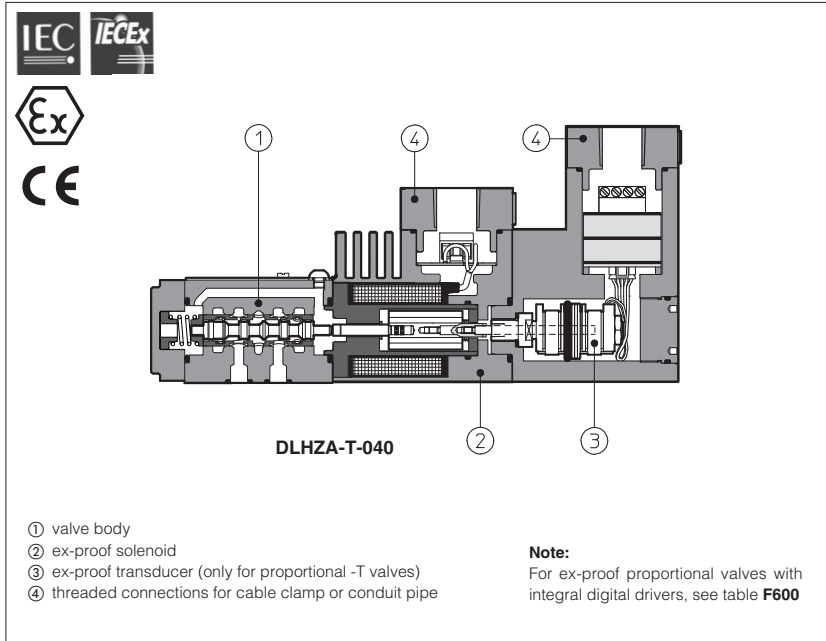


Explosion-proof solenoid valves

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 Mb
- 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	
Solenoid code			
Group II, ATEX	OZA-A	OZA-T	OA
Group II, IECEx	OZAI-A	OZAI-T	OAI
Group I, ATEX (mining)	OZAM-A	OZAM-T	OAM
Group I, IECEx (mining)	OZAMI-A	OZAMI-T	OAMI
Group II, Rostechnadzor	OZA/RU-A	OZA/RU-T	OARU
Voltage code			
VDC ±10%	12 DC, 24 DC	12 DC	12DC, 24DC, 28DC, 48DC, 110DC, 125DC, 220DC
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 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	
			Ex d	
Method of protection				
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 and IECEx (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 and IECEx (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

Marking according to ATEX Directive	MODEL N°	atos®	
	SERIAL N°	Atos spa Sesto Calende Italy	
Notified body and certificate number	 II 2GD Exd IIC T [] Gb Ex tb IIC T [] °C Db IP67		
	CE 0722 CESI 02 ATEX 014 Supply []		
Tamb. - [] ÷ + [] °C [] W [] V [] Hz			
connect by cable suitable for temp. ≥ [] °C T-783			


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

Marking according to IECEx	MODEL N°	atos®	
	SERIAL N°	Atos spa - Via alla Piana, 57 21018 Sesto Calende (Vai) Italy	
Notified body and certificate number	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			

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

EXAMPLE OF NAMEPLATE MARKING

Marking according to ATEX Directive	MODEL N°	atos®	
	SERIAL N°	Atos spa Sesto Calende Italy	
Notified body and certificate number	CE 0722  I M2 Ex d I Mb IP66		
	CESI 03 ATEX 057X Supply []		
Tamb. -20° ÷ + [] °C [] W [] V [] Hz			
connect by cable suitable for temp. ≥ [] °C T-641/BT			

3.4 GROUP I, IECEx (mining)

- Ex d** = Equipment for explosive atmospheres, flame proof housing
- 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


EXAMPLE OF NAMEPLATE MARKING

Marking according to IECEx Directive	MODEL N°	atos®	
	SERIAL N°	Atos spa Sesto Calende Italy	
Notified body and certificate number	IECEx CES 12.0007X I M2 Ex d I Mb IP66		
	Supply [4] [5] W [6] V [7] Hz		
Tamb. - 20° ÷ + [2] °C			
connect by cable suitable for temp. ≥ [3] °C T-848/BT			


3.5 ROSTECHNADZOR

Rostechnadzor certification acknowledges the whole ATEX Directive 94/9/EC. For this reason the solenoids report the ATEX nameplate in addition to the Rostechnadzor one.

This certification is available only for gas environment (not for dust).

-  = ATEX identification for explosive atmospheres equipments
- d** = Flame proof housing
- IIC** = Gas group
- T6/T4/T3** = Temperature class of solenoid surface

EXAMPLE OF NAMEPLATE MARKING

Marking according to ATEX Directive	MODEL N°	atos®	
	SERIAL N°	Atos spa Sesto Calende Italy	
Notified body and certificate number	CE 0722  II 2G Exd IIC T [] IP66		
	CESI 02 ATEX 014 Supply []		
Tamb. -40° ÷ + [] °C [] W [] V [] Hz			
connect by cable suitable for temp. ≥ [] °C T-618			

Rostechnadzor certification

ЗЭП №093 от 14.09.2007	
ООО "РНПСО"	
○ ○	
ОТКРЫВАТЬ, ОТКЛЮЧИВ ОТ СЕТИ	

Note:

According to EN60079-0 the valves with Atex certification can be coated with a non-metallic material (for ex. painted), observing the maximum thickness: **Group IIC** = 0,2 mm max



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

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

DHA

/IE

- 0

63

1/2

/ PA

- GK

/ 7

24DC

/*

DHA = spool type - direct
DPHA = spool type - piloted

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

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)

(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

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 11

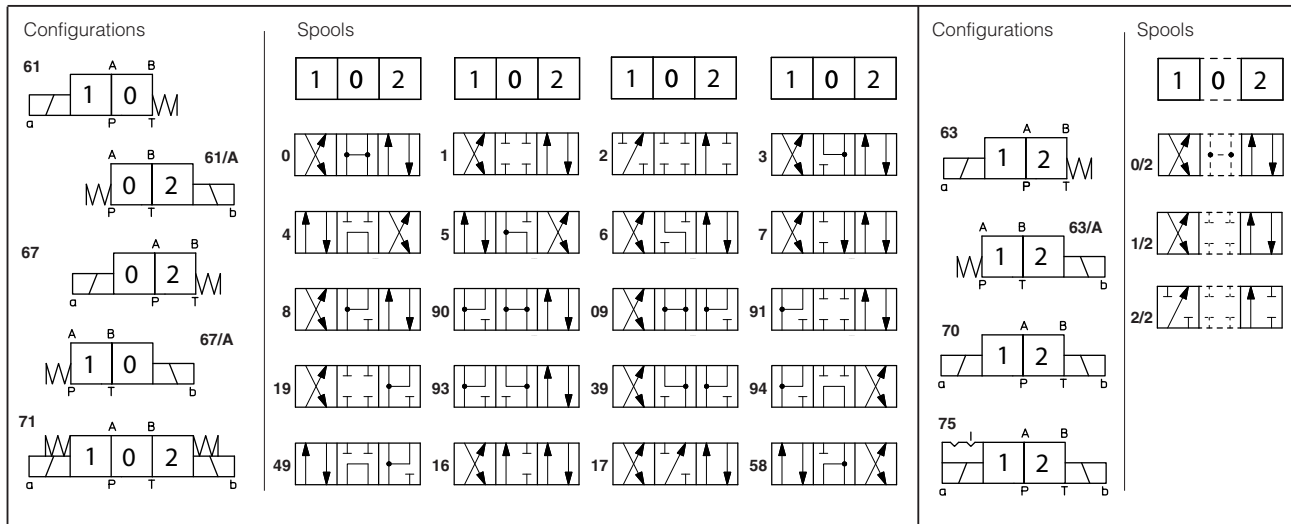
Options:

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:

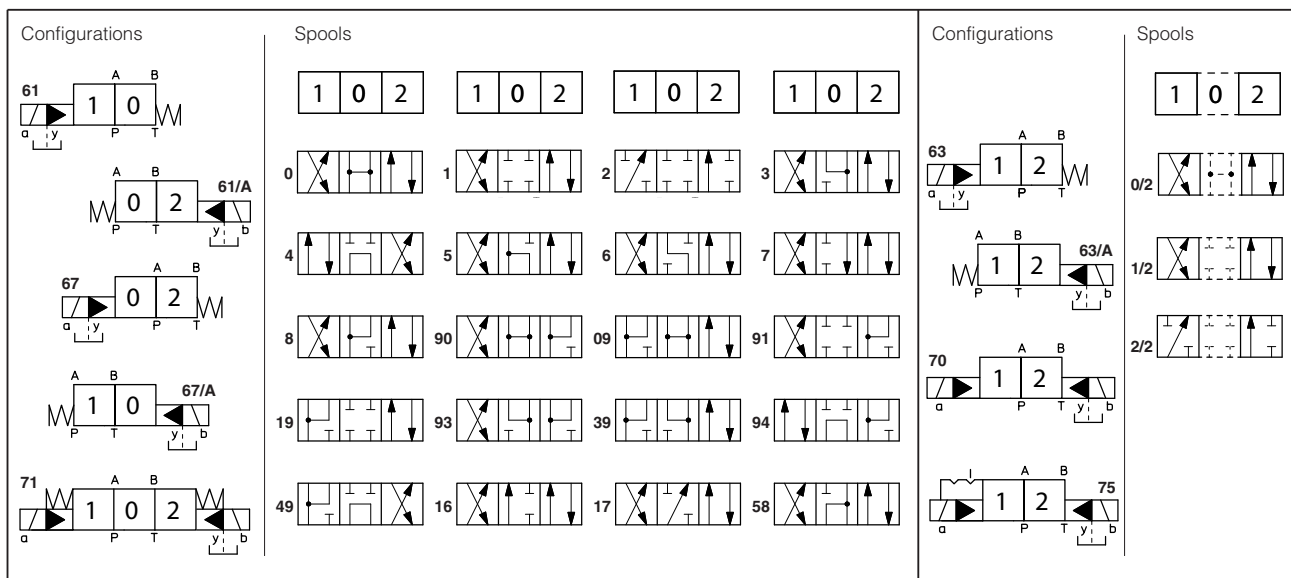
/D = Internal drain
/E = External pilot pressure
/H = Adjustable chokes (meter-out to the pilot chambers of the main valve)
/H9 = Adjustable chokes (meter-in to the pilot chambers of the main valve)
/L9 = (only for DPHA-2 and DPHA-4) plug with calibrated restrictor on port P of pilot valve
/R = Pilot pressure generator (4 bar on port P)
/S = Main spool stroke adjustment (not for DPHA-1)

5 CONFIGURATIONS and SPOOLS for DHA valves



Note: spools 1, 1/2 and 3 are available as 1P, 1/2P and 3P to limit the valve internal leakage

6 CONFIGURATIONS and SPOOLS for DPHA valves



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 H - 2 A / PA - GK - AO / 7 24DC ** /*

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)

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

Series number

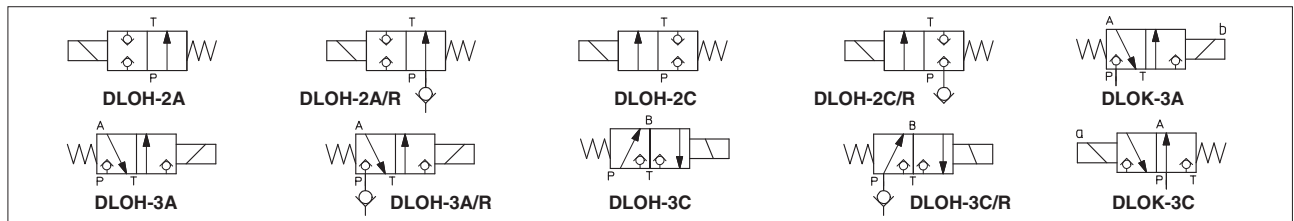
Voltage code - see section 11

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

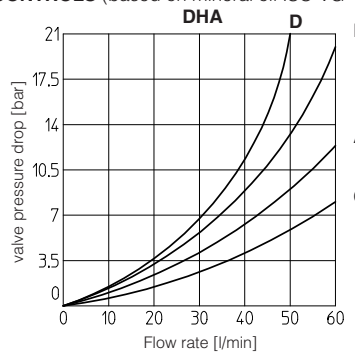
(1) Option **/BT** = low temperature -40°C also available on request (not for group I Atex -mining-)

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



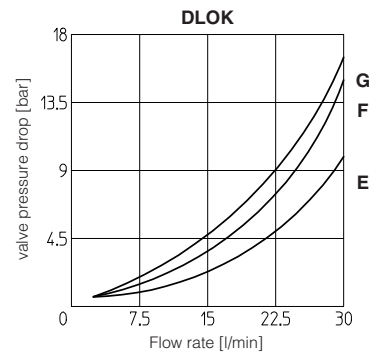
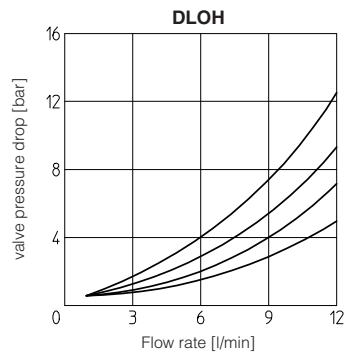
9 Q/Δp DIAGRAMS OF ON/OFF DIRECTIONAL CONTROLS (based on mineral oil ISO VG 46 at 50°C)

Flow direction	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.

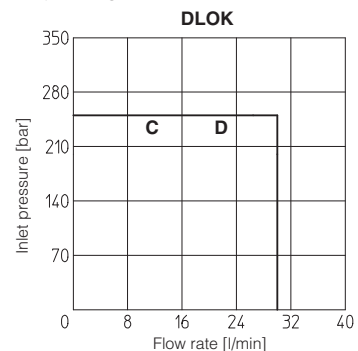
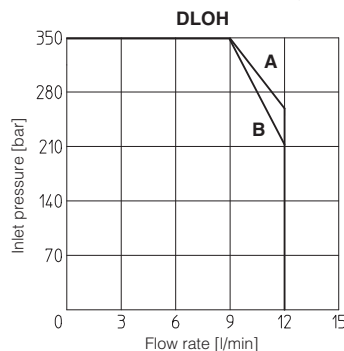
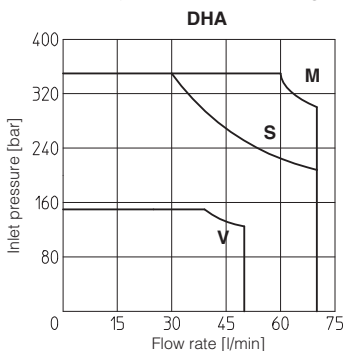
Valve type	Flow direction	
	P → A (1) (P → B)	A → T (B → T)
DLOH-2A	B	-
DLOH-2C	C	-
DLOH-3A	D	C
DLOH-3C	C	A
DLOK-3A	G	F
DLOK-3C	F	E



(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 Pressure limits: P, A, B = 350 bar; T = 210 bar

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/E** = IECEx, Group II
- AO/EM** = IECEx, Group I (mining)
- AO/M** = ATEX, Group I (mining)
- AO/RU** = Rostechnadzor (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

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

13 MODEL CODE OF COVERS FOR CARTRIDGE VALVES

LIDEW - 1 / PA - GK - AO - O 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;

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)

Certification type

- AO** = Group II, ATEX
- AO/E** = Group II, IECEx
- AO/M** = Group I, ATEX (mining)
- AO/RU** = Group II, Rostechnadzor (Russian)

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-)

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:

- 7** = for ambient temperature up to 70°C
- 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 (not for group I ATEX)
- WP** = prolonged manual override protected by metallic cap

14 HYDRAULIC SYMBOLS

15 MODEL CODE OF PROPORTIONAL DIRECTIONAL VALVES

DHZA - /IE - T - 0 7 1 - L 5 / PA - GK / 7 / * ** / *

DHZA = size 06
DKZA = size 10
DPZA = size 10
 = size 16
 = size 25

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 position transducer
T = with integral position transducer (not for DPZA)

Valve size (ISO 4401)
 DHZA DKZA DPZA
0 = size 06 **1** = size 10
 2 = size 16
 4 = size 25
 6 = size 32

Configuration, DHZA and DKZA see section 16, DPZA see section 17
5 = external plus central position, spring centered
7 = 3 position, spring centered

Spool overlapping in central position, DHZA and DKZA see section 16,
 DPZA see section 17
1 = P, A, B, T positive overlapping
3 = P positive overlapping; A, B, T, negative

Spool type
L = linear; **S** = progressive; **D** = as **S**, but with P-A = Q, P-B = Q/2

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)
B = solenoid at side of port A (and position transducer for -T version)
C = position transducer with current feedback 4±20 mA (only for -T)
D = internal drain (only for DPZA)
E = external pilot (only for DPZA)
G = pressure reducing valve for piloting (only for DPZA)
MV = vertical hand lever (only for DHZA) (2)
O = horizontal cable entrance (only for -A, not for group I ATEX)
WP = prolonged manual override protected by metallic cap (only for -A)
Y = external drain (only for DHZA and DKZA)

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 16

Spool size: DHZA and DKZA see section 16, DPZA see section 17

(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-)
 (2) Option **/MV** available only for DHZA configuration 51, 53, 71, spool type S3, S5, D3, D5, L3, L5

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

Hydraulic symbols *71, *71/B *73, *73/B *51 *53 *51/B *53/B

Valve model	DHZA-A		DHZA-T		DKZA-A		DKZA-T	
Spool overlapping	1, 3		1, 3		1, 3		1, 3	
Spool type and size (1)	L14		L1		S2		S3, L3, D3	
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 Δp = 10 bar (P-T) at Δp = 30 bar (P-T) max permissible flow		at Δp = 10 bar (P-T) at Δp = 30 bar (P-T) max permissible flow		at Δp = 10 bar (P-T) at Δp = 30 bar (P-T) max permissible flow		at Δp = 10 bar (P-T) at Δp = 30 bar (P-T) max permissible flow	
Response time (2) [ms]	1 2 3		4,5 8 12		8 14 21		17 30 45	
					28 50 60		45 80 90	
Response time (2) [ms]			< 30 (A) < 15 (T)		< 40 (A) < 20 (T)			
Hysteresis [%]			≤ 5% (A) ≤ 0,2% (T)		≤ 5% (A) ≤ 0,2% (T)			
Repeatability			± 1% (A) ± 0,1% (T)		± 1% (A) ± 0,1% (T)			

(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.

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 *53/B

Valve model	DPZA-1			DPZA-2			DPZA-4			DPZA-6					
Spool type and size	L5	S5	D5	S3	D3	L5	S5	D5	L5	S5	D5	L5	S5	D5	
Pressure limits [bar]	Ports P, A, B, X = 350; T = 250; Y = 0														
Max flow [l/min]	at Δp = 10 bar at Δp = 30 bar max permissible flow			at Δp = 10 bar at Δp = 30 bar max permissible flow			at Δp = 10 bar at Δp = 30 bar max permissible flow			at Δp = 10 bar at Δp = 30 bar max permissible flow			at Δp = 10 bar at Δp = 30 bar max permissible flow		
	100 160 180			100 160 180			100 160 180			100 160 180			100 160 180		
	100 160 180			130 225 550			130 225 550			180 310 640			180 310 640		
	100 : 60 160 : 100 180 : 110			130 : 80 225 : 135 550 : 300			180 : 130 310 : 225 640 : 460			390 680 1450			360 620 1350		
Response time (1) [ms]	< 80			< 80			< 80			< 120			< 120		
Hysteresis [%]	≤ 5%			≤ 5%			≤ 5%			≤ 5%			≤ 5%		
Repeatability	± 1%			± 1%			± 1%			± 1%			± 1%		

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

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 / IE - T - 0 4 0 - L 7 3 / PA - GK / 7 ** / *

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; **T** = not linear (1); **D** = different-linear (1);
V = progressive; **DT** = as D but with non-linear regulation (1);

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

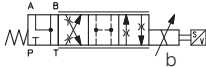
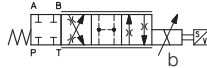
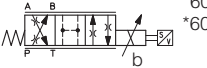
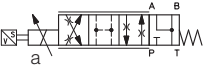
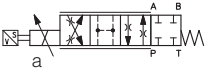
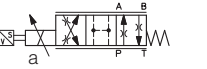
Optional cable gland:
PA = with threaded cable gland, see section 26

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

Spool size: see section 19

(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 *40-D*1 *40-DT*1 *40-T*1 *40-V*1		*60-L*1 *60-V*1														
		*40-L*3/B *40-D*3/B *40-DT*3/B *40-T*3/B *40-V*3/B		*40-L*1/B *40-D*1/B *40-DT*1/B *40-T*1/B *40-V*1/B		*60-L*1/B *60-V*1/B														
Valve model	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					70					70					50				
	Fail safe 3					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					QVKZA-A		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			4 - 6		10 - 12			6 - 8		10 - 12	
Max flow on port A [l/min]	40					50					60		70	

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)

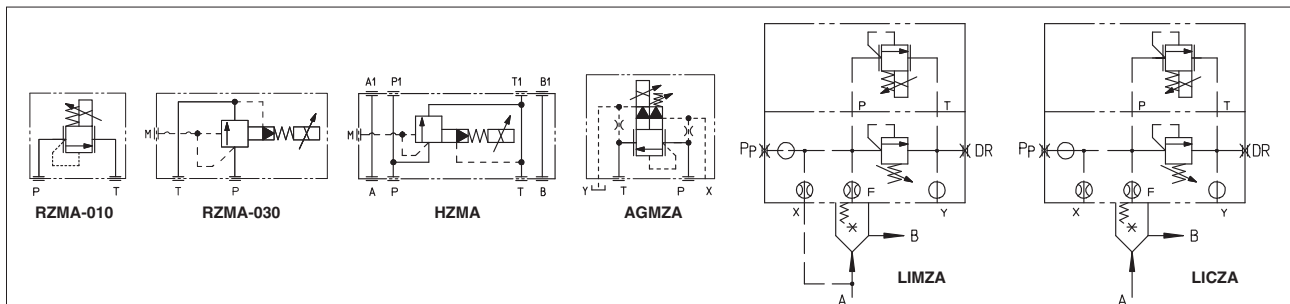
Solenoid threaded connection

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													
	010	030	030	10	20	32	1	2	3	4	5	6	8	1	2	3	4	5											
Size code	06			10			20			32			16						25										
Valve size	06			10			20			32			16						25										
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 = Rostechnadzor (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

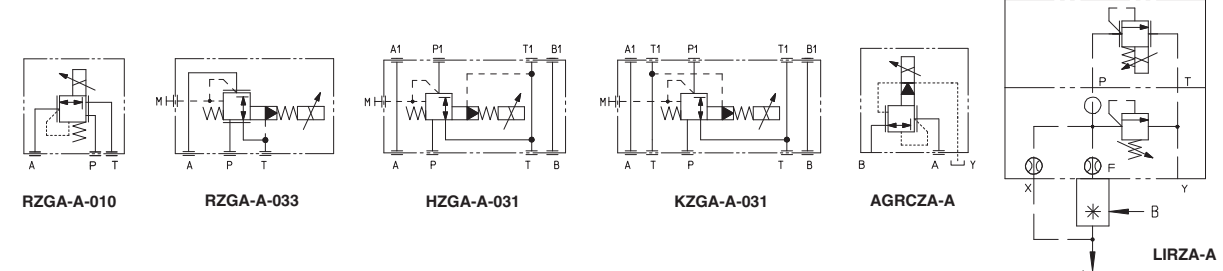
Omit for standard coil 12 Vdc:
24 = with 24 VDC coils

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)

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-)

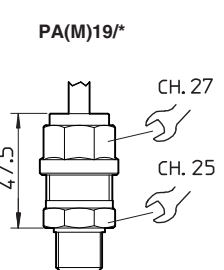
25 HYDRAULIC CHARACTERISTICS



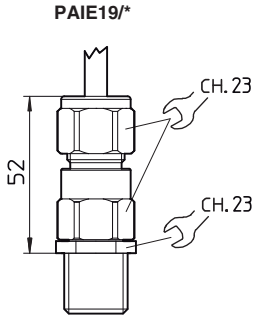
Valve model	RZGA		HZGA	KZGA	AGRCZA		LIRZA			
Size code	010	033	031	031	10	20	1	2	3	4
Valve size	06			10	10	20	16	25	32	40
Max regulated pressure [bar]	32; 100; 210				80;	180;	250			
Min regulated pressure [bar]	0,8	1	1	1	1	1	7	7	7	7
Max pressure at port P [bar]						315				
Max pressure at port T [bar]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



PA(M)19/*



PAIE19/*

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.

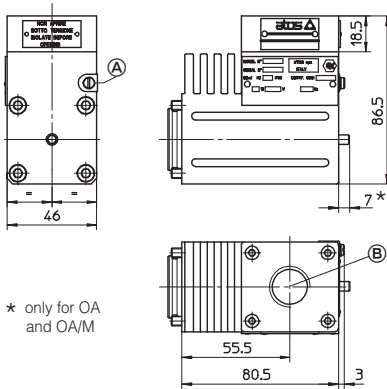
Note: special cable clamps PG12, PA(M)112/* are available on request and they have to be ordered separately

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)

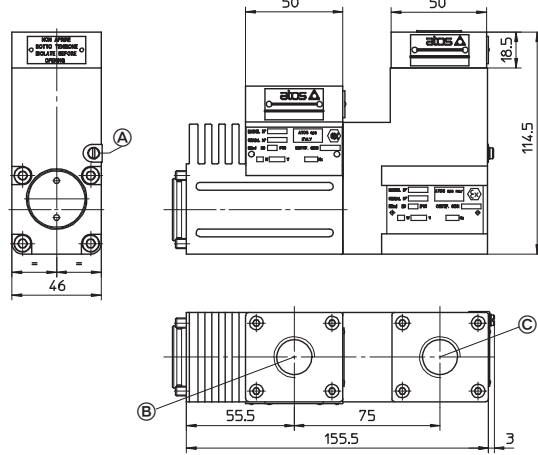
OA
OZA-A

OAI
OZAI-A

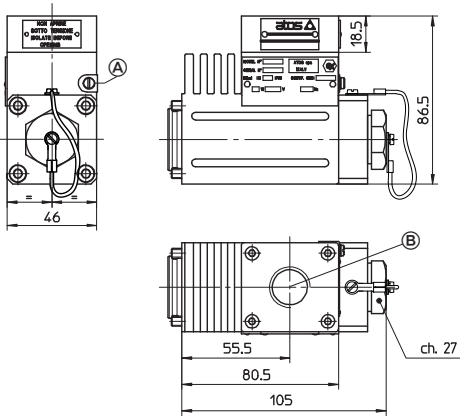
OA/M
OZA/M-A



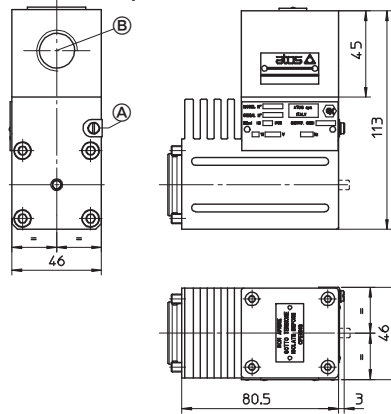
OZA-T OZAI-T OZA/M-T



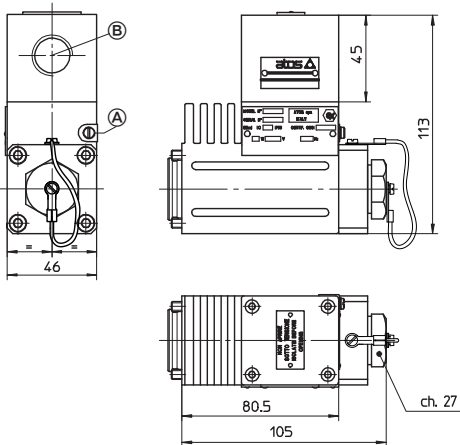
Option /WP



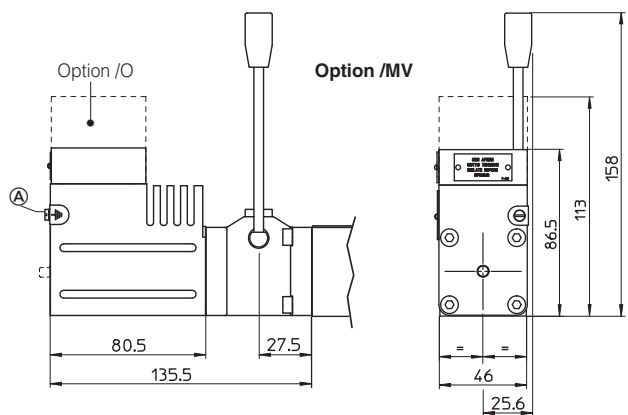
Option /O



Option /OWP



Option /O



Ⓐ = screw terminal for additional equipotential grounding

Ⓑ = Solenoid wiring

Ⓒ = Position transducer wiring

