

# Pressure reducing Valve

Series 700D - 01R01

**inbal**  
v a l v e s



Model 799D-01R01

## General Description

The **Inbal** Pressure Reducing Valve series 700D-01R01 is specifically designed for pressure regulating applications in fire protection systems. The **Inbal** 700D-01R01 Valve automatically reduces a higher inlet pressure to a preset delivery pressure, which remains steady and unaffected by the variations or fluctuations in the inlet line pressure.

The series 700D-01R01 consists of the **Inbal** Valve which is a pressure operated, sleeve actuated, axial valve and a pressure reducing pilot control. The **Inbal** Pressure Reducing Valve maintains the downstream pressure within a narrow pressure range. If the downstream pressure changes slightly the pilot control responds immediately to modulate the **Inbal** Valve for the preset pressure.

The use of the **Inbal** Pressure Reducing Valve balances the distribution of the water capacity available throughout the system and prevents a higher demand from the areas which are of lower altitude or are located closer to the pressure source. Thus, the total system demand is balanced and the excess flow through the system with high pressure water supplies is reduced to the desired level. The adjustment of the delivery pressure could be easily modified at the site.

Standard material **Inbal** Pressure Reducing Valves are rated to 300 psi and are available in sizes 1½" (40 mm) to 12" (300 mm) with threaded, flanged, and wafer ends.

The only moving part in the **Inbal** Valve, when it operates, is the reinforced sleeve which forms a drip tight seal with the corrosion resistant core. The unique design of the **Inbal** Valve and the pilot control, as well as the variety of materials and coatings make the **Inbal** Pressure Reducing Valve suitable for use with brackish or sea water similar to those found in chemical and petrochemical facilities or in offshore platforms.

## Technical Data

### Approvals

The basic **Inbal** Valve is approved in sizes 3" (80 mm) to 8" (200 mm) by FM as an automatic water control valve to 300 psi (21 bar). **Inbal** Valves series 700 are Lloyd's, DNV, and ABS Type approved in sizes 1½" (40 mm) to 12" (300 mm) to 300 psi (21 bar).

## Model Numbers

Inlet End	Outlet End	Model No.
Threaded	Threaded	711D-01R01
Flanged	Flanged	733D-01R01
Wafer	Wafer	799D-01R01

## Sizes

### Threaded End:

1½", 2", 2½", & 3" (40, 50, 65, & 80 mm).

### Flanged End:

2", 3", 4", 6", 8", 10" & 12" (50, 80, 100, 150, 200, 250 & 300 mm).

### Wafer End:

3", 4", 6", 8", 10", & 12" (80, 100, 150, 200, 250, & 300 mm).

## End Standards

### Threaded End:

NPT or BSPT.

### Flanged End:

ANSI B16.5 class 150 & 300 ;

ISO 7005 - PN 10, 16 & 25 ;

BS 10 Table D & E ;

AS 2129 Table D & E ;

Jis B2212, 2213 & 2214.

### Wafer End:

Fits most of the above standards.

## Pressure Rating

Maximum working pressure\*: 300 psi (21 bar).

\* Standard material valve.

## Adjustment Range

### Standard\*

30 to 300 psi (2 to 21 bar).

\* Marked red.

## Temperature Range

Water: Max. +150°F (+65°C).

## Installation Position

Vertical or horizontal.

## Materials

### Standard

#### Valve Housing:

Carbon Steel (SAE 1021).

#### Valve Ends:

Ductile Iron (ASTM A536-65 45 12).

#### Sleeve:

SMR5 Elastomer reinforced with Poly-ester and Kevlar.

#### Control Trim:

Brass Nickel Chrome plated, Stainless Steel.

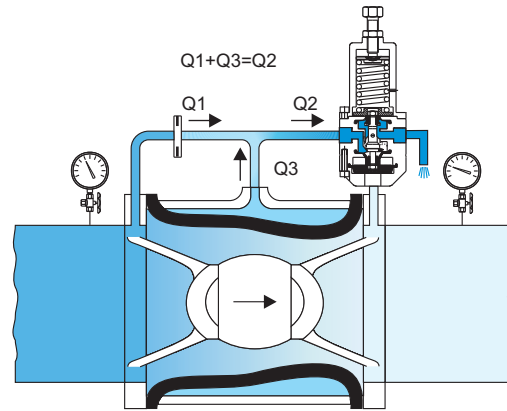


Figure (1)

### "Under Satisfied" Position

The system pressure drops below the setting. The Pilot Valve opens wider to decrease the Control Chamber pressure.

The Inbal Valve opens wider to increase the delivery pressure.

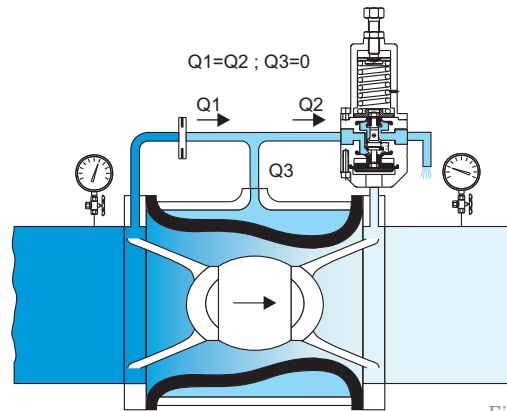


Figure (2)

### "Satisfied" Position

The system pressure is precisely as preset. The Pilot Valve releases the exact same flow rate which is introduced through the orifice.

The Inbal Valve stays in a stable throttling position.

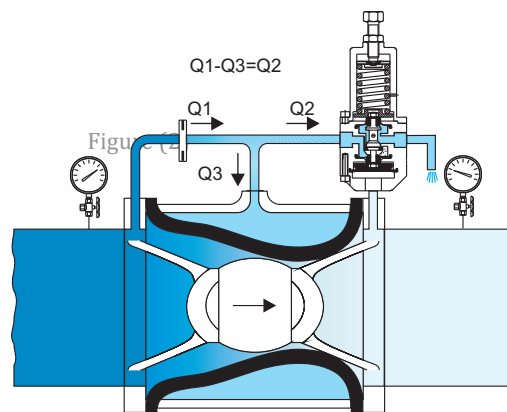


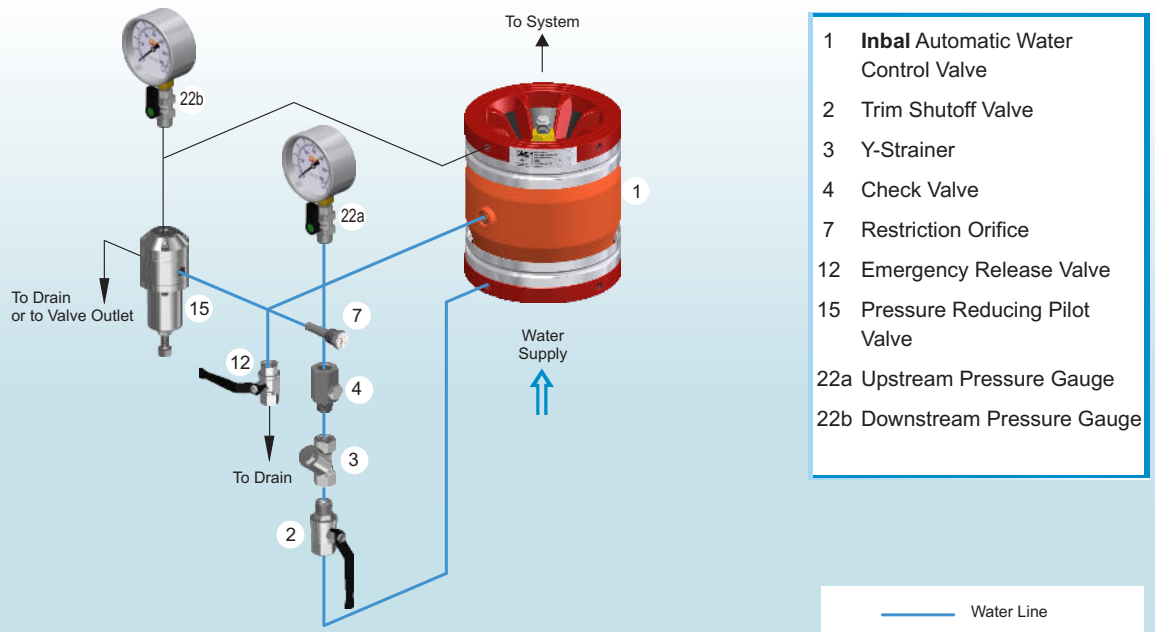
Figure (3)

### "Over Satisfied" Position

The system pressure exceeds the setting. The Pilot Valve is closing to increase the Control Chamber pressure.

The Inbal Valve is closing to reduce the delivery pressure.

## Schematic Control Diagram – 700D-01R01



- 1 **Inbal** Automatic Water Control Valve
- 2 Trim Shutoff Valve
- 3 Y-Strainer
- 4 Check Valve
- 7 Restriction Orifice
- 12 Emergency Release Valve
- 15 Pressure Reducing Pilot Valve
- 22a Upstream Pressure Gauge
- 22b Downstream Pressure Gauge

— Water Line

### Optional

Cast Steel ;  
 Bronze ;  
 Nickel Aluminum Bronze ;  
 Stainless Steel AISI 316 ;  
 Super Austenitic Stainless Steel ;  
 Super Duplex Stainless Steel ;  
 Titanium.

\* The standard for each optional material is available upon request.

### Coating

#### Standard

Powder epoxy coated. Thickness: 0.004" (0.1 mm) external and internal surfaces.

#### Optional

High built epoxy coated and polyurethane finish. Thickness: 0.01" (0.3 mm).

Halar<sup>®</sup> coated. Thickness: 0.02" (0.5 mm) .

Halar<sup>®</sup> is a registered trade mark of Ausimont USA Inc.

### Features

- No Moving Mechanical Parts (N.M.M.P) design provides immediate and accurate response to small pressure changes.
- The **Inbal** Valve has excellent regulating performance, provides stable delivery pressure even at the demand of a single fused sprinkler head, and a gradual closure in case of increasing delivery pressure to eliminate surges.
- Balanced single seat design pilot control for very accurate performance- not affected, even slightly, by inlet pressure fluctuations.
- Long spring design pilot valve for sensitive setting and maintaining precise delivery pressure.
- Easily adjusted to the desired maximum system pressure.
- Hydrodynamically designed **Inbal** Valve with streamline flow path provides increased flow capacity.
- Pressure rating to 300 psi (21 bar) for standard material valve.
- Wide range of sizes for an optimal system design.
- Emergency Release Valve, Strainer, Shutoff Valve, and Check Valve are standard items.
- Control trim made of high grade materials as standard.
- Epoxy coating supplied as standard ensures excellent corrosion resistance.
- Variety of available materials to ensure corrosion-free service even under severe conditions.
- Additional functions of various types of deluge control could be easily added on the same valve body.

## Operation

The **Inbal** Pressure Reducing Valve series 700D-01R01 is a pilot operated hydraulic valve. The pilot system controls the **Inbal** Valve Control Chamber which is the annular space between the valve Housing and the Sleeve. The Pilot Valve controls the pressure in the **Inbal** Valve Control Chamber in response to changes in the downstream pressure.

When the delivery pressure decreases, the Pilot Valve and the **Inbal** Valve open wider to increase the pressure [See Figure (1)]. When the delivery pressure increases, the Pilot Valve and the **Inbal** Valve close to throttle further the flow and consequently the delivery pressure is decreased [See Figure (3)]. Thus, the outlet pressure is maintained within a close limit. If the inlet pressure drops to the preset outlet pressure level, the pilot control allows the **Inbal** Valve to open wide for a minimal pressure drop across the valve. The adjustment of the delivery pressure is made by the adjustment screw on the Pilot Valve.

## Control Trim

The control trim includes Pilot Valve, accessories, gauges, fittings, and tubing. The trim is supplied preassembled in sections. The system is fully hydraulically tested and set on standard (unless otherwise required) to 100 psi (7 bar). The control trim includes the following components:

- Pressure Reducing Pilot Valve
- Shutoff Valve
- Strainer
- Check Valve
- Restriction Orifice
- Emergency Release Valve
- Pressure Gauges and Pressure Gauge Valves

## Valve Sizing

To extend the life span of the **Inbal** Pressure Reducing Valve it is recommended to calculate cavitation conditions at the given outlet / inlet pressure ratio. Refer to the **Inbal** Valve Sizing bulletin F50-01.

### Capacity Chart

<b>Inbal Valve Size</b>		<b>Maximum Intermittent Flow Rate</b>	
<b>(Inch)</b>	<b>(mm)</b>	<b>(gpm)</b>	<b>(m<sup>3</sup>/h)</b>
1½"	40	290	65
2"	50	350	80
2½"	65	530	120
3"	80	660	150
4"	100	1100	250
6"	150	2460	560
8"	200	3870	880
10"	250	6160	1400
12"	300	8800	2000

## Installation

Refer to the Trim Chart applicable to the **Inbal** Pressure Reducing Valve model in use. The valve must be installed in an area not subject to freezing temperatures or physical damage. The **Inbal** Valve series 700D-01R01 can be installed horizontally or vertically.

1. When the **Inbal** Pressure Reducing Valve is delivered, carefully unpack and check that there has been no damage to the operating components, piping, and fittings.
2. Verify that the factory presetting is correct or alternatively that the spring type is within the desired pressure setting. See Adjustment Range in Technical Data.
3. Always flush the pipeline before installing the **Inbal** Valve.
4. Place the **Inbal** Valve in the piping. Verify that the arrow on the **Inbal** Pressure Reducing Valve matches the actual flow direction. Determine which side the system will be accessed from and locate the valve accordingly.
5. Install the **Inbal** Valve in the pipeline. Use tape, gaskets, bolts, stud bolts, bolt sleeves, and nuts as required by the specific **Inbal** Valve model.
6. Complete the trim assembly by mounting the preassembled sections. Refer to the applicable Trim Chart and Installation Guide.
7. Connect the drain port of the Pressure Reducing Pilot Valve to the drainage system.
8. Open the Shutoff Valve. To ensure smooth operation, all air must be expelled from the **Inbal** Valve Control Chamber and Pilot Control System.
9. A pressure relief valve not less than ½" in size shall be installed downstream of the **Inbal** Pressure Reducing Valve. The pressure relief valve shall be set to 15 psi (1 bar) higher than the **Inbal** Pressure Reducing Valve's setting.
10. The downstream pressure adjustment is recommended at a minimum flow velocity of 1.5 ft/sec (0.5 m/sec). For preaction and wet systems, open the main drain. For deluge systems, when it is not feasible to flow the system, close the system shutoff valve and open the drain valve.
11. Operate the system to establish the minimum flow. Check the Downstream Pressure Gauge reading. If adjustment is required, turn the Pilot Valve adjustment screw clockwise to increase pressure or counter clockwise to decrease the pressure setting.
12. For a wet system, close the main drain. For a preaction system close the Water Supply Valve, verify that the system is properly drained, and close the main drain. For a deluge system, open the system shutoff valve and close the drain valve.

### Resetting

1. In a normal course of operation, the **Inbal** Pressure Reducing Valve is automatically reset after operation.
2. If the **Inbal** Valve was actuated by the Emergency Release Valve, the handle of the L-port ball valve should be returned the SET position.
3. If the delivery pressure should be adjusted, turn the Pilot Valve adjusting screw clockwise to increase the setting and counter clockwise to reduce the delivery pressure setting.

### Maintenance, Inspection, & Testing

It is recommended that periodic inspections and tests be conducted by qualified personnel to ensure that the **Inbal** Pressure Reducing Valve is in good operating condition. The inspections and testing activities should be done according to NFPA standards, the guidelines and regulations of the authorities having jurisdiction, and the following instructions. It is recommended that the **Inbal** Pressure Reducing Valve be tested, operated, cleaned, and inspected at least on a routine basis.

#### Inspection

A *monthly* Inspection is recommended:

1. Check the Upstream and Downstream Pressure Gauge readings.
2. Verify that the Emergency Release Valve is in SET position.
3. Verify that the Shutoff Valve is in OPEN position.
4. Visually inspect for broken or missing parts or other evidence of impaired protection.

#### Strainer Cleaning

A *quarterly* Strainer Cleaning is recommended:

1. Close the Shutoff Valve.
2. Remove the cover of the strainer, clean if necessary. Reinstall the screen and the cover.
3. Open the Shutoff Valve .

#### Valve Testing

A *semi-annual* Pressure Reducing Valve Testing is recommended:

If the **Inbal** Pressure Reducing Valve Testing is combined with the periodical testing of the whole system:

1. Check the Upstream and Downstream Pressure Gauge readings. Verify that the delivery pressure is as predetermined.
2. Record the actual flow rate and upstream and downstream pressures.

For an independent **Inbal** Pressure Reducing Valve Testing:

1. Perform steps (11), (12), and (13) in Installation. Verify that the delivery pressure is as predetermined.
2. Record the actual flow rate and upstream and downstream pressures.

#### Pilot Valve Testing

Operation of the **Inbal** Pilot Valve should be made *quarterly*. If operation of the whole system is not feasible, then an individual Pilot Valve Testing should be performed.

Testing of the Pilot Valve should be done according to the instructions in bulletin F36-02 - Pressure Reducing Pilot Valve models PA1 and PB1.

#### Removal

To remove the **Inbal** Pressure Reducing valve:

1. Close the Water Supply Valve.
2. Close the Trim Shutoff Valve.
3. Open the Emergency Release Valve to release the water pressure from the **Inbal** Valve Control Chamber.
4. Remove the **Inbal** Pressure Reducing Valve from the line for inspection.
5. To reinstall, follow the installation procedure (use new gaskets for flanged or wafer valve).

### Inquiries/Orders

The Data Sheet For Inquiries/Orders (bulletin F01-05) should be submitted ●

