

VARIABLE PRESSURE REDUCING INBAL VALVE SERIES 500-VR; 600-VR; 700-VR

511-VR		533-VR		599-VR	
611-VR	Threaded	733-VR	Flanged	699-VR	Wafer
711-VR				799-VR	



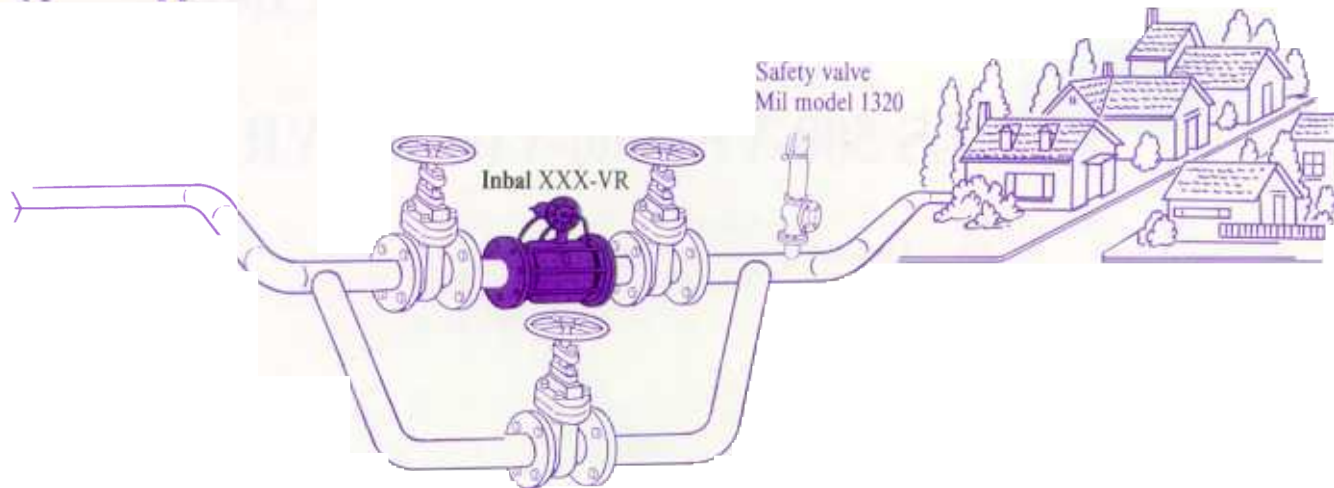
The **Inbal** variable pressure reducing valve, model XXX-VR, automatically reduces an upstream pressure to a lower downstream pressure which varies in a predetermined relationship, with the flow rate through the valve. At a given flow rate the downstream pressure remains stable and unaffected by fluctuations in the inlet pressure. The **Inbal** Variable Pressure Reducing Valve consists of **Inbal** valve series 500, 600 or 700 and pilot control system.

The **Inbal** is a line pressure operated, in-line, sleeve type, axial valve. The control system consists of a spring loaded, pressure and differential pressure operated, diaphragms actuated, 3-way valve, a calibrated orifice plate, mounted on the outlet side of the valve and auxiliary accessories.

The pilot control is actuated by both the controlled outlet pressure and the differential pressure produced across an orifice plate. The control system responds quickly to slight changes in pressure and immediately controls the **Inbal** valve to maintain the desired downstream pressure at a certain flow rate. If the demand were to fall then the pilot controls the **Inbal** valve to maintain a lower predesigned downstream pressure. When the demand increases the downstream pressure will increase in proportion to the square of the flow.

While the relationship between the downstream pressure and the flow rate is designed and determined by the orifice size the downstream pressure setting is made with a single adjusting screw on the pilot control.

Typical Application



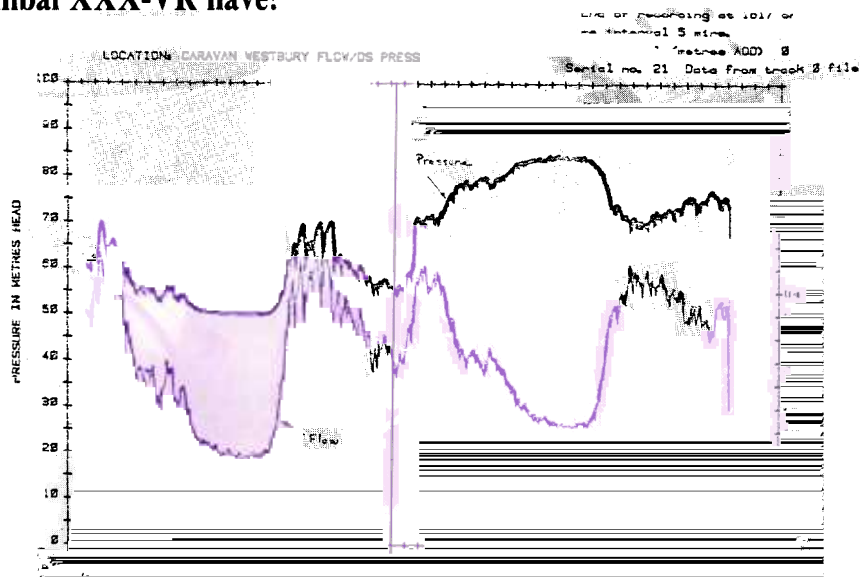
It has long been realized that system pressure has a significant effect on levels of consumption, waste and leakages. Standard pressure reducing valves are designed to give a constant downstream pressure during both peak demand and low demand.

The pressure reducing valve, model XXX-R, is set to 6.5 bar (94 psi) to achieve minimum head of 5 bar (73 psi) in the village mains at a peak flow. However, the setting of 6.5 bar (94 psi) at a night flow gives a pressure of 6.3 bar (91 psi) in the village mains. Losses due to leakage increase during off-peak hours.

The **Inbal** Variable Pressure Reducing Valve, model XXX-VR is substituted into the same installation, in order to deliver a compensated pressure depending on the rate of flow.

The XXX-VR **Inbal** valve now delivers a pressure of 6.5 bar (94 psi) at peak flow, which reduces according to demand and falls as low as 5.2 bar (75 psi) at night flow. Therefore, the pressure in the village mains remains steady at 5 bar (73 psi) regardless of changing demand. The valve also contributes directly to a reduction in losses caused by leaks in the system.

What effect does an Inbal XXX-VR have?

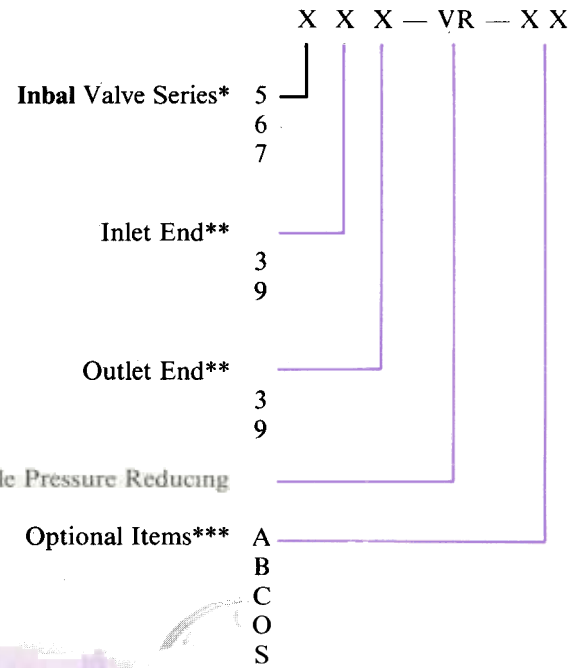
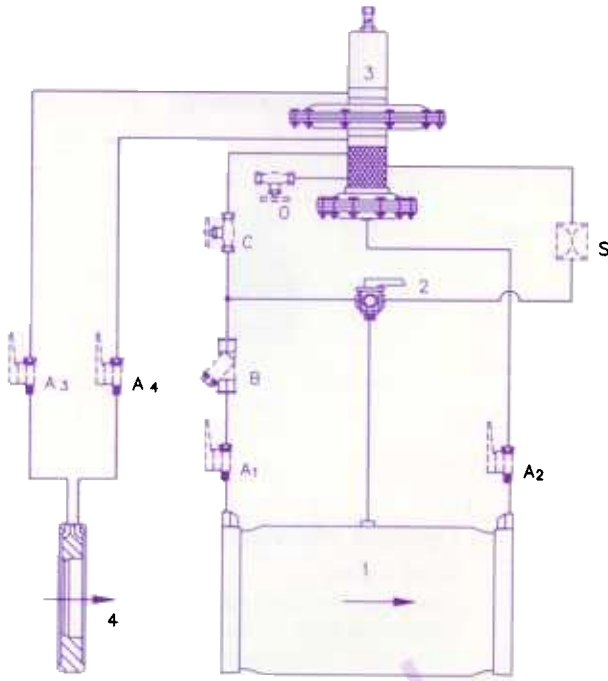


Product Features

- * The **Inbal** valve contains no mechanical moving parts. It is epoxy coated as standard and is compact and lightweight. The valve can be installed at any angle without affecting its performance.
- * The advanced “no-flow” design of the pilot control system reduces maintenance and the need for needle valves and eliminates the need for large area strainers.
- * The **Inbal** XXX-VR permits the ideal design of the water system, whereby the varied downstream pressure compensates for the effect of friction losses in a distribution main. Therefore, at a given demand in the system, the supply pressure is no higher than that required to feed the consumer.
- * The rate of leakages in distribution mains are significantly reduced.
- * The versatile design allows the engineer to determine the ideal relationship between controlled downstream pressure and flow rate.
- * The downstream pressure can easily be adjusted while the main valve is still in-line.
- * A manual control override valve is fitted as standard, allowing the **Inbal** XXX-VR to be operated manually as a fully open or fully closed valve.
- * The valve comes complete with self cleaning 100 mesh strainers as a standard fittings.

Schematic Control Diagram

Designation Data



Item Description	Model
1 Inbal Valve & Self Cleaning Strainer	500; 600 or 700
2 Manual Control Valve	341 or 345*
3 Variable Pressure Reducing Pilot Valve	PA33; PA45; PA34; PB33; PB34; PB35*
4 Orifice Plate Assembly	012

Optional Features:

A Shut-off Cocks - Isolate Pilot System	351
B Y Pattern Strainer	31
C Flow Control - Closing Speed Control	361
O Flow Control - Opening Speed Control	361
S Flow Stabilizer	362

* 341; PA33; PA34; PA45 are recommended for Inbal Valve up to size 150mm (6").
345; PB33; PB34; PB45 for sizes 200 mm (8") and larger.

* Request catalogue on each series

** Ends: 1-threaded
3-flanged
9-wafer

*** See optional features in the left hand column.

Example: Inbal 733-VR-ACO is a variable pressure reducing 700 series, flanged valve with shut-of cocks and closing and opening speed controls.

Purchase Specifications

The Variable Pressure Reducing valve shall automatically maintain, a Given flow, a steady preset downstream pressure regardless of changes in the inlet pressure and in relation to the rate of flow. It shall be a hydraulically operated, pilot controlled, sleeve type, in-line, axial valve.

The main, in-line valve, shall have only one moving part, which is the resilient sleeve. No stem, diaphragm assembly or spring are permitted at the main valve. There are to be no other sealing facilities apart from the sleeve itself.

The pilot control shall be a direct acting, two diaphragm operated, pressure and differential pressure actuated, adjustable spring loaded, 3-way valve. When the delivery pressure is precisely as pre-adjusted for a given flow, flow through the pilot control system is stopped. A thin edge orifice plate and its carrier shall be installed, normally, downstream of the valve.

This valve shall be similar in all respects to an Inbal Variable Pressure Reducing Valve, model 500-VR; 600-VR or 700-VR, as manufactured by Mil Limited or approved equal.

Capacity Chart

Inbal Valve Size		Minimum Flow Rate*						Maximum Normal Flow Rate** X00-VR		Maximum Intermittent Flow Rate*** X00-VR	
		500-VR		600-VR		700-VR		m ³ /h	gpm	m ³ /h	gpm
mm	inch	m ³ /h	gpm	m ³ /h	gpm	m ³ /h	gpm	m ³ /h	gpm	m ³ /h	gpm
40	1½	1	4.4	0.6	2.7	0.5	2.2	40	175	50	220
50	2	1	4.4	0.6	2.7	0.5	2.2	45	200	60	265
80	3	5	22	3	13	1.5	6.6	105	460	130	570
100	4	10	44	5	22	3	13	180	790	230	1010
150	6	25	110	15	66	10	44	400	1760	560	2460
200	8	40	175	20	88	15	66	700	3080	880	3870
250	10	50	220	-	-	20	88	1100	4840	1350	5940
300	12	80	350	-	-	25	110	1600	7040	1950	8580

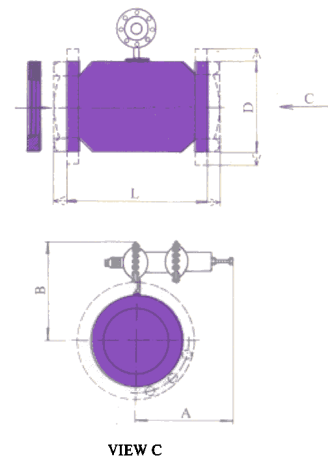
* Minimum flow rates are for averages which may vary ± 30% from tabulated values depending on system characteristics.

** Normal maximum flow rate based on pipe line velocity of 6 m/sec (20 fit/sec).

*** Maximum intermittent flow rate based on pipe line velocity of 8 m/sec (25 fit/sec).

Dimensions & Weights

	Valve model	VALVE SIZE															
		40	1 1/2"	50	2"	80	3"	100	4"	150	6"	200	8"	250	10"	300	12"
L mm/inch	5-6-711-VR	190	7 1/2	190	7 1/2	200	7 7/8										
	5-733-VR					158	6 1/4	190	7 1/2	245	9 1/8	308	12 1/8	363	14 9/32	451	17 1/4
	5-6-799-VR					155	6 1/8	187	7 3/8	235	9 1/4	302	11 7/8	350	13 3/4	445	17 1/2
D mm/inch	5-6-711-VR	162	6 3/8	162	6 3/8	181	7 1/8										
	5-733-VR					200	7 7/8	220	8 11/16	285	11 1/4	340	13 3/8	405	15 15/16	460	18 1/8
	5-6-799-VR					128	5 1/16	160	6 9/16	218	8 9/16	272	10 11/16	324	12 3/4	385	15 9/16
A mm/inch	5-6-711-VR	350	14	350	14	350	14										
	5-733-VR					350	14	350	14	350	14	350	14	350	14	350	14
	5-6-799-VR					350	14	350	14	350	14	350	14	350	14	350	14
B mm/inch	5-6-711-VR	242	9 1/2	242	9 1/2	250	9 13/16										
	5-733-VR					250	9 13/16	265	10 7/16	294	11 9/16	326	12 7/8	338	13 1/16	368	14 1/2
	5-6-799-VR					250	9 13/16	265	10 7/16	294	11 9/16	326	12 7/8	338	13 1/16	368	14 1/2
Weight Kg/lb	711-VR	14 1/2	32	14 1/2	32	16	35										
	733-VR					18	40	22	48 1/2	39	86	59	130	93	205	108	237 1/2
	799-VR					14	31	17	37 1/2	28	62	45	99	56	123	82	180
	511-VR	13 1/2	30	14	31	16	35										
	533-VR					17 1/2	38 1/2	20	44	38	84	52	114	78	172	89	196
	599-VR					12 1/2	27 1/2	14	31	24	53	36	80	49	108	62	136
	699-VR					10 1/2	23	11 1/4	26	18	40	26 1/2	58				



For the orifice plate dimensions and selection please request Bulletin no. 120.

The outside dimensions (D) comply with flange standard dimension. Figures demonstrated comply with DIN PN16 standard. Figures are varied according to the flange standard diameter.

Specifications:

Sizes:

40 thru 80 mm (1 1/2"-3") screwed.
50 thru 300 mm (2"-12") flanged.
50 thru 300 mm. (2"-12") wafer
(2" — 500 series only)

End details:

Threading: B.S.P; N.P.T standards.
Flanged: ANSI B16.1 Class 125 and 250.
DIN PN 10, 16 & 25 (BS 4504).
BS 10 Table D & E.
JIS B 2212, 2213 & 2214.

Wafer:

Mounts between all standard flanges as listed above.

Pressure Ratings:

Grade A Sleeve:
1.5 Bar (20 psi) min.
21 Bar (300 psi) max (700 series)
16 Bar (235 psi) max (500, 900 series).
Grade F Sleeve: (500 & 600 series)
5 bar (75 psi) max.
0.8 bar (12 psi) min.

Temperature Range:

Water to +65°C (150°F).

Installation & Storage

- * A straight line of minimum 5 pipe diameter (preferable 10 p.d) is required between the Inbal valve and the orifice plate with no flow restrictions (valve, elbow, tee, ect) installed on it.
- * Always flush the pipelines to clean before installation of the valve.
- * Arrow on the valve housing must match the actual flow direction.
- * Tighten bolts to the recommended torque values for the specific size and model of valve. Do not over torque.
- * Tighten bolts alternately 180° apart.
- * Exhaust tube must be free of any back pressure. Provide an air gap between the exhaust tube and drain facility.
- * If the valve is for use in ambient or fluid temperatures below freezing, consult your nearest Inbal distributor. If shut down during cold weather the valve control space and the control system must be drained.

Materials:

Inbal Valve:

Threaded ends: Cast Iron ASTM A48-40B (DIN 1691 GG-25) Epoxy coated.
Flanges and Ribs: Cast Iron ASTM A48-40B (DIN 1691 GG-25) Epoxy coated.
Housing: Carbon Steel ASTM G 10200 (DIN C22) Epoxy coated.
Sealing disc: PP, PVC.
Sleeve: SMR 5; EDPM.
Control ports: Stainless Steel 303.
Self cleaning strainers and pressure ports: Brass ASTM B21 (DIN CUZN40).
Self cleaning screen: Stainless Steel 316.

Pilot Valve:

Body: Brass ASTM B21 (DIN CUZN 40)
Stem: Stainless Steel 303.
Chambers: Carbon steel ASTM G 10200 (DIN C22) Epoxy coated.
Diaphragm: Neoprene, nylon fabric reinforced.
Seals: Buna N or Neoprene.
Bracket: Steel, Epoxy coated.

Orifice:

Orifice Plate: Stainless Steel 316L.
Orifice Carrier: Carbon Steel ASTM G 10200 Epoxy coated;

Optional Materials:

Inbal Valve:

Threaded ends: Cast Stainless Steel 303 or 316L.
Flanges and Ribs: Carbon Steel ASTM A-216 WCB (DIN GS-45), Epoxy coated; Stainless Steel 303 or 316L; Cast Bronze ASTM B62; Cast Aluminium QQ-A-601 (A356-T6); Al-Mg ASTM C 86300 (DIN 1725-2); Bronze Aluminium ASTM B148; Cast Iron Rubber lined.
Housing: Cast Iron ASTM A48-40B (DIN 1691 GG-25), Epoxy coated; Cast Aluminium QQ-A-601 (A356-T6); Al-Mg ASTM C 86300 (DIN 1725-2); Stainless Steel 303 or 316.

Pilot valve:

Wetted parts: Stainless Steel 316L; Al-Mg ASTM C 86300 (DIN 1725-2); Bronze Aluminium ASTM B148.

Pressure adjustment ranges:

1 to 3.5 bar (15 to 50 psi)
3 to 8 bar (45 to 115 psi)
7 to 11 bar (100 to 160 psi)

Flow rate: Min/Max ratio 1:4 for any sized orifice.

When ordering please specify:

- 1) Inbal Control Valve Model No.
- 2) Inbal Valve Size.
- 3) Inlet Pressures (max, min).
- 4) Flow rates (max; min)
- 5) Outlet Pressure required at the min flow rate.
- 6) Outlet Pressure required at the max flow rate.
- 7) Fluid specifications.
- 8) Options desired.

MIL LTD reserves the right to make such alterations in design, dimensions, specifications and manufacture as are deemed necessary to ensure continued improvement.

REPRESENTED BY:



17 Moshe Beker St. Rishon LeZion 75359 P.O.Box 1786 Holon 58117, Israel.
Tel. 03-9664350-6, Fax: 03-9664320, Tlx: 381430 MIL-IL; 341284 BLASS