

Control Valve, Electric Actuation

Series 700D-02C01/2/3/4

Sizes 1½" - 4" (40-100 mm)

inbal
v a l v e s



Model 799D-02C01

General Description

The **Inbal** Electrically Actuated Control Valve is specifically designed for use in fire protection systems controlled electrically by automatic or manual release. The series 700D-02C01/2/3/4 consists of **Inbal** Automatic Water Control Valve series 700D and an Electric Actuator. The **Inbal** Valve is an automatic streamline sleeve control valve which utilizes only the line pressure as a source of energy to operate. The sleeve actuator is an integral part of the **Inbal** Valve and there are No Moving Mechanical Parts (N.M.M.P.) when the **Inbal** Valve operates. The Electric Actuator is an integrated multi-functional unit. It consists of a built-in Strainer, Shutoff Valve, Check Valve, and Solenoid Valve. The Electric Actuator is purposely designed for compact, simple, and sturdy control trim.

The Electric Actuator utilizes a "dry" concept design and it is easily maintained allowing free, independent access to each device.

The **Inbal** Electrically Actuated Control Valve is used for local and/or remote operations. The Electric Actuator enables remote electric control with low energy consumption. After operation, the **Inbal** Control Valve can be remotely reset, saving the need to approach the valve for resetting.

The unique Electrically Actuated **Inbal** Control Valve can be mounted in any required position with no need to specify the type of installation in advance. The inline shape of the **Inbal** Valve, together with the integrated Electric Actuator, permits a compact, space saving configuration, protruding only slightly from the pipe lineation. The series 700D-

02C01 complies with weather-proof and explosion-proof requirements (an Ex. Pf. coil should be used). An electric flow indicator, an opening speed control, and/or closing speed control are options. The **Inbal** Control Valve is available in sizes 1½" (40 mm) to 4" (100 mm). The valves are available in threaded, wafer, and flanged ends.

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, but at the same time responds to the pressure differential across the valve versus the control pressure, thus moving gradually to prevent any rapid changes in velocity of flow and line pressure. The closure of the **Inbal** Valve is achieved when the heavy duty sleeve forms a drip-tight seal with the corrosion resistant core.

The standard material **Inbal** Control Valve is rated to a working pressure of 300 psi (21 bar) but is capable of withstanding severe surges often found in many installations due to pump start-ups or stoppages or other valve operations. The reset of the series 700D-02C, whether it was operated locally or by remote control, is simply done by restoring the operated release device to set position.

The unique design and variety of materials and coatings make the **Inbal** Control Valve suitable for use with brackish or sea water similar to those found in chemical and petrochemical facilities or in offshore platforms. It can also be used as a foam concentrate valve in foam / water systems.

The basic **Inbal** Valve was tested by FM and UL (3" & 4", 80 & 100 mm) for 300 psi (21 bar) service at 1200 psi (84 bar) hydrostatic pressure and it is part of the FM Approved **Inbal** Deluge Valve and UL Listed **Inbal** Pump Pressure Relief Valve. A wide range of various pilot valves and accessories are available when additional duties such as pressure regulating, flow control, or others are required.

Technical Data

Approvals

The **Inbal** Control Valve series 700D-02C is based on the FM Approved and UL Listed (3" & 4", 80 & 100 mm). **Inbal** Valves series 700 have Lloyd's, DNV, and ABS Type Approvals for all sizes.

Model Numbers

Inlet End	Outlet End	Model
Threaded	Threaded	711D-02C01
Flanged	Flanged	733D-02C01
Wafer	Wafer	799D-02C01

Model Number terminates with "01" utilizes Electric Actuator model 441-01, "02" - 441-02, "03" - 441-03, "04" - 441-04. See bulletins F35-04-01, F30-01-01, and F30-02-01.

For sea water trim replace "02" with "22".

Sizes

Threaded End:

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

Flanged End:

2", 2½", 3", & 4" (50, 65, 80, & 100 mm).

Wafer End:

3" & 4" (80 & 100 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.

Pressure Rating

Maximum working pressure: 230 psi (16 bar). Minimum working pressure: 30 psi (2.1 bar). Actual pressure rating is limited by the Electric Actuator. Rating to 300 psi (21 bar) is available upon request.

Temperature Range

Water: Max + 150°F(+65°C).

Solenoid Valve

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 on request.

Protection type Enclosure:

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

See bulletins F30-01-01 and F30-02-01 for further information.

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 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

The complete control trim includes an Electric Actuator, Emergency Release Valve, Supply Pressure Gauge, Pressure Gauge Valve, fittings, and tubing. On standard the control trim is supplied preassembled in sections.

See the applicable Trim Chart for complete components list.

Features

- Any line pressure, either very low or high, is sufficient to close the **Inbal** Control Valve and keep it closed tightly.
- The **Inbal** Valve, designed for control valve service from basic concepts, utilizes a built-in sleeve actuator.
- The same control valve can be operated and reset from the control room as well as from field control panel.
- No Moving Mechanical Parts (N.M.M.P.) construction ensures a long life of dependable operation, reducing the cost of maintenance.
- Very simple trim, virtually consists of only two components.
- Integrated multi-function Electric Actuator (E,A) permits a compact, space saving shape.
- Emergency Release Valve, strainer, shutoff valve, and check valve are standard devices.
- The **Inbal** Control Valve will not open falsely, not even slightly or momentarily, due to fluctuations in the line pressure.
- Quick, yet soft opening performance - eliminates water hammer and consequent damages.
- Wide range of voltages and enclosure protections for the Solenoid Valve device in the Electric Actuator.
- Pressure rating of 230 psi (16 bar) for standard **Inbal** Control Valve. Rating to 300 psi (21 bar) is available upon request.
- Wide range of sizes for an ideal system design.
- Can be installed vertically or horizontally. No need to specify in advance the type of installation.
- 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.
- Ideally suitable for use with brackish and sea water.
- Complies with weather-proof requirements as standard. Explosion-proof enclosure upon request.
- High flow capabilities due to linear flow pattern.
- Opening speed control, closing speed control, and flow indicator are optional.
- Additional functions such as pressure control, could be added on the same valve body.

Operation

The **Inbal** Valve Control Chamber is the annular space between the Housing and the Sleeve. The valve is held in a closed position as long as the inlet water pressure is maintained in the Control Chamber.

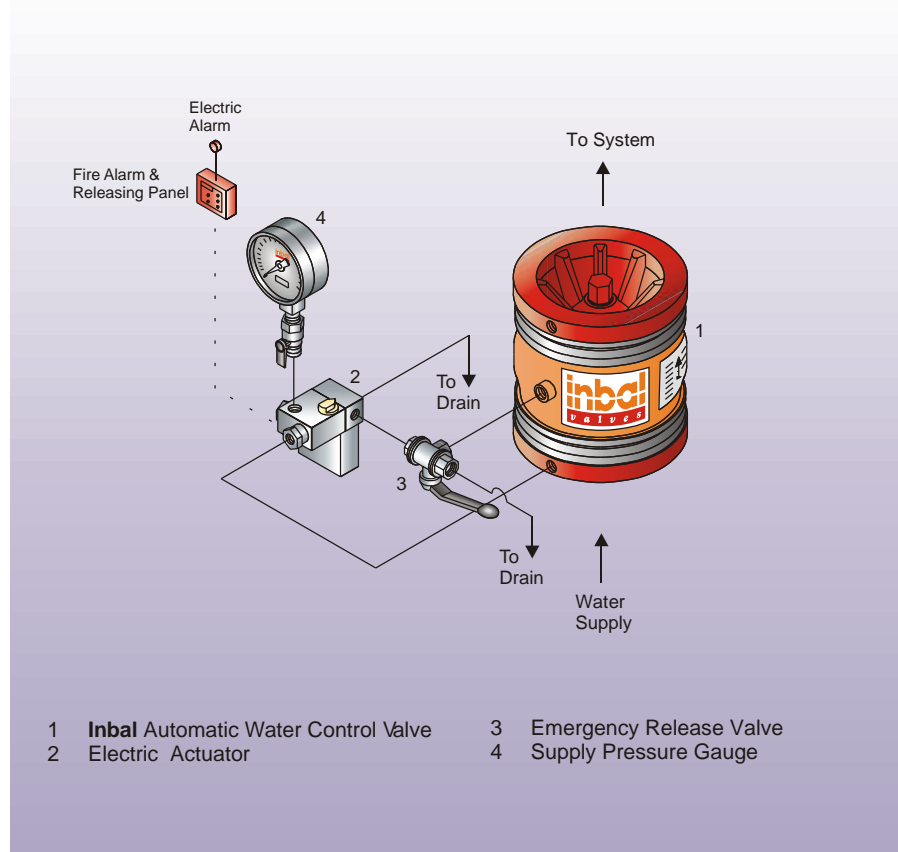
In the set position, water control pressure is applied to the Electric Actuator. The Electric Actuator inter-connects the water pressure from the upstream of the **Inbal** Valve to the Control Chamber and the valve stays closed.

The Electric Actuator is available in types of "energized to open" and "energized to close" the **Inbal** Valve. The **Inbal** Valve 700D-02C01/3 opens wide when the Solenoid Valve is energized ; **Inbal** Valve 700D-02C02/4 - when the Solenoid Valve is de-energized. This operation is followed by a release of water from the **Inbal** Valve Control Chamber, simultaneously isolating the Control Chamber from the water supply. Consequently, the **Inbal** Control Valve opens wide introducing a flow of water to the system. The **Inbal** Valve 700D-02C01/3 remains open unless the electric power ceases; **Inbal** Valve 700D-02C02/4 - electric power restored, and then it closes tight to be in a set position again. The Electric Actuator is also available with magnetic latch type solenoid valve. When the Solenoid Valve is pulsed, it is latched and holds the **Inbal** Control Valve in an open position until resetting.

Opening and/or closing speed controls, when added, control the pace of water relieved from, or introduced to, the **Inbal** Valve Control Chamber, thus slowing down the speed of opening and/or closing the **Inbal** Control Valve. Such features would be required when the pipe line system is fairly long and/or going downhill and there is a danger of water hammer due to abrupt changes of water flow velocity.

A Flow Pressure Switch is a compact unit that provides, when connected to the piping system, both local and remote indications of the valve's position and whether a flow takes place. When the **Inbal** Control Valve opens and flow starts, the pressure built in the outlet of the valve is detected by the pressure switch. The basic pressure switch con-

Schematic Control Diagrams – 700D-02C01/2/3/4



tains a single SPDT switching element in a NEMA rated water tight enclosure (an explosion-proof enclosure is optional). The Emergency Release Valve enables an opening of the **Inbal** Valve regardless of the electric actuation.

Installation

1. When the **Inbal** Control Valve is delivered, carefully unpack and check that there has been no damage to the operating components.
2. Always flush the pipelines before installing the **Inbal** Valve.
3. Place the **Inbal** Control Valve in the piping. The valve can be mounted in any position. Verify that the arrow on the Housing matches the actual flow direction. Determine which side the system will be accessed from and locate the **Inbal** Valve on the piping system accordingly.

4. A Water Supply Shutoff Valve, placed upstream to the **Inbal** Control Valve for shutting off when servicing, is considered standard good practice.
5. Install the **Inbal** Control Valve in the pipeline. Use gaskets, bolts, stud bolts, bolt sleeves, and nuts as required by the valve ends.
6. Complete the trim assembly by connecting the preassembled sections. Refer to the applicable Trim Chart and Installation Guide.
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. Verify that the Shutoff Rotor and the Emergency Release Valve are in SET position.
9. Test the **Inbal** Control Valve according to the Testing procedure.

Resetting

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

- After electric operation - reset the solenoid valve (de-energize the "energized to open" type, energize the "energized to close" type, or release the "magnetic latch" type). The **Inbal** Control Valve will close drip tight and the Electric Alarm is reset. Verify that the supply pressure has been restored to the normal level.
- After manual emergency operation - restore the Emergency Release Valve to SET position. The **Inbal** Control Valve will close drip tight. Verify that the supply pressure has been restored to the normal level.

Maintenance, Inspection, & Testing

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

Inspection

A *monthly* Inspection is recommended:

1. Verify that the Water Supply Shutoff Valve is sealed in a fully open position.
2. Verify that the Shutoff Valve device in the Electric Actuator is sealed in a fully open position (The Shutoff Rotor should be in SET position).
3. Verify that the Emergency Release Valve is in SET position.
4. The Pressure Gauge 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 Shutoff Valve device in the Electric Actuator (Turn the Shutoff Rotor to MAINTENANCE position).
2. Unscrew the Strainer Plug in the Electric Actuator, remove the screen and clean. Reinstall the screen and the plug.
3. Open the Shutoff Valve device in the Electric Actuator (Return the Shutoff Rotor to SET position).

Electric Actuation Testing

A *semi-annual* Electric Actuation Testing is recommended. By performing the Electric Actuation Testing, water will flow from all open sprinklers and/or nozzles. Prevent damage by taking the necessary precautions.

1. Operate the Solenoid Valve by energizing ("energized to open" type), de-energizing ("energized to close" type), or by "pulsing" ("magnetic latch" type) the wires leading to the Solenoid Valve. The Electric Actuator allows the water in the **Inbal** Valve Control Chamber to exhaust to the atmosphere. The Electric Alarm should operate and the **Inbal** Control Valve opens and water will flow to the system. Verify that the whole system is working properly.
2. Reset the Solenoid Valve by de-energizing ("energized to open" type), by energizing ("energized to close" type), or by "pulsing" ("magnetic latch" type) the wires leading to the Solenoid Valve. The Electric Actuator interconnects the **Inbal** Valve inlet pressure with the Control Chamber. Verify that the **Inbal** Control Valve closes drip tight and the Electric Alarm is reset.

Emergency Release Testing

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

1. Turn the Emergency Release Valve handle to OPEN position to allow the water in the **Inbal** Valve Control Chamber to exhaust out of the Vent Port of the Emergency Release Valve to the atmosphere. After a trickle of water is relieved, the exhausted flow should stop. The **Inbal** Control Valve opens wide and water will flow to the system. Verify that the whole system is working properly.
2. Return the Emergency Release Valve handle to SET position to introduce water from the **Inbal** Valve inlet to the Control Chamber. Verify that the **Inbal** Control Valve closes drip tight.

Removal

To remove the **Inbal** Control Valve:

1. Close all the pressure supply valves:
 - a) Water Supply Shutoff Valve.
 - b) Shutoff Valve device in the Electric Actuator.
2. Open the Emergency Release Valve to release the water pressure from the **Inbal** Valve Control Chamber.
3. Disconnect the electric wires from the solenoid coil. The electric work should be done by a licensed electrician.
4. Remove the **Inbal** Control Valve from the line for inspection.
5. 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.