DPZE-A

Directional valves

Piloted, positive overlap, off-board driver, without transducer, cURus marked, DIN, AMP, Deutsch or wire connectors



Sizes	Qmax	Pmax
10 ÷ 32 ISO 4401	180 ÷ 1500 l/min	350 bar

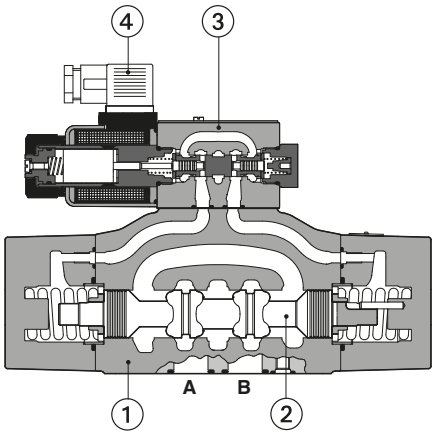
Features

- 4/2, 4/3 way, positive spool overlap
- **cURus** certified solenoids
- DIN, AMP, Deutsch or Lead wire coil connectors
- Low temperature option -40°C
- IP65 protection degree

Description

Piloted proportional valves without position transducer and with positive spool overlap, for open loop directional controls and not compensated flow regulations.
They operate in association with electronic derivers, see section 2, which supply the proportional valve with proper current to align the hydraulic regulation to the reference signal.
The solenoid are certified according to North American standards **cURus**.

Overview



1 - Valve body
2 - Main spool
3 - Solenoid pilot valve
4 - Electric connector (supplied with the valve)

1 MODEL CODE

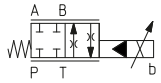
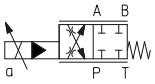
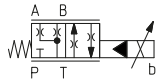
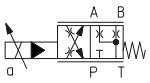
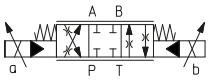
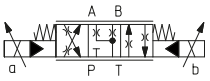
DPZE	-	A	-	2	71	-	L	5	/	*	/	*	/	*	*	/	*
1		2		3	4		5	6		7		8		9	10		11

1 - **Valve type**	
DPZE	proportional directional valve, piloted

2 - **Digital driver**	
A	off-board driver

See section 2

3 - **Valve size,** ISO 4401	
1	size 10
2	size 16
4	size 25
6	size 32

4 - **Configuration**		
	standard	option /B
51		
53		
71		-
73		

5 - **Spool type, regulating characteristics**		
L		Linear
S		Progressive
D		Differential-progressive P-A = Q, B-T = Q/2 P-B = Q/2, A-T = Q

6 - **Spool size**				
	Valve model	Spool type		
		L	S	D
3	DPZE-2	160	160	160
5	DPZE-1	100	100	100
	DPZE-2	250	250	250
	DPZE-4	480	480	480
	DPZE-6	640	640	640

Nominal flow (l/min) at Δp 10 bar P-T, see section 4

7 - **Construction options**	
B	solenoid at side of port B of the main stage (side A of pilot vale) **(1)**
D	internal drain
E	external pilot pressure
G	pressure reducing valve for piloting

(1) In standard configuration the solenoid (config. 51 and 53) is at side A of the main stage (side B of pilot valve)
See section 8

8 - **Coil connector options**	
-	omit for standard DIN connector
J	AMP Junior Timer connector
K	Deutsch connector
S	Lead Wire connection

See section 10

9 - **Coil voltage**	
-	standard coil for 24Vdc Atos drivers
6	optional coil for 12Vdc Atos drivers
18	optional coil for low current drivers

See section 5

10 - **Series identification** - not required for ordering	
.....	series number

11 - **Seals material**	
-	NBR
PE	FKM
BT	NBR low temperature

See section 6

2 OFF-BOARD ELECTRONIC DRIVERS

Drivers model	E-MI-AC-01F		E-MI-AS-IR		E-BM-AS-PS		E-BM-AES
Type	Analog		Digital				Digital
Voltage supply (VDC)	12	24	12	24	12	24	24
Valve coil option	/6	std	/6	std	/6	std	std
Format	plug-in to solenoid				DIN-rail panel		DIN-rail panel
Tech table	G010		G020		G030		GS050

3 GENERAL CHARACTERISTICS

Assembly position	Any position
Subplate surface finishing to ISO 4401	Acceptable roughness index: Ra ≤ 0,8, recommended Ra 0,4 – Flatness ratio 0,01/100
Ambient temperature range	Standard = -20°C ÷ +70°C /PE option = -20°C ÷ +70°C /BT option = -40°C ÷ +60°C
Storage temperature range	Standard = -20°C ÷ +80°C /PE option = -20°C ÷ +80°C /BT option = -40°C ÷ +70°C
Corrosion resistance	Salt spray test (EN ISO 9227) > 200 h
Compliance	CE according to EMC directive 2014/30/EU (Immunity: EN 61000-6-2; Emission: EN 61000-6-3) Comply with Directive 2011/65/EU as amended (RoHS 2), including Delegated Directive (EU) 2015/863 and all subsequent delegated directives in force on the date of this statement REACH Regulation (EC) n°1907/2006
MTTFd values according to EN ISO 13849	75 years, for further details see technical table P007
Surface protection	Zinc coating with black passivation

Atos digital proportionals valves are CE marked according to the applicable directives (e.g. Immunity and Emission EMC Directive).
Installation, wirings and start-up procedures must be performed according to the general prescriptions shown in tech table **FS900** and in the user manuals included in the E-SW-SETUP programming software.

4 HYDRAULIC CHARACTERISTICS - based on mineral oil ISO VG 46 at 50°C

Valve model		**DPZE-*-1**	**DPZE-*-2**		**DPZE-*-4**	**DPZE-*-6**
Pressure limits [bar]		ports **P, A, B, X** = 350; **T** = 250 (10 with internal drain /D) **Y** = 10				
Spool type		L5, S5, D5	L3, S3, D3	L5, S5, D5		
Nominal flow Δp P-T [l/min] **(1)**	Δp= 10 bar	100	160	250	480	640
	Δp= 30 bar	160	270	430	830	1100
Max permissible flow		180	400	550	900	1500
Piloting pressure [bar]		min = 25; max = 350 (option /G advisable for pilot pressure > 150 bar)				
Piloting volume [cm³]		1,4	3,7		9,0	21,6
Piloting flow **(2)** [l/min]		1,7	3,7		6,8	14,4
Leakage **(3)** [l/min]		0,15/0,5	0,2/0,6		0,3 / 1,0	1,0 / 3,0
Response time **(4)** [ms]		≤80	≤100		≤120	≤180
Hysteresis		≤ 5 [% of max regulation]				
Repeatibility		± 1 [% of max regulation]				

Note: above performance data refer to valves coupled with Atos electronic drivers, see section 2
(1) For different Δp, the max flow is in accordance to the diagrams in section 7.2
(2) With step reference input signal 0 ÷100 %
(3) At P = 100/350 bar
(4) 0-100% step signal

5 ELECTRIC CHARACTERISTICS

Coil voltage code	**Standard** standard coil to be used with Atos drivers with power supply 24VDC	option **/6** optional coil to be used with Atos drivers with power supply 12 VDC	option **/18** optional coil to be used with electronic drivers not supplied by Atos with power supply 24 VDC and max current limited to 1,2A
Max. solenoid current	2,5 A	3 A	1,2 A
Coil resistance R at 20°C	3,1 Ω	2,1 Ω	13,1 Ω
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	**IP65** (with connectors 666 correctly assembled)		
Duty factor	Continuous rating (ED=100%)		
Certification	**cURus** North American Standards		

6 SEALS AND HYDRAULIC FLUIDS - for other fluids not included in below table, consult our technical office

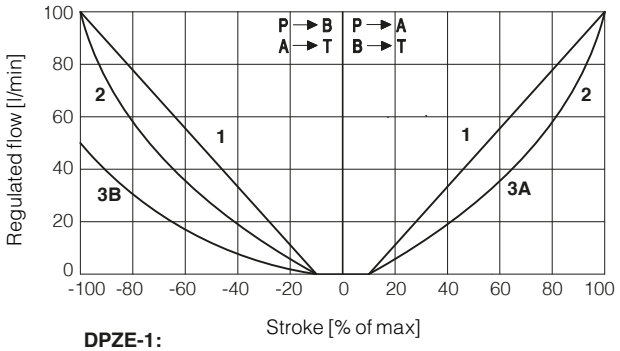
Seals, recommended fluid temperature	NBR seals (standard) = -20°C ÷ +80°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C NBR low temp. seals (/BT option) = -40°C ÷ +60°C, with HFC hydraulic fluids = -40°C ÷ +50°C

Recommended viscosity		20÷100 mm²/s - max allowed range 15 ÷ 380 mm²/s	
Max fluid contamination level	normal operation	ISO4406 class 18/16/13 NAS1638 class 7	see also filter section at www.atos.com or KTF catalog
	longer life	ISO4406 class 16/14/11 NAS1638 class 5	

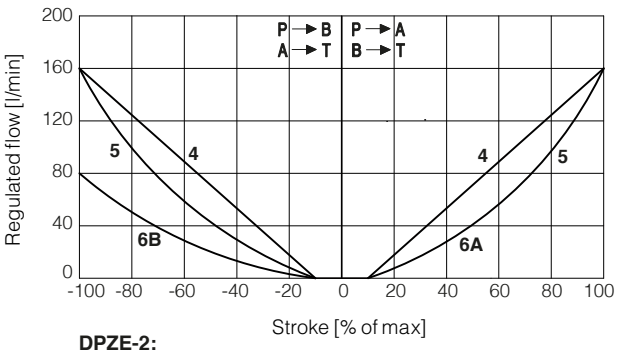
Hydraulic fluid	Suitable seals type	Classification	Ref. Standard
Mineral oils	NBR, FKM, NBR low temp.	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFDU, HFDR	ISO 12922
Flame resistant with water	NBR, NBR low temp.	HFC	

7 **CHARACTERISTIC CURVES** - based on mineral oil ISO VG 46 at 50°C

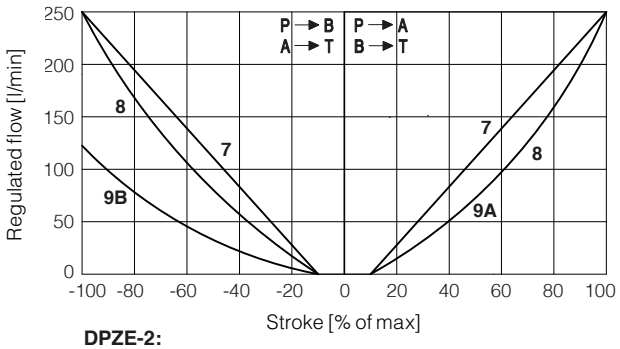
7.1 **Regulation diagrams** - values measure at Δp 10 bar P-T



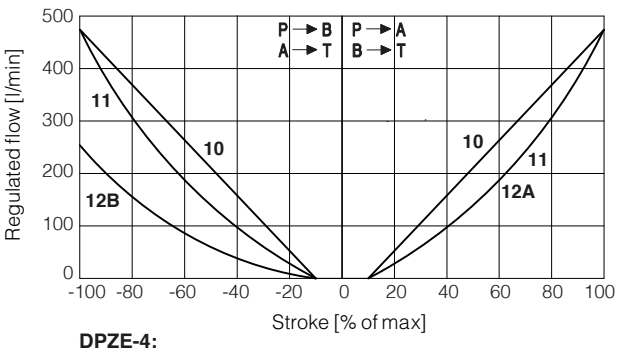
DPZE-1:
1 = L5 **2** = S5 **3A** = D5 (P → A, A → T)
3B = D5 (P → B, B → T)



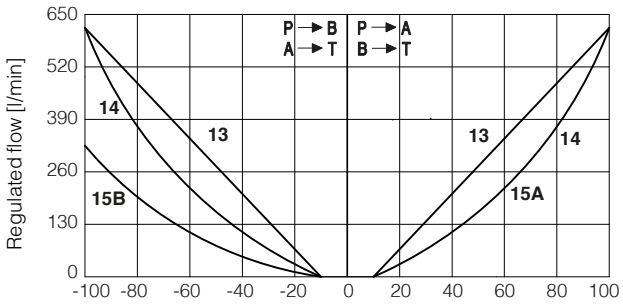
DPZE-2:
4 = L3 **5** = S3 **6A** = D3 (P → A, A → T)
6B = D3 (P → B, B → T)



DPZE-2:
7 = L5 **8** = S5 **9A** = D5 (P → A, A → T)
9B = D5 (P → B, B → T)



DPZE-4:
10 = L5 **11** = S5 **12A** = D5 (P → A, A → T)
12B = D5 (P → B, B → T)



DPZE-6:
13 = L5 **14** = S5 **15A** = D5 (P → A, A → T)
15B = D5 (P → B, B → T)

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

Reference signal 0 ÷ +10 V / 12 ÷ 20 mA } P → A / B → T

Reference signal 0 ÷ - 10 V / 12 ÷ 4 mA } P → B / A → T

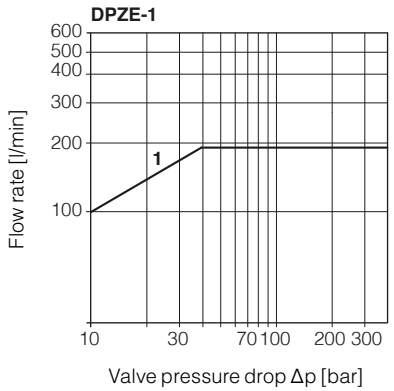
7.2 Flow /Δp diagrams stated at 100% of valve stroke

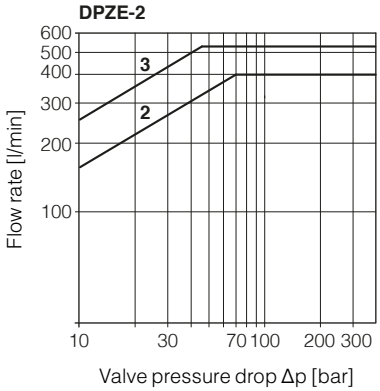
DPZE-1:
1 = spools L5, S5, D5

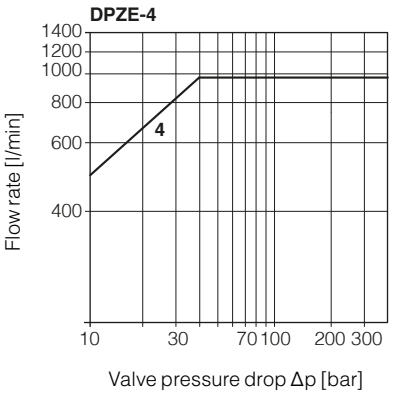
DPZE-2:
2 = spools L3, S3, D3
3 = spools L5, S5, D5

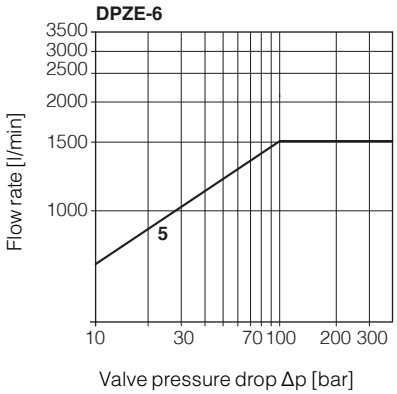
DPZE-4:
4 = spools L5, S5, D5

DPZE-6:
5 = spools L5, S5, D5



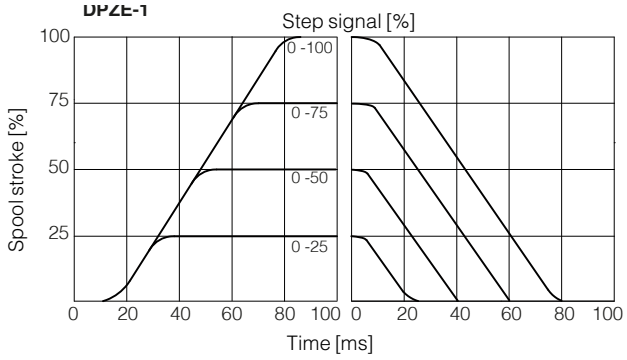


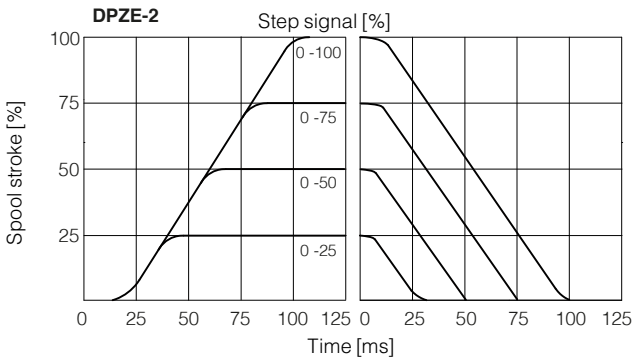


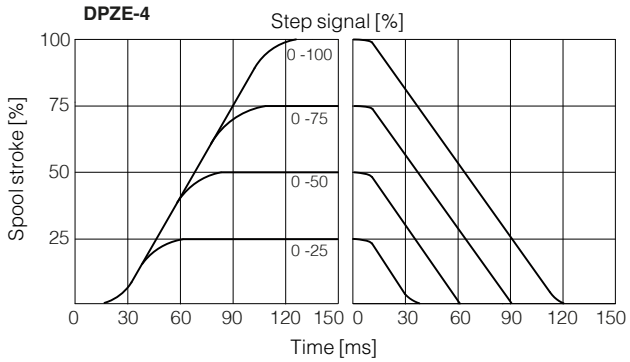


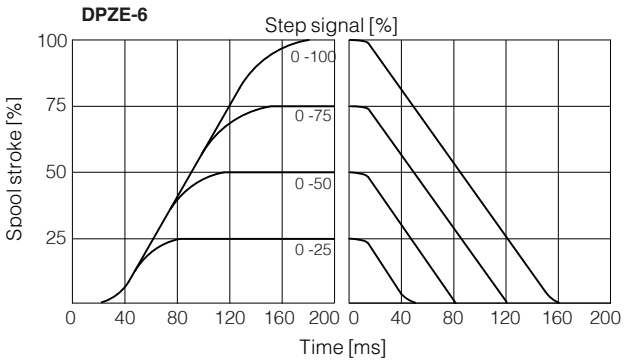
7.3 Response time (measured at pilot pressure = 100 bar)

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.



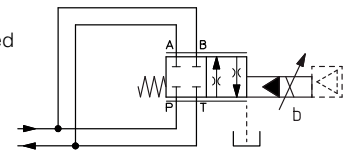






7.4 Operation as throttle valve

Single solenoid valves (*51) can be used as simple throttle valves:
Pmax = 250 bar

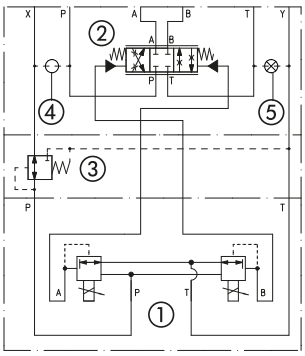


DPZE-A-	151-L5	251-L5	451-L5	651-L5
Max flow [l/min] Δp = 15 bar	320	860	1600	2200

8 CONSTRUCTION OPTIONS

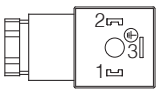
B = solenoid at side B of the main stage (side A of pilot valve).
D = Internal drain.
Pilot and drain configuration can be modified as shown in section 11.
The valve's standard configuration provides internal pilot and external drain.
E = External pilot (through port X).
Pilot and drain configuration can be modified as shown in section 11.
The valve's standard configuration provides internal pilot and external drain.
G = Pressure reducing valve installed between pilot valve and main body with fixed setting:
DPZE-1 and DPZE-2 = **40 bar**DPZE-4 and DPZE-6 = **100 bar**It is advisable for valves with internal pilot in case of system pressure higher than 150 bar.

Functional Scheme
Example of configuration 7*3 positions,
spring centered



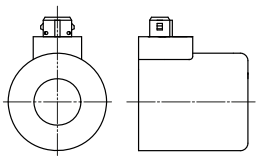
1 - Pilot valve
2 - Main stage
3 - Pressure reducing valve
4 - Plug to be added for external pilot trough port X
5 - Plug to be removed for internal drain through port T

9 SOLENOID CONNECTION

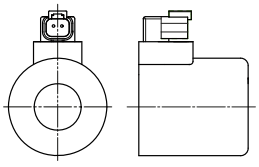
PIN	SIGNAL	TECHNICAL SPECIFICATIONS	Connector code 666
1	**COIL**	Power supply	
2	**COIL**	Power supply	
3	**GND**	Ground	

10 COILS WITH SPECIAL CONNECTORS

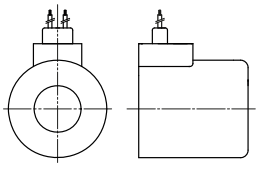
Options -J
Coil type COZEJ
AMP Junior Timer connector
Protection degree IP67



Options -K
Coil type COZEK
Deutsch connector, DT-04-2P male
Protection degree IP67



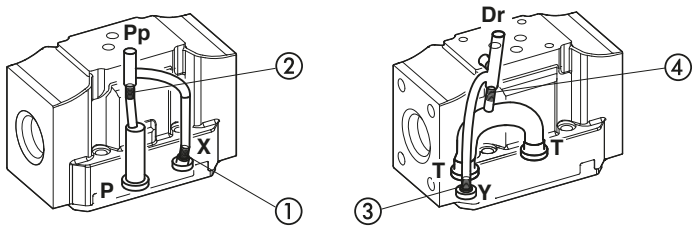
Options -S
Coil type COZES
Lead Wire connection
Cable lenght = 180 mm



11 PLUGS LOCATION FOR PILOT/DRAIN CHANNELS

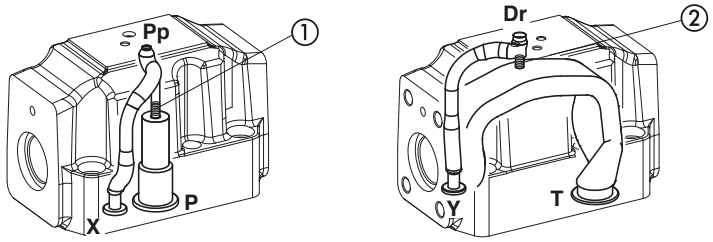
Depending on the position of internal plugs, different pilot/drain configurations can be obtained as shown below.
To modify the pilot/drain configuration, proper plugs must only be interchanged. The plugs have to be sealed using loctite 270.
Standard valves configuration provides internal pilot and external drain

DPZE-1 Pilot channels Drain channels



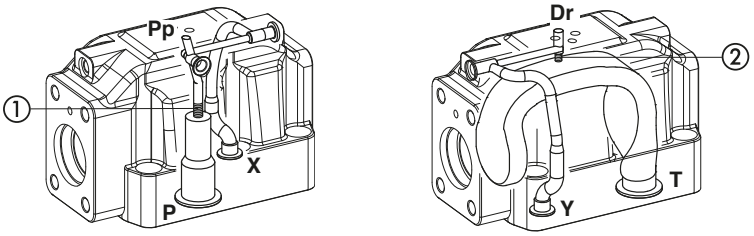
Internal piloting:
blinded plug (1) SP-X300F in X
External piloting:
blinded plug (2) SP-X300F in Pp
Internal drain:
blinded plug (3) SP-X300F in Y
External drain:
blinded plug (4) SP-X300F in Dr

DPZE-2 Pilot channels Drain channels



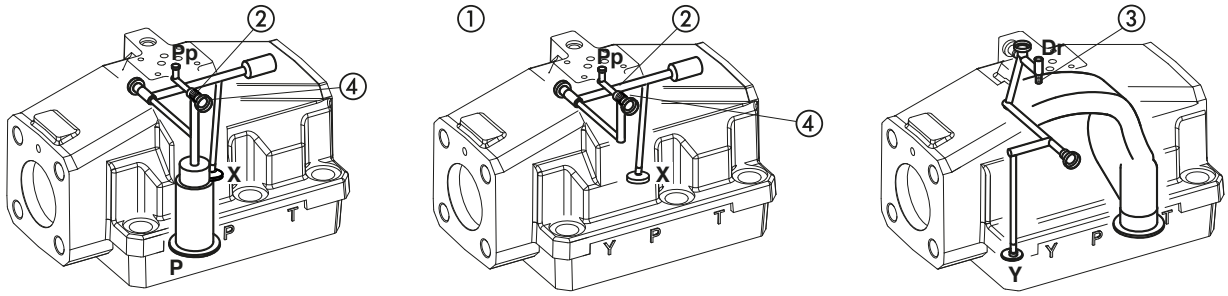
Internal piloting:
without blinded plug (1) SP-X300F
External piloting:
add blinded plug (1) SP-X300F
Internal drain:
without blinded plug (2) SP-X300F
External drain:
add blinded plug (2) SP-X300F

DPZE-4 Pilot channels Drain channels



Internal piloting:
without blinded plug (1) SP-X500F
External piloting:
add blinded plug (1) SP-X500F
Internal drain:
without blinded plug (2) SP-X300F
External drain:
add blinded plug (2) SP-X300F

DPZE-6 Pilot channels Pilot channels Drain channels



Internal piloting:
plug SP-X325A in pos (2)

External piloting:
plug SP-X325A in pos (2)

Internal drain:
Without blinded plug (3) SP-X300F
External drain:
Add blinded plug (3) SP-X300F

To reach the orifice (2), remove plug (4) = G 1/8"

12 FASTENING BOLTS AND SEALS

Type	Size	Fastening bolts	Seals
DPZE	**1** = 10	4 socket head screws M6x40 class 12.9 Tightening torque = 15 Nm	5 OR 2050; Diameter of ports A, B, P, T: Ø 11 mm (max) 2 OR 108 Diameter of ports X, Y: Ø = 7 mm (max)
	2 = 16	4 socket head screws M10x50 class 12.9 Tightening torque = 70 Nm 2 socket head screws M6x45 class 12.9 Tightening torque = 15 Nm	4 OR 130; Diameter of ports A, B, P, T: Ø 20 mm (max) 2 OR 2043 Diameter of ports X, Y: Ø = 9 mm (max)
	4 = 25	6 socket head screws M12x60 class 12.9 Tightening torque = 125 Nm	4 OR 4112; Diameter of ports A, B, P, T: Ø 25 mm (max) 2 OR 3056 Diameter of ports X, Y: Ø = 11.5 mm (max)
	6 = 32	6 socket head screws M20x80 class 12.9 Tightening torque = 600 Nm	4 OR 144; Diameter of ports A, B, P, T: Ø 34 mm (max) 2 OR 3056 Diameter of ports X, Y: Ø = 7 mm (max)

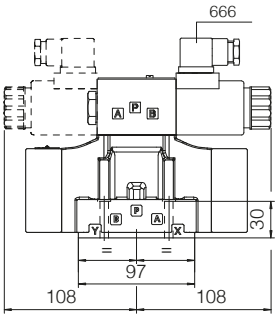
13 INSTALLATION DIMENSIONS [mm]

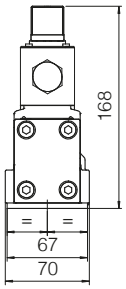
DPZE-1*

ISO 4401: 2005
Mounting surface: 4401-05-05-0-05
(see table P005)

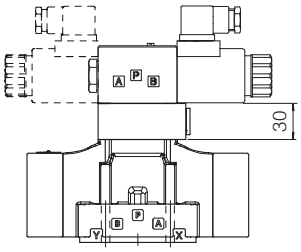
Mass [kg]

	A
DPZE-*-25*	6,9
DPZE-*-27*	7,3
Option /G	+0,9





option /G

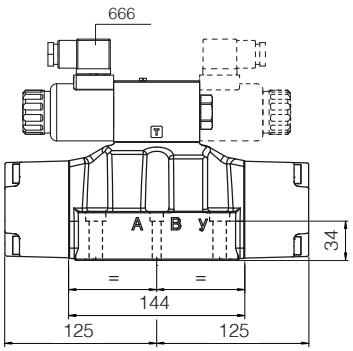


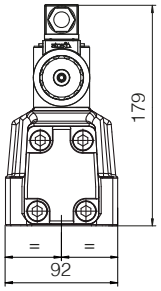
DPZE-2*

ISO 4401: 2005
Mounting surface: 4401-07-07-0-05
(see table P005)

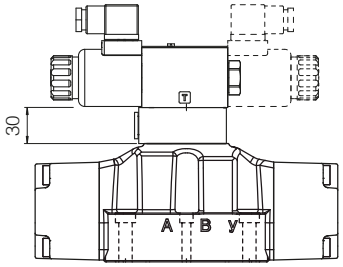
Mass [kg]

	A
DPZE-*-25*	11,9
DPZE-*-27*	12,8
Option /G	+0,9





option /G

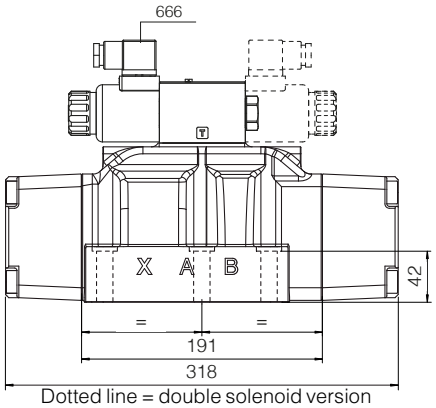


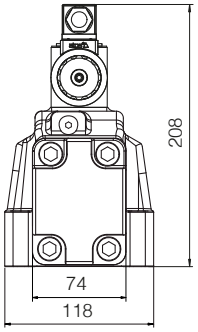
DPZE-4*

ISO 4401: 2005
Mounting surface: 4401-08-08-0-05
(see table P005)

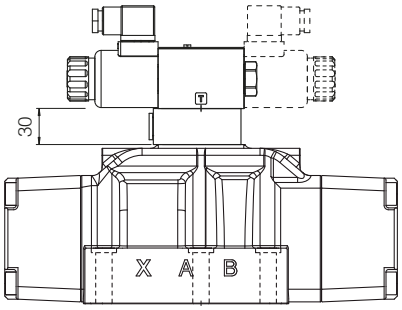
Mass [kg]

	A
DPZE-*-45*	17,1
DPZE-*-47*	18
Option /G	+0,9





option /G

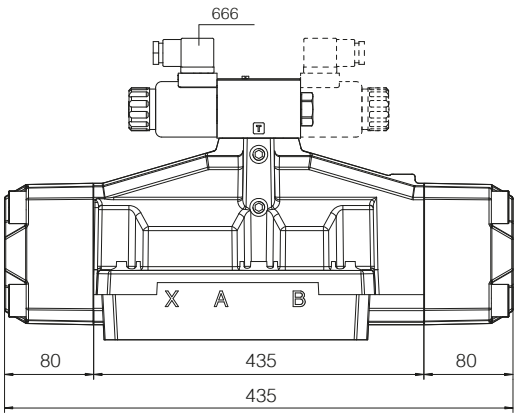


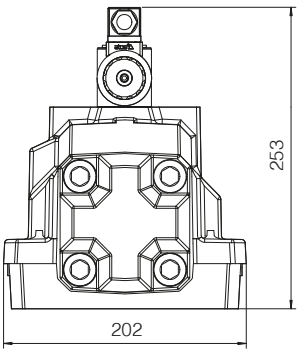
DPZE-6*

ISO 4401: 2005
Mounting surface: 4401-10-09-0-05
(see table P005)

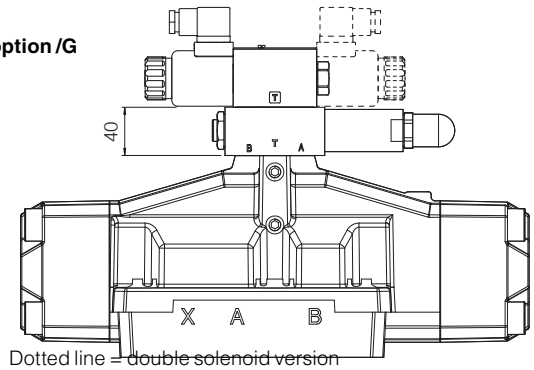
Mass [kg]

	A
DPZE-*-65*	44
DPZE-*-67*	44,5
Option /G	+1





option /G



Dotted line = double solenoid version

14 RELATED DOCUMENTATION

FS001 Basics for digital electrohydraulics
FS900 Operating and maintenance information for proportional valves
G010 E-MI-AC analog driver
G020 E-MI-AS-IR digital driver
G030 E-BM-AS digital driver
GS050 E-BM-AES digital driver
GS500 Programming tools
GS510 Fieldbus
K800 Electric and electronic connectors
P005 Mounting surfaces for electrohydraulic valves