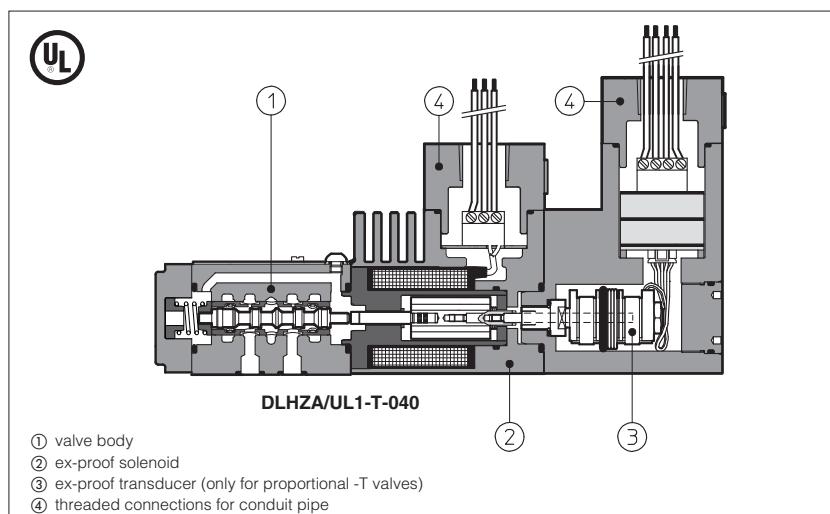


## Explosion-proof solenoid valves

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                                   |
| <b>Voltage</b> VDC                   | <b>12 DC, 24 DC</b>   | <b>12 DC</b>    | <b>12DC, 24DC, 110DC, 125DC, 220DC</b> |
| <b>code</b> VAC 50/60 Hz             | <b>±10%</b>   | –               | <b>12AC, 24AC, 110AC, 230AC (1)</b>    |
| 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.<br>The valves are supplied with 1,07 m (42 inches) cable length factory wired   |                 |  |

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

### 2 EXPLOSION PROOF SOLENOIDS: TEMPERATURE DATA

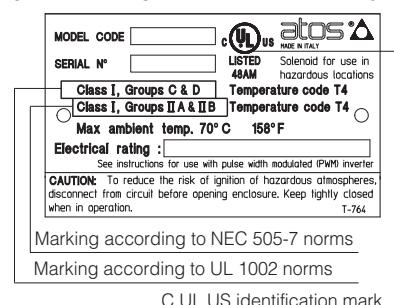
| SOLENOID TYPE                              | PROPORTIONAL | ON/OFF         |
|--|--------------|----------------|
| Method of protection                       |              | Ex d           |
| Temperature class with +70°C ambient temp. | T4           | Not applicable |
| Surface temperature     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

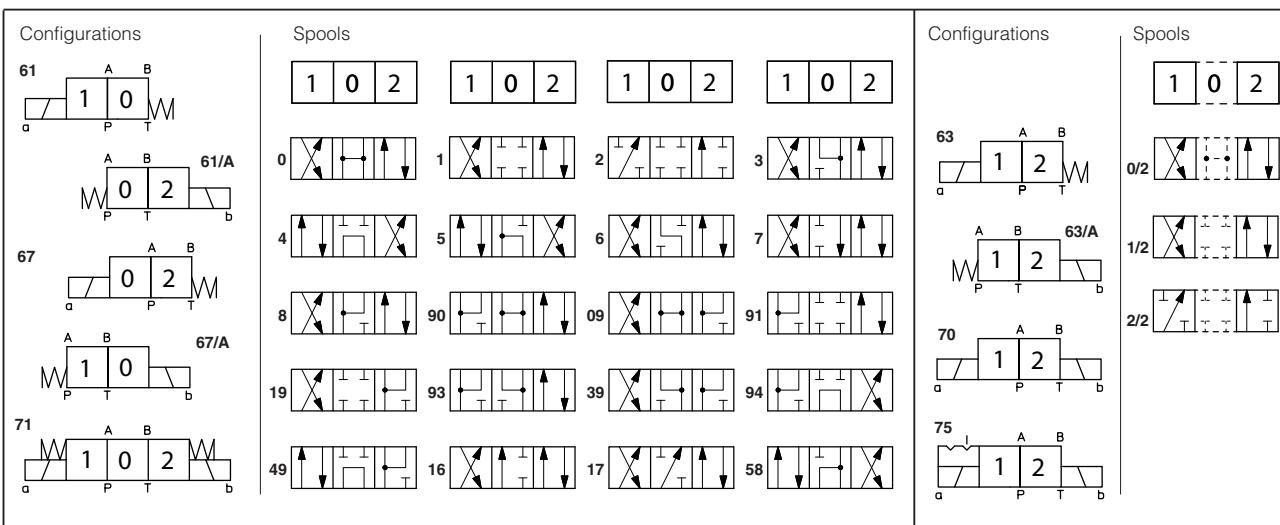
#### 3.1 EXAMPLE OF NAMEPLATE MARKING



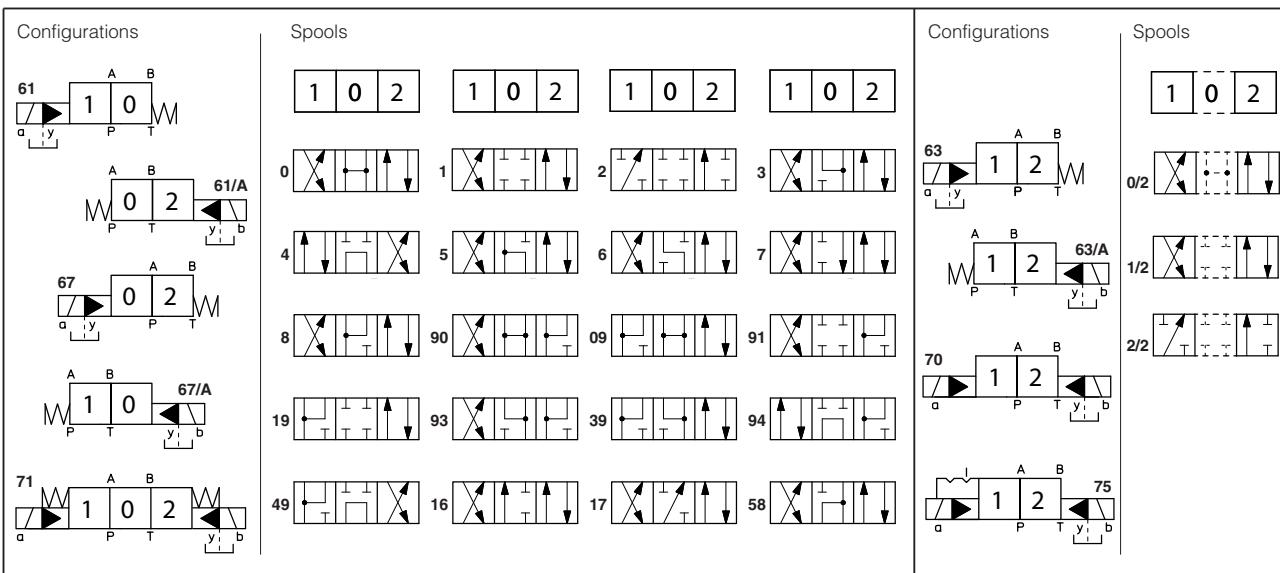
#### 4 MODEL CODE OF SPOOL TYPE ON-OFF DIRECTIONAL SOLENOID VALVES

| DHA   | / UL - | 0 | 63 | 1/2 | / NPT | / | * | 24DC | ** | /*  |
|---|--------|---|----|-----|-------|---|---|------|----|---|
| DHA = spool type - direct<br>DPHA = spool type - piloted                                    |        |   |    |     |       |   |   |      |    | Synthetic fluids:<br>WG = water-glycol<br>PE = phosphate ester<br>Low temperature execution:<br>BT = low temperature -40°C  |
| C UL US certification<br>UL = without cables<br>UL1 = with 1 m cables length, factory wired |        |   |    |     |       |   |   |      |    | Series number   |
| Valve size (ISO 4401)   |        |   |    |     |       |   |   |      |    | Voltage code - see section 1  |
| for DHA 0 = 06<br>for DPHA 1 = 10      2 = 16      3 = 25                                   |        |   |    |     |       |   |   |      |    | Options:  |
| Valve configuration, DHA see section 5 and DPHA see section 6                               |        |   |    |     |       |   |   |      |    | A = solenoid at side of port B (for single solenoid valves)<br>O = horizontal cable entrance<br>MV = vertical hand lever (1)<br>WP = prolonged manual override protected by metallic cap  |
| Spool type, DHA see section 5 and DPHA see section 6  |        |   |    |     |       |   |   |      |    | Only for DPHA:<br>/D = Internal drain.<br>/E = External pilot pressure.<br>/H = Adjustable chokes (meter-out to the pilot chambers of the main valve).<br>/H9 = Adjustable chokes (meter-in to the pilot chambers of the main valve).<br>/S = Main spool stroke adjustment (only for DPHA-2, -3). |
| Solenoid threaded connection:<br>NPT = 1/2" NPT ANSI B2.1 (tapered)                         |        |   |    |     |       |   |   |      |    | (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



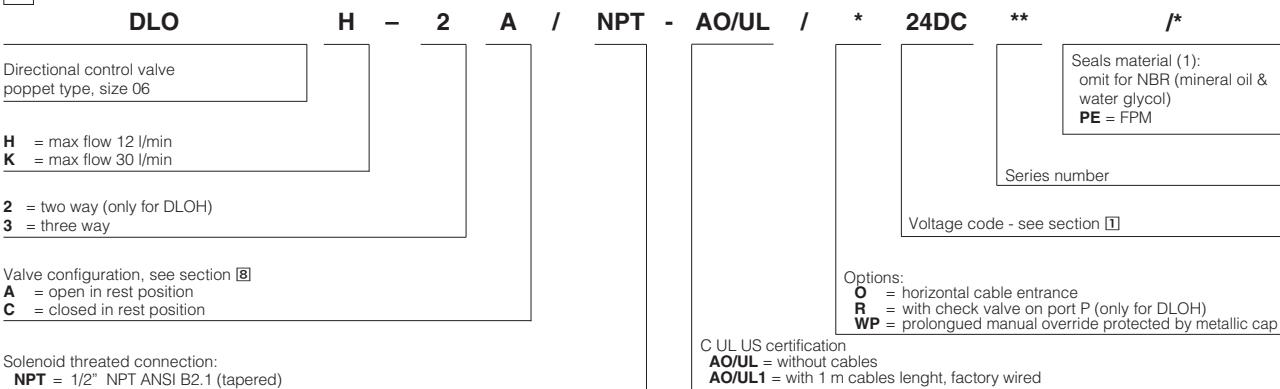
#### 6 CONFIGURATIONS and SPOOLS



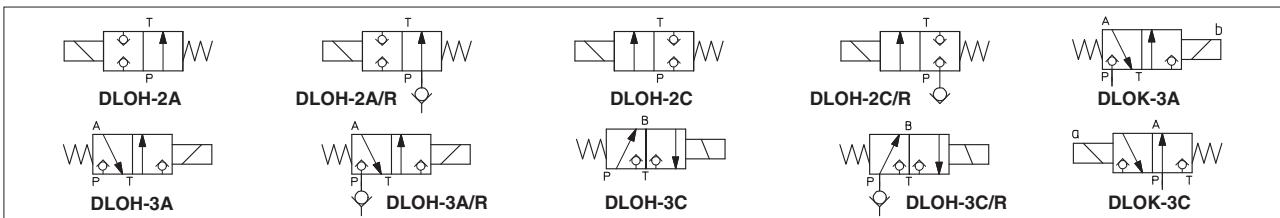
#### NOTES:

- 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

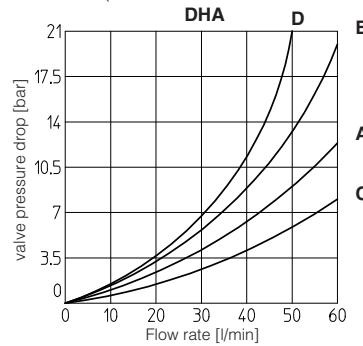


## 8 CONFIGURATION OF DLOH/AO/\* AND DLOK/AO/\*



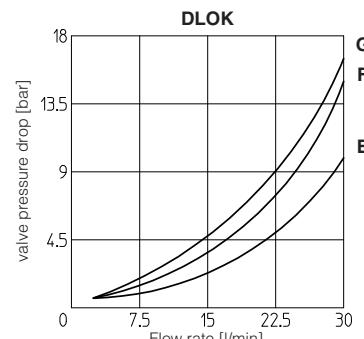
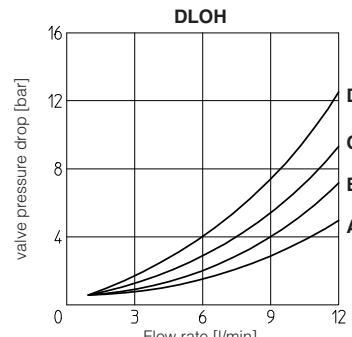
## 9 Q/Δp DIAGRAMS OF ON/OFF DIRECTIONAL CONTROLS (based on mineral oil ISO VG 46 at 50°C)

| Flow direction | P → A | P → B | A → T | B → T | P → T |
|----------------|-------|-------|-------|-------|-------|
| Spool type     | C     | C     | C     | C     |       |
| 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.

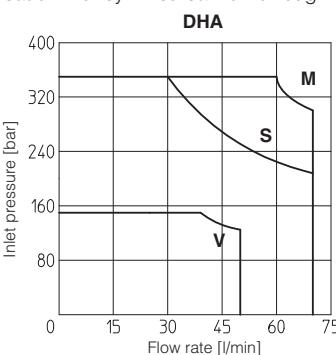
| Flow direction | P → A (1)<br>(P → B) | A → T<br>(B → T) |
|----------------|----------------------|------------------|
| Valve type     |                      |                  |
| DLOH-2A        | B                    | —                |
| DLOH-2C        | C                    | —             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



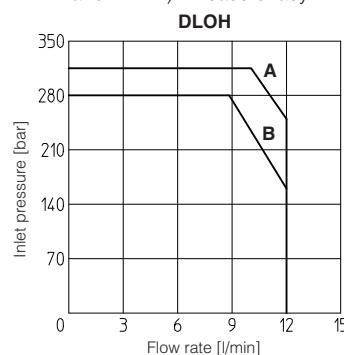
(1) For two-way valves pressure drop refers to P → T

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

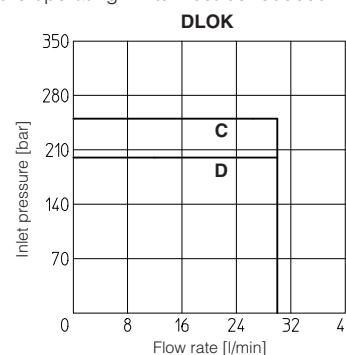
The diagram have been obtained with warm solenoids and power supply at lowest value ( $V_{nom}-10\%$ ). For DHA valves the curves refer to application with symmetrical flow through the valve (i.e. P → A and B → T). In case of asymmetric flow the operating limits must be reduced.



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



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 = G 3/4"  
 20 (ISO 6264) 32 = G 1 1/4"  
 32 (ISO 6264)

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 1

Options:

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

C UL US certification

**AO/UL** = without cables

**AO/UL1** = with 1 m cables length, factory wired

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

## 12 HYDRAULIC CHARACTERISTICS

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

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 1

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

Certification type  
**AO/UL** = C UL US certification

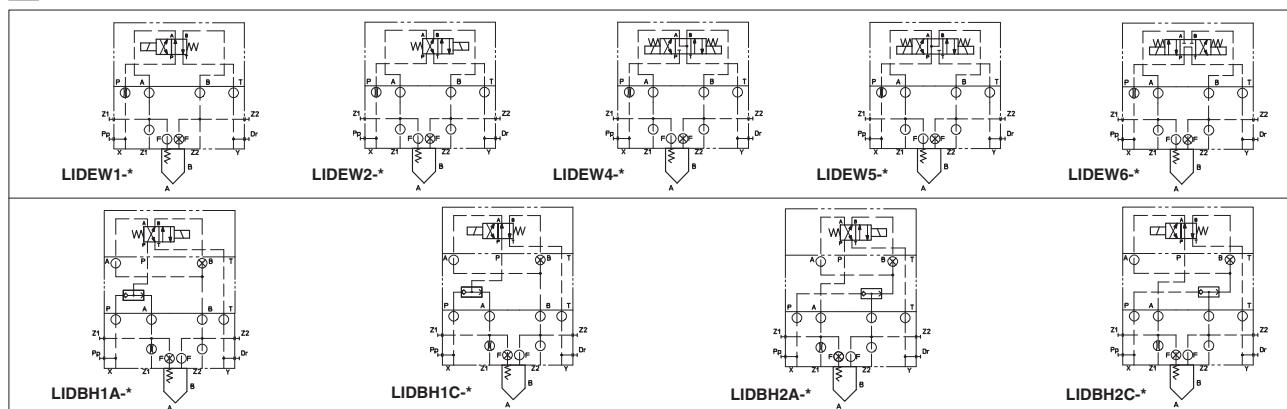
Note: for the code of the ISO cartridge to use with the above covers see tab. H003, section 2 and tab. H030, section 3.

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

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

| DHZA   | /UL | - | T | - | 0 | 7 | 1 | - | L | 5 | / | NPT | / | * | /* | / | ** | /* |
|--|-----|---|---|---|---|---|---|---|---|---|---|-----|---|---|----|---|----|----|
| DHZA = size 06   |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
| DKZA = size 10   |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
| DPZA = size 10   |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
| = size 16  |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
| = size 25  |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
| C UL US certification  |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
| UL = without cables  |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
| UL1 = with 1 m cables lenght, factory wired  |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
| 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      1 = size 10  |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
|  |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
|  |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
| 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                                 |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
| (1) Option /BT = low temperature -40°C also available on request                                   |     |   |   |   |   |   |   |   |   |   |   |     |   |   |    |   |    |    |
| (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             |             |             | <b>DHZA-A</b>   | <b>DHZA-T</b>     |                   |                     |
| Spool overlapping       | <b>1, 3</b> | <b>1, 3</b> | <b>1, 3</b>   | <b>1, 3</b>       | <b>1, 3</b>       | <b>1, 3</b>         |
| Spool type and size (1) | <b>L14</b>  | <b>L1</b>   | <b>S2</b>   | <b>S3, L3, D3</b> | <b>S5, L5, D5</b> | <b>S3, L3, D3</b>   |
| 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)    | 1           | 4,5         | 8   | 17                | 28                | 45                  |
| at Δp = 30 bar (P-T)    | 2           | 8           | 14  | 30                | 50                | 80                  |
| max permissible flow    | 3           | 12          | 21  | 45                | 60                | 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             |            |           | <b>DPZA-1</b> | <b>DPZA-2</b>                          | <b>DPZA-3</b> |           |
| Spool type and size (1) | <b>L5</b>  | <b>S5</b> | <b>D5</b>     | <b>S3</b>                              | <b>D3</b>     | <b>L5</b> |
| Pressure limits [bar]   |            |           |               | Ports P, A, B, X = 350; T = 250; Y = 0 |               |           |
| Max flow [l/min]        |            |           |               |  |               |           |
| at Δp = 10 bar          | 100        | 100       | 100 : 60      | 130                                    | 130 : 80      | 200       |
| at Δp = 30 bar          | 160        | 160       | 160 : 100     | 225                                    | 225 : 135     | 340       |
| max permissible flow    | 180        | 180       | 180 : 110     | 550                                    | 550 : 300     | 760       |
| Response time (2) [ms]  |            |           | < 80          |  | < 100         |           |
| Hysteresis [%]          |            |           | ≤ 5%          |  | ≤ 5%          |           |
| Repeatability           |            |           | ± 1%          |  | ± 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

|  |   |           |   |          |   |          |          |          |   |          |          |          |   |            |   |   |    |    |
|--|---|-----------|---|----------|---|----------|----------|----------|---|----------|----------|----------|---|------------|---|---|----|----|
| <b>DLHZA</b>   | / | <b>UL</b> | - | <b>T</b> | - | <b>0</b> | <b>4</b> | <b>0</b> | - | <b>L</b> | <b>7</b> | <b>3</b> | / | <b>NPT</b> | / | * | ** | /* |
| DLHZA = size 06<br>DLKZA = size 10   |   |           |   |          |   |          |          |          |   |          |          |          |   |            |   |   |    |    |
| C UL US certification<br>UL = without cables<br>UL1 = with 1 m cables length, factory wired          |   |           |   |          |   |          |          |          |   |          |          |          |   |            |   |   |    |    |
| <b>T</b> = with integral position transducer   |   |           |   |          |   |          |          |          |   |          |          |          |   |            |   |   |    |    |
| Valve size (ISO 4401)<br><b>0</b> = size 06 (DLHZA)<br><b>1</b> = size 10 (DLKZA)                    |   |           |   |          |   |          |          |          |   |          |          |          |   |            |   |   |    |    |
| Configuration, see section 19<br><b>4</b> = spring offset with fail safe<br><b>6</b> = spring offset |   |           |   |          |   |          |          |          |   |          |          |          |   |            |   |   |    |    |
| Spool overlapping in central position, see section 19<br><b>0</b> = P, A, B, T zero overlapping      |   |           |   |          |   |          |          |          |   |          |          |          |   |            |   |   |    |    |
| Spool type<br><b>L</b> = linear; <b>T</b> = not linear;  |   |           |   |          |   |          |          |          |   |          |          |          |   |            |   |   |    |    |
| (1) Option /BT = low temperature -40°C also available on request                                     |   |           |   |          |   |          |          |          |   |          |          |          |   |            |   |   |    |    |

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

|  |  |  |  |  |           |                        |           |           |                |           |           |            |                |           |           |           |           |            |
|--|--|--|--|--|-----------|------------------------|-----------|-----------|----------------|-----------|-----------|------------|----------------|-----------|-----------|-----------|-----------|------------|
| Hydraulic symbols                                |  | *40-L*3<br>*40-D*3<br>*40-T*3<br>*40-V*3 |  | *40-L*1<br>*40-D*1<br>*40-T*1<br>*40-V*1 |           | *60-L*1<br>*60-V*1     |           |           |                |           |           |            |                |           |           |           |           |            |
| *40-L*3/B<br>*40-D*3/B<br>*40-T*3/B<br>*40-V*3/B |  | a  | *40-L*1/B<br>*40-D*1/B<br>*40-T*1/B<br>*40-V*1/B |  | a         | *60-L*1/B<br>*60-V*1/B |           |           |                |           |           |            |                |           |           |           |           |            |
| Valve model                                      | <b>DLHZA-T*</b>  |  |  |  |           |                        |           |           |                |           |           |            |                |           |           |           |           |            |
| Pressure limits [bar]                            | ports P, A, B = 350;<br>T = 160 (250 with external drain /Y) |  |  |  |           |                        |           |           |                |           |           |            |                |           |           |           |           |            |
| Δp max P-T                                       | 70   |  |  |  |           |                        |           |           |                |           |           |            |                |           |           |           |           |            |
| Spool  | <b>L0</b>  | <b>L1</b>                                | <b>V1</b>  | <b>L3</b>                                | <b>V3</b> | <b>L5</b>              | <b>T5</b> | <b>L7</b> | <b>T7</b>      | <b>V7</b> | <b>D7</b> | <b>DT7</b> | <b>L3</b>      | <b>L7</b> | <b>T7</b> | <b>V7</b> | <b>D7</b> | <b>DT7</b> |
| Max flow [l/min]                                 | 2,5<br>4   | 4,5<br>7                                 | 5<br>8   | 9<br>14                                  | 13<br>20  | 18<br>28               |           | 26<br>40  | 26-13<br>40-20 | 40<br>55  | 65<br>80  |            | 65÷33<br>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      |           |                |           |           |            | ≤ 15           |           |           |           |           |            |
| Hysteresis [%]                                   | ≤ 0,1%   |  |  |  |           |                        | ≤ 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

|  |   |           |   |          |   |           |   |           |   |            |   |   |    |    |    |  |  |
|--|---|-----------|---|----------|---|-----------|---|-----------|---|------------|---|---|----|----|----|--|--|
| <b>QVHZA</b>   | / | <b>UL</b> | - | <b>T</b> | - | <b>06</b> | / | <b>12</b> | / | <b>NPT</b> | / | * | /* | ** | /* |  |  |
| QVHZA = size 06<br>QVKZA = size 10   |   |           |   |          |   |           |   |           |   |            |   |   |    |    |    |  |  |
| C UL US certification<br>UL = without cables<br>UL1 = with 1 m cables length, factory wired  |   |           |   |          |   |           |   |           |   |            |   |   |    |    |    |  |  |
| <b>A</b> = without position transducer<br><b>T</b> = with integral position transducer   |   |           |   |          |   |           |   |           |   |            |   |   |    |    |    |  |  |
| Valve size (ISO 4401)<br>QVHZA: <b>06</b> QVKZA: <b>10</b>   |   |           |   |          |   |           |   |           |   |            |   |   |    |    |    |  |  |
| Max regulated flow:<br>QVHZA<br>3 = 3,5 l/min;      36 = 36 l/min;<br>12 = 12 l/min;      45 = 45 l/min;<br>18 = 18 l/min;   |   |           |   |          |   |           |   |           |   |            |   |   |    |    |    |  |  |
| QVKZA<br>65 = 65 l/min<br>90 = 90 l/min  |   |           |   |          |   |           |   |           |   |            |   |   |    |    |    |  |  |
| Omit for standard coil 12 Vdc:<br><b>24</b> = with 24 VDC coils (only A version)   |   |           |   |          |   |           |   |           |   |            |   |   |    |    |    |  |  |
| Options:<br><b>C</b> = current feedback signal 4÷20 mA (only for -T versions)<br><b>D</b> = quick venting<br><b>O</b> = horizontal cable entrance (only for -A versions)<br><b>WP</b> = prolonged manual override protected by metallic cap (only for valves without transducer) |   |           |   |          |   |           |   |           |   |            |   |   |    |    |    |  |  |
| Solenoid threaded connection:<br><b>NPT</b> = 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  |                |    | <b>QVHZA-A</b><br><b>QVKZA-A</b> |    |                | <b>QVHZA-T</b><br><b>QVKZA-T</b> |
| Note: In three-way versions port P is open.<br>In two-way versions port P must be plugged.<br>Port T must always be plugged. |                |    |                                  |    |                |                                  |
| Valve model  | <b>QVHZA-A</b> |    | <b>QVHZA-T</b>                   |    | <b>QVKZA-A</b> |                                  |
| Valve size   | <b>06</b>      |    | <b>06</b>                        |    | <b>10</b>      |                                  |
| Max pressure ports P, A, B [l/min]   | 210            |    |                                  |    |                |                                  |
| Max regulated flow [l/min]   | 3,5            | 12 | 18                               | 36 | 45             | 3,5                              |
| Min regulated flow (1) [cm³/min]   | 15             | 20 | 30                               | 50 | 60             | 15                               |
| Regulating Δp [bar]  | 4 - 6          |    | 10 - 12                          | 15 | 4 - 6          | 10 - 12                          |
| Max flow on port A [l/min]   | 40             |    | 35                               | 50 | 55             | 50                               |

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

/

\*

/\*

/\*

Pressure relief:

RZMA = subplate size 06

HZMA = modular size 06

AGMZA = subplate size 10, 20, 32

LIMZA = cartridge (1)

Pressure compensator:

LICZA = cartridge (1)

C UL US certification

UL = without cables

UL1 = with 1 m cables length, factory wired

**A** = without integral pressure transducer

Valve size:

see section 23 for size code

Max regulated pressure:

see section 23

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 LIMZA)

**Y** = external drain (only for AGMZA)

Solenoid threaded connection:

**NPT** = 1/2" NPT ANSI B.2.1 (tapered)

(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

## 23 HYDRAULIC CHARACTERISTICS

|                                       |   |             |                      |                |              |
|---------------------------------------|---|-------------|----------------------|----------------|--------------|
| <b>RZMA-010</b>                       | <b>RZMA-030</b>   | <b>HZMA</b> | <b>AGMZA</b>         | <b>LIMZA</b>   | <b>LICZA</b> |
| 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

/

\*

/\*

Pressure reducing:

RZGA = subplate size 06

HZGA = modular size 06

KZGA = modular size 10

AGRCA = subplate size 10, 20

LIRZA = cartridge

C UL US certification

UL = without cables

UL1 = with 1 m cables length, factory wired

**A** = without integral transducer

Valve size:

see section 25 for size code

Max regulated pressure:

see section 25

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)

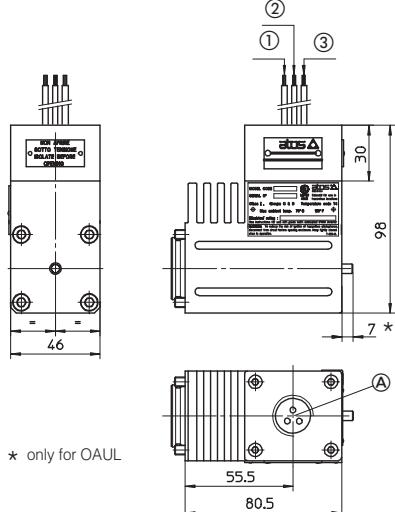
**P** = with integral mechanical pressure limiter  
(only for AGRCA and LIRZA)

**R** = with check valve (only for AGRCA)

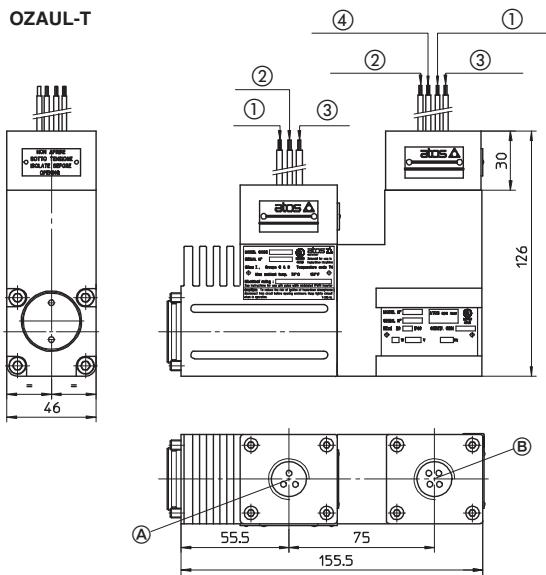
Solenoid threaded connection:  
**NPT** = 1/2" NPT ANSI B.2.1 (tapered)

## 25 HYDRAULIC CHARACTERISTICS

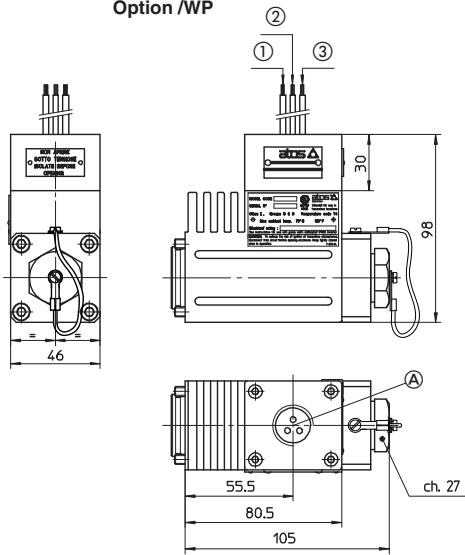
|                              |                                      |                   |                   |                |                |
|------------------------------|--------------------------------------|-------------------|-------------------|----------------|----------------|
| <b>RZGA-A-010</b>            | <b>RZGA-A-033</b>                    | <b>HZGA-A-031</b> | <b>KZGA-A-031</b> | <b>AGRCA-A</b> | <b>LIRZA-A</b> |
| Valve model                  |                                      | <b>RZGA</b>       | <b>HZGA</b>       | <b>KZGA</b>    | <b>AGRCA</b>   |
| Size code                    | 010 033 031                          | 10 20             | 10 20             | 1 2 3 4        |                |
| Valve size                   | 06                                   | 10 20             | 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 |                   |                   |                |                |

OAUL  
OZAUL-A

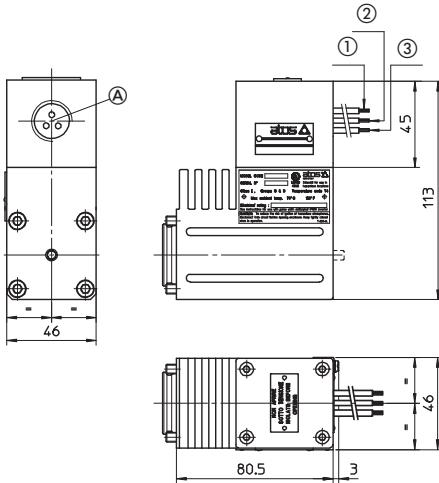
## OZAUL-T



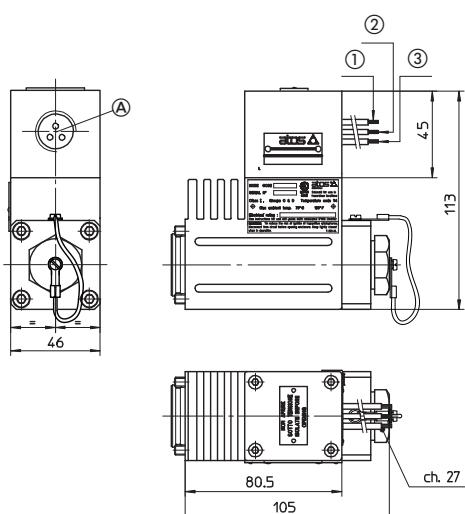
## Option /WP



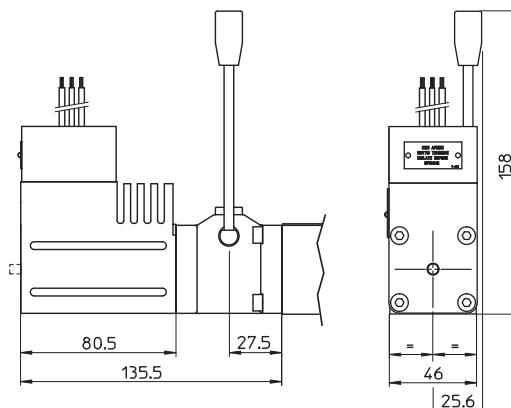
## Option /O



## Option /OWP



## Option /MV



## (A) Solenoid wiring (connection 1/2"NPT)

## OAUL1-\*AC

|   |         |                  |
|---|---------|------------------|
| 0 | ① white | = Coil (neutral) |
| 0 | ② green | = GND            |
| 0 | ③ black | = Coil           |

## OAUL1-\*DC

|   |         |       |
|---|---------|-------|
| 0 | ① red   | = +   |
| 0 | ② green | = GND |
| 0 | ③ black | = -   |

## OZAUL

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

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

|   |          |                 |
|---|----------|-----------------|
| 0 | ① white  | = Output signal |
| 0 | ② black  | = Supply -15 V  |
| 0 | ③ red    | = Supply +15 V  |
| 0 | ④ yellow | = GND           |

For UL1 version, the valves are supplied with 1 m (42 inches) cable length, factory wired.