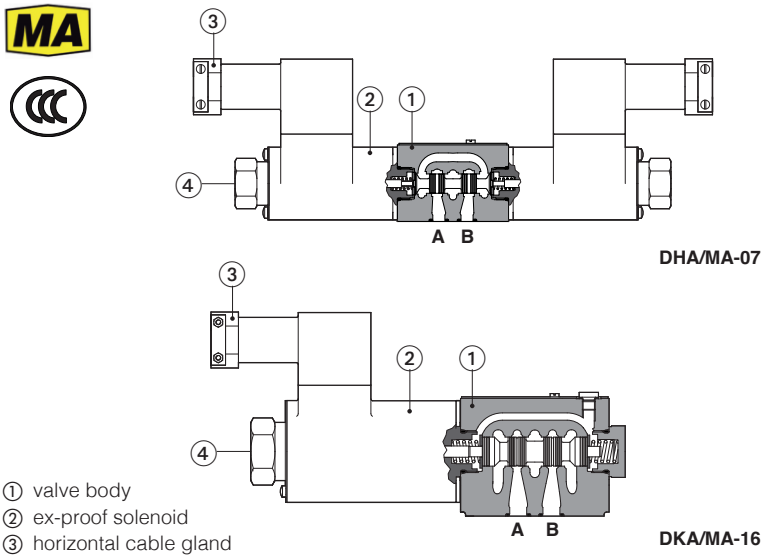
Ex-proof solenoid directional valves

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



① valve body
② ex-proof solenoid
③ horizontal cable gland
④ manual override

On-off directional valves equipped with explosion-proof solenoids certified according to **CCC** and **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

DHA	/	MA	-	0	63	1/2	/	*	24DC	*	*

DHA = spool type - direct, size 06
DKA = spool type - direct, size 10

MA = Ex-proof Ma Chinese mining certification,
CCC China Compulsory Certificate

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

Configuration, see section 2

Spool type, see section 2

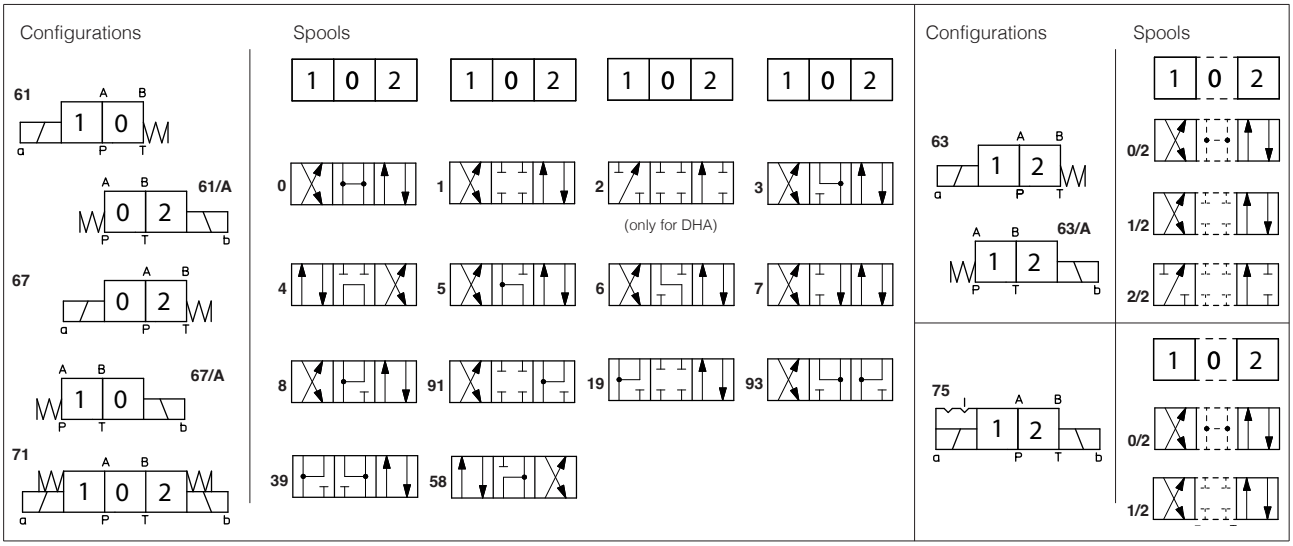
Option:
A = solenoid at side of port B (for single solenoid valves)

Voltage code, see section 5

Series number

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

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°
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**
Maximuim 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

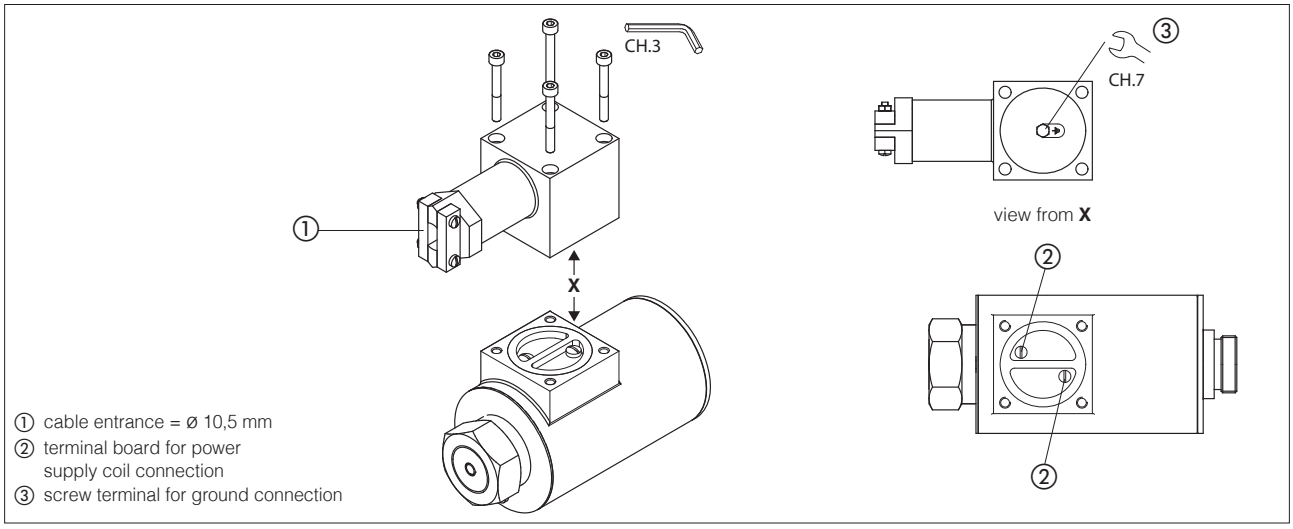
Seals, recommended fluid temperature	NBR seals (standard) = -20°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C		
Recommended viscosity	15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s		
Max fluid contamination level	ISO4406 class 20/18/15 NAS1638 class 9, 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, HVLPD	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, **CCC**	
Solenoid certified code	**DTBZ12 - 37 FYC**	**DTBZ9 - 90FYC**
Type examination certificate	MA: CNEx 22.7656X CCC: 2020312307000052	MA: CNEx 22.7655X CCC: 2020312307000052
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**

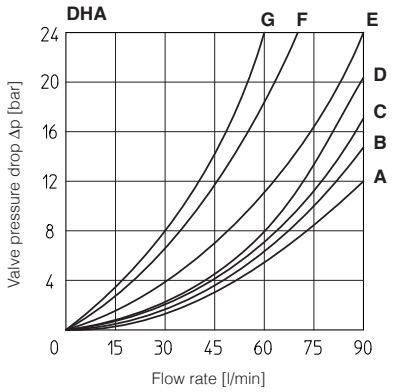
8 EX-PROOF SOLENOID WIRING



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

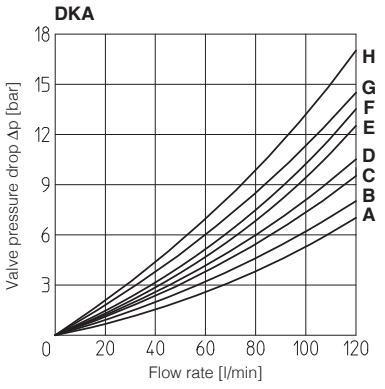
DHA

Flow direction / Spool type	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	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



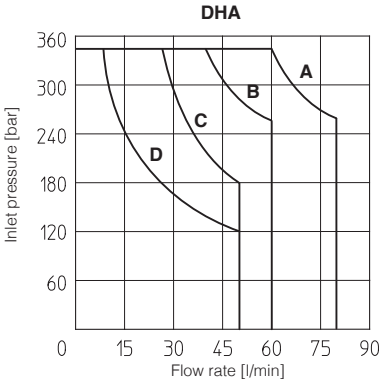
10 OPERATING LIMITS - For a correct valve operation do not exceed the max recommended flow rates (l/min) shown in the below tables

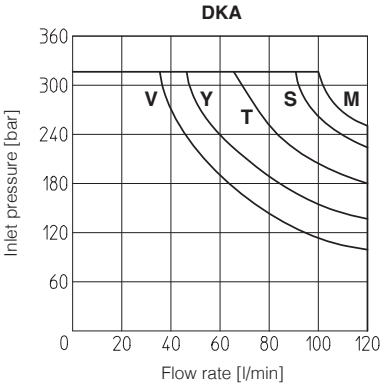
DHA

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 = Spool 2/2
T = Spool 19

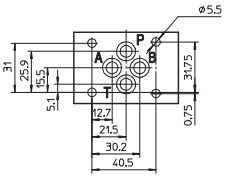




11 INSTALLATION DIMENSIONS FOR DHA/MA AND DKA/MA

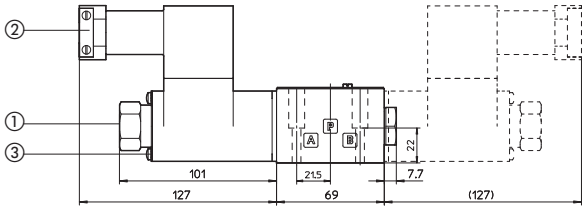
DHA/MA

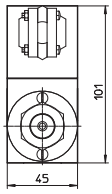
ISO 4401: 2005
Mounting surface: 4401-03-02-0-05
Fastening bolts: 4 socket head screws:
M5x30 class 12.9
Tightening torque = 8 Nm
Seals: 4 OR 108
Ports P,A,B,T: Ø = 7.5 mm (max)



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

DHA/MA-06
DHA/MA-07 (dotted line)



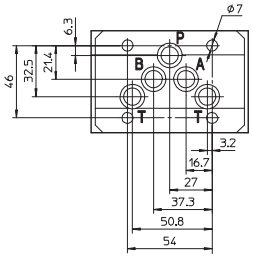


Mass of basic versions:
DHA/MA-06: 3,2 kg
DHA/MA-07: 4,9 kg

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

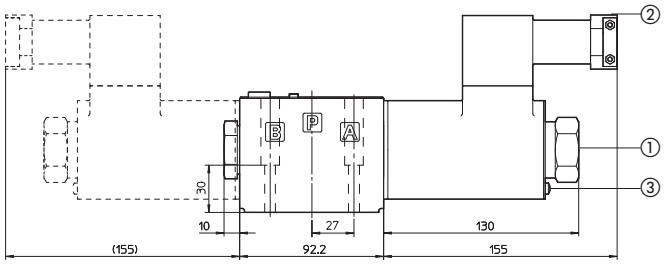
DKA/MA

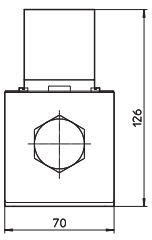
ISO 4401: 2005
Mounting surface according to 4401-05-05-0-05
(without X port, Y port optional)
Fastening bolts:
4 socket head screws M6x40 class 12.9
Tightening torque = 15 Nm
Seals: 5 OR 2050 and 1 OR 108
Ports P,A,B,T: Ø = 11.5 mm (max)
Ports Y: Ø = 5 mm



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 = ø 10,5 mm
③ screw terminal for additional equipotential grounding

12 RELATED DOCUMENTATION

X010	Basics for electrohydraulics in hazardous environments	**EX900**	Operating and manintenance information for ex-proof on-off valves
X040	Summary of Atos ex-proof components certified to MA	**P005**	Mounting surfaces for electrohydraulic valves