

DBM610

AIRFLOW METER



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1. Introduction

DBM610 airflow meter allows **control and balancing** of airflow in air conditioning system. Thanks to the interchangeable **hoods**, the airflow can be used on any type of grids or diffusers in air supply or exhaust. Easy to handle, lightweight, it allows **accurate, sturdy and fast measurements**.

It is supplied in standard with a **610 x 610 mm** hood. Four other dimensions are available as options :

- 1020 x 1020 mm
- 720 x 720 mm
- 720 x 1320 mm
- 420 x 1520 mm

These hoods are airtight and have a transparent part on each side, allowing the user to see through the vent and ensure that the hood is in a good position. The rods, made of fiberglass, provide a sturdiness of hoods.

The measurement grid, attached to the base, allows the measurement through **48 points** all over the surface of the grid. Measurement is performed using a **differential pressure sensor**, calibrated and compensated in atmospheric pressure and temperature.

The measuring unit of the airflow meter, removable, can be used as a micromanometer.

Real addition to airflow measurement, this instrument allows, by connecting a Pitot tube, to measure airflow velocity in air duct or, by connecting two silicone tubes, to check filter fouling of air station.

1.1. Key points

- Measuring range from **40 to 3500 m³/h**
- **Quick and simple** hood changes
- Software for data processing on computer (datalogger 10)
- Sturdy, lightweight and easy to handle
- **Removable** measuring unit
- **Interchangeable** hoods

1.2. Technical features

- Airflow :

Measuring range	from 40 to +3500 m ³ /h
Accuracy	3% of measuring ±10 m ³ /h
Resolution	1 m ³ /h
- Temperature (on the base)

Measuring range	from 0 to 50 °C
Accuracy	2% of measuring ±0.1 °C
Resolution	0.1°C
- Thermocouple Temperature (on the micromanometer)

Thermocouple type	K, J, T, S
Measuring range	K : from -200 to 1300°C J : from -100 to 750°C T : from -200 to 400°C S : from 0 to 1760°C
Resolution	K : ±1,1°C or ±0,4% of reading value J : ±0,8°C or ±0,4% of reading value T : ±0,5°C or ±0,4% of reading value S : ±1°C or 0,4% of reading value
- Pressure :

Measuring range	from -2500 to +2500 Pa
Accuracy	±0,2% of measuring ±2Pa
Resolution	from 0.01 to 0.1 Pa

1.3. General technical features

Display

Large graphic back-lighted LCD

Sizes : 86 x 51 mm

Connectors

ABS connectors, Ø 7 x 4 mm

Housing

Shock-proof made of ABS, IP54 protection

Keypad

12 keys

Conformity

Electromagnetic compatibility (NF EN 61326-1 guideline)

Power supply

4 alkaline batteries LR6 - Rechargeable battery Li-ion, 3.7 V 4400 mAh (optional)

Environment

Neutral gases

Operating temperature

From 0 to +60 °C

Storage temperature

From -20 to +70 °C

Auto shut-off

Adjustable from 0 to 120 min

Weight

3600 g

Languages

French, English

2. Presentation of airflow meter

2.1. Base

- Outside of the base :



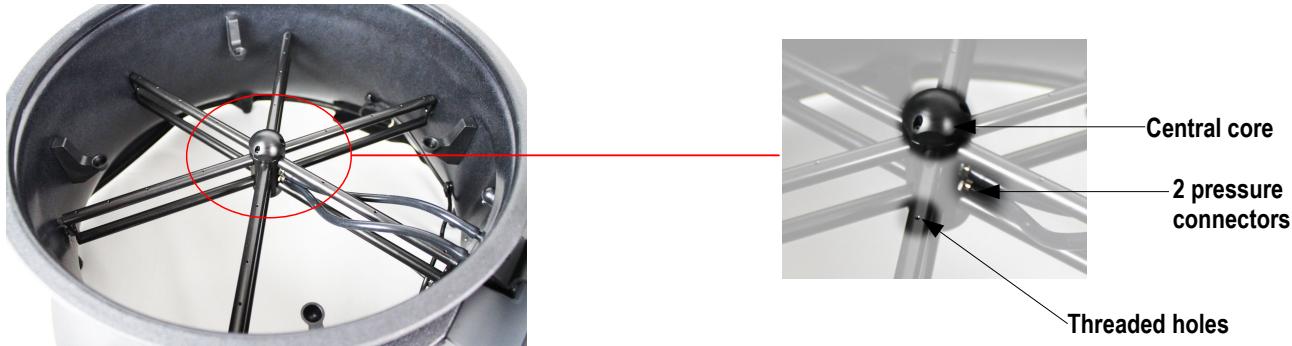
- Inside the base :



2.2. Grid

The measurement grid is fixed to the base in 6 points and is made up of the following elements :

- 1 core made up of two chambers (for total pressure and for static pressure)
- 12 tubes tapped of 4 holes
- 2 pressure connectors



The measurement grid allows to measure differential pressure. It takes into account atmospheric pressure and temperature compensation and works automatically in supply or exhaust.

2.3. Electronic housing

Features :

- Shock-proof made of ABS
- IP54 protection
- Large graphic back-lighted LCD (86 x 51 mm)
- Auto shut-off adjustable from 0 to 120 min
- Manual or automatic autozero
- Removable housing for micromanometer function



- 4 magnets at the back allow the mounting on the base (airflow meter mode)
- 2 pressure plugs allow to set the housing on the base and the connection of silicone tube for the measurement with a Pitot tube
- 1 thermocouple plug on the top of the housing (micromanometer mode)



2.3.1. Airflow meter mode

In airflow meter mode, the device has following functions :

- Simultaneous display of airflow, pressure and temperature
- Automatic airflow direction (supply or exhaust)
- Automatic average and point by point average
- HOLD function (measurement is fixed)
- USB interface for PC operation
- Languages choice



2.3.2. Micromanometer mode

In micromanometer mode, the device has following functions :

- Measurement of air velocity with Pitot tube S, L or Debimo blades
- Measurement of thermocouple temperature
- Automatic average and point by point average
- HOLD function (measurement is fixed)
- USB interface for PC operation
- Languages choice



2.3.3. Power supply of electronic housing

The airflow meter is supplied in standard with 4 batteries type AA LR6 1.5V. Rechargeable batteries and Li-Ion battery are available as options.

To replace batteries (rechargeable or not) :

- Remove the batteries cover then used batteries.
- Disconnect the batteries support.
- Replace batteries then reconnect the support.
- Replace the batteries cover.

To put the Li-Ion battery (optional) :

- Remove the batteries cover then the batteries support.
- Connect the battery.
- Replace the batteries cover.

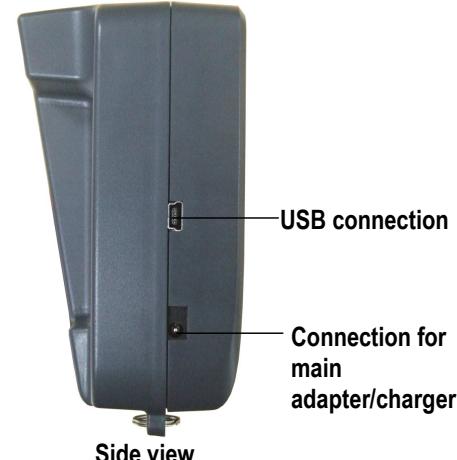


Respect the connections (see below).



Connection for LR6 batteries support (rechargeable or not)

Connection for Li-Ion battery



USB connection

Connection for main adapter/charger

To load the device :

- If the device is on Li-Ion battery : connect the main adapter/charger on the side of the device
- If the device is on rechargeable batteries : remove batteries load them an external charger

It is also possible to load the electronic housing with the main adapter/charger supplied with Li-Ion battery.

2.4. Hoods



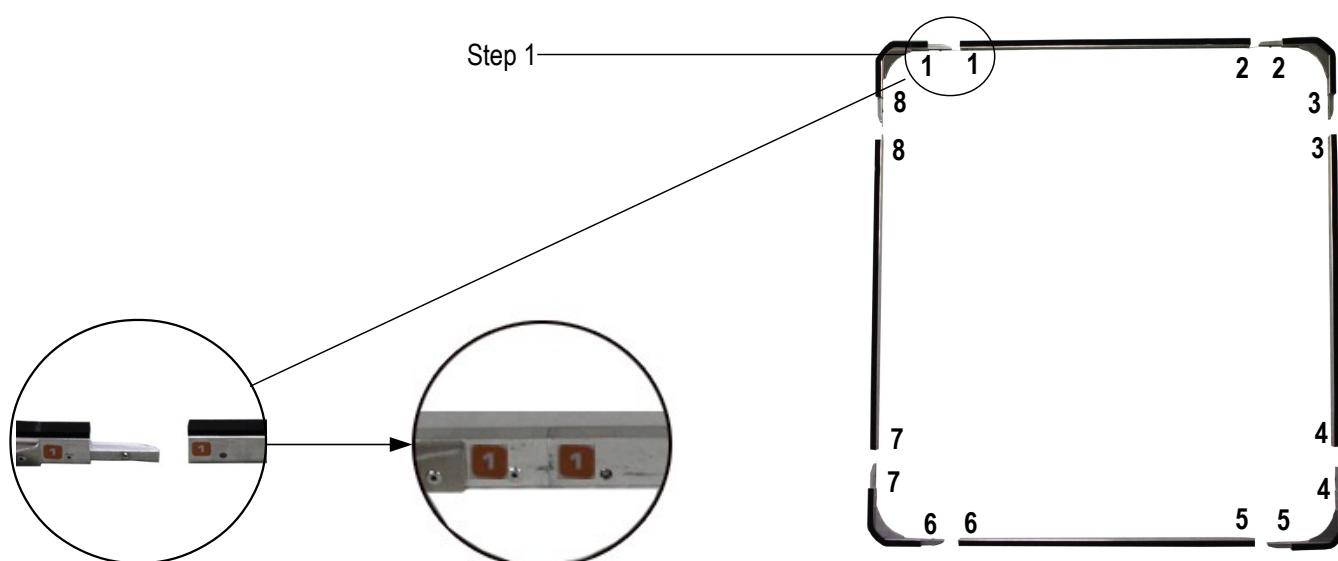
3. Mounting the airflow meter

3.1. Mounting of frame

To mount the different optional frames of airflow meter, just fit together the elements of the frame.

Stickers numbered from 1 to 8 are stuck on each end of the elements :

Example with 720 x 720 mm frame :



3.2. Setting of the cloth

Before set the cloth on the frame, frame must be mounted.

- First, insert a corner of the frame inside a corner of the cloth.
- Insert the opposite corner of the frame in the corresponding corner of the cloth.
The color mark must be in the middle of the frame side. (1).
- Press on the corresponding side of the cloth to put it in the rail of the frame.
- Proceed the same way for the rest of the cloth.

When the cloth is fixed on the frame :

- Place the cloth on the base.
The mark on the cloth and the Velcro tape are opposed to the carrying handle of the base.
- Put the elastic of the cloth around the DBM base.
- Tighten the Velcro tape of the cloth on the base.
- If necessary, turn the cloth to match the mark of the cloth with the mark on the base.



Cloth on the base



Elastic to be set around the base



Zoom on the back of the base with tightened Velcro tape



Zoom on elastic of the cloth around the base



Mark on the cloth

Mark on the base

3.3. Setting of rods

- Place the 4 holding rods inside the hood.
- Take a rod and insert the rounded end of the rod in the reception holding cup of the base.
- Slightly bend the rod and insert the flat end of the rod on the opposite corner of the holding cup.
- Proceed the same way for the three other rods.



Rounded end in the holding cup



Flat end in the opposite corner

Note :

- The airflow meter has 4 rods. Some of them have extensions (airflow meters of 1020 x 1020, 720 x 1320 and 420 x 1520 dimensions). It is necessary to put the extensions on each rod before put them in the device.
- Rods are placed face-to-face ; they intersect only on the following sides : housing side and cloth mark side.

4. Using DBM610 in airflow meter mode

4.1. Starting up

When the airflow meter is correctly set and the housing mounted on the base, press **On/Off** button :

The device directly displays the data below (see photo) :

- airflow
- delta pressure
- temperature



The solenoid valve is active and flaps every second.

4.2. Configure the airflow meter

- Press "Menu" button.
- Press "Left arrow" or "Right arrow" key until reach "Configuration".
- Press "Ok" button.

The sub-menu "Configuration" appears with following data :

- **Correction coefficient** : allows to set the correction coefficient
- **Units** : allows to set unit for airflow, pressure and temperature
- **Damping** : allows to smooth the measurement and avoid unwanted
- **Standard airflow** : allows to activate or not the standardized airflow as per DIN1343 standard

4.2.1. Set the correction coefficient

- Go to "Correction coef" line then press **OK** button.
- Select the required correction coefficient with up and down arrows then press **OK**.
Screen displays the selected coefficient. It is possible to modify it with arrow keys.
- Press **OK** to validate and back to "Configuration" menu.

4.2.2. Set measurement units

- Go to " Unit " line then press **OK** key.
- Go to the required line (airflow, temperature or pressure) then press **OK**.
- Select unit with up and down arrows then press **OK**.

Available units are :

- **Airflow** : m³/h, L/s, cfm
- **Pressure** : Pa, mmH₂O, mmHg, inWg
- **Temperature** : °C, °F

- Press **Esc** to quit " Units " sub-menu and back to " Configurations " menu.

4.2.3. Set a damping

- Go to " Damping " line then press **OK**.
- Select the required coefficient (from 0 to 9) then press **OK**.

4.2.4. Activate or deactivate standardized airflow

The standardized airflow allows to have a calculation of airflow as per DIN 1343 standard.

- Go to " Standard airflow" then press **OK**.
- Select **ON** or **OFF** with up and down arrows then press **OK**.

When standardized airflow is activated, " NORMO " indication is shown on screen on the left of time.

4.3. Perform averages

During measurement, it is possible to perform an automatic average.

- Press " **Moy/Avg** " button.
- Press **OK** or the red button on the right of the base to launch measurement.
Measurement duration appears at the lower right of the screen.
- Press **OK** or the red button on the right of the base to display the results when required measurement duration is reached.
- Press up and down arrows to get to results of the different parameters.
Screen displays results on two columns :
 - *1st column : measurement results*
 - *2nd column : results average ; here, values will be the same in both columns.*
- Press **OK** or the red button on the right of the base to go to measurement screen.
- Press **OK** again or the red button on the right of the base to launch a new measurement.
- Press **OK** again or the red button on the right of the base to display results when required measurement duration is reached.
- Press up and down arrows to get to results of the different parameters.
Screen displays results on two columns :
 - *1st column : measurement results*
 - *2nd column : results average of the 1st point and 2nd point and airflow aggregate.*

During measurement :

- Press " **Esc** " to cancel and back to measurement screen.

On measurement screen :

- Press " **Esc** " to cancel and not include these results. It will be possible to launch a new measurement.
- Press " **Save** " to save results.

5. Using DBM610 in micromanometer mode

5.1. Starting up

The device is disconnected from airflow meter base.

- Press **On/Off** button.

The device directly displays data below (see photo) :

- **Airflow**
- **Air velocity**
- **Pressure delta**
- **Temperature compensation**
- **Type of airflow sensor used and size of the surface**

4%	10:41:26
Airflow	19m ³ /h
Air Velo	0.2m/s
ΔP	0.032Pa
T°Comp	20.0 °C
S Pitot	
LxW : 168 x 162 mm	

5.2. Set the micromanometer

- Press " **Menu** " button.
- Press " **Left arrow** " or " **Right arrow** " button until reach " **Configuration** ".
- Press " **Ok** " button.

*The sub-menu " **Configuration** " appears with following data :*

- **Airflow sensor** : allows to select the airflow sensor used for the measurement : Pitot tube L, S, Debimo blade or Coefficient
- **Surface** : allows to define the of surface and its size
- **Units** : allows to define unit for airflow, air velocity, pressure and temperature
- **Damping** : allows to smooth the measurement and avoid unwanted variations
- **Solenoid valve** : allows to activate or not the solenoid valve
- **Thermocouple** : allows to set the thermocouple type : K, J, T ou S
- **Temp Compen** : allows to set the compensation temperature
- **Standard airflow** : allows to activate or not the standardized airflow as per DIN1343 standard

5.2.1. Select the airflow sensor

- Go to " **Airflow sensor** " line then press **OK**.
- Press **OK** on the " **Element** ".
- Select the airflow sensor (Pitot tube L, Pitot tube S, Debimo blade or Coefficient) with up arrow and down arrow then press **OK**.

It is also possible to select the corresponding coefficient to the airflow sensor :

- Go to " **Airflow sensor** " line then press **OK**.
- Press **OK** on the " **Coefficient** ".
- Select the coefficient from 0 to 9 with up arrow and down arrow then press **OK**.
Screen displays the required coefficient. It is possible to modify it with arrow buttons.
- Press **OK** to back to " **Airflow sensor** " sub-menu .
- Press **Esc** to quit " **Airflow sensor** " sub-menu and back to " **Configurations** " menu.

5.2.2. Set the surface

Set length and width of the surface :

- Go to " **Surface** " and press **OK**.
- Go to " **Type** " line then press **OK**.
- Press **OK** on **LxI** line.
- Select the required dimensions with up and down arrows then press **OK**.
- If necessary, modify the length then the width with arrows then press **OK** (if no modification, just press **OK**).

Set diameter of the surface :

- Go to " **Surface** " then press **OK**.
- Go to " **Type** " line then press **OK**.
- Press **OK** on **Diameter** line.
- Select the required dimension with up and down arrows then press **OK**.
- If necessary, modify the diameter with arrows then press **OK** (if no modification, just press **OK**).

Set surface unit :

- Go to " **Surface** " then press **OK**.
- Go to " **Type** " line then press **OK**.
- Press **OK** on **Unit** line.
- Select the unit (mm or in) with arrows then press **OK**.

Set K factor :

- Go to " **Surface** " then press **OK**.
- Go to " **K factor** " line then press **OK**.
- Select the K factor with up and down arrows then press **OK**.
- If necessary, modify the value of K factor with arrows then press **OK** (if no modification, just press **OK**).
- Press **Esc** to quit " **Surface** " sub-menu and back to " **Configurations** " menu.

5.2.3. Set measurement units

- Go to " **Units** " line then press **OK**.
- Go to the required line (airflow, air velocity, pressure or temperature) then press **OK**.

Available units are :

- **Airflow** : m³/h, L/s, cfm
- **Air velocity** : m/s, fpm, km/h, mph
- **Pressure** : Pa, mmH₂O, mmHg, inWg
- **Temperature** : °C, °F

- Press **Esc** to quit " **Units** " sub-menu and back " **Configurations** " menu.

5.2.4. Set a damping

- Go to " **Damping** " line then press **OK**.
- Select the required coefficient (from 0 to 9) then press **OK**.

5.2.5. Activate or deactivate the solenoid valve

- Go to " **Solenoid valve** " line then press **OK**.
- Select **ON** or **OFF** with up and down arrows then press **OK**.

5.2.6. Set the thermocouple type

- Go to " **Thermocouple** " line then press **OK**.
- Select thermocouple type : K, J, T or S with up and down arrows then press **OK**.

5.2.7. Set the compensation temperature

- Go to " **Temp Compens** " line then press **OK**.
- Set the temperature with arrows then press **OK**. This temperature must be between -20 and 80°C.

5.2.8. Activate or deactivate the standardized airflow

The standardized airflow allows to have a calculation of airflow as per DIN 1343 standard.

- Go to " **Standard airflow** " line then press **OK**.
- Select **ON** or **OFF** with up and down arrows then press **OK**.

*When standardized airflow is activated, " **NORMO** " indication is shown on screen on the left of time.*

5.3. Activate or deactivate air velocity and airflow

It is possible to activate or deactivate measurement in air velocity and/or airflow.

- Press " **Menu** " button.
- Go to " **Measurement** " with left and right arrows then press **OK**.
- Go to " **Airflow** " or " **Air velocity** " then press **OK**.
- Select **ON** or **OFF** then press **OK**.

5.4. Perform averages

The micromanometer can perform 3 types of averages : automatic average, point/point average and automatic point/point average.

- Press " **Moy/Avg** " button.
- Select the type of required average then press **OK**.

5.4.1. Automatic average

This function allows the calculation of the average value measured by the device in a selected time interval.

*First, select " **Auto average** ", the device displays measurement screen.*

- Press **OK** to launch measurement.
The device displays measured values and measurement duration.
- Press **OK** to stop measurements and get results.
- Press up and down arrows to get to results of different parameters.
- Press " **Save** " button to save dataset or **Esc** to cancel and back to measurement screen.

5.4.2. Point/point average

This function allows the calculation of the average between different measurement points selected by the user.

*First, select " **Pt/Pt average** ", the device displays measurement screen.*

- Press **OK** to validate the 1st point.
The device displays measured values and the number of measurement points.
- Press **OK** to add measurement points.
- Press " **Moy/Avg** " button to get to screen results when the required number measurement points has been reached.
- Press up and down arrows to get to results of different parameters.
- Press " **Save** " button to save dataset or **Esc** to cancel and back to measurement screen.

5.4.3. Point/point automatic average

This function allows the calculation of average value of different measurement points which are calculated on a given duration. It is necessary to give the duration while each point will be calculated.

*First, select " **Auto Pt/Pt average** ", the device displays measurement screen.*

- Press **OK** to validate the 1st point.
- Enter the duration in minute and second with arrows then press **OK**.
- Press **OK** to launch the measurement of the 1st point.
The device displays measurements and the remaining measurement duration.
- Press **OK** to add measurement points.
- Press " **Moy/Avg** " button to get to screen results when the required number measurement points has been reached.
- Press up and down arrows to get to results of different parameters.
- Press " **Save** " button to save dataset or **Esc** to cancel and back to measurement screen.

5.5. Perform an autozero

The autozero allows to offset from time to time any drift of the sensitive element during time by a manual adjustment of the zero. The autozero is made automatically when the solenoid valve is activated.

- Press "Zero" button during measurement.

6. Manage dataset recordings

This part allows to display or delete recorded dataset in the device.

To get to dataset from "Measurement" screen :

- Press "Menu" or "Save" button.
- Go to "Savings" with left and right arrows.
- Press OK.

6.1. Get to recorded datasets

- Go to "Display" line then press OK.
Dataset list is displayed.
- Go to the required dataset then press OK.
Dataset opens with following features :
 - Number of points
 - Dataset type
 - Date and time of beginning and end
- Press OK to display values.
Values table opens.
- Use left and right arrows to change of page.
- Use up and down arrows to change parameters.
- Press Esc to back to the recorded dataset list.

6.2. Delete recorded datasets

- Press "Delete" line then press OK.
A message is displayed asking to all erase.
- Press OK to all erase or Esc to cancel.



Totality of recordings will be definitively deleted

7. Set the device

This part allows to set the different general parameters of the device.

- Go to "Menu".
- Go to "Settings" with left and right arrows.
- Press OK.

7.1. Set date and time

- Go to "Date/Time" line then press OK.
- Set date and time with arrows.
- Press OK to validate and back to "Settings" sub-menu.

7.2. Set language

- Go to "Languages" line then press OK.
- Select the required language (French or English) with up and down arrows.

- Press **OK** to validate.

7.3. Set automatic shut-off

- Go to " **Extinction** " line then press **OK**.
- Select **OFF** to deactivate it or the time before automatic shut-off (15, 30, 45 min or 1h).
- Press **OK** to validate.

7.4. Set brightness

- Go to " **brightness** " line then press **OK**.
- Select the required level of brightness (from 1 to 9 or AUTO) with up and down arrows.
- Press **OK** to validate.

7.5. Set contrast

- Go to " **Contrast** " line then press **OK**.
- Select the required level of contrast (from 0 to 3) with up and down arrows.
- Press **OK** to validate.

7.6. Activate or deactivate beep

- Go to " **Beep** " line then press **OK**.
- Select **ON** to activate or **OFF** to deactivate beep of the keyboard of device
- Press **OK** to validate.

8. Information about the device

This part allows to have any information about identification, calibration and after sales service.

To get to it from measurement screen :

- Press " **Menu** ".
- Go to " **Informations** " with left and right arrows.

8.1. Identification

- Go to " **Identification** " then press **OK**.
Screen displays software version number and device serial number.
- Press **Esc** to back to " **Informations** " menu.

8.2. Calibration

- Go to " **calibration** " then press **OK**.
Screen displays calibration date of the device.
- Press **Esc** to back to " **Informations** " menu.

8.3. After sales service

- Go to " **After sales service** " then press **OK**.
Screen displays Kimo after sales services phone number and email.
- Press **Esc** to back to " **Informations** " menu.