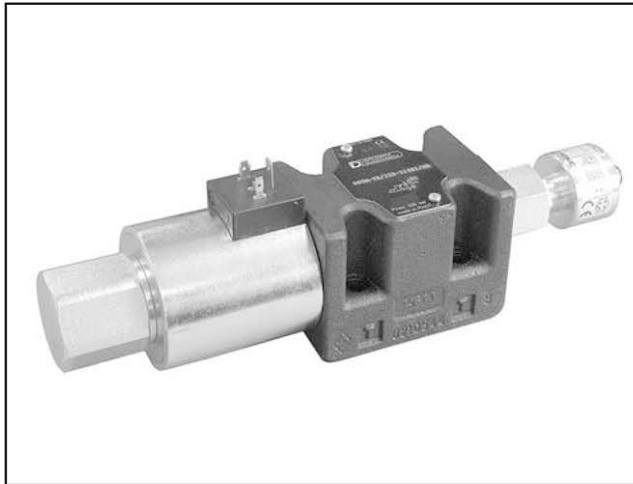


Part number:

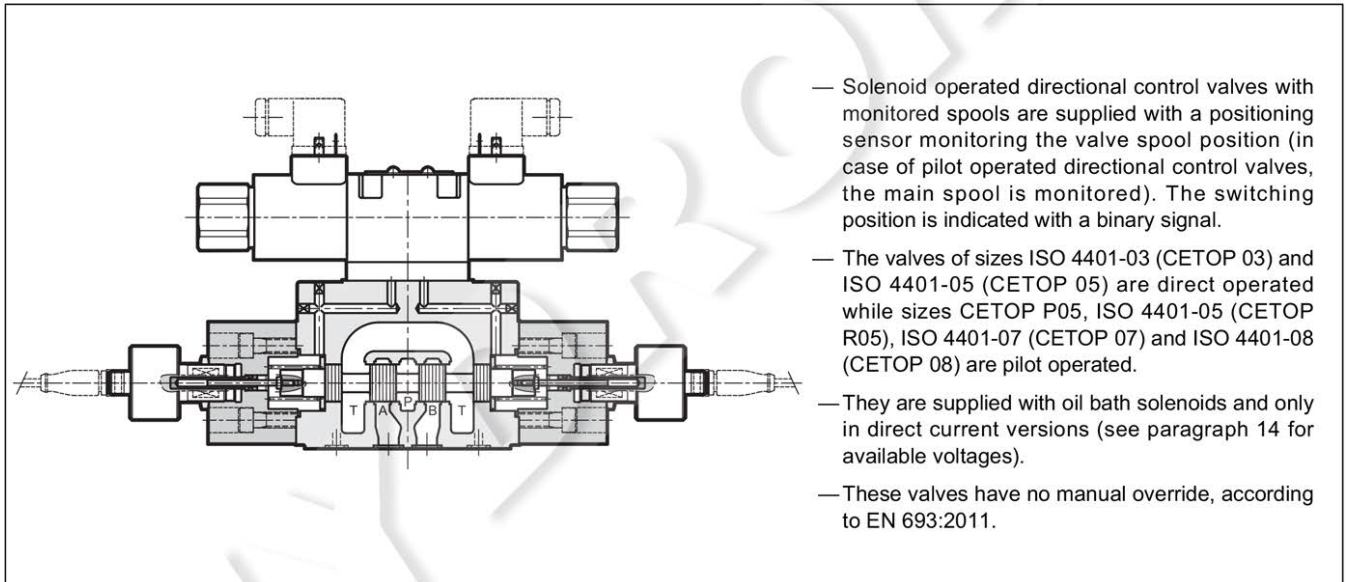


DS(P)*M

DIRECTIONAL VALVES WITH SPOOL POSITION MONITORING

- | | |
|---------------|--------------------------------|
| DS3M | ISO 4401-03 (CETOP 03) |
| DS5M | ISO 4401-05 (CETOP 05) |
| DSP5M | CETOP P05 |
| DSP5RM | ISO 4401-05 (CETOP R05) |
| DSP7M | ISO 4401-07 (CETOP 07) |
| DSP8M | ISO 4401-08 (CETOP 08) |

OPERATING PRINCIPLE



- Solenoid operated directional control valves with monitored spools are supplied with a positioning sensor monitoring the valve spool position (in case of pilot operated directional control valves, the main spool is monitored). The switching position is indicated with a binary signal.
- The valves of sizes ISO 4401-03 (CETOP 03) and ISO 4401-05 (CETOP 05) are direct operated while sizes CETOP P05, ISO 4401-05 (CETOP R05), ISO 4401-07 (CETOP 07) and ISO 4401-08 (CETOP 08) are pilot operated.
- They are supplied with oil bath solenoids and only in direct current versions (see paragraph 14 for available voltages).
- These valves have no manual override, according to EN 693:2011.

PERFORMANCES (working with mineral oil of viscosity of 36 cSt at 50°C)

		DS3M	DS5M	DSP5M DSP5RM	DSP7M	DSP8M	
Maximum operating pressure: P - A - B ports	bar	350	320	320	350	350	
T port		210		see performance limits at paragraph 6.2			
Maximum flow rate from P to A - B - T	l/min	see performance limits at paragraph 2.3			150	300	600
Ambient temperature range	°C	-20 / +50					
Fluid temperature range	°C	-20 / +80					
Fluid viscosity range	cSt	10 ÷ 400					
Fluid contamination degree		According to ISO 4406:1999 class 20/18/15					
Recommended viscosity	cSt	25					
Mass: single solenoid valve	kg	1,8	5	7,1	8,7	15,6	
double solenoid valve		2,2	-	8	9,6	16,6	

1 - IDENTIFICATION OF SOLENOID VALVES DIRECT OPERATED

1.1 - Identification code

D	S	M	-	/	-	K1	/
----------	----------	----------	---	---	---	-----------	---

Directional control valve solenoid operated

3 = ISO 4401-03 (CETOP 03) size
5 = ISO 4401-05 (CETOP 05) size

Monitoring of the spool position

Spool type (see par. 1.2)

S*	TA	TB
SA*	TA02	TB02
	TA100	TB100

Series No.

20 = for DS5M
21 = for DS3M
(the overall and mounting dimensions remain unchanged from 20 to 29)

Seals:

N = NBR seals for mineral oil (standard)
V = FPM seals for special fluids

Monitored position:
(see par. 17 for switching logic)

R0 = monitored rest position
MA = monitored position 'a'
MB = monitored position 'b'

Coil electrical connection:
plug for connector type
DIN 43650 (standard)

DC power supply

D12 = 12 V	D110 = 110 V
D24 = 24 V	D220 = 220 V

NOTE: Verify spool and sensor type availability in the tables below

DS3		SPOOLS			
		S*	SA*	TA TB	TA100 TB100
SENSOR TYPE	R0	x			
	MA		x	x	x
	MB		x	x	x

DS5		SPOOLS		
		TA TB	TA02 TB02	TA100 TB100
SENSOR TYPE	R0			
	MA	x	x	x
	MB	x	x	x

NOTE: To be compliant with the EN 693:2011 standard, the valves have no manual override.

1.2 - Spool types for DS3M and DS5M

Type S*:
2 solenoids - 3 positions with spring centering

Type SA*:
1 solenoid side A
2 positions (central + external) with spring centering

Type TA:
1 solenoid side A
2 external positions with return spring

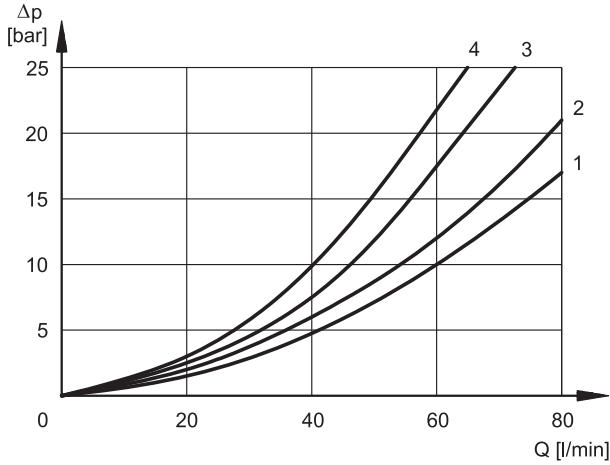
Type TB:
1 solenoid side B
2 external positions with return spring

TA100

TB100

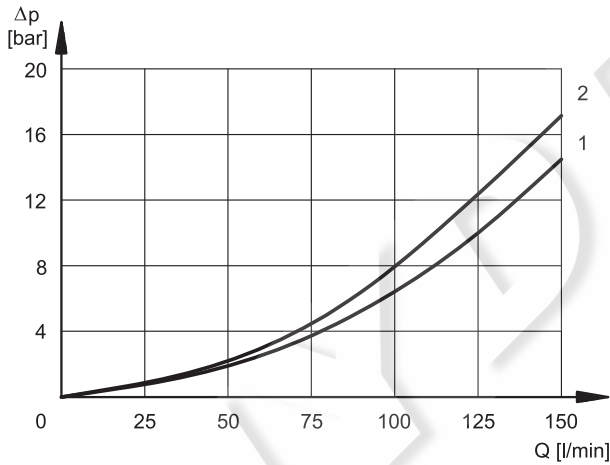
2 - CHARACTERISTIC CURVES OF SOLENOID VALVES DIRECT OPERATED

2.1 - Pressure drops Δp -Q for DS3M solenoid valves (obtained with viscosity 36 cSt at 50 °C)



SPOOL TYPE	FLOW DIRECTION				
	P→A	P→B	A→T	B→T	P→T
	CURVES ON GRAPH				
S1, SA1	1	1	2	2	-
S4, SA4	4	4	4	4	2
TA, TB	1	1	1	1	-
TA100, TB100	3	3	3	3	-

2.2 - Pressure drops Δp -Q for DS5M solenoid valves (obtained with viscosity 36 cSt at 50 °C)



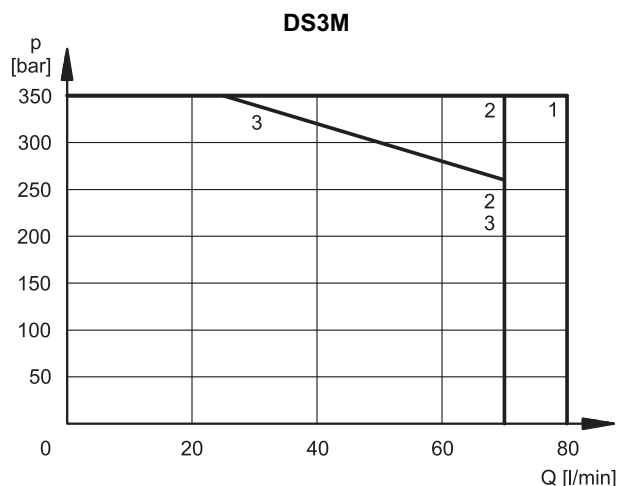
SPOOL TYPE	FLOW DIRECTION				
	P→A	P→B	A→T	B→T	P→T
	CURVES ON GRAPH				
TA, TB, TA02, TB02	2	2	1	1	-
TA100, TB100	1	1	1	1	-

2.3 - Performance limits for DS3M and DS5M solenoid valves

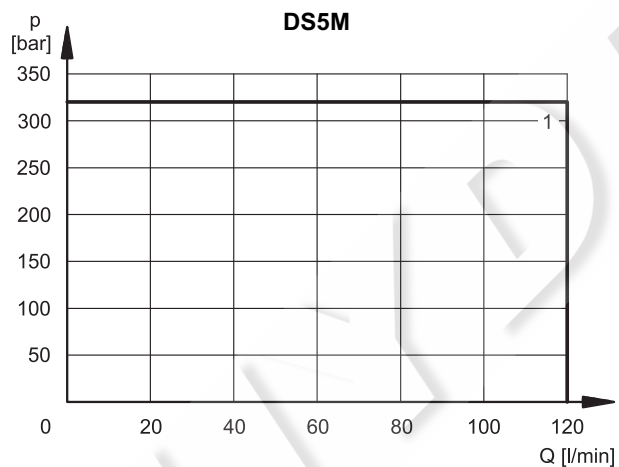
The curves define the flow rate operating fields according to the valve pressure of the different versions.

The values have been obtained according to ISO 64003 norm with solenoids at rated temperature and supplied with voltage equal to 90% of the nominal voltage. The values have been obtained with mineral oil, viscosity 36 cSt, temperature 50 °C and filtration according to ISO 4406:1999 class 18/16/13.

The operating limits can be considerably reduced if a 4-way valve is used as 3-way valve with port A or B plugged or without flow.



SPOOL	CURVE	
	P→A	P→B
S1, SA1	1	1
S4, SA4	2	2
TA, TB	1	1
TA100, TB100	3	3



SPOOL	CURVE	
	P→A	P→B
TA	1	1
TA02	1	1
TA100	1	1

2.4 - Switching times

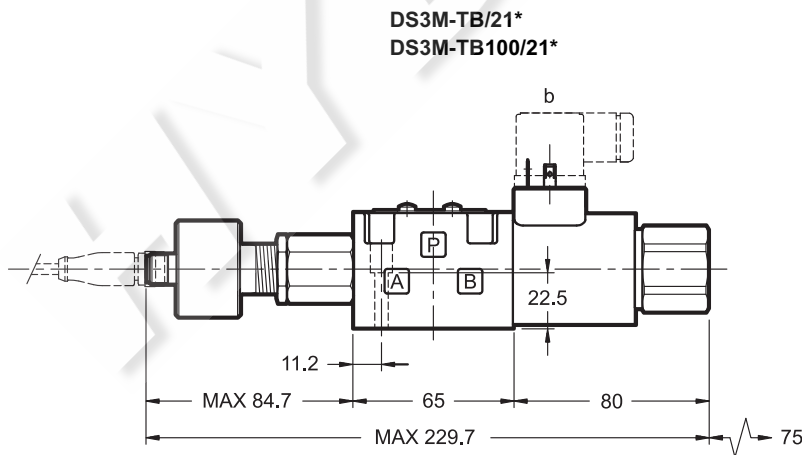
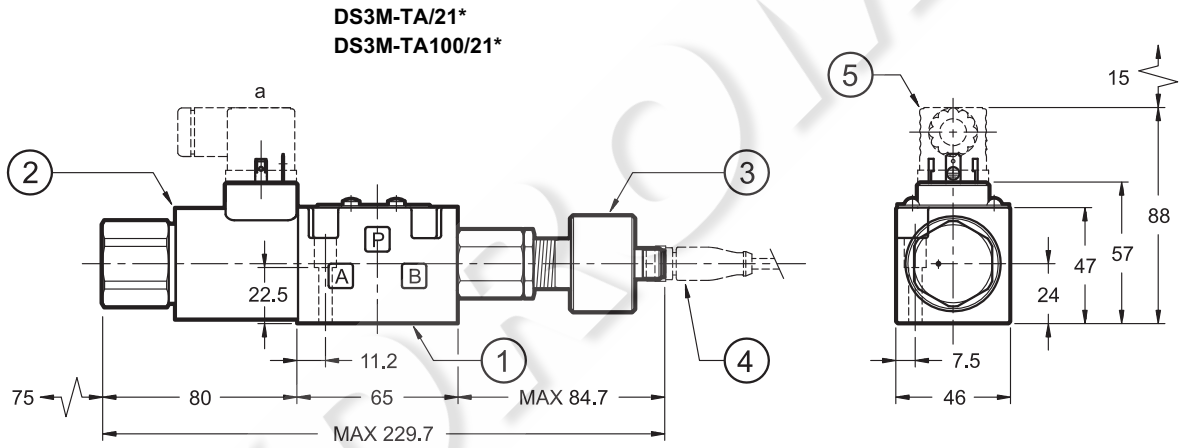
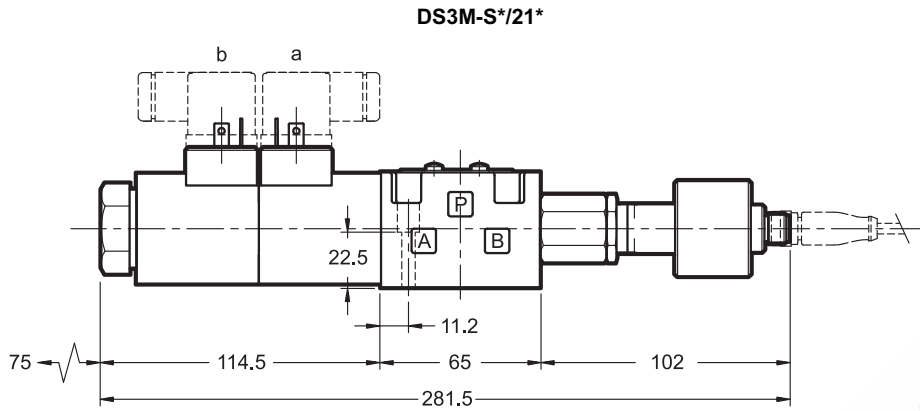
The indicated values had obtained according to ISO 6403 standards, using mineral oil with viscosity 36 cSt at 50 °C.

TIMES [ms]	ENERGIZING	DE-ENERGIZING
DS3M	25 ÷ 75	15 ÷ 25

TIMES [ms]	ENERGIZING	DE-ENERGIZING
DS5M	100 ÷ 150	20 ÷ 50

3 - OVERALL AND MOUNTING DIMENSIONS FOR DS3M

dimensions in mm



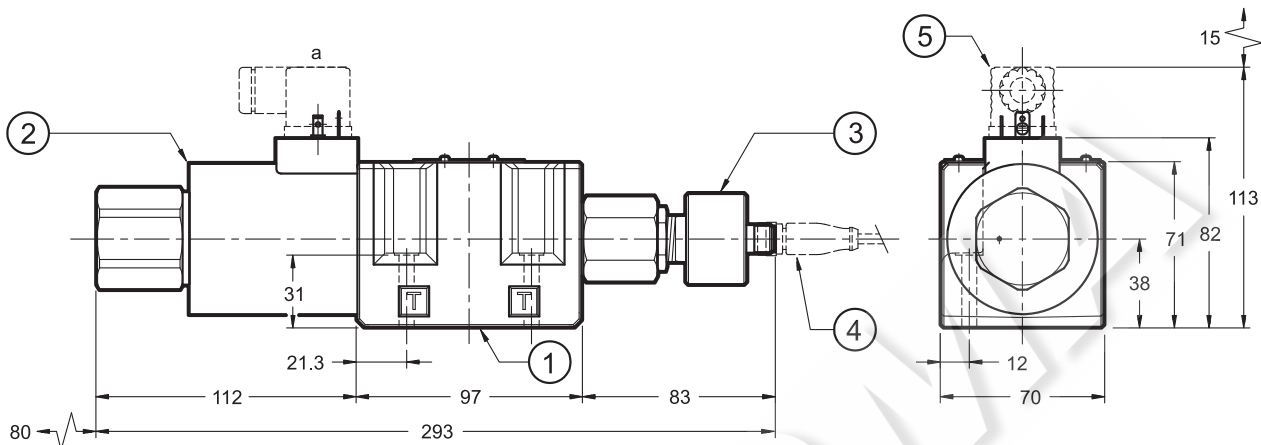
Fastening of single valve: 4 SHC screws ISO 4762 M5x30
Tightening torque: 5 Nm
Threads of mounting holes: M5x10
Sealing rings: 4 OR type 2037 (9.25x1.78) - 90 Shore

1	Mounting surface with sealing rings
2	Coil rotating 360°
3	Positioning sensor: setting sealed at factory, do not unscrew.
4	Connector for positioning sensor type straight, molded. To be ordered separately, see paragraph 20
5	Coil electric connector DIN 43650 type to be ordered separately - cat. 49 000

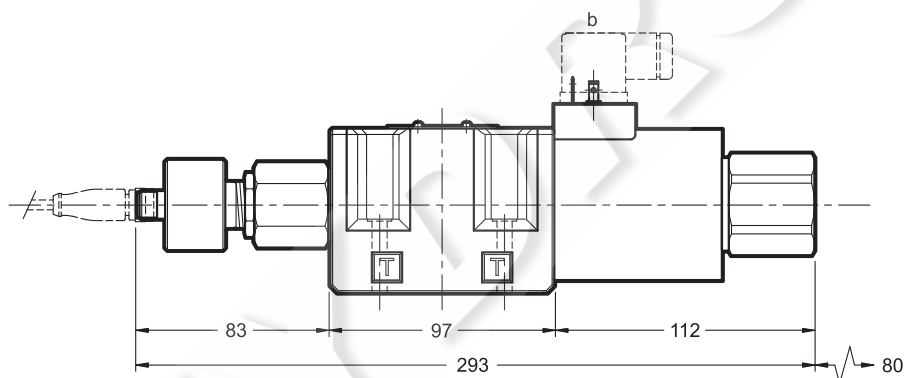
4 - OVERALL AND MOUNTING DIMENSIONS FOR DS5M

dimensions in mm

DS5M-TA/20*
DS5M-TA02/20*
DS5M-TA100/20*



DS5M-TB/20*
DS5M-TB02/20*
DS5M-TB100/20*



Fastening of single valve: 4 SHC screws ISO 4762 M6x40
Tightening torque: 8 Nm
Threads of mounting holes: M6x10
Sealing rings: 5 OR type 2050 (12.42x1.78) - 90 Shore

1	Mounting surface with sealing rings
2	Coil rotating 360°
3	Positioning sensor: setting sealed at factory, do not unscrew.
4	Connector for positioning sensor type straight, molded. To be ordered separately, see paragraph 20
5	Coil electric connector DIN 43650 type to be ordered separately - cat. 49 000

5 - IDENTIFICATION OF SOLENOID VALVES PILOT OPERATED

5.1 - Identification code

D	S	P	M	-	/	-	/	/	/	K1	/
---	---	---	---	---	---	---	---	---	---	----	---

Directional valve,
Solenoid controlled
Pilot operated

Size: _____
5 = CETOP P05
5R = ISO 4401-05 (CETOP R05)
7 = ISO 4401-07 (CETOP 07)
8 = ISO 4401-08 (CETOP 08)

Monitoring of the spool position _____

Spool type (see paragraph 5.2)
S1 SA1 SB1 TA TB
S3 TA100 TB100
S4
RK

Series: _____
10 = for DSP5M, DSP5RM and DSP8M
20 = for DSP7M
 (the overall and mounting dimensions within the same ten remain unchanged)

Seals: _____
N = NBR seals for mineral oil (**standard**)
V = FPM seals for special fluids

Piloting (see paragraph 7): _____
I = internal (not available for S4 spool)
E = external
C = internal piloting with backpressure valve
 (available on DSP7 and DSP8 only)
Z = internal piloting with 30 bar fixes adjustment pressure reducing valve
 (see par. 6.2)

Monitored position:
(see par. 17 for switching logic)
1 positioning sensor
R0 = rest position monitored
MA = position 'a' monitored
MB = position 'b' monitored
2 positioning sensor
M0 = rest position monitored
MAB = 'a' and 'b' positions monitored

Coil electrical connection:
plug for connector type
DIN 43650 (**standard**)

DC power supply
D12 = 12 V **D110** = 110 V
D24 = 24 V **D220** = 220 V

P = Subplate with restrictor on port P placed under pilot operated solenoid valve (omit only for valves with fixed adjustment reducing valve - version Z - and for flow control valves for the control of the main spool shifting - version D)
D = main spool shifting speed control (see par. 8)

Drainage (see paragraph 7):
I = Internal
E = External

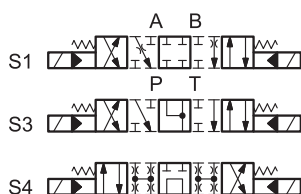
NOTE: Verify spool and sensor type availability in the table below

		SPOOLS				
		S*	SA* SB*	TA TB	TA100 TB100	RK
SENSOR TYPE	R0	x				
	MA		x	x	x	x
	MB		x	x	x	x
	M0	x				
	MAB	x	x	x	x	

NOTE: To be compliant with the EN 693:2011 standard, the valves have no manual override.

5.2 - Spool types for DSP5M, DSP5RM, DSP7M and DSP8M

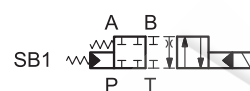
Type S*:
2 solenoids - 3 positions
with spring centering



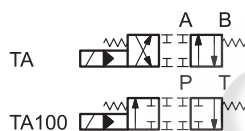
Type SA*:
1 solenoid side A
2 positions (central + external)
with spring centering



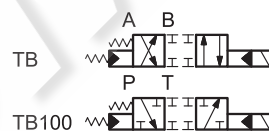
Type SB*:
1 solenoid side B
2 positions (central + external)
with spring centering



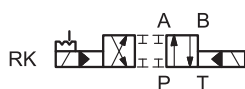
Type TA:
1 solenoid side A
2 external positions with
return spring



Type TB:
1 solenoid side B
2 external positions with
return spring

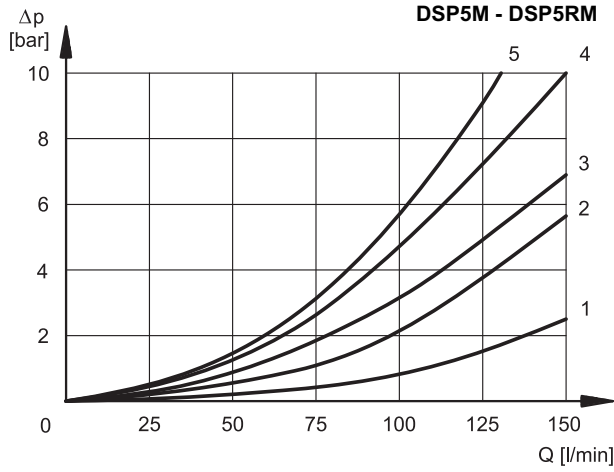


Type RK:
2 solenoids - 2 positions
with mechanical retention



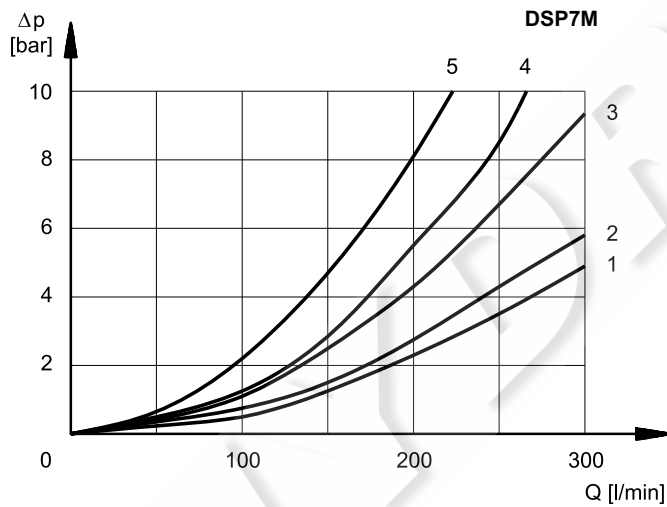
6 - CHARACTERISTIC CURVES (values obtained with viscosity 36 cSt at 50 °C)

6.1 - Pressure drops for pilot operated valves



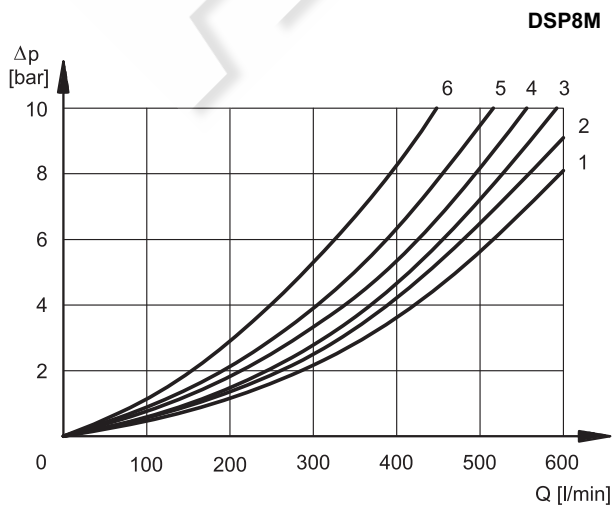
SPOOL TYPE	FLOW DIRECTION				
	P→A	P→B	A→T	B→T	P→T
	CURVES ON GRAPH				
S1, SA1	4	4	1	1	-
S3	4	4	1	1	-
S4	5	5	2	3	5
TA, TB	4	4	1	1	-
TA100, TB100	3	3	1	1	-
RK	4	4	1	1	-

For pressure drops of the S3 spool between A-T and B-T ports in central position refer to the curve 4.



SPOOL TYPE	FLOW DIRECTION				
	P→A	P→B	A→T	B→T	P→T
	CURVES ON GRAPH				
S1, SA1	1	1	3	4	-
S3	1	1	4	4	-
S4	2	2	4	5	4
TA, TB	1	1	3	4	-
TA100, TB100					-
RK	1	1	3	4	-

For pressure drops of the S3 spool between A-T and B-T ports in central position refer to the curve 4.



SPOOL TYPE	FLOW DIRECTION				
	P→A	P→B	A→T	B→T	P→T
	CURVES ON GRAPH				
S1, SA1	2	2	3	3	-
S3	2	2	2	1	-
S4	4	4	3	5	6
TA, TB	2	2	3	3	-
TA100, TB100	5	5	5	5	-
RK	2	2	3	3	-

For pressure drops of the S3 spool between A-T and B-T ports in central position refer to the curve 4.

6.2 - Performance limits for DSP5M - DSP7M - DSP8M pilot operated directional valves

PRESSURES	DSP5M DSP5RM	DSP7M	DSP8M
Max pressure in P, A, B ports	320	350	350
Max pressure in T line with internal drainage	140	140	140
Max pressure in T line with external drainage	210	210	210
Min piloting pressure (X port and / or Y port) NOTE 1	5 ÷ 10	5 ÷ 12	7 ÷ 14
Max piloting pressure (X port and / or Y port) NOTE 2	210	210	210

NOTE 1: minimum piloting pressure can be the lower range value at low flows rates, but with higher flow rates the higher value is needed.

NOTE 2: if the valve operates with higher pressures it is necessary to use the version with external pilot and reduced pressure. Otherwise, the valve with internal pilot and pressure reducing valve with 30 bar fixed adjustment can be ordered. Add the letter Z to the identification code to order this option (see par. 5.1).

MAXIMUM FLOW RATES		DSP5M DSP5RM		DSP7M		DSP8M	
Spool type	[l/min]	PRESSURES					
		at 210 bar	at 320 bar	at 210 bar	at 350 bar	at 210 bar	at 350 bar
S4 - TA100		120	100	200	150	500	450
S1 - S3 - TA - RK		150	120	300	300	600	500

6.3 - Switching times

The values indicated refer to a solenoid valve working with piloting pressure of 100 bar, with mineral oil at a temperature of 50°C, at viscosity of 36 cSt and with PA and BT connections.

The energizing and de-energizing times are obtained at the pressure variation which occurs on the lines.

TIMES (± 10%) [ms]	ENERGIZING		DE-ENERGIZING	
	2 Pos.	3 Pos.	2 Pos.	3 Pos.
DSP5M - DSP5RM	60	50	50	40
DSP7M	75	60	60	45
DSP8M	100	70	80	50

7 - PILOTING AND DRAINAGE

These valves are available with piloting and drainage, both internal and external.

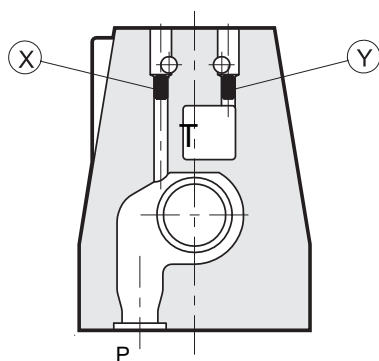
The version with external drainage allows for a higher back pressure on the outlet.

TYPE OF VALVE	Plug assembly	
	X	Y
IE INTERNAL PILOT AND EXTERNAL DRAIN	NO	YES
II INTERNAL PILOT AND INTERNAL DRAIN	NO	NO
EE EXTERNAL PILOT AND EXTERNAL DRAIN	YES	YES
EI EXTERNAL PILOT AND INTERNAL DRAIN	YES	NO

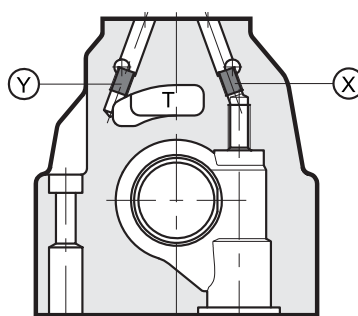
X: plug M5x6 for external pilot
Y: plug M5x6 for external drain

X: plug M6x8 for external pilot
Y: plug M6x8 for external drain

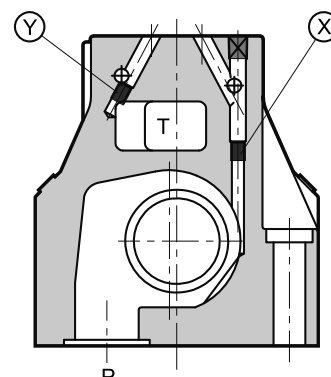
X: plug M6x8 for external pilot
Y: plug M6x8 for external drain



**DSP5M
DSP5RM**



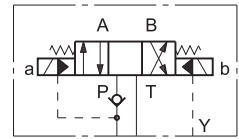
DSP7M



DSP8M

7.1 - Backpressure valve incorporated on line P (C option)

DSP7M and DSP8M valves are available upon request with backpressure valve incorporated on line P. This is necessary to obtain the piloting pressure when the control valve, in rest position, has the line P connected to the T port (spools S4). The cracking pressure is of 5 bar with a minimum flow rate of 15 l/min.

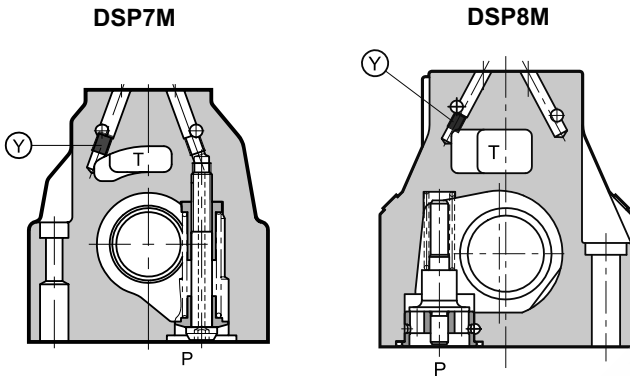


In the C version the piloting is always internal.

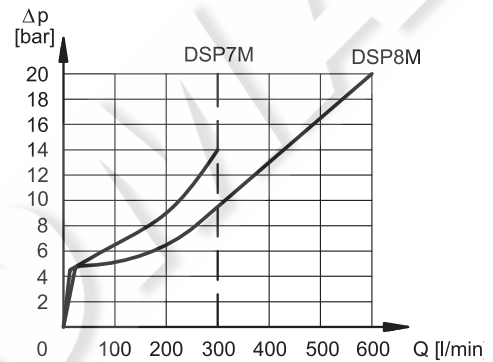
NOTE: the backpressure valve can't be used as check valve because it doesn't assure the seal.

Add **C** to the identification code for this request (see paragraph 5.1).

For DSP7M only, the backpressure valve can be also delivered separately and it can be easily mounted on line P of the main control valve. Ask for code **0266577** to order the backpressure valve.



pilot always internal
Y: plug M6x8 for external drain

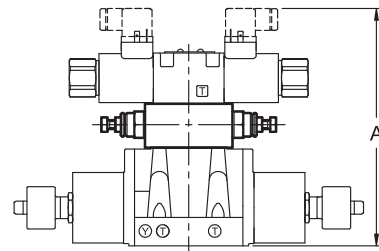


The curve refers to the pressure drop (body part only) with backpressure valve energized to which the pressure drop of the reference spool must be added. (see paragraph 6)

8 - OPTIONS: CONTROL OF THE MAIN SPOOL SHIFTING SPEED

By placing a MERS type double flow control valve between the pilot solenoid valve and the hydropiloted valve, the piloted flow rate can be controlled and therefore the change over smoothness can be varied.

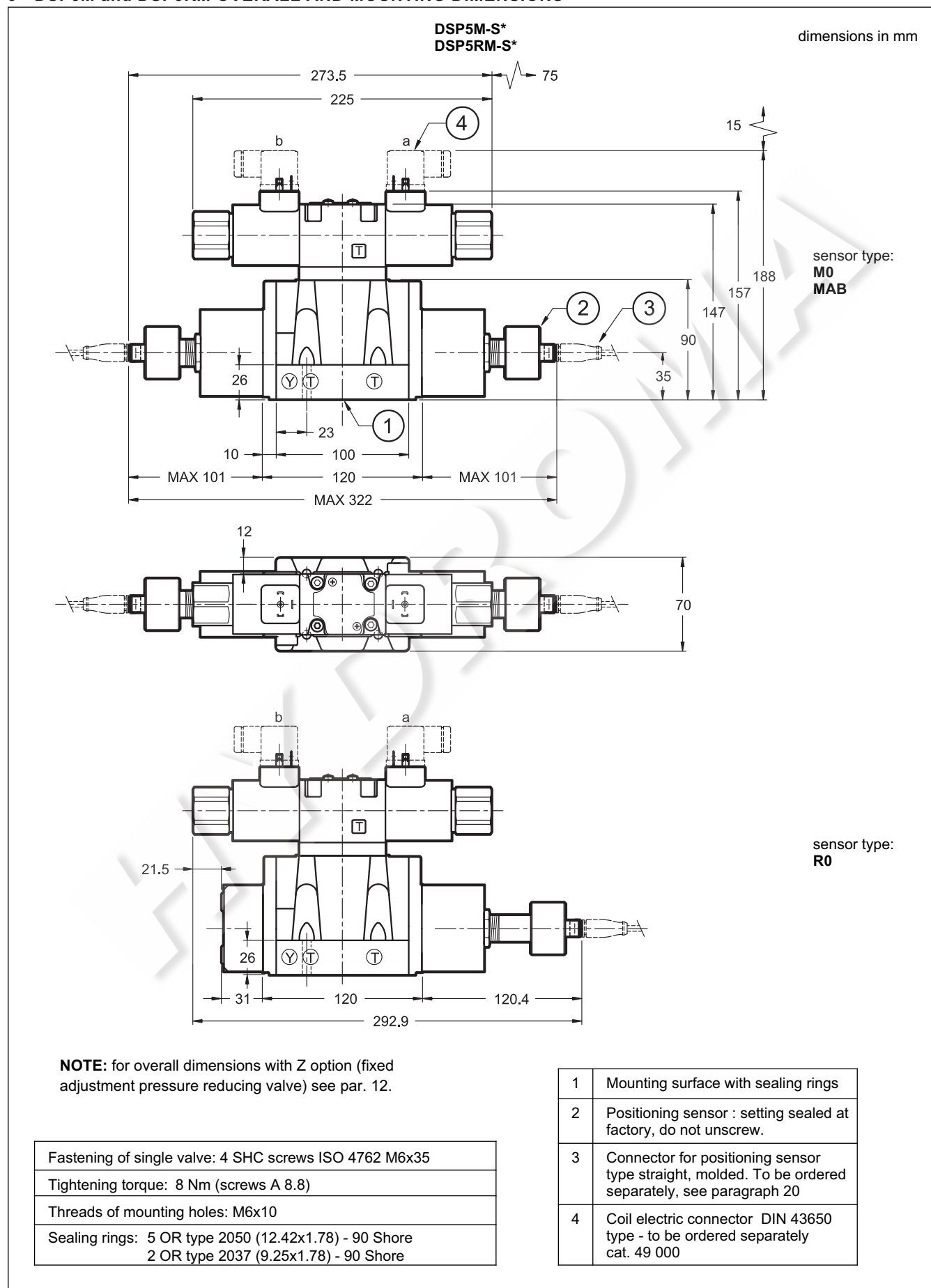
Add the letter **D** to the identification code to request this device (see paragraph 5.1).



dimensions in mm

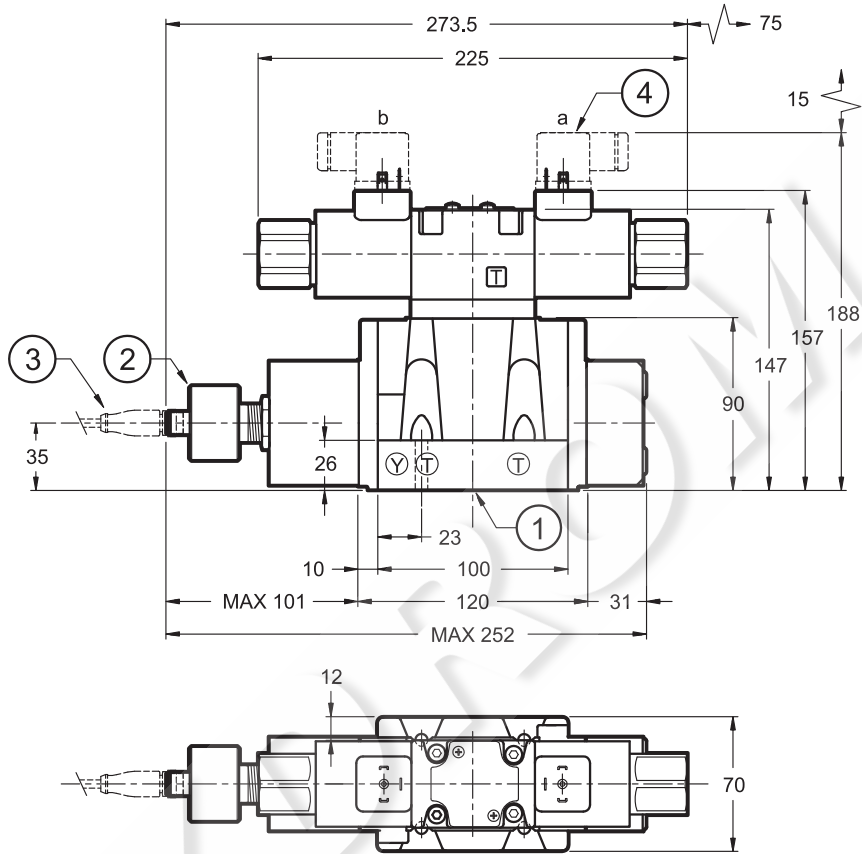
	DSP5	DSP7	DSP8
A	218	225	254

9 - DSP5M and DSP5RM OVERALL AND MOUNTING DIMENSIONS



dimensions in mm

**DSP5M-RK
DSP5RM-RK**



sensor type:
**MA
MB**

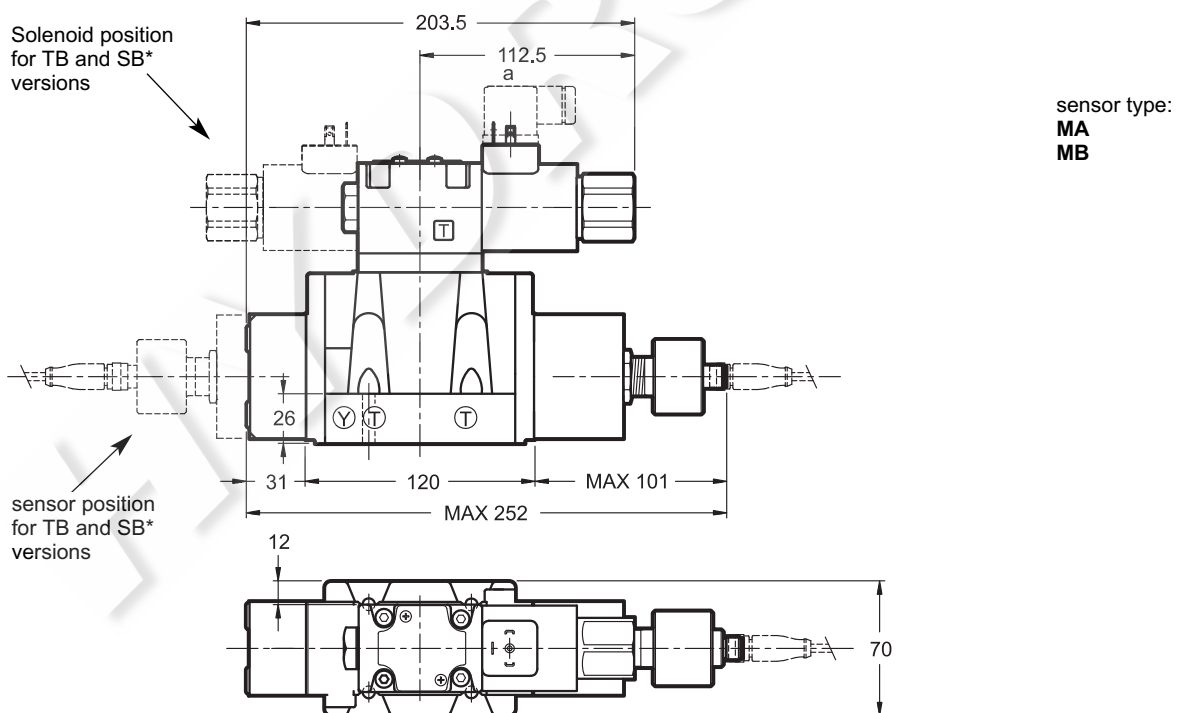
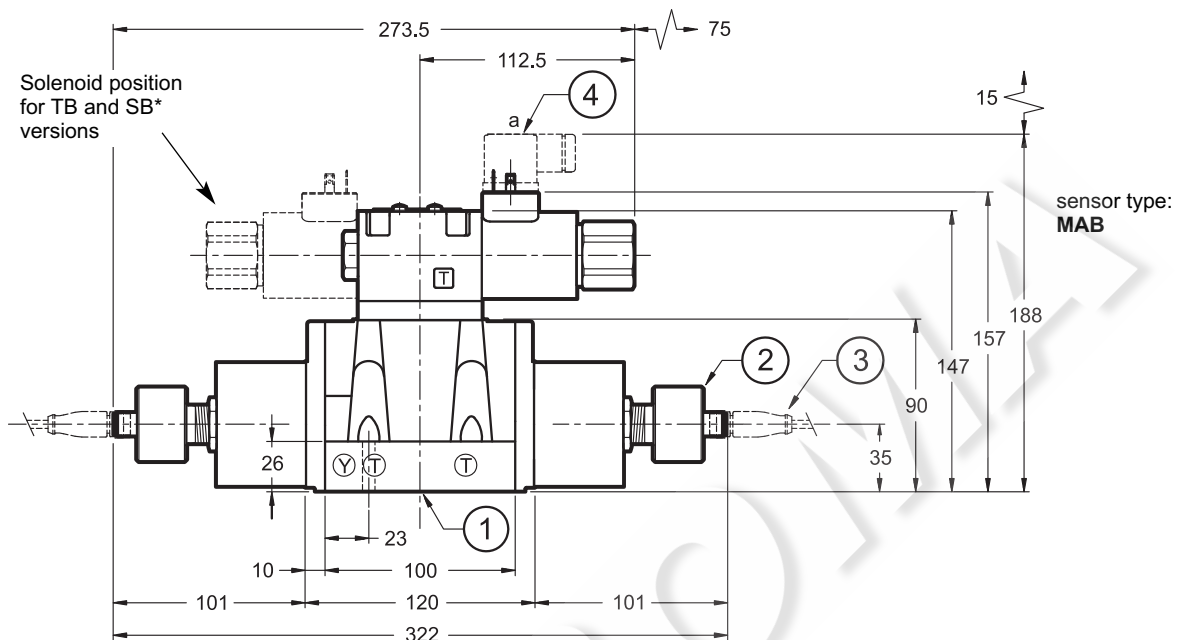
NOTE: for overall dimensions with Z option (fixed adjustment pressure reducing valve) see par. 12.

Fastening of single valve: 4 SHC screws ISO 4762 M6x35
Tightening torque: 8 Nm (screws A 8.8)
Threads of mounting holes: M6x10
Sealing rings: 5 OR type 2050 (12.42x1.78) - 90 Shore 2 OR type 2037 (9.25x1.78) - 90 Shore

1	Mounting surface with sealing rings
2	Positioning sensor : setting sealed at factory, do not unscrew.
3	Connector for positioning sensor type straight, molded. To be ordered separately, see paragraph 20
4	Coil electric connector DIN 43650 type - to be ordered separately cat. 49 000

DSP5M-TA, TA100, SA1
 DSP5RM-TA, TA100, SA1

dimensions in mm

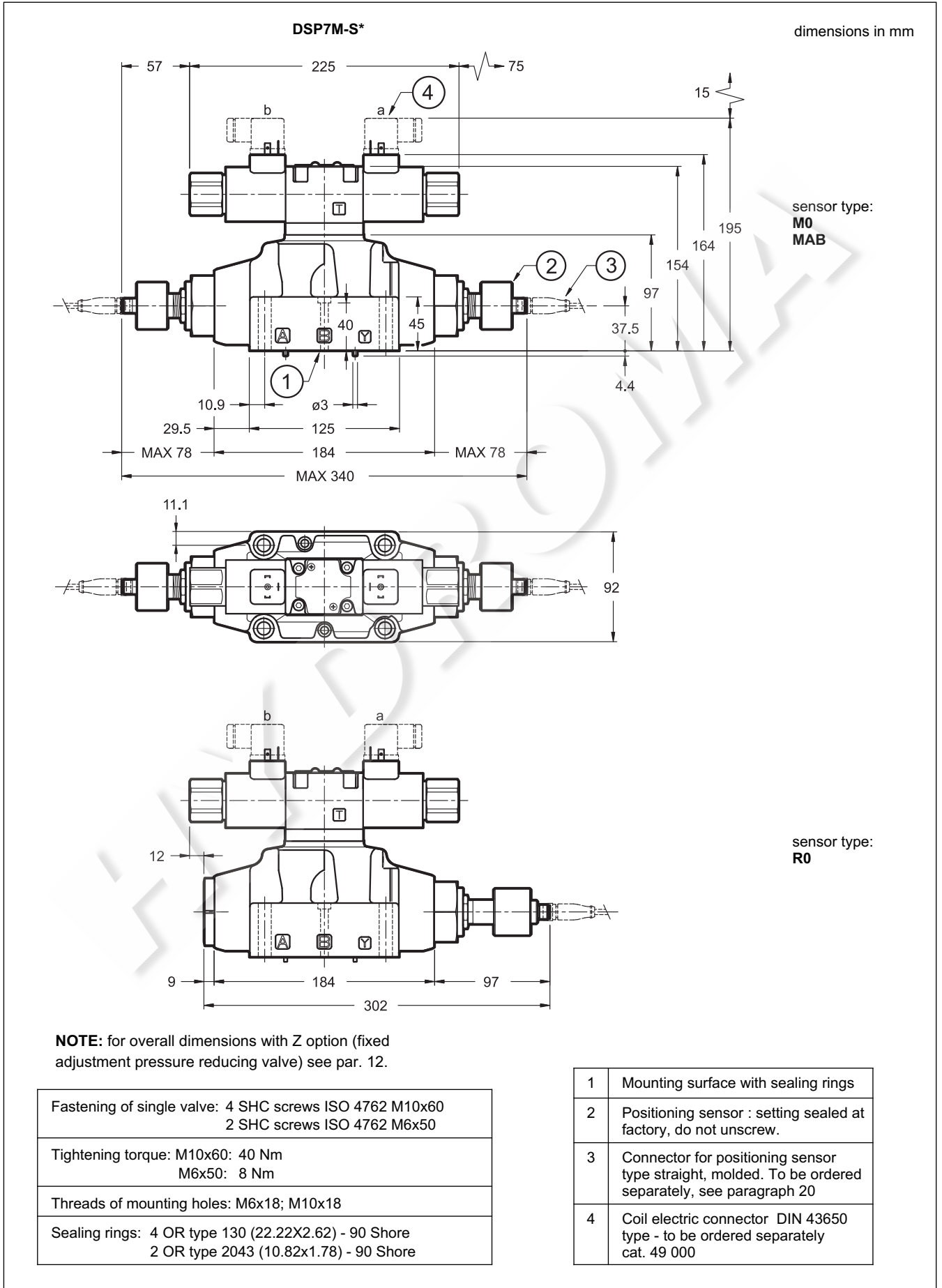


NOTE: for overall dimensions with Z option (fixed adjustment pressure reducing valve) see par. 12.

Fastening of single valve: 4 SHC screws ISO 4762 M6x35
Tightening torque: 8 Nm (screws A 8.8)
Threads of mounting holes: M6x10
Sealing rings: 5 OR type 2050 (12.42x1.78) - 90 Shore 2 OR type 2037 (9.25x1.78) - 90 Shore

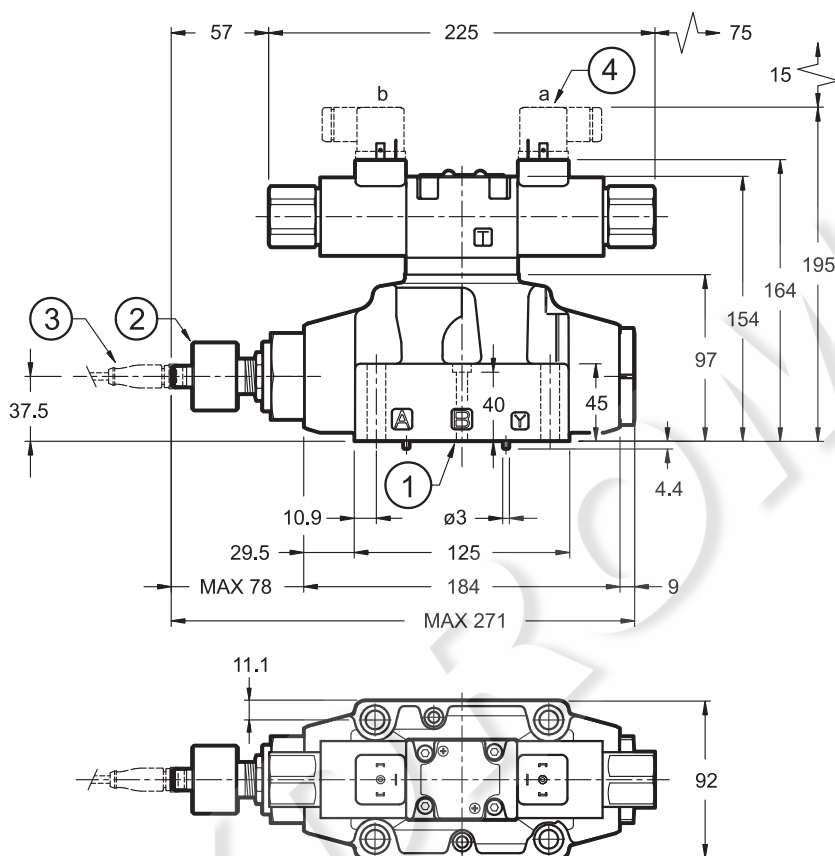
1	Mounting surface with sealing rings
2	Positioning sensor : setting sealed at factory, do not unscrew.
3	Connector for positioning sensor type straight, molded. To be ordered separately, see paragraph 20
4	Coil electric connector DIN 43650 type - to be ordered separately cat. 49 000

10 - DSP7M OVERALL AND MOUNTING DIMENSIONS



dimensions in mm

DSP7M-RK



sensor type:
MA
MB

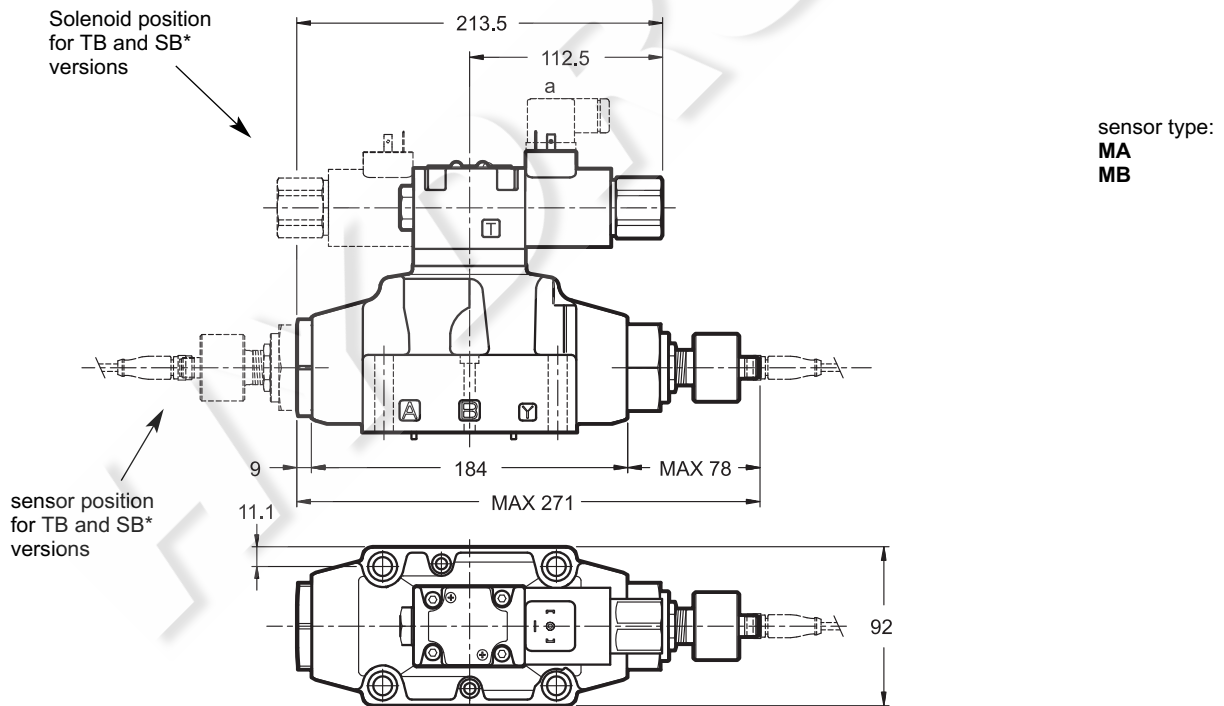
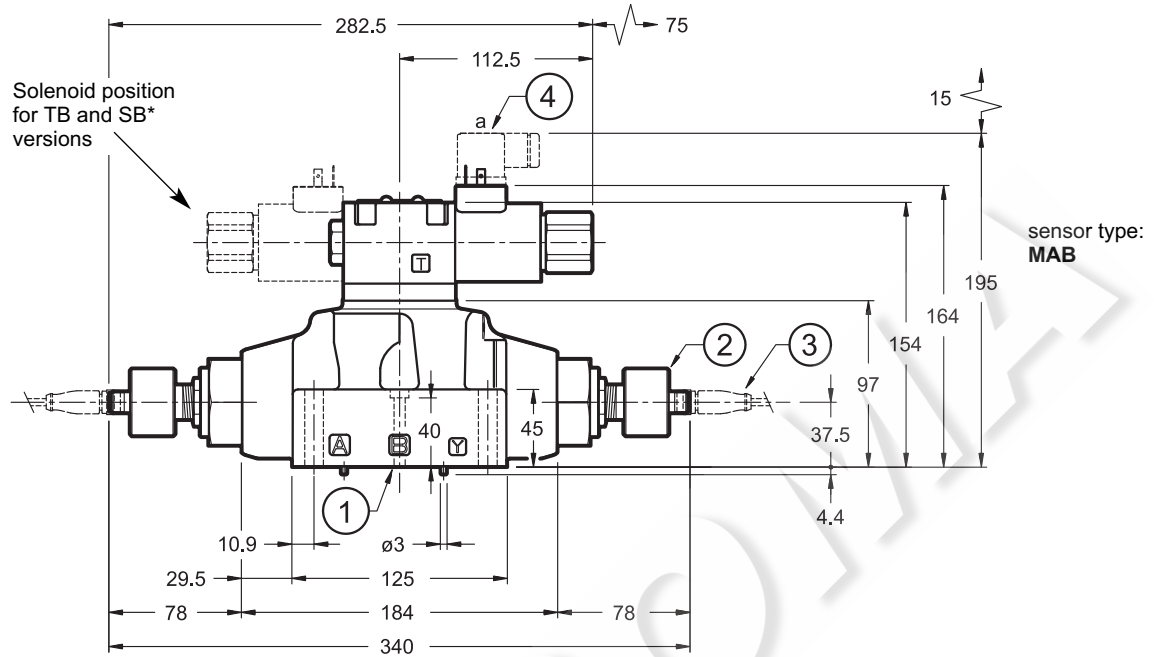
NOTE: for overall dimensions with Z option (fixed adjustment pressure reducing valve) see par. 12.

Fastening of single valve: 4 SHC screws ISO 4762 M10x60 2 SHC screws ISO 4762 M6x50
Tightening torque: M10x60: 40 Nm M6x50: 8 Nm
Threads of mounting holes: M6x18; M10x18
Sealing rings: 4 OR type 130 (22.22X2.62) - 90 Shore 2 OR type 2043 (10.82x1.78) - 90 Shore

1	Mounting surface with sealing rings
2	Positioning sensor : setting sealed at factory, do not unscrew.
3	Connector for positioning sensor type straight, molded. To be ordered separately, see paragraph 20
4	Coil electric connector DIN 43650 type - to be ordered separately cat. 49 000

DSP7M-TA, TA100, SA1

dimensions in mm

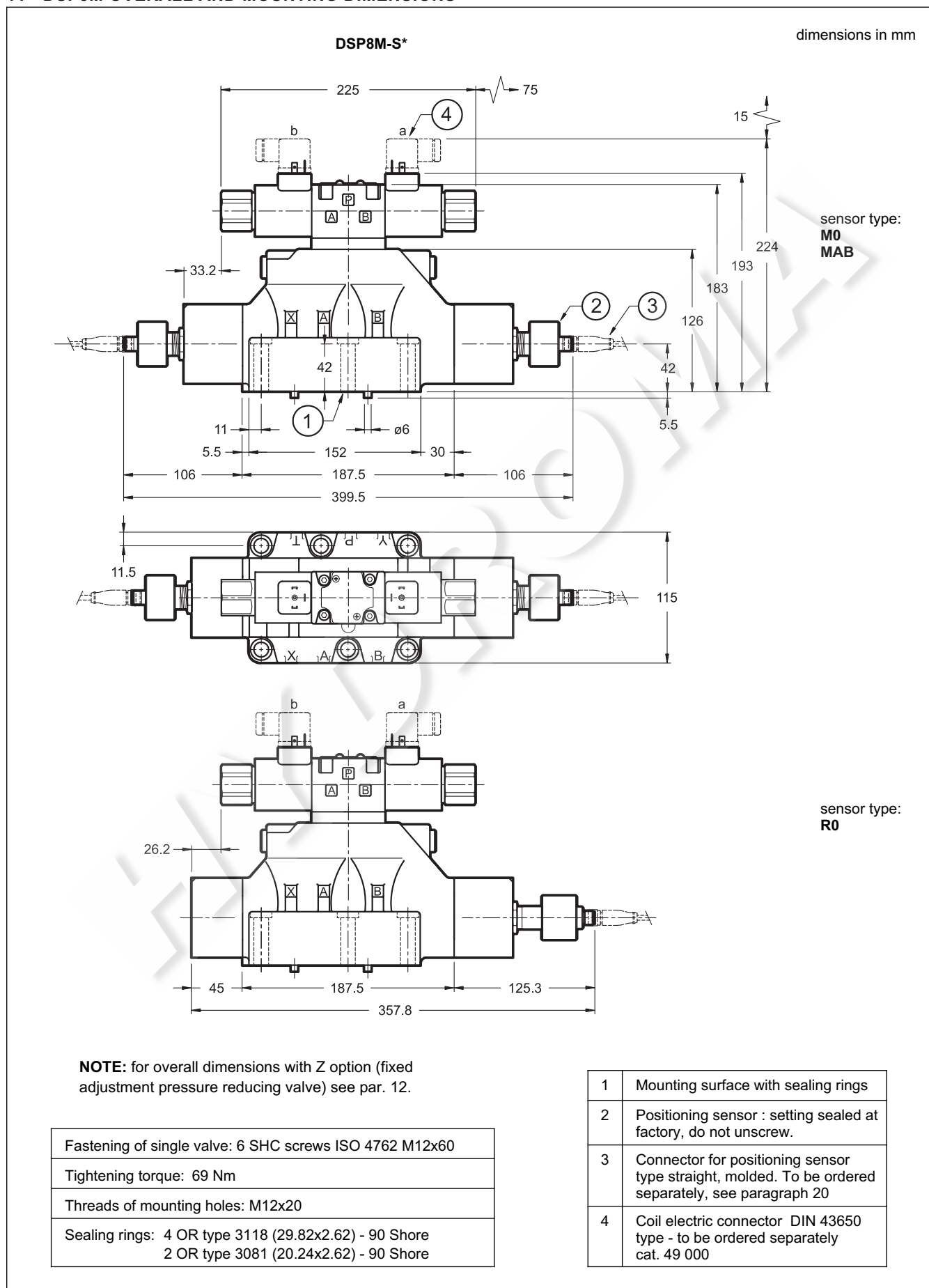


NOTE: for overall dimensions with Z option (fixed adjustment pressure reducing valve) see par. 12.

Fastening of single valve: 4 SHC screws ISO 4762 M10x60 2 SHC screws ISO 4762 M6x50
Tightening torque: M10x60: 40 Nm M6x50: 8 Nm
Threads of mounting holes: M6x18; M10x18
Sealing rings: 4 OR type 130 (22.22X2.62) - 90 Shore 2 OR type 2043 (10.82x1.78) - 90 Shore

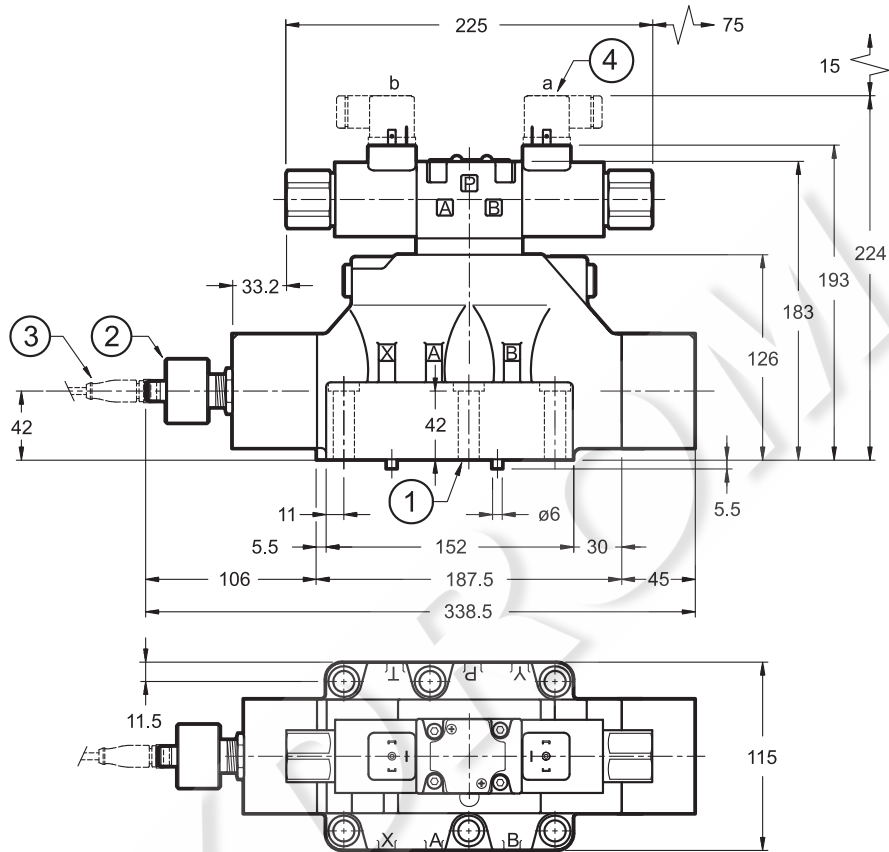
1	Mounting surface with sealing rings
2	Positioning sensor : setting sealed at factory, do not unscrew.
3	Connector for positioning sensor type straight, molded. To be ordered separately, see paragraph 20
4	Coil electric connector DIN 43650 type - to be ordered separately cat. 49 000

11 - DSP8M OVERALL AND MOUNTING DIMENSIONS



DSP8M-RK

dimensions in mm



sensor type:
M0
MAB

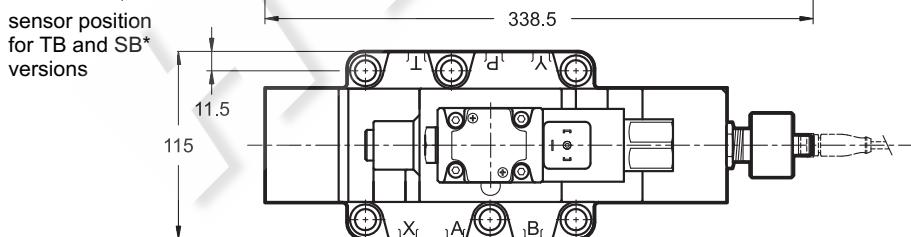
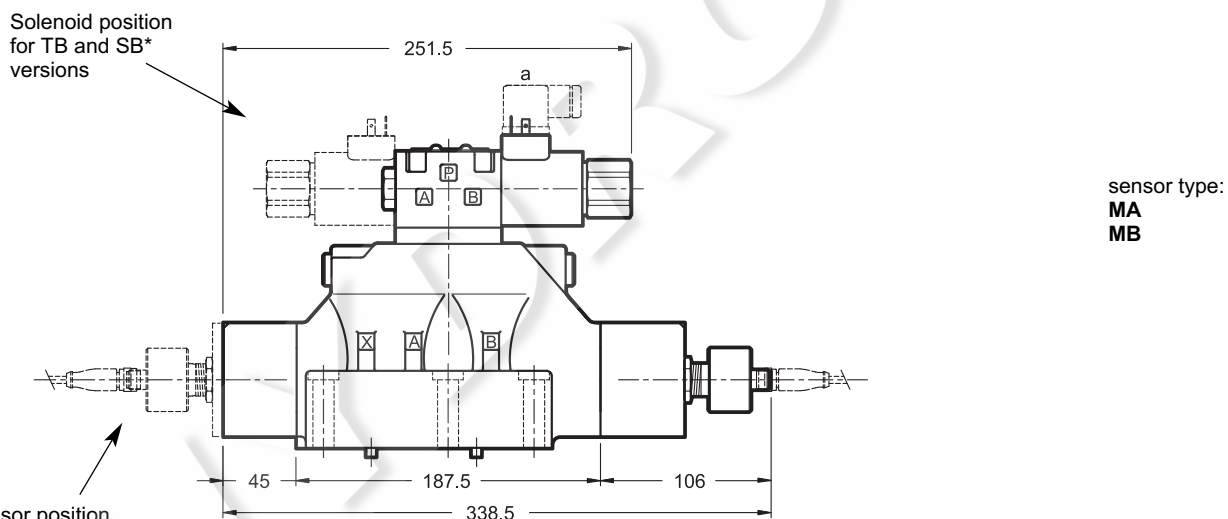
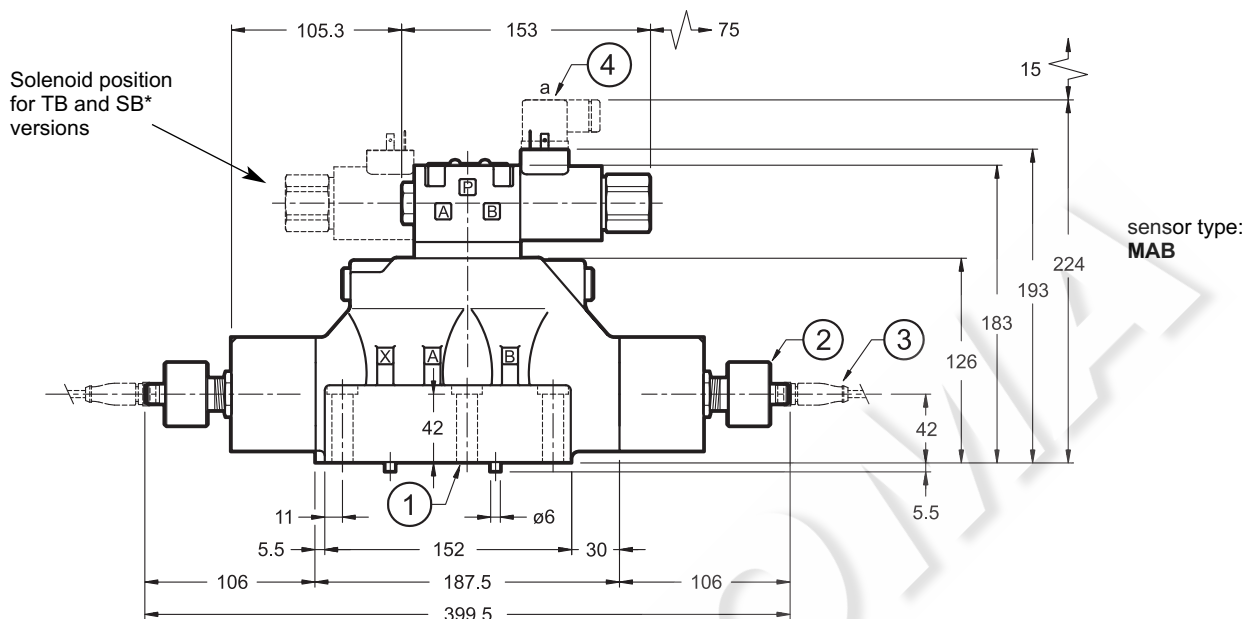
NOTE: for overall dimensions with Z option (fixed adjustment pressure reducing valve) see par. 12.

Fastening of single valve: 6 SHC screws ISO 4762 M12x60
Tightening torque: 69 Nm
Threads of mounting holes: M12x20
Sealing rings: 4 OR type 3118 (29.82x2.62) - 90 Shore 2 OR type 3081 (20.24x2.62) - 90 Shore

1	Mounting surface with sealing rings
2	Positioning sensor : setting sealed at factory, do not unscrew.
3	Connector for positioning sensor type straight, molded. To be ordered separately, see paragraph 20
4	Coil electric connector DIN 43650 type - to be ordered separately cat. 49 000

DSP8M-TA, TA100, SA1

dimensions in mm

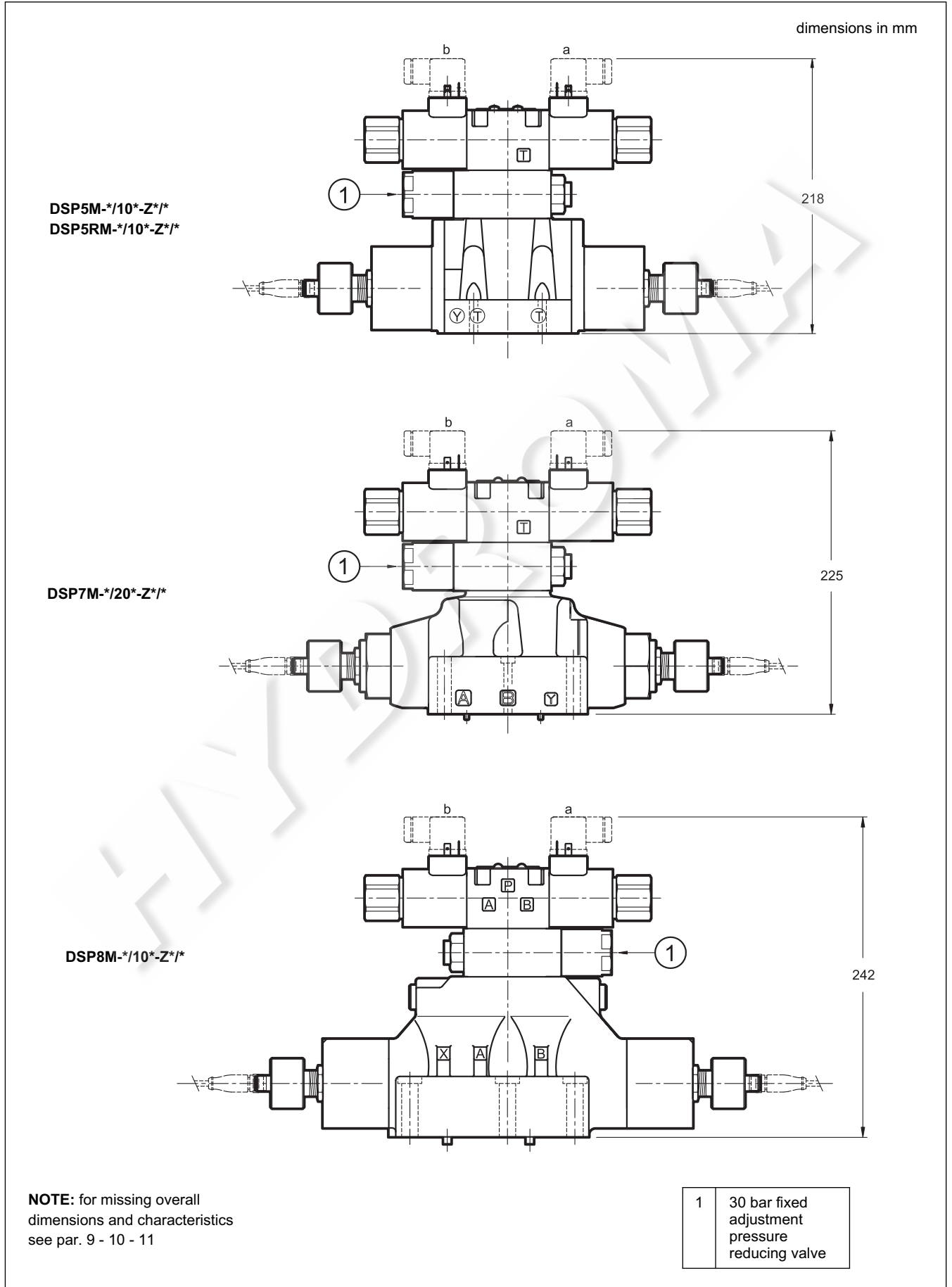


NOTE: for overall dimensions with Z option (fixed adjustment pressure reducing valve) see par. 12.

Fastening of single valve: 6 SHC screws ISO 4762 M12x60
Tightening torque: 69 Nm
Threads of mounting holes: M12x20
Sealing rings: 4 OR type 3118 (29.82x2.62) - 90 Shore 2 OR type 3081 (20.24x2.62) - 90 Shore

1	Mounting surface with sealing rings
2	Positioning sensor : setting sealed at factory, do not unscrew.
3	Connector for positioning sensor type straight, molded. To be ordered separately, see paragraph 20
4	Coil electric connector DIN 43650 type - to be ordered separately cat. 49 000

12 - DSP*M-*/*-Z*/* OVERALL AND MOUNTING DIMENSIONS

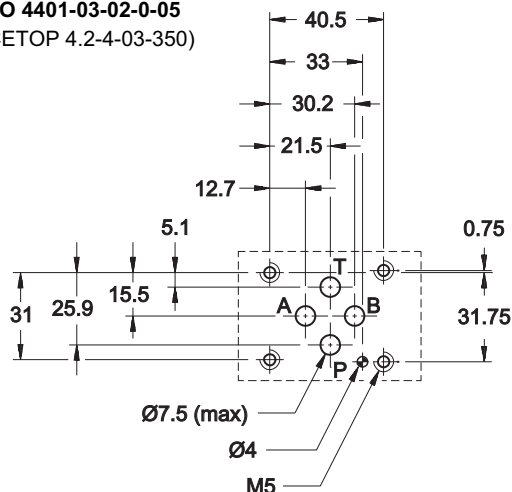


13 - MOUNTING SURFACES

13.1 - Direct operated valves

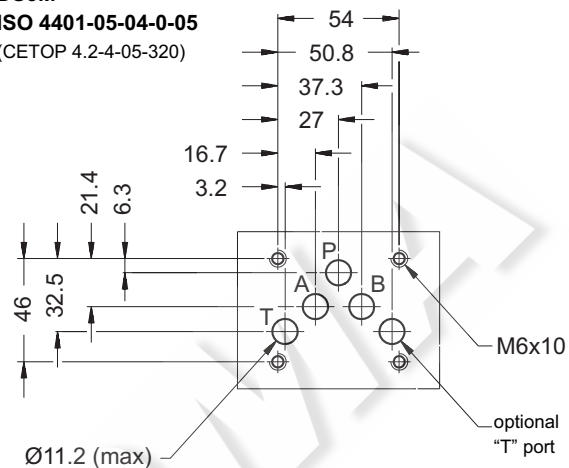
DS3M

ISO 4401-03-02-0-05
(CETOP 4.2-4-03-350)



DS5M

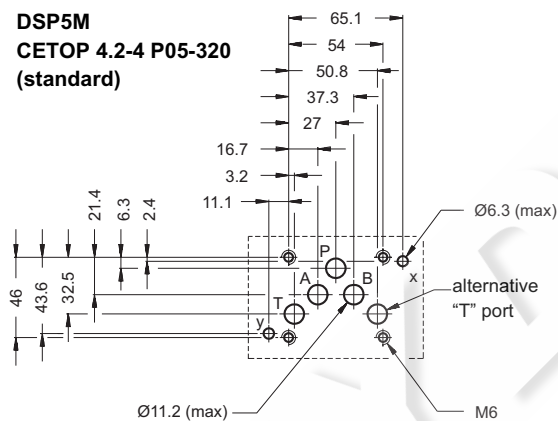
ISO 4401-05-04-0-05
(CETOP 4.2-4-05-320)



13.2 - Pilot operated valves

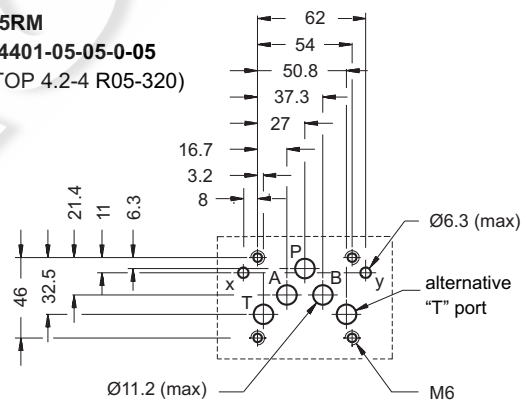
DSP5M

CETOP 4.2-4 P05-320
(standard)



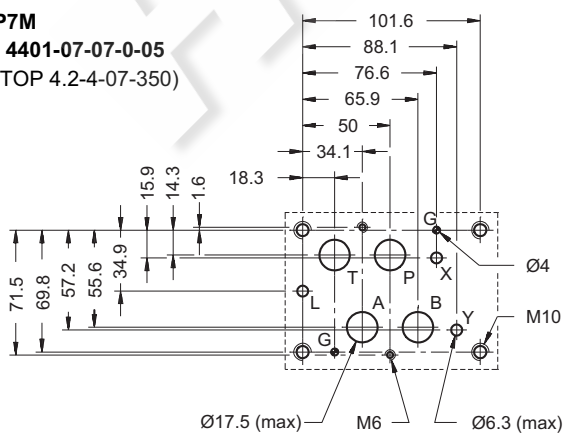
DSP5RM

ISO 4401-05-05-0-05
(CETOP 4.2-4 R05-320)



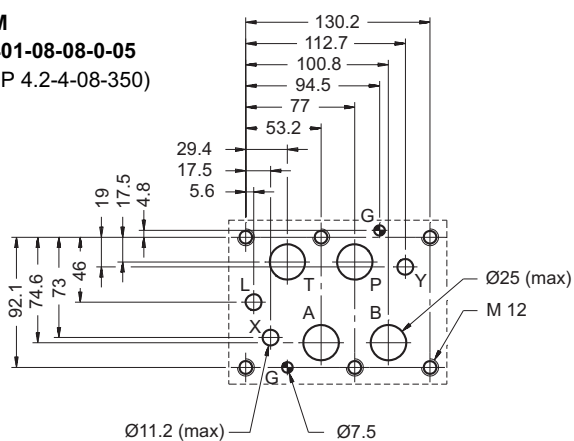
DSP7M

ISO 4401-07-07-0-05
(CETOP 4.2-4-07-350)



DSP8M

ISO 4401-08-08-0-05
(CETOP 4.2-4-08-350)



14 - ELECTRICAL FEATURES

14.1 - Solenoids

These are essentially made up of two parts: tube and coil. The tube is threaded into the valve body and includes the armature that moves immersed in oil, without wear. The inner part, in contact with the oil in the return line, ensures heat dissipation.

The coil is fastened to the tube by a threaded ring, and can be rotated and locked to suit the available space.

NOTE 1 : In order to further reduce the emissions, use of type H connectors is recommended. These prevent voltage peaks on opening of the coil supply electrical circuit (see catalogue 49 000).

NOTE 2: The IP65 protection degree is guaranteed only with the connector correctly connected and installed.

VOLTAGE SUPPLY FLUCTUATION	± 10% Vnom
MAX SWITCH ON FREQUENCY DS3M DS5M DSP5M - DSP5RM DSP7M DSP8M	15.000 ins/hr 13.000 ins/hr 5.000 ins/hr 5.000 ins/hr 4.000 ins/hr
DUTY CYCLE	100%
ELECTROMAGNETIC COMPATIBILITY (EMC) (NOTE 1)	In compliance with 2004/108/EC
LOW VOLTAGE	In compliance with 2006/95/EC
CLASS OF PROTECTION: Atmospheric agents (CEI EN 60529) Coil insulation (VDE 0580) Impregnation	IP 65 (NOTE 2) class H class F

14.2 - Current and absorbed power

The tables shows current and power consumption values relevant to the different coil types for DC.

DS3M, DSP5M, DSP5RM, DSP7M and DSP8M (values ± 5%)

Suffix	Nominal voltage [V]	Resistance at 20°C [Ω]	Current consumpt. [A]	Power consumpt [W]	Coil code
D12	12	4,4	2,72	32,7	1903080
D24	24	18,6	1,29	31	1903081
D110	110	423	0,26	28,2	1903084
D220	220	1692	0,13	28,2	1903085

DS5M (values ± 5%)

Suffix	Nominal voltage [V]	Resistance at 20°C [Ω]	Current consumpt. [A]	Power consumpt [W]	Coil code
D12	12	3,2	3,75	45	1903200
D24	24	12	2	48	1903201
D110	110	250	0,44	48	1903204
D220	220	1050	0,21	47	1903205

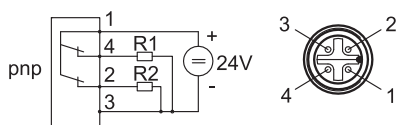
15 - COIL CONNECTORS

The solenoid operated valves are delivered without the connectors. They must be ordered separately.

For the identification of the connector type to be ordered, please see catalogue 49 000.

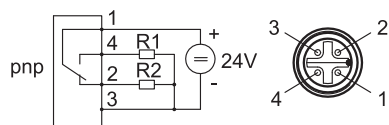
16 - POSITIONING SENSORS

R0 CONNECTION SCHEME



Pin	Values	Function
1	+24V	Supply
2	NC	Normal Closed -
3	0 V	-
4	NC	Normal Closed +

M* CONNECTION SCHEME



Pin	Values	Function
1	+24V	Supply
2	NC	Normal Closed
3	0 V	-
4	NO	Normal Open

NOTE: The M0 and MAB versions have two positioning sensors; consider that the connection scheme shown must be done for each sensor.

ELECTRICAL CHARACTERISTICS

Operating voltage range	V DC	20 ÷ 32
Absorbed current	A	0.4
Max output load	mA	400
Output		2 PNP
Electric protections		polarity inversion short circuit
Hysteresis	mm	≤ 0.1
Operating temperature range	°C	-25 ÷ +80
Class of protection according to CEI EN 60529 standards (atmospheric agents)		IP65
EMC Electromagnetic compatibility		DIN EN 61000-6-1/2/3/4

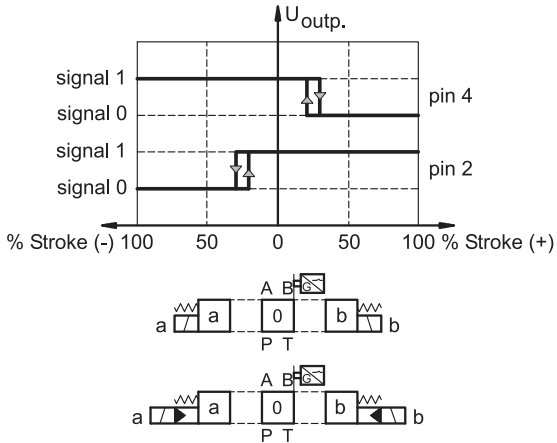
17 - SWITCHING LOGICS

Duplomatic offers a wide range of available positions to be monitored, and for the pilot operated valve there are even monitoring with redundant signal.

17.1 - R0 monitoring

Rest (middle) position monitored with one positioning sensor.

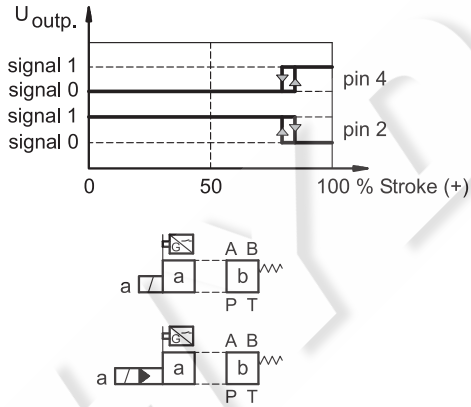
Available on both direct and pilot operated valves;
spool type S*



17.2 - MA monitoring

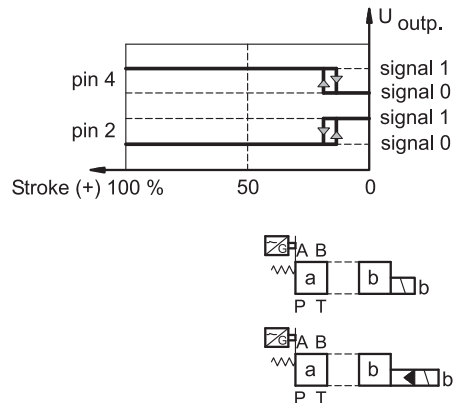
Energized position monitored with one positioning sensor.

Available on both direct and pilot operated valves;
spool type SA*, TA, TA02, TA100



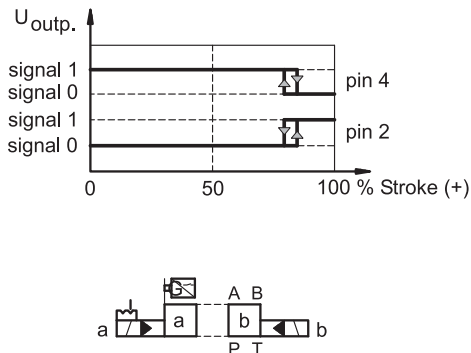
De-energized position monitored with one positioning sensor.

Available on both direct and pilot operated valves;
spool type SB*, TB, TB02, TB100



Position 'a' monitored with one positioning sensor.

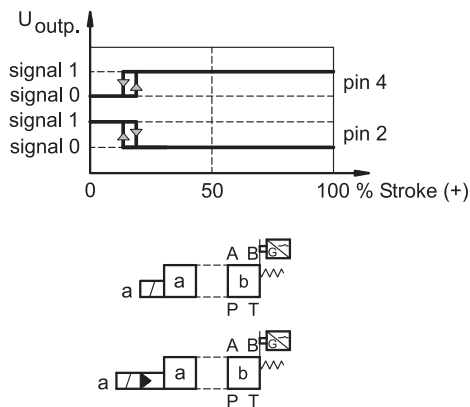
Available on pilot operated valves only;
spool type RK



17.3 - MB monitoring

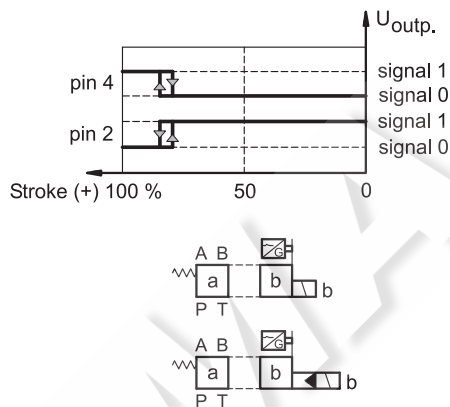
De-energized position monitored with one positioning sensor.

Available on both direct and pilot operated valves;
spool type SA*, TA, TA02, TA100



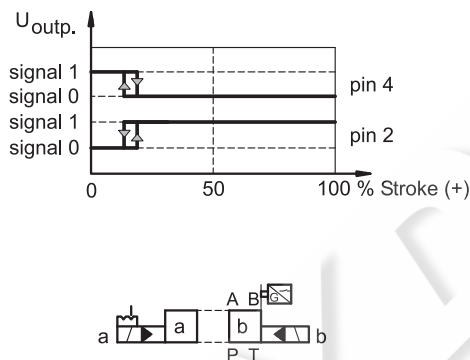
Energized position monitored with one positioning sensor.

Available on both direct and pilot operated valves;
spool type SB*, TB, TB02, TB100



Position 'b' monitored with one positioning sensor.

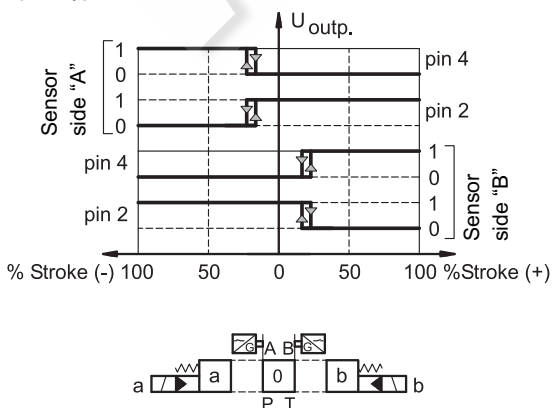
Available on pilot operated valves only;
spool type RK



17.4 - M0 monitoring

Rest (middle) position monitored by two separate positioning sensors.

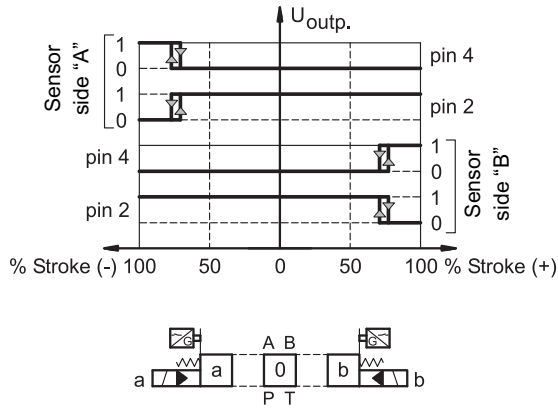
Available on pilot operated valves only;
spool type S*



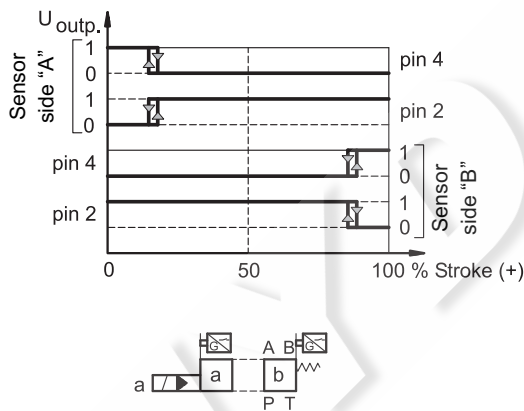
17.5 - MAB monitoring

Both external positions monitored by two separate positioning sensors.

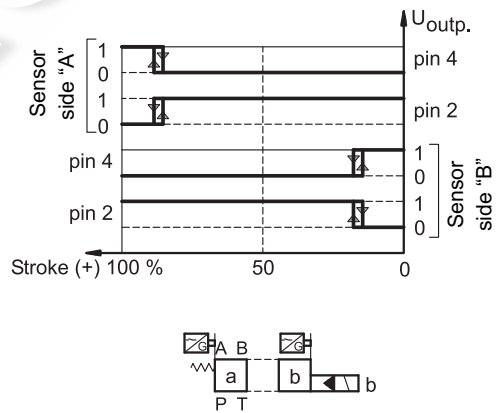
Available on pilot operated valves only;
spool type S*



De-energized position monitored on side A.
Energized position monitored on side B.
Available on pilot operated valves only;
spool type SA1, TA, TA100



Energized position monitored on side A.
De-energized position monitored on side B.
Available on pilot operated valves only;
spool type SB1, TB, TB100



18 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals (code N). For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other fluid types such as HFA, HFB, HFC, please consult our technical department.

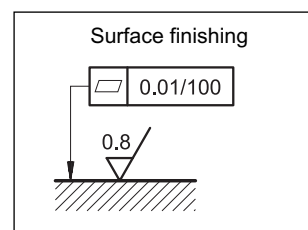
Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics. The fluid must be preserved in its physical and chemical characteristics.

19 - INSTALLATION

The valves can be installed in any position without impairing correct operation.

Valve fastening takes place by means of screws or tie rods, laying the valve on a lapped surface, with values of planarity and smoothness that are equal to or better than those indicated in the drawing.

If the minimum values of planarity or smoothness are not met, fluid leakages between valve and mounting surface can easily occur.



20 - SENSOR CONNECTORS

The female connectors for position switches can be ordered separately, by specifying the descriptions here below, depending on the desired type.

STRAIGHT CONNECTOR, MOLDED CABLE, PRE-WIRED

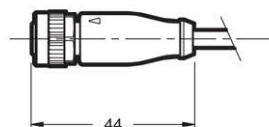
description: ECM4S/M12L/10

Protection class: IP68

Cable: with 4 conductors 0.34 mm² - length 5 mt - Ø 4.7 mm

Cable material: polyurethane resin (oil resistant)

Without LED.



ANGLED CONNECTOR, MOLDED CABLE, PRE-WIRED

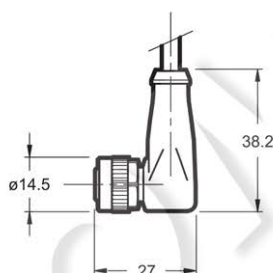
description: ECM4S/M12S/10

Protection class: IP68

Cable: with 4 conductors 0.34 mm² - length 5 mt - Ø 4.7 mm

Cable material: polyurethane resin (oil resistant)

Without LED.



ANGLED CONNECTOR, UNASSEMBLED

Circular connector with screw locking; strain relief by means of clamping cage.

description: EC4S/M12S/10

Protection class: IP67

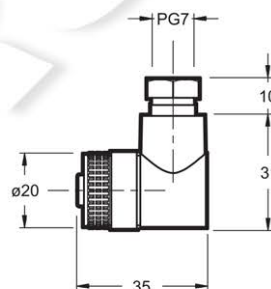
IEC 61076-2-101 (Ed. 1)/ IEC 60947-5-2

Conductor size: max 0.75 mm²

Cable gland: PG7 - suitable cables: 4 ÷ 6 mm²

Case material: polyamide (nylon)

Without LED.



21 - SUBPLATES (see catalogue 51 000)

	DS3M	DS5M	DSP5M	DSP7M	DSP8M
Type with rear ports	PMMD-AI3G	PMD4-AI4G	PME4-AI5G	PME07-AI6G	
Type with side ports	PMMD-AL3G	PMD4-AL4G	PME4-AL5G	PME07-AL6G	PME5-AL8G
P, T, A, B ports dimensions	3/8" BSP	3/4" BSP (PMD4-AI4G) 1/2" BSP (PMD4-AL4G)	3/4" BSP	1" BSP	1 1/2" BSP
X, Y ports dimensions	-	-	1/4" BSP	1/4" BSP	1/4" BSP