

molbloc-L RANGES WITH LOW PRESSURE CALIBRATIONS

• FULL MOD, LOW PRESSURE

• DOWNSTREAM

• SINGLE P, LOW PRESSURE

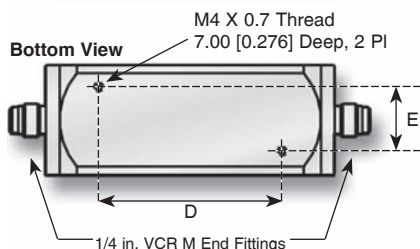
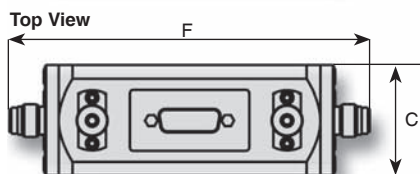
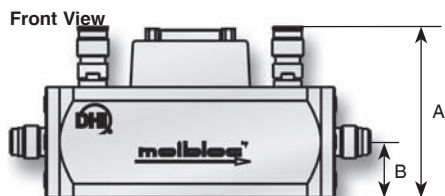
Bro No. 4060.1.C.1 Rev b - Pages 15/16
2004 06 07

molbloc SIZE AND FULL SCALE FLOW (sccm)

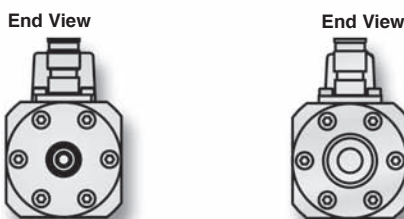
GASES		SIZE 1E1	SIZE 5E1	SIZE 1E2	SIZE 2E2	SIZE 5E2	SIZE 1E3	SIZE 5E3	SIZE 1E4	SIZE 3E4	SIZE 1E5	
INERT	Nitrogen	N ₂	10	50	100	200	500	1 000	5 000	10 000	30 000	100 000
	Argon	Ar	10	50	100	200	500	1 000	5 000	10 000	25 000	80 000
	Helium	He	10	50	100	200	500	1 000	5 000	10 000	30 000	100 000
	Sulfur Hexafluoride	SF ₆	10	50	100	200	500	1 000	2 000 500	6 000 1 000	6 000 4 000	-- --
	Xenon	Xe	10	40	80	150	400	800	3 500 500	8 000	11 000 3 000	30 000 20 000
FLAMMABLE	Butane	C ₄ H ₁₀	20	100	130 30	270 50	670 140	2 300	2 200 1 400	7 000 3 000	-- --	-- --
	Ethane	C ₂ H ₆	20	100	200	400	1 000	2 000	6 000 1 000	18 000 2 000	18 000 6 000	60 000 50 000
	Ethylene	C ₂ H ₄	16	80	160	320	800	1 600	7 000 1 000	16 000	20 000 5 000	70 000 40 000
	Hydrogen	H ₂	20	100	200	400	1 000	2 000	10 000	20 000	60 000	200 000
	Methane	CH ₄	16	80	160	320	800	1 600	8 000	16 000	40 000 5 000	120 000 40 000
	Propane	C ₃ H ₈	20	100	200	400	1 000	2 000	3 000 1 000	10 000 2 000	10 000 7 000	-- --
FLUORO-?C ARBONS	Carbon Tetrafluoride	CF ₄	10	50	100	200	500	1 000	4 000 600	10 000	12 000 3 000	36 000 25 000
	Hexafluoroethene	C ₂ F ₆	10	50	100	200	500	1 000	2 000 600	6 000 1 200	6 000 4 000	-- --
	Trifluoromethane	CHF ₃	10	50	100	200	500	1 000	4 000 600	10 000	12 000 4 000	38 000 30 000
OTHER	Air	Air	10	50	100	200	500	1 000	5 000	10 000	30 000	100 000
	Carbon Dioxide	CO ₂	10	50	100	200	500	1 000	5 000	10 000	20 000 4 000	60 000 30 000
	Carbon Monoxide	CO	10	50	100	200	500	1 000	5 000	10 000	30 000	100 000
	Nitrous Oxide	N ₂ O	10	50	100	200	500	1 000	5 000	10 000	20 000 4 000	60 000 30 000
	Octafluorocyclobutane ¹	C ₄ F ₈	15	60 9	65 17	130 34	330 85	1 100 175	1 050 840	3 400 1 700	-- --	-- --
	Oxygen	O ₂	10	50	100	200	500	1 000	5 000	10 000	30 000	80 000

All Except 1E5

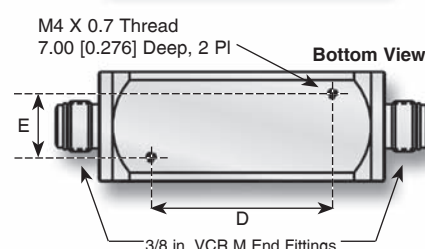
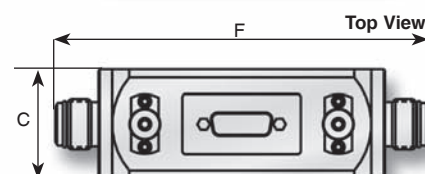
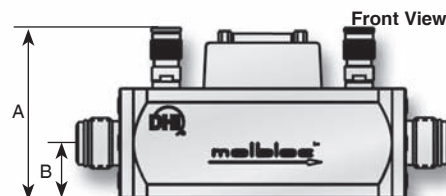
1E5



molbloc SIZES		
5E3 and Lower	1E4, 3E4	1E5
A 58.50 (2.303)	74.50 (2.933)	74.50 (2.933)
B 16.00 (0.630)	24.00 (0.945)	24.00 (0.945)
C 32.00 (1.260) SQ	48.00 (1.890) SQ	48.00 (1.890) SQ
D 68.84 (2.750)	80.00 (3.150)	80.00 (3.150)
E 19.06 (0.750)	28.00 (1.102)	28.00 (1.102)
F 124.00 (4.881)	157.00 (6.181)	164.00 (6.458)



molbloc Dimensions mm [in]



molbloc-L RANGES WITH HIGH PRESSURE CALIBRATIONS

- FULL MOD, HIGH PRESSURE
- SINGLE P, HIGH PRESSURE

Bro No. 4060.1.C.1 Rev b - Pages 15/16
2004 06 07

		molbloc SIZE AND FULL SCALE FLOW (sccm)										
GASES		SIZE 1E1	SIZE 5E1	SIZE 1E2	SIZE 2E2	SIZE 5E2	SIZE 1E3	SIZE 5E3	SIZE 1E4	SIZE 3E4	SIZE 1E5	
INERT	Nitrogen	N ₂	20	100	200	400	1 000	2 000	10 000	20 000	40 000 7 500	N/A
	Argon	Ar	20	100	200	400	1 000	2 000	10 000	17 000	35 000 6 000	N/A
	Helium	He	20	100	200	400	1 000	2 000	10 000	20 000	65 000	N/A
	Sulfur Hexafluoride	SF ₆	25	100 15	120 30	250 50	600 150	2 000 300	2 000 1 400	6 200 2 800	-- --	N/A
	Xenon	Xe	20	100	150	350	650	1 700	3350 950	11 000 1 900	11 000 5 700	N/A
FLAMMABLE	Butane ²	C ₄ H ₁₀	*	*	*	*	*	*	*	*	*	N/A
	Ethane	C ₂ H ₆	40	200	350 50	700 100	1 800 200	4 000	6 000 2 300	20 000 4 500	20 000 13 800	N/A
	Ethylene	C ₂ H ₄	40	200	350	700	2 000	4 000	7 000 2 000	22 000 4 000	22 000 12 700	N/A
	Hydrogen	H ₂	40	200	400	900	2 000	4 500	22 000	45 000	130 000	N/A
	Methane	CH ₄	35	175	350	700	1 700	3 500	13 000 2 000	33 000	42 000 12 000	N/A
	Propane	C ₃ H ₈	50	200 25	200 50	400 100	1 000 250	3 500 500	3 500 2 600	11 000 5 400	-- --	N/A
FLUORO-°C ARBONS	Carbon Tetrafluoride	CF ₄	20	100	200	400	1 000	2 000	3 700 1 200	12 000 2 400	12 000 7 300	N/A
	Hexafluoroethene	C ₂ F ₆	25	100 15	120 30	250 50	600 150	2 000 300	1 800 1 500	6 000 3 000	-- --	N/A
	Trifluoromethane	CHF ₃	25	125	240 30	450 60	1 200 150	2 500	4 000 1 500	12 000 3 000	12 000 8 800	N/A
OTHER	Air	Air	20	100	200	400	1 000	2 000	10 000	20 000	40 000 7 200	N/A
	Carbon Dioxide	CO ₂	25	125	250	500	1 250	2 500	6 600 1 400	20 000 2 500	20 000 8 800	N/A
	Carbon Monoxide	CO	20	100	200	400	1 000	2 000	10 000	20 000	40 000 7 500	N/A
	Nitrous Oxide	N ₂ O	25	125	250	500	1 250	2 500	11 000 1 500	20 000 3 000	20 000 9 000	N/A
	Octafluorocyclobutane ²	C ₄ F ₈	*	*	*	*	*	*	*	*	*	*
	Oxygen	O ₂	20	100	200	400	1 000	2 000	10 000	20 000	40 000 6 500	N/A

molbloc-L RANGES TABLES LEGEND

A bold value indicates that the maximum flow is limited by the maximum Reynolds number value of 1 200 which is reached before the normal differential pressure range is reached. In that case, the second value gives the minimum flow for which measurement uncertainty (accuracy) is ± 0.2 % of the measured value (± 0.3 % for the 3E4 molbloc, ± 0.5 % for the 1E5 molbloc) using molbox1, or ± 0.5 % of the measured value using molbox RFM. Divide the second value by 10 when using molbox RFM microrange option.

Where there is no value in the field (--), this indicates that the maximum Reynolds number is reached before the differential pressure reaches 5 kPa (1 kPa in the case of the 1E5 molbloc), therefore calibration with that gas is not useful.

- Due to low vapor pressure, only downstream calibration type is available.
- The operating pressure range is greater than the vapor pressure value for this gas.

LIST OF SYMBOLS molbloc-L LAMINAR FLOW ELEMENT (P. 2)

q_m	= mass flow	[kg/s]	C_G	= geometry of molbloc flow path and Reynolds number dependence	[m ³]
P_1	= upstream absolute pressure	[Pa]	Re	= Reynolds number	[-]
P_2	= downstream absolute pressure	[Pa]	M	= molecular weight of the gas	[g/mol]
P	= $\frac{P_1 - P_2}{2}$	[Pa]	$Z_{(P,T)}$	= compressibility factor of the gas under P,T conditions	[-]
T	= absolute temperature of gas	[K]	R	= universal gas constant	$\left[\frac{J}{kg \cdot mol \cdot K} \right]$
$\eta_{(P,T)}$	= dynamic gas viscosity under P,T conditions	[Pa•s]	r	= radius of the piston	[m]