

Fire Pump Pressure Relief Valve

Model 799D-01S01

inbal
v a l v e s



Model 799D-01S01

General Description

The **Inbal** model 799D-01S01 is specifically designed for the Fire Pump Pressure Relief Valve. The **Inbal** Fire Pump Pressure Relief Valve automatically relieves excess pressure in the fire protection system and accurately maintains a predetermined maximum pressure, regardless of fluctuations in the upstream potential and/or changes in demand.

The model 799D-01S01 consists of the **Inbal** Valve which is a pressure operated, sleeve actuated, axial valve and a pilot control. The **Inbal** Valve utilizes no moving mechanical parts, which makes the valve response to be fast upon rapid increase in system pressure. The instantaneous action of the **Inbal** Fire Pump Pressure Relief Valve virtually eliminates development of surge conditions. On the other hand, the closure performance of the valve is gradual, preventing any secondary surge involvement in the pipeline. The pilot control enables reliable modulating pressure relief service to accurately maintain the system pressure at a

predetermined maximum constant level, protecting the system in excess of the pressure for which the system is designed to operate.

The **Inbal** Fire Pump Relief Valve model 799D-01S01 is UL Listed in sizes 3"; 4"; and 6" (80; 100; and 150 mm) for a maximum relief pressure of 300 psi (21 bar), and in 8" (200 mm) for a maximum relief pressure of 175 psi (12 bar). Moreover, the valve is capable of withstanding severe surges caused by pump start-up or stoppage.

The **Inbal** Control Valve has an excellent operating characteristic. The only moving part is the reinforced sleeve which actuates without delay due to the 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 pilot control, which is based on the "no-flow" design (see bulletin F36-01-01), reduces the need for an external strainer, eliminates the need for a needle valve or restriction orifice, and requires minimal maintenance activities.

Technical Data

Approvals

Inbal Fire Pump Relief Valves are UL Listed for sizes 3", 4", and 6" (80, 100, and 150 mm) to 300 psi (21 bar) and 8" (200 mm) to 175 psi (12 bar). **Inbal** Pressure Relief Valves have ABS and DNV Type Approval to 300 psi (21 bar) in sizes 1½" (40 mm) to 12" (300 mm).

Model Numbers

Inlet End	Outlet End	Model No.
Wafer	Wafer	799D-01S01*

* Supersedes model no 799-S. In the U.L. listing guide the "799-S" might be still in use.

Sizes

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

End Standards

Wafer (flangeless) end to fit between the standards of:

ANSI B16.5 class 150 & 300 ;

ISO 7005 - PN 10, 16 & 25 ;

BS 10 Table D & E ;*

AS 2129 Table D & E ;*

Jis B 2212; 2213; & 2214.*

* See bulletin F02-01-01 for exclusion of flange standards.

Pressure Rating

Sizes 3", 4", & 6" (80, 100, & 150 mm) are approved to a working pressure of 300 psi (21 bar). Size 8" (200 mm) is approved to a working pressure of 175 psi (12 bar).

Adjustment Range

Seven different springs are available for an effective coverage of the full pressure range:

code	psi	bar	Marked
4A	3 - 18	0.2 - 1.2	Blue
4B	15 - 50	1 - 3.5	Black
4C	45 - 100	3 - 7	Red
4D	75 - 130	5 - 9	Green
4E	100 - 160	7 - 11	Yellow
4G	130 - 230	9 - 16	Green & White
6E	190 - 300	13 - 21	Green & Red

Temperature Range

Water: Max. +150°F (+65°C).

Installation Position

Vertical or Horizontal.

Materials

Standard

Valve Housing:

Carbon Steel (SAE 1021).

Wafer End:

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 ;

Stainless Steel AISI 316.

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.

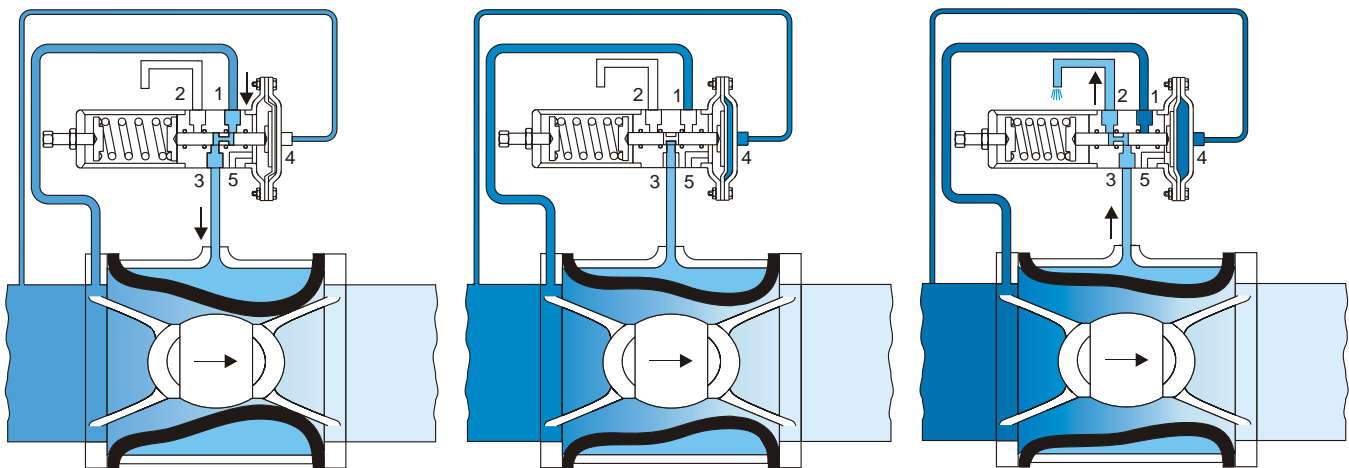
Features

- No Moving Mechanical Parts (N.M.M.P.) design provides very fast response for effective protection of the system from surge damage.
- Accurate modulating action to maintain the system pressure within a close limit.
- Advanced "No Flow" design of the pilot control eliminates the need for a needle valve, reduces the need for an external strainer, and reduces maintenance activities.
- Easily adjustable to the desired maximum system pressure.
- Long spring design for sensitive setting and the maintaining of accurate set pressure.
- Excellent **Inbal** Valve regulating performance ensures soft gradual closure to prevent secondary surge development.
- Hydrodynamically designed **Inbal** Valve with streamline flow path provides increased flow capacity.
- Pressure rating to 300 psi (21 bar) for standard material valve.
- Epoxy coating supplied as standard ensures excellent corrosion resistance.
- Optional materials to ensure corrosion-free service even under severe conditions.

Operation

The **Inbal** model 799D-01S01 Fire Pump Relief Valve is designed to be installed on a tee off the pipeline system between the fire pump and the check valve, relieving excess pressure to sump or drain system.

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 system pressure does not exceed the setting of the Pilot Valve. Should the system pressure exceed the set point, the Pilot Valve will open to vent the Control Chamber pressure, thus the **Inbal** Valve will open relieving all excess pressure and flow to sump or atmosphere. Upon the dropping of the pipeline pressure, the Pilot Valve and the **Inbal** Valve start to close gradually while ensuring that the system pressure does not exceed the preset pressure at any time during the closure process. Once the system pressure exceeds the set point, the **Inbal** Valve starts to regulate to accurately maintain the preset system pressure. When the system demand is ceased, the **Inbal** Fire Pump Pressure Relief Valve opens to relieve all of the pump pressure and flow. The check valve then closes, isolating the fire system. The pump may



"Under Satisfied" Position

The upstream pressure is lower than the spring setting. Ports (3) and (1) are interconnected and port (2) is isolated. The **Inbal** Valve closes to increase the inlet pressure.

"Satisfied" Position

The Pilot Valve is in equilibrium position. The control pressure acting on the diaphragm precisely balances the spring setting. There is no flow through the pilot system, therefore the **Inbal** Valve remains steady to maintain the preset upstream pressure or flow.

"Over Satisfied" Position

The upstream pressure exceeds the spring setting. Ports (3) and (2) are interconnected and port (1) is isolated. The **Inbal** Valve opens to decrease the inlet pressure.

Figure (1)

Figure (2)

Figure (3)

now safely be stopped without generating any system surges. When the pump is idle, the **Inbal** Valve model 799D-01S01 slowly closes and automatically resets for the next cycle.

Control Trim

The control trim includes all the components, nipples, fittings, and tubing preassembled and premounted on the **Inbal** Valve. The **Inbal** Valve 799D-01S01 is supplied after passing comprehensive hydraulic testing and set, on standard (unless otherwise required), to 150 psi (10 bar). The control trim includes the following components:

- Pressure Relief Pilot Valve
- Manual Override Valve
- Y-Strainer (optional)
- Shutoff Valve (optional)

Valve Sizing

To extend the life span of the **Inbal** Pressure Relief Valve, it is recommended to calculate cavitation conditions at the given pressures and flow rates. Refer to **Inbal** Valve Sizing Bulletin F50-01-01.

Capacity Chart

Inbal Valve Size	Maximum Recommended Flow Rate NFPA20	Maximum Intermittent Flow Rate
(Inch)	(gpm)	(gpm)
3"	500	700
4"	1000	1250
6"	2500	2800
8"	5000	5000

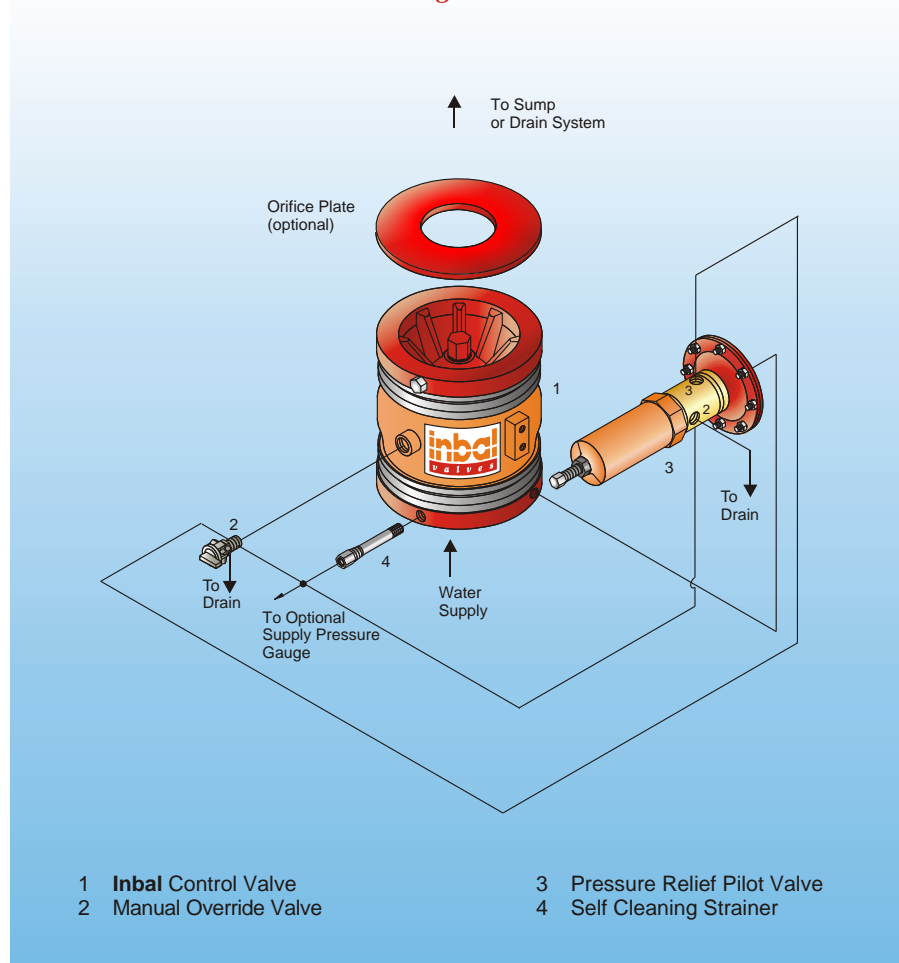
(mm)	(m³/h)	(m³/h)
80	114	160
100	227	285
150	568	640
200	1135	1135

Installation

Refer to the Trim Chart applicable to the **Inbal** Fire Pump Relief Valve model in use. The valve must be installed in an area not subject to freezing temperatures or physical damage. The **Inbal** Valve model 799D-01S01 can be installed horizontally or vertically.

1. When the **Inbal** Pressure Relief Valve is delivered, carefully unpack and check that there has been no damage to the operating components, piping, and fittings.
2. Verify that the factory presetting is correct or alternatively that the spring type is within the desired pressure setting (see Adjustment Range in Technical Data).
3. Always flush the pipeline before installing the **Inbal** Valve.
4. Place the **Inbal** Valve in the piping at the outlet of the tee. Verify that the arrow on the **Inbal** Pressure Relief Valve matches the actual flow direction. Determine which side the system will be accessed from and locate the **Inbal** Valve on the piping system accordingly.
5. Install the **Inbal** Valve in the pipeline. Use gaskets, stud bolts, bolt sleeves, and nuts as required by the valve ends.
6. Connect the drain port of the Pilot Valve to the drainage system.
7. Open the shutoff valve. To ensure smooth operation, all air must be expelled from the **Inbal** Valve Control Chamber and Pilot Control System.
8. If adjustment is required see (3) in Resetting
9. Test the **Inbal** Pressure Relief Valve according to the Testing procedure.

Schematic Control Diagram – 799D-01S01



- | | |
|------------------------------|-------------------------------|
| 1 Inbal Control Valve | 3 Pressure Relief Pilot Valve |
| 2 Manual Override Valve | 4 Self Cleaning Strainer |

Fire Pump Pressure Relief Valve

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Resetting

1. In a normal course of operation the **Inbal** Fire Pump Pressure Relief Valve is automatically reset after operation.
2. If the **Inbal** Valve was actuated by the Manual Override Valve, the handle of the valve should be restored to AUTO position.
3. If the relieved set point pressure should be adjusted, turn the Pilot Valve's adjusting screw clockwise to increase and counter-clockwise to decrease the pressure setting. The adjustment is recommended at a minimum flow velocity of 1.5 ft/sec (0.5 m/sec).

Maintenance, Inspection, & Testing

It is recommended that periodic inspections and tests be conducted by qualified personnel to ensure that the **Inbal** Fire Pump Pressure Relief Valve is in good operating condition. The inspection and testing activities should be done according to the NFPA standards, the guidelines and regulations of the authorities having jurisdiction, and the following instructions. It is recommended that the **Inbal** Pressure Relief Valve be tested, operated, cleaned, and inspected on a routine basis.

Inspection

A *monthly* inspection is recommended:

1. Check the Supply Pressure Gauge reading.
2. Verify that the Manual Override Valve is in AUTO position.

Warning: If the Manual Override Valve is in SHUT position, the pressure relief valve operation is neutralized.

3. Verify that the Pilot Valve and the **Inbal** Valve are tightly closed.
4. Visually inspect for broken or missing parts, or other evidence of impaired protection.

Strainer Cleaning

A *quarterly* Strainer Cleaning is recommended:

If a self cleaning strainer is used:

1. Close the Shutoff Valve.
2. Remove the self cleaning strainer, clean if necessary, and reinstall.
3. Open the Shutoff Valve.

If an external strainer (optional) is used:

1. Close the Shutoff Valve.
2. Remove the covers of the Y-Strainer. Clean if necessary. Reinstall the screen and the cover.
3. Open the Shutoff Valve.

Pressure Relief Valve Testing

A *semi-annual* Pressure Relief Valve is recommended:

1. Testing of the valve involves the operation of the fire pump. If testing of the whole system is not feasible, the Main Shutoff Valve should be closed before the pump is activated. The **Inbal** Pressure Relief Valve is sized to have the capability of relieving the all pump capacity at the predetermined system pressure.
2. When the pump is on, verify that the Pilot Valve and the **Inbal** Valve are open and that the pump delivery pressure is maintained at the preset level.
3. When the pump is stopped, verify that the **Inbal** Valve is gradually closing to a drip tight position.

Pilot Valve Testing

Operation of the **Inbal** Pilot Valve should be made *quarterly*. If operation of the whole system is not feasible, then an individual Pilot Valve testing should be implemented.

Testing of the Pilot Valve should be done according to the instructions in bulletin F36-01-01 - "Pressure Reducing/Relief Pilot Valve Series LA3 and LB3".

Removal

To remove the **Inbal** Pressure Relief Valve:

1. Close the Main Shutoff Valve.
2. Open the Manual Override Valve, by turning the handle to OPEN position, to release the water pressure from the **Inbal** Valve Control Chamber.
3. Remove the **Inbal** Fire Pump Pressure Relief Valve from the line for inspection.
4. To reinstall, follow the Installation procedure. Use new flange gaskets.

Inquiries/Orders

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