

# Dry Pipe Valve

Series 700D/DG/DX - 04/14E01



Model 799DG-04E01

## General Description

The **Inbal** Dry Pipe Valve is specifically designed to control the flow of water to the dry pipe sprinkler system and to provide actuation of fire alarms when the system operates. The **Inbal** Dry Pipe Valve is used to separate the water supply from the dry pipe sprinkler system, by providing a bubble tight seal as long as the valve is in a set position. The **Inbal** Automatic Water Control Valve which is used in this dry pipe system is a pressure operated, sleeve actuated, axial valve designed for use in fire protection systems. The trim design allows low air pressure supply to control a higher water supply pressure.

When a sprinkler operates, the air pressure in the piping system drops sufficiently to open the **Inbal** Dry Pipe Valve, allowing water to flow into the dry pipe system to be discharged from the fused sprinkler. The operation of the **Inbal** 700DG-04E activates a water motor alarm and/or an alarm pressure

switch. The **Inbal** Dry pilot Valve opens also when a hydraulic emergency release is operated. As soon as the sprinkler piping is reset, the **Inbal** Dry Pipe Valve resetting is merely done by activating the reset knob.

The control trim includes pilot valves, actuators, accessories, fittings and gauges to provide for proper operation, either by vertical or horizontal installation.

The standard material **Inbal** Dry Pipe Valves are rated to 300 psi (21 bar) and are 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** Dry Pipe 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.

## Technical Data

### Approvals

The **Inbal** Dry Pipe System series 700DG-04E 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** Valves have Lloyd's, DNV, and ABS Type Approvals for all sizes.

### Model Numbers

Inlet End	Outlet End	Model No.
Threaded	Threaded	711DG-04E01
Threaded	Grooved	716DG-04E01
Flanged	Flanged	733DG-04E01
Flanged	Grooved	736DG-04E01
Grooved	Grooved	766DG-04E01
Wafer	Wafer	799DG-04E01

"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: 799D-14E01 is a wafer ends dry pipe valve with basic 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).

### 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 trademark 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.

! Hydraulic Actuator.

! Air Supervisory Pressure Switch.

! Y-Strainer with a stainless steel screen

! Alarm Test Valve - 3 way, quarter turn ball valve.

! Check Valve - spring loaded, soft seat.

! Trim Shutoff Valve, Condensate Valve

(optional), 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 Valve.

! 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.

! 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.

! Pressure rating to 300 psi (21 bar) for standard 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.

! Additional functions such as pressure control 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.

In the set position, the water pressure is applied from the upstream of the Water Supply Valve to the Control Chamber of the **Inbal** Dry Pipe Valve. The sprinkler piping system over the protected area is under air/gas pressure. The pressure holds the Pneumatic Actuator closed and **Inbal** Dry Pipe Valve stays closed.

If the supervisory pressure in the sprinkler piping system is lost for any reason, or if one or more of the automatic

sprinklers operates, then air is released and the pressure in the piping system drops. The Pneumatic Actuator opens and simultaneously vents the water from the **Inbal** Valve Control Chamber and from the Hydraulic Actuator diaphragm chamber. The **Inbal** Dry Pipe 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 other openings in the sprinkler piping system. The operation of the **Inbal** Dry Pipe Valve activates 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** Dry Pipe Valve from closing unless the Resetting procedure is followed.

The actual sprinkler piping pressure in which the **Inbal** Dry Pipe Valve opens, as a function of the water supply pressure, is shown in Graph (1) in bulletin F32-02-01. In the event of an air supply failure or a leakage of air from the sprinkler piping system, a low air alarm signal will be activated. Once the air pressure drops below the range plotted on the same Graph (1), the Pneumatic Actuator and the **Inbal** Dry Pipe Valve will open and will not close unless the Resetting procedure is exercised.

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

## Installation

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

1. When the **Inbal** Dry Pipe 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.

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. Connect the air supply through the **Inbal** Automatic Air Maintenance Panel 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 sprinkler piping pressure" as shown in Graph (1) in bulletin F32-02-01. 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 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 sprinkler piping 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 an adequate loss of air pressure when the sprinkler piping system operates.
10. If a Water Motor Alarm is used, check valve model 371-12-01 (see bulletin F40-12-01) should be installed in the piping to the Motor Alarm.
11. Set the **Inbal** Valve by following the Resetting procedure.
12. Test the **Inbal** Valve, the trim, and the alarms according to the Testing procedure.

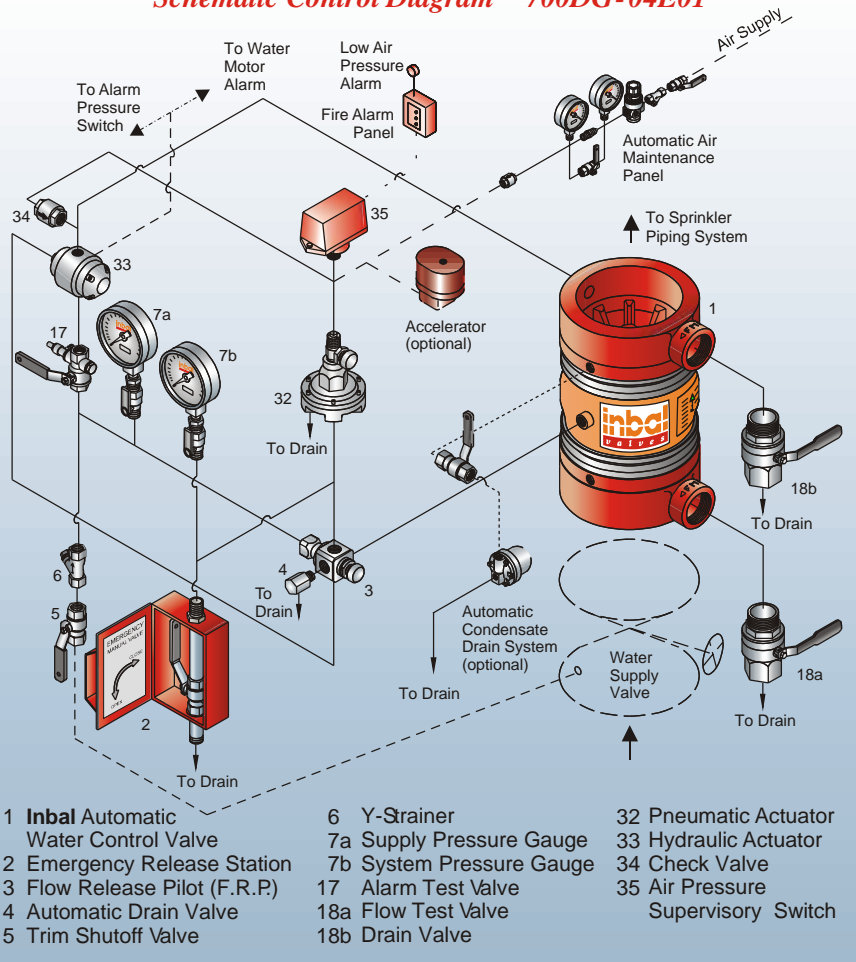
### Resetting

The **Inbal** Dry Pipe Valve 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. The water flow alarms are reset.
2. Close the Trim Shutoff Valve.
3. Close the air supply valve.
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.

### Schematic Control Diagram – 700DG-04E01



8. Close the Drain Valve downstream of the **Inbal** Valve.
9. Close the inspector's test valve if it was in operation.
10. Open the air supply 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 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 the Pressure Supervisory Switch and Low Air Pressure Alarm are reset.
11. Release the reset knob on the Pneumatic Actuator.
12. Open the Trim Shutoff Valve. Push and hold the reset knob on the Flow Release Pilot (F.R.P.) and allow the water to build up in the trim and in the **Inbal** Valve Control Chamber. Verify that the pressure readings on both pressure gauges are equal.
13. Release the reset knob on the Flow Release Pilot.
14. Close the Drain Cock on the Alarm Test Valve.

15. If a Water Motor Alarm is used, open the Drain Cock on the Check Valve, installed in the piping to the Motor Alarm. Once all the water is drained, close the Drain Cock.
16. 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.
17. Close the Flow Test Valve.
18. Fully open the Water Supply Valve.

### Maintenance, Inspection, & Testing

It is recommended that periodic inspections and tests be conducted by qualified personnel to ensure that the **Inbal** Dry Pipe 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** Dry Pipe Valve be tested, operated, cleaned, and inspected at least on a routine basis.

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## Series 700D/DG/DX - 04/14E01



### 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** Dry Pipe 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 F32-02-01.
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 station 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 in the sprinkler piping system to reduce the pressure to the predetermined alarm level (but not below that level, as this may inadvertently activate Dry Pipe Trim Testing).
3. Verify that the Low Air Pressure Alarm operates properly.
4. Close the inspector's test valve. Verify that normal pneumatic pressure is restored and the Low Air Pressure Alarm and Air Pressure Supervisory Switch are reset.
5. Open the Water Supply Valve.

### Dry Pipe Trim Testing

A *semi-annual* Dry Pipe 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** Dry Pipe Valve inlet.
2. Close the Flow Test Valve.
3. Close the Water Supply Valve installed in the inlet of the **Inbal** Dry Pipe Valve.
4. Open the inspector's test valve to let the air/gas pressure in the sprinkler piping system decrease. The Low Air Pressure Alarm should operate. Water should be drained from the dry pipe trim. Wait until the pressure reading on the System Pressure Gauge drops to zero, which simulates an open position of the **Inbal** Dry Valve.
5. Reset the valve by performing the instructions in Resetting.

### Trip Testing

By performing the Trip Testing, the sprinkler piping system will be flooded with water, which will flow from any open release in the system. The **Inbal** Dry Pipe 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** Dry Pipe Valve inlet.
2. Close the Flow Test Valve.
3. Record Water Supply Pressure and pneumatic system pressure.
4. Trip the **Inbal** Valve to open by either:
  - a) Opening the sprinkler system inspector's test valve to simulate operation of the dry pipe system.
  - b) Opening the Emergency Release Valve. Opening the inspector's test valve would be required to verify flow.
5. Record the elapsed time to development of 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 pressure have restored to the level as recorded in (3) above.

### Removal

To remove the **Inbal** Dry Pipe 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 the Drain Valve to allow all 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).

### Inquiries/Orders

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