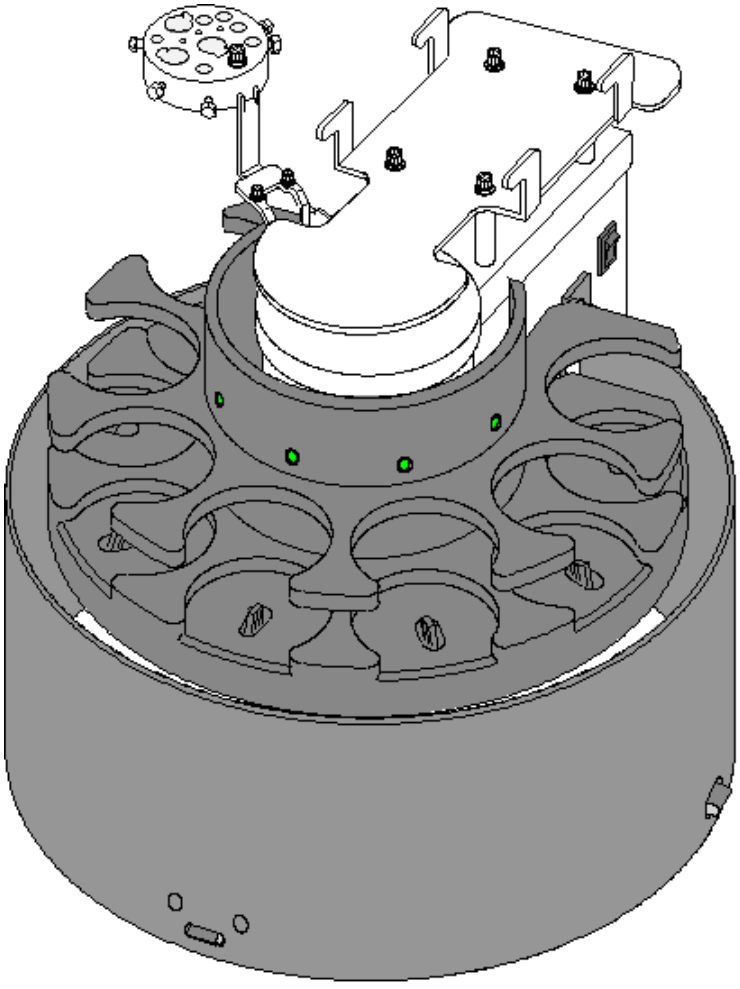
Multiple Sample Changer

CHA-700

Operation Manual



Please read this manual thoroughly in advance for the best performance of the equipment.

KYOTO ELECTRONICS
MANUFACTURING CO., LTD.
http://www.kyoto-kem.com
AN 59-00229-01Ver.09

Introduction

Thank you for choosing a KEM Multiple Sample Changer, CHA-700.
Connecting this equipment to the Automatic Potentiometric Titrator (AT-700/710) enables you to perform a hassle-free automatic measurement of up to six samples or eleven samples.

【Features】

1) **Compact Design**
This changer can be placed on top of the AT-700/710. You will see how compact it is: equipment width – 365mm.

2) **Six-rack Model or Eleven-rack Model**
Six racks for samples plus one more rack for immersion cleaning. Holds beakers of 250mL or 200mL.
Eleven-rack model: Holds containers of φ46mm, such as 50mL beakers or 100mL disposable cups.

3) **Optional Electrode Cleaning Available**
Optional electrode cleaning system can be connected for shower cleaning of electrodes. Furthermore, for six-rack model, shower cleaning (nonaqueous) of electrodes and drain samples from the beaker is available.

4) **Different Measurement Methods from One Rack to Another**
Individual settings can be made for each rack, which enables you to easily perform measurements of several different samples.

1. Preparations for measurement

Important:

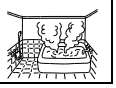
You must observe the following rules in order to prevent physical or property damage of yourself as well as of the others.

Meaning of Symbols

Warning	Danger of severe injury or possible death
Caution	Risk of physical or property damage
	This symbol means Prohibition.
	This symbol means Mandatory.

Place for Installation

Avoid a place under any of the following conditions to avoid malfunction.

Caution		
Operation of devices with strong electric motors using common power source	Under direct sun light 	Corrosive gas atmosphere
Near strong magnetic/electric field		
Heavily loaded and fluctuated or near power source or magnetic field	Excessive range of temperature other than specified	Ambient humidity exceeding 85%RH 
Under vibration	Location with large temperature difference	

Power Source

Warning		
You must ground earth wire of power cable. Danger of electric shock if not grounded to earth.		
Caution		
Plug out power cord in case of unit malfunction or possible lightning. Otherwise, the unit may be broken.	Power source for this unit: AC100-240V Frequency: 50Hz/60Hz	Do not share power as shown below. 
	Supply power direct from power outlet. 	Do not put any obstacle around power outlet just case of need for plugging out power cord to avoid the possible danger of the whole system in trouble.

Test Sample

Warning	
Some sample or chemical requires protective gloves, glasses and mask. Ventilate the room. Splashing chemical may injure the eyes or skin. Windpipe may be hurt if fume is inhaled.	Do not use chemical which may generate inflammable gas or work in such atmosphere. Be aware of a risk of explosion inside the system.

About place for storage

Caution		
If the unit is not used for an extended period of time, first clean the electrode and place it for storage. Also discard the regent in the burette, and clean it with pure water or methanol before storage.	It is recommended to pack the main unit in the carton box in which the instrument was first delivered 	Avoid the places for storage under inadequate ambient conditions such as extremely high/low temperature, high humidity or heavily dusty atmosphere

About Use

Caution
Operate the vertical movement of the table with the operation key. Do not touch the table or remove the beaker while the table is in motion.
Do not touch the arm while the arm is in motion.
Check the state after turning off the power if the tube is removed.

Other Cautions

Caution	
Do not attempt overhaul or repair the unit by unauthorized person except authorized by KEM. Danger of electric shock, fire or malfunction.	Do not use the unit in a way other than specified. Danger of fire, electric shock or malfunctioning of the unit.
Environment This equipment shall be used under the following conditions classified in the section 1.4.1 of the CE marking (Low Voltage Directive, 2006/95/EC, EN61010-1): altitude up to 2000m; over voltage CAT II; pollution degree 2.	

About the Manual

Read this operation manual thoroughly before use.
It describes all that are required for routine measurements.
Keep this manual beside your equipment so that you can refer to whenever necessary.

The following symbols indicate the important notes that raise your attention.

1. Note

Note

Unless you observe the note, you may not be able to obtain specified performance of the unit, and your unit may not be covered by warranty.

2. Hint

This symbol notes technical tips which are convenient to your measurement work.

※ In this manual, [∧], [∨], [<SAMPLE] and [STIRRER>] key are explained the sign each of[↑], [↓], [←]and [→].

※ It is prohibited to duplicate any part or all of manual without prior consent.

※ This manual has been prepared to the best of our knowledge; however, if you should find any missing or ambiguous description, please contact your nearest dealer or sale representative.

※ Maker will not be liable for any loss or damage caused by use of or the result of the product.

※ This manual describes usage according to standard specification. For special version, refer to the accompanying document.

Table of Contents

ページ

1. Preparations for measurement

1-1. Supplied parts

Check the supplied parts referring to the following parts list. If you should find any missing or broken parts including the main unit or accessories, contact your sales representative or local dealer.

Part Number	Part Description	Qty	Remarks
-	Main Unit	1	
-	Protection Base Board	1	
69-00680-06	Safety Cover	1	
64-00430	SS-BUS Cable 1m	1	
12-03645-01	Connection tube2×3 L=980 PFA (for Bottle)	1	
65-00028-01	Clamp Filter	1	
64-00898	AC Adapter Type4	1	
64-00633 64-00633-01 64-00633-02 64-00633-03	Power Cord (EU,KR) with PlugG(WS-010) Power Cord (US,TW) with PlugB(WS-001) Power Cord (GB) with PlugG(WS-012A) Power Cord (CN) with PlugI(WS-015D)	1*	200-240 V 100-120 V 220-240 V 200-240 V
12-03745	CHA-700Operation Manual (CD-ROM)	1	
20-08803	Propeller(for 11samples)	1	For 11-sample model only
-	Inspection Certificate/Warranty	1	

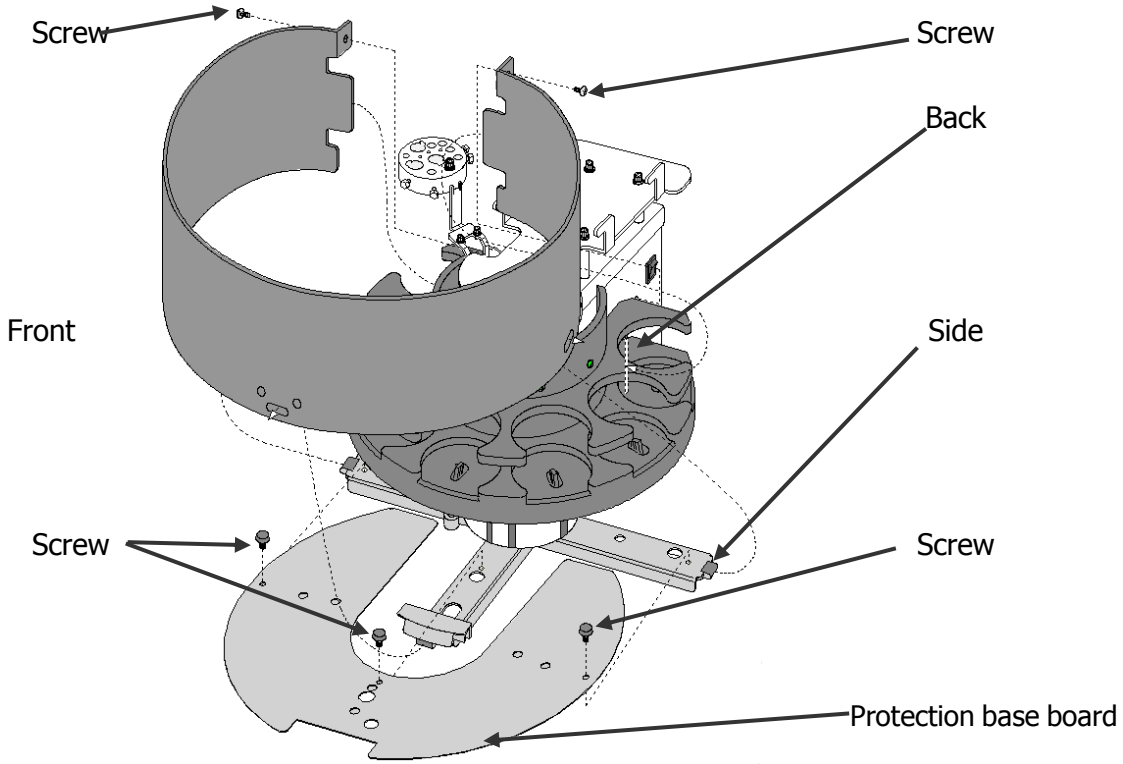
*Make sure your country's power requirement.

Note Please refer to the section "7-1. Parts list" when ordering these parts.

1-2. Installation and start-up

1-2-1. Placing Protection base board and Safety Cover

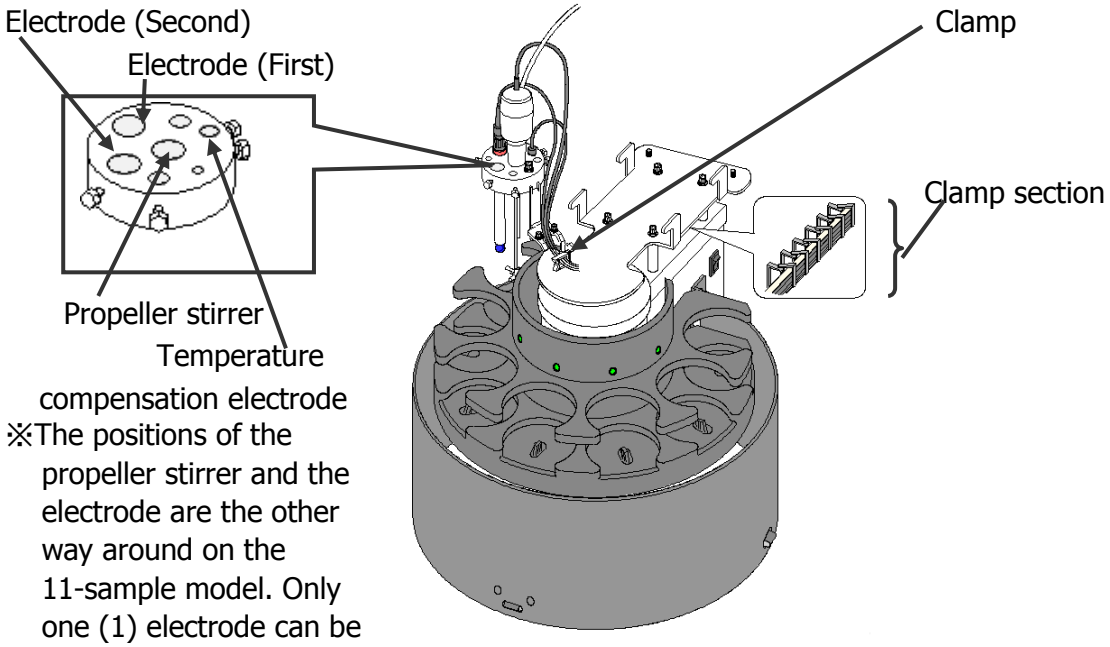
1) Remove the screws (3 places) for protection base board.
2) Slide protection base board under the table as figure below, and fix with screws unscrewed 1).
3) Remove the screw of the side of the equipment by driver.
4) Mount the safety cover to the equipment. Slightly spread the cover to mount the front part as shown below, and then mount the right and left of sides and the back. Fix with screws unscrewed 3).



Caution Make sure to place protection board and safety cover for security.

1-2-2.Placing Electrode and Propeller Stirrer

1) Put the electrode cable, the propeller stirrer and the temperature compensation electrode from the position as shown below through to the back. Put the cables to the clamp section of the CHA-700 to bundle them.
2) Place the electrode and the propeller stirrer to the electrode holder. See the figure below for where to put them. Put the cables to the clamp as shown below to bundle them.

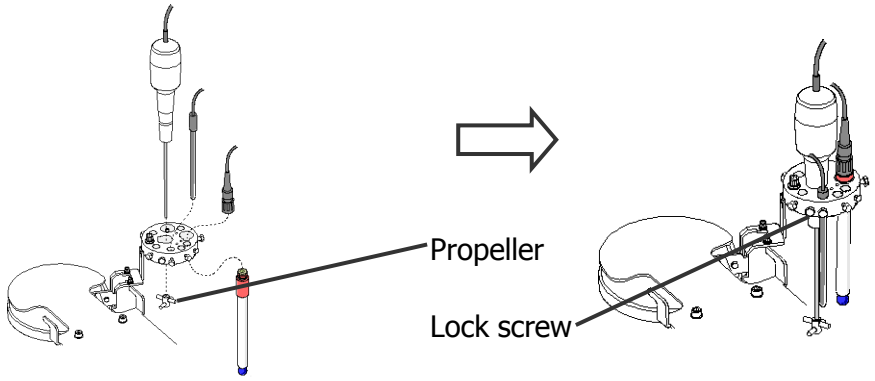


※The positions of the propeller stirrer and the electrode are the other way around on the 11-sample model. Only one (1) electrode can be set.

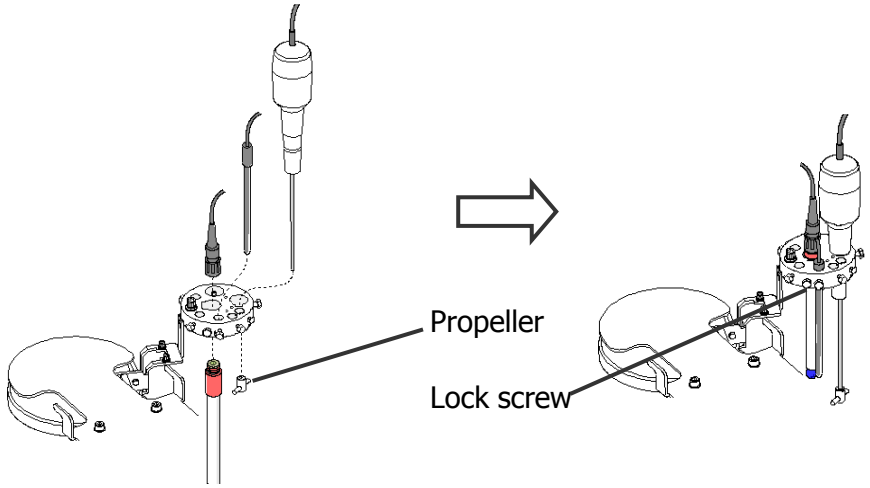
<Installing the propeller stirrer>
Before installing, remove the blade portion from the body of the propeller stirrer. Then put in the body from above of the electrode holder. Fix it with the lock screws and attach the propeller portion to the original position. Put the propeller (supplied with the CHA-700) from below on the 11-sample model.

<Installing the electrode>
Put in the electrode from under the electrode holder. Hold the electrode so that the position of the electrode tip becomes higher than the blade of the propeller stirrer. Then fix it with the lock screws.

For 6-sample model

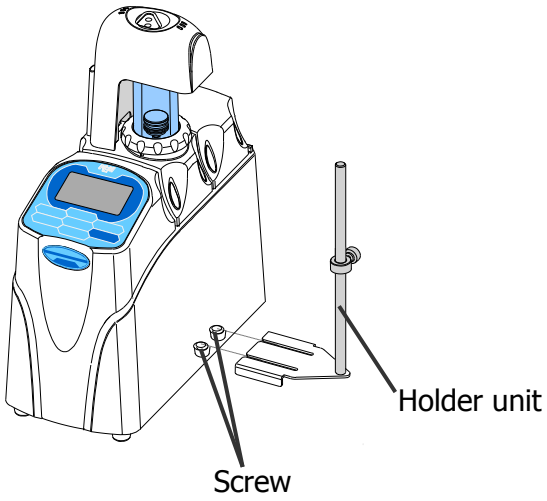


For 11-sample model

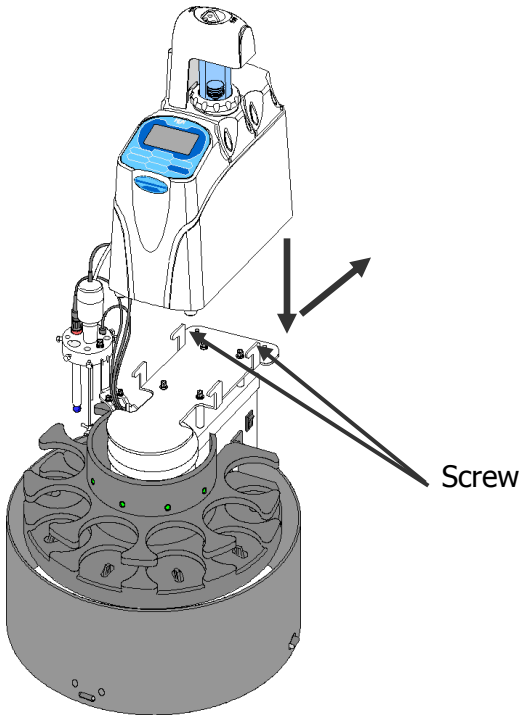


1-2-3. **Installtion of titrator**

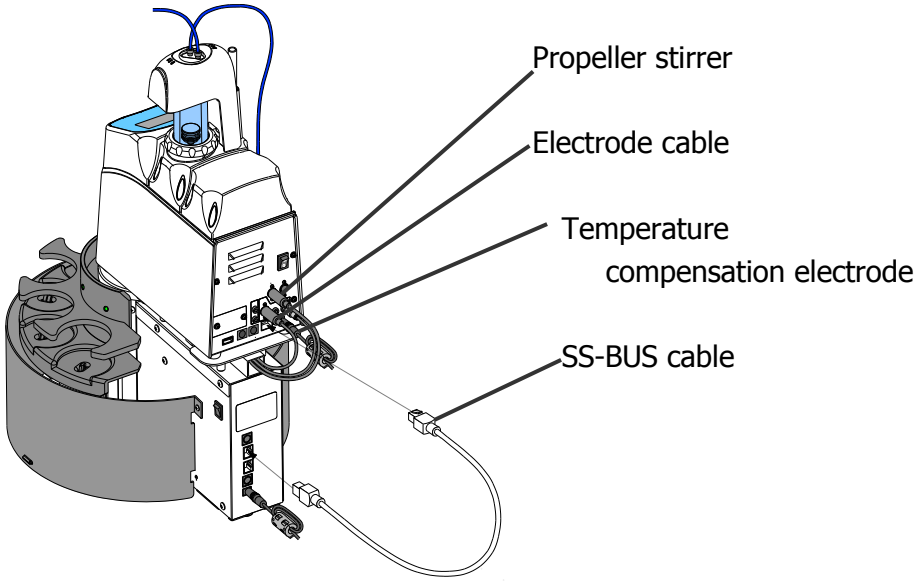
1) Loosen the screws and remove the holder unit from the titrator.



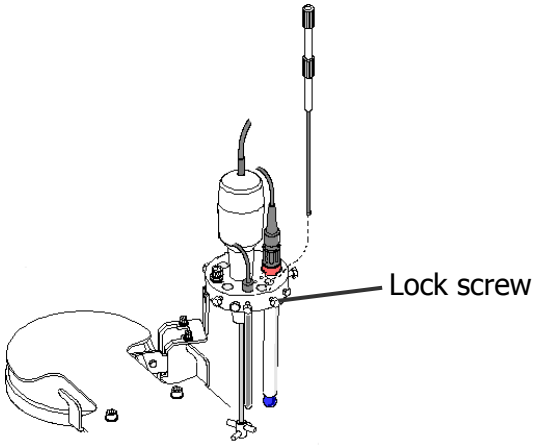
2) Loosen the screws (2 places) at the position of figure until the screw head is buried under the plate. As shown below, place the titrator over the hooks of the changer so that they can go into the bezels on the bottom of the titrator. Then slide the titrator and screw to fix it.



3) Connect SS-BUS port of the back of CHA-700 and the back of AT-700/710 with the SS-BUS cable. Connect the electrode cable, the propeller stirrer and the temperature compensation electrode to the connector of the back of the AT-700/710.



4) Put in the titration nozzle from above of the electrode holder. Adjust the nozzle position so that its tip becomes higher than the blade of the propeller stirrer. Then fix with the lock screws. If your titration nozzle is of antidiffusion type, face the titrant discharge side toward the outside of the electrode holder.

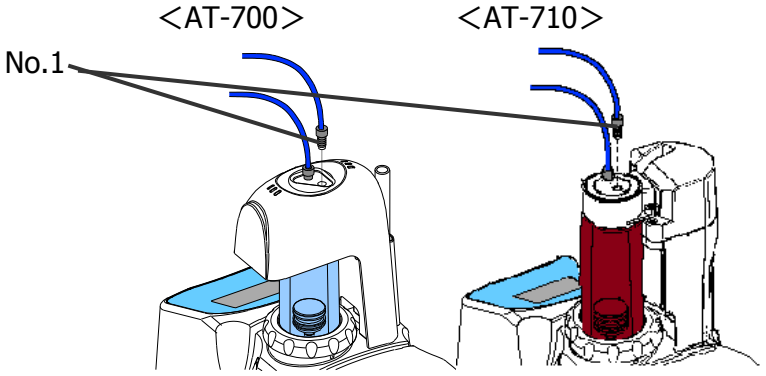


Note When using an additional burette as option, connect titration nozzle with electrode holder through the right side in view of the front of burette tube connected ahead. When titration nozzle is connected through the left side, measurement with an additional burette only might interfere the connected tube.

1-2-4. Installation of tube

Caution **Remove remaining reagent in the tube before titration nozzle is connected.**
If any residue remains, there exists danger of injury on your skin or in the eyes by splashing chemical or at worst leading to the loss of eye sight.

1) Take out the tubing connected to No. 1 of the AT-700/710.
2) Attach the tubing supplied with the CHA-700, instead.



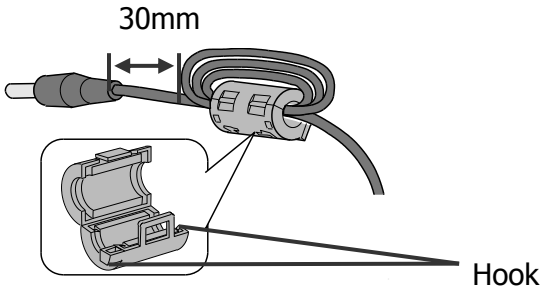
Note When attaching the tubing, hold the tube and turn the joint alone so that extra force is not given to the tubing.

3) Connect the other side of the tubing to the cap of the reagent bottle.

Note See the Operation Manual of the Automatic Potentiometric Titrator for how to set it up.

1-2-5.Installation of Clamp Filter

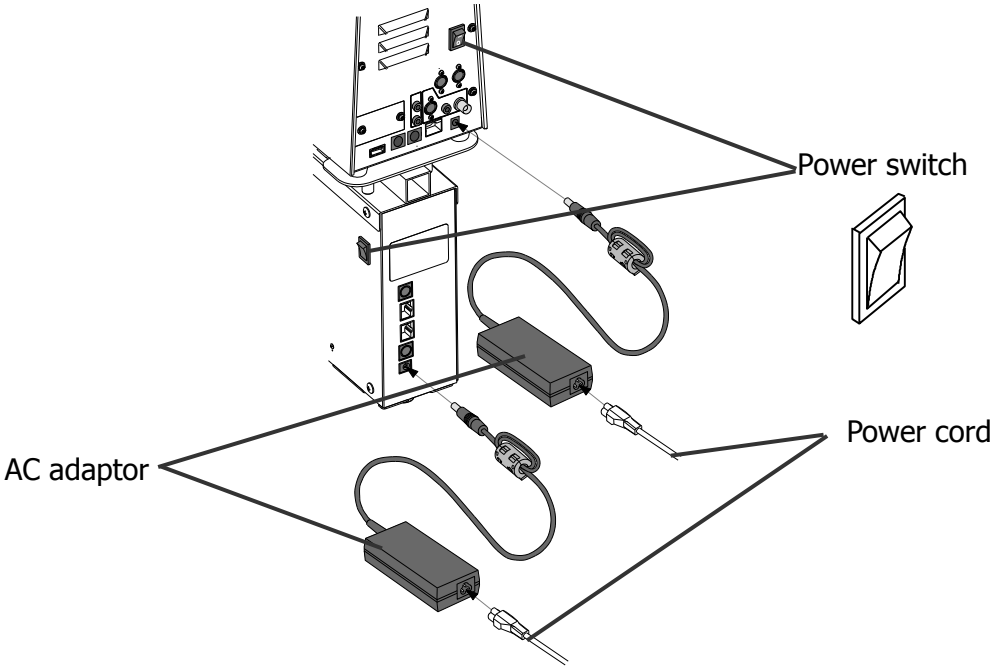
Install the clamp filter to AC adapter as figure below. Hold the hooks of the clamp filter and open as figure below, and wrap treble remaining the tip by about 30mm.



Note Installation of the clamp filter to AC adaptor is needed to satisfy the condition of EMC standard.

1-2-6.Power cable

1) Make sure the power switch of Main unit and the measuring unit are in OFF position.
2) Install Power cord to AC adaptor, plug in the connector plug of AC adaptor on the back of main unit.



3) Connect Power cord to the power outlet.

1-2-7.**Turning On Equipment, Setting Up Titrator**

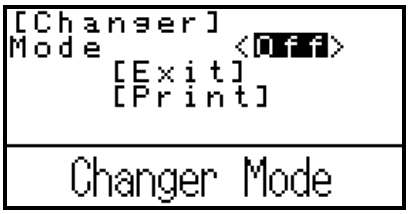
<When your titration unit is AT-710B, AT-700>

1) Turn on main unit (CHA-700) first, and then turn on the titrator.

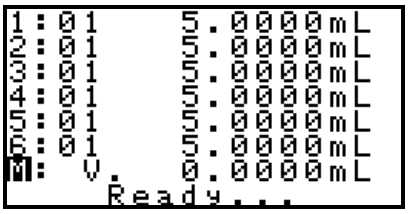
Note Always turn on main unit (CHA-700) first.
The number of the rack of the table is automatically recognized.

2) Press [MENU/HOME] of AT-700/710. Select "6. Changer" with [↓] key and press [ENTER].

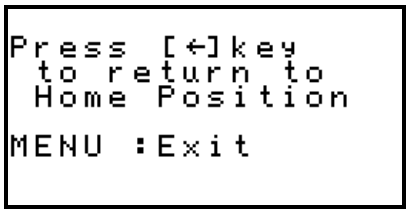
3) Change "Mode" to "On" with either of [←] [→] keys and press [ENTER]. Main screen of AT-700/710 will change to Changer Mode. Press [MENU/HOME].



4) Move the cursor to "M" with [↑] [↓] keys and press [ENTER].



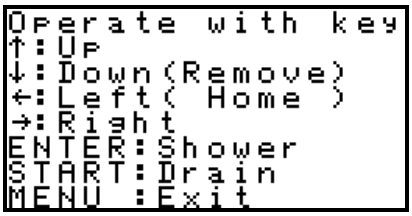
5) Make sure that the table and the arm do not get stuck. Then Press [←] to move the table and the arm to their home positions (home position for arm, higher position for table).



Caution

When you press [START/STOP] and stop the equipment while turning on or measuring, you are required to return the table and the arm to their home positions. The manual operation screen can be used after returning the table and the arm to the home positions. When they are at their home positions, the following operation will be done:
table goes down → arm moves to No. 1 → arm moves to original position → table goes up.
Make sure that there is nothing that may stick the table and the arm around the equipment.
When you press [START/STOP] and start measurement without returning the table and the arm to their home positions, the equipment will automatically return them to their home positions before starting measurement.

6) Once the arm and the table return to their home positions, the screen on the right will appear and manual operation can be performed. Make sure with [↑], [↓], [←] and [→] keys that the electrodes on the electrode holder do not obstruct the table operation.



Caution

For 50mL beaker, confirm the electrode does not hit the beaker again.
This prevents damaging the electrode or vessel by the arm when it maneuvers.

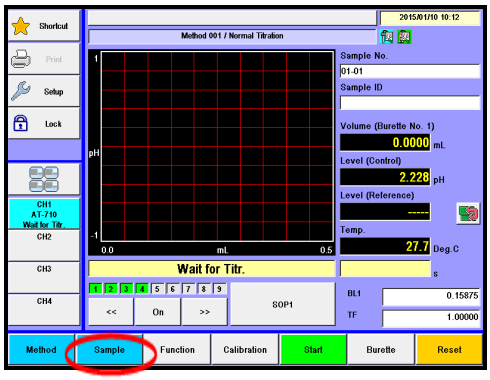
<When your titration unit is AT-710M, AT-710S>

1) Turn on main unit (CHA-700) first, and then turn on the titrator.

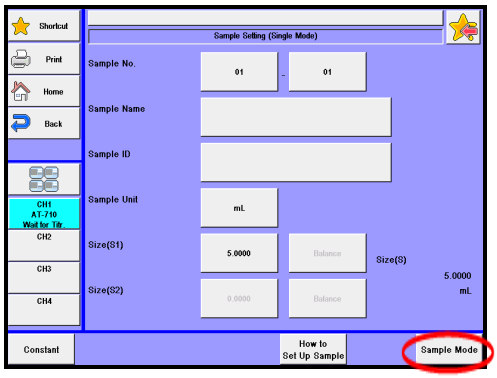
Note

Always turn on main unit (CHA-700) first.
The number of the rack of the table is automatically recognized.

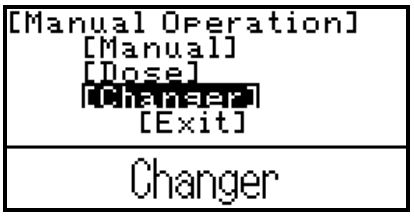
2) Press [Sample] button on Main display of MCU-710.



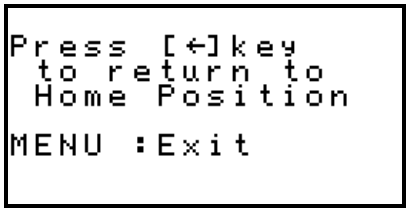
3) Press [Sample Mode] button. Select "CHA-7XX Changer Mode" and press [OK] button.



4) Press [MENU/HOME] of AT-710.
Select "Changer" with [↓] key and press [ENTER].



5) Make sure that the table and the arm do not get stuck. Then Press [←] to move the table and the arm to their home positions (home position for arm, higher position for table).



⚠ **Caution**

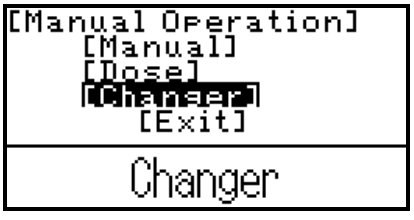
When you press [Reset] button and stop the equipment while turning on or measuring, you are required to return the table and the arm to their home positions. The manual operation screen can be used after returning the table and the arm to the home positions. When they are at their home positions, the following operation will be done:
table goes down → arm moves to No. 1 → arm moves to original position → table goes up.
Make sure that there is nothing that may stick the table and the arm around the equipment.
When you press [Start] button and start measurement without returning the table and the arm to their home positions, the equipment will automatically return them to their home positions before starting measurement.

6) Once the arm and the table return to their home positions, the screen on the right will appear and manual operation can be performed. Make sure with [↑], [↓], [←] and [→] keys that the electrodes on the electrode holder do not obstruct the table operation.

⚠ **Caution**

For 50mL beaker, confirm the electrode does not hit the beaker again.
This prevents damaging the electrode or vessel by the arm when it maneuvers.

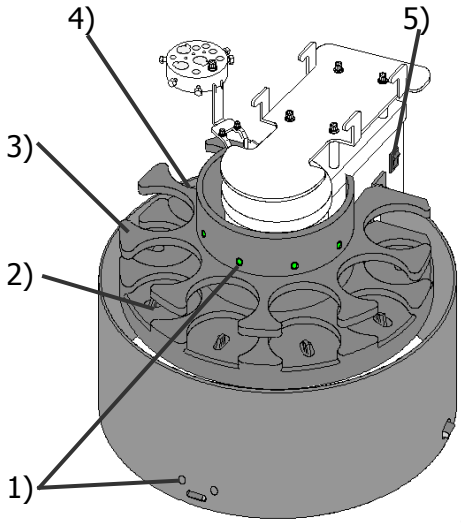
7) Press [MENU/HOME] of AT-710.
8) Select "Exit" with [↓] key and press [ENTER].



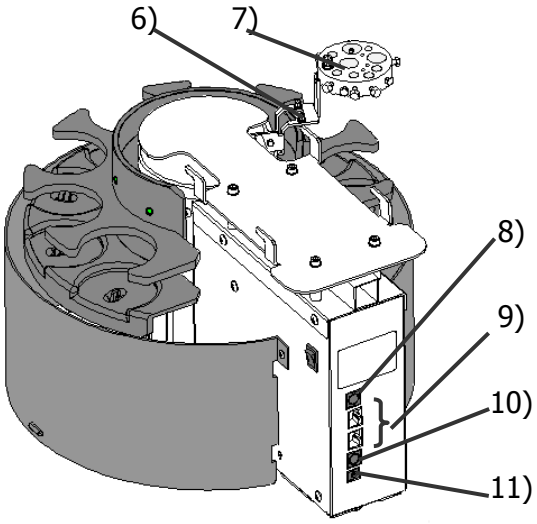
2. Parts configuration

2-1. Main unit

<Front view>



<Back view>



1) LED screen
   The on-going events or status underway are displayed on the screen.
2) Beaker sensor
   This sensor senses whether a beaker is in the position or not.
3) Table
   This is the rack where sample vials are placed in position to the order.
4) Home Position (Beaker position to store electrodes, rinse position)
   When the equipment is turned on and an initial keystroke is made or a titration is started, the table moves to this position. Electrodes and nozzles are cleaned at this position, too. Electrodes are stored here after measurement.
   If the electrode is to be dip stored, put water in disposable cup about 80%, and place it in position for beaker where the electrode is to be stored.
5) Power switch
   This key turns on or off the power.
6) Arm
   The electrode and the nozzle are stored and moved with this arm.
7) Electrode holder
   The electrode and the nozzle are mounted onto and fixed by this holder.
8) RS-232C port
   This port is not used in this unit.
9) SS-BUS port
   This port connects AT-700/710 Automatic potentiometric titrator.
10) PUMP port
    This port connects the pump to rinse and drain out the in beaker after titration is over.
11) Power receptacle (～LINE)
    This receptacle connects the power line.

2-2. Manual operation and LED lamp

<Outline of changer operation key of AT-700/710>
When "1-2-7. Turning On Equipment, Setting Up Titrator" is operated, the display of titration volume and potential can be switched by pressing [<SAMPLE] on the main screen of AT-700/710. And the manual operation screen can be accessed, the manual operation of the changer can be operated.

<Description of operation key on the main screen of AT-700/710>

Key	Description
1) [∧]	Cursor key
2) [∨]	Cursor key
3) [<SAMPLE]	Key to switch the display of titration volume and potential.
4) [STIRRER>]	Key to operate On/Off of the stirrer. This key is not usable for titrating.
5) [ENTER]	Key to confirm.
6) [START/STOP]	Key to start titration and to stop measurement.
7) [MENU/HOME]	Key to move to menu screen from the main screen, and to set the parameter. Also key to return to the main screen from each input screen.

<Description of manual operation key on the changer screen of AT-700/710>
The manual operation screen is displayed when moving the cursor to "M" with [↑], [↓] keys and pressing [ENTER] on the main screen. (For AT-710M or AT-710S, press [MENU/HOME] key of AT-710 and then press [Changer] key.) And when the changer set is "On", the changer operation button is displayed, and the manual can be operated on the calibration screen of the electrode, too.

Key	Description
1) [∧] (↑)	Key to move the table up and stop it at the upper end position.
2) [∨] (↓)	Key to move the table down and stop it at the lower end position. The table will go down by a long press (2 seconds). Then it will go up and move to the table replacement position.
3) [<SAMPLE] (←)	Key to move the arm to the left of one step. Effective only the table is at the lower end position. The arm will move to the home position and the piston will move to the lower limit bottom position by a long press (2 seconds).
4) [STIRRER>] (→)	Key to move the arm to the right of one step. Effective only the table is at the lower end position.
5) [ENTER] (Shower)	Key to move the table up, then move it down to operate at the position of shower cleaning (option) afterward. The shower cleaning is stopped when pressing this key again. When the table is at the shower cleaning position, only shower cleaning is operated. Drain is also operated during shower cleaning.
6) [START/STOP] (Drain)	Key to move the table up and to drain the beaker (option) is operated. Drain is stopped when pressing this key again. When the table is at the upper position, only drain is operated.
7) [MENU/HOME]	Key to move to the main screen from the changer screen.

Caution

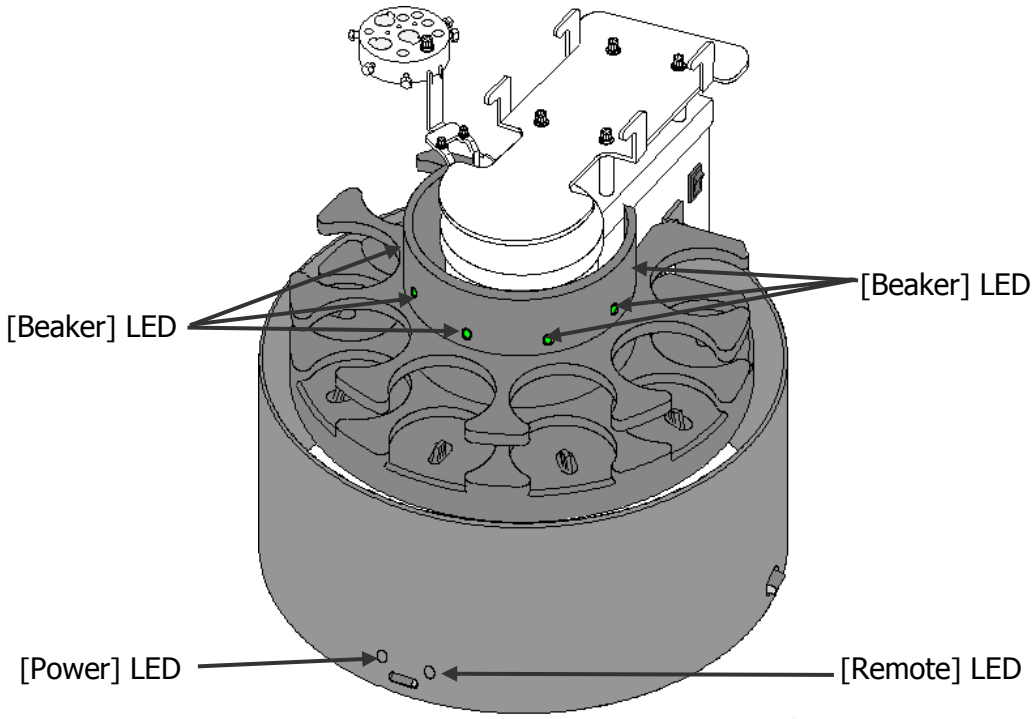
The reagent adhered to the propeller might be splashed out when the propeller stirrer is operated with [STIRRER>] key, so that the beaker should be put on the table and operate at the position which the table goes up.
By manual operation the solvent is dispensed to rinse or shower while arm and table maneuver. Before operating, make sure the cables and tube lines are in correct order. Otherwise, there may exist danger of breaking the instrument or physical injury.

Note

A long press cannot be used on the electrode calibration screen.
When you press [START/STOP] and stop the equipment while turning on or measuring, you are required to return the table and the arm to their home positions. The manual operation screen can be used after returning the table and the arm to the home positions.

<Description of LED lamp>

1) [Power] LED	This LED turns on when power switch is in ON position.
2) [Remote] LED	On : Mode for sequence operation and titration Blink : Mode for error Off : Mode for manual operation
3) [Beaker] LED	This LED turns on when the beaker is detected in 3 seconds, and blinks during measuring and turns off when the measurement ends. Moreover, LED turns on alternately during cleaning.

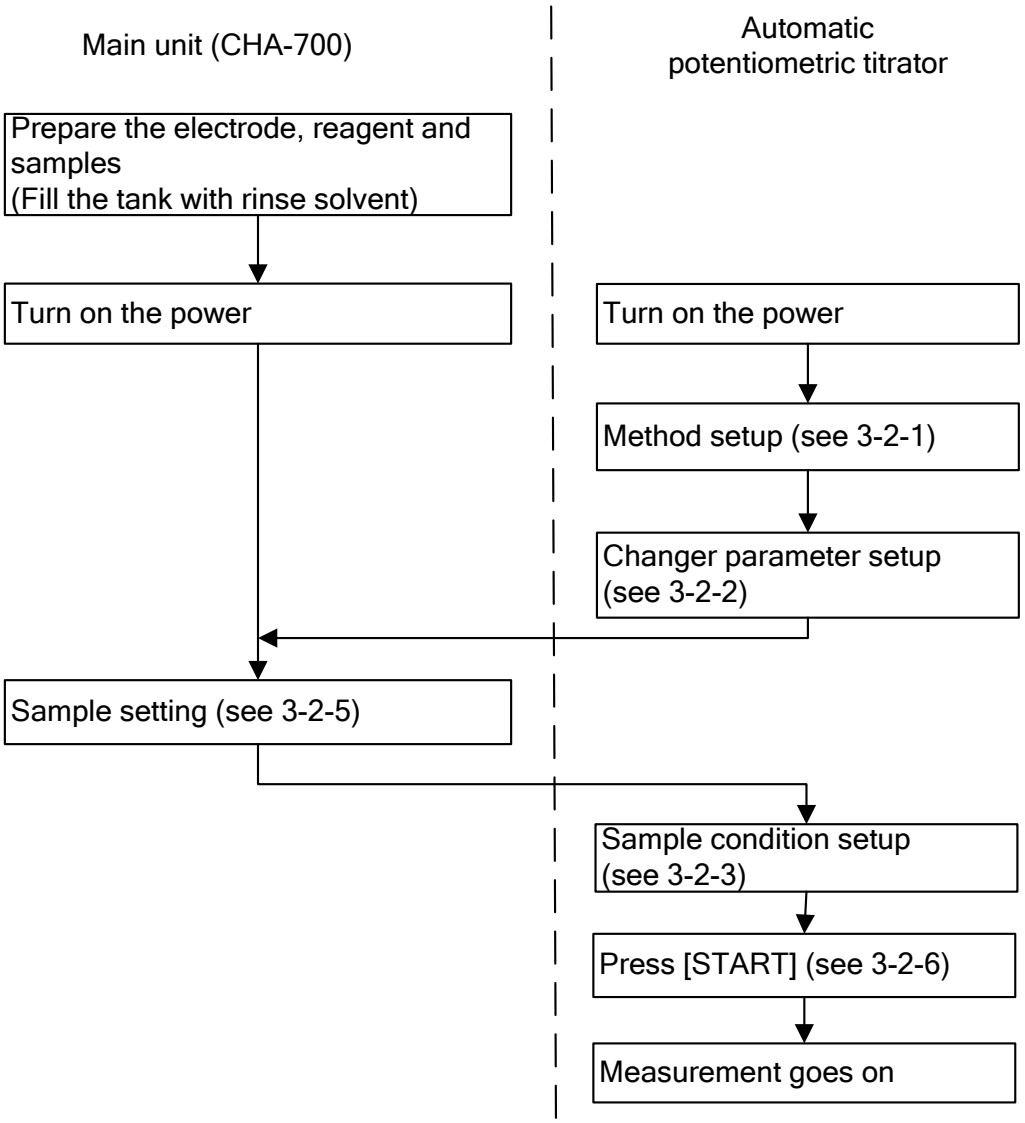


[Remote] LED blinks when the error occurs.
[Beaker] LED blinks clockwise during cleaning and anti-clockwise during draining

3. Basic operating procedure

3-1. Flow chart of measurement

The titration system with a multiple sample changer goes on according to the below flow steps. For details of each step, refer to individual section accordingly.



Note Turn on the power in order of CHA-700 and AT-700/710.

3-2. Measurement procedure

Titration using shower rinse with a sample solution or using only dip rinsing can be performed with standard parts and accessories as supplied, however, The shower rinse and drain of a solution in the beaker require optional accessories.

3-2-1. **Method setup**

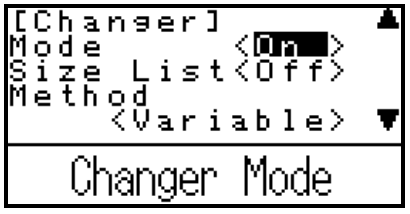
All the methods to be used in titration must be configured on the titrator. For method setup, refer to the manual for your titration unit.

3-2-2. **Parameter setup for sample changer**

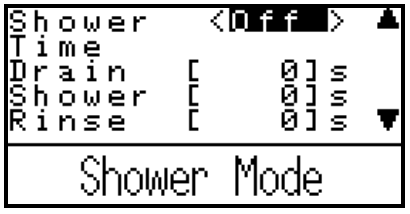
<When your titration unit is AT-710B, AT-700>

1) Press [MENU/HOME] key of AT-700/710.
2) Select "3. Changer" with [↑] or [↓] key.

3) Select "On" with [←] or [→] key on "Mode" screen.
4) Set Size List with [←] or [→], and press [ENTER].
5) Set Method with [←] or [→], and press [ENTER].



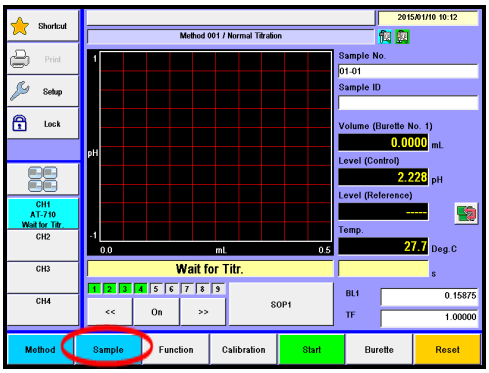
6) Select the command operated the cleaning sequence with [↑] or [↓] key, and press [ENTER].
7) Set the operation time with [↑], [↓], [←], [→] key.(refer to 3-3. for sequence)
8) Set Rinse Stir. Speed with [↑] or [↓], and press [ENTER].
9) Select Start Mode with [←] or [→], and press [ENTER].
10) Move the cursor to [Exit] and press [ENTER].



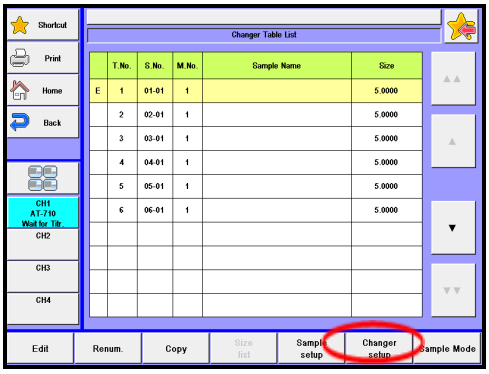
Note Another option is needed to purchase for shower cleaning and sample drain.

<When your titration unit is AT-710M, AT-710S>

1) Press [Sample] button.



2) Press [Changer setup] button on "Changer Table List."



3) The screen on the right will appear.
Select and edit the item you wish to edit.

Each parameter is determined by the [OK] button.

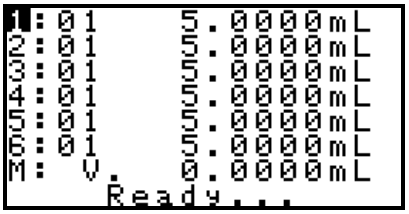
Note Another option is needed to purchase for shower cleaning and sample drain.

3-2-3.**Sample condition setup**

<When your titration unit is AT-710B, AT-700>

For method setup, refer to the manual for your titration unit.

1) Select Sample No. of the same position as table No. of CHA-700 on the main screen of AT-700/710, and press [ENTER].



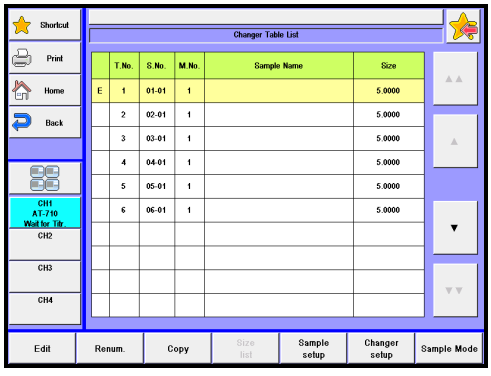
2) Set all measurement samples of each following parameter.

Parameter	Selection
Sample No.	01-01
Size(S)	(5.000)
Unit	(mL)
Sample name	
Method No.	1

The number on the method setting screen of AT-700/710 and table No. are same.
The sample can not be changed during measurement.

<When your titration unit is AT-710M, AT-710S>

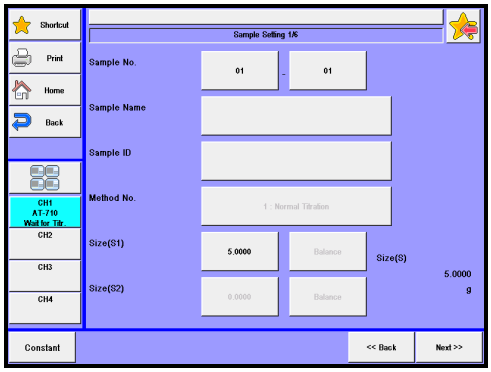
1) Press [Edit] button on "Changer Table List."
Sample volume (S1) can directly be input on the changer table list screen by pressing a number of the sample volume (Size). Sample volume (S1) can be input for Balance to point the cursor on the number on the Sample Setting (List) screen.



2) The screen on the right will appear.

Select and edit the item you wish to edit.

Each parameter is determined by the [OK] button.



Note

Size (S1) can directly be input on the size list screen by pressing a number of the Size.

The number on the method setting screen of AT-700/710 and table No. are same.
The sample can not be changed during measurement.

3-2-4.**Preparation of sample**

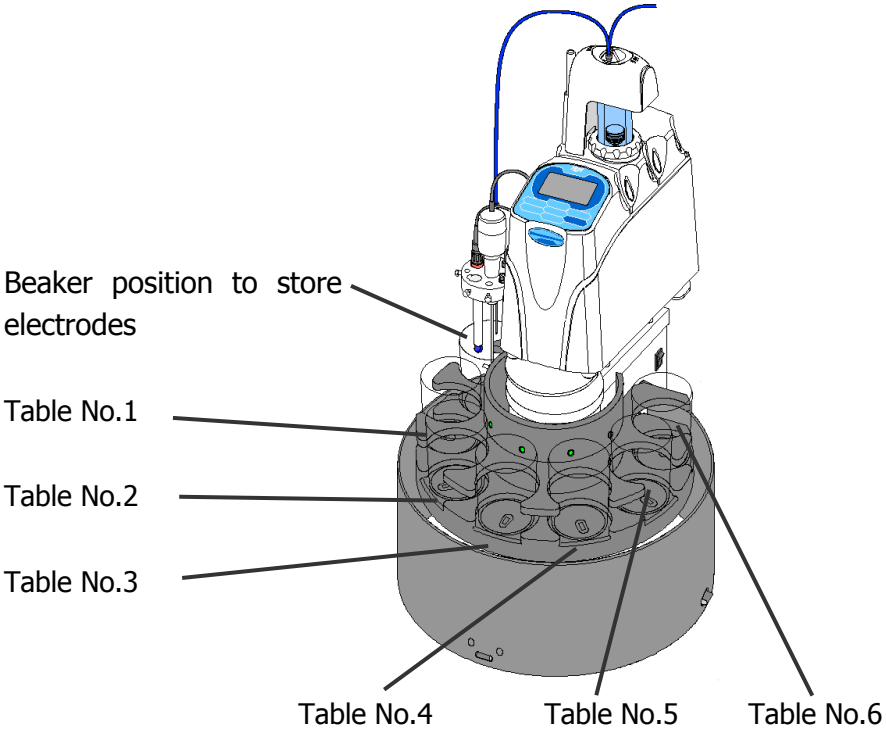
Here you prepare the sample solution to be tested. When you use a 250mL, 200mL disposable cup or beaker, at least about 120mL is required by diluting with solvent if necessary. With insufficient solution, the electrode will not dip into the solution, causing failure in titration after all.

3-2-5.**Sample setting**

1) Place the container with sample in it on the table rack. The sample can be placed in any desired position. The measurement starts in order of setting.

> The beaker sensor will light in about 3 seconds when the sample is set, and the sample is recognized.
> The measurement is operated in order of setting the beaker. However, the sample set before turning on the power is measured in order of the small table No..

2) If the electrode is to be dip stored, put water in disposable cup about 80%, and place it in the beaker position to store electrodes. In this case, move the table to the lower end position with [↓] key and move the arm to the position excluding the cleaning position with [→] key, and move the table to the upper end position with [↑] key on the manual operation screen.



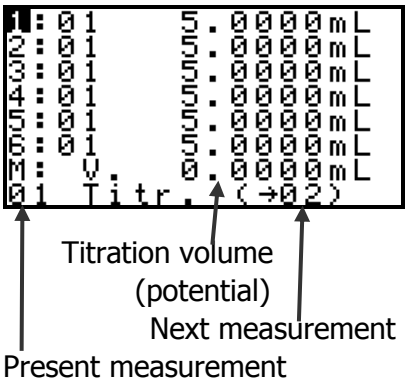
3-2-6.Start titration

<When your titration unit is AT-710B, AT-700>

1) Press [START/STOP] on titration unit to start titration.

⚠ **Caution**	**When you press [START/STOP] and stop the equipment while turning on or measuring, you are required to return the table and the arm to their home positions.** **When you press [START/STOP] and start measurement without returning the table and the arm to their home positions, the equipment will automatically return them to their home positions before starting measurement. When they are at their home positions, the following operation will be done:** **table goes down → arm moves to No. 1 → arm moves to original position → table goes up.** **Make sure that there is nothing that may stick the table and the arm around the equipment.**

2) "Remote" LED of CHA-700 turns on, table No. of present measurement and next measurement are displayed on the screen of titrator.
3) The samples are automatically titrated. The measurement is operated in order of setting the beaker. (when Start Mode is 1). When Start Mode is 2, the sample is measured in order of small number of table No. put on the table at the starting measurement, the added sample is measured in order of setting.
4) Titration volume or potential can be checked with [←] key on the main screen during measurement.



5) The measurement result can be checked by pressing with [MENU/HOME] key to access "2.Data File."

The result can be checked during measurement.

6) When all the samples are titrated, "Remote" LED turns off.
7) After the series of measurements is over, the electrode moves to the beaker for storage on the rack, and is dipped in solvent (when the beaker is set).

Specific measurement can be measured only by putting the sample on the same table No. position and pressing the [START/STOP] key when a separate method is set to each No. of the sample setting screen of AT-700/710.

<When your titration unit is AT-710M, AT-710S>

1) Press [Start] button on titration unit to start titration.

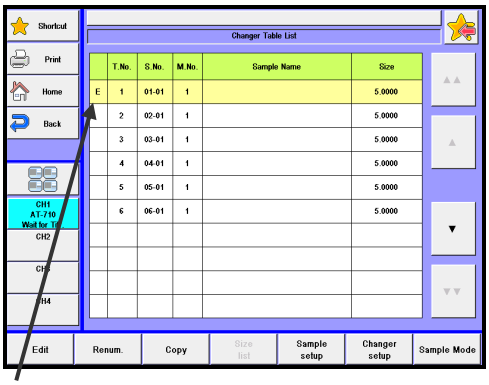
Caution

When you press [Reset] button and stop the equipment while turning on or measuring, you are required to return the table and the arm to their home positions.
When you press [Start] button and start measurement without returning the table and the arm to their home positions, the equipment will automatically return them to their home positions before starting measurement. When they are at their home positions, the following operation will be done:
table goes down → arm moves to No. 1 → arm moves to original position → table goes up.
Make sure that there is nothing that may stick the table and the arm around the equipment.

Note

The measurement can not start during displayed with "Unit during operation" by a screen of MCU-710. Before start of measurement, press [MENU/HOME] key of AT-710 to move to the main screen from the changer screen.

2) "Remote" LED of CHA-700 turns on. On the "Changer Table List" screen, "*" is displayed for the Table No. of the sample that is currently measured and then "N" is displayed for the Table No. of the sample that is measured next. (In a standby state for titration, "E" is displayed at the position of the last measured sample.)



State

3) The samples are automatically titrated. The measurement is operated in order of setting the beaker. (When Start Mode is In Order of Putting). When Start Mode is Ascending Order Only at Time of Start, the sample is measured in order of small number of table No. put on the table at the starting measurement, the added sample is measured in order of setting.

4) The measurement result can be checked by pressing with [Titration Result] button on Main display.

The result can be checked during measurement.

5) When all the samples are titrated, "Remote" LED turns off.
6) After the series of measurements is over, the electrode moves to the beaker for storage on the rack, and is dipped in solvent (when the beaker is set).

Specific measurement can be measured only by putting the sample on the same table No. position and pressing the [Start] button when a separate method is set to each No. of the "Changer Table List."

3-2-7. Stop measurement

<When your titration unit is AT-710B, AT-700>
The measurement can be stopped by pressing [START/STOP] key again during measurement.
When the device is stopped in the emergency, turn off the power on the right side of CHA-700.

Caution

When you press [START/STOP] and stop the equipment while turning on or measuring, you are required to return the table and the arm to their home positions. The manual operation screen can be used after returning the table and the arm to the home positions. Make sure that there is nothing that may stick the table and the arm around the equipment.

Note Turn on the power of CHA-700 and Automatic Potentiometric Titrator again when the power of Automatic Potentiometric Titrator is turned off during measurement.

<When your titration unit is AT-710M, AT-710S>
The measurement can be stopped by pressing [Reset] button during measurement.
When the device is stopped in the emergency, turn off the power on the right side of CHA-700.

Caution

When you press [Reset] and stop the equipment while turning on or measuring, you are required to return the table and the arm to their home positions. The manual operation screen can be used after returning the table and the arm to the home positions. Make sure that there is nothing that may stick the table and the arm around the equipment.

Note Turn on the power of CHA-700 and Automatic Potentiometric Titrator again when the power of Automatic Potentiometric Titrator is turned off during measurement.

3-2-8. **Add Sample**

The sample can be added one by one during measurement. The beaker sensor will light in about 3 seconds when the sample is set, and the sample is recognized. Set the sample measurement condition before starting preset measurement.

⚠ **Caution**	**Add the sample when the table is at the upper end position. Do not add the sample when the table is at the lower position because it is dangerous the arm is operated.**

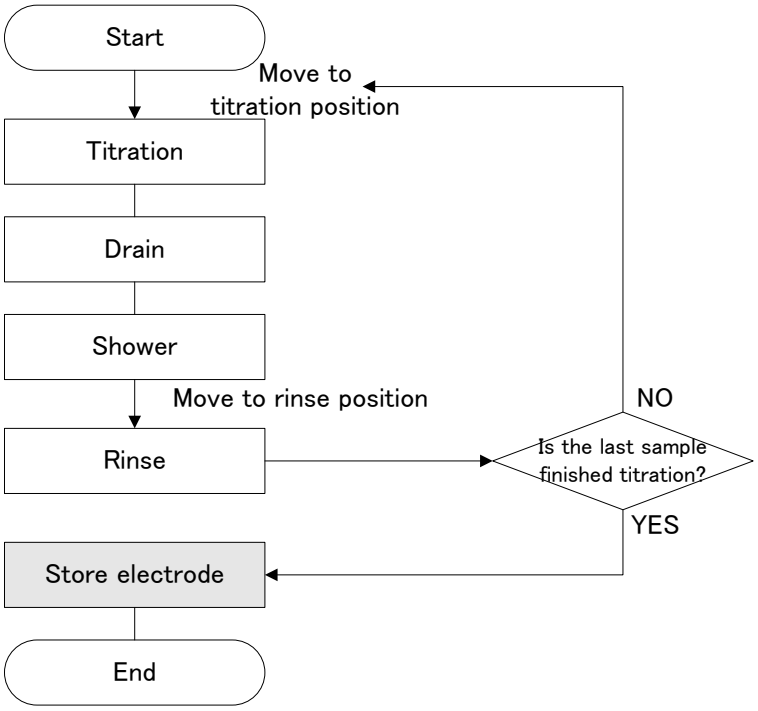
 **Note**	Add the sample before measuring the final sample. The table is moved to the cleaning position once only when 50 samples are measured continuously, and home position is checked.

3-3. Program sequence

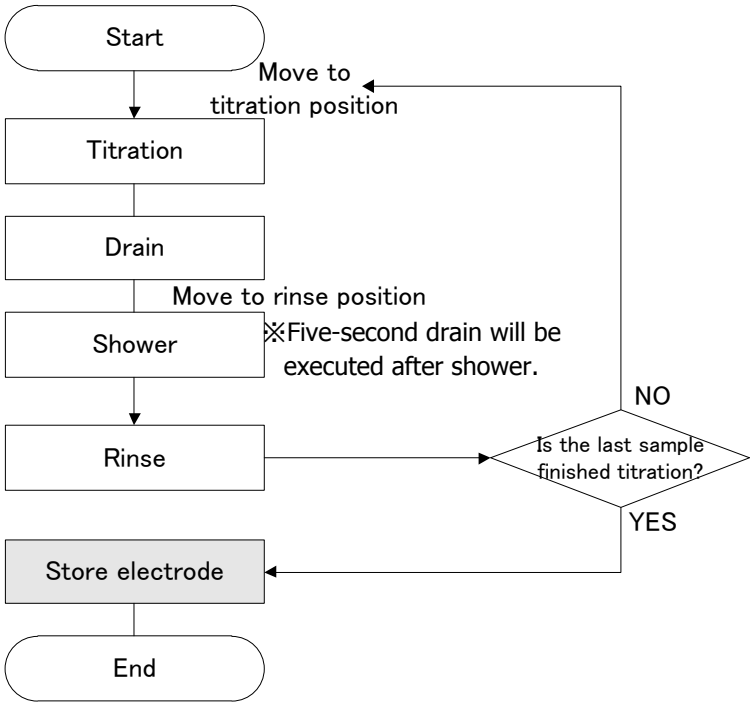
3-3-1. About sequence

This unit is preinstalled with the following sequence, which is titration, rinse and drain, etc. The flow of a necessary sequence can be set by setting the sequence time at 0 seconds, and skipping the item.

<Ring mode>



<Bath mode>



<Description of command>

Command	Contents
Drain (Drain Time)	The reagent is drained with drain pump of option. Set drain time for "Time."
Shower	Shower cleaning is operated with shower pump of option. Drain is operated at the same time during shower cleaning. Set shower cleaning time for "Time."
Rinse (Wait Time (Rinse))	The arm is moved to the dip position and the stirrer is operated, and the electrode is dip rinsed. The stirrer is stopped after dipping. Set dip time for "Time."

3-3-2. **Example of sequence setup**

<Example of sequence>

Shower mode	Contents	Setting time(s)			Option
		Drain (Drain Time)	Shower	Rinse (Wait Time (Rinse))	
Off (Rinse Mode)	Only measurement is operated, the electrode is preserved in another solution after measurement. (neutralization titration, redox titration)	0	0	0	
Off (Rinse Mode)	Dip cleaning is operated at each measurement. (neutralization titration, redox titration)	0	0	15	
Bath (Bath Mode)	Shower cleaning is operated at each measurement. (neutralization titration, redox titration, precipitation titration)	0	10	0	Electrode Auto Cleaning Bath Unit
Ring (Ring Mode)	Shower cleaning and dip cleaning are operated at each measurement. (non-aqueous titration)	20	5	300	Two-solution Electrode Auto Cleaning Unit

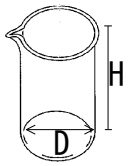
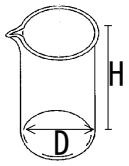
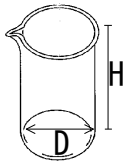
Drain is operated at the same time during shower cleaning.
The stirrer is operated during rinsing.

4. Measurement by type of sample

4-1. Optional beaker holder

The beakers for CHA-700 (Six-rack Model) are 250mL beaker up to 95mm in height and 71mm in outside diameter, 200mL disposable cup and 200mL beaker. Depending on sample type, beakers and corresponding beaker holders other than standard may be required.

Kinds of holder and Beaker

Kind of holder	Dimension
For 100mL beaker (12-03953)	 D 55±1mm H 70±2mm
For 100mL tall beaker (12-03954)	 D 50±1mm H 88±2mm
For 50mL beaker, 100mL disposable cup (12-03952)	 D 46±1mm H 60±2mm

4-2. Shower cleaning

Shower cleaning and draining can be performed with the optional electrode auto cleaning bath unit.

Do not use any solution other than pure water with this unit.

Note

4-2-1. Parts of electrode auto cleaning bath unit

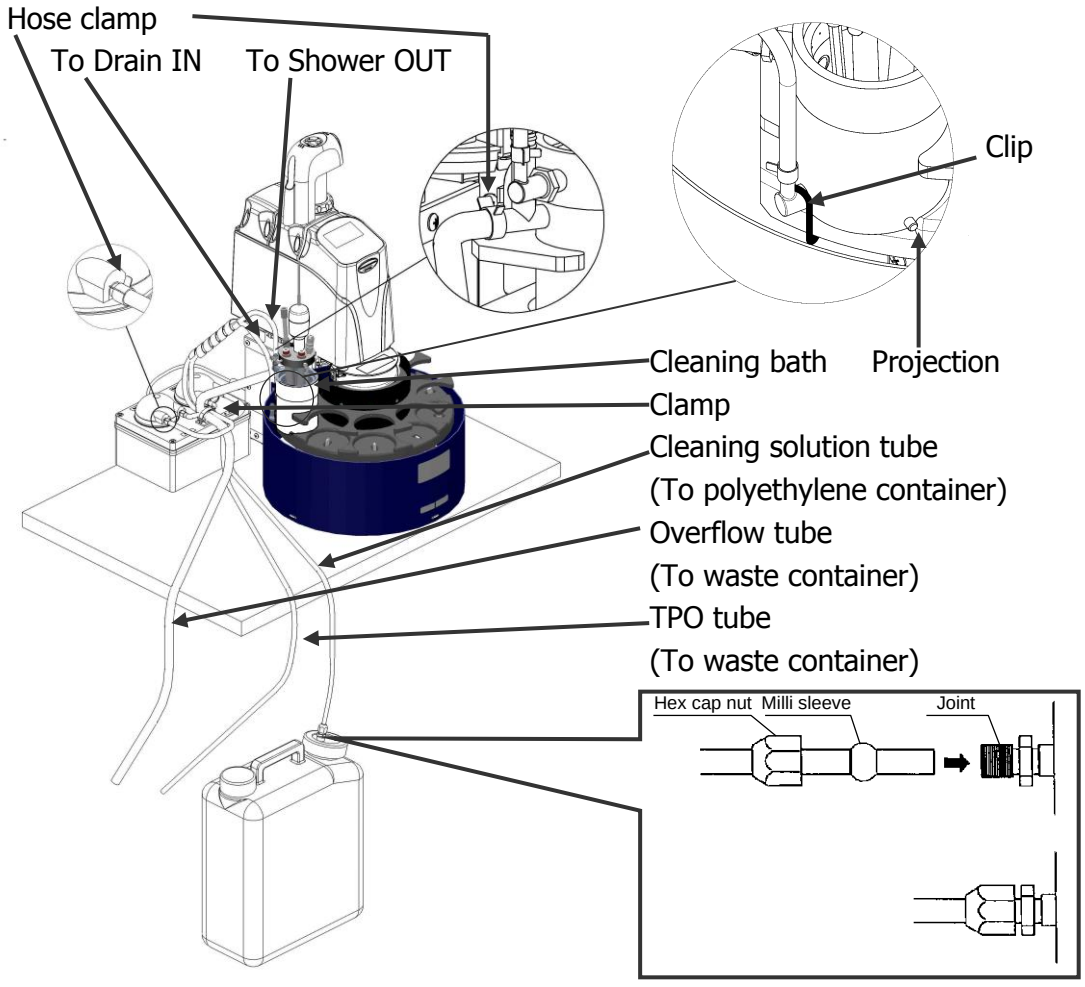
Part Number	Part Description	Qty	Remarks
-	Cleaning Bath (with tubing)	1	
-	Pump Unit	1	
-	Cleaning Solution Tube	1	TPO tube + PTFE tube
-	TPO tube 1.5m	1	
-	Overflow Tube	1	
12-04408	Polyethylene Container 10L	1	
-	Hose Clamp	4	
-	Clip	1	

A drain container is not included in this unit.

Note

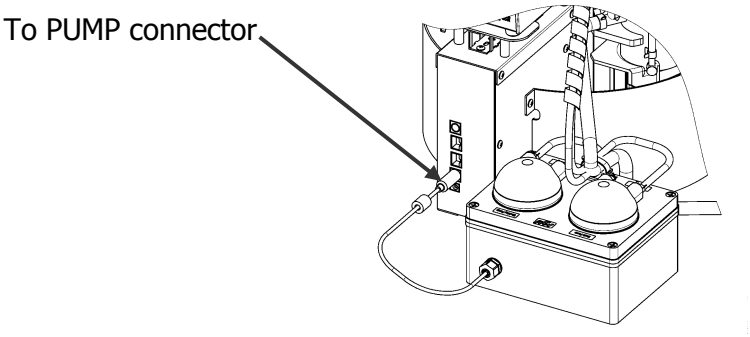
4-2-2. Installation

1) As shown below, place the cleaning bath to the original position of the carousel, and fix the cleaning bath and a table by a clip. Put the projection of the cleaning bath into the cut of the carousel to install. Make sure not to rotate the carousel while installing.
2) Screw the upper tube of the cleaning bath into the OUT side of the washing pump of the pump unit. Then fix the tube with the hose clamp. Screw the lower tube of the cleaning bath into the IN side of the drain pump. Then fix the tube with the hose clamp. Place the overflow tube to the cleaning bath, and put the other end into a waste container. Fix these three tubes with the clamp of the peristaltic pump.
3) Screw the cleaning solution tube into the IN side of the washing pump, and fix the tube with the hose clamp. Place the other end into the cleaning solution container as shown below.
4) Screw the TPO tube into the OUT side of the drain pump, and fix the tube with the hose clamp. Put the other end into a waste container.



⚠ Caution	**Make sure to leave the end of the drain and overflow tubes in the air. If the tube end is put in a solution, solutions may not drain properly and waste liquid may overflow from the cleaning bath.**

5) Place the connector of the pump to the PUMP connector on the back side of the CHA-700.

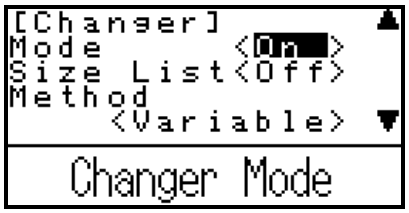


4-2-3. Setting up changer parameters

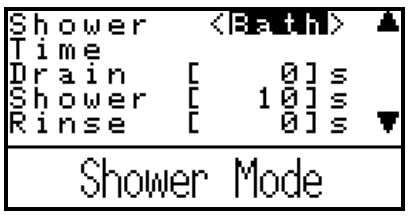
<When your titration unit is AT-710B, AT-700>

1) Press [MENU/HOME] of AT-700/710.
2) Select "6. Changer" with [↑] or [↓], and press [ENTER].

3) Set Mode to "On" with [←] or [→], and press [ENTER].
4) Select with [←] or [→] if you wish to use Size List, and press [ENTER].
5) Select Method setting with [←] or [→], and press [ENTER].

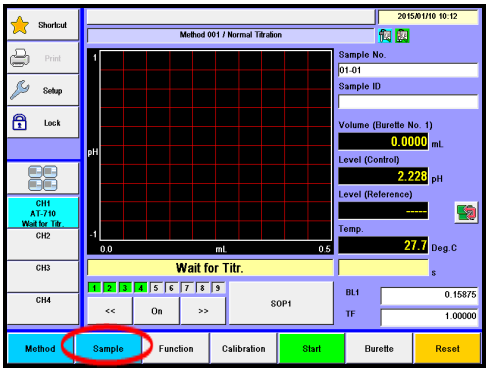


6) Set Shower to "Bath" with [←] or [→], and press [ENTER].
7) Then set up time for Shower. Select command for cleaning sequence you wish to operate with [↑] or [↓], and press [ENTER]. Enter operating time with [↑], [↓], [←] or [→].
8) Set Rinse Stir. Speed with [↑] or [↓], and press [ENTER].
9) Select Start Mode with [←] or [→], and press [ENTER].
10) Move the cursor to [Exit] and press [ENTER].

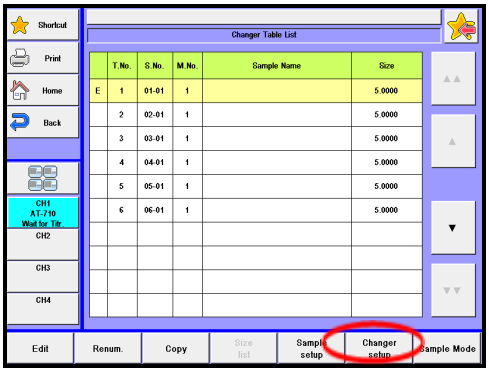


<When your titration unit is AT-710M, AT-710S>

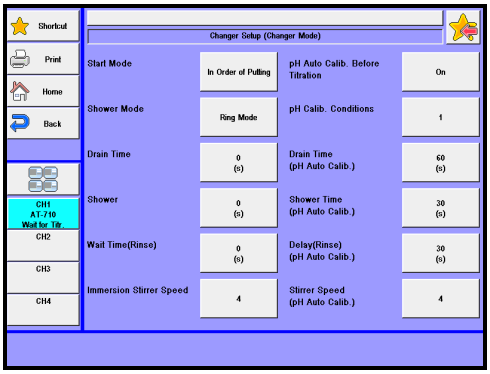
1) Press [Sample] button.



2) Press [Changer setup] button on "Changer Table List."



3) The screen on the right will appear.
Set Shower Mode to "Bath Mode." Then set up time for Shower. Each parameter is determined by the [OK] button.



4-3. Shower cleaning (nonaqueous)

By connecting the optional two-solution electrode auto cleaning unit, you will be able to perform shower cleaning (nonaqueous) and drain samples from the beaker at the measurement position. In addition, you will be able to perform dip cleaning in the beaker after cleaning if you put a beaker with water at the home position.

Note See "4-3-2. Chemical resistance" for solvents you can use with this unit.

4-3-1. Parts of electrode two-solution electrode auto cleaning unit

Part Number	Part Description	Qty	Remarks
-	Cleaning Ring	1	with tubing and clamp
-	Shower Pump Unit	1	
-	Drain Pump Unit		
-	Drain Pipe		with tubing
-	Pump Cable	1	
-	Connecting Cable	1	
-	PTFE Tubing	2	
12-04408	Polyethylene Container 10L	1	
-	Hexagonal Wrench	1	
-	Polyethylene Washing Bottle	1	

Note A drain container is not included in this unit.

4-3-2.Chemical resistance

See below for chemical resistance of the tubing used with this unit. The data below is based on the dip test of the tubing.

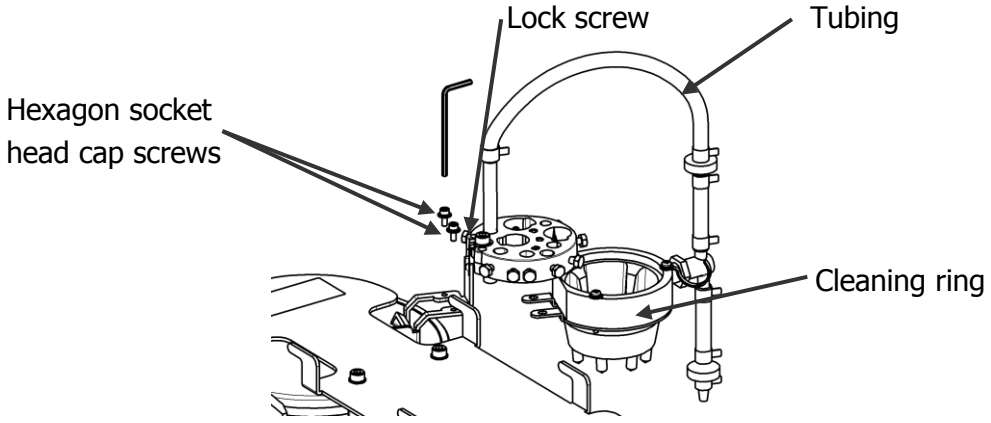
Chemical resistance of the supplied tube

Acetone	×	Ethanol	●	Nitric acid (70%)	●
Acetic acid	×	Formalin	●	Phosphoric acid (85%)	●
Ammonia (28%)	●	Gasoline	●	Sodium hydrochlorite	●
Amyl alcohol	●	Hydrochloric acid (35%)	●	Sodium hydroxide	●
Aniline	●	Hydrofluoric acid (50%)	●	Sulfuric acid (98%)	●
Benzaldehyde	●	Isooctane	●	Tetrahydrofuran	×
Benzene	●	Kerosene	●	Toluene	●
Chloroform	●	Methanol	●	Trichloroethane	●
m-Cresol	●	Methyl ethyl ketone	×	Trichloroethylene	●
Dichloromethane	●	Monochlorobenzene	●	Water	●

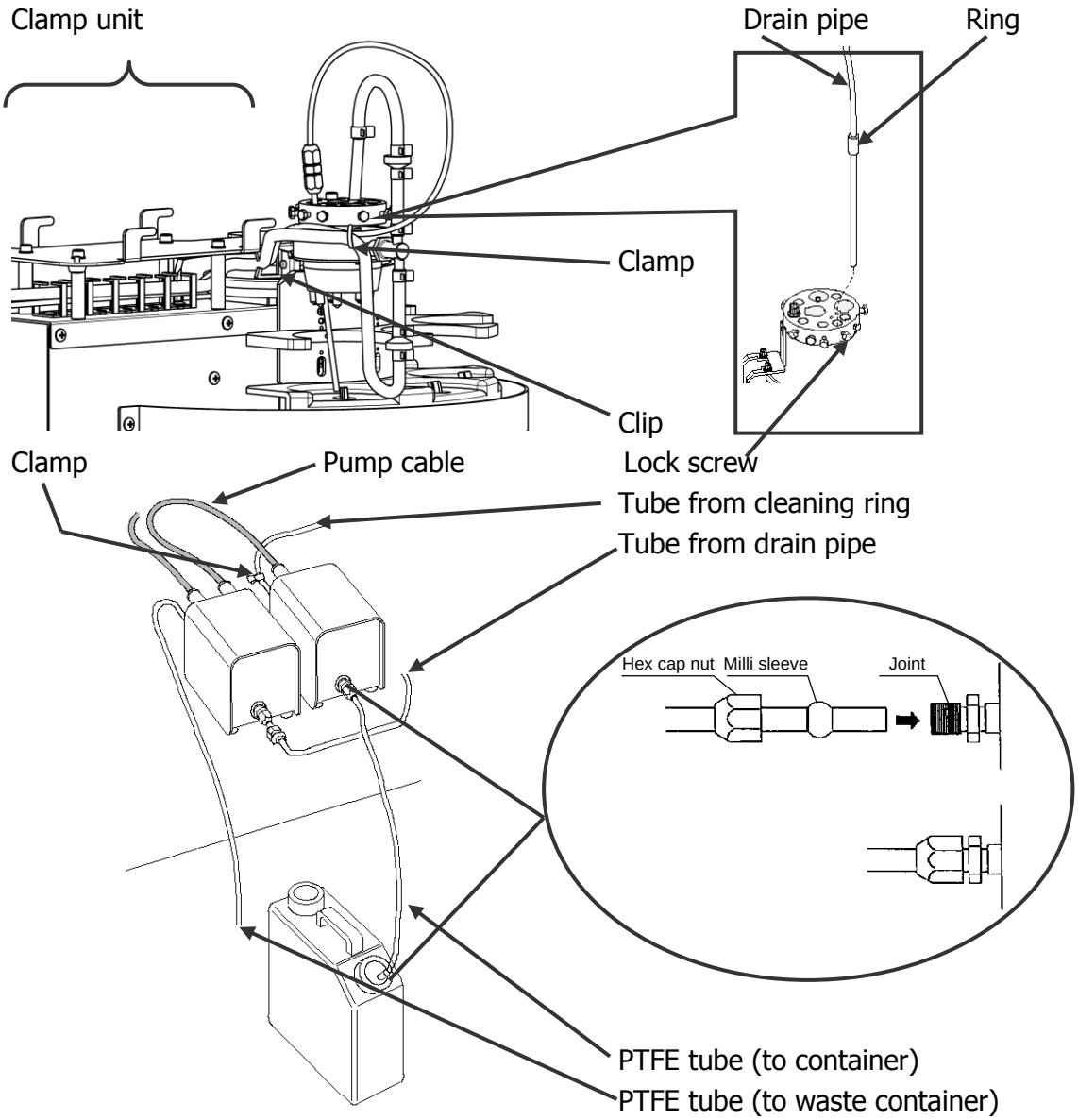
Note: ● resistant × harmful, not recommended

4-3-3.Installation

1) As shown below, remove the hexagon socket head cap screws with the supplied hexagonal wrench. Use these screws to install the cleaning ring.
As shown below, insert the tubing to the electrode holder. Then fix it with the lock screw.



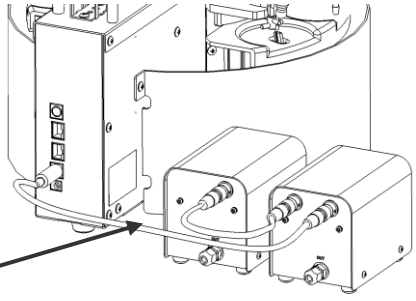
2) Fix the tubing from the cleaning ring to the clamp and the clip. Place it to the clamp of the CHA-700. Put the tip of the tubing to the OUT side of the cleaning pump with supplied clamp.
3) Fix the drain pipe to the clamp and the clip. Place it to the clamp of the CHA-700. Insert it to the electrode holder. Have the tip of drain pipe contact the bottom of the beaker, and have the ring position come to the position of the lock screw of the electrode holder. Tighten the lock screw to fix the drain pipe. Put the other end of the drain pipe to the IN side of the drain pump.
4) Put the supplied PTFE tubing to the IN side of the cleaning pump, and put it to the container of the cleaning solution.
5) Put the supplied PTFE tubing to the OUT side of the drain pump, and put it to the waste container.
6) Connect the cleaning pump and the drain pump with the pump cable.



⚠ **Caution**	**Make sure to leave the end of the drain and overflow tubes in the air. If the tube end is put in a solution, solutions may not drain properly and waste liquid may overflow from the cleaning bath.**

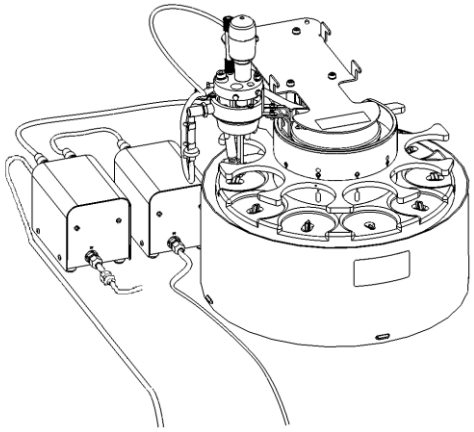
Note	Solutions may not be stirred if the drain pipe is in contact with the propeller stirrer. When placing the drain pipe to the electrode holder, have the drain pipe tip face outward of the electrode holder in order to make sure that the drain pipe is not in contact with the propeller of the propeller stirrer.

7) Connect the connecting cable to the drain pump, and put the other end to the PUMP connector on the back of the CHA-700.



Connecting cable

8) Follow the steps from "1-2-2." to "1-2-7" to install the titrator. Put electrodes after turning on the equipment and lowering the table by manual operation. Then place the propeller stirrer.



Note

The pump may not start pumping when the instrument is activated for the first time or after storage for a long period of time. Priming is necessary by the following steps:

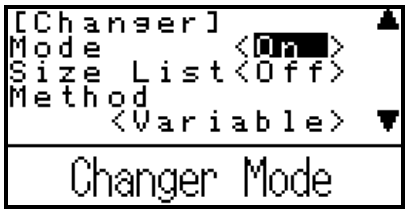
1) Fill the supplied washing bottle (500mL) with solvent for shower.
2) Place the container on the table rack.
3) Move the cursor to "M" with [↑] [↓] keys and press [ENTER]. Press [↓] key to move the table down position. Move the arm to the container placed step 2) with [↑] [↓] keys.
4) Remove the tube line to the rinse container.
5) Press [Enter] key (table move shower position), and supply rinse solvent through the tip of tube (removed at step 4) from the washing bottle.
6) Repeat the above step (5) until the solvent reaches the pump.
7) Return the tube line to the rinse container.

4-3-4.Setting up changer parameters

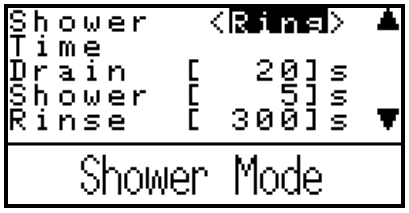
<When your titration unit is AT-710B, AT-700>

1) Press [MENU/HOME] of AT-700/710.
2) Select "6. Changer" with [↑] or [↓], and press [ENTER].

3) Set Mode to "On" with [←] or [→], and press [ENTER].
4) Select with [←] or [→] if you wish to use Size List, and press [ENTER].
5) Select Method setting with [←] or [→], and press [ENTER].



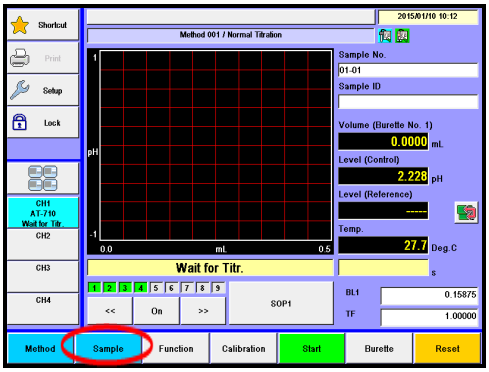
6) Set Shower to "Ring" with [←] or [→], and press [ENTER].
7) Then set up time of drain, shower and dipping with reference to" 3-3-2.Example of sequence setup."
8) Select command for cleaning sequence you wish to operate with [↑] or [↓], and press [ENTER]. Enter operating time with [↑], [↓], [←] or [→].
9) Set Rinse Stir. Speed with [↑] or [↓], and press [ENTER].
10) Select Start Mode with [←] or [→], and press [ENTER].
11) Move the cursor to [Exit] and press [ENTER].



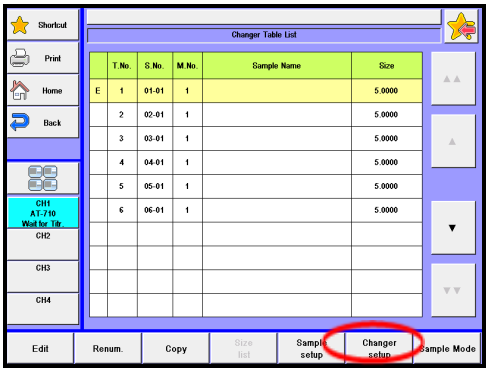
Note The flow rate of the pump is about 400mL/min. Time required for drain is, however, subject to sample characteristics; therefore, enter the value you have obtained through your testing with the same sample.
We recommend that the "Shower" time be used up to ten (10) seconds. This is because cleaning solution may overflow from the beaker if the drain pump is not working.

<When your titration unit is AT-710M, AT-710S>

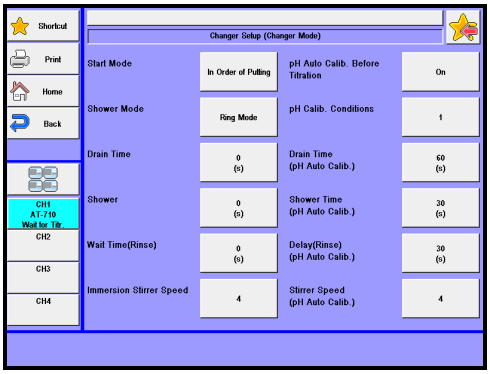
1) Press [Sample] button.



2) Press [Changer setup] button on "Changer Table List."



3) The screen on the right will appear. Set Shower Mode to "Ring Mode." Then set up time of Drain Time, Shower and Wait Time (Rinse) with reference to" 3-3-2.Example of sequence setup." Each parameter is determined by the [OK] button.



Note

The flow rate of the pump is about 400mL/min. Time required for drain is, however, subject to sample characteristics; therefore, enter the value you have obtained through your testing with the same sample.
We recommend that the "Shower" time be used up to ten (10) seconds. This is because cleaning solution may overflow from the beaker if the drain pump is not working.

4-4. Automatically perform pH calibration of glass electrodes

For AT-710M or AT-710S, setting pH standard solutions onto CHA-700 allows to perform (Max three points) auto pH calibration of a glass electrode.

4-4-1. Parameter setup for sample changer

1) Press [Sample] button on the main screen.
2) Set "pH Auto Calib. Before Titration" to "On".
3) Set up rinse time and the like. When "Shower Mode" is "Ring mode", rinsing for pH calibration is performed in the sequence excluding shower rinsing.

4-4-2. Placing pH standard solution

Pour pH standard solution into a beaker. When a 200mL disposable cup or beaker is used, adequate liquid measure is about 120mL. In the case that the liquid measure is too little, correct pH calibration cannot be performed because an electrode fails to be soaked in the solution.

4-4-3. Performing pH calibration

1) Place the disposable cup with pH standard solutions in it on the turntable rack. The rack turns counterclockwise.
2) If the electrode is to be dip stored, put water in disposable cup about 80%, and place it in position for beaker where the electrode is to be stored.

4-4-4.Start pH calibration

1) Remove the titration nozzle from the electrode holder.
2) Press [Calibration] button.

Note The measurement can not start during displayed with "Unit during operation" by a screen of MCU-710. Before start of measurement, press [MENU/HOME] key of AT-710 to move to the main screen from the changer screen.

3) Press [pH Auto Calib. Exe.] button.
4) Press the button for the serial No. of an electrode; select an electrode and then press [Next] button. Then, pH auto calibration starts.
5) The "Auto" LED turns lit on CHA-600, and the message "Changer Operating" appears on display of the titration unit.
6) When all the samples are titrated, LED "Auto" turns off.
7) After the series of measurements is over, the electrode moves to the beaker for storage on the rack, and is dipped in solvent.
8) Press [Calib. End] button.
9) Install the titration nozzle to the electrode holder and fix it with the lock.

4-4-5.Stop pH measurement

The pH measurement can be stopped by pressing [Reset] button during measurement.

Note Turn on the power of CHA-700 and Automatic Potentiometric Titrator again when the power of Automatic Potentiometric Titrator is turned off during measurement.

5. Maintenance

The multiple sample changer is composed of complicated drive system so that periodic servicing and maintenance is more required than any other types of instrument.
In order to continue specified performance and secure safety for an extended period of time, it is recommended to keep the unit well maintained according to the instructions below.

5-1. Daily maintenance

Check the following items on daily basis in order to maintain the instrument in normal condition for a long period of time.
If sample solution or solvent happens to splash during measurement, immediately wipe off the solution and protect the instrument from contamination.
When the table or tubing is removed during the daily work, be sure to retighten the screws securely when attaching them again.

5-1-1. Caution on entangled tubes and cables

When the arm is activated manually (maneuver between titration position and rinse position), watch the tubes and cables in order to avoid them entangled around the arm or beakers.
Adjust a fixed clip to fix that the lead wire is appropriate length to the arm when the situation is seen as above.
Check the key manual operation by pressing the key in order.
Error is displayed when a defect is found in the operation. Care it referring to "6-1. Troubleshooting of sample changer."

Caution **Be careful that the lead wire might be disconnected when the lead wire is pulled.**

Note [←] and [→] keys are operated only when the table is at the lower position by pressing [Down].

5-1-2. Detection of a beaker

Check that a movable part of the beaker detection switch is not stuck to the table side. Put the beaker on the table and check LED lamp of each beaker position lights in 3 seconds. Check the beaker detection switch is operated when LED does not light. Contact us or agency when LED still does not light.

5-1-3. Leak from jointed parts or loosened tube joint

Check any loose contact at the tube of titrator, at jointed parts at the inlet of rinse solution, the drain outlet or rinse bath, and if any loose joint should be found, it must be tightened.

5-1-4. Damage on electrode or titration nozzle

Make sure there is no cracks or breaking of the electrode or titration nozzle by visual check. If any should be found, it must be replaced with new one.

5-1-5. Electrical contact

Check any loose contact at SS-BUS port or other ports on the titrator (AT) and burettes (APB).

5-1-6. Titrant and diluting solution

Make sure that these reagents are filled enough in containers for the volume of samples to be measured. Add reagent if not enough. Also, see to it that the absorbing tube end touches the bottom of tank.

5-1-7. Waste liquid

The tank for waste liquid must be empty before measurement starts.

5-1-8.Cleaning the table

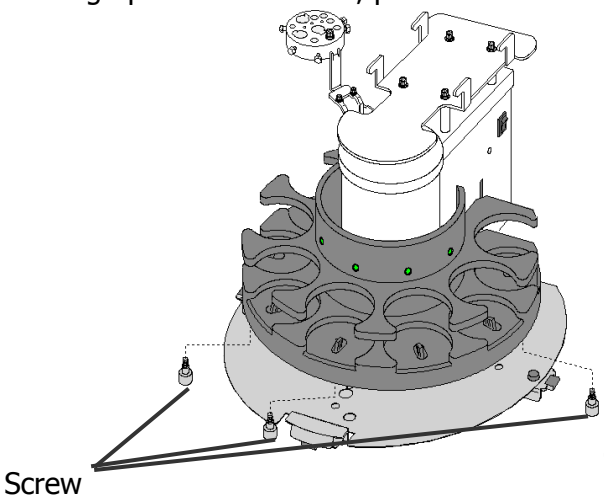
Wipe off any dirt on and around the table rack. Remove the table and clean it when dirt does not come off.

<How to remove the table>

1) Move the cursor to "M" with [↑], [↓] key on the main screen of AT-700/710, and press [ENTER].
2) Press [↓] key by a long press (2 seconds) to move the table position of CHA-700 to the table replacement position.

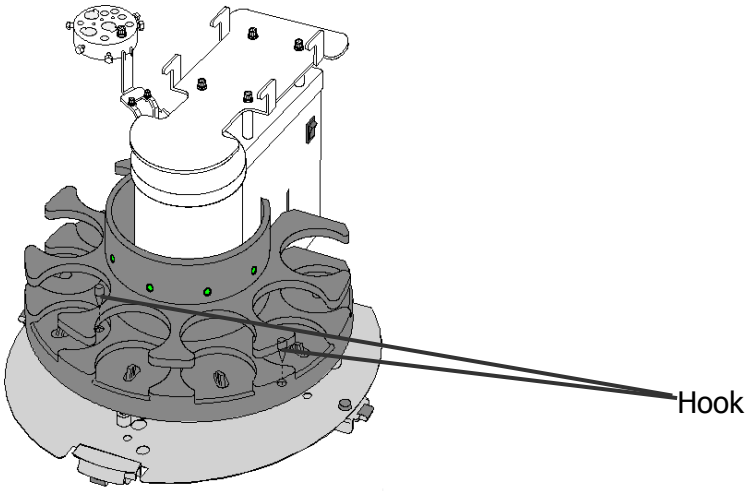
⚠ **Caution**	**When you press [START/STOP] and stop the equipment while turning on or measuring, you are required to return the table and the arm to their home positions. The manual operation screen can be used after returning the table and the arm to the home positions. When they are at their home positions, the following operation will be done: table goes down → arm moves to No. 1 → arm moves to original position → table goes up. Make sure that there is nothing that may stick the table and the arm around the equipment. Make sure that there is nothing that may stick the table and the arm around them.**

3) Remove the cover to unscrew (3 places) as figure below.
4) After lifting up the table a little, pull forward and remove.



<How to install the table>

1) Install the table in the reverse procedure of <How to remove the table>. At this time, install right and left hooks of figure below to match with the hole of CHA-700.
2) Insert the screws (3 places).

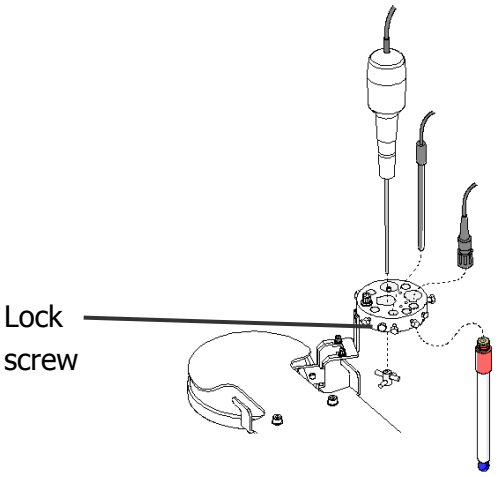


⚠ **Caution**	**When you press [START/STOP] and stop the equipment while turning on or measuring, you are required to return the table and the arm to their home positions. The manual operation screen can be used after returning the table and the arm to the home positions. When they are at their home positions, the following operation will be done:** **table goes down → arm moves to No. 1 → arm moves to original position → table goes up.** **Make sure that there is nothing that may stick the table and the arm around the equipment. Make sure that there is nothing that may stick the table and the arm around them.**

5-2. Replacement of parts

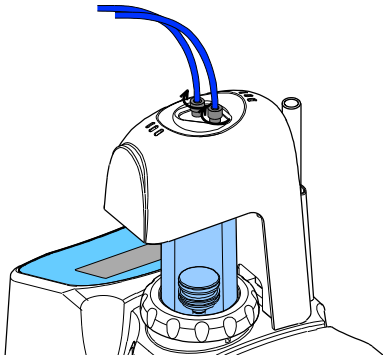
5-2-1. Replacement of electrode or titration nozzle

Fix the electrode by the lock screw fastening under electrode holder and fix the titration nozzle by the lock screw fastening over it. Fix the top of each part with the lock screw at the upper position of the blade of propeller stirrer.

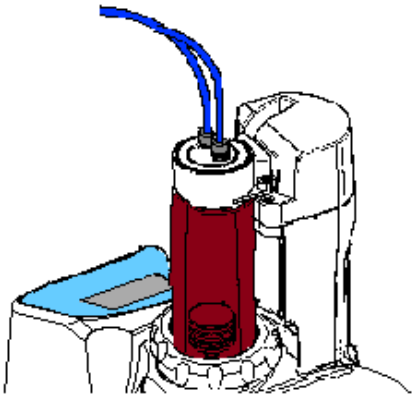


<Installation of tube>
Insert the connection tube and tighten with hands.

AT-700



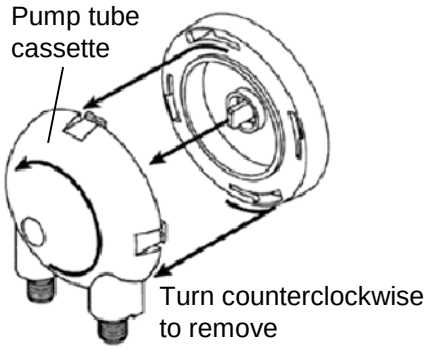
AT-710



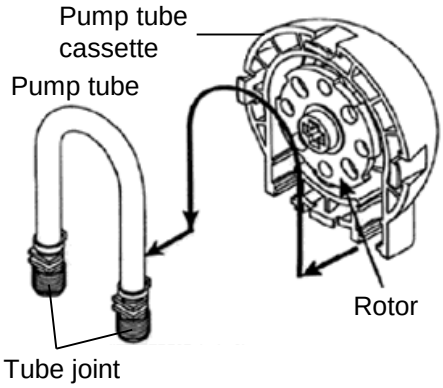
5-2-2. Replacement of pump tube

If the pump tube of Electrode auto cleaning bath unit is deteriorated, the tube may be broken with rinse liquid leaking and the pump may stop working.
Replace pump tube as follows:

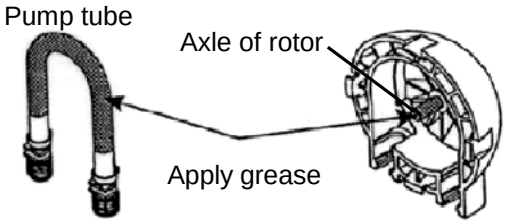
1) Disconnect the tubes connected to the pump tube cassette.
2) Turn the cassette counterclockwise to remove it.



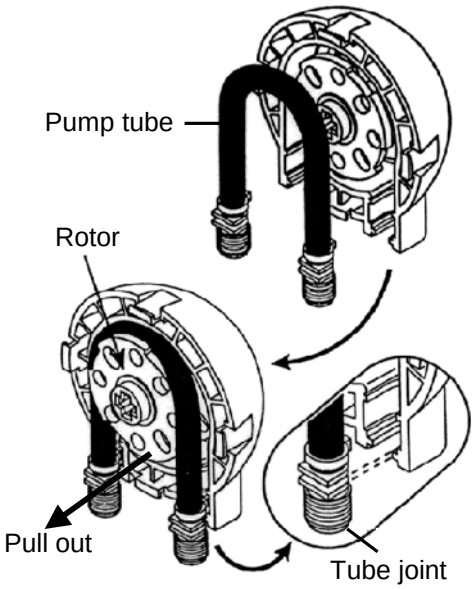
3) Remove the tube joint from the cassette by pulling one of the ends, and then pull out the tube.



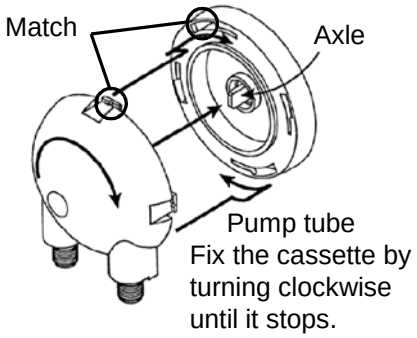
4) Apply grease over the tube and the axle of pump cassette as illustrated.



5) Fit in the new pump tube around the rotor as shown by pulling it out a little bit.
Fix the tube joint securely to the groove as illustrated.



6) Match the axle and rotor, and fix the cassette by turning clockwise until it stops.



⚠ Caution

The life of the pump tube (Thermoplastic Elastomers (TPE) tube) is approximately one year in normal use. Some sample liquid may corrode the pump tube (Pharmed tube) and deteriorate it.
Pay attention to chemical character of the liquid and consider early exchange of pump tube if necessary.

<Chemical resistance of pump tube>
The pump tube has resistance to various chemicals as shown in the chart, which is helpful to your selection of measurement samples or solvent to be used.
The chart is based on the dipping test of pump tube, and it is recommended to run the pump and pretest tube in advance to ensure its stability.

Chemical resistance of the supplied pump tube (64-01103-03, TPE tube)

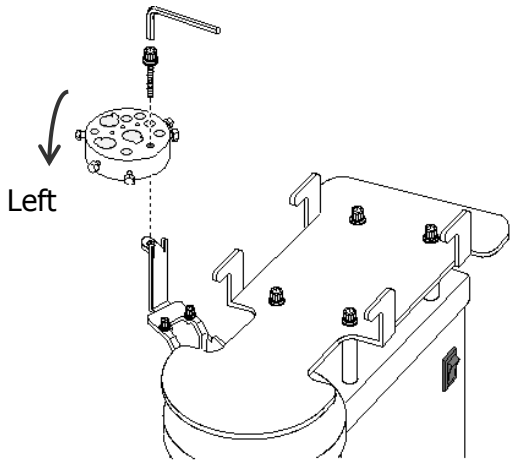
Acetone	▲	Chloroform	×	Kerosene	×	Phosphoric acid	●
Acetaldehyde	●	Chlorobenzene	×	Ketone	×	Propyl alcohol	▲
Acetic acid	●	Cychlohexane	×	Lascquer solvent	×	Saline water	●
Allyl alcohol	▲	2.4-dichlorotoluene	×	Linseed oil	●	Soap water	●
Aluminum chloride	●	Ethanol	▲	Naphtha	×	Sodium chloride	●
Ammonia	●	Ether	▲	Natural gas	●	Sodium hydroxide	▲
Ammonium chloride	●	Ethyl chloride	×	Nitric acid (10%)	●	Sulfuric acid (diluted)	●
Aniline	▲	Ethylene chlorohydrin	×	Nitric acid (30%)	▲	Sulfuric acid (normal)	●
Aqua regia	▲	Freon	×	Nitric acid (70%)	×	Sulfuric acid (concentrated)	▲
Benzene	×	Gasoline	×	Nitrobenzene	×	Tetrahydrofuran	×
Botanical oil	●	Glycerol	●	Oleic acid	▲	Toluene	×
Bromo benzene	×	Hydrochloric acid	●	Perchloric acid	×	Water	●
Butan	▲	Hypochlorite soda	●	Perchloroethylene	×	Xylene	×
Carbon disulfide	×	Isooctane	×	Phenol	▲		

Note: ● resistant ▲ corrosive, not recommended × harmful, not recommended

5-2-3.**Changing electrode holder**

Remove hexagon socket head cap screws to change the electrode holder.

Move electrode holder to left end and secure on the 11-sample model.



⚠ **Caution**	**If the electrode holder on the 11-sample model is secured o the right end, it may hit the titrator when moving to the home position.**

5-3. Annual check and maintenance

Perform the annual check and maintenance before one year elapses after purchase. Our authorized service person will work on your unit accordingly. This service is required every year thereafter.
The annual check and maintenance include the replacement of the motor and pump (option). The life of these parts depends on how often they are used. The following table shows the average frequency of such services.

Frequency of use per year	Motor	Pump
Less than 5,000 samples	Once / 4 years	Once / 2 years
Less than 10,000 samples	Once / 2 years	Once / 1 year
More than 10,000 samples	Depends on mechanical conditions	

Note 1: Less than 5,000 samples per year means that less than 20 samples are measured per day during 250 working days per annum

5-4. Overhaul

It is recommend that the unit used for more than five years be overhauled. In addition to the parts replaced in the annual check, the overhaul includes disassembly of driving unit and cleaning each part involved and replacing worn-away parts. Also, all joints and tubing will be replaced with new ones.
The cost of the overhaul depends on the conditions of your unit, so feel free to consult with our local sales representative or dealer.

6. Troubleshooting

6-1. Troubleshooting of sample changer

When any mechanical or electrical trouble occurs, the sample changer stops working by flashing Remote LED indicating the unit is in trouble. The error is described on display screen of AT-700/710 titration unit or MCU-710. Please refer to the details of description and remedies in the manual for your titration unit.

6-2. Troubleshooting

When error message does not appear or the message is unclear, check the followings:

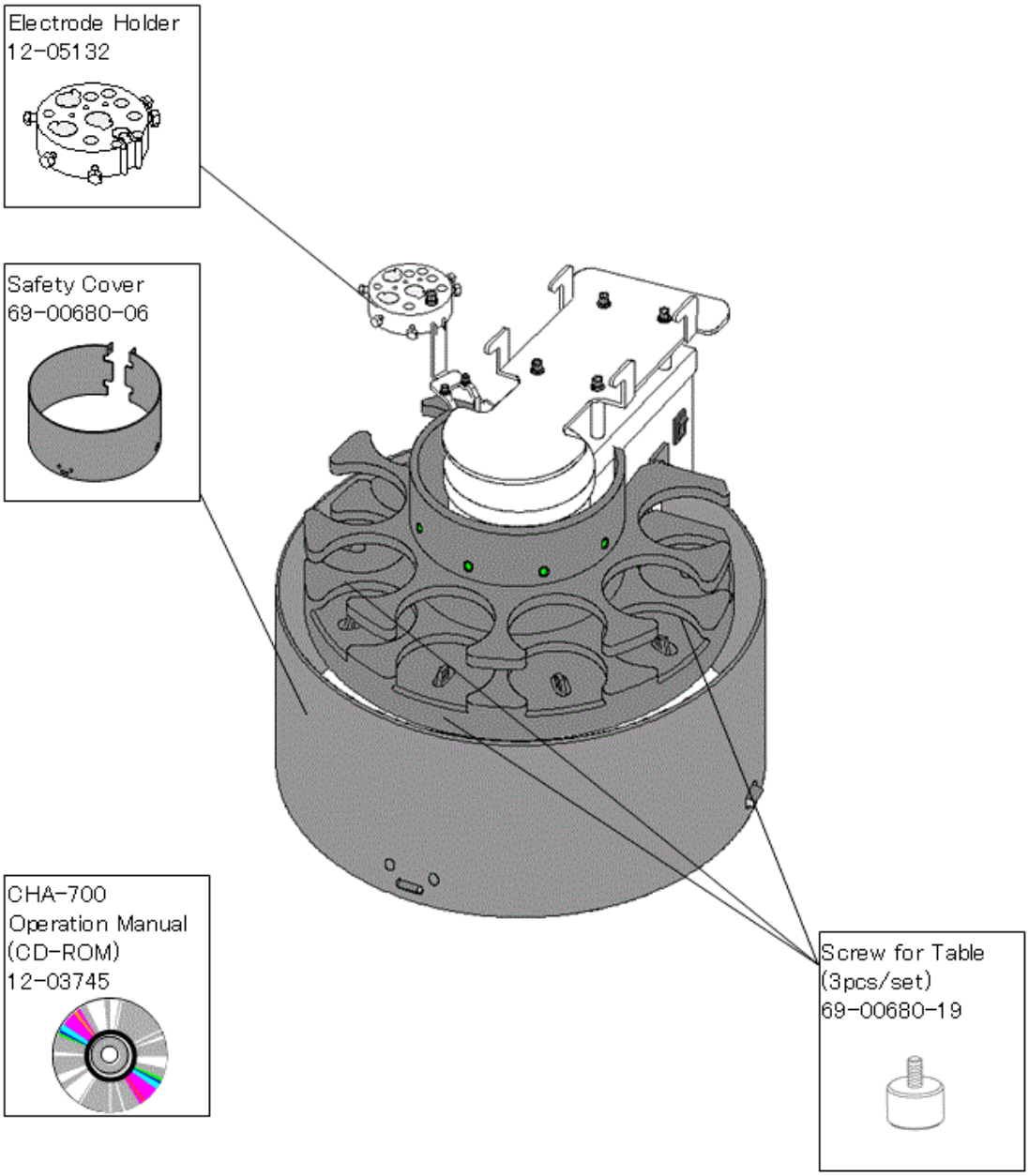
Trouble	Check items and countermeasures
Power does not turn on.	・Check voltage of power source, and supply correct voltage. When it does not improve even if check the above item, turn off power immediately and contact your local dealer.
Reproducibility is poor or too much deviated results.	・Check if preamplifier and electrode are appropriate. ・Check if electrode is rinse cleaned well. Check if shower and dip rinse time are sufficiently long. If too short, adjust it.
Arm stops halfway.	・Check if electrode cable or reagent tube is pulled back. Eliminate physical tension to any of them.
Arm does not turn.	・Check the motor by manually turning the holder, and report the situation to your local dealer.
Electrode or nozzle hits table rack or rinse bath.	・Check the screw fastened to electrode holder and retighten if it is found loose. See "1-2-2. Placing Electrode and Propeller Stirrer."
Table does not turn vertical smoothly.	・Check the table is connected correctly.
Beaker is not detected.	・Check the sensor for the beaker detection is operated and the lamp lights. When the sensor is not operated, contact your local dealer.
Rinse solvent is not pumped out.	・Press [Shower] or [Rinse] key of the manual operation to check to see that the pump operates properly. ・If pump works, check the length of rinse tube if long enough or securely connected or its tip dipped in solvent. Practice priming if necessary. ・If pump does not work even with cable connected correctly, contact your local dealer. ・If solvent does not flow out in spite the pump works, replace pump tube.

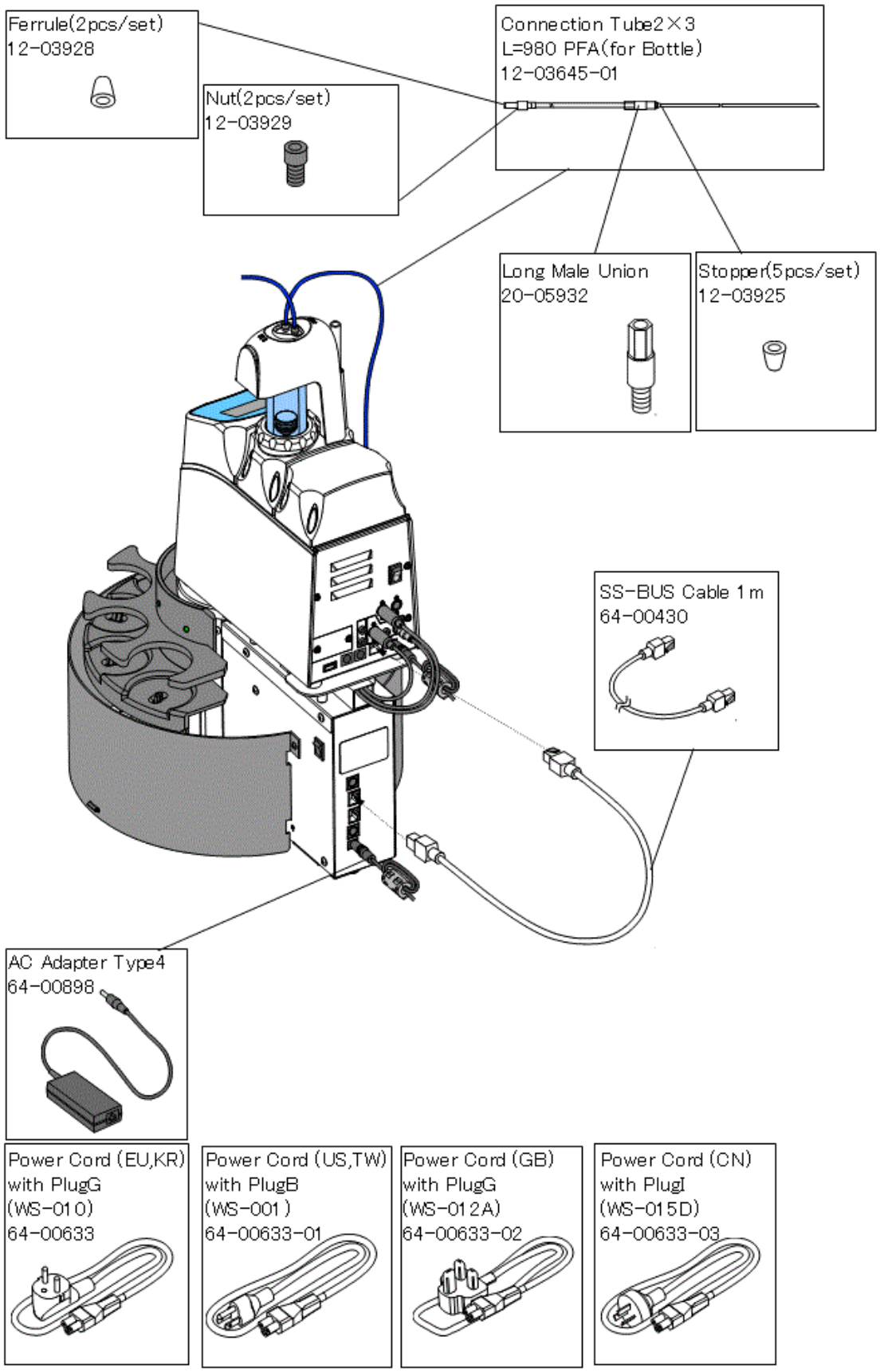
7. Others

7-1. Parts list

The supplied parts, consumable parts and optional components are shown in the following lists, and you can obtain any of these parts at your dealer or from sales representative.

Parts




Ferrule(2pcs/set)
12-03928
Nut(2pcs/set)
12-03929
Connection Tube2×3
L=980 PFA(for Bottle)
12-03645-01
Long Male Union
20-05932
Stopper(5pcs/set)
12-03925
SS-BUS Cable 1m
64-00430
AC Adapter Type4
64-00898
Power Cord (EU,KR)
with PlugG
(WS-010)
64-00633
Power Cord (US,TW)
with PlugB
(WS-001)
64-00633-01
Power Cord (GB)
with PlugG
(WS-012A)
64-00633-02
Power Cord (CN)
with PlugI
(WS-015D)
64-00633-03

Options

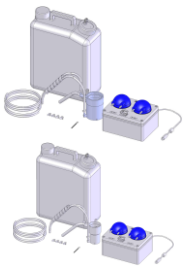
Part Number	Part Description	Remarks
12-04267	Electrode Auto Cleaning Bath Unit (for 6 samples)	
12-04267-01	Electrode Auto Cleaning Bath Unit (for 11 samples)	
64-01103-03	Pump Tube	
12-04657	Two-solution Electrode Auto Cleaning Unit	for 6-sample model
12-03954	Holder for 100mL Tall Beaker(7pcs/set)	
12-03953	Holder for 100mL Beaker(7pcs/set)	
12-03952	Holder for 50mL Beaker(7pcs/set)	for 50mL beaker and Disposable cup(100mL)
66-00009-01	Disposable Cup(200mL 1000pcs/set)	
66-00092-05	200mL Beaker	
66-00093-01	100mL Tall Beaker	
66-00092-04	100mL Beaker	
66-00009-00	Disposable Cup(100mL 1000pcs/set)	
66-00092-03	50mL Beaker	
20-08803	Propeller(for 11samples)	
12-04408	Polyethylene Container 10L	
12-05193	PP 70mLCup (100pcs/set)	for Microquantity titration, only 11-sample model Changer
12-04982	O-ring S12.5 1A NBR (2pcs/set)	for Microquantity titration
12-04983	Holder for Cup (11pcs/set)	for PP 30mLCup

7-2. Options

Various convenient peripherals are available as shown below. These options can be purchased from KEM. Contact your local dealer or sales representative.

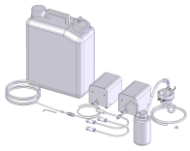
CHA-700

Shower cleaning Drain(6-sample or 11-sample model)



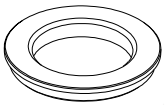
Electrode Auto Cleaning Bath Unit

Perform shower cleaning (nonaqueous solution) and dip cleaning (6-sample model)



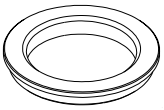
Two-solution Electrode Auto Cleaning Unit

Use 100mL tall beaker (6-sample model)



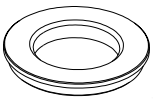
Beaker Holder (for 100mL Tall Beaker)

Use 100mL beaker (6-sample model)



Beaker Holder (for 100mL Beaker)

Use 50mL beaker (6-sample model)



Beaker Holder (for 50mL Beaker and Disposable Cup(100mL))

7-3. Basic specification

Specification	Contents	
Number of samples	Up to 6	Up to 11
Sample container	250mL beaker, 200mL disposable cup, 250mL beaker or 200mL beaker	100mL disposable cup or 50mL beaker
	(option) 100mL disposable cup, 50mL beaker, 100mL beaker or 100mL tall beaker	
Cleaning	Dipping in beaker at fixed position / Shower cleaning (option)	
Rinse solution	Pure water , alcohol, etc.	Pure water
Stirring device	Propeller stirrer	
Motion	Sample rack up-down motion, rotation of arm	
Sequence setting	Set from Automatic Potentiometric Titrator	
Sequence control	1) Auto : started by Automatic Potentiometric Titrator 2) Manual : operated from Automatic Potentiometric Titrator	
Display	LED (Power, Remote, Beaker) * LED for beaker at each position	
External I/O	SS-BUS ×2: for connecting AT-700/710 and APB PUMP ×1 : for optional shower cleaning and sample drain	
Ambient conditions	Temperature :5 to 35℃ Humidity :85%RH or below (no condensation)	
Power supply	DC24V 1.9A(Main unit) AC100-240V ±10% 50/60 Hz(Comes with AC Adapter)	
Power consumption	Approx. 20W	
Dimensions	365 (W) × 443(D) × 315 (H) mm	
Weight	Approx. 8kg	
CE marking	EMC : EN61326 LVD : Conforming to EN61010-1	

8. Warranty and after-sales service

1. Warranty Period

One (1) year from the date of receipt of this product or the date of installation by KEM service personnel or by authorized personnel.

2. Warranty Details, After-sales Service

This product passed the strict inspections of KEM and, except for consumables, KEM warrants this product, under normal use, for One (1) year from the date of receipt of this product or the date of installation by KEM service personnel or by authorized personnel. (Parts and consumables will be supplied for at least seven (7) years after discontinuation of this product.)
This product can be repaired at user's site by KEM service personnel or by authorized personnel. Note that secondhand or pre-owned products are not covered by warranty.

3. Exclusion

Warranty shall be void where:

- items are consumables, accessories or wearing parts such as, but not limited to, tubing and pump seals, or parts which are in direct contact with samples and/or reagents and are considered consumables due to normal wear.
- trouble of the pump diaphragm by a sample and the reagent origin;
- any part is replaced or any repair or remodeling is performed by unauthorized personnel;
- unauthorized service parts, spare parts and/or consumables are used;
- the user does not follow the instructions for installation, correct use, maintenance and/or storage, resulting in malfunction;
- the user does not follow the ranges and/or conditions stated in the product brochure, flyer or specifications;
- periodic checks and/or maintenance is not performed;
- breakage and/or malfunction is caused by careless handling such as, but not limited to, exposing to or submerging in water, or dropping down;
- breakage and/or malfunction is caused by excessive force applied to glassware or plastics;
- malfunction or leakage is caused by sample properties (corrosively, solid materials, etc.);
- malfunction is caused by any device, part and/or chemical other than those supplied by KEM;
- overuse has led to fatigue or wear of parts;
- items are consumables or wearing parts;
- this product has been moved or transported to another place once accepted and installed;
- breakage and/or malfunction is caused by conditions beyond control of KEM including, but not limited to Acts of God such as fire, earthquake, lightning strike, flood, etc.;

KEM is also unable to offer warranty and related services of repairs and maintenance checks of any kind once specifications, capability, features and/or functions of this product as well as its parts are changed, altered or remodeled by unauthorized personnel.

4. Disclaimer

KEM is not held liable, during or after the warranty period, regardless of whether loss or damage is caused by any event beyond control of KEM, or it is the user's opportunity loss and/or lost earnings caused by failure or malfunction of KEM products, or with or without predictability of KEM, for loss or damage resulting from a particular reason, secondary loss or damage, accident compensation, damage to products other than those supplied by KEM, and any other incidental compensation.
KEM is also not held liable for physical and/or economic loss or damage resulting from the use of KEM products, or loss of stored data during repair or servicing of such product.