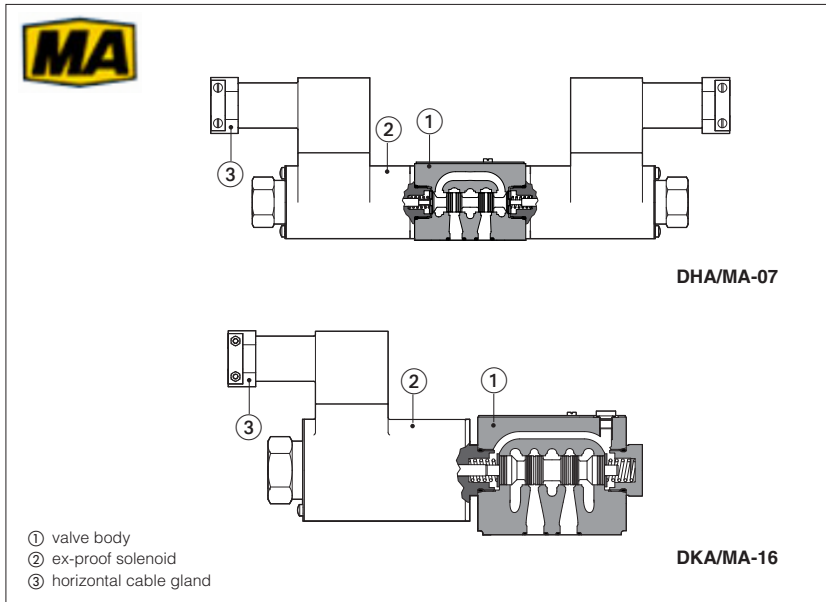


On-off explosion-proof solenoid valves with MA certification

ISO 4401 size 06 and 10 (direct), 16 and 25 (pilot operated)



On/off direct and pilot operated 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.

1 EXPLOSION PROOF SOLENOIDS: MAIN DATA

SOLENOID TYPE	ON/OFF	
Voltage code VDC ±10%	12DC, 24DC, 110DC	
Power consumption	16,5 W (DHA, DPHA)	18W (DKA)
Method of protection	Ex d	
Temperature class	T4	
Surface temperature	≤135 °C	
Ambient temperature	-20 ÷ +40 °C	
Protection degree	IP 65	
Duty factor	100%	
Mechanical construction	Flame proof housing classified Ex d	
Cable entrance and electrical wiring	Horizontal cable gland, internal terminal board for cable connection, see section 9	
MA Certification	Ex d = Equipment for explosive atmosphere, flame proof housing I = Gas group (Methane) Mb = Equipment protection, high level protection for explosive atmospheres	

2 MAIN CHARACTERISTICS OF EX-PROOF VALVES

Assembly position / location	Any position	
Subplate surface finishing	Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)	
Fluid	Hydraulic oil as per DIN 51524 535	
Recommended viscosity	15 ÷ 100 mm ² /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 (β25 ≥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 4 and 6	
Operating pressure	DHA	P, A, B = 350 bar T = 210 bar
	DKA	P, A, B = 315 bar T = 210 bar
	DPHA	P, A, B, X = 350 bar T = 250 bar for external drain (standard) T = 210 bar with internal drain (option /D) Ports Y = 0 bar - Minimum pilot pressure for correct operation is 8 bar
Maximum flow	DHA	80 l/min see section 8, operating limits
	DKA	120 l/min see section 8, operating limits
	DPHA	DPHA-2: 300 l/min ; DPHA-4: 700 l/min , see section 8, operating limits

3 MODEL CODE OF DIRECT SOLENOID VALVES TYPE DHA, DKA

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

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

MA = Ex-proof Ma Chinese mining certification

0 = size 06 for DHA
1 = size 10 for DKA

Valve configuration, see section 4

Spool type, see section 4

Seals material:
 omit for NBR (mineral oil & water glycol)
PE = FPM

Series number

Voltage code - see section 1

Options:

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

4 CONFIGURATION OF DHA VALVES

Configurations	Spools	Configurations	Spools

Spools **0** and **3** are also available as **0/1** and **3/1** with restricted oil passages in central position, from user ports to tank.
 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.

5 MODEL CODE OF PILOTED SOLENOID VALVES TYPE DPHA

DPHA / **MA** - **2** **63** **1/2** - **A** **24DC** ****** **/***

DPHA = spool type - piloted

MA = Ex-proof Ma Chinese mining certification

Valve size (ISO 4401)
2 = 16 **4** = 25

Valve configuration, see section 6

Spool type, see section 6

Seals material:
 omit for NBR (mineral oil & water glycol)
PE = FPM

Series number

Voltage code - see section 1

Options:

A = solenoid at side of port B (for single solenoid valves)
/D = Internal drain
/E = External pilot pressure
/H = Adjustable chokes (meter-out to the pilot chambers of the main valve)
/S = Main spool stroke adjustment

6 CONFIGURATIONS and SPOOLS

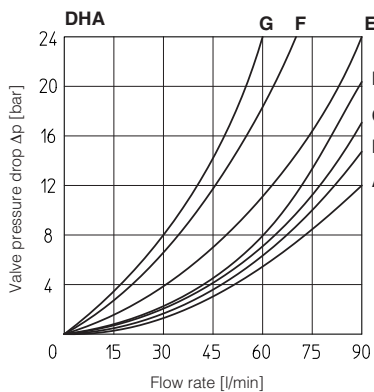
Configurations	Spools	Configurations	Spools

Spools type **0** and **3** are also available as **0/1** and **3/1** with restricted oil passages in central position, from user ports to tank.
 Spools type **1, 4, 5, 6** and **7** are also available as **1/1, 4/8, 5/1, 6/1** and **7/1** that are properly shaped to reduce water-hammer shocks during the switching.

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

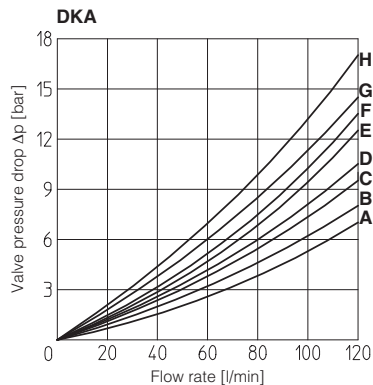
DHA

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	F	F	G	C	E
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			



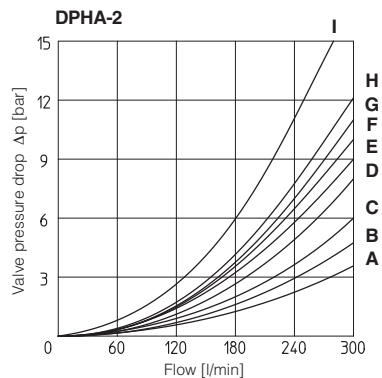
DKA

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



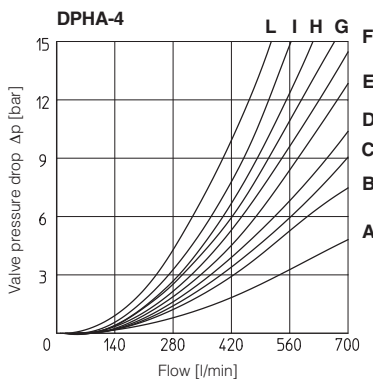
DPHA-2

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

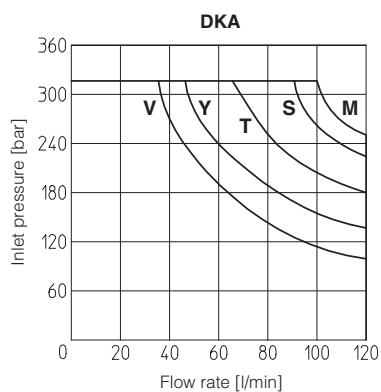
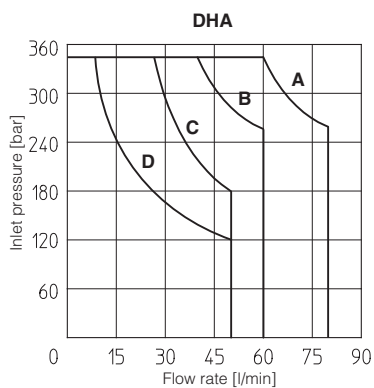


DPHA-4

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



8 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

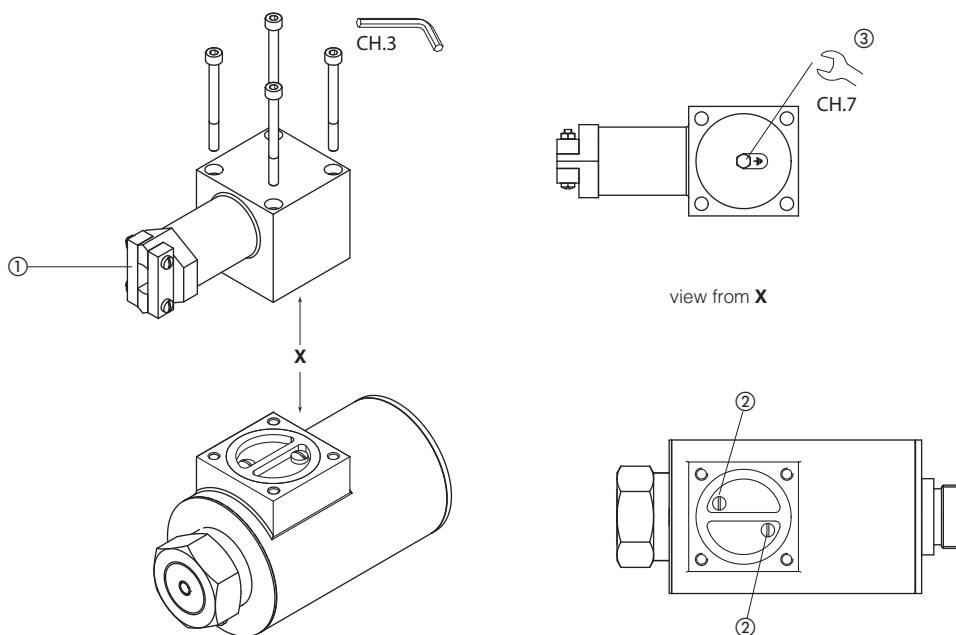
DPHA-2

Spool	Inlet pressure [bar]			
	70	140	210	350
	Flow rate [l/min]			
0, 1, 3, 6, 7, 8	300	300	300	250
2, 4, 4/8	300	300	240	140
5	260	220	180	100
0/1, 0/2, 1/2	300	250	210	180
16, 17, 56, *9, 9*	300	300	270	200

DPHA-4

Spool	Inlet pressure [bar]			
	70	140	210	350
	Flow rate [l/min]			
1, 6, 7, 8	700	700	700	600
2, 4, 4/8	500	500	450	400
5, 0/1, 0/2, 1/2	600	520	400	300
0, 3	700	700	600	540
16, 17, 58, *9, 9*	500	500	500	450

9 SOLENOID WIRING



- ① cable entrance = \varnothing 10,5 mm
- ② terminal board for power supply coil connection
- ③ screw terminal for ground connection

DHA

ISO 4401: 2005

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

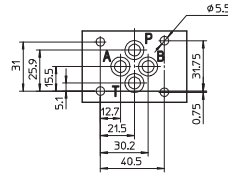
Fastening bolts: 4 socket head screws:

M5x30 class 12.9

Tightening torque = 8 Nm

Seals: 4 OR 108

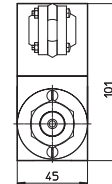
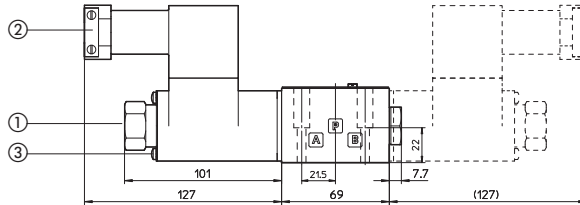
Ports P,A,B,T: $\varnothing = 7.5$ mm (max)



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

DHA-06

DHA-07 (dotted line)



Mass of basic versions:
DHA-06: 3,2 kg
DHA-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

ISO 4401: 2005

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

Fastening bolts:

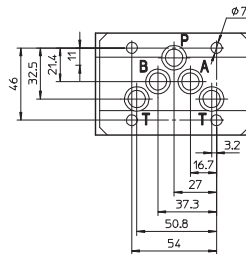
4 socket head screws M6x40 class 12.9

Tightening torque = 15 Nm

Seals: 5 OR 2050 and 1 OR 108

Ports P,A,B,T: $\varnothing = 11.5$ mm (max)

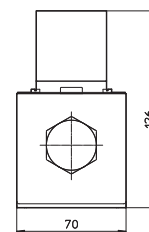
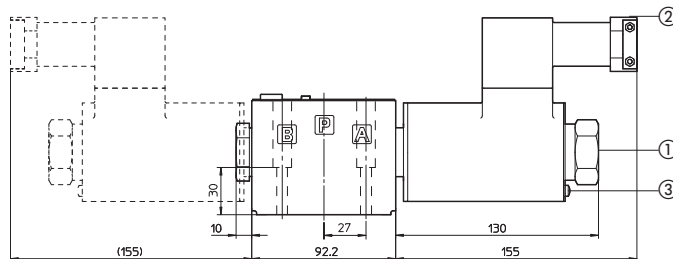
Ports Y: $\varnothing = 5$ mm



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

DKA-16

DKA-07 (dotted line)



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

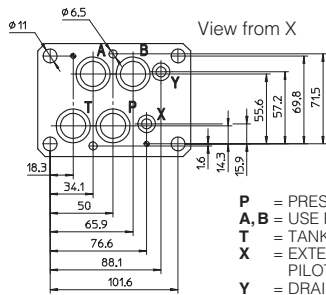
- ① manual override
- ② horizontal cable gland, cable entrance = $\varnothing 10,5$ mm
- ③ screw terminal for additional equipotential grounding

DPHA-2

ISO 4401: 2005

Mounting surface: 4401-07-07-0-05

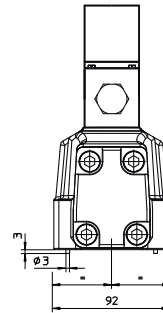
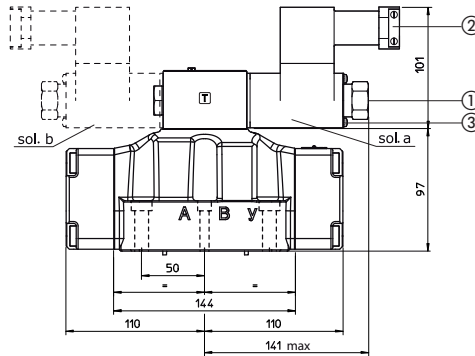
Fastening bolts:
 4 socket head screws M10x50 class 12.9
 Tightening torque = 70 Nm
 2 socket head screws M6x45 class 12.9
 Tightening torque = 15 Nm
 Diameter of ports A, B, P, T: $\varnothing = 20$ mm;
 Diameter of ports X, Y: $\varnothing = 7$ mm;
 Seals: 4 OR 130, 2 OR 2043



P = PRESSURE PORT
 A, B = USE PORT
 T = TANK PORT
 X = EXTERNAL OIL PILOT PORT
 Y = DRAIN PORT

DPHA-26

DPHA-27 (dotted line)



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

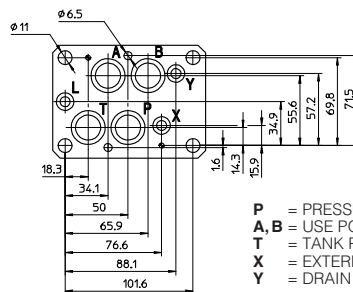
Mass of basic versions
 DPHA-26: 10,8 kg
 DPHA-27: 12,5 kg

DPHA-4

ISO 4401: 2005

Mounting surface: 4401-08-08-0-05 (see table P005)

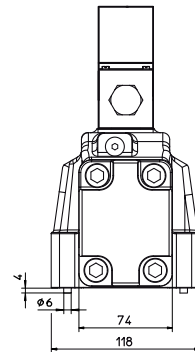
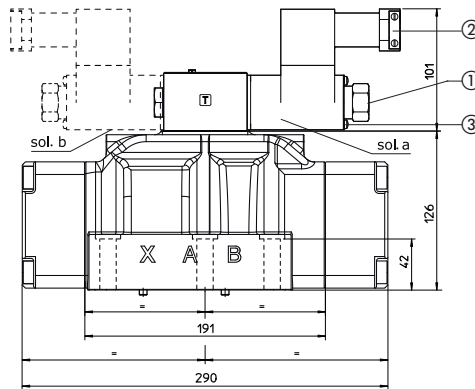
Fastening bolts:
 6 socket head screws M12x60 class 12.9
 Tightening torque = 125 Nm
 Seals: 4 OR 4112; 2 OR 3056
 Diameter of ports A, B, P, T: $\varnothing = 24$ mm;
 Diameter of ports X, Y: $\varnothing = 7$ mm;



P = PRESSURE PORT
 A, B = USE PORT
 T = TANK PORT
 X = EXTERNAL OIL PILOT PORT
 Y = DRAIN PORT

DPHA-46

DPHA-47 (dotted line)



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

Mass of basic versions:
 DPHA-46: 19,4 kg
 DPHA-47: 21,9 kg