



Registration applies to the Boulder, Colorado

HandiLaz®

Operator's Manual



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SYSTEMS**

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HandiLaz Operator's Manual
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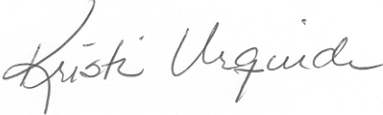
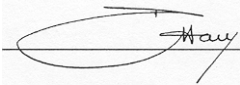
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Quality Statement

The Quality Policy of Particle Measuring Systems is to strive to meet or exceed the needs and expectations of our customers and to align the activities of all employees with the common focus of customer satisfaction through continuous improvement in the quality of our products and services.

Declaration of Conformity

Application of Council Directive(s):	89 / 336 /EEC, 73 / 23 /EEC		
Standard(s) to which Conformity is Declared:	EMC	EN 61326: 1997/A1: 1998/A2: 2001	
	Safety	EN 61010-1: 2001	
Manufacturer's Name:	Particle Measuring Systems, Inc.		
Manufacturer's Address:	5475 Airport Boulevard, Boulder, CO 80301 USA		
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Distributor's Name:	Particle Measuring Technique, Great Britain		
Distributor's Address	Unit B1 South, Willow End Park		
	Danemoor, Malvern WR14 1XZ		
	Worcestershire, WR13 6NN United Kingdom		
Distributor's Telephone/FAX:	011-44-1684-312950 / 011-44-1684-312969		
Type of Equipment:	Air Borne Particle Sensor		
Model No:	HandiLaz		
I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).			
Signature:	Signature:		
			
Full Name: Kristi Urquidi	Full Name:	David Hall	
Position: Vice President Operations	Position:	Managing Director	
Place: Boulder Date: November 15, 2005	Place: Malvern	Date: November 15, 2005	

Manual Conventions

NOTE: A NOTE in the text is used to highlight an item that is of operational importance.

CAUTION:

A **CAUTION** in the text is used to highlight an item that, if not done or incorrectly done could damage the instrument and/or any materials or devices affected by the instrument.

WARNING:

A **WARNING** in the text is used to highlight an item that, if not done or incorrectly done could result in bodily injury or death.

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Chapter 1

Introduction

HandiLaz is a handheld, 4-channel, laser-based, aerosol particle counter, designed for microcontamination assessment in cleanrooms and other environmentally-controlled areas. Its molded casework has been designed for ease of handling and cleaning. It operates from its own internal battery source as well as the external power supply unit, which rapidly re-charges the battery pack.

Features:

- Small and can be carried comfortably for long periods
- Simple to use and maintain
- The internal battery pack can be charged rapidly
- Stores data internally for review or transfer to a PC
- Interfaces with an external PC to allow result analysis (using optional CountWin software)
- Has a wide range of optional accessories

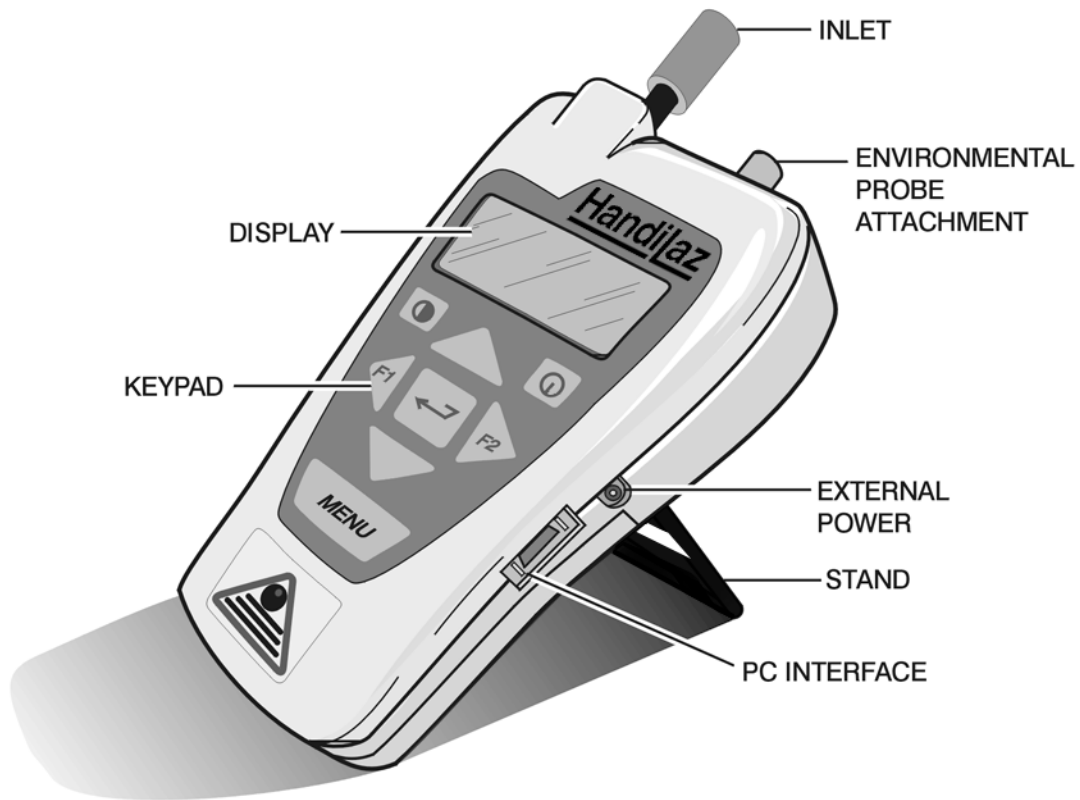


Figure 1-1: Front and Side View

Front

The front panel includes a multi-function keypad and display that are designed to be easily used and cleaned.

Sides

The right side includes the DC power jack and RS-232 connection to an optional printer or an external PC (requires the optional CountWin software).

Top

The top includes the particle inlet nozzle and the connection to the optional temperature-humidity probe.

CAUTION:

The inlet nozzle should not be removed, and no cleaning device be inserted into the inlet nozzle. The protective cap for the inlet nozzle should be replaced when the HandiLaz is not in use.

Battery Compartment

The battery compartment houses the battery pack. The connection from the battery to the connector in the compartment is reversible; either orientation will work.

CAUTION:

Only the battery pack supplied with the HandiLaz may be used; use of any other battery pack could result in permanent damage to the power pack or the HandiLaz.

WARNING:

The battery pack must only be used with HandiLaz and its accessories as prescribed by this manual. Use with any other charger or product could lead to damage and possible hazard to the user.

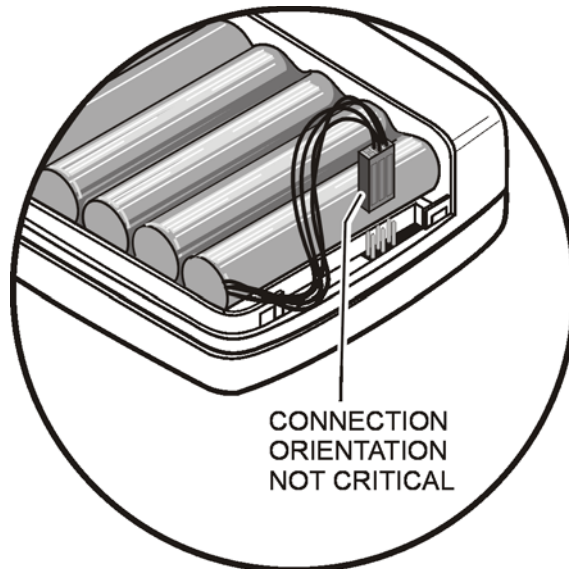


Figure 1-2: Battery Pack Connection

Rear Panel

Three label spaces are found on the rear of the HandiLaz. The top label is the calibration label, indicating calibration status and due date. The middle label is the product identification and serial label. The third label space is intended for customer use and is left blank.

Tilt Stand

The built-in tilt-stand supports the instrument for tabletop operation. It may be retracted for use in hand-held mode.

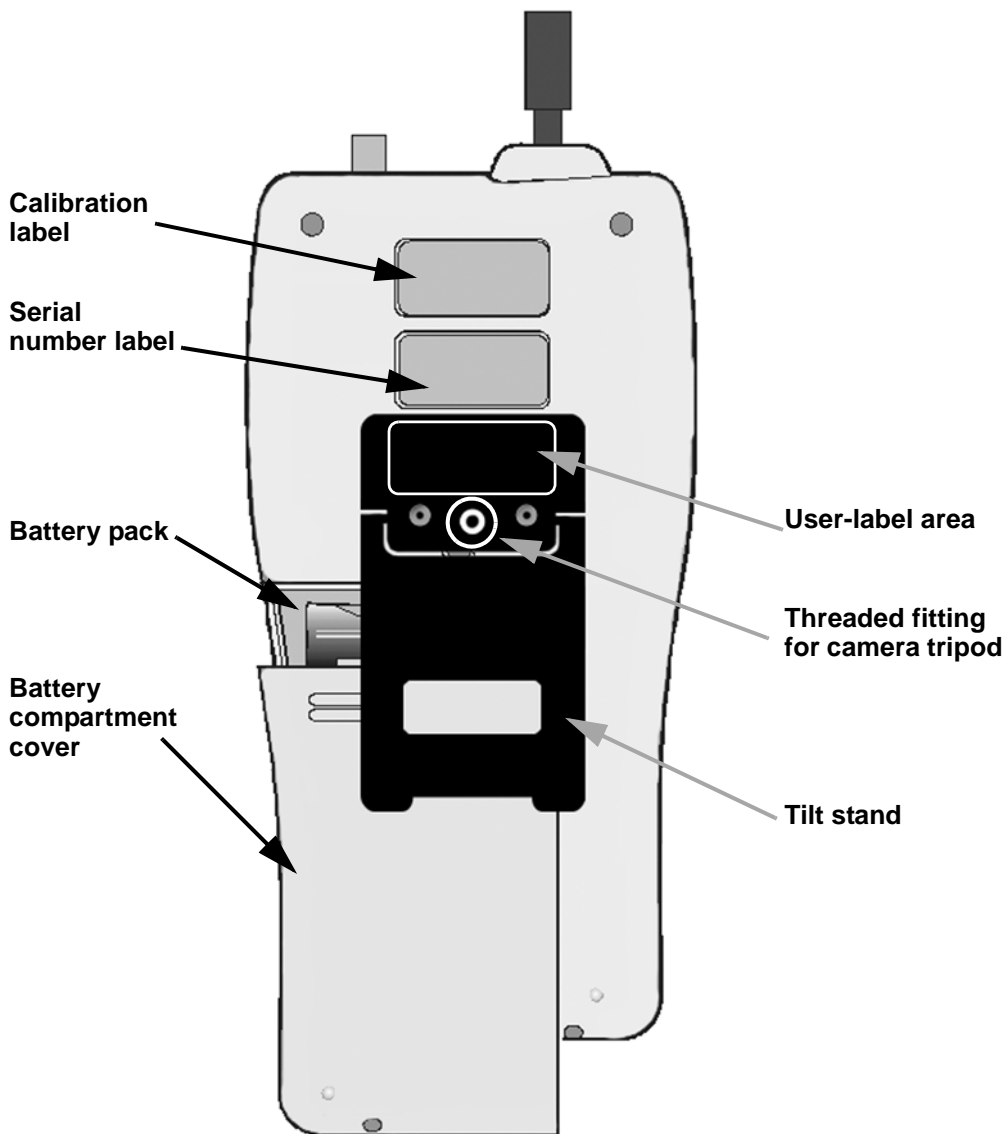


Figure 1-3: Rear View

Mounting Socket

The built-in UNC mounting socket accepts a standard camera tripod or hand-grip.

Specifications

Installation Over-voltage	Category II
Ambient Environment	Pollution Degree 2
Product laser classification	Class I Laser Device
Laser Type	Diode laser
Sample flow rate	0.1 CF \pm 10%
Purge flow rate	0.1 CF \pm 10%
Background counts	less than 1 count/ft. ³
Maximum particle concentration @ 10% coincidence loss	1,000,000/ CF (10% coincidence)
Counting efficiency	50% \pm 10% @ 0.30 μ m
Viewing volume	115% \pm 10% @ 0.5 μ m
Number of size channels	4
Channel thresholds	0.3 μ m, 0.5 μ m, 1.0 μ m, and 5.0 μ m
Environmental sensors	Temperature and humidity probe (optional) Vaisala® type, 0° to +50°C, 20 – 95% R.H.
Communications	RS-232 serial communications port for printing or data link/remote host operation
Data storage	500 sample results may be stored for 3 months regardless of battery power
Operating limits	Temperature: 5–35°C Humidity: 10–90% R.H. Non-condensing
Transportation/Storage	-40 to +70°C
Maximum altitude	2000 M
Indoor/Outdoor	Indoor use only. Ordinary protection (not protected against harmful ingress of moisture)
Material	Kydex injection molded
Mounting	Hand-held or mounted using external UNC screw fitting

Power	<ul style="list-style-type: none"> • AC adapter. 100–240 VAC 50/60 Hz to 15 VDC • HandiLaz: 15 VDC, 2A • Class I Equipment requiring a grounded electrical supply • Internal batteries, approximately 3 hours + 15 min. per charge in measurement mode
Battery recharge time	<ul style="list-style-type: none"> • Using the internal charger: 2 hours • Using the optional Rapid external battery charger: 1 hour
External rapid battery charger (optional)	<ul style="list-style-type: none"> • 100-240 VAC, 50/60 Hz, 2 A • Class I Equipment requiring a grounded electrical supply
Dimensions (h, w, d)	<p>8.5 × 4.5 × 2.5 inches 220 × 100 × 60 mm</p>
Weight	2.2 lb./1kg

Chapter 2 Unpacking

The HandiLaz and standard items are packed in a foam insert inside a box for maximum protection during shipment.

To unpack your HandiLaz:

- 1 Carefully open the container and remove the HandiLaz, inspecting each item for damage.

NOTE: If the shipping container itself shows signs of damage or mishandling, stop unpacking and notify the shipper immediately.

- 2 If any components are damaged, notify the shipper and Particle Measuring Systems, and repackage the unit in the original packing materials.
- 3 If your shipment is undamaged, store the packing materials. It is important to store packing materials, because warranties may not apply if return shipping containers are inadequate.

Packing Lists

The HandiLaz 104000-1 is shipped with the following standard items:

- HandiLaz particle counter
- *HandiLaz Operator's Manual*
- Isokinetic probe
- Power supply (AC to DC converter)
- AC power cord
- Calibration certificate

The HandiLaz 104000-2 is shipped with the following standard items:

- HandiLaz particle counter
- *HandiLaz Operator's Manual*
- Isokinetic probe

- External battery charger
- Power supply (AC to DC converter)
- AC power cord - two
- Spare battery
- Humidity/temperature sensor
- CountWin software
- PC cable
- Calibration certificate

Chapter 3

Installation and Setup

The procedures that follow will help you make sound decisions about installation. Some of the items are merely guidelines; other items include specific details and should be followed exactly. If you have questions about these items, contact Particle Measuring Systems.

Selecting a Location

To improve performance and utility, consider the following issues when choosing a location for the HandiLaz:

Temperature and humidity	The unit should be operated in normal laboratory conditions, that is, normal working temperature and humidity.
Mechanical shock	The HandiLaz is designed to perform as a rugged, portable measuring instrument. However, severe or repeated shocks could have a long-term effect on measurement accuracy instrument reliability.
Gross contamination	HandiLaz is a sensitive environmental monitor. Avoid exposure to high concentrations of airborne contaminants, as this could contaminate the optical sensor.
Fluid ingress	The HandiLaz is designed to withstand moderate cleaning or wiping down. However, it should not be immersed in liquid, nor should any liquid be spilled into the sample input or any electrical connection ports.
Connections	When the HandiLaz is being used with cables connected (for example, when charging from an external charger or downloading results to an external PC), care should be taken to route the cables so that they are not inadvertently snagged.
Electromagnetic fields	Do not operate the HandiLaz close to strong or localized magnetic or electromagnetic fields.

Charging the Battery

The HandiLaz is shipped with its batteries 60-80% charged. Before first use, fully charge the battery pack by connecting the HandiLaz to the provided AC to DC converter for two hours.

Alternatively, full charge may be achieved using the optional external charger for a period of one hour. See “Battery Charger and Spare Battery Pack Option” on page 5-4.

The battery pack charge status is shown on the battery status indicator, when the instrument is powered up. See “Battery Charge Indicator” on page 4-2.

If the HandiLaz will be stored for longer than one month, it is recommended that the battery pack be discharged by running the HandiLaz on battery power alone until it stops. This will improve the life of the battery pack.

NOTE: NiMH batteries produce full rated power until the end of their charge cycle. This can cause the battery charge indicator to indicate that the charge is higher than it actually is. If the charge indicator shows that the battery is low, recharge the battery as soon as possible.

WARNING:

- The main disconnect is the detachable power cord, which shall be easily accessible when installed.
- Ensure that the power cord is connected to a properly grounded outlet.
- All batteries must be disposed of in accordance with local regulations.

Chapter 4 Basic Operation

This section introduces you to the user interface which is comprised of the keypad and the LCD display. It also describes how to perform basic functions.

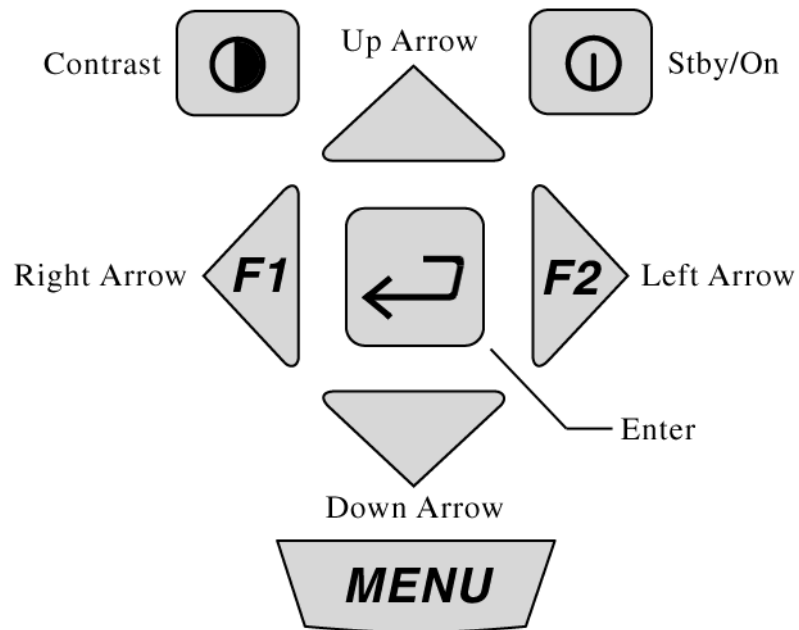


Figure 4-1: Keypad Layout

Keypad

The unit's configuration and operation is controlled by the eight keys on the membrane panel, as shown above.

Starting the HandiLaz

To start or stop the instrument:

press the  key.

NOTE: If the instrument does not respond, check the battery and/or electrical power.

When HandiLaz is started, it will perform a power-on diagnostic check of its functions. The pump will run for a short time. If a fault is detected, a message will be displayed on the screen.

When the startup diagnostic check is complete, the Main Menu screen will be displayed.

Menu	10 : 46 : 33	---Menu designator and current time
Measure		---Current operational mode
25 C	37%	---Temperature, battery status, and humidity

NOTE: Temperature and humidity are only displayed when the optional temperature/humidity probe is installed.

Battery Charge Indicator

Small squares at the bottom of the display indicate the relative strength of the battery.

Display	Meaning
■■■■■	Battery Charging (via external charger)
■■■■■ to ■■■■■	Battery Fully Charged
■■■■	Battery OK
■■■■	Battery Weak—should be recharged.

NOTE: If the battery charge diminishes enough to make measurement unreliable, a WARNING will be displayed and counting operations will be automatically discontinued.

Temperature and Humidity Sensor

If an external Temperature/Humidity probe is connected (PMS part number 501014-00), the temperature (degC) and humidity (percent) will be displayed at the bottom of the screen.

Time Display







Time is displayed in hours, minutes and seconds. For information on setting the time, see “Clock” on page 4-11.

NOTE: If the clock is not running, the internal clock battery may be depleted. This can be corrected by charging the unit for a short time.

Display Contrast

The display contrast level is adjustable to your preference.



To adjust the display contrast:


- 1 Press and hold down the  button.
- 2 While holding down the  button, press either the  or  button. The  button will cause the contrast to increase until the display is too dark to be read. The  button will cause the contrast to decrease until the display is too light to be read.
- 3 Release both buttons to leave the contrast set to the level suitable for you.

Main Menu

After the automatic startup check-out, HandiLaz will display the Main Menu, the first of a circular list of menus.

To select any of the menus at the same level as the Main Menu:


Press  or . The first menu is always ‘Measure’.

If navigating by pressing , the menu order is the following:






- Measure
- Reset Measure (Resets Location ID only)
- Sample Set-up
- Channel Alarms
- Location Set-up

- Review Data
- Comms. Set-up (Should be set at 9600 or Printer enabled)
- Download to PC (Wait for PC)
- Print All
- Reset Memory (Clears data)
- Clock
- Self Test
- Toggle Beep

To activate a menu:

When the menu item is visible on the display, press  to enter the menu.

To enter values:

Use the following buttons: , , , or  and then press  to fix the values.

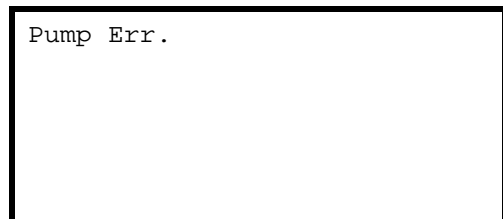
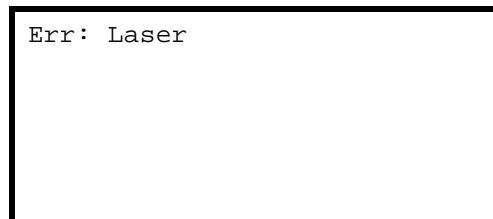
To start a function menu, such as ‘Measure’:

press .

Measure

Entering this menu starts the measurement process, which has its own set of sub-menus.

The unit will first purge the optical chamber by running the pump and laser for three seconds, with a displayed countdown. If the pump or laser are not performing correctly, the operation will be discontinued and a message describing the problem will be displayed.



The following diagram represents the operating cycle:



The operating cycle is repeated for one less than the number of samples specified.

There are three “Measure” screens:

- Sampling/Cycle progress
- Active Measurement
- Sample Group Summary.

Sampling Cycle Progress Screens



Sampling progress screens are displayed before active measurement starts and between periods of active measurement in the sample group.

If there is a programmed delay or a purge time, this will be shown. Otherwise, the active measurement screens will be displayed immediately.


Active Measurement Screens

There are four “Active Measurement” screens:

- Count1
- Count2
- Sensors
- Status

They are selected by pressing the  and  keys. The entry screen is the Count1 screen. All four screen show a countdown of sample time remaining which is displayed in the lower left corner.

To discontinue sampling:



press  and return to the Main Menu.


The upper three lines of the two count screens (Count1 and Count2) show the particle counts in three classifications, and the count units are shown in the lowest line.

Count1 screen — displays the 0.3µm, 0.5µm, 5.0µm particle count and count units.


0.3	56013
0.5	7370
5.0	1958
57:05 N Cm	

To select count units:

Press the  or  keys repeatedly during sampling until the count units you want appear on the display.

If the  button is used, the count units will appear in the following order:

1	N Df	Absolute Differential Counts
2	N/cuft Cm	Cumulative Counts per cubic foot
3	N/m ₃ Cm	Cumulative Counts per cubic meter
4	N/l Cm	Cumulative counts per liter
5	N Cm	Absolute Cumulative Counts
6	N/cu ft Df	Differential Counts per cubic foot
7	N/m ₃ Df	Differential Counts per cubic meter
8	N/l Df	Differential Counts per liter

If selected by , the order of 2 to 8 is reversed, but still beginning with N Df (Absolute Differential Counts.)

Count2 screen — Identical to Count1 except that it displays the counts in the 5.0µm channel instead of the 1.0µm channel.

0.3	2072
0.5	1175
1.0	121
57:05 N Cm	





To enter display the Count2 screen:

Press the  button.

The Sensor screen: — The Sensor screen displays the temperature and relative humidity.

```
Sensor
Temp          75F
R/H           25%
49:12
```

To enter the Sensor screen:

- 1 From Count2, by press the  button.
- 2 Use the  and  keys select whether the temperature is displayed in degrees Centigrade or Fahrenheit.
- 3 Press the  button to save your setting.

Status screen — displays the time; location Id. Number; the sample Number and number of samples taken; the percentage of sample record memory used.

```
14:10:13
Loc:          1 1/60
Mem:          5
46:27
```

To enter the Status screen:

From the Sensor screen, press the  button.

Sample Group Summary Screen

There are three Sample Group Summary screens:

- Total1
- Total2
- Sample Group Parameters

Total1 Screen

0.3	2072 N/A
0.5	1175 N/A
5.0	121 N/A
Grp	N Df.

Total2 Screen



0.3	2072 N/A
0.5	1175 N/A
1.0	121 N/A
Grp	N Df.

Sample Group Parameters Screen

17:45:41
03 Mar 2048
NS:22
ST: 00:00:20

Reset Measure







Entering this menu resets Location ID settings to the software default.


Press  and then  to reset. This resets Location only.

Sample Setup

The Sample Setup menu has the following sub-menus:

- Sample Time
- Purge Time (Time at beginning of group sample to purge air. This happens once per sample.)
- Delay Time (This happens at the beginning of a series of samples.)
- Interval Time (This is the time between samples within a group.)
- Number of Samples
- Geiger Enable (audible output of particle detection)
- Geiger Channel Select 0.3µm or 0.5µm or 1.0µm or 5.0µm

To change a value, press  to enter the sub-menu, use , , , or  to change the values, and press  to fix the value.

To escape the sub-menus press .

Channel Alarms

Channel alarms has the following set of sub-menus:

- Enable Channel Alarms
- 0.3 μ m total count alarm threshold (0 to 999999)
- 0.3 μ m Enable
- 0.5 μ m total count alarm threshold (0 to 999999)
- 0.5 μ m Enable
- 1.0 μ m total count alarm threshold (0 to 999999)
- 1.0 μ m Enable
- 5.0 μ m total count alarm threshold (0 to 999999)
- 5.0 μ m Enable
- Print on Alarm
- Sound on alarm

Location Setup


This has three sub-menus:

- **Location ID** (0 to 999)
- **Auto-Increment** Location Id after every group measurement (Yes)
- **Auto-Increment** (No)


To set the location ID:

- 1 From the MENU level, press the ∇ or \triangle buttons until the Location Setup menu option appears.
- 2 Press the \leftarrow button to activate the Location Setup menu set. The Location ID screen will appear.
- 3 Press the \leftarrow button to activate the Location ID edit mode.
- 4 Use the $F2$ or $F1$ buttons to navigate to the numeric position you want to edit.
- 5 Use the ∇ or \triangle buttons to set the number you want in a numeric position.
- 6 When the number is correct, press the \leftarrow button to save your setting and return to the Location Setup navigation level.
- 7 If you want to change the Auto-Increment settings, use the ∇ to navigate to the Auto-Increment screen you want to edit.

To toggle Auto-Increment Location ID after every group measurement from Yes to No or from No to Yes:


- 1 Navigate to the Auto-Increment Location ID after every group measurement screen.
- 2 Use the ▼ or ▲ buttons to toggle from Yes to No or No to Yes.
- 3 Press the  button to save your setting and return to the Location Setup navigation level.

To toggle Auto-Increment from Yes to No or from No to Yes:

- 1 Navigate to the Auto-Increment screen.
- 2 Use the ▼ or ▲ buttons to toggle from Yes to No or No to Yes.
- 3 Press the  button to save your setting and return to the Location Setup navigation level.

Review Data

This menu causes the results held in internal memory to be displayed. The data is scrolled into view by using the ▼ ▲ keys.

For details of a specific data set, press .

Comms. Setup

This menu sets up the Baud Rate of the serial interface, which is necessary for the printing of results and communication to PCs, etc.

- Printer Enable (Yes/No)
- Baud Rate (1200, or 2400, or 4800, or 9600)

Download to PC

This menu enables the results held in internal memory to be downloaded to a PC, under 'COUNTWIN'.

NOTE: The Baud Rate must be set to 9600 under the Comms Setup menu.

NOTE: If you are unable to download to a PC, ensure that both the PC and the HandiLaz baud rate is set to 9600.

Print All

This menu entry causes the results held in non-volatile ram to be printed out via the serial interface.

Reset Memory

This menu clears sample results from internal memory (clears data collected).

To reset memory:





From the Reset Memory display, press the  (Yes) key.

Clock

This has four sub-menus:

- Time
- Day
- Month
- Year

To set Time, Day, Month, or Year:

Select by the   keys, press  to enter and leave a sub-menu, press  to escape.


Self Test

Entering this menu repeats the self test program that ran at startup.


Toggle Beep

This menu allows the user to enable or disable a tone (beep) when a membrane key is pressed.

To enable a tone when a key is pressed:

From the Toggle Beep menu, press the  key.

To disable a tone when a key is pressed:

From the Toggle Beep menu, press the  key.

Chapter 5

Using Optional Accessories

External Printer Option

The HandiLaz may be used with the external thermal printer, to obtain hard copy results of measurements. The printer may be powered in either of the two following ways:

- wall current using the printer external supply (PMS parts PS139, PS140, PS141)
- the printer battery pack (PMS part EL193).

The printer is connected to the comms port of the HandiLaz by means of the printer cable (PMS part CD33).

Paper for the external printer can be ordered from Particle Measuring Systems (PMS part PR20).

Setting the DIP Switches on the HandiLaz External Printer

Three sets of DIP switches, each containing eight switches (24 total) which identify the communication, language, and print layout parameters that the printer will use. A minimum of four switches must be changed for this printer to be used with the HandiLaz. The switches which must be changed are labeled by "*" below. After completing the following procedure, the HandiLaz will print successfully.

To prepare HandiLaz for printing:

- 1 Turn the printer off.
- 2 While holding the "On-Line" button, turn the printer on.
- 3 The printer will print the current switch settings, followed by:

`"Continue?: Push 'On-Line SW'"`

`"Write?: Push 'Paper feed SW'"`

- 4 Push the "On-Line" switch.

- 5 Use the following commands to set switches:

ON = On-Line Button

OFF = Feed Button

Printout as Switches are being Set

```
[ DIP SW setting mode]
Dip SW-1
* 1 (OFF) : Input = Serial
  2 (ON)  : Printing Speed = High
  3 (ON)  : Auto Loading = ON
  4 (OFF) : Auto LF = OFF
  5 (ON)  : Setting Command = Enable
  6 (OFF) : Printing
  7 (ON)  : Density
  8 (ON)  : = 100%
Dip SW-2
  1 (ON)  : Printing Columns = 40
  2 (ON)  : User Font Back-Up = ON
  3 (ON)  : Character Select - Normal
  4 (ON)  : Zero = Normal
  5 (ON)  : International
  6 (ON)  : Character
  7 (ON)  : Set
* 8 (OFF) : = USA
Dip SW-3
  1 (ON)  : Data Length = 8 bits
  2 (ON)  : Parity Setting = No
  3 (ON)  : Parity Condition = Odd
* 4 (OFF) : Busy Control = XON/XOFF
* 5 (OFF) : Baud
  6 (ON)  : Rate
  7 (ON)  : Select
  8 (ON)  : = 9600

Continue?: Push 'On-Line SW'
Write?:   Push 'Paper feed SW'
```

- 6 Push the “Paper feed” button. The following text will print:

DIP SW setting complete!!

The printer is ready for use.

- 7 Turn the HandiLaz “Enable Printer” switch ON.
- 8 Confirm a baud rate of 9600 on HandiLaz. 9600 is used because this is the default for CountWin.

If a different baud rate is desired, consult the printer manual.

CountWin Software Option

CountWin is a Windows® application that allows importing data from an HandiLaz counter’s results buffer into a personal computer. This information is displayed as a tree of measurements. Each measurement contains one or more groups or locations. Each group/location contains one or more samples and each sample contains one or more size band values. Using this display is similar to using Windows File Manager or Explorer.

Clicking on an item shows an associated data summary. For groups and locations this is the mean of the samples. When used for measurements this summary can be a classification. For sample results, this is the size band data.

CountWin can perform ISO 14644, BS5295 and Federal Standard 209E classifications on suitable data sets from the particle counter. This occurs automatically upon reading the data.

CountWin can automatically export the results in a form suitable for importing into a spreadsheet application. “.CSV” files will open in EXCEL.

CountWin can print a simple summary report.

Installing CountWin

Minimum PC requirements to run CountWin are the following:

- an IBM PC 486 or greater
- 4 MB RAM
- Windows 95, Windows 3.11 and Windows for Workgroups.

Prior to installation, it is recommended to close down all applications. Insert the CountWin disk into drive A. Using the start button, select run and type **a:\setup.exe**. The setup program will then step through the installation process. An icon is created in the PMS group which can be opened on the desktop if desired.

Connecting the PC to the HandiLaz

De-energize the HandiLaz before plugging it into the PC. Use the PC cable (PMS part CD31). When connecting, ensure that the connectors are firmly plugged into the HandiLaz and the PC. Screw down the PC connection. Ensuring that the PC is on, switch on the HandiLaz and begin the transfer.

Data download and transfer

The on-line help files on CountWin can provide necessary help on data download and export to other applications.

Zero-count Filter Option

The zero-count filter (PMS part number FL03) allows you to conduct periodic zero-count tests. Connection to the HandiLaz is by means of tubing.

NOTE: Using the zero-count filter in a contaminated environment will clog the filter.

Similarly, the zero-count filter should be stored away from particle contaminants (for example, in a sealed bag) when not in use, as contamination could impair its function as a zero-count filter.

Battery Charger and Spare Battery Pack Option

The external battery charger will fully charge a HandiLaz battery pack in one hour from a discharged state. It enables the HandiLaz to be continuously available as a portable instrument whenever needed.

To use the battery charger, connect the battery charger to appropriate wall current, and then connect the battery to the charger. The battery charger and battery pack have been designed so that the orientation of the connection is not critical.

There are three indicators on the external charger:

- The *power indicator* shows connection to the main power source.
- The *fast charge indicator* shows the battery pack is undergoing full charge.
- The *trickle indicator* shows the battery pack is fully charged and being topped-up in trickle-charge mode.

Humidity and Temperature Sensor Option

The humidity and temperature sensor connects to the top of the HandiLaz by means of a bayonet-type connector. See Figure 1-1, “Front and Side View,” on page 1-2.

To connect the probe to the HandiLaz:

- 1 Align the red dots on the humidity/temperature sensor connection and the HandiLaz connection.
- 2 Push the probe straight toward the HandiLaz chassis until the sensor snaps into place.

To remove the probe:

- 1 Retract the sleeve on the bottom of the humidity/temperature sensor connection.
- 2 Pull the sensor straight away from the HandiLaz chassis.

Once the sensor is connected, temperature and humidity values will be displayed on the HandiLaz measure menu. Care should be taken with the probe to avoid contamination of the sensor with liquid.

Carry Case Option

The Carry Case holds the HandiLaz and the main accessories as a set.

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Chapter 6 Troubleshooting

Problem	Possible Cause	Try...
HandiLaz will not turn on	<ul style="list-style-type: none"> • Battery missing • Battery discharged • Charger not connected • Charger not powered up 	Check the presence and connection of the internal battery pack. Charge the battery. Make sure the charger is on and the charger power cable is plugged in.
HandiLaz display is dark or not on	Contrast incorrectly set.	Turn power off and back on. Adjust the contrast setting to achieve the required display level.
Keypad does not respond	Processing lock-up	Cycle power. Turn unit off. Wait 10 seconds and turn back on. Ensure connection to any PC has followed the recommendations in the “CountWin” section.
Pump error reported	Obstruction to flow on inlet	Check for obstruction. Do not insert anything into the inlet nozzle as this could damage the sensitive optics.
Printer does not function	<ul style="list-style-type: none"> • Printer not turned on • Incorrect DIP settings on printer • Connections faulty 	Ensure printer powered up. Ensure DIP settings are as per this manual.
TRH probe does not function	<ul style="list-style-type: none"> • Improper probe connection • Incorrect software menu 	Ensure the probe is pushed fully home. Ensure the measure menu is being used for TRH readings.

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Chapter 7 Maintenance

The HandiLaz is designed to be sturdy and trouble-free. Certain periodic maintenance will preserve the operation and appearance of the unit.

Cleaning

Clean the external surfaces of the unit using a mild soap and water solution and a soft, lint-free cloth. The HandiLaz has been designed to withstand application of harsh solvents such as ethanol. Care should be taken to avoid ingress of liquids of any kind into the HandiLaz.

Calibration

The HandiLaz should be calibrated annually. The calibration status of the HandiLaz is indicated on the rear of the unit. HandiLaz calibration should be performed only by approved Particle Measuring Systems technicians.

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Appendix A

Options and Accessories

The following items are optional. Contact your Particle Measuring Systems sales representative for more information.

Option	PMS Part Number
PC cable	CD31
External printer	PR37
Carry case	MI503
Spare battery pack	AE2100
External battery charger	AE2135
CountWin software	FW000061
Zero count filter	FL03
Printer paper	PR20
Humidity/temperature sensor	501014-00
Power supply for printer (Japanese)	PS139
Power supply for printer (European)	PS140
Power supply for printer (USA)	PS141
Printer cable	CD33
Spare battery pack for printer	EL193

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Appendix B

International Precautions

WARNING

This instrument is a Class I laser product. Use of controls, or adjustment, or performance of procedures other than those specified here may result in hazardous radiation exposure.

AVERTISSEMENT

Cet instrument contient un laser de Classe 1. L'usage de moyens ou procédures, ou la pratique de certains réglages autres que ceux prévus dans ce manuel peuvent entraîner des risques d'exposition aux radiations laser.

WARNUNG

Das Gerät ist ein Laser der Klasse 1. Werden Einstellungen vorgenommen oder Verfahren eingesetzt, die nicht in dieser Bedienungsanleitung beschrieben sind, kann es zu gefährlicher Strahlung kommen.

ATTENZIONE


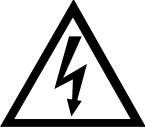
Questo strumento è nella classe 1 dei prodotti laser. Fare controlli o calibrazioni e seguire procedure diverse da quelle specificate in questo manuale, può provocare esposizione a radiazioni pericolose.

PRECAUTION

Este equipo es un producto laser de Clase I. La utilización de controles, ajustes o procesos diferentes de los especificados aquí, pueden dar lugar a exposiciones a radiaciones peligrosas.



Hazard Symbols

The meaning of hazard symbols appearing on the equipment is as follows:

Symbol	Nature of Hazard
	Attention, consult accompanying documents.
	Dangerous High Voltage


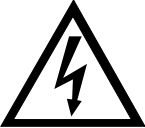
Symboles de risque

Des symboles représentant les risques sont placés sur l'appareil. Leur signification est la suivante:

Symbole	Nature du risque
	Attention, consulter les documents d'accompagnement
	Danger Electricite



Warnschilder

Die, an dem Gerät angebrachten Warnschilder haben folgende Bedeutungen:

Symbol	Gefahrenart
	Achtung! In den beiliegenden Unterlagen nachschlagen
	Achtung Hochspannung



Simboli di pericolo

Il significato dei simboli di pericolo che appaiono sugli strumenti il seguente:

Simbolo	Natura del pericolo
	Attenzione. Consultare i documenti allegati
	Tensione Pericolosa

Simbolos de peligro

Los simbolos de peligro que aparecen en el equipo significan:

Símbolo	Naturaleza del Peligro
	Atención, consultar los documentos adjuntos.
	Peligro alto voltaje.

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