

# ***GrayWolf***

*Sensing Solutions*



## ***PC-5000 QuickStart Guide***

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**GrayWolf Sensing Solutions, LLC**

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## 1. Unpacking and Inspecting the Instrument

Careful consideration was given to our packing material to ensure that your GrayWolf Instrument will reach you in perfect condition. If the Instrument has been subject to excessive handling during shipping, there may be visible damage to the shipping carton. In the event of damage, keep the shipping container and packing material for the carrier's inspection. Carefully unpack the Instrument from its shipping container and inspect the contents for damaged or missing items. If the Instrument appears damaged or something is missing, contact the carrier and GrayWolf immediately. Please save the container and packing material in case you have to return the Instrument.

## 2. Registering Your Product

It is important to register your product with GrayWolf to ensure that your warranty will be activated. To register your product, visit the GrayWolf Website and complete the form provided at:

[https://graywolfsensing.com/contact\\_register/](https://graywolfsensing.com/contact_register/)

## 3. Contacting GrayWolf

To order accessories, receive technical assistance, report damaged or missing items from your shipment, or to get the information for your nearest GrayWolf authorized reseller, please call **+1-203-402-0477**

## 4. Storing and Shipping the Instrument

To store the instrument, place it in its optional case or in a box, under cover, within an environment as stated in our specifications. If the unit needs to be packed and shipped for annual calibration or service, it is recommended to use the original packing materials. If they are not available please insure that the instrument is packaged in a box that is sturdy and that the unit is well protected with proper packing materials to cushion and protect the Instrument from harm during transit.

## 5. Important Safety Information

This section presents important information intended to ensure safe and effective use of this product. Please read this section carefully and keep it in an accessible location.

- **Do not use near explosive, flammable, or reactive gases**
- **Do not attach directly to pressurized gases or liquids**
- **Do not improperly discard electronic instruments, only dispose in accordance with local regulatory requirements**
- **Defective or non-working Lithium-Ion batteries must be recycled; DO NOT DISPOSE IN TRASH**
- **This device contains a Class I Laser Product that is not accessible during normal operation; do not take this device apart, exposure to harmful laser radiation can occur**
- **Taking the device apart will void all warranties**
- **Do not use this device for any unintended purpose other than measuring of particles in ambient environments**
- **Do not operate the instrument with the inlet capped or plugged as this can cause damage to the Instrument**
- **Do not allow water or any other liquid to enter the inlet of the particle counter, this will damage the Instrument**
- **Any changes or modifications to GrayWolf equipment, not expressly approved by GrayWolf, could void the user's ability to operate the equipment, can risk serious injury and will void all warranties**

**FOR MORE COMPLETE WARNING AND CAUTION INFORMATION SEE USER MANUAL**

## 6. Product Views and Connections



Front View

Temperature & RH Probe  
Universal Sensor Port  
Isokinetic Probe



4.3" Color Touch Screen

Side View

External Vacuum  
Connection Port  
(not present when optional  
internal pump is installed)



External Power Connection  
USB-B Client Connection  
USB-A Host Connection  
Ethernet RJ45 Connection

Connecting Ethernet Cable



Connecting USB - B Client



Connecting USB - A Host



## 7. Power Considerations and Connecting to AC Mains Power

The GrayWolf Instrument comes with a power adapter line cord for AC mains powered operation and battery charging. The power adapter is designed to operate with line voltage from 100-240V. The correct plug adapter must be used to match your local AC power adapter standard. If the Instrument power adapter does not have the proper plug configuration, please contact GrayWolf or an authorized reseller for service.

To install the country specific plug adapter, simply slide the adapter into the power supply as shown.

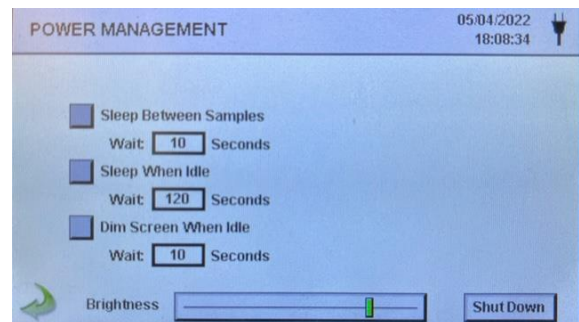


## 8. Turning the Unit On

The PC-5000 automatically powers on when the power cable is connected. The input of the power cable must be 100-240V – 50/60Hz 1.2A AC, and the output is 15V 2A DC. Attempting to use a different power supply than the one provided will potentially damage the unit and void any warranties.

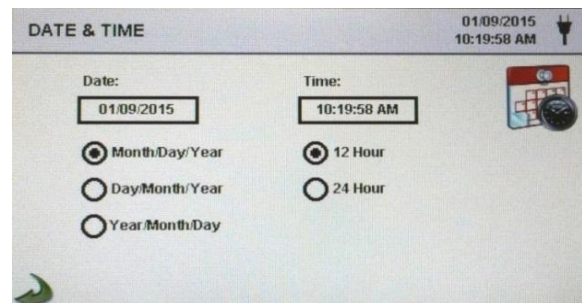


Additional power options may be accessed by clicking on the wall power symbol in the top left corner of the screen. There you can enable power saving functions like screen brightness, dimming the screen when idle, and sleep mode in between readings. you may also shut down the device from this screen but you will need to un plug and plug the unit back into wall power to turn it on again.



## 9. Operation – Initial Power Up – First Time Use

After the Particle Counter turns on for the first time a window will appear stating "Time of Day Clock Not Set". Press OK to Set Clock.



### Date Format Button

Choose format for - Month/Day/Year, Day/Month/Year or Year/Month/Day indication by selecting the corresponding button on the touchscreen.

### Numeric Keypad

Touch date window, a numeric keypad will appear to allow for date change. For change or correction of input values navigate using < or > to move cursor. When complete, press OK button

**Time Format Button** Choose 12 hour or 24 hour clock indication by selecting the corresponding button on the touchscreen.

**Numeric Keypad** Touch time window, a numeric keypad will appear to allow for time change. Use 24 hour clock format for time entry to properly indicate AM or PM. For change or correction of input values navigate using < or > to move cursor. When complete press OK button - Time will display with AM/PM or in 24 hour format based on format selection.



**Back Arrow Icon** Press Back Arrow Icon on bottom left corner of the display to return to main home screen.










## 10. Included Items

Along with your 5000 Series Particle Counter you will also receive the following items: Please check that all of the following items are included with your instrument.








Included Accessories	
Description	Image
<b>Isoprobe Threaded 0.1 CFM Nickel Plated Aluminum</b>	
<b>Purge Filter Assembly 0.1 CFM (2.83 LPM)</b>	
<b>Temperature / RH Probe 32-122°F (0-60°C) ±1°F (0.5°C), 15-90% ±2% (NOTE: This probe is optional for Model 5000)</b>	
<b>Power Supply 15V ~2amp 100-240VAC (Select adapter -US, -EU, -UK or -CN)</b>	
<b>USB Cable 6' (1.8m)</b>	
<b>Handheld User Manual and Data Transfer Software (USB Key)</b>	

GrayWolf offers a number of optional accessories. Consult your User Manual or contact the GrayWolf Sales department or an authorized reseller for more information.






## 11. Control and Menu Icons

	Function Name	Location/Screen	Description of Function
	<b>GrayWolf Logo Icon</b>	Home Screen	Press logo and a Product Information screen will appear displaying your model number, serial number, manufacture date, last calibration date, next calibration due date and number of channels activated on the unit. Press back arrow icon on bottom left corner of the display to return to home screen.
	<b>Speaker Icon</b>	Home Screen	Speaker Icon allows for volume adjustment using a pop-up slider bar. When pressed the cross bar on slider and move up and down for volume control. Icon will have red prohibited symbol when sound is turned off or muted.
<b>20.2 C 35% RH</b>	<b>Temperature &amp; RH</b>	Home Screen	By pressing the temperature and RH value indication the screen will change to a large indication of the current Temperature, Relative Humidity and the current Barometric Pressure. Press back arrow icon on bottom left corner of the display to return to home screen.
<b>2015/01/15 12:30:01 PM</b>	<b>Time and Date Indication</b>	Home Screen	To change time and date, press the date and time in the top right corner of the display and the change time and date screen will appear allowing for changes.
	<b>Power Management Icon</b>	Home Screen	On the top right of the display is the battery/power adapter indication icon. Pressing this icon displays the battery power management screen as well adjust screen brightness.
	<b>USB Communication Icon</b>	Home Screen	If a USB drive is connected, the USB Icon will appear. When pressed from the home screen the current record displayed will be saved to the USB drive.
	<b>Printer Indication</b>	Home Screen	If the printer is connected to USB Port, the Printer Icon will appear. When pressed from the home screen the current record on screen will be sent to the printer.
	<b>System Warning Indication</b>	Home Screen	When the System Warning Indication Icon appears, please contact Particles Plus technical service for assistance. When pressed, the Instrument will display additional information.
	<b>Alarm Indication</b>	Home Screen	Visual indication of alarm condition if the particle count exceeds the user defined thresholds. When pressed this will silence the alarm.
	<b>Run Icon</b>	Home Screen	The Run Icon starts the instrument sampling. Once pressed the Run Icon will be replaced by the Stop Icon.
	<b>Stop Icon</b>	Home Screen	The Stop Icon stops the instrument from sampling.

## 15. Control and Menu Icons (Continued)

	Function Name	Location/Screen	Description of Function
	<b>Real-Time Meter &amp; Graphing Icon</b>	Home Screen	When pressed the Real-Time Icon switches between the Real-Time Meter mode, graphing of pulse/seconds and the Main Screen.
	<b>Recorded Data Icon</b>	Home Screen	When pressed, the Recorded Data Icon will display the saved data records page. All saved records can be accessed from this screen.
	<b>Reports Icon</b>	Home Screen	When pressed, the Reports Icon will display the standards options page, where ISO 14644-1, EU-GMP Annex 1, or Federal Standard 209E modes can be selected.
	<b>Particle Data Selection Icon</b>	Home Screen	When pressed, the Particle Data Icon changes the indicated values from particle count, count per cubic meter, or count per cubic foot and particle mass concentration (activated in channel management). These values are displayed simultaneously as differential and cumulative counts.
	<b>Differential Mode Icon</b>	Home Screen	When pressed, the Differential Mode Icon toggles the differential data values off and on the display during or after sampling.
	<b>Cumulative Mode Icon</b>	Home Screen	When pressed, the Cumulative Mode Icon toggles the cumulative data values off and on the display during or after sampling.
	<b>Location Menu Icon</b>	Home Screen	When pressed, the Location Menu Icon displays the Location and Recipe set up pages. This feature allows for the input of up to 1000 locations 20 characters long and up to 50 unique user-defined recipes.
<b>Mode: Automatic</b>	<b>Mode Indication</b>	Home Screen	The Mode Indication displays the current mode of operation the Instrument is set to. These modes include automatic, manual, continuous, and Real-Time Meter.
<b>Sample: 00:01:00</b>	<b>Sample Indication</b>	Home Screen	The Sample Time Indication displays the current sample time duration (Hours:Minutes:Seconds). This value will countdown from the set value for the sample time, displaying the amount of time left in the current sample. See Sampling Setup in Settings Menu.
<b>Hold: 00:02:00</b>	<b>Hold Indication</b>	Home Screen	The Hold Time Indication displays the current hold time, as an interval between samples. The maximum hold time is 99 hours, 59 minutes and 59 seconds. See Sampling Setup in Settings Menu.

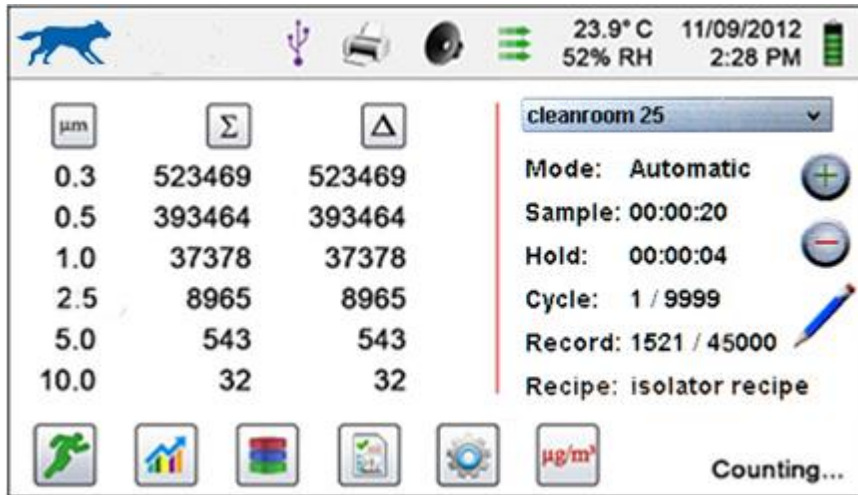
## 15. Control and Menu Icons (Continued)

	Function Name	Location/Screen	Description of Function
<b>Cycle: 1 / 3</b>	<b>Cycle Indication</b>	Home Screen	The Cycle Indication displays the number of count samples that will be taken at a location in automatic mode. The maximum number of possible cycles that can be set is 9,999. The value is displayed as the sample number vs. the total number of samples to be completed in this cycle. See Sampling Setup in Settings Menu.
<b>Record: 1 / 40000</b>	<b>Record Indication</b>	Home Screen	The Records Indication is a display of the total number of sampling records saved in the Instrument out of the total number of records the instrument is capable of storing -- 40,000 possible saved records (rotating buffer) including particle count data, environmental data, locations and times per record.
	<b>Settings Menu Icon</b>	Home Screen	When pressed, the Settings Menu Icon brings you to the Settings Screen. All aspects of the Instrument's set-up can be managed from the icon driven sub-menus.
	<b>Annotation Icon</b>	Home Screen	The Annotation Icon, displays as a <b>blue</b> pencil. When pressed, written notation (up to 32 letters, can be added to a record during the time of the sampling, or after a sample has been taken. Advanced processing allows for annotations to be inserted while the unit is sampling with no interruption to the operation. The <b>green</b> pencil denotes that an annotation exists on that record. This feature can be disabled from the Configuration screen in Settings.
	<b>Plus and Minus Button</b>	Home Screen	When pressed, these icons scroll through 500 possible locations that can be saved and uniquely identified in the Locations set-up screen. Locations can have set recipes assigned to them in advance for ease-of-use during sampling.
	<b>Green Flow &amp; No Flow Indication</b>	Home Screen	The three horizontal arrows indicate that the pump is working and that the internal flow sensor is detecting the correct flow rate through the Instrument. If a red line appears diagonally through three green arrows, it is an indication no flow.
	<b>Back Arrow Icon</b>	Various Screens throughout program	Press back arrow Icon to return to the previous screen.



## 16. Sampling

### Main Sampling Home Screen



**Taking a Sample**

**Using the start sample icon on the display begins the sample.**

To take a sample, press the start sample icon on the display. This will begin the sample according to the sampling set-up parameters displayed on the right side of the home display. The sample setting can be changed in the Settings sub-menu.



**Stopping the Sample**

**Using the stop sample icon on the display**

To stop sampling, press the Stop Icon on the display.



**Data Unit of Measure Selection**

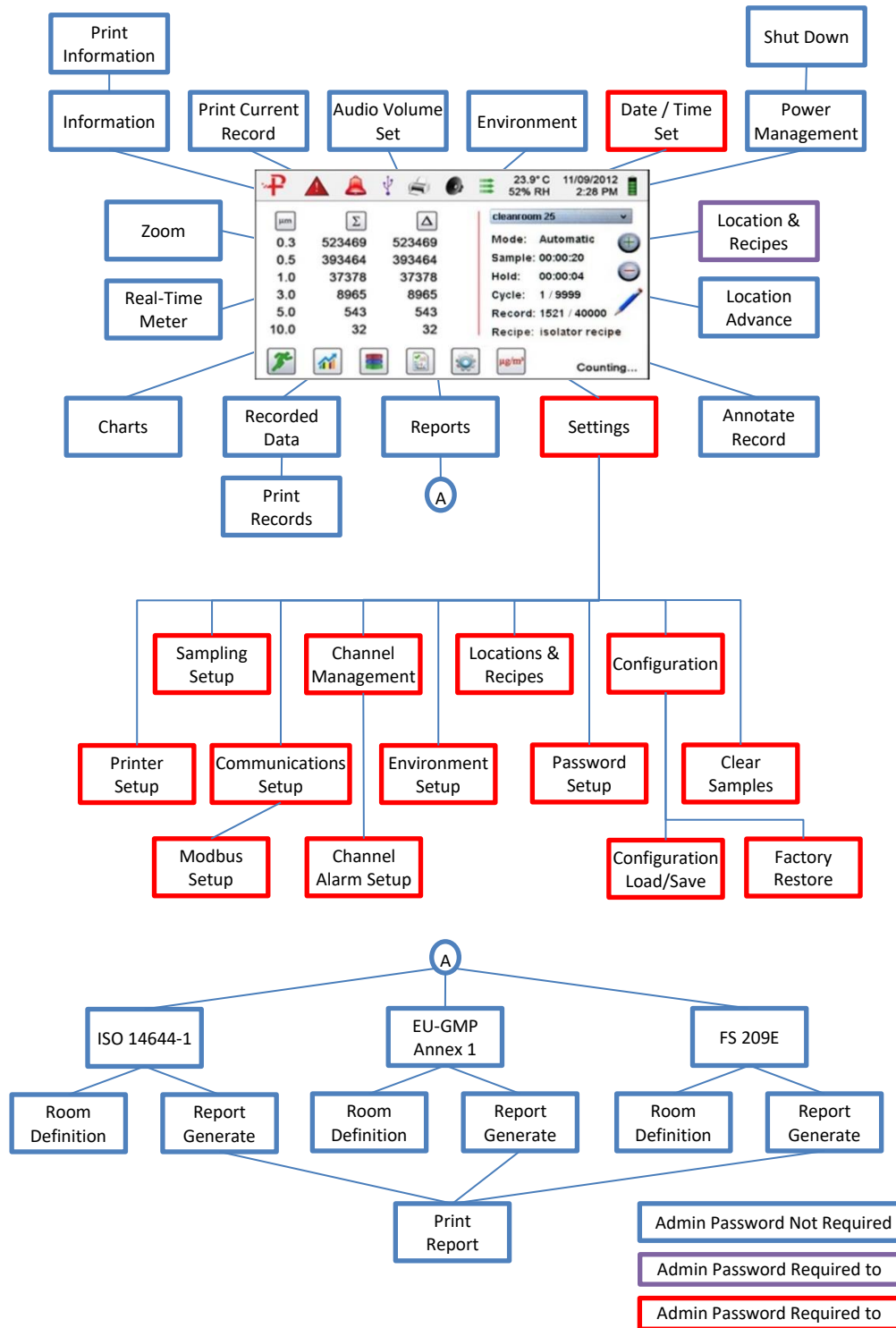
The Instrument can display the active sample or any recorded and saved record in count, count per cubic meter, count per cubic foot, or micrograms per cubic meter (in mass mode). This can be changed by pressing the icon, rotating through the data output indication options.

## 17. Particle Data Types and Descriptions

Data type in GrayWolf Software	Data type on PC-5000	Description
Raw Counts Differential	$\Delta$	Differential Raw Counts for each channel. Differential Raw Count ( $\Delta$ ) is the total count of all particles detected during a sample for a given channel.  Example: A differential raw count ( $\Delta$ ) of 25,107 for the 0.3 $\mu$ m channel means that 25,107 particles were counted between a size of 0.3 $\mu$ m-0.5 $\mu$ m in that sample.
Raw Counts Cumulative	$\Sigma$	Cumulative Raw Counts for each channel. Cumulative Raw Count is a count of all particles greater than a given channel size.  Example: A cumulative raw count for the 1 $\mu$ m channel is a count of all particles greater than 1 $\mu$ m.  $\Sigma$ 1 $\mu$ m = $\Delta$ 1 $\mu$ m + $\Delta$ 2.5 $\mu$ m + $\Delta$ 5 $\mu$ m + $\Delta$ 10 $\mu$ m
Counts per Volume Cubic Feet Differential	$\Delta$ ft <sup>3</sup>	Differential Counts per ft <sup>3</sup> . $\Delta$ ft <sup>3</sup> is the Differential Count for a channel by volume in ft <sup>3</sup> . It is the total number of counts for a given channel normalized to a unit volume using the sample time and the flow rate of the pump.  Example: $\Delta$ ft <sup>3</sup> for 1 $\mu$ m is a count of all particles between 1 $\mu$ m-2.5 $\mu$ m, normalized to 1 cubic foot.
Counts per Volume Cubic Feet Cumulative	$\Sigma$ ft <sup>3</sup>	Cumulative Counts per ft <sup>3</sup> . $\Sigma$ ft <sup>3</sup> is the Cumulative Count for a channel by volume in ft <sup>3</sup> . It is the total number of counts for all particles greater than a given channel size, normalized to a unit volume using the sample time and the flow rate of the pump.  Example: $\Sigma$ ft <sup>3</sup> for 1 $\mu$ m is a count of all particles greater than 1 $\mu$ m, normalized to 1 cubic foot.
Counts per Volume Cubic Meter Differential	$\Delta$ m <sup>3</sup>	Differential Counts per m <sup>3</sup> . $\Delta$ m <sup>3</sup> is the Differential Count for a channel by volume in m <sup>3</sup> . It is the total number of counts for a given channel normalized to a unit volume using the sample time and the flow rate of the pump.  Example: $\Delta$ m <sup>3</sup> for 1 $\mu$ m is a count of all particles between 1 $\mu$ m-2.5 $\mu$ m, normalized to 1 cubic meter.
Counts per Volume Cubic Meter Cumulative	$\Sigma$ m <sup>3</sup>	Cumulative counts per m <sup>3</sup> . $\Sigma$ m <sup>3</sup> is the Cumulative Count for a channel by volume in m <sup>3</sup> . It is the total number of counts for all particles greater than a given channel size,

		<p>normalized to a unit volume using the sample time and the flow rate of the pump.</p> <p>Example: <math>\sum m^3</math> for <math>1\mu\text{m}</math> is a count of all particles greater than <math>1\mu\text{m}</math>, normalized to 1 cubic meter.</p>
<p>Particulate Mass</p> <p><math>\mu\text{g}/\text{m}^3</math></p> <p>ug/m3</p>	<p><math>\mu\text{g}/\text{m}^3</math></p>	<p>Differential Mass Concentration reading of <math>\mu\text{g}/\text{m}^3</math> for each channel. A particle in a given channel size range has an average mass. That average mass is multiplied by the number of particles to arrive at the total mass of the particles for a given channel. Using the sample time and flow rate of the pump, a concentration can be determined for a unit volume. This gives the mass concentration.</p> <p>Example: The Differential Mass Concentration of the <math>1\mu\text{m}</math> channel is the total mass of particles between <math>1\mu\text{m}</math>-<math>2.5\mu\text{m}</math>, per unit volume.</p>
<p>Particulate Mass</p> <p>PM m3</p>	<p>PM</p>	<p>Cumulative Mass Concentration reading. PM values are the most common way to quantify air quality with respect to particulates. It is a sum of all the mass concentrations for all channels smaller than the given channel.</p> <p>Example: a PM 2.5 reading is the sum of the Differential Mass Concentration for all particle sizes smaller than <math>2.5\mu\text{m}</math>. It is a sum of the Differential Mass Concentration readings for the <math>0.3\mu\text{m}</math>, <math>0.5\mu\text{m}</math>, and <math>1\mu\text{m}</math> channels.</p> <p>Because the particle counter does not have the ability to measure particulates smaller than <math>0.3\mu\text{m}</math>, there is no PM 0.3 reading.</p>

## 18. Operational Flow Chart – Menu Map



**For set-up menus instructions and detailed operations for your PC-5000 Series handheld particle counter please refer to your user manual.**

