

No. CM4-LB16604E

Introduction

- (a) Thank you for your purchase of our product. This "electrical conductivity meter CM-42X" (hereinafter referred to as the "instrument" or "product") is a pH meter with high functionality and excellent operability
- (b) The product features a number of advanced technologies such as standard inclusion of an electrical conductivity cell, adoption of a touch-panel color graphic LCD screen, intelligent electrode compatibility, support for GLP and GMP, validation support functions, support for Part11 and a built-in self-diagnosis feature.
- (c) Equipment such as RS-232C output, USB (host), USB (peripheral), and analog output is standard, and connection of an optional external printer, PC or other equipment is simple.
- (d) Since important items are described in "Safety Information," read the contents carefully. In addition, please keep this instruction manual and the electrode "Instruction Manual" in a safe place after reading since it may be required in future if you do not know how to operate the product or have problems.

Safety Information

(1) Meaning of markings

Meaning of symbols such as the ones used in notations of warning in the instruction manual is described below. In addition, the alert symbol (\triangle : General caution symbol) used on a product label, etc. is meant to notify the existence of hazard/loss and it also means "Refer to the Instruction Manual".

- WARNING : Indicates the degree of hazard which can lead to death or serious injury if you fail to operate the product properly.
 Serious injury means an injury such as loss of sight, burns (high temperature or low temperature), electric shock, bone fracture and poisoning, and the aftereffects of the injury remains or the injury requires hospitalization or long periods of outpatient treatment.
 - CAUTION : Indicates the degree of hazard/loss which can result in minor injury or property damage if you fail to operate the product properly.
 Minor injury means an injury, burn or electric shock not requiring hospitalization or long periods of outpatient treatment. Property damage refers to damage that affects property around the product such as equipment and buildings (wide-ranging damage).
 - **(IMPORTANT)** : A WARNING A CAUTION Indicates important matters such as to prevent damage to the product main body, prevent data destruction, prevent wasting time, and maintain performance.
 - [NOTE] : Indicates comments, reasons, background information, case examples and other items to help the reader understand the meaning.
 - >> : Indicates reference items.
 - (1), (2), (3): Indicates item numbers such as the ones used in operations.

(2) Safety compliance items

Explosion, Fire	Please do not use in locations where explosive gas or
 Electric shock,	flammable gas is present.
Leakage	ullet Do not put the product in a fire or burn it. The product's
	interior may explode or catch on fire.
	ullet When you remove the electrode plug, please be sure that
	the power is turned off. If water or chemicals enter inside the
	product, there may be a short circuit and the risk of electric
	shock or fire.

	Electromagnetic	This equipment is IEC61326-1 emission Class A
	interference	equipment. The use of this equipment in a household or
		residential building (housing environment) may cause
		harmful interference to other devices.
		If electrical interference occurs, the user must take
		appropriate action such as moving the location of the device.
	Injury	●Part of the electrode is made of glass. Please handle with
		care to avoid breakage. If the glass breaks there is a risk of
		injury from the sharp pieces of glass.
	Falling	Please do not drop the main body of the instrument. It may
		cause damage.
	Disassembly or	Please do not disassemble or modify the instrument other
	modification	than as is described in this instruction manual. It may cause
		damage.
	Caution label	When the caution label attached to the product is no longer
	Loss	readable, please order one from a dealer or our sales office
		and affix it in its original position.
	Protection	The protection performance of this equipment will be
		compromised if it is used in a manner not specified in this
		manual.
	Disconnection	Do not install in a way that prevents the disconnection
_		method of the AC adapter and electrical outlet.

(3) Notes on use of the instruction manual

Important items such as "Safety compliance items" are described in this instruction manual. Handle the manual as follows:

- (a) The instruction manual is required not only at the start of operation but also required when maintenance is performed or in case a failure occurs. Please keep the manual at hand all the time so that the operator who actually operates the product can read the manual at any time.
- (b) If the instruction manual is lost or too smeared to read, please order a new copy through your local sales agent or directly from our sales office.
- (c) Some of the diagrams used in the instruction manual or on product labels may be modified with part of their shapes or displays omitted or they may be described in abstract form. In addition, numbers etc. shown on the screen example are just examples for such cases.
- (d) The contents of the instruction manual may be changed without prior notice for reasons such as to improve performance.
- (e) Intellectual property right of the instruction manual belongs to DKK-TOA. All or part of the manual must not be reproduced without permission.

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(1) Warranty Coverage

DKK-TOA Corporation (DKK-TOA) warrants that its products will operate correctly in accordance with the company's prescribed specifications (specifications). DKK-TOA will repair faults that occur during the warranty period.

- (a) The warranty period is one year from the date of delivery to the original user.
- (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. Repair work will be charged for.

- (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) Direct or indirect failure or damage caused by disaster such as earthquake, storm and flood damage, and lightning, fire, accident, abnormal voltage, salt damage, 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 and consumables
- (f) Failure or damage caused by the use of consumables, parts, or software not supplied by DKK-TOA.
- (g) Malfunctions 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 (including combinations with DKK-TOA products). In such cases, this warranty covers DKK-TOA's products only and third-party products are the responsibility of the respective manufacturer (*1).
- (j) Malfunctions or damage caused by non-performance of maintenance items that were specified by DKK-TOA in the instruction manual past the maintenance period.
- (k) Use outside of Japan (for use outside of Japan a separate contract is required).
- (1) Products without a product nameplate (except when there is evidence that the product was delivered as such from DKK-TOA).

(3) Others

- (a) This warranty is valid only in Japan.
- (b) The normal supply period to customers of product maintenance parts (* 2) is five years after manufacturing is discontinued (* 3).
- (c) Malfunctions or damage will be judged by our engineers.
- (d) For repair, please place an order to our sales office.
- * 1: We ask that you please store third-party product guarantees.
- * 2: Maintenance parts means spare parts needed to maintain the operation of the product.
- * 3: When procurement is impossible and there is no substitute, the period may be less than five years.

Reading Guide

To understand the product overview, please refer to the necessary items of this instruction manual depending on your purpose, such as to start operation. Circled numbers in figures are the items and order to refer to primarily.



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1. Packing Contents

Туре	Name	Model.	Qty	Exterior
Main unit	Electrical conductivity meter	CM-42X	1	
	Electrode holder	7430850K	1	F
Standard attachments	Electrode stand (Stand, strut, stopper)	7430860K	1	
	Tilt stand	7430870K	1	
	Electrode attachment (G)	0IB00004	1	
	Electrical conductivity cell (built-in memory type)	CT-58101B	1*	
	AC adapter	7430880K	1	
	Power cord (2P conversion adapter included)	118C229	1	
	Earth lead (2m)	X0979500	1	
	Poly beaker (150mL)	0DE00001	1	hutantur

(continues)

(Continued)

Туре	Name	Model	Qty	Exterior
Standard attachments	Instruction manual (CM-42X)	-	1	

(NOTE) • Electrical conductivity cell is not included if only the main unit is purchased.

Also, if you have ordered additional non-standard cells or parts, these may be packaged together with the main unit.

2. Specifications and Features

(1) Specifications

Model		CM-42X	
Measurement method		AC 2 electrode method	
Measurement frequency		Automatic selection of 80Hz and 3kHz	
Measurement i	tems	Elec cndct/Elec res/Concentration/Saline, temp/TDS.	
Measurement r	ange	Due to the cell to be used	
Diamlary		Elec cndct/Elec res/Concentration/Saline/TDS.	
Display		Synchronous temp display	
Indicator		Touch-panel color graphic LCD	
	Electrical conductivity	Due to the cell to be used	
	Electrical resistivity		
Measurement	Salt		
item/range	Concentration	Converted from electrical conductivity	
	TDS		
	Temperature	0.0~100.0°C	
		0.0~200.0µS/m (0.000~2.000µS/cm)	
		0.000~2.000mS/m (0.00~20.00µS/cm)	
		0.00~20.00mS/m (0.0~200.0µS/cm)	
	Electrical conductivity	0.0~200.0mS/m (0.000~2.000mS/cm)	
	(Manual/automatic range	0.000~2.000S/m (0.00~20.00mS/cm)	
	switching)	0.00~20.00S/m (0.0~200.0mS/cm)	
		0.0~200.0S/m (0.000~2.000S/cm)	
		Switching between SI units (S/m) and CGS units (S/cm)	
		possible	
		0.005~2.000Ω·m (0.5~200.0Ω·cm)	
		0.00~20.00Ω·m (0.000~2.000kΩ·cm)	
Display range		0.0~200.0Ω·m (0.00~20.00kΩ·cm)	
Display lange	Electrical resistivity	$0.000 \sim 2.000 \text{k}\Omega \cdot \text{m} (0.0 \sim 200.0 \text{k}\Omega \cdot \text{cm})$	
	(Manual/automatic range	0.00~20.00kΩ·m (0.000~2.000MΩ·cm)	
	(Wallual/automatic range	0.0~200.0kΩ·m (0.00~20.00MΩ·cm)	
	switching)	0.000~2.000MΩ·m (0.0~200.0MΩ·cm)	
		0.00~20.00MΩ·m (0~2000MΩ·cm)	
		Switching between SI units (Ω ·m) and CGS units (Ω ·cm)	
		possible	
	Salt	0.00~4.04% (NaCl)	
	Sait	0.00~42.40 (PSS)	
	Concentration	0~2.000%	
	(Automatic range switching)	0~20.00%	
	(a ratomatic range switching)	0~200.0%	

				0~99.99mg/L	
		TD	PS	0~999.9mg/L	
Display range		(M	anual/automatic range	0~9.999g/L	
		swi	itching)	0~99.99g/L	
				0~999.9g/L	
		Temperature		-5~110°C	
		Electrical conductivity		±0.5%FS	
D	4-1-114-	Electrical resistivity		±0.5%FS	
Motor	main	Co	ncentration	±0.5%FS	
unit	mam	Salt		±0.5%FS	
um		TD	PS	±0.5%FS	
		Ter	mperature	Within ±0.2 °C	
		Ter	mperature compensation	ATC (automatic temperature compensation): 0~100.0°C	
		ran	ge	MTC (manual temperature compensation): 0~100.0°C	
		No	ne	ATC OFF	
		Re	ference temperature setting	0~100.0°C	
Tempe	erature	Ter	mperature coefficient	0~10.00%/°C	
compe	ensation	(lin	near)		
		Temperature coefficient		2-10 points	
		(multi-point)			
		Pure water dual temperature		Yes	
		compensation			
Conce	ntration c	onve	ersion settings	2-10 points	
Tempe	erature ca	libra	tion	1-point calibration	
Perfor	mance as	surai	nce temperature, humidity	$0\sim45^{\circ}$ C 85% or less (no condensation)	
Data n	nemory			2000 data	
Print f	eature			External printer (plain paper printing)	
111111	cature			EPS-P30 (optional) connectable	
Auto-ł	nold featu	re		Yes	
Auto-ł	nold cond	ition	is settings	Yes	
Statist	ics calcula	ation	feature	Average value	
Calibra	ation reco	ord c	reation feature	Up to 20 times 10 different electrodes	
Interval measurement		nt	Yes		
Security feature			Yes		
Upper and lower limit output settings		nit output settings	Yes		
RS-232C			2 channel		
utpu	USB (ho	USB (host)		Yes	
ut/oı	USB (peripheral)			Yes	
inp	Analog		Measurement value	0~1V F.S.	
External	output	Range		100mV/Range	
			Alarm	Upper limit: open collector	
				Lower limit: open collector	

mection	External printer	Yes	
	Turntable (TTT-710/TTT-510)	Yes	
on coi	Electrode selector	Yes	
Optic	Control box (AC-1V)	Yes	
Power	r supply	AC100~240V (AC adapter)	
Power consumption		Approximately 12VA (Adapter DC output DC5V 6VA)	
Main unit dimensions		Approximately 130 (width) \times 60 (height) \times 230 (depth) mm	
Main unit weight		Approximately 0.8kg	

(2) Features

Clock feature	Built-in
Data memory	2000 data
Cell constant automatic reading	Valid only when built-in memory sensor used
	Automatic reading of individual electrode cell constants
Calibration record	Up to 20 times 10 different electrodes
Cal memo sensor support	Yes
Auto-hold feature	Yes
Auto-hold conditions settings	Yes
SI unit/CGS unit Display switching	Switching possible between electrical conductivity, electrical resistivity SI units (S/m, Ω ·m) and CGS units (S/cm, Ω ·cm) display.
Statistics calculation feature	Average value
Interval feature	Yes
Printing feature (external printer)	Yes (external printer sold separately)
Security feature	Yes
Upper and lower limit output settings	Yes
External input/output	Yes
Diagnostic feature	Yes

3. Measurement Principles

Electrical conductance is equivalent to the reciprocal of electrical resistance (Ω) of the solution and is expressed in units of S (Siemens). In addition, electrical conductivity is equivalent to the reciprocal of the electrical resistivity with the solution (Ω ·m), it is expressed in units of S/m. In other words, electrical conductivity indicates the degree of ease for current to flow, and has a reciprocal relationship to electrical resistivity which indicates the degree of difficulty of flow.



Install two electrodes in parallel opposed to each other, with an electrolyte solution in between, and then apply an alternating voltage between the electrodes. Such a measuring container is called a cell. Cations and anions from the electric field generated in the solution migrate to the cathode and anode respectively, and an alternating current flows. The resistance $R(\Omega)$ at this time between the electrodes is inversely proportional to the area of the electrode Am^2 , proportional to the distance Im between the two poles, and is given by the following equation.

$$R = \rho \cdot (I \nearrow A)$$

Here ρ is called the resistivity and is a measure of the difficulty of flow of current, and is a constant unique to the solution (in Ω ·m). Since the reciprocal 1/ ρ of ρ represents the ease of current flow, represented by κ , it is called the electrical conductivity. Here, when the equation is rewritten with J = l/A, it becomes the following equation.

(1)

$$\kappa = J \cdot (1/R) \tag{2}$$

Here J is the cell constant, with units of m⁻¹.

In actual measurements, various forms of cell size are used, and it is difficult to easily obtain the cell constant from the geometric dimensions. Typically, the electrical conductivity of the cell is measured using a standard solution of known electrical conductance to measure the cell constant from the ratio of the electrical conductance and electrical conductivity. Roughly speaking, cells where the distance is small between electrodes and the surface area is large, the cell constant is small, and such cells can be used for the measurement of samples with low electrical conductivity. When the distance is large between the electrodes and the surface area is small, the cell constant is large, and such cells can be used to measure samples with high conductivity.

Normally a cell of cell constant $100m^{-1}$ (measurement range $1mS/m\sim10S/m$) is used, but in the case of measuring high electrical conductivity solutions, a cell with a cell constant of $1000m^{-1}$ or more is used, and to measure a low electrical conductivity solution, a cell with cell constant of $10m^{-1}$ or less is used.

4. External View



5. Installation and Assembly

5.1 Unpacking

Please unpack the electrical conductivity meter main unit, standard attached goods and instruction manual from the packing box. Please refer to "1. Packing Contents" and check the quantity etc. By any chance, if there is something missing, please contact the dealer from which you purchased the product. In addition, please save the packing box, to use for moving or transportation.

5.2 Electrode stand assembly and electrode mounting

(1) Electrode stand assembly

 Fix the strut. Pass the electrode stopper through the strut, loosen the electrode stand hexagon cap nut and insert the strut. Next, confirm that the strut is in all the way and firmly tighten the hexagon cap nut to fix it.

- *② If required fix the electrode stopper. Fix the electrode stopper near the center of the column. Please set the electrode to a position so that items such as beakers do not hit the bottom surface.
 - If you use a stirrer or the like, please fix the electrode stopper according to the procedure 2 described above.



Strut

(2) Electrode holder assembly and mounting

- ① Mount the electrode attachment. Please mount the electrode attachment to the electrode holder.
- (2) Insert the holder into the strut. Please insert the electrode holder into the electrode stand strut while pressing the electrode holder lever.

Electrode attachment



(3) Electrical conductivity cell mounting

- ① Mount the electrical conductivity cell. …… Please mount each electrical conductivity cell to the electrode attachment.
- 2 Place the protective cap in the cap holder.
- ③ Fix the lead wire. …… Please fix the cell lead through the lead wire seal. Caution: At this time, forcing open the lead wire seal may cause damage.



(4) Connection of the electrode plug

- ① Confirm that the power is switched OFF.
- 2 Inserting the electrode plug. Please put the "O" mark on the electrode plug tip facing up, and insert the electrode jack on the rear of the main body straight.
- (3) Locking. After you have completely inserted the electrode jack, please press the fixed ring only to the back, then turn to the right to lock it. In this case, please be very careful not to turn the electrode plug body.



5.3 Connecting power

1 Inserting the output plug. Please insert the dedicated AC adapter output plug into the

power jack on the rear of the unit.



② Connect the ground to the ground terminal on the bottom of the main body.

(IMPORTANT) • In the case that stable measurement is not possible due to electrical influence from the surroundings, please ground the device with the earth.



3 Connecting the AC adapter to the electrical outlet. Please connect the AC adapter to an electrical outlet. Please turn on the power switch when the unit beeps 2-3 seconds later. The measurement screen displays (For the method of inserting the power switch, please refer to "7.2 Power insertion")





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Explosion,	●Immediately turn OFF the power and disconnect the power cable
fire, Electric	from the outlet when there seems to be a problem.
	If you smell a burning smell or encounter smoke or abnormal
SHOCK	behavior, there is a risk of ignition or implosion or the like.
	Immediately turn off the power and unplug the power cable.
	After confirming that smoke has disappeared, contact your dealer
	or DKK-TOA. Repairing the product yourself is dangerous so
	refrain from doing so under any circumstances. Using the product
	under abnormal conditions may cause fire or electric shock.
	ullet Please do not use chemicals from which flammable gases arise
	and the like or use the product in an atmosphere of flammable
	gas.
	Doing so may cause a gas explosion inside the device.
	Persons other than service personnel specified by DKK-TOA
	must absolutely not remove the case cover or disassemble or
	perform repair on the product.
	There are high voltage parts and doing so may cause an electric
	shock. In addition, doing so may cause fire or abnormal operation
	and the like.
	Please do not connect or disconnect the power cable or AC
	adapter with wet hands.
	If not, it may cause failure, fire, or electric shock.
	Please do not use other than the standard attached goods
	(7430880K) for the AC adapter.
	Doing so may cause fire or electric shock. In addition, there is a
	possibility that the device may be damaged.
	Please do not use a power supply other than AC100V (50/60Hz).
	Doing so may cause fire or electric shock. In addition, there is a
	possibility that the device may be damaged.
	Please do not apply water to the main body or touch it with wet
	hands.
	Doing so may cause electric shock or failure because the
	structure of this device is not waterproof or drip-proof.
	●In the case that stable measurement is not possible due to
	electrical influence from the surroundings, please ground the
	device with the earth.

5.4 Installation

(1) Installation example on a desk or similar

Please set the instrument up on a flat surface such as a desk as in the following diagram example.



Installation example on a desk or similar

(2) Attaching the tilt stand

In the case of using the product with the main body mounted on a tilt stand, please mount it according to the following diagram.



Attaching the tilt stand

(3) Installation example on a wall

In the case of using the product with the main body fixed to a wall, please install it with the following procedure.

① Mount screws in the wall. …… Please prepare two flathead or roundhead screws (head diameter 7~8mm, nominal diameter 4mm).

[IMPORTANT] • Screws are not included.

- Please leave about 7mm from the screw head to the wall.
- Please leave 120mm space between each screw (same for both vertical and horizontal mounting).



- (2) Hook the main body. Please hook the main body bottom surface wall mounting holes over the screws.
 - **(IMPORTANT)** Switch the power of the main body to OFF and unplug the AC adapter plug to do the work.
 - Applying too much force may result in damage to the main body or the wall. Caution



(IMPORTANT) • When using on a wall, please be sure to fix the strap firmly to the main body and fix to the wall or the like.

- Since it is dangerous if the product falls when mounted to a wall, please do not mount in an area where there are large impacts or vibration.
- In the case of connecting a cable or the like while the product is hanging on a wall, please do so while supporting the main body with your hand because it is dangerous if it falls.
- Since it is dangerous if the main body falls, please avoid wall mounted installation on soft walls, and install in a location where the product can be securely mounted.

5.5 Notes on installation

WARNING	Explosion, fire, Electric shock	 Please do not use chemicals from which flammable gases arise. Also, please do not place the product in an atmosphere of flammable gas. Doing so may cause a gas explosion inside the device. Please do not install the product in a location where water, chemicals or the like may enter inside the interior of the device. If water or chemicals enter inside the device, it may cause a short circuit, fire or electric shock. 	
		This equipment is IEC61326-1 emission Class A equipment. The	
		use of this equipment in a household or residential building	
		(housing environment) may cause harmful interference to other	
		devices.	
		If electrical interference occurs, the user must take appropriate	
-		action such as moving the location of the device.	
[IMPORTA	NT] When y	ou install and store the equipment, please note the following.	
	 Insta 	allation and storage temperature and humidity	
	Temperature 0°C or more, 45°C humidity of 85% or less (do not place		
	near	a heating appliance such as a stove)	
	 Plea 	se do not install or store in the following locations.	
	Loca	ations with condensation	
	Loca	ations subject to corrosive gas	
	Loca	ations prone to vibration	
	Loca	ations under direct sunlight	
	Loca	ations with significant dust or dirt	
	Loca	ations where air from an air conditioner blows directly on the product	
	Atm	ospheres with low discharge voltage gases such as argon	
	• Plea	se do not leave the product in unstable or dangerous locations or	
	appl	y a strong shock or drop the product.	
	• Plea	se do not put anything on top of the device.	

6. Names and Features of Each Part

6.1 Surface panel part



Names and features

Symbol	Name	Features
\bigcirc	Display part	To display the measurement results and setting conditions etc.
2	Operation key	Key to perform each operation.

(1) Basic method of operation of the touch panel screen



Names and operation

Number	Name	Operation
1	Тар	Press lightly on the icon or button with your finger.
2	Swipe	Press and hold the screen with your finger to move downward or upward.
3	Long tap	Press an icon or button for a few seconds with your finger.
	(Long press)	
(2) Electrical conductivity/resistivity/TDS measurement display screen



Names and features

Number	Name	Features
	Date and time display	Displays date, hour and minute.
2	USB display	View USB connection state.
3	Channel number display	Displays the channel number. When the electrode selector (optional) is
		connected, displays the number of electrodes to measure (A-E). If tapped
		the active channel can be switched.
4	Sample ID display	Displays sample ID.
5	Measurement item display	Displays measurement item.
6	Hold display	Displayed when the measured value is on HOLD.
$\overline{\mathcal{O}}$	Measurement value display	Displays measured value.
8	Graph display	Displays stability display graph.
9	Display calibration	Displays calibration date and time and cell constant.
	information	
10	Status display	Displays status and errors, such as stability judgment.
(11)	Operator display	Displays operator name.

Number	Name	Features
(12)	Operation display	Displays guidance message such as for operation.
		Displays the interval time while interval measurement is running.
(13)	Sample comment display	Displays sample comments.
14)	Stable display	Displayed when the measured value is stable. When the measurement
		value stays within the hold condition setting range for 10 seconds, the
		STAB mark lights up. (The stability judgment time of 10 seconds is a
		fixed value)
(15)	Display autorange	Displays measurement range in the case of auto range.
16	Units display	Displays units (electrical conductivity: example S/m, electrical
		resistivity: example Ω ·m).
17	Temperature display	Displays temperature measurements.
18	Calibrating temperature	Displays when temperature calibration is being performed.
	display	
19	Temperature compensation	Displays the type of temperature compensation (linear/multi-point/pure
	display	water/OFF (without temperature compensation)).
20	MENU button	Used to display menu screen.
(21)	RANGE button	Tap to switch to the measuring range. Long-tap to force switch to AUTO
		range.
(22)	BACK button	Used when returning to the previous screen. If the measurement screen is
		tapped during HOLD, cancels HOLD.
23	F1 button	Sets the optional features selected by the user.
		Default: "DATA OUT" button (used to display the memory data screen.)
24)	HOME button	Used to display measurement screen.
25	F2 button	Sets the optional features selected by the user. Default: "SAMPLE
		INFO" button (used to display the "sample information settings" screen.)
26	DATA IN button	Implements the storage of data memory. When an external printer is
		connected, implements the storage and printing of the measured values.
		PC connection carries out an automatic output to memory and PC.
27)	GRAPH button	Used when switching between the measured values and graphs screens.
(28)	HOLD button	Used to hold a measured value.

(3) Concentration/saline (NaCl)/measurement display screen



Names and features

Number	Name	Features
(1)	Date and time display	Displays date, hour and minute.
2	USB display	View USB connection state.
3	Channel number display	Displays the channel number. When the electrode selector (optional) is
		connected, displays the number of electrodes to measure (A-E). If tapped
		the active channel can be switched.
4	Sample ID display	Displays sample ID.
5	Measurement item display	Displays measurement item.
6	Hold display	Displayed when the measured value is on HOLD.
\overline{O}	Measurement value display	Displays measured value.
8	Graph display	Displays stability display graph.
9	Display calibration	Displays solibustion data and time and call constant
	information	Displays canoration date and time and cell constant.
10	Status display	Displays status and errors, such as stability judgment.
(11)	Operator display	Displays operator name.

Number	Name	Features
12	Operation display	Displays guidance message such as for operation.
		Displays the interval time while interval measurement is running.
(13)	Sample comment display	Displays sample comments.
14	Stable display	Displayed when the measured value is stable. When the measurement
		value stays within the hold condition setting range for 10 seconds, the
		STAB mark lights up. (The stability judgment time of 10 seconds is a
		fixed value)
15	Units display	Displays units (concentration: %, salt: %).
(16)	Temperature display	Displays temperature measurements.
(17)	Calibrating temperature	Displays when temperature calibration is being performed.
	display	
18	Temperature compensation	Displays the type of temperature compensation (linear/multi-point/pure
	display	water/OFF (without temperature compensation)).
(19)	MENU button	Used to display menu screen.
20	BACK button	Used when returning to the previous screen. If the measurement screen is
		tapped during HOLD, cancels HOLD.
(21)	F1 button	Sets the optional features selected by the user.
		Default: "DATA OUT" button (used to display the memory data screen.)
(22)	HOME button	Used to display measurement screen.
23	F2 button	Sets the optional features selected by the user. Default: "SAMPLE
		INFO" button (used to display the "sample information settings" screen.)
24)	DATA IN button	Implements the storage of data memory. When an external printer is
		connected, implements the storage and printing of the measured values.
		PC connection carries out an automatic output to memory and PC.
25	GRAPH button	Used when switching between the measured values and graphs screens.
26	HOLD button	Used to hold a measured value.



(4) Saline (PSS) measurement display screen

Names and features

Number	Name	Features
1	Date and time display	Displays date, hour and minute.
2	USB display	View USB connection state.
3	Channel number display	Displays the channel number. When the electrode selector (optional) is
		connected, displays the number of electrodes to measure (A-E). If tapped
		the active channel can be switched.
4	Sample ID display	Displays sample ID.
5	Measurement item display	Displays measurement item.
6	Hold display	Displayed when the measured value is on HOLD.
$\overline{7}$	Measurement value display	Displays measured value.
8	Graph display	Displays stability display graph.
9	Display calibration	Division and time and coll constant
	information	Displays canoration date and time and cell constant.
10	Status display	Displays status and errors, such as stability judgment.

Number	Name	Features
(1)	Operator display	Displays operator name.
12	Operation display	Displays guidance message such as for operation.
		Displays the interval time while interval measurement is running.
(13)	Sample comment display	Displays sample comments.
14	Stable display	Displayed when the measured value is stable. When the measurement
		value stays within the hold condition setting range for 10 seconds, the
		STAB mark lights up. (The stability judgment time of 10 seconds is a
		fixed value)
(15)	Units display	Displays units (salt (PSS): psu).
(16)	Temperature display	Displays temperature measurements.
(17)	Calibrating temperature	Displays when temperature calibration is being performed.
	display	
18	Temperature compensation	Displays the type of temperature compensation (linear/multi-point/pure
	display	water/OFF (without temperature compensation)).
(19)	MENU button	Used to display menu screen.
20	BACK button	Used when returning to the previous screen. If the measurement screen is
		tapped during HOLD, cancels HOLD.
(21)	F1 button	Sets the optional features selected by the user.
		Default: "DATA OUT" button (used to display the memory data screen.)
(22)	HOME button	Used to display measurement screen.
(23)	F2 button	Sets the optional features selected by the user. Default: "SAMPLE
		INFO" button (used to display the "sample information settings" screen.)
(24)	DATA IN button	Implements the storage of data memory. When an external printer is
		connected, implements the storage and printing of the measured values.
		PC connection carries out an automatic output to memory and PC.
25	GRAPH button	Used when switching between the measured values and graphs screens.
26	HOLD button	Used to hold a measured value.
27)	CAL. button	Used to display salinity calibration (PSS) screen.

(5) Graph display screen (example: elec cndct)



Names and features

Number	Name	Features
\bigcirc	Date and time display	Displays date, hour and minute.
2	Operation display	Displays information, such as operation.
		Displays the interval time while interval measurement is running.
3	Channel number display	Displays the channel number. When the electrode selector (optional) is
		connected, displays the number of electrodes to measure (A-E). If tapped
_		the active channel can be switched.
4	Sample ID display	Displays sample ID.
5	Measurement item display	Displays measurement item.
6	Hold display	Displayed when the measured value is on HOLD.
$\overline{7}$	Measurement value display	Displays measured value.
8	Scale display	Displays the measurement scale.
9	Centering button	Button to center the graph.

Number	Name	Features
10	Scale change button	Used when changing the maximum value of the scale of a graph.
		$\triangle / \triangleright$: Increase the maximum value.
		∇ / \triangleleft : Reduce the maximum value.
(1)	Status display	Displays status and errors, such as stability judgment.
(12)	USB display	View USB connection state.
(13)	Operator display	Displays operator name.
14	Sample comments display	Displays sample comments.
(15)	Display autorange	Displays measurement range in the case of auto range.
(16)	Temperature display	Displays temperature measurements.
(17)	Temperature compensation	Displays the method of temperature compensation (ATC/MTC).
	display	("ATC": automatic temperature compensation, "MTC": manual
		temperature compensation)
(18)	Calibrating temperature	Dicplays when temperature calibration is being performed
_	display	Displays when temperature canoration is being performed.
(19)	Measurement value stability	Dicplayed when the measured value is stable
	display	Displayed when the measured value is stable.
20	Units display	Displays units (electrical conductivity: example S/m, electrical resistivity:
		example Ω ·m).
21)	Change over time graph	Displays changes in the measured value over time in a graph.
22	Time scale display	Displays the time scale.
23	Most recent measurement	Tan to display latest readings on a graph
	values button	Tap to display fatest readings on a graph.
24)	MENU button	Used to display menu screen.
25	RANGE button	Tap to switch to the measuring range. Long-tap to force switch to AUTO
_		range.
26	BACK button	Used when returning to the previous screen.
27)	F1 button	Sets the optional features selected by the user.
		Default: "DATA OUT" button (used to display the memory data screen.)
28	HOME button	Used to display measurement screen.
29	F2 button	Sets the optional features selected by the user.
		Default: "SAMPLE INFO" button (used to display the "sample
		information settings" screen.)
30	DATA IN button	Implements the storage of data memory. When an external printer is
		connected, implements the storage and printing of the measured values.
		PC connection carries out automatic output to memory and PC.
31)	GRAPH button	Used when switching between the measured values and graphs screens.
32	HOLD button	Used to hold a measured value.

(6) Keyboard screen



Names and features

Number	Name	Features
\bigcirc	Input display	Display the characters typed.
2	Input key	Tap to input characters.
3	Case toggle key	Used to switch between English uppercase/lowercase.
4	Alphanumeric/	Used to switch between alphanumeric/kana.
5	BS key	Used to delete the character input.
6	Space key	Used to input a space character.
\overline{O}	Left key	Used to move the cursor to the left.
8	Right key	Used to move the cursor to the right.
9	Enter key	Used to confirm the input.
10	Cancel key	Used to cancel the input.
11)	Menu key	Used to display the menu screen.
12	Return key	Used to return to the previous screen.
13	Home key	Used to display the measurement screen.

(7) Dialog box screen



Names and features

Number	Name	Features
1	Title display	Displays the title.
2	Message display	Displays the message.
3	Operation key	Select cancellation or execution of the operation.
		OK: execute operation. Cancel: cancel operation. Review: tap after confirming the contents of the message and return to the original screen.

(8) Numeric keypad screen



Names and features

Number	Name	Features
1	Title display	Displays the title.
2	Increase key	Used to increase the number by one.
3	Input display	Displays the numbers inputted.
4	Decrease key	Used to reduce the number by one.
5	Operation key	Select settings or cancellation of inputted number.
		OK: set the number inputted. Cancel: delete the number inputted or cancel settings.
6	All clear key	Used to clear all numbers.
\overline{O}	Input key	Input numbers etc.
8	Enter key	Used to confirm the input.
9	Range reduction key	Used when making the numeric range 1/10th.
10	Range expansion key	Used when making the numeric range 10 times.
11)	Number sign toggle key	Used to toggle the number sign (+/-).

6.2 Side parts

(1) Left side part



Symbol	Name	Contents
(1)	Power switch	Power ON and OFF switch
0	Option connector	Interconnect switching equipment, record output, connector for
4		upper and lower limit output
3	USB memory connector	Connector for USB memory
	(Host)	
4	USB connector	USB connector for connecting PC
	(Peripheral)	
5	External connector (1)	Connectors for connecting computer, turntable and external
		printer
6	External connector (2)	Connectors for connecting computer, turntable and external
		printer

6.3 Rear part



Symbol	Name	Contents
1	Electrode jack	Jack to connect the electrodes
2	Power supply jack	Jack to connect the power supply

6.4 Bottom part



Symbol	Name	Contents
1	Earth terminal	Earth connection terminal.
2	Battery compartment	Houses the backup battery.
3	Wall mount hole	Hole to use for mounting on wall.

6.5 Electrode stand



Symbol	Name	Contents
1	Electrode holder	Attach the electrode attachment and fix the electrode.
		Press the lower lever and the device moves up and down.
2	Electrode attachment	Used to mount electrodes.
3	Strut	Fix the electrode holder and stopper.
4	Electrode stopper	Fixes the strut in desired position, and prevents electrode holder
		moving too low.
5	Hexagon cap nut	Used to fix the strut.
6	Cap holder	Place to place the electrode protection cap.
7	Electrode stand	Stand to fix the strut etc.

6.6 Electrical conductivity cell



Symbol	Name	Contents
1	Platinum board (Platinum	Measurement of electrical conductivity sensing part (Platinum black
	black)	plating here)
2	Air bubble removal	Hole to remove air bubbles mixed in the interior of the electrical
		conductivity cell to the exterior.
3	Electrode plug	Plug to connect to the main unit.
4	Protective cap	Used for storing the electrical conductivity cell and to protect the
		Platinum board.

7. Basic Operations

7.1 Cell preparation

Before making measurements, please inspect the cell.

1 Remove the protective cap of the electrical conductivity cell.



2 Mount the electrical conductivity cell to the electrode attachment.

Please mount the electrical conductivity cell to the electrode attachment. Place the protective cap in the cap holder.



- ③ Confirm that the power is switched OFF.
- (4) Inserting the electrode plug. Please put the "O" mark on the electrode plug tip facing up, and insert the electrode jack on the rear of the main body straight.
- (5) Locking. After you have completely inserted the electrode jack, please press the mounting ring only to the back, then turn to the right to lock it. Please note that at this time, absolutely do not rotate the electrode plug body.



7.2 Power insertion

- (a) When the power switch is pressed the unit beeps and the measurement screen is displayed.
- (b) If power is switched ON with an electrical conductivity cell with memory connected, the cell constant stored in the cell memory is automatically input in the electrical conductivity meter main unit, with no need to manually enter the cell constant. Samples can be measured right away.



(1) If an abnormality occurs

Fire, electric ●Immediately turn OFF the power and disconnect the power	
shock	cable from the outlet when there seems to be a problem.
	If you smell a burning smell or encounter smoke or abnormal
	behavior, there is a risk of ignition or implosion or the like.
Immediately turn off the power and unplug the power cable.	
After confirming that smoke has disappeared, contact your	
	dealer or DKK-TOA.
Repairing the product yourself is dangerous so refrain from	
	doing so under any circumstances. Using the product under
	abnormal conditions may cause fire or electric shock.

7.3 Preparation of electrical conductivity cell

- (a) An electrical conductivity cell is not included as standard. Please purchase separately, and use an electrical conductivity cell suitable for the application.
- (b) Before making measurements, please inspect the electrode. For more information please refer to "11 Maintenance".
- 1 Remove the protective cap of the electrical conductivity cell.



② Connecting the electrode. …… Please connect the electrodes to the device in accordance with "7.1 Cell preparation".

7.4 Electrical conductivity measurement

- [NOTE] For normal measurements, please set the temperature compensation to automatic temperature compensation (ATC) and the temperature coefficient to 2.00%/°C. For more information, please refer to "8.3 (3) Setting the temperature compensation" and "8.3 (8) Setting the linear temperature compensation factor" (not required if you use this equipment for the first time as this is the default setting value).
- (1) Wash in distilled water. Wash the tip of the conductivity cell with pure water and gently wipe with tissue paper or similar.



CAUTION Injury
 Part of the electrical conductivity cell is made of glass, so be careful not to damage it.
 Doing so may cause injury from the pieces of glass.

- (2) Soak in beaker. Please place the sample into a beaker and soak the cell in the beaker. Accurate measurements can be obtained if the following points are observed.
 - Ensure that the electrical conductivity cell bubbles are removed over 2mm below the liquid surface and that bubbles do not mix inside the electrical conductivity cell. If bubbles are mixed, shake the electrical conductivity cell up and down and left and right to remove the air bubbles.
 - Please ensure there is more than 2mm distance from electrical conductivity cell bottom to bottom of bottle.



③ Reading the display. …… When the indication is stable, please read the display.

7.5 Electrical resistivity measurement

The display units must be switched to electrical resistivity before measuring because the display units are set to electrical conductivity when the product is shipped.

For how to set up please refer to "8.3 (2) Setting the display item".

7.6 Concentration measurement

The display units must be switched to concentration display before measuring because the display units are set to electrical conductivity when the product is shipped.

For how to set up please refer to "8.3 (2) Setting the display item".

7.7 Salinity measurement (NaCl/PSS)

The display units must be switched to salinity display before measuring because the display units are set to electrical conductivity when the product is shipped.

For how to set up please refer to "8.3 (2) Setting the display item".

- * For measurement of salt (NaCl), electrical conductivity is converted to NaCl concentration.
- * Salinity measurements (PSS) (practical salinity) are calculated based on the Practical Salinity Scale of 1978 (UNESCO REPORT # 37,1981).

7.8 TDS measurement

The display units must be switched to TDS display before measuring because the display units are set to electrical conductivity when the product is shipped.

For how to set up please refer to "8.3 (2) Setting the display item".

* TDS indicates the total dissolved solids content.

7.9 Turn off the power and end measurement

① Press and hold the power switch. Please press the power switch for 2-3 seconds. 3 beeps sound and the display disappears.



Press and hold the power switch

(2) Wash in distilled water. Wash the tip of the electrical conductivity cell with pure water and gently wipe with tissue paper or similar.



Wash the tip of the electrical conductivity cell

(3) Storing. Normally, fill a beaker with pure water such as ion-exchanged water or distilled water, and store the electrical conductivity cell immersed in the beaker. If the cell is not to be used for 1 week or longer, store with protective cap filled with pure water such as ion-exchanged water or distilled water covering the electrical conductivity cell.



conductivity cell dry out. The performance of the cell will deteriorate and may not be able to make accurate measurements. If it becomes dry by mistake, use it after the electrical conductivity cell is immersed in pure water for 1 day or more.

8. How to Use Various Features

8.1 Main screen contents

(1) Initial screen (Measurement screen)

This is the screen that is displayed when you switch the power on.



Electrical conductivity measurement screen

(2) Menu screen

Electrical conductivity measurement menu screen. [MENU] displays when the button is tapped. The

screen for performing various settings etc.



- Tap the D button (or A button) to return to the measurement state.
- Scroll down/Tap the \checkmark button or swipe the screen with your finger and menu (2/2) displays.
- Scroll up/Tap the \blacktriangle button or swipe the screen with your finger and menu (1/2) displays.

Operation name	Contents of the operation	Reference to
Setting the instrument body	Set the measuring instrument body.	>>"8.2"
Setting the electrical	Set the electrical conductivity	>>"8.3"
conductivity measurement	measurement.	
Cell constant calibration	Cell constant calibration.	>>"8.5"
Setting the temperature	Set the multi-point temperature	>>"8.8"
coefficient (multi-point)	coefficient (temperature and the	
	electrical conductivity against that	
	temperature).	
Saline calibration (PSS)	Saline calibration.	>>"8.7"
Setting the density	Set the density characteristics (density	>>"8.9"
characteristics	and the electrical conductivity against that	
	density).	
Sample information settings	Sample ID settings.	>>"8.11"
Hold condition setting	Set the hold conditions	>>"8.12"
Setting the interval	Set the interval measurement.	>>"8.14"
measurement		
Memory data	Display memory, print, calculate average	>>"8.17"
	value, write to USB memory, erase.	
Security management	Security management settings.	>>"8.25"
Management information of the	Management information of the	>>"8.29"
instrument	instrument.	
Turntable settings	Turntable measurement settings.	>>"8.20"
Print item settings	Setting of print items.	>>"8.18"
USB memory operation	USB memory operation.	>>"8.22"
Execution of temperature	Execution of temperature calibration.	>>"8.21"
calibration		
Alarm settings	Alarm settings.	>>"8.10"
Communication settings	Settings for communication with devices	>>"8.23"
	such as PCs.	
Operator registration	Operator registration.	>>"8.26"
Operator selection	Operator selection and editing.	>>"8.27"
Help	Display help.	>>"8.31"
Initialization	Restore to default settings.	>>"8.32"

Menu screen operation

8.2 Setting the instrument body

(1) Instrument main body settings screen

Please display the screen to perform the instrument main body settings using the following procedure.

Operation procedure	
Operation	Screen example
(1) Display the "Menu" screen Tap the button on the measurement screen.	
② Display the "instrument main body settings" Tap the yellow "instrument main body settings" icon.	2015/04/17 11:47 BBB Operator/GUEST Setting for the instrument main unit can be performed.
	Operation sound ON
	O Display language English
	<u> </u>
	O Display rotation 0°
	O Brightness of backlight 9
	O Time transfer to eng-save mode OFF
	Brightness of backlight during Energy saving mode
	Time to power turned OFF after going Into energy saving mode OFF
	O AC power automatic restore OFF
	O Disp of stability disp graph ON
	○ F1 button setting HELP
	○ F2 button setting Not set
	Instrument main body settings
	screen
(3) To return to the "Menu" screen Tap the button (or the MENU button).	
(4) To return to the measurement screen Tap the measurement screen.	

(2) Setting the operation sounds

Sets the operation sounds. The default setting is "ON".

Operation procedure

Operation

① Select "operation sounds". … Tap the yellow "operation sounds" icon on the "instrument main body settings" screen.

(2) Select either "ON" or "OFF". ... Tap either "ON" or "OFF".

(3) Setting the display language

Sets the display language. The default setting is "Japanese".

Operation procedure

Operation

- ① Select "display language". … Tap the yellow "display language" icon on the "instrument main body settings" screen.
- (2) Select the language. --- Tap "Japanese" or "English".

(4) Setting the cell selector

The X series can connect an electrode selector that can use up to 5 electrical conductivity cells (ES-1G or similar) (for how to connect please refer to "10.3 Connection of the cell selector". The default setting is "OFF".

Operation	procedure
- p	

Operation

(1) Select "cell selector". … Tap the yellow "cell selector" icon on the "instrument main body settings" screen

(2) Select either "ON" or "OFF". ... Tap either "ON" or "OFF".

(5) Setting the display rotation

Sets the orientation of the screen. This product can change the screen orientation according to how the main body is installed. From the basic vertical screen display state with the main body logo at the front (display rotation angle 0°), the screen can be rotated left or right 90° or 180° up to 360°.

Operation	procedure

Operation
① Select "display rotation" Tap the yellow "display rotation" icon on the "instrument main body
settings" screen.

- ② Select "rotate 90° left", "rotate 90° right" or "rotate 180°". ... Tap "90° left", "90° right" or "rotate 180°".
- (3) If you do not wish to rotate the display. ... Tap "Cancel".

(6) Setting the backlight brightness

You can set the brightness of the backlight of the display screen. Brightness can be adjusted in steps from $1 \sim 9$.

Operation	procedure
-----------	-----------

Operation
(1) Select "backlight brightness settings" On the "instrument main body settings" screen, tap the yellow "backlight brightness" icon.
② Changing the setting value Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to change the setting.
③ Confirm Tap the ENT button.

(4) If you do not wish to change the setting value. ... Tap "Cancel".

(7) Setting the energy saving mode transition time

After a set amount of time, the backlight brightness will be set as in the following item "(8) Setting the energy saving mode backlight brightness".

Operation							
① Select "time trans to eng-save mode" On the "instrument main body settings" screen, tap the yellow "Time trans to eng-save mode" icon.							
② Changing the setting value Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)" buttons to change the setting. To set to "OFF", enter "0".							
③ Confirm Tap the ENI button.							
④ If you do not wish to change the setting value Tap "Cancel".							

(8) Setting the energy saving mode backlight brightness

The energy saving mode backlight brightness can be set. Brightness can be adjusted in steps from 1~9. Basically please set a darker setting than the brightness set under the preceding item "(6) Setting the backlight brightness".

Operation procedure								
Operation								
(1) Select "energy-serving mode backlight brightness" On the "instrument main body settings"								

(1) Select "energy-saving mode backlight brightness". … On the "instrument main body settings" screen, tap the yellow "energy-saving mode backlight brightness" icon.

- (2) Changing the setting value. ... Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)" buttons to change the setting. To set to "OFF", enter "0".
- **③ Confirm.** ... Tap the **ENT** button.
- (4) If you do not wish to change the setting value. --- Tap "Cancel".

(9) Setting the time from energy-saving mode to power OFF

The time for automatically going from energy-saving mode to power OFF of the main body can be set.

Operation procedure

Operation

- ① Select "Time from energy-saving mode to power OFF setting". … "Instrument main body settings" On the screen, tap the yellow "backlight brightness" icon.
- (2) Changing the setting value. ... Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)" buttons to change the setting. To set to "OFF", enter "0".
- **③ Confirm.** ... Tap the **ENT** button.
- ④ If you do not wish to change the setting value. ... Tap "Cancel".
- * However: the device will not automatically power OFF if the following conditions are true.
 - When accessing the USB memory stick.
 - When the USB peripheral is connected with a PC etc.
 - When the peripherals are connected to EXT I/O connectors.
 - "Measuring interval", "Waiting for hold stability judgment".

(10) Setting the AC power supply automatic return

Set whether to switch power to ON status or not automatically when the AC adapter is connected.

Operation procedure

Operation

(1) Select "AC power supply automatic return". ... On the "instrument main body settings" screen, tap the yellow "AC power supply automatic return" icon.

2 Select "OFF" or "ON". ... Tap "OFF" or "ON".

(11) Setting the stability display graph display

You can set whether or not to show the stability display graph on the measurement screen. The stability display graph is a graph displaying the value obtained by measuring changes in real time.



Electrical conductivity measurement screen

Operation procedure

Operation

(1) Select "Display stability display graph". ... On the "instrument main body settings" screen tap the yellow "stability display graph" icon.

②Select "OFF" or "ON". ... Tap "OFF" or "ON".

(12) Setting the F1/F2 button

You can set arbitrary functions selected by the user for the F1 and F2 (function) buttons. The default settings are F1 button: "DATA OUT", F2 button: "SAMPLE INFO".



- ① Select "F1 button settings" or "F2 button settings". ... On the "instrument main body settings' screen, tap the yellow "F1 button settings" or" "F2 button settings" icon.
- (2) Select the function you wish to allocate. ... Tap to select the F1 and F2 button function you wish to assign from the following functions.
 - HELP: display the "help" screen
 - SAMPLE: display the "sample information settings" screen
 - DATA OUT: display the "memory data screen"
 - INTERVAL: display the "interval measurement settings" screen
 - TTT SET: display the "turntable settings" screen
 - OPERATOR SEL: display the "operator selection" screen
 - HOLD SET: display the "hold settings" screen
 - Untitled: no function assigned

8.3 Setting the electrical conductivity measurement

(1) Electrical conductivity measurement settings screen

Operation Screen example (1) Display "Menu" screen. ... Tap the button in the measurement screen. (2) Display the "Set elec conduct msmt" screen. ... Tap the 2015/04/17 11:47 B Operator / GUES Setting for the EC meas can be performed. Operator / GUEST yellow icon for "Set elec conduct msmt". EC display item Conductivity EC temp compensation ATC EC temp comp type Linear EC old and new units SI unit EC reference temp (°C) 25.0 °C EC linear temp correc fctr (%/°C) 2.00 %/°C EC cell constant setting 100.0 /m EC cell constant display ON TDS conversion factor 0.500 MENU 7 Set elec conduct msmt screen 3 To return to the "Menu" screen. ... Tap the ſ button (or the MENU button). (4) To return to the measurement screen. ... Tap the button.

Operation procedure

(2) Setting the display item

Select the display item from "Elec cndct", "Elec res", "Concentration", "Saline", and "TDS". The selected display item and unit is displayed in the measurement screen (refer to following).

Elec cndct	: S/m
Elec res	:Ω·m
Concentration	: %
Saline (NaCl)	: %
Saline (PSS)	: psu
TDS	: mg/L

Operation procedure

		Oper	ration									
 Ŧ	 11		0.		•	·	.1	((G)	1	1		

① Select "EC display item". … Tap the yellow icon of "EC display item" in the "Set elec conduct msmt" screen.

(2) Select the display item. ... Select and tap from "Conductivity", "Resistivity", "Concentration", "Saline (NaCl)", "Saline (PSS)", and "TDS".

(3) Setting the temperature compensation

This device is equipped with 2 built-in temperature compensation functions, the automatic temperature compensation (ATC) and the manual temperature compensation (MTC), and no temperature compensation (OFF).

- ATC : The temperature of the electrode is measured by the thermistor built into the electrical conductivity cell, and displays the electrical conductivity/electrical resistivity converted to standard temperature (normally 25°C) by automatically compensating the temperature characteristics of the measurement solution. (Initial setting)
- MTC : The temperature of the solution is measured using a mercury thermometer etc., then that temperature is entered, and displays the electrical conductivity/electrical resistivity converted to standard temperature (normally 25°C) by automatically compensating the temperature characteristics of the measurement solution.
- OFF : Displays the electrical conductivity/electrical resistivity without temperature compensation.

Operation procedure

Operation

(1) Select "EC temp compensation". … Tap the yellow icon of "EC temp compensation" in the "Set elec conduct msmt" screen.

(2) Select the temperature compensation function. ... Tap one of "ATC", "MTC", or "OFF".
(4) Setting the temperature compensation type

- (a) The electrical conductivity of the solution will always change versus temperature, but some will change linearly while others do not change linearly depending on the type, concentration etc., of the solution. Also, separate from this, with the measurement of the low electrical conductivity in the pure water region, the percentage of the electrical conductivity by the disassociation of the water becomes large, and the effect of the temperature also becomes large, so special temperature compensation will be required (refer to "9.1 (1) Measurement of electrical conductivity in pure water region" for details). Therefore, it is necessary to set the content of the temperature compensation when measuring.
- (b) This device can select from "Linear", "Multi-point", or "Pure water".

Linear: When the temperature characteristics are linear (initial setting)

Multi-point: When the temperature characteristics are not linear

Pure water: When measuring the low electrical conductivity in pure water region

Operation procedure

Operation

① Select "EC temp comp type". … Tap the yellow icon of "EC temp comp type" in the "Set elec conduct msmt" screen.

2 Select the temperature compensation type. ... Tap "Linear", "Multi-point", or "Pure water".

[IMPORTANT]	• Make sure to set "(8) Setting the linear temperature compensation factor"
	when the temperature compensation is set to Linear.
	 Make sure to set the "temperature factor (multi-point)" when the
	temperature compensation is set to Linear. (Refer to "8.8 Setting the
	temperature coefficient (multi-point)".)

(5) Setting the manual temperature compensation temperature

The MTC value can be set when the temperature compensation is set to "MTC" in above (4). Initial setting is "25.0°C".

Operation procedure

Operation

- (1) Select "EC man tmp comp tmp (°C)". … Tap the yellow icon of "EC man tmp comp tmp (°C)" in the "Set elec conduct msmt" screen.
- (2) Change the setting value. … Tap the numeric keypad to enter the numeric value. Or, tap the "▲ (increase)/▼ (decrease)" button to change the setting value.
- ③ Set the value. ... Tap the **ENT** button.
- (4) When not changing the setting value. ... Tap "Cancel".
- * The setting range is between 0.0 and 100.0°C.

(6) Setting the new and old units

Selection between the new (SI) unit (S/m, Ω ·m) or the old unit (S/cm, Ω ·cm) is possible when set to

"Conductivity" or "Resistivity" in (2).

SI unit: Displays as the SI unit $(S/m (\Omega \cdot m))$ (initial setting).

CGS unit: Displays as CGS unit (S/cm (Ω ·cm)).

Operation procedure

Operation
① Select "EC old and new units" Tap the yellow icon of "EC old and new units" in the "Set elec
conduct msmt" screen.

(2) Select either "SI unit" or "CGS unit". ... Tap either "SI unit" or "CGS unit".

(7) Setting the standard temperature

Converts the electrical conductivity measured at specific temperature to the electric conductivity of the temperature set here. Initial setting is "25.0°C".

Operation procedure	Operation	procedure
---------------------	-----------	-----------

Operation
① Select "EC reference temperature (°C)" Tap the yellow icon of "EC reference temperature (°C)"
in the "Set elec conduct msmt" screen.

- (2) Change the setting value. ... Tap the numeric keypad to enter the numeric value. Or, tap the "▲ (increase)/▼ (decrease)" button to change the setting value.
- ③ Set the value. ... Tap the **ENT** button.
- (4) When not changing the setting value. ... Tap "Cancel".
- * The setting range is between 0.0 and 100.0°C.
- * The indicated value may exceed the display range, making it impossible to display depending on the setting value of the temperature factor when the standard temperature is set too high.

(8) Setting the linear temperature compensation factor

The electrical conductivity of the aqueous solution is generally proportional to the temperature, and the electrical conductivity becomes higher when the temperature becomes higher. Therefore, to compare the electrical conductivity regardless of the actual temperature of the solution, it is necessary to convert to the electrical conductivity at the specific temperature (standard temperature), and the comparison factor for that conversion is the temperature factor.

Initial setting is "2.00" %/°C.

The temperature factor is calculated with following procedure.

- (a) Maintain the temperature of the sample at the standard temperature ($t_{standard}$), and measure the electrical conductivity with the temperature compensation OFF ($L_{standard}$).
- (b) Set the sample to different temperature (t), and measure with the electrical conductivity OFF as in (1) (L_t).
- \bigcirc Calculate the temperature factor α from following formula.

 $\alpha = (L_t - L_{standard})/\{L_{standard} \times (t - t_{standard})\} \times 100 [\%/^{\circ}C]$

Operation procedure for temperature factor

operation

- (1) Select "EC linear temperature compensation factor (%/°C)". … Tap the yellow icon of "EC linear temperature compensation factor (%/°C)" in the "Set elec conduct msmt" screen.
- (2) Change the setting value. … Tap the numeric keypad to enter the numeric value. Or, tap the "▲ (increase)/▼ (decrease)" button to change the setting value.
- ③ Set the value. ... Tap the **ENT** button.
- (4) When not changing the setting value. ... Tap "Cancel".

^{*} The setting range is between 0.00 and 10.00%/°C.

(9) Setting the cell constant

- (a) The value of the distance between the both poles of the electrical conductivity cell divided by the surface area of the poles is called as the cell constant.
- (b) The cell constant differs for each electrical conductivity cell, so this is one of the parameter necessary to measure accurate electrical conductivity.
- (c) The cell constant is recorded in the cell when the electrical conductivity cell with memory is used. The recorded cell constant is automatically set when connected to the main unit.
- (d) Perform the setting of the cell constant when using the electrical conductivity cell without memory. The cell constant is described in the label on the electrical conductivity cell (refer to next figure), so enter that numeric value.



Operation procedure

Operation

- (1) Select "EC cell constant setting". … Tap the yellow icon of "EC cell constant setting" in the "Set elec conduct msmt" screen.
- (2) Set the range. ... Set the range with the $[{}^{\text{Range}}_{4}]$ or $[{}^{\text{Range}}_{4}]$ buttons.
 - Multiply by 1/10 every time the Range button is tapped
 - Multiply by 10 every time the $\mathbb{R}_{\mathbb{P}}^{\mathsf{Range}}$ button is tapped
- ③ Change the setting value. ... Tap the numeric keypad to enter the numeric value.
- (4) Set the value. ... Tap the **ENT** button.
- (5) When not changing the setting value. ... Tap "Cancel".

^{*} The setting range is between 0.001/m and 5000/m.

(10) Setting the cell constant display

Sets if the cell constant is displayed in the screen or not. Initial setting is "ON".

Operation procedure
Operation
1) Select "EC cell constant display" Tap the yellow icon of "EC cell constant display" in the "Set

(1) Select "EC cell constant display". … Tap the yellow icon of "EC cell constant display" in the "Set elec conduct msmt" screen.

(2) Select either "ON" or "OFF". ... Tap either "ON" or "OFF".

(11) Setting the TDS conversion factor

Sets the factor when converting from electrical conductivity to TDS. Initial setting is "0.500".

Operation procedure

Operation

- (1) Select "TDS conversion factor". … Tap the yellow icon of "TDS conversion factor" in the "Set elec conduct msmt" screen.
- (2) Changing the setting value. Enter a number by tapping the keypad. Or, tap the "▲ (increase)/▼ (decrease)" button to change the setting value.

③ Set the value. … Tap the **ENT** button.

* The setting range is between 0.050 and 1.000.

8.4 Switching the measurement range

The measurement range can be switched between the automatic range and the manual range for the measurement of the electrical conductivity and electrical resistivity (it will be only automatic range for the concentration measurement and saline measurement).



Measurement screen

(1) Measurement range for each cell constant

The measurement range differs depending on the cell constant of the electrical conductivity cell as shown next, and the switchable range of the manual range will change accordingly.

Cell model name	CT-27111D (J=1 m ⁻¹)	CT-58101C (J=10 m ⁻¹)	CT-58101B CT-88101B (J=100 m ⁻¹)	CT-58101A (J=1000 m ⁻¹)
Electric	0.0~200.0µS/m	0.0~200.0µS/m		
conductivity	0.000~2.000mS/m	0.000~2.000mS/m	0.000~2.000mS/m	
Display	0.00~20.00mS/m	0.00~20.00mS/m	0.00~20.00mS/m	0.00~20.00mS/m
range	0.0~200.0mS/m	0.0~200.0mS/m	0.0~200.0mS/m	0.0~200.0mS/m
		0.000~2.000S/m	0.000~2.000S/m	0.000~2.000S/m
			0.00~20.00S/m	0.00~20.00S/m
				0.0~200.0S/m

List of cell model	name and	display range
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(continues)

CT-27111D (J=1 m ⁻¹)	CT-58101C (J=10 m ⁻¹)	CT-58101B CT-88101B (J=100 m ⁻¹)	CT-58101A (J=1000 m ⁻¹)
	0.500~2.000Ω·m	0.050~2.000Ω·m	0.005~2.000Ω·m
5.00~20.00Ω·m	$0.50 \sim 20.00 \Omega \cdot m$	$0.05 \sim 20.00 \Omega \cdot m$	0.00~20.00Ω·m
5.0~200.0Ω·m	0.5~200.0Ω·m	0.0~200.0Ω·m	0.0~200.0Ω·m
0.000~2.000kΩ·m	0.000~2.000kΩ·m	0.000~2.000kΩ·m	0.000~2.000kΩ·m
0.00~20.00kΩ·m	$0.00 \sim 20.00 k\Omega \cdot m$	0.00~20.00kΩ·m	0.00~20.00kΩ·m
0.0~200.0kΩ·m	$0.0 \sim 200.0 \text{k}\Omega \cdot \text{m}$	0.0~200.0kΩ·m	0.0~200.0kΩ·m
0.000~2.000MΩ·m	0.000~2.000MΩ·m	0.000~2.000MΩ·m	
0.00~20.00MΩ·m			
	$\begin{array}{c} \text{CT-27111D} \\ (\text{J=1 m}^{-1}) \end{array} \\ \hline 5.00 \sim 20.00 \Omega \cdot \text{m} \\ \hline 5.0 \sim 200.0 \Omega \cdot \text{m} \\ \hline 0.000 \sim 2.000 \text{k} \Omega \cdot \text{m} \\ \hline 0.00 \sim 20.00 \text{k} \Omega \cdot \text{m} \\ \hline 0.000 \sim 2.000 \text{M} \Omega \cdot \text{m} \\ \hline 0.000 \sim 20.00 \text{M} \Omega \cdot \text{m} \\ \hline 0.000 \sim 20.00 \text{M} \Omega \cdot \text{m} \\ \hline 0.000 \sim 20.00 \text{M} \Omega \cdot \text{m} \end{array}$	$\begin{array}{c} \text{CT-27111D} \\ (\text{J=1 m}^{-1}) \end{array} \begin{array}{c} \text{CT-58101C} \\ (\text{J=10 m}^{-1}) \end{array} \\ \hline \bigg $ \\ \hline \\ \hline \Biggr \\ \hline \end{array} \\ \hline \end{array} \\ \hline \bigg \\ \hline \bigg \\ \hline \bigg \\ \hline \bigg \\ \hline \bigg \\ \hline \bigg \\ \hline \bigg \\ \hline \bigg \\ \\ \hline \bigg \\ \\ \hline \bigg \\ \hline \bigg \\ \hline \bigg \\ \\ \hline \bigg \\ \hline \bigg \\ \hline \bigg \\ \\ \hline \bigg \\ \\ \\ \hline \bigg \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	$\begin{array}{c} CT-27111D\\ (J=1\ m^{-1}) \end{array} \qquad \begin{array}{c} CT-58101C\\ (J=10\ m^{-1}) \end{array} \qquad \begin{array}{c} CT-58101B\\ CT-88101B\\ (J=100\ m^{-1}) \end{array} \\ 0.500\sim2.000\Omega\ m \end{array} \\ 0.050\sim2.000\Omega\ m \end{array} \\ 0.050\sim2.000\Omega\ m \end{array} \\ 0.05\sim20.00\Omega\ m \end{array} \\ 0.05\sim20.00\Omega\ m \\ 0.05\sim20.00\Omega\ m \end{array} \\ 0.00\sim20.00\Omega\ m \\ 0.00\sim2.000\Omega\ m \\ 0.00\sim2.0000\ m \\ 0.00\sim2.000\ m \\ 0.00\sim2.00\ m \\ $

(Continued)

*J: Cell constant

(2) Setting the measurement range switching

When the **AUTOR** button on the measurement screen is set to automatic range display, it will switch to manual range corresponding to the currently indicated value when the **RANGE** button is tapped, and the manual range will switch in the following order every time the **RANGE** button is tapped again (the **MANUALR** screen will display when set to manual range). The device is forcibly switched to automatic range when the **RANGE** button is tapped and held while set to manual range.

• Example of switching for each unit

•When the display unit is electrical conductivity (SI unit) (when cell constant is J = 100.0/m) \rightarrow 2.000mS/m \rightarrow 20.00mS/m \rightarrow 20.00S/m \rightarrow 20.00S/m \rightarrow

•When the display unit is electrical conductivity (CGS unit) (when cell constant is J = 100.0/m) \rightarrow 20.00µS/cm \rightarrow 200.0µS/cm \rightarrow 200.0mS/cm \rightarrow 200.0mS/cm \rightarrow 200.0mS/cm \rightarrow

•When the display unit is electrical resistivity (SI unit) (when cell constant is J = 100.0/m) $\rightarrow 2.000M\Omega \cdot m \rightarrow 200.0k\Omega \cdot m \rightarrow 20.00k\Omega \cdot m \rightarrow 200.0\Omega \cdot m - 2.000\Omega \cdot m \leftarrow 20.00\Omega \cdot m \leftarrow 20.00\Omega$

•When the display unit is electrical resistivity (CGS unit) (when cell constant is J = 100.0/m) $\rightarrow 200.0M\Omega \cdot cm \rightarrow 20.00M\Omega \cdot cm \rightarrow 20.00k\Omega \cdot cm \rightarrow 20.00k\Omega \cdot cm$

^{__}200.0Ω·cm ← 2.000kΩ·cm ←

(IMPORTANT) • The switching range for manual range differs depending on the set cell constant. (Refer to "(1) Measurement range for each cell constant")

8.5 Calibration of the cell constant

- (a) The cell constant will shift little by little from the value displayed on the cell after measuring for many times, and accurate measurement of the electrical conductivity becomes impossible. In such cases, the cell constant can be calibrated by measuring the electrical conductivity of the potassium chloride calibration solution with known electrical conductivity in constant temperature. Make sure to perform the calibration at 25°C.
- (b) The calibration result is recorded in the device main unit and the memory of the electrical conductivity cell, and that calibration data can also be read, displayed, and printed.

(1) About the potassium chloride calibration solution

(a) Cell constant and type of calibration solution

The potassium chloride solution is widely used as the calibration solution for calibration of the cell constant. The calibration solutions to be used are following 4 types depending on the cell constant of the electrical conductivity cell to calibrate.

Cell constant	Calibration solution
(model name of the electrical conductivity cell)	
$10000 {\rm m}^{-1}$	A (74.246g/L)
$1000 \text{m}^{-1}(\text{CT}-58101\text{A})$	B (7.437g/L)
$100m^{-1}(CT-58101B)$	C (0.744g/L)
10m ⁻¹ (CT-58101C)	D (standard solution C diluted 10 times)

DKK-TOA is selling the electrical conductivity cell check C solution (0BI00001) to check if the electrical conductivity cell is normal, but this solution is for only to check if the electrical conductivity is normal or not, so note that this is not a solution to perform calibration of the cell constant.

(b) Adjustment method of the calibration solution

It is necessary to accurately prepare the potassium chloride solution when calibrating the cell constant. The adjustment method for each calibration solution is described next.

<Used reagent and instrument>

Use following reagent and instrument.

Water	: A2, A3, or A4 water for chemical analysis defined in JIS K 0557
Potassium chloride	: Powderize the potassium chloride (for electrical conductivity
	measurement) defined in JIS K 8121 using an agate mortar, heat it to
	500°C for 4 hours, and cooled inside a desiccator
Volumetric flask	: Volumetric flask defined in JIS R 3505
Volumetric pipette	: Volumetric pipette defined in JIS R 3505

<Preparing the calibration solution>

Calibration solution A	: Measure 74.246g of potassium chloride, dissolve in water (20°C),
	transfer to 1000mL volumetric flask, and add water to the indication
	line.
Calibration solution B	: Measure 7.437g of potassium chloride, dissolve in water (20°C),
	transfer to 1000mL volumetric flask, and add water to the indication
	line.
Calibration solution C	: Measure 0.744g of potassium chloride, dissolve in water (20°C),
	transfer to 1000mL volumetric flask, and add water to the indication
	line.
Calibration solution D	: Measure 100mL of standard solution C with volumetric pipette,
	transfer to 1000mL volumetric flask, and add water (20°C) to the
	indication line.

Store the calibration solutions A, B, and C in a polyethylene bottle or a tempered glass bottle with an airtight stopper.

However, avoid storing for long period of time since it may change the electrical conductivity. Calibration solution D may change the electrical conductivity even for short period of storage, so prepare when it is to be used.

<Electrical conductivity of the calibration solution>

The electrical conductivity value of the calibration solutions prepared in above <Preparing the calibration solution> are as follows.

Calibration solution	Electric conductivity (mS/m)					
	0°C	25°C				
А	6518	9784	11134			
В	714	1117	1286			
С	77.4	122.1	140.9			
D	7.77	12.75	14.69			

Theoretical electrical conductivity of the potassium chloride calibration solution

(2) Cell constant calibration screen

Operation Screen example (1) Display the "Menu" screen. ... Tap the MENU button in the measurement screen. 2 Display the "Cell constant calib" screen. --- Tap "Cell constant calib". 2015/04/17 11:47 THE Operator / GUEST Calib of the cell const can be performed. Operator / GUEST Automatically acquire and display the measurement value and unit by the current cell constant calibration value. EC std solution 140.9 ms/m Automatically acquire and display the 0.000 mS/m Current meas val measurement value and unit when the cell Meas val when $\theta = 1$ 0.000 mS/m constant θ is 1. Meas val when $\theta = 100 \ 0.000 \ \text{mS/m}$ Automatically acquire and display the Cell constant 101.0 /m measurement value and unit when the cell constant θ is 100. Exec Cell const calib / memory Exec Init of cell constant Display the calculated cell constant. MENU Calib record Cell constant calibration screen 3 To return to the "Menu" screen. ... Tap the ſ button (or the MENU button). (4) To return to the measurement screen. ... Tap the $\widehat{}$ button.

Operation procedure

(3) Setting the electrical conductivity of the calibration standard solution

Enter the electrical conductivity value and the unit of the potassium chloride standard solution (enter the electrical conductivity value at the temperature to calibrate).

Operation procedure
Operation
① Select "EC std solution" Tap the yellow icon for "EC std solution" in the "Cell constant calib" screen.
 ② Set the range Set the range with the Range or Range buttons. Multiply by 1/10 every time the Range button is tapped Multiply by 10 every time the Range button is tapped
③ Set the electrical conductivity of the calibration solution Tap the numeric keypad to enter the numeric value. Or, tap the "▲ (increase)/▼ (decrease)" button to change the setting value.
(4) Set the value Tap the ENT button.
(5) When not changing the setting value Tap "Cancel".

* The setting range is between 0.0μ S/m and 200.0S/m.

(4) Executing the cell constant calibration

Operation procedure

Operation

- (1) Display the "Cell constant calib" screen. … Display the "Cell constant calib" screen following "(2) Cell constant calibration screen".
- (2) Preparing the calibration solution. ... Immerse the beaker with calibration solution into the constant temperature water tank, and wait until the temperature of the solution is equal to the temperature of the constant temperature water tank.
- (3) Measure the electrical conductivity. ... Immerse the electrical conductivity cell in the solution and measure the electrical conductivity.
 - * The measurement value and unit by the current cell constant calibration value is displayed in real time in the "Msrd val by calib val", and the measured value and the measured value and unit when the cell constant is set to 100 is displayed in real time in the "Msrd val when θ =100".
- (4) Executing the cell constant calibration. ... Tap the **Exec** button.
 - * The calculated cell constant is always displayed in the "Cell constant calib". That cell constant is recorded as a cell constant calibration history in the main unit, and that cell constant is used for the measurement. It is also recorded in the memory of the electrical conductivity cell. The cell constant calibration result is printed if a printer is connected.

(a) About the recording of the cell constant calibration

- This device has a function to record calibration history for total of 11 electrical conductivity cell, 10 electrical conductivity cells with memory and 1 electrical conductivity cell without memory. Up to 20 calibration histories can be recorded for each cell. The calibration will overwrite the oldest calibration when the calibration histories exceeds 20.
- The electrical conductivity cell with memory will recognize the number of the cell at the time when the recording is conducted with the cell constant calibration, and automatically create the history table for that electrode. Even if other cell with memory is connected, the number of that cell is automatically determined when the recording is executed by the cell constant calibration, and the data is recorded into the history table for that cell.
- Since the used electrical conductivity cell with memory has a memory function within the cell itself, the calibration history for last 10 calibration is recorded in the cell itself when the recording is executed by the cell constant calibration.
- Only the currently used cell constant is read when a electrical conductivity cell with calibration history recorded that was used on a different set is connected to this instrument for the first time. To read the cell constant calibration history, select "Read electrode history" from the "Cell cnst calib history" in the menu, and execute the reading of the electrode history.

(IMPORTANT) • The room temperature, temperature, and operator name is not recorded in the memory of the electrical conductivity cell with memory. Also, the cell constant calibration history will hold up to 10 histories. Note that the content of the electrical conductivity cell memory will be overwritten when the electrical conductivity cell with a number that already has a history in the main unit is read by the "Read electrode".

- History can only be made for 1 cell for electrical conductivity cells without memory.
- The following message is displayed in a dialog box when the number of electrical conductivity cells with memory has exceeded 10, In this case erase history that is not needed following the procedure in "8.6 Display of cell constant calibration history, printing, erasing".

Erase the unnecessary electrode history.

• Calibration history can be displayed and printed following the procedure in "8.6 Display of cell constant calibration history, printing, erasing".

8.6 Display of cell constant calibration history, printing, erasing

- (a) This device has a function to record cell constant calibration history for total of 11 electrical conductivity cell, 10 electrical conductivity cells with memory and 1 electrical conductivity cell without memory.
- (b) 20 calibration history can be recorded for each cell, and it is possible to display, print, and erase those data.
- (c) Refer to "8.5 Calibration the cell constant" for recording method of the calibration history.

(1) Cell constant calibration history (1/2) screen

Operation procedure

Operation	Screen example
(1) Display the "Menu" screen Tap the <i>MENU</i> button in the measurement screen.	
② Display the "Cell constant calib" screen Tap the yellow icon for "Cell constant calib".	2015/04/17 11:47 Image: Bigger Construction Operator ∕GUEST Calib of the cell construction be performed. Image: Construction in the cell construction is calib of ms/m Image: Current meas val 0.000 mS/m Image: Current meas val 0.000 mS/m Meas val when θ=1 0.000 mS/m Meas val when θ=100 0.000 mS/m Cell constant 101.0 /m Cell const calib / memory Exec Init of cell constant Exec

(continues)

Operation	Screen example			
③ Display the "Cell cnst calib history" screen Tap the Calib record button.	2015/04/17 11:47 Image: Construction of the cell const be confirmed I. CT-57101B No. 12345678 Erase I. CT-57101C No. 24680135 Erase I. CT-57101A No. 12312312 Erase I. CT-57101B No. 11223344 Erase I. Erase Image: Construction of the cell construction of the cell construction of the cell construction of the cell const calib history (1/2) screent			
(4) To return to the "Menu" screen Tap the button twice (or the MENU button).				

• The cell constant calibration history is erased by tapping the **Erase** button next to the electrical conductivity cell number to erase.

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(2) Displaying and printing the cell constant calibration history

(a) Display method

Operation procedure

Operation	Screen example
(1) Display the cell constant calibration history Tap the yellow icon for the electrical conductivity cell number to display the cell constant calibration history to display in the Cell cost calib history (1/2) screen	
Displays the cell model name and the production number.	2015/04/17 11:47 世間 Operator∕GUEST Calib data of cell constant is displayed.
Displays the cell comment.	 [CT-57101B No. 12345678] Calib hist (Cell comment) 1 2015/05/05 08:39 GUEST 140.9 mS/m θ=100.0/m
Displays the cell constant calibration date, operator, value of the standard solution, and cell constant.	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
	4 2015/04/24 21:32 GUEST 140.9 mS/m θ=100.0/m 5 2015/04/24 14:52 GUEST
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
	7 2015/04/23 17:55 GUEST 140.9 mS/m θ=100.0/m
	Cell cnst calib history (2/2) screen

- Tap the **D** button to return to the Cell cnst calib history (1/2) screen.
- Rest of the cell constant calibration history is displayed by tapping the bottom scroll/▼ button or swiping the screen with finger.
- Tap the **Print** button to print the 20 histories at once. However, if there is less than 20 histories, it will print to the last history and end the print there.

(b) Printing method

Operation procedure

Operation

- (1) Display the Cell cnst calib history (2/2). ... Display the Cell cnst calib history screen (2/2) to print in (2)-(a).
- (2) Set the value. ... Tap the **Print** button.
- * Calibration history data is printed. Following is the print example.

Print example of the cell constant calibration history

2015/09/11 [Electrode]	12:30	*Year/month/date hour/minute (date and time of print)
Model	CT-57101B	Cell model
Number	507K0001	Cell production number
Mnat expira	tion 2015/09/06	*Cell management expiration
1234567890)1234567890	*Cell comment
[Set]	1201001000	
Model	CM-42X	*Set model
Number	12345678	*Set production number
Mnat expira	tion 2015/09/06	*Set management expiration
1234567890	01234567890	*Set comment
[Cell constant	calibration history	
1. 2015/09/0	06 12:30	History number, recorded year/month/date hour/minute
Operator	name	Operator name
Meas.	139.2mS/m	Measurement value
Std.S	140.9mS/m	Standard solution value
C.Con	101.2 /m	Cell constant
2. 2015/09/07 12:30		History number, recorded year/month/date hour/minute
Operator	name	Operator name
Meas.	139.2mS/m	Measurement value
Std.S	140.9mS/m	Standard solution value
C.Con	101.2 /m	Cell constant
3. 2015/09/0	08 12:30	History number, recorded year/month/date hour/minute
Operator	name	Operator name
Meas.	139.2mS/m	Measurement value
Std.S	140.9mS/m	Standard solution value
C.Con	101.2 /m	Cell constant
4. 2015/09/09 12:30		History number, recorded year/month/date hour/minute
Operator	name	Operator name
Meas.	139.2mS/m	Measurement value
Std.S	140.9mS/m	Standard solution value
C.Con	101.2 /m	Cell constant
5. 2015/09/	10 12:30	History number, recorded year/month/date hour/minute
Operator name		Operator name
ivieas.	139.2m5/m	Neasurement value
510.5 C Con	140.9MS/M	
0.001	101.2711	

- Only the items set with "8.18 Setting the print items" is printed for the items with *.
- The item without data is skipped and next item is printed without any space.
- 20 histories are printed all at once. However, if there is less than 20 histories, it will print to the last history and end the print there.

(3) Erasing of cell constant calibration history

- (a) To erase the cell constant calibration history of the electrical conductivity cell, follow next procedure.
 History for only 1 cell can be created for the electrical conductivity cell without memory.
- (b) Following message is displayed in the dialog box when number of the electrical conductivity cell with memory used exceeds 10, so erase the history that is not needed.

Erase the unnecessary electrode history.

Operation procedure

	Op	oerat	ion						
	-								

- (1) Select the electrode number to erase. ... Tap the Erase button for the electrode number to erase the cell constant calibration history in the "Cell cnst calib history (1/2)" screen. The "Erase cell constant calib history" confirmation dialog box is displayed.
- (2) Execute erase calibration data. ... Tap "OK" in the dialog box.
 - * The cell constant calibration history for the selected electrical conductivity cell is erased.

③ When not executing erase calibration data. ... Tap "Cancel" in the dialog box.

(4) Read electrode history

- (a) The electrical conductivity cell can record up to 10 cell constant calibration histories.
- (b) The history recorded in the cell can be read into this instrument when the history of a cell is not recorded on this instrument, such as that cell is connected to the instrument for the first time. By doing so, it is not necessary to perform the calibration again.
- (c) The history recorded in the cell is the date and time that was recorded as calibration history and the calibration data (the calibration date and time is not recorded). Also, the operator name is not recorded. Note that the history of the cell will be overwritten and the data for operator name will be erased when the read electrode history is executed when the history of that cell is in that instrument.

Operation procedure

Operation

- (1/2)" screen. The "Read elect hist" confirmation dialog box is displayed.
- (2) Execute reading of the electrode history. ... Tap "OK" in the dialog box.
- ③ When not executing reading of the electrode history. ... Tap "Cancel" in the dialog box.

8.7 Saline calibration (PSS)

(1) Saline calibration (PSS) screen

Operation procedure	
Operation	Screen example
(1) Display the "Menu" screen Tap the measurement screen.	
② Display the "Saline calibration (PSS)" screen Tap the yellow icon for "Saline calibration (PSS)".	2015/04/17 11:47 ₩ Operator∕GUEST Saline calib can be performed.
Displays the current saline calibration factor.	Saline calib factor 1.0000
Displays the value calculated with current saline calibration factor.	25. 0°C 10.00 psu ₅₽₽₽ जा#
	Ers calib data Exec calib
	Saline calibration (PSS) screen
③ To return to the "Menu" screen Tap the button (or the MENU button).	
(4) I o return to the measurement screen Tap the button.	

.... .

(2) Setting the saline concentration of the calibration standard solution

Operation procedure

Operation

 Select "Calib std sol". … Tap the yellow icon for "Calib std sol" in the "Saline calibration (PSS)" screen.

② Set the saline concentration of the calibration solution. … Tap the numeric keypad to enter the numeric value. Or, tap the "▲ (increase)/▼ (decrease)" button to change the setting value.

③ Set the value. … Tap the **ENT** button.

* The setting range is between 00.01 and 42.00psu.

(3) Executing the saline calibration (PSS)

Operation procedure

Operation

(1) Display the "Saline calibration (PSS)" screen. ... Display the "Saline calibration (PSS)" screen following "(1) Saline calibration (PSS) screen".

(2) Measurement of saline concentration. ... Immerse the electrical conductivity cell into the standard solution and measure the saline concentration.

- * The measurement value and the unit by the current saline calibration factor is displayed in real time at the bottom left of the screen.
- * 🚥 is displayed at the bottom right of the screen when the measurement value stabilizes.
- ③ Execute the saline calibration. ... Tap the Exec cal ib button.
 - * **PSS** is displayed at the bottom right of the screen once the calibration is completed.
 - * That saline calibration factor is recorded in the main unit, and that saline calibration factor is used for the measurement. The calculated saline calibration factor is always displayed in the "Saline calib factor" area.

(4) Erasing the saline calibration (PSS) data

Operation procedure

Operation

(1) Display the "Saline calibration (PSS)" screen. ... Display the "Saline calibration (PSS)" screen following "(1) Saline calibration (PSS) screen".

(2) Select "Ers calib data". ... Tap Ers calib data . The "Erase calib data" dialog box is displayed.

③ Execute the erase calibration data. … Tap "OK" in the dialog box.

(4) When not executing erase calibration data. ... Tap "Cancel" in the dialog box.

-

8.8 Setting the temperature coefficient (multi-point)

- (a) It is possible to create a temperature characteristics table unique to the solution by setting 2 to 10 points of temperatures and electrical conductivity against those temperatures when the electrical conductivity of the solution is not linear against the temperature.
- (b) The temperature characteristics table is set with the electrical conductivity. It cannot be set with the electrical resistivity.

Operation procedure

(1) Temperature coefficient (multi-point) settings screen

Operation	Screen example					
(1) Display the "Menu" screen Tap the MENU button in the measurement screen.						
 ② Display the "Set temp fctr (curve)" screen Tap the yellow icon for "Set temp fctr (curve)". * This is a screen to create the temperature characteristics. 	2015/04/1 Setting c I/P by ta	7 11:47 📲 🖀 of the temp co apping the I/P o factor (curv	Operator∕GUEST instant is performed. 'field of the table. re)			
		Temp (°C)	Elec cndct			
	1	10. 0	0.100 mS/m			
	2	20.0	0.100 mS/m			
	3	30. 0	0.100 mS/m			
	4	40.0	0.100 mS/m			
	5	50.0	0.100 mS/m			
	6	60.0	0.100 mS/m			
	7	70.0	0.100 mS/m			
	8	80.0	0.100 mS/m			
	9	90.0	0.100 mS/m			
	10	100. 0	0.100 mS/m			
	MENU	temp fctr (c	Erase all data			
(3) To return to the "Menu" screen Tap the						
button (or the MENU button).						

④ To return to the measurement screen. … Tap the button.

(2) Setting the temperature coefficient (multi-point)

- (a) Enter the temperature and the electrical conductivity against that temperature and create the temperature characteristics table.
- (b) Number to set is 2 to 10 points. Also, enter from the lower temperature from data number 1 in the temperature setting field.

Operation procedure					
Operation					
① Change the setting value Tap the entry field to change the setting value in the "Set temp fctr (curve)" screen.					
② Enter the setting value for the temperature (°C) Tap the numeric keypad to enter the numeric value. Or, tap the "▲ (increase)/▼ (decrease)" button to enter the setting value.					
 ③ Enter the setting value for the electrical conductivity Set the range with the range or the button. After setting the range, tap the numeric keypad to enter the numeric value. Or, tap the "▲ (increase)/▼ (decrease)" button to change the setting value. Tap "" in the numeric keypad if it is not to be set. Multiply by 1/10 every time the range button is tapped Multiply by 10 every time the range button is tapped 					
(4) Confirmation of change Tap the ENT button once the setting change is completed.					
 * The setting range will be as follows depending on the display unit. • Electrical conductivity SI unit 0.0μS/m to 200.0S/m 					
• Electrical conductivity CGS unit 0.000µS/cm to 2.000S/cm					

• Temperature 0.0 to 100.0°C

(3) Erasing the temperature characteristics table data

The set temperature characteristics table data can be deleted all at once.

Operation procedure

Operation						
1) Select "Er all data" Tap Erase all data in the "Set tmp fctr (curve)" screen. The "Erase all						
temperature factor data" confirmation dialog box is displayed.						

(2) Execute erase all memory data. ... Tap "OK" in the dialog box.

- * Data is deleted and it will display "----".
- ③ When not executing erase all memory data. ... Tap "Cancel" in the dialog box.

8.9 Setting the concentration characteristics

- (a) It is possible to create a concentration characteristics table unique to the solution by setting 2 to 10 points of concentrations and electrical conductivity against those concentrations when converting from the electrical conductivity of the solution to the concentration (%).
- (b) The concentration characteristics is set with the electrical conductivity. It cannot be set with the electrical resistivity.

(1) Concentration characteristics settings screen

Operation procedure	e
Operation	Screen example
(1) Display the "Menu" screen Tap the MENU button in the measurement screen.	
(2) Display the "Setting of conc char" screen Tap the yellow icon for "Setting of conc char".	2015/04/17 11:47 TOPERator GUEST Setting of conc charac is performed. I/P by tapping the I/P field of the table.
* This is a screen to create the concentration characteristics.	Setting of conc characteristic
	Conc (%) Elec cndct 1 1.000 0.100 mS/m 2 2.000 0.100 mS/m 3 3.000 0.100 mS/m 4 4.000 0.100 mS/m 5 5.000 0.100 mS/m 6 6.000 0.100 mS/m 7 7.000 0.100 mS/m 9 9.000 0.100 mS/m 10 10.000 0.100 mS/m
③ To return to the "Menu" screen Tap the button (or the MENU button).	Setting of conc char screen
To return to the measurement screen Tap the button.	

(2) Setting the concentration characteristics

- (a) Enter the concentration and the electrical conductivity against that concentration and create the concentration characteristics table.
- (b) Number to set is 2 to 10 points.
- (c) The range of the concentration is common for all points.

(IMPORTANT) • When inputting concentration (%), please input the maximum concentration range as the standard. Please set the standard range when inputting the first concentration and do not change the range when you input the second and subsequent concentrations. If the range is changed, it will also change for previously inputted concentration values.

		Operation
(1	Change the setting value Tap the ent	ry field of the table to change the setting value.
2	Enter the setting value for the concent	ration (%) Tap the numeric keypad to enter the numeric
	value. Or, tap the " \blacktriangle (increase)/ \blacktriangledown (decrease)	e)" button to enter the setting value. Tap "" in the numeri
	keypad if it is not to be set.	
3	Enter the setting value for the electrica	I conductivity Set the range with the range or the range
	button. After setting the range, tap the nume	ric keypad to enter the numeric value. Or, tap the "
	(increase)/ $\mathbf{\nabla}$ (decrease)" button to change the	ne setting value.
	• Multiply by $1/10$ every time the $\begin{bmatrix} Range \\ A \end{bmatrix}$ by	utton is tapped
	• Multiply by 10 every time the Range butt	on is tapped
4	Confirmation of change Tap the EN	button once the setting change is completed.
*	The setting range will be as follows depen	ding on the display unit.
	• Electrical conductivity SI unit	0.0µS/m to 200.0S/m
	• Electrical conductivity CGS unit	0.000µS/cm to 2.000S/cm
	• Concentration	0.000 to 200.0%

Operation procedure

Operation

- (1) Select "Er all data". … Tap Erase all data in the "Setting of conc char" screen. The "Erase all tempe characteristics data" confirmation dialog box is displayed.
- (2) Execute erase all memory data. ... Tap "OK" in the dialog box.
 - * Data is deleted and it will display "----".
- (3) When not executing erase all memory data. ... Tap "Cancel" in the dialog box.

8.10 Setting the alarm

(1) Alarm setting screen

An output may be output or the buzzer may be sounded when the electrical conductivity, electrical resistivity, concentration, saline, or TDS has exceeded the upper and lower limit when the upper and lower limit alarm is set. Refer to "10.8 (4) Alarm output" for details regarding the output of alarm using an external device.

Operation procedure

Operation	Screen example
(1) Display the "Menu" screen Tap the MENU button in	

the measurement screen.

(2) Display the "Alarm setting" screen. ... Tap the yellow icon for "Alarm setting".



Alarm setting screen

(3) To return to the "Menu" screen. … Tap the button (or the MENU button).

④ To return to the measurement screen. … Tap the button.

(2) Setting the electrical conductivity upper and lower limit alarm

Sets if the upper and lower limit output is to be executed or not. Initial setting is "OFF".

Operation procedure	
Operation	
1 Select "EC upper, lower lmt alrm" Tap the yellow icon for "EC upper, lower lmt alrm" in the	-

("Alarm setting" screen.

(2) Select either "ON" or "OFF". ... Tap either "ON" or "OFF".

(3) Setting the upper and lower limit buzzer sound

Set to sound the buzzer or not when the set upper or lower limit is exceeded Initial setting is "OFF".

Operation procedure

Operation

① Select "EC U, L/L alrm buz snd". ... Tap the yellow icon for "EC U, L/L alrm buz snd" in the "Alarm setting" screen.

(2) Select either "ON" or "OFF". ... Tap either "ON" or "OFF".

(4) Setting the electrical conductivity upper and lower limit alarm value

Sets the upper and lower limit for the electrical conductivity. Initial value is "electrical conductivity upper limit: 200.0mS/m" and "electrical conductivity lower limit: 0.0mS/m".

Operation procedure

Operation

① Select "EC upper limit alarm" or "EC lower limit alarm". … Tap the yellow icon for "EC upper limit alarm" or "EC lower limit alarm" in the "Alarm setting" screen.

(continues)

(continued)

Operation

(2) Change the electrical conductivity upper limit or lower limit value. ... Set the range with the

or the \mathbb{R}_{ange} button. After setting the range, tap the numeric keypad to enter the numeric value. Or, tap the " \blacktriangle (increase)/ \blacktriangledown (decrease)" button to change the setting value. Tap "---" in the numeric keypad if it is not to be set.

- Multiply by 1/10 every time the Range button is tapped
- Multiply by 10 every time the **Renge** button is tapped
 - * The setting range will be as follows depending on the display unit. however, set a higher value for the upper limit than the lower limit.
 - Electrical conductivity SI unit 0.0µS/m to 200.0S/m
 - \bullet Electrical conductivity CGS unit $-0.000 \mu S/cm$ to 2.000S/cm

(5) Setting the electrical resistivity upper and lower limit alarm value

Sets the upper and lower limit for the electrical resistivity. Initial value is "electrical resistivity upper limit: $2.000M\Omega \cdot m$ " and "electrical resistivity lower limit: $0.000M\Omega \cdot m$ ".

Operation procedure

Operation
(1) Select "Elec res U/L alrm" or "Elec res L/L alrm" Tap the yellow icon for "Elec res U/L alrm" or "Elec res L/L alrm" in the "Alarm setting" screen.
② Change the electrical resistivity upper or lower value Set the range with the range or the button. After setting the range, tap the numeric keypad to enter the numeric value. Or, tap the "▲ (increase)/▼ (decrease)" button to change the setting value. Tap "" in the numeric keypad if it is not to be set
 Multiply by 1/10 every time the Range button is tapped Multiply by 10 every time the Range button is tapped
* The setting range will be as follows depending on the display unit. however, set a higher value for the upper limit than the lower limit.
• Electric resistivity SI unit 0.000Ω ·m to $2.000M\Omega$ ·m
Confirmation of change Tap the ENT button once the setting change is completed.

⁽³⁾ Confirmation of change. ... Tap the **ENT** button once the setting change is completed.

(6) Setting the concentration upper and lower limit alarm value

Sets the upper and lower limit for the electrical resistivity. Initial value is "concentration upper limit:

200.0%" and "concentration lower limit: 0.000%".

Operation procedure
Operation
(1) Select "Concentration U/L alarm" or "Concentration L/L alarm" Tap the yellow icon for "Concentration U/L alarm" or "Concentration L/L alarm" in the "Alarm setting" screen.
② Change the concentration upper limit or lower limit value Set the range with the range or the button. After setting the range, tap the numeric keypad to enter the numeric value. Or, tap the "▲ (increase)/▼ (decrease)" button to enter the setting value. Tap "" in the numeric keypad if it is not to be set
 Multiply by 1/10 every time the Range button is tapped Multiply by 10 every time the Range button is tapped The setting range is 0.000 to 200.0% for both upper and lower limit. however, set a higher value for the upper limit than the lower limit.
③ Confirmation of change Tap the ENT button once the setting change is completed.

(7) Setting the saline (NaCl) upper and lower limit alarm value

Sets the upper and lower limit for the saline (NaCl). Initial value is "saline (NaCl) upper limit: 4.00%" and "saline (NaCl) lower limit: 0.00%".

Operation procedure

Operation
(1) Select "Saline (NaCl) U/L alarm" or "Saline (NaCl) L/L alarm" Tap the yellow icon for "Saline (NaCl) U/L alarm" or "Saline (NaCl) L/L alarm" in the "Alarm setting" screen.
(2) Change the setting value for the saline (NaCl) upper limit or lower limit value Tap the
numeric keypad to enter the numeric value. Or, tap the "▲ (increase)/▼ (decrease)" button to enter the
setting value. Tap "" in the numeric keypad if it is not to be set.
* The setting range is 0.00 to 4.00% for both upper and lower limit however set a higher value for the

* The setting range is 0.00 to 4.00% for both upper and lower limit. however, set a higher value for the upper limit than the lower limit.

③ Confirmation of change. ... Tap the **ENT** button once the setting change is completed.

(8) Setting the saline (PSS) upper and lower limit alarm value

Sets the upper and lower limit for the saline (PSS). Initial value is "saline (PSS) upper limit: 40.00psu" and "saline (PSS) lower limit: 0.00psu".

Operation procedure
Operation
① Select "Saline (PSS) U/L alarm" or "Saline (PSS) L/L alarm" Tap the yellow icon for "Saline (PSS) U/L alarm" or "Saline (PSS) L/L alarm" in the "Alarm setting" screen.
 ② Change the setting value for the saline (NaCl) upper limit or lower limit value Tap the numeric keypad to enter the numeric value. Or, tap the "▲ (increase)/▼ (decrease)" button to enter the setting value. Tap "" in the numeric keypad if it is not to be set. * The setting range is 0.00 to 42.00% for both upper and lower limit. however, set a higher value for the upper limit than the lower limit.
3 Confirmation of change Tap the ENT button once the setting change is completed.

(9) Setting the TDS upper and lower limit alarm value

Sets the upper and lower limit for the TDS. Initial value is "TDS upper limit: 999.9g/L" and "TDS lower limit: 0.00mg/L".

Operation procedure

Operation
① Select "TDS upper limit alarm" or "TDS lower limit alarm" Tap the yellow icon for "TDS upper
limit alarm" or "TDS lower limit alarm" in the "Alarm setting" screen.

② Change the electrical resistivity upper or lower value. ... Set the range with the range or the button. After setting the range, tap the numeric keypad to enter the numeric value. Or, tap the "▲ (increase)/▼ (decrease)" button to change the setting value. Tap "---" in the numeric keypad if it is not to be set.

- Multiply by 1/10 every time the $\mathbb{R}_{4}^{\text{Range}}$ button is tapped
- Multiply by 10 every time the Range button is tapped
- * The setting range is 0.00mg/L to 999.9g/L for both upper and lower limit. however, set a higher value for the upper limit than the lower limit.

(3) Confirmation of change. ... Tap the **ENT** button once the setting change is completed.

8.11 Setting the sample information

(1) Sample information settings screen

Operation procedu	re
Operation	Screen example
(1) Display the "Menu" screen Tap the MENU button in the measurement screen.	
② Display the "sample ID settings" screen Tap the yellow "sample information settings" icon.	2015/04/17 11:47 HBA Operator∕GUEST Setting of sample ID and comment can be performed. O Number of repeats on iden smpl 1T O Sample ID Memory No. 0001 → Sample ID 0001
Current memory No. display.	Seawater
③ To return to the "Menu" screen Tap the	KENU CONSTRUCTION Settings screen
(4) To return to the measurement screen Tap the button.	

Operation procedure

(2) Setting the number of repetitions of the same sample

Set the number of times to iterate measurement with the same sample ID.

	Operation procedure
	Operation
(1) Select "Iteration the same sample"	ns of the same sample" On the "sample information" screen, select "iterations of ".
② Set the number (down)", buttons	to input the setting value. Tap "" in the numeric keypad if it is not to be set.
3 Confirm Tap	the ENT button.
* The setting range	is 0-99.
[IMPORTANT]	 If the iteration number is set to 0, please note that the sample ID will no longer be updated. If set to 1 the sample ID will increase by one each time with no branch number. If set to 2 or more, a branch number such as 001-01, 001-02 will be attached to the sample ID.

(a) Printing measurement results

Next an example of printing when the iteration number is 3 is shown. If the iteration number is set to 2 or more, a branch number such as 001-01, 001-02 will be attached to the sample ID. For the "8.18 Setting the print items", if the average value calculation print setting is "ON" the measured value will be automatically remembered, and the average value calculation results are printed. (>>Refer to "8.18 Setting the print items"

Example of printing measurement results

No.001-01 2015/09/06 12:30				
Operator name				
AL 25.5°C 134.0mS/m				
Auto hold				
No.001-02				
2015/09/06 12:30				
Operator name				
AL 25.5°C 134.2mS/m				
Auto hold				
No.001-03				
2015/09/06 12:30				
Operator name				
AL 25.5°C 134.4mS/m				
Auto hold				
n = 3				
mean = 134.2mS/m				
R = 0.4mS/m	Ń			

*Sample ID.					
*Year/month/date hour: minute					
*Operator name					
ATC/MTC/OFF	Temperature Measurement value				
*Hold method					
*Sample ID.					
*Year/month/date h	nour: minute				
*Operator name					
ATC/MTC/OFF	Temperature Measurement value				
*Hold method					
*Sample ID.					
*Year/month/date h	our: minute				
*Operator name					
ATC/MTC/OFF	Temperature Measurement value				
*Hold method					
Iteration count (number of data)					
Average value					
Range (maximum	-minimum value)				

Only printed when average value calculation print setting is "ON"

(Symbol when printing temperature compensation:				
When measuring the electrical conductivity)				
AL: ATC (LINE)	Linear automatic temperature compensation			
AC: ATC (Curve)	Multi-point automatic temperature compensation			
AP: ATC (Pure water)	Pure water automatic temperature compensation			
ML: MTC (LINE)	Linear manual temperature compensation			
MC: MTC (Curve)	Multi-point manual temperature compensation			
MP: MTC (Pure water) Pure water manual temperature compensation				
No symbol: Temperature compensation OFF				

- Only the items set with "8.18 Setting the print items" is printed for the items with *.
- Items with no data are passed and the following item is printed below.
- If average value calculation print setting is "ON", the measurement value is stored automatically.

(3) Setting the sample ID

The ID of any sample can be set. The default value is the current sample ID.

Also, the sample ID is displayed on the measurement screen and is updated in the following cases.

- If recording or printing is performed by pressing the DATA IN button
- If MANUAL printing is performed by pressing the **Print** key
- If automatic printing and storing is performed by the interval measurement
- If automatic printing and recording is performed by hold
- If automatic printing and recoding is performed by turntable measurement

Operation procedure

Operation

① Select the sample ID. ... On the "sample information" screen, tap the yellow "sample ID" icon.

(2) Changing the setting value. ... Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.

③ Confirm. ... Tap the **ENT** button.

* The setting range is 1-9999.

(4) Setting the sample comments

You can annotate a sample with up to 15 characters.

Operation procedure

	Operation	Screen example
--	-----------	----------------

(1) Select "sample comment". … On the "sample information settings" screen, tap the yellow sample comments text input window.

(2) Sample comment settings. ... Tap the keyboard to type characters.

- English: Switch to alphanumeric character input
- BS: Erase 1 character
- SPACE: input a space character
- \leftarrow : move the cursor to the left
- \rightarrow : move the cursor to the right
- Kana: kana (Japanese characters) input switch
- SHIFT: English upper/lower case switch
- ENTER: Confirm
- Cancel: return to operator registration



Sample comment input screen

- (3) Modifying inputted characters. ... Move the cursor to the right of the text you want to modify by tapping the BS button.
 - * One inputted character is erased.
- (4) Confirm. ... After completing input of the sample comments, tap the ENTER button.
- (5) To finish part way through inputting sample

comments. ... Tap the **Cance** button.

8.12 Setting the hold conditions

This device incorporates features to retain (hold) the measured values. There are two types of hold

function - automatic (auto hold) and manual (manual hold).

Auto hold (AUTO):

When measuring, tap the HOLD button, and the device will automatically judge whether or not

the value is stabilized in line with the set hold conditions and hold the measured value.

Judge whether the value is stabilized and hold the measurement value.

Manual hold (MANUAL):

When measuring, the measured value when the **HOLD** button is pressed is held.

Time hold TIME:

When measuring, tap the HOLD button, and the set time will be held.

(1) Hold condition settings screen

Operation procedure

Operation		Screen example	
① Display the "Menu" screen Tap the	MENU button	n	

the measurement screen.

② Display the "hold setting" screen. … Tap the yellow "hold setting" icon.

* It is the screen to perform the auto hold method and set various auto hold condition settings.



Setting the hold conditions

③ To return to the "Menu" screen. … Tap the

button (or the MENU button).

④ To return to the measurement screen. …Tap the button.

(2) Setting the hold method

Set the hold method. The default setting is "AUTO".

Operation procedure

Operation

① Select "hold method". … On the "hold condition settings" screen, tap the yellow "hold method" icon.

(2) Select "AUTO", "MANUAL" or "TIME". ... Tap "AUTO", "MANUAL" or "TIME".

(3) Setting the record during hold

You can set whether or not to print and record the held measurement values (display values). The default setting is "ON".

Operation procedure

Operation

① Select "Record hold". ... On the "hold condition settings" screen, tap "record when holding".

(2) Select either "ON" or "OFF". ... Tap either "ON" or "OFF".

(4) Setting the re-hold during hold

If the hold method from (2) is on "AUTO", if the HOLD button is tapped when on hold, you can set whether or not to apply hold again. Please apply the settings referring to the following contents. The default setting is "ON".

- ON : On the measurement screen, the HOLD button is enabled at any time. During hold Tap the HOLD button to cancel hold and perform auto hold again. Also, during stability judgment, tap the HOLD button and stability judgment restarts from the moment the button was tapped. To return to normal measurement, tap the DD button.
- OFF : On the measurement screen, tap the HOLD button and auto hold is performed. During hold and stability judgment, tap the HOLD button or the D button and hold is canceled and the device returns to normal measurement.
Operation procedure

Operation

- ① Select "Automatically cancel during hold". … On the "hold condition settings" screen, tap "Automatically cancel during hold".
- 2 Select "ON" or "OFF". ... Tap "ON" or "OFF".

(5) Setting the Hold (TIME) conditions

If the hold method from (2) is "TIME", the time hold conditions can be set. The default setting is 10 seconds.

Operation procedure

Operation	
Soloct "hold (TIME) time" On the "hold condition settings" careen ten the vallow "hold (TIME)	

- (1) Select "hold (TIME) time". ... On the "hold condition settings" screen, tap the yellow "hold (TIME) time" icon.
- ② Set the hold (TIME) time. ... Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
- (3) Confirm. ... Tap the **ENT** button.

* The setting range is 1-999 seconds.

(6) Setting the hold (AUTO) timeout time

- (a) If the hold method from (2) is "AUTO", the timeout can be set.
- (b) If the conditions from (8) are not met within the set time, then from that moment hold is applied and an error message is displayed at the bottom of the measurement screen.
- (c) The printed data will have a * mark. The default setting is 30 seconds.
- (d) Please set the timeout to be longer than "(7) Setting the hold (AUTO) stability judgment time".

Operation procedure

Operation

(1) Select "hold (AUTO) timeout time". … On the "hold condition settings" screen, tap "hold (AUTO) timeout time".

(2) Set the timeout time. ... Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value. If you do not wish set the timeout period, tap "0".

(continues)

(continued)

Operation

③ Set the value. ... Tap the **ENT** button.

* The setting range is 5-999 and 0. If 0 (= OFF) is selected the timeout does not last forever

(a) When the hold function with pharmaceutical water (JP) is "ON"

Time-out settings are in minutes. The setting range is 5-60 minutes and " ∞ ". If (∞) is selected timeout does not occur.

(7) Setting the hold (AUTO) stability judgment time

- (a) If the hold method from (2) is "AUTO" you can set the stability judgment time
- (b) The default setting is 10 seconds.
- (c) Please set the stability decision time to be shorter than "(6) Setting the hold (AUTO) timeout time". However, set so the upper limit > the lower limit.

Operation procedure

Operation

- (1) Select "hold (AUTO) stability judgment time". … On the "hold condition settings" screen, tap the yellow "hold (AUTO) stability judgment time" icon.
- (2) Set the hold (AUTO) stability judgment time. ... Enter a number by tapping the keypad. Or, tap the "▲ (increase)/▼ (decrease)" buttons to enter the setting value
- **3** Set the value. ... Tap the **ENT** button.

* The setting range is 2-999 seconds.

(8) Setting the EC hold condition unit

If the hold method is "AUTO", either "digit" or "measurement unit" can be selected as the auto hold condition units. The default setting is "digit". If you set the "digit", "(9) Setting the EC hold conditions" are applied to all items in the measurement of electric conductivity. If "measurement unit" is set, please set each hold condition individually in accordance with "(10) Setting each item of the hold conditions".

Operation procedure

Operation

① Select "EC hold condition units". … On the "hold condition settings" screen, tap "EC hold condition units".

2 Select "measurement units" or "digit". ... Tap "measurement units" or "digit".

(9) Setting the EC hold conditions

(2) if the hold method from (2) is "AUTO", hold condition can be set. The default setting is

"5 digit(/10s)". For the number of seconds, the "(7) Setting the hold (AUTO) stability judgment time" value will be applied.

Operation procedure

(1) Select "EC hold conditions (for digit)". ... On the "hold condition settings" screen, tap "EC hold conditions (for digit)".

(2) Set the digit number. ... Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value. If you change the sign, tap the 🗄 or 🗄 button.

* The setting range \pm 1-99 digit.

(10) Setting each item of the hold conditions

(2) If the hold method is "AUTO", each measurement item's auto hold condition can be set. The default settings are as follows. For the number of seconds, the "(7) Setting the hold (AUTO) stability judgment time" value will be applied.

Electrical conductivity SI units	: 1.00mS/m/10s
Electrical conductivity old units	: 10.0µS/cm
Electrical resistivity SI units	: 0.100MΩ·m/10s
Electrical resistivity old units	: 10.0MΩ·cm
Concentration	: 0.1%/10s
• Salt (NaCl)	: 0.05%/10s
• Salt (PSS)	: 0.50psu/10s
• TDS	: 1.00mg/L/10s

Operation procedure

Operation		
① Select the "hold conditions" for the measurement item you wish to set On the "hold condition settings" screen, tap "hold conditions" for the measurement item you wish to set.		
② Changing the setting value Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to change the setting. If there are Range Range buttons, after setting the range with the Range or button, change the settings value. If + Or - button displays, tap the + / - button to set the code		
• Multiply by 1/10 every time the ^{Range} button is tapped		
• Multiply by 10 every time the Range bu	atton is tapped	
* The setting range will be as follows dep	pending on the display unit.	
Electrical conductivity SI units	0.1µS/m~200.0S/m	
• Electrical conductivity old units	0.001µmS/cm~2.000S/cm	
Electrical resistivity SI units	0.001Ω·m~2.000MΩ·m	
Electrical resistivity old units	0.1Ω·cm~200.0MΩ·cm	
Concentration	0.001%~200.0%	
• Salt (NaCl)	0.01%~1.00%	
• Salt (PSS)	0.10psu~10.00psu	
• TDS	0.01mg/L~999.9g/L	
③ Confirming changes After completing the settings, tap the [ENT] button.		

(11) Setting the hold function in pharmaceutical water measurement (JP)

- (a) With this device you can set pharmaceutical water measurement (JP). This feature can only be set when auto hold is set.
- (b) If pharmaceutical water measurement (JP) is "ON", auto hold condition settings are disabled. Also, pharmaceutical water measurement (JP) settings are only enabled for electrical conductivity measurements (For resistivity, salinity, concentration and TDS measurements, even for pharmaceutical water measurement (JP) normal hold behavior applies)
 - ON: On the measurement screen, when hold stability judgment is started, first measurement values are recorded and printed (applies only to intermediate values). After starting hold stability judgment, judgment will be performed after the interval set in "(14) pharmaceutical water measurement Intermediate values recording settings" has elapsed.

[Hold stability judgment criteria]

O In the case that the change in conductivity between the current value and the value measured 5 minutes previously is 10.0μ S/m (0.1μ S/cm) or less

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* If the above conditions are not met, stability judgment process will continue until the timeout period elapses, and the measurement values at that time will be stored and printed. (Applies only to recording intermediate values)

OFF: normal hold condition settings are enabled.

Operation procedure	
Operation	
① Select "pharmaceutical water measurement hold feature (JP)" On the "hold condition settings" screen, tap "pharmaceutical water measurement hold function (JP)."	

2 Select "ON" or "OFF". ... Select "ON" or "OFF".

(12) Setting the hold time-out period in the pharmaceutical water (minutes)

- (a) If the hold method from (11) is "ON", the timeout can be set.
- (b) If the conditions from (3) are not met within the set time, then from that moment hold is applied and an error message is displayed at the bottom of the measurement screen.
- (c) The printed data will have a * mark. The default setting is 20 minutes.

Operation procedure

Operation
① select "pharmaceutical water hold timeout period (minutes)" On the "hold condition settings"
screen, tap "pharmaceutical water hold timeout period (minutes)."

- (2) Set the timeout time. ... Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value. If you do not wish set the timeout period, tap '0'.
- **③ Confirm**. ... Tap the **ENT** button.

* The setting range is 5-60 and 0. If $0 (= \infty)$ is selected the timeout does not last forever.

(13) Setting the record of the initial value of the pharmaceutical water measurement

Sets whether or not the initial measurement values are printed and stored. The default setting is "OFF".

Operation procedure	
Operation	-
1 Select "recording of pharmaceutical water measurement initial values" On the "hold	

condition settings" screen, tap "set pharmaceutical water measurement initial values."

(2) Select either "ON" or "OFF". ... Tap either "ON" or "OFF".

(14) Setting the record of the intermediate value in the pharmaceutical water measurement

- (a) Can be set only when setting pharmaceutical water measurements (JP). Storing and printing of measurement values is carried out at every time interval set at the same time as hold stability judgment. The default setting is "OFF".
- (b) The sample IDs for recorded intermediate values of measured values will be branch codes. Note that the maximum branch code is 99, so if the sampling frequency exceeds 99 times, all subsequent branch codes will be 99.

Operation procedure

Operation

- ① Select "recording of pharmaceutical water measurement initial values". … On the "hold condition settings" screen, tap "set pharmaceutical water measurement initial values."
- (2) Change the setting value. ... Tap the numeric keypad to enter the numeric value. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value. If you do not wish to record intermediate values, tap "0".
- **③ Confirm**. ... Tap the **ENT** button.

* The setting range is 10-300 seconds.

(15) Setting the pharmaceutical water measurements temperature stability judgment (T°C \pm n°C/s)

- (a) Can be set only when setting pharmaceutical water measurements (JP). After starting hold processing, the device judges whether or not the sample temperature meets the set conditions.
- (b) If the temperature of the sample does not meet the set conditions after 60 minutes have elapsed after starting the temperature judgment process, timeout occurs.

The default setting is "25°C±---°C/10s"

Operation procedure

Operation	Screen example
(1) Display the "pharmaceutical water temperature stability judgment range settings" screen On the "hold condition settings" screen, tap "pharmaceutical water temperature stability judgment ($T^{\circ}C \pm n^{\circ}C/s$)".	2015/04/17 11:47 \textcircled{C} Operator \checkmark GUEST Setting of temp stbi determination range with pharma water msmtt is performed. Temp stab deter range (T \degree C \pm n \degree C/s sec) 25 \degree C \pm \degree C / 10 s

Settling judgment range screen

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MENU

- ② Temperature stability judgment range settings. … Tap the number you wish to set in the input window. Input a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value. If you do not wish set the timeout period, tap "---" or "0".
- ③ Set the value. … Tap the **ENT** button.
- (4) To return to the "hold condition settings" screen. ...
 - Tap the **D** button.
- * The setting range is as follows.
 - Temperature setting T (°C): 10° C ~ 40° C, or --- (= OFF).
 - Settings range n (°C): 0.1°C~1.0°C, or --- (= OFF).
 - Time (s): 1s to 99s.

8.13 Performing hold

Feature to retain (hold) the display of measured values. To perform auto hold, please follow "8.12 hold condition settings" and set the hold condition.

(1) Performing hold

On the measurement screen, tap the HOLD button.



Measurement screen example) electrical conductivity measurement

(a) In the case of auto hold

If the hold method is set to "AUTO", the stability of values will be judged automatically in accordance with the set hold conditions, and the measured value will be held. During stability judgment, the above message will appear. When timeout occurs, hold is applied at that time, and the lower part of the measurement at the bottom screen displays an error message. The printed data will have a * mark.

(b) In the case of manual hold

If the hold method is set to "MANUAL", the measurement value will be held at the moment that the button is tapped.

(c) In the case of time hold

If the hold method is set to "TIME", the measurement value will be held at the moment that the **HOLD** button is tapped.

(2) Canceling hold

Check the measurement screen display, and cancel hold in one of the following ways.

(a) Tap the **D** button

On the measurement screen, while on hold, when the **D** button is tapped, the **HOLD** mark disappears, and hold is canceled.

(b) Tap the HOLD button

If "8.12 (4) Setting the re-hold during hold" is set to "OFF", on the measurement screen, while on hold, when the HOLD button is tapped, the HOLD mark disappears, and hold is canceled.

8.14 Setting the interval measurement

Feature to measure set time intervals.

(1) Interval measurement settings screen

Operation procedure

Operation	Screen example
(1) Display the "Menu" screen Tap the MENU button in	
the measurement screen.	

- (2) Display the "interval measurement settings" screen.
 - ··· Tap the yellow "interval measurements settings" icon.
 - Screen for performing various interval measurement feature condition settings.



Interval measurement settings screen

- (3) To return to the "Menu" screen. … Tap the button (or the MENU button).
- ④ To return to the measurement screen. … Tap thebutton.

(2) Setting the interval measurement

Sets whether or not to carry out interval measurement. The default setting is "OFF".

Operation procedure

Operation

① Select "interval measurement settings". … On the "interval measurement settings" screen, tap the yellow "interval measurement" icon.

2 Select "ON" or "OFF". ... Tap "ON" or "OFF".

(3) Setting the interval

Sets the interval. The default setting is "00:00:10".

Operation procedure

Operation	Screen example

(1) Select "interval". ... On the "interval measurement settings" screen, tap the yellow "interval" icon.

② Display the interval settings screen. … Tap the "interval" input window.



Interval measurement settings

screen

(Continued)

(continued)

(continued)		
Operatio	n	Screen example
③ Interval settings Tap the input	ut window of the item you	
wish to set (hours/minutes/second	s). Or move to the item you	
wish with the keypad \rightarrow button.		
Input a number by tapping the k	eypad. Or, tap the "▲	
(increase)/▼ (decrease)" button	to enter the setting value.	
(4) Confirm Tap the ENT butto	n.	
* Setting range is 0:00:01 to 4:59:5	9.	
(IMPORTANT) • If you set in	nterval interval of 5s or les	s, if the external printer, personal
computer of	or turntable are on RS-232	C connection, the interval will be
forcibly set	to 5s. However, dependir	ng on the number of items to be
printed, pri	nting may not complete in	5 seconds. In this case, please
consider th	e time it takes to print, and	d set the interval to an appropriate
value. If the	e next interval time comes	during printing, printing will continue
without sto	pping and some values m	ay be missed if they could not be
printed in t	me.	

• With interval time printing, the next print starts after the interval time elapses following the start of printing. Please note that it is not following the end of printing.

(4) Setting the mumber of interval data capture points

The number of interval measurement data capture points are set.

<Example>

If the interval is set to 10 minutes and the number of data capture points to 5 times, then over

10 minutes 5 measurement data values will be recorded and printed. The default setting is "∞".

Operation procedure

Operation
① Select "Number of data capture points" On the "Interval measurement settings" screen, tap "Number of data capture points".
② Inputting the setting value Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.

(3) Confirm. ... Tap the **ENT** button.

* The setting range is ∞ or 1-2000.

(5) Setting the initial data capture

Sets whether or not to capture measurement data for the initial measurement interval. The default setting is "ON".

- ON : On the measurement screen, the measurement data is captured at the moment that the **START** button is tapped. In this case, the first data point is not counted in the number of data capture points. (Initial settings)
- OFF : On the measurement screen, the first measurement is made and data is captured after the set interval has elapsed following the moment when the **START** button is tapped.

Operation procedure

Operation

① Select "initial data capture". … On the "interval measurement settings" screen, tap "initial data capture".

(2) Select "ON" or "OFF". ... Tap "ON" or "OFF".

(IMPORTANT)	• Up to 2000 measurement data points can be stored in the memory, but if
	the number exceeds 2000, depending on the settings in "8.25 (3) Setting
	the memory data overwrite (Memory loop)", $\textcircled{1}$ measurements overwrite
	old data; or $\textcircled{2}$ an error message displays at the bottom of the screen
	advising that the memory is full. In the case of $\textcircled{2}$, please note that interval
	measurement stops automatically and data will no longer be stored.
	Please check the number of measurement data captured and the memory
	remaining when carrying out measurements. To erase the memory,
	please follow "8.25 (5) Erasing all memory data".

8.15 Performing interval measurement

- (a) Feature to measure a set interval (interval time). With interval measurements, the measured data is recorded and printed automatically and the sample ID is updated.
- (b) To perform an interval measurement, please set the interval measurement conditions in accordance with "8.14 Setting the interval measurement".
- (c) If you set interval interval of 5s or less, if the external printer, personal computer or turntable are on RS-232C connection, the interval will be forcibly set to 5s.

(1) Starting interval measurement

Operation procedure



electrical conductivity measurement

(2) Stopping interval measurement

Operation procedure

Operation	
(1) Stopping interval measurements Tap the Stop button during interval measurement operation. Interval measurement stops and enters interval measurement waiting mode.	
 2 Start interval measurements Tap the START button again to start interval measurements again. * During interval measurements, operations other than tapping the STOP button cannot be carried out. To perform other button actions, please stop the interval measurement by tapping the STOP button 	

8.16 Measurement data storage (memory data)

- (a) This device can remember up to 2000 measurement data points.
- (b) Data can be stored in the following four different ways. Also, all memory data other than main body information is stored in the memory, (for more information see "8.17 Display of memory data, average value calculation, writing (USB memory), printing, erasing").
- (c) If the number of data points exceeds 2000, depending on the settings in "8.25 (3) Setting the memory data overwrite (Memory loop)", ① measurements overwrite old data; or ② an error message displays at the bottom of the screen advising that the memory is full. To erase the memory, please follow "8.25 (5) Erasing all memory data".
- (d) Next an example of the measurement screen when recording measurement data is shown.



Measurement screen example 1. Normal measurement



Measurement screen example 2. Interval measurement

Operation procedure

Operation
(1) Tap the DATAIN button On the measurement screen, tap the DATAIN button. Each time the button is
tapped, data is recorded.
* When an external printer is connected, each time the DATA IN button is tapped, data is recorded to the
main body and printed (for more information please refer to "8.19 Printing measurement data").
(2) Recording with interval measurements When the START button is tapped with interval measurement, data is recorded every interval.
(3) Automatic recording with auto hold If the hold method is set to "AUTO" under hold condition settings, and recording of measured values is set to "ON", when the HOLD button is tapped, data is recorded.
④ Measuring with the turntable When a turntable is connected and automatic continuous

measurement is carried out, the measurement results are automatically recorded and printed.

8.17 Display of memory data, average value calculation, writing (USB memory), printing

Display, average calculation, writing (USB memory stick), printing and erase of recorded measurement data can be carried out.

(1) Memory data screen

Operation procedure

Operation	Screen example
(1) Display the "Menu" screen Tap the MENU button in the measurement screen.	
② Display the "memory data" screen Tap the yellow "memory data" icon.	2015/04/17 11:47 III Operator GUEST Confirmation of the recorded data can be performed. Tap the data number to view.
Memory No., sample ID, measurement date and time, measurement value, temperature are displayed from the newest to the oldest.	(0050) ID 0050 2015/3/16 12:50:35 205.3 mS/m ATC 25.1°C (0049) ID 0048 2015/3/16 12:30:20 1.5 S/m ATC 22.1°C
	0048 ID 0046 2015/3/15 16:17:54 20. 2 mS/m ATC 25. 1°C ▲
	00047) ID 0005 2015/1/12 10:32:25 C 15.4 S/m 25.1°C ▼
	00246 ID 00003 2015/1/8 9∶45∶15 0.1 mS/m ATC 23.7°C
	ID 0101 2015/1/5 19:12:48 121.3 ms/m ATC 25.1°C
	(0044) ID 0567 2015/1/5 19∶11∶48 139. 2 mS/m ATC 25. 1°C
	Calc avr val Copy data to USB
	Memory data screen
(3) To return to the "Menu" screen Tap the button (or the MENU button).	
④ To return to the measurement screen Tap the▶ button.	

- Tap the **Calc avr val** button and the memory data specify number screen (for average value calculations) is displayed.
- Tap the Copy data to USE button and the memory data specify number screen (for USB output) is displayed.
- Tap the **Print** button and the memory data specify number screen (for printing) is displayed.

(2) Display memory data

On the "memory data" screen, tap the memory data number you wish to display and sample ID.,

measurement values, temperature and other information displays in the dialog box.

ENT button. The data number displayed at the top.

Operation	Screen	example
① Select the memory data On the "memory data" screen,		
the data numbers you wish to view are displayed on the		
screen.	2015/04/17 11:47 Confirmation of the performed. Tap the c	♪ Operator/GUEST recorded data can be lata number to view.
* How to use the memory data screen	0050) ID 0050 2015	/3/16 12:50:35 🔼
• Swipe the screen with your finger and you can scroll up	205.3 mS/m A	TC 25.1°C
and down.		/0/10 10:00:00
• And with the 🚺 and ¥ buttons you can scroll multiple	Jump to specified me	mory No. (1 - 2000)
lines together.		
• And with the 🔺 and 💌 buttons you can move to the		156
first or the last data number.	1 1	
• If you wish to move to a specific data number, tap the		1 2 3 ENT
Jump button. Set the number of data you wish to view		
with the keypad or tap or " \blacktriangle (up)/ \blacktriangledown (down)", and tap the	Cancel	ОК

Operation procedure

MENU 7 A Print

Calc avr val

Memory data jump screen

(Continued)

Operation	Screen example
② Display memory data Tap the yellow icon of the data number you wish to view.	2015/04/17 11:47 III Operator/GUES Confirmation of the recorded data can be performed. Tap the data number to view.
• If you tap $ riangle$ or $ riangle$ buttons you can display the	00050) ID 0050 2015/3/16 12:50:35
information of the previous and following data numbers.	205.3 mS/m ATC 25.1°C
	0042
	ID. 0567-99 GUEST 2015/04/24 12:50:30 ATC 23.7℃ Auto hold CT-57101B No.12345678 Elect comment Meas. 139.2mS/m Std.s 140.9mS/m C. Con 101.2/m Erase
	Back
	120.2 mS/m ATC 25.1°C

Display memory data

Print

Jump

Calc avr val

MENU

- (3) To return to the memory screen. ... Tap "Back".
- (4) To return to the "Menu" screen. ... Tap the button (or the MENU button).
- (5) To return to the measurement screen. ... Tap the **button**.
- On the memory data display screen, tap the **Print** button to print the memory data.
- On the memory data display screen, tap the **Erase** button and the memory data points can be deleted one at a time. To erase all memory, please refer to "8.25 (5) Erasing all memory date".

(3) Memory data average value calculation

Operation procedure



Number specifying screen

- ② Select the start memory No. input select. … Tap the start memory No. input cell.
- ③ Start memory No. input. ... By tapping the keypad, input a number. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
- (4) Confirm start memory No. ... Tap the **ENT** button.
- (5) Select the end memory No. input select. ... Tap the end memory No. input cell.
- (6) End memory No. input. ... By tapping the keypad, input a number. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
- (7) Confirm end memory No. ... Tap the **ENT** button.

(Continued)

(continued)

Operation	Screen example
 (8) Display the average value calculation result Tap Exe calc * When an external printer is connected, the data will be printed on the external printer at the same time. Memory data average value print example n = 39 mean = 1.000mS/m R = 0.005mS/m * If the display items are mixed (conductivity, resistivity, concentration, salinity, TDS), average value calculation is not possible. 	2015/04/17 11:47 CQUEST Specify range to calculate average val, and calculate average val of the meas vals. Caution : The avr val calc is not psbl when range with mixed meas item set. Memory No. 0001 ~ 0039 Avr val calc result No. avr val data : 39 Avr val : 7.5 Rng (max val - min val) : 1.0

Example of calculation results

Exe calc

P

MENU

(4) Writing of memory data (USB memory stick)

This device can connect to a USB memory stick and write to the memory.

Operation procedure



Number specifying screen

- ② Select the start memory No. input select. ... Tap the start memory No. input cell.
- ③ Start memory No. input. ... By tapping the keypad, input a number. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
- (4) Confirm start memory No. ... Tap the **ENT** button.
- (5) Select the end memory No. input select. ... Tap the end memory No. input cell.
- (6) End memory No. input. ... By tapping the keypad, input a number. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
- (7) Confirm end memory No. ... Tap the **ENT** button.

(Continued)

(continued)

Operation	Screen example

(8) Performing copy data to USB. --- Tap Start copy

and the memory data is copied to USB from the start memory $% \left({{{\mathbf{U}}_{\mathrm{S}}}_{\mathrm{S}}} \right)$

No. to the end memory No.

[IMPORTANT]	Before using the USB memory stick please refer to "10.7 Connection of
	the USB memory" and use it correctly.

Writing procedure (USB memory)

[IMPORTANT]	While writing (USB memory stick lamp flashes fast), please do not unplug
	the USB memory stick from the device. Doing so may cause damage or
	failure.

(5) Printing memory data

(a) When you wish to print data one by one

Operation procedure

Operation	Screen example
(1) Display the memory data On the "memory data" screen, tap the data number of the data that you wish to print.	2015/04/17 11:47 \square Operator \checkmark GUEST Confirmation of the recorded data can be performed. Tap the data number to view. (0050) ID 0050 2015/3/16 12:50:35
	0042
	1D. 0567-99 GUEST 2015/04/24 12:50:30 ATC 23.7°C Auto hold CT-57101B No. 12345678 Elect comment Meas. 139.2mS/m Std. s 140.9mS/m C. Con 101.2/m Erase
	Back
	139. 2 mS/m ATC 25. 1°C
	Calc avr val Copy data to USB
	Memory data display example

(2) Execute print. ... Tap the **Print** button.

(4) To return to the "memory" screen. ... Tap "Back".

(b) When you wish to print multiple data



Number specifying screen

- ② Select the start memory No. input select. ... Tap the start memory No. input cell.
- ③ Start memory No. input. ... By tapping the keypad, input a number. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
- (4) Confirm start memory No. ... Tap the **ENT** button.
- (5) Select the end memory No. input select. ... Tap the end memory No. input cell.
- (6) End memory No. input. ... By tapping the keypad, input a number. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
- (7) Confirm end memory No. ... Tap the **ENT** button.
- (a) Performing copy data to USB. … Tap Print and the memory data is copied to USB from the start memory No. to the end memory No.

Printing memory data example

No.001-01 2015/09/06 12:30 Operator name AL 25.5°C 12.34mS/m Auto hold	*Sample ID. *Measurement date and time *Operator name ATC/MTC/OFF Temperature Measurement value *Hold method	
No.001-02	*Sample ID.	
Operator name	*Operator name	
AL 25.5°C 12.56mS/m Auto hold	ATC/MTC/OFF Temperature Measurement value *Hold method *Sample ID	
2015/09/06 12:30	*Measurement date and time	
Operator name	*Operator name	
AL 25.5°C 12.78mS/m	ATC/MTC/OFF Temperature Measurement value	
Auto hold	*Hold method	
	(Symbol when printing temperature compensation:	
	When measuring the electrical conductivity)	
	AL: ATC (LINE) Linear automatic temperature compensation	
	AC: ATC (Curve) Multi-point automatic temperature compensation	
	AP: ATC (Pure water) Pure water automatic temperature compensation	
	ML: MTC (LINE) Linear manual temperature compensation	
	MC: MTC (Curve) Multi-point manual temperature compensation	
	MP: MTC (Pure water) Pure water manual temperature compensation	
	No symbol: Temperature compensation OFF	

• Only the items set with "8.18 Setting the print items" is printed for the items with *.

• Items with no data are passed and the following item is printed below.

(6) Erasing memory data

Memory data can be erased one at a time. To erase all memory, please refer to "8.25 (5) Erasing all memory date".

Operation procedure	e de la constante de la consta
Operation	Screen example
(1) Display the memory data On the "memory data" screen, tap the data number of the data that you wish to erase.	2015/04/17 11:47 ﷺ Operator∕GUEST Confirmation of the recorded data can be performed. Tap the data number to view. (0050) ID 0050 2015/3/16 12:50:35 ▲ 205.3 mS/m ATC 25.1°C 0042
	ID. 0567-99 GUEST 2015/04/24 12:50:30 ATC 23.7°C Auto hold CT-57101B No.12345678 Elect comment Meas. 139.2mS/m Std. s 140.9mS/m C. Con 101.2/m Erase
	Back 1004445 10 0307 2015/17/5 19.11.46 139.2 mS/m ATC 25.1°C Calc avr val Copy data to USB MENU Print Jump
	Memory data display example
(2) Perform erase Tap the Erase button.	
(3) To continue erasing other memory data Tap \triangle or ∇ to display the data you wish to erase, then tap the Erase button.	

Operation procedure

(4) To return to the "memory data" screen. --- Tap "Back".

8.18 Setting the print items

The items to print can be selected.

(1) Print settings screen

Operation procedure

Operation	Screen example	
Display the "Menu" screen Tap the button in the measurement screen.		
② Display the "Print item setting screen" Tap "Print item settings".	2015/04/17 11:47 🎬 Operat Setting for the print item can be	tor∕GUES e perform
	Sample ID	ON
	O Date	ON
	O Temp	ON
	O Cell name	ON
	🔘 Cell serial number	0FF
	O Cell mngt expiration	OFF
	O Cell comment	OFF
	O Instrument model name	OFF
	🔘 Instrument serial number	OFF
	O Inst mngt expiration	0FF
	O Instrument comment	OFF
	Operator name	ON
	O Hold status	<u>OFF</u>
	O Line break	ON
	O Average value calc print	ON
		IN
	Print settings scree	en
3) To return to the "Menu" screen Tap the button (or the MENU button).		
 To return to the measurement screen Tap the button. 		

(2) Setting the print

Operation procedure

Operation

- ① Select "print item settings". … On the "print item settings" screen, tap the yellow icon of the item you wish to set.
- (2) Select either "ON" or "OFF". ... Tap either "ON" or "OFF".
 - * If you tap the **AII ON** button, all items will be set to "ON", and if you tap the **AII OFF** button, all items will be set to "OFF".

(a) Regarding "average value calculation printing"

- "Average value calculation printing" can only be performed when "8.11 (2) identical samples repetition settings" is set to 2-99.
- Please note that if "identical samples repetition" is set to 0 or 1, the average value will not print.
- If pharmaceutical water measurement (JP) is set, the average value calculation print settings and will be disabled.

(IMPORTANT) • If "average value calculation" in "average value calculation print settings" is set to "ON", at the same time as printing, measurement data memory will be recorded.

Average value calculation print (occurrences: 3)

No.001-01	*Sample ID.	(Symbol when printing temperature
2015/09/06 12:30	*Year/month/date hour:minute	compensation:
Operator name	*Operator name	When measuring the electrical
$\Delta I \rightarrow E^{\circ}C$ 124 0mS/m		conductivity)
AL 25.5 C 154.0115/11		AL: ATC (LINE)
Auto hold	*Hold method	Linear automatic temperature
No.001-02	*Sample ID.	compensation
2015/09/06 12:30	*Year/month/date hour:minute	AC. ATC (CUIVE) Multi-point automatic temperature
Operator name	*Operator name	compensation
		AP: ATC (Pure water)
AL 25.5 C 134.2005/00	ATC/MITC/OFF Temperature Measurement value	Pure water automatic temperature
Auto hold	*Hold method	compensation
No.001-03	*Sample ID.	ML: MTC (LINE)
2015/09/06 12:30	*Year/month/date hour:minute	Linear manual temperature
Operator name	*Operator name	compensation
		MC: MTC (Curve)
AL 25.5°C 134.4mS/m	ATC/MTC/OFF Temperature Measurement value	
Auto hold	*Hold method	MP: MTC (Pure water)
n = 3	Iteration count (number of data)	Pure water manual temperature
mean = $134 2mS/m$	Average value	compensation
P = 0.4 mS/m	Pange (maximum minimum value)	No symbol: Temperature
- 0.4113/11		compensation OFF

• Only the items set with "8.18 Setting the print items" is printed for the items with *.

- Items with no data are passed and the following item is printed below.
- If average value calculation print setting is "ON", the measurement value is stored automatically.

8.19 Printing measurement data

This device can connect to an external printer and print measurement data.

(1) Printing method



Measurement screen example 1. Normal measurement



Measurement screen example 2. Interval measurement

Operation procedure

Operation

- (1) Tap the **DATA IN** button. ... On the measurement screen, tap the **DATA IN** button. Each time the button is tapped, the data is printed and the sample ID is updated.
- (2) Automatic printing with interval measurement. ... With interval measurement, if the start button is tappeddata is printed and sample ID updated at every interval.
- (3) Automatic printing with hold. ... Set "recording on hold" from the hold condition settings to "ON". On the measurement screen, if the HOLD button is pressed, the data is printed and the sample ID is updated.
- (4) Automatic printing with turntable. ... When a turntable is connected and automatic continuous measurement is carried out, the measurement results are automatically printed and the sample ID is updated.

(2) Printing measurement data example

Following is the print example.

Printing measurement data exam	nple If the repetition count is two or more, branches such as -01, -02 are appended to the sample ID.
No.001-01 2015/09/06 12:30 Operator name AL 25.5°C 134.2mS/m Auto hold [Electrode] Model CT-57101B Number 507K0001 Cell constant 101.2/m Mngt expiration 2015/09/06 12345678901234567890 [Set] Model CM-42X Number 12345678 Mngt expiration 2015/09/06 1234567890	 *Sample ID. *Year/month/date hour: minute *Operator name ATC/MTC/OFF Temperature Measurement value *Hold method *Cell model *Cell production number *Cell constants *Cell management expiration *Cell comment *Set model *Set model *Set production number *Set management expiration *Set comment
	(Symbol when printing temperature compensation: When measuring the electrical conductivity)AL: ATC (LINE)Linear automatic temperature compensation AC: ATC (Curve)AD: ATC (Curve)Multi-point automatic temperature compensation AP: ATC (Pure water)Pure water automatic temperature compensation ML: MTC (LINE)Linear manual temperature compensation MC: MTC (Curve)MUL: MTC (LINE)Linear manual temperature compensation MC: MTC (Curve)MUL: Point manual temperature compensation

- Only the items set with "8.18 Setting the print items" is printed for the items with *.
- The item without data is skipped and next item is printed without any space.
- Measured values are printed with a * mark if a timeout occurs.

8.20 Execute measurement and turntable settings

- (a) Please refer to the Instruction Manual that came with the turntable for detailed instructions on how to use the turntable. For the connection method, please also refer to "10.4 Connection of the turntable".
- (b) When performing turntable measurements, please set the measurement interval to "OFF" in "8.14 Setting the interval measurement".

(1) Turntable settings screen

Operation procedure

Operation	Screen example
(1) Display the "Menu" screen Tap the MENU button in	
the measurement screen.	

(2) Display "turntable settings" screen. --- Tap the yellow

"turntable settings" icon.



Turntable settings screen

- ③ To return to the "Menu" screen. … Tap the button (or the MENU button).
- ④ To return to the measurement screen. … Tap the button.

(2) Setting the turntable measurement

Sets whether or not to perform turntable measurements. The default setting is "OFF".

Operation procedure	
Operation	
① Select "turntable measurement" On the "turntable settings" screen, tap the "turntable	

() Select "turntable measurement". ... On the "turntable settings" screen, tap the "turntable measurement".

2 Select "ON" or "OFF". ... Tap "ON" or "OFF".

(3) Setting the turntable model

The turntable model to use is set to either "TTT-710" or "TTT-510". The default setting is "TTT-710".

Operation procedure

Operation

① Select "turntable model settings". … On the "turntable settings" screen, tap the "turntable model settings".

(2) Select "TTT-510" or "TTT-710". ... Tap "TTT-510" or "TTT-710".

(4) Setting the number of samples

Set the number of samples on the table used for turntable measurements. The default setting is "12". Please note that if the number of samples on the turntable and the number of samples in the instrument settings are different, an error will occur, and measurement will not start.

Operation

① Select "number of samples". … On the "turntable settings" screen, tap the yellow "number of samples" icon.

(2) Select the number of samples. ... Tap "12", "18", "36", "60", or "100".

(5) Setting the measurement start table No.

Set the table No. to start measuring in the case of turntable measurements. The default setting is "1".

(IMPORTANT) • There are five types of table that can be used with the turntable based on the beaker size (12, 18, 36, 60, 100 samples). Please check the type of the table to be used and set the start table No. (Please refer to the Instruction Manual that came with the turntable for detailed instructions.)

Operation procedure

· · ·
Operation
① Select "measurement starting table No." On the "turntable settings" screen, tap the yellow "measurement starting table No." icon.
② Inputting the setting value Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
Oppfirm Tan the The batter

(3) Confirm. ... Tap the **ENT** button.

* The setting range is 1~number of samples on each table.

(6) Setting the measurement end table No.

- (a) Set the table No. to end measuring in the case of turntable measurements.
- (b) The end table number is normally the table No. in which the end pin is inserted, but can can be set by inputting. In this case, measurement will end either at the set end table number or the table board which has the end pin inserted, whichever is reached first.
- (c) If the number of samples to measure is more than the number of samples on the table boards, set the end table no. to " ∞ " and do not insert the end pin anywhere. With these settings, measurements will continue without end until the stop key is tapped. The default setting is "12".

Operation procedure

Operation	
① Select "measurement starting table No." On the "turntable settings" screen, tap the yellow	

"measurement starting table No." icon.

(2) Inputting the setting value. ... Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.

③ Confirm. ... Tap the **ENT** button.

* The setting range is 1~number of samples on each table and ∞ . For ∞ , measurement is endless.

(7) Setting the number of repeat measurements

Sets the repetition of measurement of the same sample when measuring with the turntable. The default setting is "1".

Operation procedure
Operation
① Select "Number of repeat measurements" On the "turntable settings" screen, tap the yellow "Number of repeat measurements" icon.
② Inputting the setting value Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
 ③ Confirm Tap the ENT button. * The setting range is 1-9.

(8) Setting the end alarm time

- (a) Set the end alarm for turntable measurements.
- (b) The end alarm can indicate the end of continuous measurement of multiple samples. It is useful if you wish to check the end of measurement when you are a short distance away from the equipment. The default setting is "10".

Operation procedure

Operation

	1	
(1) Select "alarm time" On the	"turntable settings" screen, t	ap the yellow "alarm time" icon.

- ② Inputting the setting value. ... Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
- **③ Confirm**. ... Tap the **ENT** button.
 - * The setting range is 0-9999s.
(9) Setting the stirring time prior to measurement and the waiting time prior to measurement

Set the stirring time prior to measurement and waiting time prior to measurement when measuring with the turntable Useful if it is necessary to stir each sample on the table uniformly before measuring, or when you wish to measure after the potential becomes stable because it takes time for the potential to settle. If this setting is performed, when the electrode is immersed in the sample stirring will be carried out for the set stirring time. Further, measurement will be performed after the waiting time has elapsed after stirring is stopped.

* If pharmaceutical water measurement (JP) is set, stirring will continue during the waiting time and while measuring.

(a) Setting the stirring time prior to measurement

Set the stirring time prior to measurement. The default setting is 10 seconds.

Operation procedure

Operation	
1 Select "Stirring time prior to measurement" On the "turntable settings" screen, tap the yellow	

"Stirring time prior to measurement" icon.

- (2) Inputting the setting value. ... Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
- **③ Confirm**. ... Tap the **ENT** button.
 - * The setting range is 1-9999s.

(b) Set the waiting time prior to measurement

Set the waiting time prior to measurement (time to leave standing). The default setting is 10 seconds.

Operation procedure

- ① Select "Waiting time prior to measurement". … On the "turntable settings" screen, tap the yellow "Waiting time prior to measurement" icon.
- (2) Inputting the setting value. ... Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
- **③ Confirm**. ... Tap the **ENT** button.
 - * The setting range is 1-9999s.

(10) Setting the behavior when the end pin is detected

Set the behavior when the end pin is detected when measuring with the turntable.

The default setting is "Go back home and end". Settings are as follows.

Go back home and end: After measurement ends the table plate position returns to home.

Stop at the current table and end: After measurement ends, stop at the position at the end measurement without returning home.

* This setting is valid for TTT-710 use only.

Operation procedure

Operation
① Select "Behavior when the end pin is detected" On the "turntable settings" screen, tap the
vellow "Behavior when the end pin is detected" icon.

(2) Select the action. ... Tap either "Stop at the current table and end" or "Go back home and end".

(11) Setting the stirring while measuring

(a) Set whether to stir while measuring with the turntable. The default setting is "OFF".

Operation procedure

① Select "Stirring during measurement". … On the "turntable settings" screen, tap the yellow "Stirring time during measurement" icon.

2 Select "ON" or "OFF". ... Tap "ON" or "OFF".

(12) Setting the preliminary stirring of next sample

(a) Set the preliminary stirring of the next sample when measuring with the turntable.

(b) The default setting is "OFF".

Operation procedure

Operation

① Select "preliminary stirring of next samples". … On the "turntable settings" screen, tap the yellow "preliminary stirring of next samples" icon.

2 Select "ON" or "OFF". ... Tap "ON" or "OFF".

(13) Setting the washing mode, washing conditions

- (a) During the measurement with the turntable, set the washing mode for electrodes and washing conditions.
- (b) There can be up to 9 different washing modes (sequences) for electrode washing including custom settings when options are connected (If options are not connected only pure water shower washing is available).
- (c) You can set the washing time for each wash (number of air blows for air blow). The washing mode numbers and sequences are as follows.

Washing mode	Washing sequence				
number					
1	Pure water shower \rightarrow air blow				
2	Pure water bubbling \rightarrow pure water shower \rightarrow air blow				
3	Chemical shower \rightarrow water shower \rightarrow air blow				
4	Chemical bubbling \rightarrow pure water shower \rightarrow air blow				
5	Chemical bubbling \rightarrow pure water bubbling \rightarrow pure water shower \rightarrow air blow				
6	Chemical bubbling \rightarrow chemical shower \rightarrow air blow				
7	Chemical shower \rightarrow air blow				
8	Chemical bubbling \rightarrow pure water bubbling \rightarrow chemical shower \rightarrow air blow				
9	User settings (* for details, refer to "(c) Custom washing mode settings")				

Washing mode number and washing sequence

- Pure water shower : perform shower washing with pure water in the wash tank.
- Chemical shower : perform shower washing with chemicals in the wash tank.
- Pure water bubbling : collect pure water in the wash tank and perform air bubbling wash.
- Chemical bubbling : collect chemicals in the wash tank and perform air bubbling wash.
- Air blow : blow off the water droplets adhering to the electrode and nozzle.

(a) Washing mode settings

Select electrode washing mode from "1" to "9". The default setting is "1".

Operation procedure

Operation				Sc	reei	n ex	am	ple			
(1) Display the "washing mode settings screen" On the "turntable settings" screen, tap "turntable washing mode."			/17 the ttin g mo	11:4 wash g of de N	ing was	mode hing	and g moo	Oper Ispe de ing	ator ecify sequ	/GL / the _1	JEST No.
	r	Mode number	1	2	3	4	5	6	7	8	9
		(1)	A.	•	夵	:	- 87	8.	赤	*	User
	WO	(2)	~~	2. R	240	24 M	*	The	~~	*	sett ing
	WS SQ	(3)		~~	~~	~~	(A)	~~		A.R.	
		(4)					~~			~~	
		(5)									
	*	:9. U/ Menu	S ca	n be	: Ch : Ch : Pu : Ai : sel	emic emic re w re w r bl lect	al b al s ater ater ow onl	ubb I howe bub sho	ling er oblin ower th T	ng TT-7	710
	V	Vasl	ning	g m	ode	e s€	elec	ctio	n s	cre	en

- ② Select "washing mode settings". ... Tap the yellow "washing mode settings" icon.
- ③ Select washing mode. ... By tapping the keypad, input the number. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.

(4) Confirm. ... Tap the **ENT** button.

(b) Washing conditions settings (time, number of times)

Sets the range of washing process conditions (time, number of times).

Operation procedure



Turntable settings screen

- ② Inputting the setting value. ... Enter a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
 - * The settings range is as follows.
 - Pure water shower : 0-9999s
 - Chemical shower : 0-9999s
 - Pure water bubbling : 0-9999s
 - Chemical bubbling : 0-9999s
 - Air blow : 1-9 times
 - * If set to 0, the process is not performed.

(c) Custom washing mode settings (TTT-710 only)

Any combination of electrode washing mode can be set by the user. User mode is only enabled when "TTT-710" is selected under "(3) Setting the turntable model".

	Operation proced	lure
0	peration	Screen example
(1) Display the "washing n "turntable settings" screen	node settings screen" On th , tap "turntable washing mode."	he
② Select "washing mode "washing mode settings" id	settings" Tap the yellow con.	
(3) Select custom settings the number "9". Or tap the input the setting value "9".	"9" By tapping the keypad, in "▲ (up)/▼ (down)", buttons to	put
(4) Confirm Tap the ENT	button.	
5 Return to the "turntable button.	e settings" screen Tap the	2015/04/17 11:47 B Operator GUEST Setting for the turntable can be performed. Stirring during meas OFF Prelim stir of next spcm OFF Setting of washing conditions Turntable washing mode 9 Washing process 1 Chemical immersion Time/number 10s Washing process 2 Chemical bubbling Time/number 10s Washing process 3 Pure water bubbling
	The contents of the previous custom settings is displayed.	Time/number 20s Washing process 4 Time/number 3T Washing process 5 Time/number Time/number Time/number 5 Time/number Time/number Time/number

6 Selection of washing process. ... Tap the input window for the washing process you wish to set from "washing process 1" to "washing process 5".

(continues)

(If washing mode is "custom settings")

(continued)

Oper	Screen example					
⑦ Set the washing process Select and tap the washing process from "chemical bubbling", "pure water bubbling",						
"chemical shower", "pure wa	"chemical shower", "pure water shower", " air blow",					
"chemical immersion" and "p	oure water immersion". If you do					
not wish to set, tap "".						
* If "" is set, the following	g washing operations will not be					
performed.						
(8) Set washing conditions (ti	me, number of times) Tap					
the yellow input window for t	the process "time and number of					
times" for the washing condit	ions you wish to set.					
(9) Set washing conditions (1	time number of times) By					
tanning the keynad input a n	$ = 3 $ Set washing containons (time, number of times) By tanning the keyword input a number of tan the "A (un)/ \blacksquare					
(down)", buttons to input the	setting value.					
* The settings range is as follo	ows.					
• Pure water shower	: 0-9999s					
Chemical shower	: 0-9999s					
Pure water bubbling	: 0-9999s					
Chemical bubbling	: 0-9999s					
• Air blow	: 1-9 times					
Pure water immersion	: 0-9999s					
Chemical immersion	• Chemical immersion : 0-9999s					
* If set to 0, the process is not performed.						

(14) Executing turntable measurement

When performing turntable measurements, please set the measurement interval to "OFF" in "8.14

Setting the interval measurement".

```
(IMPORTANT) • Turn the turntable power supply ON after turning the device power switch ON.
```

(a) Turntable setting screen

Operation procedure

Operation	Screen example

(1) Display "turntable settings" screen. … On the "turntable setting" screen, tap the yellow "turntable measurement" icon.

2 Select "ON". ... Tap "ON".



Turntable measurement settings screen

3 To return to the "Menu" screen Tap the					
button (or the	MENU	button).			

(4) To return to the measurement screen. … Tap the button.

(b) Execute measurement

If the measurement screen is displayed after selecting "ON" on the "turntable measurement settings screen", the device enters measurement start waiting state. In this state, tap the **START** button to start the turntable measurement.

[IMPORTANT]	• Depending on the settings in "8.12 Setting the hold conditions", the turntable					
	measurement, will use the following measurement methods (auto hold					
	measurement settings)					
	If the hold method is "AUTO":					
	When the electrodes are immersed in the sample, stirring will be					
	performed for the set stirring time ^{*1} . Then, after stirring ends, when the set waiting time prior to measurement ^{*2} has elapsed, potential will be automatically judged for stability and measured with the set hold					
	conditions ^{* 3} .					
	In the case of pharmaceutical water measurement with "AUTO" hold					
	method:					
	When the electrodes are immersed in the sample, stirring will continue					
	until the end of measurement regardless of the set stirring time and measurement waiting time.					
	If the hold method is "MANUAL":					
	Manual: When the electrodes are immersed in the sample, stirring will be					
	performed for the set stirring time ^{* 1} . Then, after stirring ends, when the					
	set waiting time prior to measurement *2 has elapsed, measurement will					
	be performed.					
	*1 and *2: Please refer to the Instruction Manual that came with the					
	turntable.					
	* 3: Please refer to "8.12 Setting the hold conditions".					
	 Up to 2000 measurement data points can be stored in the memory, but if the 					
	number exceeds 2000, depending on the settings in "8.25 (3) Setting the					
	memory data overwrite (Memory loop)", (1) measurements overwrite old data;					
	or (2) an error message displays at the bottom of the screen advising that the					
	memory is full. In the case of (2), please note that turntable measurements will					
	continue, but the data will not be recorded. Please check the number of					
	samples and memory remaining when carrying out measurements. To erase					
	the memory, please follow '8.25 (5) Erasing all memory data".					
(c) Stopping/restartin	ng measurement					

If you interrupt the measurement part way through and you wish to resume, please do the following. During turntable measurements, on the measurement screen tap the **TAUSE** button to temporarily interrupt the turntable measurement. If you wish to resume, tap the **RESTART** button.

(d) Ending measurement

If you wish to end the measurement part way through, please do the following. During turntable measurements, on the measurement screen tap the **Truess** button to forcibly end the turntable measurement.

8.21 Performing temperature calibration

- (a) Measured temperature can be compensated with a trusted thermometer such as the reference thermometer measured by the electrical conductivity cell temperature sensor.
- (b) When performing temperature calibration, the compensated temperature measured by the electrical conductivity cell sensor is displayed.
- (c) The compensation value only compensates deviations of the temperature sensor near the calibration temperature. Please note that it is not able to accurately measure the full temperature range of 0~100°C.

(1) Performing temperature calibration screen

Operation	Screen example
(1) Display the "Menu" screen Tap the MENU button in the measurement screen.	
 Display the "perform temperature calibration" screen. Tap the yellow "perform temperature calibration" icon. 	
Input the actual temperature read from the thermometer.	2015/04/17 11:47 Temperature calibration can be performed. Input the read value of the thermometer.
Displays the temperature as read from the temperature device plus the temperature calibration value.	Temp calib, ther read val 25.2 °C Cal result
Displays the temperature as read from the temperature device, without temperature calibration.	Before 25.0°C → After 25.2°C Temp cal val +0.2°C
Displays the current temperature calibration value. When temperature calibration is performed, the new temperature calibration value is refreshed.	Reset the temperature calib value (tap [Reset])
Pe	Exec calib MENU Reset erform temperature calibration screen
 ③ To return to the "Menu" screen Tap the putton (or the measurement screen Tap the ④ To return to the measurement screen Tap the 	

Operation procedure

button.

(2) Performing temperature calibration

Operati	on

- (1) Prepare the thermometer. ... Prepare a 0.05°C or more precision reference thermometer or a standard thermometer.
- (2) Prepare a beaker. … Immerse the electrical conductivity cell to be calibrated and the thermometer into the beaker of water. Fill enough water so that the temperature sensor and thermometer are well immersed. Also, make the water at a temperature close to the temperature for the actual measurement.
- (3) Display the temperature calibration screen. ... According to (1) perform temperature calibration screen above, display the "perform temperature calibration" screen.
- (4) Read the temperature of the thermometer. ... When the temperature has stabilized, read the temperature of the thermometer. Tap the thermometer reading input window and input the reading.
- (5) Performing temperature calibration. ... Tap Exec calib to perform temperature calibration. The default setting is "25.0" for the first temperature calibration, and the last input value after that. Note that when temperature calibration is performed, is displayed under the temperature value on the measurement screen.

[IMPORTANT] • The setting range is $0.0 \sim 100^{\circ}$ C, but temperature cannot be calibrated more than $\pm 5.0^{\circ}$ C.

• When using electrode selectors, please note that the temperature calibration is unavailable for electrical conductivity cells without memory.

(3) Temperature calibration value initialization (reset)

On the "Perform temperature calibration" screen, the temperature calibration value can be initialized. Temperature calibration values are not initialized even if the instrument is initialized, so please follow these steps.

Operation procedure

Operation	

- (1) Display the "Menu" screen. ... On the measurement screen tap the (MENU) button.
- (2) Display the "perform temperature calibration" screen. … Tap the yellow "perform temperature calibration" icon.
- (3) Select temperature calibration value initialization. ... Tap the Reset button. The "perform temperature calibration values reset" confirmation dialog box displays.
- (4) Perform the initialization. --- Tap "OK" in the dialog box.
 - * The temperature calibration value is initialized.
- (5) If you do not wish to initialize. ... Tap "Cancel" in the dialog box.

8.22 USB memory stick operation

Various operations such as writing data can be performed if a USB memory stick is connected.

(IMPORTANT) • The write speed to the USB memory differs depending on the manufacture and product of the USB memory.

- Use a USB memory with memory capacity of 32GB or less.
- It will take longer to write to USB memory when there are more files.
- It is recommended to erase the data in the USB memory once the acquisition of data to a PC is completed.
- It is recommend to dedicate the USB memory for this instrument.
- A USB memory equipped with a security features (encrypting, verification features, etc.) cannot be used.
- When using a USB memory for the first time on this instrument, format to FAT16 or FAT32 with a PC. Other formats cannot be recognized.

When a compatible USB memory stick is connected to the device, the root folder "TOADKK_X" is automatically created in the USB memory stick.

Measurement data and instrument settings are stored in this folder.

This folder contains the following files.

- Data output from "settings exported to USB memory stick" → X_Series_setting.dat
- Measurement data written to the USB memory stick for each writing of measurement values and a copy of memory data

(The extension changes for each measurement item)

Example)

pH data	CH1_A_20151022_162210.phdx
ORP data	CH1_A_20151022_162210.ordx
Electrical conductivity data	CH1_A_20151022_162210.ecdx
Ion data	CH1_A_20151022_162210.iodx
Dissolved oxygen data	CH1_A_20151022_162210.dodx

• Measurement data that was written to the USB memory stick by the instrument's interval measurement (The extension changes for each measurement item)

Example)

pH data	CH1_A_20151022_162210.phix
ORP data	CH1_A_20151022_162210.orix
Electrical conductivity data	CH1_A_20151022_162210.ecix
Ion data	CH1_A_20151022_162210.ioix
Dissolved oxygen data	CH1_A_20151022_162210.doix

* The measurement data storage location when "copy instrument memory data to USB memory stick" is performed as follows.

Measurement data memory data, is divided and stored in the following folders for each memory data number.



(1) USB memory stick operation screen

Operation procedure

Operation	Screen example
(1) Display the "Menu" screen Tap the button in the measurement screen.	
 Display the "USB memory stick operation" screen Tap the yellow "USB memory stick operation" icon. If "security management" is set to "ON" the export to USB memory settings, loading from USB memory settings "software update" to run only the instrument Manager can be (instrument administrator for more information see "8.28 instrument administrator registration"). 	2015/04/17 11:47 III Operator ∕GUEST USB mem can be connected, and various oper such as writing the data can be performed.
 ③ To return to the "Menu" screen Tap the button (or the MENU button). ④ To return to the measurement screen Tap the button 	USB memory stick operation

(2) Write settings to USB memory stick when using data memory

Sets whether to write data to the USB memory stick each measurement when the USB memory stick is connected. The default setting is "OFF".

Operation procedure	
Operation	
1) Select "write to USB memory stick when using data memory" On the "USB memory stick	
operation" screen, tap "write to USB memory stick when using data memory".	

2 Select "ON" or "OFF". ... Tap "ON" or "OFF".

(3) Copy the instrument memory to the USB memory stick

This unit can memorize up to 2000 measurements, and this memory can be copied to a USB memory stick.

Memory data copy procedure

Operation
(1) Select "Copy the instrument memory data to USB memory stick" On the "USB memory stick operation" screen, tap the yellow "Copy the instrument memory data to USB memory stick" icon. The "Copy instrument memory data to USB memory stick" confirmation dialog box displays.
 Perform copying Tap "OK" in the dialog box. * All 2000 data items are copied.
* While copying do not switch off the main body.

(3) If you do not wish to copy. ... Tap "Cancel" in the dialog box.

(4) Format the USB memory stick

The USB memory stick is formatted.

(IMPORTANT) • Please note that the memory on the memory stick - all measurement data and other data - is erased.

Formatting procedure

Operation

① Select "Format USB memory stick". … On the USB memory stick operation" screen, tap the yellow "Format USB memory stick" icon. The "Format USB memory stick" confirmation dialog box displays.

(2) Perform formatting. ... Tap "OK" in the dialog box.

* While formatting do not switch off the main body.

③ If you do not wish to format. … Tap "Cancel" in the dialog box.

(5) Export settings to USB memory stick

Instrument settings are exported to the USB memory stick. Please note that if there is old data on the USB stick, the old settings will be overwritten.

Export to USB memory stick procedure

(1) Select "Export to USB memory stick settings". … On the "USB memory stick operation" screen, tap the yellow "Export to USB memory stick settings" icon. The "Export to USB memory stick settings" confirmation dialog box displays.

2 Perform export. ... Tap "OK" in the dialog box.

* While exporting do not switch off the main body.

③ If you do not wish to export. … Tap "Cancel" in the dialog box.

(6) Import settings from USB memory stick

Instrument settings are imported from the USB memory stick.

(IMPORTANT) • When settings are imported, the settings on the instrument are overwritten. However, even if a software update is carried out and the number of setting items increases, the setting items that exist will be overwritten with the imported contents. Setting items that do not exist will not be overwritten.

Operation	Screen example
① Display the "Perform import" screen On the "USB memory stick operation" screen, tap the yellow "import settings from USB memory stick" icon.	2015/04/17 11:47 Image: Connect the read of setting contents from USB memory Connect the USB memory for reading to The main unit. Tap the Execute button to execute when the Execute button changes to red. Execute read Caution : • Setting of inst is 0/W by cont that is read when rdg of set cont is executed. • Do not turn off the pwr of the inst while rdg.
(2) Import Tan Execute read. The "Import settings"	

Procedure to import settings

- (2) Import. … Tap Execute read. The "Import settings" confirmation dialog box is displayed.
 - * While importing do not switch off the main body.
- (3) Start import. --- Tap "OK" in the dialog box.
- ④ If you do not wish to import. … Tap "Cancel" in the dialog box.

(7) Software update

A software update is performed.

[IMPORTANT]	• Under no circumstances disconnect the AC adapter while the update is
	underway. Doing so will cause the instrument to no longer start.
	 Please initialize the instrument main body after a software update.
	Please refer to "8.32 Initialization" for the initialization procedure.

Software update step 1 (prior preparation)

Operation	
① Login to the service site Login to the membership services site from our website.	

- * Please register if you haven't already done so.
- (2) Open the "instruction manual" page. ... Click the "instruction manual" of the "product name".
- (3) Download the software. ... Click the main body software file name (X_Series_conv.bin), and perform the download.
- (4) Copy the file to a USB memory stick. ... Connect the USB memory stick to a PC and copy the downloaded files to the USB memory stick.
 - * When copying to the USB stick, place the file in the root folder. If the file is not in the root folder the update will not be able to run correctly.

* The software version information can be checked in "instrument management information" on the menu screen.

Operation	Screen example
Operation (1) Display the "Perform update" screen On the "USB memory stick operation" screen, tap the yellow "Software update" icon.	Screen example 2015/04/17 11:47 B Operator GUEST Execute the update of the software. Searching file to update the software. Tap the Execute button to execute when the Execute button changes to red. Execute update
	Caution : • Do not turn off the power of the instrument while updating. MENU

Software update step 2 (Perform the update)

Perform update screen

② Connect the USB memory stick. ... Connect the USB memory stick with the update files to the host instrument body.

* When the update file search ends, the **Execute update** buttons turns bright red.

(3) Perform update. ... Tap Execute update . The "Perform update" confirmation dialog box is displayed.

- Under no circumstances disconnect the AC adapter while the update is underway. Doing so will cause the instrument to no longer start.
- (4) Start update. --- Tap "OK" in the dialog box.
- (5) If you do not wish to update. ... Tap "Cancel" in the dialog box.
- (6) Restart the main body. ... Tap "Switch off power" in the dialog box, and turn off the power. After disconnecting and reconnecting the AC adapter, turn on the main body.
- * The software version information can be checked in "instrument management information" on the menu screen.

8.23 Setting the communication (RS-232C)

(1) Communication settings screen

Operation procedure



(2) Setting the communication speed (bps)

Sets the communication speed. The default setting is "9600".

Operation procedure

Operation
Select "communication speed (bps)" On the "communication settings" screen, tap the yellow

- Select "communication speed (bps)". ... On the "communication settings" screen, tap the yellow "communication speed (bps)" icon.
- (2) select the communication speed. ... Select and tap "19200", "9600", "4800", "2400", or "1200".

(3) Setting the data length (bits)

Set the length of the data. The default setting is 8 bit.

Operation procedure

Operation

(1) Select "data length (bits)". … On the "communication settings" screen, tap the yellow "data length (bits)" icon.

2 Select data length. ... Tap "7bit" or "8bit".

(4) Setting the parity

Set parity. The default setting is "NONE".

Operation procedure

Operation

① Select "parity". ... On the "communication settings" screen, tap "parity".

2 Select "NONE", "ODD" or "EVEN". ... Select and tap "NONE", "ODD" or "EVEN".

(5) Setting the stop bit

Set the stop bit. The default setting is "2" bit.

Operation procedure

Operation

① Select "stop bit". ... On the "communication settings" screen, select "stop bit".

2 Select the number of bits. ... Select and tap "1" or "2".

(IMPORTANT) • Simultaneous connection of USB (peripheral) and RS-232C is not possible.

8.24 Setting the communication (Bluetooth) * factory option

(1) Communication settings screen

Operation procedure	;
Operation	Screen example
(1) Display the "Menu" screen On the measurement screen tap the MENU button.	
② Display the "Communication settings" screen Tap the yellow "communication settings" icon.	2015/04/17 11:47 Coperator GUEST Setting for the communication can be Performed. RS232C setting Communication speed (bps) 19200 bps Date length (bit) 8 bit Date length (bit) 8 bit Parity NONE Stop bit 1 bit Bluetooth LE setting Instrument device address:::
(3) To return to the "Menu" screen Tap the button (or the MENU button).	
(4) To return to the measurement screen Tap the button.	

(2) BLE communication settings

The default setting is "ON".

Operation proc	cedure
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Operation

① Select "BLE communication" … On the "communication settings" screen, tap the yellow "BLE communication" icon.

2 Select "ON" or "OFF" ... Tap "ON" or "OFF".

(3) Start / clear pairing

Operation procedure

Operation

① "Start pairing" … On the "communication settings" screen, tap the yellow "start pairing" icon.

② A dialog box appears.

If the pairing is not completed … "Start the pairing?" If the pairing is completed … "Clear the pairing?"

(4) Regarding the BLE connection state

The BLE connection state changes as follows.

"Unpaired" --- Pairing with the PC is not implemented

"Waiting for connection" --- Pairing with the PC is completed and the device is waiting

"Connected" --- The PC and BLE communication are connected

(IMPORTANT) • This instrument uses wireless Bluetooth communication (V4.0 Low Energy standard).

- Threre is only one pairing info read memory, so if you change the PC to be connected it is necessary to clear the pairing then carry out pairing again.
- Bluetooth communication features can only be used when using the X-LOG data compilation software. Please refer to the X-LOG instruction manual for more information, including how to pair.
- This instrument uses wireless equipment that has acquired certification of construction type under the Radio Act regulations. Using the Bluetooth communication features in foreign countries may result in punishment, so please only use them within Japan. When taking the device overseas, set the "BLE communication" to "OFF" or clear the pairing.
- The device address refers to the unique address (number) assigned to each Bluetooth module.

8.25 Security management

- (a) This device has security management features to prevent tampering or removal of the instrument by others.
- (b) To perform this function, prior registration of the operators and instrument administrator is required. Please follow "8.26 Operator registration" and "8.28 Instrument administrator registration".

(1) Security management screen

Operation procedure

Operation	Screen example
 Operation ① Display the "Menu" screen On the measurement screen tap the MENU button. Scroll down/tap the ▼ button or swipe the screen with your finger and the menu screen displays. ② Display the "security management" screen Tap the yellow "security management" icon. * "Security management" and "erase all memory data" settings can only be changed by the instrument administrator 	2015/04/17 11:47 Security management can be performed. Operator ✓ GUEST The setting of security management can be performed. Security management OFF Memory loop OFF
administrator.	Operator select at startup OFF Erase all memory data Exec
	Security management screen
(3) To return to the "Menu" screen Tap the D button (or the MENU button).	
 ④ To return to the measurement screen Tap the button. 	

(2) Setting the security management

- (a) Set whether or not to perform security management.
- (b) If "ON" is selected, when the power is switched on the operator must be selected and the operator password must be input correctly or the device will not start. Also, operators other than the instrument administrator cannot do the following. The default setting is "OFF".
 - Erasing all memory data (this chapter)
 - Adding or removing instrument administrators ("8.28 Instrument administrator registration")
 - Operator deletion ("8.27 Operator editing, selection")
 - Initialization ("8.32 Initialization")
 - Export settings to USB memory stick ("8.22 (5) Export settings to USB memory stick")
 - Importing settings from USB memory stick ("8.22 (6) Import settings from USB memory stick")
 - Software update "8.22 (7) Software update"

However, "add or remove instrument administrator", "remove operator" can only be performed by an instrument administrator whether security management is set to "ON" or "OFF".

Operation procedure

(1) Select the "security management" screen On the "security management" screen, tap the yellow	Operation
© ••••••• ••••••••••••••••••••••••••••	1 Select the "security management" screen On the "security management" screen, tap the yellow

"security management" icon.

(2) Select "ON" or "OFF". ... Tap "ON" or "OFF".

(3) Setting the memory data overwrite (Memory loop)

This device can store up to 2000 measurements. If the number of data points exceeds 2000, the memory will behave as follows according to whether this setting is "ON" or "OFF". The default setting is "OFF".

- ON : Memory is overwritten in order starting from No.1.
- OFF : From the time of the operation to store measurement data, the following message is displayed at the bottom of the screen and data will not be stored even if a measurement data storage operation is performed. In order to store new measurement data, memory data must be erased. To erase the memory, please follow (5) Erasing all memory data.

-	
Memory is full.	

Operation procedure

Operation

(1) Select the "Overwrite memory". ... On the "security management" screen, tap the yellow "memory loop" icon.

(2) Select "ON" or "OFF". ... Tap "ON" or "OFF".

(4) Selecting the start up operator

Sets whether the operator selection screen is displayed when the device starts up or not.

Operation	Screen example	;
(1) Select the Select operator starts. ••• "Security management" screen, tap the start-up operator choose yellow	2015/04/17 11:47 ESA Select the operator.	
icon.	◯ 0. GUEST.	Login
	1. TOA Admin	Login
	0 2. toa	Login
	<u> </u>	Login
	8.	Login
	9.	Login
	<u> </u>	Login
	Select the start up o	perator

Operation procedure

2 Select "ON" or "OFF". ... Tap "ON" or "OFF".

(5) Erasing all memory data

(3) If "OFF" is selected in the memory overwrite settings, if the number of memory data points exceeds 2000, the message box will indicate that the memory has become full, and even if operation to store the measurement data is performed, data will no longer be stored. In order to store new measurement data, memory data must be erased. Furthermore, performing erase all memory erases all 2000 data points. Before you erase all memory please save required data.

(a) Saving memory data

Please save required memory data using one of the following methods.

1 Printing

Please print out the memory data following "8.17 Display of memory data, average value calculation, writing (USB memory), printing, erasing".

(2) Copying to USB

Copy the memory data to the USB memory stick following "8.22 USB memory stick operation".

③ Importing to PC

You can easily import the memory data into a PC using software to import in CSV format (data recording software X-LOG). For more details, please contact us.

(b) Performing memory all clear

Operation procedure
Operation
① Perform "memory all clear" On the "Security management" screen, tap Exec in "memory data all clear". The "memory all clear" confirmation dialog box displays.
2 Start all clear Tap "OK" in the dialog box.
* All memory will be erased.

③ If you do not wish to perform all clear. ... Tap "Cancel" in the dialog box.

8.26 Operator registration

- (a) This device can manage users with security management features (refer to "8.25 Security management").
- (b) If this feature is used, only registered operators can use the device.
- (c) There are two types, instrument administrators and operators (up to 25 people) and only instrument administrators can perform settings and operations related to altering memory data (clearing the memory data, changing date and time, security management settings, initialization etc.).
- (d) The first operator registrant is automatically an instrument administrator. For how to register instrument administrators, please refer to "8.28 Instrument administrator registration".
- (e) When the operator is registered and selected at start up of the device under "8.27 Operator editing, selection", the operator name is displayed on the measuring screen and is stored together with the measurement data. Also, when the data is output to a PC, the operator name is output along with the measurement data. If an external printer is used for printing, it is possible to print the operator name by selecting this in the printing settings.

(1) Operator registration screen

Operation procedure

Operation	Screen example	

(1) Display the "Menu" screen. ... On the measurement screen tap the MENU button.

- (2) Display the "operator registration" screen. … Tap the yellow "operator registration" icon.
 - * Screen to perform operator registration.



Operator registration screen

3 To return to t	the "M	enu" screen Tap the	ר
button (or the	MENU	button).	

④ To return to the measurement screen. … Tap thebutton.

(2) Setting the name

Register the name of the operator. The length is 12 characters or less. Note that up to 25 operators can be registered, and the first operator is automatically registered as the instrument administrator.

Operation	Screen example

Operation procedure

① Select "name". … On the "Operator registration" screen, tap the "name" input window.

(2) Input characters. ... Tap the keyboard to type characters.

- English: Switch to alphanumeric character input
- BS: Erase 1 character
- SPACE: input a space character
- \leftarrow : move the cursor to the left
- \rightarrow : move the cursor to the right
- Kana: kana (Japanese characters) input switch
- SHIFT: English upper/lower case switch
- ENTER: Confirm
- Cancel: return to operator registration



Operator name settings screen

(3) Modifying inputted characters. ... Move the cursor to the

right of the text you want to modify by tapping the **BS** button.

- * One inputted character is erased.
- ④ Confirm. … After completing name input, tap the ENTER button.
- (5) To finish part way through inputting a name. ... Tap the **Cancel** button.

(3) Setting the password

(2) Register the set operator's password under name settings. The length is 12 characters or less.

Operation	Screen example
① Select "name" On the "Operator registration" screen, tap	
the "name" input window.	
② Input characters Tap the keyboard to type characters.	2015/04/17 11:47 USBA
* Input cells will be displayed as "*".	A password up to 12 characters can be set.

Operation procedure

- BS: Erase 1 character
- \leftarrow : move the cursor to the left
- \rightarrow : move the cursor to the right
- SHIFT: English upper/lower case switch
- ENTER: Confirm
- Cancel: return to operator registration



Password settings screen

③ Modifying inputted characters. … Move the cursor to the right of the text you want to modify by tapping the BS button.

* One inputted character is erased.

- (4) Confirm. ... After completing password input, tap the ENTER button.
- (5) To finish part way through inputting a password. ... Tap the **Cance I** button.

(4) Performing operator registration

Perform registration for the operator set in the (2) name and (3) password settings.

Operation procedure
Operation
(1) Select "operator registration" On the "operator registration" screen, input (2) name setting and (3) password setting.
(2) Tap Exec to move to the registration screen.
 ③ Perform registration Tap the registration button for the number of the operator you wish to register. * Complete registration and return automatically to the "menu" screen.
(IMPORTANT) • Please note that If the button or button is tapped without performing operator registration and menu screen is returned to, or the button is tapped and the measurement screen is returned to, operator registration will not be performed and the settings in (2) and (3) will be lost.

8.27 Operator editing, selection

The registered operator can be displayed, selected, deleted or have his/her registration changed.

(1) Operator selection screen

Operation procedure

operation Selection Antiple	Operation	Screen example
-----------------------------	-----------	----------------

(1) Display the "Menu" screen. ... On the measurement screen tap the button.

(2) Display the "operator registration" screen. --- Tap the

yellow "operator selection" icon.



• Only when an instrument administrator enters this screen, when the operator names are tapped and selected, each operator can be edited, deleted or any operator can be set as an administrator. When a user other than an instrument administrator enters this screen, only the operator currently logged on may be edited.

- Tap the yellow operator name icon and select "edit" and the operator edit screen opens.
- Tap the Login of the operator name using the device and the password input screen displays. When the password is authenticated, the operator is selected.

(2) Delete operators

The registered operator is deleted. However, this operation can only be performed by an instrument administrator. In addition, the instrument administrator cannot to remove the last operator.

[IMPORTANT]	• Even if you are an instrument administrator, you cannot remove yourself.
	 The first administrator (top administrator) cannot be deleted.
	• If you need to delete the last operator, please perform "8.32 Initialization".
	However, note that all data will be lost.
	Operation procedure
	Operation

(1) Select "Operator name". … On the "Select operator" screen, tap the yellow icon by the operator name you wish to delete.

2 Select delete. ... Tap "delete". The "Delete operator name" dialog box is displayed.

③ Perform delete. ... Tap the dialog box "OK".

(4) If you do not wish to delete. ... Tap "Cancel" in the dialog box.

(3) Change operator registration (operator edit)

Change the name and password of the registered operator.

Operation procedure

	Operation	Screen example
--	-----------	----------------

(1) Select operator name. ... On the "Select operator" screen,

tap the yellow icon by the operator name you wish to change.

(2) Display the "operator edit" screen. --- Tap "edit".





- (3) Change operator name. ... Tap the name input window.
- Edit name. ... Tap the keyboard to type a character The name can be edited. For more information please refer to "8.26 Operator registration (2) Setting the name".
- (5) Change password. ... Tap the "password" input window.

(continued)

Operation	Screen example
6 Edit name Tap the keyboard to type a character	
* The password can be edited. For more information please	
refer to "8.26 Operator registration (3) Setting the	
password".	
* Input cells will be displayed as "*". To modify the	
characters, tap the BS button and delete one character.	
⑦ Registration of name and password After entering	
the name and password, tap the Exec button.	
* Complete the operator registration change.	
[IMPORTANT] • Please note that if the	or MENU button is tapped and the
menu (2/2) screen is returned to, or i	f the button is tapped and the
measurement screen is returned to,	the operator will not be registered and
the settings in (3) will be lost.	

(4) Operator selection

Select the operator to use the device.

Operation procedure
Operation
 Select "Operator name" On the "select operator" screen, tap Login for the operator to use the device. * The password input screen is displayed.
 (2) Input password Tap the keyboard to type a character. * For more information please refer to "8.26 Operator registration (3) Setting the password". * Input cells will be displayed as "*". To modify the characters, tap the BS button and delete one character.
3 Confirm After completing password input, tap the ENT button.

* The "measurement screen" is displayed, and the operator name changes.
8.28 Instrument administrator registration

- (a) When performing security management features, only instrument administrator has the rights for the following settings and operations.
 - Memory all clear (refer to 8.25 (5) Erasing all memory data)
 - Instrument administrator registration, cancellation (this chapter)
 - Operator deletion ("8.27 Operator editing, selection")
 - Initialization ("8.32 Initialization")
 - Export settings to USB memory stick ("8.22 (5) Export settings to USB memory stick")
 - Importing settings from USB memory stick ("8.22 (6) Import settings from USB memory stick")
 - Software update "8.22 (7) Software update"

However, "add or remove instrument administrator", "remove operator" can only be performed by an instrument administrator whether security management is set to "ON" or "OFF".

(b) The first operator registrant is automatically an instrument administrator. The instrument Manager registration instrument administrators only.

(1) Operator selection screen

Operation procedure

Operation	Screen example

- (1) Display the "Menu" screen. ... On the measurement screen tap the MENU button.
- (2) Display the "operator registration" screen. ... Tap the

yellow "operator selection" icon.



(Continued)

(continued)

Operation	Screen example
(3) To return to the "Menu" screen Tap the button (or the MENU button).	
 To return to the measurement screen Tap the button. 	

(2) Deletion of instrument administrator

The administrator registration of the operator registered as an instrument administrator is deleted.

However, the operator performing this operation cannot change his/her own registration. Also, the first administrator (top administrator) cannot be deleted.

Operation procedure

(1) Select "Operator name". … On the "Select operator" screen, tap the yellow icon by the instrument administrator name you wish to delete.

- (2) Delete instrument administrator. ... Tap "delete manager".
 - * The instrument administrator is removed, and the "administrator" display is erased.

(3) Registration of instrument administrator

Register an operator not registered as an instrument administrator. However, the operator performing this operation cannot change his/her own registration.

Operation procedure

Operation
1) Select "operator name" On the "Select operator" screen, tap the yellow icon by the operator name
you wish to register as an instrument administrator.

(2) Register as instrument administrator. ... Tap "set as administrator".

* The operator is registered as an instrument administrator and "administrator" is displayed.

8.29 Instrument management information

- (a) Input the management expiration date settings and comments.
- (b) Only an instrument administrator can change settings and input when the security management feature is switched ON, operators other than instrument administrators can only refer to the settings.
- (c) When the security management feature is switched OFF, operators other than instrument administrators can also change settings and input.

(1) Instrument management information screen

Operation procedure

Operation	Screen example
 Display the "Menu" screen On the measurement tap the <u>MENU</u> button. 	screen
② Display "Instrument management information"	
screen Tap the yellow "Instrument management	
information" icon.	
	2015/04/17 11:47 TRANSPORT Setting for the instrument management Information can be performed.
This information about sets and electrodes (electrical conductivity cells) is retrieved automatically.	Instrument model name CM-42X Instrument serial number 522961 Inst mngt expiration 2015/03/16
	Instrument comment Instrument comment Cell name Cell serial number 502F0334 Cell mngt expiration 2015/06/30 Cell comment Cell comment Cell comment Cell comment Cell comment Cell comment Cell comment Cell comment Cell serial number 2015/03/16 15:10:50 Software version information Main:Ver.1.0 Loader:Ver.1.0
	Instrument management information screen
(3) To return to the "Menu" screen Tap the (or the MENU button).	button
 To return to the measurement screen Tap the button. 	

(2) Setting the administrative deadlines

Used to set items such as set or electrical conductivity cell maintenance times and administrative deadlines. If an administrative deadline is set, when the set date is passed, a message displays at the bottom of the measurement screen.

Operation procedure

Operation	Screen example

① Select "instrument administrative deadline",

"electrode administrative deadline". ... On the

"instrument management information" screen, tap the yellow "instrument administrative deadline" or "cell administrative deadline" icon.

② Input the administrative deadline. … Tap the input window of the item you wish to set (hours, minutes and seconds). Or move to the item you wish with the keypad → button.

Input a number by tapping the keypad. Or tap the " \blacktriangle (up)/ \blacktriangledown (down)", buttons to input the setting value.



Administrative deadline input screen example

③ Confirm. ... Tap the **ENT** button.

(3) Input a comment

Please input comments, such as from the instrument and electrical conductivity cell administrator and calibrator of no more than 20 characters.

Operation procedure
Operation
① Display "comment input screen" On the "instrument management information" screen, tap the input window of "instrument comment" or "cell comment".
 (2) Input comment Tap the keyboard to type characters. * A comment can be input. For more information please refer to "8.26 Operator registration (2) Setting the name".
 ③ Confirm After completing input of the sample comments, tap the END button. * Complete input and return to the "instrument management information" screen.

(4) Setting the date and time

Set the date and time. >> Refer to "8.30 Setting the time"

8.30 Setting the time

Set the date and time.

(1) Instrument management information (time settings) screen

Operation procedure Operation Screen example ① Display the "Menu" screen. ... On the measurement screen tap the [MENU] button. 2015/04/17 11:47 💼 🖻 Setting for the instrument management (2) Display "Instrument management information" screen. ... Tap the yellow "Instrument management Information can be performed. information" icon. Instrument model name CM-42X Instrument serial number 522961 Inst mngt expiration 2015/03/16 Instrument comment Instrument comment Cell name GST-5741C Cell serial number 502F0334 Cell mngt expiration 2015/06/30 Cell comment Cell comment Date and time 2015 / 03 / 16 15 : 10 : 50 Software version information Main:Ver.1.0 Loader:Ver.1.0 MENU 7 Instrument management information screen ③ To return to the "Menu" screen. … Tap the (or the MENU button). (4) To return to the measurement screen. ... Tap the ♠ button.

Operation procedure

Operation	Screen example

- (1) Select "date and time". ... On the "instrument management information" screen, tap the yellow "date and time" icon.
- ② Display "Date and time settings" screen. … Tap the yellow "Date and time settings" icon.



Date and time settings

- ③ Set the "date" and "time". … Tap the input window of the Item you wish to set (hours, minutes and seconds). Or move to the item you wish with the keypad → button.
 Input a number by tapping the keypad. Or tap the "▲ (up)/▼ (down)", buttons to input the setting value.
- (4) Confirm. ... Tap the **ENT** button.

8.31 Help

Maintenance methods, problem solutions, special solution measurement, contents, causes and measures for error messages for the device are displayed.

(1) Help screen

Operation	Screen example
(1) Display the "Menu" screen On the measurement screen tap the MENU button.	
 ② Display the help screen Tap the yellow "Help" icon. ③ To return to the "Menu" screen Tap the button (or the Menu button). ④ To return to the measurement screen Tap the to button. 	2015/04/17 11:47
Help reference procedu	ure
Operation	
① Switch to the help item On the "help" screen, tap the yell	ow icon for the item you wish to refer to.

* Description of the item is displayed. Please follow the instructions.

8.32 Initialization

- (a) In the case that this device becomes completely inoperable or abnormal display occurs, there are cases where performing initialization returns the device back to normal.
- (b) Please note that initialization clears the memory and settings and memory will be lost. Also, if security management function is switched ON, operators other than instrument administrators cannot perform initialization.

(1) Initialization screen

Operation procedure

Operation	Screen example
① Display the "Menu" screen On the measurement screen tap the MENU button.	
(2) Display "initialization" screen Tap the yellow "Initialization" icon To tap.	2015/04/17 11:47 The instrument main unit can be initialized. All settings are returned to the factory settings. (Meas vals and memory data are erased. However, CALMEMO data and calib data are not erased.)
(3) To return to the "Menu" screen Tap the button (or the MENU button).	
(4) To return to the measurement screen Tap the measurement screen.	

(2) Perform initialization

Perform the initialization of the instrument main body.

(IMPORTANT) • After the initialization of the instrument main body down, switch the power OFF, disconnect and reconnect the AC power plug and restart.

	Operation procedure
	Operation
① Display "initialization	"screen Tap the yellow "Initialization" icon
② Perform initialization.	••• Tap Exec . The "Initialization" confirmation dialog box displays.
3 Start initialization 7	`ap "OK" in the dialog box.

(4) If you do not wish to initialize. ... Tap "Cancel" in the dialog box.

8.33 Function of electrode with memory

This device can connect the electrical conductivity cell with a built-in memory. Functions of the electrical conductivity cell with memory are as follows.

(1) Items and contents that can be recorded in the electrode

The items that are recorded in the electrical conductivity cell are described in the following table.

Item	Content		
Model	This is recorded at the time of shipment, and it cannot be changed.		
Production number	This is recorded at the time of shipment, and it cannot be changed.		
Cell constant	This is recorded at the time of shipment, and the cell constant at the time of shipment is always read into the main unit unless calibration of the cell constant by the standard solution is performed.		
Management expirationThis is recorded automatically when the electrode management exp entered. >> "8.29 (2) Setting the administrative deadlines"			
Comment	This is recorded automatically when the electrode comment is entered. >> "8.29 (3) Input a comment"		
Temperature calibration	Recorded during the temperature calibration.		
Newest cell constant calibration data	This is recorded when the calibration of the cell constant is performed with the standard solution, and performed the recording operation. This data is always read into to the instrument main unit as the cell constant when the calibration is performed. >> "8.5 Calibration of the cell constant"		
Cell constant calibration history Maximum of 10	This is recorded when the calibration of the cell constant is performed with the standard solution, and performed the recording operation. 10 histories including the newest calibration data can be recorded. Recording of the eleventh set will overwrite the oldest set. >> "8.5 Calibration of the cell constant"		

Items that are recorded or items that can be recorded in the electrode with memory

(2) Useful function of the electrode

(a) Setting of the cell constant is not required

Since the cell constant is recorded in the electrical conductivity cell itself, it is not necessary to enter the cell constant with the key operation. Also, there is no worry of entering wrong numeric value.

(b) When using multiple sets

Up to 10 calibration history of the cell constant can be recorded, so amount of deterioration of the cell can be checked by referencing the history.

9 Application of Measurement

9.1 Measuring special solution

(1) Measurement of electrical conductivity in pure water region

Generally, the electrical conductivity will rise 2% when the temperature rises 1°C. On the other hand, the percentage of electrical conductivity by the disassociation against the total electrical conductivity will become larger, and the change of the electrical conductivity will become larger than general 2% per 1°C in the high pure water region with very low electrical conductivity. Therefore, it is not sufficient with only the general temperature compensation of the electrolyte solution with the electrical conductivity measurement in the pure water region (sample with 0.1mS/m at 25°C).

So it is necessary to perform the temperature compensation against the electrolyte together with the temperature compensation against the disassociation of water (double temperature compensation) for the highly purified water.

The electrical conductivity can be calculated from following formula for the highly purified water at 25°C (compliant to JIS K 0130).

 $\kappa_{x25}(S/m) \ = \ \kappa_{xt} \swarrow Q_t + (1 - P_t \swarrow Q_t) \kappa_{w25} \ (1 - P_t \checkmark Q_t) \kappa_{w25} \ (1 - P_t \land Q_t) \kappa_{w25} \ (1 - P_t$

- κ_{x25} : Electrical conductivity at 25°C (S/m)
- κ_{xt} : Electrical conductivity at t°C (S/m)
- κ_{w25} : Electrical conductivity of pure water at 25°C (S/m)
- Pt : Temperature compensation factor of pure water
- Qt : Temperature compensation coefficient of impurity electrolyte
 (Normally the temperature compensation coefficient 1.985 of sodium chloride solution is used)

Also, the temperature compensation factor for pure water (P_t) is acquired from "Electrical conductivity of pure water".

Temperature	Electrical conductivity of pure water
0°C	0.0011649 mS/m
5	0.0016607
10	0.002310
15	0.003143
20	0.004194
25	0.005501
30	0.007101
35	0.009037
40	0.011351
45	0.014081
50	0.017268
55	0.02095
60	0.02514
65	0.02987
70	0.03516
75	0.04102
80	0.04744
85	0.05444
90	0.06205
95	0.07030
100	0.07930

Electrical conductivity of pure water

This electrical conductivity meter is equipped with "double temperature compensation" for highly purified water. To perform the measurement of pure water region, set the temperature compensation to "Pure water".

It is possible to use the low electrical conductivity measurement cell (CT-58101C) as the electrical conductivity cell to be used, but to measure more accurately considering the dissolving of carbon dioxide in the atmosphere, use the dedicated flow-through type electrical conductivity cell for pure water (CT-27111D).

(2) High temperature or low temperature solution

Never apply sudden temperature change (50°C or more) to the electrical conductivity cell since it may damage the cell.

Also, since the temperature measurement cell is inside the electrical conductivity cell, it will take time to reach the temperature equilibration when the temperature difference is high, and the electrical conductivity value will change during that period. Read out the electrical conductivity value after confirming the temperature indication has stabilized.

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(3) Solution including non-aqueous medium

The temperature factor of the aqueous solution is generally 2% per 1°C, but the temperature factor for non-aqueous medium varies depending on the solvent. Therefore, it is necessary to acquire the temperature factor of the non-aqueous medium depending on the sample. However, the relationship of the temperature and the electrical conductivity value is not always linear, so it is necessary to acquire the precise relationship of the temperature and the electrical conductivity in advance, and create the linear or curvilinear temperature compensation relationship formula.

Refer to "8.3 (8) Setting the linear temperature compensation factor" for the details of how to calculate the temperature factor.

(4) Solution including solid material

The platinum black may detach from the pole plate of the electrical conductivity cell by contacting the solid material with the solvent containing solid material. Note that the cell constant will change when the platinum black is detached, making it impossible to perform accurate measurement due to deterioration of the linearity.

9.2 Temperature management with electrical conductivity measurement

If the relationship with the electrical conductivity can be achieved to the change of the sample concentration, it is possible to create the concentration characteristics curve (standard curve) by creating solution with few types of concentration by diluting the sample, and measuring the electrical conductivity of each. By using this function, it is possible to manage the concentration of the sample by the electrical conductivity measurement.

(IMPORTANT) • It is possible to make more accurate measurement by setting the temperature factor for that solution when the temperature of the solution to perform the concentration control is not constant.

10. Connection with Peripherals

10.1 Peripherals that can be connected

- (a) Peripheral and contents as an optional device is indicated in the table below.
- (b) Use the A type (male) MicroB type (male) USB2.0 compliant and less than 3m long as the USB communication cable.
- (c) Refer to each item for the connection methods and features of these.

```
[IMPORTANT] • Proper communication may not be possible due to noise during the
communication with a PC via USB, so it is strongly recommended to use a
USB communication cable with a ferrite core. It is also strongly
recommended to attach a ferrite core.
```

• Use a PC for communication compliant with the safety standard (IEC60950-1 or IEC61010-1).

Peripheral	Content	
External printer EPS-P30	This is an external printer using a plain paper type printer paper	
Cell selector ES-1GC	Up to 5 electrodes can be connected and switched between and used	
Turntable • TTT-710 • TTT-510	Multiple samples can be automatically measured continuously	
Control box AC-1V	Controlling of pump, etc., is possible using the upper and lower limit output	
Personal computer	Use a PC for communication compliant with the safety standard (IEC60950-1 or IEC61010-1).	
USB memory	Data can be written to a USB memory Use the one not equipped with the security features, memory capacity of 32GB or less, and formatted to FAT16 or FAT32 with a PC. The USB3.0 compatible USB memory will operate as USB2.0.	

Peripherals that can be connected and Contents

(IMPORTANT) • Always turn OFF the power of the external device to be connected to the main unit when connecting the external device.

- Do not operate with wet hands when connecting to an external device.
- Use the product specified by TOA-DKK for the connecting cable, etc.

10.2 Connection of the external printer

This instrument can connect an external printer using a plain paper type printer paper, and print the measurement results and calibration results.

[IMPORTANT] • Always use the optional part of TOA-DKK as the connecting cable for the external printer. Never use the one not supplied from TOA-DKK.

(1) Connection method

(Connection method: Perform following operation after confirming that the power of the device is turned OFF.)

(1) **Connect**. Connect the supplied external printer connection cable connector to the external connector (1) or the external connector (2) at the side of the main unit. The external connector will automatically identify the connection cable, so it will operate normally regardless of which connector is connected.



- (2) Confirm the printer operation. Please refer to the external printer instruction manual and put the printer into a state where it can operate.
- ③ Press the power switch and display the measurement screen.

(2) Settings

Refer to "8.18 Setting the print items" for setting the print item of the printer.

(IMPORTANT) • Printing cannot be canceled once it is started. Take extra caution when setting of the print range.

(3) How to use

Refer to "8. How to Use Various Features" and the Instruction Manual of the external printer for printing to the printer.

(4) About the paper end detection function of the external printer

The external printer (optional) has a paper end detection features (paper near end sensor features), and the sensor will detect that the printer paper is near the end and stops accepting the printing. This is a feature to prevent printing without any paper, but because of this features, it is not possible to use the printer paper all the way to the end. Disable the paper end detection features to use paper right until the end.

(IMPORTANT) • The paper end detection feature is enabled at the time of delivery.
• The paper end detection for the printer paper is not performed when the paper end detection feature is disabled, so use taking caution of the remaining of the printer paper.

(5) Procedure to disable the paper end detection features

Operation	Screen example
 Turn OFF the power of the printer. Remove the paper Open the printer paper cover and remove the paper. Turn on the dip switch No. 4 Push up the dip switch No. 4 in the center to turn it ON. 	ON 日日日日日日日 12345678
 ④ Set the paper Turn ON the power and set the paper. ⑤ Print the print sample 1 Turn on the power while pushing the [SEL] button on the printer, and print the print sample 1. 	Turn ON the switch No. 4Memory SW Information1:CountryJPN2:Codepage910Jpn3:EmulationCBM-9104:ACK TimingBefore5:PNE SensorEnable6:P-ON SelSelect7:BUSYStandard8:Buffer2Kbyte <sel:select< td="">/ LF:Next>1:CountryJPN</sel:select<>
	Drint comple 1

(continues)

(Continued)

Operation	Screen example		
(6) Print the print sample 2 Press the [SEL] button to print the print sample 2.	2:Codepage 910Jpn		
	Print sample 2		
⑦ Print the print sample 3 Press the [SEL] button to print the print sample 3.	3:Emulation CBM-910		
	Print sample 3		
(8) Print the print sample 4 Press the [SEL] button to print the print sample 4.	4:ACK Timing After		
	Print sample 4		
(9) Print the print sample 5 Press the [SEL] button to print the print sample 5.	5:PNE Sensor Enable		
	Print sample 5		
(1) Print the print sample 6 Press the [LF] button to print the print sample 6.	Disable?		
	Print sample 6		
(1) Print the print sample 7 Press the [SEL] button to print the print sample 7.	6:P-ON Sel Select		
	Print sample 7		
(1) Print the print sample 8 Press the [SEL] button to print the print sample 8.	7:BUSY Standard		
	Print sample 8		
(1) Print the print sample 9 Press the [SEL] button to print the print sample 9.	8:Buffer 2Kbyte		
	Print sample 9		

(continues)

(Continued)	
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Operation	Screen example	
 (1) Print the print sample 10 Press the [SEL] button to print the print sample 10. If the [SEL] button was pressed by mistake incited of the [LF] button in Step (10), it will return to Step (5) by pressing the [LF] button here. (1) Print the print sample 11 Press the [SEL] button to print 	//SEL:Write :Retry// Print sample 10 Memory SW Information	
 the print sample 11. Change has completed normally when [5:PNE Sensor Disable] is printed. Change is not completed when [5:PNE Sensor Enable] is printed. 	1:CountryJPN2:Codepage910Jpn3:EmulationCBM-9104:ACK TimingBefore6:P-ON SelSelect5:PNE SensorDisable7:BUSYStandard	
(f) Cycle the power Turn OFF the dip switch No. 4 by pushing it down, and turn the power OFF and then ON.	8:Buffer 2Kbyte Write in Now。。。 Please Power OFF	
	Print sample 11	

[IMPORTANT]	• Make sure to	o return the	dip switch No	. 4 to OFF
-------------	----------------	--------------	---------------	------------

• The SEL lamp will stay lit instead of flashing even when the printer paper is not set if the paper end detection features is disabled.

10.3 Connection of the cell selector

This device can connect an electrical conductivity cell selector that can use up to 5 electrical conductivity cells (ES-1G or similar).

(IMPORTANT) • Always use the optional part of TOA-DKK as the connecting cable for the electrode selector. Never use the one not supplied from TOA-DKK.

(1) Connection method

- ① Connect the cell plug. …… Place the instrument on top of the cell selector as shown in figure below, and connect the cell plug of the cell selector to the cell jack of the device.
- ② Connecting with the cell selector connection cable. Connect the TO OPTION2 connector of the cell selector to the OPTION connector of the instrument with the cell selector connection cable as shown in figure below.



(2) Settings

To set the cell changer, please refer to "8.2 (4) Setting the cell selector".

(3) How to use

- (a) The display of the measurement screen will change as the following example when "8.2 (4) Setting the cell selector" is set to "Yes".
- (b) Please tap the channel display unit and select the No. $(A \sim E)$ of the cell to be measured for use.
- (c) Refer to the instruction manual supplied with each cell selector for how to use each cell selector.



(IMPORTANT) • When using cell selectors, please note that temperature calibration is unavailable for electrical conductivity cells without memory.

10.4 Connection of the turntable

- (a) This instrument can connect a turntable TTT-710 or TTT-510 to perform the multiple samples automatic continuous measurement.
- (b) Purchase the optional X series TTT connection 232C cable 2m Cross when connecting.
- (c) Only 1 turntable can be connected.

[IMPORTANT] • Always use the optional part of TOA-DKK as the connecting cable for the turntable. Never use the one not supplied from TOA-DKK.

(1) Connection method

(Perform the following operation after confirming that the power of the device and the turntable is turned OFF.)

Connect the RS232C connector of the TTT-710 to the external connector (1) or the external connector (2) of the instrument as shown in figure below. The external connector will automatically identify the connection cable, so it will operate normally regardless of which connector is connected.



Turntable connection cable for X series (7433040K)

(2) Settings

Please refer to "8.20 Execute measurement and turntable settings" for setting the measurement and calibration of the turntable.

(IMPORTANT) • Turn the turntable power supply ON after turning the device power switch ON.

(3) How to use

Please refer to "8.20 Execute measurement and turntable settings" for executing the measurement and calibration of the turntable. Refer to the Instruction Manual supplied with the turntable for the detailed method to use the turntable.

10.5 Connection of the control box

This instrument can connect a control box (AC-1V) to control pump, etc.

[IMPORTANT] • Please be sure to use our optional parts for the control box connection cable (analog output cable). Never use the one not supplied from TOA-DKK.

(1) Connection method

Open the cover at the left side of the instrument and connect the OPTION connector on the instrument to the terminals on the rear of the control box as shown in the figure below.



(2) Settings

If you are using a control box, please refer to "8.10 Setting the alarm" and set the upper and lower limit values that you want to control.

(3) How to use

Refer to the Instruction Manual supplied with the control box for the detailed method to use the control box.

10.6 Connection of the personal computer

CM-42X can be connected to a USB peripheral and to a PC via RS-232C.

(1) Connection method using RS-232C

(Connection method: Perform following operation after confirming that the power of the device is turned OFF.)

Connect the connector. Open the cover on the left side of the instrument and connect the connection cable connector to the external connector (1) or the external connector (2). The external connector will automatically identify the connection cable, so it will operate normally regardless of which connector is connected.



- 2 Confirm the operation of the PC. Set the PC so it can be operated referring to the Operating Instruction of the PC.
- ③ Press the power switch of the instrument and display the measurement screen.
- (IMPORTANT) Perform the setting referring to "8.23 Setting the communication (RS-232C)" section when a PC is connected. Set the instrument and the PC with the same communication condition.

(2) Connection using a USB peripheral

- (a) The data for measurement value and calibration value can be acquired into a PC by connecting to the instrument main unit with a USB communication connection cable.
- (b) Use the A type (male) MicroB type (male) USB2.0 compliant and less than 3m long as the USB communication cable.
- (c) TOA-DKK has prepared a software "data acquisition software X-LOG" (optional) to acquire the measurement data to a PC in a CSV format. Table and graph can be created using the commercially available spreadsheet software from the data saved with this software (contact TOA-DKK for details).

(IMPORTANT) • It is necessary to install a driver to the PC when connecting via USB to the PC, but the driver is automatically installed to the PC when CM-42X is connected to the PC, so this step is basically not necessary.

- It is necessary to install the newest driver manually for the port where the driver was deleted or when the connection is not recognized from the beginning.
- The USB product for CM-42X is using the FTDI FT232R, and newest driver can be downloaded from the website of FTDI.
- [IMPORTANT] Proper communication may not be possible due to noise during the communication with a PC via USB, so it is strongly recommended to use a USB communication cable with a ferrite core. It is also strongly recommended to attach a ferrite core.
 - Use a PC for communication compliant with the safety standard (IEC60950-1 or IEC61010-1).
- ① Confirm the power is OFF. Confirm that the power of the instrument main unit is OFF.
- 2 Connect to the PC. Connect to the PC with a USB communication connection cable.
- ③ Turn ON the power switch. Turn ON the power switch of the instrument main unit.



* Micro USB cable is a commercial product

10.7 Connection of the USB memory

This instrument can write data, etc., to a connected USB memory.

- **(IMPORTANT)** The write speed to the USB memory differs depending on the manufacture and product of the USB memory.
 - Use a USB memory with memory capacity of 32GB or less.
 - It will take longer to write to USB memory when there are more files.
 - It is recommended to erase the data in the USB memory once the acquisition of data to a PC is completed.
 - It is recommended to dedicate the USB memory for this instrument.
 - A USB memory equipped with a security features (encrypting, verification features, etc.) cannot be used.
 - When using a USB memory for the first time on this instrument, format to FAT16 or FAT32 with a PC. Other formats cannot be recognized. The USB3.0 compatible USB memory will operate as USB2.0.

(1) Connection method

Open the cover at the left side of the instrument and connect the USB memory.



(2) Setting method and how to use

To use a USB memory, perform the setting and use referencing the following.

>> "8.22 USB memory stick operation", "8.17 Display of memory data, average value calculation, writing (USB memory), printing, erasing"

(3) About the saved data

- (a) To acquire the data written to a USB memory (CSV format) to a PC, a software (data compilation software X-LOG) is required.
- (b) The data saved with this software can be used to create table or graph using the commercially available spreadsheet software.
- (c) Refer to the Instruction Manual of the data compilation software (X-LOG) for details.

10.8 Other connection to the external device

This instrument can be connected to a recorder, etc., using the optional (sold separately) analog output cable. Also, there is an open collector output features as an alarm output (upper and lower limit output).

(1) Analog output cable connection method

Open the cover at the left side of the instrument and connect the dedicated analog output connection cable to the OPTION connector.



(2) CM-42X analog output specification

	Electrical con	l conductivity		000mV (each rai	nge)		
	Electrical resistivity		0~1	0~1000mV (each range)			
	Tempera	ture	0~1	000mV (0~100°C	C)		
	TDS		0~1	000mV (each rai	nge)		
Analog output	Saline (NaCl conv	Saline (NaCl conversion)		04Mv (0.00~4.04	4%)		
	Saline (PSS-78 con	e version)	0~42	24mV (0.00~42.	4psu)		
	Concentra convers	ation ion	0~1	000mV (each rai	nge)		
					~ 1		
Range output	Electrical	Electri	cal	TDS	Salt	Salt	Concentration
voltage	conductivity	resistiv	ity		NaCl conversion	PSS-78 conversion	conversion
0mV	199.9uS/m	19.99M	Ω·m	99.99mg/L	4.00%	42.40%	1.999%
100mV	1.999mS/m	1.999M	Ω·m	999.9mg/L			19.99%
200mV	19.99mS/m	199.9k	Ω·m	9.999g/L			199.9%
300mV	199.9mS/m	19.99k	Ω·m	99.99g/L			
400mV	1.999S/m	1.999k	Ω·m	999.9g/L			
500mV	19.99S/m	199.9	Ω∙m				
600mV	199.9S/m	19.99	Ω∙m				
700mV		1.999	Ω∙m				

(3) For the pin at the time of the analog output cable connection

Terminal	Output content	Terminal	Output content	
number	Ouput coment	number		
1	CH1 analog output \oplus	9	CH1 range \oplus	
2	CH1 analog output ⊖	10	CH1 range \bigcirc	
3	CH1 temperature \oplus	11	Not used	
4	CH1 temperature \bigcirc	12	Not used	
5	Not used	13	Open collector upper limit 1 \oplus	
6	Not used	14	Open collector upper limit 1 \bigcirc	
7	Not used	15	Open collector lower limit 2 \oplus	
8	Not used	16	Open collector lower limit 2 \bigcirc	

When CM-42X is connected

(IMPORTANT) • Insulate unused terminals using an insulation tape, etc., so it will not short with other terminal. Also, make connection after turning OFF the power of the instrument.

(4) Alarm output

- (a) Concerning the upper and lower limit output, the output will appear depending on the set value in "8.10 Setting the alarm" (the transistor switches ON when it exceeds the upper or lower limit value). Please refer to "8.10 Setting the alarm" for how to set the upper and lower limits.
- (b) The output is an open collector output, so it can directly drive if it is a small relay. Use a relay for voltage DC25V or lower and current 50mA or lower.



The range of the upper and lower limit output can be changed by the setting. Refer to alarm setting for each measurement item for how to set.

	VARNING Failure, ignition, electric shock	●Never connect AC100V or a relay exceeding DC25V,
		50mA to the upper and lower limit output terminal. Also,
		make connection after turning OFF the power of the
		instrument. If not, it may cause failure, fire, or electric shock.

11. Maintenance

11.1 Cleaning the main unit

To clean the dirt from the instrument, wipe with a dry cloth or tissue paper that is made with a soft material. If it is heavily tainted, wipe with a gauze, etc., that is soaked in diluted neutral detergent and wrung hard.

	Failure and electric shock	 Never wipe with a cloth soaked in water or wash with liquid. It may cause failure of the instrument or electric shock.
[IMPORTAN	T · Never use instrument	organic solvent such as thinner when wiping dirt off from the . Wiped area may discolor.

11.2 Replacing the printer paper (when optional printer is connected)

Check the remaining of the printer paper before using.

Refer to "Instruction Manual of the external printer" for replacement method.

(IMPORTANT) • Always use the specified product for the printer paper. Using other paper may result in failure.

11.3 Replacing the electrical conductivity cell

Replace with a different electrical conductivity cell using the following procedure.

- ① Turn OFF the power of the main unit.
- 2 Disconnect the electrode plug. Turn only the mounting ring counterclockwise to

unlock, and pull out the electrode plug. Take caution not to turn the electrode plug body at this time.



- (3) Inserting the electrode plug. Please put the "O" mark on the tip of the electrode plug of the electrical conductivity cell to be replaced facing up, and insert the electrode jack on the rear of the main body straight.
- (4) Lock. Once it is inserted all the way in, turn only the mounting ring clockwise to lock. Take caution not to turn the electrode plug body at this time.



Caution: Never turn the plug body.

(5) Turn ON the power of the main unit. Once the electrode plug is securely connected, turn ON the power of the main unit. The model, production number, calibration value, etc., recorded in the memory are automatically sent to the device when an electrical conductivity cell with memory is connected.

[IMPORTANT]	 Disconnect/connect the electrode plug after turning OFF the power. 		
	 The memory of the electrode may get erased when disconnection/ 		
	connection of the electrode plug is performed within 2 seconds after		
	completing the calibration or within 2 seconds after recording the history.		
	(When sensor with built-in memory is used)		
	 The memory may not be read correctly when the electrode plug is 		
	disconnected/connected in a screen other than the initial screen.		
	 Memory of the electrode may get erased when frequently repeating 		
	connecting the electrode plug immediately after disconnecting, or		
	disconnecting the electrode plug immediately after connecting.		

11.4 Replacing the clock backup battery

- (a) This instrument is using a backup battery to maintain the operation of the clock even when the AC adapter is disconnected.
- (b) The indication of battery replacement is approximately 1 year after installing a new battery. The battery is worn out when the clock is not indicating correct time after connecting the AC adapter and started up, so replace the battery.
- 1 Prepare a new battery. Purchase a lithium battery CR2032.
- 2 Disconnect the plug. Turn OFF the power of the instrument and disconnect the plug of the AC adapter.
- ③ **Remove the old battery**. …… Remove the battery cover at the bottom of the instrument and remove the old battery.



- (4) Replacing the battery. When replacing put the + side to the top.
- (5) Attach the battery cover as it was originally.



(6) Set the date and time. Refer to "8.30 Setting the time" and set the date and time.

[IMPORTANT] • Make sure to use the battery specified by TOA-DKK. Using other battery may result in failure.

- Attach the battery making sure the + and is in the correct orientation. It may cause a failure.
- The battery installed at the time of delivery is for monitoring. The life may be shorter than 1 year.

11.5 Cleaning the cell

Injury	●Part of the electrode is made with glass, so take caution not to break
	it.
	You may be injured by the sharp pieces of glass.
	Please take caution when handling hydrochloric acid, chlorine bleach
	or organic solvents and the like for cleaning.
	Immediately wash with water if hydrochloric acid, chlorine bleach or
	organic solvents contact the hands or skin.
	Immediately rinse with large amount of water and consult a physician
	if it contacts the eyes.

(1) Standard cleaning

(1) Washing the electrical conductivity cell. Wash the tip of the electrical conductivity cell with pure water and gently wipe with tissue paper or similar.



Wash the tip of the electrical conductivity cell

2 Storing. …… Normally, fill a beaker with pure water such as ion-exchanged water or distilled water, and store the electrical conductivity cell immersed in the beaker. If the cell is not to be used for 1 week or longer, store with protective cap filled with pure water such as ion-exchanged water or distilled water covering the cell. Never let the platinum black part of the electrical conductivity cell dry out. If it got dried by mistake, use it after the electrical conductivity cell is immersed in pure water for 1 day or more.
Electrical

conductivity cell

Protective cap with pure water



Storing cell normally

Storing cell when it is not to be used for 1 week or longer

(2) Cleaning when the electrical conductivity cell is contaminated

Accurate measurement value may not be achieved when the cell is contaminated, so wash the electrode with following method.

The following cleaning method is for the electrical conductivity cell using platinum black. For cells that do not use platinum black, please carry out washing after referring to the instruction manual for each electrical conductivity cell.

(a) General contamination

Immerse in chlorine bleach (approximately 1% solution) for 1 night and wash thoroughly with pure water. For a severe contamination, immerse in sulfuric acid (approximately 10%) for approximately 10 minutes, and wash thoroughly with pure water. Pepsin solution (approximately 3%, 0.1mol/L hydrochloric acid solution) is valid.

(b) Contamination by substance that does not dissolve in water

Wash with organic solvent that will dissolve the contamination when the cell is contaminated with substances that do not dissolve in water (oil, paint, etc.). Then, after all the solvent that has adhered to cell has evaporated, rinse with ethyl alcohol, and then wash with pure water.

(c) Organic contamination

If an organic matter, mold, etc., has affixed to the cell, immerse in chlorine bleach (solution of approximately 1%) for 1 night, and thoroughly wash with pure water. Also, sodium hydroxide solution (approximately 10%) or pepsin solution (approximately 3%, 0.1mol/L hydrochloric acid solution) is valid for protein.

If the contamination is not cleaned by the methods in (a) to (c), it is necessary to perform the plating of the platinum black again. Replating of platinum black is performed with a fee by DKK-TOA CORPORATION. Contact DKK-TOA CORPORATION or dealer.

- (IMPORTANT) Never clean the contamination on the platinum pole of the electrical conductivity cell by directly touching it. Electrode surface will be scratched and lowers the performance.
 - Never immerse in the sodium hydroxide solution for long period of time. The expected life of the cell will be shortened.

12. Measures to take when there seems to be a failure

12.1 Safety precautions when a problem has occurred

Conform to following cautions when a problem has occurred.

-			
	Explosion, ignition, electric shock	Immediately turn OFF the power and disconnect the power	
		cable from the outlet when there seems to be a problem.	
electrics		There is a possibility of ignition, internal explosion, etc., when	
		the instrument operates abnormally, smell and burning odor,	
		or there is a smoke. Immediately turn OFF the power and	
		disconnect the power cable from the outlet. After confirming	
			that smoke has disappeared, contact your dealer or
		DKK-TOA. Repairing the product yourself is dangerous so	
		refrain from doing so under any circumstances. Using the	
		product under abnormal conditions may cause fire or electric	
		shock.	

12.2 Error and message list

This instrument has an error message feature to notify the operation mistake or generation of trouble. The

following table explains the content, causes, and measures for error messages.

Example of message	Content	Cause	Measure
Sensor with memory is connected	It is replaced with a new sensor with memory	This is because it is replaced with a new sensor with memory	This is not a trouble
Inappropriate sensor is connected	This is displayed when an inappropriate sensor is connected	There is a possibility that an inappropriate sensor is connected This may be the case that pH electrode was connected to the electrical conductivity meter	Confirm the sensor Replace with an appropriate sensor
Management expiration of main unit is getting close	This is displayed when the set management expiration of the main unit is approaching	The set management expiration of the main unit is within 5 days	Execute the inspection of the main unit
Management expiration of the main unit has exceeded	This is displayed when the set management expiration of the main unit has exceeded	The set management expiration of the main unit has exceeded	Execute the inspection of the main unit
Management expiration of the electrical conductivity cell is getting close	This is displayed when the set management expiration of the electrical conductivity cell is approaching	The set management expiration of the electrical conductivity cell is within 5 days	Execute the inspection of the electrical conductivity cell
Management expiration of the electrical conductivity cell has exceeded	This is displayed when the set management expiration of the electrical conductivity cell has exceeded	The set management expiration of the electrical conductivity cell has exceeded	Execute the inspection of the electrical conductivity cell
Auto hold has timed out	This is displayed when the auto hold condition is not met within the auto	The auto hold condition may be too strict	Review the auto hold condition and set to appropriate setting
	hold timeout set time	The setting for timeout time may be too short	Review the setting for timeout time and set to appropriate setting
		The measurement value may be unstable	Refer to help for "Measure for trouble" and "Measuring special solution".
The instrument main unit is initialized	This is displayed when the instrument main unit is set to factory setting	Everything except date and setting The memory data and the c cleared	time will be set to factory

(continues)

Example of message	Content	Cause	Measure
Memory data if full	This is the message when the memory of the main unit is full	The memory data of the main unit is full The maximum number of memory data that can be recorded in the main unit is 300	No more data can be recorded when the memory data overwrite setting is set to "OFF" Read out the recorded data with data compilation software, etc., and then clear the memory data with "Erase all memory data" The old data is overwritten with new one when the number of data exceeds 2000 if the memory data overwrite setting is set to "ON"
There is an error with the USB memory. Please confirm.	It has recognized that something was connected to the USB terminal, but it cannot be recognized as supported USB device (cannot mount)	Connected a USB memory that was formatted to NTFS or exFAT	Reformat to FAT16 or FAT32 using a PC
		A broken USB memory was connected	Use a USB memory without any problem
		Used a USB memory equipped with security features such as encryption	Use a standard USB memory without the security features
The USB memory is write protected.		To record data when USB memory is in a write-protected state.	

(Continued)

12.3 Other troubles and their measures

- (a) The following table explains the content, causes, and measures for problems other than error messages.
- (b) Also, when a trouble other than listed here has occurred or when requesting a repair, confirm name of the set and the production number affixed to rear of the instrument and contact the dealer or TOA-DKK.

Content of trouble	Cause	Measure
The display does not change	It is in a hold status	Clear the hold (the hold status is cleared by tapping the BACK button)
	The connection of the electrical conductivity cell is incomplete	Reconnect the electrical conductivity cell correctly
	The electrical conductivity cell may have a problem	Perform an inspection of the electrical conductivity cell
	The electrical conductivity cell may be defect	Replace the electrical conductivity cell
Problem of indicated value	The electrical conductivity cell is contaminated	Wash the electrical conductivity cell
	The electrical conductivity cell may be cracked	Replace the electrical conductivity cell
	Cable of the electrical conductivity cell may have a broken wire	Replace the electrical conductivity cell
	The electrical conductivity cell may not be sufficiently immersed in the sample	Immerse the electrical conductivity cell sufficiently in the sample
The indicated value drifts	The electrical conductivity cell may be contaminated	Wash the electrical conductivity cell

(continues)

(Continuo	4)
(Conunue	u)

Content of trouble	Cause	Measure
The indicated value flashes	The indicated value will flash when the measured value is out of display range (indicated value is out of range) Inspect following items	
	The sample may be out of display range	The measurement value out of display range cannot be displayed
	The indicated value may be out of display range	Try setting the range to "AUTO"
	Connection of the electrical conductivity cell may be incomplete	Reconnect the electrical conductivity cell correctly
	The electrical conductivity cell may not be sufficiently immersed in the sample	Immerse the electrical conductivity cell sufficiently in the sample
	The electrical conductivity cell may be cracked	Replace the electrical conductivity cell
The indicated temperature value flashes	The indicated value will flash when the measured value is out of display range (indicated value is out of range). Inspect following items	
	The temperature of the sample may be out of display range	The measurement value out of display range cannot be displayed
	Connection of the electrode may be incomplete	Reconnect the electrode correctly
	The ATC electrode may have a broken wire or short	Replace the electrode
External printer does not	The printer may not be powered on	Turn ON the power of the printer
print	Connection of external printer may be incomplete	Securely connect the connection
	The printer may be jammed	Check the jamming of the printer paper
	The printer may be defect	Request a repair
The screen display is disrupted	It may have been operated in a way that strong impact was applied to the main unit	Operate softly so no impact is applied

12.4 When the instrument does not operate

Try disconnecting and then reconnecting the AC power plug and then turn the power On again when the instrument stopped working at all or a problem has occurred in the display.

13. About Transporting, Storing, and Discarding

13.1 Transporting

[IMPORTAN	NT] • A	lways pack into the packaging box that the instrument was delivered.				
	D	o not drop the box, trip on the box, or place a heavy object on to top of				
	th	the box. It may cause failure of the instrument.				
	• A	lways use the specified packing material when transporting. Note that				
	th	e damage or failure caused by transporting with the packaging material				
	n	ot specified is not covered by the warranty.				
	• A	lways turn OFF the power of the instrument when moving it.				
	Injury	Part of the electrode is made of glass. Handle with care not to				
		damage it. If the glass breaks there is a risk of injury from the sharp				
		pieces of glass.				
		● Do not touch with wet hands while the electrode is removed or while				
		the battery cover is opened. Also, do not install or store in a location				
		where water or chemical may contact.				

13.2 Storing

	Explosion,	Please do not use chemicals from which flammable gases arise
	ignition, electric shock	and the like or store the product in an atmosphere of flammable
		gas.
		Doing so may cause a gas explosion inside the device.
		Please do not install or store the product in a location where
		water, chemicals or the like may enter inside the interior of the
		device.
		If water or chemicals enter inside the device, it may cause a short
		circuit, fire or electric shock.

Condition for the location to install or store is as follows.

- Location where the temperature (0 to 45°C) and humidity (20 to 90%, no condensation) are within their respective range.
- Location where corrosive gas does not occur.
- Location where there is no condensation.
- Location not under direct sunlight.
- Location without vibration.
- Location without too much dust or dirt.
- Location not under direct draft from the air conditioner.
- Location away from heating appliance such as stove.
- Location that is stable and safe.

13.3 Discarding

To discard the device or the reagent, take necessary measure based on the local government regulations. Contact the local government for details.

CAUTION Discarding To discard this product or parts, take necessary measures for industrial waste based on the laws and regulations.

14. Parts List

To purchase various parts and options, order through the dealer from whom you purchased this instrument. Please have the product name, model, and quantity available when you order.

14.1 Parts

Product name	Model	Package unit	Note
Electrode stand	7430860K	1 set	Standard attachments (stand, stopper, strut)
Electrode holder	7430850K	1	Standard attachments
Electrode attachment (G)	0IB00004	1	For X series electrode Standard attachments
Electrode attachment (J)	0IB00005	1	For J series electrode
Electrode attachment (N)	0IB00008	1	For glass thermometer/nozzle
AC adapter	7430880K	1	Standard attachments
Power cord	118C229	1	Standard attachments
Lithium battery	-	1	Clock backup battery Purchase a commercially available lithium battery (CR2032)
Ground wire	X0979500	1	Standard attachments
Poly beaker (150mL)	0DE00001	1	Standard attachments
Slanted surface	7430870K	1	
Instruction manual (CM-42X)	-	1	Standard attachments

14.2 Cells, standard solution etc.

Product name	Model	Package unit	Note
Electrical conductivity cell Immersion type, for general use	CT-58101B	1	Memory built-in type Standard attachments
Electrical conductivity cell Immersion type, for low electrical conductivity	CT-58101C	1	Memory built-in type
Electrical conductivity cell Immersion type, for high electrical conductivity	CT-58101A	1	Memory built-in type
Electrical conductivity cell Flow-through type, for general use	CT-88101B	1	Memory built-in type
Electrical conductivity cell Flow-through type, for pure water	CT-27111D	1	Memory built-in type
Electrical conductivity cell Flow-through type, for low electrical conductivity	CT-88101C	1	Memory built-in type
Electrical conductivity cell Flow-through type, for high electrical conductivity	CT-88102A	1	Memory built-in type
Flow cell, made of PP	CEF-22A	1	For CT-27111D
Flow cell, made of SUS	CEF-23A	1	For CT-27111D
C solution for electrical conductivity cell check	0BI00001	1	100mL x 4
B solution for electrical conductivity cell check	0BI00002	1	250mL x 2

14.3 Option, parts sold separately

Product name	Model	Package unit	Note
Electrical conductivity check plug	EC-1G	1	
Temperature check plug	TC-1G	1	
Turntable	TTT-710	1	For multiple samples continuous measurement Select the table from 12, 18, 36, or 60 samples, and consult for 100 samples
Cell selector	ES-1GC	1	With connection cable
Control box	AC-1V	1	
External printer	EPS-P30	1	With connection cable
External printer paper	P000119	1 pack	20 rolls, non-thermal paper
Ribbon for external printer	0RD00001	1	1
Turntable for X series connection cable (For connecting with the RS-232C connector)	7433040K	1	RS-232C cable for connecting to turntable TTT-710 and TTT-510
Data compilation software	X-LOG	1	Read the measurement data into a PC in a CSV format
Stirrer	ST-7	1	
RS-232C cable	118N062	1	For DOS/V PC connection of the personal computer Cable length 2m
External printer connection cable	118N061	1	Dedicated for external printer
Analog output cable	7433020K	1	Cable length 1.5m
RS-232C cable	118N062	1	PC connection cable length: 2m

Model: CM-42X

(Entry for in-house)

Instruction manual No.	2016.1.13 (BT)	New revision	
CM4-LB16601E			(RSL Shibusawa)
Instruction Manual No.	2016.3.11 (BT)	Revised	
CM4-LB16602E			(RSL Shibusawa)
Instruction Manual No.	2016.6.17 (BT)	Revised	
CM4-LB16603E			(RSL Shibusawa)
Instruction Manual No.	2017.2.27 (BT)	Revised	
CM4-LB16604E			(RSL Shibusawa)

• Print size: B5 (mechanical size: A4), the cover is size A (equivalent to 86.5kg), and the paper used for the body is 44.5kg equivalent with perfect binding. RSL



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