



INSTRUCTION MANUAL

Salt Analyzer

MODEL SAT-500

- Please read this instruction manual carefully before using the product.
- Please give this instruction manual to each “actual operator” of the product.

Introduction

Thank you very much for purchasing the SAT-500 salt analyzer.

This device measures the salt (sodium chloride) concentration and chloride ion concentration of food and other substances.

Before using this product, read this manual carefully and use it correctly.

Note that any malfunctions or damage caused by using the product in a manner other than that described in the instruction manual will not be covered by the warranty.

You will need this manual if you encounter something you do not understand or a problem. After reading it, keep it in a safe place.

For Safe Use

Safety Precautions

 **WARNING** : Ignoring this symbol and mishandling the product may result in death or serious injury.

 **CAUTION** : Ignoring this symbol and mishandling the product may result in injury or may cause only property damage.

Additionally, this manual uses the following along with the pictograms above to indicate the type of hazard or damage that may occur.



Mandatory

Indicates actions that you must always observe.



Prohibited

Indicates prohibited actions.



Electric shock caution

Indicates a potential risk of electric shock.



Fire hazard caution

Indicates a potential risk of smoke or fire.



Explosion hazard caution

Indicates a potential risk of explosion.



Poison caution

Indicates a potential risk of injury from toxic substances.



Corrosion caution

Indicates a potential risk of corrosion.



Puncture caution

Indicates a potential risk of puncture.

Handling Precautions

In case of an abnormal occurrence

WARNING



- If you notice any abnormality, immediately turn off the power and unplug the power cord from the outlet.



- If the device behaves abnormally, emits a burning smell, or produces smoke, there is a risk of fire or internal explosion. In this case, turn off the power immediately and unplug the power cord from the outlet. After confirming that the smoke has cleared, contact your dealer or DKK-TOA.



- Do not attempt to repair it yourself as it may be dangerous. Continuing to use the device in an abnormal state may cause fire or electric shock.



Precautions for using the device

WARNING



- Do not use chemicals that produce flammable gases, or use the device in an atmosphere with flammable gases.

There is a risk of gas explosion inside the device.



- Anyone other than DKK-TOA-designated service personnel must never remove the case cover or attempt to disassemble or repair the product.



There is a risk of electric shock due to the high voltage parts inside. It may also cause fire or abnormal operation.



- Do not plug or unplug the power cord with wet hands.

This may cause failure, fire, or electric shock.

- Do not use a power source other than 100 (50/60 Hz) to 240 VAC.

Otherwise, it may cause a fire or electric shock or damage the device.

- Do not splash water on the main unit or touch it with wet hands.

Doing so may cause electric shock or failure as this device is not waterproof/water-resistant.

⚠ WARNING

- Be sure to ground the main unit.
Otherwise, it may cause electric shock or failure.

**⚠ WARNING**

- The electrolytic silver wire (SAT-AG) will become pointed with continued use, so handle it with care.

There is a risk of injury such as laceration.



- The capillary tube of the micro-dispenser, which is made of glass, may break during installation or removal. When it is damaged, handle it with care.

There is a risk of injury such as laceration.

Other precautions for using the device

When using the device, pay attention to the following.

- Do not splash water, reagents, organic solvents, etc. on the device. This may cause failure, discoloration, or deformation. If any of these happens to splash on the device, wipe it off immediately.
- Do not press or rub the display or key operation section with hard or sharp objects.
This may cause scratches or damage.

Precautions for Installation or Storage

WARNING



- Do not use chemicals that produce flammable gases, or do not store or install the device in an atmosphere with flammable gases.

There is a risk of gas explosion inside the device.



- Do not install or store the device in a place where water, chemicals, etc. may enter it.



If water or chemicals enter the internal parts of the device, the circuit may short-circuit, causing fire or electric shock.



Other precautions for installation and storage

When installing and storing the device, take the following precautions.

- Install or store the device at a temperature of 10 to 35°C and a humidity of 35% to 85%.
- Install or store the device in a place where condensation does not occur.
- Do not install or store the device in a place where corrosive gas is generated.
- Install or store the device in a place without vibration.
- Install or store the device in a place not exposed to direct sunlight.
- Install or store the device in a place with little dust or debris.
- Do not leave the product in an unstable or hazardous place, subject it to strong shocks, or drop it.
- Do not place the device in extremely cold places or near heating appliances such as stoves.
- Avoid locations where the wind from an air cooling appliance hits directly.

Precautions for Using Reagents

CAUTION



- When using reagents, always check the Safety Data Sheet (SDS). In addition, wear protective gloves, protective goggles, protective mask, etc. as appropriate, and ensure sufficient ventilation for example by means of a ventilation fan and a local exhaust ventilation.
- When handling electrolytes or additives, take care to avoid contact with your skin and be careful not to get them in your eyes or mouth. Depending on the situation, wear gloves, protective glasses, protective masks, etc., and handle them with adequate ventilation.
- Otherwise, you may be at risk of skin or eye injury from splashes of reagents. If the reagent comes into contact with your skin or gets into your eyes or mouth, wash them thoroughly with tap water and consult a doctor or pharmacist.

Moving and Transporting the Device

CAUTION



- When transporting the device, always pack it in the original packaging box.
Note that if the device is transported without proper packaging, it may be damaged or fail.
- When moving the device, always turn off the power and unplug it from the outlet.
Otherwise, the device may be damaged or fail.

Disposal of the Device, Reagents, and Other Related Materials

When disposing of the device or reagents, observe the local government regulations. For details, contact your local government.

WARNING



- Do not place the device in fire or burn it.
There is a risk of explosion or rupture inside the device.

Warranty

(1) Warranty Coverage

DKK-TOA Corporation (hereinafter “DKK-TOA”) guarantees that the product will operate properly as specified in the specifications defined by the company (hereinafter “specifications”). Product failures occurring during the warranty period will be repaired free of charge.

- (a) The warranty period of this product is one year from the date of delivery.
- (b) Specific written agreements with DKK-TOA, if any, shall take precedence over this warranty.
- (c) The limitation of warranty described herein may not apply where applicable laws do not allow such limitation.

(2) Limited Warranty

This warranty does not cover the cases listed below. Repairs will be carried out for a fee.

- (a) Direct or indirect failure or damage caused by the use of the product for a purpose or in a manner not prescribed by the specifications or the instruction manual for the product.
- (b) A direct or indirect failure or damage caused by a natural disaster such as earthquake, wind or flood damage, or lightning strike, or by an accident, fire, abnormal voltage, salt damage, or gas damage.
- (c) Failure or damage caused by any repair or modification not authorized by DKK-TOA.
- (d) Failure or damage caused by the transport, moving, or dropping of the product after the purchase that is not attributable to DKK-TOA.
- (e) Electrodes, sensors, and consumables.
- (f) Failure or damage caused by the use of consumables, parts, or software not supplied by DKK-TOA.
- (g) Failure or damage caused by the use of connecting equipment not supplied by DKK-TOA.
- (h) Loss of data, settings, programs, or software stored on the product not attributable to DKK-TOA.
- (i) Any product other than DKK-TOA's, if specified by the purchaser or user, that incorporates, or is incorporated into or combined with DKK-TOA's products (*1). In such cases, this warranty covers DKK-TOA's products only.
- (j) A failure or damage resulting from a failure to perform a maintenance item for which the maintenance period specified in the instruction manual by DKK-TOA has passed.
- (k) Using the product outside Japan (its use outside Japan requires an individual contract).
- (l) Products without a nameplate (excluding products proved to have been delivered by DKK-TOA).
- (m) If installation, piping, or wiring is not performed in accordance with the delivery specifications specified by DKK-TOA.

(3) Others

- (a) This warranty is valid only in Japan.
- (b) Spare parts (*2) for the product will normally be supplied for five years (*3) from the date manufacturing and sales are discontinued.
- (c) The cause of any failure or damage shall be determined by a DKK-TOA technician.
- (d) For repairs, contact the DKK-TOA sales representative.

*1: Warranty certificates for products from other companies must be maintained by the user.

*2: Spare parts refer to parts that are required to maintain operation of the product.

*3: This five-year period is subject to availability of parts or their replacement.

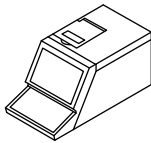
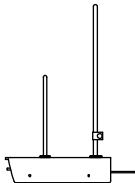
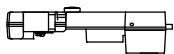
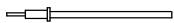
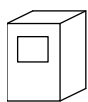
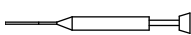
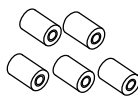
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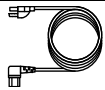
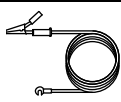
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1. Packaged Items

Classification	Name	Part No.	Quantity	External view
Main unit	Salt analyzer main unit	SAT-500	1	
Accessories	Stirrer unit	6877950K	1	
	Electrode holder	6877940K	1	
	Silver electrode	AG-111	2	
	Reference electrode	ELR-003	1	
	Electrolytic silver wire	SAT-AG	1	
	Electrolyte SAT-1F1 (500 mL)	143A373	1	
	Additive solution SAT-1G1 (50 mL)	143A374	1	
	Polishing solution SAT-1Z1 (50 mL)	143A376	1	
	Reference internal solution SAT-1E1 (100 mL)	143A375	1	
	NaCl standard solution (100 mL)*1	143A371 143A372	1	
	Micro-dispenser*2	0SZ00018 0SZ00021 0SZ00024	1	
	Dedicated beaker	SAT-B20	1	
	Stirring bar	SAT-SB	2	
	Printer paper (5 rolls)	PAP-HCS	1	

(To be continued)

(Continued from previous page)

Classification	Name	Part No.	Quantity	External view
Accessories	Power cord	118C025	1	
	2P conversion adapter	102A991	1	
	Grounding wire (2 m)	6545820K	1	
	Simplified instruction manual	145A475	1	
	Instruction manual	145A474	1	

*1: Either 10% NaCl standard solution SAT-1A1 (143A371) or 1% NaCl standard solution SAT-1A2 (143A372) will be included (specification required).

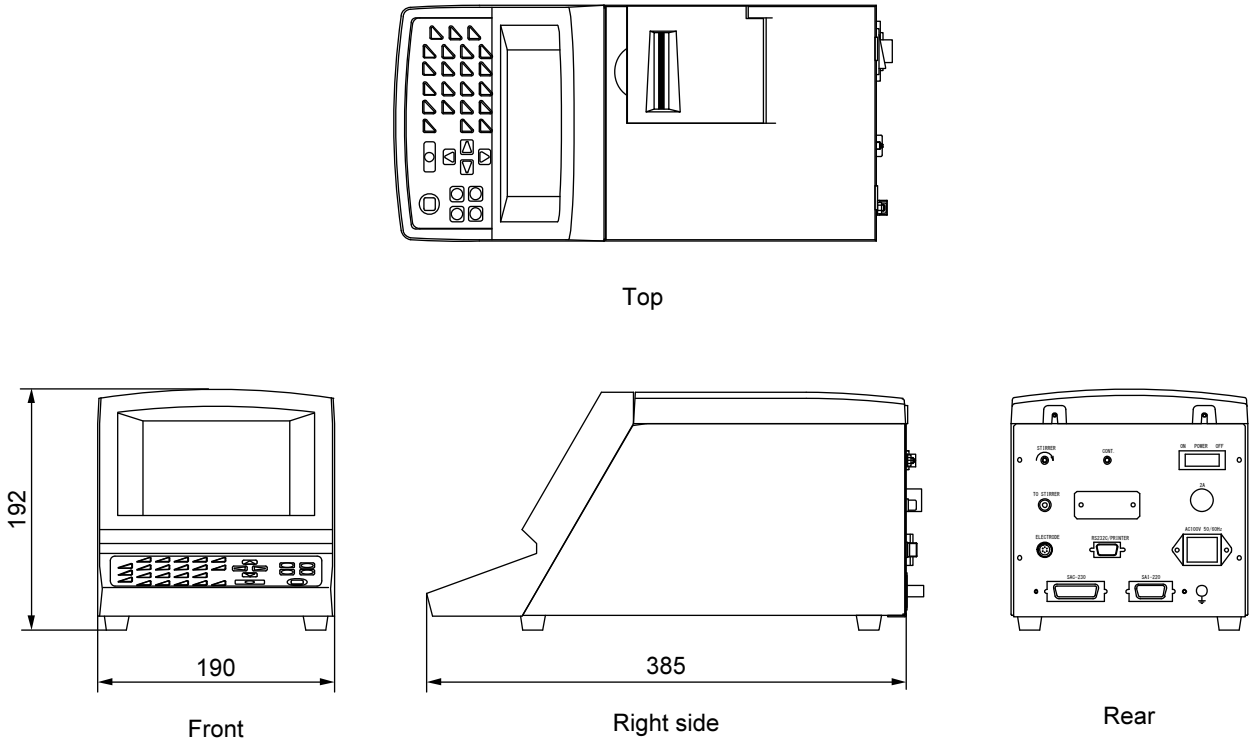
*2: Only when you purchase a complete set including a dispenser, 2 μ L (0SZ00018), 20 μ L (0SZ00021), or 200 μ L (0SZ00024) will be included (specification required).

2. Specifications

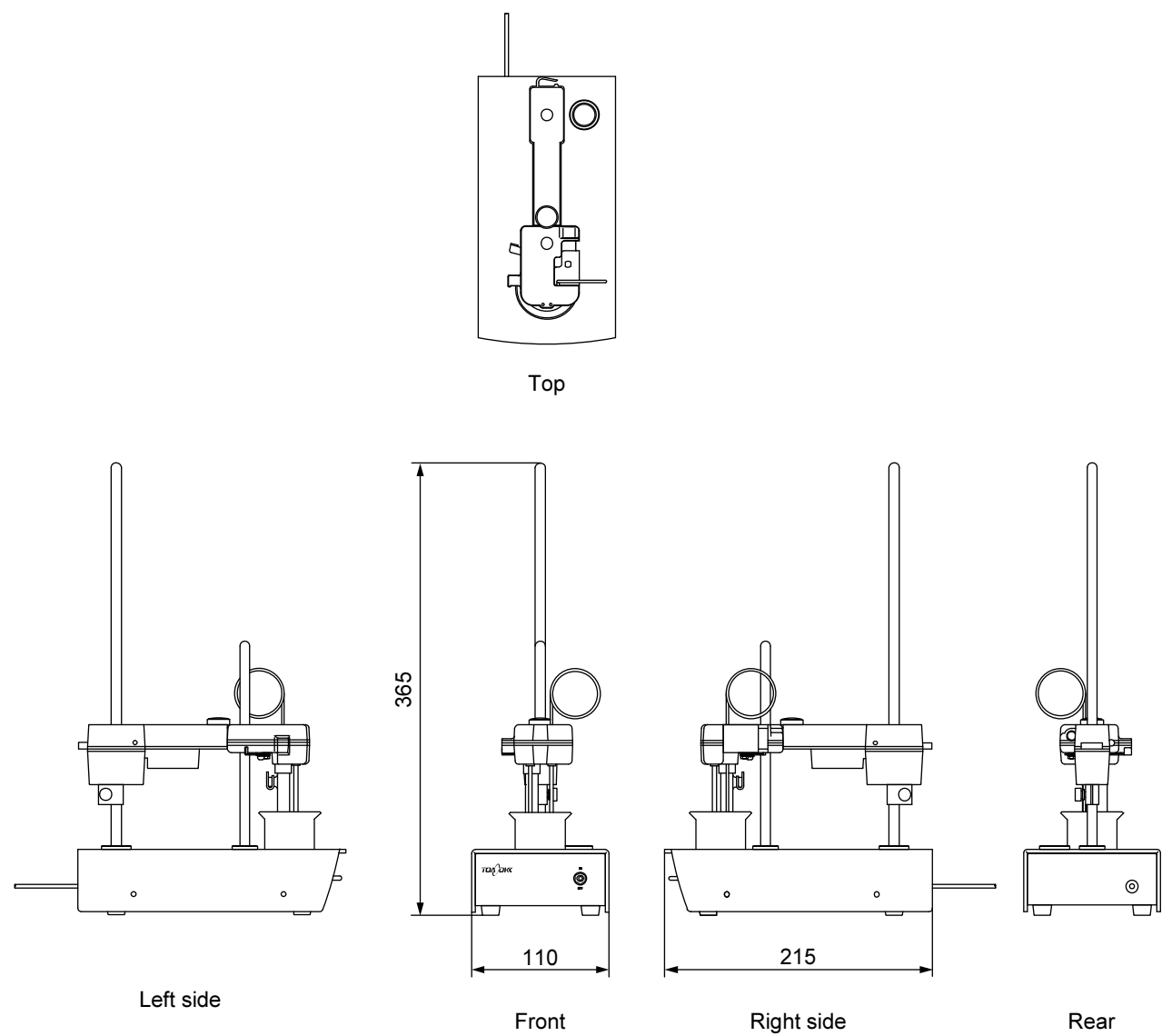
Model	SAT-500	
Display	Graphic LCD (320 x 240 dots) with backlight Japanese/English display switchable	
Measurement method	Coulometric titration method (endpoint detected via potential difference)	
Sample injection method	Manual injection using a micro-dispenser	
Sample injection volume	2, 20, 200 μ L and others (1 to 9,999 μ L)	
Measurement range (for display in %)	When injecting 2 μ L: 0.00% to 49.99%, resolution 0.01% When injecting 20 μ L: 0.000% to 4.999%, resolution 0.001% When injecting 200 μ L: 0.0000% to 0.4999%, resolution 0.0001% When injecting others: 0.0000% to 99.99% (This varies depending on calibration solution concentration.)	
Concentration conversion	NaCl/Cl ⁻ switchable	
Concentration unit	% (W/V), % (W/W), mg/L, mol/L	
Repeatability	CV value: $\leq 0.5\%$ in a 1% NaCl standard solution measurement using a 20 μ L micro-dispenser	
Measurement time	≈ 25 seconds/measurement in a 1% NaCl standard solution measurement using a 20 μ L micro-dispenser	
Calibration	Automatic one-point calibration using NaCl standard solution with a concentration according to the injection volume	
Measurement start method	Automatic start by potential change or manual start using the START key	
Printer	Internal thermal printer	
Memory data	300 data pieces (with backup) Recalculable by changing the unit, correction coefficient, etc. Statistically calculable for the average, standard deviation, CV value, etc.	
Output	RS-232C (connectable to a PC or an external printer)	
Operating temperature	10 to 35°C (no sudden temperature changes)	
Power supply	100 to 240 VAC 50/60 Hz	
Power consumption	≤ 20 VA	
Dimensions	Main unit	Approx. 190(W) $\times$ 192(H) $\times$ 385(D) mm
	Measuring unit	Approx. 110(W) $\times$ 370(H) $\times$ 220(D) mm
Weight	Main unit	Approx. 3.3 kg
	Measuring unit	Approx. 1.1 kg

3. External View

3.1 Salt Analyzer Main Unit

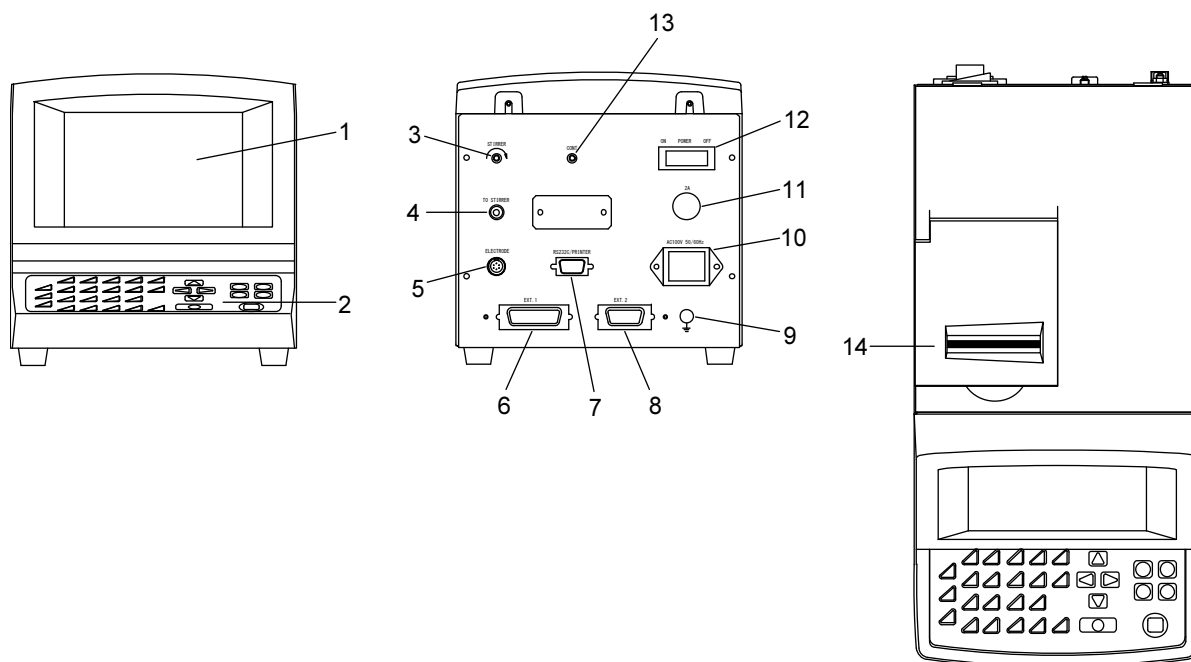


3.2 Measuring Unit



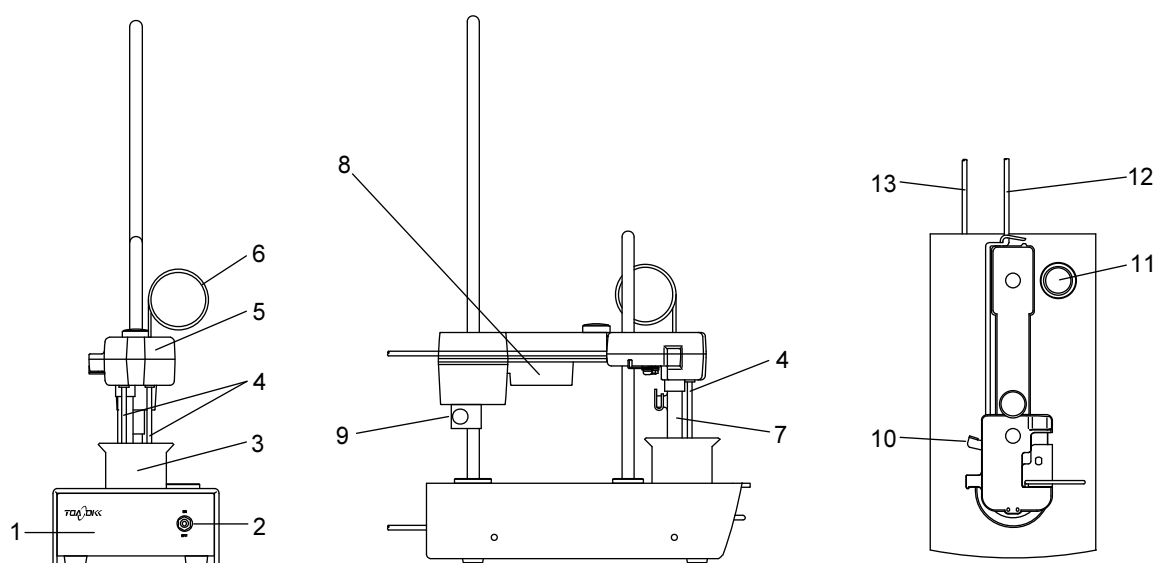
4. Name and Function of Each Part

4.1 Main Unit



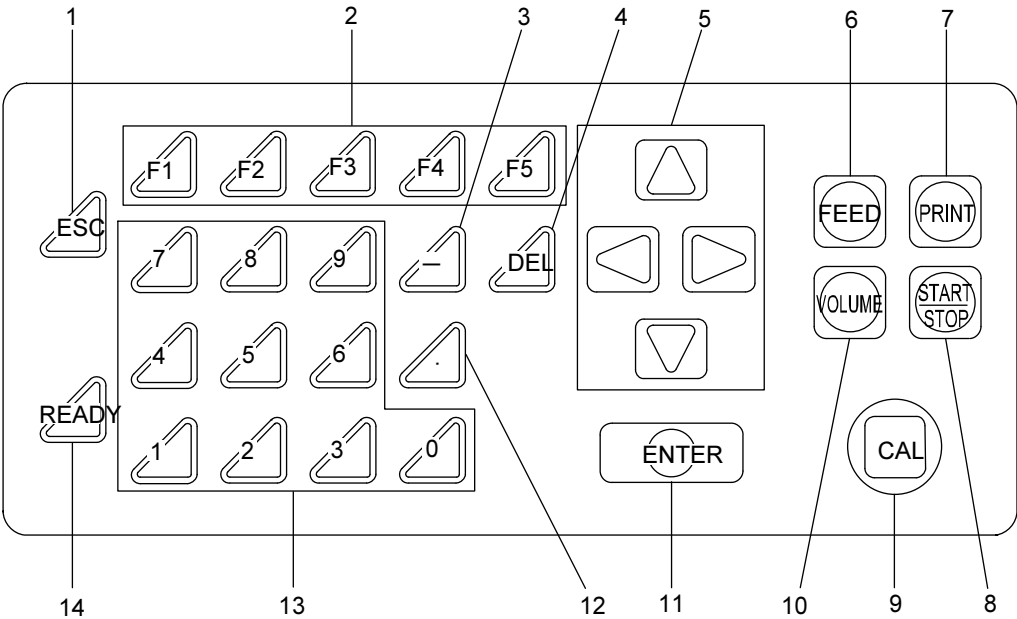
Symbol	Name	Description
1	LCD unit	Displays measurement results and settings.
2	Operation panel	Keyboard used for various operations and settings.
3	Stirring speed adjustment volume	Volume for adjusting the rotation speed of the stirrer. Adjustable with a flat-blade screwdriver.
4	Power connector for stirrer unit	Power connector for connecting the stirrer unit.
5	Electrode holder connector	Connector for the cable from the electrode holder.
6	EXT.2 connector	Not used.
7	RS-232C/external printer connector	A connector for connecting a PC or an optional dedicated external printer.
8	EXT.1 connector	Not used.
9	Grounding terminal	Terminal for installing this device.
10	Power supply inlet	Used to connect the power cord.
11	Fuse holder	Contains a 2 A fuse.
12	Power switch	Switch for turning the power on and off.
13	Contrast volume	Volume for adjusting the brightness of the screen display.
14	Internal printer	Prints measurement results and others on dedicated thermal paper.

4.2 Measuring Unit



Symbol	Name	Description
1	Stirrer unit	Stirs the electrolyte in the measuring beaker.
2	Stirring power switch	Turns on and off the stirring power.
3	Measuring beaker	The measurement solution is injected here for measurement.
4	Silver electrodes	An electrolytic electrode (right side) for performing electrolysis operation and an indicator electrode (left side) for measuring potential (mV). The left and right electrodes are the same.
5	Electrode holder	Holder for attaching the silver electrodes, reference electrode, and electrolytic silver wire.
6	Electrolytic silver wire	Silver wire for generating silver ions that react with salt.
7	Reference electrode	Reference electrode for measuring potential (mV).
8	Electrode holder vertical movement lever	Moves the electrode holder up and down.
9	Electrode holder stopper	Prevents the electrode holder from lowering any further.
10	Silver wire attach/detach lever	For attaching and detaching the electrolytic silver wire.
11	Protection cap holder	Place for placing the protection cap of the reference electrode during measurement.
12	Electrode holder connection cable	For connecting the electrode holder to the main unit.
13	Stirrer unit Power cable	Connected to take power from the stirrer unit from the main unit.

4.3 Operation Panel



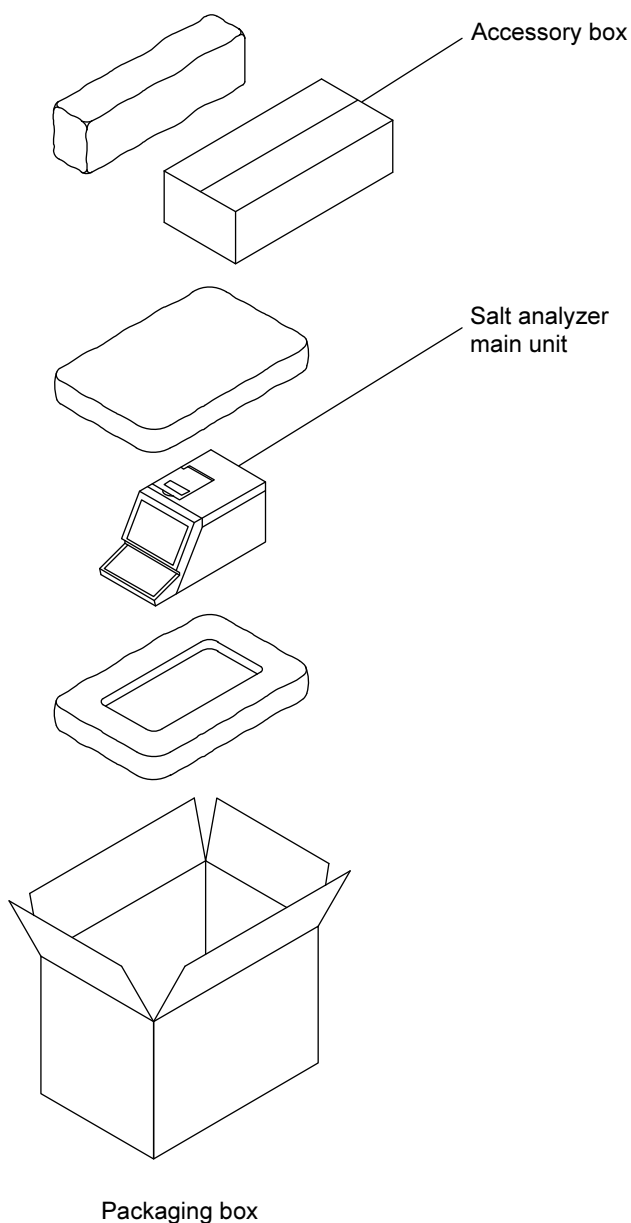
Symbol	Name	Description
1	ESC key	Returns to the previous screen.
2	F1 to F5 keys	Entry points for selecting various functions and changing conditions in memory data recalculation.
3	Minus key	For entering a minus sign (-).
4	DEL key	For clearing a set value or other data.
5	Arrow keys	For moving the cursor up, down, left, or right.
6	FEED key	For feeding printer paper.
7	PRINT key	For printing measurement results or statistical calculation results.
8	START/STOP key	Mainly for starting titration during manual start.
9	CAL key	For performing standard solution calibration.
10	VOLUME key	For changing the sample injection volume.
11	ENTER key	For confirming various settings.
12	• key	For entering a decimal point.
13	0 to 9 keys	For entering numbers.
14	READY key	For transitioning to the initial screen during various settings or device startup.

5. Installation and Assembly

5.1 Unpacking

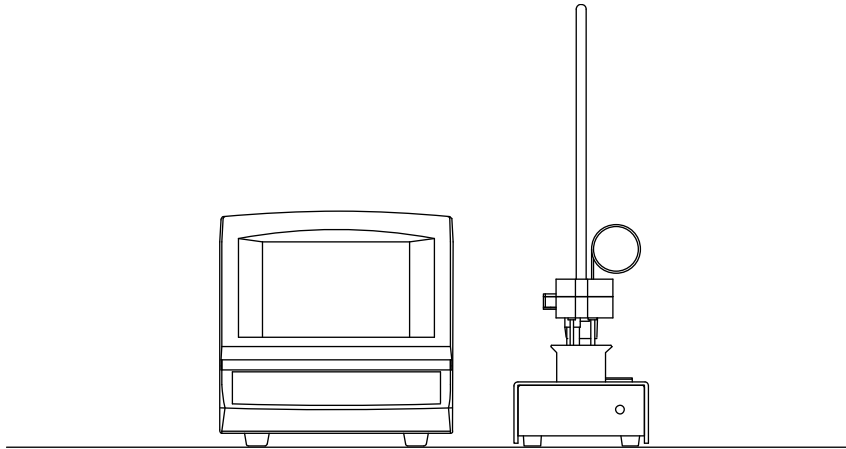
The salt analyzer is packed as shown in the figure below. Remove the salt analyzer main unit and accessories from the packaging box. Refer to “1. Packaged Items” to check the number of items, etc. If any item is missing from the package, please contact your dealer.

Please keep the packaging box and use it when moving or transporting the product.



5.2 Installation Procedure

Install the device on a flat surface.



Precautions for installation

WARNING



- Do not use chemicals that produce flammable gases, or install the device in an atmosphere with flammable gases.

There is a risk of gas explosion inside the device.



- Do not install the device in a place where water, chemicals, etc. may enter the device.



If water or chemicals enter the internal parts of the device, the circuit may short-circuit, causing fire or electric shock.



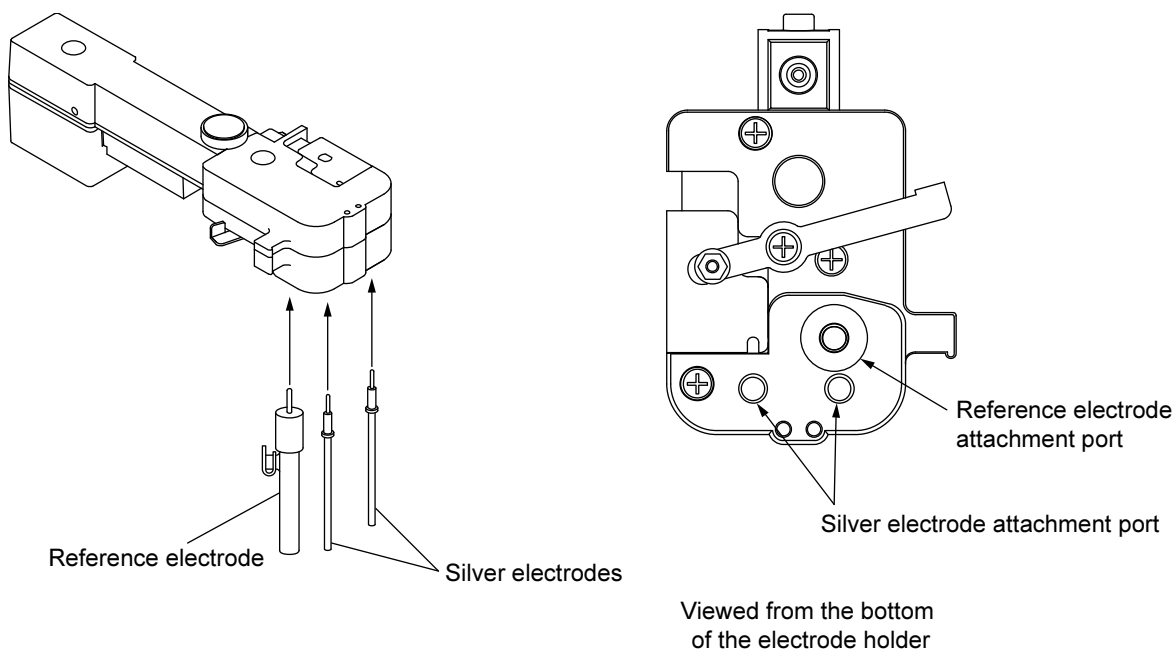
- Install or store the device in the temperature range of 10 to 35°C and humidity range of 35% to 85%.
- Install or store the device in a place where condensation does not occur.
- Do not install or store the device in a place where corrosive gas is generated.
- Install or store the device in a place without vibration.
- Install or store the device in a place not exposed to direct sunlight.
- Install or store the device in a place with little dust or debris.
- Do not leave the product in an unstable or hazardous place, subject it to strong shocks, or drop it.
- Do not place the device in extremely cold places or near heating appliances such as stoves.
- Install or store the device in a location where it will not be exposed to direct air from an air conditioner.

5.3 Assembling the Measuring Unit

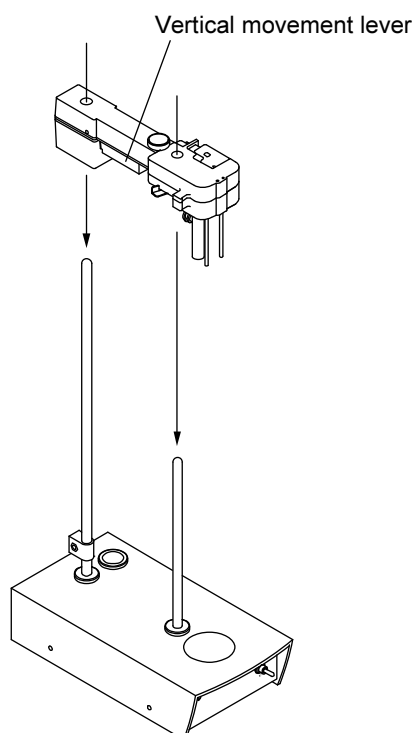
The measuring unit consists of the following.

- Stirrer unit (6877950K)
- 2 silver electrodes (AG-111)
- Electrolytic silver wire (SAT-AG)
- Stirring bar (SAT-SB)
- Electrode holder (6877940K)
- Reference electrode (ELR-003)
- Dedicated beaker

① Attach the two silver electrodes and the reference electrode to the electrode holder.

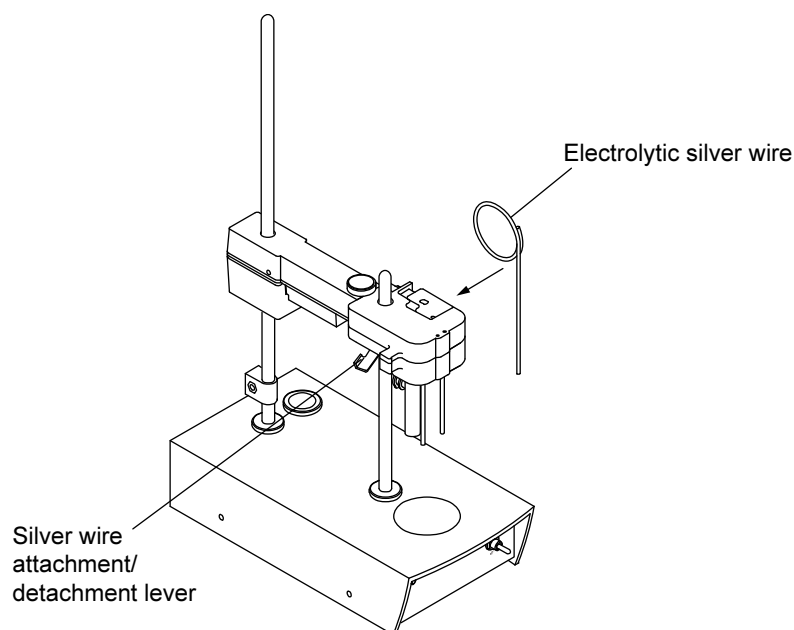


② While pinching the vertical movement lever of the electrode holder, insert the electrode holder into the posts of the stirrer unit.



- ③ While pinching the silver wire attach/detach lever, attach the electrolytic silver wire to the electrode holder.

Be sure to insert the electrolytic silver wire from the right side, not the top.



⚠ WARNING



- When attaching the electrolytic silver wire (SAT-AG) to the electrode holder, be sure to insert it from the right side. Do not insert it from above.



If you insert or remove the electrolytic silver wire from the top especially when its tip is wet with electrolyte, the electrode holder may fail, leading to inaccurate measurements.

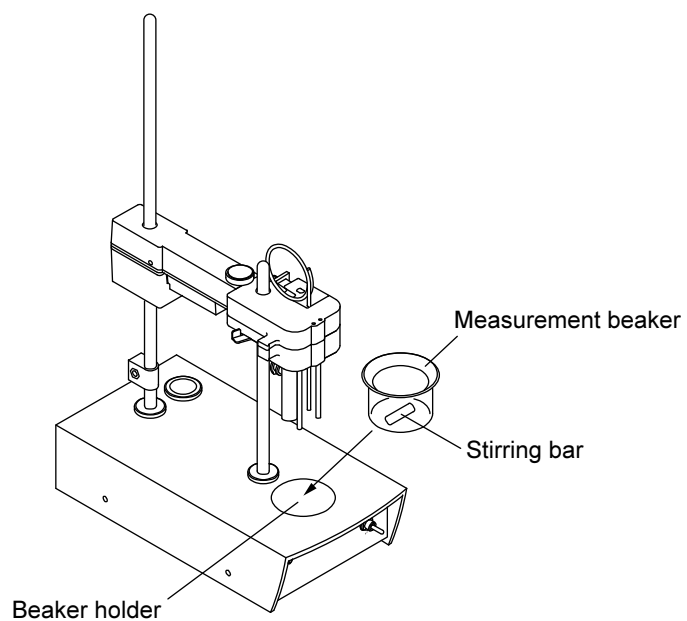


- With continued use of the electrolytic silver wire, its tip will be more pointed.

Thus, handle it with care as there is a risk of injury such as laceration.

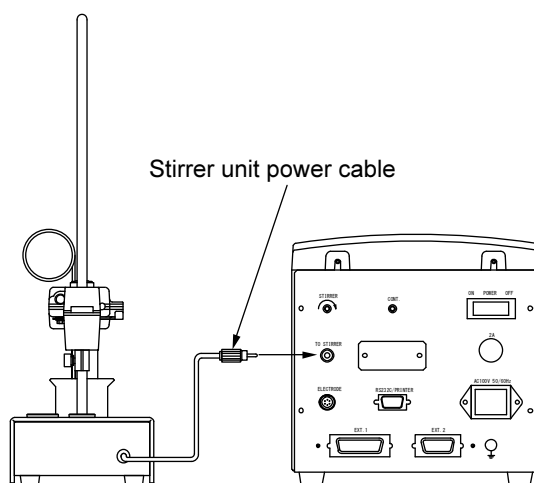


- ④ Place the stirring bar in the measuring beaker and place it on the beaker holder.

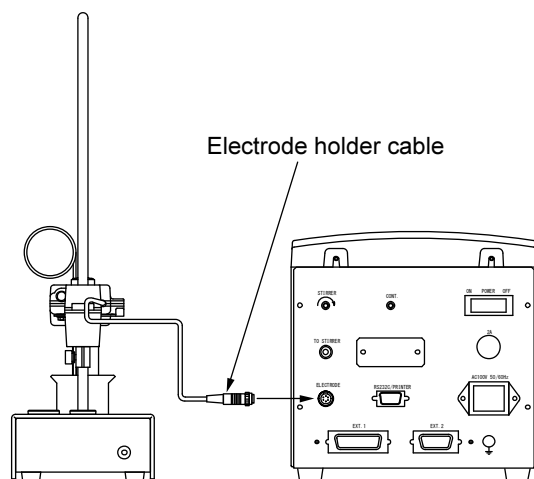


5.4 Connecting the Main Unit and Measuring Unit

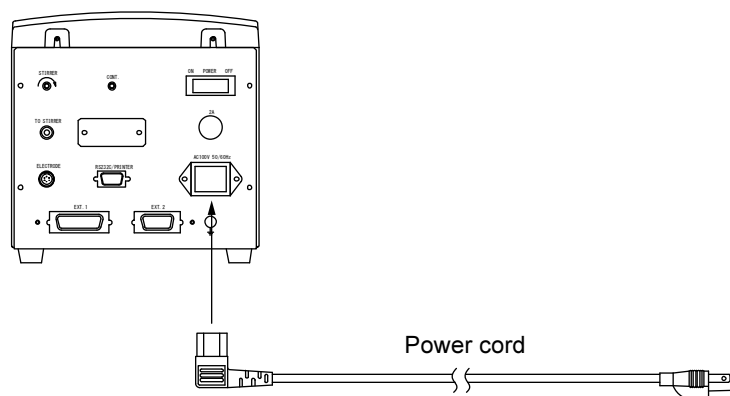
- ① Connect the power cable from the back of the stirrer unit to the “TO STIRRER” connector on the back of the main unit.



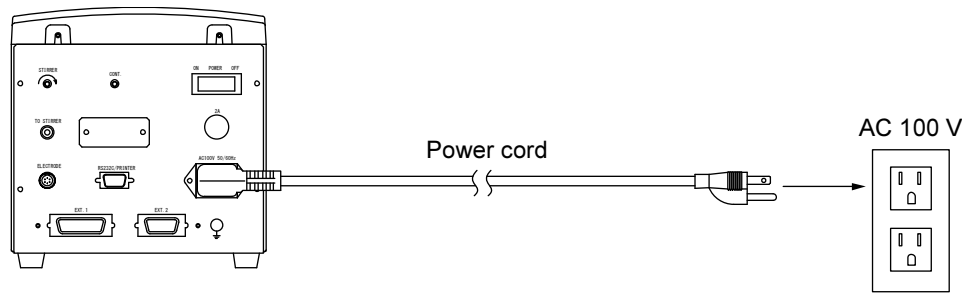
- ② Connect the cable from the electrode holder to the “ELECTRODE” connector on the back of the main unit.



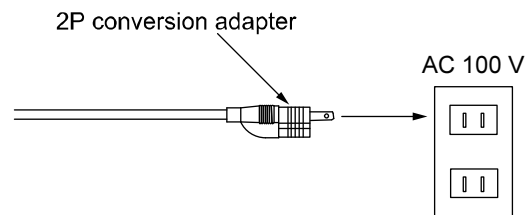
- ③ Insert the included power cord into the power supply inlet on the main unit.



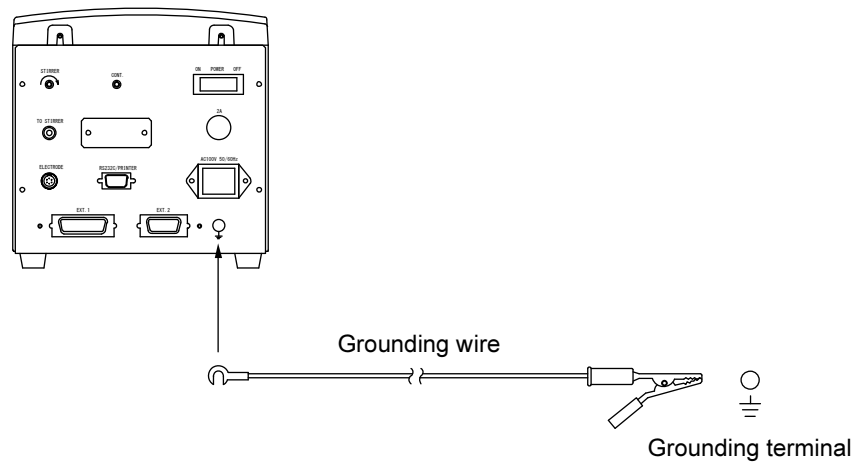
- ④ Ensure that the power switch is OFF, then plug the power plug into the outlet.



For a 2P-type outlet, use the included 2P adapter.



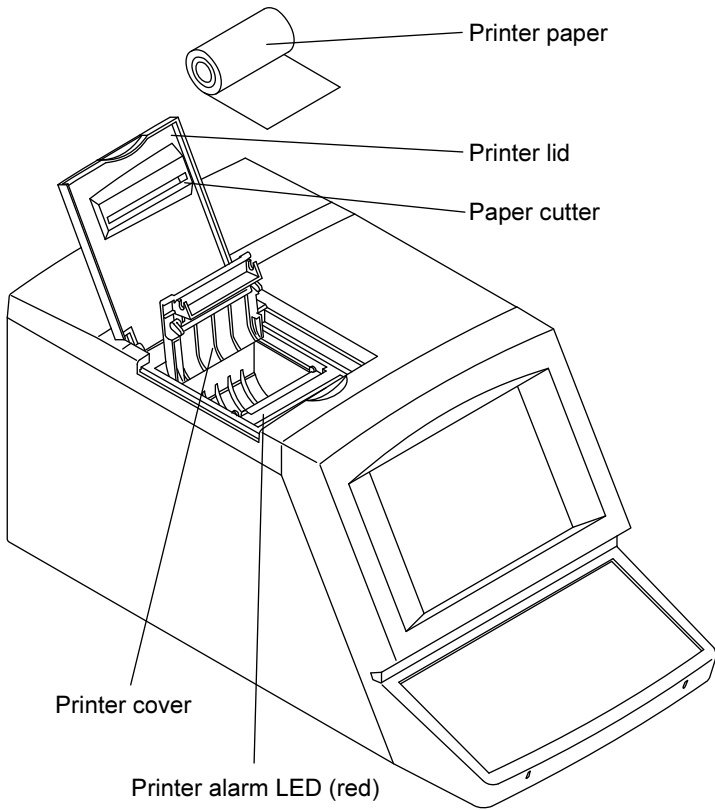
When using a 2P type outlet, connect the grounding wire of the main unit to the ground terminal using the included grounding wire.



5.5 Loading Printer Paper

When using this device for the first time or when the printer paper is running low, you will need to replace it with new paper and load it into the printer. Load the printer paper into the printer as follows.

- ① Open the printer lid and the printer cover inside.
- ② Insert the printer paper in the orientation shown in the figure, and pull out about 10 cm of printer paper. Then, close the printer cover until it snaps into place.
- ③ Pass the printer paper through the paper cutter on the printer lid and then close it.



Printer alarm LED (red) status	Error description and action
Off; or lighting for a few seconds after power is turned on, and then turning off	No error Normal condition
Lighting	Paper end (paper out) Replace or load paper to turn off the light.
Blinking	Abnormal printer head temperature or abnormal voltage. Turn off the power and turn it back on after a few minutes. If the issue persists after several attempts, the printer has failed.

 CAUTION

-
- For paper in the internal printer, the included printer paper or PAP-HCS (5-roll pack, option) must be loaded and used.
Using any other printer paper may cause the device to fail.
 - Be sure to load the printer paper in the direction shown in the diagram.
Printing cannot occur if the paper is in the opposite direction.
 - While measurement results or similar are being printed, the display screen may flicker slightly, which is not a failure.
-

6. Basic Operations

6.1 Operations before Starting the Device

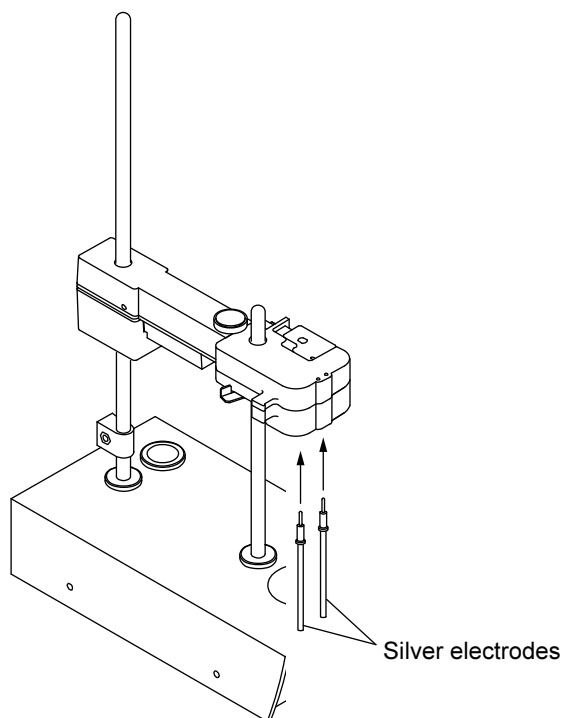
Before powering on the device, the following preparations are required.

1. Polishing the surface of the silver electrodes and attaching them to the electrode holder
2. Polishing the surface of the electrolytic silver wire and attaching it to the electrode holder
3. Preparing the reference electrode
4. Preparing the measuring beaker and electrolyte
5. Turning on the power

6.1.1 Polishing the surface of the silver electrodes and attaching them to the electrode holder

The silver electrodes need to be clean before measurement. Before starting the measurement, polish the silver electrodes with the included polishing solution (SAT-1Z1). Do the polishing as follows.

- ① Put a small amount of polishing solution on tissue paper or similar.
- ② Polish the tips of the silver electrodes, which will be immersed in the electrolyte, until they are clean.
- ③ Wipe them dry with clean tissue paper.
- ④ Attach them to the electrode holder.

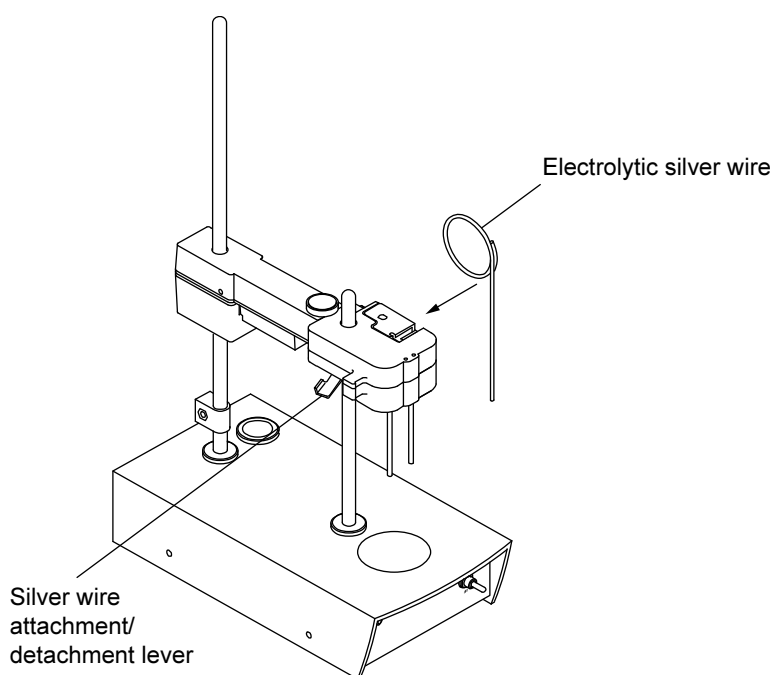


6.1.2 Polishing the surface of the electrolytic silver wire and attaching it to the electrode holder

The electrolytic silver wire must be measured with its surface cleaned, just like the silver electrodes. Before starting the measurement, polish the silver wire with the included polishing solution (SAT-1Z1). Do the polishing and attachment to the electrode holder as follows.

- ① Put a small amount of polishing solution on tissue paper or similar.
- ② Polish the electrolytic silver wire's tip, which will be immersed in the electrolyte, and the part that will contact the electrode holder until they are clean.
- ③ Wipe them dry with clean tissue paper.
- ④ Attach the wire to the electrode holder.

While holding the silver wire attach/detach lever of the electrode holder, attach it from the right side.



As you continue to measure, the tip of the electrolytic silver wire will become thinner and more pointed. If it becomes extremely thin, accurate measurements will no longer be possible. If so, cut off the tip with nipper or a similar.

WARNING



- When attaching the electrolytic silver wire (SAT-AG) to the electrode holder, be sure to insert it from the right side. Do not insert it from above.



If you insert or remove the electrolytic silver wire from the top especially when its tip is wet with electrolyte, the electrode holder may fail, leading to inaccurate measurements.



- With continued use of the electrolytic silver wire, its tip will be more pointed.

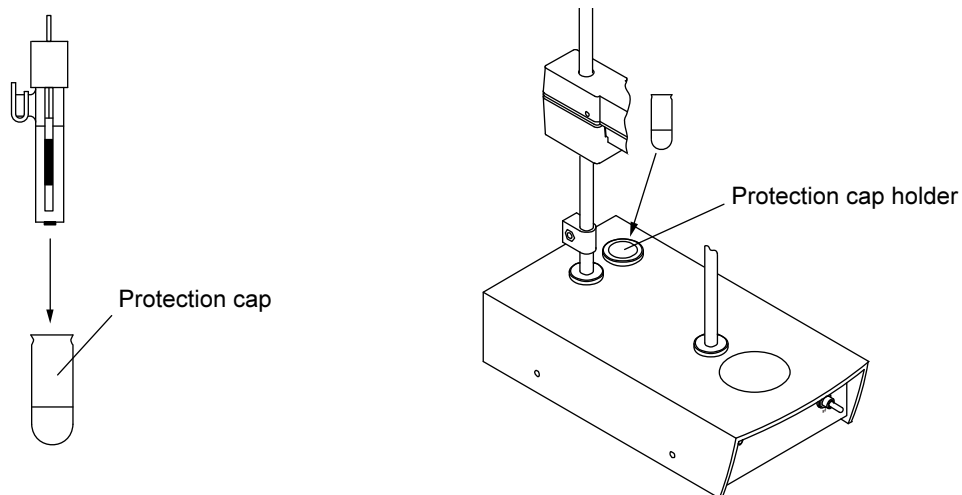
Thus, handle it with care as there is a risk of injury such as laceration.



6.1.3 Preparing the reference electrode

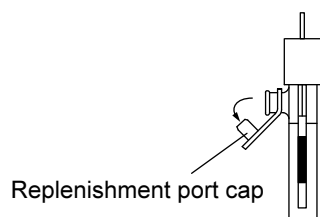
The reference electrode (ELR-003) is made of glass, so be careful not to drop or hit it to prevent it from being damaged.

- ① Remove the protection cap. Place the removed protection cap in the stirrer unit's protection cap holder.

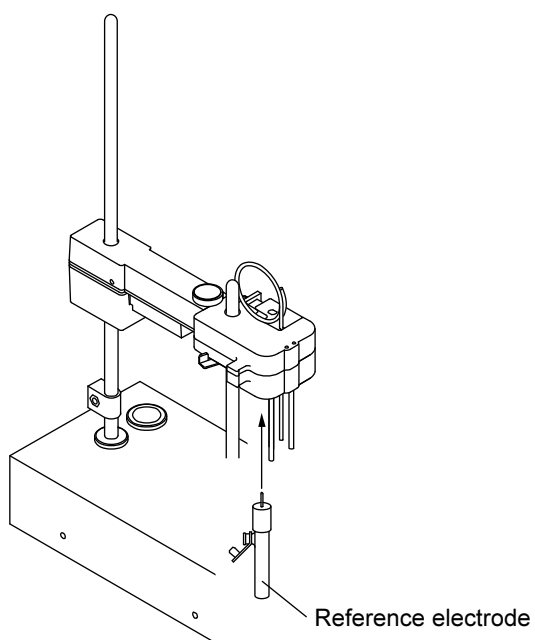


- ② Open the replenishment port cap.

If the internal solution is low, refill with the included reference internal solution (SAT-1E1).

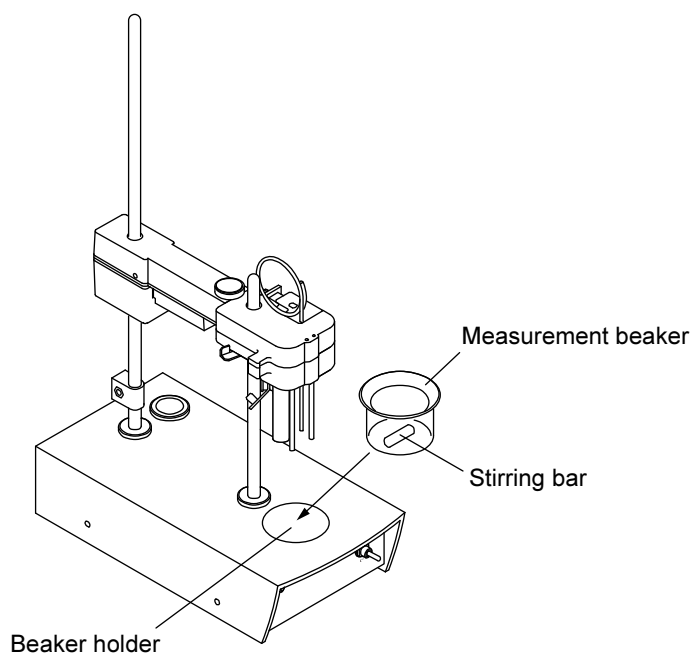


- ③ Attach the electrode to the electrode holder.

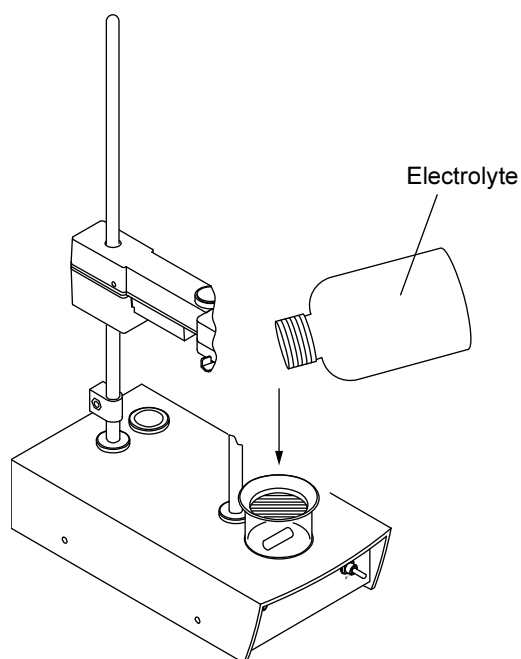


6.1.4 Preparing the measuring beaker and electrolyte

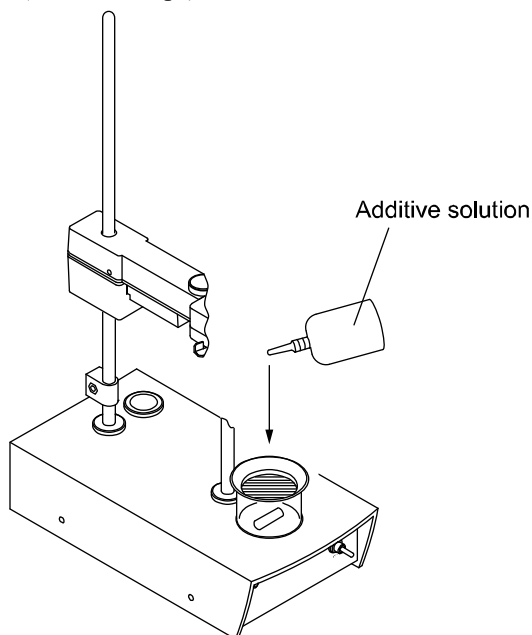
- ① Place the stirring bar in the measuring beaker and place it in the stirrer unit's beaker holder.



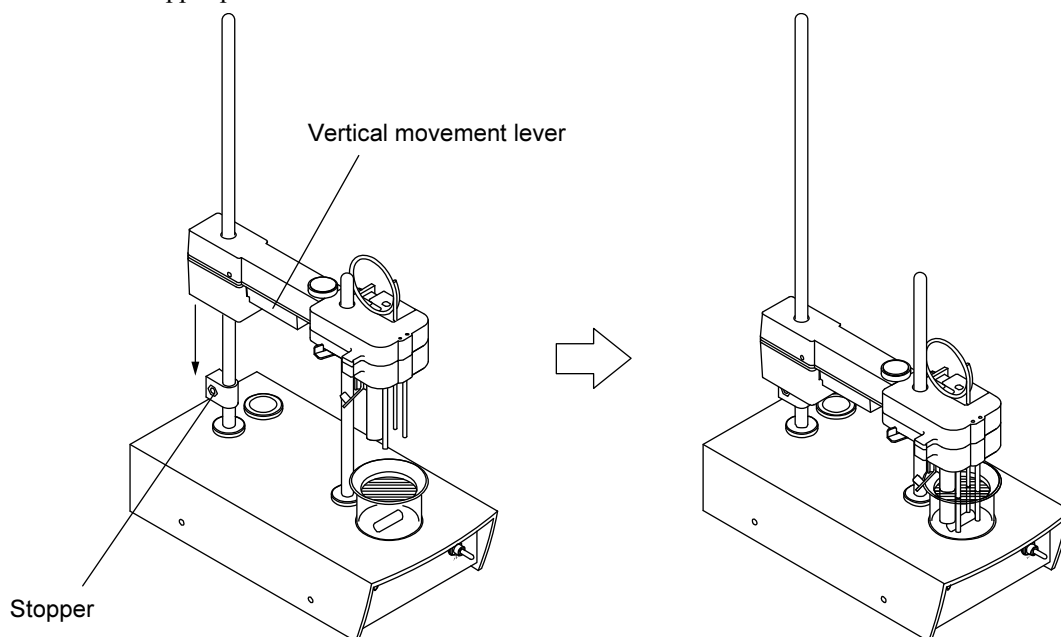
- ② Pour in approx. 20 mL of electrolyte (80% or so of the beaker).



- ③ Add approx. 0.7 mL (about 20 drops) of additive solution.



- ④ While pinching the vertical movement lever, lower the electrode holder, with the electrodes attached, to the stopper position.



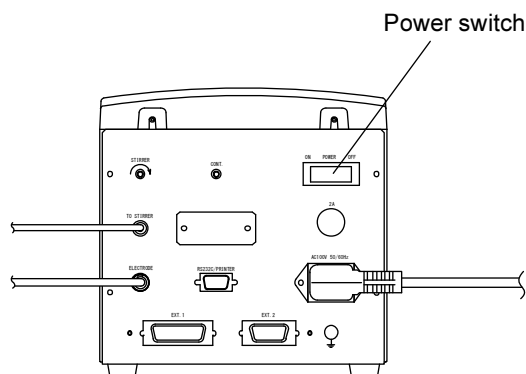
CAUTION



- When using reagents, always check the Safety Data Sheet (SDS). In addition, wear protective gloves, protective goggles, protective mask, etc. as appropriate, and ensure sufficient ventilation for example by means of a ventilation fan and a local exhaust ventilation.
- When handling electrolytes or additives, take care to avoid contact with your skin and be careful not to get them in your eyes or mouth. Depending on the situation, wear gloves, protective glasses, protective masks, etc., and handle them with adequate ventilation.
- Otherwise, you may be at risk of skin or eye injury from splashes of reagents. If the reagent comes into contact with your skin or gets into your eyes or mouth, wash them thoroughly with tap water and consult a doctor or pharmacist.

6.1.5 Turning on the power

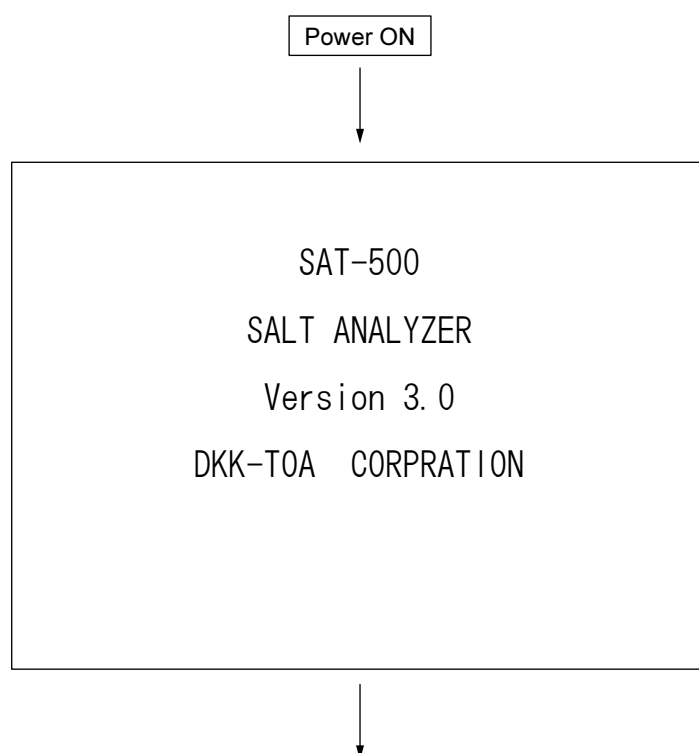
- ① After completing the steps in 6.1.1 to 6.1.4, turn on the power switch on the back of the main unit.

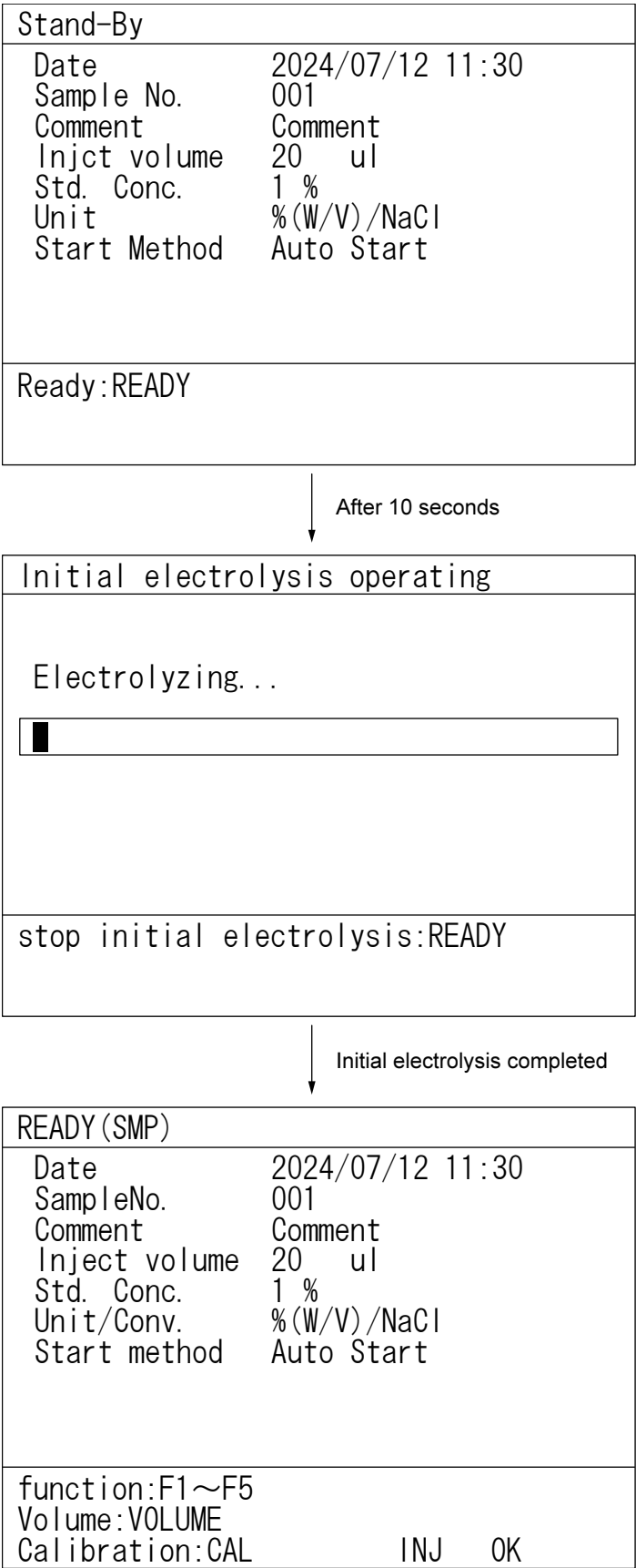


- ② After turning on the power, the initial electrolysis process will automatically start 10 seconds later.

It will not, however, be performed if the electrolyte is judged to contain no salt after 10 seconds; instead, the screen will switch to the READY screen and the device will be ready for measurement.

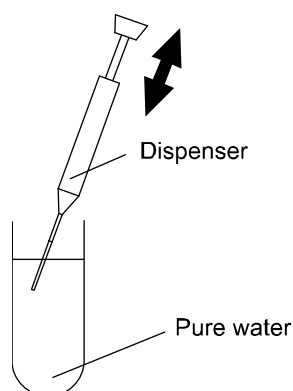
- ③ Once the initial electrolysis process is complete, the measurement is ready.



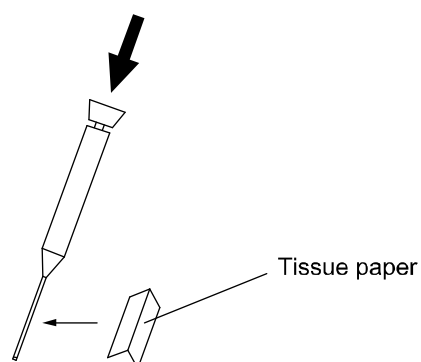


6.2 Using the Micro-dispenser

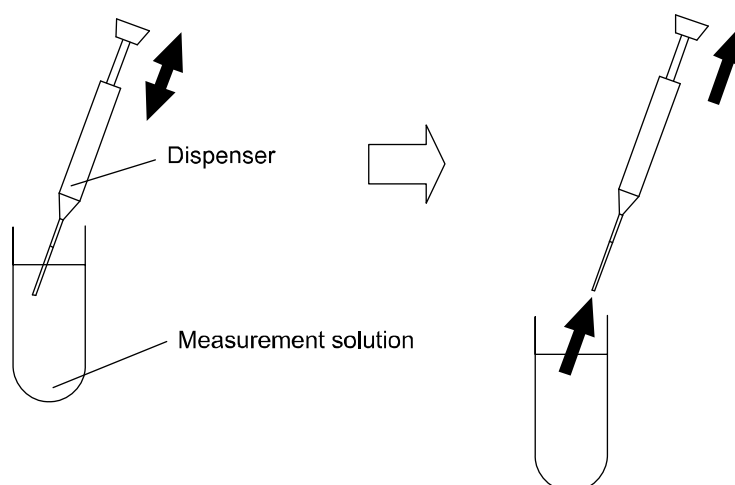
- ① Immerse the tip of the micro-dispenser in pure water and push and pull the piston four or five times to clean the inside of the glass capillary.



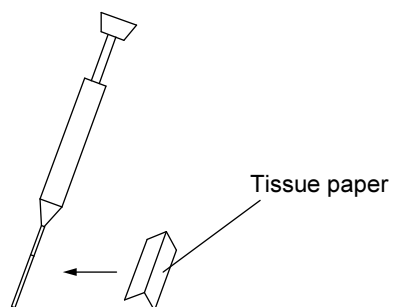
- ② With the piston pressed, remove the dispenser tip from the pure water and wipe off the water droplets around the glass capillary with tissue paper or similar.



- ③ Immerse the tip of the micro-dispenser in the measurement solution, push and pull the piston four or five times to co-wash the inside of the glass capillary. Then, with the piston pulled, remove the dispenser tip from the measurement solution.

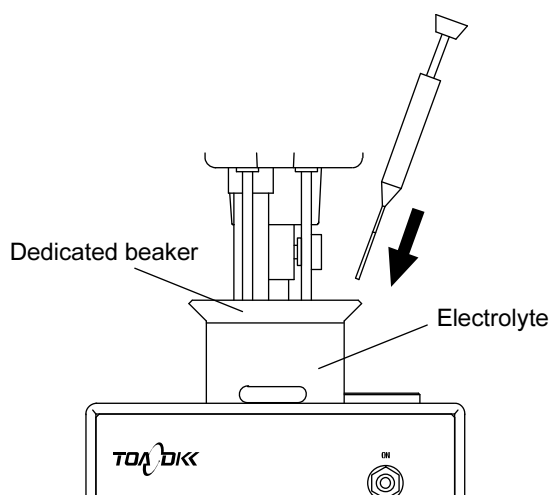


- ④ Use tissue paper or similar to wipe off the water droplets around the glass capillary. Ensure that the capillary is filled with the measurement solution.

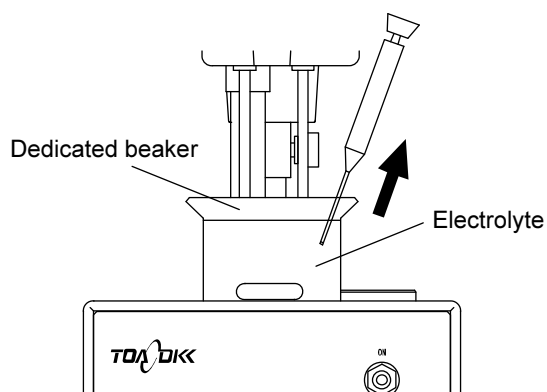


- The capillary is filled with the measurement solution.
- ✗ The tip is dented with air.
- ✗ The capillary has droplets of the measurement solution on its outer surface.
- ✗ The capillary tube contains air.

- ⑤ Immerse the dispenser tip into the measuring beaker containing electrolyte and press the piston to discharge the measurement solution.



- ⑥ With the piston pressed in, remove the dispenser tip from the electrolyte.



6.3 Setting the Injection Volume

For this device, the quantification range of salt concentration varies depending on the sample injection volume.

You need to select the micro-dispenser to use and set its capacity according to the salt concentration of the sample.

Table 6.3.1 Quantification range of salt for the set injection volume

Injection volume setting	Micro-dispenser capacity to use	Salt concentration quantification range	Remarks
2 μL	2 μL	2.00% to 49.99% (W/V)	Recommended: 2.00% to 20.00% (W/V)
20 μL	20 μL	0.200% to 4.999% (W/V)	Recommended: 0.200% to 2.000% (W/V)
200 μL	200 μL	0.0200% to 0.4999% (W/V)	Recommended: 0.0200% to 0.2000% (W/V)
Custom injection volume	Custom-set injection volume	4/injection volume (μL) to 100/injection volume % (W/V)	Recommended: 4/injection volume (μL) to 40/injection volume % (W/V)

* After setting the arbitrary injection volume, press the **VOLUME** key four times to cycle through “Custom injection volume” > “2 μL” > “20 μL” > “200 μL” > “Custom injection volume”.

- ① On the initial, READY screen, press the **VOLUME** key to make a selection. Each time you press the key, the “Injection volume” displayed on the screen will switch in the order of “2 μL” > “20 μL” > “200 μL” > “Custom injection volume”.

Initial (READY) screen

READY (SMP)	
Date	2024/07/12 11:30
SampleNo.	001
Comment	Comment
Inject Volume	20 ul
Std. Conc.	1 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
function:F1~F5	
Volume:VOLUME	
Calibration:CAL	
INJ OK	

VOLUME

READY (SMP)	
Date	2024/07/12 11:30
SampleNo.	001
Comment	Comment
Inject Volume	20 ul
Std. Conc.	1 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
function:F1~F5	
Volume:VOLUME	
Calibration:CAL	
INJ OK	

Each time you press the **VOLUME** key, the injection volume will change.

6.4 Standard Solution Calibration

First, perform standard solution calibration before measuring the sample.

6.4.1 Standard solution for calibration

You perform a one-point calibration using an NaCl standard solution. The NaCl concentration of the standard solution is as follows depending on the sample injection volume.

Table 6.4.1 Concentrations of NaCl standard solutions for various injection volume

Injection volume setting	Micro-dispenser Capacity	NaCl standard solution concentration	Remarks
2 μ L	2 μ L	10.0% (W/V)	Use a DKK-TOA's 10% NaCl standard solution (SAT-1A1).
20 μ L	20 μ L	1.00% (W/V)	Use a DKK-TOA's 1% NaCl standard solution (SAT-1A2).
200 μ L	200 μ L	0.100% (W/V)	Dilute SAT-1A1 by 100 times or SAT-1A2 by 10 times for use.
Custom injection volume	Custom-set injection volume	Custom-set injection concentration ^(*)	Dilute SAT-1A1 or SAT-1A2 to the appropriate concentration for use.

*1: For the NaCl standard solution (calibration solution) concentration, use a solution with a concentration of 4/injection volume (μ L) to 40/injection volume % (W/V).

● How to prepare 0.100% (W/V) NaCl standard solution

DKK-TOA does not sell 0.100% (W/V) NaCl standard solution.

If necessary, dilute a 10.0% (W/V) NaCl standard solution (SAT-1A1) or 1.00% (W/V) NaCl standard solution (SAT-1A2) for use.

As an example of how to prepare a 0.100% (W/V) NaCl standard solution, a method for diluting a 10.0% (W/V) standard solution 100 times is shown below.

Items to prepare

- 10.0% (W/V) NaCl standard solution (SAT-1A1)
- Volumetric pipette 1 mL
- Measuring flask 100 mL
- Polyethylene bottle 100 mL
- Pure water (distilled water or ion-exchanged water)

Preparation procedure

- ① Use the volumetric pipette to take 1 mL of the 10.0% (W/V) NaCl standard solution and transfer it to the measuring flask.
- ② Add pure water up to the marked line on the measuring flask.
- ③ Stopper the measuring flask and shake well.
- ④ Transfer the prepared solution to the polyethylene bottle.

If preparing from the 1.00% (W/V) standard solution, perform the same operation by diluting 10 times (dilute 10 mL of the standard solution with pure water to make 100 mL).

6.4.2 Calibration criteria

Be sure to perform standard solution calibration at least twice. If the results of two consecutive measurements meet the requirements in Table 6.4.2, the calibration is successful and you are ready to measure samples. If the calibration is unsuccessful after two attempts, you can perform the calibration operation up to five times. If it is unsuccessful after five attempts, it shall be considered to have failed. If it has failed, take action according to the troubleshooting instructions, and then retry the calibration.

Table 6.4.2 Criteria for successful calibration

Injection volume setting	Absolute value	Repeatability
2 μ L	9.01% to 10.99% (W/V)	Two calibration values are within $\pm 0.5\%$ of the average.
20 μ L	0.901% to 1.099% (W/V)	Same as above
200 μ L	0.0901% to 0.1099% (W/V)	Same as above
Custom injection volume	Within $\pm 10\%$ of the set calibration solution concentration	Same as above

6.4.3 Calibration procedure

- ① First, in the sample measurement mode, perform blank measurements of the standard solution twice or three times.

(Immediately after turning on the power or if the interval from the measurement of the previous sample exceeds 2 minutes, the result of the next measurement is likely to be inaccurate. Therefore, measure the standard solution twice or three times and make sure that the measured values are stable before performing standard solution calibration.)

- ② Press the **CAL** key to switch to the standard solution calibration mode.

(Pressing the **CAL** key again will stop the calibration and switch to the sample measurement mode.)

READY screen (sample measurement mode)

READY (SMP)	
Date	2024/07/12 11:30
SampleNo.	001
Comment	Comment
Inject Volume	20 μ l
Std. Conc.	1 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
function:F1~F5	
Volume:VOLUME	
Calibration:CAL	INJ OK



READY screen (standard solution calibration mode)

READY (STD)	
Date	2024/07/12 11:33
Prev. Calib	0.000
	0.000
Inject volume	20 ul
Std. Conc.	1 %
Start Method	Auto Start
function:F1~F5	
Volume:VOLUME	
Calibration stop:CAL	INJ OK

Inject the standard solution when "INJ OK" is displayed.

- ③ When “INJ OK” is displayed in the bottom right of the screen, injecting the standard solution starts its measurement automatically.

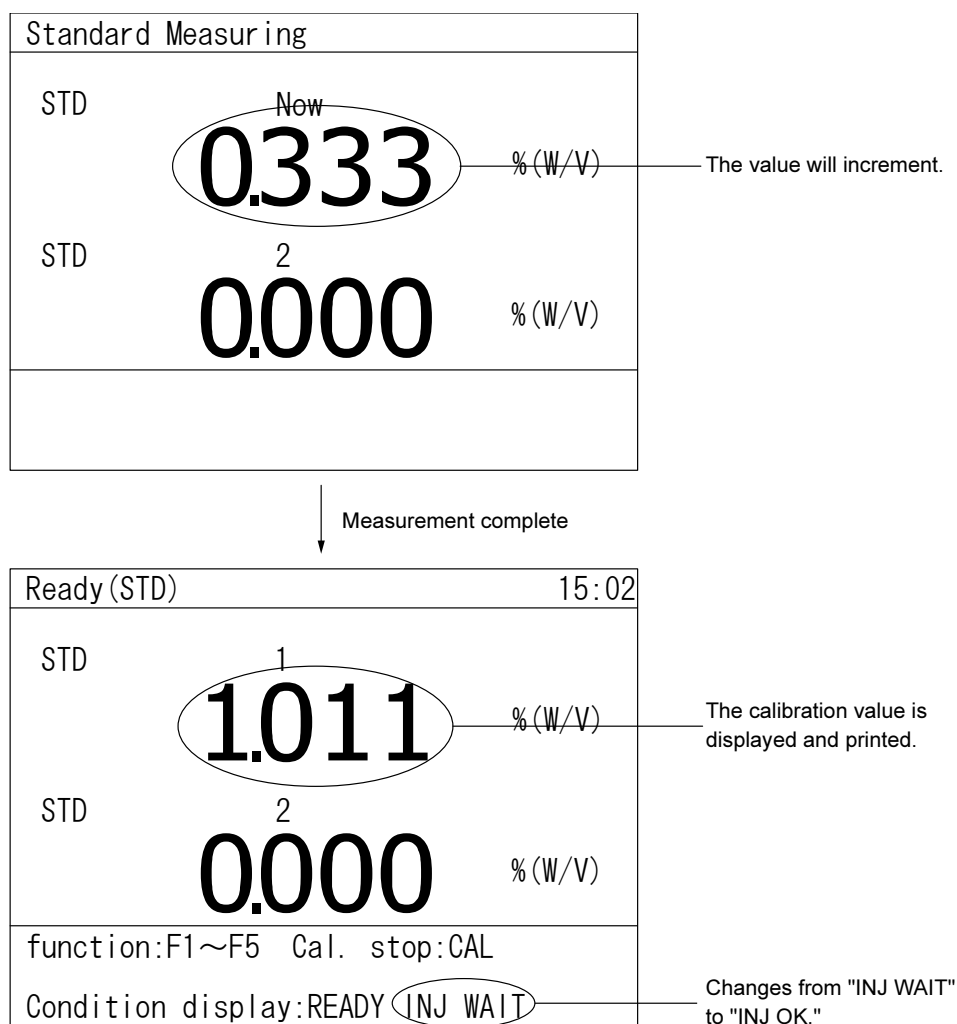
(The display will show “Preparing” for 5 seconds, then change to “Measuring Standard Solution” and the value for Calibration 1 will increment.)

Once the measurement is completed, the first calibration value will be displayed and printed.

↓
Injecting standard solution

Meas Wait
Waiting...

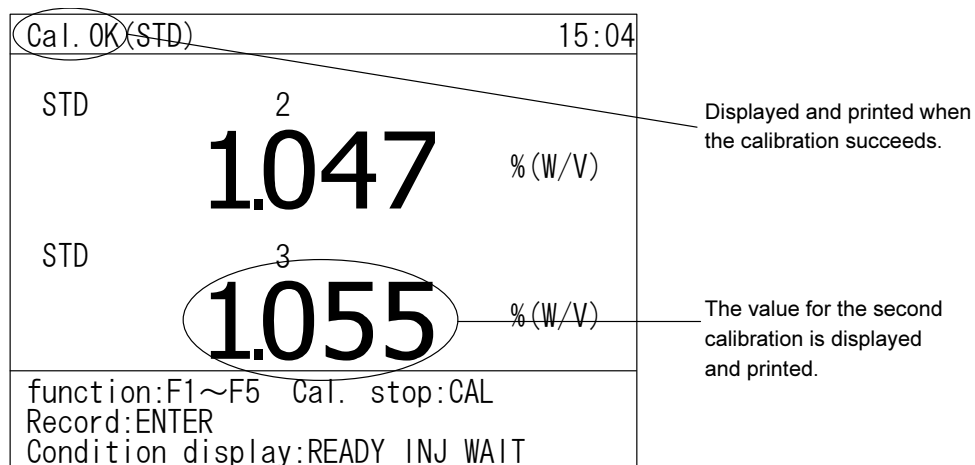
↓
After 5 seconds



- ④ After the display in the bottom right of the screen changes from “INJ WAIT” to “INJ OK”, inject the standard solution. The second measurement of the standard solution will start.

(The display will change to “Measuring” and the value for Calibration 2 value will increment.)

Once the measurement is completed, the second calibration value will be displayed and printed. If the criteria for successful calibration are met, the calibration is successful. Otherwise, further, repeat the calibration operation. If the criteria are met within five attempts, the calibration is successful.





● Standard solution calibration should begin within 2 minutes of the end of the pre-calibration blank measurement. If the interval exceeds 2 minutes, perform another discard measurement with the standard solution and then perform standard solution calibration.

6.5 Sample Measurement

After standard solution calibration is completed, proceed to measure the sample.

Only liquid samples can be measured. Solid samples and samples containing solids cannot be measured immediately: their measurements require pretreatment such as dilution, extraction, or filtration.

For pretreatment methods, see “10. Measuring Various Samples”.

- ① After standard solution calibration is complete, injecting the sample starts the sample measurement automatically.

(The display will show “Preparing” for 5 seconds, then change to “Measuring Sample” and the measured and converted values will increment.)

When the measurement is complete, the measurement result will be displayed and printed, and the display will switch to “READY”.

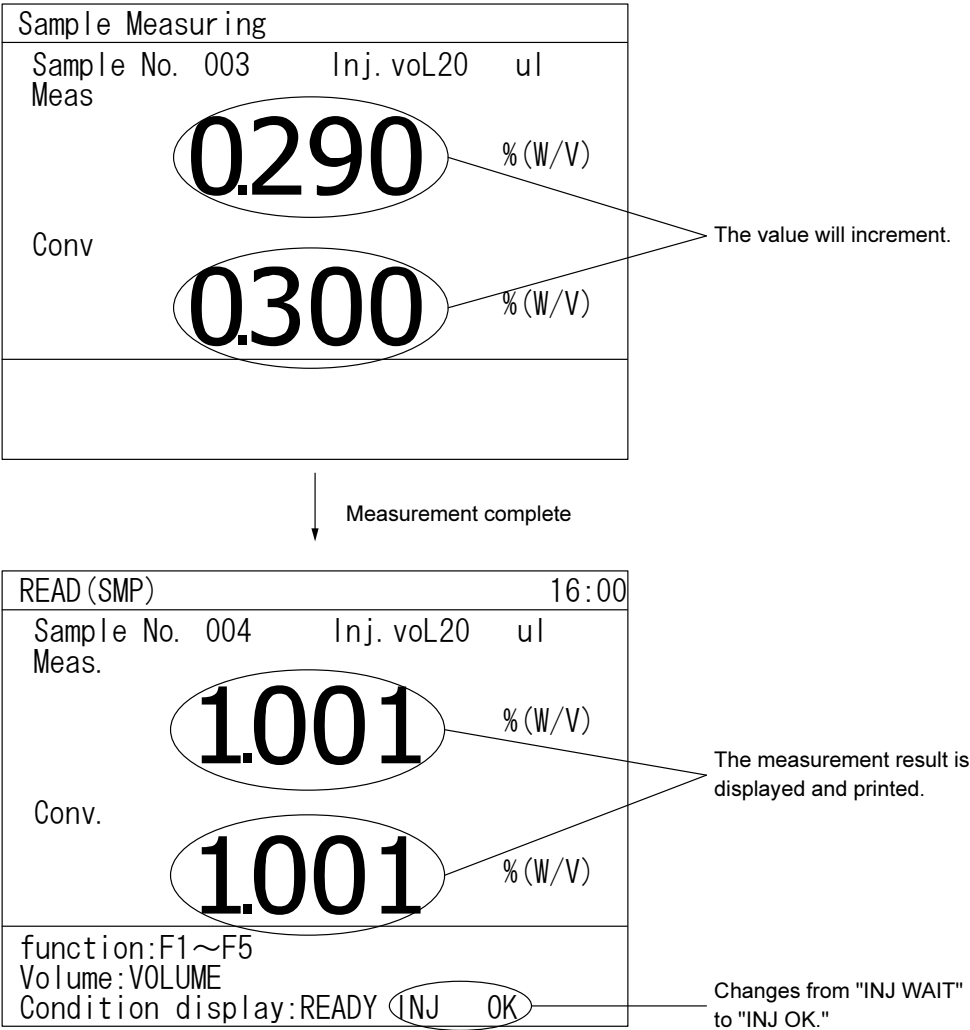
Calibration OK screen

Cal. OK (STD)		15:04
STD	2	
	1.047	% (W/V)
STD	3	
	1.055	% (W/V)
function:F1~F5 Cal. stop:CAL		
Record:ENTER		
Condition display:READY INJ WAIT		

↓
Injecting the sample

Meas Wait
Waiting...

↓
After 5 seconds



Measurement result printout example

DATE	2004/08/03 16:42
SAMPLE No.	001
Comment	
CONC. (Mea)	0.563 % (W/V)
CONC. (Conv)	5.630 % (W/W)
COEFFICIENT	10.00

From the top:

Date and time
Sample number
Comment
Measured value
Converted value
Conversion coefficient

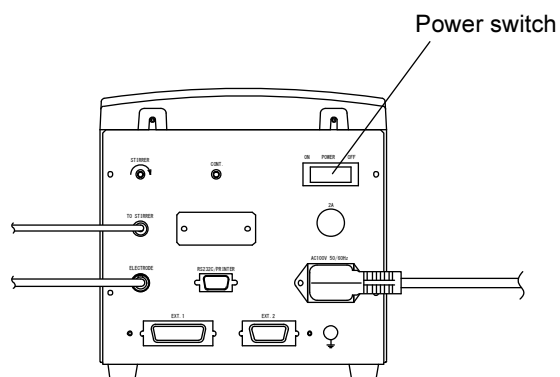
- ② After the display changes from “INJ WAIT” to “INJ OK” in the bottom right of the screen, inject the next sample. The sample number automatically increments by one, and the sample measurement begins.

6.6 Operation at the End of Measuring

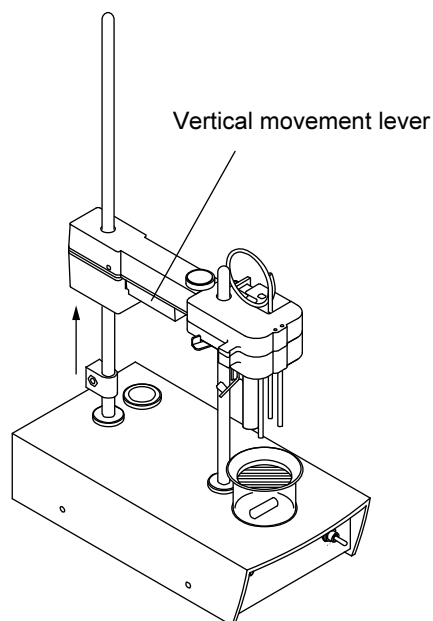
After all measurements of a day finish, clean and store the electrodes.

- ① Power off the main unit.

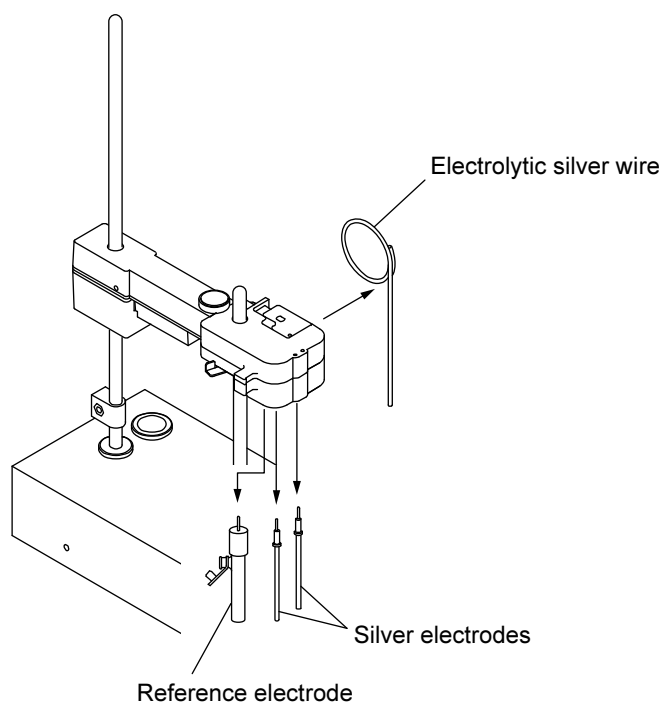
(The stirrer unit's switch can be left ON.)



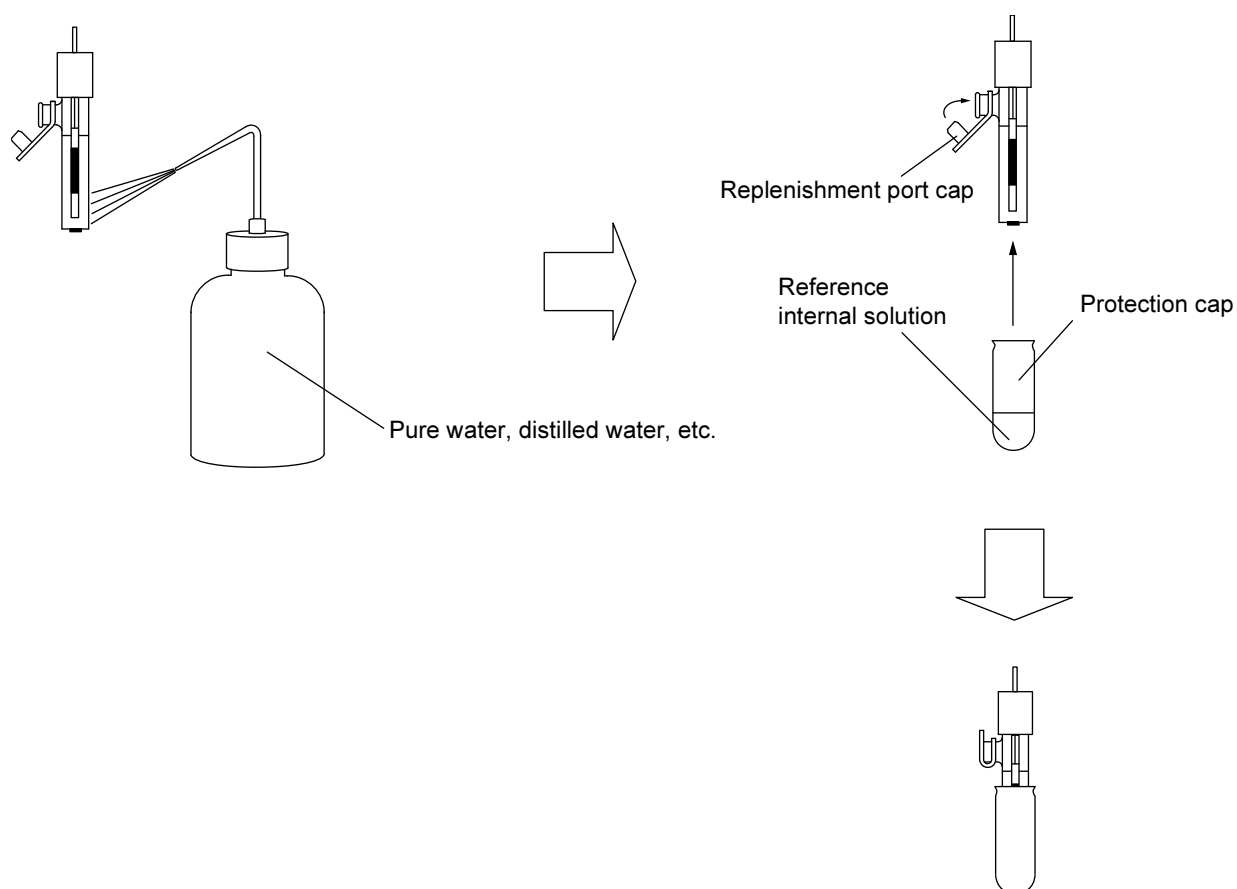
- ② Move the electrode holder up to remove the electrodes from the measuring beaker with the electrolyte.



- ③ Remove the reference and silver electrodes and the electrolytic silver wire from the electrode holder.



- ④ Wash the tip of the reference electrode with pure water, and store it with the replenishment port cap and protection cap on.



- ⑤ Polish the silver electrodes and electrolytic silver wire with a polishing solution, as done before starting the measurement, and then store them.

- ⑥ Dispose of the electrolyte in the measuring beaker and wash it with pure water.

The used electrolyte is a strongly acidic solution containing silver chloride sediment. Thus, do not dispose of it in the sink or similar.

Its disposal must follow local government regulations.

DKK-TOA recommends that you put it in a dedicated waste liquid tank and entrust it to an industrial waste disposal company for disposal.

- ⑦ Wash and store the micro-dispenser as follows.

● Daily storage method of the micro-dispenser

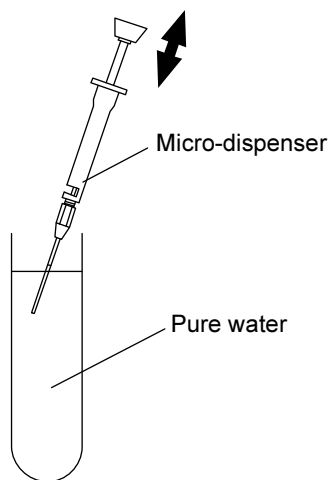
If you use the micro-dispenser of the accessories, store it as follows after measurements.



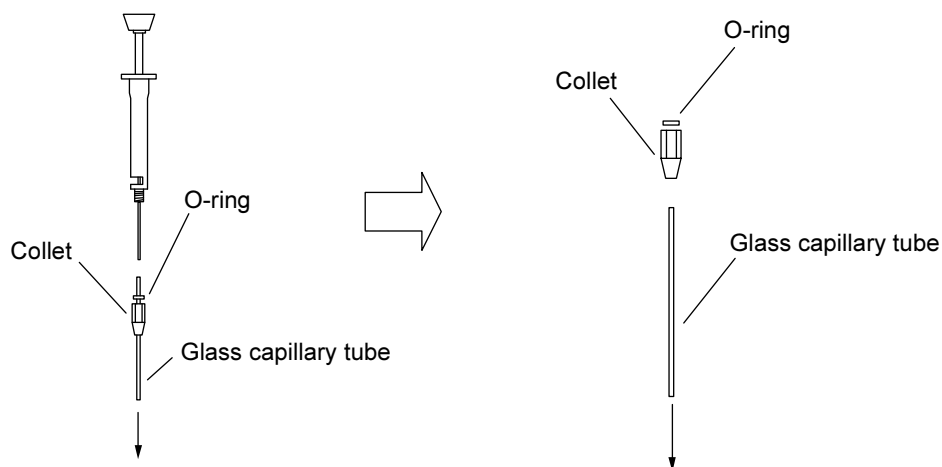
CAUTION

- After all measurements of a day finish, always wash the inside of the micro-dispenser's glass capillary with pure water, then remove it from the dispenser and store it. If you store the capillary without washing or removing it, samples may stick to it and stainless steel rod piston, rendering it unusable.

- ① Immerse the tip of the micro-dispenser in a container of pure water and push and pull the piston 10 or more times to clean the inside of the glass capillary.

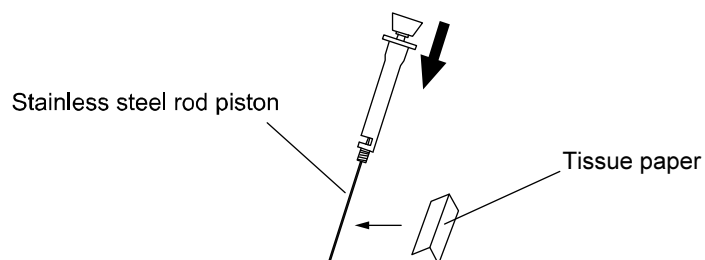


- ② Loosen the collet of the micro-dispenser to remove the glass capillary from the dispenser. Then, remove the capillary from the collet.

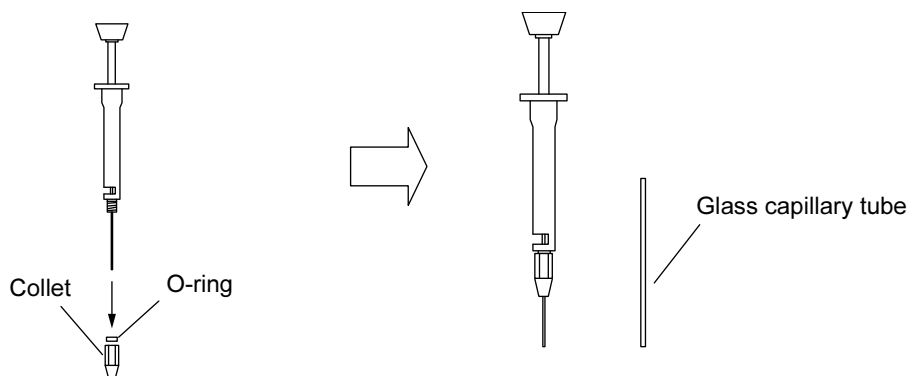


When you remove the collet, the O-ring usually comes off together, as it is often seated inside.

- ③ With the micro-dispenser's piston pressed in, wipe the entire wire section with tissue paper or similar.



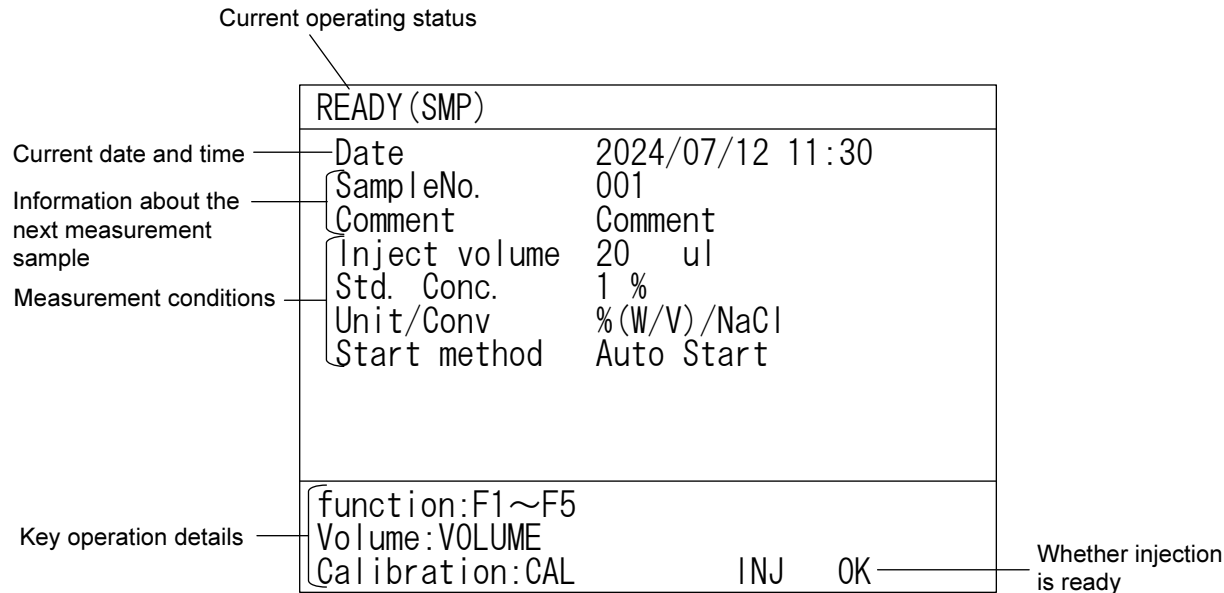
- ④ Reattach the O-ring and collet to the dispenser to complete the process.



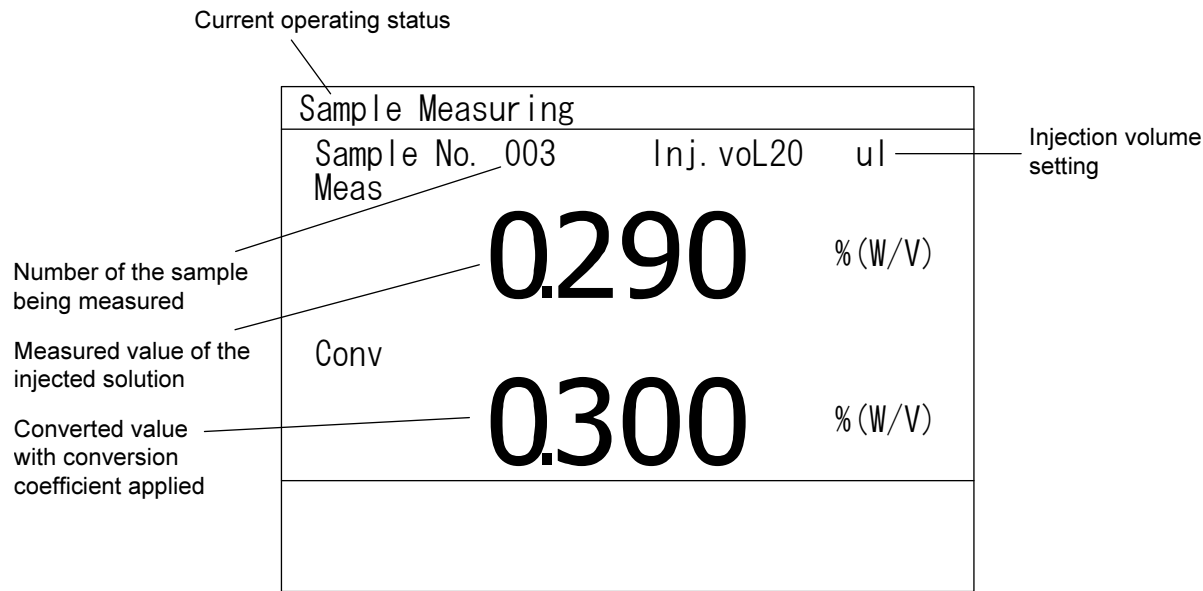
7. Description of Main Display Screens

(1) Display screens during sample measurement

READY screen

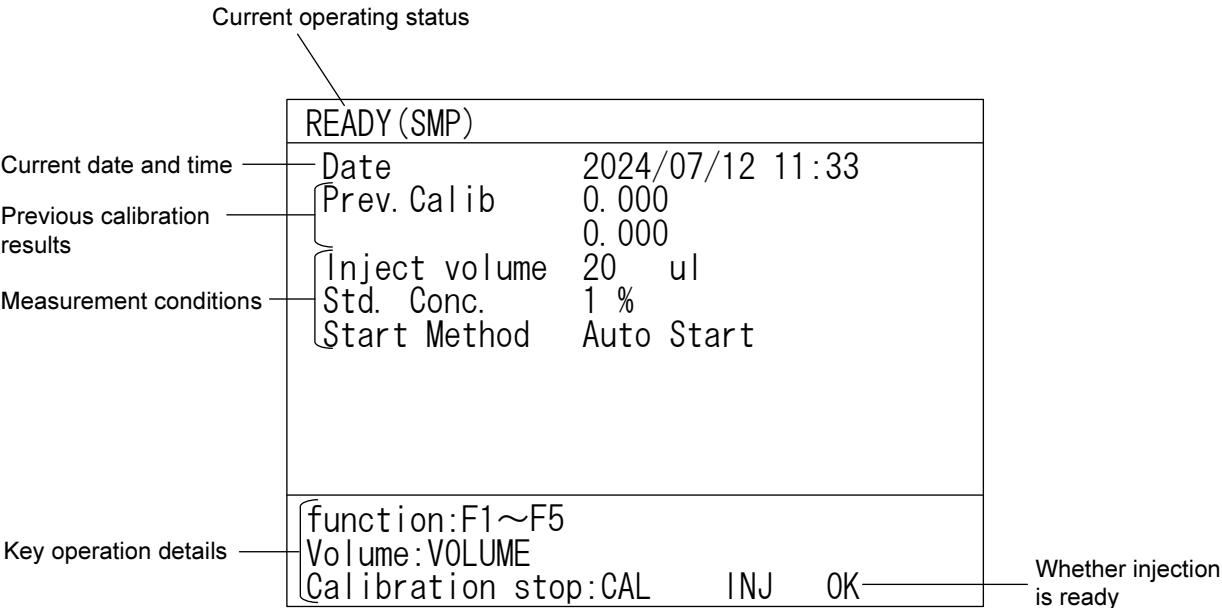


Measurement in progress screen

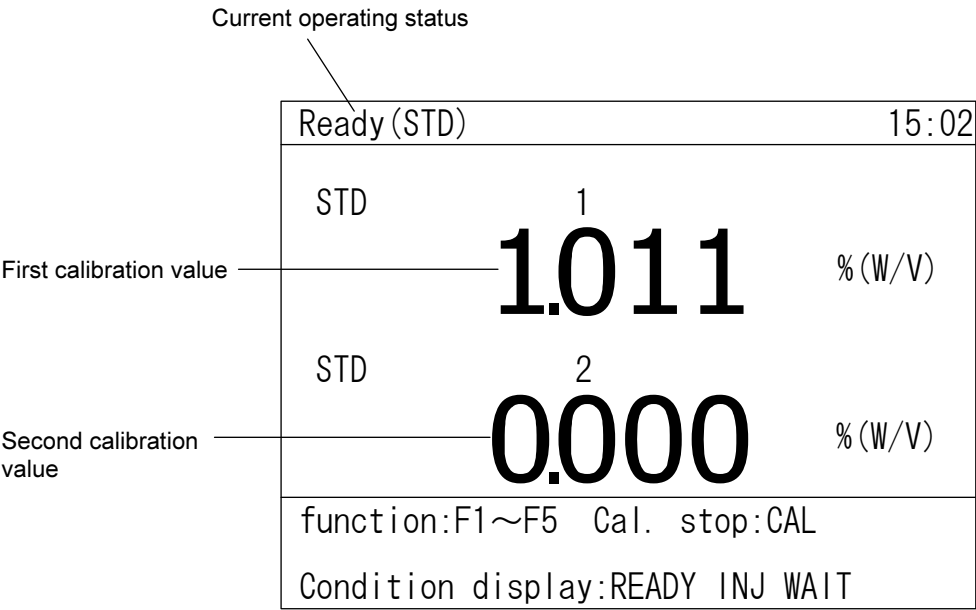


(2) Display screens during standard solution calibration

READY screen



Standard solution calibration in progress screen



8. Usage of Various Functions

By using the **F1** to **F5** keys as necessary on the READY screen, you can set and use various functions, such as measurement conditions, concentration calculation settings, memory data recalculation, statistical calculations, and maintenance functions (e.g., potential check, troubleshooting display).

The functions are listed below.

- F1 key: Functions related to measurement conditions and concentration calculation settings, etc.
 1. Selecting the start method
 2. Setting the sample number
 3. Setting comments
 4. Setting the custom injection volume
 5. Setting the conversion coefficient
 6. Setting the concentration unit
 7. Setting the NaCl/Cl conversion
 8. Printing the measurement conditions
- F2 key: Functions related to memory data analysis
 1. Reanalyzing memory data (one by one at a time)
 2. Reanalyzing memory data (multiple data pieces at a time)
 3. Setting the measurement result print items
- F3 key: Functions related to option connection, etc.
 1. Selecting the printer
 2. RS-232C settings
- F4 key: Maintenance-related functions
 1. Titration check function
 2. Electrolyte replacement alarm function
 3. Troubleshooting
 4. Calibration data management function
- F5 key: Other functions
 1. Setting of date and time
 2. Automatic statistical calculation function
 3. Manual statistical calculation function
 4. Setting the statistical calculation print items
 5. Selecting the display mode

8.1 Selecting the Start Method

For starting measurements, you can select either of two methods: automatic and manual. The former starts the measurement automatically when you inject the sample. The latter starts the measurement when you press the START/STOP key, instead of when injecting the sample.

You should select manual start if your sample injection volume is 1 mL or more. Otherwise, you should select automatic start.

Setting procedure

- ① In the READY screen, press the **F1** → **1** keys to display the Selecting the Start Method screen.

Selecting the Start Method screen

Start method select	
Start method	Auto Start
select: →← decide: ENTER return: ESC end: READY	

- ② Use the **◀ ▶** keys to select the start method. Then, press the **ENTER** key to confirm. Once it is confirmed, the display automatically returns to the READY screen.

READY screen (sample measurement mode)

READY (SMP)	
Date	2024/07/12 11:30
SampleNo.	001
Comment	Comment
Inject volume	20 ul
Std. Conc.	1 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
function: F1~F5 Volume: VOLUME Calibration: CAL INJ OK	

Displays the start method you selected.

8.2 Setting the Sample Number

This function sets the number of the sample to be measured next. The sample number will increment each time a specimen measurement ends. If you set the number of repetitions to 2 or more, the sample number will increment every time the measurement repeats the set number of times. In this case, the sample number is printed and stored with a sub-number added after it (e.g., 001-01, 001-02, and so on).

Setting procedure

On the READY screen, press the **F1** → **F2** keys to display the Setting Sample No. screen.

Setting the Sample No. screen

Sample NO. set	
Sample No. =	1 -> █
Repeat =	0
select: ↑ ↓ decide: ENTER	
Input: 1 ~ 999	
return: ESC end: READY	

(1) Setting the sample No.

- ① On the Setting Sample No. screen, use the **△** **▽** keys to move the cursor █ to “Sample No.”.
- ② Enter the sample number for the next measurement by pressing the **0** to **9** key as necessary. Then, press the **ENTER** key to confirm. The setting range is 1 to 1000.

READY (SMP)	
Date	2024/07/12 11:41
SampleNo.	123
Comment	Comment
Inject Volume	20 ul
Std. Conc.	1 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
function: F1~F5	
Volume: VOLUME	
Calibration: CAL	INJ OK

Displays the set sample No.

(2) Setting the number of repetitions for the same sample No.

- ① On the Setting Sample No. screen, use the   keys to move the cursor (■) to “Number of repetitions”.
- ② Use the  to  keys as necessary to enter the number of repetitions. Then, press the  key to confirm.

The setting range is 1 to 99.

READY (SMP)	
Date	2024/07/12 11:42
SampleNo.	123-01
Comment	Comment
Inject Volume	20 ul
Std. Conc.	1 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
function:F1~F5	
Volume:VOLUME	
Calibration:CAL	INJ OK

Displays the set sample No.

8.3 Setting Comments

You can create comments by entering characters, etc. for each sample number. This is useful for printing and storing the sample name, measurer name, etc.

In comment settings, you can set them for each sample number (for each specimen) or set the same comment for a specified range of sample numbers. You can also register the comments you have created in a list and call up and set the comments from the list when necessary.

Up to 20 characters can be set for a comment.

(1) Setting comments for each sample No.

Use this when setting comments for each sample number (for each specimen).

Setting procedure

- ① On the READY screen, press the **F1** → **3** → **1** keys to display the Setting Comments for Each Sample No. screen.
- ② Use the **▲** **▼** **◀** **▶** keys to move the cursor (■) to the sample number for which to set a comment. Then, press the **ENTER** key to display the Comment Input screen.

Setting Comments for Each Sample No. screen

The setup of every sample No.	
No. 1	Comment
No. 2	Comment
No. 3	Comment
No. 4	Comment
No. 5	Comment
No. 6	Comment
No. 7	Comment
No. 8	Comment
No. 9	Comment
No. 10	Comment
No. select: ↑ ↓ decide: ENTER	
No. change: → ← list indication: F5	
return: ESC end: READY	

- ③ Use the   keys to move the cursor (■) to the position to start entering the comment. Then, press the  key.

Comment Input screen

Comment input	
 Comment ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { } ~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ à á â ã ä å æ ç è é ê ë ì í î ï ñ ò ó ô õ ö ÷ ø ù ú û ü ý þ ÿ	
Move: ↓ → ←	return: ESC
decide: ENTER	
Delete: DEL	Save: F5

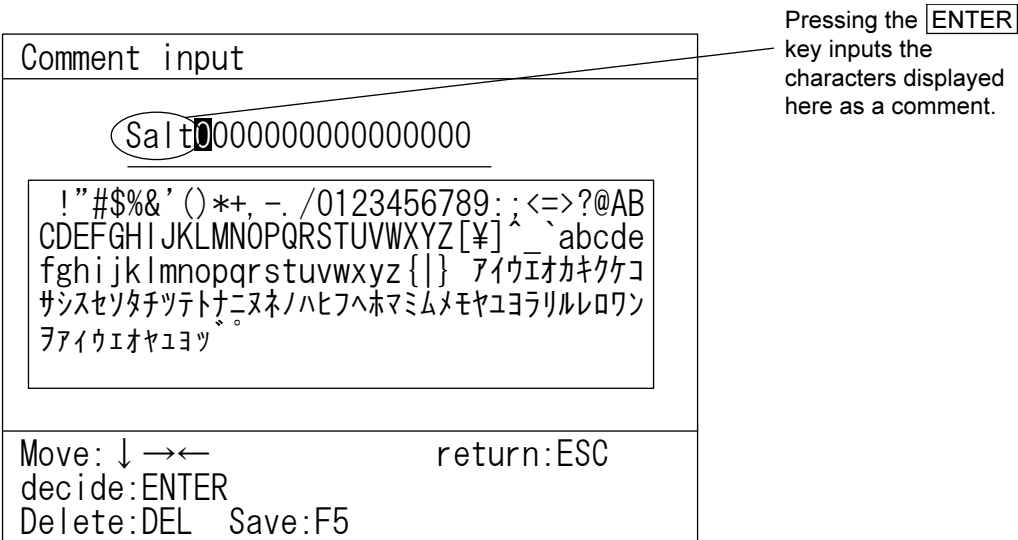
Starts comment input from the cursor (■) position.

- ④ Use the     keys to move the cursor (■) to the character to enter. Then, press the  key to confirm the character.

Comment input	
 #00000000000000000000 ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { } ~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ à á â ã ä å æ ç è é ê ë ì í î ï ñ ò ó ô õ ö ÷ ø ù ú û ü ý þ ÿ	
Move: ↓ ↑ → ←	return: ESC
decide: ENTER	

Pressing the  key on a character with the cursor (■) inputs that character.

- ⑤ After you have finished entering the necessary characters, use the  key to move the cursor (■) to the comment display area and press the  key. The comment is set and the display returns to the Setting Comments for Each Sample No. screen.



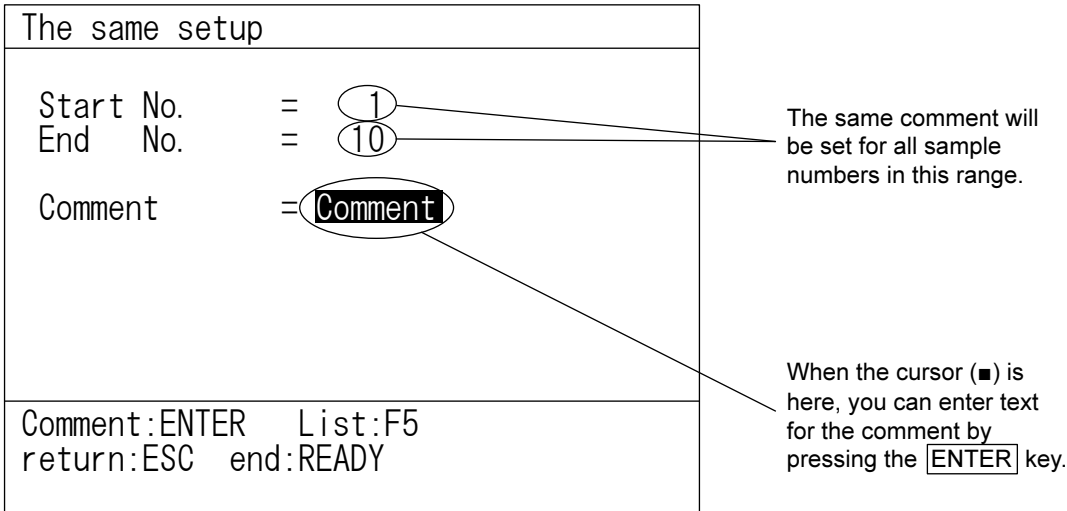
(2) Setting the same comment

To set the same comment for multiple consecutive sample numbers, you can set one comment simultaneously for them by specifying the sample number range.

Setting procedure

- ① On the READY screen, press the **F1** → **3** → **2** keys to display the Setting the Same Comment screen.
- ② Press the **0** to **9** keys as necessary to set the sample No. at which to start the same setting. Then, press the **ENTER** key to confirm.
- ③ Press the **0** to **9** keys as necessary to set the sample No. at which to end the same setting. Then, press the **ENTER** key to confirm.
- ④ Move the cursor (■) to “Comment”. Then, press the **ENTER** key to display the Comment Input screen.

Setting the Same Comment screen



- ⑤ Use the   keys to move the cursor (■) to the position to start entering the comment. Then, press the  key.

Comment Input screen

Comment input	
 Comment	
! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { } ~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã ä å æ ç è é ê ë ì í î ï ð ñ ò ó ô õ ö ÷ ø ù ú û ü ý þ ÿ	
Move: ↓ → ←	return: ESC
decide: ENTER	
Delete: DEL	Save: F5

Starts comment input from the cursor (■) position.

- ⑥ Use the     keys to move the cursor (■) to the character to enter. Then, press the  key to confirm the character.

Comment input	
#	
! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { } ~ ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿ À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß à á â ã ä å æ ç è é ê ë ì í î ï ð ñ ò ó ô õ ö ÷ ø ù ú û ü ý þ ÿ	
Move: ↓ → ←	return: ESC
decide: ENTER	

Pressing the  key on a character with the cursor (■) inputs that character.

- ⑦ After you have finished entering the necessary characters, use the  key to move the cursor (■) to the comment display. Then, press the  key. The comment is set and the display returns to the Setting the Same Comment screen.

Comment input

Salt1

! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B
C D E F G H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ` a b c d e
f g h i j k l m n o p q r s t u v w x y z { | } ア イ ウ エ オ カ キ ク ケ コ
サ シ ス セ ソ タ チ ツ テ ト ナ ニ ヌ ネ ノ ハ ヒ フ ヘ ホ マ ミ ム メ モ ヤ ユ ヨ ラ リ ル レ ロ ワ ン
ヲ ア イ ウ エ オ ヤ ユ ヲ ヅ

Move: ↓ → ← return: ESC
decide: ENTER
Delete: DEL Save: F5

Pressing the **ENTER** key inputs the characters displayed here as a comment.

↓ **ENTER**

Setting the Same Comment screen

The same setup

Start No. = 1 ->

End No. = 10

Comment = Salt1

Input: 1 ~ 999 Enter: ENTER
return: ESC end: READY

This comment will be set for the specified sample number range.

(3) Registering comments to a list and setting/deleting comments from a list

Created comments can be registered to a list. If the same comment needs to be set repeatedly, it can be selected from the list and set.

Up to 20 comments can be registered in a comment list.

Additionally, comments that are no longer needed can be deleted from the list.

Procedure for registering a comment to the list

- ① On the Comment Input screen, perform comment input steps ① to ⑤ in “(1) Setting comments for each sample No.” or ① to ⑦ in “(2) Setting the same comments”.
- ② Pressing the **F5** key registers the comment to the comment list.

Comment input

Salt1 █

!"#\$%&'()*+,-./0123456789:;<=>?@AB
 CDEFGHIJKLMNOPQRSTUVWXYZ[¥]^_`abcde
 fghijklmnopqrstuvwxyz{|} アイウエオカキクケコ
 サシスセソタチツテトナニヌネノハヒフヘホマミムメモヤユヨラリルレロワ
 ヲアイウエオヤユヅ

Move: ↓ → ←
return: ESC

decide: ENTER
Delete: DEL
Save: F5

Pressing the **F5** key registers the characters displayed here to the comments list.

Procedure for setting comments from the comment list

Setting comments for each sample No.

- ① On the READY screen, press the **F1** → **3** → **1** keys to display the Setting Comments for Each Sample No. screen.
- ② Use the **△** **▽** keys to move the cursor (█) to the sample number for which to set the comment. Then, press **F5** to display the Comment List screen.

Setting Comments for Each Sample No. screen

The setup of every sample No.		
No. 1	Comment	
No. 2	Comment	
No. 3	Comment	
No. 4	Comment	
No. 5	Comment	
No. 6	Comment	
No. 7	Comment	
No. 8	Comment	
No. 9	Comment	
No. 10	Comment	
No. select: ↑ ↓ decide: ENTER		
No. change: → ← list indication: F5		
return: ESC end: READY		

- ③ Use the     keys to move the cursor (█) to the comment to set, and press the  key. The comment is set and the display returns to the Setting Comments for Each Sample No. screen.

Comment list	
LNo. 1	ABCDEFGG
LNo. 2	hijklmn
LNo. 3	1234567
LNo. 4	アイウエ
LNo. 5	-----
LNo. 6	-----
LNo. 7	-----
LNo. 8	-----
LNo. 9	-----
LNo. 10	-----
select: ↑ ↓ decide: ENTER	
Return: ESC	

Setting the same comment

- ① On the READY screen, press the  →  →  keys to display the Setting the Same Comment screen.
- ② Press the  to  keys as necessary to set the sample No. at which to start the same setting. Then, press the  key to confirm.
- ③ Press the  to  keys as necessary to set the sample No. at which to end the same setting. Then, press the  key to confirm.
- ④ Move the cursor (█) to “Comment”. Then, press the  key to display the Comment Input screen.

Setting the Same Comment screen

The same setup	
Start No.	= 1
End No.	= 10
Comment	= <u>Comment</u>
Comment:ENTER List:F5 return:ESC end:READY	

When the cursor (■) is here, pressing the **F5** key displays the Comment List screen.

- ⑤ Use the **△** **▽** **◀** **▶** keys to move the cursor (■) to the comment to set, and press the **ENTER** key. The comment is set and the display returns to the Setting the Same Comment screen.

Comment list	
LNo. 1	ABCDEFGG
LNo. 2	hijklmn
LNo. 3	1234567
LNo. 4	アイウエ
LNo. 5	-----
LNo. 6	-----
LNo. 7	-----
LNo. 8	-----
LNo. 9	-----
LNo. 10	-----
select:↑↓ decide:ENTER Return:ESC	

Deleting comments from the list

- ① On the READY screen, press the **F1** → **3** → **3** keys to display the Comment List screen.
- ② Use the **△** **▽** **◀** **▶** keys to move the cursor (■) to the comment to delete. Then, press the **DEL** key to delete it.

Comment List screen

Comment list	
No. 1	ABCDEFGG
No. 2	hijklmn
No. 3	1234567
No. 4	アイウエ
No. 5	
No. 6	
No. 7	
No. 8	
No. 9	
No. 10	
select: ↑ ↓ page change: →	
Delete: DEL	
Return: ESC end: READY	

Pressing the **DEL** key
deletes the comment
at the cursor (■).

8.4 Setting the Custom Injection Volume

Use this setting when performing measurements with injection volumes other than 2, 20, or 200 μL . When you set a custom injection volume, you must also set the calibration solution to a custom concentration.

Setting procedure

On the READY screen, press the **F1** → **4** key to display the Setting the Custom Injection Volume screen.

Setting Custom Injection Volume screen

Optional inject volume set	
volume	= 1000 μL → █
Std conc.	= 0.020%
select: $\uparrow$ $\downarrow$ decide: ENTER	
Input: 1 ~ 9999	
return: ESC end: READY	

(1) Setting the custom injection volume

- ① On the Setting Custom Injection Volume screen, use the **△** **▽** keys to move the cursor (█) to “Custom injection volume”.
- ② Use the **0** to **9** keys as necessary to enter the injection volume. Then, press the **ENTER** key to confirm. The setting range is 1 to 9999 μL .

READY (SMP)	
Date	2024/07/12 14:22
SampleNo.	001
Comment	Comment
Inject Volume	1000 μL
Std. Conc.	0.020 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
function: F1~F5	
Volume: VOLUME	
Calibration: CAL	INJ OK

Changes to the injection volume you set.

(2) Setting the calibration solution concentration

- ① On the Setting Custom Injection Volume screen, use the   keys to move the cursor () to “calibration solution concentration”.
- ② Use the  to  keys as necessary to enter the calibration solution concentration. Then, press the  key to confirm.

The setting range is 0.001% to 99.999% (W/V).

READY (SMP)	
Date	2024/07/12 14:22
SampleNo.	001
Comment	Comment
Inject Volume	1000 ul
Std. Conc.	0.020 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
function:F1~F5	
Volume:VOLUME	
Calibration:CAL	INJ OK

Displays the set calibration solution concentration.

8.5 Setting the Conversion Coefficient

For example, when measuring a diluted solution sample or a solid sample extract, you can set the dilution factor and convert it to the salt concentration of the original sample, which is then printed and stored.

In Conversion Coefficient settings, you can set them for each sample number (for each specimen) or set the same comment for a specified range of sample numbers.

(1) Setting for each sample No.

You can set the Conversion Coefficient for each sample number (each specimen).

Setting procedure

- ① On the READY screen, press the **F1** → **5** → **1** keys to display the Setting Conversion Coefficients for Each Sample No.
- ② Use the **△** **▽** **◀** **▶** keys to move the cursor (■) to the sample number for which to set the Conversion Coefficient.
- ③ Use the **0** to **9** keys as necessary to enter the Conversion Coefficient. Then, press the **ENTER** key to confirm.

Setting Conversion Coefficients for Each Sample No. screen

The setup of every sample No.			
No.	1 =	1. 000	-> ■
No.	2 =	1. 000	
No.	3 =	1. 000	
No.	4 =	1. 000	
No.	5 =	1. 000	
No.	6 =	1. 000	
No.	7 =	1. 000	
No.	8 =	1. 000	
No.	9 =	1. 000	
No.	10 =	1. 000	
value:0. 001~1999. 999 decide:ENTER			
return:ESC end:READY			

If the set Conversion Coefficient is not 1.000, its value will be displayed when the display returns to the READY screen.

READY screen (sample measurement mode)

READY (SMP)	
Date	2024/07/12 14:25
Smp. No. /Coef.	001 / 2.000
Comment	Comment
Inject Volume	20 ul
Std. Conc.	1 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
function:F1~F5	
Volume:VOLUME	
Calibration:CAL	INJ OK

Displays the Conversion Coefficient corresponding to the sample number.

(2) Setting the same Conversion Coefficient

To set the same Conversion Coefficient for multiple consecutive sample numbers, you can specify the sample number range and set one Conversion Coefficient simultaneously for them.

Setting procedure

- ① On the READY screen, press the **F1** → **5** → **2** keys to display the Setting the Same Conversion Coefficient screen.
- ② Press the **0** to **9** keys as necessary to set the sample No. at which to start the same setting. Then, press the **ENTER** key to confirm.
- ③ Press the **0** to **9** keys as necessary to set the sample No. at which to end the same setting. Then, press the **ENTER** key to confirm.
- ④ Use the **0** to **9** keys as necessary to enter the Conversion Coefficient. Then, press the **ENTER** key to confirm.

Setting the Same Conversion Coefficient screen

The same setup	
Start No.	= 1
End No.	= 3
Coefficient	= 1.000 -> ■
Input:0.001~199.9999 decide:ENTER	
return:ESC end:READY	

The same comment will be set for all sample numbers in this range.

8.6 Setting the Concentration Unit

This function selects the concentration unit. You can select % (W/V), % (W/W), mg/L, or mol/L.

Setting procedure

- ① On the READY screen, press the **F1** → **6** keys to display the Setting the Concentration Unit screen.

Setting the Concentration Unit screen

Concentration unit set	
Conc. unit	% (W/V)
select: → ← decide: ENTER return: ESC end: READY	

- ② Use the **◀** **▶** keys to select the concentration unit and press the **ENTER** key to confirm. Once it is confirmed, the display automatically returns to the READY screen.

READY screen (sample measurement mode)

READY (SMP)	
Date	2024/07/12 11:30
SampleNo.	001
Comment	Comment
Inject Volume	20 ul
Std. Conc.	1 %
Unit/Conv.	% (W/V) /NaCl
Start method	Auto Start
function: F1~F5 Volume: VOLUME Calibration: CAL INJ OK	

Displays the selected concentration unit.

8.7 Setting the NaCl/Cl Conversion

This function allows you to select whether to convert the salt concentration to NaCl (sodium chloride concentration) or Cl (chloride ion concentration).

Setting procedure

- ① On the READY screen, press the **F1** → **7** keys to display the Setting NaCl/Cl Conversion screen.

Setting NaCl/Cl Conversion screen

NaCl/Cl conversion set	
NaCl/Cl	NaCl
select:→← decide:ENTER Return:ESC end:READY	

- ② Use the **◀** **▶** keys to select NaCl/Cl conversion and press the **ENTER** key to confirm.

Once it is confirmed, the display automatically returns to the READY screen.

READY screen (sample measurement mode)

READY (SMP)	
Date	2024/07/12 11:30
SampleNo.	001
Comment	Comment
Inject Volume	20 ul
Std. Conc.	1 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
function:F1~F5 Volume:VOLUME Calibration:CAL INJ OK	

Displays the selected concentration conversion.

8.8 Printing the Measurement Conditions

This function lets the printer output the measurement conditions. The data to print includes the measurement method, injection volume, standard solution concentration, concentration unit, NaCl/Cl conversion, and Conversion Coefficient.

When you need the printed measurement conditions, set “Internal” or “External” for the printer to use beforehand.

Printing procedure

- ① On the READY screen, press the **F1** → **8** keys to print the measurement conditions. The display automatically returns to the READY screen.

Measurement result printout example

START METHOD	Auto Start
INJ. VOL	20 μ L
UNIT	% (W/V)
NaCl/Cl	NaCl

From the top:

Start method

Injection volume

Concentration unit

NaCl/Cl conversion

8.9 Reprinting and Reanalyzing Memory Data (One by One at a Time)

The measurement results are backed up in the device's memory. Up to 300 data pieces can be stored in the memory. The data pieces in memory can be recalled individually for display and printing. This function can also recalculate the concentration unit, Conversion Coefficient, NaCl/Cl conversion, and injection volume that have been changed.

Procedure for reprinting memory data

- ① On the READY screen, press the **F2** → **I** keys to display the Memory Data List screen.
- ② Use the **△** **▽** **◀** **▶** keys to move the cursor (■) to the sample number to reanalyze. Then, press the **ENTER** key to display the Reanalyze Memory Data screen.

Memory Data List screen

The re-calculation of memory data					
D. No	Date		S. No	Comment	Meas.
101	08/04	12:27	101	Comment	-----
100	08/02	16:54	100	Comment	0.114
099	08/02	16:53	099	Comment	0.108
098	08/02	16:53	098	Comment	0.097
097	08/02	16:52	097	Comment	0.098
096	08/02	16:52	096	Comment	0.101
095	08/02	16:52	095	Comment	0.101
094	08/02	16:51	094	Comment	0.103
093	08/02	16:51	093	Comment	0.091
select: ↑ ↓ → ← decide: ENTER					
meas/conv change: F5					
return: ESC end: READY					

- ③ Pressing the **PRINT** key will print the displayed memory data.

Reanalyze Memory Data screen

Re-calculation		D. No.	100
Date	2024/08/02 16:54		
Sam. No.	100		
Comment	Comment		
Volume	20 ul		
NaCl/Cl	NaCl		
Neas.	0.114 %(W/V)		
Coefficient	1.000		
Conv.	0.114 %(W/V)		
volume:VOLUME comment:F1			
unit:F2 NaCl/Cl:F3			
Coefficient:F4 Data update:F5			

Procedure for reanalyzing memory data

- ① On the READY screen, press the **F2** → **1** keys to display the Memory Data List screen.
- ② Use the **▲** **▼** **◀** **▶** keys to move the cursor (■) to the sample number to reanalyze. Then, press the **ENTER** key to display the Reanalyze Memory Data screen.
- ③ Pressing the **VOLUME** key switches the injection volume set value.
Each time you press the key, the set value cycles through 2 μ L → 20 μ L → 200 μ L → Custom Injection Volume.
- ④ Pressing the **F1** key displays the Setting Comments screen, where you can change the comment. For the comment input procedure, see “8.3 Setting Comments”.
- ⑤ Pressing the **F2** key switches the concentration unit.
Each time you press the key, the concentration unit cycles through %(W/V) → %(W/W) → mg/L → mol/L.
- ⑥ Pressing the **F3** key switches between NaCl and Cl conversion.
Each time you press the key, the concentration conversion alternates between NaCl and Cl.
- ⑦ Pressing the **F4** key allows you to change the Conversion Coefficient.
The Conversion Coefficient is displayed at the cursor (■). Enter the Conversion Coefficient using the **0** to **9** keys as necessary. Then, press the **ENTER** key to confirm.
- ⑧ Pressing the **F5** key overwrites and updates the results and returns the display to the Memory Data List screen.

Reanalyze Memory Data screen

Re-calculation		D. No. 100
Date	2024/08/02 16:54	
Sam. No.	100	
Comment	Comment	
Volume	20 μ L	
NaCl/Cl	NaCl	
Neas.	0.114 %(W/V)	
Coefficient	1.000	
Conv.	0.114 %(W/V)	
volume:VOLUME comment:F1 unit:F2 NaCl/Cl:F3 Coefficient:F4 Data update:F5		

This can be changed with the **F1** key.
 This can be changed with the **VOLUME** key.
 This can be changed with the **F3** key.
 Displays the value recalculated based on each change.
 This can be changed with the **F4** key.
 Displays the value recalculated based on each change.

8.10 Reprinting and Reanalyzing Memory Data (Multiple Data Pieces at a Time)

You can select multiple stored data pieces and print them together. You can also change the concentration unit Conversion Coefficient, NaCl/Cl conversion, and injection volume to recalculate multiple data at once.

Procedure for reprinting multiple memory data pieces simultaneously

- ① On the READY screen, press the **F2** → **2** keys to display the Memory Data List screen.
- ② Use the **△** **▽** **◀** **▶** keys to move the cursor (■) to the data number to reprint. Then, press **ENTER** to confirm. The selected data piece has an asterisk (*) displayed to the left of the data number.
- ③ Select the data piece to reprint in the same way.
- ④ Pressing the **PRINT** key prints the selected data piece.

Memory Data List screen

The re-calculation of memory data					
D. No	Date		S. No	Comment	Meas.
101	08/04	12:27	101	Comment	-----
*100	08/02	16:54	100	Comment	0.114
*099	08/02	16:53	099	Comment	0.108
*098	08/02	16:53	098	Comment	0.097
097	08/02	16:52	097	Comment	0.098
096	08/02	16:52	096	Comment	0.101
095	08/02	16:52	095	Comment	0.101
094	08/02	16:51	094	Comment	0.103
093	08/02	16:51	093	Comment	0.091
select: ↑ ↓ → ← decide: ENTER					
re-calculation: F1 meas/conv change: F5					
return: ESC end: READY					

Procedure for reanalyzing multiple memory data pieces simultaneously

- ① On the READY screen, press the **F2** → **2** keys to display the Memory Data List screen.
- ② Use the **△** **▽** **◀** **▶** keys to move (■) to the data number to reanalyze. Then, press the **ENTER** key to confirm. The selected data piece has an asterisk (*) displayed to the left of the data number.
- ③ Select the data piece to reanalyze in the same way.
- ④ Press the **F1** key to display the Reanalyze Multiple Memory Data Pieces Simultaneously screen.

- ⑤ Pressing the **VOLUME** key switches the injection volume set value.

Each time you press the key, the set value cycles through $2\ \mu\text{L} \rightarrow 20\ \mu\text{L} \rightarrow 200\ \mu\text{L} \rightarrow \text{Custom Injection Volume}$.

- ⑥ Pressing the **F1** key displays the Setting Comments screen, where you can change the comment. For the comment input procedure, see “8.3 Setting Comments”.

- ⑦ Pressing the **F2** key switches the concentration unit.

Each time you press the key, the concentration unit cycles through $\%(W/V) \rightarrow \%(W/W) \rightarrow \text{mg/L} \rightarrow \text{mol/L}$.

- ⑧ Pressing the **F3** key switches between NaCl and Cl conversion.

Each time you press the key, the concentration conversion alternates between NaCl and Cl.

- ⑨ Pressing the **F4** key allows you to change the Conversion Coefficient.

The Conversion Coefficient is displayed at the cursor (█). Enter the Conversion Coefficient using the **0** to **9** keys as necessary. Then, press the **ENTER** key to confirm.

- ⑩ After the conditions have been changed, pressing the **F5** key overwrites the changes and returns the display to the Memory Data List screen.

The re-calculation of memory data	
Comment	Comment
Volume	20 uL
NaCl/Cl	NaCl
Coefficient	1.000
Unit	%(W/V)
volume:VOLUME Comment:F1 unit:Change:F2 NaCl/Cl:F3 coefficient:F4 Data update:F5	

This can be changed with the **F1** key.
 This can be changed with the **VOLUME** key.
 This can be changed with the **F3** key.
 This can be changed with the **F4** key.
 This can be changed with the **F2** key.

8.11 Setting the Measurement Result Print Items

You can set the measurement result items to print. The printable items include the date and time, sample number, comments, measured values, Conversion Coefficient, converted values, and post-printing line breaks. (When post-printing line breaks are set to ON, the system automatically inserts five-line breaks after the result is printed. When they are set to OFF, one line break occurs after printing.) Select only the necessary items from these.

Setting procedure

- ① On the READY screen, press the **F2** → **3** keys to display the Setting the Measurement Result Print Items screen.
- ② Use the **▲** **▼** keys to move the cursor (■) to the item for set printing ON/OFF. Then, use the **◀** **▶** keys to switch printing ON/OFF.
- ③ Press the **ENTER** key to confirm the printing item. The display returns to the READY screen.

Setting the Measurement Result Print Items screen

Printing item set	
Date	ON
Sample No.	ON
Comment	ON
Meas. value	ON
Coefficient	ON
Conv. value	ON
FEED (OFF:1 ON:3)	ON
item select: ↑ ↓ print ON/OFF select: → ← decide: ENTER return: ESC end: READY	

8.12 Selecting the Printer

Select the printer to print measurement results, calibration data, etc. You can select “Internal”, “External”, or “Not Used”. If you select “External”, prepare an external printer (EPS-G) and an external printer connecting cable (0GC00003) separately (for details about the external printer, see “9.1 Connecting to External Printer EPS-G”).

Setting procedure

- ① On the READY screen, press the **F3** key → **I** to display the “Selecting the Printer” screen.
- ② Use the **<** **>** keys to switch to the printer to use. Then, press the **ENTER** key to confirm. Once it is confirmed, the display automatically returns to the READY screen.

Selecting the Printer screen

Printer select	
Printer	Internal
select:→← decide:ENTER return:ESC end:READY	

8.13 RS-232C Settings

By connecting a PC, measurement results and other data can be sent to it.

You can also import the measurement results into your PC using data processing software, G-LOG II. This is the setting of the communication conditions for this purpose.

Setting procedure

- ① On the READY screen, press the **F3** → **2** keys to display the RS-232C Settings screen.
- ② Use the **△** **▽** keys to move the cursor (■) to “Baud rate”. Then, use the **◀** **▶** keys to select the set value. You can set 2400, 4800, 9600, or 19200 (bps).
- ③ Use the **△** **▽** keys to move the cursor (■) to “Data length”. Then, use the **◀** **▶** keys to select the set value. You can set 7 or 8 (bits)
- ④ Use the **△** **▽** keys to move the cursor (■) to “Parity”. Then, use the **◀** **▶** keys to select the set value. You can set “NONE”, “ODD”, or “EVEN”.
- ⑤ Press the **△** **▽** keys to move the cursor (■) to “Stop bits”. Then, use the **◀** **▶** keys to select the set value. You can set 1 or 2 (bits).
- ⑥ Press the **△** **▽** keys to move the cursor (■) to “Flow control”. Then, use the **◀** **▶** keys to select the set value. You can set FNONE or FHARD.
- ⑦ Use the **△** **▽** keys to move the cursor (■) to “Auto send”. Then, use the **◀** **▶** keys to select the set value. You can set “ON” or “OFF”.
- ⑧ Press the **ENTER** key to confirm the conditions. Once it is confirmed, the display automatically returns to the READY screen.

RS-232C Settings screen

RS-232C set	
Baudrate	19200
Length	8
Parity	NONE
Stop bit	1
Flow	FNONE
Auto trans.	Disable Tx
items select: ↑ ↓ value select: → ← decide: ENTER return: ESC end: READY	

Ensure that all RS-232C settings match the settings on the PC.

8.14 Titration Check Function

This function checks the titration operation by injecting the standard solution. After the titration operation, it automatically determines whether the titration was performed normally. If it detects an abnormality, it can display the cause and action.

When performing a titration check, be sure to use the following combination of injection volume and standard solution.

Injection volume of 2 μ L — 10.0% (W/V) NaCl standard solution

Injection volume of 20 μ L — 1.00% (W/V) NaCl standard solution

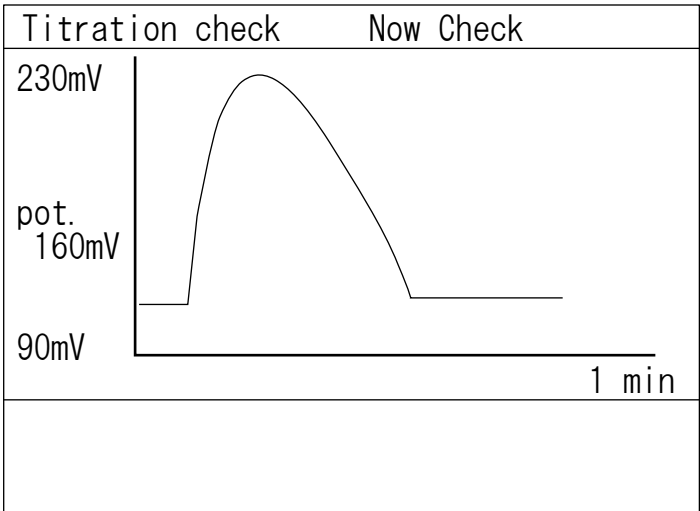
Injection volume of 200 μ L — 0.100% (W/V) NaCl standard solution

Additionally, the titration check must be performed after one or two blank measurements of the standard solution.

Operation procedure

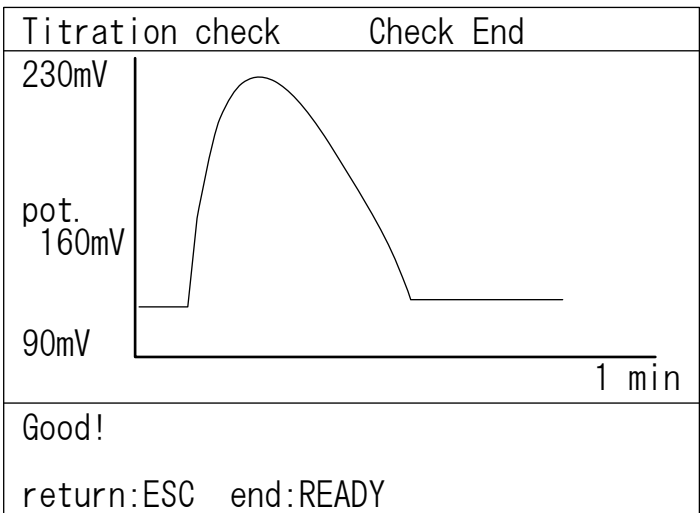
- ① On the READY screen, press the **F4** → **1** keys to display the Titration Check Function screen.
- ② Inject the standard solution. The titration check starts automatically.

Titration Check Function screen



- ③ Once the check is complete, the result will be displayed.

Titration Check Completion screen



The following table summarizes the judgment results of the titration check and their causes and actions.

Judgment result of titration check and causes/actions

Judgment result	Cause	Action
Normal.		
Slightly unstable potential.	The stirring bar is not rotating.	- Check if the power switch of the stirrer unit is ON. - Check if the connector for connecting the stirrer unit is properly connected.
Measurement is impossible due to an unstable potential.	- The stirring bar rotation speed is slow. - The reference electrode does not contain enough internal solution. - The internal solution of the reference electrode is old. - The liquid junction of the reference electrode has turned black. - The reference electrode has deteriorated. - Additive solution has not been added to the electrolyte in the beaker.	- Turn the stirring speed adjustment volume on the back of the salt analyzer main unit to increase the stirring speed. - Refill the reference electrode through the replenishment port with internal solution. - Drain the current internal solution and refill with a new internal solution. - Remove the current liquid junction and attach a new one. - Replace the reference electrode. - Add approx. 0.7 mL (approx. 20 drops) of additive solution.
Slightly longer measurement time	Mismatch between the standard solution concentration and injection volume.	Perform measurement using one of the following combinations of standard solution and injection volume. Standard solution 10% NaCl — injection volume 2 μL Standard solution 1% NaCl — injection volume 20 μL Standard solution 0.1% NaCl — injection volume 200 μL
Excessively long measurement time	- The tip of the silver wire is extremely thin. - The electrolyte in the current beaker has been injected many times. - The silver wire and silver electrodes are dirty.	- Cut off the tip of the silver wire and immerse the thick part in the electrolyte for measurement. - Discard the electrolyte in the current beaker and replace it with a new electrolyte. - After polishing the silver wire and silver electrode with a polishing solution, retry the measurement.
Slightly shorter measurement time	Mismatch between the standard solution concentration and injection volume.	Perform measurement using one of the following combinations of standard solution and injection volume. Standard solution 10% NaCl — injection volume 2 μL Standard solution 1% NaCl — injection volume 20 μL Standard solution 0.1% NaCl — injection volume 200 μL
Excessively short measurement time		
Slightly higher base potential	The reference electrode does not contain enough internal solution.	Refill the reference electrode through the replenishment port with internal solution.
Excessively high base potential	The internal solution of the reference electrode is old.	Drain the current internal solution and refill with a new internal solution.
Slightly lower base potential	The liquid junction of the reference electrode has turned black.	Remove the current liquid junction and attach a new one.
Excessively low base potential	- The reference electrode has deteriorated. - Additive solution has not been added to the electrolyte in the beaker. - The electrolyte in the current beaker has been injected many times. - The silver wire and silver electrodes are dirty.	- Replace the reference electrode. - Add approx. 0.7 mL (approx. 20 drops) of additive solution. - Discard the electrolyte in the current beaker and replace it with a new electrolyte. - After polishing the silver wire and silver electrode with a polishing solution, retry the measurement.

8.15 Electrolyte Replacement Warning Function

As measurements continue with the same electrolyte, it gradually depletes, eventually preventing proper measurement. This function notifies you that the electrolyte should be replaced.

Setting procedure

- ① On the READY screen, press the **F4** → **2** keys to display the Setting Electrolyte Replacement Warning Function screen.
- ② Use the **◀▶** key to move the cursor (■) to “ON”. Then, press the **ENTER** key to confirm. Once it is confirmed, the display automatically returns to the READY screen.

Setting Electrolyte Replacement Alarm Function screen

Electrolyte exchange alarm function	
alarm function	ON
select:→← decide:ENTER	
return:ESC end:READY	

READY screen

READY (SMP)	
Date	2024/07/12 14:36
SampleNo.	001
Comment	Comment
Inject Volume	20 ul
Std. Conc.	1 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
exhausted 0%	
Reset:DEL	
Volume:VOLUME	
Calibration:CAL	INJ OK

READY (SMP)		16:13
Sample No.	005	Inj. vol20 ul
Meas.	1.083 % (W/V)	
Conv.	1.083 % (W/V)	
exhausted 1 %		
Reset:DEL		
Volume:VOLUME		
Condition display:READY INJ		OK

These display the electrolyte depletion level.

Actions for electrolyte replacement warning

When you are continuously measuring samples, the “Electrolyte Depletion Level” may reach 100%. In this case, an alarm sounds, and the following electrolyte replacement warning appears.

Electrolyte Replacement Warning Display screen

READY (SMP)		16:00
Sample No.	004	Inj. vol 20 ul
Meas.	1.001 % (W/V)	
Conv.	1.001 % (W/V)	
exhausted		Reset:DEL
Change electrolyte		
Condition:→		INJ OK

The action you should take in this case is as follows.

- ① On the electrolyte replacement warning display screen, press the **ENTER** key to dismiss the warning.
- ② Press the **DEL** key to reset the electrolyte depletion level from “100%” to “0%”.
- ③ Turn off the power switch on the back of the main unit.
- ④ Discard the electrolyte in the beaker and pour a new electrolyte and additive solution into the beaker.
- ⑤ Lower the electrode holder to the specified position and turn on the power switch on the back of the main unit.

The initial electrolysis process is followed by a return to the READY state.

- ⑥ After performing standard solution calibration, proceed with sample measurement.

8.16 Troubleshooting Display

This function can display the possible causes and actions on the screen when an issue occurs during measurement. The troubleshooting function allows you to view troubleshooting information for error messages and other issues.

(1) Displaying troubleshooting information about error messages

This displays the error cause and action when an error occurs during measurement.

Operation procedure

- ① On the READY screen, press the **F4** → **3** keys to display the Error Messages and Actions screen.
- ② Use the **△** **▽** keys to move (■) to the error symptom the error cause of which is to be displayed. Then, press the **ENTER** key to confirm.

Error Messages and Actions screen

Error message and countermeasure
1. ---- Display(Measured value is over) 2. Calibration NG(repetition) 3. Calibration NG(Value is too high) 4. Calibration NG(Value is too low)
error select: ↑ ↓ cause:ENTER return:ESC end:READY

- ③ Use the   keys to move () to the error cause for which to display the action for the error. Then, press the  key to confirm.

Error Cause Display screen (if "Measurement range exceeded" is selected)

---- Display(Measured value is over)
1. Salt concentration is too high. 2. Potential is unstable. 3. Current isn't normal.
cause select: ↑ ↓ step:ENTER return:ESC end:READY

- ④ Once you have confirmed the action against the error, press the  key. The display automatically returns to the Error Cause Display screen.

Error Action Display screen (if "Excessively high salt concentration in the sample" is selected)

Salt concent ration is too high.
1. Dilute a sample to enter into the measurement range. 2. Reduce the amounts of sample
check:ENTER return:ESC end:READY

(2) Displaying troubleshooting information about other issues

This displays the error cause and action when an issue other than the error messages occurs during measurement.

Operation procedure

- ① On the READY screen, press the **F4** → **3** → **2** keys to display the Other Issues and Actions screen.
- ② Use the **△** **▽** **◀** **▶** keys to move (■) to the issue symptom the issue cause of which is to be displayed. Then, press the **ENTER** key to confirm.

Other Issues and Actions screen (1/3)

Other troubles and countermeasures 1/3
1. Initial electrolysis doesn't begin even if a power supply is turned on 2. Initial electrolysis isn't finished 3. Repetition of measurement is bad. 4. Measurement value is higher than expectations. 5. Measurement value is lower than expectations.
trouble select: ↑ ↓ cause: ENTER Page: → ← return: ESC end: READY

- ③ Use the **△** **▽** keys to move (■) to the issue cause the issue action of which is to be displayed. Then, press the **ENTER** key to confirm.

Issue Cause Display screen (if "Initial electrolysis does not begin when power is turned on" is selected)

Initial electrolysis doesn't begin.
1. Reference electrode deteriorates. 2. Electrode and silver wire are dirty. 3. The silver wire isn't installed on the electrode holder properly. 4. Electrodes aren't installed on the electrode holder properly.
Select: ↑ ↓ decide: ENTER return: ESC end: READY

- ④ Once you have confirmed the action against the error, press the **ENTER** key. The display automatically returns to the Issue Cause Display screen.

Issue Action Display screen (if “The reference electrode has deteriorated” is selected)

The reference electrode deteriorates.
1. Replace the inner solution. 2. Exchange it for the new one.
check:ENTER return:ESC end:READY

8.17 Calibration Data Registration And Management Function

You can register the results of up to 10 standard solution calibrations in memory and create a calibration history. You can also enter the electrode's manufacturing lot number and the calibrator's name in the registered calibration data.

(1) Registering the calibration data history

When all standard solution calibrations are complete, the data is registered in memory.

Operation procedure

- ① Press the **ENTER** key on the Calibration Completion screen to display the Calibration Data Display screen.
- ② Use the **△** **▽** keys to move (■) to the measurer. Then, press the **ENTER** key to display the Comment Input screen.
- ③ Enter the name of the calibration personnel by character input. The character input procedure is the same as for comment input. See “8.3 Setting Comments”.
- ④ Use the **△** **▽** keys to move the cursor (■) to the “Electrode AG-111”. Then, press the **ENTER** key to display the Comment Input screen.
- ⑤ Enter the electrode lot number by character input. The character input procedure is the same as for comment input. See “8.3 Setting Comments”.
- ⑥ Use the **△** **▽** keys to move the cursor (■) to the “Electrode ELR-003”. Then, enter the electrode lot number in the same way.

- ⑦ Use the   keys to move the cursor (■) to the “Silver wire SAT-AG”. Then, enter the lot number in the same way.
- ⑧ Press the  key to return the display to the Calibration Completion screen.

Calibration Completion screen

Cal. OK (STD)		15:04
STD	2	
	1.047	% (W/V)
STD	3	
	1.055	% (W/V)
function:F1~F5 Cal. stop:CAL		
Record:ENTER		
Condition display:READY INJ WAIT		



Calibration Data Display screen

Calib. data indication		No. 1
Date	2024/07/18 16:08	
Analyst	Kato	
ele. 1 AG-111	408F1	
ele. 2 AG-111	408F1	
Ref. ELR-003	408F0001	
Ag SAT-AG	408F1	
Calid	1:1.024 2:1.023	
select: ↑ ↓ decide:ENTER		
Print:PRINT		
Return:ESC		

(2) Recalling and printing registered calibration data

Calibration data registered in memory can be recalled and displayed or printed.

Operation procedure

- ① On the READY screen, press the  →  keys to display the Calibration Data List screen.
- ② Use the   keys to move the cursor (■) to the calibration data to display. Then, press the  key to display the Comment Input screen.

Calibration Data List screen

Calibration data list			
1	2024/07/18	16:08	Kato
2	-----	-----	-----
3	-----	-----	-----
4	-----	-----	-----
5	-----	-----	-----
6	-----	-----	-----
7	-----	-----	-----
8	-----	-----	-----
9	-----	-----	-----
10	-----	-----	-----
select: ↑ ↓ decide: ENTER LAll data Print: PRINT ALL data Delete: DE return: ESC end: READY			

- ③ Pressing the **PRINT** key on the Calibration Data Display screen prints only the displayed calibration data (pressing it on the Calibration Data List screen prints all the calibration data displayed in the list).

Calibration Data Display screen

Calib. data indication		No.	1
Date	2024/07/18 16:08		
Analyst	Kato		
ele. 1 AG-111	408F1		
ele. 2 AG-111	408F1		
Ref. ELR-003	408F0001		
Ag SAT-AG	408F1		
Calid	1:1. 024	2:1. 023	
select: ↑ ↓ decide: ENTER Print: PRINT Reture: ESC			

(3) Deleting calibration data

You can delete unnecessary registered calibration data from memory.

Operation procedure

- ① On the Calibration Data List screen, pressing the **DEL** key deletes all the calibration data.

8.18 Date and Time Settings

You can set the date and time. The set date and time are retained even after the power is turned off.

Operation procedure

- ① On the READY screen, press the **F5** → **1** key to display the Date and Time Settings screen.

Date and Time Setting screen

Date set	
Year = 24	-> █
Month= 7	
Day = 12	
Hour = 14	
Min. = 47	
select: ↑ ↓ decide: ENTER	
Input: 0 ~ 99	
return: ESC end: READY	

- ② Use the **0** to **9** keys as necessary to enter the year. Then, press the **ENTER** key to confirm.
- ③ Use the **0** to **9** keys as necessary to enter the month. Then, press the **ENTER** key to confirm.
- ④ Use the **0** to **9** keys as necessary to enter the day. Then, press the **ENTER** key to confirm.
- ⑤ Use the **0** to **9** keys as necessary to enter the hours. Then, press the **ENTER** key to confirm.
- ⑥ Use the **0** to **9** keys as necessary to enter the minutes. Then, press the **ENTER** key to confirm. Once it is confirmed, the display automatically returns to the READY screen.

READY screen

READY (SMP)	
Date	2024/07/12 14:47
SampleNo.	001
Comment	Comment
Inject Volume	20 ul
Std. Conc.	1 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
function: F1~F5	
Volume: VOLUME	
Calibration: CAL	INJ OK

Changes to the date and time you set.

8.19 Automatic Statistical Calculation Function

This function can automatically calculate and print statistical results such as the average, standard deviation, and coefficient of variation (CV) values after each set number of measurement times.

Setting procedure

- ① On the READY screen, press the **F5** → **2** keys to display the Setting Automatic Statistical Calculation Function screen.

Setting Automatic Statistical Calculation Function screen

Automatic Statis Calc. function	
Auto Statis	ON
MeasCount. = 03	-> ■
Calc Object	MEAS
Item Select: ↑ ↓	
times: 2~99 decide: ENTER	
return: ESC end: READY	

- ② Use the **◀ ▶** keys to select “Automatic statistical calculation function ON/OFF”. Then, press the **ENTER** key to confirm. If you select “OFF”, the display automatically returns to the READY screen.
- ③ Use the **▲ ▼** keys to move the cursor (■) to “Number of measurements” and enter its value with the **0** to **9** keys as necessary. Then, press the **ENTER** key to confirm.
- ④ Use the **▲ ▼** keys to move the cursor (■) to the item to calculate statistically and use the **◀ ▶** keys to select the item. Then, press the **ENTER** key to confirm. Once it is confirmed, the display automatically returns to the READY screen.

READY screen

READY (SMP)	
Date	2024/07/12 14:46
SampleNo.	001
Comment	Comment
Inject Volume	20 ul
Std. Conc.	1 %
Unit/Conv.	%(W/V)/NaCl
Start method	Auto Start
Auto Statis	1/3 (MEAS)
function: F1~F5	
Volume: VOLUME	
Calibration: CAL	INJ OK

Displays the setting for automatic statistical calculation.

8.20 Manual Statistical Calculation Function

This function can select multiple data pieces from memory data and print out statistical calculation results such as the average, standard deviation, and CV values. Note that this calculation can only be performed for data with matching concentration units.

Operation procedure

- ① On the READY screen, press the **F5** → **3** key to display the Manual Statistical Calculation screen.
- ② Use the **△** **▽** **◀** **▶** keys to move the cursor (■) to the data number to calculate statistically. Then, press the **ENTER** key to confirm. The selected data piece has an asterisk (*) displayed to the left of the data number.
- ③ Select the data piece to calculate statistically in the same way.
- ④ Pressing the **PRINT** key prints the Statistical calculation results for selected data.

Manual Statistical Calculation screen

Manual statistics calculation				
D. No	Date	S. No	Comment	Meas.
*058	07/22 16:12	058	Comment	1. 028
*057	07/22 16:10	057	Comment	1. 018
*056	07/22 16:08	056	Comment	1. 052
*055	07/22 16:07	055	Comment	1. 049
054	07/22 16:04	054	Comment	1. 051
053	07/22 16:03	053	Comment	1. 036
052	07/22 16:00	052	Comment	1. 030
051	07/22 15:58	051	Comment	1. 072
050	07/22 15:56	050	Comment	1. 037
select: ↑ ↓ → ← decide: ENTER				
meas/conv change: F5 Print: PRINT				
return: ESC end: READY				

Statistical calculation result printout example

MEAS.	STATIS
S. NO.	999-01 1. 001 % (W/V)
S. NO.	999-02 0. 998 % (W/V)
S. NO.	999-03 1. 002 % (W/V)
N	= 3
MEAN	= 1. 000 % (W/V)
R	= 0. 004 % (W/V)
MAX	= 1. 002 % (W/V)
MIN	= 0. 998 % (W/V)
SD	= 0. 002 % (W/V)
CV	= 0. 21 %

From the top:

Measurement data

Number of measurement data pieces

Average value

Range

Maximum value

Minimum value

Standard deviation

CV value (coefficient of variation)

8.21 Setting the Statistical Calculation Print Items

You can set the items to print for the results of automatic and manual statistical calculations. Items that can be set to print are the average, maximum, and minimum values, and the range, standard deviation, and CV value.

Setting procedure

- ① On the READY screen, press the **F5** → **4** keys to display the Setting Statistical Calculation Result Print Items screen.
- ② Use the **△** **▽** keys to move the cursor (■) to the item for set printing ON/OFF. Then, use the **◀** **▶** keys to switch printing ON/OFF.
- ③ Press the **ENTER** key to confirm the printing item. The display returns to the READY screen.

Setting the Measurement Result Print Items screen

Printing item set(Statistics calc.)	
Result	ON ■
Count	ON
Average	ON
Max.	ON
Min.	ON
Range	ON
Stdev	ON
C. V.	ON
item select: ↑ ↓	
print ON/OFF select: → ← decide: ENTER	
return: ESC end: READY	

8.22 Selecting the Display Language

You can select Japanese or English for the screen display.

Setting procedure

- ① On the READY screen, press the **F5** → **5** keys to display the “Selecting the Display Language” screen.

Selecting Display Language screen (from English to Japanese)

言語の切換	
現在の言語	英語
言語選択: → ← 決定: ENTER 前画面: ESC 初期画面: READY	

- ② Use the **◀ ▶** keys to select the start method. Then, press the **ENTER** key to confirm. Once it is confirmed, the display automatically returns to the READY screen.

Display in Japanese READY screen (sample measurement mode)

READY (サンプル)	
日時	2024/07/12 15:02
サンプルNo.	001
Comment	Comment
注入量	20 ul
校正濃度	1 %
濃度単位/概算	% (W/V) / NaCl
スタート方式	自動スタート
機能選択: F1 ~ F5	
注入量設定:	VOLUME
標準液校正:	CAL INJ OK

9. Connecting to an External Device

This device can be connected to the following external devices to perform measurements.

- External printer EPS-G
- PC

9.1 Connecting to External Printer EPS-G

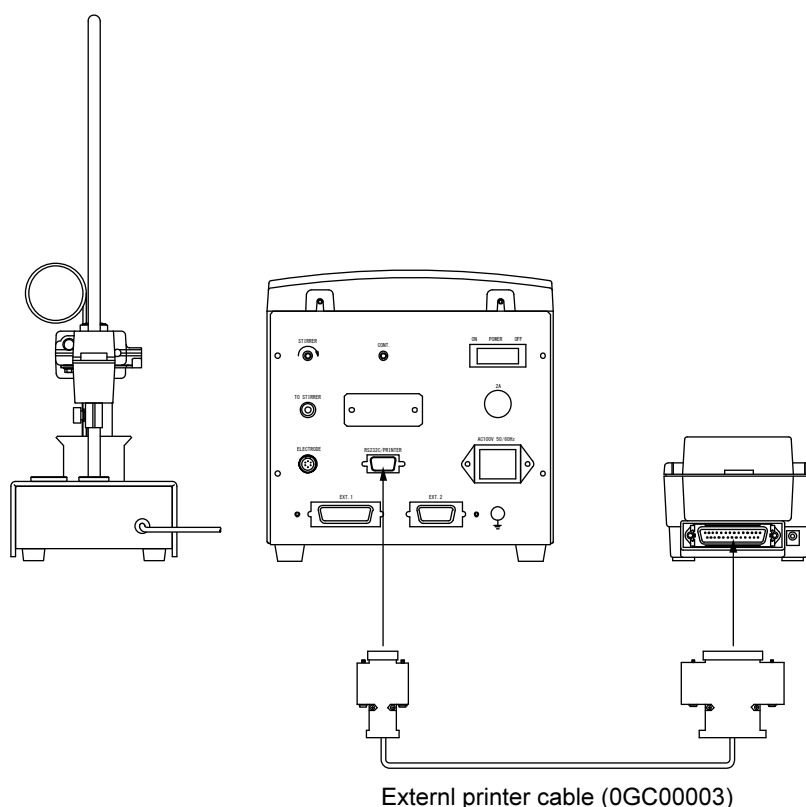
This device can be connected to a dedicated external printer (EPS-G) for printing. It uses regular printer paper, so the printed data will not disappear over time, making it convenient for long-term data storage.

(The internal printer uses thermal paper, so the printed data will gradually fade over time. Thus, for long-term storage of the printed data, you will need to make additional copies.)

- ① To connect this device to an external printer (EPS-G), use the external printer connecting cable (0GC00003).

Connect the “RS232C/PRINTER” connector on the back of the salt analyzer to the connector of the external printer using a connecting cable.

Note that if an external printer is connected to this device, it is impossible to connect a PC.



- ② In the settings of the salt analyzer main unit, set “External” as the printer to use.

For the setting instructions, see “**8.12 Setting the Printer.**”

If you set “External” as the printer to use, measurement data cannot be printed on the internal printer.

9.2 Connecting to a PC

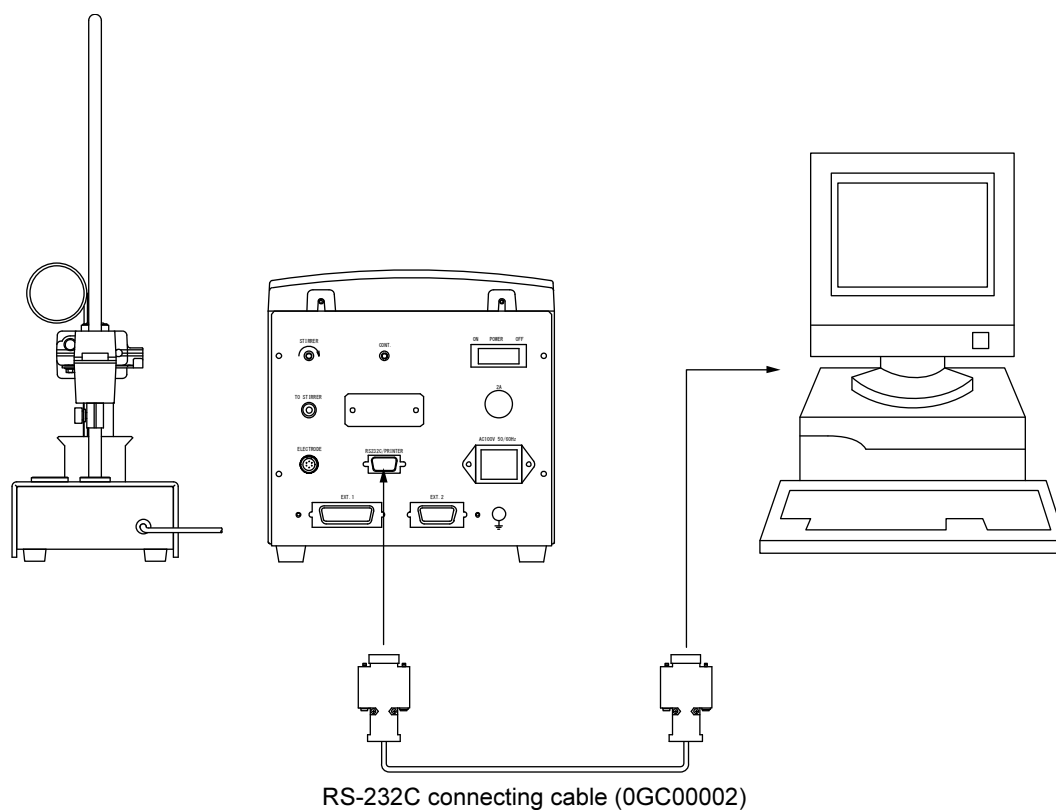
This device can transfer data to your PC by connecting to it with an RS-232C cable.

This device can also import measurement data into your PC using DKK-TOA's data collection software, G-LOG II.

- ① To connect to a PC, use an RS-232C connecting cable (0GC00002).

Connect the “RS232C/PRINTER” connector on the back of the salt analyzer to the connector of the PC's RS232C connector using a connecting cable.

Note that if a PC is connected to this device, it is impossible to connect an external printer (EPS-G).



- ② Set the RS-232C communication conditions in settings of the salt analyzer main unit.

For the setting instructions, see “8.13 RS-232C Settings”.

10. Measuring Various Samples

Since this device can only analyze liquid samples, solid samples and paste-like samples require pretreatment such as dilution, extraction, or filtration. This chapter introduces examples of measurement methods, including sample pretreatment, for various samples.

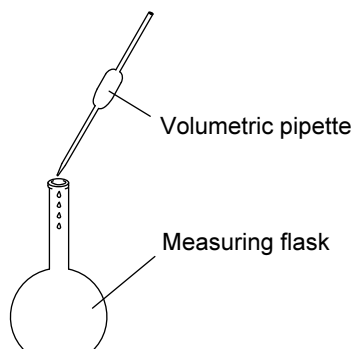
10.1 Measuring High-Salt Liquid Samples

Examples: Soy sauce, Worcestershire sauce, noodle soup

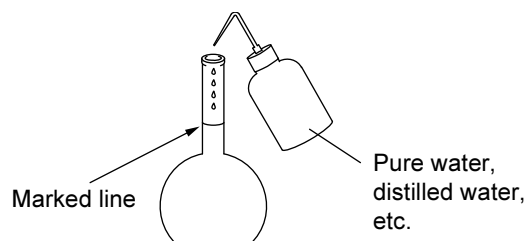
If the salt concentration of the liquid sample is too high for the injection volume, it must be diluted with pure water before injection.

Pretreatment procedure

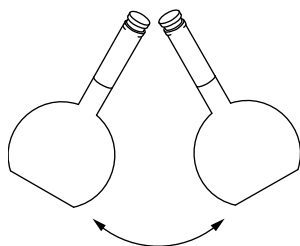
- ① Take the sample with a volumetric pipette and transfer it to a measuring flask.



- ② Add pure water to the marked line on the measuring flask.



- ③ Put the lid on and shake the measuring flask well to mix the solution, then inject it into the salt analyzer.



Procedure for converting the salt concentration of the sample stock solution

Salt concentration of the sample stock solution (% (W/V))

= Salt concentration of pretreated sample solution (% (W/V)) ×

Capacity of measuring flask (mL)

Sample stock solution volume taken (mL)

If you enter the calculated value of ○ into the main unit as the conversion coefficient, the value automatically calculated using the above formula after measurement will be displayed and printed as the converted value.

For the procedure for setting the Conversion Coefficient, see “8.5 Setting the Conversion Coefficient”.

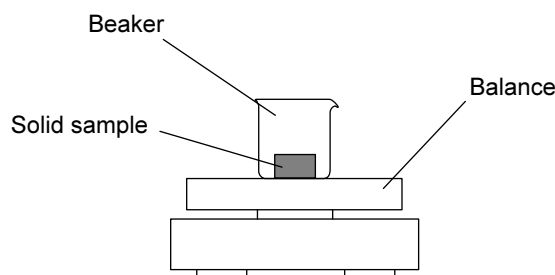
10.2 Measuring Soluble Solid Samples

Examples: Salt, soap cubes

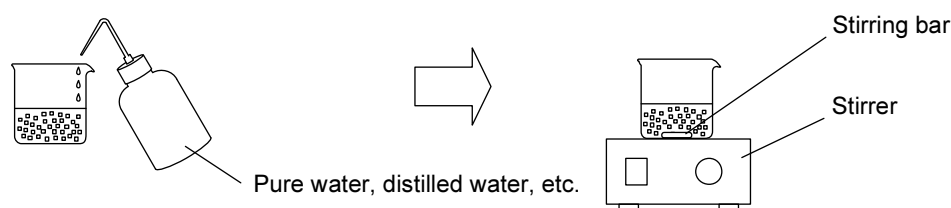
Solid samples cannot be directly injected and measured. For soluble solid samples, dissolve the sample in pure water and inject the solution for measurement.

Pretreatment procedure

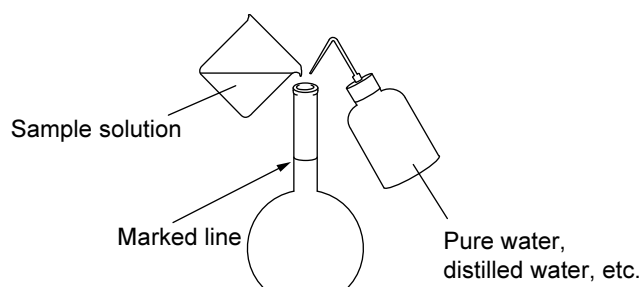
- ① Take the sample in a beaker and weigh the sample using a balance.



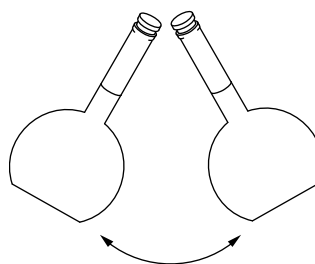
- ② Add an appropriate amount of pure water and stir to dissolve the sample.



- ③ Transfer the solution in ② to the measuring flask and add pure water to the marked line.



- ④ Put the lid on and shake the measuring flask well to mix the solution, then inject it into the salt analyzer.



Procedure for converting the salt concentration of a solid sample

Salt concentration of solid sample (% (W/W))

= Salt concentration of pretreated sample solution (% (W/V)) ×

Capacity of measuring flask (mL)

Weight of solid sample (g)

If you enter the calculated value of ○ into the main unit as the conversion coefficient, the value automatically calculated using the above formula after measurement will be displayed and printed as the converted value.

For the procedure for setting the Conversion Coefficient, see “8.5 Setting the Conversion Coefficient”.

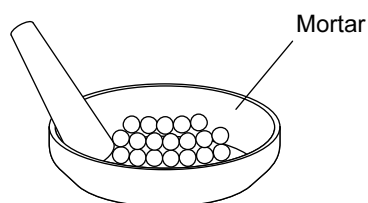
10.3 Measuring Insoluble Solid Samples

Examples: Pickles, processed fish products (kamaboko, chikuwa), dried noodles

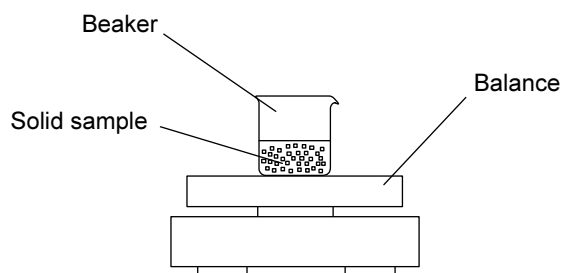
Solid samples cannot be directly injected and measured. To measure an insoluble solid sample, finely grind the sample before mixing it with pure water. Then, remove the insoluble matter and inject the rest into the analyzer.

Pretreatment procedure (grinding the sample in a mortar)

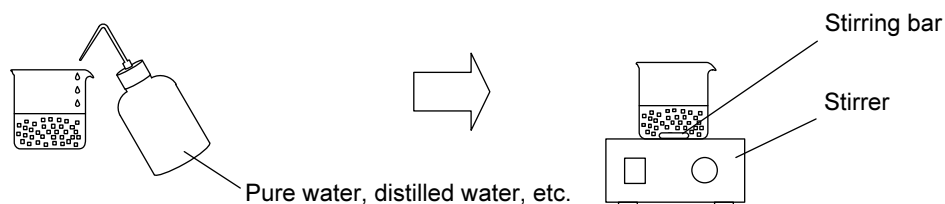
- ① Take the sample in a mortar and grind it finely.



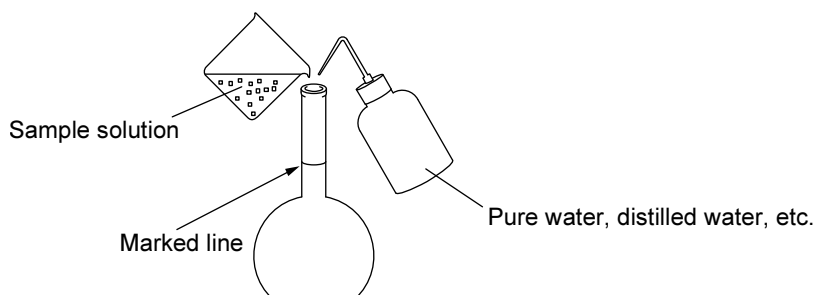
- ② Take the ground sample in a beaker and weigh the sample using a balance.



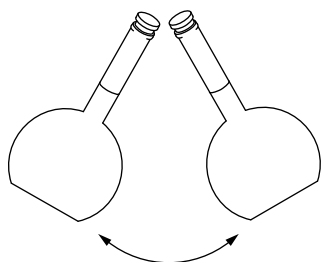
- ③ Add an appropriate amount of pure water and stir to dissolve and extract the salts in the sample.



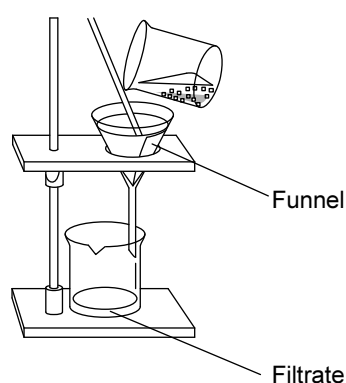
- ④ Transfer the solution in ③ into a measuring flask and add pure water to the marked line.



- ⑤ Close the lid, shake the measuring flask well to mix the solution, then leave it to stand for 10 minutes or more.



- ⑥ Inject the supernatant solution from ⑤, or filter the solution from ⑤ and inject the filtrate into the analyzer.



Procedure for converting the salt concentration of a solid sample

Salt concentration of solid sample (% (W/W))

= Salt concentration of pretreated sample solution (% (W/V)) ×

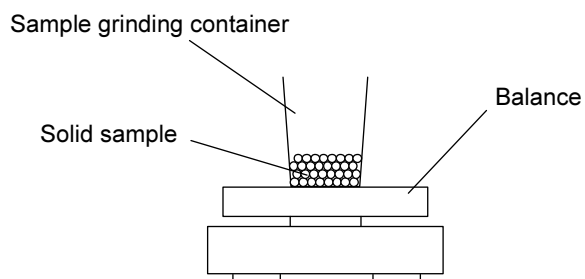
$$\frac{\text{Capacity of measuring flask (mL)}}{\text{Weight of solid sample (g)}}$$

If you enter the calculated value of ○ into the main unit as the conversion coefficient, the value automatically calculated using the above formula after measurement will be displayed and printed as the converted value.

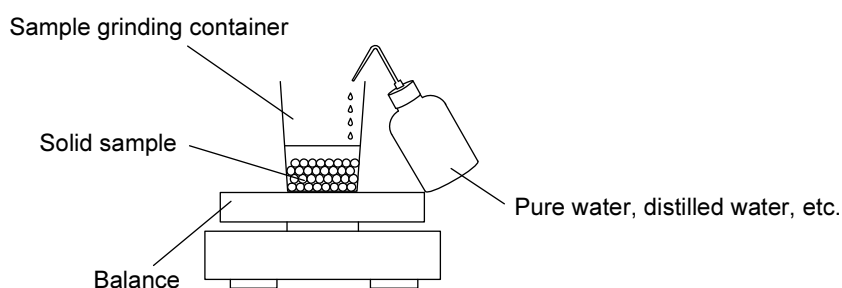
For the procedure for setting the Conversion Coefficient, see “8.5 Setting the Conversion Coefficient”.

Pretreatment procedure (grinding and mixing the sample with a homogenizer, mixer, etc.)

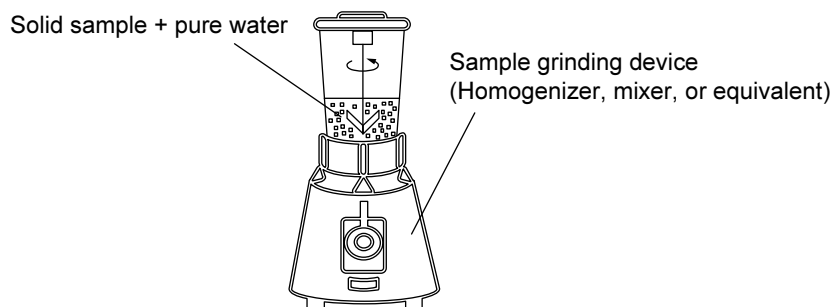
- ① Take the sample in a sample grinding container and weigh the sample using a balance.



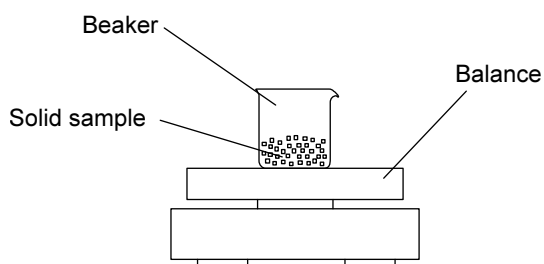
- ② Add the same weight of pure water as the sample to the container in ①.



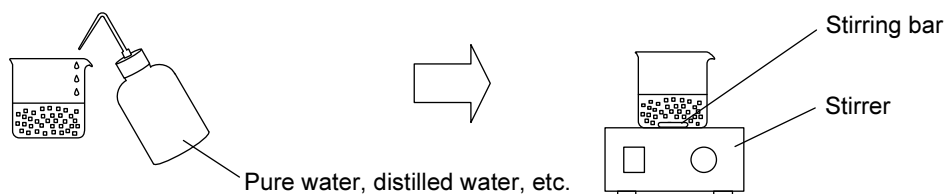
- ③ Grind and mix the sample using a grinding device.



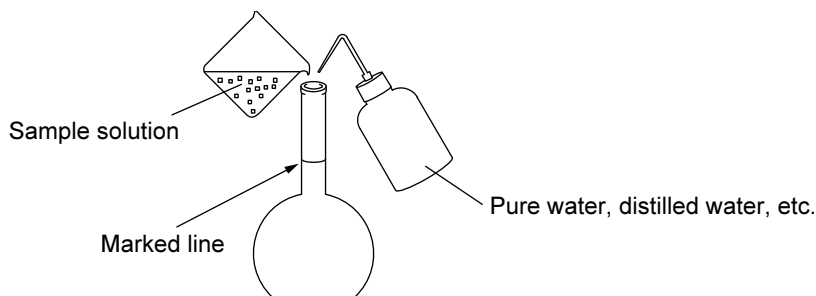
- ④ Take the ground and mixed sample in a beaker and weigh the sample using a balance.



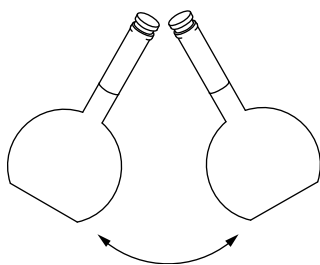
- ⑤ Add an appropriate amount of pure water and stir to mix the sample.



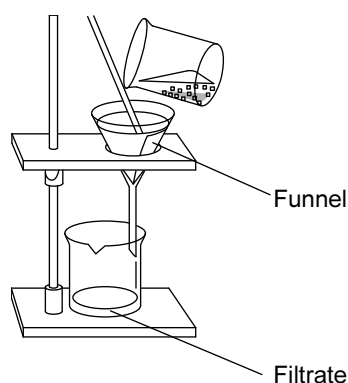
- ⑥ Transfer the solution in ⑤ into a measuring flask and add pure water to the marked line.



- ⑦ Close the lid, shake the measuring flask well to mix the solution, then leave it to stand for 10 minutes or more.



- ⑧ Inject the supernatant solution from ⑦, or filter the solution from ⑤ and inject the filtrate into the analyzer.



Procedure for converting the salt concentration of a solid sample

Salt concentration of solid sample (% (W/W))

= Salt concentration of pretreated sample solution (% (W/V)) ×

$$\frac{\text{Capacity of measuring flask (mL)} \times 2}{\text{Weight of the ground and mixed sample (g)}}$$

If you enter the calculated value of ○ into the main unit as the conversion coefficient, the value automatically calculated using the above formula after measurement will be displayed and printed as the converted value.

For the procedure for setting the Conversion Coefficient, see “8.5 Setting the Conversion Coefficient”.

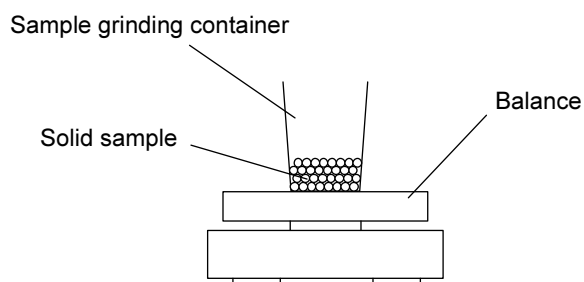
10.4 Measuring Oily Solid Samples

Examples: Snack confectionery, rice crackers, ham, sausages

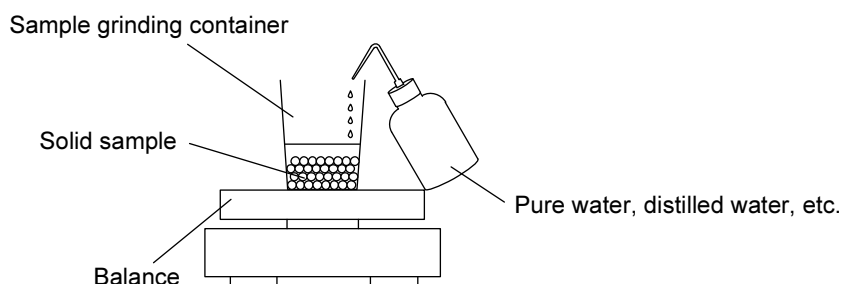
For an oily sample, the oil has almost no dissolved salt, so sampling it directly may result in oil inclusion, leading to measured value errors. Similarly, if solid matter is present, its inclusion during sampling can cause measured value errors. Therefore, before measuring such samples, you should remove oil and solid matter.

Pretreatment procedure

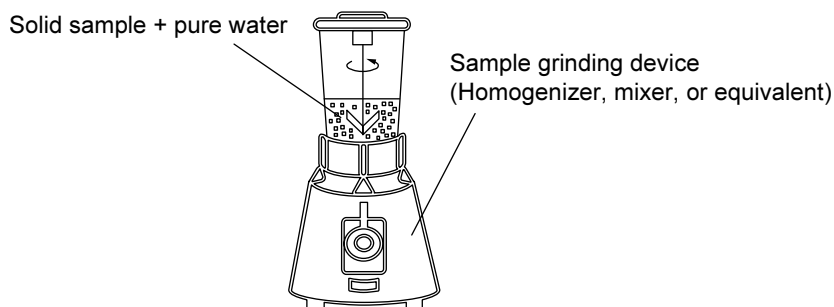
- ① Take the sample in a sample grinding container and weigh the sample using a balance.



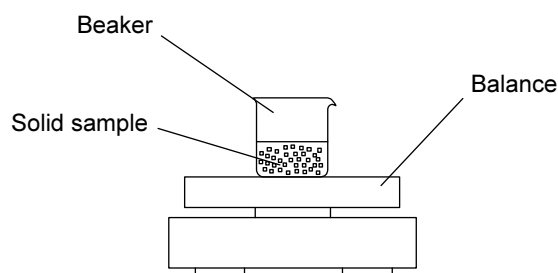
- ② Add the same weight of pure water as the sample to the container in ①.



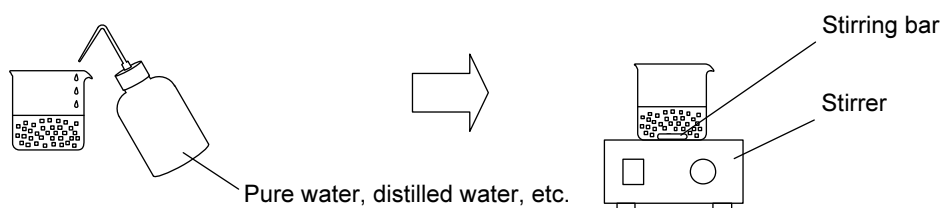
- ③ Grind and mix the sample using a grinding device.



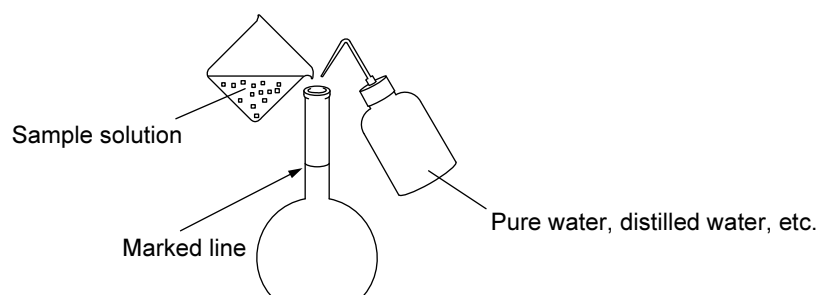
- ④ Take the ground and mixed sample in a beaker and weigh the sample using a balance.



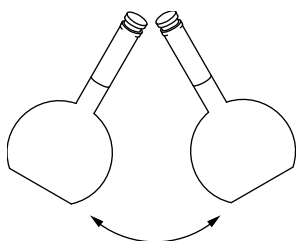
- ⑤ Add an appropriate amount of pure water and stir to mix the sample.



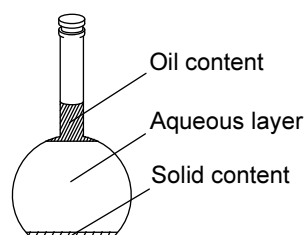
- ⑥ Transfer the solution in ⑤ into a measuring flask and add pure water to the marked line.



- ⑦ Close the lid, shake the measuring flask well to mix the solution, then leave it to stand for 10 minutes or more.



- ⑧ Since the oil floats to the top and the solids sink to the bottom, inject the middle, aqueous layer.



Procedure for converting the salt concentration of a solid sample

Salt concentration of solid sample (% (W/W))

= Salt concentration of pretreated sample solution (% (W/V)) ×

$$\frac{\text{Capacity of measuring flask (mL)} \times 2}{\text{Weight of the ground and mixed sample (g)}}$$

If you enter the calculated value of ○ into the main unit as the conversion coefficient, the value automatically calculated using the above formula after measurement will be displayed and printed as the converted value.

For the procedure for setting the Conversion Coefficient, see “8.5 Setting the Conversion Coefficient”.

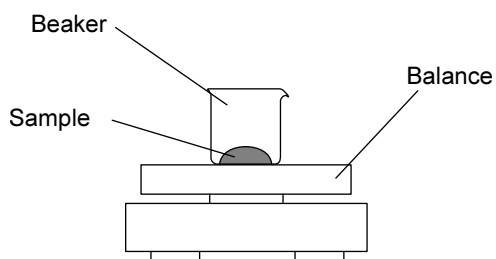
10.5 Measuring Paste or Gel Samples

Examples: Miso, ketchup, mayonnaise, fish paste

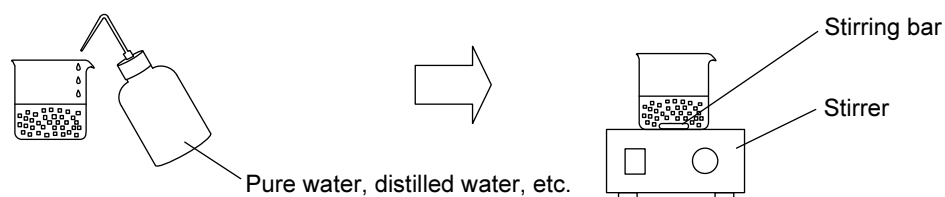
For paste or gel-like samples with high viscosity, the sample cannot be directly taken using the micro-dispenser. When measuring such samples, dilute the sample with pure water, and measure the supernatant solution (or the aqueous layer if oil is present).

Pretreatment procedure

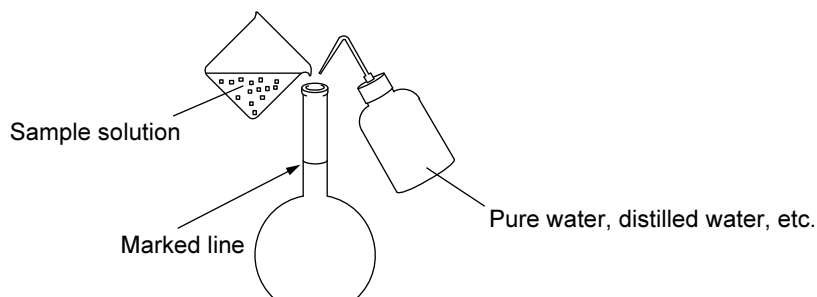
- ① Take the sample in a beaker and weigh the sample using a balance.



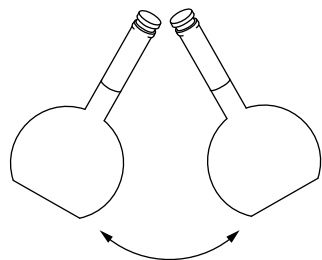
- ② Add an appropriate amount of pure water and stir to dissolve the sample.



- ③ Transfer the solution in ② to the measuring flask and add pure water to the marked line.



- ④ Cap the measuring flask and shake well to mix.



- ⑤ If the sample dissolves completely, inject the solution from ④ as is.

Otherwise, inject the supernatant solution from ④, or filter the solution from ④ and inject the filtrate.

For oily samples, inject the aqueous layer of the solution from ④.

Procedure for converting the salt concentration of the original sample

Salt concentration of original sample (% (W/W))

= Salt concentration of pretreated sample solution (% (W/V)) ×

$$\frac{\text{Capacity of measuring flask (mL)}}{\text{Weighing value of original sample (g)}}$$

If you enter the calculated value of ○ into the main unit as the conversion coefficient, the value automatically calculated using the above formula after measurement will be displayed and printed as the converted value.

For the procedure for setting the Conversion Coefficient, see “**8.5 Setting the Conversion Coefficient**”.

11. Maintenance and Inspection

11.1 Cleaning the Main Unit

To remove dirt from the device, wipe it with a soft material such as a dry cloth or tissue paper. If it is very dirty, soak gauze in a diluted solution of neutral detergent, wring it out tightly, and then wipe it.



CAUTION

●When cleaning the device, never use organic solvents such as thinner. Otherwise, it may cause discoloration.

●Never wipe or wash with water. This may cause device failure or electric shock.

11.2 Daily Maintenance and Inspection

(1) Silver electrodes

After use, apply a small amount of polishing solution (SAT-1Z1) to tissue paper or similar and polish the electrode surfaces to remove dirt. Next, wipe each silver electrode dry with a clean tissue paper or similar, then attach them to the electrode holder and store them.

(2) Reference electrode

After use, wash it thoroughly with pure water, close the replenishment port, and then place a protection cap on the electrode tip before storing it.

(3) Electrolytic silver wire

After use, apply a small amount of polishing solution (SAT-1Z1) to tissue paper or similar, polish the surface to remove dirt. Next, wipe each silver electrode dry with a clean tissue paper or similar, then attach them to the electrode holder and store them.

(4) Micro-dispenser

After use, repeat the suction and dispensing of pure water using the micro-dispenser at least 10 times, then remove the glass capillary from the dispenser and store it. If it is stored without removing the glass capillary, the capillary and dispenser wire may become stuck together, preventing the dispenser from suctioning/dispensing.

For details about storage methods, see “**Daily storage method of the micro-dispenser**” in “**6.6 Operation at the End of Measuring**”.

(5) Used electrolyte

After use, the electrolyte remaining in the beaker cannot be disposed of as is because it contains silver chloride precipitate. DKK-TOA recommends entrusting this to a industrial waste disposal company. If you choose to dispose of the electrolyte yourself, filter out the silver chloride precipitate and neutralize the filtrate with an alkaline solution before disposal. Recover the silver chloride precipitate as metallic silver using the reduction roasting method.

12. Troubleshooting

12.1 Safety Precautions in Case of an Abnormality

If any abnormality occurs, follow the precautions below.

WARNING



- If you notice any abnormality, immediately turn off the power switch and unplug the power plug from the outlet.

If the device behaves abnormally, emits a burning smell, or produces smoke, there is a risk of fire or internal explosion. Immediately turn off the power and unplug the power cord from the outlet. After confirming that the smoke has cleared, contact your dealer or DKK-TOA. Never attempt to repair it yourself as it may be dangerous. Continuing to use the device in an abnormal state may cause fire or electric shock.

12.2 Error Messages

This device has an error messaging function to notify you of any issues.

The causes and actions for error messages are listed below.

Error message	Symptom	Cause	Action
Calibration failure	Calibration values vary in standard solution calibration.	1) When the calibration solution is taken using the dispenser, air bubbles are mixed into the sample. 2) When the calibration solution is injected from the dispenser, the glass capillary tube moves simultaneously. 3) The internal solution of the reference electrode is running low. 4) The internal solution of the reference electrode has deteriorated. 5) The liquid junction of the reference electrode is clogged. 6) The reference electrode itself has deteriorated. 7) The interval between injections of the calibration solution has exceeded 2 minutes.	1) Check that no air bubbles have been mixed in before injecting. 2-1) Remove the glass capillary tube from the dispenser once, then reattach it. 2-2) Replace the dispenser wire if bent. 3) Refill the internal solution. 4) Replace the internal solution. 5) Replace the liquid junction. 6) Replace the reference electrode. 7) Inject the calibration solution at intervals of no more than 2 minutes.
	In standard solution calibration, the calibration value is 10% or more higher than the set concentration.	1) The concentration of the standard solution is too high. 2) The injection volume is too large. 3) The capacity of the dispenser is not properly adjusted. 4) The electrolyte has been depleted. 5) The surfaces of the silver electrodes and electrolytic silver wire are dirty.	1) Use a standard solution with a concentration corresponding to the injection volume. 2) Inject the volume corresponding to the standard solution of the concentration to use. 3) Refer to the dispenser manual to adjust the volume. 4) Replace the electrolyte and perform the measurement. 5) Polish the electrode surfaces with a polishing solution.

Error message	Symptom	Cause	Action
Calibration failure	In standard solution calibration, the calibration value is 10% or lower than the set concentration.	1) The concentration of the standard solution is too low. 2) The injection volume is too small. 3) The capacity of the dispenser is not properly adjusted.	1) Use a standard solution with a concentration corresponding to the injection volume. 2) Inject the volume corresponding to the standard solution of the concentration to use. 3) Refer to the dispenser manual to adjust the volume.
The measured or converted value is displayed as "----".	The measurement does not finish even when 3 minutes have passed since it started.	1) The salt concentration in the sample exceeds the measurement range. 2) The potential is unstable.	1-1) Dilute the sample to be within the measurement range. 1-2) Reduce the injection volume. 2-1) Replace the internal solution of the reference electrode. 2-2) Polish the silver electrodes with a polishing solution. 2-3) Remove the silver and reference electrodes from the electrode holder, then reattach them before measurement.

12.3 Other Issues and Actions

This section lists issue symptoms, causes, and actions for the issues other than the errors notified by error messages. If you encounter any issue other than those listed above or request a repair, check the set name and serial number on the back of the device and contact your dealer or DKK-TOA.

Issue symptom	Cause	Action
Nothing is displayed on the screen even when you turn on the power switch.	1) The power cord is not connected. 2) The fuse is blown. 3) The main unit's rechargeable battery is dead.	1) Connect the power cord. 2) Replace the fuse. 3) The main unit needs to be repaired. Contact DKK-TOA or your dealer.
Even if the electrodes are immersed in the electrolyte and the power is turned on, initial electrolysis does not occur.	1) The reference electrode has deteriorated. 2) The silver electrodes are dirty. 3) Poor contact between the electrolytic silver wire and electrode holder. 4) The electrodes are not inserted firmly into the electrode holder. 5) The stirring bar is not rotating. 6) The electrodes were immersed in an electrolyte that had been used once and the power was turned on.	1-1) Replace the internal solution of the reference electrode. 1-2) Replace the liquid junction of the reference electrode. 1-3) Replace the reference electrode. 2) Polish the silver electrodes with a polishing solution. 3) Remove the electrolytic silver wire from the electrode holder and reattach it. 4) Remove the electrodes from the electrode holder and reattach them. 5) Place the stirring bar in the measuring beaker and turn on the stirrer switch. 6) No abnormality.
The initial electrolysis process is not completed (the progress bar does not change extend at all during electrolysis).	1) The reference electrode has deteriorated. 2) The silver electrodes and electrolytic silver wire are dirty. 3) Poor contact between the electrolytic silver wire and electrode holder. 4) The electrodes are not inserted firmly into the electrode holder. 5) The stirring bar is not rotating.	1-1) Replace the internal solution of the reference electrode. 1-2) Replace the liquid junction of the reference electrode. 1-3) Replace the reference electrode. 2) Polish the silver electrodes and electrolytic silver wire with polishing solution. 3) Remove the electrolytic silver wire from the electrode holder and reattach it. 4) Remove the electrodes from the electrode holder and reattach them. 5) Place the stirring bar in the measuring beaker and turn on the stirrer switch.
The display is unclear.	1) Improper contrast adjustment. 2) The ambient temperature at the installation location is too low.	1) Turn the "CONTRAST" volume on the back of the device to adjust to an appropriate brightness. 2) Not a failure. This display changes its brightness depending on the ambient temperature, so adjust it appropriately by turning the "CONTRAST" volume on the back of the device.

Issue symptom	Cause	Action
Measurement does not start even after a sample is injected.	1) The salt concentration in the sample is too low. 2) The measurement start method is set to "Manual". 3) The electrode cable is not connected to the back of the main unit.	1) Increase the injection volume and retry the measurement. 2-1) Set the measurement start method to "Auto". 2-2) For a manual start, pressing the START/STOP key will start the measurement. 3) Connect the electrode cable to the back of the main unit.
Measurement starts even though a sample has not been injected.	1) The reference electrode has deteriorated.	1-1) Replace the internal solution of the reference electrode. 1-2) Replace the liquid junction of the reference electrode. 1-3) Replace the reference electrode.
The measured values vary too much.	1) The reference electrode has deteriorated. 2) Air bubbles are mixed into the sample when it is taken with the dispenser. 3) Solid matter was mixed into the sample when it was taken with the dispenser. 4) The measurement interval exceeds 2 minutes. 5) The stirring bar rotation speed is slow. 6) The electrodes are not completely immersed in the electrolyte. 7) No additive solution is added to the measuring beaker.	1-1) Replace the internal solution of the reference electrode. 1-2) Replace the liquid junction of the reference electrode. 1-3) Replace the reference electrode. 2) After taking a sample with the dispenser, check that there are no air bubbles before injecting. 3-1) After taking a sample with the dispenser, check that no solid matter is mixed in before injecting. 3-2) Before injecting, filter or pretreat the sample by centrifugation. 4) After the previous measurement is completed, inject the sample within 2 minutes. 5) Turn the "STIRRER" volume on the back of the main unit to increase the rotation speed. 6-1) Lower the height of the electrode holder so that it does not hit the stirring bar, and make sure that the electrodes are completely immersed in the electrolyte. 6-2) If the electrolyte level is low, add it until the measuring beaker is about 80% full. 7) Add approx. 0.7 mL (approx. 20 drops) of additive solution.
The measured value is much higher than expected.	1) The actual injection volume is larger than the set injection volume. 2) The sample contains non-salt components that react with silver (e.g., bromine, iodine, sulfur).	1) Match the set injection volume with the actual injection volume. 2) Such samples cannot be measured.
The measured value is much lower than expected.	1) The actual injection volume is small than the set injection volume.	1) Match the set injection volume with the actual injection volume.

Issue symptom	Cause	Action
The internal printer does not operate.	1) The printer setting is set to “Not used” or “External”. 2) The printer LED is lit red (printer paper not detected). 3) The printer LED is blinking red.	1) Set the printer setting to “Internal”. 2-1) Replace the printer paper. 2-2) Close the printer cover securely until it locks. 3) Turn off the power, then turn it back on after a few minutes. If these actions do not improve the situation, the printer has failed and needs to be repaired. Contact DKK-TOA or your dealer.
The external printer does not operate.	1) The printer setting is set to “Not used” or “Internal”. 2) Printer paper jam. 3) The external printer has failed.	1) Set the printer setting to “External”. 2) Open the top cover and use tweezers or similar to remove the jammed paper. 3) It needs to be repaired. Contact DKK-TOA or your dealer.
No measurement results are sent to the PC.	1) The RS-232C communication conditions are set incorrectly. 2) The connecting cable to the PC is not connected. 3) The connecting cable type is incorrect.	1) Match the RS-232C settings of this device with the communication conditions settings of the PC. 2) Make sure to connect the RS-232C cable (straight connection). 3) Check the cable type (straight connection, cross connection).
Printing occurs, but nothing is printed on the printer paper.	1) All print item settings are set to “Do not print”. 2) The printer has failed.	1) Set the items to print in “Print Item Settings”. 2) It needs to be repaired. Contact DKK-TOA or your dealer.
Part of the print is missing.	1) Part of the printer head is missing.	1) It needs to be repaired. Contact DKK-TOA or your dealer.
No keys work.	1) Measurement is currently in progress. 2) The program has gone out of control. 3) The device has failed.	1) Wait until the measurement operation is complete. 2) Initialize the device. 3) It needs to be repaired. Contact DKK-TOA or your dealer.
The stirring bar does not rotate.	1) The stirrer’s power switch is off. 2) The stirrer’s connection terminal is not connected to the back of the main unit. 3) The stirring speed adjustment volume is at the minimum position (*1). 4) The stirrer’s stirring motor has failed.	1) Turn on the switch on the front of the stirrer. 2) Connect the stirrer’s connection terminal to the back of the main unit. 3) Using a flat-blade screwdriver, turn the stirring speed adjustment volume (⇔ display) on the back of the device to set an appropriate speed. 4) The stirrer needs to be repaired. Contact DKK-TOA or your dealer.
The stirring bar is rotating too fast or slow.	1) The stirring speed is not adjusted properly.	1) Using a flat-blade screwdriver, turn the stirring speed adjustment volume (⇔ display) on the back of the device to set an appropriate speed.
The device is forcibly reset.	1) The program has gone out of control due to power supply noise or other factors.	1) Initialize the device according to “12.4 Initializing the Device”.

*1: When the stirring speed adjustment volume is set to the minimum, the stirring bar may stop rotating. This is not a failure.

12.4 Initializing the Device

If the memory is corrupted by power supply noise or the program goes out of control and the device no longer operates normally, initializing the device as below may return it to normal.

Initialize the device in the following order.

- ① Turn off the power switch on the back of the device.
- ② While holding down the **ENTER** key, turn on the power switch to display the initialization screen.
- ③ To change the screen display language to Japanese, press the **0** key. To change it to English, press the **1** key.

Initialization screen

言語の設定
日本語の場合は '0' を押してください。
When initializing in English, Please push '1'

Note that in this case, all memory data and measurement conditions will be initialized.

13. Transportation, Storage, and Disposal

13.1 Transportation Precautions

When moving or transporting the device, pay attention to the following.

- When transporting the device, be sure to pack in the original packaging box.
- When transporting it, be sure to use the specified packaging materials. Note that damage or failure caused by using unspecified packaging materials for transporting shall not be covered under warranty.
- When moving the device, always turn off the power switch and unplug the power cord from the outlet.

13.2 Transportation Method

Place the device in the original packaging box along with the packaging materials before transporting it. Avoid dropping the box, tipping it over, or stacking heavy items on the box. Otherwise, the device may fail.

13.3 Storage Precautions

WARNING



- Do not use chemicals that may generate flammable gases or store the device in an atmosphere containing flammable gases.

There is a risk of gas explosion inside the device.



- Do not store the device in a place where water, chemicals, etc. may enter it.



If water or chemicals enter the internal parts of the device, the circuit may short-circuit, causing fire or electric shock.



- Install or store the device in the temperature range of 10 to 35°C and humidity range of 35% to 85%.
- Install or store the device in a place where condensation does not occur.
- Do not install or store the device in a place where corrosive gas is generated.
- Install or store the device in a place without vibration.
- Install or store the device in a place not exposed to direct sunlight.
- Install or store the device in a place with little dust or debris.
- Do not leave the product in an unstable or hazardous place, subject it to strong shocks, or drop it.
- Do not place the device in extremely cold places or near heating appliances such as stoves.
- Avoid locations where the device is exposed to direct airflow from air conditioning equipment.

13.4 Disposal Precautions

When disposing of the device or reagents, observe the local government regulations. For details, contact your local government.

** WARNING**

● Do not place the device in fire or burn it.

There is a risk of explosion or rupture inside the device.



14. List of Items Sold Separately

Name	Part No.	Quantity	Remarks
Micro-dispenser (for 2 μ L)	0SZ00018	1	
Glass capillary tube (for 2 μ L micro-dispenser)	0SZ00019	1	100 pieces
Parts kit (for 2 μ L micro-dispenser)	0SZ00020	1	Items in the kit Stainless steel rod piston: 1 O-ring: 2 Collet: 1 Coil spring: 1
Micro-dispenser (for 20 μ L)	0SZ00021	1	
Glass capillary (for 20 μ L micro-dispenser)	0SZ00022	1	100 pieces
Parts kit (for 20 μ L micro-dispenser)	0SZ00023	1	Items in the kit Stainless steel rod piston: 2 O-ring: 2 Collet: 1 Coil spring: 1
Micro-dispenser (for 200 μ L)	0SZ00024	1	
Glass capillary (for 200 μ L micro-dispenser)	0SZ00025	1	100 pieces
Parts kit (for 200 μ L micro-dispenser)	0SZ00026	1	Items in the kit Stainless steel rod piston: 1 O-ring: 2 Collet: 1 Coil spring: 1 Teflon chip: 3
Silver electrode	AG-111	1	Accessories
Electrolytic silver wire	SAT-AG	1	Accessories
Reference electrode	ELR-003	1	Accessories
Liquid junction	6784580K	1	For ELR-003 replacement
Electrode holder	6877940K	1	Accessories
Stirrer unit	6877950K	1	Accessories
Electrolyte SAT-1F1 (500 mL)	143A373	1	Accessories
Electrolyte preparation reagent for salt analyzer ^{*1}	143A377	1	
Additive solution SAT-1G1 (50 mL)	143A374	1	Accessories
Polishing solution SAT-1Z1 (50 mL)	143A376	1	Accessories
Reference internal solution SAT-1E1 (100 mL)	143A375	1	Accessories
Standard solution SAT-1A1 (100mL)	143A371	1	NaCl 10.0% (W/V) For 2 μ L injection
Standard solution SAT-1A2 (100 mL)	143A372	1	NaCl 1.00% (W/V) For 20 μ L injection
Dedicated beaker	SAT-B20	1	With 1 stirring bar
Stirring bar	SAT-SB	1	Accessories
Printer paper	PAP-HCS	1	Thermal paper for internal printer (5 rolls)
RS232C cable	0GC00002	1	9-pin D-Sub straight female For PC connection

Name	Part No.	Quantity	Remarks
External printer	EPS-G	1	Non-thermal paper printing
External printer cable	0GC00003	1	
Printer paper for external printer	P000119	1	Non-thermal paper (20 rolls)
Ribbon for external printer	0RD00001	1	
Data collection software	G-LOG II	1	Software for importing data into the PC

*1: If you use the electrolyte preparation reagent for salt analyzer (143A377) without sulfuric acid, add sulfuric acid before use.

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