TECHNICAL MANUAL

Rotary Valve Maxflo "+"
60° and 80° Opening type NT

1 - INSTALLATION

1.1 - VALVE PIPE-WORK LAYOUT

- A sufficient straight length of piping should be provided upstream and downstream of the valve so as not to affect the fluid flow.
- If block valves are to be installed very close to the control valves, they should be of the full-bore type.
- If piping upstream and downstream of the valve contains reducers, make allowance for their pressure drop factor.
- Adhere to the dismantling dimension shown on the dimensional drawings. Provide access to the handwheel (operation) and the positioner (adjustment).
- The actuator should preferably be mounted vertically. Never consider it to be a fixed point and ensure that the valve and piping are supported.

1.2 - SPECIFICATION CHECK

- Check the specifications on the manufacturer's name plate (fig. 8) for conformity.
- Note the **Code - Serial N°** - Reference **N° OC .....**

These reference numbers should be quoted

- in all correspondence concerning this valve
- when all or only part of the material is returned
- in any "spare parts" order

1.3 - INSTALLING THE VALVE IN THE PIPING

- Comply with the flow direction (arrow on the valve body) (fig. 7).
- The gaskets should be suitable for the type of connections being used.
- The piping should be cleaned before installation, in order to eliminate any foreign matter.
- Check that the flanges (Series - PN - DN - Gasket bearing surfaces) are compatible with those of the valve, that they are correctly aligned, that their surfaces are parallel and that the face-to4ace dimension is compatible with that of the valve.
- Connection bolt : see table (fig. 2).

1.4 - CONNECTION TO CONTROL SYSTEM

Ensure that the maximum supply pressures are not exceeded :

1"valve	1.4 bar
11/2 valve	2.1 bar
2 to 12" valve	3.0 bar

2 - START-UP

2.1 - NO FLUID IN THE SYSTEM

- Check the compressed air supply circuits, the pneumatic or electric control circuits, and then check that the valve operates correctly (operation direction - control signal). If the valve is fitted with a pneumatic positioner with by-pass, the first check should be carried out in the by-pass position.
- Check for tightness of the stuff ing box. Caution the stuff ing box will reach its best performance after a running-in period (about 100 operations). Excessive tightening of the stuffing box will result in operating faults (hysteresis) without resulting in any better results subsequently. It is not unusual for a slight leak to occur on start-up.

2.2 - FLUID IN THE SYSTEM

- In the case of a valve installed with a by-pass, keep the control valve closed, open the block valves, then open the control valve and then close the by-pass valve.
- Adhere to the service conditions used to specify the control valve (pressure - temperature - Δp - flow...). Temperature rise should be progressive to avoid thermal shock.
- Should the manually-controlled valve become jammed, do not exert too much strenght on the handwheel so as not to damage the equipment 9 the valve is jammed by foreign matter.

3 - MAINTENANCE

3.1 - MAINTENANCE OF THE STUFFING BOX

When it is no longer possible to tighten the braid-equipped stuffing box, it may be re-packed. Isolate the control valve, and progressively loosen the stuff ing box to allow pressure to escape. Re-pack with one or two packing pieces (chamfered on the long edge). Re-tighten and return to service.

3.2 - MAINTENANCE OF THE BODY ASSEMBLY

Inspection of parts inside the assembly necessitates disconnecting the valve from the piping.

3.3 - MAINTENANCE OF THE ACTUATOR DIAPHRAGM

The diaphragm requires no maintenance. If the actuator is opened up for inspection or to change the diaphragm, loosen the long screws which pre-stress the spring last of all. On the assembly, tighten them first, without forgetting to replace the safety plates (ref. 63 fig. 1). This operation may be performed without shutting the valve if it is fitted with a handwheel ; the shut-off valve can be maintened in position by using ft.

4 - VALVE MODIFICATION

4.1 - CHANGING VALVE ACTION

4.1.1 - Reversing the actuator NR

Dismantle the diaphragm box. Check that its spring scale is compatible with the new direction of operation. If necessary, change the spring.

Re-assemble the diaphragm box on the opposite side.

4.1.2 - Actuator with handwheel and/or stops

Reverse the position of the handwheel and/or stops after changing the valve's direction of operation.

The valve is supplied with a stop (ref. 65 fig. 1) in order to protect the plug. It is adjusted in the factory. This stop function may be performed by the handwheel, in which case the end-setting is factory adjusted.

In the case of reversal and/or dismantling, check and readjust if necessary on re-assembly.

4.1.3 - Actuator equipped with a positioner KPP or KPE

Refer to technical manual NT 50-172

4.2 - CHANGING THE POSITION OF THE ACTUATOR WITHOUT CHANGING THE DIRECTION OF ACTION OF THE VALVE (fig. 6)

Disconnect the crank, the stuff ing box and the two fixing nuts, lift off the diaphragm box arch assembly and rotate it so as to bring it to the desired position.

4.3 - MODIFICATION OF FLOW/SIGNAL LAW

This may be performed by using the cam positioners; KPP or KPE.

The characteristics should be selected from the table shown on the units (self-adhesive label).

4.4 - CALIBRATION

After performing any operation on a positioner, recalibrate the unit (position - cam - zero - scale).

4.5 - MODIFICATION OF VALVE CAPACITY (see fig. 1-3-4-5)

To change it, it suffices simply to replace the seat, the plug remaining the same.

Ascertain that the plug is well free of the seat - Valve opening by depressurization : disconnect the air inlet on the actuator. - Valve closing by depressurization : supply the actuator diaphragm box ($p \leq 1$ bar).

Unscrew the locking nut (46).

Remove the seat (47) and the packing washer (48).

4.5.1 - Sealing ≦ 0.05% Cv on metal bearing face

- Enter the new seat into the body systematically interposing a 1 /10 mm packing washer between seat and body.
- Install the plug on the seat :
  - Supplying the actuator with 1 bar in the case of a valve OPENING BY DEPRESSURIZATION
  - Disconnecting the air inlet to the actuator in the case of a valve CLOSING BY DEPRESSURIZATION
- At the valve closing position, the spherical part of the plug must coincide with the axis of the pipework. The estimation of the clearance between the plug and the bearing on the seat allows the correct positioning of both these parts with respect to each other to be checked.

  The capability of adding one or more packing washers allows the optimum contact to be sought.
- Open then abruptly close the plug in the closing position in order to obtain self-centring of the seat.
- Lock the nut (46) at the same time respecting the tightening torques specif ied in paragraph 4.5.3.

  At the closing position, the sphere axis must not exceed the seat axis. A slight lead in the closing is rather desirable (fig. 3).

  A visual examination of the bearing with a light, at the back of the plug, allows the grade of contact to be estimated.

  This normal mounting, without looking for too fine a contact, allows a maximum leak equal to 0.05 % of the Cv to be obtained.

4.5.2 - Sealing ≤ 0.01 % on metal bearing face (according to ANSI B 16-104)

- **Remark** : To obtain a leak rate ≤ 0.01 % of the Cv of the valve, R is necessary to still further adjust the position of the seat with reference to the plug than required for the case obtaining a leak ≤ 0.05 % of the Cv.

  To do so, it is necessary to use one of the packing shims, whose choice is made as follows (fig. 4)

  . Measurement X1
    - no shim between seat and body
    - no plug in the piping axis

  . Measurement X2
    - no shim between seat and body
    - with plug in pil:iing axis

  . The difference X1 - X2 provides the thickness of the shims to be added between seat and body so that, the valve being in the axis of the piping, it bears perfectly on the seat.

- Insert the new seat into the body interposing the required shim thickness (X1 - X2).
- Install the plug on the seat :
- Supply the actuator at 1 bar in the case of a valve OPENING BY DEPRESSURIZATION
- Disconnect the air inlet to the actuator in the case of a valve CLOSING BY DEPRESSURIZATION
- Open, then bring the plug sharply into the closing position to obtain self-centring of the seat. Simultaneously lock nut (46) respecting the tightening torques specified in paragraph 4.5.3.
- This type of assembly with investigation into the thickness of the shims to be inserted between seat and body can easily obtain **a max. leak rate :≤ 0.01 % of the Cv**.

4.5.3 - Tightening torques for the seats

Diameter Inches	Torque mks
1"	5,5
1" 1/2	14
2"	21
3"	55
4"	58
6"	130
8"	95
10"	75
12"	102

4.6 - REPLACEMENT OF 60° ROTARY ACTUATOR WITH AN 80° ROTARY ACTUATOR (increase inflow coefficient Cv)

4.6.1 - Actuator replacement

- Remove the diaphragm box. Check that Its scale is compatible with the pressure drop limitations for an 800 rotary actuator. If necessary, change the spring or the power supply (see data sheet).
- Uncouple the crank, the stuffing box, the fixing nuts and the travel indicator. Remove the casing.
- Couple the casing, the crank corresponding to the 80° rotary actuator, the stuffing box, the fixing nuts and the travel indicator.
- Assemble the diaphragm box in the desired direction of action. Couple the crank.

4.6.2 - Actuator with handwheel and/or stops

- Replace the handwheel and/or stops with those corresponding to the 8011 rotary actuator.
- Adjust the travel limiter (ref. 69 fig. 1) and/or the stop (ref. 65 fig. 1) to protect the plug on closing.

4.6.3 - Actuator with KPP or KPE positioner

- Replace the unit's support plate with that corresponding to the KPP or KPE positioner on the 800 rotary actuator.
- If necessary, modify the unit's support plate in the 600 rotary actuator assembly kit as per instructions in fig. 9.
- Assemble and recalibrate the unit (Zero - Scale).

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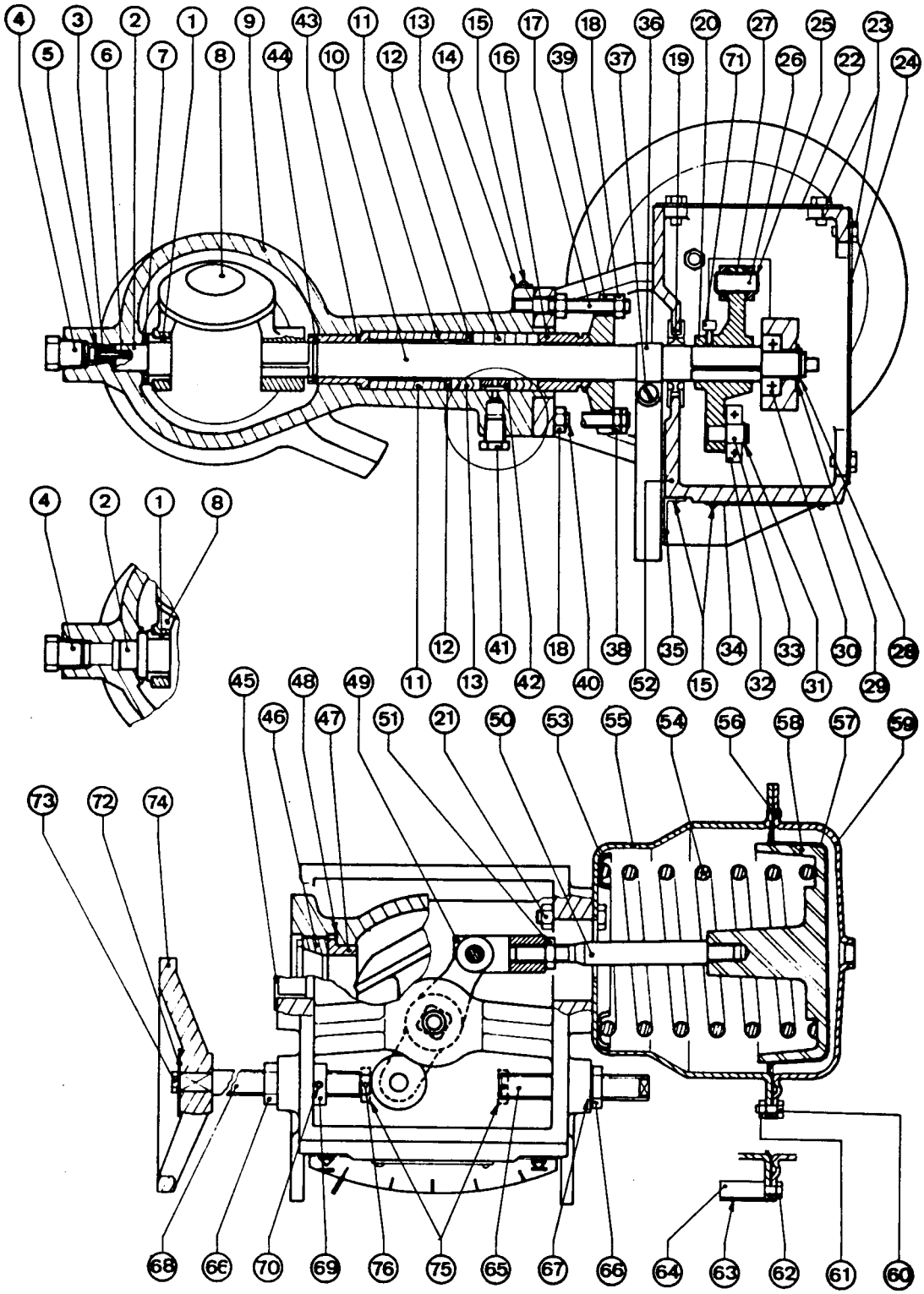
LIST OF ITEMS

1 - Plug ring
2 - Pivot
3 - Locking cone
4 - Briggs plug
5 - Lock washer
6 - Pivot locking screw
7 - Thrust washer
8 - Plug
9 - Body
10 - Control shaft
11 - Spacer
12 - Backing washer for stuffing box
13 - Packing
14 - Marker arrow direction of fluid flow
15 - Rivets
16 - tuffing box bush
17 - Stud bolt for stuffing box
18 - H nuts (for stuff ing box)
19 - Shaft gasket
20 - Crank
21 - Diaphragm box locking nut
22 - Protective plate
23 - Plate screw
24 - Protective plate
25 - Crank shaft circlips
26 - Crank shaft
27 - Crank friction ring
28 - Shaft holding circlips
29 - Shaft holding washer
30 - Ball bearing
31 - Roller axle circlips
32 - Support roller
33 - Roller axle
34 - Name plate
35 - Travel indicator plate
36 - Travel pointer
37 - Pointer screw
38 - Nuts Hm (double stuffing box) (optional)
39 - Stuff ing box flange
40 - Stud bolts for casing
41 - Briggs plug (optional)
42 - Cage (optional)
43 - Shaft guide
44 - Stop ring
45 - Plug
46 - Seat nut
47 - Seat
48 - Packing washer
49 - Fork
50 - Linking rod
51 - Fork bolt Hm
52 - Case
53 - Spring bearing cup
54 - Spring
55 - Diaphragm box body
56 - O-ring seal
57 - Diaphragm
58 - Diaphragm box piston
59 - Diaphragm box cover
60 - Diaphragm box screw
61 - Diaphragm box screw nut
62 - Spring pre-tensioning screw
63 - Safety plate
64 - Protected pipe
65 - Stop screw
66 - Lock nut
67 - Tab washer
68 - Handwheel screw
69 - Travel limiter
70 - Limiter locking screw
71 - Crank lock screw
72 - Open/closed indicator plate
73 - Handwheel screw
74 - Handwheel
75 - Pad (80* rot. actuator)
76 - Pin (800 rot. actuator)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5 6 7 8 44 10 12 14 16 39 37 19 71 26 22 24
4 2 1 8
12 41 18 38 35 34 33 30 28
45 48 49 11 13 42 40 52 15 32 31 29
46 47 51 21 50 53 55 54 56 58 57 59
73 72 74
68 66 70 69 76 75 65 67 66 64 63 62 61 60

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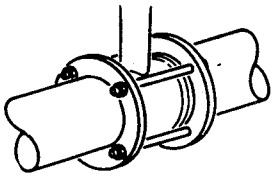
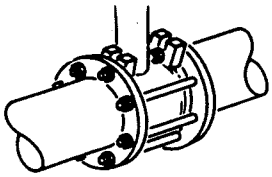
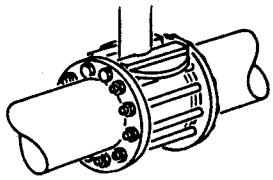
MOUNTING STYLE



With tie-rods
for sizes 1", 1"1/2 and 2"



With tie-rods and short studs for sizes 3" and 4"



With tie-rods, threaded spacer pieces and screws for sizes 6" to 12"

PIPING FASTENERS
(not supplies with valve)

Diameter		AFNOR/DIN/UNI : PN				ANSI Série (ISO PN)				
Inches	mm	10	16	25	40	64	100	150(20)	300(50)	600(100)
1"	25	4T (L=180 ; ØM12) 8E				4T (L=200 ; ØM16) 8E		4T (L=180 ; ØM14) 8E	4T (L=200 ; ØM16) 8E	
1"1/2	40	4T (L=200 ; ØM16) 8E				4T (L=230 ; ØM20) 8E		4T (L=195 ; ØM14) 8E	4T (L=230 ; ØM20) 8E	
2"	50	4T (L=230 ; ØM16) 8E				4T (L=240 ; ØM20) 8E	4T (L=240 ; ØM24) 8E	4T (L=230 ; ØM16) 8E	7T (L=230 ; ØM16) 2T (L= 97 ; ØM16) 18E 4RM	
3"	80	7T (L=260 ; ØM16) 2T (L=101 ; ØM16) 18E 4RL				7T (L=300 ; ØM20) 2T (L=120 ; ØM20) 18E 4RM	Note 1	4T (L=260 ; ØM16) 8E	7T (L=300 ; ØM20) 2T (L=120 ; ØM20) 18E 4RM	
4"	100	7T (L=290 ; ØM16) 2T (L=101 ; ØM16) 18E 4RLL		7T (L=310 ; ØM20) 2T (L=120 ; ØM20) 18E 4RL		7T (L=320 ; ØM24) 2T (L=127 ; ØM24) 18E 4RM	7T (L=335 ; ØM27) 2T (L=144 ; ØM27) 18E 4RM	7T (L=290 ; ØM16) 2T (L=101 ; ØM16) 18E 4RLL	7T (L=310 ; ØM20) 2T (L=120 ; ØM20) 18E 4RL	7T (L=355 ; ØM24) 2T (L=140 ; ØM24) 18E 4RM
6"	150	6T (L=335 ; ØM20) 4V (L=70 ; ØM20) 12E		6T (L=350 ; ØM24) 4V (L=70 ; ØM24) 12E		6T (L=395 ; ØM30) 4V (L=80 ; ØM30) 12E	10T (L=395 ; ØM30) 4V (L=90 ; ØM30) 20E	6T (L=335 ; ØM20) 4V (L=70 ; ØM20) 12E	10T (L=360 ; ØM20) 4V (L=80 ; ØM20) 20E	10T (L=410 ; ØM27) 4V (L=90 ; ØM27) 20E
8"	200	6T (L=350 ; ØM20) 4V (L=80 ; ØM20) 12E	10T (L=350 ; ØM20) 4V (L=80 ; ØM20) 20E	10T (L=370 ; ØM24) 4V (L=90 ; ØM24) 20E	10T (L=385 ; ØM27) 4V (L=70 ; ØM27) 20E	10T (L=450 ; ØM33) 4V (L=90 ; ØM33) 20E		6T (L=360 ; ØM20) 4V (L=80 ; ØM20) 12E	10T (L=400 ; ØM24) 4V (L=100 ; ØM24) 20E	10T (L=440 ; ØM30) 4V (L=100 ; ØM30) 20E
10"	250	10T (L=385 ; ØM20) 4V (L=80 ; ØM20) 20E	10T (L=410 ; ØM24) 4V (L=90 ; ØM24) 20E	10T (L=410 ; ØM27) 4V (L=90 ; ØM27) 20E	10T (L=430 ; ØM30) 4V (L=90 ; ØM30) 20E	10T (L=450 ; ØM33) 4V (L=90 ; ØM33) 20E	10T (L=480 ; ØM36) 4V (L=110 ; ØM36) 20E	10T (L=405 ; ØM24) 4V (L=90 ; ØM24) 20E	14T (L=440 ; ØM27) 4V (L=110 ; ØM27) 28E	14T (L=490 ; ØM33) 4V (L=120 ; ØM33) 28E
12"	300	Note 2	10T (L=410 ; ØM24) 4V (L=80 ; ØM24) 24E	14T (L=440 ; ØM27) 4V (L=90 ; ØM27) 28E	14T (L=455 ; ØM30) 4V (L=90 ; ØM30) 28E	14T (L=480 ; ØM33) 4V (L=100 ; ØM33) 28E	14T (L=525 ; ØM39) 4V (L=120 ; ØM39) 28E	10T (L=430 ; ØM24) 4V (L=85 ; ØM24) 20E	14T (L=470 ; ØM30) 4V (L=110 ; ØM30) 28E	18T (L=510 ; ØM33) 4V (L=120 ; ØM33) 36E

Fig. 2

T : Tie-rod (NFE 25135)- V : srews (NFE 27311
E : Nut Hh (NFE 27411) - R: Washer (NFE 25513)

Note 1 : Installation only on request
Note 2 : Installation not feasible.

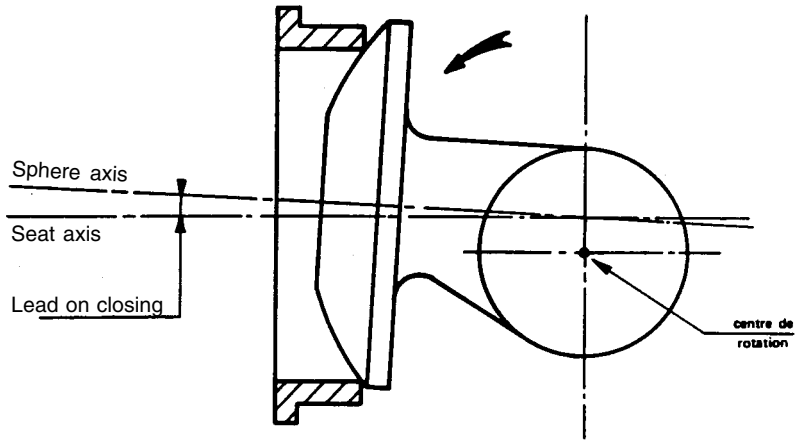


Fig. 3

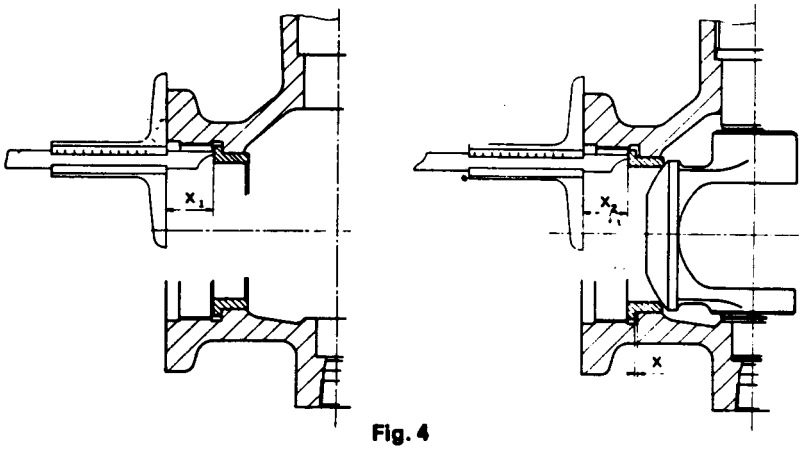


Fig. 4

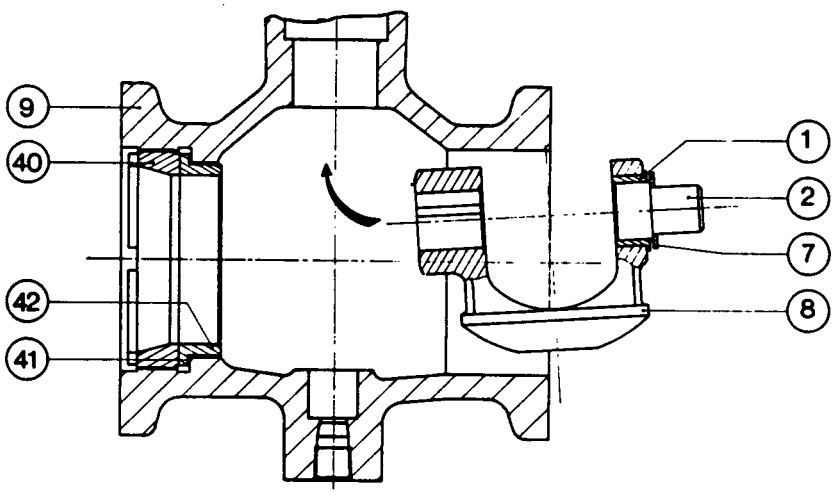


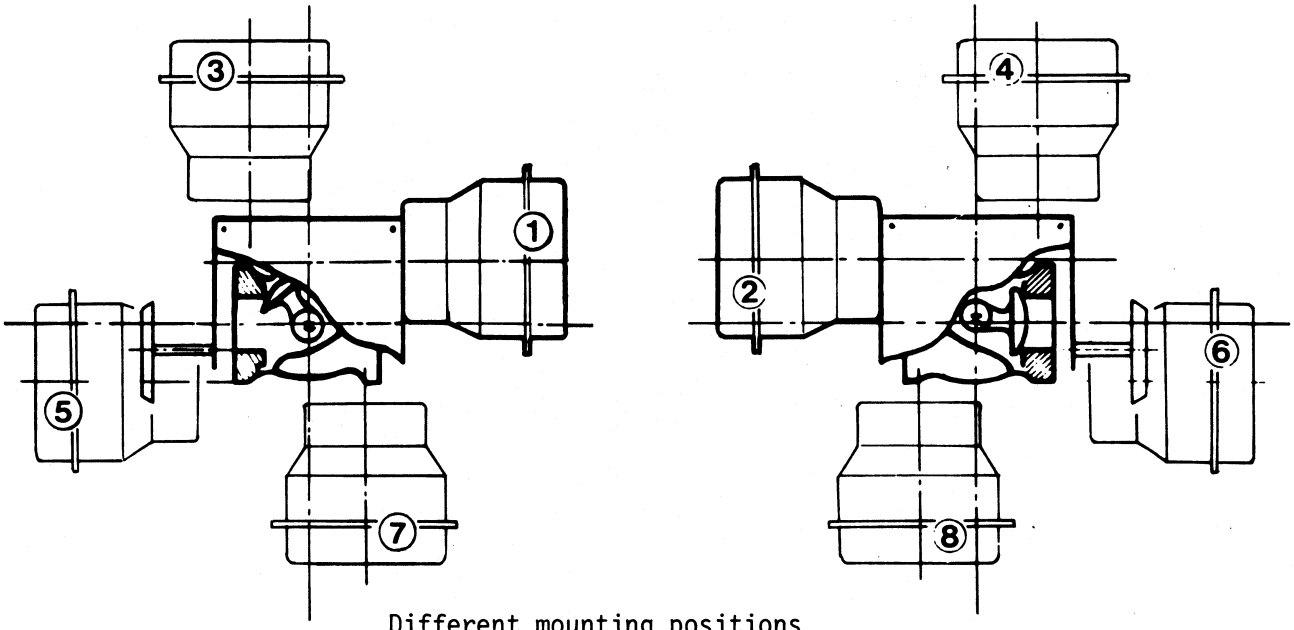
Fig. 5

DIRECT ACTION

OPENED BY DEPRESSURIZATION (OMA)

REVERSE ACTION

CLOSED BY DEPRESSURIZATION (FMA)



Different mounting positions
(viewed from travel indication side)

Fig. 6

FLUID TENDS TO CLOSE

FLUID TENDS TO OPEN

Fig. 7

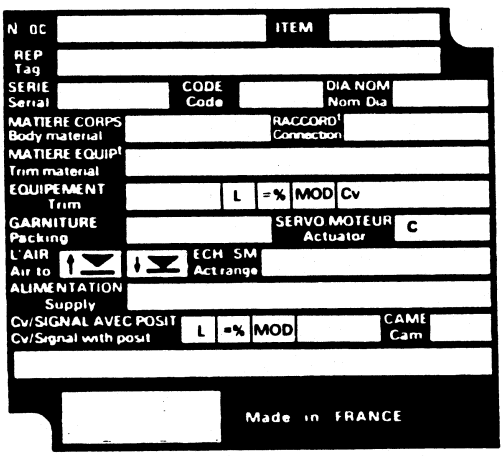
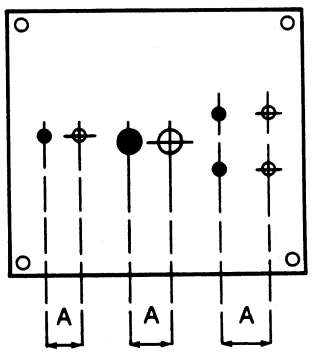


Fig. 8



Drilling for 80° rotation A = 10,4 mm

Fig. 9

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