



## HYDROMINE™ LFC\_3B Pressure Regulating Valves

### Overview:

A pressure regulating valve is designed to maintain a desired downstream pressure irrespective of the flow requirement. The HYDROMINE™ LFC\_3B fixed 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.

### Simplicity:

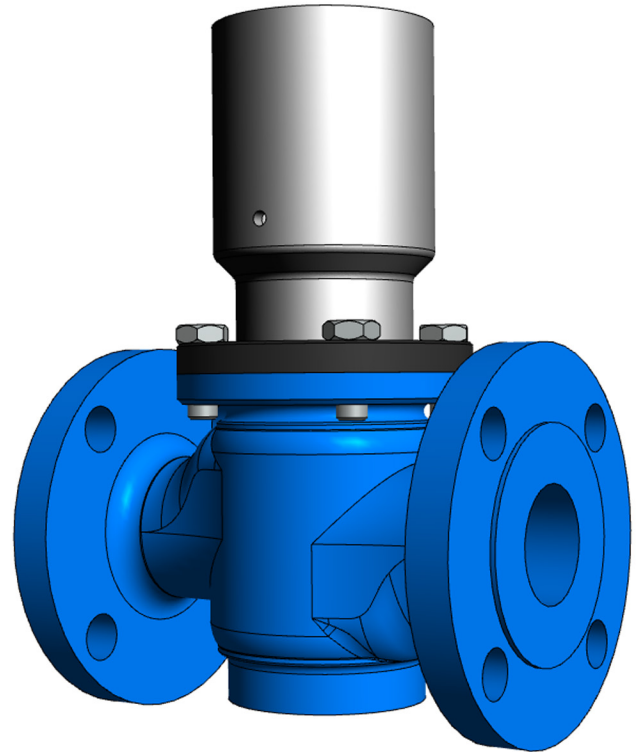
The HYDROMINE™ LFC\_3B pressure regulating valve is designed to minimize wearing parts and in effect only has one moving part called the plug assembly. The plug assembly is a piston that is engineered to be unbalanced. The unbalanced plug assembly is designed to use inline fluid pressure to create specific 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 ( $P_u$ ) would act to open the valve and downstream pressure ( $P_d$ ) would act to close the valve. As the  $P_d$  increases, the closing force increases proportionally causing the valve to close. If  $P_d$  is reduced, the valve will open proportionally 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 (ANSI B16.10)		
		Valve size	Face to face #150	
		Unit	(mm)	(Inch)
Body	Casting - Ductile iron			
Body seat	431 / 304 S/ Steel			
Plug	431 / 304 S/ Steel	DN50 / 2"	203	8
V-Port	431 / 304 S/ Steel	DN80 / 3"	241	9 1/2
Piston rod	431 / 304 S/ Steel	DN100 / 4"	292	11 1/2
Piston	431 / 304 S/ Steel	DN150 / 6"	356	14
Plug seat	Polyurethane	DN200 / 8"	495	19 1/2
Sleeve	431 / 304 S/ Steel	DN250 / 10"	622	24 1/2
Body cover	Ductile iron or Carbon steel	DN300 / 12"	699	27 1/2
Cylinder	431 / 304 S/ Steel	DN350 / 14"	787	31
Cylinder cover	Ductile iron or Carbon steel	DN400 / 16"	914	36
O-Rings	Nitrile (Buna)			
Hose	Self-grip Push-Lok			

All face to face dimensions are in accordance with ANSI B16.10 Class 150.

### Low Maintenance Requirement:

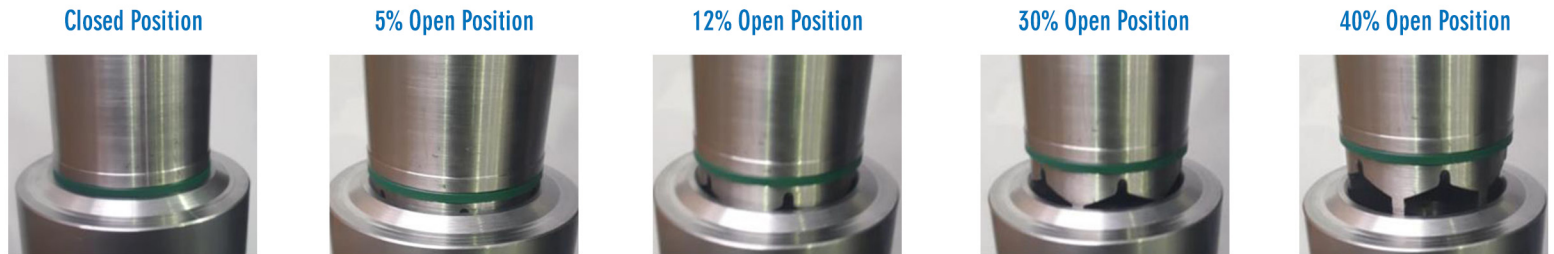
All the moving parts of HYDROMINE™ LFC\_3B pressure regulating valve are manufactured from stainless steel which increases reliability and durability. The HYDROMINE™ LFC\_3B requires minimal maintenance, the majority of which, can be conducted with the valve remaining in situ.





## HYDROMINE™ LFC\_3B Pressure Regulating Valves

### Plug Assembly, V-Port And Dealing With Cavitation:



As displayed, the HYDROMINE™ LFC\_3B 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 assembly in a 5% open position. It can clearly be seen that only the top of the V-Port opens 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 is 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 (ℓ/sec)		5	10	25	40	50	100	150	200	250	300	350	400	450	500
Pressure drop (kPa)	DN50	46	93												
	DN80	17	34	86											
	DN100		22	56	89										
	DN150			25	40	51	101								
	DN200				22	28	56	83	111						
	DN250					18	36	54	72	90	108				
	DN300						25	37	50	62	75	87	100		
	DN350							27	37	46	55	64	73	82	
DN400								26	33	39	46	52	59	65	
Flow US gallon / min		79,25	158,50	396,26	634,01	792,52	1585,03	2377,55	3170,06	3962,58	4755,09	5547,61	6340,12	7132,64	7925,15
Pressure drop (psi)	2"	6,74	13,47												
	3"	2,48	4,97	12,42											
	4"		3,24	8,11	12,97										
	6"			3,67	5,87	7,34	14,68								
	8"				3,22	4,03	8,06	12,09	16,12						
	10"					2,62	5,24	7,85	10,47	13,09					
	12"						3,62	5,43	7,24	9,05	10,86	12,67	14,48		
	14"							3,98	5,31	6,64	7,97	9,29	10,62	11,95	
16"								3,79	4,74	5,69	6,64	7,58	8,53	9,48	

Kv / Cv Values		
Unit	Kv	Cv
DN50 / 2"	39	45
DN80 / 3"	104	122
DN100 / 4"	160	187
DN150 / 6"	354	413
DN200 / 8"	644	752
DN250 / 10"	992	1158
DN300 / 12"	1435	1675
DN350 / 14"	1955	2283
DN400 / 16"	2739	3198



## HYDROMINE™ LFC\_3B Pressure Regulating Valves

### Robust, Reliable And Efficient:

Due to the minimal number of moving parts to affect 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 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 upstream pressure to the air vent chamber. Valves are equipped with tell-tale breather holes 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 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 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 these conditions are easily avoidable and rectifiable through regular maintenance programs and service water quality control and condition monitoring.

### Valve Sizing:

Please consult with HYDROMINE™ Projects International for clarification of correct sizing for your requirements.

### Design & Manufacturing Standards:

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

ANSI B16.10 API598  
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 BI 6.5, BS4504, BS10, AS/NZS 4331.1 (ISO 7005-1) DIN, all makes of grooved or ring joint couplings, and other as per clients requirement.

