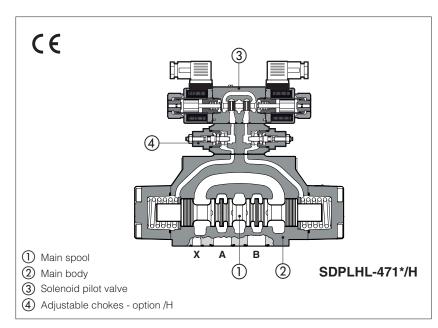


## Solenoid directional valves type SDPLHL

piloted, spool type, max pressure 280 bar



Spool type, pilot operated directional solenoid valves available in three or four way configurations.

These valves are specifically designed for medium pressure applications such as in the plastics sector.

They are operated by a directional valve ③ type SDHL (see technical table E018) equipped with threaded solenoids for AC or DC power supply.

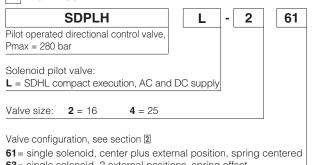
Spools ① are fully interchangeable and they are available in a wide range of hydraulic configurations.

The valves can be supplied with different options and special spools to best suit the application requirements, see section 4.

Rugged execution suitable for outdoor use.

Mounting surface: ISO 4401 size 16, 25 Max flow up to 300 and 700 l/min. Pressure up to 280 bar

1 MODEL CODE



63= single solenoid, 2 external positions, spring offset

67= single solenoid, center plus external position, spring offset

71= double solenoid, 3 positions, spring centered

Spool type, see section 2

75= double solenoid, 2 external positions, with detent

Note: SDPLHL-\* S PIL version without pilot solenoid valve available on request

/ A - X

24 DC

\*\*

Seals material, see section 3:

- = NBR
PE = FKM

Voltage code, see section 5

X = without connector
See section 11 for available connectors, to be ordered separately
XK = Deutsch connector

Options, see section 4

2 CONFIGURATIONS and SPOOLS (representation according to ISO 1219-1, for functional scheme, see section 4)

#### 3 MAIN CHARACTERISTICS, SEALS AND HYDRAULIC FLUID - for other fluids not included in below table, consult our technical office

Assembly position / location	Any position for all valves except for type -*70 (without springs) that must be installed with horizontal axis if operated by impulses.				
Subplate surface finishing	Roughness index Ra 0,4 - flatne	ess ratio 0,01/100 (ISO 1101)			
MTTFd values according to EN ISO 13849	75 years, for further details see	technical table P007			
Ambient temperature	Standard = $-30^{\circ}\text{C} \div +70^{\circ}\text{C}$ ; /P	<b>E</b> option = $-20^{\circ}$ C ÷ $+70^{\circ}$ C;			
Seals, recommended fluid temperature	NBR seals (standard) = -20°C = FKM seals (/PE option)= -20°C	- +80°C, with HFC hydraulic fluids ÷ +80°C	s = -20°C ÷ +50°C		
Recommended viscosity	15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s				
Max fluid contamination level	ISO4406 class 20/18/15 NAS1638 class 9, see also filter section at www.atos.com or KTF catalog				
Hydraulic fluid	Suitable seals type	Classification	Ref. Standard		
Mineral oils	NBR, FKM	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524		
Flame resistant without water	FKM	HFDU, HFDR	100 1000		
Flame resistant with water	NBR	HFC	ISO 12922		
Flow direction	As shown in the symbols of tabl	e <b>2</b>			
Operating pressure	P, A, B, X = <b>280 bar</b> T = <b>210 bar</b> for external drain (standard) T with internal drain (option /D) and port Y = <b>210 bar</b> SDPLHL (DC); <b>160 bar</b> SDPLHL (AC) Minimum pilot pressure = 8 bar				
Rated flow	See diagrams Q/ $\Delta$ p at section 6				
Maximum flow	SDPLHL-2: <b>300 l/min;</b> SDPLHL-4: <b>700 l/min;</b> (see rated flow at section <b>(a)</b> and operating limits at section <b>(7)</b> )				

#### 3.1 Coils characteristics

Insulation class	H (180°C) for DC coils  F (155°C) for AC coils  Due to the occuring surface temperatures of the solenoid coils, the European standards  EN ISO 13732-1 and EN ISO 4413 must be taken into account
Protection degree to DIN EN 60529	IP 65 (with connectors 666, 667 correctly assembled)
Relative duty factor	100%
Supply voltage and frequency	See electric features 5
Supply voltage tolerance	± 10%

#### 4 NOTES

#### 4.1 Options

/A = Solenoid mounted at side of port A of main body (only for single solenoid valves).
In standard version, solenoid is mounted at side of port B.

/D = Internal drain (standard configuration is external drain)

/E = External pilot pressure (standard configuration is internal pilot pressure).

/R = Pilot pressure generator (4 bar on port P) see section 4.2

/S = Main spool stroke adjustment.

/WP = Prolonged manual override protected by rubber cap.

The manual override operation can be possible only if the pressure at T port is lower than 50 har

# Devices for main spool switching control and to reduce the hydraulic shocks at the valve operation

/H = Adjustable chokes (meter-out to the pilot chambers of the main valve).

/L1, /L2, /L3 = calibrated restrictors on A and B ports of the pilot valve: L1 =0,8mm, L2 =1mm, L3 =1,25mm)

/L9 = plug with calibrated restictor in P port of pilot valve - see section 9

Suggested for pilot pressure higher than 210 bar or to limit the hydraulics shocks caused by the fast main spool switching

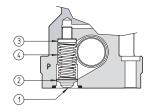
#### 4.2 Special shaped spools

- spools type 0 and 3 are also available as 0/1 and 3/1 with restricted oil passages in central position, from user ports to tank.
- spools type 1, 4 are also available as 1/1 and 4/8 that are properly shaped to reduce water-hammer shocks during the switching (to use with option /L\*).

Shaped spool availability	0/1	3/1	1/1	4/8
SDPLHL-2, SDPLHL-4	•	•	•	•

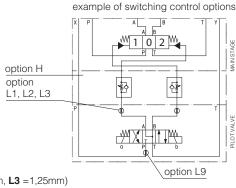
#### 4.3 Pilot pressure generator (option /R)

The device /R generates an additional pressure drop, in order to ensure the minimum pilot pressure, for correct operation of the valves with internal pilot and fitted with spools type 0, 0/1, 4, 4/8, 5, 58. The device /R has to be fitted when the pressure drop in the valve, verified on flow versus pressure diagrams, is lower than the minimum pilot pressure value.



- ① Flapper-guide
- ② Flapper
- Spring stop-washer
- 4 Spring

FUNCTIONAL SCHEME (config. 71)

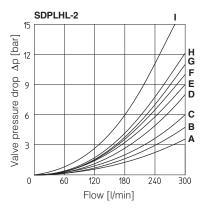


### 5 ELECTRIC FEATURES

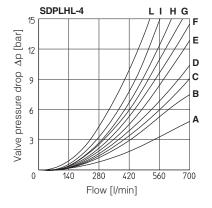
Valve	External supply nominal voltage ± 10%	Voltage code	Type of connector Power Code of spare coil  X version XK version		spare coil  XK version	
	12 DC	12 DC			COL-12DC	COLK-12DC
	14 DC	14 DC	666	29 W	COL-14DC	COLK-14DC
SDPLHL	24 DC	24 DC			COL-24DC	COLK-24DC
SUPLAL	28 DC	28 DC	or 667		COL-28DC	COLK-28DC
	110/50 AC	110/50/60 AC	58 VA <b>(3)</b>	50.1/A <b>(0)</b>	COL-110/50/60AC (1)	-
	230/50 AC	230/50/60 AC		COL-230/50/60AC (1)	-	

- (1) Coil can be supplied also with 60 Hz of voltage frequency: in this case the performances are reduced by 10÷15% and the power consumption is 58 VA
- (2) Average values based on tests performed at nominal hydraulic condition and ambient/coil temperature of 20°C.
- (3) When solenoid is energized, the inrush current is approx 3 times the holding current. Inrush current values correspond to a power consumption of about 150 VA.

## 6 FLOW VERSUS PRESSURE DIAGRAMS Based on mineral oil ISO VG 46 at 50°C



Flow direction Spool type		Р→В	A→T	В→Т	P→T
0/2, 1, 3, 6, 7	Α	Α	D	Α	-
1/1, 1/2	В	В	D	Е	-
0	Α	Α	D	E	С
0/1	Α	Α	D	-	-
2	Α	Α	-	-	-
2/2	В	В	-	-	-
3/1	Α	Α	D	D	-
4	С	С	Н	- 1	F
4/8	С	С	G	I	F
5	Α	В	F	Н	G
19	С	-	-	G	-
39	С	-	-	Н	-
58	В	Α	F	Н	Н
91	С	С	Е	-	-
93	-	С	D	-	-



Flow direction Spool type	P→A	Р→В	А→Т	В→Т	P→T
1	В	В	В	D	-
1/1	D	Ε	Ε	F	-
1/2	Е	D	В	С	-
0	D	С	D	Ε	F
0/1, 3/1, 6, 7	D	D	D	F	-
0/2	D	D	D	Ε	-
2	В	В	-	-	-
2/2	Ε	D	-	-	-
3	В	В	D	F	-
4	С	С	Н	L	L
5	Α	D	D	D	Н
19	F	-	-	Е	-
39	G	F	-	F	-
58	Е	Α	В	F	Н
91	F	F	D		
93	-	G	D	-	-

7 OPERATING LIMITS For a correct valve operation do not exceed the max recommended flow rates (I/min) shown in the below tables

#### SDPLHL-2

	Inl	Inlet pressure [bar]					
Spool	70	140	210	280			
		Flow rat	te [l/min]				
0, 1, 3, 6, 7, 8	300	300	300	300			
2, 4, 4/8	300	300	240	140			
5	260	220	180	100			
0/1, 0/2, 1/2	300	250	210	180			
58, *9, 9*	300	300	270	200			

#### SDPLHL-4

	Inlet pressure [bar]						
Spool	70	140	210	280			
	Flow rate [l/min]						
1, 6, 7, 8	700	700	700	600			
2, 4, 4/8	500	500	450	400			
5, 0/1, 0/2, 1/2	600	520	400	300			
0, 3	700	700	600	540			
58, *9, 9*	500	500	500	450			

#### 8 SWITCHING TIMES (average values in m sec)

				Piloting p	ressure				
		70 bar		140 bar		250 bar			
Valve model	Configuration		Alternating current	Direct current	Alternating current	Direct current	Alternating current	Direct current	
	71 01 07 01*/\(\Lambda\) 07*/\(\Lambda\)	Switch ON	40	55	30	50	20	40	
SDPLHL-2	71, 61, 67, 61*/A, 67*/A	Switch OFF			60	)			
SUPLIIL-2	63, 63*/A	Switch ON	55	80	45	70	35	55	
	03, 03 /A		95						
	71, 61, 67, 61*/A, 67*/A	Switch ON	60	80	45	60	30	45	
SDPLHL-4	, , , , , ,		80						
SUPLEL-4	63, 63*/A	Switch ON	95	115	75	95	50	65	
	65, 65 /A			130					

#### Notes:

- 1) For configuration 75, times of switching ON and switching OFF are the same: this value is equal to time of switch ON of configuration 63.
- 2) TEST CONDITIONS
- Nominal voltage supply DC (direct) and AC (alternating) with connector type SP-666. The use of other connectors can affect the switching time;
- 2 bar of counter pressure on port T;
- mineral oil: ISO VG 46 at 50°C
- 3) The response time is affected by elasticity of the hydraulic circuit, by variation of hydraulic characteristics and temperature.

### 9 PLUGS LOCATION FOR PILOT/DRAIN CHANNELS

Depending on the position of internal plugs, different pilot/drain configurations can be obtained as shown below. To modify the pilot/drain configuration, proper plugs must only be interchanged. The plugs have to be sealed using loctite 270. Standard valves configuration provides internal pilot and external drain

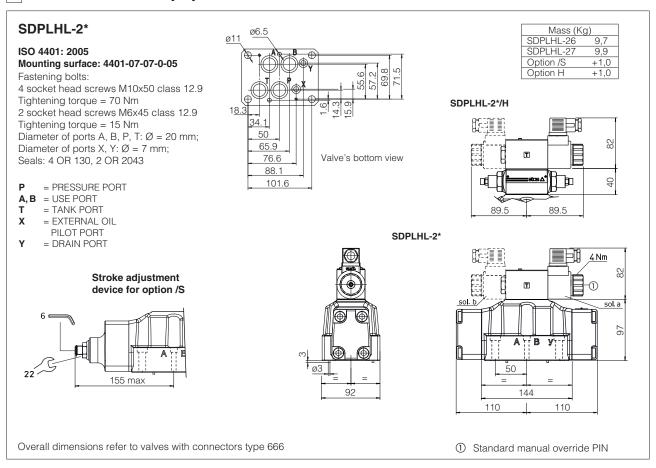
#### SDPLHL-2 Drain channels Pilot channels Internal piloting: Without blinded plug SP-X300F ①; External piloting: Add blinded plug SP-X300F ①; 2 Without blinded plug SP-X300F @; Internal drain: **External drain:** Add blinded plug SP-X300F ②. Ø 1,2 mm Option L9 This option provides a calibrated restrictor PLUG-H-12A (Ø 1,2 mm) in the P port of the pilot valve PLUG-12A SDPLHL-4 Pilot channels **Drain channels** Internal piloting: Without blinded plug SP-X500F ①; External piloting: Add blinded plug SP-X500F ①; Internal drain: Without blinded plug SP-X300F 2; External drain: Add blinded plug SP-X300F 2. Ø 1,5 mm Option L9 This option provides a a calibrated restrictor PLUG-H-15A (Ø 1,5 mm) in the P port of the pilot valve

#### 10 ELECTRIC CONNECTORS ACCORDING TO DIN 43650 - the connectors must be ordered separately

Connector code	Function			
666	666 Connector IP65, suitable for direct connection to electric supply source			
667	As 666 connector IP65 but with built-in signal led, suitable for direct connection to electric supply source			

PLUG-15A

#### 11 DIMENSIONS FOR SDPLHL-2 [mm]



#### 12 DIMENSIONS FOR SDPLHL-4 [mm]

