AlcoMeasure®

WM1

Wall Mounted Breathalyser

User Manual

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2 Notes

3 Information and Safety Precautions

The WM1 must be installed, serviced and maintained by an authorised service technician. The authorised service technician is also responsible for providing training to the device owner (or representative) for safe internal access to the device, including changing straws and basic maintenance.

Once training and installation are complete the device owner assumes all responsibility for key management and internal access to the device.

Throughout this manual the person responsible for the device will be referred to as the “user”. This person can be distinguished from the individuals being tested whom shall be referred to as the “subjects”. It should be noted that the subject is called a user in the sections dealing with user validation and user lists, since this is common terminology.

Opening either door of the device exposes some of the internal wiring to the user, exposing the user to the risk of electric shock. This must be done with care and should only be carried out by a person authorised to do so.

The top door of the device shall only be accessed under the direction of the authorised service technician.

The bottom door of the device can be accessed for refilling straws by any person who has been given adequate training by the authorised service technician or the device owner.

3.1 Safety Notifications

The following notifications are found throughout the manual:

 INFORMATION	Intended to explicitly display crucial information which should not be missed.

 DANGER	Intended to inform users of a specific danger which may have serious consequences such as major injury or even death.

4 Introduction

Thank you for choosing the AlcoMeasure WM1 wall mounted breathalyser. This user's manual contains essential product information from installation and operating instructions, to software configuration and troubleshooting. It is recommended that you thoroughly read it to ensure the safest and most efficient interaction with this product.

The AlcoMeasure WM1 is available in a range of models with multiple options which are all detailed throughout this manual. Please note that some sections may not relate to your specific model.

Every effort has been made to ensure the accuracy of this manual. All-Systems Electronics (ASE) reserves the right to make modifications to this manual, as well as the hardware and software referred to in this manual.

 DANGER	The calibration gas cylinder used in this device is classed as dangerous goods and should be transported as such. If necessary, it can be removed from the device and shipped separately. See section 5.5 for more information. The Material Safety Data Sheet (MSDS) for the calibration gas cylinder can be found on the accompanying USB stick or downloaded from www.all-systems.com.au.

 INFORMATION	The reading obtained through correct use of this device is considered accurate at the time of testing. Neither the manufacturer, distributor, owner nor licensee of this device, nor the proprietor of these premises, accept liability or responsibility in respect thereof. Readings obtained through use of this device cannot be used as evidence in a court or tribunal.

5 Product Information

5.1 Manufacturer

Postal Address	Contact	
All-Systems Electronics Pty. Ltd.	Telephone:	+61 2 9624 4644
16 Hope Street	Fax:	+61 2 9838 8562
Seven Hills, NSW 2147	E-mail:	sales@all-systems.com.au
Australia	Website:	www.all-systems.com.au

5.2 Distributor

Postal Address	Contact	
Breathalyser Sales & Service	Telephone:	+61 2 8338 1555
128 O'Riordan Street	Fax:	+61 2 8338 1688
Mascot, NSW 2020	E-mail:	nsw@breathalyser.com.au
Australia	Website:	www.breathalyser.com.au

5.3 Standards Certification

The AlcoMeasure WM1 meets and exceeds the latest Australian standard for breath alcohol testing devices, AS 3547:2019, and has been certified for a calibration period of 12 months. See section 5.4 for more information on product certification.

5.4 Product Specifications

Size and Weight	Height: 535 mm Width: 380 mm Depth: 135 mm Weight: 13.5 kg
Power	85 – 264 V AC, 47 – 63Hz, 20W max consumption
Sensor	Alcohol specific Honeywell electrochemical cell
Total Test Time	10 seconds at 0.000 g/210L with fast recovery enabled (default)
Response Time	3 seconds at 0.000 g/210L
Recovery Time	3 seconds at 0.000 g/210L, 60 seconds at 0.100 g/210L
Operating Temperature	0°C – 45°C, relative humidity 30%-90% non-condensing Optimal environment is air conditioned at approximately 24°C
Storage Temperature	-10°C – 70°C
Units of Measure	User selectable: g/210L (default); g/100mL; % BAC; Promille w/w; Promille w/v; mg/mL; g/L; mg/100mL; µg/L; µg/100mL; mg/L; g/230L
Measurement Resolution	Increments of 0.001 g/210L
Detection Range	0.000 – 0.300 g/210L
Accuracy	Better than ±0.005 at 0.000 to 0.050 g/210L Better than ±10% above 0.050 g/210L
Sample Volume	1.0 L
Flow Rate	8 L/min to 36 L/min
Calibration Period	Calibration period is 12 months or 100,000 tests, whichever occurs first. This is called the “Periodic Service” for the remainder of this manual.
Self-adjust function	Self-calibration will occur every 24 hours, skipping up to 2 self-calibrates if low usage is detected. In general, whenever calibration is discussed in the remainder of this manual, it refers to this function.
Masking Capability	0.006 g/210L
Display	Sunlight-readable 17-character LED display, 280mm x 18mm

Connectivity	3 x RS232 serial ports 1 x USB Mini-B connector 1 x USB Standard-A (Firmware Update Only) 1 x Ethernet connector 1 x SD Card holder (FAT32)
Certifications	AS 3547:2019 Breath alcohol testing devices – Type 3 AS/NZS 3100:2017 Approval and test specification - General requirements for electrical equipment AS/NZS 61000.6.3:2021 Electromagnetic compatibility (EMC) Generic standards - Emission standard for equipment in residential environments

5.5 Shipping Information

The gas cylinder contained inside the AlcoMeasure WM1 is considered a dangerous good. This means that care should be taken when handling and shipping the device.

If the WM1 needs to be shipped via courier, it needs to be declared as dangerous goods. The following information will be useful when declaring on the couriers shipping forms.

Shipping Name	Compressed Gas N.O.S.
Dangerous Goods Class	2
UN Number	UN1956

5.6 Product Features

Figure 1 - Outer Features

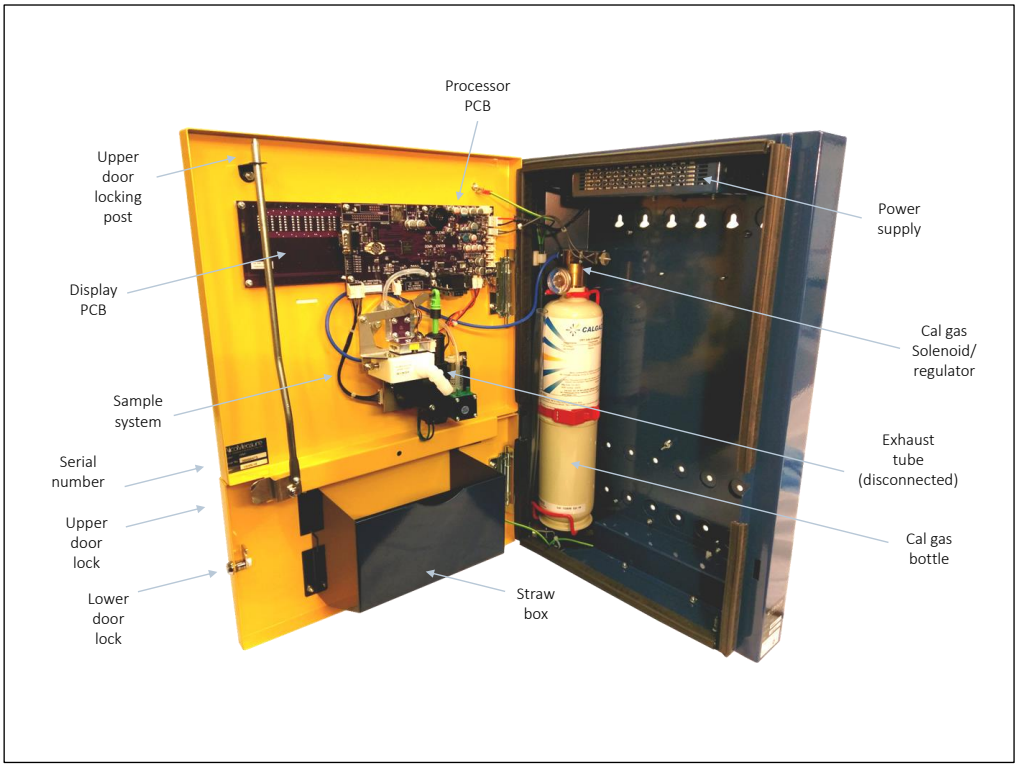


Figure 2 - Inner Features

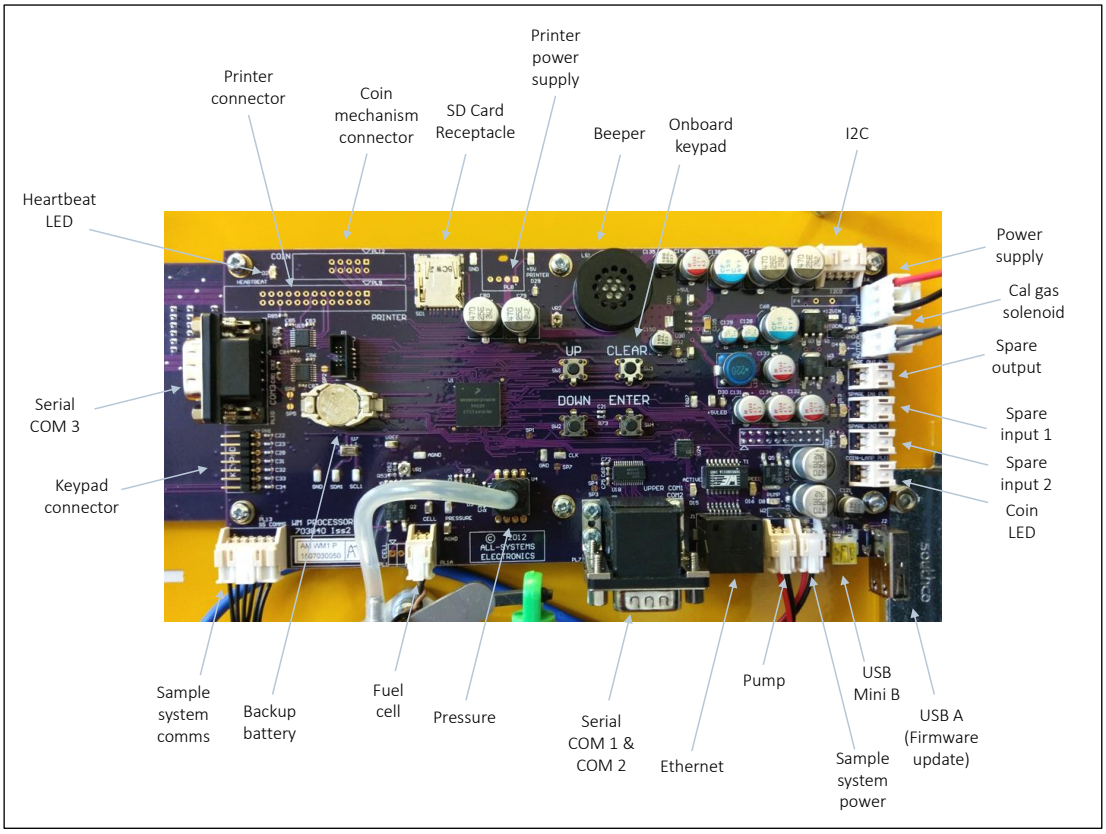


Figure 3 - Processor PCB

5.7 Software and Firmware versions

The following versions were current at the time of writing this manual.

Device Firmware	1.2000	See section 22 for information on updating firmware
Device Bootloader	1.1000	Not user upgradeable
Sample System Firmware	2.000	Not user upgradeable
Sample System Bootloader	1.002	Not user upgradeable
AlcoMeasure Utility	1.4.0.0	See section 8 for installation/updating information

5.8 Product Models and Options

5.8.1 Models

The AlcoMeasure WM1 is available in 3 distinct models as listed below.

5.8.1.1 Standard Model

The Standard model comes with all the necessary features required to breath-test a work force under normal circumstances.

It can run in free test mode, where individuals can simply take a straw and test themselves. No other interaction with the device is required by the test subject.

It can also interface to an external device or system, like an access control system or a hardware output for activating a door or alarm. See section 19 for more information on these modes.

The device can be configured using a PC Program called AlcoMeasure Utility (section 8). The displayable messages are configurable, the test log can be downloaded, and many other features can be configured by the user. Logging and configuration options are described in detail in sections 9 and 10.

Most sections of this manual relate to the Standard model unless specified otherwise.

5.8.1.2 Evidential Model

The Evidential model is the top-end model in the AlcoMeasure WM1 range. It comes with all the standard model's features as well as a built-in printer and a keypad. The keypad is used to identify test subjects, and the printer can be configured to provide a printout for every test.

The Evidential model also provides a special "Formal" test type which is described in section 16.1.

Any of the options outlined in section 5.8.2 can still be added to the Evidential model.

See section 16 for more information on the Evidential model.

5.8.1.3 Vend Model

The Vend model is mainly designed for use in the hospitality industry. It comes with all the standard model's features as well as a built in universal coin receiver and coin box. The universal coin receiver can be programmed to take most types of metal coins and tokens. The coin box can only be accessed by opening the top door of the device, adding a layer of security. This should only be done by an authorised service technician.

For more information on the Vend model see section 17.

5.8.2 Options

The AlcoMeasure WM1 can be purchased with any of the option packages listed below. Options can also be customised outside of the packages listed below. Please contact the distributor outlined in section 5.2 for more information on a custom solution.

5.8.2.1 Live Option

The Live option adds extra software functionality to any of the models outlined in section 5.8.1.

The Live option includes the ability for the unit to send emails to one or more email addresses. The unit can be configured to send an email if a subject tests over a programmable limit. It can also be configured to periodically email the test log for processing by a manager. More information on Email functionality can be found in section 13.

The Live option includes the ability to interface to external software, such as AlcoMeasure Server. AlcoMeasure Server is described in detail in the "AlcoMeasure Server Manual" and is available as a separate product. However, this external software could also be in the form of custom software provided by the client. A HTTP API is provided for this purpose, and is described in section 20.

The Live option also includes the following:

- "Formal" test type which is described in section 16.1.
- Ability to validate a subject via a user list stored in the unit (section 12).
- Access to the HTTP API by disabling the login mechanism (section 11.1.5).

5.8.2.2 Keypad

A keypad can be added to any Standard WM1 model if it is not already fitted. It cannot, however, be fitted to a Vend model. See section 19 for more information on subject identification.

5.8.2.3 iButton Reader

The iButton Reader is installed on the front of the AlcoMeasure for subject identification instead of a keypad, and requires that each subject be issued with an iButton. The iButton is pressed against the reader to identify the subject and start a test. iButton's are sold separately by the distributor listed in section 5.2.

Further information on the iButton option can be found in section 19.3.

5.8.2.4 Proximity Card Reader

A proximity card reader can be installed on the front of the AlcoMeasure for subject identification instead of a keypad.

5.8.2.5 Alarm Beeper

An optional beeper can be added to the AlcoMeasure that will alarm when a test result is higher than the set limit.

5.8.2.6 Camera

A front mounting camera can be added to the AlcoMeasure to aid with subject identification. It takes several photos during each test, which are logged on the SD Card against the test result. These can then be downloaded periodically using the AlcoMeasure Utility program.

Further information on configuring the Camera can be found in section 11.12, and information on downloading and viewing photos can be found in section **Error! Reference source not found.**.

5.8.2.7 Relay Board

A small internal printed circuit board can be added that provides 3 extra voltage free relay contactors. These can be used to trigger external devices when a test starts, or when a test passes/fails.

Further information on configuring the Relay Board can be found in section 11.7.

5.8.2.8 AlcoMeasure Server

AlcoMeasure Server is a standalone software package used for the remote management of AlcoMeasure devices. It provides a mechanism for downloading device log data into a centralised database that can then be accessed from a standard browser. It also provides the ability to email notifications from a centralised location.

It is purchased separately, and can be used with any AlcoMeasure that has the “Live” feature unlocked.

See github.com/All-Systems-Electronics/AlcoMeasure for more information on the Server Software, including the Brochure and User Manual.

Further information on configuring the Server connection can be found in section 11.10.

6 Installation Instructions

 DANGER	High voltage! Beware of electric shocks which may cause major injury or even death. 240V present within the machine – care must be taken during the installation procedure to ensure mains cable does not get caught between the machine and the mounting plate. The AlcoMeasure WM1 is not to be hardwired in any circumstances as it may require removal for servicing and/or repair.

 INFORMATION	To maintain accuracy and correct operation the device must be installed in a controlled environment free of contaminants and temperature fluctuations. See section 5.4 for the optimal operating temperature.

The AlcoMeasure WM1 is designed to be permanently mounted to a wall and powered continuously. Alternatively, it can be mounted to a stand or other suitable mounting device if the correct clearances are accounted for.

To make the installation and servicing of the machine as easy as possible, the AlcoMeasure WM1 comes pre-assembled with a mounting plate located on the back of the machine. The mounting plate should be permanently secured onto the desired mounting location, after which the AlcoMeasure is fastened to the mounting plate. This allows the machine to be simply and quickly removed for servicing or repair purposes.

6.1 Manufacturers Recommendations

The following manufacturer recommendations should be considered prior to installing the machine.

- Installation should be completed by an authorised service technician.
- Ensure that the machine is powered only by tested and tagged power leads, such as the one provided. Extension leads are not recommended.
- Secure the AlcoMeasure to the mounting plate using supplied M5 hardware, rather than the single centre stud wing nut.

6.2 Requirements

The following checklist shows all items that should be received in the AlcoMeasure WM1 box, excluding optional extras:

- AlcoMeasure WM1 device
- Mounting plate (located on back of device)
- M5 wing nut (attached to mounting plate)
- USB Stick containing User Manual and AlcoMeasure Utility software
- Upper door key
- Lower door key
- M5 hex nut x 4
- M5 flat washer x 4
- M5 star washer x 4

The following items need to be supplied by the installer:

- M5 nut driver
- Adequate fixing screws/bolts to support 15kg weight

6.3 Mounting Dimensions

Figure 4 - Outer Dimensions

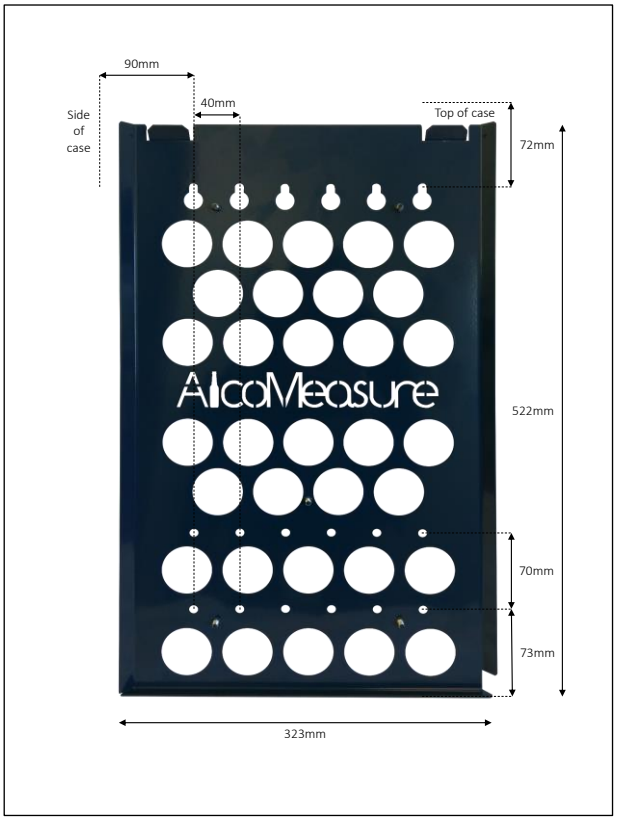


Figure 5 - Backing Plate Mounting Dimensions

6.4 Clearances

INFORMATION	Under no circumstances should the device be operated while it is placed on a flat surface. A minimum of 50mm unobstructed air space must be allowed.

When mounting the AlcoMeasure WM1 the following clearances must be allowed:

- A minimum of 50mm unobstructed air space below AlcoMeasure. This is to ensure that the exhaust port is not blocked, causing inaccurate results. The device must NOT be operated while placed directly on a flat surface.
- A minimum of 150mm unobstructed air space to the right of the AlcoMeasure. This allows enough space for a hand to fit and unlock the straw dispenser door.
- A minimum of 300mm unobstructed air space to the left of the AlcoMeasure. This is to ensure that both doors can be completely opened without obstruction.
- Between 1.0m to 1.3m clearance from the floor. This needs to take into consideration the average height of a person to allow subjects to comfortably take a test by having the mouthpiece approximately at mouth level.

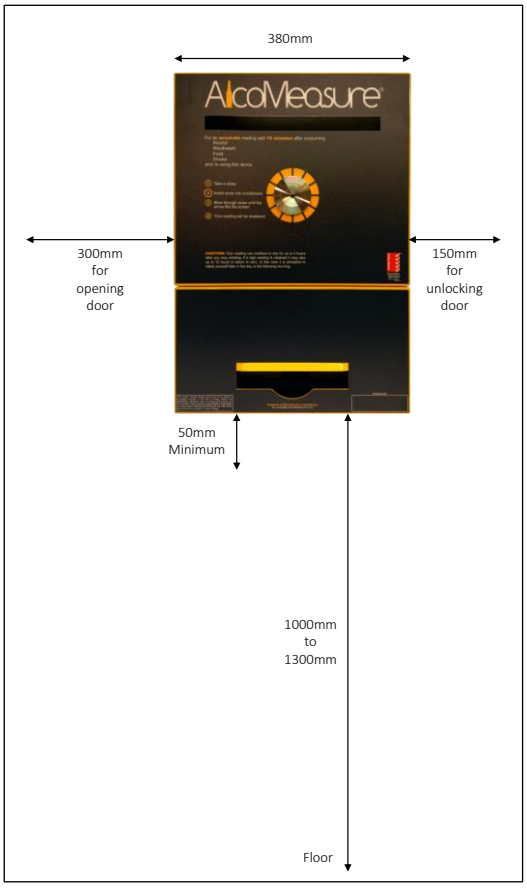


Figure 6 - Mounting Clearances

6.5 Installation Procedure

The following procedure describes how to successfully install the AlcoMeasure WM1.

DANGER	Opening either door of the device exposes the installer to 240V. Care must be taken to avoid touching the internal wiring directly or with tools.

1. Unlock and open the bottom door using the key provided.
2. Unlock the top door using the supplied keys. Take care when opening it not to dislodge the exhaust tube or disturb any wiring or mechanics.
3. Loosen and remove the wing nut from the centre fastening stud of the mounting plate on the rear or the machine, then remove the plate by pulling outwards from the bottom.
4. Choose a suitable mounting location taking into account the clearances specified in section 6.4. The device should be mounted near a power point where it can be powered continuously, and should not be hardwired.
5. Securely attach the mounting plate to the wall or other suitable structure using at least four of the available mounting holes.

   Take note that the mounting plate is slightly smaller than the overall device. The dimensions of the mounting plate are specified in Figure 5.
6. Lift the AlcoMeasure onto the locating tabs on the mounting plate and secure it to the mounting plate with the supplied M5 hardware.

   If quick release is required then a single wing nut can be used to fasten the AlcoMeasure to the mounting plate, however this is not the recommended method if security is a concern.
7. Fill the straw dispenser with straws.
8. If the gas cylinder was removed, replace it following the procedure in section 6.6.2.
9. Observe the calibration gas cylinder and check that the gas level is above approximately 250 PSI.
10. Close and lock the top door, holding the door firmly in place to ensure that the locking bar at the top of the door correctly locates under the lip of the AlcoMeasure body.
11. Close and lock the bottom door.
12. The machine is now ready to be powered on. See section 1 for information on how to operate the device.

6.6 Calibration Gas Cylinder Removal

There are several reasons why the internal gas cylinder may need to be removed or reinstalled:

- Since the gas cylinder is considered dangerous goods, it may be beneficial to remove the gas cylinder and ship it separately from the device.

- If the device is being exposed to temperatures outside of its normal operating range then the gas bottle will need to be removed, since the gas bottle itself is not rated for the storage temperature range of the AlcoMeasure.
- Otherwise, it may be desirable to remove the gas cylinder just for general storage.

 DANGER	Opening either door of the device exposes the installer to 240V. Care must be taken to avoid touching the internal wiring directly or with tools.

6.6.1 Removal

1. Unlock and open the bottom door, followed by the top door, using the supplied keys. Take care when opening it not to disturb any wiring or mechanics.
2. Remove the exhaust tube from the rear of the sample system and move it to one side.
3. Release the cylinder bracket clasp and move it to one side. It may be held in place by a cable tie which will need to be cut.
4. Taking care not to apply pressure to the wiring or gas tube on the solenoid regulator, remove the top of the cylinder from its bracket, followed by the bottom of the cylinder.
5. Keeping the cylinder in the device, unscrew it from the solenoid regulator and then remove it from the device.
6. Use a cable tie or similar means to secure the solenoid regulator so it doesn't touch the electronics inside the AlcoMeasure.
7. The top and bottom doors of the device can now be safely locked again.

6.6.2 Installation

1. Inspect the top of the gas cylinder for debris or damage to the thread. Blow out any debris with compressed air.
2. Unlock and open the bottom door, followed by the top door, using the supplied keys. Take care when opening it not to disturb any wiring or mechanics.
3. If the solenoid regulator is secured with a cable tie or similar, free it ready for installation.
4. Carefully align the top of the cylinder with the thread on the solenoid regulator and screw the bottle to the regulator, taking care not to cross-thread or over-tighten.
5. Once the gas bottle is firmly in place, the gauge should show the current gas level. Check that it is above approximately 250 PSI.
6. Move the gas cylinder clasp arms so they hang loosely around the cylinder.
7. Mount the cylinder into the bracket, inserting the bottom followed by the top of the cylinder.
8. Engage the bracket clasp to hold the cylinder firmly in place. Before locking the clasp in place, run a new cable tie between the clasp and the bottle. Lock the clasp, and then wrap the cable tie around the clasp to secure it, as seen in Figure 7.

9. Replace the exhaust tube on the rear of the sample system.
10. Ensuring that everything is in place, power on the device. Make sure there is sufficient clearance below the device, as described in section 6.4.
11. Once the Initialising message has scrolled across the screen, press “Clear” to enter the “Service” menu.
12. Navigate down through the menu to the “Gas Bottle Change” menu item, and press enter. This will start a special recalibration mode that purges the system and allows it to stabilise before starting tests. This may take anywhere from 15 minutes to 2 hours, depending on the ambient temperature.
13. Press “Clear” to exit the menu”.
14. Lock the top door followed by the bottom door.
15. Leave the device to go through its stabilisation routine, after which time it will be ready to take tests.

Figure 7 - Gas cylinder with cable tie on clasp

6.7 Storage Instructions

The device may be powered off and removed from its fixed installation for long term storage.

If the storage temperature is likely to exceed the normal operating temperature of the device as described in section 5.4, the gas bottle should be removed. See section 6.6 for more information on removing/installing the gas bottle.

When the device is removed from storage it should be installed according to all relevant instructions in section 6.

7 Operating Instructions

INFORMATION

To maintain the accuracy specified in section 5.4, the device must remain powered and in continuous operation 24 hours a day. If it is turned off after use it will not be able to perform its normal daily self-calibration routine.

7.1 Initial Start Procedure

When the device is first powered on, it may take some time for it to stabilise. This could take up to 15 minutes, during which time no tests can occur. Once the scrolling messages indicate that a test can be taken then the device is ready for normal operation.

If the device has not calibrated in the previous 30 days, the device will need to perform a self-calibration before it allows any tests to occur. It may take 45 minutes or longer for this to occur, depending on ambient temperature.

If the gas bottle has been removed for any reason, the device should be re-initialised by pressing the “Gas Bottle Change” item in the Service Menu. This will trigger the self-calibration mechanism just described.

Otherwise, if the device has been turned off for only a few days then it will allow tests to occur as soon as it has warmed up. It may, however, still perform a self-calibration after about 45 minutes of operation.

7.2 Initial Configuration

The AlcoMeasure WM1 comes preconfigured to run in Free Test mode, unless if a specific configuration has been requested. This means that once it warms up it requires no further configuration to take tests.

However, there are some initial configuration items that the installer should take care of.

Once the WM1 is turned on, follow the instructions in section 8 to connect it to a PC running AlcoMeasure Utility. Use the Utility to configure the System Time and Date. This is necessary for the log to contain the correct time stamp. If your region is currently in Daylight Saving time, make sure Daylight Savings is enabled in the device. Further information can be found in section 15.2

The Utility should also be used to customize the scrolling messages that will be displayed on the screen. Further information can be found in section 10.

The WM1 should now be ready to use. Continue reading this manual for more advanced configuration options.

7.3 Performing a Test

INFORMATION	ALCOHOL SHOULD NOT BE CONSUMED FOR AT LEAST 15 MIN PRIOR TO USING THE DEVICE For an accurate reading wait 15 minutes after consuming alcohol, mouthwash, food, smoke, prior to using this device. Your reading can continue to rise for up to 2 hours after you stop drinking. If a high reading is obtained it may take up to 10 hours to return to zero. In this case it is advisable to retest yourself later in the day or the following morning.

When running in Free Test mode (default), the device will display the scrolling message “Take straw and blow”. This indicates that the device is ready to take a test.

The test subject should take a straw from the straw dispenser and insert one end of the straw into the stainless-steel mouthpiece at the centre of the device. After taking a deep breath, the test subject should start blowing into the device through the straw at a moderate and steady rate. The display on the device will change to show an arrow. The arrow travels from the left to right side of the display and shows how much of the sample the subject still needs to provide. Once the arrow reaches the right-hand side of the screen the display will say “Blow Complete”, indicating that the sample has been taken and the subject can stop blowing.

After a few seconds of processing, the test result will be displayed on the screen.

If the test result is 0, and the Fast Recovery option is enabled (section 11.5), the result will be displayed for only a few seconds, and then the device will be ready to take the next test.

If the test result is greater than 0, or if Fast Recovery is disabled, the device will alternate displaying the result and displaying the appropriate result message as described in section 10.2.

If the test result is greater than the maximum range of the device, the device will display “You have exceeded this machines maximum reading of 0.300 g/210L”. This will alternate with a warning message.

The device can also be configured to have a lower “maximum displayable result”. See section 11.5.3 for more information.

See section 11.1 for information on the other modes of operation.

If the device is an Evidential model, see section 16 for more information on the Formal Test.

7.4 Ongoing Maintenance

The AlcoMeasure WM1 is an advanced scientific measurement device. As such, it should be regularly serviced and maintained according to the manufacturer’s instructions described below.

7.4.1 Owner Maintenance

DANGER

Opening either door of the device exposes the user to 240V. Care must be taken to avoid touching the internal wiring directly or with tools. These steps should be undertaken by only be a person authorised to do so.

To ensure the AlcoMeasure WM1 performs at the best of its capabilities the manufacturer recommends the following steps be taken by the user:

- Use AlcoMeasure Utility to periodically download both the service log and the test log (if applicable) from your AlcoMeasure WM1 using the Utility program. This ensures an ongoing record of all test results, as well as a record of any problems or errors that the device has experienced.
- At a minimum, ensure that the machine takes at least one test per week. This will maximise the service life of the alcohol sensor.
- Regular replenishment of straws will be required, dependant on the frequency of use.
- If the device is an Evidential model, printer paper will need to be replaced when emptied.
- If the device is a Vend model, the coin box will need to be emptied dependant on the frequency of use. When this is done the coin count should also be cleared using AlcoMeasure Utility.
- Ensure that the expiration date on the power leads test tag is not exceeded. Attached test tag requires annual lead testing.

7.4.2 Periodic Service

To ensure ongoing compliance with all standards, and to ensure maximum and consistent accuracy, the AlcoMeasure WM1 should be regularly serviced by an authorised service technician. The maximum time allowed between services is 12 months, after which the “Periodic service due” message will be displayed.

Alternatively, the device should be serviced if 100,000 tests have been performed since the last service.

8 AlcoMeasure Utility Software

The main method of configuring and interacting with the AlcoMeasure WM1 is with a PC application called AlcoMeasure Utility. The following section outlines how to install and use the AlcoMeasure Utility application.

AlcoMeasure Utility can be found on the USB stick provided with the device.

8.1 Requirements

- Windows XP SP3/Vista/7/8/8.1/10.
- 32 bit or 64 bit Operating System.
- Spare USB Port and Type-A to Mini-B USB cable, or an ethernet connection.

8.2 Application Installation

1. Run the setup file entitled “AlcoMeasureUtilitySetup_W_X_Y_X.exe”.
2. If the User Account Control dialog box is displayed asking “Do you want to allow this app to make changes to your computer?” press “Yes”.

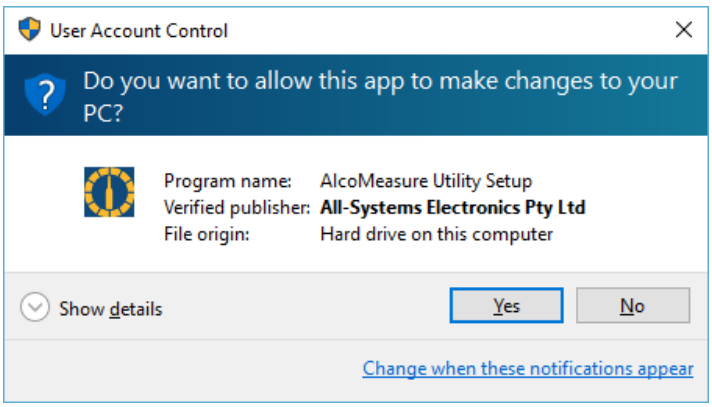


Figure 8 - Windows User Access Control

3. Once the AlcoMeasure Utility Setup program is displaying the Welcome screen, press “Next”.
4. Press “Install” to start the installation process.
5. When the installation has completed, press “Finish” to exit the Setup program.
6. To run the program, find the shortcut in the Start Menu (or search for AlcoMeasure Utility).

8.3 USB Driver Installation

An AlcoMeasure WM1 and a USB Type-A to Mini-B cable is required to complete these instructions.

Ensure that AlcoMeasure Utility has been installed correctly following the instructions in section 8.2 and ensure the AlcoMeasure is disconnected from the PC.

8.3.1 Windows Vista/7/8/8.1/10

Connect the AlcoMeasure to the computer using the USB cable. If it has never been plugged in before, a “Device Setup” icon will be displayed on the taskbar. Once the icon disappears, the AlcoMeasure will be installed.

8.3.1.1 Windows Vista/7/8/8.1/10 Driver Troubleshooting

If the driver fails to install for any reason, it can be installed manually by following these steps:

1. Open “Device Manager” in Windows.
2. Plug in the AlcoMeasure.
3. If the device is listed as “AlcoMeasure WM1 00000000”, and it has an exclamation mark next to it, then no driver has been installed for it. Skip to step 5.
4. If the device is listed under the “Ports (COM & LPT)” item as “USB Serial Device (COMX)”, Windows has automatically installed a default driver for it. Continue to install the correct driver.
5. Right click the device and select “Update Device Software”.
6. Press “Browse my computer for driver software”.
7. Press “Browse”.
8. Navigate to “C:\Program Files (x86)\All-Systems Electronics\AlcoMeasure Utility\Drivers” and press “OK”.
9. Press “Next”, and allow the driver to install. If any dialog boxes are displayed, tell them to “Continue Anyway”.

8.3.2 Windows XP

1. Connect the AlcoMeasure to the computer using the USB cable. If it has never been plugged in before the "Found New Hardware Wizard" should be automatically displayed (Figure 9). Select "No, not this time", and press "Next".

Figure 9 - Windows XP Found New Hardware Wizard

2. The wizard should identify the AlcoMeasure WM1 (serial No) as shown in Figure 10. Make sure "Install the software automatically (Recommended)" is selected and press "Next".

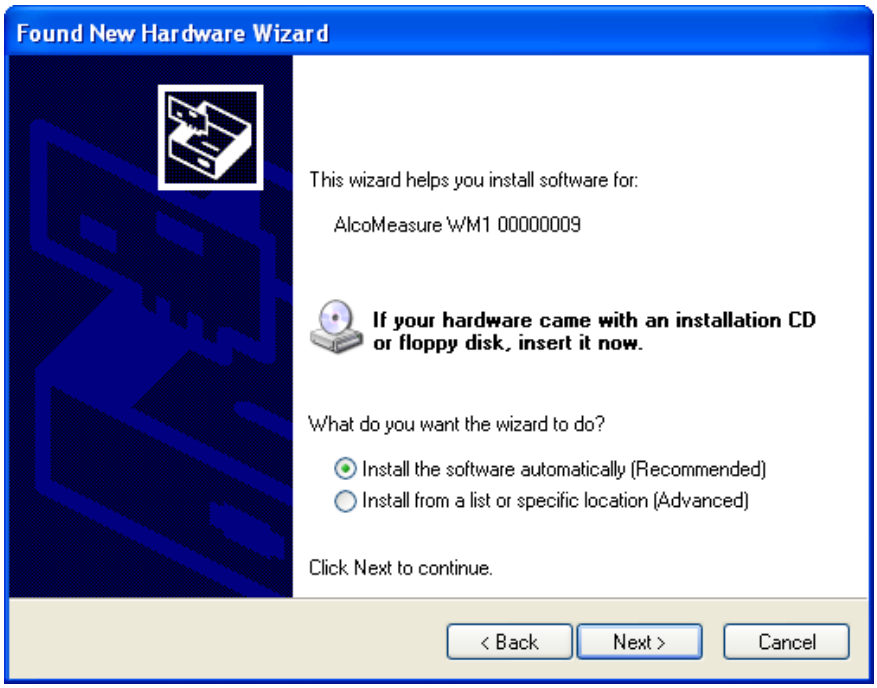


Figure 10 - Windows XP Found New Hardware Wizard

3. The wizard should now start installing the driver automatically. When the “Hardware Installation” dialog is displayed to warn that the device has not passed Logo testing (Figure 11), press “Continue Anyway”.

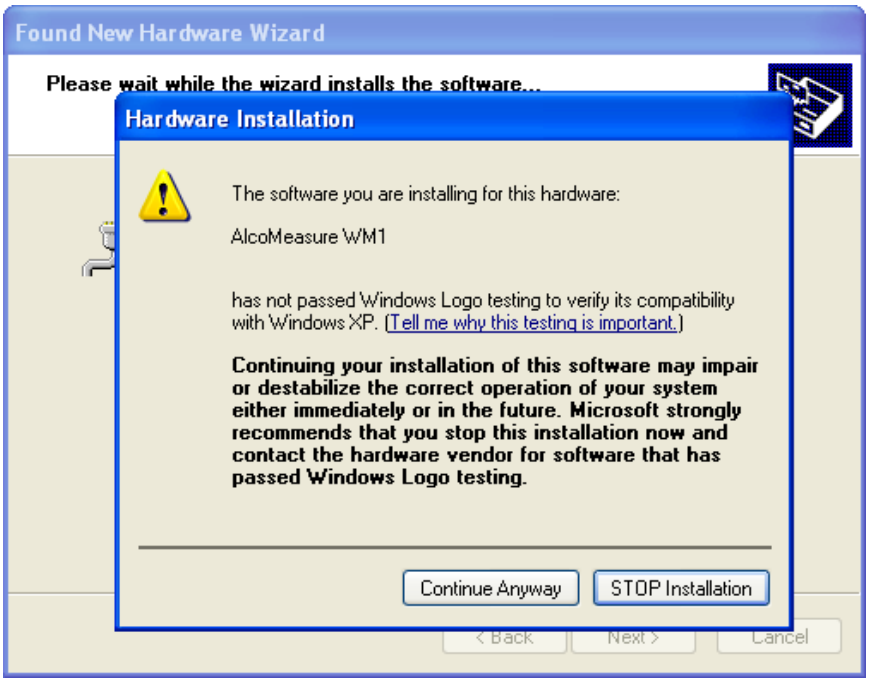


Figure 11 - Windows XP Logo Testing

4. Press “Finish” to complete the driver installation.

8.3.2.1 Windows XP Driver Troubleshooting

If the driver fails to install for any reason, it can be installed manually by following these steps:

1. Open “Device Manager” in Windows.
2. Plug in the AlcoMeasure.
3. If the device is listed as “AlcoMeasure WM1 00000000”, and it has an exclamation mark next to it, then no driver has been installed for it.
4. Right click the device and select “Update Device Software”.
5. When the dialog asks “Can Windows connect to Windows Update to search for software”, select “No, Not at this time”, and press “Next”.
6. Select “Install from a list or specific location (Advanced)”.
7. Select “Search for the best driver in these locations.
8. Press “Browse” and navigate to the drivers folder in the AlcoMeasure Utility installation directory, probably found at “C:\Program Files\All-Systems Electronics\AlcoMeasure Utility\drivers”.
9. Press “Next” to carry on with installation.
10. The wizard should now start installing the driver automatically. When the “Hardware Installation” dialog is displayed to warn that the device has not passed Logo testing (Figure 11), press “Continue Anyway”.
11. Press “Finish” to complete the driver installation.

8.4 Connecting to AlcoMeasure Device

There are 3 ways to connect to your AlcoMeasure device:

- USB
    - USB is the simplest method of connecting to an AlcoMeasure WM1. Once the USB driver is installed, simply connect the AlcoMeasure to your PC using a standard Type-A to Mini-B USB cable. In the Utility program, select USB in the connection box in the top left of the application. When the AlcoMeasure is connected to the PC it will automatically connect. If it does not, check that the driver is installed correctly following the instructions in section 8.3
- Ethernet
    - To connect to a device using the Utility program, select Ethernet in the connection box in the top left of the application.
    - If you are connecting to an AlcoMeasure WM1 on a local network, type its IP address into the text box beneath the connection box. Once entered, press Connect to attempt to connect to the device.
    - If the device has a custom port number configured in it, the port number can be specified in the following format:
        i. 192.168.1.92:26000
    - If the device is located on a remote network, and port-forwarding is being used to connect to the unit, enter the public IP address of the remote network, followed by the port number used to address the device.
    - Ethernet functionality must be both unlocked and enabled in the WM1 before it can be connected to. Instructions for how to configure a unit for Ethernet connectivity are in section 11.9.

When a connection is successfully established the AlcoMeasure Utility Icon will appear in the top right of the screen showing that a WM1 is connected. The status items will also be read from the unit and displayed on the left side of the application.

If your AlcoMeasure has "Email" or "Userlist" functionality unlocked in it, these features will be unlocked in the Utility program when your AlcoMeasure WM1 is connected to it for the first time. A dialog box will pop up informing the user that these features have been unlocked, as shown in Figure 12. The program needs to be restarted for this to take effect.

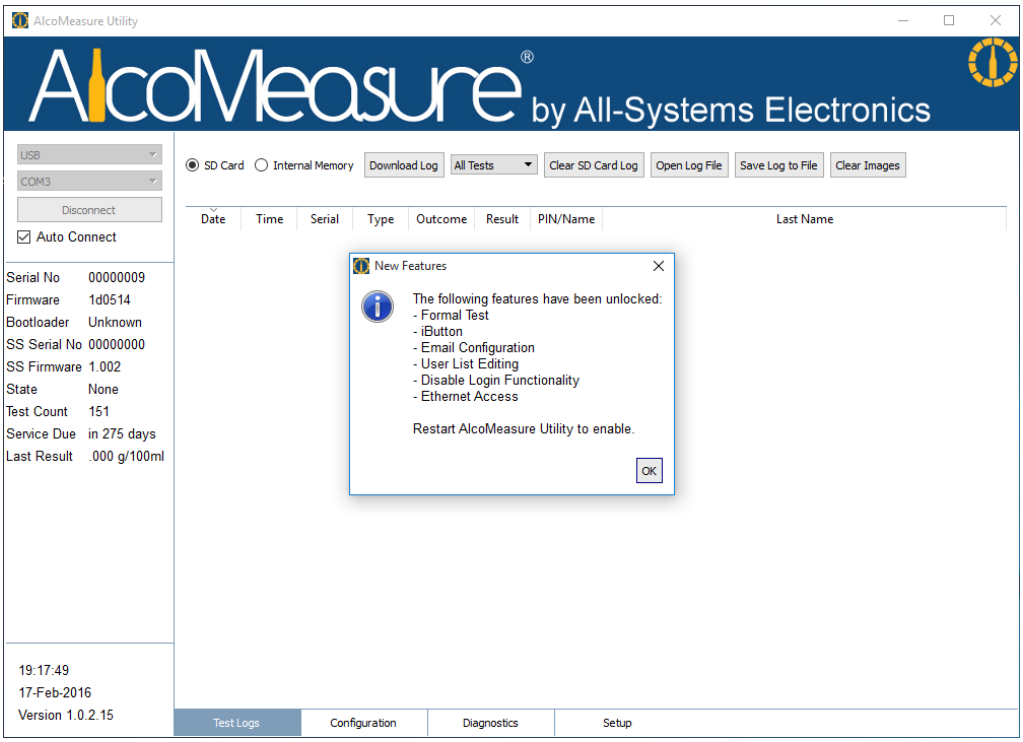


Figure 12 - AlcoMeasure Utility New Features

8.5 AlcoMeasure Status

When the AlcoMeasure Utility software has successfully connected to an AlcoMeasure, the left-hand side of the Utility will display the current status of the AlcoMeasure, as shown in Figure 12.

- Serial No
  - The serial number of the connected device.
- Firmware
  - The firmware version of the connected device.
- Bootloader
  - The bootloader version of the connected device.
  - This will display “Unknown” if the bootloader version is less than version 1.0003.
- SS Serial No
  - The serial number of the sample system in the connected device.
  - If no sample system is connected this will display “na”.
- SS Firmware
  - The firmware version of the sample system in the connected device.
  - If no sample system is connected this will display “na”.
- State
  - The overall state of the AlcoMeasure.
  - This is described in more detail in section 15.6.
- Test Count

    - The total number of tests the unit has completed.
- Service Due
    - The number of days until the next periodic service is due.
    - If the service is due it will display “Service Due Now”.
- Last Result
    - The result of the last complete test, displayed in the current units of measure.
- Coin Count
    - The current coin count in the device is displayed here only if the device is a Vend model.

8.6 Setup Screen

The AlcoMeasure Utility Setup screen shows any configurable items for the Utility software, as well as information about the software and its authors.

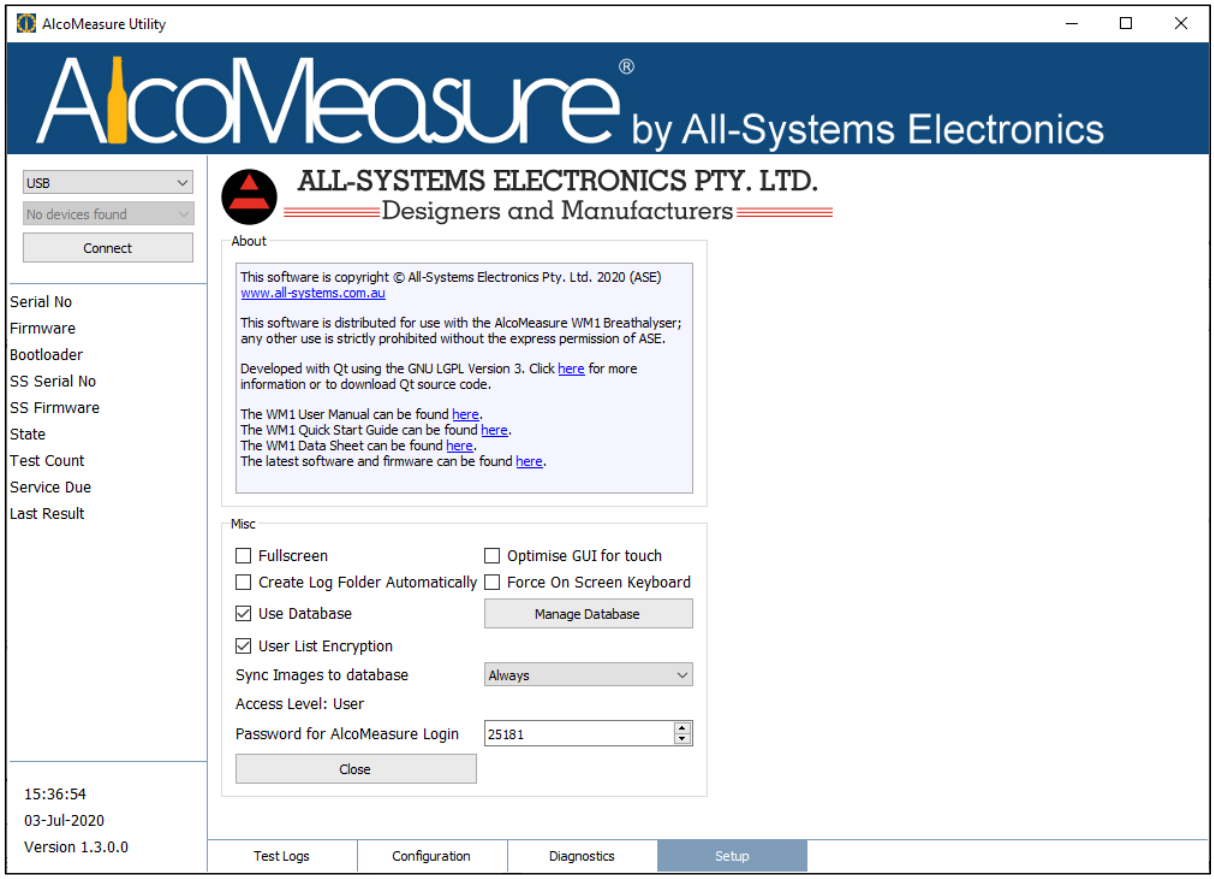


Figure 13 - AlcoMeasure Utility Setup Tab

- About
  - Information is given here about the author of the software, as well as all copyright information. Unless specified separately, all software is copyright to All-Systems Electronics Pty Ltd. Where Open Source software has been used, the licence will be displayed here. Further information can be found by contacting All-Systems Electronics.
  - Links are also provided to local copies of documentation, and the GitHub repository for firmware and software updates.
- Full screen
  - Enables full screen mode for the Utility application.
- Optimise GUI for touch
  - Enables larger buttons and text boxes to make it easier to use on a touch screen. Also allows the user to scroll by swiping the screen.
- Create folder for log files based on date

  - When the log is downloaded from a WM1, and if the “Save Log to File” button is pressed, then a folder will be automatically created using the days date. This may allow for easier grouping of log files if logs are downloaded from multiple devices each day.
  - This is only applicable if the database is NOT in use.
- Force On-Screen Keyboard
  - Enables the on-screen keyboard so it will pop-up whenever the user clicks in a text box. This may be useful on a touch screen where no physical keyboard is present. The user will need to manually close the keyboard when they are finished typing.
- Use Database
  - Enables the database functionality in the Utility.
  - This means that device logs are automatically added to a local database for easy perusal. This should be left on.
- Manage Database
  - This button opens a form for configuring the database connection.
- User List Encryption
  - By default, the user list is transmitted to the device in an encrypted state. This checkbox allows the encryption to be disabled. This may be useful for diagnosing a connection problem, or if user list uploads are taking too long.
  - Note that the connected device will send back the file as an encrypted file unless encryption is disabled in the device as well. See section 11.2 for more information.
- Sync Images to database
  - When downloading logs from a WM1 with a camera, the images can make the log download take a very long time.
  - This option allows the utility to either prompt before downloading them, or to never download them.
  - Note that once the utility syncs a log entry without its images, it will never again try to download those images. They will have to be manually copied off the SD Card.
- Password for AlcoMeasure Login
  - When the Utility connects to an AlcoMeasure WM1 it requires a password to establish a connection. The default password is 99920, but this can be changed in each individual device by the user. See section 11.1 for more details.
  - If the password is changed in a WM1 then the new password must be specified here before the Utility can connect to it.

8.7 AlcoMeasure Configuration

The configuration of an AlcoMeasure WM1 can be changed using the AlcoMeasure Utility application.

All of the configuration items under the “Configuration” tab can be edited by first reading the data from the unit. The configuration can then be edited and written back into the unit. It can also be saved to files and read back out in order to be uploaded into another unit, or just saved as a backup of a device’s configuration.

Before a configuration can be read from or written to a device, the Utility must first connect to that device as described in section 8.4.

9 Event Logs

The AlcoMeasure WM1 automatically logs all tests, calibrations, and any other events that occur.

It keeps a service log of every single event in internal memory. Internal memory is capable of storing 7696 logs, at which time it will wrap around on itself and overwrite older logs. Some events take up more than a single log entry. For example, tests with either long user ID's, or with images attached, take up more than a single log entry.

The WM1 will also automatically "mirror" all events to the SD Card, if one is inserted and enabled. This allows events to be logged more permanently, as they are not in danger of being overwritten. The only limit to the number of logs that can be stored on the SD Card is the size of the SD Card.

If the device has a camera, images will be stored for no longer than 30 days on a device.

For extra logging configuration options see section 11.2.

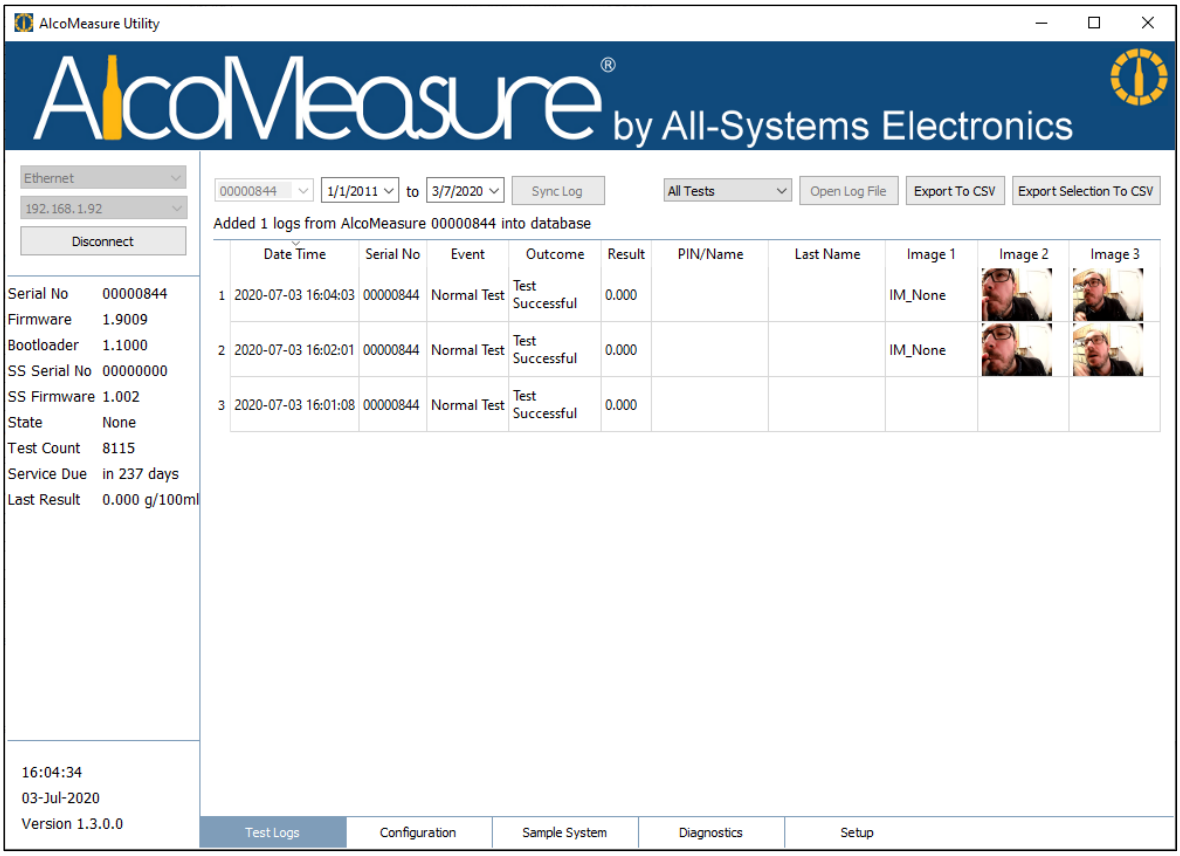


Figure 14 - AlcoMeasure Utility Test Log Download

9.1 Test Logs

The test logs tab is the main view for accessing the event history from one or more WM1's.

When no device is connected, the top left drop-down allows the user to select a particular device in order to show its logs. This drop-down is searchable, so if the user starts typing in a serial number it will narrow the selectable options to devices that match the search string.

The user can also select “None” to show no records (the default) or “Show All” to show events from all known devices.

If a device is connected, that device will automatically be selected in the drop-down.

The displayed logs can be sorted by any column. They can also be filtered by date range using the date selection boxes at the top of the window. Finally, they can also be filtered by log type. If the database contains images, these will only be displayed if the log type is set to “All Tests”.

The “Open Log File” button can be used to display a previously exported log file.

The “Export to CSV” button exports the entire log as displayed in the table to a csv file. The date range selection and log type filters are applied to this export.

The “Export Selection to CSV” button does the same as “Export to CSV”, except that only the highlighted rows will be exported. Any images will be saved in a sub-directory in the same folder as the saved log file, and will be loaded from the PC if the log file is opened locally.

9.1.1 Sync Log

To download the log from an AlcoMeasure WM1, first connect to the WM1 with AlcoMeasure Utility (8.4).

Once connected, select the Test Logs tab on the bottom of the Utility.

At the top of the screen, press the “Sync Log” button. This will initiate downloading all logs that the Utility doesn’t already have in its database. Depending on the last time the log was synced, this may take a long time.

If the connected device has a camera, this can significantly slow the syncing progress. A possible workaround is to use the AlcoMeasure Server software (section 5.8.2.8), which will automatically sync all logs and images into its own database for perusal at any time, and then disable the downloading of images in the utility as described in section 8.6.

9.2 Log Report

A Log Report can be displayed for any log record by double clicking on that record.

The Log Report will display all the relevant log information on a formatted A4 page, including test result, subject identification and any photos. It can then either be printed or saved to a PDF.

Figure 15 - AlcoMeasure Utility Log Report

10 Message Configuration

The Editable messages can be located under the Configuration -> Messages tab in the Utility.

Most of the editable messages are scrolling messages that run across the screen from right to left as the device is waiting for a test.

All messages have a maximum length of 253 characters.

At the top of the screen is a number of controls

- Read Messages from Unit
  - Reads all editable messages from the connected device and displays them on the screen.
- Write Messages to Unit
  - Writes the messages that are currently displayed on the screen into the connected device.
- Default Messages
  - Sets the displayed messages to their defaults. They then need to be written into the device.
- Open Messages File
  - Opens a previously saved messages configuration file and displays it on the screen.
- Save Messages to File
  - Saves the currently displayed messages to a file with extension “acm”.

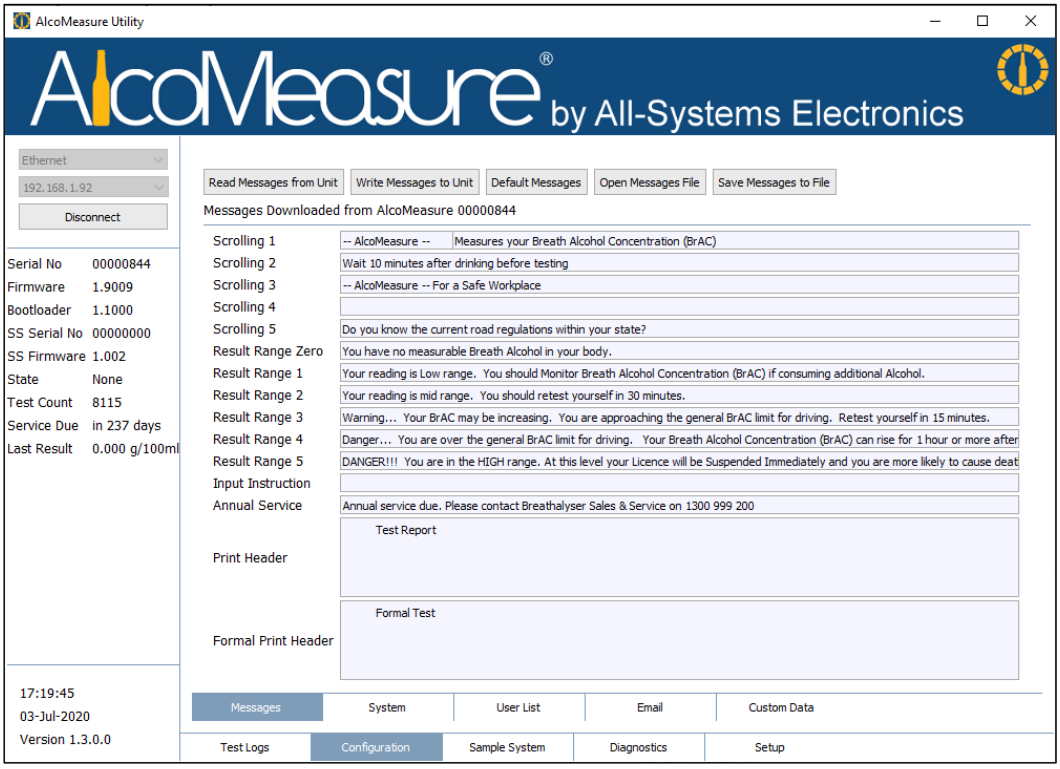


Figure 16 - AlcoMeasure Utility Edit Messages

10.1 Scrolling Messages

The first 5 messages are scrolling messages. When the AlcoMeasure WM1 is in its normal operation mode, it displays a number of scrolling messages in sequence while it waits for a person to start a test.

The sequence is as follows:

- Input Instruction
- Scrolling 1
- Input Instruction
- Scrolling 2
- Input Instruction
- Scrolling 3
- Input Instruction
- Scrolling 4
- Input Instruction
- Scrolling 5

If a scrolling message is left blank then it will be skipped and the next available scrolling message will be used instead.

For example, if scrolling messages 2, 3 and 4 are left blank then the display will rotate between the Input Instruction message and scrolling messages 1 and 5.

If all messages are left blank then the display will rotate between the Input Instruction message and the text "--AlcoMeasure --", which is the fixed part of the first scrolling message.

10.2 Result Messages

When a test is completed, the result of the test will be displayed as a number in the current units of measure. It will also be followed by a result message, and then finally the result will be shown again before allowing the next test.

If the result is high enough that a significant recovery time is required, the display will cycle between showing the result and the result message until the device is ready to take another test.

There are 6 possible result messages that can be displayed. These messages match up to the Alcohol result ranges in the System Configuration screen (section 11.5).

- Result Range Zero
    - Displayed when a test result equals 0 (in current units of measure).
    - This message can be disabled by activating "Fast Recovery" mode. See section 11.5.
- Result Range 1
    - Displayed when a test result is greater than 0 and less than Range 1 in the System Configuration.

- Result Range 2
    - Displayed when a test result is greater than or equal to Range 1 and less than Range 2 in the System Configuration.
- Result Range 3
    - Displayed when a test result is greater than or equal to Range 2 and less than Range 3 in the System Configuration.
- Result Range 4
    - Displayed when a test result is greater than or equal to Range 3 and less than Range 4 in the System Configuration.
- Result Range 5
    - Displayed when a test result is greater than or equal to Range 4 in the System Configuration.

10.3 Input Instruction Message

This message is displayed in alternation with the scrolling messages as described in section 10.1.

This message can be customised to instruct the subject on what to do in order to initiate a test.

If left blank the default message will be used. There are different default messages depending on the Input Mode the device has been configured for (section 11.1).

- Free Test
    - “Take straw and blow”.
- Coin
    - “Insert coins to take test”.
- Keypad
    - “Type PIN into keypad and press ENTER to take test”.
- Command
    - “Identify user to start test”.

10.4 Periodic Service Message

This message is displayed when the device is due for its periodic service.

10.5 Print Header Messages

If a printer is attached to the WM1 then the header at the top of the printout can be customised using these messages.

11 System Configuration

The System configuration is where most of the configuration settings can be found. It is located under the Configuration -> System tab in the Utility.

At the top of the screen is a number of controls

- Read Config from Unit
  - Reads all system configuration settings from the connected device and displays them on the screen.
- Write Config to Unit
  - Writes the system configuration settings that are currently displayed on the screen into the connected device.
- Open Config File
  - Opens a previously saved system configuration file and displays it on the screen.
- Save Config to File
  - Saves the currently displayed configuration to a file with extension “acf”.

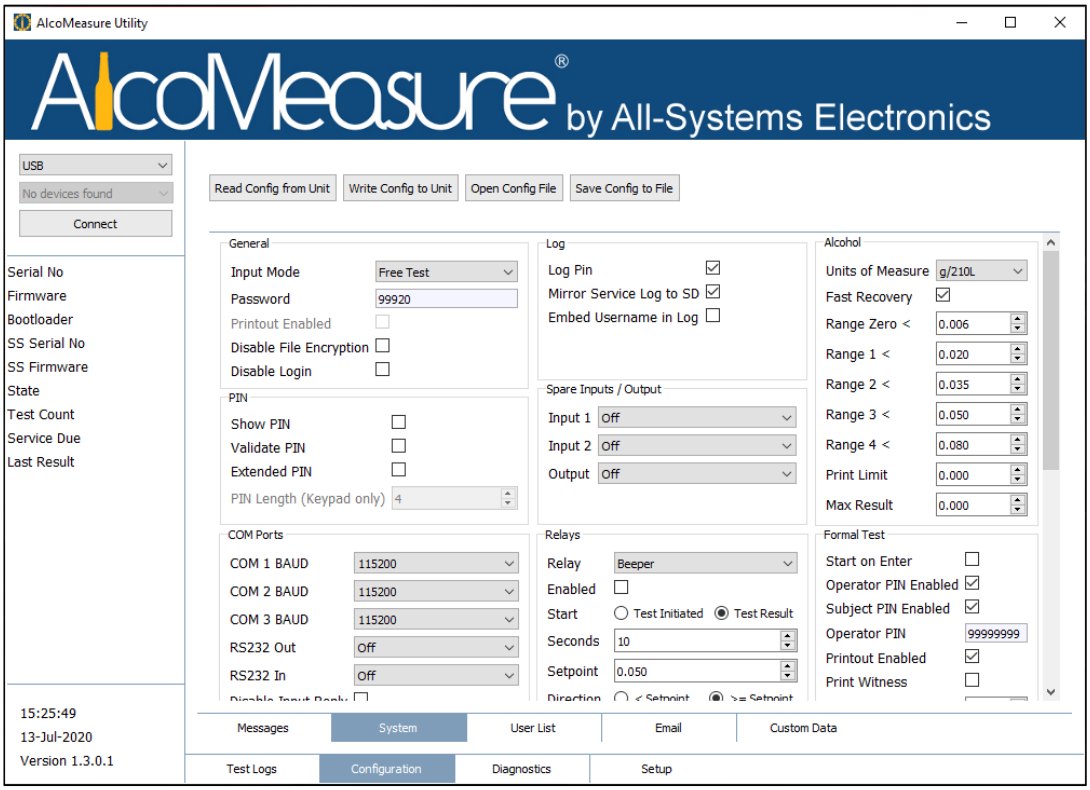


Figure 17 - AlcoMeasure Utility System Configuration

11.1 General

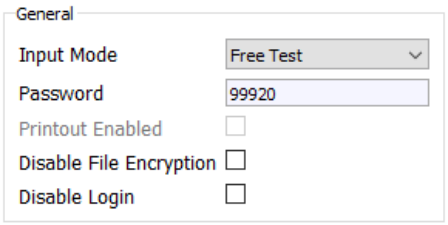


Figure 18 - System Config - General

11.1.1 Input Mode

The "Input Mode" setting is the main setting that defines how the device is to be used. There are several input modes which can be selected from. Some input modes are only available if particular options are fitted to the unit.

The input mode affects how the unit starts a test. Free Test is the only mode that allows a subject to blow without any other action. All other modes will display "Not Ready…" if a blow is detected before a test has been initiated.

The possible input modes are:

- Free Test
  - In Free Test mode the device requires no special action in order to take a test. It will display the Instruction message, and will start a test as soon as it detects a person blowing into the sample port.
  - Once a test is complete it will display the result and then return to waiting for a person to blow into the sample port again.
- Coin
  - Only available in the Vend Model.
  - In Coin mode the device will wait for the correct value of coins to be inserted before taking a test.
  - See section 17 for more information on how a Vend model works.
- Keypad
  - Only available if the Keypad option is fitted.
  - In Keypad mode the device will wait for a User PIN to be entered on the keypad before taking a test.
  - See section 11.3 for more information on settings related to the User PIN.
  - See section 12 for more information on User Validation.
- Command
  - Command mode allows an external device to trigger a test.

- While in Command mode the Instruction message will be displayed to the subject, and the machine will wait for an external device to tell it to start before it allows the subject to start blowing.
- Possible methods of interfacing to the device in Command mode are:
  - Serial (RS232) Command Mode. See section 19.2 for more information.
  - Relay Input. See section 11.4 for more information.
  - iButton. See section 19.3 for more information.
  - HTTP Request. See section 20 for more information.

11.1.2 Password

A password is required in order to login to the AlcoMeasure WM1. The password entered into the unit here must match the password in AlcoMeasure Utility in order for the Utility program to connect to the WM1. See section 8.6 for more details.

The password also needs to be typed into the device using the internal keypad if the user wishes to access any settings via the internal menu. See section 21 for more information.

11.1.3 Printout Enabled

If a printer is attached to the device, this checkbox allows the printout to be enabled or disabled for a normal test.

11.1.4 Disable File Encryption

By default, when any files (including the user list) are transmitted to the WM1 via the Utility program, they are transmitted in an encrypted state. This adds a layer of security, since people's names and PIN's are being transmitted.

However, if custom software is being used to communicate with the device it may be desirable to disable file encryption. This means that when any files are requested from the device they will be sent in plain text.

Note that the Utility will continue to send the user list to the device in an encrypted state. This can be enabled/disabled in the Utility Setup screen (section 8.6).

11.1.5 Disable Login

Normally when the AlcoMeasure Utility program connects, it uses a password to login to the device (section 8.6). However, if the customer wishes to interact with the device using its HTTP API, this login mechanism needs to be disabled. The HTTP API is described in section 20.

Note that the "Disable Login" feature will need to be unlocked in order for this option to be available.

11.2 Log

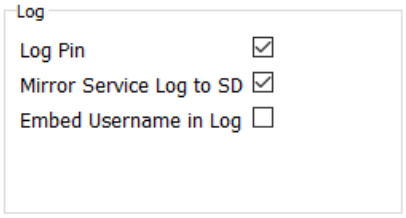


Figure 19 - Log settings

11.2.1 Log Pin

If enabled, if a test is initiated by the subject entering in their PIN then the PIN will be logged along with the test result. If this is disabled, only the test result will be logged.

11.2.2 Mirror Service Log to SD

Enables the service log mirroring function, whereby all events logged to internal memory are then also duplicated onto the SD Card. This gets around some of the limitations of the internal Service Log, as described in section 9.

11.2.3 Log Username to SD Card

If an SD Card is inserted, and the "Mirror Service Log to SD" option is enabled, this checkbox allows the user name associated with a PIN to be logged with the test result instead of the PIN.

This option is useful if it is desirable to not store subject's PIN's in the log.

In order for this option to work, User validation must be enabled (section 11.3) and a valid user list must be uploaded into the unit (section 12).

11.3 PIN

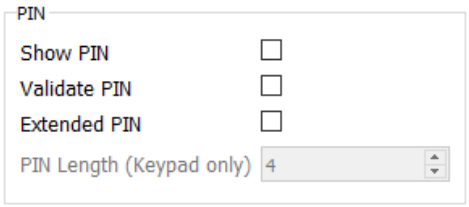


Figure 20 - PIN Settings

11.3.1 Show PIN

If a keypad is attached to the machine then this setting controls whether the subject's PIN is displayed on the screen as they are typing it, or if asterisk's are displayed.

If a printer is attached to the machine then this setting also enables the printing of the subject's PIN on the test printout for both a Normal test and a Formal test.

11.3.2 Validate PIN

Enables PIN validation against the user list described in section 12. If a PIN is entered that is not found in the list then the test will not commence.

If not enabled then all PIN's are considered valid, as long as they are the correct length.

This mode will work for both "Keypad" Input Mode and "Command" Input Mode.

11.3.3 Extended PIN

The maximum PIN length is usually 8 digits, and the maximum ID length is usually 20 characters.

However, if more than this is required, this setting can be enabled. It stores the ID string on the SD Card instead of internal memory. This is useful if integrating with QR Code readers, card scanners, or if controlling the device by some other means. The maximum length of the extended PIN is 500 characters.

The extended PIN can NOT be validated. Any PIN validation will have to be carried out by another device before sending the ID to the AlcoMeasure.

11.3.4 PIN Length

This sets the number of digits the subject must enter on the keypad before pressing Enter. If not enough digits are entered then the PIN will not be valid. This setting is only relevant when using the "Keypad" Input Mode.

11.4 Spare Inputs / Output

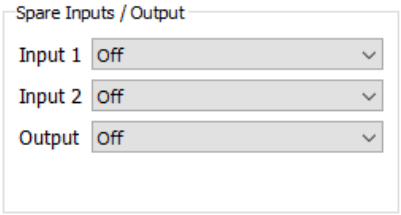


Figure 21 - Spare Inputs and Output settings

11.4.1 Input 1 and Input 2

The AlcoMeasure WM1 provides 2 inputs, where each accepts a voltage free contact. Either Input can be configured to trigger the start of a test when the input is activated. This is useful for connecting a button to the unit to start a test.

If the input is set to "Normal Test" then a normal test will start when the input is activated.

If the input is set to "Formal Test" then a formal test will start when the input is activated (only available in Evidential Models, see 5.8.1.2).

11.4.2 Output

The AlcoMeasure WM1 provides a single 12V DC switched output.

The output can be configured to operate in any of the following modes:

- Relay
    - The output will operate with the “Relay” functionality.
    - Once selected, configure the relay functionality for the spare output as described in section 11.7.
- On Ready
    - The output will be activated, and remain on, whenever the device is ready to start a test.
    - Once a test is initiated, the output will turn off until the test is complete and the device is again ready to start a new test.
- On Always
    - The output will always be on.

11.5 Alcohol

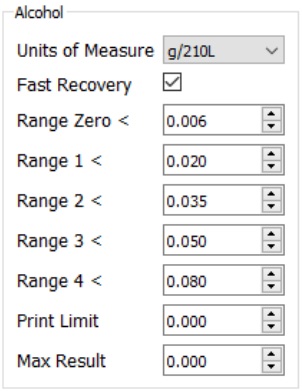


Figure 22 - Alcohol Settings

11.5.1 Units of Measure

The device can be setup to display and use a number of different units of measure, as listed below:

- g/210L (Australian Default)
- g/100ml
- % BAC
- Promille w/w
- Promille w/v
- mg/mL
- g/L
- mg/100mL
- µg/L
- µg/100mL
- mg/L
- g/230L

11.5.2 Fast Recovery

The fast recovery setting speeds up the time it takes for a zero test. Normally upon completion of a test the result will be displayed, followed by a scrolling message, and then the result is displayed again.

If this setting is enabled, if a test result is zero then the result will be displayed for a few seconds, and then the device will immediately return to a waiting state.

11.5.3 Alcohol Limits

- Range Zero
    - Anything below this setting will be regarded as a 0 result.
    - For example, if this setting is set to 0.003 g/210L and a subject blows 0.002 g/210L, the device will then display and log a result of 0.000. It will also perform any actions that occur on a zero result, including “Fast Recovery”.
    - The Result Range Zero message will be displayed for any results below this value (if “Fast Recovery” is not enabled.
- Range 1
    - The “Result Range 1” message will be displayed if the test result is greater than Range Zero and less than this value.
- Range 2
    - The “Result Range 2” message will be displayed if the test result is greater than Range 1 and less than this value.
- Range 3
    - The “Result Range 3” message will be displayed if the test result is greater than Range 2 and less than this value.
- Range 4
    - The “Result Range 4” message will be displayed if the test result is greater than Range 3 and less than this value.
    - The “Result Range 5” message will be displayed if the test result is greater than or equal to this value.
- Print Limit
    - If a printer is installed, the test result will be printed if the result is greater than or equal to this value.
- Max Result
    - If a test result is greater than this value then the result will not be displayed. Instead, a message will be displayed informing the subject that their result was greater than this value.
    - For example, if Max Result is set to 0.005 g/210L and the subject blows 0.013 g/210L, the following message will be displayed:
        - Your result was higher than .005 g/210L.

- To disable this functionality, set Max Result to 0.

11.6 COM Ports

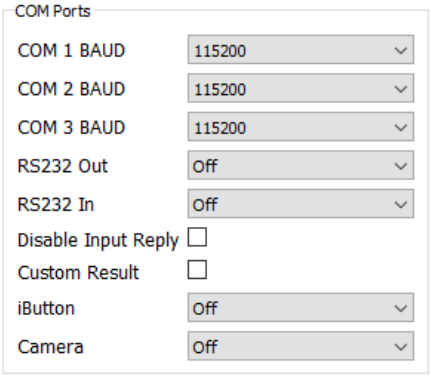


Figure 23 - COM Port Settings

There are 3 user configurable RS232 Serial ports on the AlcoMeasure WM1. A number of options can be purchased that connect to these serial ports. Alternatively, the user can integrate the AlcoMeasure with another system or device using some of the settings described below.

11.6.1 COM BAUD Rates

All 3 serial ports can be setup with a number of BAUD rates as follows:

- 2400
- 4800
- 9600
- 19200
- 38400
- 57600
- 115200
- 153600
- 230400

11.6.2 RS232 Out

This setting enables a string containing the result to be sent on the selected serial port at the completion of a test.

See section 19.2 for further information on this functionality.

Note that if COMUSB is selected for this feature then the device will not be capable of connecting to the Utility program via USB.

11.6.3 RS232 In

This setting allows the initiation of a test by the sending of a string to the device over the selected serial port. At the completion of the test a string containing the result will be sent back on the same port.

See section 19.2 for further information on this functionality.

The Input Mode must be set to “Command” in order for this functionality to work. See section 11.1 for more information.

Note that if COMUSB is selected for this feature then the device will not be capable of connecting to the Utility program via USB.

11.6.4 Disable Input Reply

If a serial port is configured with “RS232 In” functionality, this setting disables the reply string at the completion of a test.

This setting is useful if a device is configured to receive an initiation string on a particular serial port, and send a reply back to a different device on another serial port.

11.6.5 Custom Result

This setting enables the ability for the user to specify the format of the result string for either RS232 In or RS232 Out modes.

If this setting is enabled, the “Custom Data” tab is used to configure the format of the result string. See section 14 for more information.

11.6.6 iButton

If the device is fitted with an iButton reader, this setting specifies the serial port the iButton is attached to.

Note that the iButton can only be fitted to either COM2 or COM3.

11.6.7 Camera

If the device is fitted with a camera, this setting specifies the serial port the camera is attached to.

11.7 Relays

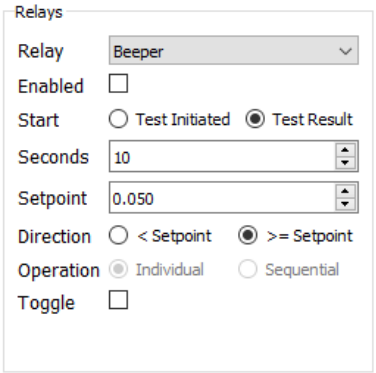


Figure 24 - Relay settings

The AlcoMeasure WM1 can be equipped with a special relay board which contains 3 programmable voltage free relays. These are configured with the following relay settings. Select the relay to be configured using the drop down box.

The WM1 can also operate its beeper and its spare output in the same manner. Note that not all operations are available for these outputs. If the "Spare Output" is being configured in Relay mode, it must first be set to operate in Relay mode as described in section 11.4.

- Relay
    - The output/relay the user wishes to configure.
- Enabled
    - Specifies whether this relay's functionality is enabled or not.
- Start
    - The relay functionality can be configured to either start at the time the test is initiated, or at the time a result is displayed during the test.
    - Test Initiated
        - This is useful for telling an external device that a test has just started.
        - This functionality will only work if the device is in "Keypad" or "Command" Input Mode.
    - Test Result
        - This is useful for activating an alarm or door actuator when a test result is obtained.
- Seconds
    - The number of seconds the relay should be activated for.
    - If set to 0 the relay will either deactivate at the completion of the test, or after 10 seconds, whichever is longest.
- Setpoint
    - The Test Result will be compared against this set point to decide whether to activate the relay functionality or not.
    - This option is only available if the relay functionality is in "Test Result" mode.
- Direction
    - If "< Setpoint" is selected then the relay will be activated if the result is less than the Setpoint value.
    - If ">= Setpoint" is selected then the relay will be activated if the result is greater than or equal to the Setpoint value.
    - This option is only available if the relay functionality is in "Test Result" mode.
- Operation
    - If "Individual" is selected, the relay will operate irrespective of what other relays are doing. This is the most common setting, and is useful if a few different external devices need to be triggered using the relays.

- If “Sequential” is selected on multiple relays, the highest relay which has its setpoint condition met will be activated. No other “sequential” relay will be activated, even if its condition is met.
  - This mode is useful for setting up a traffic light system which shows whether a test passed or failed.
  - Sequential mode is only available for the relays on the relay board. It is also only available if the relay is set to start on test result.

- Toggle
  - If this is enabled, the relay will toggle on and off repeatedly. The time in each state will be 500ms.

11.8 Formal Test

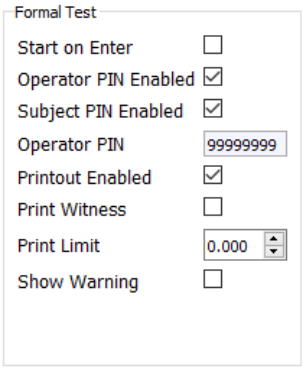


Figure 25 - Formal Test settings

These options are only available if the connected device has “Formal Test” enabled. See section 5.8 for more details.

11.8.1 Start on Enter

This allows the subject to start a Formal test by pressing the Enter button on the keypad. This functionality will only work if the “Input Mode” is NOT set to “Keypad” (section 11.1).

Only available if the keypad is attached.

11.8.2 Operator PIN Enabled

The Operator PIN is a PIN that is assigned for the sole purpose of starting a Formal Test. If a user is a manager authorised to test other subjects, they can be assigned an Operator PIN.

If this is enabled then an Operator PIN is required in order to start a Formal test.

If a keypad is attached to the unit, when the Operator PIN is detected a Formal test will automatically start.

11.8.3 Subject PIN Enabled

If this is enabled then a Subject PIN is required in order to complete a Formal test. The test must be initiated by some means, and then the subject PIN will be required before continuing.

11.8.4 Operator PIN

If the Operator PIN is enabled, and yet "Validate PIN" (section 11.3) is disabled, then this becomes the PIN that is used to start a test.

11.8.5 Printout Enabled

This setting enables a special printout for the Formal Test. See section 18 for more information.

11.8.6 Print Witness

This setting enables a special field for a witness to sign on the Formal Test printout.

11.8.7 Print Limit

The test result will only be printed if the result is greater than or equal to this value.

11.8.8 Show Warning

This setting enables the display of the Range messages in Formal Test mode. See section 10.2 for more information.

11.9 Ethernet

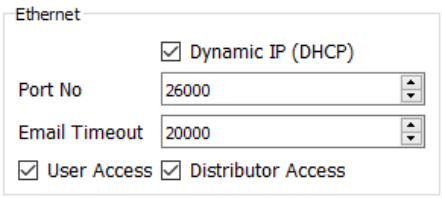


Figure 26 - Ethernet Settings

Ethernet connectivity comes with some basic security measures, like requiring a password to login, and encrypting files like the user list as they are being transmitted. However, it is suggested that if the device is going to be connected to the Internet, or any other unsecure network, then a VPN or SSH tunnel should be setup by the user to ensure the connection is secure. This is outside the scope of this manual.

If any of these settings are changed, the device should be power cycled before attempting to connect to it.

11.9.1 Dynamic IP (DHCP)

This enables the ability for the device to be assigned its IP address with a DHCP server.

If this is disabled, the devices IP settings must be configured on the Diagnostics tab (section 15).

11.9.2 Port No

The port number that incoming connections must connect to. The default port number is 26000.

11.9.3 Email Timeout

If the device is setup with email functionality, this setting specifies how long the device will wait for a reply from the SMTP server before giving up.

11.9.4 User Access

Ethernet access can be disabled by unticking this setting. If this is not enabled, the utility will not be able to connect to the device over ethernet.

Enabling User Access allows anyone to use AlcoMeasure Utility to connect to the device using the login password. See section 11.1 for more information on changing the password.

11.9.5 Distributor Access

Ethernet access for the distributor can be disabled by unticking this setting. If this is enabled, the distributor can use AlcoMeasure Utility to connect to the device if they are on the same network as the device.

11.10 Server

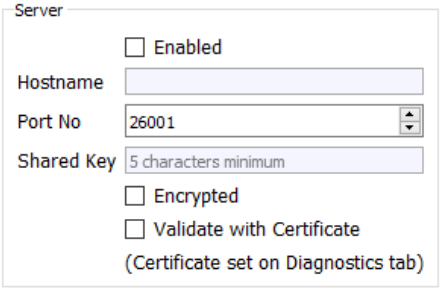


Figure 27 - Server connection settings

If the “Server” feature is enabled in the device (section 5.8.2.8), these settings allow the server connection to be configured. This allows the device to automatically establish a connection to either “AlcoMeasure Server”, or to custom server software provided by the user.

11.10.1 Server Enabled

The “Enabled” setting enables/disables the server functionality. If this setting is changed the device must be restarted in order for it to take effect.

The Server connection cannot be enabled at the same time as the Email functionality. If this is enabled, then email functionality is disabled.

11.10.2 Hostname

The address of the server to connect to. This can be an IP4 address or a hostname.

11.10.3 Port No

The port of the server connection.

11.10.4 Shared Key

If the server is configured to require authentication via shared key, it must be entered here. The shared key must be a minimum of 5 characters in length. Once the shared key is entered, it will be no longer visible to the user.

11.10.5 Encrypted

If the server connection uses SSL/TLS encryption, this must be enabled.

11.10.6 Validate with Certificate

If the server connection uses SSL/TLS encryption, the server can further be validated by storing the server's public certificate on the device. This is enabled with this setting. The certificate must then be uploaded to the device on the Diagnostics tab (section 15.4).

11.11 Coins

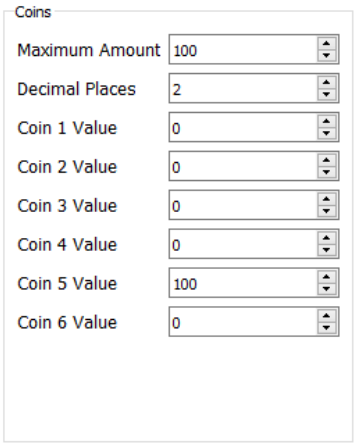


Figure 28 - Coin Configuration

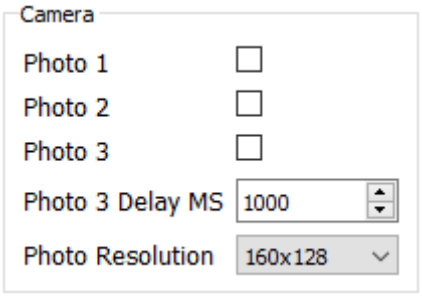
These settings are only available if the connected device is a Vend Model (section 5.8.1.3).

The Input Mode must be set to Coin in order for these settings to take effect. See section 11.1 for more information.

See section 17 for more information on configuring the Vend model, including the configuration of the coin mechanism.

- Maximum Amount
  - The amount required to take a test.
- Decimal Places
  - The number of decimal places to use when displaying the coin values.
- Coin Values 1-6
  - The value to assign each coin type.
  - The 6 coin values here match the first 6 categories that can be programmed into the coin mechanism (section 17).

11.12 Camera



These settings are only available if the connected device has the camera option fitted (section 5.8.2.6).

The AlcoMeasure is capable of taking up to 3 photos during a test. These can each be separately enabled or disabled.

Because each photo will take a few hundred milliseconds to download from the device when the log is downloaded, if the device takes many tests per day it may be wise to only enable the required photos so as to minimise the download time. Also, keeping the photo resolution low will significantly help reduce download time as well.

- Photo 1
  - This photo gets taken when a test is initiated by the subject. The device can either be in Keypad or Command Input Mode. The photo will not be taken in any other Input Mode.
  - If a PIN is used and is invalid or cancelled, this photo will be taken as well.
- Photo 2
  - This photo gets taken once the subject has started blowing.
- Photo 3
  - This photo gets taken a short amount of time after the subject has stopped blowing.
- This time is user adjustable with the “Photo 3 Delay MS” setting.
- Photo 3 Delay MS
  - The number of milliseconds to wait after the subject has stopped blowing before taking photo 3.
  - This can be set to 1 for a near-instant photo.
- Photo Resolution
  - The camera can be set to 160x128, 320x240 or 640x480 resolution.
  - The higher resolutions allow for a clearer photo, but they also increase the amount of time it takes to download photos when the log is downloaded.
  - It is recommended to keep the resolution at 320x240 or lower.

12 User List Configuration

The User List is located under the Configuration -> User List tab in the Utility.

The User List is not required for normal operation. Even if subject identification is used, if it doesn't matter whether the PIN is a valid PIN or not then a user list is not required. The PIN will simply be logged against the test result. See section 19 for more information on subject identification.

However, if it is desirable for the AlcoMeasure to validate the PIN (see section 11.3) before taking a test, it must contain a valid user list.

At the top of the screen is a number of controls

- Download User List
  - Reads the user list from the unit and displays it on the screen.
- Upload User List
  - Writes the user list that is currently displayed on the screen into the connected device.
  - If the user list is empty, this effectively clears the user list in the device.
  - By default the user list will be encrypted before it is sent to the AlcoMeasure. This behaviour can be changed, as described in section 8.6.
- Open User List File
  - Opens a previously saved user list file that is saved in csv format, and displays it on the screen.
  - This function can be used to import a user list created externally. See section 12.3.
- Save User List to File
  - Saves the currently displayed user list to a file with extension "csv".

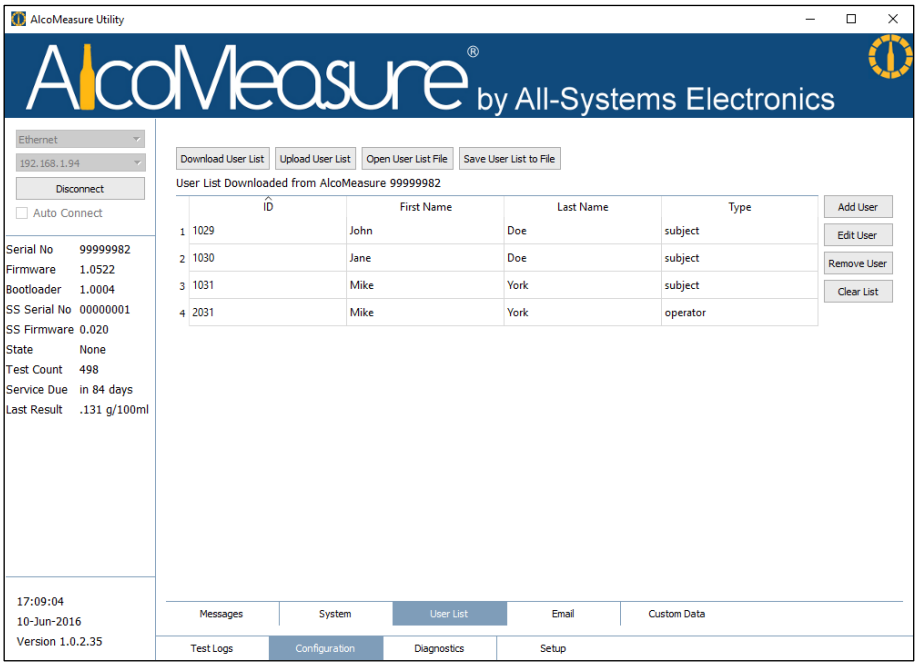


Figure 29 - AlcoMeasure Utility User List

12.1 User List Editing

On the right of the User List table are 4 buttons for editing the user list.

- Add User
  - Brings up the Edit User form, allowing the new user to be edited.
- Edit User
  - The user to be edited must be selected in the user list table.
  - When the button is pressed it brings up the Edit User form, allowing the currently selected user to be edited.
- Remove User
  - The user to be removed must be selected in the user list table before pressing this button.
- Clear List
  - Clears the entire user list table.
  - The list in the connected device is not cleared until the new empty list is uploaded into the device.

12.2 Editing a User

There are 4 items that can be used to identify a user:

- First Name
- Last Name
- PIN
  - This can be any sequence of ASCII alpha-numeric characters, and can be up to 20 characters long.
  - If they keypad is being used then it should be noted that the longest PIN that the keypad will accept is 8 characters long. Also, only number 0-9 can be entered into the keypad.
- User Type
  - If a user is a subject then their PIN can be used to start a new normal test.
  - If a user is an Operator then their PIN can be used to start a formal test, most likely in order to test another individual.

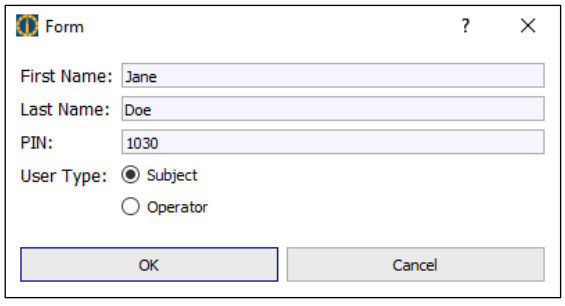


Figure 30 - AlcoMeasure Utility User Edit

12.3 User List Format

The user list file is stored in standard comma separated variable (csv) format.

This means that if the user wishes to create the user list in an external program like Microsoft Excel, or export the user list from a database, this can easily by accomplished by making sure that it follows the following formatting rules and is saved as a csv file.

Each row in the csv file is made up of 4 columns:

- PIN
- First Name
- Last Name
- operator/subject

Each row must be delimited by a Carriage Return and a Line Feed.

No row can exceed a size of 255 bytes, including commas and the 2 new line bytes.

An example file's contents would be:

1029,John,Doe,subject

1030,Jane,Doe,subject

1031,Mike,York,subject

2031,Mike,York,operator

13 Email Configuration

The AlcoMeasure WM1 has an email option that allows the device to automatically send emails based on a few triggers. See section 5.8 for more information on the different models and options.

The email functionality works by connecting to an existing Simple Mail Transfer Protocol (SMTP) server using an existing username and password. These must be provided by the user.

Once the SMTP configuration is complete, the functionality can be configured to email in 2 different circumstances:

- An email can be sent when a subject blows a test result over a pre-set value.
- An email can be sent periodically with the log file as an attachment.

These emails can be configured to be sent to one or more recipients.

INFORMATION	The internal email functionality cannot be used at the same time as the "Server Connection" functionality in sections 11.10. If the device is connected to an instance of AlcoMeasure Server, AlcoMeasure Server handles the email notifications.

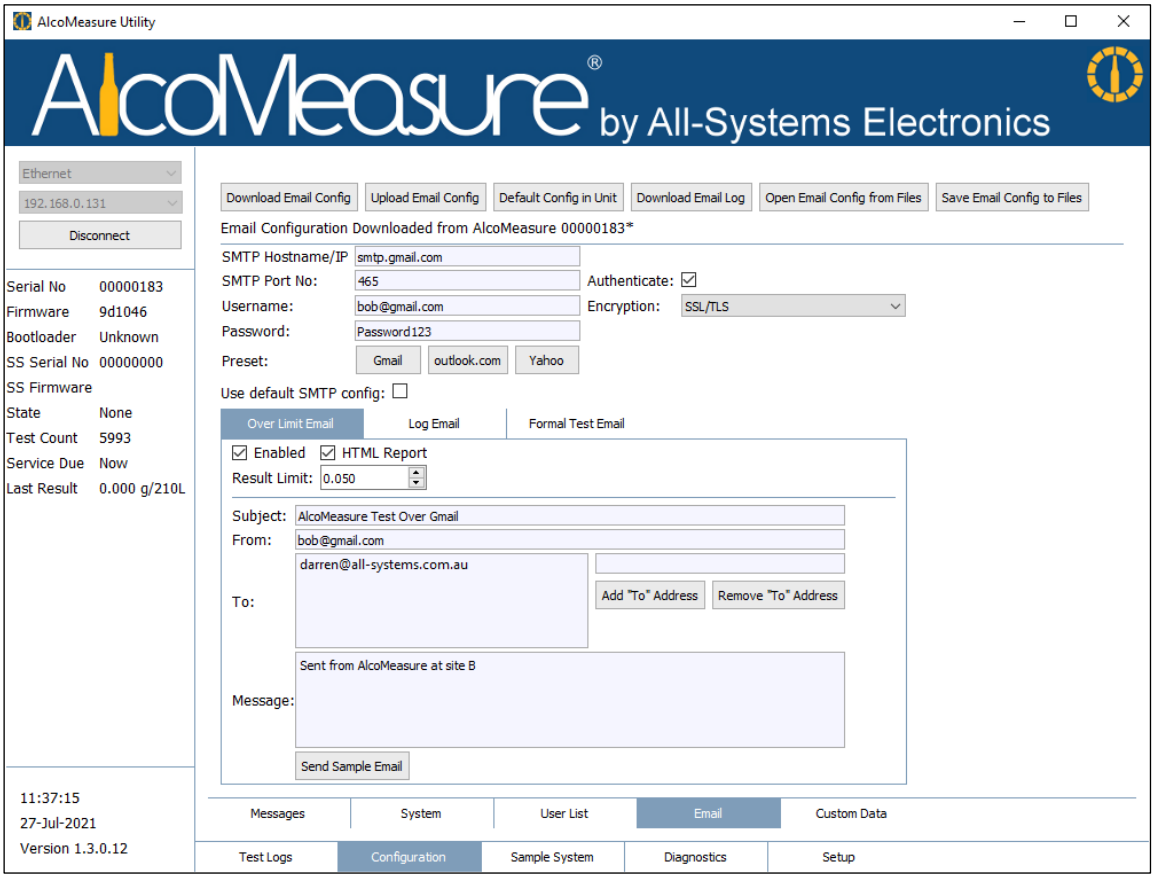


Figure 31 - AlcoMeasure Utility Email Configuration

13.1 Email Buttons

At the top of the screen is a number of controls

- Download Email Config
    - Reads the email configuration from the connected unit and displays it on the screen.
- Upload Email Config
    - Writes the email configuration that is currently displayed on the screen into the connected device.
- Default Config in Unit
    - Initialises the configuration in the connected unit to the default configuration.
- Download Email Log
    - It can be difficult to diagnose problems connecting to the SMTP. So a log file is maintained on the SD Card of all the main commands and replies between the AlcoMeasure and the SMTP.
    - If the email functionality is not working, press this button to download the log.
    - The user will be prompted to save the file somewhere. Once downloaded it can be opened in Notepad.
    - Note that the log file in the device will be reset when the log file is downloaded.
- Open Email Config from Files
    - Opens a previously saved email configuration from the computer.
    - The email configuration is actually a set of files in a folder, so a folder is selected with this dialog.
- Save Email Config to Files
    - Saves the currently displayed email configuration to the folder specified by the user.

13.2 SMTP Configuration

In order to configure the email, a working SMTP instance must be setup by the user independent of the AlcoMeasure configuration. The SMTP account and password should be used by another program (e.g. Microsoft Outlook) to test that the SMTP configuration works.

- SMTP Hostname/IP
    - Either the Fully Qualified Domain Name, or the IP address, of the SMTP server.
- SMTP Server Port
    - The port on the SMTP the AlcoMeasure needs to establish a connection to.
    - The default port is usually 25.
- Username
    - The full username of the account on the SMTP that the AlcoMeasure is sending the email through. If the username is a full email address then that email address should be entered here.
- Password
    - The password that goes along with the username of the account on the SMTP.

- Authenticate
    - If authentication is required then this checkbox should be ticked. If unsure, leave it ticked.
- Encryption
    - Select the encryption type required by your SMTP, or select None.

13.3 Connecting to cloud services

The Alcomeasure has been tested against Gmail, Outlook.com, Office365, and Yahoo, with the free Gmail service being the most robust.

The preferred method of configuring the connection is to create an “app password” in the service of your choice, and then using that password in the password field of the device.

The 3 “Preset” buttons below the SMTP config fields will configure the device with the most likely settings required for each of the main cloud services.

13.4 Over Limit Email

The Over Limit email can be configured to be automatically sent whenever a test result is greater than or equal to the “Result Limit” value.

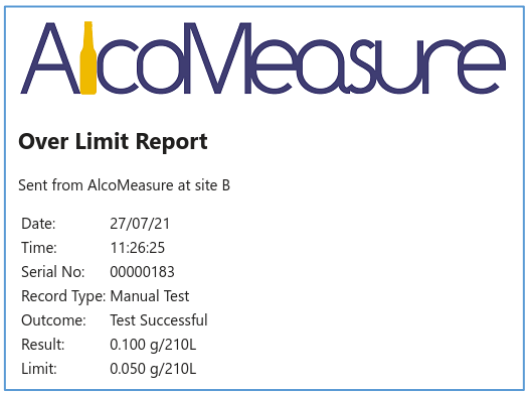


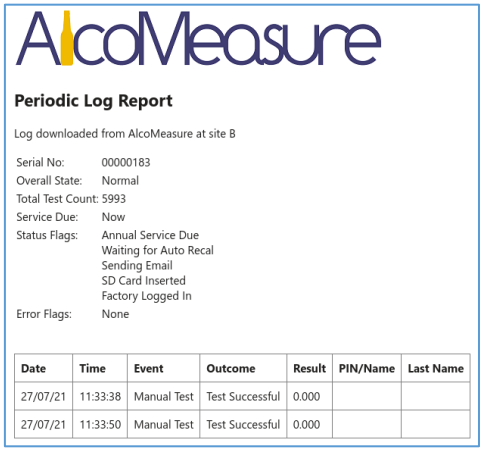
Figure 32 - Over Limit Email

- Enabled
    - Enable or disable the Over Limit Email.
- HTML Report
    - Formats the email like a report, with the AlcoMeasure logo at the top.
    - Includes any photos taken during the test (if the device has the camera option fitted).
    - Disable this feature if the email body is required to be sent as plain text.
- Result Limit
    - The email containing the result will be sent if the result is >= this value.
    - For example if this value is set to 0.050 g/210L, an email will be sent if the result is 0.050 or greater.

- Alternatively, if this value is set to 0.000 g/210L, an email will always be sent because the result will always be >= to 0.000.

13.5 Log Email

The Log email is sent periodically, and contains the log file as an attachment as well as some status information.



Periodic Log Report

Log downloaded from AlcoMeasure at site B

Serial No: 00000183
Overall State: Normal
Total Test Count: 5993
Service Due: Now
Status Flags: Annual Service Due
Waiting for Auto Recal
Sending Email
SD Card Inserted
Factory Logged In
Error Flags: None

Date	Time	Event	Outcome	Result	PIN/Name	Last Name
27/07/21	11:33:38	Manual Test	Test Successful	0.000		
27/07/21	11:33:50	Manual Test	Test Successful	0.000		

Figure 33 - Log Email

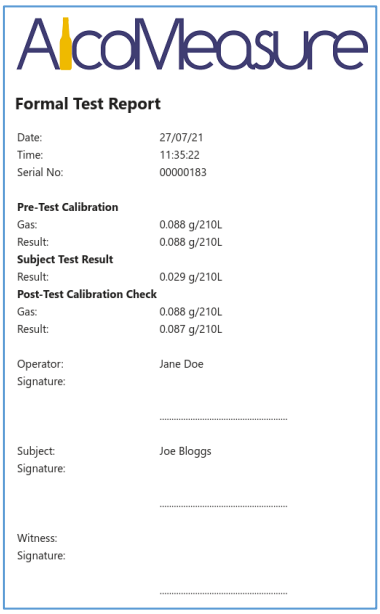
- Enabled
  - Enable or disable the Log Email.
- HTML Report
  - Formats the email like a report, with the AlcoMeasure logo at the top.
  - Disable this feature if the email body is required to be sent as plain text.
- Clear Log
  - If ticked, every time the log email gets sent, a new log file will be created on the SD Card.
  - This means that each time the log is emailed, only the log entries that have occurred since the last time the log was emailed will be sent.
  - The normal behaviour would be to tick this, otherwise the log may grow very large and take a long time to email.
- Log Format
  - The log can be attached as a CSV document.
  - The log can be embedded in the email as a HTML table, as shown in Figure 33.
  - Both can also be selected.
- Automatically email log
  - The log can be emailed daily, weekly, or monthly
  - The time of day the log should be emailed can be customised here.
  - If the log is set to weekly or monthly, the day of the week/month can be selected here.

The status information sent in the email is listed. See section 8.5 for more information on these items.

- Total Test Count
- Service Due
- Status Flags
- Coin Count (Vend model only)
- Error (if the unit is in error state)
- Error Flags (if any are set)

13.6 Formal Test Email

The Formal Test email can be configured to be automatically sent whenever a formal test is performed, as described in section 11.8.



AlcoMeasure

Formal Test Report

Date:	27/07/21
Time:	11:35:22
Serial No:	00000183
Pre-Test Calibration	
Gas:	0.088 g/210L
Result:	0.088 g/210L
Subject Test Result	
Result:	0.029 g/210L
Post-Test Calibration Check	
Gas:	0.088 g/210L
Result:	0.087 g/210L
Operator:	Jane Doe
Signature:	
	.....
Subject:	Joe Bloggs
Signature:	
	.....
Witness:	
Signature:	
	.....

- Enabled
  - Enable or disable the Formal Test Email.
- Signature Field
  - Adds lines for the operator and subject to sign the email if printed.
- Witness Field
  - Adds a line for the witness to sign the email if printed.

13.7 Email Message Configuration

- Subject
  - The text that will appear in the subject line of the email.
- From
  - Who the email is being sent by.
  - This usually needs to be sent from the email address associated with the account name.
  - If an email address was used as the username, then use the same email address here.

- To
    - The recipients of the email.
    - Up to 10 email addresses can be added as recipients.
    - To add a new address, type it into the textbox on the right and press Add “To” Address.
    - To remove an address, select it in the “To” list and press Remove “To” Address.
- Message
    - Extra text that will appear in the body of the email.
- Send Sample Email
    - This button attempts to send a sample email using the configuration settings stored in the connected device.
    - If the configuration displayed on the screen does not match the configuration in the device, an error message will display.
    - If the email is successful, it should appear in the recipient’s inbox after a few minutes.
    - If no email is received, there are a few things to check.
        - In the Diagnostics screen under Errors, check to see if there is an Email error.
        - If there is an error called ERROR_EMAIL_FAIL then the AlcoMeasure has detected that the email failed to be sent.
        - Check the Email Log for further diagnostics information (section 13.1).

14 Custom Data

The Custom Data tab allows the reply string that is sent over RS232 at the end of a test to be customised.

This functionality comes in all models, and is useful for getting particular information from the AlcoMeasure. This is particularly important if the device listening for a reply from the AlcoMeasure requires the reply to be in a particular format.

Before the custom data functionality can be used, either “RS232 Out” or “RS232 In” modes need to be enabled (or both), and the “Custom Result” tick box should be checked. These are covered in section 11.6.

An SD Card must also be inserted into the unit for the custom data functionality to work.

For more information on the serial command modes see section 19.2.

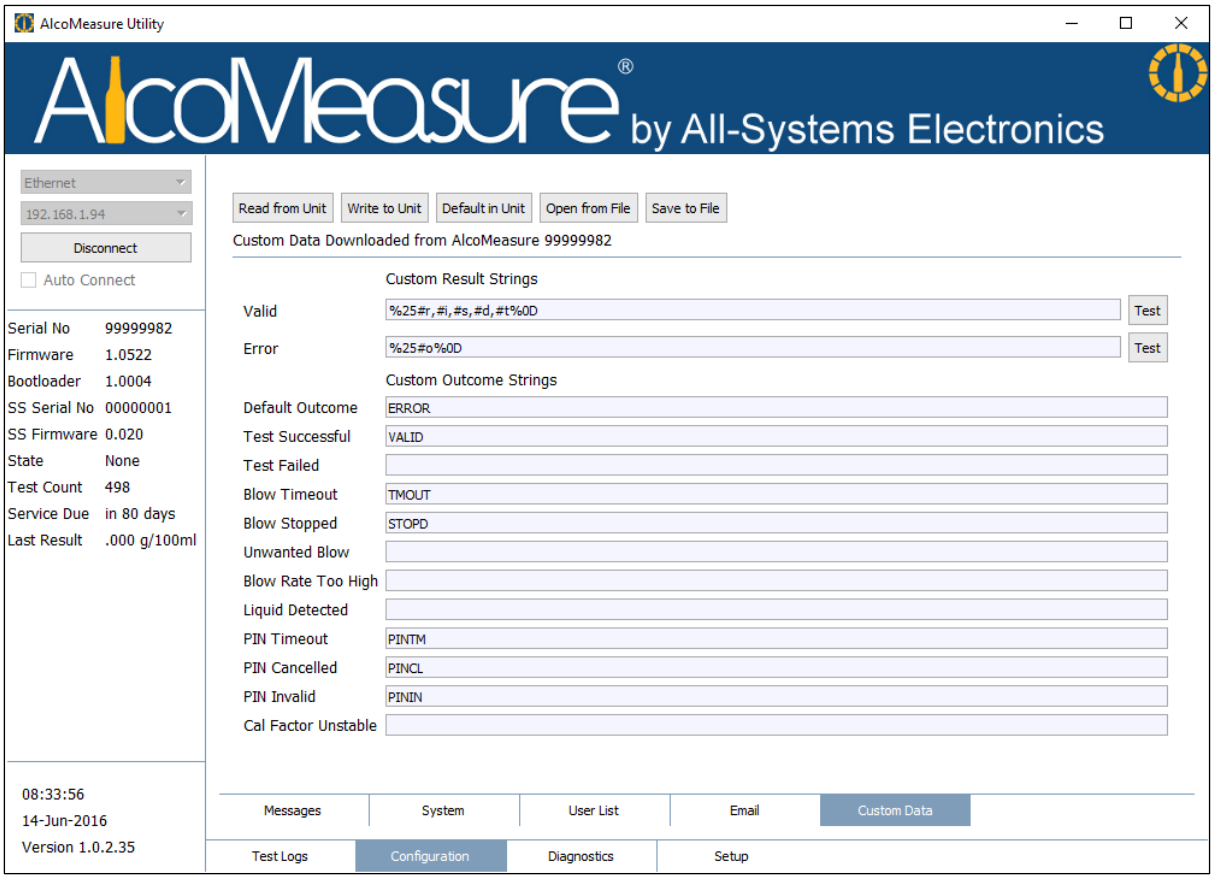


Figure 34 - AlcoMeasure Utility Custom Data Configuration

14.1 Custom Data Buttons

At the top of the screen is a number of controls

- Read from Unit
  - Reads the custom data configuration from the connected unit and displays it on the screen.
  - If the “File Not Found” error message is displayed, press the “Default in Unit” button to write a default file to the connected device.

- Write to Unit
    - Writes the custom data configuration that is currently displayed on the screen into the connected device.
- Default in Unit
    - Initialises the custom data configuration in the connected unit to the default configuration.
- Open from File
    - Opens a previously saved custom data configuration from the computer.
- Save to File
    - Saves the currently displayed custom data configuration to the folder specified by the user.

14.2 Custom Data Configuration

There are 2 possible result strings that can be configured:

- Valid
    - Gets sent if the test completes successfully.
- Error
    - Gets sent if the test fails to complete. If this string is empty then the “Valid” string will be sent instead.

To test the output format of each of these strings first make sure a configuration exists in the unit, then press “Test”. The device will create a dummy test result and send it back to the Utility. The result string will then be displayed on the screen.

14.2.1 Variables

The result strings are customised by mixing standard text with any number of variables. These variables are filled in by the AlcoMeasure once the test is complete. All variables start with a hash (#) character, followed by the variable.

The list of variables are:

- #r - Insert test result in current units of measure.
- #i - Insert user ID.
- #s - Insert AlcoMeasure serial number.
- #d - Insert date of test.
- #t - Insert time of test.
- #f - Insert First name.
- #l - Insert Last name.
- #o - Insert outcome string (see section 14.2.3 for information on customising outcome strings).

For example, the following valid result string gives the following result when the Test button is pressed:

- Result - #r

- Result - 0.000

14.2.2 Special Characters

If the user wishes to insert a special character, like a carriage return or a line feed, this can be done using percent encoding.

For example, if a carriage return needs to be entered into the string it can be done as follows. First, work out what a carriage return is in hexadecimal, in this case hex 0D. To insert this into the string, place %0D in the string. This will then be converted into a carriage return character.

If the user wishes to insert either a % or a # into the string, these will also need to be inserted using percent encoding (%25 for %, and %23 for #).

Special characters can be inserted into either of the Custom Result Strings, or any of the Custom Outcome Strings.

14.2.3 Outcome Strings

Each test that is performed produces an outcome. When creating a custom result string, this outcome can be inserted into the string using the #o variable (see section 14.2.1).

When a #o is found in the Custom Result String, it is replaced by the matching outcome string from the list of Custom Outcome Strings.

If the outcome has been assigned a custom string, that string will be inserted into the result string in place of the variable.

If the outcome has not been assigned a custom string, but the “Default Outcome” has been assigned a custom string, then the “Default Outcome” string will be inserted into the result string in place of the variable.

If neither the outcome nor the Default Outcome has been assigned a custom string then the number of the outcome will be given.

Outcomes:

0. Default Outcome
1. Test Successful
2. Test Failed
3. Blow Timeout
4. Blow Stopped
5. Unwanted Blow
6. Blow Rate Too High
7. Liquid Detected
8. PIN Timeout
9. PIN Cancelled
10. PIN Invalid
11. Cal Factor Unstable

For example, assume the Error Result String is formatted as follows:

- Outcome - #o

When “Test” is pressed, if the “Test Failed” outcome string contains the text “Test has failed”, the result string will be:

- Outcome – Test has failed

If the “Test Failed” outcome string is empty, but the “Default Outcome” outcome string contains the text “An error has occurred”, the result string will be:

- Outcome – An error has occurred

If the “Test Failed” outcome string is empty and the “Default Outcome” outcome string is empty, the result string will be:

- Outcome – 2

15 Diagnostics

The Diagnostics tab in the Utility allows the user to directly interact with the connected AlcoMeasure. Unlike the Configuration sections, this section does not allow values to be downloaded from one machine and uploaded into another. Any changes made on this screen have an immediate effect on the connected device.

As well as the setting of some parameters, the Diagnostics tab displays an expanded view of the device's current status. This can be useful for diagnosing problems and checking the state of the device.

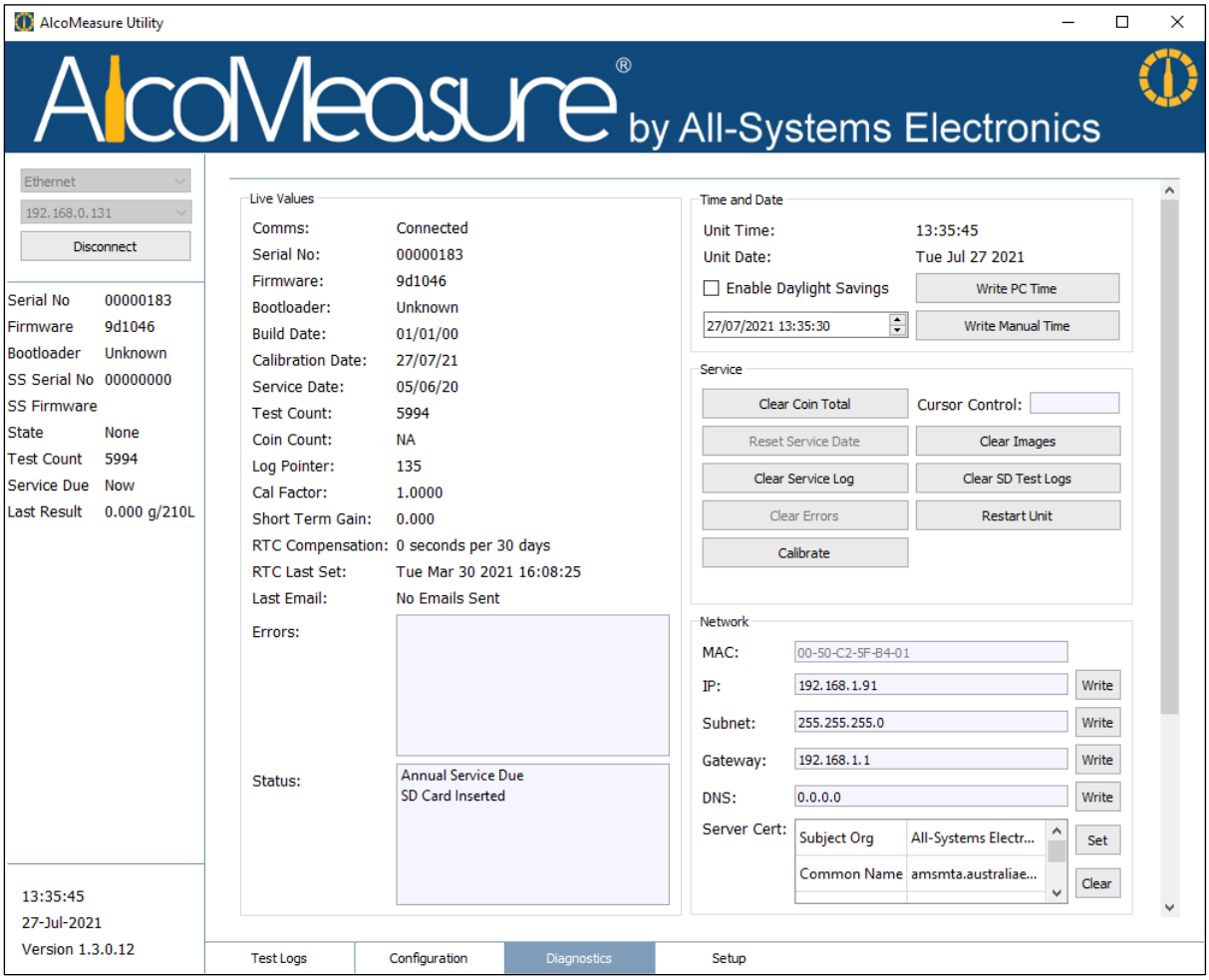


Figure 35 - AlcoMeasure Utility Diagnostics

15.1 Live Values

None of these values can be edited directly, they are read only. However, some items can be updated by other means. For example, upon pressing "Calibrate" (section 15.3) the machine will start a manual calibration. If this finishes successfully, the "Calibration Date" value will be updated.

List of values:

- Comms
    - Shows that a machine is either "Connected" or "Disconnected".

- Serial No
    - The serial number of the connected device.
- Firmware
    - The firmware version of the connected device.
- Bootloader
    - The bootloader version of the connected device.
    - This will display “Unknown” for bootloaders older than version 1.0003.
- Build Date
    - The date the device was built in the factory.
- Calibration Date
    - The date the device was last calibrated. Since the device auto-calibrates, this value should update every few days.
- Service Date
    - The date the device was last serviced by an authorised service technician.
- Test Count
    - The total number of tests the device has completed, including calibrations.
- Coin Count
    - The total value of coins inserted since the coin count was last reset.
- Log Pointer
    - The location of the log pointer in the internal circular log buffer.
    - Once the log pointer reaches its maximum value, it will wrap back around to 0 and start overwriting old logs.
    - For more information see section 9.
- Cal Factor
    - The calibration factor calculated during a calibration. This is applied, along with some other parameters, to all raw test results to come up with a final test result.
- Short Term Gain
    - A compensation value that takes into account fuel cell fatigue in order to normalise test results.
    - This value will increase with every test result greater than 0. It will decrease with every successive test that is completed.
- RTC Compensation
    - A compensation value to help keep the real time clock accurate.
    - This value is displayed as the number of seconds to either add or subtract to the time over a 30 day period.
- RTC Last Set
    - The date and time the real time clock was last set.
- Last Email

    - The result/error message of the last email that was sent.
- Errors
    - A list of any global errors that have occurred since the errors were last cleared.
- Status
    - A list of any global status items.

15.2 Time and Date

This section allows the user to set the time and date of the connected device.

- Enable Daylight Savings
    - This setting should be manually changed whenever daylight savings starts or ends.
    - When ticked, 1 hour is added to the time in the unit.
    - When unticked, the time in the unit is unchanged.
- Write PC Time
    - Writes the current PC time into the unit, +/- 1 second.
    - If daylight savings is enabled, 1 hour will be subtracted before the time is written. This assumes that the PC time also includes the 1 hour daylight saving time.
- Write Manual Time.
    - Allows the user to specify an exact time and date to write to the unit.
    - If daylight savings is enabled, 1 hour will be subtracted before the time is written. This assumes that the PC time also includes the 1 hour daylight saving time.

15.3 Service

The items in this section help the user carry out some basic servicing tasks, although the periodic service still needs to be carried out by an authorised technician.

- Clear Coin Total
    - Resets the coin count to 0.
    - This should be done when the coin box is emptied, to help the user keep track of the value of coins in the coin box.
- Cursor Control
    - This function allows the user to navigate the internal menu of the device without using the physical buttons inside the AlcoMeasure.
    - Simply click the cursor inside the “Cursor Control” box.
    - Use the Cursor keys (arrow keys) to navigate the internal menu.
        - Left arrow is “Clear”.
        - Right arrow is “Enter”.
        - Up arrow is “Up”.
        - Down arrow is “Down”.

  - To simulate a press and hold of the desired key, press and hold the “Shift” button followed by the desired arrow button.
  - For more information on the internal menu see section 20.
- Clear Images
  - Clears all images from the SD Card.
  - This can be useful if the camera isn’t working properly, or if the device starts running slowly due to a significant number of photos being present on the SD Card.
- Clear Service Log
  - Clears the internal service log. This should only be done under instruction from the service technician as the device’s history will be lost.
- Clear SD Test Logs
  - Clears the “Test Log” folder on the SD Card, which is used for the Email Log attachment.
- Restart Unit
  - Initiates a restart of the device.
  - The device should display “Restarting” for approximately 5 seconds, and then perform a restart.
  - This is useful in remote situations. If the device is not operating correctly, a restart could be performed to see if the problem is rectified.
- Calibrate
  - Performs a manual calibration of the device.

15.4 Network

The ethernet capabilities of the device are configured in the Network section of the Diagnostics tab. Note that the device needs to be restarted in order for any of these changed to take effect.

- MAC
  - The MAC address of the device. This is unique to each device and cannot be changed.
- IP/Subnet/Gateway
  - The IP address parameters of the network interface.
  - If DHCP is enabled then the address information will be dynamically assigned by the network. Otherwise, these can be edited by the user.
- DNS
  - If left empty, the device will attempt to dynamically find the DNS address from the network. If this doesn’t work, it will need to be entered manually.
- Server Cert
  - If a digitally signed certificate needs to be installed on the device as part of its connection to a custom server, or AlcoMeasure Server, it can be Set and Cleared here.

15.5 Extra Features

The AlcoMeasure contains a number of extra “paid for” features that can be unlocked. Some of these features will come unlocked from the factory in certain models.

This section lists all the features that are unlocked in the connected device.

15.6 Tests

This section shows the current state of the connected device, and in particular shows the state of any current test that is occurring. This can be used to diagnose possible problems.

- State
    - The current global state of the device. If the AlcoMeasure is taking a test, this will show what type of test it is taking. When it is ready to take a test, it will be in the “None” state.
- Test State
    - The current state the device is in while taking a test.
    - The “State” above will show the type of test being performed, and the “Test State” will show what stage of the test the device is up to.
- Last Outcome
    - The outcome of the last test. Test Successful indicates that the last test finished successfully and produced a result.
    - See section 14.2.3 for more information.
- Error State
    - If the global “State” says “Error”, the Error State will indicate what type of error the device is in.
    - See section 23.2 for more information.
- Last Result
    - The result of the last successful test, displayed in the current units of measure.

16 Evidential Model

The Evidential model is the top-end model in the AlcoMeasure WM1 range. It comes with all the standard model's features as well as a built in printer and a keypad. The keypad functionality is described in section 19, and the printer functionality is described in section 18.

As well as these extra hardware features, the Evidential model comes with a Formal Test mode.

16.1 Formal Test

The Formal Test can be triggered a number of ways:

- Spare Input 1 or 2. A push button, or similar, can be connected to either of the spare inputs. The spare input then needs to be configured to start a "Formal" test as described in section 11.4.
- Pressing Enter on the keypad as described in section 11.8.
- Starting a test with an Operator PIN as described in section 11.8.
- Sending a Formal Test Command as described in sections 19.2 and 20.3.2.

Once the formal test starts, it will carry out in the following order:

1. The Operator PIN will need to be provided.
    - This will only occur if the Operator PIN is enabled and it hasn't already been provided.
2. The Subject PIN will need to be provided.
    - This will only occur if the Subject PIN is enabled and it hasn't already been provided.
3. Auto-Calibration.
    - The device will perform an automatic calibration using its internal calibration gas. This will take up to 1 minute.
4. Perform Test.
    - The device will wait for the subject to start blowing in order to take a test. If the subject doesn't start blowing within a reasonable amount of time, or if the subject stops blowing halfway through, the test will be cancelled.
5. Calibration Check.
    - The device does a check of its calibration by injecting calibration gas and measuring the result, just like a normal test. This can be used to validate that the device was in calibration both before and after the subject's test.
    - This should be within the tolerance shown under *Accuracy* in section 5.4.
6. Printing the result.
    - If the printer is enabled, a printout will be provided to the subject/operator showing the results of all components of the formal test. These can be customised as described in section 11.8.
7. Emailing the result

- If the Formal Test email is enabled, a report will be sent showing the results of all components of the formal test. This can be customised as described in section 13.6.

17 Vend Model

The Vend model can be run in either Free Test mode or Coin mode. When in Coin mode, the insertion of the correct value of coins will initiate a test. It will display the Instruction message while it waits.

If a coin is inserted, but if the total is not reached, then the device will alternate between showing how much money has been inserted and saying “Insert More Coins”. The device will wait 10 minutes for more coins to be inserted. If no new coin is inserted in this time the coin value will be cleared so it doesn’t continually display “Insert More Coins”. Each new coin that is inserted will reset the 10 minute timer.

If any remainder is present after a test is taken, this remainder will count towards the next test. However, if the remainder has not changed after 2 consecutive tests then the remainder will be removed.

For example, if a WM1 is configured to take Australian coins, and a total of $1.00 starts a test, the subject could insert 10 cents, followed by $1. This will start a test. However, there will be a remainder of 10 cents. Once the test is complete, the device will show that it still has 10 cents counting towards the next test. A subject could then insert 90 cents to take a test. However, if the subject inserts a $1 coin again, after the test has completed the remainder will be reset back to 0.

Once the correct value of coins has been inserted, any further coins will be rejected through the coin return mechanism. Note that if a subject inserts a coin, and it is accepted, it can no longer be returned since it falls immediately into the coin box even if the coin value resets after the 10 minute timeout.

17.1 Coin Mechanism Configuration

The coin values that the device is expected to see and display are configured in section 11.11.

However, the coin mechanism attached to the front door of the device also needs to be programmed to accept the different coin types the user wishes for the AlcoMeasure to accept. Note that the coin mechanism can also accept game tokens.

The default configuration is for the coin mechanism to accept the following (Australian currency):

- Category 1 5c
- Category 2 10c
- Category 3 20c
- Category 4 50c
- Category 5 $1
- Category 6 $2

To program the coin mechanism, follow the instructions on the side of the coin mechanism. These instructions are also provided here as a reference. Make sure the AlcoMeasure is not in an error state, and is displaying a scrolling message indicating it is ready to start a test.

- To program a coin type into the Microcoin QL, press the program button on the device 3 times.

- Then press the program button until the category number you wish to program the coin into is displayed.
- Then insert a number of different samples of the same coin, preferably more than 10.
- Press and hold the program button to exit programming mode.
- Now, press the program button once. Insert the coin into the device to enable the coin category.
- From now on, when the coin type is inserted, the coin mechanism will accept it.

18 Printer

The main function of the printer is to provide a test result printout clearly showing the results of a test.

The printout can be configured to occur at the completion of either a normal test, a formal test, or both. These options are available in the System Config screen as described in sections 11.1 and 11.8.

18.1 Normal Test Printout

The normal test printout is shown in Figure 36.

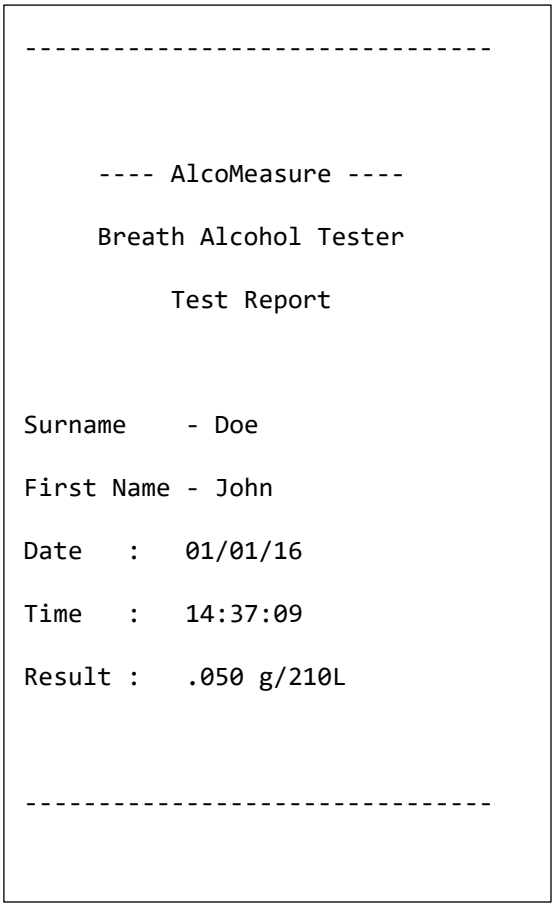


Figure 36 - Normal Test Printout

The row containing the text “Test Report” can be changed by the user, as shown in section 10.5.

If a PIN has been used to trigger the test, and if the “Show PIN” option is enabled (section 11.3), then it will be displayed above the Surname. If “Validate PIN” is also enabled then the first and last names will be automatically filled out.

18.2 Formal Test Printout

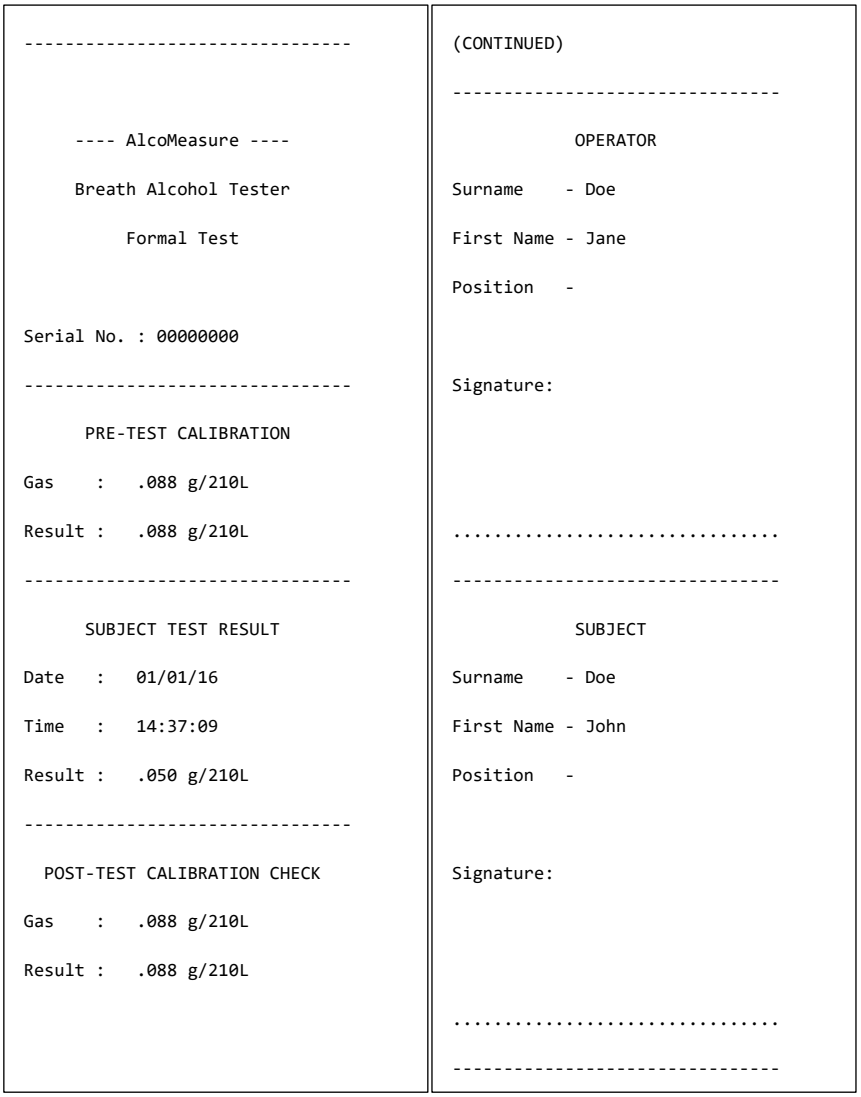


Figure 37 - Formal Test Printout

The formal test printout, as shown in Figure 37, is only available on an Evidential model.

The row containing the text “Formal Test” can be changed by the user, as shown in section 10.5.

If a PIN has been used to trigger the test, and if the “Show PIN” option is enabled (section 11.3), then the Subject’s PIN will be displayed above the Subject’s Surname. The Operator’s PIN will never be shown.

If “Validate PIN” is also enabled then the first and last names of both Operator and Subject will be automatically filled out.

18.3 Printer Servicing

If the Green LED on the front of the printer is lit up, this means the printer is in normal operation and does not require attention.

If the Amber LED on the front of the printer is lit up, this means the printer is in an error state. The AlcoMeasure will also display a warning message indicating the printer error. The possible warning messages and what to do about them are found in section 23.1.

19 Subject Identification

The AlcoMeasure provides a number of mechanisms for a subject to be identified. The subject identification, also called the PIN, is logged against the test. This means that each test result can be reconciled to a subject when the log is downloaded or emailed.

Another possible use for subject identification is to provide a simple User Access Control system. This can be done by combining subject validation with relay functionality to activate a door lock, only allowing an employee access into a workplace if they have successfully blown a zero test.

None of the following subject identification methods require that subject validation is enabled. If validation is disabled then once a PIN is received by the unit a test will commence. For more information on user validation see section 12.

The HTTP API described in section 20 also contains the ability to start a test while providing a subject/operator ID, as well as the ability to download logs showing subject ID's.

19.1 Keypad

The keypad provides a simple mechanism for an employee to identify themselves before taking a test. The PIN is then logged against the test and can be accessed later through the log.

When a keypad is installed on a unit, and the unit is in "Keypad" input mode (section 11.1), a PIN will need to be entered via the keypad in order for the unit to start a test.

A test is initiated by pressing any digit on the keypad. If "Show PIN" is enabled (section 11.3) that digit, and all subsequent digits, will be displayed on the screen. Otherwise an asterisk will be displayed. The display will also change into "PIN Acceptance" mode, and will display the required number of digits on screen.

Continue entering the PIN by pressing enough digits to fill the required spaces on screen. Press Enter to finalise the PIN. If user validation is enabled, the PIN will be validated and a test will start only if the subject appears in the user list. Otherwise a test will start immediately.

If Enter is pressed before all digits are entered then the AlcoMeasure will report an incorrect PIN.

If a wrong digit is pressed, cancel will erase the last digit. If all digits are erased, a further press of the Cancel button will abort the test.

19.2 Serial Command Mode

Serial Command Mode allows a test to be started via any of the available serial ports. The port needs to be configured in "RS232 In" mode as shown in section 11.6.

If a serial output is required at the completion of a test, but the test is not to be triggered using the serial command, then "RS232 Out" mode can be enabled on a port.

Initiating a test:

- Send a string to the AlcoMeasure in the following format:
    - %1234\r\n
    - 1234 is a PIN that can be any length from 0 up to 20 characters long.

  - This PIN does not have to be the same length as the PIN Length set in the PIN menu.
  - \r\n can be a line feed (hex 0A), carriage return (hex 0D), or both.
  - To start a Formal test instead (if available), replace the % with a #.
- The subject should now be prompted to blow into the unit.
- Once the test has completed, a reply string will be sent back in the following format:
  - %0.ZZZ,0123456789abcdefghij,SERIALNO,DD/MM/YY,HH:MM:SS\r
  - 0.ZZZ is the result in the current units of measure.
  - 0123456789abcdefghij is a PIN 1 to 20 characters long. If no PIN was sent to the unit, this field will be missing.
  - SERIALNO is the serial no of the unit.
  - DD/MM/YY is the date of the test.
  - HH:MM:SS is the time of the test.
  - \r the string ends with a carriage return (hex 0D).

If the test fails to complete, there are a number of error messages that can be sent back:

- %TMOUT,SERIALNO,DD/MM/YY,HH:MM:SS\r
  - Timed out waiting for subject to blow.
- %STOPD,SERIALNO,DD/MM/YY,HH:MM:SS\r
  - Subject started blowing but stopped before completion.
- %PININ,SERIALNO,DD/MM/YY,HH:MM:SS\r
  - Pin invalid (if PIN validation is enabled).
- %PINTM,SERIALNO,DD/MM/YY,HH:MM:SS\r
  - Timed out waiting for PIN to be entered.
- %PINCL,SERIALNO,DD/MM/YY,HH:MM:SS\r
  - Pin cancelled.
- %ERROR,SERIALNO,DD/MM/YY,HH:MM:SS\r
  - An unknown error occurred.

If the string is sent to the unit when the unit is not ready it will send back one of the following error messages:

- %NTRDY\r
  - The AlcoMeasure is not in a state where it can start a test.
- %TSTNG\r
  - The AlcoMeasure is still processing the previous RS232 test.
- %NOFML\r
  - The formal test string has been sent to the unit, but formal test is not enabled in the unit.

- %UNKWN\r
    - An unknown error occurred.

The output strings from the serial command mode can be customised as described in section 14.

19.3 iButton

If the iButton option is fitted to an AlcoMeasure then a subject can be identified by pressing an iButton token against the iButton reader mounted on the front of the AlcoMeasure. This will initiate a test as per usual.

If user validation is enabled, the PIN to enter into the user list can be found engraved on the surface of the iButton token (supplied separately).

20 HTTP API

The AlcoMeasure includes a HTTP rest API that can be used to control the device.

For the API to be accessible, the “Disable Login” feature needs to be enabled as described in section 5.8.2.1, and the “Disable Login” setting needs to be set to true as described in section 11.1.5.

If the API is just being used to poll the status of the device, then this can be done no-matter what mode the device is in. However, if the API is to be used to instigate tests then the device must be in “Command” mode, as described in section 11.1.1. This stops a user from walking up and blowing into the device until the device has been told to expect a test.

The API can be accessed by establishing a connection from an external client, including a web browser, to the target device. However, depending on the clients use case, it may be better to have the device automatically connect to the client’s software. This can be done by configuring the server connection, as described in section 11.10.

Note that the device cannot accept an incoming encrypted connection, so this method is inherently insecure. The outgoing server connection can be encrypted, so this is the more secure method. The client should also consider using a VPN or SSH tunnel if the provided security isn’t strong enough.

The default port for the device is 26000, and after the device has returned a response it will drop the connection, even if “Connection: keep-alive” is provided in the header.

20.1 Status

The status command returns the current status of the device as an xml document.

Request: GET /status.cgi

Response:

```
<status.cgi>
<ProcessState value="None"/>
<TestState value="None"/>
<Outcome value="Test Successful"/>
<ErrorState value="None"/>
<Serial value="00000844"/>
<Firmware value="1.1034"/>
<Bootloader value="1.1000"/>
<SSSerial value="00000852"/>
<SSFirmware value="1.002"/>
<FeatureFlags value="252"/>
<TestCount value="8171"/>
<CoinCount value="-1"/>
<LastResult value="1188"/>
<LastLogNo value="290"/>
<DaysTillService value="197"/>
<success value="1"/>
</status.cgi>
```

The ProcessState value is the main state of the device. It can be any of the following:

- None
- Calibrate
- Normal Test
- Formal Test
- Purge
- Purge with sample
- Error

If the ProcessState is “Error”, the ErrorState value will indicate the error.

If a test is being performed, the stage of the test the device is up to is indicate by the TestState value. It can be any of the following:

- None
- Started
- Waiting For Blow Start
- Waiting For Blow Finish
- Finding Results
- Calibrating
- Recovering
- Outcome Not Retrieved
- Waiting For Operator PIN
- Waiting For Subject PIN

Once a test is completed, the Outcome value will be one of the following:

- No Outcome
- Test Successful
- Test Failed
- Blow Timeout
- Blow Stopped
- Unwanted Blow
- Blow Rate Too High
- Liquid Detected
- Calibration Failed
- Cal Factor Below Minimum
- Cal Factor Above Maximum
- PIN Timeout

- PIN Cancelled
- PIN Invalid
- Cal Factor Unstable

If the test was successful, the test result is stored in the LastResult value. Note that this value is not in the current units of measure. To convert it to g/210L it must be divided by 44000. So 1188 in this example is actually 0.027 g/210L.

Once a test starts, a log entry will always be generated regardless of the outcome. After completion of the test, the log entry will be saved in the LastLogNo value. This can be retrieved using the download log command.

20.2 Download Log

The log command returns items that have been logged by the AlcoMeasure.

20.2.1 Download Internal Log

Request: GET /log.cgi?downloadInternal

This will download the entire internal log as a .txt file. The format is as follows:

The downloaded log entry will have the following format:

22/10/20,08:09:42,00000844,Normal Test,Test Successful,0.000,1234,,IM018001.JPG,IM018002.JPG,IM_None

- Column 0 - date
- Column 1 - time
- Column 2 - serial
- Column 3 - log type
- Column 4 - outcome
- Column 5 - result
- Column 6 - user ID (or first name if user list validation is enabled)
- Column 7 - Last name if user list validation is enabled
- Column 8 - Photo 1
- Column 9 - Photo 2
- Column 10 - Photo 3

Optional parameters:

- showIndex
    - An extra column will be prepended to each log entry showing its current index. Note that the index starts at 0 and ends at 7695. After the log is filled, older entries are overwritten after which time earlier entries in the log may have newer timestamps than later entries.
- initial=XYZ
    - The address of the first log to download.

- size=XYZ
    - The number of log entries to download.
- vp
    - If a userlist is present, ID's in the log will be validated and the resolved names will be included instead of the ID.

20.2.2 Download Photos

If a photo was taken as part of a test, first the test's log entry should be downloaded. If a valid photo number is given in the log record, the photo number is passed into the function.

For example, if IM018001.JPG is found in the log entry, 18001 should be passed in as the photoNo parameter.

Request: GET /log.cgi?downloadPhoto&photoNo=XYZ

If found, a .jpg file will be sent back. Otherwise, an error message will be generated.

20.3 Start a Test

To start a test, the start test request must be issued, along with the test type, and any of several optional parameters.

20.3.1 Starting a Normal Test

A normal test is started with the following request:

Request: GET /status.cgi?startTest=5

If this returns successful, the ProcessState value in the status response should change to "Normal Test". It will then prompt for a subject to blow into the device. The status should then be polled to determine when the test is complete, and what the result is.

Optional parameters:

- ID=1234abcd
    - If a subject ID should be logged against the test, it can be passed in via this parameter. If validation is disabled, the test will start. If validation is enabled, the test will only begin if the ID is valid. If it is not, an error will be returned.
- display=Message%20to%20display
    - This is a custom message that will be displayed while waiting for the subject to blow into the device. It will scroll across the continuously until either the subject initiates a blow, or the blow times out. A maximum of 252 characters can be displayed in a scrolling message.

20.3.2 Starting a Formal Test

If formal test mode is enabled in the device, a formal test is started with the following request:

Request: GET /status.cgi?startTest=6

If this returns successful, the ProcessState value in the status response should change to “Formal Test”. It will then begin the formal test process, starting with a calibration. The status should then be polled to determine when the test is complete, and what the result is.

Optional parameters are the same as for the Normal test, with the following addition:

- OP=dcba4321
    - If an operator ID should be logged against the test, it can be passed in via this parameter. If validation is disabled, the test will start. If validation is enabled, the test will only begin if the ID is valid. If it is not, an error will be returned.
    - This should usually be done in combination with the subject ID.

20.4 Display Custom Message

A custom message can be displayed using the following command:

Request: GET /status.cgi?display=Message%20to%20display

If this returns successful, the device will scroll the message across the screen once, after which it will continue to display its normal messages. A maximum of 252 characters can be displayed in a scrolling message.

Optional parameters:

- time=5
    - If the time parameter is specified, and it is non-zero, the message will not be scrolled. Rather it will be held statically on the screen for the number of seconds passed in the time parameter.
    - In this case, no more than 17 characters can be displayed on the screen.

21 Internal Menu

The normal way of interacting with the AlcoMeasure WM1 is by the use of the AlcoMeasure Utility application, described in section 8. Most sections of this manual describe the configuration of the device using the Utility software.

However, the AlcoMeasure WM1 also has an internal menu that can be navigated using 4 push buttons inside the unit. This menu can be used for quick access to basic features in the Service menu. It can also be used in the case where the user does not have access to a Windows PC in order to change a parameter in the AlcoMeasure.

21.1 Menu Navigation

Once the top door of the AlcoMeasure has been unlocked, you will see 4 buttons on the main processor board of the AlcoMeasure. These are used to navigate the internal menu. They will also have slightly different actions depending on their context.

The push buttons, and the way they navigate the menu, are as follows:

- Up
    - Cycles up through menu items.
- Down
    - Cycles down through menu items.
- Enter
    - Selects the highlighted menu item.
- Clear
    - Goes back to the previous menu in the menu tree.

The display on the front of the AlcoMeasure will show where the user is currently located in the menu structure. Section 21.2 can be used to help navigate the menu.

To get into the menu press the “Clear” key while the normal scrolling messages are being displayed. The message “Service Menu” will be displayed on the screen.

The menu has a number of different types of items.

- Sub-menus have a -> symbol at the right hand side of the display. Pressing enter on these will display a whole new menu of items. Press Clear to exit back to the previous menu.
- Information items are display only. Selecting them will have no effect.
- Editable numbers can sometimes look the same as Information items, however selecting them will allow the user to either edit them. When a number is being edited, a single digit is edited at a time. The digit being edited will flash. Pressing Up and Down will change the value of the selected digit. Pressing Enter will move forward to the next digit, or save the value if the last digit is selected. Pressing Clear will move backward to the previous digit, or cancel the edit if the first digit is selected.

21.2 Menu Layout

21.2.1 Service Menu

Item Name	Description	Type	Editable
Errors Found	Only shown if errors have occurred The errors menu	Sub Menu	
Tests	Total Test Count	Number	
Print Enable	Only shown if printer is attached Enables normal test printout	On/Off	Yes
Daylight Sav	Daylight Saving Enabled	On/Off	Yes
Next Service	Number of days till the next service is due	Number	
IP	Devices IP address	IP Address	
Coins	Only shown in Vend model Current total of coins Clears the coin count if selected	Number	Yes
Cal Factor	The current calibration factor	Real Number	
Cal Gas	The current calibration gas value	PPM	
Gas Bottle Change	Schedules an auto-calibrate to occur once the device has stabilised.	Action	
Calibrate	Starts a calibration test	Action	
Formal Test	Only shown if formal test is available. Starts a formal test	Action	
Altitude	The approximate altitude of the device in metres.	Number	

Dry Test	Takes a test sample immediately. The result that is shown includes wet to dry and altitude compensation.	Takes Test	
Last Result	Shows the last test result	Units of measure	
Bootloader	Shows the bootloader version	Real Number	
Firmware	Shows the firmware version	Real Number	
Advanced	Access to the main menu A password is required to access this menu	Sub Menu	

21.2.2 Errors Menu

Item Name	Description	Type	Editable
Global Errors	Displays a list of any existing errors	List	
Comms Errors	Displays a list of any existing communication errors	List	
Clear Errors	Clears all current errors	Action	Yes

21.2.3 Advanced – Main Menu

Item Name	Description	Type	Editable
Diagnostics	Diagnostics Menu	Sub Menu	
Settings	Settings Menu	Sub Menu	
Sample System	Sample System Menu	Sub Menu	

21.2.4 Diagnostics Menu

Item Name	Description	Type	Editable
Serial	Device's serial number	Number	
Built	Device's build date	Date	

Serviced	The date of the last service	Date	
Cal Date	The date of the last calibration	Date	
Tests	The total test count	Number	
Time	The current time in the device	Time	Yes
Date	The current date in the device	Date	Yes
Log	The current location of the system log pointer	Number	
Cal Factor	The current calibration factor	Real Number	
STG	The current short term gain	Real Number	
Bar Offset	The barometer calibration offset	Number	
Revision	The current firmware version	Real Number	
Extra Features	The list of enabled extra features	List	
Errors	The Errors menu	Sub Menu	

21.2.5 Settings Menu

Item Name	Description	Type	Editable
Alcohol	Alcohol related settings menu	Sub Menu	
Coins	Only shown in Vend model Coin related settings menu	Sub Menu	
Formal Test	Only shown if formal test is available	Sub Menu	
Beeper	Beeper settings menu	Sub Menu	
Spare Inputs	Spare inputs settings menu	Sub Menu	
Spare Output	Spare Output settings menu	Sub Menu	

Relay Board	Optional Relay Board settings menu Once the relay is chosen (1-3), the relay configuration sub-menu is shown	Sub Menu	
COM Ports	COM Ports settings menu	Sub Menu	
Log	Test log settings menu	Sub Menu	
PIN	PIN/ID settings Menu	Sub Menu	
Ethernet	Only shown if Ethernet is enabled Ethernet settings Menu	Sub Menu	
Camera	Only shown if Camera is enabled Camera settings menu	Sub-Menu	
Input	Input mode setting	List	Yes
Password 1	Advanced (Main Menu) password	Number	Yes
Disable Encryption	Disables file transmission encryption	On/Off	Yes
Disable Login	Disables Ethernet login	On/Off	Yes
DS Offset	Daylight Savings Offset	Number	Yes

21.2.6 Alcohol Menu

Item Name	Description	Type	Editable
Units	Units of Measure	List	Yes
Fast Recover	Recovers as quickly as possible after zero test	On/Off	Yes
Range 0	Range message 0 displayed if result < this value	Units of Measure	Yes
Range 1	Range message 1 displayed if result >= Range 0 and result < this value	Units of Measure	Yes
Range 2	Range message 2 displayed if result >= Range 1 and result < this value	Units of Measure	Yes

Range 3	Range message 3 displayed if result >= Range 2 and result < this value	Units of Measure	Yes
Range 4	Range message 4 displayed if result >= Range 3 and result < this value. Range message 5 displayed if result >= this value	Units of Measure	Yes
Print Limit	Only shown if printer is attached Printer will print result if >= this value	Units of Measure	Yes
Max Result	If the result is greater than this value then a message will be displayed informing the subject that their result was greater than this value	Units of Measure	Yes

21.2.7 Coin Menu

Item Name	Description	Type	Editable
Max Amount	The value required to start a test	Number	Yes
Decimals	The number of decimal points to display	Number	Yes
Coin Values	A list of 6 editable coin values	List	Yes
Coin Timeout	The coin inserted timeout in seconds	Number	Yes

21.2.8 Formal Test Menu

Item Name	Description	Type	Editable
Enter Start	Start formal test by pressing Enter on keypad	On/Off	Yes
Operator PIN	Require operator PIN to start formal test	On/Off	Yes
Subject PIN	Require subject PIN to start formal test	On/Off	Yes
Operator PIN Set	Set the fixed operator PIN	Number	Yes
Printout	Enable the printout of the formal test result	On/Off	Yes
Print Witness	Printout should contain section for witness signature	On/Off	Yes

Always Print	Always print, even if the formal test was unsuccessful. If enabled, Print Limit is ignored.	On/Off	Yes
Print Limit	Only print result if formal test result >= this value	Units of Measure	Yes
Show Warning	Display range messages in formal test mode	On/Off	Yes
Max Attempts	The maximum attempts at blowing before the formal test will fail.	Number	Yes

21.2.9 Beeper Menu

Item Name	Description	Type	Editable
Alarm	Configure the internal beeper with relay set point functionality. See Relay Menu	Sub Menu	Yes
Alarm Hz	Set the frequency of the internal beeper	Number	Yes
Button Press	Allow the beeper to sound (button press and test activation)	On/Off	Yes

21.2.10 Spare Inputs Menu

Item Name	Description	Type	Editable
IN1	Set Input 1 to start either a Normal or Formal test, or neither	List	Yes
IN2	Set Input 2 to start either a Normal or Formal test, or neither	List	Yes

21.2.11 Spare Output Menu

Item Name	Description	Type	Editable
Mode	The mode the spare output should operate in	List	Yes
Relay	If spare output is in relay mode, configures it with set point functionality. See Relay Menu	Sub Menu	Yes

21.2.12 Relay Menu

Item Name	Description	Type	Editable
Enabled	Enable relay functionality	On/Off	Yes
Start	Enable relay at initialisation of test or when result is displayed	List	Yes
Seconds	Number of seconds to activate relay	Number	Yes
Set Point	The result set point to activate the relay	Units of Measure	Yes

Direction	Activate relay when result is < or >= set point	List	Yes
Operation	Only shown for relay board items. Set the relay to operate in individual or sequential mode.	Toggle	Yes
Toggle	Enable toggling, 500ms in each state	On/Off	Yes

21.2.13 COM Ports Menu

Item Name	Description	Type	Editable
COM BAUDs	BAUD Rate for each COM Port	List	Yes
RS232 Out	COM Port for RS232 Out functionality	List	Yes
RS232 In	COM Port for RS232 In Functionality	List	Yes
iButton	Only shown if iButton is attached COM Port for iButton	List	Yes
Camera	COM Port for Camera Functionality	List	Yes
RS232 In Reply	Enable/disable reply on RS232 In port	On/Off	Yes
Custom Result	Enable custom result functionality	On/Off	Yes
Custom Result File	Create a new default custom result file	Action	

21.2.14 Log Menu

Item Name	Description	Type	Editable
Log PIN	Log PIN along with the test result	On/Off	Yes
Mirror to SD	Mirror the internal service log to the SD Card	On/Off	Yes
Tests to SD	Log tests to SD Card	On/Off	Yes
Log UserName	Log usernames to SD Card	On/Off	Yes

21.2.15 PIN Menu

Item Name	Description	Type	Editable
Show PIN	Display the PIN on screen/printout	On/Off	Yes
Validate PIN	Only shown if user list is enabled Use userlist to validate subject ID	On/Off	Yes
PIN Length	The length of the PIN typed in via Keypad	Number	Yes
New Userlist File	Create a new default user list file	Action	

21.2.16 Ethernet Menu

Item Name	Description	Type	Editable
Email	Only shown in email is enabled	Sub Menu	
DHCP	Enable dynamic allocation of IP settings	On/Off	Yes
IP	IP Address of device	IP Address	Yes
SN	Subnet Mask of network	IP Address	Yes
GW	Gateway IP Address	IP Address	Yes
DN	DNS IP Address	IP Address	Yes
Port	Port number to access device	Number	Yes
MAC	MAC Address	Number	
User Access	Allow access at user level	On/Off	Yes
Dist Access	Allow access at distributor level	On/Off	Yes
AM Server	Status of server connection	Status	

21.2.17 Email Menu

Item Name	Description	Type	Editable
Srvr Tmout	Number of seconds to wait for reply from SMTP server	Number	Yes

Send Over Email	Sends a test over limit email using current settings	Action	
Send Log Email	Sends a test log email using current settings	Action	
Send Formal Email	Sends a formal test email using current settings	Action	
New Config File	Create a new default config file	Action	
New Over File	Create a new default over limit config file	Action	
New Formal File	Create a new default formal test config file	Action	
New log File	Create a new default log config file	Action	
Create New Files	Create all new default config files	Action	

21.2.18 Camera Menu

Item Name	Description	Type	Editable
Photo 1	Enable/disable photo 1	On/Off	Yes
Photo 2	Enable/disable photo 2	On/Off	Yes
Photo 3	Enable/disable photo 3	On/Off	Yes
Photo 3 Timer	Photo 3 delay timer in milliseconds	Number	Yes
Image Size	Image resolution	160/320/640	Yes
Clear Images	Delete all images on SD Card	Action	

22 Firmware Update

The main firmware in the AlcoMeasure WM1 can be upgraded in the field. It is important to do this in order to fix bugs and add new features.

A good practice is to keep a copy of all versions of firmware that have been loaded into the device. This is useful in case a firmware upgrade causes an issue, the firmware can always be downgraded again.

The bootloader version can be found in the service menu of the device, or by connecting to the device with AlcoMeasure Utility. Newer versions of the bootloader have different error codes and the possibility of updating through the Utility. However, if in doubt, the old procedure will work in all models.

22.1 Updating with AlcoMeasure Utility

This procedure is for bootloader version 1.1000 and newer, which will be most devices from April 2019 onwards.

1. Place the new firmware file in Documents/AlcoMeasure Utility/Firmware, or another suitable easy to find location.
2. Connect device to PC with USB cable.
3. Run AlcoMeasure Utility
4. Navigate to “Diagnostics” tab.
5. Press “Update Firmware”.
6. Select the desired firmware file and press “Ok”.
7. Acknowledge the warning window by pressing “Ok”, otherwise press “Cancel”.
8. The firmware will be uploaded to the device. Once completed, the device will be offline for a few minutes while it updates itself.
9. Once the update process has completed, the device will reboot and reconnect to the PC.
    a. If the Utility fails to detect that the device is rebooting, check the device’s display to see if the update process is occurring. If it isn’t, manually power cycle the device and try again.
10. Check the new firmware version in AlcoMeasure Utility.
    a. There should also be a log entry indicating that the firmware was updated.

22.2 Updating with USB stick (new bootloader)

This procedure is for bootloader version 1.1000 and newer, which will be most devices from April 2019 onwards.

1. Place the relevant firmware file on a SanDisk or other reputable USB stick.
    - The firmware file must keep the original name, be in the root folder of the stick, and should be the only firmware file in the folder.
2. Power off the AlcoMeasure.
3. Insert the USB stick into the Type-A port on the AlcoMeasure processor board.
    - Make sure there is no cable connected to the Mini-B port.
4. Press and hold the "Clear" button on the AlcoMeasure processor board.

5. While holding clear, power on the AlcoMeasure.
    - The display will show the status of the update.
    - The clear button can be released once the firmware update is initiated.
6. The AlcoMeasure will automatically upgrade its firmware using the file on the USB stick.
    - While erasing and updating, a flashing pixel will move across the screen indicating progress.
    - If an error occurs, it will be displayed on the screen.
7. Power off the AlcoMeasure.
8. Remove the USB stick.
9. Power on the AlcoMeasure and check its new firmware version.
    - There should also be a log entry indicating that the firmware was updated.

22.3 Updating with USB stick (old bootloader)

This procedure is for bootloader versions older than 1.1000. However, this procedure will work with all versions of bootloader, although the error codes flashed by the heartbeat LED may not be correct in newer versions of the bootloader.

In order to proceed you will need a copy of the latest firmware from your distributor. You will also need a USB stick that is formatted as FAT32. The AlcoMeasure has been fully tested to work with SanDisk USB 2.0 sticks.

22.3.1 Procedure

1. Connect your USB Stick to your PC.
2. Remove all other AlcoMeasure firmware files from the USB stick.
3. Place the new firmware file in the root directory of the USB stick.
    - DO NOT change the file name, as this is used to identify the file.
    - The filename should be in the following format:
        - AlcoMeasureX_XXXX.S19
4. Safely eject the USB stick from your PC.
5. Power off the AlcoMeasure.
6. If a USB cable is connected to the AlcoMeasure, remove it.
7. Insert the USB stick into the USB port on the AlcoMeasure processor board.
8. Find the Heartbeat LED labelled D2 on the top left of the processor board.
9. Power the AlcoMeasure back on.
10. The heartbeat LED should flash twice, and then turn hard on.
11. After a few seconds the heartbeat LED should start flashing quickly. It should continue to do this for about 10 seconds.
12. Once it stops it will pause briefly and then flash slowly.
13. 2 flashes means it has updated successfully.
    - If the bootloader is an older version, 5 flashes indicates success.
    - If it is unsuccessful, see section 22.3.2.

14. Remove the USB stick and the AlcoMeasure will automatically reboot.
15. Using either AlcoMeasure Utility or the internal memory, check that the firmware version in the device matches the new firmware.

22.3.2 Update Troubleshooting

If the firmware fails to update for some reason the heartbeat LED will flash the error code. Table 1 shows a description of the possible error codes (Bootloader 1.0004 and newer).

Error Code	Description
1	Waiting for USB Stick. If a stick is inserted then this indicates that the AlcoMeasure is unable to read the stick. Try cycling power to make sure.
2	Firmware Update was successful. Waiting for USB stick to be removed.
3	Firmware Update failed. If this message is given then the device may no longer function properly. Try the updating procedure again.
4	Cannot find firmware. The stick may contain the firmware file in the wrong format, or the stick may not be formatted to FAT32.

Table 1: Bootloader Error Codes

22.4 Possible Issues

Table 2 shows a list of possible issues that may be encountered when upgrading firmware.

If the firmware is being upgraded from a version that is OLDER than the version shown in column 1, then the issue described in column 2 may apply.

Firmware Version	Issue Description
1.0004	If any COM Ports are in use their BAUD rate will need to be reconfigured, as it will get set to a default value of 2400 BAUD. Also, make sure that no COM functionality is set to COMUSB. If this is set it will stop the AlcoMeasure from talking to AM Utility via the USB port.
1.0100	Formal Test mode is now a feature flag. If formal test was previously unlocked it will need to be unlocked again.

1.0518	Email over limit functionality now sends an email if the result is >= the Result Limit. This means that if the Result Limit was previously set to 0.000, it will need to be adjusted to 0.001 to avoiding getting an email for a zero test.
1.0704	Emails are now sent with a html body by default. If the client's email functionality required the body to be in plain text, this can be re-enabled by disabling the "HTML Report" option.

Table 2: Firmware Update Changes

23 Troubleshooting

The following section is intended to provide basic information to help you diagnose any problems or malfunctions you may have with your AlcoMeasure WM1. Troubleshooting is segmented into different sections with different severity levels, requiring various urgency in action to be taken. If in any circumstance the recommended action does not clear the warning message please contact your distributor.

23.1 AlcoMeasure Warning Messages

The following table describes the AlcoMeasure warning messages with recommended action to be taken for each message. These messages do not prevent the machine from operating however if action is not taken promptly, errors could arise.

Warning Message	Description	Action
Battery voltage is low.... please replace	The Real Time Clock (RTC) has reset, most likely due to the voltage of the on-board coin battery being low. Some other minor data may also be lost.	Replace the battery with a 3V CR1225 coin battery and reset the time. Note: If unit is powered on, there is no need to reset the time.
Printer cover is open.	The cover on the printer has not been closed correctly which puts the printer in an error state with the LED turned Amber.	Ensure that the cover has successfully closed and the LED has turned green.
Printer is out of paper.	The printer has run out of paper and will not be able to print any more results until it is replaced with a new roll.	Open the printer cover, remove the core of the empty roll and replace it with a new roll of paper. Close the printer cover and ensure the LED illuminates green.
You have exceeded this machines maximum reading of .330 g/210L	The reading which has just been detected is outside the range of the unit.	Wait 10 minutes and re-test.
Your result was higher than	The reading which has just been detected is outside the displayable value. This value is editable by the user.	Wait 10 minutes and re-test. If the maximum displayable value is set too low, change it to a higher value as described in section 11.5.

Periodic service due. Please contact Breathalyser Sales & Service on 1300 999 200	The unit is due for its periodic service.	Please contact Breathalyser Sales & Service on 1300 999 200

Table 3: AlcoMeasure Warning Messages

23.2 AlcoMeasure Error Messages

The following table describes the AlcoMeasure error messages with recommended action to be taken for each message. These messages will cause the machine to stop functioning and all required immediate action to be taken.

State	Error Message	Description	Action
1	Waiting for Recalibration to occur... Warming Up	The unit is required to calibrate and is just waiting for the sample system to achieve the target temperature and then stabilize before it begins the calibration routine. This will only occur if the unit has been turned off for more than 30 days.	Allow the unit up to 45 minutes to calibrate. If the message continues to be displayed after the 45 minute period, contact your distributor for further assistance.
2	Recalibration Failed. Please contact your distributor	The unit has failed its auto-calibration routine and is required to calibrate again.	Contact your distributor for further assistance.
3	Warming up. Please Wait...	The sample system is warming up to the target temperature.	Allow the sample system up to 15 minutes to warm up to the target temperature.
4	Sample System is over temperature....	The sample system has gone over the allowable temperature and is now in error state.	Ensure the unit is located indoors and in an air conditioned room. If the error message continues, contact your distributor for further assistance,

5	Liquid Detected..... recovering	Liquid has been detected within the sample system and a routine has begun in an attempt to disperse of this liquid.	Allow the unit to successfully complete its recovery routine. If the error message doesn't clear, please contact your distributor for further assistance.
6	Communication problem with Sample System	The communications between the processor board and the sample system	Ensure that the 6 way communications cable (PL13) between the processor board and sample system board is firmly connected, and that no wires have come loose from the connector at either end.
7	Sample System Serial Number doesn't match	The sample system serial number within the sample system does not match the value expected by the processor board. This will most likely occur when the sample system is replaced.	When a sample system is replaced the AlcoMeasure must be manually calibrated with the new sample system installed. Perform a manual calibration and check that the error message is no longer displayed. If the sample system has not been replaced, contact your distributor for further assistance.
8	Maximum days without recalibration. Please contact your distributor	The maximum amount of days (30) has passed since the last successful calibrate.	Please contact Breathalyser Sales & Service on 1300 999 200

9	Not Ready...	The unit is in a state in which it is not ready to take a sample.	If the device is in Free Test mode, wait until the Instruction Message is displayed before blowing into the device. If the device is not in Free Test mode, follow the Instructions in the Instruction message to initiate a test before attempting to blow into the device.
10,11	Out of service. Please contact your distributor	The unit is outside of its service period and needs servicing by your distributor.	Please contact Breathalyser Sales & Service on 1300 999 200
12	Waiting for Recalibration to occur…	The device has just started, and needs to auto-calibrate before it can be used.	Wait for recalibration to occur.
13	Sample System Failed. Please contact your distributor.	An error occurred while communicating with the sample system.	Power the AlcoMeasure, wait a few seconds, then power it on again. It should work as per normal. If the problem reoccurs, contact Breathalyser Sales & Service on 1300 999 200
14	Fuel Cell Timed Out. Please contact your distributor.	An internal error occurred while waiting for a result.	Please contact Breathalyser Sales & Service on 1300 999 200
15	Invalid firmware. Please install the correct version.	The hardware in this device is incompatible with the installed firmware.	A firmware version starting with 1.08 needs to be installed in this device.

16	Sample System Error. Please contact your distributor.	A critical error occurred with the sample system.	Please contact Breathalyser Sales & Service on 1300 999 200
17	Failed to reach operating temperature. Please contact your distributor.	The device was unable to reach a stable operating temperature within a reasonable amount of time.	Leave the device powered for 24 hours to see if it stabilises, or move it to a more suitable location. If this doesn't rectify the issue, contact Breathalyser Sales & Service on 1300 999 200
18	Invalid sample system. Please reconfigure	The device is not configured to use the installed sample system.	Please contact Breathalyser Sales & Service on 1300 999 200

Table 4: AlcoMeasure Error Messages

24 Warranty

LIMITED MANUFACTURER'S WARRANTY

During the period of twelve (12) months from the date of delivery of the products from the seller, or any authorised distributor, to the buyer, the seller will replace or repair any defective products without charge so long as the damage does not arise from:

1) improper adjustment, calibration or operation by the buyer;
2) the use of accessories including consumables, hardware, or software which were not manufactured by or approved in writing by the seller;
3) any contamination or leakages caused or induced by the buyer;
4) any modifications of the product which was not authorised in writing by the seller;
5) any misuse of the product by the buyer;
6) any use or operation of the product outside of the physical, electrical or environmental specifications of the products;
7) inadequate or incorrect site preparation; and
8) inadequate or improper maintenance of the product.

For purposes of this warranty, maintenance of the product should be carried by the authorised distributor in strict adherence to and in accordance with seller's instructions.

All transportation charges incurred in returning defective products, or any of its component parts, for repair, together with the cost of returning them to the buyer must be paid by the buyer.

This warranty does not extend to cover any damage or depletion to –

- the product's exterior, locks, consumables (e.g. calibration gas, straws, printer's paper and toner); or
- Sensitive Parts – which includes the "breath intake port" and fuel cell ("sensitive parts");
- nor to corrosion due to any cause nor to any damage to painted or anodized surfaces.

The Sensitive Parts included in the product carries a six (6) month limited warranty from the seller or its suppliers and this is the only warranty given to the buyer in respect of these parts of the product.

1. Subject to the Agreement and to the extent permitted by the Australian Consumer Law and relevant state legislation, the sole obligation of the seller under this warranty is to use its best endeavours to provide the products or to repair the products or repair or replace (at the seller's discretion) any part of a product which is found to be defective during the period of warranty and in no event shall the seller be liable for any other claims or damages including, but not limited to, claims for faulty design, negligent or misleading advice, damages arising from loss or use of the products, and any indirect, special or consequential damages or injury to any person, corporation or other entity.

2. If any products are supplied to the buyer as a 'consumer' of goods within the meaning of that term in the Australian Consumer Law as amended or relevant state legislation, the consumer will have the benefit of certain non-excludable rights and remedies in respect of the products and nothing in these terms and conditions excludes or restricts or modifies any condition, warranty, right or remedy which pursuant to the Competition and Consumer Act 2010 (Cth) or similar legislation is so conferred. However, as the product is a product not ordinarily acquired for personal, domestic or household use or consumption, pursuant to section 64A of the Australian Consumer Law the seller limits its liability to payment of an amount equal to the lowest of:
    1) replacing the goods or supplying equivalent goods;
    2) the cost of repair of the goods;
    3) the cost of having the goods replaced.
3. Subject to clause 2 the seller is not liable for default or failure in performance of its obligations pursuant to the Agreement resulting directly or indirectly from acts of God, civil or military authority, acts of public enemy, war, accidents, fires, explosions, earthquakes, floods, the elements, strikes, labour disputes, shortage of suitable parts, components, materials including ink, chemicals and paper, labour or transportation or any other cause beyond the reasonable control of the seller.
4. Subject to clause 2, the seller is not responsible for any loss caused by an error or defect in the products or errors or faults caused by the fuel cell, lack or calibration gas, failure to recalibrate the product sufficiently, or any other fault caused due to failure to the products' sensors or sampling methods. For the avoidance of doubt, the seller will not be held liable for any damage, direct or indirect, occurred to the buyer as a result of such failure in sampling their breath, wrong reading, or incorrect sampling.

"Agreement" means the agreement signed between the seller and the authorised distributor

"Authorised distributor" means Breathalyser Sales and Service Pty Ltd ACN 001 901 622

"Buyer" includes you, (if a company or another entity) its directors, managers, associates, employees, any other stakeholders, contractors, or agents.

"Product/s" means AlcoMeasure WM1, including its coin operated model and the AlcoMeasure WM1 with printer.

"Seller" means All-Systems Electronics Pty Ltd ACN 002 182 827