Solenoid directional valves type SDHL - compact execution
direct operated, ISO 4401 size 06

Spool type, two or three position direct operated valves size 06 in compact execution with reduced solenoids dimensions, ideal for applications in mini power packs, mobile and agricultural machines.

Solenoids are made by:
- wet type screwed tube \( \circ \), different for AC and DC power supply, with integrated manual override pin \( \circ \)
- interchangeable coils \( \circ \), specific for AC or DC power supply, easily replaceable without tools - see section 5 for available voltages

Standard coils protection IP65
Wide range of interchangeable spools \( \circ \), see section 2.
The valve body \( \circ \) is 3 chamber type made by shell-moulding casting with wide internal passages ensuring low pressure drops.

Mounting surface: ISO 4401 size 06
Max flow: 60 l/min
Max pressure: 350 bar

### 1 MODEL CODE

<table>
<thead>
<tr>
<th>SDHL - 0</th>
<th>61</th>
<th>1</th>
<th>/A</th>
<th>-</th>
<th>X</th>
<th>24 DC</th>
<th>**</th>
<th>/ *</th>
</tr>
</thead>
</table>

Directional control valves size 06 compact execution

Valve configuration, see section 3
61 = single solenoid, center plus external position, spring centered
63 = single solenoid, 2 external positions, spring offset
71 = double solenoid, 3 positions, spring centered
75 = double solenoid, 2 external positions, with detent

Spool type, see section 4.

Options: A, WP, see section 5

X = without connector
See section 7 for available connectors, to be ordered separately

### 2 CONFIGURATIONS and SPOOLS (representation according to ISO 1219-1)

#### 2.1 Special 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, 5 and 58 are also available as 1/1, 4/6, 5/1 and 58/1. They are properly shaped to reduce water-hammer shocks during the switching.
- spools type 1, 1/2, 3, 8 are available as 1P, 1/2P, 3P, 8P to limit valve internal leakages.
- Other types of spools can be supplied on request.

### Diagram

![Diagram of SDHL-061*-AC and SDHL-071*-DC valves]
3 MAIN CHARACTERISTICS

Assembly position / location  Any position
Subplate surface finishing Roughness index Ra 0.4 - flatness ratio 0.01/100 (ISO 1101)
Ambient temperature  Standard execution = -30°C ÷ +70°C
/PE option = -20°C ÷ +70°C
Flow direction  As shown in the symbols of table 6
Operating pressure  Ports P.A.B: 350 bar;
                         Port T 210 bar for DC version; 160 bar for AC version
Maximum flow  60 l/min, see Q/Δp diagram at section 8 and operating limits at section 9

3.1 Coils characteristics

Insulation class  H (180°C) for DC coils  F (155°C) for AC coils
Due to the occurring 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 feature 8
Supply voltage tolerance ± 10%

4 SEALS AND HYDRAULIC FLUID - for other fluids not included in below table, consult our technical office

Seals, recommended fluid temperature
NBR seals (standard) = -20°C ÷ +80°C, with HFC hydraulic fluids = -20°C ÷ +50°C
FKM seals (/PE option) = -20°C ÷ +80°C
Recommended viscosity  15 to 100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s
Fluid contamination class  ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 μm (β10 > 75 recommended)

Hydraulic fluid
<table>
<thead>
<tr>
<th>Suitable seals type</th>
<th>Classification</th>
<th>Ref. Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBR, FKM</td>
<td>HL, HLP, HLPD, HVLP, HVLPD</td>
<td>DIN 51524</td>
</tr>
<tr>
<td>FKM</td>
<td>HFDU, HFDR</td>
<td>ISO 12922</td>
</tr>
<tr>
<td>NBR</td>
<td>HFC</td>
<td></td>
</tr>
</tbody>
</table>

5 OPTIONS

Options
A = Solenoid mounted at side of port B (only for single solenoid valves). In standard versions, solenoid is mounted at side of port A.
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 bar

6 ELECTRIC FEATURES

<table>
<thead>
<tr>
<th>External supply nominal voltage ± 10%</th>
<th>Voltage code</th>
<th>Type of connector</th>
<th>Power consumption (2)</th>
<th>Code of spare coil SDH1</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 DC</td>
<td>12 DC</td>
<td>666 or 667</td>
<td>22 W</td>
<td>COL-12DC</td>
</tr>
<tr>
<td>14 DC</td>
<td>14 DC</td>
<td></td>
<td></td>
<td>COL-14DC</td>
</tr>
<tr>
<td>24 DC</td>
<td>24 DC</td>
<td></td>
<td></td>
<td>COL-24DC</td>
</tr>
<tr>
<td>28 DC</td>
<td>28 DC</td>
<td></td>
<td></td>
<td>COL-28DC</td>
</tr>
<tr>
<td>110/50 AC (1)</td>
<td>110/50/60 AC</td>
<td></td>
<td>58 VA</td>
<td>COL-110/50/60AC</td>
</tr>
<tr>
<td>230/50/60 AC (1)</td>
<td></td>
<td></td>
<td></td>
<td>COL-230/50/60AC</td>
</tr>
</tbody>
</table>

(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 52 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.

7 ELECTRIC CONNECTORS ACCORDING TO DIN 43650 (to be ordered separately)
666 = standard connector IP-65, suitable for direct connection to electric supply source.
667 = as 666, but with built-in signal led.
8 **Q/P DIAGRAMS** based on mineral oil ISO VG 46 at 50°C

<table>
<thead>
<tr>
<th>Spool type</th>
<th>P→A</th>
<th>P→B</th>
<th>A→T</th>
<th>B→T</th>
<th>P→T</th>
</tr>
</thead>
<tbody>
<tr>
<td>0, 0/1</td>
<td>A</td>
<td>A</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>1, 1/1</td>
<td>D</td>
<td>C</td>
<td>D</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>3, 3/1</td>
<td>D</td>
<td>D</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>4, 4/8, 5, 5/1, 58, 58/1</td>
<td>F</td>
<td>F</td>
<td>C</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>1/2, 2/2</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>6, 7</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>8</td>
<td>A</td>
<td>A</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>2</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>2/2</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>19, 91</td>
<td>E</td>
<td>E</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>39, 93</td>
<td>F</td>
<td>F</td>
<td>G</td>
<td>G</td>
<td>G</td>
</tr>
</tbody>
</table>

9 **OPERATING LIMITS** based on mineral oil ISO VG 46 at 50°C

The diagrams have been obtained with warm solenoids and power supply at lowest value (V nominal - 10%). The curves refer to application with symmetrical flow through the valve (i.e., P→A and B→T). In case of asymmetric flow and if the valves have the devices for controlling the switching times the operating limits must be reduced.

<table>
<thead>
<tr>
<th>Curve</th>
<th>DC version, spool type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0, 0/1, 0/2, 1/2, 8</td>
</tr>
<tr>
<td>B</td>
<td>1, 1/1</td>
</tr>
<tr>
<td>C</td>
<td>3, 3/1, 6, 7</td>
</tr>
<tr>
<td>D</td>
<td>4, 4/8, 5, 5/1, 19, 39, 58, 58/1, 91, 93</td>
</tr>
<tr>
<td>E</td>
<td>2, 2/2</td>
</tr>
</tbody>
</table>

10 **SWITCHING TIMES** (average values in msec)

Test conditions: - 20 l/min, 150 bar
- nominal voltage
- 2 bar of counter pressure on port T
- mineral oil: ISO VG 46 at 50°C

The elasticity of the hydraulic circuit and the variations of the hydraulic characteristics and temperature affect the response time.

<table>
<thead>
<tr>
<th>Valve</th>
<th>Switch-on</th>
<th>Switch-off</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AC</td>
<td>DC</td>
</tr>
<tr>
<td>SDHL</td>
<td>10 - 25</td>
<td>20 - 40</td>
</tr>
<tr>
<td></td>
<td>30 - 50</td>
<td>15 - 25</td>
</tr>
</tbody>
</table>

11 **SWITCHING FREQUENCY**

<table>
<thead>
<tr>
<th>Valve</th>
<th>AC (cycles/h)</th>
<th>DC (cycles/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDHL</td>
<td>666 / 667</td>
<td>7200</td>
</tr>
</tbody>
</table>
ISO 4401: 2005
Mounting surface: 4401-03-02-0-05
Fastening bolts: 4 socket head screws: M5x30 class 12.9
Tightening torque = 8 Nm
Seals: 4 OR 108
Ports P,A,B,T: Ø = 7.5 mm (max)

P = PRESSURE PORT
A, B = USE PORT
T = TANK PORT

The use of plug-in restrictors in valve’s ports P or A or B may be necessary in case of particular conditions as long flexible hoses or the presence of accumulators which could cause at the valve switching instantaneous high flow peaks over the max valve’s operating limits.

Mass: 1.3 kg
Mass: 1.6 kg

Mass: 1.2 kg
Mass: 1.4 kg

Option /WP (DC version)
Option /WP (AC version)

Standard manual override PIN

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

Overall dimensions refer to valves with connector 666

PLUG-IN RESTRICTOR (to be ordered separately)

The use of plug-in restrictors in valve’s ports P or A or B may be necessary in case of particular conditions as long flexible hoses or the presence of accumulators which could cause at the valve switching instantaneous high flow peaks over the max valve’s operating limits.

Ordering code: PLUG H - **

08, 10, 12, 15 calibrated orifice diameter in tenths of mm
Example PLUG-H-12 = orifice diameter 1.2 mm
Other orifice dimensions are available on request