FLUKE®

985

Airborne Particle Counter

Users Manual

BC
03/2012 Rev. 1, 08/2025 (English)

LIMITED WARRANTY AND LIMITATION OF LIABILITY

Each Fluke product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is 1 year and begins on the date of shipment. Parts, product repairs, and services are warranted for 90 days. This warranty extends only to the original buyer or end-user customer of a Fluke authorized reseller, and does not apply to fuses, disposable batteries, or to any product which, in Fluke's opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions of operation or handling. Fluke warrants that software will operate substantially in accordance with its functional specifications for 90 days and that it has been properly recorded on non-defective media. Fluke does not warrant that software will be error free or operate without interruption.

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Fluke's warranty obligation is limited, at Fluke's option, to refund of the purchase price, free of charge repair, or replacement of a defective product which is returned to a Fluke authorized service center within the warranty period.

To obtain warranty service, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that service center, with a description of the difficulty, postage and insurance prepaid (FOB Destination). Fluke assumes no risk for damage in transit. Following warranty repair, the product will be returned to Buyer, transportation prepaid (FOB Destination). If Fluke determines that failure was caused by neglect, misuse, contamination, alteration, accident, or abnormal condition of operation or handling, including overvoltage failures caused by use outside the product's specified rating, or normal wear and tear of mechanical components, Fluke will provide an estimate of repair costs and obtain authorization before commencing the work. Following repair, the product will be returned to the Buyer transportation prepaid and the Buyer will be billed for the repair and return transportation charges (FOB Shipping Point).

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Introduction

The Fluke 985 Airborne Particle Counter (the Product) is a portable instrument that measures and reports air contamination.

The Product stores 10 000 samples in memory and records the date, time, counts, and sample volume of each sample.

Use the supplied USB cable, an Ethernet connection, or a flash USB drive (not supplied) to download data to a PC.

How to Contact Fluke

Fluke Corporation operates worldwide. For local contact information, go to our website: www.fluke.com

To register your product, or to view, print, or download the latest manual or manual supplement, go to our website.

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Applications

The Particle Counter can be used to:

- Monitor cleanrooms
- Investigate indoor air quality
- Monitor gowning rooms
- Test filter seals
- Locate particle contamination sources
- Monitor particle size distributions

Safety Information

A **Warning** identifies conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment under test.

General Safety Information is in the printed Getting Started Manual that ships with the Product and at www.fluke.com. More specific safety information is listed where applicable.

Operation

The subsequent sections tell you about Product operation.

Power On/Off

Push ⏻ to turn-on and turn-off the Product.

When the Product is turned on, a splash screen shows, followed by the default sample screen.

You can start to collect samples immediately from the sample screen. The samples use the default or stored sample setup values that you can configure.

Before you use the Product, make sure the battery is fully charged. See the Getting Started Manual.

Navigation Menu

The navigation menu lets you move through the five different sections of the Product software. To go to the Navigation menu, push MENU. The live navigation icon in the middle of the screen is larger and brighter than the other icons. There are five main menus. See Table 1.The Sample Setup and Communication Setup menus also have submenus.

Table 1. Main Menu Icons

Icon	Menu Item
	Sample Screen
	Buffered Data Screen
	Sample Setup
	Communication Setup
	Trend Data

To get in to the navigation menu and select a menu option:

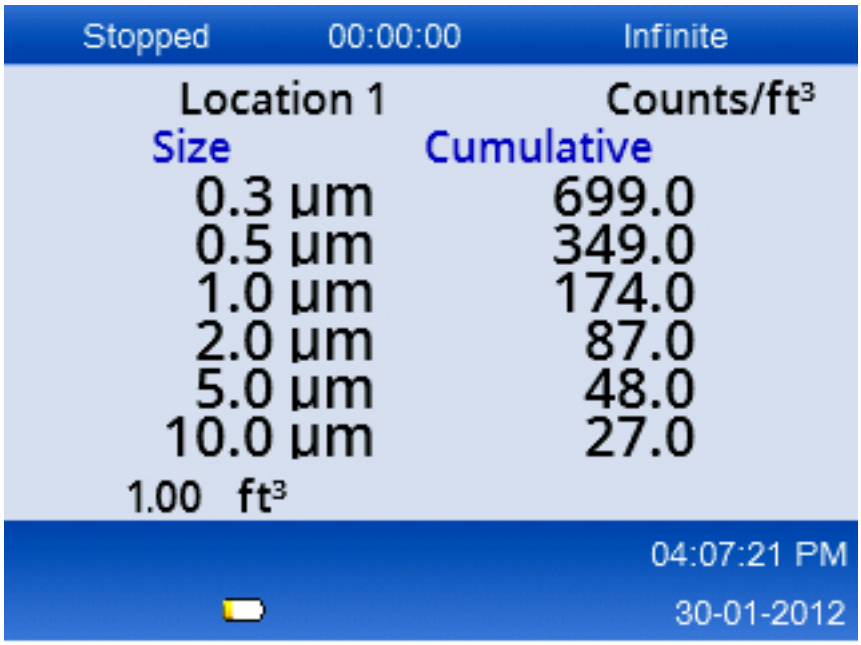
1. Push MENU.
2. Push ◀ or ▶ to highlight a menu icon. Arrows above and below an icon show that there is a submenu item.
3. Push ▲ or ▼ to move through the submenus.
4. Push ENTER/SELECT to choose the highlighted icon. The submenu or screen for the selected submenu is shown.
5. Evaluate, edit data, and configure fields as necessary.

Fields and controls in a screen can include radio buttons, text fields, and numeric fields, check boxes and drop down menus. An on screen keyboard shows when a text field is necessary. Use the keyboard to record data in the field.

Sample Screen Menu

The sample screen is the default screen that shows after the Product is turned-on. The screen shows the current sample settings as you take samples. Push ◀ or ▶ to select from loaded locations. See Figure 1.

Figure 1. Sample Screen



Buffered Data Menu

The Product can store 10,000 samples. To see the Buffered Data:

1. Push MENU.
2. Push ▶ until the Buffered Data Screen Menu icon shows.
3. Push ENTER SELECT to see the buffered data samples.
4. To move through each sample, push ▲ or ▼. Hold down ▲ or ▼ to move through the samples faster.

Delete Records

From the Buffered Data Screen menu, you can erase all of the samples:

1. Push ◗ to highlight .
2. Push ENTER SELECT.
3. The Product gives you a selection to erase the data.
4. To erase the data, push ◗ to highlight and push ENTER SELECT. All data is erased.

To exit this menu, keep highlighted and push ENTER SELECT. The Product goes to the buffered data screen.

Setup Menus

There are two setup menus:

- Sample Setup
- Communication Setup

Use these menus and their submenus to configure the Product.

Note

In the setup menus there is Help. To access Help, use the Product buttons to highlight and push . An explanation of the setup menu is shown. When completed, push ENTER SELECT to go back to the previous menu.

Sample Setup Menu

To see the primary Sample Setup Menu:

1. Push MENU.
2. Push ◗ until the Sample Setup Menu icon shows.
3. Push ENTER SELECT to go to the Sample Setup screen.

From this menu, you can set the parameters shown in Table 2.

Table 2. Sample Options

Option	Description
Method	**Time:** The Product samples for the time recorded in this field. Range: 00:00:01 to 23:59:59. In the Time-based sampling method, this value plus the hold time equals one cycle. **Volume:** The Product sample is equal to the volume recorded in this field. In the volume-based sample procedure, this value, plus the hold time, is equal to one cycle. The sample stays at the estimated value.
Hold	The time between samples. Range: 00:00:00 to 23:59:59
Delay	The time before the first sample starts after ENTER/SELECT is pushed. Range: 00:00:03 to 23:59:59.
Cycles	The total of sample and hold intervals. Range: 0 to 999. When in Automatic mode, the Product stops after the last cycle is complete. A value of 0 makes the Product run until you push ENTER/SELECT.
Mode	**Automatic**: the Product samples refer to the recorded parameters. **Manual**: the Product samples once and stops. **Beep**: Uses Automatic mode settings but ignores count alarm settings. The Product beeps for each particle counted.

Sample Setup Submenus

The Sample Setup Menu includes three submenus. Submenu icons are shown in Table 3 and the subsequent sections tell you about these submenus.

Table 3. Sample Setup Submenus

Icon	Submenu Item
	Alarm Setup
	Data Display Setup
	Location Setup

Alarm Setup Submenu

The Product Alarm can be set to trigger from different particle dimensions.

To update or change a parameter:

1. From the primary Sample Setup Menu icon, push ⌓ to show the Alarm Setup icon.
2. Push ENTER SELECT to go into the submenu.
3. You can set the Product Alarm to sound when Particle sizes from 0.3 µm to 10.0 µm.

Use the Product buttons to select and record the menu data.

Data Display Setup Submenu

How the Product shows and keeps data can be changed in the Data Display Setup submenu.

To update or change a parameter:

1. From the main Sample Setup Menu icon, push ⌓ twice to show the Data Display Setup icon.
2. Push ENTER SELECT to go into the submenu.
3. Use the Product buttons to select and record the menu data.
4. Push ENTER SELECT to configure the parameter.

The Data Display Setup screen includes check boxes, radio buttons and drop-down menu fields. The Sample screen changes to agree with the display setup.

Parameters such as font size can be different for different configurations.

Setting the Method of Counting Data

The choices for data counting are:

Cumulative

Cumulative counting mode includes all particles that are greater than or equal to the particle size selected in the Sample Volume field.

Differential

Differential counting mode includes all particles that are greater than or equal to the particle size selected in the Sample Volume field, but less than the next largest particle size.

Location Setup Submenu

Sample location can be recorded for the samples. If the Product is used in multiple areas, it will make the samples clear if the sample location was recorded. 75 locations can be added.

To update or change a location parameter:

1. From the primary Sample Setup Menu icon, push ⌓ three times to show the Location Setup icon.
2. Push ENTER SELECT to enter the submenu.
3. Use the Product buttons to choose an action for the location setup. See Table 4.
4. After the location data is changed, push MENU to return to the navigation menu.

Table 4. Location Submenu Icons

Icon	Description
	Add a location
	Edit a location
	Delete a location
	In the locations, use this to move a selected location down in the list.
	In the locations, use this to move a selected location up in the list.

Communication Setup Submenus

The Communication Setup Menu includes two submenus. Submenu icons are shown in Table 5 and the subsequent sections tell you about these submenus.

Table 5. Communication Submenu Icons

Icon	Submenu Item
	General Setup
	Diagnostics
	Login

Communication Setup

Check DHCP for automatic LAN configuration or uncheck it to set an IP address, Subnet, and Gateway manually. With firmware version 1.53 and higher, there is a selection for .xls or .tsv Data Export.

- **tsv** Tab-separated variable file that supports a maximum of 10,000 data records.
- **xls** Excel spreadsheet file. This file is locked for editing and is CFR21 part II secure. A maximum of 5000 data records can be exported.

General Setup Submenu

Product hardware setup can be changed with the General Setup submenu. These parameters can be changed:

- Backlight Timeout in seconds: 000 to 999 seconds
- Backlight Contrast: High, Medium, or Low
- Security: You can add a password for the Product. The default password is "**123456**". If password is changed and lost, contact Fluke Customer Service to reset it. See the *How to Contact Fluke* section.

- Feedback Volume: Mute, Low, Medium, High
- The Current System Date: MDY, YMD, DMY formats
- The Current System Time: 12 hour or 24 hour

To exit the submenu, push MENU.

Diagnostics Submenu

The Diagnostics Submenu shows you static product information:

- Model Number
- Serial Number

The submenu also shows dynamic data that you can see as a sample is taken:

- Present Battery Voltage
- Calibration: OFF or a voltage during a live sample
- Laser Current: OFF or mA during a live sample
- Motor Current
- Pump Hours (cumulative)
- Laser Hours (cumulative)
- Calibration Date
- Calibration Due Date

At the bottom of the screen, there are these abbreviations, with versions listed:

- FW = firmware
- BL = Bootloader
- FP = FPGA code
- HW = hardware
- BD = Board Dash number

To exit the submenu, push MENU.

Login Submenu

You can lock the General Setup submenu so that the parameter settings cannot be changed.

If the General Setup submenu is locked:

1. Push ▲ or ▼ to highlight  .
2. Push ENTER/SELECT to access the login screen.
3. Enter the password.

The general setup items can now be changed. You can disable password security in the General Setup submenu, but until you disable it, you are still in security mode and it will be necessary for you to enter the password each time you want to go to the General Setup submenu.

Trend Data

The Product can show you data trends with the Trend Data screen.

Data trends are plotted and graphed in size and count values over time. The graph updates automatically as new data is available. Historical data can also be plotted by location.

To plot particle size data in real time:

1. Push MENU and ◄ or ► to get to the Trend Data icon.
2. Push ENTER/SELECT to enter the Trend Data Screen. The Trend Graph screen is shown.
3. Push ENTER/SELECT.
4. The Graph Setup screen is shown with the Sampling Control icon active by default.
5. Push ENTER/SELECT to start the sample process with the current setup or change the settings in the Graph Setup screen first, then highlight the Sampling Control icon and push ENTER/SELECT. The sample process starts.

Note

Refer to the Help screen for more information about Graph Setup.

The right side of the trend graph is fixed at the most recent sample. Push to adjust the number of sample points displayed in the trend graph. The maximum number of samples displayed is 255. Use and to adjust the Y axis scale.

Note

If historical location data is selected for review at the Trend setup screen, the x-axis will only be linear if the sample times of each of the data records are the same.

Data Export

The Product stores collected data in flash memory. The data is stored until the data is cleared and is retained when the Product is off. Data can be moved to a PC or laptop with a USB cable, a flash USB drive, or transmitted through an Ethernet connection. A sample report, seen in Excel, is shown in Figure 2.

How to Move Product Data to a PC with a USB Cable

To move Product data to a PC with a USB cable:

1. Connect the USB cable to the Product or the Charge Base USB port. If you use the Charge Base, the Product must be on the base. When you connect the USB cable, you will see .
2. Use Windows Explorer to go to the HPC USB Drive.
3. Windows Explorer will open and show you the Data.tsv or Data.xls file icon. Right click on the file and open it with Microsoft Excel or a text editor. A sample report, seen in Excel, is shown in Figure 2.

How to Move Product Data to a Flash USB Drive

To move Product data to a flash USB drive:

1. Connect the USB flash drive to the Product USB drive port. When you connect the USB drive, wait for the USB drive icon () to show at the bottom of the display.
2. Push MENU and go to the Buffered Data Screen.
3. Push ENTER SELECT.
4. Push to highlight the data export icon ().
5. Push ENTER SELECT to export the data to the flash USB drive.
6. To see the data:
7. Use Windows Explorer to go to the flash USB drive.

On the drive, there will be a Data.tsv or Data.xls file. Double click the file to open it. The file can be opened with Microsoft Excel or a text editor. A sample report, seen in Excel, is shown in Figure 2. Note that each time you download data to the drive, previously downloaded data is overwritten.

How to Move Product Data with an Ethernet Cable

To move Product data to a PC with an Ethernet cable, you can connect the Ethernet cable to the PC or directly to an Ethernet connection source.

If you connect directly to the PC Ethernet port, you must be able to connect to the network, for example, with a wireless connection. With this setup, the Product IP address and subnet will need to be set manually.

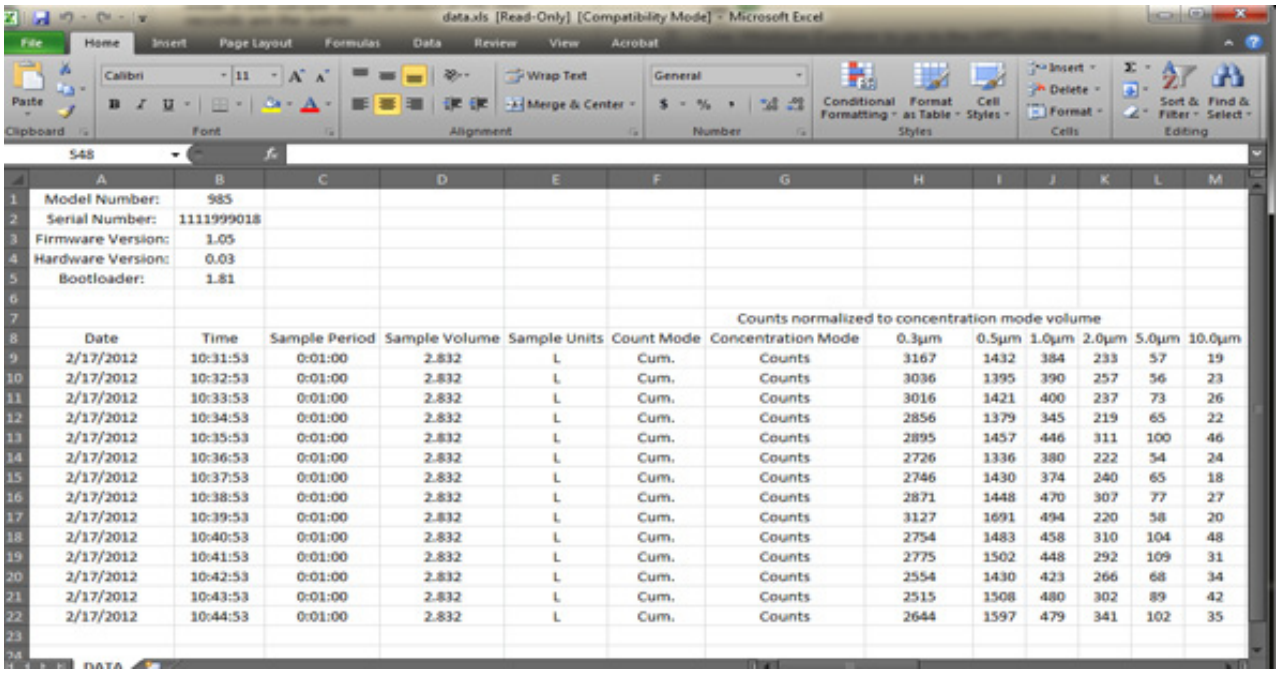
The Charge Base must be used for Ethernet connectivity. Connect the Ethernet cable to the Charge Base Ethernet port and to the Ethernet source. The Product must be on the base. See the Getting Started manual.

1. When the Ethernet cable is connected, you will see the Ethernet connection icon on the lower display ( ).
2. With a web browser, go to the Internet address HPC [Product Serial Number]. After “HPC”, add your Product serial number without brackets. You are taken to a website where you can download the Data.tsv or Data.xls file to your PC.
3. Double click on the filename to download or open the file.

To see the data:

1. If the file was downloaded, use Windows Explorer to go to the directory where the file was downloaded. If you choose to open the file from the web browser, go to step 2.
2. Double-click the file open it. The file can be opened with a text editor or Microsoft Excel. A sample report, seen in Excel, is shown in Figure 2.

Figure 2. Exported Data



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Model Number:	985											
2	Serial Number:	1111999018											
3	Firmware Version:	1.05											
4	Hardware Version:	0.03											
5	Bootloader:	1.81											
6													
7							Counts normalized to concentration mode volume						
8	Date	Time	Sample Period	Sample Volume	Sample Units	Count Mode	Concentration Mode	0.3µm	0.5µm	1.0µm	2.0µm	5.0µm	10.0µm
9	2/17/2012	10:31:53	0:01:00	2.832	L	Cum.	Counts	3167	1432	384	233	57	19
10	2/17/2012	10:32:53	0:01:00	2.832	L	Cum.	Counts	3036	1395	390	257	56	23
11	2/17/2012	10:33:53	0:01:00	2.832	L	Cum.	Counts	3016	1421	400	237	73	26
12	2/17/2012	10:34:53	0:01:00	2.832	L	Cum.	Counts	2856	1379	345	219	65	22
13	2/17/2012	10:35:53	0:01:00	2.832	L	Cum.	Counts	2895	1457	446	311	100	46
14	2/17/2012	10:36:53	0:01:00	2.832	L	Cum.	Counts	2726	1336	380	222	54	24
15	2/17/2012	10:37:53	0:01:00	2.832	L	Cum.	Counts	2746	1430	374	240	65	18
16	2/17/2012	10:38:53	0:01:00	2.832	L	Cum.	Counts	2871	1448	470	307	77	27
17	2/17/2012	10:39:53	0:01:00	2.832	L	Cum.	Counts	3127	1691	494	220	58	20
18	2/17/2012	10:40:53	0:01:00	2.832	L	Cum.	Counts	2754	1483	458	310	104	48
19	2/17/2012	10:41:53	0:01:00	2.832	L	Cum.	Counts	2775	1502	448	292	109	31
20	2/17/2012	10:42:53	0:01:00	2.832	L	Cum.	Counts	2554	1430	423	266	68	34
21	2/17/2012	10:43:53	0:01:00	2.832	L	Cum.	Counts	2515	1508	480	302	89	42
22	2/17/2012	10:44:53	0:01:00	2.832	L	Cum.	Counts	2644	1597	479	341	102	35

Maintenance

⚠⚠Warning

To prevent possible electrical shock, fire, or personal injury:

- **Have an approved technician repair the Product.**
- **Use only specified replacement parts.**
- **Do not put battery cells and battery packs near heat or fire. Do not put in sunlight.**
- **Do not disassemble or crush battery cells and battery packs.**

For safe operation and maintenance of the product:

- **Repair the Product before use if the battery leaks.**
- **Connect the battery charger to the mains power outlet before the Product.**
- **Do not keep cells or batteries in a container where the terminals can be shorted.**
- **Clean with a damp cloth and mild detergent.**

Specifications

For specifications, see the Getting Started Manual that ships with the Product.

Product Disposal

Dispose of the Product in a professional and environmentally appropriate manner:

- Delete personal data on the Product before disposal.
- Remove batteries that are not integrated into the electrical system before disposal and dispose of batteries separately.
- If this Product has an integral battery, put the entire Product in the electrical waste.