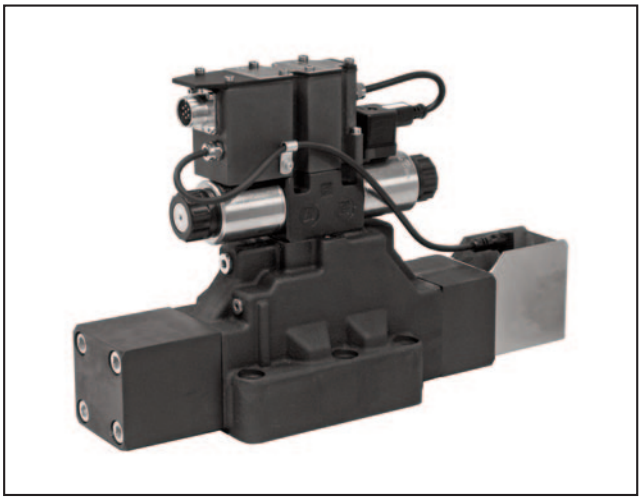


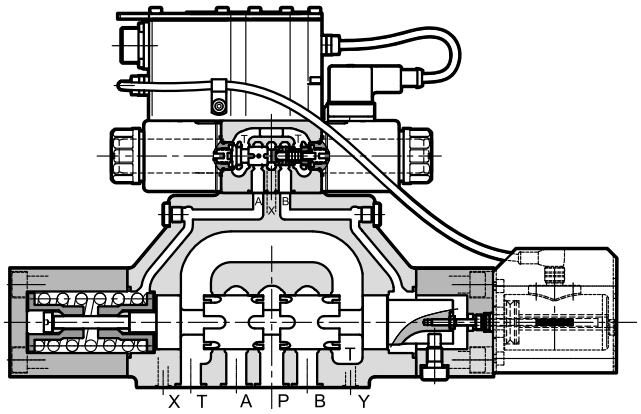
DSPE*J*

PROPORTIONAL DIRECTIONAL VALVES, PILOT OPERATED, WITH FEEDBACK AND INTEGRATED ELECTRONICS

SUBPLATE MOUNTING

DSPE5J* **CETOP P05**
DSPE5RJ* **ISO 4401-05**
DSPE7J* **ISO 4401-07**
DSPE8J* **ISO 4401-08**
DSPE10J* **ISO 4401-10**
DSPE11J* **ISO 4401-10** oversize ports

OPERATING PRINCIPLE



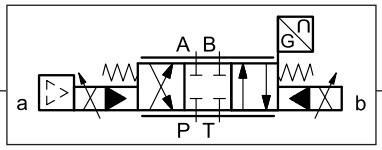
— The DSPE*J* are proportional directional valves, pilot operated, with feedback and integrated electronics, with mounting interface in compliance with ISO 4401 standards.

— They are controlled directly by the integrated electronics. Transducer and digital card allow a fine control of the main spool position, reducing both hysteresis and response times and optimizing the valve performance.

— The valves are available with different types of electronics, with analogue or fieldbus interfaces.

— The valves are easy to install. The driver manages the digital settings directly.

HYDRAULIC SYMBOL (typical)



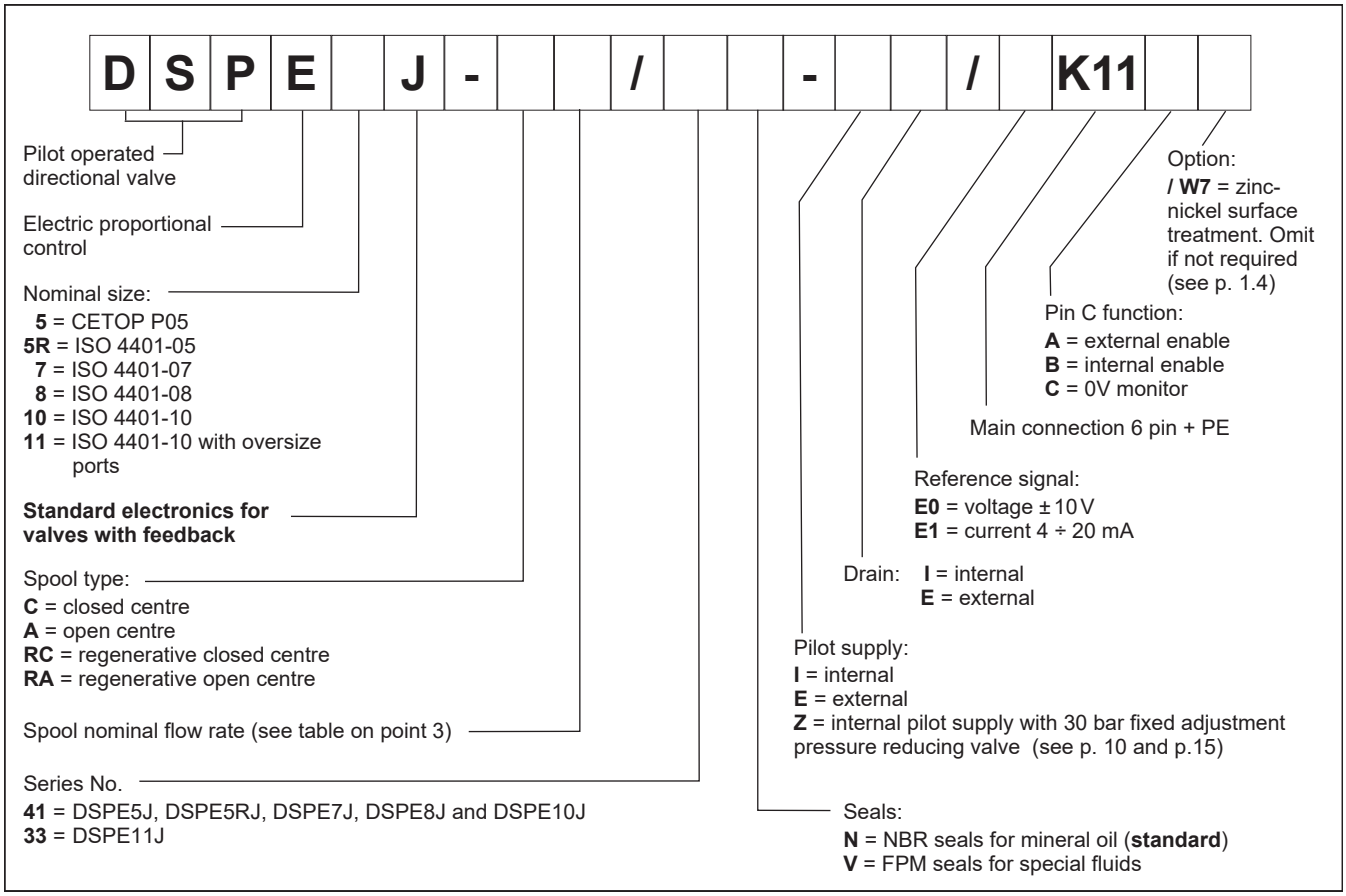
PERFORMANCES

(obtained with mineral oil with viscosity of 36 cSt at 50 °C and p = 140 bar)

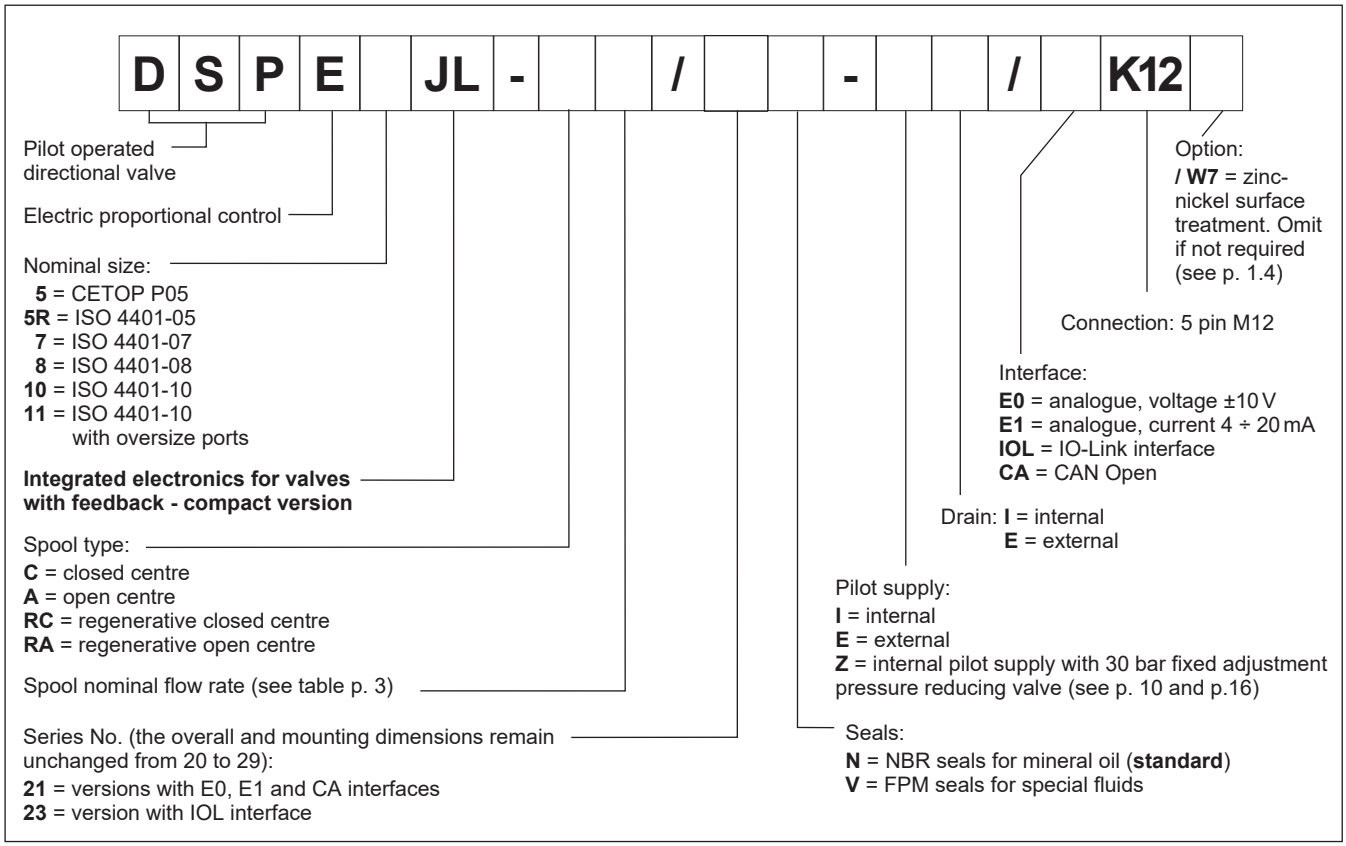
		DSPE5J* DSPE5RJ*	DSPE7J*	DSPE8J*	DSPE10J*	DSPE11J*
Max operating pressure: P - A - B ports T port	bar	350 see point 10				320 see p. 10
Max flow rate	l/min	180	450	800	1800	2000
Hysteresis	% Q_{max}	< 0,5%				
Repeatability	% Q_{max}	< ± 0,2%				
Electrical characteristics		see point 4				
Ambient temperature 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	kg	8.1	9.5	17.8	44.6	41.8

1 - IDENTIFICATION CODES

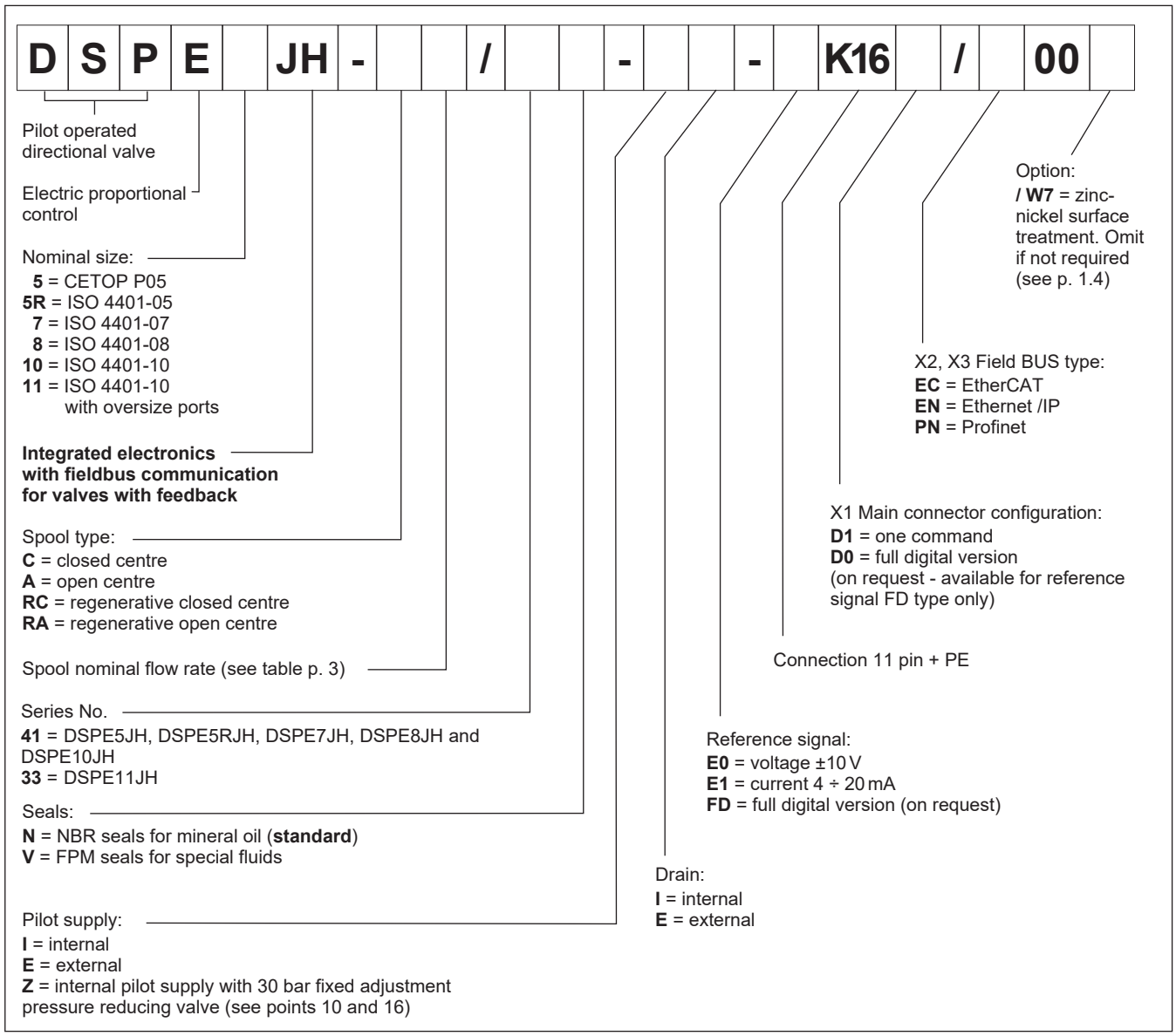
1.1 - Standard electronics



1.2 - Compact electronics



1.3 - Electronics with fieldbus communication

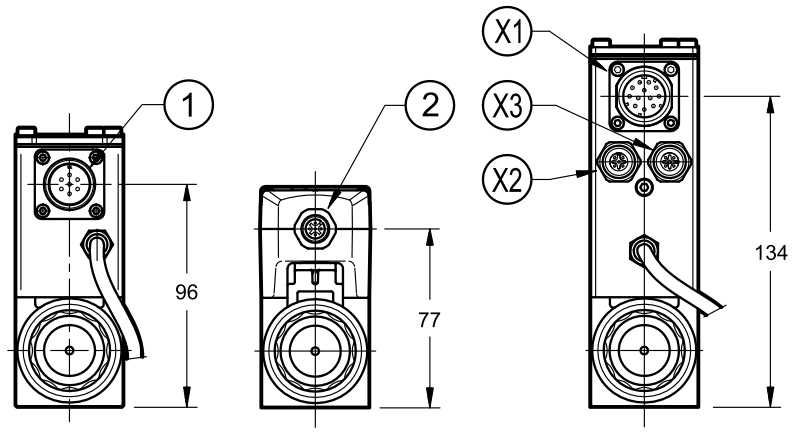


1.4 - Surface treatments

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. (test operated according to UNI EN ISO 9227 standards and test evaluation operated according to UNI EN ISO 10289 standards).

2 - COMPARISON AMONG INTEGRATED ELECTRONICS

dimensions in mm



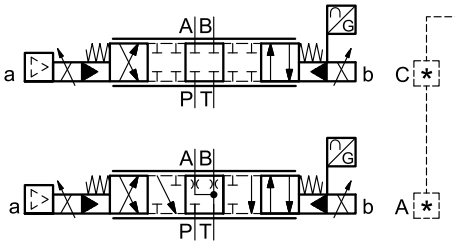
1	Connection 6 pin + PE
2	Connection M12 5 pin, code A, male
X1	Main connection 11 pin + PE
X2	Fieldbus communication (IN)
X3	Fieldbus communication (OUT)

NOTE 1: Please refer to section 7 for connections descriptions and pinouts.
NOTE 2: Related mating connectors have to be ordered separately.
See catalogue 89 000.

3 - AVAILABLE CONFIGURATIONS

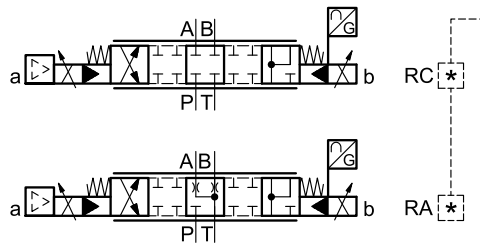
The valve configuration depends on the combination of spool type and rated flow.

3 positions with spring centreing



valve type	*	Nominal flow with Δp 10 bar P→T
DSPE5J* DSPE5RJ*	**80**	80 l/min
	80/40	80 (P-A) / 40 (B-T) l/min
DSPE7J*	**100**	100 l/min
	150	150 l/min
	150/75	150 (P-A) / 75 (B-T) l/min
DSPE8J*	**200**	200 l/min
	300	300 l/min
	300/150	300 (P-A) / 150 (B-T) l/min
DSPE10J*	**350**	350 l/min
	500	500 l/min
	500/250	500 (P-A) / 250 (B-T) l/min
	800	800 l/min
	800/500	800 (P-A) / 500 (B-T) l/min
DSPE11J*	**1000**	1000 l/min

regenerative spools



valve type	*	Nominal flow with Δp10 bar P→T
DSPE7J*	**150/75**	150 (P-A, A-T) / 75 (P-B, B-P) l/min
DSPE8J*	**300/150**	300 (P-A, A-T) / 150 (P-B, B-P) l/min
DSPE10J*	**500/250**	500 (P-A, A-T) / 250 (P-B, B-P) l/min

4 - ELECTRONICS COMMON DATA

Duty cycle		100% (continuous operation)
Protection class according to EN 60529 (**NOTE**): DSPE*J, DSPE*JH DSPE*JL		 IP65/IP67 IP65
Supply voltage	V DC	24 (from 19 to 30 V DC), ripple max 3 Vpp
Power consumption	VA	25
Maximum solenoid current	A	1.88
Fuse protection, external	A	3
Managed breakdowns		Overload and electronics overheating, cable breakdown, supply voltage failures
Electromagnetic compatibility (EMC) emissions EN 61000-6-4, immunity EN 61000-6-2		According to 2014/30/EU standards

NOTE: The IP degree is guaranteed only with a mating connector of equivalent IP degree, installed and tightened correctly. Moreover, on the JH versions, it is necessary to protect any unused connections with caps.

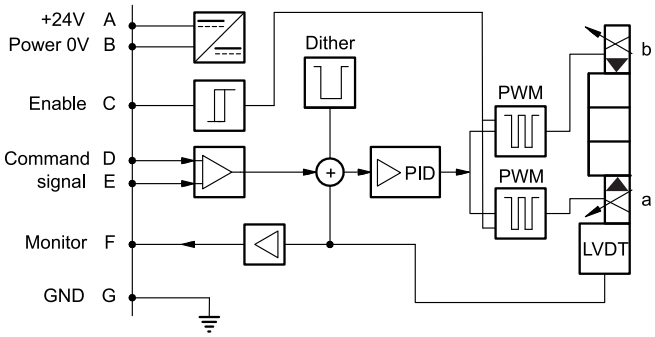
5 - DSPE*J* - STANDARD ELECTRONICS

5.1 - Electrical characteristics

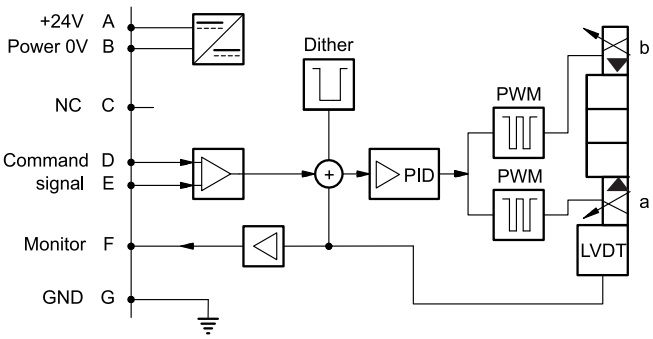
Command signal: voltage (E0) current (E1)	V DC mA	± 10 (Impedance Ri > 11 kohm) 4 ÷ 20 (Impedance Ri = 58 ohm)
Monitor signal (main spool position): voltage (E0) current (E1)	 V DC mA	 ± 10 (Impedance Ro > 1 kohm) 4 ÷ 20 (Impedance Ro = 500 ohm)
Communication for diagnostic		LIN-bus Interface (by means of the optional kit)
Connection		6 pin + PE (MIL-C-5015-G - DIN EN 175201-804)

5.2 - On-board electronics diagrams

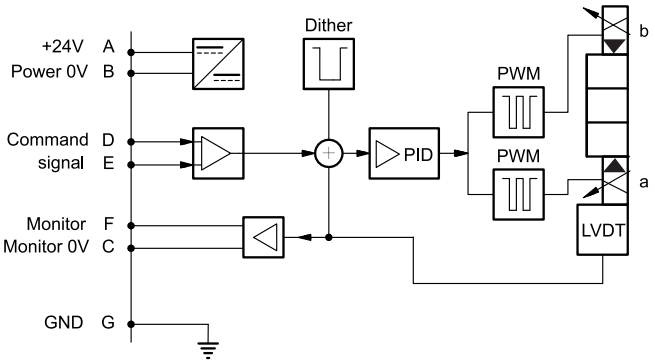
VERSION A - External Enable



VERSION B - Internal Enable

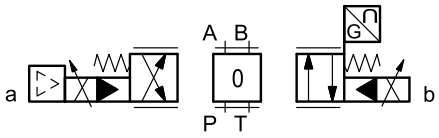


VERSION C - 0V Monitor

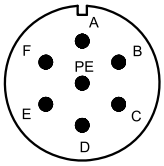


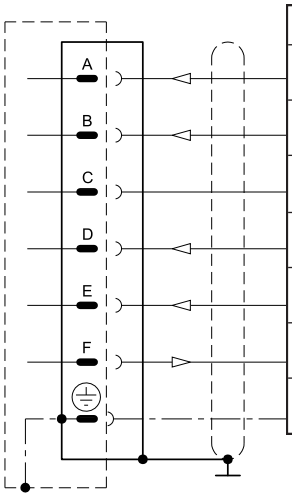
5.3 - Versions with voltage command (E0)

The reference signal is between -10V and +10V. The monitor feature of versions B and C becomes available with a delay of 0,5 sec from the power-on of the card.



COMMAND	**-10V**	**0V**	**+10V**
MONITOR	**-10V**	**0V**	**+10V**



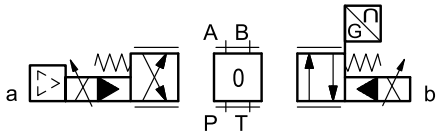


Pin	Values	version A	version B	version C
A	24 V DC	Supply Voltage		
B	0 V			
C		Enable 24 V DC	do not connect -	PIN F reference 0 V
D	± 10 V	Command		
E	0 V	Command reference		
F	± 10 V	Monitor (0V reference: pin B)		Monitor
PE	GND	Ground (Earth)		

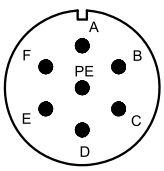
5.4 - Versions with current command (E1)

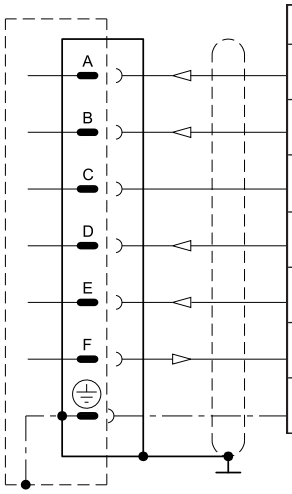
The reference signal is supplied in current 4 ÷ 20 mA. If the current for command is lower the card shows a breakdown cable error. To reset the error is sufficient to restore the signal.

The monitor feature of versions B and C becomes available with a delay of 0,5 sec from the power-on of the card.



COMMAND	**4 mA**	**12 mA**	**20 mA**
MONITOR	**4 mA**	**12 mA**	**20 mA**





Pin	Values	version A	version B	version C
A	24 V DC	Supply Voltage		
B	0 V			
C		Enable 24 V DC	do not connect -	PIN F reference 0 V
D	4 ÷ 20 mA	Command		
E	0 V	Command reference		
F	4 ÷ 20 mA	Monitor (0V reference: pin B)		Monitor
PE	GND	Ground (Earth)		

6 - DSPE*JL - COMPACT ELECTRONICS

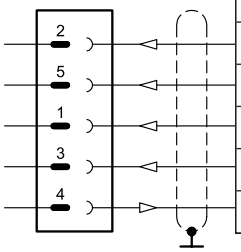
In IO-Link networks, the length of the connecting cables is limited to 20 metres. In CA versions, pin 3 and pin 5 are galvanic isolated up to 100 V to avoid earth loops.

6.1 - Electrical characteristics

Command signal:	voltage (E0) current (E1)	V DC mA	±10 (impedance Ri > 11 kohm) 4 ÷ 20 (impedance Ri = 58 ohm)
Monitor signal :	voltage (E0) current (E1)	V DC mA	0 ÷ 5 (impedance Ro > 1 kohm) 4 ÷ 20 (impedance Ro = 500 ohm)
IO-Link communication (IOL): Data rate		kBaud	IO-Link Port Class B 38.4
Can Open communication (CA): Data rate		kbit	10 ÷ 1000
Data register (IOL and CA versions only)			card voltage supply, solenoid faults (shortcircuit, bad configuration), box temperature.
Connection			5-pin M12 code A (IEC 61076-2-101)

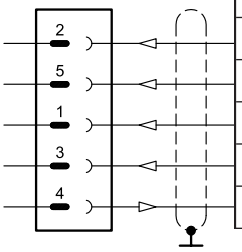
6.2 - Pin tables

'E0' connection



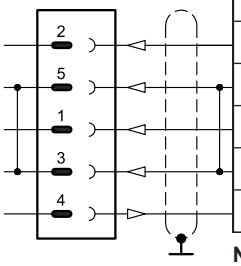
Pin	Values	Function
2	24 V DC	Supply voltage (solenoid and logic)
5	0 V	
1	± 10 V	Command
3	0V	Command reference
4	0 ÷ 5V	Monitor (0V reference: pin 5)

'E1' connection



Pin	Values	Function
2	24 V DC	Supply voltage (solenoid and logic)
5	0 V	
1	4 ÷ 20 mA	Command
3	0V	Command reference
4	4 ÷ 20 mA	Monitor (0V reference: pin 5)

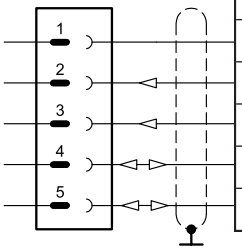
'IOL' connection



Pin	Values		Function
2	2L+	24 V DC	Solenoid supply voltage
5	2L-	0 V (GND)	
1	1L+	+24 V DC	Logic and IO-Link supply voltage
3	1L-	0V (GND)	
4	C/Q		IO-Link Communication

NOTE: Pin 3 and pin 5 are linked with each other in the valve electronics. The reference potentials 1L- and 2L- of the two supply voltages must also be linked with each other on the customer side.

'CA' connection



Pin	Values	Function
1	CAN_SH	Shield
2	24 V DC	Supply voltage
3	0 V (GND)	
4	CAN H	Bus line (high)
5	CAN_L	Bus line (low)

7 - DSPE*JH - FIELDBUS ELECTRONICS

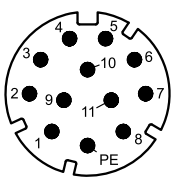
The 11 + PE pin connection allows separate supply voltage for electronics and solenoids.

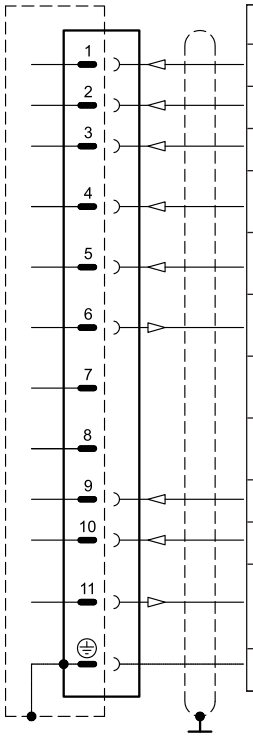
Command - valve position schemes as for the standard electronics. Please refer to pictures in p. 5.3 and 5.4.

7.1 - Electrical characteristics

Command signal: voltage (E0) current (E1) digital (FD)	V DC mA	±10 (Impedance Ri > 11 kohm) 4 ÷ 20 (Impedance Ri = 58 ohm) via fieldbus
Monitor signal (main spool position): voltage (E0) current (E1)	V DC mA	±10 (Impedance Ro > 1 kohm) 4 ÷ 20 (Impedance Ro = 500 ohm)
Communication / diagnostic		via Bus register
Communication interface standards		IEC 61158
Communication physical layer		fast ethernet, insulated 100 Base TX
Power connection		11 pin + PE (DIN 43651)

7.2 - X1 Main connection pin table





D1: one command

Pin	Values	Function
1	24 V DC	Main supply voltage
2	0 V	
3	24V DC	Enable
4	± 10 V (E0) 4 ÷ 20 (E1)	Command
5	0 V	Command reference signal
6	± 10 V (E0) 4 ÷ 20 (E1)	Monitor (0V reference pin 10)
7	NC	do not connect
8	NC	do not connect
9	24 V DC	Logic and control supply
10	0 V	
11	24 V DC	Fault (0V DC) or normal working (24V DC) (0V reference pin 2)
12	GND	Ground (Earth)

D0: full digital

Pin	Values	Function
1	24 V DC	Main supply voltage
2	0 V	
3	24V DC	Enable
4	NC	do not connect
5	NC	do not connect
6	NC	do not connect
7	NC	do not connect
8	NC	do not connect
9	24 V DC	Logic and control supply
10	0 V	
11	24 V DC	Fault (0V DC) or normal working (24V DC) (0V ref. pin 2)
12	GND	Ground (Earth)

7.3 - FIELDBUS connections

Please wire following guidelines provided by the related standards communication protocol. Any connections present and not used must be protected with special caps so as not to nullify the protection against atmospheric agents.

X2 (IN) connection M12 D 4 pin female

Pin	Values	Function
1	TX+	Transmitter
2	RX+	Receiver
3	TX-	Transmitter
4	RX-	Receiver
HOUSING	shield	

X3 (OUT) connection: M12 D 4 pin female

Pin	Values	Function
1	TX+	Transmitter
2	RX+	Receiver
3	TX-	Transmitter
4	RX-	Receiver
HOUSING	shield	

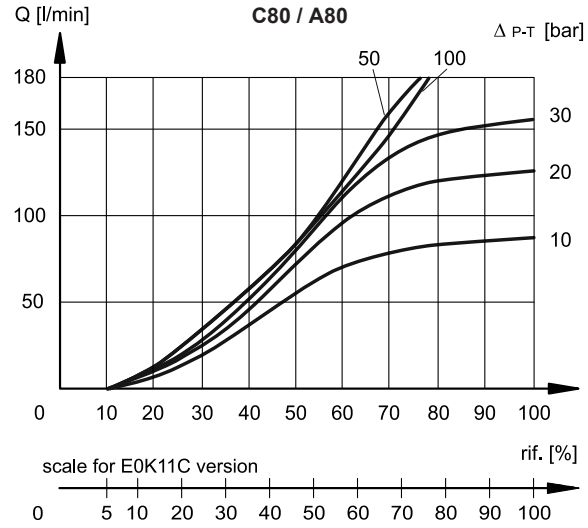
NOTE: Shield connection on connector housing is recommended.

8 - CHARACTERISTIC CURVES

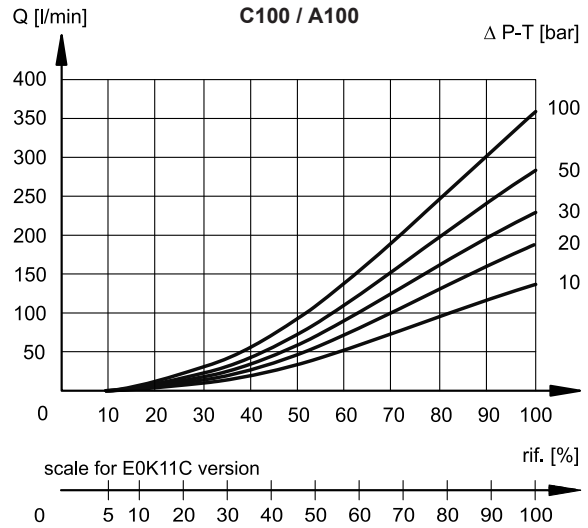
(obtained with mineral oil with viscosity of 36 cSt at 50°C and p = 140 bar)

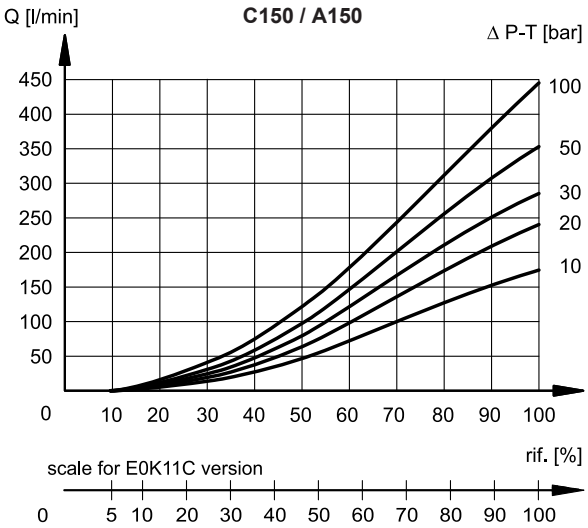
Typical flow rate curves at constant Δp related to the reference signal and measured for the available spools. The Δp values are measured between P and T valve ports.

8.1 - Characteristic curves DSPE5J* and DSPE5RJ*

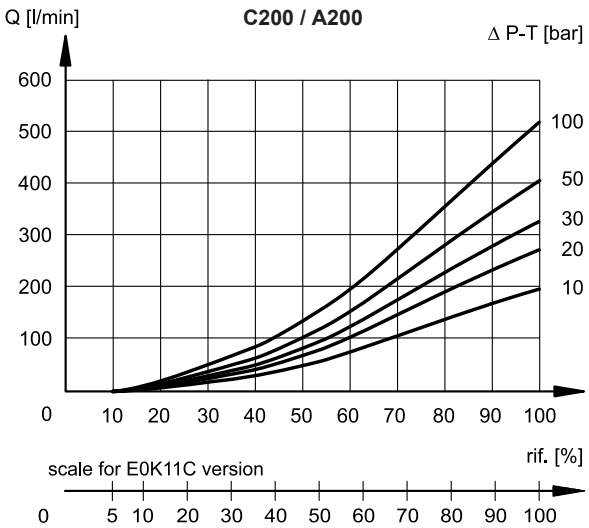


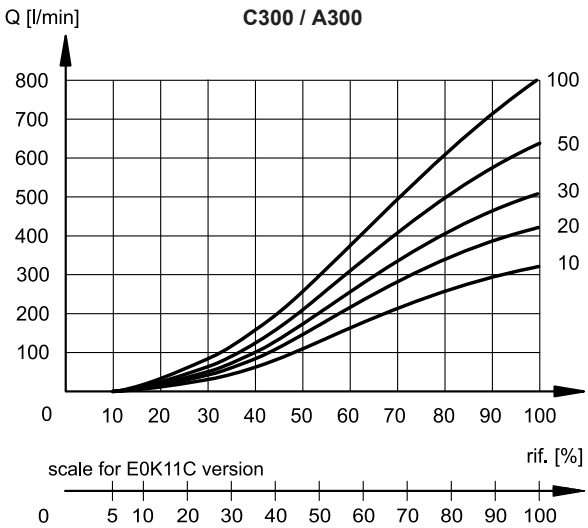
8.2 - Characteristic curves DSPE7J*



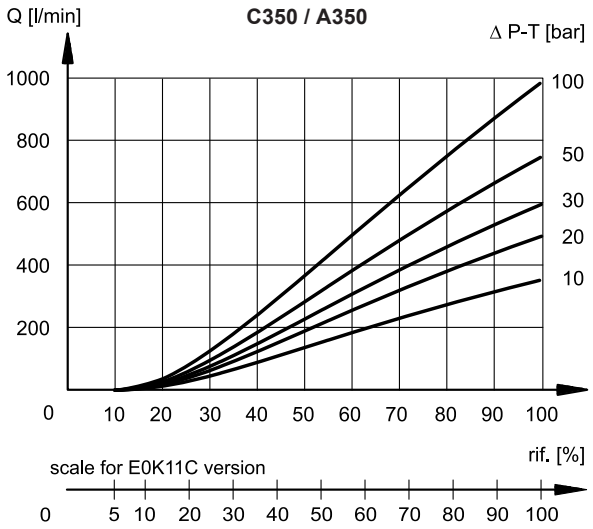


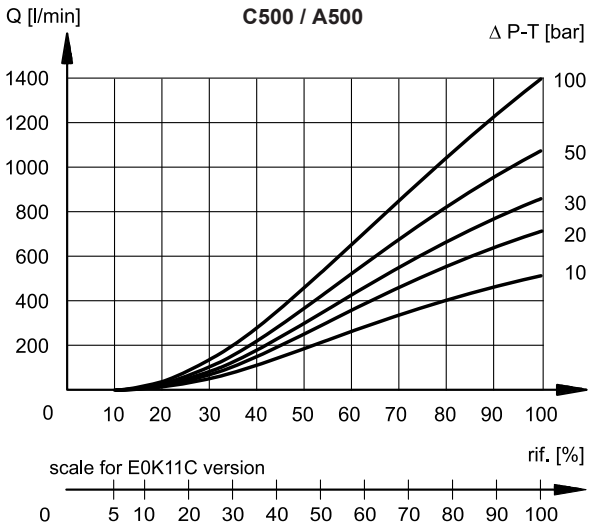
8.3 - Characteristic curves DSPE8J*

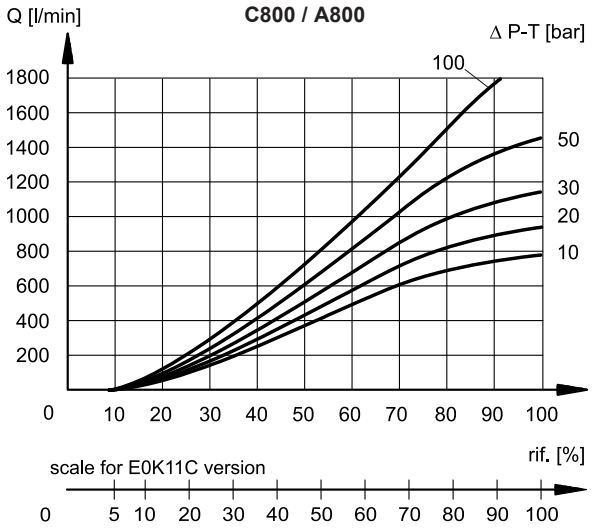




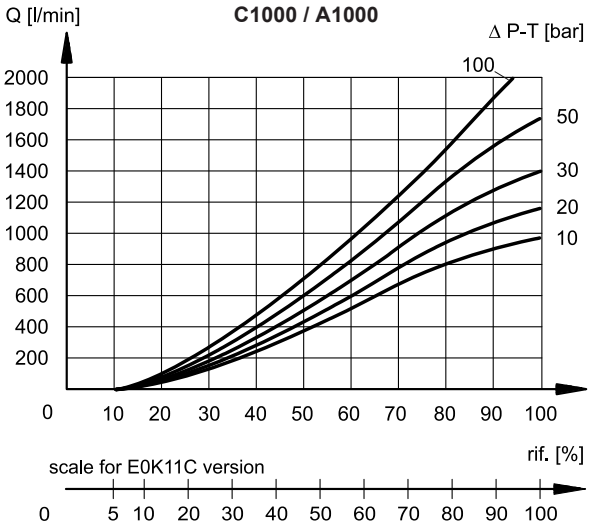
8.4 - Characteristic curves DSPE10J*





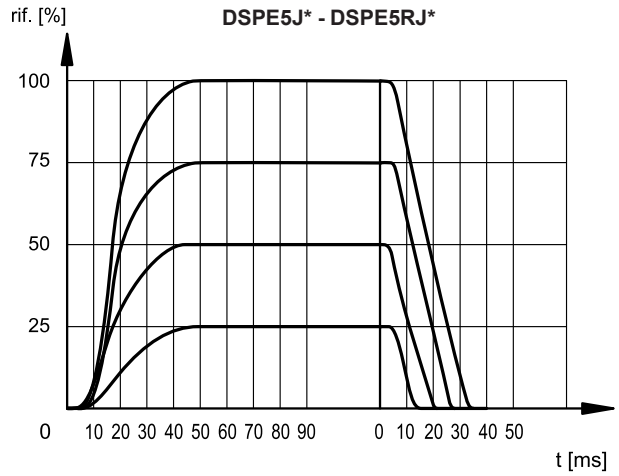


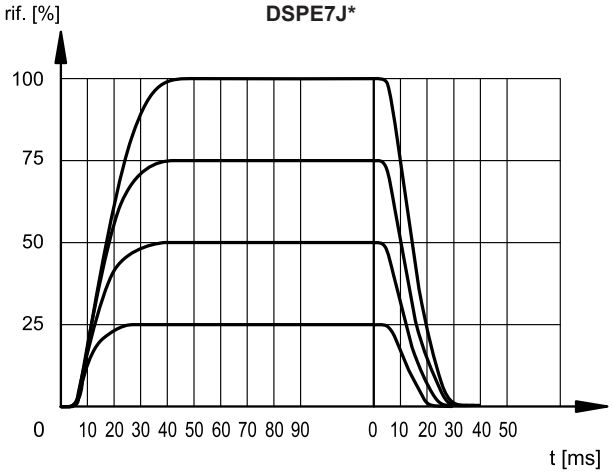
8.5 - Characteristic curves DSPE11J*

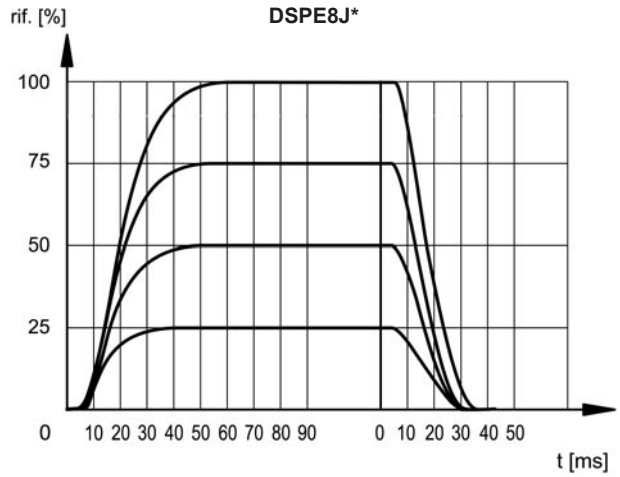


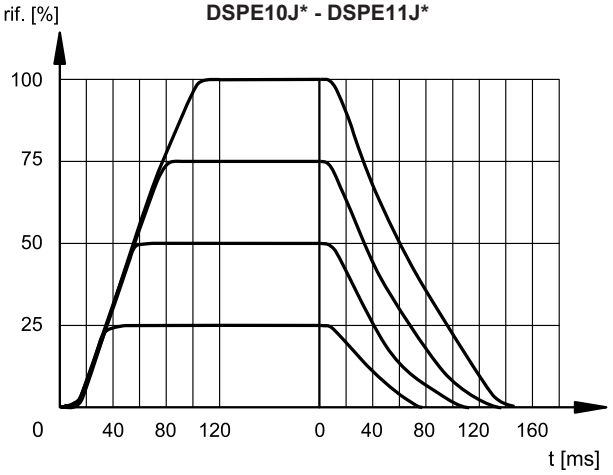
9 - STEP RESPONSE

(obtained with mineral oil with viscosity of 36 cSt at 50°C and static pressure 100 bar)









10 - HYDRAULIC CHARACTERISTICS

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

FLOW RATES		DSPE5J* DSPE5RJ*	DSPE7J*	DSPE8J*	DSPE10J*	DSPE11J*
Max flow rate	l/min	180	450	800	1800	2000
Pilot supply flow requested with operation 0 →100%	l/min	3.5	6.4	15.7	14.5	14.5
Pilot supply volume requested with operation 0 →100%	cm^3	1.7	3.2	9.2	21.6	21.6

PRESSURES (bar)	MIN	MAX
Pilot supply pressure on X port	30	210 (**NOTE**)
Pressure on T port with interal drain	–	10
Pressure on T port with external drain	–	250

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

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

10.1 - Pilot and drain

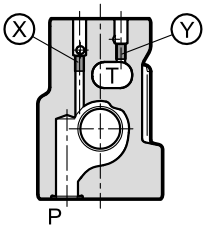
DSPE*J* valves are available with pilot and drain both internal or external. The version with external drain allows a higher back pressure on the unloading. The version with external pilot with reduced pressure must be used when higher pressures are needed.

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

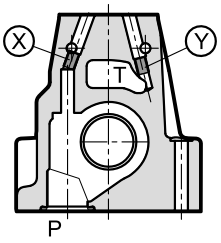
NOTE: The configuration of pilot and drain must be chosen when ordering. Subsequent modifications are allowed only to specialized operators with authorization and in factory.

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

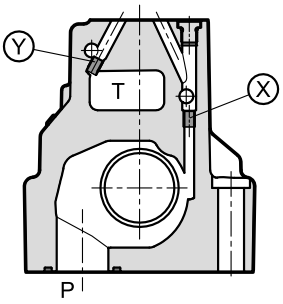
DSPE5J / DSPE5RJ



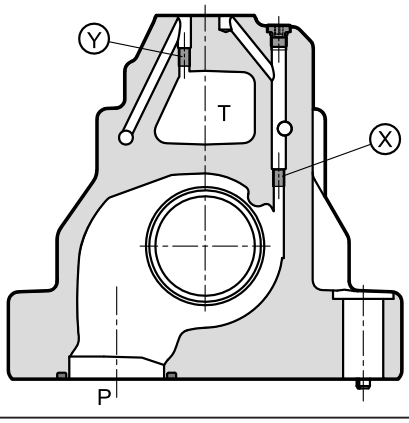
DSPE7J



DSPE8J



DSPE10J / DSPE11J

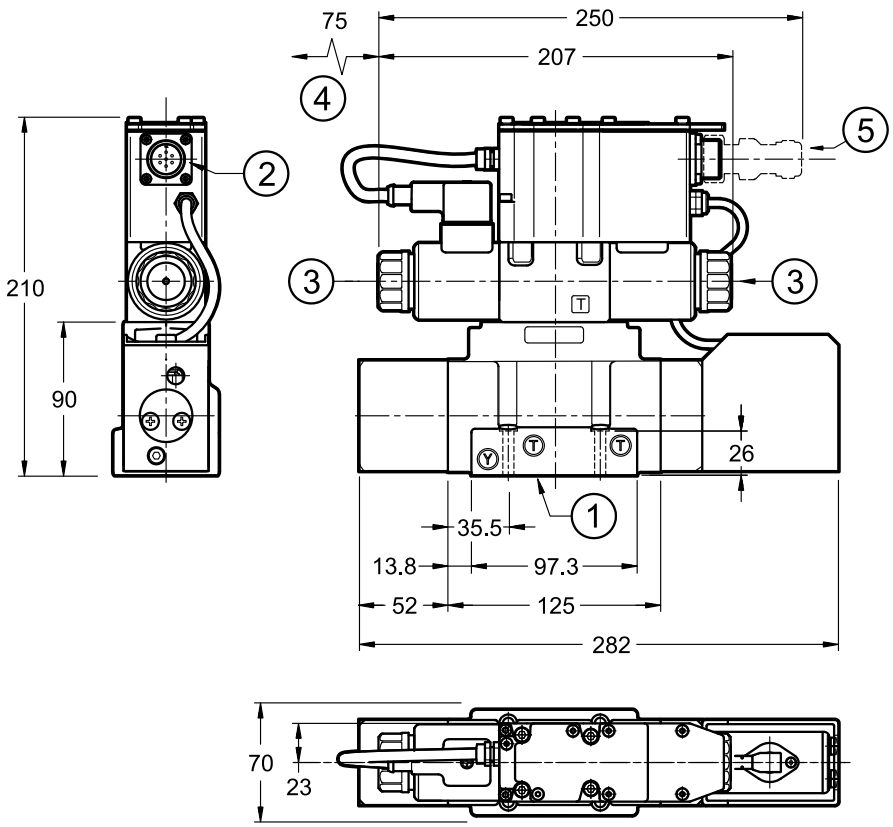


X: plug M5x6 for external pilot
Y: plug M5x6 for external drain

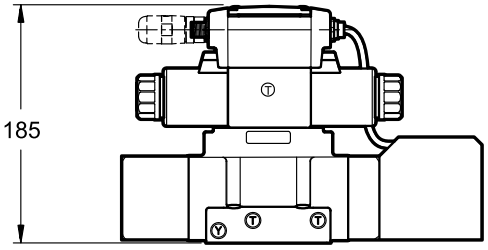
X: plug M6x8 for external pilot
Y: plug M6x8 for external drain

11 - DSPE5J* AND DSPE5RJ* - OVERALL AND MOUNTING DIMENSIONS

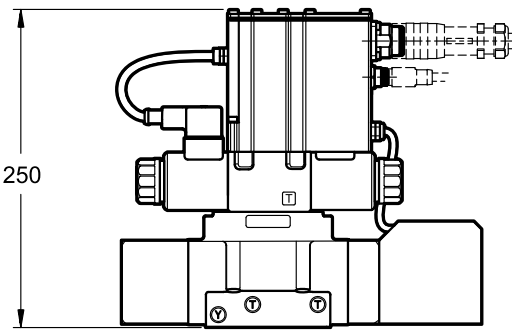
dimensions in mm



DSPE5JL



DSPE5JH



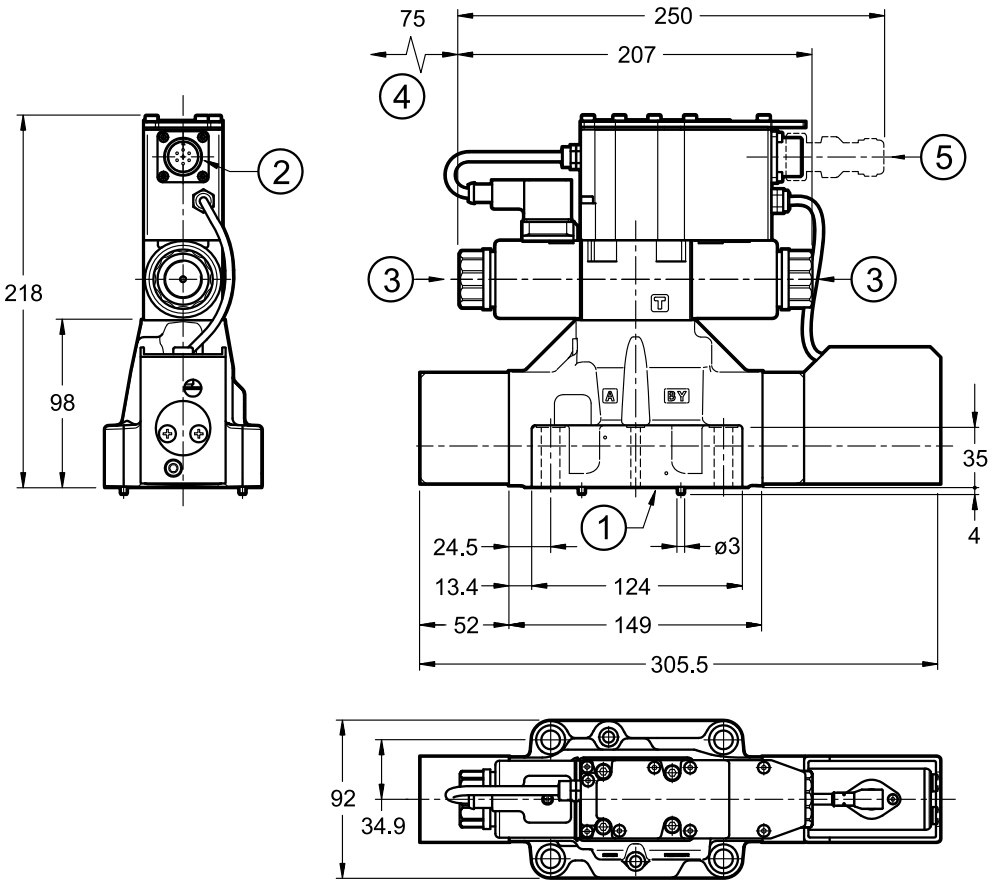
NOTES:
- Overall dimensions with Z option (fixed adjustment pressure reducing valve) at point 15.
- Mounting surface at point 16.
- Do not dismantle the transducer.

1	Mounting surface with sealing rings: 5 OR type 2050 (12.42x1.78) - 90 Shore 2 OR type 2037 (9.25x1.78) - 90 Shore
2	Main connection 6 pin + PE
3	Manual override embedded in the solenoid tube
4	Coil removal space
5	Mating connector **To be ordered separately.** See catalogue 89 000

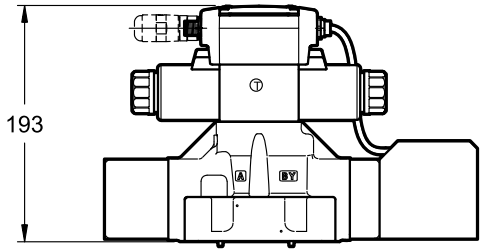
Valve fastening: 4 SHC screws M6x35 ISO 4762
Tightening torque: 8 Nm (A8.8 screws)
Threads of mounting holes: M6x10

12 - DSPE7J* - OVERALL AND MOUNTING DIMENSIONS

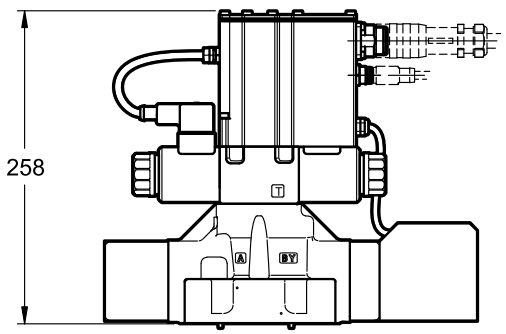
dimensions in mm



DSPE7JL



DSPE7JH



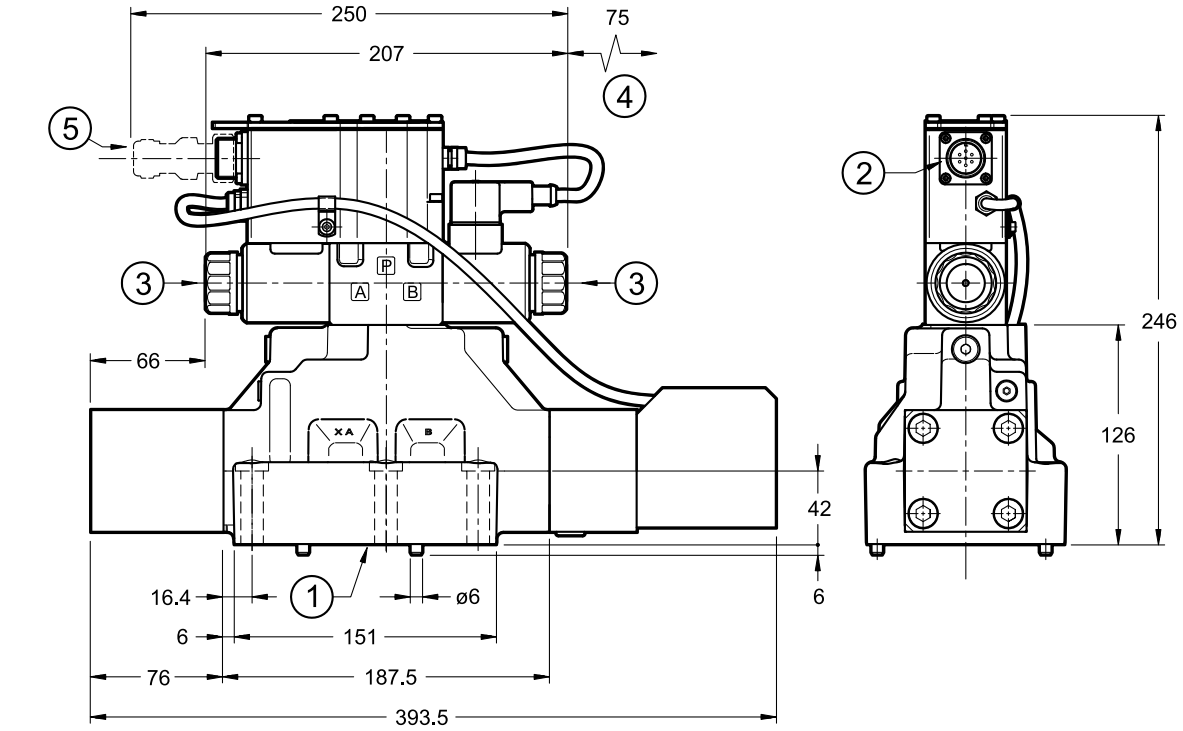
NOTES:
- Overall dimensions with Z option (fixed adjustment pressure reducing valve) at point 15.
- Mounting surface at point 16.
- Do not dismantle the transducer.

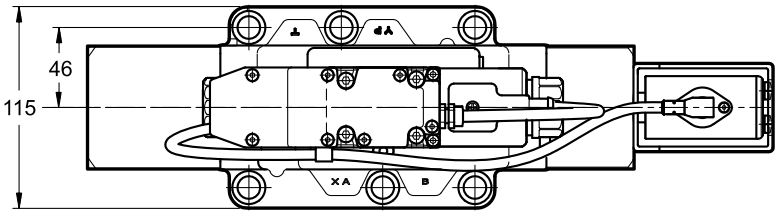
1	Mounting surface with sealing rings: 4 OR type 130 (22.22x2.62) - 90 Shore 2 OR type 2043 (10.82x1.78) - 90 Shore
2	Main connection 6 pin + PE
3	Manual override embedded in the solenoid tube
4	Coil removal space
5	Mating connector. **To be ordered separately.** See catalogue 89 000

Valve fastening: 4 SHC screws M10x50 ISO 4762 2 SHC screws M6x50 ISO 4762
Tightening torque: M10x50: 40 Nm (A8.8 screws) M6x50: 8 Nm (A8.8 screws)
Threads of mounting holes: M6x18; M10x18

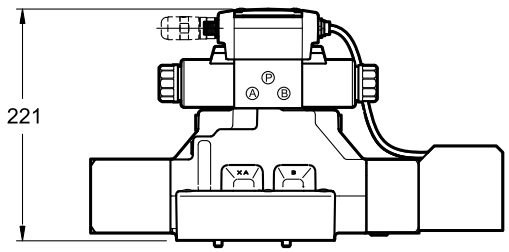
13 - DSPE8J* - OVERALL AND MOUNTING DIMENSIONS

dimensions in mm

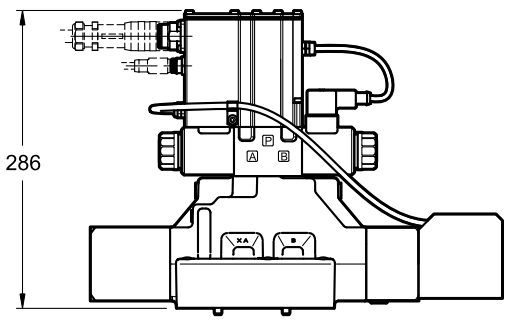




DSPE8JL



DSPE8JH



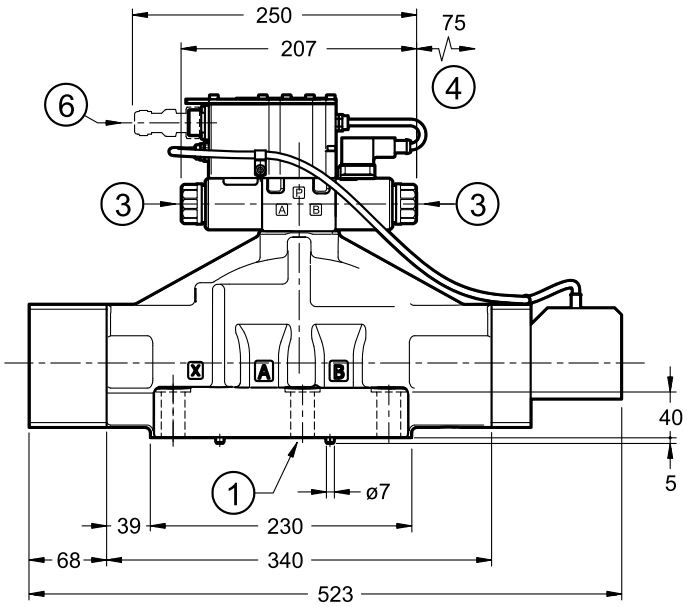
NOTES:
- Overall dimensions with Z option (fixed adjustment pressure reducing valve) at point 15.
- Mounting surface at point 16.
- Do not dismantle the transducer.

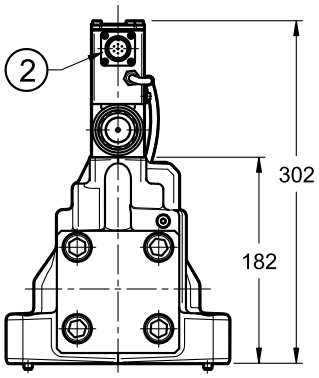
1	Mounting surface with sealing rings: 4 OR type 3131 (32.99x2.62) - 90 Shore 2 OR type 3087 (21.89x2.62) - 90 Shore
2	Main connection 6 pin + PE
3	Manual override embedded in the solenoid tube
4	Coil removal space
5	Mating connector. **To be ordered separately.** See catalogue 89 000

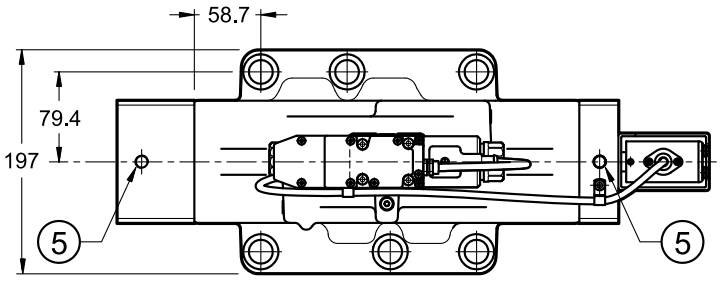
Valve fastening: 6 SHC screws M12x60 ISO 4762
Tightening torque: 69 Nm (A8.8 screws)
Threads of mounting holes: M12x20

14 - DSPE10J* / DSPE11J* - OVERALL AND MOUNTING DIMENSIONS

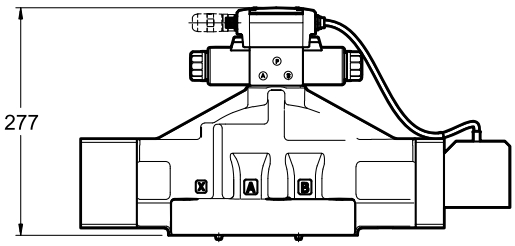
dimensions in mm



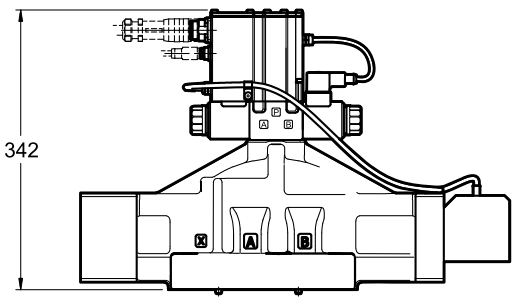




DSPE1*JL



DSPE1*JH



NOTES:
- Overall dimensions with Z option (fixed adjustment pressure reducing valve) at point 15.
- Mounting surface at point 16.
- Do not dismantle the transducer.

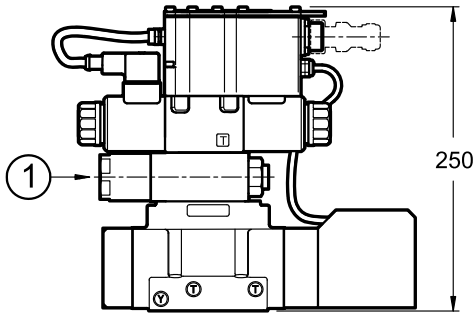
1	Mounting surface with sealing rings: **DSPE10J*** 4 OR type 4162 (40.86x3.53) - 90 Shore 2 OR type 3081 (20.24x2.62) - 90 Shore **DSPE11J*** 4 OR type 4212 (53.57x3.53) - 90 Shore 2 OR type 3081 (20.24x2.62) - 90 Shore
2	Main connection 6 pin + PE
3	Manual override embedded in the solenoid tube
4	Coil removal space
5	M12 eyebolt seat for safe lift
6	Mating connector. **To be ordered separately.** See catalogue 89 000

Valve fastening: 6 SHC screws M20x70 ISO 4762 (supplied)
Tightening torque: 470 Nm (A10.9 screws)
Threads of mounting holes: M20x40

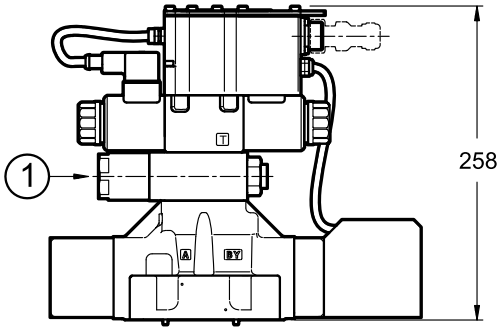
15 - OVERALL AND MOUNTING DIMENSIONS - PILOT SUPPLY TYPE Z

dimensions in mm

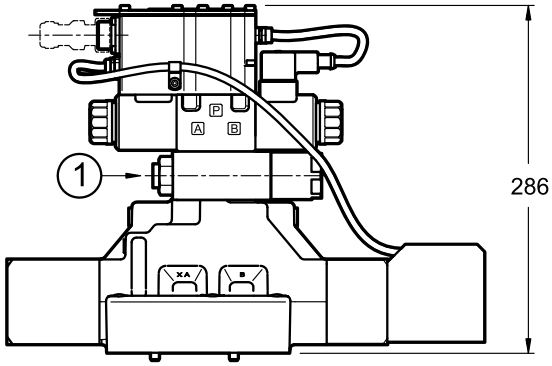
DSPE5J*



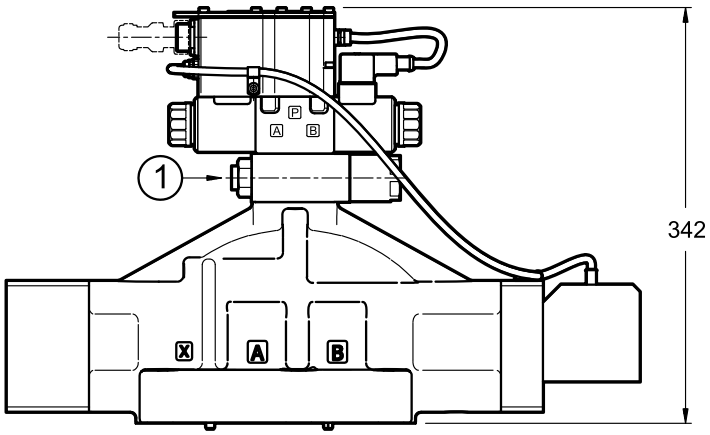
DSPE7J*



DSPE8J*



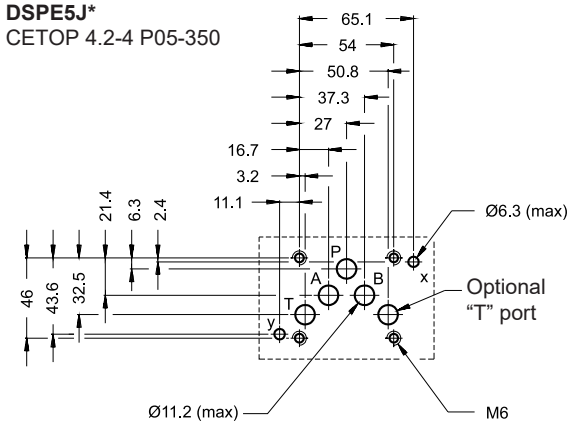
DSPE10J* / DSPE11J*



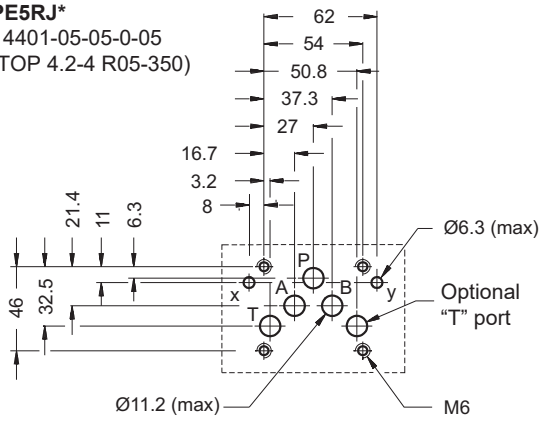
1	30 bar fixed adjustment pressure reducing valve

16 - MOUNTING SURFACES

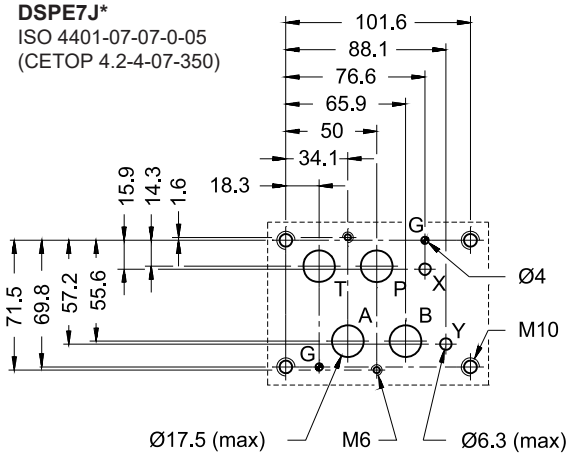
DSPE5J*
CETOP 4.2-4 P05-350



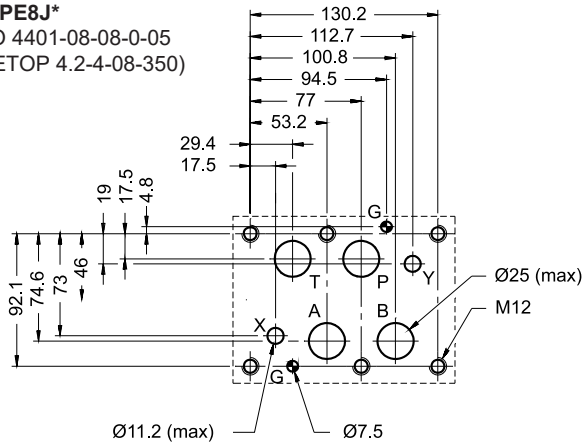
DSPE5RJ*
ISO 4401-05-05-0-05
(CETOP 4.2-4 R05-350)



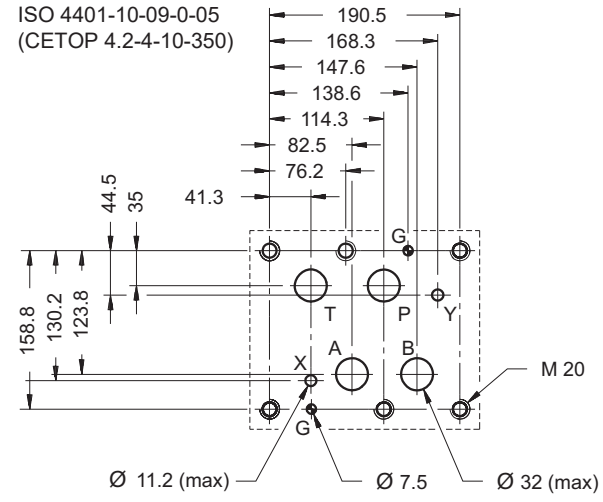
DSPE7J*
ISO 4401-07-07-0-05
(CETOP 4.2-4-07-350)



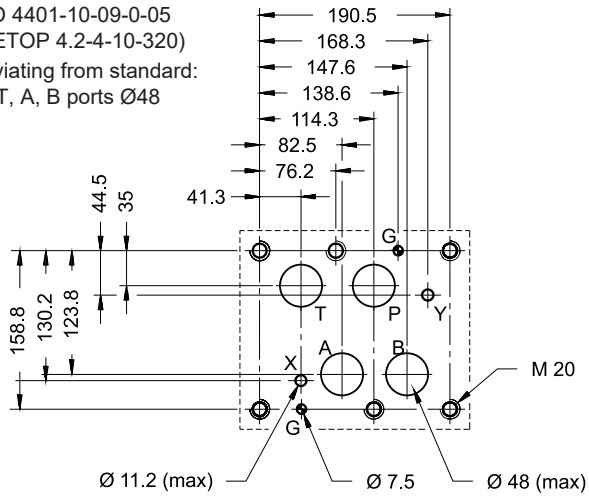
DSPE8J*
ISO 4401-08-08-0-05
(CETOP 4.2-4-08-350)



DSPE10J*
ISO 4401-10-09-0-05
(CETOP 4.2-4-10-350)



DSPE11J*
ISO 4401-10-09-0-05
(CETOP 4.2-4-10-320)
deviating from standard:
P, T, A, B ports Ø48



17 - 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.

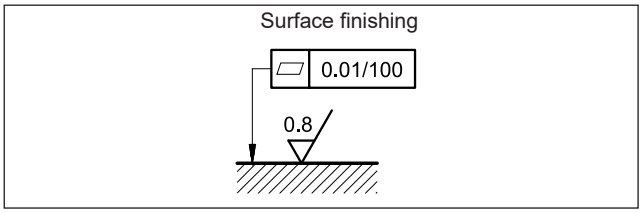
The fluid must be preserved in its physical and chemical characteristics.

18 - INSTALLATION

The 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.



19 - ACCESSORIES

(to be ordered separately)

19.1 - Mating connectors

Mating connectors must be ordered separately. See catalogue 89 000.

For K11 and K16 versions we recommend the choice of a metal connector to avoid electromagnetic disturbances and to comply with EMC regulations on electromagnetic compatibility. If you opt for a plastic connector, make sure that it guarantees and maintains the IP and EMC protection characteristics of the valve.

19.2 - Mating connectors and caps for fieldbus communication

Duplomatic offers spare parts to be wired and also ready-to-use cord sets. Please refer to cat. 89 000.

19.3 - Connection cable

The optimal wiring provides for 7 isolated conductors, with separate screen for the signal wires (command, monitor) and an overall screen.

Cross section for power supply:
- up to 20 m cable length : 1,0 mm^2
- up to 40 m cable length : 1,5 mm^2 (IO-Link excluded)

Cross section for signals (command, monitor):
- 0,50 mm^2

19.4 - Kit for start-up LINPC-USB

Device for service start-up and diagnostic, available for valves with K11 and K16 connections. See catalogue 89 850.

20 - SUBPLATES

(see catalogue 51 000)

No subplates are available for DSPE5RJ*, DSPE10J* and DSPE11J*.

	DSPE5J*	DSPE7J*	DSPE8J*
Type with rear ports	PME4-AI5G	PME07-AI6G	-
Type with side ports	PME4-AL5G	PME07-AL6G	PME5-AL8G
P, T, A, B ports dimensions X, Y ports dimensions	3/4” BSP 1/4” BSP	1” BSP 1/4” BSP	1 ½” BSP 1/4” BSP

DUPLOMATIC MOTION SOLUTIONS
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