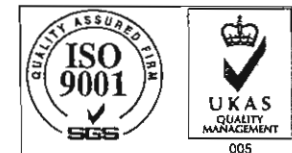


**Precision Humidity + Temp. + Dew Point
1000 Data logger no., RS232**

HYGROMETER



Your purchase of this HYGROMETER marks a step forward for you into the field of precision measurement. Although this METER is a complex and delicate instrument, its durable structure will allow many years of use if proper operating techniques are developed. Please read the following instructions carefully and always keep this manual within easy reach.



OPERATION MANUAL

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1. FEATURES

- * The best hygrometer in the world.
- * Humidity + Temperature + Dew point are combined into one meter, intelligent and professional.
- * 0.01 %RH resolution for the humidity reading, 0.01 degree resolution for the humidity reading.
- * Very fast humidity measuring response time.
- * 2 %RH humidity accuracy, high precision.
- * Dew point measurement.
- * Manual and auto manual data logger.
- * Data logger function with flexible sampling time selection, can save max. 1000 reading data with recall.
- * Just few panel buttons, easy operation.
- * Microprocessor circuit assures maximum possible accuracy, provides special functions and features.
- * Large LCD with two display, easy readout.
- * Heavy duty & compact housing case, designed for easy carry out & operation.
- * Records Maximum and Minimum readings with Recall.
- * Auto shut off saves battery life.
- * Data hold function for freezing the desired value on display.
- * RS 232 PC serial interface.
- * Show the humidity & temperature values on the LCD display at same time.
- * Built-in low battery indicator.
- Wide humidity & temp. measuring range.
- * Separate humidity & temp. probe, easy operation. & remote measurement.

2. SPECIFICATIONS

2-1 General Specifications

Circuit	Custom one-chip of microprocessor LSI circuit.	
Display	59 mm x 34 mm, 16 mm (0.63") digit size. dual function LCD display.	
Measurement Unit	<i>Humidity</i> : %RH (Relative Humidity)	
	<i>Temperature</i> : °C or °F.	
	<i>Dew point</i> : °C or °F.	
Response Time	Less than 4 seconds. <i>@ Reach the 85% reading value</i>	
Temperature Compensation	Automatic temp. compensation for the humidity function.	
Sampling Time of Data Logger	Manual	Push the data logger button once will save the data one time.
	Auto	1, 2, 10, 30, 60, 600, 1800, 3600 seconds.
Data Hold	Freeze the display reading by push button.	
Memory Recall	Maximum & Minimum value.	
Sampling Time	Approx. 0.8 second.	
Power off	Auto shut off saves battery life or manual off by push button.	
Data Output	RS 232 PC serial interface.	
Operating Temperature	Meter :	0 to 50 °C.
	Probe :	0 to 60 °C.
Operating Humidity	Main instrument : Less than 80% R.H.	
	Probe : 0 to 100 %RH.	
Power Supply	006P DC 9V battery (<i>Alkaline or Heavy duty type</i>).	

Power Current	Approx. DC 4.6 mA.
Weight	313 g/0.69 LB. @ <i>Battery is not included.</i>
Dimension	<i>Main instrument</i> : 203 x 76 x 38 mm (8.0 x 3.0 x 1.5 inch).
	<i>Humidity Sensor Probe</i> : 197 mm (7.8 inch) in length.
Accessories Included	Instruction manual.....1 PC. Humidity probe.....1 PC. Carrying case.....1 PC.
Optional Accessories	RS232 cable, UPCB-02 Data Acquisition software, SW-U801-WIN Data Logger software, SW-DL2005

2-2 Electrical Specifications

Humidity/ Temperature

Humidity	Range	0 % to 100 % R.H.
	Resolution	0.01 % R.H.
	Accuracy	± 2% R.H. <i>@ 20 %RH to 80 %RH</i> <i>@ 10 °C to 40 °C</i>
Temperature	Range	0 °C to 50 °C, 32 °F to 122 °F.
	Resolution	0.01 degree
	Accuracy	°C - 0.5 °C. °F - 0.9 °F. <i>@ 5 °C to 35 °C.</i>

Dew Point

°C	Range	-25.3 °C to 48.9 °C
	Resolution	0.01 °C
°F	Range	-13.5 °F to 120.1 °F.
	Resolution	0.01 °F.

Remark :

- * Dew Point display value is calculated from the Humidity/Temp. measurement automatically.
- * The Dew Point accuracy is sum accuracy value of Humidity & Temperature measurement..

3. FRONT PANEL DESCRIPTION

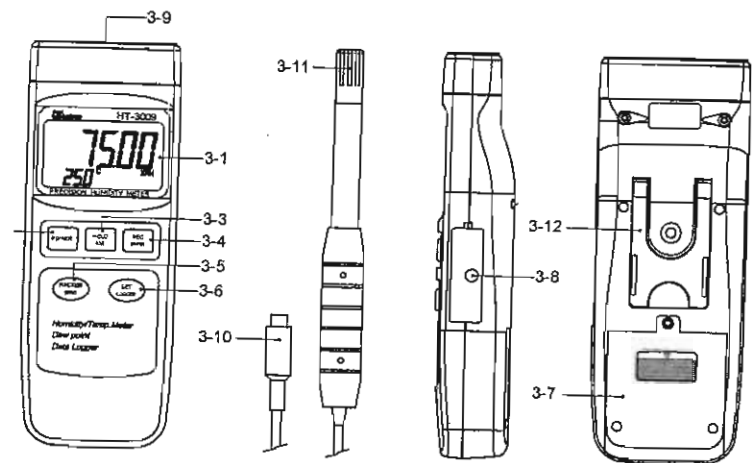


Fig. 1

- 3-1 Display
- 3-2 Power Button
- 3-3 Hold Button (Esc Button)
- 3-4 REC Button (Enter Button)
- 3-5 Function Button (Send Button)
- 3-6 Set Button (Logger Button)
- 3-7 Battery Compartment/Cover
- 3-8 RS-232 Output Terminal
- 3-9 Probe Input Socket
- 3-10 Probe Plug
- 3-11 Probe head (Humidity & Temperature)
- 3-12 Stand

4. GENERAL MEASURING PROCEDURE

The meter default value are :

- * The temperature reading unit is
- * The sampling time of data logger function is 2 seconds.

4-1 Humidity and Temperature measurement

- 1) Plug the " Probe Plug " (3-10, Fig. 1) into the " Probe Input Socket " (3-9, Fig. 1).
- 2) Power on the meter by pressing the " Power Button " (3-2, Fig. 1), the LCD shows the unit " %RH " & " °C " at the same time and measured value will show on the display (upper display is Humidity value, the lower display is the temperature value).
- 3) The meter Temp. display unit is defaulted to " °C ". If intend to let the meter's temperature unit default to " °F ", then please refer section 5-1 (page).

4-2 Dew point measurement

The procedures of " Dew point measurement " are same as the above " 4-1 Humidity and Temperature measurement " except select the " Dew point " function by pressing the " Function Button " (3-5, Fig. 1) once, the LCD will show the unit " DEW " & " °C (or °F). The upper display show the Dew point value, the lower display show the temperature value.

4-3 Data Hold

During the measurement, press the " Hold Button " (3-3, Fig. 1) once will hold the measured value & the LCD will display a " HOLD " symbol.

* Press the " Hold Button " once again will release the data hold function.

4-4 Data Record (Max., Min. reading)

- * The data record function records the maximum and minimum readings. Press the " REC Button " (3-4, Fig. 1) once to start the Data Record function and there will be a " REC. " symbol on the display.
- * With the " REC. " symbol on the display :
 - a) Press the " REC Button " (3-4, Fig. 1) once, the " REC. MAX. " symbol along with the maximum value will appear on the display.

If intend to delete the maximum value, just press the " Hold Button " (3-3, Fig. 1) once, then the display will show the " REC. " symbol only & execute the memory function continuously.

- b) Press the " REC Button " (3-4, Fig. 1) again, the " REC. MIN. " symbol along with the minimum value will appear on the display.

If intend to delete the minimum value, just press the " Hold Button " (3-3, Fig. 1) once, then the display will show the " REC. " symbol only & execute the memory function continuously.

- c) To exit the memory record function, just press the " REC " button for 2 seconds at least. The display will revert to the current reading.

4-5 Data Logger

The data logger function can save 1000 measuring data (Humidity/Temp. value or Dew point/Temp. value)

The data logger procedures are as following :

- a) Press the " REC Button " (3-4, Fig. 1) once to start the Data Record function and there will be a " REC. " symbol on the display.
- b) **Auto Data Logger (Sampling time can select to 1, 2, 10, 30, 60, 600, 1800, 3600 seconds)**

Press the " Logger Button " (3-6, Fig. 1) once to start the Data Logger function. The upper display will show the sampling time in seconds (For example, 1, 2, 10, 30, 60, 600, 1800, 3600) once a while then revert to the normal display screen. In the same the top display will show the marker " A ", the marker " A " will be flashed per sampling time. Now the Data Logger function is executed.

Manual Data Logger (Sampling time set to 0 second)

Press the " Logger Button " (3-6, Fig. 1) once will save the data one time into the memory, at the same time the the marker " A " will be flashed once a while.

Memory full

If Press the " Logger Button " (3-6, Fig. 1) once, both the mark " A ", upper display and lower display are flashed, it indicate the memory data already over 1000 no. and the memory is full.

- c) During the Data Logger function is executed, press the " Logger Button " (3-6, Fig. 1) once will stop to execute the data logger function, the mark " A " will disappeared. If press the " Logger Button " (3-6, Fig. 1) once again will continuous the Data Logger function.

Remark :

- 1) If intend to change the data logger sampling time, please refer section 5-2, page .
- 2) If intend to know the space of balance data numbers into the memory IC, please refer section 5-3, page .
- 3) If intend to clear the saving data from the memory please refer section 5-4, page .

5. ADVANCED MEASURING PROCEDURE

When execute the following Advanced Measuring Procedure should cancel the " Hold function " and the " Record function " first. The display will not show the " HOLD " and the " REC " marker.

- a. Hold the " Set Button " (3-6, Fig. 1) at least two seconds until the lower display show " COde ", then release the " Set Button ", the upper display will show " 1000 ".
* 1000 is the password code that allow to execute the Advanced Measuring Procedure following.
After display show " COde 1000 ", push the " Enter Button " (3-4, Fig. 1) once will go to the following b. procedures.
* If push the " ESC Button " (3-3, Fig. 1) will escape the selecting function and return to the normal measuring display.
- b. One by one to press the " Set Button " (3-6, Fig. 1) once a while to select the five main function that show on the lower display as :
°FChange the Temp °C, °F unit
SEC....Change the data logger sampling time
Cnt.....To show the balance data numbers in the memory
CLr.....Clear the existing saving data from the memory
OFF.....Auto power ON/OFF management

5-1 Change the Temp °C, °F unit

Use the " Set Button " to select the main function to " °F ", then one by one to press the " Function Button " (3-5, Fig. 1) a while will determine the default Temp. unit to °C or °F
@ Press the " Function Button ", if the upper display value show " 0 ", the default Temp. unit is °C
@ Press the " Function Button ", if the upper display value show " 1 ", the default Temp. unit is °F.
After the function is determined, press the " Enter Button " (3-4, Fig. 1) to confirm and save the selection data into memory IC permanently. Press the " Esc Button " (3-3, Fig. 1) will revert to normal display screen.

5-2 Change the data logger sampling time

Use the " Set Button " to select the main function to " SEC ", (SECOND) then one by one to press the " Function Button " (3-5, Fig. 1) a while will determine the default Data Logger sampling time value (seconds).
@ Press the " Function Button ", if the upper display value show " 0 ", the Data Logger function is manual operation.
@ Press the " Function Button ", if the upper display value show " 1 ", the default Data Logger sampling time is 1 second.
@ Press the " Function Button ", if the upper display value show " 2 ", the default Data Logger sampling time is 2 seconds.
@ Press the " Function Button ", if the upper display value show " 10 ", the default Data Logger sampling time is 10 seconds.
@ Press the " Function Button ", if the upper display value show " 30 ", the default Data Logger sampling time is 30 seconds.

@ Press the " Function Button ", if the upper display value show " 60 ", the default Data Logger sampling time is 60 seconds.

@ Press the " Function Button ", if the upper display value show " 600 ", the default Data Logger sampling time is 600 seconds (10 minutes).

@ Press the " Function Button ", if the upper display value show " 1800 ", the default Data Logger sampling time is 1800 seconds (30 minutes).

@ Press the " Function Button ", if the upper display value show " 3600 ", the default Data Logger sampling time is 3600 seconds (1 hour).

After the function is determined, press the " Enter Button " (3-4, Fig. 1) to confirm save the selection data into memory IC permanently. Press the " Esc Button " (3-3, Fig. 1) will revert to normal display screen.

5-3 To show the balance data numbers in the memory

Use the " Set Button " to select the main function to " Cnt " (count), then the upper display will show the balance data numbers that exist into the memory (allow memorize data no.). Press the " Esc Button " (3-3, Fig. 1) will revert to normal display screen.

5-4 Clear the existing saving data from the memory

1) Use the " Set Button " to select the main function to " CLr " (CLEAR), at the same time the upper display will show the Data Logger counts no. that already save into the memory.

2) Press the " Function Button " (3-5, Fig. 1) once, the upper display will show " 0 ", if intend to clear the existing saving data from the memory, just press the " Enter Button " (3-4, Fig. 1) to confirm, then the existing data will clear from the memory IC.

Remark :

Before Press the " Function Button " (3-5, Fig. 1) to confirm, it can press the " Esc Button " (3-3, Fig. 1) to exist the clear function and the data will be not cleared.

5-5 Auto power ON/OFF

Use the " Set Button " to select the main function to " OFF ", then one by one to press the " Function Button " (3-5, Fig. 1) a while will determine the default the power management system is Auto Power Off enable or disable.

@ Press the " Function Button " once, if the upper display value show " 0 ", it is not Auto Power Off management (disable).

@ Press the " Function Button " once, if the upper display value show " 1 ", it is the Auto Power Off management (enable).

After the function is determined, press the " Enter Button " (3-4, Fig. 1) to save the selection function into memory IC permanently. Press the " Esc Button " (3-3, Fig. 1) will revert to normal display screen.

6. HOW TO SEND THE DATA OUT FROM THE METER

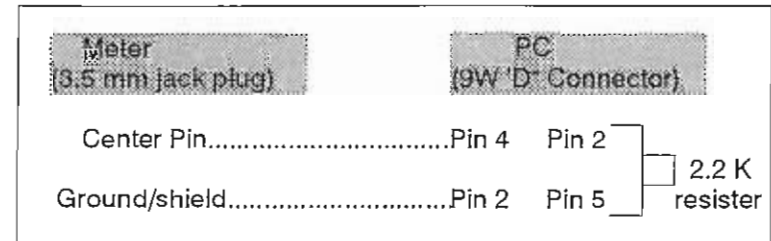
- 1) If intend to send the data out from the meter, it should cancel the " Hold function " and the " Record function " first. The display will not show the " HOLD " and the " REC " marker.
- 2) Press the " Send Button " (3-5, Fig. 1) at least 2 seconds until the lower display show " 232 ", then release the button.
- 3) Push the " Send Button " (3-5, Fig. 1) once, then both the upper and the lower display will flash slowly, at the same the storage data logger data will be send out the meter from the " RS-232 Output Terminal " (3-8, Fig. 1).
- 4) If intend up load the data to the computer, then should connect the RS232 cable (optional, model : UPCB-02) and apply the Data Logger software (optional, Model : SW-DL2005).

7. RS232 PC SERIAL INTERFACE

The instrument has RS232 PC serial interface via a 3.5 mm terminal (3-8, Fig. 1).

The data output is a 16 digit stream which can be utilized for user's specific application.

A RS232 lead with the following connection will be required to link the instrument with the PC serial port.



The 16 digits data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

Each digit indicates the following status :

D0	End Word
D1 & D8	Display reading, D1 = LSD, D8 = MSD <i>For example :</i> <i>If the display reading is 1234, then D8 to D1 is : 00001234</i>
D9	Decimal Point(DP), position from right to the left 0 = No DP, 1 = 1 DP, 2 = 2 DP, 3 = 3 DP
D10	Polarity 0 = Positive 1 = Negative
D11 & D12	Annunciator for Display °C = 01 °F = 02 % RH = 04
D13	When send the upper display data = 1 When send the lower display data = 2
D14	4
D15	Start Word

RS232 FORMAT : 9600, N, 8, 1

8. BATTERY REPLACEMENT

- 1) When the left corner of LCD display show " ", it is necessary to replace the battery. However, in-spec. measurement may still be made for several hours after low battery indicator appears before the instrument become inaccurate.
- 2) Slide the " Battery Cover " (3-7, Fig. 1) away from the instrument and remove the battery.
- 3) Replace with 9V battery (Alkaline or Heavy duty type) and reinstate the cover.
- 4) Make sure the battery cover is secured after changing the battery.