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Instruction manual

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MASS-VIEW® series

Doc. nr.: 9.17.051H Date: 20-07-2020

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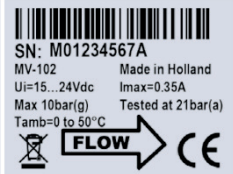
ATTENTION
Please read this instruction manual carefully before installing and operating the instrument.
Not following the guidelines could result in personal injury and/or damage to the equipment.

Even though care has been taken in the preparation and publication of the contents of this manual, we do not assume legal or other liability for any inaccuracy, mistake, misstatement or any other error of whatsoever nature contained herein. The material in this manual is for information purposes only, and is subject to change without notice.

Short-form Operation Instruction



Before installing the **MASS-VIEW®** it is important to be sure whether you received the right model using the packing list and the attached label on the instrument.



Be sure the piping system is clean. For absolute cleanliness always install filters to assure a moisture and oil-free gas stream. Install the **MASS-VIEW®** according to the direction of the flow arrow on the label at the back of the instrument.



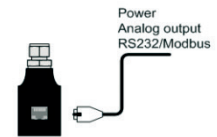
Install the instrument in the line and tighten the fittings according to the instructions of the supplier of the fittings.



Be sure the system has no leaks before applying gas pressure.

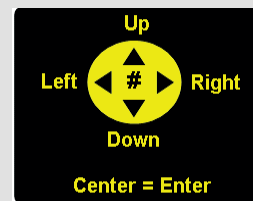


Electrical connections must be made with a standard cable or according to the hook-up diagram in this manual.



When the instrument is powered up the first time, a setup menu appears where the pre-installed gas can be selected, which flow range is to be used and which communication type.

Use the 4-way button (up and down direction) for navigation and press the centre of the button to select.



Apply power to the instrument and allow approx. 30 minutes for warm-up and stabilization. This may be done with or without gas pressure applied to the system.



After entering the default password (which is 'abc') in the security menu, all menus can be enabled or disabled. Also a new password can be entered and saved.



Perform zero action if needed. See instructions at section 3.6 *zeroing procedure* in this manual.



Your instrument is now ready for operation.

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1 General Product Information

1.1 Introduction

MASS-VIEW® instruments are accurate instruments for measuring and controlling the mass flow rate of gases. These smart instruments offer multiple process values as input- or output parameters. Many parameters can be changed on the instrument through the menu, other parameters can only be changed using our digital interfaces.

This manual covers the general part of the **MASS-VIEW®** series mass flow instruments for gases. It covers the general instructions needed for the instruments.

1.2 Intended Use

The intended use of **MASS-VIEW®** instruments is to measure or control gas flow rates of the specified gas types as stored in the instrument. The gas has to be clean and dry.

1.3 Symbols



Important information. Discarding this information could cause injuries to people or damage to the instrument or installation.



Helpful information. This information will facilitate the use of this instrument.



Additional info available on the internet or from your local sales representative.

1.4 Product Support References

MASS-VIEW® instruments have modular instruction manuals consisting of:

- Instruction manual **MASS-VIEW®** series (document nr. 9.17.051)
- Short form instruction manual **MASS-VIEW®** series (document nr. 9.17.054)
- Operation instructions digital instruments (document nr. 9.17.023)

Fieldbus/interface description:	Manual :	Hook-up diagram :
RS232 Interface with FLOW-BUS protocol	9.17.027	9.16.044
Modbus interface	9.17.035	9.16.066

- FlowPlot Manual (document nr. 9.17.030)
- Hook-up diagram **MASS-VIEW®** series (document nr. 9.16.085)
- Dimensional drawing **MASS-VIEW®** series (document nr. 7.05.697)
- MASS-VIEW®** Controller series (document nr. 7.05.890)



These documents can be downloaded from our website: www.massflow-online.com

1.5 Warranty

Bronkhorst® products are warranted against defects in material and workmanship for a period of three years from the date of shipment, provided they are used in accordance with the ordering specifications and the instructions in this manual and that they are not subjected to abuse, physical damage or contamination. Products that do not operate properly during this period may be repaired or replaced at no charge. Repairs are normally warranted for one year or the balance of the original warranty, whichever is the longer.

The warranty includes all initial and latent defects, random failures, and undeterminable internal causes. It excludes failures and damage caused by the customer, such as contamination, improper electrical hook-up, physical shock etc.

Re-conditioning of products primarily returned for warranty service that is partly or wholly judged non-warranty may be charged for.

Mass Flow ONLINE B.V. prepays outgoing freight charges when any party of the service is performed under warranty, unless otherwise agreed upon beforehand, however, if the product has been returned collect to Bronkhorst High-Tech B.V., these costs are added to the repair invoice. Import and/or export charges, foreign shipping methods/carriers are paid for by the customer.

1.6 General Description

The **MASS-VIEW®** series operate on the principle of direct thermal mass flow measurement (no bypass). An advantage of using this type of sensor is that the instruments measure direct mass flow, virtually independent of pressure and temperature changes, and have a low pressure drop.

Other advantages compared to conventional meters are the high accuracy and the large range ability. The **MASS-VIEW®** series are supplied with totalizer and alarm functions. Flow control can be achieved by an optional built-in needle valve. A bright graphical OLED display, clearly visible over any angle, allows reading of actual flow (value and bar graph), total flow and fluid type. The display features easy navigation through a user-friendly menu, using a 4-way button with centre push. Furthermore the instruments have 2 potential free alarm contacts grounded on one side.

1.7 Housing

The **MASS-VIEW®** meter has a straight tube with a mass flow sensor. The fluid connections have an inner thread of G1/4" (1/4" BSPP cavity) or G1/2" (G1/2" BSPP cavity). The connections reside on the back of the instrument.



The bottom fluid connection is the inlet; the upper connection is the outlet.

For electrical connection and power supply, the instrument has a RJ-45 modular connector on top of the instrument. These instruments are suited for indoor (dry) applications, like laboratories and in well protected (OEM) housings. The front part is made of ABS, the back part of Aluminium. The laminar flow element and orifice size inside the control valve are optimized for the customers gas and process conditions.



MASS-VIEW®



MASS-VIEW®
with needle valve



MASS-VIEW®
with constant-flow controller

1.8 Sensor principle

The **MASS-VIEW®** operates on the principle of direct thermal mass flow measurement. The thru-flow design sensor consists of a heater resistor and a temperature sensing resistor. Both resistors are made of temperature sensitive resistive material that is covered with a stainless steel tube. The necessary heating power to keep the temperature difference between the heater resistor and the sensing resistor at a constant level depends on the mass flow. A different and unique heater current is produced for each value of the flow. The measurement principle described is called Constant Temperature Anemometry (CTA).

The transfer function between mass flow and output signal can be described by the equation:

$$V_{signal} = K \cdot \Phi_m$$

V_{signal}	= output signal
K	= constant factor (includes λ – heat conductivity, C_p – specific heat, μ – dynamic viscosity and ρ – density of the gas)
Φ_m	= mass flow

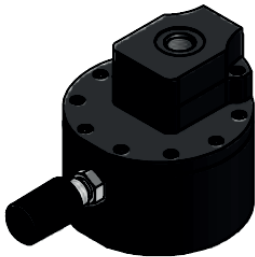


1.9 Needle valve principle



The needle valve has an orifice with a long, tapered conical seat. A needle-shaped plunger, on the end of a screw, exactly fits this seat. As the screw is turned and the plunger retracted, flow between the seat and the plunger increases. Since it takes many turns of the fine-threaded screw to retract the plunger, precise regulation of the flow rate is possible.

1.10 Constant-flow controller principle

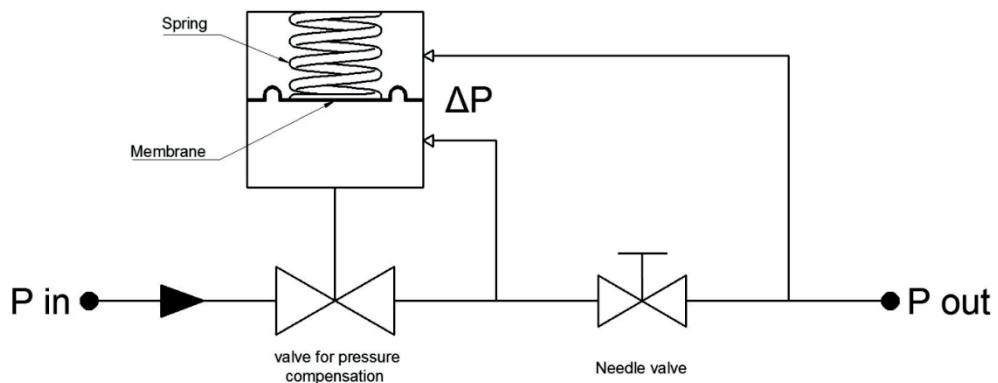


Flow control with a needle valve at constant pressure results in a constant flow rate. But when pressure conditions change, the flow will also change.

With a constant-flow controller with varying upstream pressure the flow will almost be constant.

By keeping the pressure drop across a needle valve constant the flow rate also is constant. Deviations of the pressure drop are compensated by a membrane operated valve. This membrane is actuated by a spring. The spring force closes the valve.

The equilibrium between closing (valve spring) and opening (membrane) keeps the flow constant.

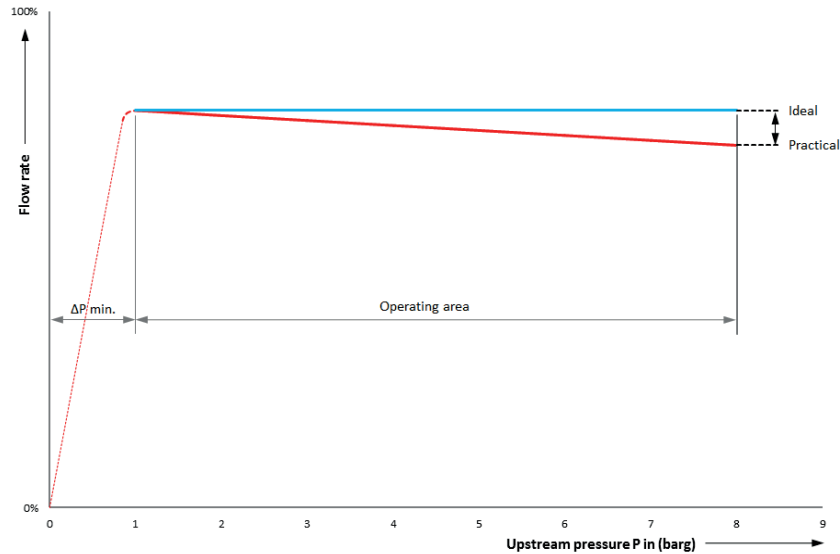


Schematic flow diagram constant-flow controller

The pressure loss across the needle can be described by:

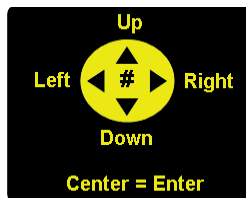
$$\Delta P = \frac{k \rho_n T \phi^2 v_n}{P_{out}} \text{ in which } P_{out} = 1 \text{ bar at } 20^\circ\text{C and } 1 \text{ atm}$$

The spring force in the upstream membrane valve closes the valve in the “zero” flow situation. By opening the needle valve the ΔP will increase, so far that the membrane lifts up and compensates the spring force. In the equilibrium position the flow will be constant even when the upstream pressure (P_{in}) changes. However when the upstream pressure increases, it will cause a small effect on the spring force, which means that the ΔP to open the membrane valve will be a little smaller. This results in a lower flow.



In practise the deviation of the ideal straight line will be less than 0,5-1% per bar.

1.11 Electronics, display and 4-way button

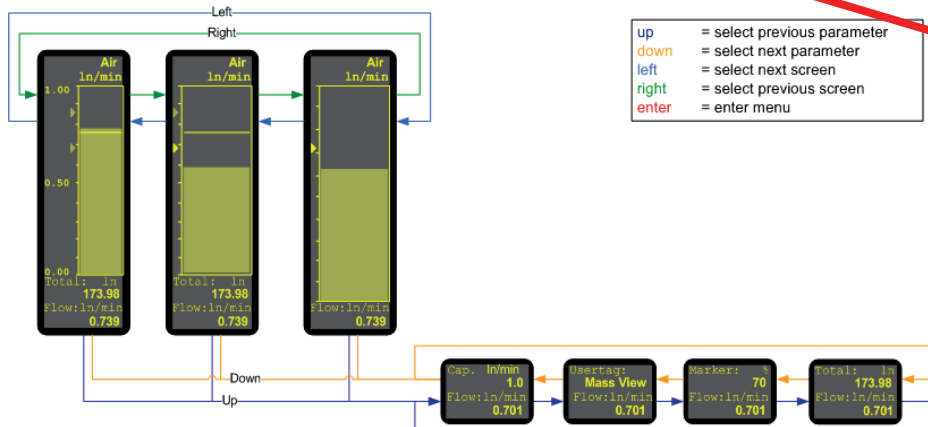


The MASS-VIEW® has a bright graphical OLED display, clearly visible over any angle, which allows reading of actual flow (value and bar graph), total flow and gas type. The three display options can be changed using the 4-way button. This button is a navigation joystick which has UP/DOWN/LEFT/RIGHT keys and a centre push (ENTER) key.



4-way button

- up = select previous parameter
- down = select next parameter
- left = select next screen
- right = select previous screen
- enter = enter menu



1.12 Software tools



The **MASS-VIEW®** series have a digital interface which can be connected using RS-232 (or RS-485) to a computer. For a MS-Windows based PC, we have several freeware tools available for download on our website.

- **FlowDDE**
the FLOW-BUS DDE (Dynamic Data Exchange) Server is gathering data *from* the modules connected to the FLOW-BUS, and at the same time transferring data *to* these modules. DDE provides the user a basic level of inter process communication between MS-Windows applications and is therefore, the most flexible way to transfer data. By using DDE commands, sent by software, to the DDE Server, data can be sent or requested from the FLOW-BUS. FlowDDE communicates very easily with Microsoft Excel and other applications.
- **FlowPlot** (needs FlowDDE).
Flow-Plot is a DDE-client program for service-purposes on Bronkhorst® digital instruments or readout-units. It gives good insight into the dynamic behaviour of digital instruments.
- **FlowView** (needs FlowDDE).
FlowView is a DDE-client program to operate Bronkhorst® digital instruments.

2 Installation

2.1 Unpacking and inspection

Check the outside packing box for damage incurred during shipment. Should the packing box be damaged, then the local carrier must be notified at once regarding his liability, if so required. At the same time a report should be submitted to your supplier.

Remove the envelope containing the packing list; carefully remove the equipment from the packing box. Inspect the contents for damaged or missing parts.



*Before installing a **MASS-VIEW®** instrument it is important to read the attached label and check:*

- Model type
- Power supply
- Maximum pressure
- Temperature

Do not discard spare or replacement parts with the packing material and inspect the contents for damaged or missing parts.

2.2 Removal and return instructions



When returning material, arrange a return material authorisation (RMA) at www.massflow-online.com and completely fill out the RMA request.

Instrument handlings:

- Purge gas lines
- Remove instrument from line
- Insert the instrument into a plastic bag and seal the bag
- Place the bag in an appropriate shipping container

Add documentation:

- Reason of return
- Failure symptoms
- Contaminated condition
- Declaration on Contamination

When returning material, always describe the problem and if possible the work to be done on the RMA request.

It is absolutely essential that you notify your supplier if toxic or dangerous fluids have been in contact with the instrument!

This is to enable us to take sufficient precautionary measures to safeguard our staff.

Take proper care of packing, if possible use the original packing box; seal instrument in plastic etc.



All instruments must be dispatched with a fully completed 'declaration on contamination form', found in the RMA-form on the website. Instruments without this declaration will not be accepted.

Note:

If the instruments have been used with toxic or dangerous fluids the customer should pre-clean the instrument.

2.3 Mounting

The mounting position of the **MASS-VIEW®** is vertical, although it is possible to turn the device 180° and change the display setting. Avoid installation in close proximity of mechanic vibration and/or heat sources.

2.4 In-line filter



Although the gases to be measured should be absolutely free of dirt, oil, moisture and other particles, it is recommended to install an in-line filter upstream of the flow meter / controller, and if backflow can occur, a downstream filter is recommended too. Be aware of the pressure drop caused by the filter.

2.5 Fluidic connections

The **MASS-VIEW®** can be equipped with (compression) fittings. Follow the guideline of the manufacturer of the fittings.



While tightening fittings, do not apply excessive force, in order to avoid damaging in/output thread or other sensitive parts of your instruments.

Please be aware when using Oxygen (O₂) that the fittings mounted to the body should be absolutely oxygen clean.



Always check your system for leaks, before applying fluid pressure. Especially if toxic, explosive or other dangerous fluids are used.

2.6 Piping

Be sure that piping is absolutely clean!



DO NOT install small diameter piping on high flow rates, because the inlet jet flow will affect the accuracy.

DO NOT mount abrupt angles direct on in- and outlet, especially not on high flow rates. At least 10 pipe diameters distance between the angle and the instrument is recommended.

DO NOT mount pressure regulators direct on the inlet of gas flow meters/controllers, but allow some meters of piping (at least 25 pipe diameters).

2.7 Electrical connections

The **MASS-VIEW®** instruments are powered with +15 Vdc to +24 Vdc.

When providing your own power supply be sure that voltage and current rating are according to the specifications of the instrument(s) and furthermore that the source is capable of delivering enough power to the instrument. Refer to Hook-up **MASS-VIEW®** series (document nr. 9.16.085) for more details.



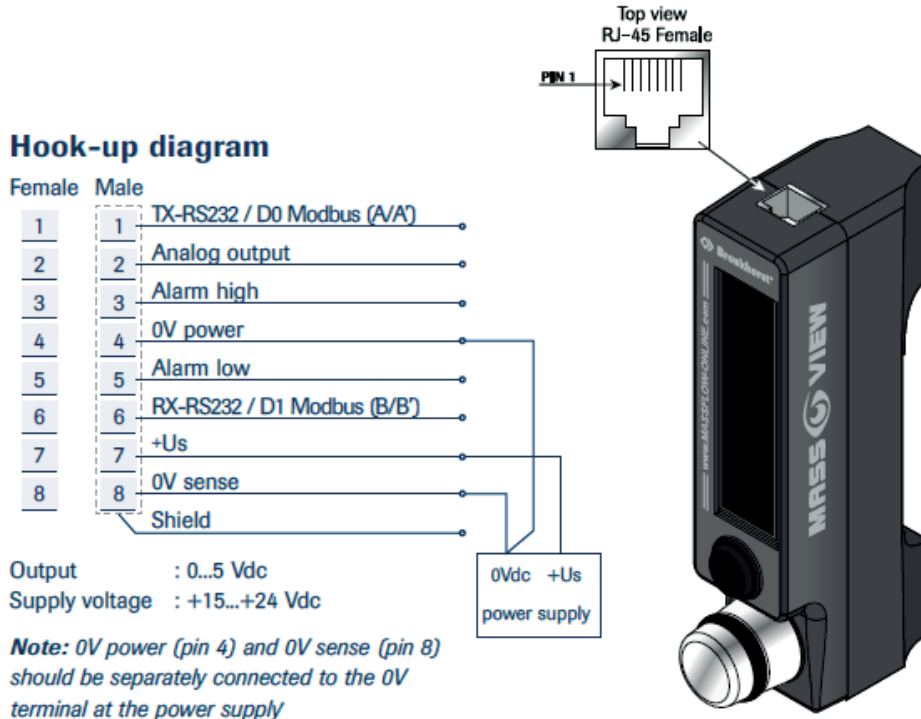
We recommend using our standard cables. These cables have the right connectors and if loose ends are used, these are coloured and marked to prevent improper connection. All cabling options can be purchased online www.massflow-online.com

When using other cables, cable wire diameters should be sufficient to carry the supply current and voltage losses must be kept as low as possible.



When connecting the system to other devices (e.g. to PLC), be sure that the integrity of the shielding is not affected. Do not use unshielded wire terminals.

Please study carefully the hook-up diagram which is shown here:

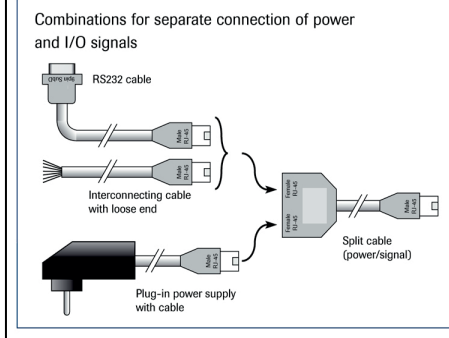


Depending on the mode of the digital output (which can be changed through the user interface) the function of pin 1 and pin 6 are:

Pin 1 = RS232 TXD or MODBUS D0
Pin 6 = RS232 RXD or MODBUS D1

Pin 2 = analog output
Pin 3 = alarm contact 1
Pin 5 = alarm contact 2
Pin 4 = 0V shared alarm contact for alarm 1/2

Available cabling options on massflow-online.com



To use both the power supply and an analog or digital connection, you should use the optional shielded RJ-45 Y-adapter.

All connector and cabling options can be purchased online: www.massflow-online.com

2.8 Test pressure

Each instrument is pressure tested.

The tested pressure is stated on the instrument label.

The absolute maximum line pressure is 10 bar (g). Check test pressure before installing in the line. If the label is **not** available or the test pressure is incorrect, the instrument should **not** be mounted in the process line.

2.9 Supply pressure

Do not apply pressure until electrical connections are made. When applying pressure to the system, take care to avoid pressure shocks in the system and increase pressure gradually.

2.10 System purging

If explosive gases are to be used, purge the process with inert dry gas like Nitrogen, Argon etc. for at least 30 minutes. Complete purging is also required to remove such gases from the system before exposing the system to air.

2.11 Seals

The seals fitted are compatible with the published list of gases, at the stated conditions.

2.12 Equipment storage

The equipment should be stored in its original packing in a cupboard, warehouse or similar. Care should be taken to not subject the equipment to excessive temperatures or humidity.

2.13 Electromagnetic compatibility

The **MASS-VIEW®** series carries the CE-mark.

Therefore it has to comply with the EMC requirements as are valid for these instruments.

However compliance with the EMC requirements is not possible without the use of proper cables and connector assemblies. Do not use unshielded wire terminals.

3 Operation

3.1 General

Bronkhorst® instruments are designed in such a way that they will meet user process requirements in the best possible way. Flow meters and controllers are powered from a dc power source with a minimal ripple. When providing your own power supply be sure that voltage and current rating are according to the specifications of the instrument and furthermore that the source is capable of delivering enough energy to the instrument. Cable wire diameters should be sufficient to carry the supply current and voltage losses must be kept as low as possible.

3.2 Power and warm-up

Before switching on the power, be sure all connections have been made according to the hook-up diagram in 2.7. Check gas connections and make sure there is no leakage. If needed purge the system with a proper gas. Turn on power and allow at least 30 minutes for warming up and stabilizing. During the warm-up period, gas pressure may either be on or off.

3.3 Setting up the instrument

After powering on, the first time, the instrument will ask which gas is used and which flow range is to be used (see picture below).

Navigate to the fluidname using the 4-way button (up and down direction) and press in the centre to make a selection, then select the range using the up and down direction and press also in the centre to make the selection.

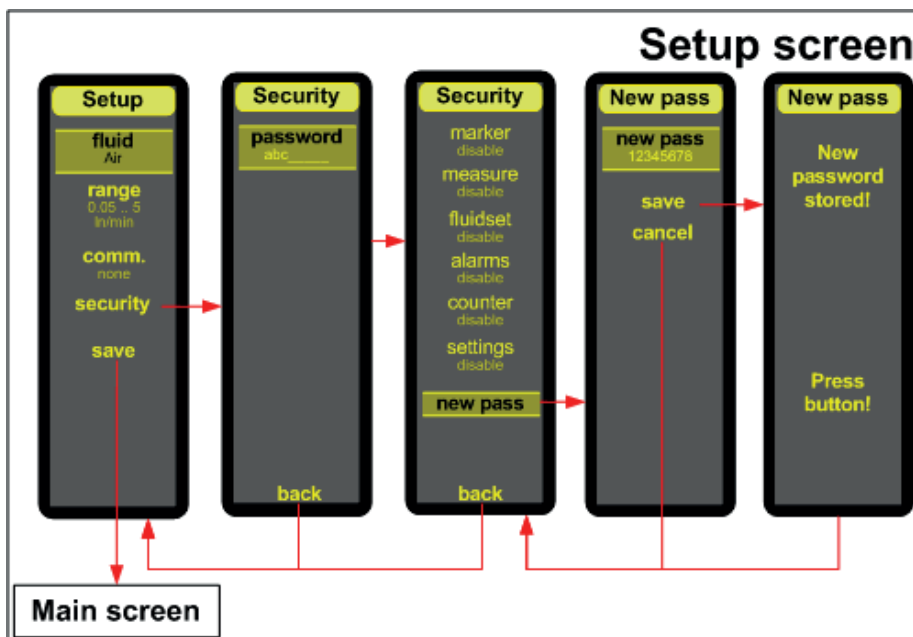
After selecting the fluid and the range, the communication type can be selected . The settings will be stored when the “save” button is pressed.



After entering the default password (which is ‘abc’) in the security menu, all menu’s can be enabled or disabled. Also a new password can be entered and saved.

Then turn on gas supply gently. Avoid pressure shocks, and bring the instrument gradually up to the level of the actual operating conditions. Also switch off gas supply gently.

The **MASS-VIEW®** is designed in such a way that for a change in the range or gas, you simply select another available range or gas in the menu.

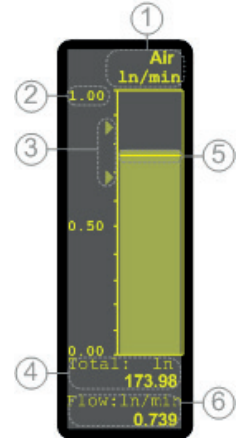


3.4 User Interface, menu structure and instrument functions

3.4.1 The readout screen

The readout screen of the **MASS-VIEW®** is divided into several blocks as described in the picture on the right.

- At the top of the screen the fluid name and the unit dimensions are displayed.
- Left of the graph the capacity is displayed.
- If there are any alarms activated, their values will be displayed at the left side of the graph.
More information about how to use the alarms can be found in chapter 3.4.6.
- The custom readout parameter 1 is displayed near the bottom of the screen. More information can be found in chapter 3.4.2.
- The “Flow marker” indicates the *desired* flow and is only a “marker” where the actual flow should be. The Flow Marker value can be set in the menu “marker”.
- Readout parameter 2 is displayed at the bottom of the screen and indicates the actual flow and the selected unit.

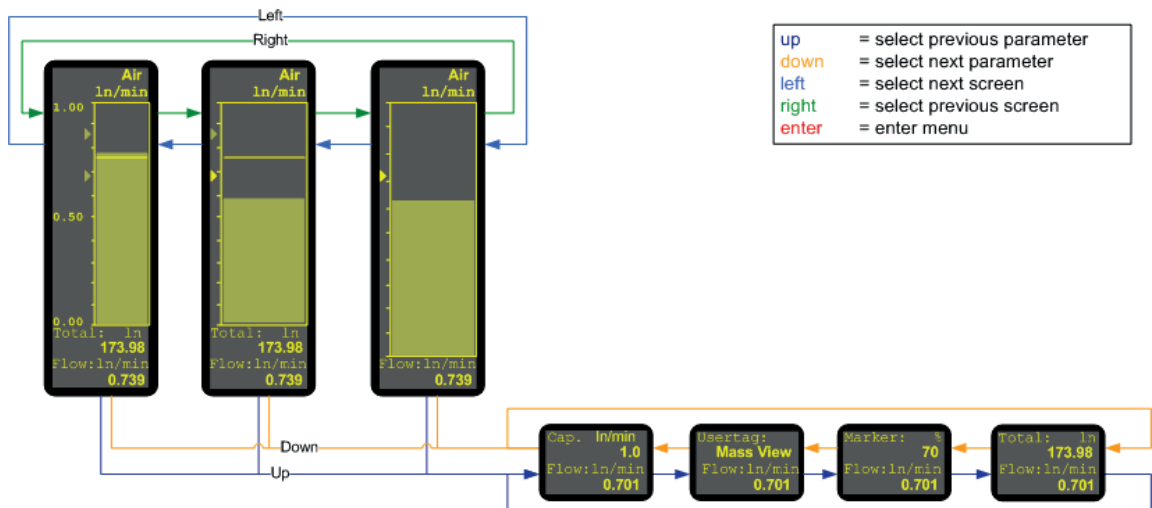


3.4.2 Changing the readout screen

It is possible to customize the readout screen using the navigation button (see picture below).

By pressing **left** or **right** one can switch between three different graph sizes. Depending on the selected graph one can also switch between four different custom readout parameters by pressing **up** or **down**.

- Full scale capacity with unit.
- Flow marker value. “Off” when flow marker is disabled.
- Usertag.
- Counter with counter unit. “Off” when counter is disabled.



The readout parameter 2 can be displayed in percentage or actual capacity units. This can be changed with the “Readout” parameter in the measure menu.



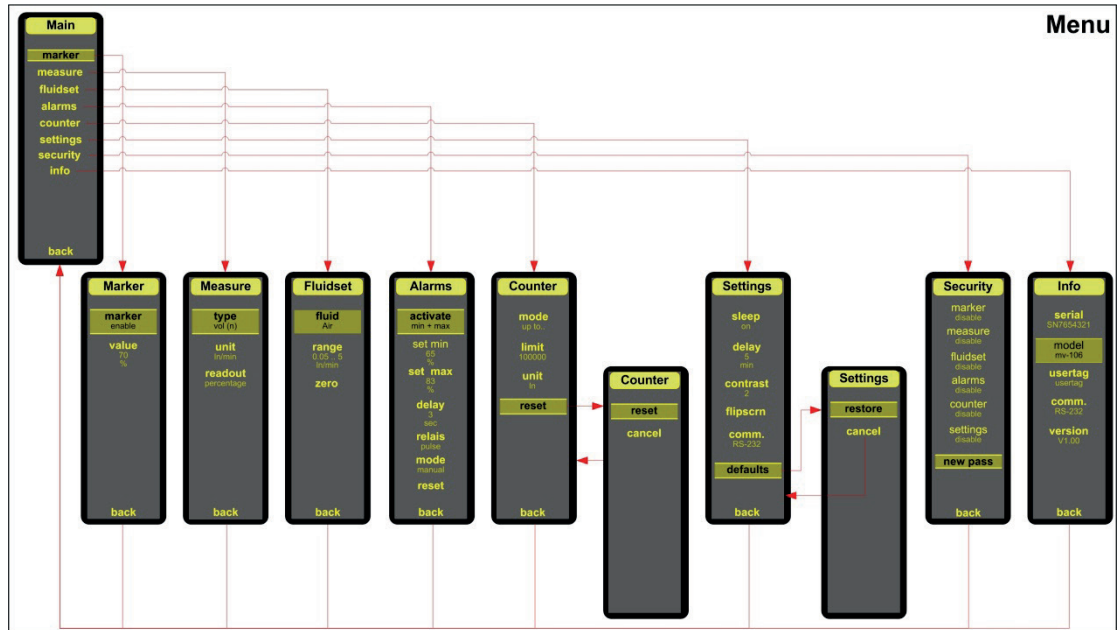
Capacity choice:

Measurement below 2% of the full scale will be interpreted as 0 (m)ln/min flow.

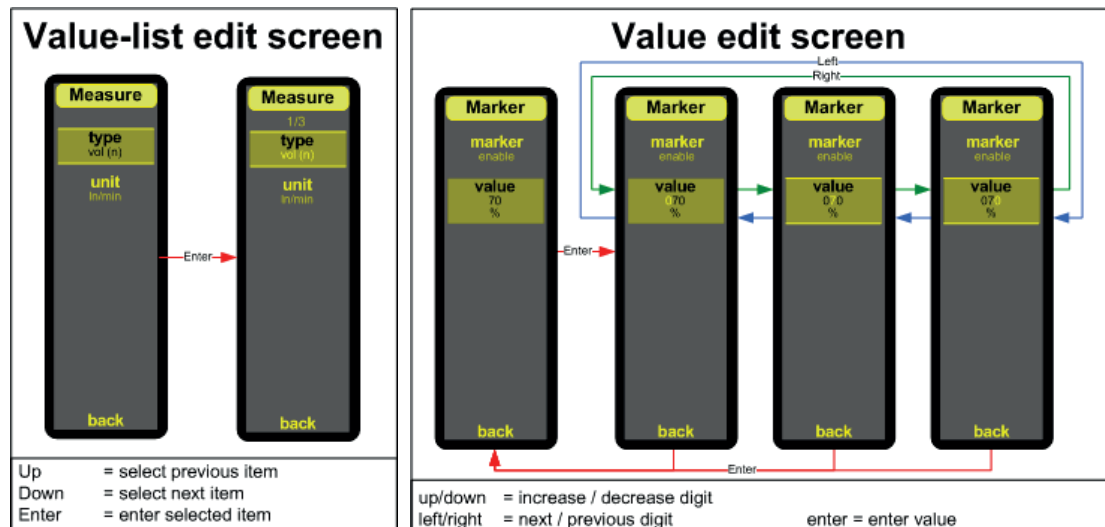
3.4.3 The menu structure

From the readout screen one can enter the menu by pressing **enter**. One can navigate through the menu-items using **up** and **down** and enter the selected item by pressing **enter**.

Select the “back” option to return to the readout screen or to go up one level in the menu.



In each sub-menu various parameters can be edited by pressing **enter**. Depending on the type of parameter, the edit screen will look like the following.



In the value-list edit screen a value can be selected from a list using the **up** and **down** button. The number of parameter values in the list and the index of the selected item will be displayed on top of the screen. In the value edit screen the parameter value can be changed by selecting the digits using **left** or **right** and then increase or decrease the value using **up** or **down**.

Pressing **enter** after editing the parameter value will save the new value and return to the sub-menu.

Note:

The visibility of some parameters depends on the value of other parameters. For instance if the marker is disabled, the marker value will not be displayed.

3.4.4 Sleep mode

To increase the lifetime of the display a sleep mode is built-in which displays the flow at a random place on the screen. The sleep mode will become active when the readout screen is visible and no button is pressed for a number of minutes.

The screensaver and the delay can be enabled in the settings menu.

In addition to the sleep mode the display contrast can be adjusted in 5 steps in the settings menu.

3.4.5 Counter

The counter in the **MASS-VIEW®** can be set up in the “counter” menu and has 3 different modes which can be selected via the “mode” parameter in the “counter” menu:

1. **Off** : counter disabled.
2. **Up** : counting upwards continuously.
3. **Up to..** : counting up to limit (batch counter).

When the counter mode is set to “Up” or “Up to..” the following parameters will be displayed

Unit: The output unit in which the counter will be displayed on the screen. (FlowDDE parameter 123 or 128).

Limit: Batch limit. This parameter is only active when counter mode “Up to..” is selected.

Reset: Resets the counter.

3.4.6 Alarms

The alarms can be adjusted in the Alarms menu using the following parameters:

Activate (FlowDDE parameter 118)

This parameter sets one of the following alarm modes.

Name:	DDE Value:	Description:
None	0	Alarms Off.
Min + max	1	Alarm on absolute limits.
Response	2	Alarm on limits related to setpoint/marker.

When the alarm mode is set to “None”, the other alarm parameters are not visible in the menu.

Set max / Set min (FlowDDE parameter 116 and 117)

The minimum and maximum alarm values can be set between 0% and 130%.

An alarm can be disabled by setting the value to 0%.

When alarm mode “min + max” is selected, these are absolute values, when “Response” is selected these values are relative to the setpoint or marker value. This enables the user to create a band around the setpoint/marker.

Delay (FlowDDE parameter 182)

The delay parameter is the time in seconds the alarm action will be delayed when alarm limit has been exceeded. This is also the time automatic reset will be delayed when sensor signal reaches the desired level again.

Mode (FlowDDE parameter 156)

With the “mode” parameter the user can choose if the alarms reset automatically or manually. When the reset mode is set to automatic, the alarms will be reset when measure reaches the desired level and the delay time has exceeded.

When the reset mode is manual, the user can reset the alarms in the following ways:

1. With the “reset” option in the alarms menu.
2. Via RS-232 (or FLOWDDE / FlowView / FlowPlot).
Writing the value “2” to FLOWDDE parameter 114 resets the alarms.
3. When the readout screen is visible and an alarm is active, this will be displayed at the top of the screen (see chapter 3.4.7). By pressing **up** at an alarm situation, the user can reset the alarms from the readout screen.

Relay

The relays parameter sets the output mode of the relays. The user can choose between disabled, enabled and pulse. When a relay is active, the relay contact will connect to the 0V signal.

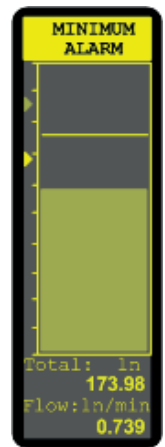
3.4.7 Alarm outputs

The status of the alarms can be read in various ways.

For example when the minimum and maximum alarms are enabled this is made visible in the readout screen with two markers at the left of the graph (see picture on the right).

When an alarm arises the corresponding marker will be highlighted and the header will blink and display the alarm.

The **MASS-VIEW®** meters have two relays which indicate an alarm situation. The status of the relays depend on the alarm source and status of the relay parameter (see table below).



	disable		enable		pulse	
	Relay 1	Relay 2	Relay 1	Relay 2	Relay 1	Relay 2
Min alarm	0	0	1	0	0/1/0/1/0/1...	0
Max alarm	0	0	0	1	0	0/1/0/1/0/1...
Response (min)	0	0	1	0	0/1/0/1/0/1...	0
Response (max)	0	0	0	1	0	0/1/0/1/0/1...
Counter	0	0	1	1	0/1/0/1/0/1...	0/1/0/1/0/1...

3.4.8 User tag

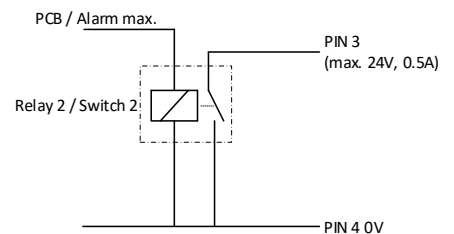
The User tag can be edited at the menu item *info*.

3.4.9 Alarm contacts

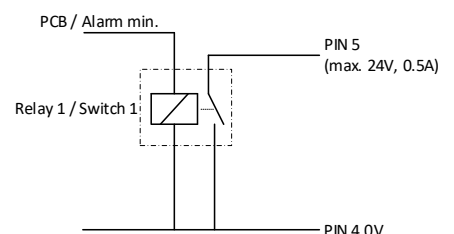
The MASS-VIEW® flow meter has two alarms connected to a relay/switch.

This relay is already included in the MASS-VIEW®.

One side of the switch is connected to ground (pin 4, 0 Vdc) and the other side is connected to Pin 3 (alarm max).



The other relay is also with one side connected to Ground (pin4, 0 Vdc) and the other side is connected to Pin 5 (alarm min).



Switching current: max. 24 Vdc, 0.5 A.

3.5 Other gases

The **MASS-VIEW**® series are calibrated on Air. All other pre-installed gases are calculated using a theoretical conversion model which describes the flow curve for other gases which will introduce additional inaccuracies.

However, as the accuracy of the conversion model also depends on viscosity, pressure and temperature, special attention should be taken for gases in the heterogeneous gas state where specific heat, density, thermal conductivity and viscosity can vary tremendously.

3.6 Zeroing procedure

The **MASS-VIEW**® has a zero procedure for each individual gas. The zero function permits the user to zero the instrument when needed. Please make sure the instrument is zeroed on the desired gas at the desired operating temperature and pressure conditions. It is extremely important that all flow be blocked and the **MASS-VIEW**® is in a static (NO FLOW) condition. Select from the main Menu Option -> Fluidset -> Zero. Pause a few seconds, then press any key to complete the zero procedure.

4 Maintenance

4.1 General

No routine maintenance is required to be performed on the instrument. Units may be purged with clean, dry inert gas. The **MASS-VIEW®** is designed in such a way that for a change in the range or gas, you simply select another available range or gas in the menu.

In case of severe contamination it may be required to clean the inside of the instrument. After cleaning a recalibration is needed. Bronkhorst® has a trained staff of servicemen available. Contact Mass Flow ONLINE B.V. for cleaning and recalibration options.



If the equipment is not properly serviced, serious personal injury and/or damage to the equipment could be the result. It is therefore important that servicing is performed by trained and qualified service personnel.

4.2 Needle valves

CAUTION: Pressure surges, as may occur during system pressurisation or deflation must be avoided.



Excessive force used to achieve positive shut-off can deform or score the sealing surface in the valve.

5 Troubleshooting

5.1 General

For a correct analysis of the proper operation of the **MASS-VIEW®** meter it is recommended to remove the unit from the process line and check it without applying gas supply pressure. In case the unit is dirty, this can be ascertained immediately by loosening the couplings. Furthermore check if the RJ-45 connector is fixed properly. Energizing or de-energizing of the instrument indicates whether there is an electronic failure. The OLED screen should light up.

After that, fluid pressure is to be applied in order to check behaviour.

If there is suspicion of leakage, do not check for bubbles with a leak detection liquid under the cover as this may lead to a short-circuit at the sensor or PC-board.

5.2 Troubleshooting summary

Symptom	Possible cause	Action
No output signal, no display, no flow indication	No power supply	1a) Check power supply
		1b) Check cable(s)
	PCB failure	1c) contact online: Mass Flow ONLINE*
	Valve blocked	1d) contact online: Mass Flow ONLINE*
	Filter blocked	1e) Clean filter
	Sensor failure	1f) contact online: Mass Flow ONLINE*
Maximum output signal, maximum flow indication	Flow too high	2a) reduce the flow or re-range the instrument
	PCB failure	2b) contact online: Mass Flow ONLINE*
	Sensor failure	2c) contact online: Mass Flow ONLINE*
High setpoint vs. output offset, flow indication lower than expected	Pressure not correct	3a) Check pressure
	Blockage in line	3b) Remove cause
	Valve blocked	3c) contact online: Mass Flow ONLINE*
	PCB failure	3d) contact online: Mass Flow ONLINE*
Signal or flow indication lower than expected	System stoppage	4a) Remove cause
Flow is gradually decreasing or changing	(Gas) Condensation	5a) Decrease supply pressure or increase temperature
	Pressure has changed	5b) Check valve setting
Small flow occurs when valve is supposed to be closed	Valve is leaking	6) contact online: Mass Flow ONLINE*



For troubleshooting issues or returns, please go to www.massflow-online.com and click on service. Here you find the instructions how to fix the problem (FAQ's) or how to return an instrument (RMA).

5.3 Service and repair



MASS-VIEW® instruments can be repaired *but not all the parts*. Parts that can be repaired can be found on the website of Mass Flow ONLINE (www.massflow-online.com)