



## HYDROMINE™ LFC\_3B Fail-To-Close Pneumatic Actuated Valve

### Overview:

The HYDROMINE™ LFC\_3B Fail-to-close pneumatic actuated valve is designed to be a cost effective solution for remote isolation, level control, pump discharge control valves, and similar functions found in a pipe system. The fail-to-close function helps to protect other equipment in the system, and assists to prevent overflowing of the dams during power, air or gas failures.

Opening and closing of the valve is relatively simple. It uses a 24 VDC / 110 VAC / 220 VAC solenoid valve which is assisted by pneumatic or gas pressure ranging between 2 to 8 bar / 29 to 116 psi to open, and it uses the force generated by a spring to close. The speed of the valve can be adjusted to any desired speed fairly quickly and easily.

The benefit of using a pneumatic actuated valve system supersedes the need for similar actuation methods that are costly and unreliable, resulting in lower operating costs, better productivity, and long term sustainability.

The HYDROMINE™ LFC\_3B Fail-to-close pneumatic actuated valve has been developed to present a robust, simple and cost effective (up to 2.5 MPa / 363 psi) solution to fluid handling issues in any industrial sector.



### Low Operating Torque:

The HYDROMINE™ LFC\_3B Fail-to-close pneumatic actuated valve is hydrostatically balanced to enable easy opening and closing at any pressure and differential conditions. It does not require the use of actuators of any kind or size.

### Simplicity:

The HYDROMINE™ LFC\_3B Fail-to-close pneumatic actuated valve is designed with only one moving part called the plug assembly, thereby minimizing the effects of multiple wearing parts. The plug assembly is a piston type arrangement that is engineered to be balanced, which uses pneumatic pressure acting in a cylinder mounted on top of the valve to function. The pneumatic cylinder is designed to overcome the water pressure inside the piping system, the valve, as well as the spring. As such, only the valve own operating torque is required to overcome the sum of the friction forces generated within the valve body, the seals, the cylinder, the weight of the plug (depending on the installation configuration) and the tension of the spring.

The torque requirement is not affected by inline pressure variants and therefore makes the valve extremely reliable for actuation applications. The pneumatic actuation cylinder is simple in comparison to an electric actuator. The HYDROMINE™ LFC\_3B Fail-to-close pneumatic actuated valve can easily be fitted with limit switches to give open and closed indications.

### Materials of Construction & Dimensions:

Face to face dimensions (ANSI B16.10)			Part Name	Material Specification
Unit	#150			
	(mm)	(inch)	Body	Ductile iron
DN50 / 2"	303	8	Body seat	431 / 304 S/Steel
DN80 / 3"	241	9 1/2	Plug	431 / 304 S/Steel
DN100 / 4"	292	11 1/2	V-Port or Seat holder	431 / 304 S/Steel
DN150 / 6"	356	14	Shaft	431 / 304 S/Steel
DN200 / 8"	495	19 1/2	Piston	431 / 304 S/Steel
DN250 / 10"	622	24 1/2	Plug seat	Polyurethane
DN300 / 12"	699	27 1/2	Sleeve	431 / 304 S/Steel
DN350 / 14"	787	31	Body cover or sleeve holder	Ductile iron / Carbon steel
DN400 / 16"	914	36	Cylinder	431 / 304 S/Steel
			Cylinder flange	Carbon steel
			Cylinder top cover	Ductile iron / Carbon steel
			Spring	Spring steel
			Indication rod	431 / 304 S/Steel
			Hoses	Self-grip Puch-Lok
			Seals	Polyurethane
			O-Rings	Bona N

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



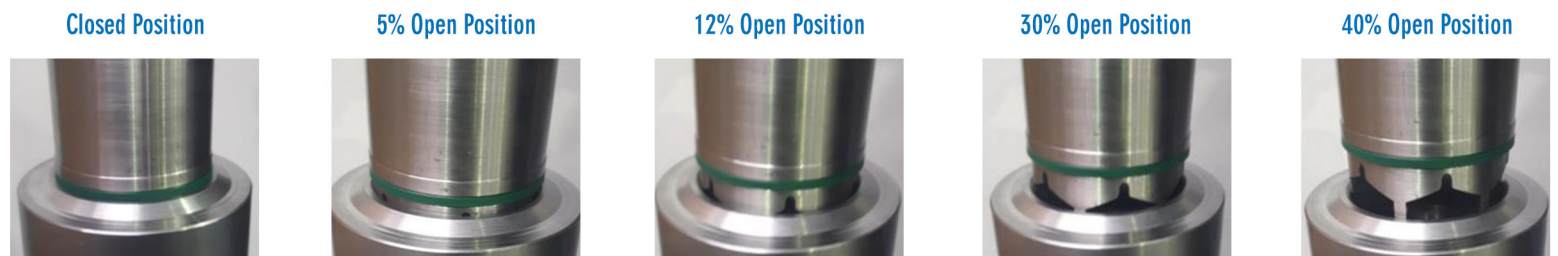
## HYDROMINE™ LFC\_3B Fail-To-Close Pneumatic Actuated Valve

### Flow Rates:

Flow (l/sec)		5	10	25	40	50	100	150	200	250	300	350	400	450	500
Pressure drop (kPa)	DN50	54	108												
	DN80	20	40	100											
	DN100		26	65	104										
	DN150			30	47	59	118								
	DN200				26	32	65	97	130						
	DN250					21	42	63	84	105	126				
	DN300						29	44	58	73	87	102	117		
	DN350							32	43	53	64	75	86	96	
	DN400								31	38	46	53	61	69	76
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"	7,86	15,73												
	3"	2,90	5,80	14,50											
	4"		3,79	9,46	15,14										
	6"			4,28	6,86	8,57	17,14								
	8"				3,77	4,71	9,41	14,12	18,83						
	10"					3,06	6,11	9,17	12,23	15,28					
	12"						4,23	6,34	8,45	10,56	12,68	14,79	16,90		
	14"							4,65	6,20	7,75	9,30	10,85	12,40	13,95	
	16"								4,43	5,53	6,64	7,75	8,85	9,96	11,07

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

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



As displayed, the HYDROMINE™ LFC\_3 Fail-to-close pneumatic actuated 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 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 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.





## HYDROMINE™ LFC\_3B Fail-To-Close Pneumatic Actuated Valve

### Valve Sizing:

Please consult with a technical expert at HYDROMINE™ for clarification on correct valve sizing on your specific requirements.

### Operating Conditions:

These HYDROMINE™ LFC\_3B Fail-to-close pneumatic actuated valves are designed to operate in systems with relatively clean media like water or other liquids with a low percentage of suspended solids and chlorides. The valve's operating pH range is 2 -14 pH.

### Low Maintenance Requirement:

The HYDROMINE™ LFC\_3B Fail-to-close pneumatic actuated valve requires minimal maintenance, the majority of which can be conducted with the valve remaining in situ. All moving parts are manufactured from stainless steel which increases their reliability and durability.

### Design & Manufacturing Standards:

The HYDROMINE™ LFC\_3B Fail-to-close pneumatic actuated valve is designed in accordance with various International Boiler and Pressure vessel 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"

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 and ring joint couplings, and as per client specific requirements.

