

DSPE*J

PROPORTIONAL DIRECTIONAL VALVE PILOT OPERATED WITH FEEDBACK AND INTEGRATED ELECTRONICS

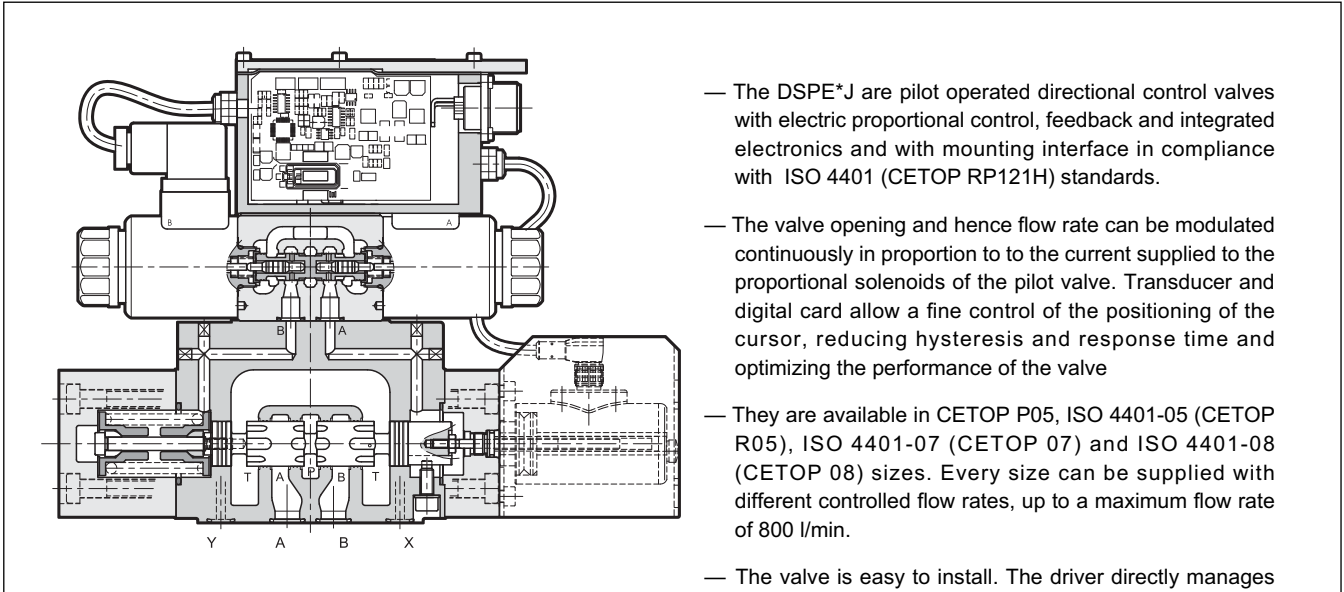
SERIES 20

SUBPLATE MOUNTING

- DSPE5J** **CETOP P05**
- DSPE5RJ** **ISO 4401-05 (CETOP R05)**
- DSPE7J** **ISO 4401-07 (CETOP 07)**
- DSPE8J** **ISO 4401-08 (CETOP 08)**

p max (see performance table)
Q max (see performance table)

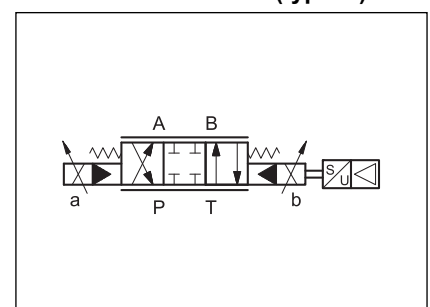
OPERATING PRINCIPLE



- The DSPE*J are pilot operated directional control valves with electric proportional control, feedback and integrated electronics and with mounting interface in compliance with ISO 4401 (CETOP RP121H) standards.
- The valve opening and hence flow rate can be modulated continuously in proportion to the current supplied to the proportional solenoids of the pilot valve. Transducer and digital card allow a fine control of the positioning of the cursor, reducing hysteresis and response time and optimizing the performance of the valve
- They are available in CETOP P05, ISO 4401-05 (CETOP R05), ISO 4401-07 (CETOP 07) and ISO 4401-08 (CETOP 08) sizes. Every size can be supplied with different controlled flow rates, up to a maximum flow rate of 800 l/min.
- The valve is easy to install. The driver directly manages digital settings (see par. 6). In the case of special applications, you can customize the settings using the optional kit (see par. 8).

PERFORMANCES (obtained with mineral oil with viscosity of 36 cSt at 50°C and with digital integrated electronics)		DSPE5J DSPE5RJ	DSPE7J	DSPE8J
Max operating pressure: P - A - B ports T port	bar	350 see paragraph 11		
Controlled flow with Δp 10 bar P-T	l/min	see paragraph 2		
Step response		see paragraph 5		
Hysteresis	% Q_{max}	< 0,5%		
Repeatability	% Q_{max}	< \pm 0,2%		
Electrical characteristics		see paragraph 6		
Ambiente temperature range	°C	-10 / +50		
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	8,5 9	10,5 11	17 17,4

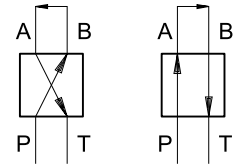
HYDRAULIC SYMBOL (typical)



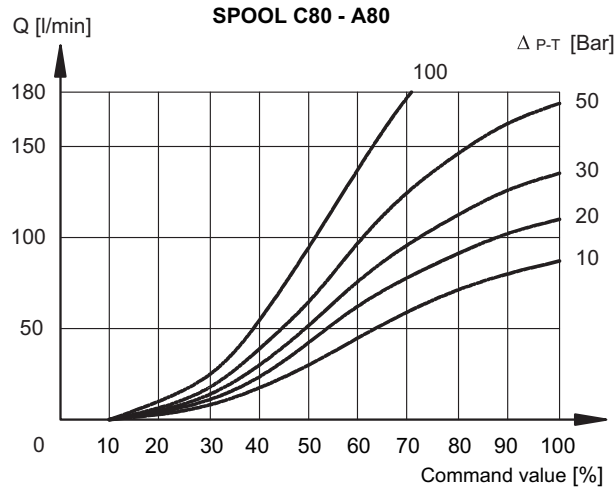
3 - CHARACTERISTIC CURVES (with mineral oil with viscosity of 36 cSt at 50°C and with digital integrated electronics)

Typical flow rate curves at constant Δp related to the reference signal and measured for the available spools. The Δp values are measured between P and T valve ports.

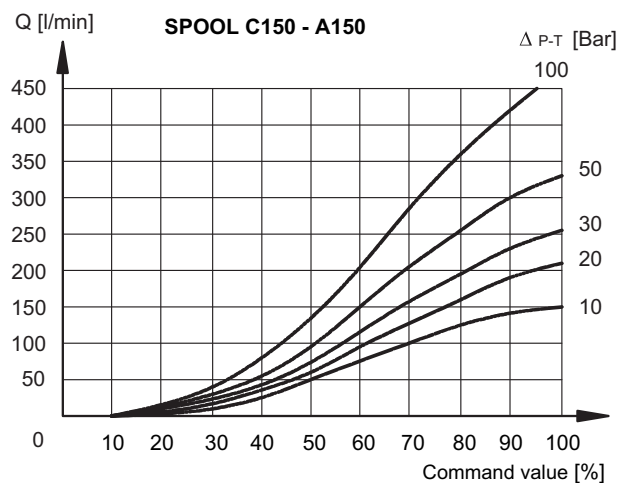
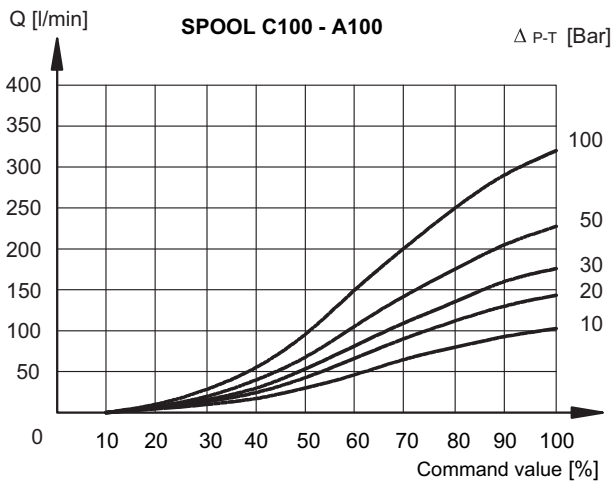
The curves are obtained after linearization in factory of the characteristic curve through the digital amplifier.



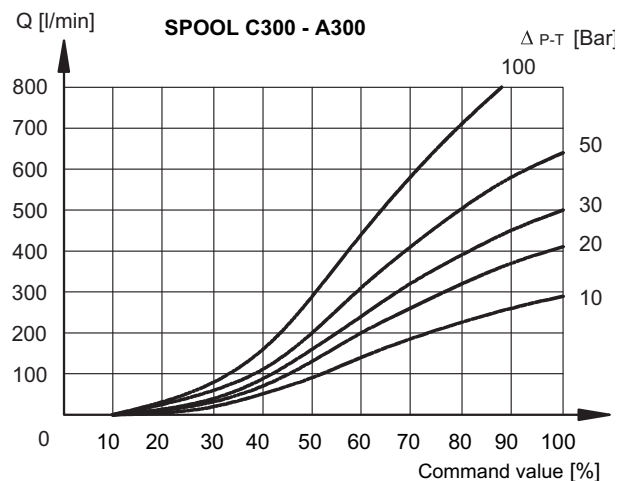
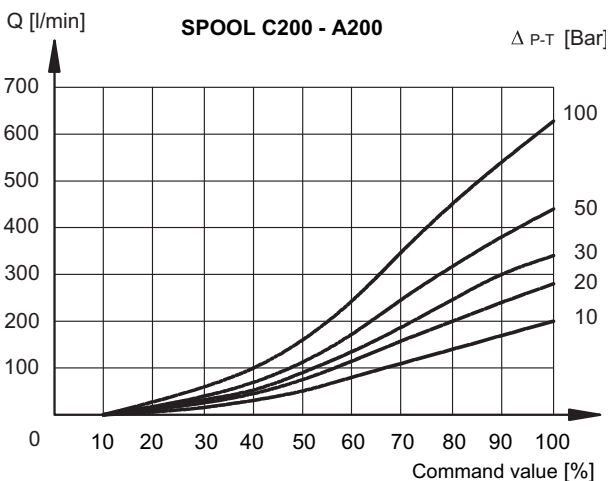
3.1 - Characteristic curves DSPE5J and DSPE5RJ



3.2 - Characteristic curves DSPE7J



3.3 - Characteristic curves DSPE8J



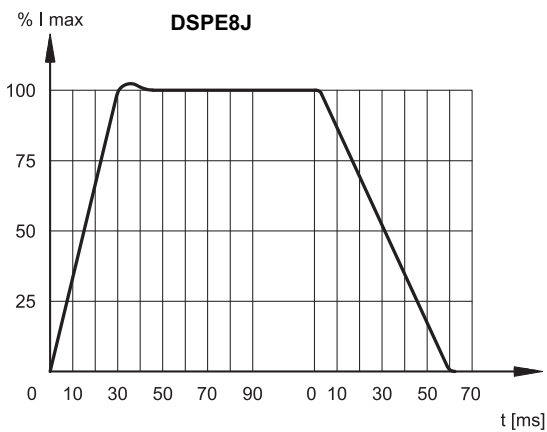
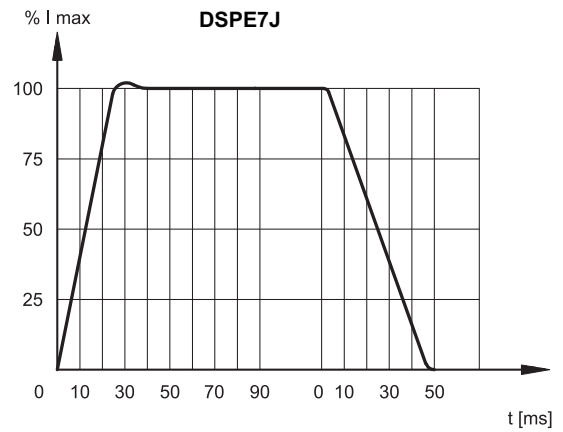
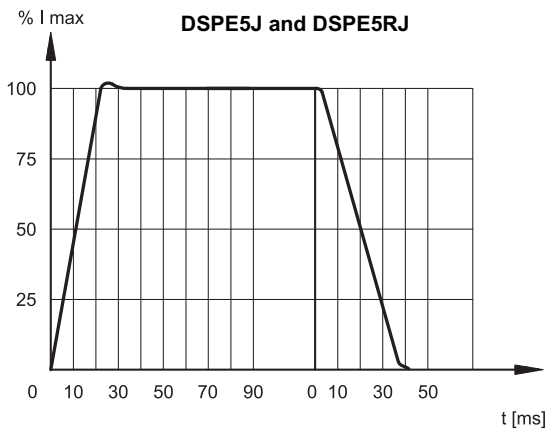


4 - HYDRAULIC CHARACTERISTICS (with mineral oil with viscosity of 36 cSt at 50°C and with digital integrated electronics)

		DSPE5J DSPER5G	DSPE7J	DSPE8J
Max flow rate	l/min	180	450	800
Piloting flow requested with operation 0 → 100%	l/min	4,7	7,6	16
Piloting volume requested with operation 0 → 100%	cm ³	1,7	3,2	10

5 - STEP RESPONSE (obtained with mineral oil with viscosity of 36 cSt at 50°C and with digital integrated electronics)

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



6 - ELECTRICAL CHARACTERISTICS

6.1 - Digital integrated electronics

The proportional valve is controlled by a digital amplifier (driver), which incorporates a microprocessor that controls, via software, all the valve functions, such as:

- continuous converting of the voltage reference signal (E0) or of the current reference signal (E1) in a digital value
- generation of up and down ramps
- gains limit
- compensation of the dead band
- protection of the solenoid outputs against possible short circuits

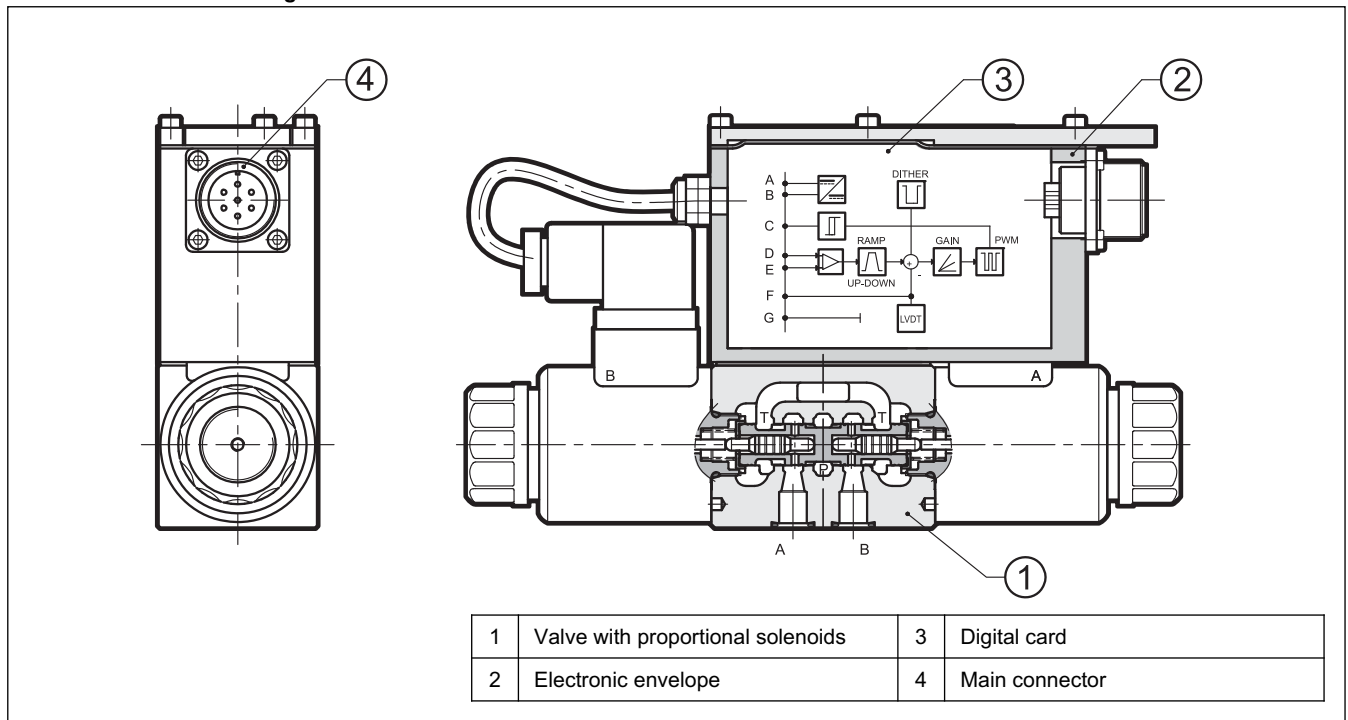
The digital driver enables the valve to reach better performance compared to the analogic version, such as:

- reduced response times
- optimization and reproducibility of the characteristic curve, optimised in factory for each valve
- complete interchangeability in case of valve replacement
- possibility to set, via software, the functional parameters
- possibility to perform a diagnostic program by means of the LIN connection
- high immunity to electromagnetic troubles

We deliver the DSPE*J with these standard settings:

UP/DOWN ramp at minimum value, no deadband compensation, max valve opening (100% of spool stroke). It is possible to customize these parameters using the special kit, to be ordered separately (see par 8).

6.2 - Functional block diagram



6.3 - Electrical characteristics

NOMINAL VOLTAGE	V DC	24 (from 19 to 35 VDC, ripple max 3 Vpp) external fuse 5A (fast), max current 3A
ABSORBED POWER	W	70
MAXIMUM CURRENT	A	2.6
DUTY CYCLE		100%
VOLTAGE SIGNAL (E0)	V DC	±10 (Impedence Ri > 50 KΩ)
CURRENT SIGNAL (E1)	mA	4 ± 20 (Impedence Ri = 500 Ω)
ALARMS		Overload and electronics overheating, LVDT sensor error, cable breakdown or power failure or < 4mA.
COMMUNICATION		LIN-bus Interface (with the optional kit)
MAIN CONNECTOR		7 - pin MIL-C-5015-G (DIN 43563)
ELECTROMAGNETIC COMPATIBILITY (EMC) emissions immunity	CEI EN 61000-6-4 CEI EN 61000-6-2	According to 2004/108/CE standards
PROTECTION AGAINST ATMOSPHERIC AGENTS		IP67 (CEI EN 60529 standards)

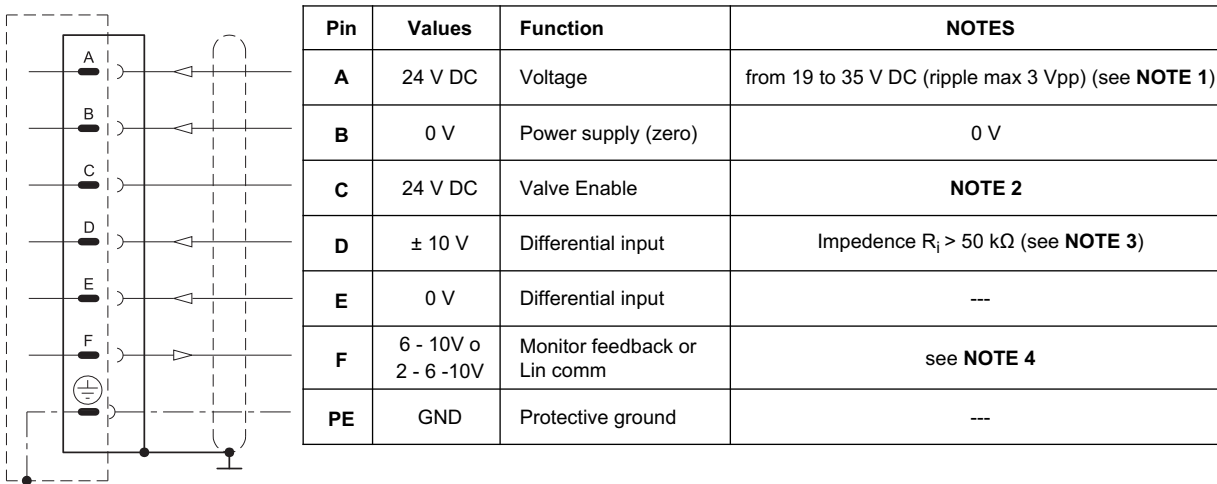
7 - OPERATING MODALITIES

The digital driver of DSPE*J valves is available in two versions, with voltage or current reference signal.

7.1 - Version with voltage reference signal (E0)

This is the most common version; it makes the valve completely interchangeable with the traditional proportional valves with analogic type integrated electronics. The valve has only to be connected as indicated below. This version doesn't allow the setting of the valve parameters, for example the ramps must be performed in the PLC program, as well as the reference signal limit.

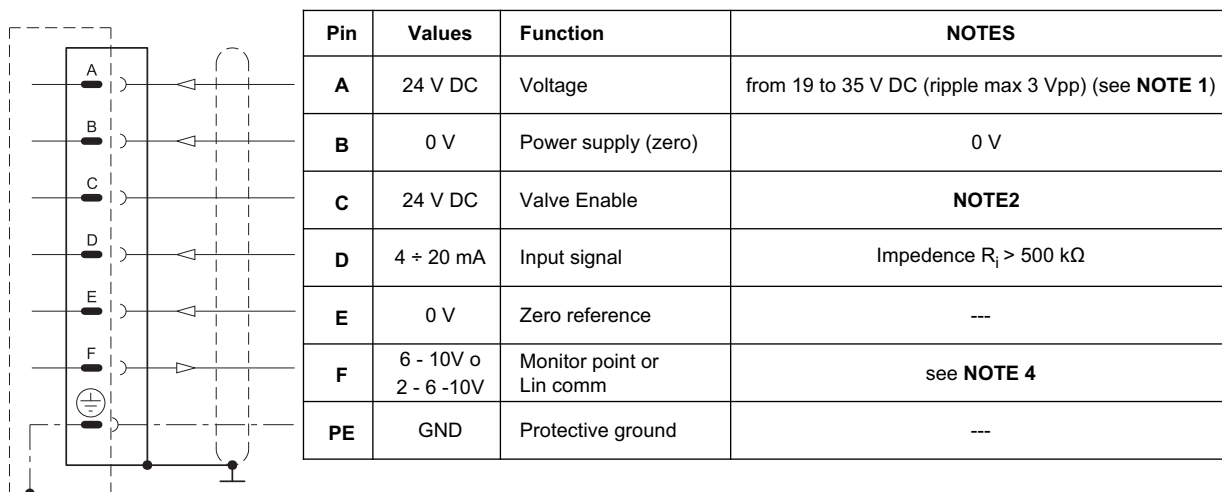
Connection scheme E0



7.2 - Version with current reference signal (E1)

The reference signal is supplied in current 4 - 20 mA. With the 12 mA signal the valve is in central position, with the 20 mA signal the valve performs the configuration P-A and B-T, while with 4 mA the configuration is P-B and A-T. For "SA" single solenoid valves, with reference 20 mA to pin D, the valve full opening is P-B and A-T, while with 4 mA the valve is at rest. If the current to solenoid is lower, than the card shows a BREAKDOWN CABLE error. To reset the error is sufficient to restore the current 4mA.

Connection scheme E1



NOTE 1: preview on the Pin A (24 VDC) an external fuse for protecting electronics. Fuse characteristics: 5A/50V type fast.

NOTE 2: preview 24V DC on the PIN C to activate the card power stage.

NOTE 3: The input signal is differential type on E0 version only. For double solenoid valves, with positive reference signal connected to pin D, the valve opening is P - A and B - T. With zero reference signal the valve is in central position. For "SA" single solenoid valves, with positive reference to pin D, the valve opening is P-B and A-T. The spool stroke is proportional to $U_D - U_E$.

If only one input signal (single-end) is available, the pin B (0V power supply) and the pin E (0V reference signal) must be connected through a jumper and both connected to GND, electric panel side.

NOTE 4: This value changes, as shown in the table below. When MONITOR function is enabled and the card is enabled, read the test point pin F in relation to pin B (0V). When detect a failure or error of the sensor LVDT, the drive bring the valve back in central position and locks it. In this condition the pin F, referring to the pin B, indicates 0V DC output. To reset the fault, the card must be disabled and re-enable. When the card is disabled, the pin F referred to the pin B shows 2.7V DC output: this value is given by the voltage of the LIN bus communication and not by the MONITOR value.

double solenoid valves		single solenoid valve	
command (Pin D)	Pin F	command (Pin D)	Pin F
-10 V	10 V	-	-
0 V	6 V	0 V	6 V
+10 V	2 V	+10 V	10 V

NOTE for the wiring: connections must be made via the 7-pin plug mounted on the amplifier. Recommended cable sizes are 0,75 mm² for cables up to 20m and 1,00 mm² for cables up to 40m, for power supply. The signal cables must be 0,50 mm². A suitable cable would have 7 cores, a separate screen for the signal wires and an overall screen.

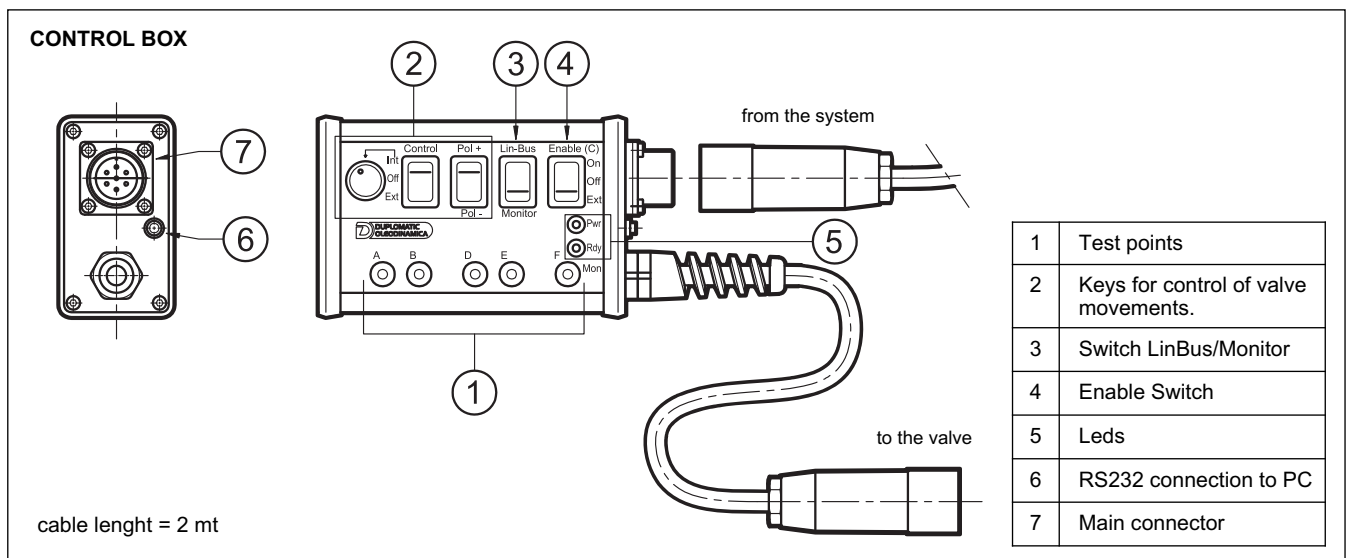
8 - OPTIONAL KIT LINPC-USB/10

The kit (to be ordered separately, code 3803230100) includes control box with 7 poles connector, USB PC cable (2.70m lenght), software for card configuration. The software is Microsoft XP®, Microsoft Windows Vista® and Windows 7® compliant.

The box has three main functions:

- It can be used to read the values from the external command (PLC, etc. ..) to the valve. In this case, the box simply acts as monitor through points of measurement.
- It may exclude the command from the PLC and controls the valve, choosing the direction and speed of movement (keys gr. 2 and 4). This way you can test the response of the valve control input, and diagnose failures, malfunctions, simulating the valve working.
- The control box acts as interface between PC and electronic card (key 3) to allow customization of the parameters via software.

For more detailed information on the use of the box, see the documentation on the software CD.



8.1 - Programming the parameters via LIN Bus

The software included in the kit allows the customization of the following parameters:

Deadband compensation

You can change the mechanical spool overlap by adjusting the parameters V: MINA and V MINB.

Gain Adjustment

You can change the parameters V and V MAXA: MAXB, which restrict the spool opening for positive and negative values of the reference signal.

AINW: W command input scaling

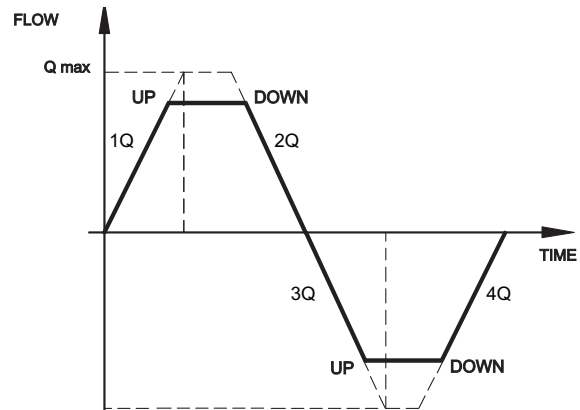
This command allows to scale the input signal and determine whether the input is enabled for signals in voltage or in current.

V: TRIGGER

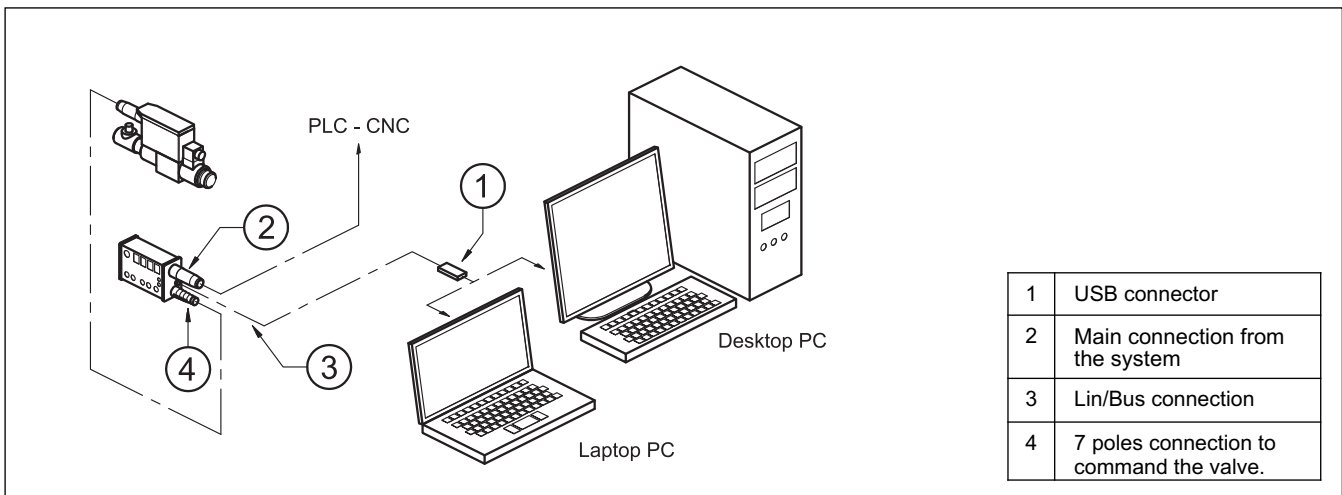
Value in percentage by which you activate the deadband function of V: MinA and V: minB

Ramps

Ramps are divided into four quadrants and can be customized by setting the parameters 1Q, 2Q, 3Q and 4Q. They define the time variation of current in the solenoid in reference to input command. range: 1 ÷ 60000 ms.



8.2 Wiring scheme of Lin/Bus box



9 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. 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.

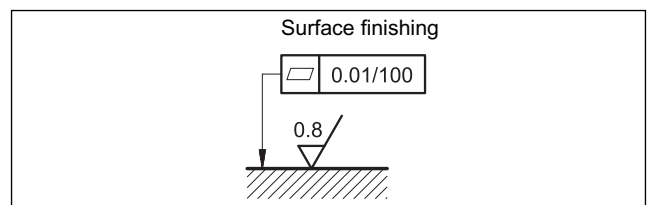
The fluid must be preserved in its physical and chemical characteristics.

10 - INSTALLATION

DSPE*J 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 bolts 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.



11 - PILOTING AND DRAINAGE

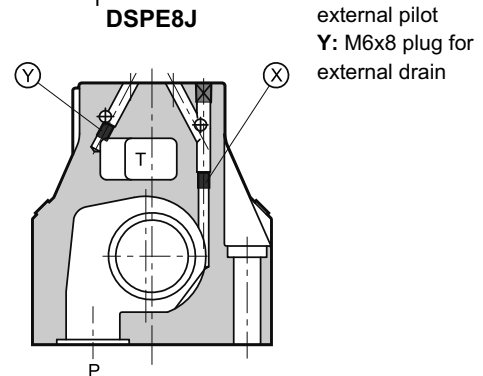
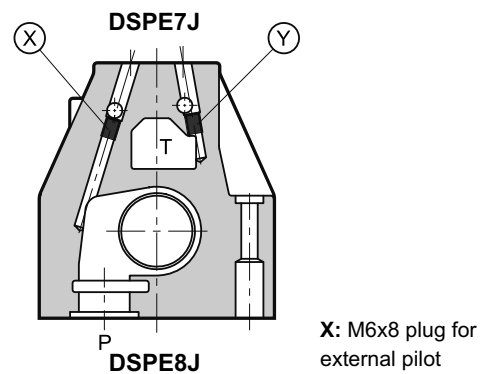
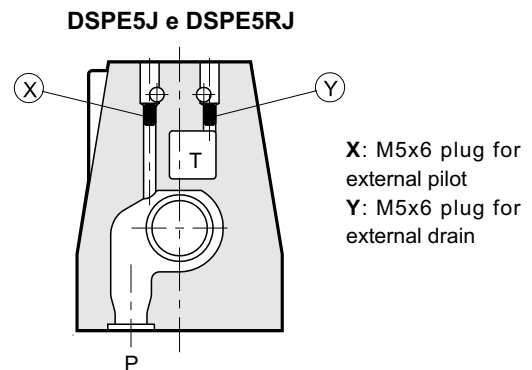
The DSPE valves are available with piloting and drainage, both internal and external. The version with external drainage allows a higher back pressure on the unloading.

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

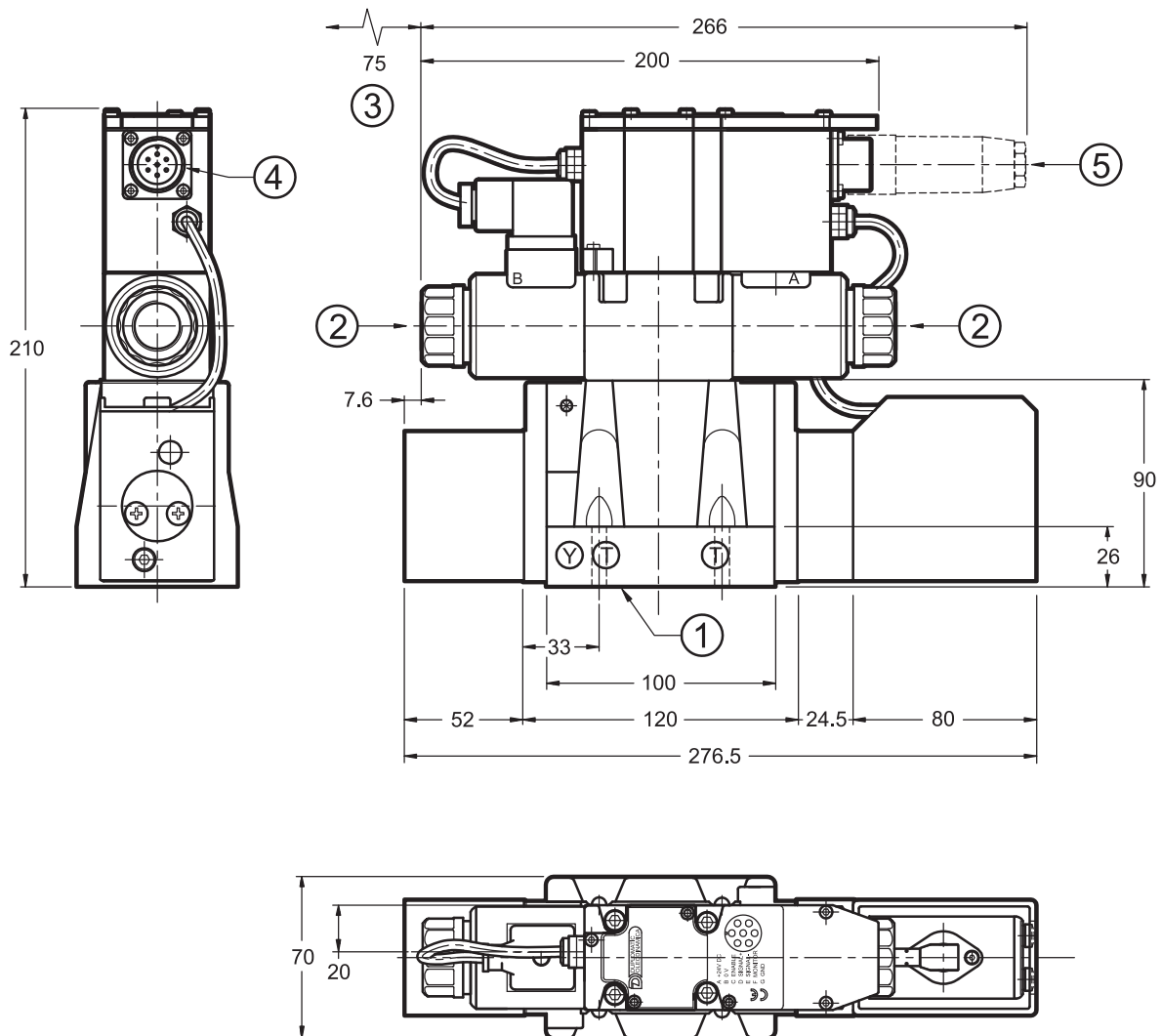
PRESSURES (bar)

Pressure	MIN	MAX
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).



12 - OVERALL AND MOUNTING DIMENSIONS DSPE5J and DSPE5RJ



NOTES:

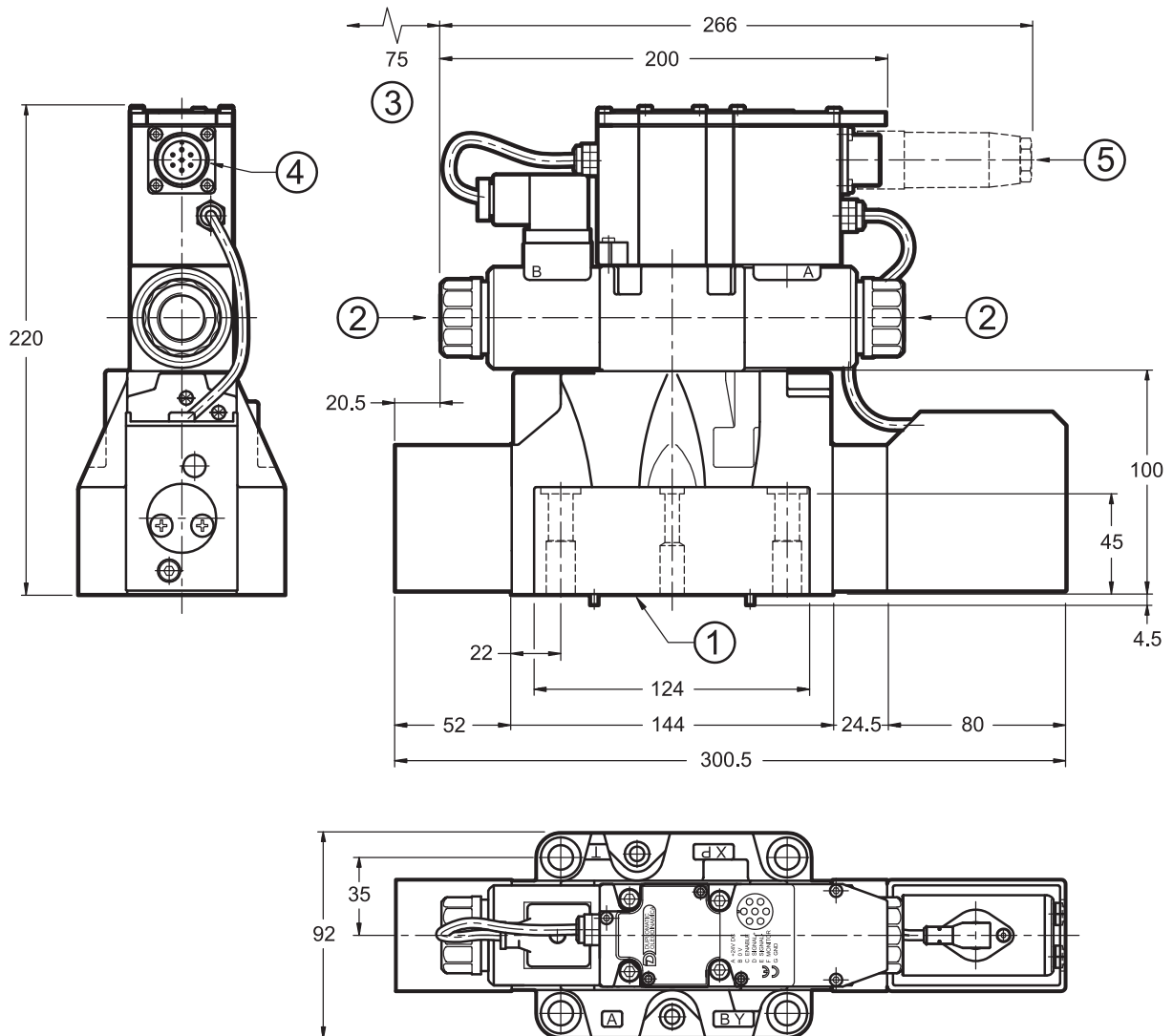
- for single solenoid overall dimensions see par. 15.
- for overall dimensions with Z option (fixed adjustment pressure reducing valve) see par. 16.
- for mounting surface see par. 17.
- at the first start up, or after a long period of no use, it is necessary to vent the air through the breather (2) placed at the end of the solenoid tube.
- Is recommended not to disassemble the transducer.

dimensions in mm

Valve fastening: 4 bolts M6x35
Tightening torque: 8 Nm (bolts A 8.8) - 14 Nm (bolts A 12.9)
Threads of mounting holes: M6x10
Sealing rings: 5 OR type 2050 (12.42x1.78) - 90 Shore 1 OR type 2037 (9.25x1.78) - 90 Shore

1	Mounting surface with sealing rings
2	Breather (male hexagonal spanner 4)
3	Coil removal space
4	Main connection
5	Electrical connector 7 pin DIN 43563 - IP67 PG11 EX7S/L/10 code 3890000003 (to be ordered separately)

13 - OVERALL AND MOUNTING DIMENSIONS DSPE7J



NOTES:

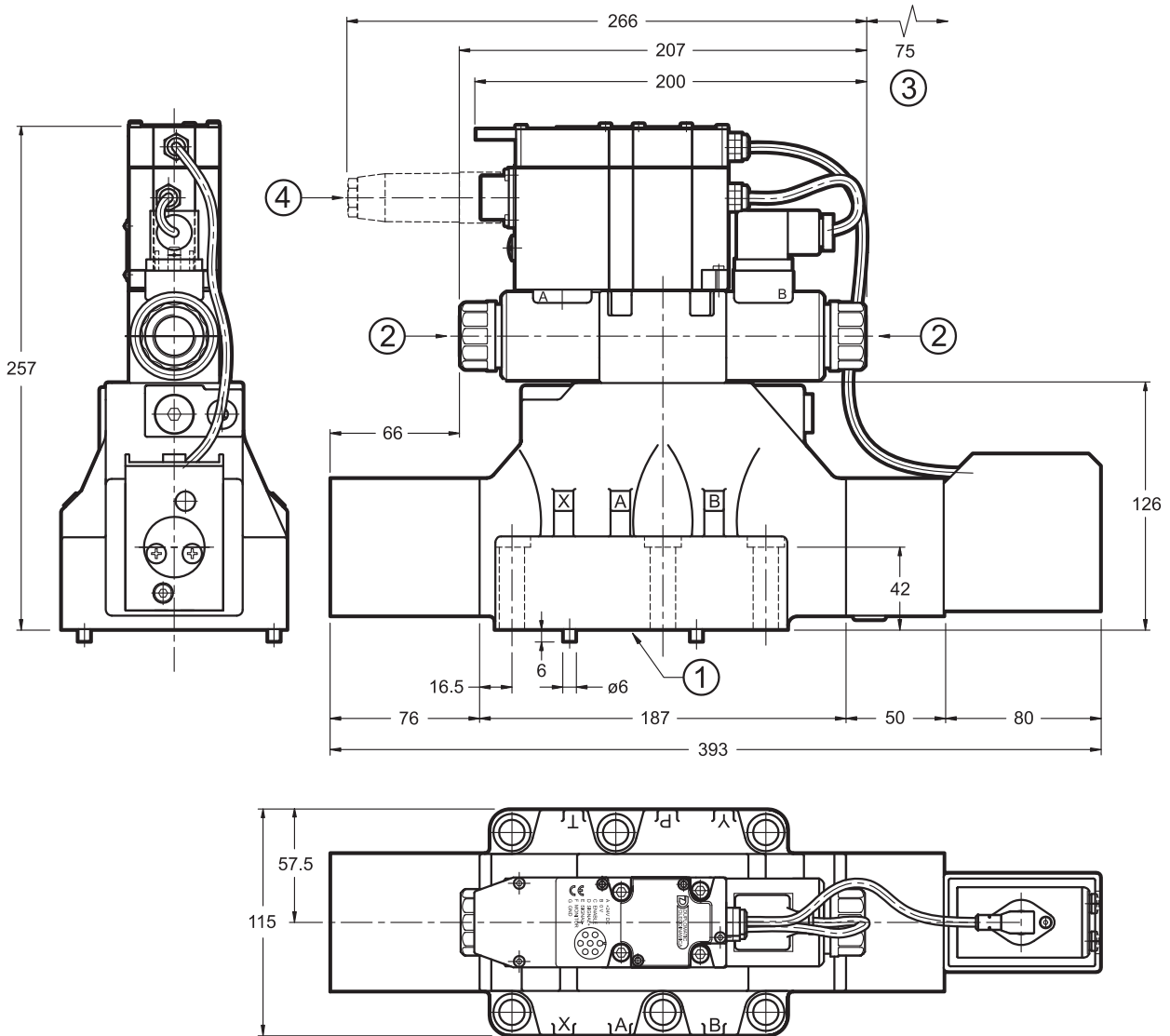
- for single solenoid overall dimensions see par. 15.
- for overall dimensions with Z option (fixed adjustment pressure reducing valve) see par. 16.
- for mounting surface see par. 17.
- at the first start up, or after a long period of no use, it is necessary to vent the air through the breather (2) placed at the end of the solenoid tube.
- Is recommended not to disassemble the transducer.

dimensions in mm

Valve fastening:	4 bolts M10x60 2 bolts M6x60
Tightening torque:	M10x60: 40 Nm (bolts A 8.8) - 67 Nm (bolts A12.9) M6x60: 8 Nm (bolts A 8.8) - 14 Nm (bolts A12.9)
Threads of mounting holes:	M6x18; M10x18
Sealing rings:	4 OR type 130 (22.22x2.62) - 90 Shore 2 OR type 2043 (10.82x1.78) - 90 Shore

1	Mounting surface with sealing rings
2	Breather (male hexagonal spanner 4)
3	Coil removal space
4	Main connection
5	Electrical connector 7 pin DIN 43563 - IP67 PG11 EX7S/L/10 code 3890000003 (to be ordered separately)

14 - OVERALL AND MOUNTING DIMENSIONS DSPE8J



NOTES:

- for single solenoid overall dimensions see par. 15.
- for overall dimensions with Z option (fixed adjustment pressure reducing valve) see par. 16.
- for mounting surface see par. 17.
- at the first start up, or after a long period of no use, it is necessary to vent the air through the breather (2) placed at the end of the solenoid tube.
- Is recommended not to disassemble the transducer.

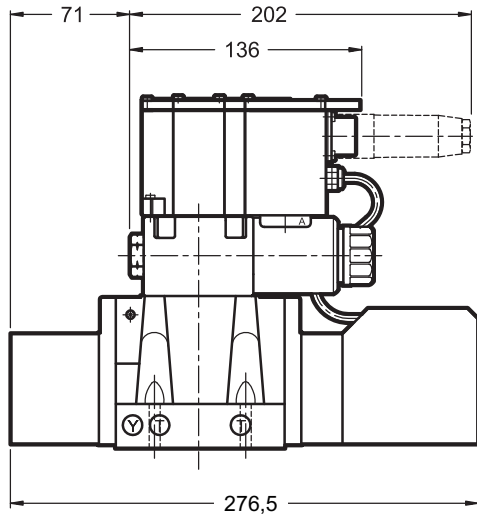
Fastening of single valve: 6 bolts M12X60
Tightening torque: 69 Nm (bolts A 8.8) 115 Nm (bolts A 12.9)
Threads of mounting holes: M12X20
Sealing rings: 4 OR type 3118 (29.82x2.62) - 90 Shore 2 OR type 3081 (20.24x2.62) - 90 Shore

1	Mounting surface with sealing rings
2	Breather (male hexagonal spanner 4)
3	Coil removal space
4	Main connection for Electrical connector 7 pin DIN 43563 - IP67 PG11 EX7S/L/10 code 3890000003 (to be ordered separately)

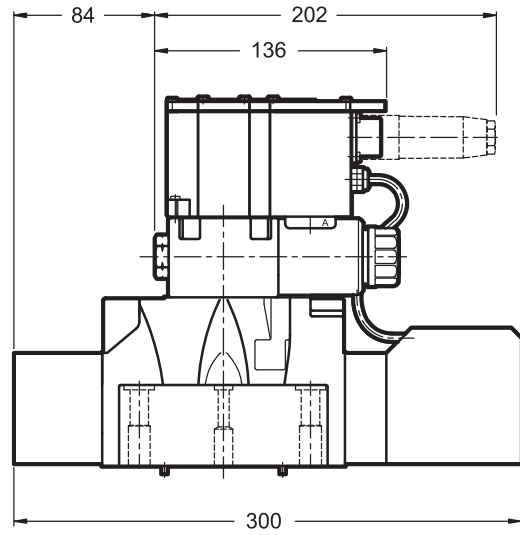
15 - OVERALL AND MOUNTING DIMENSIONS SINGLE SOLENOID VALVES

dimensions in mm

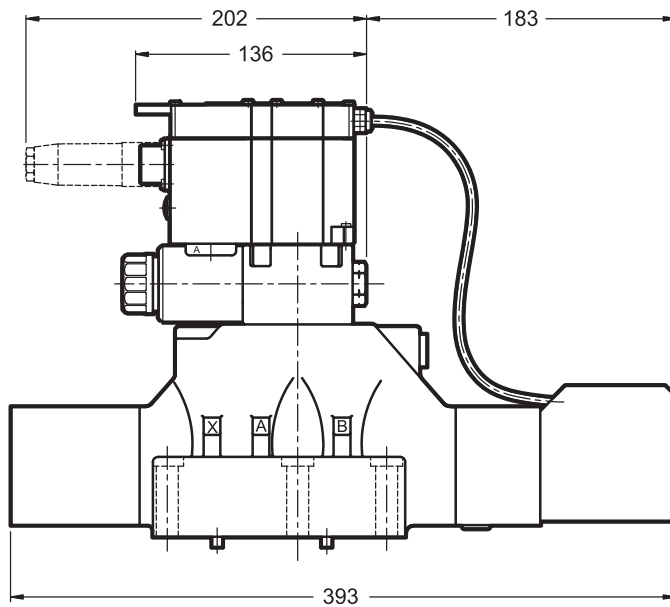
DSPE5J-*SA



DSPE7J-*SA



DSPE8J-*SB

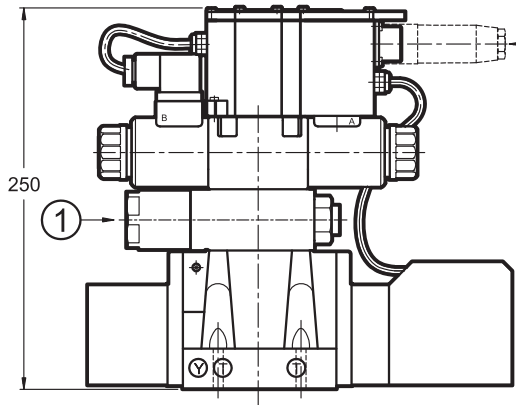


NOTE: for the missing overall dimensions and characteristics see par. 12 - 13 - 14.

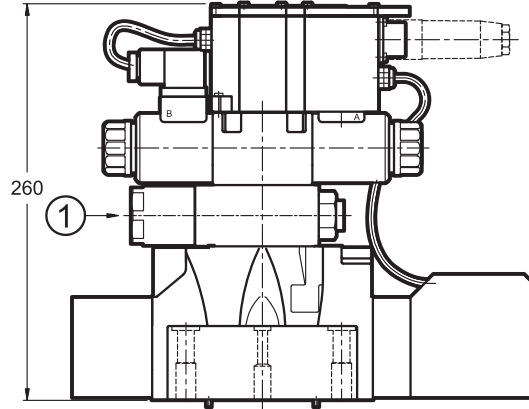
16 - OVERALL AND MOUNTING DIMENSIONS DSPE*J*-Z*

dimensions in mm

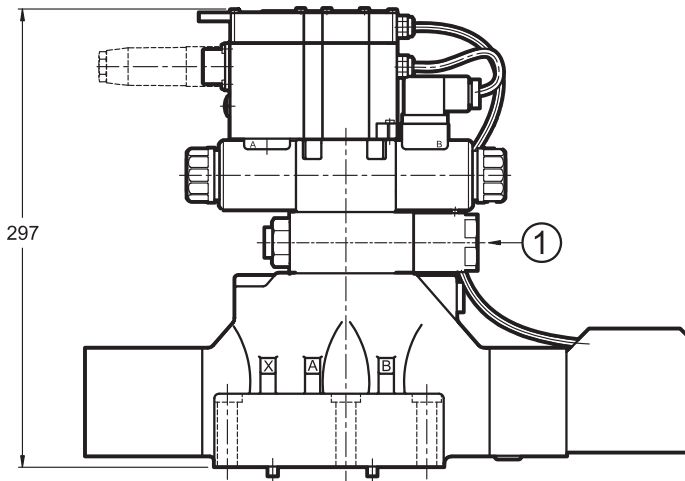
DSPE5J*-Z*



DSPE7J*-Z*



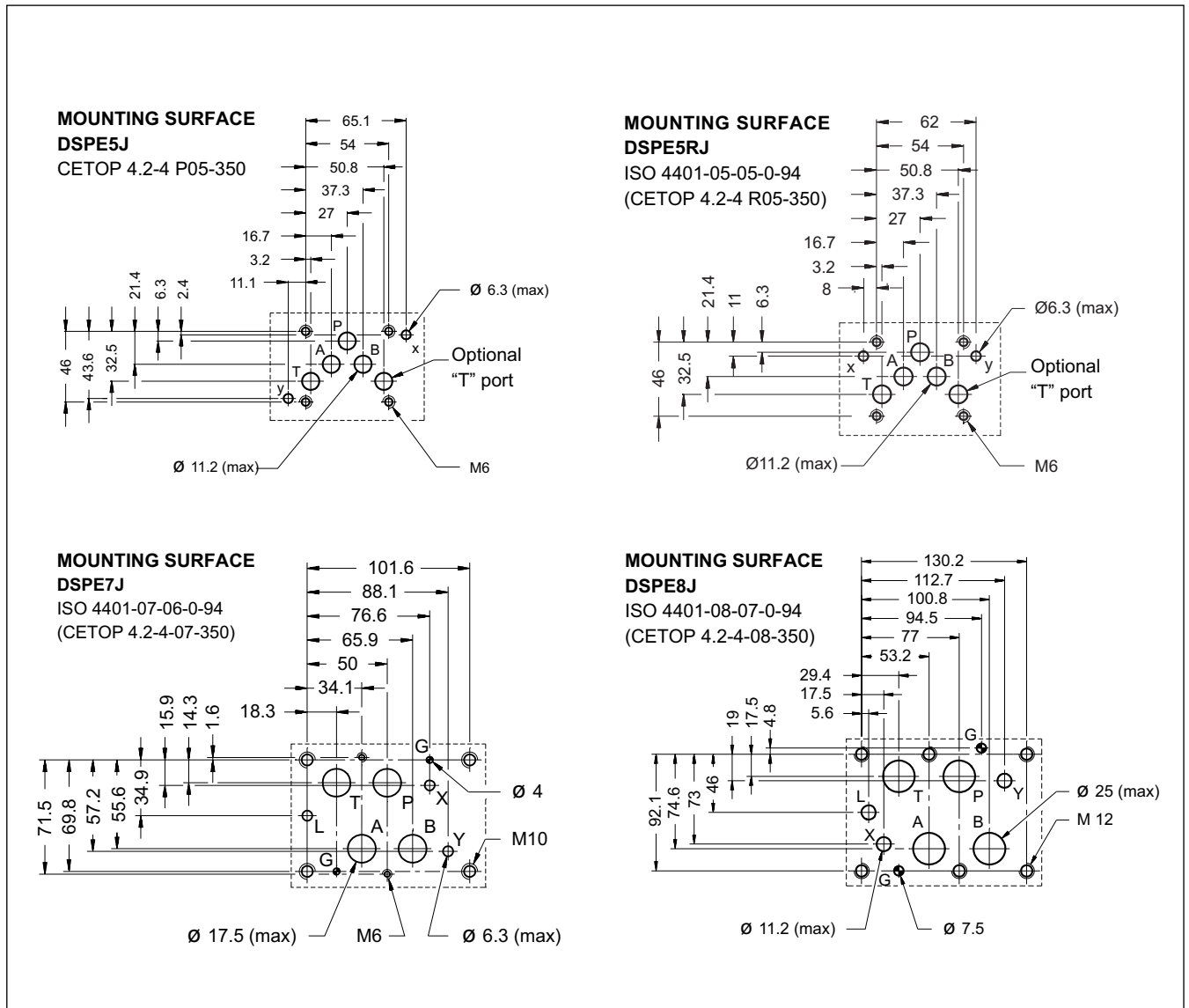
DSPE8J*-Z*



NOTE: for the missing overall dimensions and characteristics see par. 12 - 13 - 14.

1	30 bar fixed adjustment pressure reducing valve
---	---

17 - MOUNTING SURFACES



18 - SUBPLATES (See catalogue 51 000)

	DSPE5J	DSPE7J	DSPE8J	DSPE10G
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



DSPE*J

SERIES 20



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

