

mass flowmeter for compressed air

VARIOMASS LC



- pressure and temperature compensated flowmeter
- easy and cost effective installation of the sensor
- no pressure loss caused by the sensor
- no moving parts, i.e. maintenance free
- high turndown ratio and low budget version

The VARIOMASS LC system is a compact mass flowmeter for compressed air working according to the thermal dispersion principle for pipe sizes from ½" up to 2" as In-Line meter with complete flow body and for pipe size from 2.5" (65 mm) up 20" (500 mm) as an Insertion meter. Compare to the VARIOMASS ECO flowmeter we do not have that high accuracy so this will reduce the system price to a low budget unit. The microprocessor controlled electronic is within the sensor head enclosure and has a 24 VDC power supply, an analog and pulse output. The optional software WIN-LC and the USB port with a connection to a PC allows the user to readout and change all preset values or he can use the PC as a data logger for the flow values data's vs. time. All units have a LCD display with 2 x 16 sign to indicate the actual and total flow values with flow units. The analog outputs (0-20 mA or 4-20 mA) transmit the actual flow values and the pulse output (example 1 m³/puls) gives you the total flow value for example to an external pulse counter. All electrical connections are made by a round 8-Pin female metal connector with protection class IP 65 (NEMA 4).

STANDARD AND OPTIONAL PARTS

Fig. 1): In-Line Sensor with and Fig.2) without flow conditioner Fig. 3) BVR ½"-D with pressure transmitter



Fig. 4): Option ball valve retractor assembly BVR ½"

Fig 5): LCD Display with backlight (Standard)



- flow conditioner for In-Line Sensor for use with short up- and downstream area
- distance holder ring for Insertion Sensor to fix the insertion depth
- BVR ½" ball valve retractor assembly in stainless steel for Insertion Sensor allows to install or retract the Sensor probe under pipe pressure up to 12 bar g
- Software: WIN-LC for parameter settings or reading values with USB port (Option V)
- BVR ½"-D ball valve retractor assembly in stainless steel for Insertion Sensor with pressure transmitter (0-10 bar) allows to install or retract the Sensor probe under pipe pressure (max. 12 bar g) and gives you a 4-20 mA output of actual line pressure
- 8-PIN male counter connection with protection class IP 65 (NEMA 4) without or with interconnecting cable in length of 2, 5, 10, 20 or xx meter (xx = 21 up to 99 Meter – please indicate)

TECHNICAL DATA

Power supply	24 V (+/- 20%) DC max. 8 Watt
Ambient temperature:	0°C (32°F) up to + 45°C (113°F)
Protection class:	IP 65 (NEMA 4) aluminum enclosure with male connector
Output signal:	0/4 - 20 mA linear acc. to flow range & pulse output 1m³/pulse
Flow unit:	Nm³/h, Nm³/min., NI/min. or SCFM
Normal / Standard conditions(N):	Acc. to ISO 1217 with 20°C (68°F) & 1 bar abs. (14.5 PSI) (optional other standard conditions possible – please indicate)
Media:	air at 4 to 12 bar g (Optional other pressure range or gases)
Media temperature range:	20°C (+/- 20°C) (Optional up to 200°C)
Max. working pressure:	16 bar g. / 230 PSI (Optional 40 bar g. / 580 PSI)
Process connection:	R ½" male thread for Insertion sensor and NPT ½" up to R 2" male thread for In-Line sensor
Accuracy:	+/- 3% of reading +/- 1% of FS (Full Scale)
Turn down ratio:	10:1 up to 100:1
Repeatability:	+/- 0.5% of reading
Wetted parts:	Stainless steel (316 SS)
Pipe size and flow ranges according to normal conditions (N) of 20°C, 1 bar abs. & 0% r. humidity	In-Line sensor from 1 NL/min (SLPM) up to 600 Nm³/h (SCMH) and Insertion meter from 65 mm up to 500 mm pipe with 1 Nm³/h up to 100.000 Nm³/h with high flow option
Up- and Downstream area:	min. 10 x D and 5 x D, with conditioner 3 x D and 2 x D

Table of In-Line Sensor:

Model No.	Pipe size DN (inch)	Pipe inside diameter di	Flow body Length L	Process Thread	Standard flow range *** (optional higher)
L-2	DN 15 (1/2")	15.8 mm	178 mm	1/2" NPT	0 - 20 Nm³/h (0,35 Nm³/min.)
L-3****	DN 20 (3/4")	20.9 mm	300 mm	R 3/4"	0 - 100 Nm³/h (1,65 Nm³/min.)
L-4****	DN 25 (1")	26.6 mm	300 mm	R 1"	0 - 150 Nm³/h (2,5 Nm³/min.)
L-5	DN 32 (1 1/4")	35.1 mm	254 mm	1 1/4" NPT	0 - 250 Nm³/h (4,15 Nm³/min.)
L-6****	DN 40 (1 1/2")	40.9 mm	600 mm	R 1 1/2"	0 - 350 Nm³/h (5,85 Nm³/min.)
L-7****	DN 50 (2")	52.5 mm	750 mm	R 2"	0 - 600 Nm³/h (10 Nm³/min.)

Table of Insertion Sensor:

Model No.	pipe size* DN (Inch)	Pipe inside Diameter	total area ** Flow section	Process Thread	Standard flow range *** (optional higher)
L-0	DN 65 (2 1/2")	70.9 mm	1 m	R ½"	0 - 900 Nm³/h (15 Nm³/min.)
L-0	DN 80 (3")	83.1 mm	1.2 m	R ½"	0 - 1400 Nm³/h (23 Nm³/min.)
L-0	DN 100 (4")	107.9 mm	1.6 m	R ½"	0 - 2300 Nm³/h (38 Nm³/min.)
L-0	DN 125 (5")	132.5 mm	2 m	R ½"	0 - 3500 Nm³/h (58 Nm³/min.)
L-1	DN 150 (6")	160.3 mm	2.4 m	R ½"	0 - 5000 Nm³/h (83 Nm³/min.)
L-1	DN 200 (8")	210.1 mm	3.1 m	R ½"	0 - 9000 Nm³/h (150 Nm³/min.)
L-1	DN 300 (12")	312.7 mm	4.7 m	R ½"	0 - 20000 Nm³/h (333 Nm³/min.)
L-1	DN 500 (20")	495.4 mm	7.4 m	R ½"	0 - 50000 Nm³/h (833 Nm³/min.)

*bigger pipe sizes than 500 mm on request – special probe length (> 400 mm) necessary

**minimum 10 * D up and 5 * D downstream area after a 90° elbow (D = pipe inside diameter)

*** according to normal conditions (N) and a velocity of 0 – 80 Nm/sec. – Optional high flow up to 250 Nm/sec.

**** new flow body with R thread instead of NPT and 10 x D up- and 5 x D downstream area, dimensions are made for flow body without flow conditioner, otherwise NPT-M thread, ask for total flow body length.

DIMENSIONS

Insertion Sensor:

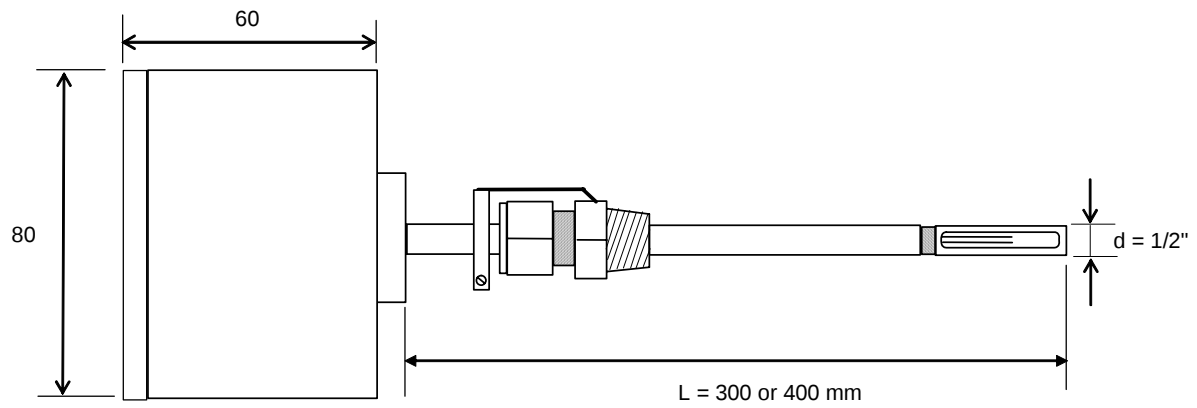


Fig. 6): Insertion Sensor with Standard Swagelok fitting $1/2"$ and optional distance holder ring



In-Line Sensor:

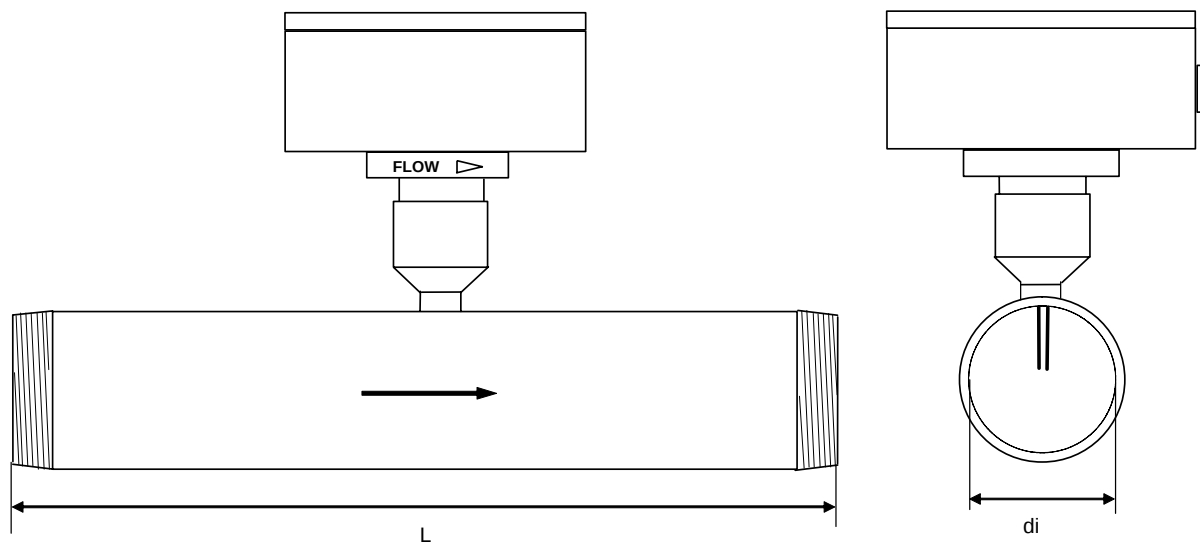


Fig. 7): Electronic with LCD and counter male connector (optional):

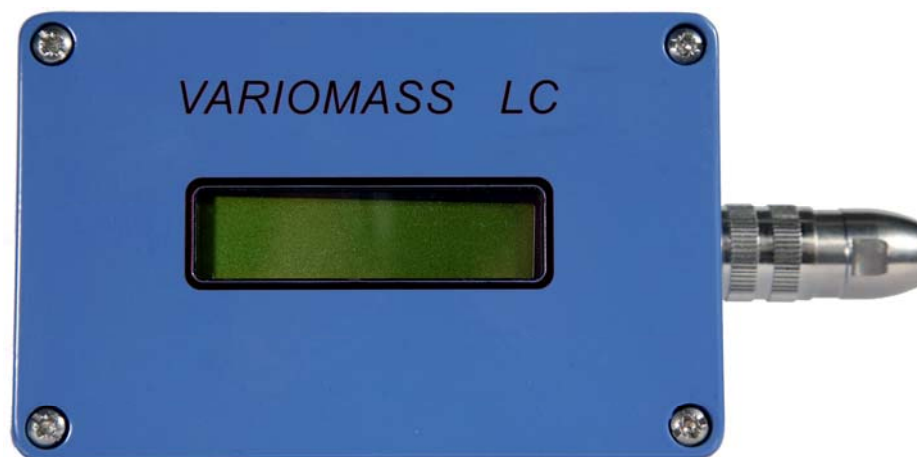


Fig 8) WIN-LC Software for programming and readout of VARIOMASS LC data:

Flow rate: **571 Nm³/h**

Total flow: **1043 Nm³**

Sensor table

Value 1:	0.00 m/s	0.404 mA
Value 2:	0.64 m/s	0.932 mA
Value 3:	0.79 m/s	1.412 mA
Value 4:	1.00 m/s	1.936 mA
Value 5:	1.17 m/s	2.384 mA
Value 6:	1.48 m/s	2.960 mA
Value 7:	1.90 m/s	3.632 mA
Value 8:	2.48 m/s	4.328 mA
Value 9:	3.24 m/s	5.016 mA
Value10:	4.47 m/s	5.872 mA
Value11:	5.40 m/s	6.408 mA
Value12:	6.93 m/s	7.144 mA
Value13:	8.82 m/s	7.800 mA
Value14:	10.97 m/s	8.460 mA
Value15:	12.81 m/s	8.992 mA
Value16:	15.66 m/s	9.568 mA
Value17:	17.74 m/s	10.072 mA
Value18:	20.17 m/s	10.596 mA
Value19:	22.70 m/s	11.056 mA
Value20:	27.13 m/s	11.744 mA
Value21:	30.67 m/s	12.316 mA
Value22:	34.50 m/s	12.908 mA
Value23:	39.26 m/s	13.592 mA
Value24:	44.33 m/s	14.284 mA
Value25:	49.35 m/s	14.932 mA
Value26:	55.20 m/s	15.648 mA
Value27:	60.32 m/s	16.220 mA
Value28:	67.18 m/s	16.948 mA
Value29:	72.97 m/s	17.528 mA
Value30:	79.65 m/s	18.128 mA
Value31:	85.04 m/s	18.592 mA

Parameter

Date: **9.04.09**
Time: **12:07**

Pipe inside diameter: **107.9 mm**
Flow range: **2300 Nm³/h**
Zero shift: **0 Nm³/h**
Dimension: **Nm³/h**
Tag No.: **0**
LCD-Filter: **1 sec**
Current output: **4 - 20 mA**
Puls: **barrier !**

Change

1

2

3

4

5

6

7

8

9

Sensor parameters

Serial-No.: **29033013** Calibration date: **6.04.09**

Medium: **air** Flow direction: **R**

Pressure: **8 bar abs.**

Temperature: **22 °C**

Humidity: **30 %**

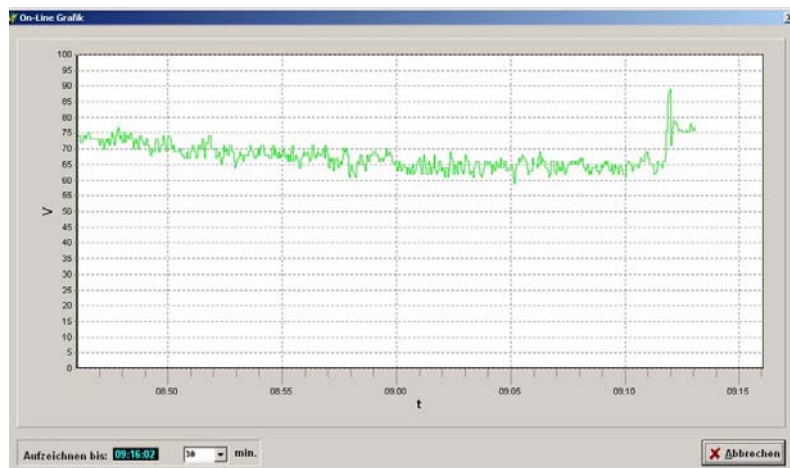
Ref. condition: **ISO-1217 [20 °C & 1 bar abs.]**

Transmission to VARIOMASS: Transmission

COM8 / 9600,8,1,n

09. Apr 2009 12:08:10

The VARIOMASS LC flow meter can be configured by the optional Software **WIN-LC** from a PC. Following data can be readout: total flow since installation, 2 programmable totalizer, date and time, flow range, flow unit, pipe inside diameter, output signal, maximum flow value, calibration date of the sensor aso.



The USB port in combination with the software WIN-LC can be used as an Online monitoring of the flow values over the time on a PC. These data can be saved on the PC and the software will generate a graphic over the time for maximum of one day. All graphics can be print out or zoom in or out.

Fig. 9) day diagram generated with software WIN-LC and USB port (Option V)

MODEL NUMBER

L - - S - - - - -	Flow direction R = Horizontal from Right to Left L = Horizontal from Left to Right O = Vertical from Top to Bottom U = Vertical from Bottom to Top D = LCD Display Output signal: IO = Analog (0/4-20 mA) and pulse IV = plus USB port and WIN-LC software Process connection O = Swagelok fitting 1/2" in stainless steel or NPT/ R male thread for In-Line meter K = ball valve retractor assembly (BVR 1/2") F = DIN flanges for In-Line meter Z = special (please indicate) wetted material S = stainless steel (316 SS) pipe size / sensor probe length L 0 = 65mm up to 300mm / L = 300 mm or 65mm up to 125mm with BVR 1/2" 1 = 300mm up to 500mm / L = 400 mm or 125mm up to 300mm with BVR 1/2" 2 = In-Line Sensor 1/2" (DN 15) 3 = In-Line Sensor 3/4" (DN 20) 4 = In-Line Sensor 1" (DN 25) 5 = In-Line Sensor 1 1/4" (DN 32) 6 = In-Line Sensor 1 1/2" (DN 40) 7 = In-Line Sensor 2" (DN 50) Z = special
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Options - please indicate:

- | | |
|--|--|
| ☐ counter connector round 8-PIN male | ☐ Flow conditioner for In-Line sensor |
| ☐ counter connector with 2 mtr. cable | ☐ BVR 1/2"-D for pressure Transmitter |
| ☐ counter connector with 10 mtr. cable | ☐ Distance holder ring for Insertion Sensor |
| ☐ counter connector with 20 mtr. cable | ☐ Special calibration please indicate |
| ☐ counter connector with _____ mtr. cable | ☐ other Media than AIR: N2, O2, CO2, Argon |

For a purchase order we need the following information: for an Insertion meter the pipe inside diameter (example 107.9 mm) and the maximum flow range (example 0 – 2000 Nm³/h). The output signal is 4-20 mA and the pulse output with external power supply with 1 m³/puls and the flow range according to the above table for Insertion or for In-Line meter unless otherwise specified.



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