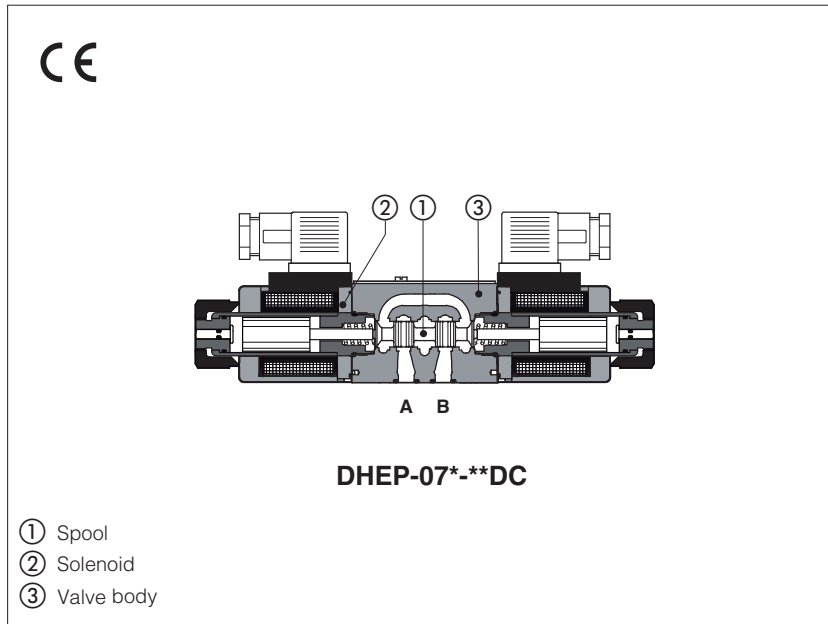


Solenoid directional valves P_{max} 420 bar

direct operated, ISO 4401 size 06



DHEP

Spool type, direct operated solenoid valves with max pressure up to 420 bar for heavy duty applications.

They are equipped with threaded solenoids certified according 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, see section ②.

Solenoids ② are made by:

- wet type screwed tube, different for AC and DC power supply, with integrated manual override pin.
- interchangeable coils, specific for AC or DC power supply, easily replaceable without tools - see section ⑥ for available voltages

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

The valve body ③ is made by high strength cast iron.

Mounting surface ISO 4401 size **06**

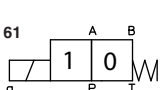
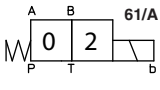
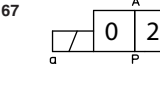
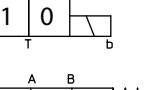
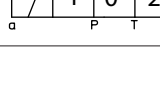
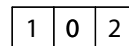
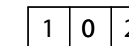
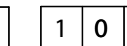
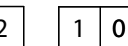


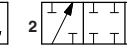
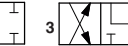




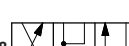


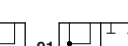




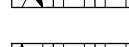
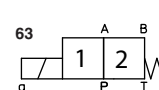
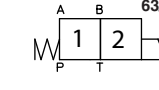
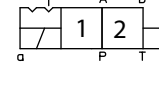
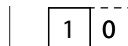


Max flow up to **80** l/min

Max pressure: **420** bar

1 MODEL CODE

DHEP - 0	63	1/2	/A	X	24 DC	**	/*
Directional control valves DHEP-0 = Size 06							Seals material, see sect. ⑮: - = NBR PE = FKM BT = NBR low temperature
Valve configuration, see table 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							Series number
Spool type, see section ②							Voltage code, see section ⑥
Options, see note 1 at section ⑦				00-AC = AC solenoids without coils 00-DC = DC solenoids without coils X = without connector See section ⑬ for available connectors, to be ordered separately Coils with special connectors, see section ⑭ XJ = AMP Junior Timer connector XK = Deutsch connector XS = Lead Wire connection			

2 CONFIGURATIONS and SPOOLS

Configurations	Spools	Configurations	Spools
<p>61</p>  <p>61/A</p>  <p>67</p>  <p>67/A</p>  <p>71</p> 	<p>0</p>  <p>1</p>  <p>2</p>  <p>3</p>  <p>4</p>  <p>5</p>  <p>6</p>  <p>7</p>  <p>8</p>  <p>90</p>  <p>09</p>  <p>91</p>  <p>19</p>  <p>93</p>  <p>39</p>  <p>94</p>  <p>49</p>  <p>16</p>  <p>17</p>  <p>58</p>  <p>1/9</p>  <p>only for configuration 71</p>	<p>63</p>  <p>63/A</p>  <p>75</p> 	<p>0/2</p>  <p>1/2</p>  <p>2/2</p> 

3 GENERAL CHARACTERISTICS

Assembly position	Any position
Subplate surface finishing to ISO 4401	Acceptable roughness index, Ra ≤0,8 recommended Ra 0,4 - flatness ratio 0,01/100
MTTFd valves according to EN ISO 13849	150 years, see technical table P007
Ambient temperature range	Standard = -30°C ÷ +70°C /PE option = -20°C ÷ +70°C /BT option = -40°C ÷ +60°C
Storage temperature range	Standard = -30°C ÷ +80°C /PE option = -20°C ÷ +80°C /BT option = -40°C ÷ +80°C
Surface protection	Body: zinc coating with black passivation Coil: zinc nickel coating (DC version) plastic incapsulation (AC version)
Corrosion resistance	Salt spray test (EN ISO 9227) > 200 h
Compliance	CE to Low Voltage Directive 2014/35/EU RoHS Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006

4 HYDRAULIC CHARACTERISTICS

Operating pressure	Ports P,A,B: 420 bar; Port T 210 bar for DC version; 160 bar for AC version
Max flow	80 l/min , see Q/Δp diagram at section 8 and operating limits at section 9

5 ELECTRICAL 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 section 6
Supply voltage tolerance	± 10%

6 COIL VOLTAGE

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	COE-12DC		
14 DC	14 DC			COE-14DC		
24 DC	24 DC			COE-24DC		
28 DC	28 DC			COE-28DC		
48 DC	48 DC			COE-48DC		
110 DC	110 DC			COE-110DC		
125 DC	125 DC			COE-125DC		
220 DC	220 DC			COE-220DC		
24/50 AC	24/50/60 AC			669	58 VA (3)	COE-24/50/60AC (1)
48/50 AC	48/50/60 AC					COE-48/50/60AC (1)
110/50 AC	110/50/60 AC		COE-110/50/60AC (1)			
230/50 AC	230/50/60 AC		80 VA (3)		COE-230/50/60AC (1)	
115/50 AC	115/60 AC				COE-115/60AC	
230/50 AC	230/60 AC				COE-230/60AC	
110/50 AC - 120/60 AC	110 RC	669	30 W	COE-110RC		
230/50 AC - 230/60 AC	230 RC			COE-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 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 NOTES FOR DHEP

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 17.

L1, L2, L3 = (only for DHEP-DC) device for switching time control, installed in the valve solenoid, see section 11.
 For spools 4 and 4/8 only device L3 is available.

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

2 Accessories

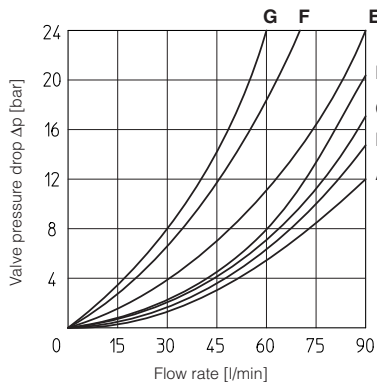
WPD/HE-DC = (only for DHEP-DC) manual override with detent, to be ordered separately, see tab. K150

3 Special shaped 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 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.

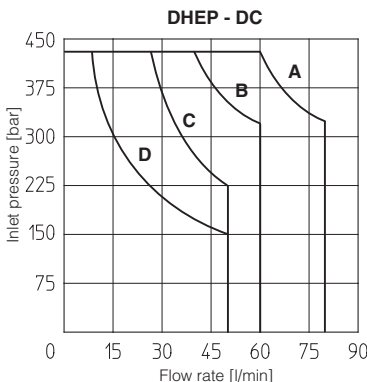
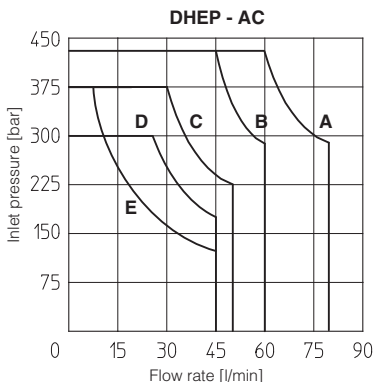
8 Q/ΔP DIAGRAMS based on mineral oil ISO VG 46 at 50°C

Flow direction 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	D	C	C	C	
3, 3/1	D	D	A	A	
4, 4/8, 5, 5/1, 58, 58/1 09, 90, 91, 93, 94	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			



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 ($V_{nom} - 10\%$). 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	0/2, 1/1, 6, 7
C	3, 3/1	3/1, 4, 4/8, 5, 5/1, 19, 39, 58, 90, 91, 93, 94
D	4, 4/8, 5, 5/1, 6, 7, 19, 39, 58, 91, 93, 94	2, 2/2
E	2, 2/2	-

10 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
DHEP	10 - 25	20 - 40	30 - 50	15 - 25
DHEP-*/L1	—	—	60	60
DHEP-*/L2	—	—	80	80
DHEP-*/L3	—	—	150	150

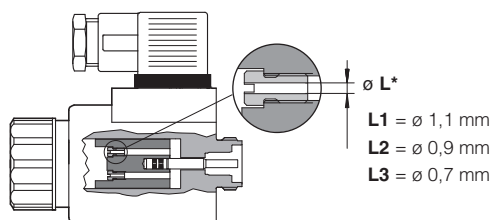
12 SWITCHING FREQUENCY

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

11 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.



13 ELECTRIC CONNECTORS ACCORDING TO DIN 43650 (to be ordered separately, see tech table K800)

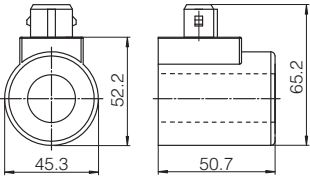
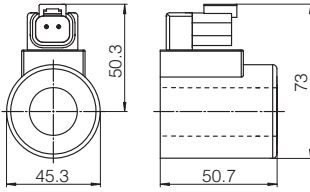
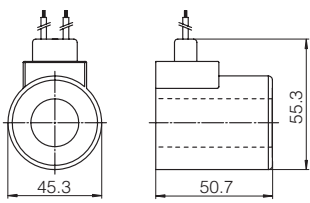
666 = standard connector IP-65, suitable for direct connection to electric supply source

667 = as 666, but with built-in signal led. Available for power supply voltage 24 AC or DC, 110 AC or DC, 220 AC or DC

669 = with built-in rectifier bridge for supplying DC coils by alternate current (AC 110V and 230V - I_{max} 1A)

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

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

Note: for the electric characteristics refer to standard coils features - see section 6

15 SEALS AND HYDRAULIC FLUIDS - 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 NBR low temp. seals (/BT option) = -40°C ÷ +60°C, with HFC hydraulic fluids = -40°C ÷ +50°C		
Recommended viscosity	15 ÷ 100 mm ² /s - max allowed range 2,8 ÷ 500 mm ² /s		
Max fluid contamination level	ISO4406 class 20/18/15 NAS1638 class 9, see also filter section at www.atos.com or KTF catalog		
Hydraulic fluid	Suitable seals type	Classification	Ref. Standard
Mineral oils	NBR, FKM, NBR low temp.	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFDU, HFDR	ISO 12922
Flame resistant with water	NBR, NBR low temp.	HFC	

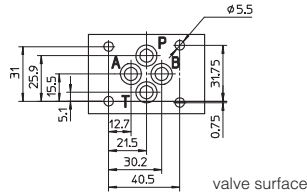
16 FASTENING BOLTS AND SEALS

Fastening bolts	Seals
4 socket head screws M5x30 class 12.9 Tightening torque = 8 Nm	4 OR 108; Diameter of ports A, B, P, T: Ø 7,5 mm (max)

17 INSTALLATION DIMENSIONS [mm]

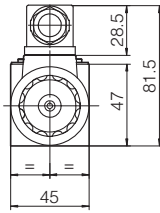
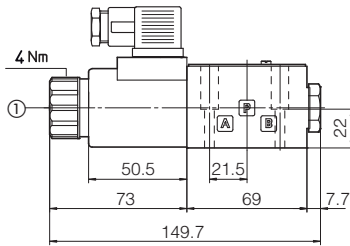
ISO 4401: 2005
 Mounting surface: 4401-03-02-0-05

Mass (Kg)		
	DC	AC
DHEP-06	1,5	1,4
DHEP-07	2	1,8

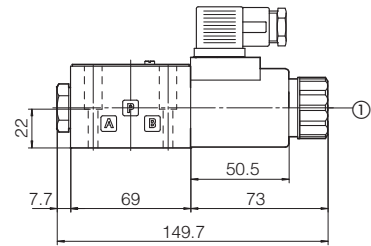


P = PRESSURE PORT
A, B = USE PORT
T = TANK PORT

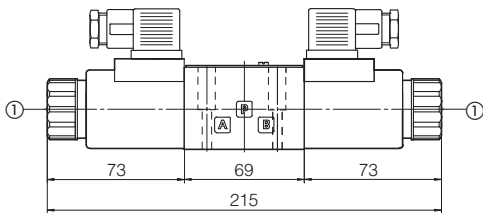
DHEP-06(DC)



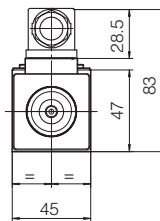
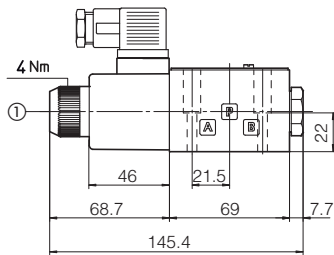
DHEP-06*/A(DC)



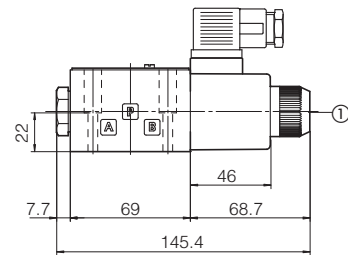
DHEP-07(DC)



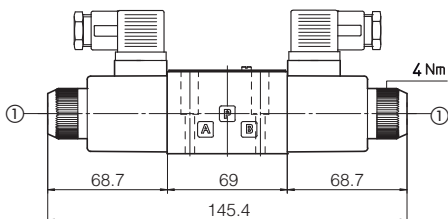
DHEP-06(AC)



DHEP-06*/A(AC)

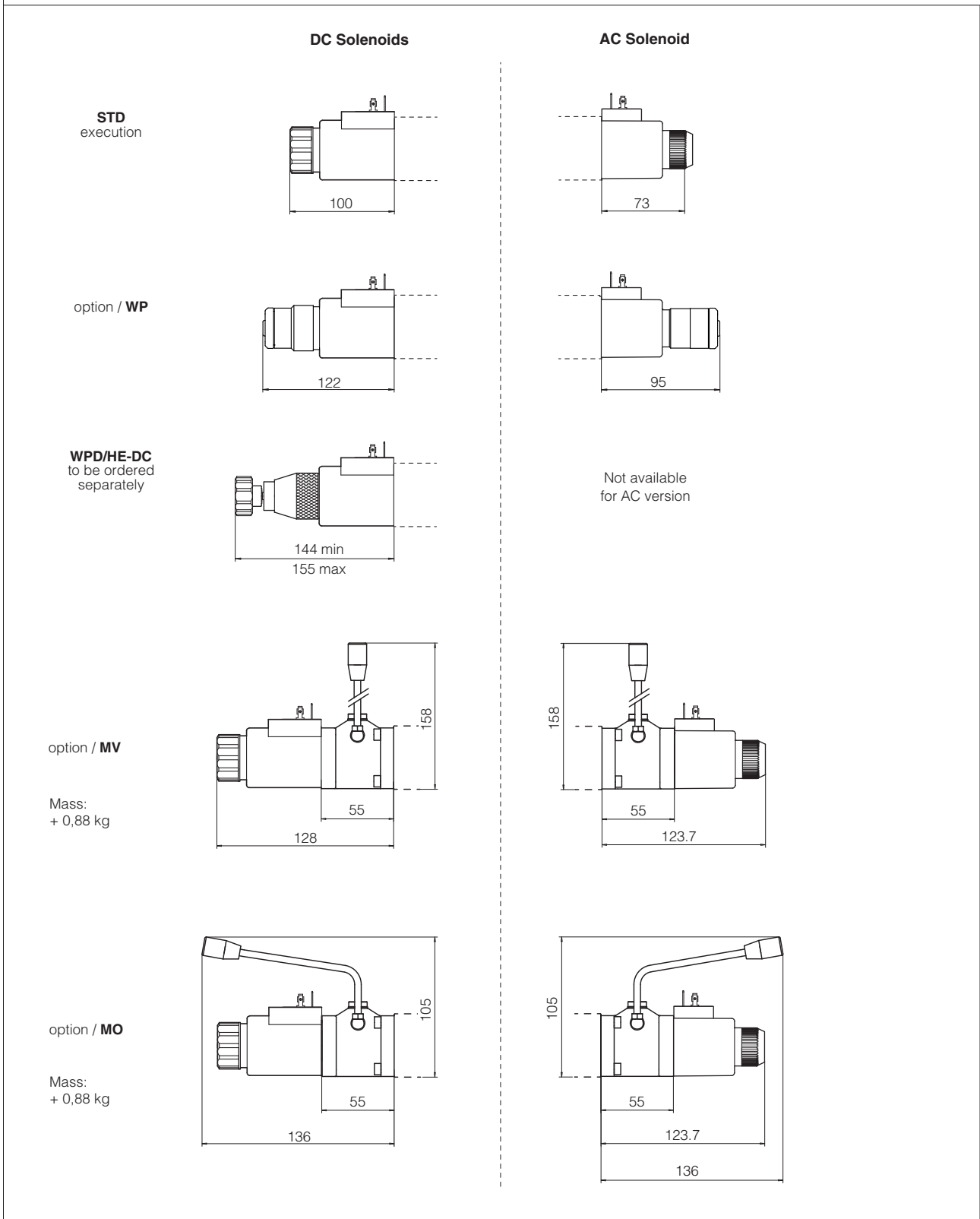


DHEP-07(AC)



Overall dimensions refer to valves with connectors type 666

① Standard manual override PIN. The manual override operation can be possible only if the pressure at T ports is lower than 50 bar



19 RELATED DOCUMENTATION

E001 Basics for solenoid directional valves
K150 Handwheels for hydraulic controls
K280 Single and modular subplates
K800 Electric and electronic connectors

P005 Mounting surfaces for electrohydraulic valves
E900 Operating and maintenance information