Kett

Rice Whiteness Tester
C-600

Operating Manual

Thank you for purchasing this product.
Please read the operating manual carefully and use this product properly.

For safety precautions

Improper use of the Rice Whiteness Tester in violation of the following safety notes may result in death, injury or damage to property due to fire, etc. While the safety of the product has been given considerable attention, read the precautions in the operating manual and use the instrument properly.

■ Observe the safety precautions.

Read the precautions noted in the operating manual.
The safety measure of the unit may be impaired if instructions are ignored during use.

■ Do not use if broken.

If you suspect a problem or malfunction in the unit, make sure to contact the vendor.

■ Meaning of warning symbols

In order to prevent damage resulting from erroneously operating the equipment, the following symbols are indicated in the operating manual and on the product. These symbols have the following meanings.

	**Caution**	Failure to observe these items may lead to injury to the user or damage to property.
	**Note**	Items which the user should be aware of in order to use the unit safely.

Contents

1. Measurement Principles and Characteristics

■ Measurement Principles

This device is designed to measure the whiteness of rice based on our own uniquely developed standard. The C-600 measures reflectivity and utilizes two blue LEDs as its light source. The light from the blue LEDs shine onto the sample surface at a 45 degree angle. Next, the amount of reflected light reflected is measured with a photo diode. The whiter the sample, the more light reflected back and detected, and thus a higher measurement value is registered. The whiteness of rice correlates directly with the milling percentage of that rice. Therefore, you can use this device to indirectly measure the milling percentage of a rice sample.

■ Characteristics

This device is lighter and more compact than our previous C-300 model. Furthermore, using blue LED light sources allows for a longer light source lifetime, reduced power consumption and reduced heat generation. Sensitivity calibration when the device is turned on has also been reduced, allowing you to begin measurements faster when compared to previous models.

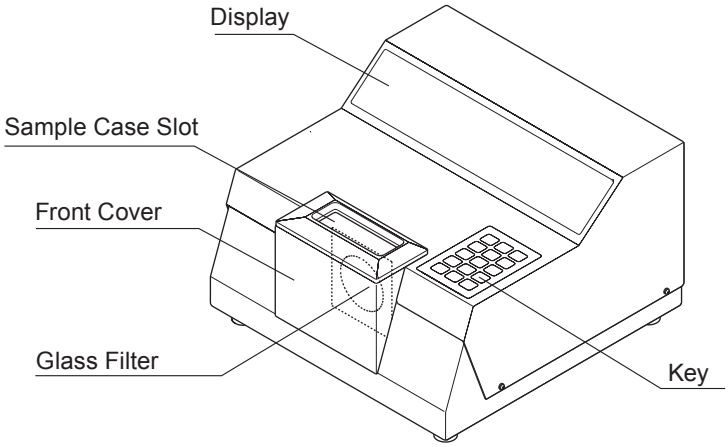
2. Specifications

Measurement Method	:	Reflectivity measurement
Accepted Samples	:	Non-glutinous polished rice, non-glutinous brown rice, non-glutinous pre-washed rice, glutinous polished rice, glutinous brown rice, glutinous pre-washed rice
Measured Item	:	Whiteness
Measurement Range	:	5.0 to 69.9
Resolution	:	0.1
Display Method	:	Fluorescent display tube
Functions	:	Average, printer output
Usable Temperature/ Humidity Range	:	Temperature: 5 to 40°C, Humidity: 30 to 85% (non-condensing)
Light Source	:	Blue LED
External Output	:	RS-232C
Power Source	:	AC 100V-120V (50/60Hz) : Power cord A (Flat blade attachment plug, Type A-1) AC 220V-240V (50/60Hz) : Power cord B (Round pin attachment plug, Type C-4)
Maximum Power Consumption	:	16W(AC100-120V,AC220-240V)
Dimensions	:	290 (W) × 295 (D) ×185 (H) mm
Weight	:	5.0 kg
Included Parts	:	Whiteness standard plate, sample case, sample platter, fixed quantity shooter, sample cup, glass wipe, replacement sponge, replacement packing (x3), replacement fuse, power cord A (100-120V) or power cord B (220-240V) , power plug adapter, user manual
Optional Items	:	Printer VZ-380, printer connector cable VZC69

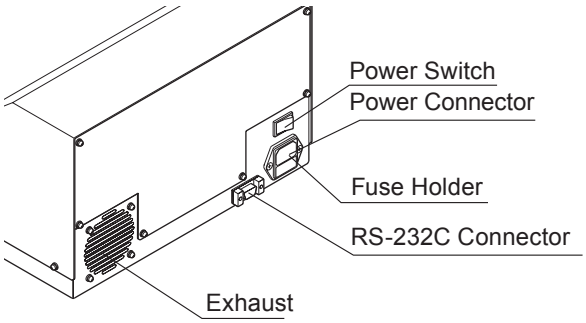
3. Part Names

■ Main Unit

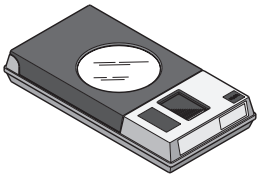
<Front Side>



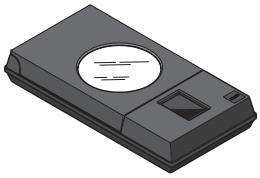
<Rear Side>



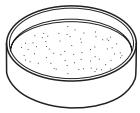
■ Included Parts - with part numbers



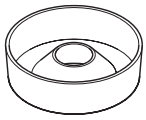
Whiteness Standard Plate
C-600-01



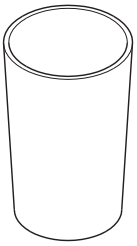
Sample Case
C-600-02



Sample Platter
C-600-03

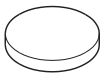


Fixed Quantity Shooter
C-600-04

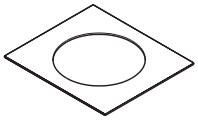


Sample Cup
C-600-05

Glass Wipe
C-600-07

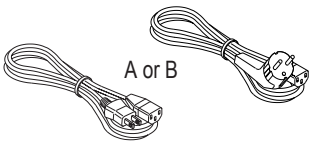


Replacement Sponge
C-600-08



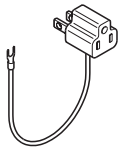
Replacement Packing (x3)
C-600-09

Replacement Fuse
C-600-10



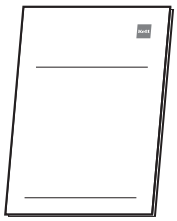
Power Cord A
(100V-120V)
C-600-11-A

Power Cord B
(220V-240V)
C-600-11-B



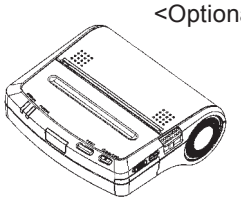
Power Plug Conversion Adapter
C-600-12

(It is attached for Power cord A (for 100V-120V uses) only.)

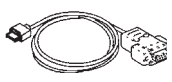


User Manual
C-600-13

<Optional Parts>



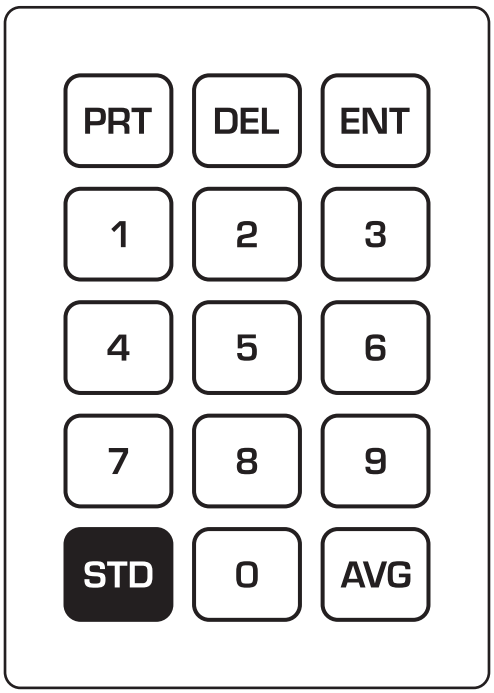
Printer VZ-380
C-600-14



Printer Connector Cable VZC69
C-600-15

4. Description of Operation Keys

■ Operation Panel



Key	Function
PRT	Used to turn the printer output ON or OFF.
DEL	Used as a backspace when inputting numerical values.
ENT	Used to input standard plate values. Used to finalize numerical input.
0 ~ 9	Used to input numerical values.
STD	Used for sensitivity calibration.
AVG	Used to display the average of the measured values.

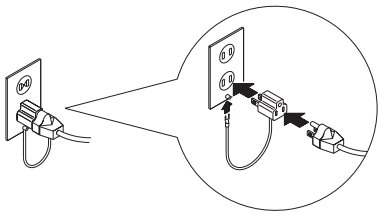
5. Preparing for Measurement

5-1. Connecting the Power Cord

* **Power supply voltage may be different when using this product in other countries. Please only use a power cord designed for your country.**

(1) Insert the power cord into the power supply connector on the rear side of the main unit.

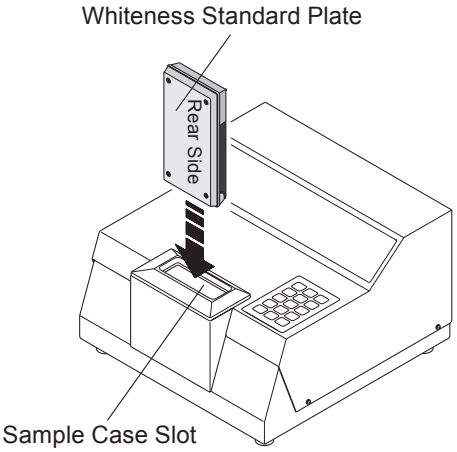
(2) If the power supply is a three-prong plug 100V-120V outlet, insert the power cord into VAC outlet. (See the right fig and in case of 100V-120V uses with blade plug condition)
Connect the included power plug conversion adapter into the power cord first, then plug the cord into a 100V-120V power outlet. Next, connect the ground wire on the power cord to the ground.



* **220V-240V outlet is used, power cord B should be used.**
* **If the power supply is 220V-240V with flat blade plug, the conversion adapter should be prepared by yourself.**
* **If the power supply is 100V-120V with round pin plug, the conversion adapter should be prepared by yourself.**

5-2. Inserting the Whiteness Standard Plate

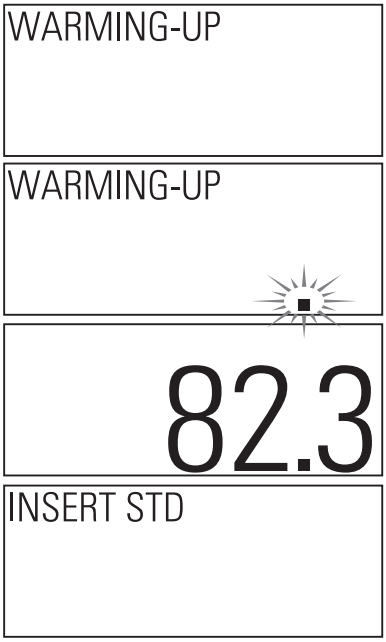
As shown in the figure, insert the whiteness standard plate into the sample case slot on the main unit until it cannot be inserted any further.



* **The whiteness standard plate lid should never be opened unless you need to clean the glass surface.**
* **Make sure the rice whiteness plate is facing in the correct direction.**

5-3. Starting Up the Main Unit

Turn the power switch located on the rear side of the main unit to ON. "WARMING-UP" is displayed. You will see numbers flashing and after approximately 20 seconds, the value of the whiteness standard plate is displayed. Once the value of the whiteness standard plate is displayed, remove the whiteness standard plate.



* **If the whiteness standard plate is not inserted correctly when the power switch is turned ON, the display will repeatedly show "INSERT STD. "If this should occur, insert the whiteness standard plate into the sample case slot on the main unit until it cannot be inserted any further.**

The C-600 is now ready for measurement.

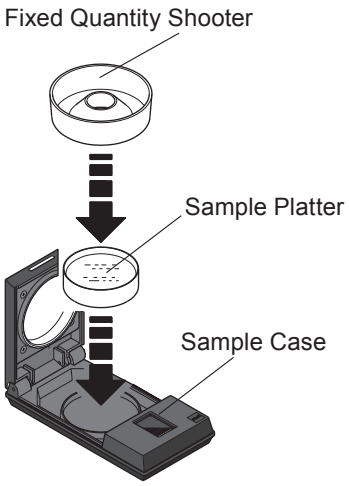
6. Measurement

*** Before performing any measurements, use the glass wipe to clean the glass surface of the sample case and the main unit's glass filter.**

6-1. Inserting the Sample for Testing

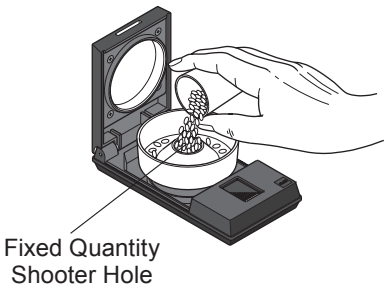
(1) Place the sample case on a flat surface and set the sample platter.

(2) Place the fixed quantity shooter on the sample platter.



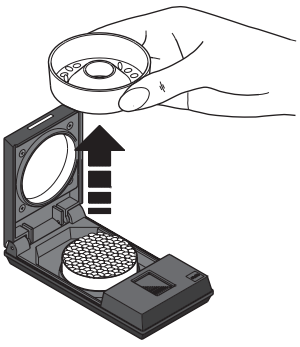
(3) Put a level cup of rice in the sample cup, then pour the rice from the cup through the hole in the fixed quantity shooter. Insert all of the rice from the cup until the rice begins to overflow out of the hole in the fixed quantity shooter.

*** The sample cup is designed for acquiring a sample of rice only. Do not use the sample cup as a container for any other purpose.**



(4) Remove the fixed quantity shooter from the sample platter and tightly close the lid on the sample case.

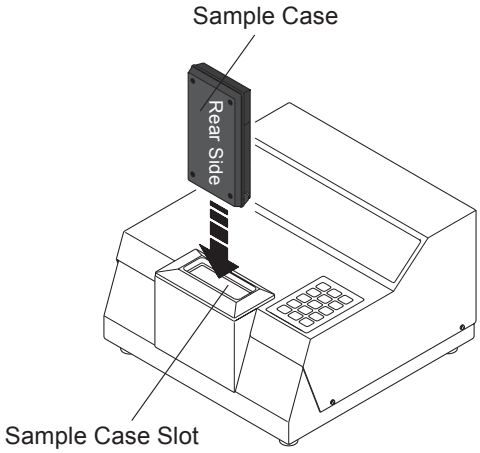
*** By carefully following the above instructions you can virtually eliminate any discrepancies in measurement values due to human error. If you do not properly insert the test sample, you will not receive an accurate measurement.**



6-2. Insertion Into the Main Unit

Insert the sample case into the sample case slot on the main unit until it cannot be inserted any further.

* **Make sure the sample case is facing the correct direction.**

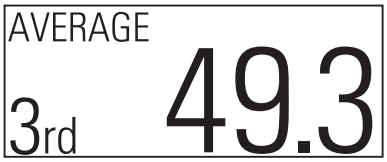


6-3. Measurement

Once the sample case has been inserted into the main unit, the number of times measured and the whiteness value are displayed on the display.

■ Average Value

You can also display the average value of two to nine measurements. After performing between two to nine measurements, press the AVG key to view the average value and the number of times measured. Once the average value is displayed, all values up to that point are cleared and the next measurement is treated as the first measurement of a new set.



The number of measurements is displayed after each measurement is completed.
However, the number of measurements is reset to one in the following cases.

(1) When the AVG key is pressed.

(2) When the number of measurements exceeds nine.

6-4. Sensitivity Calibration

After performing measurements for a long period of time, the sensitivity of the device may need to be re-calibrated. Therefore, you must check the sensitivity of the device from time to time.
To check the sensitivity, insert the whiteness standard plate into the main unit and measure the value of the whiteness standard plate. If this measurement value is not equal to the number on the whiteness standard plate, the sensitivity needs to be re-calibrated. Press the STD key with the whiteness standard plate still inserted to automatically calibrate the sensitivity.

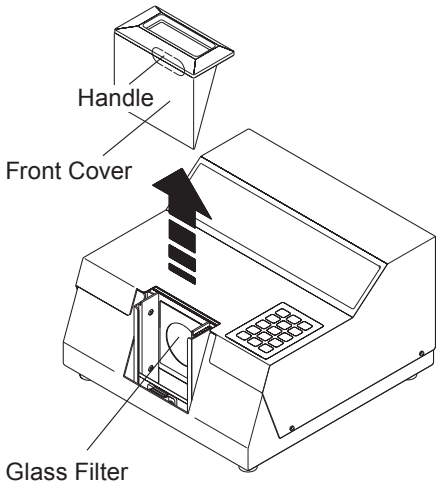
You can also press the STD key to calibrate the sensitivity when "STD" is displayed in the upper-left corner of the display.

7. Maintenance and Other Functions

7-1. Main Unit Glass Filter

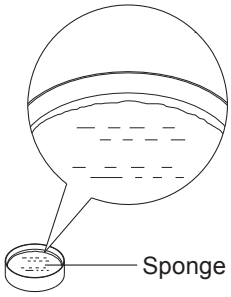
If the glass filter on the main unit is dirty, you will not receive an accurate measurement. You must keep the glass filter clean at all times when using the device. Use your finger to lift upwards on the handle on the inside of the front cover, in order to remove the front cover. This gives you access to the glass filter for cleaning.

* **There are sharp edges protruding from the front cover and the metal parts of the main unit. Be careful not to injure yourself when cleaning the glass filter.**



7-2. Sample Platter Sponge

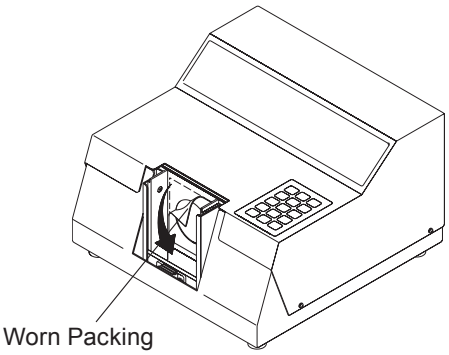
As the sample platter sponge wears, the amount of sample material you can fit into the sample platter increases, which results in inaccurate measurements. The sponge needs to be replaced when you can see lines on the inside of the sample platter when it is empty. The sponge is attached to the bottom of the platter with double-sided tape. Simply pull out the sponge to replace it.

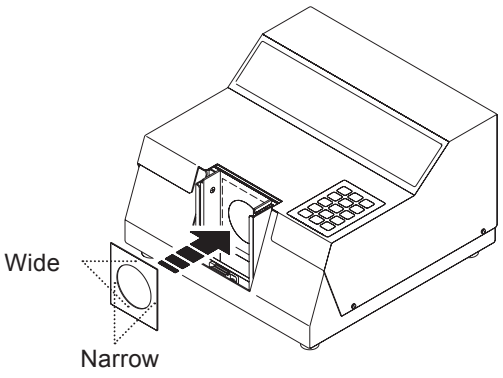


7-3. Main Unit Glass Filter Packing

When the packing attached to the main unit's glass filter wears down, please replace it. If this packing wears down, a space will form between the glass filter and the sample case.

* **Attach the packing in the orientation shown in the figure.**





7-4. Inputting a Whiteness Standard Value

(1) If the device is turned ON, turn the device OFF.

(2) Insert the whiteness standard plate into the main unit.

(3) When you turn the power switch ON, "WARMING-UP" is displayed.

(4) After a few moments, the light on the lower right side will begin to flash. When this happens, press the ENT key.

(5) "INPUT STD" is displayed.

(6) Input the three-digit number written on the whiteness standard plate. Press the ENT key.

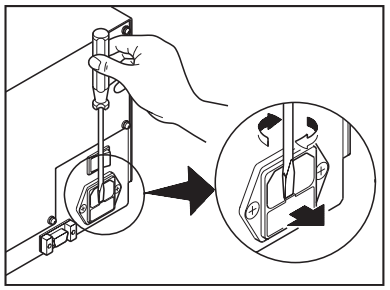
* **If you make a mistake when inputting the number, you can press the DEL key to go back and correct your mistake.**
* **You can only enter values in the range of 80.0 to 99.9.**

(7) "WARMING-UP" is displayed, and after a few moments, the value of the whiteness standard plate is displayed. Once the value of the whiteness standard plate is displayed, remove the whiteness standard plate.

* **This procedure must be performed whenever the whiteness standard plate is replaced.**

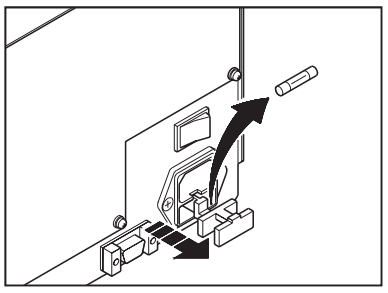
7-5. Replacing the Fuse

(1) Turn the power OFF and disconnect the power cord from the power supply connector.



(2) The fuse compartment is on the rear side of the main unit. Insert a flat head screwdriver or some other thin, flat object at the top of the fuse compartment and pull it out towards you.

(3) Remove the fuse from the fuse compartment and check to see if it has been blown.



(4) If the fuse is not blown, put it back into the fuse compartment. If the fuse is blown, replace it with the spare fuse or another compliant fuse (250 V, 3.15 A).

(5) Insert the fuse compartment back into the main unit as it was before removal.

(6) Insert the power cord back into the power supply connector of the device.

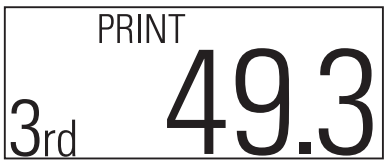
* **If the fuse blows again after replacement, the device itself may be broken. If this should occur, please request a maintenance inspection.**

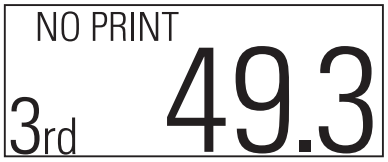
7-6. Output to a Printer (Optional)

You can output measurement data if you connect the device to an optional printer.

PRT Press this key to switch printer output ON or OFF.

PRT When the key is pressed and "PRINT" is displayed, printer output is turned ON. When "NO PRINT" is displayed, printer output is turned OFF.





- *** Connect the device to the printer using the printer cable VZC69 (optional) only after setting up the printer VZ-380 (optional).**
- *** Refer to the printer's user manual for more details about how to connect the device to the printer.**
- *** Whiteness values outside the range of 5.0 to 69.9 cannot be output.**

[Printout Example]

RICE WHITENESS TESTER C-600

TIMES	
1	39.6
2	39.5
3	39.7
4	39.6
5	39.6
AVERAGE	39.6

8. Errors

When an error occurs with this device, an error number is displayed alongside an error message.

Display	Cause	Solution
ERROR01 LEAK	Circuitry error.	Repair is required.
ERROR02 DARK	No whiteness standard plate has been inserted when attempting to perform a sensitivity calibration.	Insert the whiteness standard plate, then try performing the sensitivity calibration again.
	Circuitry error.	Repair is required.
ERROR03 LED VOLTAGE	Circuitry error.	Repair is required.
ERROR04 MEMORY	Circuitry error.	Repair is required.
ERROR05 UNDER5	Circuitry error.	Repair is required.
ERROR06 OVER100	The value of the whiteness standard plate is not the same as the value input on the main unit.	Follow the instructions for inputting the whiteness standard value (see Section 7-4) and try again.
	Circuitry error.	Repair is required.

Notes

- Copying some or all of the contents of this user manual without prior written consent is strictly prohibited.
- The contents of this user manual may be changed at any time in the future without any prior notice.
- The appearance and/or representations of the products and parts depicted in this user manual may not appear exactly as their actual counterparts, but this does not affect their operation or functionality.
- This user manual was intended to be written as clearly and accurately as possible. However, if you are unclear about anything in this user manual or notice any missing information, please contact us directly.
- We cannot be held responsible for any actions or effects resulting from the execution of any operations outlined in this user manual.

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