

# Preaction Valve, Double Interlock

Series 700D/DG/DX - 04/14J01

Pneumatic Actuation

**inbal**  
valves

Model 799DG-04J01



## General Description

The **Inbal** Pneumatically Actuated, Double Interlocked, Preaction Valve utilizes an **Inbal** Dry Pipe Valve and a pneumatic pilot system. The **Inbal** Valve is controlled by pressure maintained in the pneumatic release system and supervisory pressure maintained in the sprinkler piping system.

The **Inbal** Double Interlocked Preaction Valve will open to fill the sprinkler system with water only after both of the following occurrences: Activation of the release system and relieving of supervisory pressure from the sprinkler system. As soon as the releasing system and the sprinkler piping are reset, the **Inbal** Double Interlocked Preaction Valve resetting is merely done by activating the reset knobs. If only the pneumatic release system operates, an alarm will activate but the **Inbal** Valve will not open. If the sprinkler piping is damaged or a sprinkler is broken or fused

but the pneumatic release system has not activated, an alarm will activate without opening the **Inbal** Valve.

The dry pilot line of closed sprinklers with a fixed temperature release is located over the protected area and it is pressurized with compressed air or nitrogen. The dry pilot line is connected to one of the Pneumatic Actuators in the **Inbal** control trim, which is normally held closed by the pressure maintained in the release system. The other Pneumatic Actuator is held closed by the supervisory pressure in the sprinkler piping system.

The **Inbal** Preaction Valve is used for automatic or manual operation as a refrigerated area system or when it is essential to prevent accidental water discharge.

The **Inbal** Double Interlocked, Preaction Valve is available in sizes 1½" (40 mm) to 12" (300 mm). The valves have

threaded, flanged, grooved, or wafer inlet and outlet ends and can be used in vertical or horizontal installation. The standard material **Inbal** Preaction Valve is rated to 300 psi (21 bar).

The only moving part in the **Inbal** Automatic Water Control Valve, when it operates, is the reinforced sleeve which forms a drip-tight seal with the corrosion resistant core. It has a smooth opening to prevent any water hammer in the piping system.

The unique design and variety of materials and coatings make the **Inbal** Double Interlocked Preaction Valve dependable for a prolonged period of service regardless of water quality.

## Technical Data

### Approvals

The **Inbal** Double Interlocked Preaction Valve with a pneumatic release system consists of a Dry Pipe Valve which is FM Approved in sizes 3", 4", 6", and 8" (80, 100, 150, and 200 mm) to 300 psi (21 bar), and a pneumatic release system identical to the system used in an **Inbal** Deluge Valve which is also FM Approved to the same maximum working pressure.

### Model Numbers

Inlet End	Outlet End	Model No.
Threaded	Threaded	711DG-04J01
Threaded	Grooved	716DG-04J01
Flanged	Flanged	733DG-04J01
Flanged	Grooved	736DG-04J01
Grooved	Grooved	766DG-04J01
Wafer	Wafer	799DG-04J01

"DG" can be replaced with "D" or "DX" depends on the **Inbal** Automatic Water Control Valve series in use. See bulletins F02-01-01, F02-02-01, and F02-03-01.

The above model numbers refer to fully trimmed valves. For basic trim replace "04" with "14".

For example: 711D-14J01 is a threaded ends valve with basic pneumatically actuated, double interlocked, preaction trim.

### Sizes

**Threaded End:**

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

**Flanged and Grooved Ends:**

1½", 2", 2½", 3", 4", 6", 8", 10", & 12" (40, 50, 65, 80, 100, 150, 200, 250, & 300 mm).

**Wafer End:**

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

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## End Standards

*Threaded End:*

NPT or BSPT.

*Flanged End:*

ANSI B16.5 class 150 & 300;

ISO 7005 - PN10, 16 & 25 ;

BS 10 Table D & E ;

AS 2129 Table D & E ;

Jis B 2212; 2213; 2214.

*Wafer End:*

Fits most of the above standards.

*Grooved End:*

ANSI/AWWA C606-87.

## Pressure Rating

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

\*Standard material valve.

## Temperature Range

Water: Max. +150°F (+65°C).

## Installation Position

Vertical or horizontal.

## Materials

### Standard

*Valve Housing:*

Forged steel (SAE 1021).

*Valve Ends and Wafer Flow Test & Drain Ends:*

Ductile Iron (ASTM A536 65-45-12).

*Threaded, Flanged, and Grooved Flow Test & Drain Ends:*

Carbon Steel (SAE 1020).

*Sleeve:*

SMR5 Elastomer reinforced with Polyester and Kevlar.

*Control Trim:*

Brass Nickel Chrome plated, Stainless Steel, and Galvanized Steel.

### Optional

Cast Steel ;

Bronze ;

Nickel Aluminium Bronze ;

Stainless Steel AISI 316 ;

Super Austenitic Stainless Steel ;

Super Duplex Stainless Steel ;

Titanium.

## 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®* coated. Thickness: 0.02" (0.5 mm).

*Halar® is a registered trade mark of Ausimont USA Inc.*

## Control Trim

On standard, the control trim is supplied preassembled in sections. If self assembly is required, all the trim components are supplied in loose form. See the applicable Trim Chart for complete components list.

## Features

! The unique design eliminates the need for a check valve.

! No Moving Mechanical Parts (N.M.M.P.) construction ensures a long life of dependable operation, reducing the cost of maintenance.

! Quick, yet soft opening performance - eliminates water hammer and consequent damages.

! Optional opening and/or closing speed control is available.

! Fast and easy reset by thumb activated knobs.

! Supplied as standard preassembled in sections - saves the self assembly cost.

! Can be installed vertically or horizontally.

! Compact design - minimum space for valve and trim.

! Unique principle of operation prevents false operation due to water surges.

! Wide range of sizes for an ideal system design.

! 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.

## Operation

The Control Chamber of the **Inbal** Automatic Water Control Valve is the annular space between the valve Housing and the Sleeve. The valve is held in a closed position as long as inlet pressure is maintained in the Control Chamber.

In the set position, water pressure is applied to the Control Chamber from the upstream of the Water Supply Valve through the Flow Release Pilot. The Pneumatic Actuators are held closed by the sprinkler piping supervisory pressure and the air pressure in the pilot release system. Consequently, the **Inbal** Valve stays closed keeping the piping system dry. The sprinkler piping and the pilot line are pressurized with air through the **Inbal** Automatic Air Maintenance Panels.

When the dry pilot line operates, the

pressure in the pneumatic pilot system drops, causing the Dry Pilot Pneumatic Actuator to open and the Dry Pilot Supervisory Pressure Switch and the Low Air Pressure Alarm to activate. But the Flow Release Pilot (F.R.P.) will not operate since pressure at the F.R.P.'s outlet is held by the Sprinkler Piping Pneumatic Actuator which is still closed. When a sprinkler opens, supervisory pressure in the sprinkler piping is reduced causing the Sprinkler Piping Pneumatic Actuator to open and the Sprinkler Piping Supervisory Pressure Switch and the Low Air Pressure Alarm to activate, but the **Inbal** Preaction Valve stays closed.

Only after the opening of both pneumatic actuators, the F.R.P. outlet pressure drops and the **Inbal** Valve Control Chamber is relieved causing the **Inbal** Valve to open. Water will flow to the piping system and the Water Motor Alarm and/or Alarm Pressure Switch will activate. The relieved flow out of the Control Chamber activates the F.R.P. to latch in an open position, isolating the Control Chamber from the inlet water supply. Consequently, the **Inbal** Automatic Control Valve is latched in an open position and will not close until the Resetting procedure is followed.

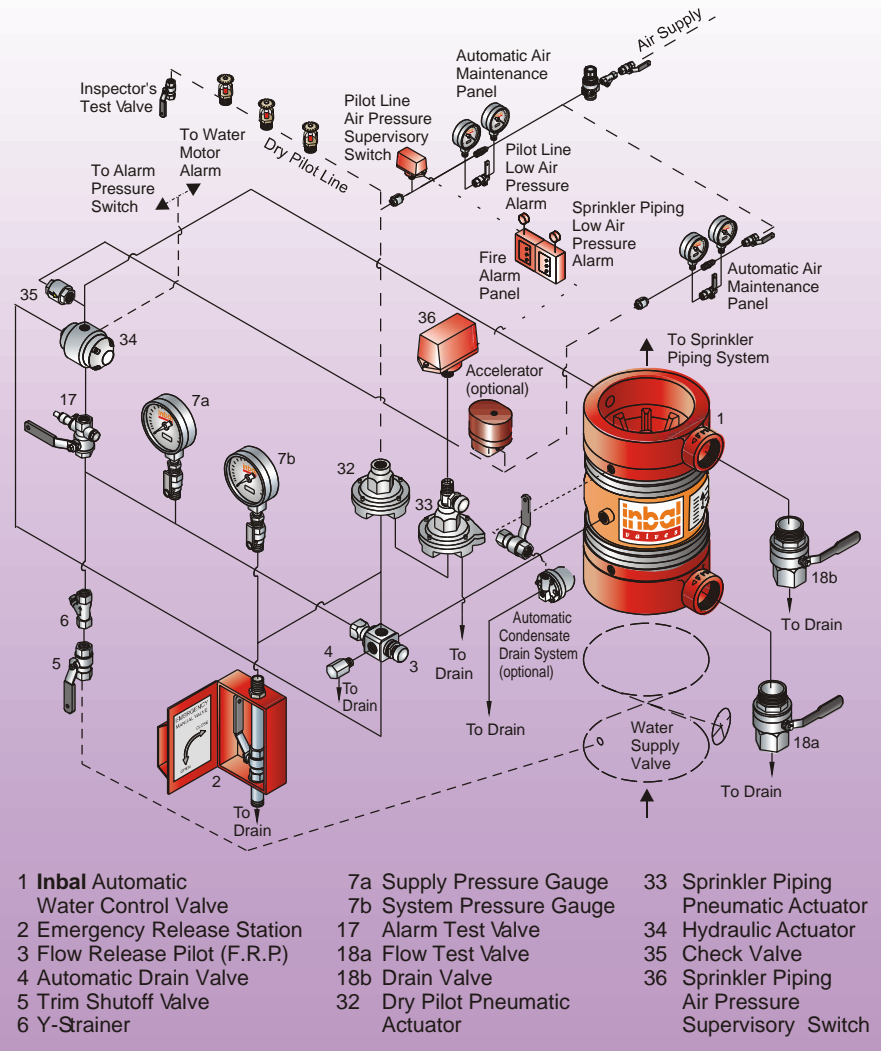
The Emergency Release Valve is used for emergency actuation of the **Inbal** Preaction Valve and for routine testing.

## Installation

Refer to the Trim Chart applicable to the specific **Inbal** Double Interlocked, Preaction Valve model in use.

1. When the **Inbal** Double Interlocked Preaction Valve is delivered, carefully unpack and visually check that there has been no damage to the operating components, piping, and fittings.
2. Always flush the pipelines before installing the **Inbal** Valve.
3. Place the **Inbal** Valve in the piping at the outlet of the Water Supply Valve. Verify that the arrow on the valve Housing matches the actual flow direction. Determine which side the system will be accessed from and locate the **Inbal** Valve accordingly.
4. Install the **Inbal** Valve in the pipeline. Use gaskets, bolts, stud bolts, bolt sleeves, and nuts as required by the valve ends.
5. Complete the trim assembly by connecting the preassembled sections, or assemble the trim if ordered in loose component form. Refer to the applicable Trim Chart and Installation Guide.

## Schematic Control Diagram – 700DG-04J01



6. The water pressure supply connection to the control trim must always be from the inlet of the Water Supply Valve through a 1/2" pipe.
7. Connect the air supply through the **Inbal** Automatic Air Maintenance Panels. The air supply must be regulated and maintained automatically. It is recommended to preset the Automatic Air Maintenance Panel to maintain a constant air supply equal to the "minimum recommended pilot line pressure" as shown in Graph (1) in bulletin F32-01-01 which is identical to the "minimum recommended sprinkler piping pressure" as shown in Graph (1) in bulletin F32-02-01. The Air Pressure Supervisory Switches should be set to activate at a pressure drop of 5 psi (0.35 bar).
8. The air supply must be restricted to ensure that the automatic air supply cannot replace air as fast as it escapes when a sprinkler operates.
9. It is recommended to install an inspector's test valves on the sprinkler piping system and on the pneumatic pilot system. The inspector's test valve is a locked closed ball valve with an outlet end orifice equivalent to the smallest orifice of releasing device provided on the systems. The inspector's test valve may be used to verify an adequate loss of air pressure when either the sprinkler piping or the pneumatic release system operates.
10. Set the **Inbal** Double Interlocked Preaction Valve by following the Resetting procedure.
11. Test the **Inbal** Valve, the trim, and the alarm according to the Testing procedure.

### Resetting

The **Inbal** Double Interlocked Preaction System must be reset and restored to service as soon as possible after automatic, emergency, or manual actuation.

1. Close the Water Supply Valve. The water flow alarms are reset.
2. Close the Trim Shutoff Valve.
3. Close the air supply valve and the sprinkler piping's shutoff valves.
4. Open the Flow Test Valve, Drain Valve, and the Drain Cock on the Alarm Test Valve, allowing all the water to drain.
5. Inspect and replace any sprinklers that have operated, been damaged, or been exposed to fire conditions.
6. Inspect the trim and alarm Y-Strainers. Clean if necessary.
7. Verify that the Emergency Release Valve is in a closed position.
8. Close the inspector's test valves if they were in operation.
9. Open the air supply valve to fill the pneumatic pilot system with air. Verify that the Pilot Line Pressure Supervisory Switch and Low Air Pressure Alarm are reset and that the air pressure exceeds the "minimum recommended pilot line pressure" as shown in Graph (1) in bulletin F32-01-01.
10. Open the Trim Shutoff Valve. Push and hold the reset knob on the Flow Release Pilot (F.R.P.) and allow water pressure to build up in the trim and in the **Inbal** Valve Control Chamber. Verify that the pressure readings on both pressure gauges are equal.
11. Release the reset knob on the Flow Release Pilot.
12. Close the Drain Cock on the Alarm Test Valve.
13. Slightly open the Water Supply Valve, allow the air that might be trapped in the section of pipe between the **Inbal** Dry Pipe Valve and the Water Supply Valve to escape through the Flow Test Valve.
14. Close the Flow Test Valve.
15. Fully open the Water Supply Valve. Verify that there is no flow from the Drain Valve, downstream of the **Inbal** Valve.
16. Close the Drain Valve.
17. Open the sprinkler piping's shutoff valve to fill the sprinkler piping system with air. Use the air by-pass valve in the **Inbal** Automatic Air Maintenance Panel to accelerate the filling rate. Push and hold the reset knob on the Sprinkler Piping Pneumatic Actuator until the air pressure exceeds the "minimum recommended sprinkler piping pressure" as shown in Graph (1) in bulletin F32-02-01. Verify that Sprinkler Piping Pressure Supervisory Switch and Low Air Pressure Alarm are reset.
18. Release the reset Knob on the Pneumatic Actuator.

# Preaction Valve, Double Interlock

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## Maintenance, Inspection, & Testing

It is recommended that periodic inspections and tests be conducted by qualified personnel to ensure that the **Inbal** Double Interlocked Preaction Valve and related equipment are in good operating condition. The inspection 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** Valve be tested, operated, cleaned, and inspected at least on a routine basis.

### Inspection

A *weekly* Inspection is recommended:

1. Verify that the Water Supply Valve and the air supply valve are sealed in a fully open position.
2. Verify that the required water and air pressures are being applied to the **Inbal** Valve inlet and trim.
3. Verify that the Trim Shutoff Valve, Alarm Test Valve, Emergency Release Valve, Pressure Gauge Valves, Condensate Valve (if in use), Flow Test Valve, and Drain Valve are in set position.
4. The Supply, System, and Air Pressure Gauges should be checked for accuracy. Verify that the proper ratio of air or nitrogen pressure to the water supply pressure is being maintained. Refer to Graph (1) in bulletin F32-01-01 and to Graph (1) in bulletin F32-02-01.
5. Visually inspect for broken or missing parts, or other evidence of impaired protection.

### Strainer Cleaning

A *quarterly* Strainer Cleaning is recommended:

1. Close the Trim Shutoff Valve.
2. Remove the covers of the trim and alarm Y-Strainers. Clean if necessary.
3. Open the Trim Shutoff Valve.

### Alarm Testing

A *Quarterly* Alarm Testing is recommended:

#### Water Flow Alarm

1. Test the Water Motor Alarm or Alarm Pressure Switch by opening the Alarm Test Valve.
2. Water Motor Alarm should be audible. Alarm Pressure Switch should activate. Verify that remote alarm signals are properly received.

3. Close the Alarm Test Valve. All local alarms should stop sounding and pressure switch is reset. All remote alarms reset.

4. Verify that the supply piping to the alarm drains properly.

#### Low Air Pressure Alarm

1. Close the Water Supply Valve.
2. Partially open the inspector's test valve on the sprinkler piping system to reduce the pressure to, but not below, the predetermined alarm level.
3. Verify that Sprinkler Piping Low Air Pressure Alarm operates properly.
4. Close the inspector's test valve. Verify that normal pneumatic pressure is restored and that the Sprinkler Piping Low Air Pressure Alarm and the Sprinkler Piping Air Pressure Supervisory Switch are reset.
5. Repeat steps (2); (3); & (4) above, operating the inspector's test valve on the pneumatic pilot system.
6. Open the Water Supply Valve.

#### Preaction Trim Testing

A *semi-annual* Preaction Trim Testing is recommended. Testing of the control trim is conducted with no flow of water to the system.

1. Open the Flow Test Valve to flush away debris or foreign particles, which may have accumulated in the **Inbal** Valve inlet.
2. Close the Flow Test Valve.
3. Close the Water Supply Valve.
4. Open the dry pilot inspector's test valve. The Pilot Line Low Air Pressure Alarm should operate. Verify that System Pressure Gauge reading has not dropped.
5. Close the dry pilot inspector's test valve.
6. Open the sprinkler system inspector's test valve. The Sprinkler Piping Low Air Pressure Alarm should operate. Verify that the System Pressure Gauge reading has not dropped.
7. At this position, open the dry pilot inspector's test valve again. Water should be drained from the trim. Wait until the pressure on the System Pressure Gauge drops to zero which simulates an open position of the **Inbal** Preaction Valve.
8. Reset the valve by performing the instructions in Resetting.

## Trip Testing

By performing the Trip Test, water will flood the sprinkler piping system and will flow from any open release. The **Inbal** Preaction Valve should be trip tested *annually* with the Water Supply Valve partially open, and *every 3 years* with the Water Supply Valve fully open. The Trip Testing should be done during warm weather.

1. Open the Flow Test Valve to flush away debris or foreign particles which may have accumulated in the **Inbal** Valve inlet.
2. Close the Flow Test Valve.
3. Record the water supply pressure and pneumatic system pressure.
4. Trip the **Inbal** Valve by operation of either:
  - a) Both inspectors' test valves on the dry pilot and sprinkler systems.
  - b) Emergency Release Valve. (Opening the inspector's test valve on the sprinkler piping would be required to verify flow).
5. The **Inbal** Valve should open, filling the sprinkler system with water. Record the elapsed time for the development of a full flow of water from the inspector's test valve.
6. Verify that all the alarms operate properly.
7. Reset the valve by performing the instructions in Resetting.
8. Verify that the water supply pressure and pneumatic system pressures are restored to the level as recorded in (3) above.

## Removal

To remove the **Inbal** Preaction Valve:

1. Close all the pressure supply valves:
  - a) Water Supply Valve.
  - b) Trim Shutoff Valve.
  - c) Air supply valve.
2. Open the Emergency Release Valve to release the water pressure from the **Inbal** Valve Control Chamber.
3. Open the Flow Test Valve and Drain Valve to allow all the water and air to drain.
4. Disconnect the union and remove the trim from the valve.
5. Remove the **Inbal** Valve from the line for inspection.
6. To reinstall, follow the Installation procedure (use new gaskets for flanged or wafer valve).