

Congratulations !

You have purchased the latest in Handheld Relative Humidity and Temperature instrumentation. We trust that your new **MC-83** Relative Humidity-Temperature meter will give you many years of reliable service.

The **MC-83** is a breeze to operate. This manual has been designed to help you get started, and also contains some handy tips. If at any stage you require assistance, please contact either your local TPS representative or the TPS factory in Brisbane.

The manual is divided into the following sections:

1. Table of Contents

Each major section of the handbook is clearly listed. Sub-sections have also been included to enable you to find the information you need at a glance.

2. Introduction

The introduction has a diagram and explanation of the display and controls of the **MC-83**. It also contains a full listing of all of the items that you should have received with your **MC-83**. Please take the time to read this section, as it explains some of items that are mentioned in subsequent sections.

3. Main Section

The main section of the handbook provides full details of the **MC-83**, including operating modes, troubleshooting, specifications, and warranty terms.

MC-83 Humidity & Temperature Meter

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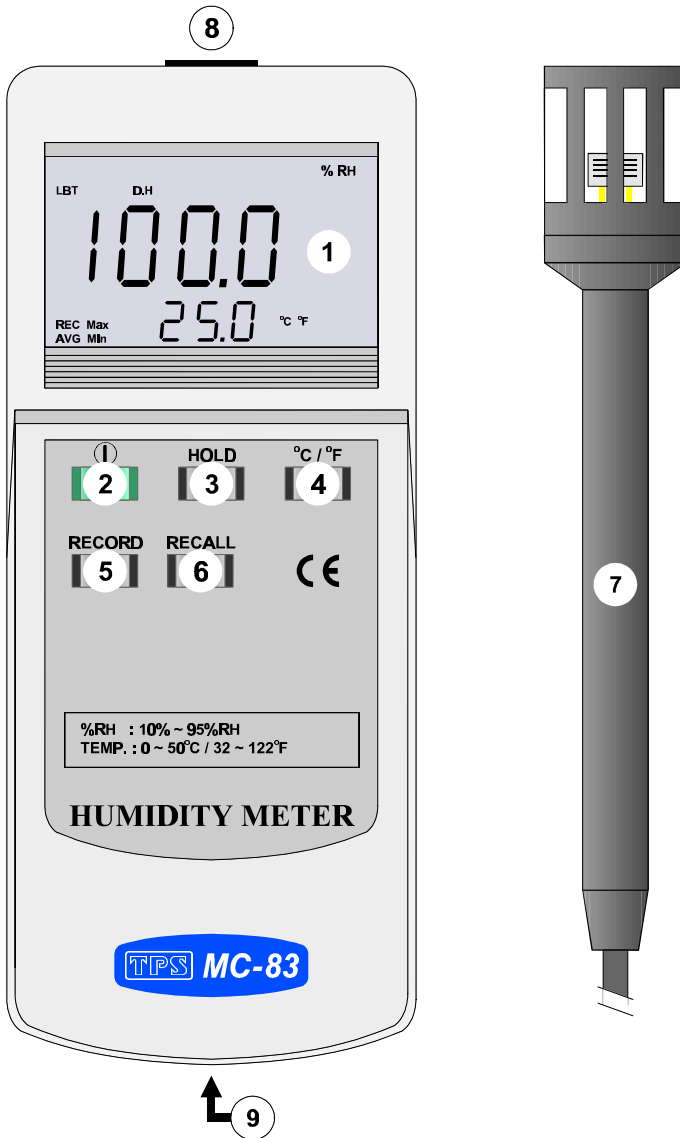
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1. Introduction

1.1 MC-83 Display and Controls



- ① **Display**
Custom Liquid Crystal Display, shows Relative Humidity & Temperature simultaneously. Indicators show the current mode.
- ② **On / Off Switch (Ⓛ).**
Press to switch the **MC-83** on. Press a second time to switch the unit back off. Alternatively, the **MC-83** will switch itself off if no button has been pressed for 10 minutes.
- ③ **HOLD**
Press to freeze a reading on the display. “**D.H**” is shown on the display whilst in Data Hold mode. Press a second time to un-freeze the display. This feature is useful in rapidly changing environments (see section 3).
- ④ **°C / °F**
Selects either °Celsius or °Fahrenheit units in Temperature readout mode. The display shows “°C” or “°F” accordingly. See section 2.
- ⑤ **RECORD**
Press to start recording Maximum, Minimum and Average values. Press a second time to stop recording these values. See section 4 for a full description of this function.
- ⑥ **RECALL**
Press to sequentially recall Maximum, Minimum and Average values recorded using the Record function. See section 4 for a full description of this function.
- ⑦ **Relative Humidity & Temperature Probe**
The Relative Humidity & Temperature Sensor is conveniently supplied with 1 metre of cable. The humidity sensor is a high precision thin-film capacitance type for fast response. The thermistor type temperature sensor is also designed for fast response in air.
- ⑧ **Sensor INPUT socket.**
Plug the sensor into this socket. Take care to align the plug correctly with the socket.
- ⑨ **Battery Compartment / Cover**
Undo the retaining screw and slide out the cover to access the battery.

1.2 Unpacking Information

Before using your new **MC-83**, please check that the following accessories have been included:

	Part No
1. MC-83 Relative Humidity-Temperature Meter.....	126106
2. Hard Plastic Carry Case	MC83CASE
3. 9V Battery.....	130026
4. MC-83 Handbook.....	130050

Options that may have been ordered with your **MC-83**:

1. 75% Relative Humidity Standard, 100mL.....	130090
2. 12% Relative Humidity Standard, 100mL.....	130091

1.3 Specifications

	Range	Resolution	Accuracy
Humidity	10% to 95 %RH	0.1 %RH	±3 %RH
Temperature (°C)	0 to 50 °C	0.1 °C	±0.8 °C
Temperature (°F)	32 to 122 °F	0.1 °F	±1.5 °F

Display	: Custom Liquid Crystal Display shows Relative Humidity and Temperature simultaneously.		
Sensor Type	: Humidity	: Thin-film capacitance sensor	
	: Temperature	: Thermistor	
Power	: 9V Alkaline Battery for 60 hours operation.		
Dimensions	: Instrument	: 185 x 78 x 38 mm	
	: Probe	: 160 x 26mm dia	
Mass	: Instrument only	: Approx 200g	
	: Full Kit	: Approx 0.5kg	
Environment (instrument)	: Temperature	: 0 to 50 °C	
	: Humidity	: 0 to 90 % R.H.	

2. Relative Humidity and Temperature Measurement

1. Plug the sensor into the **INPUT** socket. Take care to align the plug correctly with the socket.
2. Press the green Power switch (ⓘ) to switch the **MC-83** on.
3. The Relative Humidity reading is the larger reading in the top half of the display. Note the “% RH” indicator on the display.

The Temperature reading is the smaller reading in the bottom half of the display. Note the “°C” or “°F” indicator on the display. Press the “°C/°F” button to change between °C or °F readout.

3. Freezing the Reading on the Display

When taking measurements in a rapidly changing environment, or in a difficult to reach areas, the operator is able to freeze the display. This allows readings to be correctly noted.

1. To freeze the display, press the “**HOLD**” button during normal measurement. Note the “**D.H**” indicator on the display whilst the unit is in data hold mode.
2. To resume normal measurement, press the “**HOLD**” button a second time.

4. Data Record and Recall Functions

The Data Record function records the Maximum, Minimum and Average Relative Humidity and Temperature data. This function operates as follows...

1. Press the **“RECORD”** button. Note the **“REC”** indicator on the display whilst the **MC-83** is in data record mode. The unit is now recording Maximum, Minimum and Average Relative Humidity and Temperature values.
2. While the **MC-83** is still in data record mode, press the **“RECALL”** button. The Maximum values will now be displayed. Note the **“Max”** indicator on the display.

Press the **“RECALL”** button a second time. The Minimum values will now be displayed. Note the **“Min”** indicator on the display.

Press the **“RECALL”** button a third time. The Average values will now be displayed. Note the **“AVG”** indicator on the display.

Press the **“RECALL”** button a fourth time to return to normal Data Record mode with current readings on the display.

3. Press the **“RECORD”** button any time to exit Data Record mode.

Notes

1. The automatic power off function is disabled while Data Record mode is active.

5. Battery Replacement

1. When the battery is low the display shows “**LBT**” in the top left hand corner. When this occurs the battery must be replaced as soon as possible, otherwise readings will become inaccurate.
2. Remove the battery cover screw on the rear of the **MC-83** and slide out the battery cover.
3. Remove the battery and replace it with a new 9V battery. Alkaline batteries are preferred.
4. Replace the battery cover and re-tighten the screw.

6. Display Mode Indicators

Below is a summary of the mode indicators that appear on the **MC-83** display...

Indicator	Meaning
% RH	Indicates that the top reading is % Relative Humidity.
°C	Indicates that the bottom reading is Temperature in °C.
°F	Indicates that the bottom reading is Temperature in °F.
D.H	Indicates that the MC-83 is in Data Hold mode (see section 3).
REC	Indicates that the Record Data mode is currently active. (see section 4).
Max	Indicates that the MC-83 is displaying the Maximum recorded readings.
Min	Indicates that the MC-83 is displaying the Minimum recorded readings.
AVG	Indicates that the MC-83 is displaying the Average recorded readings.
LBT	Indicates that the battery requires replacement.

7. Humidity Calibration

The **MC-83** is supplied pre-calibrated. Re-calibration will be required periodically (approx annually), depending on application, environment etc. 75% and 12% Relative humidity standards are available from TPS. Table 1 shows the Relative Humidity characteristics of these two standards.

When making up your own standards...

- The solution must be saturated with the salt, i.e. no further solids will dissolve.
- Use distilled water.
- Use a plastic bottle that allows the sensor tip to fit snugly into the top of the bottle, making a good seal.
- Allow 24 hours after mixing for the temperature to stabilise.
- Standards can be stored (sealed) for approximately one year.

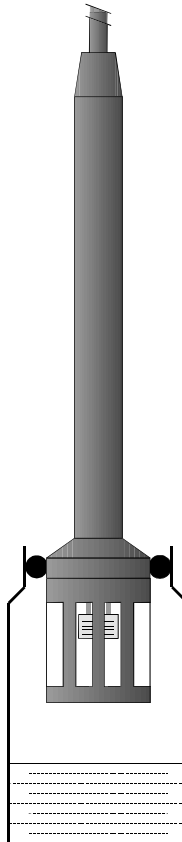
7.1 Calibration Procedure

1. Fit the sensor head into a bottle of 12% humidity standard (part no 130091).

The sensor head must be above the level of the standard, as per the diagram below.

DO NOT IMMERSE THE SENSOR.

Leave for 3 hours to allow the Relative Humidity in the bottle to stabilise.

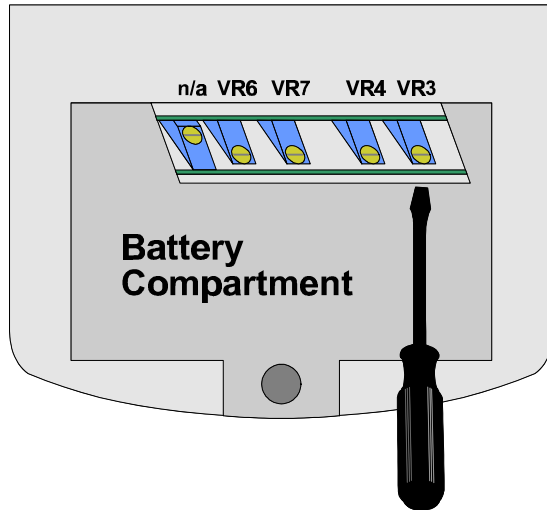


2. Switch the meter on.

Wait for the displayed Relative Humidity reading to stabilise (up to 3 minutes).

3. Remove the battery cover screw on the rear of the **MC-83** and slide the battery cover away.

Adjust VR3 (see diagram below) until the display shows the appropriate Relative Humidity value for the current temperature, as detailed in Table 1.



4. Fit the sensor head into a bottle of 75% humidity standard (part no 130090).

The sensor head must be above the level of the, as per the diagram in Step 1.

DO NOT IMMERSE THE SENSOR.

Leave for 3 hours to allow the Relative Humidity in the bottle to stabilise.

5. Switch the meter on.

Wait for the displayed Relative Humidity reading to stabilise (up to 3 minutes).

Note the reading obtained, and record it as “**A**”.

Make the following calculation to obtain value “**B**”

$$\mathbf{B = A \times (Z - Y) / (A - Y)}$$

Where...

Y is the value of the 12% humidity standard at the current temperature, as calibrated in step 3 above

Z is the value of the 75% humidity standard at the current temperature, as per Table 1.

For example...

If A = 70.0

 Y = 11.3 (assuming the current temperature is 25 °C)

 Z = 75.3 (assuming the current temperature is 25 °C)

Then B = 70.0 x (75.3 – 11.3) / (70.0 – 11.3)

 B = 70.0 x 64.0 / 58.7

 B = 76.3

6. Adjust VR4 (see diagram in Step 3 above) until the display shows the value of B calculated above.
7. Adjust VR3 (see diagram in Step 3 above) until the display shows the value of Z above.
8. Replace the battery cover and re-tighten the screw.

Notes

1. VR6 & VR7 are Temperature Zero and Gain adjustments respectively, and should **NOT** be adjusted in the field. They are factory set adjustments only.

Table 1 – Relative Humidity Vs Temperature of Standard Solutions

Temp °C	Lithium Chloride LiCl (Y)	Sodium Chloride NaCl (Z)
0	11.2	75.5
5	11.3	75.7
10	11.3	75.7
15	11.3	75.6
20	11.3	75.5
25	11.3	75.3
30	11.3	75.1
35	11.3	74.9
40	11.2	74.7
45	11.2	74.5
50	11.1	74.4

8. Troubleshooting

Symptom	Possible Causes	Remedy
Unstable readings	<ol style="list-style-type: none"> 1. Battery is low 2. Requires re-calibration 3. Sensor is faulty. 	Replace battery. Re-calibrate meter. Return to factory for repair.
Display shows just "----"	<ol style="list-style-type: none"> 1. Meter has over-ranged. 2. Instrument or sensor is faulty. 	Check that the R.H. or temperature are within the specified ranges (section 1.3) Return to factory for repair.
Meter will not turn on.	Battery is exhausted.	Replace the battery.
Reading does not change. Fixed at one value.	Data Hold function is selected.	Press " HOLD " again to unfreeze display.

9. Warranty

TPS Pty. Ltd. guarantees all instruments and sensors to be free from defects in material and workmanship when subjected to normal use and service. This guarantee is expressly limited to the servicing and/or adjustment of an instrument returned to the Factory, or Authorised Service Station, freight prepaid, within twelve (12) months from the date of delivery, and to the repairing, replacing, or adjusting of parts which upon inspection are found to be defective. Warranty period on sensors is three (3) months.

There are no express or implied warranties which extend beyond the face hereof, and TPS Pty. Ltd. is not liable for any incidental or consequential damages arising from the use or misuse of this equipment, or from interpretation of information derived from the equipment.

Shipping damage is not covered by this warranty.

Please note

A guarantee card is packed with the instrument or sensor. This card must be completed at the time of purchase and the registration section returned to TPS Pty. Ltd. within 7 days. No claims will be recognised without the original guarantee card or other proof of purchase. This warranty becomes invalid if modifications or repairs are attempted by unauthorised persons, or the serial number is missing.

Procedure for service

If you feel that this equipment is in need of repair, please re-read the manual. Sometimes, instruments are received for "repair" in perfect working order. This can occur where batteries simply require replacement or re-charging, or where the sensor simply requires cleaning or replacement.

TPS Pty. Ltd. has a fine reputation for prompt and efficient service. In just a few days, our factory service engineers and technicians will examine and repair your equipment to your full satisfaction.

To obtain this service, please follow this procedure

Return the instrument AND ALL SENSORS to TPS freight pre-paid and insured in its original packing or suitable equivalent. INSIST on a proof of delivery receipt from the carrier for your protection in the case of shipping claims for transit loss or damage. It is your responsibility as the sender to ensure that TPS receives the unit.

Please check that the following is enclosed with your equipment:

- **Your Name and daytime phone number.**
- **Your company name, ORDER number, and return street address.**
- **A description of the fault. (Please be specific.)**
(Note: "Please Repair" does NOT describe a fault.)

Your equipment will be repaired and returned to you by air express where possible.

For out-of-warranty units, a repair cost will be calculated from parts and labour costs. If payment is not received for the additional charges within 30 days, or if you decline to have the equipment repaired, the complete unit will be returned to you freight paid, not repaired. For full-account customers, the repair charges will be debited to your account.

- **Always describe the fault in writing.**
- **Always return the sensors with the meter.**