

Alpha Moisture Systems

Model SADPmini2 Dewpoint Hygrometer

2301 SADPmini2 User Manual



Contact Information

Head Office
Alpha Moisture Systems
Alpha House
96 City Road
Bradford
West Yorkshire
BD8 8ES
United Kingdom

Tel: +44 (0) 1274 733100

Email: info@amsystems.co.uk

Website: amsystems.co.uk

Office Opening Hours:

Monday - Thursday 8.30am - 5.30pm (UK TIME)

Friday 8.30am - 5.00pm

Saturday and Sunday - Closed



Authorised Distributor Contact Information

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1 Introduction


This User Manual is only for use with the instrument supplied. All information required for the safe and proper operational use of the instrument is contained here. Make sure you read and understand the information and instructions in the User Manual before using the instrument. Failure to operate the instrument as directed in this User Manual may:


- Impair the inbuilt safety protection offered by the instrument
- Expose personnel to risk of injury
- Cause damage to and/or impair the function of the instrument
- Invalidate the instrument warranty

1.1 Explanation of Prohibition, Warning and Note Symbols used

Local health and safety regulations should be observed as should the safety critical prohibitions, warnings and notes highlighted in this user manual.


DO NOT	
	Prohibited actions or behaviours

WARNING	
	Danger to personnel and/ or damage to equipment

NOTE	
	Additional information

1.2 Warranty

The SADPmini2 is supplied with a one-year warranty from the date of purchase. This warranty is subject to the proper operational use of the instrument and following the information provided in this User Manual. The instrument should not be repaired without prior inspection or authorisation by Alpha Moisture Systems or an authorised distributor. Any unauthorised alteration or misuse may invalidate the instrument warranty.

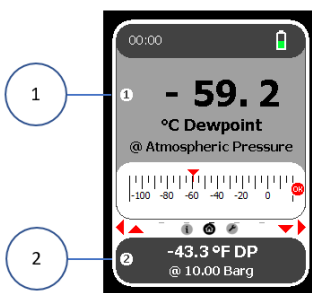
NOTE	
	Please retain the original equipment packaging so the SADPmini2 can be returned to Alpha Moisture Systems or your authorised distributor if required

1.3 Instrument Description

The SADPmini2 is a fully self-contained, micro-controller based, battery operated dewpoint hygrometer primarily used for mobile analysis and short term continuous monitoring. Using an ultra-high capacitance aluminium oxide sensor and a high accuracy, high speed, Analogue to Digital Converter (ADC), the SADPmini2 monitors dry industrial process gas and dry compressed air samples. Results are displayed on a colour Liquid Crystal Display.

The SADPmini2 is controlled via the Navigation Keypad. The display screen has two sections:

- A primary, upper section ① providing numerical, scrolling strip chart and horizontal moving coil configuration sample readouts.
- A lower secondary screen ② providing numerical sample readings in a secondary unit as required.



The display units of each section can be changed independently e.g. °C, °F, mg/m³, ppm(v), ppm(w), and lb/MMscf.

A single USB port charges the battery when connected to either a PC or a dedicated power supply. The USB port also allows firmware, calibration and set-up data transfer from dedicated User Tool PC software. Alternatively a removable SD Card allows data transfer between the SADPmini2 and PC using the User Tool software.

DO NOT	
	Do not substitute the SD Card supplied with this instrument

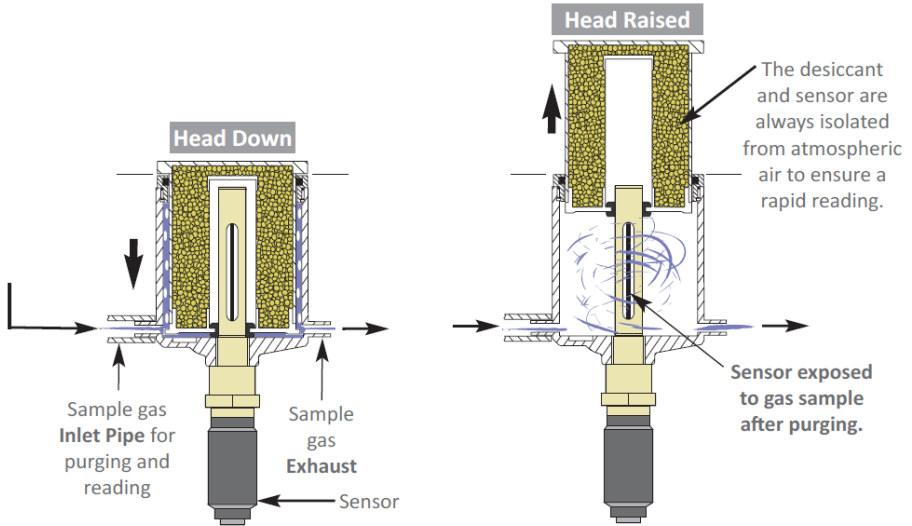
1.4 General Arrangement



1.5 Functional Description of Desiccant Chamber

Keeping the sensor dry between tests makes sure that the SADPmini2 is ready to carry out rapid sample checks. The design of the Desiccant Head achieves this by surrounding the Aluminium Oxide Sensor with desiccant, keeping the sensor dry when not in use.

A sample of the process gas or air is piped to the inlet port. The sample flows through the measuring chamber while the Desiccant Head remains in position over the Aluminium Oxide Sensor.






Restricting the continuous flow of the sample by closing off the opposite port causes a pressure increase inside the instrument which raises the Desiccant Head and exposes the Aluminium Oxide Sensor to the sample. When the desiccant chamber is fully extended the outlet flow restriction should be removed and the sample gas allowed to flow through to the measuring sensor. When measurement is complete, manually depress the desiccant chamber until it is fully closed. Disconnect the sample pipe from the instrument.

Between tests the sensor should not be exposed to ambient air. The chamber is designed so that the void space and chamber wall surfaces can be purged with sample gas before the sensor is exposed to the sample gas which allows the SADPmini2 to provide faster, more accurate and reliable results.

2 Important Information


2.1 Symbols Table

Symbol	Description
	<p>Lithium-ion Battery</p> <p>The SADPmini2 is powered by a single lithium-ion battery. The battery may be exchanged by an authorised agent with the necessary training, support systems and accreditation.</p> <p>Only use the USB power supply supplied with the instrument to charge the battery.</p> <p>It is recommended that the SADPmini2 be put on charge overnight prior to use</p>
	<p>Pressure Exposure</p> <div style="border: 2px solid red; padding: 10px; text-align: center;"> <p>The telescopic measuring head should not be exposed to more than 0.3 barg, 4 psig</p> <p>Exposing the measuring head to higher pressures may damage the instrument and result in injury to the operator or other personnel in the area.</p> </div>
	<p>USB Communication Performance</p> <p>Using the USB communication channel and charging power port within the instrument may result in not all connections to all USB ports on all PCs or laptops being entirely successful. Many USB ports, even within the same PC or laptop, differ from each other in electrical hardware or firmware implementations, whilst still broadly complying with the overall USB standards, giving rise to a variety of situations which may manifest in a reduced connection experience. It is recommended that if a port is not connecting as expected then the user should try an alternative port within the PC or laptop or employ a USB Hub device which would effectively isolate the problematic PC or laptop USB port from the instrument.</p>

2.2 Battery Information


The SADPmini2 uses a single lithium-ion battery (3.65 V nominal). The battery cannot be removed or replaced by the user. The instrument must be returned to an authorised agent for battery replacement. When the battery charge is low and/ or the battery is charging, the instrument display will be dimmed. If the battery is very low and the user tries to turn the instrument on, a battery low icon will be displayed and the instrument will shut down.



DO NOT	
	<p>Do not replace the battery. Only authorised agents should replace the battery.</p> <p>Do not open, crush, expose to heat above 50 °C or incinerate the battery. There is a risk of fire and burns.</p> <p>Only use the USB charging equipment supplied with the SADPmini2</p>

2.3 Cleaning and Decontamination

The instrument must only be cleaned with a soft cloth dampened with water.

DO NOT	
	<p>Do not use solvents, silicones or abrasives to clean the SADPmini2</p>

2.4 Information Screens

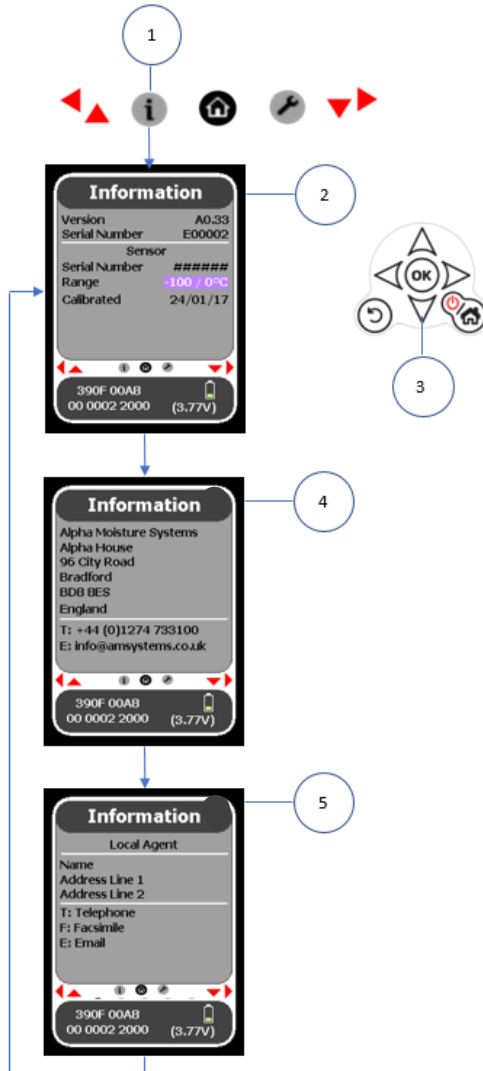
The SADPmini2 Information screens provide various instrument specification, manufacturer and authorised agent details. Information screens are for reference purposes only and do not provide any instrument functionality. To view the available Information Screens:

1. Select the Information icon ① from the Navigation Carousel to display the Information screen ②.
2. Using the navigation key ③ scroll through the screens ④ & ⑤ as required.

NOTE



Authorised distributor details will differ locally




3 Installation


This section details the sample specific SADPmini2 installation procedures and the instructions for obtaining the correct result from sample gas.


3.1 Gases to avoid

Corrosive Gases: The Sensor should not be exposed to corrosive gases (or corrosive contaminants in the gas sample) as these can chemically attack the sensor, impairing calibration accuracy and/or damaging it beyond economic repair. Examples of such gases are mercury (Hg), ammonia (NH₃), chlorine (Cl₂) etc. Strong oxidising agents such as ozone (O₃) should also be prevented from coming into contact with the sensor.

3.2 Gas Sampling System

DO NOT	
	Do not allow the sample pressure to exceed 0.3 bar / 4 psi above ambient

NOTE	
	To maintain sample integrity and minimise equilibration time the system should be as simple as possible and of minimum swept volume.


NOTE	
	The sample tube should be stainless steel for very dry gas applications. If any section of the pipework must be flexible, it is recommended that PTFE is used.

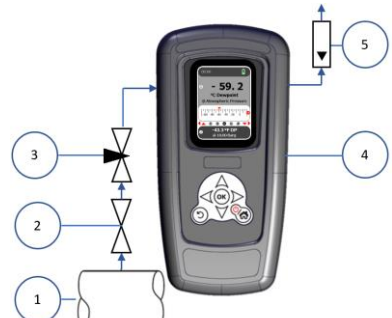
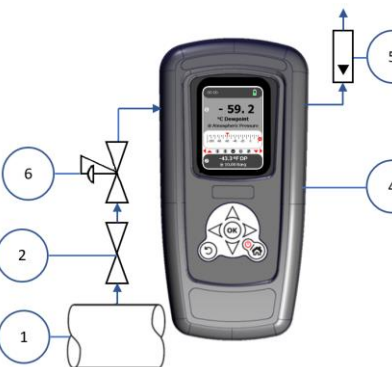
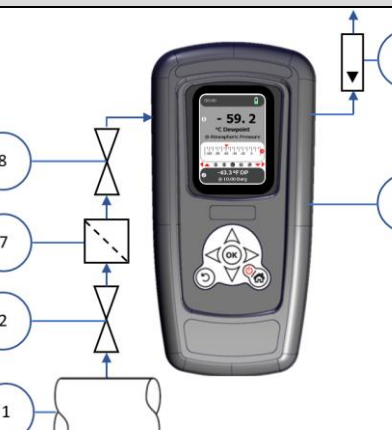
3.3 Installation Configurations

The installation configurations discussed cover the following sample scenarios:

- Clean gas < 10 bar
- Clean gas > 10 bar
- Particulate or liquid contamination


No.	Description
1	Process Line
2	Isolation Valve
3	Needle Valve
4	SADPmini2
5	Flow Indicator (Optional)
6	Pressure Regulator
7	Filter Unit
8	Needle Valve OR Pressure Regulator (depending on pressure of system)


WARNING	
	Make sure that the rubber SD Card and USB power protector bungs are installed during sampling to comply with IP65 (NEMA4X) protection

<p>Clean Gas < 10 Bar</p> <p>Reduce positive pressure gas to atmospheric pressure. Use a needle valve at low pressures (<10 barg) to control flow and pressure drop.</p>	 <p>The diagram shows a gas flow setup for pressures below 10 barg. It starts with a gas source (1) entering a sample bag (2). The gas then passes through a needle valve (3) to a sensor (4). The sensor's output is connected to a vent (5) at atmospheric pressure. The sensor screen displays a reading of -59.2.</p>
<p>Clean Gas > 10 Bar</p> <p>Reduce positive pressure gas to atmospheric pressure. Use a stainless steel, low swept volume pressure regulator at higher pressures (>10 barg).</p>	 <p>The diagram shows a gas flow setup for pressures above 10 barg. It starts with a gas source (1) entering a sample bag (2). The gas then passes through a pressure regulator (6) and a needle valve (3) to a sensor (4). The sensor's output is connected to a vent (5) at atmospheric pressure. The sensor screen displays a reading of -59.2.</p>
<p>Particulate/ Liquid Contamination</p> <p>Filter all particulate matter. Use a coalescing filter (with drain) for liquid condensate samples. Hygroscopic particulates and liquid condensate will slow the achievement of equilibrium and delay the final result. Hygroscopic liquid (such as glycol) may accentuate the buffering effect (as above) and render the sensor too slow to use. Install the filter as close to the sample point as practical.</p>	 <p>The diagram shows a gas flow setup designed to handle particulate and liquid contamination. It starts with a gas source (1) entering a sample bag (2). The gas then passes through a coalescing filter (7) with a drain, followed by a needle valve (3) to a sensor (4). The sensor's output is connected to a vent (5) at atmospheric pressure. The sensor screen displays a reading of -59.2.</p>

3.4 Installation and Sample

1. Install the sample piping system and equipment as per the required installation configuration.
NOTE: The SADPmini2 is not connected to the inlet piping system at this stage.
2. Open the sample Isolation Valve and adjust the needle valve/ regulator to allow a flow of 5-15 litres per minute to atmosphere through to sample pipe.
3. Allow the gas to flow through the sample pipe for 2 minutes to purge the system.
4. After ensuring that the sample gas is clean and dry connect the sample pipe to the instrument.
NOTE: The orientation of the ports is not important.
5. When the sample flow is low or very dry gas is being measured connect a >20 cm pipe to the outlet port to prevent back diffusion.

WARNING	
	Failure to purge the system may expose the SADPmini2 to residual moisture and/ or liquid or particulate damage. Use white/ filter paper to check for dust or oil mist in the sample

WARNING	
	Do not exceed a flow rate of 20 litres per minute

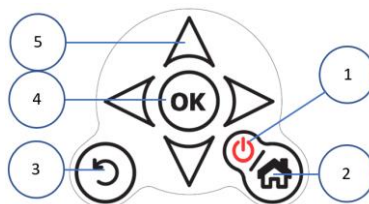
6. Allow the gas to flow through the SADPmini2 for two minutes.
7. Press the power button on the SADPmini2 and ensure that the sensor is 'dry'.
8. Block the instrument outlet, e.g. cover with a finger and allow the Desiccant Head to extend fully.
NOTE: Do not lift the Desiccant Head manually as this will draw ambient air into the sample chamber and produce a false reading.
9. Unblock the outlet and allow the gas to flow through the sensor.
10. The displayed reading will rise until the sensor is in equilibrium with the sample gas.
11. When the displayed reading has settled record the final reading.
12. When completed manually depress the Desiccant Head fully.
NOTE: It is important to make sure the Desiccant Head is depressed fully when the instrument is not in use to prevent the sensor and desiccant material becoming saturated.
13. Close the sample Isolation Valve.
14. Press and hold the power button for two seconds to switch off the SADPmini2.
15. Disconnect the sample pipework from the SADPmini2.

4 Instrument Use

The SADPmini2 is designed for quick start-up and ease of use. This section details how to power up the instrument and how to use the Navigation Keypad to access the different instrument displays and functions.

4.1 Powering Up the Instrument

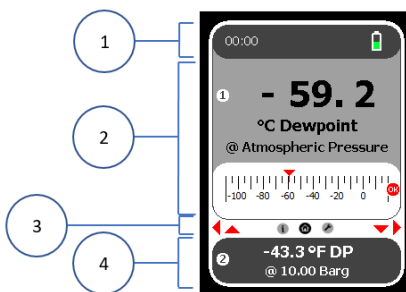
No.	Description
1	Power ON/ OFF Press to switch ON Press and hold to switch OFF
2	Home Key (returns to Home screen) Press Home Key to exit power saving Mode (no activity for 10 min.) Current screen re-activated
3	Back (to previous screen)
4	OK (confirm desired selection)
5	Navigation keys (move between screens)



4.2 Start Up Screen

After displaying the Splash screen, the SADPmini2 will display the following screen on start up.

No.	Description
1	Status bar (Time and battery status)
2	Upper Section of Screen (Main Unit/Analogue scale)
3	Navigation Carousel
4	Lower Section of Screen (Secondary Units display, additional information)

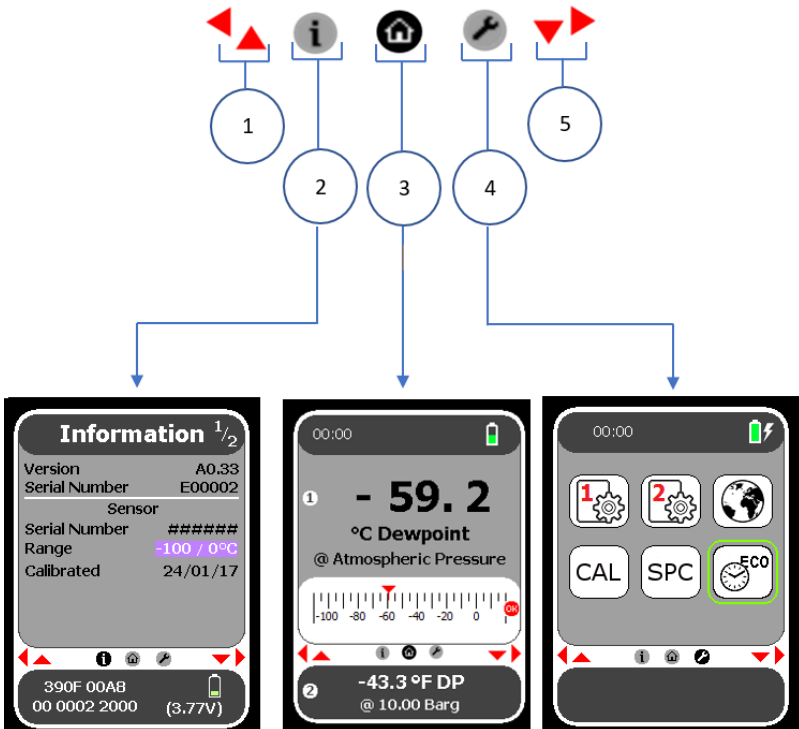


4.3 Navigation Carousel

The different instrument functions are accessed using the Navigation Carousel. Navigation icons on the carousel relate to the three different screen options available. The Navigation arrows displayed to the left and right of the Navigation Icons indicate the other screens that can be accessed after selecting one of the three Navigation icons.

No.	Description
1	Navigation Keys (left and up)
2	Information (icon)
3	Home (icon)
4	Settings (icon)
5	Navigation Keys (right and down)

Selecting an icon on the Navigation Carousel will display the associated screen.



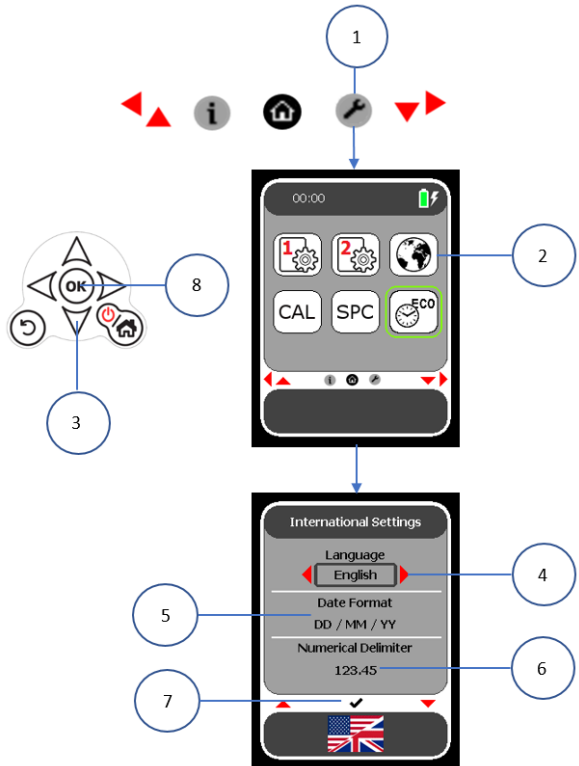
5 Instrument Settings

The SADPmini2 is despatched with client specific factory settings pre-installed. However, it may be necessary to adjust these settings periodically. Settings can be adjusted by using either the:

- Navigation keypad to directly input the setting changes into the instrument
- PC User Tool software to update the instrument settings via a USB

5.1 Setting the Language, Date and Delimiter Display: Navigation Keypad

1. Select the Setting icon from the Navigation Carousel ① to display the Settings screen.
2. Select the International Settings icon on the Settings screen ②.
3. Using the navigation keys ③ select the required language ④.
4. Using the navigation keys select the required date format ⑤.
5. Using the navigation keys select the required Numerical Delimiter format ⑥.
6. Using the navigation keys select/ highlight the Blue tick ⑦.
7. Select OK ⑧ to save the settings.




NOTE

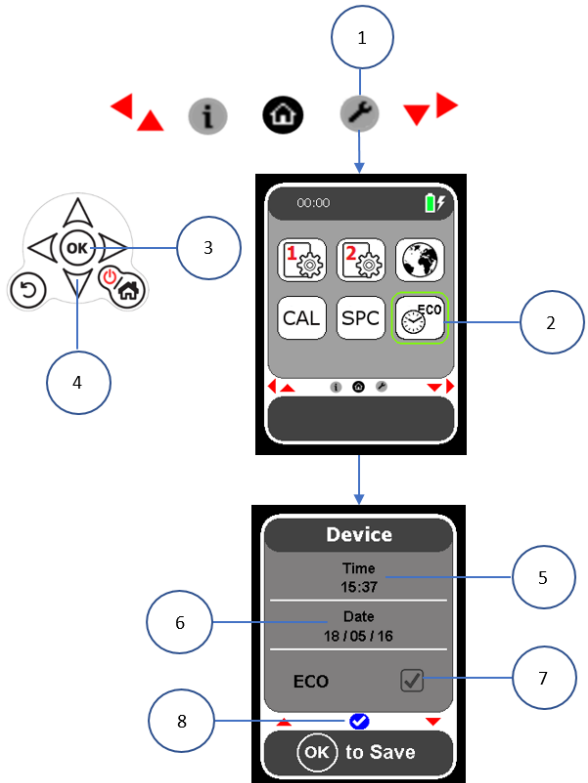


The language selected is displayed in the dialogue box and as a flag at the bottom of the screen

5.2 Setting the Time, Date and Power Saving Mode (ECO): Navigation Keypad

NOTE	
	<p>To save power and extend the battery life, the SADPmini2 has a power saving mode (ECO). When the ECO setting is enabled, the display will dim after 10 minutes and turn off after a further 30 minutes. When not enabled the display will not dim and the unit will remain active using normal power</p>

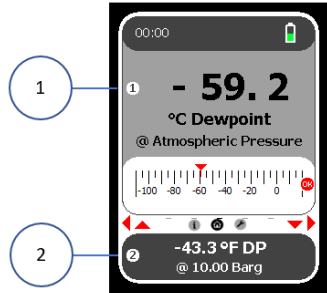
1. Select the Setting icon from the Navigation Carousel ① to display the Settings screen.
2. Select the Time/ Date and ECO icon ② on the Settings screen.
3. Select OK on the navigation keypad ③.
4. Select OK ③ again to access the time display.
5. Using the navigation keys ④ set the time ⑤.
6. Select OK (3) to save the time setting.
7. Using the navigation keys ④ highlight the date display ⑥.
8. Select OK ③ to access the date display.
9. Using the navigation keys ④ set the date.
10. Select OK ③ to save the date setting.
11. Using the navigation keys ④ highlight the ECO display ⑦.
12. Select OK ③ to enable/ disable the ECO
13. Select the navigation down key ④ to display a blue tick icon ⑧.
14. Select OK ③ to save the time/ date and ECO settings.



5.3 Notes on the Correct Use and Choices of Moisture Measurement Units

The SADPmini2 has two display screens:

- A primary, upper screen ① providing numerical, scrolling strip chart and horizontal moving coil configuration sample readouts.
- A secondary screen ② providing numerical sample readings in an alternative unit if required.



Dewpoint °C or °F

For moisture measurement indication in units of Dewpoint °C or °F the pressure at which the measurement is required to be indicated is also required. Please note that the instrument has been calibrated at atmospheric pressure and care must be exercised when choosing other engineering Units involving Gauge pressures such as barg and psig. You may select either 'atmospheric pressure' or one of four pressure engineering units along with the value of the system pressure. Absolute units of kPa and kg/cm² are also available. When selected, the main or secondary display screens will display the pressure at which the Dewpoint reading is being calculated.

The pressure units and value can be set differently for the Main and Secondary units. Note For calculation and data entry reasons the pressure range is from vacuum to 500 bar (and equivalent units), however, the device still operates at atmospheric pressure.

Other Units

There are four other Moisture Measurement Units available, which are all either pressure independent (because they are concentrations) or must be quoted at atmospheric pressure and hence do not feature the need to specify the pressure at which the indicated measurement is to be calculated.

ppm(V)

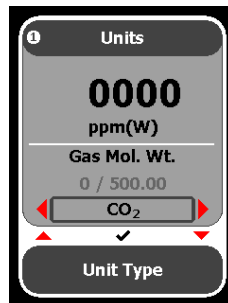
Moisture concentration expressed as parts per million by volume.

ppm(W)

Moisture concentration expressed as parts per million by weight when referencing the gas in which the moisture is being measured. The SADPmini2 default setting is for air (molecular weight 28.99) however, this function allows the molecular weight to be set appropriately for other gases.

There are other pre-sets available for Carbon Dioxide, Ethylene, Hydrogen, Methane, Nitrogen, Oxygen and Sulphur Hexafluoride.

The choice of gas applies to moisture concentrations indicated in both Main and Secondary display.



mg/m³

Moisture concentration expressed as milligrams per cubic metre.

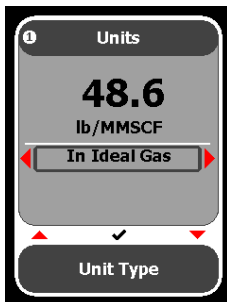
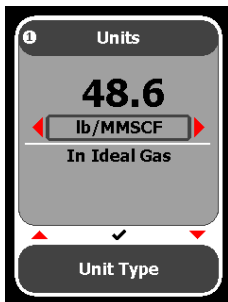
Often referred to absolute humidity when expressed as SI units kg/m³

lb/MMscf

Moisture concentration expressed as pounds per million standard cubic feet.

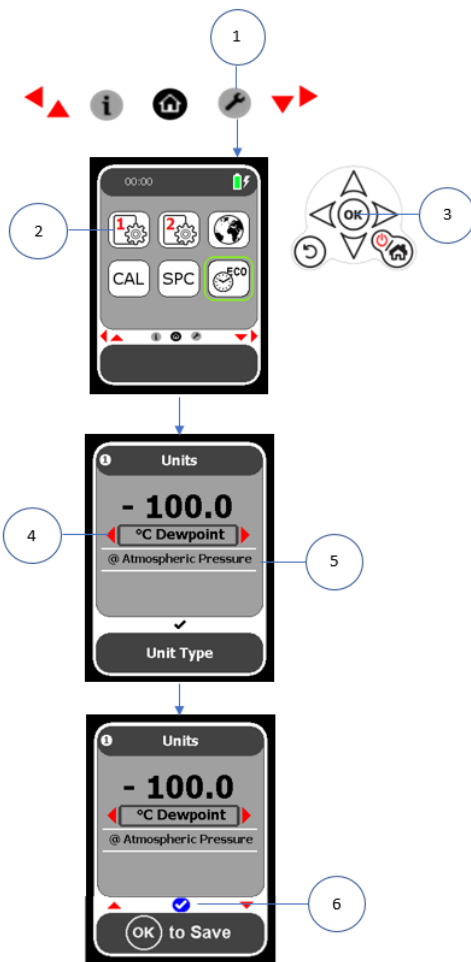
Often referred to absolute humidity when sometimes expressed as lb/ft³

Within this unit choice option there exists an option to further refine the indicated reading calculation by selecting either Ideal gas behaviour (Magnus) or Natural Gas (Bukacek correlation). The choice of calculation method applies to moisture concentrations indicated in both Main and Secondary display.




5.4 Setting the Main and Secondary Screen Units: Navigation Keypad

1. Select the Settings icon ① from the Navigation Carousel to display the Settings screen.
2. Using the navigation keys select either the main ② or secondary screen unit setting ③.
3. Select OK ④.
4. Using the navigation keys select the main screen units ⑤ as required.
5. If Dewpoint units are chosen (i.e. °C or °F) then the required pressure dewpoint must be selected. Choose either “Atmospheric Pressure” or alternative pressure dewpoint units and pressure value entered in data entry box ⑥.
6. Select OK ④.
7. Select the lower navigation key to display the blue tick ⑦.
8. Select OK ④ to save the settings.

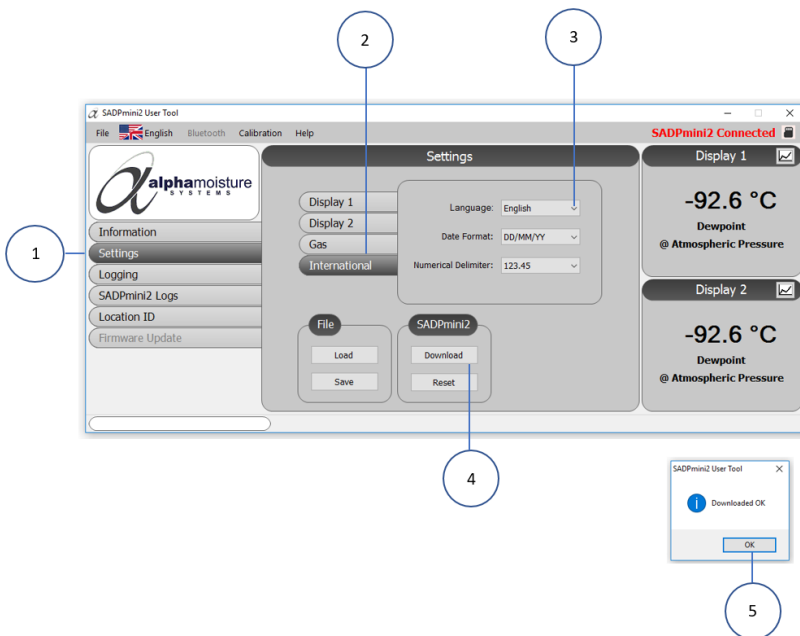


5.5 Instrument Settings using PC Tool

NOTE	
	The instrument settings may be changed by use of the supplied PC Tool software either over a USB communication channel. To install PC Tool please refer to Appendix C of this manual.

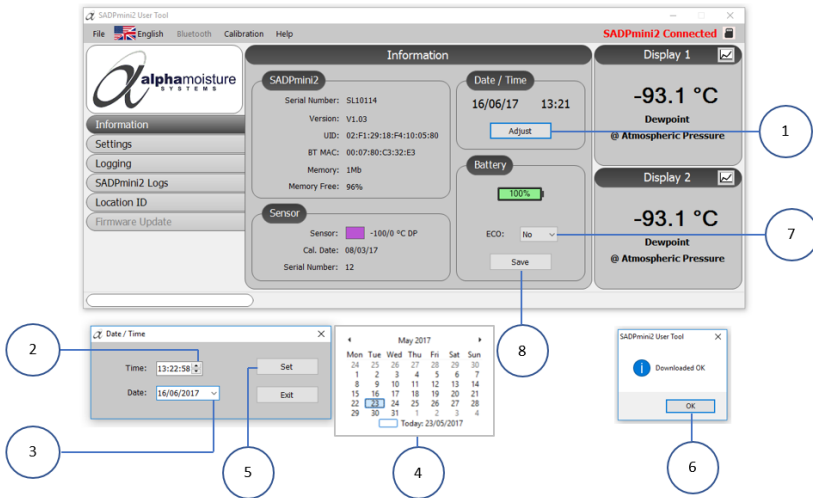
5.6 Setting the Language, Date and Delimiter Display: User Tool

1. Select the Settings tab **①**.
2. Select the International tab **②**.
3. Select the required language, date and Delimiter display formats from the dropdown menu **③**.
4. Select Download **④**.
5. Select OK **⑤** on the Download dialogue box to download the international settings to the SADPmini2.



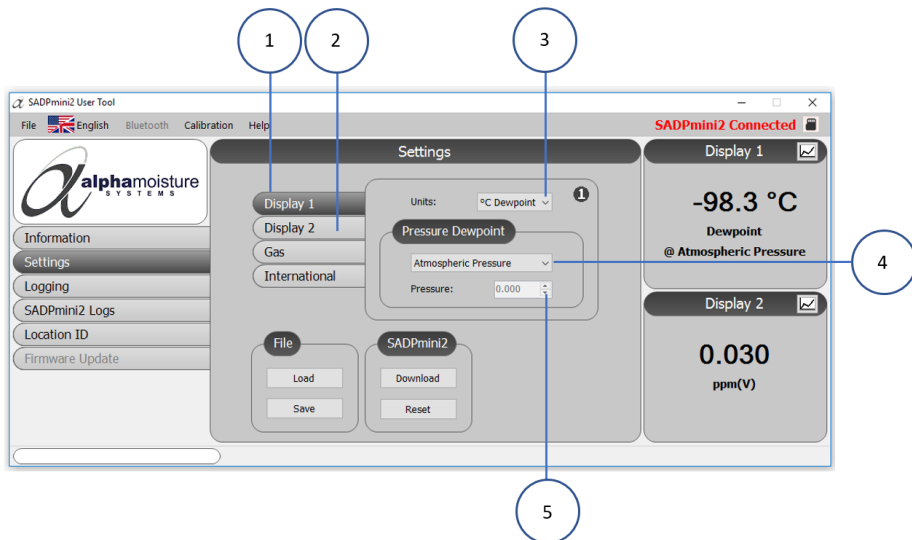
5.7 Setting the Time, Date, and Power Saving Mode (ECO): User Tool

1. Select the Date/ Time Set key ①.
2. Using the arrows ② set the correct time.
3. Using the arrow ③ select the drop-down calendar ④ and set the date.
4. Select Set ⑤ to confirm settings.
5. Select OK ⑥ on the Download dialogue box to download the date and time settings to the SADPmini2.
6. Using the arrow ⑦ select the ECO enabled (No/ OFF: Yes/ ON).
7. Select the Save ⑧ to save the settings.
8. Select OK ⑥ on the Download dialogue box to download the ECO setting to the SADPmini2.



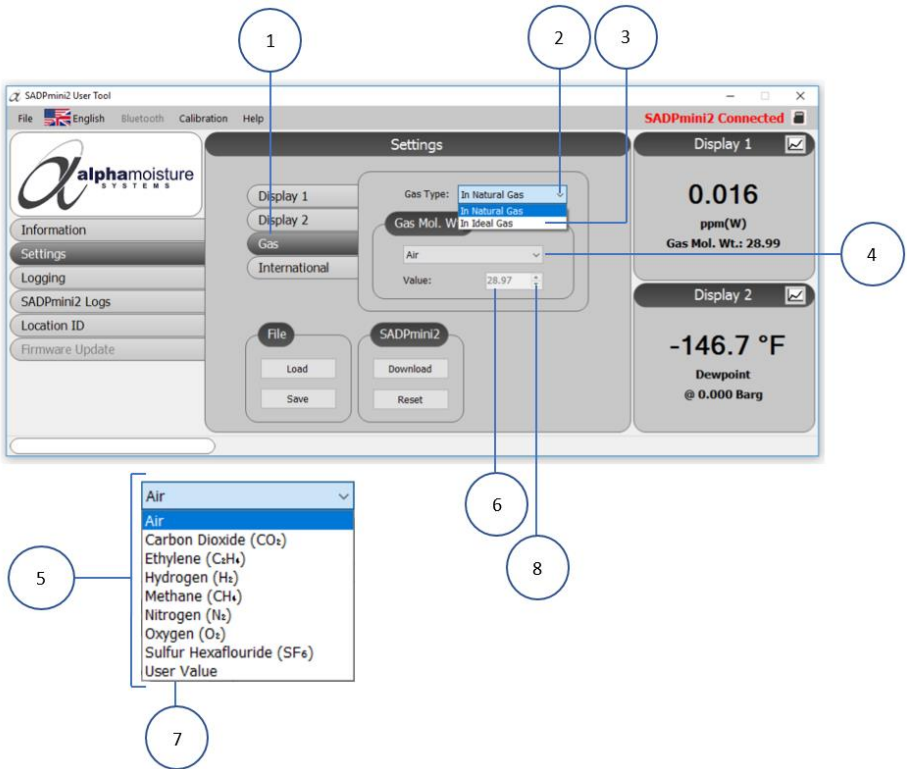
5.8 Setting the Main and Secondary Screen Units: User Tool

1. Select Display 1 ① or Display 2 ② as required.
2. Select the required Moisture Units from the drop-down menu ③.
3. If Dewpoint units are chosen (i.e. °C or °F) then the required pressure dewpoint must be selected. Choose either “Atmospheric Pressure” from the drop-down menu ④ or alternative pressure dewpoint units and pressure value entered in data entry box ⑤.



5.9 Setting the Gas Type: User Tool

1. Select the Gas tab ①.
2. Select, In Natural Gas ② or In Ideal Gas ③ as required.
3. Select the Gas Molecular Weight drop down menu ④.
4. Select the required gas type ⑤. **NOTE:** The User Tool software automatically sets the Molecular Weight parameter for the selected gas ⑥.
5. To use alternative Molecular weights (perhaps for other gases) please select User Value ⑦ from the drop down box. The weight may then be entered in the data entry box ⑥ or by using the up down editing arrows ⑧.




NOTE



The choice of gas and calculation method applies to moisture concentrations indicated in both Main and Secondary display

6 Calibration

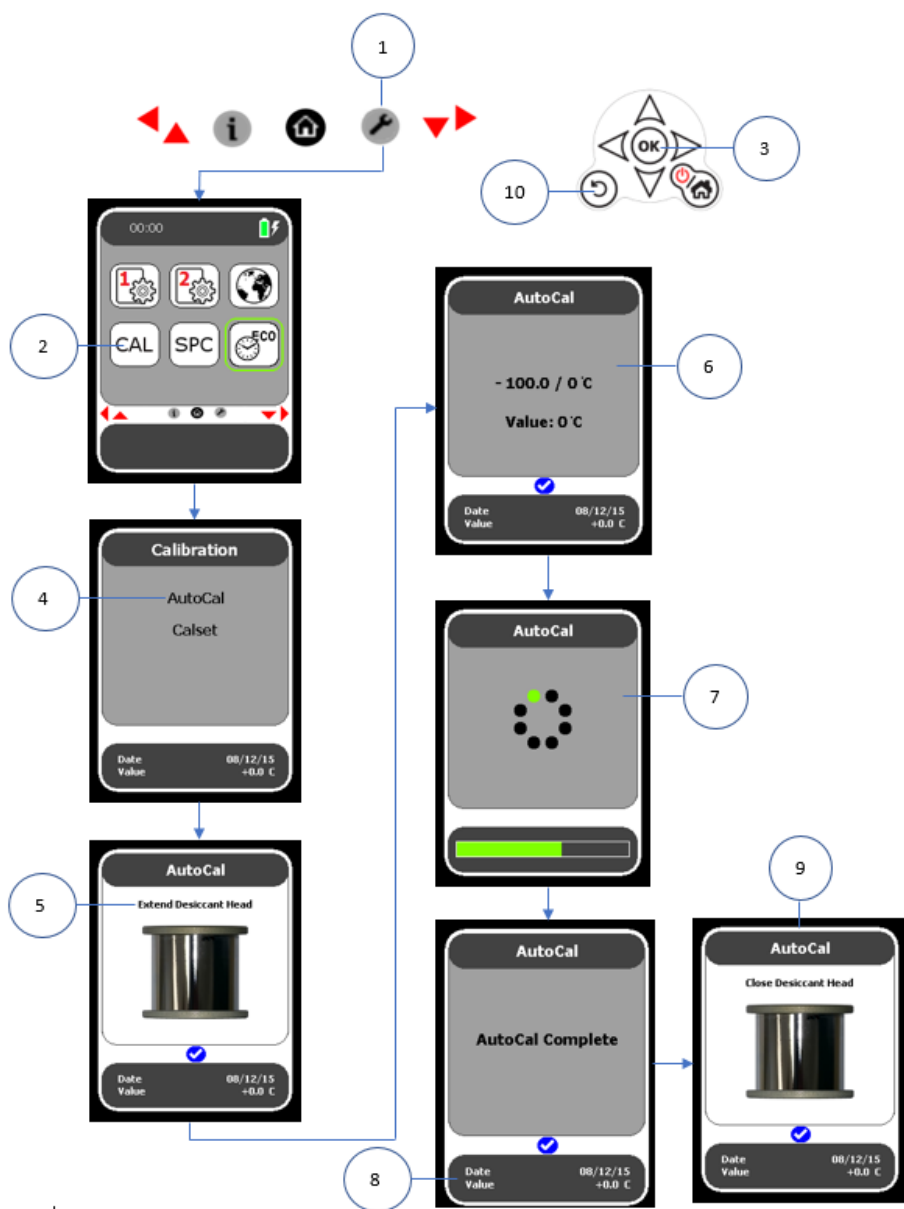
Field verifications of the range span may be performed periodically, every two to three months, to ensure correct operation between laboratory calibrations and correcting for any deviation. These functions can also be used to verify operation of the instrument if confirmation of an unexpected result is required.

NOTE	
	Time and Date must be set prior to calibration because the Time and Date of the calibration is saved with the calibration data

6.1 AutoCal

The AutoCal facility uses the fact that each sensor is designed and manufactured to give no further increase in response when it reaches its maximum moisture level. For example, a SADPmini2 with a full-scale value of 0 °C dewpoint will read 0 °C dewpoint when exposed to a gas with this moisture concentration and will continue to read 0 °C dewpoint as the moisture concentration rises above 0 °C dewpoint. The SADPmini2 can therefore be adjusted to read 0 °C dewpoint on any gas with a moisture concentration wetter than 0 °C dewpoint, ambient air for instance, thus setting the span to match the original calibration.

1. Select the Settings icon (1) from the Navigation Carousel to display the Settings screen.
2. Using the navigation keys highlight the CAL settings (2).
3. Select OK (3) to display the Calibration screen. **NOTE** the AutoCal dialogue (4) box will be highlighted automatically.
4. Select OK (3) to access the AutoCal function.
5. Extend the Desiccant Head as shown (5).
6. Select OK (3).
7. Select OK (3) to start the AutoCal procedure (6).
8. The SADPmini will display the AutoCal procedure in progress (7) and AutoCal procedure complete screen (8) when finished.
9. Select OK (3).
10. Close the Desiccant Head as shown (9).
11. Select BACK (10) twice to return to the Settings Screen.

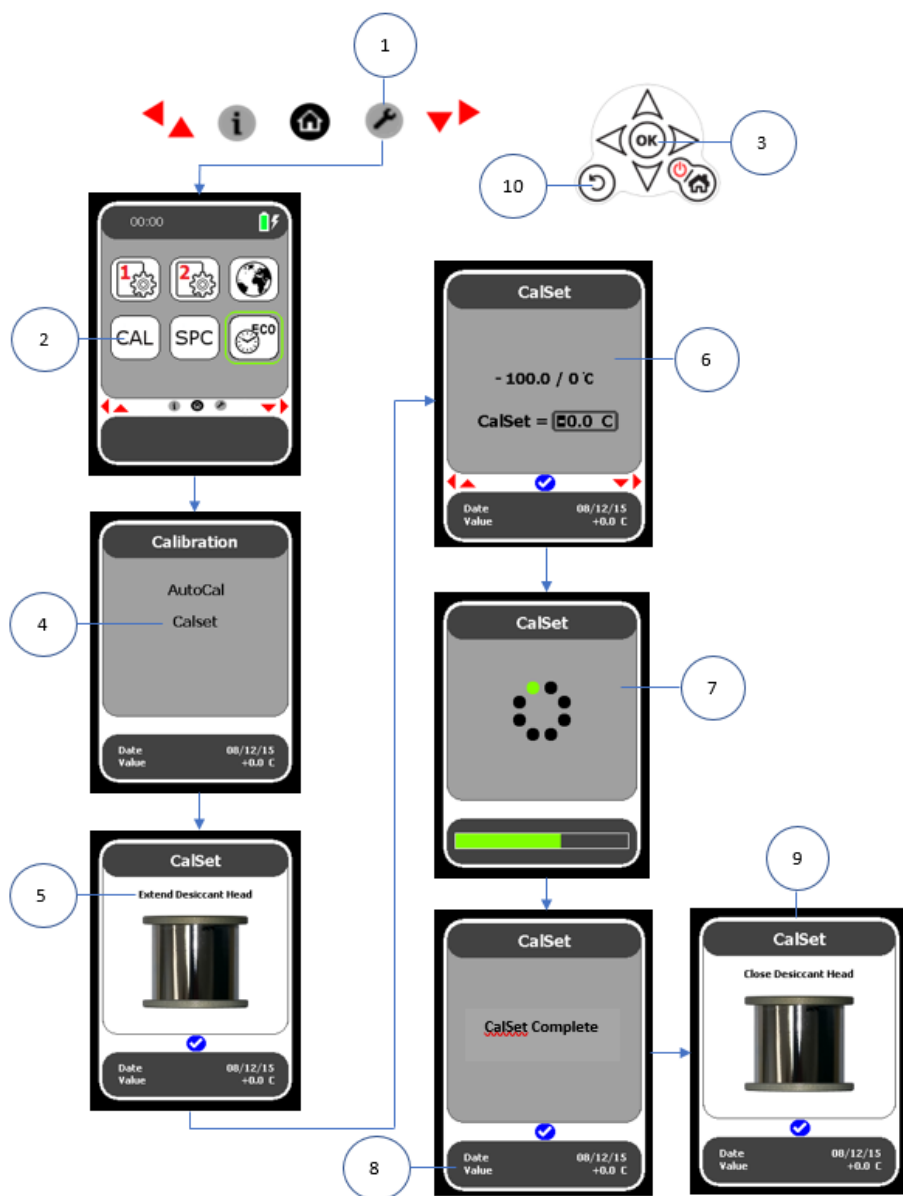


6.2 CalSet


The instrument may be checked against a known moisture level, for example a reference standard, such as a chilled mirror hygrometer or a psychrometer using the function CalSet. This procedure is particularly useful when calibrating a Blue Spot sensor (-80°C to + 20°C) where the wettest end of the range is usually above normal ambient conditions.


For the CalSet procedure the user must enter the dewpoint of the gas the sensor is exposed to. Using the current calibration curve, the software calculates the target gain at this point.


















1. Select the Settings icon ① from the Navigation Carousel to display the Settings screen.
2. Using the navigation keys highlight the CAL settings ②.
3. Select OK ③ to display the Calibration Screen ④.
4. Use the navigation keys to highlight the CalSet function ④.
5. Select OK ③.
6. Extend the Desiccant Head of the SADPmini2 as shown ⑤.
7. Select OK ③.
8. Using the navigation keys input the CalSet value ⑥.
9. Select OK ③ to start the CalSet procedure.
10. The SADPmini will display the CalSet procedure in progress ⑦ and CalSet procedure complete screen ⑧ when finished.
11. Select OK ③.
12. Close the Desiccant Head of the SADPmini2 as shown ⑨.
13. Select BACK ⑩ to return to the Settings Screen.

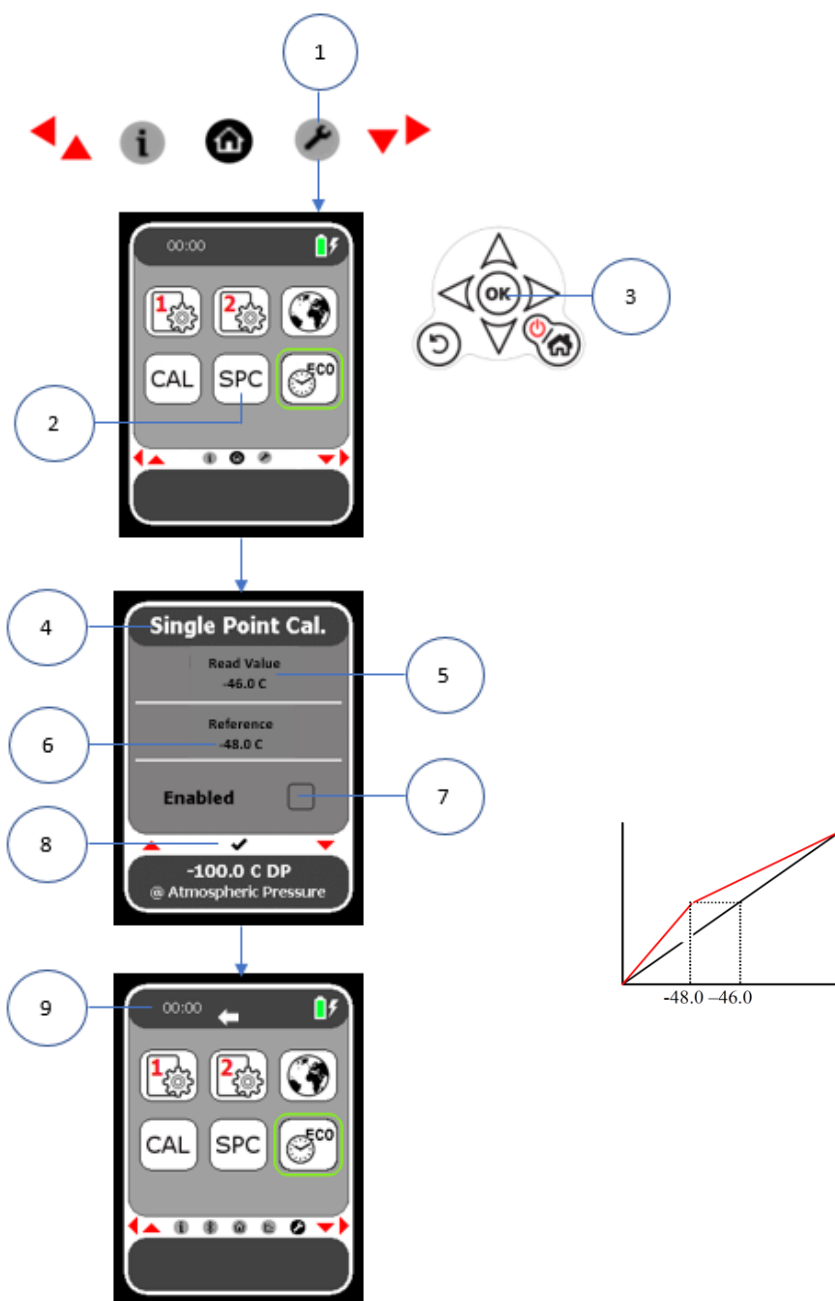


6.3 Single Point Calibration (SPC)

NOTE	
	The SPC facility allows users to check the reading of the instrument against a “standard reference gas” or instrument, such as a chilled mirror unit, at a particular value that may be considered to be critical, and make any adjustment necessary to give agreement with that “standard reference.” Rather than making the adjustment to the span of the instrument, as with AutoCal, the SPC adjustment is made by introducing a two-part straight-line response curve with a break point at the set point, or “standard reference.”

NOTE	
	An AutoCal must be carried out before performing an SPC

1. Measure the value of the reference gas with the instrument in the normal way allowing the instrument to reach equilibrium and note the indicated value and the stated value of the “standard reference.”
[For example, the instrument reads -46°C dewpoint, and the “standard reference gas” is certified by the gas supplier as being -48°C dewpoint].
2. The instrument can now be removed from the gas sample, to conserve the reference gas.
3. Select the Settings icon  from the Navigation Carousel to display the Settings screen.
4. Using the Navigation keys highlight the SPC setting .
5. Select OK  to display the SPC screen . **NOTE:** The Read Value  dialogue box will be automatically highlighted.
6. Select OK .
7. Using the navigation keys input the required Read Value .
8. Select OK  to exit.
9. Using the navigation keys highlight the Reference dialogue box .
10. Select OK .
11. Using the navigation keys input the required Reference .
12. Select OK  to exit.
13. Using the navigation keys highlight the SPC Enabled/ Disabled dialogue box .
14. Select OK  to enable or disable SPC. **NOTE** the secondary screen reading changes.
15. Using the navigation keys display the blue tick .
16. Select OK  to save the SPC settings. The SADPmini2 defaults to the Settings screen .



Appendix A
Instrument Specification

A1: Instrument Specifications

Description	Specification
Accuracy	±2 °C dewpoint
Type	Battery powered dewpoint hygrometer.
Dimensions	108mm (4.252") width 215mm (8.465") height 127mm (5") depth
Weight	1.75 kg (3.8 lbs)
Display	Full colour graphics 240 x 320 resolution display.
Power Supply	Single lithium-ion battery (3.65 V nominal).
Sampling	Pressure: Atmospheric with flow rate of 5-15 litres/minute.
Operating Temperature	-20 °C to +50 °C
Storage Temperature	-20 °C to +50 °C
Operating Humidity	95% RH non-condensing
Calibration	Factory calibration traceable to UK national and International Standards

Appendix B
Trouble Shooting

B1: Trouble Shooting

Fault	Possible Explanation	Action	Notes
Unit does not turn on, screen remains blank and LCD back light is not illuminated	Battery low level	Connect the supplied power supply unit for a minimum of 12 hours charging to achieve full charge	
Unit fails AutoCal with Sensor Open Circuit Error displayed or Instrument indicates lower limit	It may be that an internal wiring fault has occurred	Perform AutoCal again, ensuring that the desiccant head is fully extended	If action fails contact your authorised distributor
Instrument will not dry down to lower limit	Desiccant Sieve wet	Perform service on unit using Service Kit	Service Kit available from your authorised distributor
	Sealing 'O' ring failure	Perform service on unit using Service Kit	
Battery has short life between charges	Battery reaching end of useful life	Contact your authorised distributor	
Navigation Keypad fails to react to user key presses	The keypad may be damaged or an internal wiring fault has occurred	Contact your authorised distributor	
Fails to connect PC on USB Channel	Cable damaged or cable too long.	Change Cable	
General Error in operation		Send a SADPmini2 Report to your authorised distributor (See Appendix D5)	

Appendix C
User Tool Software Installation and Guidance

C1: User Tool Software Installation

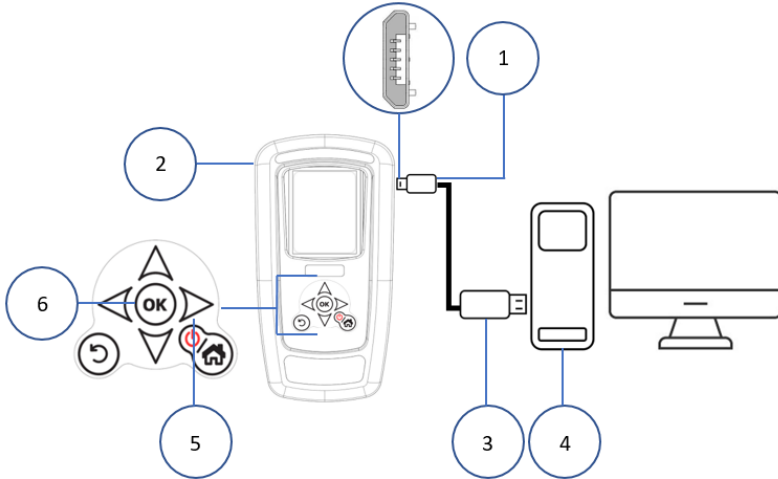
The SADPmini2 is supplied with dedicated User Tool software stored on the Micro SD Card. The software installation file may also be delivered by other means such as CD, DVD, flash drive, email attachment or internet download. The installation from the Micro SD card method is described here.

The user must first ensure that they have the necessary permissions within the Windows environment and administrative privileges otherwise they might not be able to install software.

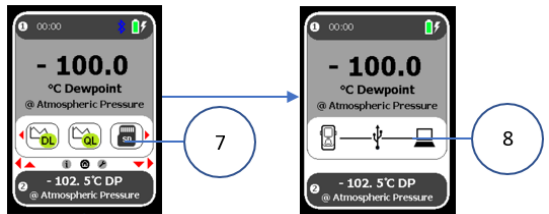
The software is compatible with Windows version XP (SP3), Vista, 7, 8 and 10.

The software provides access to instrument features which enable the user to adjust settings and transfer information via a USB connection.

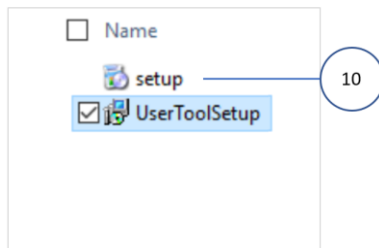
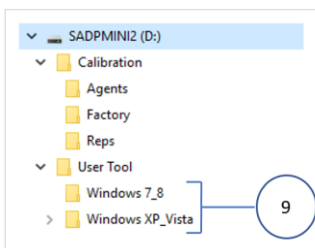
1. Install the USB cable end ① on the SADPmini2 ②.
2. Install the USB cable end ③ on the PC ④.
3. Press the power key ⑤ on the SADPmini2.
4. Press the OK key ⑥ on the SADPmini2.



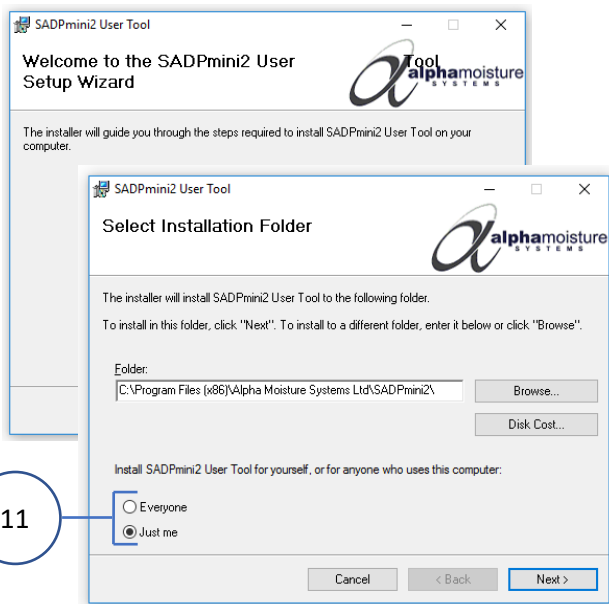
5. Press the OK key ⑥ again to display the SD Card connection.
 6. Select the SD Card icon ⑦ using the navigation keys.
 7. Press the OK key ⑥ to open the connection. The SADPmini2 USB to PC transfer screen will be displayed ⑧.
- NOTE:** There may be a short delay as the PC installs the driver.

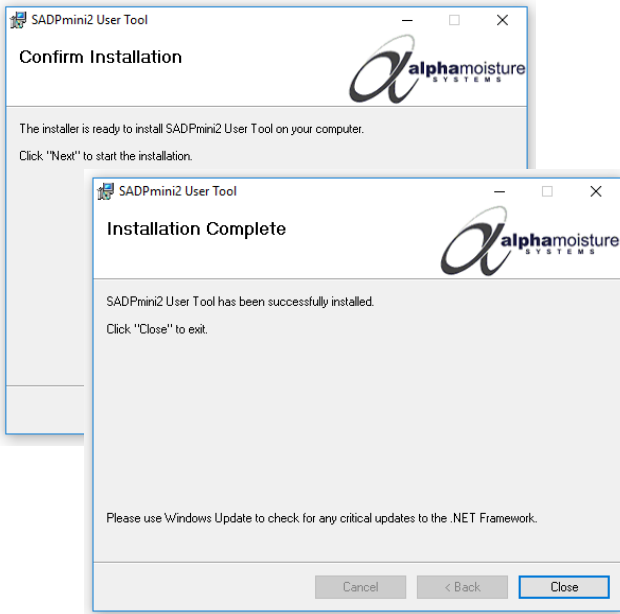




8. Select the required operating system installation version ⑨ for your PC.
9. Select the User Tool Setup icon ⑩ from the list.



10. Follow the SADPmini2 User Tool software installation prompts selecting the desired options ⑪ as required.








NOTE	
	<p>A PC restart is not normally required. A SADPmini2 User Tool launch icon (shown below) will appear on the PC desktop at the end of the installation process</p> <div style="text-align: center;"></div>


Selecting the User Tool icon on the desktop opens the User Tool software.

C2: User Tool Software Guide

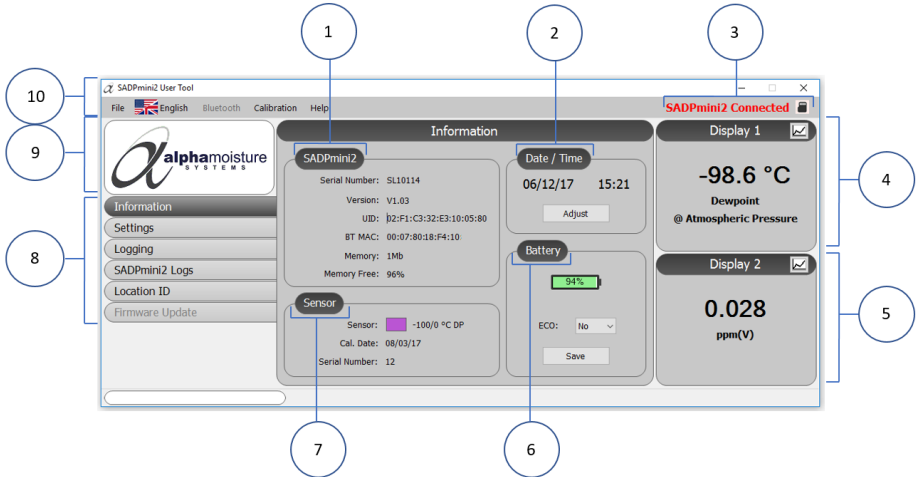
NOTE	
	It is recommended you do not connect/disconnect other devices e.g. mobile phones, portable drives etc. whilst connecting or working with the instrument as this may cause the instrument to lose/break the connection with the PC

NOTE	
	For the best visual appearance, it is recommended that the PC display text and icons option is set to default rather than medium or larger . (Microsoft font sizes/ desktop font sizes)

NOTE	
	The SADPmini2 keypad is locked when USB connected. All instructions are User Tool generated and can be downloaded to the SADPmini2

NOTE	
	Removing the USB cable during download/ data transfer may result in lost and/ or damaged data

On launching, the User Tool software will briefly display a splash screen with the manufacturer and software version number before displaying the Information screen below.



No.	Description
1	SADPmini2 instrument Overview: Serial Number, Firmware version, memory fitted (Mb), memory free (%) Unique Identification Number of Instrument
2	Date and Time
3	SADPmini2 connection status and SD Card access icon
4	Main screen display: Live mirror display of SADPmini2 main screen with graph display function
5	Second screen display: Live mirror display of SADPmini2 second screen with graph display function
6	Battery: Battery charge status icon, ECO setting box and save
7	Sensor: Range, calibration date, serial No.
8	Screen Tabs to navigate to other sections of the User Tool Software.
9	Alpha Moisture Systems website link for connected PCs
10	Headings Menu: File (for access to Instrument Report Generation, Firmware Update), Language (User Tool language selection), Calibration file selection.

Setting the User Tool Language

Select the language tab ① from the Headings Menu.

Select the required language from the drop-down menu.

The User Tool will now display information in the selected language.

NOTE: The language on the SADPmini2 will not change.



Appendix D
Firmware Maintenance

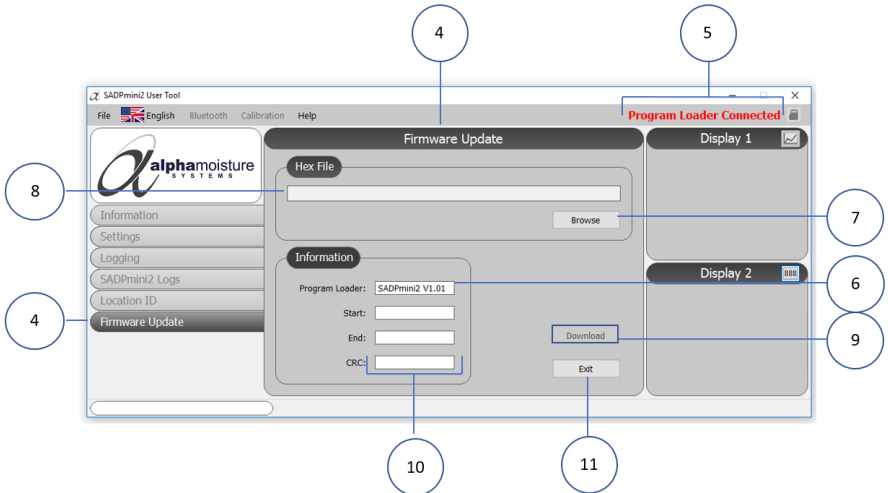
D1: Firmware Update

Instrument firmware updates may be distributed as email attachments. Users should save the firmware update file from the email to a location on their PC before updating their instrument. NOTE: Firmware files are Hex files (*.hex).

1. Select the File tab from the headings menu ①.
2. Select Program Loader ②.
3. Select Yes/ No ③ to confirm or quit.




4. **NOTE:** If Yes is selected the Firmware Update screen will be displayed (4). All other User Tool Functions are disabled.
5. Program Loader Connected will be displayed (5).



The Program Loader screen will also be displayed on the SADPmini2 Instrument screen and the version of Program Loader software running on the instrument will be displayed (6).

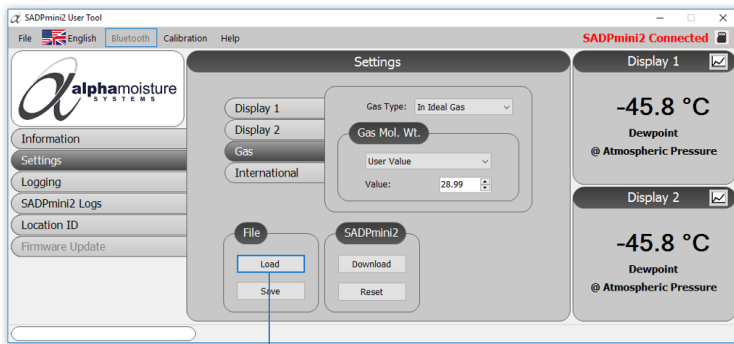
6. Select Browse (7) to locate, select and open the saved Firmware file on your computer. **NOTE:** The chosen firmware file details will be displayed in (8).
7. Select Download (9) to begin the programming.
8. The progress bar will display the following messages:
 - Erasing Memory
 - Programming Memory
9. The User Tool will generate a CRC number (10) from the file it is about to load to be checked after the process has completed successfully when the message **Downloaded OK** appears.
10. Select Exit (11) to return the instrument back to normal USB connected mode and the User Tool Information Screen.

NOTE	
	The Time and Date may need to be reset when the Firmware update is complete

D2: Loading User Tool Configured Files

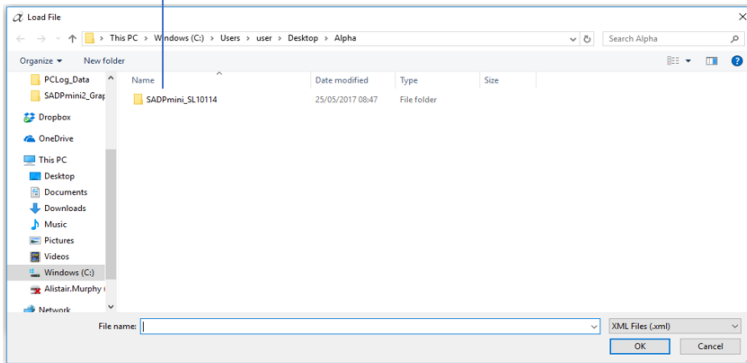
The User Tool software allows the user to load files into the SADPmini2 that contain already set parameters. This feature is particularly useful for multiple instrument set up.

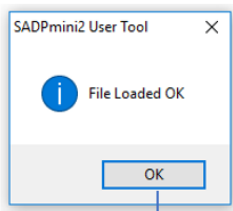
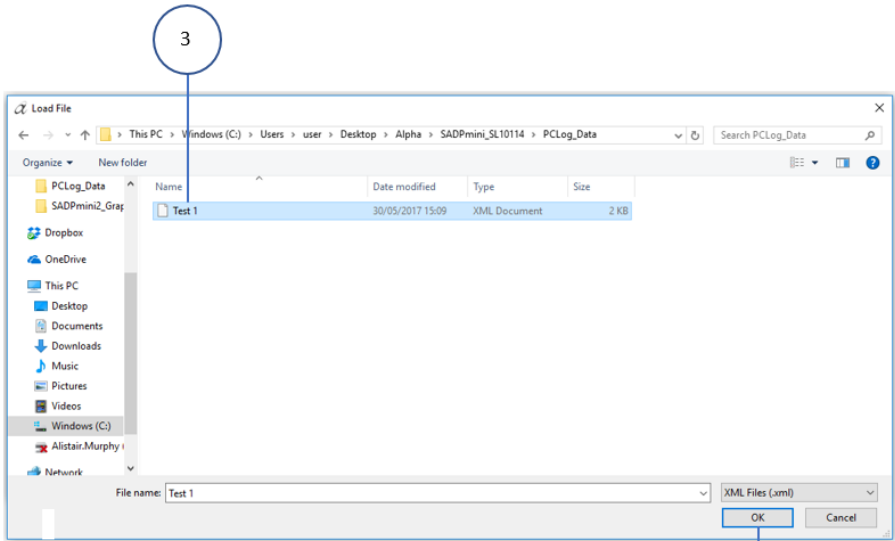
1. Select the Load tab ①.
2. A folder will open.
3. Select the relevant folder where the setting file resides ②.
4. Select the file ③ to upload.
5. Select OK ④ to load the XML settings file to the User Tool
6. Select OK to confirm ⑤.



1

2

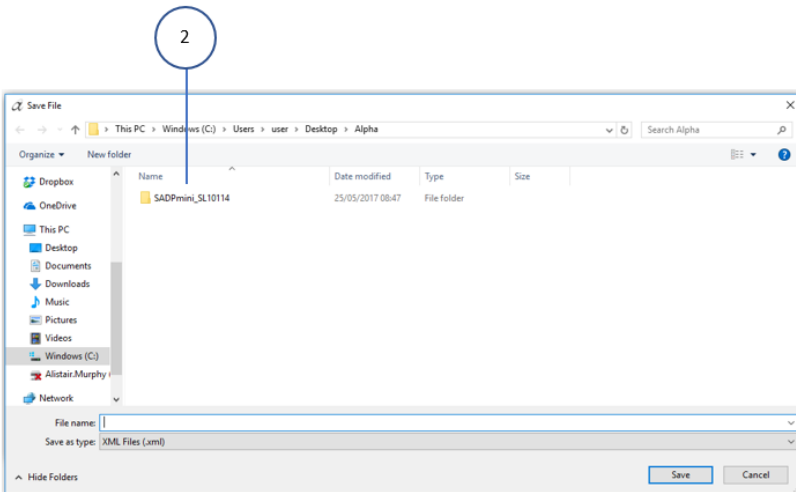
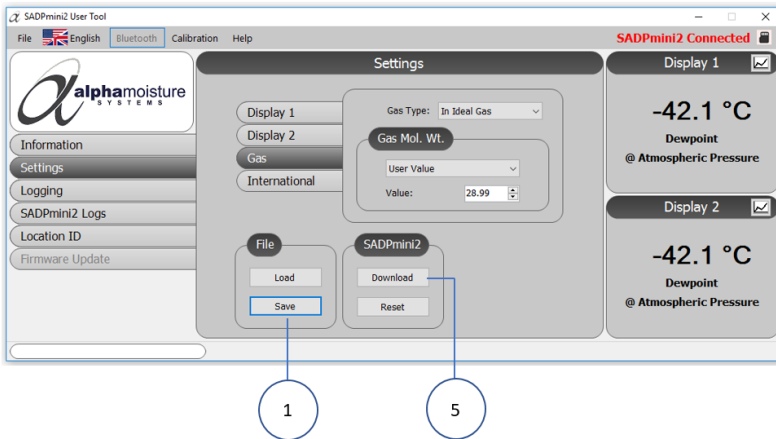


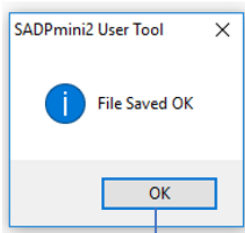
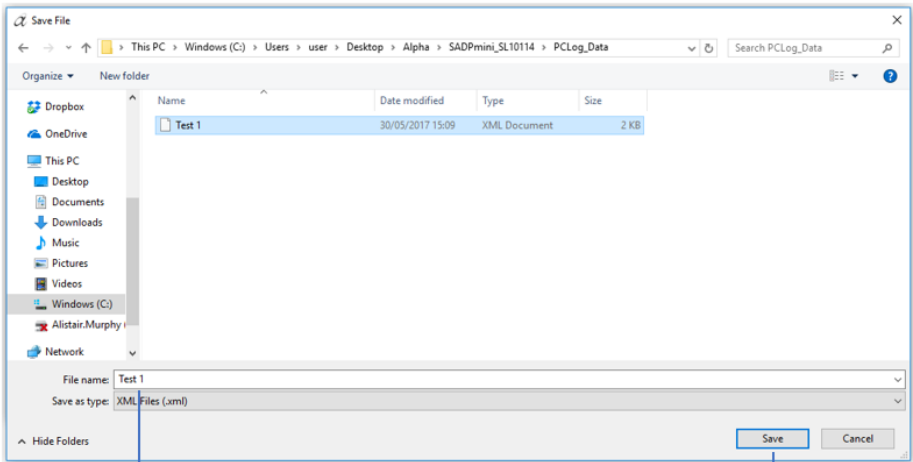


D3: Saving User Tool Configured Files

The User Tool software allows the user to save settings to a PC file to enable uploading for future use.

1. Select the Save tab ①.
2. A folder view will open ②.
3. Select/ open an existing folder or create a new folder.
4. Select/ type a file name ③.
5. Select save ④ to save the XML settings file to the file name chosen.



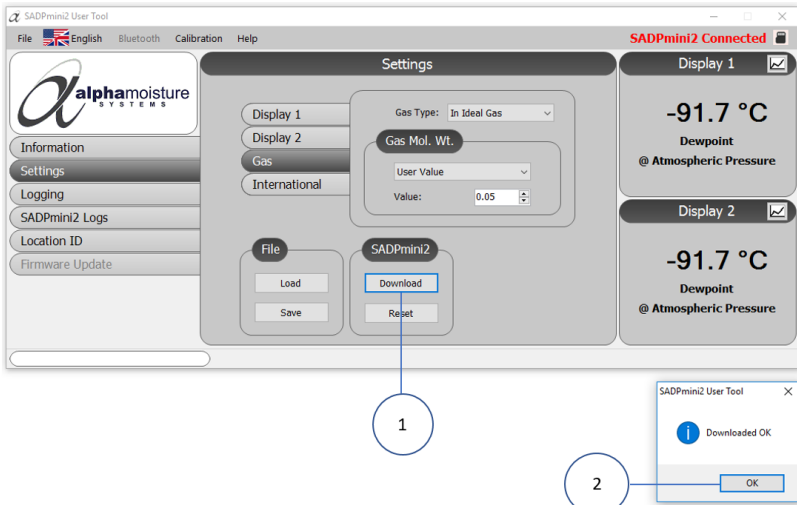


D4: Downloading Settings to the SADPmini2

NOTE

The instrument settings may be uploaded from a settings file stored on the PC to the User Tool software then modified if required and then downloaded to a SADPmini2.

1. Select the Download tab ①.
2. Select OK ② to confirm setting transfer to the SADPmini2.

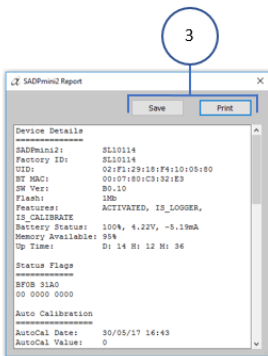
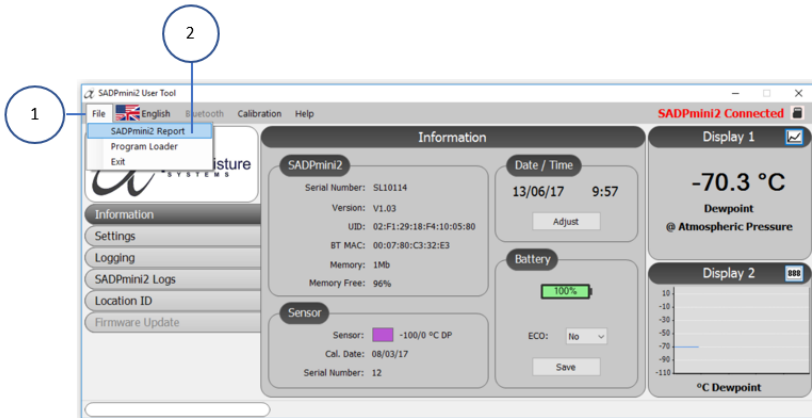


D5: SADPmini2 Report


The Report function provides the user with a real-time snapshot overview of the instrument status and settings.

To view the SADPmini2 Report:

1. Select the File tab from the headings menu ①.
2. Select SADPmini2 Report ②.
3. Select Save/ Print ③ as required.

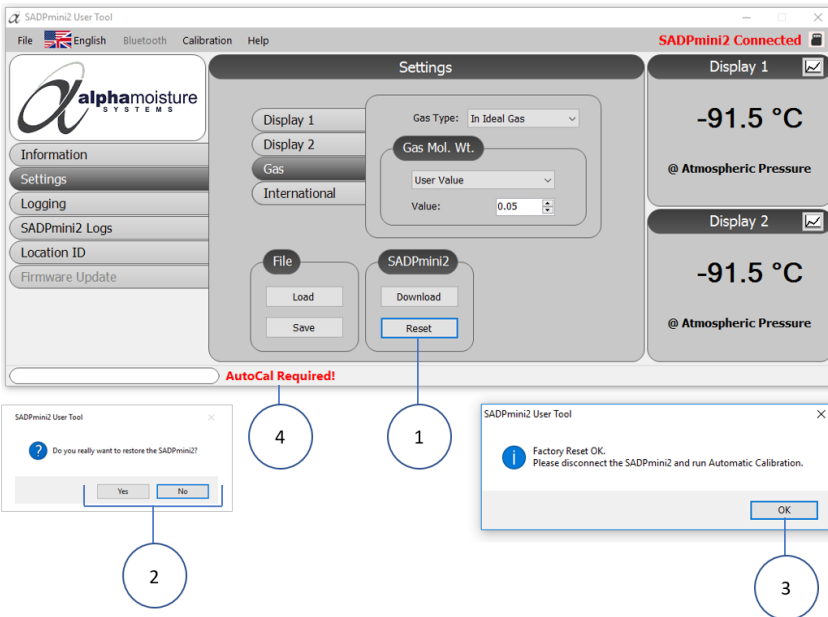


D6: Configuring Instrument to Default Settings

WARNING	
	<p>Configuring the instrument to Default Settings will change the settings to the following defaults:</p> <ul style="list-style-type: none"> Both Display units °C Dewpoint at Atmospheric pressure Language English Date format dd/mm/yy Numerical delimiter is a ‘.’ Gas Molecular weight 28.99 g/mol Gas type Ideal Gas <p>Please contact your distributor for advice before proceeding with this process. If continuing with the process, a dialogue box “Auto Calibration Required” will appear.</p>

1. Select the Reset tab ①.
2. Select Yes/ No ② as required and If Yes select OK ③ to confirm.

NOTE SADPmini2 will need to be disconnected from the User Tool and an AutoCal or CalSet performed as indicated ④.



The screenshot shows the SADPmini2 User Tool interface. The 'Settings' menu is open, and the 'Reset' button is highlighted with a circled '1'. Below the main window, two dialog boxes are shown. The first dialog box asks 'Do you really want to restore the SADPmini2?' with 'Yes' and 'No' buttons, and is circled with a '2'. The second dialog box says 'Factory Reset OK. Please disconnect the SADPmini2 and run Automatic Calibration.' with an 'OK' button, and is circled with a '3'. A red warning banner at the bottom of the main window says 'AutoCal Required!' and is circled with a '4'.

D7: Downloading Calibration Files

Calibration files may be distributed as email attachments when a new sensor has been installed on the instrument. Users should save the file (.bin) from the email to a location on their PC before updating their instrument.

To install the calibration file:

1. Select Calibration ① from the Headings Menu.
2. Select Browse ②.
3. Locate and select the required Calibration file on your computer. **NOTE:** Calibration files are Binary files (.bin).
4. Select a file to load. **NOTE:** The calibration file details will be displayed in the dialogue box ③.
5. Select Download ④ to transfer the file to the SADPmin2.
6. Select Exit ④.

