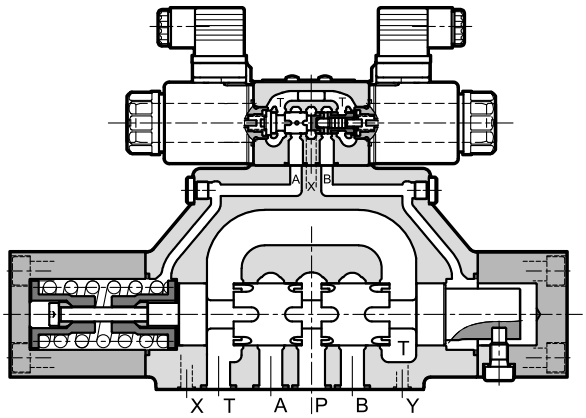
DSPE*

PROPORTIONAL DIRECTIONAL VALVES, PILOT OPERATED, ELECTRO-HYDRAULIC OR HYDRAULIC (DSCE*) ACTUATED

SUBPLATE MOUNTING

DSPE5	**CETOP P05**
DSPE5R	**ISO 4401-05**
DSPE7	**ISO 4401-07**
DSPE8	**ISO 4401-08**
DSPE10	**ISO 4401-10**
DSPE11	**ISO 4401-10** oversize ports

OPERATING PRINCIPLE



— The DSPE* are proportional directional control valves with electric proportional control and mounting interface in compliance with ISO 4401 standards.

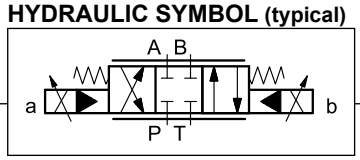
— DSCE* are the hydraulic actuated versions for external actuation by pressure control valve.

— They are suitable for directional and speed control of hydraulic actuators.

— Valve opening and hence flow rate can be modulated continuously in proportion to the current supplied to the solenoid.

— The valves can be actuated by a current control supply unit or by an external electronic card, to maximize the valve performances (see point 19).

HYDRAULIC SYMBOL (typical)



PERFORMANCES

(obtained with mineral oil with viscosity of 36 cSt at 50°C and electronic control card)

		DSPE5 DSPE5R	DSPE7	DSPE8	DSPE10	DSPE11
Max operating pressure: - P - A - B ports - T port	bar	350 see point 8				
Rated flow rate with Δp 10 bar P-T	l/min	80	150	300	800	1000
Step response		see point 6				
Hysteresis (with PWM 100 Hz)	% Q max	< 4%				
Repeatability	% Q max	< ±2%				
Electrical characteristics		see point 5				
Ambient temperature range	°C	-20 / +60				
Fluid temperature range	°C	-20 / +80				
Fluid viscosity range	cSt	10 ÷ 400				
Fluid contamination degree		According to ISO 4406:1999 class 18/16/13				
Recommended viscosity	cSt	25				
Mass: DSPE* single solenoid valve DSPE* double solenoid valve DSCE*	kg	6.3 7 5.5	7.7 8.4 6.9	15.4 15.9 14.4	42.8 43.5 41	40 40.7 39.2

1 - IDENTIFICATION CODE FOR ELECTRO-HYDRAULIC ACTUATED VALVES

Pilot operated directional control valve

Electric proportional control

Nominal size:
5 = CETOP P05 (**NOTE 1**)
5R = ISO 4401-05
7 = ISO 4401-07
8 = ISO 4401-08
10 = ISO 4401-10
11 = ISO 4401-10 with oversize ports

Spool type:
C = closed centre
A = open centre
RC = regenerative, closed centre
RA = regenerative, open centre

Spool nominal flow rate (see table point 2)

Configurations for single solenoid version (omit for double solenoid version):
SA = 1 solenoid for cross configuration
SB = 1 solenoid for parallel configuration

Series No.
20 = DSPE5, DSPE5R, DSPE7 and DSPE8
12 = DSPE10 and DSPE11

Seals:
N = NBR seals for mineral oil (**standard**)
V = FPM seals for special fluids

Piloting: **I** = internal
E = external
Z = internal piloting with 30 bar fixed adj. pressure reducing valve (see points 8 and 14)

Drain: **I** = internal
E = external

D12 = voltage 12V DC
D24 = voltage 24V DC

Coil electrical connection:
K1 = plug for connector type EN 175301-803 (ex DIN 43650) (**standard**)
K7 = plug DEUTSCH DT04-2P, for male connector type DEUTSCH DT06-2S.

Manual override:
(see point 16)

Option:
/ W7 = Zinc-nickel surface treatment (see **NOTE 2**)
Omit if not required

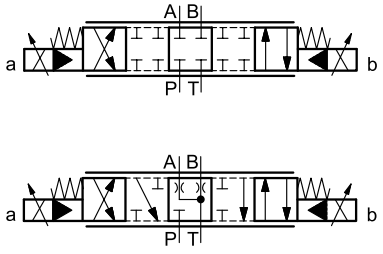
NOTE 1: This version is interchangeable with the model E4E Duplomatic.

NOTE 2: The standard valve is supplied with surface treatment of phosphating black. The zinc-nickel finishing on the valve body makes the valve suitable to ensure a salt spray resistance up to **240** hours. For a salt spray resistance up to **600** hours refer to **point 9**.
(test operated according to UNI EN ISO 9227 standards and test evaluation operated according to UNI EN ISO 10289 standards).

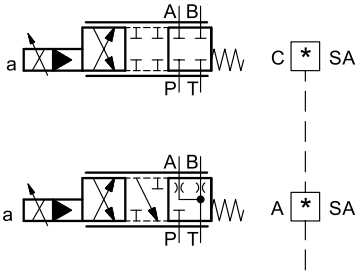
2 - AVAILABLE CONFIGURATIONS

The valve configuration depends on the combination of the following elements:
number of proportional solenoids, spool type, nominal flow rate.

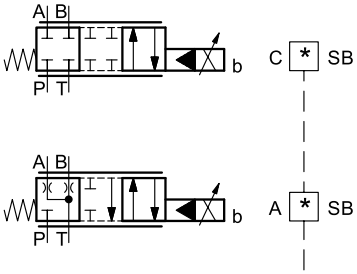
2 solenoids configuration:
3 positions with spring centering



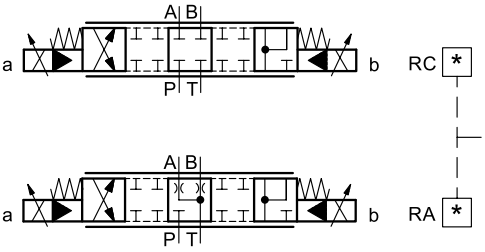
"**SA**" configuration: 1 solenoid on side A.
2 positions (central + external) with return spring



"**SB**" configuration: 1 solenoid on side B.
2 positions (central + external) with return spring



Type of valve	*	Nominal flow with Δp10 bar P→T
DSPE5 DSPE5R	**80**	80 l/min
	80/40	80 (P-A) / 40 (B-T) l/min
DSPE7	**100**	100 l/min
	150	150 l/min
	150/75	150 (P-A) / 75 (B-T) l/min
DSPE8	**200**	200 l/min
	300	300 l/min
	300/150	300 (P-A) / 150 (B-T) l/min
DSPE10	**350**	350 l/min
	500	500 l/min
	500/250	500 (P-A) / 250 (B-T) l/min
	800	800 l/min
DSPE11	**1000**	1000 l/min



Type of valve	*	Nominal flow with Δp10 bar P→T
DSPE7	**150/75**	150 (P-A, A-T) / 75 (P-B, B-P) l/min
DSPE8	**300/150**	300 (P-A, A-T) / 150 (P-B, B-P) l/min
DSPE10	**500/250**	500 (P-A, A-T) / 250 (P-B, B-P) l/min

3 - IDENTIFICATION CODE FOR HYDRAULIC ACTUATED VALVES

D	S	C	E		-			/			-	E	E	

Directional control valve for external actuation by pressure control valve

For proportional control

Nominal size:
5 = CETOP P05
5R = ISO 4401-05
7 = ISO 4401-07
8 = ISO 4401-08
10 = ISO 4401-10
11 = ISO 4401-10 with oversize ports

Spool type:
C = closed centre
A = open centre

Spool nominal flow rate (see point 2)

Series No.
20 = DSCE5, DSCE5R, DSCE7 and DSCE8
12 = DSCE10 and DSCE11

Seals:
N = NBR seals for mineral oil (**standard**)
V = FPM seals for special fluids

External pilot supply

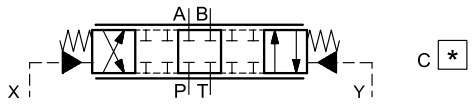
External drain

Option:
/ W7 = Zinc-nickel surface treatment (see **NOTE**)
Omit if not required

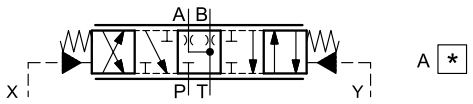
Spool types

DSCE* valves are delivered with short-circuit subplate.

The hydraulic actuation takes place by pressurization in X and Y ports.



C [*]



A [*]

NOTE: The standard valve is supplied with surface treatment of phosphating black.

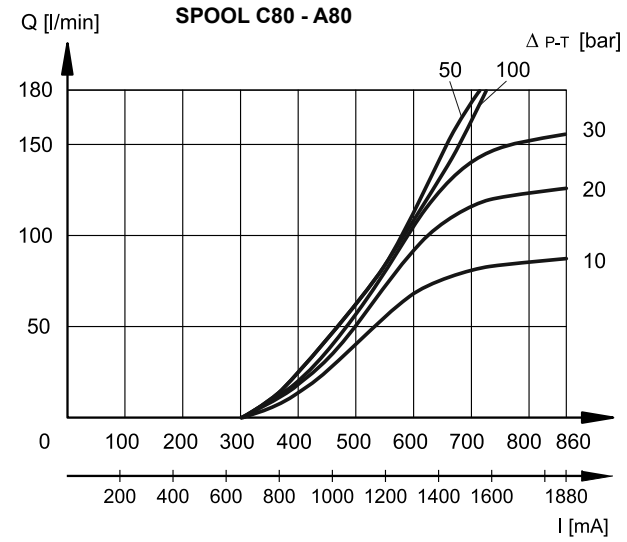
The zinc-nickel finishing makes the valve suitable to ensure a salt spray resistance up to **600** hours.
(test operated according to UNI EN ISO 9227 standards and test evaluation operated according to UNI EN ISO 10289 standards).

4 - CHARACTERISTIC CURVES

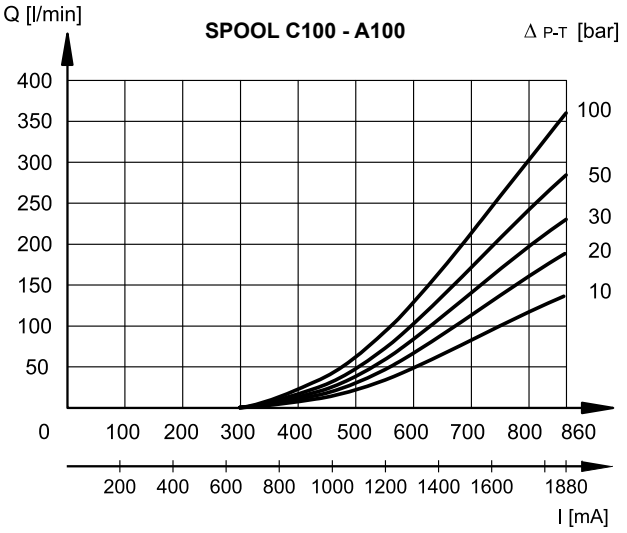
(obtained with mineral oil with viscosity of 36 cSt at 50°C and electronic control card)

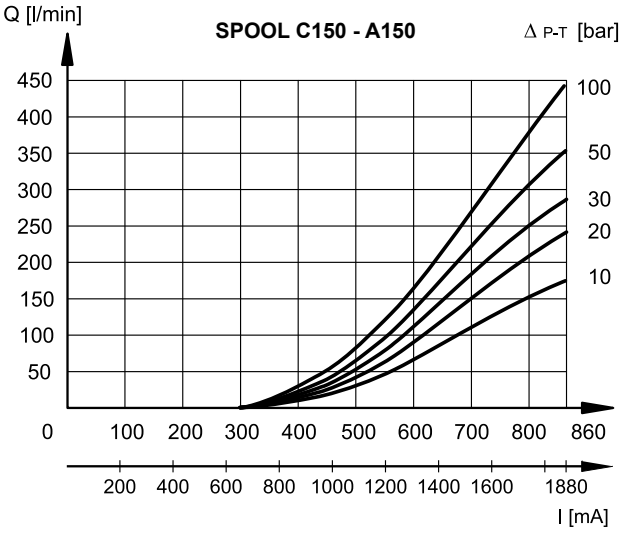
Typical flow rate control curves at constant Δp according to the current supply to the solenoid, measured for the available spool types. The reference Δp values are measured between P and T valve ports.

4.1 - Characteristic curves DSPE5 and DSPE5R

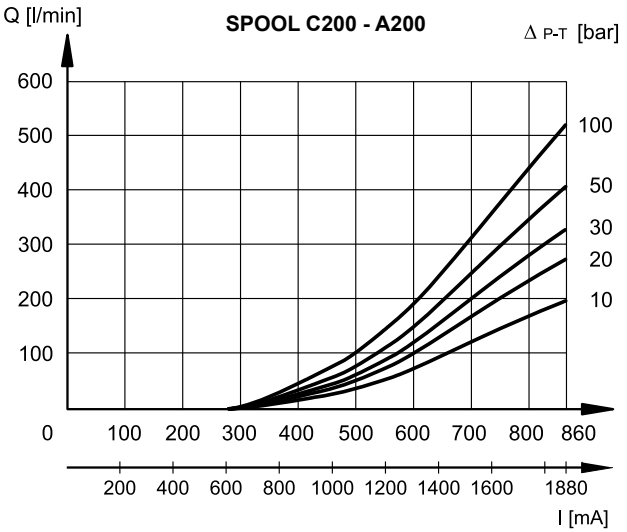


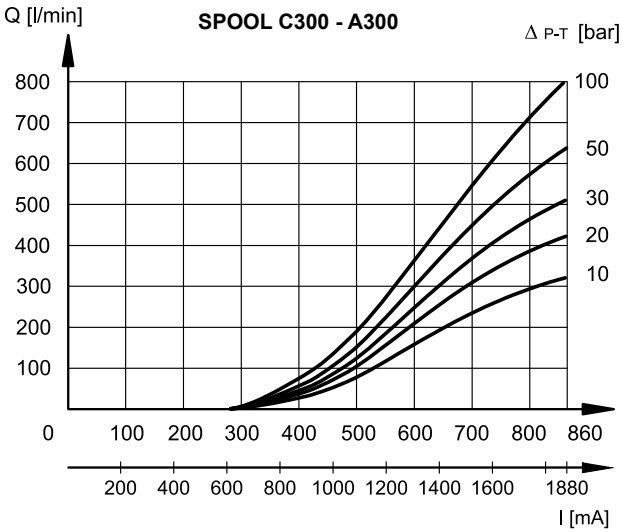
4.2 - Characteristic curves DSPE7



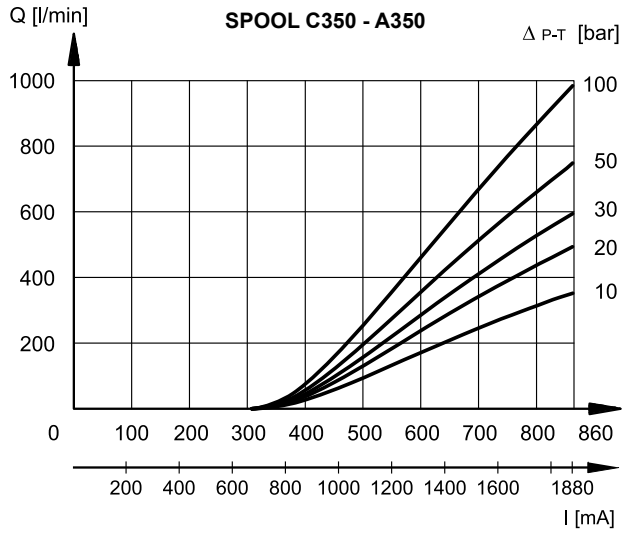


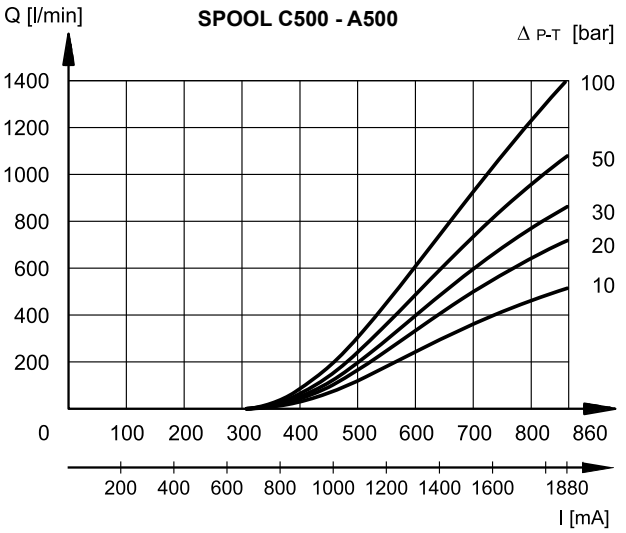
4.3 - Characteristic curves DSPE8

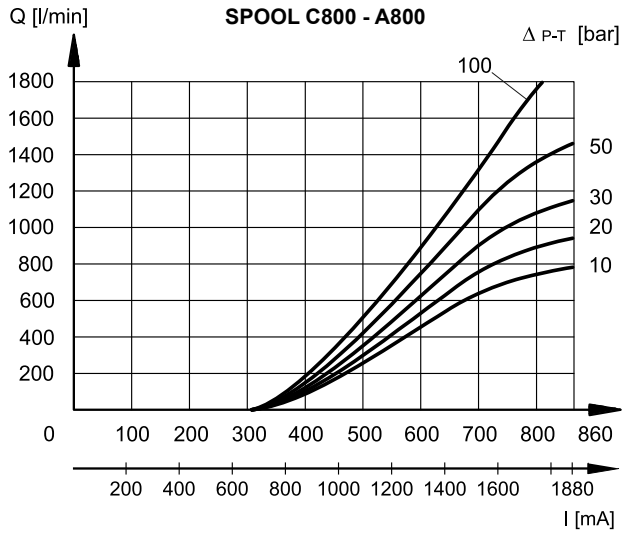




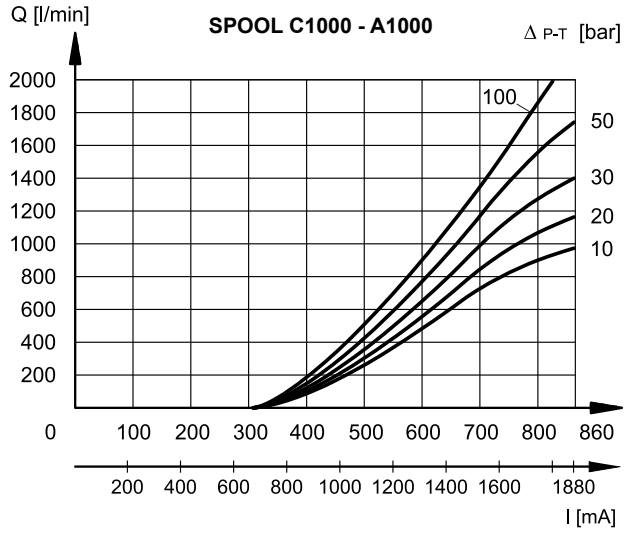
4.4 - Characteristic curves DSPE10







4.5 - Characteristic curves DSPE11



5 - ELECTRICAL CHARACTERISTICS

Proportional solenoid

The proportional solenoid comprises two parts: tube and coil.

The tube, screwed to the valve body, contains the armature which is designed to maintain friction to a minimum thereby reducing hysteresis.

The coil is mounted on the tube secured by means of a lock nut. It can be rotated through 360° depending on installation clearances.

NOMINAL VOLTAGE	V DC	**12**	**24**
RESISTANCE (at 20°C) K1 coil K7, WK1, WK7 coil	Ω	 3.66 4.4	 17.6 18.6
NOMINAL CURRENT	A	1.88	0.86
DUTY CYCLE		100%	
ELECTROMAGNETIC COMPATIBILITY (EMC)		According to 2014/30/EU	
PROTECTION FROM ATMOSPHERIC AGENTS (IEC 60529)		IP65	
CLASS OF PROTECTION Coil insulation (VDE 0580) Impregnation		 class H class F	

6 - STEP RESPONSE

(obtained with mineral oil with viscosity of 36 cSt at 50°C and electronic control card)

Step response is the time taken for the valve to reach 90% of the set pressure value following a step change of reference signal.

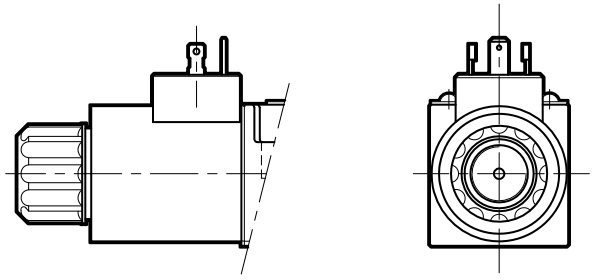
The table shows the typical step response tested with static pressure 100 bar.

REFERENCE SIGNAL	0 → 100%	100 → 0%
	Step response [ms]	
DSPE5 / DSPE5R	50	40
DSPE7	80	50
DSPE8	100	70
DSPE10 / DSPE11	200	120

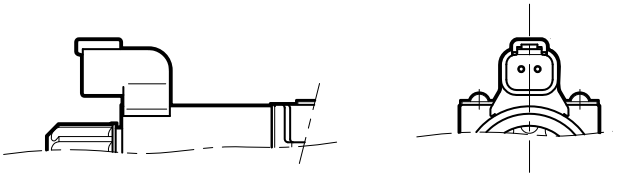
7 - ELECTRIC CONNECTIONS

Connectors for K1 connection are always delivered together with the valve.

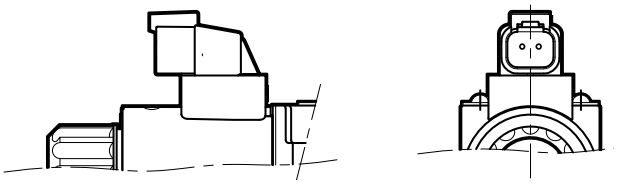
connection for EN 175301-803
(ex DIN 43650) connector
code **K1** (**standard**)
code **WK1** (W7 version only)



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



connection for
DEUTSCH DT06-2S male connector
code **WK7** (W7 version only)



8 - HYDRAULIC CHARACTERISTICS

(obtained with mineral oil with viscosity of 36 cSt at 50°C and electronic control card)

		DSPE5 DSPER5	DSPE7	DSPE8	DSPE10	DSPE11
Max flow rate	l/min	180	450	800	1800	2000
Pilot supply flow requested with operation 0 →100%	l/min	2.1	2.4	5.5	6.5	6.5
Pilot supply volume requested with operation 0 →100%	cm^3	1.7	3.2	9.2	21.6	21.6

PRESSURES (bar)	MIN	MAX
Piloting pressure on X port (DSPE*)	30	210 (**NOTE**)
Pressure on T port with internal drain	–	10
Pressure on T port with external drain	–	250

NOTE: if the valve operates at higher pressures it is necessary to use the version with external pilot supply with reduced pressure.

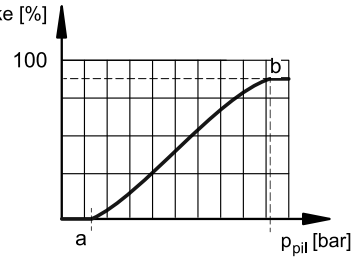
Otherwise, the valve with internal pilot and pressure reducing valve with 30 bar fixed adjustment can be ordered (piloting type: Z, see point 1 and 14).

8.1 - Pilot supply pressures for DSCE* valves

These values are intended at nominal Δp. The resistive forces increase at higher Δp and therefore the maximum pilot pressure must be higher to move the main spool for its entire stroke.

Max pilot pressure must not exceed 30 bar.

		DSCE5	DSCE7	DSCE8	DSCE10	DSCE11
Valve opening (a)	bar	5.0	4.0	3.5	4.5	4.5
Max spool stroke (b)	bar	24.0	24.0	23.5	23.0	23.0



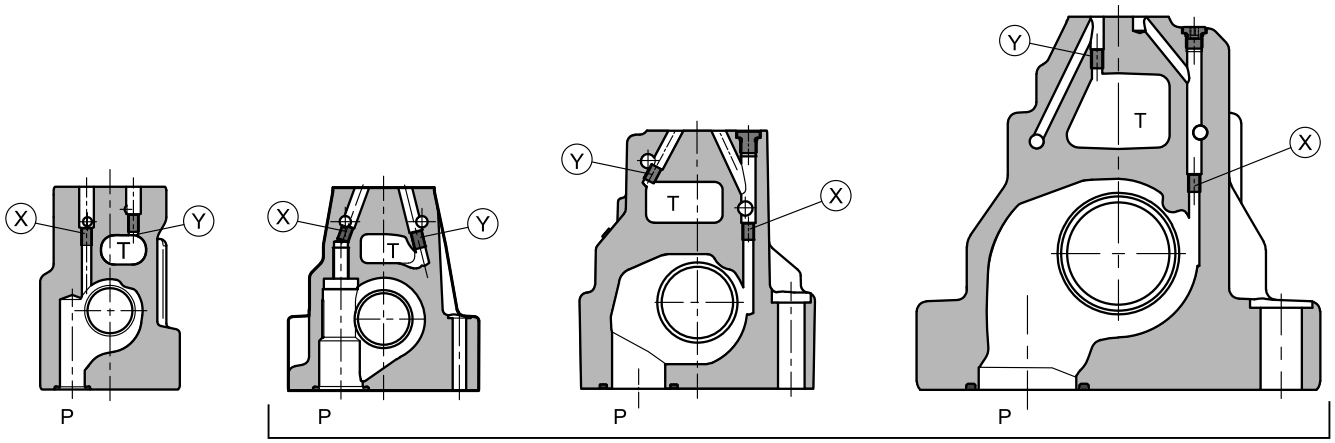
8.2 - Pilot and drain

DSPE* valves are available with pilot and drain both internal or external. The version with external drain allows a higher back pressure on the unloading. The version with external pilot with reduced pressure must be used when higher pressures are needed.

The pilot supply Z type consists of an arrangement with internal piloting and 30 bar supply pressure for the pilot stage by means of a fixed adjustment pressure reducing valve.

NOTE: The configuration of pilots and drains must be chosen when ordering. Subsequent modifications are allowed only to specialized operators with authorization and in factory.

TYPE OF VALVE		Plug assembly	
		X	Y
IE	internal pilot and external drain	NO	YES
II	internal pilot and internal drain	NO	NO
EE	external pilot and external drain	YES	YES
EI	external pilot and internal drain	YES	NO



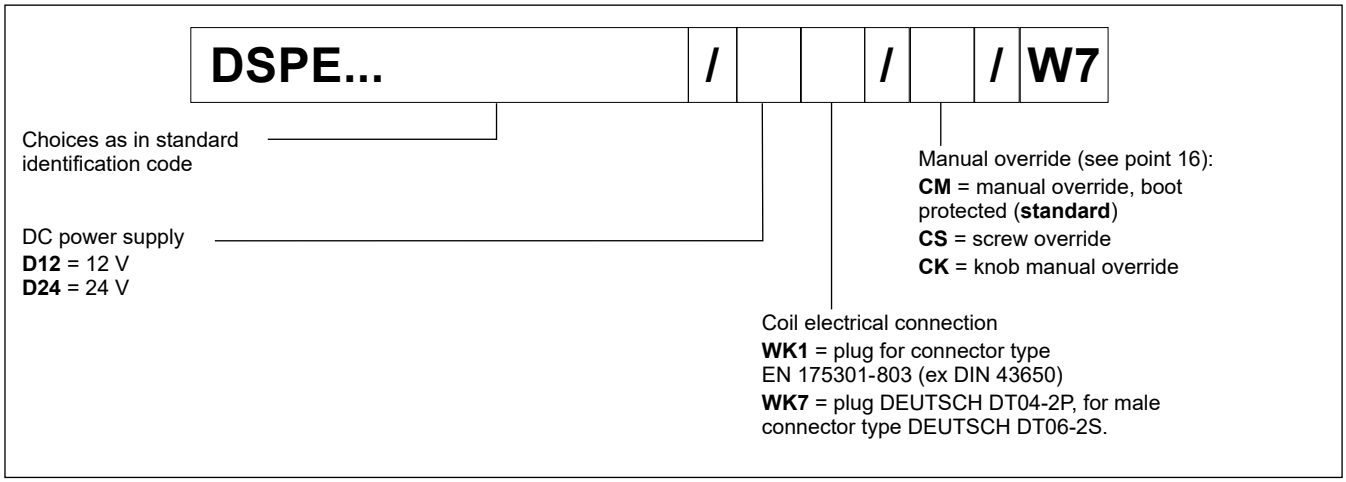
DSPE5 / DSPE5R

X: plug M5x6 for external pilot
Y: plug M5x6 for external drain

DSPE7, DSPE8, DSPE10/11

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

9 - HIGH IP AND CORROSION RESISTANCE VERSION



9.1 - Corrosion resistance

This version 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 boot protected manual override is fitted as standard in order to protect the solenoid tube. See the dimensions of the CM manual override in point 16.

9.2 - Coils

The coils feature a zinc-nickel surface treatment. The electrical characteristics do not change compared to the standard version: see table in point 5.

9.3 - Protection from atmospheric agents IEC 60529

The IP protection degree is guaranteed only with both valve and connectors of an equivalent IP degree correctly connected and installed.

electric connection	electric connection protection	whole valve protection
WK1 EN 175301-803 (ex DIN 43650)	IP66	IP66
WK7 DEUTSCH DT04 male	IP66/IP68/IP69 IP69K*	IP66/IP68/IP69 IP69K*

(*) The IP69K protection degree is not taken into account in IEC 60529 but it is included in ISO 20653.

NOTE: As regards the liquid ingress protection (second digit), there are three means of protection.

Codes from 1 to 6 are related to water jets.

Rates 7 and 8 are related to immersion.

Rate 9 is reserved for high pressure and temperature water jets.

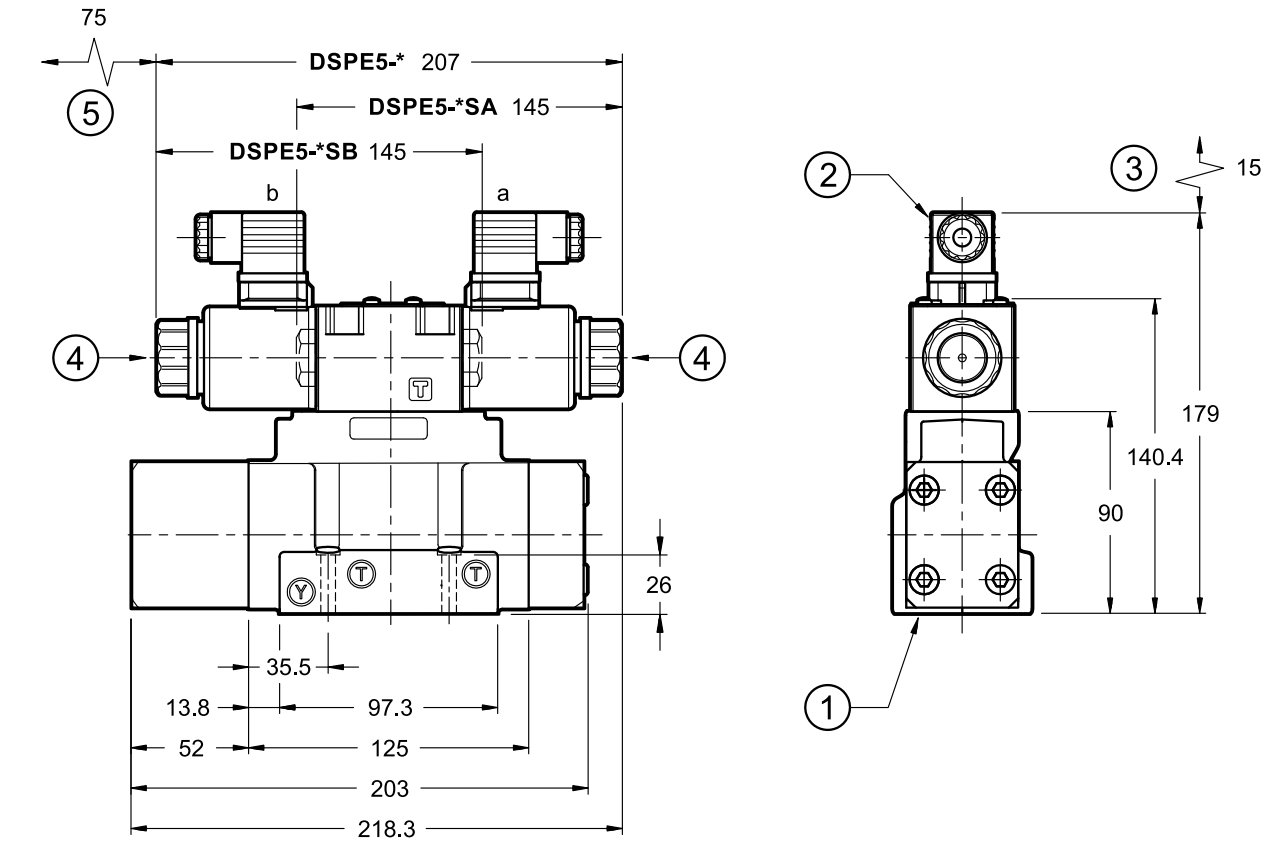
This means that IPX6 covers all the lower steps, rate IPX8 covers IPX7 but not IPX6 and lower, instead IPX9 does not cover any of them.

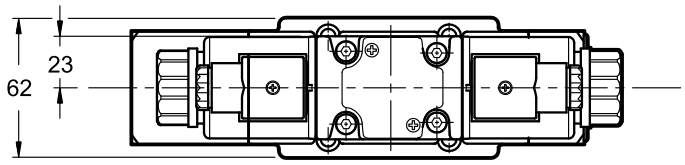
Whether a device meets two types of protection requirements it must be indicated by listing both the tests separated by a slash.

(E.g. a marking of an equipment covered both by temporary immersion and water jets is IP66/IP68).

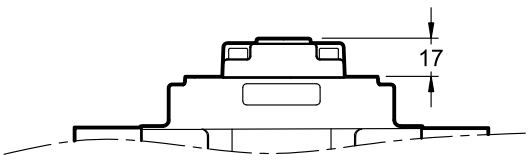
10 - OVERALL AND MOUNTING DIMENSIONS DS*E5 AND DS*E5R

dimensions in mm





DSCE5



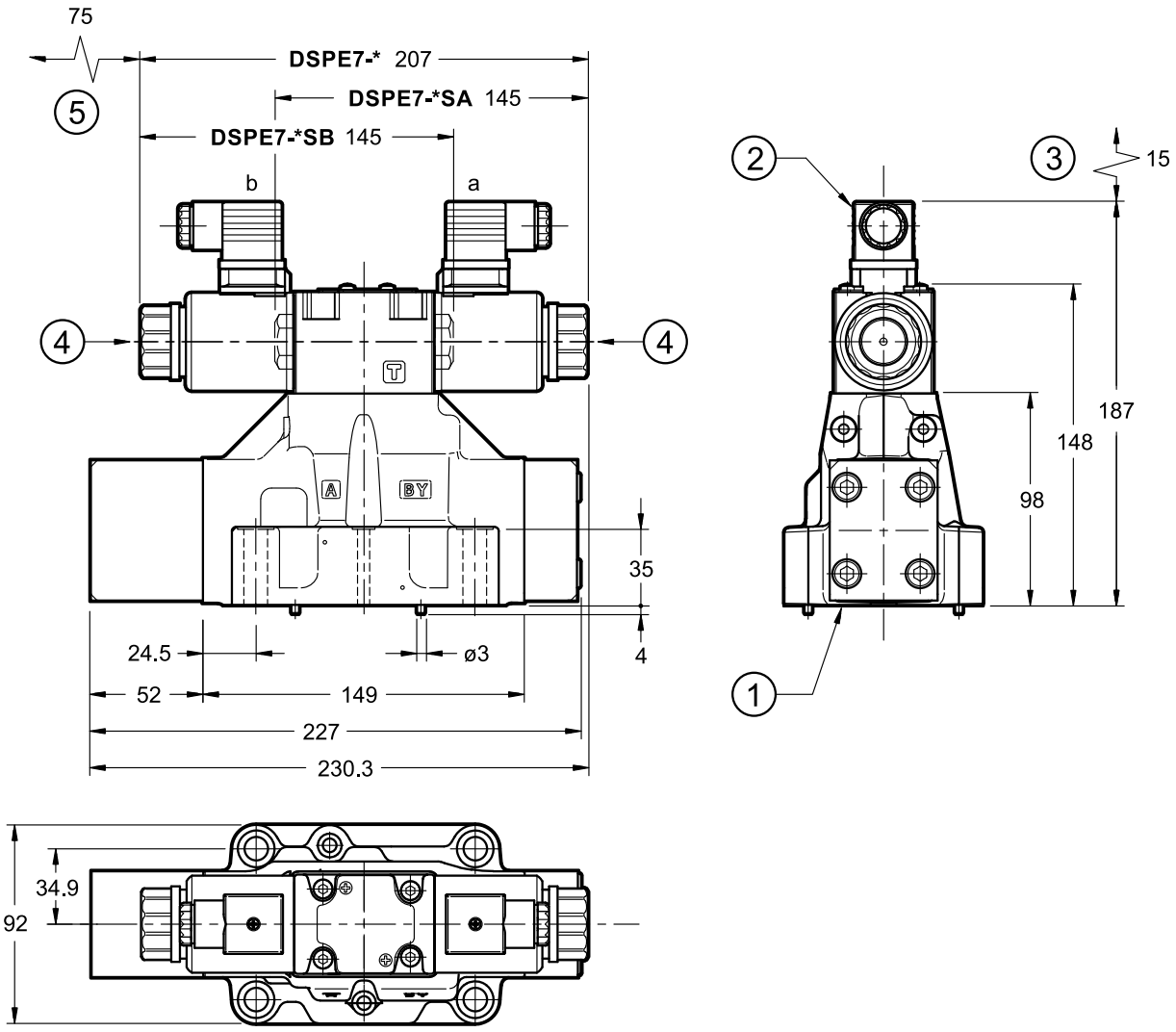
NOTE: for overall dimensions with Z option
(fixed adjustment pressure reducing valve) see point 14.
- Mounting interface at point 15.

Valve fastening: N. 4 SHC screws M6x35 - ISO 4762
Tightening torque: 8 Nm (A 8.8 bolts)
Thread of mounting holes: M6x10

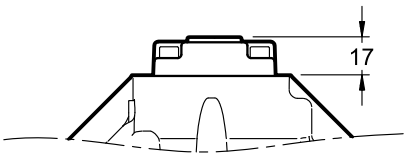
1	Mounting surface with sealing rings: N. 5 OR type 2050 (12.42x1.78) - 90 Shore N. 2 OR type 2037 (9.25x1.78) - 90 Shore
2	EN 175301-803 (ex DIN 43650) electrical connector
3	Connector removal space
4	Standard manual override embedded in the solenoid tube
5	Coil removal space

11 - OVERALL AND MOUNTING DIMENSIONS DS*E7

dimensions in mm



DSCE7



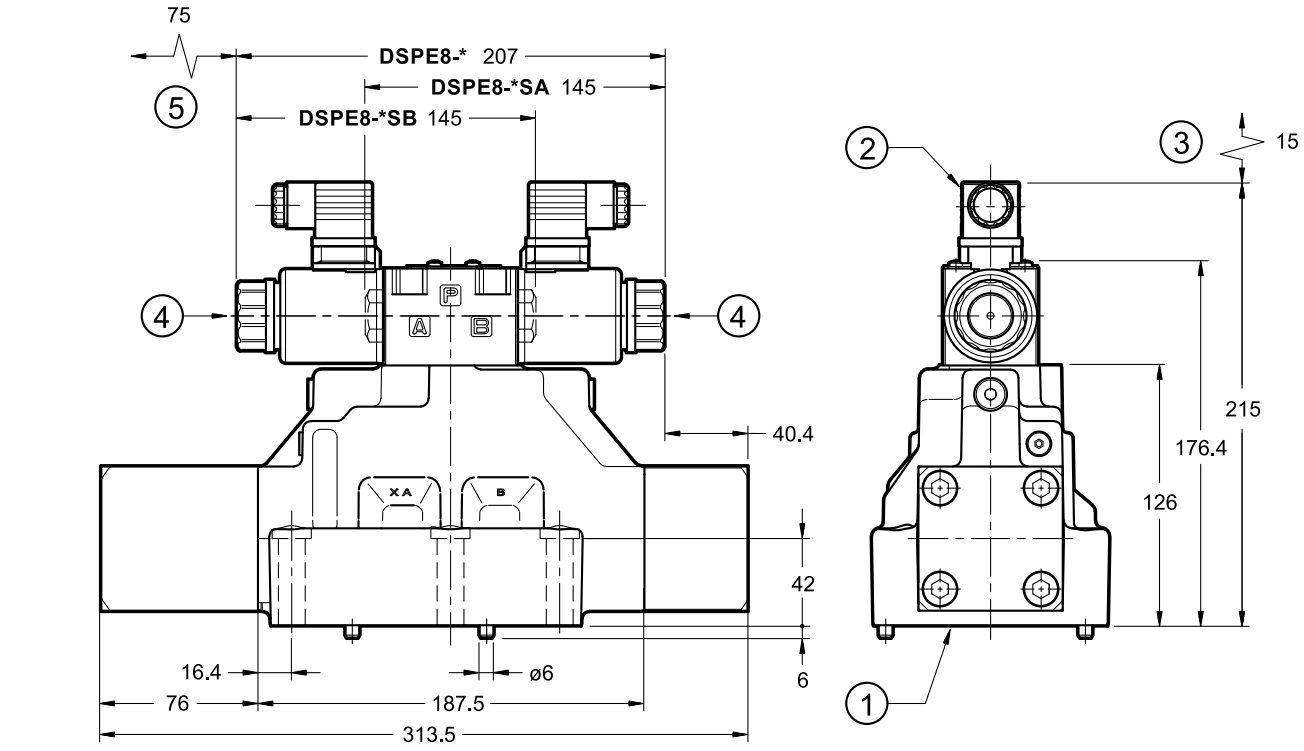
NOTE: for overall dimensions with Z option
(fixed adjustment pressure reducing valve) see point 14.
- Mounting interface at point 15.

Single valve fastening:	N. 4 SHC M10x50 bolts - ISO 4762 N. 2 SHC M6x50 bolts - ISO 4762
Tightening torque:	M10x50: 40 Nm (A 8.8 bolts) M6x50: 8 Nm (A 8.8 bolts)
Thread of mounting holes:	M6x18; M10x18

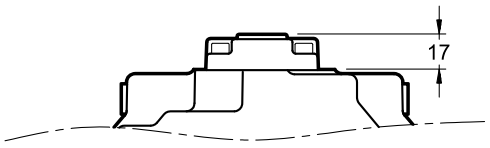
1	Mounting surface with sealing rings: N. 4 OR type 130 (22.22x2.62) - 90 Shore N. 2 OR type 2043 (10.82x1.78) - 90 Shore
2	EN 175301-803 (ex DIN 43650) electrical connector
3	Connector removal space
4	Standard manual override embedded in the solenoid tube
5	Coil removal space

12 - OVERALL AND MOUNTING DIMENSIONS DS*E8

dimensions in mm



DSCE8



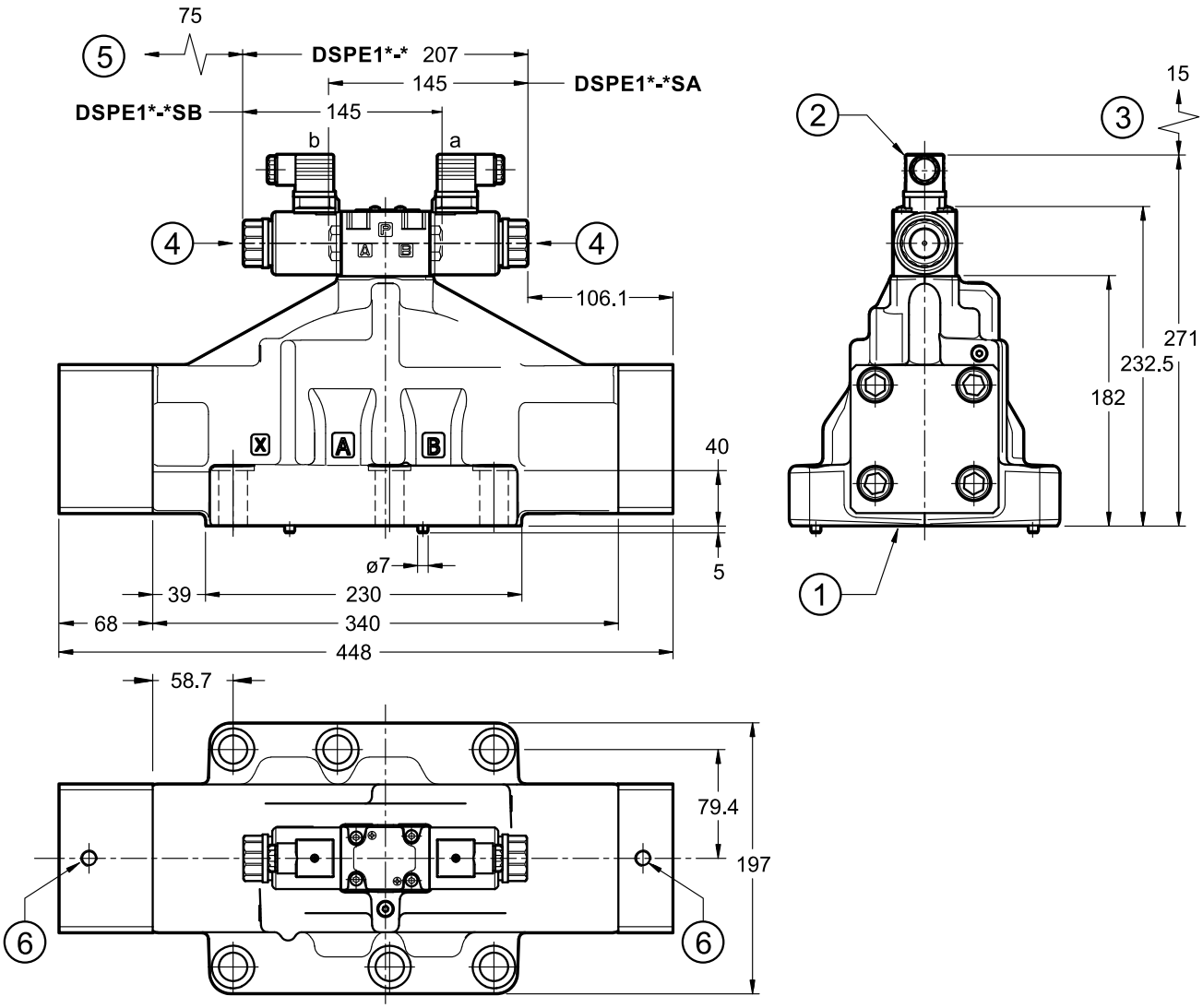
NOTE: for overall dimensions with Z option
(fixed adjustment pressure reducing valve) see point 14.
- Mounting interface at point 15.

Valve fastening: N. 6 SHC M12x60 bolts - ISO 4762
Tightening torque: 69 Nm (A 8.8 bolts)
Thread of mounting holes: M12x20

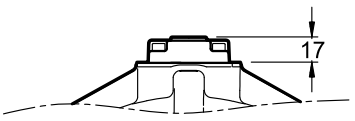
1	Mounting surface with sealing rings: N. 4 OR type 3131 (32.99x2.62) - 90 Shore N: 2 OR type 3087 (21.89x2.62) - 90 Shore
2	EN 175301-803 (ex DIN 43650) electrical connector
3	Connector removal space
4	Standard manual override embedded in the solenoid tube
5	Coil removal space

13 - OVERALL AND MOUNTING DIMENSIONS DS*E10 AND DS*E11

dimensions in mm



DSCE10 / DSCE11



1	Mounting surface with sealing rings: **DS*E10** N. 4 OR type 4162 (40.86x3.53) - 90 Shore N. 2 OR type 3081 (20.24x2.62) - 90 Shore **DS*E11** N. 4 OR type 4212 (53.57x3.53) - 90 Shore N. 2 OR type 3081 (20.24x2.62) - 90 Shore
2	EN 175301-803 (ex DIN 43650) electrical connector
3	Connector removal space
4	Standard manual override embedded in the solenoid tube
5	Coil removal space
6	N. 2 M12 holes for eyebolts lifting

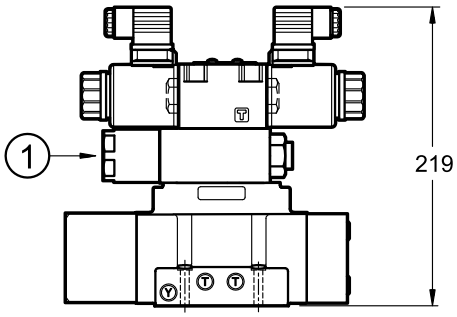
NOTE: for overall dimensions with Z option
(fixed adjustment pressure reducing valve) see point 14.
- Mounting interface at point 15.

Valve fastening: N. 6 SHC M12x70 screw - ISO 4762
Tightening torque: 330 Nm (A 8.8 bolts)
Thread of mounting holes: M20x40

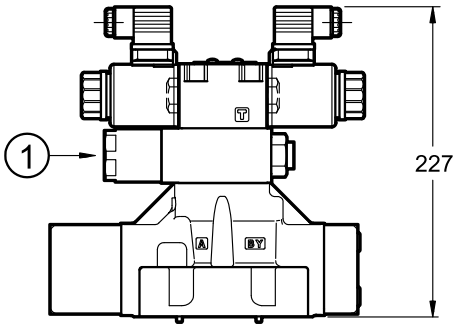
14 - OVERALL AND MOUNTING DIMENSIONS - PILOT SUPPLY TYPE Z

dimensions in mm

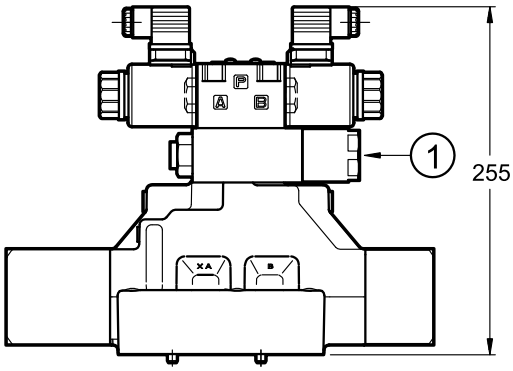
DSPE5



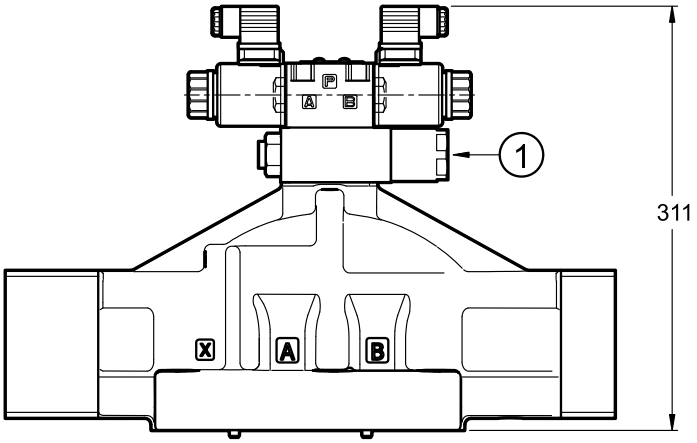
DSPE7



DSPE8



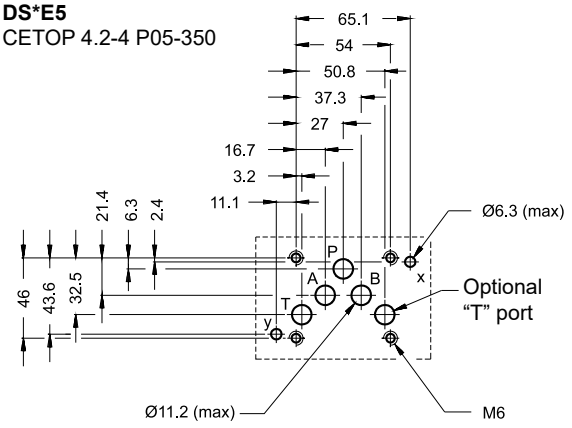
DSPE10 / DSPE11



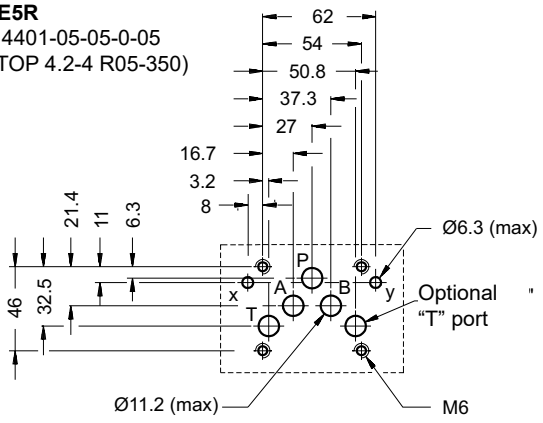
1	30 bar fixed adjustment pressure reducing valve

15 - MOUNTING SURFACES

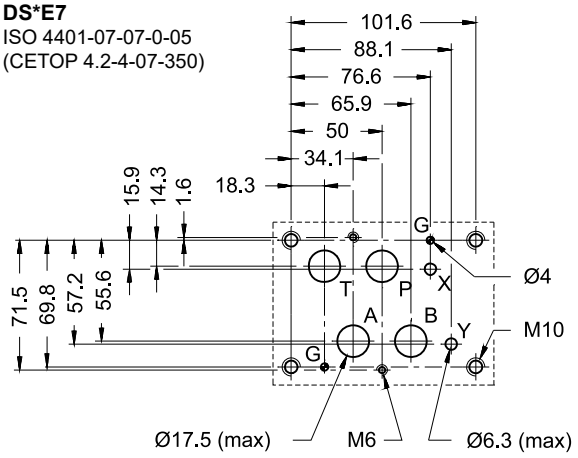
DS*E5
CETOP 4.2-4 P05-350



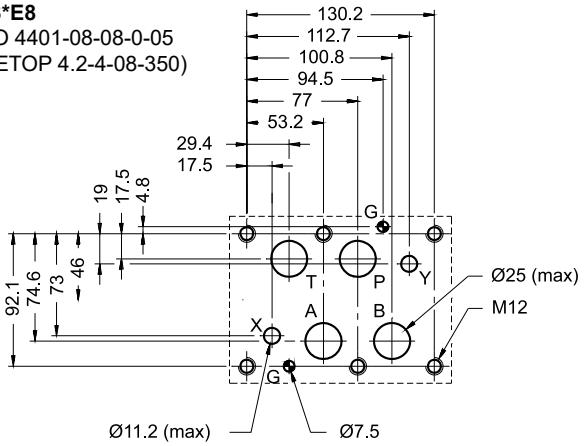
DS*E5R
ISO 4401-05-05-0-05
(CETOP 4.2-4 R05-350)



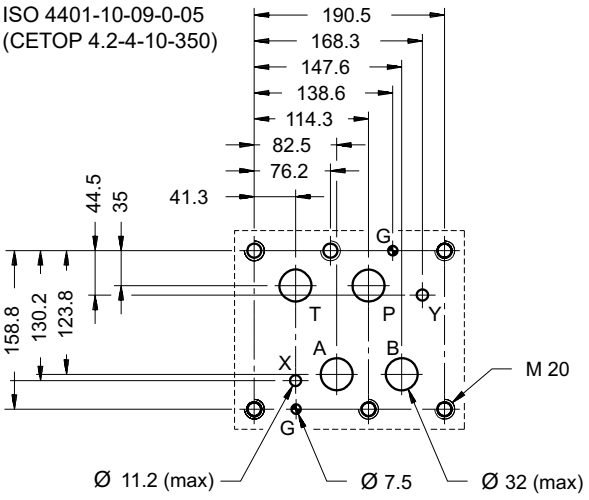
DS*E7
ISO 4401-07-07-0-05
(CETOP 4.2-4-07-350)



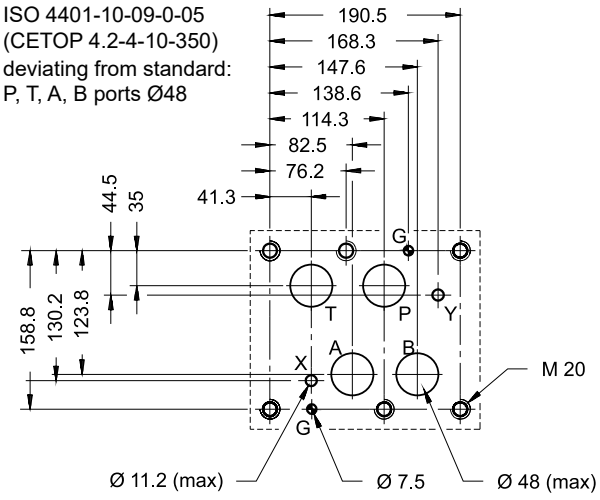
DS*E8
ISO 4401-08-08-0-05
(CETOP 4.2-4-08-350)



DS*E10
ISO 4401-10-09-0-05
(CETOP 4.2-4-10-350)



DS*E11
ISO 4401-10-09-0-05
(CETOP 4.2-4-10-350)
deviating from standard:
P, T, A, B ports Ø48



16 - MANUAL OVERRIDE

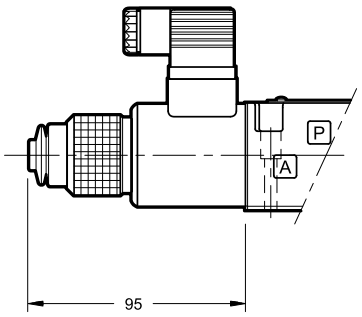
The standard valve has solenoids whose pin for the manual operation is integrated in the tube. The operation of this control must be executed with a suitable tool, minding not to damage the sliding surface.

Three different manual override version are available upon request:

- **CM** version, manual override belt protected
- **CS** version, with metal ring nut provided with a M4 screw and a blocking locknut
- **CK** version, knob. When the set screw is screwed and aligned with the edge of the knob, tighten the knob till it touches the spool: in this position the override is not engaged and the valve is de-energized. After adjusting the override, tighten the set screw in order to avoid the knob loosing.

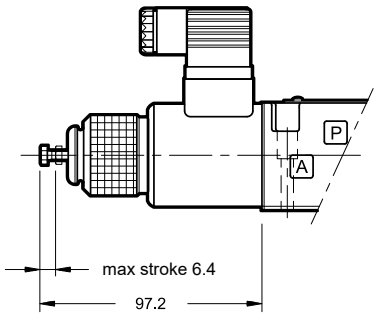
NOTE: The manual override use doesn't allow any proportional regulation; in fact, using this kind of override the main stage spool opens completely and the valve will behave as an on-off valve.

CM version



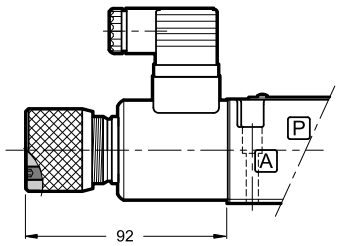
Code: 3803210003

CS version



Code: 3803210004

CK version



Allen key for set screw: 3 mm

Code: 3803210005

17 - 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 fluid types 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.

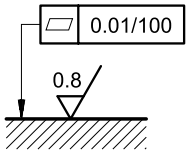
18 - INSTALLATION

The DSPE* valves can be installed in any position without impairing correct operation.

Ensure that there is no air in the hydraulic circuit.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak from the mounting surface.

Surface finishing



19 - ELECTRONIC CONTROL UNITS

DSPE*-SA, DSPE*-**SB,**

EDC-111	for solenoid 24V DC	plug version	see cat. 89 120
EDC-141	for solenoid 12V DC		
EDM-M111	for solenoid 24V DC	DIN EN 50022 rail mounting	see cat. 89 252
EDM-M141	for solenoid 12V DC		

DSPE*-A*, DSPE*-C*

EDM-M211	for solenoid 24V DC	rail mounting DIN EN 50022	see cat. 89 252
EDM-M241	for solenoid 12V DC		

20 - SUBPLATES

(see catalogue 51 000)

No subplates are available for DS*E5R, DS*E10 and DS*E11.

		DS*E5	DS*E7	DS*E8
Model with rear ports		PME4-AI5G	PME07-AI6G	-
Model with side ports		PME4-AL5G	PME07-AL6G	PME5-AL8G
Thread of ports:	P - T - A - B X - Y	3/4” BSP 1/4” BSP	1” BSP 1/4” BSP	1½” BSP 1/4” BSP

DUPLOMATIC MOTION SOLUTIONS
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