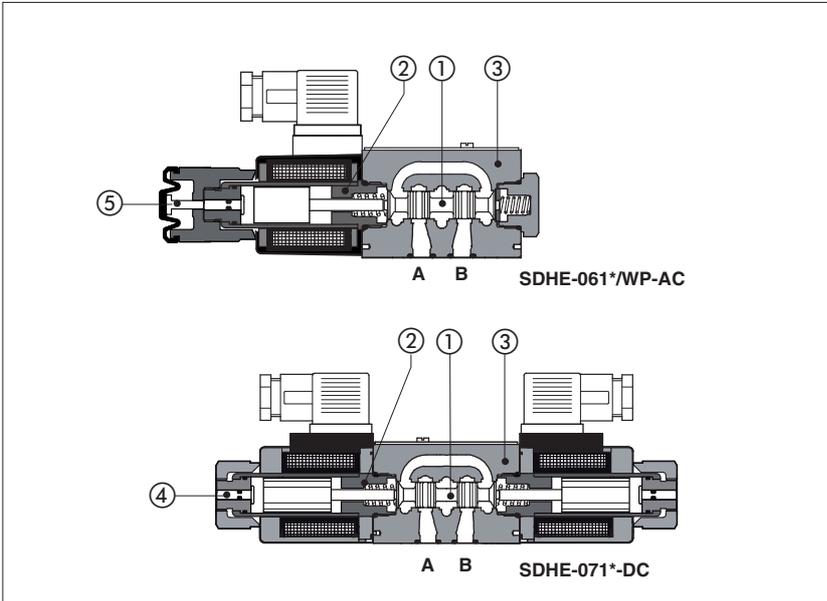


# Solenoid directional valves type SDHE

direct operated, high performances, ISO 4401 size 06



Spool type, high performance direct operated valves with threaded solenoids certified according to the North American standard **cURus**.

Single and double solenoid valves are available in two or three position configurations and with a wide range of interchangeable spools (1) with different schemes, three or four way connections, see section 2.

Solenoids (2) are made by:

- wet type screwed tube, different for AC and DC power supply, with integrated manual override pin (4)
- interchangeable coils, specific for AC or DC power supply, easily replaceable without tools - see section 5 for available voltages

Standard coils protection **IP65** (once correctly assembled with relevant electric connectors).

The coils are insulated according to class H for DC and F for AC versions.

The valve body (3) is 3 chamber type made by shell-moulding casting with wide internal passages.

### Options

- prolonged manual override protected with rubber cap (5) for easy hand operation
- control devices of the valve switching time
- optional **IP67** AMP Junior Timer and Deutsch coil's connectors or lead wire for customized applications

### Surface mounting ISO 4401 size 06

**Max flow up to 80 l/min**  
**Max pressure: 350 bar**

### 1 MODEL CODE

**SDHE - 0 63 1/2 /A - X 24 DC \*\* /\***

Directional control valves size 06

Valve configuration, see section 2

- 61** = single solenoid, center plus external position, spring centered
- 63** = single solenoid, 2 external positions, spring offset
- 67** = single solenoid, center plus external position, spring offset
- 71** = double solenoid, 3 positions, spring centered
- 75** = double solenoid, 2 external positions, with detent

Spool type, see section 2

Options, see note 1 at section 4

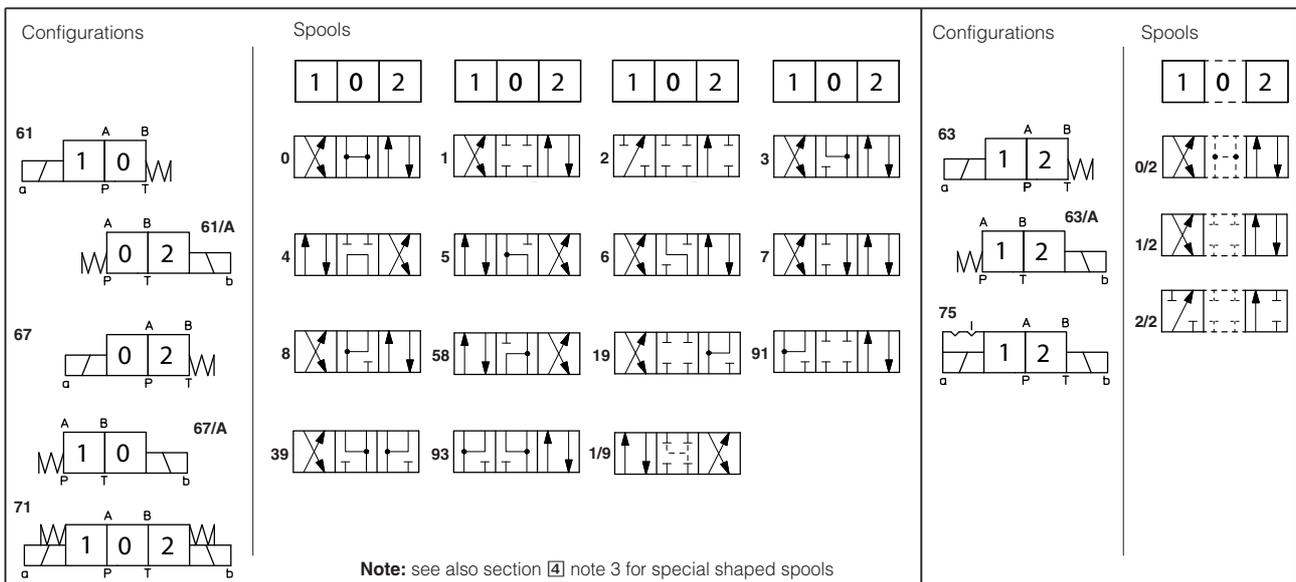
Seals material:  
omit for NBR (mineral oil & water glycol)  
**PE** = FPM

Series number

Voltage code, see section 5

- X** = without connector  
See note 2 at section 4 for available connectors, to be ordered separately
- Coils with special connectors, see section 11
- XJ** = AMP Junior Timer connector
- XK** = Deutsch connector
- XS** = Lead Wire connection

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



### 3 MAIN CHARACTERISTICS OF SDHE DIRECTIONAL VALVES

Assembly position / location	Any position
Subplate surface finishing	Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)
Ambient temperature	from -30°C to +70°C (standard seals) -20°C to +70°C (/PE seals) (1)
Fluid	Hydraulic mineral oil HL, HLP as per DIN 51524
Recommended viscosity	15 ÷ 100 mm <sup>2</sup> /s - max allowed range 2,8 ÷ 500 mm <sup>2</sup> /s
Fluid contamination class	ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 µm (β <sub>25</sub> ≥ 75 recommended)
Fluid temperature	-30°C +60°C (standard seals) -20°C +80°C (/PE seals)
Flow direction	As shown in the symbols of section 2
<b>Operating pressure</b>	Ports P,A,B: <b>350</b> bar; Port T <b>210</b> bar for DC version; <b>160</b> bar for AC version
Rated flow	See diagrams Q/Δp at section 6
<b>Maximum flow</b>	<b>80 l/min</b> , see operating limits at section 7

(1) Option /BT = special version for ambient temperature -40°C +60°C available on request

#### 3.1 Coils characteristics

Insulation class	<b>H</b> (180°C) for DC coils <b>F</b> (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	<b>IP 65</b> (with connectors 666, 667, 669 or E-SD correctly assembled)
Relative duty factor	100%
Supply voltage and frequency	See electric feature 5
Supply voltage tolerance	± 10%
Certification	<b>cURus</b> North American Standard

### 4 NOTES

#### 1 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 - see section 12.

**L1, L2, L3** = (only for SDHE-DC) device for switching time control, installed in the valve solenoid, see section 9.  
 For spools 4 and 4/8 only device L3 is available.

#### 2 Type of electric/electronic connector 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.  
**669** = with built-in rectifier bridge for supplying DC coils by alternate current (AC 110V and 230V - I<sub>max</sub> 1A).

#### 3 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, 4/8, 5/1** and **58/1**. They are properly shaped to reduce water-hammer shocks during the swiching.
- 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.

### 5 ELECTRIC FEATURES

External supply nominal voltage ± 10%	Voltage code	Type of connector	Power consumption (2)	Code of spare coil
12 DC	<b>12 DC</b>	666 or 667	30 W	SCOE-12DC /10
14 DC	<b>14 DC</b>			SCOE-14DC /10
24 DC	<b>24 DC</b>			SCOE-24DC /10
28 DC	<b>28 DC</b>			SCOE-28DC /10
110 DC	<b>110 DC</b>			SCOE-110DC /10
220 DC	<b>220 DC</b>			SCOE-220DC /10
110/50 AC	<b>110/50/60 AC</b>	669	58 VA (3)	SCOE-110/50/60AC /10 (1)
230/50 AC	<b>230/50/60 AC</b>			SCOE-230/50/60AC /10 (1)
110/50 AC - 120/60 AC	<b>110 RC</b>	669	30 W	SCOE-110RC
230/50 AC - 230/60 AC	<b>230 RC</b>			SCOE-230RC

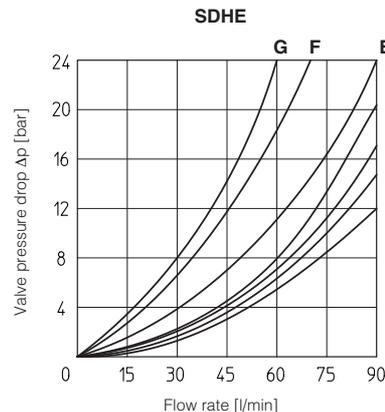
(1) Coil can be supplied also with 60 Hz of voltage frequency: in this case the performances are reduced by 10 ÷ 15% and the power consumption is 52 VA.

(2) Average values based on tests preformed 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 160 VA.

**6 Q/ΔP DIAGRAMS** based on mineral oil ISO VG 46 at 50°C

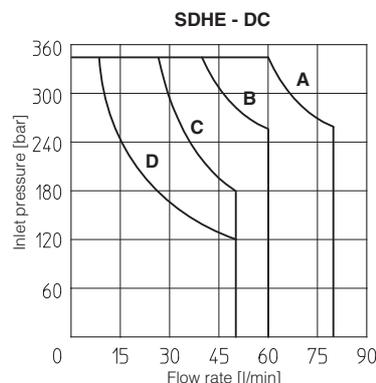
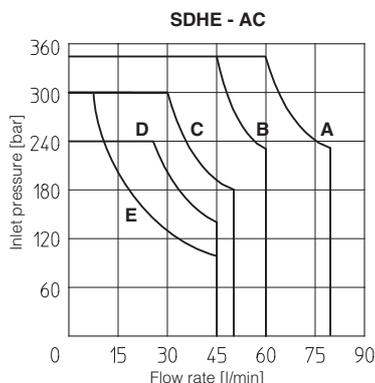
Spool type	Flow direction				
	P→A	P→B	A→T	B→T	P→T
0, 0/1	A	A	C	C	D
1, 1/1, 1/9	D	C	C	C	
3, 3/1	D	D	A	A	
4, 4/8, 5, 5/1, 58, 58/1	F	F	G	C	E
1/2, 0/2	D	D	D	D	
6, 7	D	D	D	D	
8	A	A	E	E	
2	D	D			
2/2	F	F			
19, 91	E	E	D	D	
39, 93	F	F	G	G	



**7 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 ( $V_{nom} - 10\%$ ). 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.

Curve	Spool type	
	AC	DC
A	1, 1/2, 8	0, 0/1, 1, 1/2, 3, 8
B	0, 0/1, 0/2, 1/1, 1/9, 3	0/2, 1/1, 6, 7, 1/9, 19
C	3/1, 6, 7	3/1, 4, 4/8, 5, 5/1, 39, 58, 58/1, 91, 93
D	4, 4/8, 5, 5/1, 19, 39, 58, 58/1, 91, 93	2, 2/2
E	2, 2/2	-



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

Test conditions: - 36 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.

Valve	Switch-on AC	Switch-off AC	Switch-on DC	Switch-off DC
SDHE	10 - 25	20 - 40	30 - 50	15 - 25
SDHE-*/L1	—	—	60	60
SDHE-*/L2	—	—	80	80
SDHE-*/L3	—	—	150	150

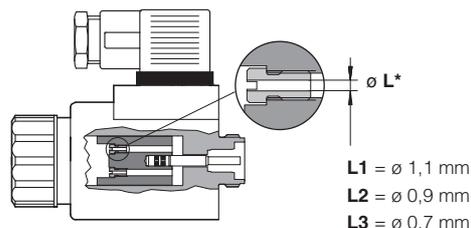
**10 SWITCHING FREQUENCY**

Valve	AC (cycles/h)	DC (cycles/h)
SDHE + 666 / 667	7200	15000

**9 DEVICES FOR THE SWITCHING TIME CONTROL**

These devices are used to control the valve's switching time (only for DC version) and therefore reduce the hammering shocks in the hydraulic circuit.

Options L1, L2, L3 control the switching time in both moving directions of the valve spool by means of calibrated restrictors installed in the solenoid anchor.



**11 COIL WITH SPECIAL CONNECTORS** only for voltage supply 12, 14, 24, 28 Vdc

AMP Junior timer connector	Deutsch connector DT-04-2P	Lead Wire connection
<p><b>Options -XJ</b>                      Coil type SCOEJ                      AMP Junior Timer connector                      Protection degree IP67</p>	<p><b>Options -XK</b>                      Coil type SCOEK                      Deutsch connector DT-04-2P male                      Protection degree IP67</p>	<p><b>Options -XS</b>                      Coil type SCOEJ                      Lead Wire connection                      Cable length = 180 mm</p>

Note: for the electric characteristics refer to standard coils features - see section 5

**11 DIMENSIONS [mm]**

**ISO 4401: 2005**

**Mounting surface: 4401-03-02-0-05**

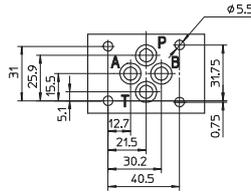
Fastening bolts: 4 socket head screws:

M5x30 class 12.9

Tightening torque = 8 Nm

Seals: 4 OR 108

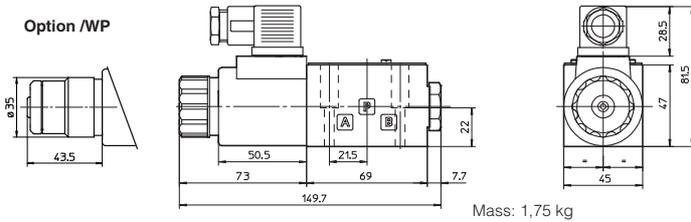
Ports P,A,B,T:  $\varnothing = 7.5$  mm (max).



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

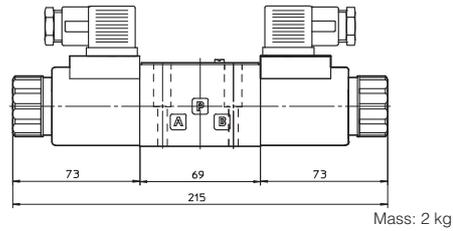
**SDHE-06(DC)**

Option /WP



Mass: 1,75 kg

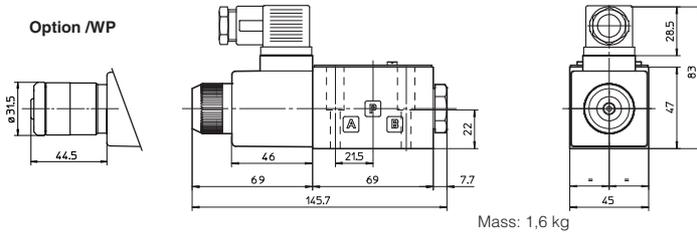
**SDHE-07(DC)**



Mass: 2 kg

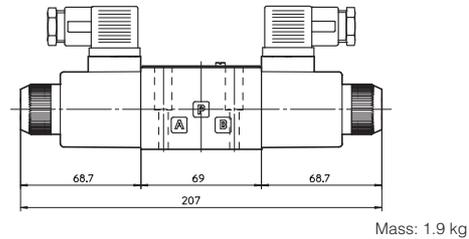
**SDHE-06(AC)**

Option /WP



Mass: 1,6 kg

**SDHE-07(AC)**



Mass: 1.9 kg

Overall dimensions refer to valves with connectors type SP-666

**12 ELECTRIC CONNECTORS ACCORDING TO DIN 43650 (to be ordered separately)**

666, 667 (for AC or DC supply)		669 (for AC supply)		CONNECTOR WIRING		
				<b>666, 667</b> 1 = Positive ⊕ 2 = Negative ⊖ ⊕ = Coil ground		<b>669</b> 1,2 = Supply voltage V <sub>AC</sub> 3 = Coil ground
				<b>SUPPLY VOLTAGES</b>		
<b>666</b> All voltages		<b>667</b> 24 AC or DC 110 AC or DC 220 AC or DC		<b>669</b> 110/50 AC 110/60 AC 230/50 AC 230/60 AC		