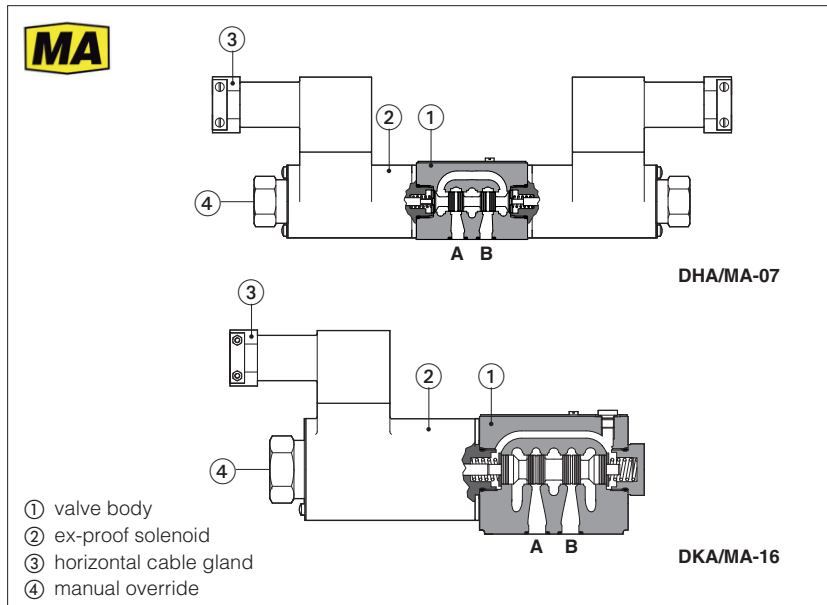


# Ex-proof solenoid directional valves

On-off, direct, spool type - **MA** certification



On-off directional valves equipped with explosion-proof solenoids certified according to **MA** Chinese mining certification, protection mode:

**Ex db I Mb** for surface, tunnel or mine plants

The solenoids are provided with cable glands (horizontally oriented) for cable entrance and internal terminal board for power supply coils connections.

The solenoid case classified **Ex db** 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/MA:**

Size: **06** - ISO 4401

Max flow: **80 l/min**

Max pressure: **350 bar**

**DKA/MA:**

Size: **10** - ISO 4401

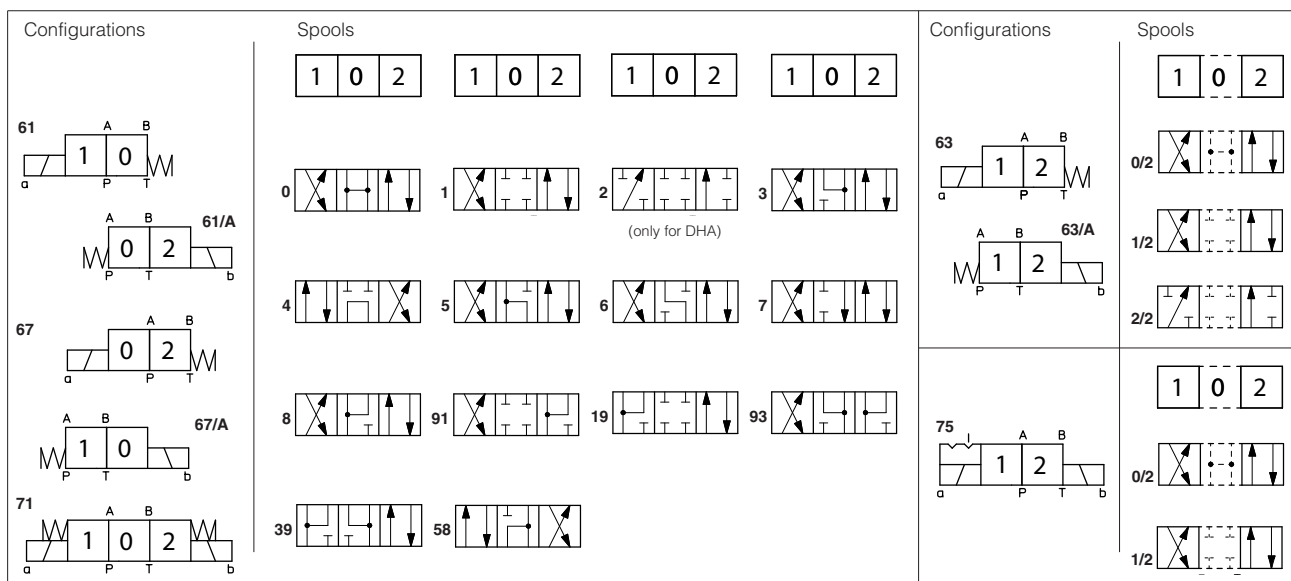
Max flow: **120 l/min**

Max pressure: **315 bar**

## 1 MODEL CODE

<b>DHA</b>	/	<b>MA</b>	-	<b>0</b>	<b>63</b>	<b>1/2</b>	/	<b>*</b>	<b>24DC</b>	<b>*</b>	<b>*</b>
<p><b>DHA</b> = spool type - direct, size 06  <b>DKA</b> = spool type - direct, size 10</p> <p><b>MA</b> = Ex-proof Ma Chinese mining certification</p> <p><b>Valve size</b> (ISO 4401)  <b>0</b> = 06 for DHA  <b>1</b> = 10 for DKA</p> <p><b>Configuration</b>, see section 2</p> <p><b>Spool type</b>, see section 2</p>											
<p><b>Voltage code</b>, see section 5</p>										<p><b>Seals material</b>, see sect. 6:                  - = NBR                  PE = FKM</p>	
<p><b>Option:</b>  <b>A</b> = solenoid at side of port B (for single solenoid valves)</p>											<p>Series number</p>

## 2 CONFIGURATIONS and SPOOLS (representation according to ISO 1219-1)



**DHA** spools **1, 4, 5** and **58** are also available as **1/1, 4/8, 5/1** and **58/1**. They are properly shaped to reduce water-hammer shocks during the switching.  
**DKA** spool **1** is also available as **1/1**. It is properly shaped to reduce water-hammer shocks during the switching.

### 3 GENERAL CHARACTERISTICS

Assembly position / location	Any position
Subplate surface finishing to ISO 4401	Acceptable roughness index, Ra ≤0,8 recommended Ra 0,4 - flatness ratio 0,01/100
MTTFd values according to EN ISO 13849	150 years, for further details see technical table P007
Ambient temperature	<b>Standard</b> = -20°C ÷ +70°C <b>/PE</b> option = -20°C ÷ +70°C
Storage temperature range	<b>Standard</b> = -20°C ÷ +80°C <b>/PE</b> option = -20°C ÷ +80°C
Compliance	Explosion proof protection, see section 7 -Flame proof enclosure Ex-d

### 4 HYDRAULIC CHARACTERISTICS

<b>Operating pressure</b>	<b>DHA/MA</b>	P, A, B = <b>350 bar</b>	T = <b>210 bar</b>
	<b>DKA/MA</b>	P, A, B = <b>315 bar</b>	T = <b>210 bar</b>
<b>Maximum flow</b>	<b>DHA/MA</b>	<b>80 l/min</b>	
	<b>DKA/MA</b>	<b>120 l/min</b>	

### 5 ELECTRICAL CHARACTERISTICS

<b>SOLENOID TYPE</b>	ON/OFF		
<b>Voltage code</b> VDC ±10%	<b>12DC, 24DC, 110DC</b>		
Power consumption	16,5 W (DHA)	18W (DKA)	
Protection degree	IP 65 to DIN EN 60529		
Duty factor	100%		

### 6 SEALS AND HYDRAULIC FLUID

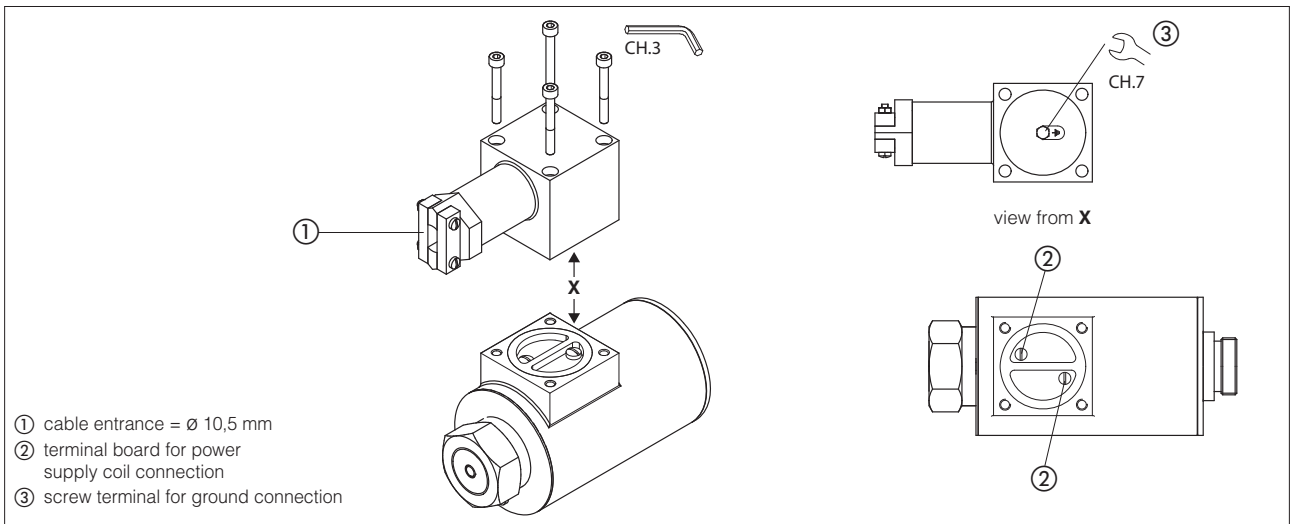
Seals, recommended fluid temperature	NBR seals (standard) = -20°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C		
Recommended viscosity	15 ÷ 100 mm <sup>2</sup> /s - max allowed range 2.8 ÷ 500 mm <sup>2</sup> /s		
Max fluid contamination level	ISO4406 class 20/18/15 NAS1638 class 9, see also filter section at www.atos.com or KTF catalog		
<b>Hydraulic fluid</b>	<b>Suitable seals type</b>	<b>Classification</b>	<b>Ref. Standard</b>
Mineral oils	NBR, FKM, HNBR	HL, HLP, HLPD, HVL, HVLDP	DIN 51524
Flame resistant without water	FKM	HFDR, HFDR	ISO 12922
Flame resistant with water	NBR, HNBR	HFC	

### 7 CERTIFICATION DATA

Valve type	<b>DHA/MA</b>	<b>DKA/MA</b>
Certification	MA mining	
Solenoid certified code	<b>DTBZ12 - 37 FYC</b>	<b>DTBZ9 - 90FYC</b>
Type examination certificate	CNEx 22.7656X	CNEx 22.7654X
Method of protection	Ex db I Mb	
Surface temperature	≤ 135 °C	
Ambient temperature	-20 ÷ +40 °C	
Cable entrance	cable entrance Ø = 10.5mm	

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

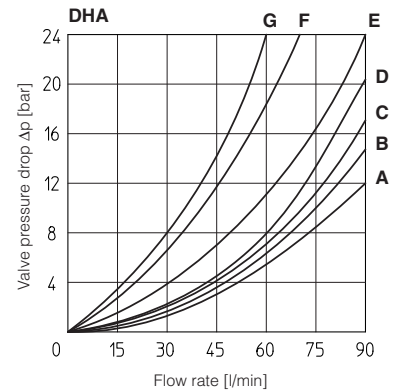
**8 EX-PROOF SOLENOID WIRING**



**9 Q/ $\Delta$ P DIAGRAMS** based on mineral oil ISO VG 46 at 50°C

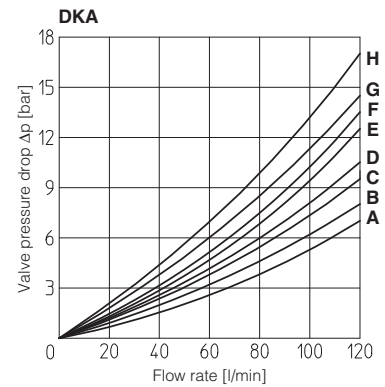
**DHA**

Flow direction \ Spool type	Flow direction				
	P→A	P→B	A→T	B→T	P→T
0, 0/1	A	A	C	C	D
1, 1/1	D	C	C	C	
3, 3/1	D	D	A	A	
4, 4/8, 5, 5/1, 58, 58/1 19, 91, 93, 39	F	F	G	C	E
1/2, 0/2	D	D	D	D	
6, 7	D	D	D	D	
8	A	A	E	E	
2	D	D			
2/2	F	F			



**DKA**

Flow direction \ Spool type	Flow direction					
	P→A	P→B	A→T	B→T	P→T	B→A
0, 0/1, 0/2, 2/2	A	A	B	B		
1, 1/1, 1/3, 6, 8	A	A	D	C		
3, 3/1, 7	A	A	C	D		
4	B	B	B	B	F	
5	A	B	C	C	G	
1/2	B	C	C	B		
19	A	D	C			H



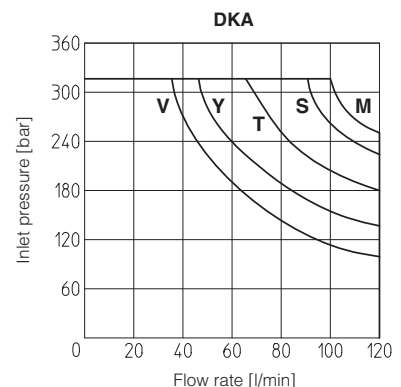
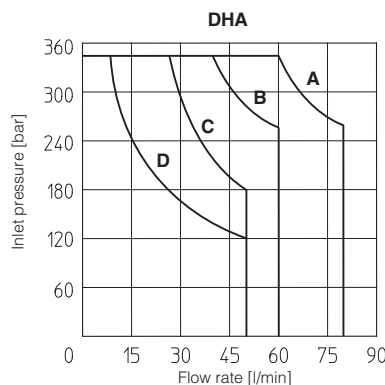
**10 OPERATING LIMITS** For a correct valve operation do not exceed the max recommended flow rates (l/min) shown in the below tables

**DHA**

- A** = Spools 0, 0/1, 1, 1/2, 3, 8
- B** = Spools 0/2, 1/1, 6, 7
- C** = Spools 3/1, 4, 4/8, 5, 5/1, 19, 39, 58, 58/1, 09, 90, 91, 93, 94
- D** = Spools 2, 2/2

**DKA**

- M** = Spools 0, 0/1, 1, 1/1, 3, 3/1, 1/2, 0/2, 8
- S** = Spools 1/3, 6, 7
- Y** = Spools 4, 5
- V** = Spools 2/2
- T** = Spools 19



**11** INSTALLATION DIMENSIONS FOR DHA/MA AND DKA/MA

**DHA/MA**

ISO 4401: 2005

Mounting surface: 4401-03-02-0-05

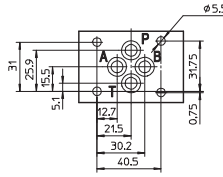
Fastening bolts: 4 socket head screws:

M5x30 class 12.9

Tightening torque = 8 Nm

Seals: 4 OR 108

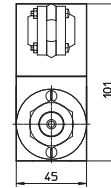
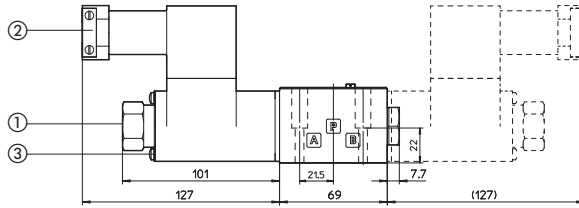
Ports P,A,B,T:  $\varnothing = 7.5$  mm (max)



**P** = PRESSURE PORT  
**A, B** = USE PORT  
**T** = TANK PORT

**DHA/MA-06**

**DHA/MA-07** (dotted line)



Mass of basic versions:  
 DHA/MA-06: 3,2 kg  
 DHA/MA-07: 4,9 kg

- ① manual override
- ② horizontal cable gland, cable entrance =  $\varnothing 10,5$  mm
- ③ screw terminal for additional equipotential grounding

**DKA/MA**

ISO 4401: 2005

Mounting surface according to 4401-05-05-0-05  
 (without X port, Y port optional)

Fastening bolts:

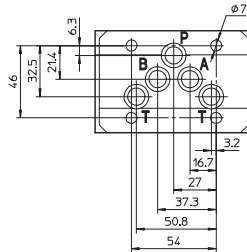
4 socket head screws M6x40 class 12.9

Tightening torque = 15 Nm

Seals: 5 OR 2050 and 1 OR 108

Ports P,A,B,T:  $\varnothing = 11,5$  mm (max)

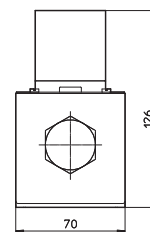
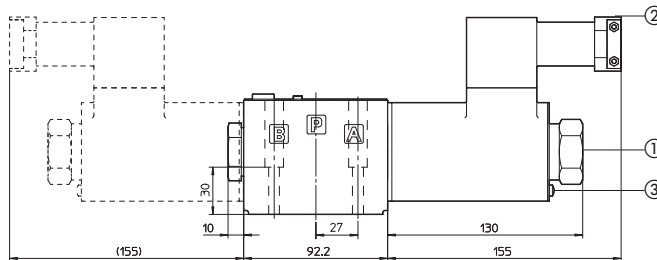
Ports Y:  $\varnothing = 5$  mm



**P** = PRESSURE PORT  
**A, B** = USE PORT  
**T** = TANK PORT

**DKA/MA-16**

**DKA/MA-07** (dotted line)



Mass of basic versions:  
 DKA/MA-16: 5,7 kg  
 DKA/MA-17: 8,7 kg

- ① manual override
- ② horizontal cable gland, cable entrance =  $\varnothing 10,5$  mm
- ③ screw terminal for additional equipotential grounding

**12** RELATED DOCUMENTATION

**X010** Basics for electrohydraulics in hazardous environments  
**X040** Summary of Atos ex-proof components certified to MA

**EX900** Operating and maintenance information for ex-proof on-off valves  
**P005** Mounting surfaces for electrohydraulic valves