

# Gas Detection & Measurement AGDM1603 User's Manual

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# Device Description

The AGDM1603 series are small size portable gas detecting devices that detect and measure density of specific gases in their surrounding environment. The device comes in several models, while they share the same electronics and mechanics, they differ in the type of gas sensor modules used. Different models provide applications in air quality, breathe alcohol content, and detection of flammable gases. Some models offer multiple applications, which are simply implemented by changing the target gas of the sensor in the sensor setup menu. To apply this feature and other setup modes an android App is provided (IOS App is not available currently).

The device is offered with or without LCD monitor and LED backlight. The monitor displays gas measurement, device status, temperature, and relative humidity of surrounding air. Additional device features are alarm function that generates alarm sounds when gas level exceeds preprogrammed safe levels, and a Bluetooth interface for remote monitoring and setup. The device has internal rechargeable Lithium-ion battery that can provide hours of operation without external power based on type of sensor that is used.

The device can be used as a personal item kept in shirt pocket, in purse, in homes, cars, offices, or warehouses.

**Warning-** For outdoor applications, avoid using the device in extreme temperatures cold or hot, under direct sun for extended period, misty air or contact with water.

## Applications

The following are some of the applications suggested for using AGDM1603 devices. These applications require using different models of device having a suitable type of sensor. Note that some models have sensors that provide sensitivity to a range of different gases and therefore they can be used for multiple applications.

- 1- Air Quality indicator for indoors.
- 2- CO detection for safety and life preservation.
- 3- CO<sub>2</sub> measurement for monitoring industrial pollution.
- 4- Combustible gases such as Propane/Methane/Hydrogen detection for safety and hazard prevention.
- 5- Propane/Methane/LNG detection for gas leakage detection.
- 6- Alcohol Content (vapor form) measurement for industrial usage.
- 7- Blood Alcohol Content (BAC) measurement for safe and legal level Alcohol consumption.

# Models and Target Gases

1. Model -05 Alcohol
2. Model -06 Butane, Methane and Ethanol
3. Model -07 Toluene, Ammonia or Hydrogen
4. Model -09 Ozone gasses
5. Model -10 Hydrogen sulfide (H<sub>2</sub>S) or Carbon monoxide
6. Model -12 Carbon dioxide
7. Model -13 Formaldehyde or Toluene
8. Model -14/15 Carbon Monoxide, Ammonia, Hydrogen sulfide (H<sub>2</sub>S), Hydrogen, Ethanol (Alcohol) and Nitrogen dioxide (NO<sub>2</sub>)

Note- The order of target gases in each line are designated as Sx-0, Sx1, . . . in the device display. For example; Model -13 Toluene is depicted as S13-1

AGDM316-	Air Quality Monitor	Flammable Gases	Alcohol Detection Breathalyzer
05			√
06		√	
07	√	√	
09	√		
10	√		
12	√		
13	√		
14/15	√	√	√

## Specification

- 1- Size: width = 88.34 mm, height = 56mm, thickness = 19.5 mm.
- 2- Weight: 73 grams.
- 3- External Power: Micro USB type B, capacity 5 Volts 375mA
- 4- Power consumption: Sensor OFF; 10% Backlight and fully charged battery 100 mW.  
Sensor ON; 450 mW to 950mW for small to large sensor types.
- 5- Battery: internal Lithium-ion 3.7V, 400mAh.
- 6- Operating temperature: -10 to 50 degrees Celsius.
- 7- Storage: -30 to 70 degrees Celsius non-condensing.
- 8- All devices are calibrated using standard clean air or a Lab calibration gas with known concentration suitable for the device sensor used.
- 9- Bluetooth version 5.1

# Package Contents

- 1- Gas Detector & measurement AGDM1603 device.
- 2- Micro USB B type cable.
- 3- Manual

## Display Window

- 1- Top Status Bar

The top row of the display depicts the state of the Gas monitor by showing the following symbols.

**ON/OFF** symbol appears when the sensor is turned on by the front pushbutton switch or remote command through the App.



**Ready** symbol appears flashing when sensor is just turned on. The flashing continues for 60 seconds while sensor is in preheat mode and may take additional preheat cycle(s) if sensor response is not steady and does not fall within a low preset limit. Most sensors reach steady state response within this time, some take several times longer. It is recommended by the sensor manufacturers to heat the sensors for a few minutes or longer for best results.



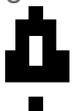
**CAL** symbol appears when device enters calibration mode (available for factory setup only). The symbol flashes when calibration data has been saved.



**Error** symbol appears when device's sensor fails to respond properly.



**Alarm** symbol appears when gas measurement exceeds minimum gas concentration for a given gas sensor.



Warning symbol appears when BAC measurement exceeds 0.00 in BAC mode.



## 2- Display Measurement Window

The display middle area shows measurement results. There are three selectable types of graphic windows: Air Quality Block graph, Density Bar graph and if applicable BAC (blood alcohol content). They are associated with different types of measurements and device models. Detailed descriptions are found below under section for specific device models.

## 3- Bottom Status Bar

The left side of bottom status bar shows the internal battery capacity next to a battery symbol. In the middle, the device's surface temperature is shown next to a thermometer symbol. On the right side, the relative humidity in percentage is shown next to a rain drop humidity symbol. The default temperature is set to degrees F (Fahrenheit) or C (Celsius) by factory although the current temperature setting can be changed by remote command through the App.

CAUTION- Temperature and relative humidity readings are affected due to internal heat from gas sensor when device is in measurement mode, and radiated heat from internal battery when it is in charging state, but these variations in temperature and relative humidity are compensated for by the device software. For better and more consistent reading, avoid turning on and off the device or sensor often, and keep the device away from heat or cold generating body or sources.

# Pushdown Switch

The pushdown switch has several functions. Primarily, it is used as on/off switch. To turn on the device push down and hold the switch for more than 4 seconds. To turn off the device push down and release the switch, about 4 seconds, or when a bell symbol (same as alarm symbol) appears on the top status bar. If the button is released several seconds longer than that, the device will be restarted.

Secondly, the switch is used to turn the gas sensor on or off. When in measurement screen, push down then release the switch momentarily.

Thirdly, the switch is used to acknowledge capturing the peak measurement value in the BAC test and returning the display to normal test again. When in this state, push down then release the switch momentarily.

Finally, the switch is used to turn the backlight on if it is turned off due to timeout by battery saving function. When in this state, push down then release the switch momentarily.

CAUTION- When device is operating in battery mode and battery capacity falls below operational limit device will automatically shut itself down.

## Sound Alarm

The AGDM1603 device is equipped with a piezoelectric sound Alarm that beeps at 1 KHz with 40db sound level but with different on/off time pattern signaling different alarm levels. The Air Quality levels are designated as five blocks or regions (see Air Quality Monitor section) and are referred to by color codes here and in the AGDM316 App. These levels mimic the Air Quality Index standards from US organizations such as EPA NAAQS, OSHA and others. Green is Safe region, Yellow is Moderate, Orange is Unhealthy for sensitive group, Red is Unhealthy, and Purple is Very Unhealthy and beyond (Hazardous).

There are four preprogrammed alarm levels for every target gas. The device Alarm active levels corresponding to gas concentration and beeping patterns as described below:

1. Level 1, when in yellow region, alarm beeps half a second every 30 seconds.
2. Level 2, when in Orange region, alarm beeps half a second every 15 seconds.
3. Level 3, when in Red region, alarm beeps half a second every 5 seconds.
4. Level 4, when in Purple region, alarm beeps half a second every 2 seconds.

Alarm sound can be tested or turned off or on by the App settings “Alarm Sound”. By default, the alarm sound is turned on after initial power up.

**Warning-** turning off the alarm sound may result in situations where un-healthy and hazardous gases detection may go unnoticed.

## Sensors and Target Gas

The gas sensors used in different AGDM1603 models are of type SnO<sub>2</sub> or MEMS. These sensors are considered to have good lifespan and durability, having reliable sensitivity and response which correspond closely to the manufacturing gas response data.

These types of sensors, according to manufacturer datasheets, usually have sensitivity and response to a group of gases. The group sensitivity and responses are also skewed by variations in environmental temperature and relative humidity which have been compensated for by the AGDM1603 software. Each gas in the group has separate response output that may overlap with another in the group and makes it harder to determine which gas is present.

It is stated by the sensor manufacturers that the sensitivity response improves as sensor stays powered a longer time. Therefore, as long as possible, keep the sensor power on once it's turned on.

The concept of target gas focuses on selecting one gas in the group as most probable or concerned as target gas presented. The device always displays measurements, safety parameters and alarm settings for the target gas. It is up to the user to select a target gas from the group which corresponds to application required. For example, one should choose Alcohol as target if device is used as breathalyzer or choose CO as target if carbon monoxide is to be detected as the concerned gas. Use the App settings page “sensor & gas type” to change the target gas. Changing the target gas is possible at any time even when the sensor is on, and measurement is in progress.

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## Managing Device and Sensor Power On/Off mode

To turn on the device power, press and hold down the pushbutton Switch for more than 4 seconds. To turn off the device power, press and hold down the pushbutton Switch for about 4 seconds and then release when the Alarm Symbol appears on the monitor. Turning off the power can also be done from the App settings page “Shut Down Device”.

To turn on or off the sensor power, press the pushbutton switch momentarily. After turning on the sensor power, a sensor Power On Symbol and Ready Symbol (blinking) appears on the monitor. The Ready Symbol stops blinking after sensor is ready within a minute time, or more for some sensors. If the sensor is not functioning correctly a sensor Error Symbol will appear on the monitor. The sensor can also be turned on and off from the App using Play and Pause icons on the App screen. The procedure mimics the local On/Off function and provides light symbols as indicators (refer to App “Numeric/Graphic Display Page” section for more information).

## Air Quality Monitor

An Air Quality Monitor device is used for detecting indoor or outdoor air pollutants. The indoor air pollutants are mainly emitted as volatile organic compounds (VOC) gases from plants, organic chemicals used in household materials including paint, varnishes, furniture, cleaning, disinfecting and cosmetic products. The outdoor air pollutants are mainly caused by industrial plants, cars and transportation vehicles that burn fossil fuel.

The display for Air Quality or AirQ mode, as shown in Figure 1, depicts a cascade of five horizontal blocks indicating different safety levels, from left to right, represent the Safe, Moderate, Unhealthy for sensitive group, Unhealthy and Very unhealthy or beyond (Hazardous) regions. A block is highlighted when concentration of pollutants for a targeted gas falls within the block, therefore the highlighted block moves from left to right as density of pollutant in the air increases. A separate line shows gas measurement in PPM (parts per million) or PPB (parts per billion), and sensor type and

gas target identifier number which follow a letter "S". For Air Quality monitor using the App refer to the "Numeric/Graphic Display Page" in App section.

The following devices detect and measure different groups of gases that are considered pollutants affecting the Air Quality indoors or outdoors.

In the following seven models, the target gas should be set to the desired gas and display mode set to AirQ by using the App settings page "Display Mode". Note that display mode can be set to "Normal" to display measurement only.

## **Model AGDM1603-7**

The device is suitable for detecting VOC gases Toluene and Ammonia for air quality measurement. The device is also known to be sensitive to gases emitted from citrus fruits.

## **Model AGDM1603-9**

The device is suitable for detecting Ozone gases at low concentration for air quality measurement. Please note the sensor manufacturer warnings regarding the sensor in this product:

1. Avoid exposure to high corrosive gases (such as H<sub>2</sub>S, SO<sub>2</sub>, Cl<sub>2</sub>, HCl).
2. Avoid exposure to organic silicon aerosol, Alkali, Alkali metals salt, halogen pollution.
3. Avoid icing on sensor's surface, otherwise sensing material may break down and lose sensitivity.
4. If the sensor is not powered for up to a month, it will take up to 48 hours of operation before sensor high stability restores.

## **Model AGDM1603-10**

The device is suitable for detecting H<sub>2</sub>S or Carbon monoxide for air quality measurement.

## **Model AGDM1603-12**

The device is suitable for detecting Carbon dioxide for air quality measurement.

## **Model AGDM1603-13**

The device is suitable for detecting VOC gases Formaldehyde or Toluene for air quality measurement. The device also is known to be sensitive to alcohol, benzene, and smoke.

## **Model AGDM1603-14**

The device is suitable for detecting Carbon Monoxide, Hydrogen, Ammonia or H<sub>2</sub>S for air quality measurement.

## Model AGDM1603-15

The device is suitable for detecting NO<sub>2</sub> and NO gases which are detrimental for measuring air quality concerning pollution from automobile exhaust.



Figure 1 Air Quality screen

## Breathalyzer

A Breathalyzer is used to monitor Blood Alcohol Content (BAC) by measuring alcohol level in the breath. For BAC measurement use the included mouthpiece and insert it in the sensor vent on the back side of the device. If the unit is equipped with the vent shown on left side of Figure 2 Back sideremove the vent by twisting it in counterclockwise direction and replace it with the vent, also included, shown on the right side of the Figure 2 Back side and turn it clockwise until it clicks in.



*Figure 2 Back side*

Simply slide the mouthpiece in the center hole of the vent as shown in Figure 3 Mouthpiece.



*Figure 3 Mouthpiece*

The display for Breathalyzer or BAC mode is shown in Figure 4. A BAC level is depicted in the middle, a separate line shows BAC mode, sensor type and target gas identifier number which follow letter “S”. The target gas should be set to Ethanol or Alcohol and display mode set to BAC by using the App settings. The App “BAC Page” can also be used to monitor the BAC reading.

It is recommended to wait a few minutes after consumption of the last alcohol beverage and before measuring the BAC. Once the sensor is turned on and its ready blow in the mouthpiece for about 5 seconds and then observe the device display for result. Continuous tests can be performed without turning the sensor off and on again. While testing any level above 0.00 will generate a beeping sound, and the peak value will be captured and displayed. A warning sign will also blink indefinitely until the display is acknowledged. To acknowledge and go back to a new test, press the pushbutton switch and release momentarily and wait until the display shows 0.00. The acknowledgement and warning sign also is removed when display mode is changed in the “Display Mode” of the App settings page.

The unit of measurement for BAC is in g/dL or grams per Deciliter which is used in USA as legal measurement method. A Zero alcohol level is displayed as 0.00 and increases as measured levels of alcohol in the breath increases (level 0.08 or above in many states in US are considered legally intoxicated). The following table by Wikipedia shows BAC levels versus number of drinks consumed based on weight for male and female.

**As a disclaimer, please note that AIMTEK LLC does not approve nor disapprove any part of the Table 1 contents.**

Male Female	<a href="#">Approximate blood alcohol percentage (by vol.)</a> [7]								
	One drink has 0.5 US fl oz (15 ml) alcohol by volume								
Drinks	Body weight								
	40 kg 90 lb	45 kg 100 lb	55 kg 120 lb	64 kg 140 lb	73 kg 160 lb	82 kg 180 lb	91 kg 200 lb	100 kg 220 lb	109 kg 240 lb
1	– 0.05	0.04 0.05	0.03 0.04	0.03 0.03	0.02 0.03	0.02 0.03	0.02 0.02	0.02 0.02	0.02 0.02
2	– 0.1	0.08 0.09	0.06 0.08	0.05 0.07	0.05 0.06	0.04 0.05	0.04 0.05	0.03 0.04	0.03 0.04
3	– 0.15	0.11 0.14	0.09 0.11	0.08 0.1	0.07 0.09	0.06 0.08	0.06 0.07	0.05 0.06	0.05 0.06
4	– 0.2	0.15 0.18	0.12 0.15	0.11 0.13	0.09 0.11	0.08 0.1	0.08 0.09	0.07 0.08	0.06 0.08
5	– 0.25	0.19 0.23	0.16 0.19	0.13 0.16	0.12 0.14	0.11 0.13	0.09 0.11	0.09 0.1	0.08 0.09
6	– 0.3	0.23 0.27	0.19 0.23	0.16 0.19	0.14 0.17	0.13 0.15	0.11 0.14	0.1 0.12	0.09 0.11
7	– 0.35	0.26 0.32	0.22 0.27	0.19 0.23	0.16 0.2	0.15 0.18	0.13 0.16	0.12 0.14	0.11 0.13
8	– 0.4	0.3 0.36	0.25 0.3	0.21 0.26	0.19 0.23	0.17 0.2	0.15 0.18	0.14 0.17	0.13 0.15
9	– 0.45	0.34 0.41	0.28 0.34	0.24 0.29	0.21 0.26	0.19 0.23	0.17 0.2	0.15 0.19	0.14 0.17
10	– 0.51	0.38 0.45	0.31 0.38	0.27 0.32	0.23 0.28	0.21 0.25	0.19 0.23	0.17 0.21	0.16 0.19

Subtract approximately 0.01 every 40 minutes after drinking.

Table 1

The following AGDM316 models described below can be set as breathalyzers.

## Model AGDM1603-14

The device is suitable for detecting Ethanol (Alcohol) for BAC measurement.

## Model AGDM1603-5

The device is suitable for detecting Ethanol (Alcohol) for BAC measurement.



Figure 4 Breathalyzer Screen

## Flammable Gases

The following devices are intended for detecting flammable gases such as Butane, Methane, Ethanol or Hydrogen. The display for Flammable Gas detectors or display measurement mode depicts a vertical bar graph as shown in Figure 5. The vertical solid bar graph moves from bottom to top as density of targeted gas in the air increases. A separate line shows Gas measurement in PPM (parts per million), and sensor type and target identifier number after a letter "S". The targeted sensor minimum and maximum gas detection levels are shown in the bottom and top of the bar graph.

In following models, target gas should be set to the desired gas and display mode set to “Normal” in the App settings page “Display Mode”.

Press the pushbutton switch to start detection and measurement and push again to stop.

## Model AGDM1603-6

The device is suitable for detecting and measuring Butane, Methane and Ethanol as flammable gases.

## Model AGDM1603-14

## Model AGDM1603-7

These models are suitable for detecting and measuring Hydrogen as flammable gas.



*Figure 5 Gas Detection Measurement Screen*

## Display Option

The display option with no LCD monitor shown in Figure 6 is not currently available and is reserved for future offering.



*Figure 6 No LCD Display Option*

## **Bluetooth Interface**

The AGDM1603 devices have Bluetooth Interface. The Bluetooth App is currently available through AGDM1603 APP for Android devices only.

## **Android APP**

The AGDM1603 APP for Android provides Bluetooth 5.0 wireless access to AGDM1603 devices and allows the user to setup, send commands, and operate the device. The App constantly updates and displays gas measurement and device status.

## **Android App Download**

The ADDM316 App can be downloaded from Googleplay or aimetkllc.com website at My Account.

## **AGDM1603 APP Functions**

These functions are described in the App Feature Pages in the following sections but some display features that are common among the Numeric, Graphic and BAC Pages are described here:

1. Device Name or Location - used for displaying device's characteristic and is completely customizable (see settings page).
2. Sensor Power - becomes green when the device sensor power is turned on by Play button on the screen or pushbutton on the device.

3. Sensor Ready - blinks every second after the sensor power is turned on and is in preheat mode. The preheat time can last for 2 minutes or more depending on the sensor type. The indicator becomes solid green after preheat time is over.
4. Sensor Error - becomes Red if Sensor fails.
5. Sensor Alarm - becomes Red if target gas concentration exceeds the Safe Level.
6. Safety Level - shows a color-coded representation of current gas concentration safety level. Green for Safe, Yellow for Moderate, Orange for Unhealthy, Red for Very Unhealthy and Maroon for Hazardous.
7. USB Power - becomes green when device is plugged into an external USB power source.
8. Temperature - shows temperature near device in degree C or F. The unit type is programmable (see settings page). When sensor is running, an internal algorithm deducts the added temperature due to the heater and displays the compensated value.
9. RH - shows Relative Humidity in percentage.
10. Battery - shows the current capacity of internal Lithium-ION battery in percentage.
11. Touch screen buttons - Settings, Next Page, Play and Stop buttons are provided.
12. Settings Page button - used for Jump to Settings page.
13. Next Page button - used for changing the page from Numeric to Graphic Display or vice versa or moving from Settings page to the previous page.
14. Play touch button - the Play (Run symbol) turns on power to device sensor and starts the sensor detection process.
15. Stop button - the Stop (Pause symbol) stops the sensor detection process and turns off power to device sensor.

## Scan Page

This Scan page is the starting point after App is initiated. The App searches the nearby BLE devices and will try to reconnect to an AGDM1603 device that was previously connected but unexpectedly disconnected.

If that is not the case, the App will display the available AGDM1603 devices and waits for the user to select the desired device by tapping or clicking on the Bluetooth device ID, see Figure 7 Scan Page.

After device is selected a login screen as in Figure 8 Login Screen will be displayed. Touch SKIP and you will be logged in (for factory reserved functions Login with Password is required).

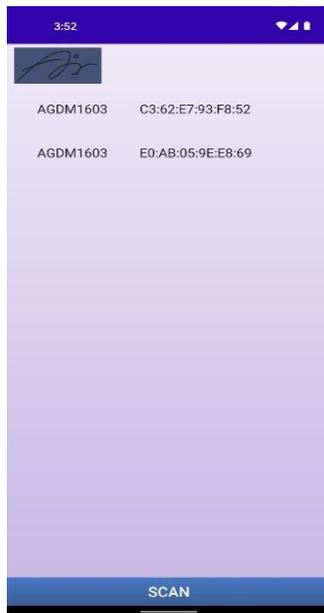


Figure 7 Scan Page

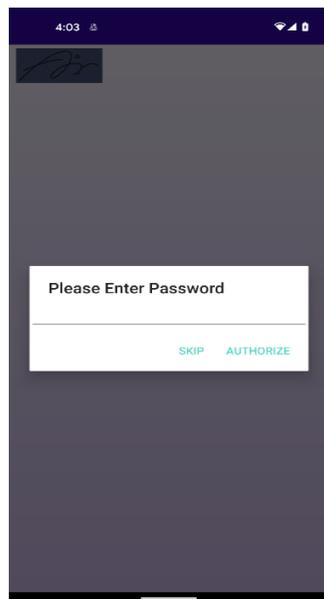


Figure 8 Login Screen

## Numeric Display Page

This page shows the targeted gas measurements in PPM or PPB in the center of page as shown in Figure 9 Numeric Display.

1. Use the Play button to start the gas detector.
2. Wait for 2 minutes (most sensor types) to 5 minutes max as the sensor is heating up.
3. The target gas measured value will continuously update.
4. Touch the Next Page button if need to see measurement in Graphic Display page.
5. Touch Settings Page button if need to change settings (some settings are not allowed while gas detector is on).

**WARNING-** turning off the alarm sound may result in situation where un-healthy and hazardous gases detection may go unnoticed.

6. Touch the Stop button to stop the gas detector if desired.

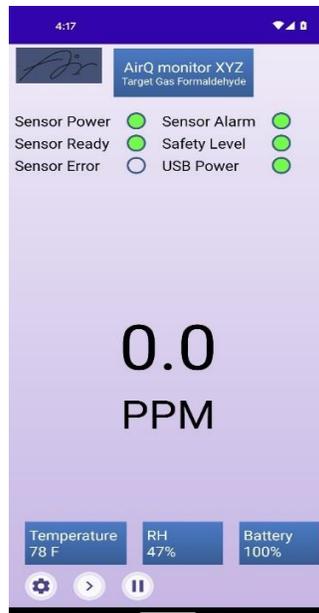


Figure 9 Numeric Display

## Graphic Display Page

This page shows gas measurands in x-y graphical plot as shown in Figure 10. The measurement values are displayed for the last 120 seconds with safety levels shown by a color-coded bar graph on the right of the screen. The Max y-coordinate represents gas value equal to 25% above Hazardous Safety level. If measurement value exceeds the Max value graph stays in a flat line. You can go back and forth to and from Numeric Display page without a disruption but moving to Settings page and back will force the graph to restart from left of graph.

1. Use the Play button to start the gas detector.
2. Wait for 2 minutes (for most sensor types) to 5 minutes max as the sensor is heating up.
3. If desired, stop the measurement by Stop button, touch the screen anywhere in the x-y plot and a value for that position will be displayed.
4. If desired, target gas can be changed while sensor is in run mode without need to stop the sensor. This eliminates the time needed for pre-heating the sensor when sensor is turned on.

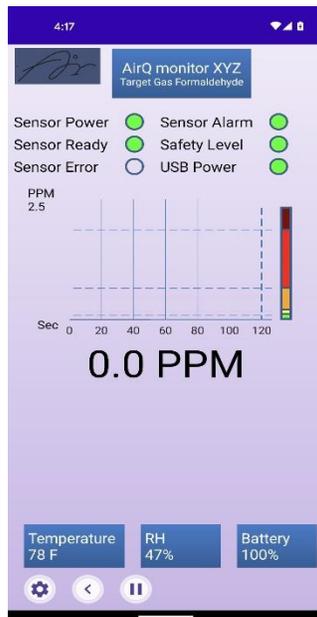


Figure 10 Graphics Display

## BAC Page

This page shows the Blood Alcohol Content as shown in *Figure 11*. For more detail about BAC measurement refer to *Breathalyzer* in the earlier section.

1. Use the Play button to turn on sensor power, skip this step and the next if power is on already.
2. Wait for 2 minutes (for most sensor types) to 5 minutes max as the sensor is heating up and the Sensor Ready light starts blinking.

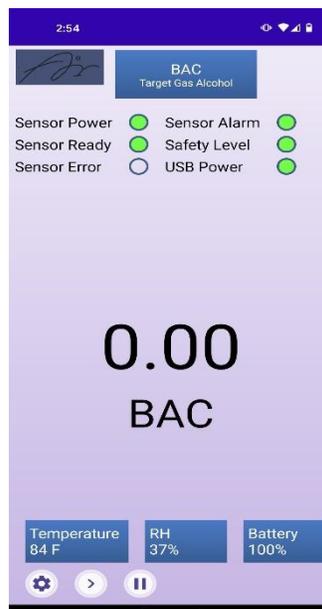


Figure 11 BAC Display

3. When Sensor Ready light is solid Green and is not blinking, device is ready for measurement.
4. Use the provided mouthpiece and attach it to the device's back side sensor mounting. Exhale into the mouthpiece, the display will show Blood Alcohol Content (BAC) in g/dL or grams per deciliter which is used in USA as legal measurement method. A Zero alcohol content level is displayed as 0.00 and while testing any level above that will generate a beeping sound, and the peak value will be captured and displayed. A warning sign will also blink indefinitely until the display is acknowledged. To acknowledge and go back to a new test, press the pushbutton switch once and release momentarily and wait until the display shows 0.00. The acknowledgement and warning sign also is removed when display mode is changed in the "Display Mode" of the App settings page.
5. It is recommended to wait a few minutes after consumption of alcoholic drink before testing for BAC.

## Settings Page

This page shows current settings of device parameters and provides buttons to program settings and control device operation, shown in Figure 12.



Figure 12 Settings Page

1. Sensor & Gas Type – Use this button to explore the type of gases that the sensor can detect and measure. Choose the desire type by checking the circle in front of gas type. Note that gas type can be altered at any time, before and after the sensor power is on and ready, except for S14-S15 which is dual sensor.
2. Display mode – Use this button to select device display mode. Normal is used for Gas measurement screen, AirQ is for Air quality screen and BAC is for breathalyzer screen.
3. Temperature – Use this button to select between degrees Celsius or Fahrenheit.

4. Alarm Sound – Use this button to suppress alarm sound or enable it, or test the Alarm Sound.  
**WARNING-** turning off the alarm sound may result in situation where un-healthy and hazardous gases detection may go unnoticed.
5. Backlight Intensity – The default is set at 10%. Use the button to enter any other number from 1 to 99.
6. Device Name Alias – This option is useful for naming or identifying the device for example by its location. Use this button to enter any desired name which is ten characters or less.
7. Screensaver Mode – The device LCD screen can be set to turn off after a set delay time. This option is useful for prolonging LCD screen lifetime. The selections are 1 minute, 1 hour, 8 hours or not used.
8. Shut Down Device – Use this button to turn off the device completely.  
**WARNING-** The device can only be turned on by pressing the pushbutton switch on the front of device.
9. Exit App – Use this button to exit the App.
10. About – Shows App version number and Copywrite notice.
11. Disconnect – Use this button to disconnect the App from device Bluetooth connection. If device is disconnected the button will change to connect and can be used to connect to the device.

## Trouble Shooting

Problem	Possible cause	Solution
Device will not turn on.	USB Power is not plugged in, and Battery is very low.	Plug in the USB power cord and make sure USB adapter is powered by A/C power.
	Faulty USB Adapter or Micro USB cord.	Replace Micro USB cord or USB Adapter or both.
	Faulty Device.	Device is bad and needs to be replaced.
Displayed temperature is stuck at higher than normal.	Sensor Heat control.	Turn off power to sensor and restart the device.
Sensor Error indicator stays on even after multiple on/off tries.	Faulty Sensor.	Sensor is bad and needs to be replaced.
Device is on, but the APP scan page does show the device.	APP did not terminate the last time.	Terminate App and restart it again.

## Safety Information

- Avoid dropping.
- Do not place near heat sources.
- Do not disassemble.
- Do not submerge in water.
- Do not use under rain or misty air.
- Avoid extreme temperatures.
- Clean with lightly dampened cloth. Do not use chemicals or oil.



### Disposal

This product must not be discarded as household waste and should be delivered to a collection facility for proper disposal. Products that contain rechargeable battery and Liquid Crystal Display (LCD) are required to conform to local rules and regulations for disposal and recycling.

## FCC Statement

The following statements is referenced to BLE653 PN 453-00039 equipment by Laird Connectivity which is integrated into AGDM1603 device.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This

equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in an installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**FCC Caution:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference; and
2. This device must accept any interference received, including interference that may cause undesired operation.

**FCC Radiation Exposure Statement**

This product complies with the US portable RF exposure limit set forth for an uncontrolled environment and is safe for intended operation as described in this manual. Further RF exposure reduction can be achieved if the product is kept as far as possible from the user body or is set to a lower output power if such function is available.

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

This device is intended only for OEM integrators under the following condition:

1. The transmitter module may not be co-located with any other transmitter or antenna,

The BL653 holds current certifications in the following countries: <b>Country/Region</b> USA (FCC) EU Canada (ISED) UK (UKCA) Japan (MIC) Korea (KC) Australia New Zealand	<b>Regulatory ID</b> SQGBL653 N/A 3147A-BL653 N/A 201-200063 R-C-L7C-BL653 N/A N/A
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Manufacturer	Model	Antenna Type	Peak Gain 2400-2500 MHZ
Laird Connectivity	BLE653 PN#453-00039	PCB printed	1.28 dBi

## Warranty

This product is guaranteed to be free from defects and in good working condition when shipped and is warranted for a maximum period of 12 months from the date of original purchase. Within the first 30 days of purchase, you can return the product for a full refund, provided if terms of warranty are not broken.

**WARNING!** The warranty will be void if any of the following situations occur:

1. If product is attached to a USB adapter that is not a standard 5 volts source and causes damage to device electronics.
2. If product shows signs of damage or defects caused by or resulting from abuse, accident, or alteration.
3. If product is used in an environment other than what is specified and intended by the manufacturer such as extreme temperatures, water, abnormal dust, or any chemical damage.
4. If product is disassembled or tampered with in any way.
5. Any degradation due to normal wear.
6. If product is damaged during shipment originated from customer.

## **Services and inquires**

For purchased product regarding periodical calibration cost and repair or returns contact company website [support@aimtekllc.com](mailto:support@aimtekllc.com). For all other inquiries contact [sales@aimtekllc.com](mailto:sales@aimtekllc.com).

To insure proper and quick response please provide Customer name, Model number and Date of purchase, and any questions or comments you may have.