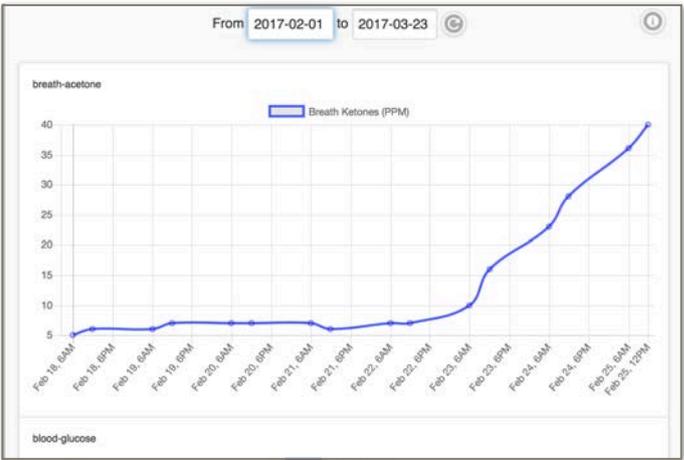


The KETONIX Manual v2.1



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1. UNPACK AND POWER YOUR KETONIX (Ketonix® USB Version)

In your case you will find:

- The KETONIX USB
- The KETONIX Battery Red
- USB Cable
- Cable to charge the battery
- An extra mouthpiece
- A KETONIX zipper case (15 cm X 10 cm X 5 cm)
- Step-by-step guide

When you first receive your KETONIX **the sensor needs to be powered overnight**. We recommend to power it on for at least 12 hours. The KETONIX Battery needs to be charged until full. When charging the battery for the first time it can take up to 12 hours.

Note: If you do not use your KETONIX for an extended period we recommend that you power it on for at least 12 hours.

Note: To extend the life of the device don't have any cosmetics on (E.g. Lipstick), don't smoke prior and rinse your mouth before carrying out a measurement. Fine particles may damage the sensor. Do not use it in a wet environment.

Note: Do not leave the KETONIX USB connected 24/7. Leave the device plugged in after taking a measurement for two minutes in order to eliminate moisture in the sensor.

STORAGE: Store the KETONIX in the case provided to protect the sensor from dust and dirt. Store the cable rolled up as delivered.



2. DOWNLOAD THE SOFTWARE

The KETONIX USB software needs to be downloaded from www.ketonix.com

Minimum Requirements: OS Maverick and above (for Mac) and Windows 7 and above (for PC).

2.1 Downloading for MAC

1. Go to the website and log in. (**Tip:** Tick remember me to store your username and password).
2. Go to **MY MENU** in the task bar and select **Downloads**.
3. Select the **Software** folder
4. Select the native software for MAC (version \geq 2.4.3).
5. Select Download, a disk image (.dmg) file will now be downloaded to your Mac.
6. Double click on the downloaded dmg file, the disk image will open in a window.
7. Now drag the Ketonix.app to Applications
8. The Ketonix application is now installed and could be started like any other application
9. **Tip:** You can drag your KETONIX icon to your doc for easy access

2.2 Downloading for PC (Windows)

1. Go to the website and log in. (**Tip:** Tick remember me to store your username and password).
2. Go to **MY MENU** in the task bar and select **Downloads**.
3. Select the **Software** folder
4. Select the native software (version \geq 2.4.3) for PC (Windows).
5. Select Download and install to your desktop by choosing the **"open"** option and follow the instructions in the installation package.

3. CALIBRATE THE KETONIX

Before you use the KETONIX for the first time it needs to be calibrated to your local environment.

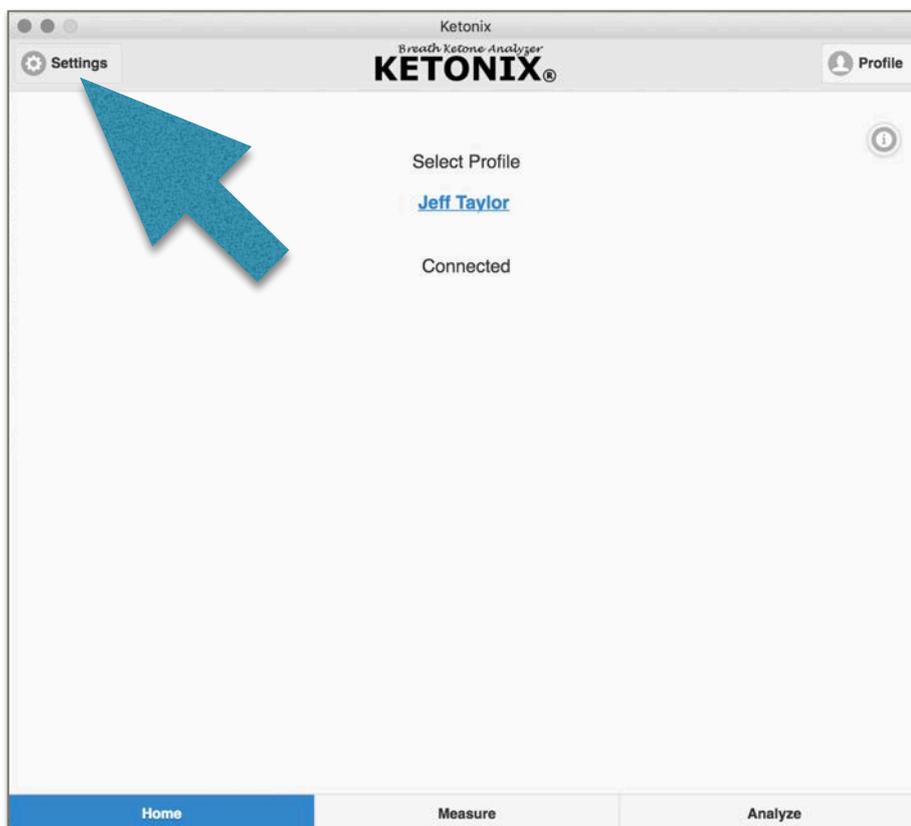
Note: If your KETONIX has not been used for a while, you are travelling or the environment you are in has changed you should calibrate the device again.

YOU DO NOT NEED TO CALIBRATE THE KETONIX FOR EACH USE

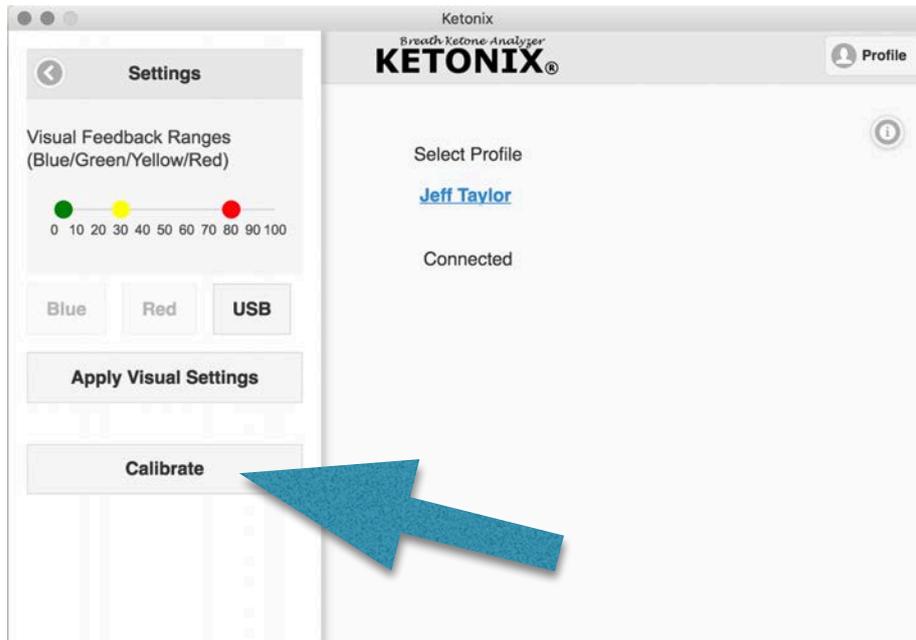
Note: When carrying out a calibration close all other software and applications so the calibration process will not be interrupted.

To calibrate carry out the following:

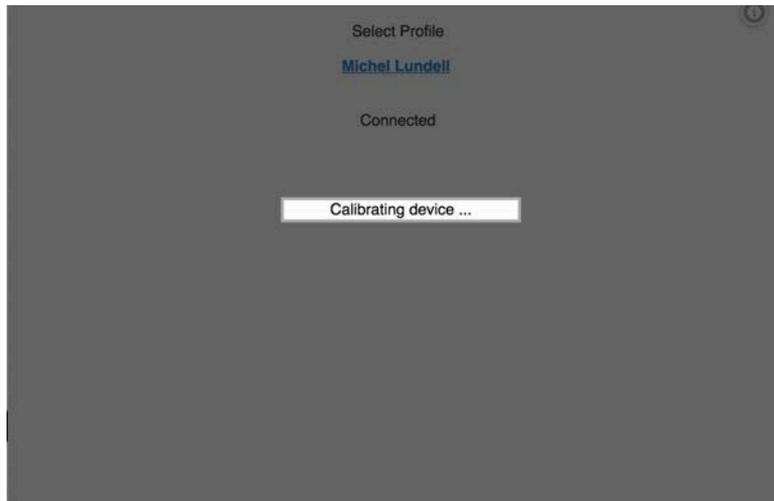
1. **Power the KETONIX up over night (12 hours is preferred).** Also charge the battery.
2. Unplug the KETONIX and wait 10 minutes (let the device cool down)
3. Start the software
4. Plug in the KETONIX, you should see a message “Connected”
5. Wait until the Ketonix have a steady blue light (not flashing).
6. Now put the device into a cardboard box or similar. The box will minimise influence of draft and temperature changes on the sensor while calibrating it.
7. Click on the Settings icon up in the left corner of the window.



A side panel will now appear and let you click on the button Calibrate

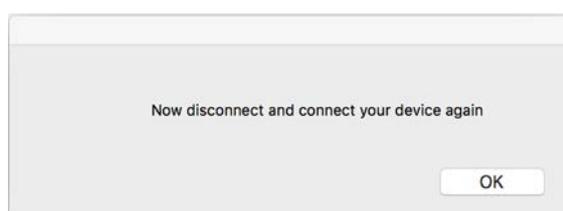


Now the calibration starts



Note: It is important to let the KETONIX perform the Calibration to the end.
Let the calibration message disappear on its own.

When calibration is finished, the calibration message will disappear and the software asks you to disconnect and connect your device again.



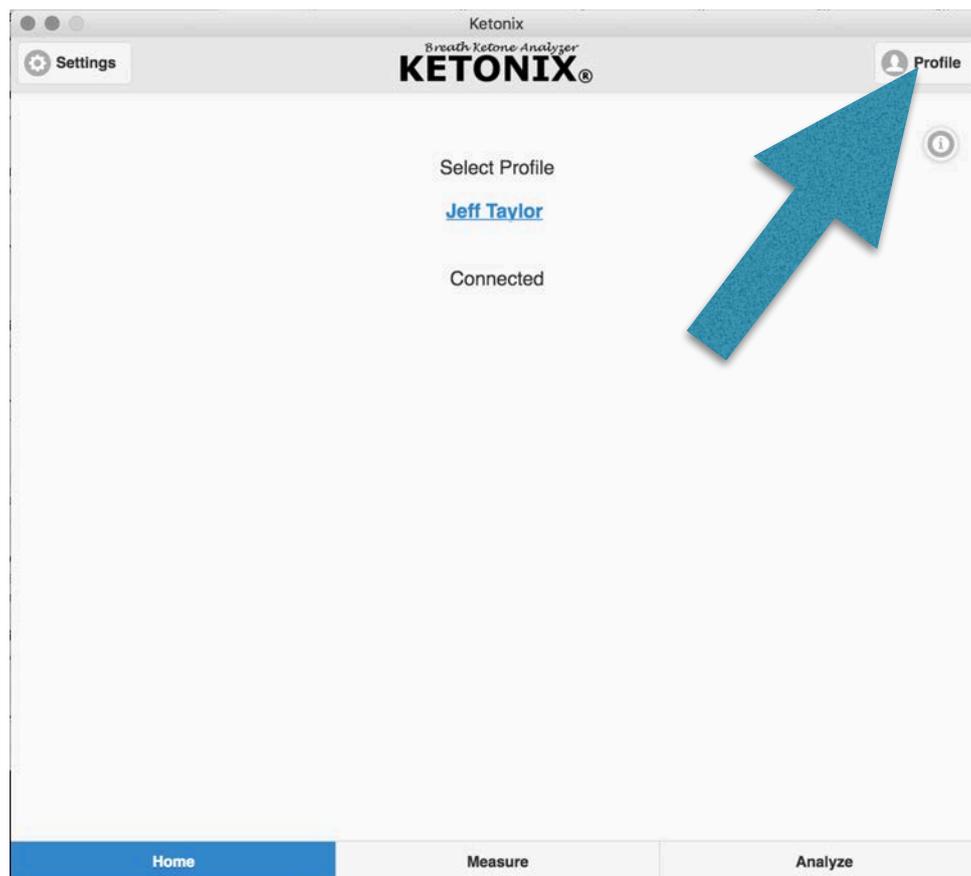
4. CREATE A PROFILE

Before taking a measurement, you need to set up a Profile to save data. You will need at least one profile. If more than one person is going to use the KETONIX you will need to create multiple profiles.

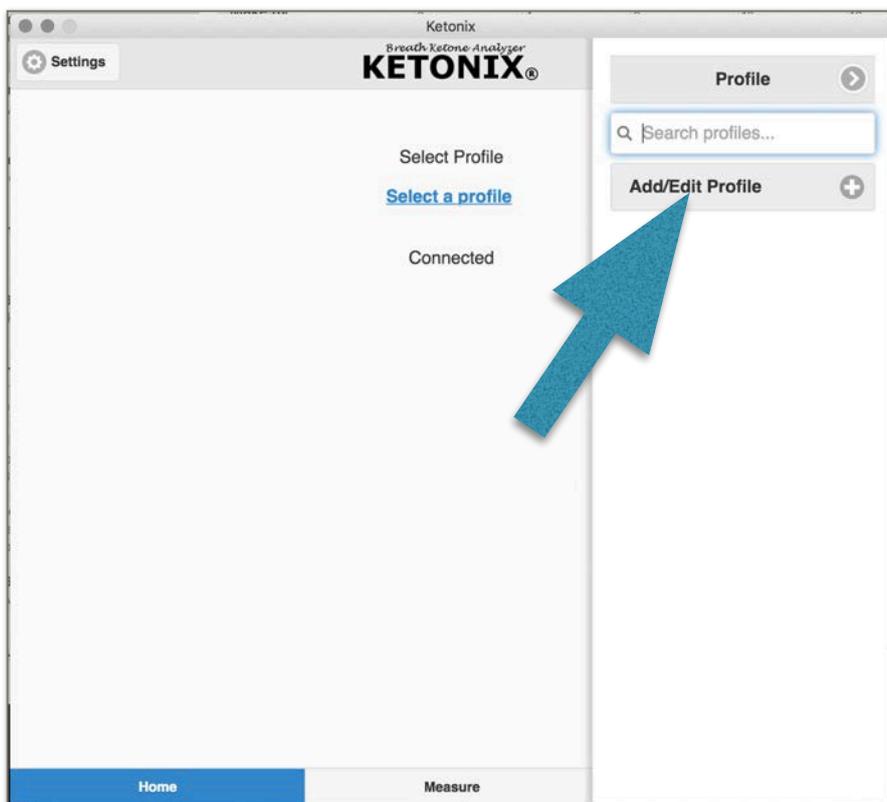
Your data will be stored in a local database and optionally on the Ketonix website. If you participate in a study, it's probably required to also store the data on the Ketonix website so study management can download your results.

Note: When creating additional profiles and want to store your data on the cloud you will need to create a new **username** and **password** on the website (ketonix.com) for each additional profile.

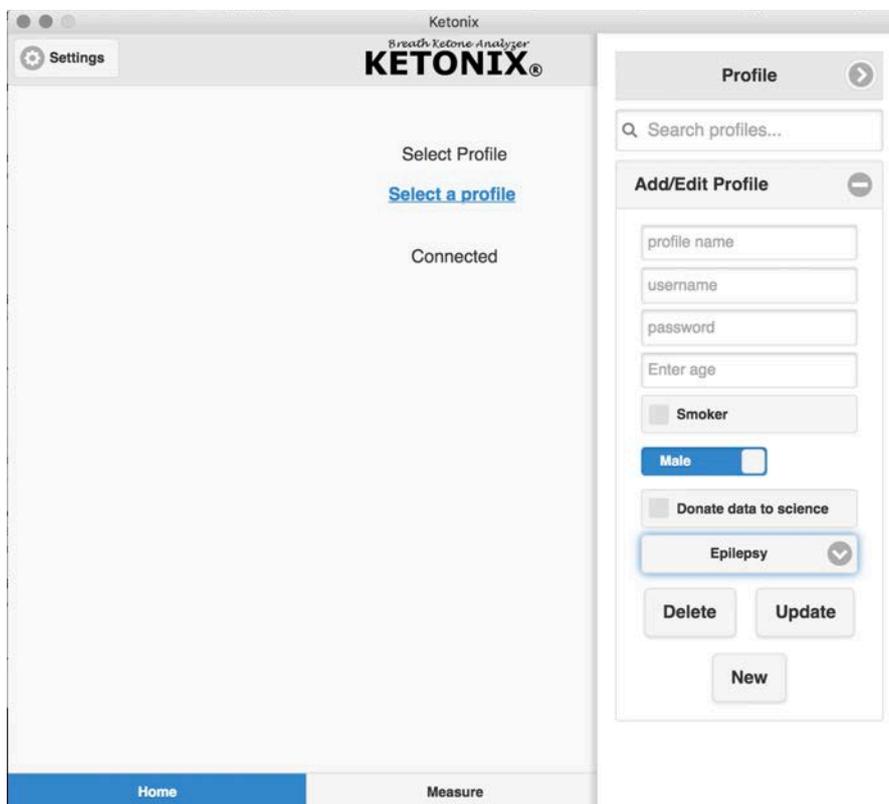
To create a profile, click on the Profile icon at the top right corner (in the Home tab).



Then click on "Add/Edit Profile"



A profile form will now appear where you can set your details.



Add/Edit Profile ⊖

profile name

username

password

Enter age

Smoker

Male

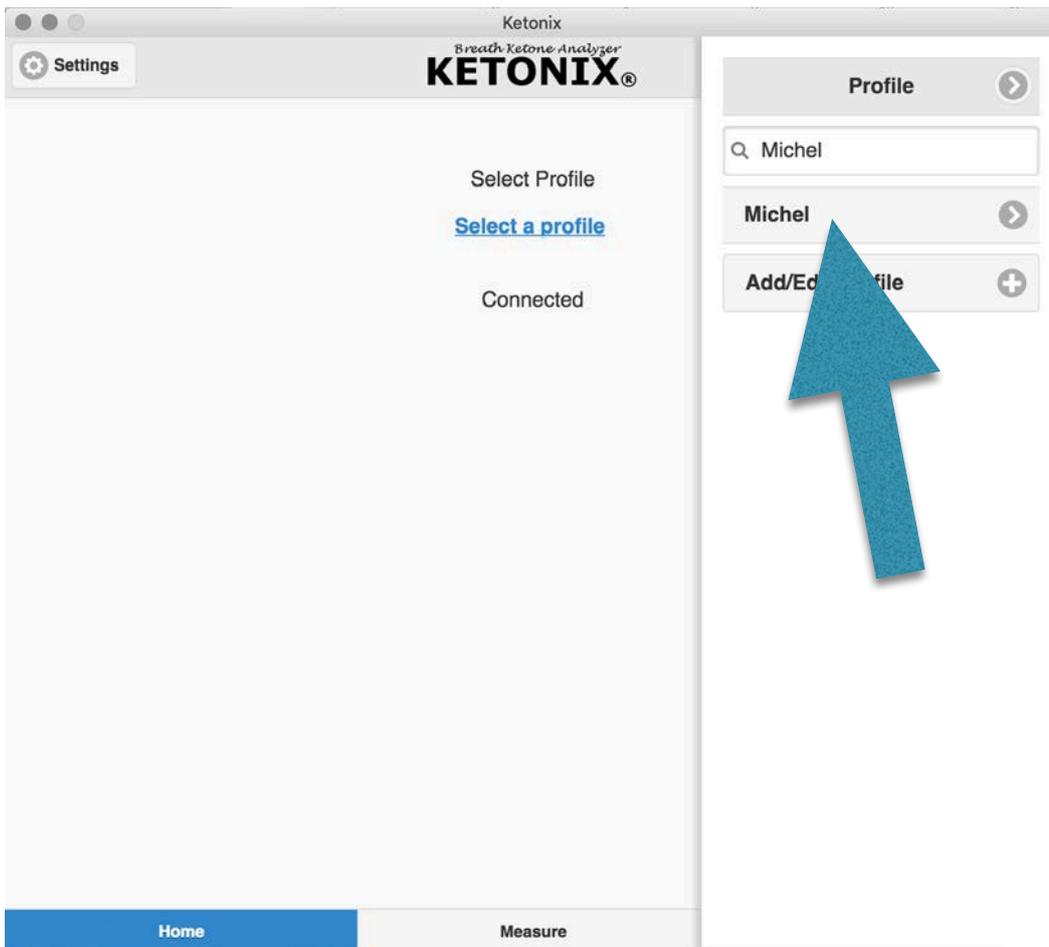
Donate data to science

Epilepsy ⌵

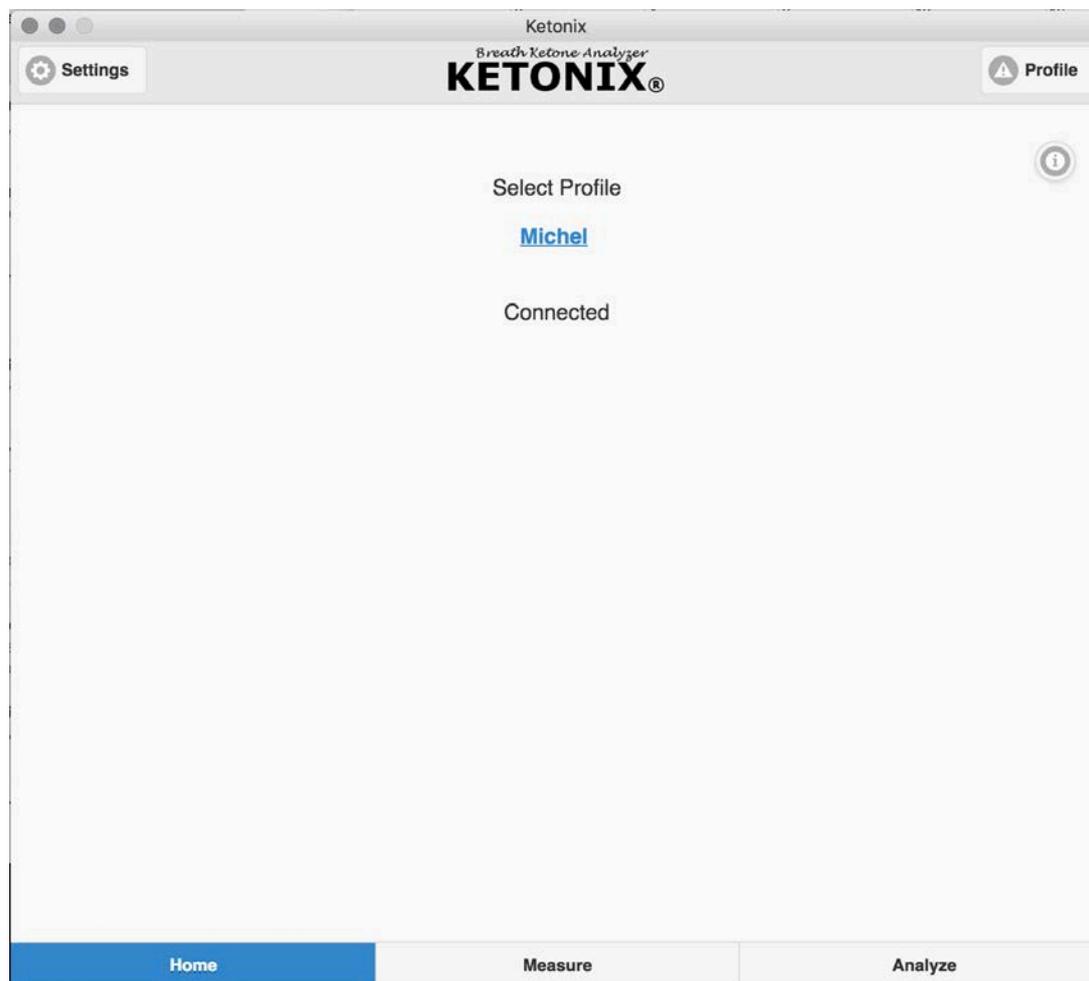
Delete Update

New

1. First enter a profile name (mandatory).
2. Enter your **Username** and **Password** if you also are going to store your data on www.ketonix.com online (**Optional**). Just leave them blank if you are ok with storing your measures in your local database.
3. Enter your **Age**, if you leave it blank it will be set to 25.
4. Select your gender Male/Female.
5. Tick “Donate data to science” if you agree to let you data be anonymously used. (We encourage you to do so. This will help us and you learn more about breath testing ketones. This data will not be traceable back to you from any analysis done).
6. Select your reason for using a ketogenic diet.
7. Click on New to save your profile
8. Your profile name should now appear below the Select Profile field. Click on your profile name to select it.



Your profile name should now appear as in the example below.
(But with your name instead of “Michel”)



You are now ready to take a measurement.

5. TAKING A MEASUREMENT

5.1 Correct Technique and Practice

To get consistent measurements it is very important to follow the same procedure each time. You want the contents in the bottom of your lungs to be exposed to the KETONIX, not the air just halfway down your lungs.

5.2 Taking a Measurement with the Software

1. The status should read “Ready”



2. Do **not** make a deep inhale before the exhale.
3. Breathe normally as if you are relaxed (Eg: Reading a book)
4. After exhaling and before inhaling, empty the remaining part of the air in your lungs into the device.

5. The exhale should last as long as possible. You will sense a slight panic when you have exhaled as much as possible. When you sense the “panic must breathe” you remove the KETONIX from your mouth, put it down and let it analyse your test.

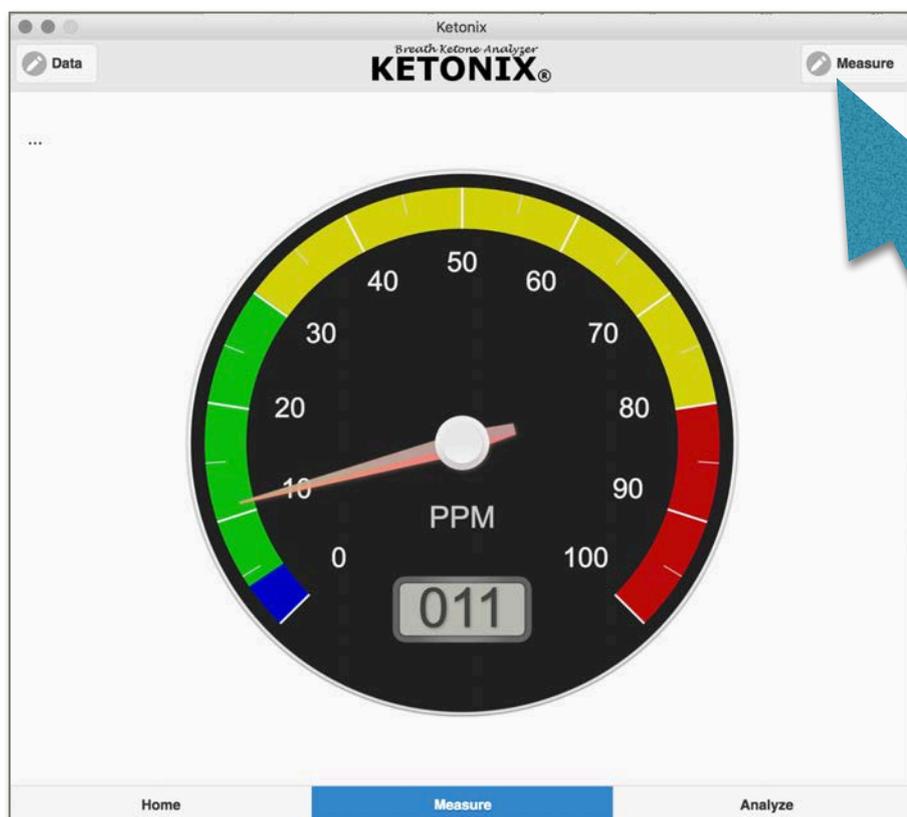
The ability to get the last air out of the lungs (which has the highest concentration) is different for everybody. The reading is personal and should be used as an indicator of how lifestyle affects your ketosis.

In the beginning you should empty your lungs into the KETONIX three times each time you perform a test. Click on the Save Measure button only after exhaling three times into the device. Only the highest value sensed will be displayed and saved when you click on the Save Measure button up in the right corner of the Measure tab.

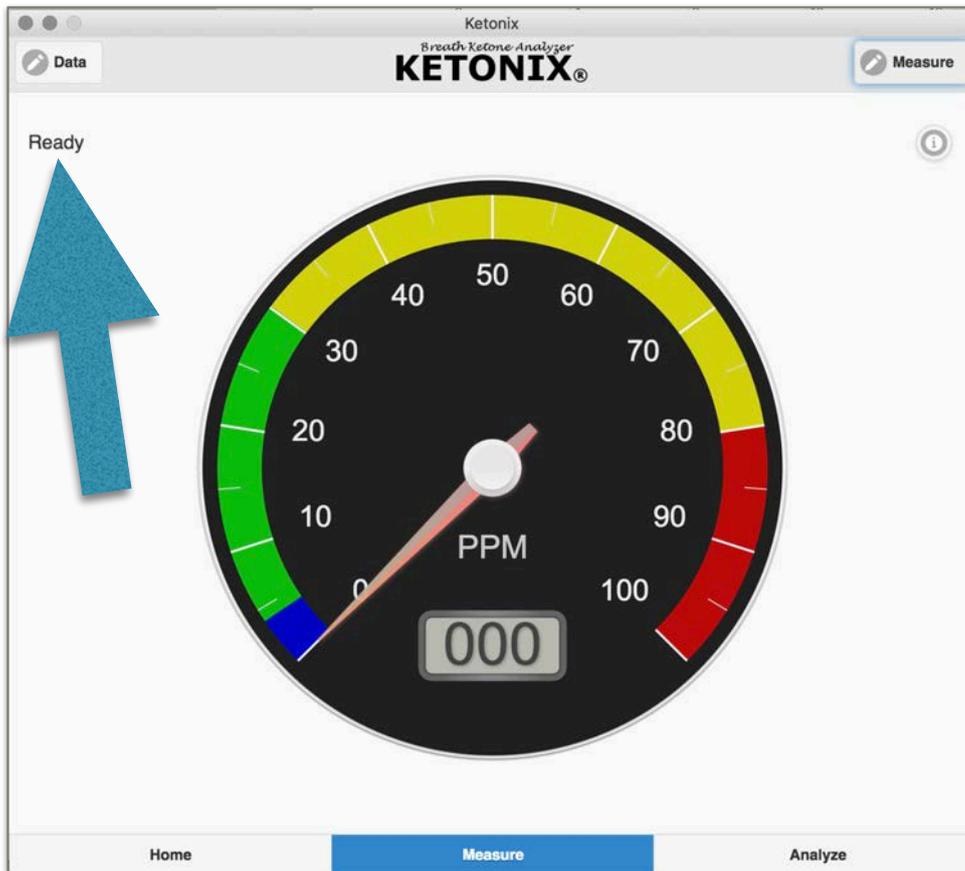
Example: When device is ready (steady blue) then exhale (empty your lungs) into the device. Breathe normally then empty your lungs again into the device. Breathe normally and then do a final empty your lungs into the Ketonix. Then wait 45 seconds to let it analyse. The highest concentration of acetone of the three measures are displayed.

Note: It is a common failure to make an inhale just to exhale. This will dilute the concentration and result in a more inaccurate measure.

6. When the gauge does not update any more, you should click on the Save Measure button at the top right



7. When you saved your measure, the sensor needs to breathe some air to be ready for a new measure. When it's ready for a new measure, the status is changed from ... to Ready.



5.3 Taking a Measurement without the Software

1. Turn on your KETONIX with either the USB cable or a charged KETONIX battery.
2. Wait until the blue light stops blinking and remains steady.
3. Do not take deep breathes, breathe normally
4. Exhale gently into the mouthpiece until your lungs feel empty.
5. Wait 45 secs and the colored lights will indicate your result. (E.g. 3 yellow blinks)
6. Wait 2 minutes before unplugging your KETONIX.

Note: See **SETTINGS – 6.1 Interpreting the Visual Spectrum** to understand the Feedback from the colored LED lights.

6. SETTINGS

6.1 Interpreting the Visual Spectrum

When you take a measurement with the KETONIX your results are indicated via a Visual Spectrum from the device which gives you feedback on what level of Ketosis you are in. The highest value of your measurement is displayed using the colored LEDS inside the KETONIX. The four different LED's indicate the different value ranges you have set your KETONIX to. BLUE being the lowest and will indicate no or very small traces of Ketones.

Example: the preconfigured feedback settings for KETONIX® USB

- BLUE : 0 - 4 PPM : Low
- GREEN : 4 - 30 PPM : Nutritional Range
- YELLOW : 30 - 80 PPM : High Ketosis
- RED : above 80 PPM : Very High Ketosis

Note: The colored LED lights will blink/flash between 1 to 10 times. This will tell you where your measurement is within the color range with 1 blink indicates the lowest value in the range and 10 blinks being the highest value in the range.

Readings within the blue range will not indicate with blinks, it will remain steady.

6.2 Preconfigured Settings

The KETONIX has three factory settings **Blue**, **Red** and **USB**. Each of these settings indicates different values for each color. The individual user can therefore have even more specific feedback. The **Blue** and **Red** factory settings are valid for the Ketonix Red/Blue (released 2015) and the **USB** setting is for the Ketonix USB version (released 2017).

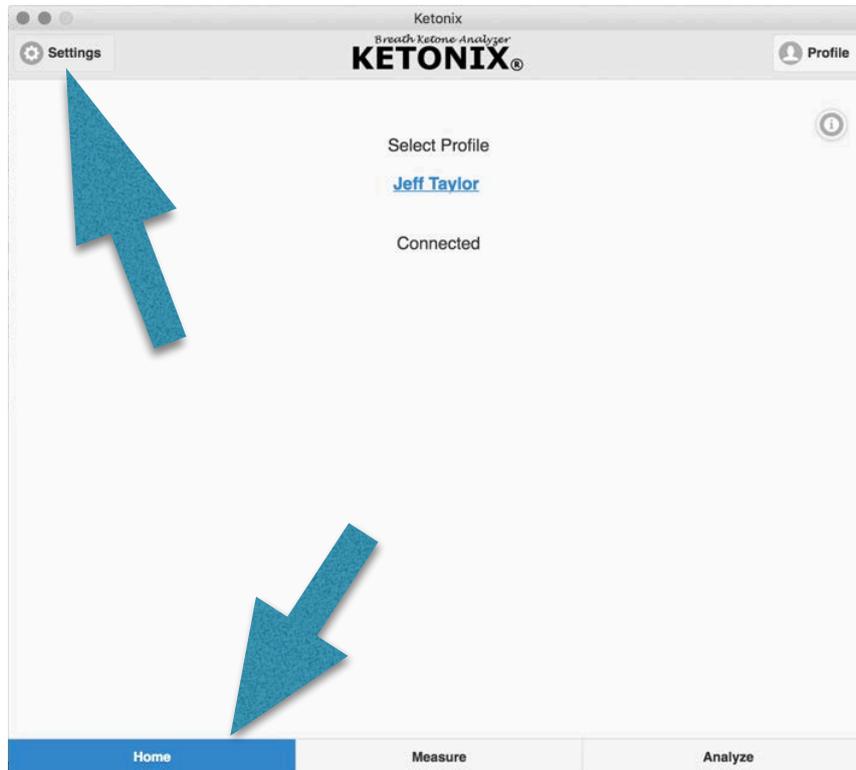
The different values in each setting are noted in the below table and the settings page of the software.

Color	Blue	Red	USB
Green	25 %	25 %	4 PPM
Yellow	40 %	50 %	30 PPM
Red	55 %	75 %	80 PPM

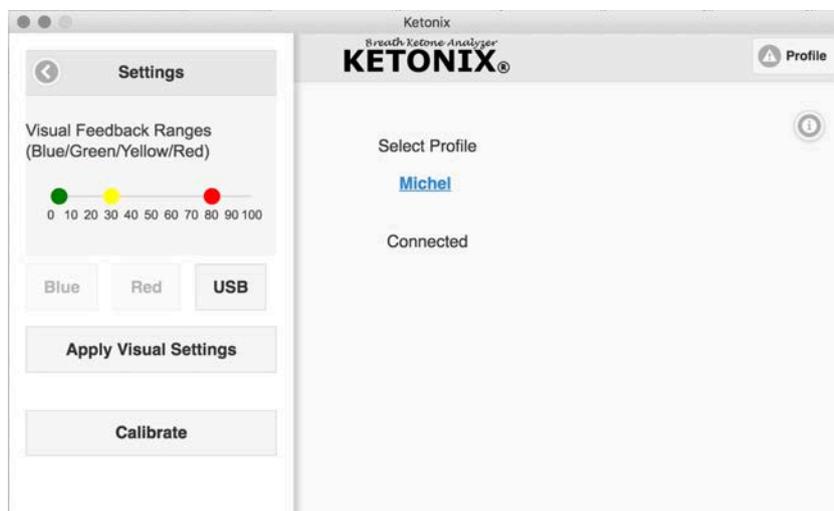
6.3 Adjusting the Preconfigured Settings (Blue, Red and USB)

To change a setting carry out the following:

1. Click on the Settings icon at the top right in the Home tab



2. Drag the coloured knobs to a value you want that range to start. Then click on Apply Visual Settings. To “get back to factory settings” click on a factory setting button, then Apply Visual Settings.

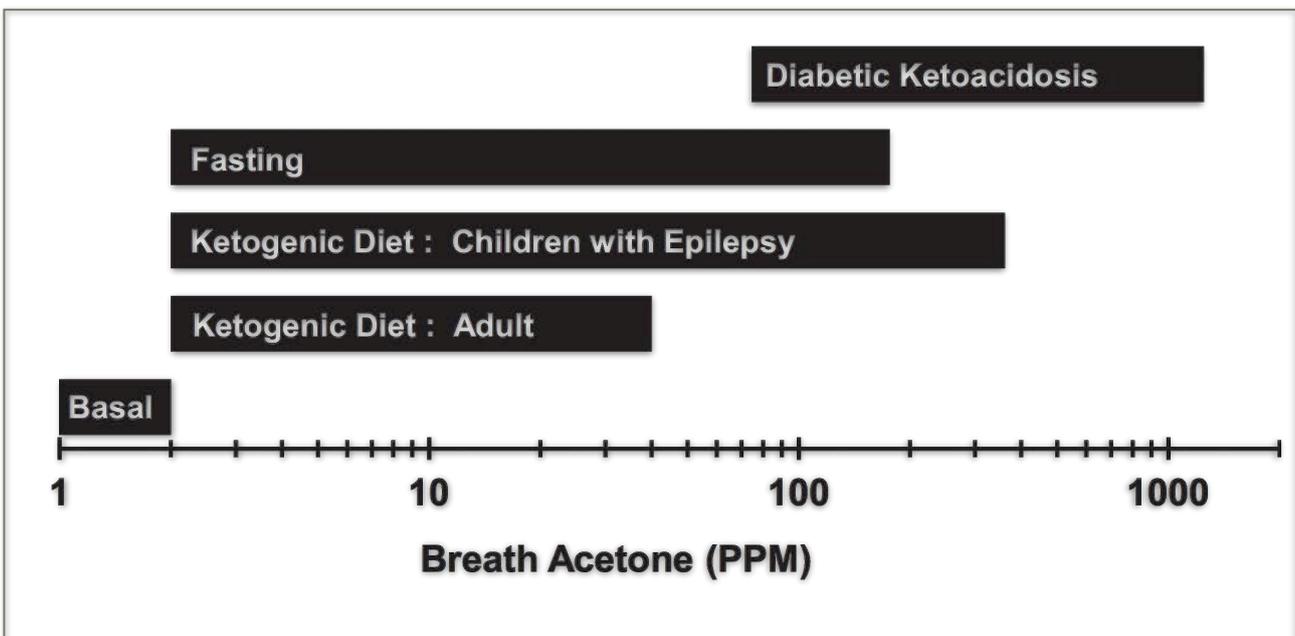


7. The KETONIX Value and how to use it

Use your KETONIX as a compass to navigate to a lifestyle that achieves ketosis in a way that you can manage. By measuring often and observing what and how lifestyle affects your ketosis you learn what food, fasting and activity works for you. The Ketonix reading is highly dependent on your ability to perform a test, e.g. get the last air out of your lungs (highest concentration is in the bottom of the lungs). **The reading is individual and personal.** Each individual have their own metabolism and lifestyle. There is more factors than just the macronutrients that affects the ketosis. Body creates glucose as response to both physical and psychological stress. The important thing is the trend of your readings with regard to lifestyle actions. The most recent model of Ketonix, the Ketonix USB model indicates the result in PPM acetone. There is reference ranges in the literature that could help you out determine what level you should aim for.

Changing the Ketogenic ratio of your food, different intensity when exercising and fasting will work differently for everyone. Ketonix is designed to give you feedback and empower you to create a "lifestyle that works for you". The device was designed to give instant feedback and provide the user information about the current level of ketosis. Based upon trends the user can make lifestyle choices that maintain ketosis.

Below is a reference chart regarding PPM acetone:



Obesity (2015) 23, 2327–2334. doi:10.1002/oby.21242
Measuring Breath Acetone for Monitoring Fat Loss: Review
Joseph C. Anderson

7.1 Testing food: Test a new brand of bacon ...

1. Measure a baseline in a stable state, preferably fasted state
2. Have your portion of your bacon.
3. Take a measure every 15 minute until you reach the baseline again.

7.2 Evaluating exercise

When evaluating exercise, one must know that some exercise activates the bodys ability to produce glucose. Then during recovery muscles stores glucose, so measuring during, right after and a couple of hours later can give you a picture of how different exercise types can affect your body.

Example: High Intensity Interval Training (HIIT) is likely to produce glucose during training, and your ketosis values will decrease until your muscles absorbed the glucose.

Example: Endurance exercise is likely to produce less glucose and utilise fat oxidation more, and your ketosis values will increase instead.

At what intensity, type and length of exercise your bodys proportion of producing glucose, and oxidise fat is very individual.

The testing strategy is in much the same as testing food. Test before, then after in intervals of 30 or 60 minutes (what suites you best).

7.3 Simply in ketosis

This is the easiest way to use the KETONIX. Just set the feedback range to your ketosis, then measuring does not need a computer, you can use the feedback lights inside the KETONIX.

The Ketonix USB comes preconfigured with a nutritional ketosis range: 4-30 PPM which is what the review in Obesity (2015) 23, 2327–2334. doi:10.1002/oby.21242

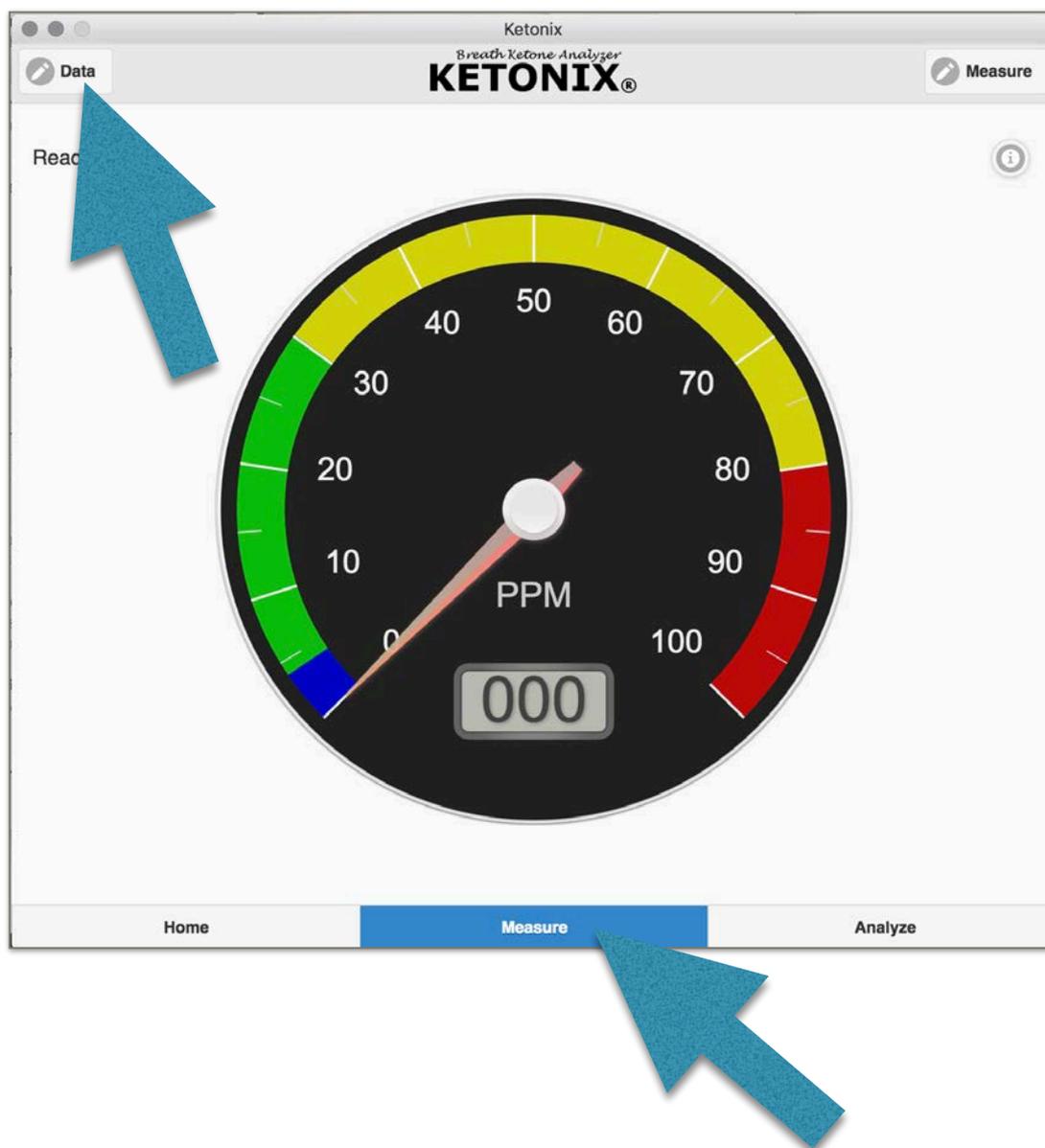
Measuring Breath Acetone for Monitoring Fat Loss: Review by Joseph C. Anderson.

Any value in or above the Green range (Green, Yellow, Red) indicates ketosis. The green range indicates begin in nutritional ketosis. A way to determine your ketosis “start” is to do a day of water fast, then measure. A value above this will tell you you are in ketosis.

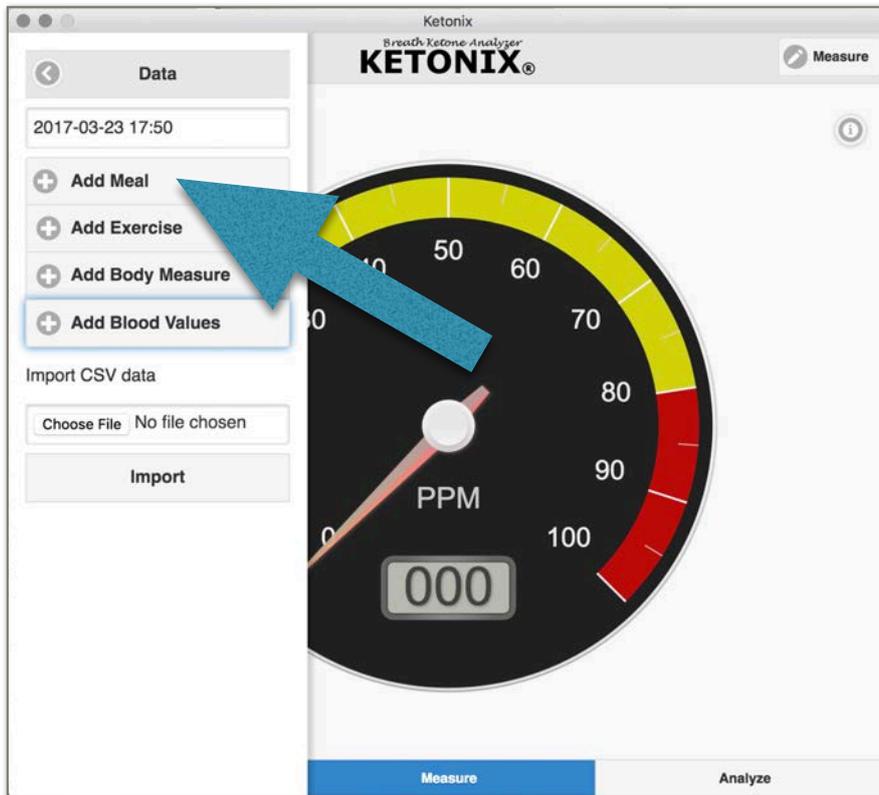
8. SAVING ADDITIONAL DATA

You can save additional data such as meals, exercise, body measures and blood values. To save additional data carry out the following:

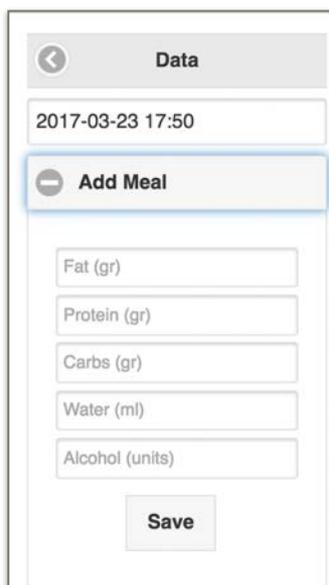
1. Select the “Measure tab” in the bottom of the software window.
2. Click on the **Data** icon at the top right.



3. Expand the group of data you want to add data to.



4. Enter your data in the form fields. The date field at the top will be saved as log-time for the additional data.

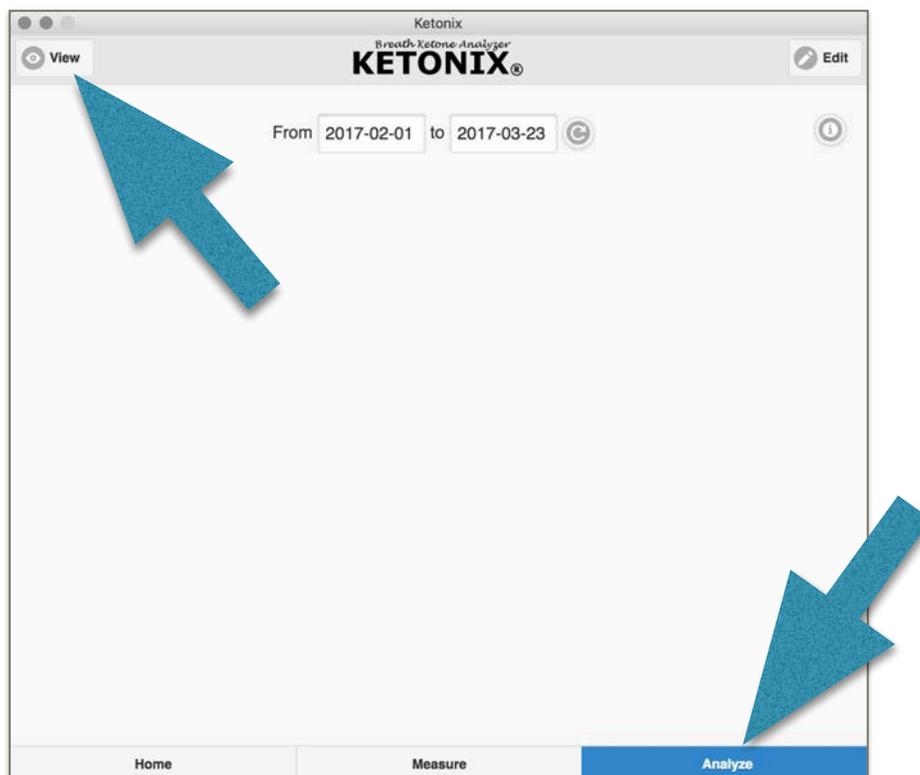


5. Then click on the Save button.

9. VISUALIZING DATA

To view your data do the following:

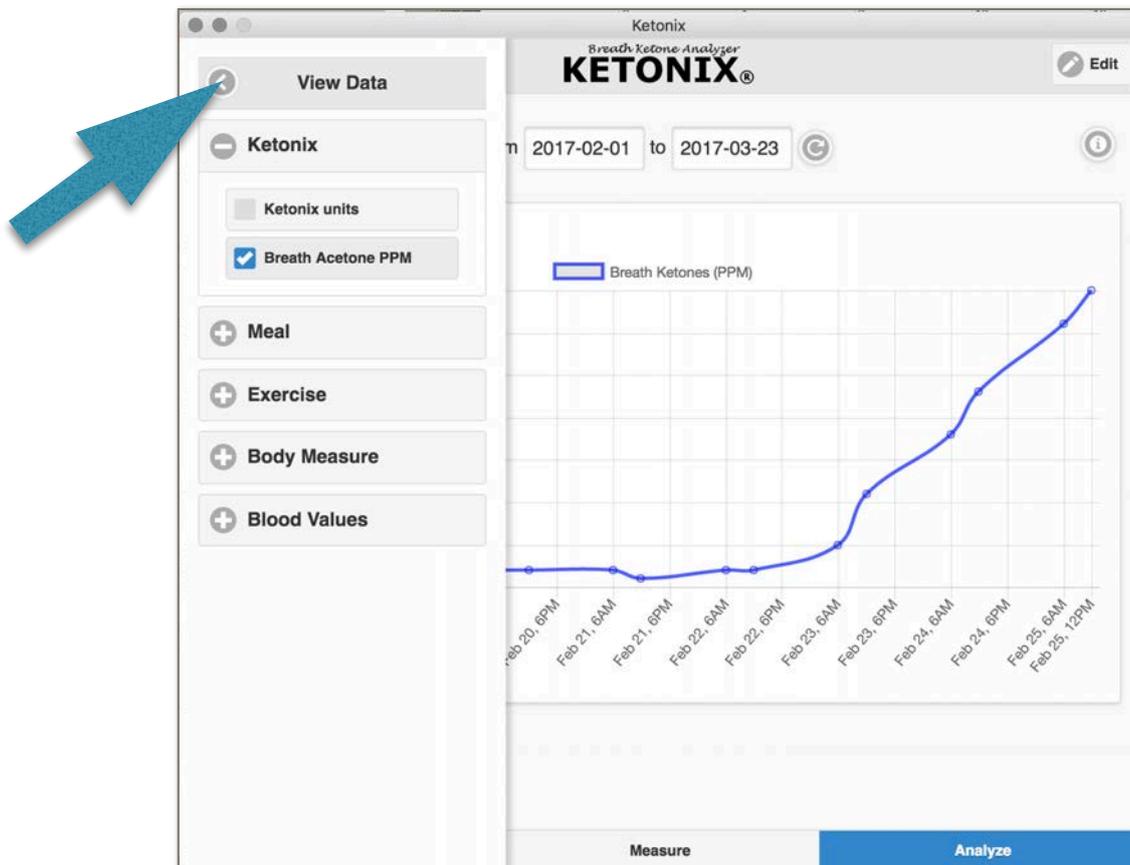
1. Select the Analyze tab at the bottom of the software window.
2. Expand the View panel by clicking on the View icon at the top left



3. Now expand the group of data you want to see by clicking on the label



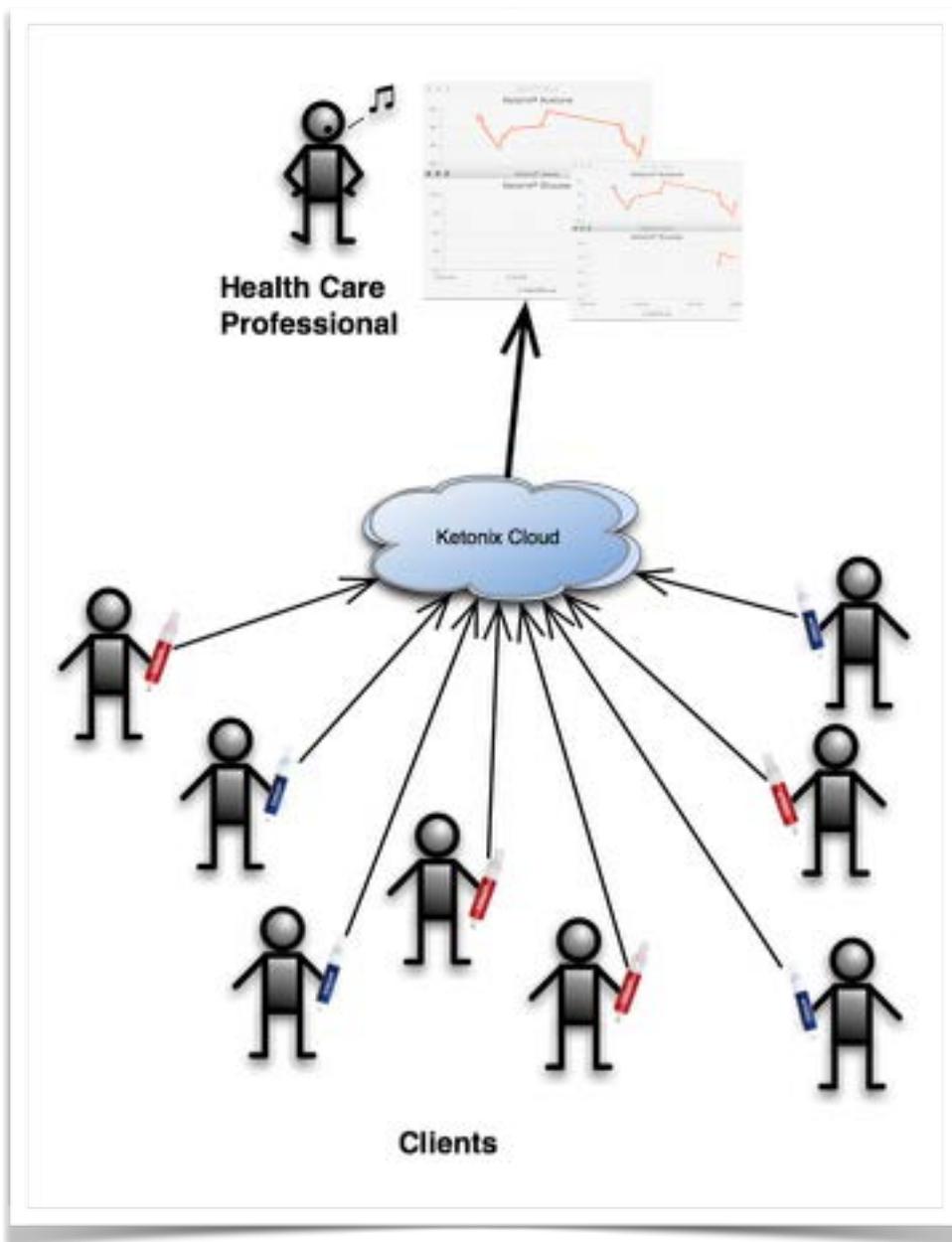
4. Select the data you want to view, then click on the left arrow at the top left beside "View Data" to close the panel.



10. KETONIX FOR THE MEDICAL AND HEALTHCARE PROFESSIONAL

Aiming to support medical healthcare professionals we have a simple **STUDY** function. It is **free** to use and enables practitioners to easily collect data remotely for analyse and support to their clients.

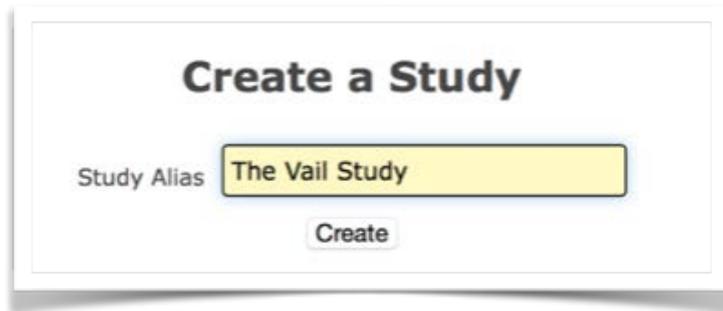
Using this functionality, client's progression can easily be monitored by the practitioner via the Internet and the cloud. We believe this will be a helpful tool in the therapeutic use of ketogenic diets and enable a new trend in "health coaching".



10.1 Create a Study (health care professional)

The study tool is simple to use.

1. Choose a name and select **Create**. The name could be a group name, the clinics name or whatever you want to use to group all or some of your clients.



The screenshot shows a web form titled "Create a Study". It features a text input field labeled "Study Alias" containing the text "The Vail Study". Below the input field is a button labeled "Create".

You will automatically receive a **“Study Id”**, **“Study Key”** and a **“Resign Key”**. Distribute the “Study Id” and the “Study Key” and other documents to your clients.

The **“Resign Key”** should be kept secret to have control of “drop outs”.



The screenshot shows a confirmation screen titled "Study Created!". It displays the following information:

- Study Alias: The Vail Study
- Save and keep the following information safe
- Resign Key: 183-TPM-IZX-PDM-YNP
- Distribute the following enrollment information to all participants
- Study Id: 183-ZTV-DCJ-VLU-TZW
- Study Key: 183-PRK-JDV-YNP-RAI

10.2 Enroll a Patient/Client in a Study (client)

To enroll a patient/client in a study follow the instructions when prompted.

By entering study id, study key and click on "Enroll Study" you agree to share your data with the organisation that created this study and provided the id and key.

You can at any time choose to discontinue access to your future data by selecting "Resign" in the "List My Enrolments".

Study Id

Study Key

10.3 List Studies (client)

The clients have control of which study or studies they are participating in.

Enrolled Studies for Michel Lundell

Study Id	Study Key
0183-EDO-PWG-ILU-POU	183-YVU-ACG-BLU-AKR Resign

10.4 Resign from a Study (client)

The participant can resign from the study after obtaining a “**Resign Key**” from the study management.

Resign from Study

When you decide to resign from the study, you need a **Resign Key**.
Please contact the study management and they will provide one.

Study Id

Study Key

Resign Key

10.6 Visualize Data (health care professional)

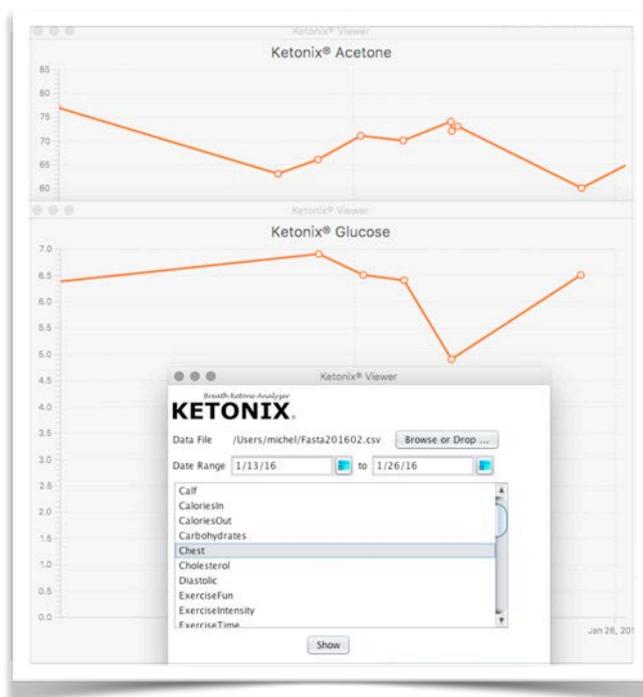
If a medical or healthcare professional has patients using KETONIX as part of their treatment they can Visualize a patients data stored online.

The clients data is easily downloaded for analysis from your account.

Studies				
Alias	Study Id	Study Key	Resign Key	
Wichita Study	183-EDC-PWQ-ALU-POL	183-PRK-JDV-YNP-RAI	183-TPM-IZX-PDM-YN	Download Data
Wichita Study	183-EDC-PWQ-ALU-POL	183-PRK-JDV-YNP-RAI	183-TPM-IZX-PDM-YN	Download Data
Wichita Study	183-EDC-PWQ-ALU-POL	183-PRK-JDV-YNP-RAI	183-TPM-IZX-PDM-YN	Download Data
The Vail Study	183-ZTV-DCJ-VLU-TZW	183-PRK-JDV-YNP-RAI	183-TPM-IZX-PDM-YN	Download Data

Click on Download Data, and a compressed zip file containing each clients data is downloaded.

Using the Ketonix®Viewer you will be able to view a patient's data across a number of fields. Select the charts and time-frame you want to view, then just drop your **clients data** into **the Data File Box** and it will be rendered.



To change from one patient to another all you have to do is drop the individual patient's data file into the Data File box.

11. GENERAL

11.1 Comparison to Blood Testing

A common misunderstanding is that breath acetone directly correlates to the blood test ketone beta-hydroxybutyrate. It is easy to make that assumption, and in some contexts it appears to correlate.

When fatty acids break down in the liver to acetoacetate. Acetone is spontaneously released from the AcetoAcetate. Excess AcetoAcetate is stored in blood as beta-hydroxybutyrate.

Acetone is a waste product that is not stored in your body.
Beta-hydroxybutyrate is buffered energy which can be converted back to AcetoAcetate which then is used to create energy (ATP).

The concentration of Beta-hydroxybutyrate is a product of how much excess AcetoAcetate that is not used and time.

The concentration of Acetone in breath indicates the amount of AcetoAcetate produced by breaking down fatty acids in the liver (ketosis).

Being in high ketosis (high breath acetone) will over time build a higher concentration of beta-hydroxybutyrate.

11.2 High Carbohydrate Testing

KETONIX is designed to be used in a LOW CARB CONTEXT. KETONIX was designed to help people to optimise their Ketogenic Diet (or a Low Carb High Fat diet). In general a low carb context is consuming < 100 grams carbohydrates/day.

When you received your KETONIX, there is a tendency for customers and others to test it all the time, even if they are not following a Low Carb High Fat Diet.

It has not been designed to be used by someone eating a lot of carbohydrate rich food. If you use the device whilst eating a lot of carbohydrates it is possible to get a positive measurement on the device.

The reason for this is that eating high carb content will make the bacteria in the stomach produce methane from breaking down of the carbs. This gas will influence the reading. Simple sugars will also produce some methanol in your blood. The body does not produce many ketones whilst eating a lot of carbohydrates. Ketone production is initiated when carbs are low.

KETONIX should be used in context. Example: If you eat pizza and beer then look for ketones ... you are out of context.11.3 Alcohol

The sensor is sensitive to alcohol and can result in a positive measurement. Whilst your body is processing alcohol ketosis will be put on hold until it is gone. We recommend not to drink prior to carrying out a measurement.

11.3 Alcohol

The sensor is sensitive to alcohol and can result in a positive measurement. Whilst your body is processing alcohol ketosis will be put on hold until it is gone. We recommend not to drink prior to carrying out a measurement.

11.4 Exercise

When exercising your body needs more energy. Ketones are energy and you're the level will go down during short to medium training sessions.

When doing aerobic exercise you will exhale acetone and ventilate your lungs. Wait a few minutes after exercise before testing. Test a few times after the exercise to see how your body works.

During a longer session, the buffer of ketones may become emptied and the process of breaking down fatty acids begun again to produce more ketones. As a result of a longer session the ketones can be higher than before.

11.5 Fat Adapted

If a person is fat-adapted or not, greatly affects the level of ketones you have. When starting to follow a low-carb lifestyle your ketone levels will be high due to the glucose demand from the muscles and brain. After a number of weeks the ketone levels will decrease quite a lot as the muscles become adapted to using fat as fuel.

11.6 Exogenous Ketones

Supplementing with exogenous ketones will most likely not increase your breath ketones. Adding more energy will not trigger body to produce energy from stored fat. Breath ketones comes from breaking down fatty acids in the liver to ketones, it does not come from blood ketones (beta-hydroxybutyrate).

12. SPECIFICATIONS

- Indicates your ketone production by analyzing your breath.
- A reusable instrument that can be used thousands of times.
- Powered by a computer with USB port, USB charger 5V or a 5V battery with USB port.
- User calibration available with software.
- Comes preconfigured with the general settings indicating acetone in ppm (the light feedback can be changed by user software)

Feedback Color: PPM:

BLUE	:	0 - 4	PPM	:	Low
GREEN	:	4 - 30	PPM	:	Nutritional Range
YELLOW	:	30 - 80	PPM	:	High Ketosis
RED	:	above 80	PPM	:	Very High Ketosis

- User definable feedback ranges.
- Record breath ketones locally or to an online account (www.ketonix.com).
- You can anonymously contribute your data to studies of ketogenic diets (Optional).
- Mouthpiece can be easily removed and cleaned. An extra mouthpiece is included. The mouthpiece has three different settings that can easily be changed to adjust the resistance.
- Software provides profile management to enable several users to share a device using personal mouthpieces.
- The USB cable is detachable and the battery can be inserted direct to enable mobile measures. Measures using battery is only indicated by lights.
- Weight: 40 gr (total weight 260 gr).
- Size: length 130 mm, diameter 25 mm.

13. TROUBLE SHOOTING

There will be a separate troubleshooting guide available on www.ketonix.com

14. CHARGING THE BATTERY

When you receive the battery it has a very low charge. We recommend to charge it first thing and not empty it totally.

The short cable that comes with the set is the charging cable. It got two different ends, one is the end that should be inserted into the battery, the other should be inserted into a computer or USB charger.

The end that should be inserted into the battery is labeled “KETONIX® Battery”. It is a microUSB contact and can only be inserted one way. Look carefully and don't force it into the battery, its a small contact and could break.



When you power the battery with the charging cable and charging begins, a small LED light blinks near the contact at the battery.

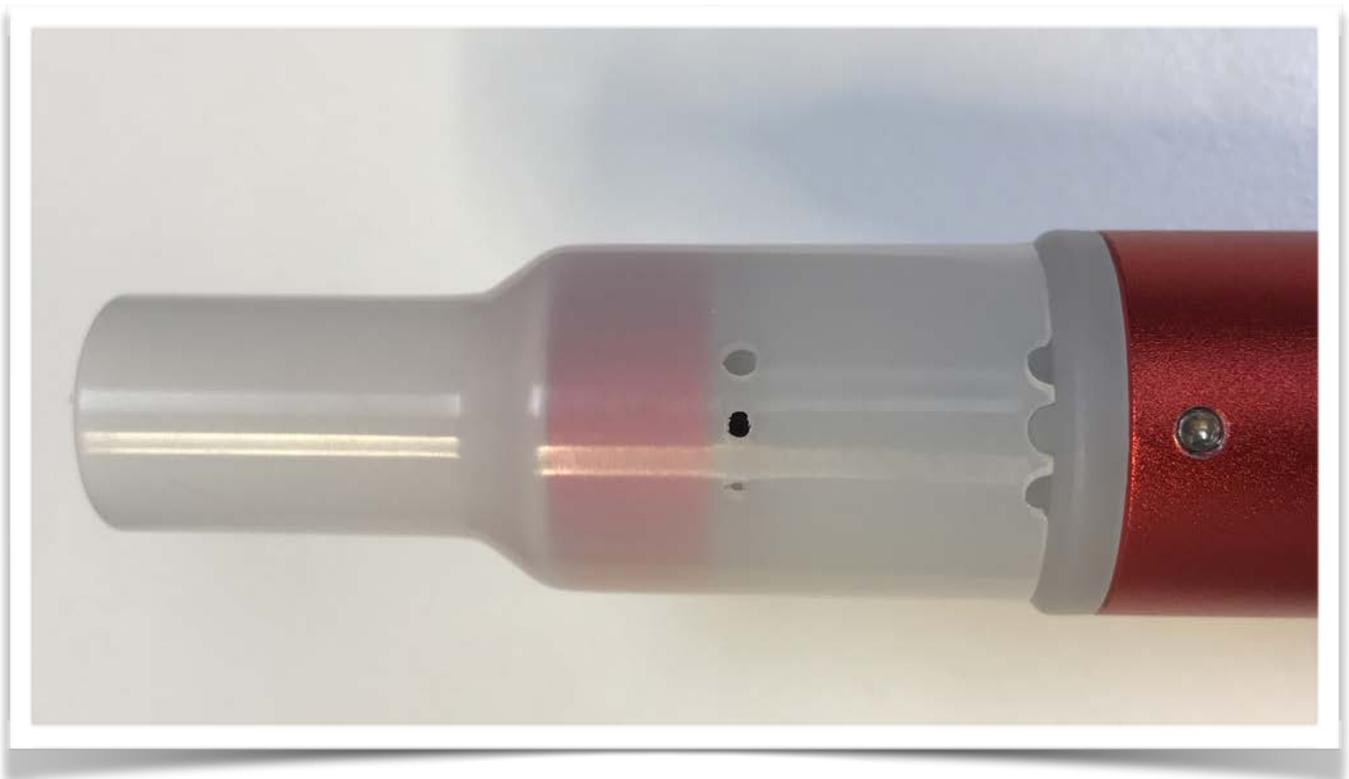
When battery is fully charged, the small LED light is steady.

15. THE ADJUSTABLE MOUTHPIECE

The mouthpiece now has three different positions. Each position have a different size of hole that lets the air out from the sensor. The leftmost position has the smallest hole and gives most resistance. The rightmost position gives the least resistance.

The ideal position is when you feel that you are able to empty your lungs completely.

To adjust it, just pull it up a little bit, turn it to the position you want and push it down again.



16. IMPORT CSV DATA

Previous version of the software could save data into a csv file. This section is about how you can import it to your local database.

1) First, select the profile you want the data to be added to. Click on the Home tab (down to the left). Then click on the Profile icon up at the right, type in a couple of letters in your profile name in the “Search Profiles ..” text box, then click on your profile name.

2) Click on the Measure tab (bottom middle), then click on the Data icon at the top left. At the end of the Data panel, you will see Import CSV data. Click on Choose File and then select your csv file. Then click Import.

