

### Characteristics

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.

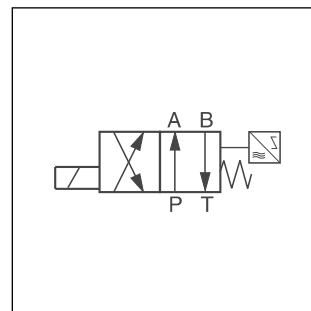
#### Attention

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

## Directional Control Valve Series D1VW Inductive Position Control



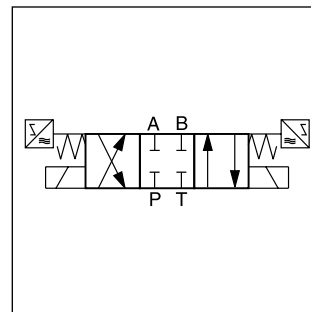
D1VW\*B



D1VW\*B

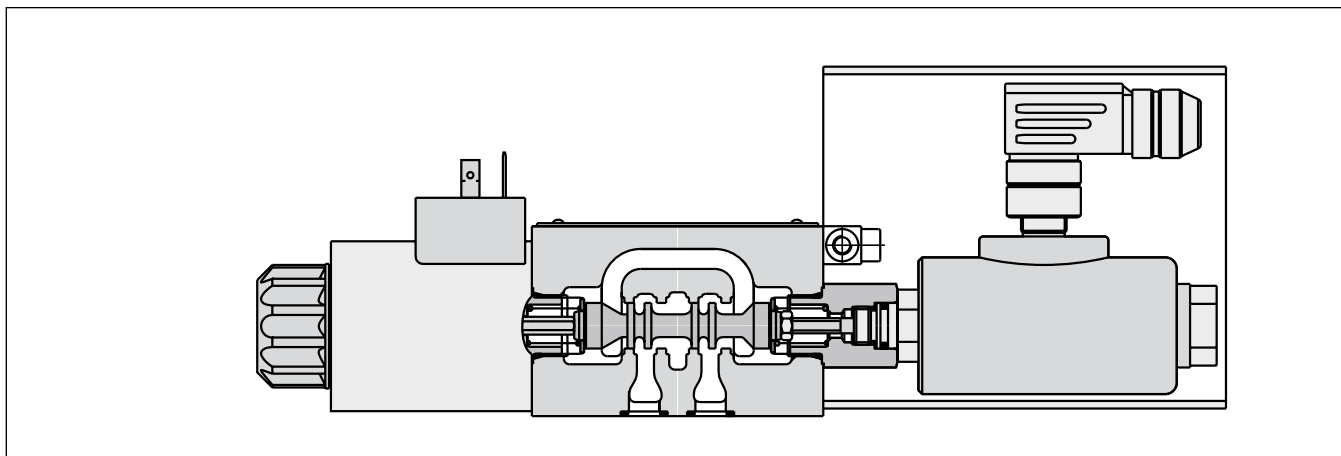


D1VW\*C

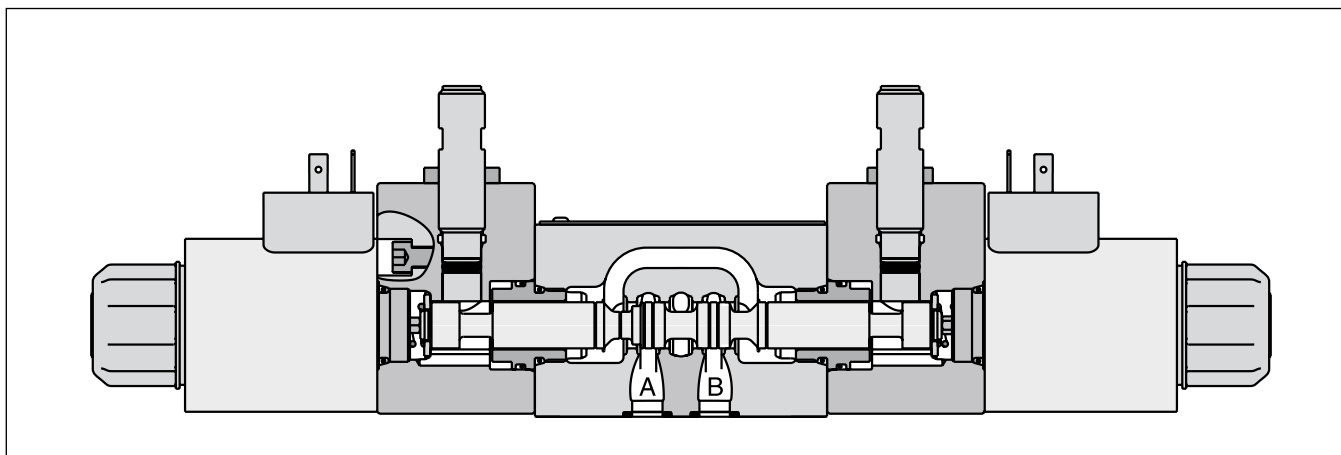


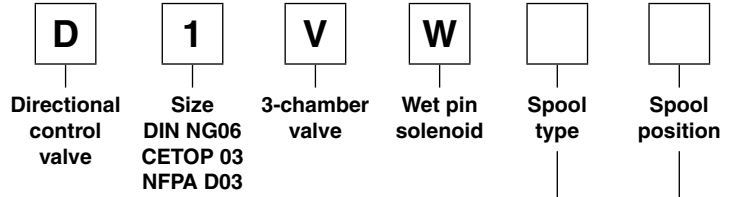
D1VW\*C

#### D1VW\*B



#### D1VW\*C





**2**

3 position spools	
Code	Spool type
	a 0 b
001	
002	
003 <sup>1)2)</sup>	
004	
005 <sup>1)</sup>	
015 <sup>1)3)</sup>	
016 <sup>1)</sup>	
076 <sup>1)</sup>	
078 <sup>1)</sup>	

2 position spools	
Code	Spool type
	a b
020	
026 <sup>4)</sup>	
030 <sup>4)</sup>	

<sup>1)</sup> Spool types on request for spool position "C".  
<sup>2)</sup> Only available for spool position "E" and "F".  
<sup>3)</sup> Only available for spool position "K" and "M".  
<sup>4)</sup> Only available for spool position "B" and "H".

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".	<b>2 positions.</b> <b>Spring offset in position "0".</b>
F	 Spring offset in position "b".	2 positions. Operated in position "0".
K	 Operated in position "b".	<b>2 positions.</b> <b>Spring offset in position "0".</b>
M	 Spring offset in position "a".	2 positions. Operated in position "0".

2 position spools		
Code	Spool position	
B	 Spring offset in position "b".	<b>2 positions.</b> <b>Spring offset in position "b".</b> <b>Operated in position "a".</b>
D <sup>5)</sup>	 Spring offset in position "a".	<b>2 positions.</b> <b>Spring offset in position "a".</b> <b>Operated in position "b".</b>
H	 Spring offset in position "a".	<b>2 positions.</b> <b>Spring offset in position "a".</b> <b>Operated in position "b".</b>

<sup>5)</sup> Only for position control (code I3N)

**Bold letters =**  
 Short-term availability



Seals



Solenoid voltage



**Connector as per EN 175301-803, without plug**  
 (please order plug separately)



Manual override option



Position control



**Design series**  
 (not required for ordering)

Code	Position control	Spool position
I2N	End position monitored side B	E, F, B (Solenoid on a-side)
<b>I5N<sup>7)</sup></b>	<b>Start position monitored side B</b>	
I1N	End position monitored side A	K, M, H (Solenoid on b-side)
<b>I4N<sup>7)</sup></b>	<b>Start position monitored side A</b>	
I3N	End positions	C, D
I6N <sup>7)</sup>	Start positions	C

Code	Manual override
<b>omit</b>	<b>Standard valve with manual override</b>
T <sup>7)</sup>	without manual override

<sup>7)</sup> 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=
<b>J</b>	<b>24V=</b>
U <sup>6)</sup>	98V=
G <sup>6)</sup>	205V=

<sup>6)</sup> To be used in combination with rectifier plugs at 120VAC / 230VAC power supply.

Code	Seals
<b>N</b>	<b>NBR</b>
V	FPM

Further spool types and voltages on request.

**Technical Data**

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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 <sub>D</sub> value	[years]	75			
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 (with correctly mounted plug-in connector)				
	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.

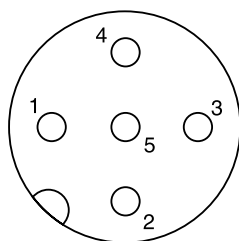
**Single solenoid valves**

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

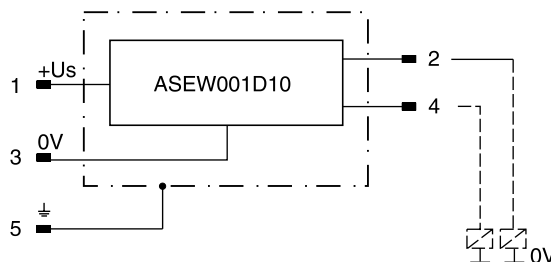
Protection class	IP 65 in accordance with EN 60529 (with correctly mounted plug-in connector)	
Ambient temperature	[°C]	0...+50
Supply voltage $U_s$ / ripple	[V]	18...42 / 10%
Current consumption without load	[mA]	≤ 30
Max. output current per channel, ohmic	[mA]	400
Min. output load per channel, ohmic	[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.	[mm <sup>2</sup> ]	5 x 0.25 braided shield recommended
Wiring length max.	[m]	50 recommended

**2**

**M12 pin assignment**



- 1  $U_s$  18...42V
- 2 Out B: normally open
- 3 0V
- 4 Out A: normally closed
- 5 Earth ground



**Definitions**

**Start position monitored:**

The valve is de-energized. The inductive switch gives a signal at the moment when the spool leaves the spring offset position (below 15% spool stroke). At the switching point the spool is located within the closed position. It is secured that only the flow paths of the offset position are granted.

**End position monitored:**

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

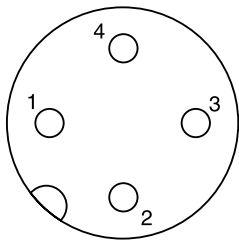
The switch can only be located on the opposite side of the solenoid for direct operated valves. Delivery includes plug M12 x 1 (see accessories, plug M12x1; order no.: 5004109).

**Double solenoid valves**

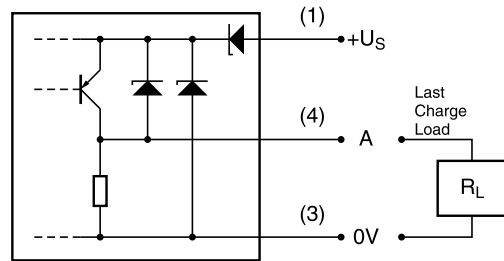
**Electrical characteristics of position control as per IEC 61076-2-101 (M12x1)**

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

**M12 pin assignment**



- 1  $U_s$  10...30V
- 2 not connected
- 3 0V
- 4 Out A: normally open

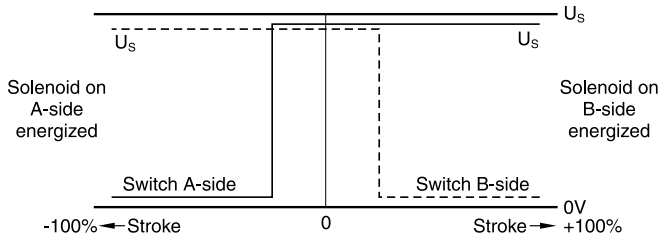


**Definitions**

**Start position monitored:**

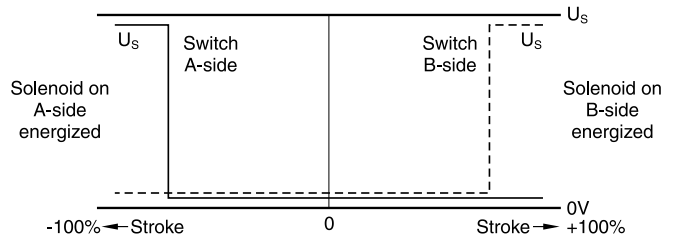
The valve is de-energized. The inductive switch gives a signal at the moment when the spool leaves the center position (below 15% spool stroke).

At the switching point the spool is located within the closed position. It is secured that only the flow paths of the offset position are granted.



**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.

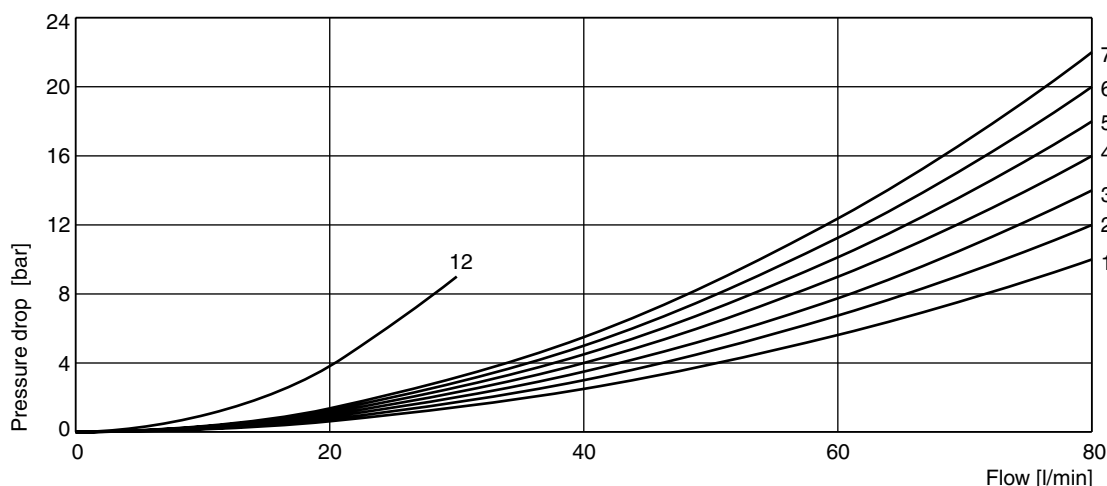
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number

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

Spool	Position „b“		Position „a“		Position „0“				
	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T
001	2	2	2	2	-	-	-	-	-
002	1	4	1	4	1	1	5	5	2
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	-	-	-	-	-

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**Flow curve diagram**

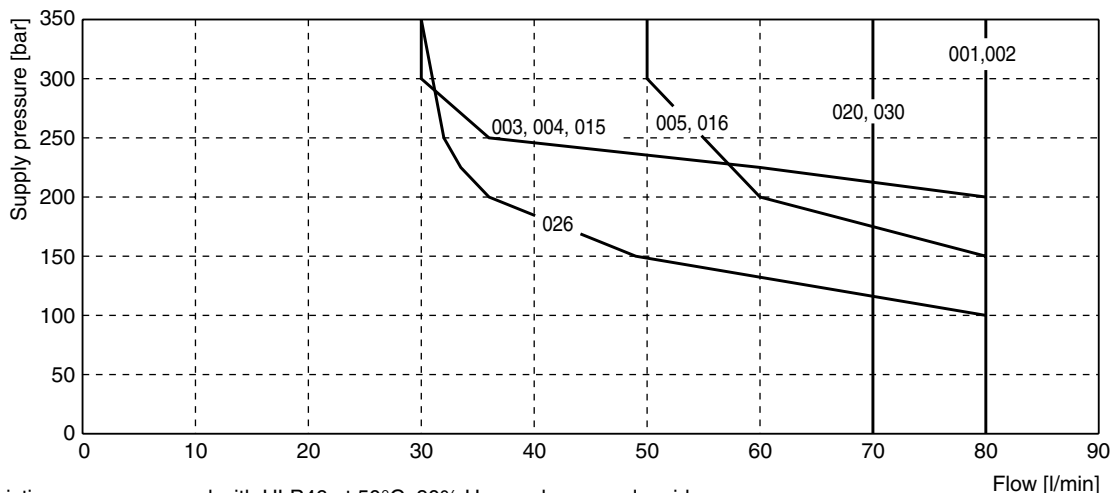


All characteristic curves measured with HLP46 at 50°C.

**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.



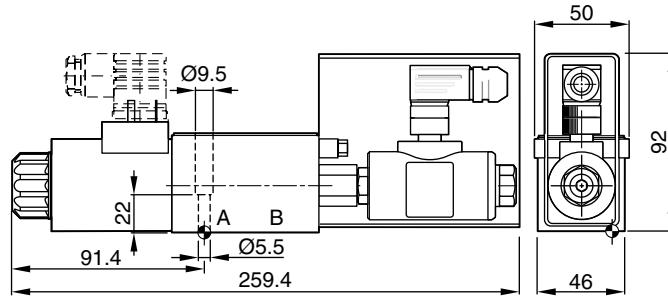
All characteristic curves measured with HLP46 at 50°C, 90% U<sub>nom</sub> and warm solenoids

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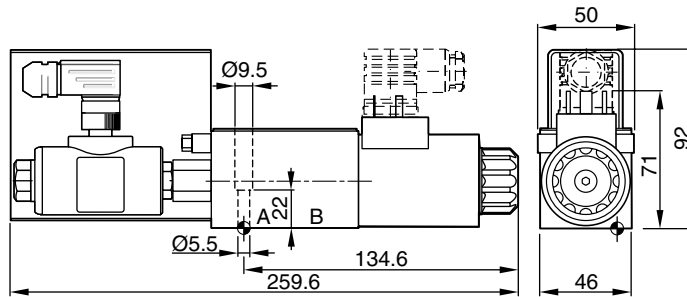
**Dimensions**

Interface EN 175301-803, DC solenoid, with plug M12x1<sup>1)</sup>  
B, E, F -style

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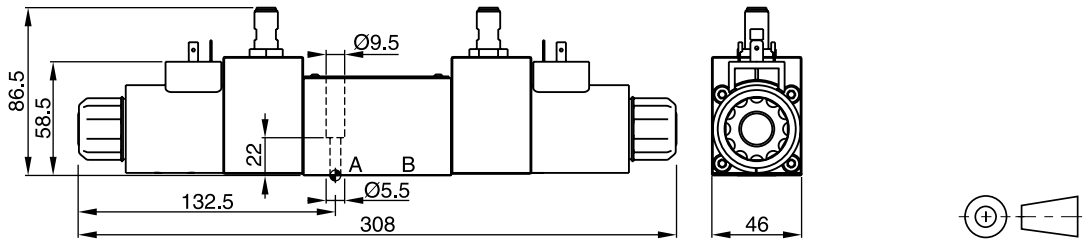


H, K, M -style





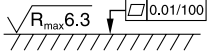


<sup>1)</sup> Delivery includes plug M12 x 1 (see accessories, plug M12x1; order no.: 5004109).

Interface EN 175301-803, DC solenoid, without plug M12x1<sup>2)</sup>  
C -style



<sup>2)</sup> Please order plug M12 x 1 separately. Straight plug recommended – no defined position possible for angled plug.

Surface finish	 Kit	 Kit	 Kit	 Kit
	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	<b>NBR: SK-D1VW-N-91</b> 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**

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