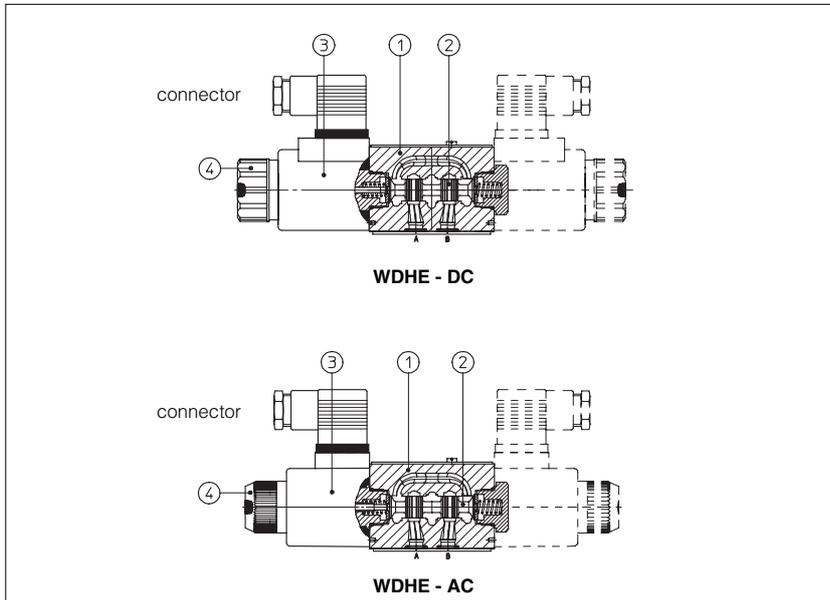


Solenoid directional valves type **WDHE**

direct operated, ISO 4401 size 06



Spool type, direct operated solenoid valves available in three or four way configurations and with two or three spool positions, see section 2.

Configurations and construction

The spools ② are interchangeable and they are available in a wide range of hydraulic configurations, see section 3.

The solenoids ③ have two different executions for AC or DC power supply and they are composed by:

- wet type screwed tube with integrated manual override pin ④ (the tube are different for AC and DC power supply).
- AC and DC coils with different voltage valves, see section 4

The coils are interchangeable for the same type of power supply AC or DC and they can be easily replaced without tools. The coils are fully encapsulated with the following temperature classes:

- class H for DC coils
- class F for AC coils

The valve body ① is 3 chambers type, made by shell-molding casting.

The optimized internal flow paths, largely cored with extrawide channels to the tank port, ensure low pressure drops.

Surface mounting ISO 4401 size 06

Max flow up to 60 l/min

Max pressure: 350 bar

1 MODEL CODE

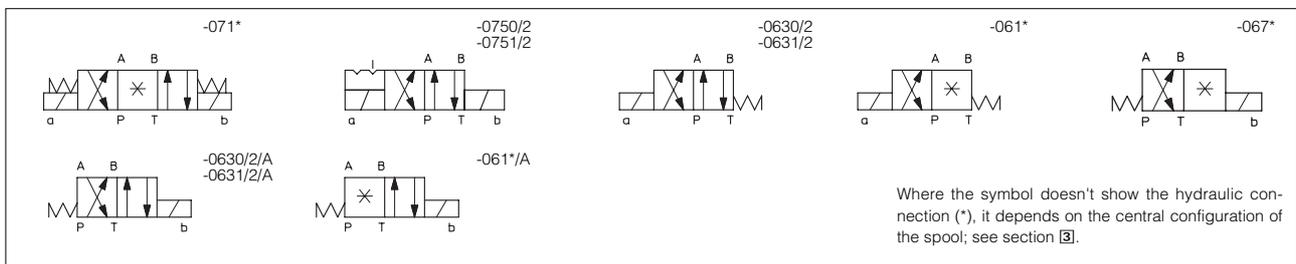
WDHE - 0	63 1/2 /A - N 24 DC **	/*
Directional control valves ISO 4401 size 06	Synthetic fluids PE = phosphate ester Design number External supply voltage, see section 4	Connector type, see section 5, note 2 N = standard connector WP-666 P = connector with signal led WP-667 Q = connector with built-in rectifier bridge WP-669 A = solenoid mounted at side of port B (only for single solenoid valves)

- 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

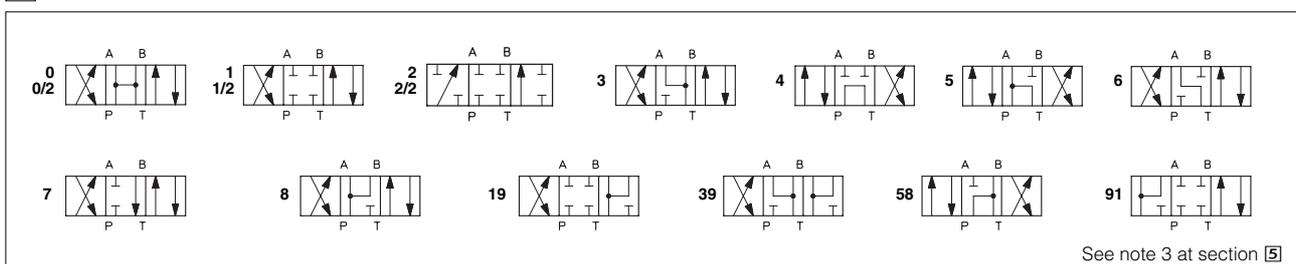
Spool type, see section 3

Note: configuration 63 and 75 are available only with spools type 0/2 and 1/2.

2 CONFIGURATION



3 SPOOLS



4 MAIN CHARACTERISTICS OF WDHE DIRECTIONAL VALVES

Assembly position / location	Any position
Subplate surface finishing	Roughness index \sqrt{Ra} 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 mm ² /s at 40°C (ISO VG 15 ÷ 100)
Fluid contamination class	ISO 19/16, achieved with in line filters at 25 µm value to $\beta_{25} \geq 75$ (recommended)
Fluid temperature	-20°C +60°C (standard seals) -20°C +80°C (/PE seals)
Flow direction	As shown in the symbols of tables 2 and 3
Operating pressure	Ports P, A, B: 350 bar Port T: 160 bar for AC solenoids; 210 bar for DC solenoids
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) for DC coils F (155°C) for AC coils
Connector protection degree	IP 65
Relative duty factor	100%
Supply voltage and frequency	See electric feature 6
Supply voltage tolerance	± 10%

5 NOTES

5.1 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.

5.2 Type of electric connectors DIN 43650, supplied with the valve

WP-666 (option **-N**) = standard connector IP-65 for direct connection to electric supply source.

WP-667 (option **-P**) = as WP-666, but with built-in signal led.

WP-669 (option **-Q**) = with built-in rectifier bridge for supplying DC coils by alternate current (AC 110V and 220V - I_{max} 1A).

5.3 Spools

- spools type **0/2 and 1/2** are only used for two position valves: single solenoid valves, type WDHE-063*/2; double solenoid valves type WDHE-075*/2.
- 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**, properly shaped to reduce water hammer shocks during the switching
- spools type **1, 1/2, 3 and 8** are available as **1P, 1/2P, 3P and 8P** to reduce the valve internal leakages
- other types of spools can be supplied on request.

6 ELECTRIC FEATURES

External supply nominal voltage ± 10%	Type of connector	Power consumption (2)	Code of spare coil
12 DC	WP-666 or WP-667	30 W	SP-WCOE-12DC
24 DC			SP-WCOE-24DC
110/50/60 AC	WP-667	58 VA	SP-WCOE-110/50/60AC (1)
220/50/60 AC			SP-WCOE-220/50/60AC (1)
110/50/60 AC	WP-669	30 W	SP-WCOE-110DC
220/50/60 AC			SP-WCOE-220DC

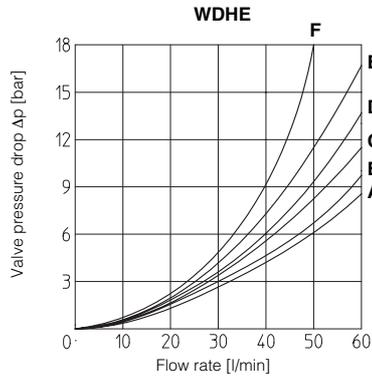
(1) In case of 60 Hz voltage frequency the performances are reduced by 10÷15% and the power consumption is 52 VA.

(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. Inrush current values correspond to a power consumption of about 160 VA.

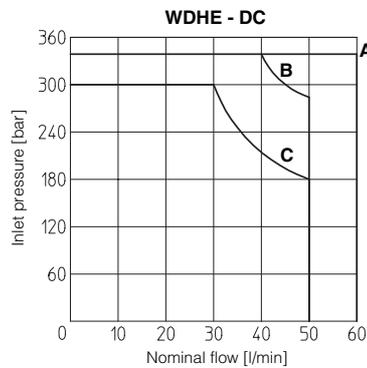
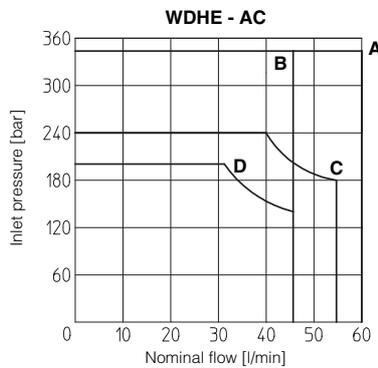
7 Q/ΔP DIAGRAMS based on mineral oil ISO VG 46 at 50°C

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



8 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.



WDHE

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

9 SWITCHING TIMES (average values in msec)

Valve	Switch-on AC	Switch-on DC	Switch-off AC	Switch-off DC
WDHE + WP-666 / WP-667	40	60	25	35
WDHE + WP-669	60	—	90	—

Test conditions:

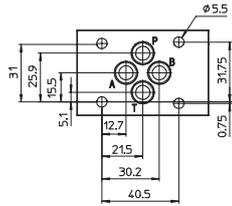
- 36 l/min; 150 bar
- nominal supply voltage
- 2 bar of back pressure on port T
- mineral oil ISO VG 46 at 50°C

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

10 SWITCHING FREQUENCY

Valve	AC (cycles/h)	DC (cycles/h)
WDHE + WP-666 / WP-667	7200	15000

11 INSTALLATION DIMENSIONS [mm]



Mounting surface

ISO 4401-AB-03-4 size 06

Fastening bolts: 4 socket head screws M5x50

Seals: 4 OR 108

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

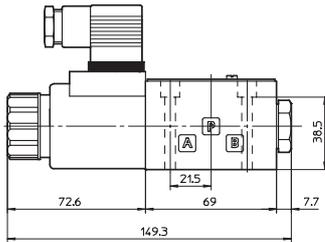
P = PRESSURE PORT

A, B = USE PORT

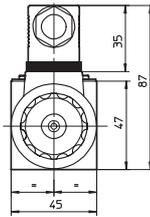
T = TANK PORT

For the max pressures on ports, see section 4

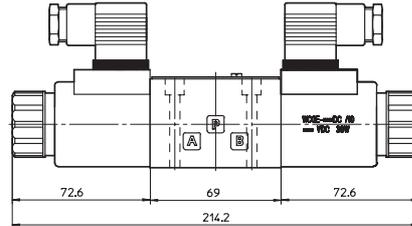
WDHE-06*-DC



Mass: 1,47 kg

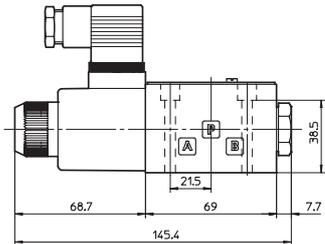


WDHE-07*-DC

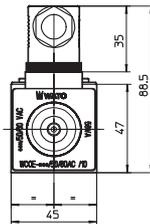


Mass: 2 kg

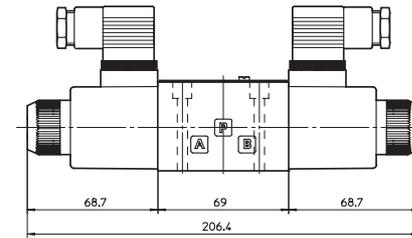
WDHE-06*-AC



Mass: 1,33 kg



WDHE-07*-AC



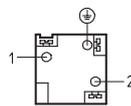
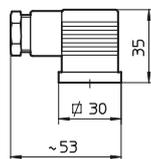
Mass: 1,73 kg

Overall dimensions refer to valves with connectors type WP-666

12 ELECTRIC CONNECTORS ACCORDING TO DIN 43650 - The connectors are supplied with the valve

WP-666, WP-667
(for AC or DC supply)

WP-669
(for AC supply)



CONNECTOR WIRING

WP-666, SP-667

1 = Positive ⊕
2 = Negative ⊖
⊕ = Coil ground

WP-669

1,2 = Supply voltage V_{AC}
3 = Coil ground

SUPPLY VOLTAGES

WP-666

All voltages

WP-667

24
110
220

110/50 AC
110/60 AC
220/50 AC
220/60 AC