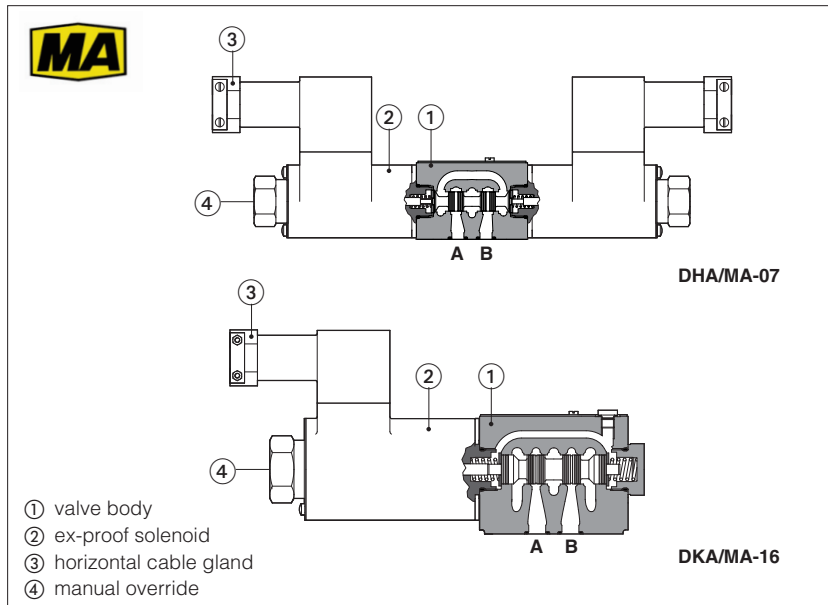


Ex-proof solenoid directional valves

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 d 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 d** 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:	DKA/MA:
Size: 06 - ISO 4401	Size: 10 - ISO 4401
Max flow: 80 l/min	Max flow: 120 l/min
Max pressure: 350 bar	Max pressure: 315 bar

1 MODEL CODE

DHA	/	MA	-	0	63	/	1/2	/	*	24DC	*	*
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DHA = spool type - direct, size 06
DKA = spool type - direct, size 10

MA = Ex-proof Ma Chinese mining certification

Valve size (ISO 4401)
0 = 06 for DHA
1 = 10 for DKA

Configuration, see section 2

Spool type, see section 2

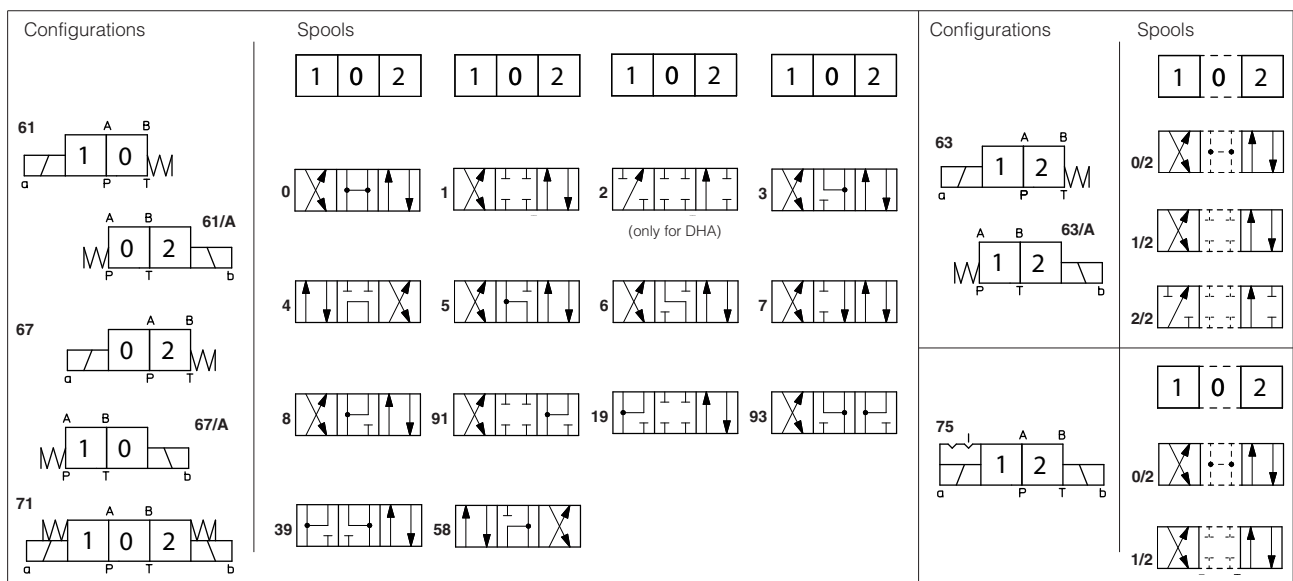
Seals material, see sect. 6:
- = NBR
PE = FKM

Series number

Voltage code, see section 5

Option:
A = solenoid at side of port B (for single solenoid valves)

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 swiching.
DKA spool **1** is also available as **1/1**. It is properly shaped to reduce water-hammer shocks during the swiching.

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	Standard = -20°C ÷ +70°C /PE option = -20°C ÷ +70°C
Storage temperature range	Standard = -20°C ÷ +80°C /PE option = -20°C ÷ +80°C
Compliance	Explosion proof protection, see section 7 -Flame proof enclosure Ex-d

4 HYDRAULIC CHARACTERISTICS

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

5 ELECTRICAL CHARACTERISTICS


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

6 SEALS AND HYDRAULIC FLUID

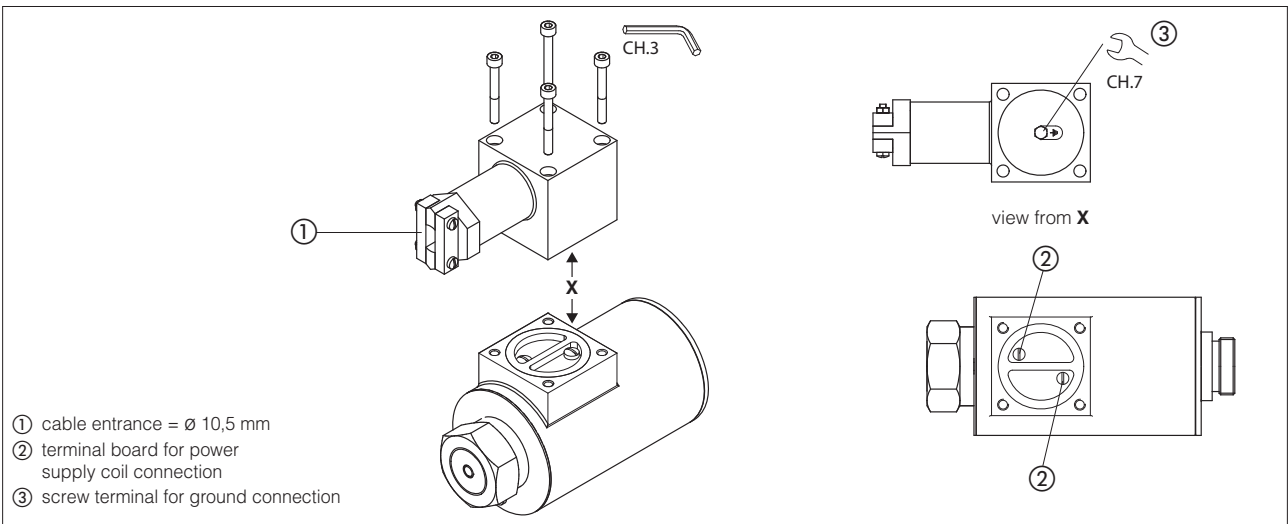
Seals, recommended fluid temperature	NBR seals (standard) = -20°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C		
Recommended viscosity	15 ÷ 100 mm ² /s - max allowed range 2.8 ÷ 500 mm ² /s		
Max fluid contamination level	ISO4406 class 20/18/15 NAS1638 class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

7 CERTIFICATION DATA

Valve type	DHA/MA	DKA/MA
Certification	MA mining	
Solenoid certified code	DTBZ12 - 37 FYC	DTB29 - 90FYC
Type examination certificate	CNEx 17.4187	CNEx 17.4190
Method of protection	Ex d I Mb	
Ambient 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**

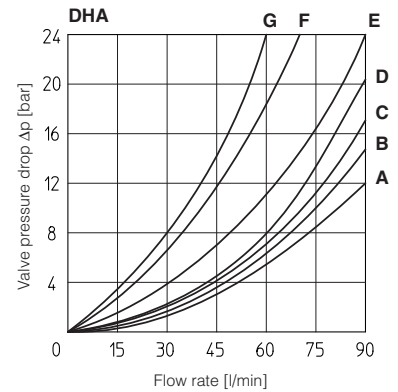
8 EX-PROOF SOLENOID WIRING



9 Q/ Δ P DIAGRAMS based on mineral oil ISO VG 46 at 50°C

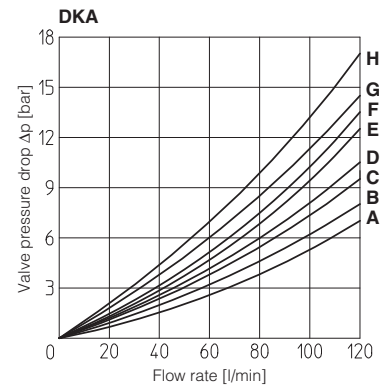
DHA

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



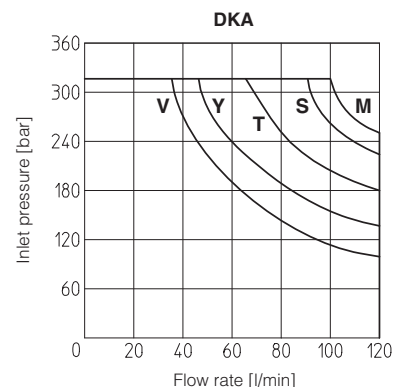
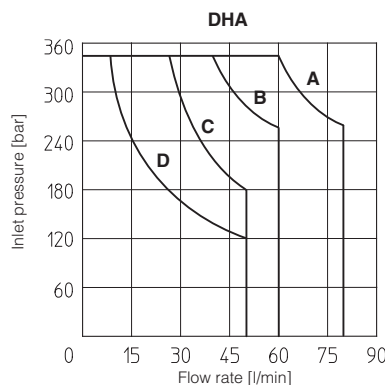
10 OPERATING LIMITS For a correct valve operation do not exceed the max recommended flow rates (l/min) shown in the below tables

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



DHA/MA

ISO 4401: 2005

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

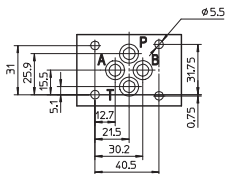
Fastening bolts: 4 socket head screws:

M5x30 class 12.9

Tightening torque = 8 Nm

Seals: 4 OR 108

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



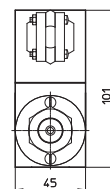
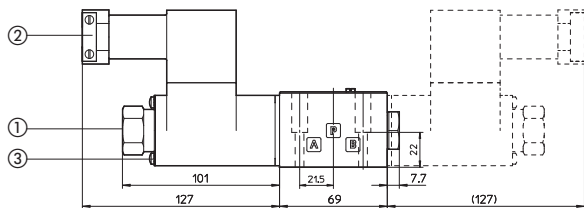
P = PRESSURE PORT

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:

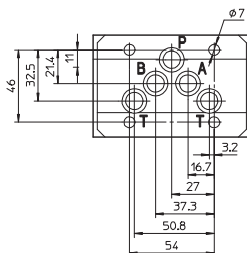
4 socket head screws M6x40 class 12.9

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



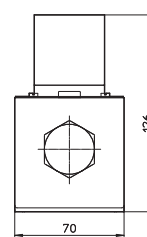
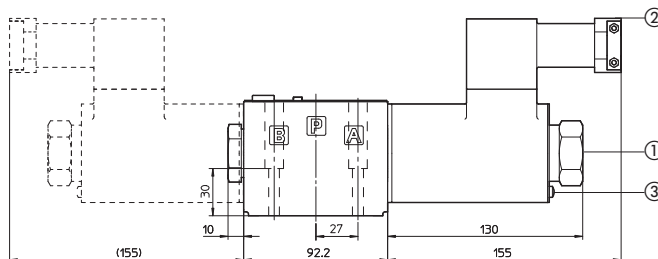
P = PRESSURE PORT

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

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