

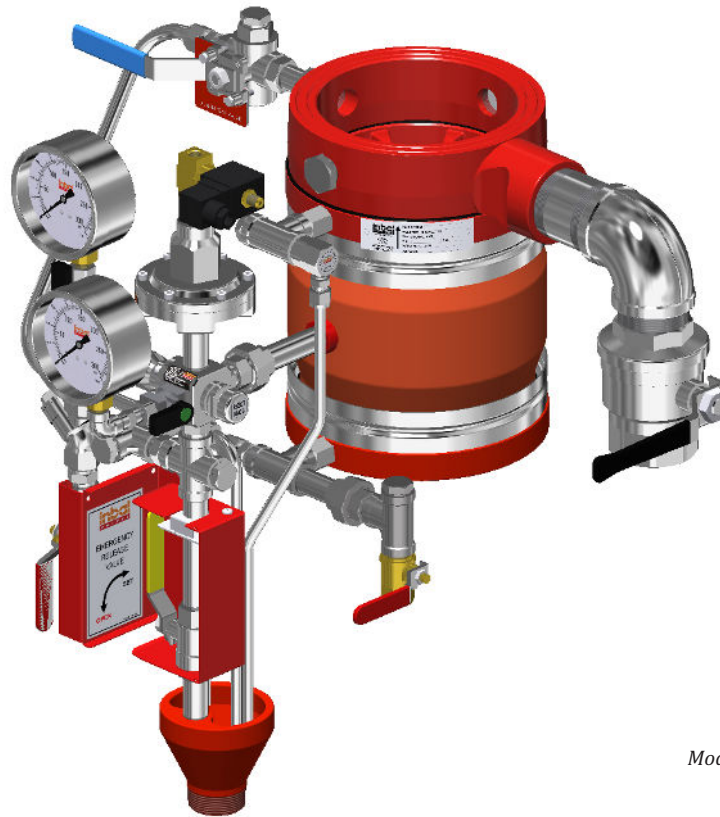
Inbal Deluge Valve, Pneu-Electric Actuation



Series 700D/DG/DX - 04/24D01

Local Resetting

FM Approved



Model 799DX-04D01

General Description

The **Inbal** Deluge Valve with Pneu-Electric Actuation Trim is specifically designed for use in fire protection systems actuated by an electric detection and release system and by a pneumatic detection and release system. 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** Pneu-Electrically Actuated Deluge Valve is used for automatic or manual operation. Electric activation of the **Inbal** Deluge system requires a solenoid valve which is installed on the dry pilot line and controlled by a control (fire alarm & releasing) panel either manually or by heat, smoke, or flame detectors. The dry pilot line, which is pressurized by compressed air or dry nitrogen, functions as a thermal detector equipped with a fixed temperature release. When the Solenoid Valve is actuated either automatically or manually, or when one or more of the pilot sprinklers 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 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 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. The **Inbal** can also be used as a foam concentrate control valve in foam/water systems.

Technical Data

Approvals

The **Inbal** Pneu-Electrically Controlled Deluge System models:

711D -24D01	733D -24D01	799D -24D01
711DX -24D01	733DX -24D01	799DX -24D01
711DX -04D01	733DX -04D01	799DX -04D01
711DG -24D01	733DG -24D01	799DG -24D01
711DG -04D01	733DG -04D01	799DG -04D01

are all FM approved to 300 psi (21 bar) in sizes 2", 3", 4", 6", 8", 10" and 12" (50, 80, 100, 150, 200, 250 and 300 mm), with threaded, flanged and wafer ends. Consult the FM Approval Guide for acceptable applications. **Inbal** Deluge Valves have Lloyd's, DNV ■ GL, BV, RMRS, and ABS Type Approvals for all sizes.

Model Numbers

Inlet End	Outlet End	Model No.
Threaded	Threaded	711DX-04D01
Threaded	Grooved	716DX-04D01
Flanged	Flanged	733DX-04D01
Flanged	Grooved	736DX-04D01
Grooved	Grooved	766DX-04D01
Wafer	Wafer	799DX-04D01

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

The above model numbers refer to potable water trimmed valves. For sea / brackish water control trim, replace "04" with "24"; "34" – for foam control trim. For example: 711D-24D01 is a threaded ends deluge valve with sea water, Pneu-Electrically actuated control trim.

Sizes

Threaded Ends:

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).

Grooved Ends:

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

Wafer Ends:

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 - PN10, 16 & 25;

BS 10 Table D & E;

AS 2129 Table D & E;

Jis B 2212, 2213, 2214.

Grooved End:

ANSI/AWWA C606-87.

Wafer End:

Fits most of the above standards.

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.

Solenoid Valve

Approved models:

3 way, normally closed or multipurpose, series 151/3 of which the following solenoid valves are FM approved:

151-61A – Brass body; ¼"; 24 V DC; 8 Watt; IP 67; to 290 psi (20 bar)¹

151-63A – St. St. 316 body; ¼"; 24 V DC; 8 Watt; IP 67; to 290 psi (20 bar)¹

151-65A – Brass body; ¼"; 24 V DC; 8 Watt; EEx d IIC T4/5/6, IP 66; to 290 psi (20 bar)³

151-66A – Brass body; ¼"; 24 V DC; 8 Watt; EEx d IIC T4/5/6, IP 66; to 290 psi (20 bar)⁴

151-67A – St. St. 316 body; ¼"; 24 V DC; 8 Watt; EEx d IIC T4/5/6, IP 66; to 290 psi (20 bar)³

151-68A – St. St. 316 body; ¼"; 24 V DC; 8 Watt; EEx d IIC T4/5/6, IP 66; to 290 psi (20 bar)⁴

153-01A – Brass body; ¼"; 24 V DC; 9 Watt; IP65; to 435 psi (30 bar)¹

153-02A – Brass body; ¼"; 24 V DC; 10 Watt; NEMA 1,2,3,3S,4,4X; to 435 psi (30 bar)²

153-12A – Brass body; ¼"; 24 V DC; 10 Watt; NEMA 1,2,3,3S,4,4X; to 435 psi (30 bar)²

153-15A – Brass body; ¼"; 24 V DC; 8 Watt; EEx dm IIC T4, IP67, Flameproof; to 435 psi (20 bar)³

See bulletin F30-11 for the complete list of solenoid valves.

(1) - Din 43650A connector

(2) - ½" Conduit, 18" leads

(3) - M20x1.5

(4) - ½"NPTF

Available in:

Energized to open, energized to close, and magnetic latch (impulse) types.

Standard voltages:

AC 50Hz: 24, 48, 110, 220, & 380 volt;

AC 60Hz: 24, 120, & 240 volt;

DC: 12, 24, 48, 110, 120, & 220 volt.

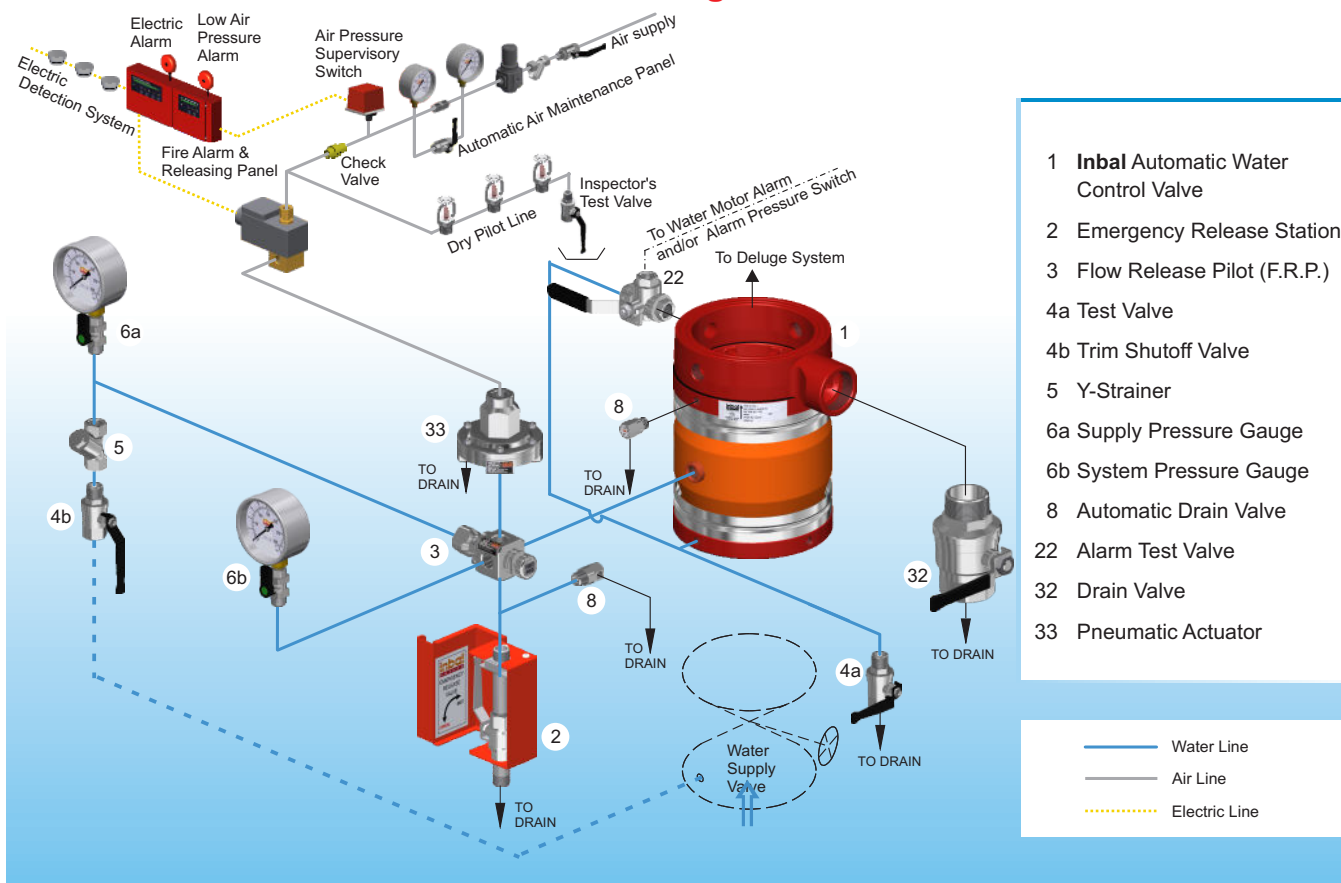
Other voltages are available upon request.

Protection type Enclosure:

Conforms to NEMA (1 to 9), IEC (79 & 529), or GENELEC (50014 to 50019) standards.

See bulletins F30-01 and F30-02.

Schematic Control Diagram – 700DX-04D01



Materials

Standard

Valve Housing:

Forged Steel (SAE 1021).

Valve Ends and Wafer 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 Poly- ester and Kevlar.

Control Trim:

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

Optional

Cast Steel;

Bronze;

Nickel Aluminum 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 Control Trim can be also supplied completely assembled on the Valve body when requested. The complete control trim includes the following components:

- Flow Release Pilot (F.R.P.) with a built in check valve.
- Pneumatic Actuator.
- Solenoid Valve, 3 way.
- 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

- Dry pilot line is used as a back up to the electric release system.
- 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 self-assembly 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 valve.
- Wide range of sizes for an ideal system design.
- Wide selection of solenoid valves to meet various requirements for type of operation, voltage, frequency and enclosure.
- 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 electric actuation trim consists of a Solenoid Valve connected to the dry pilot line and controlled by the electric detection system and the control (Fire Alarm & Releasing) panel.

The dry pilot line, equipped with closed sprinkler heads, is located over the protected area. The line 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. The pressurized air or nitrogen pilot line maintains the Pneumatic Actuator in a closed position. The de-actuated Solenoid Valve is closed. Consequently, the **Inbal** Deluge Valve stays closed.

The **Inbal** Deluge Valve opens wide when the Solenoid Valve is actuated either manually or by the electric detectors or when one or more of the closed sprinklers installed on the dry pilot line fuses. Either one of these operations releases the air from the Pneumatic Actuator, thus releasing the water from the **Inbal** Valve Control Chamber. The **Inbal** Deluge Valve opens wide, 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 device closes. The **Inbal** Valve will close only when the Resetting procedure is followed.

Graph (1) in bulletin F32-01 shows the actual pilot line pressure in which the **Inbal** Deluge Valve opens as a function of the water supply pressure. In the event of an air supply failure or air leakage from the pneumatic release system, a low air alarm signal will be activated. Once the air pressure drops below the range shown on the same 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 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) in bulletin F32-01. 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 cannot 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. Assemble the Solenoid Valve according to the drawing, the applicable solenoid valve bulletin, and direction of flow. The Solenoid Valve must be wired in accordance with the requirements of the authorities having jurisdiction and/or NEC, IEC or CENELEC standards and codes. Wiring should be done by a licensed electrician.
11. Set the **Inbal** Deluge Valve by following the Resetting procedure.
12. Test the **Inbal** Valve, the trim, and the alarms according to the Testing procedure.

Resetting

The **Inbal** Deluge Valve system must be reset and restored to service as soon as possible after automatic, emergency, or manual test 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 pneumatic release system subjected to fire conditions.
6. Reset the Fire Alarm & Releasing Panel, the detection system, and the Solenoid Valve. Verify that the Electric Alarm is reset.
7. Inspect the trim and alarm Y-Strainers. Clean if necessary.
8. Verify that the Emergency Release Valve is in a closed position.
9. Open the air supply to fill the pilot system with air. Verify that the pressure exceeds the "minimum recommended pilot line pressure" as shown in graph (1) in bulletin F32-01 and that the Pressure Supervisory Switch and Low Air Pressure Alarm are reset.
10. After the air pressure is built, 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.
11. Release the reset knob on the Flow Release Pilot (F.R.P.).
12. Close the Flow Test Valve.
13. Fully open the Water Supply Valve. Verify that there is no flow from the Drain Valve downstream of the **Inbal** Valve.
14. 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.

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 disconnected wires, 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 should 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 Supervisory Pressure 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. Actuate the Solenoid Valve or 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 Electric Alarm and the Low Air Pressure Alarm operate 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 actuation of either:
 - a) Inspector's test valve.
 - b) Solenoid 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. 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. Disconnect the electric wires from the Solenoid Valve. The electric work should be done by a licensed electrician.
3. Open the Emergency Release Valve to release the water pressure from the **Inbal** Valve Control Chamber.
4. Open the Flow Test Valve and Drain Valve to allow all the water to drain.
5. Disconnect the union and remove the trim from the valve.
6. Remove the **Inbal** Valve from the line for inspection.
7. 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. ●