



PROTIMETER®

Moisture Measurement System

Instruction Manual

Protimeter MMS, Protimeter MMS Plus



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Introduction

The Protimeter Moisture Measurement System (MMS), 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 three different modes of operation. In this way, a detailed understanding of the moisture condition of the property can be obtained.

1.0 Product Familiarisation

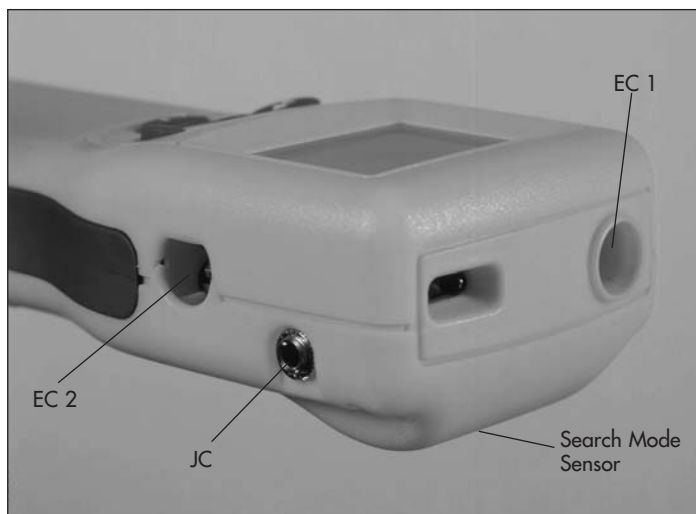
The Protimeter MMS kit comprises a carry case containing the MMS instrument and a range of standard accessories, as detailed in table 1.

Description	Part Number
Protimeter MMS / MMS Plus	BLD5800 / BLD5800LH
<i>Comprising:</i>	
Protimeter MMS instrument	POL5800 / POL5800LH
Hygrostick hygrometer probe	POL4750
Hygrostick extension lead	BLD5802
Moisture probe	BLD5060
Deep wall probes (length 140mm)	BLD5018
Surface temperature sensor (direct contact)	BLD5804
Carry case	POU5800-01
Calibration check device (for %WME)	BLD5086
Instruction manual	INS5800

Table 1








The MMS instrument is a battery powered handheld unit that has cluster of four buttons and a large liquid crystal display (LCD). The bulge at the top of the instrument houses a sensor for detecting moisture within solid materials. Edge connection1 (EC1) is for use with a Hygrostick probe. The jack-socket (JC) is for use with a moisture probe, deep wall probes or hammer electrode. EC2 is for use with the Direct Contact Surface Temperature Sensor and for connection to a PC when using the optional MMS logging software.



The Hygrostick probe measures relative humidity (%rh) and ambient air temperature (T_{AIR}) in rooms or materials. It can be connected directly to the MMS instrument or by means of the Hygrostick extension lead. The surface temperature sensor is used (T_s) 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 non-conductive materials. Deep wall probes are used to obtain WME values at depth in solid structures such as walls and floors.

1.1 Switching the MMS On and Off

Prior to initial use, ensure that two LR6 batteries are correctly inserted in the battery compartment. Note that low battery power is indicated by  on the display; when this appears, replace the batteries. Switch the MMS on by pressing  momentarily. The MMS will switch off automatically after 1 minute unless the default setup is changed (see section 5). Alternatively, switch off by pressing  and holding for 3 seconds or more. Once  has been depressed for 3 seconds all text information blocks appear on the display; these disappear when  is released and the unit switches off.




1.2 Optional Accessories

A range of optional accessories may be used with the Protimeter MMS and MMS Plus. These include Hammer Electrodes, memory access software and deep wall probes. For more information please contact GE Protimeter or your official Protimeter supplier.

2.0 Moisture Meter Modes

The MMS can be used to detect and measure moisture in non-conductive solid materials such as wood and masonry. Two modes of operation are available, the Search mode for qualitative measurements and the Measure mode for precise and localised moisture content measurements in wood or WME values in materials other than wood.

2.1 Search Mode - Selection and Use





Turn the MMS on by pressing . Select the moisture meter mode by pressing  successively until the word MOISTURE is visible in the top right corner of the LCD. Then press  to select the Search mode, indicated by REL•))) on the LCD.

The instrument can now be used to take relative moisture readings in solid, homogenous materials (such as walls and floors) by holding the leading edge of the sensor bulge against the surface as illustrated, at an angle ranging from 20-50°. Relative readings ranging from 0-1000 are given on the LCD together with a progress bar that indicates if the material is in a DRY, AT RISK or WET condition.

As reliable readings will only be obtained if the leading edge of 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 is up to 10mm in dense, homogenous materials. 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 MMS in Search mode, it is recommended that no attachments (i.e. Hygrostick probe, Surface Temperature Sensor or Moisture probe) are connected. This practice will minimise reading errors and the potential for electromagnetic interference with other electronic equipment.



2.2.0 Measure Mode - Selection and Use

Turn the MMS on by pressing . Select the moisture meter mode by pressing  successively until the word MOISTURE is visible in the top right corner of the LCD. Then press  to select the Measure mode, indicated by %WME  on the LCD. Connect the Moisture Probe (or other electrodes such as Deep Wall Probes or Hammer Electrode - see section 2.2.1) to the MMS Instrument using socket (JC).



The instrument can now be used to take actual %MC readings in wood and %WME readings in non-conductive solid materials other than wood by pushing the Moisture Probe pins into the surface. The measured value is displayed and the progress bar indicates whether the material is in a DRY, AT RISK or WET condition, as summarised in table 2.2.

%MC (wood only) or %WME value	Instrument display in MOISTURE Measure Mode
< 8%	- - - % (denotes out of range), inactive progress bar
≥ 8% but < 17%	%MC or %WME value, DRY, active progress bar
≥ 17% but < 20%	%MC or %WME value, AT RISK, active progress bar
≥ 20% but < 28%	%MC or %WME value, WET, active progress bar
≥ 28 to 100	Relative value only, active progress bar

Table 2.2

2.2.1 Using Auxiliary Moisture Probes in Measure Mode

When sub-surface readings are required in masonry, the Deep Wall Probes should be used instead of the standard Moisture Probe. To use, drill two \varnothing 6mm clearance holes 50 - 75mm apart to the required depth. Push the two 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 (JC) and measure the %WME value as described in section 2.2. The most convenient way to take sub-surface readings in wood is by using an optional Hammer Electrode.



2.2.2 Detecting Hygroscopic Salts

The MMS 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 and compare with the original reference reading. If the difference is more than 20 points there is significant salts contamination that may warrant further investigation.

3. Hygrometer Mode - Selection and Use



To use the MMS as a hygrometer, connect the Hygrostick probe directly into (EC1) or indirectly, by means of the Hygrostick extension lead. Turn the MMS on by pressing (⏻). Select the hygrometer mode by pressing ►► successively until the word HYGROMETER is visible in the top left corner of the LCD. Then press ► to select relative humidity (%rh), ambient temperature (T_{AIR}) or dew point temperature (T_{DEW}) as required. Temperature values can be displayed in °C or °F (see section 5 for setup).

%rh and T_{AIR} measurements are made by the Hygrostick sensor and the MMS instrument uses these values to calculate T_{DEW} . When using the MMS to measure the conditions in air, the Hygrostick probe is normally connected directly to the instrument. When it is impractical or awkward to use the instrument in this way, the Hygrostick extension lead may be used to connect the Hygrostick to the instrument. Typically, the extension lead will be used when taking readings from Hygrostick probes that have been embedded in structures such as walls and floors.




4. 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.

To use the MMS as a Condensator, connect the Hygrostick probe directly into EC1 and connect the Surface Temperature Sensor (either the standard direct-contact type or the optional infrared remote type) into EC2. Turn the MMS on by pressing button . Select the Condensator mode by pressing  successively until the word CONDENSATOR is visible in the top centre of the LCD.



Then press  to select relative humidity (%rh), ambient temperature (T_{AIR}), dew point temperature (T_{DEW}), surface temperature (T_S) or temperature difference (T_{DIFF}) as required. T_S and T_{DIFF} measurements can only be obtained if a Surface Temperature Sensor is connected to the instrument and held against the surface of interest. Temperature values can be displayed in $^{\circ}C$ or $^{\circ}F$ (see section 5 for setup).

T_{DIFF} is a useful function when investigating condensation as it tells the user how many degrees a surface is above or below the prevailing dew point temperature. When a surface is more than $3^{\circ}C$ above dew point, T_{DIFF} is displayed with the message NO CONDENSATION. When the surface temperature is $3^{\circ}C$ or less above dew point, T_{DIFF} is displayed with the message AT RISK, NO CONDENSATION. When the surface temperature is equal to or lower than the dew point, a negative T_{DIFF} is displayed with the message CONDENSATION. The progress bar is activated when T_{DIFF} is less than $14^{\circ}C$ above dew point. It moves from left to right to signify the increasing risk of and degree of condensation. Table 4. summarises this functionality.

Temperature of Surface	Instrument display in CONDENSATOR T_{DIFF} Mode
$> 14^{\circ}C$ above dew point	T_{DIFF} , NO CONDENSATION, inactive progress bar
$\leq 14^{\circ}C$ but $> 3^{\circ}C$ above dew point	T_{DIFF} , NO CONDENSATION, active progress bar
$\leq 3^{\circ}C$ above dew point	T_{DIFF} , AT RISK, NO CONDENSATION, active progress bar
\leq dew point	T_{DIFF} , CONDENSATION, active progress bar




Table 4.

5. Setup Mode







The Protimeter MMS instrument has a range of features that can be selected by the user as listed in table 5.

Setup Code	Setup selection
S 1	Displays temperature values in °C
S 2	Displays temperature values in °F
S 3	Activates LCD back light
S 4	Deactivates LCD back light
S 5	Activates bleeper
S 6	Deactivates bleeper
DEF	Default settings (°C, activated back light, activated bleeper, 1 minute auto switch off)
0.00	Real-time clock (adjustable only through IrdA comm port with Protimeter software)
T 1	Auto switch off adjustment, from 1 minute to 6 minutes





Table 5.

To enter the Setup mode switch the instrument on and disconnect any attachments that may be connected. When the display shows three horizontal dashes (- - -), press  momentarily; the word SETUP then appears in the bottom left hand corner of the LCD together with the code S1 in the centre of the display. Within three seconds, press  successively to scroll through the setup codes as detailed in table 5. Press  to set the selected setup option.



Example 1 - deactivate back light and change temperature readings from °C to °F


- Enter Setup mode by pressing button  momentarily when display shows - - -
 - Scroll to S 4 by pressing 
 - Press button  to select the deactivated backlight option
 - Scroll to S 2 by pressing 
 - Press  to select the °F display option
 - Press  momentarily to return to operating modes, or leave for three seconds
- The instrument would now display temperatures in °F without any backlighting.

Example 2 - change the default auto switch off from 1 minute to 5 minutes

- * Enter Setup mode by pressing  momentarily when display shows - - -
 - * Scroll to t 1 by pressing 
 - * Press  four times in succession; display now shows t 5
 - * Press  momentarily to return to operating modes, or leave for three seconds
- The instrument would now switch off automatically after five minutes.

6. Holding and Logging Mode

Moisture, temperature and RH values can be held by pressing and holding . If the button is held down for less than three seconds, the instrument reverts to the mode of measurement that had been selected previously. If held down for more than three seconds, the instrument switches off when  is released (see section 1.1).

Readings can be logged in the MMS memory (minimum of 300 line entries) by pressing . Table 6 details what information is logged when using this facility in the operational modes. Contents of the memory can be downloaded to a PC running Microsoft® Windows 95 or later, and loaded with Protimeter MMS Logging Software. For further information please refer to the MMS LOGGING HELP DOCUMENT (INS5800L) supplied with the Protimeter Logging Software CD.



Mode	Display	Information stored by pressing button 
MOISTURE meter	REL.)))))	yr/mm/dd, hr:min, relative value example: 00/01/07, 09:30, 530
MOISTURE meter	%WME 	yr/mm/dd, hr:min, %WME value example: 00/01/07, 09:30, 12.5
HYGROMETER	%rh	yr/mm/dd, hr:min, %rh, T _{AIR} , Hygrostick serial no. example: 00/01/07, 09:30, 52.5, 21.2, 123456
HYGROMETER	T _{AIR}	yr/mm/dd, hr:min, T _{AIR} , Hygrostick serial no. example: 00/01/07, 09:30, 21.2, 123456
HYGROMETER	T _{DEW}	yr/mm/dd, hr:min, T _{AIR} , T _{DEW} , Hygrostick serial no. example: 00/01/07, 09:30, 21.2, 10.5, 123456
CONDENSATOR	%rh	yr/mm/dd, hr:min, %rh, T _{AIR} , Hygrostick serial no. example: 00/01/07, 09:30, 52.5, 21.2, 123456
CONDENSATOR	T _{AIR}	yr/mm/dd, hr:min, T _{AIR} , Hygrostick serial no. example: 00/01/07, 09:30, 21.2, 123456
CONDENSATOR	T _{DEW}	yr/mm/dd, hr:min, T _{AIR} , T _{DEW} , Hygrostick serial no. example: 00/01/07, 09:30, 21.2, 10.5, 123456
CONDENSATOR	T _s	yr/mm/dd, hr:min, T _s example: 00/01/07, 09:30, 18.6
CONDENSATOR	T _{DIFF}	yr/mm/dd, hr:min, T _{DIFF} , T _{AIR} , T _{DEW} , Hygrostick serial no. example: 00/01/07, 09:30, 8.1, 21.2, 10.5, 123456

Table 6.

7.0 Diagnostic Procedure Guidelines

When diagnosing dampness in buildings there are three key criteria that must be considered as outlined in table 7.

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 MMS 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 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 dew point, condensation occurs. When the Protimeter MMS Condensator mode is selected to measure T_{DIFF} (the proximity of a surface to dew point) the instrument identifies if there is NO CONDENSATION, an AT RISK condition, or CONDENSATION occurring.
3	Is a wall surface or other building element contaminated with hygroscopic salts or other conductive materials?	Artificially high moisture meter readings may be obtained in material that (i) has been heavily contaminated by hygroscopic salts or (ii) in materials that are conductive by nature. The presence (or otherwise) of nitrates and chlorides should be established when investigating suspected rising dampness situations in particular.

Table 7

Item 1: The Search and Measure modes should be used in conjunction to (i) map out the extent of a moisture problem and (ii) to distinguish between surface and sub-surface moisture. The profile of readings obtained will give insight into the potential cause (e.g. condensation, lateral ingress or rising dampness) of a moisture-related problem.

Far greater insight will be obtained from moisture readings taken in a methodical manner to those taken in a random manner. When testing walls, the user is recommended to commence by taking readings at the skirting board level and move up the wall in regular steps of 10-15 cm. When high sub-surface 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 1cm at a time, the moisture profile through the wall can be established.

Item 2: Condensation related moisture problems are arguably the most prevalent. 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 T_{DIFF} 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, T_{DIFF} 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 of between 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 occurs. As groundwater moves through the wall and migrates to the surface, salts tend to accumulate where the rate of evaporation of this water is greatest. The salts themselves are non-conductive, but when mixed with a small amount of moisture a highly conductive solution is formed. The presence (or absence) of such salts should therefore be established when rising dampness is suspected by using the Protimeter MMS in Measure mode as described. When required, the Protimeter Salts Analysis Kit (part number BLD4900) can be used to identify the relative concentrations of nitrates and chlorides.

In summary, effective dampness diagnosis is a process that draws on the knowledge and expertise of the surveyor. The Protimeter MMS kit enables the practitioner to investigate moisture levels in materials and environments from various perspectives that, in turn, enables him/her to make more thorough and reliable judgements as to the cause of dampness related problems.

8.0 Calibration Checking

Check the Moisture meter Measure mode by holding the pins of the Moisture Probe across the exposed wires of the calibration check device (Calcheck). The WME value of correctly calibrated instruments is between 17 - 19. Instruments that register values outside this range should be returned to Protimeter (or an official Protimeter distributor) for servicing. There is no facility to check the calibration of the Search mode.

Working Hygrostick probes can be checked against reference Hygrostick probes, or against known humidities. Protimeter plc recommend those Hygrostick probes that have drifted by more than ± 5 %RH are discarded and replaced. New Hygrostick probes are available from Protimeter plc or official Protimeter distributors.

9. Care and Maintenance

The Protimeter MMS is a precision built piece of electronic equipment that will provide many years of reliable service if the following points are observed:

- i. When not in use, keep the MMS instrument in its pouch together with its accessories. Store the kit in a stable, dust-free environment and out of direct sunlight.
- ii. Remove the batteries from the instrument if it is to be stored for periods of more than four weeks, or when the low battery power symbol appears on the display.
- iii. When using the MMS 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 erosion of the instrument case.
- iv. Check the condition of accessories used with the MMS instrument on a regular basis and replace them if they become worn or damaged.
- v. To preserve 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 at frequent intervals.

10. Technical Specification

Dimensions & Weights

Protimeter MMS Kit (BLD5800): 230 x 190 x 90mm, 1.2kg

Protimeter MMS instrument (POL5800): 180 x 70 x 45mm (max. values), 300g

Hygrostick probe (POL4750): length 50mm, \varnothing 8mm. Optimal clearance hole \varnothing 12mm (when used with compression sleeve to measure ERH in solid material)

Power: x2 LR6 batteries

Measurement Ranges

Moisture Meter Search mode: 0- 1000 relative scale, nominal depth of measurement -15mm

tolerance \pm 10 relative scale

Moisture Meter Measure mode: 8 - 29 %WME, 30- 100 relative scale in saturated material

Hygrostick probe:

Measurement range: 30 - 100 %rh, -10 to 50 °C



Tolerance:

30 - 40 %rh, \pm 2.5 %rh @ 20 °C

40 - 98 %rh, \pm 2 %rh @ 20 °C

-10 to 50 °C, \pm 0.3 °C

Surface temperature sensor: -10 to 50 °C, \pm 0.3 °C

By pressing  while switching on using  the following information is displayed on the screen in sequence:

Information

Example

Firmware version

2.02

Instrument part no.

BLD5800

%rh Calibration curve

d2-5

Firmware date

yy-mm-dd

Hygrostick serial no (when connected)

123456

APPENDIX 1

Guidance Notes for Measuring Moisture in Floors using the Protimeter MMS

1 Rapid Moisture Level Assessment of Solid Floors

Primary Reference: Section 2.1 of MMS Instruction Manual

In Search Mode, the MMS can be used to assess the moisture level of solid floor slabs in relative terms and to identify areas of concern that may warrant a more detailed investigation.

Having selected the Search Mode (as detailed in section 2.1 of the MMS instruction manual) hold the bulge of the instrument against the floor slab and note the value on the LCD. Slabs that register a value of 200 or less are generally considered to be in a safe air-dry condition. If values of more than 200 are recorded, we recommend that the actual moisture level of the slab is quantified by alternative test procedures prior to laying decorative floor coverings.

2 Equilibrium Relative Humidity Measurements in Solid Floors

Primary Reference: Section 3 of MMS Instruction Manual

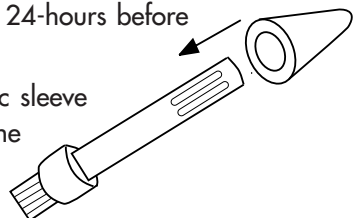
In Hygrometer Mode, the MMS can be used to measure the equilibrium relative humidity (ERH) value of solid floor slabs. In essence, this procedure measures the relative humidity (%rh) of a pocket of air that is deemed to be in moisture equilibrium with the material under investigation. Slabs that have an ERH value of 75% or lower are considered to be in a safe air-dry condition. Slabs that have an ERH value of 80% or greater are generally considered being in a damp condition.

Caution: moisture sensitive coverings that are laid onto damp floors may fail in service.

2.1 Sub-surface ERH Test Procedure - without using Protimeter Humidity Sleeves

i. Drill 12mm (0.5") diameter clearance holes to a nominal depth of 50mm (2") at the required points of measurement (POMs) and plug or cover with suitable impervious material. Ideally, holes should be drilled 24-hours before measurements are to be taken

ii. Remove the Hygrostick sensor and conical plastic sleeve from the MMS pouch; push the Hygrostick through the sleeve so that the tip of the Hygrostick protrudes fully from the narrow end of the sleeve as shown.

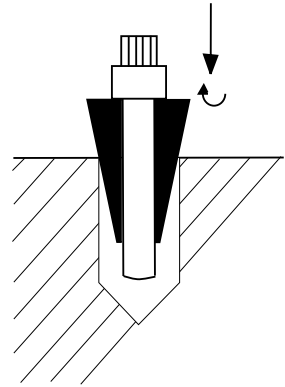


iii. Push the Hygrostick-Sleeve assembly into the pre-drilled hole and twist firmly to seal as shown. Ideally, leave the Hygrostick in the hole for 60 minutes before taking a reading

iv. Use the extension lead (supplied in the MMS pouch) to connect the Hygrostick to the MMS instrument (having previously removed the protective yellow Hygrostick cap, if fitted)

v. Select the Hygrometer Mode of operation (as detailed in section 3 of the MMS instruction manual)

vi. Measure the %rh in the hole; this is the ERH value of the floor slab



2.2 Sub-surface ERH Test Procedure - using Protimeter Humidity Sleeves

Protimeter Humidity Sleeves are convenient optional accessories for use with Protimeter Hygrosticks. Clearance holes are drilled at the required POMs and the Humidity Sleeves are inserted. As each Humidity Sleeve has its own sealing cap, it is not necessary to plug or cover the drilled holes. Having placed the Humidity Sleeves in the floor slab (ideally, 24-hours before ERH measurements are to be taken) remove the cap and follow the procedure as given above from 2.1 ii.

2.3 Surface ERH Test Procedure - using Surface Humidity Box

If it is impractical or undesirable to take sub-surface ERH readings (the best technique for determining the actual moisture condition of the slab) the Hygrostick can be used in combination with a Humidity Box placed on the surface. Typically, Humidity Boxes are used on floors with embedded heating pipe work, or when a contractor is working to standards that specify surface ERH techniques (e.g. BS 8203:1996).

A Protimeter Humidity Box (Part No. BLD4711) is available as an optional accessory. It should be used in accordance with applicable standard recommendations, or placed at the POM for at least 24-hours prior to taking ERH readings.

APPENDIX 2

BLD5800LH MMS 'Plus' - Additional Functions

The Protimeter MMS 'Plus' is a derivative of the standard Protimeter MMS that has additional functionality as follows:

- In Hygrometer mode, it can display the Mixing Ratio (Specific Humidity) of moisture vapour in either grains/lb or g/kg of dry air
- It can be used with an optional low humidity range sensor, Protimeter Part No. BLD5812

Instructions to Display Mixing Ratio or Specific Humidity

The Mixing Ratio, or Specific Humidity as it is also known, is the mass of water vapour per unit mass of dry air. This figure can be displayed in the Hygrometer mode of operation, as detailed in section 3.

By Pressing ► repeatedly in Hygrometer mode, the following measurements are displayed in succession:

%rh relative humidity

T_{AIR} air temperature in either °C or °F

T_{DEW} dewpoint in either °C or °F

g.Lb Specific Humidity expressed as grains/lb (when the MMS is set up to measure temperature in °F)

– or –

AbS Mixing ratio expressed as g.kg (when the MMS is set up to measure temperature in °C)

The Mixing Ratio (AbS) or Specific Humidity (g.Lb) displays are accompanied by a momentary beep to draw attention to the unit of measurement before displaying the value itself.

To change from °C to °F temperature measurement and vice versa, please refer to section 5.

BLD5800LH Logging Software

If required, measured values can be stored in the MMS 'Plus' memory for downloading to a PC. Please refer to **Section 6** for details. Only software version 2.04 and above, should be used with the MMS 'Plus'.

Instructions on using the Low Humidity Range Probe, BLD5812

The optional Low Humidity Range (LHR) probe measures humidity in the nominal range 0-40%rh.

It can only be used with the Protimeter MMS 'Plus' instrument as follows:

1. Select Hygrometer mode of operation as detailed in **Section 3**
2. Ensure that the Hygrostick is not plugged into the connection on the top of the instrument
3. Plug the LHR probe to the connection on the right-hand side of the MMS
4. Press ► to display %rh, temperature, dewpoint, Mixing Ratio or Specific Humidity as required

Caution

Be aware that the relative humidity of many environments exceeds 40%rh. When the LHR probe is connected in environments that exceed 40%rh the MMS instrument displays **o - r**, denoting out of range.

The LHR probe must not be plugged into the socket on the top of the MMS instrument. Be aware that this could damage the instrument.

BLD5812 Low Humidity Range Probe Specifications

Nominal measurement range:	0 - 40%rh
	Uncertainty $\pm 2.0\%rh$ @ 20 °C
	0 - 40 °C
	Uncertainty ± 0.3 °C

The information contained in this manual is given in good faith. As the method of use of the instrument (and its accessories) and the interpretation of the readings are beyond the control of the manufacturers, they cannot accept responsibility for any loss, consequential or otherwise, resulting from its use.

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