37950-00
-03

## Accessories and replacement parts

| Description | Number |
|---|---|
| Replacement probe with 4-ft extension cord, 7¹³⁄₁₆"L x 1¹⁄₁₆" dia | MN-37950-52 |
| Replacement calibration salt bottle, 33% RH | MN-37950-60 |
| Replacement calibration salt bottle, 75% RH | MN-37950-61 |
| Replacement batteries, 9 V, pack of 4 | MN-09376-04 |

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## Table of Contents

# I. Introduction

Thank you for selecting the Cole-Parmer® 37950-00 thermohygrometer. This microprocessor-based relative humidity and temperature hygrometer measures relative humidity (RH) from 0 to 99.9% RH and temperature from 0.0° to 199.9°F (-17.7° to 93.2°C). Use this meter for ambient air and environmental applications.

⚠ **Caution: Do not submerge the probe in a liquid or powder or else damage to the probe may occur. Probe is for ambient air use only.** ⚠
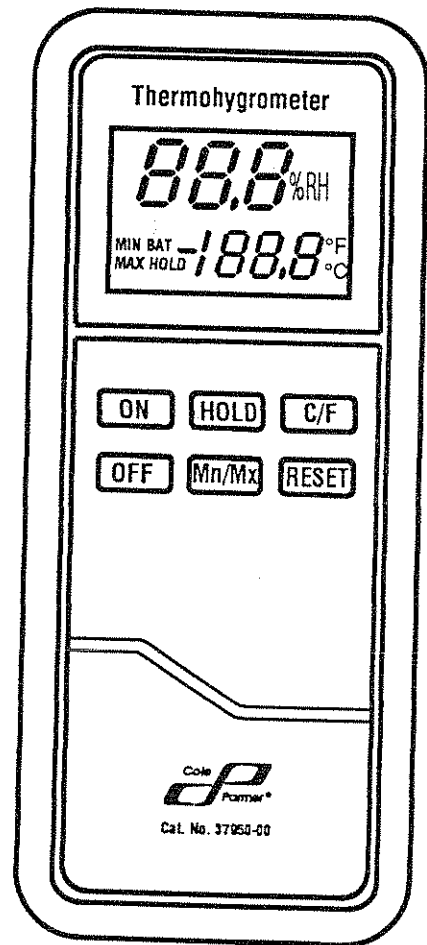
## II. Packing List

The following items should be in your shipping box:

- Meter
- Probe
- Carrying case
- This instruction manual

## III. Installing the Battery

This meter runs on one (1) 9 V battery that provides 50 hours of service minimum. To order a replacement battery, see the inside front cover of this manual. The display flashes to indicate when the batteries are low.

The battery compartment is located on the back of the meter below the pull-out support stand.

**To install the battery:**

1.  Turn the instrument keyboard-side down to expose the back panel with the pull-out support stand.

2.  Using your fingernail, a coin, or another sharp instrument, pry open the battery compartment cover by pulling back and lifting up the latch. See Figure 1.



Figure 1. Back view.

Labels: Non-skid rubber strip; Hinge; Pull-out support stand; Clip to secure support stand; Battery compartment latch; Battery compartment lid; Non-skid rubber strip

3.  Install the battery by aligning the connectors on the battery with the receptors on the battery connector plug. Press firmly until the battery is in place. See Figure 2.

6.  Close the battery compartment cover by pressing firmly until you hear a click.

**To replace the battery:**

Follow the instructions above, except turn the meter off before you begin the process. To remove the old battery, pull the battery connector plug gently off the battery. To order a new battery, see the inside front cover of this manual.
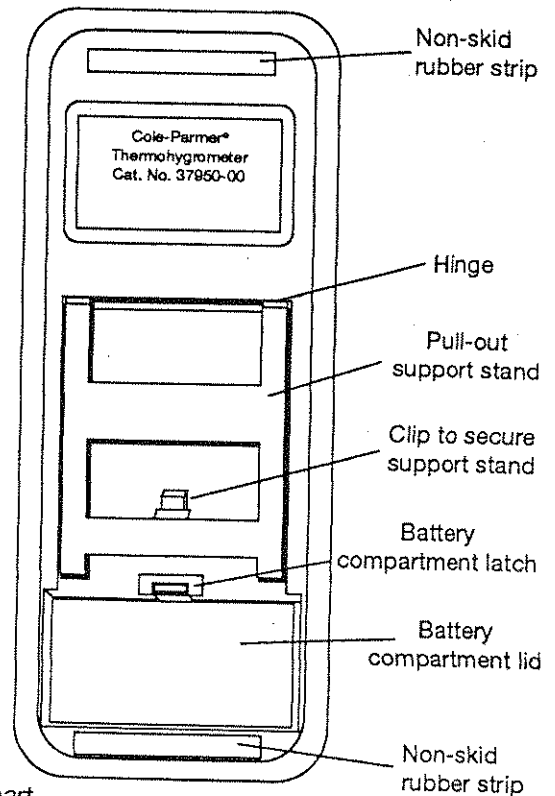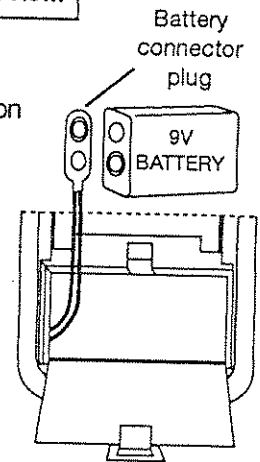


Battery connector plug

9V BATTERY

Figure 2. Back view, showing open battery compartment.

## IV. Start-up

To get started, connect the probe to the top of the meter. See "Connections" on page 5 if you need directions. Press **ON**. First you will see a test screen, then the current temperature offset value. After this, the meter is in the measuring mode and the screen displays the current relative humidity reading and the temperature. If this does not happen and the display remains off, check the battery or AC connection. Otherwise, see page 14 for an explanation of error messages.

The thermohygrometer is shipped fully calibrated, but we recommend periodic calibration checks to insure full accuracy. If humidity reading is off by more than 2% when checking against a salt reference or other humidity standard, please see section V (pages 6–8) for calibration instructions.
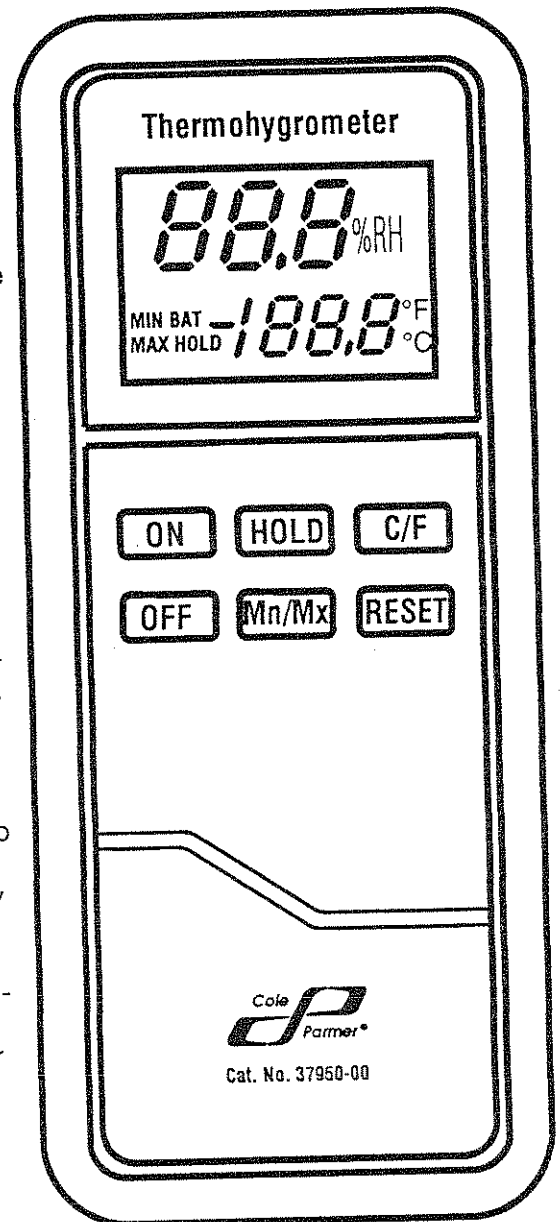
Thermohygrometer

88.8 %RH

MIN BAT
MAX HOLD ─ 188.8 °F °C

[ ON ]  [ HOLD ]  [ C/F ]

[ OFF ]  [ Mn/Mx ]  [ RESET ]

Cole Parmer®

Cat. No. 37950-00

Figure 3. Front view of meter.

## A. Description of function Keys

See Figure 3 on page 3 for the placement of these keys.

**ON**
- Turns the meter on
- Use with other function keys to get advanced options

**OFF**
- Turns the meter off

**HOLD**
- Freezes the current display readings
- Selects the next digit for calibration

**Mn/Mx**
- Displays the minimum and maximum measured values
- Increases/decreases the temperature offset value
- Changes default display to °C or °F
- Switches between automatic shutoff and non-sleep modes

**C/F**
- Temporarily switches display output between °F and °C
- Saves settings and calibration data
- Switches to calibration mode when pressed with **ON** and **RESET**

**RESET**
- Resets the minimum/maximum value memory
- Discontinues the calibration mode

### B. Connections

**To attach the probe:**

1. Position the meter so that the connectors on the top of the meter are visible.

2. Align the flat edge of the plug grip with the back of the meter. See Figure 4.

3. Press plug firmly into socket.

Flat side
of plug

Figure 4. Top view,
showing connections.

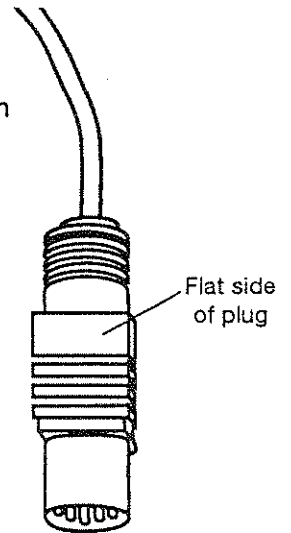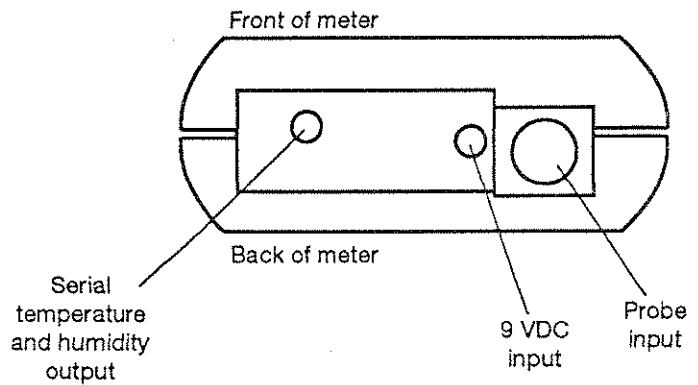Front of meter

Back of meter

Serial
temperature
and humidity
output

9 VDC
input

Probe
input

**Other
connections:**

Two other connections are available:

- 9 VDC power connection
- Serial output for temperature and humidity

Make these connections according to Figure 4. See page 13 for a description of how these connections may be used.

## V. Calibration

### A. Temperature Calibration

*Note: You don't need to calibrate the temperature unless there is a significant difference between the indicated meter temperature and a verified temperature standard.*

**Calibrate the temperature as follows:**

1. Determine the amount of adjustment needed:

   a) Determine the temperature offset value currently used by the meter, $T_o$, by pressing **OFF**, then **ON**: the offset value displays for about 2 seconds just after the test screen has appeared and before the current readings are shown.  $T_o =$ _____

   b) Measure the temperature with this meter, $T_m$.

   $T_m =$ _____

   c) Measure the temperature with a verified temperature standard, $T_s$.  $T_s =$ _____

   d) Calculate the new temperature offset value, $T_{new}$, by adding the results in steps (a) and (b) and subtracting the results in (c): $T_{new} = T_o + T_m - T_s$.  $T_{new} =$ _____

2. Press **OFF**.

3. Press **ON, C/F**, and **RESET** simultaneously and hold until the screen displays "CAL". Release the keys. The screen displays the current temperature offset value, $T_o$, with the first digit flashing.

4. Change the temperature offset value to the new temperature offset value, $T_{new}$, calculated above in step 1 (d).

   a) Press **Mn/Mx** to change the flashing digit to the first digit of $T_{new}$, which was calculated above. The number will change each time **Mn/Mx** is pressed from 0 to 1, 2, 3, –3, –2, –1, –0. Press **Mn/Mx** as many times as needed to get the digit you want.

   b) Press **HOLD**. The other digit begins flashing.

   c) Press **Mn/Mx** to change flashing digit to the second digit of $T_{new}$.

7. Press **C/F** and hold until the screen displays "SA", for "saved".

8. Press **OFF**. The new temperature offset value will be used the next time you turn on the meter.

## B. Relative Humidity Calibration

Check the relative humidity calibration of your meter every 30 days or more often if you frequently measure extreme humidity conditions. To do this, place the probe in two different calibration salt bottles and check the measured value against the reference value in each case. If the measured value does not equal the reference value, recalibration may be necessary if the difference between the values does not meet your accuracy requirements. If the values are only slightly different and you do not require the highest possible accuracy, then calibration is not necessary.

*Note: Relative humidity calibration takes 90 to 120 minutes.*

*Note: Two-point relative humidity calibration is necessary to maintain the accuracy of the meter throughout its range.*

### Calibrate for humidity as follows:

1.  Place the meter, probe, and calibration salt bottles in a place where the temperature will remain constant for 40 to 90 minutes. This can be done by thermally isolating the calibration salt bottle and probe or by placing them in a temperature-controlled environment such as the carrying case. Keep away from sunlight, electronic equipment, drafts, heating ducts, and all other causes of temperature variation.

*Note: You will not get good results if your calibration temperature varies more than ±0.5°F in five minutes. If this happens, the meter automatically extends the calibration time, so if the temperature is very unstable the calibration might never be complete. To prevent this, thermally insulate the calibration salt bottle and probe or place them in a temperature-controlled environment such as the carrying case.*

2.  Press **OFF**.

3.  Press **ON**, **C/F**, and **RESET** simultaneously and hold until the screen displays "CAL". Release the keys. The screen displays the temperature offset value.

4.  Calibrate the low humidity point as follows:

⚠️ **Caution: Be very careful when inserting the sensor probe into the calibration salt bottle. Rough movement may damage the bottle.** ⚠️
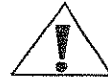
a) Gently open the cover of the 33.0% RH salt bottle and carefully insert the probe into the container. The probe will hit a stopper when it is fully inserted.

b) Press **RESET**. The screen displays "33.0%RH" and "MIN". The meter will beep when the key is pressed. DO NOT press any other keys! Low humidity calibration begins automatically and takes between 45 and 60 minutes to complete.

*Note: Do not touch any key before the calibration process is complete or you will need to start the process over again. If you need to discontinue the calibration process, press RESET three times and the meter will return to the measuring mode.*

c) When calibration is complete, the meter will display "SA".

5.  Calibrate the high humidity point:

⚠️ **Caution: Be very careful when inserting the sensor probe into the calibration salt bottle. Rough movement may damage the bottle.** ⚠️

a) Gently open the cover of the high-point humidity salt bottle and carefully insert the probe into the container. The probe will hit a stopper when it is fully inserted.

b) Press **HOLD**. The screen displays "75.0%RH" and "MAX". The meter will beep when the key is pressed. DO NOT press any other keys! High humidity calibration begins automatically and takes between 45 and 60 minutes to complete.

*Note: Do not touch any key before the calibration process is complete or you will need to start the process over again. If you need to discontinue the calibration process, press RESET three times and the meter will return to the measuring mode.*

c) When calibration is complete, the meter displays "C2". If it displays E2 instead, recalibrate the probe. If it still displays E2, the probe is damaged and you need to replace it.

d) Press **OFF**. Remove probe from high-point humidity salt bottle. Relative humidity calibration is now complete.

### 4. Mn/Mx memory mode

Press **Mn/Mx** to display the minimum and maximum values of temperature and relative humidity that were registered during the current power-on usage period.

1.  In the measuring mode, press **Mn/Mx**. The display now shows the minimum values for relative humidity and temperature, with "MIN" in the lower left-hand display area. If no key is pressed within 10 seconds, the display reverts to active readings. Otherwise see step 2.

2.  To display the maximum values, press **Mn/Mx** again within the 10-second period. The display now shows the maximum values for relative humidity and temperature, with "MAX" in the lower left-hand display area. If no key is pressed within 10 seconds, the display reverts to active readings. Or, press **Mn/Mx** to return to active readings immediately.

### 5. Hold mode

Press **HOLD** while in the measuring mode to freeze the display screen readings. Press **HOLD** again to return to active readings.

### 6. °C/°F mode

Press **C/F** to switch the display output between °C and °F. Whenever the meter is turned on, it reverts to a default display.

## B. Advanced Operations

This meter comes equipped with a serial temperature and humidity output for advanced operations. The serial output can be used to feed the TTL level signal into a microprocessor or to link the meter to a computer via an RS-232 converter.
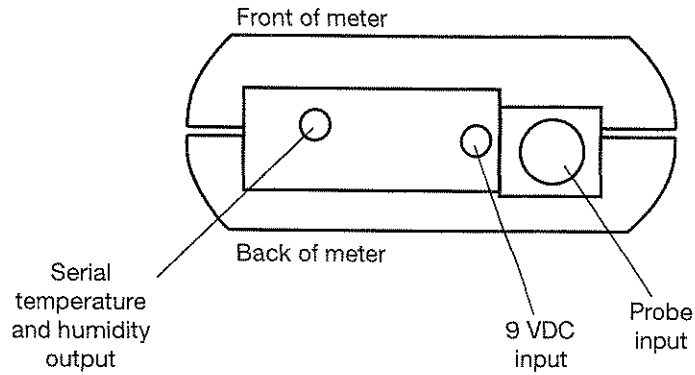
Front of meter

Back of meter

Serial temperature and humidity output

9 VDC input

Probe input

**Figure 4. Top view, showing connections.**

## VII. Error messages

| LCD Readout | Beeping or flashing? | Indicates | Cause | Solution |
|---|---|---|---|---|
| OP | Beeping | Probe incorrectly connected | Improper setup or faulty wire | Check probe connection |
| 0.0 %/99.9% | — | Probe is damaged | Rough handling or defective probe | Replace the probe |
| E1, E3, E4 | Beeping | Circuit error | Various | Return meter for service |
| E2 | Beeping | Improper calibration or probe is damaged | Improper calibration or damaged probe | Recalibrate meter or replace the probe |
| Normal display | Flashing | Low battery | Overuse of these batteries | Replace or recharge batteries |