GE
Sensing

Hygromaster®

Protimeter Thermo-Hygrometer

Instruction Manual

Table Of Contents

Introduction

The GE Protimeter *Hygromaster* is a handheld hygrometer with data logging capability. Spot measurements of relative humidity, dew point, mixing ratio and ambient temperature are shown on a split display at the touch of a button. Surface temperature can also be measured using an optional surface temperature sensor.

When used as a data logger, the instrument is set to record measurements as required and is left in place for the required period of time. The memory contents are then downloaded to a PC, using optional software, where the logged measurements are displayed in tabular and graphical form for quick and simple analysis.

1 Hygrostick® and Humistick® Humidity Probe Options

The Hygromaster is used with a detachable humidity probe to measure relative humidity and ambient temperature. Two humidity probes are available, the *Hygrostick* and the *Humistick.* The Hygrostick is optimized for measuring humidity in the 30-100 **%rh** range and may be used with Protimeter humidity sleeves for measuring the equilibrium relative humidity of solid walls and floors. The Humistick is a general purpose sensor, with a measurement range of 1-100 **%rh**, making it more suitable for general air quality applications.

Table 1 below lists the Humidity Probe dimensions nominal rh and temperature ranges.

Table 1: Humidity Probe Dimensions

Humidity Probe	Dimensions	Nominal rh Range	Nominal Temperature Range
Hygrostick	Ø8 mm x 50 mm	30 -100 **%rh**	0 - 50 **°C**
Humistick	Ø16 mm x 65 mm	1 -100 **%rh**	-20 - 50 **°C**

2 Function Buttons

The Hygromaster has four buttons (see Table 2 below) that are used individually or in pairs to take measurements, log readings and set-up the instrument. When pressed individually they perform the following standard functions:

Table 2: Function Buttons

Buttons	Function
	ON, **OFF** and hold
▶	Upper level display scroll
▶▶	Lower level display scroll
	Stores measurement in memory

For details of all button combinations, refer to Table 3 through Table 8.

3 Standard Functions – Humidity and Temperature Measurements

Measure humidity and temperature as follows:

1. Connect the Hygrostick or Humistick probe to the Hygromaster instrument either directly into the socket on the top of the instrument or indirectly with the optional extension lead.
2. Switch the Hygromaster instrument **ON** by pressing ⏻ briefly.
3. Press ▶ successively to display relative humidity (**%rh**), dew point (TD) or mixing ratio/absolute humidity (**ppmw/gpp**) on the upper display.
4. Press ▶▶ successively to display air temperature (TA), surface temperature (TS), surface to dew point temperature difference (Δ-T), time and date, probe serial number.

5. To switch OFF, press and hold ⏻ until display shows '**OFF**.' Alternatively, the instrument will switch itself **OFF** after a user-settable interval (default 2 minutes) from the last button press or RS232 activity.

Note: *The battery status will be shown for 3 seconds each time the instrument settings are changed. Change the batteries immediately when* **1 bar** *is shown, as < 10% of life remains. See note below regarding clock.*

Note: *Ts and Δ-T will only be displayed if the auxiliary surface temperature sensor is connected to the socket in the right hand side of the instrument and this later is set to* "**ON**" *(see above). Otherwise, the lower display will show* "**OFF**" *changing to* "—" *after 3 seconds.*

Note: *Should successive readings on both halves of the display not change, the upper display decimal is flashed to show that new readings are still being taken.*

4 Function Tables

See Table 3 on the next page for Spot Measurements.

Table 3: Spot Measurements

Button	Function	Display Symbols	Explanation
⏻	**ON, OFF, Hold**	**II** (pause)	Switch **ON** - quick press Switch **OFF**- press and hold for 3 sec **Hold** value - quick press and release, pause symbol flashes.
▶	Humidity, dew point, mixing ratio/absolute humidity, air temp.	**%rh** TD **°C** or **°F** **ppmw**/**gpp**	Primary display scroll. To change units see Instrument Set Up (Table 7).
▶▶	Surface temperature, surface - dew point temperature difference, time and date, probe serial number	TA Ts Δ- T	Secondary display scroll. Time is shown on upper display as **HH:MM**. Date is shown on lower display as **MM:DD.** Probe serial number is scrolled across.
↵	Stores measurement in the instrument memory	Log	Press and hold for 3 seconds to store all measurements. Momentarily displays the log record number and stored data.

See Table 4 below for Setup Functions.

Table 4: Setup Functions

Button	Function	Display Symbols	Explanation
▶▶ & ↵	Enter logging parameters set up mode	🔧 & 📞	When the instrument is **ON**, press and hold buttons for 2 seconds to enter data logger mode - see Logging Set Up (Table 6).
▶ & ⏻	Enter instrument set up mode	🔧	When the instrument is **ON**, press and hold buttons for 2 seconds to enter instrument set up mode - see Instrument Set Up (Table 7).
▶▶& ⏻	Short cut to Surface Temperature set up modes	▬ (RS 232 mode)	Switches surface temperature socket **ON**, **OFF** (RS232 mode) or Auto mode.

See Table 5 below for Common Functions in Setup Modes.

Table 5: Common Functions in Setup Modes

Button	Function	Explanation
▶	Slow incremental advance	Increment the active parameter
▶▶	Fast incremental advance	Fast increment the active parameter
	Advance to next parameter	Accept the selected parameter and advance to next parameter. After final parameter, save the settings.
	Abandon set up	Returns instrument to normal operation without saving new settings.
▶& ▶▶	Zeroes current parameter settings	Resets the active parameter to minimum value
(none)	Timeout	If no button is pressed for 5 seconds setup mode exits without saving changes.

See Table 6 below for Logging Setup.

Table 6: Logging Setup

Upper Display	Lower Display	PC Setup Definitions	Meaning	Minimum	Maximum
Note: *The logger settings are unaffected by powering down, but if the batteries are removed and replaced, all settings will be cleared to '0', making the logging disabled. The Logging Setup parameters ⏩ & ↵ are presented in the following order:*					
SEE	L09		Entering Logger setup mode (display is frozen until buttons released)		
15	InT	Logging	Logging interval is set to 15 minutes (example)	0 (OFF)	24 hr
0	dEL	WB First	Delay before logging is set to none (take a log immediately when settings accepted)	0 (no delay)	24 hr

Table 6: Logging Setup (cont.)

Upper Display	Lower Display	PC Setup Definitions	Meaning	Minimum	Maximum
0	Cou	No. Rem	If not zero, count this many logs and stop	0 (no count)	400 logs
2	Job[1]	Job No	User job number - to be stored with all following readings	0	15

[1]If ↵ is pressed after 'job', the logging settings will be accepted. If the interval is set other than '**0**', logging will be active and the  icon set. Pressing ⏻, or not pressing any key at all for five seconds at any point in the process will exit immediately without making any changes.

See Table 7 below for Instrument Setup.

Table 7: Instrument Setup

Upper Display	Lower Display	Meaning	Default	Minimum	Maximum
Note: *The Instrument Setup parameters ▶ & ⏻ are presented in the following order:*					
SEE	USr	Entering Instrument (User) setup mode (display is frozen until buttons released)			
0	dEF	Reset all instrument parameters to factory Default	0 (no)	0 (no)	1 (yes)
2	Sdt	Set automatic ShutDown Time. **0** = stay on until turned-off manually	2 mins	0	9 mins
C	dE9	Select **°C** and **ppmw**, or **°F** and **gpp**	°C	°C	°F

Table 7: Instrument Setup (cont.)

Upper Display	Lower Display	Meaning	Default	Minimum	Maximum
OFF	Sur	Set side-port[1] surface temperature **ON** or **OFF**	OFF	OFF	ON
2	bU2[2]	Set buzzer level: **0** = **OFF** (silent), **1** = minimum, and **2** = maximum	2 (max)	0	2

[1]The side-port temperature sensing function reverts to the default **OFF** mode when the instrument is switched **OFF**. If ⏻ is pressed during the set-up procedure, or there is a delay of more than 5 seconds in confirming a set-up parameter by pressing ↵, then the instrument returns to normal operating mode without changing the set-up parameters.

[2]If ↵ is pressed after '**bU2**', the new settings are accepted; except, the settings are retained when the instrument is switched **OFF**.

See Table 8 below for Surface Temperature Port Selection.

Table 8: Surface Temperature Port Selection

Upper Display	Lower Display	Meaning	Default	Minimum	Maximum
Note: *This short-cut parameter ▶▶ & ⏻ allows you to set the Surface Temperature port without using the instrument setup menu. Each time the key-pair is pressed, the lower display switches between* **ON** *and* **OFF**					
-	Sur	Set side-port surface temperature **ON** or **OFF**	OFF	OFF	ON

5 Logging Functions - PC Setup

To log the functions and setup the PC, do the following:

1. Connect the sensors as described previously and confirm correct operation.
2. Unplug the surface temperature sensor, if fitted. Connect the instrument to the serial port on the host PC, using the supplied cable.
3. Switch **ON** the instrument and ensure that the side socket is set to RS232 mode and the computer icon  is lit.
4. Start the PC software and select Tools → Setup (if the setup dialogue has not started automatically).
5. Confirm that the instrument serial number has been read correctly (not shown as "-"). This would indicate that the communications have been established. If not, check settings under the *"Communication"* tab.
6. Click on *"Set Time"* to set the instrument clock to the PC clock time.

7. Enter the required logging parameters as follows:

Note: *Be sure to enter the Logging Interval, Wait Before First Log, Number of Logs and Job No in the appropriate boxes.*

a. Press *"Set Interval"* button to send to the instrument.

b. Confirm that the logging parameters are set correctly by pressing the *"Check Interval"* button, and ensure that the settings you require have appeared in the appropriate parameter boxes.

c. Finally, check that the 'logging' icon  is lit on the instrument display.

Note: *It does not matter whether the above is set from the PC or in* "Logging Setup" *mode, as described in Logging Set-up Function (Table 6).*

8. Remove the RS232 serial cable from the instrument port and place it in the environment that is to be monitored. Ensure that a Hygrostick or Humistick sensor is plugged into the top of the instrument.

9. Press and hold ⏻ until the display shows **OFF**.

6 Logging Functions - Manual Logging (Recording)

Note: *It is recommended that the clock is checked before performing manual logging.*

1. Use ▶▶ as described above to scroll to the time/date display. The clock must be set from the PC as described above whenever the batteries are replaced.

2. With the instrument **OFF**, press and hold ↵ for 3 seconds to take a manual log point. This behaves exactly as if the logging were performed using the timer as above. There is no requirement for logging to have been enabled first, although it may be useful to set the job number.

3. Similarly, with the instrument **ON**, press and hold ↵ for 3 seconds to take a manual log point. In this case, note that the side port must be previously set in *"surface temperature"* mode if this input is to be used. Again there is no requirement for logging to have been enabled first, although it may be useful to set the job number.

7 Logging Functions - Reading the Data

1. Switch **ON** the instrument and ensure that the side socket is set to RS232 mode and the computer icon is lit.
2. Start the PC software and select Tools → Setup (if the setup dialogue has not started automatically).
3. Confirm that the instrument serial number has been read correctly (not shown as "**-**"). This indicates that the communications have been established. If not, press *"Get Serial Number"* before checking settings under the *"communication"* tab.
4. Confirm that *"Number of records used"* is as expected (refresh the data with the *"Get Log Data"* button) and close the setup dialogue using "**OK**".
5. Select the fourth tool button (shows two computers, tool-tip *"Download data"*) and *"All new records"* in the download dialogue. Use *"Latest specified number of records"* to recover older data if desired.
6. When the download completes, click on **OK** then save as prompted.
7. Use the graphing tool for a quick inspection (select a subset of the records first, if required) or open the saved data file in a spreadsheet for further manipulation.

The information contained in this leaflet 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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