

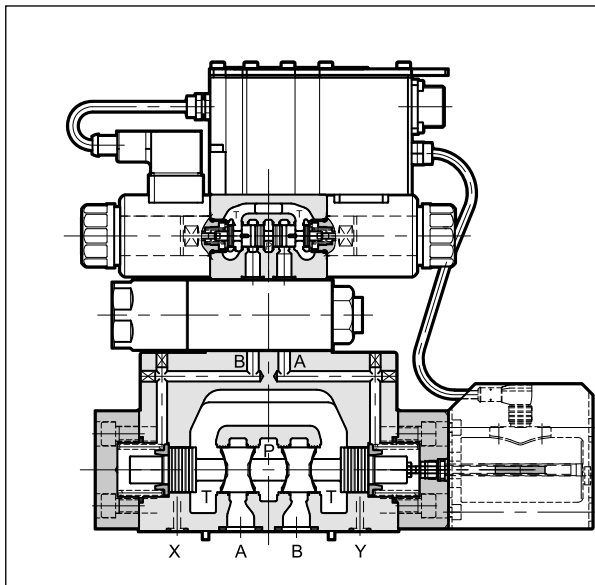
DDPE*J*

PROPORTIONAL DIRECTIONAL CONTROL VALVE, PILOT OPERATED, WITH FEEDBACK AND INTEGRATED ELECTRONICS

SUBPLATE MOUNTING

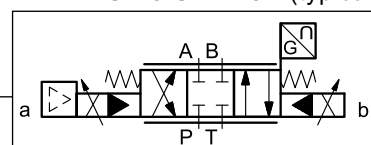
- DDPE5RJ* ISO 4401-05
- DDPE7J* ISO 4401-07
- DDPE8J* ISO 4401-08
- DDPE10J* ISO 4401-10
- DDPE11J* ISO 4401-10 oversize ports

OPERATING PRINCIPLE



- The DDPE*J* are proportional directional control valves, pilot-operated, with closed-loop position control of the main stage, with digital integrated electronics and with mounting interface in compliance with ISO 4401 standards.
- They are controlled directly by an integrated digital amplifier. Transducer and digital card allow a fine control of the positioning of the spool, reducing hysteresis and response times.
- They are available with different types of electronics, with analogue or fieldbus interfaces.
- A monitoring signal of the main spool position is available.
- The valves are easy to install. The driver manages digital settings directly.

HYDRAULIC SYMBOL (typical)



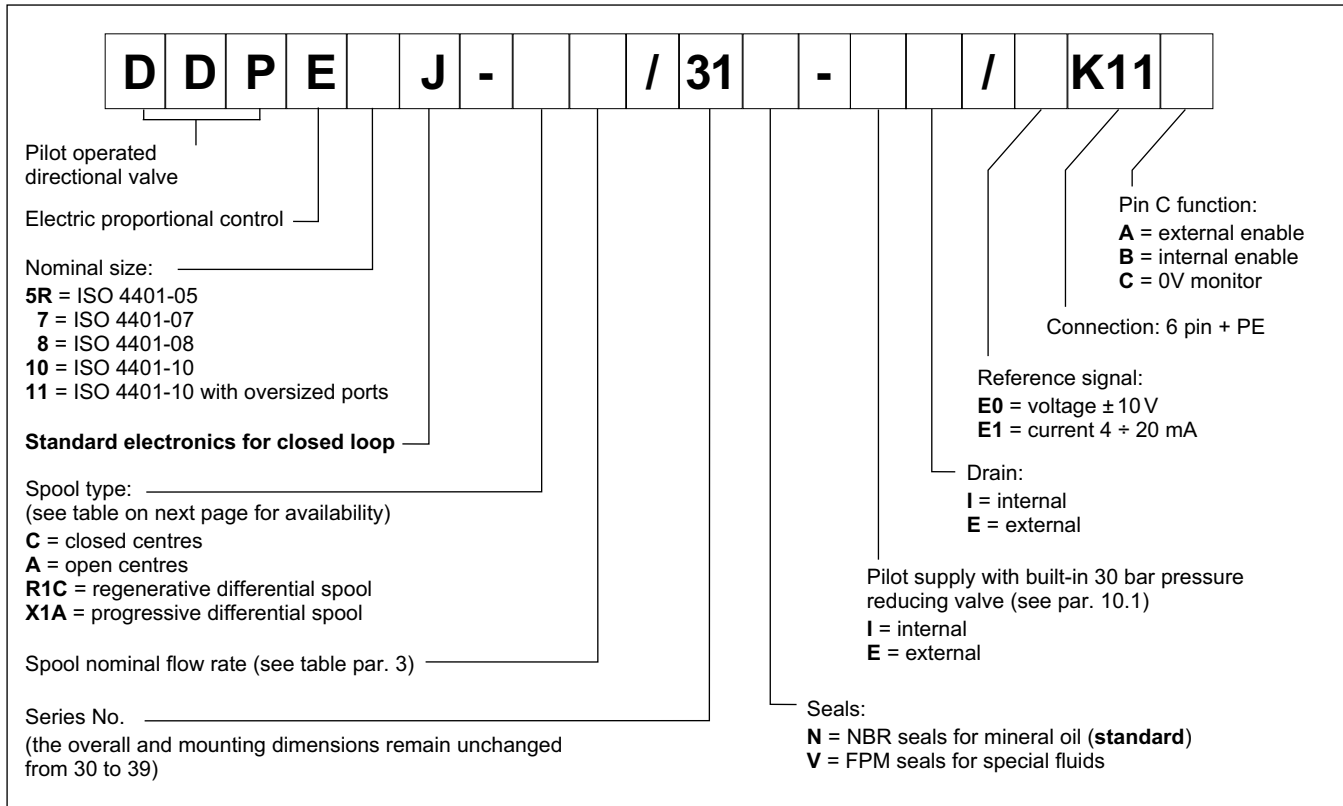
PERFORMANCES

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

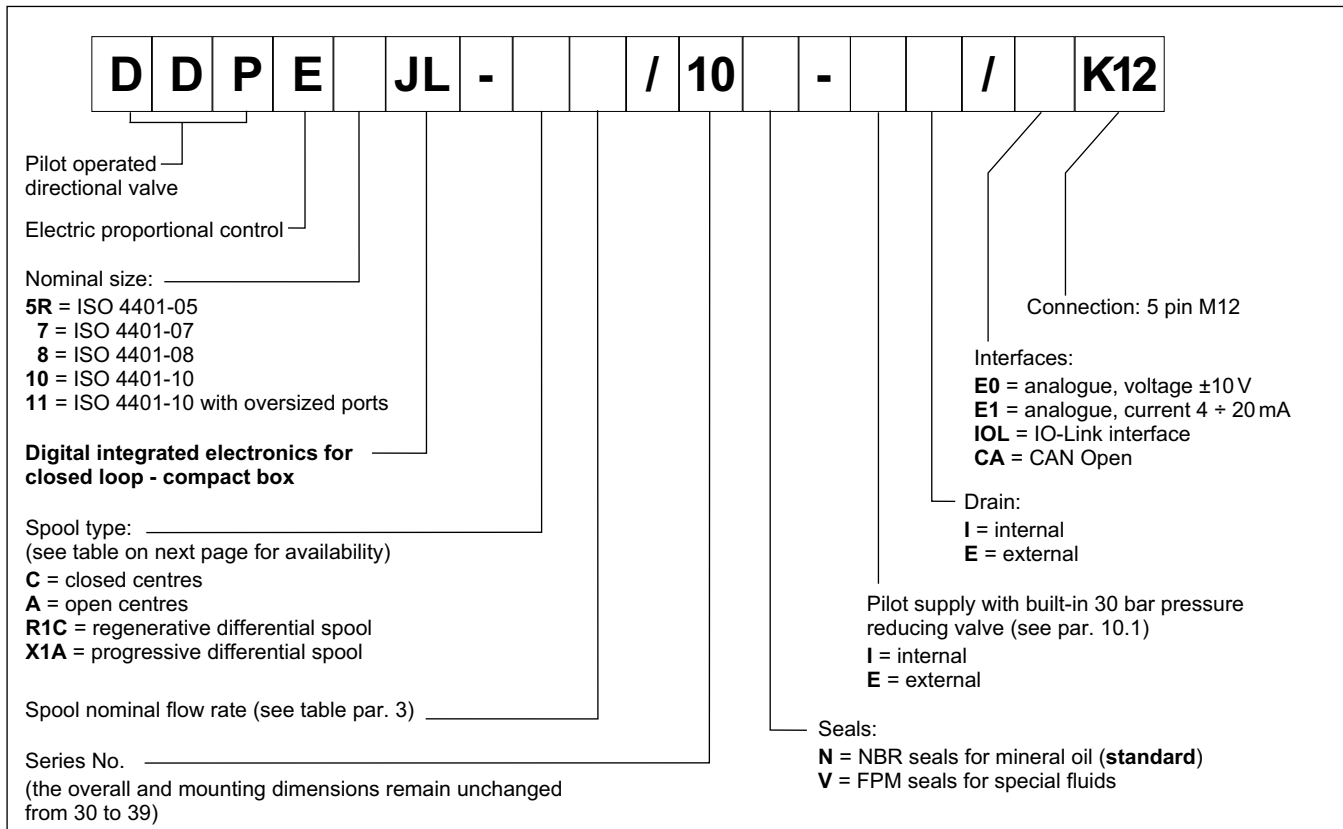
		DDPE5RJ*	DDPE7J*	DDPE8J*	DDPE10J*	DDPE11J*
Max operating pressure: P - A - B ports T port	bar	350 see paragraph 10				
Rated flow at Δp 10 bar	l/min	100	220	400	800	1000
Hysteresis	% Q _{max}	< 0.5%				
Repeatability	% Q _{max}	< ± 0.2%				
Electrical characteristics		see paragraph 4				
Ambient temperature 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	7.2	11.3	16.2	55	55

1 - IDENTIFICATION CODE

1.1 - Standard electronics



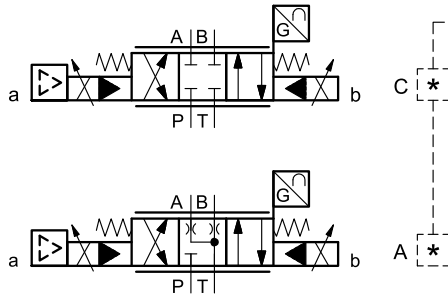
1.2 - Compact electronics



3 - AVAILABLE CONFIGURATIONS

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

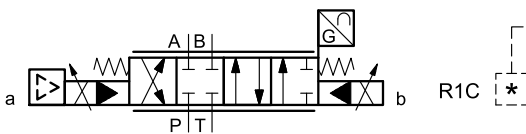
3 positions with spring centring



valve type	*	Nominal flow with Δp 10 bar P-T
DDPE5RJ	100	100 l/min
DDPE7J	120	120 l/min
	220	220 l/min
DDPE8J	250	250 l/min
	400	400 l/min
DDPE10J	800	800 l/min
DDPE11J	1000	1000 l/min

regenerative differential spool

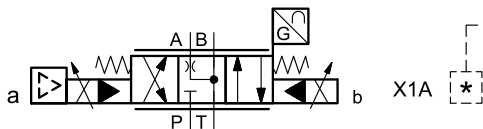
The R1C spool is specific for regenerative circuits made with external check valve.



valve type	*	Nominal flow with Δp 10 bar P-T
DDPE7J	220	220 l/min

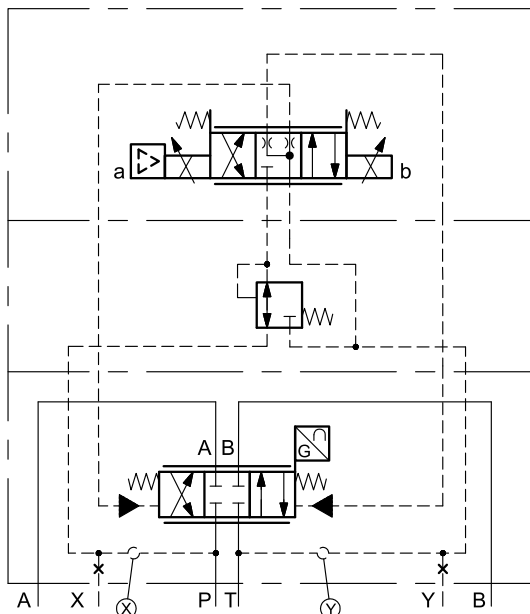
progressive differential spool

The X1A spool is specific for alternate p/Q control, typical of plastic injection cycles.



valve type	*	Nominal flow with Δp 10 bar P-T
DDPE7J	220	220 l/min

detailed symbol (spool type C)



4 - ELECTRONICS COMMON DATA

Duty cycle		100% (continuous operation)
Protection class according to EN 60529		IP65 / IP67
Supply voltage	V DC	24 (from 19 to 30 VDC), 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

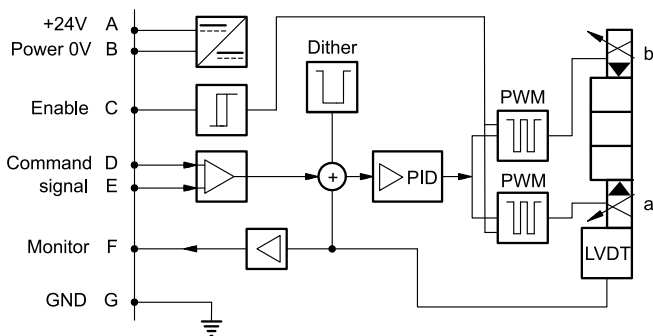
5 - DDPE*J - STANDARD ELECTRONICS

5.1 - Electrical characteristics

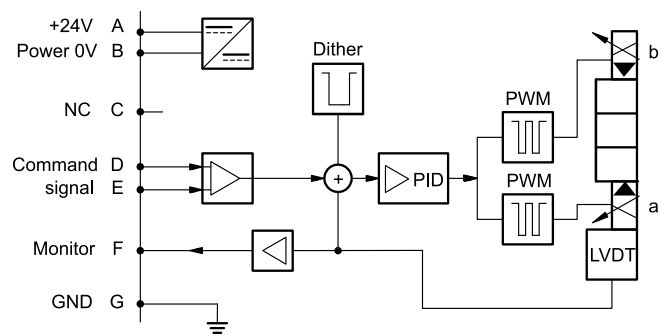
Command signal:	voltage (E0) current (E1)	V DC mA	± 10 (Impedance $R_i = 11\text{ k}\Omega$) $4 \div 20$ (Impedance $R_i = 58\text{ }\Omega$)
Monitor signal (current to solenoid):	voltage (E0) current (E1)	V DC mA	± 10 (Impedance $R_o > 1\text{ k}\Omega$) $4 \div 20$ (Impedance $R_o = 500\text{ }\Omega$)
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

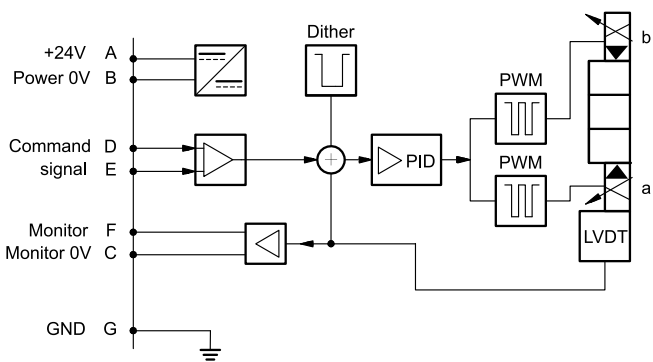
VERSION A - External Enable



VERSION B - Internal Enable

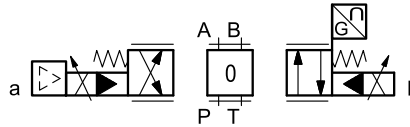


VERSION C - 0V Monitor

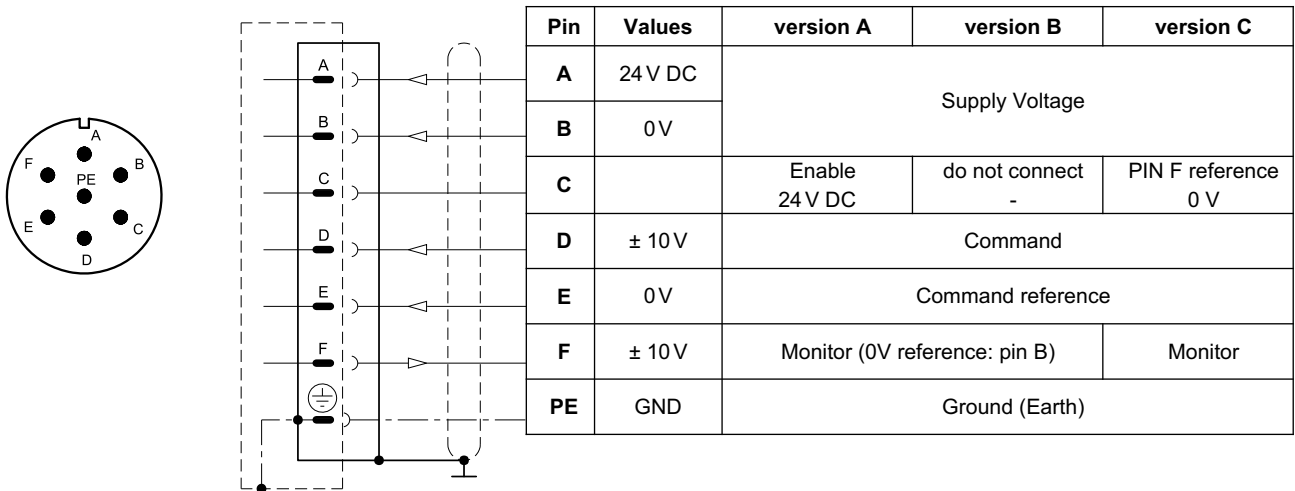


5.3 - Versions with voltage command (E0)

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.



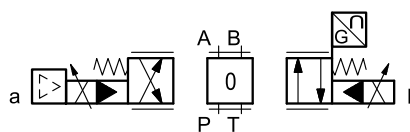
COMMAND	-10V	0V	+10V
MONITOR	-10V	0V	+10V



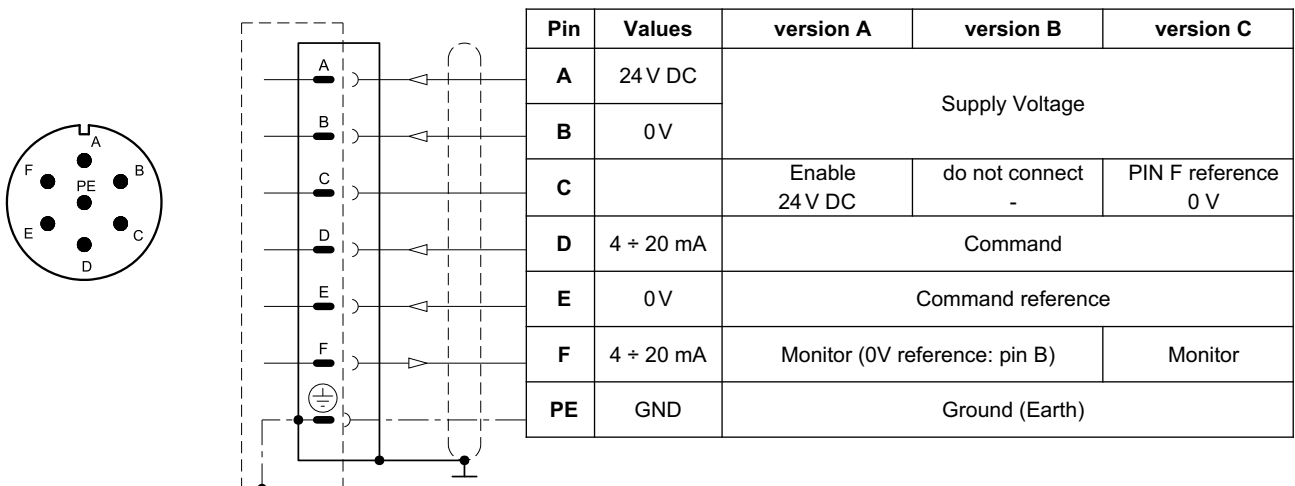
5.4 - Versions with current command (E1)

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



6 - DDPE*JL - COMPACT ELECTRONICS

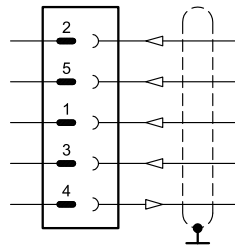
In versions 'IOL' and 'CA' pin 3 and pin 5 are galvanic isolated up to 100 V to avoid earth loops. In IO-Link networks, the length of the connecting cables is limited to 20 metres.

6.1 - Electrical characteristics

Command signal:	voltage (E0) current (E1)	V DC mA	± 10 (Impedance $R_i = 11 \text{ k}\Omega$) $4 \div 20$ (Impedance $R_i = 58 \text{ }\Omega$)
Monitor signal :	voltage (E0) current (E1)	V DC mA	$0 \div 5$ (Impedance $R_o > 1 \text{ k}\Omega$) $4 \div 20$ (Impedance $R_o = 500 \text{ }\Omega$)
IO-Link communication (IOL): Data rate		kBaud	IO-Link Port Class B 230.4
Can Open communication (CA): Data rate		kbit	$10 \div 1000$
Data register (IOL and CA versions only)			solenoid voltage supply, solenoid faults (shortcircuit, bad config, internal), box temperature, switch-on time, vibrations)
Connection			5-pin M12 code A (IEC 61076-2-101)

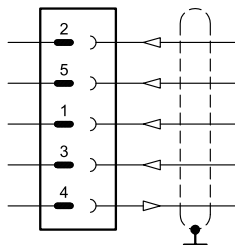
6.2 - Pin tables

'E0' connection



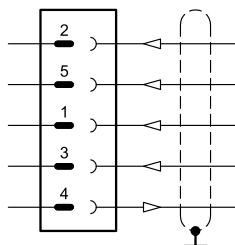
Pin	Values	Function
2	24 V DC	Supply voltage (solenoid and logic)
5	0 V	
1	$\pm 10 \text{ V}$	Command
3	0 V	Command reference
4	$0 \div 5 \text{ V}$	Monitor (0V reference: pin 5)

'E1' connection



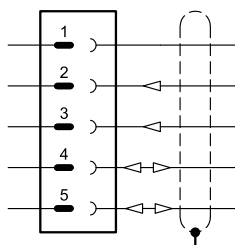
Pin	Values	Function
2	24 V DC	Supply voltage (solenoid and logic)
5	0 V	
1	$4 \div 20 \text{ mA}$	Command
3	0 V	Command reference
4	$4 \div 20 \text{ mA}$	Monitor (0V reference: pin 5)

'IOL' connection



Pin	Values	Function
2	2L+ 24 V DC	Supply of the power stage
5	2L- 0 V (GND)	Internal galvanic isolation from PIN 3
1	1L+ +24 V DC	
3	1L- 0V (GND)	IO-Link supply voltage
4	C/Q	IO-Link Communication

'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 - DDPE*JH - FIELDBUS ELECTRONICS

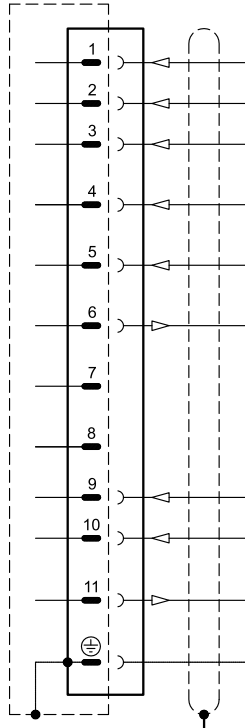
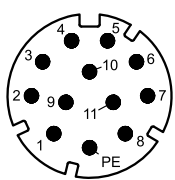
The 11+ PE pin connection allows separate supply voltage for electronics and solenoids.

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

7.1 - Electrical characteristics

Command signal: voltage (E0) current (E1) digital (FD)	V DC mA	± 10 (Impedance $R_i = 11 \text{ k}\Omega$) $4 \div 20$ (Impedance $R_i = 58 \text{ }\Omega$) via fieldbus
Monitor signal (current to solenoid): voltage (E0) current (E1)	V DC mA	± 10 (Impedance $R_o > 1 \text{ k}\Omega$) $4 \div 20$ (Impedance $R_o = 500 \text{ }\Omega$)
Communication / diagnostic		via Bus register
Communication interface standards CAN Open PROFIBUS DP EtherCAT, Ethernet /IP, Profinet, PowerLink		EN 50325-4 + DS408 EN 50170-2 / IEC 61158 IEC 61158
Communication physical layer CAN Open PROFIBUS DP EtherCAT, Ethernet /IP, Profinet, PowerLink		optical insulated CAN ISO 11898 optical insulated RS485 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	24V DC	Main supply voltage
2	0V	
3	24V DC	Enable
4	$\pm 10 \text{ V}$ (E0) $4 \div 20$ (E1)	Command
5	0V	Command reference signal
6	$\pm 10 \text{ V}$ (E0) $4 \div 20$ (E1)	Monitor (0V reference pin 10)
7	NC	do not connect
8	NC	do not connect
9	24V DC	Logic and control supply
10	0V	
11	24V DC	Fault (0V DC) or normal working (24V DC) (0V reference pin 2)
12	GND	Ground (Earth)

D0: full digital

Pin	Values	Function
1	24V DC	Main supply voltage
2	0V	
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	24V DC	Logic and control supply
10	0V	
11	24V 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 relative standards communication protocol.

7.3.1 - Communication connection CA (CAN Open)

X2 (IN) connection: M12 A 5 pin female



Pin	Values	Function
1	CAN_SH	Shield
2	NC	Do not connect
3	GND	Signal zero for data line
4	CAN_H	Bus line (high)
5	CAN_L	Bus line (low)

X3 (OUT) connection: M12 A 5 pin male



Pin	Values	Function
1	CAN_SH	Shield
2	NC	Do not connect
3	GND	Signal zero for data line
4	CAN_H	Bus line (high)
5	CAN_L	Bus line (low)

7.3.2 - Communication connection PD (PROFIBUS DP)

X2 (IN) connection: M12 B 5 pin male (IN)



Pin	Values	Function
1	+5V	Termination signal supply
2	PB_A	Bus line (high)
3	0V	Signal zero for data line and termination
4	PB_B	Bus line (low)
5	SHIELD	

X3 (OUT) connection: M12 B 5 pin female



Pin	Values	Function
1	+5V	Termination signal supply
2	PB_A	Bus line (high)
3	0V	Signal zero for data line and termination
4	PB_B	Bus line (low)
5	SHIELD	

7.3.3 - Communication connections: EC (EtherCat), EN (Ethernet/IP), PN (PROFINET), PL (POWERLINK)

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



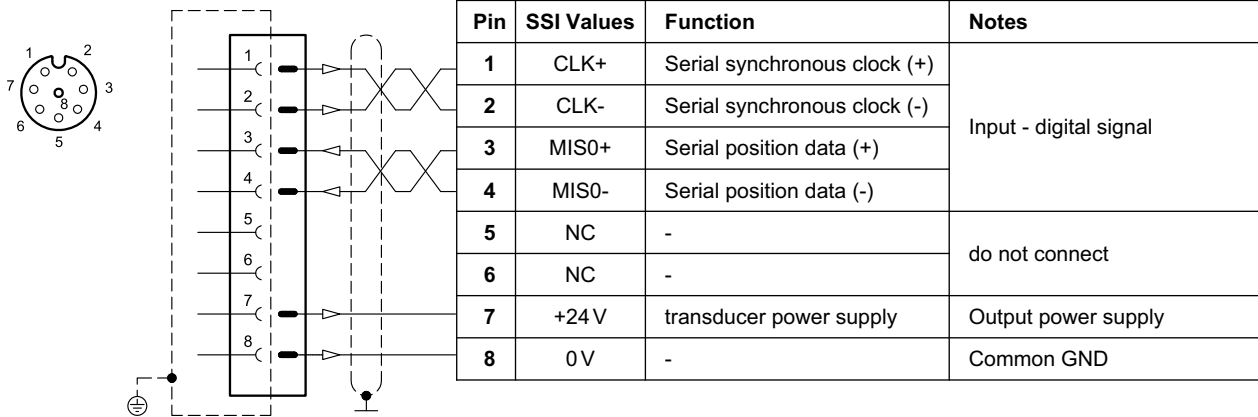
Pin	Values	Function
1	TX+	Transmitter
2	RX+	Receiver
3	TX-	Transmitter
4	RX-	Receiver
HOUSING	shield	

NOTE: Shield connection on connector housing is recommended.

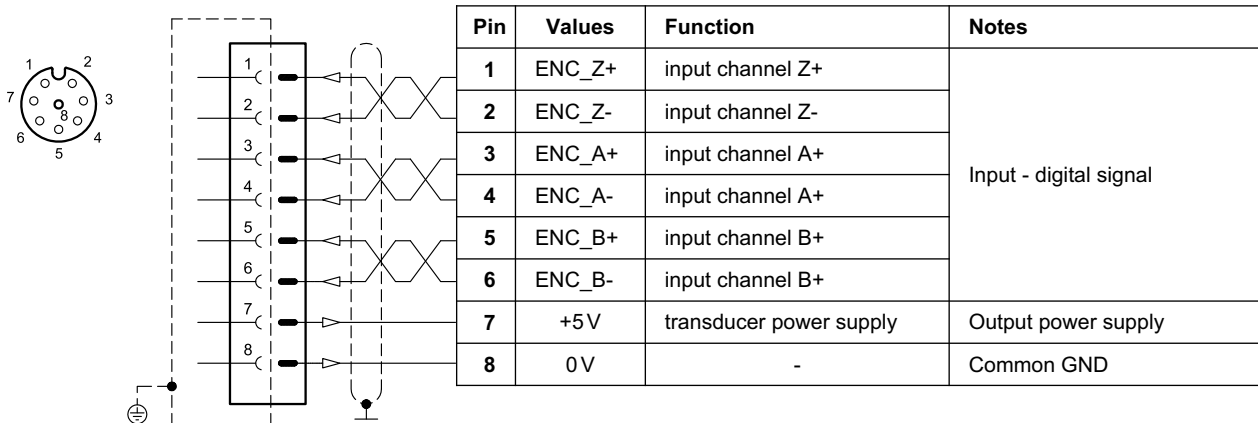
7.4 - Digital transducer connection

X7 connection: M12 A 8 pin female

VERSION 1: SSI type



VERSION 2: ENCODER type

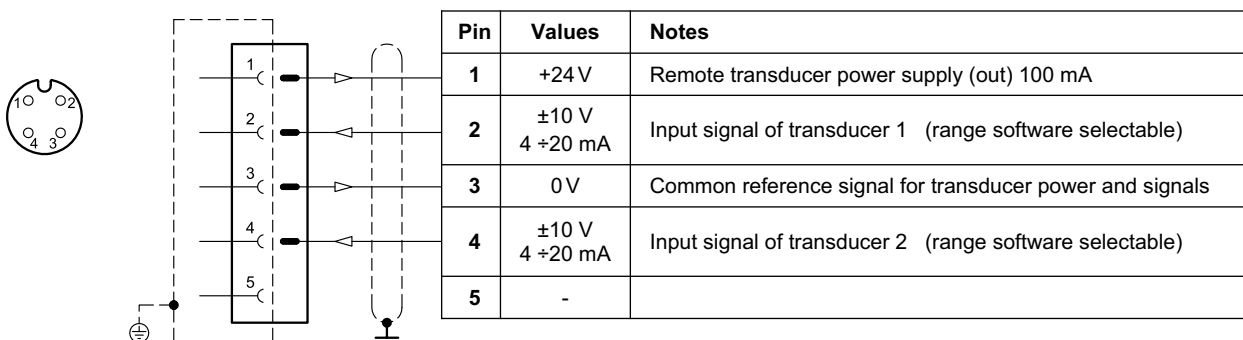


7.5 - Analogue transducer connection

X4 connection: M12 A 4 pin female

VERSION 1: single / double transducer

(single or double is a software-selectable option)



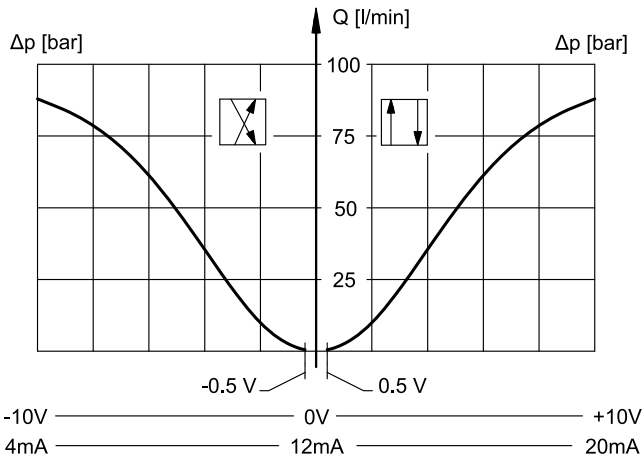
8 - CHARACTERISTIC CURVES

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

Typical flow rate curves at constant Δp related to the reference signal and measured for the available spools.
The Δp values are measured per land: $\Delta p = 5 \text{ bar}$ ($\Delta p P \rightarrow T = 10 \text{ bar}$).

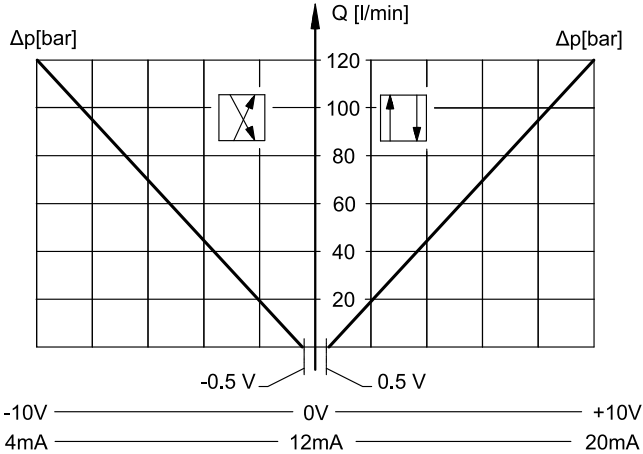
8.1 - Characteristic curves DDPE5RJ *

SPOOL C100 / A100

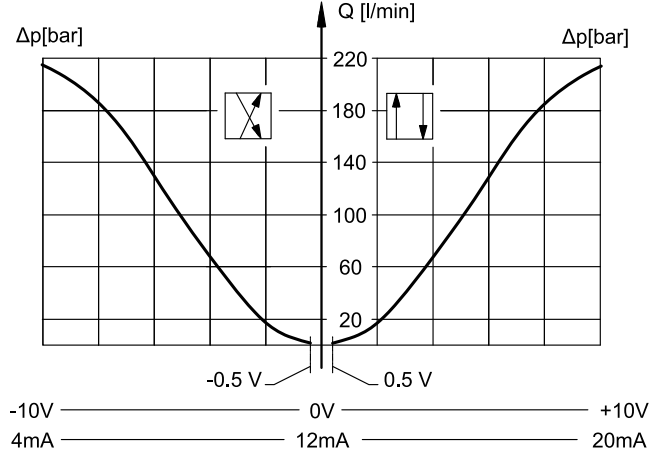


8.2 - Characteristic curves DDPE7J*

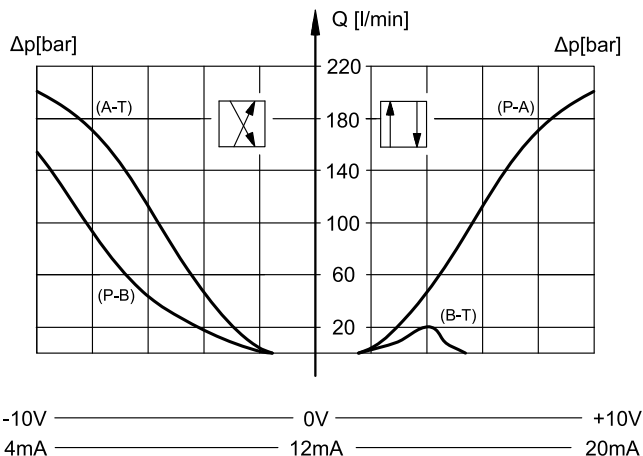
SPOOL C120 / A120



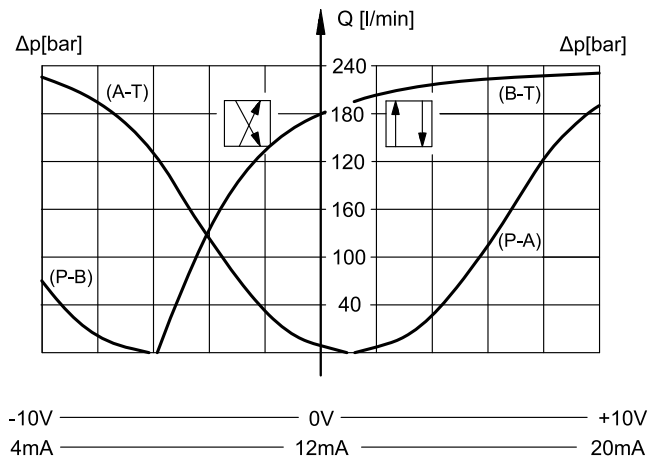
SPOOL C220 / A220



SPOOL R1C220

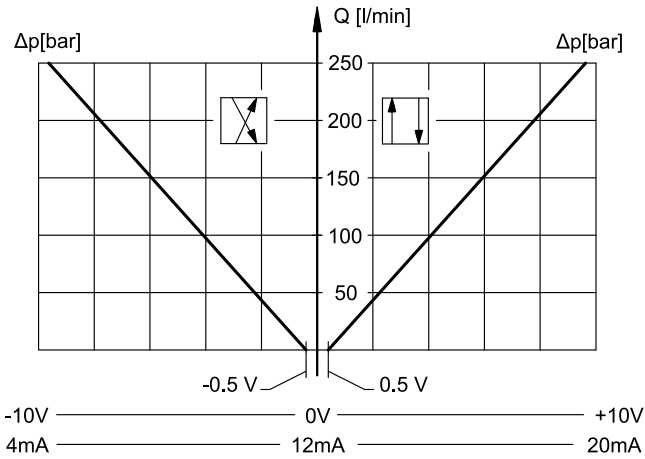


SPOOL X1A220

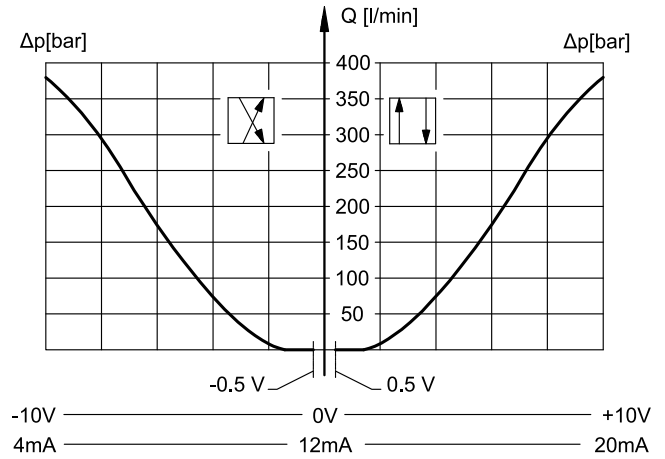


8.3 - Characteristic curves DDPE8J*

SPOOL C250 / A250

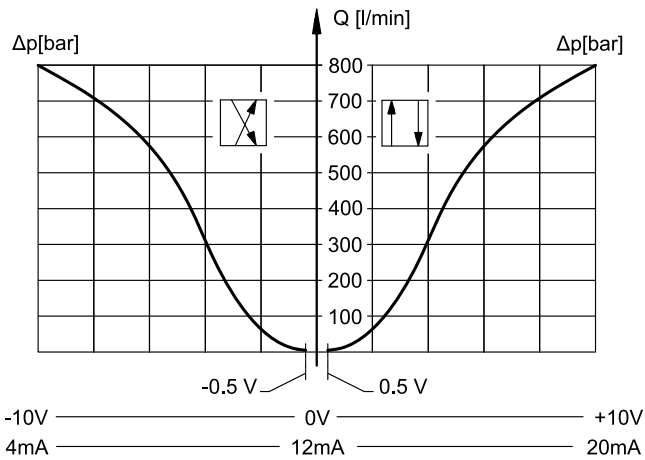


SPOOL C400 / A400



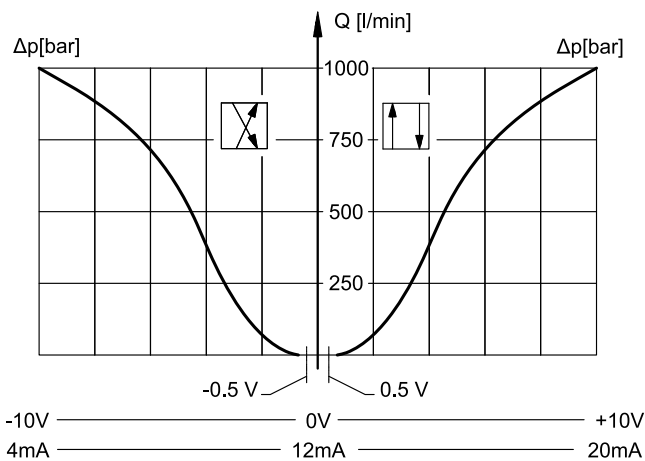
8.4 - Characteristic curves DDPE10J*

SPOOL C800 / A800



8.5 - Characteristic curves DDPE11J*

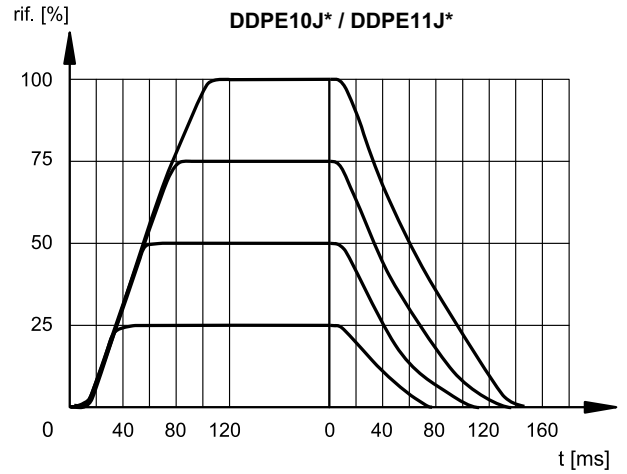
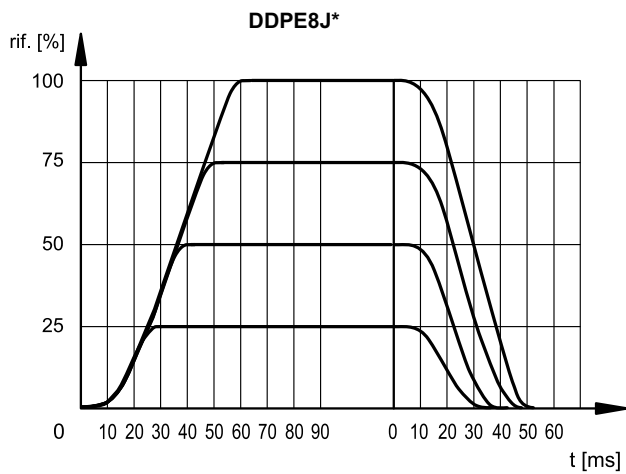
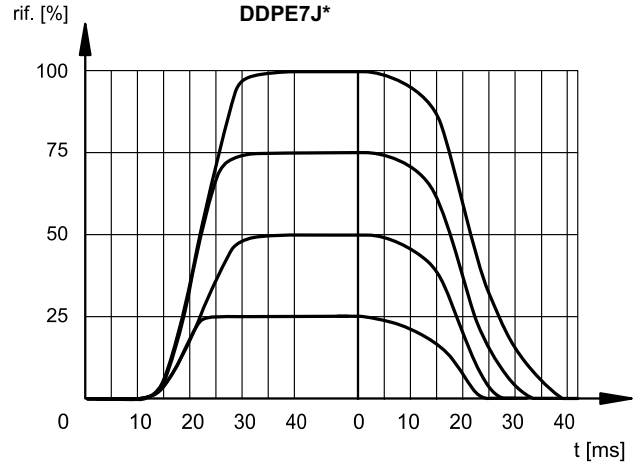
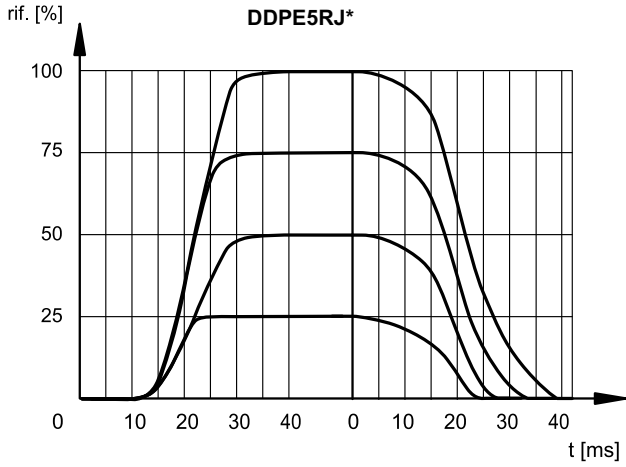
SPOOL C1000 / A1000





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)

		DDPE5RJ*	DDPE7J*	DDPE8J*	DDPE10J*	DDPE11J*
Max flow rate	l/min	180	450	900	1600	3500
Piloting flow requested with operation 0 → 100%	l/min	7	13	28	35	35
Piloting volume requested with operation 0 → 100%	cm ³	1.7	3.2	10	22	22

10.1 - Pilot supply and drain

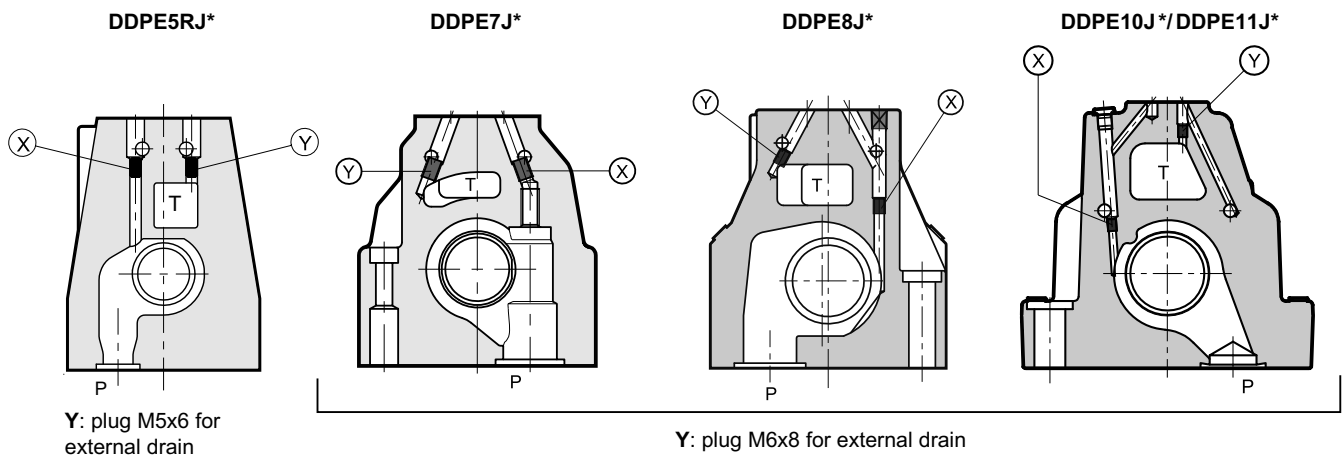
The DDPE*J* valves are available with internal or external pilot supply and are always equipped with a 30 bar pressure reducing valve. Drain can be internal or external. The version with external drain allows a higher back pressure on the T line.

PRESSURES (bar)

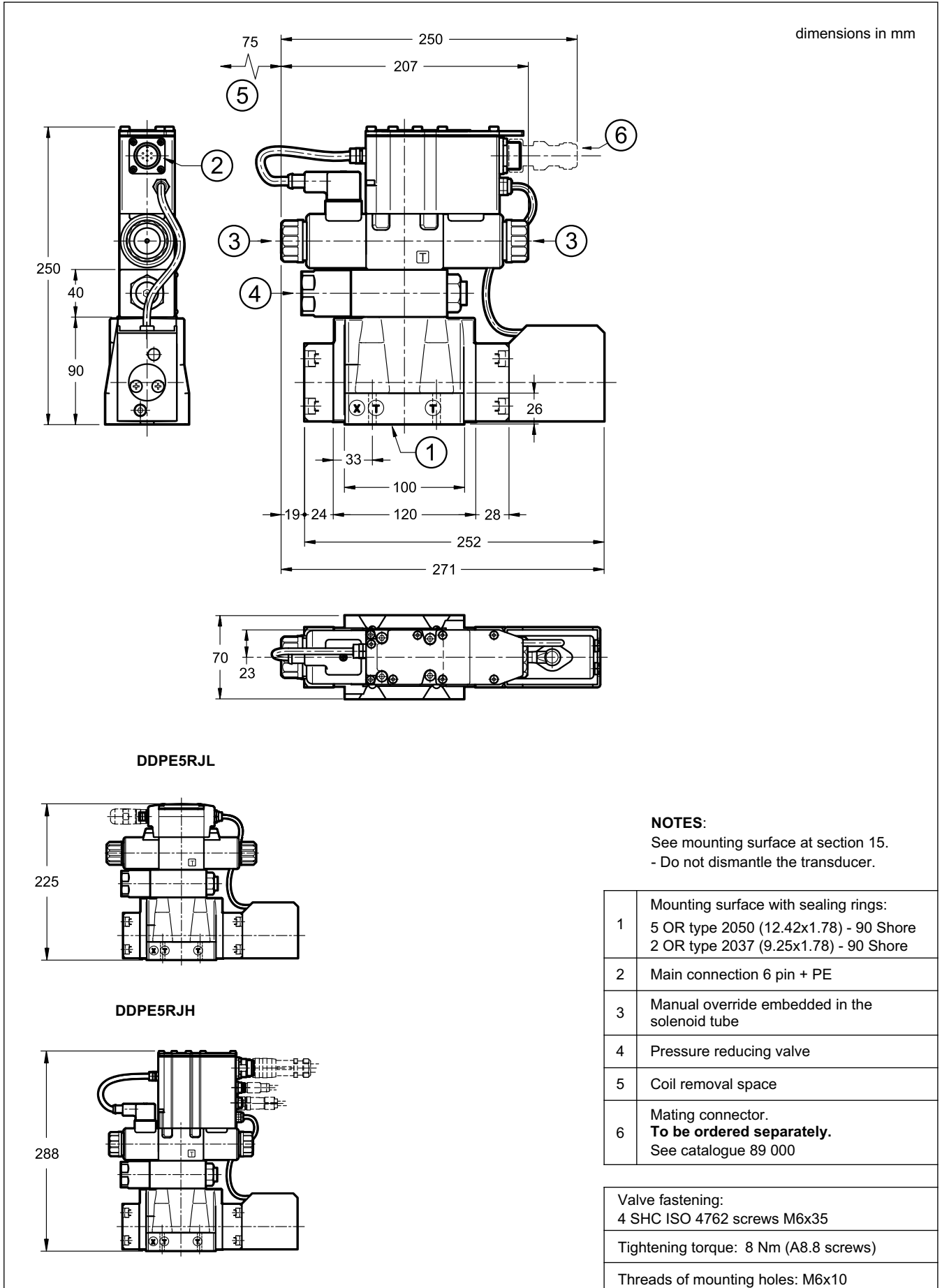
Pressure	MIN	MAX
Pilot pressure on X port	30 (NOTE)	350
Pressure on T port with internal drain	-	10
Pressure on T port with external drain	-	250

NOTE: The valve works well also with inlet pressure, starting from 10 bar. Low pressure affects response times, that will be slower.

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

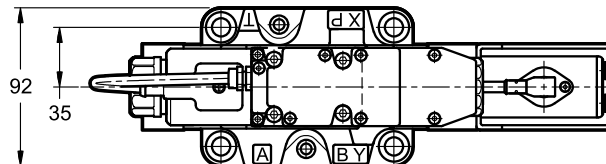
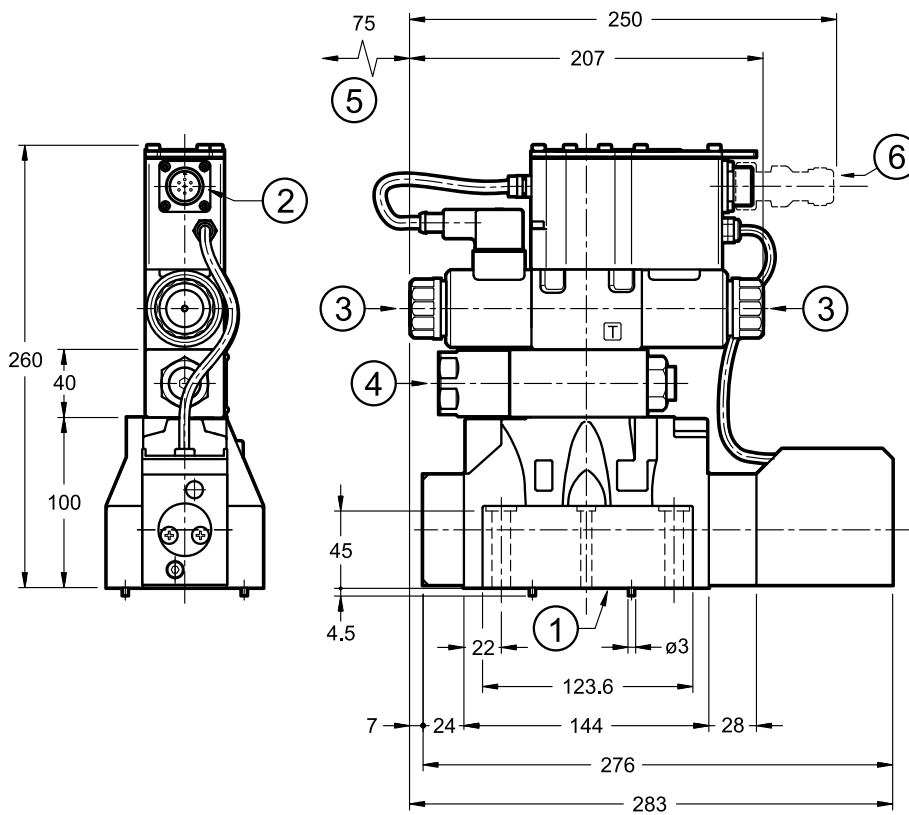


11 - OVERALL AND MOUNTING DIMENSIONS DDPE5RJ

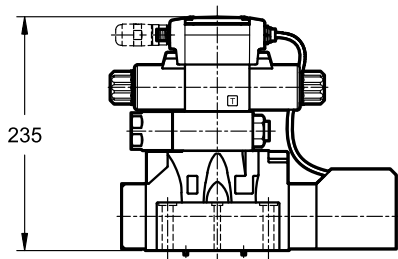


12 - OVERALL AND MOUNTING DIMENSIONS DDPE7J

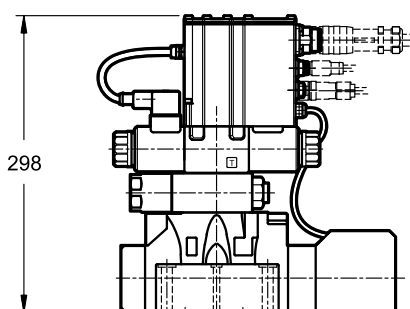
dimensions in mm



DDPE7JL



DDPE7JH



NOTES:

See mounting surface at section 15.
- Do not dismantle the transducer.

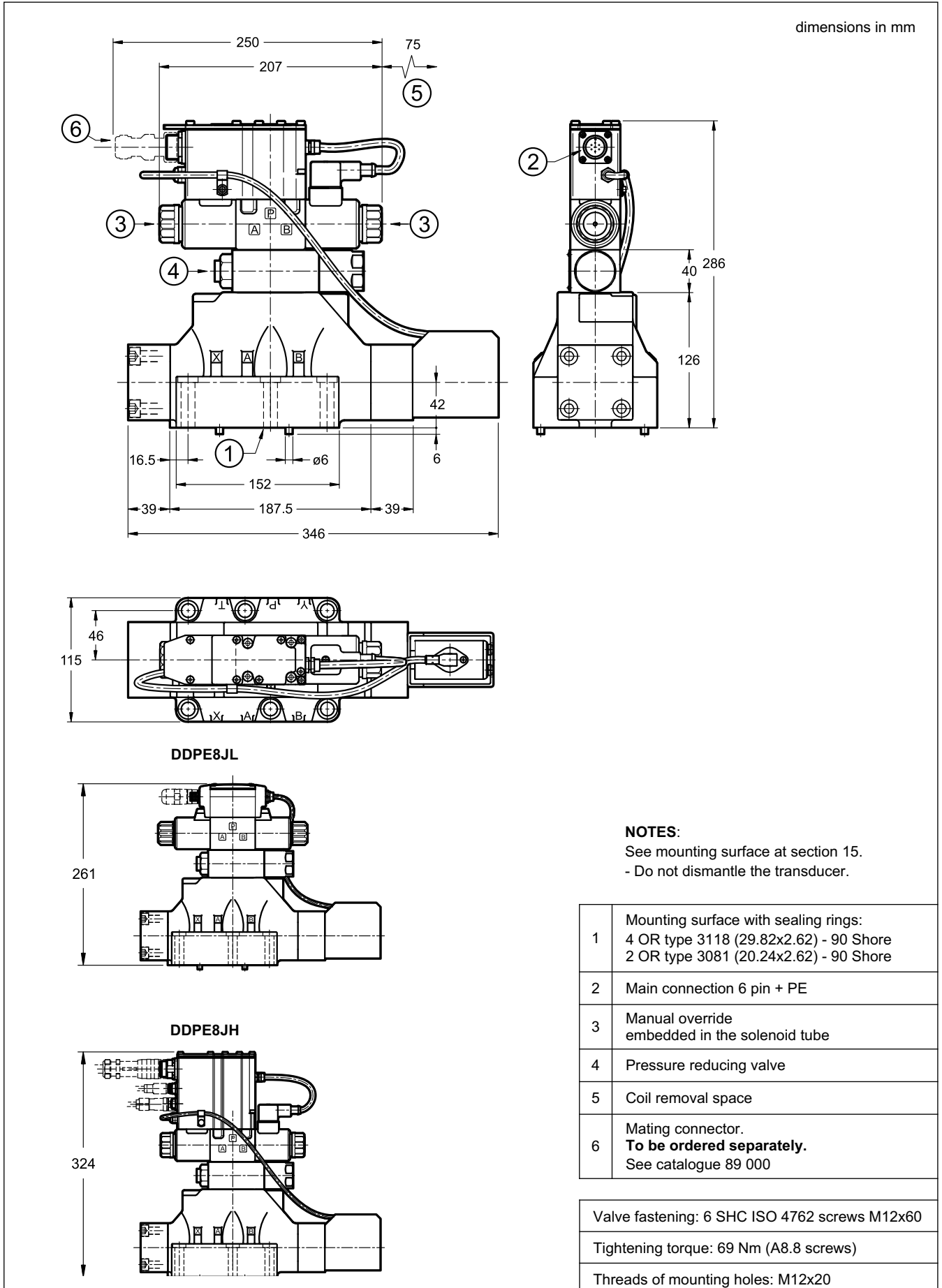
1	Mounting surface with sealing rings: 4 OR type 130 (22.22x2.62) - 90 Shore 2 OR type 2043 (10.82x1.78) - 90 Shore
2	Main connection 6 pin + PE
3	Manual override embedded in the solenoid tube
4	Pressure reducing valve
5	Coil removal space
6	Mating connector. To be ordered separately. See catalogue 89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

Valve fastening: 4 SHC screws ISO 4762 M10x60
2 SHC screws ISO 4762 M6x60

Tightening torque: M10x60: 40 Nm (A8.8 screws)
M6x60: 8 Nm (A8.8 screws)

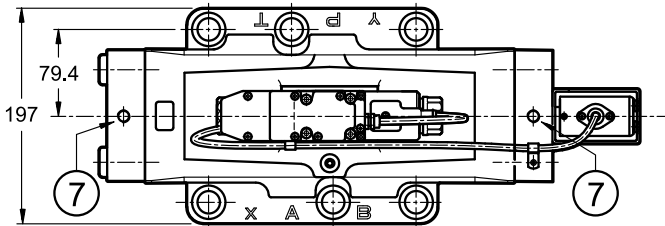
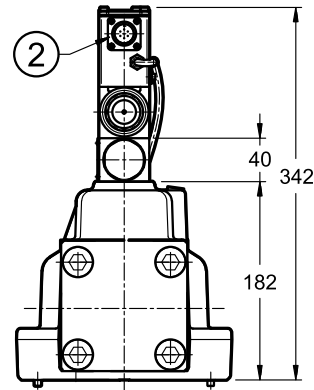
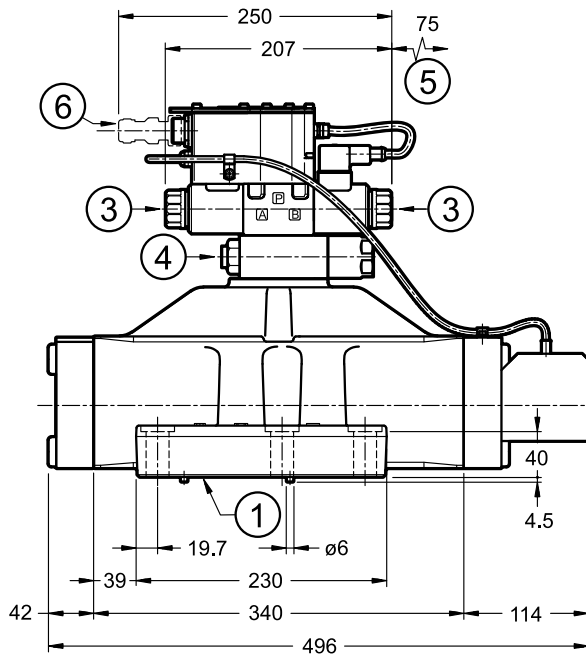
Threads of mounting holes: M6x18; M10x18

13 - OVERALL AND MOUNTING DIMENSIONS DDPE8J



14 - OVERALL AND MOUNTING DIMENSIONS DDPE10J / DDPE11J

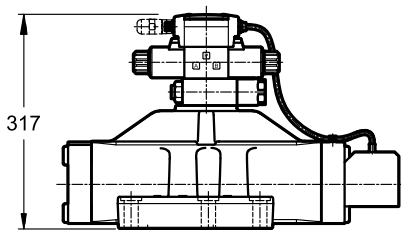
dimensions in mm



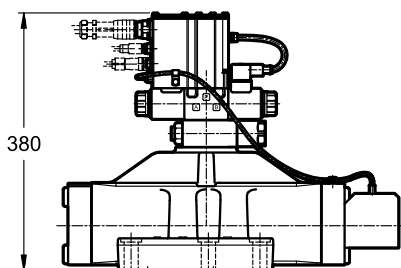
NOTES:

- See mounting surface at section 15.
- Do not dismantle the transducer.

DDPE10JL



DDPE10JH



1	Mounting surface with sealing rings: DDPE10J* 4 OR type 4150 (37.59x3.53) - 90 Shore 2 OR type 3081 (20.24x2.62) - 90 Shore DDPE11J* 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	Pressure reducing valve
5	Coil removal space
6	Mating connector. To be ordered separately. See catalogue 89 000
7	M12 eyebolt seat for safe lift

Valve fastening:
6 SHC screws ISO 4762 M20x70

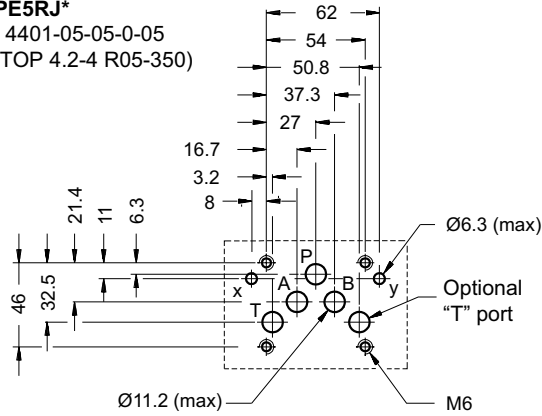
Tightening torque: 330 Nm (A8.8 screws)

Threads of mounting holes: M20x40

15 - MOUNTING SURFACES

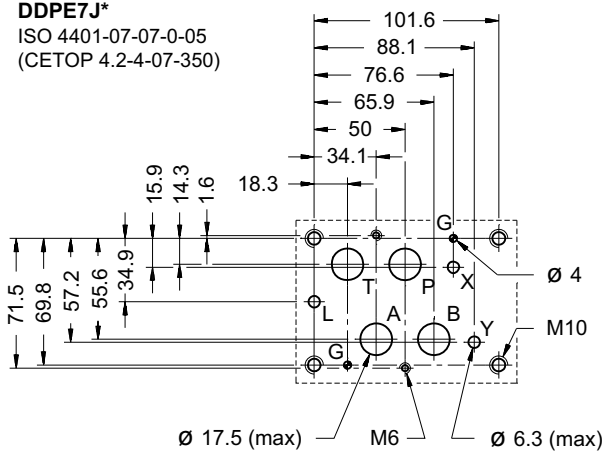
DDPE5RJ*

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



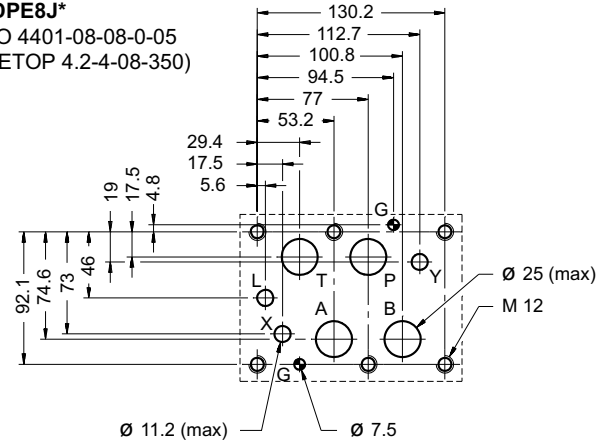
DDPE7J*

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



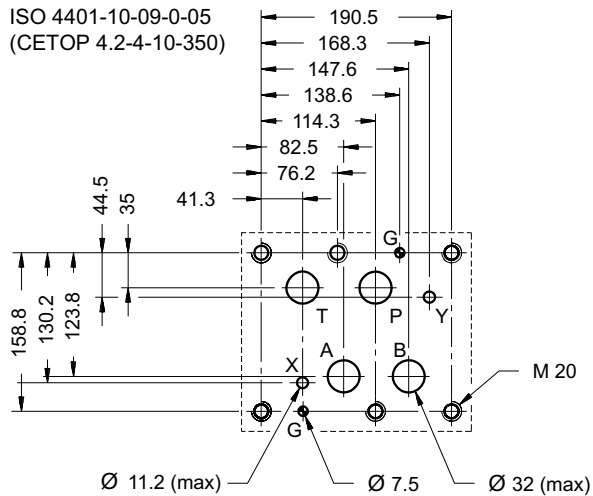
DDPE8J*

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



DDPE10J*

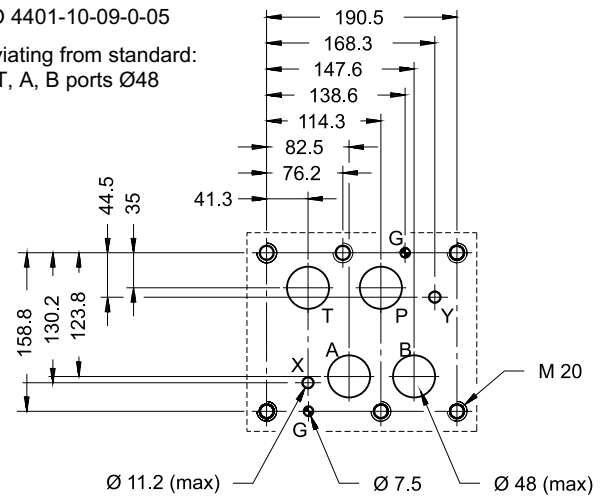
ISO 4401-10-09-0-05
(CETOP 4.2-4-10-350)



DDPE11J*

ISO 4401-10-09-0-05

deviating from standard:
P, T, A, B ports Ø48



16 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals (code N). For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics.

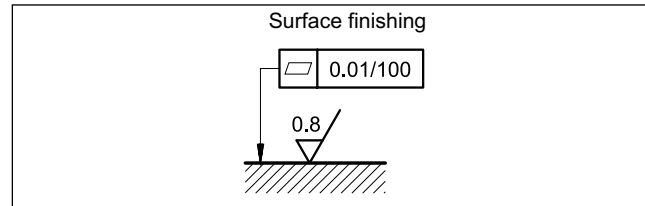
The fluid must be preserved in its physical and chemical characteristics.

17 - 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.



18 - ACCESSORIES

(to be ordered separately)

18.1 - 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.

18.2 - Mating connectors for fieldbus communication and for sensors.

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

18.3 - 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 mm²
- up to 40 m cable length : 1,5 mm² (IO-Link excluded)

Cross section for signals (command, monitor):

- 0,50 mm²

18.4 - 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.

19 - SUBPLATES

(see catalogue 51 000)

No subplates are available for DDPE5RJ*, DDPE10J* and DDPE11J*.

	DDPE7J*	DDPE8J*
Type with rear ports	PME07-AI6G	-
Type with side ports	PME07-AL6G	PME5-AL8G
P, T, A, B ports dimensions	1" BSP	1 1/2" BSP
X, Y ports dimensions	1/4" BSP	1/4" BSP