VeriFit® Quantitative Model MT-11
Unit Operation Manual

VeriFit® Quantitative

NEXTTEQ INTERNATIONAL

■ Product Contents

Check the contents of the package before using the product.

- ☐ Main unit ..... 1 pc
- ☐ AC adapter (plug attached, with 3 other plugs) ..... 1 pc
- ☐ Sampling tube (fused double tube) 1.5 m ..... 2 pcs
- ☐ Alcohol cartridge (alcohol wick attached, installed in alcohol fill case) ..... 1 pc
- ☐ Alcohol fill case ..... 1 pc
- ☐ Storage cap (attached to main unit) ..... 1 pc
- ☐ Replacement alcohol wick ..... 2 pcs
- ☐ Tube connector ..... 2 pcs
- ☐ Test guide ..... 10 pcs
- ☐ Strap clip ..... 1 pc
- ☐ High-performance zero check filter ..... 1 pc
- ☐ Tube Joint Set Type M 100 pairs/set ..... 1 box
- ☐ Tube Joint Attachment Tool Type M ..... 1 box
- ☐ Stylus pen (attached to main unit) ..... 1 pc
- ☐ USB cable type A-B 1.5 m ..... 1 pc
- ☐ USB flash drive ..... 1 pc
- ☐ External output connector cap (attached to main unit) ..... 1 pc
- ☐ Soft case ..... 1 pc
- ☐ Warranty ..... 1 copy

- If any contents of the package are damaged or missing, contact the distributor from whom you purchased the product.

■ About this Operation Manual

- The operation manual for this product is in two sections. Read the operation manual (PC Software User Guide) for information on how to use the PC software.
- Information in this operation manual is subject to change without notice in the interest of product improvement.
- Every effort has been made to ensure that the information contained in this operation manual is correct. If you discover any errors or omissions, however, please contact your Nextteq® representative.
-

■ Disclaimers

Be aware that the measurements provided by this product are only for evaluating the fit of a respirator during a Fit Test. The respirator fit will vary depending on the circumstances. The Fit Test measurement value is not intended for use when calculating the exposure of individuals to actual toxic substances. Accordingly, understand that Nextteq® bears absolutely no responsibility if it is used for purposes other than the above-mentioned evaluation.

Table of Contents

1 Safety Precautions 5
1-1 Users (Important) 5
1-2 Graphical Symbols 5
1-3 Caution Labels 7
2 About this Product 8
2-1 Overview 8
2-2 Measurement Principle 8
2-3 Precautions 11
2-4 Names of Parts 13
3 Preparation 14
3-1 Types of Data and Measurement Results 14
3-2 Preparation of the Alcohol 14
3-3 Supplying Power, Startup, and Shutdown 17
3-4 Main Menu Screen 18
3-4-1 Checking the Version Information 18
3-5 Basic Screen Configuration and Operations 19
3-6 Preparing for Measurement 22
3-6-1 Connecting the Sampling Tube 22
3-6-2 Selecting How to Connect to the Respirator 23
3-6-3 Checking the Particle Concentration in the Environmental Air 25
3-6-4 If Condensation Develops in the Test Guide or Sampling Tube 25
3-6-5 Checking and Cleaning the Suction Ports 26
4 Measurement 27
4-1 Measurement Modes 27
4-2 Configuration of the Measurement Mode Screen 28
4-3 Daily Check Mode 30
4-4 Fit Test Mode 32
4-5 Fit Check Mode 37
4-6 Training Mode 39
5 Settings 41
5-1 Setting Menu 41
5-2 Fit Test Settings 41
5-3 Fit Check Settings 44
5-4 Daily Check Settings 45
5-5 Training Settings 46
5-6 Date/Time Settings 47
5-7 Basic Settings 48
5-8 Touch Panel Correction 51
6 Database 52
6-1 Database Menu 52
6-2 Database Selection 53
6-3 Database Management 54
6-4 People Data 55
6-5 Respirator Data 56
6-6 Operator Data 57
7 External Output 58
8 Maintenance 60
8-1 Inspections and Maintenance 60
8-2 Operational Check with Clean Air 62
8-3 Consumables 62
9 Troubleshooting 63
10 Main Specifications 66
11 Warranty and Repairs 68

Thank you for purchasing this product.

- This operation manual contains important safety information and product handling instructions.
- Before use, read through this operation manual to ensure safe and proper use.

1 Safety Precautions

The warnings and instructions in this operation manual are provided to ensure that the product is used safely, to prevent injury to the operator and others, and to prevent property damage. All the precautionary information is important for ensuring safety. Therefore, be sure to read and understand the information thoroughly before using the product and observe it during use.

1-1 Users (Important)

This product should only be operated by trained and experienced operators that understand the specialized technology and dangers involved. Untrained or currently being trained operators should only operate the product under close supervision by a person that is already trained or has sufficient specialized experience.
This operation manual is written assuming the product will be operated by a person that understands the risks of operating the product.

1-2 Graphical Symbols

The degree of danger involved in using the product without observing the indicated precautionary information is indicated by one of two labels: WARNING or CAUTION. Always observe the precautionary information indicated with these labels, which is important for ensuring safety.

Labels Indicating Degrees of Damage or Injury

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in injury or equipment damage.

⚠ WARNING

- This product is not explosion proof, so do not use it near combustible or flammable materials.
- Do not subject the product to strong impacts or drops. Otherwise, a malfunction or accident could result.
- Never attempt to disassemble or modify the product. Otherwise, a malfunction or accident could result.
- This product is designed for indoor use. Use this product indoors at an altitude no higher than 2000 meters (6560 feet).
- If there are lightning strikes nearby, turn OFF the power, and unplug the power cord from the outlet. Otherwise, an electric shock or fire could result.
- If a problem occurs during operation, immediately stop operating the product, and remove the cause. If it is determined that the product caused the problem, turn OFF the power switch, unplug the power cord from the outlet, and then contact the distributor from whom you purchased the product or your Nextteq® representative. Never operate the product if it is not functioning normally. Also, never allow anyone other than a qualified service engineer to disassemble or modify the product. Otherwise, a malfunction or accident could result.
- Do not operate this product while it is wrapped or covered by a cloth or bedding. Otherwise, a fire or malfunction could result from trapped heat.

⚠ WARNING

- Do not get water or other liquids on the product. Otherwise, a malfunction could result.
- Be sure to comply with the recommended operating temperature range (15 to 30 °C, 59 to 86 °F). Otherwise, a malfunction or accident could result.
- Only use the AC adapter that is provided with this product.
- Do not use the product with power supplies other than single-phase 100 to 240 V AC ± 10 %. Also, do not use an overloaded electrical outlet. Otherwise, an electric shock or fire could result. Contact the distributor from whom you purchased the product or your Nextteq® representative if you will be using the equipment at a voltage outside of these specifications.
- Do not use a damaged power cord or lose power supply outlet. Doing so could result in a fire, electric shock, or other hazards.
- Do not touch the power cord, plug or outlet with wet hands. Otherwise, an electric shock could result.
- Never attempt to connect to the connectors on the back of the main unit using wire or other metal objects, or any other method not specified in this manual. Otherwise, a fire or equipment damage could result.
- Do not insert wire or other foreign objects into the suction ports. Otherwise, a malfunction could result.
- Do not use this product in an environment where it is exposed to toxic gases, acidic or alkaline substances, or anything other than air. Otherwise, a malfunction, explosion, or fire could result.
- If this product is used in a manner other than that specified by Nextteq®, the protective functionality built into it could be lost.

⚠ CAUTION

- When moving the product, do not swing it. Otherwise, a malfunction or injury could result.
- Install this product at a level, stable location. Otherwise, a malfunction, accident, or operational error could result.
- Do not install or store the product where it is exposed to strong direct sunlight, or near a fire. Otherwise, a product malfunction or failure could result.
- Do not climb or place heavy objects on the product. Otherwise, a product deformation, malfunction, or accident could result.
- Do not wash the product directly in water. Otherwise, an electric shock, fire, or malfunction could result.
- Unplug the power cord from the outlet when the product is not in use. Otherwise, a fire or malfunction could result.
- Unplug the power cord from the outlet when cleaning the product. Otherwise, a fire or malfunction could result. Do not use alcohols or organic solvents (such as paint thinner or benzene) other than ethanol for cleaning. Otherwise, the paint could peel.
  The AC adapter is not liquid resistant, so do not clean it with ethanol.
- Always grip the plug to unplug the power cord. Pulling on the cord could damage the cord and cause an electric shock or fire.
- Do not step on or place heavy objects on the power cord. Otherwise, a disconnection, electric shock, or fire could result.

⚠ CAUTION

- Be careful not to bump into the suction ports or the other protrusions. Although the corners and other potentially hazardous areas on this product have been smoothed, be careful during handling. Otherwise, an injury could result.
- The materials used in this product (including accessories and optionally available parts) could induce an allergic reaction. If you have any allergies, be sure to check that you are not allergic to any of the materials (see p. 67). Avoid using the product if you are allergic to any of the materials.
- Be careful not to entangle your hands or feet on the sampling tubes, power cord, or USB cable. Otherwise, a malfunction or injury could result.
- Be careful not to pierce your hand or fingers with the tip of the tube joint attachment tool. Do not point the tip toward anyone. Otherwise, an injury could result.
- Do not allow this product to fall. Otherwise, a malfunction or injury could result.
- If continuous measurements are taken, the alcohol concentration in the room will increase. Ventilate the area as needed.
- Depending on the measurement environment, long-term exposure may adversely affect your health. In this case, stop the measurements immediately, and leave the measurement environment until you recover.
- Use the USB cable provided with this product, or another USB cable no longer than 3 m.
- Do not block the cooling fan. Otherwise, a malfunction or operational error could result.

1-3 Caution Labels

Caution labels are affixed to the back of this product. Comply with the cautions noted therein.

	**AVOID SHOCK** Do not subject the product to strong impacts or drops. Otherwise, a malfunction or accident could result.
	**KEEP DRY** Do not touch the power cord, plug or outlet with wet hands. Do not wash the product directly in water. Otherwise, an electric shock, fire, or malfunction could result.

2 About this Product

1-4 Overview

This measuring instrument checks the integrity of the face to respirator seal when the user dons a respirator (filtering facepiece or elastomeric type). Measurements can be performed in a general indoor space.

Individuals have differently shaped faces. Many different types of respirators are sold by respirator manufacturers, so select a respirator that is a good fit to your face when it is worn. To fully draw out the performance of the respirator, the correct handling of the respirator, and whether it adheres sufficiently against the face must be considered.

This product is used to measure the extent of adhesion between the face and the face contact portion of the respirator when the respirator is worn. If there is a gap between them, contaminants may leak into the respirator depending on the extent of the gap. With this product, the extent of this leakage can be measured. By figuring out the best respirator fit to minimize the extent of this leakage, respirator wearers themselves can fully draw out the inherent performance of the respirator, or the safety advantage of wearing the respirator.

This product uses a condensation nucleus counter (CNC) as a detector. It counts the number of particles larger than a pre-specified size existing in a given volume of air sampled. This product automatically samples air and switches between the inside and outside measurements based on preset conditions.

In measuring the extent of leakage (leakage percentage), first the air near the respirator is sampled, and the particle concentration in the air (outside the respirator) is measured. Next, air is sampled from inside the respirator being worn and the particle concentration in this air is measured. Then a leakage percentage is found from the ratio of these two values. Quantification of the degree of adhesion is performed in this way.

This product is operated using a (pressure sensitive) touch panel and is easy to operate thanks to the color LCD. It can also be operated by connecting external input devices such as a USB mouse and USB keyboard.

1-5 Measurement Principle

■ Counting the Number of Particles

The number of particles in the sampled air is counted by an instrument called a condensation nucleus counter (CNC).

When particles (of dust) suspended in air are illuminated by light, the particles scatter the light (Mie scattering). The optical system and electrical circuit are configured to ensure that each time one particle passes through, an electrical signal pulse from the scattered light generates one spike, enabling the number of particles passing through to be counted. At the same time, the intensity (brightness) of the scattered light is strongly correlated with the size of the particles. Generally speaking, only very weak scattered light is obtained from small particles under 0.3 μm in size, making their detection difficult. Accordingly, a liquid (e.g. isopropyl alcohol) is condensed onto the particles, enlarging their apparent size until even tiny particles on the order of 20 nm can be detected from the scattered light. In other words, a CNC is an instrument that performs counts by condensing vapor with tiny particles as the nucleus.

■ Quantification of the Degree of Adhesion of the Respirator

The method used to quantitatively assess the degree of adhesion between the respirator and the face of the person wearing the respirator is as follows.
If there is a gap that particles can just pass through between the face of the wearer and the respirator, depending on the size of this gap, particles outside the respirator will penetrate inside the respirator during respiration. The degree of adhesion of the respirator to the face can be expressed numerically by the ratio between the concentration of these particles in the room air (outside the respirator) near the respirator, and the concentration inside the respirator.
With this product, this extent of adhesion is expressed as a leakage percentage, indicated by the following formula.

$$LP = \frac{C_i}{C_o} \times 100$$

LP: Leakage [%]
C_o: Particle concentration outside the respirator (outside)
C_i: Particle concentration inside the respirator (inward)

The fit factor/protection factor, an index showing the cleanliness of the air inside the respirator with respect to the air outside the respirator, is found from the leakage percentage using the following formula.

$$FF = \frac{100}{LP}$$

FF: Fit Factor, Protection Factor

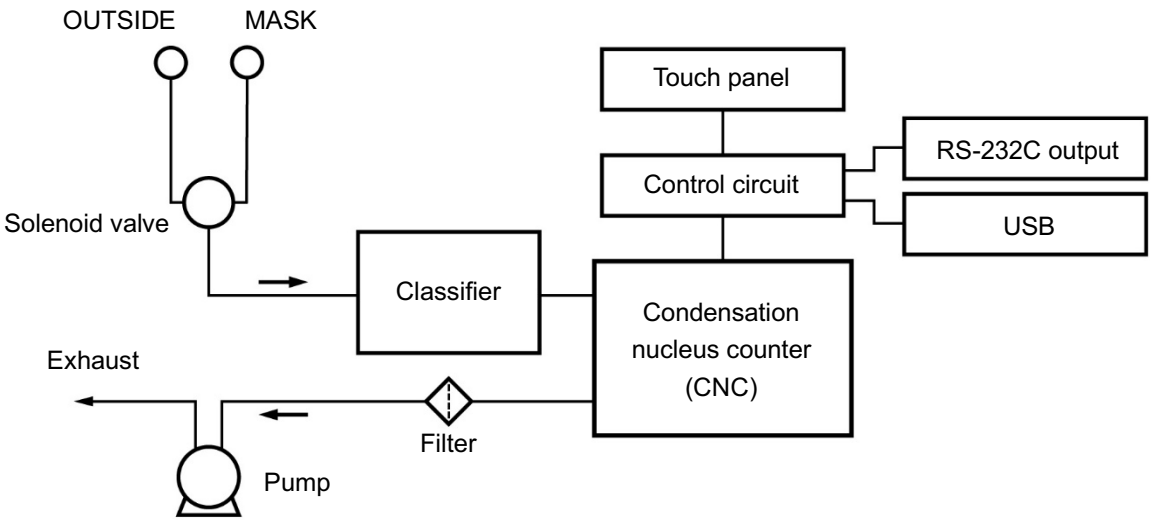
The overall leakage percentage is calculated based on the arithmetic mean leakage percentage of a multiple number of measurements taken.
The overall fit factor/overall protection factor is determined by substituting the arithmetic-mean leakage percentage of individual measurements (overall leakage percentage) into the above formula (harmonic mean of fit factors/protection factors of individual measurements)

$$LP_A = \frac{LP_1 + LP_2 + LP_3 + \bullet\bullet\bullet + LP_n}{n}$$

$$FF_A = \frac{100}{LP_A} = \frac{100n}{LP_1 + LP_2 + LP_3 + \bullet\bullet\bullet + LP_n} = \frac{n}{\frac{1}{FF_1} + \frac{1}{FF_2} + \frac{1}{FF_3} + \bullet\bullet\bullet + \frac{1}{FF_n}}$$

n: Number of measurements
LP_A: Overall Leakage [%]
FF_A: Overall Fit Factor, Overall Protection Factor

■ Block Diagram



■ Purge

A purge time is established to exchange the air remaining inside the detector with air subject to measurement when measurement starts and when the instrument switches between sampling air from Inside and Outside the Mask.
During measurement, purges are performed in the following sequences.

Example 1

Alternating measurements of OUTSIDE and MASK

OUTSIDE purge (1) → OUTSIDE measurement (1) → MASK purge (1) → MASK measurement (1)
→ OUTSIDE purge (2) → OUTSIDE measurement (2) → MASK purge (2) → MASK measurement (2)
→• • ‥ • • •
→ OUTSIDE purge *n* → OUTSIDE measurement *n* → MASK purge *n* → MASK measurement *n*

Example 2

OUTSIDE measurements are performed at the beginning and end of the sequence. In between, MASK measurements are performed consecutively.
(“Outside sample times” is set to “Twice in Fit test”.)

OUTSIDE purge (1) → OUTSIDE measurement (1) → MASK purge (1) → MASK measurement (1)
→ MASK measurement (2) → MASK measurement (3) → • • • → MASK measurement *n*
→ OUTSIDE purge (2) → OUTSIDE measurement (2)

1-6 Precautions

⚠ CAUTION

■ Cautions When Carrying the Product

This measuring instrument is equipped with a detector and processor, so be careful not to bump the unit when moving or handling it.

■ Opening and Closing the Mirror

When opening and closing the mirror, support the main unit with one hand.

■ Connecting to the Respirator

If the tube joint (push-on ring type) is selected for the connection to the respirator, the respirator used for measurement cannot be used for actual work. Use the test guide to check the degree of adhesion of a respirator that will actually be worn (Fit Test without Fit Check, Training, or respirator selection) (see p.23). Note that the test guide cannot be used in Fit Tests for respirator selection. For respirators with replaceable cartridges, use a sampling adapter sold by respirator manufacturers.

■ Handling the Tube Joint Attachment Tool

Be careful not to pierce your hand or fingers with the tip of the tube joint attachment tool. Do not point the tip toward anyone. Otherwise, an injury could result.

■ Measurement

Instruct the subject that if they feel breathless when wearing the respirator, it is ok to remove it at any time. In that case, the operator should stop the measurements immediately and assist the subject with removing the respirator.

Depending on the measurement environment, long-term exposure may adversely affect your health. In this case, stop the measurements immediately, and leave the measurement environment until you recover.

■ Handling the Sampling Tube

If this product is used for an extended period, condensation may develop inside the tube. Condensation will have an impact on the measurement results, so if water droplets are evident inside a tube, dry it thoroughly, or replace it with a dry tube before performing measurements.

■ Operating the Touch Panel

The touch panel in this product is pressure sensitive. To operate it, lightly touch one time only on a single point on the screen.
A malfunction may result if you touch multiple places simultaneously. Also be careful not to touch too hard, as you risk damaging the touch panel.

■ Face Contact

There are some parts, such as the tube joint, that touch or may touch your face.
If you have any allergies, be sure to check that you are not allergic to any of the materials (see p. 67). Avoid using the product if you are allergic to any of the materials.

■ Laser

This product is a class 1 laser product. The information on the built-in laser is as follows.

Wavelength: 658 nm
Output: 40 mW (laser rating); 15 mW (controlled)
Beam divergence angle: 10 × 20° FWHM
Pulse width and frequency: CW

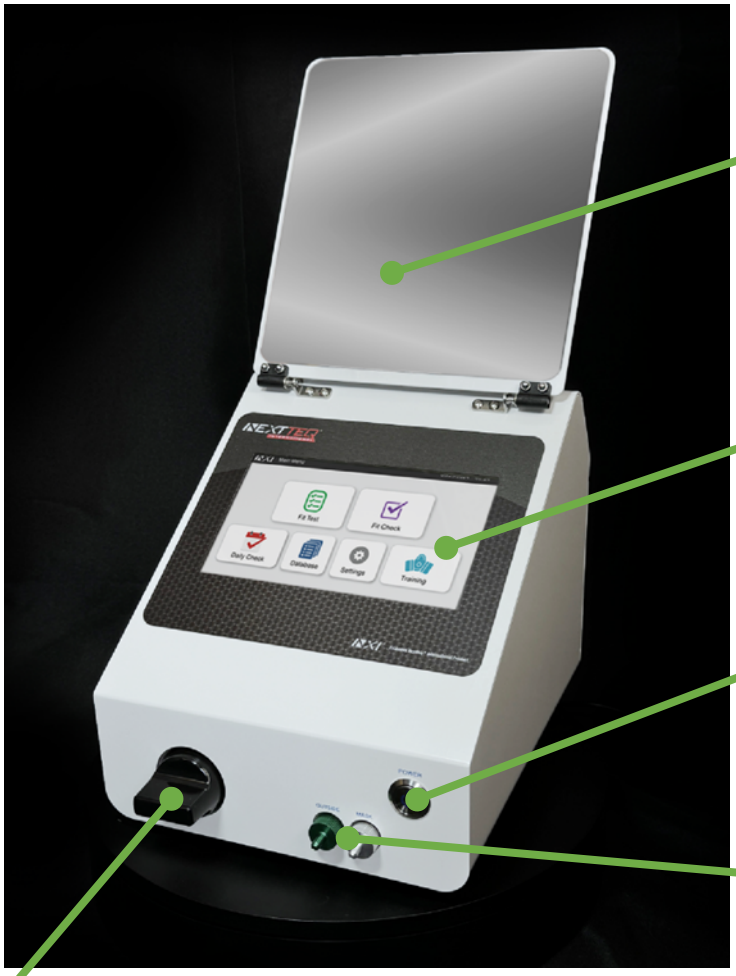
⚠CAUTION	**Using and adjusting the control unit or performing any procedures other than those specified in this manual may cause exposure to hazardous radiation.**

■ Pollution Degree and Overvoltage Category

The pollution degree and overvoltage category for this product are as follows.

Pollution Degree 2
Overvoltage Category II

1-7 Names of Parts



Mirror

Color LCD touch panel
(pressure sensitive type)

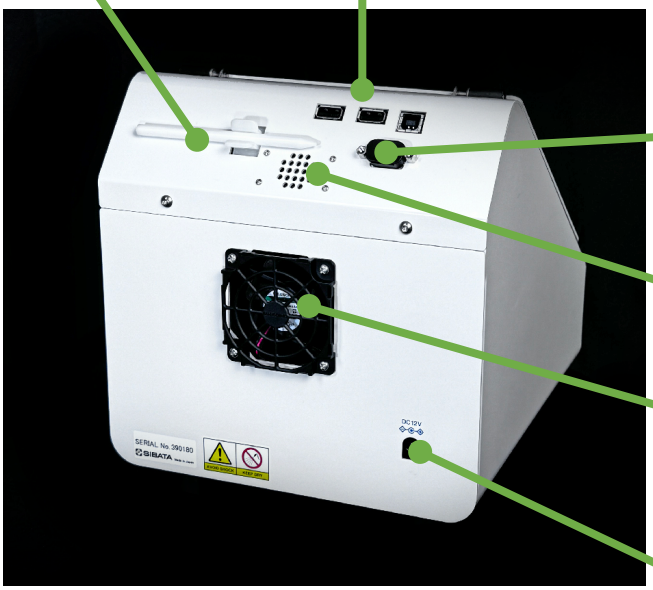
[POWER] switch

Suction ports
“MASK”
“OUTSIDE”

Alcohol cartridge insertion port

Stylus pen

USB connectors
Type A: 2 ports, for USB flash drive, USB mouse, and USB keyboard
Type B: 1 port, for connecting a PC



RS232C external
output connector
(with cap)

Speaker

Cooling fan

Power supply connector

3 Preparation

1-1 Types of Data and Measurement Results

Data used for measurement include People, Respirator, Operator, and Protocol Fit Test settings. These can be created using PC software and stored on a PC, transferred to a database file on a USB flash drive, or used in stand-alone measurements with this main unit.

These types of data can also be created with the main unit. However, deletion of protocol data, as well as the editing or deletion of other types of data, can only be performed using PC software.

These types of data can be created without using a USB flash drive, but they cannot be stored.

In terms of the measurement modes, measurement results from the Fit Test mode, Fit Check mode, and Daily Check mode are saved in the USB flash drive database file. The saved measurement results can be transferred to the PC using PC software, for use in creating and printing reports.

These measurements can be performed without using a USB flash drive, but the measurement results cannot be stored. If the measurements are performed from the PC software, the measurement results are saved on the PC.

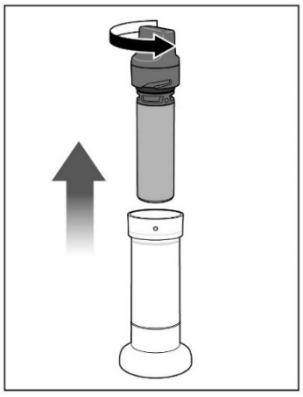
1-2 Preparation of the Alcohol

With this product, isopropyl alcohol (2-propanol) is used for the measurements and needs to be purchased separately.

Use high purity reagent grade isopropyl alcohol, or one with a purity of at least 99.5%. A malfunction could result if a lower quality is used.

⚠WARNING	**Be sure to read the Isopropyl Alcohol SDS before use.**

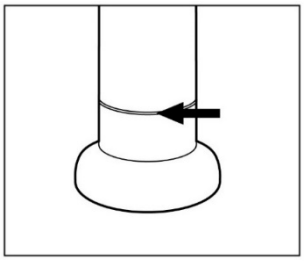
Turn the alcohol cartridge counterclockwise to release the lock, and then remove it from the alcohol fill case.

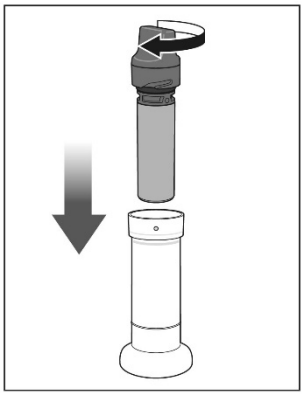


⚠CAUTION	**Keep the alcohol cartridge clean after it is removed.** Otherwise, a malfunction could result.

An alcohol wick is inserted into the alcohol cartridge at the time of shipment. Dry or replace the alcohol wick if the measurement time shortens or the wick becomes dirty and changes color (see p. 61).

Fill the alcohol wick case up to the line at the bottom of the case. Insert the alcohol cartridge, and turn it clockwise until you feel a click.



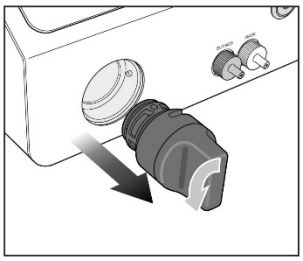


If you overfill it, the alcohol might overflow when the alcohol cartridge is re-inserted.

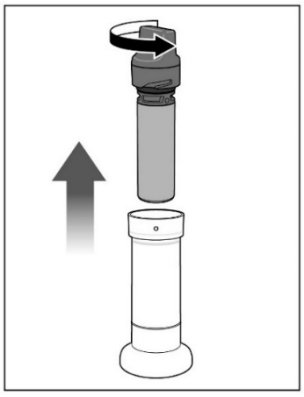
Leave it as is for 2 to 3 minutes.
The alcohol will permeate the alcohol wick inside the alcohol cartridge.

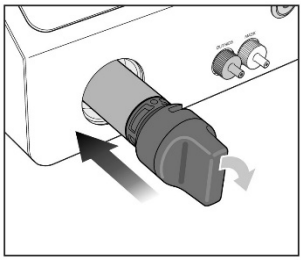
If a new or sufficiently dry alcohol wick is used, it will absorb more alcohol than when continuously used, and there will be almost no alcohol in the alcohol fill case. In this case, remove the alcohol cartridge, and re-permeate it by replenishing with additional alcohol.

Check that the main unit is unplugged. Remove the storage cap from the alcohol cartridge insertion port (see p.13).

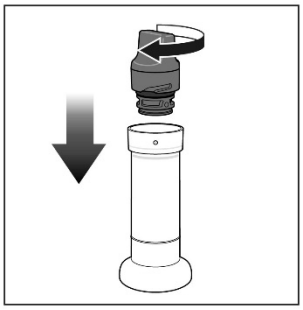


Remove the alcohol cartridge from the alcohol fill case. Shake it gently to remove any excess alcohol, and then attach it by inserting it into the alcohol cartridge insertion port.

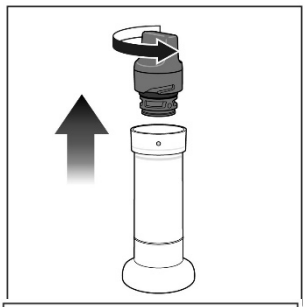




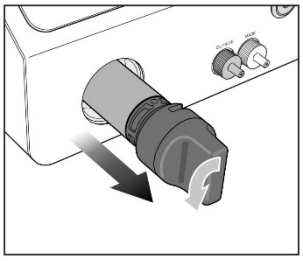
Attach the storage cap that has been removed from the main unit to the alcohol fill case.

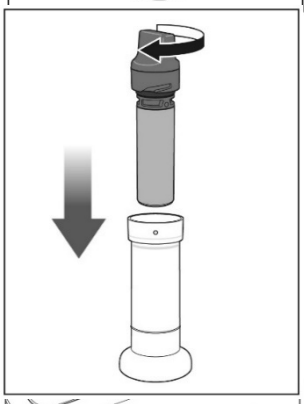


After using the main unit, check that the power is OFF. Then remove the storage cap from the alcohol fill case.

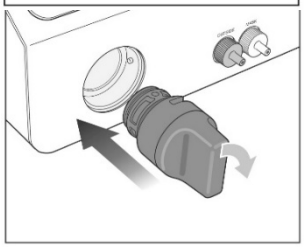


Remove the alcohol cartridge and store it by inserting it into the alcohol fill case.





Attach the storage cap to the alcohol cartridge insertion port.



⚠CAUTION	**Do not leave the alcohol cartridge inserted into the main unit as is when not in use or during shipment.** Otherwise, the alcohol might seep inside, leading to malfunctions.

1-3 Supplying Power, Startup, and Shutdown

Connect the DC plug from the AC adapter to the power connector on the back of the main unit. Then connect the power cord at the other end to an AC outlet.
If some problem is detected with the product, discontinue use immediately, unplug the power cord from the outlet, and contact the distributor from whom you purchased the product or your Nextteq® representative.

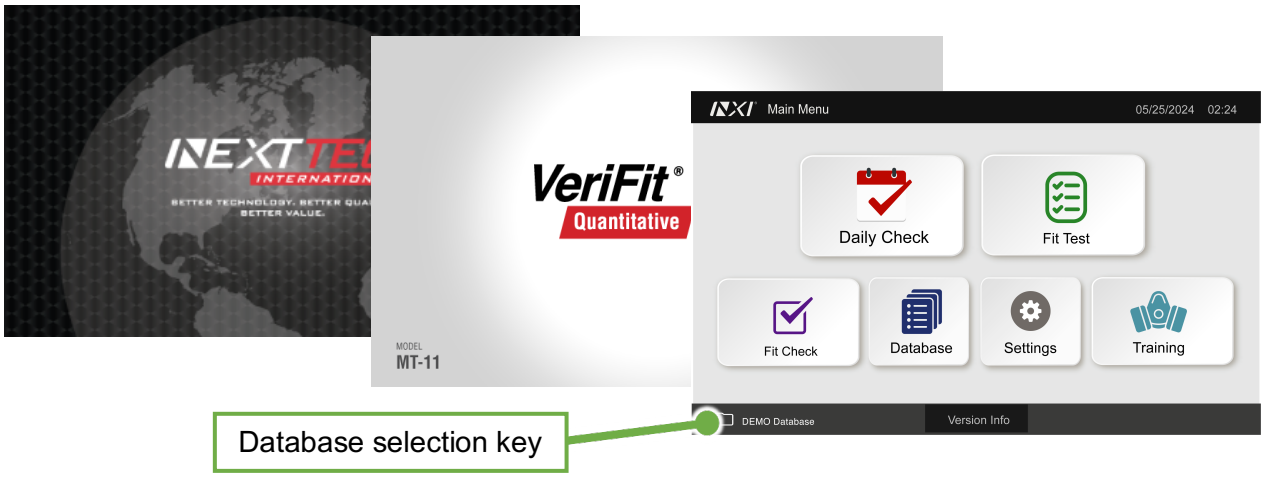
> Only use the AC adapter that is provided with the product.

■ Startup

Insert the USB flash drive into the unit prior to startup. To turn ON the power, check that the power cord has been inserted into an AC outlet. Then touch the **[POWER]** switch on the front of the unit. The switch lamp will light up, and the startup procedure will begin.

> The pump will stop momentarily and the screen will darken, but if the switch lamp is still lit up, the startup operation is continuing, so wait for it to complete.

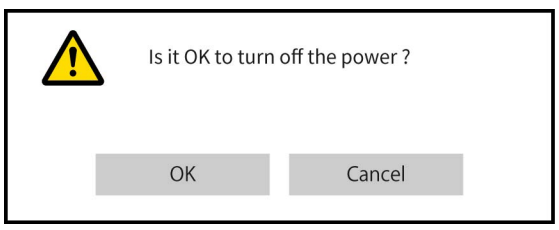
After startup, the Main Menu screen is displayed, and the USB flash drive and database are checked.



> The USB flash drive must be in the unit prior to startup to access a database stored on the drive.

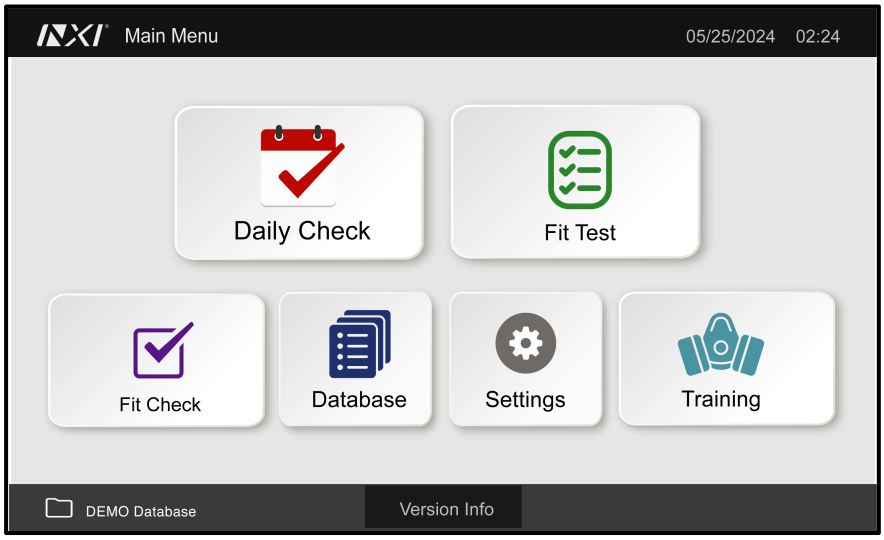
If there is a previously used database on the USB flash drive, this is automatically selected.
To change the database, touch the Database selection key to display the database selection screen (see p. 53).
If a USB flash drive is not found, the DEMO database built into the main unit is automatically selected.

■ Shutdown



To turn OFF the power, touch the **[POWER]** switch on the front. When a confirmation message is displayed, select **[OK]**. After the shutdown procedure finishes, the switch lamp will go out and the power will turn OFF. Unplug the power cord from the AC outlet.
The data might be corrupted if the power cord is unplugged from the AC outlet before the main unit turns OFF.

1-4 Main Menu Screen



Touch **[Fit Test]**, **[Daily Check]**, **[Fit Check]**, or **[Training]** to perform measurements in each mode. **[Settings]** is used to configure the measurement mode settings and other settings, and **[Database]** is used to manage the database and other data.

■ Remote Display

When communication with the PC software starts, the unit identification number is displayed at the bottom of the screen (in the subarea), and operation of the touch panel will be disabled. (See the Operation Manual (PC Software User Guide) for how to use the PC software.)

■ Standby Display when Switching Screens

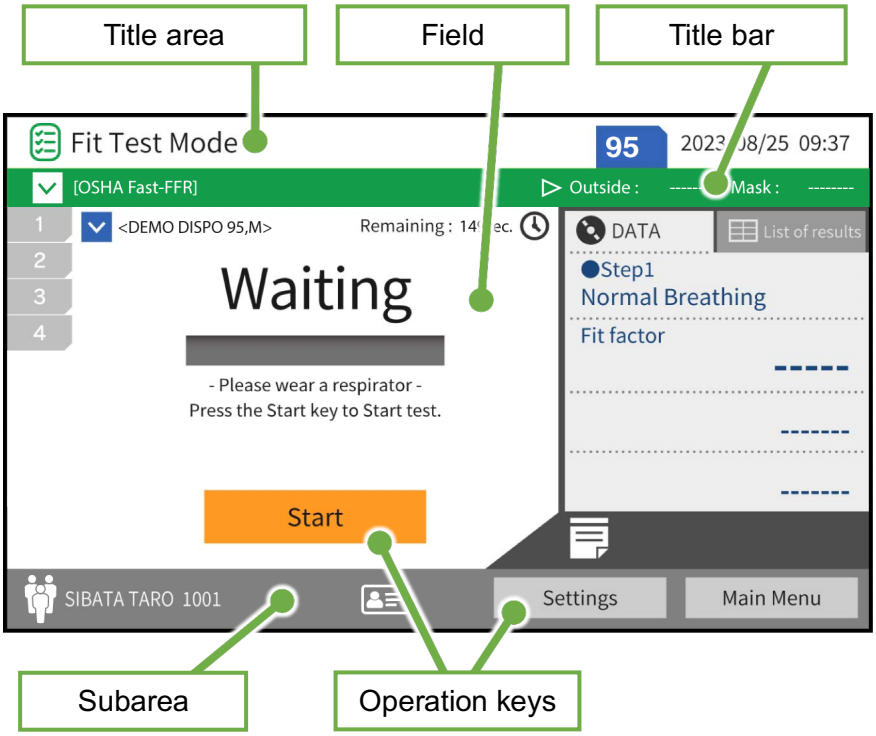
This mark may be displayed during operation. At this point, the product is in the process of switching screens. Be aware that if you perform another operation while this mark is displayed, the product may malfunction. If the unit is not operating properly, turn OFF the [POWER] switch, and then turn it ON again. If the problem persists, the product may be malfunctioning. If this happens, discontinue use immediately and contact the distributor from whom you purchased the product or your Nextteq® representative.

1-4-1 Checking the Version Information

Touch **[Ver. info.]** to display the version information screen. Touch **[Main Menu]** on the version information screen to return to the Main Menu screen.

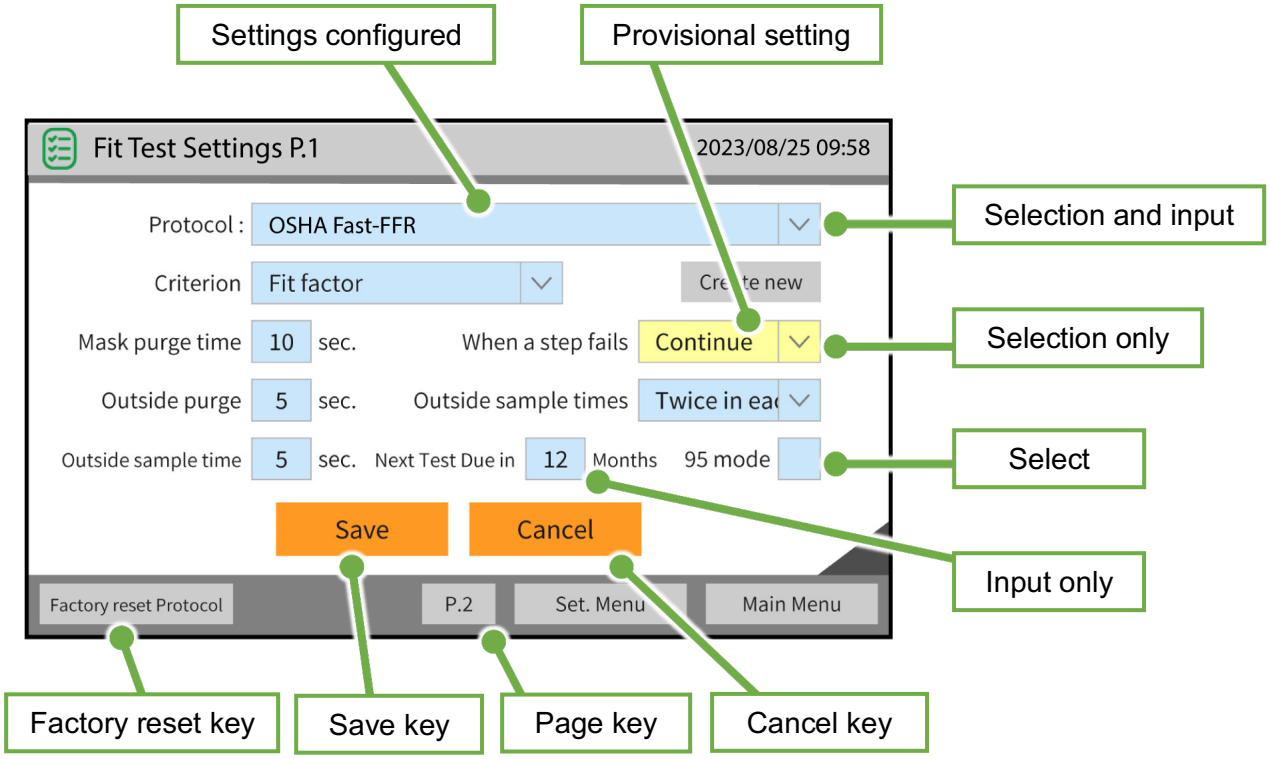
1-5 Basic Screen Configuration and Operations

The following shows the basic configuration of the screen.



Title area	This displays the icons and title of the screen being displayed, and the current date and time. In the measurement mode screen, this also displays icons related to the measurement status.
Title bar	This is distinguished by color from the screen being displayed. In the measurement mode screen, this also displays measurement related information.
Field	In the measurement mode screen, this indicates the progress, the results data, and the operation keys. In the settings screen and database screen, this is used to display and input various items.
Subarea	This displays various operation keys related to data selection and changing screens. If the screen is changed by touching **[Settings]** or **[***Data]** in each measurement mode, a key will be displayed for returning to the original screen. During communication with the PC software, the unit identification number appears here. (See the Operation Manual (PC Software User Guide).)
Operation keys	When a key is touched, the operation noted on the key is performed, or the screen displayed changes.

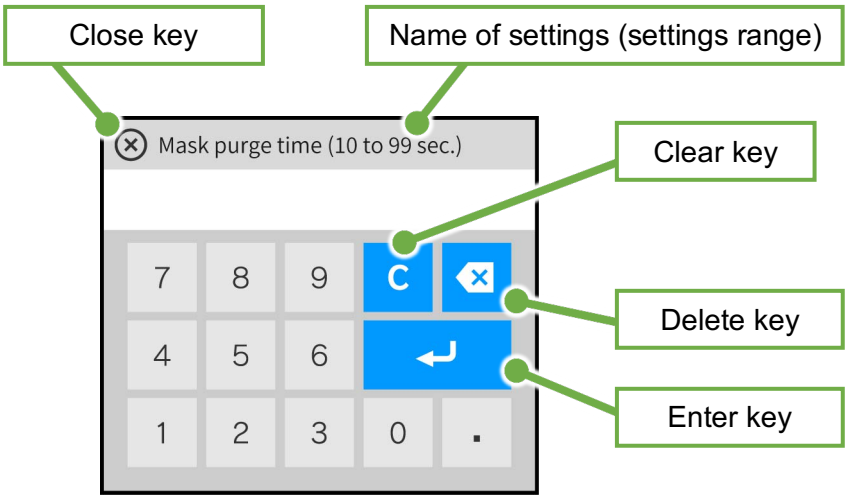
These are the basic operations in the selection and input screens.



Selection and input	With this item, touching the mark at the right edge enables selection from a pull-down list. Touching the character display area at the left displays a keyboard that can be used to input characters.
Selection only	This item can only be selected from a pull-down list.
Select	This item is set by selecting or clearing a checkbox. If the checkbox is selected, it is ON. If the checkbox is cleared, it is OFF.
Input only	This item is entered by direct input. Touch this to display a numerical keypad or a keyboard.
Settings configured	Items before the changes or items that have been configured are displayed in blue.
Provisional setting	If a setting is changed, it will become provisionally set. The changed item will change color from blue to yellow, and keys for applying or canceling the changes will be displayed.
[Save]	When an item has been provisionally set, this key is displayed for applying the changes. Touch this to apply the provisional settings details. The settings area changes from yellow back to blue and the key disappears.
[Cancel]	When an item has been provisionally set, this key is displayed for canceling the changes. Touch this to cancel the provisional settings and return to the state before the changes. The settings area changes from yellow back to blue and the key disappears.
Factory reset key	Touch this to return the settings to the factory defaults (see p. 22). With the Fit Test settings only, factory reset affects the **protocol being set**, not the Fit Test settings as a whole (see p. 41).
Page key	When the settings details cover multiple pages, touch this key to move between pages.

Once a setting is changed and becomes a provisional setting, its provisional status will not change even if you change it again to the original setting. Apply or cancel the changes.

A numerical keypad is displayed for inputting only numerical values or figures.

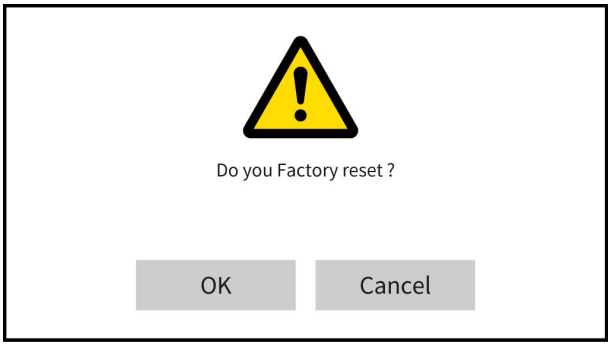


Name of Settings	Displays the details for the value being configured, and its settings range.
Close key	Touch this to cancel the entry and close the numerical keypad.
Clear key	Touch this to set the value entered to **"0"**.
Delete key	Touch this to delete the last digit entered.
Enter key	Touch this key to accept the numerical value and close the numerical keypad. If the number entered is smaller than the settings range, it will be replaced by the lower limit value. If it is larger, it will be replaced by the upper limit value.

A keyboard is displayed for inputting characters.

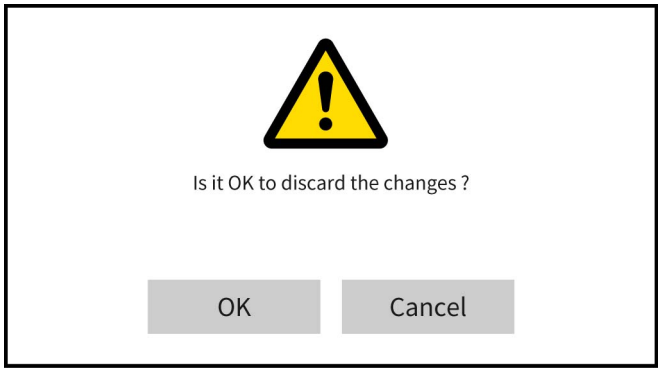
a/あ	Switches between direct input and alphanumerical character input.	⇧	Switches between capital and lower case characters.
⇥	Select a character conversion candidate.	12?	Switches between alphabetical characters and numerals.
⏎ ···	Applies the character conversion.	⌫	Deletes the previous character.
		⌦	Deletes the next character.

When the factory reset key is touched, a factory reset confirmation message is displayed.
With the Fit Test settings only, factory reset affects the **protocol being set**, not the Fit Test settings as a whole (see p. 41).



[OK]	Touch this to return the settings to the factory defaults.
[Cancel]	Touch this to cancel the operation and close the confirmation message.

When you proceed from provisional settings status with **[Save]** or **[Cancel]** displayed back to the original measurement mode or the Main Menu screen, a confirmation message asking if you want to discard the provisional settings will be displayed.



[OK]	Touch this to discard the provisional settings and proceed to the next screen.
[Cancel]	Touch this to cancel the operation and close the confirmation message.

1-6 Preparing for Measurement

1-6-1 Connecting the Sampling Tube

⚠CAUTION	**Be careful not to pierce your hand or fingers with the tip of the suction port.**

Taking the ends of the sampling tubes (tube pair) with equal lengths, connect the transparent tube to the **"MASK"** suction port on the front of the main unit (see p.13), and connect the green tube to **"OUTSIDE**".

1-6-2 Selecting How to Connect to the Respirator

Select how to connect to the respirator.

To check the degree of adhesion of a respirator that will actually be worn	⇒ **Test guide**[*1]	⇒ See "■ **Connecting and Wearing the Respirator Using the Test Guides**".
To minimize leakage from the connection area	⇒ **Tube joint**[*2, 3] (Push-on ring type in which the tube passes directly through the respirator)	⇒ See "■ **Attaching/Connecting the Tube Joint and Wearing the Respirator**" (p. 24.)

***1 Test Guides cannot be used to perform Fit Tests.**

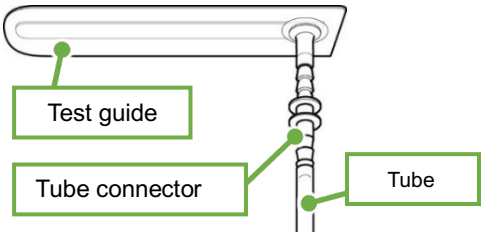
***2 A respirator with a tube joint attached cannot be used for actual work.**

***3 For replaceable respirators, use a sampling adapter sold by respirator manufacturers.**

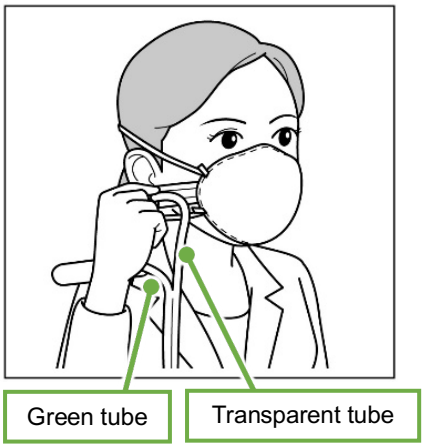
■ Connecting and Wearing the Respirator Using the Test Guides

(1) Connect the tube connector and test guide to the tips of the tubes.

A tube connector is not required for disposable test guides.

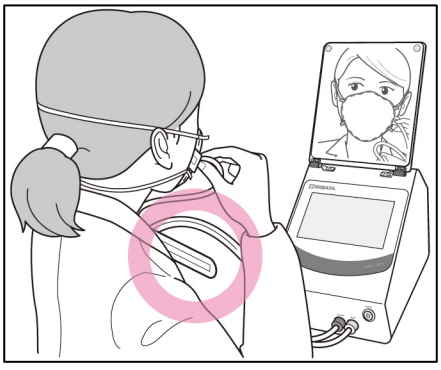


(2) Place the **test guide that is on the transparent sampling tube** against the cheek. Then insert this test guide about halfway into the gap between the respirator and the face.



(3) To ensure that the **test guide on the green tube** is positioned near the test guide inserted into the respirator, pass both tubes through the strap clip provided, and attach the clip to an appropriate point such as a lapel.

Accurate measurements become impossible if the test guide is bent, so attach it to the strap clip at a position where it will not be bent.

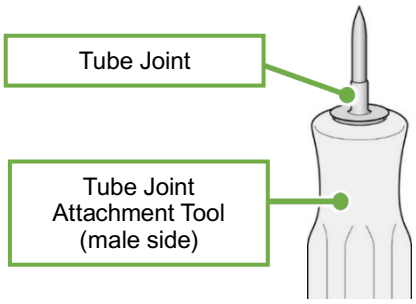


→ Proceed to **"3-6-3 Checking the Particle Concentration in the Environmental Air"**.

■ Attaching/Connecting the Tube Joint and Wearing the Respirator

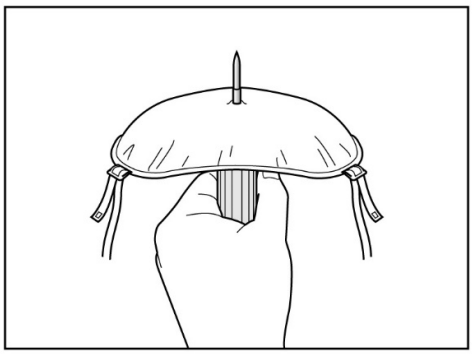
⚠CAUTION	**Be careful not to pierce your hand or fingers with the tip of the tube joint attachment tool. Do not point the tip toward anyone.**

(1) Fit a tube joint to the convex side of the tube joint attachment tool provided.

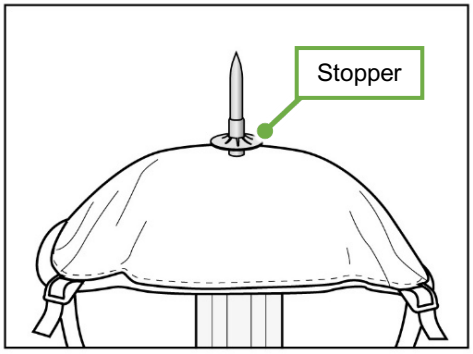


(2) At a position between the subject's nose and mouth, pierce the respirator with the tip of the tube joint until it emerges outside the respirator.

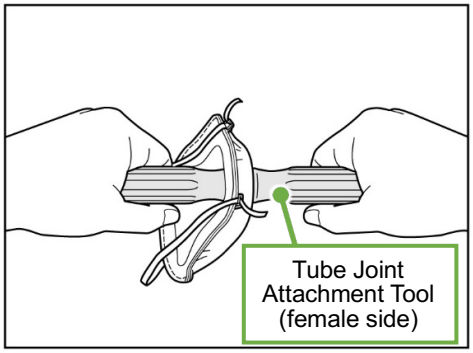
Be careful because if the penetration position is too close to the edge of the respirator or where the subject's nose will be, the tube joint hole will be blocked by the subject's skin, making it impossible to sample inside the respirator.



(3) Fit in the tube joint stopper, ensuring that the convex side is up and away from the mask.

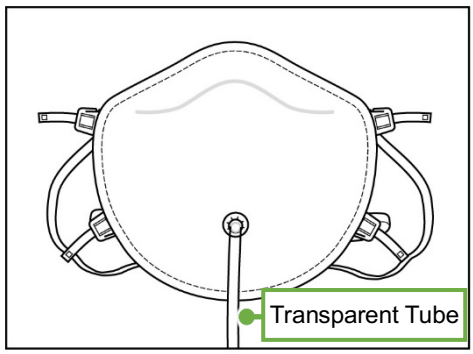


(4) Fit on the female side of the tube joint attachment tool and press the stopper onto the tube joint. The tube joint is now attached to the respirator.



(5) Connect the **transparent tube** to the tube joint and put on the respirator.

(6) Pass **both the transparent and green tubes** through the strap clip provided. Attach the clip to an appropriate point such as a lapel to ensure that the respirator does not pull away.



1-6-3 Checking the Particle Concentration in the Environmental Air

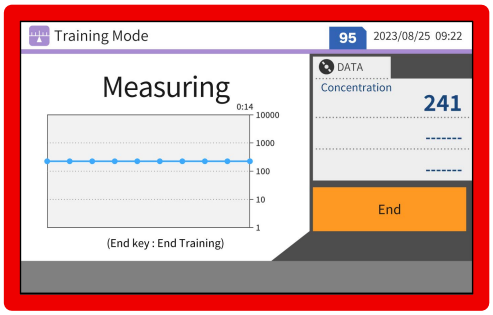
For correct measurements, there must be a certain amount of particles in the environmental air. If there are too few particles during measurement, an alert will be displayed and the measurements will stop.
(Regarding the minimum particle standards leading to the display of an alert, see p. 44 for the Fit Check mode, and see p. 45 for the other modes.)
The particle concentration in the environmental air is checked as follows.

(1) In the Main Menu screen, touch **[Training]** to enter the Training mode (see p. 39).

(2) Touch **[Settings]** to display the settings screen. Set **[Concentration]** to **"ON"** and touch **[Save]**. Then touch **[Return to Measurement Screen]** to return to the measurement screen.

(3) Touch the **[Start]** key and check the **[Concentration]** measurement value.

(4) When the check of the particle concentration in the environmental air is finished, touch **[End]** to finish the measurement.



If the particle concentration in the environmental air is insufficient, consider using a particle generator (optionally available).

> The particle concentration will be very high in the vicinity of the particle generator.
> Be careful to leave a space during installation so that the person does not come into direct contact with the vapor generated.

1-6-4 If Condensation Develops in the Test Guide or Sampling Tube

If measurements are performed over an extended period of time, condensation may develop inside the test guide and the sampling tube. This can cause fluctuations in the concentration of the particles and can reduce the alcohol retention time.
If water droplets are evident inside the tube, dry it thoroughly, or replace it with a dry tube before performing measurements. The drying method is described below.

- With the main unit turned ON, connect the test guide and sampling tube that have condensation inside them to the **"MASK"** suction port, and leave them as is for some time.
- Remove the test guide or sampling tube with condensation inside from the suction port on the main unit and circulate dry pressurized air through it.

> If you are in a hurry, replace the test guide and sampling tube with dry ones.

1-6-5 Checking and Cleaning the Suction Ports

With extended use, or use in very dusty environments, contaminants can accumulate within the suction ports, reducing the intake of air, leading to an impact on the measurements. Check the interior of the suction ports periodically and clean them if necessary (see p. 61).

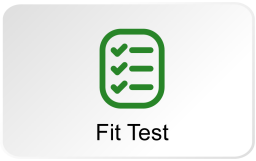
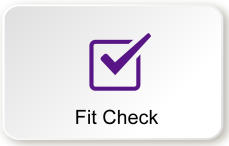
As a diagnostic procedure, remove the sampling tube from the suction port, and switch repeatedly to the Fit Check mode (see p. 37). If the particle concentrations for OUTSIDE, MASK, or both are low and continue that way, there could be an accumulation of contaminants in the applicable suction port.

OUTSIDE and MASK measurements are performed alternately, so a difference in the particle concentrations can easily arise in ventilated environments or environments with a low concentration of particles in the air. Accordingly, take multiple measurements to ensure that you can determine whether any tendency towards high or low particle concentrations is continuing.

4 Measurement

1-7 Measurement Modes

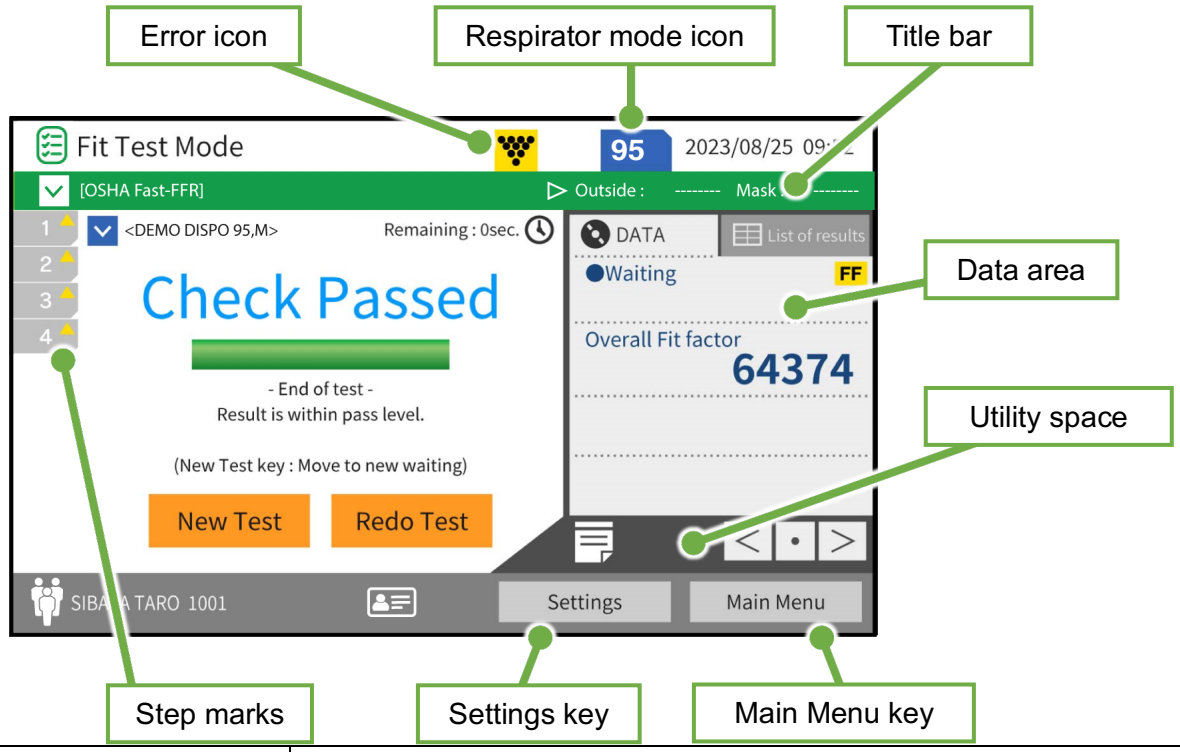
This product is equipped with four measurement modes.

Measurement Mode	Description	Reference Page
Fit Test mode 	Measurements are performed in accordance with a preprogrammed sequence (protocol), and the leakage percentage and fit factor/protection factor are automatically calculated. *Use this when selecting a respirator for each person and when having them practice wearing a respirator.* This product is already programmed with JIS, OSHA, and other protocols. In addition, the protocol can be customized (see p. 41).	P. 32
Fit Check mode 	The leakage percentage is measured once. *In order to confirm the degree of adhesion of the respirator before entering a workplace, use this mode using the test guides.*	P. 37
Daily Check mode 	Check that the product is operating normally before starting a Fit Test. *If you attempt to start a Fit Test before performing a Daily Check, a confirmation message is displayed recommending that you switch to the Daily Check mode.*	P. 30
Training mode 	The leakage percentage is simply measured in real time. *Use this mode when checking the fit of the respirator while adjusting its position. The pump operates continuously, so measurements of particle concentrations in the environmental air are performed here as well* (see p. 25).	P. 39

Standard settings are configured for all four measurement modes at the time of shipment.
To change the settings, do so in accordance with **"5 Settings"**.

1-8 Configuration of the Measurement Mode Screen

Each of the measurement modes shares the following basic screen configuration.



Error icon	Errors are displayed here. Touch this to display a message related to the error details.
Respirator mode icon	Displays the respirator mode.
Title bar	Displays the instantaneous particle concentration.
Step marks	With this product, the sequence and stages of the operation are indicated as [Step]. Marks for each measurement step to be performed subsequently are displayed. The finished steps are darkened.
Data area	Displays the calculated measurement results, or the OUTSIDE and MASK particle concentrations.
Utility space	Displays some of the operation keys related to measurements or operation keys related to the data.
[Main Menu]	Touch this to exit measurement mode and return to the Main Menu screen.
[Settings]	Touch this to configure the settings for the current measurement mode in use (see p. 41 and after). After completing the settings, touch **[Return to Measurement Screen]** to return to the previous measurement mode. Be aware that when you configure the settings, the measurement results displayed will disappear.

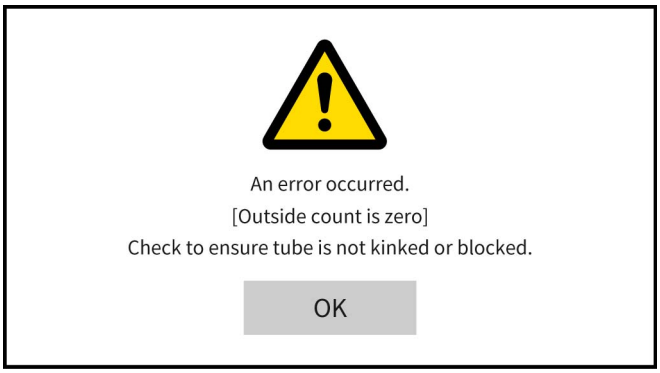
The respirator mode icon displays the current respirator mode.

99+	99+ mode: This is displayed when the mode set is for measuring respirators with a filter efficiency of at least 99%.
95	95 mode: This is displayed when the mode set is for measuring respirators with a filter efficiency of less than 99%.
–	This icon is displayed when the respirator mode has not been selected.

The error icon is displayed if an error occurs. If the icon is touched, a message is displayed corresponding to the error details, but measurements can continue during this time.
For error details and procedures, see **"9 Troubleshooting"** (p. 63).
Touch **[OK]** to close the message.

	Equipment alert: This is displayed in the following circumstances. • When there is insufficient alcohol • When the detector output is unstable
	High concentration particle alert: This is displayed when the OUTSIDE particle concentration is too high.

If an error has occurred that prevents measurements from continuing, measurements are stopped, and a message is displayed.
For error details and procedures, see **"9 Troubleshooting"** (p. 63).
Touch **[OK]** to close the message and return to standby.



1-9 Daily Check Mode

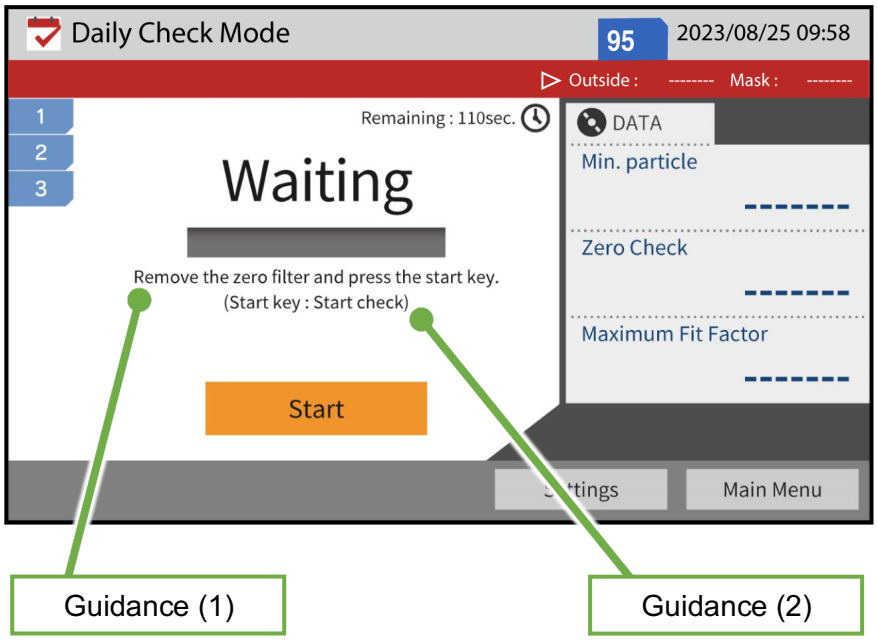
Touch **[Daily Check]** in the Main Menu screen.
In the Daily Check mode, the system checks whether there is a sufficient number of particles in the measurement environment and whether the product is operating normally before starting the Fit Test.
Three items are checked (3 step process).

(1) Min. Particle Alert: Checks whether the number of particles in the measurement environment is at the optimal concentration.

(2) Zero Check: Checks whether the system reads properly when a zero check filter is in place.

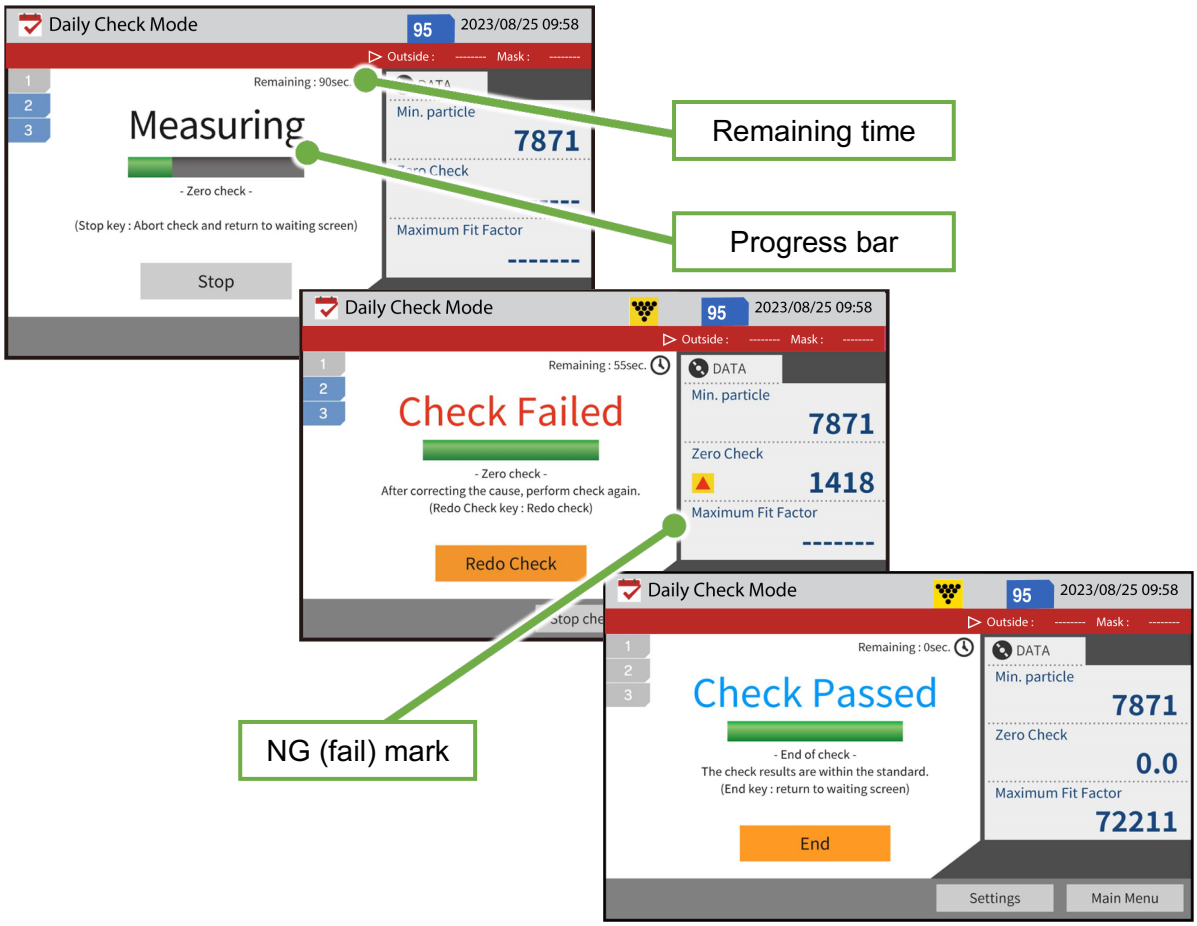
(3) Maximum Fit Factor check: Maximum measurable Fit Factor value for the current measurement environment.

If you attempt to start a Fit Test before performing a Daily Check, a confirmation message is displayed recommending that you switch to the Daily Check mode.



Guidance (1)	Displays instructions for the measurement preparations, and the current measurement details.
Guidance (2)	Displays the operational details.
Data area	The measurement results for each step are displayed each time a measurement finishes.
Min. Particle	The results of the Min. Particle Check are displayed with the particle concentrations.
Zero Check	The results of the zero check are displayed with the particle concentrations.
Maximum Fit Factor	The results for the Maximum Fit Factor check are displayed with the Fit Factor.

With the Daily Check, the high-performance zero check filter provided is used.
Connect/disconnect the high-performance zero check filter as described in Guidance (1). Then proceed with measurements as per the operations in Guidance (2).



Remaining time	Displays the remaining time for all measurements as a numerical value.
Progress bar	The progress through the current step is indicated by the bar color. When the bar is completely colored, the current step is finished.
NG (fail) mark	This is displayed beside any measurements that fall below the standards.

Touch **[Start]** and check each step.
If the measurement results are not within the standard range, **"Check Failed"** will be displayed, an NG (fail) mark will be displayed in the data area, and the operation is paused. Reconfigure the settings. Then touch **[Redo Check]** and repeat the failed measurements.
When all three steps pass, **"Check Passed"** is displayed, the measurements finish, and the measurement data is saved.

If you stop the measurements by touching **[Stop]**, the measurement results for the steps to that point are not saved.

1-10 Fit Test Mode

Touch **[Fit Test]** in the Main Menu screen.

If you turn ON the power but do not perform a Daily Check, a confirmation message asking if you want to perform the Daily Check will be displayed.

[Implement]	Touch this to proceed to the Daily Check mode (see p. 30). To return from the Daily Check mode, return to the Main Menu screen, and touch **[Fit Test]**.
[Not Implement]	Touch this to cancel the operation and display the Fit Test mode.

In the Fit Test mode, measurements are performed in accordance with a preprogrammed protocol, and the leakage percentage and fit factor/protection factor are automatically calculated. Use this when selecting a respirator for each person and when having someone practice wearing a respirator.

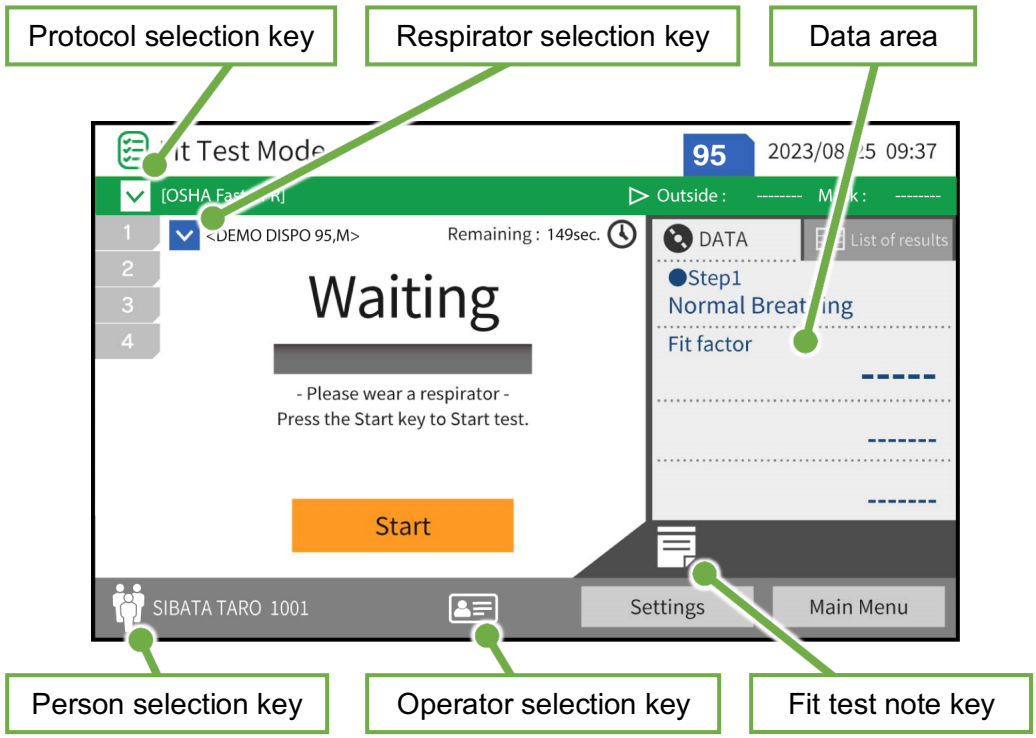
This product is already programmed with JIS, OSHA, and other protocols. In addition, the protocol can be easily customized on the screen (see p. 41).

In the Fit Test mode, the number of steps differs depending on the protocol.

In order to set the measurement conditions or to record the measurements, select the data in the following sequence.

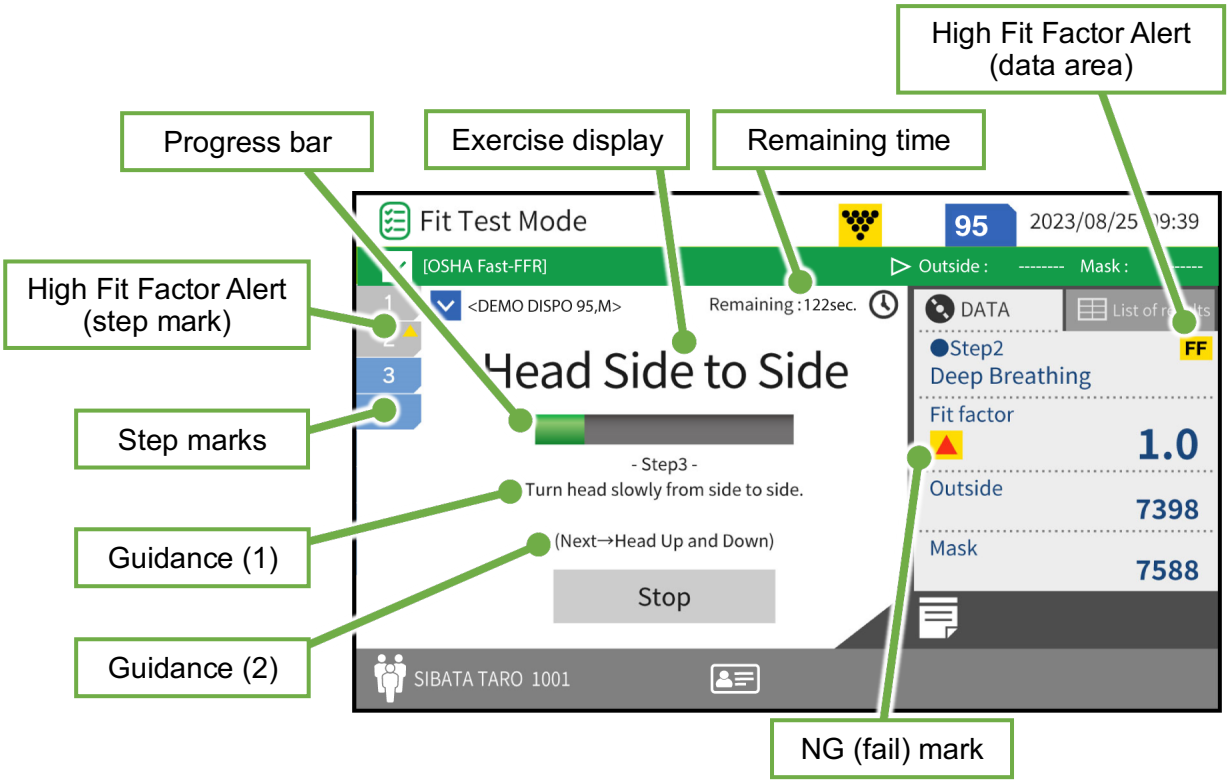
Person → **Respirator・Mask size** → **Protocol** → **Operator**

Each selection key will blink in sequence, so select the data accordingly. If the conditions for starting measurements are met, the **[Start]** key will be enabled.



Each selection key	Touch a selection key to display a window in which to input or select the data from a pull-down list and set the measurement conditions. To create new data, touch the **[xxx Data]** key in the window. To change the protocol details or to create a new protocol, touch the **[Settings]** key in the window or the subarea (see p. 41). When new data is created, it is added to the pull-down list.
Person selection key	Select the person.
Respirator selection key	Select the respirator and input the mask size. Respirator mode is determined based on the respirator selected, and limits are then placed on the selectable protocols.
Protocol selection key	Select the protocol. The selectable protocols are limited by the Respirator mode.
Operator selection key	Select the operator who will conduct the measurements.
Fit test note key	Input a memo regarding the subject's status or the details of the measurements. Even after the measurements, you can input items into the Fit test note until the preparations for the next measurement begin.
Data area	During standby, the initial step exercise is displayed, and **"----"** is displayed in all value fields.

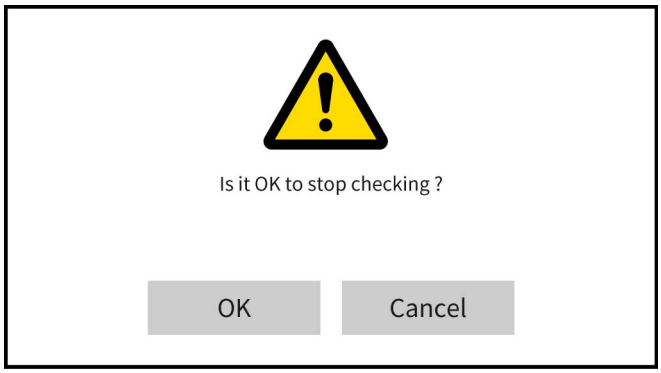
To preserve other records, touch the Fit test note key, and make a note.
Preparations for measurement are complete, touch the **[Start]** key to start the measurement.



First, an OUTSIDE measurement is taken and then a MASK measurement is taken. The measurements are repeated as many times as the number of the set steps. If the Twice in Fit test is set at the Outside sample times, an OUTSIDE measurement is first taken and then MASK measurements are taken consecutively as many times as the number of the steps configured. Finally, an OUTSIDE measurement is again performed. (For the Outside sample times, see p. 41.) The OUTSIDE measurement time and MASK measurement time depend on the settings.

Guidance (1)	Displays the current step number and exercise for the subject now to be performed.
Guidance (2)	Displays the next exercise.
Progress bar	The progress through the current step is indicated by the bar color. When the bar is completely colored, the current step is finished, and the system moves to the next step.
Remaining time	This indicates the remaining measurement time as a numerical value.
Step marks	Displays a mark next to the step indicating a High Fit Factor Alert. For the procedures, see **"9 Troubleshooting"** (p. 63).
Data area	During the measurements, displays the measurement results for the preceding step. If the Twice in Fit test is set at Outside sample times, the initial step exercise keeps being displayed, and **"----"** is displayed in all value fields. For steps configured as excluded from the average value calculation, **"Excl."** will be displayed beside the step number, and **"----"** will be displayed in value fields. (See p. 43 regarding exclusion from the average value calculation.) An icon will be displayed marking the step with a High Fit Factor Alert. Touch this to display a message corresponding to the error details. If the results are not within the standard range, an NG (fail) mark will be displayed.

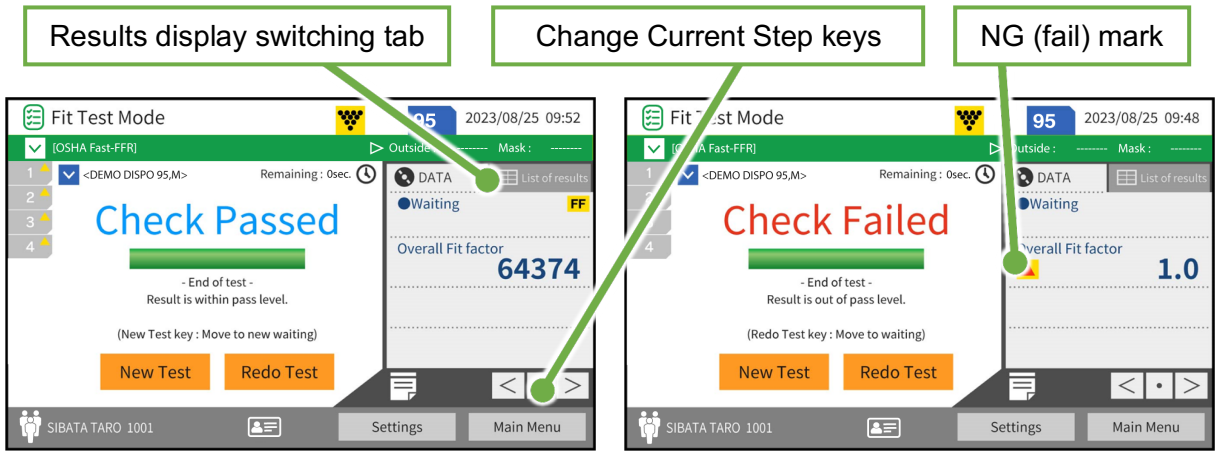
If you touch **[Stop]**, a confirmation message asking if you want to stop the measurement will be displayed.



Measurement will continue even while this message is displayed.

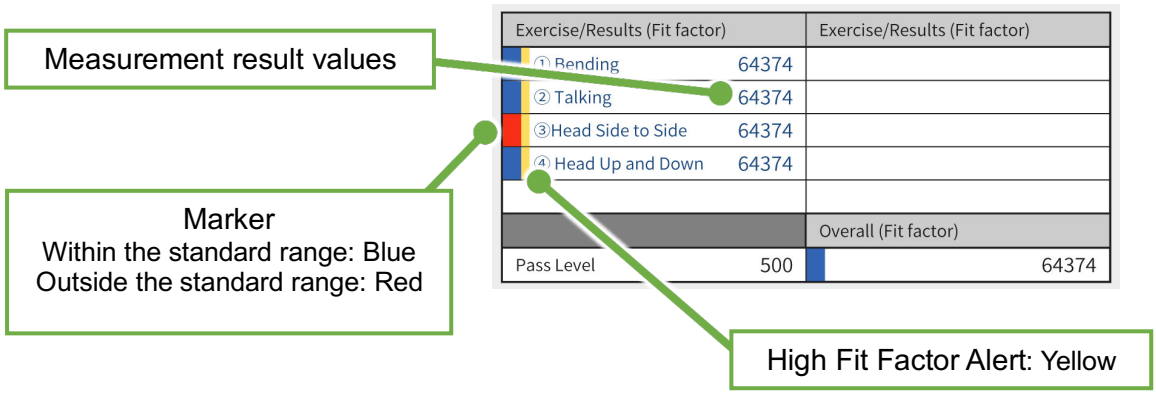
[OK]	Touch this to stop the measurement and return to **"Waiting"**. The measurement results for the steps to that point are not saved.
[Cancel]	Touch this to cancel the operation and restart the measurement.

The measurement data is saved when the measurements finish.
The judgment results (i.e., Check Passed or Check Failed) will be displayed in the field, and the overall results will be displayed in the data area.



If the overall results are within the standard range, **"Test Passed"** will be displayed. If the overall results are not within the standard range, **"Test Failed"** will be displayed, and an NG (fail) mark will be displayed in the data area.

Touch the Change Current Step keys to change the display of results in the data area in sequence by step number.
Touch the **[List of results]** tab to display a list of the measurement results for each step in the Fit Test.

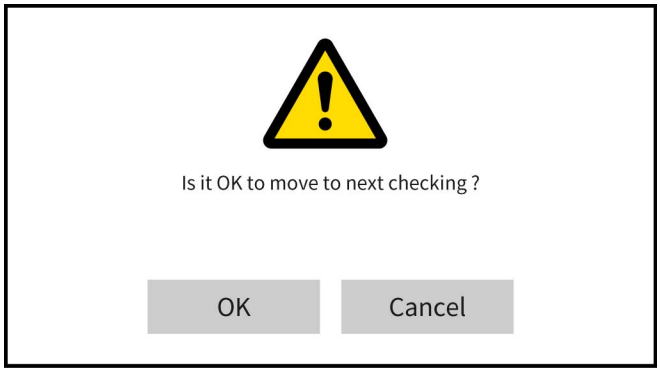


A marker is placed to the left of each step. Steps with values within the standard range are shown in blue. Steps with values outside the standard range are shown in red.
The area to the right of the marker for the step indicating a High Fit Factor Alert is shown in yellow.
A **"—"** will be displayed in the measurement result value field for steps without measurements, or for steps configured as excluded from the average value calculation. (See p. 43 regarding exclusion from the average value calculation.)
Touch the **[Data]** tab to return to the original results display.

If you touch the **[Redo Test]** key or **[New Test]** key, a confirmation message will be displayed.
If you touch **[Redo Test]**, the Respirator and Person data is left as is, and the system returns to **"Waiting"**. If you touch **[New Test]**, the selections for Respirator and Person will be canceled, and the system returns to **"Waiting"**.

> In the Fit Test mode, it is not possible to start the next measurement with the measurement results remaining on the screen.

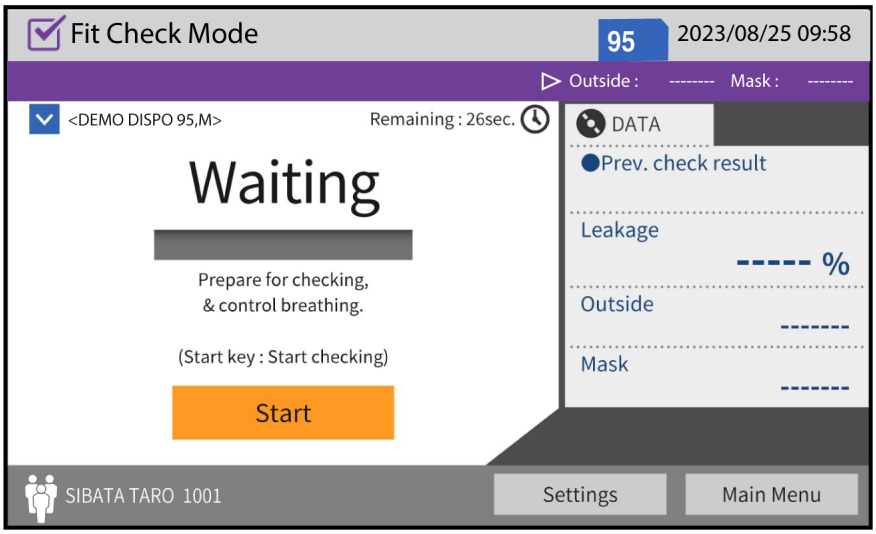
In the Fit Test mode, when you proceed from the display of measurement results to the next measurement or the Main Menu screen, a confirmation message asking if you want to delete the measurement results from the screen and proceed to the next screen will be displayed.



[OK]	Touch this to delete the measurement results from the screen and proceed to the next screen.
[Cancel]	Touch this to cancel the operation and close the confirmation message.

1-11 Fit Check Mode

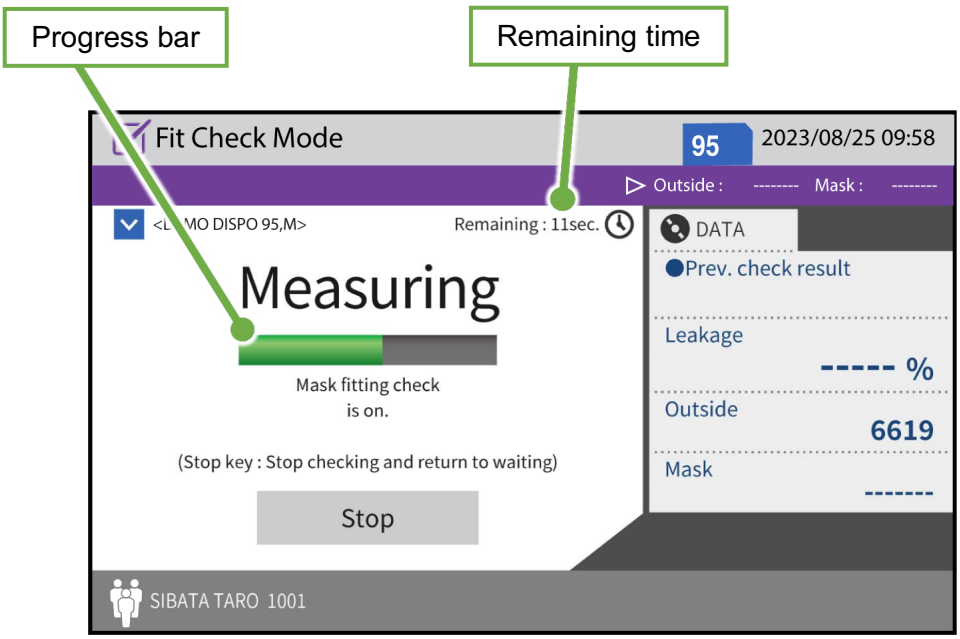
Touch **[Fit Check]** in the Main Menu screen.
In the Fit Check mode, the leakage percentage is measured once. In order to confirm the degree of adhesion of the respirator before entering a workplace, use this mode using the test guides.



Data area	Displays the preceding measurement results. **"----"** will be displayed in all value fields at the start of Fit Check mode, or when returning after configuring settings. The results display will update each time a measurement finishes.

You can store the measurements and select the Respirator and Person data.
Measurements can be started even if data is not selected.

Preparations for measurement are complete. Touch the **[Start]** key to start the measurement.

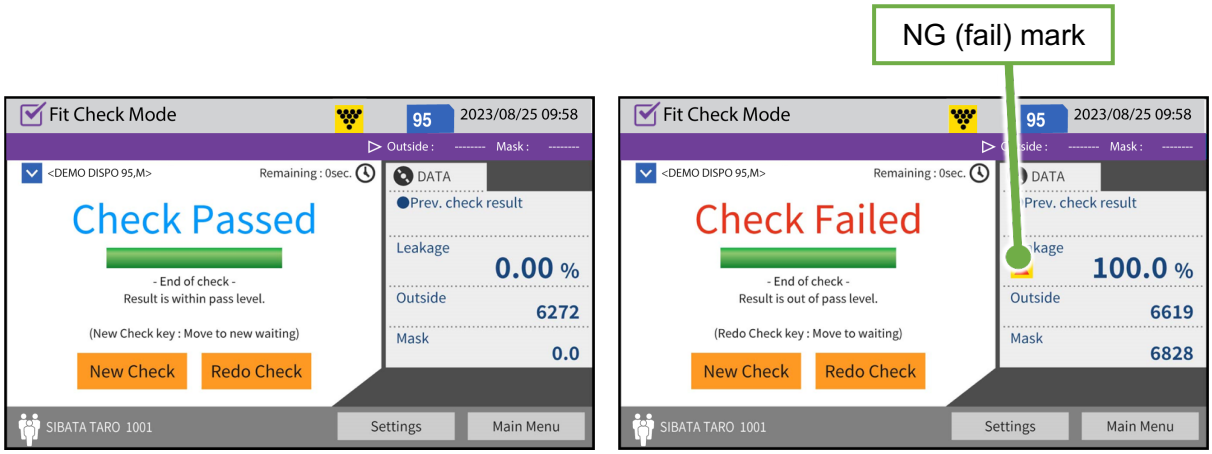


First, an OUTSIDE measurement is performed and then a MASK measurement is performed for the same interval.

Data area	Displays the measurement results. **"----"** will be displayed in all value fields at the start of Fit Check mode, or when returning after configuring settings. The results display will update each time a measurement finishes.
Progress bar	The measurement progress is indicated by the bar color. When the bar is completely colored, measurement is finished.
Remaining time	This indicates the remaining measurement time as a numerical value.

Touch **[Stop]** to stop the measurement and return to standby mode.

The measurement data is saved when the measurements finish.
The judgment results will be displayed in the field, and the results from the measurement cycle now finished will be displayed in the data area.

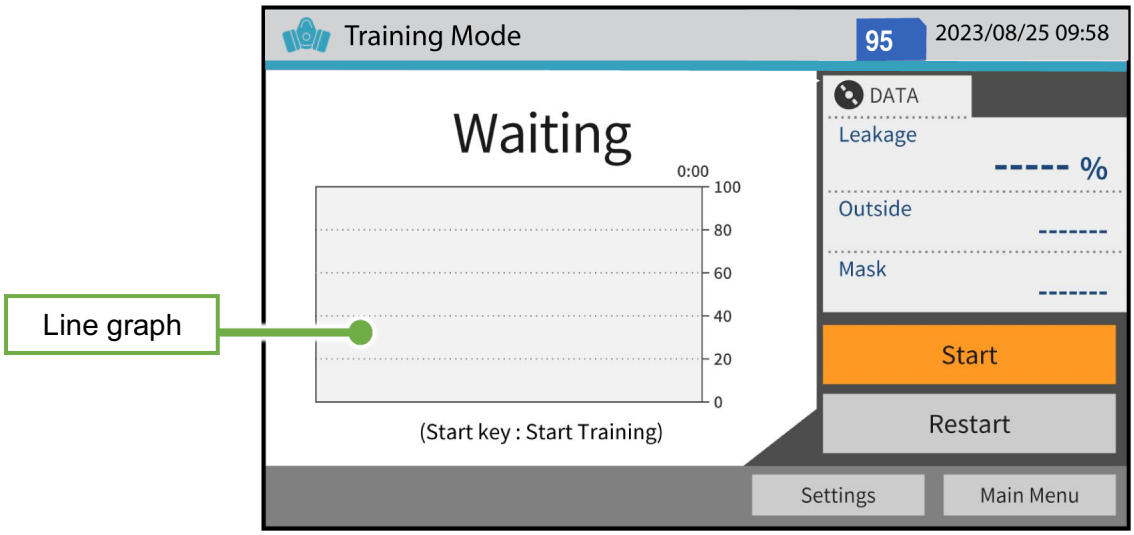


If the measurement results are within the standard range, **"Check Passed"** will be displayed. If the measurement results are not within the standard range, **"Check Failed"** will be displayed, and an NG (fail) mark will be displayed in the data area.
Touch the **[Redo Check]** key to return to **"Waiting"** with the Respirator and Person data as is.
Touch the **[New Check]** key to cancel the selections for Respirator and Person before returning to **"Waiting"**. The measurement results in the data area are retained until the next measurement is started.

1-12 Training Mode

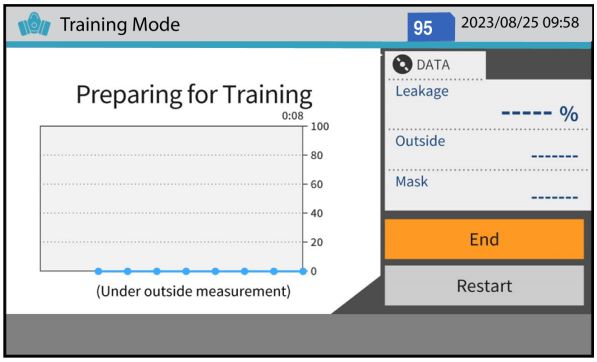
Touch **[Training]** in the Main Menu screen.
In the Training mode, the real-time measurement is simply performed. Use this when having practice of wearing a respirator. Measurements of particle concentrations in the environmental air are performed here as well (see p. 25).

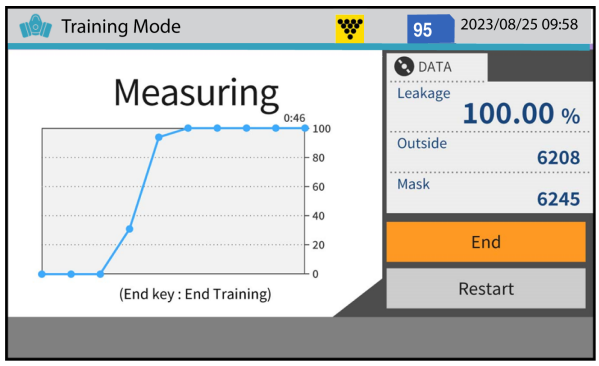
If a respirator wearing practice is held in the Training mode, do not perform the test as is with the Fit Test mode.
The subject must remove the respirator, then put it on again themselves with no assistance from the operator or measuring device, at which point it must be confirmed whether the Fit Test is passed.



Line graph	The measurement results are displayed as a line graph. The percentage (%) is shown on the vertical axis if **"Criterion"** is set to **"Leakage"**. The logarithmic value is shown for **"Fit Factor"** and **"Protection Factor"** and when **"Concentration"** is set to **"ON"**. To change the maximum value of the vertical axis (Display range), touch **[Settings]** (see p. 46).

Preparations for measurement are complete. Touch the **[Start]** key to start the measurement.





An OUTSIDE measurement is first performed and then MASK measurements are performed consecutively. The results are compared between the first OUTSIDE measurement and the latest MASK measurement. **"Preparing for Training"** is displayed until the MASK measurement starts. **"Measuring"** is displayed during the MASK measurement, and the graph is plotted. When the **"Outside sample cycle"** configured has elapsed, the process starts again from the OUTSIDE measurement and the results are updated. This measurement cycle is repeated.
Touch the **[Restart]** key at any time when you want to redo the OUTSIDE measurement.

When **"Concentration"** in the Training settings is set to **"ON"**, only OUTSIDE is continuously measured.

Data area	Displays the simplified measurement results in real time. **"----"** is displayed during the OUTSIDE measurement or purging.
Concentration	Displays the current particle concentration in the environmental air (OUTSIDE particle concentration).
Outside	Displays the latest OUTSIDE particle concentration. It is updated to the new value when the measurement is performed again.
Mask	Displays the current MASK particle concentration.

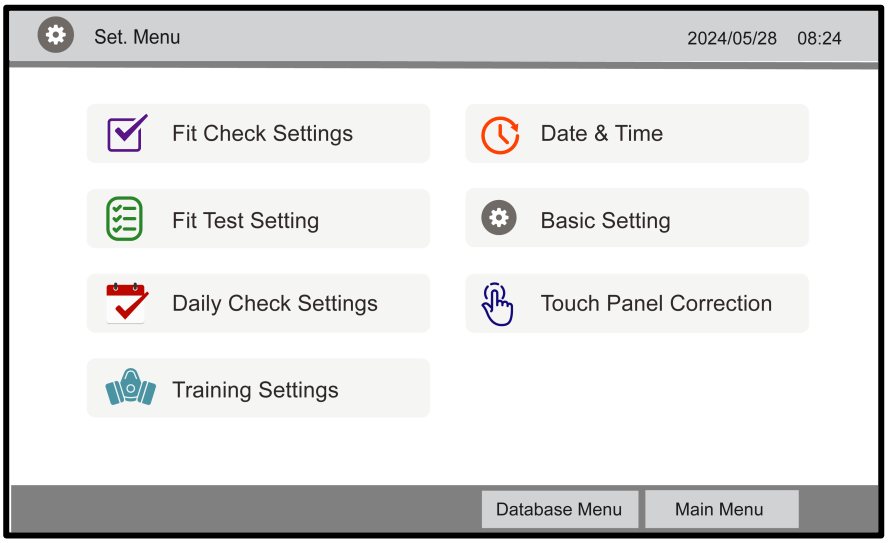
Touch **[End]** to finish the measurement and return to standby mode.

Be aware that in the Training mode, measurements are repeated until you touch **[End]**.

5 Settings

1-13 Setting Menu

Touch **[Settings]** in the Main Menu screen, or touch **[Setting menu]** on the Database menu or in the sub area on the settings screen to display this screen.



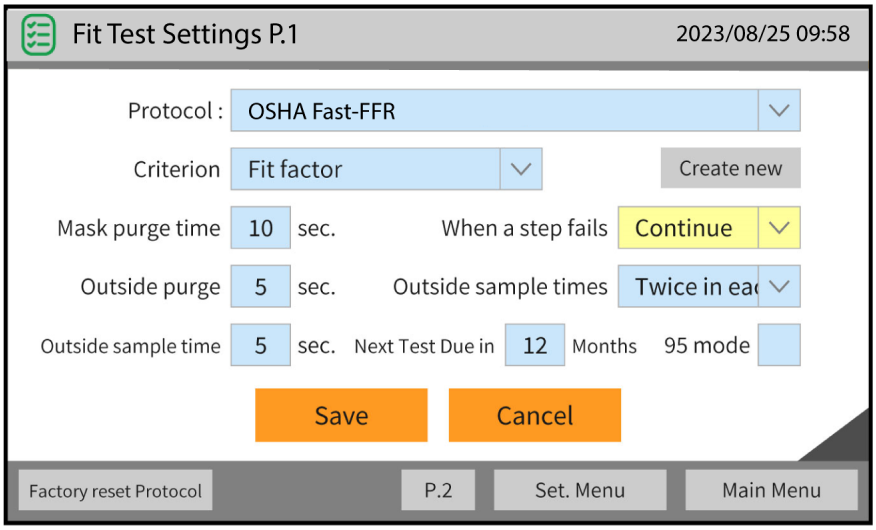
Touch the keys to configure the respective settings.
Touch **[Database menu]** or **[Main Menu]** to display these screens.

1-14 Fit Test Settings

These are for creating, browsing, and editing the protocol used in the Fit Test mode (see p. 32). The PC software is used to delete a protocol.

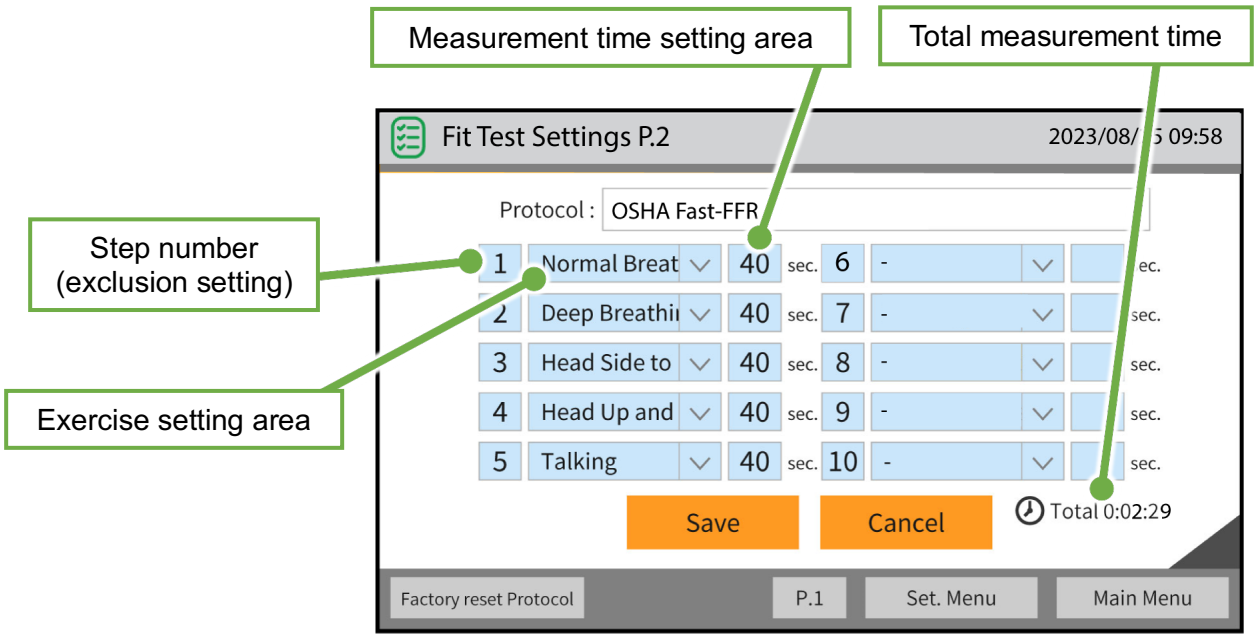
> The protocol used in the Fit test is not selected here.

The Fit Test settings are configured in two pages. The **[Save]** settings are performed separately for each page. Regardless of the page, Factory Reset Protocol is applied **simultaneously on both pages**, but only with respect to the **protocol being set**.
The page 1 is used to select the protocol and to configure the basic settings.



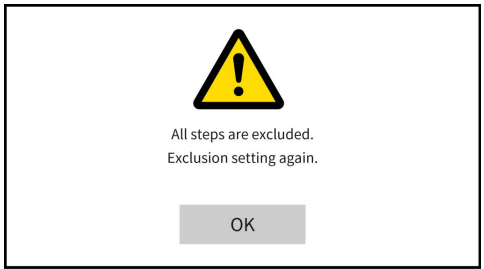
Protocol	Select a protocol to browse and edit from the pull-down list. When this is changed, other settings items as well will change to the settings for this protocol. Newly created protocols are marked with a "★".
Criterion	Sets the criterion for evaluating the measurement results. For the criterion item, select from **"Leakage", "Fit Factor", and "Protection Factor".**
Mask purge time	Sets the MASK purge time (see p. 10).
Outside purge	Sets the OUTSIDE purge time (see p. 10).
Outside sample time	Sets the length of time for the OUTSIDE particle count.
When a step fails	Sets whether to stop the measurement or continue when the results at the step where the measurements finished fail.
Outside sample times	Sets the method for an OUTSIDE measurement, which is used as the basis for calculating the measurement results. **[Once in each exercise]**: For each step, an OUTSIDE measurement that is performed before the MASK measurement is used for the calculation. **[Twice in each exercise]**: For each step, two OUTSIDE measurements, one before and one after the MASK measurement, are used for the calculation. With this setting, more accurate measurements can be made since the error that may be caused by the time lag between the start and end of the step can be eliminated. **[Twice in Fit test]**: One OUTSIDE measurement is performed for both the start and end of the sequence. In between these OUTSIDE measurements, MASK measurements are performed consecutively. The first and final OUTSIDE measurements are used to calculate the measurement results for all steps. With this setting, the Fit Test can be performed in a shorter time.
Next Test Due in	Sets the period from when a measurement is performed and evaluated as **"Test Passed"** until the next measurement is performed.
95 mode	Sets what type of respirator is worn for measurement. Clear the checkbox if the respirator's filter efficiency is at least 99%. (99+ mode) Select the checkbox if the respirator's filter efficiency is less than 99%. (95 mode)
[Create new]	Creates a new protocol. Touch this to display the protocol name input screen. Input a name and touch **[Save]**. The protocol is now registered and can be selected during measurement.

On page 2, the settings are configured for each step with respect to the protocol selected on page 1.



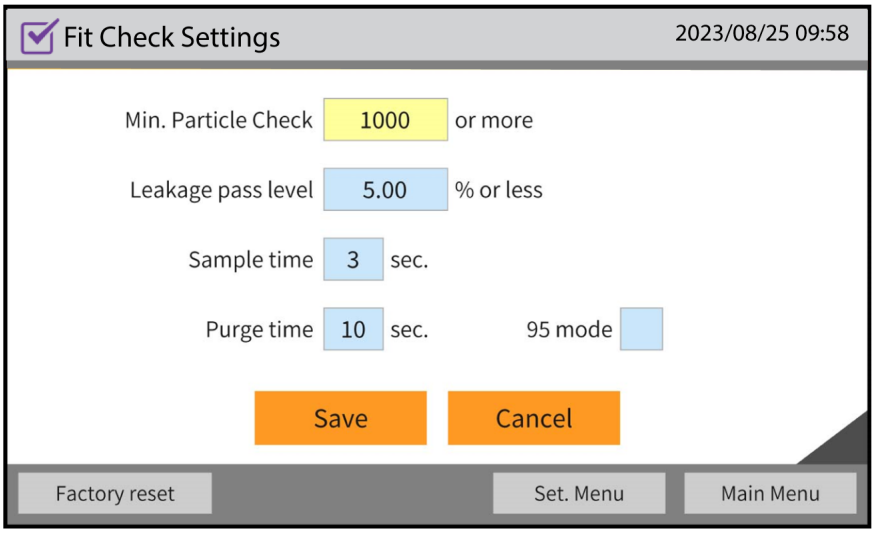
Protocol	Displays the protocol configured on page 1. Newly created protocols are marked with a "★". Changes of the protocol can only be made on page 1, so to change the protocol, touch [**P.1**].
Total measurement time	Displays the total duration of all measurements. Even when settings are provisional, this displays the total time for the settings currently being displayed.
Step number (exclusion setting)	If you touch here, a **"/"** mark will be added on the number and the corresponding step will be excluded from use in the calculation of the overall measurement results. In this case, if the measurement time is less than the minimum time required for that step, it will be automatically changed to the required measurement time. (It can be further increased.) If you touch it again, the **"/"** mark will disappear. Be aware however that the changed measurement time will not automatically return to the original value.
Exercise setting area	Sets the exercise for the step. Select a candidate from the pull-down list. If **"■ End of Exercise"** is selected or **"—"** is displayed, all subsequent steps will be deleted completely when you touch **[Save]** to save the settings. Note that **"■ End of Exercise"** cannot be selected at Step (1).
Measurement time setting area	Sets the length of time to count MASK particles at the step.

If all steps are configured as excluded, a confirmation message will be displayed when you touch **[Save]**. In this case, review the settings.



1-15 Fit Check Settings

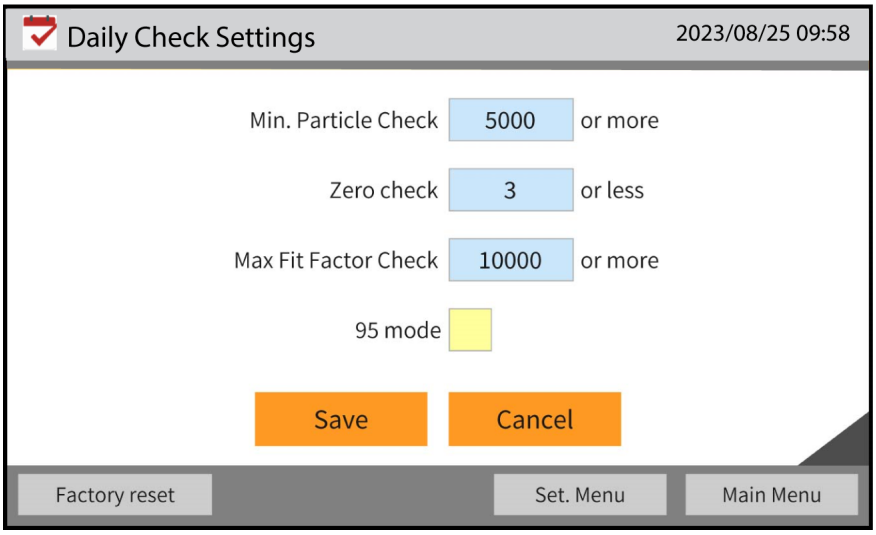
The following screen is used to configure the settings for the Fit Check mode (see p. 37).



Min. Particle Check	Sets the criterion value for displaying an error message if the OUTSIDE particle concentration is insufficient for calculating the measurement results. Sets the lower limit value for the number of OUTSIDE particles per **"Sample time"**. To stop the error message display, set **"Min. Particle Alert"** to **"OFF"** on page 3 of the Basic settings (see p. 50).
Leakage pass level	Sets the leakage percentage used as the pass/fail judgment criterion.
Sample time	Sets the length of time to count particles. In the Fit Check mode, the OUTSIDE and MASK measurements will be performed for the same amount of time.
Purge time	Sets the purge time (see p. 10). In the Fit Check mode, OUTSIDE and MASK purging will be performed for the same amount of time.
95 mode	Sets what type of respirator is worn for measurement. Clear the checkbox if the respirator's filter efficiency is at least 99%. (99+ mode) Select the checkbox if the respirator's filter efficiency is less than 99%. (95 mode)

1-16 Daily Check Settings

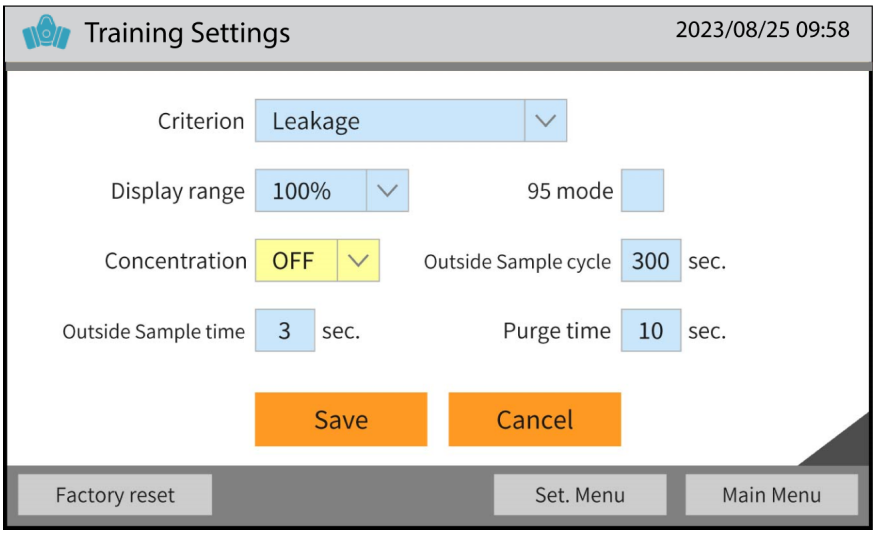
The following screen is used to configure the settings for the Daily Check mode (see p. 30).



Min. Particle Check	Sets the particle concentration that will be the lower limit value for the **Min. Particle Check**. This also sets the value for the standard for displaying an error message if the OUTSIDE particle concentration is insufficient for calculating the measurement results. To stop the error message display, set **"Min. Particle Alert"** to **"OFF"** on page 3 of the Basic settings (see p. 50).
Zero check	Sets the particle concentration that will be the upper limit value for the **Zero check**.
Max Fit Factor check	Sets the Fit Factor that will be the lower limit value for the **Maximum Fit Factor check**.
95 mode	Sets what type of respirator is being checked. Clear the checkbox if the respirator's filter efficiency is at least 99%. (99+ mode) Select the checkbox if the respirator's filter efficiency is less than 99%. (95 mode)

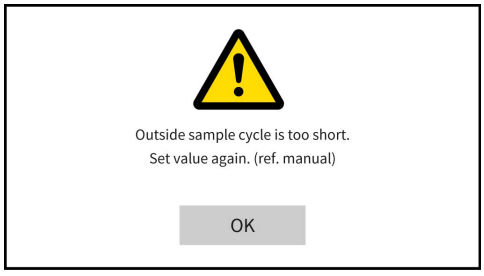
1-17 Training Settings

The following screen is used to configure the settings for the Training mode (see p. 39).



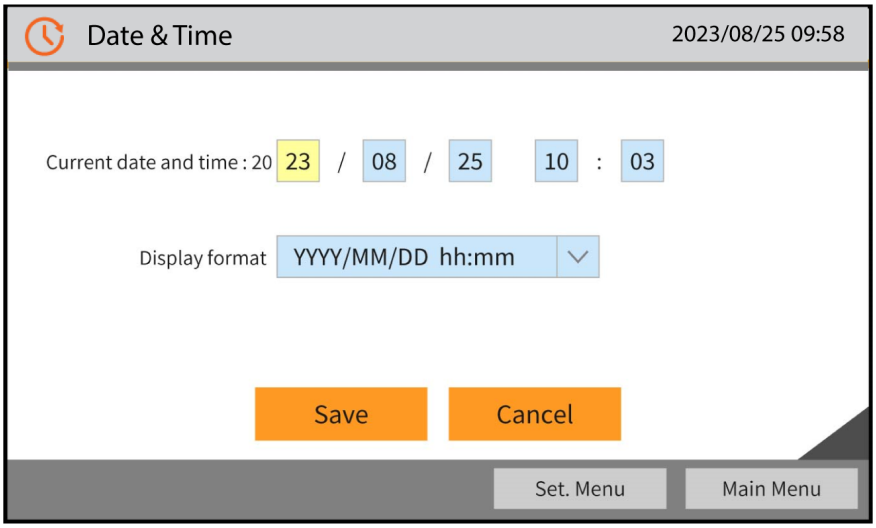
Criterion	Sets the criterion for evaluating the measurement results. For the criterion item, select from **"Leakage"**, **"Fit Factor"**, and **"Protection Factor"**.
Display range	Select a candidate for the maximum value for the vertical axis in the line graph. The percentage (%) is shown on the vertical axis if **"Criterion"** is set to **"Leakage"**. The logarithmic value is shown for **"Fit Factor"** and **"Protection Factor"** and when **"Concentration"** is set to **"ON"**.
Concentration	If this item is set to **"ON"**, the current particle concentration in the environmental air (OUTSIDE particle concentration) is measured. In this case, the settings other than **"Display range"** will be disabled.
Outside Sample time	Sets the length of time for the OUTSIDE particle count.
95 mode	Sets what type of respirator is worn for measurement. Clear the checkbox if the respirator's filter efficiency is at least 99%. (99+ mode) Select the checkbox if the respirator's filter efficiency is less than 99%. (95 mode)
Outside Sample cycle	Sets the cycle from one OUTSIDE measurement until the next OUTSIDE measurement is performed.
Purge time	Sets the purge time (see p. 10). In the Training mode, OUTSIDE and MASK purging will be performed for the same amount of time.

In order to perform measurements, even at the fastest speed, the time must be twice the (**Purge time** + **Outside Sample time**). If **"Outside Sample cycle"** is set to a value shorter than this, a confirmation message will be displayed. In that case, review the settings.



1-18 Date/Time Settings

The following screen is used to set the date and time.

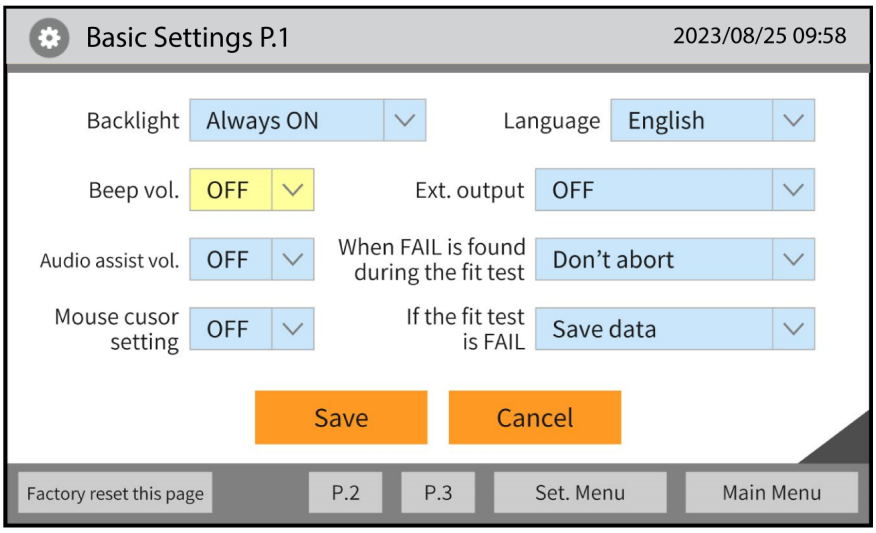


Current date and time	Enter the current date and time.
Display format	Select a candidate for the format for the date and time display.

When you change the setting and then touch **[Save]**, if an impossible date (such as February 31) has been set as the provisional setting, a confirmation message will be displayed. In that case, change the date and time to an acceptable setting.

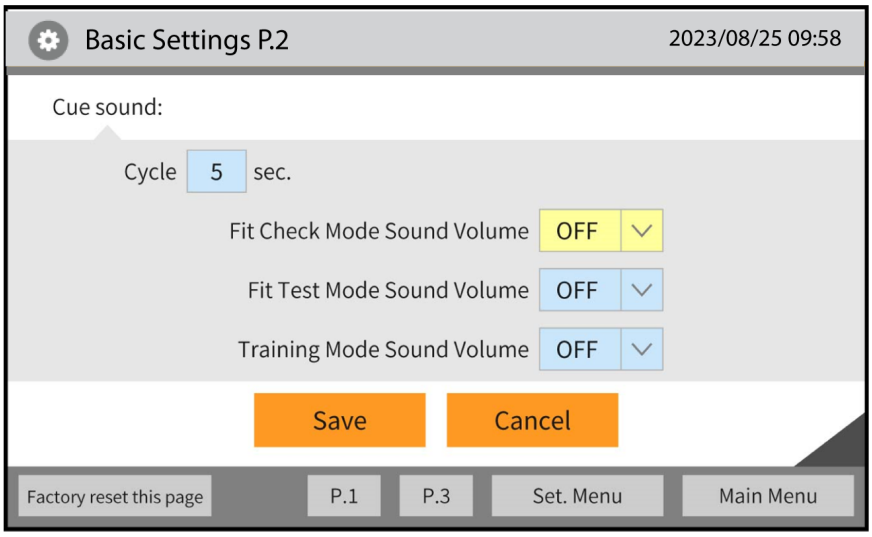
1-19 Basic Settings

The following screen is used to configure the basic settings for this product. The Basic settings are configured in three pages. Factory resets and **[Save]** settings are performed separately for each page. The basic settings for the product are performed on page 1.



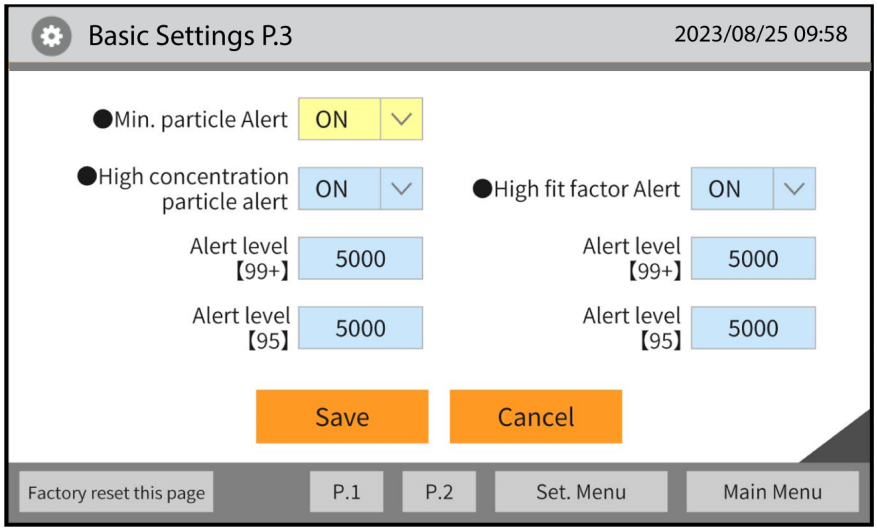
Backlight	Sets the length of time until the touch panel display goes dark when not in use. Note that the touch panel display will remain lit during measurements even when it is not in use.
Beep vol.	Sets the volume of the sound (beep) when the touch panel is operated, at the start and end of measurements, and when an error occurs.
Audio assist vol.	Sets the volume to provide audio instructions for test subject exercises in Fit Test. If this item is set to **"OFF"**, the audio instructions are not provided.
Mouse cursor setting	Sets the display of the mouse cursor when using a USB mouse for the screen operations. The settings take effect at the next restart.
Language	Select the On-Screen Display language.
Ext. output	Sets the output to an optional printer (see p. 67 and p. 58).
When FAIL is found during the fit test	Sets whether to continue measurements when the Overall Fit Test results evidently **fail** due to the results at a step midway through.
If the fit test is FAIL	Sets whether to save the measurement results when the Overall Fit Test results **fail**.

The cue sound settings are performed on page 2. When the cue sound is set, the product beeps at set intervals to assist with periodic operations during the measurements.



Cycle	Sets the time interval at which the cue sound beeps. The setting is the same for all modes.
Sound Volume	Sets the cue sound volume. The settings are separate for each measurement mode. Set this to **"OFF"** to turn OFF the cue sound.

The settings for displaying alerts and the conditions for their occurrence are configured on page 3. For error details and procedures, see **“9 Troubleshooting”** (p. 63).



Min. particle Alert	Sets whether to display an error message if the OUTSIDE particle concentration is insufficient for calculating the measurement results. The conditions for the occurrence of a Min. Particle Alert are in the Fit Check settings in the Fit Check mode (see p. 44), and in the Daily Check settings in the Fit Test mode (see p. 45). Measurements stop when this alert occurs.
High concentration particle alert	Sets whether to display an error icon (see p. 29) if the OUTSIDE particle concentration is too high. Measurement will continue even while this alert occurs.
Alert level (screen left)	Sets the conditions for the occurrence of an alert separately for each respirator mode. An alert occurs if the OUTSIDE particle concentration is higher than the set value.
High fit factor Alert	Sets whether to display an error mark (see p. 34) if the Fit Factor at each step in the Fit Test is too high. Measurement will continue even while this alert occurs.
Alert level (screen right)	Sets the conditions for the occurrence of an alert separately for each respirator mode. An alert occurs if the Fit Factor is higher than the set value.

1-20 Touch Panel Correction

Correct the touch position on the touch panel.
Try performing this correction if the operation performed does not match the position you touch on the screen.

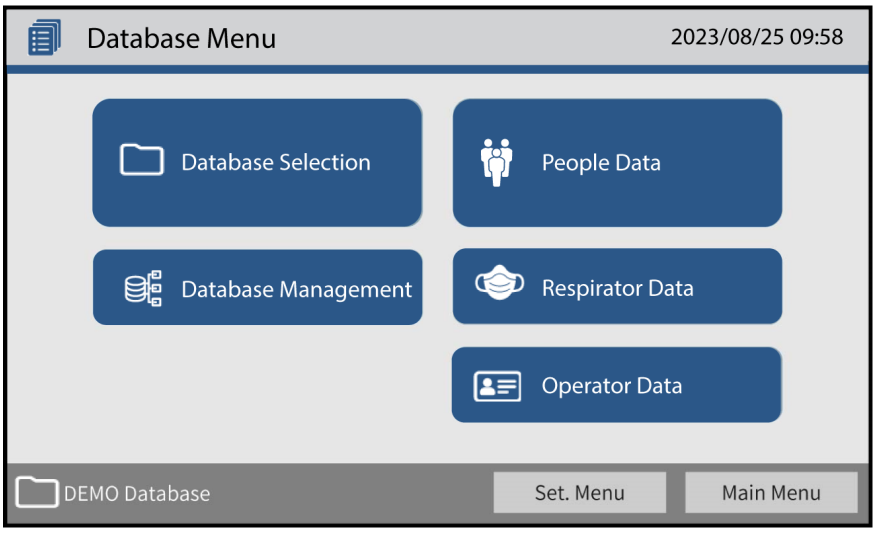
Touch the center of the red mark until the timer displayed at the center of the screen completes. Next, a red mark will be displayed at another location. Touch this one in the same way, and continue this for a total of four times.
If the process fails, it returns to the beginning. If it succeeds after four cycles, the touch panel is corrected, and the system returns to the Setting menu.

If the operation still does not match after correction, request repairs.

6 Database

1-21 Database Menu

Touch **[Database]** in the Main Menu screen, or touch **[Database menu]** on the Setting menu or in the sub area of the settings screen to display this screen.



Touch **[Database selection]** or **[Database management]** to perform operations on the database itself. Touch **[People data]**, **[Respirator data]**, or **[Operator data]** to browse or create the data. Touch **[Setting menu]** or **[Main Menu]** to display each screen.

■ Data Storage

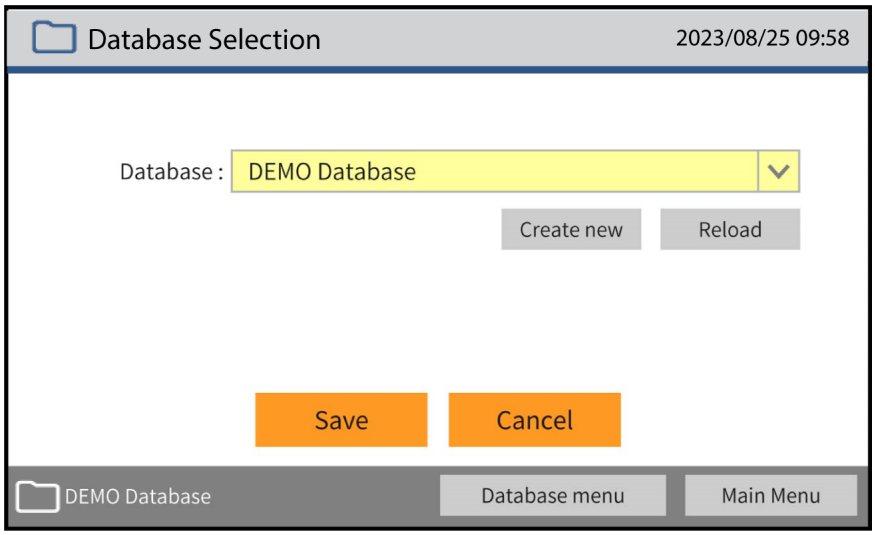
The data operated using the Database menu and the Protocol settings (Fit Test settings, see p. 41) are saved to the database file on the USB flash drive.

⚠CAUTION	**In the unlikely event some sort of problem occurs, note Nextteq® accepts no responsibility for providing compensation for data that could not be acquired or recorded, loss of data or other content, or for any other direct or indirect damages involved. Use the PC software to periodically transfer the data to the PC for storage as a precaution against failures.**

The data can be created without using the USB flash drive, but it cannot be stored.

1-22 Database Selection

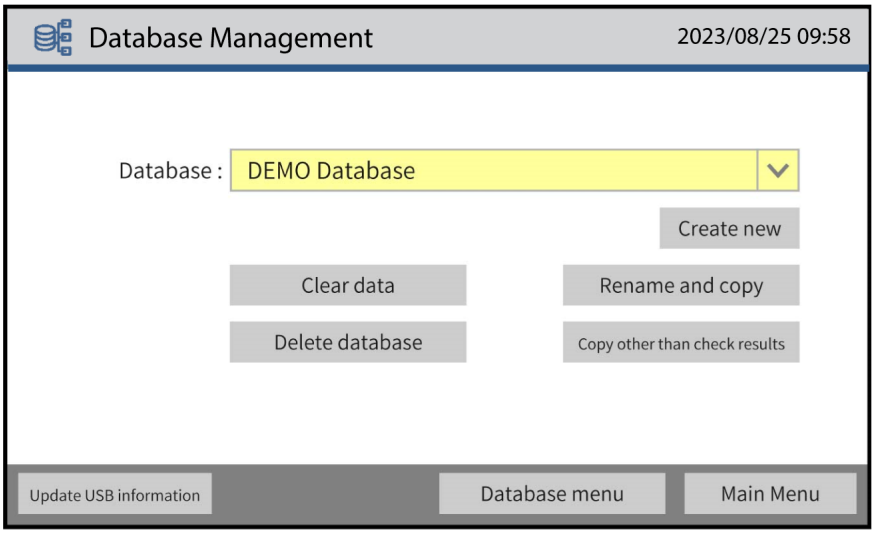
The following screen is used to select the database to use.
Touching the Database selection key (see p.17) will also display this screen.



Database	Select the database to use from the pull-down list.
[Create new]	Creates a new database. Touch this to display a screen for inputting the name of the database.
[Reload]	Reloads the contents from the USB flash drive.

1-23 Database Management

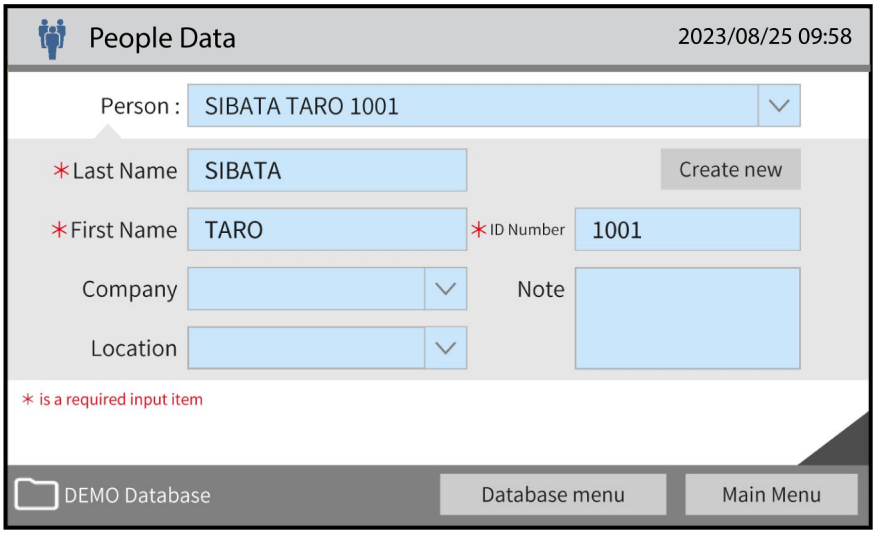
The following screen is used to manage the database.



Database	Select the database to manage from the pull-down list.
[Create new]	Creates a new database. Touch this to display a screen for inputting the name of the database.
[Clear data]	Empties the database by deleting the data. Only the default protocols remain.
[Delete database]	Deletes the database. A database cannot be recovered after it is deleted.
[Rename and copy]	Creates a copy of the database. When this is touched, a confirmation message is displayed. Touch **[OK]** to display a screen for inputting the name of the database.
[Copy other than check results]	Creates a copy of the database, not including the measurement results. When this is touched, a confirmation message is displayed. Touch **[OK]** to display a screen for inputting the name of the database.
[Update USB information]	Reloads the contents from the USB flash drive.

1-24 People Data

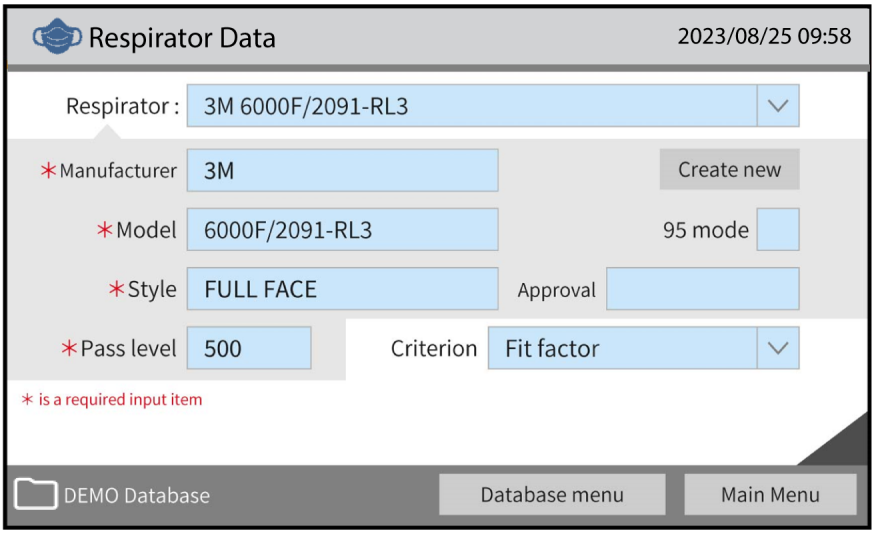
The following screen is used to browse or create People data. The PC software is used to edit or delete the data.
The items marked with an * are required when creating new data.



Person	Select the People data to display from the pull-down list.
Create new	Creates new People data. Touch this to clear the respective items.
Last Name **First Name** **ID Number** **Note**	These are for inputting and displaying details on each item.
Company **Location**	This is for inputting and displaying details on each item. Details in other People data can be selected from the pull-down list.

1-25 Respirator Data

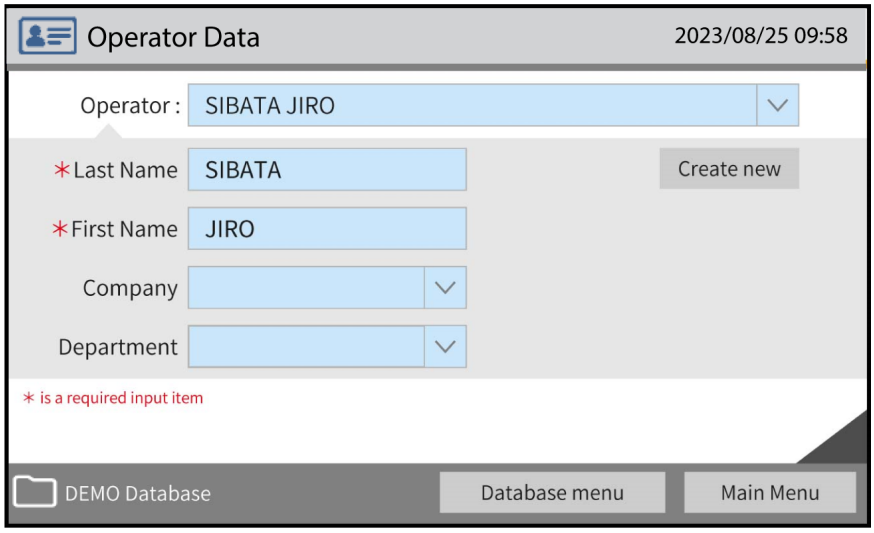
The following screen is used to browse and create Respirator data. The PC software is used to edit or delete the data.
The items marked with an * are required when creating new data.



Respirator	Select the Respirator data to display from the pull-down list.
[Create new]	Creates new Respirator data. Touch this to clear the respective items.
Manufacturer **Model** **Style** **Pass level** **Approval**	These are for inputting and displaying details on each item. The **"Pass level"** display increment is switched by **"Criterion"**.
95 mode	Sets the respirator's filtering efficiency. Clear the checkbox if the respirator's filter efficiency is at least 99%. (99+ mode) Select the checkbox if the respirator's filter efficiency is less than 99%. (95 mode)
Criterion	Switches the increments for the **"Pass level"** displayed. This only switches the display in this screen. It does not set the measurement criterion.

1-26 Operator Data

The following screen is used to browse and create data on the Operator conducting the Fit Test. The PC software is used to edit or delete the data.
The items marked with an * are required when creating new data.



Operator	Select the Operator data to display from the pull-down list.
[Create new]	Creates new Operator data. Touch this to clear the respective items.
Last Name **First Name**	These are for inputting and displaying details on each item.
Company **Department**	This is for inputting and displaying details on each item. Details on other Operator data can be selected from the pull-down list.

7 External Output

An optional printer is available as an external output device for this product (see p. 67). In this case, connect the cable to the RS232C external output connector on the back of the main unit (see p.13), and on page 1 of the Basic settings (see p. 48), set **"Ext. output"** to **"Printer"**.
With external output, the output status and details differ depending on the measurement mode being used. The measurement start date and time, the resulting numerical values, and the pass/fail results are printed. In the Fit Test mode, data is printed every time a step finishes, and the overall results are printed at the end of the sequence. However, if Twice in Fit test is set at Outside sample times, all measurement results will be printed when the measurements finish. (For the Outside sample times, see p. 41.)

1) Connector Specifications

D-sub 9-pin, male type
Pin #2: Data output
Pin #5: Signal ground
Pin #7: CTS (printer busy) input
Pin #8: RTS (+12 V) output

> A D-sub 9-pin (female/female) straight cable can also be used to connect the instrument to a PC.

2) Output Specifications

Communication speed: 9600 bps
Data: 8 bit
Parity: No
Stop: 1 bit
(Supports CTS handshake.)

> At the end of one line, a newline CR(0xD), LF(0xA) is sent.

3) The Printer's Printing Format

In the Fit Check mode, the measurement results are output when the measurements finish.

CR(0xD) LF(0xA) ← New line (First time only)
yyyy/MM/dd ← Measurement date (First time only)
XXXX HH:mm XXXXXXX XXXXXXX L%=XX.XX XXXX ← Measurement results

1st digit: Code number
6th digit: Measurement start time
12th digit: OUTSIDE particle concentration (no zero suppression)
20th digit: MASK particle concentration (no zero suppression)
28th digit: Criterion: L%
31st digit: Measurement results (zero suppression 0.00 to 99.99 (100.0))
37th digit: Judgment results (PASS or FAIL)

In the Fit Test mode, data is printed every time a step finishes, and the overall results are printed at the end of the sequence. However, if Twice in Fit test is set at Outside sample times, all measurement results will be printed when the measurements finish. (For the Outside sample times, see p. 41.)

```
CR(0xD) LF(0xA)                    ← Newline
YYYY/MM/DD hh:mm                   ← Measurement start date and time
XXXXXXXXXXXXXXXXXXXX               ← Protocol name
ST01 X  XXXXXXX XXXXXXX FF=XXXXXXX XXXX   ← ST01 measurement results
ST02 X  XXXXXXX XXXXXXX FF=XXXXXXX XXXX   ← ST02 measurement results
ST03 X  XXXXXXX XXXXXXX FF=XXXXXXX XXXX   ← ST03 measurement results
ST04 X  XXXXXXX XXXXXXX FF=XXXXXXX XXXX   ← ST04 measurement results
ST05 X  XXXXXXX XXXXXXX FF=XXXXXXX XXXX   ← ST05 measurement results
ST06 X                             ← ST06 measurement results (excluded)
ST07 X  XXXXXXX XXXXXXX FF=XXXXXXX XXXX   ← ST07 measurement results
ST08 X  XXXXXXX XXXXXXX FF=XXXXXXX XXXX   ← ST08 measurement results
ST09 X  XXXXXXX XXXXXXX FF=XXXXXXX XXXX   ← ST09 measurement results
ST10 X  XXXXXXX XXXXXXX FF=XXXXXXX XXXX   ← ST10 measurement results
AVE                                FF=XXXXXXX XXXX   ← Overall result
```

1st digit: Step No. (ST01 to ST10, AVE (Overall result))
7th digit: Exercise No.
10th digit: OUTSIDE particle concentration (no zero suppression)
18th digit: MASK particle concentration (no zero suppression)
26th digit: Criterion: FF
29th digit: Measurement results
(zero suppression, 1 to 1000000)
37th digit: Judgment results (PASS or FAIL)

> For steps configured as excluded from the overall result calculation, nothing will be printed after the judgment criterion. (See p. 43 regarding exclusion from the overall result calculation.)

The exercise numbers are as follows.

1	Normal Breathing
2	Deep Breathing
3	Head Side to Side
4	Head Up and Down
5	Talking
6	Grimace
7	Jogging
8	Bending
9	Other Exercise

8 Maintenance

1-27 Inspections and Maintenance

■ AC Adapter

Before use, make sure that the power cord is not damaged. Use of a damaged power cord might cause electric shock or a short circuit. If the power cord is damaged, stop using it, and replace it with a new one.

■ Main Unit

Before use, make sure that the main unit and parts are not deformed or damaged. Use of the main unit or parts in an abnormal state might cause injury or an accident. If they are deformed or damaged, stop using them immediately and ask for repair.

If the main unit becomes dirty, wring all the water out of a soft cloth, and use the cloth to gently wipe the unit clean. In the case of stubborn dirt, gently wipe it clean with a cloth moistened with a small amount of neutral detergent or ethanol.

- The AC adapter is not liquid resistant. Do not use this method to clean it.
- Never use paint thinner, benzene, alcohol, or any other similar solvent, as they will damage the surface.
- Be aware that if you wipe the surface of the mirror or the touch panel with too much force, you will damage them.

■ Sampling Tubes and Test Guides

Check the sampling tubes and test guides to see whether they are cut, torn or otherwise damaged or deformed, and check whether there is any foreign matter inside them. Use of them in an abnormal state might inhibit accurate measurements. If they are damaged or deformed, replace them with new ones. If there is foreign matter inside them, remove it. If it cannot be removed, replace them with new ones.

Also note that they may become discolored or sticky due to the usage environment or the passage of time. Discoloration does not pose a problem. If they do become sticky, however, the particles subject to measurement will adhere to them which will have an effect on the results, so replace them with new ones.

In the case of dirt on the exterior, wipe it away with a cloth moistened with a small amount of ethanol.

If condensation develops inside them, dry them thoroughly, or replace them with dry ones (see p. 25).

After the measurements are finished, be sure to wipe them with a cloth moistened with ethanol, dry them, and then store them. Do not bend or compress them during storage.

■ Suction Ports

With extended use, or use in very dusty environments, contaminants can accumulate within the suction ports, reducing the intake of air, leading to an impact on the measurements. Check the interior of the suction ports periodically (see p. 26), and clean them if necessary.

Check that the main unit is OFF. Then turn the suction port nozzles counterclockwise and remove them. Gently clear away any contaminants on the nozzle mesh using compressed air or a flow of water.

- The mesh cannot be removed from the nozzle.
- Be careful not to lose the O-rings attached to the nozzles.

If a flow of water is used for cleaning, dry the parts thoroughly afterward. Re-install the nozzles after cleaning. (White: **MASK**; Green: **OUTSIDE**)

■ Drying and Replacing the Alcohol Wick

With extended use, or use in environments with high humidity or air pollution, an accumulation of moisture or contaminants on the alcohol wick inside the alcohol cartridge could cause it to change color, shortening its operating life or impeding measurements. In this case, remove the alcohol wick, and dry it or replace it with a new one.

⚠CAUTION	**Wash your hands before handling the alcohol cartridge, and perform the procedure in a clean location so as to avoid contaminating it.** **If your skin comes in contact with the alcohol, rinse it away thoroughly with plenty of water.**

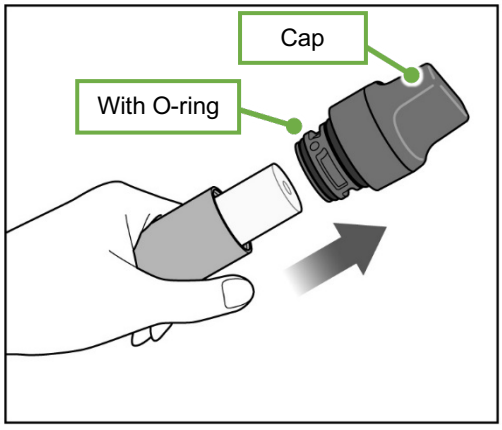
Hold the barrel of the alcohol cartridge in one hand. With the other hand, grasp the cap, twist it, and pull it away from the barrel, separating them.

Remove the alcohol wick from inside the barrel.

If moisture has accumulated in the alcohol wick, set it aside in a dry room overnight to allow the moisture to evaporate before reusing the wick.

If it has become dirty or discolored, do not reuse it. Replace it with a new one.

Place the alcohol wick inside the barrel and attach the cap to the original position.



Be careful, as there is a difference between the alcohol cartridge cap (with O-ring), and the storage cap that is attached to the alcohol cartridge insertion port on the main unit.

1-28 Operational Check with Clean Air

In the following cases, perform an operational check with clean air.

- If the measurement results are poor though no leak seems to occur
- If water droplets or debris may have entered into the product

(1) Connect the high-performance zero check filter provided to the **"MASK"** suction port on the front of the main unit (see p.13).

(2) Remove the blue cap from the high-performance zero check filter.

(3) Leave the **"OUTSIDE"** suction port open.

(4) Touch **[Fit Check]** in the Main Menu screen and perform a measurement in the Fit Check mode (see p. 37).

- **If the measurement results for "Leakage" are 0.2% or less:**
  The interior of the product is judged to be clean.
- **If the measurement results for "Leakage" exceed 0.2%:**
  The interior of the product must be cleaned. Contact the distributor from whom you purchased the product or your Nextteq® representative.

1-29 Consumables

Consumables	Life *	Replacement
Pump	Approx. 1 year	This is replaced by Nextteq®, so request repairs.
Internal filter	Approx. 1 year	
Built-in backup battery	Approx. 3 years	
Accessories (tubes, etc.) and other items generally handled as consumables	—	Refer to www.nextteq.com or contact Nextteq® to purchase consumables.

* This depends on the usage.

9 Troubleshooting

If a problem occurs during use of the product, promptly stop using it. If the error has been caused by a product failure, do not reuse it and request repair. Problems sometimes occur for reasons other than malfunction. Before requesting repair, check the following:

Symptom	Possible Cause	Remedy
Nothing is displayed even when the **[POWER]** switch is turned ON.	The power cord is not connected.	Connect it to the power supply. (See p.17.)
	Malfunctioning controller or display (touch panel).	Request repairs.
The measurement results are worse than previously.	Contamination inside the CNC.	Request repairs.
	Deterioration of the pump.	Request repairs.
Operable duration of time by replenishing the alcohol (time until the “Please replenish alcohol” equipment alarm is displayed) becomes shorter.	Moisture has accumulated in the alcohol wick.	Dry the alcohol wick. If this does not remedy the problem, replace it (see p. 61).
An equipment alert is displayed.	Insufficient alcohol.	Replenish the alcohol.
	The detector output is unstable.	With the power ON, leave the equipment for a few minutes. Then repeat the measurements. If the alert is displayed again, request repairs.
The particle concentration is too high (High concentration particle alert is displayed) or too low.	A particle generator (optionally available) is used.	Reduce the output from the particle generator, change its orientation, or stop it. If the concentration does not decrease, ventilate the area.
	The room is unventilated.	Ventilate the room.
	The alert level is too low.	Increase the alert level.
	Problem with the interior tubing or a CNC malfunction.	Request repairs.
	Condensation in the sampling tube or test guide.	Dry the sampling tube or test guide, or replace them with dry ones (see p. 25).
High Fit Factor Alert is displayed.	The suction ports are clogged with dust.	Clean the suction ports (see p. 61).
	The alert level is too low.	Increase the alert level.
The MASK particle concentration remains at zero.	The sampling tube is bent.	Unbend it to ensure that the air flows correctly. If the problem persists, request repairs.
	The tube joint has become affixed by suction to the subject’s skin and cannot take in particles.	Change the position where the tube joint set is attached.
The OUTSIDE particle concentration remains at zero. (The **[Outside count is zero]** error screen is displayed and the measurement stops.)	Insufficient alcohol.	Replenish the alcohol.
	The sampling tube is bent.	Unbend it to ensure that the air flows correctly.
	The sampling tube is not connected correctly.	Adjust the connection to ensure that air flows through the line.
	Problem with the interior tubing or a CNC malfunction.	Request repairs.

Symptom	Possible Cause	Remedy
The OUTSIDE particle concentration is insufficient. (The **[Outside count is below minimum]** error screen is displayed and the measurement stops.)	Insufficient alcohol.	Replenish the alcohol.
	The particle concentration in the environmental air is low.	Increase the particle concentration in the environmental air by using a particle generator (optionally available).
	The settings value for the error display is too high (Fit Test and Daily Check).	Lower the settings value for the Daily Check settings (see p. 45).
	The settings value for the error display is too high (Fit Check).	Lower the settings value for the Fit Check settings (see p. 44).
	Problem with the interior tubing or a CNC malfunction.	Request repairs.
The **[Equipment error is suspected.]** error screen is displayed, and the measurement stops.	Internal equipment malfunction.	Turn the power OFF and turn it ON again. Wait for a while and then operate the equipment. If the problem persists, request repairs.
The **[Classified output is not stable.]** error screen is displayed, and the measurement stops.	The output from the classifier is unstable.	With the power ON, leave the equipment for a few minutes. Then repeat the measurements. If the problem persists, request repairs.
The date and time settings are initialized.	The backup battery has exceeded its operating life.	Replace the battery. Request repairs.
The operation screen or the measurement operations are strange.	Problem with the touch panel processing.	Turn the power OFF and then turn it ON again. If the problem persists, request repairs.
The operation performed does not match the position you touched on the screen.	There is an offset in the touch position on the touch panel.	Correct the touch position (see p. 51). If the problem persists, request repairs.
Min. Particle Check in the Daily Check mode ends in **"Check Failed"**.	There are too few particles in the measurement environment.	Increase the number of particles by using a particle generator (optionally available).
		Change to a room with a larger number of particles.
	A high-performance zero check filter is attached to the **"MASK"** suction port.	Remove the high-performance zero check filter from the **"MASK"** suction port.
	The settings value is set higher than necessary.	Return the setting to the default value.
Zero check in the Daily Check mode ends in **"Check Failed"**.	There is no high-performance zero check filter attached to the **"MASK"** suction port.	Connect the high-performance zero check filter to the **"MASK"** suction port.
	The high-performance zero check filter is damaged.	Replace the high-performance zero check filter.
	Too many particles are adhering to the inside of the tubes.	If you are using a particle generator (optionally available), do not point it toward the main unit.
		If you are using a sampling tube, replace it with another tube, or remove the tube.
Maximum Fit Factor check in the Daily Check mode ends in **"Check Failed"**.	There is no high-performance zero check filter attached to the **"MASK"** suction port.	Connect the high-performance zero check filter to the **"MASK"** suction port.
	The high-performance zero check filter is damaged.	Replace the high-performance zero check filter.
	High-performance zero check filters are attached to both the **"MASK"** and **"OUTSIDE"** suction ports.	Connect the high-performance zero check filter only to the **"MASK"** suction port.

	The settings value is set higher than necessary.	Return the setting to the default value.

10 Main Specifications

Item Code	NX90692
Model	MT-11
Measurement Target	Evaluation of the degree of adhesion between the respirator and the surface of the face
Measurement Items	Number of particles, Leakage, Fit Factor, and Protection Factor
Measurement Principle	Particle concentration is determined by the condensation nucleus counter (CNC). (Measuring the ratio of the number of dust particles in the room and inside the mask)
Applicable Particle Size	99+ mode: 0.02 to 1 μm; 95 mode: Close to 0.06 μm
Measurement Range	Particle concentration range: 0 to 100,000 or more Leakage: 0.00 to 100%; Fit Factor/Protection Factor: 1 to 10,000 or more
Display Range *	Particle concentration range: 0.0 to 9,999,999 Leakage: 0.00 to 100.0%; Fit Factor/Protection Factor: 1.0 to 1,000,000
Flowrate	Total flowrate: 1 L/min; Sample flowrate: 0.25 L/min
Internal Functions	Leakage, Fit Factor, and Protection Factor calculation functions RS-232C output function, USB transmission function, function for logging to the USB flash drive
Recommended Operating Environment	15 to 30 °C, relative humidity of 30 to 90% (no condensation)
Power Supply	100 to 240 V AC ± 10 %, 50/60 Hz, 1.0 A
Size of Main Unit	Approx. W210 × D275 × H240 mm (when mirror stored)
Weight of Main Unit	Approx. 4.5 kg
Accessories	AC adapter (plug attached, with 3 other plugs), 1 pc Sampling tube (pair tube) 1.5 m, 2 pcs Alcohol cartridge (alcohol wick attached, installed in alcohol fill case), 1 pc Alcohol fill case, 1 pc Storage cap (attached to main unit), 1 pc Replacement alcohol wick, 2 pcs Tube connector, 2 pcs Test guide, 10 pcs Strap clip, 1 pc High-performance zero check filter, 1 pc Tube Joint Set Type M 100 pairs/set, 1 box Tube Joint Attachment Tool Type M, 1 box Stylus pen (attached to main unit), 1 pc USB cable, type A-B 1.5 m, 1 pc USB flash drive, 1 pc External output connector cap (attached to main unit), 1 pc Soft case, 1 pc Warranty, 1 copy

* Maximum display range for indicator

- This product is not explosion-proof.
- For reasons of improvement, for example, the above-mentioned specifications and accessories are subject to change to an extent that will not impede functionality or performance.

■ Consumables and Spare Parts

For consumables and spare parts, visit the Nextteq® website at www.nextteq.com.

■ Options

For options and accessories, visit the Nextteq® website at www.nextteq.com.

■ Main Component Materials

Part Name	Material
Main Unit Case	Aluminum, PPE+PS, EPDM
Mirror	PC, aluminum
Panel Sheet	PET
Storage Cap	PBT, EPDM
Suction Port Nozzle	Aluminum, stainless steel, FKM
Stylus Pen	POM
High-Performance Zero Check Filter	PP (PTFE), silicone
Alcohol Cartridge	Aluminum, PBT, EPDM, silicone
Alcohol Fill Case	PP
Alcohol Wick	PP
Sampling Tube	PVC
Test Guide, Tube Connector	PVC, PP
Tube Joint Set	Lead, cadmium-free brass, stainless steel
Tube Joint Attachment Tool	Cellulose, stainless steel
Soft case	Nylon, PP, polyurethane

11Warranty and Repairs

■ Warranty

A warranty for this product is included in product packaging. At the time of purchase, check the terms of the warranty and fill in the required items. The warranty period is 1 year from the date of purchase. The warranty cannot be reissued, so keep it in a safe place.

■ Repairs during the Warranty Period

If repairs are required during the warranty period, contact the distributor from whom you purchased the product or your Nextteq® representative.
Regardless of the existence of a warranty, the following are not covered:

- Faults or damage due to improper usage
- Faults or damage resulting from repairs or modifications implemented by parties other than Nextteq®
- Failures caused by abuse or inadequate maintenance
- Faults or damage resulting from fires or natural disasters, such as earthquakes
- Faults or damage occurring after purchase due to relocation, movement, falling, or vibration
- Faults or damage resulting from the use of consumable items not specified by Nextteq®

■ Repairs after Expiry of the Warranty

If repairs are required after the warranty has expired, contact the distributor from whom you purchased the product or your Nextteq® representative. If proper functionality can be maintained by repair and repair parts are available, the requested repair shall be performed for a fee.

■ Product Disposal

When disposing of this product, treat it appropriately in accordance with laws and regulations related to waste matter and cleaning.

■ Inquiries

If you have any questions about this product, or if there is any other way in which we can be of assistance, contact the distributor from whom you purchased the product or your Nextteq® representative.

Disclaimers

Nextteq® shall not be responsible for providing compensation for data that was not successfully acquired or recorded, or for incidental damages (such as loss of profits or interruption of business operations) resulting from any problem that occurred for any reason while using the product.
Under certain conditions, Nextteq® will repair product problems under the warranty, but Nextteq® will not provide compensation in the event of loss or damage to recorded data. Therefore, always make a backup of necessary data before requesting repairs or other service work by Nextteq®. If you ignore the precautions in this manual or fail to create a backup, Nextteq® shall not be responsible for any damages resulting from lost or damaged data.

BETTER TECHNOLOGY. BETTER QUALITY. BETTER VALUE.

August 2025 Nextteq® MT-11 Operation Manual
P/N NX90694 Rev A

All information exhibited in this document including but not limited to features, appearances, and usage are subject to change without notice.

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U.S. Marine Veteran

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