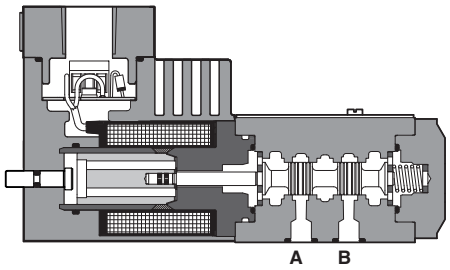
Explosion-proof solenoid valves with suppressor diode

on/off controls - ATEX certification



002290 DHA-0611

On/off directional valves equipped with explosion-proof solenoids provided with internal suppressor diode which eliminates the electric disturbances at the valve de-energizing.

They are certified ccording to ATEX 94/9/EC for surface plants with gas, vapours and dust environment, protection mode:
Ex II 2 GD Ex d IIC T6/T4/T3;
Ex tD A21 IP67 - category 2, zone 1, 2, 21 & 22.

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

1 EXPLOSION PROOF SOLENOIDS: MAIN DATA

SOLENOID TYPE	**OA**
Voltage code VDC ±10%	**12DC, 24DC, 28DC, 48DC, 110DC, 125DC, 220DC**
(1) VAC 50/60 Hz±10%	**110AC, 230AC**
Power consumption	8W
Coil insulation	Class H
Protection degree	IP 67 according to IEC 144 when correctly coupled with the relevant cable gland SP-PA*
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 9 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	**OA**	
Method of protection	Ex d	
Temperature class	**T6**	**T4** (option /7)
Surface temperature	≤ 85 °C	≤135 °C
Ambient temperature	-40 ÷ +45 °C	-40 ÷ +70 °C

3 CERTIFICATIONS

In the following are resumed the valves marking according to ATEX certifications

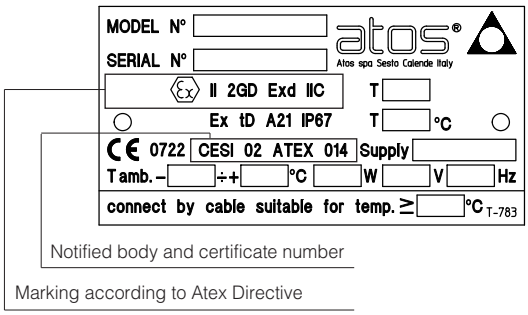
3.1 GROUP II, ATEX

⟨Ex⟩ = ATEX identification for explosive atmospheres equipments
II = Group II for surfaces plants
2 = High protection (equipment category)
GD = For gas, vapours and dust
d = Flame proof housing
IIC = Gas group
T6/T4/T3 = Temperature class of solenoid surface
tD = Dust ignition protection
A21 = Housing protection practice (for dust)
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



Note:
According to EN60079-0 the valves with Atex certification can be coated with a non-metallic material (for ex. paintened), 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

002290 DHA – 0 63 1/2 / PA - GK / 7 24DC ** /*

Special execution with internal suppressor diode

DHA = spool type - direct

Valve size (ISO 4401)
0 = 06

Valve configuration, see section 5

Spool type, see section 5

Optional cable gland:
PA = with threated cable gland, see section 9

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

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 (1)
O = horizontal cable entrance
WP = prolongued manual override protected by metallic cap

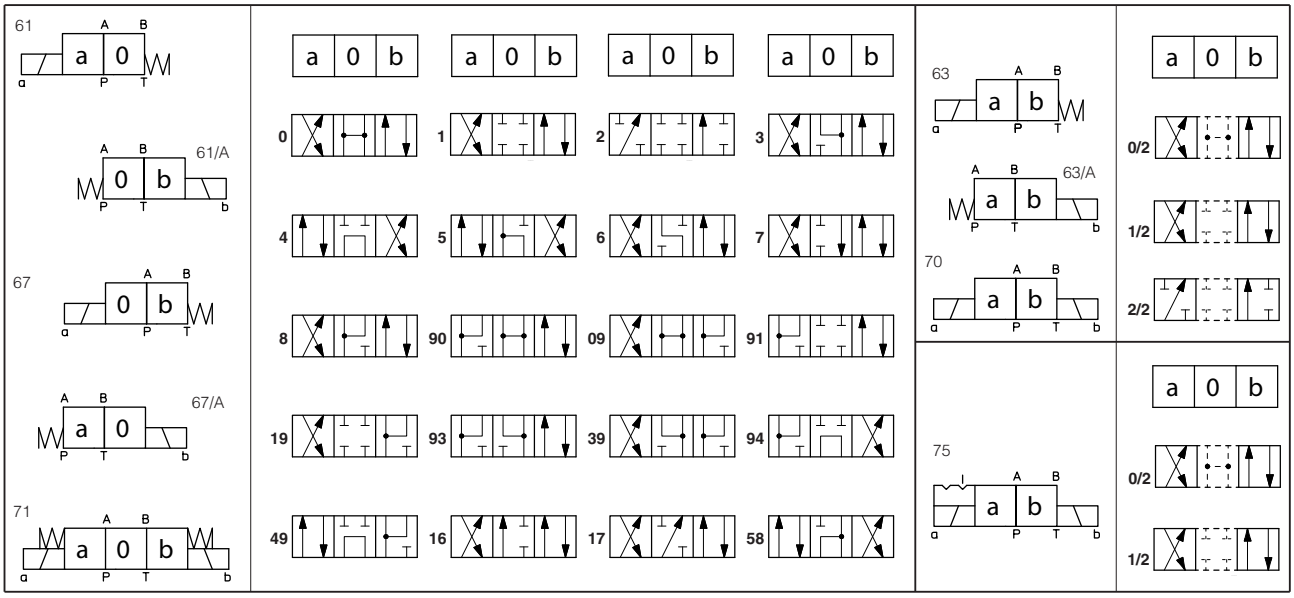
Voltage code - see section 1

Series number

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

(1) Available only for configuration 61, 63, 71

5 CONFIGURATIONS and SPOOLS

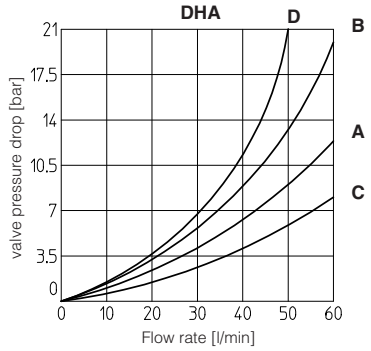


6 MAIN CHARACTERISTICS

Assembly position / location	Any position
Subplate surface finishing	Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)
Ambient temperature	-25 °C ÷ +45°C (+70°C for option /7)
Fluid	Hydraulic oil as per DIN 51524 .... 535; for other fluids see section 1
Recommended viscosity	15 ÷ 100 mm²/s at 40°C (ISO VG 15 ÷ 100)
Fluid contamination class	ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 μm ($\beta_{25} \geq 75$ recommended)
Fluid temperature	-20°C +60°C (standard seals) -20°C +80°C (/PE seals)
Flow direction	As shown in the symbols of table 5
Operating pressure	Ports P,A,B: **350** bar; Port T: **210** bar
Rated flow	See diagrams Q/Δp at section 7
Maximum flow	**70 l/min** see operating limits at section 8

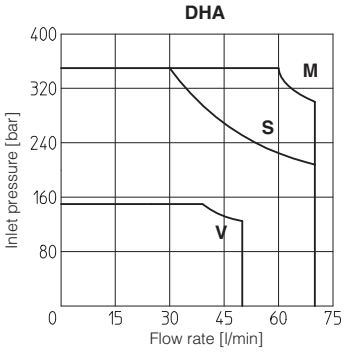
7 Q/Δp DIAGRAMS OF ON/OFF DIRECTIONAL CONTROLS (based on mineral oil ISO VG 46 at 50°C)

Spool type \ Flow direction	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	



8 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.

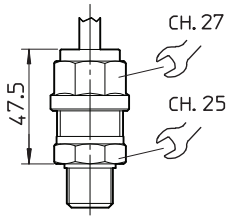


M = Spools 0, 1, 8; **V** = Spools 4, 5.
S = Spools 0/2,1/2, 3, 6, 7;

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

9 CABLE GLAND

CABLE GLAND PA19/*
(PG9 - IP67)



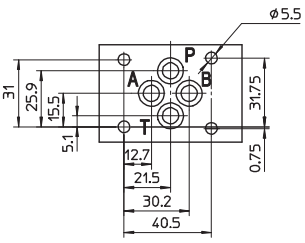
The cable glands are available on request certified ATEX according to EN 60079-0 and EN 60079-1.
PA19 cable size 7÷9,5 mm
PA112 cable size 9÷12 mm

Following codes have to be specified for spare cable glands:
PA(M)19/GK = with threated connection GK-1/2" ISO/UNI-6125 (tapered)
PA(M)19/NPT = with threated connection 1/2" NPT ANSI B2.1 (tapered)
PA(M)19/M = with threated connection M20x1,5 UNI-4535 (6H/6g).
This cable gland must be blocked with loctite or similar or with a locking nut.

Note: special cable clamps PA112 (PG12) available on request only as spare parts.

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 threated connection for cable entrance:
GK-1/2" GAS (ISO/UNI 6125) or M20x1,5 (UNI-4535) or 1/2"NPT (ANSI B2.1)

10 INSTALLATION DIMENSIONS



ISO 4401: 2005
Mounting surface: 4401-03-02-0-05
Fastening bolts:
4 socket head screws M5x50 class 12.9
Tightening torque = 8 Nm
Seals: 4 OR 108
Ports P,A,B,T: Ø = 7.5 mm (max).

P = PRESSURE PORT
A, B = USE PORT
T = TANK PORT
For the max pressures on ports, see section 4

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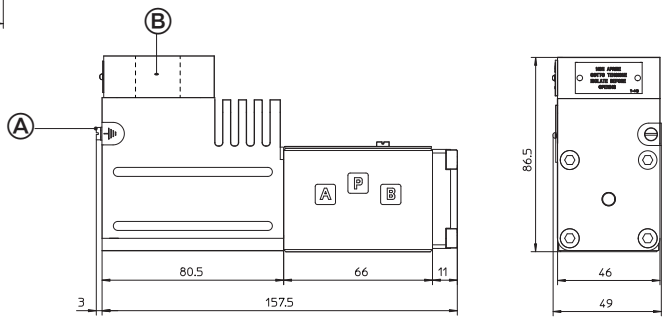
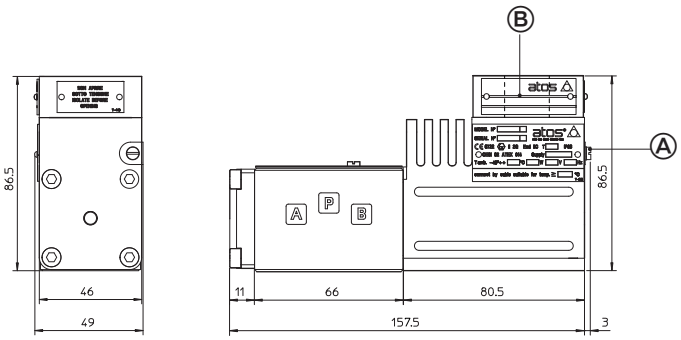
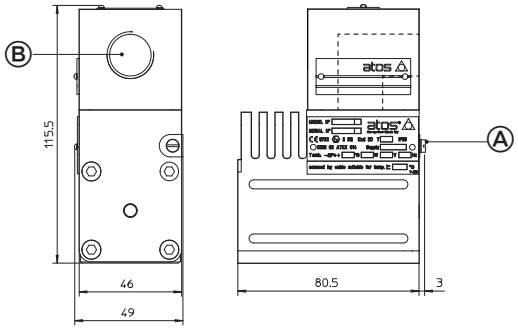


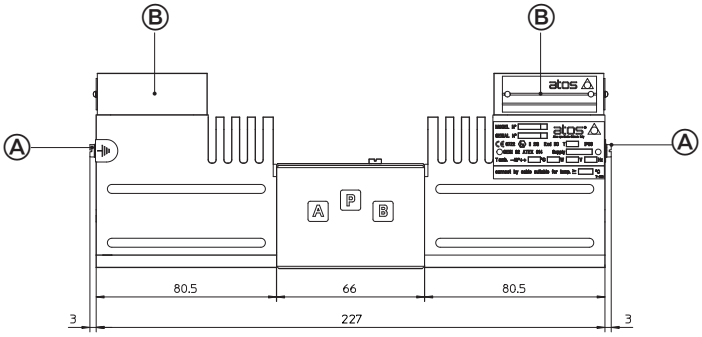
002290 DHA-06*/A



Option /O



002290 DHA-07*

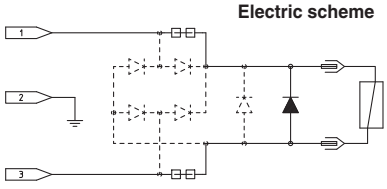


Ⓐ = **screw terminal for additional equipotential grounding**

Ⓑ = **Solenoid wiring**

1 = +
2 = GND
3 = -

Electric scheme



Dotted line = additional diodes for AC version