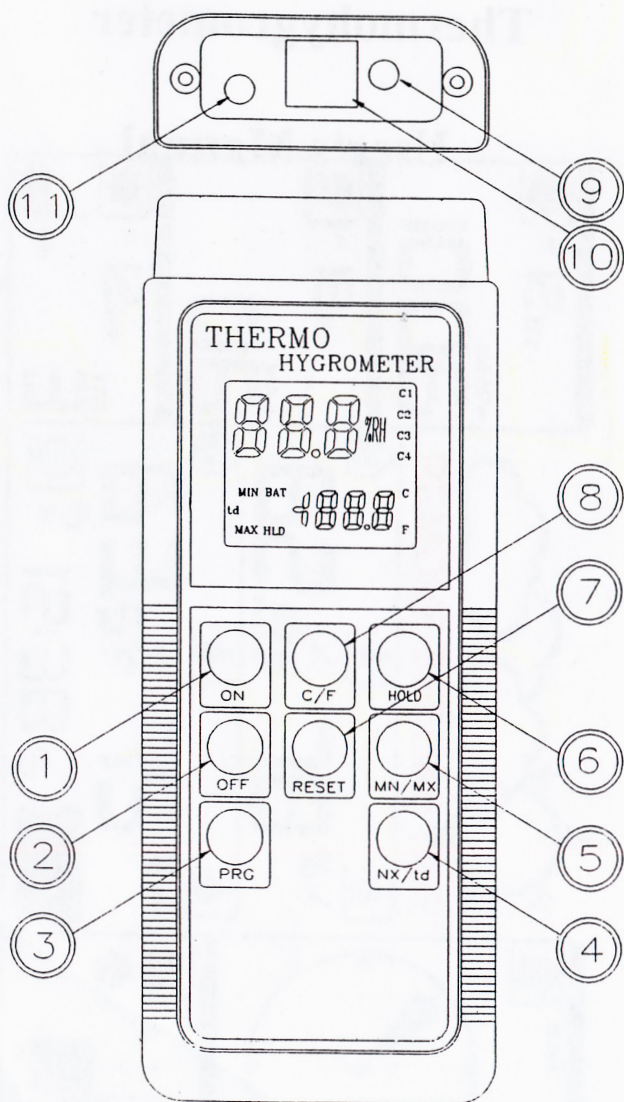


**MEMORY  
HYGROMETER/  
THERMOMETER  
INSTRUCTIONS**



# **Programmable Thermohygrometer**

## **Users' Manual**

This manual was written in four sections with the following order:

### **I FUNCTION KEYS**

This section sketches the layout of meter and describes all the possible uses of function keys.

### **II QUICK REFERENCE**

This section briefs the application and special features of all operation modes.

### **III OPERATION MODES**

This section details the instructions to operate the meter mode by mode.

### **IV ERROR MESSAGES**

This section explains the error display.

#### **I FUNCTION KEYS**

- 1) ON key
  - Power on
- 2) OFF Key
  - Power off
- 3) PRG Key
  - Switch To Alarm Check Mode From Measuring Mode
  - Switch To Alarm Setting Mode From Alarm Check Mode
  - Save The Alarm Settings And Calibrations
  - Switch To Temperature And Humidity Calibration
- 4) °C/°F Key
  - Switch between display of °C and °F
- 5) RESET Key
  - Reset Min/Max Memory
  - Erase Alarm Settings
  - Skip Calibration Mode
  - Switch Back To Normal Measuring Mode From Alarm Check Mode Or Calibration Mode

- 6) HOLD Key
  - Hold display
- 7) MN/MX Key
  - Display Minimum Value Of Memory
  - Display Maximum Value Of Memory
  - Increase/Decrease The Temperature Deviation Value
  - Sleep/Non-Sleep Mode Switch
- 8) NX/td Key
  - To Flash Next Digit For Alarm Setting
  - To Display The Next Alarm Setting Value
  - To Flash Next Digit For Calibration
  - Dew Point Read Out
- 9) 9V DC POWER JACK
- 10) PROBE SOCKET
- 11) RS232 OUTPUT SOCKET

## **II QUICK REFERENCE**

### **A. Measuring Mode**

This is the basic function to measure temperature (°C or °F) and relative humidity.

### **B. Calibration Mode**

With our 4394 & 4395 humidity reference, the end users can do the calibration themselves. This feature provides a DO-IT-YOURSELF accuracy maintenance and replacement of the probe.

### **C. Low/High Humidity Calibration Mode**

Two points' calibration is necessary for maintaining the accuracy of the meter.

### **D. Alarm Check Mode**

An environment monitoring system is implanted in the meter for special uses. A monitoring range can be set up earlier, the user will be warned for any out-of-range reading.

This Mode provides you to check the alarm settings to see if they are under your requirement.

### **E. Alarm Setting Mode**

Set, adjust and cancel the alarm settings.



## F. RS232 Output

To link to the computer gets records.

## G. Sleep Mode Option

We have a Non-sleep mode and a 20 minutes sleep mode. You can switch easily between two.

## H. Mn/Mx Mode

Maximum and Minimum monitoring. You can find out the minimum and maximum values of previous recording simply by pressing MN/MX key sequentially. The screen will display Fig. 1 & Fig. 2. Press it again to go back to normal mode or the meter will return to normal mode in 10 seconds.

## I. Hold Mode

Hold the screen for specific measuring. Simply press HOLD key when you do the measurement. The screen will display Fig. 3. Press it again to go back to normal mode.

# III OPERATION MODES

## A. Measuring Mode

This is the normal operation mode for measuring relative humidity and temperature and is the default mode when the power is first on (Fig. 4). Display of Fig. 4 will appear for 1 second, then a sensor offset as in Fig. 7 will appear and finally a display of Fig. 5 appears. When the LCD displays the



FIG 1

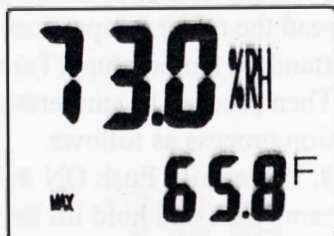


FIG 2



FIG 3



FIG 4

two readings for humidity and temperature, (Big characters is humidity and small characters is temperature), it is in the measuring mode.

### B. Temperature Calibration Mode

Conduct this procedure only if there is significant difference between your temperature standard and the meter reading.

1. Power on. In Measuring Mode, read the meter temperature ( $T_m$ ) and standard temperature ( $T_s$ ) of yours. Then proceed to temperature calibration process as follows.

2. Power off. Push ON & PRG at the same time and hold till the LCD displays CAL (Fig. 6). As ON & PRG are released, the LCD will display a number X.Y ( $T_o$ ) with X flashing (Fig. 7). X.Y is the sensor offset value.

3. The formula to get the right calibration is  $T_c = T_o + T_m - T_s$ ,  $T_c$  stands for final deviation value shown in the display (Fig. 9).  $T_o$  stands for initial deviation value shown in the display (Fig. 7).

4. We use an example to illustrate the temperature calibration. If standard temperature ( $T_s$ ) is 59 and the reading of the meter is 60.8. The deviation when you start the meter is 0.5 ( $T_o$ , Fig. 7). From the formula,  $T_c = 0.5 + 60.8 - 59 = 2.3$ . From of step 2, hold on MN/MX key, "X" will change from 0 to 1, 2, 3, -3, -2, -1, -0. Re-

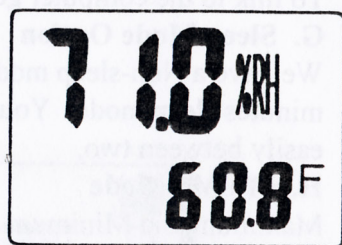


FIG 5

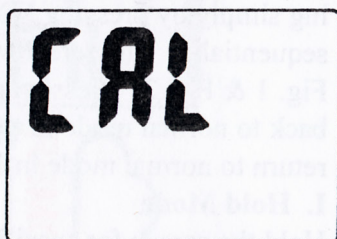


FIG 6

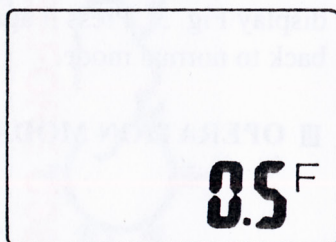


FIG 7

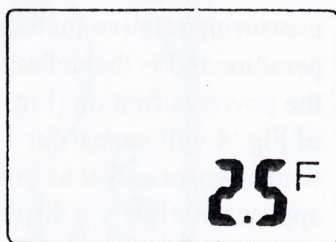


FIG 8

lease the key when it display "2" (Fig. 8). Press NX/td key, the "Y" will be flashing now. Hold on MN/MX, it will change from 0-9. Release the key when it displays "3" (Fig. 9). Press PRG until it displays "SA" (Fig. 10). Turn off the machine and finish the temperature calibration. If you turn on the meter now, it will display Fig. 11.

### C. Low Humidity Calibration Mode

Two points' calibration is necessary for the accuracy of the meter.

1. Power off. Push ON & PRG at the same time and hold till the LCD displays CAL (Fig. 6). As ON & PRG are released, the LCD will display a number X.Y (Fig. 9).

2. Gently open the cover of 4394 Insert the probe into the container from the top until you reach the end. (Warning: Be very careful and slow while inserting the probe or pulling it out. Any rough movement may damage the Humidity Reference Bottle.

3. Press RESET twice, the LCD displays 32.X% and MIN (Fig. 12). The low humidity calibration will be in process automatically. This process will be completed in about 40 minutes with "SA", "MAX" and "MIN" shown by LCD display (Fig. 13).

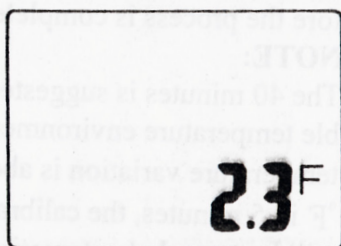


FIG 9

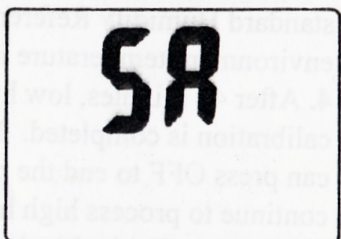


FIG 10

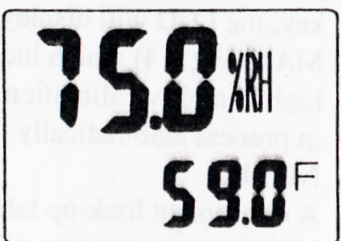


FIG 11

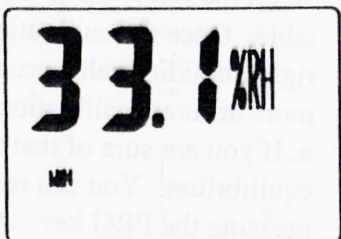


FIG 12



(Warning: Do not touch any keys before the process is completed.)

**NOTE:**

The 40 minutes is suggested for a stable temperature environment. If the temperature variation is above  $\pm 0.5$  °F in 5 minutes, the calibration time will be extended automatically. It is recommended to isolate or insulate the standard Humidity Reference if the environment temperature is not stable.

4. After 40 minutes, low humidity calibration is completed. Now you can press OFF to end the process or continue to process high humidity calibration. To do this, insert the probe into 4395 and press the NX/td key, the LCD will display 75.X and MAX (Fig. 14) which indicates the high humidity calibration will soon be in process automatically.

**NOTE:**

A convenient look-up table has been built in to aid calibration. If different temperatures, say 25 °C, the RH of MgCl is 32.7 and in 30°C, the RH is 32.4. The relations are recorded in the look-up table. Once the calibration mode in ON, the meter will search the right humidity value according to the current temperature to get more accurate calibration.

a. If you are sure of that temperature is stable and humidity is in equilibrium. You can reduce the time of the above process by pressing the PRG key. A "SA" will be shown on the screen. Be very careful with this. If the time interval is not long enough for unit to catch the right humidity, whole measurement later will not be valid.

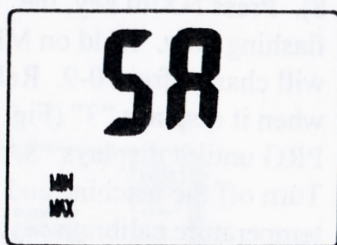


FIG 1 3

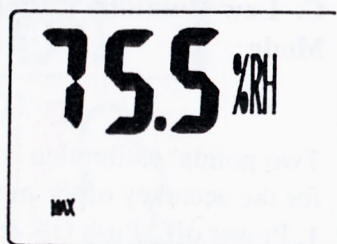


FIG 1 4

b. To skip the on-going calibration process, press RESET. If you are not sure of the on-going process, press OFF.

c. After humidity calibration is done, if the measuring mode displays E2 instead of the RH and temperature readings, this means something is wrong. Please refer to error messages section.

#### **D. High Humidity Calibration Mode**

1. There are two ways to enter the high humidity calibration mode:

a. Turn off the meter. Plug probe into 4395, then press ON & PRG at the same time. Hold till CAL is displayed on screen. Release ON & PRG and press RESET three times, the LCD will show 75.X% and MAX (Fig. 14). This indicates that the high humidity calibration is in automatic process.

b. When the automatic process for low humidity calibration is completed, the LCD displays SA, MAX and MIN (Fig. 13). Insert the probe into 4395 then press NX/td. The LCD will show 75.X% and MAX (Fig. 14). This indicates that the high humidity calibration is in automatic process.

2. Once the meter starts the automatic calibration process, do not touch any key until the meter switches to measuring mode.

3. To reduce the time for calibration process, press PRG. Be cautious with this, refer to NOTE a. of the "Low Humidity Calibration".

4. To skip the on-going calibration process, press RESET. Turn off the meter if you are not sure of the on-going process.

#### **E. Alarm Check Mode**

1. In measuring mode, press PRG key. The LCD will display the indicators C1, C2, C3, C4 plus XY.Z with C1 flashing first (Fig. 15).

2. XY.Z is the numeric value previously set for the flashing indicator. If "---", instead of a reading is displayed, it indicates that there is no alarm setting for this option.

3. Press NX/td key to check the value of C2 (C2 is flashing now), and press NX/td again to check C3, and so on.

4. In monitoring range, C1 indicates the warning point for low temperature. C2 indicates the warning point for high temperature.

C3 indicates the warning point for low humidity. C4 indicates the warning point for high humidity.

5. Press RESET key to switch the mode back to the normal operation mode, i.e. the measuring mode.

### F. Alarm Setting Mode

For example, if a user needs to be alarmed when the temperature reading goes below 75°F or above 100°F and when the relative humidity reading goes below 56% or above 75%, the user should set C1, C2, C3 and C4 as follows:

C1=75°F; C2=100°F; C3=56%;

C4=75%;

Once the meter readings go out of the range, the alarm will start to beep.

The LCD will also display which indicator is alarmed. Steps to set up the alarm are as follows:

1. Power on the meter. When the RH reading and the temperature reading are displayed (Fig. 5). Press PRG to switch from the measuring mode to alarm check mode (Fig. 15 with C1 flashing).

2. Press PRG key, it will display 77.0°F as Fig. 16 with 7 flashing. C1 means we are in low temperature alarm setting screen.

3. Press NX/td key to change the digital flash. Press MN/MX and change the number until it display 75.0°F as Fig. 17.

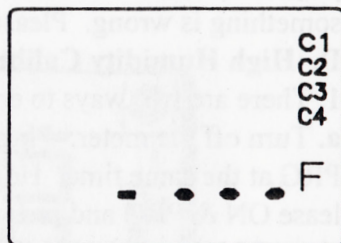


FIG 15

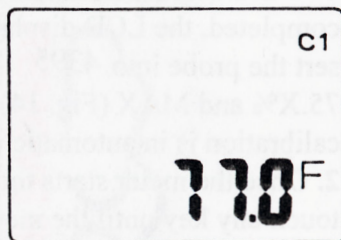


FIG 16

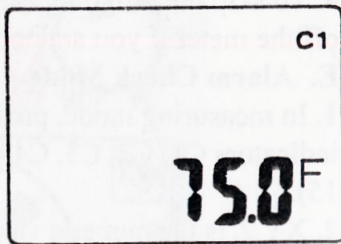


FIG 17



4. Press PRG key until it displays SA, release it, the display will show as Fig. 18 with C1 flashing.

5. Press the NX/td key until C2 flash.

6. Press the PRG key. Repeat step 2,

3. Change the number to 100°F.

Press PRG to save the setting. It will show as Fig. 19 with C2 flashing.

7. Press NX/td until C3 flash as Fig. 20.

8. Press PRG, it will display as Fig. 21 with 5 flashing.

9. By Pressing NX/td, MN/MX to change the number to 56. Then press PRG key to save. It shows as Fig. 22 with C3 flashing.

10. Press NX/td one time and it will flash C4.

11. Do step 8, 9 but change the number to 75. It will show Fig. 23 with C4 flashing.

12. Press OFF, turn off the meter or press RESET (after hearing the beep, release the key) and goes back to measuring mode.

13. In measuring mode, if the meter reads 75.1% and 74.9°F, it will continue beeping and display as shown in Fig. 24. C1, it means temperature is below our setting. C4, it means the humidity is above our setting.

14. Cancel setting: when in step 4 (or step 9), if you press RESET and hold it for 2 seconds and hear two beeps.

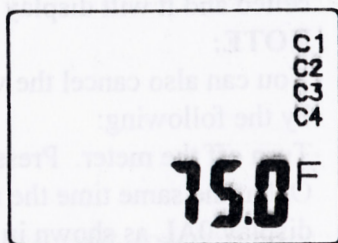


FIG 18

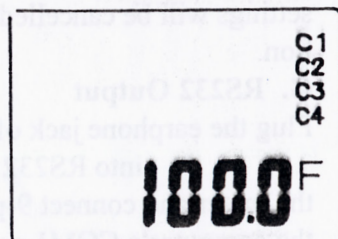


FIG 19

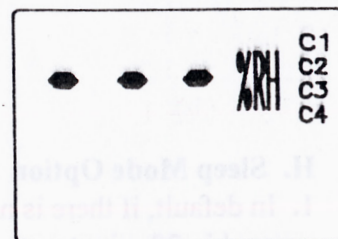


FIG 20

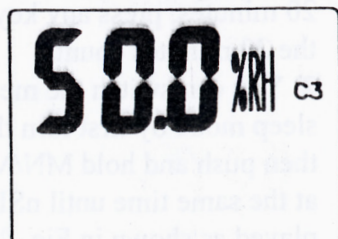


FIG 21

This means the setting has been cancelled and it will display as Fig. 25.

**NOTE:**

You can also cancel the whole setting by the following:

Turn off the meter. Press RESET and ON at the same time the meter will display 0AL as shown in Fig. 26 with two beeps. Thus C1, C2, C3 and C4 settings will be cancelled at one operation.

**G. RS232 Output**

Plug the earphone jack of the cable into RS232 socket on the meter and connect 9-pin D-sub to the computer's COM1 or COM2. Press ON key to start measurement.

**H. Sleep Mode Option**

1. In default, if there is no key pressed in 20 minutes, the meter will go off automatically. A warning continuous beep will sound shortly before 20 minutes, press any key can restart the 20 minutes counts.
2. You can switch the meter to non-sleep mode by first turn the meter off, then push and hold MN/MX and ON at the same time until nSL is displayed as shown in Fig. 27. Release

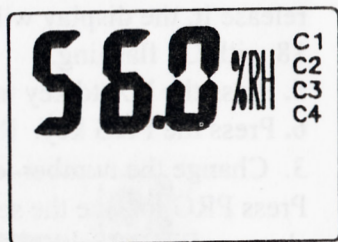


FIG22

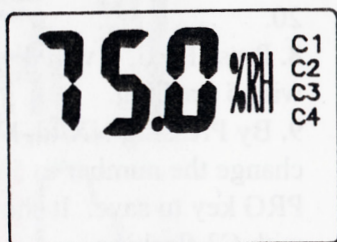


FIG23



FIG24

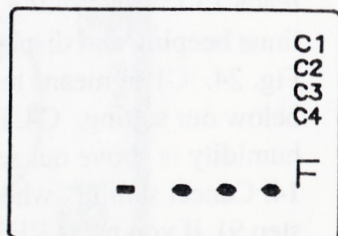


FIG25

the key and you are in Non-Sleep mode.

#### I. °C/°F Switch Mode

You can change the °C/°F display anytime you want by pressing the °C/°F key during operation. You can also change the default display by the following:

For example, if the meter turn on, temperature default to °F. Push PRG & ON at the same time until CAL is shown. Press RESET, we will see as Fig. 28 on the screen. Press MN/MX to change °F to °C. Press PRG until it displays SA, release the key, turn off the meter. Now when you turn on the meter, it will default to °C.

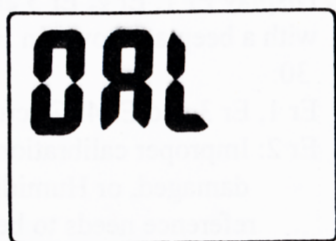


FIG26

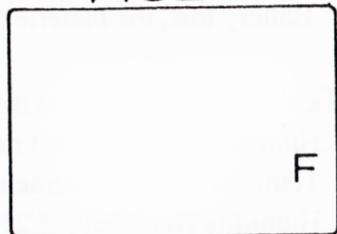


FIG28

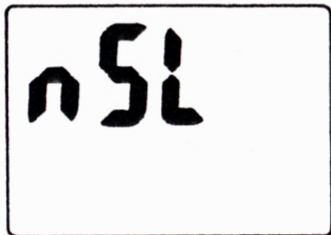


FIG27

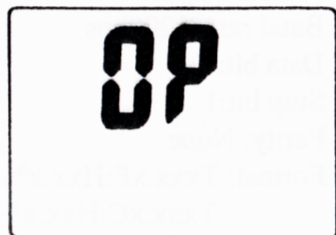


FIG29

#### IV ERROR MESSAGES

1. Display OP with continuous beeps as shown in Fig. 29:

Probe is not connected in the right position.

2. Display 0.0%, 99.9% for a long period of time:

Probe damaged. Please replace a new probe.

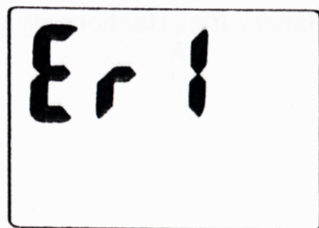


FIG30

3. Display Er 1, Er 2, Er 3 and Er 4 with a beep as shown in Fig. 30:  
Er 1, Er 3 and Er 4: Circuit error  
Er 2: Improper calibration; Probe damaged, or Humidity reference needs to be changed.
4. Display battery with screen flashing:  
Battery low, the batteries need to be replaced.

## Technical Specification

1. Humidity measurement range: 10 to 95% RH  
Temperature measurement range:  $-20$  to  $50^{\circ}\text{C}$  ( $-20$  to  $122^{\circ}\text{F}$ )
2. Humidity Accuracy: 2%RH midrange  
4%RH otherwise  
Temperature Accuracy:  $\pm 1^{\circ}\text{F}$
3. RS232 output  
Baud rate: 1200bps  
Data bit: 7  
Stop bit: 1  
Parity: None  
Format: Txxx.xF:Hxx.x% cr lf  
Txxx.xC:Hxx.x% cr lf
4. Storage Temperature:  $-20^{\circ}\text{C}$  to  $50^{\circ}\text{C}$
5. Operating Temperature:  $0^{\circ}\text{C}$  to  $50^{\circ}\text{C}$
6. Power requirements: Single 9V battery
7. Battery life: 100 hours typical (alkaline)



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