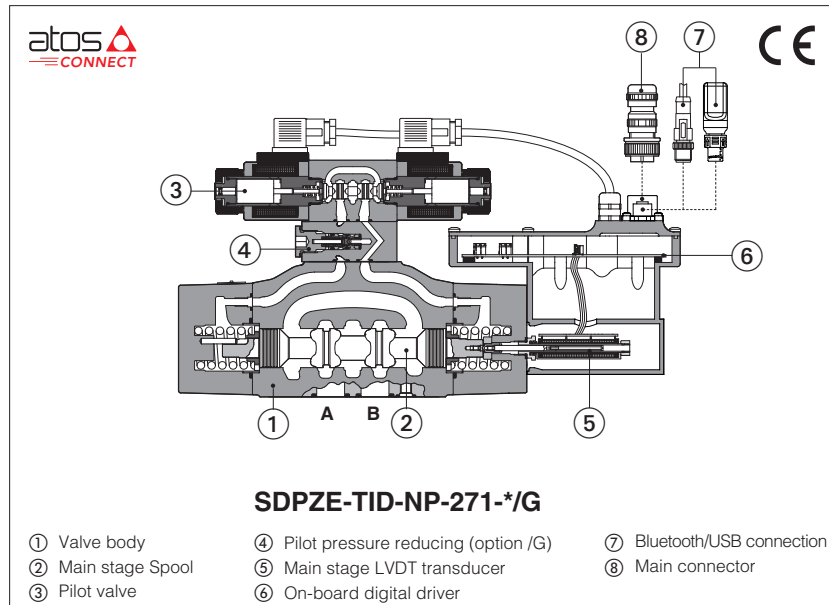


Digital proportional directional valves high performance

piloted, with on-board driver, LVDT transducer and positive spool overlap



SDPZE-TID

Digital high performances proportional directional valves, piloted, with LVDT position transducer (main stage) and positive spool overlap for directional controls and not compensated flow regulations.

TID on board digital driver performs the valve's hydraulic regulation according to the reference signal sent to the 7 pin main connector.

Bluetooth/USB connection is always present for valve settings via mobile App and Atos PC software.

The LVDT transducer grants high regulation accuracy and response sensitivity.

With de-energized proportional solenoids, the mechanical central position of the spool is performed by centering springs.

Size: **16 ÷ 32** - ISO 4401

4/3 way with standard spools

4/4 way with regenerative spools

Max flow: **550 ÷ 1600 l/min**

Max pressure: **350 bar**

1 MODEL CODE

SDPZE	-	TID	-	NP	-	2	71	-	L	5	/	*	/	*	/	*
Proportional directional valve, piloted																
TID = on-board digital driver and LVDT transducer																
Fieldbus interfaces: NP = Not present																
Valve size ISO 4401: 2 = 16 4 = 25 6 = 32 For sizes 16 and 25, on board driver is assembled on LVDT housing, in horizontal position For size 32 on board driver is assembled on pilot valve, in vertical position																
															Series number	
															Seals material, see section 9 :	
															- = NBR	
															PE = FKM	
Bluetooth option (2) , see section 5 :																
T = Bluetooth adapter supplied with the valve																

Hydraulic options (2) (3):

B = on-board digital driver, connection and LVDT transducer at side of port A of the main stage (side B of pilot valve)

D = internal drain

E = external pilot pressure

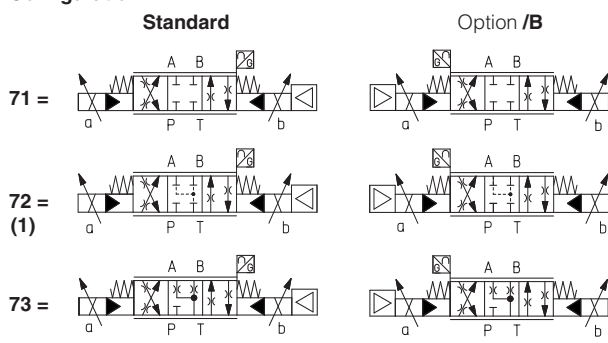
G = pressure reducing valve for piloting

Electronic options (2) :

I = current reference input and monitor 4÷20mA

J = current reference input 4÷20mA and voltage monitor ±10 VDC

Configuration:



Spool size:

	3	5	5	5
Spool type:	L, S, D	L, DL, S, D	L, S, D	L, S, D
Configuration:	71, 73	71, 73	71, 73	72
SDPZE-2 =	160	250	-	250
SDPZE-4 =	-	480	-	480
SDPZE-6 =	-	-	640	-

Nominal flow (l/min) at Δp 10 bar P-T (see section 7)

Spool type, regulating characteristics (4), see section 10

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

(1) Only for SDPZE sizes 2, 4, with spools L5, S5 or D5 see 9.4

(2) For possible combined options, see section 13

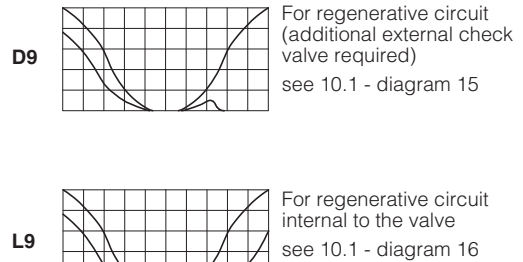
(3) Pilot and Drain configuration: standard configuration is internal pilot and external drain, other configurations on request

(4) For regenerative circuit select configuration 71 or 73 with specific spools D9 or L9, see section 2

2 SPOOLS SPECIFIC FOR REGENERATIVE CIRCUIT - for valve model code and options, see section 1

SDPZE		- TID		- NP		2		71 - L9		/ *		/ *		* /		* /	
Configuration and spool:																	
Standard									Option /B								
71-D9																	
71-L9																	
73-D9																	
73-L9																	
Spool type and size:																	
		D9				L9											
SDPZE-2 =		250				250											
SDPZE-4 =		480				-											
SDPZE-6 =		-				-											
Nominal flow (l/min) at Δp 10 bar P-T																	

D9				For regenerative circuit (additional external check valve required) see 10.1 - diagram 15	
L9				For regenerative circuit internal to the valve see 10.1 - diagram 16	



3 GENERAL NOTES

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 VALVE SETTINGS AND PROGRAMMING TOOLS - see tech. table GS500-SH

Atos CONNECT mobile App

Free downloadable App for smartphones and tablets which allows quick access to valve main functional parameters and basic diagnostic information via Bluetooth, thus avoiding physical cable connection and significantly reducing commissioning time. Atos CONNECT supports Atos digital valve drivers equipped with E-A-BTH adapter or with built-in Bluetooth. It does not support valves with p/Q control or axis controls.



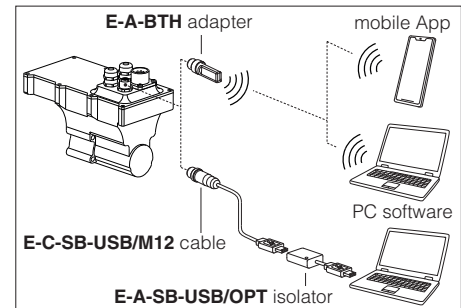
E-SW-SETUP PC software

Free downloadable software for PC allows to set all valve functional parameters and to access complete diagnostic information of digital valve drivers via Bluetooth/USB service port. Atos E-SW-SETUP PC software supports all Atos digital valve drivers and it is available at www.atos.com in MyAtos area.

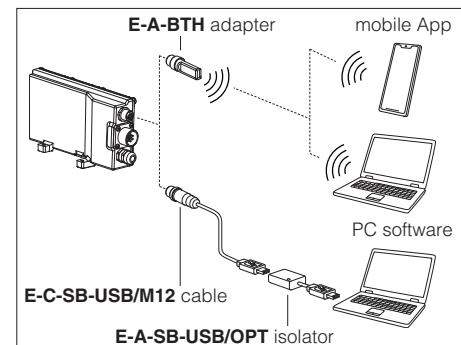


WARNING: drivers USB port is not isolated! For E-C-SB-USB/M12 cable, the use of E-A-SB-USB/OPT isolator is highly recommended for PC protection

Bluetooth or USB connection (SDPZE sizes 2, 4)



Bluetooth or USB connection (SDPZE size 6)



5 BLUETOOTH OPTION - see tech. table GS500-SH

T option adds Bluetooth® connectivity to Atos valve drivers thanks to E-A-BTH adapter, which can be left permanently installed on-board, to allow the Bluetooth connection with the valve drivers at any time. E-A-BTH adapter can also be purchased separately and used to connect with any supported Atos digital product.

Bluetooth connection to the valve can be protected against unauthorised access by setting a personal password. The adapter leds visually indicates the status of valve driver and Bluetooth connection.



WARNING: for the list of countries where the Bluetooth adapter has been approved, see tech. table **GS500-SH**
T option is not available for the Indian market, so the Bluetooth adapter must be ordered separately.

6 GENERAL CHARACTERISTICS

Assembly position	Any position
Subplate surface finishing to ISO 4401	Acceptable roughness index: $R_a \leq 0,8$, recommended $R_a 0,4$ – Flatness ratio 0,01/100
MTTFd valves according to EN ISO 13849	75 years, for further details see technical table P007
Ambient temperature range	Standard = $-20^{\circ}\text{C} \div +60^{\circ}\text{C}$ /PE option = $-20^{\circ}\text{C} \div +60^{\circ}\text{C}$
Storage temperature range	Standard = $-20^{\circ}\text{C} \div +70^{\circ}\text{C}$ /PE option = $-20^{\circ}\text{C} \div +70^{\circ}\text{C}$
Surface protection	Zinc coating with black passivation (body), tin plating (driver housing)
Corrosion resistance	Salt spray test (EN ISO 9227) > 200 h
Vibration resistance	See technical table G004
Compliance	CE according to EMC directive 2014/30/EU (Immunity: EN 61000-6-2; Emission: EN 61000-6-3) RoHS Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006

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

Valve model	SDPZE- *-2		SDPZE- *-4	SDPZE- *-6
Pressure limits [bar]	ports P, A, B, X = 350; T = 250; Y = 10;			
Spool type and size (1)	standard	L3, S3, D3	L5, DL5, S5, D5	L5, S5, D5
	regenerative		D9, L9	D9
Nominal flow Δp P-T (2) [l/min]				
$\Delta p = 10$ bar	160	250	480	640
$\Delta p = 30$ bar	270	430	830	1100
Max permissible flow	400	550	1000	1600
Piloting pressure [bar]	min. = 25; max = 350			
Piloting volume [cm³]	3,7		9,0	21,6
Piloting flow (3) [l/min]	3,7		6,8	14,4
Leakage (4)	Pilot [l/min]	0,1 / 0,3	0,2 / 0,5	0,9 / 2,8
	Main stage [l/min]	0,2 / 0,6	0,3 / 1,0	1,0 / 3,0
Response time (5) [ms]	≤ 70 (75)		≤ 75 (90)	≤ 110 (130)
Hysteresis	≤ 1 [% of max regulation]			
Repeatability	$\pm 0,5$ [% of max regulation]			
Thermal drift	zero point displacement < 1% at $\Delta T = 40^{\circ}\text{C}$			

(1) For spool type **D** and **DL** the flow value is referred to single path P-A (A-T) at $\Delta p/2$ per control edge. The flow P-B (B-T) is 50% of P-A (A-T)

(2) For different Δp , the max flow is in accordance to the diagrams in section 10.2

(3) With step reference input signal 0 ÷ 100 %

(4) At $p = 100/350$ bar

(5) 0-100% step signal see detailed diagrams in section 10.3; values in the brackets are referred to response time for valves with option /G



WARNING: for correct operation of the valve, the return lines Y (and T for /D version) must not be empty, we recommend installing a back pressure valve with a setting of approximately 2 bar.

8 ELECTRICAL CHARACTERISTICS

Power supplies	Nominal : +24 VDC Rectified and filtered : $V_{RMS} = 20 \div 32 V_{MAX}$ (ripple max 10 % VPP)
Max power consumption	50 W
Max. solenoid current	2,6 A
Coil resistance R at 20°C	3,1 Ω
Analog input signals	Voltage: range ± 10 VDC (24 VMAX tollerant) Current: range ± 20 mA Input impedance: $R_i > 50 \text{ k}\Omega$ Input impedance: $R_i = 500 \Omega$
Monitor outputs	Output range: voltage ± 10 VDC @ max 5 mA current ± 20 mA @ max 500 Ω load resistance
Alarms	Solenoid not connected/short circuit, cable break with current reference signal, over/under temperature, valve spool transducer malfunctions, alarms history storage function
Insulation class	H (180°) Due to the occurring surface temperatures of the solenoid coils, the European standards ISO 13732-1 and EN982 must be taken into account
Protection degree to DIN EN60529	IP66 / IP67 with mating connectors
Duty factor	Continuous rating (ED=100%)
Additional characteristics	Short circuit protection of solenoid's current supply; spool position control by P.I.D. with rapid solenoid switching; protection against reverse polarity of power supply
Communication interface	USB - Atos ASCII coding
Communication physical layer	not insulated - USB 2.0 + USB OTG
Recommended wiring cable	LiYCY shielded cables, see section 16

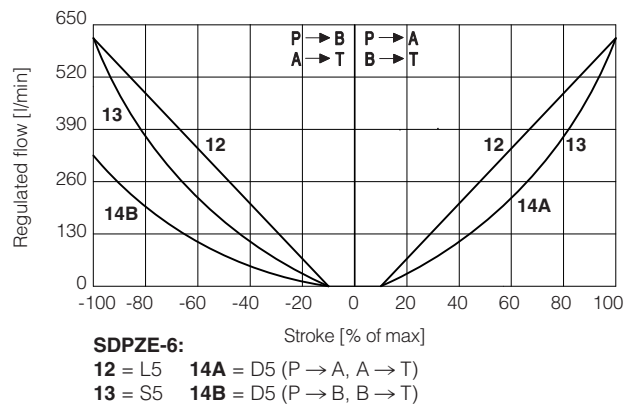
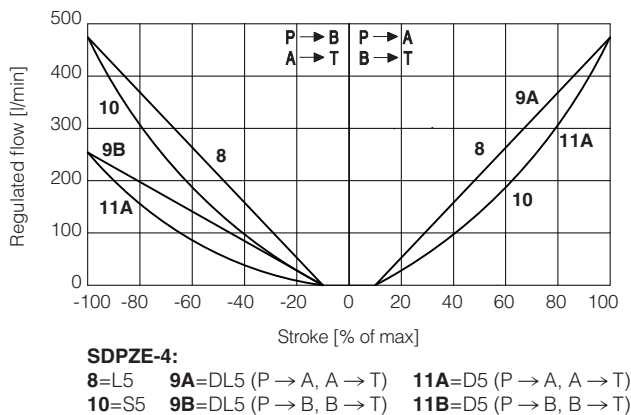
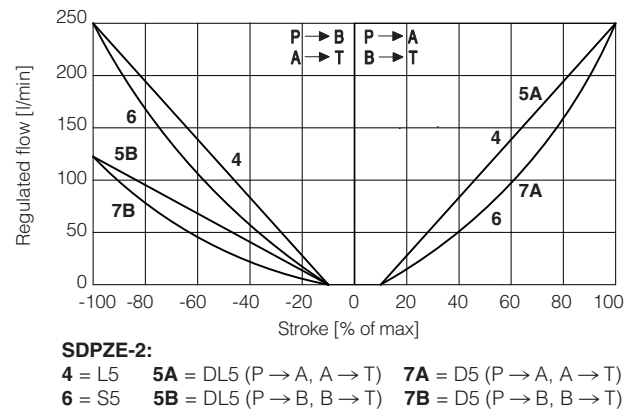
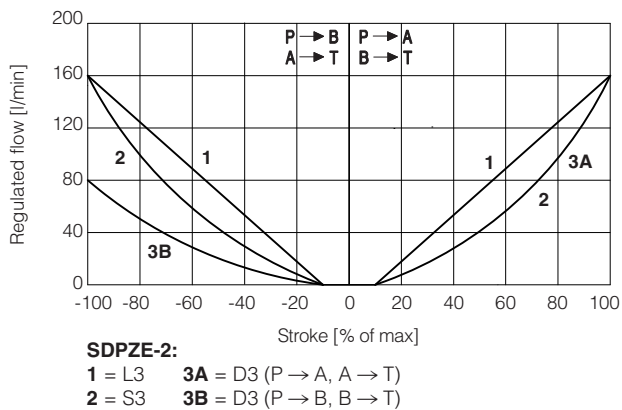
Note: a maximum time of 400 ms has to be considered between the driver energizing with the 24 Vdc power supply and when the valve is ready to operate. During this time the current to the valve coils is switched to zero.

9 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 ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C		
Recommended viscosity	20 ÷ 100 mm²/s - max allowed range 15 ÷ 380 mm²/s		
Max fluid contamination level	normal operation longer life	ISO4406 class 18/16/13 NAS1638 class 7 ISO4406 class 16/14/11 NAS1638 class 5	see also filter section at www.atos.com or KTF catalog
Hydraulic fluid	Suitable seals type	Classification	Ref. Standard
Mineral oils	NBR, FKM	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFDU, HFDR	ISO 12922
Flame resistant with water	NBR	HFC	

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

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



Note:

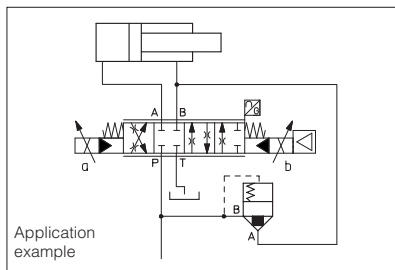
Hydraulic configuration vs. reference signal (standard and option /B)

Reference signal $\frac{0 \div +10 \text{ V}}{12 \div 20 \text{ mA}}$ } P → A / B → T

Reference signal $\frac{0 \div -10 \text{ V}}{12 \div 4 \text{ mA}}$ } P → B / A → T

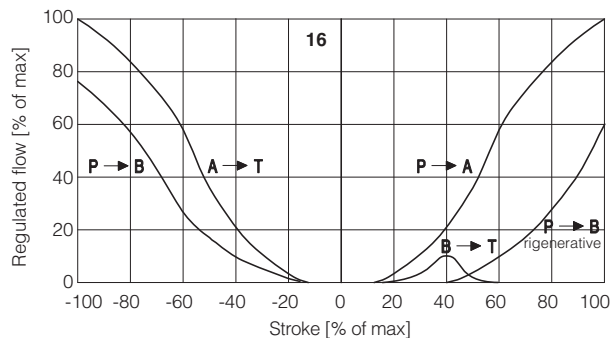
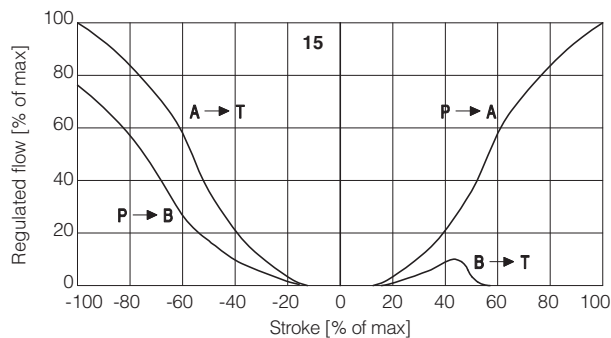
15 = differential - regenerative spool **D9**
(not available for valve size 32)

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



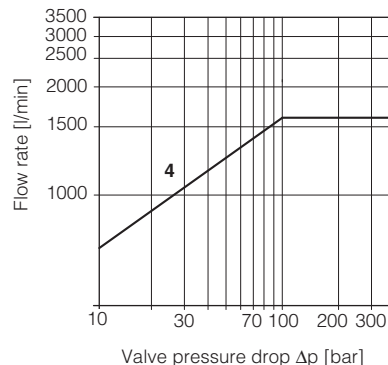
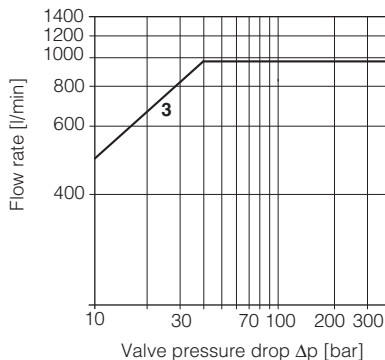
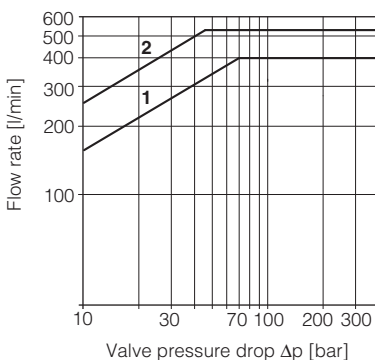
16 = linear - internal regenerative spool **L9**
(available only for valve size 16)

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



10.2 Operating diagrams

Flow /Δp diagram stated at 100% of spool stroke



SDPZE-2:

- 1** = spools L3, S3, D3
2 = spools L5, S5, D5, DL5, D9, L9

SDPZE-4:

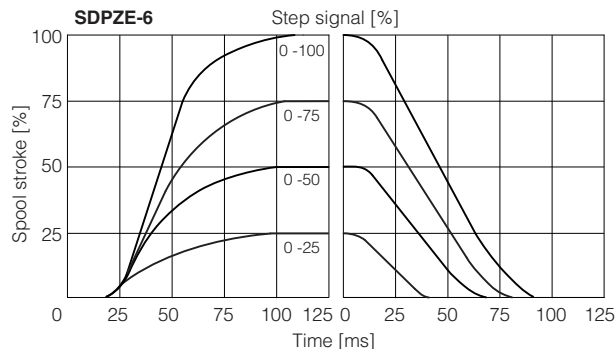
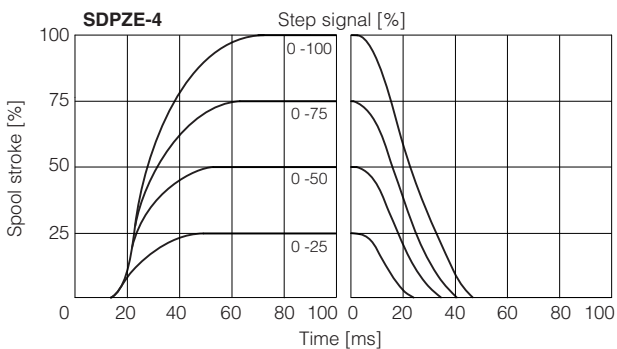
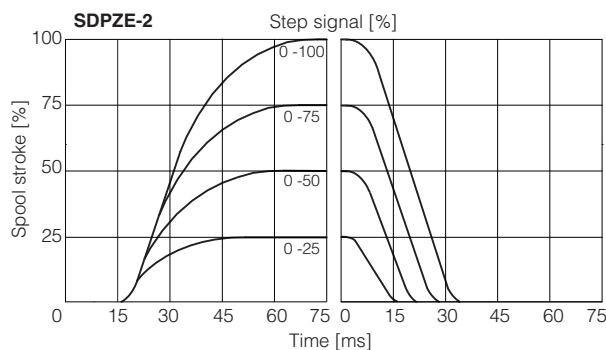
- 3** = spools L5, S5, D5, DL5, D9

SDPZE-6:

- 4** = L5, S5, D5

10.3 Response time

The response times in below diagrams are measured at different steps of the reference input signal, with a pilot pressure 100 bar. 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.

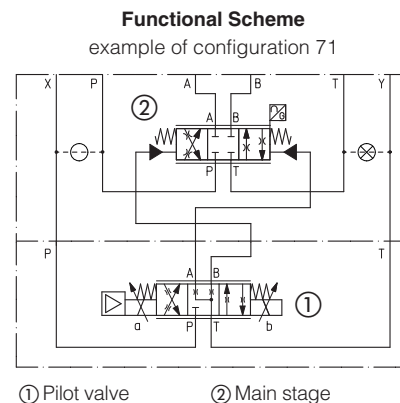


10.4 Configuration 72

Only for **SDPZE** sizes **2** and **4** with spools **L5**, **S5** or **D5**: in central position the leakages P-A and P-B are drained to tank, avoiding the drift of cylinders with differential areas.

11 HYDRAULIC OPTIONS

- B** = Configurations 71, 73: on-board digital driver connectors and LVDT transducer at side of port A of the main stage (side B of pilot valve).
For hydraulic configuration vs reference signal, see 10.1
- D** = Internal drain.
Pilot and drain configuration can be modified as shown in section 17.
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 17.
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:
SDPZE-2, SDPZE-4 and SDPZE-6 = **40 bar**



12 ELECTRONIC OPTIONS

- I** = This option provides $4 \div 20$ 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.
- J** = This option provides $4 \div 20$ mA current reference and ± 10 Vdc voltage monitor signals.
The valve functioning is disabled in case of reference signal cable breakage.

13 POSSIBLE COMBINED OPTIONS

All combination possible (except **I** with **J**)

Note: **IT** Bluetooth adapter option can be combined with all other options

14 POWER SUPPLY AND SIGNALS SPECIFICATIONS

14.1 Power supply (V+ and V0)

The power supply must be appropriately stabilized or rectified and filtered: apply at least a 10000 μ F/40 V capacitance to single phase rectifiers or a 4700 μ F/40 V capacitance to three phase rectifiers.



A safety fuse is required in series to the power supply: 2,5 A time lag fuse.

14.2 Flow reference input signal (Q_INPUT+)

The driver controls in closed loop the valve spool position proportionally to the external reference input signal.

Standard (voltage reference input): default is ± 10 Vdc and can be reconfigured via software, within a maximum range of ± 10 Vdc.

Options /I and /J (current reference input): default is $4 \div 20$ mA and can be reconfigured via software, within a maximum range of ± 20 mA.

14.3 Flow monitor output signal (Q_MONITOR)

The driver generates an analog output signal proportional to the actual spool position of the valve; the monitor output signal can be software set to show other signals available in the driver.

Standard and option /J (voltage monitor output): default is ± 10 Vdc and can be reconfigured via software, within a maximum range of ± 10 Vdc.

Options /I and /J (current monitor output): default is $4 \div 20$ mA and can be reconfigured via software, within a maximum range of ± 20 mA.

Note:

monitor output signal 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, ISO 4413).

15 ELECTRONIC CONNECTIONS

15.1 Main connector signals - 7 pin (A1) (A2)

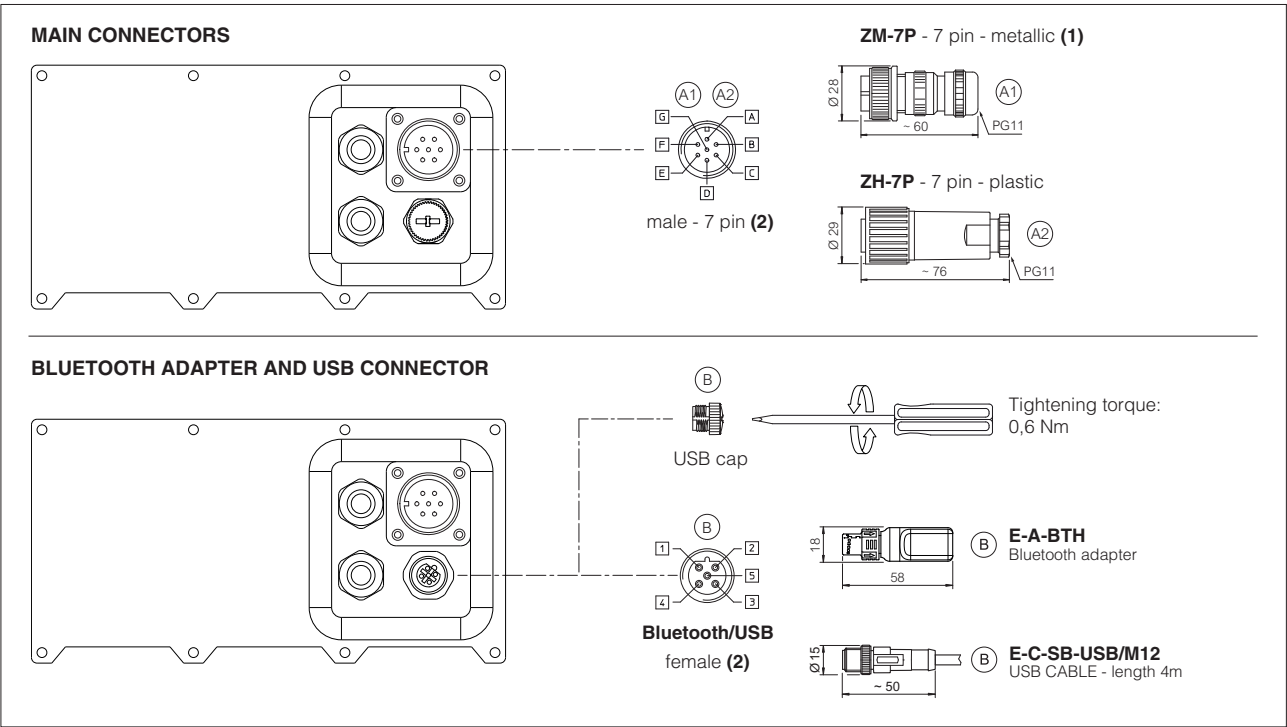
PIN	SIGNAL	TECHNICAL SPECIFICATIONS	NOTES
A	V+	Power supply 24 Vdc	Input - power supply
B	V0	Power supply 0 Vdc	Gnd - power supply
C	AGND	Analog ground	Gnd - analog signal
D	Q_INPUT+	Flow reference input signal: ± 10 Vdc for standard, $4 \div 20$ mA for /I and /J options	Input - analog signal
E	INPUT-	Negative reference input signal for Q_INPUT+	Input - analog signal
F	Q_MONITOR	Flow monitor output signal: ± 10 Vdc for standard and /J option, $4 \div 20$ mA for /I option, referred to AGND	Output - analog signal
G	EARTH	Internally connected to driver housing	

15.2 USB connector - M12 5 pin (B)

PIN	SIGNAL	TECHNICAL SPECIFICATION (1)
1	+5V_USB	Power supply
2	ID	Identification
3	GND_USB	Signal zero data line
4	D-	Data line -
5	D+	Data line +

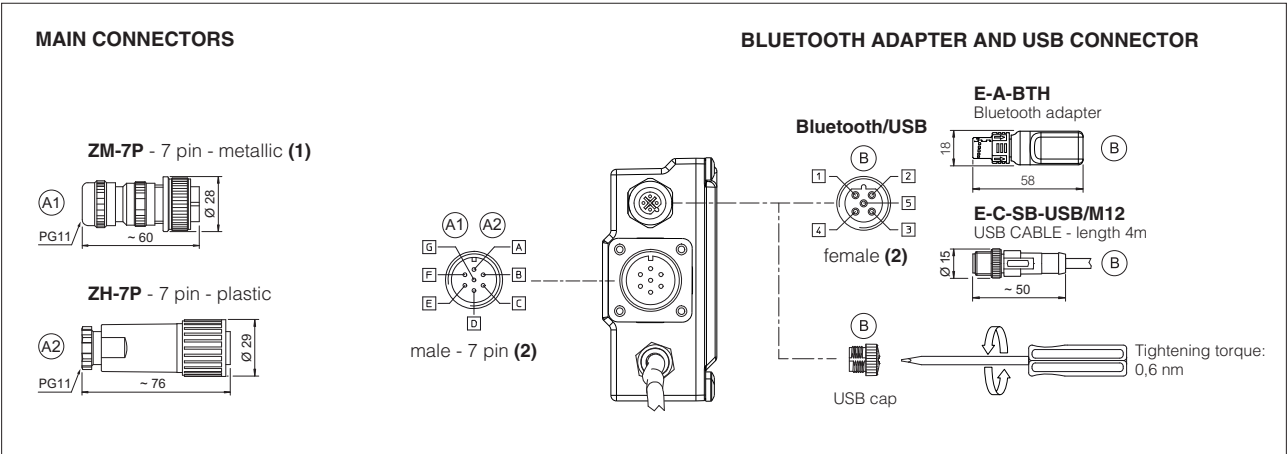
(1) Shield connection on connector housing is recommended

15.3 SDPZE-2 and SDPZE-4 connections layout



(1) use of metallic connectors is strongly recommended in order to fulfill EMC requirements (2) pin layout always referred to driver's view

15.4 SDPZE-6 connection layout



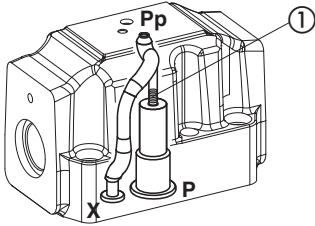
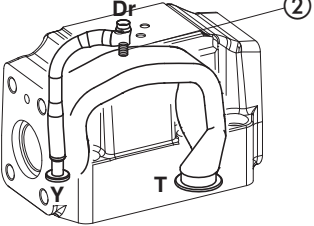
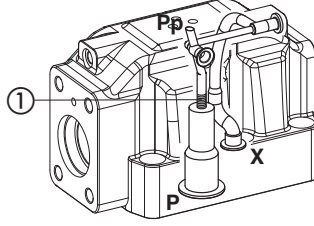
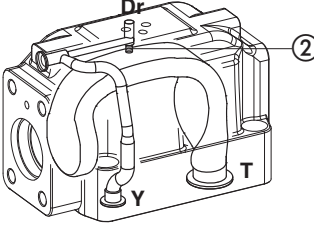
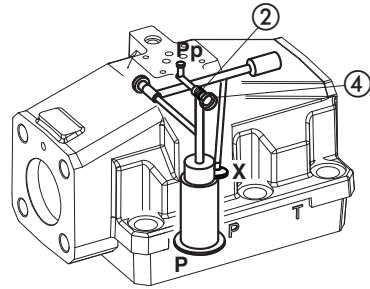
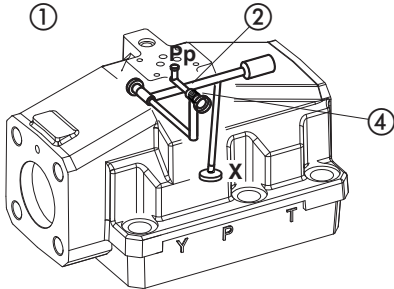
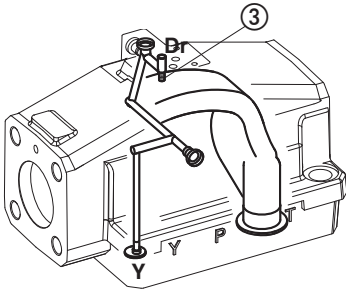
(1) use of metallic connectors is strongly recommended in order to fulfill EMC requirements (2) pin layout always referred to driver's view

16 CONNECTORS CHARACTERISTICS - to be ordered separately

CONNECTOR TYPE	POWER SUPPLY	POWER SUPPLY
CODE	(A1) ZM-7P	(A2) ZH-7P
Type	7pin female straight circular	7pin female straight circular
Standard	According to MIL-C-5015	According to MIL-C-5015
Material	Metallic	Plastic reinforced with fiber glass
Cable gland	PG11	PG11
Recommended cable	LiYCY 7 x 0,75 mm ² max 20 m (logic and power supply) or LiYCY 7 x 1 mm ² max 40 m (logic and power supply)	LiYCY 7 x 0,75 mm ² max 20 m (logic and power supply) or LiYCY 7 x 1 mm ² max 40 m (logic and power supply)
Conductor size	up to 1 mm ² - available for 7 wires	up to 1 mm ² - available for 7 wires
Connection type	to solder	to solder
Protection (EN 60529)	IP 67	IP 67

17 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

SDPZE-2 Pilot channels	Drain channels	Internal piloting: Without blinded plug SP-X300F ①; External piloting: Add blinded plug SP-X300F ①; Internal drain: Without blinded plug SP-X300F ②; External drain: Add blinded plug SP-X300F ②.
		
SDPZE-4 Pilot channels	Drain channels	Internal piloting: Without blinded plug SP-X500F ①; External piloting: Add blinded plug SP-X500F ①; Internal drain: Without blinded plug SP-X300F ②; External drain: Add blinded plug SP-X300F ②.
		
SDPZE-6 Pilot channels	Pilot channels	Drain channels
		
Internal piloting: plug SP-X325A in pos ②; To reach the orifice ②, remove plug ④ = G 1/8"	External piloting: plug SP-X325A in pos ②;	Internal drain: Without blinded plug SP-X300F ③; External drain: Add blinded plug SP-X300F ③.

18 FASTENING BOLTS AND SEALS

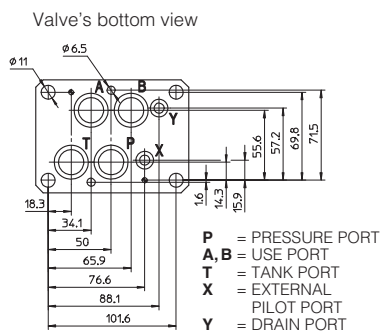
Type	Size	Fastening bolts	Seals
SDPZE	2 = 16	4 socket head screws M10x50 class 12.9 Tightening torque = 70 Nm 2 socket head screws M6x45 class 12.9 Tightening torque = 15 Nm	4 OR 130; Diameter of ports A, B, P, T: Ø 20 mm (max) 2 OR 2043 Diameter of ports X, Y: Ø = 7 mm (max)
	4 = 25	6 socket head screws M12x60 class 12.9 Tightening torque = 125 Nm	4 OR 4112; Diameter of ports A, B, P, T: Ø 24 mm (max) 2 OR 3056 Diameter of ports X, Y: Ø = 7 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)

SDPZE-TID-NP-2*

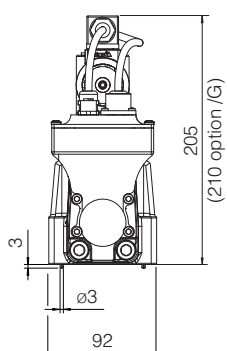
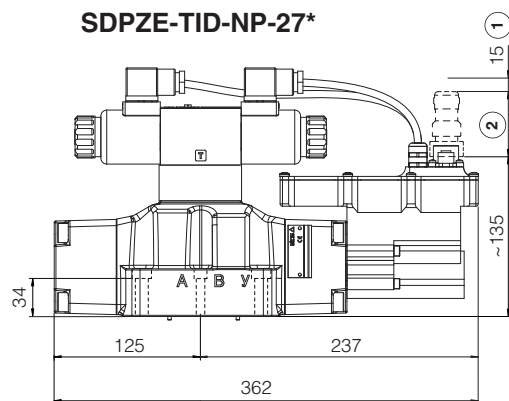
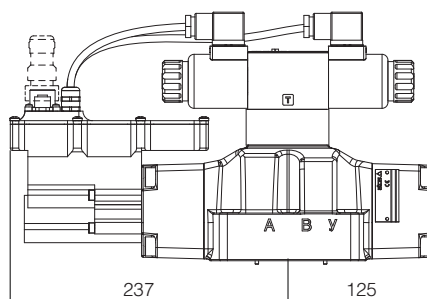
ISO 4401: 2005

Size 16

Mounting surface: 4401-07-07-0-05



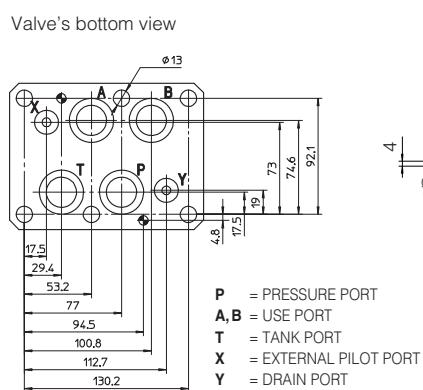
Mass [kg]	
SDPZE-*-27	14,8

**SDPZE-TID-NP-27*****SDPZE-TID-NP-27*/B****SDPZE-TID-NP-4***

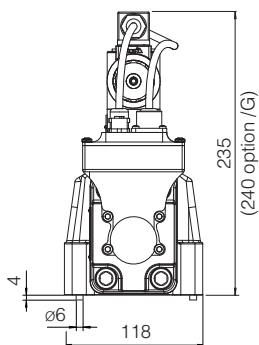
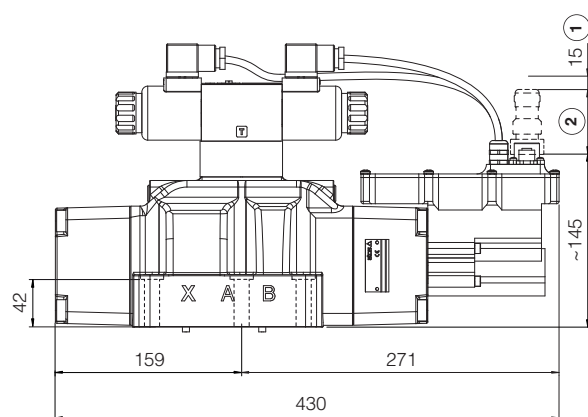
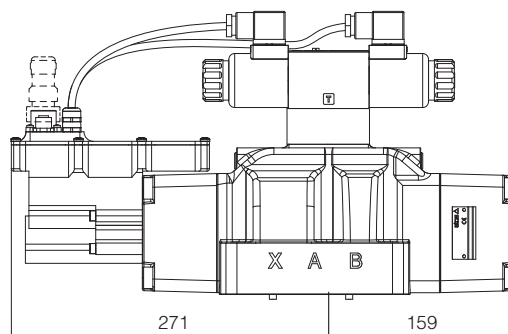
ISO 4401: 2005

Size 25

Mounting surface: 4401-08-08-0-05



Mass [kg]	
SDPZE-*-47	19,3

**SDPZE-TID-NP-47*****SDPZE-TID-NP-47*/B**

① = Space to remove the connectors

② = The dimensions of all connectors must be considered, see section 15.3

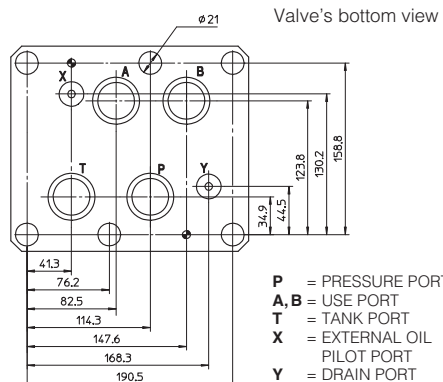
SDPZE-TID-NP-6*

ISO 4401: 2005

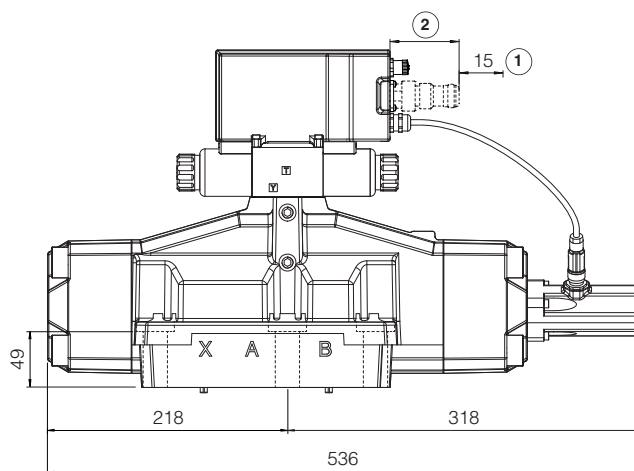
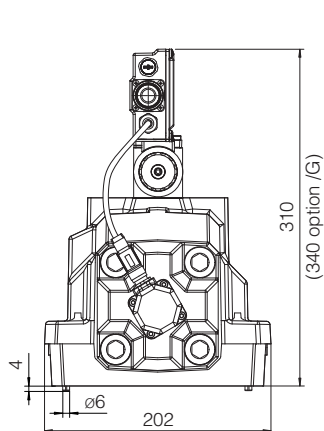
Size 32

Mounting surface: 4401-10-09-0-05

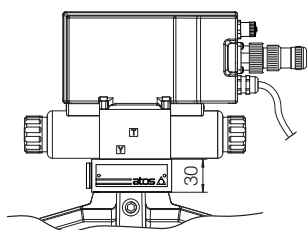
Mass [kg]	
SDPZE-*-67	43,3



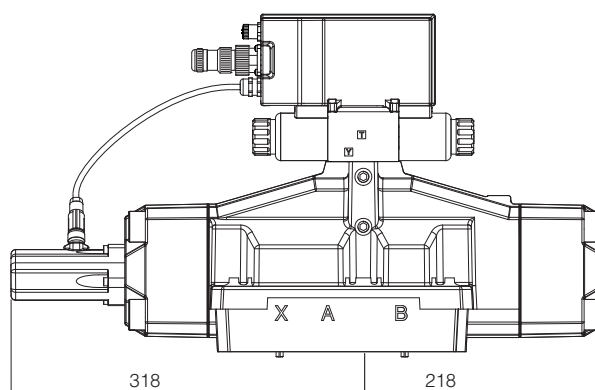
SDPZE-TID-NP-67*



Option /G



SDPZE-TID-NP-67*/B



① = Space to remove the connectors

② = The dimensions of all connectors must be considered, see section 15.4