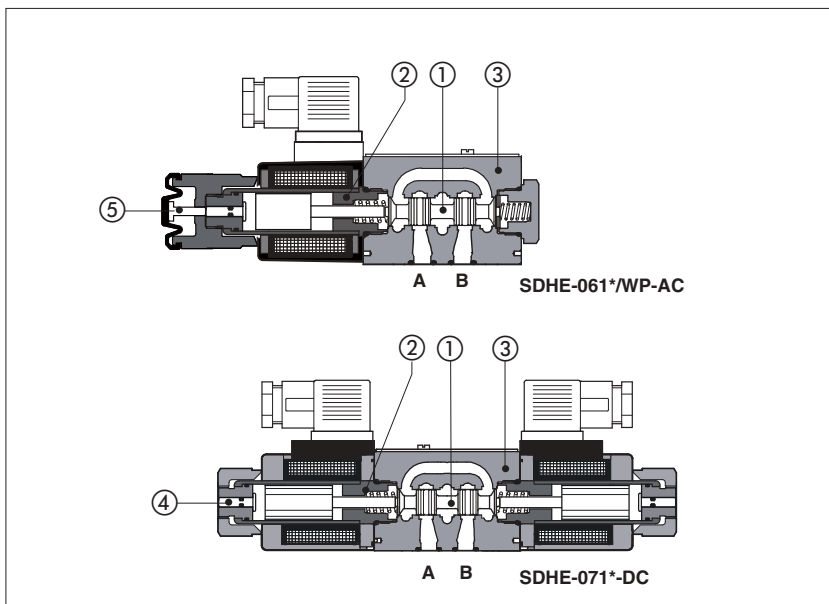


Solenoid directional valves type SDHE

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)

Configurations	Spools	Configurations	Spools
61 61/A 67 67/A 71	0 1 2 3 4 5 6 7 8 58 19 91 39 93 1/9	63 63/A 75	0/2 1/2 2/2

Note: see also section 4 note 3 for special shaped spools

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 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 (β ₂₅ ≥ 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
Operating pressure	Ports P,A,B: 350 bar; Port T 210 bar for DC version; 160 bar for AC version
Rated flow	See diagrams Q/Δp at section 6
Maximum flow	80 l/min , 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	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, 669 or E-SD correctly assembled)
Relative duty factor	100%
Supply voltage and frequency	See electric feature 5
Supply voltage tolerance	± 10%
Certification	cURus 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_{max} 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 swithcing.

- 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	12 DC	666 or 667	30 W	SCOE-12DC /10
14 DC	14 DC			SCOE-14DC /10
24 DC	24 DC			SCOE-24DC /10
28 DC	28 DC			SCOE-28DC /10
110 DC	110 DC			SCOE-110DC /10
220 DC	220 DC			SCOE-220DC /10
110/50 AC	110/50/60 AC	669	58 VA (3)	SCOE-110/50/60AC /10 (1)
230/50 AC	230/50/60 AC		30 W	SCOE-230/50/60AC /10 (1)
110/50 AC - 120/60 AC	110 RC			SCOE-110RC
230/50 AC - 230/60 AC	230 RC			SCOE-230RC

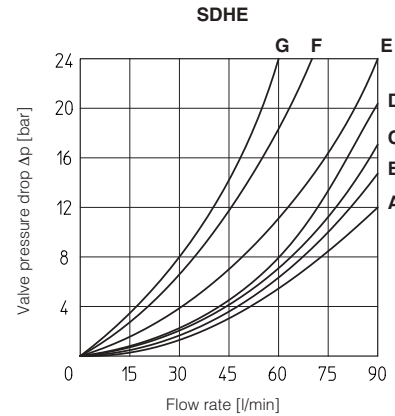
(1) Coil can be supplied also with 60 Hz of voltage frequency: in this case the performances are reduced by 10 ÷ 15% and the power consumption is 52 VA.

(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

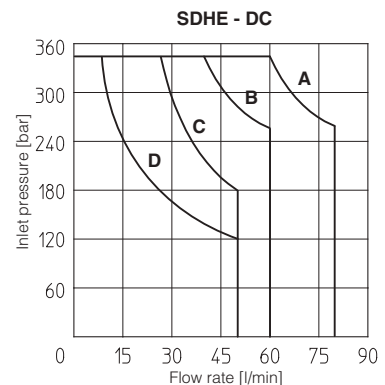
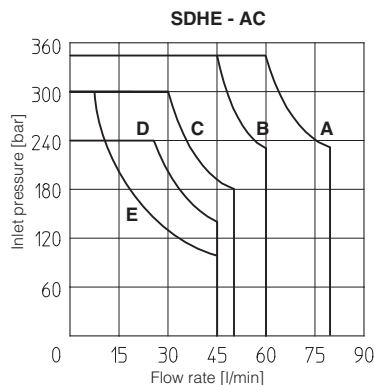
Flow direction Spool type	P→A	P→B	A→T	B→T	P→T
0, 0/1	A	A	C	C	D
1, 1/1, 1/9	D	C	C	C	
3, 3/1	D	D	A	A	
4, 4/8, 5, 5/1, 58, 58/1	F	F	G	C	E
1/2, 0/2	D	D	D	D	
6, 7	D	D	D	D	
8	A	A	E	E	
2	D	D			
2/2	F	F			
19, 91	E	E	D	D	
39, 93	F	F	G	G	



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	AC Spool type	DC Spool type
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

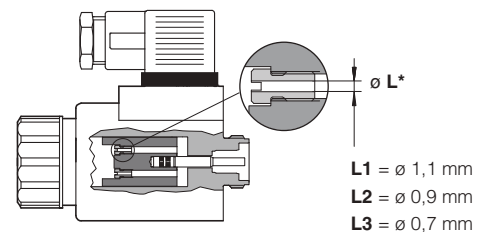
10 SWITCHING FREQUENCY

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

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

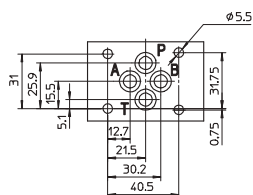
Fastening bolts: 4 socket head screws:

M5x30 class 12.9

Tightening torque = 8 Nm

Seals: 4 OR 108

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



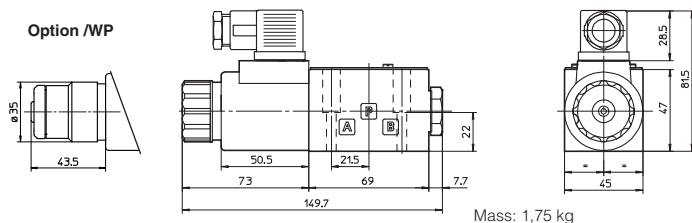
P = PRESSURE PORT

A, B = USE PORT

T = TANK PORT

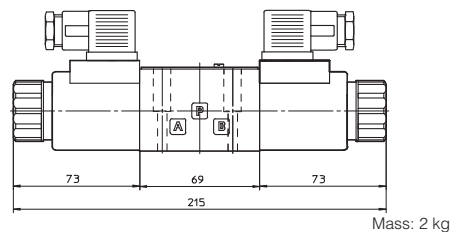
SDHE-06(DC)

Option /WP



Mass: 1,75 kg

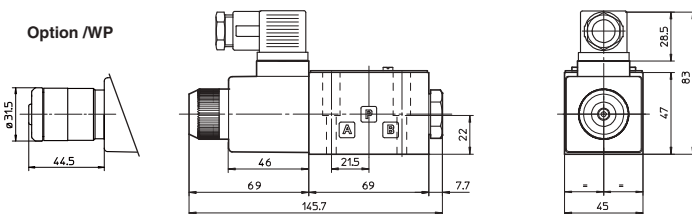
SDHE-07(DC)



Mass: 2 kg

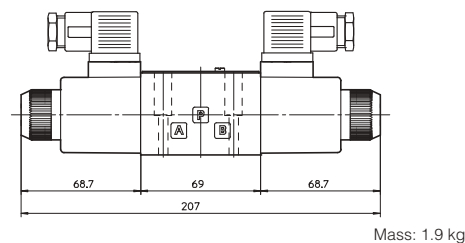
SDHE-06(AC)

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	
			666, 667 1 = Positive ⊕ 2 = Negative ⊖ ⊕ = Coil ground	669 1,2 = Supply voltage V _{AC} 3 = Coil ground
			SUPPLY VOLTAGES	
666 All voltages			667 24 AC or DC 110 AC or DC 220 AC or DC	669 110/50 AC 110/60 AC 230/50 AC 230/60 AC