

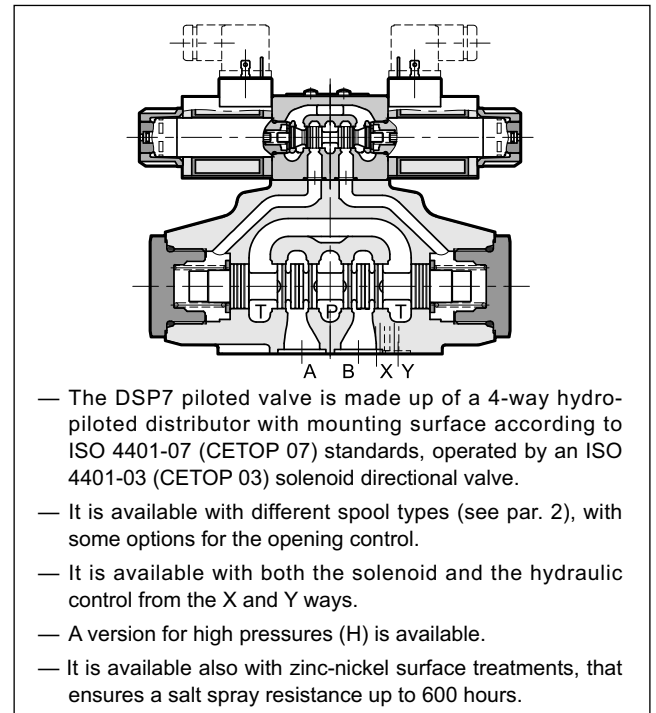
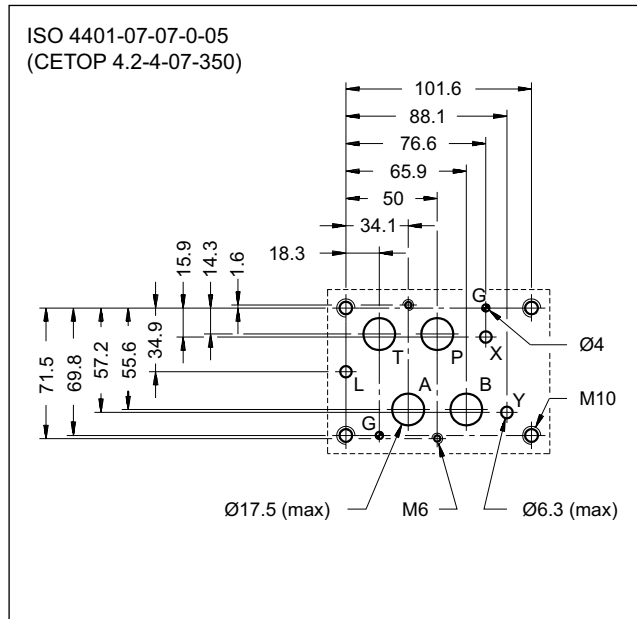
# DSP7

## PILOT OPERATED DISTRIBUTOR SOLENOID OR HYDRAULIC (DSC7) CONTROLLED

**SUBPLATE MOUNTING**  
**ISO 4401-07 (CETOP 07)**

**p** max **350** bar  
**Q** max **300** l/min

### MOUNTING SURFACE



### PERFORMANCES

(obtained with mineral oil of viscosity of 36 cSt at 50°C)

		DSP7	DSP7H
Maximum operating pressure			
- ports P - A - B	bar	350	420
- port T (external drainage)		250	350
- port T (internal drainage)		210 (DC) / 160 (AC)	210 (DC) / 160 (AC)
Maximum flow rate from port P to A - B - T	l/min	300	
Ambient temperature range	°C	-20 / +50	
Fluid temperature range	°C	-20 / +80	
Fluid viscosity range	cSt	10 ÷ 400	
Fluid contamination degree		according to ISO 4406:1999 class 20/18/15	
Recommended viscosity	cSt	25	
Mass:			
DSP7-S, RK	kg	8,6	
DSP7-T*, SA*, SB*		8,0	
DSC7		6,6	



### 1.1 - High corrosion resistance version

This version, available for the basic valve (without option of par. 13) features the zinc-nickel coating on all exposed metal parts of the valve, making it resistant to exposure to the salt spray for **600 hours** (test performed according to UNI EN ISO 9227 and assessment test performed according to UNI EN ISO 10289).

The coil are DC only and specific for this version, featuring a zinc-nickel surface treatment. The coil for DEUTSCH connector has a diode inside. Electrical features at paragraph 10.2. The boot manual override (CM) is installed as standard in order to protect the solenoid tube.

Follow the identification code below to order it

<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>DSP7....</b> </div>	/		/	<b>CM</b>	/	<b>W7</b>
<p>Choices as in standard identification code</p> <p>DC power supply</p> <p><b>D12</b> = 12 V      <b>D24</b> = 24 V</p>				<p>Manual override, boot protected</p> <p>Coil electrical connection (see par. 15)</p> <p><b>WK1</b> = plug for connector type DIN 43650</p> <p><b>WK7D</b> = plug DEUTSCH DT04-2P, for male connector type DEUTSCH DT06-2S. Coil with diode.</p>		

### 2 - SPOOL TYPE FOR DSP7

<p><b>Type S*:</b> 2 solenoids - 3 positions with spring centring</p> <p>S1</p> <p>S2</p> <p>S3</p> <p>S4</p> <p>S6</p> <p>S7</p> <p>S8</p> <p>S9</p> <p>S10</p> <p>S11</p> <p>S12</p> <p>S20</p> <p>S21</p>	<p><b>Type SA*:</b> 1 solenoid side A 2 positions (central + external) with spring centring</p> <p>SA1</p> <p>SA2</p> <p>SA3</p> <p>SA4</p>	<p><b>Type SB*:</b> 1 solenoid side B 2 positions (central + external) with spring centring</p> <p>SB1</p> <p>SB2</p> <p>SB3</p> <p>SB4</p>
<p><b>Type RK:</b> 2 solenoids - 2 positions with mechanical retention</p> <p>RK</p> <p>RK02</p>	<p><b>Type TA:</b> 1 solenoid side A 2 external positions with return spring</p> <p>TA</p> <p>TA02</p>	<p><b>Type TB:</b> 1 solenoid side B 2 external positions with return spring</p> <p>TB</p> <p>TB02</p>
<p><b>Type 23TA / 23TB</b> three-way valve - 1 solenoid - 2 external positions, return spring</p> <p>23TA</p> <p>23TB</p>		

Besides the diagrams shown, special versions are available: consult our technical dept. for their identification, feasibility and operating limits.

### 3 - IDENTIFICATION CODE AND SPOOL TYPE FOR DSC7 - HYDRAULIC OPERATED VALVE

	<div style="display: flex; justify-content: space-around; font-weight: bold; font-size: 1.2em;"> <span>D</span><span>S</span><span>C</span><span>7</span><span>-</span><span>/</span><span>10</span><span>-</span><span>E</span><span>E</span> </div>								
<p>Directional valve, hydraulic controlled pilot operated through X and Y ports.</p>			<p>Option: / <b>W7</b> = Zinc-nickel surface treatment (see <b>NOTE</b>) Omit if not required</p>						
<p>Size: ISO 4401-07 (CETOP 07)</p>			<p>External drain (see par. 9)</p>						
<p>Option: (omit for standard version) <b>H</b> = high pressure version pmax = 420 bar</p>			<p>External pilot (see par. 9)</p>						
<p>Spool type (see paragraph 2 and below)</p> <table style="margin-left: 20px;"> <tr><td><b>S*</b></td><td><b>TA</b></td></tr> <tr><td><b>SA*</b></td><td><b>TB</b></td></tr> <tr><td><b>SB*</b></td><td><b>R</b></td></tr> </table>	<b>S*</b>	<b>TA</b>	<b>SA*</b>	<b>TB</b>	<b>SB*</b>	<b>R</b>			<p>Seals: <b>N</b> = NBR seals for mineral oil (<b>standard</b>) <b>V</b> = FPM seals for special fluids</p>
<b>S*</b>	<b>TA</b>								
<b>SA*</b>	<b>TB</b>								
<b>SB*</b>	<b>R</b>								
			<p>Series: (the overall and mounting dimensions remain unchanged from 10 to 19)</p>						

**Spool type**  
The distributor is delivered with short-circuit subplate. The X and Y ports are used for the hydraulic control of the valve.

DSC7-S\*

DSC7-TA

DSC7-TB

**NOTE** : The standard valve is supplied with surface treatment of phosphating black.  
The zinc-nickel finishing makes the valve suitable to ensure a salt spray resistance up to **600** hours. (test operated according to UNI EN ISO 9227 standards and test evaluation operated according to UNI EN ISO 10289 standards).

### 4 - HYDRAULIC FLUIDS

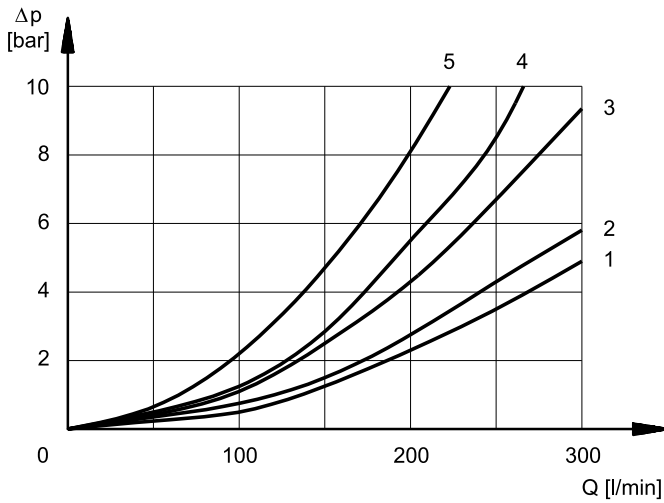
Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals (code N). For fluids HFDR type (phosphate esters) use FPM seals (code V).

For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics.

The fluid must be preserved in its physical and chemical characteristics.

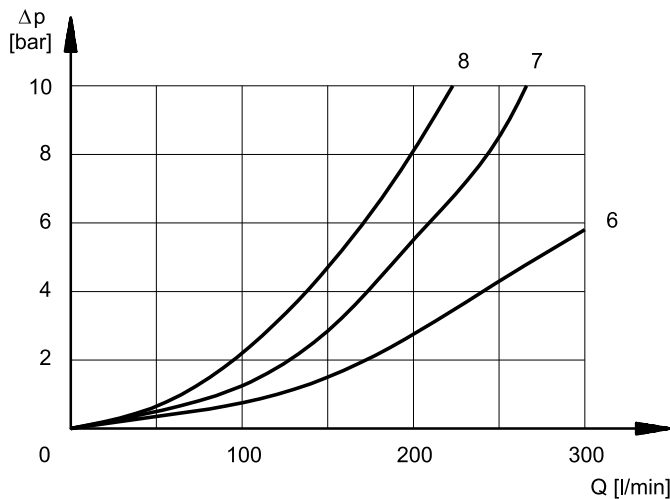
## 5 - PRESSURE DROPS $\Delta P-Q$

(values obtained with viscosity 36 cSt at 50 °C)



### PRESSURE DROPS WITH VALVE ENERGIZED

SPOOL TYPE	FLOW DIRECTION			
	P-A	P-B	A-T	B-T
	CURVES ON GRAPH			
S1, SA1, SB1	1	1	3	4
S2, SA2, SB2	1	1	4	4
S3, SA3, SB3	1	1	4	4
S4, SA4, SB4	2	2	4	5
S6	1	1	3	4
S7	1	1	4	4
S8	1	1	3	4
S9	1	1	3	4
S10	1	1	3	4
S11	1	1	3	4
S12	1	1	3	4
S20	1	1	3	4
S21	1	1	4	4
TA, TB	1	1	3	4
TA02, TB 02	1	1	4	4
RK	1	1	3	4



### PRESSURE DROPS WITH VALVE IN DE-ENERGIZED POSITION

SPOOL TYPE	FLOW DIRECTION				
	P-A	P-B	A-T	B-T	P-T
	CURVES ON GRAPH				
S2, SA2, SB2					6
S3, SA3, SB3			7	7	
S4, SA4, SB4					7
S6				7	
S7					8
S8					8
S10			7	7	
S11			7		

## 6 - SWITCHING TIMES

The values indicated refer to a solenoid valve working with piloting pressure of 100 bar, with mineral oil at a temperature of 50°C, at viscosity of 36 cSt and with PA and BT connections. The energizing and de-energizing times are obtained at the pressure variation which occurs on the lines.

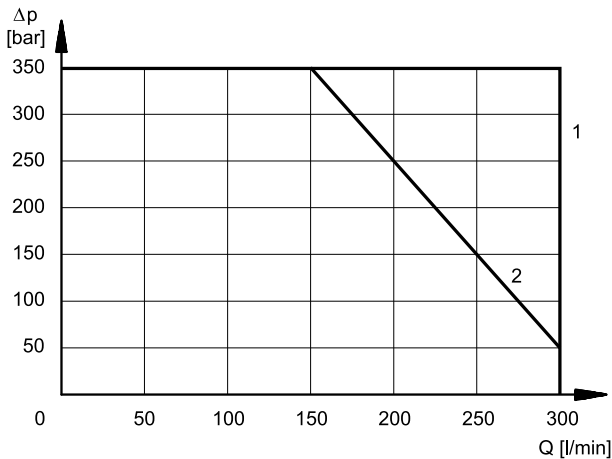
TIMES ( $\pm 10\%$ ) [ms]	ENERGIZED		DE-ENERGIZED	
	2 Pos.	3 Pos.	2 Pos.	3 Pos.
	AC solenoid	45	30	45
DC solenoid	75	60	60	45

## 7 - OPERATING LIMITS

The curves define the flow rate operating fields according to the valve pressure for the different spool types.

The values have been obtained according to ISO 6403 norm with solenoids at rated temperature and supplied with voltage equal to 90% of the nominal voltage.

The values have been obtained with mineral oil, viscosity 36 cSt at 50 °C, and filtration ISO 4406:1999 class 18/16/13.



SPOOL	CURVE	
	P→A	P→B
S1,SA1,SB1	1	1
S2, SA2, SB2	1	1
S3, SA3, SB3	1	1
S4, SA4, SB4	2	2
S6	1	1
S7	2	2
S8	2	2
S9	1	1
S10	1	1
S11	1	1
S12	1	1
S20	1	1
S21	1	1

SPOOL	CURVE	
	P→A	P→B
TA, TB	1	1
TA02, TB02	1	1
23TA, 23TB	1	1
RK	1	1

## 8 - PERFORMANCE CHARACTERISTICS

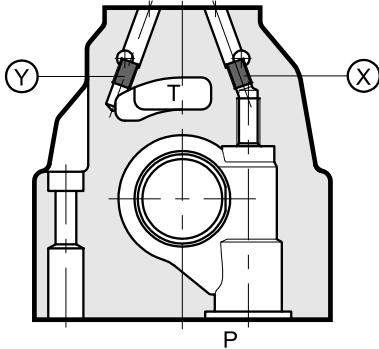
PRESSURES [bar]	DSP7	DSP7H	DSC7	DSC7H
Max pressure in P, A, B ports	350	420	350	420
Max pressure in T line with external drainage	250	350	250	350
Max pressure in T line with internal drainage	210 (DC) 160 (AC)	210 (DC) 160 (AC)	-	-
Max pressure in Y line with external drainage	210 (DC) 160 (AC)	210 (DC) 160 (AC)	-	-
Min piloting pressure <b>NOTE 1</b>	5 ÷ 12			
Max piloting pressure <b>NOTE 2</b>	210	350	210	420

**NOTE 1** minimum piloting pressure can be the lower range value at low flows rates, but with higher flow rates the higher value is needed.

**NOTE 2** If the valve operates at higher pressures it is necessary to use the version with external pilot and reduced pressure. Otherwise, the valve can be ordered with internal pilot and pressure reducing valve with 30 bar fixed adjustment (pilot type Z, see identification code)

## 9 - PILOTING AND DRAINAGE

The DSP7 valves are available with piloting and drainage, both internal and external. The version with external drainage allows for a higher back pressure on the outlet.



X: plug M6x8 for external pilot  
Y: plug M6x8 for external drain

TYPE OF VALVE		Plug assembly	
		X	Y
<b>IE</b>	INTERNAL PILOT AND EXTERNAL DRAIN	NO	YES
<b>II</b>	INTERNAL PILOT AND INTERNAL DRAIN	NO	NO
<b>EE</b>	EXTERNAL PILOT AND EXTERNAL DRAIN	YES	YES
<b>EI</b>	EXTERNAL PILOT AND INTERNAL DRAIN	YES	NO

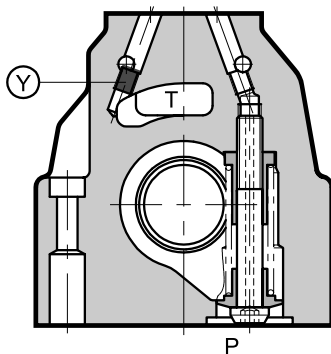
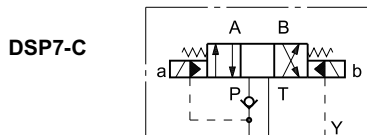
### 9.1 - Backpressure valve incorporated on line P

Valves DSP7 are available upon request with backpressure valve incorporated on line P. This is necessary to obtain the piloting pressure when the control valve, in rest position, has the line P connected to the T port (spools S2, S4, S7, S8, S\*2, S\*4, TA02, TB02, RK02). The cracking pressure is of 5 bar with a minimum flow rate of 15 l/min.

Add **C** to the identification code for this request (see paragraph 1).

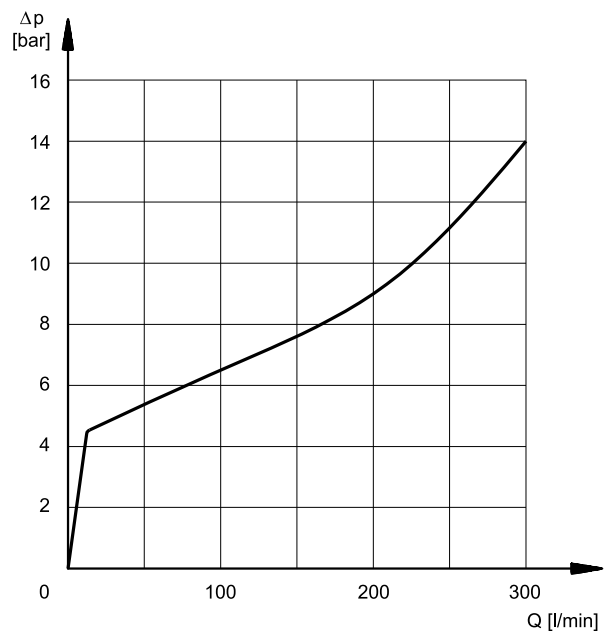
**In the C version the piloting is always internal.**

The backpressure valve can be also delivered separately and it can be easily mounted on line P of the main control valve. Specify the code **0266577** to order the backpressure valve separately.



pilot always internal  
Y: plug M6x8 for external drain

**NOTE:** the backpressure valve can't be used as check valve because it doesn't assure the seal.



The curve refers to the pressure drop (body part only) with backpressure valve energized to which the pressure drop of the reference spool must be added. (see paragraph 5)

## 10 - ELECTRICAL FEATURES

### 10.1 Solenoids

These are essentially made up of two parts: tube and coil. The tube is threaded into the valve body and includes the armature that moves immersed in oil, without wear. The inner part, in contact with the oil in the return line, ensures heat dissipation.

The coil is fastened to the tube by a threaded ring, and can be rotated 360°, to suit the available space.

**NOTE:** In order to further reduce the emissions, use of type H connectors is recommended. These prevent voltage peaks on opening of the coil supply electrical circuit (see data sheet 49 000).

#### Protection from atmospheric agents IEC EN 60529

Connection	IP 65	IP 67	IP 69 K
K1 DIN 43650	x (*)		
K7 DEUTSCH DT04 male	x	x	x (*)

(\*) The protection degree is guaranteed only with the connector correctly connected and installed

<b>SUPPLY VOLTAGE FLUCTUATION</b>	± 10% Vnom
<b>MAX SWITCH ON FREQUENCY</b>	10.000 ins/hour
<b>DUTY CYCLE</b>	100%
<b>ELECTROMAGNETIC COMPATIBILITY (EMC) (NOTE)</b>	In compliance with 2004/108/EC
<b>LOW VOLTAGE</b>	In compliance with 2006/95/EC
<b>CLASS OF PROTECTION :</b> Coil insulation (VDE 0580) Impregnation: (DC valve) (AC valve)	class H class F class H

### 10.2 - DC coils

In direct current energizing, current consumption stays at fairly constant values, essentially determined by Ohm's law:  $V = R \times I$ .

The WK1 and WK7D are coils specific for the high corrosion resistance version of the valve.

The WK7D coil includes a suppressor diode of pulses for protection from voltage peaks during switching. During the switching the diode significantly reduces the energy released by the winding, by limiting the voltage to 31.4V in the D12 coil and to 58.9 V in the D24 coil.

Using connectors type "D" (see cat. 49 000) with embedded bridge rectifier it is possible to feed DC coils (starting from 48V voltage) with alternating current (50 or 60 Hz), considering a reduction of the operating limits by approximately 5 + 10%.

The table shows current and power consumption values for DC coils.

(values ±10%)

	Nominal voltage [V]	Resistance at 20°C [Ω]	Current consumption [A]	Power consumption [W]	Coil code			
					K1	WK1	K7	WK7D
<b>D12</b>	12	4,4	2,72	32,7	1903080	1903050	1902940	1903400
<b>D24</b>	24	18,6	1,29	31	1903081	1903051	1902941	1903401
<b>D48</b>	48	78,6	0,61	29,5	1903083			
<b>D110</b>	110	436	0,26	28,2	1903464			
<b>D220</b>	220	1758	0,13	28,2	1903465			

### 10.3 - AC coils

The table shows current and power consumption values at inrush and at holding, relevant to the different coil types for AC current.

#### Coils for alternating current (values ± 5%)

Suffix	Nominal Voltage [V]	Freq. [Hz]	Resistance at 20°C [Ohm] (±1%)	Current consumption at inrush [A] (±5%)	Current consumption at holding [A] (±5%)	Power consumption at inrush (±5%) [VA]	Power consumption at holding (±5%) [VA]	Coil Code
<b>A24</b>	24	50	1,46	8	2	192	48	1902830
<b>A48</b>	48		5,84	4,4	1,1	204	51	1902831
<b>A110</b>	110V-50Hz 120V-60Hz	50/60	32	1,84	0,46	192	48	1902832
				1,56	0,39	188	47	
<b>A230</b>	230V-50Hz 240V-60Hz	60	140	0,76	0,19	176	44	1902833
				0,6	0,15	144	36	
<b>F110</b>	110	60	106	1,6	0,4	176	44	1902834
<b>F220</b>	220			0,8	0,2	180	45	1902835



## 11 - OPTIONS

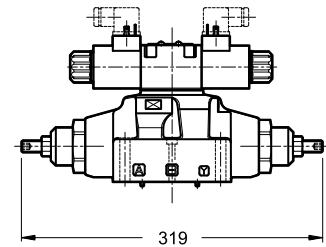
### 11.1 - Control of the main spool stroke: C

With the help of special side plugs, it is possible to introduce stroke controls in the heads of the piloted valve so as to vary the maximum spool clearance opening.

This solution allows control of the flow rate from the pump to the actuator and from the actuator to the outlet, obtaining a double adjustable control on the actuator.

Add the letter **C** to the identification code to request this device (see paragraph 1).

DSP7-S\*/C

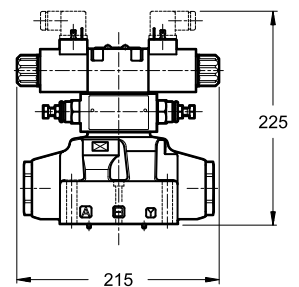


### 11.2 - Control of the main spool shifting speed: D

By placing a MERS type double flow control valve between the pilot solenoid valve and the main distributor, the piloted flow rate can be controlled and therefore the changeover smoothness can be varied.

Add the letter **D** to the identification code to request this device (see paragraph 1).

DSP7-S\*/D

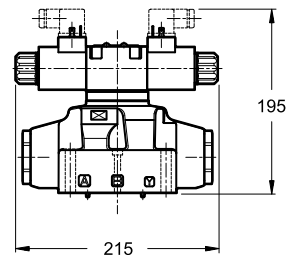


### 11.3 - Subplate with throttle on line P

It is possible to introduce a subplate with a restrictor of  $\varnothing 0,8$  on line P between the pilot solenoid valve and the main distributor.

Add **P08** to the identification code to request this option (see paragraph 1).

DSP7-S\*/P08



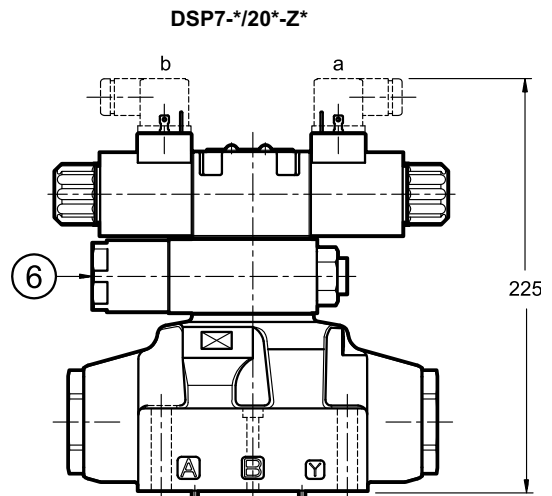
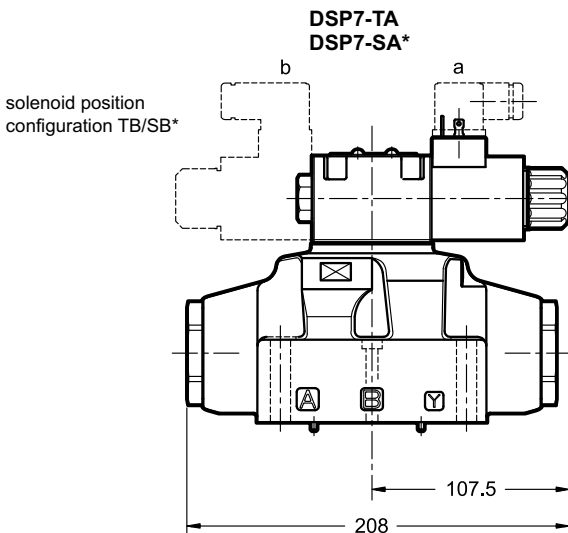
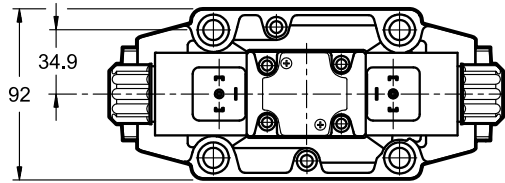
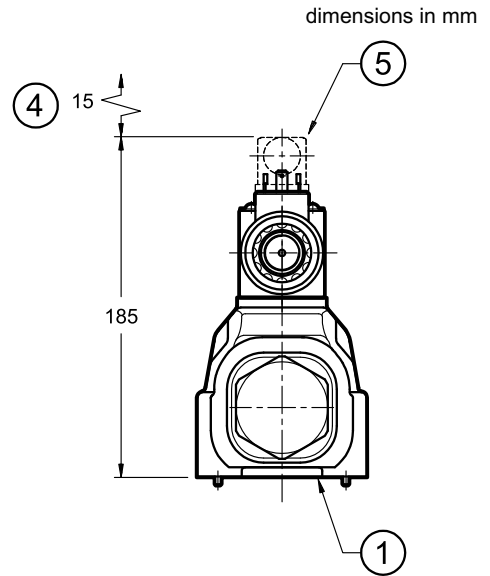
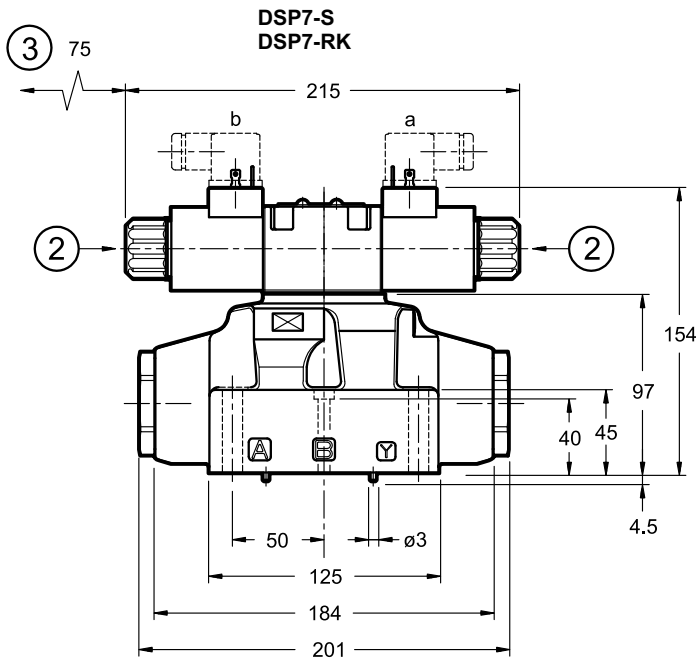
### 11.4 - Solenoid operated distributor with pilot valve in configuration S2

It is possible to deliver the solenoid operated distributor with pilot valve in configuration S2 (all the ports at outlet). With this option the piloting is necessarily external.

Add **S2** to the identification code to request this option (see paragraph 1).

This configuration is used with external piloting in order to allow the unloading of the piloting line when the solenoid operated valve is in rest position.

12 - DSP7 OVERALL AND MOUNTING DIMENSIONS FOR SOLENOID DISTRIBUTOR

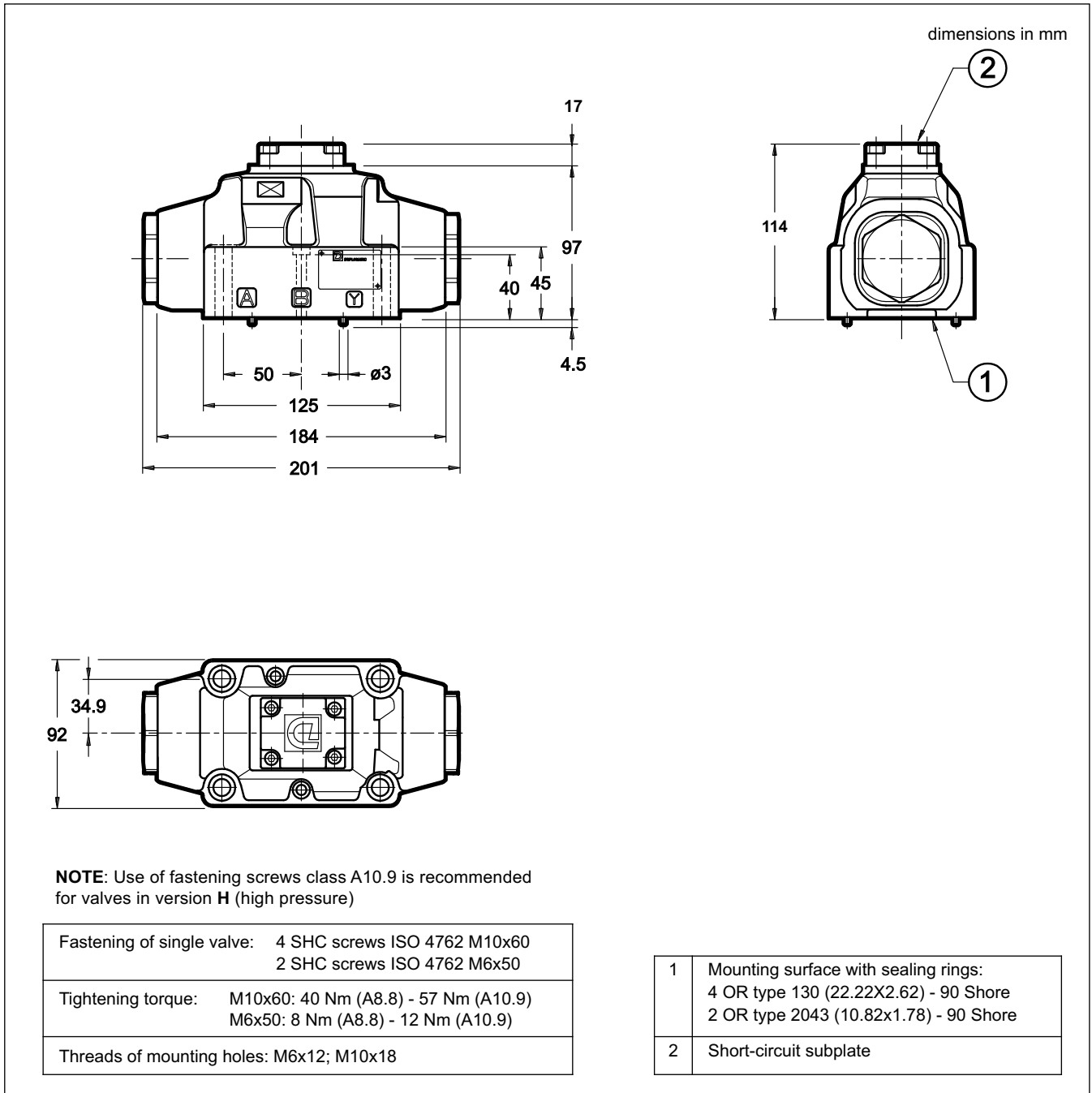


**NOTE:** Use of fastening screws class A10.9 is recommended for valves in version H (high pressure)

Fastening of single valve:	4 SHC screws ISO 4762 M10x60 2 SHC screws ISO 4762 M6x50
Tightening torque:	M10x60: 40 Nm (A8.8) - 57 Nm (A10.9) M6x50: 8 Nm (A8.8) - 12 Nm (A10.9)
Threads of mounting holes:	M6x12; M10x18

1	Mounting surface with sealing rings 4 OR type 130 (22.22X2.62) - 90 Shore 2 OR type 2043 (10.82x1.78) - 90 Shore
2	Manual override
3	Coil removal space
4	Connector removal space
5	Electric connector to be ordered separately (see cat. 49 000)
6	Reducing valve with fixed adjustment 30 bar

### 13 - DSC7 OVERALL AND MOUNTING DIMENSIONS FOR HYDRAULIC DISTRIBUTOR DSC7

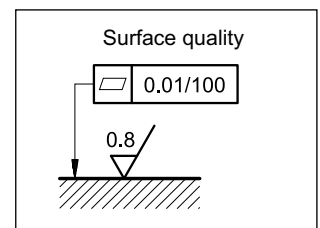


### 14 - INSTALLATION

Configurations with centring and recall springs can be mounted in any position; type RK valves - without springs and with mechanical detent - must be mounted with the longitudinal axis horizontal.

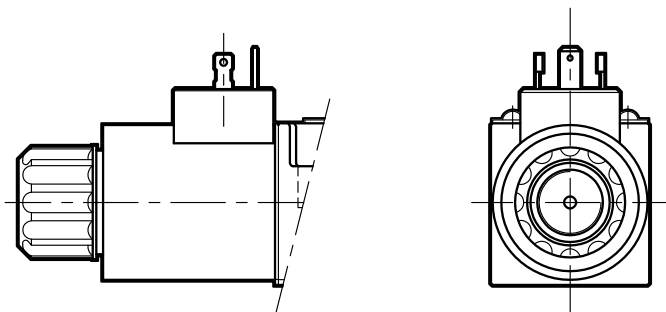
Valve fastening takes place by means of screws or tie rods, laying the valve on a lapped surface, with values of planarity and smoothness that are equal to or better than those indicated in the drawing. If the minimum values of planarity or smoothness are not met, fluid leakages between valve and mounting surface can easily occur.

**NOTE:** Use of fastening screws class 10.9 is recommended for valves in version **H** (high pressure).

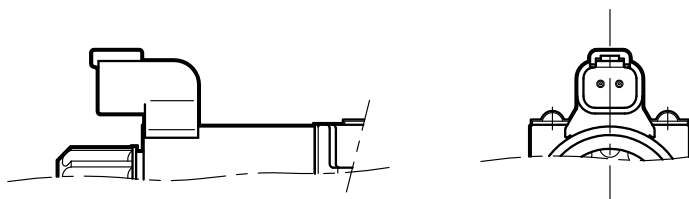


## 15 - ELECTRIC CONNECTIONS

connection for DIN 43650  
connector  
code **K1 (standard)**  
code **WK1** (W7 version only)



connection for  
DEUTSCH DT06-2S male  
connector type  
code **K7**



connection for  
DEUTSCH DT06-2S male  
connector - coil with diode  
code **WK7D** (W7 version only)



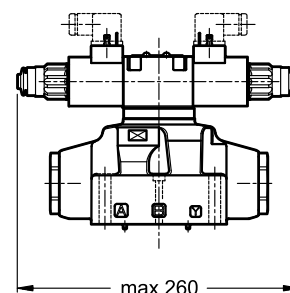
## 16 - ELECTRIC CONNECTORS

The valves are delivered without connectors. Connectors for K1/ WK1 connections (DIN 43650) can be ordered separately. See catalogue 49000.

## 17 - MANUAL OVERRIDE

Whenever the solenoid valve installation may involve exposure to atmospheric agents or use in tropical climates, the manual override, boot protection is recommended.

Add the suffix **CM** to request this device (see paragraph 1).



## 18 - SUBPLATES

(see catalogue 51 000)

These plates are not suitable for high pressure valves DSP7H.

Type with rear ports	PME07-AI6G
Type with side ports	PME07-AL6G
P, T, A, B, port dimensions X, Y; L port dimensions	1" BSP 1/4" BSP



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