MASS VIEW

The intelligent alternative for VA meters: mass flow meters for gases with flow display

> Introduction

Bronkhorst High-Tech B.V., the European market leader in thermal Mass Flow Meters/Controllers and Electronic Pressure Controllers, has many years of experience in designing and manufacturing precise and reliable measurement and control devices. With a wide range of instruments, Bronkhorst High-Tech offers innovative solutions for many different applications in a variety of different markets.

> Description

This new series of mass flow meters provides modern, novel and economical alternative to variable area meters (VA meters), also known as rotameters or purgemeters. Unlike conventional VA meters this new flow meter measures mass flow instead of volume flow. For easy VA meter replacement the MASS-VIEW®'s mechanical construction offers the most common options for process connection on the market.

> MASS-VIEW® series thermal mass flow meters

Bronkhorst High-Tech designed MASS-VIEW® series operate on the principle of direct thermal mass flow measurement (no by-pass). An advantage of using this type of sensor is that the instrument measures direct mass flow, without the need of temperature and pressure correction. Other benefits, compared to conventional VA meters are higher accuracy, wider rangeability (up to 1:100), freedom of parallax errors and an inherently safer construction, by eliminating glass components in the flow path. MASS-VIEW® flow meters can be supplied in full scale ranges from 0.2 up to 200 l_n/min (Air equivalent), with a pressure rating of 10 bar(g) or 150 psi(g). A bright graphical OLED display, clearly visible at wide angles, allows reading of actual flow (value and a bar graph), total flow and type of gas. The display features easy set up via a user-friendly menu, using a 4-way navigation push button. The pre-installed gases eliminate the need to recalibrate for different gases and therefore reduce the cost of ownership. Additional features & functions include a variety of alarm and counter functions, an analog output signal, digital interfaces and two relay contacts. Flow control may be achieved with an optional needle valve. These high quality needle valves offer smooth and fine adjustment of the gas flow rates.

> MASS-VIEW® features

- Clear indication in:
  - Actual flow rate (bar graph and value)
  - desired flow units
  - type of gas
  - totalized flow
- Bright, wide-angle OLED display
- Free of parallax errors
- Virtually independent of pressure and temperature variations
- Low pressure drop
- Wide flow ranges
- Fast response
- High accuracy
- Electronic output, analog (0…5 Vdc) and digital interface

> Digital features

- RS232 interface and Modbus-RTU communication
- Configurable password protection
- Alarm and counter functions
- Multi Gas / Multi Range
- Pre-installed gases
- Digitally calibrated
- Free software tools

> Technical specifications

Performance

Accuracy	: ± 2% RD for flow > 50% of max. capacity; ± (1% RD + 0.5% FS) on lower flows
Repeatability	: < 0.1% FS typical
Pre-installed gases	: Air, Ar, N_2, O_2, CO_2, CH_4 and C_3H_8 (special models available for H_2 and Helium)
Standard calibration gas	: Air, other gases are converted using our Fluidat® conversion model which will introduce extra inaccuracy
Rangeability	: up to 1:100
Operating pressure	: 0…10 bar(g) / 0…150 psi(g)
Pressure coefficient	: 0.2%/bar typical at Air
Operating temperature	: 0…50°C (32…122°F)
Temperature coefficient	: Zero: <0.1%FS/°C, Span: <0.2%RD/°C
Attitude sensitivity	: < 0.1%FS
Response time ($t_{63\%}$)	: 2 s

Mechanical specifications

Materials (wetted parts)	: Meter: aluminium, Viton Needle valve: SS316, Viton, PTFE
Gas connections (in/out)	: G 1/4" BSPP female thread (compression fittings optional)
Weight	: 0.7 kg

Electrical specifications

Electrical connection	: 8-pin RJ-45 modular jack
Output	: analog: 0…5 Vdc digital: RS232 / RS485 (Modbus-RTU)
Required supply voltage	: 15…24 Vdc (+/-10%)
Power consumption	: approx. 135 mA
Min. and max. relay contacts	: switching current 0.5 A, 24 Vdc, one side grounded (0 Vdc power)

Safety

Test pressure	: 21 bar (a) / 300 psi (a)
Ingress protection	: IP-50
Leak integrity (outboard)	: < 1 x 10^{-9} mbar l/s He
EMC	: CE declaration

> Models and flow capacities

Model	Description	Max. capacity (relative Air)
MV-102	MASS-VIEW® meter	2 l_n/min (SLM)
MV-104	MASS-VIEW® meter	20 l_n/min (SLM)
MV-106	MASS-VIEW® meter	200 l_n/min (SLM)
MV-302	MASS-VIEW® meter with needle valve	2 l_n/min (SLM)
MV-304	MASS-VIEW® meter with needle valve	20 l_n/min (SLM)
MV-306	MASS-VIEW® meter with needle valve	200 l_n/min (SLM)

Notes:

- *Mass flow units l_n/min and SLM refer to normal operating conditions, i.e. 0°C (32°F) and 1013 mbar (14.7 psi)*
- *Technical specifications are based on Air at maximum FS*
- *All specifications subject to change without notice*

> Accessories

The following accessories are offered for the MASS-VIEW® mass flow meters:

Adapter sets (inlet and/or outlet)

Metric sizes	Inch sizes
3 mm OD compression type	1/8" OD compression type
6 mm OD compression type	1/4" OD compression type
12 mm OD compression type	1/2" OD compression type

Power supply and electrical connection

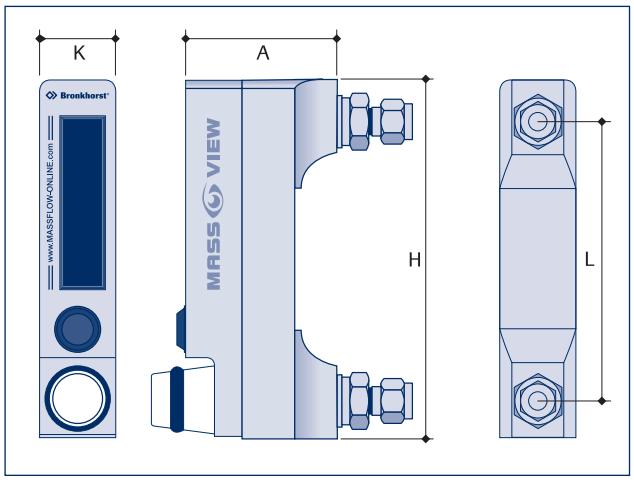
- Plug-in Power Supply 110-240 Vac, complete with cable 2 m
- Split cable Power/Signal, 30 cm
- Interconnecting cable, RJ-45 - Loose end, 3 m
- RS232 cable, RJ-45 - 9-pin Sub-D, 3 m

> Warranty

All instruments and accessories are warranted for a period of 3 years from order date.

Selectable ranges in l_n/min (SLM)	Air	N_2	O_2	Ar	CO_2	CH_4	C_3H_8
MV-102 and MV-302							
Range 1 (max.)	0.02...2	0.02...2	0.02...2	0.04...4	0.02...2	0.01...1	0.01...1
Range 2	0.01...1	0.01...1	0.01...1	0.02...2	0.01...1	0.005...0.5	0.005...0.5
Range 3	0.01...0.5	0.01...0.5	0.01...0.5	0.02...1	0.01...0.5	0.005...0.2	0.005...0.2
Range 4 (min.)	0.01...0.2	0.01...0.2	0.01...0.2	0.02...0.5	0.01...0.2	0.005...0.1	0.005...0.1
MV-104 and MV-304							
Range 1 (max.)	0.2...20	0.2...20	0.2...20	0.4...40	0.2...20	0.1...10	0.1...10
Range 2	0.1...10	0.1...10	0.1...10	0.2...20	0.1...10	0.05...5	0.05...5
Range 3	0.05...5	0.05...5	0.05...5	0.1...10	0.05...5	0.02...2	0.02...2
Range 4 (min.)	0.04...2	0.04...2	0.04...2	0.08...5	0.04...2	0.02...1	0.02...1
MV-106 and MV-306							
Range 1 (max.)	2...200	2...200	2...200	4...400	2...200	1...100	1...100
Range 2	1...100	1...100	1...100	2...200	1...100	0.5...50	0.5...50
Range 3	0.5...50	0.5...50	0.5...50	1...100	0.5...50	0.2...20	0.2...20
Range 4 (min.)	0.4...20	0.4...20	0.4...20	0.8...50	0.4...20	0.2...10	0.2...10

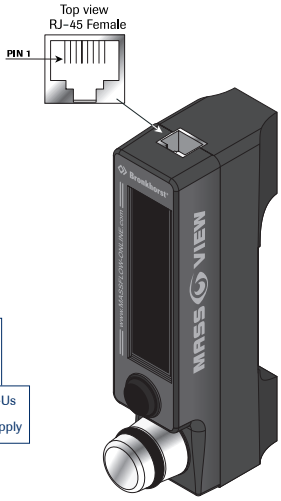
> Dimensions



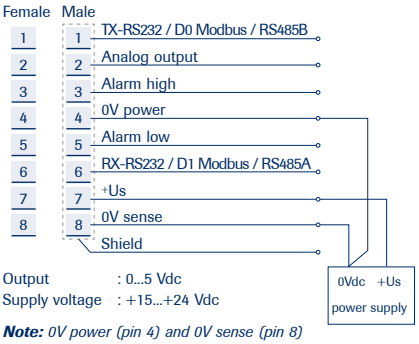
Model	A	H	K	L
MV-102/104/106	63	159	38	114
MV-302/304/306	63	159	38	114

Dimensions in mm.

> Electrical connection



Hook-up diagram

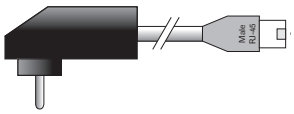


Output : 0...5 Vdc
Supply voltage : +15...+24 Vdc

Note: *0V power (pin 4) and 0V sense (pin 8) should be separately connected to the 0V terminal at the power supply*

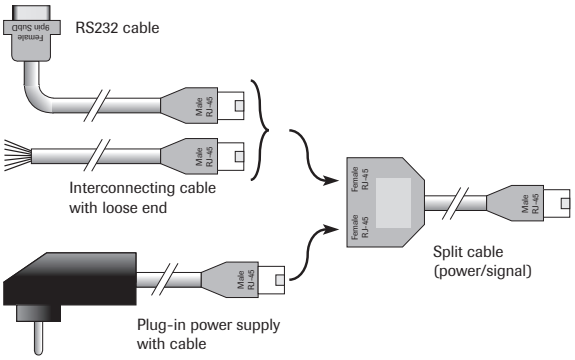
Cabling options

Plug-in power supply for basic application without external communication



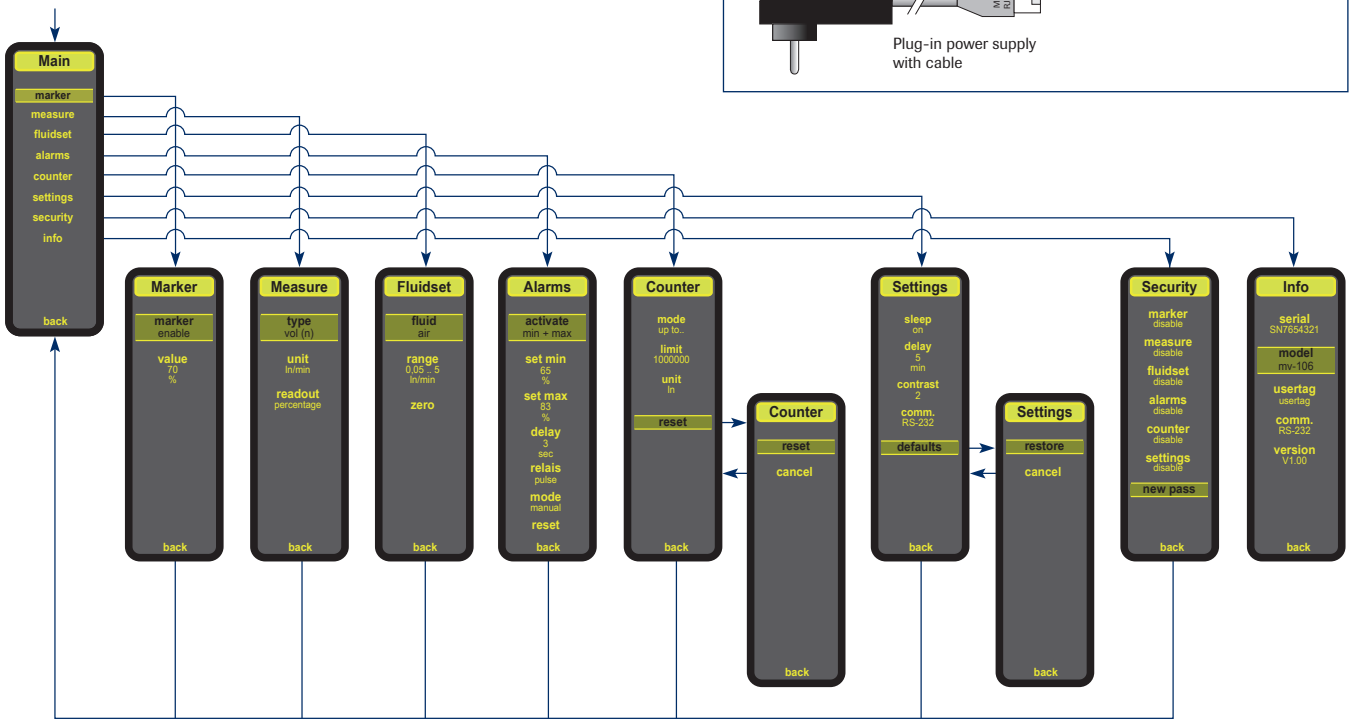
Loose-end cable for power and signal connection by customer

Combinations for separate connection of power and I/O signals



> Display menu

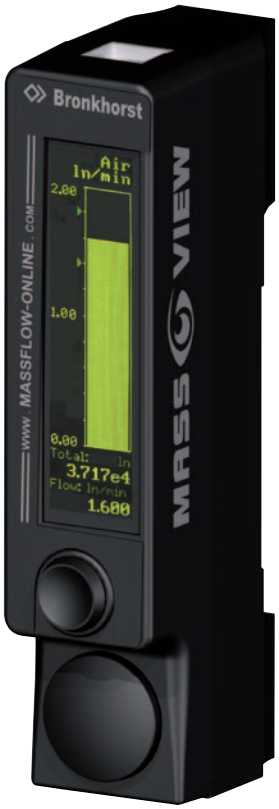
The 4-way navigation push button provides access to a user-friendly menu, e.g. for zero function, for selection of pre-installed gases in pre-installed ranges, setting of engineering units, alarm functions (minimum/maximum/counter limit) and counter functions. Password protection is provided to prevent unauthorized changes. Below overview of the MASS-VIEW® menu functions illustrates the great versatility of this product line.



> Applications

The fields of application for MASS-VIEW® are diverse:

- Burner control (furnace construction)
- Welding (welding gas monitoring)
- Cutting (steel sheets)
- Coating (equipment construction)
- Regulation of gaseous atmospheres (biotechnology)
- Local preparation of a gas mixture
- Measurement of gas consumption (hospitals)
- Flow rate monitoring (laboratories)
- Test equipment (production maintenance)
- Leak measurements (quality, environment)
- Cost centre billing
- Analytical equipment
- Aeration / sparging (food products, ice cream / edible oils)
- Blanketing (food)
- Fermentation (food, biotechnology, pharma)



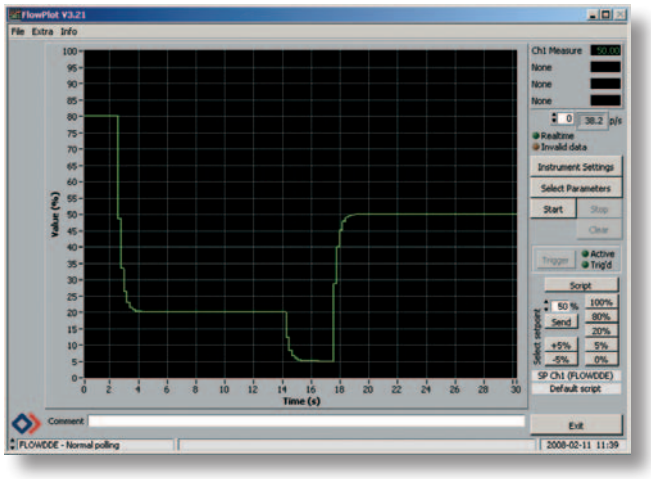
MASS-VIEW® Mass Flow Meter

> Bronkhorst FlowWare, free software tools

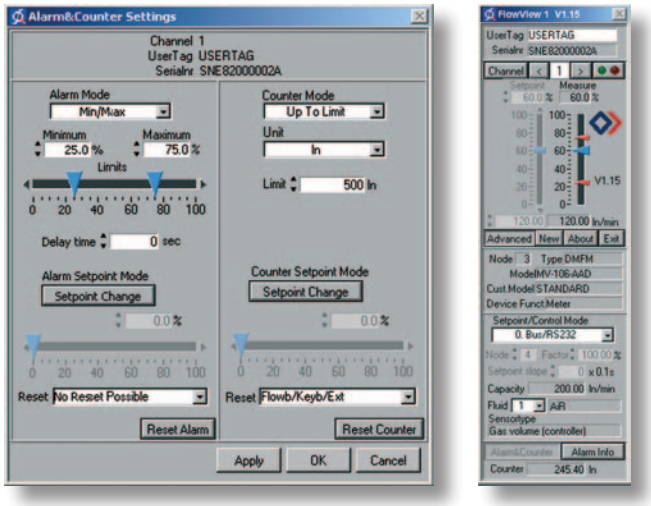
Bronkhorst High-Tech offers following software support for installation and operation by personal computer:

FlowDDE : Software tool to interface between digital instruments and MS Windows software.

FlowPlot : Software tool for monitoring and optimizing digital instruments parameters.



FlowView : Software tool to operate Bronkhorst digital instruments.



These software tools are freeware for users of our MASS-VIEW® series and other digital Bronkhorst instruments and can be downloaded from http://www.massflow-online.com

Bronkhorst distributor

Mass Flow ONLINE

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