



INSTALLATION, OPERATION & MAINTENANCE

INBAL FLOW RATE CONTROL VALVE.
SERIES: 700D-01HMP-Q3320/Q3983
700D-21HMP-Q3723/Q3999

DOCUMENT NO: 597-19.

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General Description

The **Inbal** series 700D-01/21HMP is specifically designed for flow rate control in fire protection systems utilizing FUREDOS systems. The **Inbal** Flow rate control valve remains closed as long as the downstream pipe is empty or under low pressure and automatically opens when a downstream pressure is built up.

The series 700D-01/21HMP consists of the **Inbal** Valve, which is a pressure operated, sleeve actuated, axial valve, and a pressure control trim. The **Inbal** Valve utilizes the concept of No Moving Mechanical Parts, which enables a reliable operation of the valve. The combination of the Inbal valve with a suitable actuator provides a reliable opening of the valve upon an increase in the downstream system pressure to a predetermined value.

The **Inbal** Flow rate control Valve series 700D-01/21HMP is rated to a working pressure of 21 bar (300 psi), capable of withstanding severe surges caused by pump start-up or stoppage. **Inbal** Valves are available in sizes 1½" (40 mm) to 12" (300 mm), with threaded, flanged, grooved and wafer connections.

The **Inbal** Control Valve has an excellent operating characteristic: the only moving part is the reinforced sleeve which actuates without delay due to frictionless motion. The closure of the **Inbal** Valve is achieved when the heavy-duty sleeve forms a drip-tight seal with the corrosion resistant core.

The unique design and the variety of materials and coatings make the **Inbal** Flow rate control Valve suitable for use also in brackish or sea water, similar to those found in chemical and petrochemical facilities or in offshore platforms.

Technical Data

Approvals

The basic **Inbal** Valve is FM Approved as an Automatic Water Control Valve to 21 bar (300 psi) in sizes 40mm (1½") to DN300 (12").

The basic **Inbal** Valve has ABS, Lloyds, BV, TUCR, RMRS and DNV Type Approval in all sizes.

Model Numbers

Inlet End	Outlet End	Model No.
Threaded	Threaded	711D-01HMP
Flanged	Flanged	733D-01HMP
Wafer	Wafer	799D-01HMP
Grooved	Grooved	766D-01HMP
Flanged	Grooved	736D-01HMP



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Series:

For potable water:

700D-01HMP Q3320 – Water supply to the trim is connected to the valve upstream end

700D-01HMP Q3983 – Water supply to the trim is connected to the main pipe upstream the valve.

For brackish/Sea water:

700D-21HMP Q3723 - Water supply to the trim is connected to the valve upstream end

700D-21HMP Q3999 - Water supply to the trim is connected to the main pipe upstream the valve.

Sizes

Threaded End:

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

Flanged end:

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

Wafer End:

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

Grooved End:

80, 100, 150 & 200 mm (3", 4", 6", 8").

End Standards

Threaded End:

NPT or BSPT.

Flanged End:

ANSI B16.5 class 150 & 300 ;

ISO 7005 - PN 10, 16 & 25 ;

BS 10 Tables D & E ;

AS 2129 Tables D & E ;

Jis B 2212, 2213, & 2214.

Wafer End:

Fit most of the above standards.

Pressure Rating

Maximum working pressure: 21 bar (300 psi).



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Adjustment Range

20 to 75 psi (1.5 to 5 bar).

Temperature Range

Water: Max. +65°C (+150°F).

Installation Position

Vertical or horizontal.

Materials

Standard

Valve Housing:

Carbon Steel (SAE 1021).

Valve Ends :

Ductile Iron (ASTM A536-65 45 12).

Sleeve:

SMR5 Elastomer reinforced with Polyester and Kevlar.

Control Trim:

Brass Nickel Chrome plated, Stainless 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).



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Features

- No Moving Mechanical Parts (N.M.M.P.) design provides a very reliable operation.
- Accurate action to control the flow rate at the filling phase.
- Advanced design of the actuator eliminates the need for a needle valve and provides fast evacuation of the **Inbal** Valve Control Chamber pressure for fast opening.
- Easily adjustable to the desired system pressure.
- Long spring design for sensitive setting of accurate set pressure.
- Excellent **Inbal** Valve regulating performance ensures soft, gradual opening and closing.
- Hydrodynamic design of **Inbal** Valve with streamline flow path, provides increased flow capacity.
- Pressure rating of 21 bar (300 psi).
- Emergency Release Valve, Strainer, Shutoff Valve, and Check Valve are standard items.
- 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 **Inbal** series 700D-01/21HMP flow rate control valve is designed to be installed on the main line after a FIREDOS dosing system. A calibrated orifice plate is installed on a parallel by-pass.

The Control Chamber of the **Inbal** Valve is the annular space between the valve Housing and the Sleeve. The valve is held in a closed position as long as the downstream system pressure is low and does not reach the desired set value.

The flow passes through the calibrated Orifice plate ensuring a maximum flow rate to protect the FIREDOS system.

As soon as the downstream system pressure reaches the set point, the actuator opens to vent the Control Chamber pressure, thus the **Inbal** Valve opens, allowing the premix solution of water and foam to flow towards the extinguishing system.

When the flow stops and the downstream pressure decrease, the **Inbal** series 700D-01/21HMP Valve closes, automatically resetting for the next cycle.

The Emergency Release Valve enables overriding of the actuator to open the **Inbal** Valve when there is a flow and pressure in the system irrespective of downstream line pressure reaching the set point.



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Control Trim

The control trim includes all the components, nipples, fittings, and tubing. The 700D-01/21HMP is supplied after passing comprehensive hydrodynamic tests and being set, on standard (unless otherwise required), to 6 bar (90 psi). The control trim includes the following components:

- Hydraulic actuator.
- Emergency Release Valve.
- Control chamber Pressure Gauge and Pressure Gauge Valve.

Installation

Refer to the Trim Chart applicable to the **Inbal** Flow rate control Valve model in use. The valve must be installed in an area not subject to freezing temperatures or physical damage. The **Inbal** Valve series 700D-01/21HMP can be installed horizontally or vertically.

1. When the **Inbal** Flow rate control Valve is delivered, carefully unpack and check that there has been no damage to the operating components, piping, and fittings.
2. Always flush the pipeline before installing the **Inbal** Valve.
3. Place the **Inbal** Valve in the piping. Verify that the arrow on the **Inbal** Flow rate Control Valve matches the actual flow direction. Determine from which side the system will be accessed, and locate the **Inbal** Valve on the piping system accordingly.
4. Install the **Inbal** Flow rate control Valve in the pipeline. Use tape, gaskets, bolts, stud bolts, and nuts as required by the specific **Inbal** Valve model in use.
5. In multi deluge systems it is recommended to connect the input of the control trim to the main pipe, upstream the valve, using a ¾" pipe. See the P&ID Q3983 below.
6. Complete the trim assembly by mounting the pressure gauge. Refer to the applicable Trim Chart and Instructions.
7. Connect the drain port of the Flow rate control actuator to the drainage system.
8. Open the shutoff valve. To ensure smooth operation, all air must be expelled from the **Inbal** Valve Control Chamber and actuator system.
9. If adjustment is required see para. 3 in Resetting
10. Test the **Inbal** Flow rate control Valve according to the Testing procedure.



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Resetting

1. During normal course of operation, the **Inbal** Flow rate control Valve is automatically reset after operation.
2. If the **Inbal** Valve was actuated by the Emergency Release Valve, the handle of the valve should be returned to SET position.
3. If the set point pressure is to be adjusted, turn the actuator adjusting screw clockwise to increase and counter-clockwise to decrease the pressure setting.

Maintenance, Inspection, & Testing

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

Inspection

A *monthly* inspection is recommended:

1. Check the Control Chamber Pressure Gauge reading.
2. Verify that the Shutoff Valve device is in SET position.
3. Verify that the Emergency Release Valve is in SET position.
4. Verify that the actuator and the **Inbal** Valve are tightly closed.
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 cover of the strainer, clean if necessary. Reinstall the screen and the cover.
3. Open the trim Shutoff Valve.



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Flow Rate Control Valve Testing

A *semi-annual* Flow rate control Valve Testing is recommended:

1. The testing of the valve involves the operation of the Fire Pump. If testing of the entire system is not feasible, then the Main Shutoff Valve should be closed before the pump is activated.
2. When the pump is on, verify that the **Inbal** Valve opens when the downstream pressure reaches the preset level. The control chamber Pressure Gauge reading should be zero.
3. When the pump is stopped, verify that the **Inbal** Valve gradually close to a drip tight position.

Actuator Testing

Operation of the **Inbal** actuator model 288 should be done *quarterly*. If operation of the entire system is not feasible, then an individual actuator testing should be performed. Testing of the actuator should be done by following the instructions in bulletin F32-08-02 – "Hydraulic/Pneumatic Actuator Series 288".

Removal

To remove the **Inbal** Flow rate control Valve:

1. Close the Main Shutoff Valve.
2. Open the Emergency Release Valve to release the water pressure from the **Inbal** Valve Control Chamber.
3. Remove the **Inbal** Flow rate control Valve from the line for inspection.
4. To reinstall, follow the installation procedure (use new gaskets for flanged or wafer valve).



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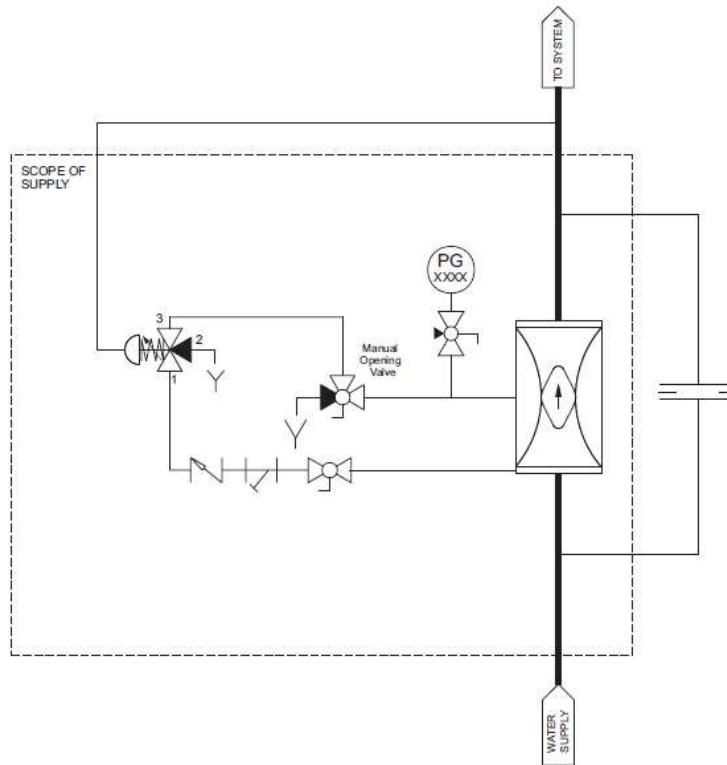
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Series 700D-01HMP - Q3320
Piping & Instrumentation Diagram

Rev 02



Inbal Automatic Water Control Valve (series 700D)



Ball Valve, 2-Way, N.O. (series 351)



Drain System



Y-Strainer (series 31)



Ball Valve, 3-Way (series 347-08)



Pressure Gauge (series 131)



Check Valve (series 371)



Restriction Orifice



Pressure Gauge Valve (series 353)



Hydraulic Actuator, 3-Way, adjustable (model 288-02)



Water Line

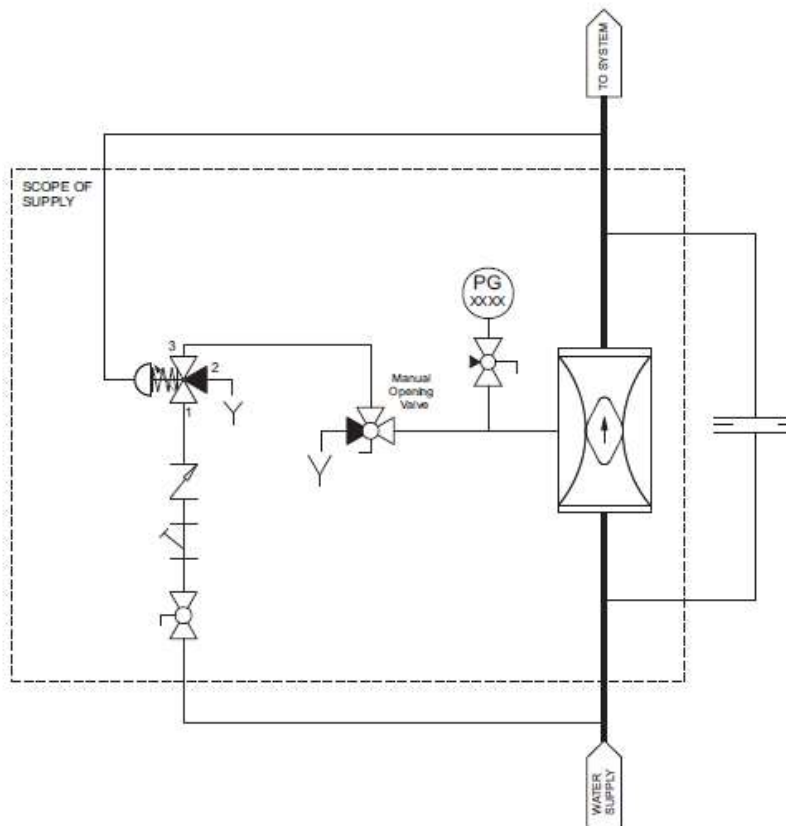
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Series 700D-01 HMP - Q3983 Piping & Instrumentation Diagram





 Inbal Automatic Water Control Valve (series 700D)

 Ball Valve, 2-Way, N.O. (series 351)

 Drain System


 Y-Strainer (series 31)

 Ball Valve, 3-Way (series 347-08)


 Pressure Gauge (series 131)

 Check Valve (series 371)

 Restriction Orifice

 Pressure Gauge Valve (series 353)

 Hydraulic Actuator, 3-Way, adjustable (model 288-02)

 Water Line