

1E5 molbloc™

100 slm Mass Flow Element

Technical Data



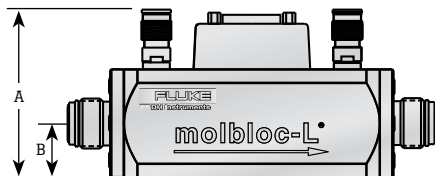
The 1E5 molbloc extends the range of the molbloc/molbox system using molbloc-L elements to 100 slm (nominal, N₂, see range chart on overleaf).

Though the 1E5 molbloc external dimensions are similar to the 3E4 and 1E4 molblobs, it differs from all other molblobs in a number of ways that should be considered when configuring a new molbloc/molbox system or adding a 1E5 molbloc to an existing system.

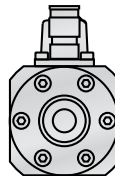
Features

- Low differential pressure range (0 kPa to 10 kPa nominal) relative to other molblobs
- Measurement uncertainty with molbox1 of $\pm 0.5\%$ of reading from 25% FS to 100% FS, 0.05% FS under 25%. Best results are obtained with molbox RFM microrange, use with molbox RFM without microrange is not recommended (see specifications on overleaf).
- High pressure calibrations are not available (full mod, upstream or single P, low pressure or downstream calibrations only).
- End fittings are 9.525 mm (0.375 in) VCR male to accommodate 12.7 mm (0.5 in) bead VCR female hardware. All other molbloc-L sizes are 6.35 mm (0.25 in) VCR male.
- Uses a special, hi flow, molstic designed for the 1E5 molbloc.

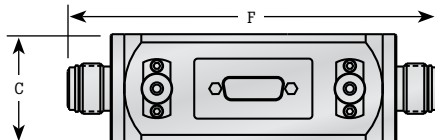
Side view



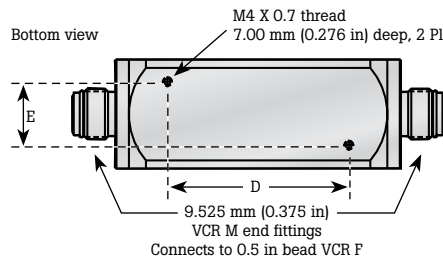
End view



Top view



Bottom view



Use this data sheet in conjunction with the molbloc/molbox Gas Calibration System Brochure (3031052).

molbloc-L dimensions

	1E5
A	74.50 mm (2.933 in)
B	24.00 mm (0.945 in)
C	48.00 mm (1.890 in) sq
D	80.00 mm (3.150 in)
E	28.00 mm (1.102 in)
F	164.00 mm (6.458 in)

Ranges with low pressure calibrations

		molbloc-L size and full scale flow (sccm @ 0 °C)	
		Size	
		1E5	
Inert	Gases		
	Nitrogen	N ₂	100000
	Argon	Ar	80000
	Helium	He	100000
	Sulfur hexafluoride	SF ₆	—
Inert	Xenon	Xe	30000 20000
Flammable	Butane	C ₄ H ₁₀	—
	Ethane	C ₂ H ₆	60000 50000
	Ethylene	C ₂ H ₄	70000 40000
	Hydrogen	H ₂	200000
	Methane	CH ₄	120000 40000
Flammable	Propane	C ₃ H ₈	—
Fluoro-carbons	Carbon tetrafluoride	CF ₄	36000 25000
	Hexafluoroethene	C ₂ F ₆	—
	Trifluoromethane	CHF ₃	38000 30000
Other	Air	Air	100000
	Carbon dioxide	CO ₂	60000 30000
	Carbon monoxide	CO	100000
	Nitrous oxide	N ₂ O	60000 30000
	Octafluorocyclobutane	C ₄ F ₈	—
Other	Oxygen	O ₂	80000

A bold value indicates that the maximum flow is limited by the maximum Reynolds number value of 1200 which is reached before the normal 1E5 differential pressure range is reached. In that case, the second value gives the minimum flow for which measurement uncertainty is $\pm 0.5\%$ of reading (both molbox1 and molbox RFM). With the molbox RFM microrange option, this value is divided by 5.

Where there is no value in the table (—), this indicates that the maximum Reynolds number is reached before the differential pressure reaches 1 kPa, therefore calibration with that gas is not useful.

Ordering information

Model

1E5 VCR-V-Q molbloc mass flow element

General specifications

Flow measurement	molbox1™ (A700k or molbox1 A350k)	molbox RFM™ (with microrange option)
Measurement update rate	1 second	1 second
Range	0 slm to 100 slm depending on gas (see molbloc ranges table)	0 slm to 100 slm depending on gas (see molbloc ranges table)
Resolution	0.04 % FS	0.01 % FS
Linearity	$\pm 0.25\%$ of reading from 25 % to 100 % FS, $\pm 0.025\%$ FS under 25 % FS	$\pm 0.25\%$ of reading from 5 % FS to 100 % FS, $\pm 0.0125\%$ FS under 5 % FS
Repeatability	$\pm 0.2\%$ of reading from 25 % to 100 % FS, $\pm 0.02\%$ FS under 25 % FS	$\pm 0.2\%$ of reading from 5 % FS to 100 % FS, $\pm 0.01\%$ FS under 5 % FS
Precision ¹	$\pm 0.32\%$ of reading from 25 % to 100 % FS, $\pm 0.032\%$ FS under 25 % FS	$\pm 0.32\%$ of reading from 5 % FS to 100 % FS, $\pm 0.016\%$ FS under 5 % FS
Predicted Stability ² (One Year)	$\pm 0.1\%$ of reading from 25 % to 100 % FS, $\pm 0.01\%$ FS under 25 % FS	$\pm 0.2\%$ of reading from 5 % FS to 100 % FS, $\pm 0.01\%$ FS under 5 % FS
Measurement Uncertainty ³ (N ₂ and any molbox supported gas for which the molbloc is calibrated)	$\pm 0.5\%$ of reading from 25 % to 100 % FS, $\pm 0.125\%$ FS under 25 % FS	$\pm 0.5\%$ of reading from 5 % FS to 100 % FS, $\pm 0.025\%$ FS under 5 % FS

¹ **Precision:** Combined linearity, hysteresis, repeatability.

² **Stability:** Maximum change in zero and span over specified time period for typical molbox and molbloc used under typical conditions. As stability can only be predicted, stability for a specific molbox and molbloc should be established from experience.

³ **Measurement Uncertainty:** Maximum deviation of the molbox flow indication from the true value of the flow through the molbloc including precision, stability and DHI calibration standard accuracy. Measurement uncertainty is sometimes referred to as "accuracy".

Pressure dependent calibration types

Calibration type	Operating pressure	Nominal differential pressure at max flow
Full mod, low pressure	250 kPa to 325 kPa absolute (22 psia to 33 psia) upstream of molbloc	10 kPa (1.45 psi)
downstream	Atmospheric pressure downstream of molbloc	18 kPa (2.6 psi)
Single P, low pressure (non-N ₂ gases only)	Any specified single molbloc upstream pressure between 250 kPa and 325 kPa absolute (22 psia to 33 psia)	10 kPa (1.45 psi)

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Printed in U.S.A. 6/2010 3191976B B-EN-N

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