

DB51

Compact Thermal Mass Flowmeter and Counter for Compressed Air and Non-Aggressive Gases

- **integrated inlet and outlet pipes for high level of accuracy**
- **removable sensor system for easy maintenance and cleaning**
- **available for 1/4" to 2" pipe sizes**
- **measuring ranges 0,8...105 l/min to 7...2840 m³/h (3440 m³/h on request)**
- **local LCD-display for flow rate or temperature, total and temperature**
- **output signals: 4...20 mA for flow rate, pulses for totalization**
- **for compressed air and non-aggressive gases**
- **zero balance possible at instrument**

Description:

Model DB51 thermal mass flow meters and counters report and measure mass flow rates and totals of non-aggressive gases, regardless of gas pressure and temperature.

Process gas flows around a heated temperature sensor that is encapsulated in glass. As a result, the sensor dissipates heat which an electronics module returns to the sensor to maintain it at a constant temperature. The dissipated heat energy is proportional to the mass flow rate of the gas and is output as a 4 to 20 mA signal by the electronic utilizing calibration curves and process parameters stored in the instrument.

The 4 to 20 mA signal is routed to secondary evaluation devices and provides the flow rate information or temperature. An additional pulse output with a pre-defined pulse value is used for totalizing purposes. Mass flow rate, total and Temperature are also displayed on an integrated back-lit LCD display.



Typical applications:

Series DB51 thermal mass flow meters and counters provide flow measurement of non-aggressive gases in 1/4" to 1 1/2" pipe systems. Their rugged, heavy-duty design and easy handling and operation make them the right choice for measuring and monitoring compressed air consumption.

They also provide measurements of other suitable gases such as: nitrogen oxygen, argon, helium and carbon dioxide.

Service friendly through removable sensor system:

For cleaning, maintenance, or recalibration the sensor head may be removed from the pipe run without taking the flow conditioner pipe itself out of the system.

This eliminates the need for a bypass pipe and ensures that the gas supply system may continue to operate even with the meter taken out.

Measuring ranges air:

Process-connection (R or NPT)	DIN flange-connection	pipe-ID [mm]	pipe-OD [mm]	Measuring range [m³/h]*
R 1/4"	/	8,9	13,7	0,05...6,3 (0,8...105 l/min)
R 1/2"	DN 15	16,1	21,3	0,2...90
R 3/4"	DN 20	21,7	26,9	0,3...175
R 1"	DN 25	27,3	33,7	0,5...290
R 1 1/4"	DN 32	36,8	42,4	0,7...530**
R 1 1/2"	DN 40	41,8	48,3	1...730**
R 2"	DN 50	53,1	60,3	2...1195**
/	DN 65	68,9	76,1	4...2050
/	DN 80	80,9	88,9	7...2840

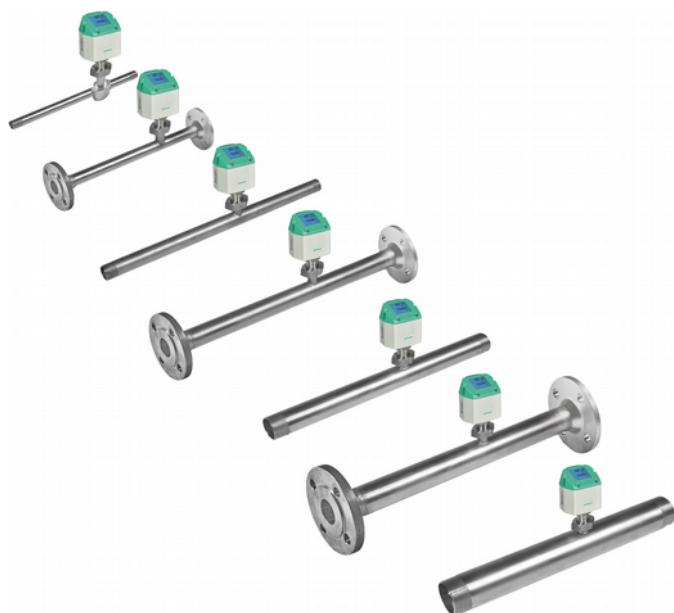
* based on 20 °C and 1000 mbar

**For optimal operation are longer inlet runs necessary.
See table in the instruction manual.

Measuring ranges gases:

Process-connection	Measuring range end values of different gases [Nm³/h]					
	Argon	CO ₂	N ₂	O ₂	N ₂ O	Natural gas
R 1/4"	8,4	5,1	4,8	5,1	5,1	3
R 1/2"	140	90	80	85	85	50
R 3/4"	275	175	160	165	170	105
R 1"	460	290	270	280	285	170
R 1 1/4"	830	525	485	505	520	310
R 1 1/2"	1140	720	670	695	715	430
R 2"	1870	1185	1100	1140	1170	705
DN 65	3205	2030	1885	1955	2010	1210
DN 80	4440	2810	2610	2710	2785	1680

* based on 0 °C and 1013 mbar
further gases on request



Technical Data:

Parameters:

at pressured air: m³/h, l/min (1000 mbar, 20 °C)
at gases: Nm³/h, NI/min (1013 mbar, 0 °C)
other reference conditions adjustable via key or factory-made

Adjustable units:

m³/h (standard), m³/min, l/min, l/s, ft/min, cfm, m/s, kg/h, kg/min, g/s, lb/min, lb/h

Gas types:

Air, nitrogen, argon, nitrous oxide, CO₂, oxygen, natural gas

Sensor:

thermal mass flow sensor

Operating temperature:

-30 ... 80 °C

Operating pressure:

PN 16, optional PN 40

Power supply:

18...36 VDC, 5 W

Burden:

< 500 Ohm

Digital output:

RS 485 (Modbus RTU)

Analogue output:

4...20 mA for m³/h bzw. l/min or temperature

Pulse output:

1 pulse per m³ resp. per litre, galvanically separated scaling adjustable via keys

Accuracy:

± 1,5 % of m.v., ± 0,3 % of f.s.
± 1 % of m.v., ± 0,3 % of f.s. (optional)

Display (optional):

TFT 1,8"

Mounting position:

any

Material:

housing: Polycarbonate

thread version:

St st 1.4301, optional 1.4571

flange version:

1.4571

Electrical protection:

IP65

Display:

Display:

TFT 1,8"

Resolution:

220 x 176

Indication:

2 values simultaneous:
actual flow and total flow (counter rate), temperature

Menu navigation:

multilingual

Adjustable via key at the display:

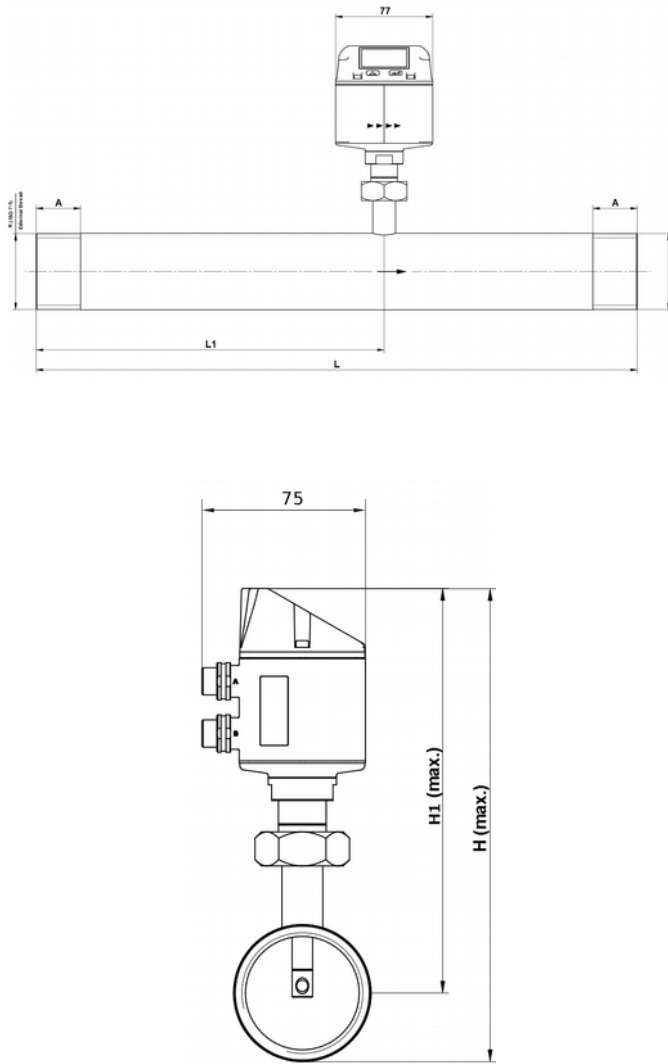
counter reset
Unit selection
4...20 mA scaling
reference conditions (°C, mbar)
pulse value
Zero point balance
leak flow volume suppression

Indication:

Rotatable at 180°

Dimensions:

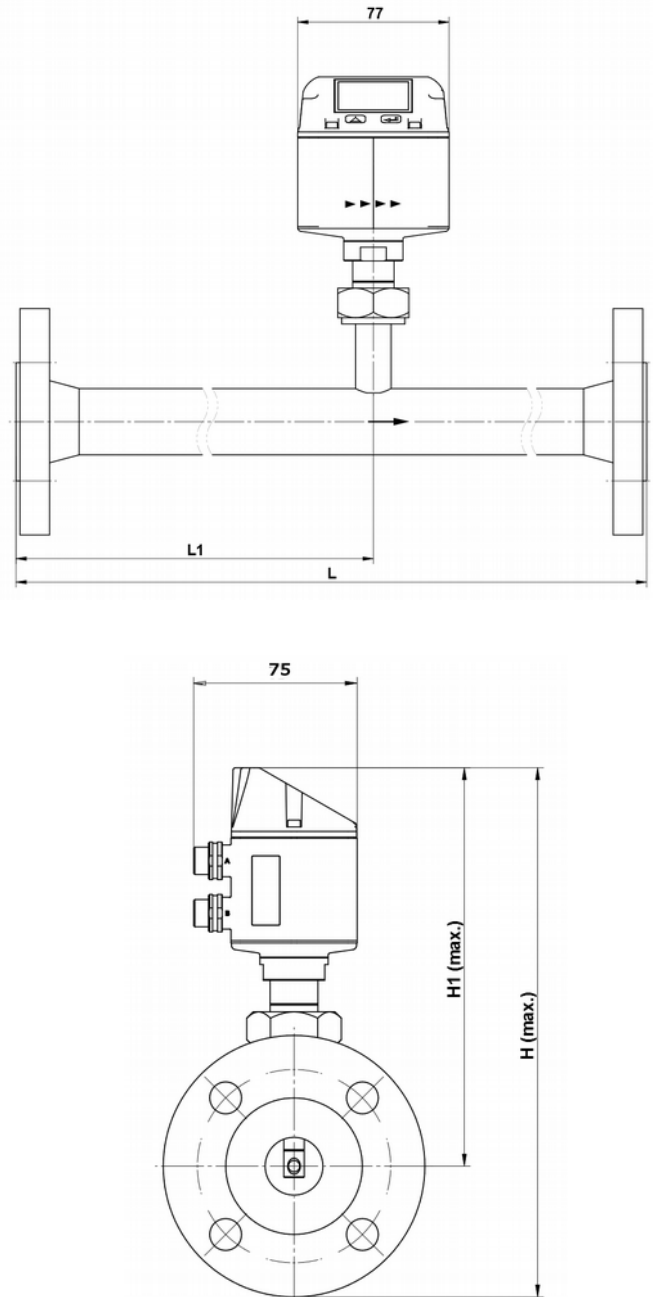
Thread version:



Process-thread	L [mm]	L1 [mm]	H [mm]	H1 [mm]	A [mm]
R 1/4"	194	137	174,7	165,7	15
R 1/2"	300	210	176,4	165,7	20
R 3/4"	475	275	179,2	165,7	20
R 1"	475	275	182,6	165,7	25
R 1 1/4"	475	275	186,9	165,7	25
R 1 1/2"	475*	275	186,9	165,7	25
R 2"	475*	275	195,9	165,7	30

*Attention: Shortened inlet section! Please observe the recommended minimum inlet section (length = 10 m inner diameter) on site!

Flange version:

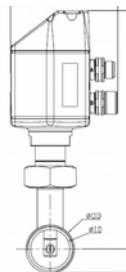
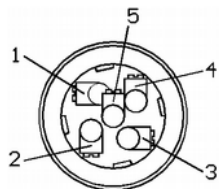


Measuring section	L [mm]	L1 [mm]	H [mm]	H1 [mm]
DN 15	300	210	213,2	165,7
DN 20	475	275	218,2	165,7
DN 25	475	275	223,2	165,7
DN 32	475	275	235,7	165,7
DN 40	475*	275	240,7	165,7
DN 50	475*	275	248,2	165,7
DN 65	475*	275	268,2	175,7
DN 80	475*	275	275,7	175,7

*Attention: Shortened inlet section! Please observe the recommended minimum inlet section (length = 10 m inner diameter) on site!

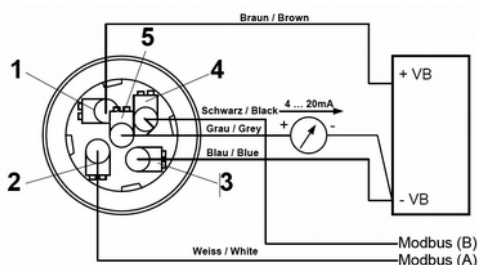
Electrical connection:

M12 plug:

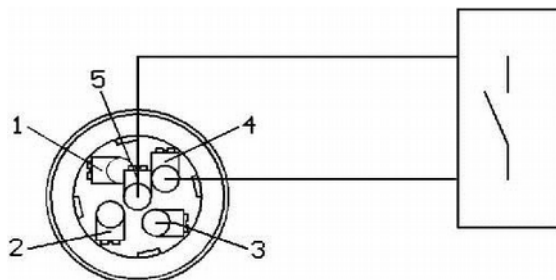


Plug A
Plug B

Plug A:



Plug B:



Accessories:

Order number:
SM12.

5. 2. G. 0

M12-plug with PVC cable

Number of poles:

5= 5-pole

Cable length:

0 = without cable for self assembly

2 = 2 m PVC cable (standard)

5 = 5 m PVC cable

10 = 10 m PVC cable

Construction:

G = straight

W = angled

Option:

0 = none

9 = Please specify in writing

Order Code:

Order number:

DB51. G. 15. L. A. 0.

Thermal Mass Flowmeter and Counter for gases, with integral inlet- and outlet pipe runs

Version:

G = G Male thread, PN 16

N = male thread NPT, PN 16

FD = DIN-Flange PN 16

9 = special connection

Measuring range (air) and pipe size [at flow speed up to 185 m/s]:

08 = 0,05...6,3 m³/h = 0,8...105 l/min, ¼"

(not at flange version)

15 = 0,2...90 m³/h, ½", DN 15

20 = 0,3...175 m³/h, ¾", DN 20

25 = 0,5...290 m³/h, 1", DN 25

32 = 0,7...530 m³/h, 1 ¼", DN 32

40 = 1...730 m³/h, 1 ½", DN 40

50 = 2...1195 m³/h, 2", DN 50

65 = 4...2050 m³/h, DN 65 (not with thread)

80 = 7...2840, m³/h, DN 80 (not with thread)

Other special ranges (up to 2840 m³/h) on request

Medium:

L = Air

N = Nitrogen

A = Argon

H = Helium

C = Carbon dioxide

S = Oxygen

B = Biogas

E = natural gas

Accuracy:

A = +/- 1,5 % m.v. +/- 0,3 % f.s.

B = +/- 1 % m.v. +/- 0,3 % f.s.

Options:

0 = none

HP = high pressure up to PN 40

V4A = Inlet- and outlet pipe made of st. steel 1.4571

(standard for flange versions)

1 = analogue output adjusted according to customer requirements

9 = Please specify in writing

2 plugs M12 and 1 blind plug are included in delivery.

DB51-Z.N1: Wall mounted power supply, 100-240 VAC, 10 VA on 24 VDC, 0,35 A

DB51-Z.N2: plug-in power supply unit, 100-240 VAC on 24 VDC, 0,35 A, with 2 m cable

DB51-Z.V1: Cover lid for flow conditioner pipe, aluminium

DB51-Z.V2: Cover lid for flow conditioner pipe, st.st. 1.4404

DB50-Z.K5: Factory calibration, 5 points