

BlueEye™ Mobile



Operating Manual BlueEye™ Mobile

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Version: 02



Mobile gas quality analyzer

Disclaimer of Liability

The information in this user's manual is presented in good faith and believed to be accurate. Bright Sensors SA has reviewed the contents of this publication to ensure consistency with the hardware and software described. Nevertheless, since variance cannot be precluded entirely, Bright Sensors SA cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

You are solely responsible for proper operation of the described products. The instructions in this manual do not relieve you of your obligation for safe handling during application, installation, operation and maintenance.

By using this manual, you acknowledge that Bright Sensors SA cannot be held liable for any damages in excess of the purchase liability regulation. We reserve the right to make changes to this manual at any time without notice.

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Safety Precautions

Safety, Protection, and Modification of the Product

- In order to protect the system controlled by the product and the product itself and ensure safe operation, observe the safety precautions described in this user's manual. Bright Sensors SA assume no liability for safety if users fail to observe these instructions when operating the product.
- If this product is used in a manner not specified in this user's manual, the protection provided by this product may be impaired.
- If any protection or safety circuit is required for the system controlled by the product or for the product itself, prepare it separately.
- Be sure to use the spare parts approved by Bright Sensors SA when replacing parts or consumables.
- Modification of the product is strictly prohibited.

The following safety symbols are used in this manual:



This warning notice informs you of imminently threatening dangers that can arise due to misuse/operator error. If these situations are not avoided, death or severe injuries can occur.



This warning notice informs you of potentially dangerous situations that can arise due to misuse/operator error. If these situations are not avoided, minor injuries can occur.



This notice informs you of potentially dangerous situations that can arise due to misuse/operator error. If these situations are not avoided, damage to the device or nearby property can occur.



This notice can provide you with helpful tips to make your work easier. This notice also provides you with further information about the device or the work process in order to prevent operator error.

Table of Contents

1. Introduction	5
1.1 Function of the BlueEye™ Mobile	5
1.2 Working with the BlueEye™ Mobile	8
1.3 Dangers during use of the BlueEye™ Mobile	9
2. First time use set-up	10
2.1 App installation and set-up	10
2.2 App - Cloud connection set-up	12
2.3 Establishing Bluetooth connection BlueEye™ Mobile to App	14
2.4 Downloading calibration data into the App	16
3. Operation	18
3.1 Connecting the BlueEye™ Mobile to a gas source	18
3.2 Start measurement	21
3.3 Combustion and Metering reference conditions	23
3.4 Recording measurement data in the App	24
3.5 Snapshot	24
3.6 Other App functionalities	24
3.7 Charging the BlueEye™ Mobile	24
3.5 Snapshot function	26
3.6 Other App functionalities	27
3.7 Charging the BlueEye™ Mobile	31
4 Cloud functionality	31
5 Maintenance & regular checks	36
6 Technical Data	38
6.1 Electrical Parameter	38
6.2 Gas pressure parameter	38
6.3 Operating temperature	38
6.4 Measured media	38
7 APPENDIX	39
7.1 Appendix A: Certificates	39
7.2 Appendix B: Calibration Report	39

1. Introduction

The gas quality analyzer BlueEye™ Mobile is designed and produced according to the state of the art and generally recognized safety standards and directives. However, its use can entail dangers that are avoidable by complying with this manual. The BlueEye™ Mobile must only be used as intended and in technically sound condition.

The BlueEye™ Mobile is available in the following versions:

1. BlueEye™ Mobile Extended
2. BlueEye™ Mobile Renewable
3. BlueEye™ Mobile Hydrogen
4. BlueEye™ Mobile Ultragreen

This manual is applicable to all versions of the BlueEye™ Mobile.



Unintended use of the device voids all warranty claims.



All of the following safety notices must be observed! Disregard of the safety notices can result in danger to the life and limb or environmental and property damage.

1.1 Function of the BlueEye™ Mobile

The BlueEye™ Mobile is a MEMS (Micro-electromechanical systems) gas quality measurement device. The integrated sensor unit combines Bright Sensors' patented dynamic viscosity measurement principle with other MEMS based measurement techniques, like thermal conductivity and Integrated Infrared (INIR). Based on Bright Sensors proprietary database of thousands of gas compositions, the gas combustion properties are calculated by industry standards. Through correlative models the measurement properties are then correlated to the gas combustion parameters.



Figure 1: Sensor cell

The BlueEye™ Mobile correlates these measurements to the following parameters of a gas composition:

- Gross Calorific Value – **H_s** (ISO 6976:2016 / GPA 2172:2009)
- Net Calorific Value – **H_i** (ISO 6976:2016 / GPA 2172:2009)
- Gross Wobbe Index – **W_{I_s}** (ISO 6976:2016 / GPA 2172:2009)
- Net Wobbe Index – **W_{I_i}** (ISO 6976:2016 / GPA 2172:2009)
- Density – **ρ** (ISO 6976:2016 / GPA 2172:2009)
- Relative Density – **ρ rel.** (ISO 6976:2016 / GPA 2172:2009)
- Compression factor – **Z** (ISO 6976:2016 / GPA 2172:2009)
- Air-Fuel ratio – **AFR** (calculated based on 20.946% oxygen in air)
- Stoichiometric Air-Fuel Ratio – **s-ARF** (calculated based on 20.946% oxygen in air)
- Methane Number – **MN** (ISO23306 PKI Methane Number)
- Carbon dioxide mol% – **CO₂ mol%** (based on IR CO₂ sensor)
- Hydrogen mol% – **H₂ mol%** (based on Bright Sensors correlative model)

The by the device deployed correlative models are temperature and pressure compensated within a defined range. To ensure measurement results within specifications, the following boundary conditions **MUST** be ensured for each BlueEye™ Mobile model individually:

BlueEye™ Mobile Specifications

Reported values	Units	Reference conditions	Applied correlation and calculation standards
Gross Calorific Value (H _s)	MJ/m ³ , kWh/m ³ BTU/scf, Therm/scf	0/0°C, 15/0°C, 15/15°C, 20/20°C, 25/20°C at 101325 Pa and 60°F at 14.65, 14.696, 14.73 psi and 15.025 psi absolute	NIST AGA-8 ISO 6976:2016 GPA 2172:2009
Net Calorific Value (H _i)			
Gross Wobbe Index (W _{I_s})			
Net Wobbe Index (W _{I_i})			
Density ρ	kg/m ³ , lbm/scf		
Air Fuel Ratio λ	-	Volume, 20.946% O ₂	Simplified method
Methane Number	-	-	ISO23306 PKI Methane Number
CO₂ & H₂ concentration ^{1 2}	mol%	-	Proprietary methods

Accuracy	≤ 1% of reading
Repeatability	≤ 0.2% of reading ³
Dynamics	One measurement every 1s, reaction time T90 < 60s

Gas Composition Range					
CH ₄	70-100 mol%	Higher Alcanes	0-1 mol%	O ₂	≤ 3 mol%
C ₂ H ₆	0-20 mol%	N ₂	0-15 mol%	H ₂ O (Gaseous)	≤ 0.1 mol%
C ₃ H ₈	0-5 mol%	CO₂	0-3 mol% (20/100 mol%) ¹	Dust, Liquids	Without
C ₄ H ₁₀	0-3 mol%	H₂	≤ 0.5 mol% (30 mol%) ²	H ₂ S	≤ 0.01 mol%
H_s addressable range		27.52 to 50.40 MJ/m ³ (15°C/15°C)			
Environment temperature		0 to 50°C, 32 to 122°F			
Medium inlet temperature		Within +/- 2°C, 36°F from environment temperature			
Operating gas pressures		960 to 6000 mbar absolute , 13.9 to 87 psi absolute			
Flow rate		50 ml/min (+/- 10%), 0.00177 scf/min (+/- 10%) ⁴			

¹ only for BlueEye™ Mobile **Renewable** & **Ultragreen**

² only for BlueEye™ Mobile **Hydrogen** & **Ultragreen**

³ unfiltered 1 second cycle measurement

⁴ flow rate range customizable on request

The in the BlueEye™ Mobile integrated sensor unit has a pressure range from 960 to 1100 mbar absolute (13.9 to 16 psi absolute) and a flow range of 50 ml/min +/- 10% (0.00177 scf/min). To achieve these rates, the device has a build in double stage pressure regulator and a flow restriction. This allows for an inlet pressure to be entered on the inlet of the device up to maximum 6.0 bar **absolute** (87 psi **absolute**) or 5.0 bar **relative**.



Applying a gas pressure above 6 bar absolute (87 psi absolute) can result in danger to the life and limb or environmental and property damage.

The pressure over the sensor unit is held constant by the pressure regulator between 20 and 22 mbar (0.29 – 0.31 psi) relative. The flow rate over the sensor unit is factory set at 50 ml/min (0.00177 scf/min) taking bases on pure methane at 25°C (77°F). In order to reduce response time, particularly when the BlueEye™ Mobile comes out of air, a purge line is installed directly after the regulator. This allows to purge the pressure regulator with a high flow rate to ensure instant measurement of the intended gas composition.

The BlueEye™ Mobile is a battery powered device integrating the sensor cell described above with a Bluetooth® Low Energy module, as well with the necessary gas connections and gas conditioning functions. Data measured by the BlueEye™ Mobile is streamed to a mobile phone through the BlueEye™ Mobile App, available on the Play Store and App Store. The data is stored locally on the mobile phone and automatically uploaded when an internet connection is available to the secured Bright Sensors' cloud, www.blueeye-mobile.com. This allows users to retrieve the data and download it as a .xlsx or .csv file, as well as automatic download through an API.



Figure 2: Data flow from BlueEye™ Mobile to Bright Sensors' cloud

1.2 Working with the BlueEye™ Mobile

DANGER

Despite the very low flow rates of the BlueEye™ Mobile under normal measurement conditions it is strongly recommend ensuring that the BlueEye™ Mobile:

- Is **NEVER** used in any Explosion Atmosphere as defined by ATEX or similar directives.
- Is only operated in the presence of a qualified technician and in a ventilated atmosphere.
- The gas outlet and the purge line **MUST** be evacuated individually to a safe venting area.

DANGER

All of the following safety notices must be observed! Disregard of the safety notices can result in danger to the life and limb or environmental and property damage.

Bear in mind that the safety warnings in this manual and on the device cannot cover all potentially dangerous situations, because the interaction of various conditions can be impossible to foresee. Merely following the instructions may not suffice for correct operation. Always remain attentive and consider potential consequences.

- Read this operating manual and especially the following safety notices carefully before working with the device for the first time.
- Warnings are provided in the operating manual for unavoidable residual risks for users, third parties, equipment or other property. The safety instructions used in this manual do not refer to unavoidable residual risks.
- Only operate the device in fault-free condition and in observance of the operating manual.
- Compliance with local statutory accident prevention, installation and assembly regulations is also mandatory.

NOTICE

All notices in the manual must be observed. Use of the BlueEye™ Mobile is only permitted in accordance with the specifications in the operating manual. Bright Sensors SA assumes no liability for damages arising due to disregard of the operating manual.

DANGER

The BlueEye™ Mobile complies with current standards and regulations. However, danger can arise with misuse and the BlueEye™ Mobile can be destroyed due to operator error. The technical specifications in this operation manual must be observed and followed for safe operation. Performance limits must not be exceeded. For safe operation, the BlueEye™ Mobile must only be used in the scope of the intended use. Service and maintenance tasks or repairs that are not described in the operating manual must not be carried out without prior consultation with Bright Sensors SA.

1.3 Dangers during use of the BlueEye™ Mobile



The BlueEye™ Mobile is CE (Conformité Européenne) conform. Observe the information given in the applicable type or unit examination certificate and the relevant country-specific regulations for installation. No observance can result in serious injury and/or damage to the equipment. Install the device as specified in the operating manual. Improper installation can lead to the loss of the explosion protection and to life-threatening situations.



In general, the following is recommended for all persons working with or on the BlueEye™ Mobile:

- Training / education for work with gas installations.
- The ability to correctly estimate dangers and risks when working with the BlueEye™ Mobile.
- Training / education by Bright Sensors SA for work with gas measuring devices.
- Education / instruction in all national standards and directives to be complied with for the work to be carried out on the BlueEye™ Mobile.

Operating personnel:

The operating personnel use and operate the device in the scope of the intended use.

Maintenance personnel:

Work on the device must only be carried out by qualified personnel who can carry out the respective tasks on the basis of their technical training, experience and familiarity with the applicable standards and requirements. These qualified personnel are familiar with the applicable statutory regulations for accident prevention and can independently recognize and avoid potential dangers.

Maintenance and cleaning:

Maintenance and cleaning must only be performed by appropriately qualified technicians.

2. First time use set-up

2.1 App installation and set-up

The BlueEye™ Mobile App is necessary to operate and gather measurement data and is available for:

- Google: Play Store for the Android OS 6 or later: <https://play.google.com/store/apps/details?id=com.brightsensors.bem1>
- Apple: App Store for the iOS 12.0 or later: <https://apps.apple.com/us/app/blueeyemobile-v2/id1546312878>

The Apps cost \$/€ 3.00 to download.

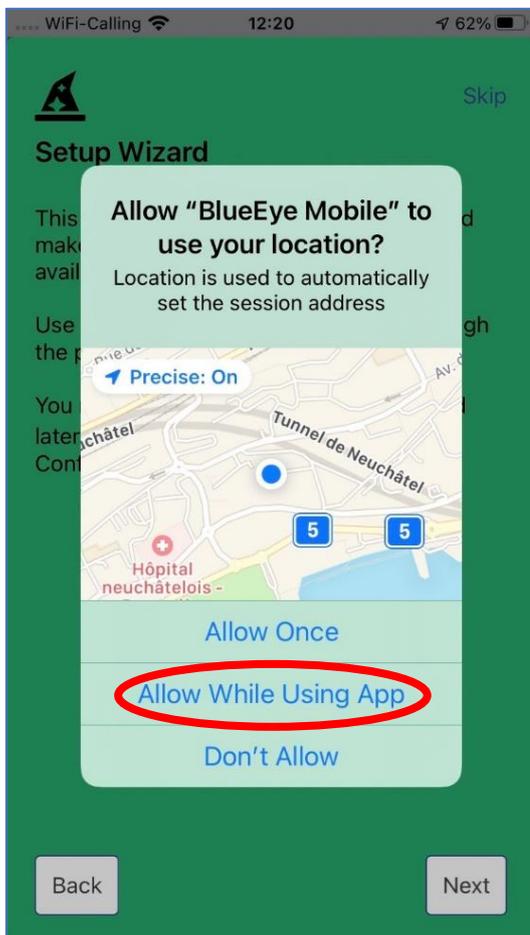
NOTICE

All pictures of App functionality stated in this manual will be based on the Apple App, small layout and wording deviations may occur when using the Android (Google Play) App.

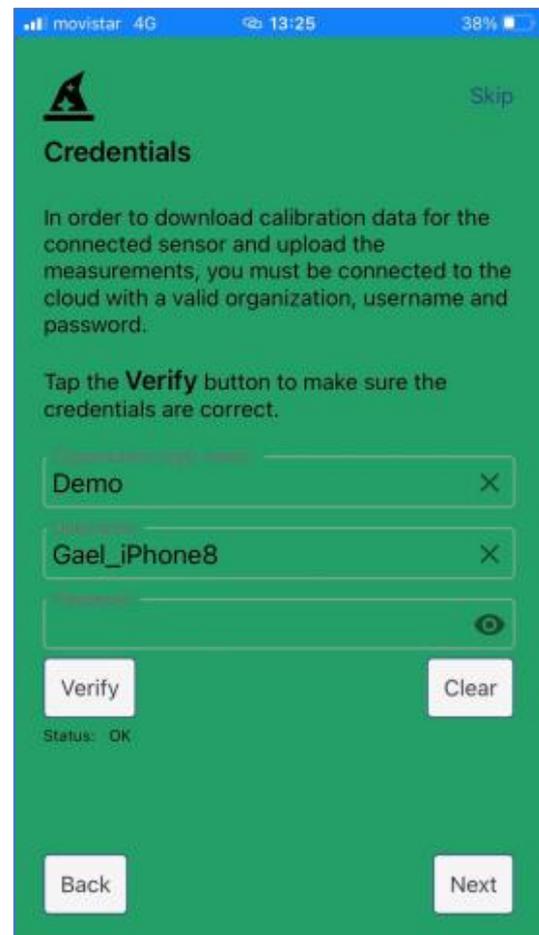
When first launching the BlueEye™ Mobile App, automatically the Setup Wizard will be launched. The wizard guides the user in the setup process of connecting to Bright Sensors' cloud, choosing the country of operation, and defining the session/measurements defaults. Per country it will recommend the most commonly used parameters such as reference conditions, date/time notation, address structure and temperature, energy and pressure units. Before starting a measurement session, the default setting will automatically appear, but they can still be changed on the for that session required individual parameters.

Steps to follow:

1: Allow location determination



2: Enter Cloud Credentials



Step 1: Activate geolocation in the BlueEye™ Mobile App by selecting “Allow While Using App” in the start screen. If not activated, use of location data cannot be displayed and no Bluetooth connection between the BlueEye™ Mobile and the mobile phone or tablet can be established.

Step 2: The account details for the cloud (organization login name, username, and password) must have been provided to you by Bright Sensors upon purchase of the BlueEye™ Mobile. If not, contact us or send an email to info@bright-sensors.com. Once account details are entered properly, the Status should be verified as **Status: Ok**, meaning that the App is connected to the cloud.

Steps to follow:

3: Select Country:

4: Units & correlative model

Step 3: Select your default country of operation, the pressure and temperature units, as well as the date and time format from the drop-down lists.

Step 4: This last screen of the Wizard allows the user to select the reference conditions for the gas quality parameters, as well the type of units and the correlative model used.

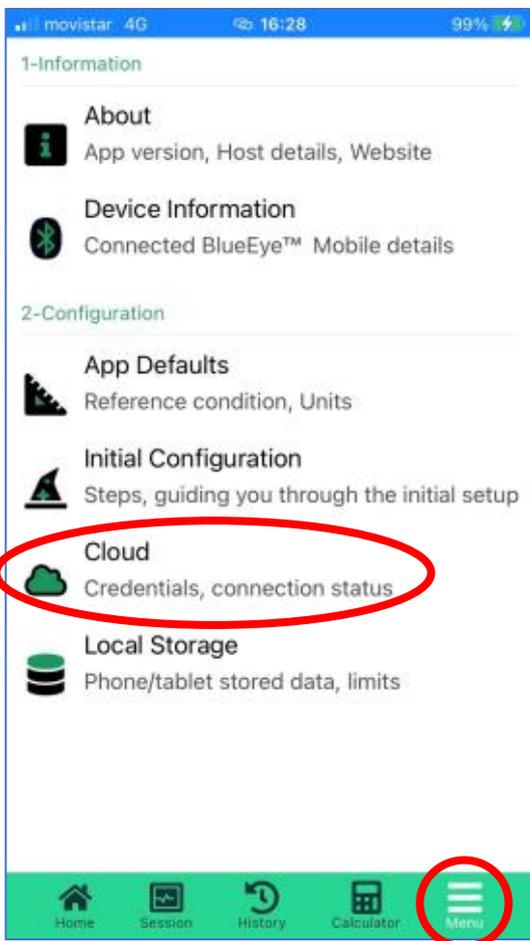
2.2 App - Cloud connection set-up

By connecting the App to Bright Sensors' cloud (www.blueeye-mobile.com), the App can automatically download individual calibration data for the in the BlueEye™ Mobile build in sensor unit. In addition, the cloud connection enables live data streaming from the mobile phone or tablet to upload the measurement data into the cloud.

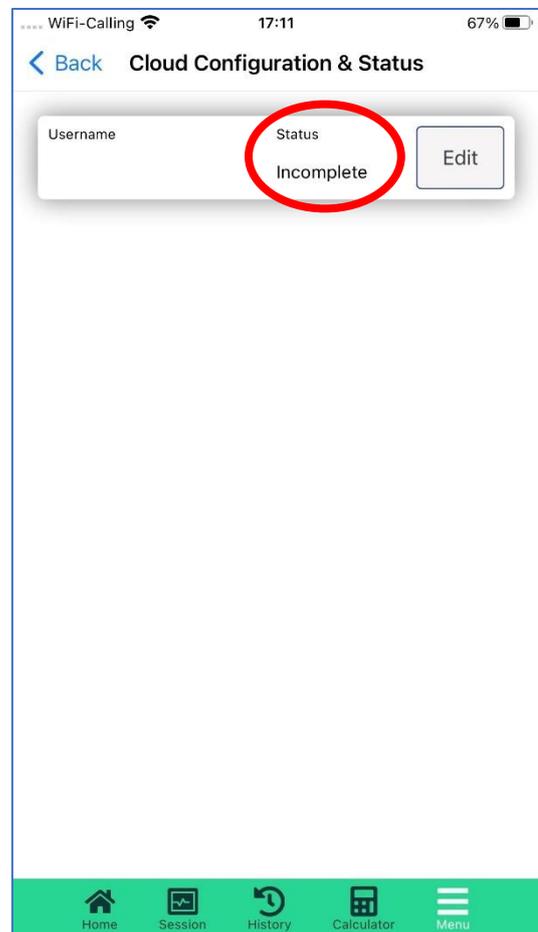
The connection with the cloud can be checked in the App. If the setup wizard hasn't been followed or the credentials have changed, connection to the cloud can be re-established by the following process:

Steps to follow:

1: Go to "Menu" and "Cloud"

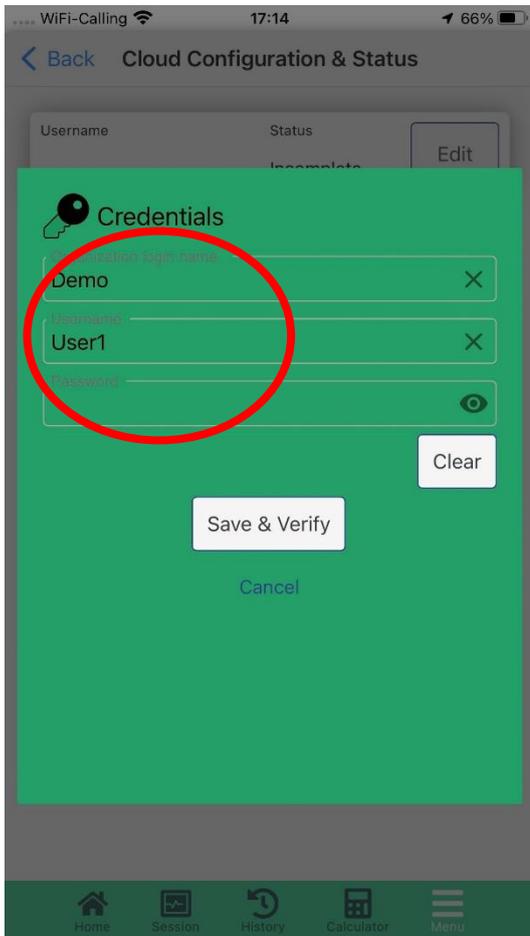


2: In "Cloud", click "Edit"

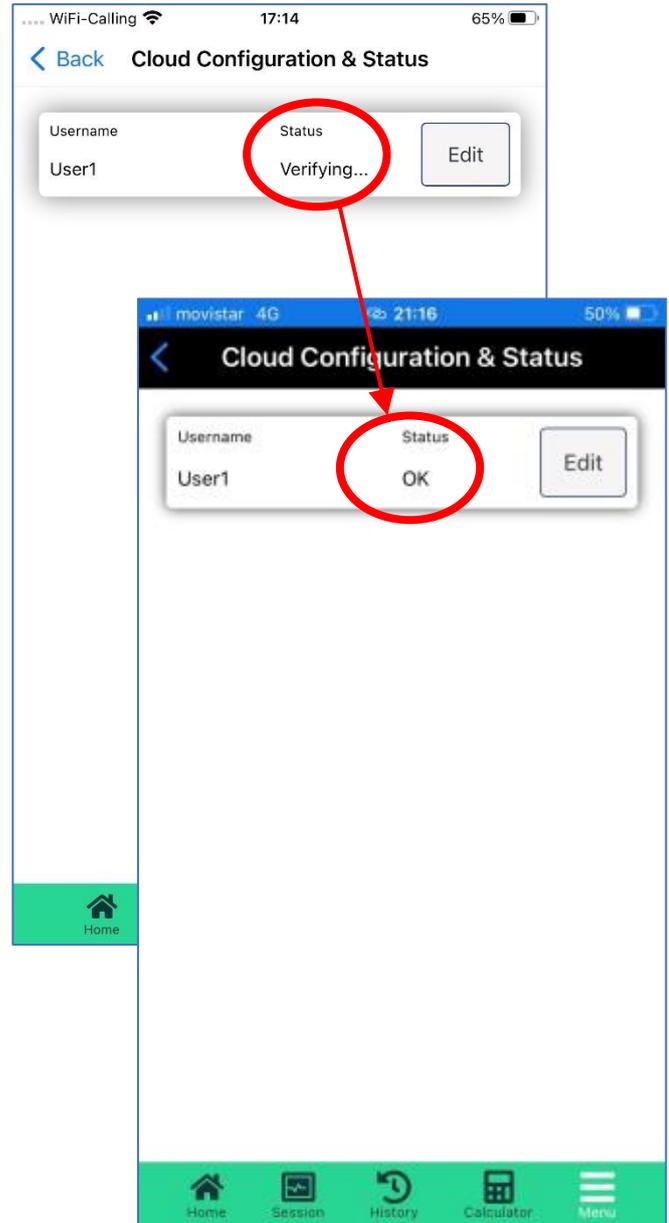


Step 2: Status: Incomplete requires (renewed) entry of credentials, continue with step 3.

3: Enter credentials "Save & Verify"



4: Wait until verification is completed



Although only 1 user can be connected to an individual BlueEye™ Mobile at the same time, multiple users can use with their own phone or tablet to operate the same BlueEye™ Mobile device. To make this possible, the individual users need to be registered and administered in the Bright Sensor cloud. Please reach out to us should you wish to make use of this functionality.

2.3 Establishing Bluetooth connection BlueEye™ Mobile to App

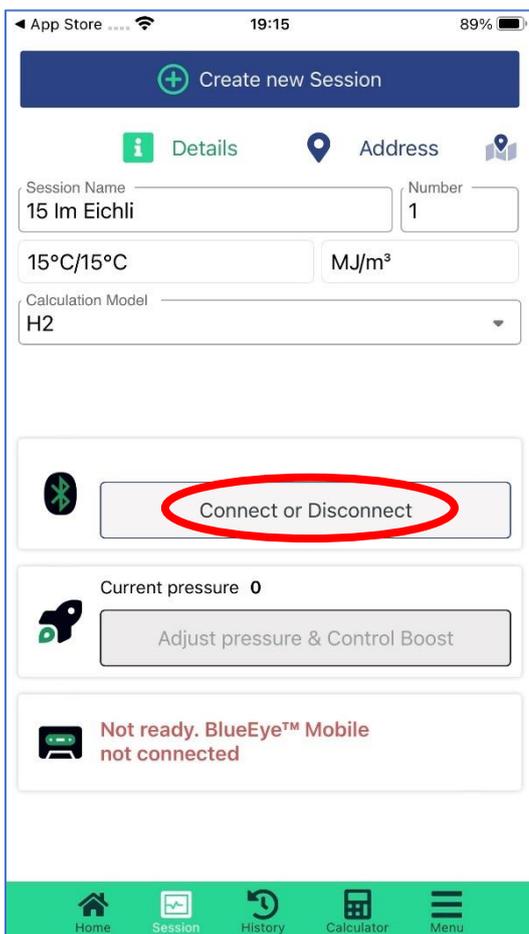
Measurement data from the BlueEye™ Mobile is live streamed to the App via a Bluetooth® connection. To establish this connection, the BlueEye™ Mobile needs to be switched on. Follow the following **steps**:

- 1: In the middle of the BlueEye™ front panel press the  button once.
- 2: Wait a few seconds until the LED start flashing green.

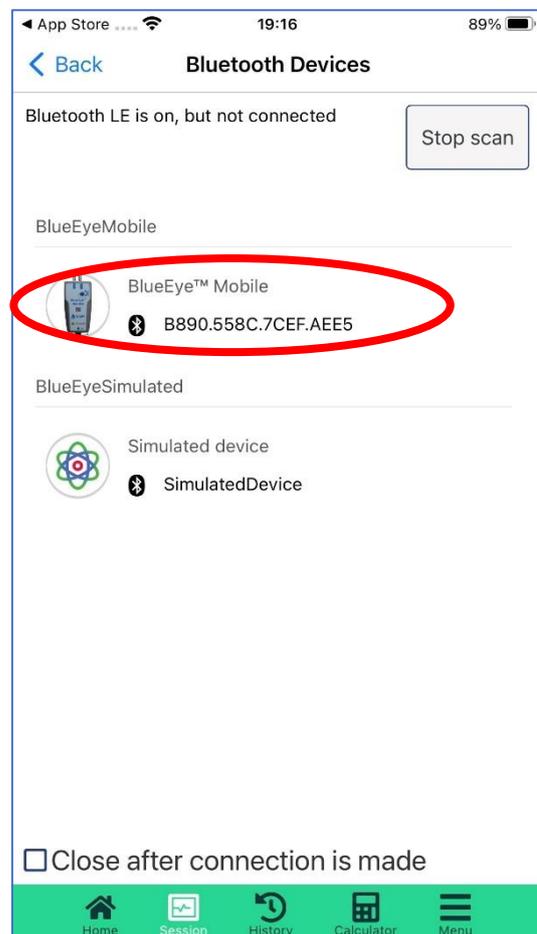


To connect (pair) the BlueEye™ Mobile with the App, follow the following **steps**:

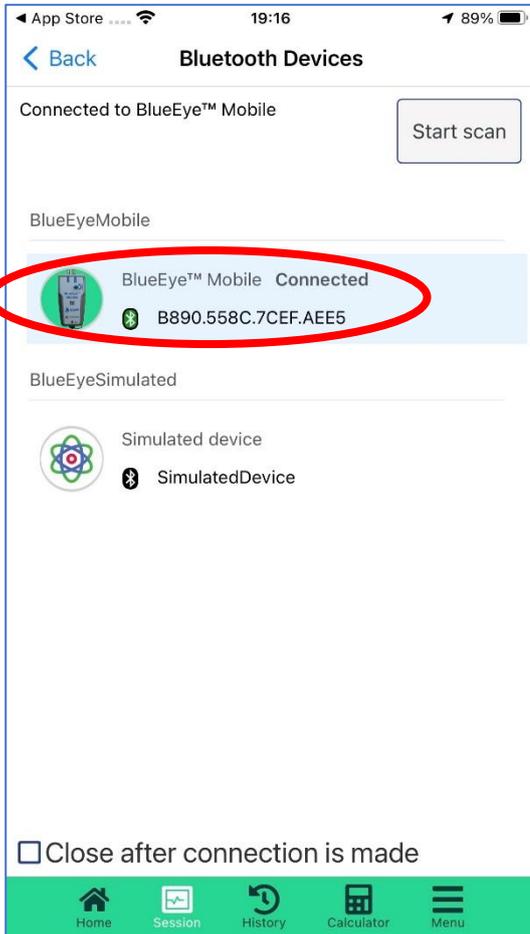
- 3: Go to "Session", click "Connect or Disconnect"



- 4: Select the UUID number of the device



5: Wait until the connection is established



4: The LED will now turn constant BLUE



NOTICE

Connecting simultaneously several Bluetooth connections to 1 phone or tablet is likely to cause data transfer disturbance. The connection with the BlueEye™ Mobile might be lost completely which will result in the loss of measurement data. It is highly recommended not pair any other Bluetooth connections to your phone or tablet while being connected to the BlueEye™ Mobile.

2.4 Downloading calibration data into the App

The first time a Bluetooth® connection is established between a BlueEye™ Mobile App and the BlueEye™ Mobile, an internet connection is required for the sensor unit calibration data to be downloaded from the cloud to the App.

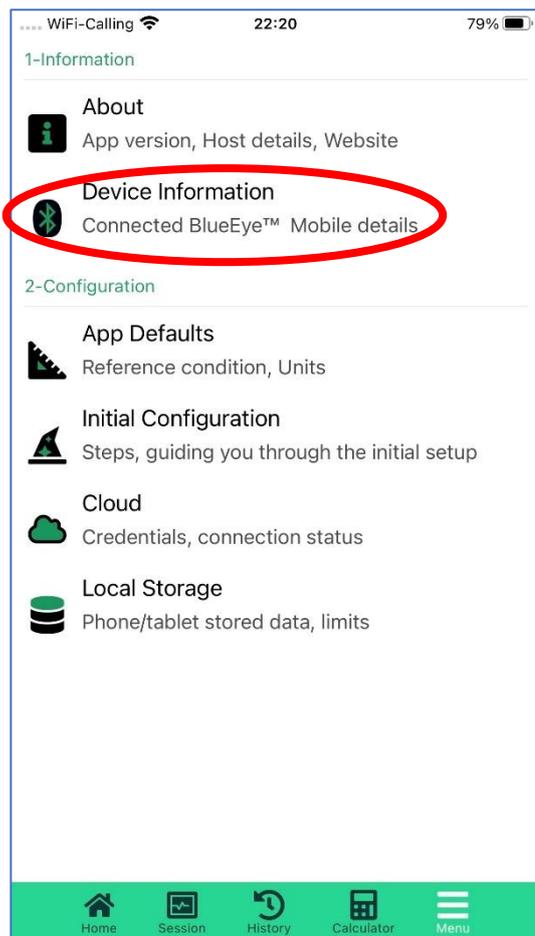
The calibration data is specific to each individual BlueEye™ Mobile and necessary for the BlueEye™ Mobile App to work correctly. The BlueEye™ Mobile App downloads **automatically** in less than 10 seconds the calibration data at first connection with a BlueEye™ Mobile, provided an internet connection is available and that the App is connected to the cloud. Once the calibration data has been downloaded to the App, the BlueEye™ Mobile is ready for accurate measurements.



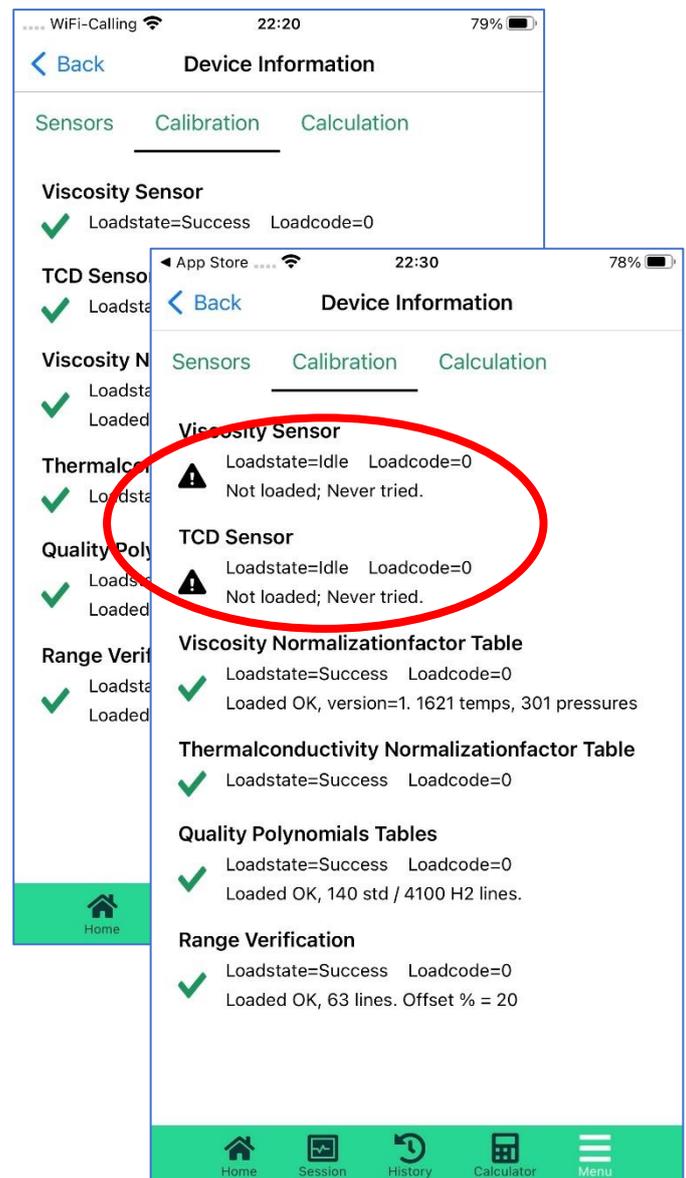
Please ensure an active internet connection is available when connecting your phone or tablet for the first time connection to the BlueEye™ Mobile.

To check if the calibration data has been downloaded correctly from the cloud, please follow the following steps:

1: In "Menu" click on "Device information"



2: Click on "Calibration" tab



All "Loadstate" check boxes should show "Success" after the ✓ check box for all the 6 parameters. If any of parameters are ⚠ unsuccessful, the following steps are to be performed:

- 1:** Verify a functioning internet connection is available
- 2:** Check if the App is properly connected to the cloud (Chapter 2.2, step 1, 2 and 3).
- 3:** Disconnect from the BlueEye™ Mobile, close and restart the BlueEye™ Mobile App and reconnect to the BlueEye™ Mobile. Calibration data download is triggered automatically every time a new connection with the BlueEye™ Mobile established.
- 4:** Check again if all "Loadstate" check boxes now are showing "Success" after the ✓ check box.

3. Operation

3.1 Connecting the BlueEye™ Mobile to a gas source

The BlueEye™ Mobile has three female single hand operated shut off quick connectors:

1. The gas INLET
2. The gas PURGE line
3. The gas OUTLET



! DANGER

The MAXIMUM inlet pressure is 5 bar / 72 psi relative (6 bar / 87 psi absolute). Exposing the BlueEye™ Mobile to a pressure above this level will lead to uncontrolled escaping gas.

DANGER

Escaping gas can lead to serious injury. In event of failure, components can be ejected at elevated speed or gas exhausted under high pressure. Open the connections only after the system has been depressurised. Ensure that the pressure in the system as a whole cannot exceed the lowest maximum pressure of any of its components. If variations of the pressure level or different pressure levels are to be expected in the system, components must be used that can withstand the maximum expected pressure levels and peaks. Observe the working conditions in accordance with BlueEye™ Mobile datasheet. Actions or alterations to the gas quality instrument, which are not described in these operating instructions, are not permitted. Ensure that the mounting point has been made absolutely free from burrs and is clean. After installation, use a gas leak detector sensitive to the used gas to ensure that there is no leak.

DANGER

For hazardous media such as flammable gases, in addition to all standard regulations, the appropriate existing codes or regulations must also be followed. Reduce the risk of creating hazardous areas by controlling and monitoring the gas release in relation to the properties of the specific media (e.g. IEC 60079-20).

The BlueEye™ Mobile is delivered together with 3 male plug connectors, each with 1-meter flexible Polyurethane Tubing with outer diameter of 4 mm and inner diameter of 2.5 mm.



Coupling between the male and the female quick connectors is established simply by pushing the male plug into the coupling. During coupling, make sure that the male plug is pushed into the coupling as far as it will go. **The plug locks audibly into place.** The procedure for connecting the BlueEye™ Mobile to a gas supply takes place in 3 steps, to be followed in the order:

1: Connect the "Outlet" tube to the "Outlet" connector **3**, on the RIGHT



2: Connect the "INLET" tube to the "INLET" connector **1**, on the LEFT



3: Connect the "PURGE" tube to the "PURGE" connector **2**, in the MIDDLE



Connecting the "PURGE" allows to purge the pressure regulator with a high flow rate to ensure instant measurement of the intended gas composition. On an unconstrained gas supply line, purging of the pressure regulator happens typically in less than one minute. Efficiency of purging of the pressure regulator depends on the application, the flow rate and pressure on the inlet and the time of the purge. To end the purge and start measuring, disconnect the "PURGE" tube from the BlueEye™ Mobile.

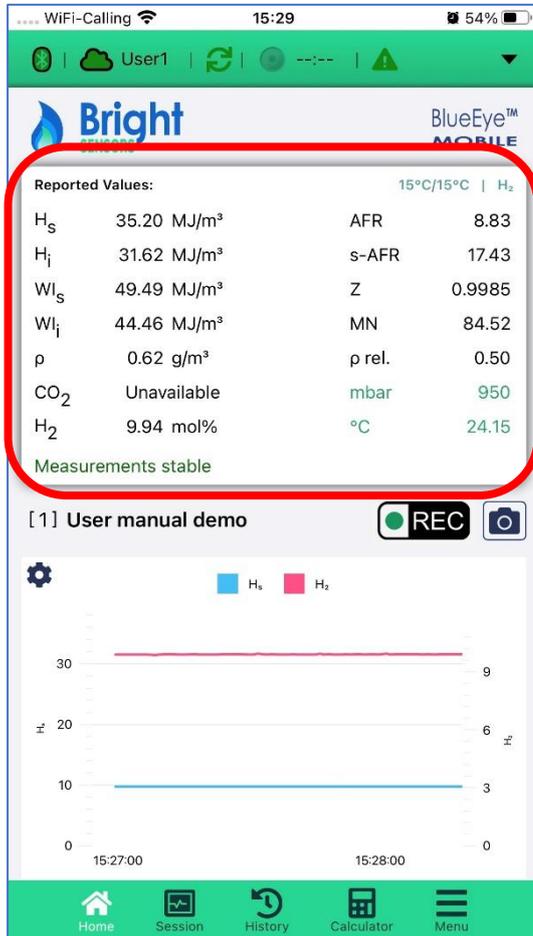


When connecting the "PURGE" connector to the BlueEye™ Mobile, the gas flow through the pressure regulator is unconstrained, thus the end of the purge line has to be placed in a safe area for venting gas. Releasing gas through the purging line within an enclosed environment inside a building or a room is not permitted since it could lead to creating hazardous gas areas.

3.2 Start measurement

Automatically after pairing the BlueEye™ Mobile with the App measurements are taken and displayed numerically and graphically in the “Home” screen. Follow the following steps:

1: Go to “Home”



2: Go to “Session”

Create new Session

Details Address

Session Name: User manual demo Number: 1

Calculation Model: 25°C/0°C MJ/m³

Calculation Model: H₂

Connected to BlueEye™ Mobile

Connect or Disconnect

Current pressure 951.37 mbar

Done

15°C/15°C
0°C/0°C
15°C/0°C
25°C/0°C
20°C/20°C
25°C/20°C
60°F/14.696 psi

1: In the top part of the home screen all parameters are displayed numerically. Ensure to select the desired combustion and metering reference conditions (see chapter 3.3), units and correlative model.

2: For changing the combustion and metering reference conditions go to “Session”, tap on the red circled box and select in the drop-down menu the desired reference conditions. Do the same for selecting the desired units and correlative model.

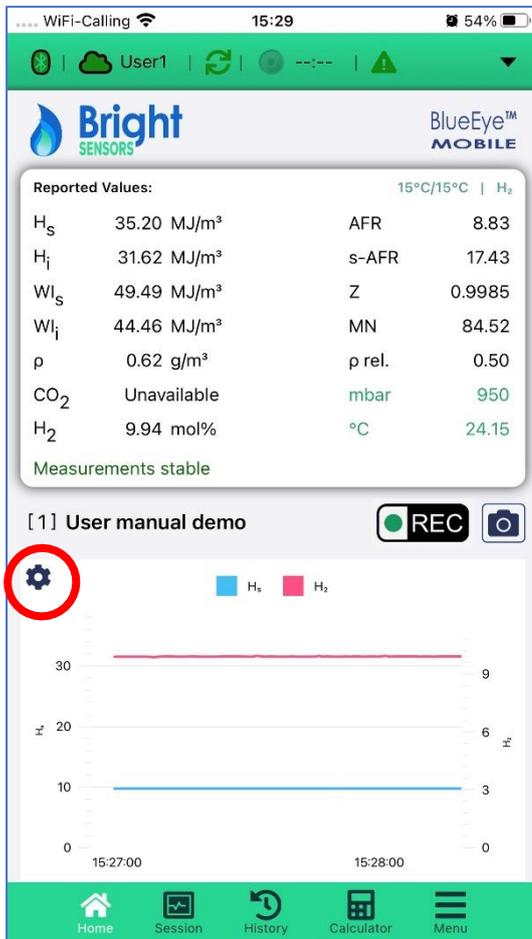
The graphical display of the measured values automatically starts as well after pairing the BlueEye™ Mobile with the App. The graph will display 2 hours of measurements. When measuring longer than 2 hours the oldest values will disappear from the graph, and the latest values added.

NOTICE

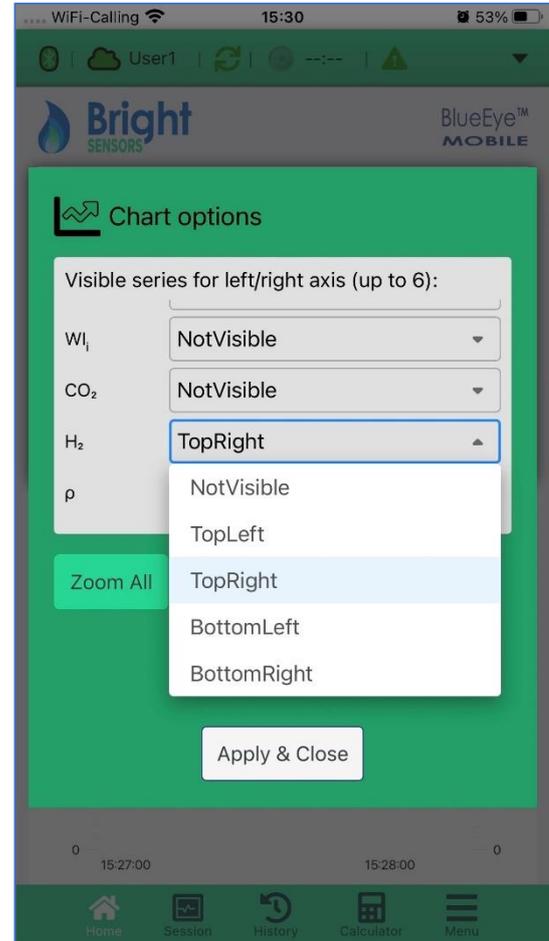
Be aware that the numerical and graphically displayed values are always displayed also when there is no gas supply connected to the BlueEye™ Mobile. Gas composition supplied to the BlueEye™ Mobile outside of the gas composition range will lead to displayed values that incorrect. Pressure fluctuations caused by for instance blocking the Outlet or Purging as well as other disturbances will also affect the output stability and can cause spikes and or inaccurate measurements.

The graphical display can be configured to display any of the output parameters. To change the parameters displayed in the chart, follow the steps:

3: in "Home" press the  button



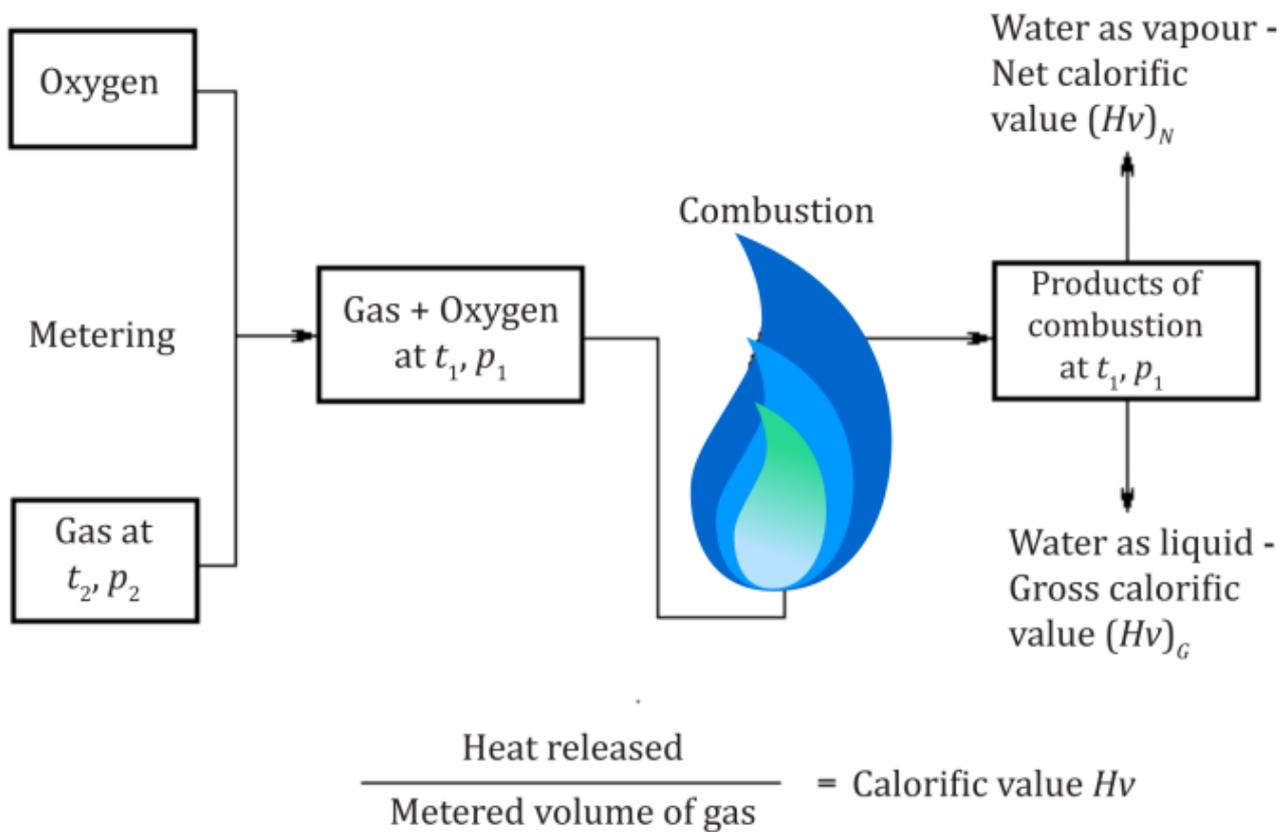
4: Select the desired parameters to display



In "Chart options" by clicking on the  button the already displayed values will be erased in the chart

3.3 Combustion and Metering reference conditions

Combustion and Metering Reference conditions are varying by geographical location and application. Combustion reference conditions are specified as: temperature, **t1**, and pressure, **p1**, at which the fuel is notionally **burned**. Metering reference conditions are specified as: temperature, **t2**, and pressure, **p2**, at which the volume of fuel to be burned is notionally **determined**. There is no a priori reason for the metering reference conditions to be the same as the combustion reference conditions. In the BlueEye™ Mobile App the following reference conditions can be selected: 0/0°C, 15/0°C, 15/15°C, 20/20°C, 25/20°C at 101325 Pa and 60°F at 14.65 psi, 14.696 psi, 14.73 psi and 15.025 psi absolute.



NOTICE

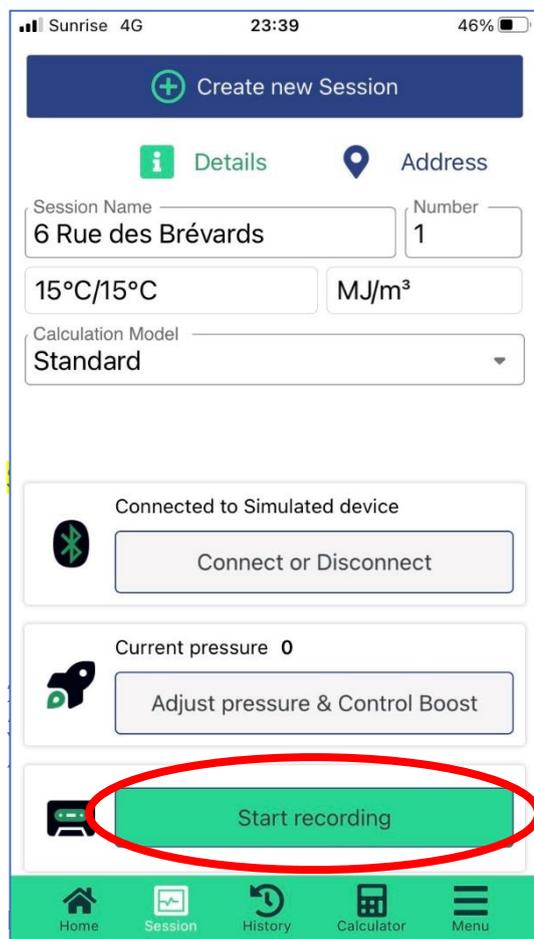
The BlueEye™ Mobile expresses the combustion properties in all generally used metering and reference conditions. Please ensure the correct reference conditions are selected to avoid structural offset between BlueEye™ Mobile output and comparing values.

3.4 Recording measurement data in the App

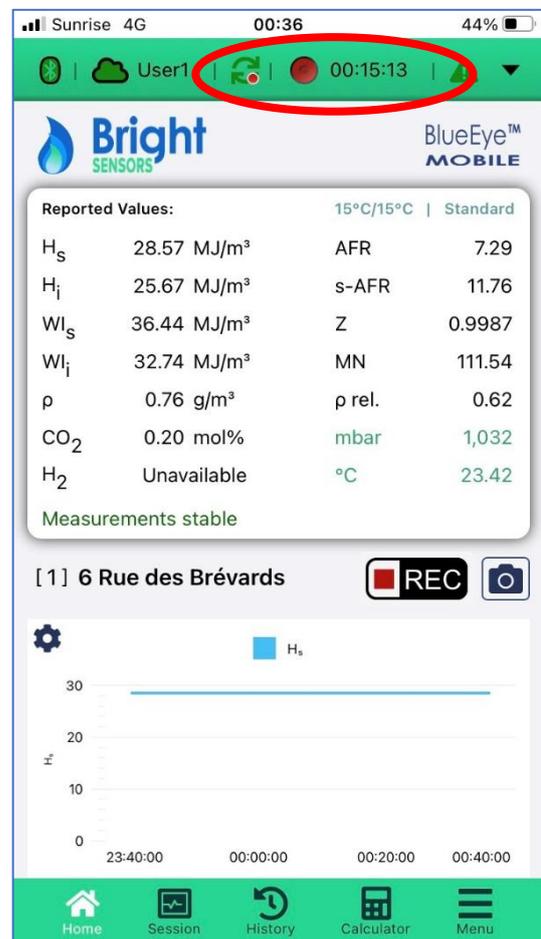
Before starting to record a measurement session, it is advisable to ensure as stable as possible environmental conditions. Avoid shaking the BlueEye™ Mobile, the gas connection and causing sudden pressure changes close to the gas outlet. These factors can impact the stability of the measurement. If the BlueEye™ Mobile hasn't been operated recently or has been exposed to rapid temperature changes before connecting to the gas supply, it is advised to conduct a "Boost" session (chapter 3.6, "Boosting") before recording a measurement session.

To start recording measurement data please follow the following **steps**:

1: In "Session", click on "Start recording"



2: Check session recording



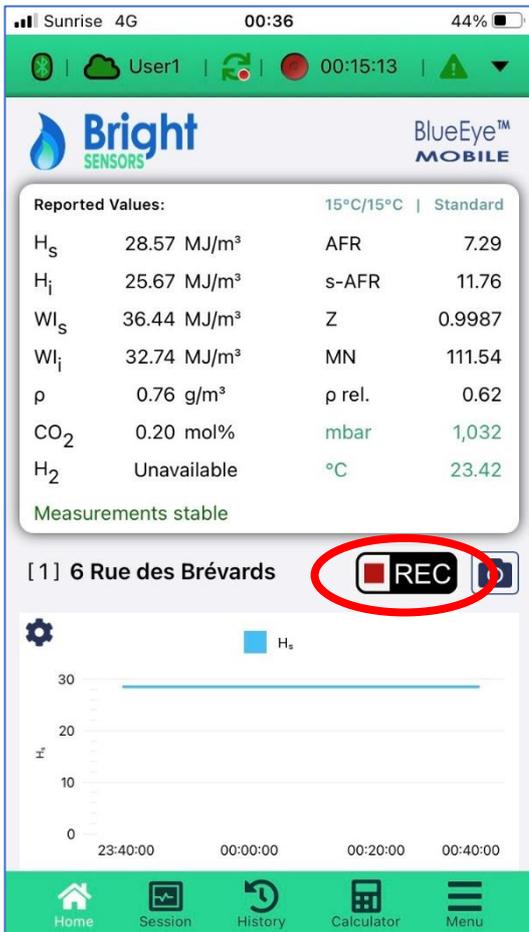
1: Check the session parameters and start recording of the session:

- "Session Name": Name of the session for the recorded series of data that will be saved in the App and exported to the cloud when an internet connection is available. The session name is automatically created from the geolocation address. It can be changed to a custom name by the user by clicking and entering the desired naming.
- "Number": Automatically incremental number that counts the number of sessions that have been performed since the App was installed.

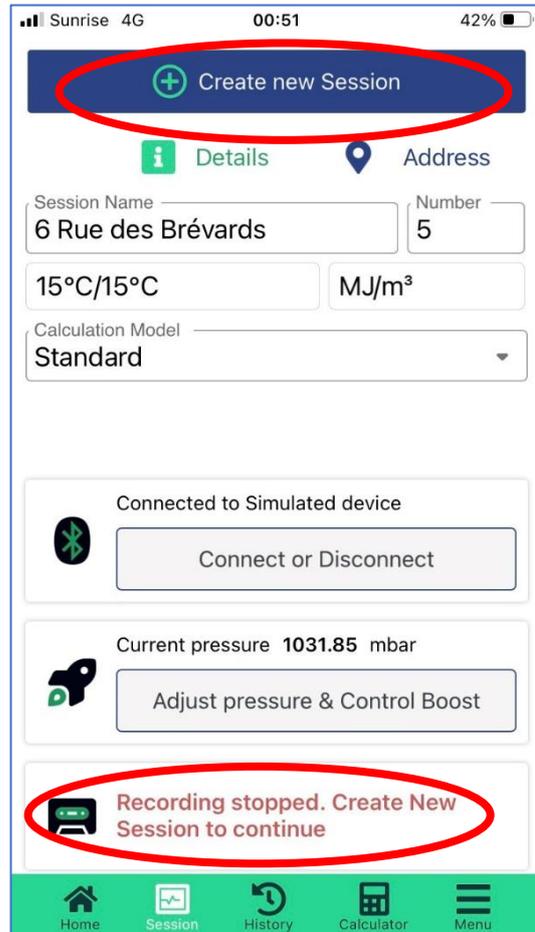
- “15°C/15°C”: The combustion and metering reference conditions for the session, predefined by the session defaults option. Can be changed to other reference conditions by the user upon clicking and choosing the desired reference conditions in the drop-down menu.
- “MJ/m³”: The defined energy units for the session, predefined by the session defaults option. Can be changed to other energy units by the user upon clicking and choosing the desired reference conditions in the drop-down menu.
- “Calculation model”: The correlation calculation model applied for the session. Can be selected from a drop-down menu based on the application and the version of hardware/software purchased. Contact us or send an email to info@bright-sensors.com to know more about the different models available.
- When session parameters are correct, a session can be triggered by clicking on “Start recording”.

Step 2: The icon  displays the lapsed time since the beginning of the session. The data is saved to the memory of the phone or tablet through the App and the icon  shows measurement data is live synchronized to Bright Sensors' cloud.

3: Tap “ REC” to end the session recording



4: Recording stopped



Step 3: Tap “ REC” will end the recording of the session and automatically bring to the “Session” page.

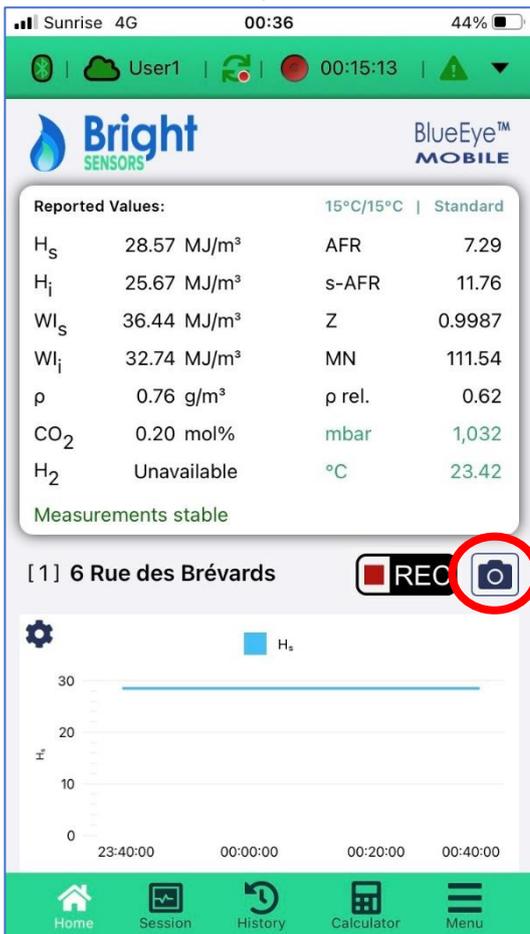
Step 4: Tap “Create new Session” to start a further session recording.

3.5 Snapshot function

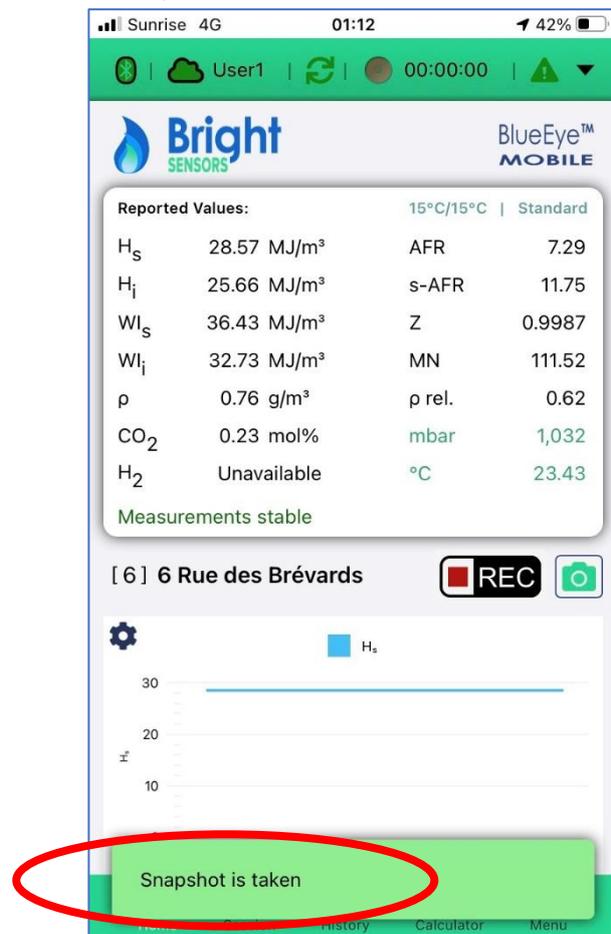
The snapshot function enables recording a unique instant measurement data point that can be compared to for instance gas engine or burner setting or exhaust gas measurement. A taken snapshot is uploaded to the cloud.

Taking a snapshot  of the session can be done following the following **steps**:

1: Go to "Home", tap



2: Snapshot is taken



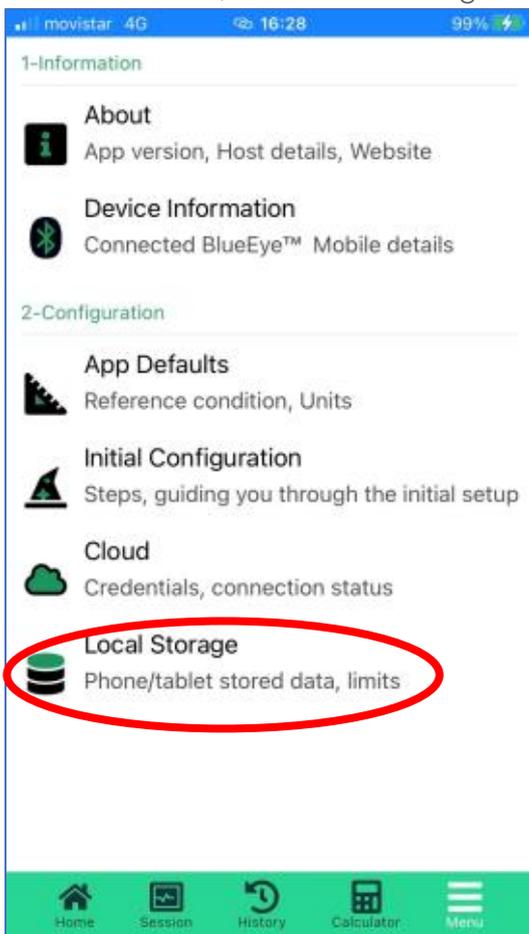
3.6 Other App functionalities

- **Local storage and available space in App**

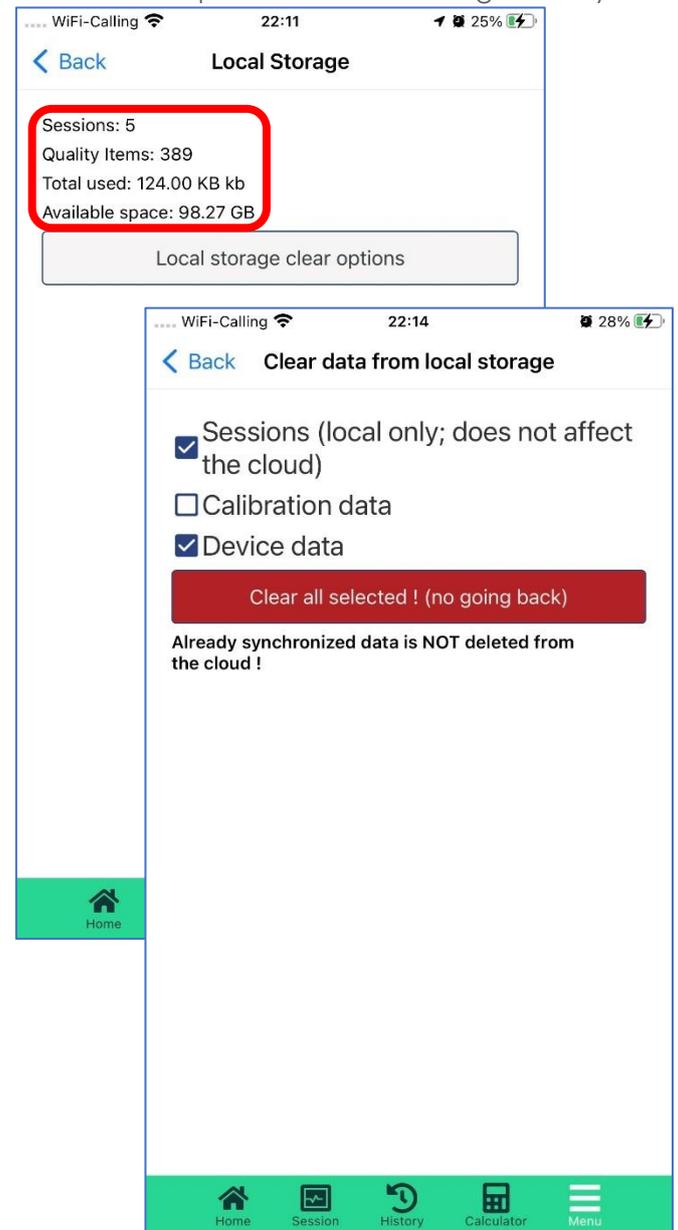
Measurement sessions are stored locally in the memory of the App and are automatically uploaded to Bright Sensors' cloud when an internet connection is available. The BlueEye™ Mobile App uses approximately 1Mb of memory for storing 1 hour of measurement data.

To check the available memory space for the App on the phone or tablet, perform the following **steps**:

1: Go to "Menu", click "Local Storage"



2: "Available space" is the remaining memory

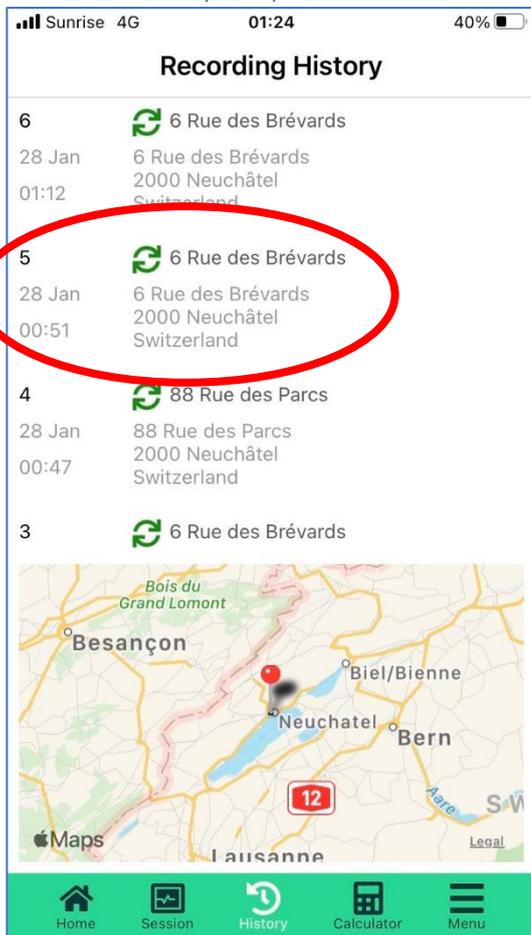


By tapping on "Local storage clear options" a next window opens. Here the functionality to erase stored Session, Calibration and Device data can be deleted.

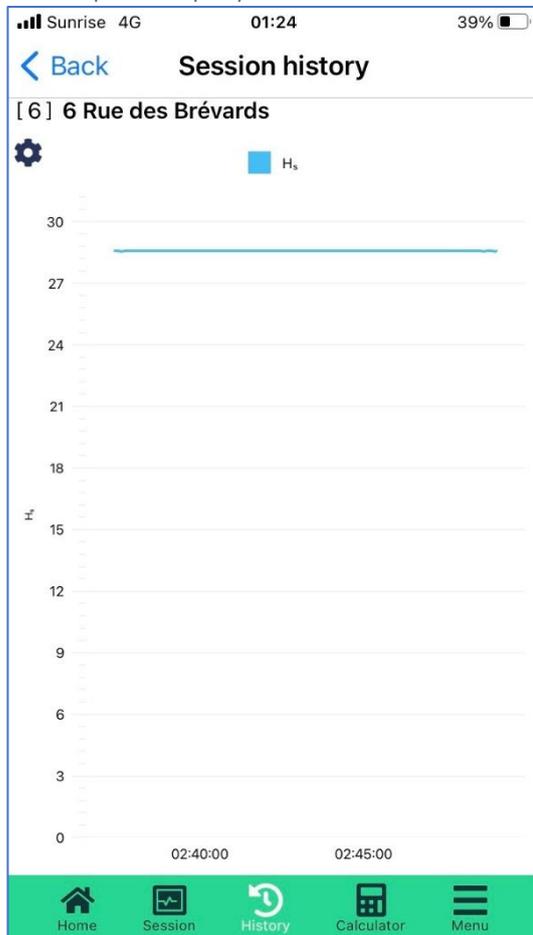
- **Session history**

Locally stored sessions are available under “History” and by tapping on an individual session, the measured values will be displayed graphically. To do so. Perform the following **steps**:

1: Go to “History”, tap on one session



2: Graph is displayed



- **Validation session**

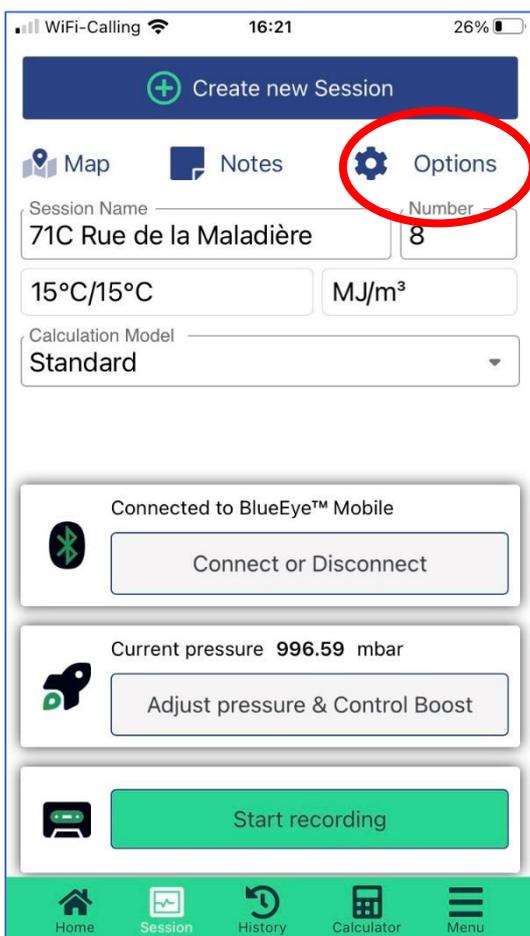
Performing a regular check on the BlueEye™ Mobile is necessary to establish if the sensor unit is still within the required accuracy. Such a check is possible by comparing the reported normalized dynamic viscosity, thermal conductivity and optionally CO₂ values in the Calibration Report with the values obtained in a validation session. It is required to perform this validation session under the following conditions:

- **Gas medium used: pure Methane (CH₄) N45 (CH₄ ≥ 99,995 %)**
- **A temperature between 20 °C and 30 °C of both the device and the pure Methane (CH₄) N45**
- **Pressure: stable between 990 and 1040 mbar absolute**
- **1 time boosting directly after starting to flow pure Methane (CH₄) N45**
- **Minimum operating time before measurement: 20 mins**
- **Measurement time: 10 mins**

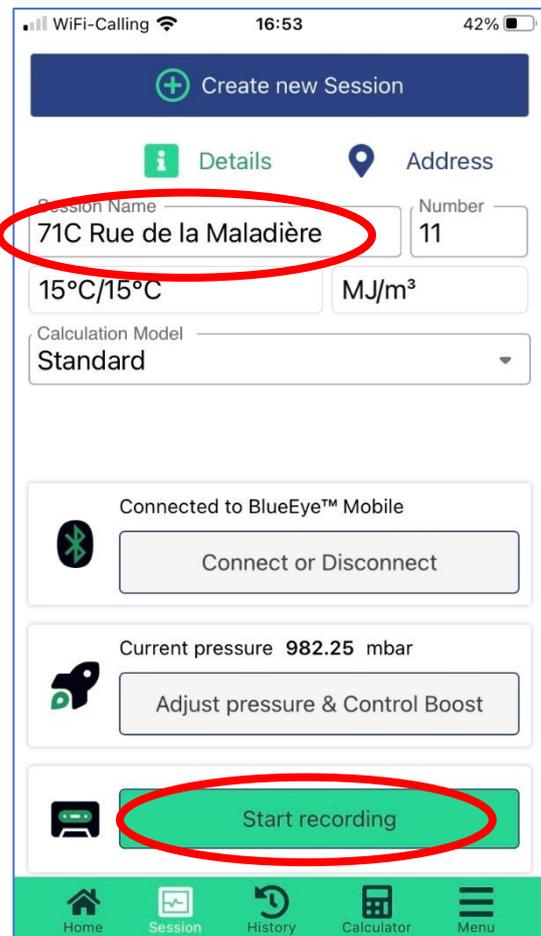
For more detailed information and background, please read Chapter 5 “Maintenance & regular checks”.

To initiate a validation session, perform the following **steps**:

1: Go to “Session”, slide right the top bar



2: Tap “Options”, tick “Validation session” and tap “Start recording”



The measurement data for this session will be recorded under a specific validation session that can be retrieved from the cloud.

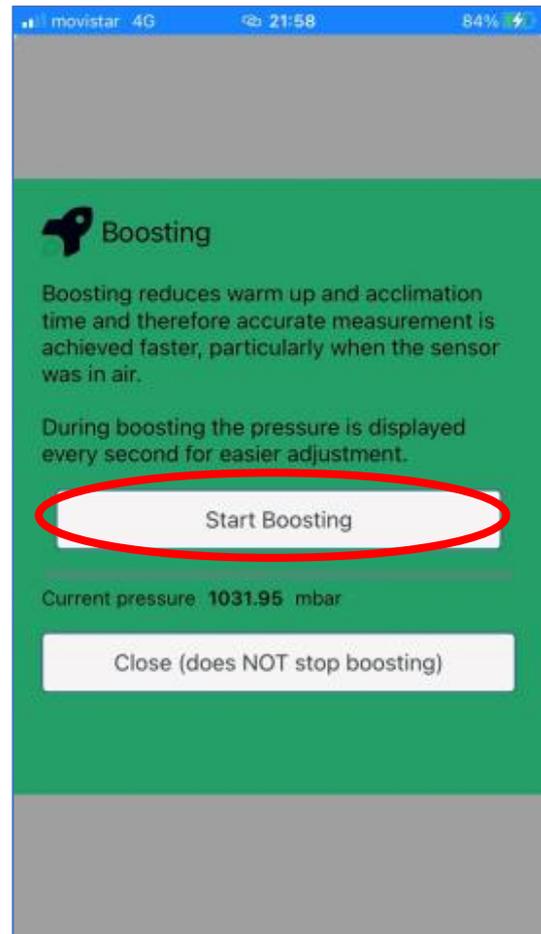
- **“Boosting” functionality**

If the BlueEye™ Mobile hasn't been operated recently or has been exposed to rapid temperature changes before connecting to the gas supply, it is recommended to perform a “Boost” session. This will reduce warmup time during the first measurement and allows to reach stable and accurate measurements fast. To initiate the “Boost” session, perform the following **steps**:

1: In “Session”, click “Adjust pressure & Control Boost”

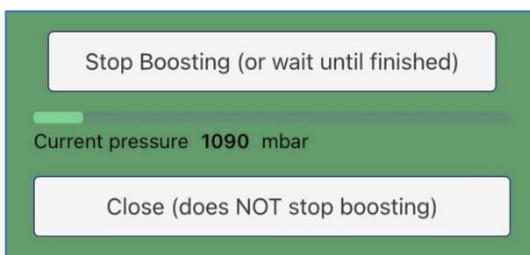


2: Tap “Start Boosting”



By tapping on “Start Boosting”, the “BOOST” function is activated, and it takes approximately 5 minutes for the process to automatically return in its normal measurement cycle.

The process can be cancelled by clicking on “Stop Boosting”.



By clicking on “Close”, “BOOST” function is not stopped, and measurement are not refreshed until the full 5 min boosting cycle is finished. Only after finishing of the boosting cycle a Session recording is possible again.

3.7 Charging the BlueEye™ Mobile

The BlueEye™ Mobile runs on a rechargeable ICR18650 Li/ion battery cell that can be charged through the side mounted USB cable connector on the BlueEye™ Mobile. Use a 5V power supply connected to the micro-USB cable to charge the BlueEye™ Mobile.



Figure 3: Side view of BlueEye™ Mobile with micro-USB connector

Perform the following **step**:

Pressing on the right touch pad button  will activate the right LED for a period of 5 seconds. The color of this LED indicates to the user the degree of charge of the device:

- Green. Device fully charged, charge greater than 75%
- Orange. Average load, between 25% and 75%
- Red. Low charge, less than 25%

4 Cloud functionality

Bright Sensors' secure cloud gathers, stores, processes and reports any recorded measurement session with the BlueEye™ Mobile. It is available at www.blueeye-mobile.com. The cloud contains all the measurement and validation data that has been recorded into sessions via the BlueEye™ Mobile App, as well as certain reporting functionalities. The data is secured and organization specific. Various roles can be defined and assigned for any organization, from single to multiuser and multiple devices. API's (Application Programming Interface) can be tailored on request.

The account details for the cloud (organization login name, username, and password) must have been provided to you by Bright Sensors upon purchase of the BlueEye™ Mobile. If not, contact us or send an email to info@bright-sensors.com

To log on go to www.blueeye-mobile.com and fill in the provided login name, username, and password. It is strongly recommended to change your password at first log on. Perform the **steps**:

1: logon at www.blueeye-mobile.com

2: In the left upper corner click "My Details"

3: Click "Change My Password" and fill in a new password in the pop-up screen

The main menu of the cloud platform displays the "Data", "Hardware", "Software" and "Reports" menu's. To view or export a particular measurement data session go to the menu "Data" and click on submenu "Sessions".

In "Sessions", click on one of the recorded sessions to display the details of the selected session:

Brightsensors Management

blueeye-mobile.com/QualitySession_ListView

Quality Sessions

Delete Export Show in Report Change Organization

Name	Number	Start Time	End Time	Device	User
<input checked="" type="checkbox"/> 15 Im Eichli	24	1/17/2022 7:55 PM	1/17/2022 7:58 PM	RGQ-3-2	User1
<input type="checkbox"/> 71C Rue de la Maladière	20	1/14/2022 4:06 PM	1/14/2022 4:15 PM	DGC-1	
<input type="checkbox"/> 71C Rue de la Maladière	19	1/14/2022 4:04 PM	1/14/2022 9:49 PM	DGC-1	
<input type="checkbox"/> 71C Rue de la Maladière	17	1/14/2022 11:57 AM	1/14/2022 11:58 AM	DGC-1	
<input type="checkbox"/> 71C Rue de la Maladière	14	1/14/2022 10:28 AM	1/14/2022 10:28 AM	DGC-1	
<input type="checkbox"/> 13 Im Eichli	23	1/13/2022 3:35 PM	1/13/2022 4:10 PM	RGQ-3-2	User1
<input type="checkbox"/> 71C Rue de la Maladière	13	1/13/2022 12:17 PM	1/13/2022 12:18 PM	DGC-1	
<input type="checkbox"/> 22702 N Sunset Dr	3	1/12/2022 11:54 PM		BRS Internal - Richard's BLE	User1

By clicking on the selected measurement session, in this case “15 Im Eichli” the details of the session are displayed in a new screen. Each recorded parameter is displayed in the session summary:

Quality Session
15 Im Eichli

Save Close Delete Refresh Show in Report

Details Location Extra Notes

Name: 15 Im Eichli **1** Start Time: 1/17/2022 7:55 PM **4**

Number: 24 **2** End Time: 1/17/2022 7:58 PM **5**

Device: RGQ-3-2 **3**

Reported values

Calculation Model: H₂ **6** Reference Temperature: 15°C/15°C **7** Unit: MJ/m³ **8**

Snapshot Item **9**

H_i 38.6794 W_i 50.9592 p 0.705 CO₂ % 0 AFR 9.7819 Z 0.9979 mbar 95257

H_i 34.8587 W_i 45.9256 p rel 0.5753 H₂ % 0 s-AFR 16.9619 MN 87.5576 C/F 295.6807

Export XLSX Export CSV (zip) Text to search...

Measure Date Time	H _i 10	H _i	W _i	W _i	p	p rel.	Z	AFR	s-AFR	MN	CO ₂ %	H ₂	aT	aP	Condition	Flags	
2022-01-17 20:04:38	↑	38.548	34.7389	50.7859	45.7676	0.7052	0.5754	0.9979	9.7493	16.9043	87.9444	0	0	295.5948	95.258	0	0
2022-01-17 20:04:40		38.5437	34.7347	50.7879	45.7691	0.705	0.5752	0.9979	9.7481	16.9075	87.9953	0	0	295.5948	95.258	0	0

In the “Details” tab, all the parameters of the session can be found, which are:

1. Name of the session
2. Incremental number for this session
3. Device name
4. Start Time
5. End Time
6. Calculation Model
7. Reference Conditions
8. Units
9. Snapshot Elements
10. Measurement Values

By clicking on the tab "Location", the information on the location of the selected session will be displayed:

- The GPS coordinates
- The street name, street number, city, zip code, area, country
- Google maps location

Quality Session
71C Rue de la Maladière

Save Close Delete Refresh Show in Report

Details Location Extra Notes

Latitude: 46.9981324294537 Longitude: 6.94620386871049 Location Code: 0

Street Name: Rue de la Maladière Street Number: 71C

City: Neuchâtel Zip Code: 2000

Area: Neuchâtel Country: Switzerland

Map: Map Satellite

There are 2 options to download all the measurement data for sessions described above:

1. Go into one individual session and click on "Export.XLSX" or "Export CSV (zip)" to respectively export either an Excel or a CSV zipped file.
2. Go in the "Sessions" menu, tick 1 or more individual sessions to download in one single Excel or CSV zipped file. Then click on "Export XLSX" to export in an Excel file.

1: Download through Session

Quality Session
15 Im Eichli

Save Close Delete Refresh Show in Report

Details Location Extra Notes

Name: 15 Im Eichli
Number: 24
Device: RGQ-3-2

Reported values

Calculation Model: H₂

Snapshot Item: H_i 38.6794, W_i 50.9592, p 0.705, CO₂ %
H_i 34.8587, W_i 45.9256, p rel 0.5753, H₂ %

Export XLSX Export CSV (zip) Text to search...

Measure Date Time ↑ H_i H_i W_i W_i

2022-01-17 20:04:38 38.548 34.7389 50.7859 4

2: Download multiple sessions at a time

Quality Sessions

Delete Export Show in Report Change Organization

	Name	Number	Start Time
<input checked="" type="checkbox"/>	15 Im Eichli	24	1/17/2022 7:55 PM
<input checked="" type="checkbox"/>	71C Rue de la Maladière	20	1/14/2022 4:06 PM
<input checked="" type="checkbox"/>	71C Rue de la Maladière	19	1/14/2022 4:04 PM
<input type="checkbox"/>	71C Rue de la Maladière	17	1/14/2022 11:57 AM
<input type="checkbox"/>	71C Rue de la Maladière	14	1/14/2022 10:28 AM
<input type="checkbox"/>	13 Im Eichli	23	1/13/2022 3:35 PM
<input type="checkbox"/>	71C Rue de la Maladière	13	1/13/2022 12:17 PM
<input type="checkbox"/>	22702 N Sunset Dr	3	1/12/2022 11:54 PM

The Excel or CSV file is automatically downloaded upon clicking on the download button. In the first tab “Sessions”, there is information related to the sessions exported, each session is referenced with a letter that is used in the following tab to represent the session (see 1 below) In the tab “Snapshots” all the individual snapshots from the sessions are listed, provided they have been triggered during the measurement sessions, referenced by their letter representation (see 2 below). In the tab “Quality” the measurement data taken during the different sessions is displayed, referenced by their letter representation (see 3 below).

The screenshot shows an Excel spreadsheet with three tabs: Sessions, Snapshots, and Quality. Red circles and numbers 1, 2, and 3 highlight specific elements in each tab.

- Tab 1 (Sessions):** A table with columns: Reference, Device ID, Device Name, Session #, Name, Start Time, End Time, Ref. Temp, Units, Street Name, Street Nr, City. Row 2 is highlighted with a red circle and the number 1.
- Tab 2 (Snapshots):** A table with columns: Reference, Time, Hs, Hi, Wls, Wli, Density, Rel.Density, Compress, AFR, s-AFR, MN, CO2 %. Row 2 is highlighted with a red circle and the number 2.
- Tab 3 (Quality):** A table with columns: Reference, Time, Hs, Hi, Wls, Wli, Density, Rel.Density, Compress, AFR. Row 3 is highlighted with a red circle and the number 3.

At the bottom of the spreadsheet, the tabs are labeled: Sessions, Snapshots, and Quality. Red circles highlight the 'Sessions' and 'Quality' tabs.

Validation sessions are available in menu “Data” under the tab “Validation sessions”.

A screenshot of a 'Data' menu. The menu is open, showing two options: 'Sessions' and 'Validation Sessions'. The 'Validation Sessions' option is highlighted with an orange background.

Visualizing validation sessions has all functionalities as standard sessions but display in addition the **normalized viscosity** and **normalized thermal conductivity**. With those values a validation check can be performed, as explained in chapter 5: “Maintenance & regular checks”.

The screenshot shows a detailed table of validation session data. The columns include: Reference, Time, Hs, Hi, Wls, Wli, Density, Rel.Density, Compress, AFR, s-AFR, MN, CO2 %, H2, AT, aP, Offset, Condition, Flags, TimeConstant, Norm viscosity, Norm TC, and Transfer. The last four columns are highlighted with a red circle.

Reference	Time	Hs	Hi	Wls	Wli	Density	Rel.Density	Compress	AFR	s-AFR	MN	CO2 %	H2	AT	aP	Offset	Condition	Flags	TimeConstant	Norm viscosity	Norm TC	Transfer	
2	A	Jan 27 2022 09:47:28	37.7464	33.9756	50.9443	45.8586	0.6697	0.5464	0.9981	9.5281	17.346	95.2585	0	-1	298.555	99903	82629	0	0	0.6625692	1.10932E-05	0.033843007	17.2777
3	A	Jan 27 2022 09:47:29	37.7477	33.9769	50.9437	45.8581	0.6697	0.5465	0.9981	9.5284	17.3451	95.2429	0	-1	298.555	99903	82630	0	0	0.6625692	1.10932E-05	0.033844076	17.2784
4	A	Jan 27 2022 09:47:31	37.7548	33.9837	50.9404	45.8557	0.6701	0.5469	0.9981	9.5304	17.34	95.1609	0	-1	298.555	99903	82632	0	0	0.6625692	1.10932E-05	0.033849686	17.2784
5	A	Jan 27 2022 09:47:33	37.7501	33.9792	50.9425	45.8573	0.6699	0.5466	0.9981	9.5291	17.3433	95.2146	0	-1	298.555	99903	82633	0	0	0.6625692	1.10932E-05	0.03384601	17.2783
6	A	Jan 27 2022 09:47:34	37.7232	33.955	50.9843	45.8139	0.6703	0.5469	0.9981	9.5277	17.3232	95.2317	0	-1	298.555	99903	82634	0	0	0.6627936	1.1097E-05	0.033851482	17.2784
7	A	Jan 27 2022 09:47:34	37.7198	33.9518	50.9859	45.8151	0.6701	0.5469	0.9981	9.5217	17.3257	95.2174	0	-1	298.555	99903	82634	0	0	0.6627936	1.1097E-05	0.033849686	17.2784
8	A	Jan 27 2022 09:47:35	37.719	33.9509	50.9863	45.8154	0.6701	0.5468	0.9981	9.5215	17.3263	95.2817	0	-1	298.555	99903	82629	0	0	0.6625692	1.10932E-05	0.033843007	17.2777
9	A	Jan 27 2022 09:47:36	37.7255	33.9572	50.9853	45.8131	0.6704	0.547	0.9981	9.5233	17.3216	95.2054	0	-1	298.555	99903	82630	0	0	0.6625692	1.10932E-05	0.033844076	17.2784
10	A	Jan 27 2022 09:47:38	37.7208	33.9642	50.9889	45.8166	0.6708	0.5474	0.9981	9.5253	17.3163	95.1022	0	-1	298.555	99903	82630	0	0	0.6625692	1.10932E-05	0.033849686	17.2784
11	A	Jan 27 2022 09:47:39	37.7289	33.9604	50.9817	45.812	0.6706	0.5472	0.9981	9.5242	17.3191	95.166	0	-1	298.555	99903	82630	0	0	0.6625692	1.10932E-05	0.03384601	17.2783
12	A	Jan 27 2022 09:47:40	37.7394	33.9992	50.957	45.8519	0.6699	0.5464	0.9981	9.5263	17.3442	95.289	0	-1	298.555	99903	82633	0	0	0.6627936	1.1097E-05	0.033851482	17.2784
13	A	Jan 27 2022 09:47:41	37.7438	33.9734	50.9349	45.8553	0.6699	0.5465	0.9981	9.5275	17.341	95.2372	0	-1	298.555	99903	82633	0	0	0.6627936	1.1097E-05	0.033849686	17.2784
14	A	Jan 27 2022 09:47:42	37.7406	33.9703	50.9366	45.8563	0.6699	0.5466	0.9981	9.5279	17.3408	95.2608	0	-1	298.555	99903	82633	0	0	0.6627936	1.1097E-05	0.033849686	17.2784

Below the table, there is a summary table with columns: T, U, V, W. The rows are: Constant, Norm viscosity, Norm TC, and Transfer.

T	U	V	W
Constant	Norm viscosity	Norm TC	Transfer
.6625692	1.10932E-05	0.033843007	17.2777
.6625692	1.10932E-05	0.033844076	17.2784
.6625692	1.10932E-05	0.033849686	17.2784
.6625692	1.10932E-05	0.03384601	17.2783
.6627936	1.1097E-05	0.033849686	17.2784
.6627936	1.1097E-05	0.033846971	17.2783
.6627936	1.1097E-05	0.03384627	17.2777
.6627936	1.1097E-05	0.033851482	17.2801

5 Maintenance & regular checks

The BlueEye™ Mobile doesn't have any moving parts, doesn't combust the medium flowing through and doesn't chemically react with the medium. As a result, under normal operations, there are minimum maintenance requirements. However, since the BlueEye™ Mobile can't control the medium quality flowing through it, the recommended inspection interval is every 12 months. Please consult Bright Sensors or your distributor for inspection interval based on the specific conditions of your application.

Regular checks are recommended to establish:

- Correct pressure and flow rate
- No contamination of the flame arrestors or sensor unit has occurred
- Accuracy of reported values is within required specifications

The BlueEye™ Mobile is factory calibrated and a calibration report is provided with the device upon purchase. The Calibration values are determined under the following conditions:

- **Gas medium used: pure Methane (CH₄) N45 (CH₄ ≥ 99,995 %)**
- **A temperature between 20 °C and 30 °C of both the device and the pure Methane (CH₄) N45**
- **Pressure: stable at 990 and 1040 mbar absolute**
- **1 time boosting directly after starting to flow pure Methane (CH₄) N45**
- **Minimum operating time before measurement: 20 mins**
- **Measurement time: 10 mins**

To validate if the drift is within the required accuracy the BlueEye™ Mobile should be tested as close as possible under the same conditions when the calibration values were established. By comparing the calibrated values with the validation values the possible drift can be quantified. Bright Sensors recommends recalibrating or replacing the sensor unit if the **average** 10-minute values are deviating more than 0.25%. See for more information Appendix C: Calibration Report example.

NOTICE

At normal use, routine inspection is advised to be performed on the BlueEye™ Mobile on a yearly interval. Have repairs performed by Bright Sensors or Bright Sensors appointed representatives only to prevent losing warranty claim.

DANGER

Do NOT open pressurized connections. Open pressurized connections only after the pressure of the system or the appropriate section has been released to atmospheric level.

DANGER

Escaping gas can lead to serious injury. In event of failure, components can be ejected at elevated speed or gas exhausted under high pressure. Open the connections only after the system has been depressurised. Ensure that the pressure in the system as a whole cannot exceed the lowest maximum pressure of any of its components. If variations of the pressure level or different pressure levels are to be expected in the system, components must be used that can withstand the maximum expected pressure levels and peaks. Observe the working conditions in accordance with BlueEye™ Mobile datasheet. Actions or alterations to the gas quality instrument, which are not described in these operating instructions, are not permitted. After setup, use a gas leak detector sensitive to the used gas to ensure that there is no leak.

**DANGER**

For hazardous media such as flammable gases, in addition to all standard regulations, the appropriate existing codes or regulations must also be followed. Reduce the risk of creating hazardous areas by controlling and monitoring the gas release in relation to the properties of the specific media (e.g. IEC 60079-20).

NOTICE

The instrument is factory calibrated. Please contact Bright Sensors SA for re-calibration or re-ranging.

**DANGER**

Instantly remove a damaged or unsafe instrument from service and mark it to prevent accidental usage. Have repairs performed by Bright Sensors or Bright Sensors appointed representatives only.

NOTICE

Please verify in advance, if the correct pressure is being applied (valves/ ball valve etc. open), the right supply voltage and wiring has been chosen.

6 Technical Data

6.1 Electrical Parameter

Supply voltage:	+5 VDC \pm 5 %
Power consumption:	< 0.5 W (average)

6.2 Gas pressure parameter

Inlet pressure	max. 5 bar relative / 87 psi relative
Permissible overload:	none
Outlet pressure:	Constant 21 mbar relative / 0.30 psi relative

6.3 Operating temperature

Permissible ambient and medium temperatures:

Ambient air temperature range:	-20°C to 70°C
Operating gas temperature range:	0 to 50°C
Medium inlet temperature:	Within +/- 2°C, 36°F from environment temperature
Maximum surface temperature:	80°C



Protect the instrument from influences by external heat sources (e.g. pipes or tanks).

6.4 Measured media

Dry, neutral gas (filtered 10 μ m)

The BlueEye™ Mobile can measure gas compositions in a wide range, in the form of H-gas or L-gas, as well as biogas or other (natural and synthetic) gas compositions. However, to ensure accuracy and warranty period, the gas composition range should be within the following range:

Gas Composition Range					
CH ₄	70-100 mol%	Higher Alcanes	0-1 mol%	O ₂	≤ 3 mol%
C ₂ H ₆	0-20 mol%	N ₂	0-15 mol%	H ₂ O (Gaseous)	≤ 0.1 mol%
C ₃ H ₈	0-5 mol%	CO₂	0-3 mol% (20/100 mol%) ¹	Dust, Liquids	Without
C ₄ H ₁₀	0-3 mol%	H₂	≤ 0.5 mol% (30 mol%) ²	H ₂ S	≤ 0.01 mol%
H_s addressable range		27.52 to 50.40 MJ/m ³ (15°C/15°C)			
Environment temperature		0 to 50°C, 32 to 122°F			
Medium inlet temperature		Within +/- 2°C, 36°F from environment temperature			
Operating gas pressures		960 to 1100 mbar absolute , 13.9 to 16 psi absolute			
Flow rate		50 ml/min (+/- 10%), 0.00177 scf/min (+/- 10%) ⁴			

¹ only for BlueEye™ Mobile **Renewable** & **Ultragreen**

³ unfiltered 1 second cycle measurement

² only for BlueEye™ Mobile **Hydrogen** & **Ultragreen**

⁴ flow rate range customizable on request

Please consult Bright Sensors SA or your local distributor if you are unsure whether your gas composition is within specification for your requirements. On request, tailored solutions for deviating composition ranges can be provided.

7 APPENDIX

7.1 Appendix A: Certificates

Certificates of conformity, can be found here: <https://www.bright-sensors.com/blueeye-mobile/>

7.2 Appendix B: Calibration Report

Calibration Report



Manufacturer:	Bright Sensors SA
Device type:	BlueEye™ Mobile Extended
Serial number:	1001500
Certificate number:	1001500/1
Certificate date:	31.01.2022
Customer:
Distributor:

Bright Sensors` BlueEye™ Mobile Extended and Hydrogen measure Dynamic Viscosity and Thermal Conductivity. These measuring principles are based on Micro-electromechanical systems (MEMS). When operating the BlueEye™ Mobile within the specified operating conditions (gas pressure, composition, temperature, and humidity) sensor drift is proven to be having no material impact. However, the BlueEye™ Mobile sensor cell, depending on the operation conditions, experiencing wear from temperature cycles, electronic component tolerance shifts, and contamination build up over time on the sensor chip. This calibration report allows the user to verify over time if the sensor cell accuracy is within the by the user required limits.

The BlueEye™ Mobile Renewable and Ultragreen have in addition to the Dynamic Viscosity and Thermal Conductivity Micro-electromechanical systems (MEMS) sensors also an Integrated IR CO₂ sensor build in. IR CO₂ sensors are more prone to drift and therefore require so called "zeroing" to reset the baseline.

Bright Sensors recommends checking the deviation from the reported values in this calibration report on a yearly basis. For devices that include a CO₂ sensor it is recommended to perform a zeroing of the CO₂ sensor on a 6-month basis.

The Calibration values are determined under the following conditions:

- Gas medium used: pure Methane (CH₄) N45 (CH₄ ≥ 99,995 %)
- A temperature between 20 °C and 30 °C of both the device and the pure Methane (CH₄) N45
- Pressure: stable at 990 and 1040 mbar absolute
- 1 time boosting directly after starting to flow pure Methane (CH₄) N45
- Minimum operating time before measurement: 20 mins
- Measurement time: 10 mins

To validate if the drift is within the required accuracy the BlueEye™ Mobile should be tested as close as possible under the same conditions when the calibration values were established. By comparing the calibrated values with the validation values the possible drift can be quantified. Bright Sensors recommends recalibrating or replacing the sensor unit if the values are deviating more than 0.25% of the in this report stated Dynamic Viscosity and Thermal Conductivity average values over the 10 minutes validation measurement.

The Dynamic Viscosity and Thermal Conductivity values can be recorder in the dedicated BlueEye™ Mobiles Apps and are stored for reporting in the Bright Sensors cloud (www.blueeye-mobile.com/). For more information, please refer to the user manual of your product.

Should you require support with the validation or if you require a recalibration, please contact Bright Sensors or your distributor.


www.bright-sensors.com
info@bright-sensors.com

Calibration Reported Values:

Dynamic Viscosity:

	Min	Max	Average	% Advised Average Tolerance Validation	Advised min. average Validation	Advised max. average Validation
Dynamic Viscosity	0.0000110799	0.0000111007	0.0000110923	+/-0.25%	1.10646E-05	1.11201E-05
Pressure (mbar absolute)	997.28	997.44	997.35			within 990 and 1040 mbar
Temperature (°C)	26.45	26.54	26.52			within 20 and 30 °C



Thermal Conductivity:

	Min	Max	Average	% Advised Average Tolerance	Advised min. average Validation	Advised max. average Validation
Thermal Conductivity	0.0339369178	0.0339830816	0.0339692244	+/-0.25%	0.033884301	0.034054147
Pressure (mbar absolute)	99728.00	99744.00	99735.02			within 990 and 1040 mbar
Temperature (°C)	26.46	26.54	26.52			within 20 and 30 °C



CO2 sensor: N/A

Status: Passed
Date: 31.01.2022
Operator: Dr. Gaël Farine

Signature: _____

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