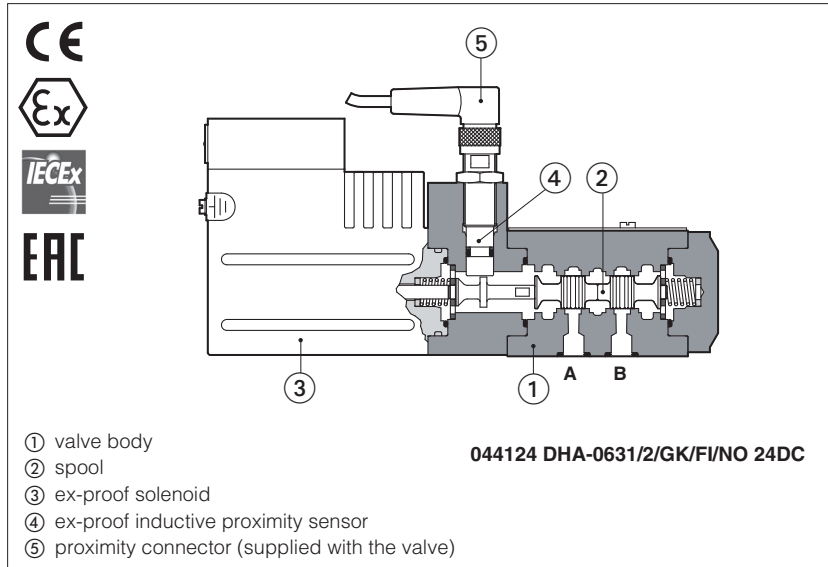


Ex-proof solenoid valves with spool position monitor

on/off, with inductive proximity sensor - Multicertification ATEX, IECEx, EAC

Available only on request



Ex-proof on/off solenoid valves equipped with proximity sensor for the spool position monitoring, multicertified according to ATEX, IECEx, EAC (see section 2 for solenoid certification).

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.

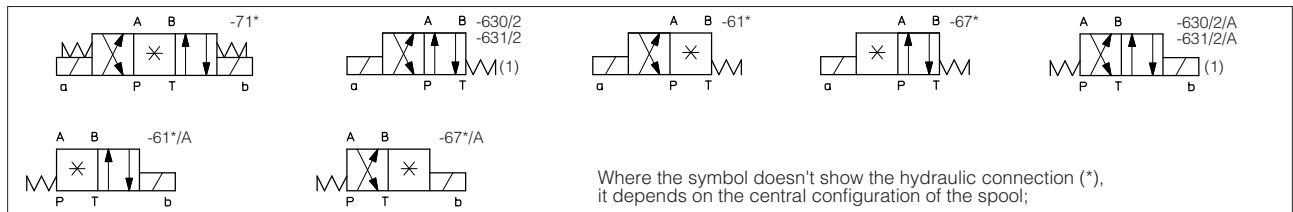
Note: the valve is not certified for safety applications in conformity to the Machine Directive 2006/42/CE

Applications: any application in explosive hazardous environments classified Zone 1 or 2 where the valve open/closed condition must be monitored.

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

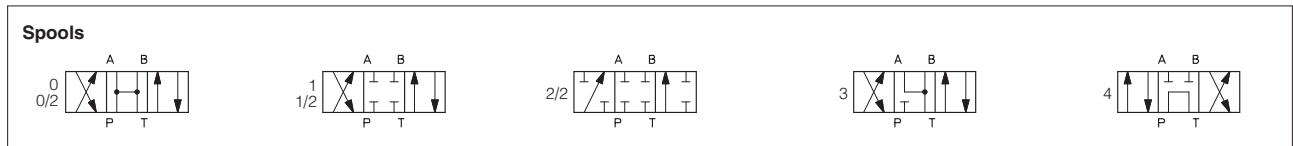
044124	DHA	0	63	1/2	GK	/	FI	*	/	*	24DC	**	/*
Special execution with ex-proof proximity sensor													Seals material - = NBR PE = FKM
DHA = spool type - direct													Series number
Valve size (ISO 4401) 0 = 06													Voltage code 24 Vdc
Valve configuration, see section 2													
Spool type, see section 2													
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)													
													Options: A = solenoid at side of port B (for single solenoid valves) O = horizontal cable entrance
													Electrical signal: /NO = electric contact is open when the valve is de-energized
													/FI = inductive proximity sensor (ATEX certified)

2 CONFIGURATION AND SPOOLS



(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



3 MULTICERTIFICATIONS

In the following are resumed the valves marking according to multicertifications for Group II

3.1 GROUP II, ATEX marking

- II 2 G** = Solenoid for surface plants with gas and vapors environment, category 2, suitable for zone 1 and zone 2
- Ex d** = Explosion-proof equipment
- II C** = Equipment of group IIC suitable for substances (gas) of group IIC
- T6/T4** = Solenoid temperature class (maximum surface temperature)
- Gb** = Equipment protection level, high level protection for explosive Gas atmospheres
- CE** = Mark of conformity to the applicable European directives
- II 2 D** = Solenoid for surface plants with dust environment, category 2, suitable for zone 21 and zone 22
- Ex d** = Explosion-proof equipment
- III C** = Suitable for conductive dust (applicable also IIIB and/or IIIA)
- IP66/67** = Protection degree
- T85/T135** = Maximum surface temperature (Dust)
- Db** = Equipment protection level, high level protection for explosive Dust atmospheres
- Ex** = Mark of conformity to the 94/9/CE directive and to the technical norms

3.2 GROUP II, IECEx marking

- Ex d** = Explosion-proof equipment
- IIC** = Equipment of group IIC suitable for substances (gas) of group IIC
- T6/T4** = Solenoid temperature classes (Gas)
- 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)
- T85°C/T135°C** = Maximum surface temperature (Dust)
- Db** = Equipment protection level, high level protection for explosive Dust atmospheres
- IP66/67** = Protection degree


3.3 EAC marking

EAC (EurAsian certification) acknowledges the whole ATEX Directive 94/9/EC.

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

- II 2 G** = Solenoid for surface plants with gas and vapors environment, category 2, suitable for zone 1 and zone 2
- Ex d** = Explosion-proof equipment
- II C** = Equipment of group IIC suitable for substances (gas) of group IIC
- T6/T4** = Solenoid temperature class (maximum surface temperature)
- Ex** = Mark of conformity to the 94/9/CE directive and to the technical norms

EXAMPLE OF NAMEPLATE MARKING

Atex notified body and certificate number	MODEL N° <input type="text"/> SERIAL N° <input type="text"/>	
Marking according to ATEX Directive	CE 0722 CESA 02 ATEX 014X Ex d IIC T6/T4 Gb	
IECEx notified body and certificate number	IECEx CES 10.0010X Ex d IIC T6/T4 Gb Ex tb IIC T85°C / T135°C Db	
Marking according to IECEx Directive	TP TC N° TC RU C-IT. Г Б 08. В. 01784 012/2011 Серия RU N 0408158	
EAC notified body and certificate number	ERC Ex II 2G Exd IIC T6/T4	
Marking according to ATEX Directive	Supply <input type="text"/> W <input type="text"/> V <input type="text"/> Hz Tamb. - <input type="text"/> ÷ + 45°C / +70°C IP66/67	
	For the correct selection of connecting cable temperatures see safety instructions	

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

4 MAIN CHARACTERISTICS

Assembly position / location	Any position
Subplate surface finishing	Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)
MTTFd values according EN ISO 13849	150 years, for further details see technical table P007
Ambient temperature range see section [6] for certified temperature class	Standard execution = -20°C ÷ +70°C /PE option = -20°C ÷ +70°C
Storage temperature range	Same as above Ambient temperature
Operating pressure	Ports P,A,B: 350 bar; Port T 210 bar
Rated flow	See diagrams Q/Δp at section [10]
Maximum flow	70 l/min , see operating limits at section [11]
Surface protection	Zinc coating with black passivation (body and solenoid housing)

5 SEALS AND HYDRAULIC FLUIDS - for other fluids not included in below table, consult our technical office

Seals, recommended fluid temperature	NBR seals (standard) = -20°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C		
Recommended viscosity	15 ÷ 100 mm ² /s - max allowed range 2.8 ÷ 500 mm ² /s		
Fluid contamination class	ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 µm (β ₂₅ ≥ 75 recommended)		
Hydraulic fluid	Suitable seals type	Classification	Ref. Standard
Mineral oils	NBR, FKM	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFDR, HFDR	ISO 12922
Flame resistant with water	NBR	HFC	

6 ELECTRICAL CHARACTERISTICS

Valve type	044124 DHA
Voltage code (1) VDC ±10%	24DC
Power consumption at 20°C	8W
Coil insulation	class H
Protection degree according to EN60529	IP66/67
Duty factor	100%

7 SOLENOID CERTIFICATION DATA

Valve type	044124 DHA		
Certifications	Multicertification Group II		
	ATEX	IECEX	EAC
Solenoid certified code	OA		
Type examination certificate (1)	ATEX: CESI 02 ATEX 014	IECEX: IECEX CES 10.0010x	EAC: TC RU C-IT. 08.B.01784
Method of protection	<ul style="list-style-type: none"> ATEX 2014/34/EU Ex II 2G Ex d IIC T6/T4/T3 Gb Ex II 2D Ex tb IIIC T85°C/T200°C Db 	<ul style="list-style-type: none"> IECEX Ex d IIC T6/T4/T3 Gb Ex tb IIIC T85°C/T200°C Db 	<ul style="list-style-type: none"> EAC Ex II 2G Exd IIC T6/T4
Temperature class	T6		T4
Surface temperature	≤ 85 °C		≤ 135 °C
Ambient temperature	-40 ÷ +45 °C		-40 ÷ +70 °C
Mechanical construction Flameproof housing enclosure Ex d	EN 60079-0: 2012, EN 60079-1: 2007 IEC 61508: 2010		
Cable entrance: threaded connection vertical (standard) or horizontal (option /O)	GK = GK-1/2" ISO/UNI-6125 (tapered) M = M20x1,5 UNI-4535 (6H/6g) NPT = 1/2" NPT ANSI B2.1 (tapered)		

(1) The type examiner certificates can be downloaded from www.atos.com, catalog on line, **technical information** section

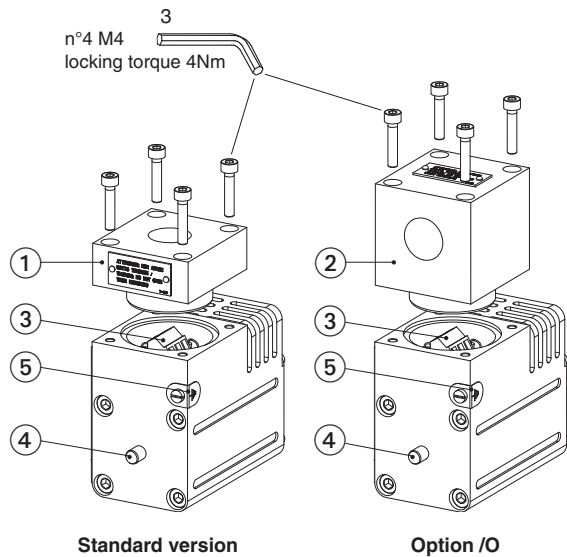
⚠ WARNING: service work performed on the valve by the end users or not qualified personnel invalidates the certification

8 PROXIMITY SENSOR: MAIN DATA

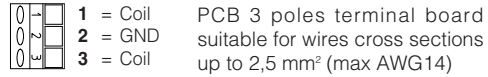
SENSOR TYPE	Y-9-BES 516- 300-S 266-S4	
Supply voltage (1) [V]	7,7 ÷ 9 VDC	
Current consumption [mA]	4 mA (de-energized)	1 mA (energized)
Protection degree	IP68 according to IEC 60529	
Max pressure [bar]	500	
Ambient temperature	-25 ÷ +70 °C	
Multicertification	Ex II 2G Ex ia IIC T6 Gb	

(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

9 EX PROOF SOLENOIDS WIRING



- ① cover with threaded connection for vertical cable gland fitting
- ② cover with threaded connection for horizontal cable gland fitting
- ③ terminal board for cables wiring
- ④ standard manual override
- ⑤ screw terminal for additional equipotential grounding



CABLE SPECIFICATION AND TEMPERATURE

Power supply: section of coil connection wires = 2,5 mm²
Grounding: section of internal ground wire = 2,5 mm²
 section of external ground wire = 4 mm²

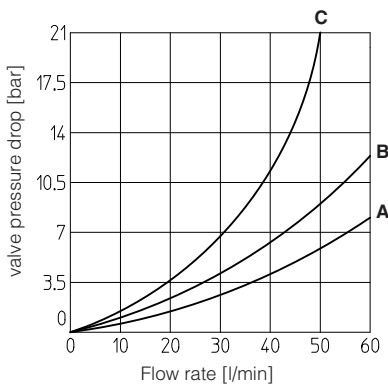
Cable temperature

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

Max ambient temperature [°C]	Temperature class	Max surface temperature [°C]	Min cable temperature
45 °C	T6	85 °C	not prescribed
70 °C	T4	135 °C	90 °C

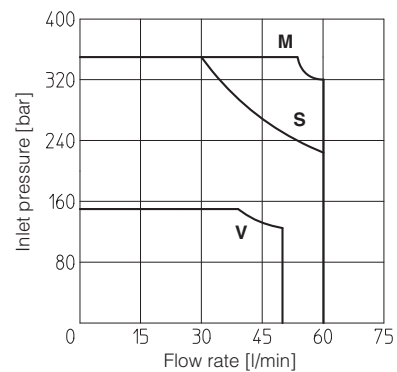
10 Q/Δp DIAGRAMS (based on mineral oil ISO VG 46 at 50°C)

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



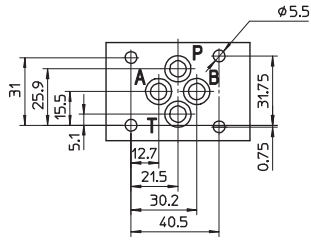
11 OPERATING LIMITS (based on mineral oil ISO VG 46 at 50°C)

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

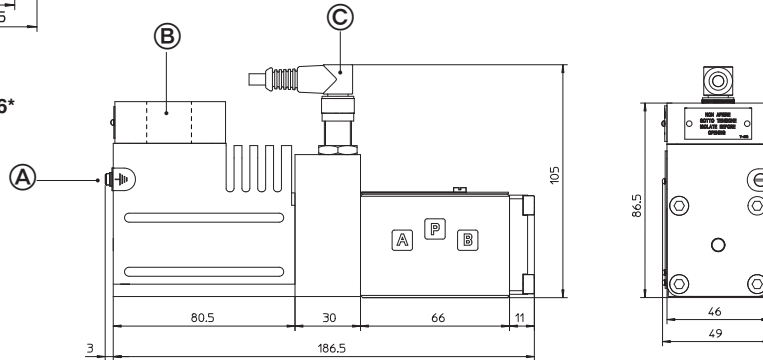
12 INSTALLATION DIMENSIONS



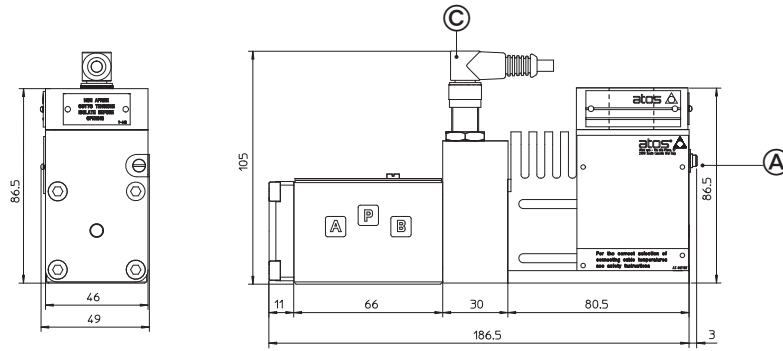
ISO 4401: 2005
Mounting surface: 4401-03-02-0-05
 Fastening bolts:
 4 socket head screws M5x50 class 12.9
 Tightening torque = 8 Nm
 Seals: 4 OR 108
 Ports P,A,B,T: Ø = 7.5 mm (max).

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

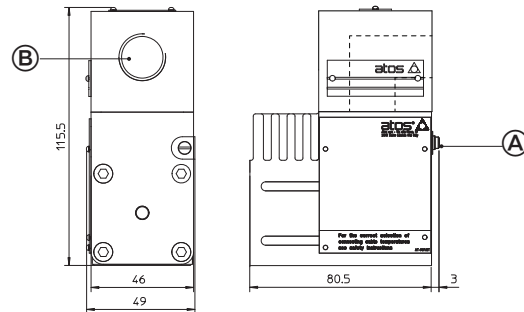
044124 DHA-06*



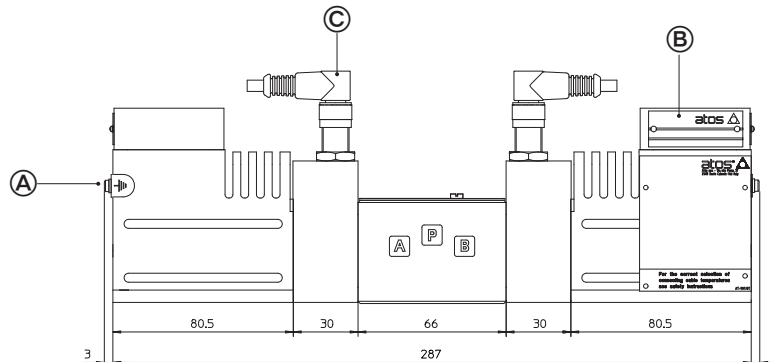
044124 DHA-06*/A



Option /O

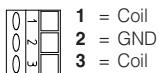


044124 DHA-07*

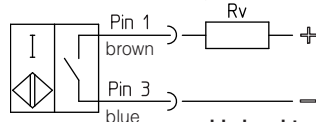


(A) = screw terminal for additional equipotential grounding

(B) = Solenoid wiring



(C) = Proximity sensor wiring



cable length = 3 mt