

## Mensura (90001033)

Automatic volume flow meter  
with pressure compensation





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### 1. Introduction

The DIFF is a unique instrument developed by Observator for measuring air flow and air temperature. The DIFF is commonly used by installers and controllers in the housing and utility industry. The DIFF can perform a pressure compensated measurement in accordance with International Standards. Operating errors are prevented by an automated measurement process. The flow reading is digital and clear, this prevents reading errors. The DIFF is capable of data storage via SD card and the use of DIFFiner software.



The standard package contains:

- DIFF automatic volume flow meter with zero pressure compensation
- Battery charger
- 4 x 1,2V AA NIMH rechargeable batteries
- Manual
- Calibration report
- Transport case
- AT-242 Hood 315x315x220 mm, transparent plastic (housing)
- Datalogging upgrade incl.:
  - SD card 2Gb
  - DIFFiner pc-software

Options:

- Fabric Hood (Nylon) incl. aluminum frame and fiber rods 400x400mm, 600x600mm, 310x1234mm or 310x1534mm (Utility and squirrel grilles)
- Extra rechargeable battery set

### Specifications

Description		
Dimensions	(250x250)x510xØ200 mm	
Net weight	2.9 kg without batteries and transport case	
Operating temperature	-10 to +50 °C, 0-95% RV	Not condensing
Range	10-400 m <sup>3</sup> /h, -15 to +70 °C (5-158°F) (2,78-111 l/s and 5,89-235CFM)	
Accuracy	±3% of the reading ±1 m <sup>3</sup> /h, ±0,5°C	
Resolution display	0,1<100>1 m <sup>3</sup> /h, 0,1 °C	
Resolution zero pressure sensor	< 0,2 Pa	
Power supply	4x 1,2 V AA NiMH 2450 mAh, rechargeable.	
Measuring time (nom.)	< 30 sec	
Material casing	ABS	
Measuring method	Zero-method. In accordance with International Standards	
EMC	In accordance with EN60132-1, IEC61000-5-5 etc.	
	IP20 accordance IEC-60529	
Battery life	8 hour while measuring 75 m <sup>3</sup> /h	

## 2. Description and usage



Nr.	Description
1	Scroll button
2	Information display
3	Measuring side DIFF
4	Air inlet/exhaust
5	Point of pressure measuring
6	Connection temperature sensor/motor

### **2.1 Operation comfort and ergonomics**

The DIFF is self-adjusting for inlet and exhaust grilles. The DIFF automatically detects the flow direction, so the DIFF does not need to be turned around when changing the grill. For your convenience you are able to set the arms and the display unit in any position. This will make it easy to operate and to read out. Use of a ladder is mostly unnecessary because of these possibilities.

### **2.2 Operation**

Measuring on a vent will cause a difference in pressure caused by the measuring instrument itself. This difference in pressure will cause a deviation in the air distribution that causes a faulty measurement. The DIFF solves this problem by measuring the pressure difference and compensate this with the build-in fan. The rotation speed of the fan makes the pressure difference zero, this will solve the faulty measurements. In this situation the volume flow through the grill is exactly the same as it was before the DIFF was in place. The DIFF gives the right measurement of air flow and temperature after the beep.

### **2.3 Before first use**

Make sure there is no packing material or any other objects in the DIFF.

#### **2.3.1 Inserting the batteries**

Charge the SANYO or PANASONIC ENELOOP batteries as described in the manual of the included charger (we recommend to read this manual carefully). Use the standard charge mode whenever possible, but definitely the first couple of times. (Please note: our specifications only apply when using the prescribed battery type)

The batteries are fully charged when the green LED lights continuously lit. The batteries will only reach their full capacity after fully charge and un-charge them multiple times (see chapter 5).

Make sure the Diff is switched off when replacing the batteries. The batteries are placed in the battery compartment on the backside of the display housing. Unscrew the thumb screw complete and move the cover upwards, now you can remove the cover of the battery compartment. Take out the battery holder carefully to replace the batteries.



**Note the polarity when placing batteries! When placing the batteries in the wrong way, the electronics of the Diff can be damaged. The battery positions are marked on the black battery holder. The stud is the + and the flat side is the – of the batteries. The electronics are protected by means of a fuse, see item 9.2.**

Hold the wires on top of the batteries when placing the battery holder back. The wires can be pinched off when they are positioned below the battery holder. Push the battery holder to the right side of the compartment and place the cover.

### 2.3.2 Adjustment of the arms

It is possible to adjust the arms of the Diff by pushing both grey buttons at the same time. The arms will “click” every 30°. This makes it possible to set a comfortable position for every situation. The display unit can be rotated to ensure an optimal reading during the measurement.



**Make sure that the display of the DIFF is not placed in front of the round opening! Putting the display in the air flow will cause faulty measurements. All measured values will be out of specifications.**



These pictures show the right position of the arms and the display.

### 2.3.3 Operation

The DIFF can be operated with only one button. The readings are shown on the display.

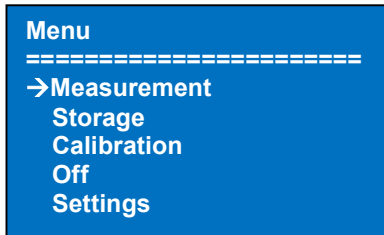


The DIFF can be switched on by pushing in the middle of the scroll button. The recess in the scroll button is intended for scrolling through the menu.



### 3. The menu

The following menu will appear when the DIFF is powered.



You can scroll through the menu by rotating the control button. Push in the middle of the control button to select the option.

#### 3.1 Calibration

Calibration of the DIFF is necessary after powering. The ultrasensitive pressure sensor will be adjusted to the environmental temperature.

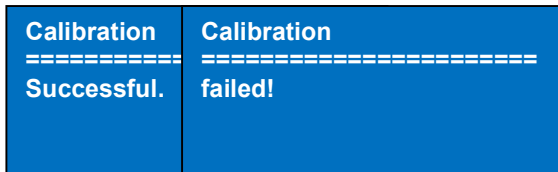
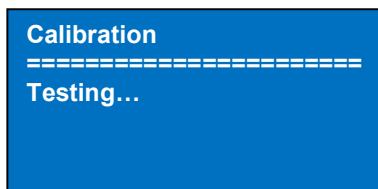
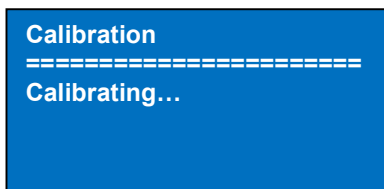


It is advisable to let the DIFF acclimatize for a minimum of 15 minutes when there are big differences in temperature. The DIFF has to be calibrated after the acclimatizing. It is recommended to calibrate the DIFF from time to time during usage.

To ensure the accuracy, it is necessary to calibrate the DIFF at least once every 30 minutes. When the environmental temperature is changing rapidly, or when the DIFF has a different temperature than the environment in which it is used, it is necessary to calibrate more often.

Please note that the DIFF has to stand on a flat surface and the room has to be free of air flow, while calibrating (close doors and windows).

When the DIFF is being calibrated the following screens will show up:



OR

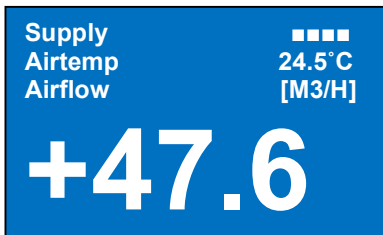
The last screen indicates that the calibration failed. The failure can be caused by air flows in the room. Make sure that the DIFF is calibrated on a flat surface. You can put a flat object on top of the DIFF to avoid airflow through the DIFF.

### 3.2 Measurement

The DIFF starts to measure immediately once the option is selected from the menu. Make sure that the following is prepared before measuring:

Closed doors and windows, the wind can create pressure waves that influence the measurement.

- Put the square opening of the DIFF against the vent. When sure that the vent is fully covered the measurement can be started. The measurements can be faulty when the measurement is started before the DIFF is in place.
- The DIFF will start with a pre-measurement. You can hear the motor starts running. The pre-measurement will be followed by the final measurement.
- Wait until the measurement is completed. The measurement can take tens of seconds. The display will show the instantaneous flow and temperature value. This value is not reliable because the DIFF is still compensating the measurement.
- There will sound a beep when the measurement is finished. The value shown on the display is the measured value. You can remove the DIFF from the vent.



The plus sign indicates that an air inlet is being measured. It is also indicated as SUPPLY on the upper left of the display.

A negative sign indicates that an air exhaust is being measured. It is also indicated as EXHAUST on the upper left of the display.

The battery status is indicated by the blocks on the upper right of the display. It is recommended to charge and/or replace the batteries when the battery status reaches the value of one block.

The air temperature of the air flowing through the DIFF is shown below the battery indication.

You can return to the menu by pressing the selection button. The measured value won't be available anymore.

#### Comments:

The motor can reach a RPM of thousands of rounds per minute, and will create some sound. This can create a high pitched tone caused by the motor control, which is normal.

#### Measurement duration:

The duration of the measurement depends on the amount of airflow going through the DIFF. The DIFF will measure faster when the airflow is higher. The reason for this, is that the accuracy may be lower with higher airflows.

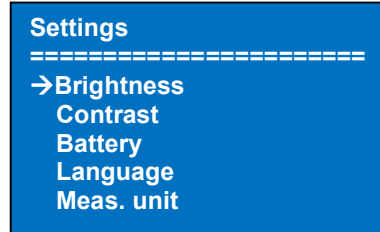
### 3.3 Datalogging

We refer to chapter 7 for more information.

### 3.4 Settings

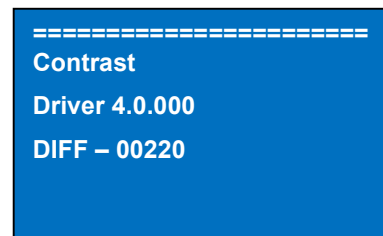
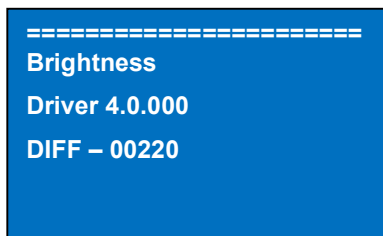
You can choose the following options in the settings menu:

- Brightness
- Contrast
- Battery
- Language
- Measuring unit
- Temperature unit
- Technical Menu



#### 3.4.1 Brightness - Contrast

The following screens are shown when selecting the option brightness or contrast.



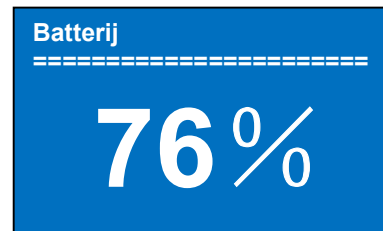
The screen gives information about the serial number and the driver number of the DIFF. The brightness or contrast is adjustable by turning the selection button. The setting can be confirmed by pressing the selection button.

#### 3.4.2 Battery

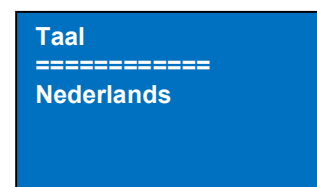
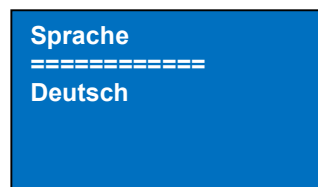
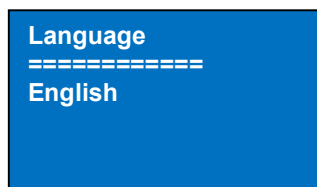
The option Battery shows the percentage of battery capacity that is left. It is possible that the percentage goes up after a measurement.

The battery status is also shown on the display while measuring. It is indicated with 4 white blocks in the upper right of the screen.

It is recommended to charge and/or exchange the batteries when the battery level has dropped to one block.

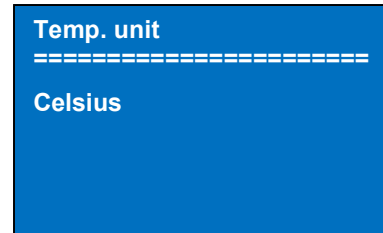
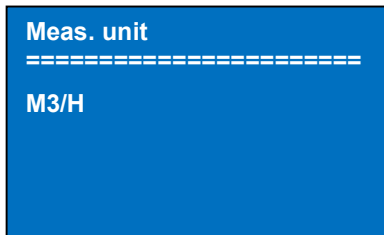


#### 3.4.3 Language



The screen changes to another language by turning the selection button. You can confirm the selection by pressing the selection button.

### 3.4.4 Measuring unit / temperature unit



The measuring or temperature unit can be selected by turning the selection button. The setting has to be confirmed by pressing the selection button. The following units can be selected:

Measuring unit:

- M3/H
- CFM
- L/S

Temperature unit:

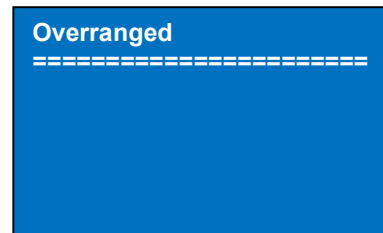
- Celsius
- Fahrenheit

### 3.4.5 Technical menu

The technical menu is only available by the Observator technicians.

### 3.5 Overrange protection

The measuring range goes up to 400m<sup>3</sup>/h. When you try to measure a value higher than 400m<sup>3</sup>/h the DIFF will stop measuring show OVERRANGED and an incorrect value on the display.

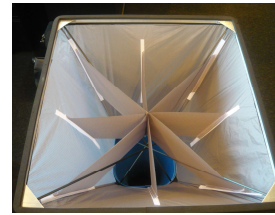


### 3.6 Off

The option will power the DIFF down. The DIFF will also be turned off when it is not used for 10 minutes or more. This will prevent unnecessary energy consumption.

### 4. Optional Hoods

There are different types of hoods available for vents larger than the standard opening of 25x25cm. **The cross needs to be mounted (Velcro) when measuring a diffuser/squirrel grill of 40x40 or 60x60cm as used in the utility.** The cross avoids that the measurements are influenced by the vortices created by the diffuser.



To mount the hood, place the round opening of the hood over the square opening of the DIFF. The pull strings need to be positioned on the left.



Pull the lower pull string and lift the hood till the lower pull string hooks behind the edge of the DIFF. With the lower pull string tightened you can pull the upper pull string. Note that the upper pull string needs to be placed above the edge.



Tighten the hood by placing the fiber poles crosswise. The poles can be placed in the recesses in the edge inside the DIFF. The fiber poles may bend about  $\pm 6$  cm while placing them.



Check if the pull strings are fit well around the DIFF and pull them tight if they are still a bit loose.



The **AT-242** is required for measuring supply and exhaust vents in residential housing. This light hood simply slides over the top of the Diff and doesn't require any additional tightening.

## 5. Batteries

### 5.1 First use of the batteries

Fully charge the batteries the first time in standard charging mode. The batteries will only reach full capacity after charging them fully a couple times. The batteries are fully charged when the green indication LEDs are continuously lit. Using fast charge will reduce the battery life, we advise to use the standard charge mode whenever possible. For more detailed information we refer to the charger manual.

### 5.2 Compatible batteries

The DIFF is designed for the usage of SANYO or PANASONIC ENELOOP rechargeable NiMH batteries with a minimum capacity of 2450mAh. Beware: Different suppliers have different specifications. The included SANYO or PANASONIC ENELOOP batteries are tested by Observator for the usage with the DIFF. We recommend to use these batteries only!

Non-chargeable batteries, like the alkaline type, are not suitable for the DIFF. Same counts for rechargeable batteries with less capacity. If you do use these types of batteries, keep in mind that the range most likely will be limited to 100 - 300 m<sup>3</sup>/h. It is also possible that the DIFF will power itself down due to voltage drop. Non-chargeable batteries have much lower capacity than the included NiMH batteries.

### 5.3 Battery life

With the DIFF fully charged you will be able to measure 1 working day (typical 8 hours of usage when the average measuring is 75 m<sup>3</sup>/h). The actual operation time depends on the measured flow. When the maximum measured flow is 100 m<sup>3</sup>/h or lower, you will be able to measure up to 2 or 3 days before the batteries need to be replaced.

#### Tips for optimal use of the batteries:

Cold batteries can deliver less energy. Store the batteries preferably in a room with an ambient temperature above 5°C. Take care that the batteries have the same temperature as the DIFF, this will avoid moisture.

### 5.4 Lifetime

The expected lifetime of the included NiMH batteries is about 1 year when using them daily. It is safe to assume that the batteries need replacement when they need to be charged more frequently than before. We recommend replacing the batteries every year or when they are charged / discharged 250 times. Fast charging cycles will decrease the battery life. Waste batteries must be disposed in accordance with the currently applicable local laws.

### 5.5 Warnings

Read the manual of the battery charger before using. Never try to charge non-chargeable batteries. Only use the (included) SANYO or PANASONIC ENELOOP NiMH (model HR-3U 1.2V) batteries with a minimum capacity of 2450 mAh.

Only charge the batteries in an ambient temperature of 0...50°C in the standard battery charger. The fast battery charger can only be used in an ambient temperature of 10...40°C. Also refer to the manual of the battery charger.



It's not possible to use a fixed power supply, usage of a fixed power supply can cause EMC problems, will void your warranty and CE approval.  
Faults and damage caused by other type of batteries then specified, is excluded from the Observator warranty. Batteries are excluded from the standard warranty terms.

## 6. Maintenance

The DIFF is a precision-instrument. Simple routine checks will ensure that the DIFF will function for many years:

- Remove moisture with a clean moisture absorbent cloth before storing the DIFF.
- Always remove the batteries when the DIFF is not used for a long time.
- Store and transport the DIFF always in the included transport case.
- Store the DIFF in dry conditions.
- Always let the DIFF adjust to the ambient temperature. The DIFF will adjust faster when it is hold against an exhaust vent.
- Never remove the grills inside the DIFF.
- Check the DIFF periodical for cracks.
- Do not expose the DIFF to water.
- Do not use aggressive detergents. This will damage the DIFF.
- Do not expose the hoods to sharp objects. A damaged hood can give wrong measurements.
- The DIFF will be best antistatic, if the instrument will be cleaned with a clean lint-free cloth frequently. Normally this only applies to air conditions with a low humidity.
- It is recommended for this instrument to be calibrated annually. After a repair, this instrument will also need a calibration. You can request a RMA number on our website. Once you've received, you can send the instrument with RMA form to us for repair and / or calibration. Note that the instrument is scheduled when it actually arrives. In order to shorten, you can before you request a RMA number, contact our service department for Air Technology, [lab@observator.com](mailto:lab@observator.com).

## 7. DIFFiner

The software program DIFFiner is available with the DIFF. This program makes it possible to:

- Store data on a SD-card and/or a PC
- Creating measuring reports
- Pre-configuring of measuring points.

This software package requires a pc with Windows XP, Vista, 7 or Windows 10 with a minimum resolution of 1024X768.

### 7.1 Installing DIFFiner

Download DIFFiner in the software section of our website:

<http://www.observatorair.com/>



**DIFFinersetup(v1.0).exe**

You can install DIFFiner with the standard settings.

Put the supplied SD-card in the card reader, after the installation.

Start DIFFiner and select the SD-card in the selection menu.



- DIFFiner needs to run as administrator when using Windows 7 (Right click on the icon and select run as administrator)
- When the SD-card is not found you should check if the SD-card is formatted as FAT32. Make sure that the SD-card is always formatted as FAT32. (My Computer → Right click on the SD-card → Format)

It is possible that the following message shows up when an external card reader (that can read multiple types of flash cards) is used.



Click on Cancel and select the SD-card in the following window. DIFFiner will operate normally.





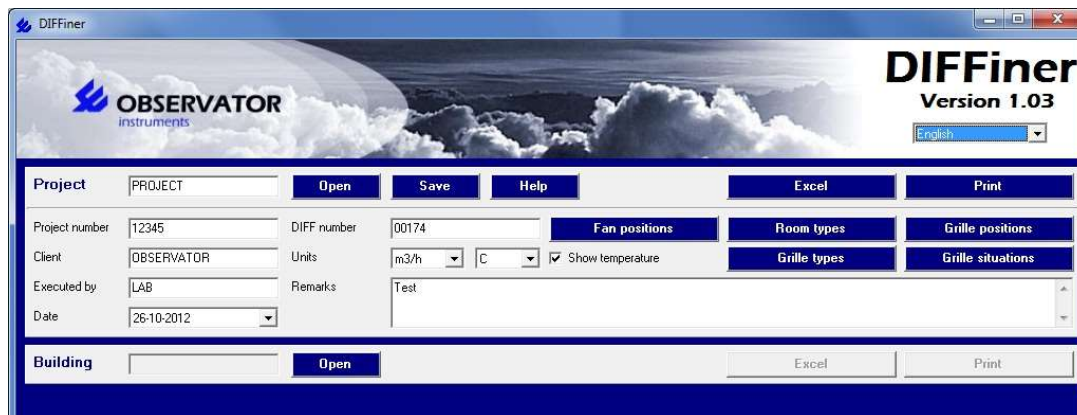
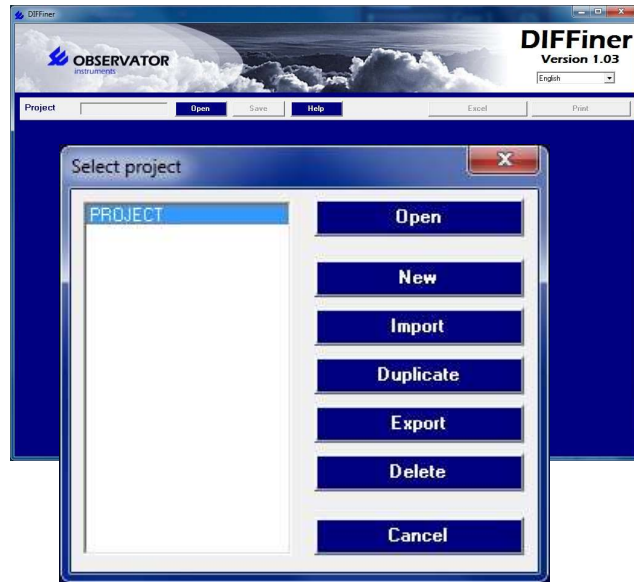
**7.2 Adding a project**

The first time a SD-card is used you will be asked if the SD-card needs to be prepared for use with DIFFiner. Click OK. The SD-card will be prepared for DIFFiner and the projects that are already on your hard disk will also be copied to the SD-card. DIFFiner will boot when the SD-card is ready.

Click open to create a new project

The screen that opens will show the already existing projects. Click new to create a new project.

It is also possible to export projects to a DIFF file. These files can be send to engineers on location. The engineer can import these files onto the DIFF. Click on new to create a new project.



It is possible to create a database in the newly appeared screen. It is possible to add the following items to the database:

- Fan setting (position of the HRS switch)
- Type of room (e.g. Living room, bedroom)
- Grill position (e.g. position 1, position 2, 2mm)
- Grill type (e.g. STHXX)
- Grill situations (e.g. Clean, unreachable)



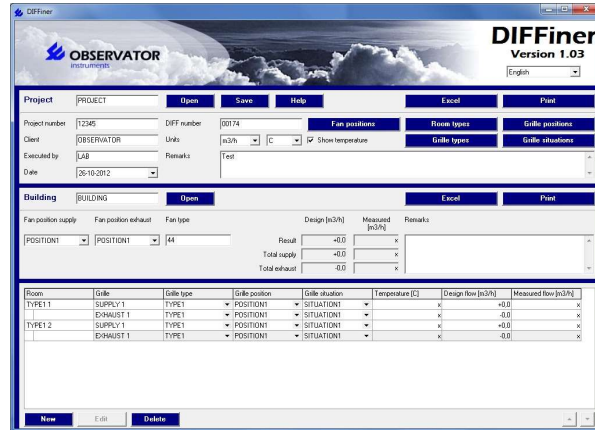
The created items can be used in the section Building. You can fill in as much as possible information of the building that is going to be measured.



Click open to add a building to the project. You can add a new building or open an already existing building in the window that opens. Click new to add a room to the building. The following parameters are available per room:

- Room type
- Number of rooms
- Amount of air inlets
- Amount of air exhausts
- The default type of grill

The picture on the right shows what it looks like when several rooms are added.



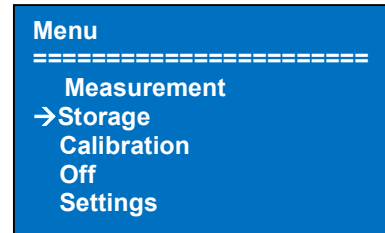
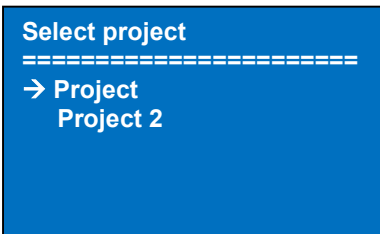
Click save to save the project to the SD-card.



It is recommended to use the standard type of SD-card (Sandisk ultra II 2.0GB or an other class 4 SD-card). The time to store the project can increase significantly when a different type of SD-card is used.

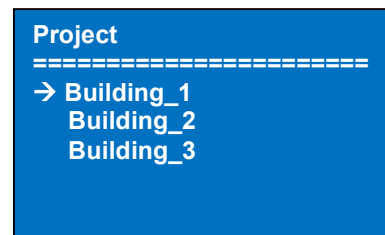
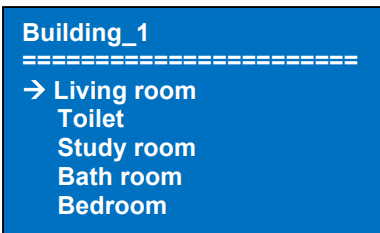
### 7.3 The DIFF with a SD-card

Put the SD-card into the DIFF and switch it on. Go to the storage option.



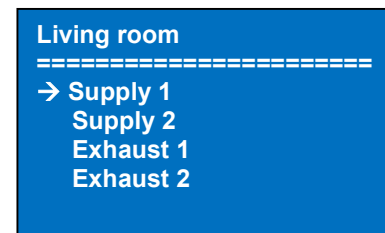
In the next window you will see a list with the stored projects. Select the project that you are going to measure

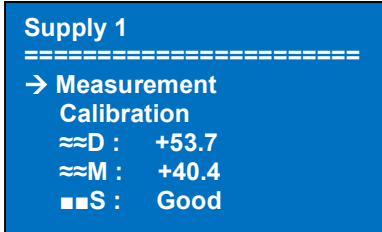
Select the building that you are going to measure



Select the room

Select the grill



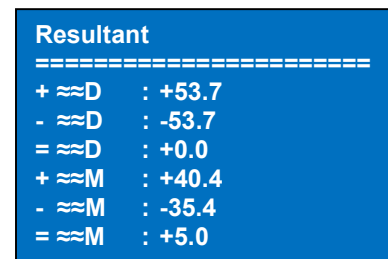


This screen shows the grill information that can be adjusted if needed. It is also possible to calibrate the DIFF from this screen. After this the measurement can be started. The measurement data will be stored after the selection button is pressed. Don't switch of the DIFF before the data is saved.

Declaration of symbols:

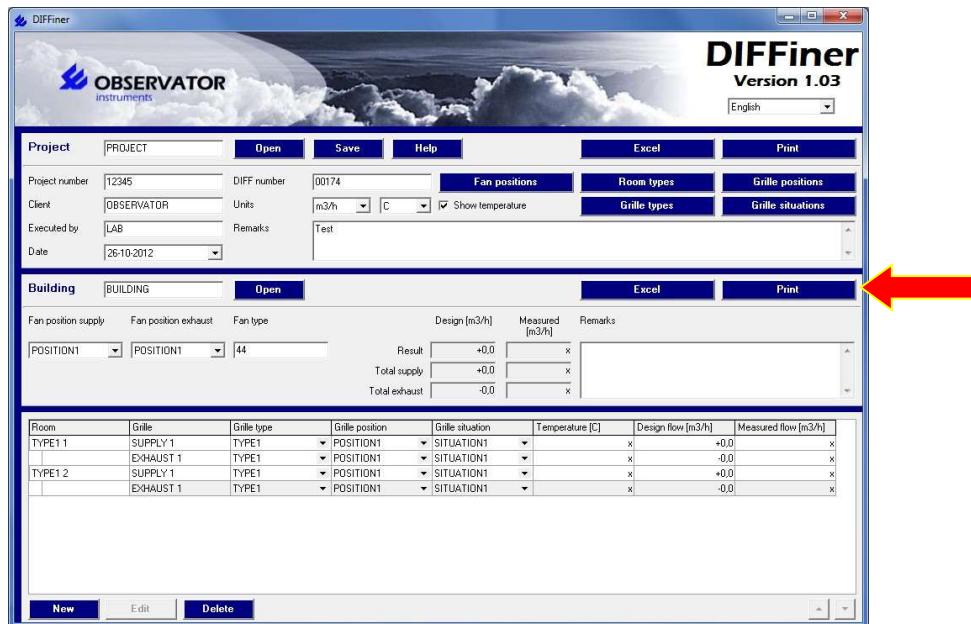
- ≈D Design flow
- ≈M Measured flow
- S Grill situation
- T Grill type
- P Grill position

After you measured all the rooms you can final check the measurement in the resultant window. You can select this menu option in the list with the rooms. This menu shows an overview of the total flow measurement. The design flow is shown as a comparison.



## 7.4 Processing the data on a computer

After the measurements are finished you can check the data on the pc.  
Put the SD-card in the reader and start DIFFiner.  
Open the project.  
The project data is now available on the pc.



The measured data can be plotted into a report by clicking print. It is also possible to export a report to Microsoft Excel. This button is next to the print button. The pictures below show examples of possible reports.

**MEETRAPPOR T DIFF**

Project	PROJECT	Projectnummer	KERKSTRAAT
Opdrachtgever	GENO	DIFF nummer	220
Uitgevoerd door	MARGRIET	Datum	03-11-2010
Opmerkingen	Woning 1 is voorzien van een ander type WTW		

Gebouw	VENTILATORTYPE	Ventilatorstand	1
Gebouw	GENO	Ventilatorstand	3
Ontwerpresultante [m3/h]	+53.7	Gemeten resultante [m3/h]	+28.0
Ontwerptoevoer [m3/h]	+329.7	Gemeten toevoer [m3/h]	+312.1
Ontwerpafvoer [m3/h]	-276.0	Gemeten afvoer [m3/h]	-284.1

Ruimte	Rooster	Roosterstand	Roosterstand	Roostersituatie	Temperatuur [C]	Ontwerp debiet [m3/h]	Gemeten debiet [m3/h]
WOONKAMER	Toevoer1	3	2MM	GOED	+23.2	+89.0	+93.3
	Toevoer2	3	2MM	GOED	+23.4	+95.0	+99.4
	Afvoer1	1	2MM	GOED	+23.3	-139.0	-133.0
	Afvoer2	1	2MM	GOED	+24.0	-140.0	-139.4
WC/BENEDEN	Toevoer1	1	2MM	GOED	+22.8	+89.0	+89.7
STUDEKAMER	Toevoer1	1	2MM	VUUL	+23.0	+88.0	+87.9
	Afvoer1	1	2MM	VUUL	+23.4	+88.0	+84.2
BADKAMER	Toevoer1	1	2MM	GOED	+23.1	+38.0	+27.8
	Afvoer1	1	2MM	GOED	+23.4	-36.0	-36.2
SLAAPKAMER	Toevoer1	1	2MM	GOED	+24.5	+100.0	+95.0
	Afvoer1	1	2MM	GOED	+23.6	-35.0	-35.3

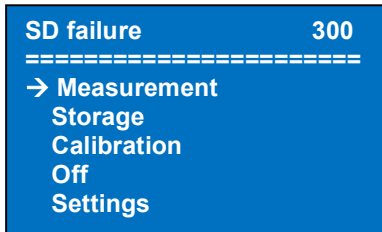
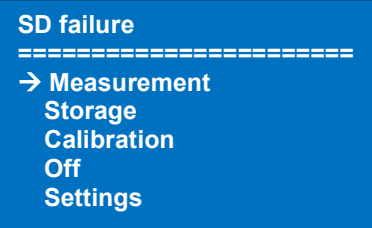
Ruimte	Rooster	Roosterstand	Roosterstand	Roostersituatie	Temperatuur [C]	Ontwerp debiet [m3/h]	Gemeten debiet [m3/h]
WOONKAMER	Toevoer1	3	2MM	GOED	+23.2	+50.0	+51.3
	Toevoer2	3	2MM	GOED	+23.4	+53.7	+40.4
	Afvoer1	1	2MM	GOED	+25.5	-105.0	-111.0
	Afvoer2	1	2MM	ONBEREIKBAAR	+26.0	-80.0	-89.4
WC/BENEDEN	Toevoer1	1	2MM	GOED	+22.8	+50.0	+49.7
STUDEKAMER	Toevoer1	1	2MM	VUUL	+23.0	+48.0	+47.9
	Afvoer1	1	2MM	VUUL	+23.8	-60.0	-62.2
BADKAMER	Toevoer1	1	2MM	GOED	+23.5	+28.0	+27.8
	Afvoer1	1	2MM	GOED	+25.4	-36.0	-36.2
SLAAPKAMER	Toevoer1	1	2MM	GOED	+24.5	+100.0	+95.0
	Afvoer1	1	2MM	GOED	+23.6	-35.0	-35.3

The header of the report can be customized to the style of the company. To change the header you should place a picture called diffheader.jpg in the DIFFiner folder. The header will now change into the picture called diffheader.jpg. The folder DIFFiner can normally be found in C:\Program Files\Observator\DIFFiner or on the SD-card. It is recommended to keep the same resolution as the default header (800 x 120) to avoid lay-out changes.

PROJECT	Projectnummer	KERKSTRAAT				
GERKO	DIFF nummer	220				
MARKURET	Datum	3-11-2010				
Woning 1 is voorzien van een ander type WTW						
GEBOUW_1	Ventilator type	1				
3	Ventilatorstand afvoer	3				
+53.7	Gemeten resultaat [m <sup>3</sup> /h]	+28.0				
+329.7	Gemeten toevoer [m <sup>3</sup> /h]	+312.1				
-276.0	Gemeten afvoer [m <sup>3</sup> /h]	-284.1				
Ruimte	Rooster	Roosterstand	Roostersituatie	Temperatuur [C]	Ontwerp debiet [m <sup>3</sup> /h]	Gemeten debiet [m <sup>3</sup> /h]
WOONKAMER	Toevoer1	1 2MM	GOED	+23.2	+50.0	+51.3
	Toevoer2	1 2MM	GOED	+23.4	+53.7	+40.4
	Afvoer1	1 2MM	GOED	+25.5	-105.0	-111.0
	Afvoer2	1 ONBEREIKBA	ONBEREIKBA	+26.0	-40.0	-39.4
WERKENDE	Toevoer1	1 2MM	GOED	+22.8	+50.0	+49.7
STUDEKAMER	Toevoer1	1 5MM	VUUL	+23.0	+48.0	+47.9
	Afvoer1	1 2MM	VUUL	+25.8	-60.0	-62.2
BADKAMER	Toevoer1	1 2MM	GOED	+23.5	+35.0	+27.8
	Afvoer1	1 5MM	GOED	+25.4	-36.0	-36.2
SLAAPKAMER	Toevoer1	1 2MM	GOED	+24.5	+100.0	+95.0
	Afvoer1	1 2MM	GOED	+25.6	-35.0	-35.3

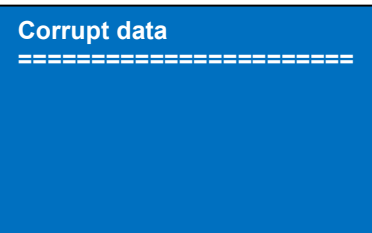
### 7.5 SD-card messages

The error SD failure can occur if the SD-card is removed while the storage menu is opened (**which is strongly discouraged!**). The DIFF will return to the main menu. If the message occurs when the SD card is still present it may be possible that the SD card is not inserted correctly. Please re-insert the SD-card.



If the SD-card is removed during the writing of data an error "SD failure 300" will occur. The number at the right will count down. It is possible to reinsert the SD-card while the counter is still active. The data will still be saved. Not reinserting the SD-card will result in data loss.

If the SD-card contains corrupt data (caused by removing the SD-card) it will show the warning "corrupt data". The warning disappears when you turn the selection button. The rooms that are not corrupted can still be measured.



Put the SD-card back in the computer to restore the file system. The SD-card will now automatically be restored when DIFFiner starts.

## ***8. Decommissioning***

### ***8.1 Decommissioning the DIFF (temporary)***

Remove the batteries when the DIFF is not going to be used for a couple of weeks or more. Charge the batteries fully before storage. Charging the batteries prevents that they get damaged because off a full discharge.

### ***8.2 Disposal of the DIFF***

Waste batteries must be disposed in accordance with the currently applicable local laws.  
The DIFF must be disposed in accordance with the current applicable local laws.

## 9. Trouble shooting

### 9.1 Errors

Symptom	Solution
Message low battery while they are fully charged. The used batteries are new.	-New batteries will only reach full capacity after charging them a couple times. Use the standard charging mode as much as possible.
Message low battery while they are fully charged. This occurs mostly while measuring high flows.	Old batteries can show these symptoms. Replace the batteries if this occurs by new ones of the specified type and fully charge them.
The DIFF keeps measuring and the flow value is high.	Charge the batteries. The battery capacity does not reach the 80%. Order new batteries if the old batteries don't reach the full capacity.
The DIFF does not power when the selection button is pressed more than four times.	Replace the batteries by fully charged ones or replace the fuse. (Chapter 9.2).
Extraordinary power usage.	Contact you dealer or Observator.
The calibration fails	There are pressure differences during the calibration or the DIFF is moved during calibration. Recalibrate when the DIFF is on a flat surface.
It is not possible to get a successful calibration.	Return the DIFF to Observator for factory calibration or repair.
Difficult to read display.	Check the settings of the contrast and backlight. (chapter 3.4)
Display turns dark.	This is caused by ESD or an auto power off because of low battery voltage. Reinsert the fuse or exchange the batteries.
A high deviation in the reading.	Charge the batteries and recalibrate the DIFF.
A high deviation in the reading and an OVERRANGED error occurs.	The measured flow is above the measuring range of the DIFF. Take partial measurements and add these or lower the flow that needs to be measured.
A high deviation in the reading and a LOW BAT error occurs.	The battery voltage is too low. Charge the batteries up to 80%.
A high deviation in the reading and/or the DIFF indicates the wrong flow direction. The measurement takes a long time.	The measurement was started before the DIFF was on the vent. Carry out a new measurement. When sure the vent is fully covered, start the measurement.
Deviation in the measurement.	Make sure that the DIFF is fully placed over the vent and the display unit is not in the airflow.
The measurement takes a long time.	Make sure you keep the DIFF in place while measuring. Make sure that there are no gaps between the DIFF and the ceiling.
The motor stops during the measurement.	The flow is around 10 m <sup>3</sup> /h the lower limit of the DIFF. Retry the measurement.
The DIFF leaves marks on the ceiling.	Clean the rubber with non-aggressive detergent.
????? On the display in the battery menu.	You just exchanged the batteries. After a couple of minutes the ????? will disappear.
The DIFF does not work. (display dark)	The DIFF is in auto off function. Switch it back on.
The excel button does not work.	Excel is not installed. Install Excel on your pc.

### 9.2 Replacing the fuse

The DIFF contains a fuse (5x20 mm 250V / 5A slow). The fuse is placed on the right side of the display unit. The fuse holder can be opened by turning the holder carefully with a big screwdriver. Take care that the batteries are in the right position before putting the fuse back in.

The fuse in the DIFF should only be replaced with the original type: 5x20 mm 250V / 5A slow. Repair can be needed if a fuse replacement does not solve the problem.

### 9.3 DIFF Accessory

Part number	Description
AT-251	Standard / Fast charger for 4xAA NiMH batteries. 100-240VAC EU, 50-60Hz and 12VDC, 1.5A (Car). Excl. Batteries.
AT-240	Hood 310x1534mm – nylon with frame and fiber support
AT-241	Hood 310x1234mm – nylon with frame and fiber support
AT-242	Hood 330x330mm – PET
AT-245	Hood 600x600mm – nylon with frame and fiber support
AT-244	Hood 400x400mm – nylon with frame and fiber support
AT-255	Extra set of 4 chargeable NiMH AA batteries 2450 mAh PANASONIC ENELOOP.
AT-260	Upgrade data storage incl. pc-software DIFFiner and 2 GB SD-card.
	SD-card reader with USB

### 9.4 DIFF Spare parts

The following spare parts are available

Part number	Description
	Glass fuse 5x20mm 5AT
AT-300-130	Battery holder
AT-300-140	Battery holder connection wire
AT-255	Extra set of 4 chargeable NiMH AA batteries 1.2 V - 2450 mAh PANASONIC ENELOOP.
AT-280	Suitcase for Diff
AT-281	Suitcase for AT-242
AT-282	Suitcase for Diff and AT-242
CAL-DIFF	Calibration-service. Calibration of 24-points with report. The instrument is adjusted when needed.



**10. Warranty**

During the warranty period of 12 months after delivery, this product will be repaired without charge for either parts or labor. This limited warranty does not cover, batteries, damage caused by the user or by improper treatment or connecting.

## **12. Contact address**

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United Kingdom.

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Telephone: +44 (0) 1494 525252