

Deluge Valve, Pneumatic Actuation

Series 700D/DG/DX - 04/14B01

Local Resetting



Model 799DG-04B01

General Description

The **Inbal** Deluge Valve with Pneumatic Actuation Trim is specifically designed for fire protection systems actuated by a fire detection and release system of dry pilot sprinklers and/or pneumatic remote control. The **Inbal** Automatic Water Control Valve used in this deluge system is a pressure operated, sleeve actuated, axial valve designed for use in fire protection systems.

The **Inbal** Pneumatically actuated Deluge Valve is used for automatic or manual operation. The dry pilot line, which is pressurized with compressed air or nitrogen, functions as a thermal detector equipped with a fixed temperature release. When one or more of the sprinkler heads located on the pilot line fuses, or when a manual release station is operated locally or remotely, the **Inbal** Deluge Valve opens and water flows from all open sprinklers and/or nozzles on the system. As soon as the releasing system and the sprinkler piping are reset, the **Inbal** Deluge Valve

resetting is merely done by activating the reset knob.

The control trim includes all the pilot valves, actuators, accessories, fittings, and gauges to provide for proper operation in either vertical or horizontal installation. The standard material **Inbal** Deluge Valve is rated to 300 psi (21 bar) and is available in sizes 1½" (40 mm) to 12" (300 mm). The valves have threaded, flanged, grooved, or wafer inlet and outlet ends.

The only moving part in the **Inbal** Deluge 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** Deluge Valve ideally 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 **Inbal** Pneumatically Controlled Deluge System series 700DG-04B is FM approved to 300 psi (21 bar) in sizes 3", 4", 6", and 8" (80, 100, 150, and 200 mm). Consult the FM Approval Guide for acceptable applications. **Inbal** Deluge Valves have Lloyd's, DNV, and ABS Type Approvals for all sizes.

Model Numbers

Inlet End	Outlet End	Model No.
Threaded	Threaded	711DG-04B01
Threaded	Grooved	716DG-04B01
Flanged	Flanged	733DG-04B01
Flanged	Grooved	736DG-04B01
Grooved	Grooved	766DG-04B01
Wafer	Wafer	799DG-04B01

"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". (See also bulletin F01-03-01 for control trims "24" & "34"). For example: 733D-14B01 is a flanged ends deluge valve with basic, pneumatically actuated trim.

Sizes

Threaded End:

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

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).

End Standards

Threaded End :

NPT or BSPT.

Flanged End:

ANSI B16.5 class 125/150 & 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 materials 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. The complete control trim includes the following components:

- Flow Release Pilot (F.R.P.) with a built in check valve.
- Pneumatic Actuator.
- Y-Strainer with a stainless steel screen.

- Alarm Test Valve - 3 way, L-port quarter turn ball valve.
- Trim Shutoff Valve, Flow Test Valve, and Drain Valve are quarter turn ball valves.
- Supply and System Pressure Gauges, with dual scale (psi and bar)
- Pressure Gauge Valves - 3 way, quarter turn ball valves.
- Drain Cup and Drain Tubes.
- Automatic Drain Valves.
- Emergency Release Station.

Features

- 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.
- The line pressure is sufficient to close the **Inbal** Valve tightly. Can perform also, when water supply valve is not in use.
- Optional opening and/or closing speed control is available.
- Instantaneous operation upon dry pilot line pressure drop.
- Fast and easy reset by thumb activated knob.
- Supplied as standard preassembled in sections - saves the selfassembly cost.
- Remote emergency release stations can be used for manual operation.
- 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.
- Pressure rating to 300 psi (21 bar) for standard materials valve.
- 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.
- The same basic trim is compatible with electric, pneumatic, and/or hydraulic release.
- Additional functions, such as pressure control or another release system, could be added on the same valve body.

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.

The dry pilot line, equipped with closed sprinkler heads, is located over the protected area. It is under air or nitrogen pressure and is connected to the valve trim. The dry pilot line serves the dual purpose of thermal detection and release system.

In the set position, water pressure is applied to the Control Chamber of the **Inbal** Deluge Valve from the upstream of the Water Supply Valve. Consequently, the **Inbal** Deluge Valve stays closed. The pressurized air or nitrogen pilot line maintains the Pneumatic Actuator in a closed position.

The **Inbal** Valve opens wide either when an inspector's test valve opens or when one or more of the closed sprinklers installed on the dry pilot line fuses. Pressure in the pneumatic release system escapes, thus the Pneumatic Actuator opens and the water from the **Inbal** Valve Control Chamber is released. The **Inbal** Deluge Valve opens fully, introducing a flow of water to the system while activating the system alarm devices. Water will flow from any open sprinklers and/or spray nozzles on the system. The operation of the **Inbal** Deluge Valve and the flow released from the Control Chamber activate the Flow Release Pilot (F.R.P) to latch in an open position, isolating the Control Chamber from the inlet water supply. The F.R.P operation prevents the **Inbal** Deluge Valve from closing, even if the open releasing dry pilot line closes. The **Inbal** Valve will close only when the Resetting procedure is followed.

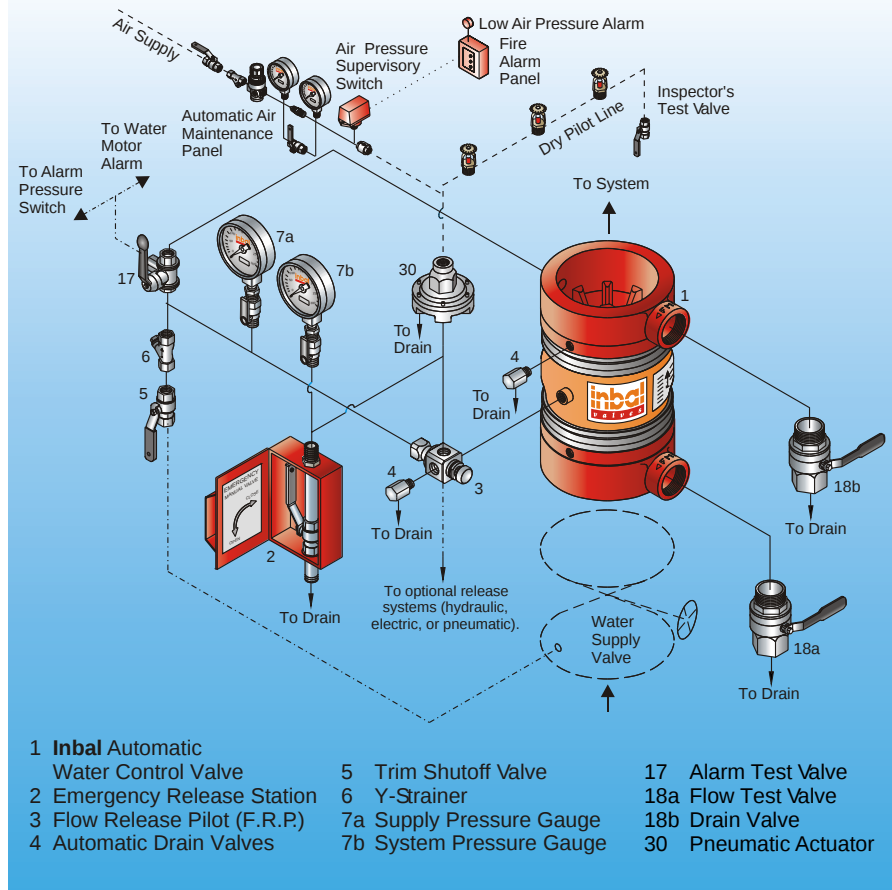
Graph (1) shows the recommended minimum pilot line service pressure as well as the actual pilot line pressure in which the **Inbal** Deluge Valve opens, both as a function of the water supply pressure. In the event of an air supply failure or a leakage of air from the pneumatic release system, a low air pressure alarm signal will be activated. Once the air pressure drops below the range plotted on Graph (1), the Pneumatic Actuator and the **Inbal** Deluge Valve will open and will not close unless the Resetting procedure is exercised.

Installation

Refer to the Trim Chart applicable to the specific **Inbal** Deluge Valve model in use.

1. When the **Inbal** Deluge Valve is delivered, carefully unpack and 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** Deluge Valve accordingly.
4. Install the **Inbal** Deluge 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.
6. The water pressure supply to the control trim must always be sourced from the inlet of the Water Supply Valve through a ½" pipe.
7. Connect the air supply through the **Inbal** Automatic Air Maintenance Panel to the release system and to the Pneumatic Actuator mounted on the valve trim. 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). The Air Pressure Supervisory Switch 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 can not replace air as fast as it escapes when a sprinkler operates.
9. It is recommended to install an inspector's test valve on the pneumatic release 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 system. The inspector's test valve may be used to verify adequate loss of air pressure when the dry pilot line operates.
10. Set the **Inbal** Deluge Valve by following the Resetting procedure.
11. Test the **Inbal** Valve, the trim, and the alarms according to the Testing procedure.

Schematic Control Diagram – 700DG-04B01



Resetting

The **Inbal** Deluge Valve system must be reset and restored to service as soon as possible after automatic, emergency, or manual actuation.

The procedure is as follows:

1. Close the Water Supply Valve. Water flow alarms are reset.
2. Close the Trim Shutoff Valve.
3. Close the air supply valve.
4. Open the Flow Test Valve and Drain Valve, allowing all the water to drain.
5. Inspect and replace any portion of the detection system subjected 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. Open the air supply to fill the pilot system with air. As soon as the air pressure in the pilot line exceeds the "minimum recommended pilot line pressure" [see Graph (1)], the Pressure Supervisory Switch and the Low Air Pressure Alarm should be reset.
9. Open the Trim Shutoff Valve. Push and hold the reset knob on the F.R.P.

and allow water pressure to build up in the trim and in the **Inbal** Valve Control Chamber. Wait and verify that pressure readings on both pressure gauges are equal.

10. Release the reset knob on the Flow Release Pilot (F.R.P.).
11. Close the Flow Test Valve.
12. Fully open the Water Supply Valve. Verify that there is no flow from the Drain Valve, downstream of the **Inbal** Valve.
13. Close the Drain Valve.

Maintenance, Inspection, & Testing

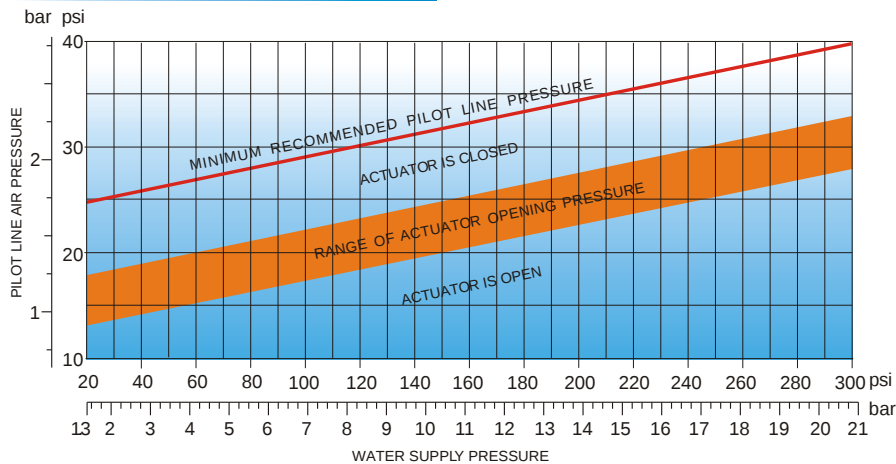
It is recommended that periodic inspections and tests be conducted by qualified personnel to ensure that the **Inbal** Deluge Valve and related equipment are in good operating condition. The inspection and testing activities should be done according to NFPA Standards, the guidelines and regulations of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

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Dry Pilot line Design Data



Graph (1)

Inspection

A weekly inspection is recommended:

1. Verify that the Water Supply Valve and the air supply valve are sealed in fully open position.
2. Verify that the required water and air pressures are being applied to the **Inbal** Deluge Valve inlet and trim.
3. Verify that the Trim Shutoff Valve, Alarm Test Valve, Emergency Release Valve, Pressure Gauge Valves, Flow Test Valve, and Drain Valve are in set position.
4. The Supply, System, and Air Pressure Gauges should be checked for accuracy.
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.
3. Close the Alarm Test Valve. All local

Alarms stop sounding and pressure switch is 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 in the release system to reduce the dry pilot line pressure to the predetermined alarm level (but not below that level, as this may inadvertently activate Deluge Trim Testing). Verify that the Low Air Pressure Alarm operates properly.
3. Close the inspector's test valve. Verify that normal pneumatic pressure is restored, and that the Low Air Pressure Alarm and Air Pressure Supervisory Switch are reset.
4. Open the Water Supply Valve.

Deluge Trim Testing

A semi-annual Deluge 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** Deluge Valve inlet.
2. Close the Flow Test Valve.
3. Close the Water Supply Valve installed in the inlet of the **Inbal** Deluge Valve.
4. Open the inspector's test valve installed on the dry pilot line. Water should be drained from the deluge trim. Wait until the pressure on the System Pressure Gauge drops to zero

which simulates an open position of the **Inbal** Deluge Valve. Verify that the Low Air Pressure Alarm operates properly.

5. Reset the valve by performing the instructions in Resetting.

Trip Testing

An annual Trip Testing is recommended. Performing the Trip Testing will cause water to flow from all open sprinklers and/or nozzles. Prevent damage by taking the necessary precautions.

1. Open the Flow Test Valve to flush away any debris or foreign particles which may have accumulated in the **Inbal** Deluge Valve inlet.
2. Close the Flow Test Valve.
3. Trip the **Inbal** Valve to open by either:
 - a) Opening the inspector's test valve.
 - b) Opening the Emergency Release Valve.The water in the **Inbal** Valve Control Chamber is released to the atmosphere. The **Inbal** Deluge Valve will open wide and water will flow to the system. All the alarms should operate. Verify that the whole system is working properly.
4. Close the inspector's test valve or the Emergency Release Valve.
5. Reset the valve by performing the instructions in Resetting.

Removal

To remove the **Inbal** Deluge Valve:

1. Close all the pressure supplies:
 - 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 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).

Inquiries/Orders

The Data Sheet For Inquiries/Orders (bulletin F01-05-01) should be submitted.