



LFC™_3A Pressure Regulating Valves

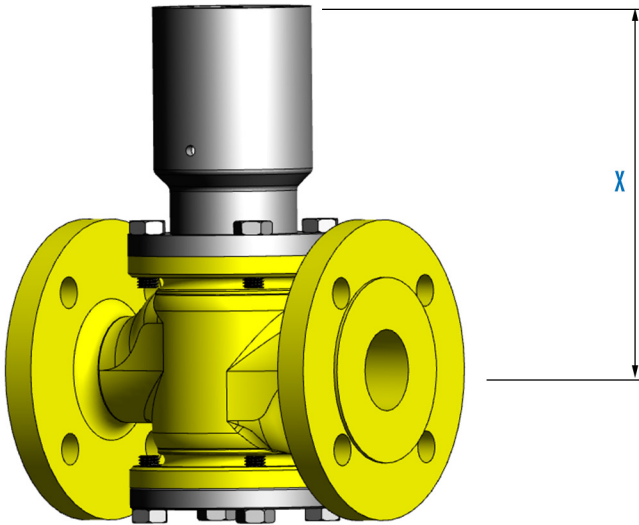
Overview:

A pressure regulating valve is designed to maintain a desired downstream pressure irrespective of the flow requirement. The LFC™_3A fixed ratio pressure regulating valve has been developed to present a robust, simple and cost-effective low pressure (up to 1.9 MPa / 275 Psi) solution to fluid handling issues in any industrial sector.

Simplicity:

The LFC™_3A 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 is designed to use inline fluid pressure to create specific conditions in the system without the use of an external controller or pilot.

A fixed reduction ratio can be established by fixing the surface area ratio exposed to the upstream and downstream pressures. Upstream pressure (Pu) would act to open the valve and downstream pressure (Pd) would act to close the valve. As the Pd increases, the closing force increases proportionally causing the valve to close. If Pd is reduced, the valve will open proportionally in an effort to maintain its hydraulic ratio.



Features:

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

Available Ratios
2:1
2.5:1
3:1
4:1
5:1

Materials Of Construction & Dimensions:

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

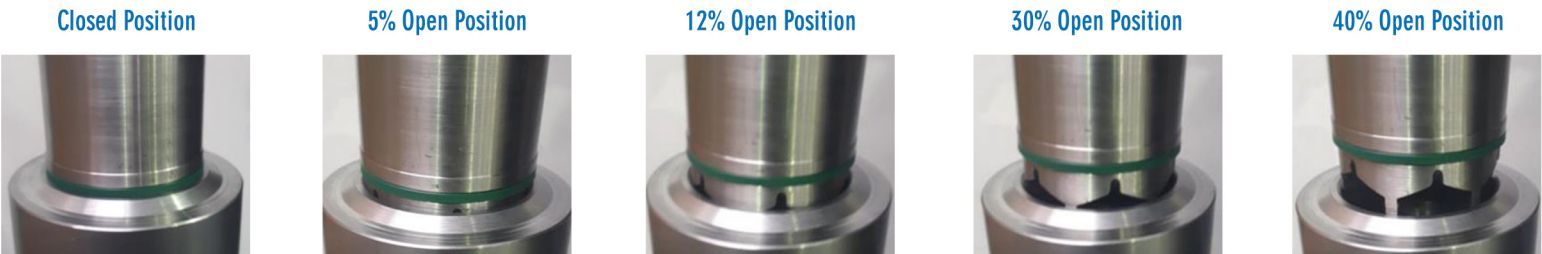
Low Maintenance Requirement:

All the moving parts of LFC™_3A pressure regulating valve are manufactured from stainless steel which increases reliability and durability. The LFC™_3A requires minimal maintenance, the majority of which, can be conducted with the valve remaining in situ.



LFCTM_3A Pressure Regulating Valves

Plug Assembly, V-Port And Dealing With Cavitation:



As displayed, the LFCTM_3A pressure regulating valve plug assembly and movements.

Plug Assembly: 5% Open, showing the full plug assembly.

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

5% Open Position: Shows the plug assemble 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.

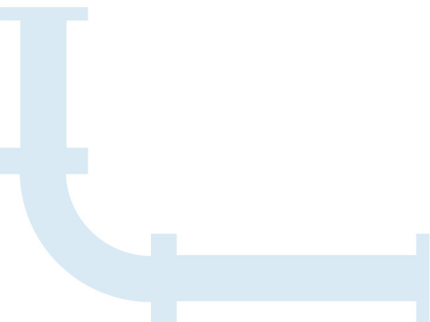
12% Open Position: Shows the plug assembly in the 12% open position. Now it can be observed how the V-Port moved away from the seat and the openings are increasing proportionally. At this point the top of the V-Ports are now being exposed to the flow path.

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 non critical 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 (e/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	103
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	14,96





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Robust, Reliable And Efficient:

Due to the minimal number of moving parts to effect the fluid control, the number of potential failures are 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 shuttle 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. Pressure regulating valves are equipped with tell-tale breather holes in the side of the cylinder 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 shuttle from operating.
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 shuttle seating surface. If the valves starts to bypass across its seat, the downstream 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 LFCTM_3A 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 1.9 MPa / 275 Psi

Available end connections: ANSI BI 6.5, BS4504, BS10, AS/NZS 4331.1 (ISO 7005-1) DIN, Victaulic, and other as per clients requirement.

