Technical data

molbox2 Flow Terminal ± 0.125 % of reading—lowest uncertainty for gas flow calibration

The molbox2 flow terminal from Fluke Calibration represents a significant update to the molbloc/molbox gas flow calibration system. molbox2 combined with molbloc flow elements enables you to achieve the lowest uncertainty available for gas flow meter and controller calibrations. A special configuration, molbox2-S, allows you to use molbox-S sonic nozzle flow elements at higher pressures than were previously possible, greatly extending their usable flow range.

A molbloc/molbox2 gas flow calibration system is the ideal solution for calibrating flow meters, thermal mass flow controllers (MFCs), rotameters, turbine meters, bubble meters, and other flow measurement devices. With real-time measurements, no moving parts and supported by traceable calibration in several different gases and operating pressures, molbloc/molbox can handle virtually any calibration application without compromise. molbloc/molbox systems are widely used in many industries, including pharmaceuticals, semiconductors, aerospace, environmental monitoring, energy production, reference gas blending, and research and standards laboratories.

Unparalleled uncertainty specifications

molbox2 innovations enable the molbloc/molbox2 system to achieve the lowest gas flow measurement uncertainties in the industry. The lower uncertainty is made possible by several key improvements, including:

- Use of Fluke Calibration's exclusive quartz reference pressure transducer (Q-RPT) technology to precisely measure both absolute and differential pressure. molbox2 Q-RPTs are specially characterized sensors benefitting from the same technology used in Fluke Calibration's pressure transfer standards.

Features

- ± 0.125 % of reading uncertainty on mass row measurements with molbloc-L and molbloc-S elements with premium calibrations
- Now get accredited and traceable uncertainty specification of +/- 0.5% of reading for 9 select gases for molbloc-L, without calibrations in actual gases - based upon gas properties in NIST REFPROP10 and the default N2 gas calibration
- Get traceable uncertainty specifications for 18 additional gases for molbloc-L without calibrations in actual gases - based upon gas properties in NIST REFPROP10 and the default N2 gas calibration
- Three times faster flow response speed compared to previous molbox versions
- Full suite of software automation products and hardware accessories to create a complete gas row calibration system—including COMPASS® for Flow calibration assistance software

- “Premium“ molbloc calibrations linearize molbloc flow output to better capitalize on existing precision and repeatability.
- Expanded molbloc modelization enables improved performance of molbloc-L laminar flow elements across their range of operating pressures.
- Reduced uncertainty on gas properties utilizing data from NIST Reference Fluid Thermodynamic and Transport Properties Database (REFPROP10).
- Continued improvements in Fluke Calibration’s molbloc calibration chain, based on fundamental mass- and time-based mass flow measurements using Fluke Calibration’s own dynamic Gravimetric Flow Standard.
- Get accredited and traceable uncertainty specification of 0.5 % of reading for 9 select gases, without calibrations in actual gases, based upon gas properties of NIST REFPROP10 and N_2 gas calibration.
- Get traceable uncertainty specifications for 18 additional gases based upon gas properties of NIST REFPROP10 and N_2 gas calibration.
- Three time faster flow response speed compared to previous molbox versions.

Four levels of molbloc-L flow element calibration are now available to let you balance uncertainty, accreditation, traceability and costs:

- **Premium:** ± 0.125 % reading or 0.0125 % full scale of reading flow measurement uncertainty
- **Standard:** ± 0.2 % reading or 0.02% full scale flow measurement uncertainty
- **Accredited and traceable:** ± 0.5% of reading or 0.05% full scale flow measurement uncertainty for 9 select gases
- **Traceable but not accredited:** ± greater of 0.5% reading, 0.05% full scale, or root sum square*[0.2% reading, gas property uncertainties] for 18 additional gases

New molbloc-Ls are eligible for either calibration type. Existing molblocs are compatible with molbox2 at ± 0.2 % of reading uncertainty (standard) and +/- 0.125% of reading uncertainty (premium) with actual gas calibrations. See below for details on upgrade service to existing molblocs to allow ≥0.5% uncertainty with expanded gas library and use of NIST REFPROP10 model without actual gas calibrations (N2 gas calibration still required).

The molbloc/molbox system has stood the test of time since the early 1990’s, used in many demanding calibration laboratories, intercomparisons and government organizations worldwide.Fluke Calibration’s uncertainty specifications are conservative and backed by a thorough uncertainty analysis and metrology support.

Fluke Calibration’s innovation and design is continually aimed at making sure our products deliver specifications that can be realized by the user, not under best case conditions but in your real-world application.

molbox2-S expands rangeability—without vacuum pumps

molbox2-S is a special configuration of molbox2 that enables you to cover a wide range (10:1 range turndown) with molbloc-S sonic nozzle flow elements, without requiring costly vacuum pumps. molbox2-S is available with upstream Q-RPT pressure range up to 2 MPa (300 psia) to allow molbloc-S elements to be conveniently used over a wide flow range upstream of flow meters being tested at atmospheric pressure, a common application. This extra rangeability makes it simple to configure a calibration system using fewer molbloc elements and minimal accessories. It also greatly extends the range of your existing molbloc-S elements when a high pressure molbloc calibration is added.

molbloc-S range example with device under testat atmospheric pressure

molbloc-S element	Usable range with SP calibration and molbox2 A700K	Usable range with HP calibration and molbox2-S -A2M
1E2-S	15 to 60 slm*	20 to 300 slm
5E2-S	67 to 250 slm*	100 to 1000 slm

*Minimum usable flow of molbloc-S elements with SP calibrations are limited by back pressure requirements for sonic flow when used upstream of a device at atmospheric pressure. Flow values are in standard liters per minute referenced to 0 °C.

molbox2-S is designed for use with molbloc-S elements and therefore is configured for absolute pressure measurement only, reducing its cost. It also reduces flow system complexity and overall cost, as well as ongoing recalibration costs.

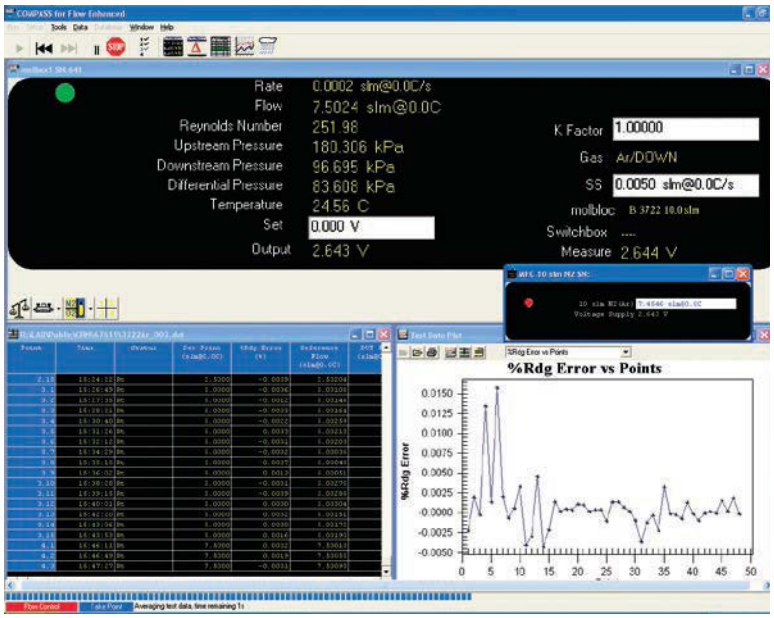
Use the same molbloc in multiple applications

Multiple molbloc calibrations are now supported for each gas. This means that you can now have

a molbloc calibrated separately for use both at high pressure (upstream of the device under test) and low pressure (downstream of the device under test) to support different applications instead of requiring two molblocs or manually loading separate molbloc calibration files. All calibrations are stored on the molbloc EEPROM and the user simply selects the calibration type from the molbox1+ front panel or via molbox2 remote interface.

COMPASS® for Flow software adds automation and more

COMPASS calibration assistance software takes molbloc/molbox to the next step in automating calibrations. COMPASS and a personal computer work with molbloc/molbox to create a modern, full function, turnkey system for calibrating andtesting flow devices.



COMPASS sets up device under test (DUT) records (also known as unit under test), defines and associates test procedures with DUTs, runs tests, acquires reference and test data, produces standard and custom calibration reports. Mass flow device gas correction factors and gas density corrections for volumetric devices like rotameters are easily supported, with options to dynamically calculate the corrected flow using automatic input of pressure and temperature measurements. All reference, DUT and test data are collected and stored in standard delimited files that can be easily downloaded to other applications.

A new version of the software, COMPASS for Flow, brings features to flow calibration that are also only available in Fluke Calibrations COMPASS for Pressure software. These include:

- Enhanced support for devices under test requiring custom calculations on output indications, special communications support and calibration of multiple devices at once.
- Macro support to handle almost unlimited test system automation.
- More complete and flexible support for accessory devices like MFC-CB (Fluke Calibration mass flow controller control box).

Specifications

General	
Power requirements	85 V ac to 264 V ac, 47 Hz to 440 Hz, 18 VA max consumption
Normal operating temperature range	15 °C to 30 °C (59 °F to 86 °F)
Storage temperature range	-20 °C to 70 °C (-4 °F to 158 °F)
Vibration	Meets MIL-T-28800D
Weight	6.8 kg (15 lb) max
Dimensions (WxHxD)	32 cm x 12 cm x 30 cm (12.6 in x 4.7 in x 11.8 in) approx.
Communication ports	RS-232 (COM1), RS-232 (COM2), IEEE-488.2
Pressure connections (molbox2 and molbloc)	Quick connectors equivalent to Swagelok® QM Series (SS-QM2-B200)
Flow ranges	<1 sccm to >5000 slm. See separate molbloc-L and molbloc-S range tables
Flow measurement rate	340 milliseconds
Gases supported (Consult your sales representative for a current list of gases available for factory molbloc calibration.)	Nitrogen (N_2), Air, Argon (Ar), Carbon Monoxide (CO), Helium (He), Oxygen (O_2), Carbon Dioxide (CO_2), Carbon Tetrafluoride (CF_4), Ethane ($C2H_6$), Ethylene ($C2H_4$), Fluoroform (CHF_3), Hexafluoroethane (C_2F_6), Hydrogen (H_2), Methane (CH_4), Nitrous Oxide (N_2O), Propane (C_3H_8), Sulfur Hexafluoride (SF_6), Butane (C_4H_{10}), Octafluorocyclobutane (C_4F_8), Xenon (Xe), Propylene (C_3H_6), Acetylene (C_2H_2), Neon (Ne), Krypton (Kr), isoButane (iBtn), Deuterium (D_2), Natural Gas (NG) *Availability to add custom gases and mixtures not currently on the molbox2
Valve driver option	(8) 12 V outputs. Each output can sink 500 mA at 12 V, max 1 Amp total
MFC control option (analog input/output)	Nominal voltage range: 0 V dc to 6 V dc input, 0 V dc to 5 V dc output Nominal current range: 4 mA to 20 mA input, 4.01 mA to 20 mA output Accuracy: ± 0.1 % FS (set), ± 0.05 % FS (measure)

Pressure Measurement

Type	Q-RPT Characterized Quartz Reference Pressure Transducers – Oscillating quartz crystal with mechanical bellows
Calibrated pressure range (full scale)	
A700K	0 to 600 kPa absolute (0 to 87 psia)
A350K	0 to 300 kPa absolute (0 to 44 psia)
S A1.4M (molbloc-S only)	0 to 1.2 MPa absolute (0 to 174 psia)
S A2M (molbloc-S only)	0 to 2 MPa absolute (0 to 290 psia)
Measurement uncertainty (one-year)	
Absolute pressure[4]	± (0.01 % of reading or 0.003 % Q-RPT span, whichever is greater)
Differential pressure (A700K with Tare)	± (8.4 Pa (0.0012 psi) or 0.032 % ΔP, whichever is greater)
Differential pressure (A350K with Tare)	± (4.2 Pa (0.0006 psi) or 0.026 % ΔP, whichever is greater)

Temperature Measurement

Type	molbloc PRTs with molbox2 Ohmic Measurement System
Range (FS)	0 to 40 °C
Resolution	0.01 °C
molbloc PRT precision	± 0.02 °C (15 to 30 °C)
S A2M (molbloc-S only)	0 to 2 MPa absolute (0 to 290 psia)
On-board	
Reference resistor	100 and 110 W ± 0.01 %, stability < 25 ppm/year
Ohmic measurement	± 0.02 % of reading (15 °C to 30 °C)

Flow measurement

with molbloc-L laminar flow elements		
	Standard molbloc calibration	Premium molbloc calibration
Range	0 to 100 % molbloc full scale	0 to 100 % molbloc full scale
Resolution	0.0015 % FS	0.0015 % FS
Precision[1]	± 0.07 % of reading, ± 0.007 % FS under 10 % FS	± 0.07 % of reading, ± 0.007 % FS under 10 % FS
Stability (one-year)[2]	± 0.09 % of reading, ± 0.009 % FS under 10 % FS	± 0.03 % of reading, ± 0.003 % FS under 10 % FS
Measurement uncertainty[3] (For any gas for which the molbloc in use is calibrated)	± 0.2 % of reading, ± 0.02 % FS under 10 % FS	± 0.125 % of reading, ± 0.0125 % FS under 10 % FS
Measurement uncertainty[5] (For any molbox2 supported gas that Fluke is accredited and the molbloc in use is NOT calibrated in actual gas)	±0.5 % of reading from 10 % to 100 % FS, ±0.05% FS under 10 % FS	±0.5 % of reading from 10 % to 100 % FS, ±0.05% FS under 10 % FS
Measurement uncertainty[6] (For any molbox2 supported gas that Fluke is not accredited and the molbloc is use is NOT calibrated in actual gas)	± greater of 0.5% reading, 0.05% full scale, or root sum square*[0.2% reading, gas property uncertainties]	± greater of 0.5% reading, 0.05% full scale, or root sum square*[0.2% reading, gas property uncertainties]
with molbloc-S sonic nozzle flow elements		
	Standard molbloc calibration	Premium molbloc calibration
Range	10 to 100 % molbloc full scale	10 to 100 % molbloc full scale
Resolution	0.0015 % FS	0.0015 % FS
Precision[1]	± 0.06 % of reading	± 0.06 % of reading
Stability (one-year)[2]	± 0.05 % of reading	± 0.03 % of reading
Measurement uncertainty[3] (For any gas for which the molbloc in use is calibrated)	± 0.2 % of reading	± 0.125 % of reading

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 molbox2 flow indication from the true value of the flow through the molbloc including precision, stability and Fluke calibration.
4. With regular use of Autozero. Add 0.005 % of Q-RPT span for one year without use of AutoZero, (translates to 0.005 % FS for molbloc-S, does not significantly affect molbloc-S standard calibration or molbloc-L uncertainty.)
5. Measurement uncertainty of a gas other than N_2 that Fluke has experience with but the molbloc does not have an actual gas calibration.
6. Measurement uncertainty of a gas other than N_2 that Fluke does not have experience with and the molbloc does not have an actual gas calibration.

Upgrading is easy

Upgrading from molbox1 and molbox1+ to molbox2 is economical and easy. A hardware and software upgrade can be performed at a Fluke Calibration factory. To upgrade and achieve the new specifications and features offered by molbox2 the following steps are performed on your system at Fluke Calibration.

1. **molbox2 hardware/software changes.** Any required parts are changed to make your molbox materially identical to a factory produced molbox2. The molbox is flashed to v6.0 embedded software. Two options are available: **Upgrade** your existing molbox1 and molbox1+ to meet molbox2 specifications, or **Trade up** to a new molbox2, capturing savings by reusing a few key parts.

2. **Q-RPT characterization of molbox1 and molbox1+ internalpressure transducers.** Both existing internal pressure transducers are used in the new molbox2. Extensive characterization of the transducers enhances their precision and ensures they meet molbox2 specifications.

3. **molbloc updates.** Any molbloc that has a +2 in its SN (upgraded previous molbloc) or is above SN 10,000 for molbloc-L or 6000 for molbloc-S can be used with molbox2 to support the NIST REFPROP10 model and get stated uncertainties without calibrations in actual gases. Majority of other molbloc-L and -S SNs can be used with molbox2, but will require a hardware and/or firmware upgrade to support the NIST REFPROP10 model to get stated uncertainties without actual gas calibrations.

4. **New molbloc gas calibrations.** molblocs are fully modeled and calibrated following hardware updates to realize the benefits of the enhanced gas property data used in molbox2, Fluke Calibration's improved calibration chain and new molbloc linearization and modeling techniques. The entire system will be upgraded and returned to you with new specifications and calibration certificates at a fraction of the cost of a new system.

Options and accessories

MFC Control Option

Set and read analog voltage and current MFCs. Optional board is built-into molbox2 and connector is on rear panel. Delivered with MFC cable and connection kit

New molbloc calibration options

Each molbloc calibration option can now be ordered as low, standard and high pressure in standard or premium. Premium molbloc calibrations result in an improved uncertainty specification when the molbloc is used with a molbox2 terminal. molbloc pressuredependent calibration options are listed below. molbloc flow ranges are dependent on the calibration pressure option and gas chosen. See the molbloc-L range sheet and molbloc-S data sheet for available molbloc ranges. All uncertainties ≥ 0.5% offered in molbox2 using NIST REFPROP10 requires only an accredited N_2 calibration.

molbloc-L Calibration Options [4,5]				
Calibration Type	Operating Pressure	Accuracy	A2LA Accredited Gas Coverage[1,3]	NIST REFPROP10 Traceable Gas Coverage[2,3]
Downstream Standard	Atmospheric Pressure downstream of the molbloc	±0.2% rdg for Accredited Calibration Gas with Actual Gas Calibration ±0.5% rdg All Accredited Gases with NIST REFPROP10, Traceable gases with NIST REFPROP10	Air, He, H_2, Ar, SF_6*, CH_4, C_3H_8, CO_2, N_2O, N_2	18 additional gases[6]
Low Pressure Standard	200 to 325 kPa (29 to 47 psi) absolute upstream of the molbloc	±0.2% rdg for Accredited Calibration Gas with Actual Gas Calibration ±0.5% rdg All Accredited Gases with NIST REFPROP10, Traceable gases with NIST REFPROP10	Air, He, H_2, Ar, SF_6*, CH_4, C_3H_8, CO_2, N_2O, N_2	18 additional gases[6]
High Pressure Standard	325 to 525 kPa (47 to 76 psi) absolute upstream of the molbloc	±0.2% rdg for Accredited Calibration Gas with Actual Gas Calibration ±0.5% rdg All Accredited Gases with NIST REFPROP10, Traceable gases with NIST REFPROP10	Air, He, H_2, Ar, SF_6*, CH_4, C_3H_8, CO_2, N_2O, N_2	18 additional gases[6]
Downstream Premium	Atmospheric Pressure downstream of the molbloc	±0.125% rdg for Accredited Calibration Gas with Actual Gas Calibration ±0.5% rgd All Accredited Gases with NIST REFPROP10, Traceable gases with NIST REFPROP10	Air, He, H_2, Ar, SF_6*, CH_4, C_3H_8, CO_2, N_2O, N_2	18 additional gases[6]
Low Pressure Premium	200 to 325 kPa (29 to 47 psi) absolute upstream of the molbloc	±0.125% rdg for Accredited Calibration Gas with Actual Gas Calibration ±0.5% rgd All Accredited Gases with NIST REFPROP10, Traceable gases with NIST REFPROP10	Air, He, H_2, Ar, SF_6*, CH_4, C_3H_8, CO_2, N_2O, N_2	18 additional gases[6]
High Pressure Premium	325 to 525 kPa (47 to 76 psi) absolute upstream of the molbloc	±0.125% rdg for Accredited Calibration Gas with Actual Gas Calibration ±0.5% rgd All Accredited Gases with NIST REFPROP10, Traceable gases with NIST REFPROP10	Air, He, H_2, Ar, SF_6*, CH_4, C_3H_8, CO_2, N_2O, N_2	18 additional gases[6]

molbloc-S (specify Premium or Standard)	
Calibration Type	Operating Pressure (absolute)
Low Pressure Standard	20 to 200 kPa (3 to 30 psia) absolute upstream of the molbloc
Standard pressure	50 to 500 kPa (7 to 70 psia) absolute upstream of the molbloc
High Pressure (New calibration option)	200 kPa to 2 MPa (29 to 300 psia) absolute upstream of the molbloc

*SF6 not available as Actual Calibration Gas

[1]The molbloc parameters have been established by an accredited N_2 calibration (Standard or Premium), all known uncertainties are defined, Fluke is accredited for the gas, but did NOT do an actual gas calibration OR flow the gas on this molbloc. Gases have been validated by Fluke and gas properties have been corrected per the method.

[2]The molbloc parameters have been established by an accredited N_2 calibration, all known uncertainties are defined including gas properties either from RefProp10 or valid customer path (e.g. ROR, GFS, other flow Primary reference), but Fluke has no direct experience with or validation of the gas

[3]NIST REFPROP10 Table with Accreddited and Traceable gas uncertainties with 0.2 or 0.125% rdg N_2 actual gas calibration uncertaint

[4]molbox upgrades avaible to molbox2 and will have "+2" added to existing S/N

[5]molbloc-L compatible with molbox2 will have serial number >10000 or upgrades will have "+2" added to existing S/N for molbox2 compatibility

[6]See the molbloc-L range sheet for specific gases and uncertainties offered for molbloc-L compatible with molbox2

molbloc-L ranges with low pressure and downstream calibrations

			molbloc size and full scale flow (sccm @ 0 °C)									
			Size									
	Gasses		1E1	5E1	1E2	2E2	5E2	1E3	5E3	1E4	3E4	1E5[3]
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	30 000	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	**3 000 500**	8 000	**11 000 3 000**	**30 000 20 000**
	Neon	Ne	10	50	100	100	500	1 000	5 000	10 000	20 000	60 000 6 000
	Krypton	Kr	10	50	100	200	500	1 000	5 000	10 000	20 000	70 000 8 000
Flammable	Butane	C_4H_{10}	20	100	**130 30**	**270 50**	**670 140**	2 300	**2 200 1 400**	**7 000 3 000**	-	-
	Ethane	C_4H_6	20	100	200	400	1000	2 000	**6 000 1 000**	**18 000 2 000**	**18 000 6 000**	**60 000 50 000**
	Ethylene	C_4H_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_3H_8	20	100	200	400	1 000	2 000	**3 000 1 000**	**10 000 2 000**	**10 000 7 000**	-
	Propylene	C_3H_6	20	100	200	400	1 000	2 000	5 000	10 000 3 000	15 000 8 000	-
	Acetylene	C_2H_2	20	100	200	400	1 000	2 000	10 000	20 000	25 000 7 000	80 000 20 000
	IsoButane	iC_4H_{10} (iBtn)	20	100	200	300	700	2 000	3 000 1 000	10 000 3 000	10 000 9 000	-
	Deuterium	D_2	20	100	200	300	800	2 000	10 000	20 000	50 000	160 000 16 000
	Natural Gas	NG	20	100	200	400	900	2 000	10 000	20 000	50 000	120 000 18 000
Fluoro-carbons	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_2F_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	5000	10 000	30 000	100 000
	Carbon dioxide	CO_2	10	50	100	200	500	1 000	5000	10 000	**20 000 4 000**	**60 000 30 000**
	Carbon monoxide	CO	10	50	100	200	500	1 000	5000	10 000	30 000	100 000
	Nitrous oxide	N_2O	10	50	100	200	500	1 000	5000	10 000	**20 000 4 000**	**60 000 30 000**
	Octafluorocyclobutane[1]	C_4F_8	15	**60 9**	**67 17**	**130 34**	**330 84**	**1 100 175**	**1 050 840**	**3 400 1 700**	-	-
	Oxygen	O_2	10	50	100	200	500	1 000	5000	10 000	30 000	80 000

[3] See page 9 for footnotes

molbloc-L ranges with high pressure calibrations

			molbloc size and full scale flow (sccm @ 0 °C)									
			Size									
	Gasses		1E1	5E1	1E2	2E2	5E2	1E3	5E3	1E4	3E4	1E5
Inert	Nitrogen	N_2	20	100	200	400	1 000	2 000	10 000	20 000	**50 000 7 500**	N/A
	Argon	Ar	20	100	200	400	1 000	2 000	10 000	17 000	**45 000 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	150	650	1 700	**3 350 950**	**11 000 1 900**	**11 000 5 700**	N/A
	Neon	Ne	10	100	100	100	1 000	1 000	10 000	10 000	40 000	N/A
	Krypton	Kr	20	100	200	200	1 000	2000	**6 000 1 000**	20 000	**20 000 5 000**	N/A
Flammable	Butane	C_4H_{10}	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ethane	C_4H_6	40	200	**350 50**	**750 100**	**1 800 200**	4 000	**6 000 2 300**	**20 000 4 500**	**20 000 13 000**	N/A
	Ethylene	C_4H_4	40	200	350	700	2 000	4 000	**7 000 1 000**	**2 000 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_3H_8	50	**200 25**	**200 50**	**400 100**	**1 000 250**	**3 500 500**	**3 500 2 600**	**11 000 5 400**	**- -**	N/A
	Propylene	C_3H_6		100	200	400	1 000	2 000	5 000	**10 000 3 000**	**15 000 8 000**	- -
	Acetylene	C_2H_2		100	200	400	1 000	2 000	10 000	20 000	**25 000 7 000**	**80 000 20 000**
	IsoButane	iC_4H_{10} (iBtn)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Deuterium	D_2	30	200	300	600	2 000	3 000	20 000	20 000	50 000	**160 000 16 000**
	Natural Gas	NG	20	200	300	700	2 000	3 000	**13 000 2 000**	40 000	**40 000 10 000**	**120 000 18 000**
Fluoro-carbons	Carbon tetrafluoride	CF_4	30	100	200	400	1 000	2 000	**3 700 1 200**	**12 000 2 400**	**12 000 7 300**	N/A
	Hexafluoroethene	C_2F_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	**50 000 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_2O	25	125	250	500	1 250	2 500	**11 000 1 500**	**20 000 3 000**	**20 000 9 000**	N/A
	Octafluorocyclobutane[1]	C_4F_8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Oxygen	O_2	20	100	200	400	1 000	2 000	10 000	20 000	**40 000 6 500**	80 000

A **bold value** indicates that the maximum flow is limited by the maximum Reynolds number value of 1200 (1550 for 3E4-L), 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 equal to the nominal uncertainty specification.

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.

[1] Due to low vapor pressure, only downstream calibration is available.

[2] The operating pressure range is greater than the vapor pressure value for this gas.

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 equal to the nominal uncertainty specification. 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.

1 Due to low vapor pressure, only downstream calibration type is available.

2 The operating pressure range is greater than the vapor pressure value for this gas.

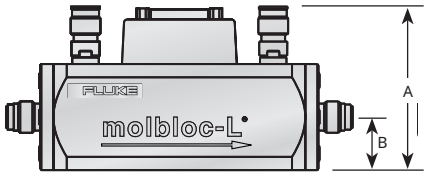
3 uncertainty of 1E5 for molbloc-L is +/- 0.5% of reading or +/- 0.125% FS whichever is greater. Premium calibrations and upstream high-pressure calibrations are not available on the 1E5 for molbloc-L

molbloc-L dimensions

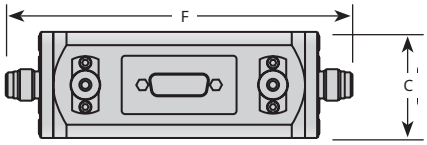
	5E3 and lower	1E4,3E4	1E5
A	58.50 mm (2.303 in)	74.50 mm (2.933 in)	74.50 mm (2.933 in)
B	16.00 mm (0.630 in)	24.00 mm (0.945 in)	24.00 mm (0.945 in)
C	32.00 mm (1.260 in) sq	48.00 mm (1.890 in) sq	48.00 mm (1.890 in) sq
D	68.84 mm (2.750 in)	80.00 mm (3.150 in)	80.00 mm (3.150 in)
E	19.06 mm (0.750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

All Except 1E5

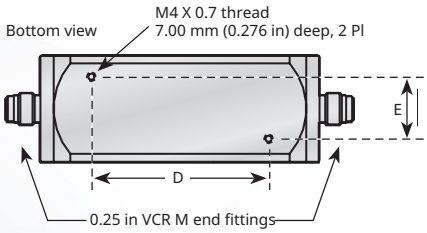
Side view

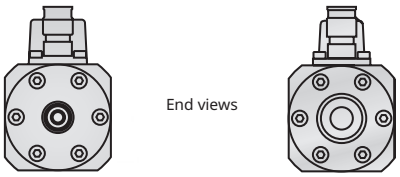


Top view



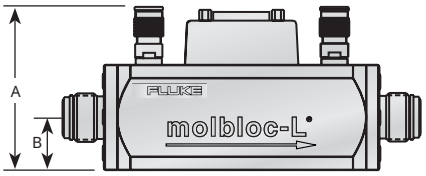
Bottom view



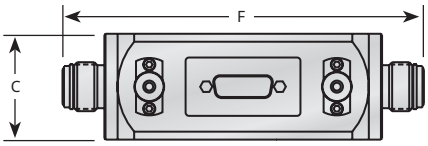


1E5

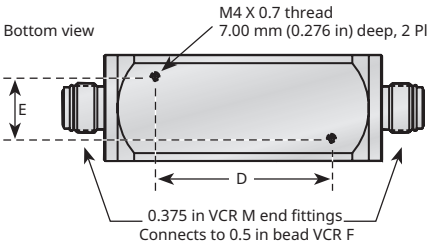
Side view



Top view



Bottom view



Calibration type	Operating pressure (absolute)
Downstream	Atmospheric pressure downstream of the molbloc
Low Pressure	200 to 325 kPa (29 to 47 psi absolute) upstream of the molbloc
High Pressure	325 to 525 kPa (47 to 76 psi absolute) upstream of the molbloc

Uncertainty with NIST REFPROP10 + Actual N_2 gas calibration

Gas library		% Uncertainty using NIST REFPROP10 + actual N_2 gas calibration	A2LA Accredited + Traceable	Traceable
nitrogen*	N_2	0.2 or 0.125	X	
helium*	He	0.5	X	
argon*	Ar	0.5	X	
hydrogen*	H_2	0.5	X	
oxygen	O_2	2		X
methane*	CH_4	0.5	X	
ethylene	C_2H_4	5		X
air*	Air	0.5	X	
R116 Hexafluoroethane	C_2F_6	5		X
nitrous oxide*	N_2O	0.5	X	
R14 Carbon Tetrafluoride	CF_4	1.3		X
sulfur hexafluoride	SF_6	0.5	X	
R143a Triflouromethane	CHF_3	10		X
carbon dioxide*	CO_2	0.5	X	
propylene	C_3H_6	3.7		X
propane*	C_3H_8	0.5	X	
ethane	C_2H_6	0.5		X
carbon monoxide	CO	1.1		X
butane	C_4H_{10}	1.5		X
xenon	Xe	1		X
acetylene	C_2H_2	20		X
RC318 Octofluorocyclobutane	C_4F_8	1.9		X
neon	Ne	3		X
krypton	Kr	3		X
isoButane	iC_4H_{10}	0.5		X
deuterium	D_2	5		X
NG	Natural Gas	0.5		X
HeOx	HeliOx 79/21	2		X

*Actual gas calibrations available at ±0.2% rdg uncertainty (standard) or ±0.125% rdg uncertainty (premium)

molbloc-S ranges with high pressure, standard pressure and low pressure calibrations

				molbloc-S size, KF (sccm/kPa), and full scale flow (slm @ 0 °C)									
				Size	1E1-S	2E1-S	5E1-S	1E2-S	2E2-S	5E2-S	1E3-S	2E3-S	5E3-S	1E4-S
				KF (sccm/kPa)	10	20	50	100	200	500	1000	2000	5000	10000
Gases			Ratio	Cal type										
Inert	Nitrogen	N_2	1.000	HP	20.00	40.00	100.0	200.0	400.0	1000.0	2000	4000	10000	20000
				SP	6.00	12.00	30.0	60.0	120.0	300.0	600	1200	3000	6000
				LP	2.00	4.00	10.0	20.0	40.0	100.0	200	400	1000	2000
				minimum w/o vac	2.00	3.50	7.7	15.0	28.0	67.0	129	248	596	1173
	Argon	Ar	0.837	HP	16.74	33.49	83.7	167.4	334.9	837.2	1674	3349	8372	16744
				SP	5.03	10.0	25.1	50.3	100	251	503	1004	2512	5023
				LP	1.67	3.35	8.4	16.7	33.5	83.7	167	335	837	1674
				minimum w/o vac	1.70	3.00	6.5	12.9	23.3	57.1	108	208	498	996
	Helium	He	2.647	HP	52.94	105.87	264.7	529.4	1058.7	2646.8	5294	10587	26468	52936
				SP	15.9	31.8	79.4	159	318	794	1588	3176	7940	15881
				LP	5.29	10.59	26.5	52.9	105.9	264.7	529	1059	2647	5294
				minimum w/o vac	9.40	13.10	25.7	51.4	91.5	199.4	399	695	1738	3281
	Sulfur hexafluoride	SF_6	0.435	HP	8.70	17.39	43.5	87.0	173.9	434.8	870	1739	4348	8695
				SP	2.6	5.2	13.1	26	52	130	260	522	1304	2609
				LP	0.87	1.74	4.3	8.7	17.4	43.5	87	174	435	870
				minimum w/o vac	0.80	1.40	3.1	5.9	11.4	26.9	54	100	250	500
	Xenon	Xe	0.460	HP	9.21	18.42	46.0	92.1	184.2	460.4	921	1842	4604	9209
				SP	2.8	5.5	13.8	28	55	138	276	552	1381	2762
				LP	0.92	1.84	4.6	9.2	18.4	46.0	92	184	460	921
				minimum w/o vac	0.80	1.40	3.6	6.5	12.9	29.7	59	110	267	529
Flammable	Ethane	C_2H_6	0.960	HP	19.21	38.42	96.0	192.1	384.2	960.4	1921	3842	9604	19208
				SP	5.8	11.5	28.8	58	115	288	576	1152	2881	5762
				LP	1.92	3.84	9.6	19.2	38.4	96.0	192	384	960	1921
				minimum w/o vac	1.50	3.00	6.7	13.4	25.2	61.9	119	229	552	1104
	Ethylene	C_2H_4	0.996	HP	19.92	39.83	99.6	199.2	398.3	995.8	1992	3983	9958	19916
				SP	6.0	12.0	29.9	60	120	299	598	1195	2987	5975
				LP	1.99	3.98	10.0	19.9	39.8	99.6	199	398	996	1992
				minimum w/o vac	1.70	3.10	7.5	13.9	27.7	64.2	128	237	572	1144
	Hydrogen	H_2	3.730	HP	74.60	149.19	373.0	746.0	1491.9	3729.8	7460	14919	37298	74596
				SP	22.4	44.8	112	224	448	1119	2238	4476	11189	22379
				LP	7.46	14.92	37.3	74.6	149.2	373.0	746	1492	3730	7460
				minimum w/o vac	8.30	14.50	36.2	62.5	114.5	280.9	509	980	2312	4623
	Methane	CH_4	1.320	HP	26.40	52.81	132.0	264.0	528.1	1320.2	2640	5281	13202	26403
				SP	7.92	15.8	39.6	79.2	158	396	792	1584	3960	7921
				LP	2.64	5.28	13.2	26.4	52.8	132.0	264	528	1320	2640
				minimum w/o vac	2.60	4.40	10.2	20.1	36.7	88.2	170	327	786	1517
	Propane	C_3H_8	0.789	HP	15.77	31.55	78.9	157.7	315.5	788.7	1577	3155	7887	15774
				SP	4.73	9.47	23.6	47.3	95	237	473	947	2366	4733
				LP	1.58	3.15	7.9	15.8	31.5	78.9	158	315	789	1577
				minimum w/o vac	1.30	2.30	5.5	10.5	20.8	48.8	98	181	453	907

Fluoro-carbons	Carbon tetrafluoride	CF_4	0.563	HP	11.26	22.51	56.3	112.6	225.1	562.9	1126	2251	5629	11257
				SP	3.37	6.76	16.9	33.7	67.7	169	337	676	1688	3377
				LP	1.13	2.25	5.6	11.3	22.5	56.3	113	225	563	1126
				minimum w/o vac	0.90	1.80	4.1	7.9	15.7	36.3	70	134	323	647
	Hexafluoro-ethene	C_2F_6	0.447	HP	8.95	17.89	44.7	89.5	178.9	447.3	895	1789	4473	8947
				SP	2.69	5.36	13.4	26.9	53.6	134	269	536	1342	2684
				LP	0.89	1.79	4.5	8.9	17.9	44.7	89	179	447	895
				minimum w/o vac	0.80	1.30	3.2	5.9	11.8	27.6	55	103	257	514
	Trifluoro methane	CHF_3	0.629	HP	12.59	25.18	62.9	125.9	251.8	629.4	1259	2518	6294	12588
				SP	3.78	7.55	18.8	37.8	75.5	189	378	755	1888	3776
				LP	1.26	2.52	6.3	12.6	25.2	62.9	126	252	629	1259
				minimum w/o vac	1.00	2.00	4.4	8.8	17.2	40.6	78	150	362	723
Other	Air	Air	0.983	HP	19.67	39.34	98.3	196.7	393.4	983.5	1967	3934	9835	19670
				SP	5.90	11.8	29.5	59.0	118	295	590	1180	2951	5900
				LP	1.97	3.93	9.8	19.7	39.3	98.3	197	393	983	1967
				minimum w/o vac	2.00	3.40	7.6	15.2	27.4	67.1	127	244	585	1170
	Carbon dioxide	CO_2	0.795	HP	15.91	31.81	79.5	159.1	318.1	795.3	1591	3181	7953	15906
				SP	4.78	9.54	23.9	47.8	95.4	239	478	954	2386	4772
				LP	1.59	3.18	8.0	15.9	31.8	79.5	159	318	795	1591
				minimum w/o vac	1.40	2.50	6.2	11.1	22.1	51.2	102	189	473	914
	Carbon monoxide	CO	1.000	HP	20.00	40.00	100.0	200.0	400.0	1000.0	2000	4000	10000	19999
				SP	6.00	12.0	30.0	60.0	120	300	600	1200	3000	6000
				LP	2.00	4.00	10.0	20.0	40.0	100.0	200	400	1000	2000
				minimum w/o vac	2.00	3.50	7.7	15.4	27.8	68.3	129	248	595	1190
	Nitrous oxide	N_2O	0.795	HP	15.90	31.80	79.5	159.0	318.0	795.1	1590	3180	7951	15902
				SP	4.78	9.54	23.9	47.8	95.4	239	478	954	2386	4771
				LP	1.59	3.18	8.0	15.9	31.8	79.5	159	318	795	1590
				minimum w/o vac	1.40	2.50	6.2	11.1	22.1	51.2	102	189	473	914
	Octafluorocyclobu-tane1	C_4F_8	0.367	LP	0.73	1.47	3.7	7.3	14.7	36.7	73	147	367	733
				minimum w/o vac	0.60	1.10	2.4	4.8	9.2	22.7	44	84	211	421
	Oxygen	O_2	0.935	HP	18.71	37.42	93.5	187.1	374.2	935.4	1871	3742	9354	18708
				SP	5.62	11.2	28.1	56,2	112	281	562	1122	2807	5612
				LP	1.87	3.74	9.4	18.7	37.4	93.5	187	374	935	1871
				minimum w/o vac	1.90	3.40	7.3	14.4	26.4	63.8	120	232	557	1113

1 The vapor pressure of Octafluorocyclobutane is 230 kPa absolute, Only LP operation is possible. Downstream vacuum is recommended.

Ratio = Inverse square root desity ratio of the indicated gas to that of nitrogen. Also the ratio of mass flow rates in each gas for a given molbloc-S element.

KF = Pressure to flow conversion ratio, sccm/kPa

To estimate a flow in a given gas at a given pressure: Flow(slm) = KF * pressure in kPa absolute / 1000 * gas ratio

All flows are approximate; in gases other than nitrogen and air, flows may vary up to 10% due to differences in nozzle characteristics and manufacturing

Cal Types: HP = High Pressure calibration 200 kPa to 2 Mpa absolute; table shows flow @ 2 Mpa, minimum flow is 10 % of value shown
SP = Standard Pressure calibration 50 kPa to 600 kPa absolute; minimum flow with vacuum is ~8.4 % of value shown (flow at ~50 kPa)
LP = Low Pressure calibration 20 kPa to 200 kPa absolute; table shows flow @ 200 kPa, minimum flow with vacuum is 10 % of value shown
minimum w/o vac = estimated minimum critical flow without vacuum when atmopheric pressure (100 kPa, 14.7 psia) is downstream of molbloc-S.

molbloc-S elements use critical (sonic) flow venturi nozzle technology to measure flows which overlap with the ranges of molbloc-L and cover the higher end of the Product system flow range. molbloc-S flow measurements are valid only when the ratio of pressure downstream to the pressure upstream of the nozzle is low enough to assure a critical (choked) flow. Measurement uncertainty (accuracy) specifications for molblocs are valid only for gases with which the molbloc has been calibrated. All molbloc-S elements are calibrated in one standard gas, either air or N_2, and may be calibrated in other gases. Calibrations with other gases are optional. The list of gases which can be measured by molbloc-S is the same as molbloc-L.

molbloc-S flow ranges are defined by the molbloc Pressure to Flow Conversion Ratio (Kf), the gas ratio used, the absolute pressure that can be delivered upstream of molbloc-S, the downstream pressure and the acceptable back pressure ratio. Kf is expressed in units of sccm/kPa and defines the relationship between mass flow in nitrogen and the absolute upstream pressure delivered to the molbloc-S. molbloc-S sizes are defined by the nominal Kf of the molbloc-S nozzle, with scientific notation, for example a 1E3 molbloc-S has a Kf of 1000 sccm/kPa. To differentiate from molbloc-L size designations, this molbloc size is designated as 1E3-S.

To calculate the flow rates for gases, or at different pressures, use this formula:

Flow (slm) = Kf × Pressure in kPa absolute/1000 × Gas Ratio
Kf = Pressure to Flow Conversion Ratio, sccm/kPa
Gas Ratio = Inverse square root density ratio of the current gas to Nitrogen

Table below shows known ratios for various gases to help in these calculations

Pressure calibration type	
Low Pressure (LP)	(with vacuum)[2]
	(no vacuum)[1][3]
Standard Pressure (SP)	(with vacuum)[4]
	(no vacuum)[1][5]
High Pressure (HP)[6][7]	

[1] Upstream pressure applied to achieve minimal critical flow rate with atmospheric pressure (approximately 100 kPaa) downstream of molbloc-S (no vacuum applied to the outlet).
[2] Low Pressure calibration (LP) (with vacuum) upstream minimum pressure=20 kPaa (3 PSIa) and maximum pressure = 200 kPaa (30 PSIa).
[3] Low Pressure calibration (LP) (no vacuum) upstream minimum pressure = atmospheric pressure on the outlet and maximum pressure = 200 kPaa (30 PSIa).
[4] Standard Pressure (SP) (with vacuum) upstream minimum pressure = 50 kPaa (7 PSIa) and maximum pressure = 600 kPaa (87 PSIa).
[5] Standard Pressure (SP) (no vacuum) upstream minimum pressure = atmospheric pressure on the outlet and maximum pressure = 600k Paa (87 PSIa).
[6] High Pressure (HP) upstream minimum pressure = 200 kPaa (30 PSIa) and maximum pressure = 2 MPaa (290 PSIa).
[7] Requires molbox2-S A2M range to reach maximum flow. molbox2-S A1.4 M will have reduced maximum flow.

Gas		Gas ratio
Nitrogen	N_2	1.000
Helium	He	2.647
Argon	Ar	0.837
Hydrogen	H_2	3.730
Oxygen	O_2	0.935
Methane	CH_4	1.320
Ethylene	C_2H_4	0.996
Air	Air	0.983
R116 Hexafluoroethane	C_2F_6	0.447
Nitrous 0xide	N_2O	0.795
R14 Carbon Tetrafluoride	CF_4	0.563
Sulfur Hexafluoride	SF_6	0.435
R143a Triflouromethane	CHF_3	0.629
Carbon Dioxide	CO_2	0.795
Propylene	C_3H_6	0.808
Propane	C_3H_2	0.789
Ethane	C_2H_6	0.960
Carbon Monoxide	CO	1.000
Butane	C_4H_{10}	0.680
Xenon	Xe	0.460
Acetylene	C_2H_2	1.033
RC318 Octofluorocyclobutane1	C_4F_8	0.367
Neon	Ne	1.179
Krypton	Kr	0.578
IsoButane	iC_4H_{10}	0.682
Deuterium	D_2	2.639
Natural Gas	NG	1.276

Nominal molbloc-S nitrogen N_2 flow rate at verious upstream pressures

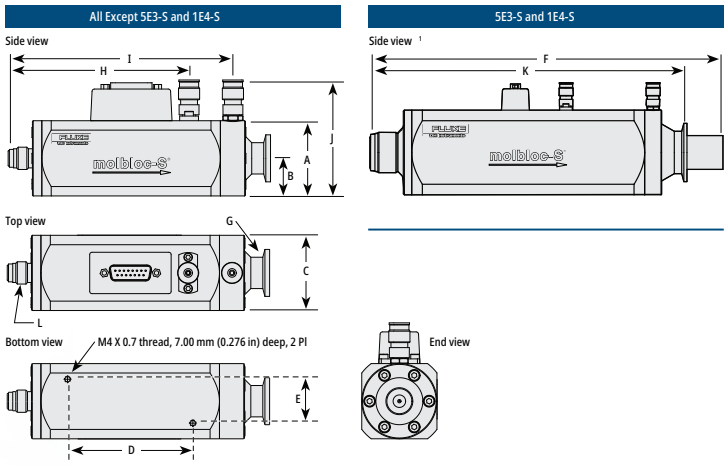
molboc-S mass flow rate (slm @ 0 ° C) when molboc-S upstream pressure is: [1,2]										
Designator	K_F (sccm/kPa)	20 kPa (3 psia)	50 kPa (7 psia)	100 kPa (15 psia)	Minimum without vacuum[3]	200 kPa (30 psia)	600 kPa (87 psia)	800 kPa (116 psia) (typ. compressor)	1.2 MPa (174 psia)	2 MPa (290 psia)
1E1-S	10	0.2	0.5	1	1.8	2	6	8	12	20
2E1-S	20	0.4	1	2	3.2	4	12	16	24	40
5E1-S	50	1	2.5	5	7.7	10	30	40	60	100
1E2-S	100	2	5	10	15	20	60	80	120	200
2E2-S	200	4	10	20	28	40	120	160	240	400
5E2-S	500	10	25	50	67	100	300	400	600	1000
1E3-S	1000	20	50	100	129	200	600	800	1200	2000
2E3-S	2000	40	100	200	248	400	1200	1600	2400	4000
5E3-S	5000	100	250	500	596	1000	3000	4000	6000	10000
1E4-S	10000	200	500	1000	1173	2000	6000	8000	12000	20000

molbloc-S dimensions

	1E1-S	2E1-S	5E1-S	1E2-S	2E2-S	5E2-S	1E3-S	2E3-S	5E3-S	1E4-S
A	48.0 mm (1.89 in in) sq	48.0 (1.89 in) sq	48.0 (1.89 in) sq	48.0 mm (1.89 in) sq	48.0 mm (1.89 in) sq	48.0 mm (1.89 in) sq	48.0 mm (1.89 in) sq	48.0 mm (1.89 in) sq	80.0 mm (3.15 in) sq	80.0 mm (3.15 in) sq
B	24.0 mm (0.94 in)	24.0 mm (0.94 in)	24.0 mm (0.94 in)	24.0 mm (0.94 in)	24.0 mm (0.94 in)	24.0 mm (0.94 in)	24.0 mm (0.94 in)	24.0 mm (0.94 in)	40.0 mm (1.57 in)	40.0 mm (1.57 in)
C	48.0 mm (1.89 in) sq	48.0 mm (1.89 in) sq	48.0 mm (1.89 in) sq	48.0 mm (1.89 in) sq	48.0 mm (1.89 in) sq	48.0 mm (1.89 in) sq	48.0 mm (1.89 in) sq	48.0 mm (1.89 in) sq	80.0 mm (3.15 in) sq	80.0 mm (3.15 in) sq
D	80.0 mm (3.15 in)	80.0 mm (3.15 in)	80.0 mm (3.15 in)	80.0 mm (3.15 in)	80.0 mm (3.15 in)	80.0 mm (3.15 in)	80.0 mm (3.15 in)	80.0 mm (3.15 in)	176.0 mm (6.93 in)	176.0 mm (6.93 in)
E	28.0 mm (1.10 in)	28.0 mm (1.10 in)	28.0 mm (1.10 in)	28.0 mm (1.10 in)	28.0 mm (1.10 in)	28.0 mm (1.10 in)	28.0 mm (1.10 in)	28.0 mm (1.10 in)	44.0 mm (1.73 in)	44.0 mm (1.73 in)
F	167.5 mm (6.59 in)	167.5 mm (6.59 in)	167.5 mm (6.59 in)	167.5 mm (6.59 in)	171.0 mm (6.73 in)	171.0 mm (6.73 in)	171.0 mm (6.73 in)	171.0 mm (6.73 in)	299.7 mm (11.80 in)1	331.0 mm (13.03 in)1
G	KF16 flange	KF16 flange	KF16 flange	KF16 flange	KF16 flange	KF16 flange	KF16 flange	KF16 flange	KF40 flange	KF40 flange
H	100.0 mm (3.94 in)	100.0 mm (3.94 in)	100.0 mm (3.94 in)	100.0 mm (3.94 in)	84.0 mm (3.31 in)	84.0 mm (3.31 in)	84.0 mm (3.31 in)	84.0 mm (3.31 in)	154.0 mm (6.06 in)	154.0 mm (6.06 in)
I	128.0 mm (5.04 in)	128.0 mm (5.04 in)	128.0 mm (5.04 in)	128.0 mm (5.04 in)	128.0 mm (5.35 in)	128.0 mm (5.35 in)	128.0 mm (5.35 in)	128.0 mm (5.35 in)	236.0 mm (9.29 in)	236.0 mm (9.29 in)
J	73.0 mm (2.87 in)	73.0 mm (2.87 in)	73.0 mm (2.87 in)	73.0 mm (2.87 in)	73.0 mm (2.87 in)	73.0 mm (2.87 in)	73.0 mm (2.87 in)	73.0 mm (2.87 in)	106.0 mm (4.17 in)	106.0 mm (4.17 in)
K	167.5 mm (6.59 in)	167.5 mm (6.59 in)	167.5 mm (6.59 in)	167.5 mm (6.59 in)	171.0 mm (6.73 in)	171.0 mm (6.73 in)	171.0 mm (6.73 in)	171.0 mm (6.73 in)	290.0 mm (11.42 in)	290.0 mm (11.42 in)
L	¼ in VCR Male[2]	¼ in VCR Male[2]	¼ in VCR Male[2]	¼ in VCR Male[2]	½ in VCR M[2]	½ in VCR M[2]	½ in VCR M[2]	½ in VCR M[2]	KF25 flange	KF25 flange

1 On some molbloc-S elements, the venturi nozzle extends beyond the molbloc downstream flange, making the overall length dimension, F, longer than the fitting-to-fitting length dimension, K. A 40 mm diameter ISO-KF nipple is supplied with 5E3-S and 1E4-S molblocs because for these molbloc sizes the nozzle overhang may interfere with downstream connections or connection of a blank off cap for leak testing.

2 Default connector type is listed. Additional upstream connector options may be available. Contact your DHI Sales Representative for details.



Ordering information

molbox2 Models			
Item No.	Model	Description	molbloc Compatibility
6074904	MOLBOX2-A700K	MASS FLOW TERM A700K STD	For molbloc-L and molboc-S
6074970	MOLBOX2-A700K-MFC	TERM A700K STD, MFC CTRL	For molbloc-L and molboc-S
6074962	MOLBOX2-A350K STD	MASS FLOW TERM A350K STD	For molbloc-L and molboc-S
6074958	MOLBOX2-A350K-MFC	TERM A350K STD, MFC CNTRL	For molbloc-L and molboc-S
6074943	MOLBOX2-A1.4M	SONIC MASS FLOW TERM A1.4M STD	molbloc-S only terminal
6074894	MOLBOX2-A1.4M-MFC	SONIC A1.4M STD MFC CTRL	molbloc-S only terminal
6074873	MOLBOX2-A2M	SONIC MASS FLOW TERM A2M STD	molbloc-S only terminal
6074887	MOLBOX2-A2M-MFC	SONIC TERM A2M STD, MFC CNTRL	molbloc-S only terminal

molbloc-l and molbloc-S models			
Item No.	Model	Description	molbox compatibility (Item No.)
6084512	1E1-L-2	LAMINAR MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958
6084596	5E1-L-2	LAMINAR MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958
6084583	1E2-L-2	LAMINAR MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958
6084577	2E2-L-2	LAMINAR MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958
6084565	5E2-L-2	LAMINAR MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958
6084633	1E3-L-2	LAMINAR MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958
6084622	5E3-L-2	LAMINAR MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958
6084614	1E4-L-2	LAMINAR MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958
6084605	3E4-L-2	LAMINAR MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958
6084554	1E5-L-2	LAMINAR MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958
6084520	1E1-S-2	SONIC MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958, 6074943, 6074894, 6074873, 6074887
6084531	2E1-S-2	SONIC MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958, 6074943, 6074894, 6074873, 6074887
6084499	5E1-S-2	SONIC MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958, 6074943, 6074894, 6074873, 6074887
6084508	1E2-S-2	SONIC MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958, 6074943, 6074894, 6074873, 6074887
6084475	2E2-S-2	SONIC MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958, 6074943, 6074894, 6074873, 6074887
6084481	5E2-S-2	SONIC MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958, 6074943, 6074894, 6074873, 6074887
6084452	1E3-S-2	SONIC MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958, 6074943, 6074894, 6074873, 6074887
6084468	2E3-S-2	SONIC MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958, 6074943, 6074894, 6074873, 6074887
6084447	5E3-S-2	SONIC MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958, 6074943, 6074894, 6074873, 6074887
6084549	1E4-S-2	SONIC MOLBLOC FLOW ELEMENT	6074904, 6074970, 6074962, 6074958, 6074943, 6074894, 6074873, 6074887

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