

3 MAIN CHARACTERISTICS OF DHI AND DHU DIRECTIONAL VALVES

Assembly position / location	Any position for all valves except for type - 070* (without springs) that must be installed with horizontal axis if operated by impulses	
Subplate surface finishing	Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)	
Ambient temperature	from -20°C to +70°C	
Fluid	Hydraulic oil as per DIN 51524 535; for other fluids see section 1	
Recommended viscosity	15 ÷ 100 mm²/s at 40°C (ISO VG 15 ÷ 100)	
Fluid contamination class	ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 µm ($\beta_{25} \geq 75$ recommended)	
Fluid temperature	-20°C +60°C (standard seals and water glycol) -20°C +80°C (PE seals)	
Flow direction	As shown in the symbols of tables 2 and 3	
Operating pressure	DHI	Ports P,A,B: 350 bar;
For versions with proximity switches (FI/NC and FI/NO versions) maximum counter pressure allowed on T port is 5 bar		Port T: 120 bar
	DHU	Ports P,A,B: 350 bar;
		Port T 210 bar
Rated flow	See diagrams Q/Δp at section 7	
Maximum flow	60 l/min see operating limits at section 8	

4.1 Coils characteristics

Insulation class	H (180°C) Due to the occurring surface temperatures of the solenoid coils, the European standards EN563 and EN982 must be taken into account
Connector protection degree DIN 43650	IP 65
Relative duty factor	100%
Supply voltage and frequency	See electric feature 6
Supply voltage tolerance	± 10%
Certification	cURus

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 - see section 12.

SP-WPD/H = manual override with detent, to be ordered separately, see tab. K150

L1, L2, L3 = device for switching time control, installed in the valve solenoid (only for DHU models).

For spools 4 and 4/8 only device L3 is available.

F* = with proximity switch for monitoring spool position: see tab. E110.

MV, MO = auxiliary hand lever positioned vertically (MV) or horizontally (MO). For available configuration and dimensions see table E138.

2 Type of electric/electronic connector DIN 43650, to be ordered separately

SP-666 = standard connector IP-65, suitable for direct connection to electric supply source.

SP-667 = as SP-666, but with built-in signal led.

SP-669 = with built-in rectifier bridge for supplying DC coils by alternate current (AC 110V and 230V - Imax 1A).

E-SD = electronic connector which eliminates electric disturbances when solenoid valves are de-energized.

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** and **5** are also available as **1/1, 4/8** and **5/1**. They are properly shaped to reduce water-hammer shocks during the switching.
- spools type **1, 3, 8** and **1/2** are available as **1P, 3P, 8P** and **1/2P** to limit valve internal leakages.
- spool type **1/9** has closed center in rest position but it avoids the pressurization of A and B ports due to the 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		Colour of coil label
				DHI	DHU	
6 DC	6 DC	SP-666 or SP-667	33 W 60 VA (3)	SP-COU-6DC /80	SP-COU-6DC /80	brown
9 DC	9 DC			SP-COU-9DC /80	SP-COU-9DC /80	light blue
12 DC	12 DC			SP-COU-12DC /80	SP-COUR-12DC /10	green
14 DC	14 DC			SP-COU-14DC /80	SP-COUR-14DC /10	brown
18 DC	18 DC			SP-COU-18DC /80	SP-COU-18DC /80	blue
24 DC	24 DC			SP-COU-24DC /80	SP-COUR-24DC /10	red
28 DC	28 DC			SP-COU-28DC /80	SP-COUR-28DC /10	silver
48 DC	48 DC			SP-COU-48DC /80	SP-COU-48DC /80	silver
110 DC	110 DC			SP-COU-110DC /80	SP-COUR-110DC /10	black
125 DC	125 DC			SP-COU-125DC /80	SP-COU-125DC /80	silver
220 DC	220 DC			SP-COU-220DC /80	SP-COUR-220DC /10	black
24/50 AC 24/60 AC	24/50/60 AC	SP-669	40 VA 35 VA 40 VA 35 VA	SP-COI-24/50/60AC /80 (1)	-	pink
48/50 AC 48/60 AC	48/50/60 AC			SP-COI-48/50/60AC /80 (1)	-	white
110/50 AC 120/60 AC	110/50/60 AC 120/60 AC			SP-COI-110/50/60AC /80 (1) SP-COI-120/60AC /80	-	yellow white
230/50 AC 230/60 AC	230/50/60 AC 230/60 AC			SP-COI-230/50/60AC /80 (1) SP-COI-230/60AC /80	-	light blue silver
110/50 AC 120/60 AC	110RC			SP-COU-110RC /80	SP-COUR-110RC /10	gold
230/50 AC 230/60 AC	230RC			SP-COU-230RC /80	SP-COUR-230RC /10	blue

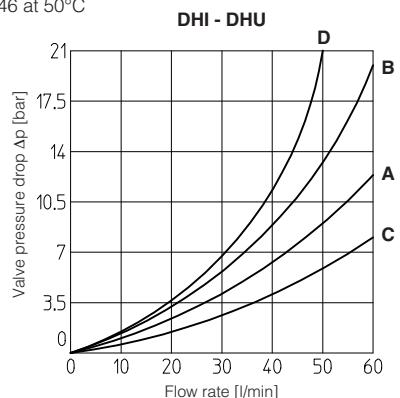
(1) Coil can be supplied also with 60 Hz of voltage frequency: in this case the performances are reduced by 10 ÷ 15% and the power consumption is 55 VA.

(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.

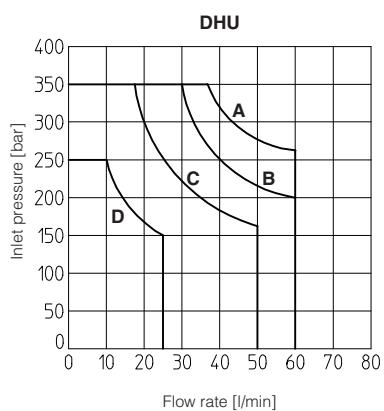
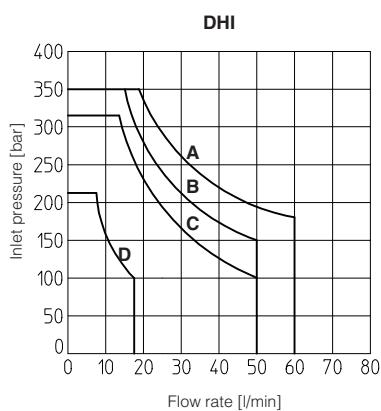
6 Q/ΔP DIAGRAMS based on mineral oil ISO VG 46 at 50°C

Spool type \ Flow direction	P→A	P→B	A→T	B→T	P→T
0	C	C	C	C	
0/2, 1, 1/2	A	A	A	A	
2, 3	A	A	C	C	
2/2, 4, 5, 9*	D	D	D	D	A
6	A	A	C	A	
7	A	A	A	C	
8	C	C	B	B	



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.



DHI

- A = Spools 1, 1/2, 8
- B = Spools 0, 1/0, 2/0, 1/1
- C = Spools 3, 3/1
- D = Spools 4, 4/8, 5, 5/1, 6, 7, 19, 39, 58, 58/1, 09, 90, 91, 93, 94
- E = Spools 2, 2/2

DHU

- A = Spools 0, 0/1, 1, 1/2, 3, 8
- B = Spools 0/2, 1/1, 6, 7
- C = Spools 3/1, 4, 4/8, 5, 5/1, 19, 39, 58, 58/1, 09, 90, 91, 93, 94
- D = Spools 2, 2/2

8 SWITCHING TIMES (average values in msec)

DHI

Valve	Switch-on AC	Switch-on DC	Switch-off
DHI + SP-666 SP-667	30	45	20
DHI + SP-669	45	—	80
DHI + E-SD	30	45	50

DHU

Valve	Switch-on AC	Switch-on DC	Switch-off
DHU + SP-666 SP-667	—	45	20
DHU + SP-669	45	—	80
DHU + E-SD	—	45	50
DHU-*L1	—	60	60
DHU-*L2	—	80	80
DHU-*L3	—	110	150

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.

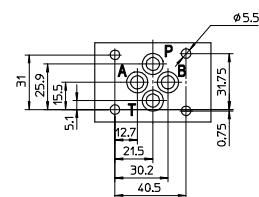
The elasticity of the hydraulic circuit and the variations of the hydraulic characteristics and temperature affect the response time.

9 COILS WITH SPECIAL CONNECTORS

AMP Junior timer connector	Deutsch connector DT-04-2P	Lead Wire connection
<p>Options -XJ Coil type SP-COUJ, SP-COURJ AMP Junior Timer connector Protection degree IP67</p>	<p>Options -XK Coil type SP-COURK (not available for COU) Deutsch connector DT-04-2P male Protection degree IP67</p>	<p>Options -XS Coil type SP-COUS, SP-COURS Lead Wire connection Cable lenght = 180 mm</p>

Note: The above coils are available only for voltage supply **12, 14, 24** and **28** Vdc. For the characteristics refer to standard coils features - see sect. **6**

10 DIMENSIONS [mm]



ISO 4401: 2005

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

Fastening bolts:

4 socket head screws M5x50 class 12.9

Tightening torque = 8 Nm

Seals: 4 OR 108

Ports P,A,B,T: Ø = 7.5 mm (max).

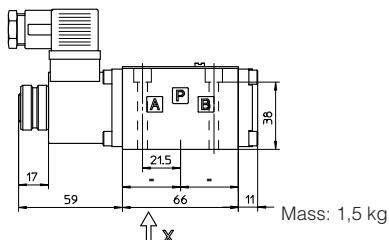
P = PRESSURE PORT

A, B = USE PORT

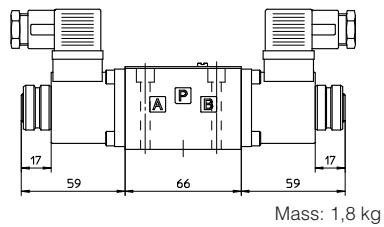
T = TANK PORT

For the max pressures on ports, see section 4

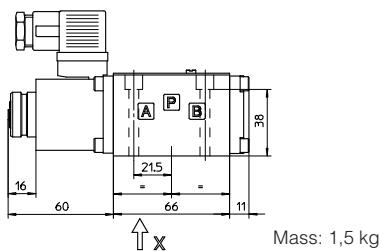
DHI-06



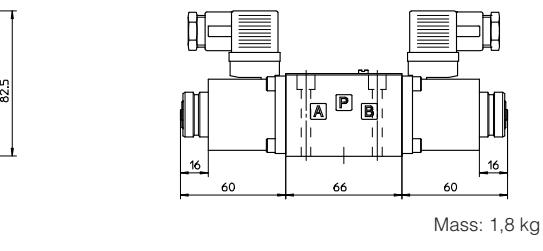
DHI-07



DHU-06

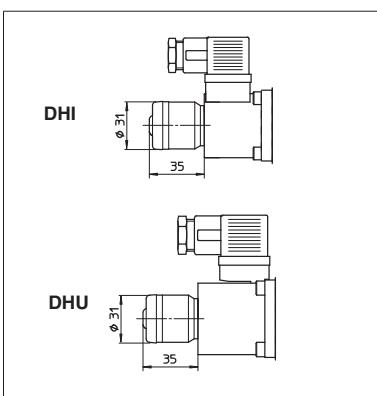


DHU-07



Overall dimensions refer to valves with connectors type SP-666

11 OPTION /WP



12 ELECTRIC CONNECTORS ACCORDING TO DIN 43650

The connectors must be ordered separately

SP-666, SP-667 (for AC or DC supply)		SP-669 (for AC supply)
CONNECTOR WIRING		
SP-666, SP-667		SP-669
1 = Positive \oplus 2 = Negative \ominus \oplus = Coil ground		1,2 = Supply voltage VAC 3 = Coil ground
SUPPLY VOLTAGES		
SP-666 All voltages	SP-667 24 AC or DC 110 AC or DC 220 AC or DC	110/50 AC 110/60 AC 230/50 AC 230/60 AC

Note: for electronic connectors type E-SD, see tab. K500

13 MOUNTING SUBPLATES

Model	Ports location	GAS Ports A-B-P-T	Ø Counterbore [mm] A-B-P-T	Mass [kg]
BA-202	Ports A, B, P, T underneath;	3/8"	—	1,2
BA-204	Ports P, T underneath; ports A, B on lateral side	3/8"	25,5	1,8
BA-302	Ports A, B, P, T underneath	1/2"	30	1,8

The subplates are supplied with 4 fastening bolts M5x50. Also available are multi-station subplates and modular subplates. For further details see table K280.