

Masoneilan 71000 Series Control Valve Instructions

Instruction No. EH 6010E

Includes Model 37-71521 (ATC) and Model 38-71521 (ATO)



OPERATION

Model 37-71521 Control Valves are opened by the spring and closed by an increase in diaphragm pressure.

Model 38-71521 Control Valves are closed by the spring and opened by an increase in diaphragm pressure.

INSTALLATION

Before placing the valve in pipeline, clean the line thoroughly of all dirt, welding chips, scale, oil, grease or any other foreign material.

Install valve so that the controlled fluid will flow through the valve body in the direction indicated by the **arrow** on the body or the words **IN** and **OUT** on the connections. A three-valve by-pass permits removal of the control valve from the line without shutting down the system.

If valve has a finned bonnet, do not insulate bonnet.

Air Piping: Pipe actuating air pressure line to the ¼" NPT opening in the diaphragm case —

To UPPER diaphragm case if valve is Model 37-71521.
To LOWER diaphragm case (Size 15 and 18 cases) or yoke (Size 11 and 13 cases) if valve is Model 38-71521.

Use ¼" OD copper tubing or the equivalent for this air line. If air line exceeds 25 ft. in length, ⅜" OD tubing is preferred. **Air lines must not leak.**

MAINTENANCE

Note: Do not change spring adjustment unless necessary to replace diaphragm.

If necessary to disassemble valve to clean or grind seats, proceed as follows:

Disassembly — To Clean: Disconnect actuating air line at diaphragm case. If a controller or positioner is mounted on the valve, disconnect air supply and con-

trolled pressure lines at instrument case. Remove bonnet studs and lift actuator, bonnet, valve plug and stem from valve body. Clean seating surfaces with a clean soft cloth.

To Grind Seat: If necessary to regrind seat, loosen stem locknuts and turn them, with indicator disk, down the plug stem and lock them. With wrench applied over the locknuts, turn the plug stem out of the actuator stem. Remove clamping nut and detach actuator from bonnet. Replace bonnet, with valve plug, on body and grind seat lightly, using bonnet as a guide. Grind only a **small** amount using a good grade of "fine" compound. Excessive grinding will only shoulder the seat ring and will not improve seating. Clean seat thoroughly and reassemble.

Reassembly — Model 37-71521: Replace actuator with clamping nut on bonnet and turn plug stem into actuator stem as far as it will go. Replace actuator and bonnet on valve body. Run locknuts up plug stem and lock tightly to actuator stem. Indicator disk should indicate maximum rated opening as shown on the travel plate. Apply sufficient pressure to diaphragm to move plug stem down until indicator disk shows valve to be closed. Loosen locknuts and turn plug stem out of actuator stem until plug is seated. Lock plug stem to actuator stem with locknuts. Relieve diaphragm pressure. Indicator disk should return to maximum rated opening.

Reassembly — Model 38-71521: Replace actuator with clamping nut on bonnet and turn plug stem into actuator stem as far as it will go. Replace actuator and bonnet on valve body. Turn plug stem, with indicator disk, out of actuator stem until plug is seated. Apply sufficient air pressure to diaphragm to lift plug off the seat. Turn plug stem one full turn out of actuator stem. Relieve diaphragm pressure. Lock plug stem to actuator stem. Indicator disk should show valve to be closed.

PARTS IDENTIFICATION

No.	Part Name	No.	Part Name	No.	Part Name
1	Body	18	Yoke Cap Screws	45	Diaphragm Case Cap Screws
2	Seat Ring	†19	Yoke Gasket	46	Diaphragm Case Nuts
3	Seat Ring Retainer	†20	Yoke Packing Box Nut	47	Body Studs
4	Plug	22	Spring	48	Body Stud Nuts
5	Plug Stem	‡26	Actuator Stem & Plate S/A	49	Body Gasket
6	Plug Stem Pin	27	Stem Locknuts	54	Guide Bushing
8	Bonnet	†30	Actuator Stem Nut	56	Indicator Plate
8AB	Finned Bonnet	†31	Yoke Packing Box	57	Indicator Plate Screws
8EB	Extension Bonnet	†32	Actuator Stem Packing	58	Indicator Disk
9	Clamp Nuts	†33	Upper Spring Button	66	Lubricator S/A
10	Packing Box Gland	†34	Lower Spring Button	67	Isolating Valve S/A
11	Packing Box Flange	36	Adjusting Screw	68	Nipple
12	Packing Box Flange Studs	†37	Adjusting Screw Bushing	†71	Spring Barrel
13	Packing Box Flange Stud-Nuts	39	Diaphragm	†72	Spring Barrel Cap
14	Plug Stem Packing	†40	Diaphragm Plate	†73	Spring Barrel Gasket
†15	Yoke Packing Box Gasket	41	Diaphragm Washer	†74	Spring Barrel Cap Screws
16	Lubricant Ring	43	Upper Diaphragm Case	‡75	Diaphragm Cap Screw
17	Yoke	44	Lower Diaphragm Case		

NOTE: Reference numbers are not factory part numbers. For part numbers consult Parts List.

†On Model 38-71521 valves only (air-to-open)

‡On Model 37-71521 valves only (air-to-close)

Replacing Diaphragm — Model 37-71521: Disconnect actuating air line at diaphragm cases. Relieve all spring compression by turning adjusting screw counterclockwise. Remove upper diaphragm case, diaphragm cap screw and washer, and diaphragm. Install new diaphragm and reassemble. Connect actuating air line, with gauge, to diaphragm case. Turn adjusting screw to compress the actuator spring. Apply air pressure and watch gauge. By feeling plug stem, note at what pressure stem begins to move. Readjust spring compression until stem just begins to move at minimum pressure of spring range stamped on serial plate.

Replacing Diaphragm—Model 38-71521: Relieve all spring compression by turning adjusting screw counterclockwise. Remove upper diaphragm case assembly (includes spring barrel, spring and spring button) spring stem nut and diaphragm plate. Install new diaphragm and reassemble. Readjust spring setting using same procedure as for Model 37-71521.

Packing Box Lubricator: Keep lubricator filled with a specified MASONILAN lubricant and turned in firmly

but not **tightly**. Lubricant is intended as an aid to the packing — not as a packing itself. Too little lubricant is better than too much.

Note: *Ball check valve in pressure lubricator prevents leakage when lubricator is being refilled. Isolating valve provides additional protection on steel or alloy valves.*

Packing: Packing box gland should be held firmly against packing — but not too tightly. Be sure that both ends of bolted flange exert equal pressure on gland.

If necessary to renew packing, disassemble valve as directed previously, remove locknuts, indicator disk, and turn plug stem out through packing box. Remove packing box flange and gland, push out old packing, together with lubricant ring, by working from underside of bonnet. Insert new ring packing — one ring of packing, then lubricant ring, then more packing rings to fill packing box. In an emergency, string packing may be inserted without removing old packing, after first taking valve out of service.



Fig. 1 Extension Bonnet
Parts Ref. No. 8EB

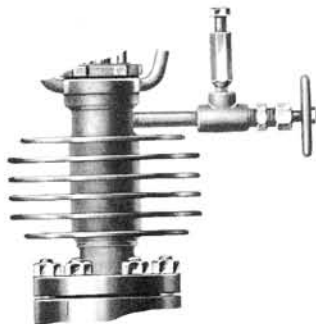


Fig. 2 Finned Bonnet
Parts Ref. No. 8AB

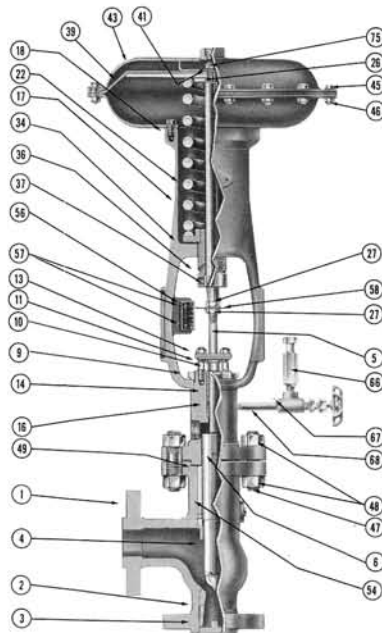


Fig. 3 Model 37-71521
(Air-to-Close)

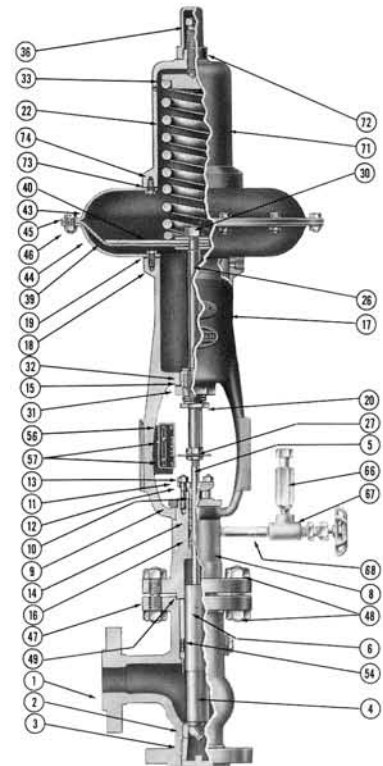


Fig. 4 Model 38-71521
(Air-to-Open)

USEFUL EQUIVALENTS

U.S. CUSTOMARY UNITS

Specific gravity of air G = 1 (reference for gases)

Specific gravity of water = 1 (reference for liquids)

U.S. gallon of water = 8.33 lbs @ std. cond.
 1 cubic foot of water = 7.48 gallons
 Air specific volume = 1/density = 13.1 cubic feet/lb
 G of any gas = density of gas/0.076

1 cubic foot of water = 62.34 lbs @ std. cond. (= density)
 1 cubic foot of air = 0.076 lbs @ std. cond. (= air density)
 Air molecular weight M = 29
 G of any gas = molecular wt. of gas/29

$$G \text{ of gas at flowing temp.} = \frac{G \times 520}{T + 460}$$

Standard conditions (U.S. customary) are at 14.69 psia & 60°F

Flow conversion of gas

$$SCFH = \frac{\text{Lbs/hr}}{\text{density}} \quad SCFH = \frac{\text{Lbs/hr} \times 379}{M} \quad SCFH = \frac{\text{Lbs/hr} \times 13.1}{G}$$

Flow conversion of liquid

$$GPM = \frac{\text{Lbs/hr}}{500 \times G}$$

Heat Units

1 Btu = 1°F/lb of water 1 cal = 1°C/gram of water 1 Kcal = 1000 cal 1 Btu = 252 cal 1 Btu = 0.252 Kcal

Temperature Conversion

$$F \text{ (Fahrenheit)} = C(9/5) + 32$$

$$C \text{ (Celsius)} = (F - 32) 5/9$$

METRIC CONVERSION TABLES

Multiply	By	To Obtain
<u>LENGTH</u>		
millimeters	0.039	inches
centimeters	0.394	inches
inches	2.54	centimeters
feet	30.48	centimeters
feet	0.304	meters
<u>AREA</u>		
sq. centimeters	0.155	sq. inches
sq. centimeters	0.001076	sq. feet
sq. inches	6.452	sq. centimeters
sq. inches	0.00694	sq. feet
sq. feet	929	sq. centimeters
<u>FLOW RATES</u>		
gallons US/minute (GPM)	3.785	liters/min
gallons US/minute	0.133	ft ³ /min
gallons US/minute	0.227	m ³ /hr
cubic feet/minute	7.481	GPM
cubic feet/hour	0.1247	GPM
cubic feet/hour	0.01667	ft ³ /min
cubic meters/hour	4.403	GPM
cubic meters/hour	35.31	ft ³ /hr
<u>VELOCITY</u>		
feet per second	0.3048	meters/second
feet per second	1.097	km/hr
feet per second	0.6818	miles/hr

Multiply	By	To Obtain
<u>VOLUME & CAPACITY</u>		
cubic feet	28.32	liters
cubic feet	7.4805	gallons
liters	61.02	cubic inches
liters	0.03531	cubic feet
liters	0.264	gallons
gallons	3785.0	cubic cm
gallons	231.0	cubic inches
gallons	0.1337	cubic feet
<u>WEIGHT</u>		
pounds	0.453	kilogram
kilogram	2.205	pounds
<u>PRESSURE & HEAD</u>		
pounds/sq. inch	0.06895	bar
pounds/sq. inch	0.06804	atmosphere
pounds/sq. inch	0.0703	Kg/cm ²
pounds/sq. inch	6.895	kPa
pounds/sq. inch	2.307	ft of H ₂ O (4°C)
pounds/sq. inch	0.703	m of H ₂ O (4°C)
pounds/sq. inch	5.171	cm of Hg (0°C)
pounds/sq. inch	2.036	in of Hg (0°C)
atmosphere	14.69	psi
atmosphere	1.013	bar
atmosphere	1.033	Kg/cm ²
atmosphere	101.3	kPa
bar	14.50	psi
kilogram/sq. cm	14.22	psi
kiloPascal	0.145	psi

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