AeroTrak™ Cleanroom Condensation Particle Counter

Model 9001

Operation Manual

P/N 6010508, Revision F
March 2024

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Manual History

The following is a manual history of the AeroTrak™ Cleanroom Condensation Particle Counter, Model 9001 Operation Manual (P/N 6010508).

Revision	Date
A	February 2017
B	May 2017
C	February 2018
D	December 2019
E	March 2023
F	March 2024

Warranty

Part Number 6010508 / Revision F / March 2024

Address TSI Incorporated / 500 Cardigan Road / Shoreview, MN 55126 / USA

E-mail Address answers@tsi.com

Limitation Of Warranty And Liability (effective October 2023)

(For country-specific terms and conditions outside of the USA, please visit www.tsi.com.)

Seller warrants the goods, excluding software, sold hereunder, under normal use and service as described in the operator's manual, to be free from defects in workmanship and material for the longer period of either **24 months** or **the length of time specified in the operator's manual/warranty statement provided with the goods or made available electronically (version published at the time of sale)**, from the date of shipment to the customer. This warranty period is inclusive of any statutory warranty. **This limited warranty is subject to the following exclusions and exceptions:**

a. Hot-wire or hot-film sensors used with research anemometers, and certain other components when indicated in specifications, are warranted for 90 days from the date of shipment;

b. Pumps are warranted for hours of operation as set forth in product or operator's manuals;

c. Parts repaired or replaced as a result of repair services are warranted to be free from defects in workmanship and material, under normal use, for 90 days from the date of shipment;

d. Seller does not provide any warranty on finished goods manufactured by others or on any fuses, batteries or other consumable materials. Only the original manufacturer's warranty applies;

e. This warranty does not cover calibration requirements, and seller warrants only that the instrument or product is properly calibrated at the time of its manufacture. Instruments returned for calibration are not covered by this warranty;

f. This warranty is **VOID** if the instrument is opened by anyone other than a factory authorized service center with the one exception where requirements set forth in the manual allow an operator to replace consumables or perform recommended cleaning;

g. This warranty is **VOID** if the product has been misused, neglected, subjected to accidental or intentional damage, or is not properly installed, maintained, or cleaned according to the requirements of the manual. Unless specifically authorized in a separate writing by Seller, Seller makes no warranty with respect to, and shall have no liability in connection with, goods which are incorporated into other products or equipment, or which are modified by any person other than Seller.

h. New parts or components purchased are warranted to be free from defects in workmanship and material, under normal use, for 90 days from the date of shipment.

The foregoing is **IN LIEU OF** all other warranties and is subject to the **LIMITATIONS** stated herein. **NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR MERCHANTABILITY IS MADE. WITH RESPECT TO SELLER'S BREACH OF THE IMPLIED WARRANTY AGAINST INFRINGEMENT, SAID WARRANTY IS LIMITED TO CLAIMS OF DIRECT INFRINGEMENT AND EXCLUDES CLAIMS OF CONTRIBUTORY OR INDUCED INFRINGEMENTS. BUYER'S EXCLUSIVE REMEDY SHALL BE THE RETURN OF THE PURCHASE PRICE DISCOUNTED FOR REASONABLE WEAR AND TEAR OR AT SELLER'S OPTION REPLACEMENT OF THE GOODS WITH NON-INFRINGING GOODS.**

TO THE EXTENT PERMITTED BY LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE LIMIT OF SELLER'S LIABILITY FOR ANY AND ALL LOSSES, INJURIES, OR DAMAGES CONCERNING THE GOODS (INCLUDING CLAIMS BASED ON CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) SHALL BE THE RETURN OF GOODS TO SELLER AND THE REFUND OF THE PURCHASE PRICE, OR, AT THE OPTION OF SELLER, THE REPAIR OR REPLACEMENT OF THE GOODS. IN THE CASE OF SOFTWARE, SELLER WILL REPAIR OR REPLACE DEFECTIVE SOFTWARE OR IF UNABLE TO DO SO, WILL REFUND THE PURCHASE PRICE OF THE SOFTWARE. IN NO EVENT SHALL SELLER BE LIABLE FOR LOST PROFITS, BUSINESS INTERRUPTION, OR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR INCIDENTAL DAMAGES. SELLER SHALL NOT BE RESPONSIBLE FOR

INSTALLATION, DISMANTLING OR REINSTALLATION COSTS OR CHARGES. No Action, regardless of form, may be brought against Seller more than 12 months after a cause of action has accrued. The goods returned under warranty to Seller's factory shall be at Buyer's risk of loss, and will be returned, if at all, at Seller's risk of loss.

Buyer and all users are deemed to have accepted this LIMITATION OF WARRANTY AND LIABILITY, which contains the complete and exclusive limited warranty of Seller. This LIMITATION OF WARRANTY AND LIABILITY may not be amended, modified or its terms waived, except by writing signed by an Officer of Seller.

Service Policy

Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any malfunction is discovered, please contact your nearest sales office or representative, or call TSI's Customer Service department at 1-800-680-1220 (USA) or +001 (651) 490-2860 (International).

Trademarks

Contents

Safety Information

This section gives instructions to promote safe and proper handling of the AeroTrak™ Cleanroom Condensation Particle Counter.

IMPORTANT NOTICE

There are no user-serviceable parts inside the instrument. Refer all repair and maintenance to a qualified factory-authorized technician. All maintenance and repair information in this manual is included for use by a qualified factory-authorized technician.

Laser Safety

- This Cleanroom Condensation Particle Counter is a Class I laser-based instrument.
- During normal operation, you will ***not*** be exposed to laser radiation.
- Precaution should be taken to avoid exposure to hazardous radiation in the form of intense, focused, visible light.
- Exposure to this light may cause blindness.

Take these precautions:

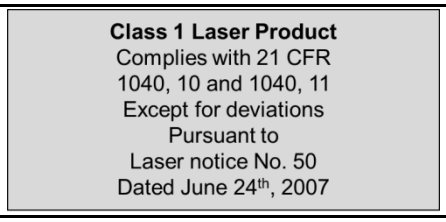
- **DO NOT** remove any parts from the particle counter unless you are specifically told to do so in this manual.
- **DO NOT** remove the housing. There are no user-serviceable components inside the housing.

WARNING

The use of controls, adjustments, or procedures other than those specified in this manual may result in exposure to hazardous optical radiation.

Labels

Advisory labels and identification labels are attached to the outside of the particle counter housing and to the optics housing on the inside of the instrument.

1. Serial number label *(back panel)*	
2. Laser instrument compliance label (*back panel*)	
3. Calibration Label (*back panel*)	
4. Laser radiation symbol label (back panel and internal)	
5. European symbol for non-disposable item. Item must be recycled.	

Description of Caution/Warning Symbols

Appropriate caution/warning statements are used throughout the manual and on the instrument that require you to take cautionary measures when working with the instrument.

Caution

CAUTION
Failure to follow the procedures prescribed in this manual might result in irreparable equipment damage. Important information about the operation and maintenance of this instrument is included in this manual.

Warning

WARNING
Warning means that unsafe use of the instrument could result in serious injury to you or cause damage to the instrument. Follow the procedures prescribed.

Caution or Warning Symbols

The following symbols may accompany cautions and warnings to indicate the nature and consequences of hazards:

	Warns that uninsulated voltage within the instrument may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make contact with any part inside the instrument.
	Warns that the instrument contains a laser and that important information about its safe operation and maintenance is included in the manual.
	Warns that the instrument is susceptible to electro-static dissipation (ESD) and ESD protection procedures should be followed to avoid damage.
	Indicates the connector is connected to earth ground and cabinet ground.

Getting Help

To obtain assistance with this product or to submit suggestions, please contact Customer Service:

TSI Incorporated
500 Cardigan Road
Shoreview, MN 55126 U.S.A.

Fax: (651) 490-3824 (USA)
Fax: 001 651 490 3824 (International)
Telephone: 1-800-680-1220 (USA) or (651) 490-2860
International: 001 651 490 2860
E-mail Address: answers@tsi.com
Web site: www.tsi.com

CHAPTER 1

Introduction and Unpacking

The AeroTrak™ Cleanroom Condensation Particle Counter (CPC *or* particle counter) has a touch-screen interface and operates on AC power.

This device has a 0.1 CFM (2.83 L/min) flow rate and size range from 10 nm (0.01 µm) to 100 nm (0.1 µm). Up to 10,000 data sets can be downloaded for analysis and reporting using the TrakPro™ Lite Secure Data Downloading Software included with the device.

Typical applications for this particle counter include cleanroom monitoring, research, exposure assessment, indoor air quality, filter testing, clearance testing, quality assurance, and contaminant migration studies.

All AeroTrak™ particle counters meet JIS standards.

(continued on next page)

Unpacking the AeroTrak™ Cleanroom Condensation Particle Counter

Carefully unpack the AeroTrak™ Cleanroom Condensation Particle Counter from the shipping container and verify that all the items shown in the photos below and listed in the following tables are present. Contact TSI® immediately if items are missing or broken (see Chapter 7, Contacting Customer Service for more information).

AeroTrak™ Cleanroom Condensation Particle Counter Parts List

Qty.	Item Description	Part/Model	Reference Picture
1	AeroTrak Cleanroom Condensation Particle Counter	9001	
1	One Fill bottle.	700172	
1	One Drain bottle.	700173	
1	Power Supply 12VDC 16A (Power cord included is country dependent)	700180	

Qty.	Item Description	Part/Model	Reference Picture
1	Country-Specific Power Cord	700057 (US) 700058 (UK) 700059 (Euro)	
1	Connector, Receptacle, 2-pin (for alarm relay)	3003132	
1	Computer Cable (2 m), USB A to B	700033	
2	Stylus	N/A	
1	HEPA Zero Filter Assembly *(requires assembly)*	700182	
1	TrakPro™ Lite Secure Software for 21 CFR Part 11 compliant data downloading (*includes manual*s)	N/A	Available on TSI® website: https://tsi.com/support/tsi-software-and-firmware/
1	Operation Manual	6010508	Available on TSI® website: tsi.com. Log into “My Account” to view manual.
1	Quick Start Guide	6010559	
1	Calibration certificate	N/A	
1	Sample inlet for 1/8” tubing	700175	
1	Sample inlet 1/4” tubing	700176	

Qty.	Item Description	Part/Model	Reference Picture
1	Sample tubing Tygon® (1M) 1/8” ID	700169	
3	Replacement wick assembly	700171	

AeroTrak™ Cleanroom Condensation Particle Counter Optional Accessory

Qty.	Item Description	Part/Model	Reference Picture
1	High Pressure Diffuser	7950	
1	Drain Line (for direct water connection)	700200	
1	9001 Pump Priming Kit	700425	
1	Wick Removal Tool	700183	

CHAPTER 2

Getting Started

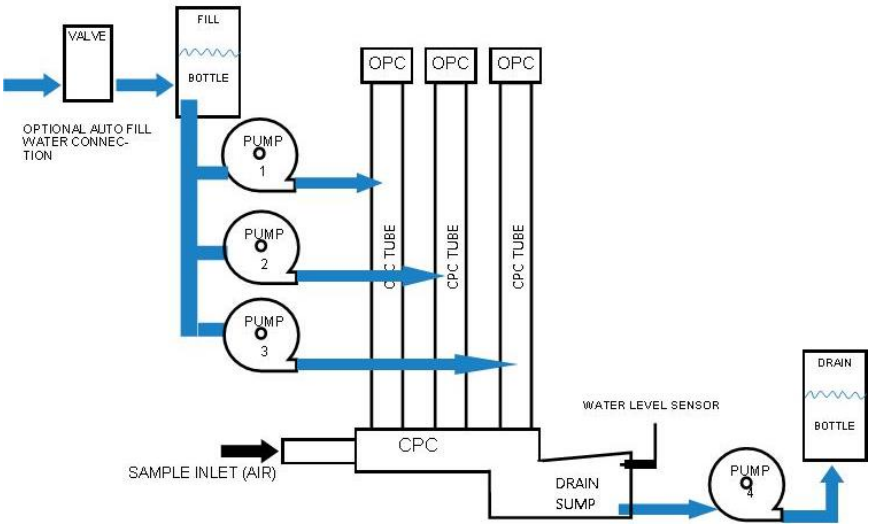
This chapter describes the features, connections, and installation of the AeroTrak™ Cleanroom Condensation Particle Counter (CPC *or* particle counter). It includes:

CPC Principle of Operation

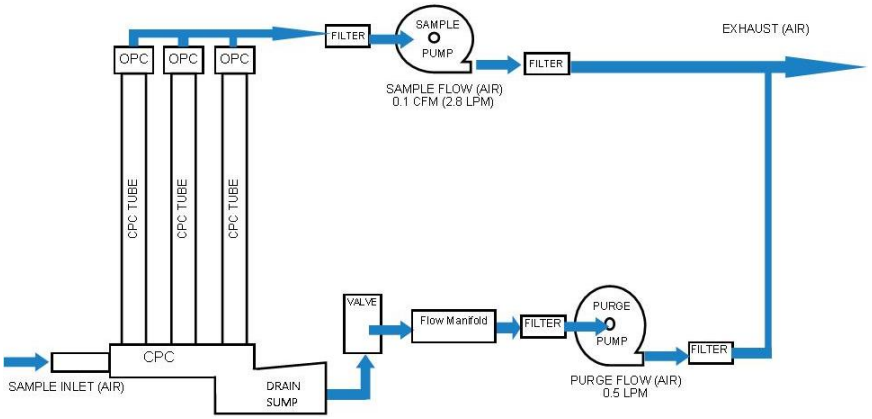
Standard optical particle counters (OPCs) can only detect particles larger than 100 nm (0.1 µm). Detection of smaller particles is done using a condensation particle counter or CPC. CPCs use a working fluid (water in this case) to grow the particle to a size that is detectable by a traditional OPC. The particle aerosol sample flow is directed through a condensation growth tube, where nanoparticles are grown using condensation. Growth tube conditions are managed such that the designated minimum particles size (for the TSI® 9001, 10 nm and any larger particles), are grown using condensation of water vapor, similar to how clouds are made up of condensation nuclei which allow water vapor to condense on them in certain atmospheric conditions.

Both water and air flow through the CPC. Below are simplified diagrams of these flows.

TSI® 9001 CPC Water Flow Diagram



TSI® 9001 CPC Air Flow



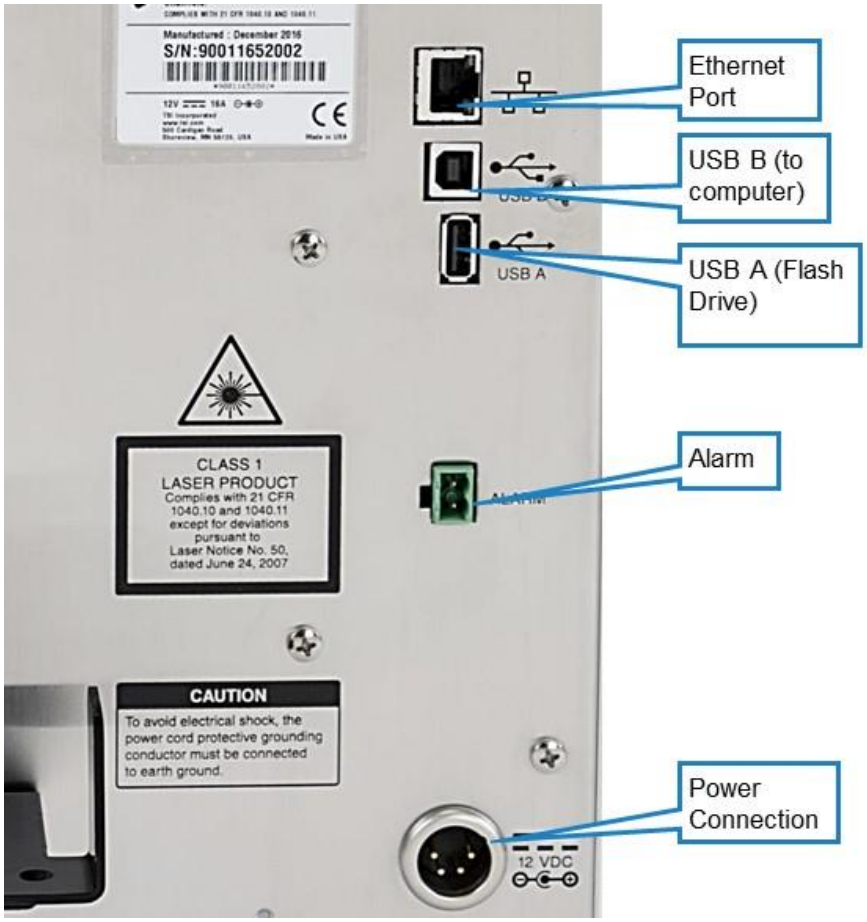
Instrument Description

The AeroTrak™ Cleanroom Condensation Particle Counter has many features to make measurements convenient. The power switch is located in the lower-left on the front panel. A power LED indicates when the instrument is powered up. The main interface is the color touch-screen interface on the front (see the note below on using a stylus with the screen). The sample inlet is located on the lower front of the instrument. A handle is located on top to carry the instrument.

The back of the instrument has many features that are described in the table below.

Description	Function
DC Power connection	This power connection is for use with an external supply. Only the TSI®-supplied 12 VDC 16.0 A power supply model 700180 should be used.
USB A	This standard USB connector is provided for use with “flash drive” devices to download data from the instrument and transfer to a computer or other device. The data files are in ASCII format for easy use in spreadsheet programs. This port can also be used to connect a keyboard.
USB B	The standard USB connector is used to connect the instrument to a computer running TSI® TrakPro™ Lite Secure software for data downloading and recipe uploading. It is used with a standard USB cable (included).

Description	Function
Ethernet port	The particle counter is compatible with either 10 or 100 MBps systems. The green LED indicates that the network is connected. The yellow LED indicates activity on the network cable.
Alarm	This connector provides two pins for a contact closure to control an external alarm.
Power Connection	This Cleanroom CPC is powered through an AC power cord.



Connecting the Fill and Drain Bottles

IMPORTANT NOTICE

Before turning the unit ON, make sure the fill and drain bottles are connected appropriately. If the fill and drain bottles are not connected, the unit cannot keep the wicks wet. Fill the fill bottle with distilled or ultrapure water only. **DO NOT** use tap water.

Connections to the unit for the Fill and Drain bottle are shown in the figure.

The top connectors connect to the fill bottle and the bottom connector connects to the drain bottle.

NOTICE

When shipping the unit, make sure you drain the wicks by clicking on "Drain Wicks" (see Device Setup: Maintenance screen). You must disconnect the water **fill** bottle from the unit but keep the **drain** bottle connected to the device.

Water bottle brackets are shipped loose and can be installed in the correct locations with two (2) screws each (screws are already installed in back of unit).

Direct Inject Water Connection (optional)

IMPORTANT NOTICE

Before turning the unit ON, make sure that the ultrapure water pressure is regulated down to 12 psi (83 kPa). **DO NOT** use the instrument with water pressure above 14 psi (97 kPa).

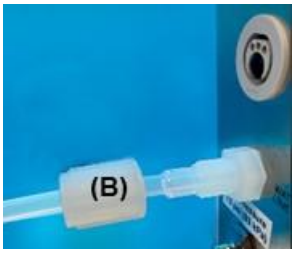
AeroTrak™ Model 9001 has the capability for direct water line connection. This connector is shown in figure **(A)**.

The direct inject water line enables the instrument to automatically provide water to the fill bottle when the water level in the fill bottle drops below the low level sensor.

The recommended inlet pressure for the incoming water line is 12 psi (83 kPa) ±2 psi (14 kPa).

Using the instrument with water pressure above 14 psi (97 kPa) can lead to damage to the instrument.

The direct water connection is made by using customer-provided 1/4” outer diameter PFA (PVDF) tubing with a flared fitting as shown in figure **(B)**.



When using direct connected water supply, also install a direct drain line using TSI® (700200) 9001 WCPC Direct Drain Line.

The fill bottle is kept in place when using direct water connection. The drain bottle does not need to be used if a direct drain line is installed.

Connecting Sample Inlet Adaptors

Remove the plastic shipping cap on the sample inlet and connect either the 1/8” barbed or 1/4” smooth tubing inlet adaptor. Only tighten the inlet adaptor finger-tight, **do not** use tools. Connect the zero filter assembly for startup. The sample inlet adaptors can be used with sample tubing. Transport losses in tubing should be considered when installing the instrument.

Shipping Cap – remove

Sample adaptors

1/4” sample adapter installed

Zero filter installed

Providing Power

This particle counter is powered through an AC power cord.

Connect the country-appropriate power cord to the external power supply. Next connect the 12 VDC connector to the socket in the particle counter and then connect the other end to an AC outlet.

WARNING

The instrument turns on automatically when the AC power supply is plugged in, so make certain you have connected the fill and drain water bottles and sample inlet adapter before connecting power.

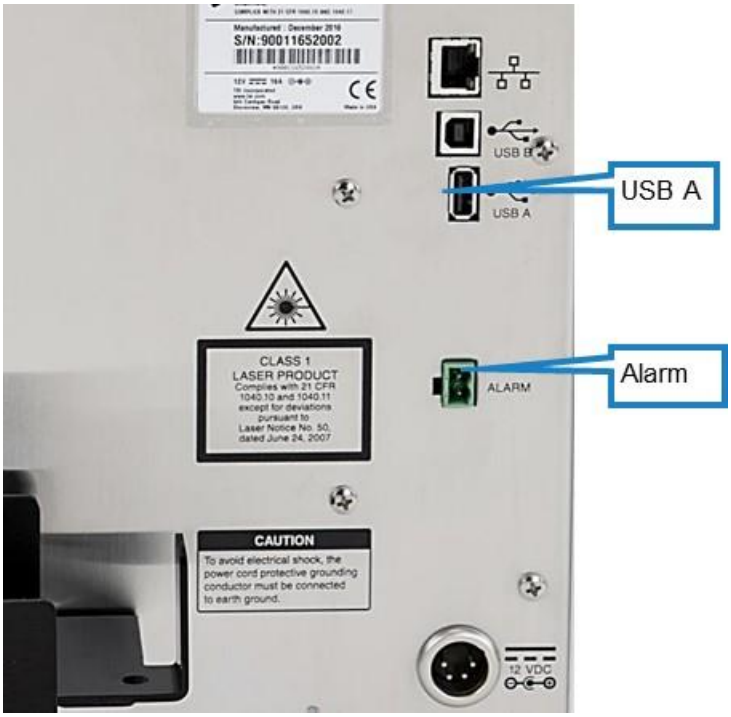
Using the Stylus

This particle counter is shipped with a plastic stylus for use with the touch screen interface. Use your fingertip or the stylus only. **DO NOT** use sharp objects, such as pens or pencils on the touch screen as they may damage it.

Using Peripherals

Connecting to the Alarm Closure

This connector provides two pins for a contact closure to control an external alarm. The contact closure is normally open and rated for 0 to 60 V AC/DC at 1.5A peak, 0.5A continuous. The “alarm out” connection is rated for 60 VDC insulation. The contact is closed under alarm conditions determined by the programming of the device. When used with an externally powered device, this can trigger a visual or audible local alarm (such as a light pole).



CAUTION

The alarm switch **MUST NOT** be wired to AC power. **Failure to properly install the user alarm could damage the instrument and/or void the instrument warranty**. Please read and follow all instructions before wiring or operating the user alarm.

WARNING

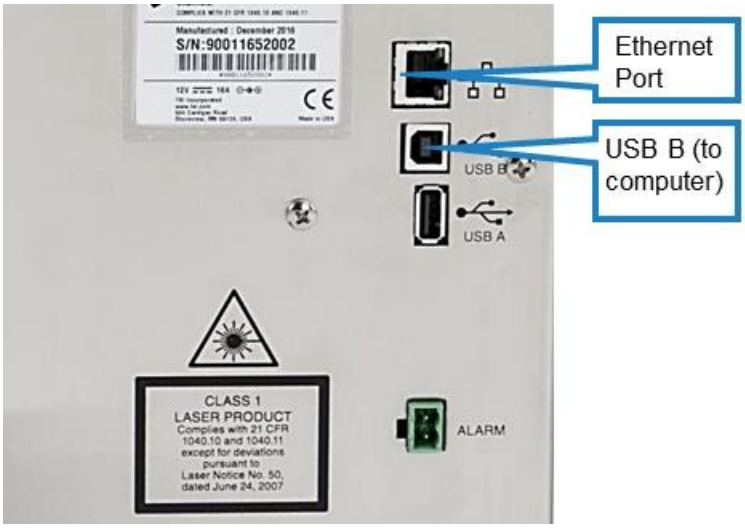
When connected to the alarm out connector, you must use safety certified equipment and/or power sources.

USB A

This standard USB connector is provided for use with “flash drive” devices to download data from the instrument and transfer to a computer or other device. The data files are in XML format for easy use in spreadsheet programs. You can plug in a flash drive at any time. Make sure there is enough space free on the drive to download data files. See instructions on using the flash drive in Chapter 4.

A keyboard can also be used with this standard USB connector, to facilitate data entry at the portable, if desired, as an alternative to the touch screen keyboard.

Using Communications Ports



Ethernet Port

The particle counter is compatible with either 10 or 100 MBps systems. The green LED indicates that the network is connected. The yellow LED indicates activity on the network cable. The instrument cannot be operated using power-over-Ethernet (POE).

The Ethernet LAN connector is a standard 10/100 Mbps 8-Position 8-Contact (8P8C, often called RJ45) modular plug connection.

USB B

The standard USB B connector is used to connect the instrument to a computer running TSI® TrakPro™ Lite Secure software for data downloading and analysis. It is used with a standard USB cable and TrakPro™ Lite Secure Software (both included).

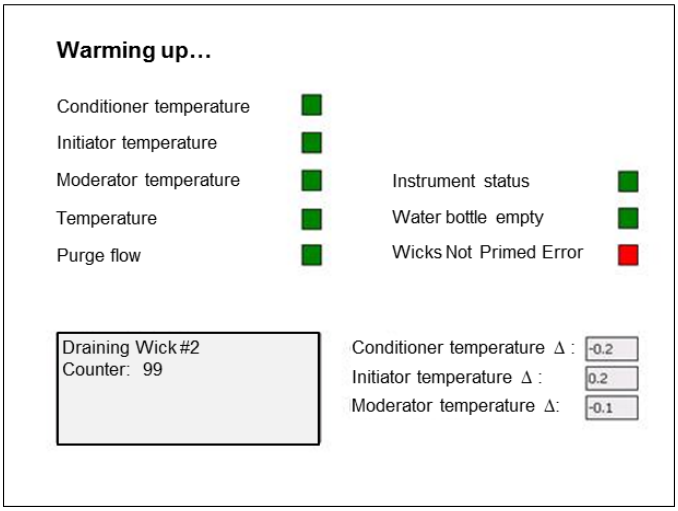
CHAPTER 3

Operation

The AeroTrak™ Cleanroom Condensation Particle Counter is controlled using a touch screen display. Use the plastic stylus or your finger tip. **DO NOT** use sharp objects (such as a pen point) that may damage the screen overlay.

IMPORTANT NOTICE
Before turning the unit ON, make sure the fill and drain bottles are connected appropriately. If the fill and drain bottles are not connected, the unit cannot keep the wicks wet. Fill the fill bottle with **distilled** or **ultrapure** water only. **DO NOT** use tap water or filtered water.

To turn on the instrument, press the power switch . The Cleanroom CPC will take about 10 to 15 minutes to warm-up. The warm-up screen is shown below:

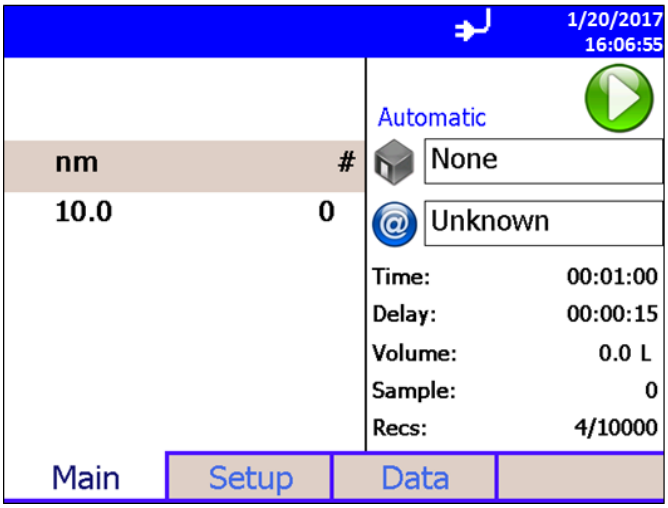


The instrument will go through a self-check and the warm-up screen will be displayed. You will need to wait for all the warm-up screen red boxes to turn green before the instrument main screen will be displayed (shown below).

The instrument is ready for operation when the main screen appears.

If the unit fails to fully initialize, refer to the Troubleshooting section.

Before collecting data, perform a Zero Check (see Maintenance section) at least once a day to verify instrument operation.



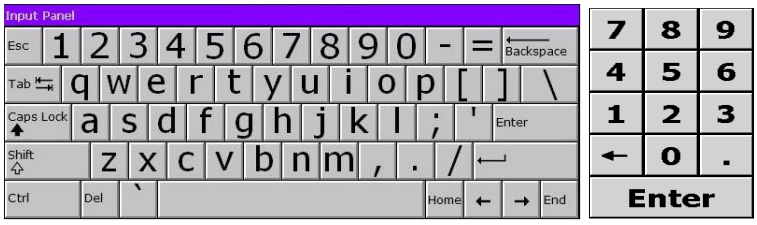
Screen Layout and Functionality

There are three main screens (tabs): Main, Setup, and Data. The operation of each of these screens, the information displayed on them, and the operations you can perform from each are described in the remainder of this chapter.

Some screens require or allow you to enter information. To enter information, tap on the screen and an on-screen keyboard appears.

Software Input Panel (Keyboard or Keypad)

1. Throughout the setup screens, a keyboard or keypad appears on the screen when text or numbers may be entered.



2. When you enter information using the keyboard, press either the ↵ (**Enter**) or **Esc** keys when you are done. When you enter data using the keypad, the data is entered when you press **OK** on the screen. The keyboard will then be hidden until another text entry box is selected.

Main Screen

The Main Screen is the default tab. The left side of the screen displays the counts or concentration setting selected in the current recipe. Tap on the size and count portion of the screen to enable Zoomed Data Screen (see Setup Tab for setting up recipes).

The display shows:

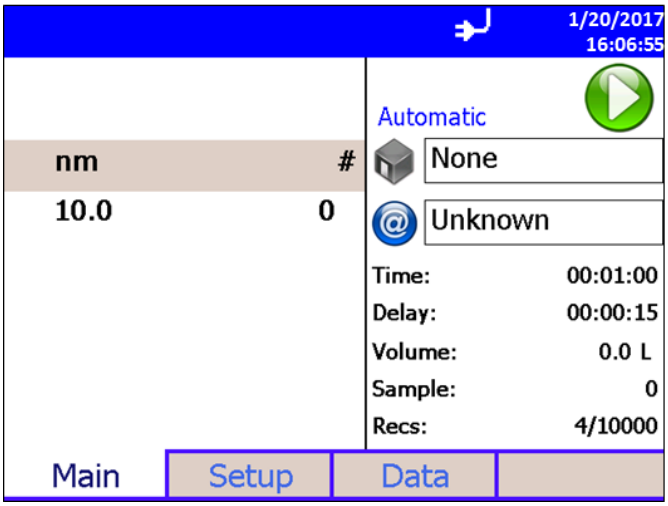
- Bin size
- Particle count/concentration

The status bar at the top of the screen shows the current time and date settings (see the Setup Tab) and indicates:

Icon	Description
	Instrument status error. If this icon is shown, press on it and a more detailed description of the operational error will be shown. Refer to the Troubleshooting Section for appropriate actions.
	Sufficient flow through the instrument. **NOTICE** During Start Delay (Delay) and Hold Times (Hold), this is only an indicator that the flow is on. During Sample Time (Time), this is an indicator of flow within specified tolerances.
	Insufficient flow through the instrument. If this icon is shown, press on it and a more detailed description of the flow error will be shown. Refer to the Troubleshooting Section for appropriate actions. **NOTICE** During Start Delay (Delay) and Hold Times (Hold), this is an indicator that the flow is off. During Sample Time (Time), this is an indicator of flow not being within specified tolerances.
	Operating on AC power.
	Indicates that TrakPro™ Lite Secure software is interfacing with the AeroTrak™ Cleanroom CPC. The front panel GUI is inoperable when the software is operational. Once the software is exited, normal front panel operation will resume.

Press and hold the  (Zone) icon to display a summary of information for the current zone.

Tap the (Location) icon to step through the list of Locations for the Zone.



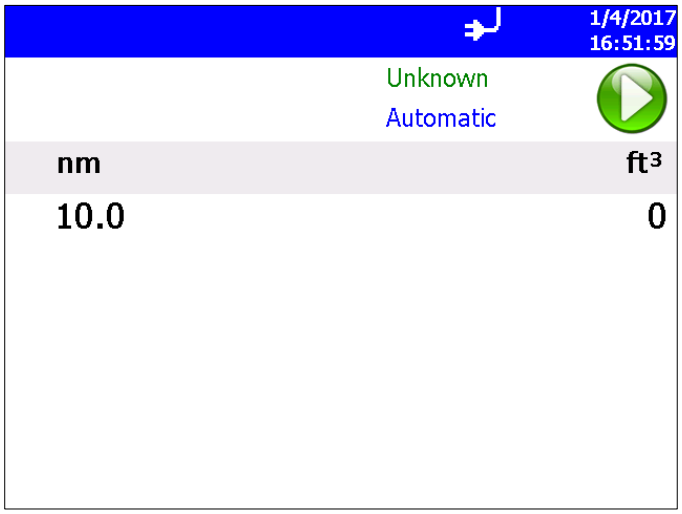
Field	Description
(Zone)	Displays the zone where the sample is being taken by the instrument. Press the icon to display a summary of information for the zone.
(Location)	This drop-down box allows selection of a preconfigured Location to associate the sampled data to.
Time	The time for each sample.
Delay	The Delay displays one of two times: 1. Before the Start button is pressed the Start Delay time is displayed and then immediately after the Start button is press the delay time begins a countdown. 2. During sampling and between cycles (after the Start Delay has been displayed), the Hold Delay is displayed and then begins a countdown.
Volume	The volume of air sampled for a given sample.
Sample	The specific sample being taken out of the total number of samples programmed to be taken.
Recs	The total number of records in the database/10000 (maximum number of records).
Manual/Automatic/Beep	Mode Indicator; refers to the “Data Count Mode” (see section below).
	Press the **Start/Stop** button to begin and end sampling in the configured mode.

Zoomed Data Screen

The Zoomed Data screen is entered by touching in the size and count part of the main tab display. The bottom portion of the screen summarizes the concentrations for the currently selected location. Tap the size and count portion of the display to switch back to the Main Tab display.

The display shows:

- Bin size
- Particle count/concentration



Field	Description
Location	Label that displays information about the currently selected location. (“Unknown” if none selected.)
Manual/Automatic/Beep	Mode Indicator; refers to the “Data Count Mode” (see section below).
	Press the **Start/Stop** button the begin sampling in the configured mode.

Setup Tab

The Setup Screen is used to set up various system functions and operations.

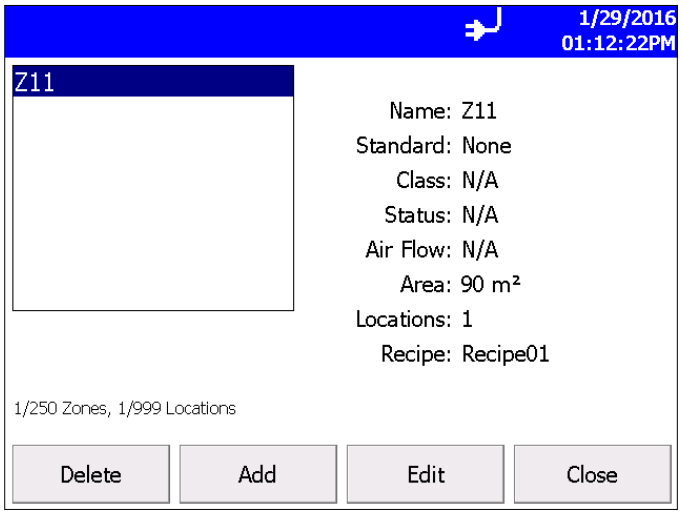
The setup tab provides access to the following:

Zones	Identify and save the location information associated with collected samples.
Recipes	Save a group of settings (a recipe) that you use over and over so you do not have to reset individual settings.
System	Change Power On Password, Setup Password, System Configuration, and Clear Samples
Info	Use the Information screen to view the system's model, serial number, copyright, manufacture date, calibration date, next calibration date, firmware version, USB IP address and date and time format.
Device	Set Date and Time, Screen Alignment, Communications, Regional Settings, and perform Maintenance.

Zone Setup Screen

“Zones” are a convenient way to group sample data for printing and export. A Zone contains 1 or more “Locations;” this is modeled after cleanroom standards that prescribe the classification of a zone (or room) by taking samples at various locations within the zone.

Use the Zone Setup screen to add, delete or edit Zone configurations.



The Zone configuration screen provides the following information for each zone that is configured.

Field	Description
Name	The name you assigned to the zone.
Standard	None.
Class	N/A
Status	N/A
Air Flow	N/A
Area	The area of the zone in ft^2 or m^2.
Locations	The location within the select zone.
Recipe	The recipe assigned to the zone.

To Delete A Zone

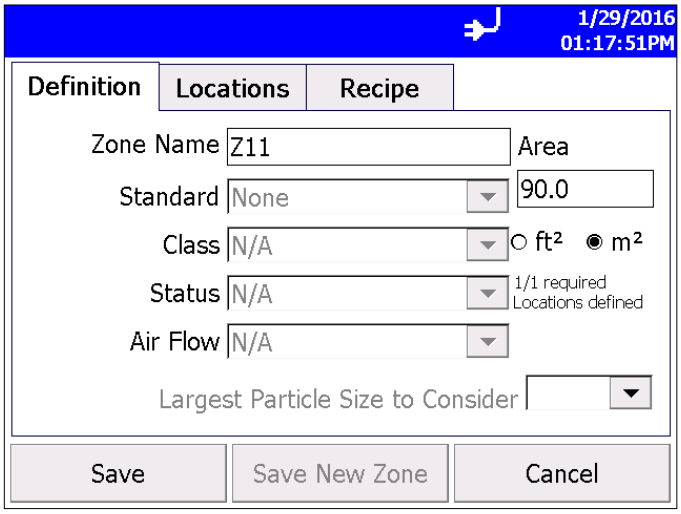
To delete a zone from the configuration screen, select (highlight) the zone name and press **Delete**. A verification message “Are you sure you want to delete this Zone?” appears. Press **Yes** to delete the zone.

A zone that has data associated with it cannot be deleted. The data associated with the zone must be deleted from the instrument before the zone can be deleted.

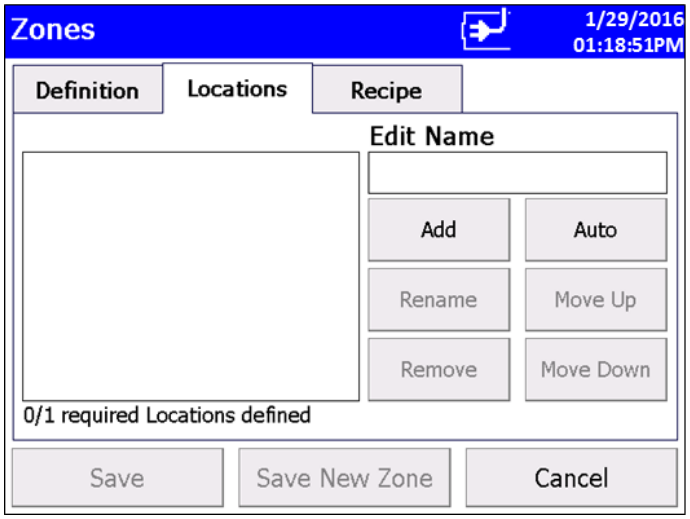
To Add a Zone

To add a zone, press **Add**. The Definition Screen is displayed.

1. Enter a name for the zone and input the Area using the keypad, Select either ft^2 or m^2 to describe the area of the zone.



2. Press the **Locations** tab. The Locations screen is displayed.



3. Enter a name for the location in the zone and press **Add**. The name will be added to the box on the left side of the screen.
4. Press the **Recipe** tab. The Recipe screen is displayed with a default recipe in the “Select Recipe” field.

5. Select the recipe you want to use from the “Select Recipe” listbox or press **Create Recipe** to create a new recipe or **Edit Recipe** to edit the recipe shown in the “Select Recipe” field.

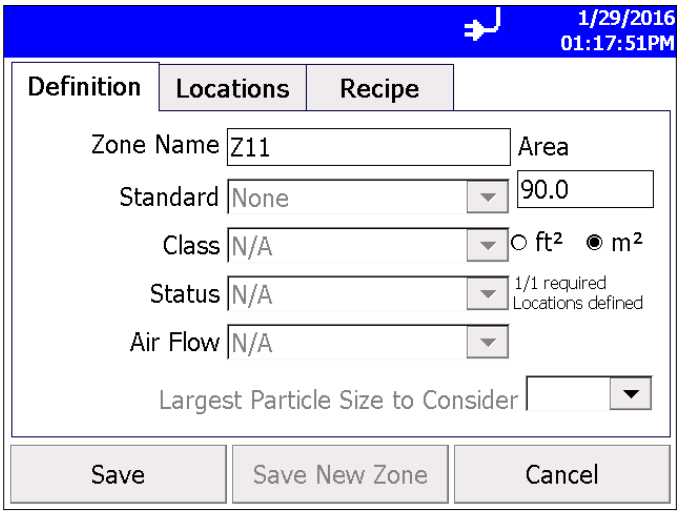
   See Recipes Setup Screen in the Setup Tab section for information about the fields and parameters of the recipe tabs.

NOTICES	
#1	You can also create recipes from the **Setup Tab** by selecting the **Recipe** icon . But if you create a new recipe here, information you have already entered for the zone is prepopulated into the required fields.
#2	If you edit an existing recipe, your changes will affect all zones using that recipe. Be certain that is what you want to do.

6. When you are done selecting the recipe to use or adding a new recipe or editing an existing recipe, press **Save** or **Save New Zone**.

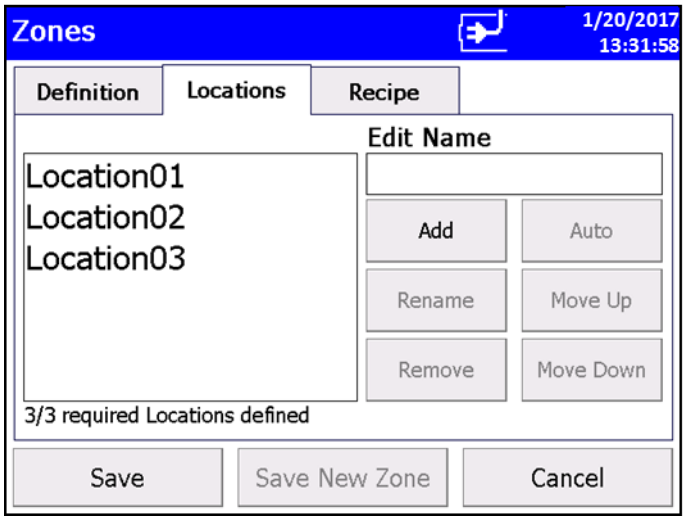
To Edit A Zone

1. To edit an existing zone configuration, press **Edit**. The following screen is displayed.

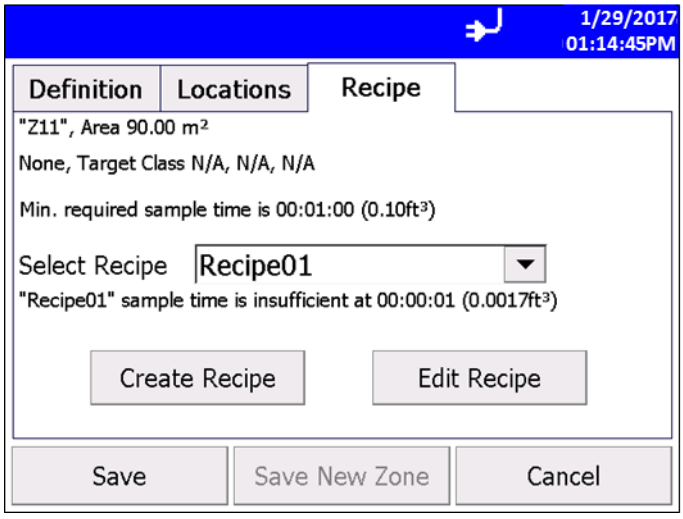


2. The display has three tabs: **Definition**, **Locations**, and **Recipe**. Select the tab for the information you want to edit.
3. The **Definition** Screen for each zone provides the same information as displayed on the main Zone Configuration screen.

4. The **Locations** Screen displays the location within the selected zone. You can add, rename, or remove a location from the zone. You can also move the location name up or down in the list.
5. You can take as many samples as possible (up to 10,000) under a specific location attached to a specific recipe and then be able to select the samples based on date to export data for a selected number of samples.



6. The **Recipe** Screen displays the recipe in use for the selected zone and information relevant to that recipe. You can select a different recipe for the zone or you can create a new recipe or edit an existing recipe. (For information about recipes see the Recipes Setup Screen in Setup Tab section.)



NOTICE

If you edit a recipe, the changes will affect all zones using that recipe. Be certain that is what you want to do.

7. When all the changes have been made, press **Save**.

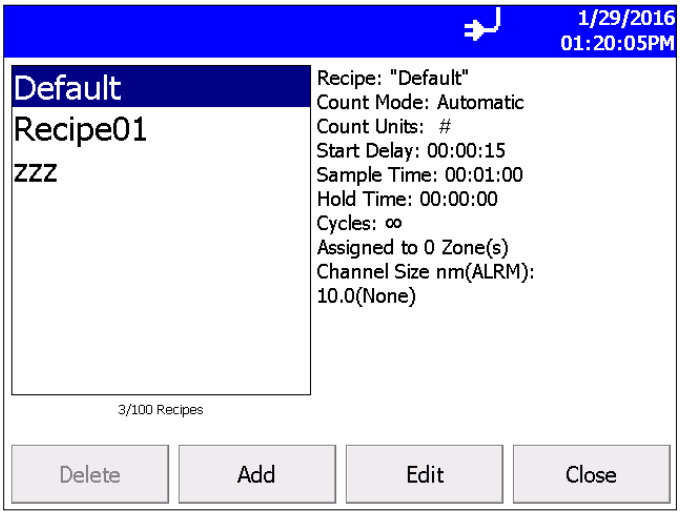
Recipes Setup Screen

Use the Recipes Setup screen to review recipes, add or delete recipes, and edit recipes. The “Default” recipe cannot be deleted. A recipe that has samples cannot be deleted.

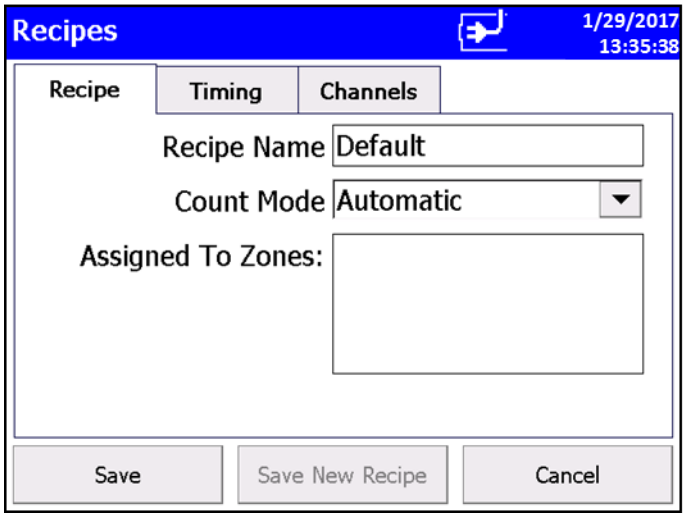
The easiest way to log data once a minute is by using the default recipe with no Zone.

1. Click **Edit** to change the sample time and the duration of the sampling.

NOTICE
The delete button will be grayed out and unavailable if the recipe has samples.



2. Press **Edit** button to display the Recipe Tab.



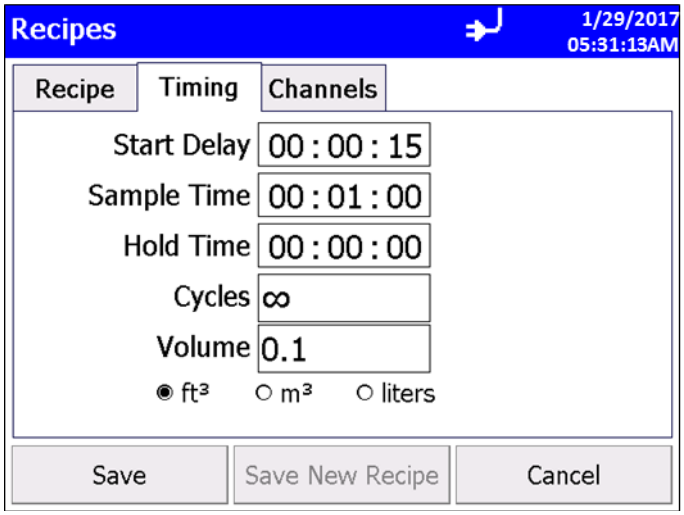
3. On the **Recipe** tab, enter a name or edit the name of the recipe. For a new recipe, a default name will appear, but you can type over it and name the recipe anything you want.

4. Select the **Count Mode**: options are Automatic, Manual, and Beep as described below.

Field	Description
Automatic	If this mode is selected, the particle counter starts counting in automatic mode when the start button is pressed and will collect the number of samples specified by the Cycles setting on the Recipes Timing Screen.
Manual	If this mode is selected, the particle counter starts sampling when the start button is pressed and stops at the end of the sample time, which is configured on the Recipes Timing Screen. If more than one sample is specified in Cycles setting, you must manually tap **Start** button for each of those samples.
Beep	The Beep mode enables the particle counter to operate in a “Geiger Counter” mode. As particles are detected, a beep is emitted. The frequency of beeps configured utilizing the alarm thresholds setting. The alarm threshold determines the beep frequency. The actual number of particulates measured in the preceding 1 second will be divided by the threshold and the corresponding number of beeps emitted. An alarm threshold of 0 will not emit beeps. Settings in the sample timing screen are ignored in beep mode. The maximum number of beeps that can be emitted per second is 50.

5. The **Assigned To Zones** box shows the zones that this recipe is assigned to.

6. Press the **Timing** tab to enter or edit start delay times, sample time, hold time, etc.



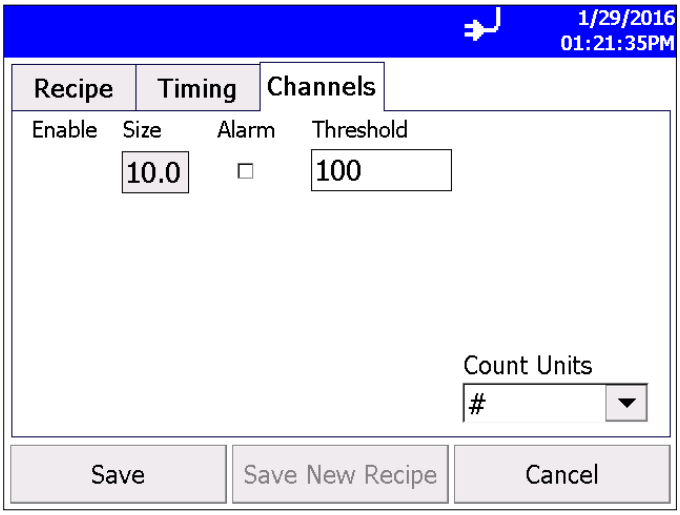
7. To make changes to the timing settings, highlight the component to change (hours, minutes, seconds, etc.) and use the on-screen keypad to change the value.

WARNING

Flow error alarms may not occur if sample time is less than 15 seconds. To ensure proper flow alarm operation, utilize a sample time of 15 seconds or larger.

Field	Description
Start Delay	Start Delay indicates how long it will be before the first sample is taken. **NOTICE** It takes approximately 10 seconds for the pump to reach the flow set point; taking a measurement before the pump is functioning properly may result in a data and flow error.
Sample Time	Sample time indicates how long the instrument will run for each sample.
Hold Time	Hold Time indicates how long the instrument pauses between samples.
Cycles	Cycles is the total number of samples you want collected. In Automatic mode, a cycle value of 0 causes the instrument to count continuously using the settings for Delay, Time, and Hold until the Start/Stop button is pressed again.
Volume	Volume sets the volume of air that will pass through the instrument for each sample. After you enter a volume, you must select Cubic Feet, Cubic Meters or Cubic Liters for measurement.

8. Press the **Channels** tab.



9. The Channels tab can be used to view the particle size, enable / disable alarm for the channel and set the alarm threshold for the channel. The threshold values are expressed in the units selected in the Count Units control. Select the appropriate Count Units #, #/ft^3, or #/m^3.

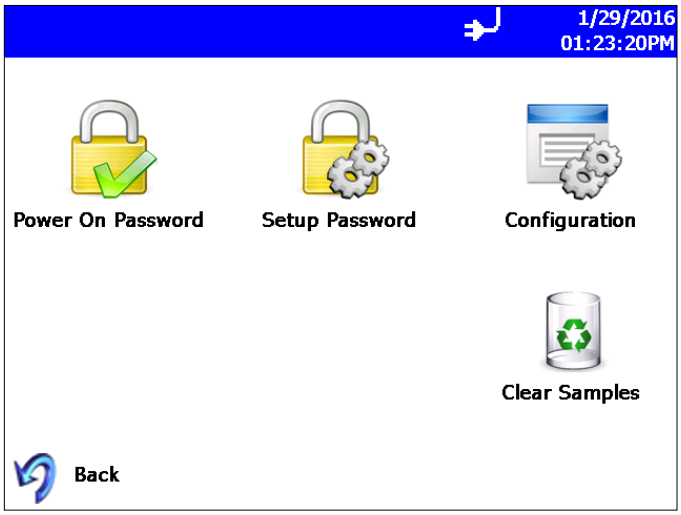
   During sampling, when a channel value exceeds the threshold value set here, the channel data is highlighted in red on the Main screen, an audible alarm sounds, and the alarm icon is displayed.

   To acknowledge the alarm and silence the buzzer, tap the alarm icon .

10. Press **Save** or **Save New Recipe** as appropriate when done.

System Setup Screen

Use the System Setup screen to select (or change) the Power On Password or Setup Password, configure the system, or clear samples.



Change Power On Password Screen

If a Power On password has been previously set, that password must be entered before being allowed to change the Power On password. If a Power On password is set, then on instrument startup a password screen will ask for the password before the instrument can be used. A blank password is regarded as no password and if set as the new password, will not prompt you for a password on system startup.

NOTICE
Keep the password in a safe place. It is difficult to reset the password and requires contacting the factory. If the password has been misplaced, please contact TSI® technical support.

Tap on the screen to display the on-screen keyboard and enter the required information.

Field	Description
Old Password	Enter your existing password (if one has already been set) or leave blank.
New Password	Enter a new password. The password can be any length and use any characters.
Confirm New Password	Retype the new password then press **OK**. A confirmation message appears if the password is changed.

NOTICE

Leave both New Password and Confirm New Password fields blank to turn off password protection. Call TSI® if you have forgotten the password.

Change Setup Password Screen

If a Setup password has been previously set, that password must be entered before being allowed to change the Setup password. If a Setup password is set, clicking on the setup tab at the bottom of the main screen brings up a password screen. That password must be entered in order to change instrument settings.

Tap on the screen to display the on-screen keyboard end enter the required information.

Field	Description
Old Password	Enter existing password (if one has already been set) or leave blank.
New Password	Enter a new password The password can be any length and use any characters.
Confirm New Password	Retype the new password then press **OK**. A confirmation message appears if the password is changed.

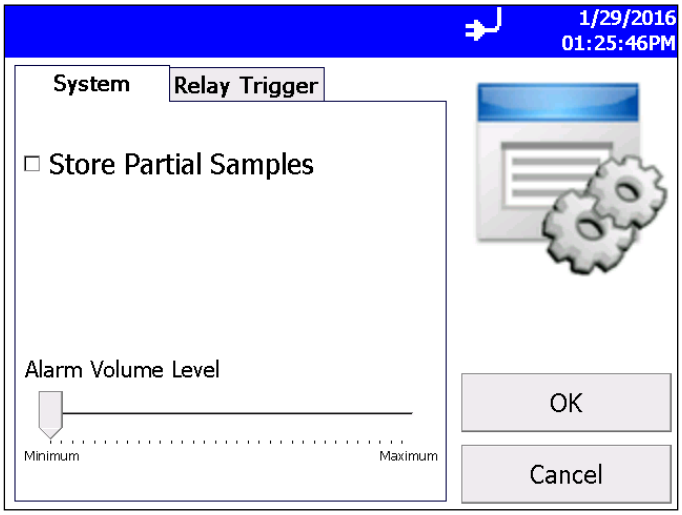
NOTICE

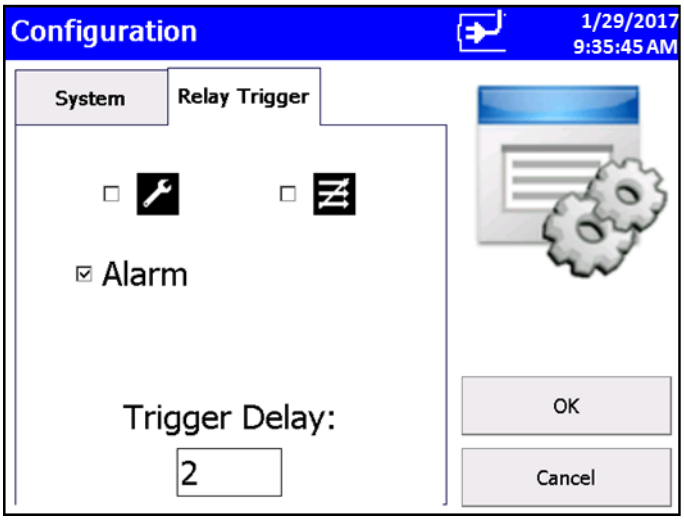
Leave both New Password and Confirm New Password fields blank to turn off password protection.

Call TSI® if you have forgotten the password.

Configuration Screen

Use the Configuration screens to set configuration parameters. Press **OK** when finished.





Field	Description
Store Partial Samples	When selected, stores the partial record in the current database if the instrument is stopped during a sampling period.
Alarm Volume Level	Controls the alarm volume setting.

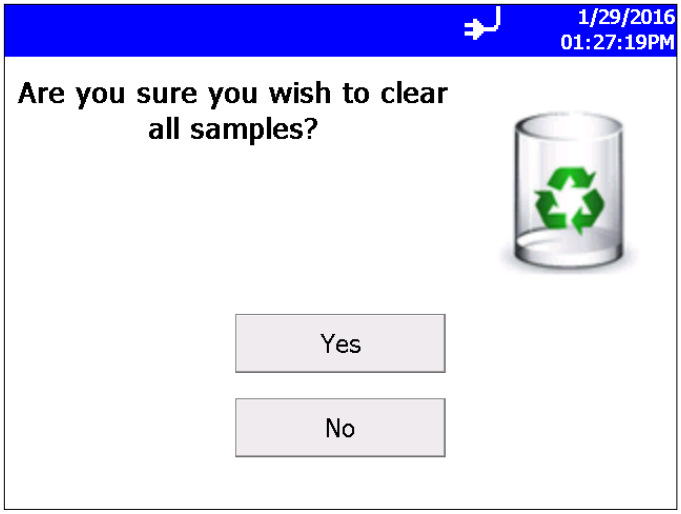
Field	Description
Relay Trigger	Check the box or boxes for the icon or icons upon which the relay trigger will close. ☐  Relay will close on instrument status errors including laser error, algorithm corruption, or select control voltages. ☐  Relay will close on any flow error including sample flow, sheath air flow, or concentrator flow. Either of these errors signifies potentially invalid data. Relay closure can be selected to operate on any or all alarm functions.
Trigger Delay	This is the number of sample cycles that must occur before the relay is activated.

Clear Samples Screen

Use the Clear Samples screen to clear all samples from the internal database. Select **Yes** to clear all samples. Select **No** to return to the System Setup screen.

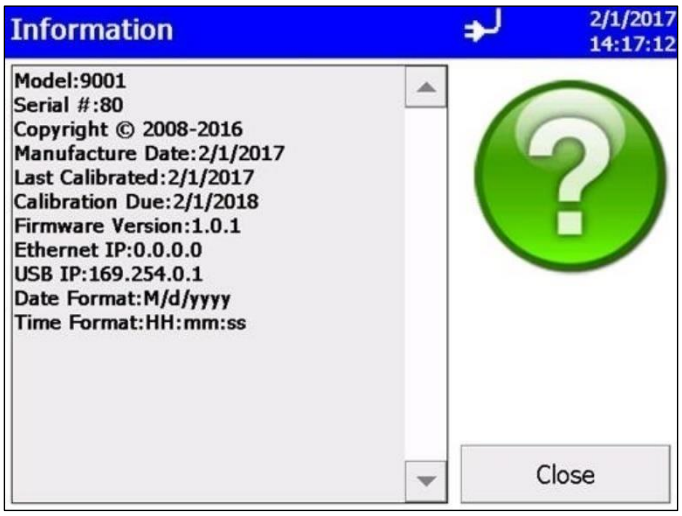
CAUTION

When **yes** is selected on the clear samples screen, all sample records are **deleted** from the instrument. There is no way to recover them once they have been deleted.



Information Screen

Use the Information screen to view the system's model, serial number, copyright, manufacture date, calibration date, next calibration date, firmware version, USB IP address and date and time format. Press **Close** when finished.

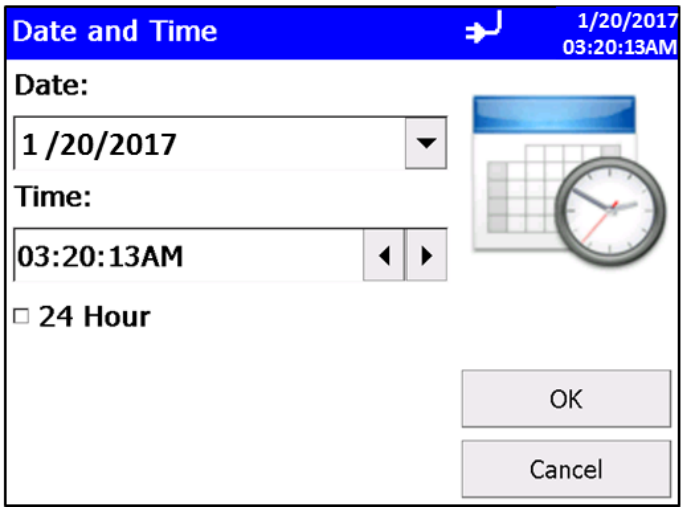


Device Setup Screen

Use the Device Setup screen to access screens to set or change the date and time, adjust touch screen alignment, set up communications, set regional features, and perform maintenance.

Date and Time Screen

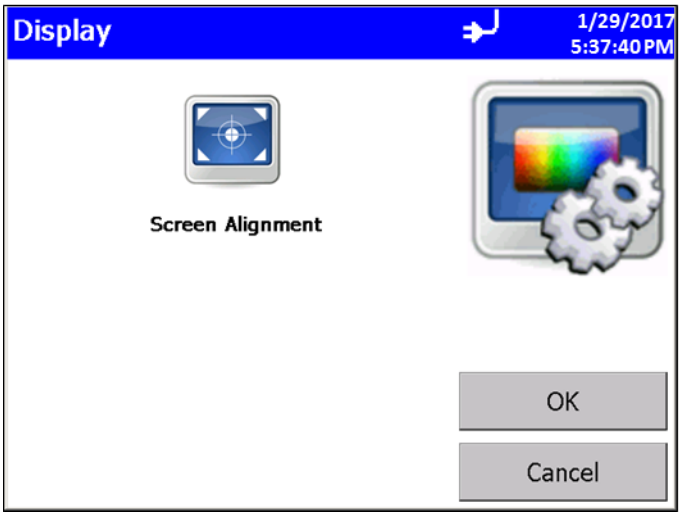
Use the Date and Time screen to set the current date and time and set the date format. Press **OK** when finished. Select options using the arrows or tapping on the screen which brings up the keypad.



Field	Description
Date	Press the down arrow to display a calendar then select the date from the calendar.
Time	Select the time component you want to change (hours; minutes; seconds) and then use the left and right arrows to adjust to the current time.
24 Hour	Click checkbox to display time in 24 hour format.

Display Screen

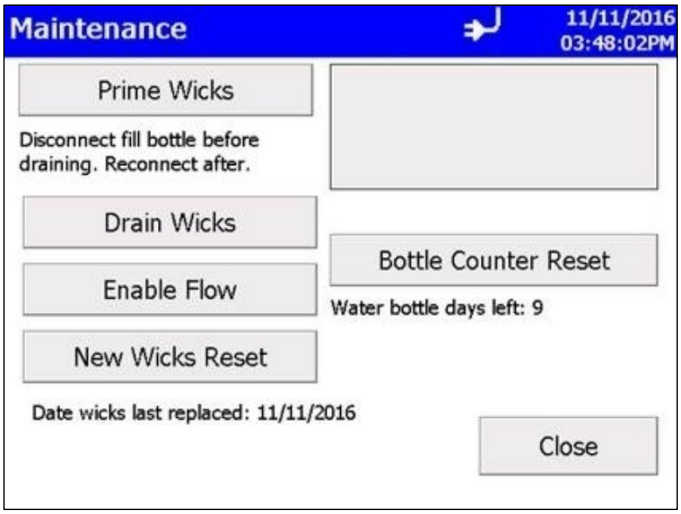
Use the Display screen to adjust touch screen alignment.



Field	Description
Screen Alignment	Press this item to reset the screen alignment. Follow the directions on the alignment screen. **NOTICE** The touchscreen display is aligned at the factory and typically will stay aligned for the life of the instrument. Only perform this alignment if tapping on the onscreen controls of the instrument seems to give poor results.

Maintenance Screen

Use the Maintenance screen to perform maintenance operations.

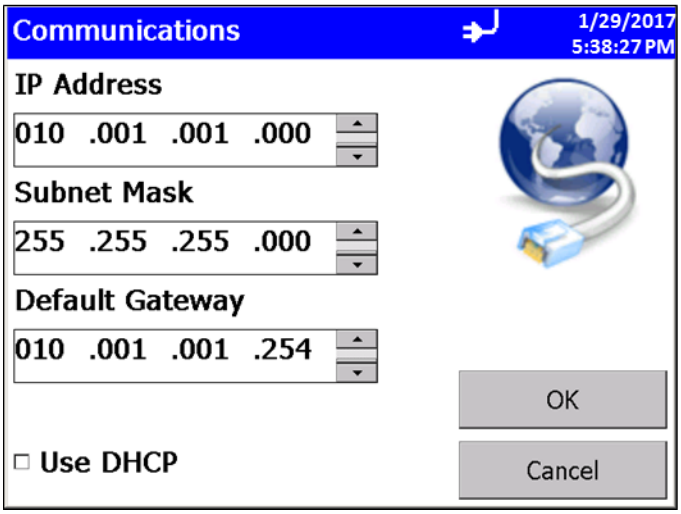


The maintenance screen has a number of useful features.

Field	Description
Prime Wicks	Whenever wicks are replaced or the unit is fully shut off for prolonged periods of time (> 1 day), wicks need to be primed. Click **Prime Wicks** and the instrument will go through a priming cycle that injects water to all three wicks. Make sure the fill and drain bottles are connected to the unit. Unit will go through the prime cycle on its own. **NOTICE:** This is done automatically during normal power-on startup. If wicks fail to prime automatically it can be initiated from this screen as needed.
Drain Wicks	The instrument needs to be drained before transporting it to a different location. Make sure the drain bottle is connected and the fill bottle is disconnected. Note that if the fill bottle is connected, a “wicks not drained” message will appear. Unit will go through the drain cycle on its own. Prior to shipping the unit it is best practice to drain the wicks two times..
Enable Flow	Turns the purge flow pump off. Enable flow will turn **off** the purge flow to allow sample flow verification.
New Wicks Reset	**For use during annual maintenance when wicks are replaced.**
Bottle Counter Reset	If you refill the bottle with distilled or ultrapure water, click **Bottle Counter Reset**. This allows the instrument to keep track of the amount of water used and notify you if the fill bottle is getting empty.

Communications Screen

Use the Communications screen to configure the IP address, subnet, and default gateway to which the instrument belongs. Addresses can be entered using the arrows or by selecting a field and using the on-screen keypad.



Field	Description
IP Address	The numerical identification (logical address) that is assigned to this device when participating in a computer network utilizing the Internet Protocol for communication between its nodes.
Subnet Mask	A network of computers and devices that have a common, designated IP address routing prefix. All hosts within a subnet can be reached in one “hop” (time to live = 1), implying that all hosts in a subnet are connected to the same link.
Default Gateway	A node on the computer network that serves as an access point to another network and is chosen when the IP address does not belong to any other entities in the Routing Table.
Use DHCP (Dynamic Host Configuration Protocol)	When checked, this protocol is used to automatically obtain the information necessary for operation from a DHCP server running on your local network.

NOTICE

TCP/IP is an industry standard networking protocol that allows computers and devices to communicate over Ethernet and other media access channels. Providing full details on how to configure an IP network is beyond the scope of this manual. Please contact your company IT department or a qualified networking professional if you are not qualified to configure such a network.

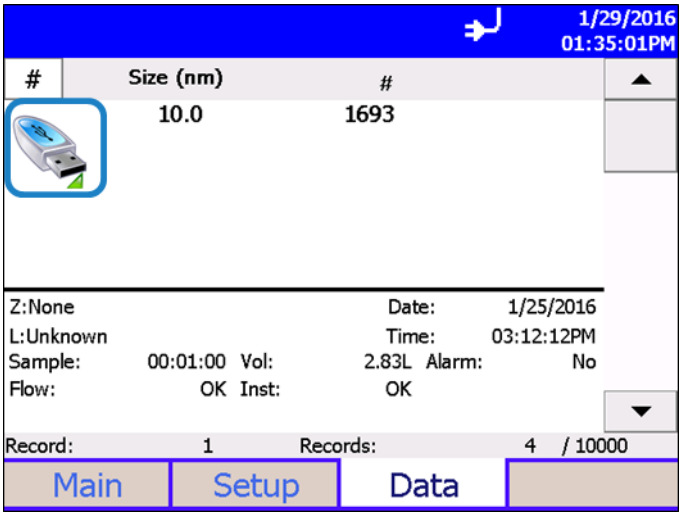
Regional Screen

Use the Regional screen to set the language in which the on-screen dialog is displayed and your regional format for numbers.

Field	Description
Language	Select the language in which you want on-screen dialog displayed; options are German, English, Spanish, French, Italian, Chinese (simplified), and Japanese.
Formats	Select the format that is commonly used to display real numbers and the date and time in your region.

Data Tab

To download data, insert a USB thumb drive and then click the  icon as shown below.



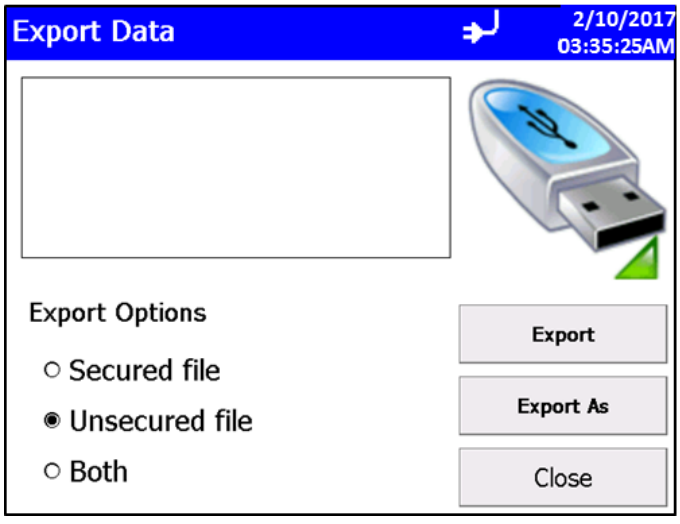
Field	Description
#	Number
Size	Channel size. This is always 10.0.
	Export the data to a flash drive. See Export Data Screen below.
Zone (Z)	Zone where the data was collected.
Location (L)	Location where the data was collected.
Sample	Duration of the sampling period.
Date	Date on which the data was collected.
Time	Time at which data was collected.
Alarm	Alarm threshold was triggered (**Yes**) or not (**No**).
Inst	Status of the instrument. **OK** if no issues; error indication if instrument has a possible issue.
Vol	Volume of air that was sampled.
Record	This record number.
Records	Total number of records.

Export Data Screen

Use the Export Data screen to export sample data to a flash drive. Select the name of the file and range of data to export. Data is downloaded into an XML file that can be opened with commonly used spreadsheet programs.

To Export Data

1. Click the USB drive icon on the Data tab. The Export Data screen (shown below) appears.

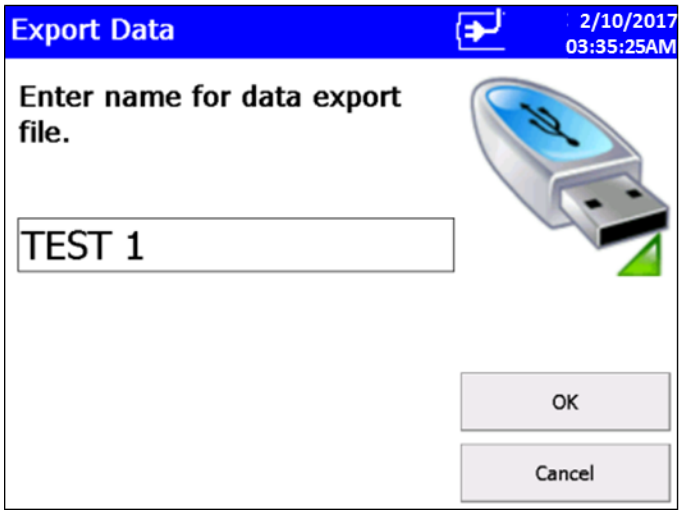


Field	Description
Secured file	This file is intended to be used with TrakPro™ Lite Secure software and maintains CFR 21 Part 11 compliance. The file has the extension ***file name*_sec.xml**.
Unsecured file	This file is intended for you to input into Excel® spreadsheet program for graphing and data manipulation purposes and has the extension ***file name*.xml**.
Both	If using both file types, both file formats can be exported. Please note that the data export time is longer when both file formats are exported.
Export	Select this button to overwrite an existing file.
Export As…	Select this button to enter a file name.

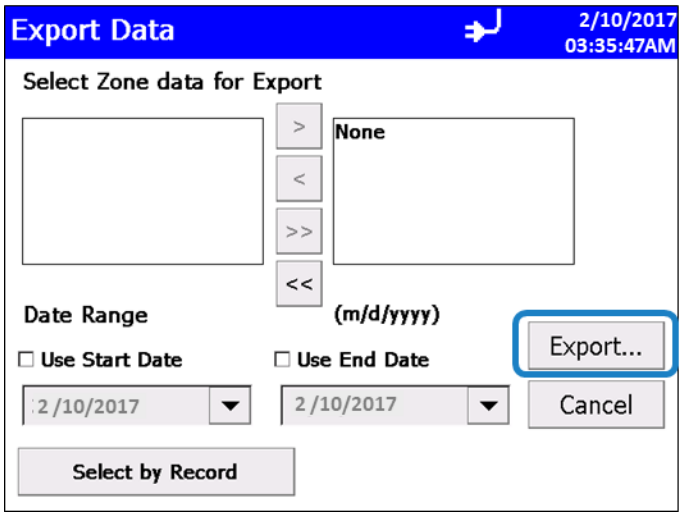
CAUTION

DO NOT modify the secure file. If the "_SEC" secure file is modified, TrakPro™ Lite Secure software will not be able to open the file.

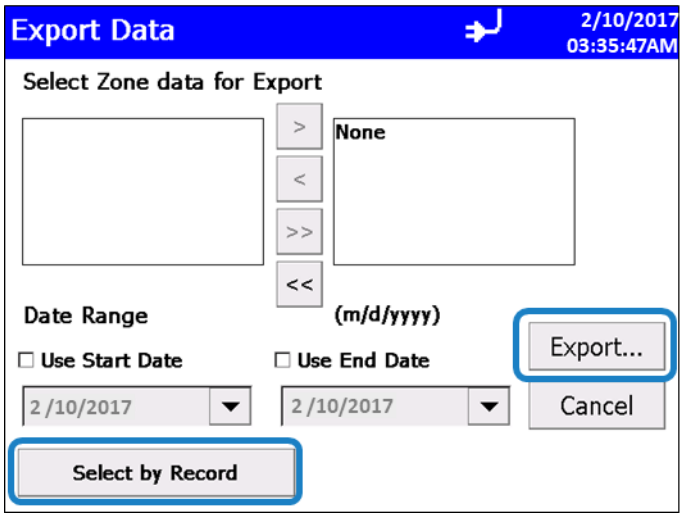
2. Enter a filename then select **OK.**



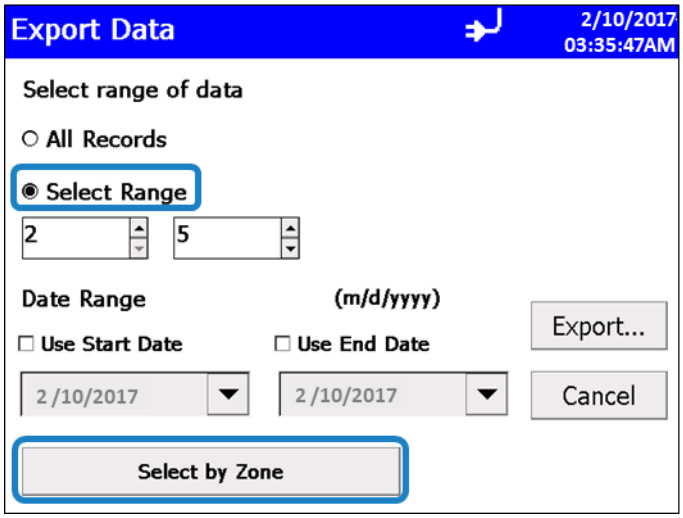
3. You now have the option to download select data sorted by date or record number as shown below. Make the choices for the data range and click **Export**.



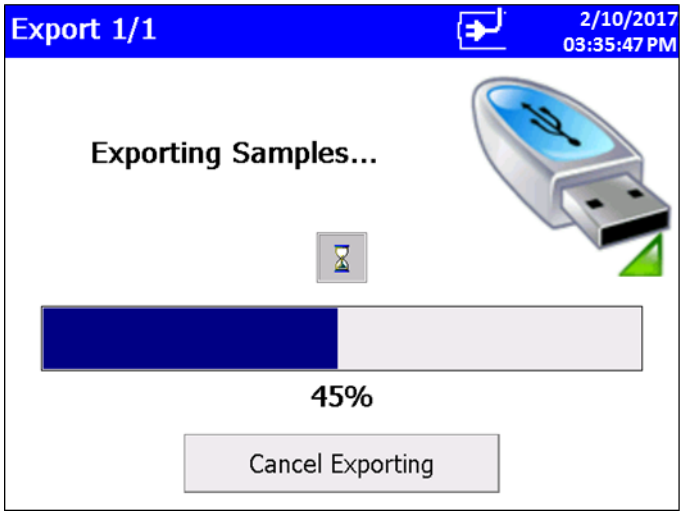
4. This form allows you to select data for export by zone. Move a desired zone to the box on the right to select it. To select data by sample index range instead, tap the **Select by Record** button at the bottom.



5. This form allows you to select data for export by range of sample Index. Tap **Select Range** radio button and then select the lower and upper sample index numbers. To select data for export by zone instead, tap the **Select by Zone** button at the bottom.

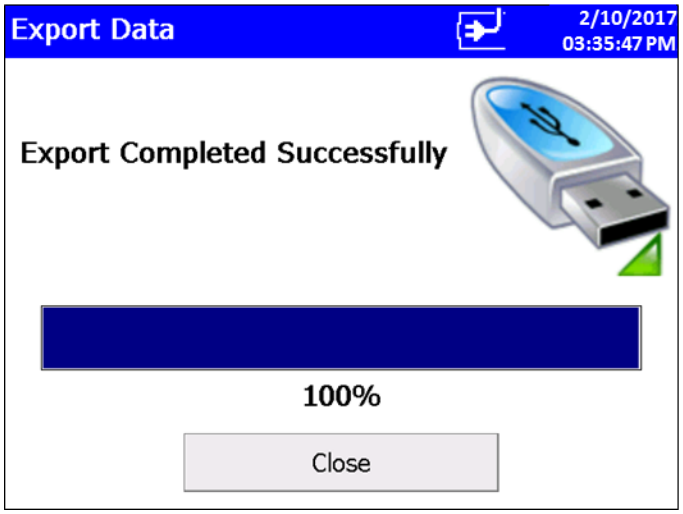


6. Data will be saved to the USB thumb drive as shown below. A status screen allows viewing the progress of the export.



CAUTION

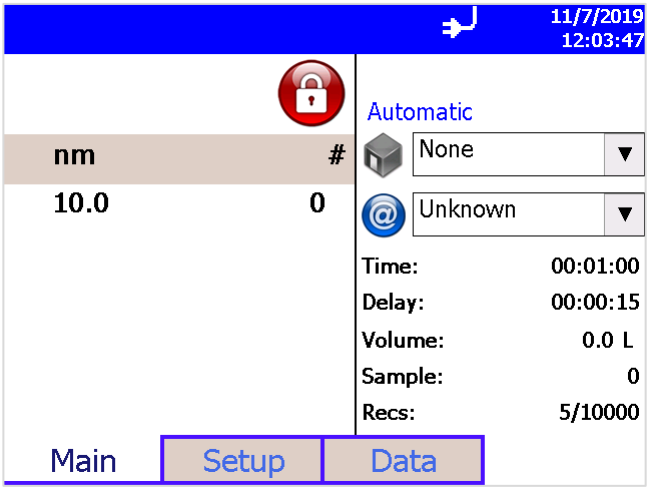
DO NOT remove the external drive during the export process. If the thumb drive is removed, re-insert and restart the download process. Data stored on the instrument is not lost during the transfer.

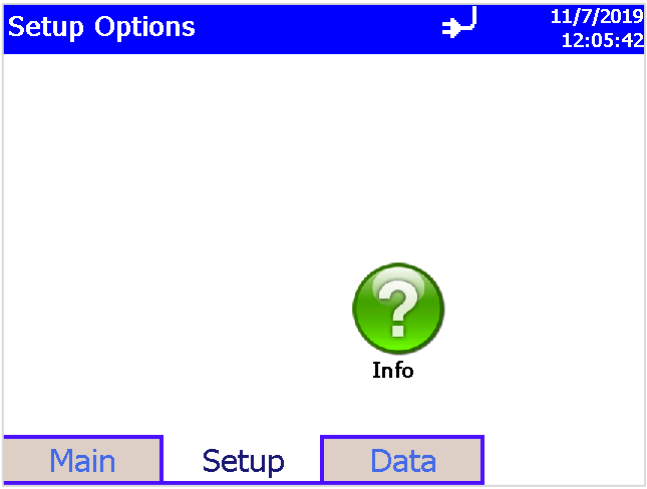


Data Integrity Mode

Data Integrity Mode allows the unit to be locked down to ensure the sampling data cannot be modified. When in this mode, all printing and data exporting is prohibited.

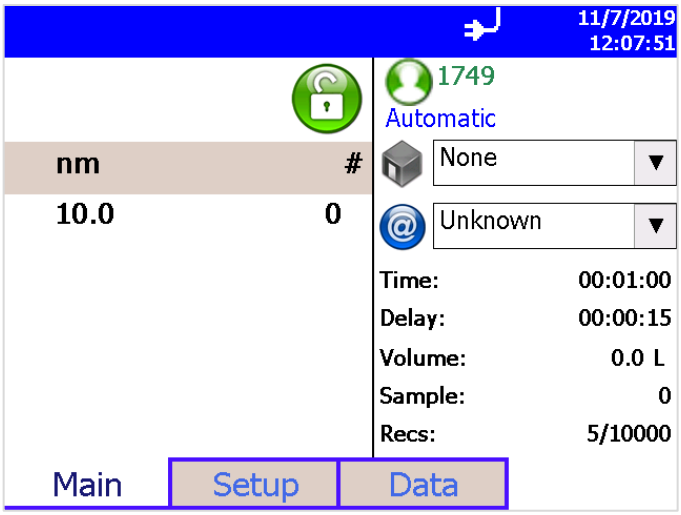
Data Integrity Mode is designed to be used in conjunction with TrakPro™ Lite Secure software. When enabling data integrity mode on the instrument, only the data can be viewed.





The lock icon  on the main page indicates the unit is in data integrity mode, but no user is logged in.

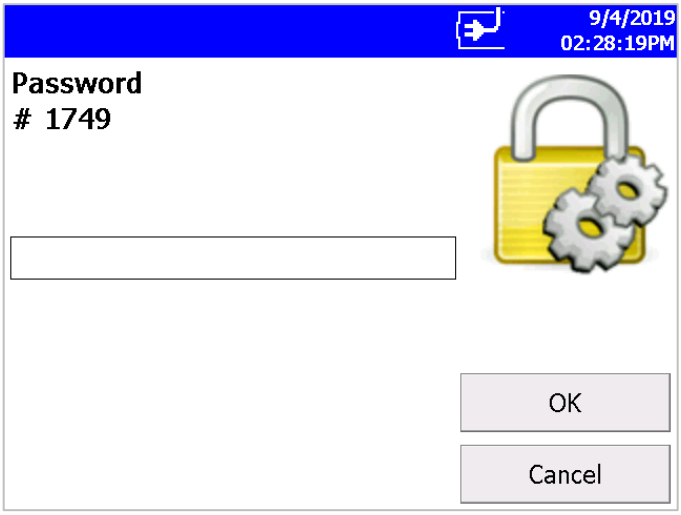
To allow sampling, the unit will need to be unlocked using TrakPro™ Lite Secure software. During this process TrakPro™ Lite Secure software will place the user ID # and password into the instrument to allow you to take samples.



The unlock icon on the main page indicates the instrument is in data integrity mode and unlocked. The user icon 1749 indicates which user has the instrument unlocked in data integrity mode.

Now that the instrument is unlocked for sampling, a zone and location can be selected. When this selection is first initiated the instrument will prompt for a password.

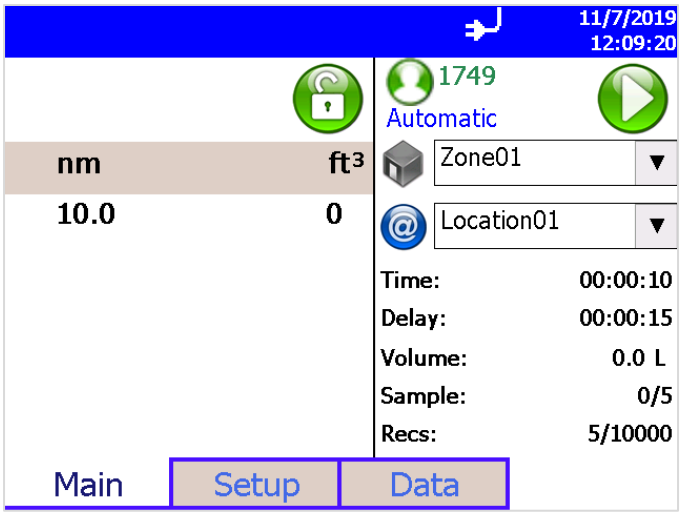
NOTICE
The password is the same password used when you logged into TrakPro™ Lite Secure software.



If an incorrect password is entered, you will not be able to start a sample.

A password needs to be entered when the unit first starts, or when the first sample is taken after disconnecting from TrakPro™ Lite Secure software; or after a timeout that was programmed from TrakPro™ Lite Secure software. The timeout is the time after a sample is complete until a new sample begins.

After a zone and location has been selected and password entered, the green start sample icon will appear and sample(s) can be taken.



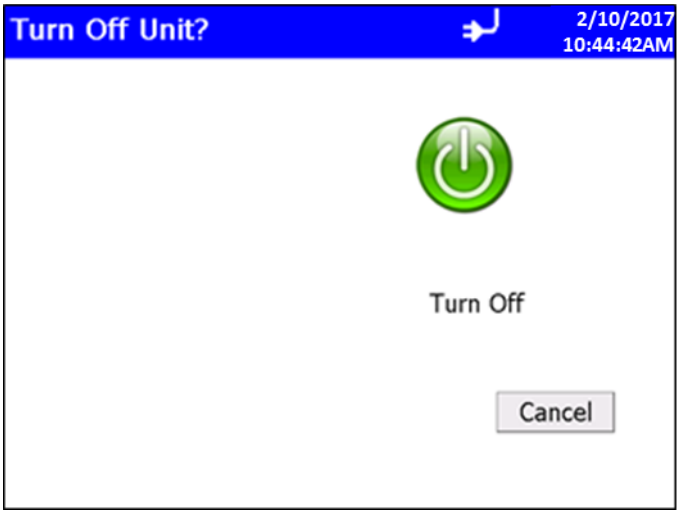
After a sample is complete, the instrument defaults to no zone and no location; the start sample icon will no longer be available. A zone and location will need to be selected to enable the start sample icon.

NOTICE

In rare events, a new sample will be started that requires the instrument to overwrite existing sample data. The screen, shown at right, will display and the instrument will not start the sample.

Powering the Unit Down

To turn off the instrument, press the power switch and the following screen will appear.



The unit can be powered down by pressing the **Turn Off** button. You **DO NOT** need to have the fill and drain bottles connected to the unit after it is completely powered down.

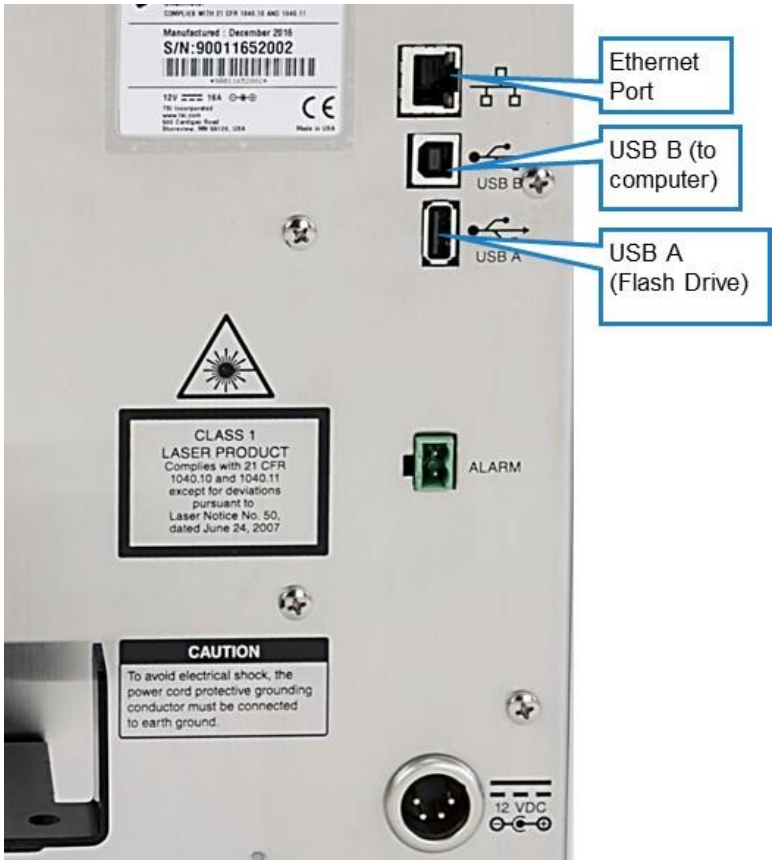
The unit should always be drained of all water prior to shipping or tipping it.

CHAPTER 4

Data Handling

There are three basic ways to get data from the AeroTrak™ Cleanroom Condensation Particle Counter.

1. Data download to a USB Flash Drive.
2. USB port connection to a computer using TrakPro™ Lite Secure software.
3. Ethernet connection to a TSI® FMS Server.



USB Data Download

The AeroTrak™ Cleanroom Condensation Particle Counter is equipped with a USB A host drive that will allow for the downloading of stored data to a USB flash drive (also commonly called a USB thumb drive).

To download data, attach a flash drive to the **USB A** host port and follow the instructions in the operation section of this manual. The data is downloaded in XML format that can be opened in Microsoft® Excel® version 2003 or greater. The data files can also be opened in the latest versions of OpenOffice™.

USB Computer Communication

The AeroTrak™ Cleanroom Condensation Particle Counter is equipped with a USB compatible to USB B cable for connection to a personal computer. The cable plugs into the back of the instrument. Data from the particle counter can be downloaded to a PC, through TrakPro™ Lite Secure software, and recipes can be uploaded to the particle counter using the TrakPro™ Lite Secure software.

Installing Software

1. The TrakPro™ Lite Secure Data Transfer utility and user manuals are available on TSI's website: https://tsi.com/support/tsi-software-and-firmware/.
2. To install the communications software and drivers, follow the on-screen instructions.
3. See the *TrakPro™ Lite Secure (version 3.0 or later) Software User's Guide (*P/N 6004404) for installation instructions.

NOTICE
Make sure the particle counter is connected before you run the software.

Ethernet Communications

An Ethernet port is provided for use with TSI® Facility Monitoring Software (FMS). Refer to the FMS Software documentation and the TSI® service and installation manual for detailed configuration and operation information on Modbus® TCP over Ethernet.

CHAPTER 5

Maintenance

The chapter contains maintenance and troubleshooting solutions for the Model 9001 AeroTrak™ Cleanroom Condensation Particle Counter.

NOTICE

There are no user-serviceable parts inside this instrument. Opening the instrument case may void the warranty. TSI® recommends that the AeroTrak™ Cleanroom Condensation Particle Counter be returned to the factory for any required maintenance or service not described in this manual. Cleaning can be done without removing the instrument case.

Maintenance Schedule

TSI® recommends annual factory cleaning and calibration for the AeroTrak™ Cleanroom Condensation Particle Counter. See Chapter 7, "Contacting Customer Service" for service/calibration.

Recommended Field Maintenance Schedule

Item	Frequency
Zero check	Daily or according to application
Factory cleaning and calibration	Annually
Cleaning the instrument enclosure	As needed
Wick Replacement	Annually as part of TSI® maintenance. Contact TSI® if a wick issue is suspected

Zero Check

The zero check ensures that the instrument is properly assembled and free from leaks, residual particles, and electronic noise.

To perform a Zero Check, attach the supplied HEPA filter to the sample inlet and run the unit for 15 to 20 minutes and watch the display for zero counts. If the instrument does not record any counts within that time period, the instrument passes the Zero Check and is okay to use.

Extended Storage

If the instrument is to be turned off for more than two (2) weeks, drain the wicks by going to the maintenance screen and selecting **Drain Wicks**. It is a good practice to perform the procedure two (2) times before shipping or storage.

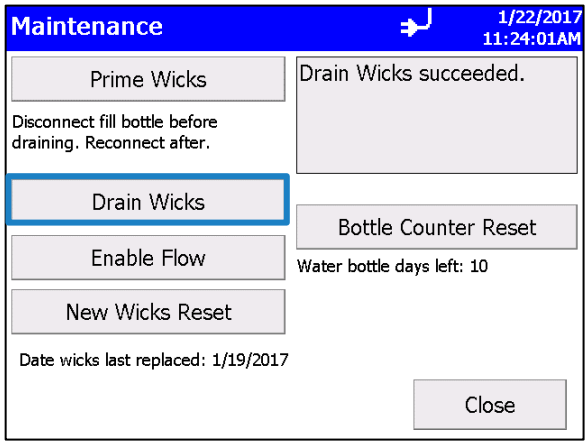
Cleaning the Instrument Enclosure

To clean the enclosure, dampen a lint-free cloth and gently wipe the surface until surface contamination is removed.

Wick Replacement

Wicks (700171) and a wick removal tool (700183) are needed. The part number for wicks is a quantity of 12 wicks. Three (3) individual wicks are needed for a wick change.

1. Drain water from the instrument through the "**Maintenance**" screen using the "Drain Wicks" function. Drain wicks two (2) times.
2. Disconnect Only the "**Fill Bottle**" before pressing "**Drain Wicks**" button.

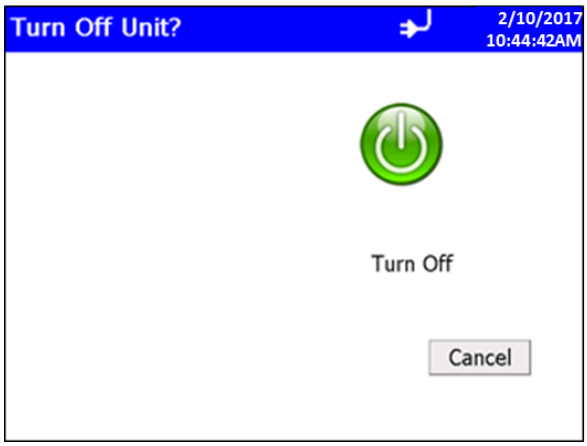


NOTICE

Instrument should always be drained of water prior to changing out "**Wicks**".

3. Remove all both Fill and Drain Bottle from the unit.

4. Power down the instrument, press the “**Power**” button on the front panel.



5. Place CPC on its side to access the bottom of the instrument.
6. Locate the wick block and remove the three (3) screws.

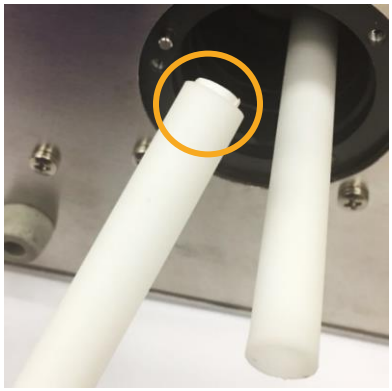
7. Attach the wick removal tool to the wick block.

8. Firmly and slowly pull “wick block” out from unit.

9. Remove all three (3) wicks from the wick block.

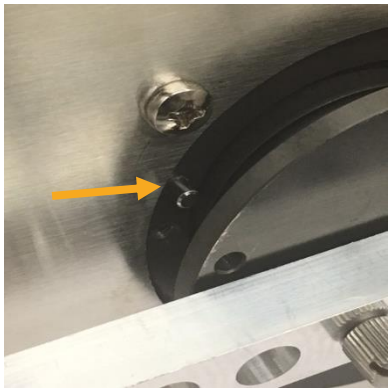
10. Install all three (3) wicks.

NOTICE
Wicks are installed with the elevated material end sticking out, going into the unit.



11. Carefully, place the bottom of the wicks onto the wick block.

12. Align wick block with the alignment pin as shown in the picture.



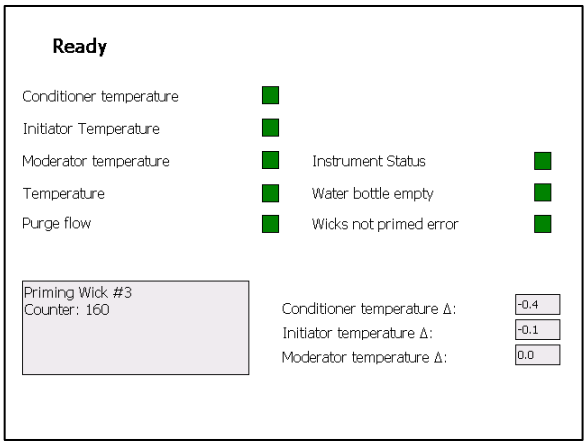
13. Push wick block completely in.
14. Tighten three (3) screws into the wick block.

NOTICE
DO NOT over tighten the screws.

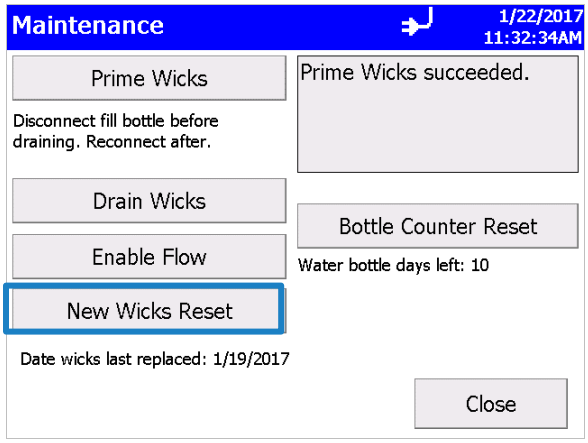
15. Turn system right side up.

16. Connect Fill and Drain Bottles to the unit.
17. Turn on instrument.

18. Allow the instrument to fully go through it's warm up.



19. Go to **Setup** => **Device** => **Maintenance**.
20. Press "**New Wicks Reset**."
    - This will reset the wick counter.



NOTICE
Instrument will alarm six (6) months from last replaced date.

21. AeroTrak™ 9001 Cleanroom CPC is ready for use.

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CHAPTER 6

Troubleshooting

Symptom	Possible Cause	Corrective Action
Counts are too low	Instrument is being operated outside temperature or relative humidity specifications.	Operate instrument within specifications.
	Internal parts have been damaged because instrument was stored at a temperature greater than 158°F (70°C).	Return to factory or factory authorized service centers for service.
	Instrument has contamination on the optics due to condensation or excessive loading.	Return to factory or factory authorized service centers for service.
	Laser or pump control is damaged.	Return to factory or factory authorized service centers for service.
	Unit is due for calibration.	Return to factory or factory authorized service centers for service.
	Bad wicks	Replace wicks. Wicks may be replaced by an authorized distributor or end user.
Instrument does not turn on	 The on/off button is not being pressed properly.	Press and hold the on/off button for one second.
	Power cord is not plugged into unit.	Connect power cord.
Instrument does not meet zero count specification (<1 particle/5 mins)	Instrument inlet is contaminated with particles	
	HEPA zero filter is not connected properly and room air is leaking into the HEPA zero filter assembly.	Check that the HEPA zero filter has been tightly connected to the inlet. Check that rubber O-ring (black) on the inlet is in place.
	Residual particles from previous samples are shedding off internal parts and into the optics.	Purge instrument by running the sampling pump for 15 to 30 minutes with the zero filter in place before attempting zero count test. Longer purge times may be required depending on amount of particle contamination in the instrument.
	An internal component has been damaged due to operation outside of temperature specifications or one or more excessive bumps or jolts, and electronic noise is inducing false counts.	Return to factory or factory authorized service centers for service.
	A leak has developed in the aerosol flow path.	Return to factory or factory authorized service centers for service.
	Internal optics have become dirty.	Return to factory or factory authorized service centers for service.

Symptom	Possible Cause	Corrective Action
Instrument does not meet zero count specification (<1 particle/5 mins) *(cont.)*	Bad wicks	Replace wicks. Wicks may be replaced by an authorized distributor or end user.
FLOW ERROR 	Instrument was unable to control flow rate [i.e., if sample tubing used is too long	Restart measurement.
	Pressure drop across inlet may be too large.	Lower pressure drop across inlet by using larger diameter tubing, less tubing, and/or adding a bleed valve.
	Inlet tubing kinked.	Straighten tubing.
	Inlet not at ambient pressure.	**DO NOT** subject the unit to other than ambient pressure conditions.
LASER POWER / DETECTOR WARNING 	Excessive direct light is entering the aerosol inlet.	Remove instrument from direct light.
	Optical path blocked.	Return to factory for service.
	Nozzle is misaligned. Fiber attached on the nozzle tip.	Contact TSI® and return to factory.
	Detector board damaged. Laser power is normal.	Return to factory or factory authorized service centers for service.
Purge Flow Alarm	The purge air flow is not within programmed range of 0.5 L/min ±0.2 L/min.	Ensure latest firmware is installed. If problem persists, contact TSI® for service.
Water State Error, Dry Wicks, Wicks Not Primed errors	Wicks have not primed or have dried.	Restart unit. Manually initiate wick priming using maintenance screen. Possible stuck water pump – contact TSI® for a wick priming kit and instructions. Replace wicks.
Drain issue	Drain pump stuck or malfunctioning.	Attempt to unstick pump by using pump priming accessory as a suction assist during Prime/Drain Wicks operations (see instructions contained with pump priming accessory and/or contact TSI® for technical advice). Replace drain pump (TSI Authorized Service Representative only).
	Drain water sensor dirty or malfunctioning.	Remove and clean sensor (TSI Authorized Service Representative only). Replace sensor (TSI Authorized Service Representative only).
Wicks due for replacement message	Automatic timer set for six (6) months	Replace wicks if desired. If unit is working fine, reset wick timer. Wicks should be replaced annually as part of factory service.

CHAPTER 7

Contacting Customer Service

This chapter gives directions for contacting people at TSI® Incorporated for technical information and directions for returning the AeroTrak™ Cleanroom Condensation Particle Counter for service.

Technical Contacts

- If you have any difficulty setting up or operating the AeroTrak™ Cleanroom Condensation Particle Counter, or if you have technical or application questions about this system, contact an applications engineer at TSI Incorporated, 1-800-680-1220 (USA) or (651) 490-2860 or e-mail technical.services@tsi.com.
- If the AeroTrak™ Cleanroom Condensation Particle Counter, does not operate properly, or if you are returning the instrument for service, visit our website at tsi.com/service, or contact TSI Customer Service at 1-800-680-1220 (USA) or (651) 490-2860.

International Contacts

Service

TSI Instruments Singapore Pte Ltd
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Singapore 368324

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Fax: +65 6595-6399
E-mail: tsi-singapore@tsi.com

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TSI France Inc.
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BP 100
Technopôle de Château-Gombert
13382 Marseille cedex 13
FRANCE

Telephone: +33 (0)1 41 19 21 99
E-mail: tsifrance@tsi.com

Returning for Service

Visit our website at tsi.com/service and complete the on-line “Service Request” form or call TSI® at 1-800-680-1220 (USA), (651) 490-2860, or 001 651 490-2860 (International) for specific return instructions.

Customer Service will need the following information:

- The instrument model number
- The instrument serial number
- A purchase order number (unless under warranty)
- A billing address
- A shipping address

Use the original packing material to return the instrument to TSI®. If you no longer have the original packing material, seal off any ports to prevent debris from entering the instrument and ensure that the display and the connectors on the instrument front and back panels are protected. This instrument is very sensitive and must be packed in a manner appropriate for a precision instrument.

Prior to shipping or any activity that involves tipping the unit, be sure to drain the wicks [two (2) times] from the Maintenance screen.

Return the water bottles with the unit when returning for service.

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APPENDIX A

Specifications

All specifications meet or exceed ISO 21501-4 and JIS B9921 and are subject to change without notice.

Specification	Description
Size Range	Min. Detectable Particle (D_{50}) 10 nm Max. Detectable Particle >3 µm
Particle Channel Sizes	Single channel
Counting Efficiency	50% at 10 nm
Concentration Limits	57,000,000 p/Cu. Ft @ 10% coincidence
Working Fluid	Ultra-Pure or De-Ionized Water
Light Source	Long-life laser diode
Zero Count	<0.07 count/Cu. Ft
Flow Rate	0.1 CFM (2.83 L/min)
Flow Control	Electronic automatic closed loop (patented flow control technology)
Calibration Frequency	Recommended minimum of once per year
Sample Tube Extension	Isokinetic sampling probe not needed. Tubing up to 3 ft (1 m) for 10 nm particles
Sampling Modes	Manual, automatic, beep, count, or concentration
Sampling Time	1 second to 99 hours
Sampling Frequency	1 to 9999 cycles or continuous
Sample Output/Exhaust	Internal HEPA filter
Vacuum Source	Internal pump with patented* flow control technology
Communication Mode	Modbus® TCP over Ethernet (TCP/IP) or USB NDIS
Data Storage	250 zones
	999 locations
	10,000 sample records including date, time, particle concentration, flow status and instrument status
Data Security	2-level password protection to lock out usage and configuration
Data Transfer	Via USB storage device, connection to TrakPro™ Lite Secure Software through Ethernet or USB cable, or optional TSI® FMS Software

*Patent Number 6,167,107

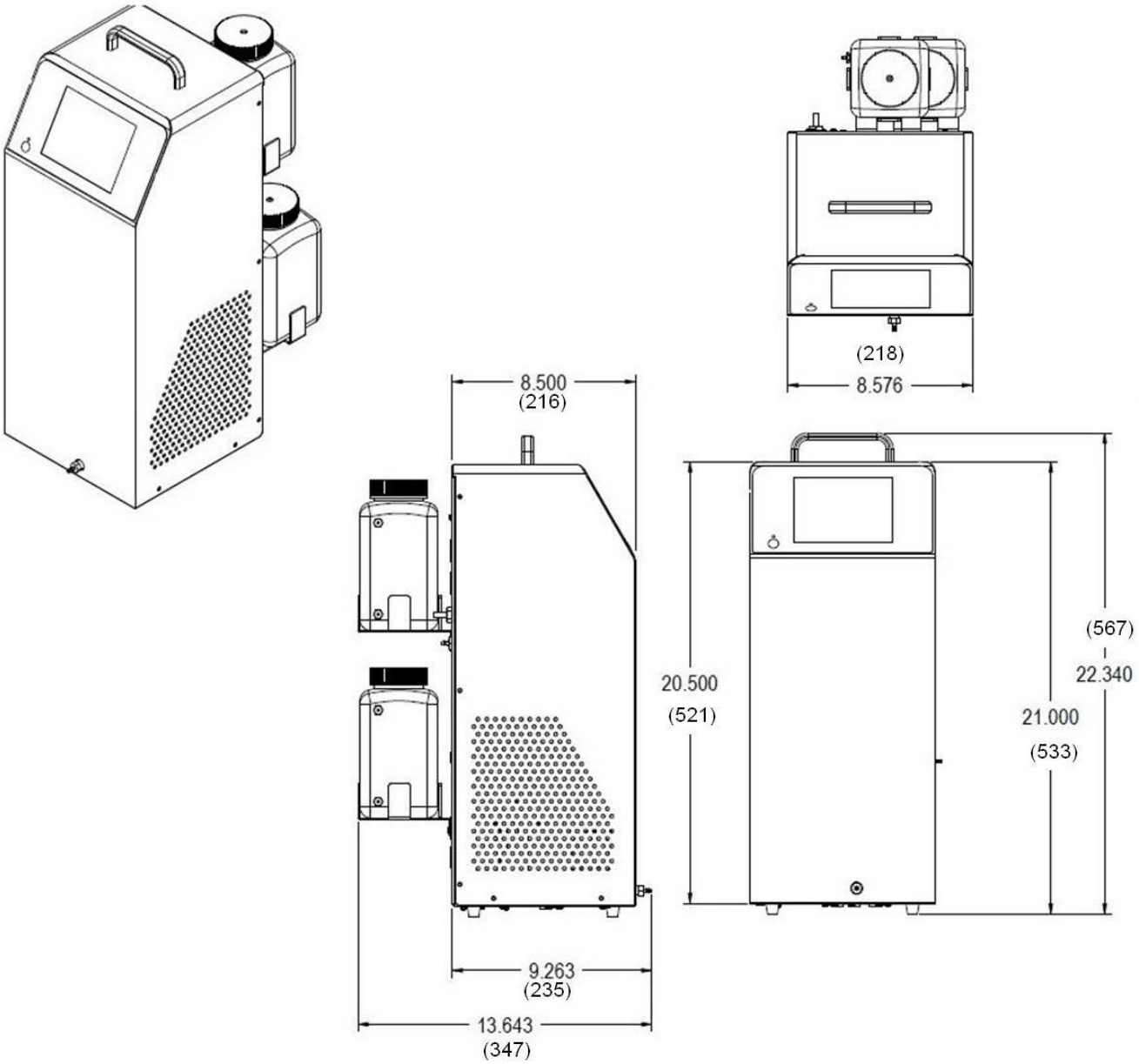
Specification	Description
Alarm/Status.....	Audible alarm on counts. Audible alarm is not associated with sensor status indicators. Only the visual alarm is associated with counts and sensor status indicators. Audible alarm built in; 85 dBA at 1 meter (adjustable)
Status Indicators.....	Flow, laser and temperatures
Alarm Output.....	Dry contacts, closed when alarm is engaged
Alarm Limits.....	Programmable
Alarm	This connector provides two pins for a contact closure to control an external alarm. The contact closure is normally open and rated for 0 to 60 V AC/DC at 1.5 A peak, 0.5 A continuous. The “alarm out” is rated for 60 V insulation. The contact is closed under alarm conditions determined by the programming of the device.
Display	VGA 5.7-inch (14.5 cm) touch screen display
Languages.....	English, German, French, Spanish, Japanese, Chinese (simplified), Italian
Software.....	Compatible with TrakPro™ Lite Secure and FMS 5 Software
Unit ID	Configurable IP address
External Surface.....	304 Stainless Steel
AC Power (power to AC adapter)....	100 to 240 VAC universal power supply
DC Power (power to instrument)	12 VDC @ 16.0 A
Dimensions (H x W x D)	22.4 in. x 9.3 in. x 8.6 in. (56.9 cm x 24.6 cm x 21.8 cm) (without water bottle)
Standards	CE, JIS B 9921, ISO 21501-4 as listed above
Weight.....	28.5 lbs. (13.0 kg)
	WARNING / HEAVY OBJECT
	To avoid muscle strain or back injury, use proper lifting techniques when removing or replacing.
Warranty	One year
Operating Range.....	59° to 86°F (15° to 30°C)
Humidity Range.....	0 to 90% RH, non-condensing
Storage Range.....	-40° to 158°F (-40 to 70°C)
Included Accessories ..	Quick Start Guide, manual available on tsi.com, power supply, alarm connector, purge filter, 2 inlets (barbed inlet and a 3/16” OD straight tube connector inlet), water bottles, bracket for water bottles, and USB cable
Optional Accessories ..	Sample tubing
Patents.....	Visit tsi.com/patents

Compliance

CE Marking	EN61326-1: 2013 EN6110-1:2010
RoHS Marking	Yes
Laser Safety	Complies with 21 CFR 1040.10 and 1040.11 and IEC 60825-1:2014

Dimensional Diagram

Dimensions are given in inches (mm in parenthesis).



Knowledge Beyond Measure.

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