

**HHPC-6**  
**Handheld Airborne**  
**Particle Counter**  
**Operator Manual**



**March 2005**



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# Manual Overview

## About This Manual

The information in this manual has been carefully checked and is believed to be accurate. However, Hach Ultra Analytics assumes no responsibility for any inaccuracies that may be contained in this manual. In no event will Hach Ultra Analytics be liable for direct, indirect, special, incidental, or consequential damages resulting from any defect or omission in this manual, even if advised of the possibility of such damages. In the interest of continued product development, Hach Ultra Analytics reserves the right to make improvements in this manual and the products it describes at any time, without notice or obligation.

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## Safety Conventions



### WARNING

*A warning is used to indicate a condition which, if not met, could cause serious personal injury and/or death. Do not move beyond a warning until all conditions have been met.*

### CAUTION:

*A caution is used to indicate a condition which, if not met, could cause damage to the equipment. Do not move beyond a caution until all conditions have been met.*

### Note:

*A note is used to indicate important information or instructions that should be considered before operating the equipment.*

## General Safety Considerations

- All service procedures should be conducted by properly trained service personnel.
- Follow all procedures in “[Return Procedures](#)” on page 45 before shipping a unit to a service center for repair or re-calibration.
- Additional safety information is included in the *Particle Counters for Air* manual. For additional assistance, contact the Hach Ultra Analytics Technical Support representatives at 800.866.7889 or +1 541.472.6500.

## Electrical Safety

To reduce the risk of electric shock, do not expose the particle counter to rain or moisture.

Failure to use this instrument in a manner intended by Met One may circumvent the protection provided by this instrument, resulting in personal injury or loss of life.

## Laser safety

- Laser Safety -- Class 1 Laser Product -- Complies with 21 CFR Chapter 1, Subchapter J.
- Evaluated and tested in accordance with EN 61010-1:1993, "Safety requirements for Electrical Equipment for Measurement, Control, and Laboratory Use" and IEC 825-1:1993, "Safety of Laser Products."



### WARNING

*Use of controls or adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure that may cause blindness.*



### WARNING

*Invisible and visible laser radiation when open. Avoid direct exposure to beam.*

## Electrostatic Safety

Electrostatic discharge (ESD) can damage or destroy electronic components. Therefore, all work inside the particle counter should be done at a static-safe workstation. To create a static-safe workstation, do the following:

- Use a grounded conductive table mat and resistor-isolated wrist-strap combination.
- Earth-ground all test instruments to prevent a buildup of static charge.

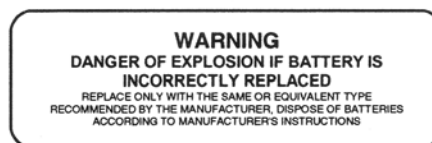


### WARNING

*Using a wrist strap without an isolation resistor will increase the severity of an electrical shock.*

## Battery Safety

An explosion can occur if the internal battery is replaced incorrectly. The following label appears on the battery.



### WARNING

*Attempts by untrained personnel to disassemble, alter, modify or adjust the electronics may result in personal injury and damage to the HHPC-6 Handheld Particle Counter.*

## Warranty

Hach Ultra Analytics warrants that this instrument will be free of defects in materials and workmanship for a period of one (1) year from the shipping date. If any instrument covered under this warranty proves defective during this period, Hach Ultra Analytics will, at its option, either repair the defective product without charge for parts and labor, or provide an equivalent replacement in exchange for the defective product.

To obtain service under this warranty, the customer must notify the nearest Hach Ultra Analytics service support center on or before the expiration of the warranty period and follow their instructions for return of the defective instrument. The customer is responsible for all costs associated with packaging and transporting the defective unit to the service support center, and must prepay all shipping charges. Hach Ultra Analytics will pay for return shipping if the shipment is to a location within the same country as the service support center.

This warranty shall not apply to any defect failure or damage caused by improper use or maintenance or by inadequate maintenance or care. This warranty shall not apply to damage resulting from attempts by personnel other than Hach Ultra Analytics representatives, or factory-authorized and trained personnel, to install, repair or service the instrument; to damage resulting from improper use or connection to incompatible equipment; or to instruments that have been modified or integrated with other products when the effect of such modification or integration materially increases the time or difficulty of servicing the instrument.

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### Revision History

- Edition A, August 2003, Hach Ultra Analytics.

### Acknowledgements

- Belden is a registered trademark of Belden Inc.
- PROCOMM is a registered trademark of Symantec, Inc.
- Windows and HyperTerminal are registered trademarks of the Microsoft Corporation.



# 1 Introduction

The HHPC-6 Handheld Airborne Particle Counter is an intelligent, portable and robust instrument that measures, counts, stores and reports airborne particulates. The standard HHPC-6 holds 500 samples<sup>1</sup> in memory. These records include date, time, counts, sample labels, volume, alarm flags, temperature and relative humidity. Easily download the data to a personal computer using the included interface cable and software. The internal battery can power the HHPC-6 while mobile or connected to the ac power adapter provided with the unit for extended or stationary sampling.

The HHPC-6 is commonly used to monitor the air quality in clean rooms, manufacturing processes, pharmaceutical production, for mold remediation and Indoor Air Quality (IAQ) monitoring.

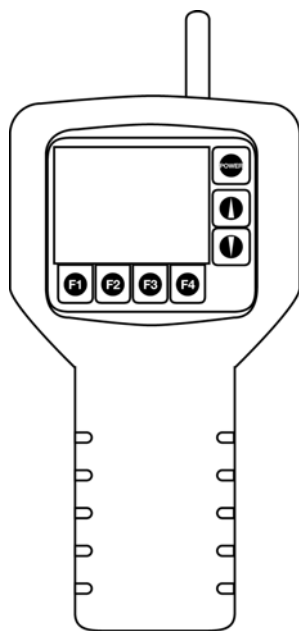


Fig 1-1 : Front View of the HHPC-6

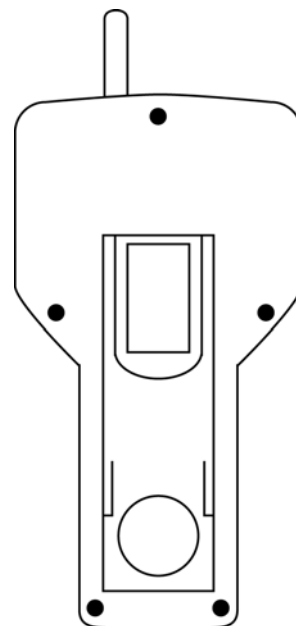


Fig 1-2 : Rear View of the HHPC-6

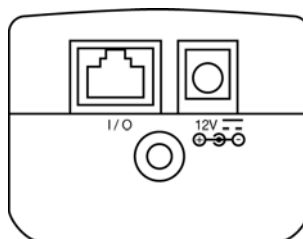
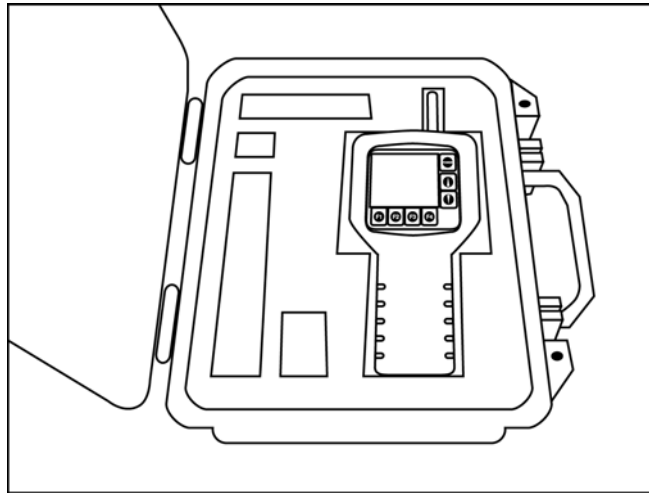


Fig 1-3 : Bottom View of the HHPC-6

1. Option EX enables the HHPC-6 to store up to 2000 sample records. This option can only be added at the factory.

## 1.1 Unpacking the Unit

- If there are any signs of damage to the shipping container, immediately notify the carrier for possible insurance adjustment purposes.
- If the container is intact, carefully open and unpack the contents according to the following general directions. Compare each item with the shipping list to make sure all listed items are received. Report any missing or surplus items to a Hach Ultra Analytics representative immediately, 800.866.7889 or +1 541.472.6500.



*Fig 1-4 : HHPC-6 Unit in the Optional Carrying Case*

- Lift the HHPC-6 from the shipping container or the carrying case and place it on a flat surface.
  - Remove the layer of protective plastic from the LCD screen.
- The HHPC-6 is now ready to set up and operate.

### Contents of the Shipment

The HHPC-6 includes these items in a reusable shipping box:

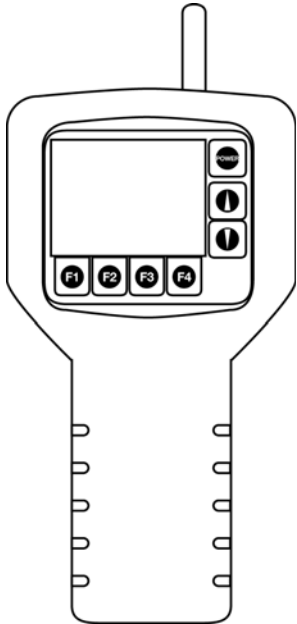


Fig 1-8 : HHPC-6 Particle Counter



Fig 1-5 : Zero Count Filter



Fig 1-6 : Intake Nozzle, 1/8" Hose Barb, MP000026-01



Fig 1-7 : AC/DC Power Supply, VP624005

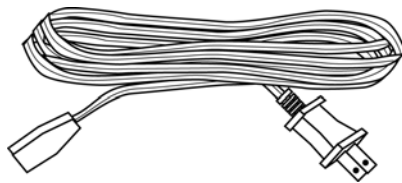


Fig 1-9 : US Power Cord, VP623501

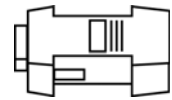


Fig 1-10 : RJ-45 to DB-9 Adaptor, SA000070-01

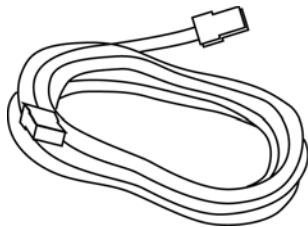


Fig 1-11 : RS-232 Modular Cable, VP894408



Fig 1-12 : HHPC-6 Utility Software, CS200020-01



Fig 1-13 : 6" 1/4"-OD High Purity Tubing, VP792002

## a ) Optional Accessories

Optional accessories include the following:

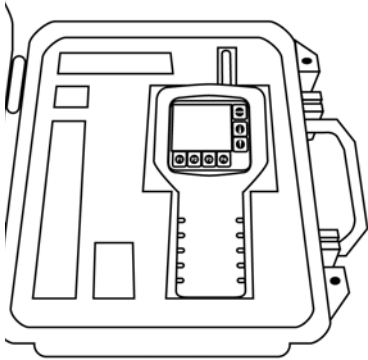


Fig 1-14 : Carrying Case,  
SA000089-01

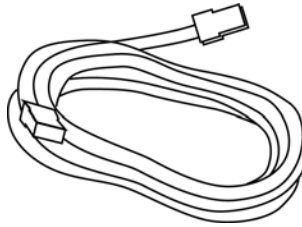


Fig 1-15 : RS-232 Serial Interface  
Extension Cable, EP096010

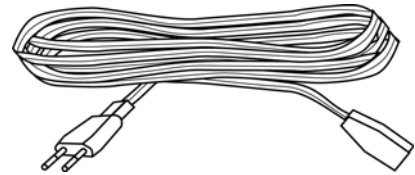


Fig 1-16 : European Power Cord,  
VP625300

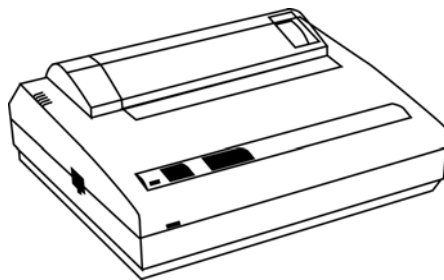


Fig 1-17 : Serial Thermal Printer, SA000094-01



Fig 1-18 : Isokinetic Probe, Hose Barb, MP000120-01

## 1.2 Understanding the Display and the Keypad

The HHPC-6 features a Liquid Crystal Display (LCD) that is bordered on the right and the bottom by a keypad. When the unit is powered on, the Met One Opening Screen displays briefly, followed by the Main Screen.

### Note:

*If the unit does not power up, double-check the ac connection or the battery power. To charge the battery, see “Charging the Battery” on page 41.*

### Screens

Press the corresponding button from the bottom keypad to invoke these screens:

- Main Screen
- Setup Screen (page 1 and page 2)
- Clock Setup Screen
- Label Setup Screen

## Main Screen

The following information displays on the main screen:

- Size channel sizes and corresponding counts
- Sample air relative humidity (%RH)
- Sample air temperature (°C or °F)
- Battery charge indicator (amount of charge remaining, refer to [Table 5-1 on page 41](#))
- Sampled volume indicator (clock timer symbol)
- Selected sample volume

## Keypad

Function keys are used for selecting various selectable screens. The **Up** and **Down** arrow keys are used for scrolling within the selected screen.

- Function keys:
  - **F1** starts and stops the sample
  - **F2** selects setup screen
  - **F3** selects Date, Time and Delay Screen
  - **F4** selects sample label screen
- **Power** key toggles the power on and off
- Arrow keys change the LCD contrast from the main screen



## 2 Setting up the HHPC-6

### 2.1 Safety Considerations

Read and follow all safety considerations carefully when setting up and operating the HHPC-6:

**Note:**

*If the general safety information presented earlier in “General Safety Considerations” on page 3 has not been reviewed, please do so now.*

- Remove the isokinetic probe cover (the black cap) before operating the unit. Leaving the cap on will damage the pump and other internal electrical components.
- Do not use a wrench to connect or disconnect the intake nozzle or isokinetic probe. This connection should only be finger-tight.
- Only factory certified personnel should service the HHPC-6.



**WARNING**

*Attempts by untrained personnel to disassemble, alter, modify or adjust the electronics may result in personal injury and damage to the HHPC-6.*

- Do not operate the unit using a power supply that does not supply the same voltage and charging current (polarity).
- Do not use the HHPC-6 stand during keypad operation.

### 2.2 Selecting an Intake Device

The HHPC-6 is shipped with two different intake devices: the isokinetic probe and the intake hose barb.

#### a ) Isokinetic Probe

The isokinetic probe, shown in [Figure 2-1](#), is used when sampling ambient air samples. It is connected to the HHPC-6 for shipping and covered with a black plastic cap to protect the unit from debris and contamination when not in use. It is ready for use as soon as the unit is unpacked. Turn intake device counter-clockwise to remove; turn it clockwise to install.

User may connect longer tubing to the optional isokinetic probe with a hose barb end (not included, part number MP000120-01) for sampling hard to reach areas.

**Note:**

*Only use maximum 4 feet of high purity or approved tubing, longer or incorrect size or type of tubing will affect the sample accuracy.*

#### Zero Count Filter

To connect the zero count filter, connect the 6-inch long high purity tubing provided with the unit to the intake hose barb and the opposite end to the zero count filter. Airflow direction arrow or indicator on the zero count filter should be pointing towards the tubing.

### b ) Intake Hose Barb

The intake hose barb connects tubing to the particle counter for zero counting and purging or sampling hard to reach areas. To connect the intake hose barb, unscrew the isokinetic probe from the unit, screw in the hose barb and remove the protective cap intake hose barb.

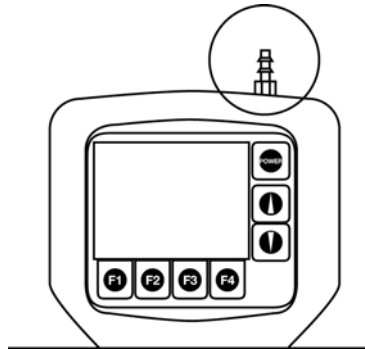


Fig 2-1 : Hose Barb Fitting

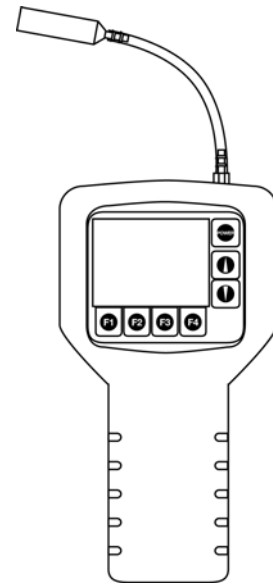


Fig 2-2 : Isokinetic Probe with Tubing and Zero Count Filter

## 2.3 Quick Start

**Note:**

Before attempting to connect any external source to the HHPC-6, read and understand the “General Safety Considerations” on page 3.

HHPC-6 is shipped ready to use and is configured in a default mode as listed below:

Table 2-1 : Default Settings

Parameter	Default Setting
Count Mode	Concentration
Sample Volume	1.0L
Count Data	Cumulative
Number of Samples	1
Alarm Limit	0
Alarm Size	1st channel
I/O Port	Printer
Temperature	°C

KISS - watch zeus - edition 3

*Table 2-1 : Default Settings*

Parameter	Default Setting
Buffer Count	0
Label	Location 1

The user may choose to change the above default settings as needed for a specific application before sampling.

To reset the unit to the default settings, hold down the **F1** key and press the **Power** button, release the **F1** key when “Defaulting data” appears on display screen.

Once the unit is unpacked and connected to the appropriate intake device, conduct a one-minute count cycle using the default settings then download the data to a personal computer and print the results.

- 1) Remove the isokinetic probe cover (the black plastic cap).
- 2) To turn on the unit, press the **Power** key.
- 3) To begin counting, on the Main Screen, press **F1** (Count).

Counting begins and the **F1** key changes to Run. After one minute, the count cycle concludes and the **F1** changes back to Count.

The results are saved automatically in the print buffer.

- 4) To transfer the sample records to a PC, connect the particle counter to the communications port on the PC using the modular cable (VP894408) and the DB-9 to RJ-45 converter (SA000070-01).
- 5) Insert the HHPC-6 utility software into the drive.
- 6) Copy **HHPC6Utility.exe** and **HHPC6.ini** to a working directory on the PC.

If the Communications port to be used is other than Com1, open **HHPC6.ini** and change Port=Com1 to Port=ComX (where X represents the number of the port to use.)

- 7) To open the utility software, double-click the **HHPC6Utility.exe** file.

The HHPC-6 Utility window appears as shown in [Figure 2-3](#).

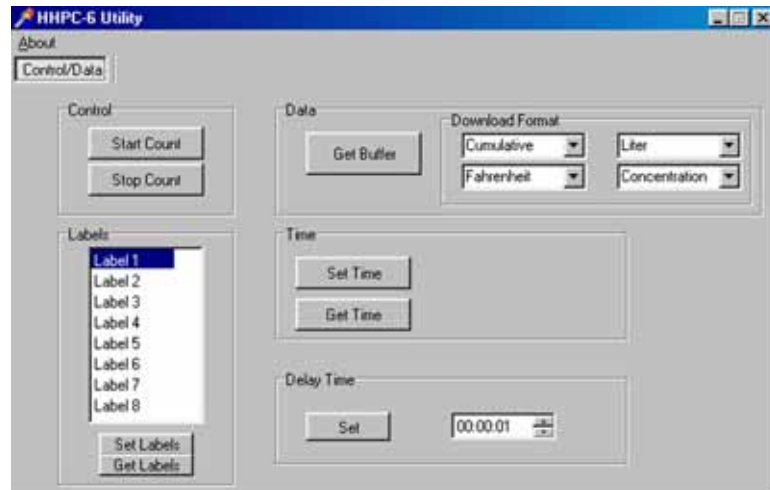


Fig 2-3 : HHPC-6 Utility Window

- 8) Follow the instructions in the **Readme.txt** file on the diskette to download the data from the buffer to the computer and print the results.

## 2.4 Selecting Custom Settings

Use the function (**F1-F4**) and arrow keys on the keypad to make changes to the settings as required for the specific application.

### a ) Setting the Clock

#### Setting the Date

- 1) On the Main Screen, press **F3** (Clock).  
The Clock Setup Screen appears as shown in [Figure 2-4](#). The date area is selected.

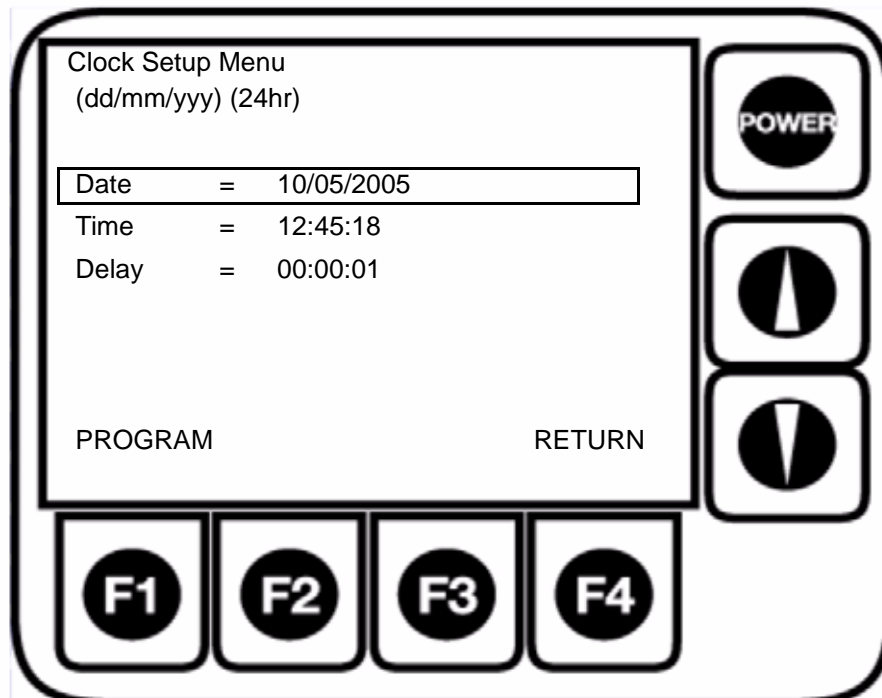


Fig 2-4 : Clock Setup Screen

- 2) Date is selected by default or the last change. The cursor indicates the current selection. Press **F4** (Enter) key to exit the screen if the information displayed is correct.
- 3) Press **F1** (Program) key to make changes; the display above **F4** key will change to FORMAT. The cursor will move to the first two digits of the date.
- 4) To toggle the order in which the date appears press the **F4** key (Format) (MM/DD/YYYY or DD/ MM/YYYY). Press **F1** to accept the change, followed by F4 to exit.

### Setting the Time

To change the time displayed:

- 1) From the main menu, press **F3**.
- 2) Press the **Up** or **Down** arrow Key and move the cursor to the Time field.
- 3) Press **F1** (Program) key to make changes in the selected field; the display above the **F4** key will change to FORMAT. The cursor will move to the first two digits of the time.
- 4) Press the **F4** (Format) key to toggle between standard and military time.
- 5) To change hours, minutes or seconds, move the cursor to hours, minutes or seconds by using the **F2** or **F3** keys and use the **Up** or **Down** arrow keys to select the correct hours, minutes or seconds. Press **F1** (Enter) to accept the change and **F4** to exit.

### Setting Delay Time

- 1) From the main menu, press **F3**.
- 2) Press the **Up** or **Down** arrow key and move the cursor to the Delay field.

- 3) Press the **F1** (Program) key to make changes in the selected field; the display above the **F4** key will change to FORMAT. The cursor will move to the first two digits of the delay time (HH:MM:SS).
- 4) Move the cursor to hours, minutes or seconds by using the **F2** or **F3** keys and use the Up or Down arrow keys to select the correct hours, minutes or seconds. Press **F1** (Enter) to accept the change and **F4** to exit.

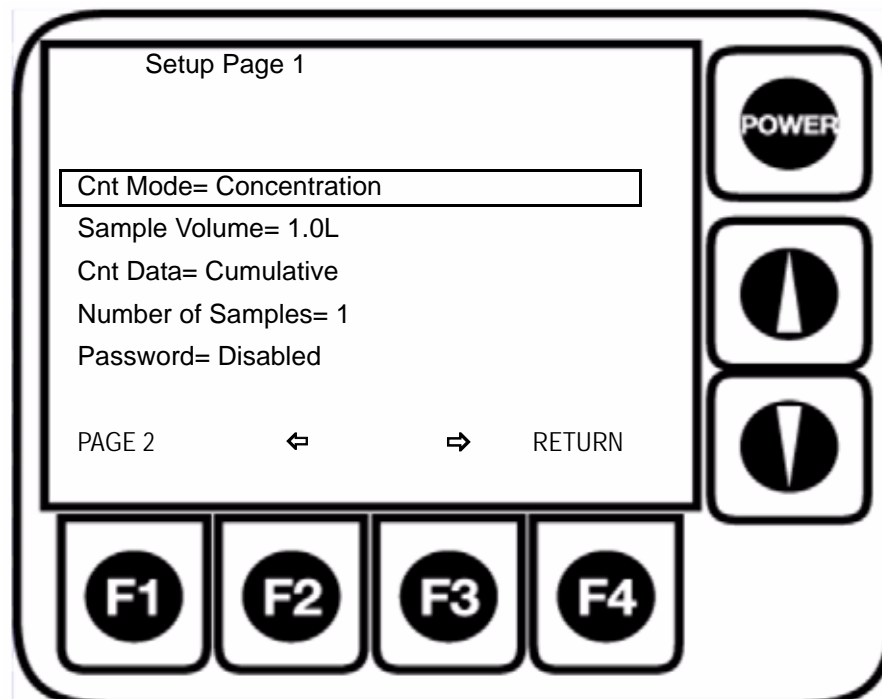
**Note:**

*Delay time will apply to all future multiple samples. This feature is commonly used when running unmanned multiple samples with the intention of running samples at the delayed intervals.*

## b ) Selecting Sample Modes

### Setting the Count Mode

- 1) On the Main Screen, press **F2** (Setup).  
The Setup Screen, Page 1 appears with the Count Mode field selected as shown in [Figure 2-5](#).



*Fig 2-5 : Setup Screen*

- 2) To review the modes available, press **F3** (Right Arrow).

Table 2-2 : Count Modes

Mode	Description	Example
Concentration	This mode is useful for taking a quick snapshot of airborne particulate samples, especially in areas where particulate levels are unknown and may exceed the operating levels of the counter. The HHPC-6 estimates count per cubic foot or liter depending on the volume selected.  The unit updates the displayed results by calculating the completed sample counts and volume compared to the balance of volume.	If the selected volume is 0.1 cubic foot (one minute sample) and the sample is allowed to complete, then the displayed result is 10 times the actual sampled counts. If the same sample display was viewed at the 6th second into the sampling, the displayed result is 100 times the actual sampled count.
Totalize	Particle counts are displayed and accumulated as sampled. When the sample is completed, the record is stored and the value is displayed on the screen until the next sample is started.	N/A
Audio	The particle counter beeps each time the alarm limit is exceeded. See <a href="#">“Setting the Alarm Count and Size”</a> on page 23.	If the limit is set for 10, the counter beeps when the count first reaches 10 and beeps again for each multiple of 10.

- 3) Press **F4** (Return) to select the displayed mode and return to the Main Screen.

### Setting the Sample Time or Volume

Sample Volume and 1.0L is the default. Press **F2** and **F3** to scroll through all sample volume and standard sample time selections. Press the **F4** (return) key to accept a selection when displayed and return to the main screen.

- 1) Press the **Up** and **Down** arrows to select the second selection line, Sample Time or Sample Volume. When Sample Time is highlighted, the **F1** key will change from PAGE 2 to EDIT as shown in [Figure 2-6](#). It will revert to PAGE 2 when the cursor is moved to another line or the sample time is changed to Sample Volume.

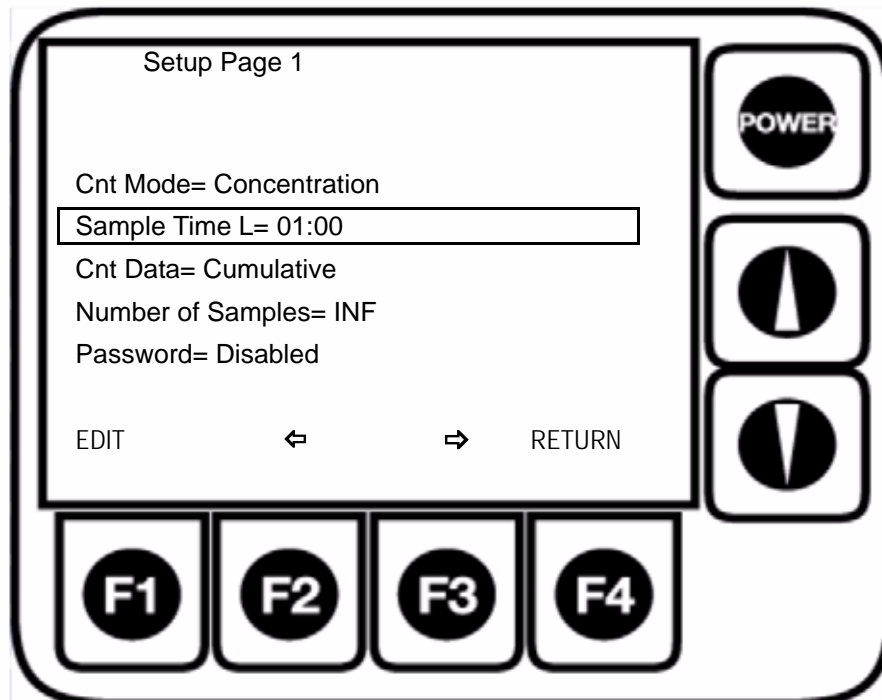


Fig 2-6 : Selecting Sample Time

### Setting Custom Sample Time

When Sample Time is highlighted, the F1 key will change from PAGE 2 to EDIT as shown in [Figure 2-6](#). It will change back to PAGE 2 when the cursor is moved to another line or the sample time is changed to Sample Volume.

- 1) Display sample results in Liters (L) or Cubic feet (CF). Select the sample results display mode by pressing **F2** or **F3** prior to changing Sample Time.
- 2) Press **F1** (Edit) and the cursor highlights the first two digits (Minutes). Press **F3** to select seconds. Use **Up** or **Down** arrow keys to select the desired sample time. Press **F1** to save the change or depress **F4** to escape without changing.
- 3) The HHPC-6 will automatically convert the selected time to volume because all sample results have to reference the volume sampled. For example, if Sample Time is set to CF = 02.00, the main screen displays **0.20 CF**.

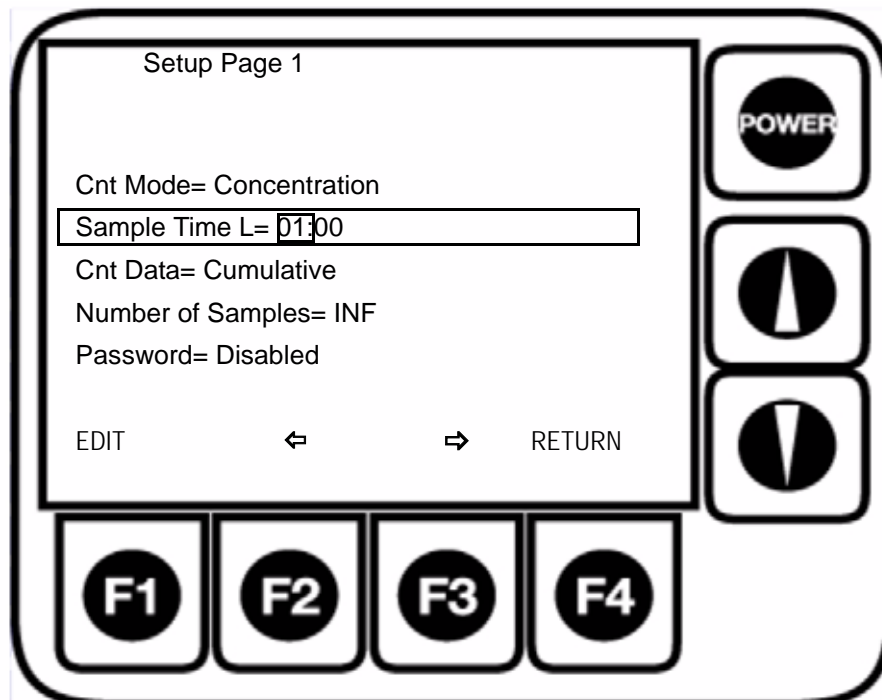


Fig 2-7 : Changing Sample Time

The Sample Time and Volume options available are listed in [Table 2-3](#).

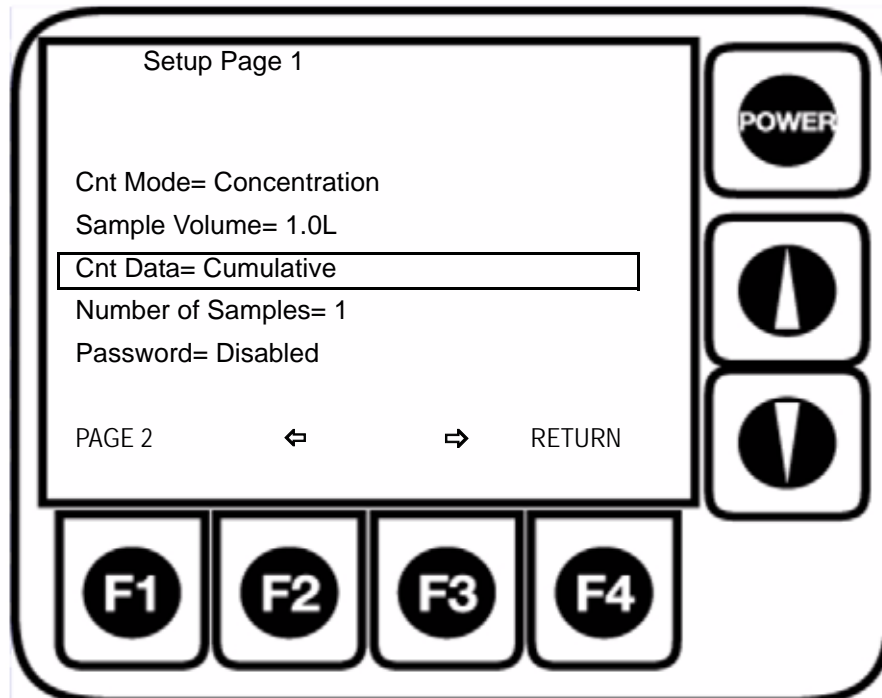
Table 2-3 : Sample Time and Volume Options

Sample Volume	Duration
1.0L	21 seconds
10.0L	3.53 minutes
0.01CF	six seconds
1.0CF	10 minutes
2.83L	60 seconds
28.3L	10 minutes
0.10CF	60 seconds
Manual	continuously sample and display the counts until the unit is manually stopped
Sample Time L	1 second (0.05 L) to 59 minutes 59 seconds (169.85 L)
Sample Time CF	1 second (0.0017 f³) to 59 minutes 59 seconds ( 6 f³)

The volume selected appears in the right column on the Main Screen.

## 2.5 Setting the Method of Counting Data

- 1) On the Main Screen, press **F2** (Setup).  
The Setup Screen appears with the Count Mode field selected.
- 2) To move to the Count Data field as shown in [Figure 2-8](#), press the **Down** arrow.



*Fig 2-8 : Setup Screen with Count Data Selected*

- 3) Press **F2** or **F3** to toggle counting methods. The choices are:
  - **Cumulative:** Includes all particles that are larger than or equal to the particle size selected, represented by the SUM symbol.
  - **Differential:** Includes all particles that are larger than or equal to the particle size selected, but smaller than the next greatest particle size; represented by the delta symbol.
- 4) When the method highlighted is desired, press **F4** (Return) to select that method and return to the Main Screen.

## 2.6 Setting the Number of Samples

- 1) On the Main Screen, press **F2** (Setup).  
The Setup Screen appears with the Count Mode field selected.
- 2) To move to the Number of Samples field, press the **Down** arrow.

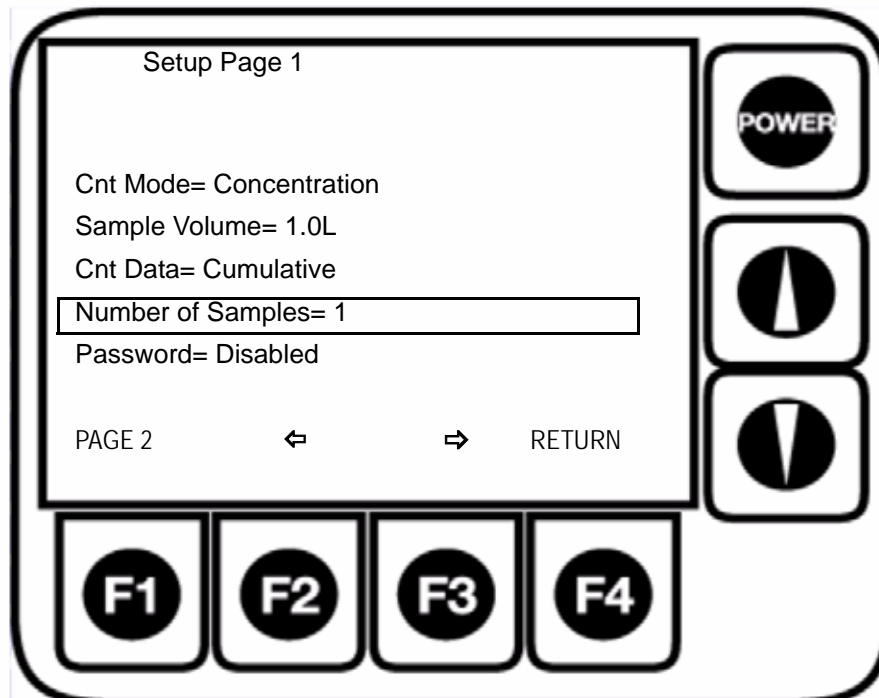


Fig 2-9 : Setup Screen with Number of Samples Selected

- 3) To select the number of samples, press **F3** (Right Arrow) until the number appears, then press **F4** (Return) to select that number and return to the Main Screen.

**Note:**

*If **F2** is pressed when the number of samples is equal to 1, the number of samples displays **INF** for continuous sampling. Press **F2** (Left Arrow) once more and the sample count will be equal to the buffer size.*

## 2.7 Setting the Alarm Count and Size

When the alarm is set, an audible alarm will be triggered when counts reach the count limits on the selected particle size.

- 1) On the Main Screen, press **F2** (Setup).
- 2) On the Setup Screen, press **F1** (Page 2) to go to the second page of that screen. The Setup Page 2 Screen appears.

In the Alarm Limit field, press **F3** (Right Arrow) or **F2** (Left Arrow) to move ahead or back to display the limits. The range is from 1 to 100,000.

- 3) When the desired limit is selected, press the **Down** Arrow key to move the cursor to the Alarm Size field.
- 4) Press **F3** (Right Arrow) to move ahead or **F2** (Left Arrow) to move back to display the various particle sizes.

- 5) Press **F4** (Return) to accept both the particle count and size alarm settings and return to the Main Screen.

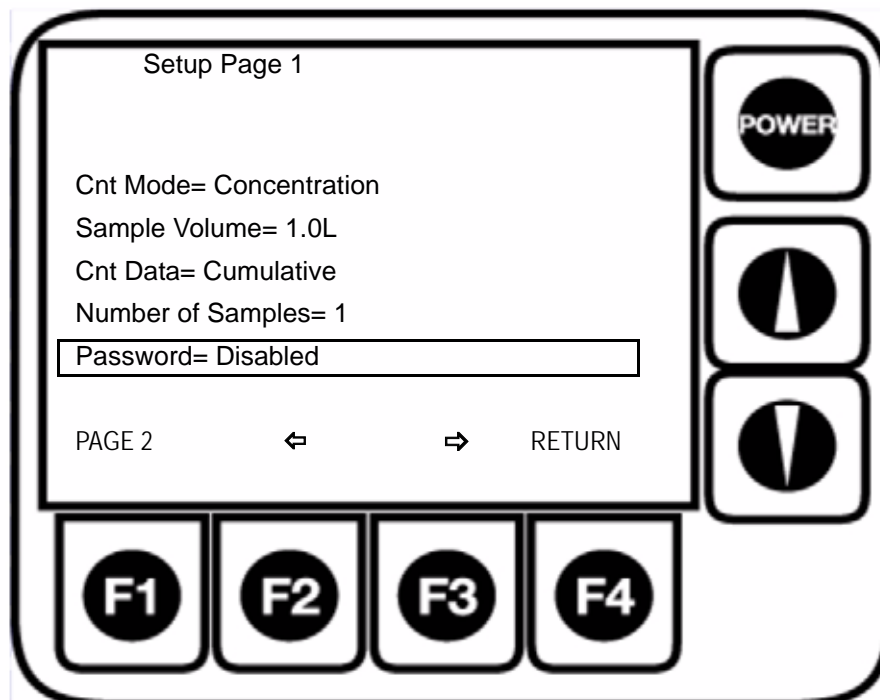
## 2.8 Setting Password Protection

This section describes the password protection function present with firmware version B and greater, part number 2087005.

### a ) Enabling Password Protection

The setup password function enables a system administrator to prevent users from modifying the counter's settings. Once the setup password is enabled, the counter allows two types of logins, System Administrator and User.

- The System Administrator login has permissions to change all settings on the particle counter.
  - The User login only allows the operator to change the location ID (Label) on the main screen. All other counter settings can only be set by the System Administrator.
- 1) To enable password protection, go to the Setup Page 1 menu shown in [Figure 2-10](#). Use the arrow keys to scroll to Password= Disabled and press the **F2** or **F3** arrow key.



*Fig 2-10 : Setup Screen with Password Selected*

The Enter Password screen displays as shown in [Figure 2-11](#).

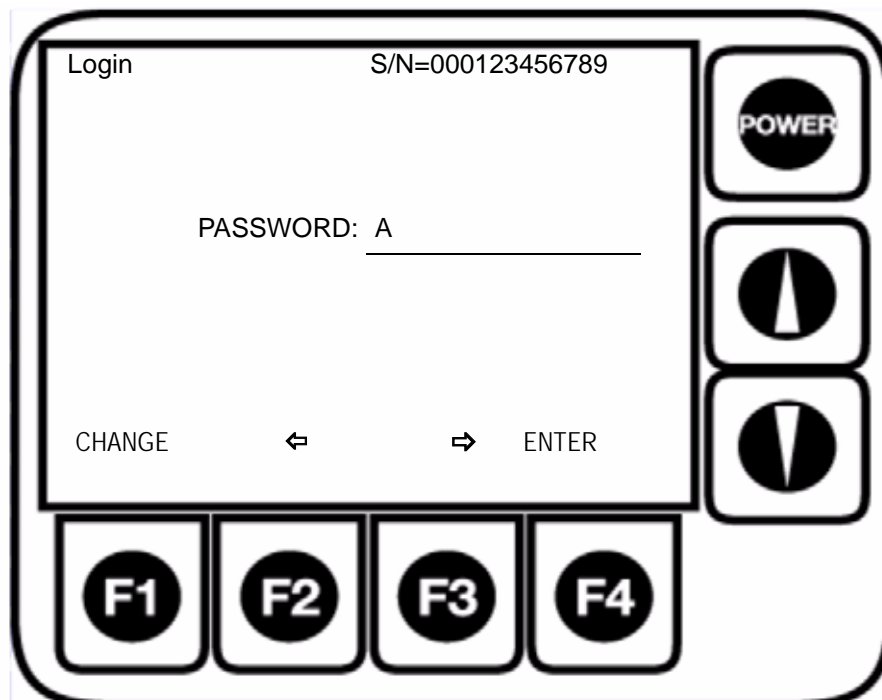


Fig 2-11 : Enter Password Screen

- 2) A prompt displays on the "Password:" line that allows password entry. Passwords can be a minimum of 1 character and a maximum of 8 characters. Initially, the box prompt will contain an "A" character.
- 3) To change the character, use the **Up** and **Down** arrow keys to scroll through the characters a-z, 0-9, A-Z, and space.
- 4) To move to the next character, use the **F2** and **F3** keys.
- 5) When the password is complete, press the **ENTER (F4)** key to enter System Administrator mode.

## b ) Logging in as the System Administrator

Once the password has been enabled, the counter will display a login screen upon power-up as depicted in [Figure 2-12](#).

To log in as the System Administrator:

- 1) From the login screen displayed at power-up shown in [Figure 2-12](#), press the **ADMIN** or **F4** key.

The password entry prompt displays as shown in [Figure 2-11](#).

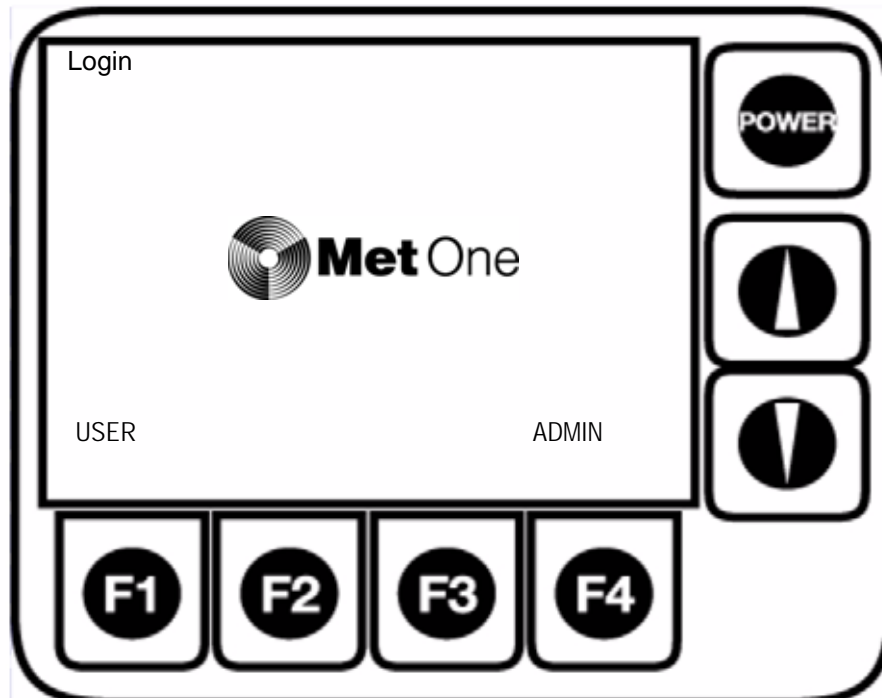


Fig 2-12 : Login Screen 1

- 2) Use the **Up** and **Down** arrow keys to scroll through the available characters (a-z, 0-9, A-Z, and space).
- 3) To login as a System Administrator, enter the correct password and press either the **ENTER (F4)** key or the **CHANGE (F1)** key to change the password.

**Note:**

*To login as an operator without programming permissions, select the **USER (F1)** key from the Login Screen. There is no need to enter a password.*

- 4) If the password entered is incorrect, the user will see the "Invalid Password" message shown in [Figure 2-13](#). Subsequently, the counter will return to the login screen.

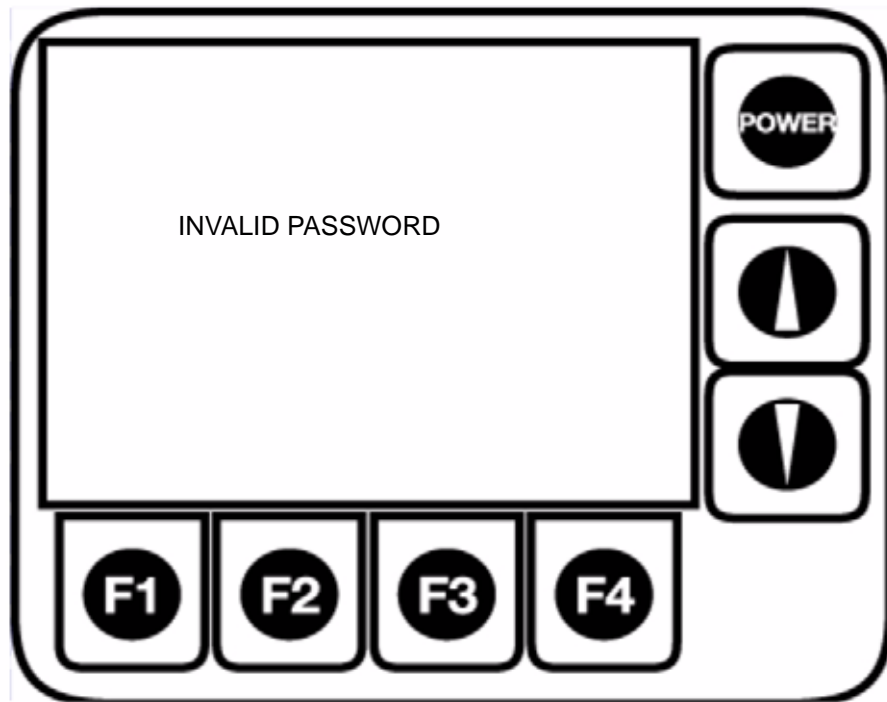
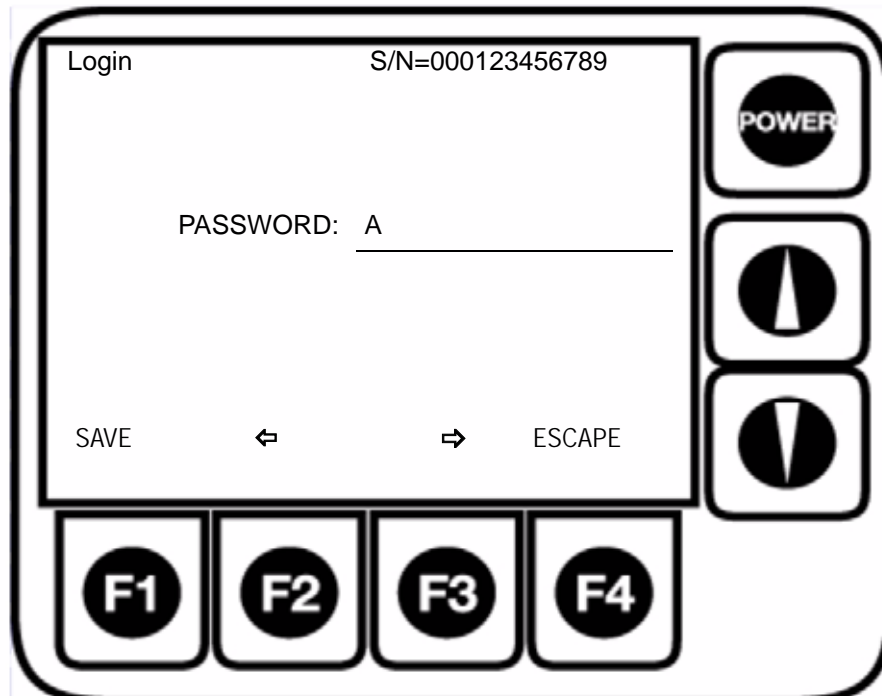


Fig 2-13 : Invalid Password Screen

### c ) Changing the Setup Password

- 1) To change the password, go to the Password Entry menu shown in [Figure 2-11](#). Press the **CHANGE (F1)** key. The New Password screen will appear as shown in [Figure 2-14](#).



*Fig 2-14 : New Password Screen*

- 2) Use the arrow keys to modify the password.
- 3) After the new password is entered, press the **SAVE (F1)** key to save the settings. To cancel without saving the changes, press **ESCAPE (F4)**.

### d ) Disabling Password Protection

To disable the setup password and allow all users to modify settings:

- 1) On power-up, log in as the System Administrator.
- 2) From the Setup Page 1 menu shown in Figure 1 on page 1-1, scroll to Password= Enabled and press the **F2** or **F3** key. The line will change to Password= Disabled.

Any user may now login and modify particle counter settings.

### e ) Resetting the Password

If the System Administrator password is forgotten or lost, contact Hach Ultra Analytics at 800.866.7889 or +1 541.472.6500 to receive a new password.

Technical support will require the following information to issue a new password:

- The counter's serial number.
- The counter's current date setting in the format MMDDYYYY, where MM is the two digit month, DD is the two digit day, and YYYY is the four digit year

## 2.9 Selecting Input/Output (I/O) Port

The HHPC-6 I/O port will have Printer selected by default. Users may select any of the selections listed in [Table 2-4](#).

- 1) Press **F2** (Setup) to display the Setup Page 1 screen. Press **F1** (Page 2) to display Setup Page 2.
- 2) Scroll down using **Down** arrow to I/O Printer field.
- 3) Use the **F2** or **F3** keys to scroll through the options available
- 4) Press **F4** to select and return to the main screen.

Table 2-4 : I/O Port Definitions and Applications

Port Definition	Application
Printer	This option should be selected when connecting the Serial Thermal printer. This option is commonly used when a hard copy of printed data is necessary upon completion of each sample.
Print Buffer	This option should be selected when printing all of the samples stored in the sample buffer using Serial Thermal printer. This is commonly done at the end of the sample period or as needed.
Serial 9600	This option should be selected when connecting the HHPC-6 to a PC.

## 2.10 Setting Temperature

The HHPC-6 Temperature and Relative Humidity sensor is self-contained. Allow unit to acclimatize to the room conditions for improved accuracy. Temperature and relative humidity results will be displayed and stored in the buffer at the end of each sample.

- 1) Press **F2** (Setup) to display the Setup Page 1 screen. Press **F1** (Page 2) again to display Setup Page 2.
- 2) Scroll down using the **Down** arrow to the Temperature field.
- 3) Press the **F2** or **F3** keys to scroll through the two options available.
- 4) Press **F4** to select Degrees of Celsius or Fahrenheit temperature reporting method and return to the main screen.

## 2.11 Setting Buffer Count

- 1) Press **F2** (Setup) to display the Setup Page 1 screen; press **F1** (Page 2) again to display the Setup Page 2 screen.
- 2) Scroll by using **Down** arrow to the Buffer Count field.
- 3) Press **F2** or **F3** keys to scroll through the two options available. This menu will display the number of samples stored in the buffer (memory). Select **Clear Buffer** and press **F4** to delete all samples stored in the buffer and return to the main screen.

- 4) The HHPC-6 stores sample data measurements in a 500 or 2000 (EX Option) rotating buffer. The HHPC-6 overwrites previous records when the buffer is full in the order of first in, first out.
- 5) To return to the Main Screen, press **F4** (Return).

## 2.12 Editing Labels

Use labels to identify samples or blocks of samples. This is especially useful when sampling air quality in different rooms or locations without downloading the samples to the personal computer after each room. It is also helpful when notes cannot be kept to correlate each sample or blocks of samples to specific location.

The unit is shipped with default label names of Location 1 to Location 8.

### a ) Editing Labels Using the Keypad

- 1) Press **F4** from the main screen to display the Label Menu screen.
- 2) Press **F1** (Edit) to begin editing the first label.

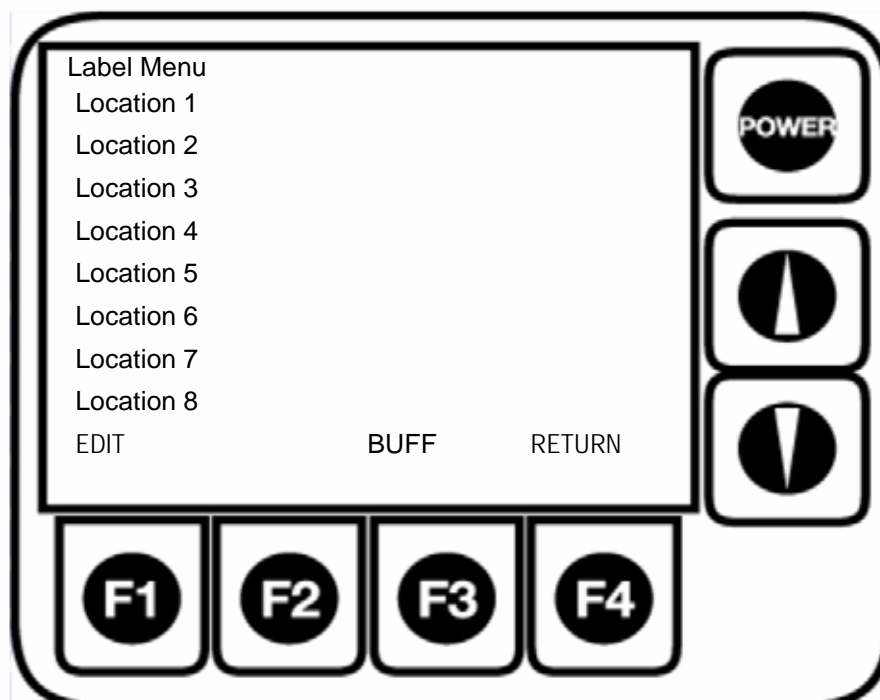


Fig 2-15 : Location Menu

- 3) Press the **Up** and **Down** arrows to select a label. When the cursor reaches the top or bottom label, the screen begins scrolling.
- 4) Press **EDIT** (**F1**).
- 5) A box cursor will appear on the first letter of the label as shown in [Figure 2-16](#).

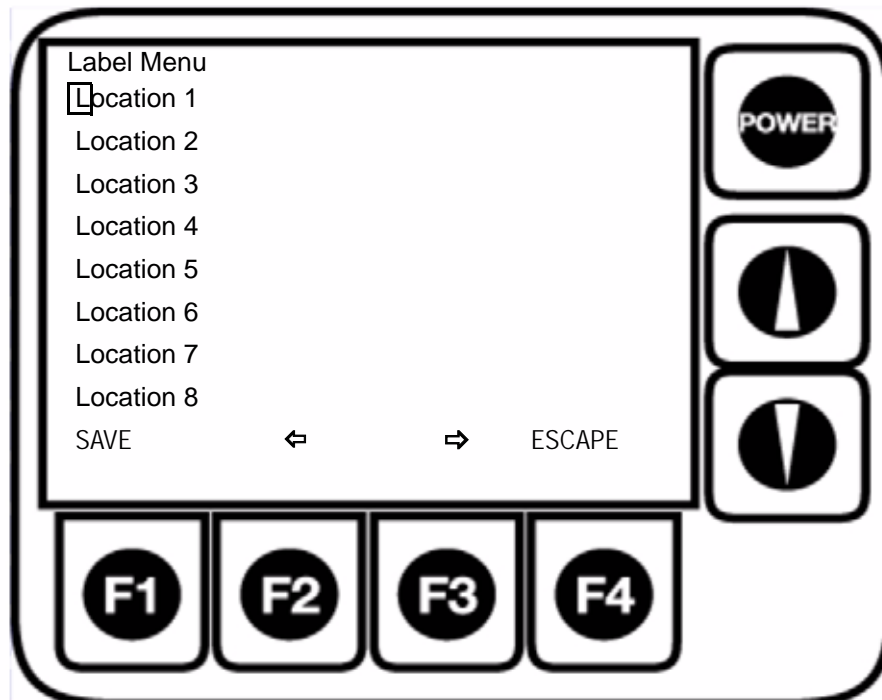


Fig 2-16 : Editing Location Label

- 6) To change the character, use the **Up** and **Down** arrow keys to scroll through the characters a-z, 0-9, A-Z, and space.
- 7) To move to the next character, use the **F2** and **F3** keys.
- 8) Press **SAVE (F1)** to save label or **ESCAPE (F4)** to escape edit mode without saving changes.

### b ) Editing Label Using HHPC-6 Utility Software

- 1) Open the HHPC-6 utility software; refer to [“Quick Start” on page 14](#).
- 2) Highlight the intended label, type over the label and repeat the process until all intended changes are completed.
- 3) Select the **Set Label** button to save the change. Select the **Get Label** button to verify the change is saved.



## 3 Operating the HHPC-6

Once the unit configuration is set, verify the unit's operation using the zero count filter. Then collect air samples, transfer them to a computer for further analysis and print them. Also, review the number of samples in the print buffer and, if needed, clear the print buffer.

In a clean room application, the zero count filter verifies that the unit is not counting electrical noise signals from internal components and is not subject to external interference. In indoor air quality and other applications, the zero count filter cleans out the sensor immediately after a high concentration sampling.

### 3.1 Verifying the Unit Using a Zero Count Filter

All particle counters must be verified prior to sampling to verify that the instrument is not false counting due to sensor leakage, internal or external electrical interference or any other reason before the unit is used for monitoring or verifying cleanroom condition. Before the HHPC-6 is used in a clean room or a clean manufacturing environment, it must be purged with a zero count filter. This process meets the Japanese Industrial Standard B9221-1997 (JIS).

- 1) Unscrew the Isokinetic probe from the unit.
- 2) Screw in intake hose barb (MP000026-01).
- 3) Secure the high purity tubing (VP 792002) to the hose barb.
- 4) Secure the opposite end of the tubing to zero count filter (VP212808). Make sure the arrow on the filter is towards the tubing. Now the unit is ready to purge and zero count.
- 5) Set the Sample Volume to "Manual" operation mode. Continue to sample until there are no new counts. (Initial counts are typically from particles shedding from components used for zero counting.)

**Note:**

*Please continue zero count process or guidelines set forth by applicable industry standard(s).*

- 6) Reverse the previous steps and remove the zero count filter and reattach the isokinetic probe to resume normal operations.

#### a ) Indoor Air and Other Applications

**CAUTION:**

*Please follow all applicable industry guidelines.*

Zero count process may not be necessary when sampling indoor air quality or other non-cleanroom sampling.

- 1) Initially set the sample volume to 0.01 CF in counting mode Concentration.
  - If sample concentration is higher than 500,000 particles per ft<sup>3</sup> on the smallest size channel, further larger volume sampling may not be necessary since the high counts provide ample statistical data.
  - If the smallest size channel counts are lower, then set the sample volume to 0.1 CF or larger.

- 2) Immediately purge the instrument after each high sampling counts, connect the zero count filter as described “[Verifying the Unit Using a Zero Count Filter](#)” on page 33, set the sample volume to 0.1 CF and begin sampling. This process will purge particles from the instrument flow path and assist in keeping the sensitive optics clean.

**Note:**

Please read the Count Mode options and descriptions in [Table 2-2](#) on page 19 to better understand sample counts.

### 3.2 Collecting Samples

- 1) Place the unit upright and remove the intake valve cover (the black plastic cap) so the intake barb or the isokinetic probe is not obstructed.
- 2) To turn on the unit, press the **Power** key.
- 3) If needed, review the settings on the Setup Screen. To review the settings, press **F2** (Setup), then review the settings on Setup Page 1. Press **F2** (Page 2) to continue on and review the settings on Setup Page 2.
- 4) Press **F4** (Return) to return to the Main Screen.
- 5) On the Main Screen, press **F1** (Count) to start sampling and it will automatically stop upon completion of the sample. If the Sample Volume is set to Manual the unit will continuously sample until **F1** (Stop) is pressed.

### 3.3 HHPC-6 Utility Software and Transferring Sample Data to PC

Copy the HHPC-6 utility software files on a hard drive or similar device prior to use. Follow detailed installation instructions on the Readme.txt file and install the software.

- 1) Plug one end of the modular cable (VP894408) to HHPC-6, plug the opposite end to DB9 to RJ-45 adapter (SA000070-01).
- 2) Plug the DB9 to RJ-45 adapter (SA000070-01) to the appropriate RS232 serial communication port or to USB to RS232 adapter if your PC does not have a RS232 port.
- 3) Press **F2** (Setup) on the HHPC-6 unit, Press **F1** (Setup Page 2) verify if the I/O port is set to Serial 9600.
- 4) If not scroll down to I/O Port by pressing the **Down** arrow keys and select Serial 9600 by pressing **F3**.
- 5) Accept and return to main menu by depressing **F4**.
- 6) Start the **HHPC-6utility.exe** Software.

*Table 3-1 : HHPC-6 Utility Software Options*

Software Option	Definition
Control	<ul style="list-style-type: none"> <li>• Select Start Count to remote start the HHPC-6 sampling.</li> <li>• Select Stop Count to remote stop the HHPC-6 sampling.</li> </ul> <p>This function can be used to verify HHPC-6 to PC electrical connection and software installation/configuration.</p>

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Table 3-1 : HHPC-6 Utility Software Options

Software Option	Definition
Get Buffer	Select Get Buffer to download all sample data stored in the HHPC-6 data buffer. PC will prompt for unique file name, enter file name with a CSV file extension. Do not change the file extension to avoid storing data in unreadable file format. CSV files are commonly viewed with Excel or similar software that supports CSV type data files. This function does not delete the HHPC-6 data buffer.
Download Format	HHPC-6 stores data in raw format. The user may download and display the stored data in any combination regardless of the settings when sampling.  Example: User may download the data in Cubic Meters and Differential Mode even if the original sampling was done at 0.1CF and Cumulative Mode.
Time	<ul style="list-style-type: none"> <li>• Set Time is used for programming Time and Date.</li> <li>• Get Time will display Time and Date set on the HHPC-6.</li> </ul>
Delay Time	Use computer keyboard number keys, Left, Right, Up and Down arrow keys or use a mouse to set Delay time. Selected Delay time will apply to all multiple samples. This feature is commonly used when running unmanned multiple samples with the intention of running samples at the delayed intervals.
Labels	<ul style="list-style-type: none"> <li>• Get Labels will download and display current labels stored in HHPC-6.</li> <li>• Set Labels will program labels edited or displayed on the PC. Highlight any label and type over to change label name, scroll up or down using mouse or keyboard for multiple label editing.</li> <li>• Select Set Labels when done editing to store the change onto HHPC-6.</li> <li>• Select Get Labels before exiting this menu to ensure that the change is stored or view the change on HHPC-6.</li> </ul>

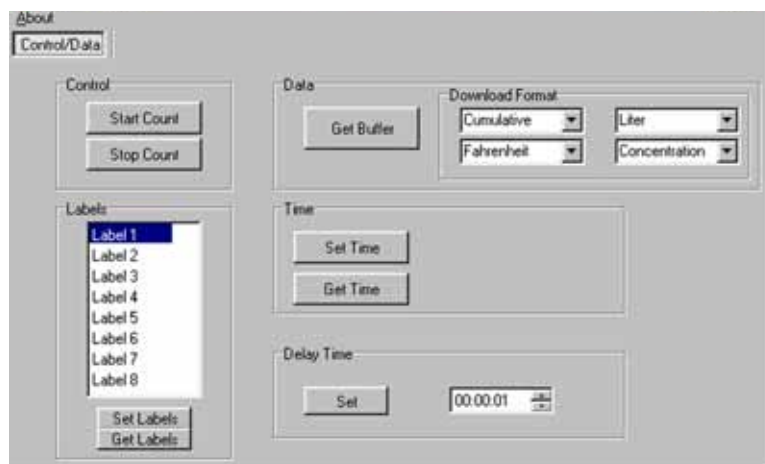


Fig 3-1 : HHPC-6 Utility Window

### 3.4 Printing Samples

Samples are automatically stored in a print buffer. Print samples at the end of each run or print them all at once.

- 1) Make sure the unit is connected to a serial printer.
- 2) On the Main Screen of the particle counter, press **F2** (Setup).
- 3) On the Setup Screen, press **F1** (Page 2) to go to the second page of that screen. The Sample Page 2 Screen appears.
- 4) Press the **Down** arrow key to go to the I/O Port field.
- 5) Press **F3** (**Right** arrow) to display the options:
  - Printer: Prints the data at the end of each sample run.
  - Print buffer: Prints all the records stored in the buffer.
  - Serial 9600: Allows the unit to communicate with the utility software, but no printing takes place.

### 3.5 Storing Samples

The HHPC-6 stores each measurement in a 500-record rotating buffer. Data is stored in a 'first-in, first-out' order. Thus, when record 501 is saved, the first record is automatically deleted, leaving 500 total records.

If option EX is used, the HHPC-6 can store as many as 2000 records and has a 2000-record rotating buffer. Thus, when the 2,001st record is saved, the first of the 2000 records is automatically deleted, leaving 2000 records remaining in storage.

#### a ) Reviewing the Buffer

- 1) The buffer review screen is entered by pressing **BUFF** (**F3**) in the location menu as shown in [Figure 2-15 on page 30](#).
- 2) The first time the buffer review screen is entered the last record stored in the buffer will be displayed like the example shown in [Figure 3-2](#).

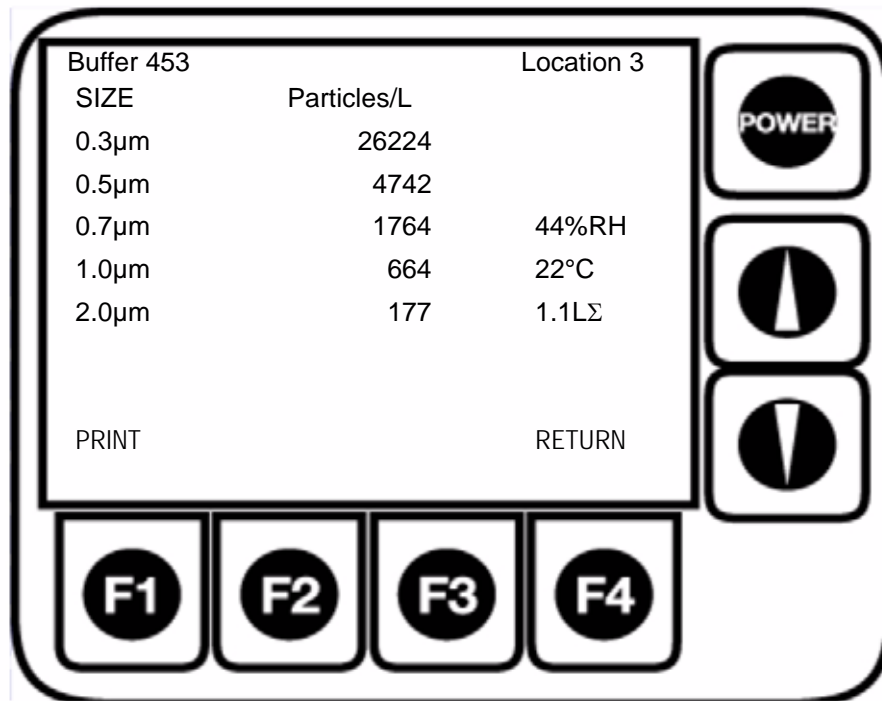


Fig 3-2 : Buffer Review Screen

- 3) Change the record displayed by pressing the **Up** or **Down** arrow keys. The display will wrap from the newest to the oldest or oldest to newest record at the end of the buffer.
- 4) Press **RETURN (F4)** to return to the label screen. When returning to the buffer screen, the record displayed will be the record selected the last time the buffer review screen was viewed.

### b ) Displaying the Number of Samples in the Print Buffer

- 1) On the Main Screen, press **F2** (Setup).
- 2) On the Setup Screen, press **F1** (Page 2).
- 3) The number of samples in the buffer appears in the Buffer Count field.

### c ) Clearing the Buffer

- 1) On the Main Screen, press **F2** (Setup).
- 2) On the Setup Screen, press **F1** (Page 2) to go to the second page of that screen. The Sample Page 2 Screen appears.
- 3) Press the **Down** Arrow key to go to the Buffer Count field.
- 4) Press **F3 (Right Arrow)** until Clear Buffer appears.
- 5) To clear the buffer and return to the Main Screen, press **F4** (Return).



## 4 Data Communications

### 4.1 Remote Serial Interface (I/O Port)

The HHPC-6 comes equipped with a RS232 communications port, an RS232 cable and a RJ-45 connector. This port is used to communicate with a computer to download data and for remote operation. The communication protocol (ENGR-124) is available upon request for software development.

The specifications and wire pin-outs for the I/O Port are:

- Baud rate: 9600 baud
- Data bits: 8 bits
- Parity: None
- Stop bits: 2 bits

#### DB-9 Serial Connection

If the computer or terminal has a 9-pin serial port with a female connector, use the provided Modular RJ-45 to DB-9 Connector along with the RS232 cable. The HHPC-6 is already configured as Data Communication Equipment (DCE), so the use of a null-modem cable is *not* required. The cable pin diagram is shown below.

HHPC-6	Adapter		PC
RJ-45 Female	RJ-45 Female	DB-9 Female	DB-9 Male
RS485 B	1	1	N/C
RS485 A	2	2	RX
SD	3	3	TX
RD	4	4	DTR
CS	5	5	GND
ER	6	6	N/C
N/C	7	7	N/C
GND	8	8	DSR
N/C	9	9	N/C

Fig 4-1 : Pin Layout for the RJ-45 to DB-9 Connector Cable



## 5 Maintenance

This section describes cleaning and maintenance procedures for the HHPC-6 and what to do when the unit requires service.

**CAUTION:**

*This manual contains no procedures for service of internal parts within the HHPC-6. Service should be performed only by factory-authorized personnel. See “Return Procedures” on page 45.*

### 5.1 Charging the Battery

The battery symbol indicates the relative battery charge status, described in Table 5-1. The dark section of the battery indicates the charge remaining.

The power supply provided with the instrument serves as battery charger and a direct power source. Connect the power supply for continuous and long-term sampling.

Table 5-1 : Battery Status Indicator

Indicator	Charge Mode	Notes
+ single plus sign	Trickle charge	The battery goes into trickle charge when: <ul style="list-style-type: none"> <li>• The battery is 95% charged, or</li> <li>• Battery temperature reaches the cut off point due to rapid charge.</li> <li>• External power supply is attached to a mostly-charged unit</li> </ul>
++ double plus sign	Rapid charge	The battery goes into rapid charge when: <ul style="list-style-type: none"> <li>• Power supply is first connected and has not yet fully charged the unit, or</li> <li>• Battery charge drops below 95% capacity.</li> </ul>

### Charging the Battery

- 1) Get the external power supply and applicable power cord from the shipping container.
- 2) Plug one end of the power cord into the external power supply and the other end into an electrical wall receptacle.
- 3) Plug the external power supply jack into the HHPC-6 at the power port location, shown in Figure 5-1.

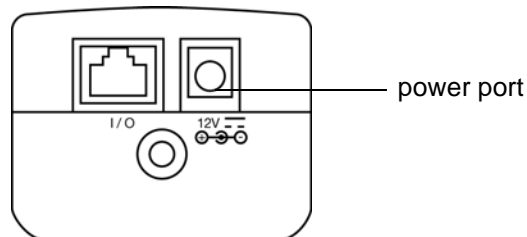


Fig 5-1 : Power Port Location

- 4) When the HHPC-6 is turned on, the battery indicator displays a “+” symbol to show the external power supply is attached.
- 5) To place the unit into fast charge mode, turn the HHPC-6 on, wait 15 seconds, then attach the external power supply.

**Note:**

*If the HHPC-6 is not powered up while the external power supply is attached, the battery is charged with a trickle charge.*

**Recharging a Completely Drained Battery**

If the HHPC-6 will not turn on:

- 1) Attach the external power supply to the unit.
- 2) Wait five minutes, then turn on the HHPC-6.
- 3) If the battery indicator does not display a “++” symbol within 15 seconds, detach the external power supply, wait 15 seconds and then re-attach the external power supply. The battery indicator should now display a “++” symbol within 15 seconds.
- 4) Leave the unit attached to the power supply until a “+” symbol appears.

**5.2 Re-calibrating the HHPC-6**

The HHPC-6 must be returned annually for re-calibration to comply with JIS B 9921-1997 standards. The calibration date is displayed on the manufacturer's decal on the back of the unit. Follow the instructions in the [“Return Procedures” on page 45](#) to return the HHPC-6 for re-calibration.

**5.3 Obtaining Service**

If the HHPC-6 requires factory service, follow the instructions in [“Return Procedures” on page 45](#) to return the HHPC-6.

## 6 Troubleshooting

### 6.1 Problems and Recommendations

The following table lists problems, reasons for the problems and recommended actions.

Table 6-1 : Troubleshooting Symptoms and Recommendations

Symptom	Possible reason and recommended action
HHPC-6 does not zero count.	<ul style="list-style-type: none"> <li>Zero count filter or hose barb is not properly attached to the unit. Reattach the filter or hose barb.</li> <li>Internal air leak. Contact the customer service center for repair.</li> <li>Cell contamination by excessive dust exposure. Return the unit to a factory authorized service center.</li> </ul>
The HHPC-6 doesn't turn on when the <b>Power</b> key is pressed.	Battery voltage too low. Connect external power supply to HHPC-6 for operation and charging. Then turn on the power again.
Unit displays the message, "Low Battery."	Connect the power supply/charger to the unit. If the LCD display shows a single "+" next to the battery indicator (slow charge), then turn the power off and back on for a rapid charge. The battery indicator will show "++."
HHPC-6 unit does not charge.	Disconnect the power jack from the unit and the power cord from the AC power source (wall receptacle). Disconnect the cord/plug from the power supply and reconnect the cord/plug to the power supply firmly. Restore all connections to the unit and power source. If the problem persists, please contact the customer service center for repair.
HHPC-6 unit display is too dark or light.	On the Main Screen, press the <b>Up</b> Arrow key to darken and the Down Arrow key to lighten the display.
Unable to download data in the buffer.	Refer to the Readme.txt file on the utility software disk for latest setup and test functions. Corrective information is not included here because it is constantly updated to keep up with changes in the operating system.
HHPC-6 display shows the message, "CAL FAIL."	<ul style="list-style-type: none"> <li>The sample exceeded the concentration limit (too many particles), which produced a temporary alarm. No corrective measure is required other than to stop sampling in that environment.</li> <li>The sensor is contaminated. Connect the zero count filter and program the unit to run for one hour.</li> <li>The laser light has dropped below acceptable level.</li> </ul> If the problem persists, please contact the customer service center for repair.
No temperature /humidity reading or an incorrect reading appears.	The temperature and humidity appear after the sample is in progress. Allow the unit to acclimatize to the sampling environment for greater accuracy.

## 6.2 Restoring Default Settings

For program malfunctions, restore the default settings through this procedure:

- 1) Disable passwords as described in [“Disabling Password Protection” on page 28](#).
- 2) Press and hold the **F1** while turning the power on.
- 3) Release **F1** when **Defaulting data** appears on the display.

To review the default settings, see [“Default Settings” on page 52](#).

**Note:**

*Restoring the default settings erases all buffer contents and resets all of the operation variables to their factory settings. The message “Defaulting Data” displays as the HHPC-6 reinitializes its systems.*

## Appendix A: Service Procedures

### A.1 Calibration

The HHPC-6 must be returned annually for re-calibration to comply with the JIS B 9921-1989 standards.

### A.2 Return Procedures

To return the HHPC-6 Handheld Airborne Particle Counter for service, complete the appropriate form that appears at the end of this section. For the most recent return procedure information, including copies of all required forms, call Hach Ultra Analytics at 800.866.7889 or +1 541.472.6500.

To return an instrument for credit, please contact the local sales representative.



#### **WARNING**

*The following actions must be performed when returning any unit for any reason to prevent personal injury and/or damage to the unit.*

- Properly decontaminate the unit prior to shipment. If a contaminated unit is received, Hach Ultra Analytics reserves the right to have the unit removed and destroyed by a hazardous materials disposal team at the shipper's expense.

### A.3 Technical Support Information

Technical Support Engineers are available to provide high quality advice and recommendations for applications, product operation, measurement specifications, hardware and software, factory and customer site training.

Please provide name, company, phone, fax, model number, serial number and comment or question.

Call +1 (541) 472-6500

Toll Free (800) 866-8854 (US/CA)

Fax +1 (541) 472-6555

6:30 AM to 5:00 PM Pacific Time

Monday through Friday

Email: [TechSupportGP@hachultra.com](mailto:TechSupportGP@hachultra.com)

Date: \_\_\_\_\_

# RETURN AUTHORIZATION / PURCHASE ORDER

## RA# \_\_\_\_\_ MUST BE MARKED ON THE OUTSIDE OF THE BOX OR YOUR UNIT WILL BE RETURNED.

In order for you to obtain a Return Authorization, this form must be completed

**SHIP YOUR UNIT TO: Hach Ultra Analytics, 481 California Avenue, Grants Pass, OR 97526**

You are responsible for properly draining and/or decontaminating your unit prior to shipment. If we receive a contaminated unit we reserve the right to have the unit removed and destroyed by a haz mat team at the owners expense.

<b>TO:</b>	Contact Providing Info:	Tel:	
	Alternate Contact:	Fax:	
		Tel:	
		Fax:	
	<b>BILLING INFORMATION:</b>		<b>SHIPPING INFORMATION:</b>
<b>FULL COMPANY NAME (do not abbrev):</b>		<b>FULL COMPANY NAME (do not abbrev):</b>	
Addr 1		Addr 1	
Addr 2		Addr 2	
City		City	
State	Zip	State	Zip
Country		Country	
Contact:		Contact:	
Tel:		Tel:	
Fax:		Ext:	
<b>Model:</b>	<b>S/N:</b>	<b>Sizes:</b>	<b>Problem:</b>
<b>Model:</b>	<b>S/N:</b>	<b>Sizes:</b>	<b>Problem:</b>
"As Received" data required? <input type="checkbox"/> Fee: \$125.00 (No charge if equipment is covered under Service Contract)		Are services covered under contract? Yes <input type="checkbox"/> No <input type="checkbox"/> Contract # _____	
<b>NOTE: MINIMUM \$150.00 EVALUATION FEE PER UNIT APPLIES FOR REPAIRS.</b>			
<b>IF YOUR AUTHORIZATION / APPROVAL TO PROCEED WITH SERVICE IS NOT RECEIVED WITHIN 30 DAYS, YOUR EQUIPMENT WILL BE RETURNED UNREPAIRED AND YOU WILL BE BILLED THE MINIMUM EVALUATION FEE ABOVE.</b>			
<b>Estimate:</b>		<b>Revised:</b>	
<i>If the actual cost exceeds the initial estimate, a revised estimate will be faxed for approval.</i>			
<b>P.O.#</b>	<b>Revised:</b>	<b>Taxable: Yes <input type="checkbox"/> No <input type="checkbox"/> Reason: _____</b>	
<b>Please provide exempt certificate if applicable</b>			
<b>Ship Method: FEDX 3DAY ECON/PPB</b>		<b>FOB: Grants Pass, Oregon</b>	<b>Payment Terms: Net 30</b>
Visa/MC/AMEX accepted. If paying by credit card, please request credit card form.			
<b>Authorization Signature:</b>			<b>Date:</b>

**NOTE: Upon your approval with your P.O.# denoted above, this form becomes a binding agreement between you, the customer, for payment of services performed by Hach Ultra Analytics.**

From: \_\_\_\_\_

Tel: **800-866-7889** Fax: **541-472-6170**

Approved: \_\_\_\_\_ Date to Ship: \_\_\_\_\_

## **IMPORTANT INFORMATION!**

### **INSTRUCTIONS FOR SENDING YOUR PARTICLE COUNTER IN FOR REPAIRS OR CALIBRATION**

- 1) Enclosed is the “RETURN AUTHORIZATION/PURCHASE ORDER” Form that must be filled out completely in order to obtain a Return Authorization Number (RA#) from Hach Ultra Analytics.
- 2) The **RA# must be marked on the outside of the box** before shipping any unit to us for repair or calibration. **Boxes received with no RA# marked on them will be returned.**
- 3) You are responsible for properly draining and/or decontaminating your unit prior to shipment. If we receive a contaminated unit we reserve the right to have the unit removed and destroyed by a haz mat team at the owners expense.
- 4) Following are Instructions for Filling out RA/PO Form. Please make sure every line is filled out completely, providing the following information:
  - a) Main Contact: Full name of contact person; include phone/fax numbers.
  - b) Billing and Shipping Information: Include addresses, phone/fax numbers, and contact person.
  - c) Equipment Information: Include model number(s), Serial number(s), and the reason for sending the equipment in (i.e., calibration and repair). Provide a detailed description of what is wrong with the unit.
  - d) Call Customer Service @ 800-866-7889 and ask the Customer Service Rep for a “NOT TO EXCEED” amount for your RA/PO Form by giving them the model number(s) of the instrument and the reason for the return.
  - e) Method of Payment: Mark the appropriate box on the bottom of the form (for credit card payment, please provide credit card information including signature of the card holder),
  - f) If you require “As Received Data”, please check the appropriate box.
  - g) Provide Taxable Information (not applicable for International service).
  - h) If you want your unit shipped back to you other than FedEx Economy (3 Day), please cross out this ship method, and provide us with the account number and ship method you wish us to use when returning your unit.

Once the form is complete, please FAX to 541-472-6170. You will be given a Return Authorization Number within 24 hours. If you need the RA# immediately, please call after faxing it and the Customer Service Rep can give you the number verbally.

This form helps us to better serve our customers, and it has reduced turn around time considerably. If you have any questions filling out this form, please do not hesitate to call our Customer Service Reps at 1-800-866-7889.

**THANK YOU FOR YOUR COOPERATION IN OBTAINING AN RA#**

<b>RA Number:</b>	<b>Date:</b>
-------------------	--------------

# Return Authorization / Service Order (International only)

- A. To obtain RA number, complete this form and email/fax it to Service at 541-472-6170.
- B. **Mark the RA number on outside of the box.** Unmarked boxes will be returned with no action.
- C. Ship your unit to: HACH Ultra Analytics, 481 California Avenue, Grants Pass, OR 97526
- D. If the actual repair cost exceeds your approval, then we will contact you with an estimate.
- E. Revise your original approval / purchase order for the new amount. If we don't receive your revised order within 60 days, we will return your unit and bill you \$ 150 evaluation fee.

## Your Information

Your name	
Tel, Fax & Email address	

## Your Company

Company Name	
<b>Bill to Address</b> Tel, Fax, Email, Contact Person	
<b>Ship to Address</b> Tel, Fax, Email Contact Person	

## Your Product

Model number	Serial number	Problem

## Payment & Shipping Information

<p>1) We approve repair/service charges up to \$ _____ on our Purchase order number: _____</p> <p>Authorized signature _____ Date _____</p>
<p>2) Shipment method, your carrier account number and other shipping instructions:</p>
<p>3) Value of the instrument for customs purposes only: \$ _____</p> <p><b>IMPORTANT NOTE ON CUSTOMS VALUE:</b> Our invoice will include the repair value as the commercial value of the invoice. This value will be declared in our invoice and shipping documentation. We would also need to declare the value of the unit itself for customs purposes. This value is for customs only and has no commercial value. Please provide us with the reasonable value of the instrument for customs purposes.</p>

Tel: 800-866-7889 Fax: 541-472-6170 EMAIL: customerservice@hachultra.com

# RETURNING UNITS FOR REPAIRS

## PROCEDURES

- A. To obtain RA number, complete the attached form and email/fax it to Service at 541-472-6170. Please provide all the information required including your company information (Bill to and ship to addresses), product information (Model number, serial number and detailed problem statement), your not to exceed amount and purchase order number, payment method and complete shipping instructions.
- B. **Mark the RA number on outside of the box.** Unmarked boxes will be returned with no action.
- C. Ship your unit to: Hach Ultra Analytics, 481 California Avenue, Grants Pass, OR 97526
- D. If the actual repair cost exceeds your approval, then we will contact you with an estimate.
- E. Revise your original approval / purchase order for the new amount. If we don't receive your revised order within 30 days, we will return your unit and bill you \$150.00 USD evaluation fee.

## RETURNING UNITS

All units should be sent to Hach Ultra Analytics at the address below. AWB should contain the following information:

Consignee	<b>Hach Ultra Analytics</b> 481 California Ave., Grants Pass, Oregon 97526 USA
Notify	<b>Expeditors International</b> 2508 North Marine Dr., Portland, OR 97217 Tel: 503-254-3707
Airport of destination	<b>Portland Airport, Oregon, USA</b>

## COMMERCIAL INVOICE

Please make sure that your commercial invoice clearly states that units are **Made in USA by Hach Ultra Analytics** and are being returned for repair or replacement. **Customs will hold shipment if no invoice is included.**

## FREIGHT CHARGES

If the returned items are not covered under warranty, you are responsible for freight charges. If the item is covered under warranty, you will pay freight for returning the item to Hach Ultra Analytics. Hach Ultra Analytics will pay the freight to ship the replaced or repaired item covered under warranty. Hach Ultra Analytics will return the repaired unit by the same method it was shipped to Hach Ultra Analytics.

## IMPORT CHARGES

When you use airfreight to return items, our broker charges an average of \$100.00 to \$150.00 to clear and deliver the shipment to us. Hach Ultra Analytics will bill you for these import charges. Attached is a declaration form that, if completed and included with your shipment to Expeditors International, may reduce or eliminate these customs fees altogether. Please forward a copy of this form to us as well because there is a similar form that we need to complete and forward to them verifying your information. As an alternative to using Expeditors International you can ship via a courier service such as Federal Express or UPS, who deliver directly to us bypassing the customs broker.

## CUSTOM'S VALUE FOR REPAIR OR REPLACED ITEMS

Please provide us with the "Declared value for customs" when completing the RA form. Our invoice will include the repair value as the commercial value of the invoice. This value will be declared on our invoice and shipping documentation. We would also need to declare the value of the unit itself for customs purposes. This value is for customs only and has no commercial value. As the shipper Hach Ultra Analytics bears the burden of proof for the value, if you do not provide a reasonable value of the instrument, Hach Ultra Analytics will override the given amount. Hach Ultra Analytics assumes no responsibility for damage to the product during shipment/transit. Please note that in case of transit damage, the amount you can claim from your insurance will be limited to the declared value.

**Declared Value/American Manufacturer's Affidavit**  
**Goods have no commercial value they are being returned for repair/calibration**

Date: \_\_\_\_\_

Name of Manufacturer: Hach Ultra Analytics  
Address of Manufacturer: 481 California Avenue  
Grants Pass, OR 97526

Description of returned articles: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I declare that the information given is true and correct to the best of my knowledge and belief.

**That the articles described above are the growth, produce or manufacture of the United States and have been returned to the United States without having been advanced in value or improved in condition by any process of manufacture or other means, and that no drawback has, or will be, claimed on such articles. The article was returned for the sole purpose of repairing/calibration either under warranty or at the expense of the owner. This value of \$\_\_\_\_\_ is for customs only and has no commercial value.**

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_

## Appendix B: Performance Specifications

### B.1 Specifications

6 Size Channels:	
Standard:	0.3, 0.5, 0.7, 1.0, 2.0, 5.0 $\mu\text{m}$
IAQ:	0.5, 0.7, 1.0, 2.0, 5.0, 10.0 $\mu\text{m}$
Custom:	0.3 to 20 $\mu\text{m}$ available
Flow Rate:	0.1 cfm (2.83 L/min)
Light Source:	Laser diode; index guided (26,000 MTBF at 25°C)
Calibration:	PSL particles in air (NIST traceable)
Counting Efficiency:	50% @ 0.3 $\mu\text{m}$ ; 100% for particles > 0.45 $\mu\text{m}$ (per JIS B9921:1997)
Zero Count:	1 count/5 minute (per JIS B9921:1997)
Coincidence Loss:	5% at 2,000,000 particles per ft <sup>3</sup>
Relative Humidity:	$\pm 7\%$ , 20% to 90%, non-condensing
Temperature:	$\pm 3^\circ\text{C}$ , 10°C to 40°C (50°F to 104°F)
Data Storage:	500 sample records (rotating buffer)
Data Recorded:	Date, time, counts, relative humidity, temperature, sample volumes, alarms, label
Display:	Graphic liquid crystal with back light
Alarms:	Counts, low battery, sensor fail
Count Modes:	Concentration, totalize, audio
Delay Time:	0 to 24 hours
Sample Inlet:	Isokinetic probe
Interface:	RS-232 and RS-485 via RJ-45
Vacuum Source:	Internal pump flow controlled
Housing:	Injection molded plastic
Dimensions:	4.5" w x 8.25" l x 2.25" d (11.43 x 20.96 x 5.72 cm)
Weight:	2.2 pounds (1.0 kg)
Environmental:	
Operating:	10°C to 40°C (50°F to 104°F),
Relative Humidity:	20% to 90%, non-condensing
Storage:	-10°C to 50°C (14°F to 122°F),
Relative Humidity:	Up to 90%, non-condensing
Power:	AC Adapter, 12 VDC at 2.5 A, 90 to 250 VAC, 50 to 60 Hz
Rechargeable Battery:	NiMH, 4.8 V at 4.5 Ah; replaceable
Continuous Operating Time:	8 hours
Recharge Time:	2 hours
Standards:	CE, JIS B9921: 1997

## B.2 Default Settings

### a ) Setup Page 1

Cnt Mode = Concentration

Sample Volume = 1.0L

Cnt Data = Cumulative

Number of Samples = 1

Password = Disabled

### b ) Setup Page 2

Alarm Limit = 0

Alarm Size<sup>2</sup> = 0.3µm or 0.5µm

I/O port = Printer

Temperature = °C

Buffer Count = 0

---

2. The default alarm size will be the counter's smallest size. For standard units, this is 0.3 µm. For indoor air quality (IAQ) units, this is 0.5 µm.

## Appendix C: Certifications

### C.1 Applicable Standards

The following standards govern various aspects of the performance and use of particle counters described in this manual.

JIS B 9921-1997

Light Scattering Automatic Particle Counter

Federal Standard 209E

Standard Practice for Defining Size Calibration, Resolution, and Counting Accuracy of an Air-Borne Particle Counter Using Near-Monodispersed Spherical Particulate Material.

### C.2 Declaration of Conformity

The Declarations of Conformity appear on the next two pages.

## DECLARATION of CONFORMITY

We,

Hach Ultra Analytics  
481 California Avenue  
Grants Pass, Oregon 97526

declare under sole responsibility that the

**Particle Counter, Model HHPC-6, Part Number 2087001**

conforms to Directive 89/336/EEC for Electromagnetic Compatibility and Directive 73/23/EEC for Low Voltage. Compliance was demonstrated to the following specifications as listed in the official Journal of the European Communities:

EN 61326:1998, Class A / EN 500081-1:1992 Emissions:

EN 55011 :1991 Class A Radiated  
EN 55011 :1991 Class A Conducted

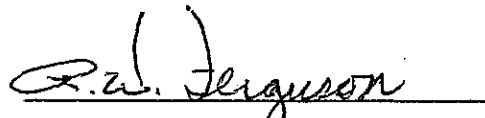
EN 61326:1998 / EN 50082-1:1997 Immunity:

EN 61000-4-2 Electrostatic Discharge  
EN 61000-4-3 Electromagnetic Field  
EN 61000-4-4 Electrical Fast Transient  
EN 61000-4-5 Surge Test Common and Differential mode  
EN 61000-4-6 3 Volt Modulated Interfering Signal  
EN 61000-4-8 Susceptible Magnetic Fields  
EN 61000-4-11 Voltage Interruption Test

EN 61010-1:1993 Amendment 1 & 2, Safety Requirement for Electrical Equipment for Measurement, Control and Laboratory Use

EN 60825-1:1993 Safety of Laser Products, Equipment Classification, Requirements and User's Guide.

Hach Ultra Analytics  
August 20, 2003  
(Place and date of issue)

  
R. W. Ferguson-Engineering Director  
(Name/signature of authorized person)

## DECLARATION of CONFORMITY

We,

Hach Ultra Analytics  
481 California Avenue  
Grants Pass, OR 97526

declare under sole responsibility that the

**Model: HNPC-6**

**Part Number: 2087615-All, 2087616-All and 2087617-All**

conforms to Directive 89/336/EEC for Electromagnetic Compatibility and Directive 73/23/EEC for Low Voltage. Compliance was demonstrated to the following specifications as listed in the official Journal of the European Communities:

EN 61326:1998, Class A, Group 1, Emissions:

EN 55011:1991 Class A Radiated  
EN 55011:1991 Class A Conducted

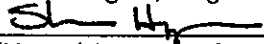
EN 61326:1998, Immunity:

EN 61000-4-2 Electrostatic Discharge  
EN 61000-4-3 Radiated Immunity, Amplitude Modulated  
EN 61000-4-4 Electrical Fast Transient  
EN 61000-4-5 Surge Transients  
EN 61000-4-6 Conducted Immunity  
EN 61000-4-8 Immunity to Power Frequency Magnetic Fields  
EN 61000-4-11 Voltage Dips and Interrupts

EN 61010-1:1993 Amendment 1 & 2, Safety Requirement for Electrical Equipment for Measurement, Control and Laboratory Use

EN 60825-1:1993 Safety of Laser Products, Equipment Classification, Requirements and User's Guide.

Hach Ultra Analytics  
26-APR-04  
(Place and date of issue)

Shawn Hogan, Engineering Supervisor  
  
(Name/signature of authorized person)



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