



FlowFinder-mk2⁺ USER MANUAL



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1 INTRODUCTION

Thank you for purchasing the FlowFinder-mk2⁺ (referred to as the instrument in this manual). This document is the user manual and contains information for correct, efficient and safe measurement with the instrument. Please read this information carefully before using the flowmeter. Always keep this information with the instrument for future use.

1.1 Explanation of symbols on the FlowFinder-mk2⁺

Symbol	Description
	Indicates that, according to the manufacturer, the product meets all EU requirements in terms of safety, health and environmental protection.
	Indicates that the material of the product can be recycled when the product's lifetime has been reached.

2 PRODUCT DESCRIPTION

The FlowFinder-mk2⁺ measures the volume flows of vents. The instrument can measure supply and exhaust volume flows from 10 to 850 m³ per hour.

The FlowFinder works with zero pressure compensation. This involves compensating for the measured pressure difference (supply overpressure, return underpressure), hereafter referred to as resistance, when placed over a valve. Without this compensation, the measuring instrument would block the flow of air.

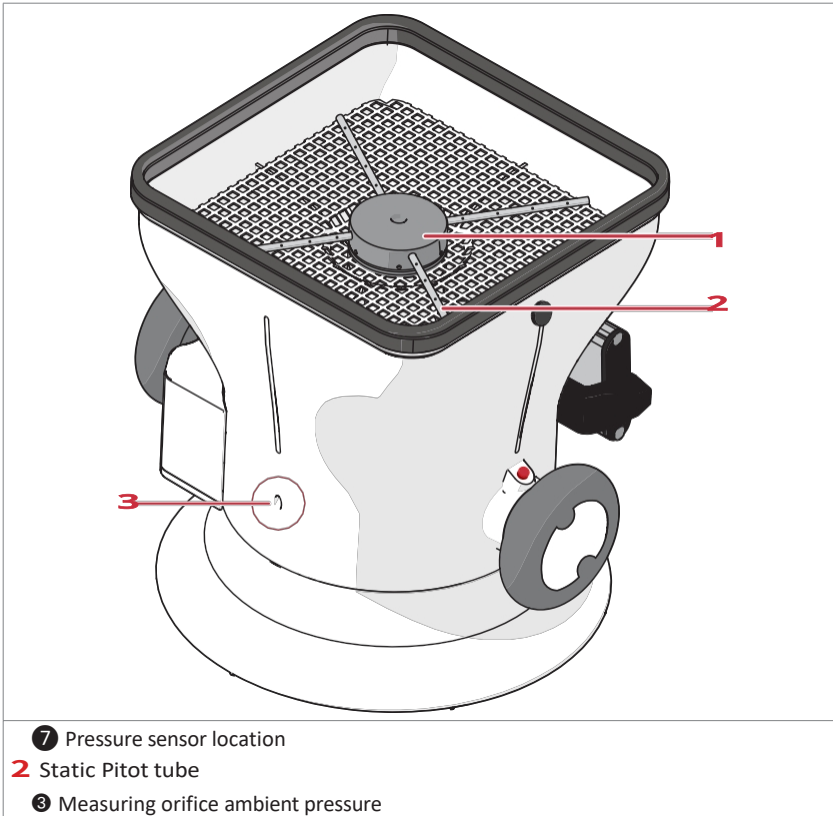
Zero pressure compensation consists of 2 steps:

1. The resistance of the FlowFinder is measured.
2. This resistance is compensated with a motor-driven fan. Once the pressure drop has been stably compensated to zero, the volume flow, also known as the flow rate, is calculated from the speed of the fan.

This zero pressure compensation is essential when adjusting ventilation systems because it ensures that the FlowFinder does not apply resistance to the ventilation system.

With the small attachment, valves up to a diameter of 210 mm can be measured. The air inlet or outlet to be measured must be completely enclosed by the

attachment. By combining the FlowFinder-mk2⁺ with one of the optional attachments (folding or not, see chapter 2.6), larger air valves can also be measured.



The FlowFinder uses four static Pitot tubes to measure the pressure difference between the ambient pressure and the pressure in the measuring funnel. These tubes are located at the top of the measurement sleeve. Each static Pitot tube has four openings and is connected to the differential pressure sensor, which is mounted under the black knob (marked 1). The sensor measures the differential pressure in the measuring horn and the environment, or static pressure. In the figure above, one of these static Pitot tubes is indicated by 2. The outside pressure is measured through an opening in the housing (indicated by 3), from which a channel runs to the pressure sensor. As the user, ensure that this opening always remains free.

2.1 Specifications FlowFinder-mk2⁺

Dimensions case (l x w x h)	315 × 315 × 370 mm
Dimensions (l x w x h)	260 × 260 × 350 mm
Dimensions attachment (l x w x h)	230 × 230 × 145 mm
Weight (with case)	6850 g
Weight (without case)	2750 g
Operating and storage temperature	5 - 40 °C
Batteries	NiMh battery; 14.4 V, 2200 mAh
Full charge capacity	8 hours at volume flows up to 200 m ³ /h

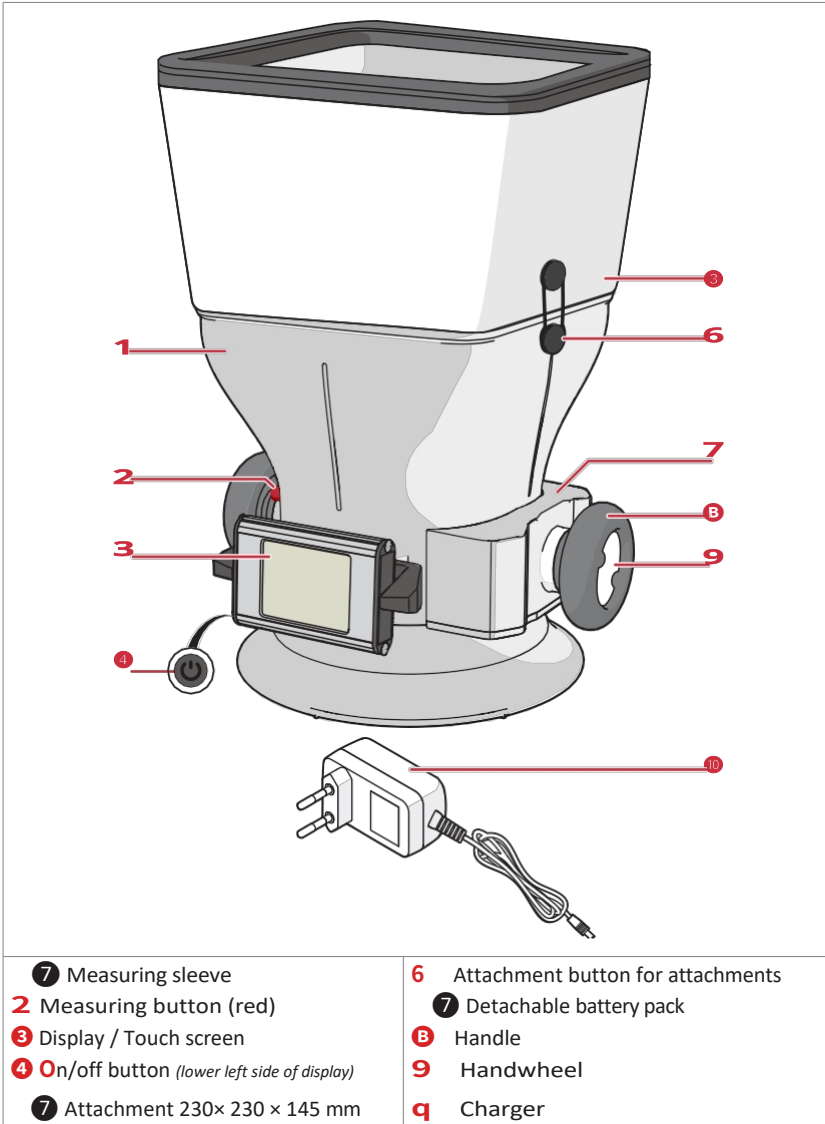
2.2 Operation

Display	Touchscreen
Languages	German, English, French, Dutch
Storage	Internal

2.3 Specifications measurements

Quantity	Units	Measuring range	Measurement uncertainty
Volume flow (with zero pressure compensation)	m ³ /h, l/s, CFM	10 - 850 m ³ /h	± 3% (at 20 °C)
Temperature	°C, °F	-20 - 80 °C	± 0.3 K (at 23 °C)
Air humidity	%	0 - 99,9 %	± 3 % (at 23 °C)
Air pressure	hPa	300 - 1100 hPa	± 1 hPa

2.4 Parts of the FlowFinder-mk2⁺



The FlowFinder-mk2⁺ comes in a case with manual, a test certificate and a charger for the battery.

2.5 Display

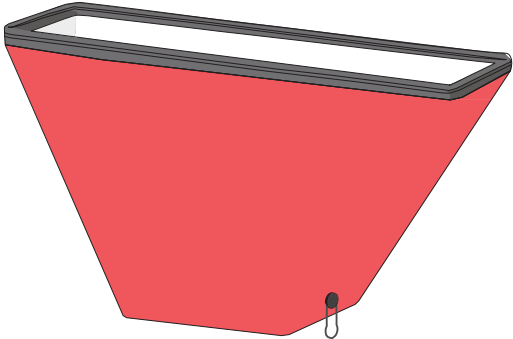
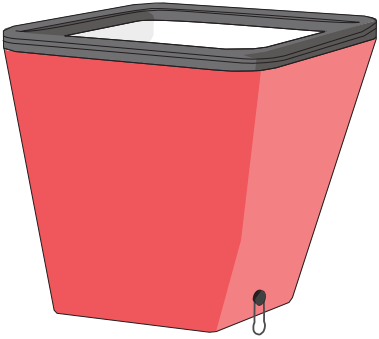
The screenshot shows the main display of the FlowFinder-MK2* device. At the top, the time (14:11) and date (19-03-2024) are displayed. Below this, the measured differential pressure (dP) is 0.0 Pa. The measured volume flow is shown as a green bar (0) and a value (0 m3/h). The measured air pressure (P) is 1015 hPa. The temperature (T) is 22.4 C and the relative humidity (RH) is 53%. A back button is visible in the top right corner. A legend below the display explains the symbols used in the screenshot.

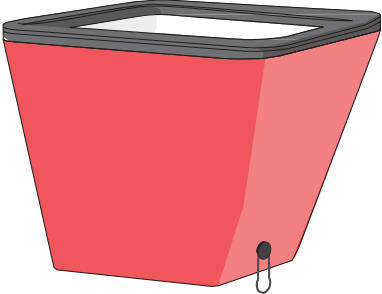
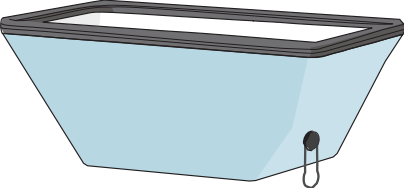
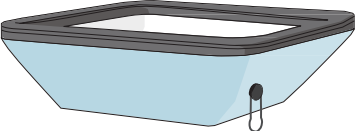
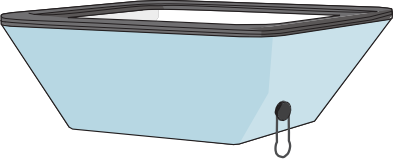
Symbol	Description
7	Date
2	Time
3	Measured differential pressure (in Pascal)
4	Measured volume flow (green bar)
7	Measured volume flow (value)
6	Battery status
7	Back button (to the menus)
B	Temperature (in Celcius or Fahrenheit)
9	Relative humidity (%)
q	Measured air pressure (hPa)

When switching on the FlowFinder, the display of the figure above is shown. This is the default measurement mode set. This display is the same for each mode that can be measured, except for the volume flow (5) this is displayed differently for the different modes.

2.6 Accessories (optional)

To enable measurements over different grids, various attachments are available. attachments are available.

Attachment Model	Opening [mm × mm]	Height [mm]	Article number
 <p data-bbox="356 826 434 847">Foldable</p>	1200 × 280	600	103937
 <p data-bbox="356 1249 434 1270">Foldable</p>	600 × 600	600	103864

Attachment Version	Opening [mm × mm]	Height [mm]	Article number
 <p>Foldable</p>	400 × 400	450	108089
 <p>Transparent</p>	680 × 200	230	106874
 <p>Transparent</p>	400 × 400	150	106551
 <p>Transparent</p>	300 × 200	200	107238

3 SAFETY INSTRUCTIONS FOR USE

3.1 Safety instructions FlowFinder-mk2⁺

⚠ Warning!

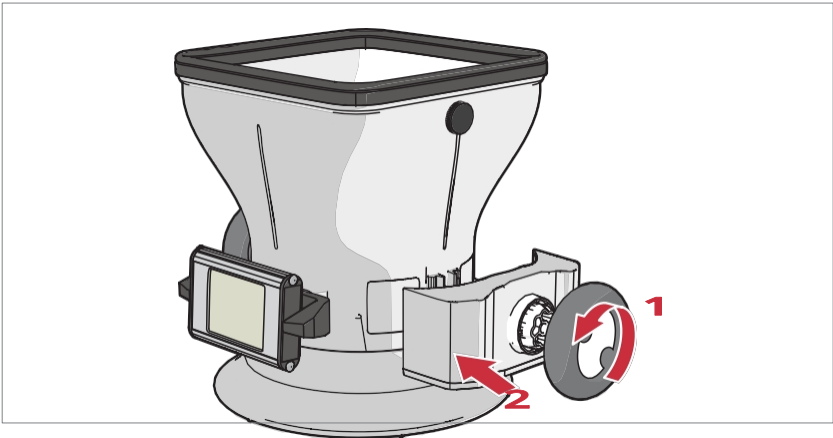
- Make sure you have fully read and understood the instructions in this document before using the instrument. Keep this document for future reference.
- Only use the instrument as described in this document.
- Do not disassemble the instrument! This nullifies the calibration and the warranty lapses.
- Do not use the instrument if any part is damaged or defective. Please contact contact ACIN instrumenten BV.
- Do not lift the instrument by the attachment.
- Do not drop the instrument and avoid impacts.
- Do not expose the instrument to water, moisture or dust.
- Protect the FlowFinder-mk2⁺ as much as possible from construction dust. Do not place the instrument with the measuring side on the ground. This will prevent circles on the measurement spots.
- Keep the measuring side of the FlowFinder-mk2⁺ clean to prevent circles on the measurement spots.
- Disconnect the battery after each use.
- Make sure the battery is (partially) charged when the instrument is not used for long periods of time.
- Switch off the product before cleaning and maintenance.
- Do not use aggressive chemical cleaning agents such as ammonia, acid or acetone when cleaning the product.

4 PREPARATION FOR USE

4.1 Switch on the instrument

First, install the battery. The battery is placed behind the right handlebar. Do this as follows:

- Loosen the handwheel in the right handle counterclockwise.



- Place the battery pack over the holder.

6 Place the battery pack with the charging port facing down. The battery pack only fits one way. Do not force the battery pack.

- Tighten the right handle again. Do this by tightening the handwheel in the right handle clockwise.

Then press the **on/off button** (near the left handle) to turn the instrument on switch on. The instrument starts up in the default measurement mode.

4.2 Using attachments

When measuring supply air, it is always recommended to use an attachment. Exhaust air can be measured without an attachment, provided the volume flow is less than 75 m³/h. This can be useful if there is not enough space to perform the return air measurement with the attachment.

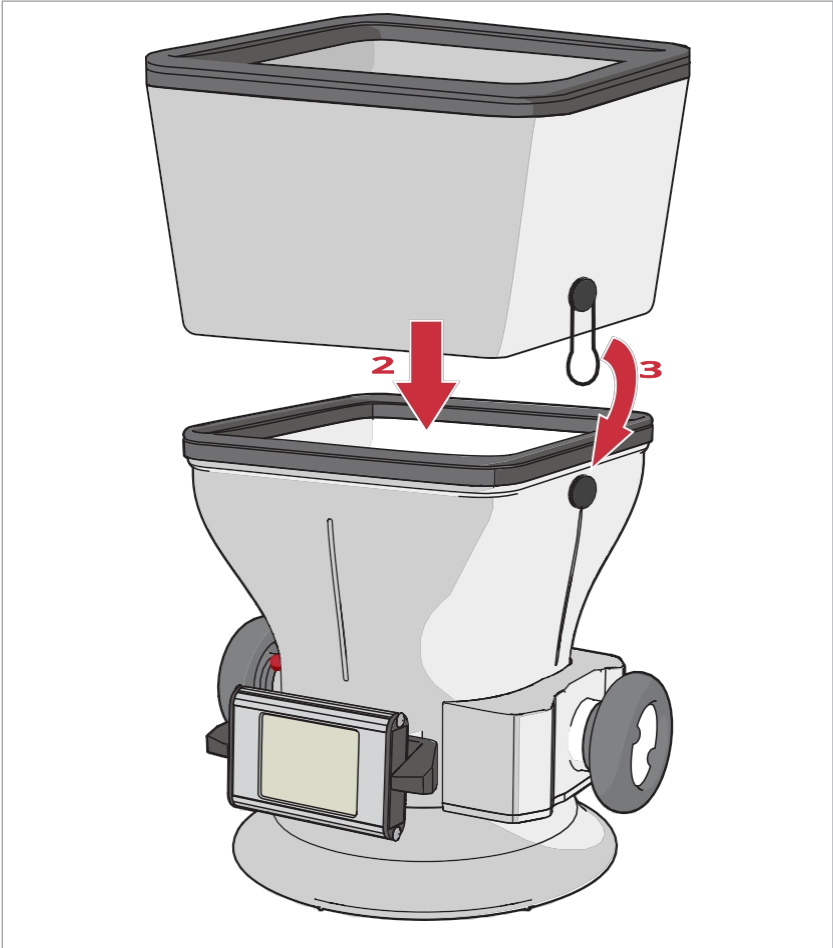
For measuring volume flows up to 175 m³/h, the 230×230×145 mm attachment provided can be used. For measuring volume flows above the 175 m³/h, it is recommended to use one of the higher folding attachments (400×400×450 mm or 600×600×600 mm or 1200×280×600 mm). If, for measurements above 175 m³/h, a lower attachment (230×230×145 mm or one of the transparent attachments) is nevertheless used, the measured values must be corrected according to the table below:

Volume flow	> 175 m ³ /h	> 325 m ³ /h
Discharge	-1,5%	-3,0%
Supply	-3,0%	-4,6%

This correction is necessary because the FlowFinder is calibrated for volume flows greater than 175 m³/h with the higher attachments, as it is assumed that volume flows greater than 175 m³/h will be measured with the higher attachments. If lower attachments are used anyway, this should be corrected because these attachments have a lower resistance.

6 Do not lift the instrument by the attachment.

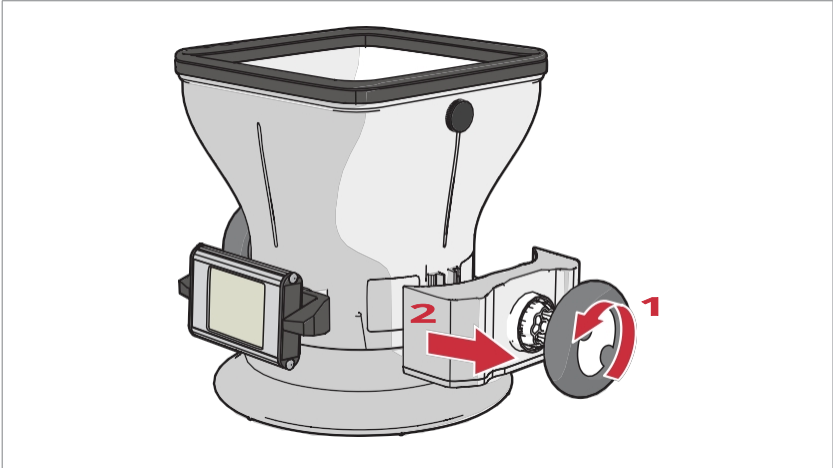
Attach an attachment as follows:



1. Place the instrument on a flat surface with the right side up.
2. Place the desired attachment on the instrument.
3. Tighten the black rubber bands of the attachment around the attachment buttons of the measuring sleeve.

4.3 Charging

If the battery is empty, or if the instrument is stored for several weeks, the battery needs to be charged. Do this as follows:



- Loosen the handwheel in the right handle counterclockwise.
- Remove the battery from the instrument.
- Connect the charger to the battery.
- Plug the charger into a wall socket.

The battery is now charging. Fully charging the empty battery from 0% to 100% takes about 3 hours.

The LED indicator on the adapter shows the status of the battery:

LED colour	Status
Yellow	No battery connected
Red/Orange	Fast charging
Green - Yellow	Battery is almost fully charged
Green	Battery is fully charged
Orange - Green	Error message

4.4 Connecting via Wi-Fi

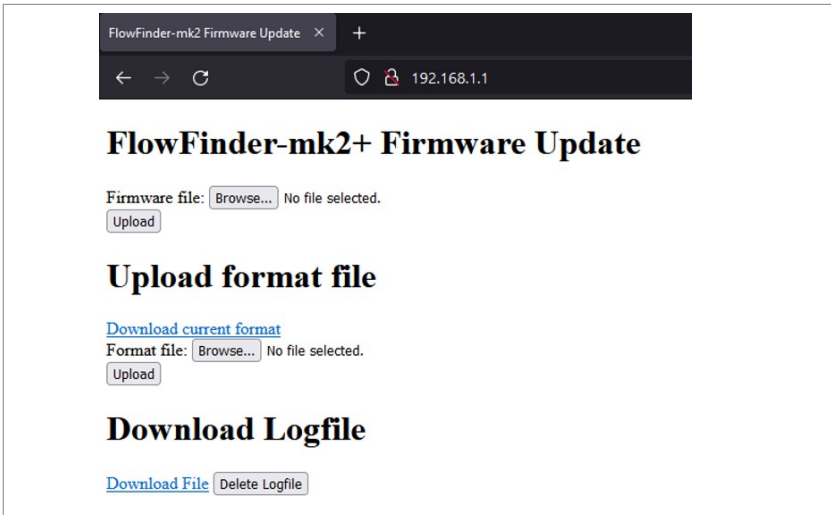
The instrument is equipped with a Wi-Fi router. Via this Wi-Fi connection, the firmware can be updated and measurement results loaded.

- Turn on the instrument.
- Open the Wi-Fi settings on your computer.

The Wi-Fi name of the instrument consists of FlowFinder followed by the serial number of your instrument. For example, FlowFinderSN20000567.

- Select the Wi-Fi of your instrument.
- **Enter 12345678** as the password.
The status right now is 'Check network requirements'. There is no need to wait.
- Open the browser on your computer and go to **192.168.1.1**

You will see the following screen:




- Choose Firmware> Browse... to upload a new firmware file.
- Choose Format file> Browse... to upload the format for the log file. This is the file containing the different spaces.
- Choose *Download logfile* to download the current logfile.


5 METERING

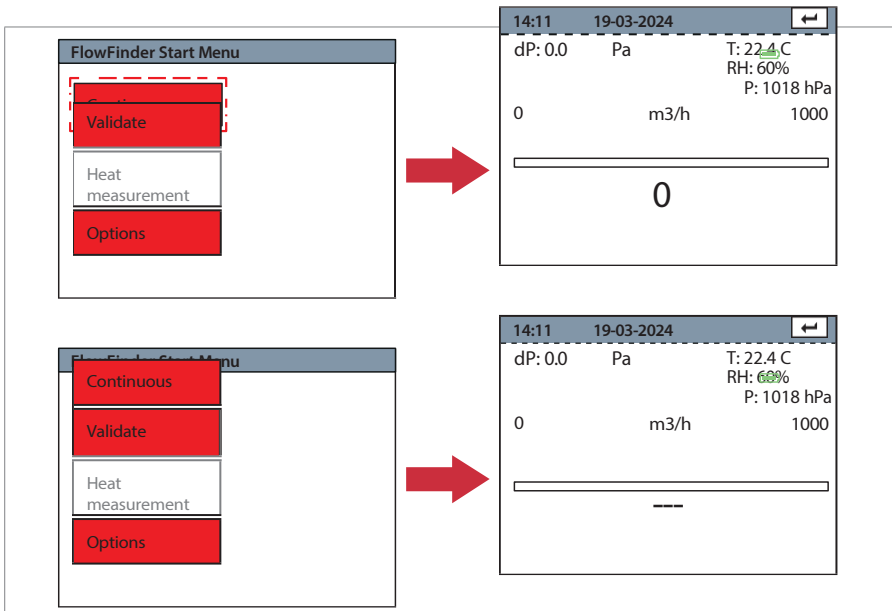
Two measurement methods are possible:

- A measurement in validate mode can be used to perform a measurement perform and save a measurement.
- A measurement in continuous mode can be used to measure volume flow over a somewhat longer period of time. This may be necessary if the system being measured on is self-regulating. This mode can also be used to adjust the valves for small volume flows (< 75 m³/h).

Switching between the two measurement methods:

1. Press the **back button**  at the top right of the screen.
2. Press **Continuous** to select continuous measurement mode.
3. Press **Validate** to select validate measurement mode.

Press the **back button**  at the top right of the screen to change measurement mode.



5.1 Measuring in validate mode

Change labels

In validation mode, measurements can be stored. To identify the measurements later, a label and a timestamp are added. The names of the labels must be determined prior to the measurements and can be modified as follows:

- Switch on the instrument.
- Connect the instrument to a computer via Wi-Fi.
- Click *Download current format* on your computer to download the current format.
- Open the .txt file.

<pre>[Tab1] [Description] Room1 Room2 Room3 Room4 Room5 Room6 Room7 Room8 [Tab2] [Description] Room9 Room10 Room11 Room12 Room13 Room14 Room15 Room16</pre>	<pre>[Tab1] [Building1] Kitchen 1 Kitchen 2 Bathroom Living room Bedroom 1 Bedroom 2 [Tab2] [Building2] Bedroom 1 Bedroom 2 Kitchen 1 Bathroom Living room</pre>
(a)	(b)

a) Default view for completing/assigning labels.

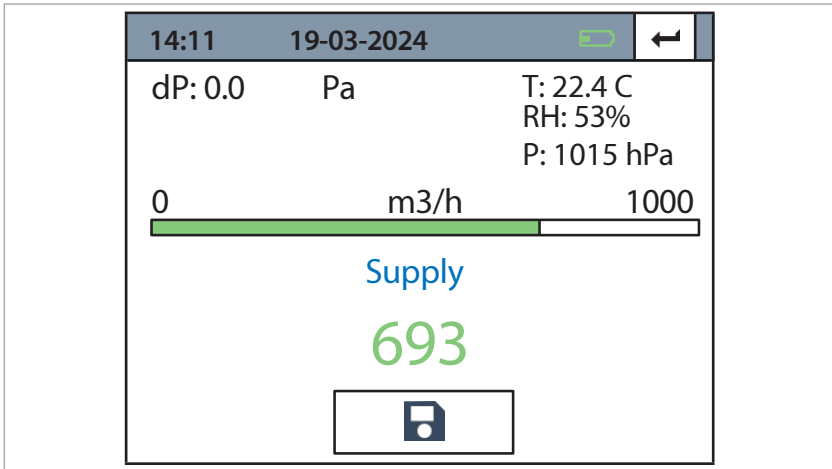
b) Example with labels filled in.

Labels can be added or changed in this file. [Tab...] should not be changed. [Description] can be modified, make sure that there always remain square brackets around this label name. You can also adjust Room1, Room2, etc. to the desired rooms. These may be a maximum of eight rooms per tab, there are a maximum of 6 tabs. Save this file and send it to FlowFinder-mk2+:

- Click *Format file: Browse...* on your computer to choose the file.
- Click *Upload* to send this file to the FlowFinder-mk2+.

Performing a measurement

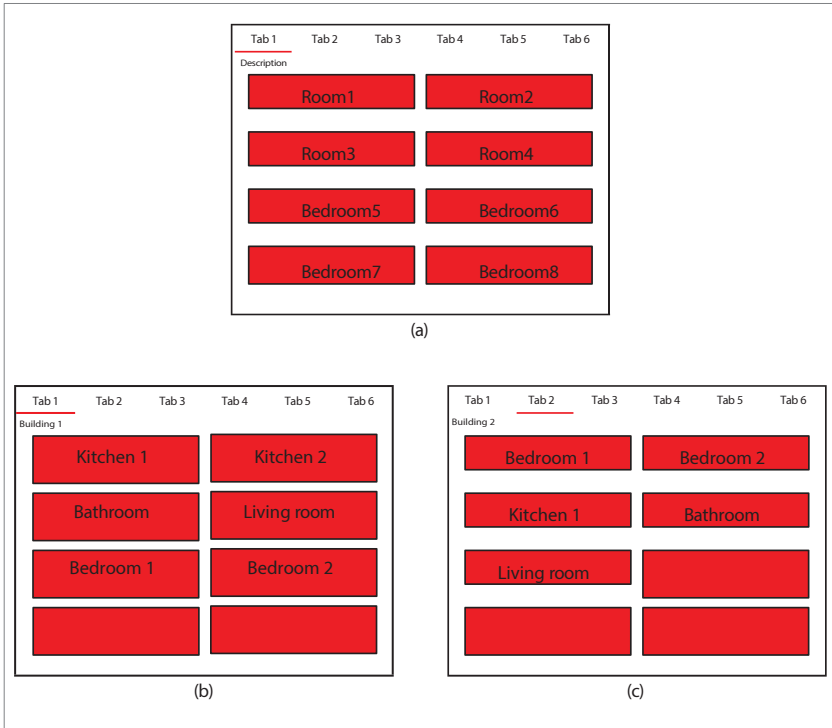
1. Make sure the instrument is switched on.
2. Place the instrument centred on the valve. Apply slight pressure to the instrument to ensure that it fits tightly against the surface.
3. Press the **red button** to start a measurement.



An indication of the progress of the measurement process appears on the screen. This measurement process consists of 2 steps: stabilise and compensate, which are performed immediately one after the other. During compensation, the direction of the air flow is indicated by *Supply* and *Return*. Once the measurement is complete, the measurement result appears on the screen. Usually this takes 10 to 15 seconds. The **SAVE** button also appears.



4. Press the **SAVE** button to save the measurement. The screen displays the saving options as set in the format file.



- (a) Default view for completing/assigning labels.
 (b) Example where the labels are filled in for tab 1.
 (c) Example with the labels filled in for tab 2.

5. Press one of the options.

The measurement is now saved and associated with a label. You can immediately perform a new measurement.

5.2 Measuring in continuous mode

- Make sure the instrument is switched on.
- Place the measuring tube centred over the valve. Apply slight pressure to the instrument to ensure that the tube fits tightly against the surface.
- Press the **red button** to start a measurement.



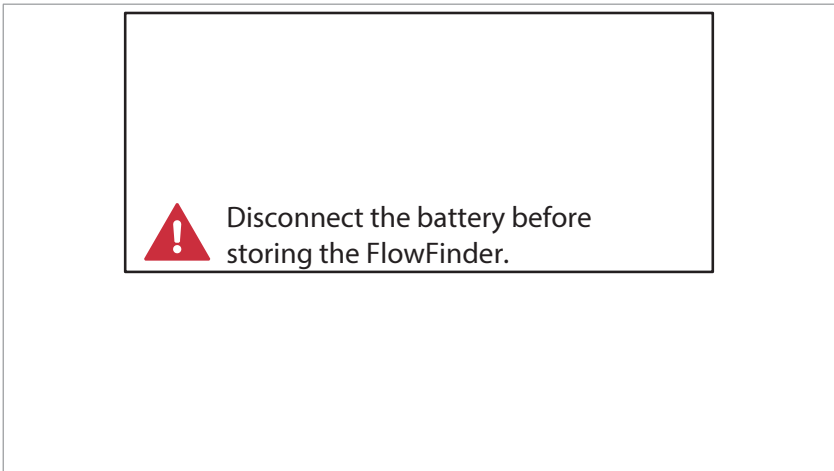
The screen displays the current flow rate. This measurement process consists of 2 steps: stabilise and compensate, which are performed immediately after each other. The figure above shows the display displayed during the measurement process. The measuring process starts with stabilising, which is indicated on the display (example in the third image above). The value is compensated and shown in red on the display (example in the fourth image above). The direction of airflow is indicated by *Supply* and *Return*. When the value is stabilised, the displayed flow rate turns green (example in the fifth screen in the image above). The instrument continuously compensates the pressure to 0 Pa in this mode.

- Press the **red button** to stop the measurement.
- 4 The measurement value is now black in colour (example in the sixth image above).
- 4 Always stop the measurement when moving to the next valve.

5.3 Switching off the instrument

Press and hold the **power button** to switch off the instrument. The display will show the text "Disconnect the battery before storing the FlowFinder." is displayed. An example of what appears on the display when the instrument is switched off is shown in the image below. The screen turns black after a few seconds, this indicates that the instrument has been switched off correctly.

Now remove the battery and charge the battery if necessary.



6 TRANSFER MEASUREMENTS

6.1 Send measurements to a computer/tablet/smartphone

- Make sure the instrument is switched on.
- Connect the instrument to a computer via Wi-Fi, see section 4.4.
- Click *Download File* to download the current log file containing the measurements download.

The log file (.txt) **c o n t a i n s** the following values: date(yyyy-mm-dd); time(hh:mm:ss); tab name; room name; flow rate; flow rate unit; direction (supply or exhaust); temperature; temperature unit; humidity; humidity unit; barometer; barometer unit

Example:

```
2023-12-15;10:01:17;Building 1;Kitchen 1;155;m3/h;Supply;23.0;C;42;%;1031;hPa
2023-12-15;10:01:59;Building 1;Kitchen 2;152;m3/h;Supply;23.0;C;46;%;1035;hPa
2023-12-15;10:02:40;Building 1;Bathroom;156;m3/h;Supply;23.0;C;44;%;1033;hPa
2023-12-15;10:03:34;Building 1;Living room;142;m3/h;Supply;23.0;C;42;%;1031;hPa
2023-12-15;10:04:16;Building 1;Bedroom 1;140;m3/h;Supply;23.0;C;43;%;1032;hPa
2023-12-15;10:04:58;Building 1;Bedroom 2;145;m3/h;Supply;23.0;C;44;%;1033;hPa
```

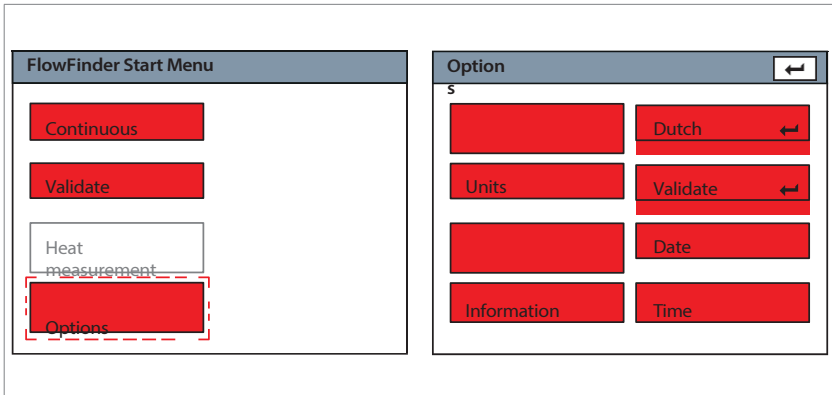
6.2 Import measurements into Excel

- Open the log file in Excel.
- Select the entire column A.
- At the top of the screen, click *Data*.
- In the data menu, click *Text to columns*.
- In the Text to Columns wizard, select *Separated* and click *Next*.
- Under separators, select *Semicolon* and click *Finish*. The data is now in columns.



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	15-12-2023	10:01:17	Building 1	Kitchen 1	155	m ³ /h	Supply	23.0	C	42 %	1031	hPa	
2	15-12-2023	10:01:59	Building 1	Kitchen 2	152	m ³ /h	Supply	23.0	C	46 %	1035	hPa	
3	15-12-2023	10:02:40	Building 1	Bathroom	156	m ³ /h	Supply	23.0	C	44 %	1033	hPa	
4	15-12-2023	10:03:34	Building 1	Living room	142	m ³ /h	Supply	23.0	C	42 %	1031	hPa	
5	15-12-2023	10:04:16	Building 1	Bedroom 1	140	m ³ /h	Supply	23.0	C	43 %	1032	hPa	
6	15-12-2023	10:04:58	Building 1	Bedroom 2	145	m ³ /h	Supply	23.0	C	44 %	1033	hPa	

7 CHANGE SETTINGS



- 4 If settings are changed in the Options menu, they remain changed even when the instrument has been switched off in between.
- 4 The image below is reasoned from the measurement screen.





7.1 Change default mode

- Press the **back button**  at the top right of the display.
- Press **Options**.
- Press the **Validate/Continuous** button to change the default mode.
- Press the **back button**  to return to the start menu.
- Press the **Continuous** or **Validate** button to return to the measurement screen.




7.2 Setting units

- Press the **back button**  at the top right of the display.
- Press **Options**.
- Press the **Units** button to open the units menu.
- Press the button with **Fahrenheit/Celsius** to change the temperature unit.
- Press the button with **m³/h / l/s / CFM** to change the volume flow unit.
- Press the **back button**  to return to the start menu.
- Press the **Continuous** or **Validate** button to return to the measurement screen.

7.3 Changing the language

- Press the back **button**  at the top right of the display.
- Press **Options**.
- Press the **language** button to change the language.
- Press the **back button**  to return to the start menu.
- Press the **Continuous** or **Validate** button to return to the measurement screen.

7.4 Change date and time

- Press the **back button**  at the top right of the display.
- Press **Options**.
- Press the **Date / Time** button to change the date or time.
- A menu opens where you can set the date or time. Set the date or time set.
- Press the **back button**  to return to the options menu.
- Press the **back button**  to return to the start menu.
- Press the **Continuous** or **Validate** button to return to the measurement screen.

8 STORAGE

1. If the instrument is not going to be used for an extended period of time:
 - a. Charge the battery (see chapter 4.1).
 - b. Place the battery pack at the bottom of the case.
3. Place the small attachment upside down over the instrument.
4. Place the instrument with the small attachment in the case with the display facing up.
5. If the display is tilted, turn the display to horizontal position.
- 4 The lid contains rubber bands behind which paperwork can be stored.
6. Carefully close the lid.
- 6 Never close the lid if you feel resistance. First fix the cause of the resistance.
7. Close both closures.

9 MAINTENANCE

- 6 **Warning!** Switch off the product before cleaning and maintenance.
- 6 **Warning!** Do not use aggressive chemical cleaning agents such as ammonia, acid or acetone when cleaning the product.
- 6 **Warning!** Do not disassemble the instrument! This nullifies the calibration.

Clean the instrument regularly with a soft, clean, dry cloth. Blow clean the inside regularly, or vacuum the dust off with a Hoover. Avoid abrasives that may damage the surface. The casing of the FlowFinder can be wiped down with a damp cloth.

10 CALIBRATION

The FlowFinder-mk2⁺ is calibrated when you receive the instrument. The calibration may change over time. The frequency with which the FlowFinder should be calibrated depends on the frequency of use of the FlowFinder. With frequent use of the FlowFinder, annual calibration is recommended. With less frequent use, it is recommended to have the FlowFinder calibrated at least every 2 years. You can always seek advice from ACIN. Please contact ACIN instruments BV (info@acin.nl).

10.1 Calibration certificate and Accreditation

The calibration certificate bears the logo below confirming that the calibration of the FlowFinder is performed by ACIN under its accreditation (registration number K186), granted by Dutch accreditation body, The Dutch Accreditation Council.



10.2 Accreditation standard

This accreditation is based on the requirements of EN ISO/IEC 17025:2017, the international standard for the competence of laboratories performing testing and calibration.

10.3 ILAC Mutual Recognition Arrangement (MRA) and International Recognition

The ILAC Mutual Recognition Arrangement (MRA) ensures that the results of accredited laboratories, such as those of ACIN, are internationally recognised. Governments and regulatory authorities worldwide accept the results of conformity assessment bodies covered by this agreement.

10.4 Scope of Accreditation

The scope of accreditation describes which specific calibration services are covered by our accreditation:

HCS code	Measurement quantity, Instrument, Measurement	Measuring range	CMC ¹	Remarks	Location
PV 00	Pressure and vacuum				
PV 12	Gauge pressure	0 Pa - 5890 Pa	0,25 Pa - 0,6 Pa		RWK
FG 10	Flow of gas				
FG 11	Gas flow rate	10 m ³ /h - 1400 m ³ /h	0.04· Q m ⁽³⁾ /h, with a minimum of 3 m ³ /h	Q = volume flow rate offered, supply and extract air	RWK

11 WARRANTY

The manufacturer's warranty on the FlowFinder-mk2⁺ is 12 months. Any modifications to the product will invalidate the warranty. We accept no liability for damage caused by improper use of the product.

¹ CMC: Calibration and Measurement Capacity

12 DISCLAIMER

Designs and specifications are subject to change without notice. All logos, brands and product names are trademarks or registered trademarks of their respective owners and are hereby acknowledged as such.

13 DISCLAIMER



This symbol indicates that this product must not be disposed of with other household waste throughout the EU. To prevent possible damage to the environment or human health from uncontrolled disposal of waste, you are responsible for recycling to promote the sustainable reuse of raw materials.

14 DECLARATION OF CONFORMITY

We, ACIN instruments BV, as the manufacturer, declare that our product FlowFinder-mk2⁺ manufactured in the Netherlands, has been tested in accordance with all relevant CE standards and -regulations and that all tests have been successfully passed. This includes, but is not limited to, the RED 2014/53/EU directive.

15 CONTACT

If you wish to send the FlowFinder-mk2⁺ to us for calibration or repair please contact us first for an appointment.

Please see the back page of this manual for contact details.

APPENDIX I: USER INFORMATION

Model	FlowFinder-mk2 ⁺
Serial number FlowFinder-mk2 ⁺	
Battery serial number	
Date	
Delivered to	
Contact person	
Department	
Address	
Postal code	
Country	
Telephone	
E-mail address	

Last calibration	Initials	Remarks	Next calibration

ACIN Instruments BV

Contact details

T: 070 3070703

E: info@acin.nl

Visiting address

Handelskade 76

2288 BG Rijswijk

Deliver/collect goods De

Bruyn Kopsstraat 5 2288EC

Rijswijk