

In-Line Balanced Pressure Proportioner (ILBP)

Proportioning Devices | Model KBP

1 General description

The in-line balanced pressure proportioner (ILBP) is a foam proportioning device which is used to balance the higher foam concentrate pressure to the lower system water pressure on pilot pressure regulating systems or foam pump proportioning systems.

The ILBP is particularly useful in providing accurate proportioning at multiple riser locations that are situated remotely from the central foam concentrate storage tank.

Different sizes of ILBP can be installed on the same foam concentrate supply system to ensure the most appropriate size and demand combination is used. The ILBP is tested and approved to work at different pressure and flow rates and will automatically adjust to give accurate proportioning across its working range.

This technical data is intended for trained experts.

Technical data can be found on the KCA website at <http://www.kcantincendi.com>.

The website may include a more recent edition of this technical data sheet.

For further information, please contact KCA or refer to the technical documentation.

The contents of this publication are subject to modifications without notice.

2 Listings and approvals

The ILBP is FM approved and UL listed as part of a fire extinguishing system combining designated foam concentrates, bladder tanks and discharge devices.

It is also required for use with Viking low flow foam systems. FM approved and UL listed system components can be found at www.approvalguide.com and iq.ulprospector.com

- FM approved – Low Expansion Foam Systems (FM5130)
- UL listed – Guide GHXV.EX26572, GFGV.EX6015, GLKX.EX27989 (UL162)

NOTICE

Other international approval certificates may be available upon request.

“SFFF compatible” refers to this product as being part of a SFFF Foam system that has been tested to recognised standards. Not all configurations are available. Please consult technical data and/or the Approval/Listing for usage requirements.

3 Technical data

3.1 Construction features

- Available in 3" (DN80), 4" (DN100), 6" (DN150), 8" (DN200)
- Nickel aluminium bronze construction for superior corrosion protection
- Brass construction available on special order
- Suitable for horizontal or vertical installation
- Direction of flow indicator on body
- For use with fresh or salt water
- Identification tag plate



Images for illustrative purposes only.



3.2 Standard materials

Nickel Aluminum Bronze Version	
Body & nozzle	Nickel aluminum bronze UNS C95800 - ASTM B148
Orifice	UNS-C36000 or C46400 or C95800
Fittings	Stainless steel
Spool assembly	See table 6.2.2

Table 3.2.1 - Standard materials

3.3 Standard design specifications

All Versions	
Design pressure	250 psi / 17.2 bar (1.7 MPa)
Design temperature range	14 °F to 120 °F (-10 °C to 49 °C)*
Operating temperature range	35 °F to 120 °F (1.7 °C to 49 °C)
Minimum operating inlet pressure	30 psi / 2.1 bar (0.2 MPa)
Maximum operating inlet pressure	150 psi / 10.3 bar (1.2 MPa)
Proportioning range	Refer to table 3.4.1
Foam inlet pressure	Minimum 15 psi (1.03 bar) above system water supply pressure
Maximum static pressure	250 psi / 17.2 bar
*Riser must be installed in an area maintained at or above 40 °F (4.4 °C)	

Table 3.3.1 - Standard design specifications

3.4 Ordering information

Connection		Foam type ³	Part number ²	Foam inlet orifice size		FM approved				UL listed			
						Minimum flow rate ¹		Maximum flow rate ¹		Minimum flow rate ¹		Maximum flow rate ¹	
Body grooved	Foam inlet grooved			Inch	mm	GPM	l/min	GPM	l/min	GPM	l/min	GPM	l/min
3" (88.9mm)	1.5" (48.3mm)	AFFF 1% Ultra LT C6	KBP089NA	0.205	5.21	50	189	750	2,839	50	189	750	2,839
		AFFF 3% S C6	KBP089NB	0.362	9.19	100	378	750	2,839	100	378	750	2,839
		AFFF 3% M C6	KBP089NM	0.362	9.19	100	378	750	2,839	100	378	750	2,839
		ARC 3X3 S C6	KBP089NJ	0.392	9.96	202	757	750	2,839	202	757	750	2,839
		LS-xMax 3%	KBP089NN	0.362	9.19	-	-	-	-	150	568	750	2,839
		Enviro USP 3%	KBP089NL	0.370	9.40	180	681	760	2,877	-	-	-	-
4" (114.3mm)	2" (60.3mm)	AFFF 1% Ultra LT C6	KBP114NA	0.279	7.09	500	1,893	1,250	4,731	250	947	1,250	4,731
		AFFF 3% S C6	KBP114NB	0.485	12.32	400	1,514	1,250	4,731	400	1,514	1,250	4,731
		AFFF 3% M C6	KBP114NM	0.485	12.32	400	1,514	1,250	4,731	400	1,514	1,250	4,731
		ARC 3X3 S C6	KBP114NJ	0.472	11.99	450	1,703	1,250	4,731	400	1,514	1,250	4,731
		LS-xMax 3%	KBP114NN	0.485	12.32	-	-	-	-	287	1,507	1,244	4,709
		Enviro USP 3%	KBP114NL	0.488	12.40	455	1,722	1,275	4,826	420	1,590	1,515	5,735
6" (165.1mm)	2" (60.3mm)	Enviro ARK 3%	KBP114NP	0.488	12.40	523	1,980	1,273	4,819	-	-	-	-
		AFFF 1% Ultra LT C6	KBP165NA	0.358	9.09	500	1,893	2,300	8,706	500	1,893	2,300	8,706
		AFFF 3% S C6	KBP165NB	0.700	17.78	600	2,271	2,300	8,706	500	1,893	2,300	8,629
		AFFF 3% M C6	KBP165NM	0.700	17.78	600	2,271	2,300	8,706	500	1,893	2,300	8,629
		ARC 3X3 S C6	KBP165NJ	0.657	16.69	850	3,218	2,300	8,706	850	3,218	2,300	8,706
		LS-xMax 3%	KBP165NN	0.700	17.78	-	-	-	-	742	2,809	2,428	9,191
6" (168.3mm) ²	2" (60.3mm)	Enviro USP 3%	KBP165NL	0.738	18.75	1,240	4,694	2,640	9,993	-	-	-	-
		Enviro ARK 3%	KBP165NP	0.700	17.78	1,050	3,975	2,315	8,763	-	-	-	-
		AFFF 1% Ultra LT C6	KBP168NA	0.358	9.09	500	1,893	2,300	8,706	500	1,893	2,300	8,706
		AFFF 3% S C6	KBP168NB	0.700	17.78	600	2,271	2,300	8,706	500	1,893	2,300	8,629
		AFFF 3% M C6	KBP168NM	0.700	17.78	600	2,271	2,300	8,706	500	1,893	2,300	8,629
		ARC 3X3 S C6	KBP168NJ	0.657	16.69	850	3,218	2,300	8,706	850	3,218	2,300	8,706
8" (219.1mm)	2.5" (76.1mm)	LS-xMax 3%	KBP168NN	0.700	17.78	-	-	-	-	742	2,809	2,428	9,191
		Enviro USP 3%	KBP168NL	0.738	18.75	1,240	4,694	2,640	9,993	-	-	-	-
		Enviro ARK 3%	KBP168NP	0.700	17.78	1,050	3,975	2,315	8,763	-	-	-	-
		AFFF 1% Ultra LT C6	KBP2196NA	0.525	13.34	1,550	5,867	4,500	17,033	1,300	4,920	4,500	17,033
		AFFF 3% S C6	KBP2196NB	0.975	24.77	1,300	4,921	4,400	16,656	1,300	4,921	4,400	16,656
		AFFF 3% M C6	KBP2196NM	0.975	24.77	1,300	4,921	4,400	16,656	1,300	4,921	4,400	16,656
8" (219.1mm) ²	2.5" (73.0mm)	ARC 3X3 S C6	KBP2196NJ	0.952	24.18	1,553	5,879	4,460	16,883	1,634	6,185	4,500	17,033
		LS-xMax 3%	KBP2196NN	0.975	24.77	-	-	-	-	1,953	7,393	4,459	16,879
		Enviro USP 3%	KBP2196NL	0.952	24.18	1,650	6,246	4,250	16,088	2,330	8,819	4,250	16,088
		AFFF 1% Ultra LT C6	KBP2193NA	0.525	13.34	1,550	5,867	4,500	17,033	1,300	4,920	4,500	17,033
		AFFF 3% S C6	KBP2193NB	0.975	24.77	1,300	4,921	4,400	16,656	1,300	4,921	4,400	16,656
		AFFF 3% M C6	KBP2193NM	0.975	24.77	1,300	4,921	4,400	16,656	1,300	4,921	4,400	16,656
8" (219.1mm) ²	2.5" (73.0mm)	ARC 3X3 S C6	KBP2193NJ	0.952	24.18	1,553	5,879	4,460	16,883	1,634	6,185	4,500	17,033
		LS-xMax 3%	KBP2193NN	0.975	24.77	-	-	-	-	1,953	7,393	4,459	16,879
		Enviro USP 3%	KBP2193NL	0.952	24.18	1,650	6,246	4,250	16,088	2,330	8,819	4,250	16,088

NOTES:

¹ Please refer to graphs in **section 7.2** for specific flow rate parameters.

² NAB 219 mm with 73 mm foam inlet are non standard and could be subject to additional lead time and price..

³ All foam types comply with the requirements of the EPA 2010/2015 PFOA Stewardship Program.

⁴ A seal kit for the spool valve is available to purchase separately. **See section 13.**

Table 3.4.1 - Ordering information

INFORMATION

Some of the available options may be not covered by the UL listing or FM approval. Please always make reference to the appropriate approval directory or guides or contact KCA for further assistance.

4 Scope of delivery

Ensure that all components are complete and in good condition.

The ILBP is supplied boxed, with a data plate and an integral sized orifice disc specific to its approved/listed concentrate.

The ILBP comes part assembled as detailed in **Section 8** and **Figure 8.1**. The ILBP is supplied with these main components:

- Balanced spool type balancing valve
- Brass swing check valve
- Duplex gauge which indicates both water pressure (black needle) and foam pressure (red needle)
- Flexible braided sensing lines
- Interconnecting brass nipples as indicated on the detailed drawings

System pipework grooved couplings are not included.

5 Availability

Please contact KCA for further information.

The product is available directly from the manufacturer and official distributors only.

6 Product variants

6.1 Options

- Suitable for Fomtec foam concentrate: AFFF 1% ULTRA LT C6 | AFFF 3%S C6 | AFFF 3%M C6 | ARC 3X3S C6 | LS-xMax 3% | Enviro USP 3% | Enviro ARK 3%
- Brass UNS C84400 construction available on request
- Pre-assembled with bladder tank and water/foam pipe work

6.2 Dimensions and equivalent length

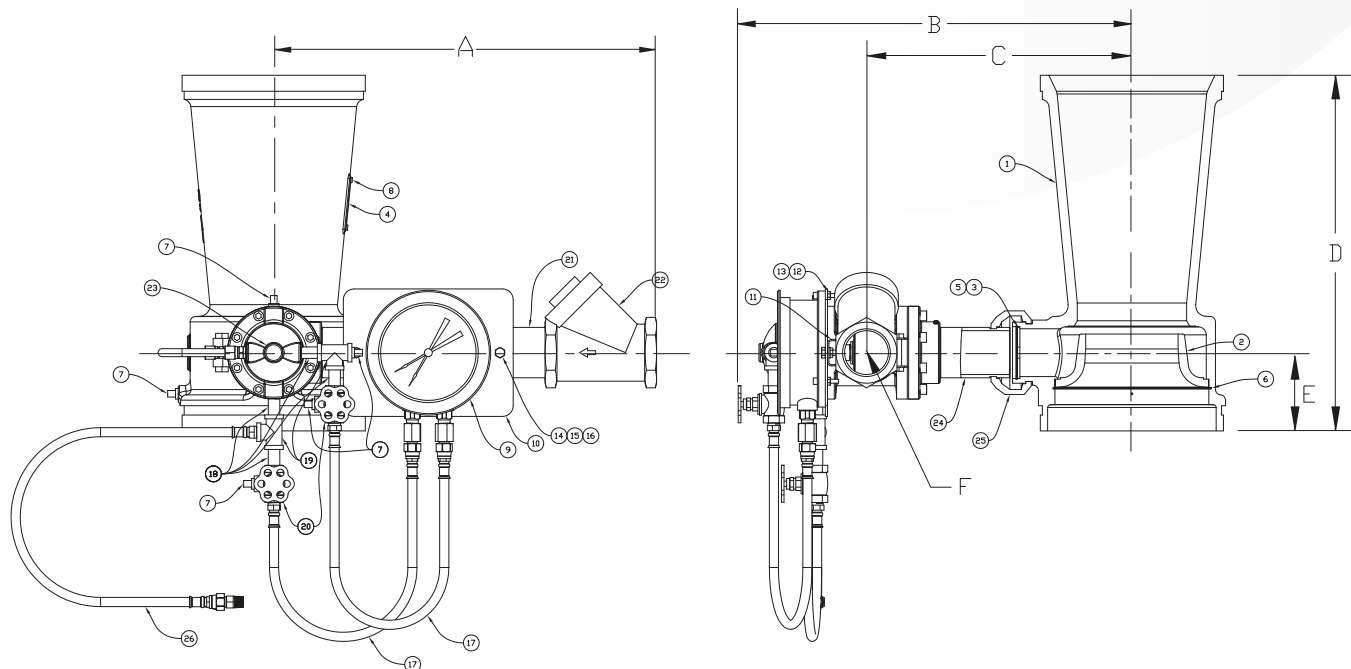


Figure 6.2.1 - In-line balanced pressure proportioner

Item	Description	Qty	Replacement part	Item	Description	Qty	Replacement part
1	Ratio controller	1	N/A	14	Bolt	2	N/A
2	Nozzle	1	N/A	15	Lock washer	2	N/A
3	Orifice plate	1	N/A	16	Nut	2	N/A
4	Data plate	1	N/A	17	Sensing line assembly	2	F09565
5	Retaining ring	1	N/A	18	Nipple	4	N/A
6	Retaining ring	1	N/A	19	Tee	2	N/A
7	1/4" plug	5	14BRPLUG	20	Side outlet valve	2	03952A
8	Rivet	2	N/A	21	Nipple	1	N/A
9	Gauge	1	F09646	22	Swing check valve (NPT)	1	F09664 (1-1/2") F09665 (2")
10	Mounting plate	1	N/A	23	Spool valve	1	N/A
11	Pipe clamp	1	N/A	24	Nipple	1	N/A
12	Screw	3	N/A	25	Grooved coupling	1	N/A
13	Nut	3	N/A	26	Sensing line assembly	1	F09615

Table 6.2.2 - ILBP Assembly components

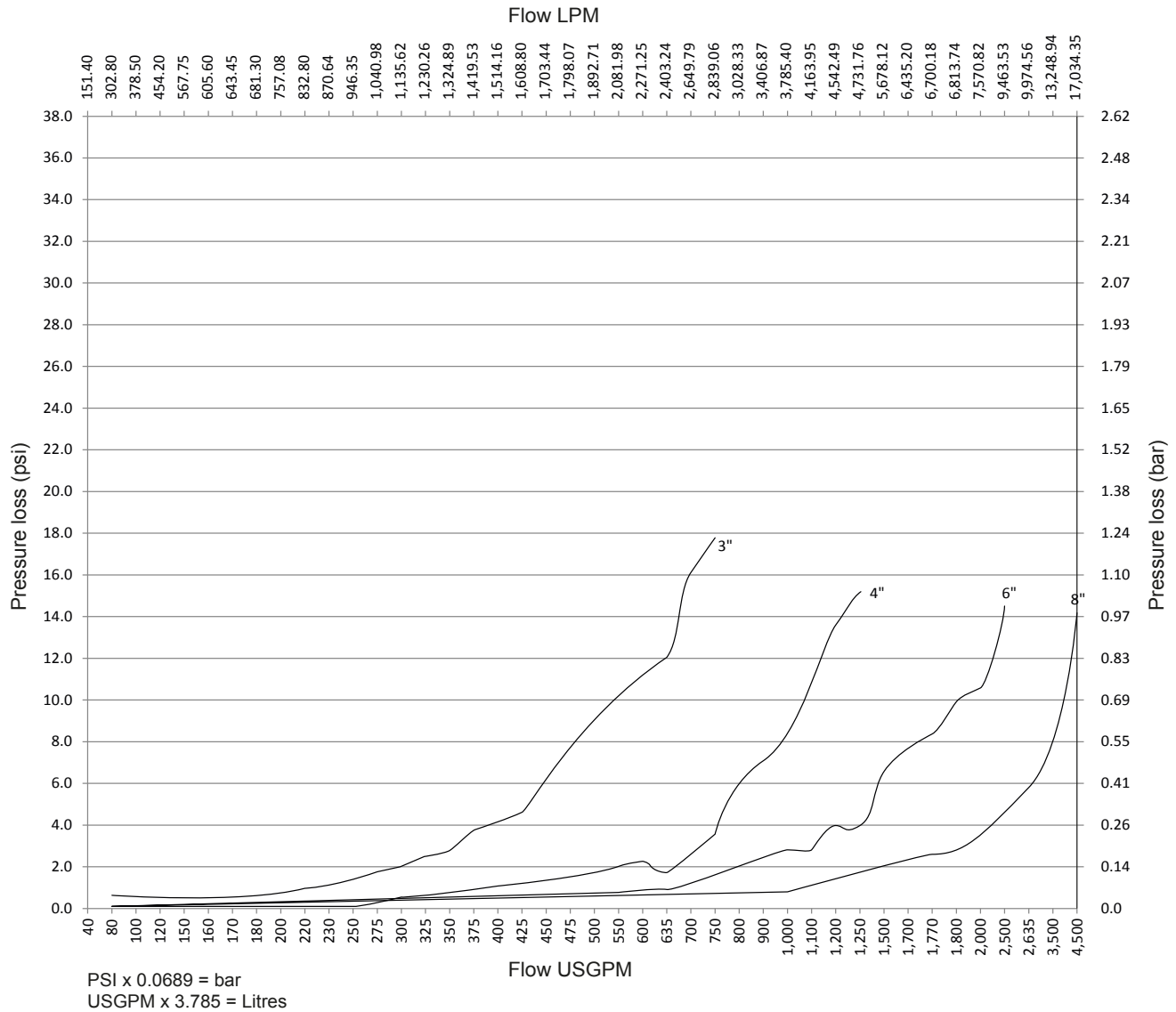
Nominal size	Equivalent length		Approximate weight		Approximate dimensions											
					A		B		C		D		E		Foam inlet (F)	
	Feet	Metre	lbs	kg	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
3" (DN80) Grooved	31	9.45	41.1	18.6	17-5/16	440	16	406	9-15/16	252	9-1/4	235	2-15/16	75	1-1/2	40
4" (DN100) Grooved	37	11.28	47.5	21.5	18	458	16-3/8	415	10-2/8	261	11	279	3-5/16	84	2	50
6" (DN150) Grooved	88	26.82	64.2	29.1	18	458	17-7/16	442	11-3/8	289	15	381	3-5/16	84	2	50
8" (DN200) Grooved	114	34.75	85.7	38.8	18	458	18-7/16	468	12-3/8	314	16-3/4	425	3-11/16	94	2	50

* Expressed in equivalent length of schedule 40 pipe based on Hazen & Williams C=120

Table 6.2.3 - Equivalent length, weight and dimension data

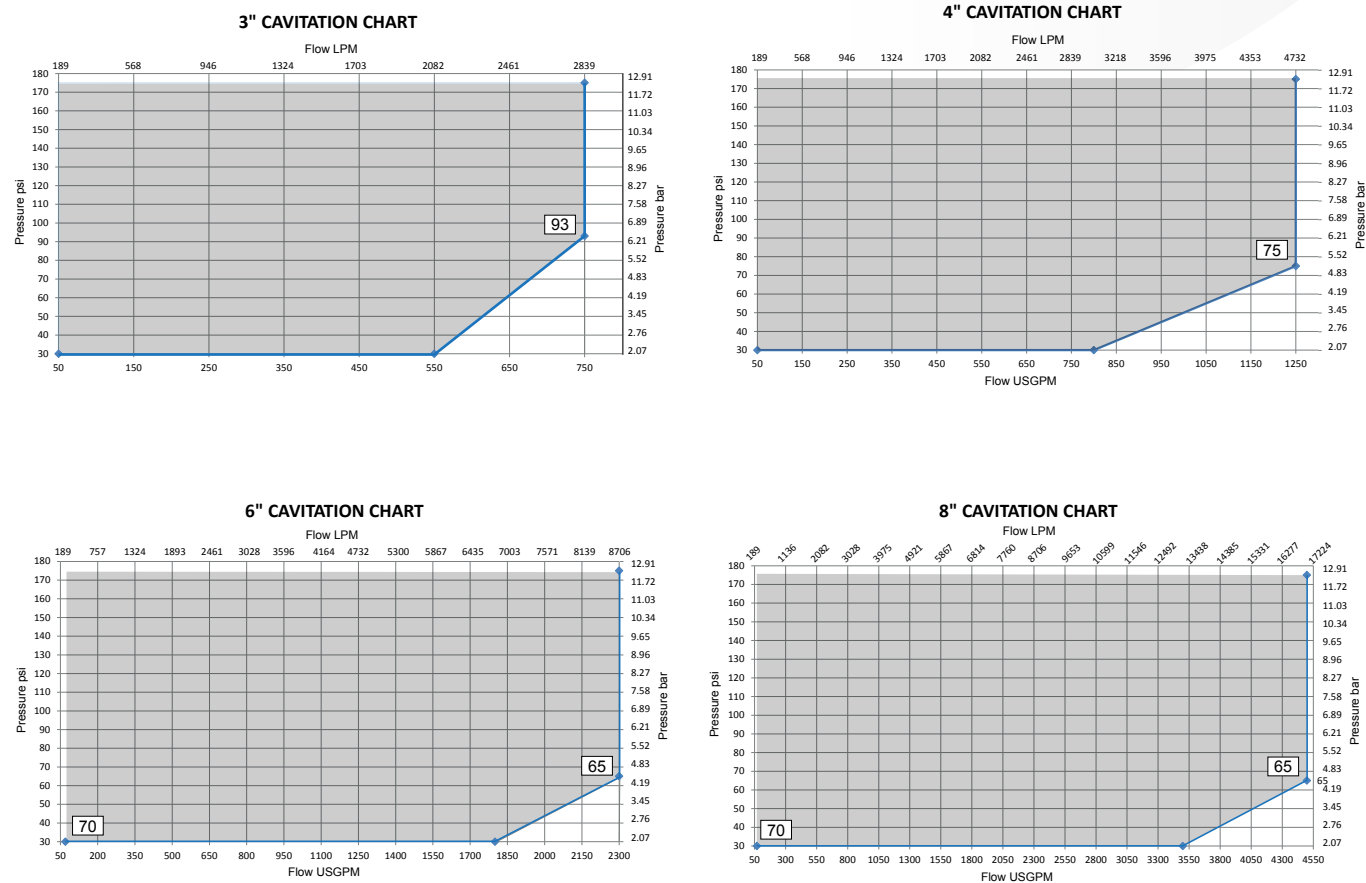
7 Performance data

7.1 Friction loss vs. foam solution flow



7.2 Inlet pressure vs. foam solution flow

ILBP must be used within the shaded flow and pressure conditions.



Graph 7.2.1 - Inlet pressure vs. foam solution flow

8 Installation

Refer to appropriate installation standards (i.e. NFPA, VdS, LPCB, etc.) and / or applicable FM Global Property Loss Prevention Data Sheets such as 4-12, foam-water sprinkler systems. Do not alter the piping without consulting a system design representative. Before installing a ratio controller, check the system design drawing to ensure the controller location does not create excessive head pressure or frictional losses.

(Refer to **Section 6.2** for identification of ILBP components.)

NOTE: On Viking low flow bladder tank system, the water supply flowing pressure at the inlet of the ratio controller and the discharge outlet of the Viking pressure regulating valve must be set at a minimum of 15 psi (1.03 bar) lower than the system flowing pressure at the inlet to the Viking pressure regulating valve. (Refer to the website for instructions on how to adjust the outlet pressure on the Viking pilot operated pressure control valve, Model A-2 or B-1, under a flowing condition.)

For foam pump systems, the foam concentrate pressure must be a minimum of 15 psi (1.03 bar) higher than the system water pressure at the inlet of the ratio controller.

The ILBP is a partially pre-assembled proportioning device, complete with a duplex water and foam pressure gauge, spool valve, concentrate controller, check valve, sensing lines and associated brass piping. It is an integral part of the Viking low flow foam system, and must be installed in accordance with the following instructions.

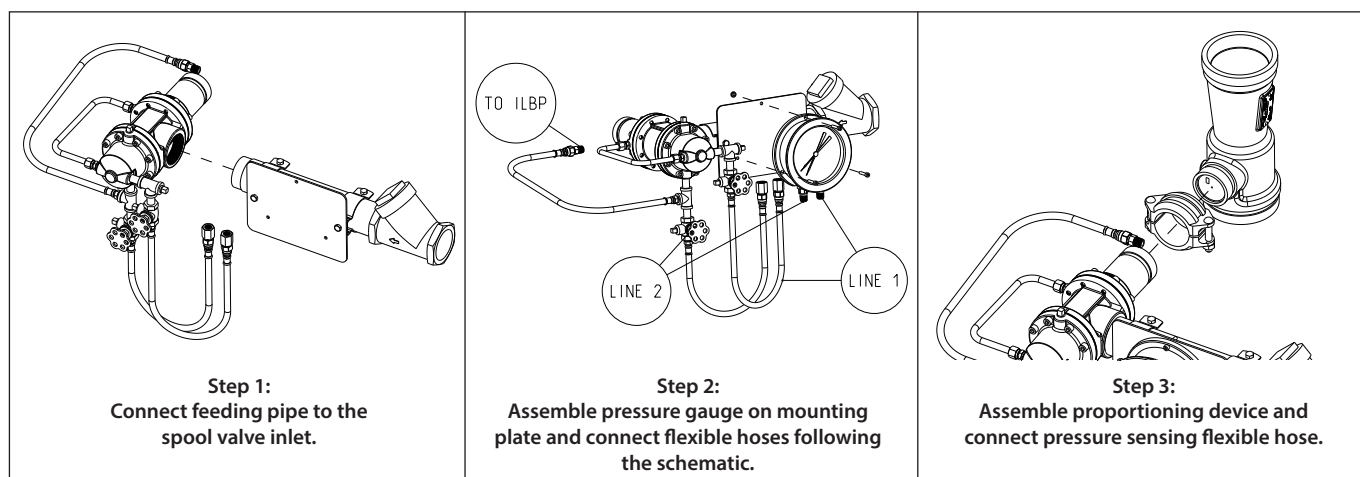


Figure 8.1 - Assembling the ILBP

The ratio controller section of the ILBP is installed in the riser, on the system side of the Viking pressure regulating valve assembly (on Viking low flow foam bladder tank systems).

The ILBP unit is shipped with the foam pressure sensing line already installed at the end of the spool valve. The water sensing line must be field installed following the schematics above. The foam concentrate supply line from the Viking Halar® coated concentrate valve is then connected to the inlet of the swing check valve. Refer to the appropriate Viking technical data pages for instructions as to completing the system installation and testing of the low flow foam system or foam pump system.

- The ILBP (ratio controller) must be installed with the arrow pointing in the direction of the water flow
- The ILBP (ratio controller) can be installed in the vertical or horizontal position
- The balancing spool valve must always lie horizontally (*see Fig 8.2*)
- The foam concentrate supply line diameter may need to be increased above the foam inlet size ("*F*" *Fig 6.2.1*) due to friction loss in piping from the riser back to the foam source
- In deluge and preaction systems a removable section of pipe should be installed between the concentrate control valve and ILBP foam inlet to allow the flushing of foam concentrate after system activation or testing
- A foam concentrate supply pressure gauge is recommended adjacent to foam inlet of the CCV
- If installed in a horizontal header, the check valve ("*22*" *Fig 6.2.1*) must be oriented so that the clapper is perpendicular to the floor and access hole is facing up (*see Fig 8.2*)
- Straight piping equal to a minimum of five (5) pipe diameters should be installed before and after the ILBP (ratio controller) to help ensure proportioning accuracy

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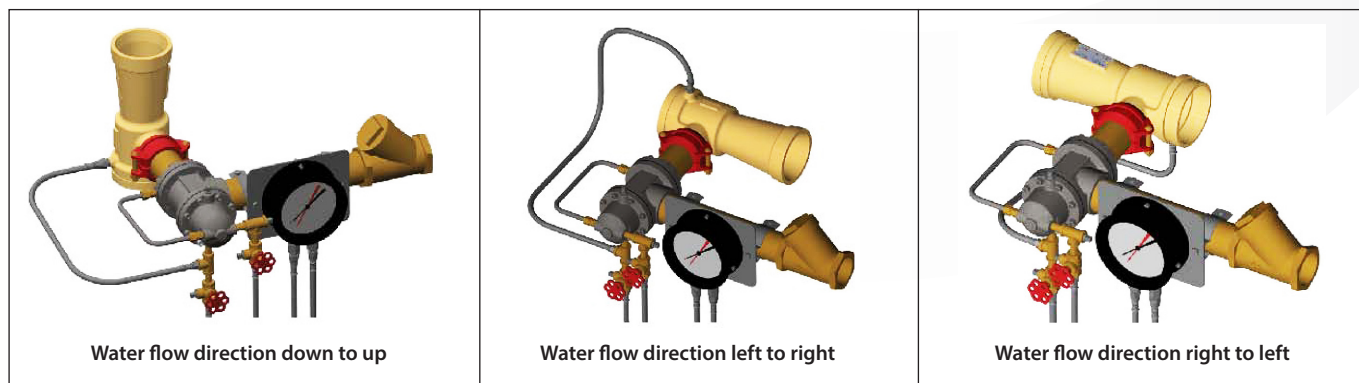


Fig. 8.2 - Typical proportioning device orientation

9 Operation

The system water pressure, under a water flow condition, must be at least 15 psi (1.03 bar) lower than the foam concentrate pressure at the ratio controller (1).

- The reduction in system water pressure for a Viking low flow bladder tank system is accomplished by the use of the Viking pilot pressure regulating valve, which is also a component of the Viking low flow foam system
- For foam pump systems, the foam pressure at the ILBP must be at least 15 psi (1.03 bar) higher than the water pressure

Upon system actuation, water begins to flow through the piping network, including the ILBP.

The ILBP water sensing line (connected upstream of the ratio controller by installer) and foam sensing line are connected to upper and lower side of internal hydraulic piston. The piston is integrally attached to the balanced spool of the pressure balancing valve.

As the foam concentrate discharge pressure from the spool valve increases above the inlet water pressure, the spool closes over the discharge ports of the balancing valve until the foam pressure equals water pressure. This allows the correct balanced pressure foam concentrate to flow through the metering orifice of the ratio controller.

As the discharge foam concentrate pressure is lowered below the water supply pressure due to increase in flow and metering pressure drop caused by the venturi of the ratio controller, the piston and spool open to allow more flow as required. When the foam concentrate inlet pressure is equal to the water inlet pressure of the ratio controller, the proper mixture of foam solution is developed at the minimum and maximum flow rates shown for each size ILBP and foam concentrate being applied.

Due to the foam concentrate pressure being supplied at a higher pressure than the water supply, a positive injection of foam concentrate occurs. This will cause rich foam solution below the minimum flow rates shown or at the initial fire condition where a small discharge flow rate occurs where only a few sprinklers have opened. As additional sprinklers operate and flow increases, the metering pressure drop across the ratio controller's venturi matches the sized foam concentrate metering orifice thus producing the desired solution of water and foam mixture as indicated in **table 3.4.1**.

10 Guarantee

For details of warranty, refer to KCA's current list price schedule or contact KCA directly.

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11 Inspections, tests and maintenance

Refer to respective requirements, according to the relevant standards for inspection, testing and maintenance.

If applicable, refer to FM Global Property Loss Prevention Datasheet 4-12 for specific test and commissioning criteria.

In addition, the "Authority Having Jurisdiction" (AHJ) may have additional maintenance, testing and inspection requirements that must be followed.

NOTICE

The owner is responsible for maintaining the fire protection system and devices in proper operating condition. The pilot operated pressure control valve must be kept from freezing conditions and physical damage that could impair its operation.



WARNING

Any system maintenance or testing that involves placing a control valve or detection system out of service may eliminate the fire protection of that system. Prior to proceeding, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the affected area.

12 Disposal



At end of use the product described here should be disposed of via the national recycling system.

13 Accessories and spares

Seal Kit for Spool Valve: Part No. F22821

See **Table 6.2.2** for additional spare parts.

14 Declaration of conformity

If required, contact KCA for further assistance.