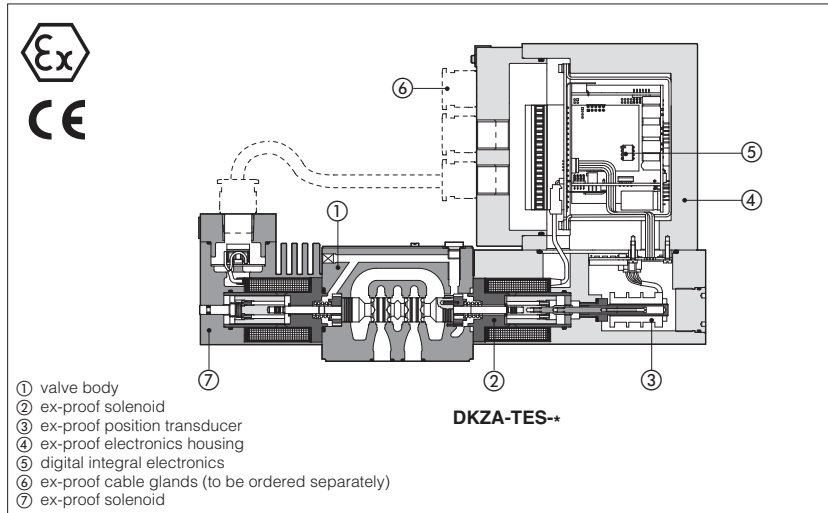


# Ex-proof proportional valves with integral digital drivers

with or without integral position or pressure transducer - ATEX or IECEx certification



Ex-proof ZA valves are proportional valves equipped with specific solenoids and integral digital electronic drivers available with following certifications and protection mode:

- ATEX 94/9/CE  
Ex II 2 G Ex d IIC T6/T5/T4/T3 (group II for surface plants with gas or vapours environment, category 2, zone 1 and 2)
- IECEx worldwide recognized safety certification, Ex d IIC T6/T5/T4/T3 Gb IP66

The solenoid and the electronics housing are designed to contain the possible explosion which could be caused by the presence of the gas mixture inside the housing, thus avoiding dangerous propagation in the external environment. They are also designed to limit the external temperature according to the certified class to avoid the self ignition of the explosive mixture present in the environment.

The integral digital drivers in explosion proof construction provides consistent advantages respect to the separated analog drivers for ex-proof valves:

- compact execution
- simplified valve wiring
- reduced risk of electromagnetic disturbances on the valve's transducer feedback signal
- possibility to exploit in hazardous environment all the advantages provided by the standard digital electronics: software setting of the main functional parameters as bias, ramps, scale, linearization of the hydraulic regulation characteristic
- complete diagnostics of the driver status, and fault condition.

Following communication interfaces are available:

- PS, Serial communication interface for configuration, monitoring and firmware updating through Atos PC software.
- BC, CANopen interface
- BP, PROFIBUS DP interface

The valves with BC and BP interfaces can be integrated into a fieldbus communication network and thus digitally operated by the machine control unit.

The ex-proof digital integral electronics is available for the full range of proportional valves, as shown in the following pages.

## 1 EXPLOSION PROOF CERTIFICATION MAIN DATA

<b>ATEX certification</b>	<b>Ex II 2G Ex d IIC T6/T5/T4/T3</b>			
<b>IECEx certification</b>	<b>Ex d IIC T6/T5/T4/T3 Gb IP66</b>			
<b>VALVE TYPE</b>	DOUBLE SOLENOID VALVES (with or without transducer)		SINGLE SOLENOID VALVES (with or without transducer)	
Temperature class (only for Group II)	<b>T4</b>	<b>T3</b> (option /7)	<b>T6</b>	<b>T5</b> (option /7)
Surface temperature	≤ 135 °C	≤ 200 °C	≤ 85 °C	≤ 100 °C
Ambient temperature	-20 ÷ +40 °C	-20 ÷ +60 °C	-20 ÷ +45 °C	-20 ÷ +60 °C
Protection degree	IP66 According to IEC 144 when correctly coupled with the relevant cable gland see section 2.2			
Mechanical construction	Flame proof housing classified Ex d, according to EN 60079-0: 2006, EN 60079-1: 2007			
Cable entrance and electrical wiring	Internal terminal board for cable connections M20x1.5 threaded connection for cable entrance			

**Note:** This technical table contains information about ex-proof certification data, model codes, dimensions and wiring of the ex-proof proportional valves with integral digital electronics.

For detailed information about:

-valve's functional characteristics and mounting surface dimensions

-digital drivers technical data and functional parameters setting

see the relevant technical tables of the standard proportional valves and digital drivers.

## 2 MAIN CHARACTERISTICS OF EX-PROOF PROPORTIONAL VALVES

Assembly position	Any position
Subplate surface finishing	Roughness index, Ra 0,4 flatness ratio 0,01/100 (ISO 1101)
Ambient temperature	See section 1.1
Fluid	Hydraulic oil as per DIN 51524 ... 535 for other fluids see model code sections
Recommended viscosity	15 ÷ 100 mm <sup>2</sup> /s at 40°C (ISO VG 15÷100)
Fluid contamination class	ISO 4406 class 20/18/15 NAS 1638 class 9, in line filters of 10 µm (β <sub>10</sub> ≥ 75 recommended)
Fluid temperature	-20°C +60°C (standard seals) -20°C +80°C (/PE seals)

## 3 CERTIFICATION

In the following are resumed the valves marking according to ATEX 94/9/CE and IECEx

### 3.1 GROUP II, ATEX

**Ex** = ATEX identification for explosive atmospheres

**II** = Group II for surfaces plants

**2** = High protection (equipment category)

**G** = For gas and vapours

**d** = Flame proof housing

**IIC** = Gas group

**T6/T5/T4/T3** = Temperature class of solenoid surface referred to the max ambient temperature

**Zone 1** = Possibility of explosive atmosphere during normal functioning

**Zone 2** = Low probability of explosive atmosphere



**WARNING:** service work provided on the valve by the end users or not qualified personnel invalidates the certification

### 3.2 GROUP II, IECEx

**Ex** = Equipment for explosive atmospheres

**d** = Flame proof housing

**IIC** = Gas group

**T6/T5/T4/T3** = Temperature class of solenoid surface

**Gb** = Equipment protection level, high level protection for explosive Gas atmospheres

**IP66** = Protection degree

**4 MODEL CODE OF EX-PROOF PROPORTIONAL DIRECTIONAL VALVES DIRECT OPERATED**

<b>DHZA</b>	/	<b>IE</b>	-	<b>TES</b>	-	<b>PS</b>	-	<b>0</b>	<b>7</b>	<b>1</b>	-	<b>L</b>	<b>5</b>	/	<b>M</b>	<b>7</b>	/	<b>**</b>	/	<b>*</b>	
<b>DHZA</b> = size 06 <b>DKZA</b> = size 10																				Seals material: - = NBR <b>PE</b> = FKM	
Certification (omit for ATEX): <b>IE</b> = IECEx																				Series number	
<b>AES</b> = without integral position transducer <b>TES</b> = with integral position transducer																				Options: <b>7</b> = for ambient temp. up to 60°C <b>B</b> = solenoid with integral digital electronics at side of port A <b>C</b> = current feedback 4 ÷ 20 mA for remote transducer, only for <b>W</b> (only AES) <b>I</b> = current reference 4 ÷ 20 mA, omit for standard voltage reference ±10 V <sub>bc</sub> <b>W</b> = power limitation function (only AES) <b>Y</b> = external drain	
Communication interfaces: <b>PS</b> = Serial (1) <b>BC</b> = CANopen <b>BP</b> = PROFIBUS DP																				Cable entrance threaded connection: <b>M</b> = M20x1,5 (6H/6g)	
Valve size (ISO 4401): <b>0</b> = size 06 (DHZA) <b>1</b> = size 10 (DKZA)																				Spool size: see section 5	
Configuration: DHZA and DKZA see section 5: <b>5</b> = external plus central position, spring centered <b>7</b> = 3 positions, spring centered																				Spool type: <b>L</b> = linear <b>S</b> = progressive <b>D</b> = as <b>S</b> , but with P-A = Q, P-B = Q/2	
Spool overlapping in central position, DHZA and DKZA see section 5: <b>0</b> = zero overlapping (only TES) <b>1</b> = P, A, B, T positive overlapping <b>2</b> = P, A, B, T positive overlapping (2) <b>3</b> = P positive overlapping; A, B, T, negative																					

- (1) Serial interface always present for AES-BC and AES-BP.  
 (2) Only for DKZA-TES-172-S5 the spool overlapping type 2 provides the same characteristic of type 1, but in central position the internal leakages from P to A and B are drained to tank, avoiding the drift of cylinders with differential areas.

**Note:** For mounting surface dimensions see table **P005**  
 For the digital drivers technical data and functional parameters setting, see: table **G115** (AES); **G210** (TES)

**5 HYDRAULIC CHARACTERISTICS of DHZA and DKZA** (based on mineral oil ISO VG 46 at 50 °C)

Hydraulic symbols of **AES** version

Hydraulic symbols of **TES** version

Valve model	DHZA-AES				DHZA-TES				DKZA-AES				DKZA-TES							
Spool overlapping	<b>1, 3</b>		<b>1, 3</b>		<b>1, 3</b>		<b>0</b>		<b>1, 3</b>		<b>1, 3</b>		<b>0</b>		<b>0</b>		<b>2</b>		<b>1, 3</b>	
Spool type and size (1)	<b>L14</b>		<b>L1</b>		<b>S2</b>		<b>S3, L3, D3</b>		<b>L5, D5</b>		<b>S5, L5, D5</b>		<b>S3, L3, D3</b>		<b>L3</b>		<b>L5, D5</b>		<b>S5, L5, D5</b>	
Pressure limits [bar]	ports P, A, B = 350; T = 160 (250 with external drain /Y)																			
Δp max P-T [bar]	70		70		50		50		40		40		40		40		40		40	
Max flow [l/min]	1		4,5		8		18		28		45		80		105		120		120	
at Δp = 10 bar (P-T)	2		8		14		30		50		80		105		120		120		120	
at Δp = 30 bar (P-T)	3		12		21		45		60		90		120		120		120		120	
at Δp max (P-T)																				
Response time (2) [ms]	< 30 (AES) < 15 (TES)																			
Hysteresis [%]	≤ 5%(AES) ≤ 0,2% (TES)																			
Repeatability	± 1% (AES) ± 0,1% (TES)																			
Thermal drift (only TES)	zero point displacement < 1% at ΔT = 40°C																			

(1) Spool type S2 only for AES version; spool type 0L5, 0D5, 0L3 only for TES version  
 (2) Response times at step signal (0%→100%) are measured from 10% to 90% of step value and are strictly referred to the valve regulation.

**6 MODEL CODE OF EX-PROOF PROPORTIONAL DIRECTIONAL VALVES PILOT OPERATED**

<b>DPZA</b>	/	<b>IE</b>	-	<b>AES</b>	-	<b>PS</b>	-	<b>2</b>	-	<b>7</b>	-	<b>1</b>	-	<b>L</b>	-	<b>5</b>	/	<b>M</b>	/	<b>7</b>	/	<b>**</b>	/	<b>*</b>
<p><b>DPZA</b> = size 10 = size 16 = size 25</p> <p>Certification (omit for Atex): <b>IE</b> = IECEx</p> <p><b>AES</b> = without integral position transducer</p> <p>Communication interfaces: <b>PS</b> = Serial (1) <b>BC</b> = CANopen <b>BP</b> = PROFIBUS DP</p> <p>Valve size (ISO 4401): <b>1</b> = size 10 <b>2</b> = size 16 <b>4</b> = size 25</p> <p>Configuration: see section 7: <b>5</b> = external plus central position, spring centered <b>7</b> = 3 positions, spring centered</p> <p>Spool overlapping in central position, see section 7: <b>1</b> = P, A, B, T positive overlapping <b>3</b> = P positive overlapping; A, B, T, negative</p> <p>(1) Serial interface always present for AES-BC and AES-BP. (2) Pressure reducing valve with fixed setting (40 bar for DPZA-1 and -2; 100 bar for DPZA-4) installed between pilot valve and main body. It is advisable for valves with internal pilot in case of system pressure higher than 200 bar.</p> <p><b>Note:</b> For mounting surface dimensions see table <b>P005</b> For the digital drivers technical data and functional parameters setting, see table <b>G115</b></p>																								
<p>Seals material: - = NBR <b>PE</b> = FKM</p> <p>Series number</p> <p>Options: <b>7</b> = for ambient temperature up to 60°C <b>B</b> = solenoid with integral digital electronics at side of port A <b>C</b> = current feedback 4 ÷ 20 mA for remote transducer, only for <b>W</b> <b>D</b> = internal drain <b>E</b> = external pilot <b>G</b> = pressure reducing valve for piloting (2) <b>I</b> = current reference 4 ÷ 20 mA, omit for standard voltage reference ±10 Vcc <b>W</b> = power limitation function</p> <p>Cable entrance threaded connection: <b>M</b> = M20x1,5 (6H/6g)</p> <p>Spool size: see section 7</p> <p>Spool type: <b>L</b> = linear <b>S</b> = progressive <b>D</b> = as <b>S</b>, but with P-A = Q, P-B = Q/2</p>																								

**7 HYDRAULIC CHARACTERISTICS OF DPZA-AES (based on mineral oil ISO VG 46 at 50 °C)**

Hydraulic symbols of **AES** version

Valve model	DPZA-1			DPZA-2			DPZA-4					
	0, 1, 3			0, 1, 3			0, 1, 3					
Spool overlapping	0, 1, 3			0, 1, 3			0, 1, 3					
Spool type and size (1)	L5	S5	D5	S3	D3	L5	S5	D5	L5	S5	D5	
Max flow: [l/min]	100			160			250			480		
at Δp = 10 bar	160			270			430			830		
at Δp = 30 bar	180			400			550			900		
max permissible flow	180			400			550			900		
Pressure limits [bar]	ports P, A, B, X = 350; T = 250 (5 for option /D); Y = 5											
Response time [ms] (1) spool overlapping 1-3	<80			<100			<120			<120		
Hysteresis [%]							≤5%					
Repeatability							±1%					

(1) Response times at step signal (0%→100%) are measured from 10% to 90% of step value and are strictly referred to the valve regulation.

**8 MODEL CODE OF EX-PROOF PROPORTIONAL DIRECTIONAL VALVES PILOT OPERATED**

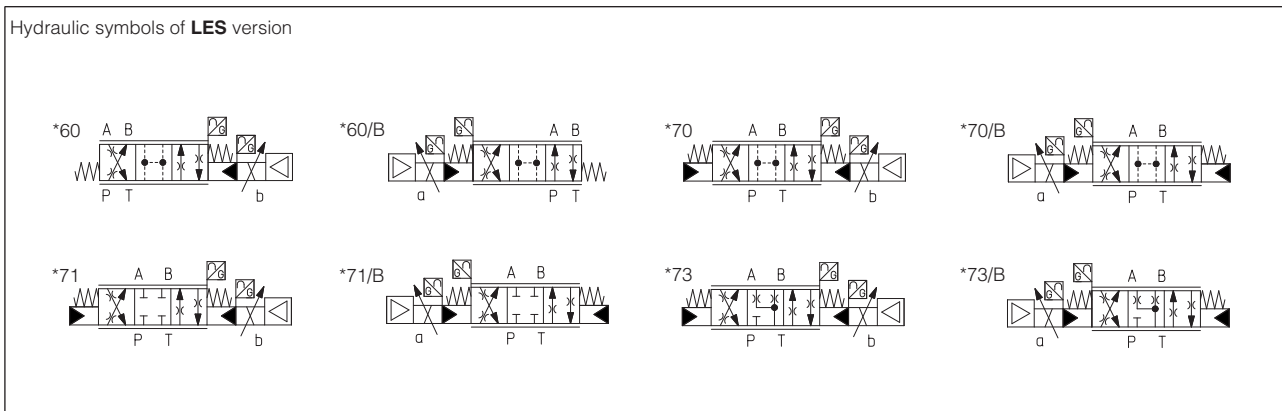
<b>DPZA</b>	/	<b>IE</b>	-	<b>LES</b>	-	<b>PS</b>	-	<b>2</b>	-	<b>70</b>	-	<b>L</b>	-	<b>5</b>	/	<b>M</b>	/	<b>7</b>	-	<b>**</b>	/	<b>*</b>
<p><b>DPZA</b> = size 10                  = size 16                  = size 25                  = size 27</p> <p>Certification (omit for ATEX):  <b>IE</b> = IECEx</p> <p><b>LES</b> = with double integral position transducer</p> <p>Communication interfaces:  <b>PS</b> = Serial  <b>BC</b> = CANopen  <b>BP</b> = PROFIBUS DP</p> <p>Valve size (ISO 4401):  <b>1</b> = size 10  <b>2</b> = size 16  <b>4</b> = size 25  <b>4M</b> = size 27</p> <p>Configuration, see section 9:                  Positive spool overlap:  <b>71, 73</b>                  Zero spool overlap:  <b>60, 70</b></p>																						<p>Seals material:                  - = NBR  <b>PE</b> = FKM</p> <p>Series number</p>
<p>Options:  <b>7</b> = for ambient temperature up to 60°C  <b>B</b> = solenoid with integral digital electronics at side of port B of the main stage  <b>D</b> = internal drain  <b>E</b> = external pilot  <b>G</b> = pressure reducing valve (1) for piloting standard for DPZA-LES-1  <b>I</b> = current reference 4 ÷ 20 mA, omit for standard voltage reference ±10 V<sub>DC</sub></p>																						<p>Cable entrance threaded connection:  <b>M</b> = M20x1,5 (6H/6g)</p>
<p>Spool size: see section 9</p>																						<p>Spool type:  <b>L</b> = linear  <b>S</b> = progressive  <b>D</b> = as <b>S</b>, but with P-A = Q, P-B = Q/2  <b>DL</b> = differential-linear as <b>L</b>, but with P-A = Q, P-B = Q/2</p>

(1) Pressure reducing valve with fixed setting (40 bar for DPZA-1 and -2; 100 bar for DPZA-4) installed between pilot valve and main body. It is advisable for valves with internal pilot in case of system pressure higher than 200 bar. This option is standard for DPZA-LES-1

**Note:** For mounting surface dimensions see: table **P005**

For the digital drivers technical data and functional parameters setting, see table **G210**

**9 HYDRAULIC CHARACTERISTICS OF DPZA-LES (based on mineral oil ISO VG 46 at 50 °C)**



Valve model	DPZA-1				DPZA-2			
	0, 1, 3	1, 3	0, 1, 3	0, 1, 3	1, 3	0, 1, 3	1, 3	0, 1, 3
Spool overlapping	<b>0, 1, 3</b>	<b>1, 3</b>	<b>0, 1, 3</b>	<b>0, 1, 3</b>	<b>1, 3</b>	<b>0, 1, 3</b>	<b>1, 3</b>	<b>0, 1, 3</b>
Spool type and size	<b>L5 (1)</b>	<b>S5</b>	<b>D5</b>	<b>DL5</b>	<b>L3</b>	<b>S3</b>	<b>D3</b>	<b>DL5</b>
Max flow: [l/min]								
at Δp = 10 bar					100			
at Δp = 30 bar					160			
max permissible flow					180			
					160			
					270			
					400			
					250			
					430			
					550			

Valve model	DPZA-4				DPZA-4M			
	0, 1, 3	1, 3	0, 1, 3	0, 1, 3	0, 1, 3	1, 3	0, 1, 3	
Spool overlapping	<b>0, 1, 3</b>	<b>1, 3</b>	<b>0, 1, 3</b>	<b>0, 1, 3</b>	<b>0, 1, 3</b>	<b>1, 3</b>	<b>0, 1, 3</b>	
Spool type and size	<b>L5 (1)</b>	<b>S5</b>	<b>D5</b>	<b>DL5</b>	<b>L5</b>	<b>S5</b>	<b>DL5</b>	
Max flow: [l/min]								
at Δp = 10 bar					360			
at Δp = 30 bar					620			
max permissible flow					770			
					380			
					660			
					800			
Pressure limits [bar]	ports P, A, B, X = 350; T = 250 (5 for option /D); Y = 5							
Response time [ms] (2)	spool overlapping 0: DPZA-1, DPZA-2 <25ms; DPZA-4 <30ms; DPZA-4M <35ms							
	spool overlapping 1-3: DPZA-1 <50ms; DPZA-1 <60ms; DPZA-4 <80ms; DPZA-4M <85ms							
Hysteresis [%]	≤ 0,1% [% of max regulation]							
Repeatability	±0,1% [% of max regulation]							
Thermal drift	zero point displacement < 1% at ΔT = 40°C							

(1) For zero overlapping spool **0L5** the valve offset position (with switch-off power supply) is 1 ÷ 6% P-B/A-T

(2) Response times at step signal (0%→100%) are measured from 10% to 90% of step value and are strictly referred to the valve regulation.

**10 MODEL CODE OF EX-PROOF SERVOPROPORTIONAL VALVES**

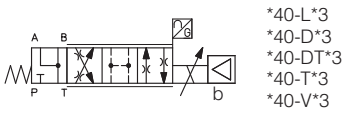
<p><b>DLHZA</b> / <b>IE</b> - <b>TES</b> - <b>PS</b> - <b>0</b> <b>6</b> <b>0</b> - <b>L</b> <b>5</b> <b>3</b> / <b>M</b> / <b>7</b> <b>**</b> / <b>*</b></p> <p><b>DLHZA</b> = size 06 <b>DLKZA</b> = size 10</p> <p>Certification (omit for ATEX): <b>IE</b> = IECEx</p> <p><b>TES</b> = with integral position transducer</p> <p>Communication interfaces: <b>PS</b> = Serial <b>BC</b> = CANopen <b>BP</b> = PROFIBUS DP</p> <p>Valve size (ISO 4401): <b>0</b> = size 06 (DLHZA) <b>1</b> = size 10 (DLKZA)</p> <p>Configuration, see section 11: <b>4</b> = external plus central position, spring centered <b>6</b> = 3 position, spring centered</p> <p><b>0</b> = zero overlapping</p> <p>Spool type: <b>L</b> = linear regulation <b>T</b> = not linear regulation <b>V</b> = progressive regulation <b>D</b> = not linear regulation <b>DT</b> = not linear regulation</p>	<p>Seals material: - = NBR <b>PE</b> = FKM</p> <p>Series number</p> <p>Options: <b>7</b> = for ambient temperature up to 60°C <b>B</b> = solenoid at side of port A <b>I</b> = current reference 4 ÷ 20 mA, omit for standard voltage reference ±10 V<sub>DC</sub> <b>Y</b> = external drain</p> <p>Cable entrance threaded connection: <b>M</b> = M20x1,5 (6H/6g)</p> <p>Fail safe configuration: <b>1</b> = A, B, P, T with positive overlapping <b>3</b> = P positive overlapping; A, B, T negative</p>	
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Spool size **1, 3, 5, 7** see section 11

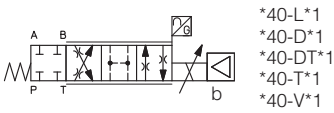
**Note:** For mounting surface dimensions see table **P005**  
For the digital drivers technical data and functional parameters setting, see table **G210** (TES)

**11 HYDRAULIC CHARACTERISTICS** (based on mineral oil ISO VG 46 at 50 °C)

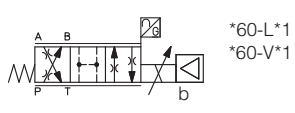
Hydraulic symbols



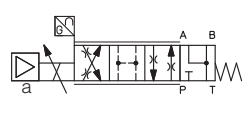
\*40-L\*3  
\*40-D\*3  
\*40-DT\*3  
\*40-T\*3  
\*40-V\*3



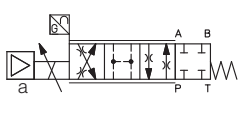
\*40-L\*1  
\*40-D\*1  
\*40-DT\*1  
\*40-T\*1  
\*40-V\*1



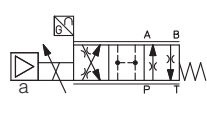
\*60-L\*1  
\*60-V\*1



\*40-L\*3/B  
\*40-D\*3/B  
\*40-DT\*3/B  
\*40-T\*3/B  
\*40-V\*3/B



\*40-L\*1/B  
\*40-D\*1/B  
\*40-DT\*1/B  
\*40-T\*1/B  
\*40-V\*1/B



\*60-L\*1/B  
\*60-V\*1/B

Valve model	<b>DLHZA-T*</b>											<b>DLKZA-T*</b>						
Pressure limits [bar]	ports P, A, B = 350; T = 210 (250 with external drain /Y)											ports P, A, B = 315; T = 210 (250 with external drain /Y)						
Spool	<b>L0</b>	<b>L1</b>	<b>V1</b>	<b>L3</b>	<b>V3</b>	<b>L5</b>	<b>T5</b>	<b>L7</b>	<b>T7</b>	<b>V7</b>	<b>D7</b>	<b>DT7</b>	<b>L3</b>	<b>L7</b>	<b>T7</b>	<b>V7</b>	<b>D7</b>	<b>DT7</b>
Max flow [l/min]	2,5	4,5	8	9	13	18					26	26÷13	40		60			60÷33
at Δp = 30 bar																		
at Δp = 70 bar	4	7	12	14	20	28					40	40÷20	60		100			100÷50
max permissible flow	8	14	16	30	40	50					70	70÷40	90		160			160÷80
Leakage [cm <sup>3</sup> /min] at P = 100 bar (1)	<100	<200	<100	<300	<150	<500	<200	<900	<200	<200	<700	<200	<1000	<1500	<400	<400	<1200	<400
Fail safe connections	P → A			P → B				A → T				B → T						
Leakage [cm <sup>3</sup> /min] at P = 100 bar (2)	Fail safe 1			Fail safe 2				Fail safe 3				Fail safe 4						
Flow [l/min] (3)	DLHZA			DLKZA				DLHZA				DLKZA						
Response time [ms]												≤ 15						
Hysteresis [%]												≤ 0,1%						
Thermal drift	zero point displacement < 1% at ΔT = 40°C																	

(1) Referred to spool in neutral position and 50°C oil temperature.  
(2) Referred to spool in fail safe position and 50°C oil temperature.  
(3) Referred to spool in fail safe position at Δp = 35 bar per edge and 50°C oil temperature.

**12 MODEL CODE OF EX-PROOF PROPORTIONAL PRESSURE RELIEF AND COMPENSATOR VALVES**

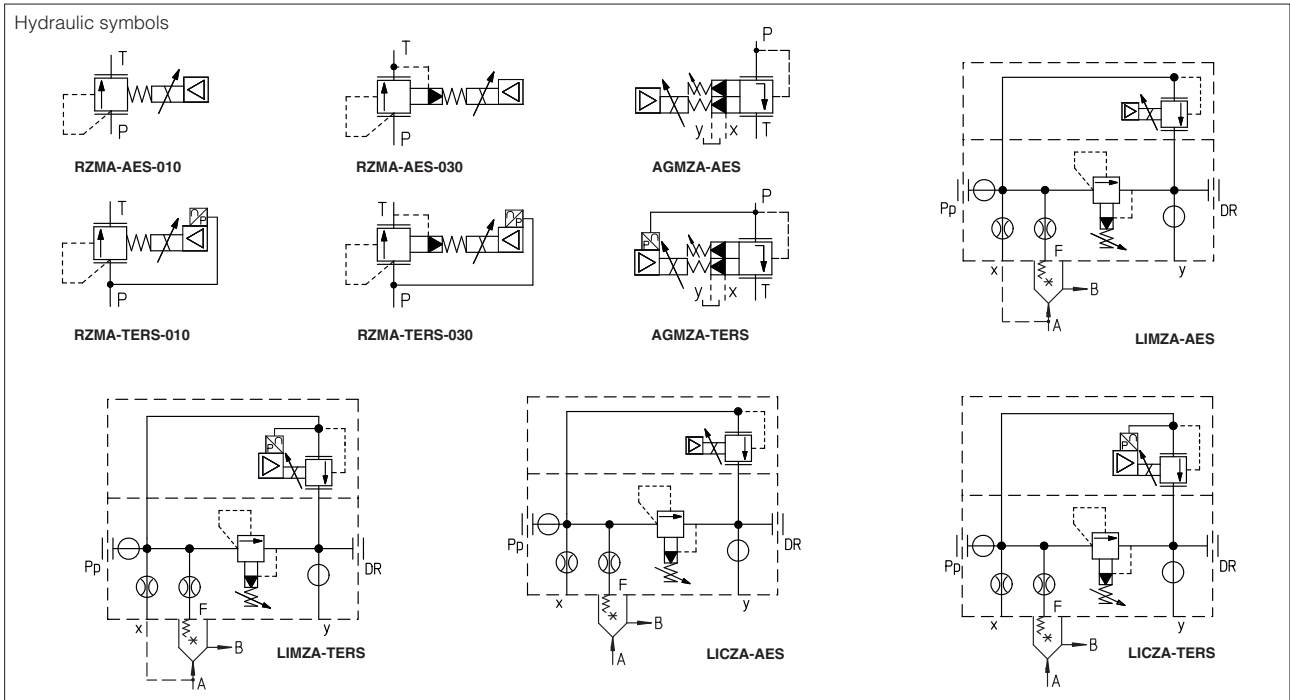
<p style="text-align: center;"><b>RZMA</b></p> <p>Pressure relief:  <b>RZMA</b> = subplate size 06  <b>AGMZA</b> = subplate size 10, 20, 32  <b>LIMZA</b> = cartridge type see sec. 14</p> <p>Pressure compensator:  <b>LICZA</b> = cartridge type see sect. 14</p> <p>Certification (omit for ATEX):  <b>IE</b> = IECEx</p> <p><b>AES</b> = without integral pressure transducer (1)  <b>TERS</b> = with integral pressure transducer (2)</p> <p>Communication interfaces:  <b>PS</b> = Serial  <b>BC</b> = CANopen  <b>BP</b> = PROFIBUS DP</p> <p>Valve size: see section 13 for size code</p>	/	<b>IE</b>	-	<b>TERS</b>	-	<b>PS</b>	-	<b>010</b>	/	<b>250</b>	/	<b>M</b>
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/*	**	/	<b>*</b>
<p>Seals material:          - = NBR  <b>PE</b> = FKM</p> <p>Series number</p>			
<p>Options:  <b>7</b> = for ambient temperature up to 60° C  <b>C</b> = current feedback 4 ÷ 20 mA for remote transducer, only for <b>W</b> (only AES)  <b>E</b> = external pilot (only for AGMZA)  <b>I</b> = current reference 4 ÷ 20 mA, omit for standard voltage reference ±10 Vdc  <b>P</b> = with integral mechanical pressure limiter (only for LI*ZA)  <b>Y</b> = external drain (only for AGMZA)</p>			
<p>Cable entrance threaded connection:  <b>M</b> = M20x1,5 (6H/6g)</p>			

- (1) Serial interface always present for AES-BC and AES-BP.  
 (2) Integral or remote pressure transducer with current feedback 4 ÷ 20 mA.

**Note:** For mounting surface dimensions see table **P005**  
 For the digital drivers technical data and functional parameters setting, see: table **G115** (AES); table **G205** (TERS)

**13 HYDRAULIC CHARACTERISTICS**



Valve model	RZMA			AGMZA			LIMZA						LICZA											
Size code	010	030		10	20	32	1	2	3	4	5	6	8	1	2	3	4	5						
Valve size	06			10	20	32	16	25	32	40	50	63	80	16	25	32	40	50						
Max regulated pressure [bar]							<b>80</b>						<b>180</b>						<b>250</b>					
Max pressure at port P, A, B, X [bar]													315											
Max pressure at port T, Y [bar]													210											
Max flow [l/min]	4	40		200	400	600	200	400	750	1000	2000	3000	4500	200	400	750	1000	2000						

**14 MODEL CODE OF CARTRIDGES (for LIMZA and LICZA)**

<p style="text-align: center;"><b>SC LI</b></p> <p>Cartridge according to ISO 7368</p> <p>Size: <b>16; 25; 32; 40; 50; 63</b> and <b>80</b> (only for LIMZA)</p> <p>Type of cartridge  <b>31</b> = for LIMZA and LICZA  <b>36</b> = for LICZA</p> <p><b>Note:</b> For mounting surface dimensions see table <b>P006</b></p>	-	<b>32</b>	<b>31</b>	<b>2</b>	<b>**</b>	<b>*</b>
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Seals material:  
 - = NBR  
**PE** = FKM

Series number

Spring cracking pressure:  
**2** = 1,5 bar for poppet 31  
**3** = 3 bar  
**4** = 4 bar  
**6** = 6 bar for poppet 31 and 36

**TYPICAL FUNCTIONS OF CARTRIDGES**

Type	Functional sketch (hydraulic symbol)	Typical section	Area ratio (1)
31			1:1
36			1:1

(1) It is the ratio of the area A to the area on which the pilot pressure is applied.

**15 MODEL CODE OF EX-PROOF PROPORTIONAL PRESSURE REDUCING VALVES**

<p style="text-align: center;"><b>RZGA</b></p> <p>Pressure reducing:  <b>RZGA</b> = subplate size 06  <b>AGRCZA</b> = subplate size 10, 20  <b>LIRZA</b> = cartridge type see sect. 17</p> <p>Certification (omit for Atex):  <b>IE</b> = IECEx</p> <p><b>AES</b> = without integral pressure transducer  <b>TERS</b> = with integral pressure transducer (2)</p> <p>Communication interfaces:  <b>PS</b> = Serial (1)  <b>BC</b> = CANopen  <b>BP</b> = PROFIBUS DP</p> <p>Valve size: see section 16 for size code</p>	/	<b>IE</b>	-	<b>TERS</b>	-	<b>PS</b>	-	<b>033</b>	/	<b>250</b>	/	<b>M</b>	/	/*	/**	/	<b>*</b>
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Options:  
**7** = for ambient temperature up to 60° C  
**I** = current reference 4 ÷ 20 mA, omit for standard voltage reference ±10 V<sub>DC</sub>  
**P** = with integral mechanical pressure limiter (only for AGRCZA and LIRZA)  
**R** = with check valve (only for AGRCZA)

Cable entrance threaded connection:  
**M** = M20x1,5 (6H/6g)

Seals material:  
 - = NBR  
**PE** = FKM

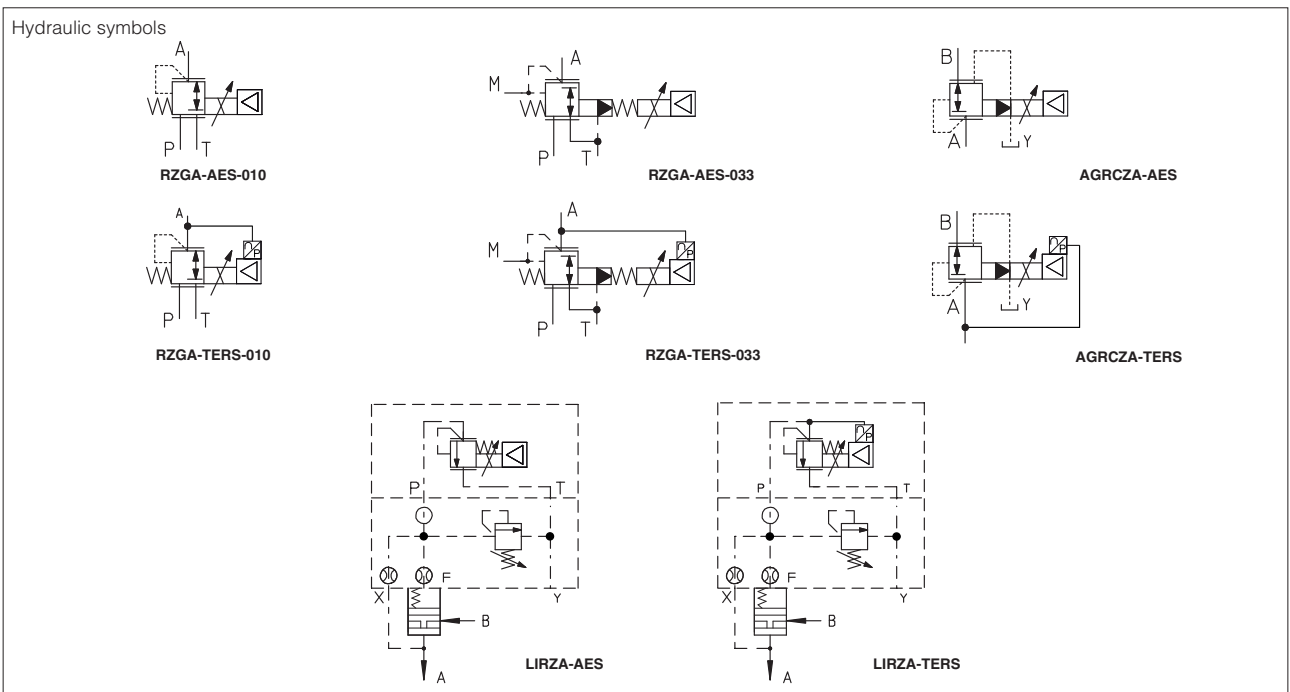
Series number

Max regulated pressure: see section 16

(1) Serial interface always present for AES-BC and AES-BP.  
 (2) Integral or remote pressure transducer with current feedback 4 ÷ 20 mA.

**Note:** For mounting surface dimensions see table P005  
 For the digital drivers technical data and functional parameters setting, see: table G115 (AES); table G205 (TERS)

**16 HYDRAULIC CHARACTERISTICS**



Valve model	RZGA		AGRCZA		LIRZA			
Size code	<b>010</b>	<b>033</b>	<b>10</b>	<b>20</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Valve size	06		10	20	16	25	32	40
Max regulated pressure [bar]	<b>32; 100; 210</b>		<b>80</b>		<b>180</b>	<b>250</b>		
Min regulated pressure [bar]	0,8	1	1	1	7	7	7	7
Max pressure at port P, A, B, X [bar]	315							
Max pressure at port T, Y [bar]	210							
Max flow [l/min]	12	40	160	300	160	300	550	800

**17 MODEL CODE OF CARTRIDGES (for LIRZA)**

<p style="text-align: center;"><b>SC LI</b></p> <p>Cartridge according to ISO 7368</p> <p>Size: <b>16; 25; 32; 40</b></p> <p>Type of cartridge: <b>37</b> = for LIRZA</p>	-	<b>25</b>	-	<b>31</b>	-	<b>2</b>	-	<b>**</b>	-	<b>*</b>
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Seals material:  
 - = NBR  
**PE** = FKM

Series number

Spring cracking pressure:  
**4** = 4 bar  
**7** = 7 bar

**TYPICAL FUNCTIONS OF CARTRIDGES**

Type	Functional sketch (hydraulic symbol)	Typical section	Area ratio (1)
37			1:1

(1) It is the ratio of the area A to the area on which the pilot pressure is applied.

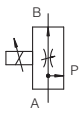
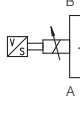
**18 MODEL CODE OF EX-PROOF PRESSURE COMPENSATED PROPORTIONAL FLOW CONTROL VALVES**

<b>QVHZA</b>	/	<b>IE</b>	-	<b>TES</b>	-	<b>PS</b>	-	<b>06</b>	/	<b>12</b>	/	<b>M</b>	/	<b>/*</b>	/	<b>**</b>	/	<b>*</b>										
<p><b>QVHZA</b> = size 06  <b>QVKZA</b> = size 10</p> <p>Certification (omit for ATEX):  <b>IE</b> = IECEx</p> <p><b>AES</b> = without integral position transducer  <b>TES</b> = with integral position transducer</p> <p>Communication interfaces:  <b>PS</b> = Serial (1)  <b>BC</b> = CANopen  <b>BP</b> = PROFIBUS DP</p> <p>Valve size (ISO 4401):  <b>06</b> = QVHZA  <b>10</b> = QVKZA</p>																												
<p>Seals material:          - = NBR  <b>PE</b> = FKM</p> <p>Series number</p> <p>Options:  <b>7</b> = for ambient temperature up to 60° C  <b>C</b> = current feedback 4 ÷ 20 mA for remote transducer, only for <b>W</b> (only AES)  <b>D</b> = quick venting (only AES)  <b>I</b> = current reference 4 ÷ 20 mA, omit for standard voltage reference ±10 V<sub>DC</sub>  <b>W</b> = power limitation function (only AES)</p> <p>Cable entrance threaded connection:  <b>M</b> = M20x1,5 (6H/6g)</p> <p>Max regulated flow:  <table style="display: inline-table; vertical-align: top;"> <tr><td>QVHZA</td><td>QVKZA</td></tr> <tr><td><b>3</b> = 3,5 l/min</td><td><b>65</b> = 65 l/min</td></tr> <tr><td><b>12</b> = 12 l/min</td><td><b>90</b> = 90 l/min</td></tr> <tr><td><b>18</b> = 18 l/min</td><td></td></tr> <tr><td><b>36</b> = 36 l/min</td><td></td></tr> <tr><td><b>45</b> = 45 l/min</td><td></td></tr> </table> </p>																	QVHZA	QVKZA	<b>3</b> = 3,5 l/min	<b>65</b> = 65 l/min	<b>12</b> = 12 l/min	<b>90</b> = 90 l/min	<b>18</b> = 18 l/min		<b>36</b> = 36 l/min		<b>45</b> = 45 l/min	
QVHZA	QVKZA																											
<b>3</b> = 3,5 l/min	<b>65</b> = 65 l/min																											
<b>12</b> = 12 l/min	<b>90</b> = 90 l/min																											
<b>18</b> = 18 l/min																												
<b>36</b> = 36 l/min																												
<b>45</b> = 45 l/min																												

(1) Serial interface always present for AES-BC and AES-BP

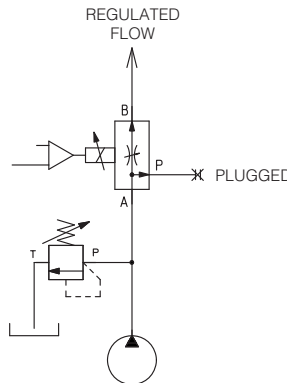
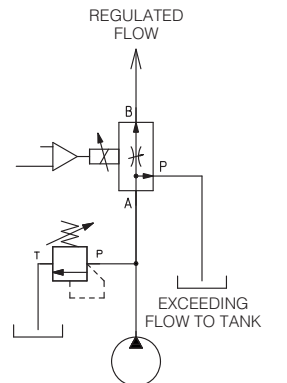
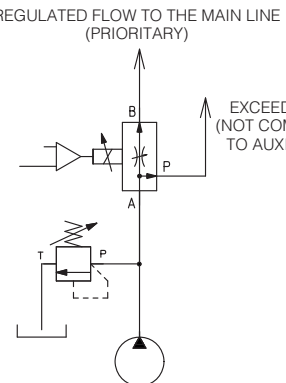
**Note:** For the digital drivers technical data and functional parameters setting, see table **G115** (AES); table **G210** (TES)  
 For mounting surface dimensions see table **P005**

**19 HYDRAULIC CHARACTERISTICS** (based on mineral oil ISO VG 46 at 50 °C)

<p>Hydraulic symbols</p> <p><b>Note:</b> In three-way connection port P is open.          In two-way connection port P must be plugged.          Port T must always be plugged.</p>	 <p><b>QVHZA-AES</b> <b>QVKZA-AES</b></p>	 <p><b>QVHZA-TES</b> <b>QVKZA-TES</b></p>														
Valve model	<b>QVHZA-AES</b>	<b>QVHZA-TES</b>	<b>QVKZA-AES</b>	<b>QVKZA-TES</b>												
Valve size	<b>06</b>			<b>10</b>												
Max pressure ports P, A, B [bar]	210															
Max regulated flow [l/min]	<b>3,5</b>	<b>12</b>	<b>18</b>	<b>36</b>	<b>45</b>	<b>3,5</b>	<b>12</b>	<b>18</b>	<b>35</b>	<b>45</b>	<b>65</b>	<b>90</b>	<b>65</b>	<b>90</b>		
Min regulated flow (1) [cm³/min]	15	20	30	50	60	15	20	30	50	60	85	100	85	100		
Regulating Δp [bar]	4 - 6		10 - 12			15		4 - 6		10 - 12		15	6 - 8	10 - 12	6 - 8	10 - 12
Max flow on port A [l/min]	40	35	50	55	50					60	70	100	70	100		

(1) Values are referred to 3-way configuration. In the 2-way configuration, the values of min regulated flow are higher.

**19.1 TYPICAL APPLICATIONS**

<p><b>2 WAY CONNECTION</b></p>  <p>In the 2 way connection the pump is always working at the pressure set on the relief valve</p>	<p><b>3 WAY CONNECTION</b></p>  <p>In the 3 way connection the pump is working at the pressure required by the user load</p>	<p><b>3 WAY CONNECTION AS PRIORITY VALVE</b></p>  <p>The regulated flow (pressure compensated) is sent to the main line the exceeding flow for the auxiliary line</p>
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## 20 ELECTRONICS WIRING

### 20.1 MAIN CONNECTIONS FOR ALL MODELS

PIN	CABLE ENTRANCE	DESCRIPTION	TECHNICAL SPECIFICATION
1	3	ENABLE	Enabling input, normal working = 24 Vdc
2	3	VLO	Power supply (logic stage) Stabilized +24 Vdc
3	3	VL+	Filtered and rectified: Vrms 21-33 (ripple max 2Vpp)
4	3	FAULT	Alarm = 0 Vdc Correct functioning = +24Vdc
5	3	COIL S2	Coil connection only for double solenoid valves
6	3	COIL S2	
7	3	INPUT-	Negative reference signal for INPUT+ (2)
8	3	MONITOR	Monitor output signal for <b>AES</b> : (1) (2) ±5 Vdc maximum range Monitor output signal for <b>TERS, TES, LES</b> : (1) (2) ±10 Vdc maximum range (4 ÷ 20 mA only for <b>fl option</b> )
9	3	INPUT+	Reference input signal: (2) ±10 Vdc maximum range (4 ÷ 20 mA only for <b>fl option</b> )
10	3	V0	Power supply (power stage - 50W) Stabilized +24 Vdc
11	3	V+	Filtered and rectified: Vrms 21-33 (ripple max 2Vpp)
PE	3	EARTH	Earth connection

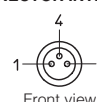
(1) referred to pin 2 (VLO)  
(2) differential mode input

### 20.2 TRANSDUCER CONNECTIONS FOR TERS, LES (factory wired), AES/W (to be wired)

PIN	CABLE ENTRANCE	VERSION	DESCRIPTION	TECHNICAL SPECIFICATION
12	4	AES/W	Monitor 2	2 <sup>nd</sup> Monitor ± 5 Vdc
		TERS	NC	Not connected
		LES	AGND	Power supply and signal = 0 Vdc
13	4	AES/W	AGND	Power supply and signal = 0 Vdc
		TERS	VT+	Transducer supply +24 Vdc
		LES	VT+	Transducer supply +15 Vdc
14	4	AES/W	TR	Pressure transducer signal
		TERS	NC	Not connected
		LES	VT-	Transducer supply -15 Vdc
15	4	AES/W	VT+	Transducer supply +24 Vdc
		TERS	TR	Pressure transducer signal
		LES	TR	Position transducer signal

**Note:** For AES and TES versions the pins 12-13-14-15 are not connected

### 20.3 PS COMMUNICATION INTERFACE (M8 connector)

PIN	CABLE ENTRANCE	SIGNAL	WIRE COLOUR	CONNECTOR INTERFACE
1	1	RS_RX	brown	 <p>Front view</p>
3		RS_TX	blue	
4		RS_GND	black	

**Note:** For AES-BC and AES-BP versions, the Serial communication interface is always available for eventual valve's parameter setting through the E-SW programming software; M8 connector available inside the electronic box, see Fig. 1

### 20.4 BC and BP COMMUNICATION INTERFACE CONNECTIONS

PIN	CABLE ENTRANCE	DESCRIPTION	
		BC	BP
16	1 / 2	NC do not connect	+5V BUS
17	1 / 2	SHIELD	SHIELD
18	1 / 2	CAN_H	B_LINE
19	1 / 2	CAN_L	A_LINE
20	1 / 2	BUS GND	BUS GND

### 20.5 CABLE ENTRANCE (see Fig.1)

① Cable entrance for PS, BC, BP communication interfaces:

The Ex-proof integral digital electronics is provided with serial (PS) or CANopen (BC) or PROFIBUS DP (BP) communication interface, depending to the selected model code

For PS version the communication connector is used for the software setting of the functional parameters. It is installed in the cable entrance pos. ① (factory plugged). For the electronics parameter setting, remove the threaded metal plug and connect the PC communication cable to the connector -see Fig.2



#### WARNING:

The above operation must be performed in a safety area.

After having completed the parameter setting, disconnect the communication cable and close the cable entrance with the proper threaded plug.

For BC and BP versions the valve is directly driven through the fieldbus interface, which connections are available on the terminal board internal to the electronics housing.

Depending to the type of connection to the fieldbus network, one or two cable entrances can be used (see section 22 TAB.1)

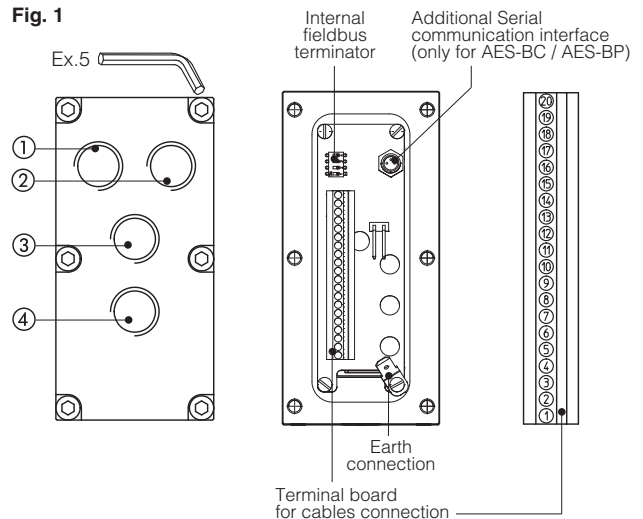
-“Via stub” connection, cable entrance ① to be used  
-“Daisy chain” connection, cable entrance ① and ② to be used

- ② Additional cable entrance for BC and BP communication interfaces
- ③ Cable entrances for power supply and main connections
- ④ Cable entrances for remote pressure transducer connections (for AES/W)





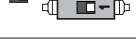
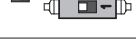
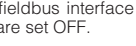

The cable entrance ④ is factory wired for:

TERS (pressure transducer)  
LES (position transducer)  
AES and TES double solenoid version

Fig. 1

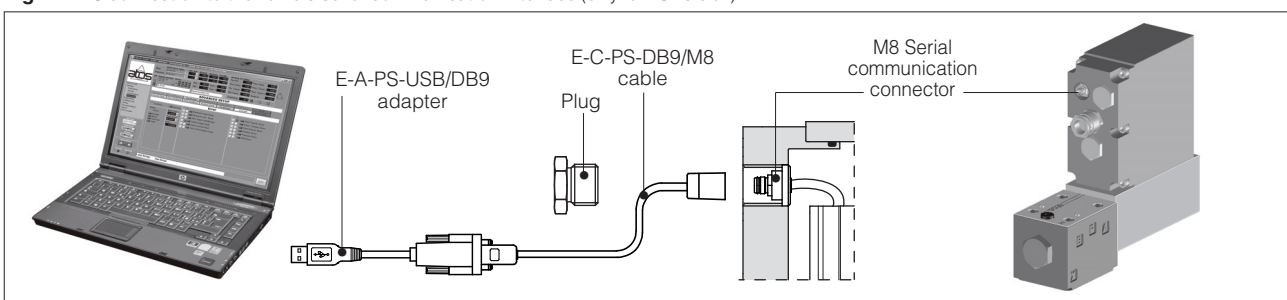


### 20.6 INTERNAL FIELDBUS TERMINATORS SETTING (BC and BP versions)

CANopen - BC version			PROFIBUS DP - BP version		
Switch	Termination enabled		Switch	Terminator Enable	
4	ON		4	OFF	
3	OFF		3	ON	
2	OFF		2	ON	
1	OFF		1	ON	

**Note:** Drivers with fieldbus interface are delivered by default 'Not Terminated'. All switches are set OFF.

Fig. 2 PC connection to the valve's serial communication interface (only for PS version)



## 21 SOFTWARE TOOLS

The driver configuration and parameters can be easily set with the Atos E-SW programming software.

The programming software is available in different versions according to the driver's communication interfacing:

**E-SW-BASIC** (PS Serial) and **E-SW-FIELDBUS** (BC CANopen and BP PROFIBUS DP).

A proper connection is required between the PC and the electronic driver communication port (PS, BC or BP).

For a more detailed description of software interface, PC requirements and adapter/cable/terminator characteristics please refer to technical table **GS500**.

**DVD programming software, must be ordered separately:**

**E-SW-\*** (first supply - mandatory) = include software installer, user manuals and fieldbus configuration files (EDS for BC, GSD for BP)

**E-SW-\*-N** (next supplies - optional) = only for supplies after the first; service not included, web registration not allowed

**USB Adapters, Cables and Terminators, can be ordered separately:**

**E-A-PS-USB/DB9** and **E-C-PS-DB9/M8** = USB adapter and cable for PS drivers

E-A-PS-USB/DB9 adapter is required only if a RS232 serial port is not available on the PC

**E-A-BC-USB/DB9, E-C-BC-DB9/RA** and **E-TRM-BC-DB9/DB9** = USB adapter, cable and terminator for BC drivers

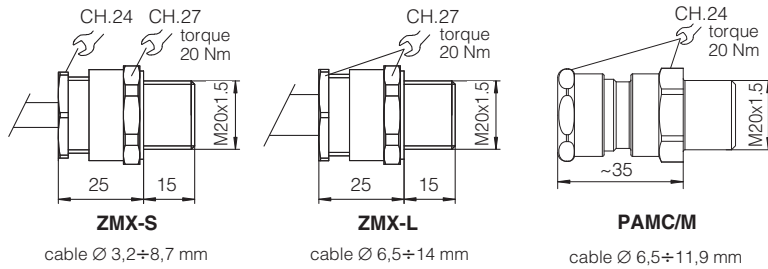
**E-A-BP-USB/DB9, E-C-BP-DB9/RA** and **E-TRM-BP-DB9/DB9** = USB adapter, cable and terminator for BP drivers

E-TRM-BC-DB9/DB9 (CANopen) and E-TRM-BP-DB9/DB9 (PROFIBUS DP) fieldbus terminators are required when the adapter is directly connected to the digital driver or to one end of the fieldbus network.

## 22 MODEL CODE OF CABLE GLANDS AND THREADED PLUGS (for non-armoured cables)

Atos can supply different kind of cable glands, depending to the valve's certification, and to the cable's diameter used by the costumer.

The cable glands and the threaded plugs (to be ordered separately) are available ATEX certified according to EN 60079-0 and EN 60079-1, or multicertified ATEX, IECEx, EAC



Depending to the model code, the valves are supplied with:

- Atex certified cable gland code ZMX-S for factory wired connections
- Atex and IECEx certified threaded plugs code ZMX-T (for connections not to be used)
- Multicertified cable gland code PAMC/M for factory wired connections

Following codes have to be specified for spare cable glands (IP66), or plug:

**ZMX-T** = brass threaded plug, threaded connection M20x1,5 (6H/6g).

**ZMX-S** = brass cable gland, threaded connection M20x1,5 (6H/6g). Cable size 3,2 ÷ 8,7 mm

**ZMX-L** = brass cable gland, threaded connection M20x1,5 (6H/6g). Cable size 6,5 ÷ 14 mm

**PAMC/M** = with threaded connection M20x1,5 UNI-4535 (6H/6g). Cable size PG-9 (IP66/67)

The cable gland PA\*/M must be blocked with lockite or similar or with a locking nut.

For connections available for the costumers, the cable glands and the treaded metal plug have to be ordered separately. The quantity and the mounting position of the cable glands and threaded plugs is depending to the selected connection of the of communication interface, as shown in the following **TAB. I**

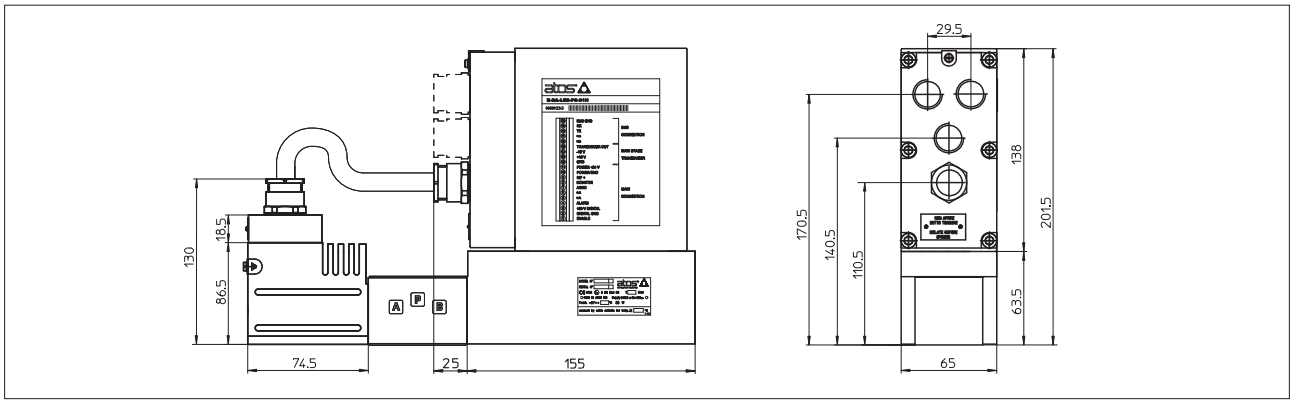
**TAB. I**

Valve's communication interfaces	To be ordered separately				Scheme	Notes
	Cable gland quantity	Cable gland position	Threaded plug quantity	Threaded plug position		
PS	1	3	none	none		Cable entrance 1 and 2 are factory plugged Cable entrance 3 is open for costumers Cable entrance 4 is factory plugged or wired depending to the valve model
BC, BP "via stub" connection	2	1, 3	1	2		Cable entrance 1, 2 and 3 are open for costumers Cable entrance 4 is factory plugged or wired depending to the valve model
BC, BP "daisy chain" connection	3	1, 2, 3	none	none		Cable entrance 1, 2 and 3 are open for costumers Cable entrance 4 is factory plugged or wired depending to the valve model

## 23 MASS

VALVE TYPE	MASS (Kg)	VALVE TYPE	MASS (Kg)	VALVE TYPE	MASS (Kg)	VALVE TYPE	MASS (Kg)	VALVE TYPE	MASS (Kg)	VALVE TYPE	MASS (Kg)
DHZA-*-05	8,2	DPZA-*-27	18,7	AGMZA-*-10	12,2	LIMZA-*-5	19,2	RZGA-*-010	9	QVHZA	8,6
DHZA-*-07	9	DPZA-*-45	22	AGMZA-*-20	16	LIMZA-*-6	28	RZGA-*-033	9,6	QVKZA	9,5
DKZA-*-05	9	DPZA-*-47	23	AGMZA-*-32	18,5	LICZA-*-1	13,6	AGRCZA-*-10	13,6		
DKZA-*-07	9,6	DLHZA	8,5	LIMZA-*-1	10,3	LICZA-*-2	14,6	AGRCZA-*-20	14,6		
DPZA-*-15	13,6	DLKZA	10,2	LIMZA-*-2	10,8	LICZA-*-3	17,7	LIRZA-*-1	17,7		
DPZA-*-17	14,6	RZMA-*-010	9	LIMZA-*-3	12	LICZA-*-4	8,2	LIRZA-*-2	8,2		
DPZA-*-25	17,7	RZMA-*-030	9,3	LIMZA-*-4	15,7	LICZA-*-5	9	LIRZA-*-3	9		

24 DIMENSIONS OF EXPLOSION PROOF SOLENOIDS WITH INTEGRAL DIGITAL ELECTRONICS [mm]



25 DIMENSIONS OF EXPLOSION PROOF VALVES WITH INTEGRAL DIGITAL ELECTRONICS [mm]

**DIRECTIONAL VALVES**  
dotted line = double solenoid version

**PRESSURE CONTROL VALVES**  
dotted line = -TERS version

**AGRCZA**

**DHZA  
DLHZA**

**DKZA  
DLKZA**

**DPZA -AES**

**DPZA -LES**

**AGMZA**

(1) For DPZA-LES-1 the height in the drawing includes the pressure reducing valve (option /G standard)  
For DPZA-AES-1, DPZA-2 and -4, in case of option /G the height in the drawings must be increased of 30 mm

**RZMA-010  
RZGA-010**

**RZMA-030  
RZGA-033**

**LIMZA  
LICZA  
LIRZA**

**QVHZA**

**QVKZA**

		LIMZA, LICZA, LIRZA						
dimension	size	16	25	32	40	50	63	80
	A		228	230	238	253	261	281
B *		243	243	252	261,5	271,5	281,5	311,5
C		90	88	80	68	60	37	-

\* for option /H add 40mm to the dimension