

Rozdzielacze do stref zagrożonych wybuchem Ex

Explosion-proof solenoid valves



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Mycie ciśnieniowe

Szeroka oferta prosto z magazynu

- Przewody hydrauliczne i przemysłowe
- Cylindry hydrauliczne
- Zasilacze hydrauliczne
- Zawory
- Elementy złączne
- Pręty i rury
- Technika filtracyjna
- Pompy
- Elementy do produkcji cylindrów hydraulicznych
- Układy hydrauliczne
- Rozdzielacze
- Agregaty filtracyjne
- Technika pomiarowa
- Elementy zasilaczy i układów hydraulicznych
- Silniki hydrauliczne
- Elementy do produkcji przewodów
- Urządzenia do produkcji przewodów
- Technika napędowa
- Chemia przemysłowa



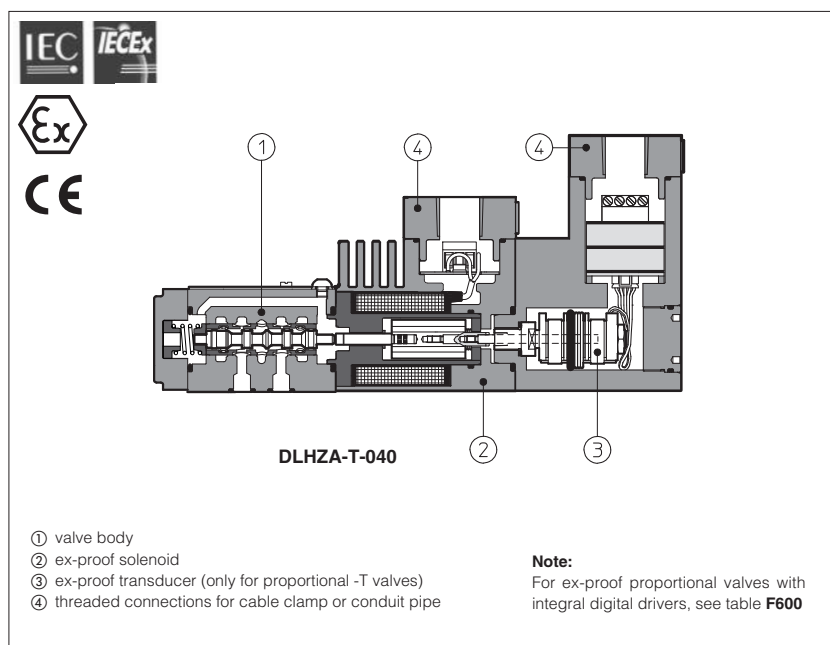
Rozdzielacze do stref zagrożonych wybuchem Ex

Explosion-proof solenoid valves



Explosion-proof solenoid valves

on/off and proportional controls - ATEX, IECEx or Rostechnadzor Russian certification



On/off and proportional valves equipped with explosion-proof solenoids available with following certifications and protection modes:

Solenoids group II for surface plants with gas, vapours and dust environment

- ATEX 94/9/EC
Ex II 2 GD Ex d IIC T6/T4/T3,
Ex tD A21 IP67 - category 2, zone 1, 2, 21 & 22
- IECEx worldwide recognized safety certification, Ex d IIC T6/T4/T3, Ex tD A21 IP67
- Rostechnadzor Russian Certification
Ex d IIC T6/T4/T3

Solenoids group I for surface, tunnels or mining plants

- ATEX 94/9/EC, Ex I M2 Ex d I
- IECEx, EX d I Mb

The solenoid case is 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. DHA and DLOH valves conform to **SIL 3** safety level (TÜV approved). These solenoids are applied to hydraulic valves for application in explosion-hazardous environments.

1 EXPLOSION PROOF SOLENOIDS: MAIN DATA

SOLENOID TYPE	PROPORTIONAL		ON-OFF
	without transducer	with transducer	
Group II, ATEX	OZA-A	OZA-T	OA
Solenoid code			
Group II, IECEx	OZAI-A	OZAI-T	OAI
Group I, ATEX (mining)	OZAM-A	OZAM-T	OAM
Group II, Rostechnadzor	OZA/RU-A	OZA/RU-T	OA/RU
Voltage	VDC ±10%	12 DC, 24 DC	12DC, 24DC, 28DC, 48DC, 110DC, 125DC, 220DC
code	VAC 50/60 Hz ±10%	–	12AC, 24AC, 110AC, 230AC (1)
Power consumption	35W		8W
Coil insulation	Class H		
Protection degree	IP 67 According to IEC 144 when correctly coupled with the relevant cable gland SP-PA*, see section 26		
Duty factor	100%		
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 connection Threaded connection for cable entrance, vertical (standard) or Horizontal (option /O). See section 26 for cable gland		

(1) For alternating current supply a rectifier bridge is provided built-in the solenoid

2 EXPLOSION PROOF SOLENOIDS: TEMPERATURE DATA

SOLENOID TYPE		PROPORTIONAL (with and without transducer)		ON/OFF	
Method of protection		Ex d			
Temperature class (only for Group II)		T4	T3 (option /7)	T6	T4 (option /7)
Surface temperature	Group II, ATEX and IECEx	≤135 °C	≤ 200 °C	≤ 85 °C	≤135 °C
	Group I, ATEX (mining)	150 °C			
	Rostechnadzor	≤135 °C	≤ 200 °C	≤ 85 °C	≤135 °C
Ambient temperature	Group II, ATEX and IECEx	-40 ÷ +40 °C (2)	-40 ÷ +70 °C (2)	-40 ÷ +45 °C (2)	-40 ÷ +70 °C (2)
	Group I, ATEX (mining)	-20 ÷ +60		-20 ÷ +70	
	Rostechnadzor	-40 ÷ +40 °C	-40 ÷ +70 °C	-40 ÷ +45 °C	-40 ÷ +70 °C

(2) The Group II solenoids are certified according to ATEX and IECEx for minimum ambient temperature -40°C. In case the complete valve must withstand with minimum ambient temperature of -40°C, select /BT in the model code

3 CERTIFICATIONS

In the following are resumed the valves marking according to ATEX Group I, ATEX and IECEx Group II, Rostechnadzor certifications.

3.1 GROUP II, ATEX

-  = ATEX identification for explosive atmospheres equipments
II = Group II for surfaces plants
2 = High protection (equipment category)
GD = For gas, vapours and dust
Ex d = Flame proof housing
IIC = Gas group
T6/T4/T3 = Temperature class of solenoid surface
Gb = Equipment protection level, high level protection for explosive Gas atmospheres
Ex tb = Equipment protection by enclosure "tb"
IIIC = Suitable for conductive dust (applicable also IIIB and/or IIIA)
Db = Equipment protection level, high level protection for explosive Dust atmospheres
IP67 = Protection degree
Zone 1 (gas) and 21 (dust) = Possibility of explosive atmosphere during normal functioning
Zone 2 (gas) and 22 (dust) = Low probability of explosive atmosphere

EXAMPLE OF NAMEPLATE MARKING

MODEL N°	atos®		
SERIAL N°	Atos spa Sesto Calende Italy		
 II 2GD Exd IIC T Gb			
Ex tb IIC T °C Db IP67			
CE 0722 CESA 02 ATEX 014 Supply			
Tamb. - ÷ + °C W V Hz			
connect by cable suitable for temp. ≥ °C T-783			

Notified body and certificate number

Marking according to ATEX Directive

3.2 GROUP II, IECEx

- Ex d** = Equipment for explosive atmospheres, flame proof housing
IIC = Gas group
T6/T4/T3 = Temperature class of solenoid surface
tb = Dust ignition protection
IIIC = Suitable for conductive dust (applicable also IIIB and/or IIIA)
Db = Equipment protection level, high level protection for explosive Dust atmospheres
IP67 = Protection degree

EXAMPLE OF NAMEPLATE MARKING

MODEL N°	atos®		
SERIAL N°	Atos spa - Via alla Piana, 57 20188 Sesto Calende (Vt) Italy		
IECEx CES 12.nnnn			
Ex d IIC T Ex tb IIC T °C Db IP67			
Supply W V Hz			
Tamb. - ÷ + °C			
connect by cable suitable for temp. ≥ °C T-784			

Marking according to IECEx

Notified body and certificate number

3.3 GROUP I, ATEX (mining)

-  = ATEX identification for explosive atmospheres equipments
I = Group I for mines and surface plants
M2 = High protection (equipment category)
d = Flame proof housing
I = Gas group (Methane)
Mb = Equipment protection level, high level protection for explosive atmospheres

4 MODEL CODE OF SPOOL TYPE ON-OFF DIRECTIONAL SOLENOID VALVES

DHA = spool type - direct DPHA = spool type - piloted Optional certifications (omit for Group II ATEX) IE = IECEx, Group II ITEM = IECEx, Group I (mining) M = ATEX, Group I (mining) RU = Rostechnadzor (Russian), Group II Valve size (ISO 4401) for DHA 0 = 06 for DPHA 1 = 10 2 = 16 4 = 25 6 = 32 Valve configuration, DHA see section [5] and DPHA see section [6] Spool type, DHA see section [5] and DPHA see section [6] Optional cable gland: PA = with threaded cable gland, see section [26] Solenoid threaded connection: GK = GK-1/2" ISO/UNI-6125 (tapered) NPT = 1/2" NPT ANSI B2.1 (tapered) M = M20x1,5 UNI-4535 (6H/6g)	/IE - 0 63 1/2 / PA - GK / 7 24DC ** Seals material: omit for NBR (mineral oil & water glycol) PE = FPM Low temperature execution: BT = low temperature -40°C (1) Series number Voltage code - see section [1]	Options: 7 = for ambient temperature up to 70°C (not for Group I) A = solenoid at side of port B (for single solenoid valves) MV = vertical hand lever (only for DHA) (2) O = horizontal cable entrance (1) WP = prolonged manual override protected by metallic cap Only for DPHA: /D = Internal drain. /E = External pilot pressure. /H = Adjustable chokes (meter-out to the pilot chambers of the main valve). /H9 = Adjustable chokes (meter-in to the pilot chambers of the main valve). /R = Pilot pressure generator (4 bar on port P) /S = Main spool stroke adjustment (not for DPHA-1).
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(1) Not for group I, ATEX (mining)

(2) Available only for DHA, configuration 61, 63, 71 and spool type 0, 0/2, 1, 1P, 1/2, 1/2P, 3, 3P, 4, 7

5 CONFIGURATIONS and SPOOLS for DHA valves

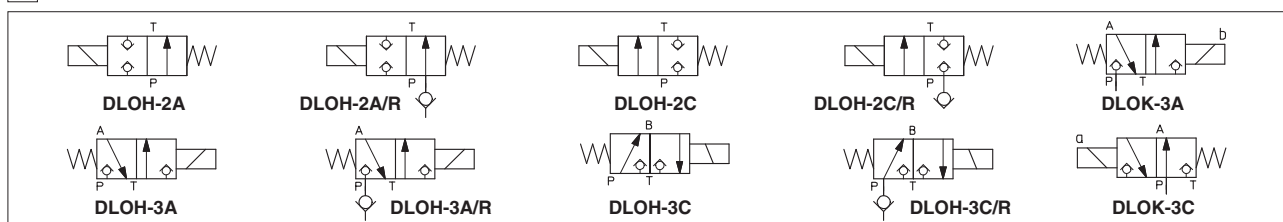
Configurations	Spoils	Configurations	Spoils
61 61/A 67 67/A 71	1 0 2 1 0 2 1 0 2 1 0 2		

7 MODEL CODE OF POPPET TYPE LEAK FREE DIRECTIONAL SOLENOID VALVES

DLO Directional control valve poppet type, size 06 H = max flow 12 l/min K = max flow 30 l/min 2 = two way (only for DLOH) 3 = three way Valve configuration, see section 8 A = open in rest position C = closed in rest position Optional cable gland: PA = with threaded cable gland, see section 26 Solenoid threaded connection: GK = GK-1/2" ISO/UNI-6125 (tapered) NPT = 1/2" NPT ANSI B2.1 (tapered) M = M20x1,5 UNI-4535 (6H/6g)	H - 2 A / PA - GK - AO / 7 24DC ** / *	Seals material (1): omit for NBR (mineral oil & water glycol) PE = FPM Series number Voltage code - see section 11 Options: 7 = for ambient temperature up to 70°C (not for Group I) O = horizontal cable entrance (not for group I Atex) R = with check valve on port P (only for DLOH) WP = prolonged manual override protected by metallic cap Certification type AO = ATEX, Group II AO/IE = IECEx, Group II AO/IE/M = IECEx, Group I (mining) AO/M = ATEX, Group I (mining) AO/RU = Rostechnadzor (Russian), Group II
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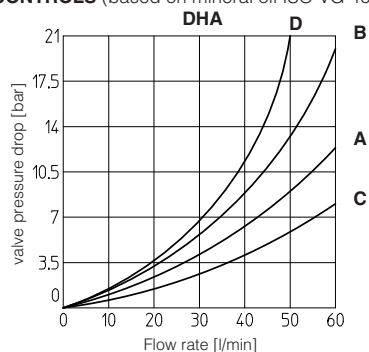
(1) Option **/BT** = low temperature -40°C also available on request (not for group I Atex -mining-)

8 CONFIGURATION OF DLOH/AO/* AND DLOK/AO/*



9 Q/Δp DIAGRAMS OF ON/OFF DIRECTIONAL CONTROLS (based on mineral oil ISO VG 46 at 50°C)

Flow direction	P→A	P→B	A→T	B→T	P→T
Spool type					
0	C	C	C	C	
0/2, 1, 1/2	A	A	A	A	
3	A	A	C	C	
4, 5	D	D	D	D	A
6	A	A	C	A	
7	A	A	A	C	
8	C	C	B	B	



11 MODEL CODE OF PRESSURE RELIEF VALVES

AGAM - 20 / 2 0 /210/100/100 / PA - NPT - AO / O 24 DC ** /*

AGAM = pressure relief valve: subplate mounting, see tab. C066
ARAM = pressure relief valve: threaded connections, see tab. C045

Valve size
 for AGAM: 10 (ISO 6264)
 20 (ISO 6264)
 32 (ISO 6264)
 for ARAM: 20 = G 3/4"
 32 = G 1 1/4"

Number of the different setting pressure values:
 1 = one setting pressure
 2 = two setting pressure
 3 = three setting pressure

Valve configuration
 0 = venting with de-energized solenoid
 1 = venting with energized solenoid
 2 = without venting

Max regulated pressure of first (second / third) setting see section 12

Optional cable gland:

PA = with threaded cable clamp, see section 26

Seals material (1):
 omit for NBR (mineral oil & water glycol)
PE = FPM

Series number

Voltage Code, see section 11

Options:
7 = for ambient temperature up to 70°C (not for Group I)
E = external pilot
O = horizontal cable entrance (not for group I Atex)
V = regulating handwheel
WP = prolonged manual override protected by metallic cap
Y = external drain

Certification type

AO = ATEX, Group II
AO/IE = IECEx, Group II
AO/IE M = IECEx, Group I (mining)
AO/M = ATEX, Group I (mining)
AO/RU = Rostekhnadzor (Russian), Group II

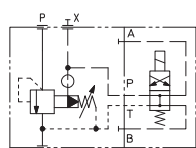
Solenoid threaded connection:

GK = GK-1/2" ISO/UNI-6125 (tapered)
NPT = 1/2" NPT ANSI B2.1 (tapered)
M = M20x1,5 UNI-4535 (6H/6g)

(1) Option **/BT** = low temperature -40°C also available on request (not for group I Atex -mining-)

12 HYDRAULIC CHARACTERISTICS

AGAM-*/10
ARAM-*/10



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18 MODEL CODE OF SERVOPROPORTIONAL VALVES

DLHZA DLHZA = size 06 DLKZA = size 10 Optional certifications (omit for Group II ATEX) IE = IECEX, Group II IEM = IECEX, Group I (mining) M = ATEX, Group I (mining) RU = Rostechnadzor (Russian), Group II T = with integral position transducer Valve size (ISO 4401) 0 = size 06 (DLHZA) 1 = size 10 (DLKZA) Configuration, see section 19 4 = spring offset with fail safe 6 = spring offset Spool overlapping in central position, see section 19 0 = P, A, B, T positive overlapping Spool type L = linear; V = progressive; T = not linear (1); DT = as D but with non-linear regulation (1); D = different-linear (1);	/IE - T - 0 4 0 - L 7 3 / PA - GK / 7 ** / * Seals material: omit for NBR (mineral oil & water glycol) PE = FPM Series number Options: 7 = for ambient temperature up to 70°C (not for Group I) B = solenoid at side of port A C = position transducer with current feedback 4÷20 mA Y = external drain Solenoid threaded connection: GK = GK-1/2" ISO/UNI-6125 (tapered) NPT = 1/2" NPT ANSI B2.1 (tapered) M = M20x1,5 UNI-4535 (6H/6g) Optional cable gland: PA = with threaded cable gland, see section 26 Fail safe configuration: 1 = A, B, P, T with positive overlapping 3 = P positive overlapping; A, B, T negative Spool size: see section 19
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(1) Spool type D, DT and T are available only for valve with fail safe position DLHZA-*-040 and DLKZA-*-040

19 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/B *40-D*1/B *40-DT*1/B *40-T*1/B *40-V*1/B *60-L*1 *40-D*1 *40-DT*1 *40-T*1 *40-V*1 *60-L*1/B *60-V*1/B																				
Valve model	DLHZA-T*										DLKZA-T*											
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	L0	L1	V1	L3	V3	L5	T5	L7	T7	V7	D7	DT7	L3	L7	T7	V7	D7	DT7				
Max flow (1) [l/min]	2,5	4,5	5	9	13	18		26			26÷13		40		60		60÷33					
at Δp = 30 bar	4	7	8	14	20	28		40			40÷20		60		100		100÷50					
at Δp = 70 bar	10	18	18	32	40	50		70			70÷40		90		160		160÷80					
max permissible flow																						
Leakage [cm³/min] at P = 100 bar (2)	<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 [cm³/min] at P = 100 bar (3)	Fail safe 1			50			70			70			50									
	Fail safe 3			50			70			70			50									
Flow [l/min] (4)	DLHZA	-			-			15÷30			10÷20											
	DLKZA	-			-			40÷60			25÷40											
Response time [ms]	≤ 10										≤ 15											
Hysteresis [%]	≤ 0,1%										≤ 0,1%											
Thermal drift	zero point displacement < 1% at ΔT = 40°C																					

Notes:

- Above performance data refer to valves coupled with Atos electronic drivers, see table G140.
 - The flow regulated by the directional proportional valves is not pressure compensated, thus it is affected by the load variations. To keep constant the regulated flow under different load conditions, modular pressure compensators are available (see tab. D150).
- (1) For different Δp, the max flow is in accordance to the diagrams in section 13.2
 (2) Referred to spool in neutral position and 50°C oil temperature.
 (3) Referred to spool in fail safe position and 50°C oil temperature.
 (4) Referred to spool in fail safe position at Δp = 35 bar per edge and 50°C oil temperature.

20 MODEL CODE OF PRESSURE COMPENSATED PROPORTIONAL FLOW CONTROL VALVES

QVHZA / IE - T - 06 / 12 / PA - GK / * / * ** / *

QVHZA = size 06
QVKZA = size 10

Optional certifications (omit for Group II ATEX)

IE = IECEx, Group II
IEM = IECEx, Group I (mining)
M = ATEX, Group I (mining)
RU = Rostechnadzor (Russian), Group II

A = without position transducer
T = with integral position transducer

Valve size (ISO 4401)

QVHZA: **06** QVKZA: **10**

Max regulated flow:

QVHZA QVKZA
3 = 3,5 l/min; **36** = 36 l/min; **65** = 65 l/min
12 = 12 l/min; **45** = 45 l/min; **90** = 90 l/min
18 = 18 l/min;

Optional cable gland:

PA = with threaded cable clamp, see section 26

Seals material (1):
omit for NBR (mineral oil & water glycol)
PE = FPM

Series number

Omit for standard coil 12 V_{DC}:

24 = with 24 VDC coils (only A version)

Options:

7 = for ambient temperature up to 70° C (not for Group I)
C = current feedback signal 4-20 mA (only for -T versions)
D = quick venting (only for -A versions)
O = horizontal cable entrance (only for -A versions, not for group I ATEX)
WP = prolonged manual override protected by metallic cap (only for -A versions)

Solenoid threaded connection:

GK = GK-1/2" ISO/UNI-6125 (tapered)
NPT = 1/2" NPT ANSI B2.1 (tapered)
M = M20x1,5 UNI-4535 (6H/6g)

(1) Option **/BT** = low temperature -40°C also available on request only for valves -A without integral position transducer (not for group I ATEX -mining-)

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

Hydraulic symbols	 QVHZA-A QVKZA-A  QVHZA-T QVKZA-T																
Note: In three-way versions port P is open. In two-way versions port P must be plugged. Port T must always be plugged.																	
Valve model	QVHZA-A					QVHZA-T					QVKZA-A		QVKZA-T				
Valve size	06					06					10		10				
Max pressure ports P, A, B [bar]	210																
Max regulated flow [l/min]	3,5	12	18	36	45	3,5	12	18	35	45	65	90	65	90			
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		

Above performance data refer to valves coupled with Atos electronic drivers.

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

22 MODEL CODE OF PROPORTIONAL PRESSURE RELIEF AND COMPENSATOR VALVES

RZMA / IE - A - 010 / 250 / PA - GK / * / * ** / *

Pressure relief:

RZMA = subplate size 06
HZMA = modular size 06
AGMZA = subplate size 10, 20, 32
LIMZA = cartridge (1)

Pressure compensator:

LICZA = cartridge (1)

Optional certifications (omit for Group II ATEX)

IE = IECEx, Group II
IEM = IECEx, Group I (mining)
M = ATEX, Group I (mining)
RU = Rostechnadzor (Russian), Group II

A = without integral pressure transducer

Valve size: see section 23 for size code

Max regulated pressure: see section 23

Optional cable gland

PA = with threaded cable clamp, see section 26

Seals material (1):
omit for NBR (mineral oil & water glycol)
PE = FPM

Series number

Omit for standard coil 12 V_{DC}:

24 = with 24 VDC coils

Options:

7 = for ambient temperature up to 70° C (not for Group I)
E = external pilot (only for AGMZA)
O = horizontal cable entrance (not for group I ATEX)
P = with integral mechanical pressure limiter (only for LI*ZA)
Y = external drain (only for AGMZA)

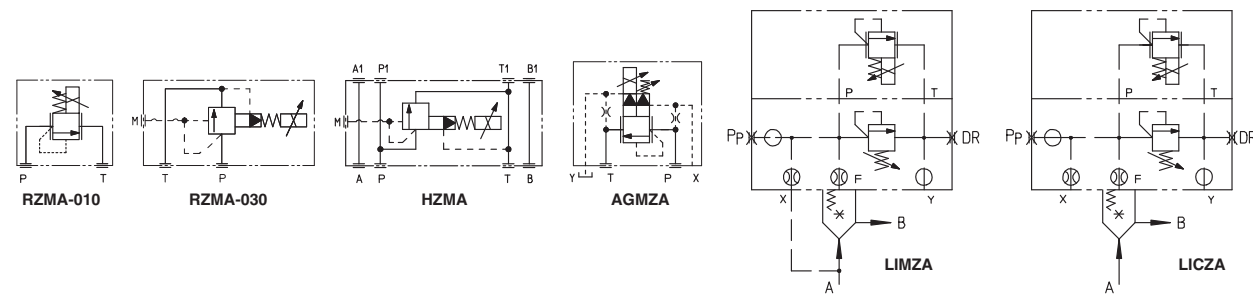
Solenoid threaded connection:

GK = GK-1/2" ISO/UNI-6125 (tapered)
NPT = 1/2" NPT ANSI B2.1 (tapered)
M = M20x1,5 UNI-4535 (6H/6g)

(1) For the code of the ISO cartridge to use with LIMZA and LICZA, see tab. F300 section 2.

(2) Option **/BT** = low temperature -40°C also available on request (not for group I ATEX -mining-)

23 HYDRAULIC CHARACTERISTICS

																					
Valve model	RZMA		HZMA	AGMZA			LIMZA						LICZA								
Size code	010	030	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]							80;		180;		250										
Max pressure at port P, A, B, X [bar]									315												
Max pressure at port T, Y [bar]									210												
Max flow [l/min]	4	40	40	200	400	600	200	400	750	1000	2000	3000	4500	200	400	750	1000	2000			

24 MODEL CODE OF PROPORTIONAL PRESSURE REDUCING VALVES

RZGA / * - A - 010 / 210 / PA - GK / * / * ** / * Pressure reducing: RZGA = subplate size 06 HZGA = modular size 06 KZGA = modular size 10 AGRCZA = subplate size 10, 20 LIRZA = cartridge Optional certifications (omit for Group II ATEX) IE = IECEx, Group II IEM = IECEx, Group I (mining) M = ATEX, Group I (mining) RU = Rostekhnadzor (Russian), Group II A = without integral transducer Valve size: see section 25 for size code Max regulated pressure: see section 25 Optional cable gland PA = with threaded cable clamp, see section 26	Seals material (1): omit for NBR (mineral oil & water glycol) PE = FPM Series number Omit for standard coil 12 Vdc: 24 = with 24 VDC coils Options: 7 = for ambient temperature up to 70° C (not for Group I) O = horizontal cable entrance (not for group I ATEX) P = with integral mechanical pressure limiter (only for AGRCZA and LIRZA) R = with check valve (only for AGRCZA) Solenoid threaded connection: GK = GK-1/2" ISO/UNI-6125 (tapered) NPT = 1/2" NPT ANSI B2.1 (tapered) M = M20x1,5 UNI-4535 (6H/6g)
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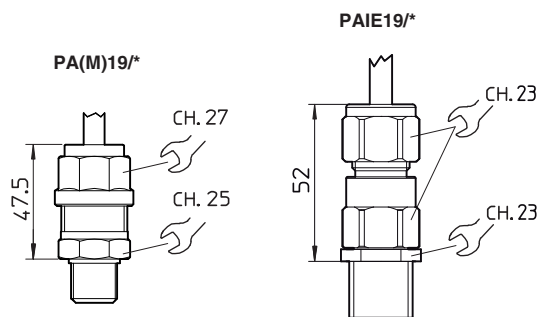
Note: for the code of the ISO cartridge to use with LIRZA, see tab. F300 section 2.
 (1) Option **/BT** = low temperature -40°C also available on request (not for group I ATEX -mining-)

25 HYDRAULIC CHARACTERISTICS

Valve model	RZGA		HZGA	KZGA	AGRCZA		LIRZA			
Size code	010	033	031	031	10	20	1	2	3	4
Valve size	06			10	10	20	16	25	32	40
Max regulated pressure [bar]	32; 100; 210				80;	180;	250			
Min regulated pressure [bar]	0,8	1	1	1	1	1	7	7	7	7
Max pressure at port P [bar]	315									
Max pressure at port T [bar]	210									
Max flow [l/min]	12	40	40	100	160	300	160	300	550	800

26 CABLE GLAND

CABLE GLAND PA19/* (PG9 - IP67)
CABLE GLAND PAM19/* - for valves with mining certification (PG9 - IP67)
CABLE GLAND PAIE19/* - for valves with IECEx certification (PG9 - IP66)



The cable glands PA and PAM, are available on request certified ATEX according to EN 60079-0 and EN 60079-1.

The cable gland PAIE, is certified IECEx according to the following standards:
 IEC 60079-0, IEC 60079-1, IEC 60079-7, IEC 61241-0, IEC 61241-1

PA19 cable size 7÷9,5 mm
 PA112 cable size 9÷12 mm

Following codes have to be specified for spare cable glands:

PA(M)19/GK = with threaded connection GK-1/2" ISO/UNI-6125 (tapered)
PA(M)19/NPT = with threaded connection 1/2" NPT ANSI B2.1 (tapered)
PA(M)19/M = with threaded connection M20x1,5 UNI-4535 (6H/6g).
PAIE19/GK = with threaded connection GK-1/2" ISO/UNI-6125 (tapered)
PAIE19/NPT = with threaded connection 1/2" NPT ANSI B2.1 (tapered)
PAIE19/M = with threaded connection M20x1,5 UNI-4535 (6H/6g).

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

Note: special cable clamps PG12, PA(M)112/* are available on request and they have to be ordered separately

The valves must be connected to the power supply using the terminal board inside the solenoid.

The cable must be suitable for the working temperature as specified in the "safety instructions" delivered with the first supply of the products.

Additional equipotential grounding can be also performed by the user on the external facility provided on the solenoid case.

Minimum section of external ground wire = 4 mm².

Minimum section of internal ground wire = the same of supply wire.

In order to reach the terminal board inside the solenoid, the top plate of the solenoid must be removed.

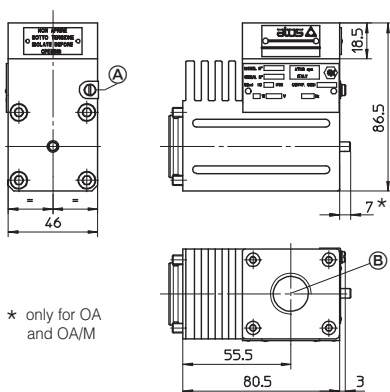
Solenoids are provided with threaded connection for cable entrance:

GK-1/2" GAS (ISO/UNI 6125) or M20x1,5 (UNI-4535) or 1/2"NPT (ANSI B2.1)

OA
OZA-A

OAI
OZAI-A

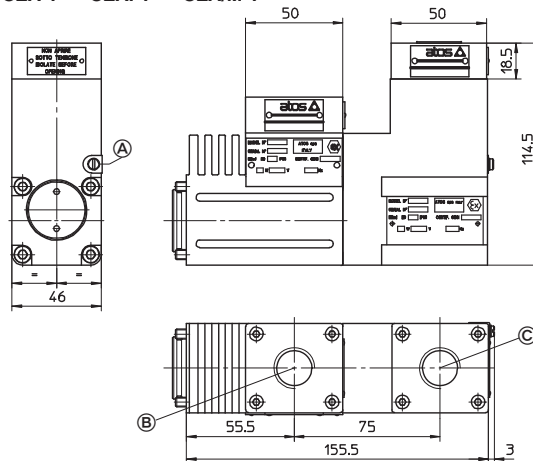
OA/M
OZA/M-A



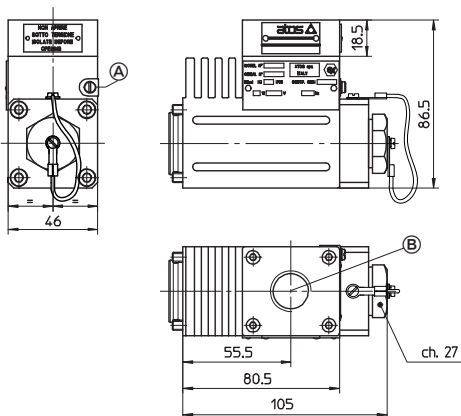
OZA-T

OZAI-T

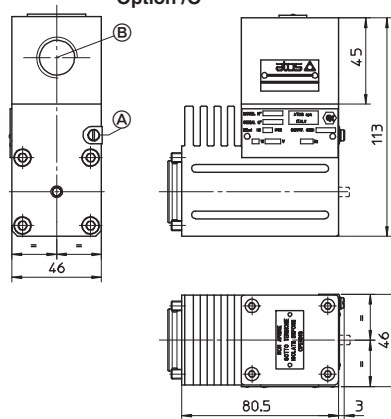
OZA/M-T



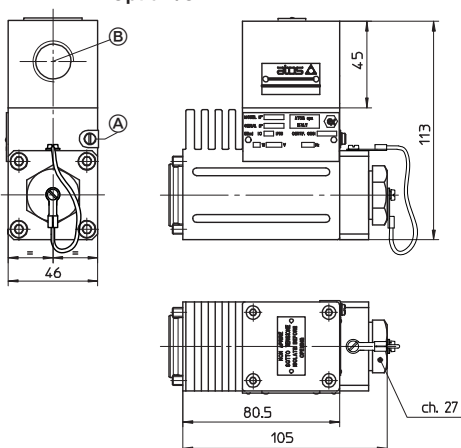
Option /WP



Option /O

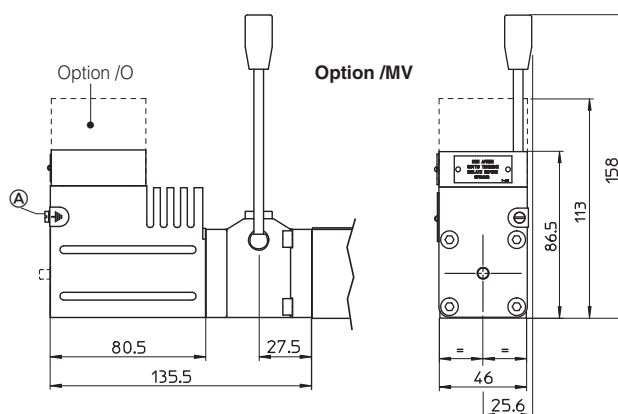


Option /OWP



Option /O

Option /MV



Ⓐ = screw terminal for additional equipotential grounding

Ⓑ = Solenoid wiring

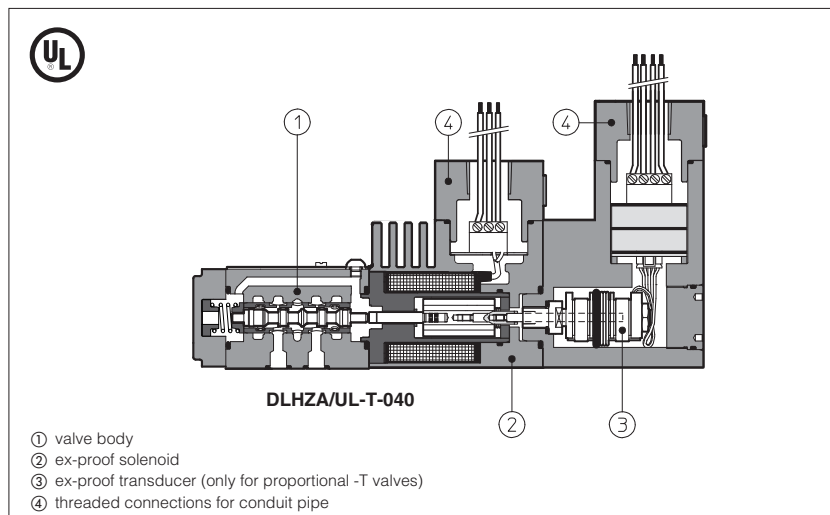
Ⓒ = Position transducer wiring

1	Coil
2	GND
3	Coil

1	Output signal
2	Supply -15 V
3	Supply +15 V
4	GND

Explosion-proof solenoid valves

on/off and proportional controls - C UL US certification



Explosion-proof on/off and proportional solenoids certified C UL US according to UL 1002 and CSA 22.2 n°139-1982 Standard, Class I, Groups C&D (Groups IIA & IIB to NEC 505-7).

The solenoid case is 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.

DHA and DLOH valves are conform to **SIL 3** safety level (TÜV approved).

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.

These solenoids are applied to hydraulic valves for application in explosion-hazardous environments.

1 EXPLOSION PROOF SOLENOIDS: MAIN DATA

SOLENOID TYPE	PROPORTIONAL		ON-OFF
	without transducer	with transducer	
Solenoid code	OZAUL-A	OZAUL-T	OAUL
Voltage code	Vdc ±10% VAC 50/60 Hz ±10%	12 DC, 24 DC	12DC, 24DC, 110DC, 125DC, 220DC
Power consumption	35W		12W
Coil insulation	Class H		
Protection degree	IP 67 According to IEC 144 when correctly coupled with the relevant conduit pipe		
Duty factor	100%		
Mechanical construction	Flame proof housing classified, according to UL 1002 and CSA 22.2 n°139-1982, class I, groups C&D (Groups IIA & IIB to NEC 505-7)		
Cable entrance and electrical wiring	Connection 1/2" NPT (ANSI B2.1) for conduit pipe The valves are supplied with 1,07 m (42 inches) cable length factory wired - cable size AWG 16		

(1) For alternating current supply a rectifier bridge is provided built-in the solenoid

2 EXPLOSION PROOF SOLENOIDS: TEMPERATURE DATA

SOLENOID TYPE	PROPORTIONAL	ON/OFF
Method of protection	Ex d	
Temperature class with +70°C ambient temp.	T4	Not applicable
Surface temperature	≤135 °C	≤ 85 °C
Ambient temperature	-40 ÷ +70 °C	

3 CERTIFICATIONS

In the following is resumed the valves marking according to UL 1002 and CSA 22.2 n° 139-1982 certification

Class I = Equipment for famable gas and vapours
Division 1 = Possibility of explosive atmosphere during normal functioning
Groups C&D = Gas group (according to UL 1002)
Groups IIA&IIB = Gas group (according to NEC 505-7)
T4 = Temperature class of solenoid surface referred to +70°C ambient temperature

3.1 EXAMPLE OF NAMEPLATE MARKING

MODEL CODE	 atos
SERIAL N°	LISTED Solenoid for use in hazardous locations
Class I, Groups C & D Temperature code T4	
Class I, Groups IIA & IIB Temperature code T4	
Max ambient temp. 70° C 158° F	
Electrical rating : _____	
See instructions for use with pulse width modulated (PWM) inverter	
CAUTION: To reduce the risk of ignition of hazardous atmospheres, disconnect from circuit before opening enclosure. Keep tightly closed when in operation.	
T-764	
Marking according to NEC 505-7 norms	
Marking according to UL 1002 norms	
C UL US identification mark	

4 MODEL CODE OF SPOOL TYPE ON-OFF DIRECTIONAL SOLENOID VALVES

DHA = spool type - direct DPHA = spool type - piloted	UL = C UL US certification	Valve size (ISO 4401) for DHA 0 = 06 for DPHA 1 = 10 2 = 16 4 = 25 6 = 32	Valve configuration, DHA see section [5] and DPHA see section [6]
Spool type, DHA see section [5] and DPHA see section [6]			
Solenoid threaded connection: NPT = 1/2" NPT ANSI B2.1 (tapered)			

/ UL - 0 63 1/2 / NPT / *

24DC

/*

Seals material: omit for NBR (mineral oil & water glycol)
PE = FPM
 Low temperature execution: **BT** = low temperature -40°C

Series number

Voltage code - see section [1]

Options:

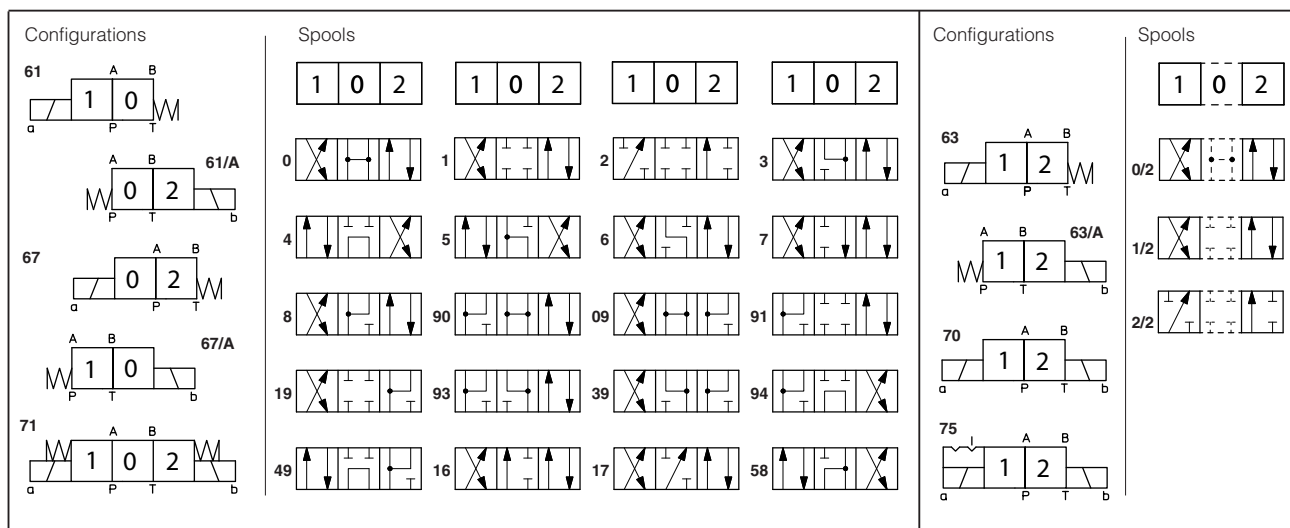
- A** = solenoid at side of port B (for single solenoid valves)
- O** = horizontal cable entrance
- MV** = vertical hand lever (1)
- WP** = prolonged manual override protected by metallic cap

Only for DPHA:

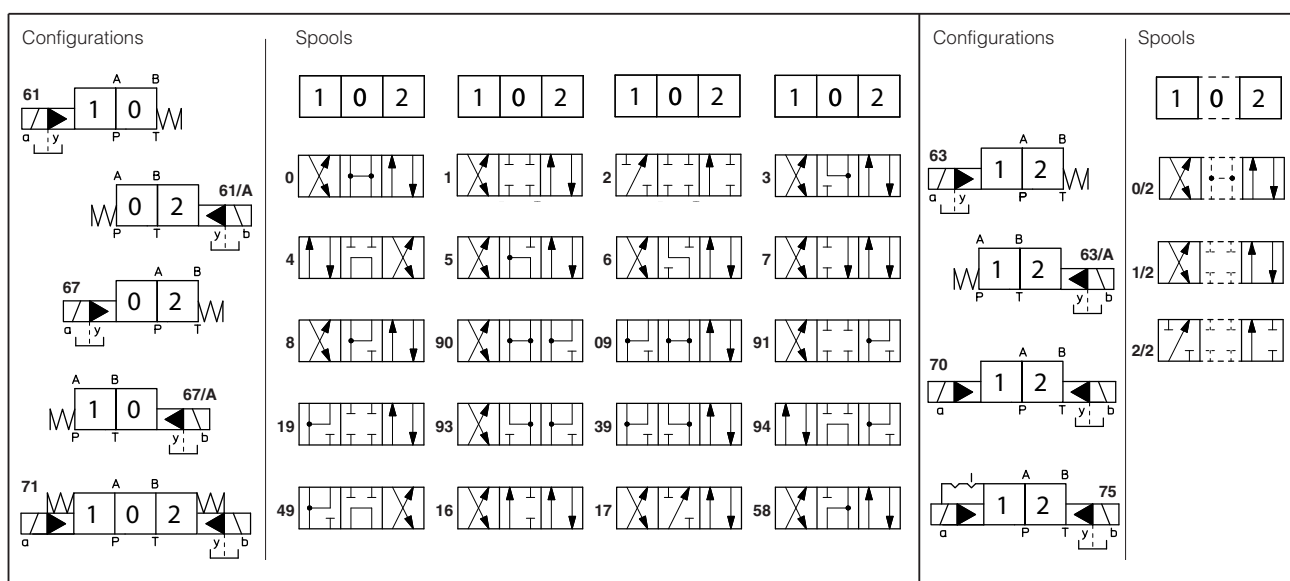
- /D** = Internal drain
- /E** = External pilot pressure
- /H** = Adjustable chokes (meter-out to the pilot chambers of the main valve).
- /H9** = Adjustable chokes (meter-in to the pilot chambers of the main valve)
- /L9** = (only for DPHA-2 and DPHA-4) plug with calibrated restrictor on port P of pilot valve
- /S** = Main spool stroke adjustment (only for DPHA-2, -3)

(1) Option **/MV** available only for DHA, configuration 61, 63, 71 and spool type 0, 0/2, 1, 1P, 1/2, 1/2P, 3, 3P, 4, 7

5 CONFIGURATIONS and SPOOLS



6 CONFIGURATIONS and SPOOLS



NOTES:

- For **DP*-1** are available only spools: **0, 0/2, 1, 1/2, 3, 4, 5, 58, 6, 7**
- For **DP*-6** are available only spools: **0, 1, 2, 3, 4, 5, 58, 6, 7, 8, 19, 91**

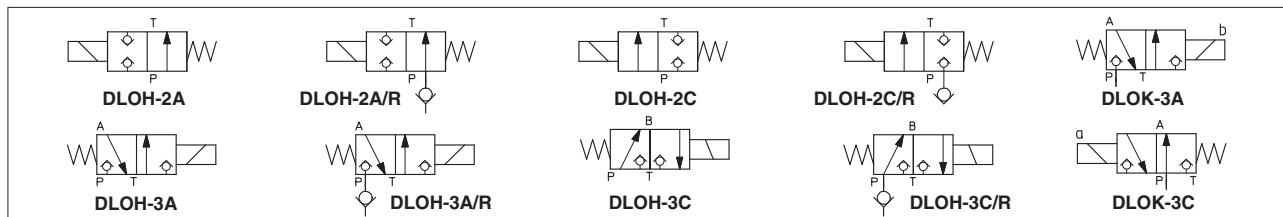
7 MODEL CODE OF POPPET TYPE, LEAK FREE, DIRECTIONAL SOLENOID VALVES

DLO Directional control valve poppet type, size 06 H = max flow 12 l/min K = max flow 30 l/min 2 = two way (only for DLOH) 3 = three way Valve configuration, see section 8 A = open in rest position C = closed in rest position Solenoid threaded connection: NPT = 1/2" NPT ANSI B2.1 (tapered)	H - 2 A / NPT - AO/UL / * 24DC ** / *	Seals material (1): omit for NBR (mineral oil & water glycol) PE = FPM Series number Voltage code - see section 11 Options: O = horizontal cable entrance R = with check valve on port P (only for DLOH) WP = prolonged manual override protected by metallic cap
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AO/UL = C UL US certification

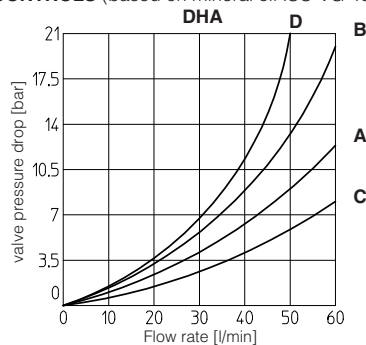
(1) Option **/BT** = low temperature -40°C also available on request

8 CONFIGURATION OF DLOH/AO/* AND DLOK/AO/*



9 Q/Δp DIAGRAMS OF ON/OFF DIRECTIONAL CONTROLS (based on mineral oil ISO VG 46 at 50°C)

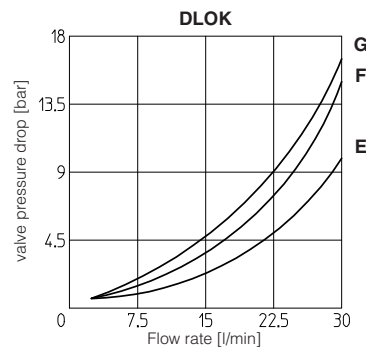
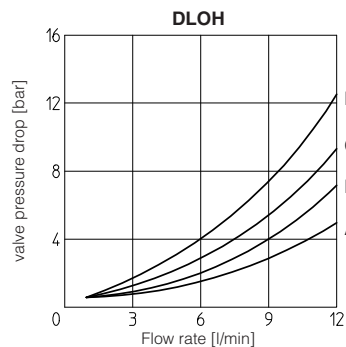
Flow direction \ Spool type	P→A	P→B	A→T	B→T	P→T
0	C	C	C	C	
0/2, 1, 1/2	A	A	A	A	
3	A	A	C	C	
4, 5	D	D	D	D	A
6	A	A	C	A	
7	A	A	A	C	
8	C	C	B	B	



INTERNAL LEAKAGE of DLOH and DLOK less than 5 drops/min (0,36 cm³/min) at max pressure.

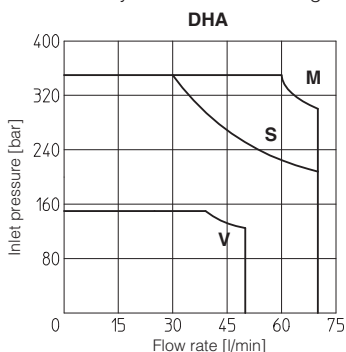
Flow direction \ Valve type	P → A (1) (P → B)	A → T (B → T)
DLOH-2A	B	—
DLOH-2C	C	—
DLOH-3A	D	C
DLOH-3C	C	A
DLOK-3A	G	F
DLOK-3C	F	E

(1) For two-way valves pressure drop refers to P→T

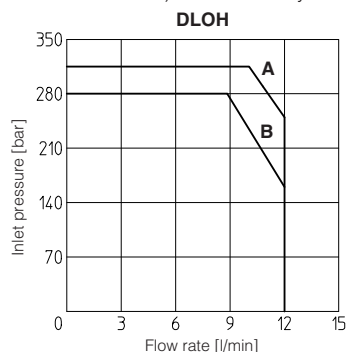


10 OPERATING LIMITS OF ON/OFF DIRECTIONAL CONTROLS (based on mineral oil ISO VG 46 at 50°C)

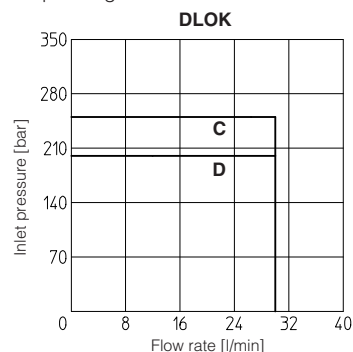
The diagram have been obtained with warm solenoids and power supply at lowest value ($V_{nom}-10\%$). For DHA valves the curves refer to application with symmetrical flow through the valve (i.e. P → A and B → T). In case of asymmetric flow the operating limits must be reduced.



M = Spools 0, 1, 8; **V** = Spools 4, 5.
S = Spools 0/2, 1/2, 3, 6, 7;



A = DLOH-3A;
B = DLOH-2A, DLOH-3C.



C = DLOK-3A;
D = DLOK-3C.

10.1 Max pressure in port T = 210 bar

11 MODEL CODE OF PRESSURE RELIEF VALVES

AGAM - 20 / 2 0 /210/100/100 / NPT - AO/UL / * 24 DC ** /*

AGAM = pressure relief valve: subplate mounting, see tab. C066
ARAM = pressure relief valve: threaded connections, see tab. C045

Valve size for AGAM: 10 (ISO 6264)
 20 (ISO 6264)
 32 (ISO 6264)
 for ARAM: 20 = G 3/4"
 32 = G 1 1/4"

Number of the different setting pressure values:
 1 = one setting pressure
 2 = two setting pressure
 3 = three setting pressure

Valve configuration
 0 = venting with de-energized solenoid
 1 = venting with energized solenoid
 2 = without venting

Max regulated pressure of first (second / third) setting see section 12

(1) Option /BT = low temperature -40°C also available on request

Seals material (1):
 omit for NBR (mineral oil & water glycol)
 PE = FPM

Series number

Voltage Code, see section 11

Options:
E = external pilot
O = horizontal cable entrance
V = regulating handwheel
WP = prolonged manual override protected by metallic cap
Y = external drain

AO/UL = C UL US certification

Solenoid threaded connection:
 NPT = 1/2" NPT ANSI B2.1 (tapered)

12 HYDRAULIC CHARACTERISTICS

AGAM-*/10 ARAM-*/10		ARAM-*/10 AGAM-*/11		AGAM-*/22 ARAM-*/22	
AGAM-*/20 ARAM-*/20		AGAM-*/21 ARAM-*/21		AGAM-*/32 ARAM-*/32	
Valve model		Size 10		Size 20	
Setting		50; 100; 210; 350		Size 32	
Max pressure port P [bar]		350			
Pressure range [bar]		4÷50; 6÷100; 7÷210; 8÷350			
Max flow AGAM [l/min]		200		400	
Max flow ARAM [l/min]		-		350	
				600	
				500	

13 MODEL CODE OF COVERS FOR CARTRIDGE VALVES

LIDEW - 1 / NPT - AO/UL - * 24DC ** /* *

Cover type:
LIDBH* = with solenoid valve and shuttle valve for pilot selection
LIDEW* = with solenoid valve for pilot selection
 * = valve configuration (see H030 section 2)

Size (ISO 7368)
 1 = 16; 4 = 40; 8 = 80 (only for LIDEW);
 2 = 25; 5 = 50;
 3 = 32; 6 = 63;

Solenoid threaded connection:
 NPT = 1/2" NPT ANSI B2.1 (tapered)

Certification type
 AO/UL = C UL US certification

Note: for the code of the ISO cartridge to use with the above covers see tab. H003, section 2 and tab. H030, section 3.

(1) Option /BT = low temperature -40°C also available on request

Optional different provision or setting of the calibrated plugs in the pilot channels see table H030 sect. 6

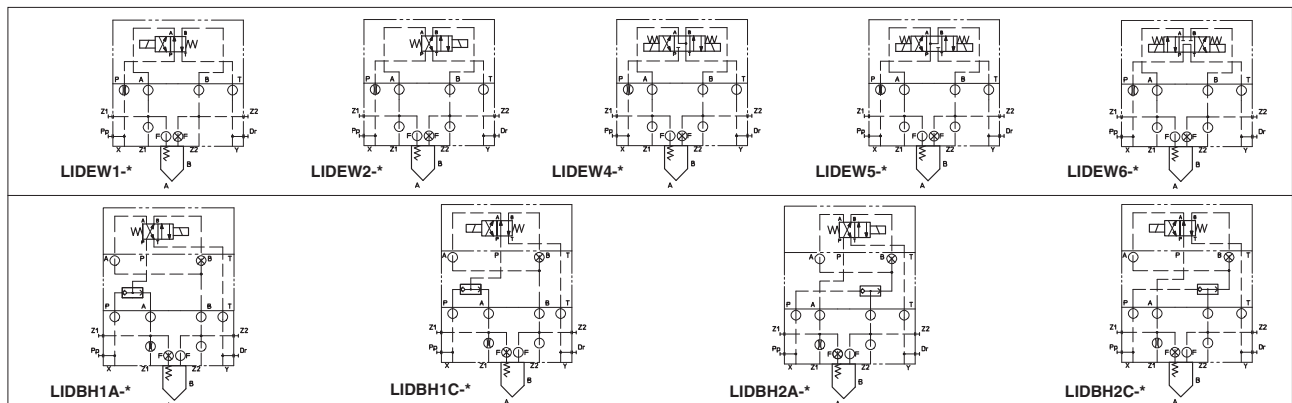
Seals material (1):
 omit for NBR (mineral oil & water glycol)
 PE = FPM

Series number

Voltage code - see section 11

Options:
B = cartridge piloted via port "B" of solenoid pilot valve
E = external attachments X (1/4" GAS) and underneath port X supplied plugged (only for sizes 40...80)
O = horizontal cable entrance
WP = prolonged manual override protected by metallic cap

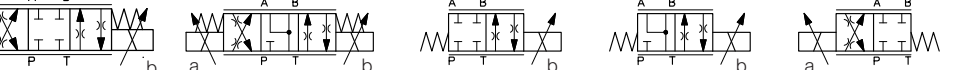
14 HYDRAULIC SYMBOLS



15 MODEL CODE OF PROPORTIONAL DIRECTIONAL VALVES

[illegible]

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

Hydraulic symbols 							
Valve model	DHZA-A DHZA-T					DKZA-A DKZA-T	
Spool overlapping	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3	1, 3
Spool type and size	L14	L1	S2	S3, L3, D3	S5, L5, D5	S3, L3, D3	S5, L5, D5
Pressure limits [bar]	ports P, A, B = 350; T = 160 (250 with external drain /Y)						
Δp max P-T [bar]	70			50		40	
Max flow [l/min]							
at $\Delta p = 10$ bar (P-T)	1	4,5	8	17	28	45	60
at $\Delta p = 30$ bar (P-T)	2	8	14	30	50	80	105
max permissible flow	3	12	21	45	60	90	120
Response time (t) ₁ [ms]	< 30 (A) < 15 (T)					< 40 (A) < 20 (T)	
Hysteresis [%]	$\leq 5\%$ (A) $\leq 0,2\%$ (T)					$\leq 5\%$ (A) $\leq 0,2\%$ (T)	
Repeatability	$\pm 1\%$ (A) $\pm 0,1\%$ (T)					$\pm 1\%$ (A) $\pm 0,1\%$ (T)	

(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.

17 HYDRAULIC CHARACTERISTICS OF DPZA (based on mineral oil ISO VG 46 at 50 °C)

Hydraulic symbols														
*71, *71/B			*73			*51			*53			*51/B		
Valve model			DPZA-1						DPZA-2			DPZA-3		
Spool type and size (1)			L5	S5	D5	S3	D3	L5	S5	D5	L5	S5	D5	L5
Pressure limits [bar]			Ports P, A, B, X = 350; T = 250; Y = 0											
Max flow [l/min]														
at $\Delta p = 10$ bar			100	100	100 : 60	130	130 : 80	200	180	180 : 130	390	360	360 : 220	600
at $\Delta p = 30$ bar			160	160	160 : 100	225	225 : 135	340	310	310 : 225	680	620	620 : 380	1030
max permissible flow			180	180	180 : 110	550	550 : 300	760	640	640 : (460)	1450	1350	1350 : 820	1600
Response time (2) [ms]			< 80			< 100						< 120		
Hysteresis [%]			$\leq 5\%$			$\leq 5\%$						$\leq 5\%$		
Repeatability			$\pm 1\%$			$\pm 1\%$						$\pm 1\%$		

(1) Additional spools and configurations for -T execution, see table F172.

(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.

ELECTRONIC DRIVERS TO BE USED WITH EX-PROOF PROPORTIONAL VALVES

- Atos driver for proportional valves type **-A** (without transducer): **E-ME-AC**, see tab. G035
- Atos driver for proportional valves type **-T** (with transducer): **E-ME-T**, see tab. G140

18 MODEL CODE OF SERVOPROPORTIONAL VALVES

DLHZA /UL - T - 0 4 0 - L 7 3 / NPT / * ** /*

DLHZA = size 06
DLKZA = size 10

UL = C UL US certification

T = with integral position transducer

Valve size (ISO 4401)
0 = size 06 (DLHZA)
1 = size 10 (DLKZA)

Configuration, see section 19
4 = spring offset with fail safe
6 = spring offset

Spool overlapping in central position, see section 19
0 = P, A, B, T zero overlapping

Spool type
L = linear; **T** = not linear;

(1) Option **/BT** = low temperature -40°C also available on request

Seals material (1):
omit for NBR (mineral oil & water glycol)
PE = FPM

Series number

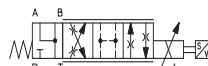
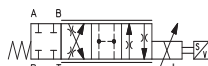
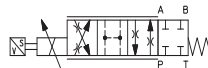
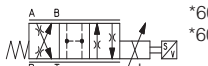
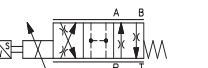
Options:
B = solenoid at side of port A
C = position transducer with current feedback 4÷20 mA
Y = external drain

Solenoid threaded connection:
NPT = 1/2" NPT ANSI B2.1 (tapered)

Fail safe configuration:
1 = A, B, P, T with positive overlapping **3** = P, positive overlapping; A, B, T negative

Spool size: see section 19

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

Hydraulic symbols	 	 	 															
*40-L*3/B *40-D*3/B *40-DT*3/B *40-T*3/B *40-V*3/B	*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*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	DLHZA-T*										DLKZA-T*							
Pressure limits [bar]	ports P, A, B = 350; T = 160 (250 with external drain /Y)										ports P, A, B = 315; T = 160 (250 with external drain /Y)							
Δp max P-T	70										60							
Spool	L0	L1	V1	L3	V3	L5	T5	L7	T7	V7	D7	DT7	L3	L7	T7	V7	D7	DT7
Max flow at Δp = 30 bar	2,5	4,5	5	9	13	18		26			26÷13	40		65			65÷33	
max permissible flow	4	7	8	14	20	28		40			40÷20	55		80			80÷40	
Leakage [cm³/min] at P = 100 bar (1)	<100	<200	<100	<300	<150	<500	<200	<900	<200	<200	<700	<200	<1000	<1500	<400	<400	<1200	<400
Response time [ms]	≤ 10										≤ 15							
Hysteresis [%]	≤ 0,1%										≤ 0,1%							
Thermal drift	zero point displacement < 1% at ΔT = 40°C																	

(1) Referred to spool in center position and 50°C oil temperature.

20 MODEL CODE OF PRESSURE COMPENSATED PROPORTIONAL FLOW CONTROL VALVES

QVHZA / UL - T - 06 / 12 / NPT / * /* ** /*

QVHZA = size 06
QVKZA = size 10

UL = C UL US certification

A = without position transducer
T = with integral position transducer

Valve size (ISO 4401)
QVHZA: **06** QVKZA: **10**

Max regulated flow:
QVHZA
3 = 3,5 l/min; **36** = 36 l/min;
12 = 12 l/min; **45** = 45 l/min;
18 = 18 l/min;
QVKZA
65 = 65 l/min;
90 = 90 l/min

Seals material (1):
omit for NBR (mineral oil & water glycol)
PE = FPM

Series number

Omit for standard coil 12 Vdc:
24 = with 24 VDC coils (only A version)

Options:
C = current feedback signal 4÷20 mA (only for -T versions)
D = quick venting
O = horizontal cable entrance (only for -A versions)
WP = prolonged manual override protected by metallic cap (only for valves without transducer)

Solenoid threaded connection:
NPT = 1/2" NPT ANSI B2.1 (tapered)

(1) Option **/BT** = low temperature -40°C also available on request

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

Hydraulic symbols																																								
Note: In three-way versions port P is open. In two-way versions port P must be plugged. Port T must always be plugged.	QVHZA-A QVKZA-A																QVHZA-T QVKZA-T																							
Valve model	QVHZA-A																QVHZA-T																QVKZA-A				QVKZA-T			
Valve size	06																06																10				10			
Max pressure ports P, A, B [l/min]	210																																							
Max regulated flow [l/min]	3,5	12	18	36	45	3,5	12	18	35	45	65	90	65	90																										
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		50		60	70	100	70	100																										

Above performance data refer to valves coupled with Atos electronic drivers.

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

22 MODEL CODE OF PROPORTIONAL PRESSURE RELIEF AND COMPENSATOR VALVES

RZMA

/

UL

-

A

-

010

/

250

/

NPT

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Pressure relief:

RZMA = subplate size 06

HZMA = modular size 06

AGMZA = subplate size 10, 20, 32

LIMZA = cartridge (1)

Pressure compensator:

LICZA = cartridge (1)

UL = C UL US certification

A = without integral pressure transducer

Valve size:

see section 23 for size code

Max regulated pressure:

see section 23

(1) For the code of the ISO cartridge to use with LIMZA and LICZA, see tab. F300 section 2.

(2) Option **/BT** = low temperature -40°C also available on request

Seals material (2):
omit for NBR (mineral oil &
water glycol)
PE = FPM

Series number

Omit for standard coil 12 Vdc:

24 = with 24 Vdc coils (only A version)

Options:

E = external pilot (only for AGMZA)

O = horizontal cable entrance

P = with integral mechanical pressure limiter (only for L1*ZA)

Y = external drain (only for AGMZA)

Solenoid threaded connection:

NPT = 1/2" NPT ANSI B2.1 (tapered)

23 HYDRAULIC CHARACTERISTICS

RZMA-010

RZMA-030

HZMA

AGMZA

LIMZA

LICZA

Valve model	RZMA			HZMA			AGMZA			LIMZA						LICZA				
Size code	010	030	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]							80; 180; 250													
Max pressure at port P, A, B, X [bar]							315													
Max pressure at port T, Y [bar]							210													
Max flow [l/min]	4	40	40	200	400	600	200	400	750	1000	2000	3000	4500	200	400	750	1000	2000		

24 MODEL CODE OF PROPORTIONAL PRESSURE REDUCING VALVES

RZGA

/

UL

-

A

-

010

/

250

/

NPT

/

*

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*

/

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Pressure reducing:

RZGA = subplate size 06

HZGA = modular size 06

KZGA = modular size 10

AGRCZA = subplate size 10, 20

LIRZA = cartridge

UL = C UL US certification

A = without integral transducer

Valve size:

see section 23 for size code

Max regulated pressure:

see section 23

Note: for the code of the ISO cartridge to use with LIRZA, see tab. F300 section 2.

(1) Option **/BT** = low temperature -40°C also available on request

Seals material (1):
omit for NBR (mineral oil &
water glycol)
PE = FPM

Series number

Omit for standard coil 12 Vdc:

24 = with 24 Vdc coils (only A version)

Options:

O = horizontal cable entrance (1)

P = with integral mechanical pressure limiter

(only for AGRCZA and LIRZA)

R = with check valve (only for AGRCZA)

Solenoid threaded connection:

NPT = 1/2" NPT ANSI B2.1 (tapered)

25 HYDRAULIC CHARACTERISTICS

RZGA-A-010

RZGA-A-033

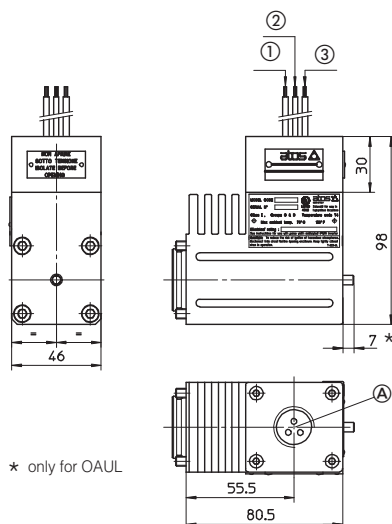
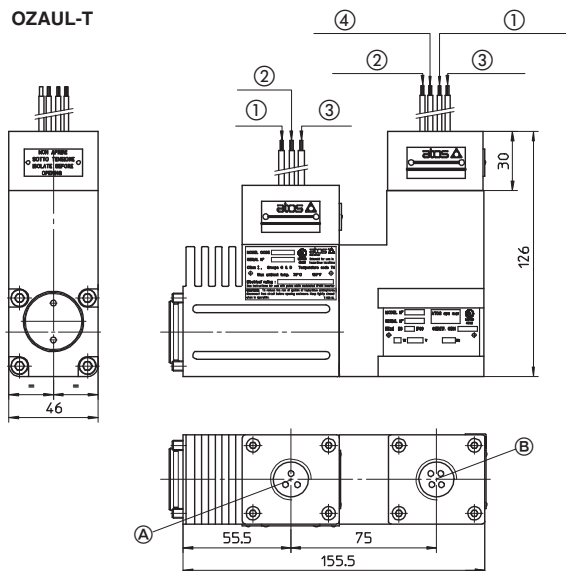
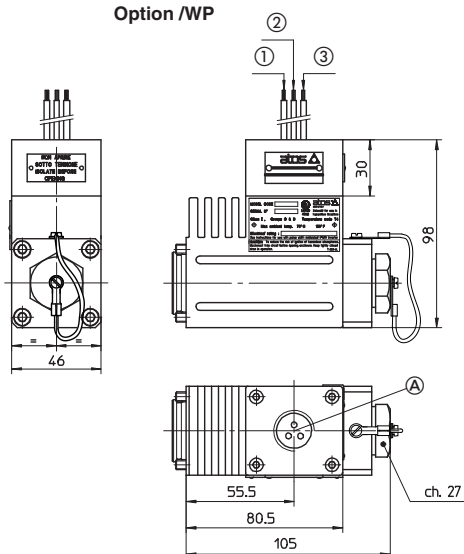
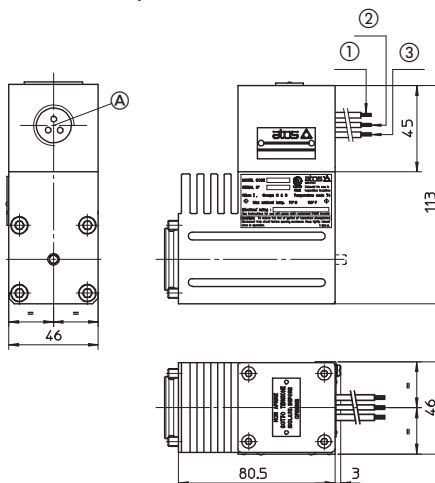
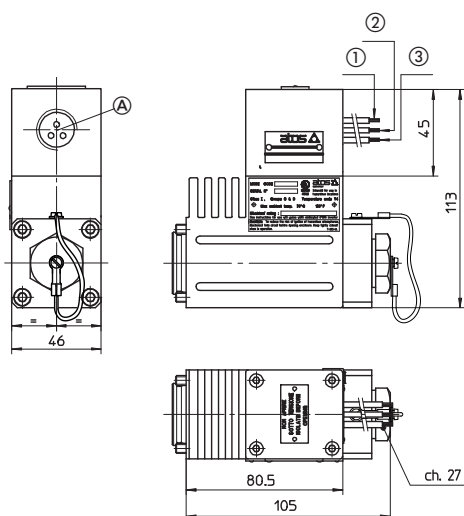
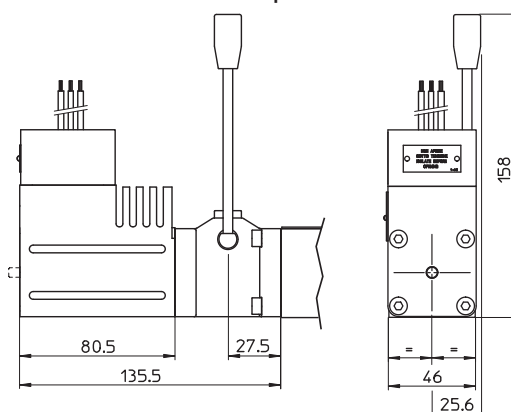
HZGA-A-031

KZGA-A-031

AGRCZA-A

LIRZA-A

Valve model	RZGA		HZGA		KZGA		AGRCZA		LIRZA			
Size code	010	033	031	031	10	20	1	2	3	4		
Valve size	06		10	10	20	16	25	32	40			
Max regulated pressure [bar]	32; 100; 210		80; 180; 250									
Min regulated pressure [bar]	0,8		1	1	1	1	1	7	7	7	7	
Max pressure at port P [bar]												
Max pressure at port T [bar]												
Max flow [l/min]	12	40	40	100	160	300	160	300	550	800		

**OAUL
OZAUL-A****OZAUL-T****Option /WP****Option /O****Option /OWP****Option /MV****(A) Solenoid wiring (connection 1/2"NPT)****OAUL-AC**

- ① white = Coil (neutral)
- ② green = GND
- ③ black = Coil

OAUL-DC

- ① red = +
- ② green = GND
- ③ black = -

OZAUL

- ① red = Coil
- ② green = GND
- ③ black = Coil

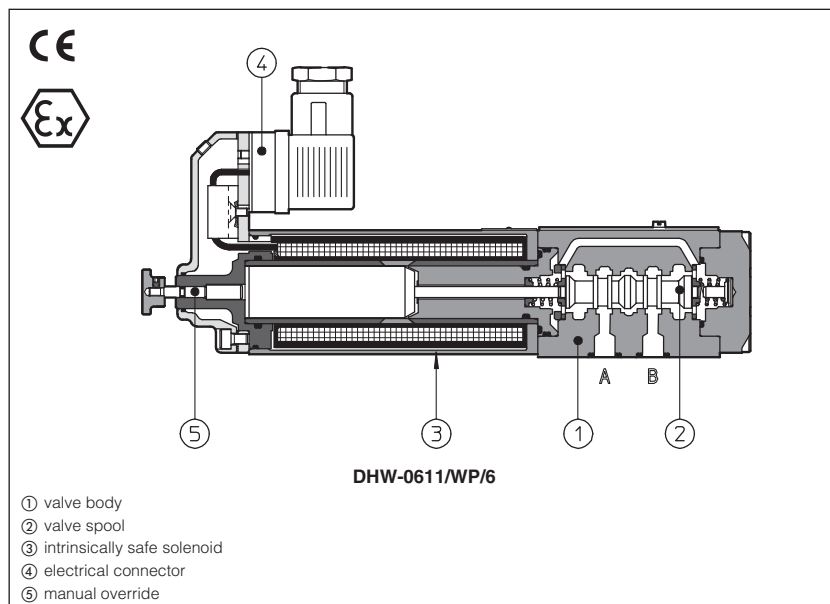
(B) Position transducer wiring (connection 1/2"NPT)

- ① white = Output signal
- ② black = Supply -15 V
- ③ red = Supply +15 V
- ④ yellow = GND

The valves are supplied with 1 m (42 inches) cable length,
factory wired - cable size AWG 16

Intrinsically safe solenoid valves

on/off controls - ATEX certification



On/off valves equipped with intrinsically safe solenoids certified according to ATEX 94/9/CE, protection mode:

- Ex II 1 G, Ex ia IIC T6, IIB T6 or IIA T5 (surface plants with gas or vapours environment, category 1, zone 0, 1 and 2).

- Ex I M2 Ex ia I (solenoids group I for surface, tunnels or mining plants).

"Intrinsically safe" protection is based on the principle of limiting the energy of electric circuits in environments with presence of hazardous atmospheres. For this reason the valves must be supplied through specific "safety barriers" which limitate the max current to the solenoid. Atos provides galvanically insulated barriers for single and double solenoid valves, see section 18 to 21. The "intrinsically safe" circuit is virtually unable to produce electrical surges or thermic effects able to cause explosion in hazardous environments also in presence of specific break-down situations.

1 INTRINSICALLY SAFE SOLENOIDS: MAIN DATA

Solenoid code	Group II	OW-18/6	OW-18/H
	Group I (mining)	OWM-18/6	OWM-18/H
Nominal resistance at 20°C	150 Ω		
Coil insulation	Class H		
Protection degree	IP65		IP67
Duty factor	100%		
Electrical connector	DIN 43650 2 pin+GND		MIL-C-26482 3 pin

2 INTRINSICALLY SAFE SOLENOIDS: ELECTRICAL AND TEMPERATURE DATA

Method of protection		Ex ia / Ex ib according to EN60079-0: 2006, EN60079-11:2007				
Gas group		I and IIC			I and IIB	I and IIA
Temperature class		T6			T6	T5
Electrical characteristic	V max	27 V	19,5 V	19,11 V	28 V	28 V
	I max	130 mA	360 mA	360 mA	250 mA	396 mA
	P max	0,9 W	1,64 W	1,72 W	1,8 W	2,8 W
Minimum supply current		≥ 65mA, for I.S. barriers see section 18 to 21				
Surface temperature (ambient temp. +60°C)		≤ 85°C			≤ 100°C	150 °C
Ambient temperature		-40 ÷ +60°C (1)				-20 ÷ +60°C

(1) The Group II solenoids are Atex certified for minimum temperature -40°C. Select /BT in the valve code for the application with minimum temperature -40°C

3 CERTIFICATIONS

In the following is resumed the valves marking according to the Atex Group I and Group II certification

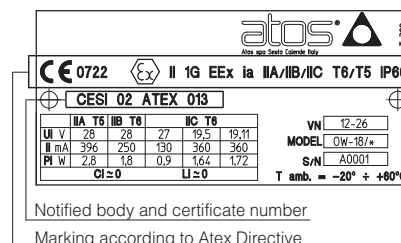
3.1 GROUP II, Atex

Ex = Equipment for explosive atmospheres
II = Group II for surface plants
I = Very high protection (equipment category)
G = For gas and vapours
ia = Intrinsically safe execution
IIC = Gas group - application in surface plants
T6 / T5 = Temperature class of the solenoid surface referred to +60°C ambient temperature
Zone 0 (1 and 2) = Explosive atmosphere continuously present

3.2 GROUP I (mining), Atex

Ex = Equipment for explosive atmospheres
I = Group I for mines and surface plants
M2 = High protection (equipment category)
d = Flame proof housing
I = Gas group (Methane)

3.3 EXAMPLE OF NAMEPLATE MARKING



4 MAIN CHARACTERISTICS OF INTRINSICALLY SAFE VALVES

Assembly position	the installation of DHW valves with the axis in vertical position is not recommended. If this type of installation is absolutely necessary, please consult our technical office
Subplate surface finishing	Roughness index $\sqrt{0.4}$ flatness ratio 0,01/100 (ISO 1101)
Ambient temperature	from -20°C to +60°C (standard, /WG and /PE seals) -40°C to +60°C for /BT option
Fluid	Hydraulic oil as per DIN 51524 535; for other fluids see section 5
Recommended viscosity	15 ÷ 100 mm²/s at 40°C (ISO VG 15 ÷ 100) max viscosity 400 mm²/s
Fluid contamination class	ISO 18/15, achieved with in line filters at 10 µm value to $\beta_{10} \geq 75$ (recommended)
Fluid temperature	-20°C +60°C (standard, /WG and /PE seals) -40°C to +60°C for /BT option

4.1 Corrosion protection characteristics

Valve screws: all screws made in stainless steel class A2

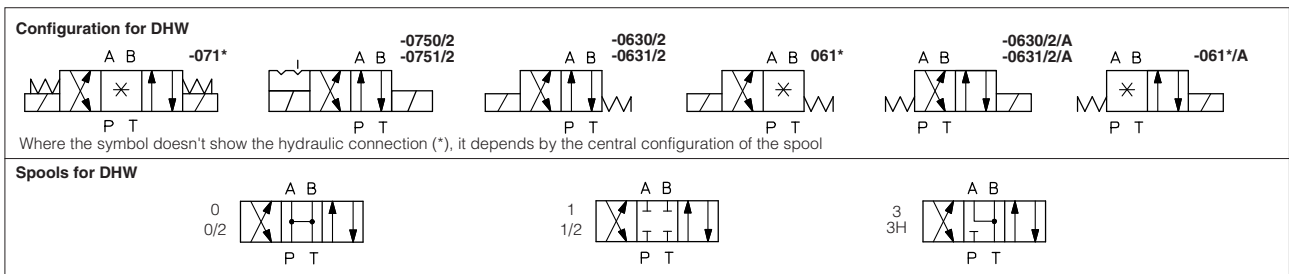
5 MODEL CODE OF SPOOL TYPE ON-OFF DIRECTIONAL SOLENOID VALVES

DH	W	/*	-	0	71	3H	/	A	/	6	**	/*		
DH = spool type - direct DPH = spool type - piloted W = intrinsically safe solenoid, Atex certified omit for Group II M = Group I (mining) Valve size (ISO 4401): for DHW : 0 = size 06; for DPHW : 1 = size 10 2 = size 16; 3 = size 25 Valve configuration, DHW see section 6 and DPHW see section 7 Spool type, DHW see section 6 and DPHW see section 7 3H = spool type 3H for marine applications (1) Only for DHW-071													Synthetic fluids (2): WG = water-glycol PE = phosphate ester	
											Series number			
											Connector type - see section 17			
											/6 = DIN 43650 (standard)			
											/H = MIL-C-26482			
Options: /A = solenoid at side of port B /WP = prolonged manual override														

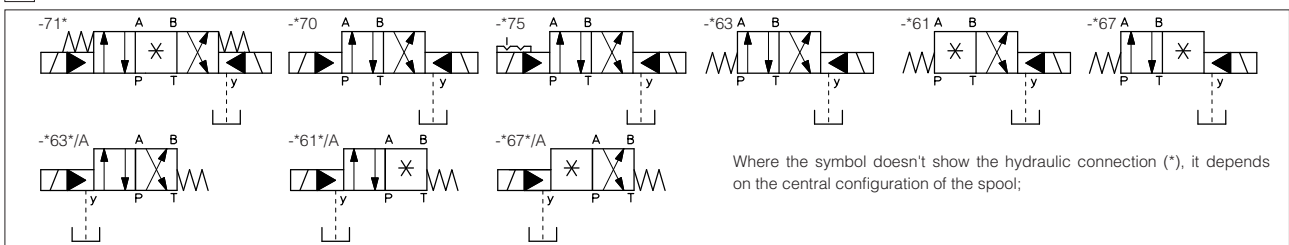
(1) Spool type 3H provides larger passages A-B to T in central position than spool type 3, see section 11.3

(2) Option /BT = low temperature -40°C also available on request (not for group I Atex -mining-)

6 HYDRAULIC CONFIGURATIONS OF DHW VALVES

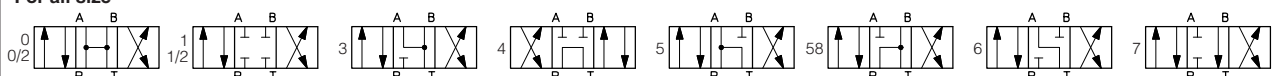


7 CONFIGURATION OF DPHW VALVES

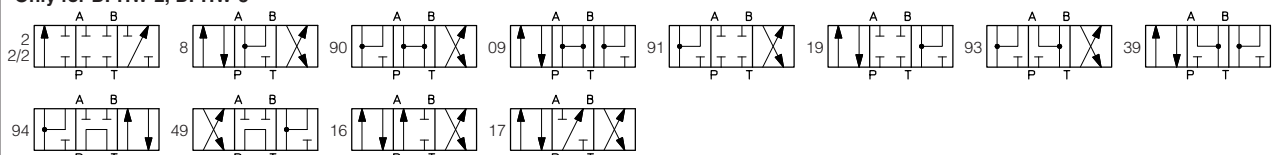


Spools for DPHW valves

For all size



Only for DPHW-2, DPHW-3

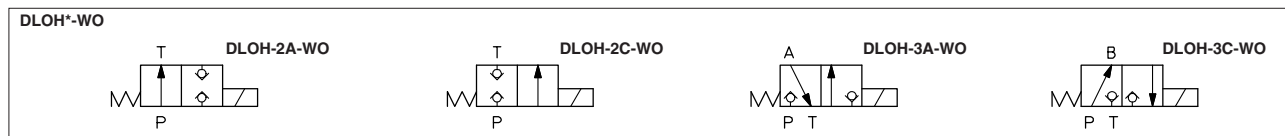


8 MODEL CODE OF POPPET TYPE LEAK FREE ON-OFF DIRECTIONAL SOLENOID VALVES

DLOH directional control valve, poppet type size 06 omit for Group II M = Group I (mining) 2 = 2 way 3 = 3 way A = open in rest position C = closed in rest position Options: /R = with check valve on port P /WP = prolonged manual override	/*	-	2	A	/	R	-	WO	/	6	**	/*
Connector type - see section 17 /6 = DIN 43650 (standard) /H = MIL-C-26482 /WO = intrinsically safe solenoid, Atex certified	Synthetic fluids (1): WG = water-glycol PE = phosphate ester Series number											

(1) Option /BT = low temperature -40°C also available on request (not for group I Atex -mining)

9 HYDRAULIC CONFIGURATIONS OF DLOH VALVES



10 Q/Δp DIAGRAMS based on mineral oil ISO VG 46 at 50°C

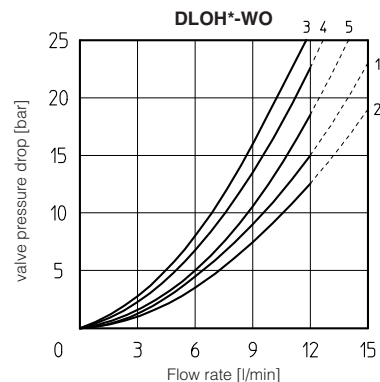
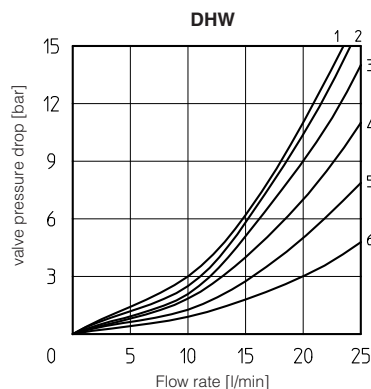
DHW

spool type	0	0/2	1/2	1	3	3H
Flow direction						
P→A / P→B	4	5	5	3	3	3
A→T / B→T	6	2	1	2	4	5

DLOH*-WO

configuration	2A	2C	3A	3C
Flow direction				
P→A / P→B (1)	1	2	4	3
A→T / B→T	-	-	5	4

(1) For two-way valves pressure drop refers to P→T

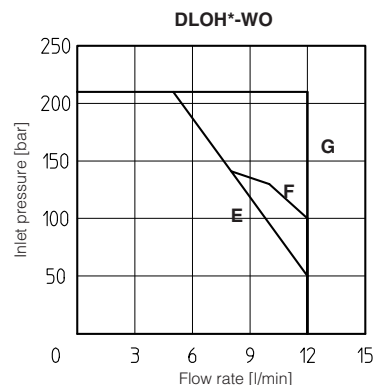
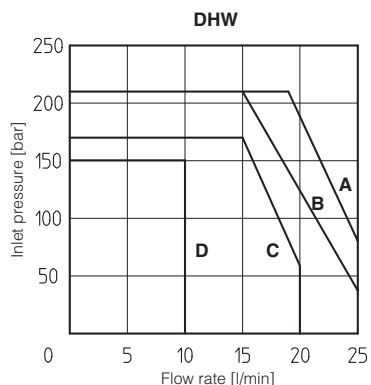


11 OPERATING LIMITS based on mineral oil ISO VG 46 at 50°C

The diagrams refer to warm solenoids and power supply provided by the Atos barrier type **Y-BXNE-412**. For DHW valves the curves refer to application with symmetrical flow through the valve (i.e. P→A and B→T). In case of asymmetric flow the operating limits must be reduced.

DHW type	0	0/2	1/2	1	3	3H
Diagram	B	B	C	C	A	D

DLOH type	2A	2C	3A	3C
Diagram	G	G	F	E



11.1 Operating pressure:

Ports P, A, B = 350 bar Port T = 160 bar

11.2 Operating limits (only for DHW-0713H)

Max flow = 10 l/min - Max pressure = 150 bar

11.3 Flow capability in central position A-B → T (only for DHW-0713H)

Max flow = 25 l/min with Δp 10,5 bar

12 INTERNAL LEAKAGES

12.1 DHW internal leakages

18 cm³/min with P=100 bar - fluid viscosity = 43 cSt at 40 °C
 30 cm³/min with P=140 bar - fluid viscosity = 22 cSt at 45 °C

12.2 DLOH*-WO internal leakages based on mineral oil ISO VG 46 at 50°C

less than 5 drops/min (0,36 cm³/min) at max pressure.

13 MODEL CODE OF PRESSURE CONTROLS

AGAM

/* - 20 / 2 0 / 210 - WO / WP / 6 ** **/***

AGAM = pressure relief valve,
subplate mounting, see tab. C066
ARAM = pressure relief valve,
threaded connections, see tab. C045

Omit for Group II
M = Group I (mining)

Valve size
for AGAM: 10 = size 10 (ISO 6264);
20 = size 20 (ISO 6264);
32 = size 32 (ISO 6264);
for ARAM: 20 = G 3/4";
32 = G 1 1/4"

Number of the different setting pressure values:
1 = one setting pressure
2 = two setting pressure
3 = three setting pressure

Valve configuration
0 = venting with de-energized solenoid
1 = venting with energized solenoid
2 = without venting

Synthetic fluids (1):
WG = water-glycol
PE = phosphate ester

Series number

Connector type - see section 17

/6 = DIN 43650 (standard)
/H = MIL-C-26482

Option:

/WP = prolonged manual override

WO = Intrinsically safe solenoid, Atex certified

Pressure range of first/second/third setting:

50 = 4 - 50 bar 210 = 7 - 210 bar
100 = 6 - 100 bar 350 = 8 - 350 bar

(1) Option /BT = low temperature -40°C also available on request (not for group I Atex -mining-)

14 HYDRAULIC CHARACTERISTICS

AGAM-10				AGAM-20				AGAM-32			
Valve model				AGAM-10-WO				AGAM-20-WO			
Max pressure [bar]				350				350			
Setting				50; 100; 210; 350				50; 100; 210; 350			
Pressure range [bar]				4÷50; 6÷100; 7÷210; 8÷350				4÷50; 6÷100; 7÷210; 8÷350			
Max flow [l/min]				200				400			

15 MODEL CODE OF COVERS FOR CARTRIDGE VALVES

LIDEW **/*** 1 - 1 / * - WO / 6 ** **/***

Cover type:
LIDBH = with solenoid valve
and shuttle valve for pilot selection
LIDEW = with solenoid valve
for pilot selection

Omit for Group II
M = Group I (mining)

Valve configuration, see section 16

Valve size (ISO 7368)
for LIDBH*: 1 = 16, 2 = 16, 3 = 16, 4 = 16, 5 = 50
for LIDEW* 1 = 16, 2 = 16, 3 = 16, 4 = 16, 5 = 50, 6 = 63, 8 = 80

Options:
/B = cartridge piloted via port "B" of solenoid pilot valve
/E = external attachments X (G 1/4") and underneath port X supplied plugged (only for sizes 40 to 80)

Synthetic fluids (1):
WG = water-glycol
PE = phosphate ester

Series number

Connector type - see section 17
/6 = DIN 43650 (standard)
/H = MIL-C-26482

WO = Intrinsically safe solenoid, Atex certified

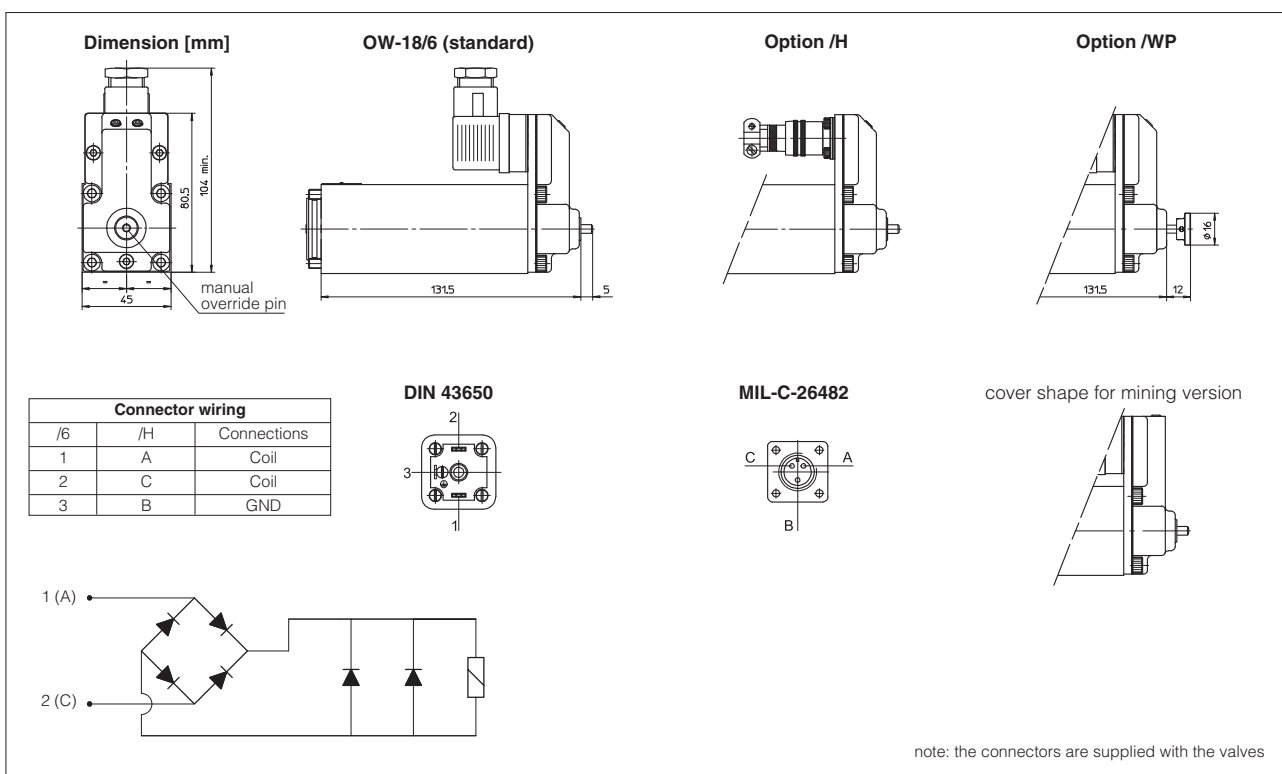
Note: for the code of the ISO cartridge to use with the above covers see tab. H003, section 2 and tab. H030, section 3.

(1) Option /BT = low temperature -40°C also available on request (not for group I Atex -mining-)

16 HYDRAULIC SYMBOLS

LIDEW1				LIDEW2				LIDEW4				LIDEW5				LIDEW6			

17 SOLENOID DIMENSIONS AND WIRING



18 INTRINSICALLY SAFE BARRIERS

The electric supply to these solenoids must be done through electronic devices situated out of potentially flammable environment (i.e. in safe zone), which limit the electric current to the intrinsically safe solenoid. These electronic devices are normally called "intrinsically safe barriers" approved and certified according to the Ex ia protection mode. To select the proper intrinsically safe barriers following data must be considered:

- 1) V_{max} and I_{max} of the solenoid as specified in section 2 must not be exceeded also in fault conditions;
- 2) the resistance of the solenoid is 150Ω and the current supplied by the barrier, in normal operation condition, must be over the min. limit (65 mA) to ensure the valve correct operation (over 70 mA for max performances).

The barriers type Y-BXNE 412 are galvanically isolated electronic devices, developed according to the European Norms EN60079-0/06, EN60079-11/07 and certified ATEX 94/9/CE, protection mode Ex ia IIC.

These barriers ensure the optimized functioning of the Atos valves up to the max operating limits specified in section 11.

The barriers Y-BXNE-412 are double channel type, suitable to operate valves with double or single solenoid.

Two single solenoid valves can be connected to the barrier (one to each channel) but they cannot be contemporary operated.

19 MODEL CODE OF I.S. BARRIER

19.1 I.S. barrier for double solenoid valves Y-BXNE 412 00 *

Supply voltage
E = 110/230 VAC
2 = 24÷48 VDC

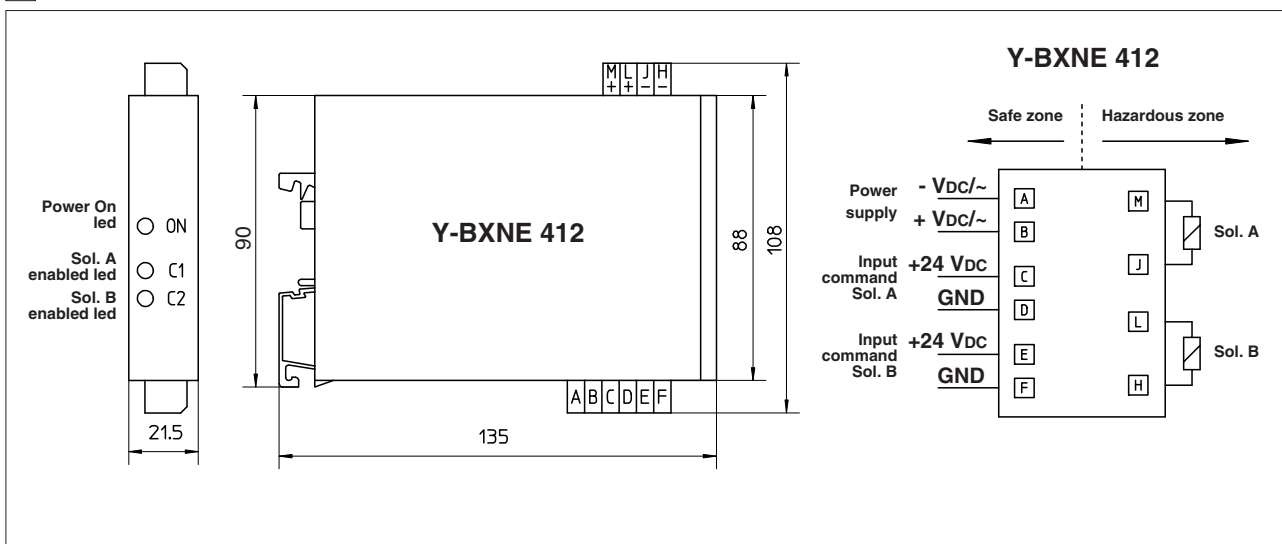
The above barrier can be used both for double or for single solenoid valves.

With one barrier, two single solenoid valves can be operated but not contemporary, see section 18.

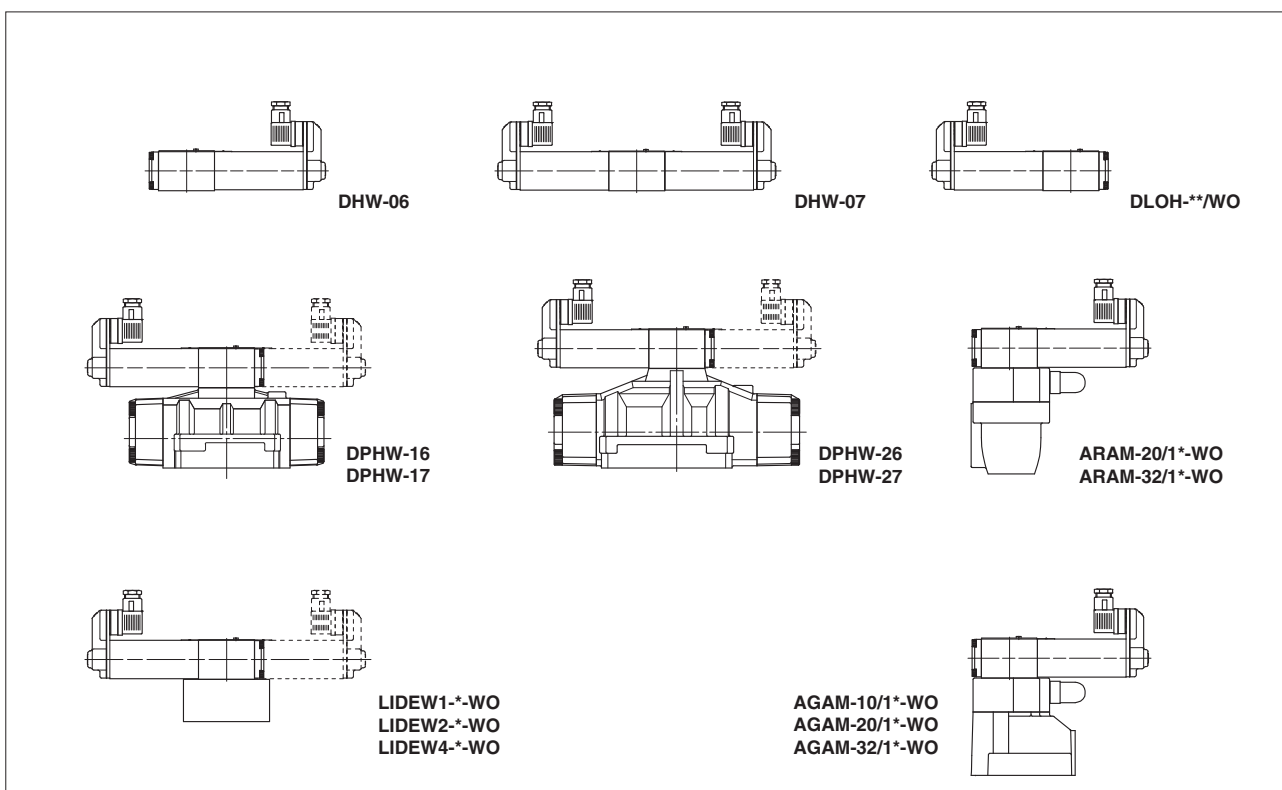
20 TECHNICAL CHARACTERISTICS OF I.S. BARRIER

	Y-BXNE 412
N° output channels	2
Power supply voltage	110÷230 VAC ±10% (50/60 HZ) 21,6 ÷ 53 Vdc
Power consumption	< 3W
Output voltage U_o	19,5 V
Output current I_o	341 mA
Output power P_o	1,64 W
Galvanic insulation supply/output	2500 VAC / 50 Hz
Storage temperature	-25 °C ÷ +70 °C
Working temperature	-10 °C ÷ +60 °C
Housing material	ABS case
Mounting	on rail EN 50022
Electrical connections	screw terminals
Method of protection	Ex ia IIC
ATEX classification	Ex II 1 G/D

21 INSTALLATION DIMENSIONS OF I.S. BARRIER [mm]

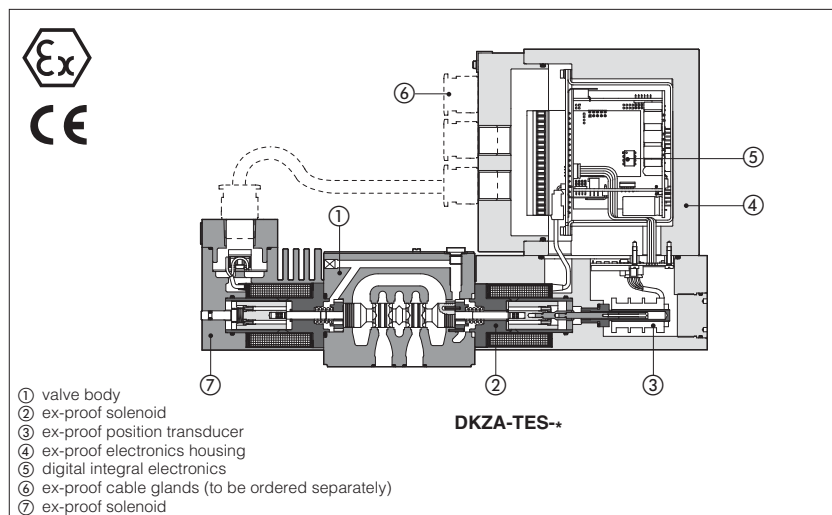


22 EXTERNAL PROFILE OF INTRINSICALLY SAFE VALVES [mm]



Ex-proof proportional valves with integral digital drivers

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



1 EXPLOSION PROOF CERTIFICATION MAIN DATA

ATEX certification	Ex II 2G Ex d IIC T6/T5/T4/T3			
IECEx certification	Ex d IIC T6/T5/T4/T3 Gb IP66			
VALVE TYPE	DOUBLE SOLENOID VALVES (with or without transducer)		SINGLE SOLENOID VALVES (with or without transducer)	
Temperature class (only for Group II)	T4	T3 (option /7)	T6	T5 (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 20			
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, $\sqrt{0.4}$ flatness ratio 0,01/100 (ISO 1101)
Ambient temperature	See section 11
Fluid	Hydraulic oil as per DIN 51524 ... 535 for other fluids see model code sections
Recommended viscosity	15 ÷ 100 mm ² /s at 40°C (ISO VG 15÷100)
Fluid contamination class	ISO 18/15 achieved with in line filters of 10 µm and $\beta_{10} \geq 75$ (recommended)
Fluid temperature	-20°C +60°C (standard and /WG 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

 = 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

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.

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

DHZA / IE - TES - PS - 0 7 1 - L 5 / M / 7 ** / *	DHZA = size 06 DKZA = size 10 Certification (omit for ATEX) IE = IECEx AES = without integral position transducer TES = with integral position transducer Communication interfaces PS = Serial (1) BC = CANopen BP = PROFIBUS DP Valve size (ISO 4401) DHZA DKZA 0 = size 06 1 = size 10 Configuration: DHZA and DKZA see section 5 5 = external plus central position, spring centered 7 = 3 positions, spring centered Spool overlapping in central position, DHZA and DKZA see section 5 0 = zero overlapping (only for -TES) 1 = P, A, B, T positive overlapping 2 = only for DKZA-TES-172-S5 (2) 3 = P positive overlapping; A, B, T, negative	Synthetic fluids: WG = water-glycol PE = phosphate ester Series number Options: 7 = for ambient temperature up to 60°C B = solenoid with integral digital electronics at side of port A I = current reference 4 ÷ 20mA (only for TES) (3) Y = external drain W = power limitation function (only AES)	Cable entrance threaded connection: M = M20x1,5 (6H/6g) Spool size: see section 5
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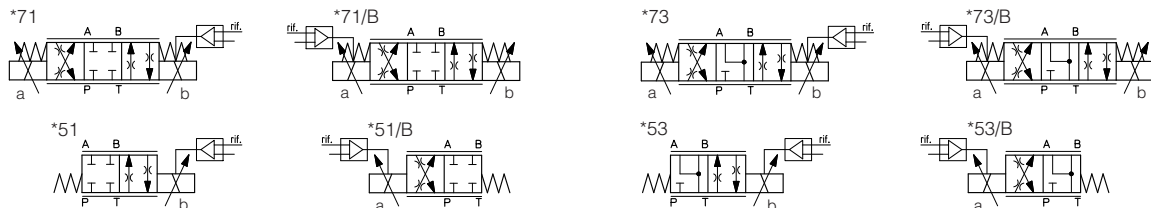
Spool type
L = linear; **S** = progressive; **D** = as **S**, but with P-A = Q, P-B = Q/2

- (1) Serial interface always present for AES-BC and AES-BP.
 (2) The configuration type 2 provides the same characteristic of type 1, but avoiding the pressurization of A and B ports with spool in rest position.
 (3) Software selectable for AES.

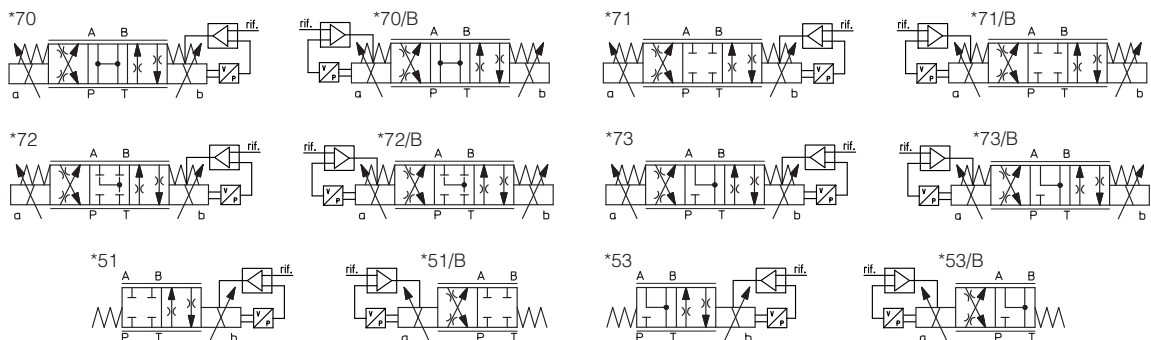
Note: For the valves functional characteristics see:
 table **F160** (DHZA-AES, DKZA-AES); table **F165** (DHZA-TES, DKZA-TES)
 For mounting surface dimensions see table **P005**
 For the digital drivers technical data and functional parameters setting, see:
 table **G115** (-AES); **G210** (-TES)

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	1, 3	1, 3		1, 3	0	1, 3	1, 3	0	0	2	1, 3	
Spool type and size (1)	L14	L1	S2	S3, L3, D3	L5, D5	S5, L5, D5	S3, L3, D3	L3	L5, D5	S5	S5, L5, D5	
Pressure limits [bar]	ports P, A, B = 350; T = 160 (250 with external drain /Y)						ports P, A, B = 315; T = 160 (250 with external drain /Y)					
Δp max P-T [bar]	70	70		50	50		40		40			
Max flow [l/min]												
at Δp = 10 bar (P-T)	1	4,5	8	17	28		45		60			
at Δp = 30 bar (P-T)	2	8	14	30	50		80		105			
at Δp max (P-T)	3	12	21	45	60		90		120			
Response time (2) [ms]	< 30 (-AES) < 15 (-TES)						< 40 (-AES)		< 20 (-TES)			
Hysteresis [%]	≤ 5%(-AES) ≤ 0,2% (-TES)						≤ 5%(-AES)		≤ 0,2% (-TES)			
Repeatability	± 1% (-AES) ± 0,1% (-TES)						± 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

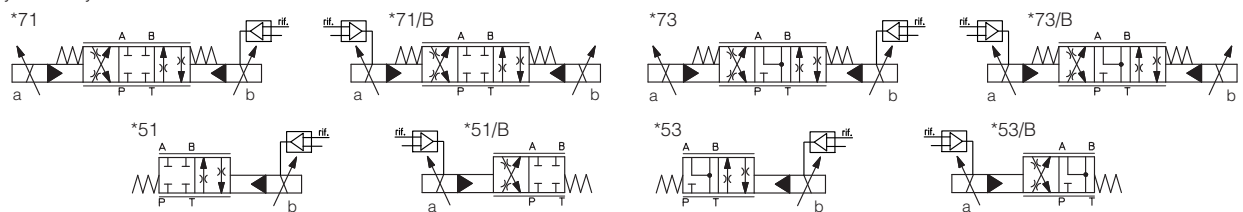
DPZA	/ IE	- LES	- PS	- 2	7	1	- L	5	/ M	/ 7	**	/	*
DPZA = size 10 = size 16 = size 25 Certification (omit for ATEX) IE = IECEx AES = without integral position transducer LES = with double integral position transducer Communication interfaces PS = Serial (1) BC = CANopen BP = PROFIBUS DP Valve size (ISO 4401) 1 = size 10 2 = size 16 3 = size 25 Configuration: see section 7 5 = external plus central position, spring centered 7 = 3 positions, spring centered Spool overlapping in central position, see section 7 0 = zero overlapping (only for -LES with spool type L) 1 = P, A, B, T positive overlapping 3 = P positive overlapping; A, B, T, negative	Synthetic fluids: WG = water-glycol PE = phosphate ester Series number Options: 7 = for ambient temperature up to 60°C B = solenoid with integral digital electronics at side of port A of main stage for -AES version and at side of port B for -LES version D = internal drain E = external pilot G = pressure reducing valve for piloting (2) standard for DPZA-LES-1 I = current reference 4÷20mA (only for -LES) (3) W = power limitation function (only AES) Cable entrance threaded connection: M = M20x1,5 (6H/6g) Spool size: see section 7 Spool type: L = linear; S = progressive; D = as S , but with P-A = Q, P-B = Q/2												

- (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-3) 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
 (3) Software selectable for AES

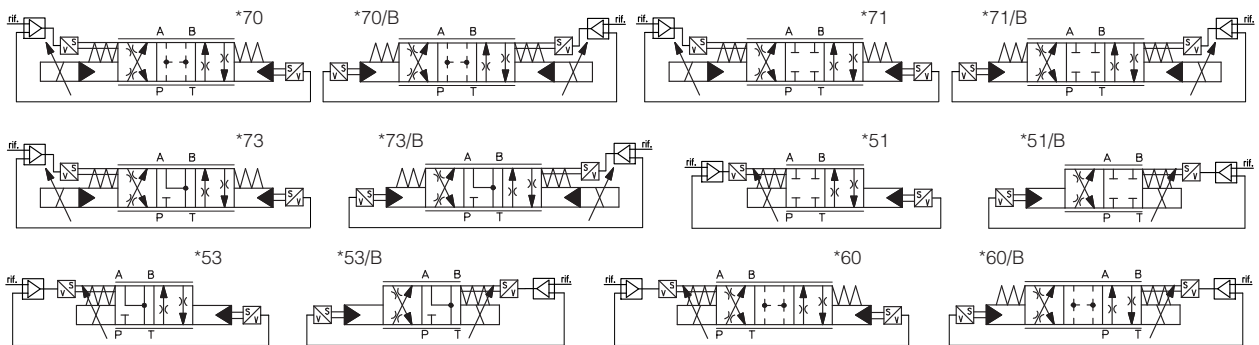
Note: For the valves functional characteristics see:
 table **F170** (DPZA-AES); table **F175** (DPZA-LES)
 For mounting surface dimensions see table **P005**
 For the digital drivers technical data and functional parameters setting, see:
 table **G115** (-AES); **G210** (-LES)

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

Hydraulic symbols of **-AES** version



Hydraulic symbols of **-LES** version



Valve model	DPZA-1				DPZA-2						DPZA-3				
Spool overlapping	0, 1, 3	1, 3	0, 1, 3	0, 1, 3	1, 3		0, 1, 3	1, 3		0, 1, 3	0, 1, 3	1, 3		0, 1, 3	
Spool type and size (1)	L5 (2)	S5	D5	DL5(3)	L3 (3)	S3	D3	L5 (2)	S5	D5	DL5 (3)	L5 (2)	S5	D5	DL5 (3)
Max flow: [l/min]															
at Δp = 10 bar	100		100:60		130		130:80	200	180	180:130	200:145	390	360	360:220	390:240
at Δp = 30 bar	160		160:100		225		225:130	340	310	310:225	340:250	680	620	620:380	680:410
max permissible flow	180		180:110		550		550:300	760	640	640:460	680:500	1450	1350	1350:820	1450:880
Pressure limits [bar]	ports P, A, B, X = 350; T = 250 (5 for option /D); Y = 5														
Response spool overlapping 0	<80 (AES); <50 (LES)				<100 (AES) <70 (LES)				<120 (AES) <75 (LES)						
time [ms] (4) spool overlapping 1-3	<80 (AES); <50 (LES)				<100 (AES) <70 (LES)				<120 (AES) <75 (LES)						
Hysteresis [%]	≤ 5% (AES) ≤ 0,1% (LES)														
Repeatability	± 1% (AES) ± 0,1% (LES)														
Thermal drift	zero point displacement < 1% at ΔT = 40°C														

- (1) Additional spool for -LES, see table F175
 (2) For zero overlapping spool **DL5**, the valve offset position (with switch-off power supply) is 1 ÷ 6% P-B/A-T
 (3) Only for LES version
 (4) 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 SERVOPROPORTIONAL VALVES

DLHZA / IE - TES - PS - 0 6 0 - L 5 3 / M / 7 ** / *	DLHZA = size 06 DLKZA = size 10	Certification (omit for Atex) IE = IECEx	TES = with integral position transducer	Communication interfaces PS = Serial BC = CANopen BP = PROFIBUS DP	Valve size (ISO 4401) 0 = size 06 (DLHZA) 1 = size 10 (DLKZA)	Configuration, see section 9 4 = external plus central position, spring centered 6 = 3 position, spring centered	Synthetic fluids: WG = water-glycol PE = phosphate ester	Series number
0 = zero overlapping						Options: 7 = for ambient temperature up to 60°C B = solenoid at side of port A I = current reference 4 ÷ 20mA Y = external drain		
Note: For the valves functional characteristics see: table F180 (DLHZA, DLKZA) For mounting surface dimensions see table P005 For the digital drivers technical data and functional parameters setting, see: table G210 (-TES)						Cable entrance threaded connection: M = M20x1,5 (6H/6g)		
Spool size 1, 3, 5, 7 see section 9						Fail safe configuration: 1 = A, B, P, T with positive overlapping 3 = P positive overlapping; A, B, T negative		
Spool type L = linear regulation ; T = not linear regulation								

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

Hydraulic symbols																																																																																																																																																																																																																																																																																																																																																																																			
*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																																																																																																																																																																																																																																																																																																																																																																									
<table><tr><td colspan="2">Valve model</td><td colspan="12">DLHZA-T*</td><td colspan="6">DLKZA-T*</td></tr><tr><td colspan="2">Pressure limits [bar]</td><td colspan="12">ports P, A, B = 350; T = 210 (250 with external drain /Y)</td><td colspan="6">ports P, A, B = 315; T = 210 (250 with external drain /Y)</td></tr><tr><td colspan="2">Spool</td><td>L0</td><td>L1</td><td>V1</td><td>L3</td><td>V3</td><td>L5</td><td>T5</td><td>L7</td><td>T7</td><td>V7</td><td>D7</td><td>DT7</td><td>L3</td><td>L7</td><td>T7</td><td>V7</td><td>D7</td><td>DT7</td></tr><tr><td colspan="2">Max flow [l/min]</td><td>2,5</td><td>4,5</td><td>5</td><td>9</td><td>13</td><td>18</td><td></td><td>26</td><td></td><td></td><td>26÷13</td><td></td><td>40</td><td></td><td>60</td><td></td><td>60÷33</td><td></td></tr><tr><td colspan="2">at Δp = 30 bar</td><td>4</td><td>7</td><td>8</td><td>14</td><td>20</td><td>28</td><td></td><td>40</td><td></td><td></td><td>40÷20</td><td></td><td>60</td><td></td><td>100</td><td></td><td>100÷50</td><td></td></tr><tr><td colspan="2">at Δp = 70 bar</td><td>8</td><td>14</td><td>16</td><td>30</td><td>40</td><td>50</td><td></td><td>70</td><td></td><td></td><td>70÷40</td><td></td><td>90</td><td></td><td>160</td><td></td><td>160÷80</td><td></td></tr><tr><td colspan="2">max permissible flow</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Leakage [cm³/min] at P = 100 bar (1)</td><td><100</td><td><200</td><td><100</td><td><300</td><td><150</td><td><500</td><td><200</td><td><900</td><td><200</td><td><200</td><td><700</td><td><200</td><td><1000</td><td><1500</td><td><400</td><td><400</td><td><1200</td><td><400</td></tr><tr><td colspan="2">Fail safe connections</td><td colspan="5">P → A</td><td colspan="5">P → B</td><td colspan="5">A → T</td><td colspan="5">B → T</td></tr><tr><td colspan="2">Leakage [cm³/min] Fail safe 1</td><td colspan="5">50</td><td colspan="5">70</td><td colspan="5">70</td><td colspan="5">50</td></tr><tr><td colspan="2">at P = 100 bar (2) Fail safe 3</td><td colspan="5">50</td><td colspan="5">70</td><td colspan="5">70</td><td colspan="5">50</td></tr><tr><td colspan="2">Flow [l/min] (3)</td><td colspan="5">-</td><td colspan="5">-</td><td colspan="5">15÷30</td><td colspan="5">10÷20</td></tr><tr><td colspan="2">DLHZA</td><td colspan="5">-</td><td colspan="5">-</td><td colspan="5">40÷60</td><td colspan="5">25÷40</td></tr><tr><td colspan="2">DLKZA</td><td colspan="5">-</td><td colspan="5" rowspan="4">-</td><td colspan="5">-</td><td colspan="5" rowspan="4">-</td></tr><tr><td colspan="2">Response time [ms]</td><td colspan="10">≤ 10</td><td colspan="4">≤ 15</td><td colspan="4"></td></tr><tr><td colspan="2">Hysteresis [%]</td><td colspan="10">≤ 0,1%</td><td colspan="4" rowspan="2">≤ 0,1%</td><td colspan="4"></td></tr><tr><td colspan="2">Thermal drift</td><td colspan="14">zero point displacement < 1% at ΔT = 40°C</td><td colspan="4"></td></tr></table>																				Valve model		DLHZA-T*												DLKZA-T*						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		L0	L1	V1	L3	V3	L5	T5	L7	T7	V7	D7	DT7	L3	L7	T7	V7	D7	DT7	Max flow [l/min]		2,5	4,5	5	9	13	18		26			26÷13		40		60		60÷33		at Δp = 30 bar		4	7	8	14	20	28		40			40÷20		60		100		100÷50		at Δp = 70 bar		8	14	16	30	40	50		70			70÷40		90		160		160÷80		max permissible flow																				Leakage [cm³/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 [cm³/min] Fail safe 1		50					70					70					50					at P = 100 bar (2) Fail safe 3		50					70					70					50					Flow [l/min] (3)		-					-					15÷30					10÷20					DLHZA		-					-					40÷60					25÷40					DLKZA		-					-					-					-					Response time [ms]		≤ 10										≤ 15								Hysteresis [%]		≤ 0,1%										≤ 0,1%								Thermal drift		zero point displacement < 1% at ΔT = 40°C																	
Valve model		DLHZA-T*												DLKZA-T*																																																																																																																																																																																																																																																																																																																																																																					
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		L0	L1	V1	L3	V3	L5	T5	L7	T7	V7	D7	DT7	L3	L7	T7	V7	D7	DT7																																																																																																																																																																																																																																																																																																																																																																
Max flow [l/min]		2,5	4,5	5	9	13	18		26			26÷13		40		60		60÷33																																																																																																																																																																																																																																																																																																																																																																	
at Δp = 30 bar		4	7	8	14	20	28		40			40÷20		60		100		100÷50																																																																																																																																																																																																																																																																																																																																																																	
at Δp = 70 bar		8	14	16	30	40	50		70			70÷40		90		160		160÷80																																																																																																																																																																																																																																																																																																																																																																	
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Leakage [cm³/min] at P = 100 bar (1)		<100	<200	<100	<300	<150	<500	<200	<900	<200	<200	<700	<200	<1000	<1500	<400	<400	<1200	<400																																																																																																																																																																																																																																																																																																																																																																
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Notes:

- (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.

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

RZMA Pressure relief: RZMA = subplate size 06 AGMZA = subplate size 10, 20, 32 LIMZA = cartridge type see section 12 Pressure compensator: LICZA = cartridge type see section 12 Certification (omit for ATEX) IE = IECEx AES = without integral pressure transducer (1) TERS = with integral pressure transducer AERS = as TERS but with remote pressure transducer (to be ordered separately), see tab. G466 Communication interfaces PS = Serial BC = CANopen BP = PROFIBUS DP Valve size: see section 11 for size code	/ IE - TERS - PS - 010 / 250 / M / * Options: 7 = for ambient temperature up to 60° C E = external pilot (only for AGMZA) I = current reference 4 ÷ 20mA (only TERS, AERS) (2) P = with integral mechanical pressure limiter (only for LIMZA) Y = external drain (only for AGMZA) Cable entrance threaded connection: M = M20x1,5 (6H/6g) Max regulated pressure: see section 11	** Synthetic fluids: WG = water-glycol PE = phosphate ester Series number
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- (1) Serial interface always present for AES-BC and AES-BP.
 (2) Software selectable for AES.

Note: For the valves functional characteristics see:
 table **F007, F010** (RZMA-*-010); table **F065, F067** (RZMA-*-030); table **F035, F040** (AGMZA); table **F300, F305** (LIMZA, LICZA)
 For mounting surface dimensions see table **P005**
 For the digital drivers technical data and functional parameters setting, see:
 table **G115** (-AES); table **G205** (-AERS, TERS)

11 HYDRAULIC CHARACTERISTICS

Hydraulic symbols

RZMA-AES-010

RZMA-AES-030

AGMZA-AES

LIMZA-AES

RZMA-TERS-010

RZMA-TERS-030

AGMZA-TERS

AGMZA-AERS

RZMA-AERS-010

RZMA-AERS-030

LIMZA-TERS

LIMZA-AERS

LICZA-AES

LICZA-TERS

LICZA-AERS

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]			80			180			250								
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

12 MODEL CODE OF CARTRIDGES (for LIMZA and LICZA)

SC LI Cartridge according to ISO 7368 Size: 16; 25; 32; 40; 50; 63 and 80 (only for LIMZA) Type of cartridge 31 = for LIMZA and LICZA 36 = for LICZA	- 32 31 2 ** / * Synthetic fluids: WG = water-glycol PE = phosphate ester 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	** Synthetic fluids: WG = water-glycol PE = phosphate ester Series number
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Note: For mounting surface dimensions see table **P006**

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.

13 MODEL CODE OF EX-PROOF PROPORTIONAL PRESSURE REDUCING VALVES

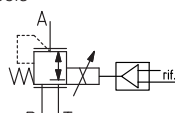
RZGA Pressure reducing: RZGA = subplate size 06 AGRCZA = subplate size 10, 20 LIRZA = cartridge type see sect. 13	/ IE - TERS - PS - 033 / 250 / M	/* ** /*	Synthetic fluids: WG = water-glycol PE = phosphate ester Series number
Certification (omit for ATEX) IE = IECEx AES = without integral pressure transducer TERS = with integral pressure transducer AERS = as TERS but with remote pressure transducer (to be ordered separately), see tab. G466	Options: 7 = for ambient temperature up to 60° C E = external pilot (only for AGRCZA) I = current reference 4 ÷ 20mA (only TERS, AERS) (2) P = with integral mechanical pressure limiter (only for AGRCZA and LIRZA) R = with check valve (only for AGRCZA)		
Communication interfaces PS = Serial (1) BC = CANopen BP = PROFIBUS DP	Cable entrance threaded connection: M = M20x1,5 (6H/6g)		
Valve size: see section 14 for size code	Max regulated pressure: see section 14		

- (1) Serial interface always present for AES-BC and AES-BP.
 (2) Software selectable for AES.

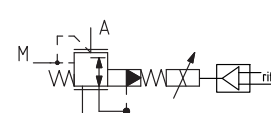
Note: For the valves functional characteristics see:
 table **F015, F020** (RZGA-*010); table **F070, F075** (RZGA-*033); table **F050, F055** (AGRCZA); table **F300, F305** (LIRZA)
 For mounting surface dimensions see table **P005**
 For the digital drivers technical data and functional parameters setting, see:
 table **G115** (-AES); table **G205** (-AERS, TERS)

14 HYDRAULIC CHARACTERISTICS

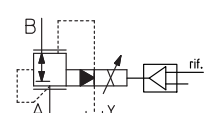
Hydraulic symbols



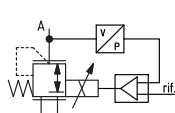
RZGA-AES-010



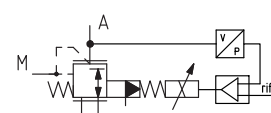
RZGA-AES-033



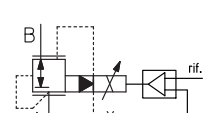
AGRCZA-AES



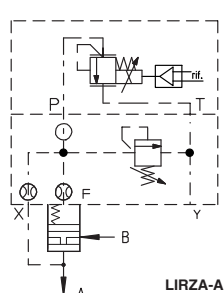
RZGA-TERS-010
RZGA-AERS-010



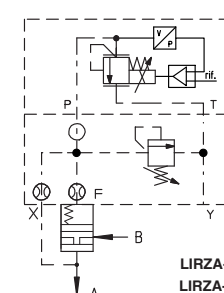
RZGA-TERS-033
RZGA-AERS-033



AGRCZA-TERS
AGRCZA-AERS



LIRZA-AES



LIRZA-TERS
LIRZA-AERS

Valve model	RZGA		AGRCZA		LIRZA			
Size code	010	033	10	20	1	2	3	4
Valve size	06		10	20	16	25	32	40
Max regulated pressure [bar]	32; 100; 210		80	180	250			
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

15 MODEL CODE OF CARTRIDGES (for LIRZA)

SC LI Cartridge according to ISO 7368 Size: 16; 25; 32; 40;	- 25 37 4	** /*	Synthetic fluids WG = water-glycol PE = phosphate ester Series number
Type of cartridge 37 = for LIRZA	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.

Note: For mounting surface dimensions see table **P006**

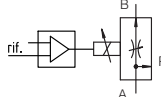
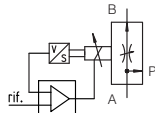
16 MODEL CODE OF EX-PROOF PRESSURE COMPENSATED PROPORTIONAL FLOW CONTROL VALVES

QVHZA / IE - TES - PS - 06 / 12 / M /* ** /*															
QVHZA = size 06 QVKZA = size 10												Synthetic fluids: WG = water-glycol PE = phosphate ester			
Certification (omit for Atex) IE = IECEx												Series number			
AES = without integral position transducer TES = with integral position transducer												Options: 7 = for ambient temperature up to 60° C D = quick venting (only for -AES versions) I = current reference 4 ÷ 20mA (only TES) (2) W = power limitation function (only AES)			
Communication interfaces PS = Serial (1) BC = CANopen BP = PROFIBUS DP												Cable entrance threaded connection: M = M20x1,5 (6H/6g)			
Valve size (ISO 4401) QVHZA: 06 QVKZA: 10												Max regulated flow: QVHZA QVKZA 3 = 3,5 l/min; 36 = 36 l/min; 65 = 65 l/min 12 = 12 l/min; 45 = 45 l/min; 90 = 90 l/min 18 = 18 l/min;			

- (1) Serial interface always present for AES-BC and AES-BP.
 (2) Software selectable for AES.

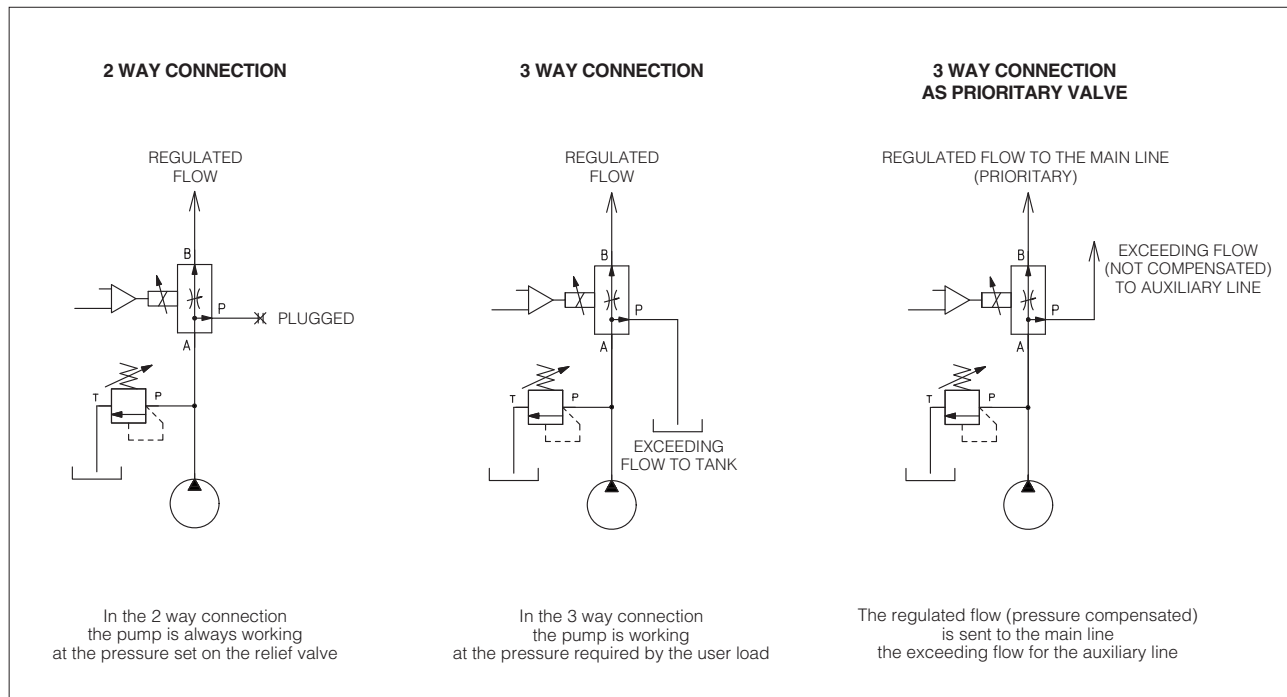
Note: For the valves functional characteristics see:
 table **F410, F412** (QVHZA-*, QVKZA-*)
 For mounting surface dimensions see table **P005**
 For the digital drivers technical data and functional parameters setting, see:
 table **G115** (-AES); table **G210** (-TES)

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

Hydraulic symbols		 QVHZA-AES QVKZA-AES  QVHZA-TES QVKZA-TES																
Note: In three-way connection port P is open. In two-way connection port P must be plugged. Port T must always be plugged.																		
Valve model		QVHZA-AES						QVHZA-TES						QVKZA-AES		QVKZA-TES		
Valve size		06										10						
Max pressure ports P, A, B [bar]		210																
Max regulated flow [l/min]		3,5	12	18	36	45	3,5	12	18	35	45	65	90	65	90			
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.

17.1 TYPICAL APPLICATIONS



18 ELECTRONICS WIRING

18.1 MAIN CONNECTIONS FOR ALL MODELS

PIN	CABLE ENTRANCE	DESCRIPTION	TECHNICAL SPECIFICATION
1	3	ENABLE	Enabling input, normal working = 24 Vdc
2	3	VL0	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	4	COIL S2	Coil connection only for double solenoid valves
6	4	COIL S2	
7	3	INPUT-	Reference signal ± 10 Vdc or 0 $\div$ 10 Vdc (2) (3)
8	3	MONITOR	± 10 Vdc or 0 $\div$ 10 Vdc (1) (3) ± 5 Vdc (only for -AES)
9	3	INPUT+	Reference signal ± 10 Vdc or 0 $\div$ 10 Vdc (2) (3)
10	3	V0	Power supply (power stage) 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 (VL0)

(2) differential mode input

(3) current reference and monitor (4 $\div$ 20mA) **for option /I** (not for -AES)

18.2 TRANSDUCER CONNECTIONS FOR -TERS, -LES (factory wired), -AERS, -AES/W (to be wired)

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

N.B. For -AES and -TES versions the pins 12-13-14-15 are not connected

18.3 -PS COMMUNICATION INTERFACE (M8 connector)

PIN	CABLE ENTRANCE (4)	SIGNAL	WIRE COLOUR	CONNECTOR INTERFACE
1	1	RS_RX	brown	
3		RS_TX	blue	
4		RS_GND	black	

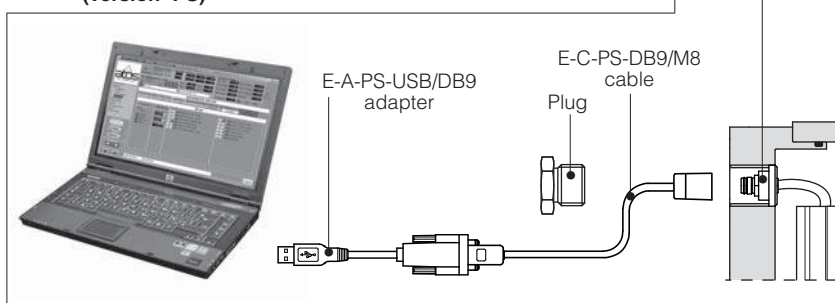
(4) For -BC and -BP versions, the Serial communication interface is always available for eventual valve's parameter setting through the E-SW programming software.

In -BC and -BP versions, the Serial communication interface is available with M8 connector inside the electronic box, see Fig.2

18.4 -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

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



18.5 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 20 TAB.I)

- "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, -BP communication interfaces

③ Cable entrances for power supply and main connections

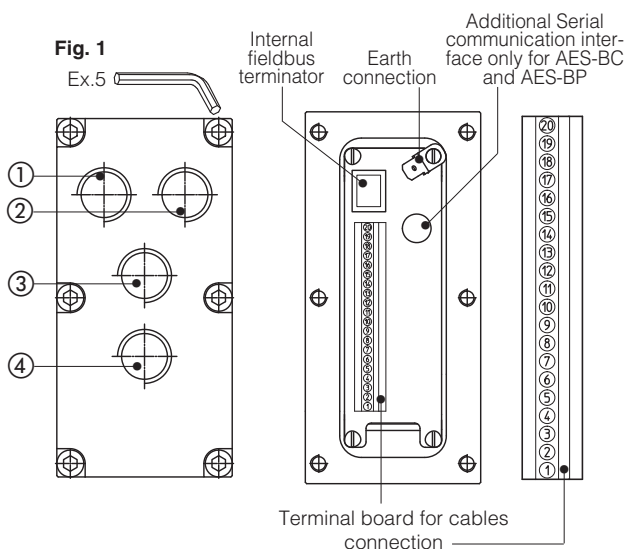
④ Cable entrances for remote pressure transducer connections (for -AERS or -AES/W)

The cable entrance ④ is factory wired for:

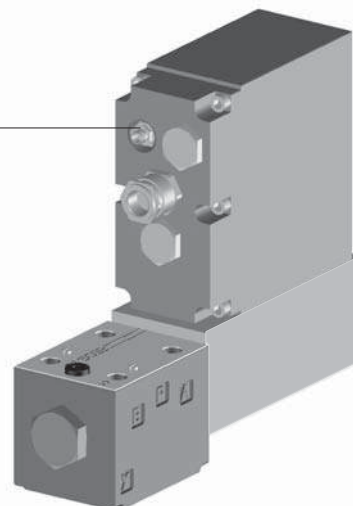
-TERS (pressure transducer)

-LES (position transducer)

-AES and TES double solenoid version



M8 Serial communication connector



19 SOFTWARE TOOLS

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

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

E-SW-PS (Serial), **E-SW-BC** (CANopen) and **E-SW-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 **G500**.

Programming software, must be ordered separately :

E-SW-* (mandatory - first supply) = Dvd including E-SW-*** software installer, operator manuals, registration form for Atos digital service

E-SW-*-N** (optional - next supplies) = as above but not including the registration form for Atos digital service

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

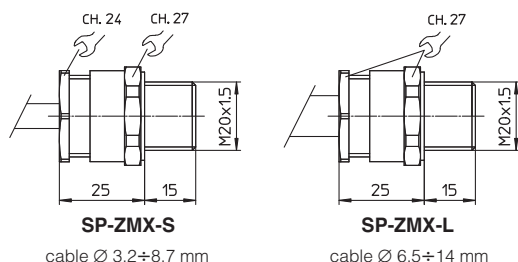
E-A-BP-USB/DB9, E-C-BP-DB9/RA and **E-TRM-BP-DB9/DB9** = USB adapter, cable and terminator for -BP drivers

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.

20 MODEL CODE OF CABLE GLANDS AND THREADED PLUGS

Atos can supply 2 different kind of cable glands, depending to the cable's diameter used by the costumer.

The cable glands and the threaded plugs (to be ordered separately) are ATEX certified according to EN 60079-0 and EN 60079-1



Atos codes for cable glands and threaded plugs:

SP-ZMX-S =brass cable gland, protection degree IP 66
threaded connection M20x1,5 (6H/6g).
Cable size 3,2 ÷ 8,7 mm

SP-ZMX-L =brass cable gland, protection degree IP 66
threaded connection M20x1,5 (6H/6g).
Cable size 6,5 ÷ 14 mm

P-ZMX-T =brass threaded plug, protection degree IP 66
threaded connection M20x1,5 (6H/6g).

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

- Atex certified cable gland code SP-ZMX-S, for factory wired connections
- Atex certified threaded plugs code SP-ZMX-T, for connections not to be used
- 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**

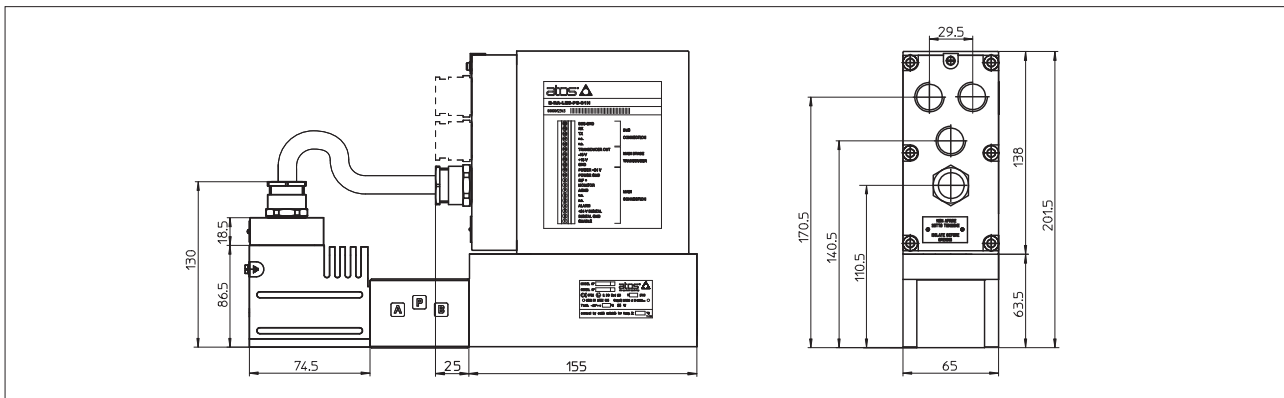
TAB. I

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 2 is factory plugged Cable entrance 3 is 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 3 is open for costumers Cable entrance 4 is factory plugged or wired depending to the valve model

21 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- <i>*</i> -05	8,2	DPZA- <i>*</i> -27	18,7	AGMZA- <i>*</i> -10	12,2	LIMZA- <i>*</i> -5	19,2	RZGA- <i>*</i> -010	9	QVHZA	8,6
DHZA- <i>*</i> -07	9	DPZA- <i>*</i> -35	22	AGMZA- <i>*</i> -20	16	LIMZA- <i>*</i> -6	28	RZGA- <i>*</i> -033	9,6	QVKZA	9,5
DKZA- <i>*</i> -05	9	DPZA- <i>*</i> -37	23	AGMZA- <i>*</i> -32	18,5	LICZA- <i>*</i> -1	13,6	AGRCZA- <i>*</i> -10	13,6		
DKZA- <i>*</i> -07	9,6	DLHZA	8,5	LIMZA- <i>*</i> -1	10,3	LICZA- <i>*</i> -2	14,6	AGRCZA- <i>*</i> -20	14,6		
DPZA- <i>*</i> -15	13,6	DLKZA	10,2	LIMZA- <i>*</i> -2	10,8	LICZA- <i>*</i> -3	17,7	LIRZA- <i>*</i> -1	17,7		
DPZA- <i>*</i> -17	14,6	RZMA- <i>*</i> -010	9	LIMZA- <i>*</i> -3	12	LICZA- <i>*</i> -4	8,2	LIRZA- <i>*</i> -2	8,2		
DPZA- <i>*</i> -25	17,7	RZMA- <i>*</i> -030	9,3	LIMZA- <i>*</i> -4	15,7	LICZA- <i>*</i> -5	9	LIRZA- <i>*</i> -3	9		

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



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

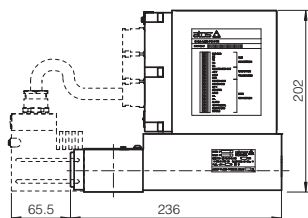
DIRECTIONAL VALVES

dotted line = double solenoid version

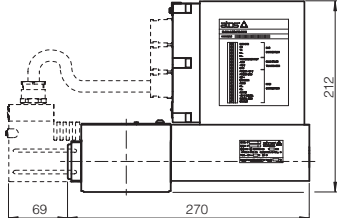
PRESSURE CONTROL VALVES

dotted line = -TERS version

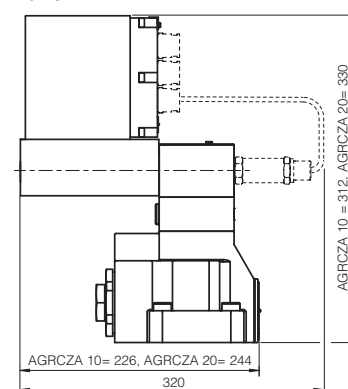
DHZA DLHZA



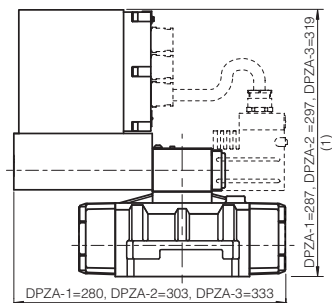
DKZA DLKZA



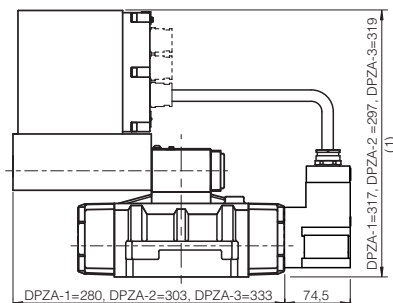
AGRCZA



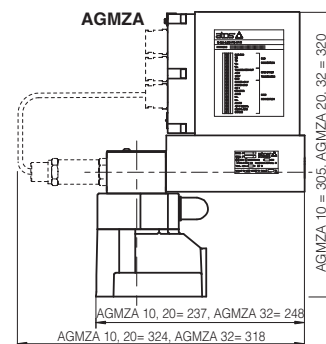
DPZA -AES



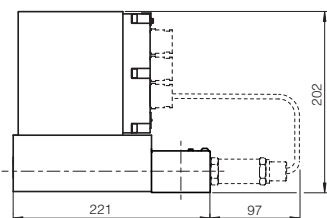
DPZA -LES



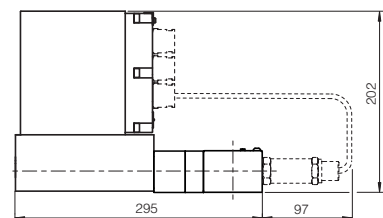
AGMZA



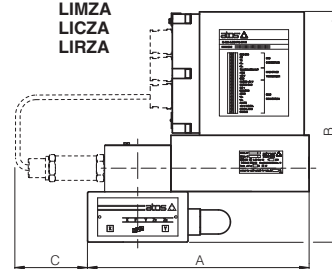
RZMA-010 RZGA-010



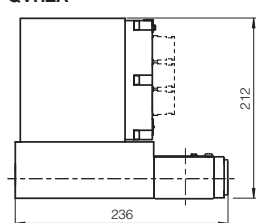
RZMA-030 RZGA-033



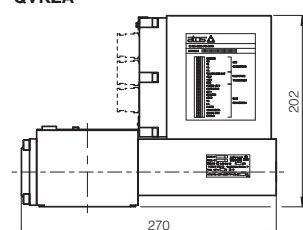
LIMZA LICZA LIRZA



QVHZA



QVKZA



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

* for option /H add 40mm to the dimension



HYDRO

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Rozdzielacze do stref zagrożonych wybuchem Ex

Explosion-proof solenoid valves



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