

AccuFIT 9000

Operation Manual

Users are cautioned to read this manual carefully and understand the warnings described in this manual before operating the product.
Please keep this manual handy for future reference.

Accutec

AT-DM 06

24.04

Component List

■ Standard

ITEM	MODEL	QTY
Main Unit		1
AC Adapter (100-240V, 12V 2A)	AF90-ADP	1
Power Cord		1
Zero Filter		2
Alcohol Storage Container	AF90-AFC	1
Storage Cap	AF90-CAP	1
Alcohol Cartridge	AF90-ACR	1
Spare Felt/Wire Mesh	AF90-AWK	2
Software CD		1
Twin Tube (1m)		1
Carrying Case		1

■ Consumables

ITEM	MODEL	QTY
Zero Filter		2
Alcohol Cartridge		1
Spare Felt / Wire Mesh		2

For more details about the consumables, please contact your distributor.

Laser Classification

This device is classified as a Class 1 Laser Product in accordance with the following standards:

- EN60825-1: 2007
- I EC60825-1: 2007

CLASS 1 LASER PRODUCT
EN60825-1 : 2007

***Class 1 Laser:**

Lasers that are considered to be safe under reasonably foreseeable conditions of operation, including the use of optical device for intrabeam viewing.

Laser Safety Information



Warning – This device employs a laser inside the unit as the light source of the sensor. Do not open/close the case of unit or disassemble the optical sensor inside the unit.

Wave length	650nm
Maximum output	20mW



Caution – Any attempt by user to control, adjust, or perform maintenance procedures other than those specified in this manual may result in hazardous exposure to laser radiation.

Important Safety Information

The symbols for the warnings used in this manual are defined below:

Classifications



Warning:

Warnings in this classification indicate risks that may result in serious injury or death if not observed.



Caution:

Warnings in this classification indicate risks that may result in damage to the product and which may void the product warranty if not observed.

Description of Symbols



△ symbol indicates a condition that requires caution (including warning). The subject of each caution is illustrated inside the triangle. (e.g. the high temperature caution symbol is shown on the left.)



⊘ symbol indicates a prohibition. Do not take the prohibited action shown inside or near this symbol. (e.g. the disassembly prohibition symbol is shown on the left.)



● symbol indicates a mandatory action. A specific action is given near the symbol.

Warning



Do not modify
or disassemble

○ Do not disassemble, modify, or attempt to repair the device.

..... A 3B laser diode is used as the optical source inside the device. Never attempt to disassemble the device as it is potentially extremely dangerous. Also, disassembling the unit may result in a malfunction.



Handle properly

○ Use the device properly by carefully following this operation manual.

..... As with any electric device misuse may result in electric shock, fire, damage to the instrument, etc.



- If any abnormal noises, unusual odor or smoke is observed, or any liquid is permitted to enter into the instrument, turn the power off immediately, remove the battery or disconnect the power cable if connected.

..... These conditions may result in electric shock, fire, or damage to the instrument. Contact your distributor.



Prohibited installation

Do not use this instrument in ambient temperature of 37°C (99°F) or greater.

..... The performance may deteriorate significantly and component damage may result.



- When the instrument is not in use, unplug the power cord.
- Failure to observe the above may result in electric shock, fire or damage to the internal circuit.

- Install the instrument in a location where the power cord is accessible such that you can disconnect the power cord easily.

- When using the power cord, make sure that the plug is clean and dry.

- The AC outlet must be within the specified power requirement.
- Failure to observe the above may result in fire.

- Use only the power cord and/or the AC adapter provided with this instrument.
- Other commercially available cords may have different voltage specifications and polarity, which may result in short circuit, fire or damage to the instrument.

Caution



Prohibition

- Do not use or leave this instrument in an environment exceeding or falling below the specified temperature/RH levels for the instrument. The instrument should not be exposed to direct sunlight for a prolonged period of time.

..... This instrument may not function properly beyond the specified operable environment.
(5 to 35°C, 20 to 85%RH, with no condensation)



Prohibition

- Do not use volatile solvents to clean the instrument.
- The case of the main unit may be damaged by organic solvents. Use a soft dry cloth to remove any dirt. If this is not effective, the user may soak the cloth in neutral detergent or water and wipe the instrument with the cloth. Never use volatile solvents such as thinner or benzene.



Prohibition

- Do not subject the instrument to strong shocks. Do not place heavy objects on the instrument.
- …… Failure to observe the above may cause malfunction or damage to the instrument.



Prohibition

- If the instrument has been stored in a cold environment, allow the instrument to come to temperature equilibrium with the environment in which it will be operated before turning it on.
- …… Even when the instrument is used in the specified operating temperature and humidity, a sudden temperature change may cause condensation. Condensation on the sensor may cause inaccurate measurements or in extreme situations, could damage the internal components.



- Do not allow static electrical discharge to the instrument.
- …… Failure to observe the above may affect the measurement value and cause damage to the instrument circuitry.



Handle properly

- Do not let the instrument draw in highly concentrated particles that exceed the specification level. (i.e., >100,000 particles/cc)



Prohibition

- Do not dispose of the instrument as Non-electronic waste.
- …… Please note that any disposal of the instrument should be in line with your local or national regulation.
For details, please contact your local distributor.

Table of Contents

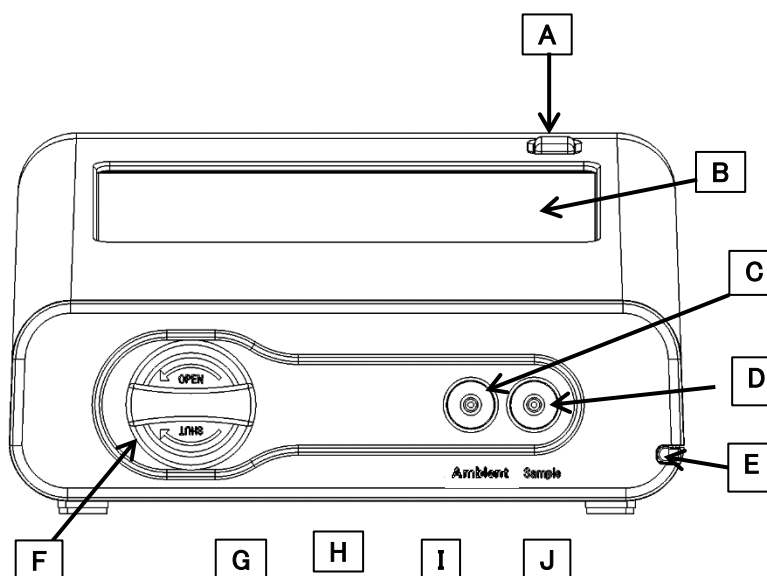
1. Part Names and Functions	1
1.1 Main Unit.....	1
1.2 Software Screen	2
2. Principle of Measurement	4
2.1 Principle	4
3. Getting Started.....	5
3.1 Recharging the Alcohol Cartridge.....	5
3.1.1 Preparation	5
3.1.2 Recharging the Alcohol Cartridge.....	6
3.1.3 Installing the Alcohol Cartridge.....	7
3.2 Getting Started (Main Unit)	8
3.2.1 Confirming the External Memory	8
3.2.2 Database Selection	9
3.2.3 Particle Check.....	9
3.2.4 Zero Check.....	9
3.2.5 Fit Factor	10
3.2.6 Validation Check Settings	10
3.3 Get the Person being Tested Ready.....	10
4. Measurement	12
4.1 Step 1.....	12
4.2 Step 2.....	12
4.3 Step 3.....	13
4.4 Step 4	14
4.5 Record	14
4.6 Print.....	15
4.7 Real-time Measurement.....	15
4.8 Toolbox (Advanced Modes)	16
4.9 Remote Control Mode.....	16
5. Administration and Setup	17
5.1 Administration.....	17

5.1.1 People	17
5.1.2 Respirators.....	17
5.1.3 Protocols.....	18
5.1.4 Fit Test Reports	19
5.1.5 Select Database	19
5.1.6 Toolbox	20
5.2 Setup	20
5.2.1 Printer Setup	20
5.2.2 Communication.....	20
5.2.3 Settings	23
5.2.4 Date and Time.....	23
5.2.5 Touch Screen Calibration.....	24
5.2.6 Device Info.....	24
6. Maintenance.....	25
6.1 Calibration	25
6.2 Alcohol Cartridge	25
6.3 Mesh (Inlet).....	27
7. Specifications	28
8. Troubleshooting	29
9. Contact Information	31

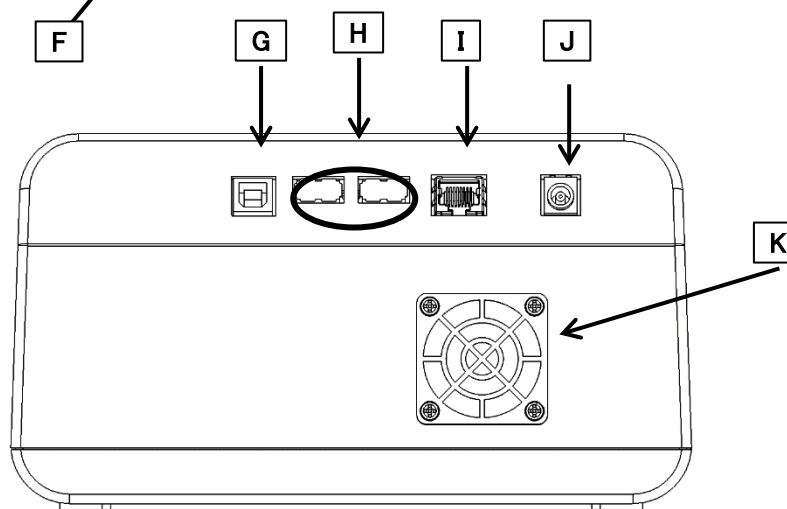
1. Part Names and Functions

1.1 Main Unit

• Front



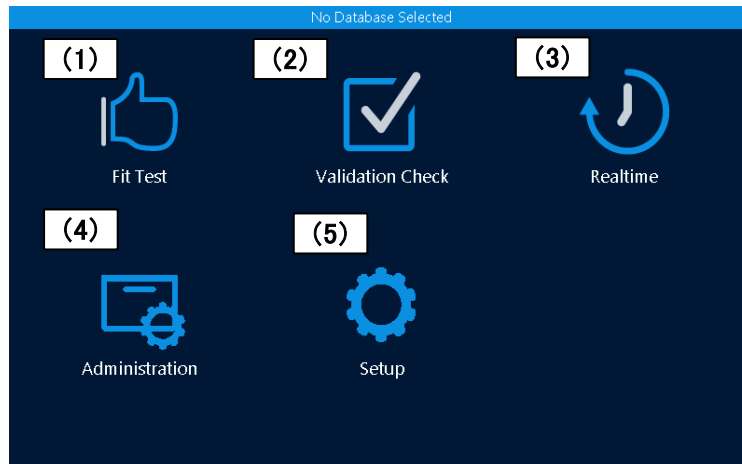
• Back



(A)	Power button	On/Off switch
(B)	Touch panel	Use this screen to operate the system.
(C)	Inlet nozzle (ambient)	Instrument uses this inlet to sample the particle concentration in the ambient air.
(D)	Inlet nozzle (sample)	Instrument uses this inlet to sample the particle concentration inside of the mask.
(E)	Stylus	Use this pen to operate the touch panel (B).
(F)	Alcohol cartridge	Contains alcohol that is necessary for measurement
(G)	USB port (Type B)	Connects to the PC
(H)	USB port (Type A)	Connects to the USB flash drive or the printer
(I)	LAN port	Connects to the LAN cable
(J)	AC jack	Supplies power from the provided AC adapter
(K)	Cooling fan	Maintains correct operating temperature (This cooling fan is to maintain appropriate processing temperatures.)

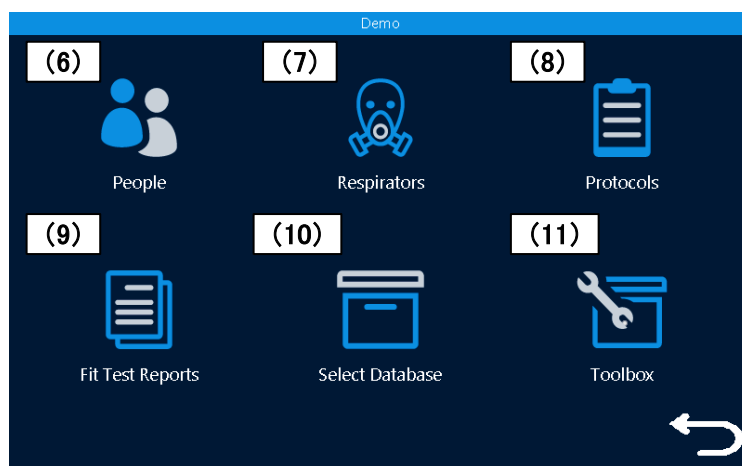
1.2 Software Screen

① Activities



(1)	Fit Test	Allows the user to perform respirator fit test
(2)	Validation Check	Allows user to conduct a system check prior to performing series of measurements
(3)	Realtime	Displays the fit factor graph or particulate concentration of the ambient air on a real time basis
(4)	Administration	Proceeds to the screen ② (Refer to 5. Administration and Setup for details.)
(5)	Setup	Proceeds to the screen ③ (Refer to 5. Administration and Setup for details.)

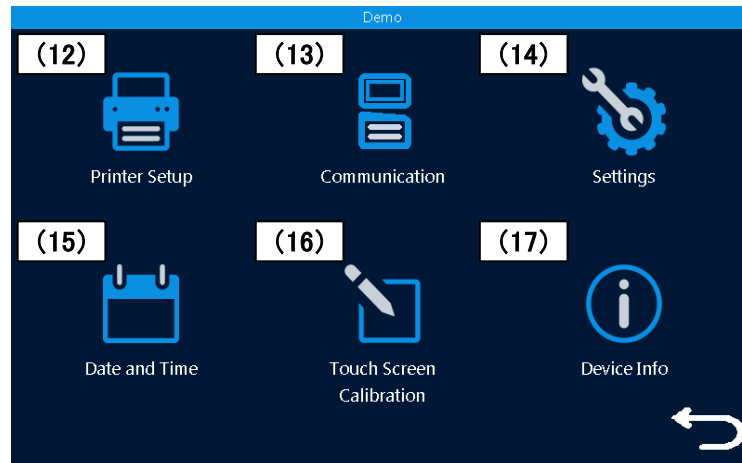
② Administration



(6)	People	Confirm and selects the list of people being tested. Portal to enter a new person to database
(7)	Respirators	Confirm and selects the list of respirators Portal to enter a new respirator to database

(8)	Protocols	Confirm, edit, and select the test protocol Portal to enter a new test protocol to database
(9)	Fit Test Reports	Display and print the reports of conducted fit tests
(10)	Select Database	Select database to load as active; create new database
(11)	Toolbox	Proceed to the advanced mode

③ Setup



(12)	Printer Setup	Configure the printer setting
(13)	Communication	Configure and set the PC communication environment
(14)	Settings	Configure the settings for the device
(15)	Date and Time	Edit the date and time setting
(16)	Touch Screen Calibration	Calibrate the touch screen
(17)	Device Info	Check the device information

2. Principle of Measurement

2.1 Principle

This device measures particle concentration in the ambient air and inside of the mask, and determines how well a mask fits by comparing the ratio of these particle concentrations. The ratio of the above concentrations is called "Fit Factor". If the Fit Factor is 100, it essentially means that the inside of the mask is 100 times as clean as the ambient air.

$$\text{Fit factor} = \frac{\text{Particle concentration in the ambient air}}{\text{Particle concentration inside of the mask}}$$

In the older protocols, the device measures particle concentration in the ambient air before and after each mask fit test exercise. Particle concentration in the ambient air can be variable over time; therefore this device measures the particle concentration in the ambient air before and after each measurement, and uses the average value. The particle concentration in the ambient air must be measured for the first measurement. For the second measurement and subsequent measurements, the concentration after the previous measurement will be used and there is no need for a redundant second measurement of the ambient air.

$$F = \frac{\bar{x}(C_{\text{before}} + C_{\text{after}})}{2 \text{ Conc}_{\text{mask}}}$$

The sequence would thus be as follows:

$C_{\text{ambient}} // C_{\text{mask}} // C_{\text{ambient}} // C_{\text{mask}} // C_{\text{ambient}} \dots \text{etc.}$

F: Fit factor

C_{before} : Particle concentration in the ambient air before exercise

C_{after} : Particle concentration in the ambient air after exercise

C_{mask} : Particle concentration inside of the mask during exercise

Note: Newer OSHA protocols approved in 2019 consist of 4 30-second exercises with the ambient measurements taken before and after the complete suite of exercises. Empirical data show that the ambient particulate concentration varies very little over two minutes, which is the time required to perform the exercises. Careful observation shows that the preliminary value of the Fit Factor for each exercise will change slightly as the test finishes when the two ambient values are averaged.

3. Getting Started

3.1 Recharging the Alcohol Cartridge

**Warning**

Isopropyl alcohol used for this device is a hazardous material. Do not allow the alcohol to contact your eyes and skin. Refer to the Safety Data Sheet (SDS) for chemical material when storing alcohol in a special container and when using it.

**Caution**

Recap the alcohol container immediately after use to prevent the alcohol from absorbing moisture and from evaporating. The AccuFIT 9000 **must** be operated on a level surface, since tipping the unit may allow alcohol to enter the optic bench.

The CPC (Condensation Particle Counter) in this device detects particles using isopropyl alcohol vapor. Installing the alcohol cartridge soaked in the alcohol solution to this device will provide the alcohol vapor in the CPC. When the alcohol vapor and an airborne particle come in contact, a cloud which has the particle at its center will be formed. As this cloud passes into the condenser the alcohol becomes tightly bound to the particle, thus increasing its diameter several orders of magnitude. If the alcohol solution in the alcohol cartridge becomes depleted, the device cannot measure particles correctly. To avoid this, please recharge the alcohol cartridge before using the device.

3.1.1 Preparation

Isopropyl alcohol and the following components are required.

- Alcohol storage container
- Storage cap
- Alcohol cartridge

The **isopropyl alcohol** used for this device must be a high-purity guaranteed reagent alcohol. Please do not use isopropyl alcohol that is available from pharmacies or supermarkets. The purity of this alcohol is low (about 70%), and may cause damage to the CPC. Any problems caused by a use of alcohol other than specified below is not covered by the warranty. Please be sure to use the appropriate alcohol with strict adherence to the handling directions.

The alcohol used for this device must be a guaranteed reagent satisfying at least the following requirements:

Chemical name:	2-Propanol
Synonym:	Isopropyl alcohol
Chemical formula:	$(\text{CH}_3)_2\text{CHOH}$
Formula weight:	60.10
Assay:	99.5% or better

When the device is not in use, the alcohol cartridge must be stored in the alcohol storage container and the alcohol cartridge inlet must be sealed with the storage cap to keep dust out.

When the device is in use, the storage cap must be used to seal the alcohol storage container.

3.1.2 Recharging the Alcohol Cartridge



Caution

Do not leave the alcohol cartridge inlet open.
Failure to observe the above may cause contamination of the optical system or a malfunction.

1. Turn the device off.
2. Open the alcohol storage container by turning the storage cap (or the alcohol cartridge) about 45° counterclockwise.

Stand the storage cap (or the alcohol cartridge) straight up in a clean place.



3. Pour isopropyl alcohol in the alcohol storage container up to the marked level. Be careful not to tip the bottle and spill the alcohol prior to seating the wick or storage cap, Once the wick assembly or storage cap is seated securely in the capsule the alcohol will not leak.

Fill level



4. Insert the alcohol cartridge into the alcohol storage container, and turn it about 45° clockwise until it is firmly locked. Do not use excessive force.

5. After the alcohol cartridge is inserted, the wick media in the cartridge will be soaked in alcohol. You can use the device after a few minutes of immersion in alcohol.



3.1.3 Installing the Alcohol Cartridge

1. Remove the alcohol cartridge from the alcohol storage container and gently shake off any excess alcohol solution. Failure to do this may cause the absorbed alcohol to clog the front of the alcohol cartridge. As a result, the flow of the incoming airborne particles and alcohol vapor will be disturbed, making it impossible to measure correctly. Please wait until the outer surface of the alcohol cartridge dries or wipe the excess alcohol off with a non-abrasive lint-free wipe.
2. Insert the alcohol cartridge into the inlet as shown on the right, and turn the alcohol cartridge clockwise about 45°.

The front of the Alcohol cartridge

To install the alcohol cartridge correctly, be sure to turn it firmly until it stops. (See the picture at right.)

[Caution]

If alcohol accumulates inside the cartridge inlet, wipe the alcohol off with a non-abrasive, lint-free wipe.



**Caution**

- To prevent the alcohol from absorbing moisture and from evaporating, always recap the alcohol storage container with the storage cap. Contaminated alcohol must be disposed of.
- When the device is not in use, the alcohol cartridge must be stored in the alcohol storage container. To keep the inside of the instrument clean, seal the cartridge inlet with the storage cap.
- **Do not carry or store the device with the alcohol cartridge installed.** Failure to observe the above may allow the alcohol solution to drip into the optical system and affect measurements. When carrying or storing the device, seal the alcohol cartridge inlet with the storage cap to keep dust out.
- Always keep the storage cap and alcohol cartridge clean. (Refer to **6. Maintenance.**) If dust sticks to the side of the cartridge or inside of the cap, it may get into the device during operation, affecting measurement.
- After measuring for a long period of time, alcohol may accumulate inside the cartridge inlet. If you notice that the measured value of the ambient particle concentration has shifted dramatically check the cartridge inlet, and wipe the accumulated alcohol off with a non-abrasive, lint-free wipe before restarting the device.

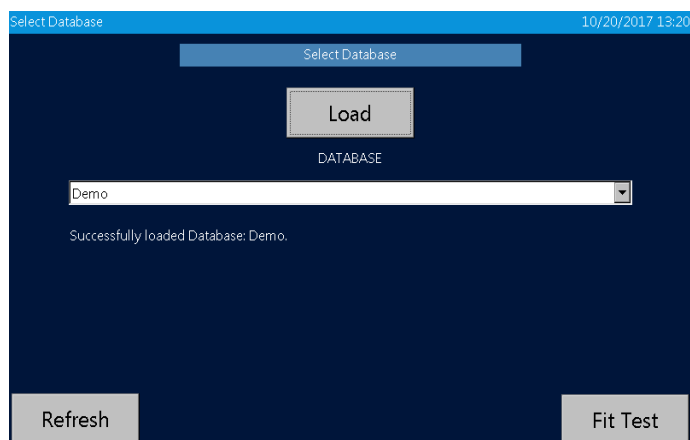
3.2 Getting Started (Main Unit)

Turn on the device to display the Activities screen (①). Prior to performing a series of fit tests, you should perform Validation Check (2) to confirm that the device is operating correctly and the environment is appropriate for measurements (i.e., that there are sufficient particles present and the instrument can measure them). The Validation Check also tests the MAC valve which cycles between the ambient sample and mask sample. Failure to perform the Validation Test may allow unreliable test results. The results of the Validation Check are saved to the database and can be referred to in future to prove that the instrument was operating properly at the time of the fit test. Always ensure that a Validation Check is performed prior to conducting a mask fit test or a series of fit tests. If the AccuFIT 9000 is connected to and is being controlled by the PC, the results will be saved to the database in use in the PC-based software, but if the instrument is being operated in stand alone mode the user should ensure that a properly configured USB thumb drive has been inserted (if the Firmware is older than ver. 2.1.0) and that a database has been loaded.

3.2.1 Confirming the External Memory

If the Firmware version in this device is older than ver. 2.1.0, the device does not have the ability to store data internally and must use a thumb drive to record the measurement results. Before starting a measurement, make sure that a USB flash drive that has been configured with the required information to perform data capture is connected to the device. If you want to upgrade the firmware version, you can get the new firmware from www.acutec.com.

3.2.2 Database Selection



Insert the USB flash drive into a USB port Type A (H) of the device, prior to performing Validation Check (2). Select the desired database and tap [Load] then tap [Fit Test] or [Exit] button.

By tapping the [Refresh] button, the databases in the pull-down menu box will be updated to display the databases stored in the USB flash drive.

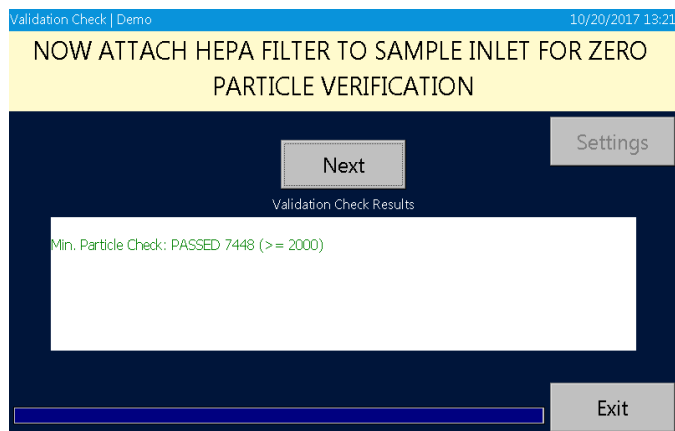
3.2.3 Particle Check



Remove the HEPA filter or the mask if attached to the clear sample line, and tap the [Start] button to check that the particle concentration in the ambient air is sufficiently high enough to calculate the mask fit factor.

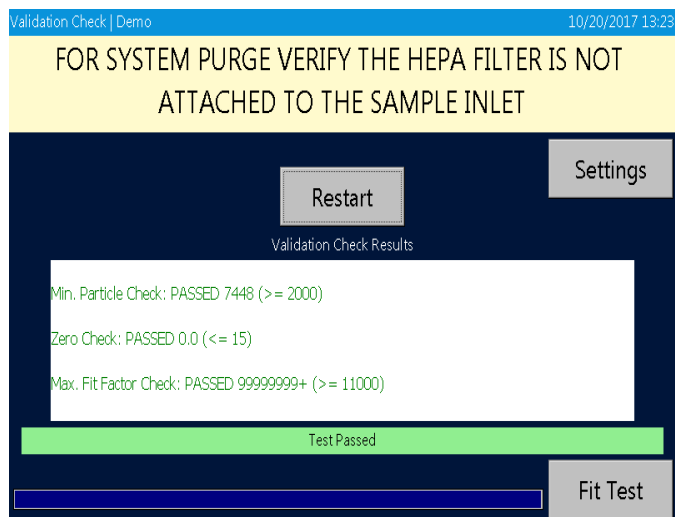
Depending on the ambient particle concentration (i.e., outside of the mask), the environment may be inappropriate to perform a mask fit test. This process also confirms that the device is operating properly. When this measurement is complete, proceed to the Zero Check

3.2.4 Zero Check



If a leak occurs in the sample train of the device, the test result may be affected. The Zero Check determines that there are no internal leaks or loose connections. Install the HEPA filter to the clear sample inlet line (making sure that the arrow on the HEPA cartridge is aligned with the flow), and tap [Next] to begin the Zero Check measurement. When the ZeroCheck is complete the AccuFit 9000 automatically continues to the next check. The barbed fitting on the HEPA filter should be inserted in the clear line just deeply enough to provide a good seal

3.2.5 Fit Factor



To confirm whether the device performs correctly, this test confirms the fit factor using the HEPA filter. The instrument measures the particle concentration in the ambient air and sample port and calculates the ratio to the particle concentration via the HEPA Filter. By determining this ratio, the device confirms that it is correctly performing this function. If the Validation Check is passed, a message "Test Passed" will appear. If there is no database, the alarm appears. Execute the Save As command from Toolbox (11) to create a database.

3.2.6 Validation Check Settings

Validation Check Settings

Minimum ambient particle level
2000.00 Value must be \geq 1000

Zero Check: Max. particles allowed in 30 s
15.00 1 - 30

Maximum Fit Factor Check: Minimum Fit Factor
11000.00 Value must be \geq 10000

Save Exit

By tapping the [Setting] button on the Validation Check screen, you can change the value(s) for the check as necessary. After changing the value(s), tap the [Save] button to save the change(s).

Recommended values are \geq 1000 Minimum particles, \leq 4 Zero particles, and \geq 12,000 Max Fit factor

3.3 Prepare the Person being Tested

Prior to a mask fit test, attach the mask to the inlet of the Device using the appropriate adapter, have the person being tested don the mask and check the seal of the mask by himself or herself, and confirm that he or she is wearing the mask properly. After that, the person being tested must continue to wear the mask for approximately 5 minutes (29 CFR 1910.134) to clear the respirable particles from inside of the mask, and then proceed to the measurement process.

Every person being tested for respirator fit must have been previously trained in the proper procedures for wearing respiratory protective devices. Inappropriate use may result in inaccurate measurements. The mask may not be adjusted once a fit test is initiated in order to ensure the reliability of the fit test results.

4. Measurement

4.1 Step 1

Fit Test

Tap Fit Test icon (1) on the Activity screen ① to start a measurement.

*If Validation Check (2) has not been completed, the screen for the check will be displayed.

Refer to **3.2 Getting Started (Main Unit)** to conduct the check prior to a measurement.

SELECT PEOPLE

If the person to be tested is already in the database, select the name from the pull-down menu.

When the person is being tested for the first time, or is not in your database the subject's data must be entered prior to the fit test.

Tapping the [New] button allows these data to be entered. Use the provided touch pen (stylus) and display keypad to enter the personal information.

When the entry is complete, tap the [Save] button to finish the entry.

4.2 Step 2

Mask size

Select the size (Small, Medium, Large, Other, or One Size Fits All)

Note: User may enter another size (e.g., "Regular") which will be saved in the database, but which will not be available in the drop-down menu.

SELECT RESPIRATOR

Select the mask to use for the test.

If the mask is already in the database, you can select it. If the mask is not already in the database it must be entered prior to the test.

4. Measurement

4.3 Step 3

Fit Test: Step 3 of 4 | Demo 10/20/2017 13:24

FIT TEST STEP 3 of 4 - SELECT PROTOCOLS Exit

Display

Current Protocol

Protocols

Operator TEST DATE Due Date

10/20/2017 10/20/2017

Back Next

Confirming the measurement parameters (Protocols)

Select the appropriate protocol.

Enter the name, initials, or ID of the person conducting the fit test. (Operator) (REMEMBER it's your database so be consistent)

Check the next test date (Due Date)
The date of the next test is displayed.
(Per 29 CFR Part 1910.134 this would be one year from current date.)

4. Measurement

4.4 Step 4

Fit Test: Step 4 of 4 | Demo 10/20/2017 13:25

Doe, John, 1357
 3M 8210 DISPOSABLE [100]
 ANSI/AIHA Z80.10-2001
 Mask Size: Small, Operator: mm

Exit

Exercise Name	Fit Factor	Exercise Name	Fit Factor
NORMAL BREATHING	-	NORMAL BREATHING	-
DEEP BREATHING	-		-
HEAD SIDE TO SIDE	-		-
HEAD UP AND DOWN	-		-
TALK OUT LOUD	-		-
BENDING OVER	-		-

Fit Factor	Concentration Values
Overall Fit Factor	Ambient -
Pass Value	Mask -

Back Click "Start" To Begin Start

Fit Test: Step 4 of 4 | Demo 10/20/2017 13:30

Test Passed

Exercise Name	Fit Factor	Exercise Name	Fit Factor
NORMAL BREATHING	99999999+	NORMAL BREATHING	99999999+
DEEP BREATHING	99999999+		-
HEAD SIDE TO SIDE	99999999+		-
HEAD UP AND DOWN	99999999+		-
TALK OUT LOUD	99999999+		-
BENDING OVER	99999999+		-

Fit Factor	Concentration Values
Overall Fit Factor	Ambient 6530
Pass Value	Mask 0

Exit Print Start New Test

Start and Exit

The fit test exercises for the selected protocol are displayed.

If not correct, tap the [Exit] button to return to the previous page and select the desired protocol. After confirmation, tap the [Start] to start the test.

When the test completes, the test result (passed or failed) will be displayed at the top of the screen. The measurement result will be saved automatically in the selected database.

*If the test result is not passed and there is reason to believe that there may be a malfunction, refer to **8. Troubleshooting** for details.

Tap the [Print] button to print the result of the mask fit test.

To start a new test, tap the [New Test] button.

*If there is no database, the alarm appears. Execute the Save As command from Toolbox (11) to create a database.



Caution

To keep the inside of the device clean, attach the zero (HEPA) filter to the inlet after using the device and run the AccuFIT9000 for approximately 5 minutes before turning the power off. Allowing the contaminated particles to accumulate inside of the device could potentially cause trouble. When the device is not in use, keep the zero filter attached to the inlet.

4.5 Record (pre-Firmware ver. 2.1.0)

After measurement, the data will be saved automatically into the active database on the USB flash drive. If the AccuFIT9000 is used in Standalone mode data cannot be saved on the fit test instrument by itself. To save data, use a USB flash drive that is configured with the database. If

4. Measurement

you do not have a USB flash drive, the device can perform measurements, but it can not record the data. (If you have the newer firmware, the data will be stored internally)

4.6 Print

By connecting the device and the printer using a USB cable, you can print the measurement results. You can configure printer setting from Printer Setup (12).

4.7 Real-time Measurement

By selecting the Realtime (3) icon on the Activities screen, real-time particle counts can be displayed graphically and digitally.

***NB: This data can not be saved.**

This function is used for training in the use of respirators, determining whether or not a respirator can be fit tested, and for troubleshooting. Using this function allows you to confirm changes in the fit factor due to minor adjustment of masks.

*Do not use this function immediately prior to the mask fit test.

To start a measurement, tap the [Start] button.

To stop the measurement, tap the [Stop] button.

To return to the Activities screen (Ⓜ), tap the [Exit] button.

By selecting the [100], [500], or [1000] button, a reference line indicating the selected pass value can be inserted on the chart.

Mode	Description
Ambient Particle Count	Displays the particle counts in the ambient environment
Realtime Particle Count	Displays the particle counts in the breathing zone of the mask
Fit factor	Displays the fit factor

4.8 Toolbox Advanced Mode

(11) Toolbox

Mode	Functions
Clean Copy	Copies data other than the fit test results from the original data base
Copy	Copies all data saved in the database
Statistics	Shows the number of records of each information type (Validation Check, people, mask, protocol, fit test results) saved in the database and confirms the file size
Save	Stores the database in a USB flash drive. In the event that the measurement data can not be saved in the USB flash drive in use, you can use this command to save the measurement data in a substitute USB flash drive.
Save As	Creates and Stores a database by a different name from the current one. When the device starts for the first time, there is a demo database only; therefore, you can use this command to create and save a new database. This command can also be used to create a backup database.
Delete	Deletes data from the USB flash drive Please note that the deleted data can not be restored.

4.9 Remote Control Mode

If the software for this device is installed in your PC, you can use your PC to remotely control the device. For details, refer to the separately provided Software User Manual.

5. Administration and Setup

5.1 Administration

5.1.1 People

You can check the existing entry of people. Select the person whose data you wish to check from the pull-down menu.

Tap the [New] button to start a new entry as necessary.

For a new entry, the first name, last name, and EMP.ID are required. Enter the other information as desired.

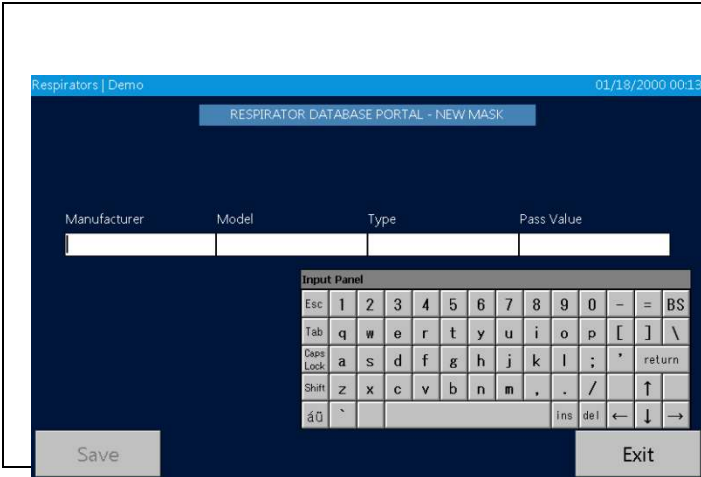
Tap the [Create] button to allow these data to be entered.

5.1.2 Respirators

You can review a mask that is already in the database.

Select the mask to display the following information: Manufacturer, Model, Type, and Pass Value.

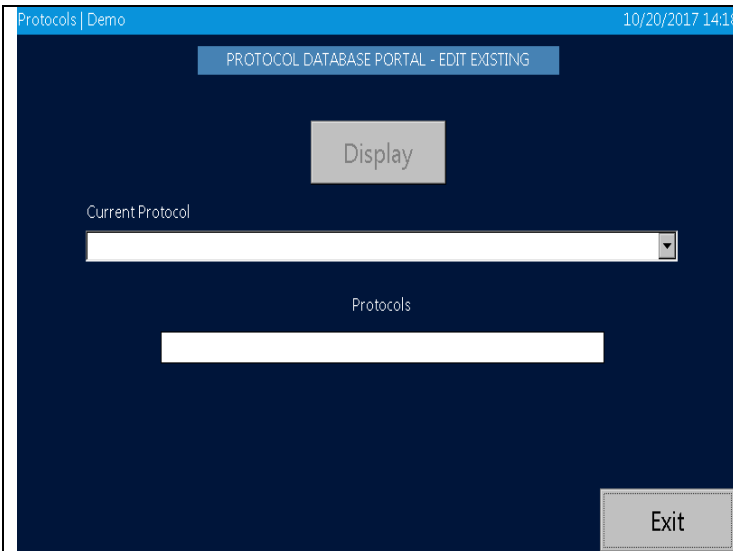
Tap the [New] button for a new entry as necessary.



Enter information into the [Manufacturer], [Model], [Type], [Pass Value] fields, and tap the [Save] button to confirm the entry.

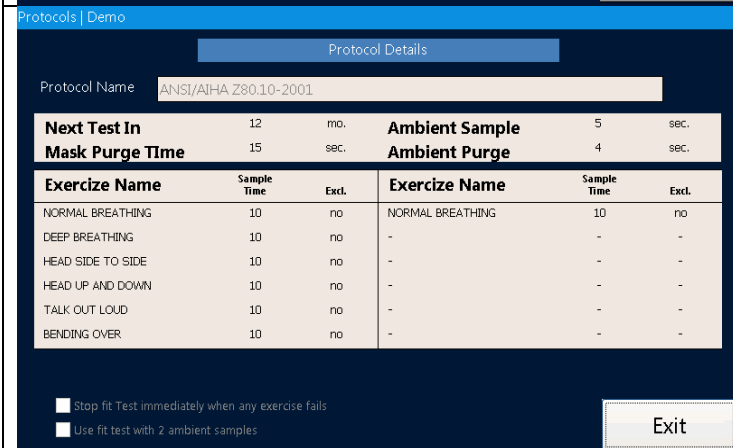
If the entry in each field is not appropriate, tapping the [Save] button will have no effect.

5.1.3 Protocols



You can check the mask fit test protocols.

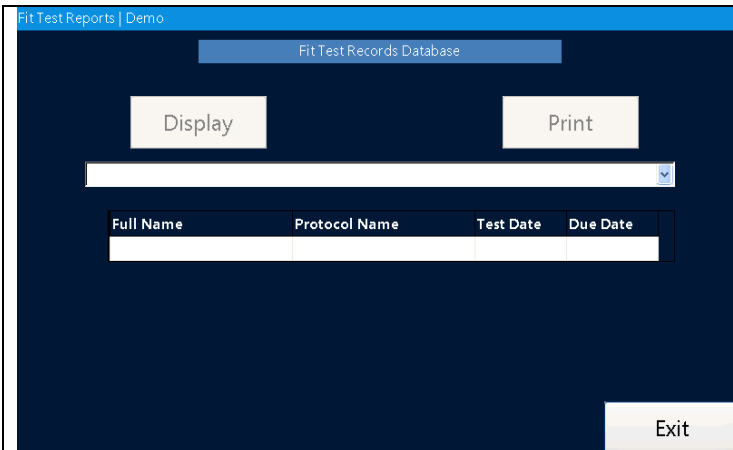
Select the protocol you wish to check from the pull-down menu and tap the [Display] button.



You can confirm the details of the protocol

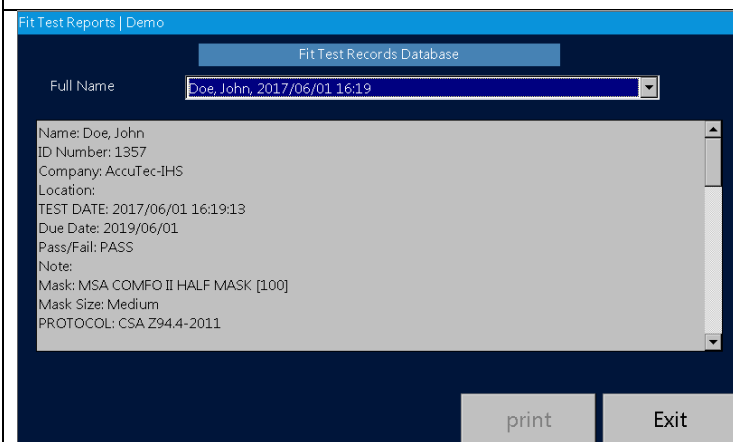
By checking the box at the bottom left of the screen, you can modify parameters of condition(s) to the mask fit test.

5.1.4 Fit Test Reports



You can review the fit test results saved in the database.

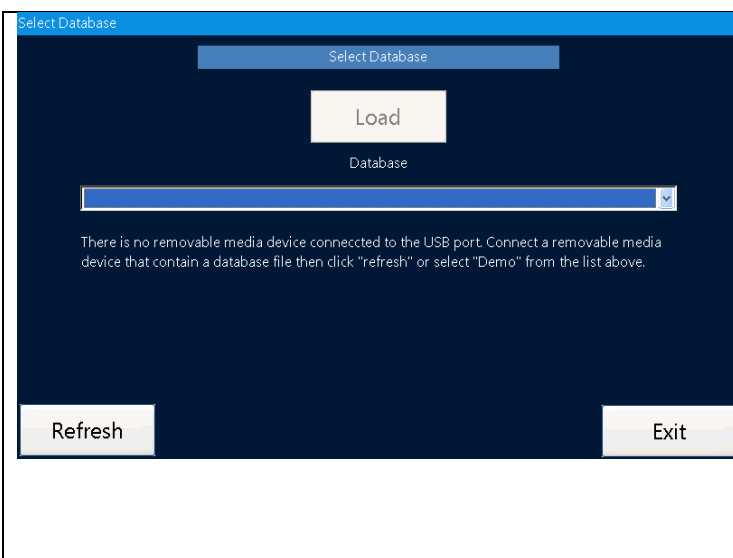
Tap the [Display] button to check the results. To print the results, tap the [Print] button. Prior to printing the results, configure the printer settings from the Printer Setup (12).



The screen shown to the left displays the test results.

This screen also can be printed by tapping the [Print] button.

5.1.5 Select Database

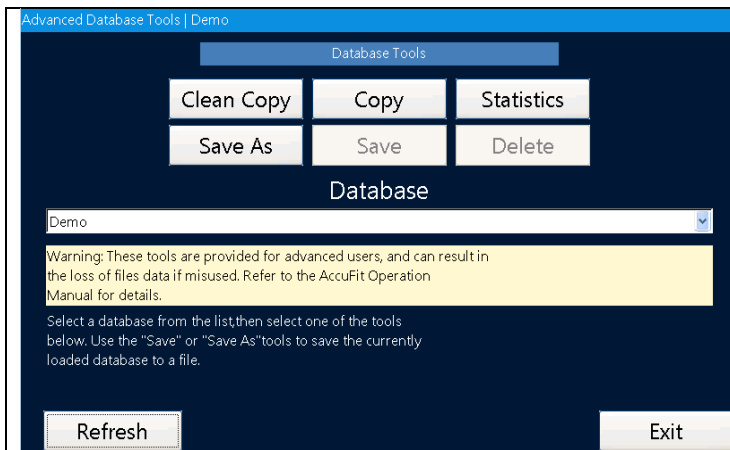


You can load the database and renew it.

Highlight the database you wish to use from the pull-down menu and tap the [Load] button to use the selected database.

The [Refresh] button is to renew the pull-down menu after changing the USB flash drive.

5.1.6 Toolbox

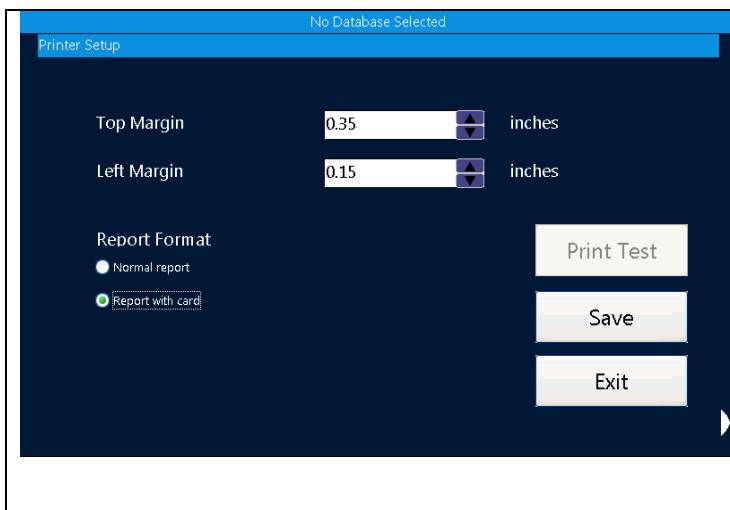


These are the tools for advanced users. For the details, refer to [4.8 Toolbox \(Advanced Modes\)](#).

The [Refresh] button is to renew the pull-down menu after changing the USB flash drive.

5.2 Setup

5.2.1 Printer Setup



You can configure the printer settings.

Select the top/left margins and report format as necessary.

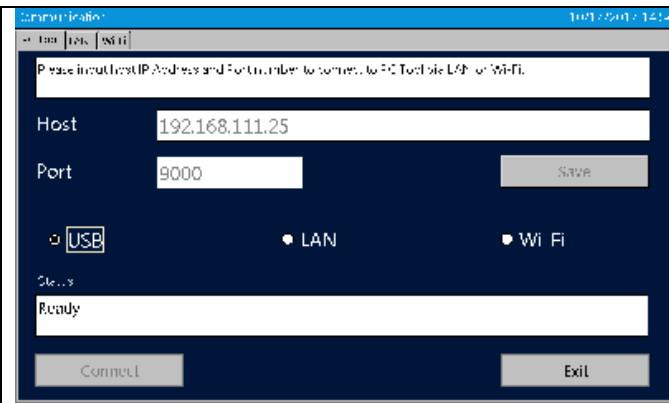
To confirm your printer setting, tap the [Print Test] button to perform the print function.

Tap the [Save] button to save your settings.

5.2.2 Communication

※For more information about the Communication settings, please refer to the User's Manual for Software Application.

To connect the Device(s) to your PC, you have three optional methods: USB, LAN and Wi-Fi connections. Please refer to the following procedures.



- PC Tool
- You can select your desired connection method by tapping the appropriate button in the middle of the screen (USB, LAN, or Wi-Fi).
- For USB connection tap USB button.
- For Wi-Fi or LAN connection to your PC, enter IP Address of PC to the Host field, and Port No. to the Port field.

Note: Entering IP Address and Port No. is necessary for LAN and Wi-Fi connections, but not for USB connection.

After you enter IP Address and Port No., tap **Save** button to save the data.

The status of the connection method you selected will appear in the **Status** text box. Typically, if you have selected USB, the Status text box will display "Not Connected" until you select Validation Check or Fit Test at the PC and then tap "Connect" on the AccuFIT 9000.

Note: Windows™ systems use a resource management utility that essentially "forgets" a USB connection if the computer enters the "sleep" mode. Simply unplug either end of the USB connector and reconnect.

Communication 02/07/2018 15:19

PC Tool LAN Wi-Fi

Please input and save the following information to connect to PC Tool via LAN. Name server addresses may be automatically assigned if DHCP is enabled.

Obtain an IP address via DHCP.

Specify an IP address

IP Address 192.168.111.25

Subnet Mask 255.255.255.0

Default Gateway 192.168.111.1 Save

MAC Address 04:a3:16:ec:13:66

Exit

- LAN Connection

For LAN Connection, you are required to enter IP Address, Subnet Mask and Default Gateway.

If DHCP is enabled, select **Obtain an IP address via DHCP** to obtain IP Address, Subnet Mask and Default Gateway automatically.

If DHCP is not enabled, select **Specify an IP address**. Upon confirming the network setting, enter IP Address, Subnet Mask and Default Gateway manually. Selecting the appropriate text box allows you to enter this required information.

When you enter the required fields, tap **Save** button to save the data. And then tap **Exit** button to close the Communication settings screen.

Communication 02/07/2018 15:20

PC Tool LAN Wi-Fi

Please input and save the following information to connect to PC Tool via Wi-Fi.

SSID SSID-01 search SSID

Password *****

Show password characters

Obtain an IP address via DHCP.

Specify an IP address

IP Address 192.168.2.4 Save

Subnet Mask 255.255.255.0

Default Gateway 192.168.2.0

MAC Address 20:f8:5e:c6:82:c6

Exit

- Wi-Fi Connection

Tap [search SSID] button, and select SSID of wireless router you use from the displayed list. Then enter the password of SSID you selected. Set **Show password characters** to reveal the password hidden behind asterisks. If DHCP is enabled, select **Obtain an IP address via DHCP** to obtain IP Address, Subnet Mask and Default Gateway automatically. If DHCP is not enabled, select **Specify an IP address**. Upon confirming the

	<p>network setting, enter IP Address, Subnet Mask and Default Gateway manually. Selecting appropriate text box allows you to enter this required information.</p> <p>When you enter the required fields, tap Save button to save the data. Then tap Exit button to close the Communication settings screen.</p>
--	---


5.2.3 Settings

	<p>You can configure the settings for measurement and language.</p> <p>Tap the [Save] button to save your settings. Please note: Changing language requires a re-start.</p>
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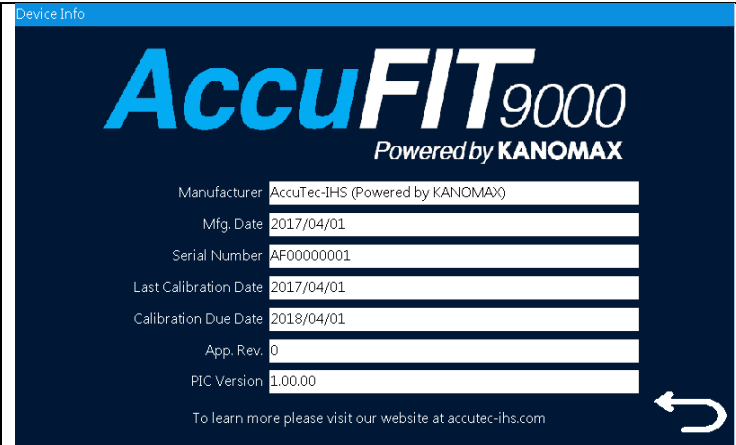
5.2.4 Date and Time

	<p>You can change the date and time settings of the device.</p> <p>Tap the [OK] button to save your change(s).</p>
--	--

5.2.5 Touch Screen Calibration

<p>Carefully press and briefly hold stylus on the center of the target. Repeat as the target moves around the screen. Press the Esc key to cancel.</p> 	<p>You can calibrate the touch pen.</p> <p>Tap the center of the cross icon on the screen. Repeat tapping the center as the cross icon moves around the screen.</p> <p>When completed, the cross icon disappears. Tap the screen to return to the Setup screen (③).</p>
--	---

5.2.6 Device Info

	<p>You can check the device information.</p>
--	--

6. Maintenance

This device requires routine maintenance according to the instruction below:

In addition, an annual calibration will ensure that the instrument is operating within manufacturer's required parameters in order to perform accurate measurements. Please contact your distributor for annual calibration.



Warning

DO NOT OPEN the outer case of the device.

It is hazardous to open the outer case of the device because a Class 3B laser diode is contained in the device.

Opening the outer case will void the warranty.

For necessary maintenance or for any service that is not described in this manual, please contact your distributor.

6.1 Calibration

Do not attempt to calibrate this device by yourself. Contact your distributor.

Failure to observe the above may result in problems in measurements.

6.2 Alcohol Cartridge

The wick material inside of the alcohol cartridge absorbs and retains alcohol. The alcohol cartridge is inserted into the main unit and therefore it must be kept clean. If dust gets into the device, it may clog the internal nozzle and affect the proper operation. Be careful when storing and handling the alcohol cartridge and storage cap to protect them from contamination.

·Cleaning and replacing the felt (wick material)

The wick material and mesh inside the alcohol cartridge are user-replaceable.

The device is provided with 2 sets of wicks and mesh. In normal use, there is no need for replacing the wick material unless a problem described below occurs.

1. The wick material is contaminated with dust or oil.
 - This problem does not occur when the device is used in normal ambient air. If the device is used for sampling highly-concentrated particles (e.g. sampling in a boiler room or sampling combustion aerosols), the wick material may become contaminated and will require replacement.
2. The mesh inside of the alcohol cartridge is clogged.
 - If the alcohol cartridge has been soaked in contaminated alcohol, the mesh inside of the alcohol cartridge may be clogged. The mesh can be cleaned by washing; however, if the clogging persists, the mesh must be replaced and the alcohol should be checked.

3. The device is not able to measure due to excess moisture in the alcohol.

→ Because of the fact that reagent grade 2-propanol is extremely hydroscopic, if extremely humid air is drawn into the device, moisture may accumulate in the alcohol cartridge and reduce the efficiency of the CPC. In this case, remove the wick material to allow it to dry and replace it with the spare. When the moisture-contaminated felt is dry, it can be re-used. If the wick material or mesh is obviously contaminated with something other than moisture it must be replaced with one of the provided spares. Over time, the felt may become discolored. Usually this will not cause a performance problem.

•Checking and replacing the felt and mesh

1) To remove the wick from the cartridge, hold the cartridge at the joint line with both hands and push the cap off the cylinder. The cartridge will be separated into the 2 parts, and the white wick material will be visible (Figure 1).

2) After the cartridge is separated, use the wick removal tool (a small wooden stick) to push the felt and mesh out of the cartridge cylinder (Figure 2).

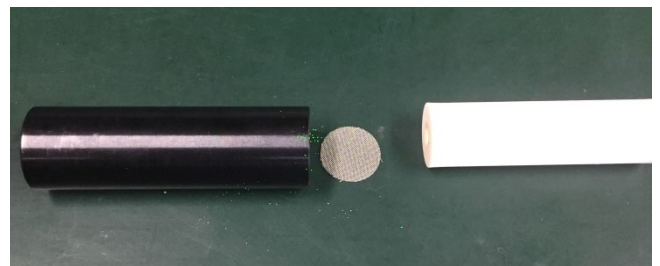
3) Make sure that the wick and mesh are clean.

If no contamination is found on the wick, it can be reused. Dry the wick and reassemble it.

If the wick is obviously contaminated, it must be replaced with the spare and disposed of. Hold the mesh up to the light and confirm that all the holes of the mesh are open and clear. If the mesh is clogged, clean air may be used to attempt to clear the mesh. If the clogging persists, replace the mesh with the provided spare.



1) Disassemble the Alcohol cartridge.



2) Remove the wick and mesh from the cartridge cylinder.

•Assembling the Cartridge



Caution

Before assembling, make sure that each part is clean.

If there is dust or debris stuck to the felt, it may get into the device and cause several problems. Please confirm that there is no dust in the alcohol cartridge or on the wick material.

Insert the clean mesh into the cartridge cylinder and confirm that the mesh lies flat on the bottom of the cylinder. Insert the wick until it reaches the bottom of the cylinder, and assemble the alcohol cartridge by reversing the steps shown above. The "O"-ring which holds the cartridge cylinder should be lubricated with a VERY light coating of the Dow-Corning DC4 silicone lubricant found in the accessory kit. Simply touch the surface of the lubricant with your index finger and apply a VERY light coating to the "O"-ring. Excessive lubricant will degrade the performance of the instrument.



Finally, after the cartridge is fully assembled, blow air on the surface of the alcohol cartridge to remove any dust particles.

6.3 Mesh (Inlet)

Over time, the mesh inside of the inlet may become clogged by dirt. Remove the inlet and mesh for cleaning as necessary.

7. Specifications

Product name	Respirator Fit Tester
MODEL	AccuFIT 9000
CPC maximum detectable concentration	100,000 particles/cc
False count	0.01 particulates/cc or less
Flow rate	Inlet flow rate: 0.7 LPM Sampling flow rate: 0.05LPM
Alcohol/recharging method	Isopropyl alcohol/Wick A full recharge of alcohol allows continuous measurement for approximately 8 hours.
Memory	USB flash drive connection (Use only certified flash drive)
Display	Color touch screen
Communication	USB, LAN, WiFi
Power source	AC adapter (AC 100 to 240V 50/60Hz) Optional External Battery Pack
Operating environment	Temperature: 5 to 37°C, Humidity: 20 to 85 %RH (with no visible condensation*)
Storage environment	Temperature: -20 to 50 °C, humidity: 0 to 85%RH (with no condensation)
Dimension	W 208 × D 262 × H 117 mm
Weight	Approximately 2.4Kg
Standard accessories	AC adapter, Power cord, Alcohol storage container, Storage cap, Alcohol cartridge, Spare wick (2 pcs.), Wire mesh (2 pcs.), Twin tube (1m), Instruction manual, Carrying case, HEPA filter (2pcs.)

*AccuFIT9000 is not waterproof. Be careful not to splash water or other liquid onto the device.

8. Troubleshooting

Symptom	Possible Cause	Troubleshooting
A count value is too low (lower than expected).	Alcohol depletion	Recharge the alcohol cartridge with alcohol. (Refer to <u>3.1 Recharging the Alcohol Cartridge with Alcohol.</u>)
	The actual particle count in the ambient area is low.	—
	Moisture has accumulated inside the alcohol cartridge.	Replace the felt inside of the alcohol cartridge or dry the felt. (Refer to <u>6.2 Alcohol Cartridge.</u>)
	Pump has problems due to low flow (or no flow).	Check the pump performance. Check the touchscreen for an error message. Check the flow rate of the pump. The flow rate must be approximately 700cc/min.
	The device is being operated in an environment outside the specified operable range.	Operate the device in the specified environment. (5 to 37°C, 20 to 85%RH, with no condensation)
	The alcohol is poor quality or is contaminated.	Replace the wick inside the alcohol cartridge. Use only the appropriate alcohol. (Refer to <u>6.2 Alcohol Cartridge.</u>)
	The mesh is clogged.	The mesh may be clogged with excess alcohol. Remove the excess alcohol. (Refer to <u>6.2 Alcohol Cartridge.</u>)
	Dust and/or alcohol may have gotten into the optical system.	Contact your distributor.
	The device requires calibration or service.	Contact your distributor.
[PD LD Error] message	The optical system in the main body is faulty.	Contact your distributor.
[Pump Error] message	The pump in the main body is faulty.	Contact your distributor.
[Peltier Error] message	The Peltier device in the main body is faulty.	Contact your distributor.

8. Troubleshooting

【Alcohol Error】 message	The amount of alcohol is low.	Replenish the alcohol cartridge with alcohol.
【Count Over】 message	Measurement concentration is too high.	Ensure that ambient particle concentration is 100,000 particles/cc or less.
【Power Supply Voltage Error】 message	Wrong AC adapter is connected.	Make sure that the provided AC adapter is connected.
	The circuit in the main body is faulty	Contact your distributor.

9. Contact Information



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