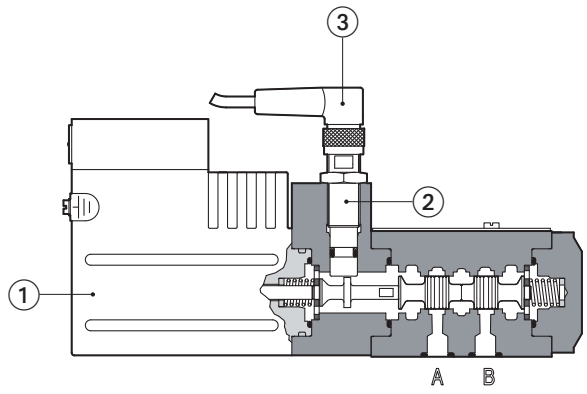
Ex-proof solenoid valves with spool position monitor

on/off, with inductive proximity sensor - ATEX certification



① Ex-proof solenoid
② Ex-proof inductive proximity sensor
③ Proximity connector (supplied with the valve)

043124 DHA-0631/2/GK/FI/NC 24DC

Ex-proof on/off solenoid valves equipped with proximity sensor for the spool position monitoring, certified according to ATEX 94/9/EC, protection mode: Ex II 2 GD Ex d IIC T6/T4/T3 category 2, zone 1, and 2 (see section 4).
The inductive proximity sensor provides an electric on-off output signal indicating the position of the valve's spool.
It has to be electrically fed by means of a safety barrier for intrinsically safe circuits (to be provided on the market), classified for Zone 1 and 2.
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.
Note: the valve is not certified for safety applications in conformity to the Machine Directive 2006/42/CE
Applications: any application in explosive hazardous environments classified Zone 1 or 2 where the valve open/closed condition must be monitored.

1 EXPLOSION PROOF SOLENOIDS: MAIN DATA

SOLENOID TYPE	**OA**
Voltage code VDC ±10%	**24DC**
Power consumption	8W
Coil insulation	Class H
Protection degree	IP 67 according to IEC 144 when correctly coupled with the relevant cable gland
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 10 for cable gland

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 PROXIMITY SENSOR: MAIN DATA

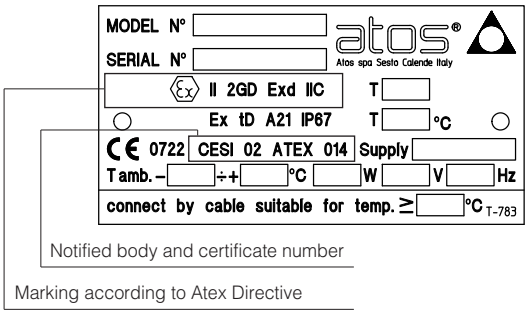
SENSOR TYPE	**Y-9-BES 516- 300-S 266-S4**	
Supply voltage **(1)** [V]	7,7 ÷ 9 VDC	
Current consumption [mA]	≥ 4 mA (de-energized)	≤ 1 mA (energized)
Protection degree	IP68 according to IEC 60529	
Max pressure [bar]	500	
Ambient temperature	-25 ÷ +70 °C	
ATEX certification	Ex II 2G EEx ia IIC T6	

(1) For application in explosive environments, the inductive proximity sensor must be electrically supplied by means of a galvanic insulated power amplifier (safety barrier) for intrinsically safe circuits, classified for Zone 1 and 2

4 CERTIFICATIONS

The valve can be used only in Gas environments, classified Zone 1 or 2
In fact the valve solenoid is ATEX certified for both Gas and Dust Zones (see the below solenoid marking), but the intrinsically safe proximity sensor is certified only for Gas according to the protection mode Ex II 2G EEx ia IIC T6
In the following is resumed the solenoid marking according to ATEX Group II certification.

EXAMPLE OF NAMEPLATE MARKING



= 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

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

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

043124	DHA	-	0	63	1/2	/	PA	-	GK	/	FI	*	/	7	24DC	**	/*

Special execution with ex-proof proximity sensor

DHA = spool type - direct

Valve size (ISO 4401)
0 = 06

Valve configuration, see section 6

Spool type, see section 6

Optional cable gland:
PA = with threated cable gland, see section 6

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)

/FI = inductive proximity sensor (ATEX certified)

Electrical signal (only for FI version):
/NC = electric contact is closed when the valve is de-energized
/NO = electric contact is open when the valve is de-energized

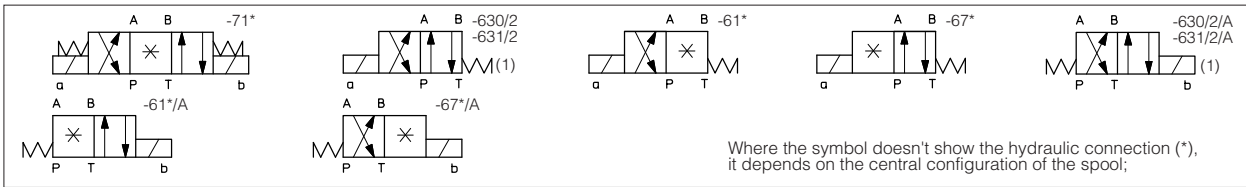
Options:
7 = for ambient temperature up to 70°C (not for Group I)
A = solenoid at side of port B (for single solenoid valves)
O = horizontal cable entrance (1)

Voltage code 24 VDC

Series number

Seals material
- = NBR
PE = FKM

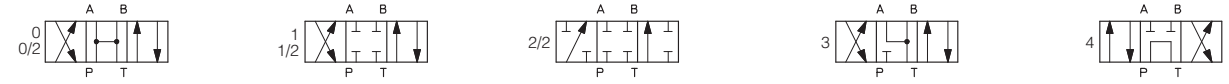
6 CONFIGURATION AND SPOOLS



Where the symbol doesn't show the hydraulic connection (*), it depends on the central configuration of the spool;

(1) Configurations 63 is available only for spool type 0/2, 1/2 and 2/2
(2) Configurations 61, 67 and 71 are available only for spools 1, 3 and 4

Spools

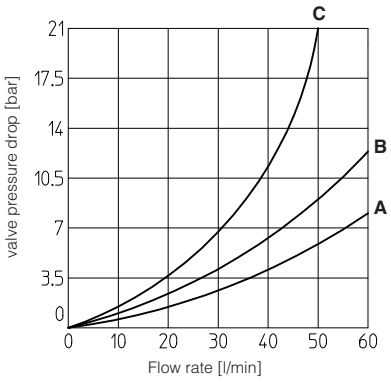


7 MAIN CHARACTERISTICS

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 5
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 6
Operating pressure	Ports P,A,B: **350** bar; Port T: **210** bar
Rated flow	See diagrams Q/Δp at section 8
Maximum flow	**60 l/min** see operating limits at section 9

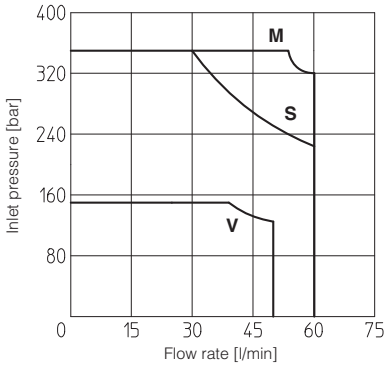
8 Q/Δp DIAGRAMS (based on mineral oil ISO VG 46 at 50°C)

Spool type \ Flow direction	P→A	P→B	A→T	B→T	P→T
0	A	A	A	A	
0/2, 1, 1/2	B	B	B	A	
3	B	A	A	A	
4	C	C	C	C	B



9 OPERATING LIMITS (based on mineral oil ISO VG 46 at 50°C)

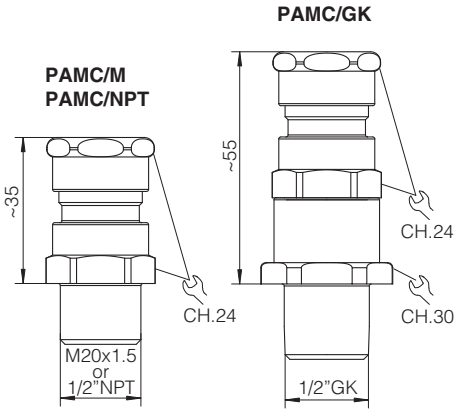
The diagram have been obtained with warm solenoids and power supply at lowest value (V_{nom}-10%).
The curves refer to application with symmetrical flow through the valve (i.e. P → A and B → T).
In case of asymmetric flow the operating limits must be reduced.



M = Spools 0, 1; **V** = Spool 4
S = Spools 0/2,1/2, 3

10 CABLE GLANDS - only for Group II

Cable gland PAMC/* (IP66/67) for valves with multicertification Group II



Cable size 6,5 to 11,9 mm

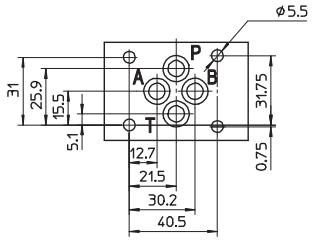
The cable glands PAMC, are Multicertified according to:
ATEX: EN 60079-0, EN 60079-1, EN 60079-7 and EN 60079-31
IECEx: IEC 60079-0, IEC 60079-1, IEC 60079-7 and IEC 60079-31
Rost: EN60079-0 and EN60079-1

Following codes have to be specified for spare cable glands:
PAMC/GK = with threated connection GK-1/2" ISO/UNI-6125 (tapered)
PAMC/NPT = with threated connection 1/2" NPT ANSI B2.1 (tapered)
PAMC/M = with threated connection M20x1,5 UNI-4535 (6H/6g).

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.

The cable glands must be blocked with loctite or similar or with a lock nut.
The valves must be connected to the power supply using the terminal board inside the solenoid.

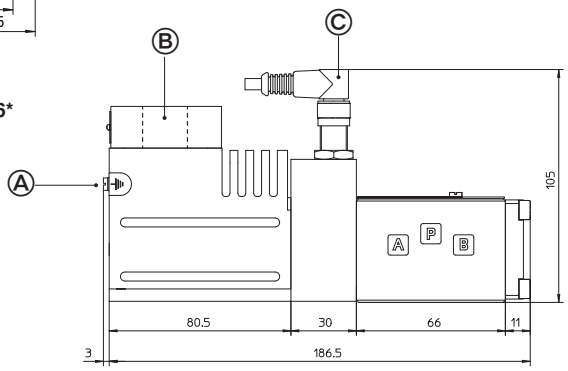
11 INSTALLATION DIMENSIONS



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

043124 DHA-06*



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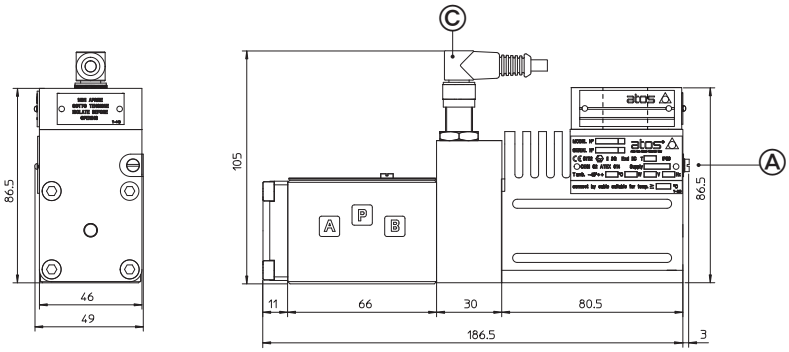
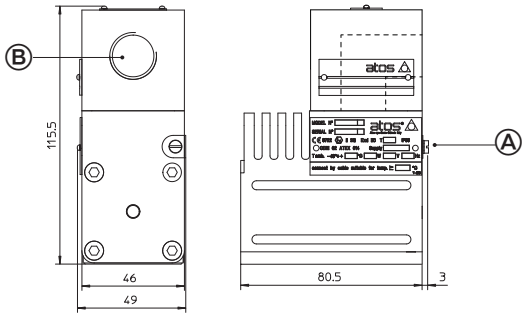


Option /O



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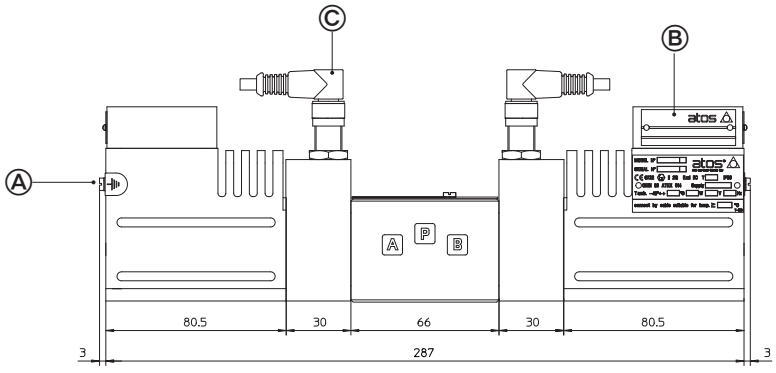
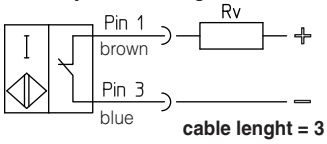


Ⓐ = **screw terminal for additional equipotential grounding**

Ⓑ = **Solenoid wiring**

1 = Coil
2 = GND
3 = Coil

Ⓒ = **Proximity sensor wiring**



cable lenght = 3 mt