ACCUTEC

AccuFit™
AccuFit PRO

Operation Manual

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.

COMPONENT LIST

Standard

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

Consumables

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

For more details about the consumables,
please visit www.accutec.com.

LASER CLASSIFICATION

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

- EN60825-1: 2014

**CLASS 1 LASER PROD-
UCT EN60825-1 : 2014**

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	660nm
Maximum output	20mW
Beam emission angle	13-22° (Vertical direction)
	6-10° (horizontal direction)

⚠ 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	• 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 35°C (95°F) or greater. ..... The performance may deteriorate significantly, and component damage installation 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. • While charging the battery with the instrument, do not remove the battery from the instrument. ..... Failure to observe the above may result in battery leakage and damage to the circuitry.

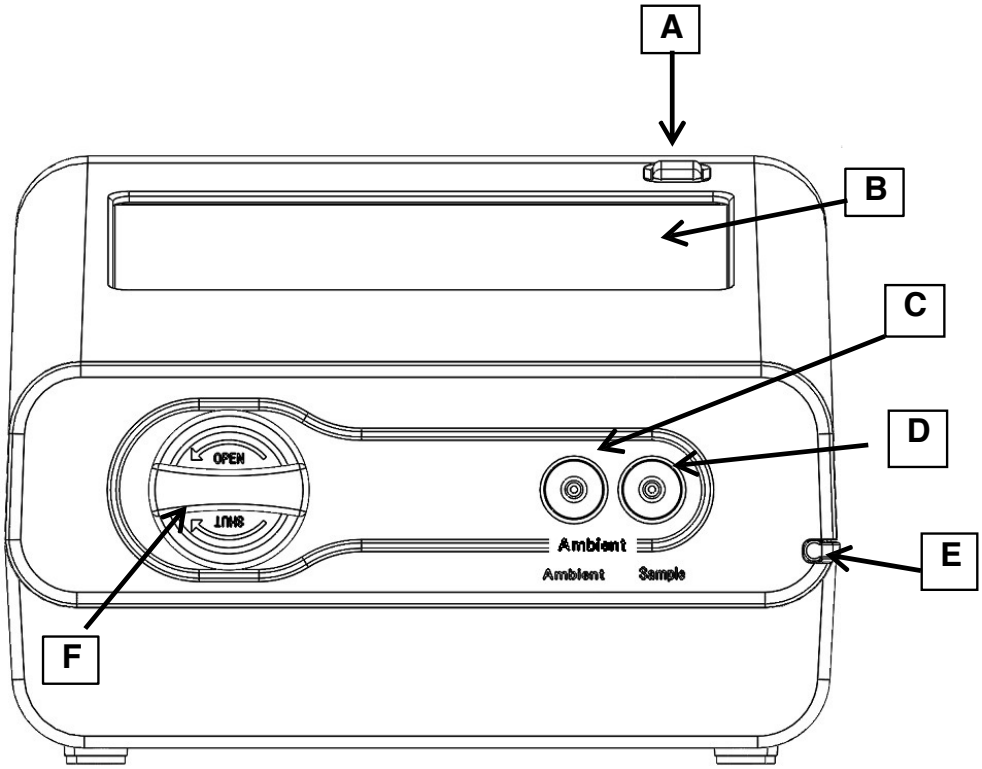
CAUTION	
 Prohibition	• Do not use or leave this instrument in an environment exceeding or falling below the specified temperature/RH levels for the instrument. The instrument should not be exposed to direct sunlight for a prolonged period of time. ..... This instrument may not function properly beyond the specified operable environment (10 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 then wipe the instrument with the dampened 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 .....

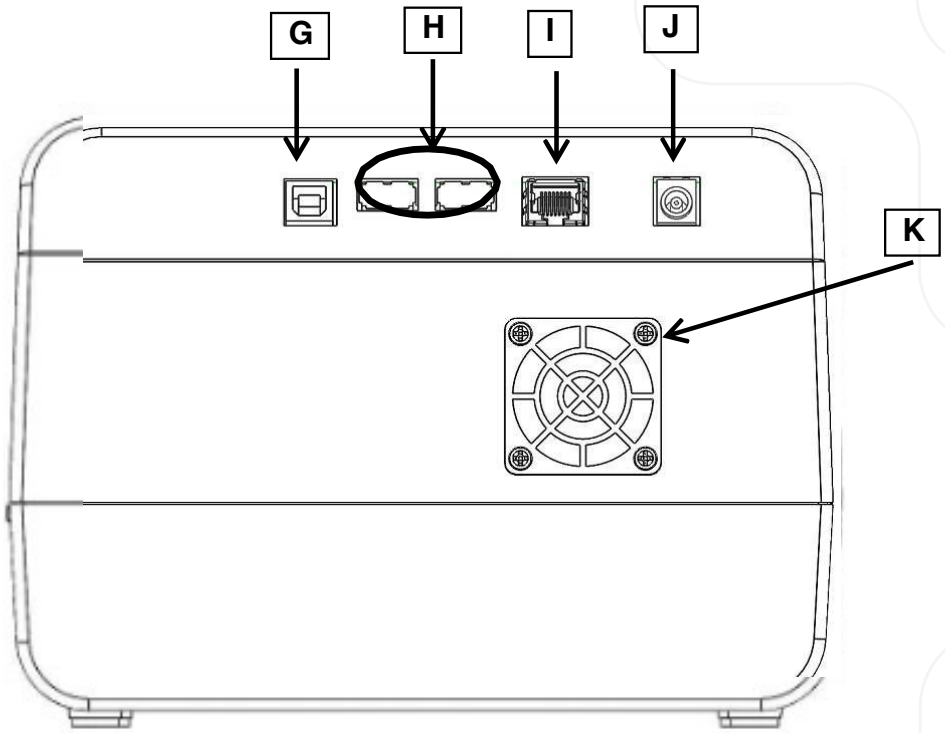
1.1 Main Unit

Front



(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)	Touch pen stylus	Use this stylus to operate the touch panel (B).
(F)	Alcohol cartridge	Contains alcohol that is necessary for measurement

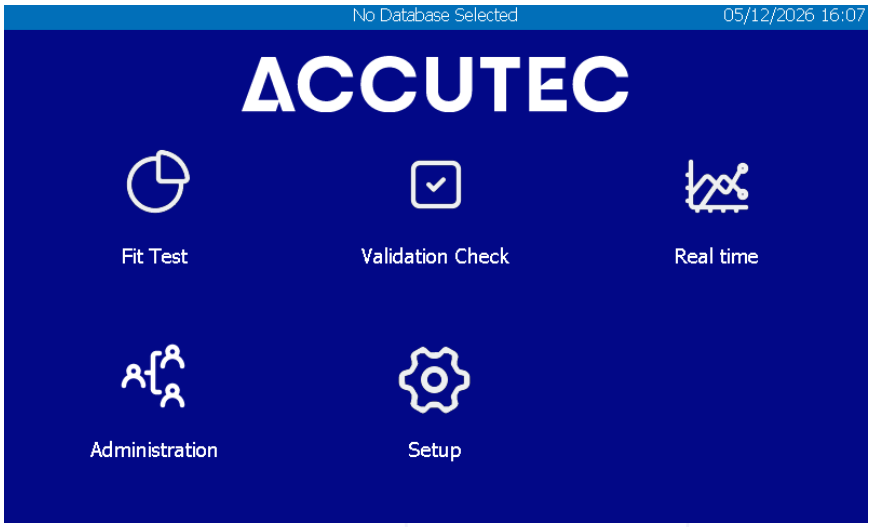
Back



(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 AC adapter/power supply
(K)	Cooling fan	Maintains internal operating temperature (This cooling fan is to maintain appropriate CPU and CPC temperatures.)

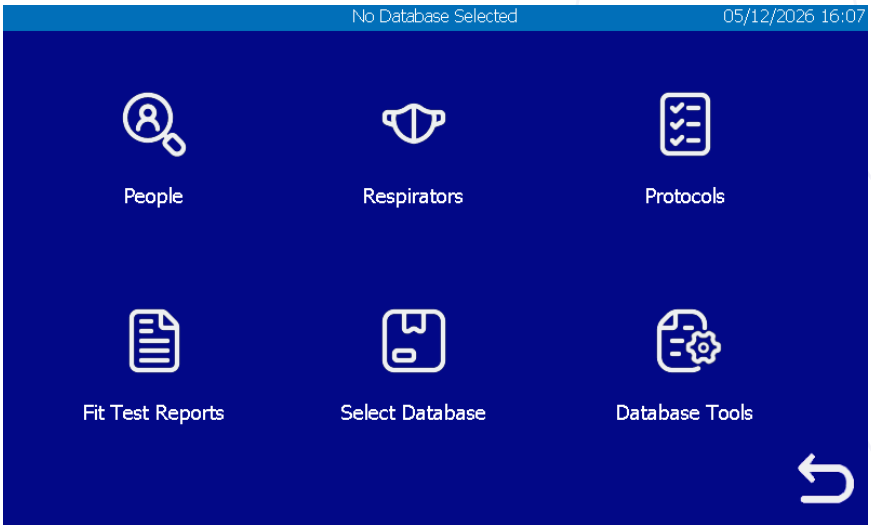
1.2 User Interface Touchscreen (Main Screen)

① Activities



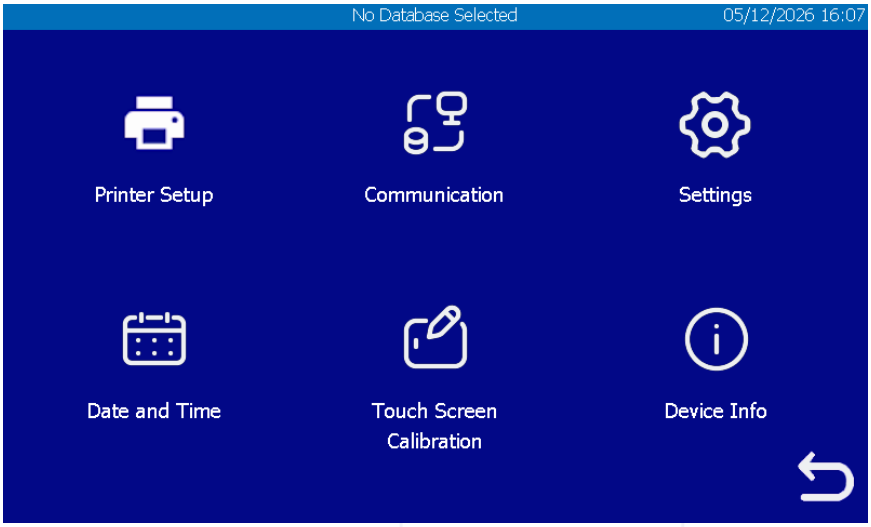
(1)	Fit Test	Allows user to perform respirator fit test
(2)	Validation Check	Allows user to conduct a system check prior to performing series of Fit Tests or other measurements Fit Tests
(3)	Realtime	Displays the fit factor graph or particle concentration of the ambient air on a real-time basis
(4)	Administration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

② Administration



(6)	People	Confirms and selects the list of people being tested. Portal to enter a new person to database
(7)	Respirators	Confirms and selects the list of respirators Portal to enter a new respirator to database
(8)	Protocols	Confirm, edit, and select the fit test protocol Enters a new test protocol to database
(9)	Fit Test Reports	Display and print the reports of conducted fit tests
(10)	Select Database	Selects database to load as active, create new database
(11)	Database Tools	Invokes the advanced mode

③ Setup



(12)	Printer Setup	Configure the printer setting
(13)	Communication	Configure and set the PC communication environment
(14)	Settings	Configures the setting(s) for the device
(15)	Date and Time	Edits the date and time setting
(16)	Touch Screen Calibration	Calibrate the touch screen
(17)	Device Info	Displays device information (Ver., S/N, Calibration, etc.)

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 twice in total, before and after a 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 exercise, 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.

$$F = \frac{\bar{x}(C_{before} + C_{after})}{2\,Conc_{mask}}$$

The sequence would thus be as follows:

C ambient // C mask // C ambient // C mask // C ambient ...etc.

F: Fit factor

C b e f o r e: Particle concentration in the ambient air before measurement

C a f t e r :Particle concentration in the ambient air after measurement

C m a s k :Particle concentration inside of the mask

Note: Newer OSHA protocols approved in 2019 consist of four 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 PRO PRO ***must*** be operated on a level surface to prevent condensed alcohol from entering the optical 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 of 2-propanol which has the particle at its center will be formed. As this cloud passes into the condenser, the alcohol molecules become tightly bound to the particle, thus increasing its diameter by 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 (2-propanol) 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:	$(CH_3)_2CHOH$
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 receiver inlet must be sealed with the storage cap to keep dust from contaminating the wick receiver.

When the device is in use, the storage cap must be used to seal the alcohol storage container to prevent moisture contamination and spillage.

3.1.2 Recharging the Alcohol Cartridge

Caution	Do not leave the alcohol cartridge receiver 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 reagent-grade isopropyl alcohol in the alcohol storage container up to the marked level.

   Be careful not to tip the bottle and spill the alcohol.
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 of the wick in alcohol.

3.1.3. Installing the Alcohol Cartridge

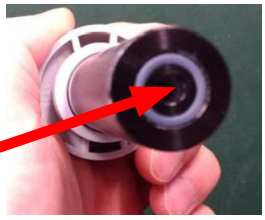
1. Remove the alcohol cartridge from the alcohol storage container and gently shake off any excess alcohol solution. Failure to do this may cause the absorbed alcohol to clog the front of the alcohol cartridge. If this should occur, the flow of the incoming airborne particles and alcohol vapor may be 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°.

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

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 discarded. • 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 receiver 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 condensed alcohol 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 Main screen (①). Prior to performing a series of fit tests, the operator should perform a 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). Failure to do this may cause unreliable test results. Always ensure that a Validation Check is performed prior to conducting a mask fit test or a series of fit tests. The Validation Check results are stored in your database for future reference.

To reiterate, the Fit Test (1) should not be performed without conducting a Validation Check (2). To perform the Validation Check, follow the procedures as follows:

3.2.1 Confirming the External Memory if operating the AccuFit Device Standalone

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 thumb 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 to the latest version, it is available at ***www.accutec.com***

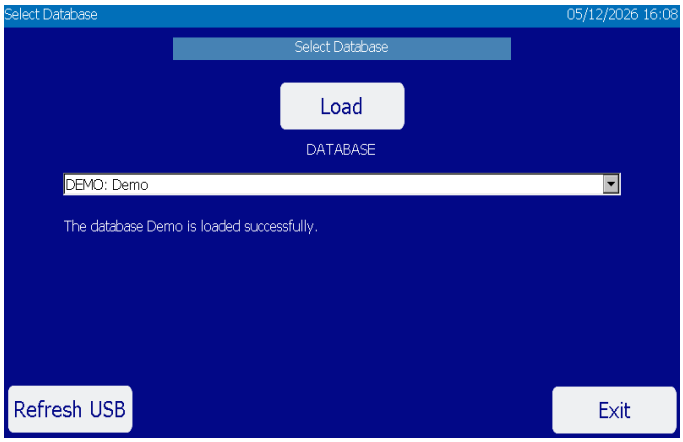
If the instrument is connected to a computer, the data will be stored in the memory of the computer.

The AccuFit PRO software operates in a Windows™ environment. Microsoft continually provides updates to their operating systems, some of which can adversely affect the communication stability of the USB connection, and so we recommend that the users of the AccuFit devices install the most up-to-date firmware from the Accutec website.

Please Note:

The procedures described in the next section should only be used if the AccuFit is being used in a standalone mode and if the firmware is a version prior to ver. 2.1.0. If the firmware has been updated to ver. 2.1.0 or newer, please refer to Appendix A. If the instrument is connected to a computer, the user should proceed to Section 5.2.2.

3.2.2 Database Selection

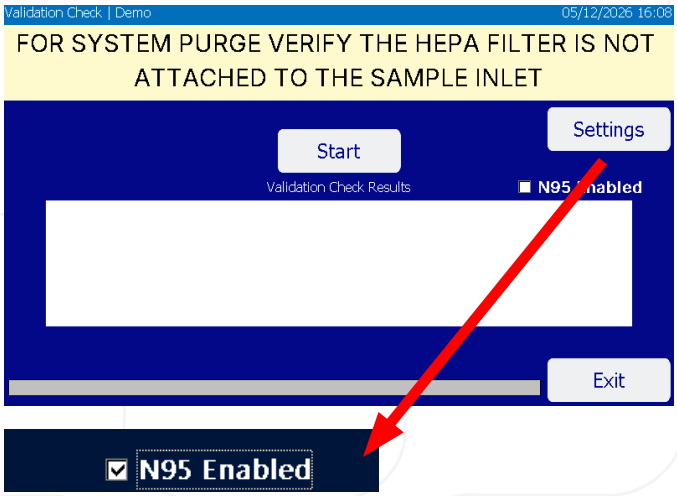


If using a USB flash drive insert it into the USB port Type A (H) of the device, prior to performing Validation Check (2).

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 or in internal memory if using ver. 2.1.0 or higher

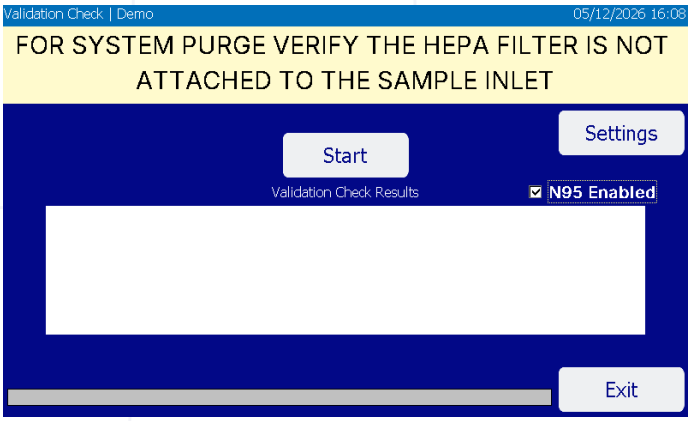
3.2.3 N95 Selection (Validation Check)



If you are Fit testing disposable respirators with an overall efficiency of less than 99% (N95's), perform Validation Check in the N95 mode (Particle Classifier energized). Select the "N95 Enabled" check box.

Please note:
The N95 mode is only available in the AccuFit PRO and is not available in the Standard device.

3.2.4 Particle Check (Validation Check)



Remove the HEPA filter 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.

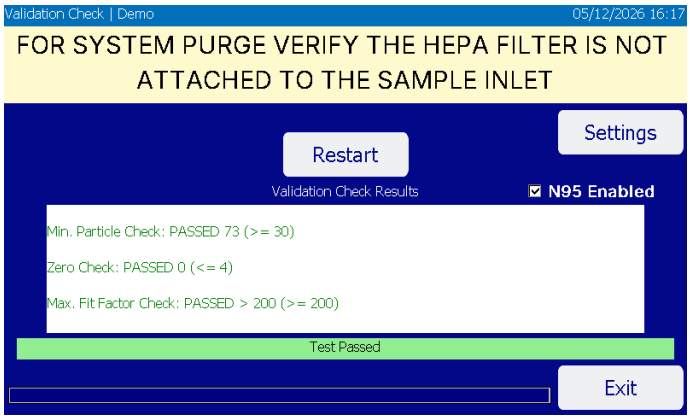
This process also confirms that the device is operating properly. When this measurement is complete, proceed to the Zero Check.

3.2.5 Zero Check (Validation 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 or external leaks or loose connections.

Attach 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 Zero Check is complete the AccuFitdevice automatically continues to the next check.

3.2.6 Max Fit Factor (Validation Check)



To confirm that the port valve performs correctly, this test confirms the fit factor using the HEPA filter. The instrument switches to the Ambient Port and takes a measurement. Then the Sample Port is selected, another measurement occurs, and the instrument 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 “Test Passed” message will appear. If the test fails, perform Validation Check again.

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

3.2.7 Validation Check Settings

By tapping the “Settings” 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 >/= 1000 Minimum particles, </= 20 Zero particles, and >/= 10,000 Max Fit Factor

If you select the Validation **Check Settings for N95 check box in the N95 Mode**, you can change values necessary in the Validation Check.

Recommended values are >/= 30 minimum particles, </=4 Zero particles and >200 for Max Fit Factor

3.3 Prepare the Person being Tested

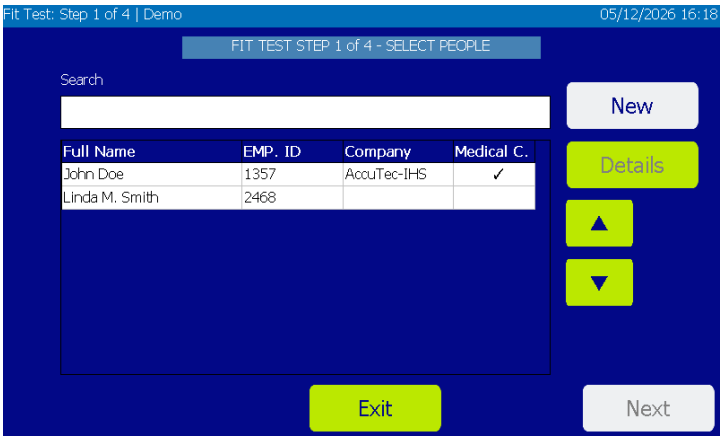
Prior to a mask fit test, attach the mask to the inlet of the Device using the appropriate adapter, have the person being tested don the mask and check the seal of the mask by himself or herself, and confirm whether he or she is wearing the mask properly. After that, the person being tested must continue 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.

Accutec urges the fit test operator to refer to the respirator manufacturer’s instructions for donning the respirator and performing the initial self-checks recommended.

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

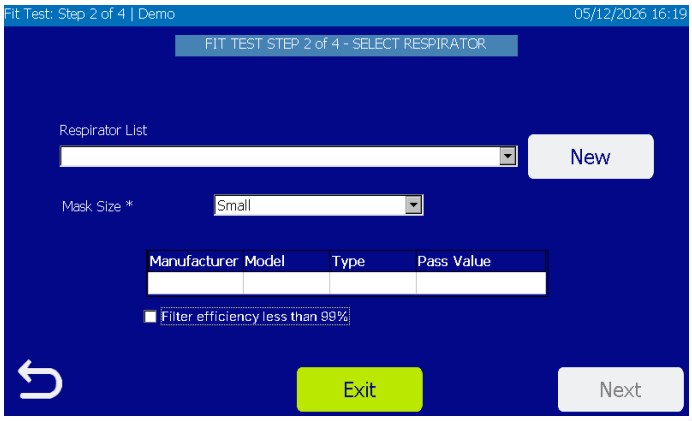
If the person to be tested is already in the database, select the name from the pull-down menu.

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 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)

SELECT RESPIRATOR

Select the mask to use for the test.

If the mask is already in the database, you can select it.

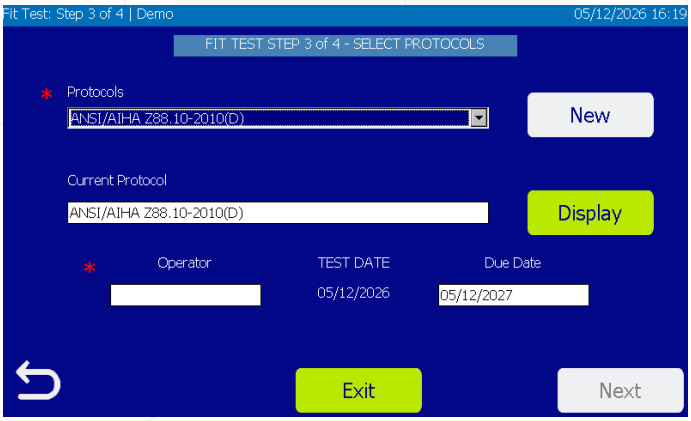
If the mask is not already in the database it must be entered prior to the test.

When you select an N95 Mask, the check box of the **Filter efficiency less than 99%** must be selected. You cannot deselect this.

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

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

4.3 Step 3



CONFIRMING THE MEASUREMENT PARAMETERS (PROTOCOLS)

Select the appropriate protocol.

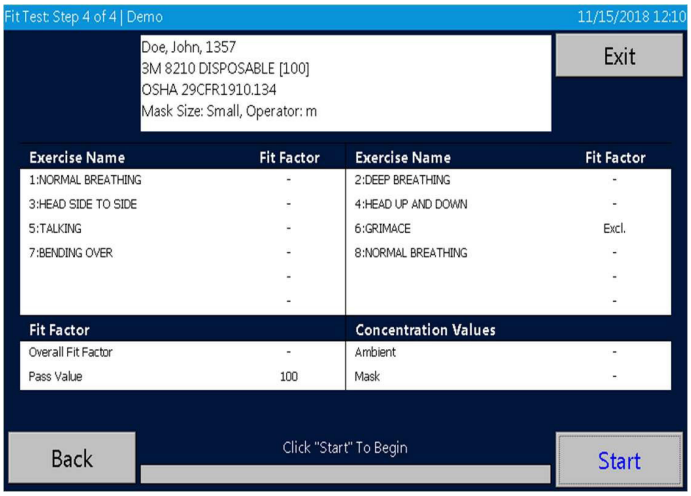
Enter the name, initials, or ID of the person conducting the fit test. (Operator) (REMEMBER it's your database so be consistent)

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 in the U.S.)

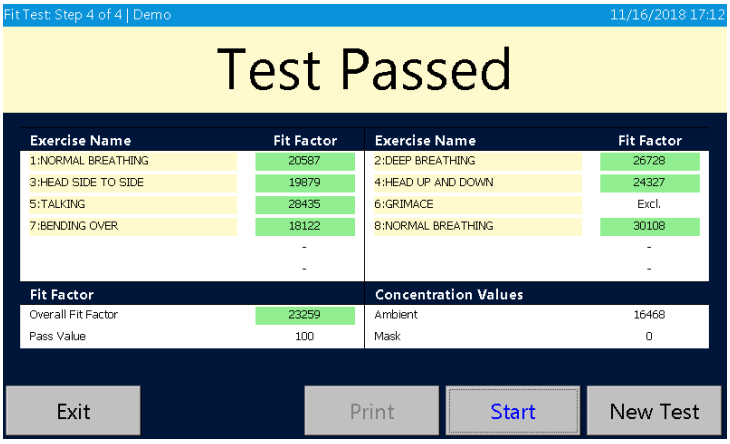
To enter a new protocol, tap the [New] button.

For details, refer to 5.1.3. Protocols.

4.4 Step 4



Note: The protocol shown above is the original 29CFR 1910.134 version.



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 configure the setting again. 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.

Please Note: Users with Firmware 2.1.5 or newer should refer to Appendix A for revised Fit Test Instructions.

Caution

To keep the inside of the device clean, attach the zero (HEPA) filter to the inlet after using the device and run the AccuFit PRO for approximately 5 minutes before turning the power off. When the device is powered on, but no fit testing is being performed, keep the zero filter attached to the clear inlet.

4.5 Record

After measurement, the data will be saved automatically into the active database on the USB flash drive or in the internal selected database. *If the AccuFit PRO has Firmware older than 2.1.0 and is used in Standalone mode, data cannot be saved on the fit test instrument itself.* If this is the case, in order to save data, use a USB flash drive that is configured with the database. If you do not have a USB flash drive, the device can perform measurements, but it cannot record the data. For this reason, we urge users to upgrade the instrument to the latest firmware available on the Accutec website here: **https://accutec.com/download/AccuFit-9000-pro-firmware/**

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).

Please bear in mind that the printer selected **MUST** be compatible with PCL3 or PCL5.

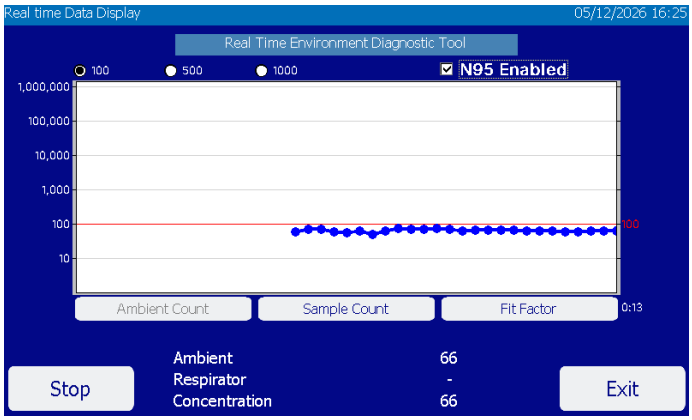
4.7 Real-time Measurement

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

***NB: This data cannot 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 (①), 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.

If you select the **N95 Enabled** check box, the real time measurement in the N95 Mode is performed.

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 Modes)

(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 (USB) or in the internal memory (SD Memory). 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 Saves 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 or SD memory Please note that the deleted data can not be restored.

Please Note: The above instructions describe Firmware older than 2.1.0. The name “Toolbox” has been changed to “Database Tools” in the newer firmware, and the additional capabilities and instructions can be found in Appendix B.

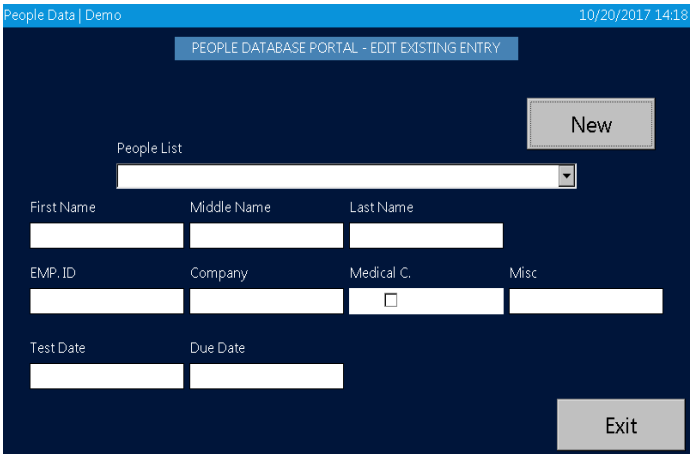
4.9 Remote Control Mode

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

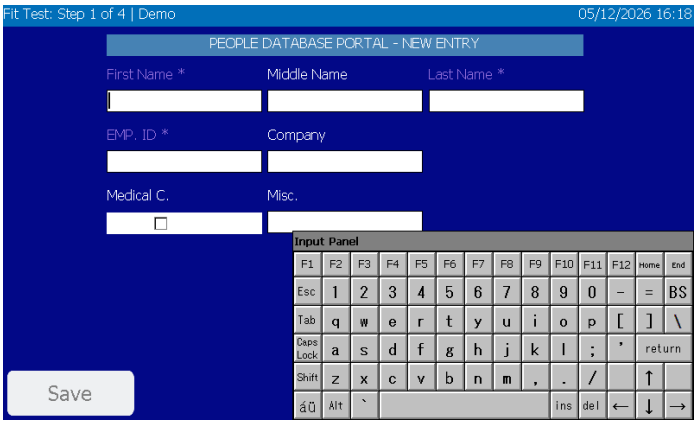
5.1 Administration

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.

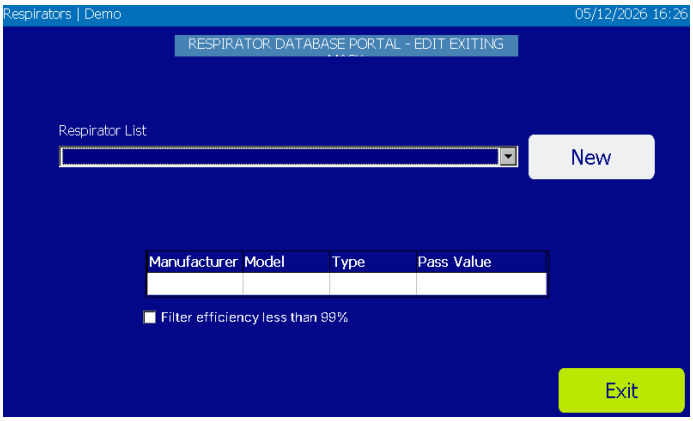


For a new entry, the first name, last name, and EMP.ID are required.

Enter the other information as desired.

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

5.1.2 Respirators



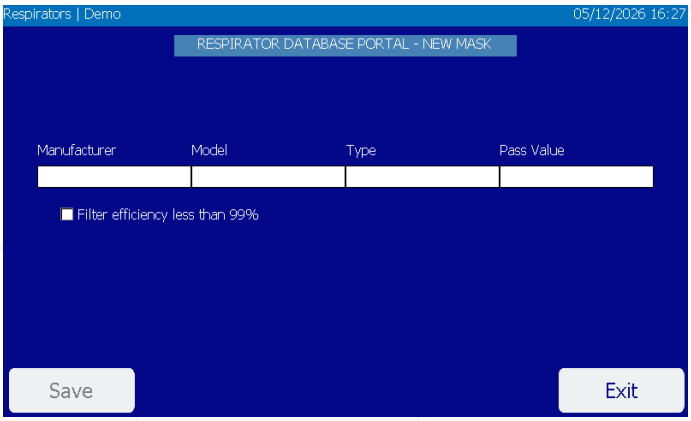
You can review an existing mask that is already in the database.

Select the mask to display the following

information: Manufacturer, Model, Type, and Pass Value.

When you select the N95 Mask, the check box of the **Filter efficiency less than 99%** is checked

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.

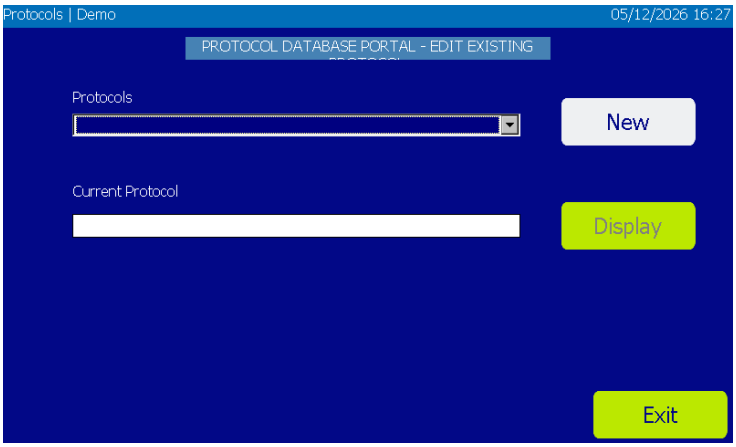
For the N95 Mask, you **MUST** check **Filter efficiency less than 99%"**

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

Please Note:

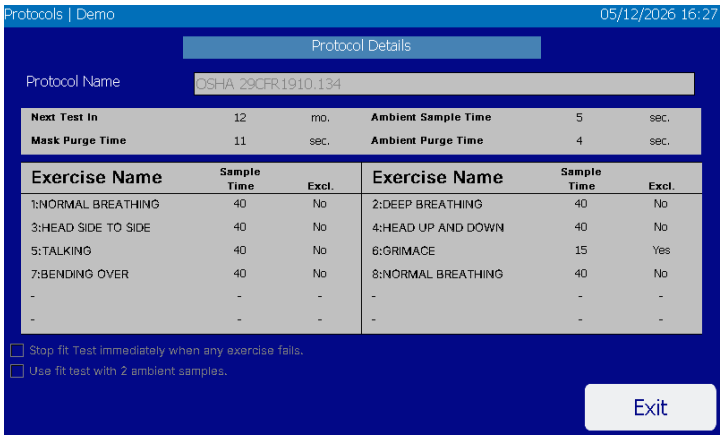
The checkbox described above is a software switch that activates the Differential Mobility Classifier (DMC) that discards all of the particles that can penetrate the N95 or FFP1 & 2 disposable respirator filter media. This is critical for enabling fit testing of N95-type respirators. Briefly, N95 and FFP1& 2 respirators are approximately 100% efficient for filtering particles that are 60 nanometers (aerodynamic diameter) and smaller. The DMC discards all of the particles with a larger aerodynamic diameter, thus ensuring that if a particle is detected in the respirator breathing zone, it made its way there by bypassing the respirator/face seal-not by penetrating the filter media. Therefore, when a disposable respirator is entered into the database, and the "Filter efficiency less than 99%"checkbox is tapped, the AccuFit PRO PRO automatically configures the DMC for disposable respirators.

5.1.3 Protocol



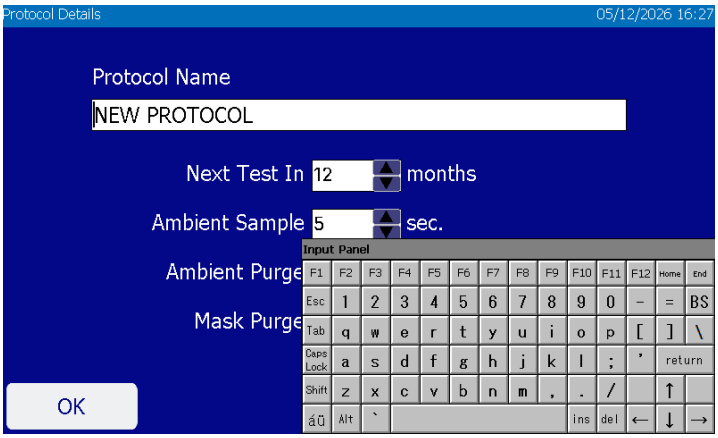
You can check the mask fit test protocols.

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.

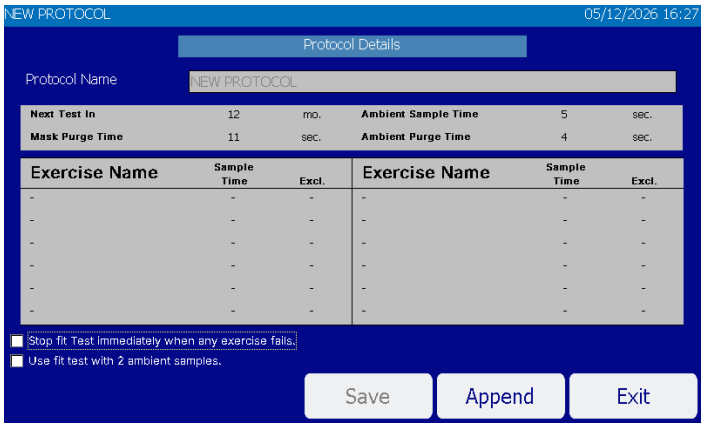


To enter a new protocol, tap the [New] button.

Enter Protocol Name you wish to add, followed by the Next Test, Ambient Sample time, Ambiebnt Purge time, and Mask Purge time.

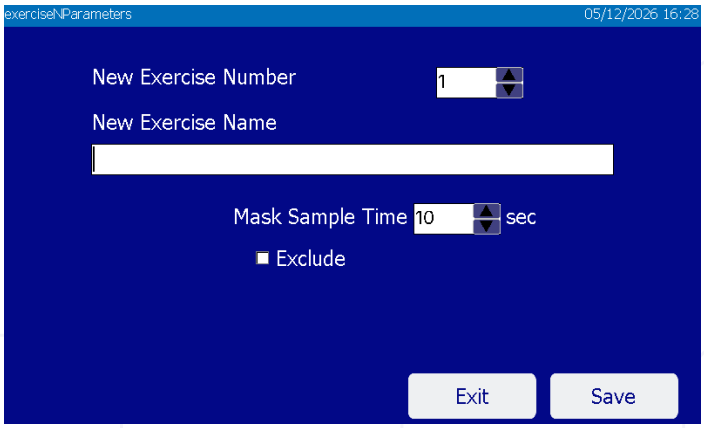
To save your entry, tap the [OK] button. The screen for entering an exercise will appear.

If you tap the [Exit] button, data you entered is discarded, and the current screen will return to the Protocol Selection screen.



Tap the [Append] button to add an Exercise.

When you tap the [Append] button, the screen for entering an exercise will appear.

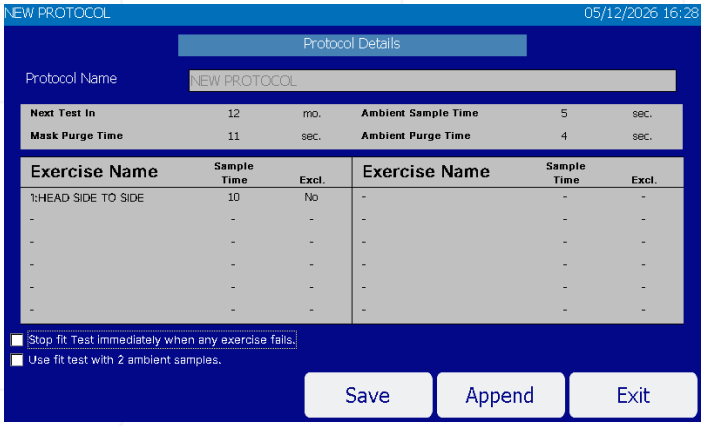


Confirm New Exercise Name, Mask Sample Time and Exclude.

When multiple exercises are entered, change the New Exercise Number to modify.

To save your entry, tap the [Save] button. The current screen will return to the Protocol Details screen.

If you tap the [Exit] button, your entry is discarded, and the current screen will return to the Protocol Details screen.

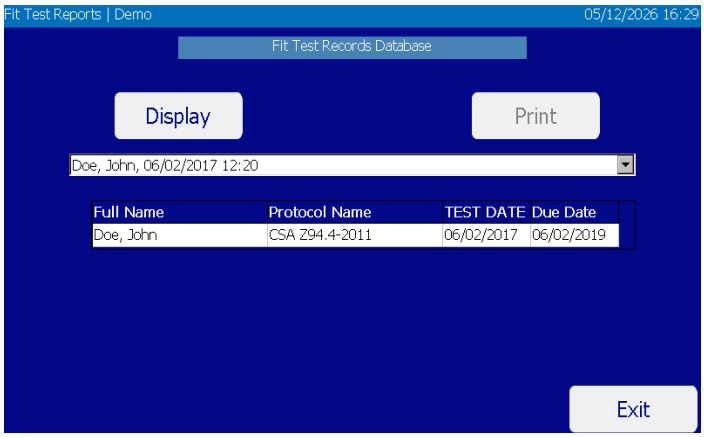


If you wish to add another exercise, tap the [Append] button.

To save your entry, tap the [Save] button. The current screen will return to the Protocol Details screen.

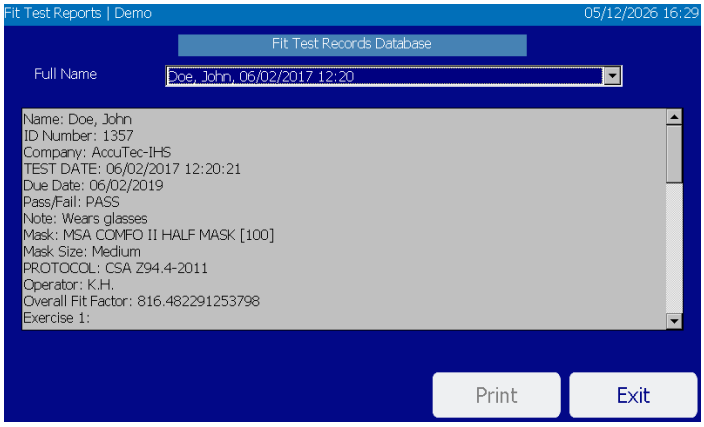
If you tap the [Exit] button, all protocols and exercises you have entered are discarded, and the current screen will return to the Protocol Selection screen.

5.1.4 Fit Test Reports



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

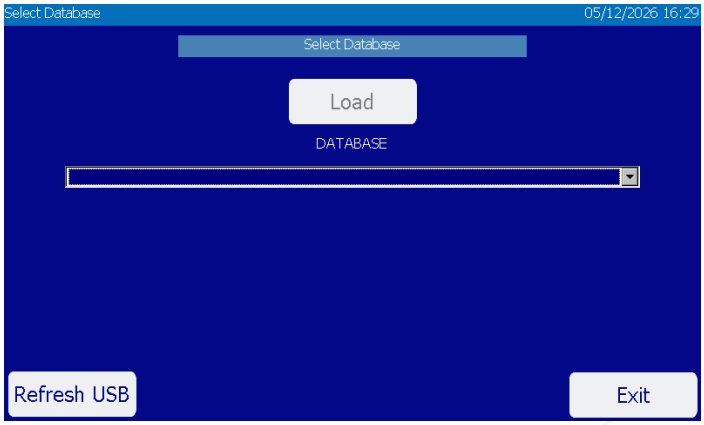
Tap the [Display] button to check the results. To print the results, tap the [Print] button. Prior to printing the results, configure the printer settings from the Printer Setup (12).



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

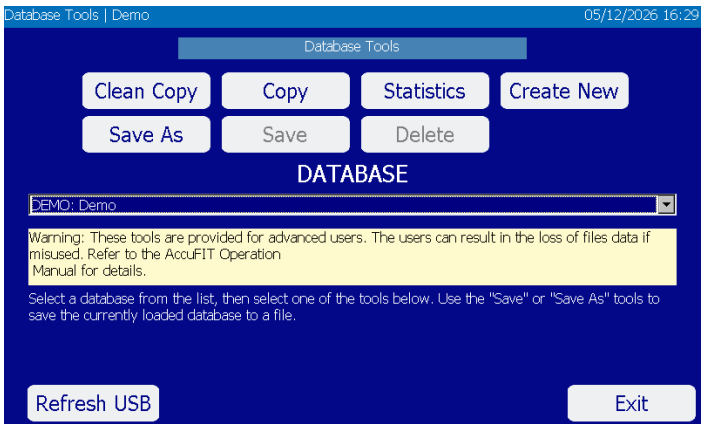


You can load the database and renew it.

Highlight the database you wish to use from the pull-down menu and tap the [Load] button to use the selected database. If Firmware is 2.1.0 or higher, the internal database(s) will also be shown.

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

5.1.6 Toolbox

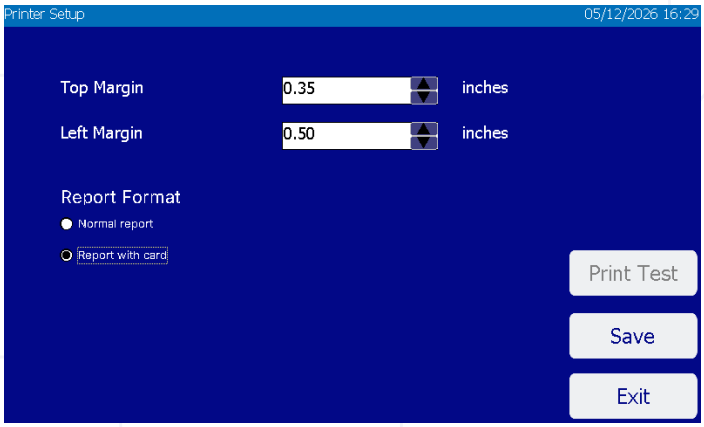


These are the tools for advanced users. For the details, refer to **4.8 Toolbox (Advanced Modes)**.

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.

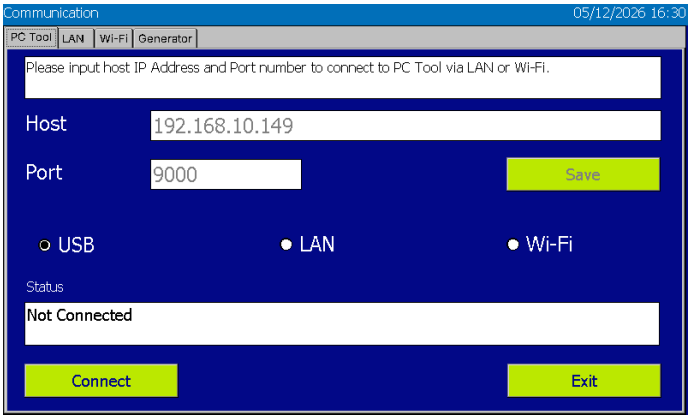
You must use a printer supporting PLC3 or PCL5 Other drivers will not work. One recommended printer is HP OfficeJet Pro 8210.

Printer Setup

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.

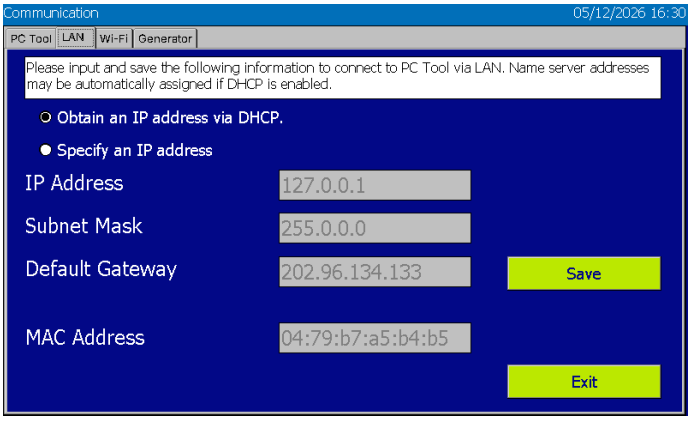


USB Connection

Most AccuFit PRO PRO users rely on the USB connection to communicate with the PC that runs the AccuFit PRO Software. It is very important to ensure that the computer has the latest driver installed which can be found at: **https://accutec.com/download/accutfit-9000cp210x-driver/**

Tap "Setup" > "Communication" to invoke the page shown on the left.

Be sure that USB button has been selected and shows a black dot . Click "Connect", and the screen will return to the Main Screen. Please refer to Appendix C for instructions which describe the initial USB setup in the computer.



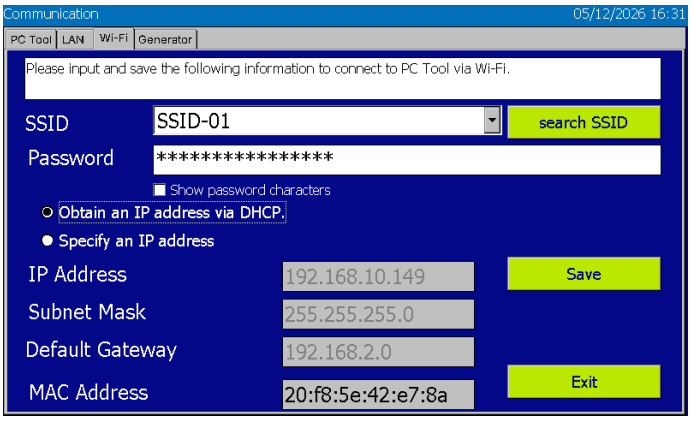
LAN Connection

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

If DHCP is enabled, select **Obtainan 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.



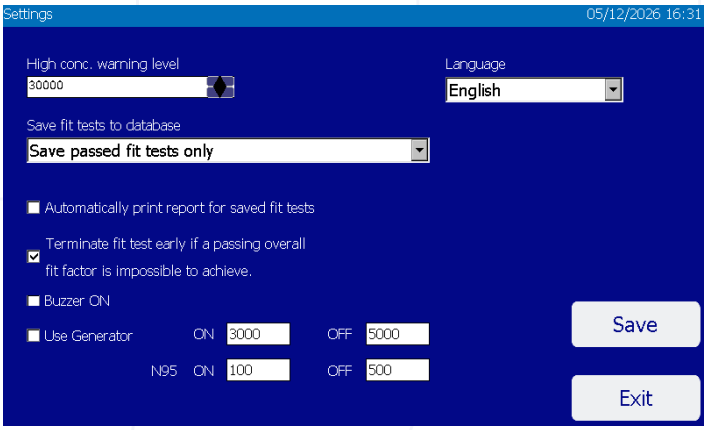
Wi-Fi Connection

Tap [search SSID] button, and select SSID of wireless router you use from the displayed list. And 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 network setting, enter IP Address, Subnet Mask and Default Gateway manually. Selecting 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.

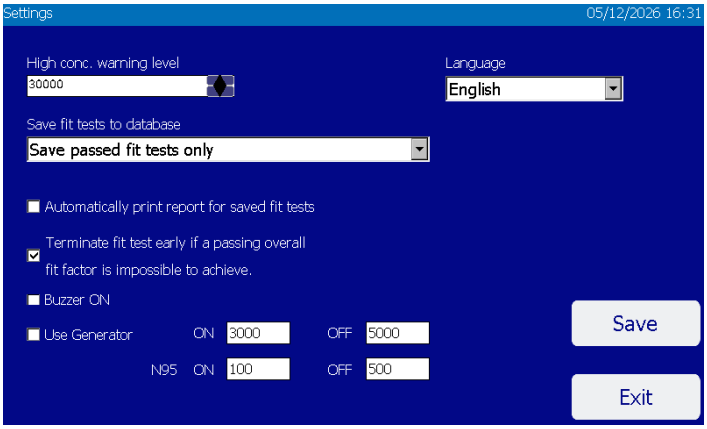
5.2.3 Settings



You can configure the settings for measurement and language.

Tap the [Save] button to save your settings. Please note: Changing language requires a re-start.

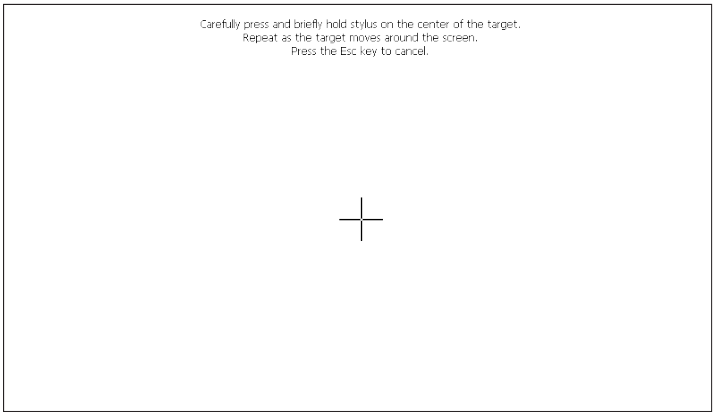
5.2.4 Date and Time



You can change the date and time settings of the device.

Tap the [OK] button to save your change(s).

5.2.5 Touch Screen Calibration

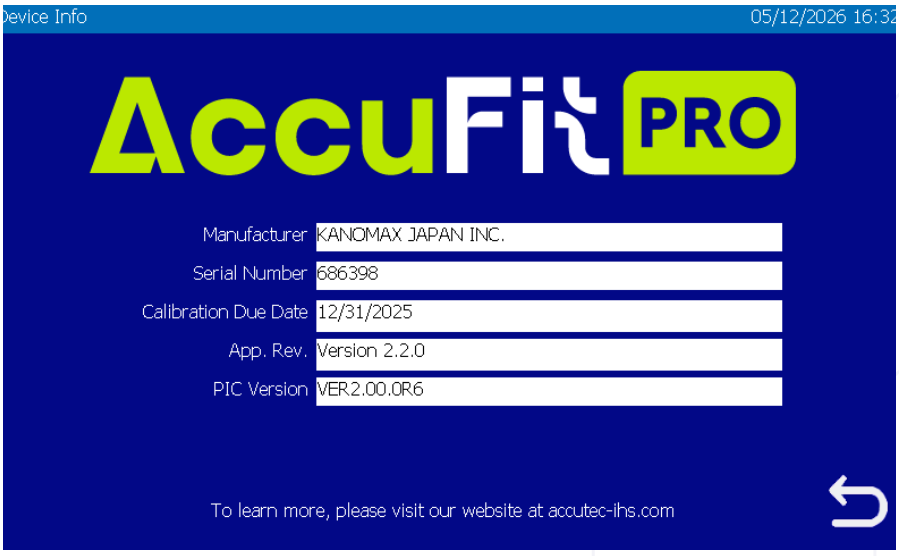


You can calibrate the touch pen.

Tap the center of the cross icon on the screen. Repeat tapping the center as the cross icon moves around the screen.

When completed, the cross icon disappears. Tap the screen to return to the Setup screen (③).

5.2.6 Device Info



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 Accutec at **https://accutec.com/calibration-repair/**
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 wick

The wick 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 felt unless a problem described below occurs.

1. The felt 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 felt 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 wick material
   In the canister of the alcohol cartridge may be clogged. The mesh can be cleaned by washing in distilled water, 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 humidity.

   Because of the fact that reagent grade 2-propanol is extremely hydroscopic, if extremely humid air is

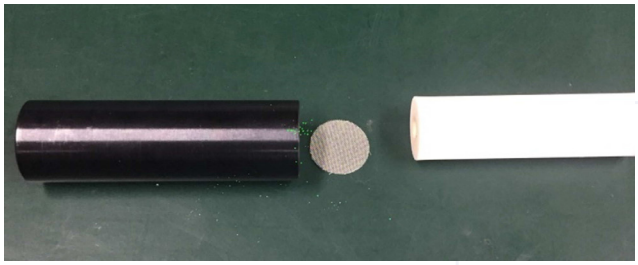
drawn into the device, moisture may accumulate in the alcohol cartridge and reduce the efficiency of the CPC. In this case, remove the felt to allow it to dry and replace it with the spare felt. When the moisture-contaminated felt is dry, it can be re-used. If the felt or mesh is obviously contaminated with something other than moisture it must be replaced with the provided spare.

Over time, the felt may become discolored. Usually this will not cause a performance problem.

Checking and replacing the wick 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, push the wick and mesh out of the cartridge cylinder (Figure 2).
3. Make sure that the wick material 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 discarded. 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.

Disassemble the Alcohol cartridge.



Remove the felt and mesh from the cartridge cylinder.

Assembling the Cartridge

⚠	Before assembling, make sure that each part is clean and the medial “O:ring has been very lightly lubricated with the DC-4 lubricant. Ensure that there is no dust adhering to the wick material. Refer to the User Guide (below) to see pictures of the assembly

Insert the clean mesh into the cartridge cylinder and confirm that the mesh lies flat on the bottom of the cylinder. Insert the white wick until it reaches the bottom of the cylinder, and assemble the alcohol cartridge by reversing the steps shown above. Finally, 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 PRO
CPC maximum detectable concentration	100,000 particles/cc
False count	0.01 pcs./cc or less
Flow rate	Inlet flow rate: 0.7LPM Sampling flow rate: 0.1LPM
Alcohol/ recharging method	Isopropyl alcohol/Felt A full recharge of alcohol allows continuous measurement for approximately 8 hours.
Memory	USB flash drive connection
Display	Color touch screen
Communication	USB, LAN, WiFi
Power source	AC adapter (AC 100 to 240V 50/60Hz) Optional Battery Pack
Operating environment	Temperature: 15 to 35 °C, Humidity: 20 to 85 %RH (with no condensation)*
Storage environment	Temperature: -20 to 50 °C, humidity: 0 to 85%RH (with no condensation)
Dimension	W 208 × D 263 × H 152 mm
Weight	Approximately 3.1kg
Standard accessories	AC adapter, Power cord, Alcohol storage container, Storage cap, Alcohol cartridge, Spare felt (2 pcs.), Wire mesh (2 pcs.), Twin tube (1m), Carrying case, HEPA filter, CD-ROM(Application Software/Instruction manual)

*AccuFit PRO 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 3.1 Recharging the Alcohol Cartridge with Alcohol.)**
	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 6.2 Alcohol Cartridge.)**
	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. (15 to 35°C, 20 to 85%RH, with no condensation)
	The alcohol is poor quality or is contaminated.	Replace the felt inside the alcohol cartridge. Use only the appropriate alcohol. **(Refer to 6.2 Alcohol Cartridge.)**
	The mesh is clogged.	The mesh may be clogged with excess alcohol. Remove the excess alcohol. **(Refer to 6.2 Alcohol Cartridge.)**
	Dust and/or alcohol may have gotten into the optical system.	Contact Accutec
	The device requires a calibration or service.	Contact Accutec.
(PD LD Error) message	The optical bench is faulty or lenses are contaminated	Contact Accutec.
(Pump Error) message	The pump in the main body is faulty.	Contact Accutec.
(Peltier Error) message	The Peltier device in the main body is faulty.	Contact Accutec.
(Low Alcohol) message	The amount of alcohol is low or is moisture-contaminated	Replenish the alcohol cartridge with alcohol. Discard contaminated 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 non-Accutec AC adapter is connected.	Make sure that the provided AC adapter is connected.
	The circuit in the main body is faulty	Contact Accutec.

9. Contact Information

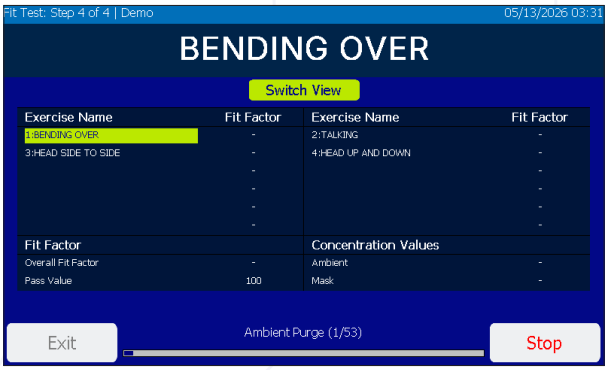
Accutec, Inc.

201 S. Miami Avenue Cleves, OH 45002 USA
TEL: (800) 896-6959
URL: https://www.accutec.com/
E-Mail: support@accutec.com

Appendix A

Fit Test Screen Enhancements

There are several changes that have been added to the Fit Test user interface on the AccuFit PRO Devices. The most obvious one is the animation images that are available in stand-alone operation when the “Switch View” box is fapped, or automatically when the fit test is run from the computer-based software.



The “details” page which is invoked when “Switch View” box is tapped is shown below.

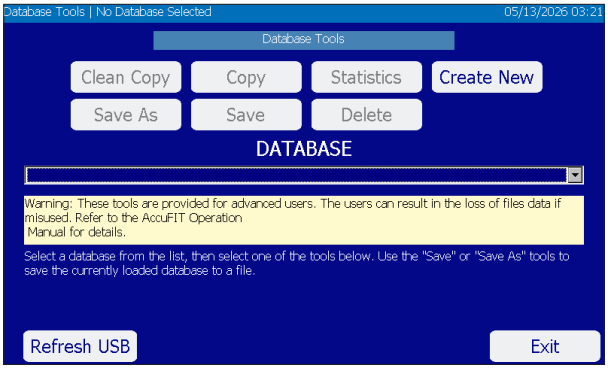
However, there are several other feature changes that are not immediately obvious to the user. One of these is the warning flag that prevents the use of the incorrect protocol if the user attempts to use a protocol for N95’s or other filtering facepieces with an elastomeric respirator, and vice versa.

Appendix B

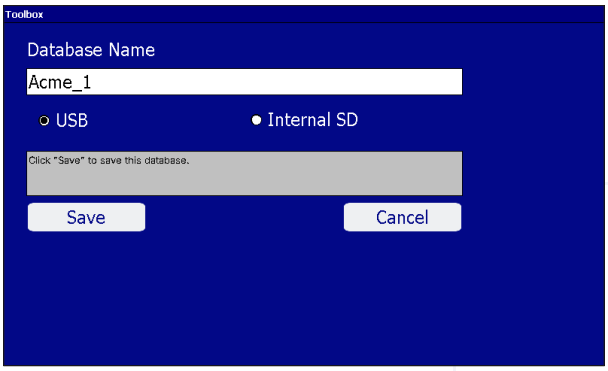
Database Tools

Transferring a Database to the AccuFit PRO Internal Memory

Insert the thumb drive with the database you copied from the computer into one of the “A”-type USB ports in the rear of the AccuFit PRO Device. Tap the “Administration” icon, then tap “Database Tools”. “The Database Tools” page will appear.

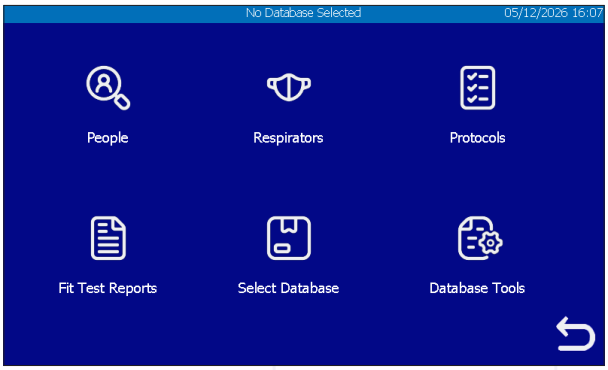


Highlight the database you want to transfer to the AccuFit PRO Device from the dropdown menu. If the database you want to transfer does not appear, tap “Refresh USB”. The database will then appear in the dropdown box, but will not be loaded into the device’s active memory. Tap the “Copy” command box in the top half of the screen if you want to copy the entire database including completed fit tests. Tap “Clean Copy” if you only want to load the “People”, “Respirators”, and “Protocols”. Note that the database is given the following name: *mydatabase_x* where “*x*” is the first copy of the database to the internal memory.



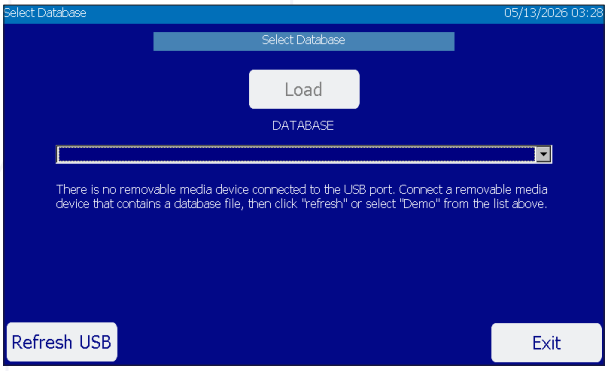
The Copy Screen appears and provides the choice of copying to “USB” (thumb drive) or “Internal SD” (the device’s internal memory). Select “Internal SD”. At this point you are given the opportunity to rename the database before saving to the internal memory by using the pop-up touchpad. Once you have renamed the database (or not, if you choose to accept the assigned name) tap “Save”.

The display returns to the “Database Tools” page, but the database you have copied to the Internal SD memory is still not loaded into active memory. Exit from the “Database Tools” page to return to the “Administration” page.



At this point you should remove the USB thumb drive from the AccuFit PRO device, as you want to be sure that you are addressing the database that has been transferred to the AccuFit PRO Internal memory rather than the database on the USB thumb drive. Tap “Select Database”.

Tap “Refresh USB” to ensure that the dropdown menu shows only those databases in the Internal SD memory.



From the dropdown menu choose the database you have loaded into the AccuFit PRO Internal Memory and tap “Load”

The AccuFit PRO device can now be used in a completely stand-alone mode to perform Validation Checks, observe the “Real Time” monitor, or perform the fit tests. All of the data you produce will now be captured to the internal memory of the AccuFit PRO device. If you want to transfer the data back to the computer for viewing or printing the fit test reports, merge or split the database(s), or produce summary reports, you will perform the reverse of the previously-described data transfer.