# Masoneilan
# Lo-db High Pressure Control Valves

**Bulletin BP5500E**
(Formerly Bulletin 373E)

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# the 77000 Series Lo-db control valve cuts noise to acceptable limits; provides long-term, maintenance-free service

The 77000 Series Lo-db valve* is designed to reduce fluid velocities and the resultant noise generation to tolerable levels, while diminishing metal fatigue and erosion due to high fluid velocities and vibration, at low initial installation costs.

**Installation Costs Minimized**

The size of the outlet flange is purposely enlarged to reduce outlet velocity and to eliminate the need for pipe reducers between the valve and the larger downstream piping. The outlet flange connection is available in lower ratings (see specifications). Additional cost savings are found in the omission of expensive silencers.

**Quiet Operation**

The multiple step, labyrinth type plug and seat ring incorporate a Stellite-faced seating surface (3) at the top to provide tight shut-off. The rest of the steps do not touch. The intermeshing flow pattern between the steps results in a large number of sharp turns for the fluid. This develops a high velocity “head loss” (pressure drop) and therefore a reduced velocity. The shape of the plug steps is designed to prevent the deposit and trapping of solids entrained in the fluid stream. Low velocity also ensures longer trim life due to less abrasion.

**Low Cost Operation and Maintenance**

The relatively short stroke of the Lo-db valve keeps installation and operation costs low by permitting use of standard, pneumatic spring-diaphragm actuators. These atcuators, used with a ratio lever, provide sufficient force to close the valve at pressure drops up to 6000 psi with the spring alone.

Due to integral bonnets, the deep packing box is the only high pressure seal in the valve. The oversize stem and plug (1) are welded together to form a sturdy, vibration-proof subassembly having a high natural frequency. The plug and stem are guided top and bottom for additional rigidity.

The removable seat ring (5) is clamped against a shoulder in the valve body by the lower flange. Since the shoulder (6) is near the bottom flange , the long seat ring is free to expand and contract with changes in fluid temperature. Leakage between the seat ring and body is prevented with a high pressure O-ring seal (2) for near ambient temperature fluids and the lapped shoulder (6) for high temperature applications. Raised lips (7) are machined on the seat ring and body for a possible seal weld.

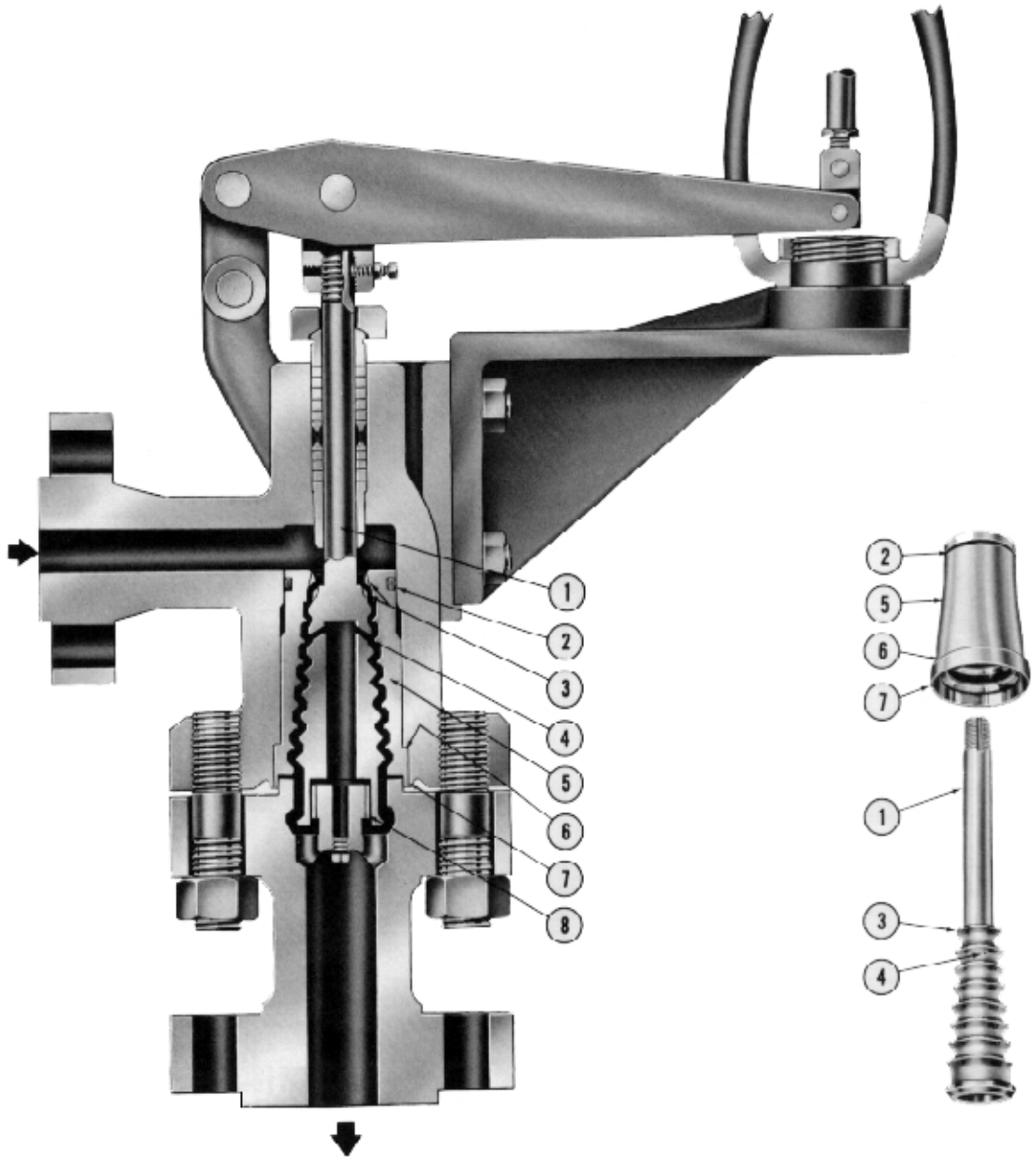
**Smooth, Stable Control; Fail Safe Action**

The high rangeability (100:1) of the Lo-db valve allows wide variations in controlled flow. Operation is stable because the low static unbalanced is achieved by supporting the plug on the lower guide (8), which acts as a piston. By admitting a selected intermediate pressure through internal plug porting (4), a balance force exists within the plug which reduces the unbalance force to a minimum. The valve will fail in the proper direction by the actuator spring on air failure.

**Auxiliary Equipment**

A variety of optional pneumatic and electropneumatic positioners, solenoid valves, limit and position switches and handwheels are available to suit each process application.

*U.S. Patent No. 3,485,474 and other foreign patents.




**Valve shown wide open**

# specifications

## general data

*flow characteristic:* linear

*rangeability:* 100:1

*flow direction:* side inlet connection - bottom outlet

*miximum fluid temperature:* to 775F (carbon steel)
to 1050F (stainless steel or chrome-moly)

*seat leakage:* 0.01% of max. $C_V$ at 50 psi air drop to atmoshpere (ANSI B16.104, Class IV)

## body

*type:* cast with integral bonnet and bolted outlet flange

*standard sizes:* 2" x 3", 2" x 4", 3" x 4", 3" x 6", 4" x 6", 4" x 8", 6" x 8"

*materials:* carbon steel (ASTM, A216 Gr. WCB)
stainless steel (ASTM, A351 Gr. CF8M)
chrome-moly steel (various grades available)

*connections:* flanged or butt welded

*body rating:* ANSI Class 2500

## Flange Ratings

| Valve Size (in.) (nominal) | Inlet | | Outlet | |
|---|---|---|---|---|
| | Size (in.) | Rating ANSI Class | Size (in.) | Maximum Rating ANSI Class |
| 2 | 2 | 1500 & 2500 | 3<br>4 † | 2500<br>900 |
| 3 | 3 | 1500 & 2500 | 4<br>6 † | 2500<br>600 |
| 4 | 4 | 1500 & 2500 | 6<br>8 † | 1500<br>600 |
| 6 | 6 | 1500 & 2500 | 8 | 2500 |

† Not available with "C" trim.

## seat ring and plug

*type:* expanding labyrinth

*materials:* AISI 316 stainless steel with Stellited seating surfaces

**plug stem** 17-4 PH stainles steel (to 800F)
AISI 316 stainless steel with Stellited guiding surfaces (to 1050F)

**guide bushings** AISI 440C hardened (to 800F)
AISI 316 stainless steel with Stellite (above 800F)

**packing (lubricated)**
Teflon asbestos (to 400F)
Grafoil (400F to 1050F)

**seat ring gasket**
Buna-N O-ring (to 180F)
Lapped metal seal and
Asbestos-filled stainless steel gasket

**studs** Steel ASTM A193 Gr.B7 (to 850F)
ASTM A320 Gr.B8 (to 1050F)

**lever** Cadmium plated steel

## Flow Coefficients - rated $C_V$

| Valve Size (in.) | Trim A (for lowest noise values) | | Trim B | | Trim C** (single step) |
|---|---|---|---|---|---|
| | Area Ratio | $C_V$* | Area Ratio | $C_V$* | $C_V$ |
| 2 | 4.2 | 15 | 1.9 | 25 | 45 |
| 3 | 3.4 | 35 | 1.8 | 50 | 110 |
| 4 | 4.0 | 60 | 2.4 | 80 | 185 |
| 6 | 3.5 | 85 | 2.0 | 125 | 260 |

* Use in conjunction with $C_y$ factor. See Masoneilan Noise Control Manual

** Use standard valve SPL prediction method with $C_f = 0.9$

## Model Numbers

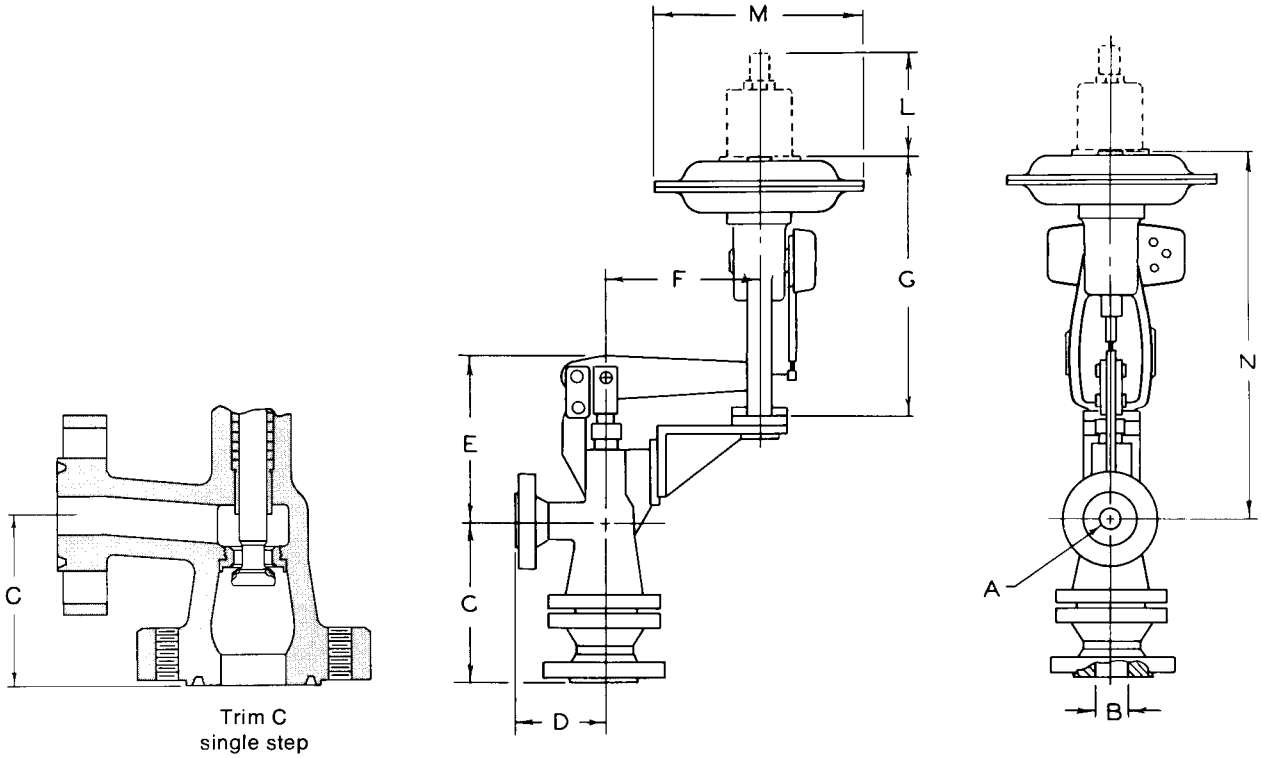
| Linear Plug Description | | with Spring-Diaphragm Actuator | |
|---|---|---|---|
| | | air-to-open | air-to-close |
| Size A | Reduced Area | 37-77773-A | 38-77773-A |
| Size B | Full Area | 37-77773-B | 38-77773-B |
| Size C | High Capacity Single Step | 37-77773-C | 38-77773-C |

## Pressure Drop Limitation (spring-diaphragm actuator)

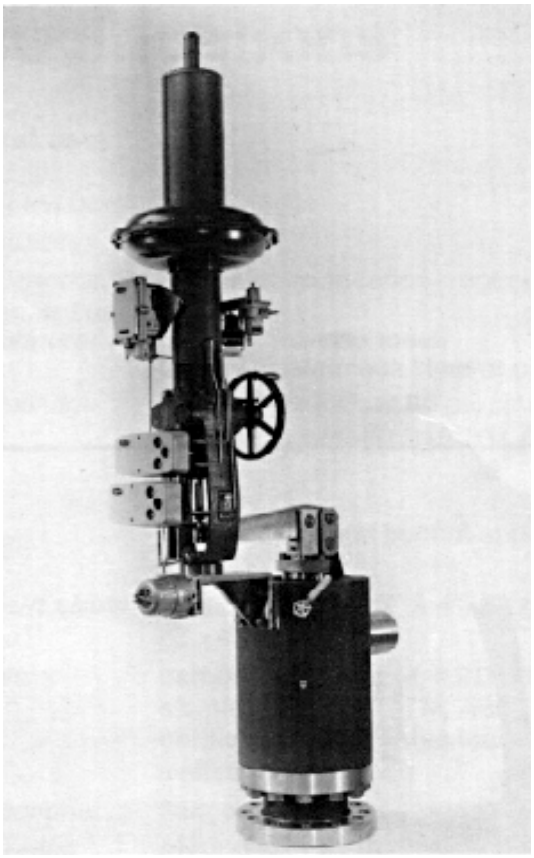
| Valve Size | Stroke (in.) | Actuator Size | Air-to-Open Action | | | Air-to-Close Action | | |
|---|---|---|---|---|---|---|---|---|
| | | | Spring Range (psi) | Allowable Pressure Drop | | Spring Range (psi) | Allowable Pressure Drop | |
| | | | | psi | bar | | psi | bar |
| 2 | 1½ | 15 | 11-30 | 5000 | 345 | 3-15 | 5000 | 345 |
| 3 | 2½ | 18L | 12-30 | 4000 | 275 | 3-15 | 6000 | 415 |
| 4 | 3½ | 24 | 9-30 | 3000 | 205 | 3-15 | 5000 | 345 |
| 6 | 3½ | 24 | 19-46 | 4000 | 275 | 3-15 | 4000 | 275 |

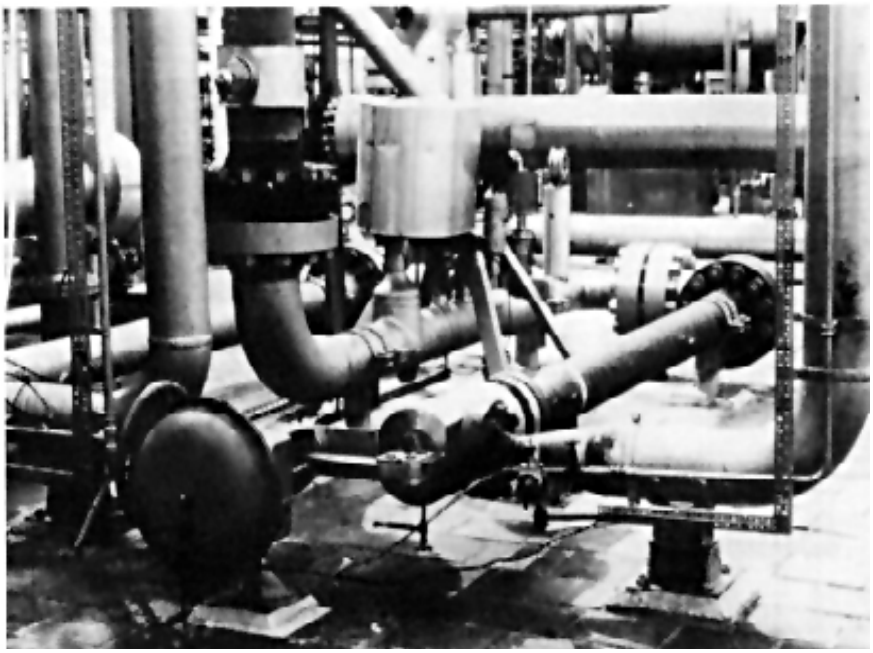
Supply pressure: 35 psig for all sizes except 50 psig required with 6" valve.

# dimensions

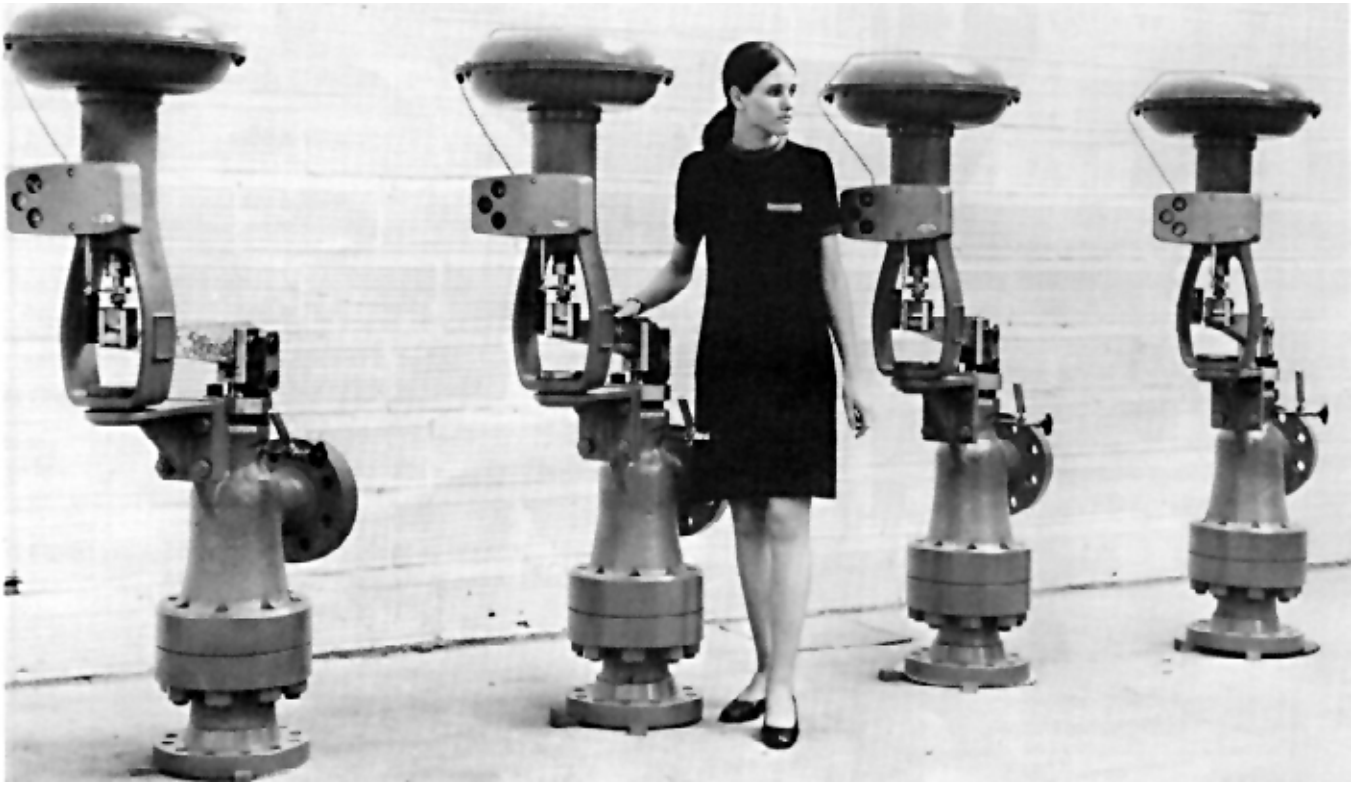



| Valve Inlet A | Valve Outlet B | C | | D | E | F | G | L | M | N |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Trim A & B | Trim C | | | | | | | |
| **inches** | | | | | | | | | | |
| 2 | 3 | 18 1/8 | 8 1/2 | 9 1/2 | 14 3/8 | 13 7/8 | 22 1/4 | 11 | 17 1/2 | 34 11/16 |
| | 4 | | ——— | | | | | | | |
| 3 | 4 | 22 13/16 | 11 13/16 | 11 1/2 | 16 1/8 | 17 | 33 | 19 1/8 | 20 3/4 | 44 9/32 |
| | 6 | | ——— | | | | | | | |
| 4 | 6 | 28 3/4 | 15 1/2 | 14 1/2 | 21 1/4 | 18 3/4 | 33 1/2 | 18 7/8 | 27 | 47 1/2 |
| | 8 | | ——— | | | | | | | |
| 6 | 8 | 37 1/2 | 20 | 16 | 25 1/4 | 22 | 41 1/4 | 17 3/4 | 27 | 57 |
| **millimeters** | | | | | | | | | | |
| 50 | 80 | 460 | 215 | 241 | 365 | 352 | 565 | 280 | 445 | 880 |
| | 100 | | ——— | | | | | | | |
| 80 | 100 | 570 | 300 | 292 | 410 | 430 | 838 | 485 | 526 | 1120 |
| | 150 | | ——— | | | | | | | |
| 100 | 150 | 730 | 395 | 368 | 540 | 475 | 851 | 478 | 686 | 1210 |
| | 200 | | ——— | | | | | | | |
| 150 | 200 | 954 | 508 | 406 | 641 | 560 | 1050 | 450 | 686 | 1450 |





Above: horizontally installed Lo-db valve handling up to 7,500,000 scfh gas in a process plant.
Left: 6” x 8” Lo-db valve for 220 lb/hr superheated steam in turbine bypass application.
Below: four of 17 Size 3” x 6” Lo-db valves employed for 5000 psi natural gas pressure reduction.



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