

# mini CORI-FLOW™

Compact Coriolis Mass Flow Meters & Controllers for  
**Liquids and Gases**

## Quick Installation Guide

Doc. no.: 9.17.052 rev. I Date: 22-02-2022



Starting up the mini CORI-FLOW™ in 10 steps

# SCOPE OF THIS GUIDE

**mini CORI-FLOW™** instruments are highly accurate instruments for measuring and controlling the mass flow rate of liquids and/or gases, independent of fluid properties. These smart Coriolis instruments offer multiple process values as input- or output parameters. Many parameters can be read and/or changed using analog or digital interfaces. Output parameters are: mass flow, density, temperature, totalized mass flow, alarms. Input parameters are: setpoint (desired mass flow rate for controllers), reset alarm/counter.

This Quick Installation Guide will help you start up your **mini CORI-FLOW™** in only 10 steps, covering the following subjects:

1. Check functional properties
2. Check pressure
3. Check piping
4. Mounting/installation
5. Leak check
6. Electrical connection
7. Operational interface
8. Multifunctional switch
9. Purging
10. Zeroing

## Other applicable documents:

- Instruction Manual mini CORI-FLOW™ 9.17.050  
*Information about sensors, valves, liquid dosing systems, maintenance, tooling, calibration, Kv-value calculation and troubleshooting*

- Instruction Manual Digital Instruments 9.17.023
- FlowPlot Manual 9.17.030

Fieldbus/interface manuals	Manual	Hook-up diagram
• RS232 interface with FLOW-BUS protocol	9.17.027	9.16.044
• FLOW-BUS interface	9.17.024	9.16.048
• PROFIBUS DP interface	9.17.025	9.16.049
• DeviceNet™ interface	9.17.026	9.16.050
• Modbus interface	9.17.035	9.16.066



These documents can be downloaded from [www.bronkhorst.com/qr-landing-pages/qrcoriolis](http://www.bronkhorst.com/qr-landing-pages/qrcoriolis) or can be sent by email on request.



## Temperature considerations



After having used the **mini CORI-FLOW™** for the first time at low temperature, re-tighten the fluid adapter screws in order to prevent any leakage. Please note: if you do not tighten, a leaking adapter / fitting can cause damage. After the first shrinking and re-tightening of the screws, no further precaution is necessary.



Note that the maximum temperature in the housing of the **mini CORI-FLOW™** is 70 °C. To check this, the internal temperature sensor can be used. Temperature can be readout digitally via FlowDDE or a Bronkhorst® readout and control module (E-8000 or BRIGHT). Make sure the temperature value readout here (=actual temperature in housing) does not exceed 70 °C.

## Starting up


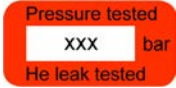
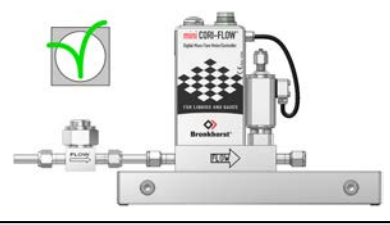


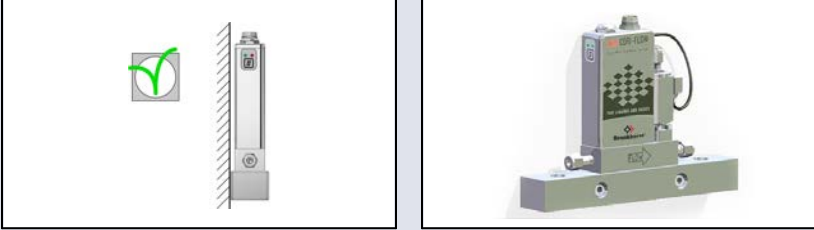


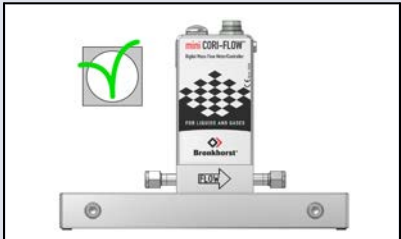
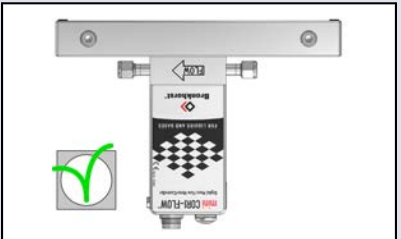
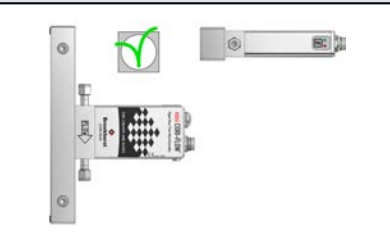
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### Check functional properties

Before installing the instrument, check if the properties stated on the instrument label match your requirements:

- Flow rate
- Fluid to be measured
- Up- and downstream pressures
- Input/output signals (see also step 6)
- Temperature
- Valve type (for controllers)

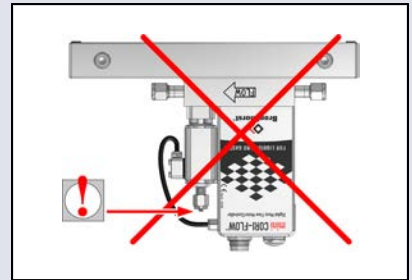
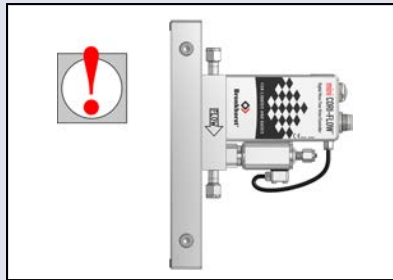
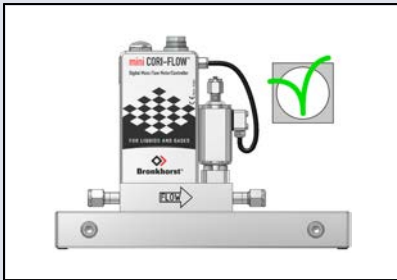


<p><b>2</b></p> 	<p><b>Check test-pressure</b></p> <p>The tested pressure is stated on the instrument with a red sticker. Before installation, make sure that the tested pressure is in accordance with normal safety factors for your application. If a pressure test sticker is missing, or if the tested pressure is insufficient, the instrument must <b>not</b> be mounted in the process line and should be returned to the factory.</p>		
<p><b>3</b></p>	<p><b>Check if system piping is clean</b></p> <p>For reliable measurement, always make sure the fluid stream is clean. Use filters to assure a moisture, oil and particle free gas stream (recommended pore-size: 10...40 µm). If back flow can occur, installing a downstream filter and a check valve is recommended too. For high flow rates, select a suitable filter size, to avoid a too high pressure drop or cavitation.</p>		
	<p><b>Warning!</b></p> <p>During the manufacturing process, the instrument has been tested with water. Despite the fact that it has been purged thoroughly afterward, the instrument cannot be guaranteed to be absolutely free of water droplets upon delivery. For applications where remaining water particles might cause undesired reactions, such as corrosion, Bronkhorst strongly recommends performing an additional, adequate drying procedure.</p>		
<p><b>4a</b></p>	<p><b>Mount/install instrument properly</b></p> <p>Install the <b>mini CORI-FLOW™</b> Meter/Controller in the line and tighten the fittings according to the instructions of the supplier of the fittings. Mount the <b>mini CORI-FLOW™</b> instrument, with screws in the body, to a rigid, stiff base body or heavy mass, such as a wall, heavy rig or stable steel construction. This is essential to achieve optimal accuracy with the <b>mini CORI-FLOW™</b> instrument.</p>		
<p><b>4b</b></p>	<p><b>Flow direction</b></p> <p>Install the <b>mini CORI-FLOW™</b> in accordance with the direction of the FLOW arrow, indicated on the instrument body, between the process fittings.</p>		
<p><b>4c</b></p>	<p><b>Base mounting</b></p> <p>Mount the <b>mini CORI-FLOW™</b> instrument, with screws in the body, to a rigid, stiff base body or heavy mass on a vibration-free position, such as a wall, heavy rig or stable construction. This is essential to achieve optimal accuracy with the <b>mini CORI-FLOW™</b> instrument.</p>		
	<p>By default the <b>mini CORI-FLOW™ M12, M13 and M14</b> are delivered on a special mounting block for achieving optimal accuracy. This mounting block has a mass and stiffness precisely tuned for the specific model.</p>		
	<p>Removing the mounting block will cause inaccuracy unless the instrument is firmly mounted on a stiff and rugged surface.</p>		
<p><b>4d</b></p>	<p><b>Mounting position general</b></p> <p>For gas and liquid <b>mini CORI-FLOW™</b> meters can be mounted in any position for a proper measurement.</p>		
			

4e

**Mounting position (integrated) valve with purge connector**

Only for **mini CORI-FLOW™** instruments with (integrated) liquid valve with purge adapter, mounting position can be critical for a good quality of degassing.



Please consult the Instruction Manual mini CORI-FLOW™ for additional information on mounting the mini CORI-FLOW instruments.



**Liquid purging**

In order to remove gas bubbles during start-up, flushing at a relatively high liquid flow rate for some minutes is recommended.



**Gas purging**

In order to remove condensation drops during start-up, flushing with dry gas for some minutes at a high flow rate is recommended.



**Leak check**

Check the system for leaks before applying (fluid) pressure, especially if toxic, explosive or other dangerous fluids are used.



**Gas tight is not the same as liquid tight**

Please note that connections which are tight for liquid, could still be insufficiently tight for gas. This might result in gas enclosure in the liquid (e.g. when using pumps), which might lead to measurement errors.

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**Electrical connection**

Electrical connections must be made with standard cables or according to the applicable hook-up diagram (see page 2).



**mini CORI-FLOW™** instruments have a IP65 ingress protection rating.



**mini CORI-FLOW™** instruments can optionally be ATEX Zone 2 protected. For ATEX Zone 2 applications, all (optional) connectors and the impact protection cover must be mounted on the instrument.

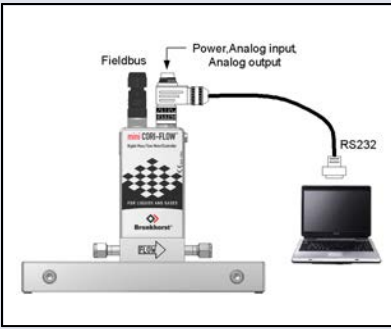
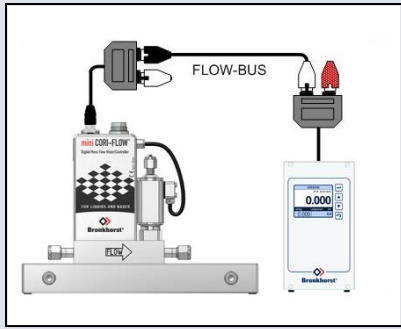
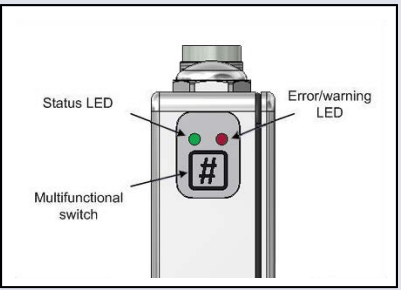




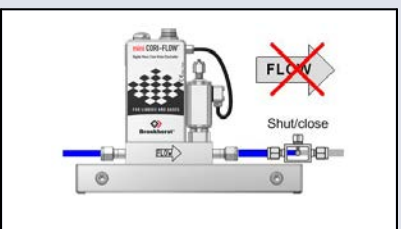
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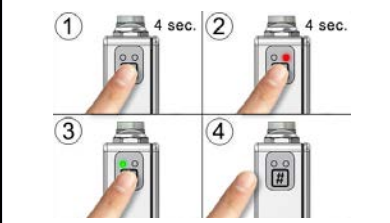
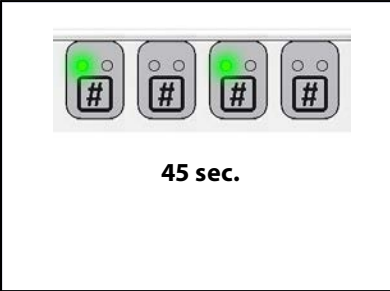


**Analog/local operation**

Connect the **mini CORI-FLOW™** to the power supply/readout unit with the 8-pin cable at the circular connector. The two examples below have the following electrical properties:

- Power** +15...+24 Vdc
- Analog output** 0...5 Vdc / 0...10 Vdc  
0...20 mA / 4...20 mA
- Analog input (controller)** 0...5 Vdc / 0...10 Vdc  
0...20 mA / 4...20 mA



<p><b>7b</b></p>	<p><b>Digital operation (RS232/fieldbus)</b></p> <p>For this procedure see description for RS232 operation or specific (optional) fieldbus. RS232 connection cable 7.03.444 enables the use of the (free) Bronkhorst® FlowWare tooling programs for Windows.</p>		
<p><b>8</b></p>	<p><b>Multifunctional micro switch operation</b></p> <p>Using the 2 LEDs and the switch on the <b>mini CORI-FLOW™</b>, several actions can be monitored and started. The green LED is used for status indication. The red LED is used for error and warning messages. The switch can be used to execute several functions, such as autozero and restoring factory settings. See the description of the zeroing procedure in this manual (step 10) or consult the <b>mini CORI-FLOW™</b> manual for details.</p>		
	<p><b>Important warning!</b> If the red LED blinks irregularly, the measuring signal is unstable or noisy: possibly the instrument is exposed to vibrations or pulsating flow.</p>		
<p><b>9</b></p> 	<p><b>Purging</b></p> <p>In systems for use with corrosive or reactive fluids, purging with an inert gas (e.g. Nitrogen or Argon) for at least 30 minutes is absolutely necessary before use. After use with corrosive or reactive fluids, complete purging is also required before exposing the system to air.</p> <p>After purging, flush the <b>mini CORI-FLOW™</b> with the actual process fluid to expel gas from the tubes (for liquids) or to remove all possible condensation drops (for gases).</p>		
	<p><b>Special control mode for purging</b></p> <p>In case of a <b>mini CORI-FLOW™</b> controller give setpoint = 100 % to control the valve or the pump. It is also possible to use special control mode = 8 to fully open the valve or set the pump at max. rpm, using a digital interface. This will bypass the PID-controller and might be useful when having the <b>mini CORI-FLOW™</b> set to a low capacity. It will ensure you to get the highest possible flow for purging.</p>		
	<p><b>Warm-up time</b></p> <p>For accurate measurement, it is recommended to warm up the instrument for at least 30 minutes.</p>		
<p><b>10</b></p>	<p><b>Zeroing</b></p> <p>Before first use, when process conditions change significantly (especially temperature) or when the instrument has been re-mounted (e.g. after servicing) it is recommended to perform an automatic zero action with the <b>mini CORI-FLOW™</b>. This action can be started manually (as described below) or via a digital interface (see the Instruction Manual Digital Instruments, document no 9.17.023). Under normal (constant) conditions it will not be necessary to zero before each application start-up.</p>		
<p><b>10a</b></p>	<p><b>Set process conditions</b></p>	<p>After warming-up, pressuring and purging the system, including the <b>mini CORI-FLOW™</b>, prepare the <b>mini CORI-FLOW™</b> for actual process conditions.</p>	
<p><b>10b</b></p>	<p><b>Stop flow</b></p> <p>Make sure there is no flow through the <b>mini CORI-FLOW™</b>, by closing a shut-off valve (in front of and) after the instrument. At least one (shut-off) valve after the <b>mini CORI-FLOW™</b> is required. High quality up- and downstream shut-off valves are recommended for proper zero point calibration.</p>		

10c	<b>Start auto-zero</b>	With no flow, use the push-button switch (#) on the <b>mini CORI-FLOW™</b> to start the zero adjustment procedure (LEDs first will go off). (1), (2) and (3): Press the push-button (#) and hold it for 8...12 seconds (each 4 seconds the LED-indication will change). (4): Release the push-button (#) when the green LED is on.	
10d	<b>Zeroing procedure</b>	The zeroing procedure will start now and the green LED will blink fast. The procedure will take at least 45 sec. When the signal is not stable the procedure will take longer (max. 6 retries will be performed). The red LED will blink if the signal is unstable or noisy. Make sure that there is no flow through the <b>mini CORI-FLOW™</b> when performing the zeroing procedure and avoid vibrations.	
10e	<b>Ready</b>	When indication is showing 0% signal and the green indication LED is continuously on, then zero has been performed well. Instrument is in normal operation mode now and ready for use.	
 <b>Measurement check</b> For a controller, send a setpoint to the <b>mini CORI-FLOW™</b> and check the measured value. Make sure the <b>mini CORI-FLOW™</b> indicates 0% at zero flow.			
Your <b>mini CORI-FLOW™</b> is now ready for operation.			