

# INSTRUCTION MANUAL

## 3 WAY PNEUMATIC VALVE



**TYPE: N90**

### 3-Ways Pneumatic Control Valve N-90

#### Direction for installation , calibration and maintenance

#### Installation

The valve may be installed in any position, provided there is sufficient space all around for easy removal of parts during maintenance.

Valve may be used for mixing N-90 (M) or diverting N-90 (D) service.

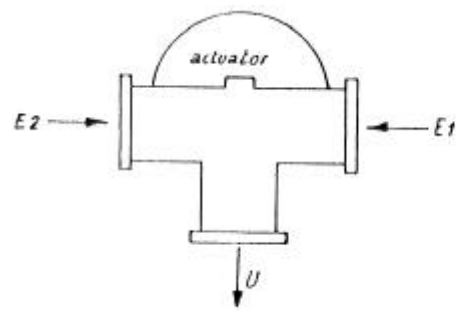


fig. 1 Mixing (N-90M)

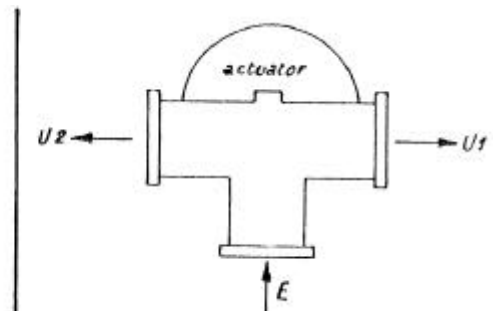


fig. 2 Diverting (N-90D)

- Blow or flush out pipe line thoroughly before installing control valve.
- A self-cleaning strainer is recommended to protect control valve.
- Install stop valves in inlet and out let lines in order to allow maintenance.
- By-passes must be installed if service cannot be shut down during maintenance.

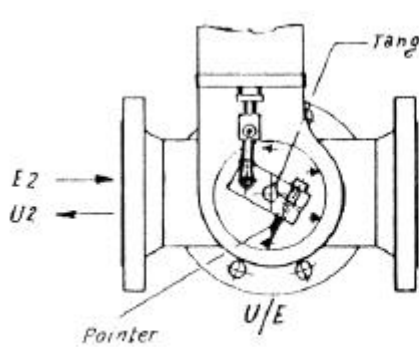


fig. 3a - Valve body -open way  
E2-U / E-U2

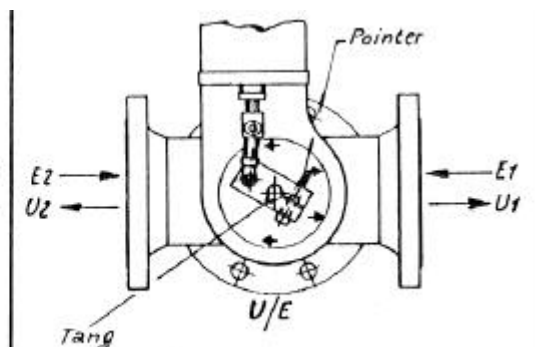


fig. 3b Valve body -open way  
E1-U / E-U1

#### OPERATION

- check for rated rotation of rotor in relation to air pressure changes on actuator diaphragm. The pointer Indicates which port is open.
- place control valve in operation in accordance with Instructions supplied with pressure or temperature controller.

## MAINTENANCE

### Disassembly:

- 1) remove screw (93) and lock washer (104) at the lower end of rod (92) **note lever face which is towards rod.** Remove screws (59) and lock washers: now it is possible to take off actuator and bonnet (64) with rotor-shaft(88) and rotor (61)  
**Caution:** while loosening screws (59) be careful that actuator and bonnet don't fall down.
- 2) remove elastic pin (103) hold lever (89) with wrench and unscrew shaft-nut (100), remove ring spacer (101), rotor, tang (109) and ring spacer (102-110). Loosen screw (106) of lever and take off lever and tang (87).  
Put on a spacer between bonnet lower end and shaft-nut, which must be screwed by hand.  
Remove screws (115) and flange (114) unscrew slowly shaft-nut, holding at opposite end the shaft, first because shaft doesn't turn while unscrewing nut, then because o-rings (116) on shaft remain in contact with seal disc (83), while spring (54) pushes off shaft together with upper bearing (111-112), upper ring spacer (53) and seal disc.  
Remove two pieces ring (113), upper bearing and ring spacer and seal disc with its o-rings (117) then remove shaft with its o-rings, middle ring spacer (53), spring, lower ring spacer (53) and lower bearing (111-112). Clean all parts in an approved solvent and remove any incrustations with very fine grain abrasive cloth.

Replace worn parts: it is recommended that all o-rings be replaced with new parts.

### Reassembly:

- 1) replace lower bearing (111-112), lower ring spacer (53), spring (54) and middle ring spacer (53). Place new o-rings (116) on shaft (88) and new o-rings (117) on seal disc. Replace two pieces ring (113) and put on shaft: upper bearing (111-112), upper ring spacer (53) and seal disc, the last in right positions on shaft o-rings. Put flange (114) on shaft and, pushing on flange, put shaft into bonnet (64). Replace screw (115) **being careful that reference marks on flange (114) and bonnet be aligned.** Replace tang (87) and lever (89) **with before noted face towards rod (92),** and tighten lever screw (106). Replace ring spacer (102-110), tang (109), rotor (61), ring spacer (101), shaft-nut (100) and elastic pin (103).
- 2) Place new bonnet o-rings (105), put bonnet into valve-body (63) being careful that reference marks on body and bonnet be aligned and be sure that position remain unaltered, while replacing actuator and tightening screws (59) and lock washers (57). Attach lower rod end to lever with screw (93) and lock washer (104). Pointer is joined to lever and open port is shown on flange (114). If during maintenance fork (95) position or rod length have been changed, it is possible to readjust original -situation (before using screw 93), loosening nuts (70) and lock nut of two pieces rod.

**Changing valve action:**

The valve action can be changed without removing the rotor or disturbing the line connections. To reverse the action remove the lever and rotate the shaft 180°. Turn the lever over so that the lever tang-way aligns with the shaft tang. The port which is open is shown on the flange (114).

**OPERATION TROUBLES**

**Problem:** proper air pressure to actuator and less than rated or no valve travel

**Possible cause(s):**

- 1) Incorrect air signal to actuator diaphragm;
- 2) air leaks in tubing or connections;
- 3) ruptured actuator diaphragm;
- 4) incorrect adjustment of rod end extension;
- 5) dirt or foreign matter restricting rotor movement,

**Remedy:**

- 1) check controller and correct;
- 2) check and correct;
- 3) replace diaphragm;
- 4) readjust in accordance with instructions;
- 5) disassemble valve . Clean and polish rotor and valve body

**Problem:** incorrect **port open** when **air is applied to actuator**

**Possible cause:**

- 1) valve assembled incorrectly

**Remedy:**

- 1) **see:** changing valve action

**Problem:** leakage from bonnet.

**Possible cause(s):**

- 1) o-rings worn or damaged. Shaft o-rings may be damaged by excessive rotor shaft bearing wear;
- 2) o-rings not installed;

**Remedy:**

- 1) replace o-rings. Check rotor shaft side movement. Replace bearing If necessary
- 2) Install o-rings.

**Problem:** erratic movement of rotor although air signal to actuator diaphragm is stable.

**Possible cause:** 1) pressure drop across valve in excess of that allowed;

**Remedy:**

- 1) **see the related table:** maximum allowable pressure drop.

**Spare Parts List** (refer to figure 4 on next page)

	<b>PART DESCRIPTION</b>	<b>MATERIAL</b>
1	Yoke with bottom cover	Steel
3	Cover fixing nuts	Steel
4	Cover fixing screws	Steel
5	Upper case	Steel
6	Screws	Steel
7	Lock washers	Steel
8	Diaphragm	Neoprene with textile insert
9	Diaphragm plate	Steel
12	Spring	Si-Mn Steel
13	Spring guide ring	Steel
14	Spring loading screw	Nickelled Steel
15	Stem	Nickelled Steel
16	Range plate	Al-Alloy
17	Screws	Stainless Steel
18	Serial plate	Stainless Steel
19	Hand-wheel screw counter nut	Nickelled Steel
20	Elastic pin	Steel
21	Hand-wheel	Steel
22	Hand-wheel screw	Nickelled Steel
23	O-ring	Nitrile Rubber
24	Screw	Steel
25	Hand-wheel plate	Steel
48	Range loading screw	Steel
49	Range loading nut	Steel
53	Ring spacer	Bronze
54	Spring	Stainless Steel AISI 316
57	Lock washer	Steel
59	Screw	Steel
61	Plug	Bronze
63	Body	Cast Iron
64	Bonnet	Cast Steel
70	Nut	Stainless Steel AISI 304
71	Pointer	Stainless Steel AISI 304
83	Seal Disc	Reinforced PTFE
87	Tang	Steel
88	Shaft	Stainless Steel AISI 316
89	Lever	Steel
92	Connecting rod	Steel
93	Screw	Steel
95	Port	Steel
100	Shaft nut	Bronze
101	Ring spacer	Stainless Steel AISI 316
103	Elastic pin	Stainless Steel AISI 316
104	Elastic pin	Steel
105	O-ring	Nitrile rubber
106	Screw	Steel
107	Elastic pin	Steel
108	Lining (if requested)	Stainless Steel AISI 316
109	Tang	Steel
111	Bearing House	Bronze
112	Bearing	Reinforced PTFE
113	Two pieces ring	Brass
114	Flange	Steel
115	Screw	Steel
116	O-ring	Nitrile rubber
117	O-Ring	Nitrile rubber

Figure- 4

