



LFC™_3B Pilot Operated Pressure Regulating Valve

Overview:

A pressure regulating valve is designed to maintain a desired downstream pressure irrespective of the flow requirement. The LFC™_3B variable ratio pressure regulating valve has been developed to present a robust, simple and cost-effective low pressure (up to 2.5 MPa / 363 psi) solution to fluid handling issues in any industrial sector.

Features:

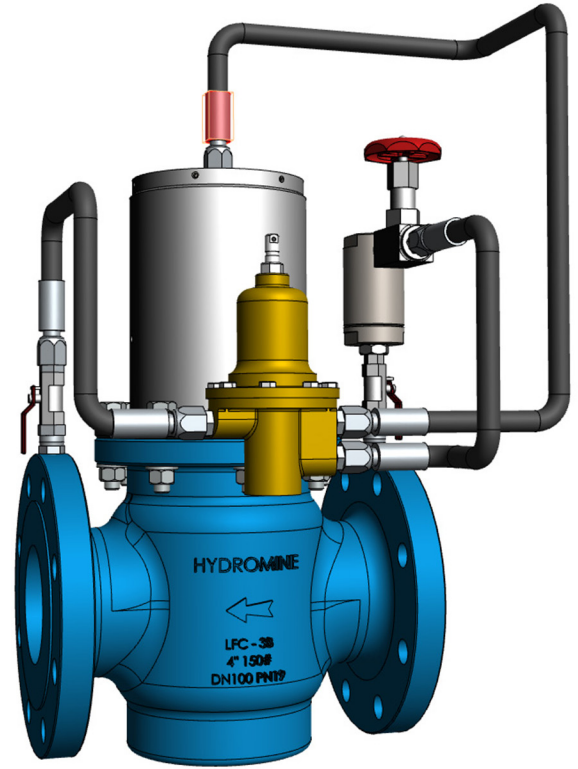
- Reduced cavitation
- Low noise levels
- Low vibration
- One moving part
- Long lasting

Simplicity:

The LFC™_3B Pilot operated pressure regulating valve is designed to minimize wearing parts and in effect only has one moving part called the plug assembly. The plug assembly is a piston that is engineered to be unbalanced. The unbalanced plug assembly combined with a pilot are designed to use inline fluid pressure to create specific conditions in the system.

Its equipped with a 3-way pilot that controls the downstream pressure. A needle valve allows upstream pressure to flow into the valve top closing compartment at a controlled flow rate.

The pilot releases pressure from the valve to compartment at an adjustable rate. By adjusting the adjustment screw, the downstream control pressure can be adjusted to the desired downstream pressure. The pilot will ensure that the downstream pressure will remain stable, even if the upstream pressure changes with demand changes.



Materials of Construction & Dimensions:

Part Name	Material Specification	Valve size	Face To Face Dimensions	
			Unit	Face to face #150
			(mm)	(Inch)
Body	Coasting - Ductile iron			
Body seat	431 / 304 S/ Steel			
Plug	431 / 304 S/ Steel	DN50 / 2"	203	7.99
V-Port	431 / 304 S/ Steel	DN80 / 3"	241	9.49
Piston rod	431 / 304 S/ Steel	DN100 / 4"	292	11.50
Piston	431 / 304 S/ Steel	DN150 / 6"	356	14.02
Plug seat	Polyurethane	DN200 / 8"	495	19.49
Sleeve	431 / 304 S/ Steel	DN250 / 10"	622	24.49
Sleeve Holder	Ductile iron	DN300 / 12"	699	27.52
Cylinder	431 / 304 S/ Steel	DN350 / 14"	787	30.98
Cylinder holder	Ductile iron	DN400 / 16"	914	35.98
Cylinder cover	Ductile iron			
O-Rings	Nitrile (Buna)			
Hoses	Single braided			

Low Maintenance Requirement:

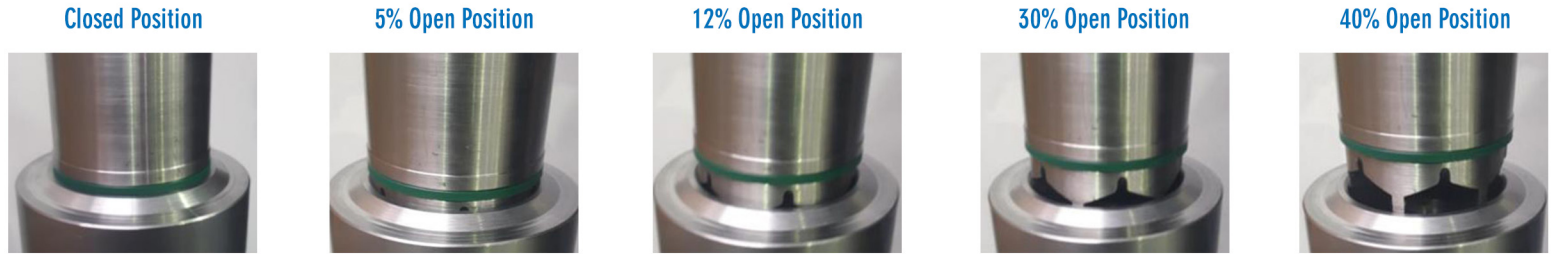
All the moving parts of LFC™_3B surge relief valve are manufactured from stainless steel which increases reliability and durability. The LFC™_3B requires minimal maintenance, the majority of which, can be conducted with the valve remaining in situ.





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Plug Assembly, V-Port And Dealing With Cavitation:



As displayed, the LFC™_3B pressure regulating valve plug assembly and movements.

Closed Position: Shows the plug assembly on the body seat in a fully closed valve position.

5% Open Position: Shows the plug assembly in a 5% open position. It can clearly be seen that only the top of the V-Port opens up and creates a flow path. This reduces cavitation and helps with fine control at low flow conditions.

12% Open Position: Shows the plug assembly in the 12% open position. Now it can be observed how the V-Port moved away from the seat and the openings are increasing proportionally. At this point the top of the V-Ports are now being exposed to the flow path.

30% Open Position: Shows the plug assembly in the 30% opened position. Now it can clearly be seen that the full V-Port is creating a larger orifice in the flow path. Up to this point, cavitation needs to be dealt with to increase the life expectancy of the valve. The V-port trim ensures that the seating elements are further apart from each other during low flow allowing the cavitation to take place on noncritical components of the valve.

40% Open Position: Shows the plug assembly in the 40% open position. Now it can clearly be seen that the V-Port is completely away from the seat and the flow path is now relatively large. At this point the flow is approaching its medium demand flow rate and the V-Port has little to no function.

Flow Rates:

Flow (l/sec)	5	10	25	40	50	100	150	200	250	300	350	400
Pressure Drop (kPa)	DN50	47	94									
	DN80	17	34	86								
	DN100		23	57	79							
	DN150			26	36	51	102					
	DN200					28	56	84	112			
	DN250						37	55	73	91	112	
	DN300						26	37	50	63	75	90
Flow US gallon/ min	79.25	158.50	396.26	634.01	792.52	1585.03	2377.55	3170.06	3962.575	4755.09	5547.605	6340.12
Pressure Drop (psi)	2"	6.82	13.63									
	3"	2.47	4.93	12.47								
	4"		3.34	8.27	11.46							
	6"			3.77	5.22	7.4	14.79					
	8"					4.06	8.12	12.18	16.24			
	10"						5.37	7.98	10.59	13.2	16.24	
	12"						3.77	5.37	7.25	9.14	10.88	13.05

Robust, Reliable And Efficient:

Due to the minimal number of moving parts to affect the fluid control, the number of potential failures is minimized. The valve can only fail for the following reasons:

1. **Lack of maintenance:** If filters are utilized in the control system, regular cleaning of the filters are required to prevent the valve operation from slowing down and eventually creating a possible hydraulic locking of the valve. This process depends on the condition of the service water being used. The dirtier the water, the shorter the filter maintenance intervals will need to be. A valve seal replacement program should be employed to ensure that the valves plug seals are replaced in accordance with manufacturer's recommendations. As these seals are largely protected the intervals for maintenance on these items can usually be done in terms of years. If these seals fail, the valve will start to bypass pressure from the Pu to the control chamber on the unbalanced valves. Balanced valves are equipped with tell-tale breather holes in the cylinder holder which will immediately indicate seal failure.

2. **Mechanical fouling:** Should a large object be introduced into the service water piping and reach the valve inlet; such object could create a mechanical jam and prevent the plug assembly from operating.



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Robust, Reliable And Efficient Cont.:

3. Overriding of the control system: As the valve is hydraulically actuated and controlled, if the control system is isolated from the service water by way of isolation valves in the control system, the valve will be hydraulically locked in position and will be unable to adjust to the inline condition changes.

4. Mechanical failure of the main seating arrangement: In time, the seating arrangement will experience conditions of high velocity across the seating surface during low flow conditions. The high velocity will eventually cause wear on the seating surface and on the plug seating surface. If the valves start to bypass across its seat, the down stream pressure could increase to the point where the pressure relief valve is activated during low flow conditions.

All of these conditions are easily avoidable and rectifiable through regular maintenance programs and service water quality control and condition monitoring.

Design & Manufacturing Standards:

The LFC™_3B has been designed in accordance with various international standards as set out below: ASME Boilers and pressure vessels design code

ANSI B16.10 ANSI B16.3
ANSI B16.34 ANSI B16.37
ANSI B16.5 ANSI N278.1

Available sizes: DN50 / 2" to DN400 / 16"
Face to face dimensions to ANSI B16.10
Pressure rating: up to 2,5 MPa / 363 psi

Available end connections: ANSI B1 6.5, BS4504, BS10, AS/NZS 4331.1 (ISO 7005-1) DIN, all makes of grooved or ring joint couplings, and other as per client's requirement.

