



**DIPLOMATIC
HYDRAULICS**

43 200/104 ED



DIRECTIONAL CONTROL VALVES

MH1 LEVER OPERATED

HT1V LEVER OPERATED IP66 protection class

MR1 ROLLER CAM OPERATED

MA1 PNEUMATICALLY OPERATED

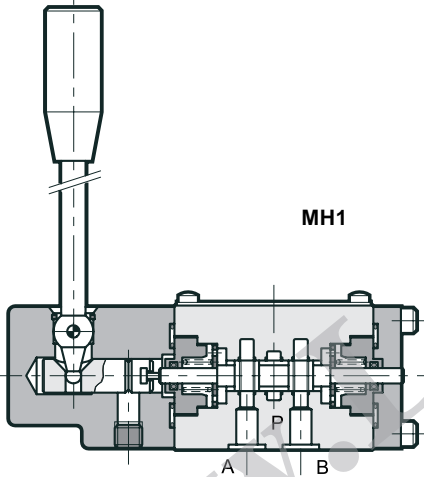
MC1 HYDRAULICALLY OPERATED

CETOP 03

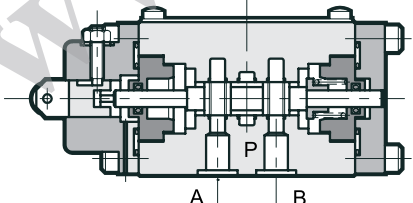
p max (see technical specifications table)

Q max (see technical specifications table)

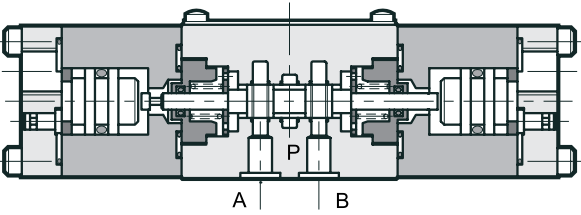
OPERATING PRINCIPLE



MH1



MR1



MC1

These directional control valves are designed for subplate mounting interface in compliance with CETOP 4.2-4-03 and ISO 4401-03 standards.

MH1 and HT1V

- MH1 and HT1V are four-way, lever operated, directional control valves. They are available with two or three positions and a return spring or mechanical detent.
- HT1V type is completely sealed from the external environment with protection class IP 66.
- They are available with several hydraulic configurations and with interchangeable spools (see par. 4.1).
- The lever can be positioned at 90° with respect to the standard position, depending on the installation needs.

MR1

- MR1 are directional control valves, roller cam operated, four-way, 2 position with return spring.
- The roller of the valve operating device can be positioned at 90° with respect to the valve mounting surface, in order to achieve flexible installation.
- This type of valve can be used as a hydraulic stroke end for cylinders, speed selectors (not compensated), hydraulic safety devices, directional control of hydraulic axes (see application examples par. 8).

MA1 and MC1

- MA1 and MC1 are directional control valves with pneumatic or hydraulic control respectively.
- They are available with 2 or 3 positions with return spring or mechanical detent.
- All versions are provided with an emergency manual override.
- These valves are available with several hydraulic configurations and with interchangeable spools (see par. 4.3).



1 - IDENTIFICATION CODE

				P	4	-	/	/	
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Directional control valve CETOP 03

MH1 lever operated
HT1V lever operated IP 66 protection class
MR1 mechanically operated
MA1 pneumatically operated
MC1 hydraulically operated

Subplate mounting _____

Number of ways _____
4 = four-way (**standard**)
23 = three-way (only for MA1 and MC1)

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

Series No:
22 for MH1
30 for HT1V
21 for MR1
20 for MA1
20 for MC1
 (the overall and mounting dimensions remain unchanged with the same decimal range - i.e. 20 - 29)

Configuration:
 see par. 4 for symbols and for the configurations available for each valve)

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

			MH1-HT1V	MR1	MA1	MC1
Maximum working pressure	- P A B ports	bar	350			
	- T port		140			
Piloting pressure (MA1-MC1)	min max	bar	-	-	1,5 10	5 140
Maximum flow: - from P port to A-B-T		l/min	40			
Ambient temperature range		°C	-20 ÷ +50			
Fluid temperature range		°C	-20 ÷ +80			
Fluid viscosity range		cSt	10 ÷ 400			
Recommended viscosity		cSt	25			
Fluid contamination degree			according to NAS 1638 class 10			
Mass		kg	1,4	1,1	1,5 MA1-T* 2,0 MA1-S	1,5 MC1-T* 2,0 MC1-S

3 - HYDRAULIC FLUIDS

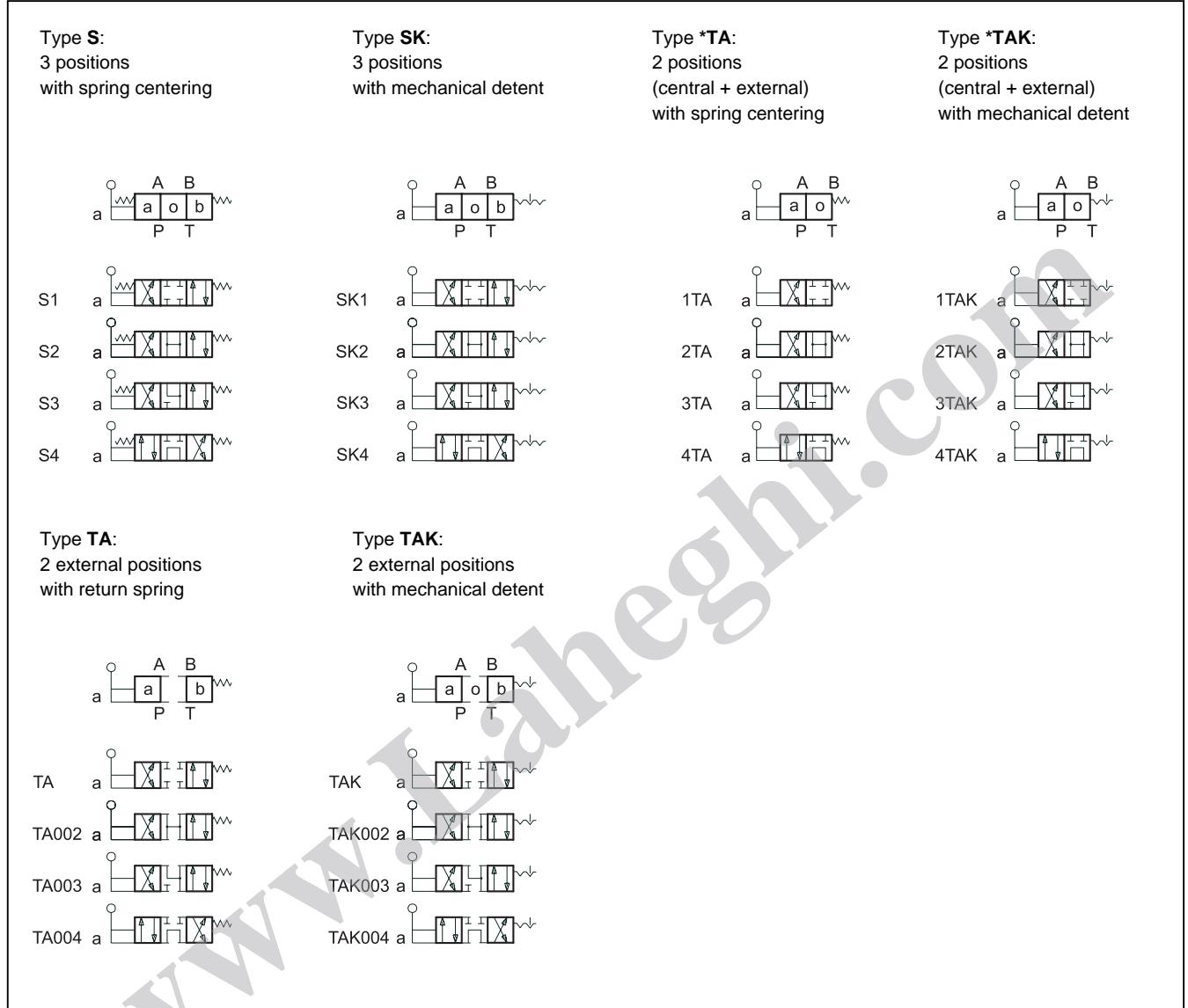
Use mineral oil-based hydraulic fluids HL or HLP type, according to ISO 6743/3.
 For fluids HFD-R type (phosphate esters) use FPM seals (code V).
 For the use of other fluid types as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 70°C causes a faster degradation of the fluid and of the seals characteristics.
 The fluid must be preserved in its physical and chemical characteristics.

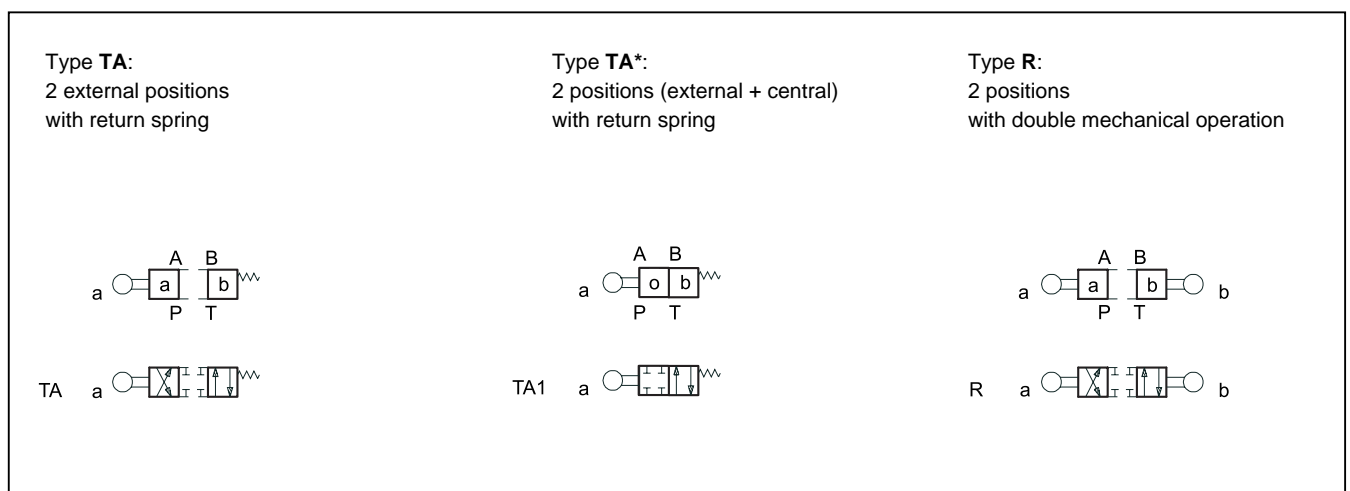


4 - CONFIGURATIONS

4.1 - Configurations available for MH1 and HT1V



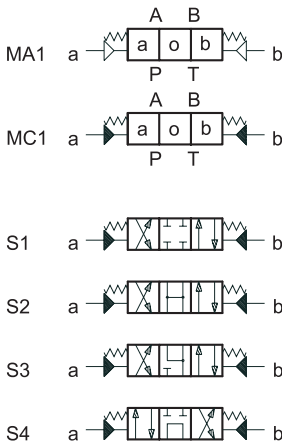
4.2 - Configurations available for MR1



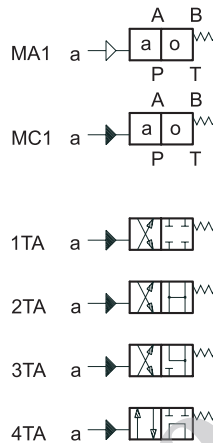


4.3 - Configurations available for MA1 and MC1

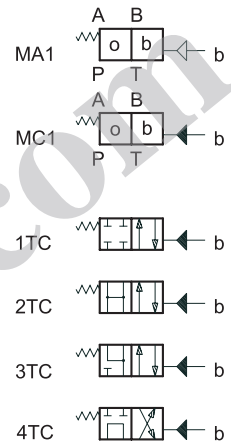
Type S:
2 operations- 3 positions
with spring centering



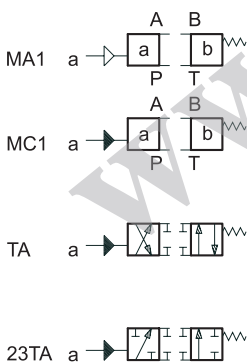
Type *TA:
1 operation side A
2 positions (central + external)
with spring centering



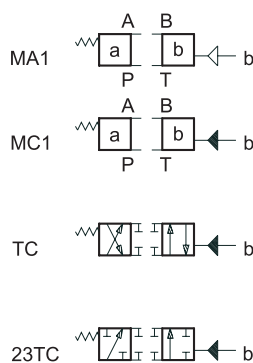
Type *TC:
1 operation side B
2 positions (central + external)
with spring centering



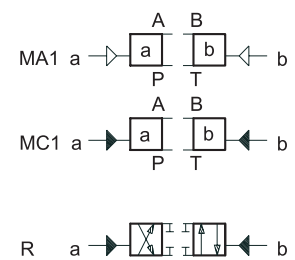
Type TA:
1 operation side A
2 external positions
with return spring



Type TC:
1 operation side B
2 external positions
with return spring



Type R:
2 operations - 2 positions
without springs

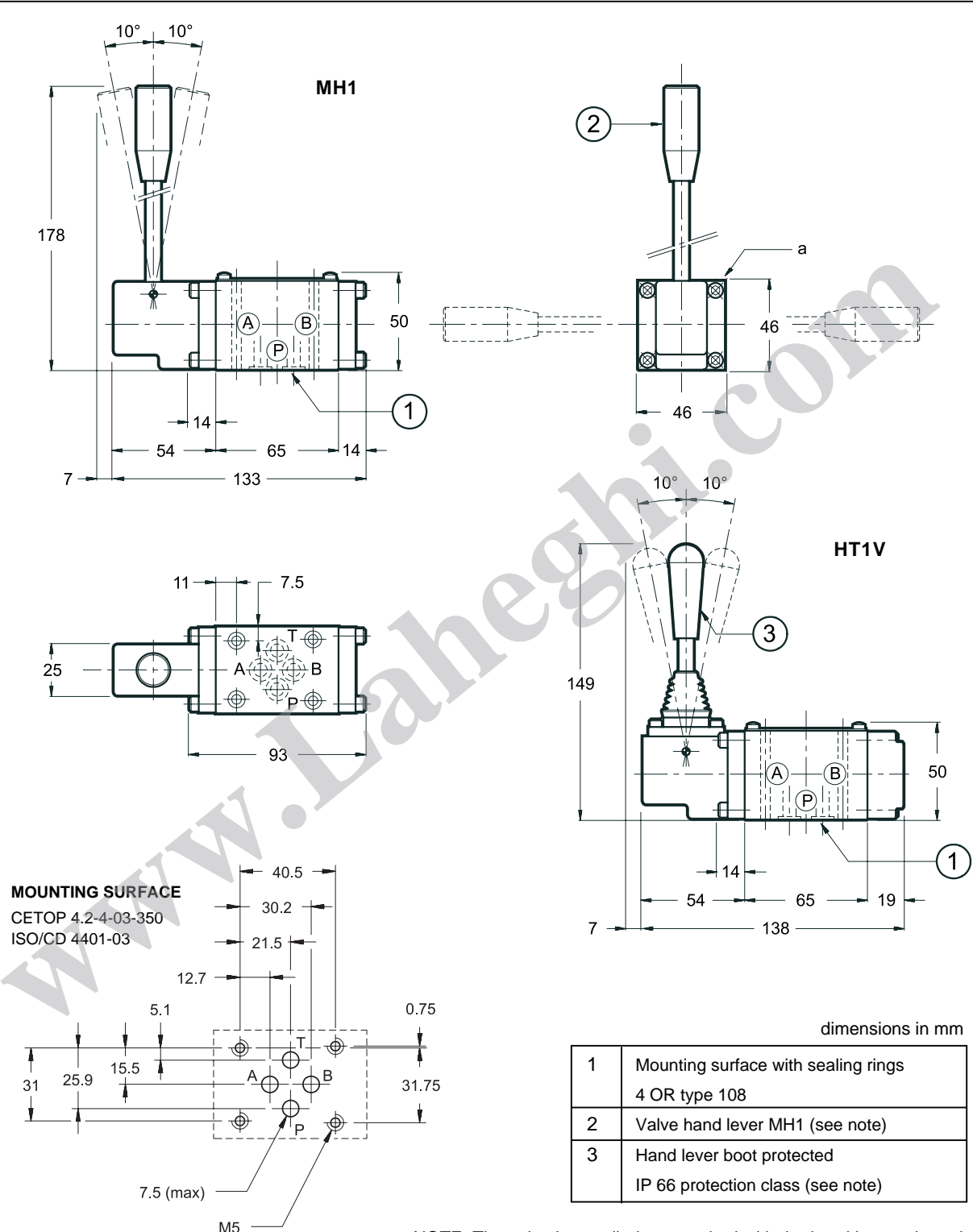


Type RK:
with mechanical detent





5 - OVERALL AND MOUNTING DIMENSIONS MH1 AND HT1V

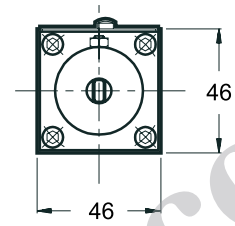
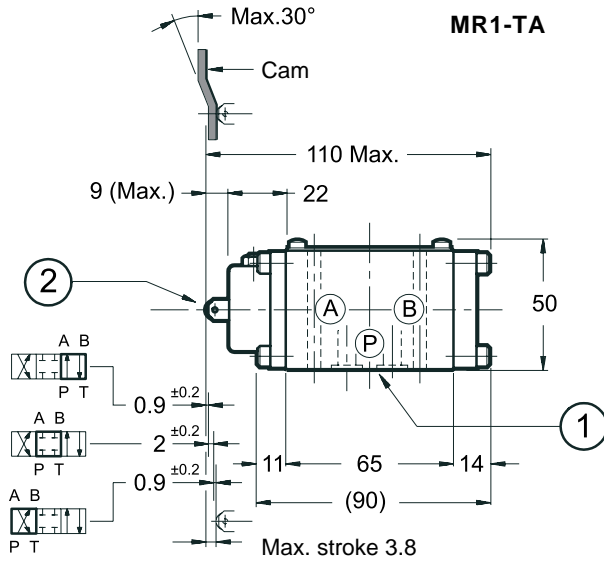


NOTE: The valve is supplied as standard with the hand lever oriented in a perpendicular position with respect to the mounting surface (as indicated in the above drawing). For installation needs the hand lever can be oriented by the user directly at 90° to the standard position:

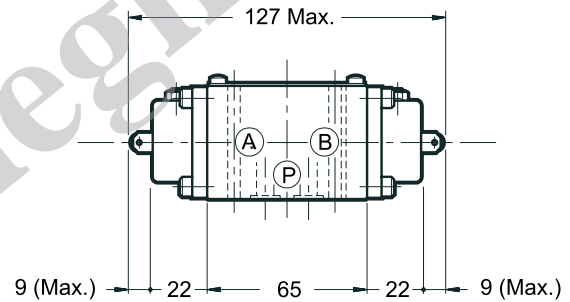
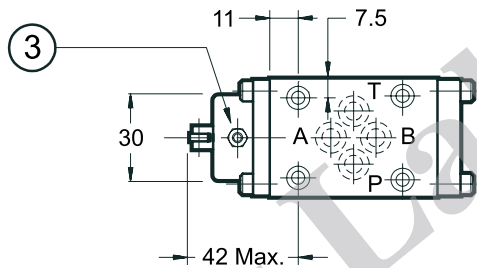
- remove the 4 M5x16 countersunk hexagonal screws (ref. a)
- rotate through 90°, to the desired direction, the hand lever and the relevant support and tight the fixing screws.



6 - OVERALL AND MOUNTING DIMENSIONS MR1

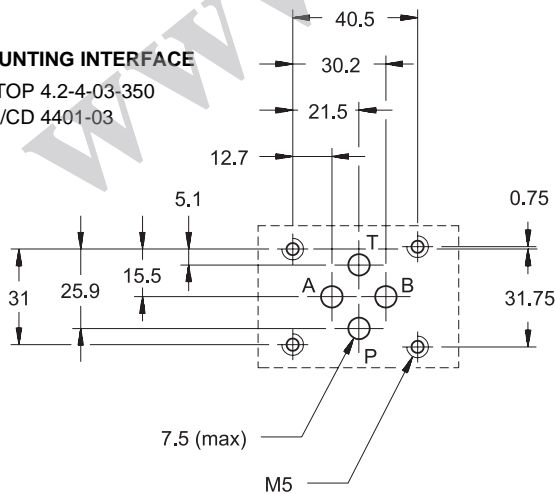


MR1-R



MOUNTING INTERFACE

CETOP 4.2-4-03-350
ISO/CD 4401-03



dimensions in mm

1	Mounting surface with sealing rings 4 OR type 108
2	Roller for valve operation (see note)
3	Countersunk hexagonal screw for roller orientation: spanner 2

NOTE: The valve is supplied as standard with the operating roller oriented in a perpendicular position with respect to the mounting surface. For installation needs the roller can be oriented by the user directly at 90° to the standard position:

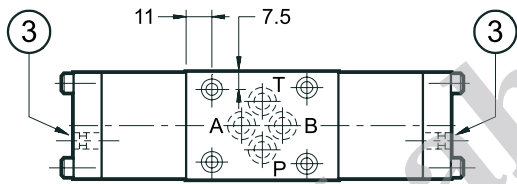
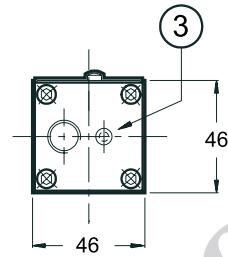
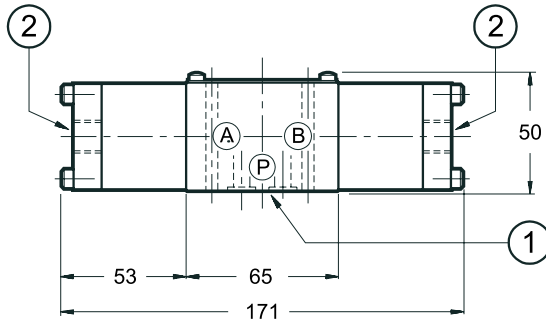
- untight the locking nut and the countersunk hexagonal screw (ref. 3) until the spool and the relevant roller can be freely oriented.
- rotate through 90° the spool with the roller
- tighten the fixing screw (ref. 3) being careful that it goes inside the spool anti-rotation slot without preventing the spool movement.



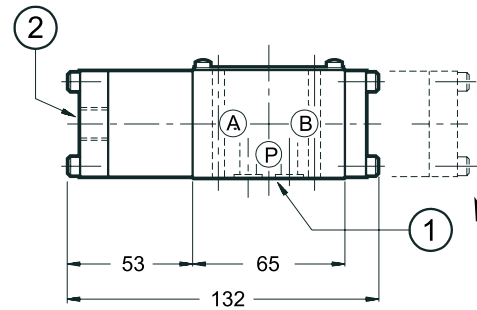
7 - OVERALL AND MOUNTING DIMENSIONS MA1 E MC1

MA1-S
MA1-R
MA1-RK

MC1-S
MC1-R
MC1-RK

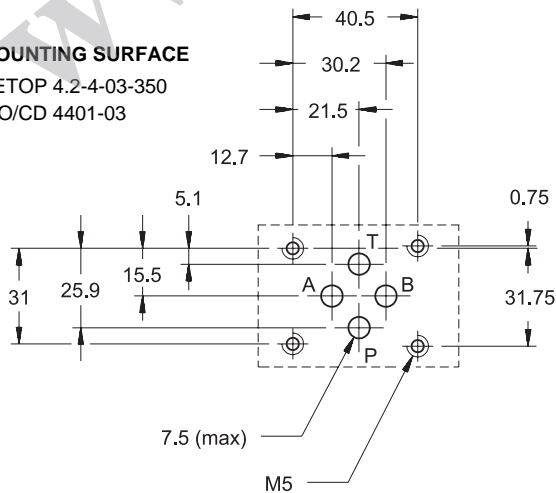


MA1-TA
MC1-TA



TC version operation position

MOUNTING SURFACE
CETOP 4.2-4-03-350
ISO/CD 4401-03

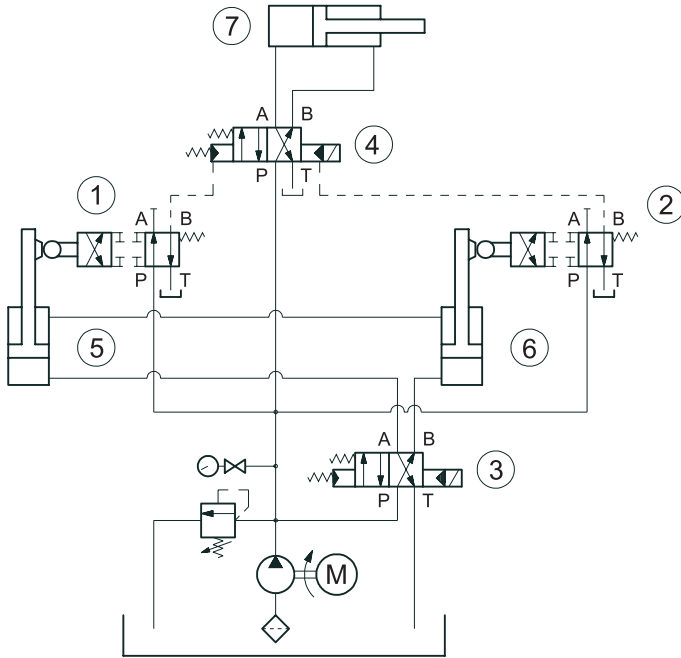


dimensions in mm

1	Mounting surface with sealing rings 4 OR type 108
2	1/4" BSP connection for pneumatic (MA1) or hydraulic (MC1) operation.
3	Manual override



8 - MR1 VALVE APPLICATION EXAMPLES



Example of automatic stroke inversion by means of MR1P4-TA.

Operated by the cams located on the cylinders ⑤ and ⑥, the MR1P4-TA valves ① and ② pilot alternatively the directional control valve ④ which controls the cylinder ⑦ movement.

In this way the stroke inversion of cylinder ⑦ is synchronized with the alternate movement of cylinders ⑤ and ⑥ operated by the solenoid valve ③.

9 - SUBPLATES (see catalogue 51 000)

Type PMMD-AI3G with rear ports
Type PMMD-AL3G with side ports
P, T, A, B ports threading: 3/8" BSP



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