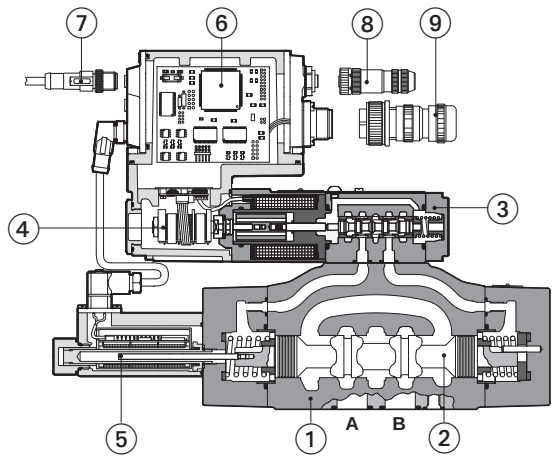
Two stage HP proportional directional valves

High Performance with two position transducers and positive spool overlap



DPZO-LES-BP-271

① Valve body
② Main stage Spool
③ Pilot valve
④ Pilot valve position transducer
⑤ Main stage position transducer
⑥ Integral electronics
⑦ USB connector
⑧ Fieldbus connectors
⑨ Main connector

DPZO-L*

Two stage high performance proportional valves with two position transducers and positive spool overlap for best accuracy and dynamics in directional controls and not compensated flow regulations.

They are specifically designed to achieve high speed closed loop controls and to implement alternated Pressure (Force) /Flow controls - options /S* coupled with spools 'Q' or 'V'.

The 4-way spool ②, sliding into a 5-chambers body ①, is controlled in double closed loop position by the DLHZO servoproportional valve ③ (see table F180) and LVDT position transducers ④ and ⑤.

The electronic driver supplies the servoproportional valve with proper current to align valve regulation to the reference signal, the integral execution ⑥ has rugged construction and grants factory presetting for valve-to-valve interchangeability.

Size: **10** to **35**
Max flow: **180** to **3500 l/min**
Max pressure: **350 bar**

1 **MODEL CODE for STANDARD SPOOLS**

DPZO	-	LES	-	NP	-	2	71	-	L	5	/	*	/	*	/	*

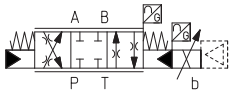
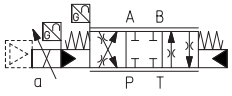
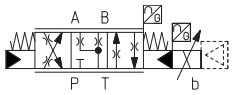
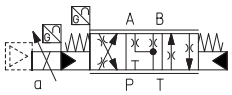
DPZO
Two stage proportional directional valve

L = without integral electronics
LE = with integral analog electronics
LES = with integral digital electronics

Fieldbus interfaces for LES:
USB interface always present
NP= Not present **BP** = PROFIBUS DP
BC= CANopen **EH** = EtherCAT

Valve size ISO 4401:
1 = 10 **2** = 16 **4** = 25
4M = 27 **6** = 32 **8** = 35

Configuration:

	Standard	Option **/B**
71 =		
73 =		

Spool type - regulating characteristics:

L =  linear

DL =  differential-linear
P-A = Q, B-T = Q/2
P-B = Q/2, A-T = Q

S =  progressive

D =  differential-progressive
P-A = Q, B-T = Q/2
P-B = Q/2, A-T = Q

Hydraulic options, see section 3:
B = solenoid, integral electronics and position transducer at side of port B of the main stage
D = internal drain
E = external pilot (through port X)
G= pressure reducing valve for piloting - standard for size 10

Electronic options, see sections 10, 12
F = fault signal
I = current reference input and monitor (4÷20 mA)
Q= enable signal
Z = **for LE execution**
enable, fault and monitor signal (12 pin connector)
Z = **for LES execution**
double power supply, enable, fault and monitor signals (12 pin connector)

Options for LES execution
SP, SF, SL = additional closed loop pressure/force control coupled with spools Q or V, see section 12 and table G212
C = current feedback for pressure transducer(s) for options /SP, /SF, /SL

Seals material, see sect. 5, 6:
- = NBR
PE = FKM
BT = HNBR (only for LES)

Series number

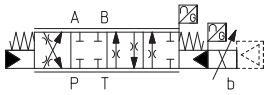
Spool size	**3** (L,S,D)	**5** (L,DL,S,D)	**5** (L,S,D)
DPZO-1 =	-	100	-
DPZO-2 =	160	250	-
DPZO-4 =	-	480	-
DPZO-4M =	-	550	-
DPZO-6 =	-	-	640
DPZO-8 =	-	-	1200

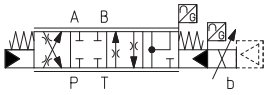
Nominal flow (l/min) at Δp 10bar P-T

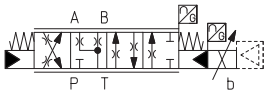
2 MODEL CODE for SPECIAL SPOOLS - refer to section 1 for valve model code and options

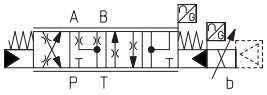
DPZO	-	LES	-	NP	-	2	71 - L9	/	*	/	*	/	*

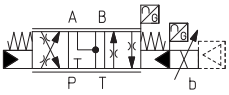
Configuration, spool type and size:

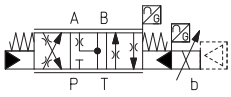
71-D9 

71-L9 

73-D9 

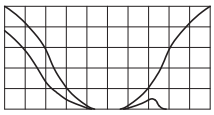
73-L9 

73-Q5 

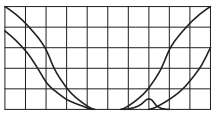
73-V9 

Spool size		D9	L9	V9	Q5
DPZO-1	=	100	-	100	100
DPZO-2	=	250	250	250	250
DPZO-4	=	480	-	480	480
DPZO-4M	=	500	-	550	550
DPZO-6	=	-	-	640	-
DPZO-8	=	-	-	1200	-

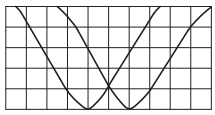
Nominal flow (l/min) at Δp 10bar P-T

D9 

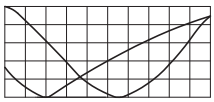
For regenerative circuit (additional external check valve required)
see section 8, diagram 26

L9 

For regenerative circuit internal to the valve
see section 8, diagram 27

Q5 

For alternate P/Q control
see section 8, diagram 28

V9 

For alternate P/Q control of injection cycle in plastic machinery
see section 8, diagram 29

3 HYDRAULIC OPTIONS

3.1 Option /B

Solenoid, integral electronics and position transducer at side of port B of the main stage.
For hydraulic configuration vs reference signal, see section 8.1

3.2 Option /G

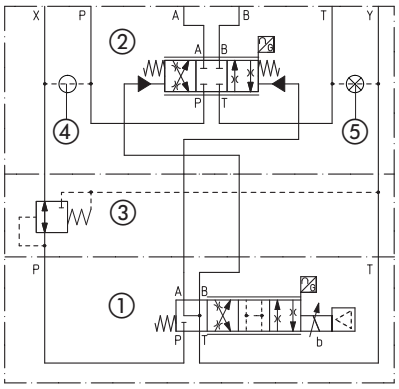
Pressure reducing valve ③ with fixed setting, installed between pilot valve and main body. Reduced pressure setting:
40 bar for DPZO-1 and DPZO-2
100 bar for DPZO-4(M), DPZO-6 and DPZO-8
It is advisable for valves with internal pilot in case of system pressure higher than 200 bar.

Pressure reducing valve ③ is standard for DPZO-1, for other sizes add /G option.

3.3 Pilot and drain configuration

The pilot / drain configuration can be modified as shown in the functional scheme here aside (for detailed view of plugs position, see table E085). The valve's standard configuration provides internal pilot and external drain.
For different pilot / drain configuration select:
Option /E External pilot (through port X)
Option /D Internal drain (through port T)

FUNCTIONAL SCHEME
example of configuration 71



① Pilot valve
② Main stage
③ Pressure reducing valve
④ Plug to be added for external pilot trough port X
SP-X300F for DPZO-1 and -2;
SP-X500F for DPZO-4(M);
DIN 908 M16x1,5 for DPZO-6
1/8" NPTF for DPZO-8
⑤ Plug to be removed for internal drain through port T

See technical table E085 section 10 for plugs positions

4 GENERAL NOTES

DPZO-L* proportional valves are CE marked according to the applicable Directives (e.g. Immunity/Emission EMC Directive and Low Voltage Directive). Installation, wirings and start-up procedures must be performed according to the general prescriptions shown in table F003 and in the installation notes supplied with relevant components. The electrical signals of the valve (e.g. monitor signals) must not be directly used to activate safety functions, like to switch-ON/OFF the machine's safety components, as prescribed by the European standards (Safety requirements of fluid technology systems and components-hydraulics, EN-982).

WARNING
To avoid overheating and possible damage of the electronic driver, the valves must be never energized without hydraulic supply to the pilot stage. In case of prolonged pauses of the valve operation during the machine cycle, it is always advisable to disable the driver (for -LE and -LES valves with option /Q or /Z)
A safety fuse 2,5 A installed on 24VDC power supply of each valve is always recommended for valves -LE and -LES, see also Power supply note at sections 10 and 12

5 MAIN CHARACTERISTICS

Assembly position	Any position
Subplate surface finishing	Roughness index, Ra 0,4 flatness ratio 0,01/100 (ISO 1101)
MTTFd valves according to EN ISO 13849	150 years, see technical table P007
Ambient temperature range	-L execution = -20°C ÷ +70°C -LE and -LES executions = -20°C ÷ +60°C /BT option only for -LES executions = -40°C ÷ +60°C
Storage temperature range	Standard execution = -20°C ÷ +70°C /BT option only for -LES execution = -40°C ÷ +70°C
Coil resistance R at 20°C	3 ÷ 3,3 Ω
Max. solenoid current	2,6 A
Max. power	-L execution = 35 Watt -LE and -LES executions = 50 Watt
Insulation class	H (180°) Due to the occuring surface temperatures of the solenoid coils, the European standards ISO 13732-1 and EN982 must be taken into account
Protection degree to DIN EN60529	-L execution = IP65 -LE execution = IP67 -LES execution = IP66/67
Duty factor	Continuous rating (ED=100%)
EMC, climate and mechanical load	See technical table G004

Valve model		**DPZO-L*-1**	**DPZO-L*-2**	**DPZO-L*-4**	**DPZO-L*-4M**	**DPZO-L*-6**	**DPZO-L*-8**
Pressure limits	[bar]	ports **P, A, B, X** = 350; **T** = 250 (10 for option /D); **Y** = 10;					
Spool type		**L5, DL5, S5, D5**	**L3, S3, D3**	**L5, DL5, S5, D5**		**L5, S5, D5**	
Nominal flow **(1)**	[l/min]						
	p= 10 bar	100	160	250	480	550	640	1200
	p= 30 bar	160	270	430	830	950	1100	2000
Max flow	[l/min]	180	400	550	1000	1100	1600	3500
Piloting pressure	[bar]	min. = 25; max = 350 (option /G advisable for pilot pressure > 200 bar)					
Piloting volume	[cm³]	1,4	3,7	9,0	11,3	21,6	39,8
Piloting flow **(2)**	[l/min]	1,7	3,7	6,8	8	14,4	20
Leakage **(3)**	Pilot [cm³]	100/300	100/300	200/500	200/600	900/2800	900/2800
	Main stage [l/min]	0,15/0,5	0,2/0,6	0,3/1,0	0,3/1,0	1,0/3,0	1,2/3,6
Response time **(4)** (0-100% step signal)	[ms]	< 50	< 60	< 80	< 85	< 90	< 120
Hysteresis	[%]	≤ 0,1%					
Repeatability		± 0,1%					
Thermal drift		zero point displacement < 1% at ΔT = 40°C					

Notes: • above performance data refer to valves coupled with Atos electronic drivers, see section 7.
• in case of long interruption of the hydraulic supply to the pilot valve, the driver has to be switched off to avoid its overheating.
(1) for different p, the max flow is in accordance to the diagrams in section 8.2
(2) with step reference input signal 0 ÷100 %
(3) at p = 100/350 bar
(4) see detailed diagrams in section 8.3

6 SEALS AND HYDRAULIC FLUID

Seals, recommended fluid temperature	NBR seals = -20°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals = -20°C ÷ +80°C HNBR seals = -40°C ÷ +60°C, with HFC hydraulic fluids = -40°C ÷ +50°C
Recommended viscosity	20÷100 mm²/s - max allowed range 15 ÷ 380 mm²/s
Fluid contamination class	ISO 4406 class 20/18/15 NAS 1638 class 9, in line filters of 10 μm (β10 ≥75 recommended)

Hydraulic fluid	**Suitable seals type**	**Classification**	**Ref. Standard**
Mineral oils	NBR, FKM, HNBR	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFDU, HFDR	ISO 12922
Flame resistant with water	NBR, HNBR	HFC	

Note: For other fluids not included in above table, consult our technical office

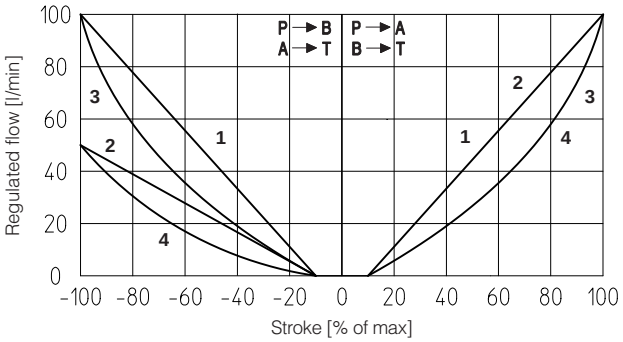
7 ELECTRONIC DRIVERS

Valve model	**DPZO-L**	**DPZO-LE**	**DPZO-LES**	**DPZO-LES / SP, SL, SF**
Drivers model	E-ME-L	E-RI-LE	E-RI-LES	E-RI-LES /S*
Type	Analog		Digital	
Format	Eurocard	Integral to valve		
Data sheet	G150	G200	G210	G212

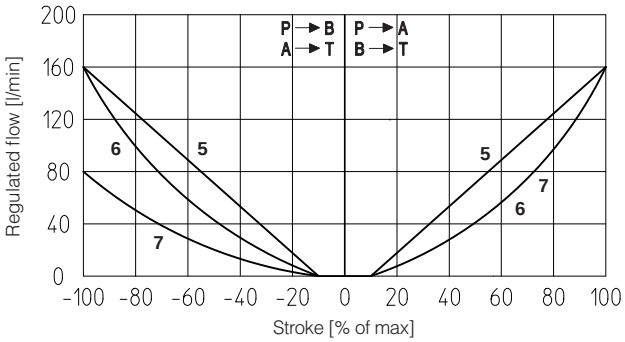
Note: For main and communication connectors see sections 15, 16

8 DIAGRAMS (based on mineral oil ISO VG 46 at 50 °C)

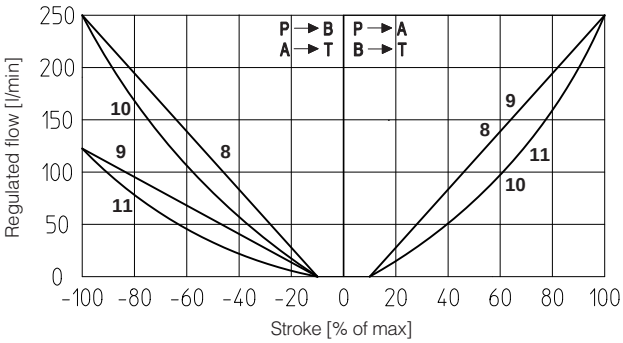
8.1 Regulation diagrams (values measure at p 10 bar P-T)



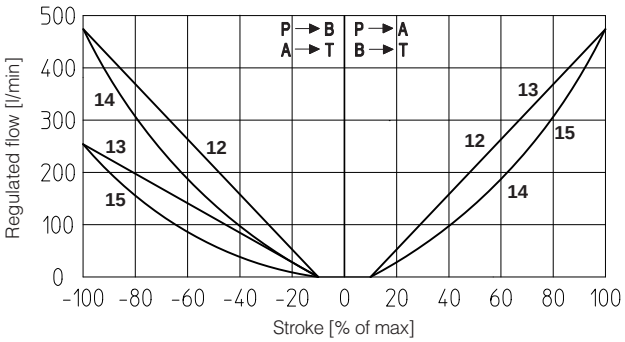
DPZO-1:
1=L5 **2** = DL5
3=S5 **4** = D5



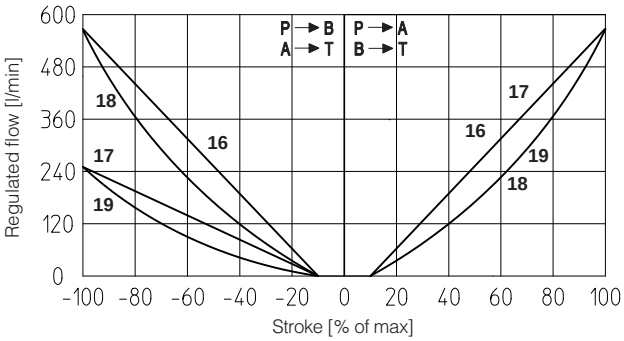
DPZO-2:
5=L3 **6** = S3
7=D3



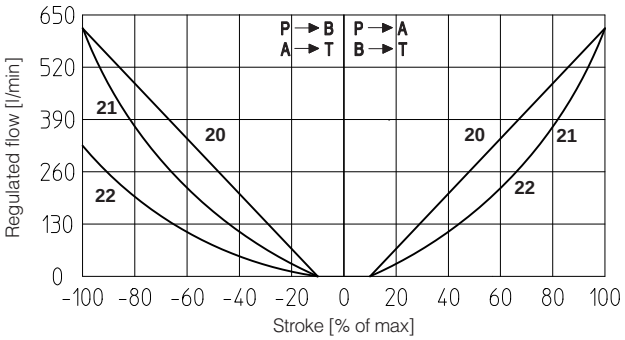
DPZO-2:
8 = L5 **9** = DL5
10 = S5 **11** = D5



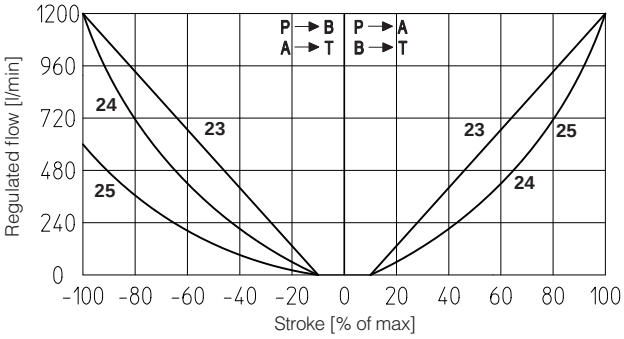
DPZO-4:
12 = L5 **13** = DL5
14 = S5 **15** = D5



DPZO-4M:
16 = L5 **17** = DL5
18 = S5 **19** = D5



DPZO-6:
20 = L5 **21** = S5
22 = D5



DPZO-8:
23 = L5 **24** = S5
25 = D5

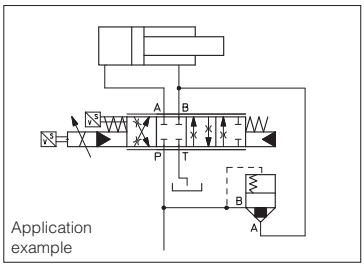
Note:
Hydraulic configuration vs. reference signal for configurations 71 and 73 (standard and option /B)

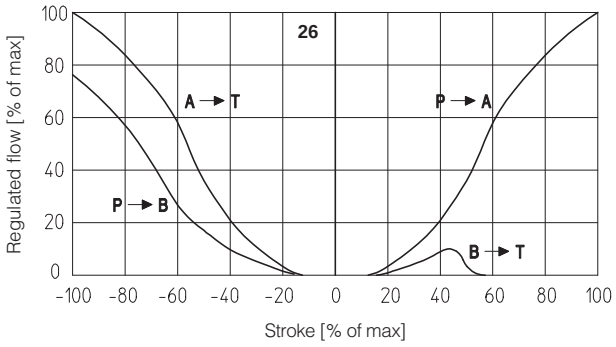
Reference signal $\left.\begin{matrix}0 \div +10\ V \\ 12 \div 20\ mA\end{matrix}\right\}$ P → A / B → T

Reference signal $\left.\begin{matrix}0 \div -10\ V \\ 4 \div 12\ mA\end{matrix}\right\}$ P → B / A → T

26 = differential - regenerative spool **D9**
(not available for valve size 32 and 35)

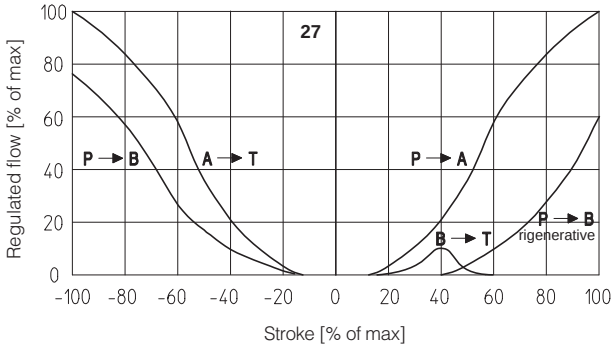
D9 spool type with a fourth position specific to regenerative circuit, performed by means of an additional external check valve.





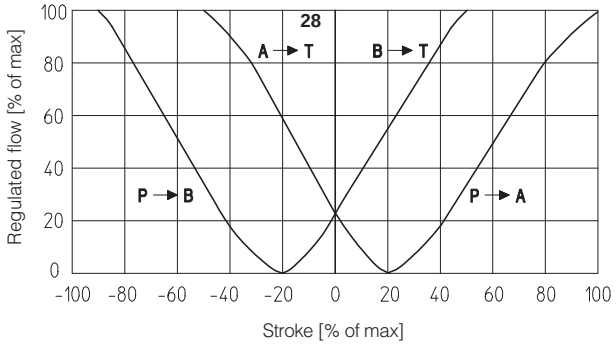
27 = linear - internal regenerative spool **L9**
(available only for valve size 16)

L9 spool type with a fourth position specific to perform a regenerative circuit internal to the valve.



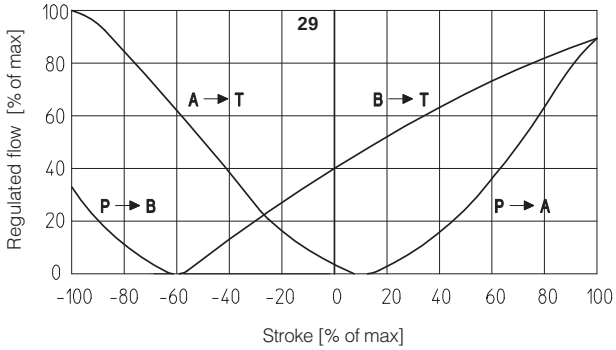
28 = linear spool **Q5**
(not available for valve size 32 and 35)

Q5 spool type is specific for alternate P/Q controls in combination with /S* option of digital integral drivers, see tab. G212, or Z-ME-KZ axis card (see tab. G340).
It allows to control the pressure in A port or B port and it provides a safety central position (A-T/B-T) to depressurize the actuator chambers.
The strong meter-in characteristic makes the spool suitable for both pressure control and motion regulations in several applications.



29 = differential - progressive spool **V9**

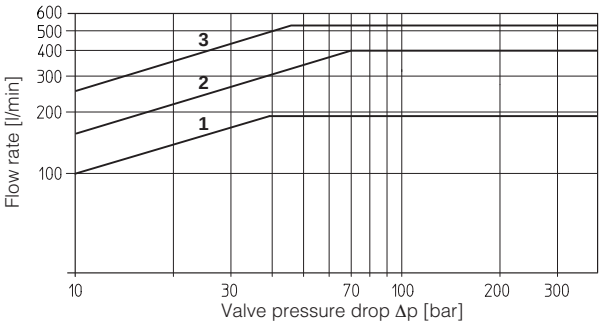
V9 spool type is specific for alternate P/Q controls in combination with /S* option of digital integral drivers, see tab. G212, or Z-ME-KZ /GI axis card (see tab. G340 and G345).
This spool is specially designed to manage the whole injection cycle in plastic machinery, thanks to the following specific features:
- strong meter-in characteristic to allow the pressure control in A port during the holding pressure (P-A) and the plasticizing (A-T) phases
- safety central position (A-T/B-T) to depressurize the actuator chambers
- large A-T and B-T flow capability, required during the plasticizing phase, to discharge big volumes from high differential injection cylinders with low pressure drops and permitting the contemporary oil suction from tank

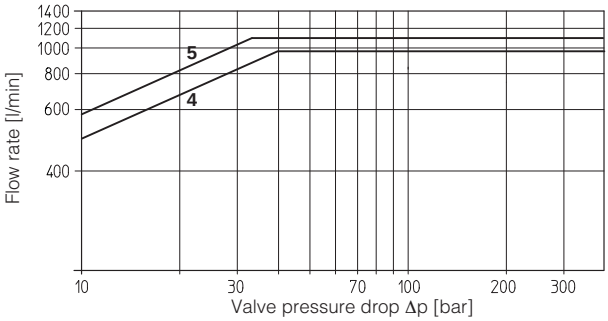


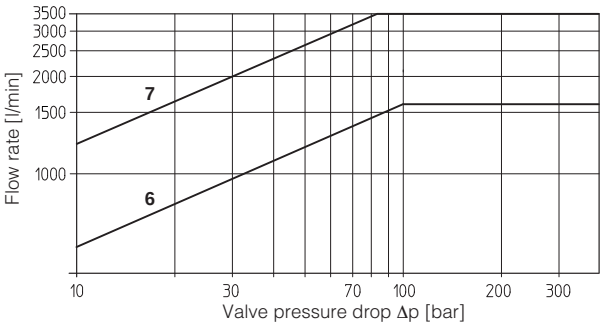
8.2 Operating diagrams

Flow /Δp diagram

stated at 100% of spool stroke







DPZO-1:
1 = spools L5, S5, D5, DL5, D9, V9, Q5

DPZO-2:
2 = spools L3, S3, D3
3 = spools L5, S5, D5, DL5, D9, L9, V9, Q5

DPZO-4:
4 = spools L5, S5, D5, DL5, D9, V9, Q5

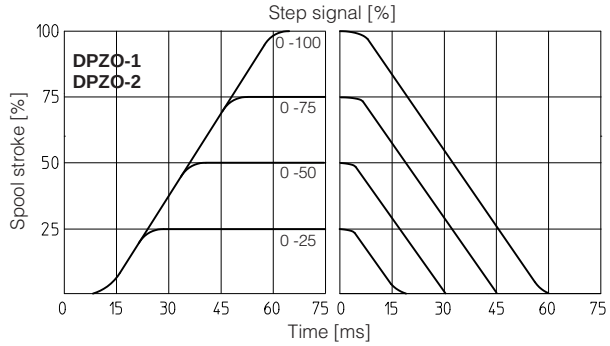
DPZO-4M:
5 = spools L5, S5, D5,DL5, D9, V9, Q5

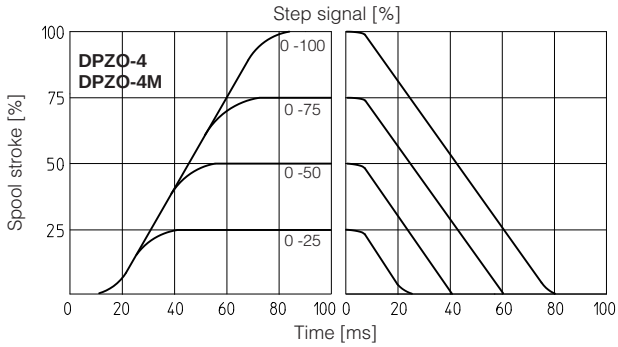
DPZO-6:
6 = L5, S5, D5, V9

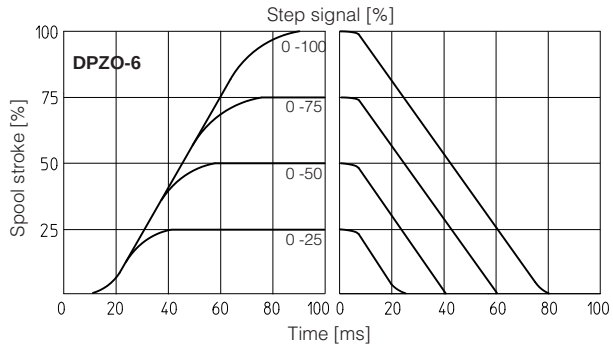
DPZO-8:
7 = L5, S5, D5, V9

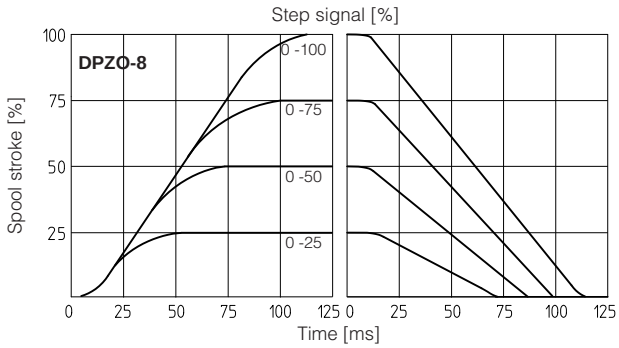
8.3 Response time

The response times in below diagrams are measured at different steps of the reference input signal. They have to be considered as average values. For the valves with digital electronics the dynamics performances can be optimized by setting the internal software parameters.



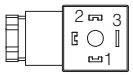




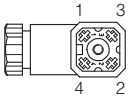


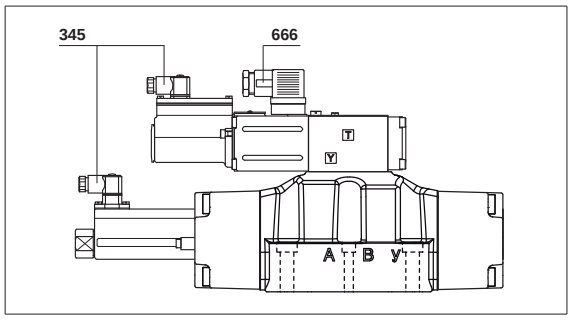
9 CONNECTIONS FOR -L EXECUTION

SOLENOID POWER SUPPLY CONNECTOR		
PIN	Signal description	666
1	SUPPLY	
2	SUPPLY	
3	GND	



POSITION TRANSDUCER CONNECTOR (pilot and main stage)		
PIN	Signal description	345
1	OUTPUT SIGNAL	
2	SUPPLY -15 VDC	
3	SUPPLY +15 VDC	
4	GND	





10 ANALOG INTEGRAL DRIVERS -LE - OPTIONS

Standard driver execution provides on the 7 pin main connector:

Power supply - 24 VDC must be appropriately stabilized or rectified and filtered; a 2,5 A safety fuse is required in series to the driver power supply. Apply at least a 10000 μF/40 V capacitance to single phase rectifiers or a 4700 μF/40 V capacitance to three phase rectifiers

Reference input signal - analog differential input with ±10 VDC nominal range (pin D, E), proportional to desired valve spool position

Monitor output signal - analog output signal proportional to the actual valve's spool position with ±10 VDC nominal range

Following options are available to adapt standard execution to special application requirements:

10.1 Option /F

It provides a Fault output signal in place of the Monitor output signal, to indicate fault conditions of the driver (cable interruption of spool transducers or reference signal - for /I option): Fault presence corresponds to 0 VDC, normal working corresponds to 24 VDC.

10.2 Option /I

It provides the 4÷20 mA current reference and monitor signals instead of the standard ±10 VDC
It is normally used in case of long distance between the machine control unit and the valve or where the reference signal can be affected by electrical noise; the valve functioning is disabled in case of reference signal cable breakage.

10.3 Option /Q

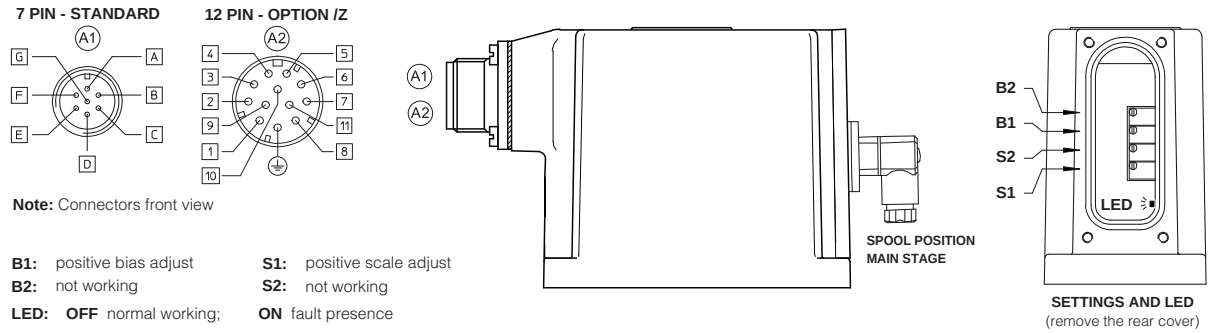
It provides the possibility to enable or disable the valve functioning without cutting the power supply (the valve functioning is disabled but the driver current output stage is still active). To enable the driver supply a 24 VDC on the enable input signal.

10.4 Option /Z (12 pin connector)

This option includes **/F** and **/Q** features, plus the Monitor output signal.
When the driver is disabled (0 VDC on Enable signal) Fault output is forced to 0 VDC.

10.5 Possible combined options: /FI and /IZ

11 ANALOG INTEGRAL DRIVERS -LE - ELECTRONIC CONNECTIONS



11.1 MAIN CONNECTOR - 7 pin (A1)

PIN	SIGNAL	TECHNICAL SPECIFICATIONS	NOTES
A	V+	Power supply 24 VDC for solenoid power stage and driver logic	Input - power supply
B	V0	Power supply 0 VDC for solenoid power stage and driver logic	Gnd - power supply
C	AGND	Ground - signal zero for MONITOR signal	Gnd - analog signal
	ENABLE	Enable (24 VDC) or disable (0 VDC) the driver (for /Q option) with /Q option ENABLE signal replaces AGND on pin C; MONITOR signal is reffered to pin B	Input - on/off signal
D	INPUT+	Reference analog differential input: ±10 VDC maximum range (4 ÷ 20 mA for /I option) For single solenoid valves the reference input is 0 ÷ +10 VDC (4 ÷ 20 mA for /I option) For double solenoid valves the reference input is ±10 VDC (4 ÷ 20 mA for /I option)	Input - analog signal
E	INPUT -		
F	MONITOR	Monitor analog output: ±10 VDC maximum range (4 ÷ 20 mA for /I option)	Output - analog signal
	FAULT	Fault (0 VDC) or normal working (for /F option) with /F option FAULT signal replaces MONITOR on pin F	Output - on/off signal
G	EARTH	Internally connected to the driver housing	

11.2 MAIN CONNECTOR - 12 pin (/Z option) (A2)

PIN	SIGNAL option /Z	TECHNICAL SPECIFICATIONS	NOTES
1	V+	Power supply 24 VDC for solenoid power stage and driver logic	Input - power supply
2	V0	Power supply 0 VDC for solenoid power stage and driver logic	Gnd - power supply
3	ENABLE	Enable (24 VDC) or disable (0 VDC) the driver	Input - on/off signal
4	INPUT+	Reference analog differential input: ±10 VDC maximum range (4 ÷ 20 mA for /I option) For single solenoid valves the reference input is 0 ÷ +10 VDC (4 ÷ 20 mA for /I option) For double solenoid valves the reference input is ±10 VDC (4 ÷ 20 mA for /I option)	Input - analog signal
5	INPUT -		
6	MONITOR	Monitor analog output: ±10 VDC maximum range (4 ÷ 20 mA for /I option)	Output - analog signal
7	AGND	Ground - signal zero for MONITOR signal	Gnd - analog signal
8	R_ENABLE	Repeat Enable - output repetition of Enable input	Output - on/off signal
9	NC	do not connect	Output - on/off signal
10	NC	do not connect	Output - on/off signal
11	FAULT	Fault (0 VDC) or normal working (24 VDC)	Output - on/off signal
PE	EARTH	Internally connected to the driver housing	

- a minimum time of 26ms to 120ms have be considered between the driver energizing with the 24 VDC power supply and when the valve is ready to operate. During this time the current to the valve coils is switched to zero.

12 DIGITAL INTEGRAL DRIVERS -LES - OPTIONS

Standard driver execution provides on the 7 pin main connector:

Power supply - 24 VDC must be appropriately stabilized or rectified and filtered; a 2,5 A safety fuse is required in series to each driver power supply. Apply at least a 10000 μF/40 V capacitance to single phase rectifiers or a 4700 μF/40 V capacitance to three phase rectifiers

Reference input signal - analog differential input with ±10 VDC nominal range (pin D,E), proportional to desired valve spool position

Monitor output signal - analog output signal proportional to the actual valve's spool position with ±10 VDC nominal range

Following options are available to adapt standard execution special to application requirements:

12.1 Option /F

It provides a Fault output signal in place of the Monitor output signal, to indicate fault conditions of the driver (cable interruption of spool transducers or reference signal - for /I option): Fault presence corresponds to 0 VDC, normal working corresponds to 24 VDC.

12.2 Option /I

It provides 4÷20 mA current reference and monitor signals, instead of the standard ±10 V.

It is normally used in case of long distance between the machine control unit and the valve or where the reference signal can be affected by electrical noise; the valve functioning is disabled in case of reference signal cable breakage.

12.3 Option /Q

It provides the possibility to enable or disable the valve functioning without cutting the power supply (the valve functioning is disabled but the driver current output stage is still active). To enable the driver supply a 24 VDC on the enable input signal.

12.4 Option /Z (12 pin connector)

It provides, on the 12 pin main connector, the following additional features:

Logic power supply

Separated power supply for the solenoid (pin 1, 2) and for the digital electronic circuits (pin 9, 10).

Cutting solenoid power supply allows to interrupt the valve functioning but keeping energized the digital electronics thus avoiding fault conditions of the machine fieldbus controller. This condition allows to realize safety systems in compliance with European Norms EN13849-1 (ex EN954-1).

Enable Input Signal

To enable the driver, supply 24 VDC on pin 3 referred to pin 2: when the Enable signal is set to zero the valve functioning is disabled (zero current to the solenoid) but the driver current output stage is still active.

Fault Output Signal

Fault output signal indicates fault conditions of the driver (solenoid short circuits/not connected, reference signal cable broken for 4÷20mA input, etc.). Fault presence corresponds to 0 VDC, normal working corresponds to 24 VDC (pin 11 referred to pin 2): Fault status is not affected by the Enable input signal

12.5 Options /SP, /SF and /SL (see table G212)

/S options add the closed loop control of pressure (/SP) or force (/SF and /SL) to the basic functions of proportional directional valves flow regulation. A dedicated algorithm alternates pressure (force) depending on the actual hydraulic system conditions.

A dedicated connector is available for the additional transducers that are required to be interfaced to the valve's driver (1 pressure transducer for /SP, 2 pressure transducers for /SF or 1 load cell for /SL).

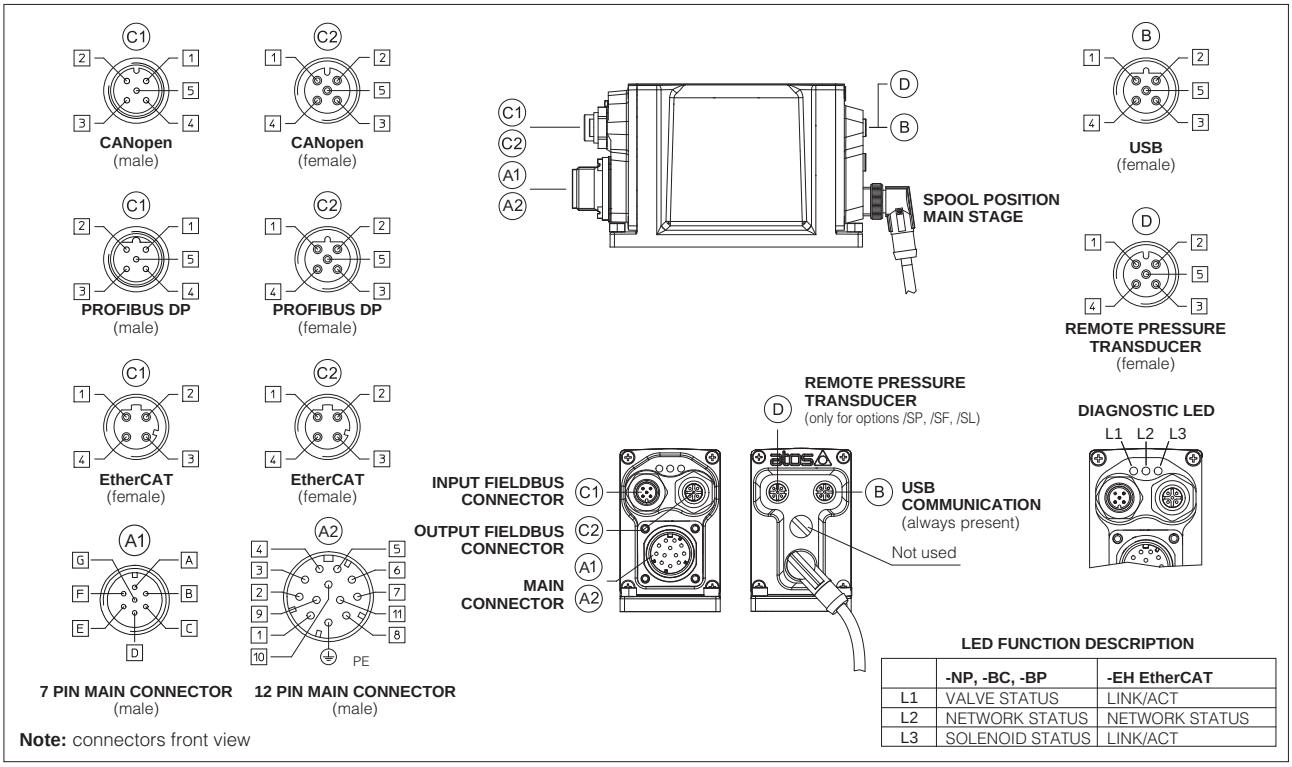
Main 12 pin connector is the same as /Z option one plus two analog signals specific for the pressure (force) control: pin 7 for reference signal and pin 8 for monitor.

12.6 Options /C

Options /CSP, /CSF and /CSL are available to connect pressure (force) transducers with 4 ÷ 20mA current output signal.

12.7 Possible combined options: /ISP, /ISF, /ISL, /CSP, /CSF, /CSL, /CISP, /CISF, /CISL, /FI, /IQ and /IZ.

13 DIGITAL INTEGRAL DRIVERS -LES - ELECTRONIC CONNECTIONS AND LEDS



Note: connectors front view

LED FUNCTION DESCRIPTION

	-NP, -BC, -BP	-EH EtherCAT
L1	VALVE STATUS	LINK/ACT
L2	NETWORK STATUS	NETWORK STATUS
L3	SOLENOID STATUS	LINK/ACT

13.1 Main connector - 7 pin (standard, /F and /Q options) (A1)

PIN	SIGNAL	TECHNICAL SPECIFICATIONS	NOTES
A	V+	Power supply 24 VDC for solenoid, driver's logic and communication	Input - power supply
B	V0	Power supply 0 VDC for solenoid, driver's logic and communication	Gnd - power supply
C	AGND	Ground - signal zero for MONITOR signal (applying 24 VDC to AGND electronics will damaged)	Gnd - analog signal
	ENABLE	Enable (24 VDC) or disable (0 VDC) the driver (for /Q option)	Input - on/off signal
D	INPUT+	Reference analog input, differential: ±10 VDC / ±20 mA, maximum range software selectable	Input - analog signal
E	INPUT -		
F	MONITOR	Monitor analog output: ±10 VDC / ±20 mA, maximum range software selectable, referred to AGND for Standard and /F option or to V0 for /Q option	Output - analog signal
	FAULT	Driver status: Fault (0 VDC) or normal working (24 VDC) (for /F option)	Output - on/off signal
G	EARTH	Internally connected to driver housing	

13.2 MAIN CONNECTOR - 12 pin (/Z option) (A2)

PIN	SIGNAL	TECHNICAL SPECIFICATIONS	NOTES
1	V+	Power supply 24 VDC for solenoid	Input - power supply
2	V0	Power supply 0 VDC for solenoid	Gnd - power supply
3	ENABLE	Enable (24 VDC) or disable (0 VDC) the controller	Input - on/off signal
4	INPUT+	Reference analog input, differential: ±10 VDC / ±20 mA, maximum range software selectable	Input - analog signal
5	INPUT-		
6	MONITOR	Monitor analog output: ±10 VDC / ±20 mA, maximum range software selectable, referred to VL0	Output - analog signal
7	NC	do not connect	
8	NC	do not connect	
9	VL+	Power supply 24 VDC for driver's logic and communication	Input - power supply
10	VL0	Power supply 0 VDC for driver's logic and communication	Gnd - power supply
11	FAULT	Driver status: Fault (0 VDC) or normal working (24 VDC)	Output - on/off signal
PE	EARTH	Internally connected to driver housing	

Note: A minimum time of 300 to 500 ms have be considered between the driver energizing with the 24 VDC power supply and when the valve is ready to operate. During this time the current to the valve coils is switched to zero.

13.4 COMMUNICATION CONNECTORS (B) - (C)

(B) USB connector - M12 - 5 pin always present

PIN	SIGNAL	TECHNICAL SPECIFICATION (1)
1	+5V_USB	Supply for external USB Flash Drive
2	ID	USB Flash Drive identification
3	GND_USB	Signal zero data line
4	D-	Data line -
5	D+	Data line +

(C1) (C2) -BC fieldbus execution, connector - M12 - 5 pin

PIN	SIGNAL	TECHNICAL SPECIFICATION (1)
1	CAN_SHLD	Shield
2	NC	do not connect
3	CAN_GND	Signal zero data line
4	CAN_H	Bus line (high)
5	CAN_L	Bus line (low)

(C1) (C2) -BP fieldbus execution, connector - M12 - 5 pin

PIN	SIGNAL	TECHNICAL SPECIFICATION (1)
1	+5V	Termination supply signal
2	LINE-A	Bus line (high)
3	DGND	Data line and termination signal zero
4	LINE-B	Bus line (low)
5	SHIELD	

(C1) (C2) -EH fieldbus execution,connector - M12 - 4 pin

PIN	SIGNAL	TECHNICAL SPECIFICATION (1)
1	TX+	Transmitter
2	RX+	Receiver
3	TX-	Transmitter
4	RX-	Receiver
Housing	SHIELD	

Note (1) shield connection on connector's housing is recommended

13.5 REMOTE PRESSURE TRANSDUCER CONNECTOR - M12 - 5 pin (D)

PIN	SIGNAL	TECHNICAL SPECIFICATION	Single transducer (1)	Double transducer (1)
1	VF +24V	Power supply +24 VDC	Connect	Connect
2	TR1	1st signal transducer: ±10 VDC / ±20 mA, maximum range software selectable	Connect	Connect
3	AGND	Common GND for transducer power and signals	Connect	Connect
4	TR2	2nd signal transducer: ±10 VDC / ±20 mA, maximum range software selectable	/	Connect
5	NC	Not connect	/	/

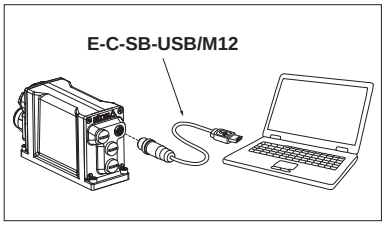
Note (1) single/double pressure transducer configuration and analog input range are software selectable

14 PROGRAMMING TOOLS (see table G500)

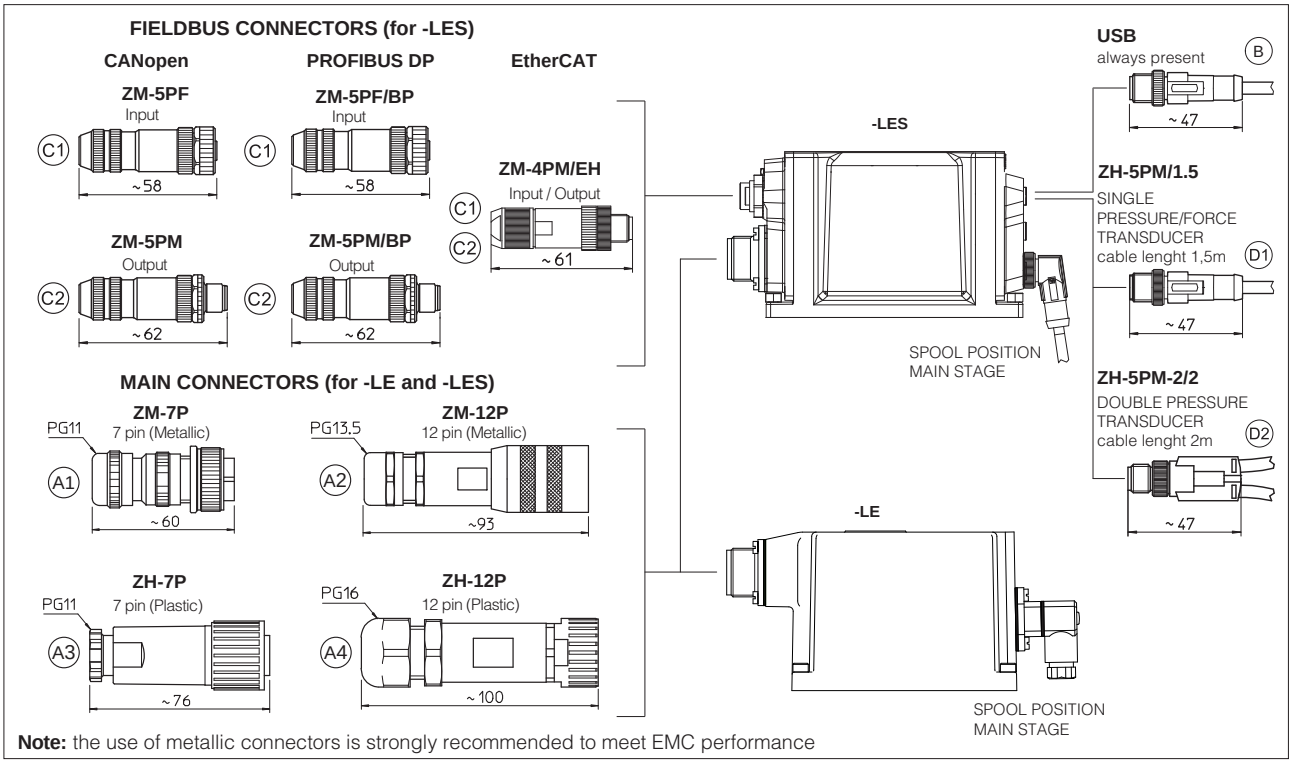
Valve's functional parameters and configurations, can be easily set and optimized using Atos E-SW programming software connected via USB communication port to the digital driver. E-SW software is available in different versions according to the driver's fieldbus interface: -NP (not present) E-SW-PS, -BC (CANopen) E-SW-BC, -BP (PROFIBUS DP) E-SW-BP and -EH (EtherCAT) E-SW-EH.

For fieldbus versions, E-SW software permits valve's parameterization through USB communication port also if the driver is connected to the central machine unit via fieldbus.

USB connection



15 CONNECTORS



Note: the use of metallic connectors is strongly recommended to meet EMC performance

16 MODEL CODES OF MAIN CONNECTORS AND COMMUNICATION CONNECTORS (to be ordered separately)

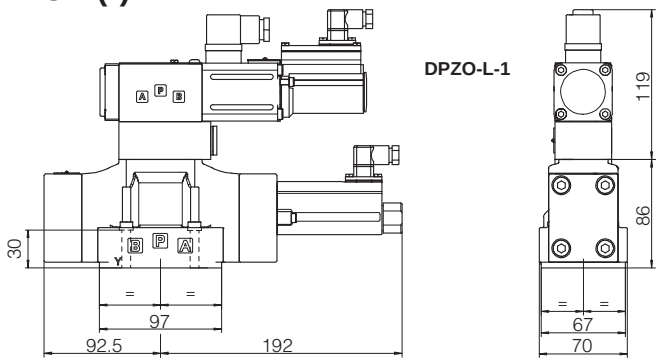
VALVE VERSION	-L		-LE, -LES	-LE /Z -LES /Z	CANopen (-BC)	PROFIBUS DP (-BP)	EtherCat (-EH)	/SP, /SL, /SF
	Power supply	Transducer						
CONNECTOR CODE	666	345	ZM-7P (A1)	ZM-12P (A2)	ZM-5PF (C1)	ZM-5PF/BP (C1)	ZM-4PM/EH (C1)	ZH-5PM/1.5 **(1)** (D1)
			ZH-7P (A3)	ZH-12P (A4)	ZM-5PM (C2)	ZM-5PM/BP (C2)	ZM-4PM/EH (C2)	ZH-5PM-2/2 **(2)** (D2)
PROTECTION DEGREE	IP65	IP67	IP67					
DATA SHEET	K500		G200, G210, G212, K500					

connectors supplied with the valve

(1) only for /SP or /SL options **(2)** only for /SF option

17 INSTALLATION DIMENSIONS [mm]

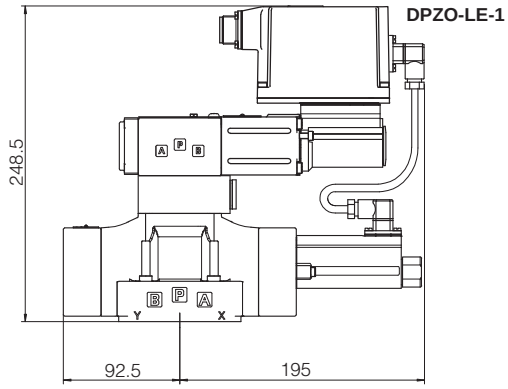
DPZO-L(*)-1

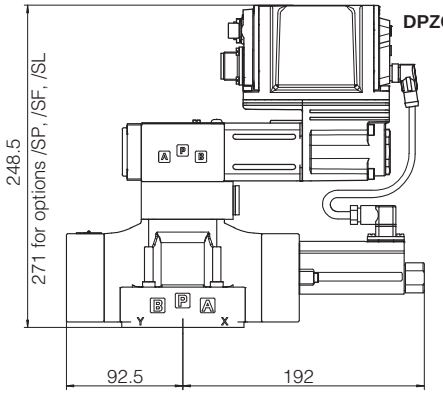


ISO 4401: 2005
Mounting surface: 4401-05-05-0-05
(see table P005)
Fastening bolts:
4 socket head screws M6x40 class 12.9
Tightening torque = 15 Nm
Seals: 5 OR 2050; 2 OR 108
Diameter of ports A, B, P, T: Ø = 11 mm;
Diameter of ports X, Y: Ø = 5 mm;

Mass [kg]

DPZO-L-1	9
DPZO-LE-1	9,4
DPZO-LES-1	





For main and communication connectors see section 15, 16

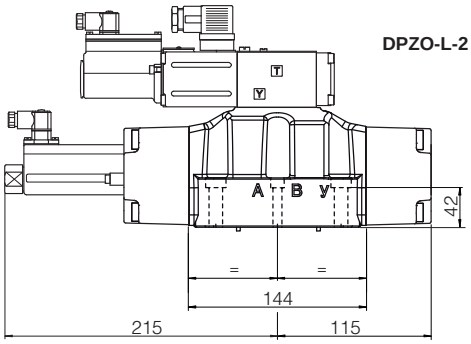
DPZO-L(*)-2

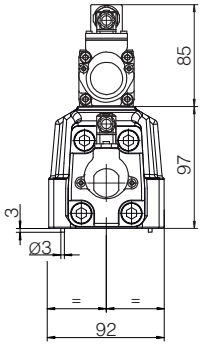
ISO 4401: 2005
Mounting surface: 4401-07-07-0-05
(see table P005)
Fastening bolts:
4 socket head screws M10x50 class 12.9
Tightening torque = 70 Nm
2 socket head screws M6x45 class 12.9
Tightening torque = 15 Nm
Seals: 4 OR 130; 2 OR 2043
Diameter of ports A, B, P, T: Ø = 20 mm;
Diameter of ports X, Y: Ø = 7 mm;

Mass [kg]

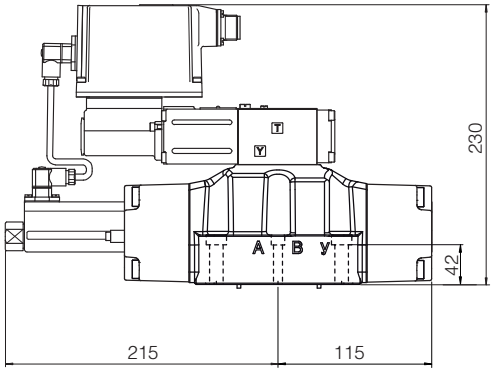
DPZO-L-2	13,5
DPZO-LE-2	13,9
DPZO-LES-2	

DPZO-L-2

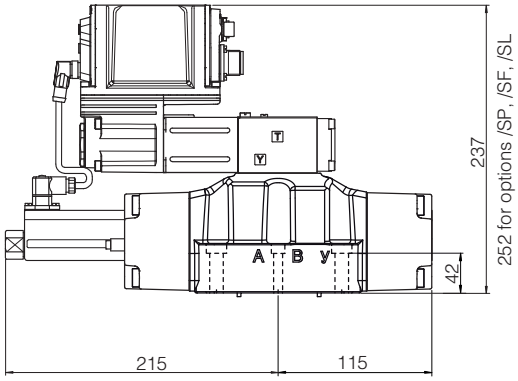




DPZO-LE-2



DPZO-LES-*-2



DPZO-L(*)-4 and DPZO-L(*)-4M

ISO 4401: 2005
Mounting surface: 4401-08-08-0-05
(see table P005)
Fastening bolts:
6 socket head screws M12x60 class 12.9
Tightening torque = 125 Nm

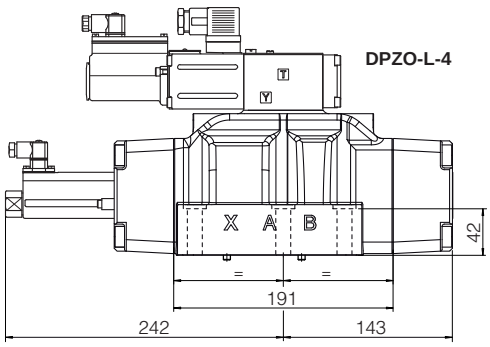
DPZO-4
Seals: 4 OR 4112; 2 OR 3056
Diameter of ports A, B, P, T: **Ø = 24 mm**;
Diameter of ports X, Y: Ø = 7 mm;

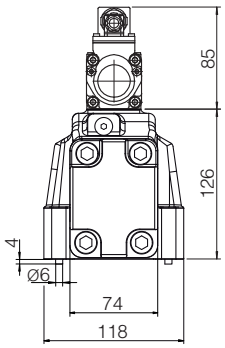
DPZO-4M
Seals: 4 OR 4131; 2 OR 3056
Diameter of ports A, B, P, T: **Ø = 32 mm;**
Diameter of ports X, Y: Ø = 7 mm;

Mass [kg]

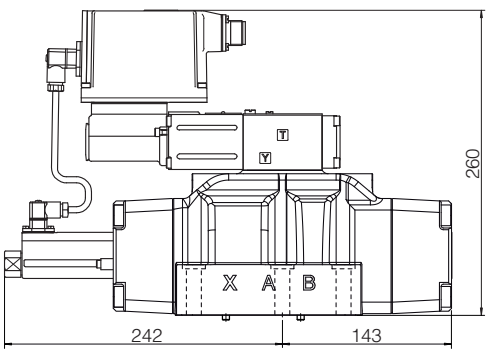
DPZO-L-4	18
DPZO-LE-4	18,9
DPZO-LES-4	

DPZO-L-4

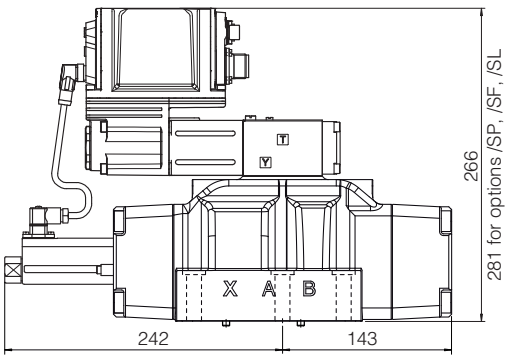




DPZO-LE-4



DPZO-LES-*-4



Note: the overall height is increased by 40 mm for /G option (0,9 kg).
For option /B the proportional solenoid, the position transducer and the electronics (in case of execution -LE and -LES) are at side of port B of the main stage.

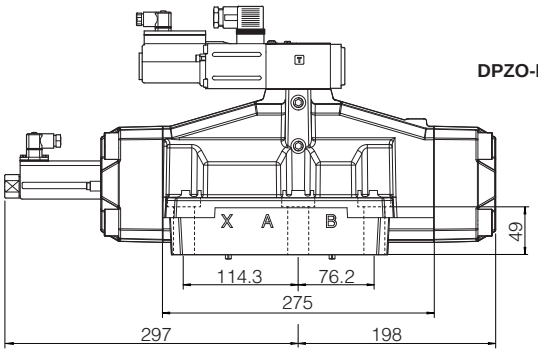
For main and communication connectors see section 15, 16

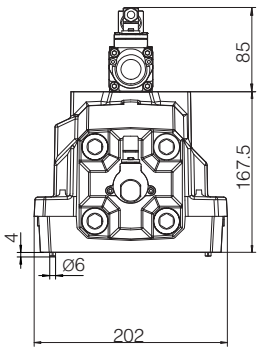
DPZO-L(*)-6

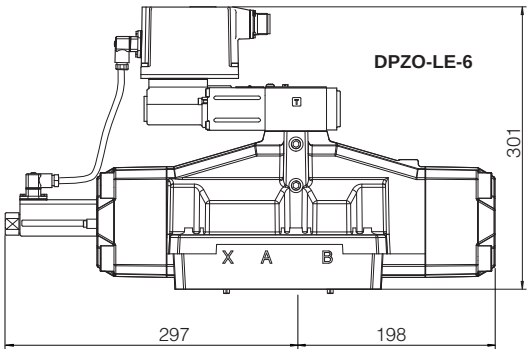
ISO 4401: 2005
Mounting surface: 4401-10-09-0-05
(see table P005)
Fastening bolts:
6 socket head screws M20x90 class 12.9
Tightening torque = 600 Nm
Diameter of ports A, B, P, T: Ø = 34 mm;
Diameter of ports X, Y: Ø = 7 mm;
Seals: 4 OR 144, 2 OR 3056

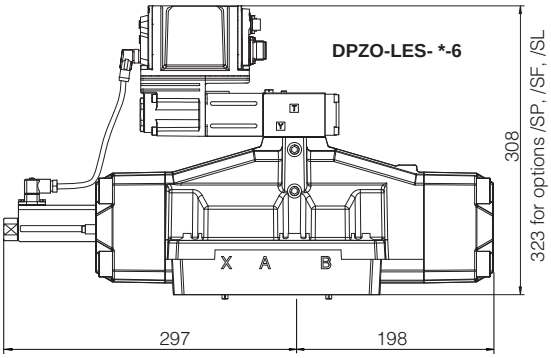
Mass [kg]

DPZO-L-6	42,5
DPZO-LE-6	43,1
DPZO-LES-6	







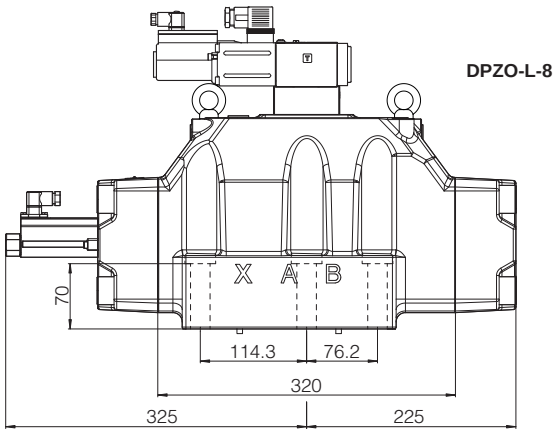


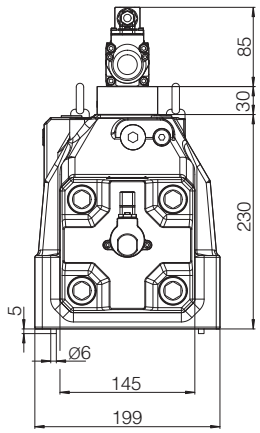
DPZO-L(*)-8

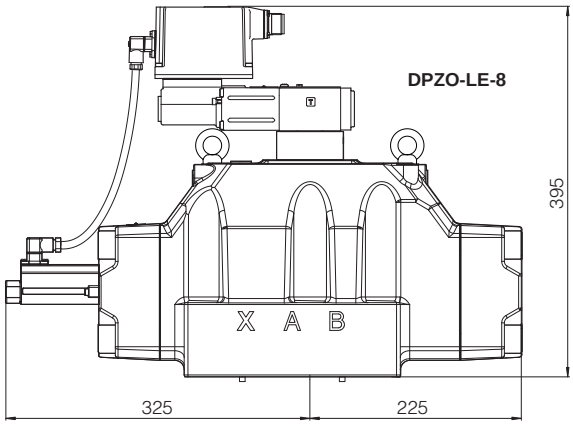
ISO 4401: 2005
Mounting surface: 4401-10-09-0-05
(see table P005)
Fastening bolts:
6 socket head screws M20x100 class 12.9
Tightening torque = 600 Nm
Diameter of ports A, B, P, T: Ø = 50 mm;
Diameter of ports X, Y: Ø = 9 mm;
Seals: 4 OR 156, 2 OR 3056

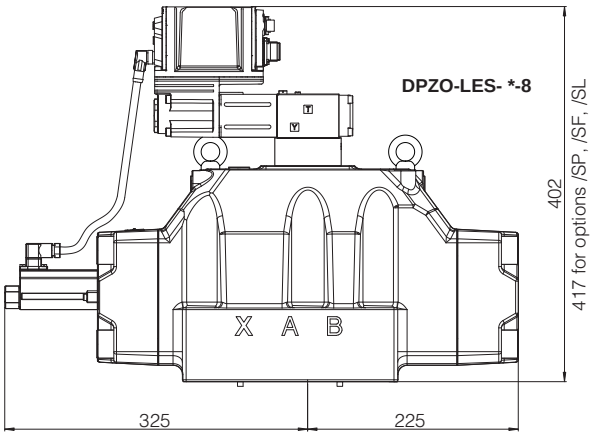
Mass [kg]

DPZO-L-8	79,4
DPZO-LE-8	80
DPZO-LES-8	









Note: the overall height is increased by 40 mm for /G option (0,9 kg).
For option /B the proportional solenoid, the position transducer and the electronics (in case of execution -LE and -LES) are at side of port B of the main stage.

For main and communication connectors see section 15, 16