



USB RH/TEMPERATURE/GPP DATA LOGGER with LCD & IRT USER'S MANUAL



HT50

Please read this manual carefully and thoroughly before using this product.

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INTRODUCTION

Thank you for purchasing General Tools & Instruments' HT50 USB RH/Temp/GPP Data Logger with LCD & IRT. Please read this user's manual carefully and thoroughly before using the instrument.

The HT50 is a low-cost, compact, battery-powered thermo-hygrometer capable of unattended logging (recording) of the ambient temperature and relative humidity (RH) of an environment for days, weeks or months. It can also measure and optionally log surface temperatures spot-checked by a technician using the unit's integral infrared (IR) thermometer. In addition, the HT50 can also calculate and display absolute humidity levels in units of grains per pound (GPP) or g/kg. Also called mixing ratio, GPP is a more useful moisture metric than RH to water damage restorers. Using RH alone, a restorer might unknowingly introduce moist air—with a low RH but a high GPP—during a job's drying phase).

Data logging can be started or stopped by pushing a button on the unit, eliminating the need to bring a laptop to the job site. After a data log has been captured and stored, it can be uploaded as a .txt file to any PC running the Windows®7 or Windows® XP operating system after plugging the HT50 into one of the computer's USB ports. The HT50's internal flash memory is large enough to store 16,300 pairs of RH and temperature readings or nearly 10,000 sets of RH, ambient temperature and surface temperature readings.

Included with the product is a mini-disc with the drivers needed to interface the unit to the computer, as well as software that can display a data log file as a table or graph and/or export it to Microsoft Excel. Exporting to Excel is recommended for sophisticated trending and analysis of humidity and temperature data and easy detection of unexpected excursions.

Applications for the HT50 include:

- Water damage restoration—Because the HT50 is designed to be deployed and left in place over the duration of the job, it is always in equilibrium with the environment.
- Process control—The HT50 enables, simplifies and cuts the cost of environmental monitoring of office buildings, greenhouses, food and equipment storage facilities, wineries, freezers, shipping containers, HVAC/R installations, computer rooms, labs, libraries, museums and saunas.
- Electronics manufacturing—Alerts provided by the low-humidity alarm function of the HT50 can mitigate the risk of damaging high-voltage static discharges.

KEY FEATURES

- One button starts/stops data logging without a PC
- Plug-and-play USB 2.0 interface; no need for cables, cradles or docks
- Large storage capacity: 16,300 pairs of RH and temperature readings or nearly 10,000 sets of RH, ambient temperature and surface temperature readings
- 3-1/2-digit LCD displays real-time temperature and RH readings, absolute humidity readings—in grains per pound (GPP) or g/kg—and device working and alarm status and “memory full”
- Built-in IR thermometer with 2:1 Distance-to-Spot ratio and measurement range of -4° to 482°F (-20° to 250°C)
- Included software is used to set: Sampling time from 10 seconds to 12 hours; Hi/Lo alarm setpoints for humidity, ambient temperature and surface temperature; Temperature unit (°F or °C)

- Software also calculates and plots GPP and dew point and wet bulb temperatures and displays data logs as time-based graphs synchronized to your PC's clock
 - One-click exporting of logs to Excel or Word
 - Long battery life (up to one year)
 - Includes USB extension cable
 - One-year warranty
-

SAFETY INSTRUCTIONS

CAUTION - Use of controls or adjustments or performance of procedures other than those specified herein may result in dangerous radiation exposure. The HT50's targeting laser is a Class 2 type that emits less than 1mW of power at a wavelength of 655nm. Avoid direct eye contact with laser light radiation. U.S. law prohibits pointing a laser beam at aircraft; doing so is punishable by a fine of up to \$10,000 and imprisonment.

Do not use the HT50 in the presence of flammable or explosive gases.

WHAT'S IN THE BLISTER PACK

The HT50 comes in a blister pack that also contains

- One "1/2 AA" battery. Replacement batteries (Part No. BA10) are available from General (www.generaltools.com).
- A disc with software drivers for Windows7 and Windows XP computers, the ELusb V1.21.1 program for capturing data logs and displaying them as curves, and a PDF of this user's manual
- A USB extension cable
- A hard copy of this user's manual (inside the fold-over card)

PRODUCT OVERVIEW

Fig. 1a below shows the main components, controls and connectors of the HT50. Fig. 1b (on the facing page) shows all possible indications on the HT50's display. Familiarize yourself with their names and functions before moving on to the Setup Instructions.

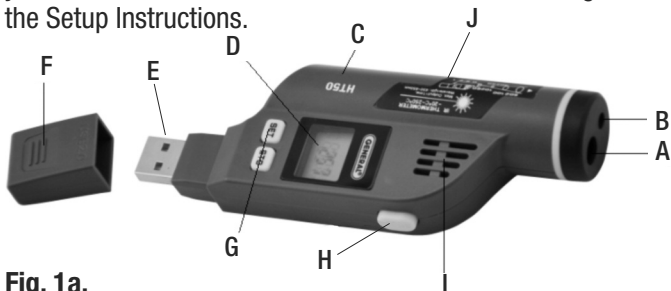
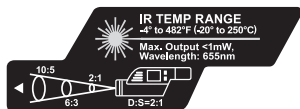


Fig. 1a.

The components, controls and connector of the HT50

- A. IR sensor window
- B. Laser pointer window
- C. Battery compartment (opens from rear of unit)
- D. 3-1/2-digit LCD (displays real-time temperature, RH and GPP readings; also indicates device working status and “memory full”)
- E. USB plug
- F. Protective cap
- G. **SET** and **STO** buttons (used to turn LCD on and switch between GPP, temperature and RH readings and units; also used to start/stop logging and check unit’s working status)
- H. **Meas** button (when pressed and held, activates IR thermometer and laser pointer)
- I. Ambient temperature and humidity sensor window
- J. Laser identification/certification/warning/safety labels (see top of next page)



GENERAL TOOLS & INSTRUMENTS
 75 Seaview Drive, Secaucus, NJ 07094
 Made in China Manufactured MM/YYYY
 Complies with 21 CFR 1040.10 and 1040.11
 except for deviations pursuant to
 Laser Notice No. 50,
 dated June 24, 2007.

Fig. 1b. All possible display indications on the HT50



Display Legend

- ▲: indicates reading is higher than high alarm setpoint for that parameter
- ▼: indicates reading is lower than low alarm setpoint for that parameter

%RH: relative humidity unit

°C: Celsius temperature unit

°F: Fahrenheit temperature unit

IRT: Indicates operation in IRT mode

Hold: Indicates that IRT measurement is being held on the display

GPP: Absolute humidity (mixing ratio) value in Imperial units (grains per pound)

g/kg: Absolute humidity (mixing ratio) value in metric units

: Low battery icon

[-]888.8: Humidity or temperature value or one of the following four working status indications

LOG: Unit is logging data

- - -: Unit is in standby mode, ready to log data

FUL: Internal memory is full (and logging has been stopped)

CON: Unit needs to be configured by software

SETUP INSTRUCTIONS

INSTALLING/REPLACING THE BATTERY


The HT50 uses a 3.6VDC “1/2 AA” Lithium-ion battery.

To open the battery compartment, turn the unit over and slide the battery compartment cover (which is clearly marked) toward the front of the unit, in the direction opposite the arrow on the cover. Remove the old battery and insert a fresh battery in the correct orientation. Then replace the cover, pushing it forward until you feel and hear a click.

After you replace the battery, the LCD will “wake up” and begin displaying real-time readings. If the **SET** or **STO** button is not pressed within 60 seconds, the LCD will be automatically powered off.


Note: If the battery is removed from a unit before it has been set up from software or while it is recording, the unit must be reconfigured before it can be reactivated. If it is not reconfigured, the unit will remain in standby mode.

INSTALL SOFTWARE AND DRIVERS

1. Place mini-disc in tray of CD/DVD drive, shiny side down. Close tray.
2. When the AutoPlay window appears, click on “Open folder to view files using Windows Explorer.”
3. Windows Explorer will indicate that there are two “Files Currently on the Disc”. One is actually a folder containing an electronic file of this user’s manual. Copy the HT50 manual to your computer’s hard drive for permanent storage. The other file is a Windows Installer Package (.msi file) named “EL USB_V1.21.1.msi”. Double-click its  icon.

4. A window titled “Welcome to ELUsb Installation Wizard” will appear. Click **Next** to continue.
5. Within the Software License Agreement window that appears next, click the **I agree (T)** box.
6. The next three windows advise that the ELusb application will be installed in your computer’s C:\Program Files folders in a new subfolder named <ELusb>, and that shortcuts to the program will be created on your desktop and Quick Launch bar. If you want to install the software elsewhere, click **Browse** and choose another location. Within each window, after selecting either the default location or another location, click **Next(N)** to continue.
7. When the “Ready to install ELUsb” window appears, click **Install** to continue.
8. Before the installation begins, a User Account Control window may appear and ask, “Do you want to allow [ELUSB V1.21.1.msi] to make changes to this computer?” Click **Yes** to continue.
9. The ELUsb Setup Wizard will now install the program on your computer. On the next window that appears, click the **Completed (F)** box.
10. At the bottom of the Device Driver Installation Wizard that appears next, click **Next** to continue.
11. The next window to appear is a Windows Security window. Click on “Install this driver software anyway” to continue.
12. The next Device Driver Installation Wizard window will advise you that an HT10/20/50 driver from General Tools or Kecheng Laboratories was successfully installed and that your device is now “Ready to use.” Click **Finish** to continue.

CONFIGURE THE UNIT

Note that the software installation has added a  icon to your desktop. To facilitate access to the program, right-click on the icon and pin it to both your Start button and the Quick Start area at the left of your taskbar. You can now eject the installation mini-disc and store it with your other important software.

Plug the HT50 into an available USB port of your computer. **If your computer is a laptop and the only available USB jack does not have enough vertical clearance to accommodate the HT50 without mechanically stressing its USB plug, do not plug the HT50 directly into the jack. You do not want the plug of the HT50 to support any of the weight of the laptop.** If that is the case, plug the HT50 into the jack of the included USB extension cable and insert the plug of the extension cable into the computer's USB jack.

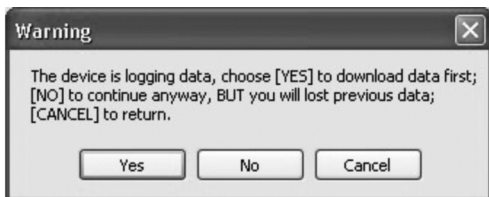
The first time you plug the HT50 into your computer, your system tray will notify you that the computer is "Installing Device Driver Software". When the notification disappears, open the ELusb program by selecting it via your Start button, clicking on its icon on your taskbar, or double-clicking its desktop icon.

If the software has installed correctly and you have plugged the HT50 into a working USB port of your computer, the following screen should appear on your computer's display.



Fig. 2. The three options made available by plugging the HT50 into a USB port

Note: If you have already used your HT50 to log data and it is still in recording mode, plugging the unit in will cause the following window to appear.



Click **Yes** to stop recording and import all data recorded to that point in time. Click **No** to continue to Setup without importing recorded data (meaning it will be lost). Click **Cancel** to go back and unplug the unit from the USB port.

You can now use the software to “configure” your HT50. Configuring the device means choosing five key parameters:

- **Sampling time**—How often it makes and stores humidity and temperature measurements.
- **Temperature unit**—degrees Fahrenheit or Celsius (°F or °C).
- **High and low (ambient) temperature alarm** setpoints
- **High and low humidity alarm** setpoints
- **High and low surface (IR) temperature** setpoints

To begin, click on “Set up the USB Data Logger” in the window shown in the figure above. Doing so will cause the following window to appear.

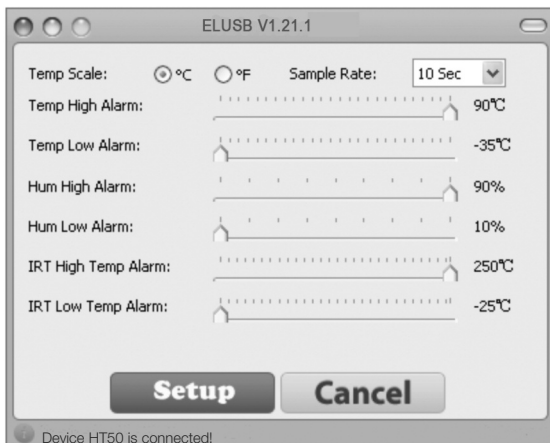


Fig. 3. The HT50 configuration (Setup) window

Using your mouse, trackball or touchpad, first choose your Temp Scale and Sample Rate (sampling time). With regard to sampling time, using the shortest setting of 10 seconds may

result in too much essentially identical data being stored in memory, potentially limiting its capacity to capture important events such as an unexpected excursion of temperature or humidity. Conversely, using the longest sampling time setting of 12 hours will likely cause important events to go undetected.

If you are an experienced data logger, you already know how to choose the optimum sampling time for your application. If you are a novice, pick a sampling time closer to the minimum sampling time than the maximum, on the assumption that the HT50 probably has enough memory (16,300 pairs of humidity and temperature readings, if you choose not to log IR thermometer measurements) to store all the data you ask the meter to log—unless you use it to log data for months, rather than weeks or days.

Be aware that if you do manage to fill up the HT10's memory (by logging for a very long time at a very short sampling time, for example), the device will simply stop recording. It will not continue recording by overwriting the oldest saved data with new data.

If you wish, you can also drag the sliders shown in the figure to set—from top to bottom—high and low alarm setpoints for (ambient) temperature, humidity, and IRT (surface) temperature.

Once you have chosen your data logging parameters, click **Setup**. A window will appear advising that “The device is set up successfully.” Clicking **Setup** also synchronizes the HT50's internal clock with your computer's clock, giving all data logs to be captured an absolute time reference.

You can now unplug the HT50 from your computer's USB port. The unit is in “standby” mode, ready to begin logging data.

OPERATING INSTRUCTIONS

DEPLOY THE UNIT

The HT50 is particularly easy to deploy on a job site because the unit does not need to be plugged into a computer to be activated (ready to start logging data). Working together, the **SET** and **STO** buttons and the LCD serve as the control and indicators needed to: 1) start and stop data logging and 2) verify and change the unit's working status.

That leaves only two things to be sure of when choosing a place to deploy the HT50:

- The temperature and humidity sensor window (Fig. 1a, Callout I) is not covered
- The humidity and temperature values at the unit's location are “representative” of the room

The HT50—with its protective cap on—can be deployed either by laying it on a horizontal surface or by hanging it vertically within the included plastic mounting bracket. The back of the bracket features both a magnet and a hanger hole.

Once you have deployed the HT50, you can initiate data logging. **To start logging ambient temperature and humidity data (but not IRT measurements), press and hold the SET button for at least 3 seconds. The LCD will display the word “LOG” to confirm that logging has begun. To start logging ambient temperature and humidity data as well as IRT measurements, press the hold the STO button for at least 3 seconds. The LCD will display the words “LOG” and “IRT” to confirm that logging has begun.**

STOP LOGGING AND IMPORT LOGS

To stop data logging, press and hold the **SET** or **STO** button for at least 3 seconds. **The LCD will display three dashes (- - -) to confirm that logging has stopped.**

That is how you should stop data logging if you plan to initiate another logging session later without uploading logged data to your computer in the interim. If you allow logging to continue and you do not upload your data to your computer soon, you risk filling up the HT50's memory.

A simpler and safer way to stop data logging is to plug the HT50 into your computer's USB port immediately after completing a logging session and then use the ELUSB software to stop logging.

Each time you plug the HT50 into the USB port, the window shown in Fig. 2 will appear. When you plug in the unit, it makes no difference whether it is still logging; the procedure for uploading (importing) data logs is identical. Just click on the middle selection—**Stop the USB Data Logger and download data**—to instantly execute both functions. The data will be imported as a .txt file. A “Save As” window will appear, asking you to identify where you want the file to be stored and what you want to name it.

VIEWING, PRINTING AND EXPORTING DATA LOGS

Immediately after you close the “Save As” window by clicking on **Save**, the uploaded data log will automatically be displayed as a set of curves representing all loggable values. Fig. 4 is a typical example. The initial display includes all parameters, including dew point and GPP or g/kg (which the software automatically calculates) and alarm setpoints that

you may have entered during Setup. To remove any parameter or horizontal and vertical grid lines from the overall plot, uncheck its box at right.

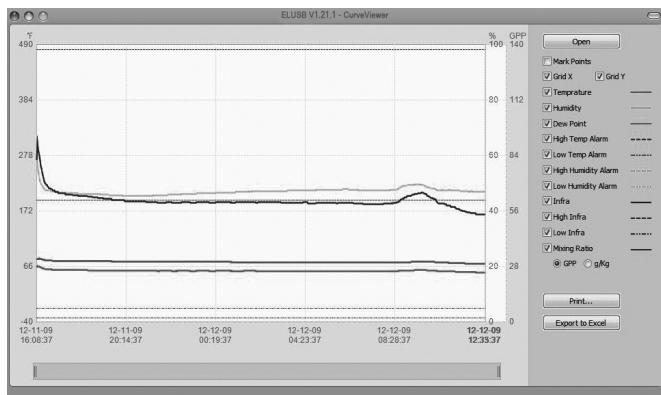


Fig. 4. A typical initial plot of an imported data log

There are several features shown in Fig. 4 worth noting:

- To mark the position of every recorded data point on the curve, check the “Mark Points” box at the top of the sidebar at right.
- To get a higher-resolution view of the data recorded during a specific period of time, scale up and down the curves by dragging the slider at the bottom of the window to the left and right.
- Hovering the cursor over a particular point of the curve displays all data related to this point—including the maximum, minimum and average values of the entire curve—in a shaded box at upper left.
- The dates and times shown on the x-axis scale and in the upper left corner are in sync with your computer’s clock.

- **To print** the .txt file of any data log, click the **Print** virtual button.
- **To open** a previously saved data log, click the **Open** button. This function is also available as the “View previously saved data” option shown in Fig. 2.
- **To export** a file to Excel for advanced trending and analysis, click the **Export to Excel** button.

USING THE IR THERMOMETER

The HT50 has an integral IR thermometer that can be used to spot-check the temperature of any surface from a distance. This function would, for example, enable an HVAC/R system installer to quickly check the temperature of air exiting a duct without having to use an anemometer-thermometer.

To activate the IRT, press and hold the **Meas** button (Fig. 1a, Callout H) while aiming the laser pointer at the surface of interest. The measured temperature will instantly appear on the LCD in the currently selected unit, along with the indication **IRT** in the upper right corner.

When you release the **Meas** button, the “Hold” icon (a lock; see Fig. 1b) will also appear on the display to indicate that the displayed value is being held. The reading will be held for 10 seconds. At that time, the HT50 will exit IRT mode and resume displaying temperature, humidity or working status on its LCD.

The HT50’s IRT has a distance-to-spot (D:S) ratio of 2:1 and assumes that its target has an emissivity of 0.95 (a valid assumption for most materials). Include these specifications when considering how close you must be to a target to measure its temperature accurately, without including the temperature of its surroundings.

OTHER INDICATIONS

As mentioned earlier, the **SET** and **STO** buttons and the LCD can be used together to display real-time temperature, RH and GPP readings, and to indicate the current working status of the HT50.

Circuitry inside the HT50 automatically shuts down the LCD (to conserve battery life) if the **SET** or **STO** button has not been pressed within the past 60 seconds. That is the case even when the unit is logging data. In other words, the LCD is normally “asleep”.

To wake up the LCD, briefly press the **SET** or **STO** button. This first press of the button will cause the LCD to resume displaying the same indication that was on-screen when the LCD was last put to sleep.

Pressing the **SET** button briefly can produce four possible display indications: (1) The current temperature, (2) the current relative humidity level, (3) the current absolute humidity level (mixing ratio in GPP or g/kg), and (4) the HT50’s current working status. Each press of the **SET** button changes the display to the next indication in the sequence; pressing the **SET** button when the LCD is displaying the unit’s current working status (4) resets the cycle to (1).

There are four possible working status indications:

- **LOG**: The unit is currently logging data
- - - -: The unit is in standby mode, ready to log data
- **FUL**: The unit’s internal memory is full and logging has been stopped
- **CON**: The unit needs to be configured by software

The **STO** button has a third function, in addition to waking up the LCD and adding IRT readings to sets of temperature and humidity data logs. When the HT50's LCD is on, brief presses of the **STO** button toggle displayed temperature readings between °C and °F, and displayed mixing ratio readings between GPP and g/kg.

When the LCD is displaying a temperature or humidity reading, it also gives an indication if the reading is outside the “acceptable” range of readings for that parameter—assuming that high and/or low alarm setpoints were entered during the Setup procedure. If an “up” arrow appears at the left of the reading (see Fig. 1b on p. 7), the measured value of that parameter is higher than its high alarm setpoint. If a “down” arrow appears at the left of the reading, it is lower than the low alarm setpoint for that parameter.

SPECIFICATIONS

Ambient Temperature Measurement Range	-4° to 158°F (-20° to 70°C)
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Ambient Temperature Measurement Accuracy	±1.8°F (1°C) from 14° to 104°F (-10° to 40°C); ±3.6°F (2°C) elsewhere in range
------------------------------------------	-----------------------------------------------------------------------------------------

Ambient Temperature Measurement Resolution and Repeatability	±0.2°F (0.1°C)
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Relative Humidity (RH) Measurement Range	0 to 100%
------------------------------------------	-----------

RH Measurement Accuracy	±3% from 20 to 80%RH, ±3.5% elsewhere
-------------------------	------------------------------------------

RH Measurement Resolution and Repeatability	±0.1%
---------------------------------------------	-------

IR (Surface) Temperature Measurement Range	-4° to 482°F (-20° to 250°C)
IR Temperature Measurement Accuracy	±4°F (3°C)
IR Temperature Measurement Resolution	±0.2°F (0.1°C)
Distance-to-Spot (D:S) Ratio	2:1
Emissivity	0.95 (fixed)
IRT Operation Temperature	32° to 104°F (0° to 40°C) @ 10 to 90% RH
Internal Storage Capacity	16,300 pairs of ambient temp. and RH readings or nearly 10,000 sets of ambient temp., RH and IR (surface) temperature readings
Display	3-1/2-digit LCD with 60 second auto power off
Temperature Response Time	0.5 seconds
Humidity Response Time	5 seconds
Interface	USB 1.0/2.0
Laser Class, Power Output, Wavelength	Class 2, <1mW @ 655nm
Dimensions	4.92 x 1.69 x 0.94 in. (125 x 43 x 24 mm)
Weight	<7 oz. (<200g)
Power Source	3.6V non-rechargeable (1/2 AA) 1200mAh Lithium-ion battery
Current Consumption	1mA (laser off); <20mA (laser on)
Battery Life (typical)	1 year

MAINTENANCE TIPS

- Avoid dropping the unit. Do not subject it to violent shock or vibration or expose it to strong electromagnetic fields (for example, near arc welders or induction heaters).
- Keep the unit out of direct sunlight.
- Do not use chemicals or abrasive cloth to clean the display window or housing.
- Before storing the HT50 for an extended period of time (several months or more), remove the battery to avoid having it leak and damage the unit.

WARRANTY INFORMATION

General Tools & Instruments' (General's) HT50 USB RH/Temp/GPP Data Logger with LCD & IRT is warranted to the original purchaser to be free from defects in material and workmanship for a period of one year. Subject to certain restrictions, General will repair or replace this instrument if, after examination, the company determines it to be defective in material or workmanship. The warranty period begins on the date of purchase. You are encouraged to register your product online. General will extend your warranty an additional 60 days if you register at [www.generaltools.com/Product Registry](http://www.generaltools.com/ProductRegistry).

This warranty does not apply to damages that General determines to be from an attempted repair by non-authorized personnel or misuse, alterations, normal wear and tear, or accidental damage—including dropping the unit. The defective unit must be returned to General Tools & Instruments or to a General-authorized service center, freight prepaid and insured.

Acceptance of the exclusive repair and replacement remedies described herein is a condition of the contract for purchase of this product. In no event shall General be liable for any incidental, special, consequential or punitive damages, or for any cost, attorneys' fees, expenses, or losses alleged to be a consequence of damage due to failure of, or defect in any product including, but not limited to, any claims for loss of profits.

Register now at www.generaltools.com/ProductRegistry to receive a 60-day extension to your warranty.

RETURN FOR REPAIR POLICY

Every effort has been made to provide you with a reliable product of superior quality. However, in the event your instrument requires repair, please contact our Customer Service to obtain an RGA (Return Goods Authorization) number before forwarding the unit via prepaid freight to the attention of our Service Center at this address:

General Tools & Instruments
75 Seaview Drive
Secaucus, NJ 07094
212-431-6100

Remember to include a copy of your proof of purchase, your return address, and your phone number and/or e-mail address.



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HT50 User's Manual

Specifications subject to change without notice

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