

DIFF

Automatic volume flow meter with pressure compensation

User manual



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1. Introduction

The DIFF is a tool 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 as specified in the building regulations in the NEN 1087, NEN 8087. The flow meter is also recommended at the ISSO publications -61, -62, -63 and -8010 and BRL 6000-10. Operating errors are prevented by an automated measurement process. The flow reading is digital and clear, this prevents reading errors. The DIFF is prepared for data storage with SD card and the use of DIFFiner. Please contact your dealer or Observator for this option.



The standard package contains:

- DIFF automatic volume flow meter with pressure compensation
- Battery charger
- 4 x 1,5V AA NIMH batteries
- Manual
- Calibration report
- transport case

Optionals:

- Upgrade for data storage including PC software (DIFFiner) and 2GB SD card,
- Various attachments
- Fast charger.

Specifications

Description	Value	
Dimensions	(250x250)x510xØ200mm	
Net weight	2.9 kg with batteries without transport case.	
Operating temperature	-10 tot +50 °C, 0-95% RV	Not condensation
Range	10-400 m3/h, -15 tot +70 °C	
Accuracy	±3% of the reading ±1 m3/h, ±0,5°C.	
Resolution display	0,1<100>1 m3/h, 0,1 °C.	
Resolution Zero pressure measurer	< 0,2 Pa	
Power supply	4x 1,2 V AA NiMH 2700 mAh, rechargeable.	
Measuring time (nom.)	< 30 sec	
Material casing	ABS	
Measuring method	In accordance with NEN1087/1088/8088	
EMC	In accordance with EN60132-1, IEC61000-5-5 etc	
	IP20 accordance IEC-60529	
Battery life	8 hour while measuring 75m ³ /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. Always place the square side over or tight against the grill. For your convenience you are able to set the arms of the Diff in any position that will make it is easy to operate and to read out. Just make sure the readout panel is not in the airflow. 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 adjusting the speed of the build-in fan according to the measurements. This makes the volume flow through the grill exactly the same as it was before the DIFF was in place. The DIFF give the right measurement of air flow after the beep.

2.3 Before first use

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

2.3.1 Inserting the batteries

Charge the SANYO batteries as described in the manual that is included with the charger (we recommend to read the manual carefully). The included battery charger is designed for the usage with the SANYO AA NiMH 2700 mAh batteries. This battery charger protects the batteries against overcharging and high temperatures. Use the standard charge mode whenever possible, but definitely the first couple of times. The batteries are fully charged when the green LED lights continuously lit. The batteries will only reach their full capacity after fully charging them multiple times (see chapter 5).

Switch off the instrument when replacing the batteries. The batteries are placed in the battery compartment on the backside of the electronics housing. Unscrew the thumb screw to open the cover of the battery compartment to take out the battery holder to replace the batteries.



Note the polarity when placing batteries! The electronics are protected by means of a fuse, see item 9.2. The battery positions are marked on the black battery holder. The stud is the + and the flat side is the – of the batteries.

Hold the wires above the batteries when placing the batteries. 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 Measuring positions

It is possible to adjust the arms 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 electronics unit can be rotated to ensure a reading during the measurement.



Make sure that the display of the DIFF is not placed in front of the opening. Putting the display in front of the air exhaust will cause faulty measurements.



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.

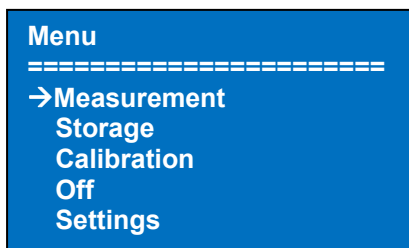


The DIFF can be switched on by pushing in the middle of the scroll button. The recess in the scroll button is intended for scrolling.



3. The menu

The following menu will appear when the DIFF is powered.



You can scroll true 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.

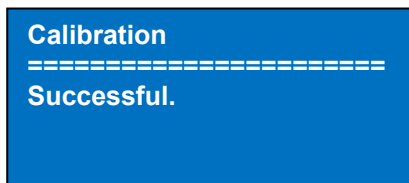
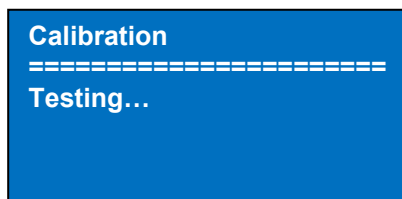
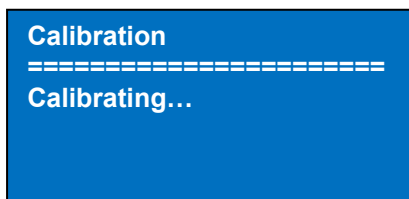


It is advisable to let the DIFF acclimatize for a minimum of 15 minutes when there are big differences in temperature. The DIFF has to be calibrated after the acclimatizing. It is recommended to calibrate the DIFF from time to time during usage.

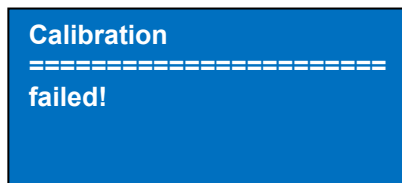
We recommend calibration of the DIFF every half an hour to secure the measuring accuracy.

It is necessary to calibrate the DIFF more often when the environmental temperature is changing rapidly or when the DIFF has a temperature divergent from the environment.

Please note that the DIFF has to stand on a flat surface and the room has to be free of air flow. When the DIFF is being calibrated the following screens will show up.



or



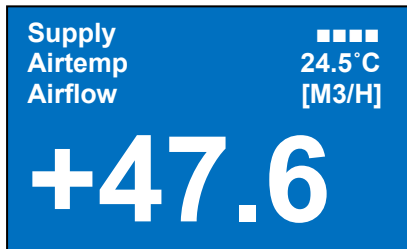
The last screen indicates that the calibration failed. The failure can be caused by air flows in the room. Make sure that the DIFF is calibrated on a flat surface. You can put a flat object on top of the DIFF to avoid airflow true the DIFF.

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:

Close 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 on the upper left of the display.

A negative sign indicates that an air exhaust is being measured. It is also indicated 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. This can create a high pitched tone which is normal.

Measurement duration:

The duration depends on the amount of airflow going through the DIFF. The DIFF will measure faster when the airflow is higher.

3.3 Storage

The storage function is available as an option. 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

Settings

=====

→Brightness
Contrast
Battery
Language
Meas. unit

3.4.1 Brightness/contrast

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

Brightness

Driver 3.0.007

DIFF – 00220

Contrast

Driver 3.0.007

DIFF – 00220

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.

Battery

=====

76%

3.4.3 Language

Taal

=====

Nederlands

Language

=====

English

Sprache

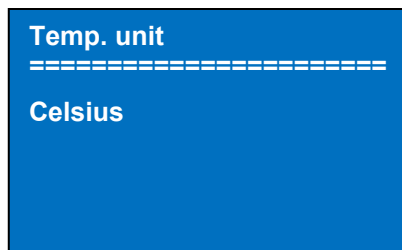
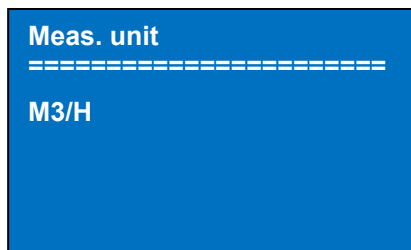
=====

Deutsch

The screen changes to an other 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 unit can be selected by turning the selection button. The setting has to be confirmed by pressing the selection button. The following measuring units can be selected:

measuring unit:

- M3/H
- CFM
- L/S

Temp. unit:

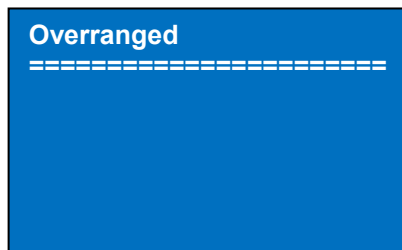
- Celsius
- Fahrenheit

3.4.6 Technical menu

The technical menu is only available by the Observator technicians.

3.5 Overrange protection

The measuring range goes up to 400m3/h. When you try to measure a value higher than 400m3/h the DIFF will show the screen shown on the right.

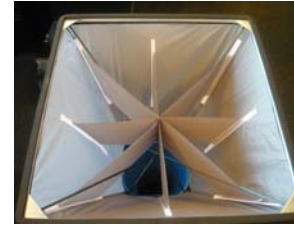


3.6 OFF

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. Extension 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 of 40x40 or 60x60cm. 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 sally 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 sally edge.



Span the hood by placing the fiber poles as a cross. The poles can be placed in the recesses from the edge inside the DIFF. The fiber poles may bend about ± 6 cm while placing them. There is also a repair kit included to repair holes in the canvas.



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 vents in the housing industry. The 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. Use 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 rechargeable NiMH batteries with a minimum capacity of 2700mAh. Beware: Different suppliers have different specifications. The included SANYO batteries are tested by Observator for the usage with the DIFF. We recommend to use these batteries only!

Nonchargeable 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 m³ / h. It is also possible that the DIFF will power itself down due of voltage drop. Nonchargeable batteries have much lower capacity then the included 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 m³/h). The actual operation time will depend on the measured flow. When the maximum measured flow is 100 m³/h or lower, you will be able to measure upto 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 then before. We recommend replacing the batteries every year or when they are charged / discharged 250 times.

Fast charging cycles will decrease the life of batteries.

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 nonchargeable batteries. Only use the (included) SANYO NiMH (model HR-3U 1.2V) batteries with a minimum capacity of 2700 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.
- Remove the batteries when the DIFF isn't used for a long time.
- Store and transport the DIFF always in the included transport case.
- Store the DIFF in dry conditions.
- 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.
- Observator recommends yearly calibration of the DIFF. Contact our service department (service@observator.com) for the calibration.

7. DIFFiner

DIFFiner is available as an option 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.

The DIFF is expandable with DIFFiner after purchase. The software package requires a pc with Windows XP, Vista or Windows 7 with a minimum resolution of 1024X768.

7.1 Downloading DIFFiner

Download DIFFiner from the website

<http://www.observator.com/instruments/air-technology/support>.

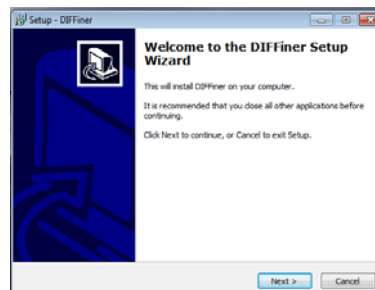


DIFFinersetup(v1.0).exe

You can install DIFFiner with the standard settings.

Put the supplied SD-card in the card reader.

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



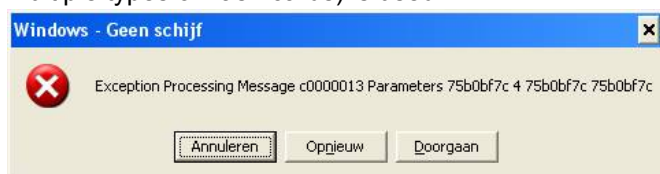
- DIFFiner needs to run as administrator when using Windows 7 (Right click on the icon and select run as administrator)

- 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

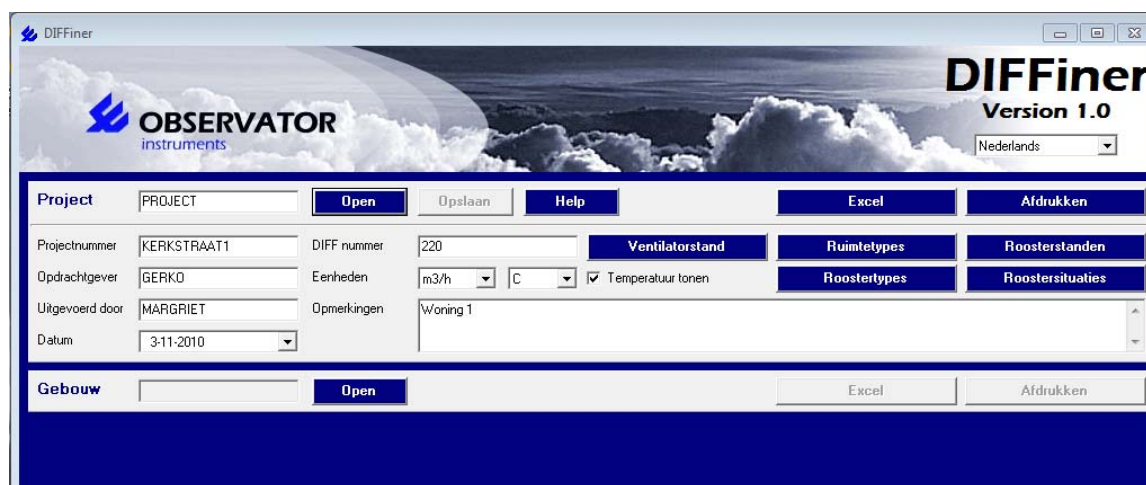
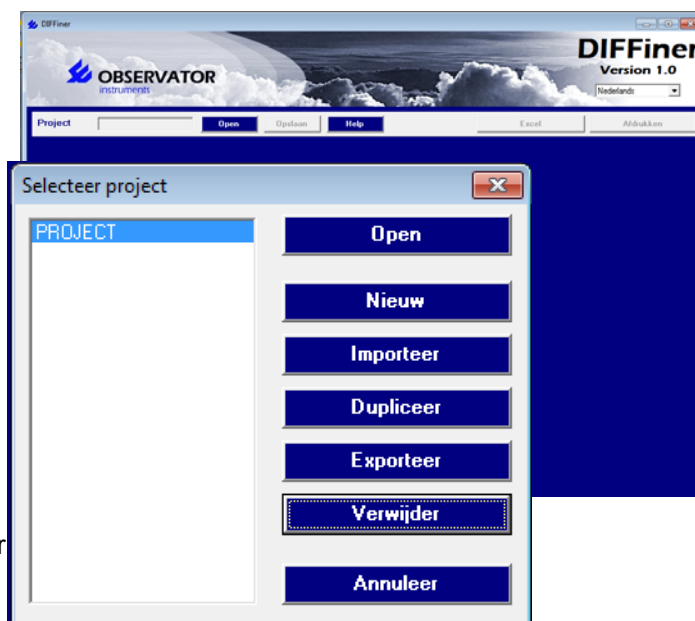
The first time a SD-card is used you will be asked if the SD-card needs to be prepared for use with DIFFiner. Click OK. The SD-card will be prepared for DIFFiner and the projects that are already on your hard disk will also be copied to the SD-card.

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.

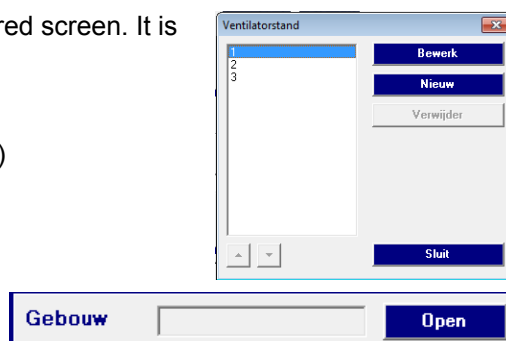
It is also possible to export projects to a DIFF file. These files can be send to engineers on location. The engineer can import these files onto the DIFF. Click on new to create a new project.



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.

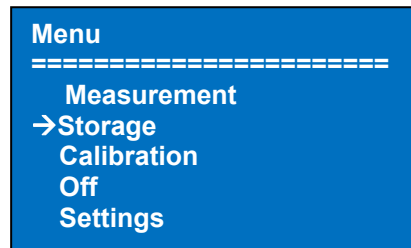
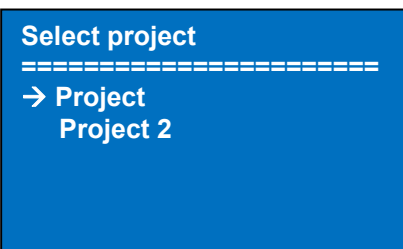
Click save to save the project to the SD-card.



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.

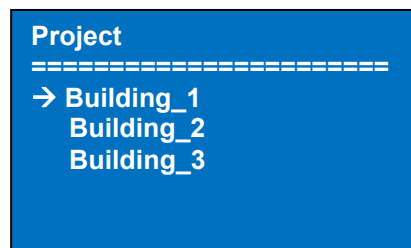
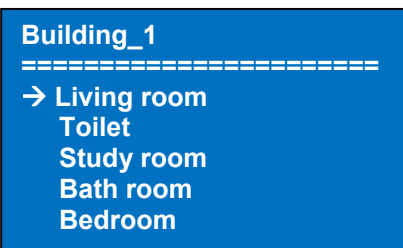
7.3 The DIFF with an SD-card

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



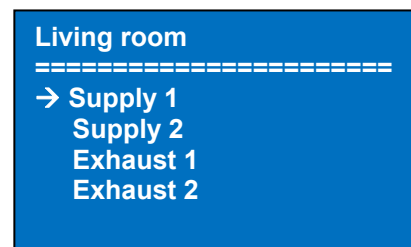
In the next window you will see a list with the stored projects.
Select the project that you are going to measure

Select the building that you are going measure



Select the room

Select the grill



**Supply 1**

=====

→ **Measurement****Calibration**

≈D : +53.7

≈M : +40.4

■S : Good

This screen shows the grill information that can be adjusted if needed. It is also possible to calibrate the DIFF from this screen. 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.

Resultant

=====

+ ≈D : +53.7

- ≈D : -53.7

= ≈D : +0.0

+ ≈M : +40.4

- ≈M : -35.4

= ≈M : +5.0



7.4 Opening the data on the computer

With the measurements 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.

DIFFiner Version 1.0

Project: KERKSTRAAT, DIFF nummer: 220, Ventilatorstand: Ruimtetypes, Roosterslanden

Gebouw: GEBOUW_1, Excel, Afdrukken

Ruimte	Rooster	Roostertype	Roosterstand	Roostersituatie	Temperatuur [C]	Ontwerp debiet [m3/h]	Gemeten debiet [m3/h]
WOONKAMER	TOEVOER 1	1	2MM	GOED	+23.2	+50.0	+51.3
	TOEVOER 2	1	2MM	GOED	+23.4	+53.7	+40.4
	AFVOER 1	1	2MM	GOED	+25.5	-105	-111.0
WC/BENEDEN	AFVOER 2	1	ONBEREIKBA	ONBEREIKBA	+26.0	-40	-39.4
	TOEVOER 1	1	2MM	GOED	+22.8	+50	+49.7
STUDEKAMER	TOEVOER 1	1	5MM	VUIL	+23.0	+48	+47.9
	AFVOER 1	1	2MM	VUIL	+25.8	-60	-62.2
BADKAMER	TOEVOER 1	1	2MM	GOED	+23.5	+28	+27.8
	AFVOER 1	1	5MM	GOED	+25.4	-36	-36.2
SLAAPKAMER	TOEVOER 1	1	2MM	GOED	+24.5	+100	+95.0
	AFVOER 1	1	2MM	GOED	+25.6	-35.0	-35.3

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.

MEETRAPPORT DIFF

Project: KERKSTRAAT, DIFF nummer: 220, Datum: 03-11-2010

Gebouw: GEBOUW_1, Ventilatorstand: 3, Ventilatorstand afvoer: 3

Ruimte	Rooster	Roostertype	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	3	2MM	GOED	+25.5	-105.0	-111.0
WC/BENEDEN	Afvoer2	3	ONBEREIKBA	ONBEREIKBA	+26.0	-40	-39.4
	Toevoer1	3	2MM	GOED	+22.8	+50	+49.7
STUDEKAMER	Toevoer1	3	5MM	VUIL	+23.0	+48	+47.9
	Afvoer1	3	2MM	VUIL	+25.8	-60	-62.2
BADKAMER	Toevoer1	3	2MM	GOED	+23.5	+28	+27.8
	Afvoer1	3	5MM	GOED	+25.4	-36	-36.2
SLAAPKAMER	Toevoer1	3	2MM	GOED	+24.5	+100	+95.0
	Afvoer1	3	2MM	GOED	+25.6	-35.0	-35.3

MEETRAPPORT DIFF

Project: KERKSTRAAT, DIFF nummer: 220, Datum: 03-11-2010

Gebouw: GEBOUW_1, Ventilatorstand: 3, Ventilatorstand afvoer: 3

Ruimte	Rooster	Roostertype	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	3	2MM	GOED	+25.5	-105.0	-111.0
WC/BENEDEN	Afvoer2	3	ONBEREIKBA	ONBEREIKBA	+26.0	-40	-39.4
	Toevoer1	3	2MM	GOED	+22.8	+50	+49.7
STUDEKAMER	Toevoer1	3	5MM	VUIL	+23.0	+48	+47.9
	Afvoer1	3	2MM	VUIL	+25.8	-60	-62.2
BADKAMER	Toevoer1	3	2MM	GOED	+23.5	+28	+27.8
	Afvoer1	3	5MM	GOED	+25.4	-36	-36.2
SLAAPKAMER	Toevoer1	3	2MM	GOED	+24.5	+100	+95.0
	Afvoer1	3	2MM	GOED	+25.6	-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
MARGRIET		Datum	3-11-2010
Woning 1 is voorzien van een ander type WTW			
GEBOUW_1	Ventilatortype	1	
3	Ventilatorstand afvoer	3	
+33.7	Gemeten resultante [m³/h]	+28.0	
+129.3	Gemeten toevoer [m³/h]	+112.1	
-276.0	Gemeten afvoer [m³/h]	-284.1	
Temperatuur	Ontwerp debiet	Gemeten debiet	
[K]	[m³/h]	[m³/h]	
+23.2	+50.0	+51.3	
+23.4	+51.7	+40.4	
+25.5	+105.0	+111.0	
+28.9	-40.0	-39.4	
+22.8	+50.0	+49.7	
+23.0	+48.0	+47.9	
+25.8	-60.0	-62.2	
+23.5	+28.0	+27.8	
+25.4	-36.0	-36.2	
+24.5	+100.0	+95.0	
+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.

SD failure

=====

→ Measurement
Storage
Calibration
Off
Settings

SD failure 300

=====

→ Measurement
Storage
Calibration
Off
Settings

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 DIFF 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 corrupt 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.

Corrupt data

=====



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 them fully before storage. Charging the batteries prevents that they get damaged because of 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 whilst they are fully charged. The used batteries are new.	-New batteries will only reach full capacity after charging them a couple times. Use the white battery charger as much as possible.
Message low battery whilst they are fully charged. This occurs mostly while measuring high flows.	Old batteries can show these symptoms. Replace the batteries if this occurs
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 then four times.	Replace the batteries or replace the fuse. (Chapter 8.2).
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. Reinsert the fuse and switch the DIFF on.
A high deviation in the reading	Charge the batteries and recalibrate the DIFF.
An over ranged 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 the DIFF indicates the wrong flow direction.	The measurement was started before the DIFF was on the vent.
Deviation in the measurement	Make sure that the DIFF is fully placed over the vent.
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 10m ³ /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.	The DIFF is in auto off function. Switch it back on
The excel button does not work	Excel is not installed.

9.2 Replacing the fuse

The DIFF contains a fuse (5x20 mm 250V / 5A slow). The fuse is placed in the right side of the electronics block. 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 spare parts

Options:

Part number	Description
AT-251	Standard / Fast charger for 4xAA NiMH batteries. 100-240V. 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 2700 mAh SANYO.
AT-260	Upgrade data storage incl. pc-software DIFFiner and 2 GB SD-card.
	SD-card reader with USB

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 2700 mAh SANYO.
AT-280	Suitcase
CL-DIFF	Calibration-service. Calibration of 24-points with report. The instrument is recalibrated 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.



Appendix: Declaration of conformity



Observator instruments B.V.

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2984 BM Ridderkerk
The Netherlands

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DECLARATION OF CONFORMITY

The manufacturer:

Observator instruments B.V.

Herewith declares the

DIFF pressure compensating volume flow meter

Is in compliance with the EMC directive 2004/108/EEC

Compliance with Essential Requirements of the directive has been assured by compliance with the following EU harmonized standard:

EN 61326-1:2006

Ridderkerk, 04th October, 2007
Observator instruments b.v.

R. de Vries
General Manager



