FLUKE®

Calibration

1E5 molbloc™

100 slm Mass Flow Element

Technical Data

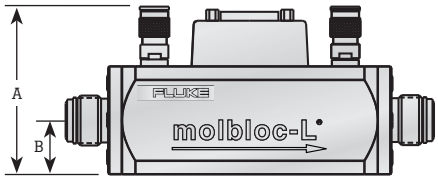
The 1E5 molbloc extends the range of the molbloc/molbox system using molbloc-L elements to 100 slm (nominal, N2, see range chart on overleaf).

Though the 1E5 molbloc external dimensions are similar to the 3E4 and 1E4 molblocs, it differs from all other molblocs 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.

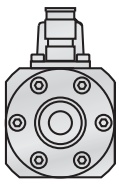
Features

- Low differential pressure range (0 kPa to 10 kPa nominal) relative to other molblocs
- Measurement uncertainty with molbox1 of ± 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 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

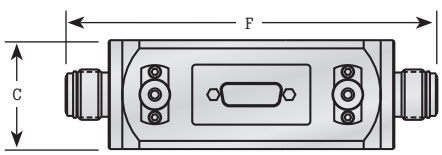


End view

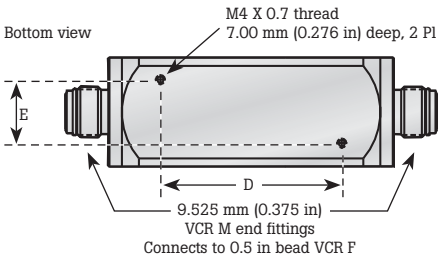


Use this data sheet in conjunction with the molbloc/molbox Gas Calibration System Brochure (3031052).

Top view



Bottom view



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)

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Calibration

Ranges with low pressure calibrations

• Full mod, low pressure • Downstream			molbloc-L size and full scale flow (sccm @ 0 °C)
			Size
	Gases		1E5
Inert	Nitrogen	N_2	100000
	Argon	Ar	80000
	Helium	He	100000
	Sulfur hexafluoride	SF_6	—
	Xenon	Xe	**30000 20000**
Flammable	Butane	C_4H_{10}	—
	Ethane	C_2H_6	**60000 50000**
	Ethylene	C_2H_4	**70000 40000**
	Hydrogen	H_2	200000
	Methane	CH_4	**120000 40000**
	Propane	C_3H_8	—
Fluoro-carbons	Carbon tetrafluoride	CF_4	**36000 25000**
	Hexafluoroethene	C_2F_6	—
	Trifluoromethane	CHF_3	**38000 30000**
Other	Air	Air	100000
	Carbon dioxide	CO_2	**60000 30000**
	Carbon monoxide	CO	100000
	Nitrous oxide	N_2O	**60000 30000**
	Octafluorocyclobutane	C_4F_8	—
	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 ± 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.

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	± 0.25 % of reading from 25 % to 100 % FS, ± 0.025 % FS under 25 % FS	± 0.25 % of reading from 5 % FS to 100 % FS, ± 0.0125 % FS under 5 % FS
Repeatability	± 0.2 % of reading from 25 % to 100 % FS, ± 0.02 % FS under 25 % FS	± 0.2 % of reading from 5 % FS to 100 % FS, ± 0.01 % FS under 5% FS
Precision[1]	± 0.32 % of reading from 25 % to 100 % FS, ± 0.032 % FS under 25 % FS	± 0.32 % of reading from 5 % FS to 100 % FS, ± 0.016 % FS under 5 % FS
Predicted Stability[2] (One Year)	± 0.1 % of reading from 25 % to 100 % FS, ± 0.01 % FS under 25 % FS	± 0.2 % of reading from 5 % FS to 100 % FS, ± 0.01 % FS under 5% FS
Measurement Uncertainty[3] (N_2 and any molbox supported gas for which the molbloc is calibrated)	± 0.5 % of reading from 25 % to 100 % FS, ± 0.125 % FS under 25 % FS	± 0.5 % of reading from 5 % FS to 100 % FS, ± 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	200 kPa to 325 kPa absolute 29 to 47 psi absolute upstream of molbloc	10 kPa (1.45 psi)
downstream	Atmospheric pressure downstream of molbloc	18 kPa (2.6 psi)

Ordering information

Model
1E5 VCR-V-Q molbloc mass flow element

Fluke Calibration. *Precision, performance, confidence.*™

Electrical | RF | Temperature | Pressure | Flow | Software

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Printed in U.S.A. 8/2014 3191976C_EN
Pub-ID 13239-eng