

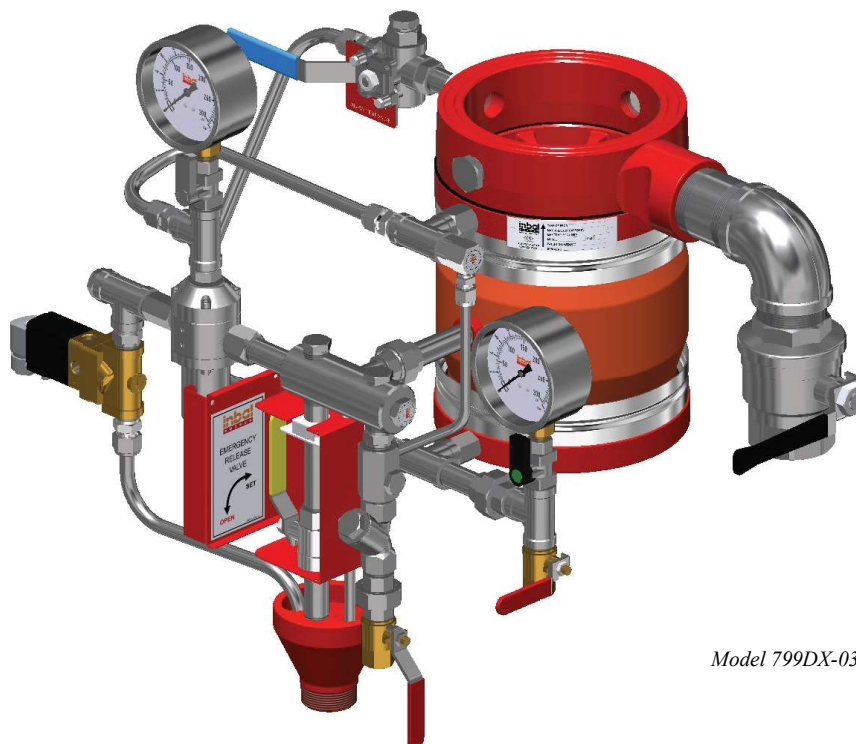
Inbal Deluge Valve, Electric Actuation

Series 700D/DG/DX - 03/23CR06

Electric Actuation, Remote Resetting



F M A p p r o v e d



Model 799DX-03CR06

General Information

The **Inbal** Pressure Control, Remote Resetting, Electrically Actuated Deluge Valve is specifically designed for use in fire protection systems which require pressure control, actuated by a remote resetting electric detection and release system. The **Inbal** Pressure Control, Electrically Actuated Deluge Valve, when in operation, 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 **Inbal** Pressure Control, Electrically Actuated Deluge Valve is used for automatic or manual operation. Electric activation of the **Inbal** Deluge System requires a solenoid valve controlled by a control (fire alarm & releasing) panel either manually or by heat, smoke, or flame detectors. When the detection system operates, the control panel activates the Solenoid Valve to open. When the Solenoid Valve is actuated either automatically or manually 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.

While the valve operates, the deluge system pressure is maintained at the preset level within a narrow 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 Control Deluge 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 valve's delivery pressure can be easily modified at the site.

After operation, the **Inbal** Valve can be reset by remote control, saving the need to approach the Deluge Valve for resetting. The trim includes all the pilot valves, accessories, and fittings to provide for proper operation, either at vertical or horizontal installation.

Standard material **Inbal** Deluge Valve is rated to 300 psi (21 bar) working pressure. The Solenoid Valve rating should be at least as the maximum designed delivery pressure. The **Inbal** Pressure Control Deluge Valves are available in sizes 1½" (40 mm) to 12" (300 mm) with threaded, flanged, grooved, or 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. It has a smooth opening to prevent any water hammer in the piping system.

The unique design of the Inbal Valve and the pilot control and variety of materials and coatings make the **Inbal** Pressure Control Deluge 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 **Inbal** Electrically Controlled Deluge System models:

711D -23CR06	733D -23CR06	799D -23CR06
711DX -23CR06	733DX -23CR06	799DX -23CR06
711DX -03CR06	733DX -03CR06	799DX -03CR06
711DG-23CR06	733DG-23CR06	799DG-23CR06
711DG-03CR06	733DG-03CR06	799DG-03CR06

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, and ABS Type Approvals for all sizes.

* Provided it is the pressure rating of the solenoid valve in use

Model Numbers

Inlet End	Outlet End	Model No.
Threaded	Threaded	711DX-03CR06
Threaded	Grooved	716DX-03CR06
Flanged	Flanged	733DX-03CR06
Flanged	Grooved	736DX-03CR06
Wafer	Wafer	799DX-03CR06

"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 "03" with "23"; "33" - for foam control trim. For example: 711D-23CR06 is a threaded ends deluge valve with sea water, electrically actuated, pressure control trim.

Sizes

Threaded and Grooved Ends:

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

Flanged and Grooved Ends:

2", 2½", 3", 4", 6", 8", 10" & 12" (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 150 & 300;¹

ISO 7006 - PN10, 16 & 25;¹

BS 10 Table D & E;²

AS 2129 Table D & E;²

Jis B 2212, 2213, 2214.²

Grooved End:

ANSI/AWWA C606-87.

Wafer End:

Fits most of the above standards.

(1) - On standard

(2) - On special request

Pressure Rating

Maximum working pressure: 300 psi (21 bar). However, the pressure rating of the specific solenoid valve in use should not be lower than the maximum upstream pressure.

Adjustment Range

30 to 300 psi (2 to 21 bar).

Temperature Range

Water: Max. + 150°F (+ 65°C).

Installation Position

Vertical or horizontal.

Solenoid Valve

FM Approved models:

2 way, Magnetic latch (impulse) series 157 of which the following solenoid valves are FM approved:

157-93A - Brass body; ½"; 24 V DC; 11 Watt; IP 65; to 230 psi (16 bar)¹

157-89A - St. St. 316 body; ½"; 24 V DC; 11 Watt; IP 65; to 230 psi (16 bar)¹

Non Latch Type Solenoid Valves :

2 way, NC (energized to open the Deluge Valve), series 157 of which the following solenoid valves are UL approved:

157-42A - Brass body; ½"; 24 V DC; 10 Watt; NEMA1,2,3,3S,4,4X; to 170 psi (12 bar)⁴

157-52A - Brass body; ½"; 24 V DC; 10 Watt; NEMA1,2,3,3S,4,4X; to 170 psi (12 bar)⁴

157-62A - St. St. 316 body; ½"; 24 V DC; 8 Watt; IP 65; to 230 psi (16 bar)⁴

Sea Water Service Solenoid valves:

157-85A/86A - Al-Br ¼"; 24VDC; 9.6 Watt;

157-87A/88A - St.St.316 EEx d IIC T6 (IP66); to 290PSI (20 Bar)

157-99A/100 - Al-Br ¼"; with latching lever;

157-91A/92A - St.St.316 24VDC; 9.6 Watt; EEx d IIC T6 (IP66); to 290PSI (20 Bar)

157-83A/84A - Al-Br ½"; 24VDC; 15.1 Watt; EEx d IIC T6 (IP66); to 290PSI (20 Bar)

157-95A/96A - Al-Br ½"; with latching lever; 24VDC;

157-97A/98A - St.St.316 15.1 Watt; EEx d IIC T6 (IP66); to 290PSI (20 Bar)

See bulletins F30-01 for the complete list of solenoid valves.

(1) - Din 43650A connector

(4) - ½" NPTF

Also available alternative voltages:

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

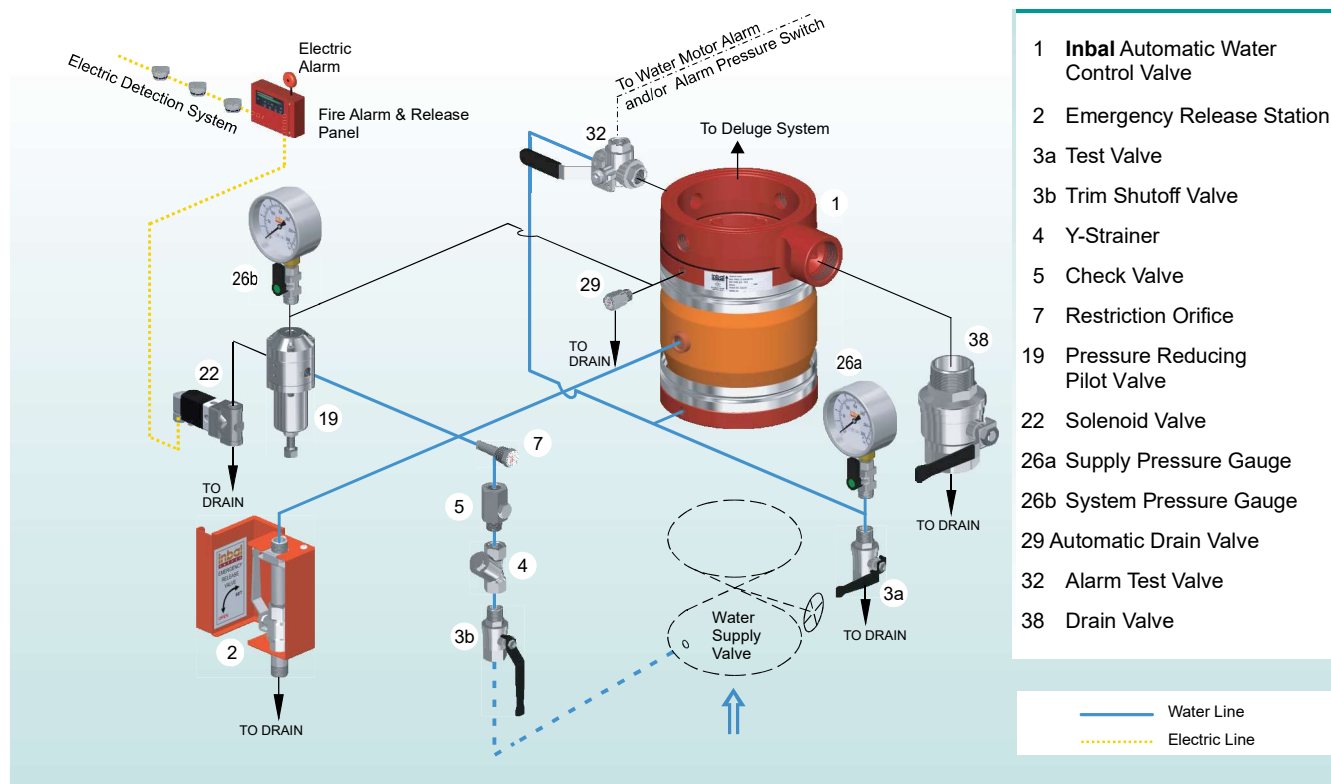
AC 60Hz: 24, 120, & 240 volt;

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

Protection type Enclosure:

Conforms to NEMA (1 to 9), IEC (79 & 529), or CENELEC (50014 to 50019) standards. See bulletins F30-01.

Schematic Control Diagram - 700DX-03CR06



Materials

Standard

Valve Housing:

Carbon Steel (SAE 1021).

Valve Ends and Wafer Drain Ends:

Ductile Iron (ASTM A536-65 45 12).

Threaded, Flanged, and Grooved 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 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 trademark of Ausimont USA Inc.

Control Trim

On standard, the control trim is supplied fully assembled. The complete control trim includes the following components:

- Solenoid Valve, 2 way.
- Pressure Reducing Pilot Valve.
- Trim Shutoff Valve*, Flow Test Valve and Drain Valve - 2 way, quarter turn, ball valves.
- Y- Strainer with stainless steel screen*.
- Alarm Test Valve 3 way, L-port, quarter turn ball valve.
- Check Valve - spring loaded, soft seat*.
- Supply and System Pressure Gauges with dual scale (psi and bar).
- Pressure Gauge Valves 3 way, quarter turn ball valve.
- Drain Cup and Drain Tubes.
- Automatic Drain Valve.
- Emergency Release Station.

For Sea Water Control Trim:

* The Trim Shutoff Valve, Y-Strainer and Check Valve are replaced with Water Supply Unit (see bulletin F40-10) .

Features

- Dual function control trim on a single valve body saves the use of two different control valves.
- Remote electrical operation and reset enable efficient control on the whole area.
- No Moving Mechanical Parts (N.M.M.P.) construction ensures a long life of dependable operation and provides stable delivery pressure and a gradual closure, in case of increasing delivery pressure, to eliminate surges.
- Quick, yet soft opening performance - eliminates water hammer and consequent damages.
- Fast and easy reset - no need to approach the valve, except in case if Solenoid Valve equipped with mechanical Latch is used.
- 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.
- Pressure rating of 300 psi (21 bar) for standard material valve provided a compatible solenoid valve is used.
- Balanced single seat design pilot control for very accurate performance - not affected, even slightly, by inlet pressure fluctuations.
- Long spring design pilot control for sensitive setting and maintaining precise delivery pressure.
- Easily adjusted to the desired system pressure.
- Hydro dynamically designed Inbal Valve with streamline flow path- provides increased flow capacity.
- Wide selection of solenoid valves to meet various requirements for type of operation, voltage, frequency, protection, and enclosure.
- 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 the inlet pressure is maintained in the Control Chamber.

The electric actuation trim consists of a Solenoid Valve, controlled by the detection system and the control (Fire Alarm & Releasing) panel. A manual emergency electric station and an alarm bell are incorporated electrically into the Fire Alarm & Releasing Panel and detector circuits. For Solenoid Valve, the Fire Alarm & Releasing Panel should include a battery charging circuit. In the event of power failure the Fire Alarm & Releasing Panel automatically switches to battery power.

In the set position, water pressure is applied to the Inbal Valve Control Chamber and to the Solenoid Valve from the upstream of the Water Supply Valve.

The **Inbal** Deluge Valve opens when the Solenoid Valve is

actuated either by the detectors through the Fire Alarm & Releasing Panel or manually (energizing of solenoid valve). The **Inbal** Valve opens also when the Emergency Release Valve opens.

Either one of these operations releases water from the **Inbal** Valve Control Chamber. The flow through the Pressure Reducing Pilot Valve responds to changes in the downstream pressure while controlling the pressure in the **Inbal** Valve Control Chamber. When the delivery pressure decreases, the pilot valve and the **Inbal** Valve open wider to increase the pressure. 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. Thus, the outlet pressure is maintained within a close limit. The operation of the **Inbal** Deluge Valve will flow water from any open sprinklers and/or spray nozzles on the system while activating the system's alarm devices.

The valve remains open until the Resetting procedure is followed. Actually, the **Inbal** Pressure Control Deluge Valve is reset by the mere retrieval of the release device to its set position.

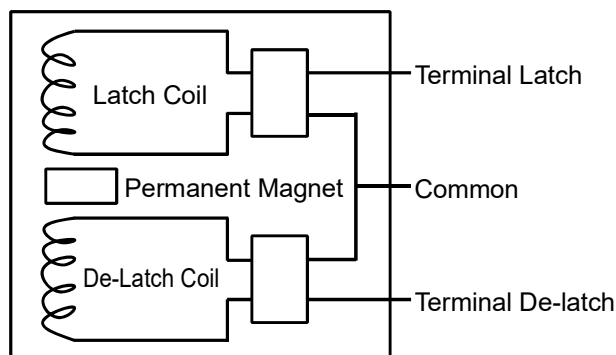
FM Approved Solenoid Valves

The **Inbal** Deluge Valve series 700-23CR06 and 700-03CR06 utilize only Magnetic Latch (impulse) type of solenoid valves.

Magnetic Latch type solenoid has two coils (Latch coil & De-Latch coil) with opposing windings and a permanent magnet. The coil has three terminals for latching and de-latching.

Thus, when the Latch coil of the solenoid valve is energized (either by momentary pulse of power (min 20 millisecond) or by continuous electrical power) it is latched and holds the **Inbal** Deluge Valve in an open position until resetting. Loss of power or switching off the Latch coil will not close the **Inbal** Deluge valve.

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



Resetting

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

1. After automatic or manual electric operation - reset the Solenoid Valve. Resetting of the Solenoid Valve is

- provided by momentary pulse of power (min 50 millisecond) to the second (De-latch) coil of the solenoid valve. The Inbal Deluge Valve will close drip tight. The water flow alarms and Electric Alarm are reset.
2. After manual emergency operation - close the Emergency Release Valve. The Inbal Deluge Valve will close drip tight and water flow alarms are reset.
- In either one of the operations exercised, the piping system should be drained.

Non-Latching type Solenoid Valves

The **Inbal** Deluge Valve series 700-23CR06 and 700-03CR06 have several optional solenoid valves:

Non-Latch Solenoid Valve: Available in types of "energized to open" and "energized to close" the Inbal Deluge Valve. When actuated, the Solenoid Valve allows the Inbal Deluge Valve to open.

Note: For "energized to open" type solenoid valve - once actuated, the Solenoid Valve must remain energized as long as the Inbal Deluge Valve's open position is required for flowing water to the area.

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

Resetting

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

1. After automatic or manual electric operation - reset the detection system, Fire Alarm & Releasing Panel, and the Solenoid Valve. The Inbal Deluge Valve will close drip tight. Electric Alarm and water flow alarms are reset. Verify that the supply pressure has been restored to the normal level.
 2. After manual emergency operation - close the Emergency Release Valve. The **Inbal** Deluge Valve will close drip tight. The water flow alarm is reset. Verify that the supply pressure has been restored to the normal level.
- In either one of the operations exercised, the system piping should be drained.

Mechanical Latching type Solenoid Valves

The **Inbal** Deluge Valve series 700-23CR06 and 700-03CR06 have Mechanical Latch solenoid valves options: Available in types of "energized to open" and "energized to close" the Inbal Deluge Valve.

When the Solenoid Valve is actuated, **Inbal** Deluge Valve opens and is latched in 'open' position.

Note: For "energized to open" type solenoid valve - once actuated, the Solenoid Valve must remain energized as long as the Inbal Deluge Valve's open position is required for flowing water to the area.

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

Resetting

The **Inbal** Deluge Valve system must be reset and restored

to service as soon as possible after automatic, emergency, or manual actuation.

1. After automatic or manual electric operation - reset the detection system, Fire Alarm & Releasing Panel, and reset the Solenoid Valve Latch manually. The **Inbal** Deluge Valve will close drip tight. Electric Alarm and water flow alarms are reset.
- Verify that the supply pressure has been restored to the normal level.
2. After manual emergency operation - close the Emergency Release Valve. The Inbal Deluge Valve will close drip tight. The water flow alarm is reset. Verify that the supply pressure has been restored to the normal level.
- In either one of the operations exercised, the system piping should be drained.

Installation

Refer to the Trim Chart applicable to the specific **Inbal** Pressure Control Deluge Valve model.

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 Valve in the pipe line. 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 1/2" pipe.
7. 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.
8. Connect the drain tube of the Solenoid Valve and all the other drain tubes to the drainage system.
9. Open the Trim Shutoff Valve and allow the water to fill up the inlet branch of the control trim.
10. The downstream pressure adjustment is recommended at a minimum flow velocity of 1.5 ft. /sec (0.5 m/sec). 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 System Pressure Gauge reading. If adjustment is required, turn the pilot valve adjusting screw clockwise to increase or counter-clockwise to decrease the pressure setting.

Inbal Deluge Valve, Electric Actuation

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12. Open the system shutoff valve and close the Drain Valve.
13. Set the **Inbal** Pressure Control Deluge Valve by following the Resetting procedure.
14. Test the **Inbal** Pressure Control Deluge Valve and the trim according to the Testing procedure.

Maintenance, Inspection, & Testing

It is recommended that periodic inspections and tests be conducted by qualified personnel to ensure that the Inbal Pressure Control 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 Pressure Control 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 is sealed in a fully open position.
2. Verify that the required water pressure is being applied to the **Inbal** Deluge Valve inlet and trim.
3. Verify that the Trim Shutoff Valve, Emergency Release Valve, Pressure Gauge Valve, Solenoid Valve, Pressure Reducing Pilot Valve, and Drain Valve (if in use) are in set position.
4. Check the Supply and System Pressure Gauge readings.
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-strainer. Clean if necessary.
3. Open the Trim Shutoff Valve.

Alarm Testing

A *quarterly* Alarm Testing is recommended:

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.

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. Close the Water Supply Valve installed in the inlet of the **Inbal** Deluge Valve.
2. Actuate the Solenoid Valve.
Verify that water is drained from the deluge trim which simulates an open position of the Inbal Deluge Valve. The Electric Alarm should operate.
3. Reset the valve by performing the instructions in Resetting.
4. Open the Water Supply Valve.

Trip Testing

An *annual* Trip Testing is recommended. By performing the Trip Testing, water will flow from all open sprinklers and/or nozzles. Prevent damage by taking the necessary precautions.

1. Trip the **Inbal** Valve to open by actuation of the Solenoid Valve. A flow of water is released from the trim. The Inbal Valve will open and water will flow to the system.
2. Check the Supply and System Pressure Gauge readings. Verify that the delivery pressure is as predetermined.
3. Record the actual flow rate and upstream and downstream pressures.
4. Verify that all the alarms operate properly.
5. Reset the system by performing the instructions in Resetting.
6. Verify that water supply pressure is restored to the normal level as recorded in (3) above.

Removal

To remove the **Inbal** Deluge Valve:

1. Close all the pressure supply valves:
 - a) Water Supply Valves.
 - b) Trim Shutoff 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 Drain Valve to allow all the water to drain.
5. Disconnect the union and remove the trim from the valve.
6. Remove the Inbal Deluge 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. ●