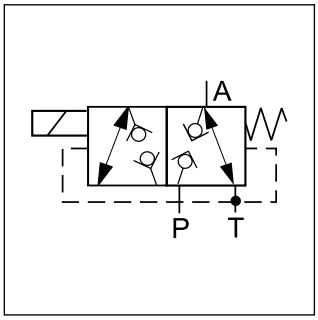
Series	Description	Direct operated					Pilot operated				Page
	DIN / ISO	06	10	16	25	32	10	16	25	32	
	Seat valves, electrically operated										
D1SE		•									2-3
	Spool valves, electrically operated										
D1VW	Standard, soft shift	•									2-7
D1VW	8 Watt solenoid	•									2-15
D1VW	Inductive position control	•									2-21
D1VW	Explosion proof (conform to ATEX)	•									2-29
D1MW	For wash down applications	•									2-35
D3W	Standard		•								2-41
D3W	Inductive position control		•								2-49
D3MW	For wash down applications		•								2-55
D31DW	Standard and position control						•				2-61
D31NW	Highest flow						•				
D41VW	Standard and position control							•			
D81/91VW	Standard and position control								•		
D111VW	Standard and position control									•	
	Spool valves, hydraulically operated										
D1VP		•									2-75
D3DP			•								
D4P				•							
D9P					•						
D11P						•					
	Spool valves, mechanically operated										
D1VL		•									2-87
D3DL			•								
D4L				•							
D9L					•						
	Accessories										
	Plugs Actuator kits O-rings and seal kits Mounting patterns										2-97

Notes

The directional valve type D1SE is equipped with a wet pin armature solenoid, drain free tapered poppet 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.



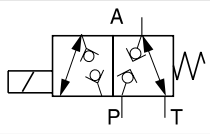
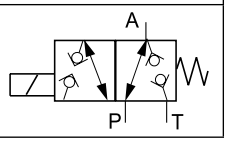
Technical data

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	[bar]	P, A, T: 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] [ms]	Energized: approx. 50 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.

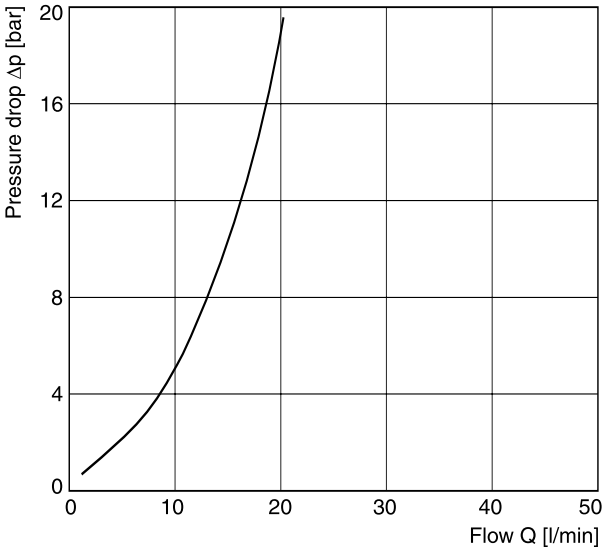
Bold letters =
Short-term availability

[1] Please order plug separately.

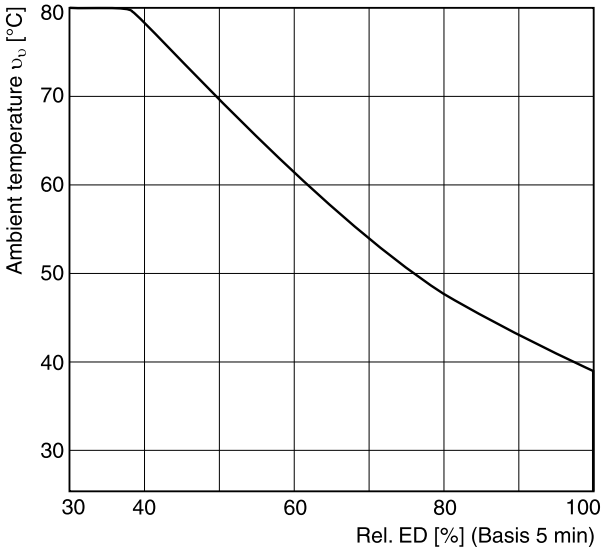
Solenoids for repair

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

Performance curve Δp-Q

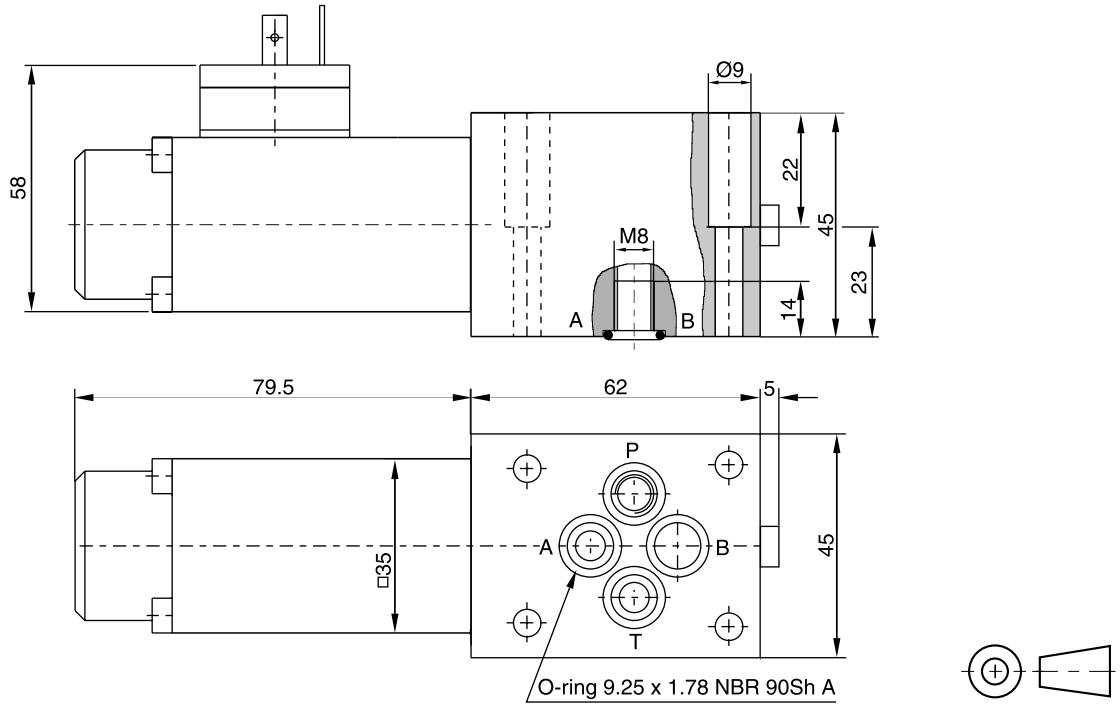


Duty cycle versus ambient temperature



All characteristic curves measured with HLP46 at 50°C.

Dimensions



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-D1SE-70** FPM: DK-D1SE-V70

Subplates and manifolds see chapter 12.

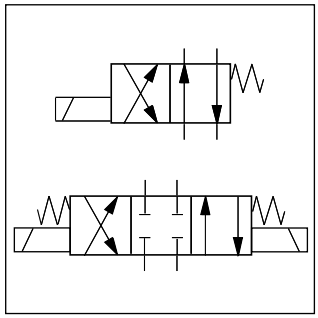
The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

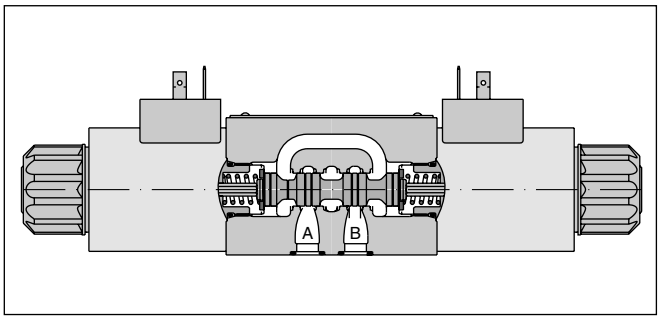
Notes

The NG06 directional control valve series D1VW provides high functional limits up to 80 l/min in combination with a very low, energy-saving pressure drop.

A wide variety of spool options allows to design an unlimited number of hydraulic circuits.

Versions with 8 watt coils, position control, Atex approval, surface protection and connector variants are shown in the following chapters.





Technical data

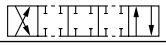
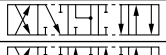
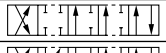
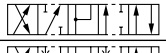
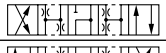
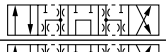
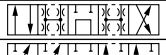
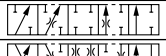
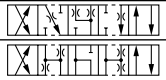
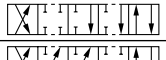
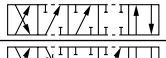
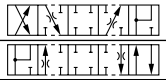
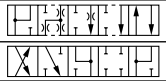
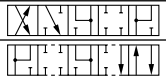
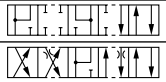
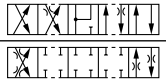
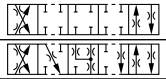
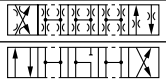
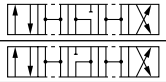
General							
Design			Directional spool valve				
Actuation			Solenoid				
Nominal size			DIN NG06 / CETOP 03 / NFPA D03				
Mounting interface			DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03				
Mounting position			unrestricted, preferably horizontal				
Ambient temperature		[°C]	-25...+50				
$MTTF_D$ value		[years]	150				
Weight		[kg]	1.5 (1 solenoid), 2.1 (2 solenoids)				
Hydraulic							
Max. operating pressure		[bar]	P, A, B: 350; T: 210 (DC), T: 140 (AC)				
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 (see shift limits)				
Leakage at 50 bar		[ml/min]	Up to 10 per flow path, depending on spool, up to 15 per flow path for spool type 008 + 009				
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 (not for soft shift)				
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 =	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]	2.72	1.29	0.33	0.15	0.6 / 0.55	0.3 / 0.27
Current consumption	in rush	[A]	2.72	1.29	0.33	0.15	2.5 / 2.4	1.25 / 1.2
Power consumption	hold		32.7 W	31 W	31.9 W	30.2 W	70 / 70 VA	70 / 70 VA
Power consumption	in rush		32.7 W	31 W	31.9 W	30.2 W	280 / 290 VA	280 / 290 VA
Solenoid connection			Connector as per EN 175301-803, solenoid identification as per ISO 9461 (code W).					
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

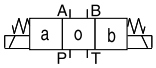
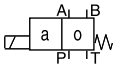
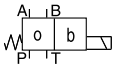
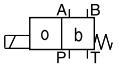
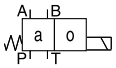
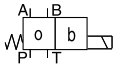
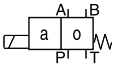
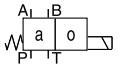
D	1	V	W			
Directional control valve	**Size DIN NG06 CETOP 03 NFPA D03**	**3-chamber valve**	**Wet pin armature solenoid, threaded in tube**	**Spool type**	**Spool position**	**Seals**

Code	Seals
N	**NBR**
V	FPM

3 position spools	
Code	Spool type a 0 b
001	
002	
003	
004	
005	
006	
007	
008 [1]	
009 [1]	
010	
011	
014	
015	
016	
021	
022	
031	
032	
034	
035	
061	
081	
082	
102	
204 [1]	
205 [1]	

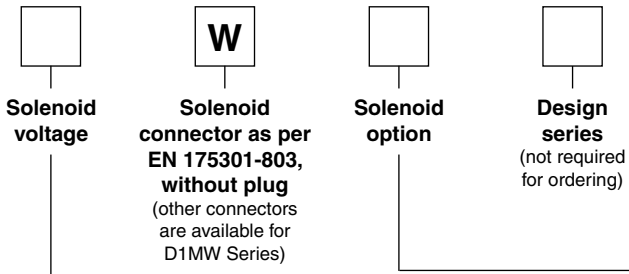
2 position spools	
Code	Spool type a b
020	
026	
030	
083 [1]	
101	
208	

[1] Consider specific spool position.

3 position spools			
Code	Spool position		
C			**3 positions.** **Spring offset in position “0“.** **Operated in position “a“ or “b“.**
	Standard	Spool type 008,009, 204, 205	
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		
	Standard	Spool type 083	
B			**2 positions.** **Spring offset in position “b“.** **Operated in position “a“.**
D			**2 positions.** **Operated in position “a“ or “b“.** **No center or offset position.**
H			**2 positions.** **Spring offset in position “a“.** **Operated in position “b“.**

Bold letters =
Short-term availability



2

Code	Solenoid option
omit	**Standard solenoid with manual override**
T	without manual override
S2 [3]	Soft shift orifice size 0.5 mm.
S3 [3]	Soft shift orifice size 0.75 mm.
4N [3]	with lockable manual override

[3] DC only

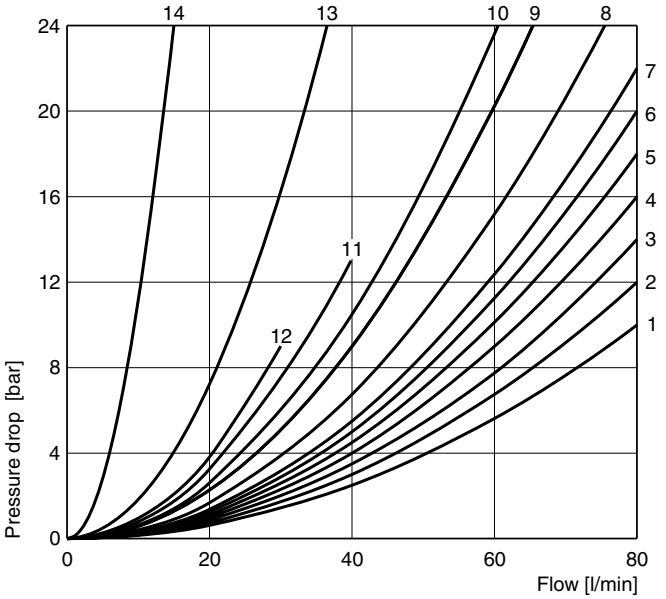
Code	Voltage
K	**12V =**
J	**24V =**
U [2]	98V =
G [2]	205V =
Y	110V 50Hz / 120V 60Hz
T	230V 50Hz / 240V 60Hz

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

Further spool types, solenoid voltages and connectors on request.

2

Flow curve



All characteristic curves measured with HLP46 at 50°C.

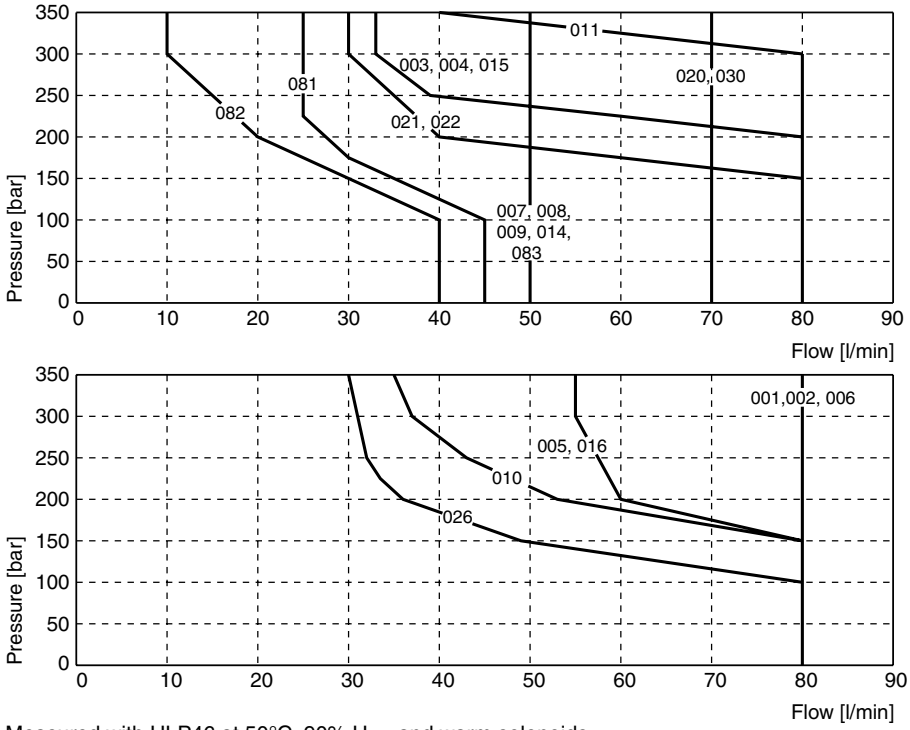
Spool	Position "b"			Position "a"			Position "0"				
	P-A	B-T	P-B	P-B	A-T	P-A	P-A	P-B	A-T	B-T	P-T
001	2	2		2	2						
002	1	4		1	4		1	1	5	5	2
003	3	4		3	6				7		
004	2	3		2	3				7	7	
005	2	2		2	2		12				
006	1	4		1	4		7	7			
007	3	2		2	2			3		2	7
010	3			3							
011	2	2		2	2				14	14	
014	3	2		2	2		3		2		7
015	3	6		3	4					7	
016	2	2		2	2			12			
020B	4	4		2	3						
026B	4			4							
030B	2	3		1	2						
034	4		8	3	3				5	7	
035	3	3		4		8			7	5	
081	13	13		13	13						
082	13	13		13	13				[1]	[1]	
101B	11	10		10	9						
102	1	4		1	4		5	5	8	8	6
61	1	3		1	3		3	2			
83H	5	2		5	2						
104	1			2	5		3		14		14
208	3			2							
	P-B	A-T		P-A	B-T		P-A	P-B	A-T	B-T	P-T
008	4	5		4	5						9
009	5	5		6	7						7
83B	5	2		5	2						
204	1	3		4	3		7		4		7
205	4	3		1	3			7		4	5

Spool	Position "b"			Position "a"		
	P-A	P-B	A-B	P-B	A-T	
021	2	4		4	2	
	P-A	B-T		P-A	P-B	A-B
022	6	2		5	2	
	2	2				
				2	2	

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

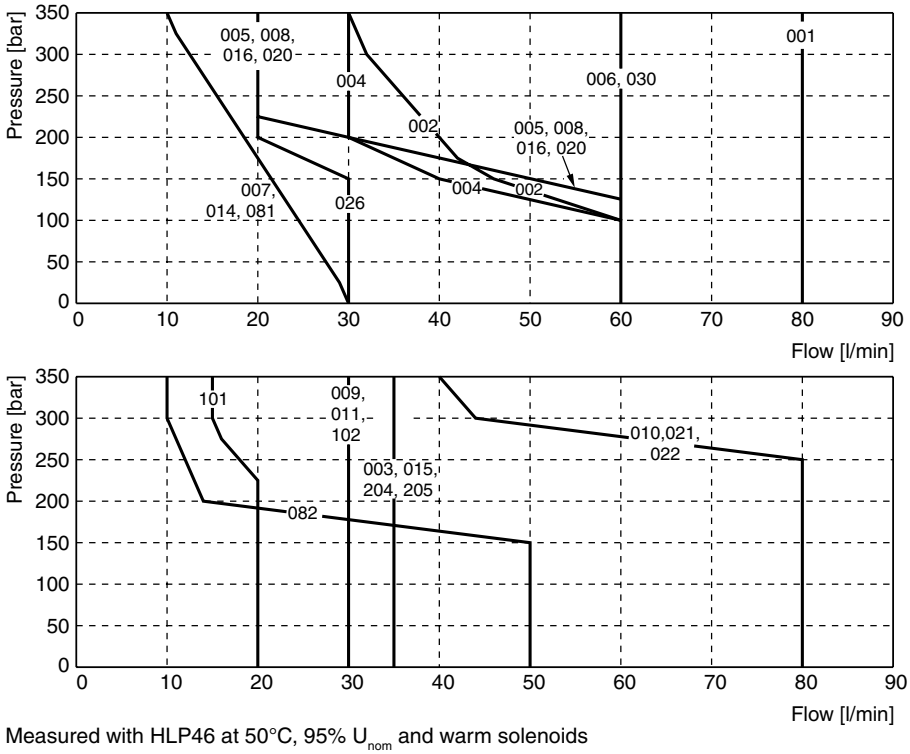
The diagram below specifies the shift limits for valves with DC solenoids. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity of 40mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

Valve with standard DC solenoid



Measured with HLP46 at 50°C, 90% U_{nom} and warm solenoids

Valve with standard AC solenoid



Measured with HLP46 at 50°C, 95% U_{nom} and warm solenoids

D1VW_UK.INDD CM_18.05.2010

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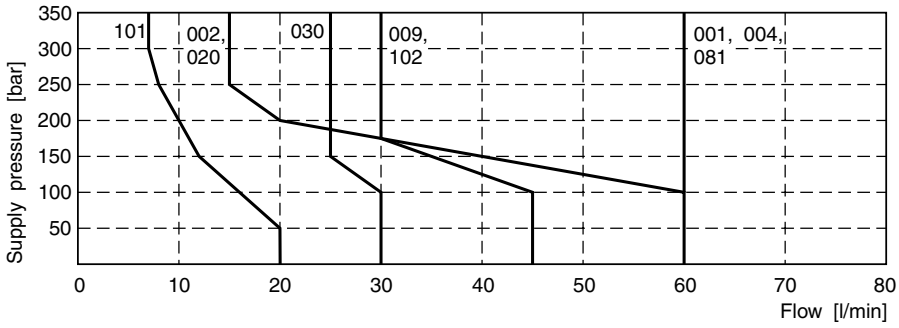
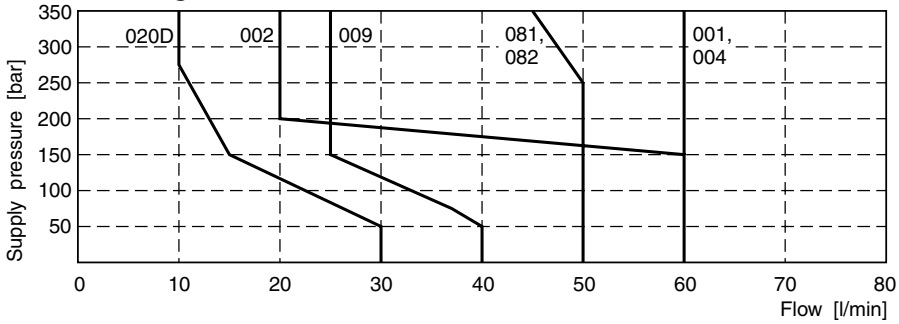
Hydraulic Controls Division
Kaarst, Germany

2

Shift limit diagram - Soft shift with 1 DC solenoid



Shift limit diagram - Soft shift with 2 DC solenoid



Measured with HLP46 at 50°C, 90% U_{nom} and warm solenoids

Response times D1VW Standard and Soft Shift

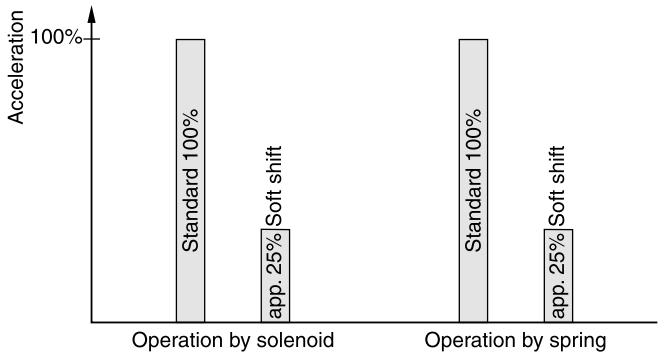
Standard solenoid		Energize	De-energize
Standard DC	w/o	45 - 60	20 - 30
Standard AC	w/o	13	20
Standard DC with rectifier plug	w/o	60 -70	70- 90

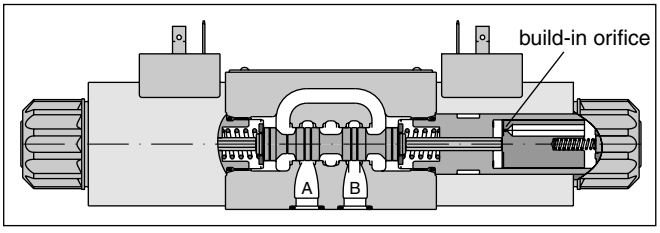
Response times Soft Shift	Orifice size	2 solenoid valve		2 solenoid valve		1 solenoid valve	
		3 positions		3 positions		2 positions	
Code		Center position: Closed		Center position: Open			
		Energize	De-energize	Energize	De-energize	Energize	De-energize
S2	0.50mm	200 - 750	310 - 650	220 - 400	350 - 750	90 - 350	160 - 500
S3	0.75mm	180 - 300	300 - 400	200 - 350	300 - 500	90 - 350	130 - 350

The lower value applies to small flow rates and low pressure, the upper value to high flow rates and high pressure

Step response times were obtained under the following conditions: HLP46 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.

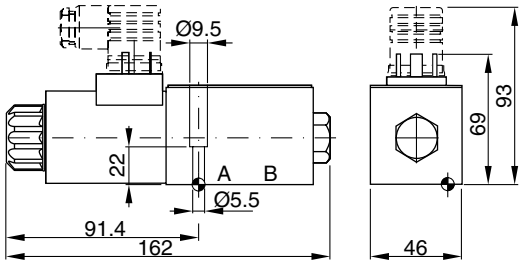
Acceleration for orifice size 0.75, code “S3” (measured against a standard valve)



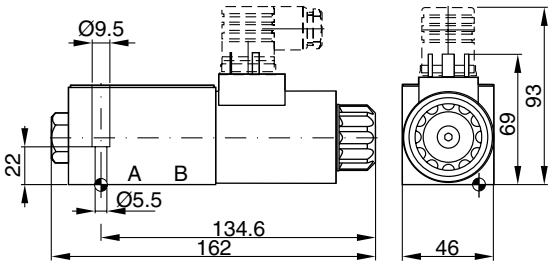


For even softer shifting, the proportional spools 081, 082, 101 and 102 can be used.

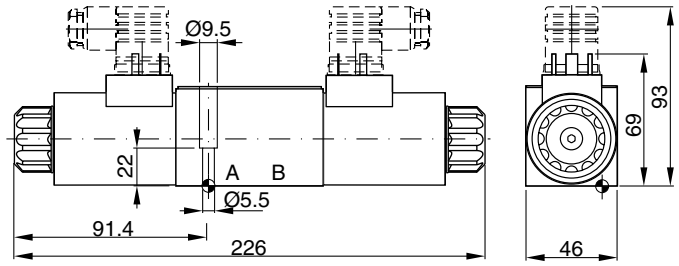
Interface EN 175301-803, DC solenoid
B, E, F -style



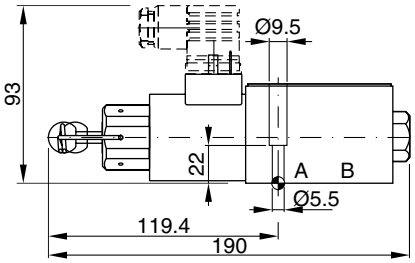
H, K, M -style



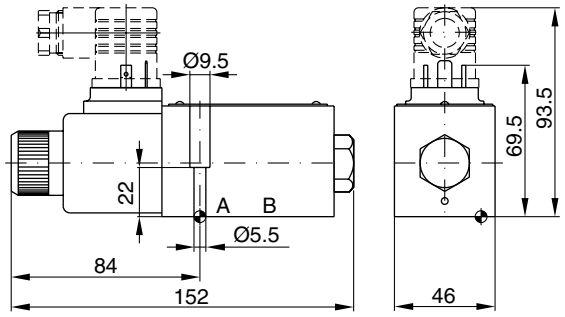
C, D -style



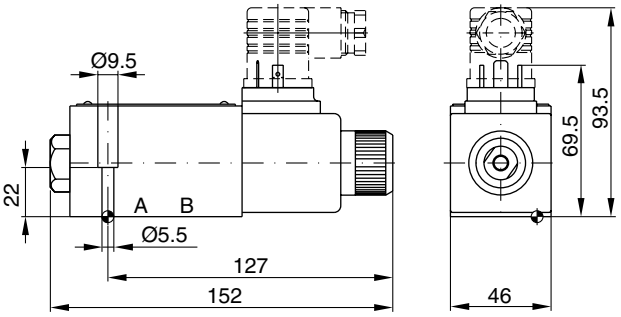
Option 4N, with lockable manual override
(available for all styles, DC only)



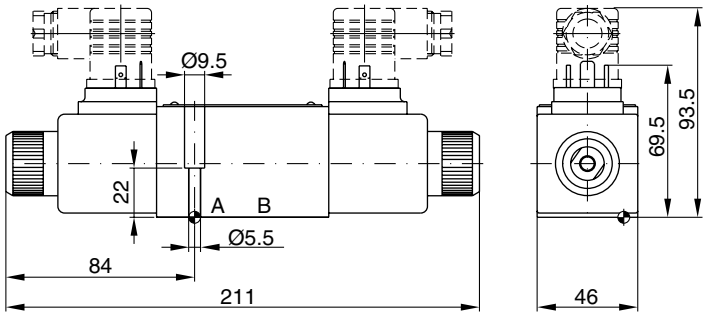
Interface EN 175301-803, AC solenoid
B, E, F -style



H, K, M -style



C, D -style



Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	NBR: SK-D1VW-N-91 FPM: SK-D1VW-V-91

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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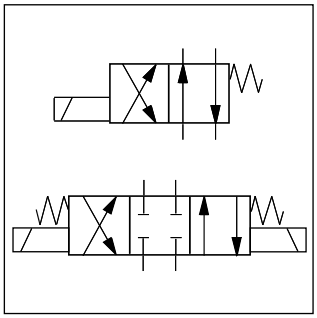
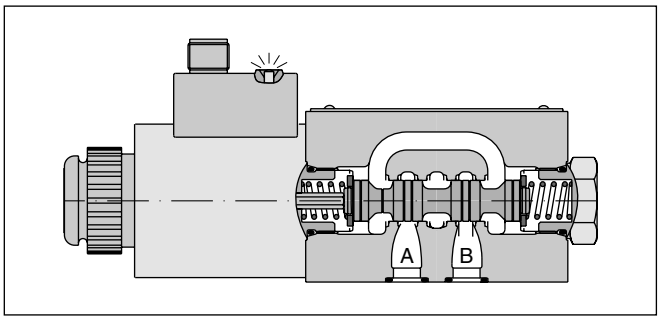
Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany

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) and M12 x 1 connection. 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.





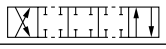
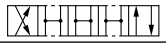
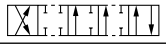
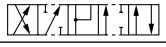
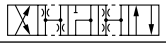
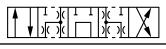
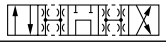
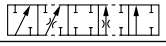
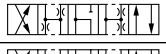
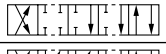
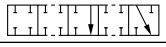
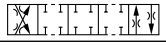
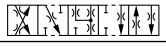
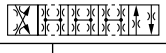
Technical data

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
$MTTF_D$ value	[years]	150
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]	60 (see shift limits)
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 acc. with EN 60529 (plugged and mounted), M12x1 IP67 (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).
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

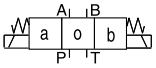
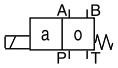
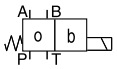
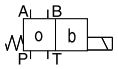
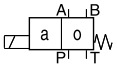
D	1	V	W			
Directional control valve	**Size DIN NG06 CETOP 03 NFPA D03**	**3-chamber valve**	**Wet pin solenoid**	**Spool type**	**Spool position**	**Seals**

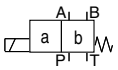
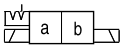
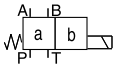
3 position spools	
Code	Spool type (a 0 b)
001	
002	
003	
004	
005	
006	
007	
008 [1]	
009 [1]	
010	
011	
014	
015	
016	
076	
078	
081	
082	
102	

2 position spools	
Code	Spool type (a b)
020	
026	
030	
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 008, 009	
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 center or offset position.**
H		**2 positions.** **Spring offset in position “a“.** **Operated in position “b“.**

[2] Only for spool 020 available.

Bold letters =
Short-term availability

J		L			
Solenoid voltage 24V=	**Connection**	**8 watt Solenoid**	**Electrical option**	**Acces-sories**	**Design series** (not required for ordering)

Code	Accessories
omit	**Standard valve (in combination with solenoid connection "D" and "W")**
5	Only in combination with solenoid connection "D" and surge diode with LED "J"

Solenoid identification acc. to ISO 9461

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

Code	Connection
D [3]	M12x1 on coil as per IEC 61076-2-101
W [3]	**Connector as per EN 175301-803, without plug**

[3] Please order plug separately.

Further spool types on request.

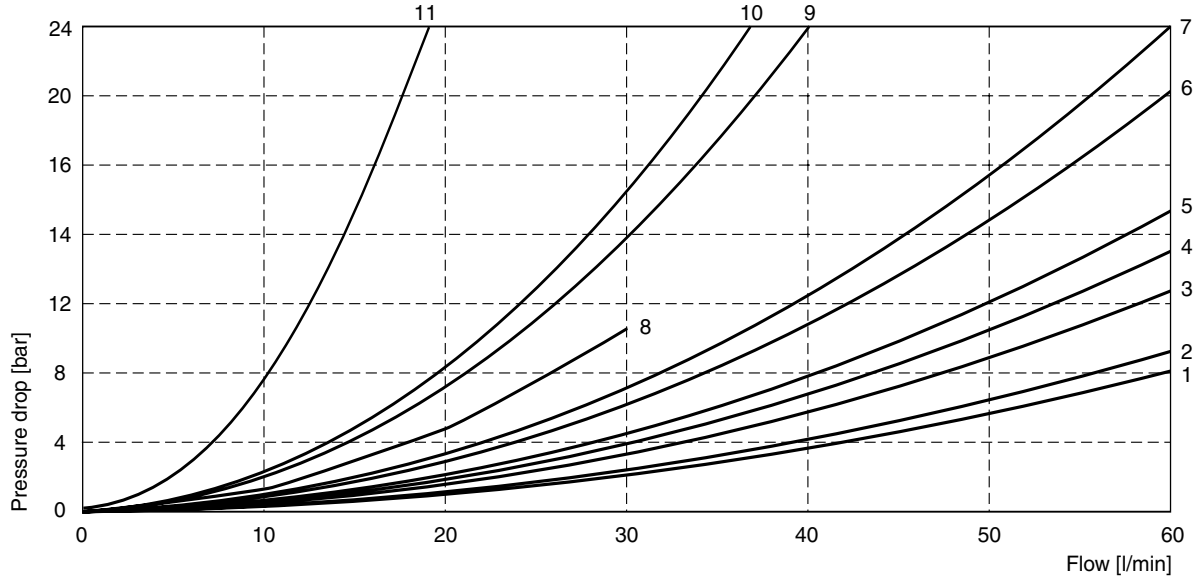
To get a DESINA valve, order the combination: JDLJ5

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.

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
001	3	3	3	3	–	–	–	–	–
002	3	4	3	4	1	1	3	3	1
003	4	4	4	5	–	–	4	–	–
004	3	4	3	4	–	–	4	4	–
005	3	3	3	3	8 (max. 30l)	–	–	–	–
006	3	4	3	4	4	4	–	–	–
007	4	3	3	3	–	2	–	1	4
010	4	–	4	–	–	–	–	–	–
011	3	3	3	3	–	–	11 (max. 25l)	11 (max. 25l)	–
014	4	3	3	3	2	–	1	–	4
015	4	5	4	4	–	–	–	4	–
016	3	3	3	3	–	8 (max. 30l)	–	–	–
020B	4	4	3	4	–	–	–	–	–
026B	4	–	4	–	–	–	–	–	–
030B	3	4	4	3	–	–	–	–	–
081	9	10	9	10	–	–	–	–	–
082	9	10	9	10	–	–	–	–	–
101B	4 (max. 40l)	7	7	6	–	–	–	–	–
102	3	4	3	4	3	3	5	5	3
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T
008	4	5	4	5	–	–	–	–	6
009	5	5	5	5	–	–	–	–	4

Flow curve diagram

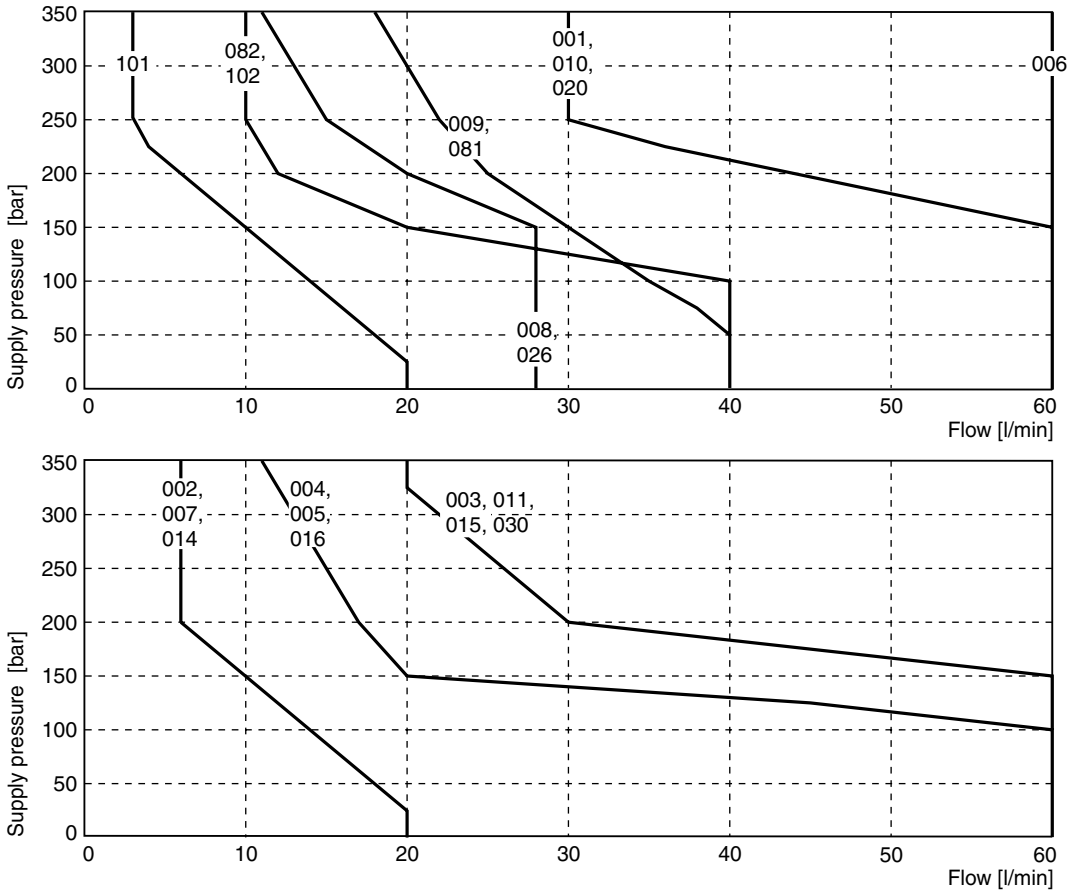


All characteristic curves measured with HLP46 at 50°C.

The diagram below specifies the shift limits. The specifications apply to balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions.

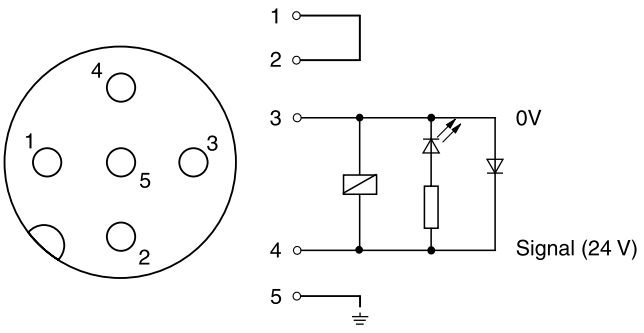
To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

Shift limit

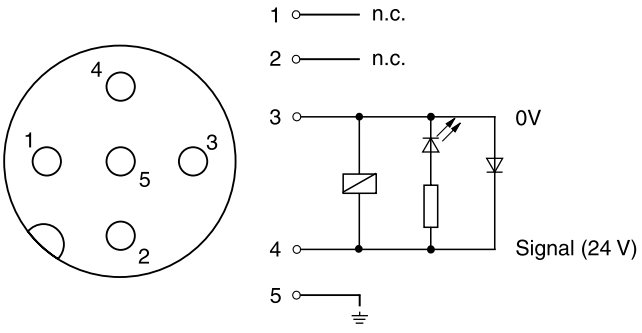


Measured with HLP46 at 50°C, 90% U_{nom} and warm solenoids

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



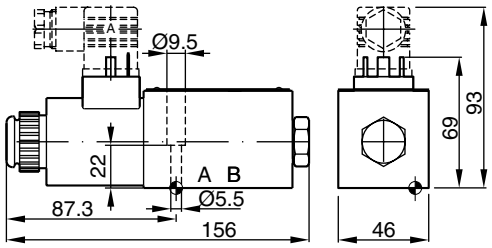
M12 pin assignment code “JDL“, Pins 1 and 2 not connected



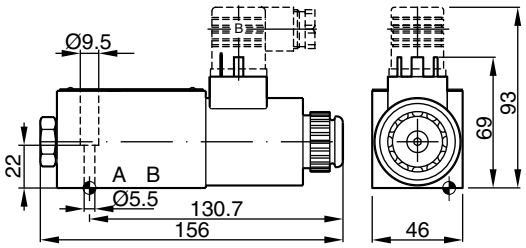
2

Interface EN 175301-803, DC solenoid, JWL

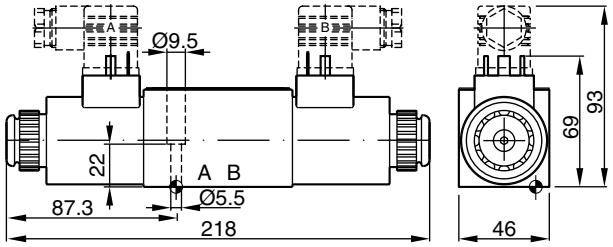
Style B, E



Style H, K

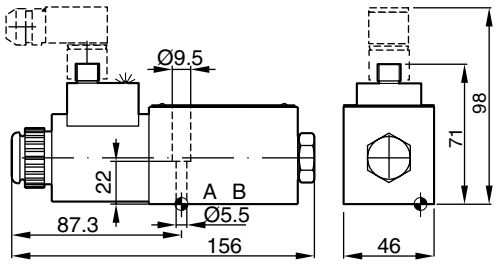


Style C, D

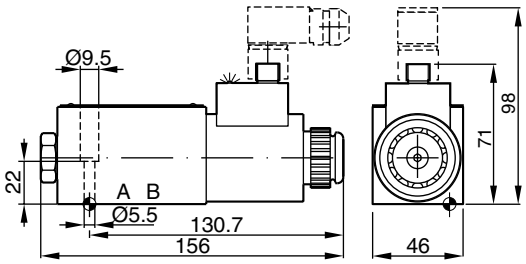


M12x1 connector, DC solenoid, JDLJ5 (DESINA) or JDL

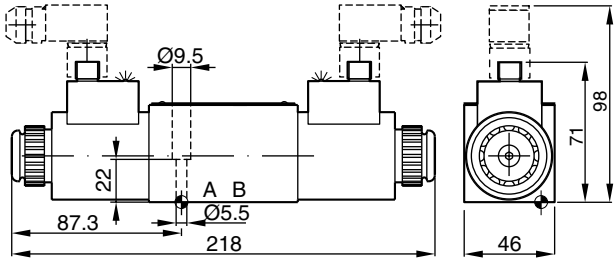
Style B, E



Style H, K



Style C, D



DESINA

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-N-91** FPM: SK-D1VW-V-91

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 valves with inductive position control are typically used in safety relevant applications. The start or end position can be monitored. The position control is available for single and double solenoid valves.

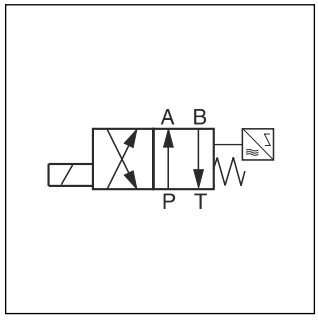
The fail-safe position of the directional valve during power failure is the spring offset or center position.

Please find detailed information on the machine directive in the position paper in chapter 1.

Attention

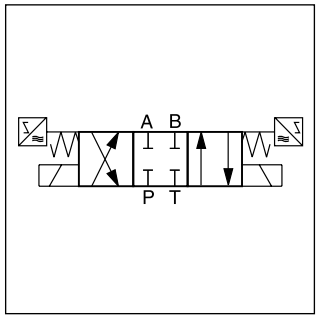
The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.

D1VW*B



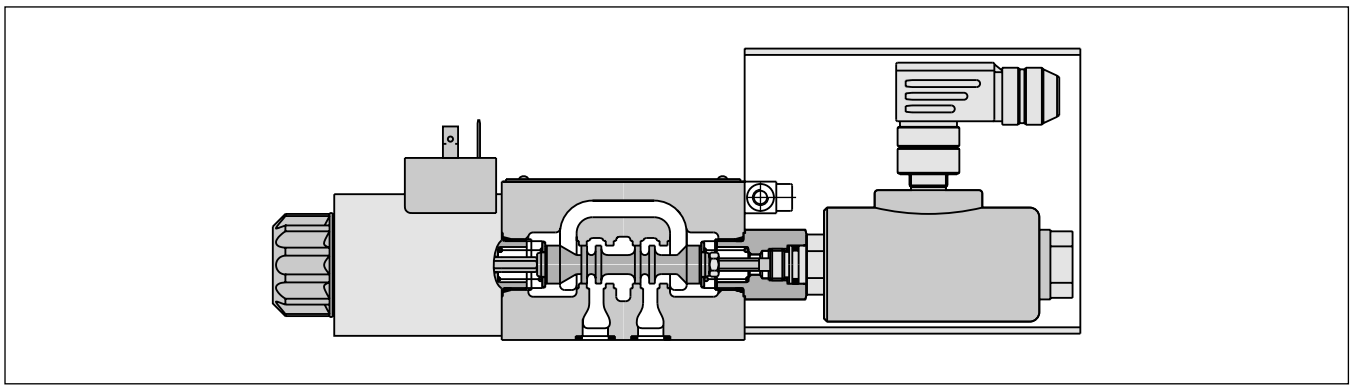
D1VW*B

D1VW*C

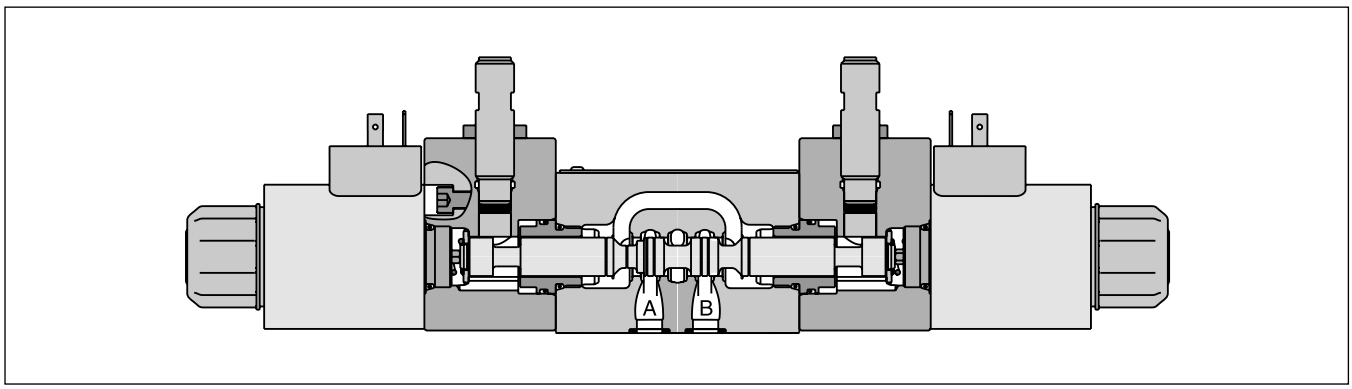


D1VW*C

D1VW*B

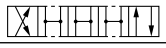
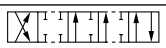
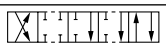
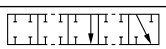


D1VW*C



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
001	
002	
003[1)2)]	
004	
005[1)]	
015[1)3)]	
016[1)]	
076[1)]	
078[1)]	

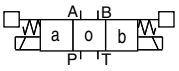
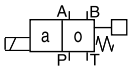
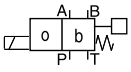
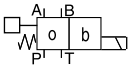
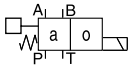
2 position spools	
Code	Spool type
	a b
020	
026	
030	

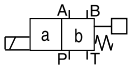
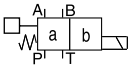
[1)] Spool types on request for spool position “C“.

[2)] Only available for spool position “E“ and “F“.

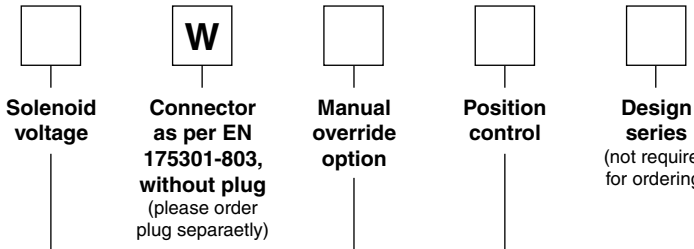
[3)] Only available for spool position “K“ and “M“.

Code	Seals
N	**NBR**
V	FPM

3 position spools		
Code	Spool position	
C		**3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.**
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



Code	Spool position	Position control
I2N	E, F, B (Solenoid on a-side)	End position monitored side B
I5N[4)]		**Start position monitored side B**
I1N	K, M, H (Solenoid on b-side)	End position monitored side A
I4N[4)]		**Start position monitored side A**
I3N	C	End positions
I6N[4)]	C	Start positions

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 "I4N", "I5N" or "I6N" (start position monitored) are required.

Code	Voltage
K	12V=
J	**24V=**
U[5)]	98V=
G[5)]	205V=

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

Further spool types and voltages on request.

2

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			
$MTTF_D$ value	[years]	150			
Weight	[kg]	1.8 (1 solenoid) / 3.8 (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 (see shift limits)			
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]	2.72	1.29	0.33	0.15
Power consumption	[W]	32.7	31	31.9	30.2
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			

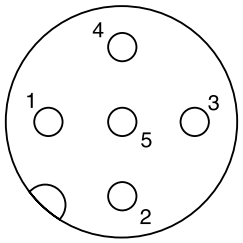
With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

Single solenoid valves

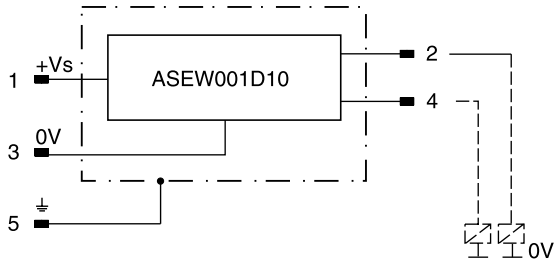
Electrical characteristics of position control as per IEC 61076-2-101 (M12x1)

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	[mA]	≤ 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 closed B
3 0V
4 Normally open A
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.

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

End position monitored:

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

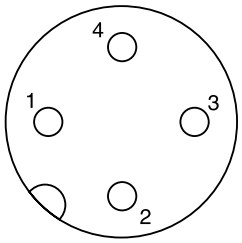
2

Double solenoid valves

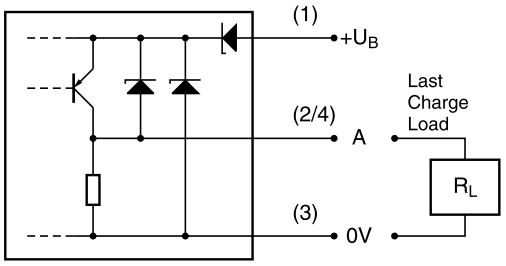
Electrical characteristics of position control as per IEC 61076-2-101 (M12x1)

Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
Ambient temperature	[°C]	0...+50
Supply voltage / ripple	[V]	10...30 / ±10%
Current consumption without load	[mA]	≤ 10
Max. output current per channel, ohmic	[mA]	200
Min. output load per channel, ohmic	[kOhm]	100
Max. output drop at 0.2A	[V]	≤ 2
EMC		EN61000-6-4 / EN61000-6-2
Min. distance to next AC solenoid	[m]	>0.1
Interface		M12x1
Wiring min.	[mm²]	3 x 0.14 brad shield recommended
Wiring length max.	[m]	50 recommended

M12 pin assignment



1 + Supply 10...30V
2 Out A: Normally open
3 0V
4 Out A: Normally open



Definitions

Start position monitored:

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

End position monitored:

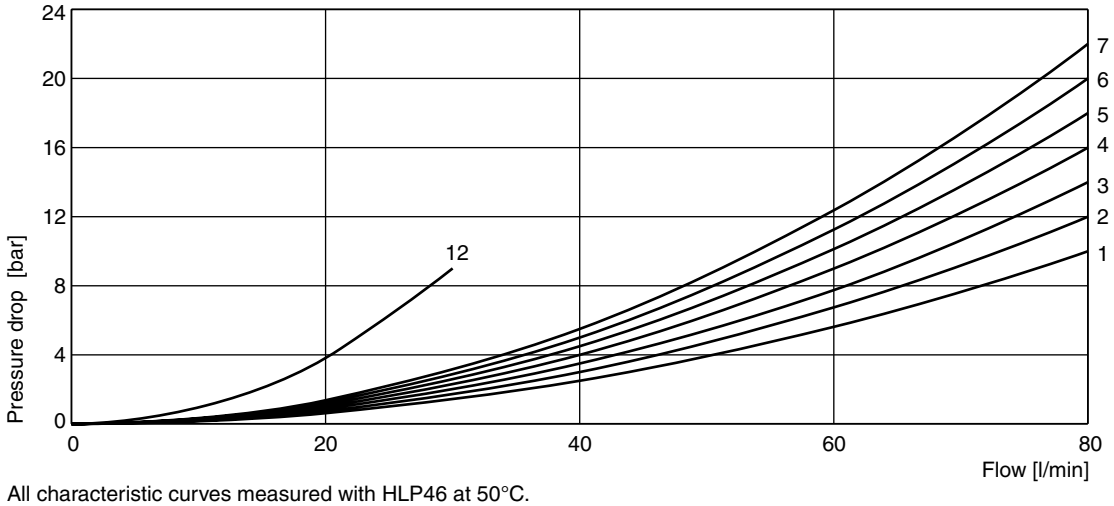
The inductive switch gives a signal before the end position is reached (above 85% spool stroke).

Please order plug M12 x 1 separately. Straight plug recommended – no defined position possible for angled plug.

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
001	2	2	2	2	–	–	–	–	–
002	1	4	1	4	1	1	5	5	2
003	3	4	3	6	–	–	7	–	–
004	2	3	2	3	–	–	7	7	–
005	2	2	2	2	12	–	–	–	–
015	3	6	3	4	–	–	–	7	–
016	2	2	2	2	–	12	–	–	–
020 B	4	4	2	3	–	–	–	–	–
026 B	4	–	4	–	–	–	–	–	–
030 B	2	3	1	2	–	–	–	–	–

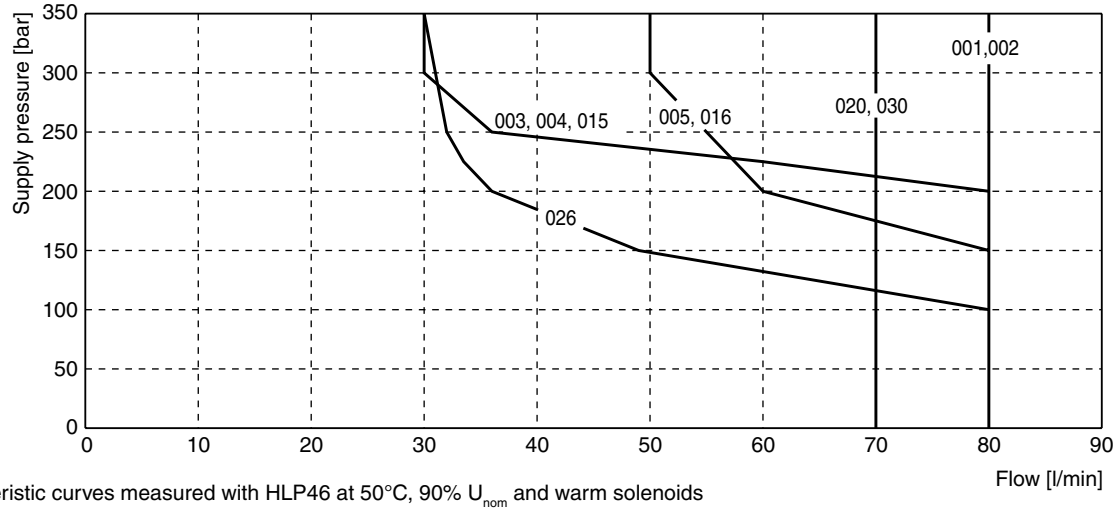
Flow curve diagram



All characteristic curves measured with HLP46 at 50°C.

Shift limit diagram

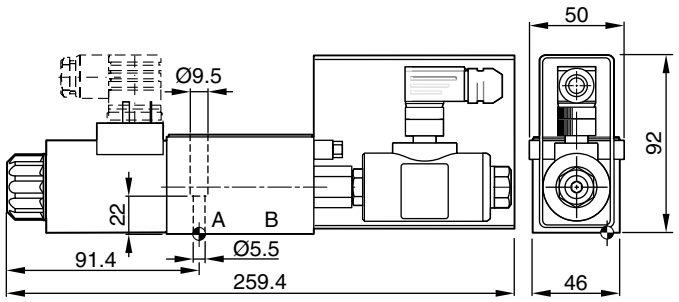
The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits,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



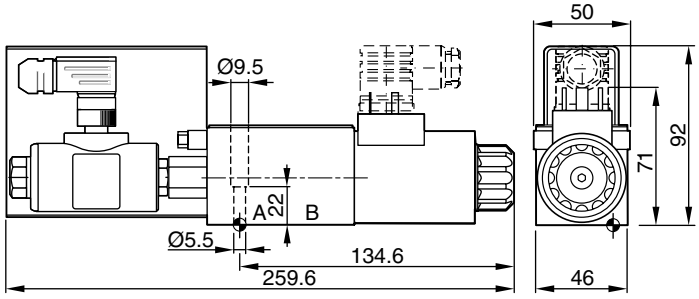
All characteristic curves measured with HLP46 at 50°C, 90% U_{nom} and warm solenoids

2

Interface EN 175301-803, DC solenoid, with plug M12x1[1)]
B, E, F -style

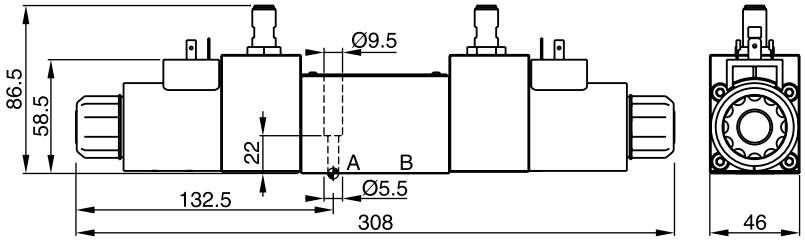


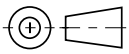
H, K, M -style



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

Interface EN 175301-803, DC solenoid, without plug M12x1[2)]
C -style





[2)] Please order plug M12 x 1 separately. Straight plug recommended – no defined position possible for angled plug.

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-N-91** FPM: SK-D1VW-V-91

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 with explosion proof solenoids is based on the standard D1VW series. The specific solenoid design allows the useage in hazardous environments.

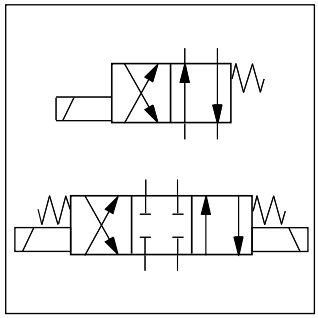
The explosion proof class is

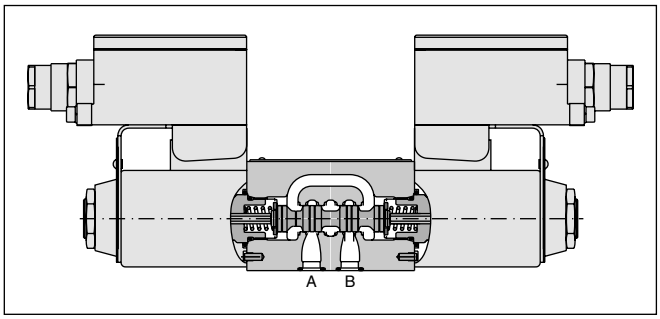
CE Ex II 2 G
Ex mbe II T4

for use in zone 1 (conform to ATEX).

All explosion proof solenoids are DC design. The valves for AC operate with integrated rectifier.

Other ATEX conform valves on request.





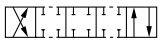
Technical data

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		
$MTTF_D$	[years]	150		
Weight	[kg]	1.8 (1 solenoid), 2.7 (2 solenoids)		
Hydraulic				
Max. operating pressure	[bar]	P, A B: 350 T: 140		
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]	60 (see shift limits)		
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), 40 (AC) De-energized: 40 (DC), 75 (AC)		
Electrical characteristics				
Duty ratio		100% ED; CAUTION: coil temperature up to 135 °C possible		
Max. switching frequency	[1/h]	15000 (DC), 7200 (AC)		
Protection class		CE Ex II 2 G , Ex mbe II T4, IP66		
	Code	J	P	N
Supply voltage / ripple	[V]	24 V =	110/50Hz / 120/60Hz	230/50Hz / 240/60Hz
Tolerance supply voltage	[%]	-10	-5	-5
Current consumption	[A]	1.25	0.31	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 Ex mbe II**	**Design series** (not required for ordering)

3 position spools	
Code	Spool type a 0 b
001	
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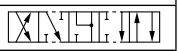
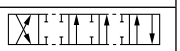
003	
004	
005	
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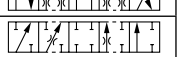
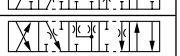
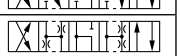
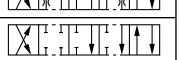
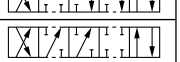
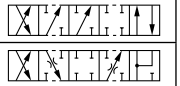
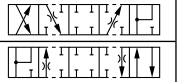
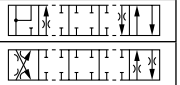
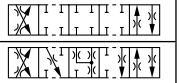
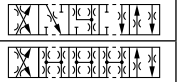
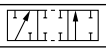
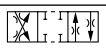
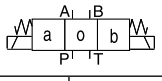
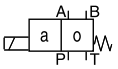
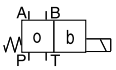
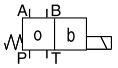
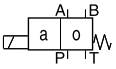
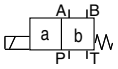
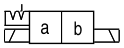
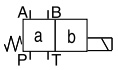
007	
008 [1]	
009 [1]	
010	
011	
014	
015	
016	
021	
022	
081	
082	
102	

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

[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 008, 009
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 positions. Operated in position “a“ or “b“. No center or offset position.
H		2 positions. Spring offset in position “a“. Operated in position “b“.

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

Code	Seals
N	NBR
V	FPM

Further spool types, styles,
and combinations on request.

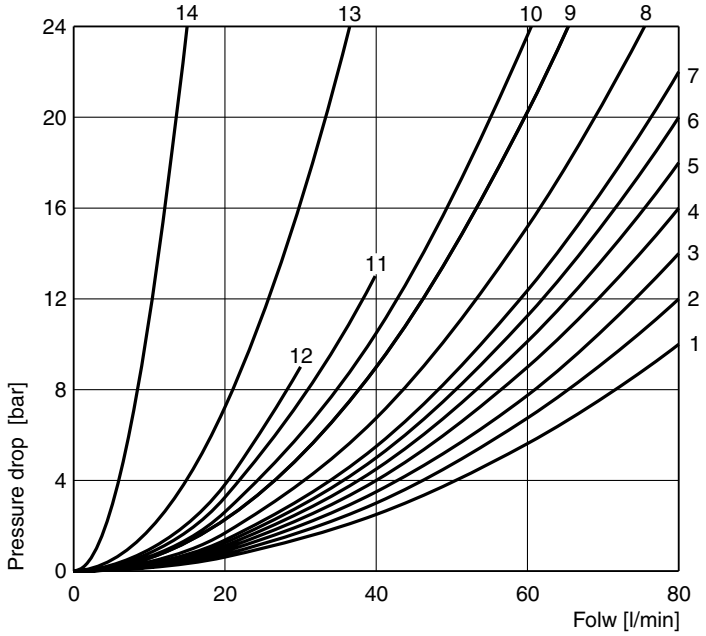
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

Spool	Position "b"			Position "a"			Position "0"				
	P-A	B-T	P-B	P-B	A-T	P-A	P-A	P-B	A-T	B-T	P-T
001	2	2		2	2						
002	1	4		1	4		1	1	5	5	2
003	3	4		3	6				7		
004	2	3		2	3				7	7	
005	2	2		2	2		12				
006	1	4		1	4		7	7			
007	3	2		2	2			3		2	7
010	3			3							
011	2	2		2	2				14	14	
014	3	2		2	2		3		2		7
015	3	6		3	4					7	
016	2	2		2	2			12			
020B	4	4		2	3						
026B	4			4							
030B	2	3		1	2						
081	13	13		13	13						
082	13	13		13	13				[1]	[1]	
101B	11	10		10	9						
102	1	4		1	4		5	5	8	8	6
	P-B	A-T		P-A	B-T		P-A	P-B	A-T	B-T	P-T
008	4	5		4	5						9
009	5	5		6	7						7

Spool	Position "b"			Position "a"		
	P-A	P-B	A-B	P-B	A-T	
021	2	4		4	2	
	P-A	B-T		P-A	P-B	A-B
022	6	2		5	2	

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

Flow curve diagram

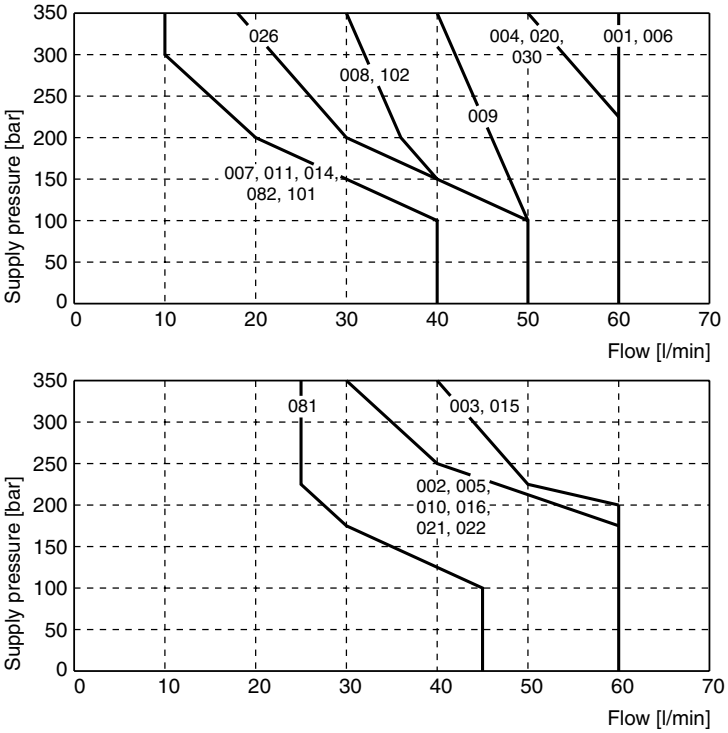


All characteristic curves measured with HLP46 at 50°C.

The diagram below specifies the shift limits for valves with AC and DC solenoids. The specifications apply to 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.

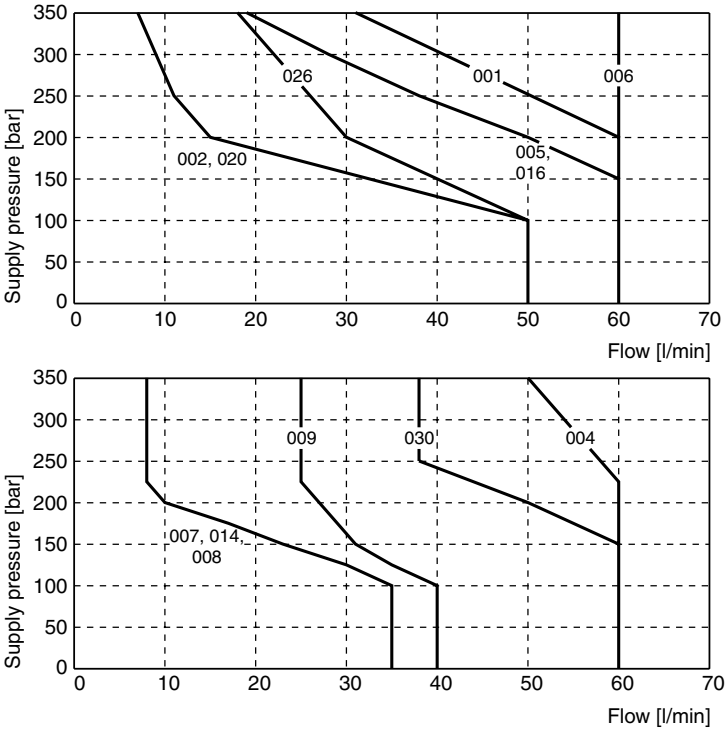
2

Shift limit diagram with DC solenoid



Measured with HLP46 at 50°C, 90% U_{nom} and warm solenoids

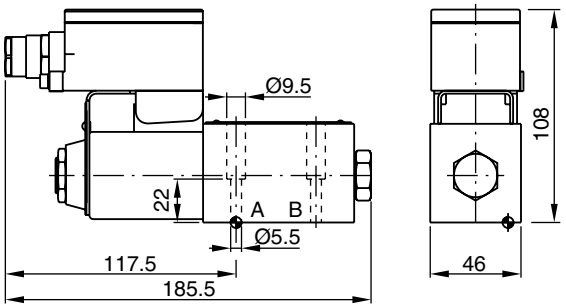
Shift limit diagram with AC solenoid



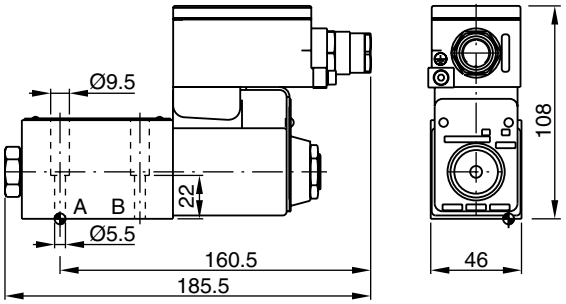
Measured with HLP46 at 50°C, 95% U_{nom} and warm solenoids

Dimensions

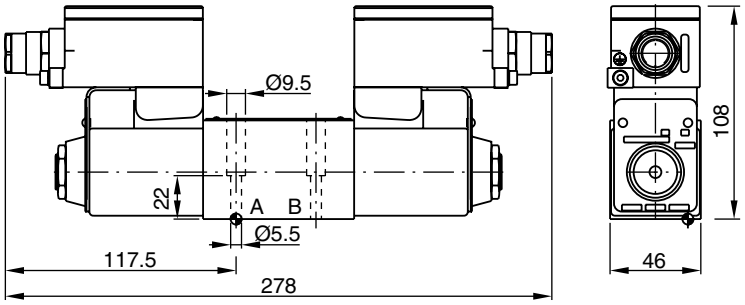
B, E -style



H, K -style



C, D -style



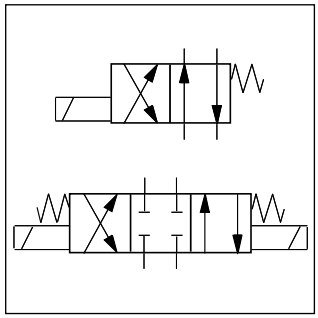
Surface finish	Kit			Kit NBR
$\sqrt{R_{max}6.3}$ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VW-N-91** FPM: SK-D1VW-V-91

Notes

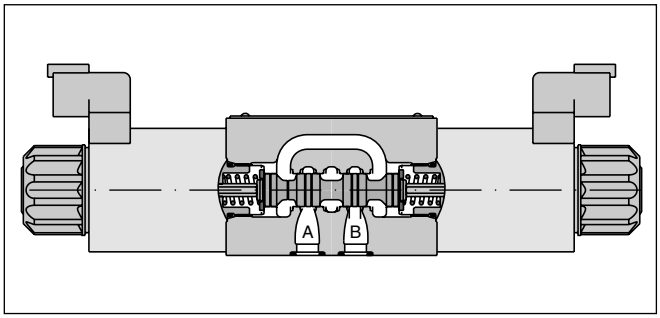
The D1MW is based on the D1VW series of directional control valves size NG06, but offers additional corrosion protection of the valve body, the solenoid coil and the anchor tube as well as the typical solenoid connections for the mobile market such as AMP Junior Timer and DT04-2P “Deutsch”.

Technical features

- High corrosion protection (optional)
- Solenoid connection:
  - Standard (as per EN175301-803)
  - AMP Junior Timer
  - DT04-2P “Deutsch”
- Robust design for rough applications
- Extended manual override with rubber cover (optional)



With AMP Junior Timer



Connector DT04-2P “Deutsch”

Technical data

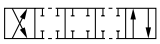
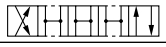
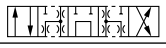
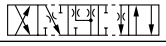
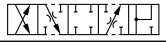
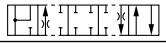
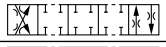
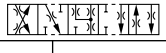
General			
Design		Directional spool valve	
Actuation		Solenoid	
Size		DIN NG06 / CETOP 03 / NFPA D03	
Mounting interface		DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03	
Mounting position		Unrestricted, preferably horizontal	
Ambient temperature	[°C]	-25...+50	
$MTTF_D$ value	[years]	150	
Weight	[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 (see shift limits)	
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		Standard (as per EN175301-803) IP65 in acc. with EN60529 (plugged and mounted) AMP Junior Timer IP67 in acc. with EN60529 (plugged and mounted) DT04-2P “Deutsch” IP69K (plugged and mounted)	
	Code	K	J
Supply voltage	[V]	12 V =	24 V =
Tolerance supply voltage	[%]	±10	±10
Current consumption hold	[A]	2.72	1.29
Power consumption hold	[W]	32.7	31
Solenoid connection		Connector as per EN 175301-803 (code W), AMP Junior Timer (code A), DT04-2P “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.

2

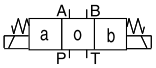
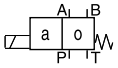
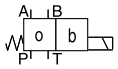
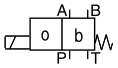
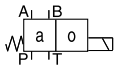
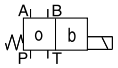
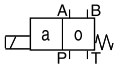
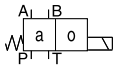
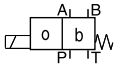
D	1	M	W			
Directional control valve	**Size DIN NG06 CETOP 03 NFPA D03**	**3-chamber valve for mobile and marine applications**	**Wet pin armature solenoid, threaded in tube**	**Spool type**	**Spool position**	**Seals**

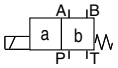
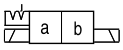
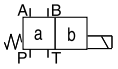
Code	Seals
N	**NBR**
V	FPM

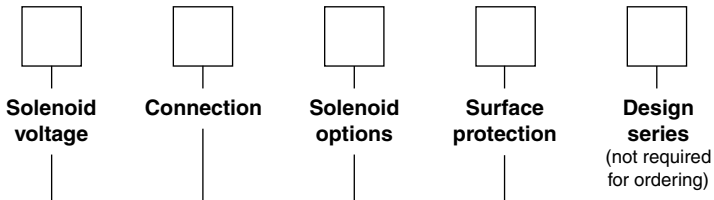
3 position spools	
Code	Spool type a 0 b
001	
002	
004	
006	
008 [1]	
011	
021	
022	
081	
082	

2 position spools	
Code	Spool type a b
020	
030	

[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 008	
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 center or offset position.
H		2 positions. Spring offset in position “a“. Operated in position “b“.



Code	Surface protection
omit	Standard, only for connection “J“ and “A“
1P [3]	Anti corrosion coating acc. to DIN 50021SS for extreme conditions. For all connection options

[3] Only in combination with connection “J” and “W”

Code	Solenoid option
omit	Standard solenoid
T	without manual override
W	extended manual override with rubber cover

Code	Connection
W [2]	Connector as per EN 175301-803
J [2]	Connector DT04-2P “Deutsch“
A [2]	2-pin AMP Junior Timer

[2] Please order plug separately.

Code	Solenoid voltage
K	12V =
J	24V =

Other spool types on request.

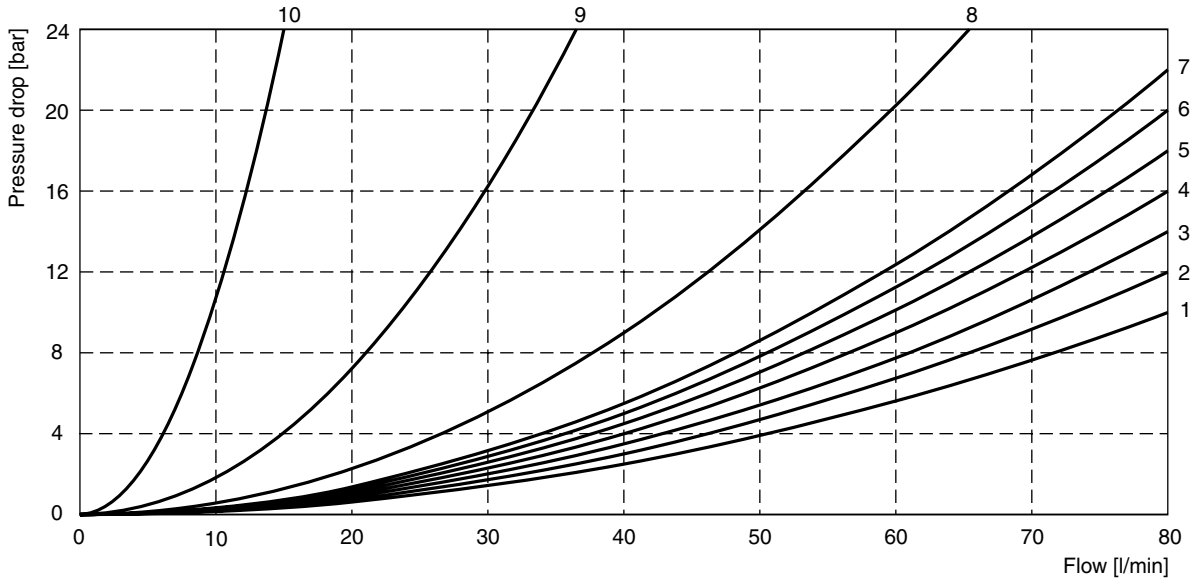
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

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
001	2	2	2	2	–	–	–	–	–
002	1	4	1	4	1	1	5	5	2
004	2	3	2	3	–	–	7	7	–
006	1	4	1	4	7	7	–	–	–
011	2	2	2	2	–	–	10	10	–
020B	4	4	2	3	–	–	–	–	–
030B	2	3	1	2	–	–	–	–	–
081	9	9	9	9	–	–	–	–	–
082	9	9	9	9	–	–	[1]	[1]	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T
008	4	5	4	5	–	–			8
	Position „b“			**Position „a“**					
	P ->A	P->B	A->B	P->B	A->T				
021	2	4	–	4	2	–			
	P ->A	B->T		P ->A	P->B	A->B			
022	6	2		5	2	–			

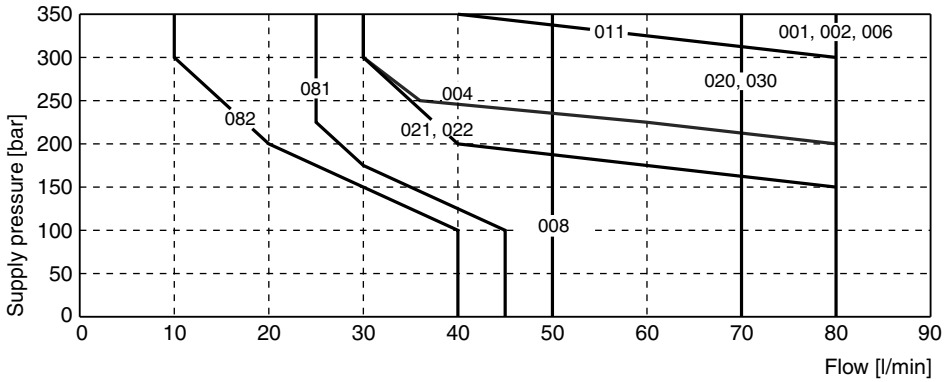
[1] Only for pressure compensation, no higher flow possible.

Flow curve diagram



All characteristic curves measured with HLP46 at 50°C.

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 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.

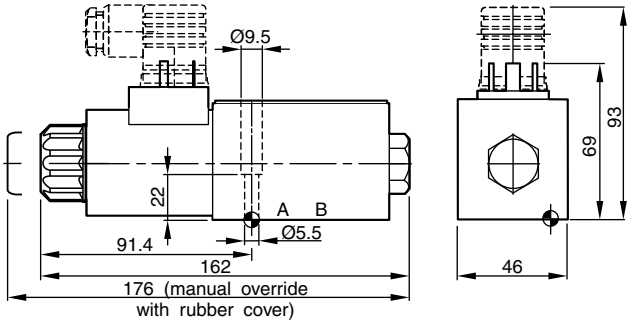


Measured with HLP46 at 50°C, 90% U_{nom} and warm solenoids

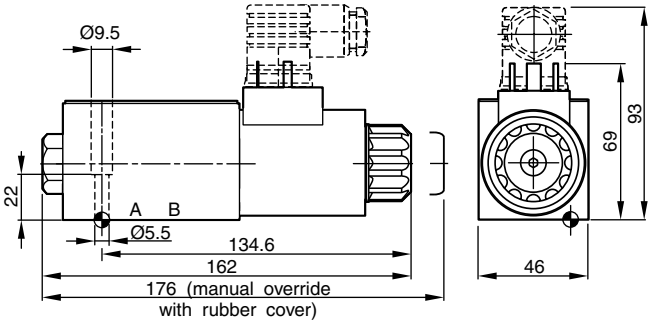
2

Dimensions with EN 175301-803 Connector

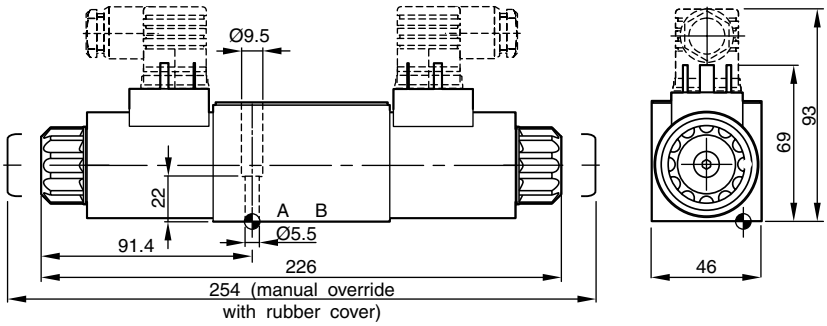
B, E, F -style



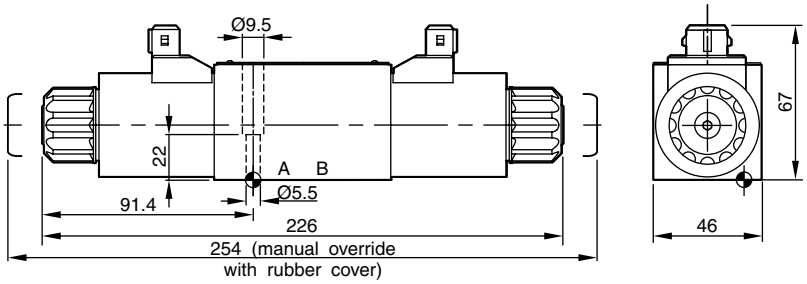
H, K, M -style



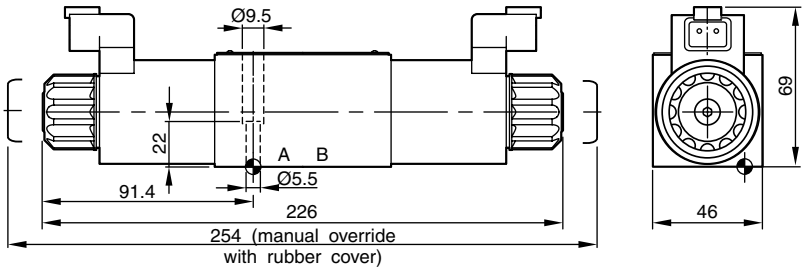
C and D -style



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



Dimensions with "Deutsch" DT04-2P Connector (only C and D -style shown)



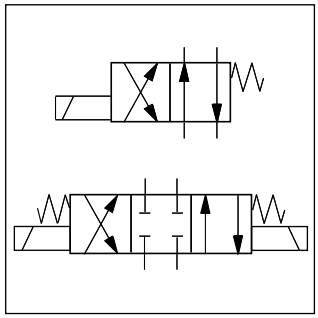
Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VW-N-91** FPM: SK-D1VW-V-91

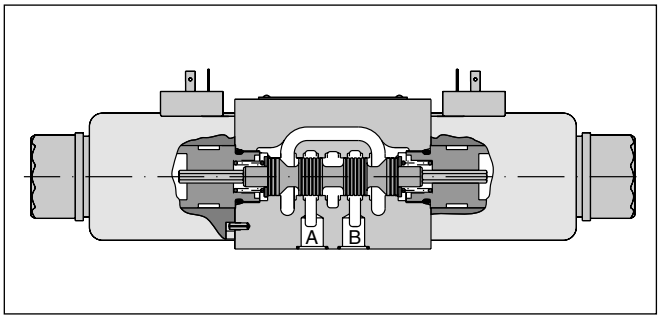
The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

The new NG10 direct operated directional control valve series D3W provides high functional limits up to 150 l/min in combination with a low, energy saving pressure drop.

The wide variety of options includes soft shift anchor tubes for smooth operation.

Versions with position control, additional surface protection and connector variants are shown in the following chapters.





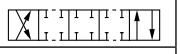
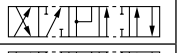
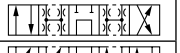
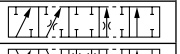
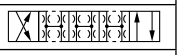
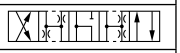
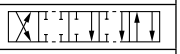
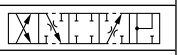
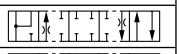
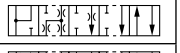
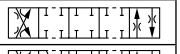
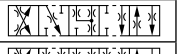
Technical data

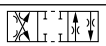
General							
Design		Directional spool valve					
Actuation		Solenoid					
Size		DIN NG10 / CETOP 05 / NFPA D05					
Mounting interface		DIN 24340 A10 / ISO 4401 / CETOP RP 121-H / NFPA D05					
Mounting position		unrestricted, preferably horizontal					
Ambient temperature	[°C]	-25...+50					
$MTTF_D$ value	[years]	150					
Weight	[kg]	4.8 (1 solenoid), 6.3 (2 solenoids)					
Hydraulic							
Max. operating pressure	[bar]	P, A B: 350; T: 210 (DC), 105 (AC)					
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) (see shift limits)					
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	0.35	0.18	0.8 / 0.72	0.4 / 0.36
Current consumption in rush	[A]	3	1.5	0.35	0.18	3.41 / 3.31	1.75 / 1.7
Power consumption hold	[W]	36	36	34	36	88 / 86	88 / 86
Power consumption in rush	[W]	36	36	34	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

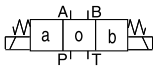
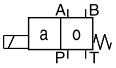
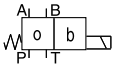
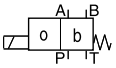
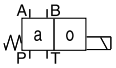
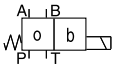
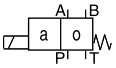
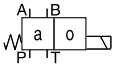
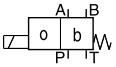
D	3	W			
Directional control valve	**Size DIN NG10 CETOP 05 NFPA D05**	**Wet pin solenoid**	**Spool type**	**Spool position**	**Seals**

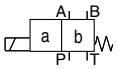
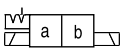
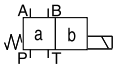
3 position spools	
Code	Spool type
	a 0 b
001	
002	
003	
004	
005	
006	
007	
008	
009	
010 [1]	
011	
012	
014	
015	
016	
021 [1]	
022 [1]	
031 [1]	
032 [1]	
081 [1]	
082 [1]	
102 [1]	

2 position spools	
Code	Spool type
	a b
020	
026	
030	
101 [1]	

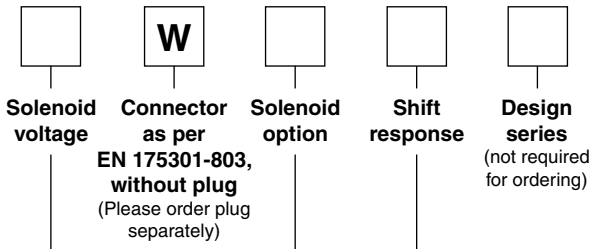
[1] Only available for DC voltage.

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 008 and 009	
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 center or offset position.**
H		**2 positions.** **Spring offset in position “a“.** **Operated in position “b“.**

Bold letters =
Short-term availability



Code	Shift response
omit	Standard response
S4 [3]	orifice diameter 1.0 mm
S7 [3]	orifice diameter 1.75 mm

[3] DC only

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

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

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

Further spool types and solenoid voltages on request.

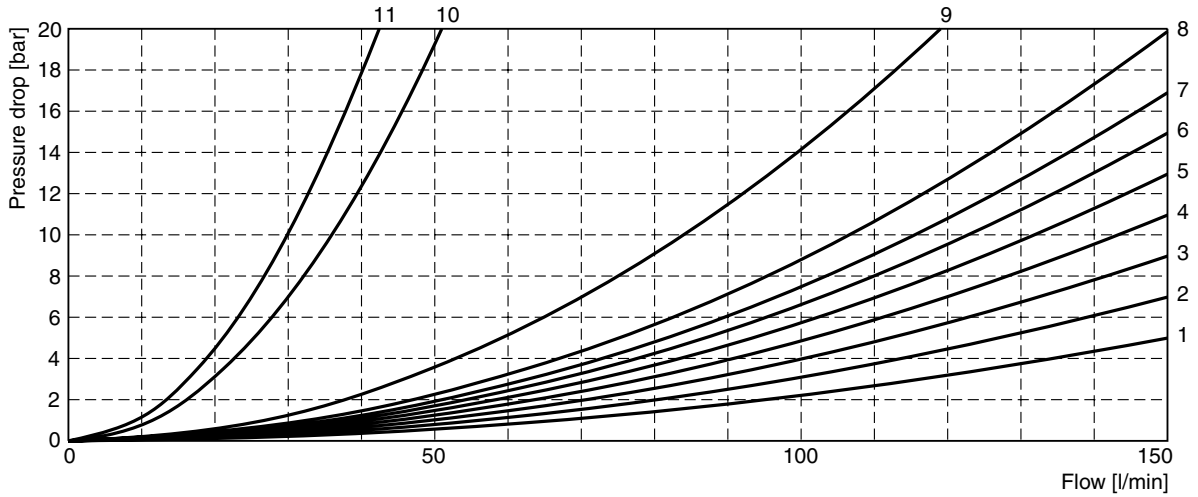
2

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					
	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
001	6	5	6	6	–	–	–	–	–	–
002	3	5	3	3	1	1	4	5	1	6
003	2	2	3	1	–	–	3	–	–	–
004	5	4	4	4	–	–	8	8	–	9
005	2	2	2	2	3	–	–	–	–	–
006	1	2	1	3	2	2	–	–	–	3
007	2	1	2	2	–	1	–	2	3	–
010	2	–	2	–	–	–	–	–	–	–
011	2	2	2	2	–	–	11	11	–	11
012	1	2	2	2	10	10	10	10	11	11
014	1	2	2	2	1	–	2	–	3	–
015	2	1	2	2	–	–	–	3	–	–
016	2	2	1	2	–	2	–	–	–	–
020	6	6	5	7	–	–	–	–	–	–
026	5	–	5	–	–	–	–	–	–	–
030	4	5	3	5	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A->B
008	8	7	7	6	–	–	–	–	9	–
009	4	4	5	8	–	–	–	–	9	–

	Position b			Position a		
	P->A	P->B	A->B	P->B	A->T	
021	2	4	8	3	2	
	P->A	B->T		P->A	P->B	A->B
022	3	2		3	2	8

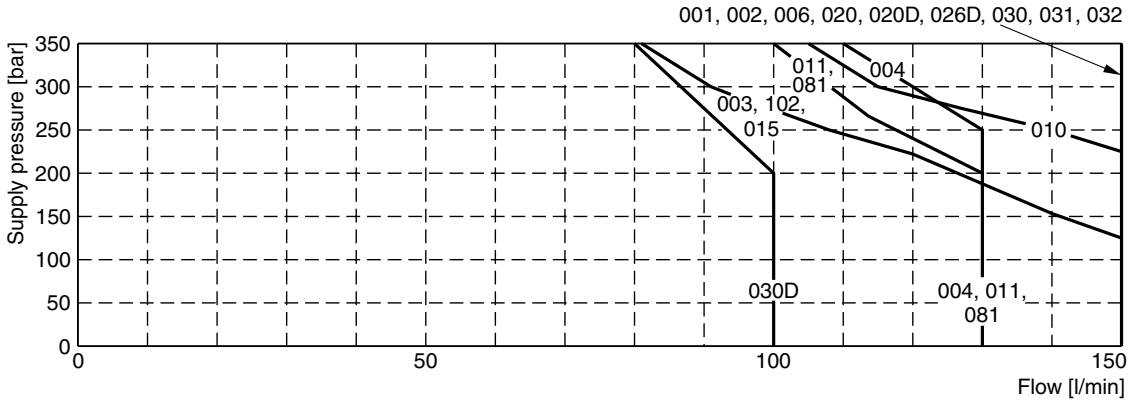
Flow curve diagram

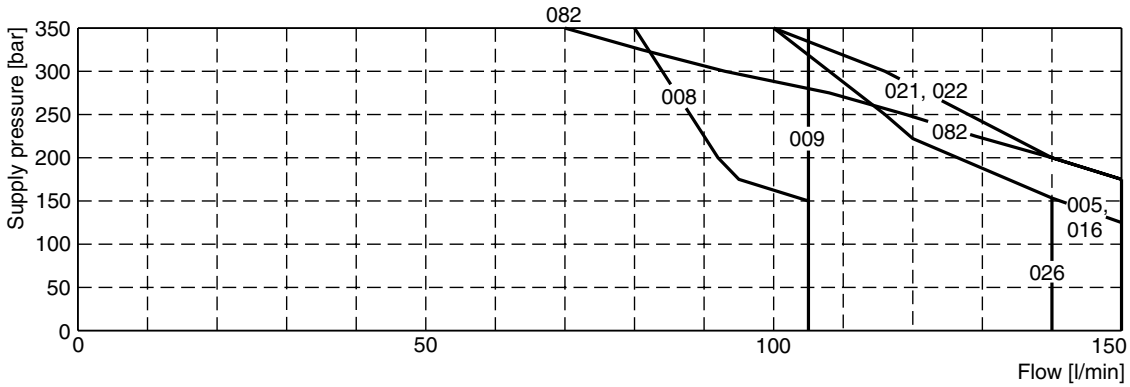


All characteristic curves measured with HLP46 at 50°C.

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 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.

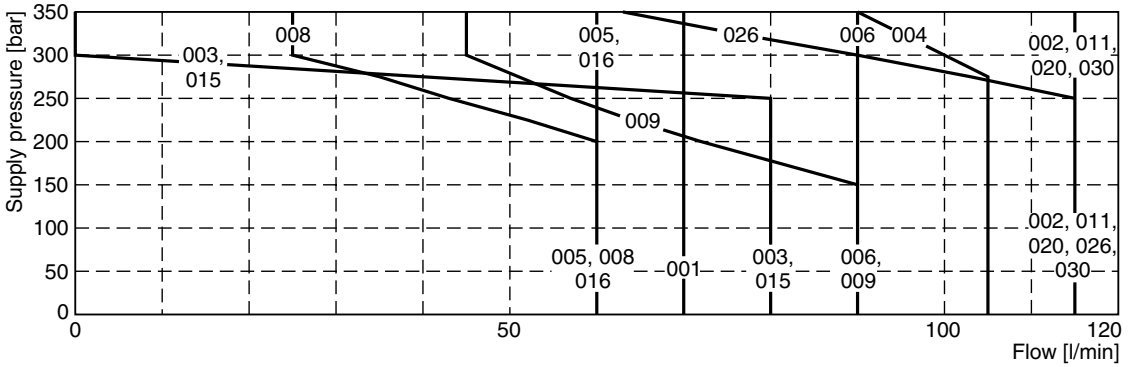
Shift limits, DC voltage *





Measured with HLP46 at 50°C, 90% U_{nom} and warm solenoids.

Shift limits, AC voltage *

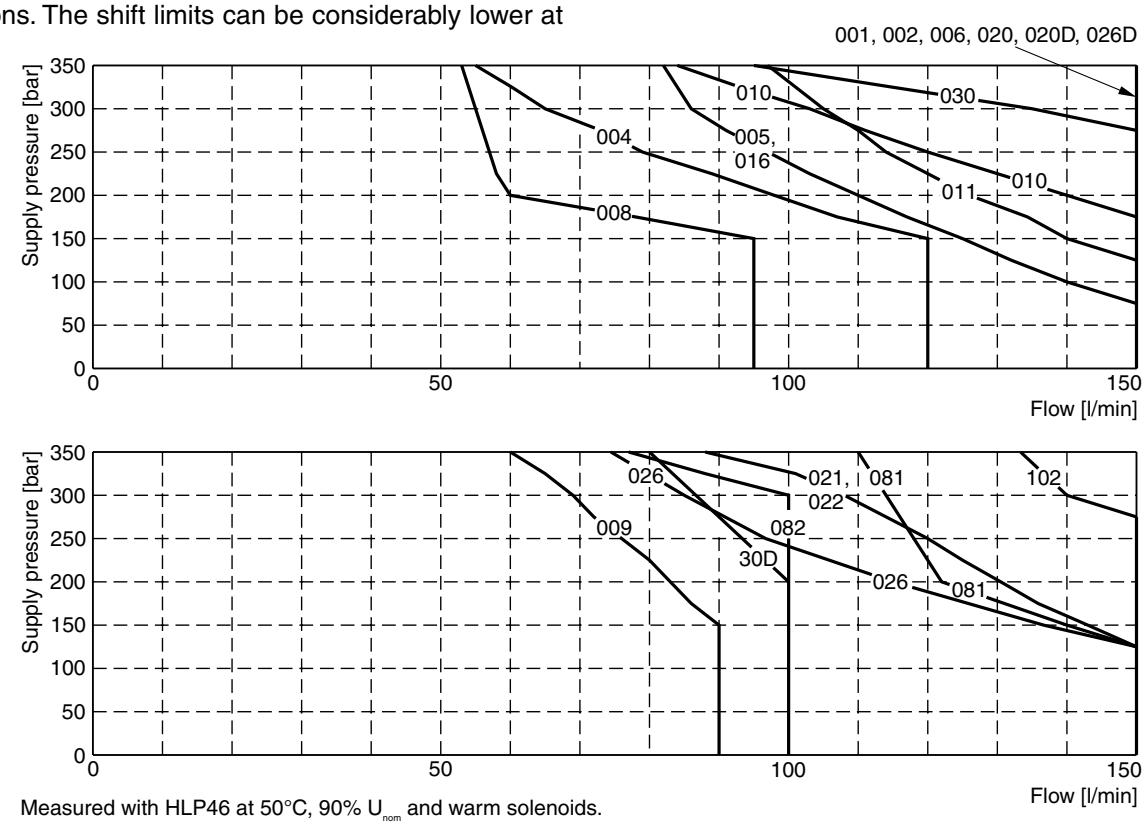


Measured with HLP46 at 50°C, 95% U_{nom} and warm solenoids.

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 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 with HLP46 at 50°C, 90% U_{nom} and warm solenoids.

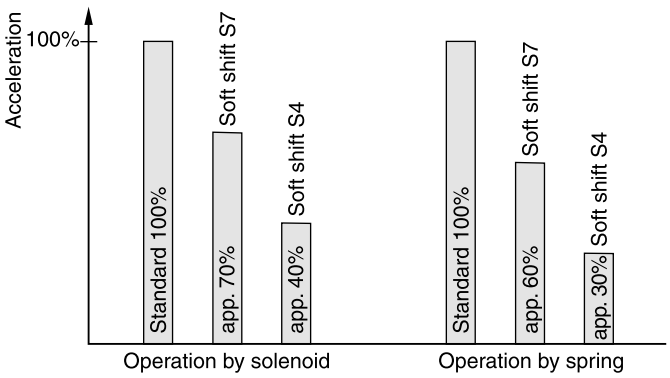
Response times D3W Soft Shift

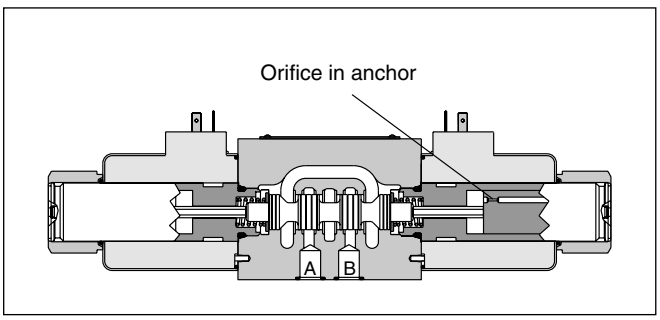
Code	Orifice size	Energize	De-energize
(Standard)	–	105 ms (DC) 21 ms (AC)*	85 ms (DC) 35 ms (AC)*
S4	1.0 mm	320 ms	550 ms
S7	1.75 mm	160 ms	370 ms

Step response times were obtained under the following conditions: HLP46 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)





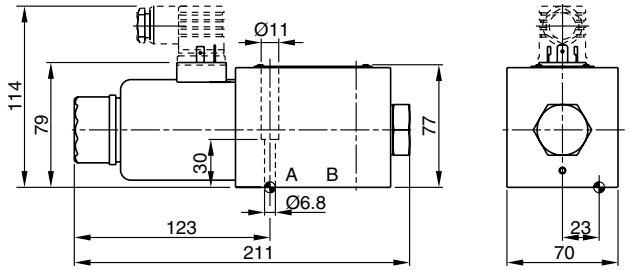
For even softer shifting, the proportional spools 081, 082, 101 and 102 can be used.

D3W stand_UK.INDD CM_18.05.2010

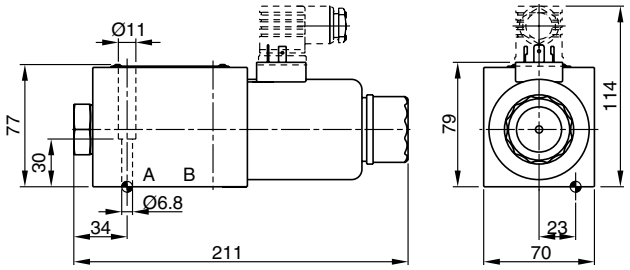
Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany

Interface EN 175301-803, DC solenoid

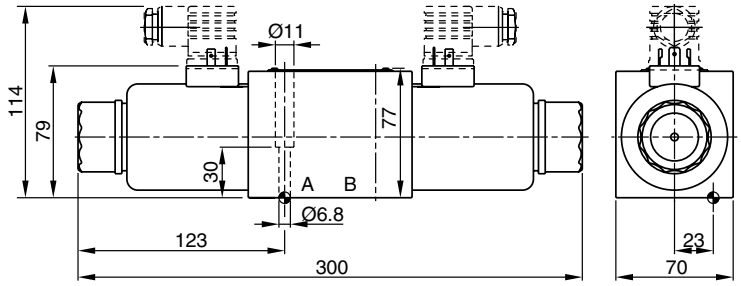
B, E, F -style



H, K, M -style

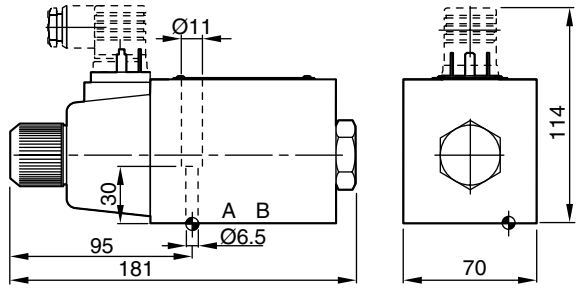


C, D -style

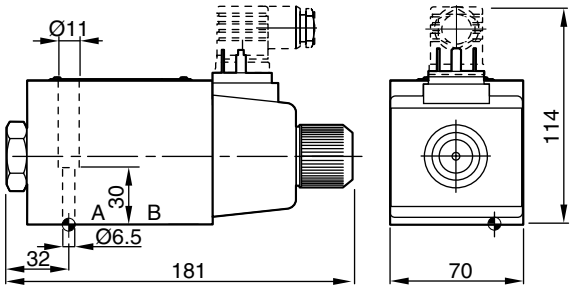


Interface EN 175301-803, AC solenoid

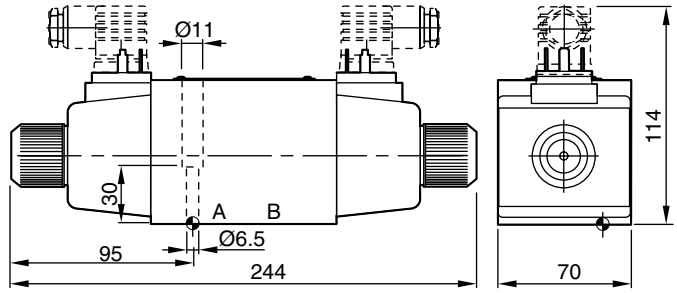
B, E, F -style



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_18.05.2010

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany

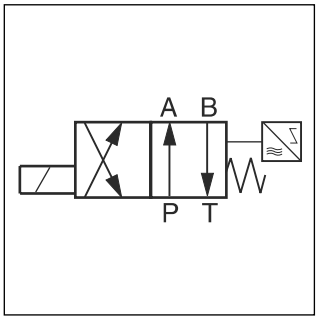
Notes

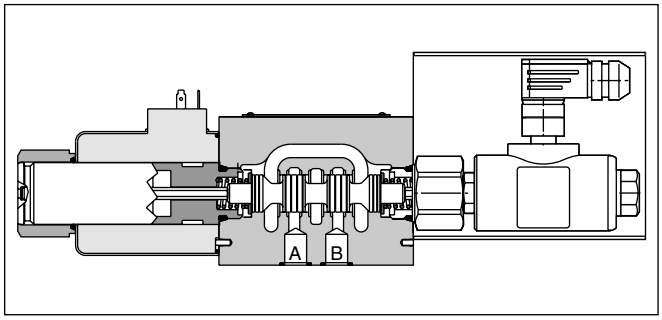
The direct operated valves with inductive position control are typically used in safety relevant applications. The start or the end position can be monitored.

The position control is available for single solenoid valves only.

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

Please find detailed information on the machine directive in the position paper in chapter 1.





Attention

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

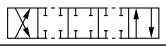
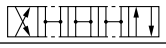
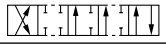
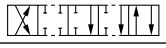
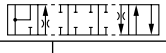
Technical data

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			
$MTTF_D$ value	[years]	150			
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 (see shift limits)			
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

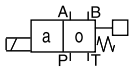
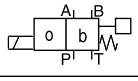
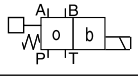
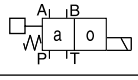
D	3	W			
Directional control valve	**Size DIN NG10 CETOP 05 NFPA D05**	**Wet pin solenoid**	**Spool type**	**Spool position**	**Seals**

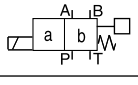
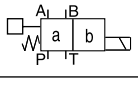
3 position spools	
Code	Spool type
	a 0 b
001	
002	
003 [1]	
004	
005 [2]	
015 [2]	
016 [1]	
021 [1]	
022 [2]	

2 position spools	
Code	Spool type
	a b
020	
026	
030	

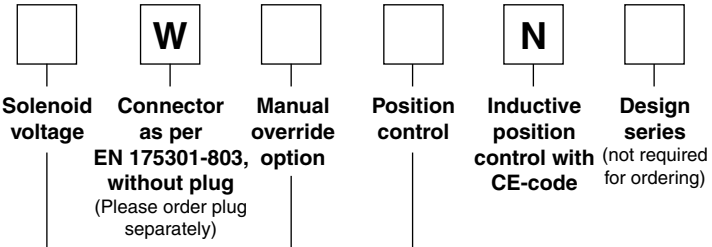
[1] Only available for spool pos. “K“ and “M“

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

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	Seals
N	NBR
V	FPM



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

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 "I4" or "I5" (start position monitored) are required.

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.

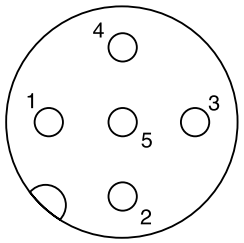
Further spool types and solenoid voltages on request.

2

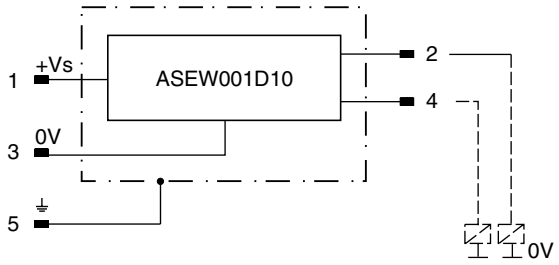
Electrical characteristics of position control as per IEC 61076-2-101 (M12x1)

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	[mA]	≤ 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 Out B: Normally closed
3 0V
4 Out A: Normally open
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.

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

End position monitored:

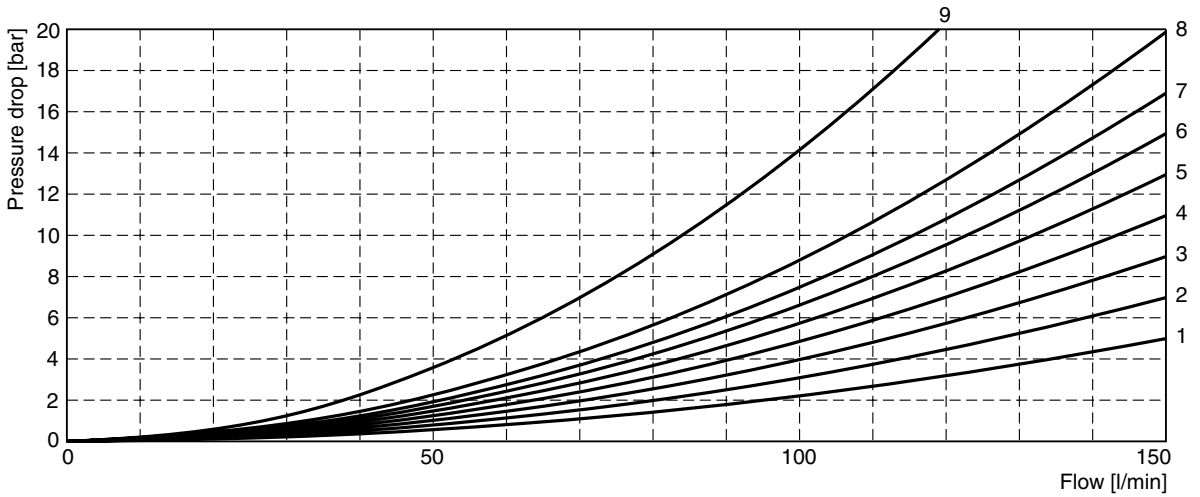
The inductive switch gives a signal before the end position is reached (above 85% spool stroke).

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
001	6	5	6	6	–	–	–	–	–	–
002	3	5	3	3	1	1	4	5	1	6
003	2	2	3	1	–	–	3	–	–	
004	5	4	4	4	–	–	8	8	–	9
005	2	2	2	2	3	–	–	–	–	–
015	2	1	2	2	–	–	–	3	–	–
016	2	2	1	2	–	2	–	–	–	–
020	6	6	5	7	–	–	–	–	–	–
026	5	–	5	–	–	–	–	–	–	–
030	4	5	3	5	–	–	–	–	–	–

	Position b			Position a		
	P->A	P->B	A->B	P->B	A->T	
021	2	4	8	3	2	
	P->A	B->T		P->A	P->B	A->B
022	3	2		3	2	8

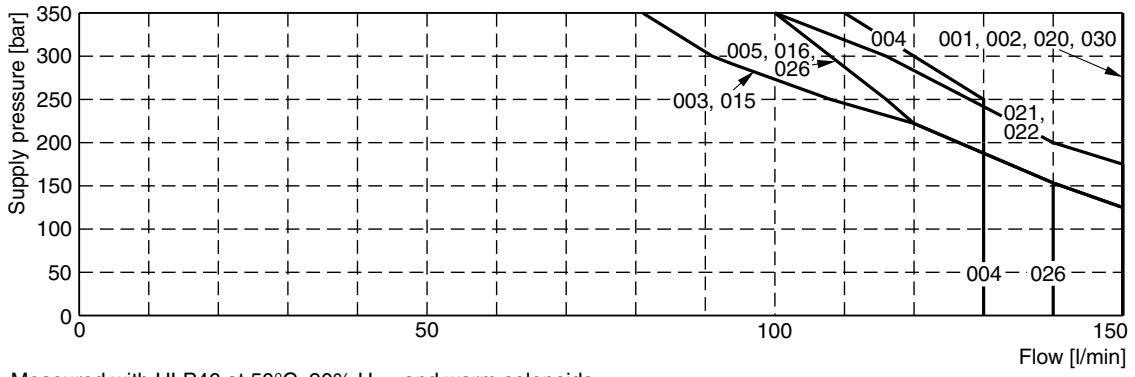
Flow curve diagram



All characteristic curves measured with HLP46 at 50°C.

Shift limit diagram

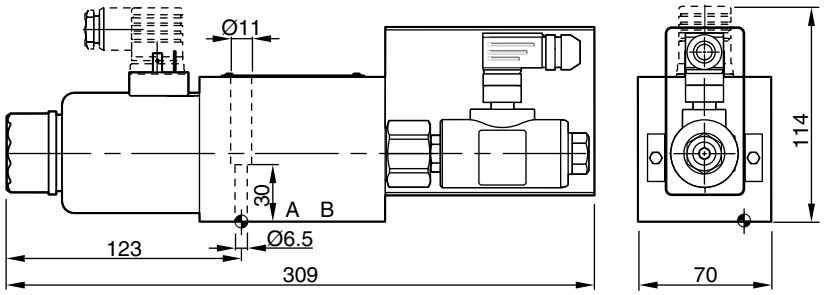
The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits,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



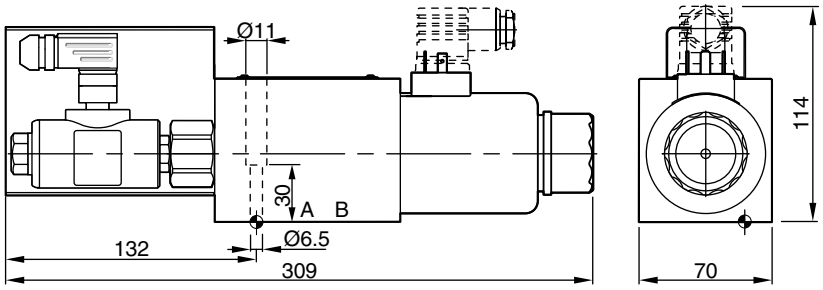
Measured with HLP46 at 50°C, 90% U_{nom} and warm solenoids

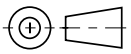
2

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.

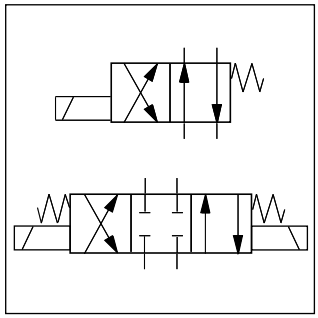
Attention

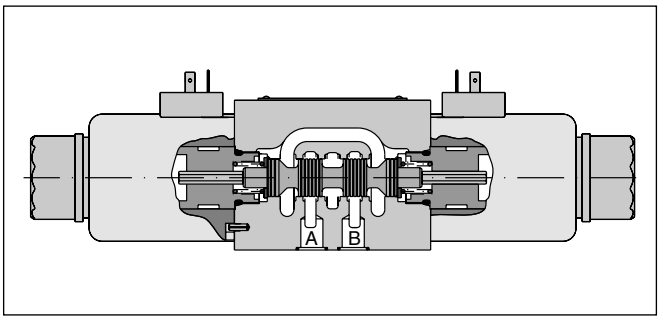
The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.

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

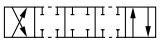
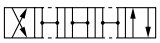
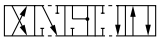
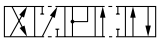
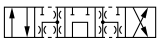
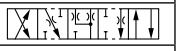
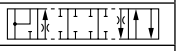
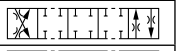
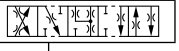
Technical data

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	
$MTTF_D$ value	[years]	150	
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 (see shift limits)	
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		Standard (as per EN175301-803) IP 65 in acc. with EN60529 (plugged and mounted) AMP Junior Timer IP67 in acc. 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.

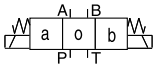
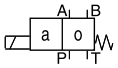
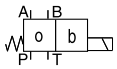
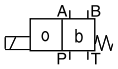
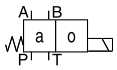
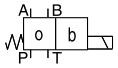
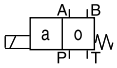
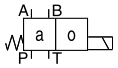
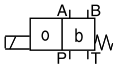
2

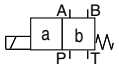
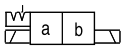
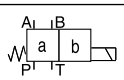
D	3	M	W			
Directional control valve	Size DIN NG 10 CETOP 05 NFPA D05	3-chamber valve for mobile and marine applications	Wet pin solenoid	Spool type	Spool position	Seals

3 position spools	
Code	Spool type a 0 b
001	
002	
004	
006	
008	
011	
021	
022	
081	
082	

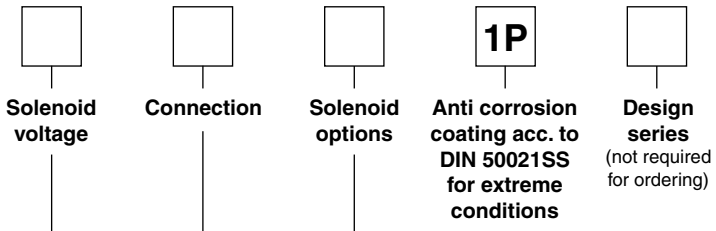
2 position spools	
Code	Spool type a b
020	
030	

Code	Seals
N	**NBR**
V	FPM

3 position spools			
Code	all 3 position spools		
C			3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.
	Standard	Spool type 008 and 009	
E	 Operated in position “a“.	 Operated in position “b“.	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 center or offset position.
H		2 positions. Spring offset in position “a“. Operated in position “b“.

Bold letters =
Short-term availability



Code	Solenoid option
omit	Standard solenoid
T	without manual override

Code	Connection
W [1)]	Connector as per EN 175301-803
A [1)]	2-pin AMP Junior Timer

[1)] Please order plug separately.

Code	Voltage
K	12V =
J	24V =

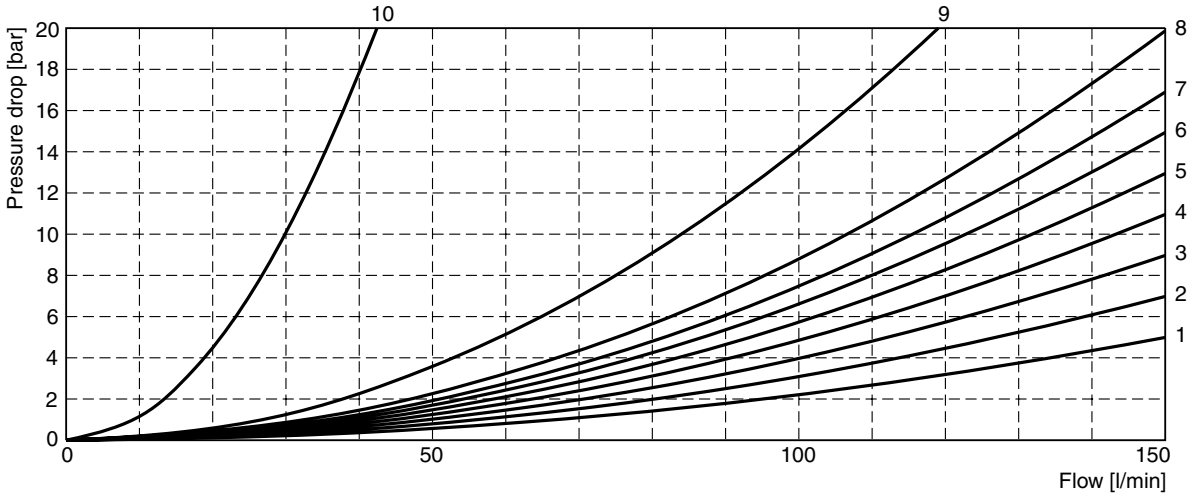
Further spool types on request.

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.

	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
001	6	5	6	6	–	–	–	–	–	–
002	3	5	3	3	1	1	4	5	1	6
004	5	4	4	4	–	–	8	8	–	9
006	1	2	1	3	2	2	–	–	–	3
011	2	2	2	2	–	–	10	10	–	10
020	6	6	5	7	–	–	–	–	–	–
030	4	5	3	5	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A->B
008	8	7	7	6	–	–	–	–	9	–

	Position b			Position a		
	P->A	P->B	A->B	P->B	A->T	
021	2	4	8	3	2	
	P->A	B->T		P->A	P->B	A->B
022	3	2		3	2	8

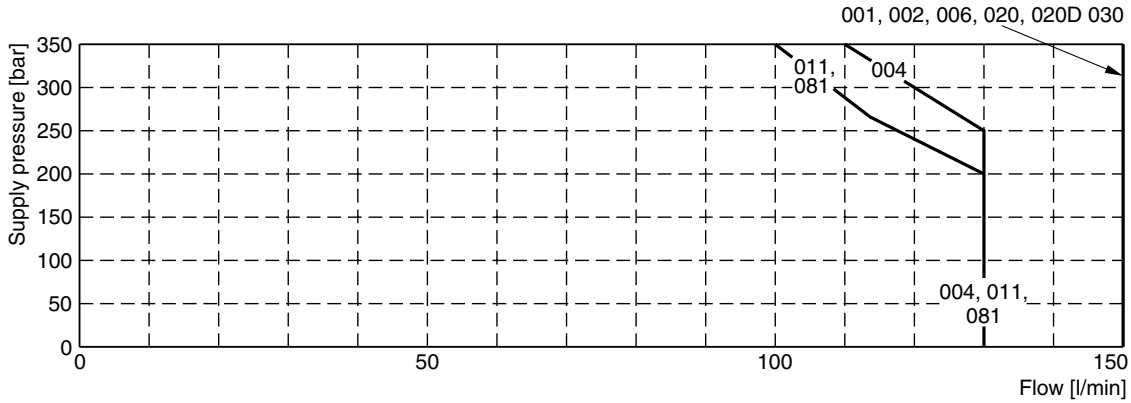
Flow curve diagram

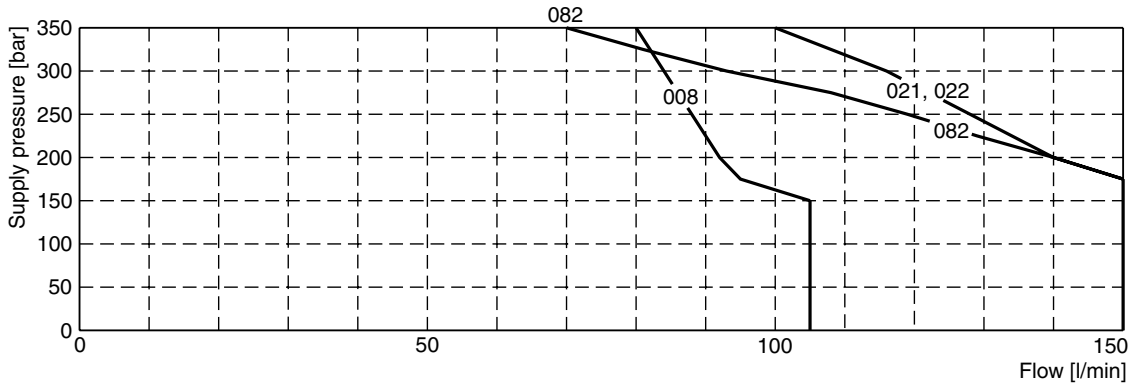


All characteristic curves measured with HLP46 at 50°C.

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 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

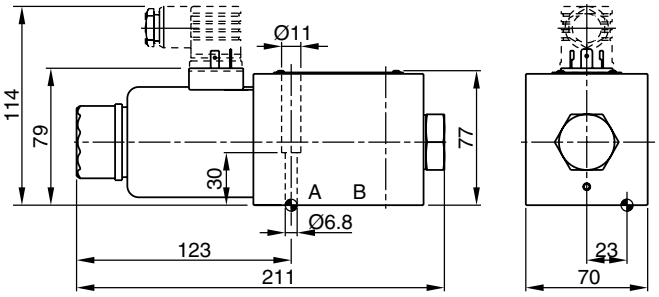




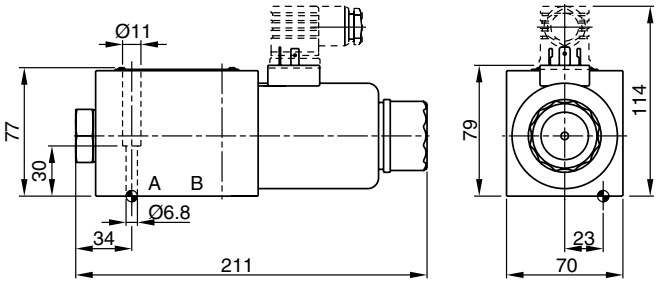
Measured with HLP46 at 50°C, 90% U_{nom} and warm solenoids

2

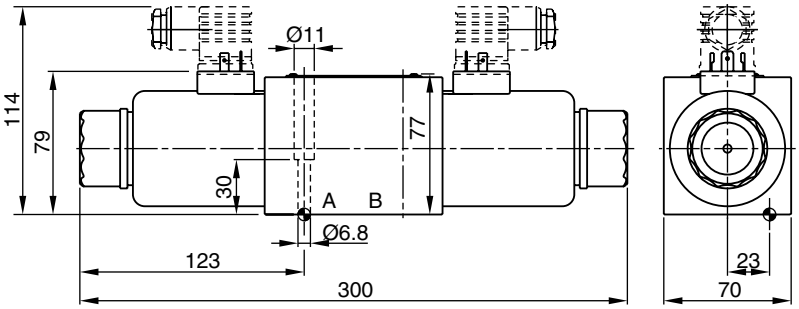
Interface EN 175301-803, DC solenoid
B, E, F -style



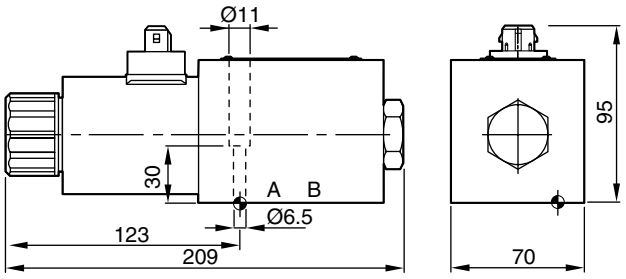
H, K, M -style



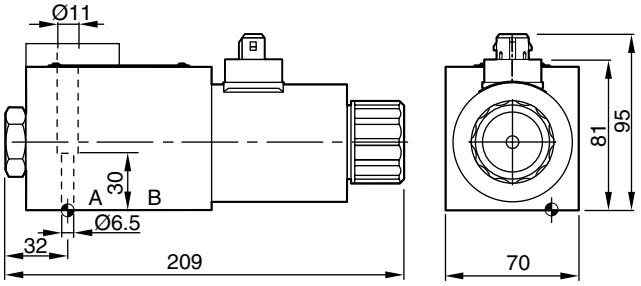
C, D -style



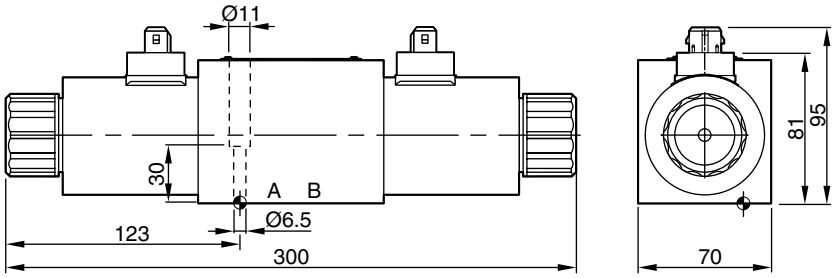
Dimensions with AMP Connector
B, E, F -style



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.

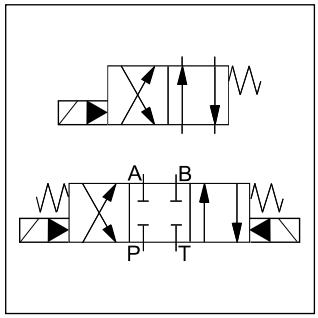
The pilot operated valves are available in 4 sizes:

D31DW	NG10 (standard)
D31NW	NG10 (high flow)
D41VW	NG16
D81VW	NG25 (for port diameter up to 26 mm)
D91VW	NG25 (for port diameter up to 32 mm)
D111VW	NG32

All valves are piloted by a D1VW valve. The valves can be ordered with position control. Please see the separate order code.

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

Additionally spools with a P to T connection in the de-energized position need an external pressure supply (external inlet) or an integral check valve.



D31DW

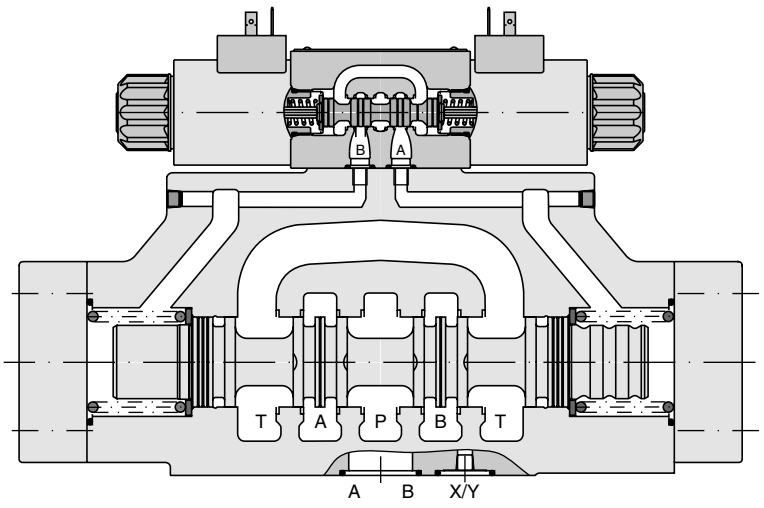
D31NW

D41VW

D81VW

D111VW

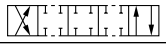
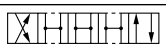
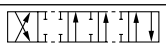
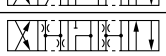
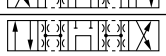
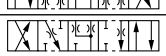
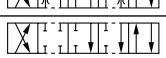
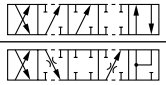
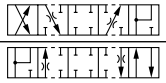
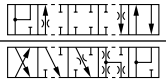
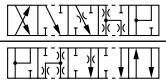
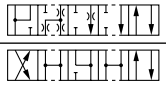
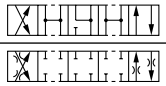
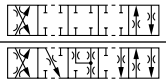
D81VW



2

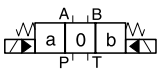
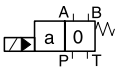
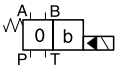
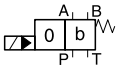
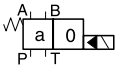
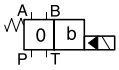
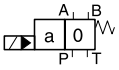
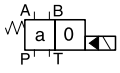
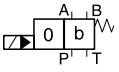
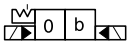
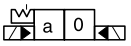
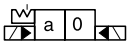
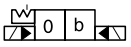
Series | **Spool type** | **Spool position**

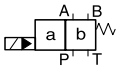
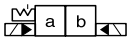
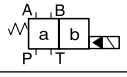
Code	Bore	Size	Feature
D31DW	Ø11mm	NG10	
D31NW	Ø11mm	NG10	High flow
D41VW	Ø20mm	NG16	
D81VW	Ø26mm	NG25	
D91VW	Ø32mm	NG25	High flow
D111VW	Ø50mm	NG32	

3 position spools	
Code	Spool type a 0 b
001 2)	
002 2)	
003 3)	
004 3)	
005 3)	
006 3)	
007 3)	
009 1)2)	
011 3)	
014 3)	
015 3)	
016 3)	
021 3)	
022 3)	
031 5)	
032 5)	
054 4)	
081 2)	
082 2)	

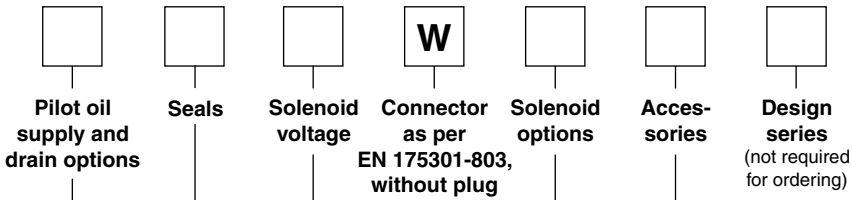
2 position spools	
Code	Spool type a b
020 2)	
026 3)	
030 2)	

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

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 009	
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 center 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 center or offset position.
H 2)		Spring offset in position “a“. Operated in position “b“.

Bold letters =
Short-term availability



2

Code	Accessories
omit	**Standard valve w/o accessories**
3A	Pilot choke, meter-out
3B	Pilot choke, meter-in
3C	Pilot with pressure reducing valve
3D [9]	Stroke adjustment side B
3E [9]	Stroke adjustment side A
3F [9]	Stroke adjustment side A and B
3R	meter-out / pressure reducing valve
1T	meter-in / pressure reducing valve

[9] Only D31, D41, D81, D91 available.

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

Code	Solenoid 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	Seals
N	**NBR**
V	FPM

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 002, 007, 009, 014, 030, 031, 032, 054 available.

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

D3-D11_UK.INDD CM_18.05.2010

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany

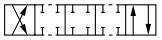
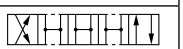
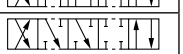
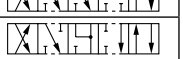
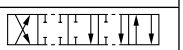
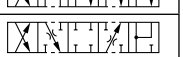
2

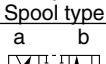
With inductive position control

Series

Code	Bore	Size	Feature
D31DW	Ø11mm	NG10	
D41VW	Ø20mm	NG16	
D81VW	Ø26mm	NG25	
D91VW	Ø32mm	NG25	High flow
D111VW	Ø50mm	NG32	

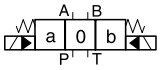
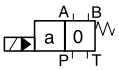
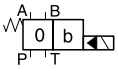
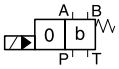
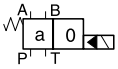
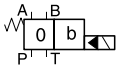
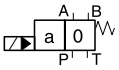
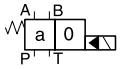
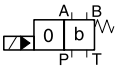
Spool type

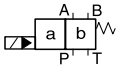
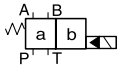
3 position spools	
Code	Spool type
	a 0 b
001 [2]	
002 [5]	
003 [3]	
004 [3]	
007 [5]	
009 [1)4)]	
011 [5]	
014 [5]	
015 [3]	
021 [3]	
022 [3]	

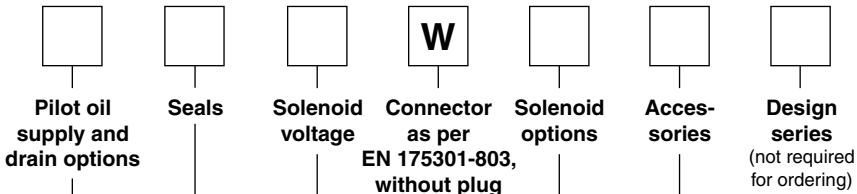
2 position spools	
Code	Spool type
	a b
020 [2]	
026 [3]	
030 [5]	

[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

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 009	
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“.



Code	Spool position	Position control
I3N	C	End position monitored, side A and B
I6N [9]		Start position monitored, side A and B
I2N	C, B, E, F (all spools) C, K, M (spool 9)	End position monitored, side B
I5N [9]		Start position monitored, side B
I1N	C, H, K, M (all spools) C, E, F (spool 9)	End position monitored, side A
I4N [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. For 4/3-way valves two switches are used.

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 "I4N", "I5N" or "I6N" (start position monitored) are required.

Code	Solenoid 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	Seals
N	NBR
V	FPM

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 002, 007, 009, 014, 030 available.

Attention

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

2

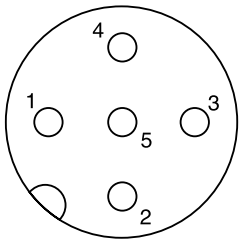
General							
Design			Directional spool valve				
Actuation			Solenoid				
Series			**D31DW**	**D31NW**	**D41VW**	**D81/91VW**	**D111VW**
Size			NG10	NG10	NG16	NG25	NG32
Weight (1/ 2 solenoids)		[kg]	6.0 / 6.6	7.6 / 8.1	9.7 / 10.3	17.9 / 18.6	67.4 / 68.0
Mounting interface			DIN 24340 A10 ISO 4401 NFPA D05	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] [°C]	-25...+50 (without inductive position control) 0...+50 (with inductive position control)				
$MTTF_D$ value		[years]	75				
Hydraulic							
Max. operating pressure		[bar]	Pilot drain internal: P, A B, X: 350; T, Y: 105 (D31NW: P, A, B, X: 315; T, Y: 140) Pilot drain external: P, A B, T, X: 350; Y: 105 (D31NW: P, A, B, T, X: 315; Y:140)				
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	170	300	700	2000
Leakage at 350 bar (per flow path) *depending on spool		[ml/min]	up to 100*	72...422*	up to 200*	up to 800*	up to 5000*
Opening pressure integral check valve		[bar]	n.a.	n.a.	see p/Q diagram	see p/Q diagram	n.a.
Minimum pilot supply pressure		[bar]	5	7	5		
Static / Dynamic							
Step response at 95%		[ms]	Energized / De-energized				
DC solenoids	Pilot pressure	50 bar	60 / 40 (50/60)	95 / 65	150 / 170	470 / 390	
		100 bar	55 / 40 (50/60)	75 / 65	110 / 170	320 / 390	
		250 bar	55 / 40 (50/50)	60 / 65	90 / 170	210 / 390	
		350 bar	55 / 40 (50/50)	60 / 65	85 / 170	200 / 390	
AC solenoids	Pilot pressure	50 bar	40 / 30 (30/50)	75 / 55	130 / 155	450 / 375	
		100 bar	35 / 30 (30/50)	65 / 55	90 / 155	300 / 375	
		250 bar	35 / 30 (30/50)	40 / 55	70 / 155	190 / 375	
		350 bar	35 / 30 (30/50)	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]	2.72	1.29	0.33	0.15	0.58 / 0.49	0.31 / 0.26
Current consumption	in rush	[A]	2.72	1.29	0.33	0.15	2.1 / 2.0	1.05 / 1.0
Power consumption	hold	[W]	32.7	31	31.9	30.2	64 / 59 VA	68 / 62 VA
Power consumption	in rush	[W]	32.7	31	31.9	30.2	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.

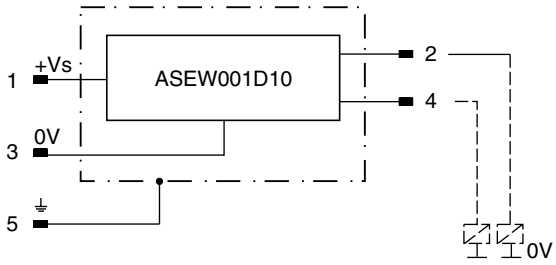
Electrical characteristics of position control M12x1

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	[mA]	≤ 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 nach IEC 61076-2-101
Wiring min.	[mm²]	5 x 0.25 brad shield recommended
Wiring length max.	[m]	50 recommended

M12 pin assignment



1 + Supply 18...42V
2 Out B: normally closed
3 0V
4 Out A: normally open
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).

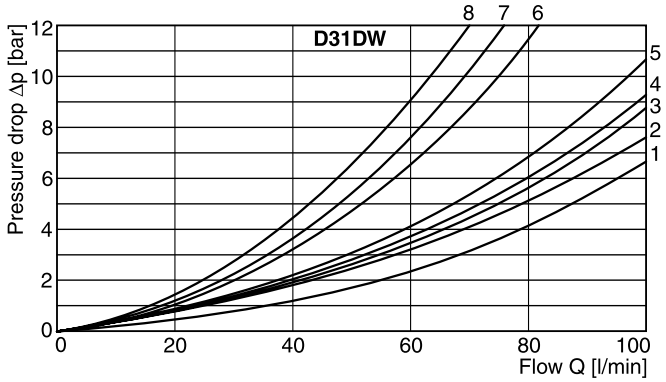
Delivery includes plug M12 x 1 (see accessories, plug M12x1; order no.: 5004109).

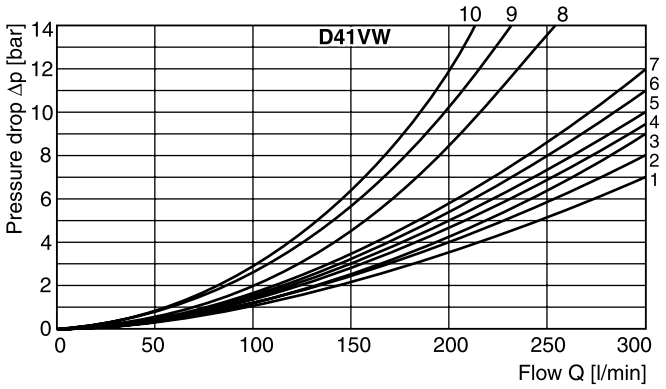
2

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

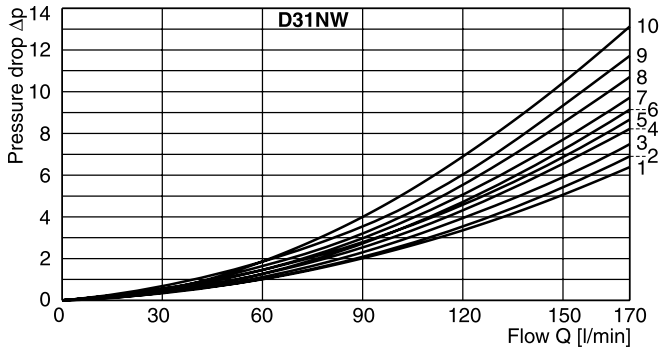
Spool Code	Curve number									
	P-A		P-B		P-T		A-T		B-T	
	D3	D4	D3	D4	D3	D4	D3	D4	D3	D4
001	3	1	3	1	–	–	1	4	1	5
002	3	1	3	2	4	6	1	4	1	6
003	3	1	4	2	–	–	1	5	1	6
004	3	1	3	1	–	–	1	5	1	5
005	3	2	4	2	–	–	1	3	1	5
006	3	1	3	2	–	–	1	3	1	6
007	4	1	3	1	–	6	1	4	1	5
009	3	2	3	9	8	8	1	7	1	10
011	3	1	3	1	–	–	1	4	1	5
014	3	1	4	1	–	6	1	4	1	5
015	4	1	3	2	–	–	1	4	1	6
016	4	2	3	2	–	–	1	3	1	5
020	3	3	4	5	–	–	1	3	1	5
021	4	2	3	8	–	–	1	2	–	–
022	3	8	4	2	–	–	–	–	1	3
026	3	3	3	5	–	–	–	–	–	–
030	3	2	1	3	–	–	1	6	1	7
054	–	2	–	3	–	–	–	6	–	7





D31NW

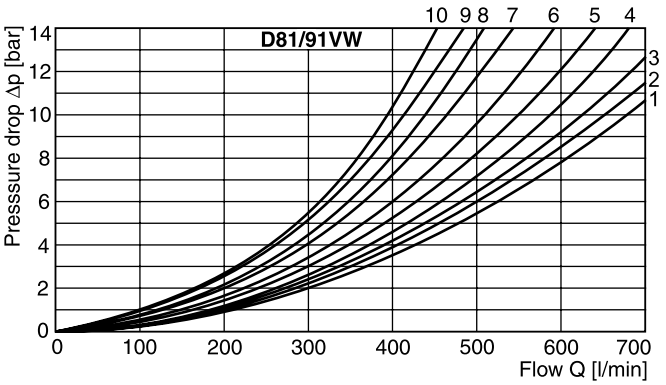
Spool Code	Curve number				
	P-A	P-B	P-T	A-T	B-T
01	3	3	7	4	3
02	3	3	–	2	4
03	3	3	–	2	5
07	4	6	6	4	10
08	2	3	–	4	4
09	2	2	–	1	4
10	2	3	–	4	4
11	5	3	–	2	5
13	2	4	–	1	4
14	4	3	–	2	4
46	8	9	–	7	9
51	6	4	–	3	6
55	–	7	–	8	–
56	4	–	–	9	–

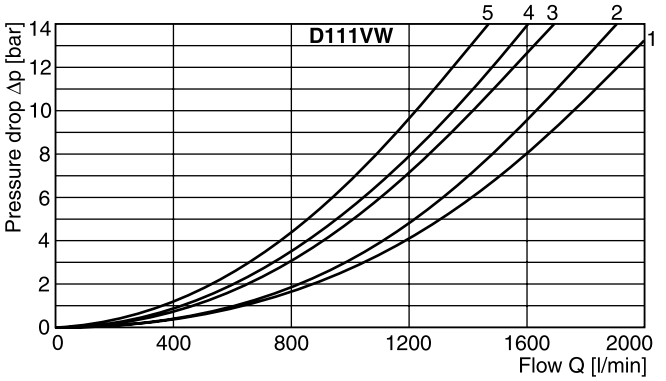


All characteristic curves measured with HLP46 at 50°C.

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
001	3	5	2	5	–	–	3	4	5	1
002	2	5	1	5	1	5	3	4	5	1
003	4	–	2	–	–	–	3	–	6	–
004	4	–	3	–	–	–	3	–	5	–
005	1	–	2	–	–	–	4	–	5	–
006	2	–	2	–	–	–	4	–	6	–
007	3	–	1	–	7	–	3	–	5	–
009	4	3	8	3	9	2	4	3	10	1
011	3	–	2	–	–	–	3	–	5	–
014	1	–	2	–	8	–	3	–	5	–
015	3	–	3	–	–	–	4	–	5	–
016	3	–	3	–	–	–	4	–	5	–
020	6	5	5	5	–	–	6	3	8	1
021	5	–	10	–	–	–	3	–	–	–
022	10	–	5	–	–	–	–	–	5	–
026	6	–	5	–	–	–	–	–	–	–
030	3	5	2	5	–	–	3	4	5	1
054	4	5	3	5	–	–	3	4	5	1

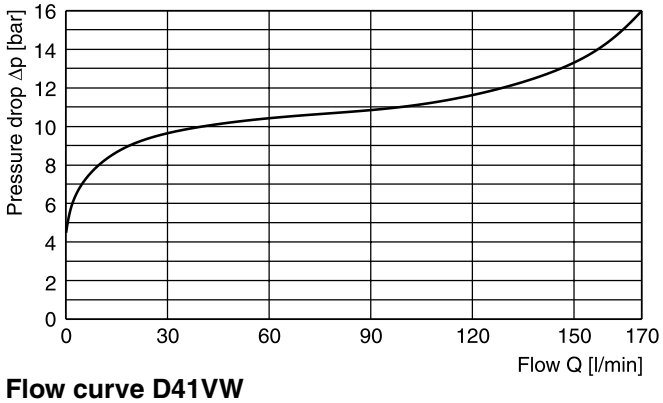




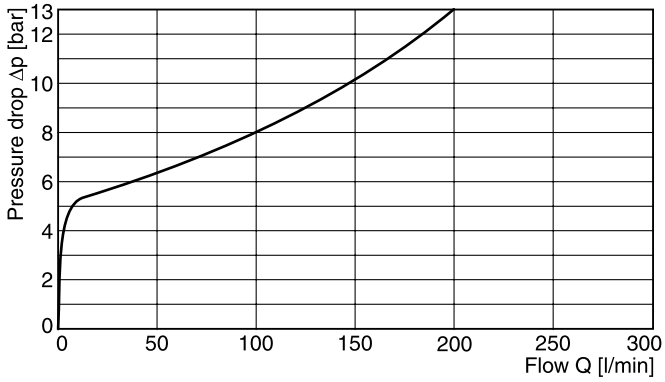
Integral check valve in the P port

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 D31NW, D41VW and D81VW.

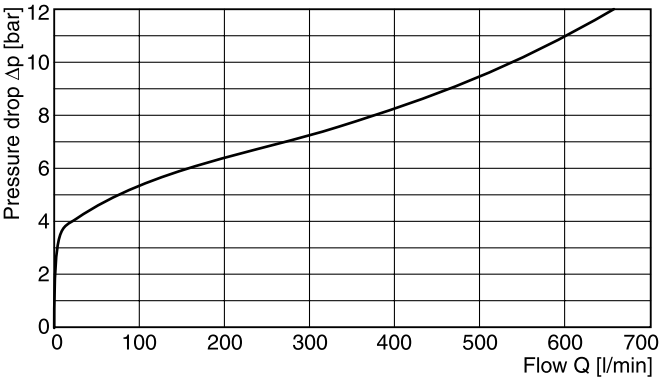
Flow curve D31NW



Flow curve D41VW



Flow curve D81/91VW



All characteristic curves measured with HLP46 at 50°C.

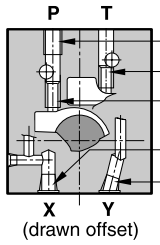
D3-D11_UK.INDD CM_18.05.2010

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany

2

Pilot oil inlet (supply) and outlet (drain)

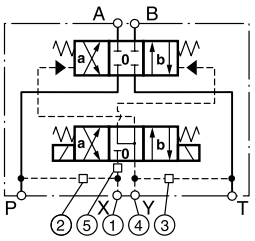
Series D31DW



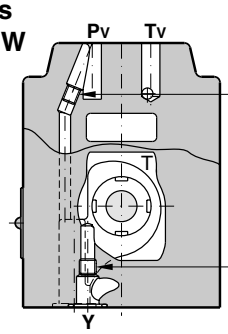
5 M6 DIN906
3 M6 DIN906
2 M5 DIN906
1 1/16 NPTF
4 1/16 NPTF

○ open, ● closed

Pilot oil Inlet	Pilot oil 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



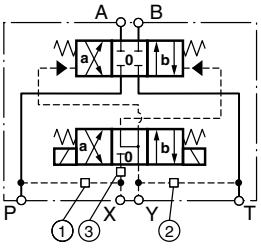
Series D31NW



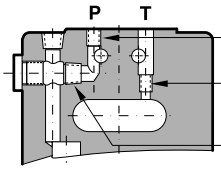
3 Slip-in orifice in pilot p-port
1 M6 DIN906
2 M6 DIN906

○ open, ● closed

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



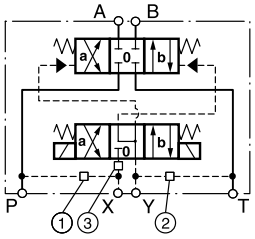
Series D41VW



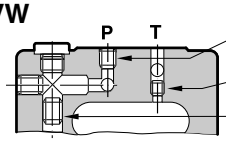
3 M6 DIN906
2 M6 DIN906
1 1/16 NPTF

○ open, ● closed

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



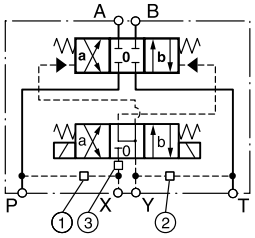
Series D81/91VW



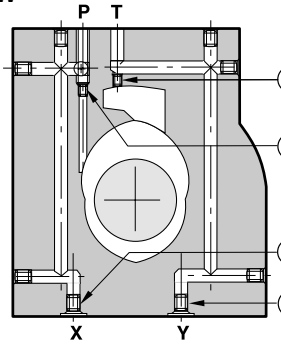
3 M6 DIN906
2 M6 DIN906
1 1/16 NPTF

○ open, ● closed

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



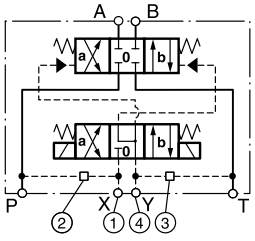
Series D111VW



3 1/16 NPTF
2 1/16 NPTF
1 1/8 NPTF
4 1/8 NPTF

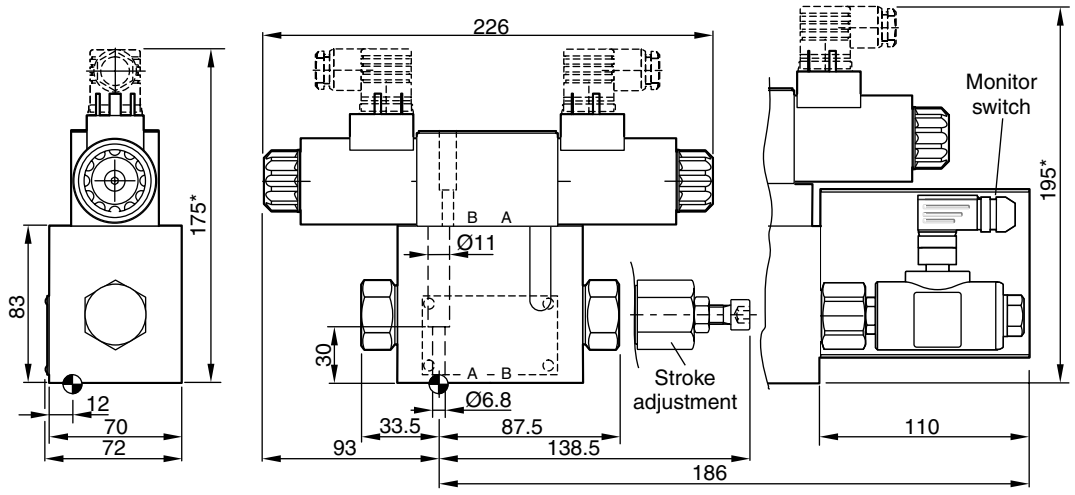
○ open, ● closed

Pilot oil Inlet	Pilot oil 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

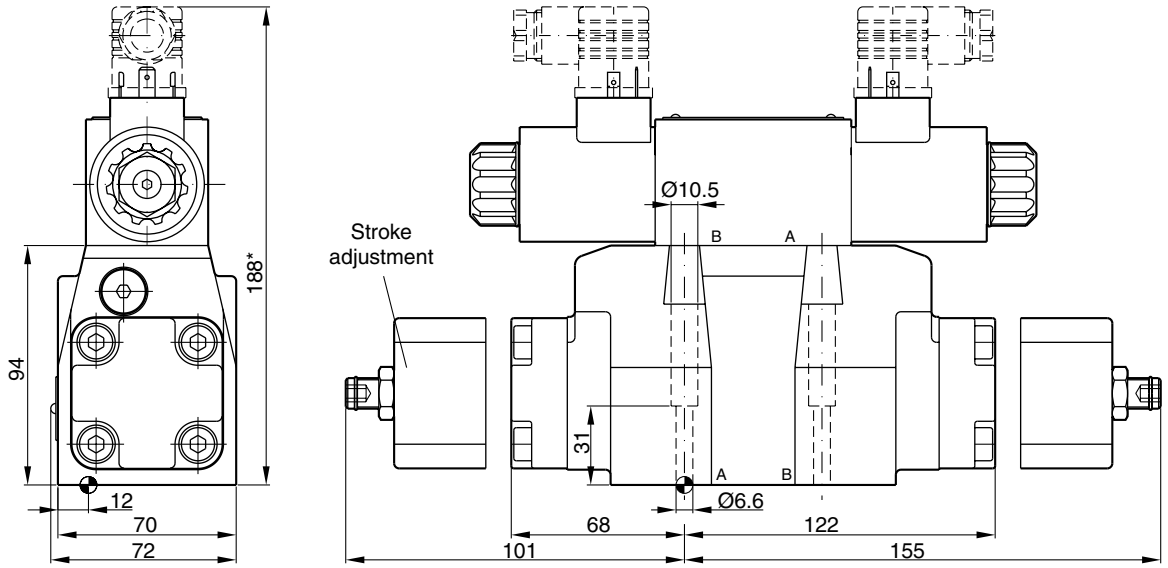
D31DW



* Please add for each sandwich plate +40mm (pressure reducing valve, choke valve meter-in/-out).

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-N-91** FPM: SK-D31DW-V-91

D31NW



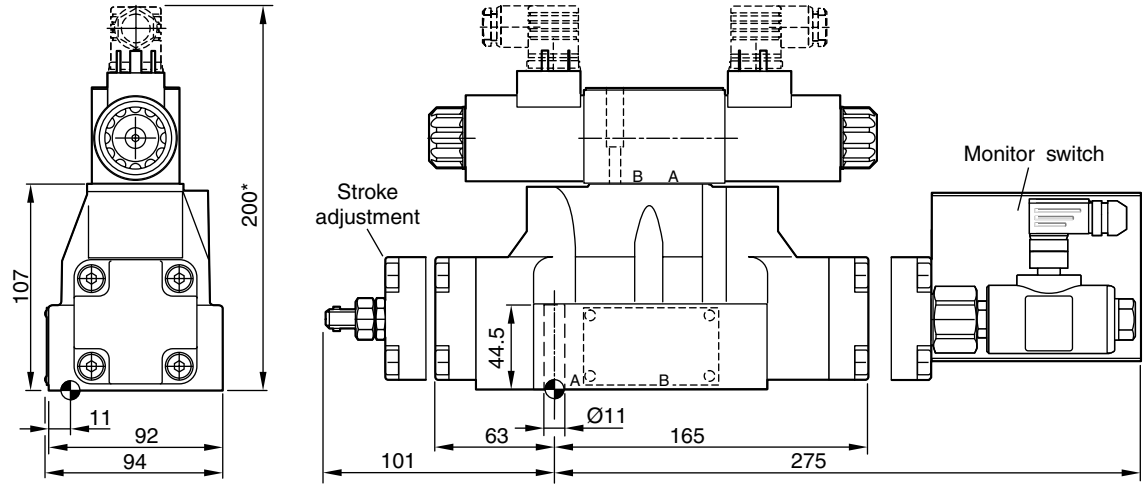
* Please add for each sandwich plate +40mm (pressure reducing valve, choke valve meter-in/-out).

Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm	NBR: SK-D31NW-N-91 FPM: SK-D31NW-V-91

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.

2

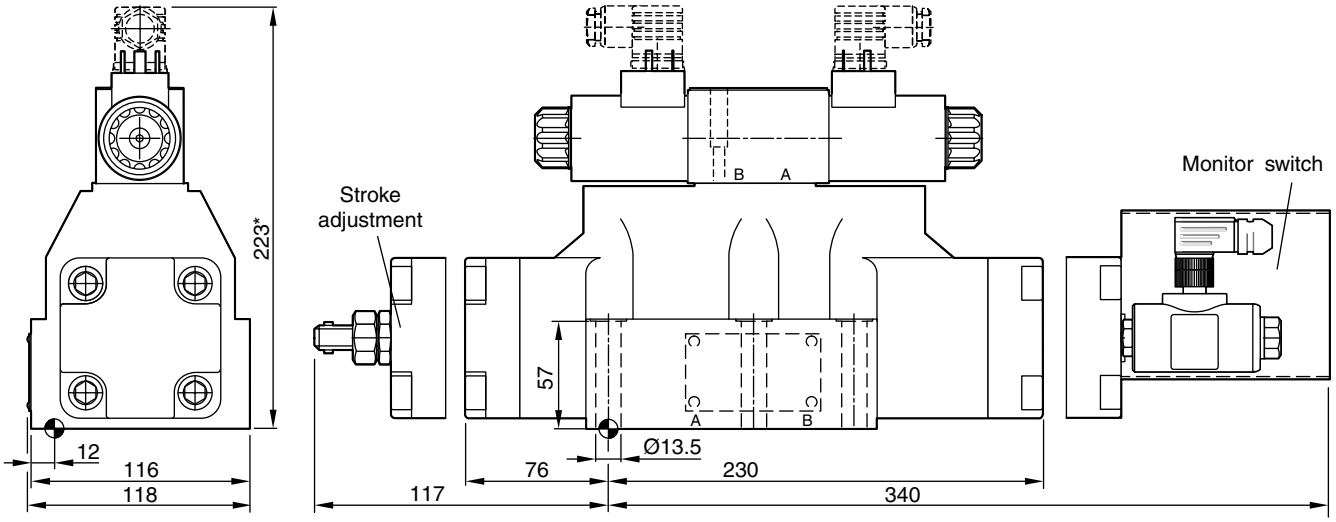
D41VW



* Please add for each sandwich plate +40mm (pressure reducing valve, choke valve meter-in/-out).

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-D41VW-N-91** FPM: SK-D41VW-V-91

D81VW, D91VW



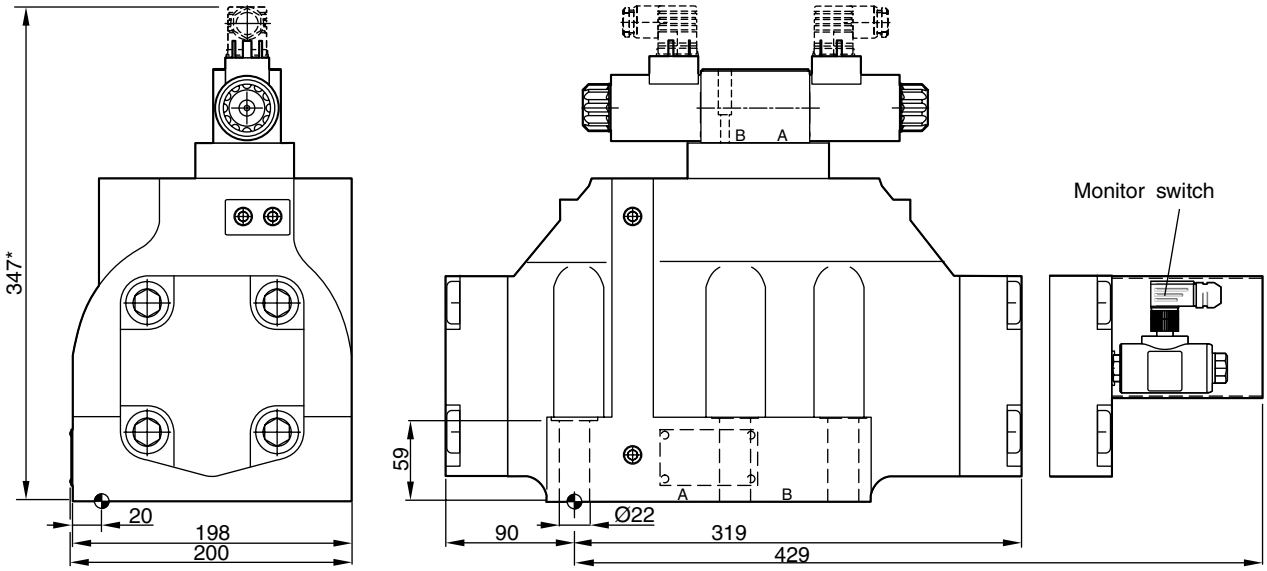
* Please add for each sandwich plate +40mm (pressure reducing valve, choke valve meter-in/-out).

Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	**NBR: SK-D81VW-N-91 / SK-D91VW-N-91** FPM: SK-D81VW-V-91 / SK-D91VW-V-91

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.

2

D111VW



* Please add for each sandwich plate +40mm (pressure reducing valve, choke valve meter-in/-out).

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-N-91** FPM: SK-D111VW-V-91

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

Hydraulically operated directional control valves are available in 5 sizes:

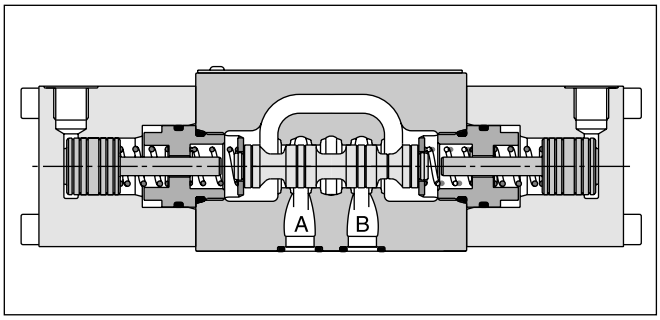
D1VP*4L NG06 – operated via end caps
D1VP*90 NG06 – operated via end caps and mounting interface (x, y)
D3DP NG10 – operated via mounting interface (x, y)
D4P NG16 – operated via mounting interface (x, y)
D9P NG25 – operated via mounting interface (x, y)
D11P NG32 – operated via mounting interface (x,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

The series D1VP can be ordered in two different designs (4L: > 10 bar operating, 200 bar tank pressure/90: > 15 bar pilot, 140 bar tank pressure). Both are 3-chamber design, thus the pilot pressure depends on the tank pressure.

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

D1VP*B*4L

D1VP*90



D1VP*C*4L

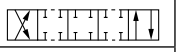
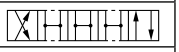
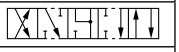
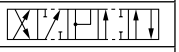
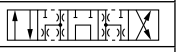
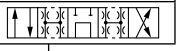
Technical data

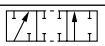
General							
Design		Directional spool valve					
Actuation		Hydraulic					
Series		**D1VP*4L**	**D1VP*90**	**D3DP**	**D4P**	**D9P**	**D11P**
Size		NG06	NG06	NG10	NG16	NG25	NG32
Weight	[kg]	1.3	1.3	3.7	9.0	17.0	66.0
Mounting interface		DIN 24340 A06 ISO 4401 NFPA D03	DIN 24340 A06 ISO 4401 NFPA D03	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					
$MTTF_D$ value	[years]	150					
Hydraulic							
Max. operating pressure	[bar]	P, A B: 350; T: 200	P, A B: 350; T: 140	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. * depending on spool, see shift limits	[l/min]	60*	60*	130	300	700	2000
Leakage at 350 bar (per flow path) * depending on spool		up to 60*	up to 60*	up to 100*	up to 200*	up to 800*	up to 5000*
Pilot supply pressure (min/max) * >tank pressure	[bar]	10* / 210	15 /210	15 /210	5 / 350 [1]	5 / 350 [1]	5 / 350 [1]
Pilot volume	[cm³]	1.2	0.7				
Pilot flow	[l/min]	10	10				
Static / Dynamic							
Step response		The response times depend on the pilot oil pressure and on the speed of the increase / decrease of the pilot pressure.					

[1] with monitor switch: 105 bar

2

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

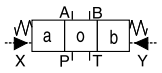
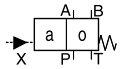
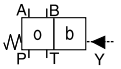
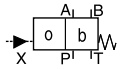
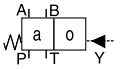
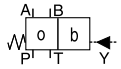
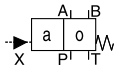
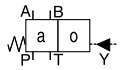
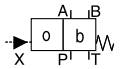
3 position spools	
Code	Spool type a 0 b
001	
002	
004	
006	
008 *	
009 *	

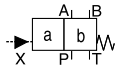
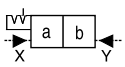
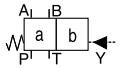
2 position spools	
Code	Spool type a b
020	
026	
030	

* Consider specific spool position.

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

Code	Seals
N	**NBR**
V	FPM

3 position spools			
Code	all 3 position spools		
C			**3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.**
	Standard	Spool type 008 and 009	
E	 Operated in position “a“.	 Operated in position “b“.	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“.**

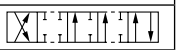
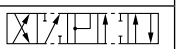
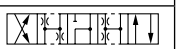
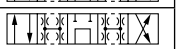
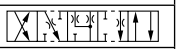
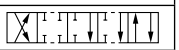
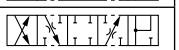
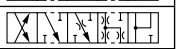
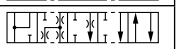
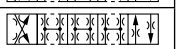
Bold letters =
Short-term availability

Further spool types and styles on request.

DVP_UK.INDD CM_18.05.2010

Parker Hannifin GmbH
Hydraulic Controls Division
Kaarst, Germany

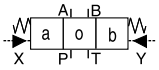
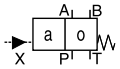
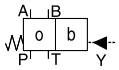
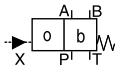
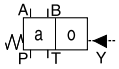
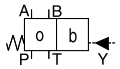
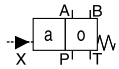
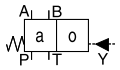
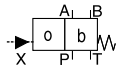
D	3	D	P			2		
Directional control valve	**Size DIN NG 10 CETOP 05 NFPA D05**	**5-chamber design**	**Hydraulically operated**	**Spool type**	**Spool position**	**Pilot oil supply and drain external/ external**	**Seals**	**Design series** (not required for ordering)

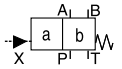
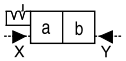
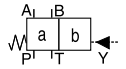
3 position spools	
Code	Spool type a 0 b
001	
002	
003	
004	
005	
006	
007	
008 *	
009 *	
010	
011	
014	
015	
016	
021	
022	
031	
032	
076	
078	
081	
082	
102	

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

* Consider specific spool position.

Code	Seals
N	NBR
V	FPM

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

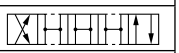
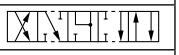
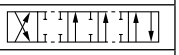
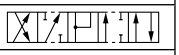
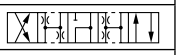
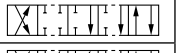
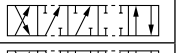
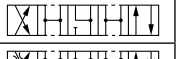
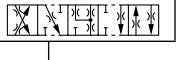
2 position spools		
Code	Spool position	
B		Spring offset in position “b“. Operated in position “a“.
D		Detent, operated in position “a“ or “b“. No center or offset position.
H		Spring offset in position “a“. Operated in position “b“.

Further spool types and styles on request.

2

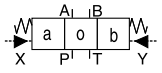
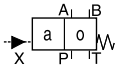
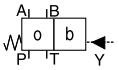
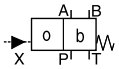
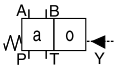
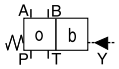
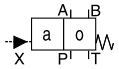
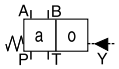
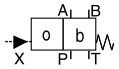
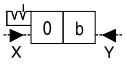
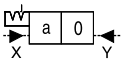
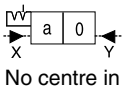
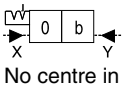
D		P		
Directional control valve	**Size**	**Hydraulically operated**	**Spool type**	**Spool position**

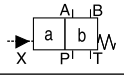
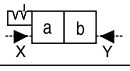
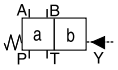
Code	Bore	Size
4	Ø20mm	NG16
9	Ø32mm	NG25
11	Ø50mm	NG32

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]	

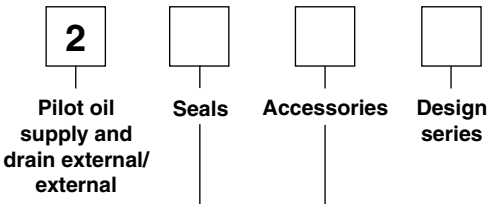
2 position spools	
Code	Spool type a b
20 [2]	
26 [3]	
30 [2]	

[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 center 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 center or offset position.
H	 Spring offset in position “a“. Operated in position “b“.

Further spool types and position control on request.



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

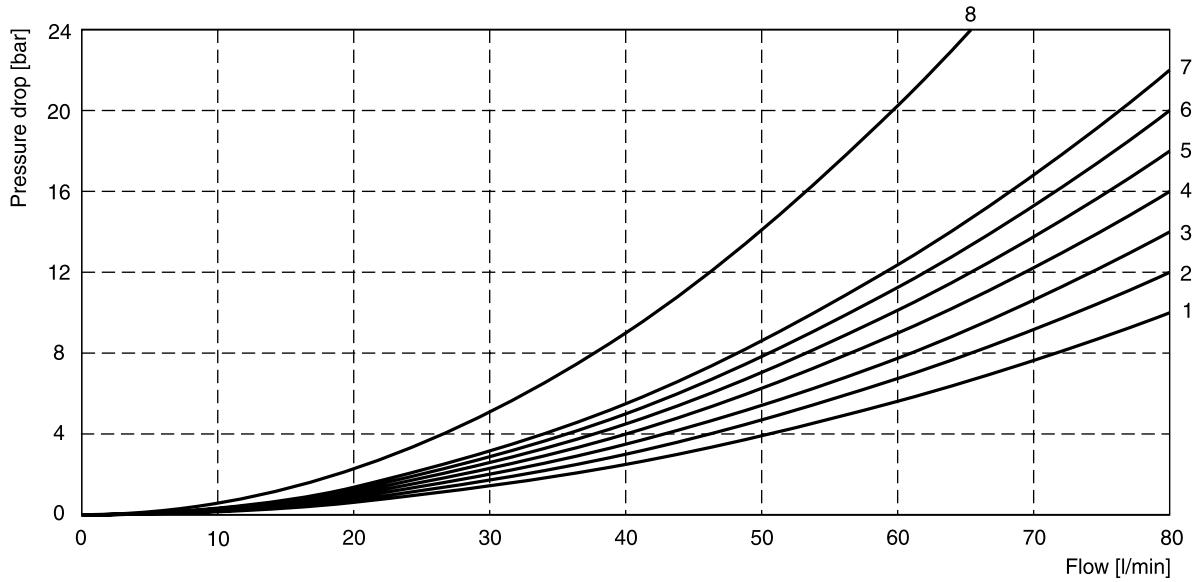
Code	Seals
N	NBR
V	FPM

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
001	2	2	2	2	–	–	–	–	–
002	1	4	1	4	1	1	5	5	2
004	2	3	2	3	–	–	7	7	–
006	1	4	1	4	7	7	–	–	–
020	4	4	2	3	–	–	–	–	–
026	4	–	4	–	–	–	–	–	–
030	2	3	1	2	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T
008	4	5	4	5	–	–	–	–	8
009	5	5	6	7	–	–	–	–	7

Flow curve



All characteristic curves measured with HLP46 at 50°C.

Shift limits

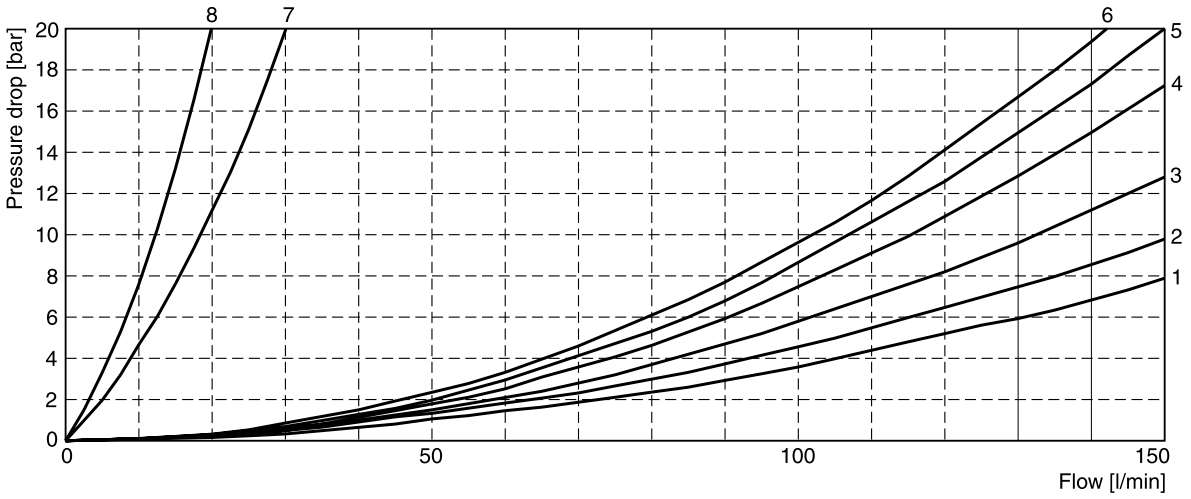
Spool	Shift limit [l/min]
001 002 004 006 020 030	60
08 09	40
026	20

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

	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
001	3	3	3	3	–	–	–	–	–	–
002	4	1	4	1	3	3	1	1	5	1
003	4	3	5	2	–	–	4	–	–	–
004	3	3	3	3	–	–	5	5	–	–
005	4	3	5	3	5	–	–	–	–	–
006	4	3	4	3	6	6	–	–	–	6
007	5	1	4	3	–	4	–	2	6	–
010	4	–	4	–	–	–	–	–	–	–
011	4	3	4	3	–	–	8	8	–	–
012	4	3	4	3	7	7	7	7	8	8
014	4	3	5	1	4	–	2	–	6	–
015	5	2	4	3	–	–	–	4	–	–
016	5	3	4	3	–	5	–	–	–	–
020	4	3	4	3	–	–	–	–	–	–
026	3	–	3	–	–	–	–	–	–	–
030	2	3	2	3	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
008	4	3	4	3	–	–	–	–	6	–
009	4	4	4	4	–	–	–	–	6	–

	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
021	5	4	6	3	3	
	P->A	B->T		P->A	P->B	A->B
022	3	3		4	5	6

Flow curve

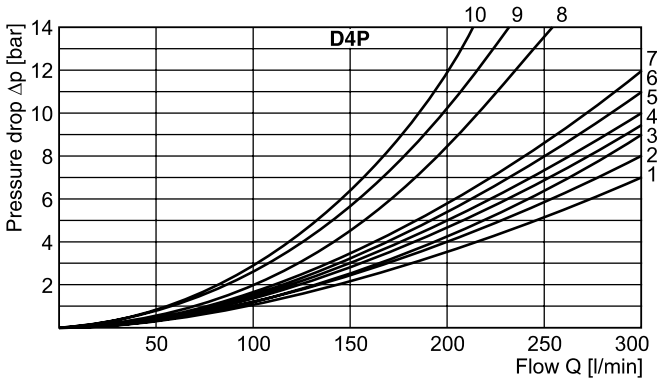


All characteristic curves measured with HLP46 at 50°C.

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

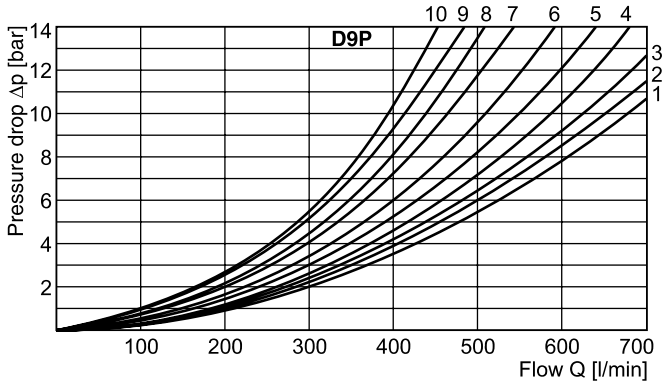
D4P

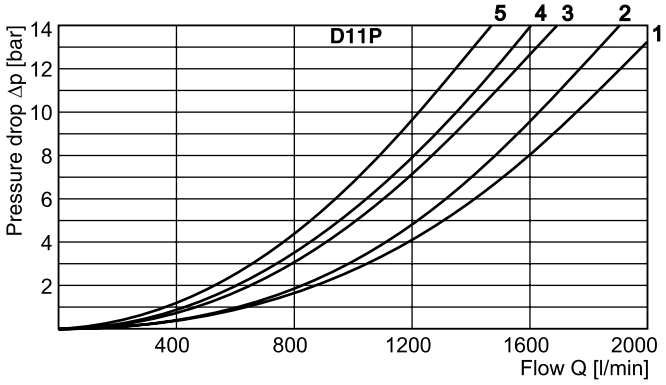
Spool Code	Curve number				
	P-A	P-B	P-T	A-T	B-T
1	1	1	–	4	5
2	1	2	6	4	6
3	1	2	–	5	6
4	1	1	–	5	5
5	2	2	–	3	5
6	1	2	–	3	6
7	1	1	6	4	5
9	2	9	8	7	10
11	1	1	–	4	5
14	1	1	6	4	5
15	1	2	–	4	6
16	2	2	–	3	5
20	3	5	–	3	5
21	2	8	–	2	–
22	8	2	–	–	3
26	3	5	–	–	–
30	2	3	–	6	7
54	2	3	–	6	7



D9P and D11P

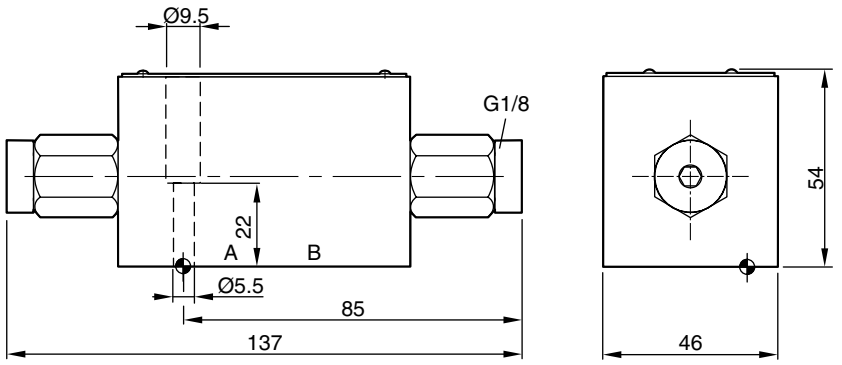
Spool Code	Curve number									
	P-A		P-B		P-T		A-T		B-T	
	D9	D11	D9	D11	D9	D11	D9	D11	D9	D11
1	3	5	2	5	–	–	3	4	5	1
2	2	5	1	5	1	5	3	4	5	1
3	4	–	2	–	–	–	3	–	6	–
4	4	–	3	–	–	–	3	–	5	–
5	1	–	2	–	–	–	4	–	5	–
6	2	–	2	–	–	–	4	–	6	–
7	3	–	1	–	7	–	3	–	5	–
9	4	3	8	3	9	2	4	3	10	1
11	3	–	2	–	–	–	3	–	5	–
14	1	–	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





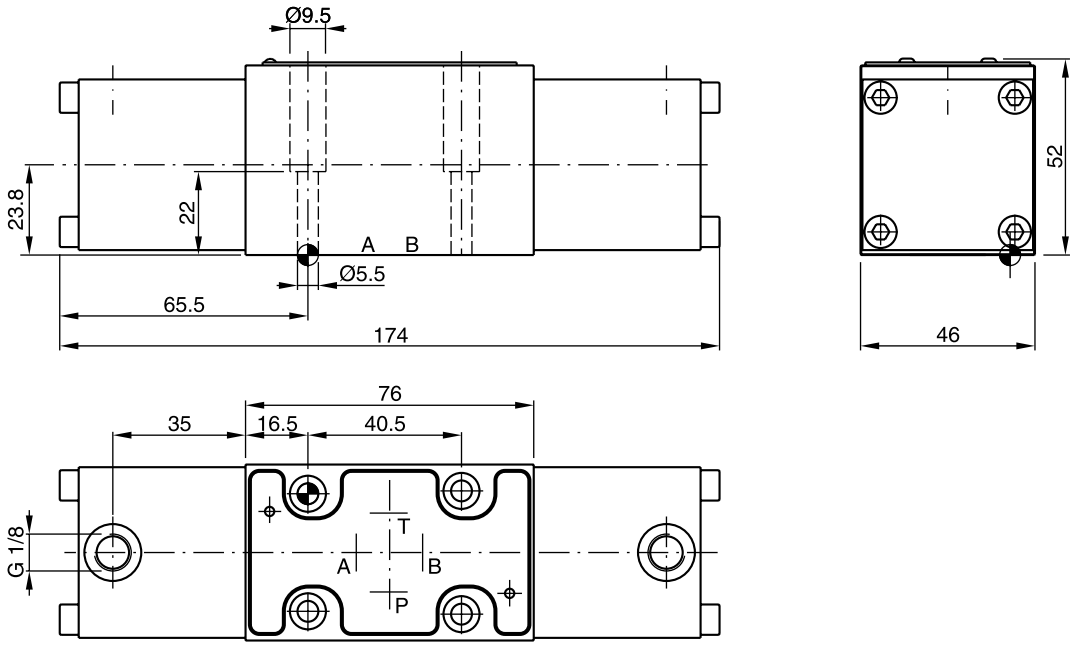
All characteristic curves measured with HLP46 at 50°C.

D1VP*90



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-N-87** FPM: SK-D1VP-V-87

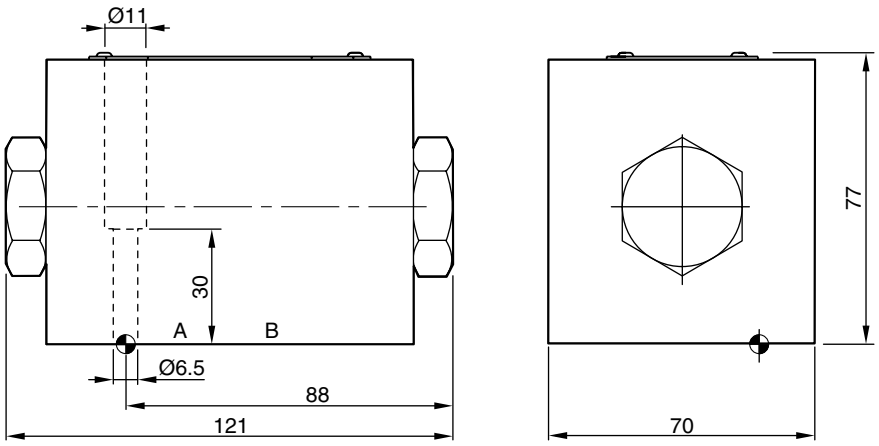
D1VP*4L



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-N4L-91** FPM: SK-D1VP-V4L-91

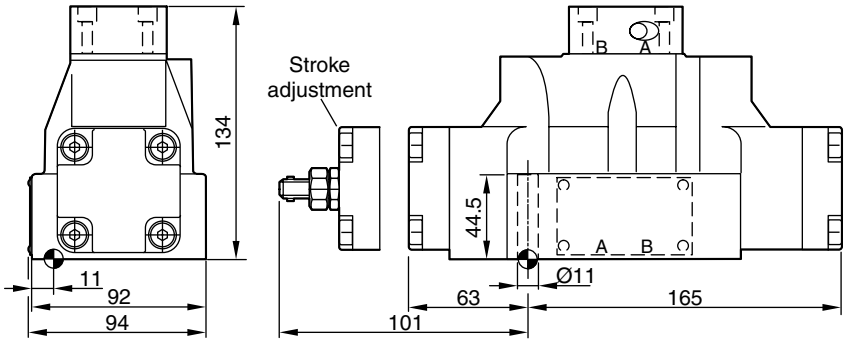
2

D3DP



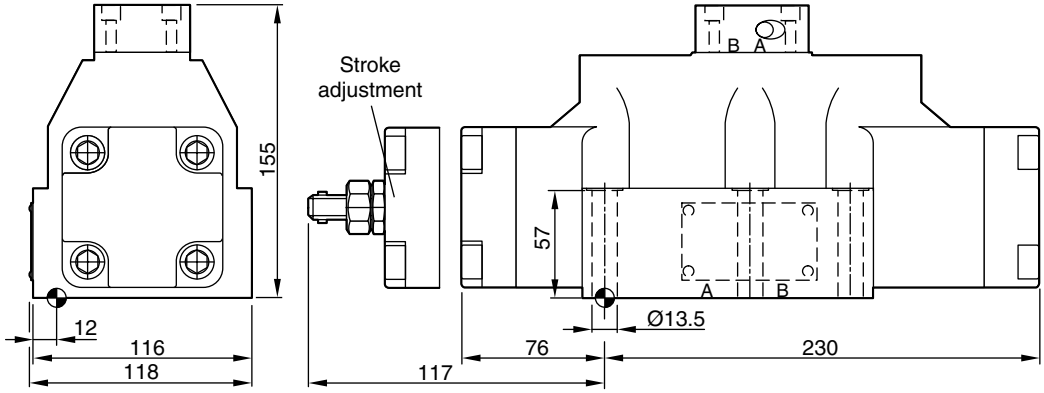
Surface finish	Kit			Kit
R_{max}6.3 ▱ 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D3DP-35** FPM: SK-D3DP-V35

D4P



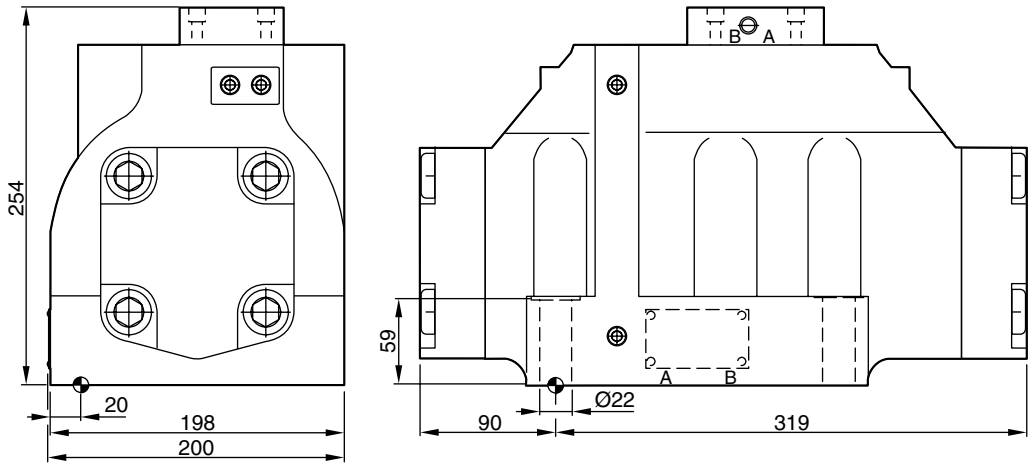
Surface finish	Kit			Kit
R_{max}6.3 ▱ 0.01/100	BK320	4x M10x60 2 x M6x55 DIN 912 12.9	63 Nm ±15% 13.2 Nm ±15%	**NBR: SK-D41VW-70** FPM: SK-D41VW-V70

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