

DSPE*

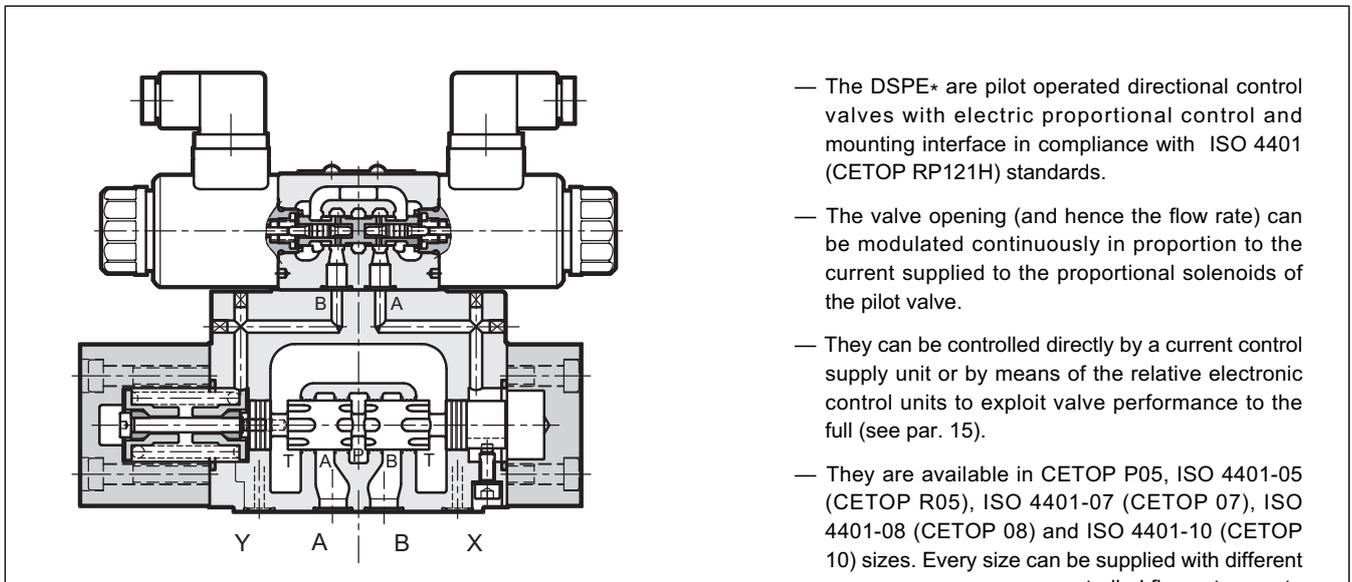
PILOT OPERATED DIRECTIONAL VALVE WITH PROPORTIONAL CONTROL SERIES 11

DSPE5 **CETOP P05**
DSPE5R **ISO 4401-05 (CETOP R05)**
DSPE7 **ISO 4401-07 (CETOP 07)**
DSPE8 **ISO 4401-08 (CETOP 08)**
DSPE10 **ISO 4401-10 (CETOP 10)**

p max (see performances table)

Q max (see performances table)

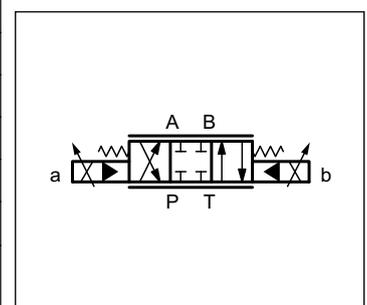
OPERATING PRINCIPLE



- The DSPE* are pilot operated directional control valves with electric proportional control and mounting interface in compliance with ISO 4401 (CETOP RP121H) standards.
- The valve opening (and hence the flow rate) can be modulated continuously in proportion to the current supplied to the proportional solenoids of the pilot valve.
- They can be controlled directly by a current control supply unit or by means of the relative electronic control units to exploit valve performance to the full (see par. 15).
- They are available in CETOP P05, ISO 4401-05 (CETOP R05), ISO 4401-07 (CETOP 07), ISO 4401-08 (CETOP 08) and ISO 4401-10 (CETOP 10) sizes. Every size can be supplied with different controlled flow rates, up to 1600 l/min.

PERFORMANCES (obtained with viscosity of 36 cSt at 50°C with the relative electronic control units)		DSPE5 DSPE5R	DSPE7	DSPE8	DSPE10
Max operating: - P - A - B ports - T port	bar	350 see paragraph 6			
Controlled flow rate with Δp 10 bar P-T	l/min	see paragraph 2			
Step response		see paragraph 8			
Hysteresis (with PWM 100 Hz)	% Q_{max}	< 4%			
Repeatability	% Q_{max}	< $\pm 2\%$			
Electrical characteristics		see paragraph 7			
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: single solenoid valve double solenoid valve	kg	7,1 7,5	9,3 9,7	15,6 16	52,5 53

HYDRAULIC SYMBOL (typical)



1 - IDENTIFICATION CODE

D	S	P	E	-	/	11	-	/	K1	/	
----------	----------	----------	----------	---	---	-----------	---	---	-----------	---	--

Pilot operated directional control valve

Electric proportional control

Nominal size:
5 = CETOP P05 (**NOTE**)
5R = ISO 4401-05 (CETOP R05)
7 = ISO 4401-07 (CETOP 07)
8 = ISO 4401-08 (CETOP 08)
10 = ISO 4401-10 (CETOP 10)

Spool type:
C = closed centres
A = open centres
RC = regenerative closed centres
RA = regenerative open centres

Spool nominal flow rate (see table par. 2)

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

Manual override: (see par. 15)

Coil electrical connection: for connector type DIN 43650
D12 = voltage 12V DC
D24 = voltage 24V DC

Drainage: **I** = internal
E = external

Piloting: **I** = internal
E = external
Z = internal piloting with 30 bar fixed adj. pressure reducing valve (see par. 6)

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

Series No. (the overall and mounting dimensions remain unchanged from 10 to 19)

NOTE: This version is interchangeable with the model E4E Diplomatic

2 - AVAILABLE CONFIGURATIONS

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

Configuration 2 solenoids:
3 positions with spring centering

1 solenoid for cross configuration "SA":
2 positions (central + external) with spring centering

1 solenoid for parallel configuration "SB":
2 positions (central + external) with spring centering

valve type	*	nominal flow rate with Δp 10 bar P-T
DSPE5	80	80 l/min
DSPE5R	80/40	80 (P-A) / 40 (B-T) l/min
DSPE7	100	100 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

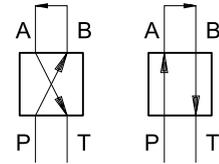
RC *

RA *

valve type	*	nominal flow rate with Δp 10 bar P-T
DSPE7	150/75	150 (P-A) / 75 (B-T) l/min
DSPE8	300/150	300 (P-A) / 150 (B-T) l/min
DSPE10	500/250	500 (P-A) / 250 (B-T) l/min

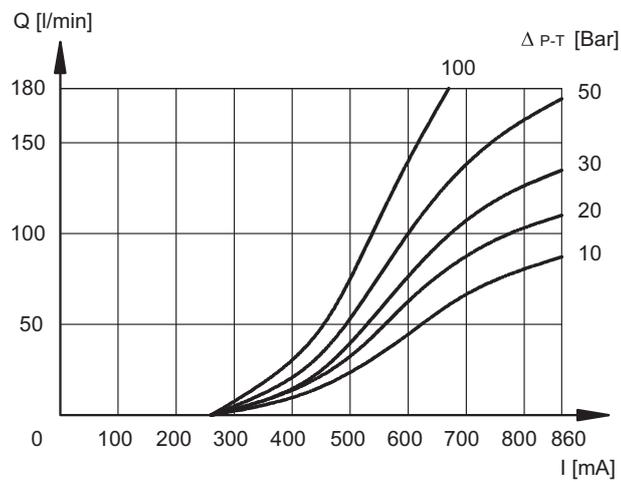
3 - CHARACTERISTIC CURVES (values measured with viscosity of 36 cSt at 50°C with valves in conjunction with the relative electronic control units)

Typical flow rate control curves at constant Δp according to current supply to the solenoid (D24 version, 860 mA max current), measured for the available spool types. The reference Δp values are measured between valve ports P and T.



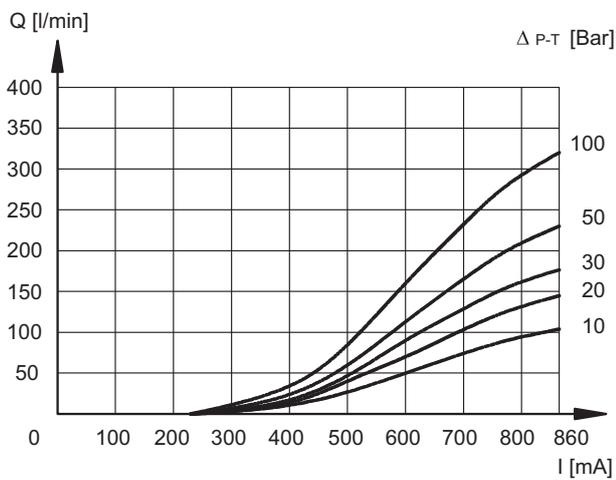
3.1 - Characteristic curves DSPE5 e DSPE5R

SPOOL C80 - A80

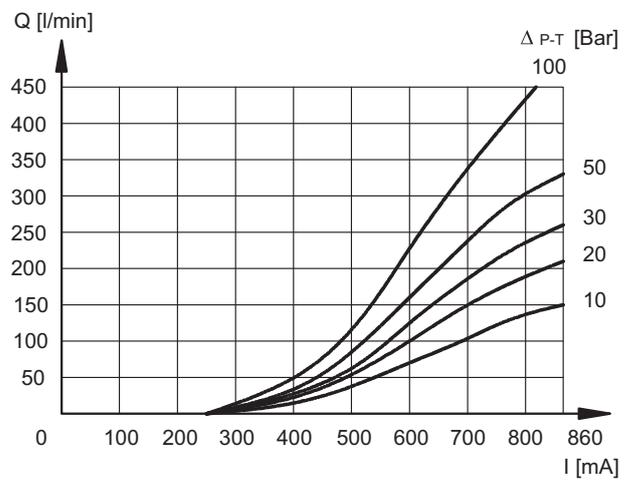


3.2 - Characteristic curves DSPE7

SPOOL C100 - A100



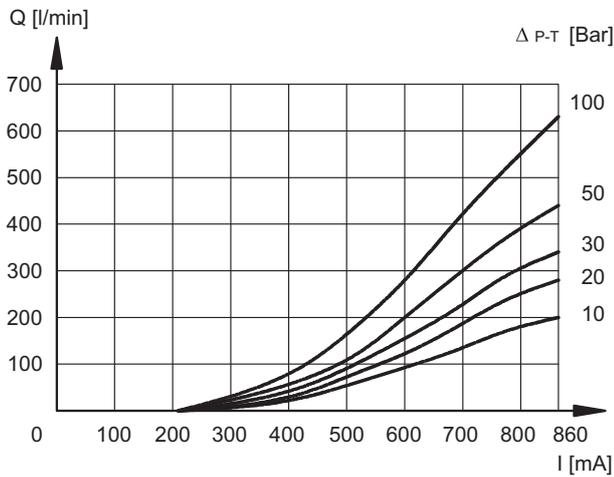
SPOOL C150 - A150



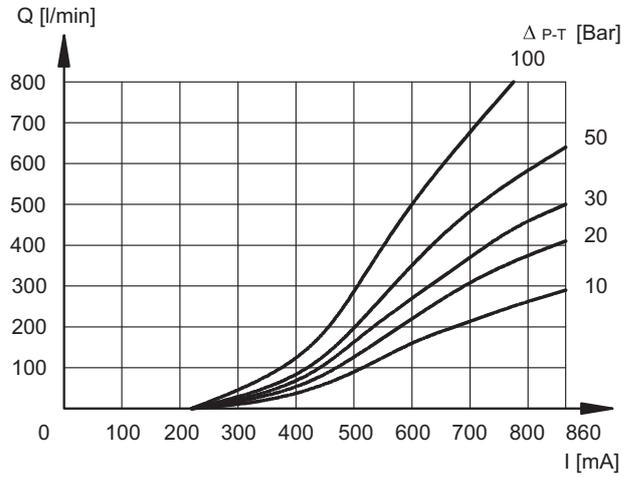


3.3 - Characteristic curves DSPE8

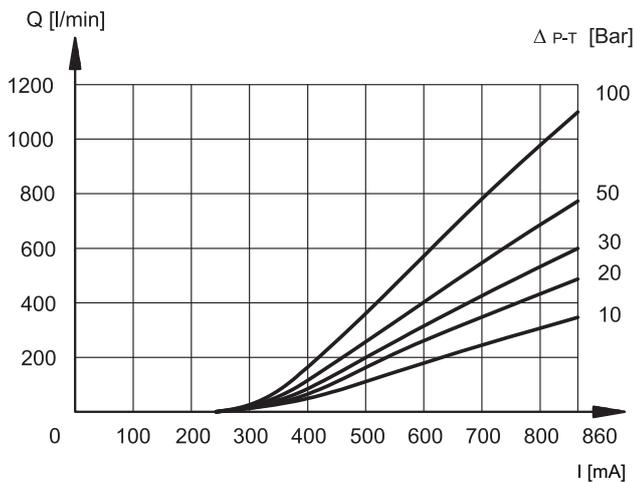
SPOOL C200 - A200



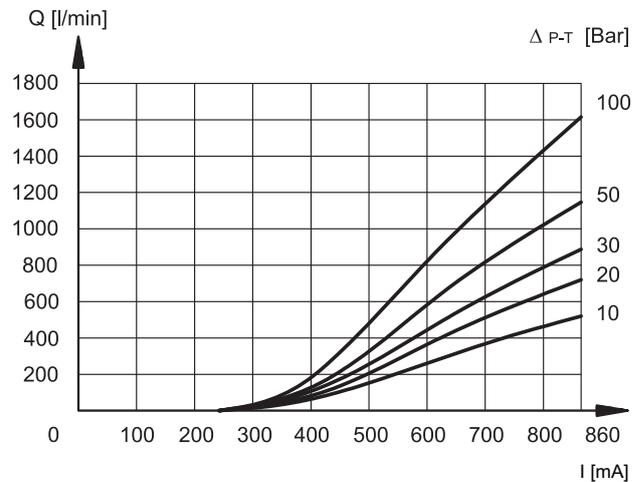
SPOOL C300 - A300



SPOOL C350 - A350



SPOOL C500 - A500



4 - HYDRAULIC CHARACTERISTICS (values measured with viscosity of 36 cSt at 50°C with valves in conjunction with the relative electronic control units)

		DSPE5 DSPE5	DSPE7	DSPE8	DSPE10
Max flow rate	l/min	180	450	800	1600
Piloting flow requested with operation 0 →100%	l/min	3	5	9	13
Piloting volume requested with operation 0 →100%	cm ³	1,7	3,2	9,1	21,6

5 - 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.

6 - PILOTING AND DRAINAGE

The DSPE valves are available with piloting and drainage, both internal and external.

The version with external drainage allows a higher backpressure on the unloading.

VALVE TYPE	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

PRESSURES (bar)

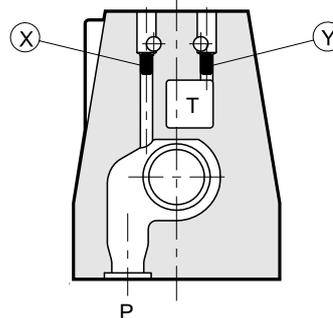
Pressure	MIN	MAX
Pressure		
Piloting pressure on X port	30	210 (NOTE)
Pressure on T port with internal drain	–	10
Pressure on T port with external drain	–	250

NOTE: the version with external pilot with reduced pressure must be used when higher pressures are needed.

Otherwise the valve with internal pilot and pressure reducing valve with 30 bar fixed adjustment can be ordered.

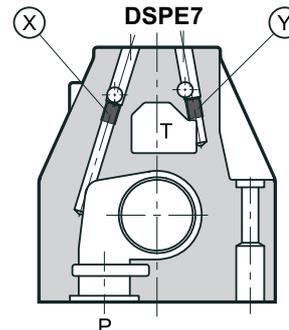
Add the letter Z to the identification code to order this option (see par. 1).

DSPE5 and DSPER5



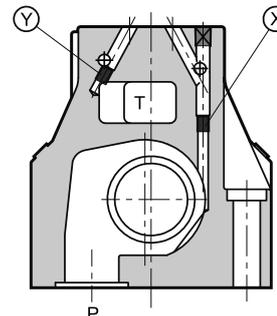
X: M5x6 plug for external pilot
Y: M5x6 plug for external drain

DSPE7



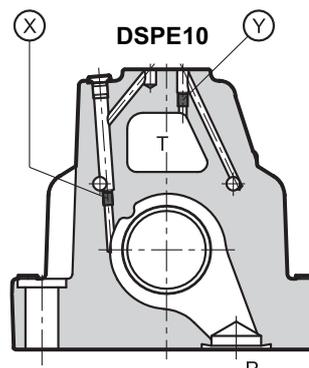
X: M6x8 plug for external pilot
Y: M6x8 plug for external drain

DSPE8



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

DSPE10



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



7 - 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)	Ω	3.66	17.6
NOMINAL CURRENT	A	1.88	0.86
DUTY CYCLE		100%	
ELECTROMAGNETIC COMPATIBILITY (EMC)	According to 2004/108/CE		
CLASS OF PROTECTION: atmospheric agents (CEI EN 60529) coil insulation (VDE 0580) Impregnation	IP 65 class H class F		

8 - STEP RESPONSE (measured with mineral oil with viscosity of 36 cSt at 50°C in conjunction with the relative electronic control units)

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.

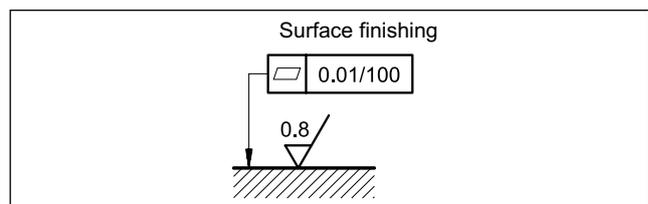
REFERENCE SIGNAL	0 → 100%	100 → 0%
	Step response [ms]	
DSPE5 and DSPE5R	50	40
DSPE7	80	50
DSPE8	100	70
DSPE10	200	120

9 - INSTALLATION

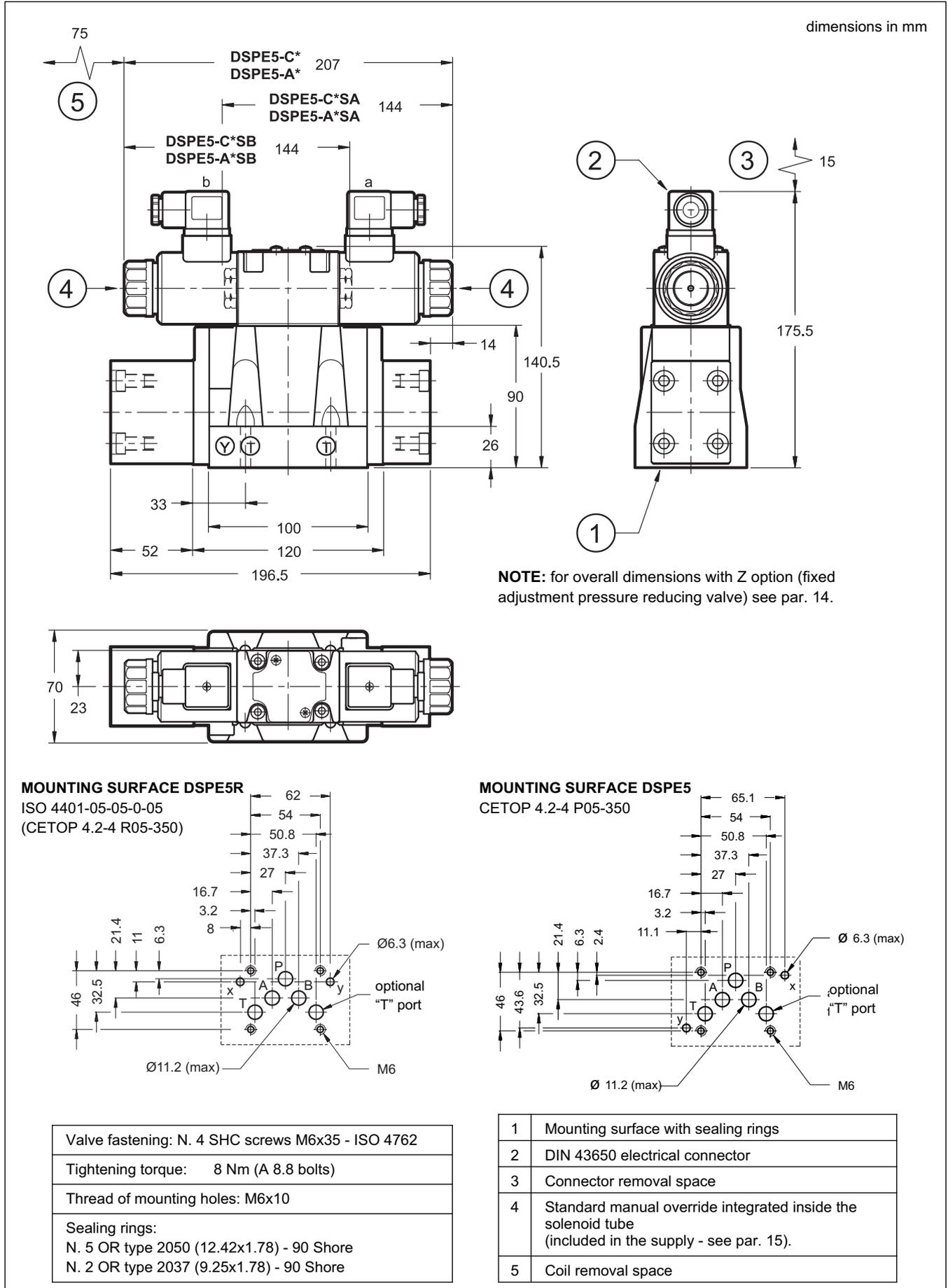
The DSPE* valves can be installed in any position without impairing correct operation.

Ensure that there is no air in the hydraulic circuit.

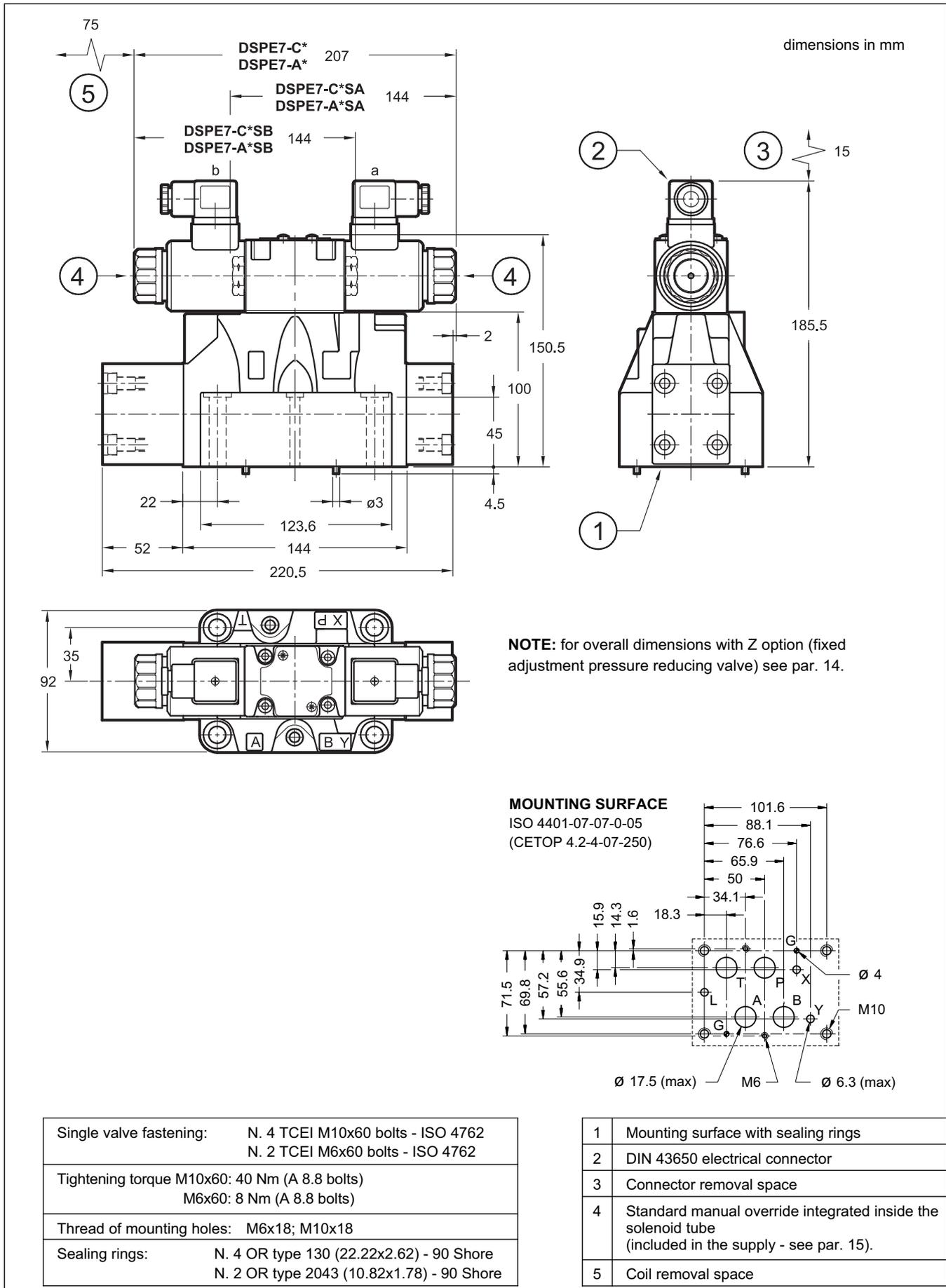
Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



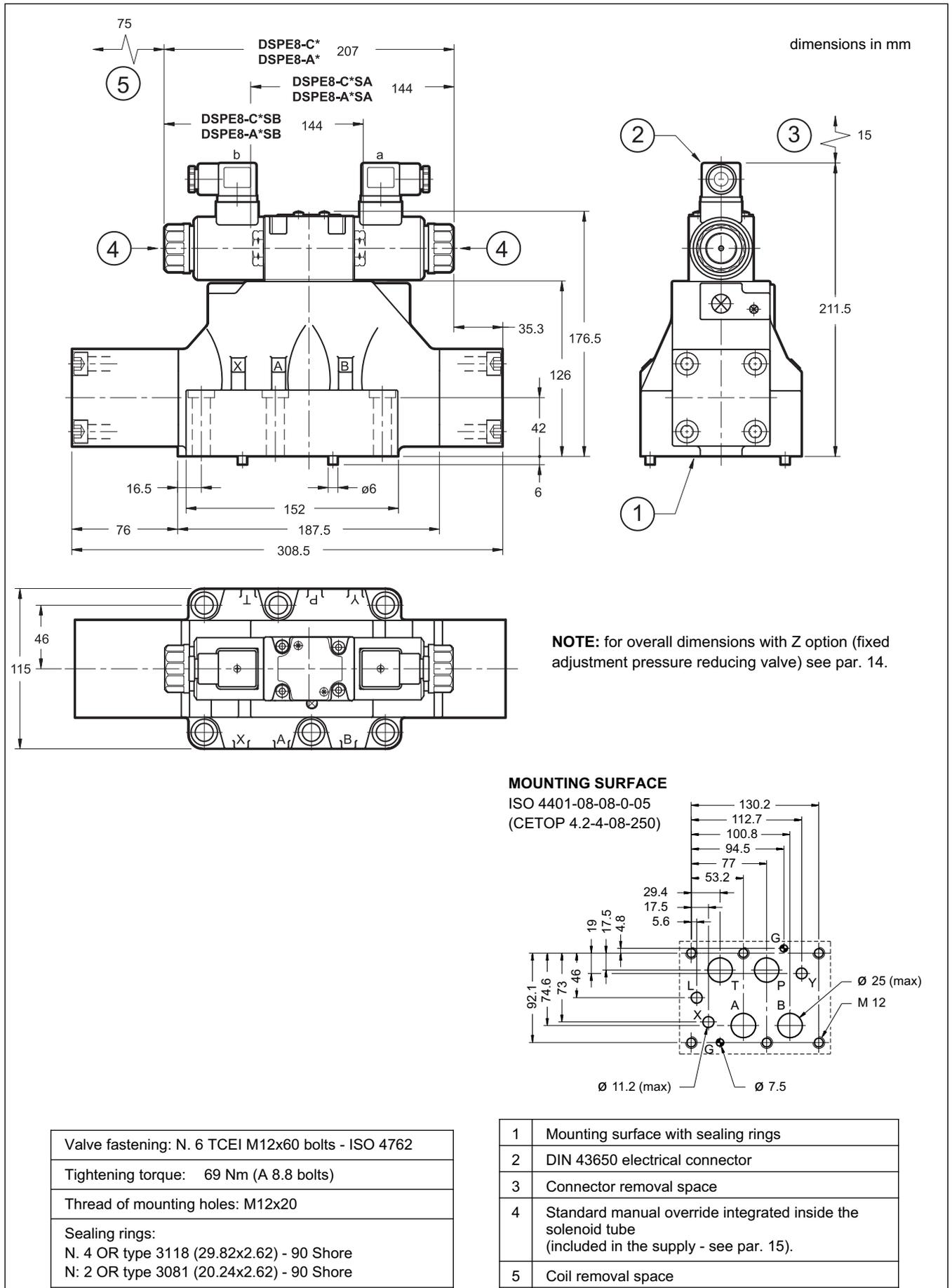
10 - OVERALL AND MOUNTING DIMENSIONS DSPE5 AND DSPE5R



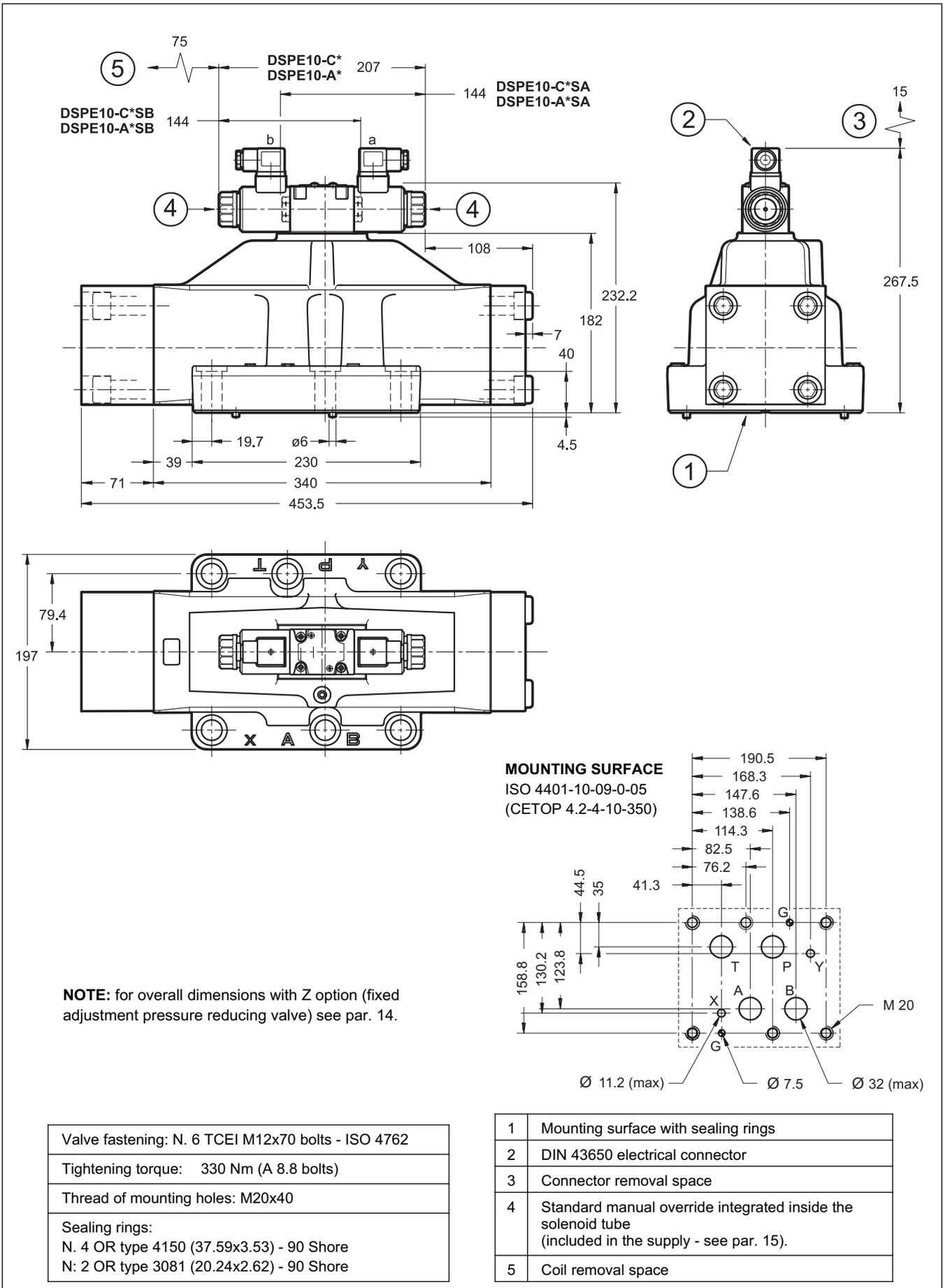
11 - OVERALL AND MOUNTING DIMENSIONS DSPE7



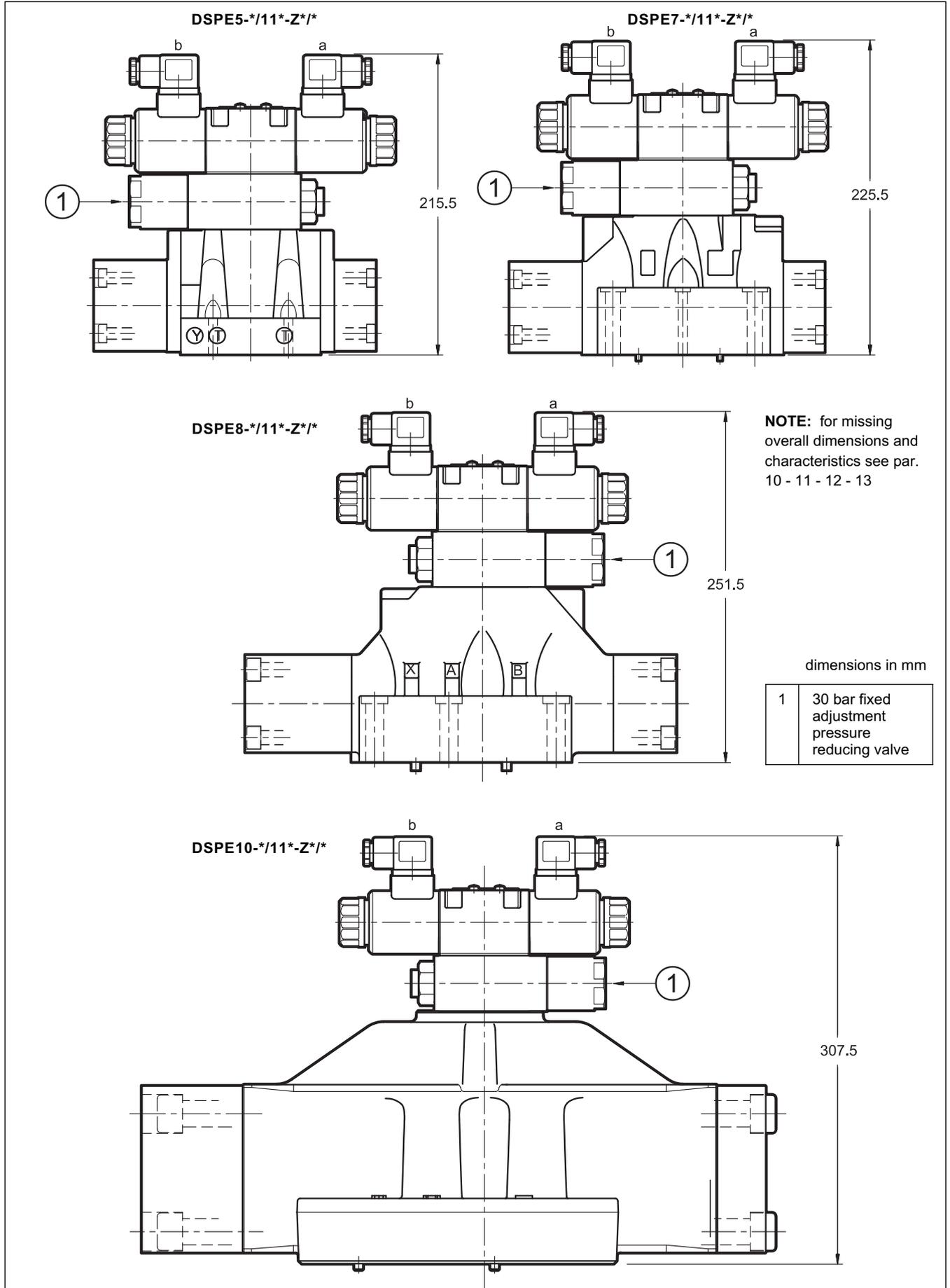
12 - OVERALL AND MOUNTING DIMENSIONS DSPE8



13 - OVERALL AND MOUNTING DIMENSIONS DSPE10



14 - OVERALL AND MOUNTING DIMENSIONS DSPE*-*/11*-Z*/*





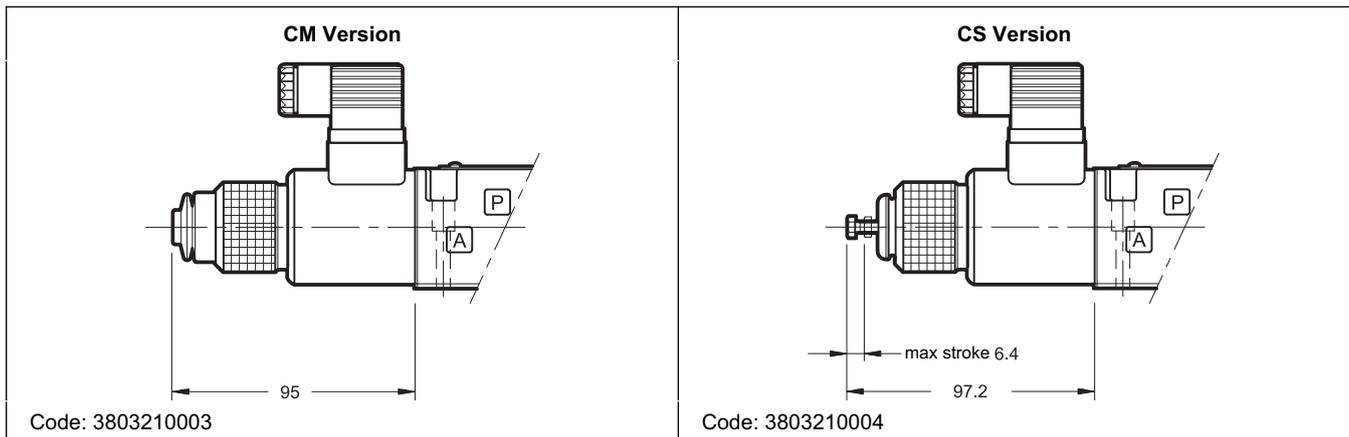
15 - MANUAL OVERRIDE

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.

Two 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 to allow the continuous mechanical operations.

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



16 - ELECTRONIC CONTROL UNITS

DSPE* - * * SA (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. 89 250
EDM-M141	for solenoid 12V DC		

DSPE* - A* DSPE* - C*

EDM-M211	for solenoid 24V DC	rail mounting DIN EN 50022	see cat. 89 250
EDM-M241	for solenoid 12V DC		

17 - SUBPLATES (see catalogue 51 000)

	DSPE5	DSPE7	DSPE8	DSPE10
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	1 1/2" BSP 1/4" BSP

DIPLOMATIC OLEODINAMICA S.p.A.
20015 PARABIAGO (MI) • Via M. Re Depaolini 24
Tel. +39 0331.895.111
Fax +39 0331.895.339
www.diplomatic.com • e-mail: sales.exp@diplomatic.com