PROTIMETER

MMS3

INS9800



INSTRUCTION MANUAL

INS9800 Rev A

OCT 2021

Amphenol

Advanced Sensors

Quick start guide

Before getting started, the batteries should be installed in the compartment.

Functions of Keys

1. Power :
    a) Press to turn ON the device.
    b) Press and hold / long press to turn OFF the device.
    c) Press to select from the menu.
2. UP / Increment :
    a) Navigate up through menu.
    b) Increment the number in configuration.
3. DOWN / Decrement :
    a) Navigate down through menu.
    b) Decrement the number in configuration.
4. Ref/ Right/ Record/ Hold :
    a. Press to hold and release reading while in measurement.
    b. Press to record value while in measurement.
    c. Press and hold to get in to reference mode while in measurement as well as to exit from the reference mode.
    d. Press to move through selection while in configuration menu.
5. Back :
    a) Press to navigate back to previous screen. When pressed while in measurement, screen is navigated to Menu.

Notes: -

1. If the unit is being stored in shelf for a long time, it is better to remove batteries.

2. For better backup and expected battery life, replace with recommended batteries.

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1.Introduction

The Protimeter Moisture Measurement System3 (Protimeter MMS3) is a powerful and versatile instrument for measuring and diagnosing dampness in buildings and building materials. This product enables building surveyors and other practitioners to measure moisture levels of building elements such as walls, floors and building environments simply by switching between the five different modes of operation. In this way, a detailed understanding of the moisture condition of the property can be obtained. Inbuilt wireless capability and the dedicated app help capture all the interested values into files or as pictures making it easy for analysis.

2. Safety considerations

- **Caution notes for the WME pins –** The pin moisture measurement pins are extremely sharp, and the instrument should be handled with due care. The pins should be covered with the cap provided with the unit when the function is not in use.
- **IR temperature measurement -** Please note that the readings are indicative readings outside the measurement range of the IR temperature mode and the accuracy of the measurement is not guaranteed outside the range.
- **Calibration of unit -** The accuracy specifications of the product are valid for one year after the date of calibration, and the product requires recalibration after this period.

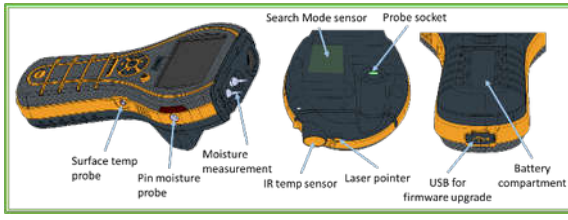
Laser pointers are effective tools when used properly, but the following considerations must be observed when using laser pointers:

- Never look directly into the laser beam.
- Never point a laser beam at a person.
- Do not aim the laser beam at reflective surfaces.
- Never view a laser beam using an optical instrument, such as binoculars or a microscope.
- Do not allow children to use laser pointers unless under the supervision of an adult.

- Use only laser pointers meeting the following criteria:
    - Labelled with FDA certification stating “DANGER: Laser Radiation” for Class 3R lasers or “CAUTION: Laser Radiation” for Class 2 lasers.
    - Classified as Class 2 or 3R according to the label. Do not use Class 3b or Class 4 products.
    - Operates at a wavelength between 630 nm and 680 nm.
    - Has a maximum output less than 5 mW, the lower the better.

3. Product Components and Accessories

The MMS3 instrument measures the different parameters in the buildings: room temperature, room humidity, building material moisture, surface moisture and surface temperature (contact and non-contact method). To measure all the above-mentioned parameters, MMS3 uses different sensors, along with a variety of accessories for convenient measurements. The following external connections are found on the instrument (see the figure below)



MMS3 interfaces

Probe socket:- This edge connection socket is for use with a Hygrostick, Quikstick or Short Quikstick probe.

Pin moisture probe:- This jack connection socket is for use with a moisture probe, Deep wall probes or a Hammer electrode.

Surface temp probe:- This jack connection socket is for use with the direct contact surface temperature sensor.

USB socket: - This is for connection to a PC when using the optional MMS3 logging software as well as to upgrade the device firmware.

- The Hygrostick (POL4750), Quikstick (POL8750) and Short Quikstick (POL8751) probes measure relative humidity (%RH) and ambient air temperature in rooms or materials. They can be connected to the MMS3 instrument either directly or by means of the extension lead.
- The surface temperature sensor is used when investigating condensation situations.
- The moisture probe is used to obtain percent moisture content values in wood or wood moisture equivalent (WME) values in other nonconductive materials.
- Multiple probe types are available, including hammer probes and deep wall probes.

3.1 Switching the MMS3 ON and OFF

Prior to initial use, ensure that the pull tab is removed from the battery compartment.

Note: *The battery level is indicated by an icon*  *on the display header. When the battery indicator starts blinking, replace the battery.*

To switch the MMS3 ON, press the power button  until you see the initial screen.

Note: *The MMS3 switches* **OFF** *automatically after 2 minutes if no activity is observed, unless the default settings are changed (see* Section "Auto Off", *for instructions).*
If the Bluetooth is turned ON, unit will not consider Auto off and will remain ON until turned OFF manually.

To switch the instrument OFF immediately, press  and hold for at least 3 seconds. Once has been depressed for 3 seconds or more, the text string **DEVICE IS SWITCHING OFF** appears on the display. When is released, the text string disappears and the unit switches **OFF**. Whenever the battery voltage falls below the threshold value, the battery indicator will start blinking. If the battery voltage falls

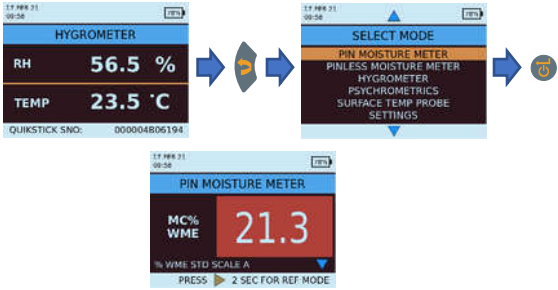
below the operating level, the instrument prompts with the message: BATTERY LOW

4. MMS3 Modes

The Protimeter MMS3 can be used to detect and measure moisture in non-conductive solid materials such as wood, drywall and masonry. The MMS3 can measure the different parameters in building applications: room temperature, room relative humidity, surface temperature with contact and non-contact method, qualitative measurements, and precise and localized moisture content measurements in wood or WME values in materials other than wood.

4.1 Pin moisture meter – Selection and use

If the meter is in a measurement mode by default, press back button to get back to menu mode. From menu select “PIN MOISTURE METER” by pressing .



Connect the moisture probe, deep wall probe, or Hammer electrode into the corresponding socket of the MMS3 instrument.

The instrument can now be used to take actual %MC (moisture content) readings in wood and %WME readings in non-conductive solid materials other than wood by placing the moisture probe pins in firm contact with the surface as shown. The measured value is displayed, and the background colour indicates whether the material is in a DRY, AT RISK or WET condition.

MC%WME	Display	Indication	Progress bar
<6	---.-		
≥6 but <17	MC%WME value	DRY	Green
≥17 but <20	MC%WME value	RISK	Yellow
≥20	MC%WME value	WET	Red

Note: The MMS3 has the capability to show %MC value for 8 wood types.





When the instrument is in Pin Moisture Meter mode, by default it displays WME WOODTYPE A (see the Protimeter wood calibration chart)

Use the up and down buttons to navigate between different wood types. From Wood Type B to Wood Type H, if MC% is greater than 30.0, ABOVE FIBER SAT will be displayed as the wood status, otherwise the wood status will not be displayed. When using the built-in pins, the operator should make firm contact on the surface. It is not necessary or recommended to push the pins deeply below the surface.

4.1a *Using Auxiliary Deep Wall Moisture Probes in Measure Mode*

To take sub-surface readings in masonry, the deep wall probes should be used instead of the standard moisture probe. To use the deep wall probes, drill two 1/4” (6 mm) diameter clearance holes, spaced 2-3 in. (50-75 mm) apart, to the required depth.

Push the two deep wall probes into the holes and press and hold the tips firmly against the bottom of the holes. Ensure that the probes are connected to socket and measure the %WME value as described in Section 4.1, “Pin Moisture Meter - Selection and Use”.

Note: The most convenient way to take sub-surface readings in wood is by using an optional Hammer Electrode.

4.1b *Detecting Hygroscopic Salts*

The Protimeter MMS3 instrument can be used as a basic salts detector when used with the moisture probe, filter papers and distilled water (not included). Moisten the filter paper with the water and take a reference reading across it with the moisture probe. Then place the moistened filter paper against the surface of interest and hold in place for 30 seconds. Remove the paper and place the pins of the moisture probe across the paper again and observe the reading. Compare this reading with the original reference reading. If the difference is more than 20 points, there is significant salts contamination that may warrant further investigation.

4.2 Pinless Moisture Meter – Selection and use

Navigate to SELECT MODE -> PINLESS MOISTURE METER and press to select the Pinless Moisture Meter mode.



The instrument can be used to take relative moisture readings in solid, homogenous materials (such as walls and floors) by holding the surface of the sensor bulge against the surface as shown. Relative readings ranging from 60-999 appear on the LCD together with a background colour change, that indicates whether the material is in a **DRY, AT RISK** or **WET** condition.

Note: *When holding the meter at the bottom, away from any objects, it should not show any reading.*



As reliable readings are obtained only if the sensor bulge is in direct contact with the surface, the *Search* mode is not suitable for surveying textured finishes. The nominal depth of penetration in dense, homogeneous materials is up to 19mm (3/4”) in the standard mode and up to 12 cm (5”) in the sensitivity mode (varies with material under test). Readings taken through low-density coverings (carpets, polystyrene tiles, etc.) will not be representative of the moisture level in the substrate itself. When using the MMS3 in *Pinless* mode, it is recommended that no attachments are connected. This practice will minimize reading errors and the potential for electromagnetic interference with other electronic equipment. When the *Pinless Moisture Meter* mode is selected, the device will display the surface moisture in terms of *Wood Moisture*

Note: *Place the MMS3 on the surface, but do not slide it. Sliding will wear out the back of the meter, as well as possibly mark the wall.*

Aquant	Display	Indication	Progress bar
<60	---.-		
≥60 but <170	Aquant value	DRY	Green
≥170 but <200	Aquant value	RISK	Yellow
≥200 but <999	Aquant value	WET	Red
≥999	999	WET	Red

In *Search* mode, the device has the capability to give comparative measurement.

Note: *If metal is present below the surface, the MMS3 may give a false positive.*

Comparative measurement helps in measuring whether the surface moisture/material is wetter or dryer than the Reference surface/ material. If the surface moisture/material is wetter than the reference surface/ material, then the progress bar is red, or if it is dryer, then the progress bar is green.

This method takes four steps:

1. Select **Pinless Moisture meter** under the *Main menu*.
2. Place the device on the material which has been chosen as the reference material.

3. Press the right arrow button for two seconds to store the reading as reference reading.
4. Now if the device is placed on any material, it indicates whether the material is wetter or dryer than the reference material.

4.3 Hygrometer – Selection and use

Navigate to **SELECT MODE -> HYGROMETER** and press to select the *Hygrometer* mode.

To use the Protimeter MMS3 as a Hygrometer connect the Hygrostick, Quikstick or Short Quikstick probe into probe socket behind, either directly or indirectly with the extension lead.

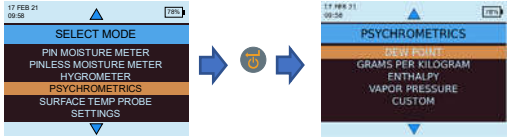


Relative humidity and temperature measurements are made with the Hygrostick, Quikstick or Short Quikstick probe, and the MMS3 instrument uses these values to calculate a range of psychometric readings. When using the MMS3 to measure the conditions in air, the humidity probe is normally connected directly to the instrument. However, when it is impractical or awkward to use the instrument in this way, the extension lead may be used to connect the Hygrostick, Quikstick or Short Quikstick to the instrument. Typically, the extension lead will be used when taking readings from probes that have been embedded in structures such as walls and floors.

Note: *For best response time, do not store the MMS3 in excessively hot or cold locations, such as in a vehicle.*

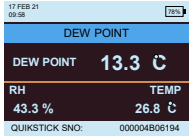
4.4 Psychrometric – Selection and use

Navigate to **SELECT MODE -> PSYCHROMETRICS** and press to select the Psychrometrics mode. Connect the Hygrostick, Quikstick or Short Quikstick probe into the socket.



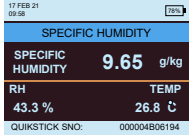
4.4a *Dew point*

Navigate to **SELECT MODE -> PSYCHROMETRICS -> DEW POINT** and press to get the *Dew Point* reading.



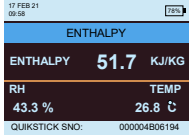
4.4b *Grains per Pound / grams per Kilogram*

Navigate to **SELECT MODE -> PSYCHROMETRICS -> GRAMS PER KILOGRAM/GRAINS PER POUND** and press to get the *Specific Humidity* reading.



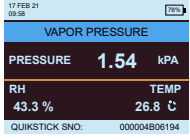
4.4c *Enthalpy*

Navigate to **SELECT MODE -> PSYCHROMETRICS -> ENTHALPY** and press to get the *Enthalpy* reading.



4.4d *Vapor pressure*

Navigate to **SELECT MODE -> PSYCHROMETRICS -> VAPOR PRESSURE** and press to get the *Vapor Pressure* reading.



Note: *Change the units in* **Settings** *to obtain metric and non-metric equivalents.*

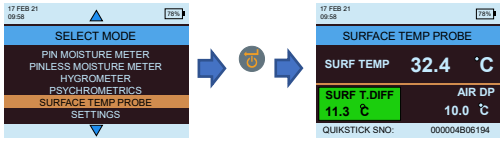
4.5 Condensator mode

The *Condensator Mode* enables the user to assess the risk of condensation occurring on surfaces or to confirm whether or not condensation is present on a surface.

The MMS3 can be used as a *Condensato*r using two modes:

4.5a *Surface Temperature probe (contact based)- selection and use*

Navigate to **SELECT MODE -> SURFACE TEMPERATURE PROBE** and press to select the *Surface Temperature Probe* mode.



In this mode, the MMS3 measures the surface temperature using an external *Surface Temperature* probe inserted into the socket and making contact with the surface to be assessed. In addition to the *Surface Temperature* probe, connect a *Humidity* probe for the MMS3 to show the *Condensation* status.

TDIFF is a useful function when investigating condensation, as it tells the user how many degrees a surface temperature is above or below the prevailing dew point temperature.

4.5b *Surface Temperature IR (non-contact based)- selection and use*

In this mode, the MMS3 measures surface temperature using IR technology. Connect a humidity probe into the corresponding socket.

Hold the button to enable the IR Thermometer. Release the button and press it again within 1 second to enable the LASER pointer. The LASER pointer will indicate the area on the surface where the measurement is being taken.



T.DIFF (ºC)	Condensation status	Background
≤0	Condensation	Red
>0 but ≤3	Risk of condensation	Yellow
>3	No Condensation	Green

4.6 Logging – selection and use

The MMS3 supports both continuous and manual logging.

4.6a *Manual Logging*

If is pressed in any of the measurement screens, the data and *Timestamp* at that instant will be logged and a **RECORD SAVED** message will be displayed on the bottom bar.

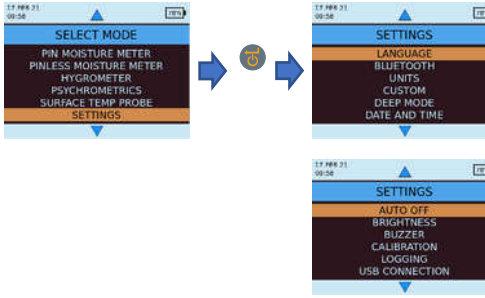
4.6b *Continuous Logging*

Continuous logging is used to sample and store data continuously. Continuous logging is enabled either by setting logging parameters through the Keypad or through a PC using *MMS3 Logging Software* or with the Protimeter App after connecting through BLE refer *"Set Logging Parameters".* After the logging parameters are saved, logging starts after the **START AFTER** minutes have elapsed. The logging icon is displayed on the top right of the screen while logging is active.

When logging is in progress, an option to stop logging is provided under the **SETTINGS** menu. Logging can be stopped either by selecting **SELECT MODE ->**

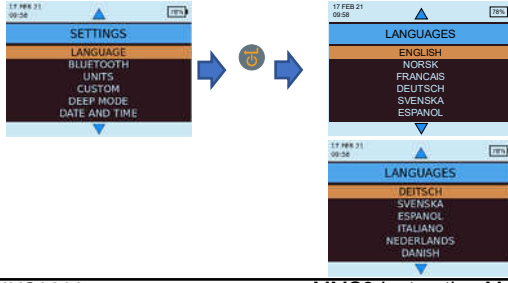
4.7 Settings – selection and use

The Protimeter MMS3 instrument has a range of user-selectable features. Navigate to **SELECT MODE -> SETTINGS** and press to configure the MMS3. The following options are available for configuring:



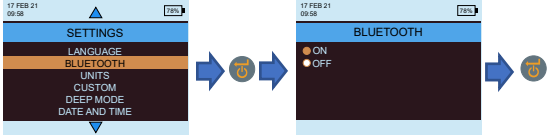
4.7a *Language*

The Protimeter MMS3 comes with pre-configured languages. User can change the language of the device by selecting “Language” from the settings menu and then choosing the required language listed. MMS3 is configurable for “English”, “Norwegian”, “French”, “Dutch”, “Sweden”, “Spanish”, “Italian”, “Nederlands” and “Danish”.



4.7b *Bluetooth*

MMS3 provides user the option to connect the device with the Protimeter app through BLE. Only while connecting to the app the BLE needs to be active and hence an option is available to turn the BLE ON and OFF saving battery while in regular use.
In Select Mode-> Settings -> Bluetooth select the required option and press to choose.

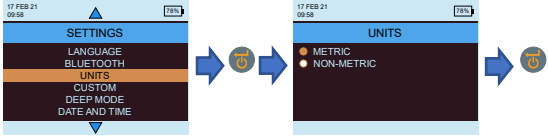


Note: *MMS3 will auto turn on Bluetooth during power on, if the Bluetooth setting was on during the last power off. The MMS3 will auto turn off Bluetooth if no connection is established or active for more than 2 mins.*

4.7c *Set Units*

MMS3 has the option to select between **METRIC** and **NON METRIC** units. Navigate to **SELECT MODE -> SETTINGS -> UNITS** and press to open the Unit options. Use / to navigate between the options available and press to save the desired units.

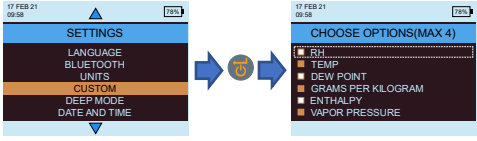
Table below shows how the units and the parameters measured appear in metric and non-metric units.



	Metric	Non-Metric
Temperature	ºC	ºF
Dew Point	ºC	ºF
Specific Humidity	g/kg	g/lb
Enthalpy	kJ/kg	Btu/lb
Vapor pressure	kPa	inHg
Surface temperature	ºC	ºF
T.Diff	ºC	ºF
Ambient Dew Point	ºC	ºF

4.7d *Custom*

MMS3 supports custom Psychrometrics option to display different Psychrometric parameters in single screen. Parameters to be displayed can be set in Custom settings screen. Navigate to ***SELECT MODE -> SETTINGS -> CUSTOM*** and press to configure the options. Use / to navigate between parameters and press to select. Maximum four parameters can be selected. The order in which the parameters selected will be displayed in Custom screen in Psychrometrics option.

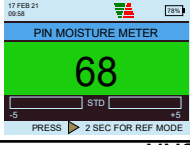


4.7e *Sensitivity mode*

Sensitivity mode is meant for non-invasive measurement. Useful for pinpointing the highest levels of moisture ingress. For non-invasive measurement, the sensitivity of the measurement can be varied when this mode is enabled. If not enabled, the measurement is taken in the standard mode. Sensitivity mode can be enabled by navigating to ***SELECT MODE-> SETTINGS->SENSITIVITY MODE*** and then selecting ON by pressing after navigating using up / down keys.

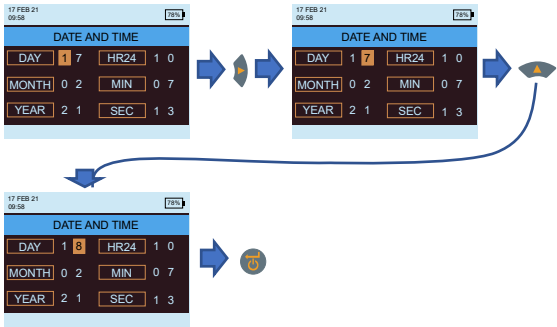


When the Sensitivity mode is enabled the measurement screen changes as below enabling to increase or decrease sensitivity by pressing and keys.



4.7f *Date and Time*

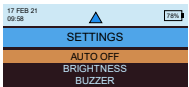
Navigate to ***SELECT MODE -> SETTINGS -> DATE AND TIME*** and press to change the device date and time. Use to navigate to the required field. Then, use / to increment / decrement the value in that box. After entering the required date and time press to save values entered. The new date and time are displayed at the top left corner of the screen. Date and time can also be set up by connecting to a PC and using the optional logging software or through the App when connected.

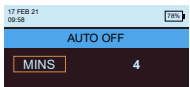


4.7g *Auto off*

The MMS3 will switch ***OFF*** automatically after auto switch off time if no activity/key press is observed. Navigate to ***SELECT MODE -> SETTINGS -> AUTO OFF*** and press to configure the Auto off time. Use / to navigate between 0 to 10 minutes and press to set the Auto off time (2 mins is the default value). To disable the Auto off feature, set the Auto switch off time to 0.

Note: *During continuous logging operation, auto switch off time is considered to be the display turnoff time. User will see an alert 10 seconds before the unit is about to auto turn off.*
Auto turn off will become inactive while the Bluetooth is on.

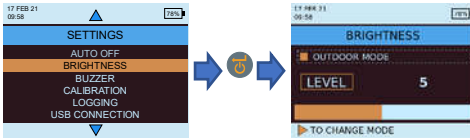






4.7h *Set Brightness*

Navigate to **SELECT MODE -> SETTINGS -> SET BRIGHTNESS** and press to set the Brightness level. Use / to navigate between the different brightness levels (1 to 10) and press to set the desired brightness. (Brightness level 5 is the default setting.)



Outdoor mode:

Outdoor mode can be used when operating the device in outdoors and high brightness is needed for better display visibility. The outdoor mode can be enabled/ disabled by pressing . Use / to navigate between the different brightness levels (1 to 10) and press to set the desired brightness (Brightness level 1 is the default setting). The outdoor mode will be auto disabled after 5 mins from the latest outdoor brightness level selection and the device will return to indoor brightness mode.

Note: *The selected outdoor mode brightness level will be remembered by the device until power cycle only. Outdoor mode and auto-logging are mutually exclusive.*

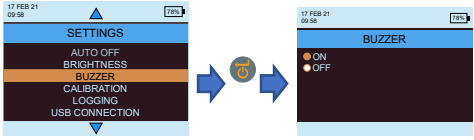
4.7i *Buzzer On/Off*

This option is used to switch the Buzzer **ON/OFF**. When the Buzzer is **ON**:

• Any key press will make a beep sound.
• In WME/Aquant mode, a **RISK/WET** condition will be alerted.
• Instrument turn **OFF** will be indicated

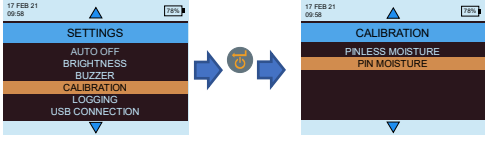
Navigate to **SELECT MODE -> SETTINGS -> BUZZER ON-OFF** and press to switch the Buzzer on/off.

Use / to navigate between the on and off options and press to save the desired configuration.

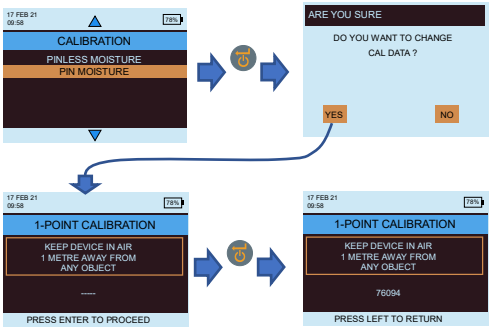


4.7j *Calibration*

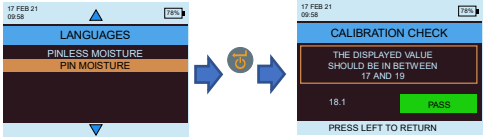
MMS3 provides an automatic calibration to the user for non-invasive measurement as well as a calibration verification for pin moisture measurement. Navigate to SETTINGS->CALIBRATION-> and then press to choose the option by selecting using / .



To calibrate in the field for Pin less moisture measurement, select pin less moisture from the menu and confirmation message appears. Once confirmed, ensure that no other devices or subjects are close to the device while holding it on air and then press enter to calibrate the offset.



To verify if the pin moisture is in calibration, select pin moisture from the calibration menu. Make sure that the WME cap is closed and no WME probe is connected to the device. Press to start the check. The calibration will be auto-checked and the result will be displayed.



4.7k *Set logging parameters.*

To initiate continuous logging using MMS3, there are three options. User can configure a continuous logging using the unit itself getting in to logging and making some key presses. The user can use the App or software for the same which will be an easy method. To start logging from the device settings, navigate to **SETTINGS->LOGGING.**

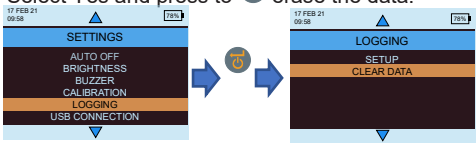


The highlighted number can be changed by pressing / . Pressing will take the cursor to the next number which will be highlighted and then can be changed. Once all the numbers are set as per need press to start the logging.

- **Start After:** minutes after which logging should start (0 to 999).
- **Sampling Interval:** sampling interval in minutes (1 to 60).
- **End After:** minutes after which logging should stop after sampling begins (1 to 999).
- **Job Number:** 1 to 255

4.7l *Clear logged data.*

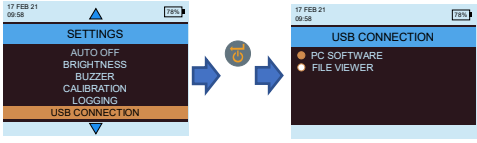
MMS3 has an option to erase the logged data in the device. Navigate to **SELECT MODE -> SETTINGS -> LOGGING -> CLEAR DATA** and press . Then it will display confirmation message asking for erasing data. Select Yes and press to erase the data.



4.7m *USB communication.*

MMS3 can be configured to work with PC software or as Mass storage device.

Navigate to ***SELECT MODE -> SETTINGS -> USB CONNECTION*** and press to set the USB connection type. Use / to navigate between the PC Software and File Viewer and press to set the desired Option.



If PC Software is selected, Data can be read through Logging Software. If File Viewer is selected data will be available in CSV format under My Computer (like mass storage device)

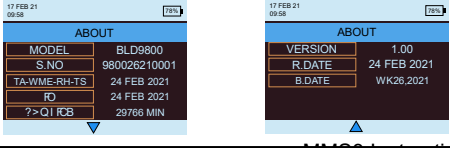
4.8 Instructions – selection and use

Navigate to SELECT MODE->INSTRUCTIONS and the user can see a QR code. By scanning the QR code it will take the user to a digital instruction manual and videos for MMS3 operations.



4.9 About – selection and use

Navigate to SELECT MODE->ABOUT and press to find details about the device.



5. System behaviour during low battery

MMS3 indicates that the battery is low by blinking the battery level indicator in the right corner of the display header.
MMS3 restricts high power operations during low battery condition to avoid any system misbehaviour and the user will be alerted.
Any configuration and/or calibration changes made during this time will be temporary and will not be saved in the memory.
Logging is restricted/stopped when the battery is low.

Note: *It is recommended to replace the batteries once the battery indicator starts blinking.*
For better backup and expected battery life, replace with recommended batteries.

6. System errors

MMS3 will detect the system errors and display the respective error codes (indicated in Red) in a loop on the screen header as shown below.



Error code	Description
1	Memory fault
2	RH, Ta, Ts and WME calibration fault
3	IR calibration fault
4	RTC fault
5	Aquant sensor fault

7. Diagnostic Procedure Guidelines

When diagnosing dampness in buildings, three key criteria must be considered, as outlined in *Table* below.

Item	Criteria	Notes
1	Is a wall or other building element in a safe air-dry condition?	Air-dry is the moisture content that is normal and safe (from moisture-related deterioration or decay) in buildings. When the Protimeter MMS3 moisture meter modes are selected, measured values are identified as DRY, AT RISK or WET
2	Is the surface temperature of a wall or other building element above or below the dew point?	Dew point is the temperature at which a given quantity of air becomes saturated (100% RH) and forms dew, or condensation. If a surface is colder than the dew point, condensation occurs. When the Protimeter MMS3 Condensator Mode is selected to measure TDIFF (the proximity of a surface to the dew point) the instrument identifies either a NO CONDENSATION condition, an AT RISK condition, or a CONDENSATION occurring condition.
3	Is a wall surface or other building element contaminated with hygroscopic salts or other conductive material?	Artificially high moisture meter readings may be obtained either in material that has been heavily contaminated by hygroscopic salts or in materials that are conductive by nature. The presence or absence of nitrates and chlorides should be established when investigating suspected rising dampness situations in particular.

Item 1: The *Search and Measure* modes (pinless and pin) should be used in combination to map out the extent of a moisture problem and to distinguish between

When high subsurface relative readings are obtained in the Search mode, the user is strongly recommended to quantify these values in **%WME** terms by using the deep wall probes in the Measure mode. If the depth of clearance holes is increased incrementally by a nominal 0.4 in. (10 mm) at a time, the moisture profile through the wall can be established.

Item 2: Condensation related moisture problems are common. When assessing the risk of condensation, or confirming its existence, the proximity of the actual temperature of the surface under investigation to the dew point must be established. The TDIFF measurement in CONDENSATOR mode tells the user how many degrees the temperature of a surface is above or below the dew point.

As many condensation situations are transient, TDIFF readings should be taken in a methodical and regular manner, similar to moisture meter readings in materials. Ambient RH and temperature values should also be taken to assess the moisture condition of the room as a whole. Dwellings and working environments generally have an RH from 40% to 60%, so there may be cause to investigate environments that register RH values outside this range.

Item 3: Two hygroscopic salts, chlorides and nitrates, may build up on the surface of walls where rising dampness or wicking occurs. As groundwater moves through the wall and migrates to the surface, salts tend to accumulate where the rate of evaporation of this

8. Care and maintenance

The Protimeter MMS3 is a precision-built electronic instrument that will provide many years of reliable service if the following points are observed:

• When not in use, keep the MMS3 instrument and its accessories in the factory carry case. Store the case in a stable, dust-free environment and keep it out of direct sunlight.

• If the instrument is to be stored for more than four weeks or if the low battery power symbol appears on the display, remove the batteries from the instrument.

• When using the MMS3 in Search mode, do not slide the bulge across surfaces, as this may lead to rapid instrument case wear. The instrument should be lifted and placed in position to prevent such wear.

• Check the condition of the MMS3 accessories on a regular basis and replace them if they become worn or damaged.

• To preserve their calibration characteristics, Hygrostick probes should not be exposed to saturated environments. If this is unavoidable, Hygrostick probes should be replaced on a regular basis and their calibration should be checked frequently.

9. Technical specifications

9.1 Operating conditions

Operating Temperature range

Instrument only	:	0°C -50°C
Humidity	:	0 to 95% non-condensing

9.2 Measurement specifications

9.2a *Humidity Measurement.*

Hygrostick Data (Nominal)

Relative humidity
Range: 30%-40% RH, Accuracy ±3% RH at 68°F (20°C)
Range: 41%-98% RH, Accuracy ±2% RH at 68°F (20°C)

Temperature
Range: 14°F to 122°F (-10°C - 50°C), Accuracy ±0.6°F(±0.3°C)

Short Quickstick Data (Nominal)

Relative humidity
Range: 0%-10% RH, Accuracy ±3% RH at 68°F (20°C)
Range: 10%-90% RH, Accuracy ±2% RH at 68°F (20°C)
Range: 90%-100% RH, Accuracy ±3% RH at 68°F (20°C)

Temperature
Range: 14°F to 122°F (-10°C - 50°C), Accuracy ±0.6°F(±0.3°C)

9.2b *Moisture Measurement.*

For Integrated and remote pin probes

Integrated Pins
Strong and reliable integrated WME pins with cap
No effect on readings by surface moisture

Pin (%WME) 6% to 100%, reading over 30% are

Non-invasive (RF)

Up to 3/4" (19 mm) deep in the standard mode and up to 5" (12 cm) deep in the sensitivity mode (varies with material under test), 60 to 999 (relative),
Tolerance: ±10 relative scale

9.2c *Surface Temperature*

Plug in Temperature Probe Surface Temperature Probe - BLD5805
Range 32°F to 158°F (0°C to 70°C)
Accuracy at 77°F (25°C) +/- 1.3°F (0.7°C)

IR Based — With 12:1 (D:S) Ratio — With Laser Pointer
Range: 14°F to 122°F (-10°C to 50°C)
Accuracy: ±3.6°F (±2°C) @77°F (25°C)

9.3 Physical Specifications

9.3a *Power*

Battery
2 X AA Alkaline ≥2500mAh
Battery Life visual indication on LCD

9.3b *Size(H x W x D)*

7.5 in. x 3.7 in. x 2.2 in. (19.1 cm x 9.4 cm x 5.6 cm)

9.3c *Gross weight*

Instrument only: 9.17 oz (260 g)

9.3d *Maximum needle Depth*

For WME Pins 0.4 in. (10 mm)

9.3e *Buzzer*

Audible buzzer for Key tone, WME/Aquant measurement

9.4 Regulatory Compliance

CE, RoHS, ETL, UKCA

9.5 User Interface

9.5a *Keypad*

Plastic/silicone keypad for easy navigation between different user menus in the unit, separate key for IR operation (non-contact based surface measurement)

9.5b *Display*

Graphical LCD
Size: 2.4"¨
Color: 256 bits
Resolution: 320 x 240 dpi
Backlight (with adjustable brightness)

9.5c *Language*

Multiple inbuilt languages

9.5d *User application profiles*

Sticky memory last used application settings.

9.5e *PC interface*

USB interface:
micro B type USB port on instrument
PC Interface features:
Firmware Upgrade in field
User specific instrument setup
Data Logging setup
Stored data retrieval

9.5f *Data logging*

RH-Tair-Ts-WME-Aquant Data logging
Easy user setup through Keypad
Samples with Date and Time stamp:
store in device upto 10000 Samples

Store results of interest in cloud from live data stream on the Protimeter app into a file or embed into an image to be accessed through phone/tablet and/or web interface.

Customer support Centers

U.S.A.

Amphenol Thermometrics, Inc.
967 Windfall Road
St. Marys, Pennsylvania 15857, USA
T: +1 814-834-9140

U.K

Amphenol Thermometrics (U.K.)
Limited
Crown Industrial Estate Priorswood
Road
Taunton, TA2 8QY, UK
T: +44 1823 335 200

www.protimeter.com

www.amphenol-sensors.com

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Advanced Sensors

INS9800 Rev A
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