Automatic degreasing control system

PARKER CHEMICAL CONTROLLER

PCC

Handling Manual

Warranty and General Conditions

＊Inspection

After installation of the equipment is completed, trial operation for performance confirmation is performed to confirm that the performance is the required, and inspection will be taken as soon as the handling instruction is completed. Also, the date of acceptance will be the final delivery date. If trial operation can not be performed within one month after the installation of the equipment for the reason not our responsibility, the first month from the installation date of the equipment will be taken as the acceptance date.

＊Equipment warranty

The warranty period of the delivered equipment will be either 12 months or 2400 hours of operation time, whichever is earlier than the final delivery date described above.

During this period, if the equipment's performance degradation, failure, damage, etc. are clearly considered to be problems with our design, manufacture, and installation, we will carry out repairs, remodeling, etc. as soon as possible. We will promptly contact you and ask for your cooperation in providing us with the necessary conveniences.

The above warranty does not come under the Company's responsibility such as being separately consumables or parts expected to have a shorter life than the above warranty period under normal operating conditions, inadequate maintenance, or force majeure such as natural disasters. It is not this thing based on the reason.

＊Disclaimer

Please store the device and final materials before final delivery.

Production compensation and quality assurance caused by line shutdown due to equipment failure etc. will be exempted.

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Chapter1

Before use

1.1.In the beginning

Thank you for purchasing our “ParkerChemicalController(PCC)”.

The systems in the series have been developed for analytical control of chemical treatment solutions including plating solution. They have unique names of their own according to the types of chemical solution for which they are intended.

The systems of this series have the following features.

1） We installed only necessary functions for use and devoted ourselves to simple operation.
2） Intuitive and intuitive operation using touch panel
3） We redesigned the structure of the entire device newly and realized a highly scalable design.
4） Separate daily operation and maintenance operation and simply press the button for daily operation.

We manufacture it carefully so that we can use it with confidence, but if you make a mistake in the method of operation you may cause unexpected accidents, so follow the instructions at your company Please do appropriate operation management.

We will explain this manual mainly about operation method of main body analysis section.

1.2.How to read this manual

First of all, this book explains the necessary basic ideas and operation methods.
Operations such as maintenance are described later in this document. We recommend that you proceed to Chapter 8 after confirming the basic operations in Chapter 2.

In addition, prompt attention to customers with pictograms as necessary. Please pay particular attention to the safety pictogram shown below.
According to the degree of danger (or the size of the accident), the instruction manual and the machine body delivered from our company are classified into 4 levels according to the following display.

Table 1　Warning pictogram

Warning term	Meanings
Danger	Indicates imminent danger and is used for death or serious injury if you do not follow the procedures and instructions.
warning	Indicate a potentially dangerous situation, and use it in case of death or serious injury if you do not follow the procedures and instructions.
Note	Indicate a potentially dangerous condition, and use in case of minor injury or damage to equipment, if the procedure or instructions are not followed.
＜Note text＞	<Note text> Where underlining is used in the text, use special attention and information that you want to emphasize.

Please understand the meaning of these warning terms and follow the instructions.

On the operation of the equipment, items to be confirmed are indicated by ″check pictogram″.

Information and operation procedures that are convenient for customers are informed by ″Pictogram of Lamp″.

1.3.Attention in the security

Please observe the following precautions in operation and operate properly.

１） Before doing automatic analysis management, always check the movement of the device and confirm that there is no problem.
→ Please check especially for expendable items.

２） Be sure to perform regular maintenance when you operate it.
→ Please do regular maintenance every year.
→ To request periodic maintenance, please contact our sales representative.

３） Always wear protective glasses when replacing tubes or refilling reagents.
→ Chemicals may jump and chemicals may enter the eyes.

４） Be sure to wear protective gloves and masks when handling reagents and calibration solution.
→ Depending on the reagent and calibration solution, there are things of powerful drugs, some of which harm the body.

５） Production guarantee and quality assurance due to shutdown of automatic analysis management equipment etc. will be exempted from responsibility.

1.4.Common specifications

Analysis method and accuracy	Absorptiometry ±４%(repetition n=20) Neutralization titration method ±４%(repetition n=20) pH value：Glass electrode method Analytical operation is fully automated method using tube pump.

Attention…

With regard to accuracy, it also varies depending on sample conditions. The above values are representative values when nickel sulfate solution and 1% sodium carbonate solution are used as samples, and do not guarantee the accuracy of the analysis value.

Automatic calibration	Concentration calibration：One point calibration with high concentration pH value：Two-point calibration with standard pH calibration solution
Supply action and pump	Proportional control by target value and analysis value. No-voltage contact circuit
Various operations and display	Operation by liquid crystal display and touch panel and thermal paper printer.
Control method	Program control with 16 bit CPU
Usage environment	Indoor specification Within 5 ℃ ~ 35 ℃ There is no dew condensation and mist
Driving power and power consumption	Single-phase AC100V 60/50Hz With ground Analysis Department Within200W
External dimensions and mass	Analysis Department 380W x 370D x 586H(Patrite +209H) 40kg Outer case 430W x 430D x 1050H 80kg

Dimensions and mass may vary depending on the option.

Depending on the modified specifications, it may not match the common specification. In this case, the remodeling specification by model is given priority.

Chapter 2

Anyway , let's use it

2.1. Names and functions

Indicates the name and function of each part of the device. Depending on the model, some devices are not installed.

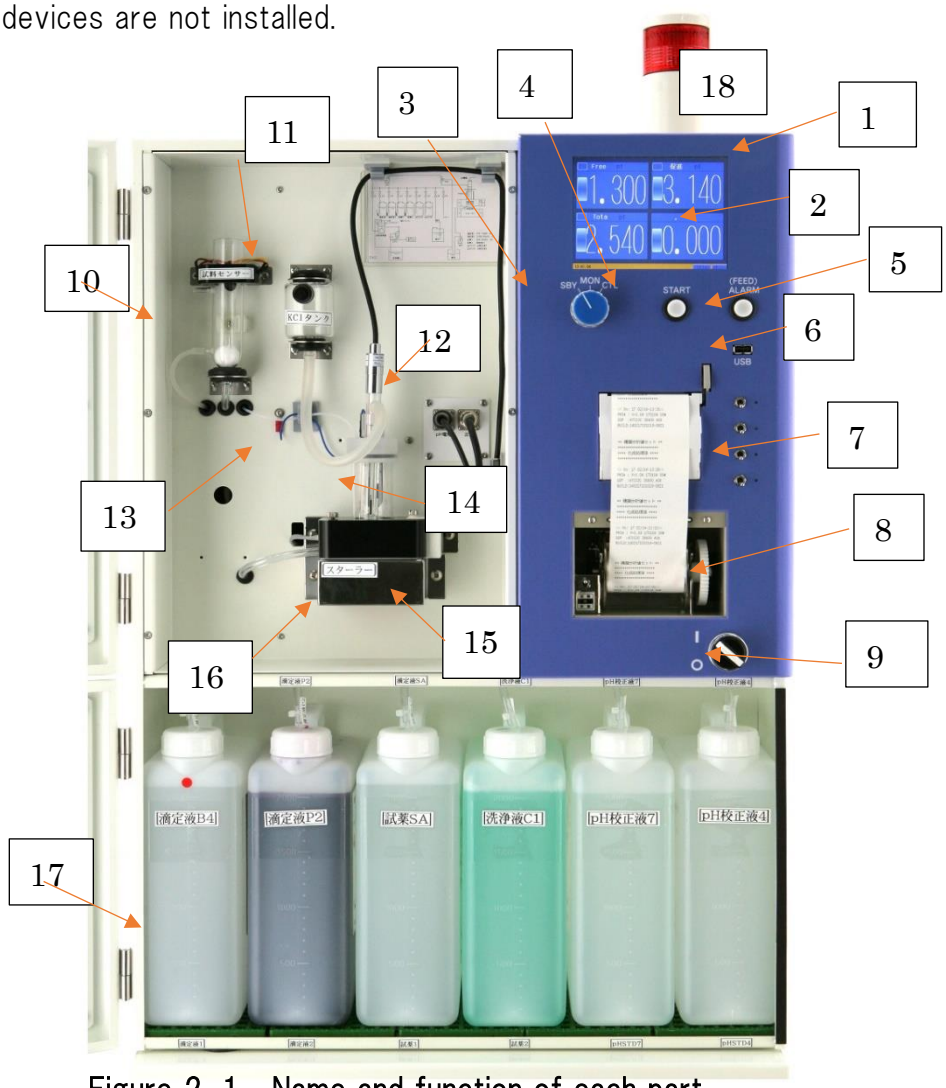


Figure 2-1　Name and function of each part

001 There is an analysis section on the left of the operation section.
002 LCD display Touch panel to make various settings.
003 Selector switch　Wait, monitoring and control modes are selectable.
004 START button　Analysis operation start.
005 BUZZ button　Buzzer ringing stop.
006 USB connector　Insert the USB memory.
007 Selection switch　In the multi-tank type, select the analysis tank.
008 Printer　You can print letters including kanji using roll thermal paper.
009 Main power switch　Turn on / off the entire device.
010 Sample measuring tube　There is a float inside and it detects the arrival of the sample.
011 KCl reservoir　Replenish the internal liquid of the electrode.

012 pH sensor　It is a triple compound sensor.
013 Liquid shielded wire　Reduce the noise in the measurement cell.
014 Measurement cell Perform pH measurement and titration here. It is abbreviated as a cell.
015 Colorimetric sensor Detects the state of colorimetric titration and pure water sampling.
016 Stirrer　Stir the inside of the cell with a magnetic stirrer.
017 Reagent bottle Reagent level sensor can be installed on the back (optional).
018 Warning lamp　LED 3 colors. Buzzer built-in.

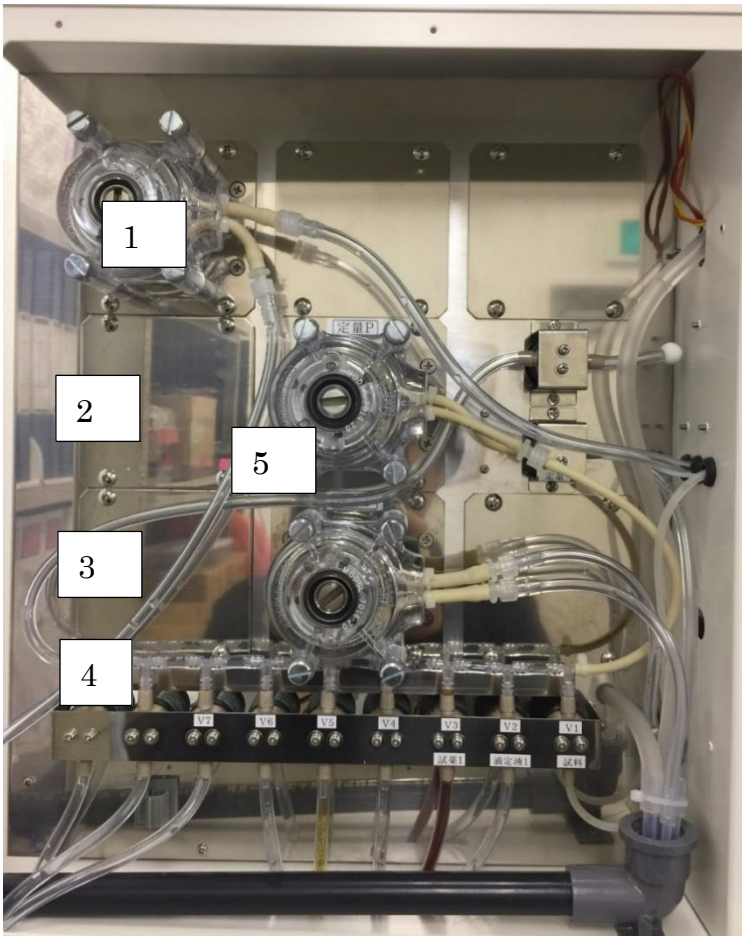


Figure 2-2　Names and functions of side parts

1　Tube pump For sample withdrawal
　　It is a pump to draw the sample from the tank.
2　Tube pump for weighing
　　We collect a certain amount of sample and pure water.
3　Tube pump　For cell drainage
　　Drain the sample in the cell.
4　Collector solenoid valve port
　　It is a solenoid valve to switch calibration solution etc.
5　Three way solenoid valve

It is used to weigh the sample.

2.2. Anyway, let’s use it

After installing the equipment, I will explain to use it anyway.
Please refer to this chapter and later in order to know the details of the equipment and maintenance.

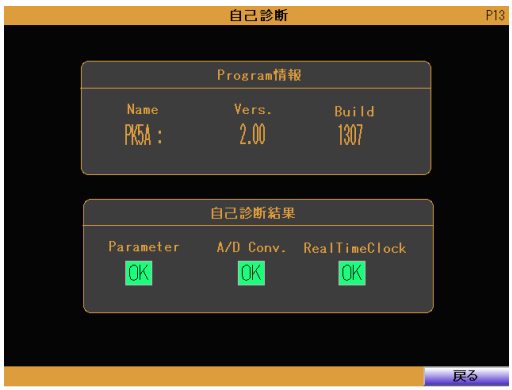
2.2.1. Condition here

The operation is set by the numerical value called the parameter of the device. After installation, it is assumed that the basic parameters are already set. Sometimes it is necessary to adjust the parameters to do the proper operation. Also assume that the reagents are properly set in the equipment and the piping air venting (setup) has also been completed. For additional information on installing the equipment, please refer to additional documents such as installation method.

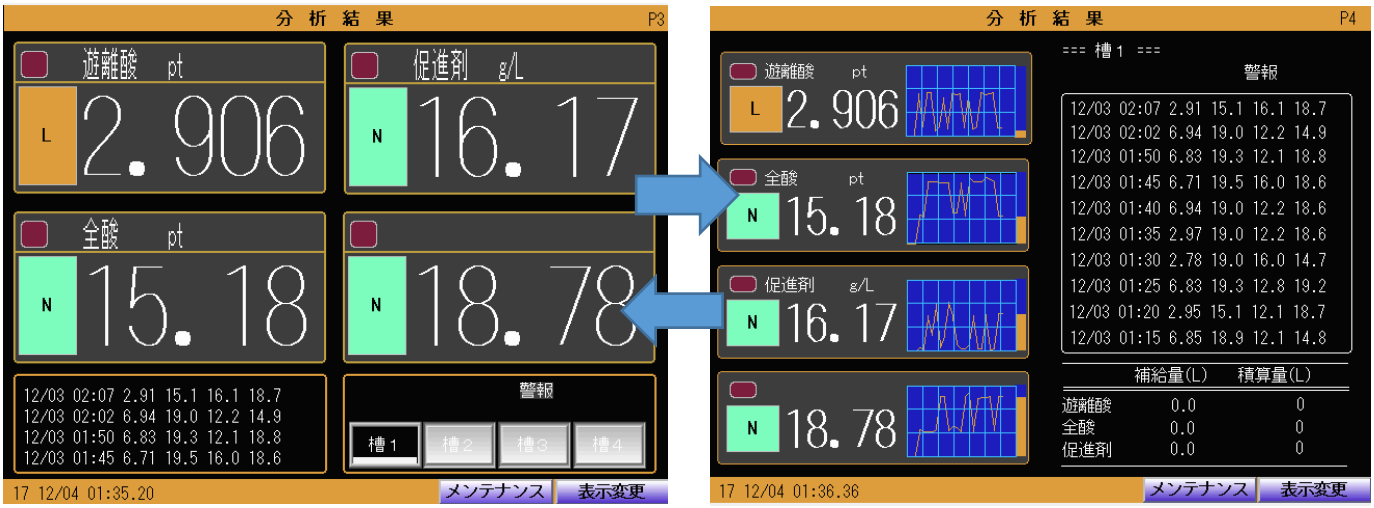
2.2.2. Minimal operation

*Turn on the power supply
here is a power switch on the back of the unit. When this switch is turned on, the unit will start up. The following behaviors are automatically performed from startup to standby state.

① Opening information is displayed on the display.
② The self-diagnosis screen is displayed, and the status of the device is confirmed in order. If it is normal all OK is displayed.
③ Information such as device program version is printed on the printer.
④ The display becomes the standby screen, and the current time and the final analysis value are displayed. It enters standby mode.



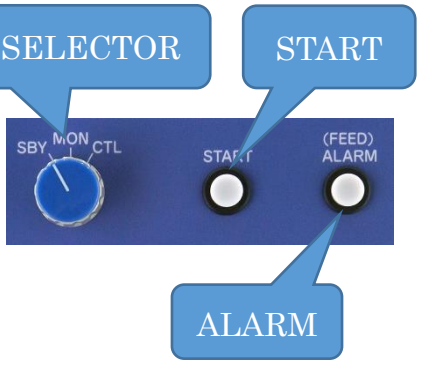
There are two display methods for display of analysis. You can change it by pressing the display change button.



*Start of operation

Check the following items before starting operation of the device.

- ✓ Is the sample line and supply tube in a predetermined state?
- ✓ Is the wastewater tank filled with wastewater?
- ✓ Is pure water of the pure water tank sufficient?
- ✓ Is the reagent (titrant and cleaning solution) sufficient, and it is set in the prescribed line?
- ✓ Is there enough liquid in the reserve tank for the internal solution of the pH sensor?
- ✓ Is there anything different from usual, such as leakage?



The operation of the equipment is easy. Select the mod with the selector switch and press the START button to start operation.

There are three modes of the device, standby (SBY), monitoring (MON), control (CTL).
Wait mode does not perform normal operation such as analysis operation, only maintenance and parameter setting is possible.
Monitoring mode repeats analysis operation but does not perform replenishment operation.

The control mode performs replenishment operation based on the analysis value obtained in the analysis operation. However, if an alarm occurs during analysis, supply will not be made (remain in analysis mode).

*One analysis

Even when the selector switch is set to SBY mode, the analysis can be performed only once by pressing the START button twice.
(This function is used when trouble occurs during installation work, inspection, etc. Use in normal operation is not recommended.)

*Alarm

When an alarm occurs, we will inform you of the alarm occurrence with the light and sound of the alarm light. At the same time, the red alarm light switch on the equipment lights up. When you press the alarm lamp switch, the light and sound stop.
The instrument counts the number of alarms that occurred during the analysis. This count returns to 0 at the beginning of repeated analysis. Even if you press the alarm lamp switch during analysis, the count does not return to 0.

*End of operation

To terminate the analysis operation in the usual way When you turn the selector switch from monitoring or control to standby, the unit moves to standby mode. However, if analysis is in progress, it will be in standby mode after this analysis is finished, so please wait for a while.

* Emergency stop

If the device is analyzing, if you want to finish the analysis anyway press the ” stop button” . Even during the analysis, the analyzer stops analysis and starts washing the inside of the equipment. When this cleaning is completed, it enters standby mode.

If you push the ″stop button” further during this cleaning operation, the unit stops at that point.
This unit analyzes reactive samples. Therefore, stopping with the sample remaining in the unit will cause troubles such as internal precipitation of metal. For this reason, do not stop by emergency stop but stop with selector switch. If it is forcibly terminated by an emergency stop, please clean it by manual operation etc. as necessary after stoppage.

2.2.3. Flow of analysis

Analysis operation proceeds in the following order in this device.

* Start analysis

Start sampling　Start cleaning of titration cell

Repeat the action of filling and draining the titration cell with pure water.

A certain amount of sample is taken into a titration cell and diluted with a specified amount of pure water.

The sample sensor's float determines if the sample has been successfully drawn into the device.

*Total alkali (TAL) Concentration measurement

A predetermined amount of sample is taken in the titration cell and further diluted to a predetermined amount with pure water. After that, while measuring the pH, add titration solution at a fixed amount and perform titration to reach the specified pH. The total alkali concentration is calculated from the titration volume up to the specified pH.

* Supply start

At this point all analysis items have been finalized. When the selector switch is in automatic, the device shifts to the automatic mode and starts replenishing the tank with replenisher. However, if the alarm count is not 0, it will not be in automatic mode and will remain in analysis mode.

* After cleaning

After the titration cell is drained, it is filled with pure water and the entire sample is drained, and the series of analysis is completed. When a series of analysis is completed, the next analysis starts. Now that all the analysis has been completed, the inside of the device is cleaned. Still waiting (waiting for next analysis).

2.3.Easy routine operation

2.3.1. Selector switch

Select the operation mode of the device. The transition from the monitoring mode to the control mode takes place when the analysis progresses and all the analysis values are obtained. When the selector switch turns from the monitoring position or the control position to the standby position during the next analysis standby mode, it enters the standby mode immediately and the analysis is completed.

2.3.2. Change parameters

It is not necessary to change the parameters simply by operating under the specified conditions. However, it may be necessary to change the parameters for setting such as changing the sampling time.

*Operation

Pressing the "maintenance button" at the bottom right of the panel opens the operation menu screen. When "parameter change" is pressed, parameter operation screen will appear. The parameter consists of the address value corresponding to the memory storing the contents and the set value which is the content.

Touch the address section, the numeric keypad will appear, you can set the direct address value.

You can also increase or decrease the address value with the "+ button" or "- button". In addition, the parameter includes abbreviations indicated by alphanumeric characters.

Touch the content section, the numeric keypad will appear and you can enter the direct number directly. When you press the "ENT button" on the numeric keypad, the set value is reflected in the memory of the device. When it is reflected, the contents set in the printer are printed.

Navigation function

Ten parameters are displayed based on the parameters displayed in the setting section. Touch the parameter shown here, it will be displayed on the setting section and you can quickly set the content. Also, touch the " << button" or " >> button" to change the display of 10 parameters at a time. Addresses for which parameters are undefined are indicated in gray, and values can not be set for that address.

Help function

A " help button" may be displayed in the setting section for parameters for which help information is set. By pressing this button you can get information on the displayed parameters.

2.3.3. pH calibration

This instrument uses a pH sensor for pH measurement. This sensor requires periodic calibration. Calibration is an operation to adjust the value obtained by the sensor to the correct value.

Perform pH calibration in standby mode. Pressing the ” maintenance button” at the bottom right of the panel opens the operation menu screen. Pressing the ” pH calibration button” will display the confirmation screen and the pH calibration operation will start.

After washing the inside of the cell with the pH 7 calibration solution (washing), wash the titration cell with pure water, then fill the cell with pH 7 calibration solution and start pH measurement. When the pH 7 calibration solution has been measured, pH measurement is carried out using pH 4 calibration solution as well as pH 7.

The panel displays the pH measurement results of the two types of calibration fluid. The calibration result obtained by pH calibration is displayed in the result box in the lower right. Here, the change in coefficient changed by this pH calibration is shown.

For general coefficients, the A coefficient is around 58, while the B coefficient is around 0.

The judgment result is displayed on the panel against the reference value preset in the equipment.

If the warning panel is displayed after exceeding the reference value, check the amount and type of pH calibration solution. In some cases there may be a problem with the pH sensor. In that case please replace the pH sensor and perform pH calibration again.

It seems that there is no hindrance to practical use.

There is a possibility of a problem. Action is required.

If it seems that it is being measured without any problem, press "Yes" and replace the pH coefficient with a new coefficient. Please press "No" if you want to discard this calibration result.

Calibration results are also printed on the printer.

Chapter 3

Guidance of the operation

3.1.About Reagents

Depending on the specifications of the equipment, there is a liquid level sensor installed on the back panel of the reagent tank. When the liquid level of the reagent tank reaches about 20 mm or less from the bottom, an alarm is output at the beginning of the analysis operation. Be careful not to supply reagents to another reagent tank by mistake. We recommend that you replace the reagent tank for each tank without adding reagents.

Do not mix reagents absolutely. Harmful gases may be generated depending on the combination of reagents. If mixing incorrectly, dilute it with water immediately and discard it properly.

3.2.Power to use

- Do not connect to a power source other than the commercial AC100V power supply. There is a danger of breakdown or burnout of the inside of the equipment due to overvoltage.

- Be careful not to let the power plug come off in the middle.

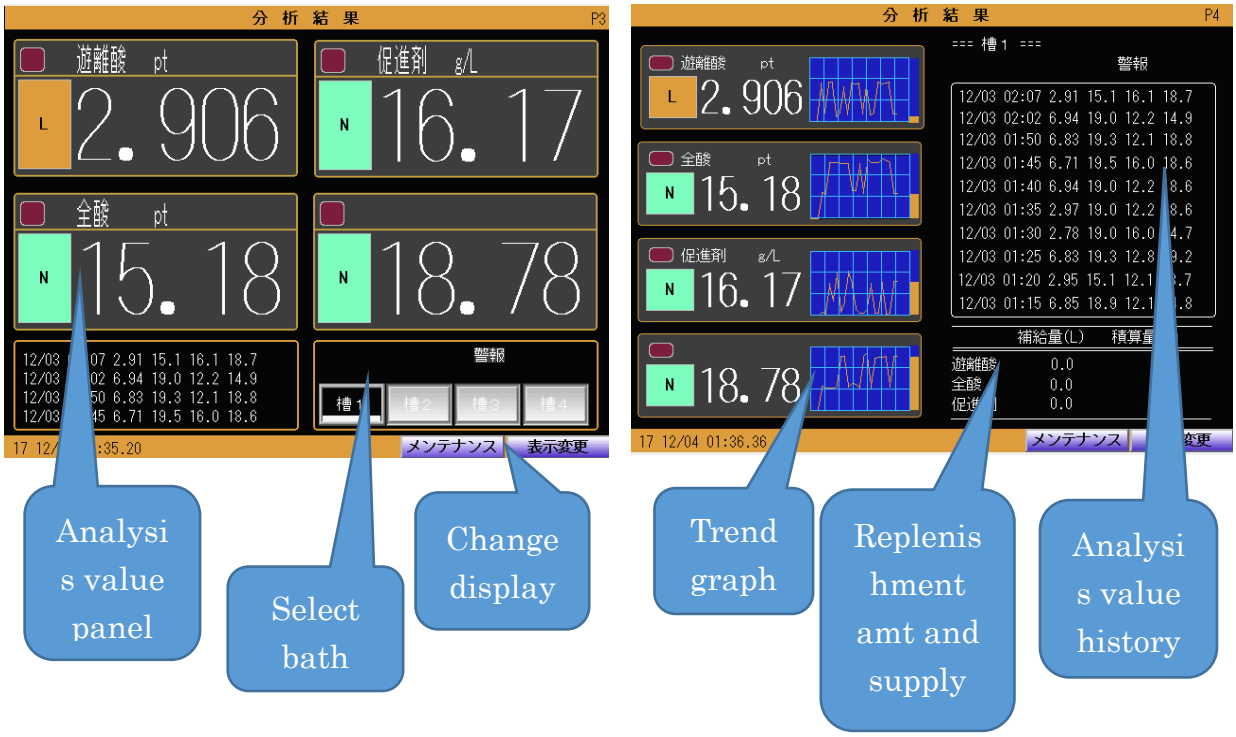
- Maximum power consumption of this device itself is 200 W or less. However, please avoid avoiding instantaneous drop of power supply voltage in common wiring with equipment with large power consumption.
- Be sure to connect to earth terminal (B type or more) from the viewpoint of security and noise countermeasure.

3.3.Mode and Operation

There are three states of this device. This is called mode. To change the mode, turn the selector switch on the operation panel. The following shows the actions and functions performed for each mode.
Wait mode This mode allows you to prepare and maintain the unit. When you turn on the power, this mode first goes on.
Monitor mode The instrument repeatedly executes only the analysis operation according to the setting.
Control mode Supply reagent supply operation to the management tank is added to the operation in analysis mode.
You can not enter this mode if an alarm occurs in the analysis.

3.4. Analysis Value Screen

Indicates the screen (analysis standby screen) when waiting for the next analysis operation. During the analysis operation, it becomes another analysis screen which is different from this. There are 2 types on the analysis standby screen, and you can switch freely.



Select bath button

For double tank type equipment, analysis by tank can be selected with this button.

Change display

You can select the screen to display.

The maintenance button will display the maintenance screen instead of the analysis value.

Trend graph

Graph shows the change in analysis value. The lower part of the vertical axis of the graph is set to the LL value of the parameter and the upper part is set to 90, 110% of the parameter HH value.

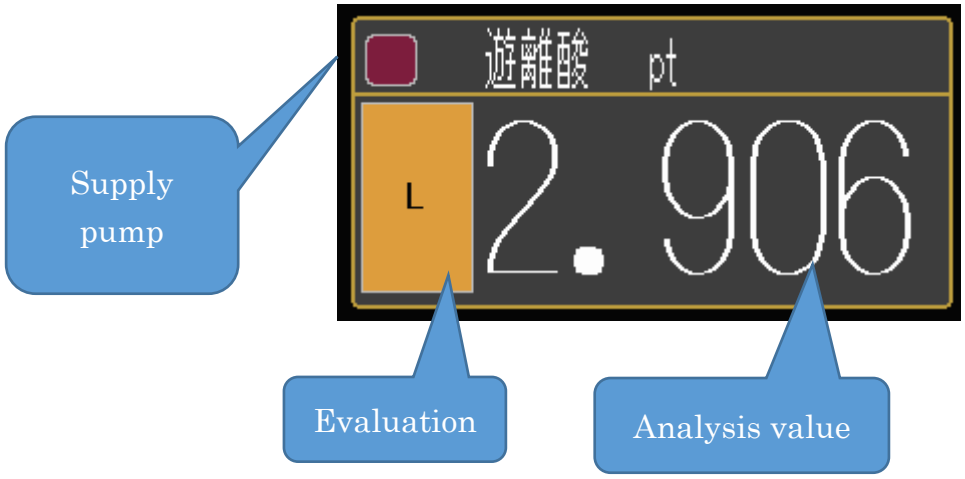
Supply amount and supplementary accumulation

It shows the amount of replenishment liquid supplemented by the last analysis replenishment and the accumulated replenishment amount at that time.

Analysis value history

The analysis value obtained and the sampling time are displayed in a list format.

Analysis value panel



Supply pump

It lights when the pump is driving.

Evaluation panel

Evaluate the analysis value according to the set value set in the parameter. When HH, LL evaluation occurs in control mode, HH, LL alarm is generated. On the other hand, in the monitoring mode, no alarm will be generated even when it is evaluated as HH or LL.

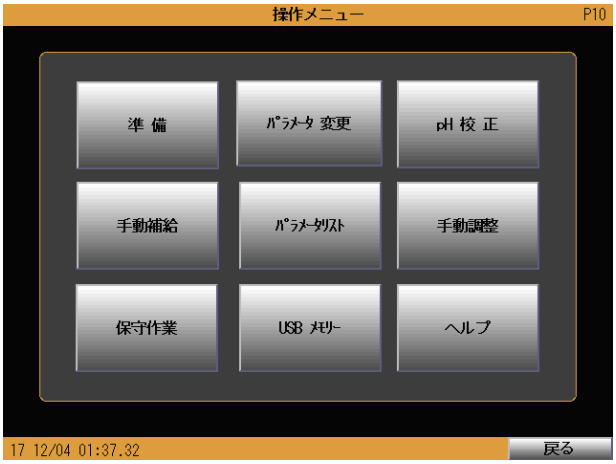
Evaluation value	Panel color	Relationship between analysis value and setting value
HH, LL	Blinking red	HH,LL above or below
H , L	Orange	Within the range of H and HH
		Within the range of L and LL
N	Green	Within the rang of L and H

Analysis value

The analysis value obtained at the end is displayed. Analysis display When the analysis value gets older than the time set in the maximum holding time, the analysis value is not displayed. However, this function does not work if 0 is set.

3.5.Maintenance screen

When the maintenance button is pushed, the maintenance menu is displayed and the maintenance operation can be executed.



3.5.1. Preparation

When you press the preparation button from the maintenance menu, the preparation action menu will be displayed. It is possible to prepare the equipment and perform the cleaning operation.

Single action

You can wash and drain the cell in the standby state.

It can be used, for example, when checking the operation of the equipment or stopping in the middle of the analyzing operation, samples are left in the cell, and so on.

Solenoid valve monitor and motor operation monitor

Displays the operation of the solenoid valve and motor during operation in real time.

EC1, EC2 Metering pump DSC Drain pump STR Stirrer

Setup

When installing a new device, the inside of the piping tube set in the tank is completely empty, and it is necessary to fill the inside of the tube with liquid ahead of the analysis operation. Also perform this operation to replace all reagents remaining in the piping to replace the reagent. A simple message will be printed on the printer when setup is done.Parameter changes and parameter lists

Refer to the previous section for parameter change.

3.5.2. Parameter changes and parameter lists

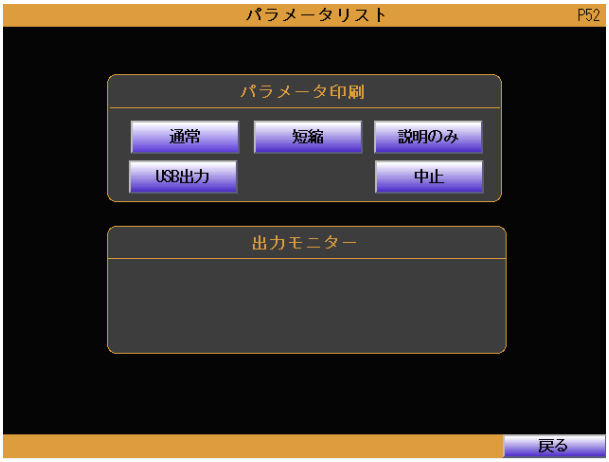
Print the parameters in a list format on the printer.

You can select the format to print.

In the normal format, the parameter value and a part of the explanatory text are printed.

"Description only" will print all descriptive sentences.

Since printing is cached in the printer, the stop button may not work.



3.5.3. USB memory

You can export the analysis value stored in the device to the USB memory.

When analyzed and the analysis value is obtained by the analyzer, it is recorded including analysis value, sampling time, supply amount, accumulated amount of supply etc.

A set of information recorded for each analysis is called a record, and 250 to 500 records are recorded in the device.

If it is recorded beyond this, the oldest record will be replaced with the new record sequentially.

Some USB memory devices can not recognize the device.

Small capacity (8 GB or less) is stable. You can check the USB memory with the connection confirmation button before use.

Operating procedure

1. Insert the USB memory straight from the panel.
2. Confirm that the USB memory is connected properly with the connection confirmation button.
3. If normal, push the USB export button and start downloading.
4. The process bar will inform you of the completion. It may take up to 1 minute.
5. When complete, pull out the USB memory straight out.

Printer printing

It is a function to print the contents written to the USB memory on the printer.

3.5.4. pH calibration

Refer to the previous section for the start of pH calibration.

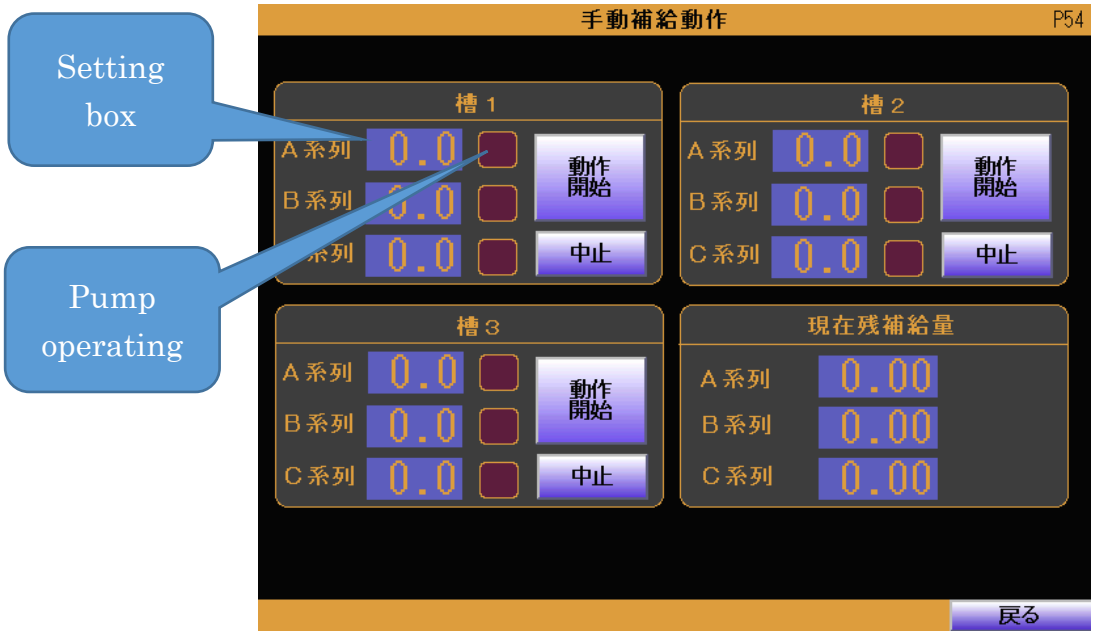
At this time, make sure that the calibration solution and pure water are set correctly.

Please refer to the technical explanation section for the concept of pH.

3.5.5. Manual supply

If you want to add replenishing liquid to the tank manually, the manual replenishment function of the equipment is convenient.

Press the Manual Supply button on the operation menu to display the setting panel.



This panel also supports devices of multiple tank management type.

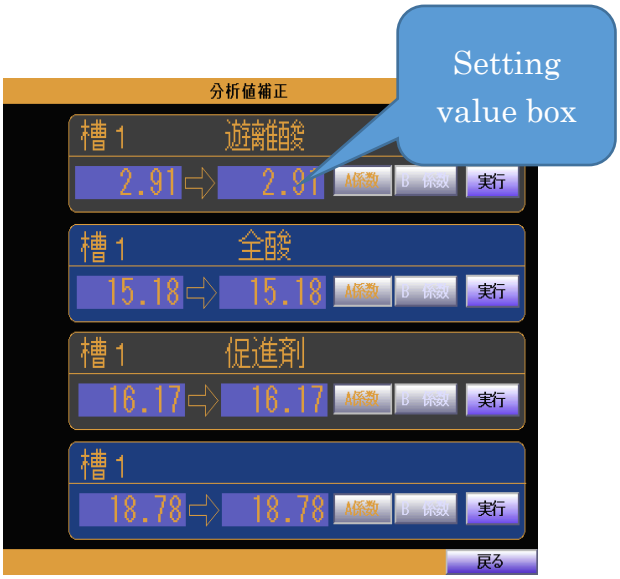
In single tank type equipment, only setting in tank 1 is not effective.

A, B, C series correspond in principle to the order in which analytical values can be obtained.

In the case of ordinary chemical conversion treatment liquid,

System A is free acid, system B is total acid, and system C is supplementation of accelerator.

1. Set the amount (L) of replenishment solution manually replenished Touch the BOX panel and make the setting. Automatically calculate the time (seconds) to drive the pump from the quantity (L) set here and the pump discharge quantity (L / min) set for the parameter.
2. Push the operation start button to drive the pump.
3. The remaining supply amount panel shows how much further should be replenished and the pump stops when it becomes 0.
4. A panel will pop up asking if you want to add the amount supplemented by this operation to the accumulated replenishment amount. Please select as necessary.



3.5.6. Manual adjustment

If you want to match the analytical value analyzed by the instrument with the hand analysis value, manual adjustment is available.

However, the same result can be obtained by changing the density adjustment coefficient of the parameter without using this function.

With this function you can easily and safely set the density adjustment factor automatically.

However, before the manual adjustment function is executed, the analysis value by the equipment must be obtained.

The apparatus obtains the final analysis value by the following calculation formula.

This analytical value is what is indicated in the supply and display of the equipment.

Evaluation of the analysis value is also done on this value.

Actual analysis value=

Equipment analysis value × Adjustment factorA + Adjustment factorB

If you select the B coefficient button and press the execute button, the adjustment coefficient B is set. If you select the A coefficient button and press the execute button, only the adjustment coefficient A is automatically calculated and set.

Generally, it is recommended that the overall adjustment is the A coefficient and the minute adjustment is done with the B coefficient. The A coefficient is selected by default (it becomes orange when selected).

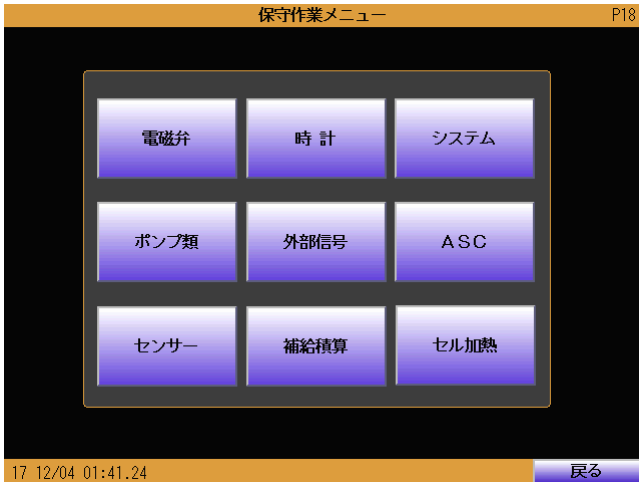
1. The setting panel is displayed for each analysis item. Set how much you want to adjust the analysis value obtained at the end. Touch the numerical value (set value BOX) on the right side of the arrow to display the keyboard and set the numerical value you want to install.
2. Execution of correction calculation can be executed for each analysis item. When executed, the result is printed on the printer.

3.5.7. Help

You can display the help screen.
Currently you can get help on parameters from the parameter setting panel.The future help is about the whole device.

3.5.8. Maintenance work

Functions used for maintenance of the equipment can be selected from the maintenance work menu. We will inform you of frequently used items in order. Some devices do not work. They indicate that the corresponding function is not installed in the device.



Clock fit

You can adjust the clock inside the device. The internal watch is running with batteries and needs to be replaced every few years.
By pressing item buttons on the setting panel, you can pop up the keyboard and set it. Also, abnormal years and times are rejected at the key in stage. When setting is completed, press "Setting button" to apply the setting.
If it is not possible to set than the consistency of the numerical value, we will inform you with a warning.

Replenishment accumulation

When the equipment executes the replenishment operation, we accumulate the amounts we have supplied up to now. When it is necessary to clear this integrated amount, you can execute with this button.

Setting this parameter to 0 without using this function will do the same thing.

Solenoid valve

You can manually turn ON / OFF all solenoid valves used inside the equipment. You can check whether the solenoid valve is operating correctly, by solenoid valve operation sound and piping fluid movement.

Multiple solenoid valves can be turned ON at the same time, but if the number of simultaneous operations exceeds 4 it will not be possible to turn ON at the same time.

When you exit from this menu by pressing the “back button”, all valves are turned off.

Pumps

It is possible to manually drive all the pumps used inside the equipment.

EP pump (Encoder operation)

The combined pump (EP 2) can be connected to a solenoid valve to suction multiple reagents individually.

A single pump (EP 1) sucks only one type of reagent.

When touching SET, the keyboard will appear and you can set the amount (mL) of discharge in test drive.

After setting, you can drive the pump by pushing forward rotation (CW) reverse rotation (CCW) button.

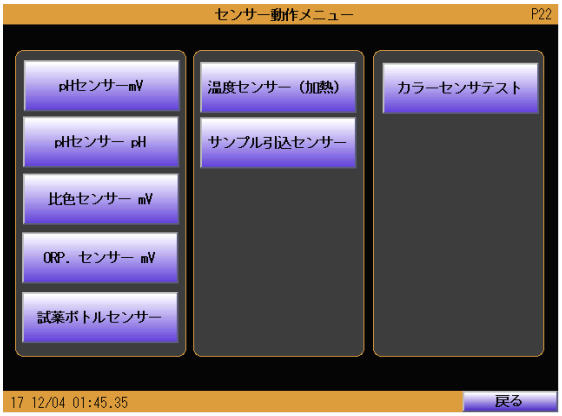
As a result of driving, the actual discharge amount is displayed in the Out box.

Normally, it is discharged slightly more than the setting due to the inertia of the motor but there is no problem.

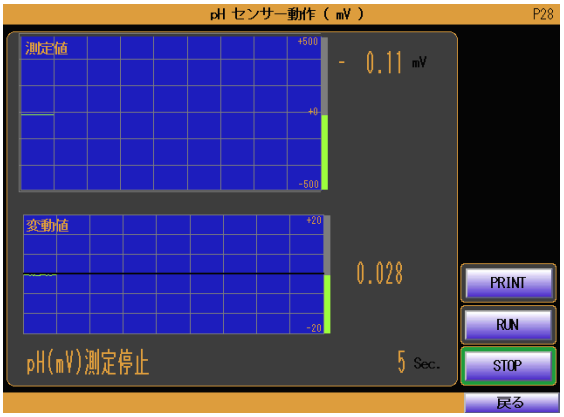
Sample pump (Use AC motor)
Sampling pumps are installed for each tank.
This pump can rotate forward and reverse. The normal rotation button is indicated by N, and the reverse rotation button is indicated by R. When the pump is rotated in the forward direction, the sample is drawn in to the instrument side.
To stop the operation of the pump, press the STOP button.
The number of seconds the pump was driven is also shown. It is also possible to actually measure the number of seconds to draw a sample from the bath into the instrument using this function.

Drainage pump (Use AC motor)
Drain the sample in the analysis cell. The pump can not be reversed.

Stirrer (Use AC motor)
Rotate the rotor in the analysis cell.



Sensor
We operate various sensors built into the device independently.
It is used for sensor adjustment and operation check. Pressing this button will display a menu for selecting which sensor to operate. Some buttons do not function depending on the specifications of the device.

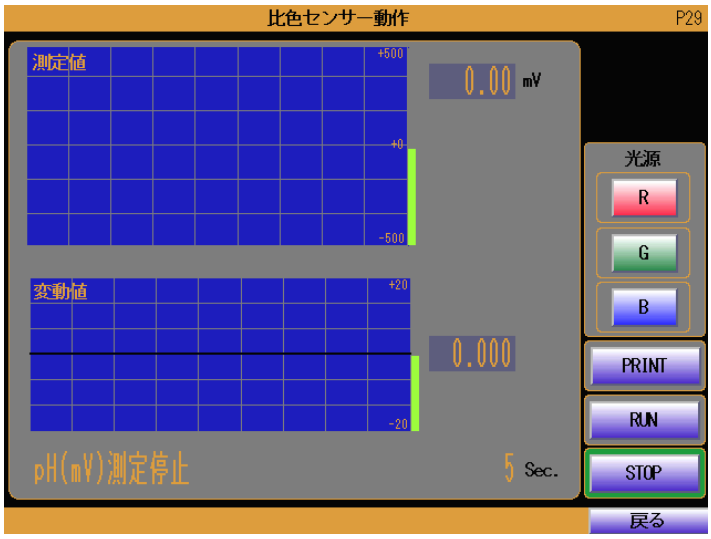


＊＊pH sensor related＊＊
Pressing the "pH sensor mV" button will drive the pH sensor and display the output voltage directly from the sensor.
On the other hand, pressing the "pH sensor pH" button converts the output voltage from the sensor to pH value based on the value set in the parameter and displays it.
To start measurement, press the "RUN" button. Then start the measurement and plot the measured value in the graph area on the left. The variable value area shows the variation of the measured value.
When you press the "PRINT" button, the measured value is printed on the printer periodically.
To stop measurement, press the "STOP" button to stop measurement. The return button does not work during measurement, so always stop measurement.

＊＊Colorimetric sensor＊＊

The colorimetric sensor is in the cell. The light source is an LED lamp, it is possible to light the colors red, green and blue at the same time.

The operation method is the same as the previous pH sensor. It is necessary to select the light source before measurement.



3.6.System settings

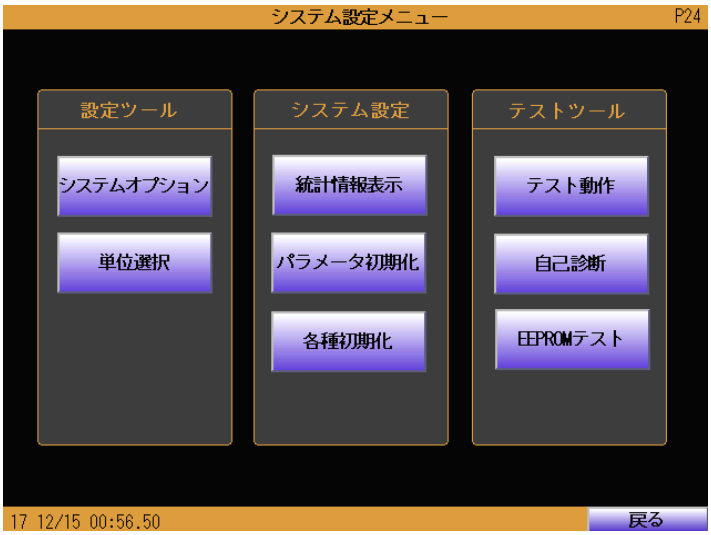
You can perform settings and tests on the system.

Press the system button on the maintenance operation menu.

You will be prompted to enter the password, so enter the password correctly.

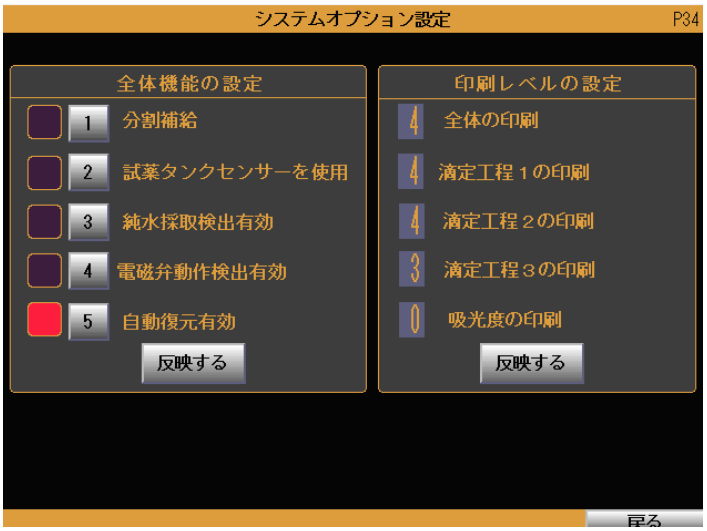
＊＊About password＊＊

"8012" is set as the master password. As a user password, you can set the parameter UPW (154) to a number from 1000 to 9999. Reflecting the user password is done when the device is turned on.



3.6.1. System options

You can set the basic functions of the device.



3.6.2. Various initialization

You can initialize the information stored in the system.

The number of analyzes is the number of analyzes analyzed by the equipment so far.

The analysis value is recorded based on this analysis frequency.

Chapter 4

Various setting and operation

Parameter setting
Setting analysis behavior and Parameters
Guidance of various alarms

4.1.Guidance of the parameter setting

4.1.1. Explanation of each parameter

The contents of the parameters defined in this device are explained.
The parameter table in the final chapter is useful for seeing the whole parameter.

	Abbreviation	Name	Unit	Description
0	AKY	Access key		You can select the language to use. 0.Japanese 1.English 2. Traditional Chinese 3. Chinese Simplified Language 4. Hangul
4	PPF	Print selection		You can set the level of "content printed by the device". Please set it from the system option.
5	APT	Analysis cycle	min	Set the repetition cycle of analysis in minutes. The range that can be set is 0 to 1339. 1339 is equivalent to one day.
6	T1C	TR1 concentration	N	Set the concentration of titrant 1.
8	TKV	Tank capacity(Tank1)	ton	It is the volume of the treatment tank.
9	TK2	Tank capacity(Tank2)	ton	It is the volume of the treatment tank.
10	AHH	pH-HH	pt	Upper limit of pH control range, setting to issue an alarm. In the case of automatic supply from the device, the supply operation is stopped. Error signal
11	AHC	pH-H	pt	It is setting of pH control range upper limit value.
12	ASV	pH nominal value	pt	It is setting of pH control range target value.
13	ALC	pH-L	pt	It is setting of pH control range lower limit value.
14	ALL	pH-LL	pt	Lower limit of pH control range, setting to issue alarm. In the case of automatic supply from the device, the supply operation is stopped. Error signal
15	AMR	pH Maximum amount of replenishment at one time	L	Limit the maximum amount of one supply.
16	ACR	pH metered replenishment	L	Set when performing quantitative supply.
17	ASC	pH supply factor	L/pt	Amount of replenisher required to increase the analysis value 1 pt with respect to 1000 L of treatment solution (L)-Reference-The relationship between mass (Kg) and volume (L) is (Kg) / (Sg) = (L) --Sg: specific gravity (= density g / cm3)

18	ART	pH accumulated supply amount	L	The device will automatically add the replenishment amount.
19	APR	pH supply pump	L/min	It is the discharge amount for 1 minute at the maximum discharge of the supply pump.
20	BHH	FAL -HH	pt	Upper limit of alkalinity control range, setting to issue an alarm. In the case of automatic supply from the device, the supply operation is stopped. Error signal
21	BHC	FAL -H	pt	It is the setting of the alkalinity control range upper limit value.
22	BSV	FAL -nominal value	pt	It is the setting of alkalinity control range target value.
23	BLC	FAL -L	pt	Alkalinity control range lower limit setting.
24	BLL	FAL -LL	pt	Lower limit of alkalinity control range, setting to issue an alarm. In the case of automatic supply from the device, the supply operation is stopped. Error signal
25	BMR	FAL maximum once supply amount	L	Limit the maximum amount of one supply.
26	BCR	FAL quantitative supply	L	Set when performing quantitative supply.
27	BSC	FAL supply factor	L/pt	Amount of replenisher required to increase the analysis value 1 pt with respect to 1000 L of treatment solution (L)-Reference-The relationship between mass (Kg) and volume (L) is (Kg) / (Sg) = (L) --Sg: specific gravity (= density g / cm3)
28	BRT	FAL replenishment accumulated amount	L	The device will automatically add the replenishment amount.
29	BPR	FAL supply pump	L/min	It is the discharge amount for 1 minute at the maximum discharge of the supply pump.
30	BHH	TAL -HH	pt	Upper limit of alkalinity control range, setting to issue an alarm. In the case of automatic supply from the device, the supply operation is stopped. Error signal
31	BHC	TAL -H	pt	It is the setting of the alkalinity control range upper limit value.
32	BSV	TAL -nominal value	pt	It is the setting of alkalinity control range target value.
33	BLC	TAL -L	pt	Alkalinity control range lower limit setting.
34	BLL	TAL -LL	pt	Lower limit of alkalinity control range, setting to issue an alarm. In the case of automatic supply from the device, the supply operation is stopped. Error signal
35	BMR	TAL maximum once supply amount	L	Limit the maximum amount of one supply.
36	BCR	TAL quantitative supply	L	Set when performing quantitative supply.
37	BSC	TAL supply factor	L/pt	Amount of replenisher required to increase the analysis value 1 pt with respect to 1000 L of treatment solution (L)-Reference-The relationship between mass (Kg) and volume

				(L) is (Kg) / (Sg) = (L) --Sg: specific gravity (= density g / cm3)
38	BRT	TAL replenishment accumulated amount	L	The device will automatically add the replenishment amount.
39	BPR	TAL supply pump	L/min	It is the discharge amount for 1 minute at the maximum discharge of the supply pump.
49	S2P	Sample replacement time(Tank2)	sec	It is time to bring the sample from the processing tank into the sampling tube. If you do not arrive in time you will get an error
50	SPP	Sample replacement time(Tank1)	sec	It is time to bring the sample from the processing tank into the sampling tube. If you do not arrive in time you will get an error
51	TSG	Segment water volume	ml	It is the amount of water when the water is pushed back into the tank from the device side and washed in the line. If it is 0, push it back with air.
52	AWV	Pure water injection amount for cleaning	ml	The amount of water collected when washing the inside of the titration cell.
53	WPT	Drain pump drive time	sec	It is time to drive the pump to drain all the water in the titration cell.
54	VCL	Measuring tube cleaning fluid addition amount	ml	This is the amount of washing solution used to wash the pH electrode in the titration cell.
55	SOV	Sample overflow time	sec	It is the time to push the previous sample, washing water after putting the sample in the sampling tube.
56	SSV	Sample reaching change value	mV	The sample arrival is a value that confirms the sample arrival by the change in potential with the sample sensor.
57	ABP	Air blow cycle	min	Set the time to perform air blow periodically.
58	SAF	Sample line air cleaning	sec	It is time to clean the inside of the sample line by air blow.
59	DMM	Analysis value maximum retention	hr	It is time to leave the final analysis value on the screen. Up to 24 hours. After 24 hours, it changes to X.
60	SVA	Sample amount for FAL analysis (Tank1)	ml	It is the amount of sample to be collected to analyze the alkalinity.
61	PWA	FAL pure water addition amount	ml	The amount of water used to dilute the sample to analyze alkalinity.
62	AFA	FAL initial addition amount	ml	The amount of titrant to analyze alkalinity is the amount added unconditionally initially.
63	VAA	FAL addition coefficient A	ml	The amount of one drop of titrant to be added unconditionally per titration step.
64	VBA	FAL addition coefficient B	ml	It is a coefficient used in the case of calculation titration.

65	EPA	FAL end point judgment value	pH	It is a numerical value that determines the end point judgment value by pH electrode measurement of alkalinity.
66	CVA	FAL high speed low speed switching value	pH	The titration speed is initially fast, and it will be titrated slowly near the end point.
67	MTA	FAL maximum titer	ml	It is a numerical value that determines the volume of the titration solution and the maximum volume.
68	TRA	FAL loading time		The normal reading time is set by the lower 3 and 4 digits, and the reading time after low speed switching is set by the lower 2 and 1.
69	DFA	FAL derivative filter		Blindfold constant titers. Fix it at -1.
70	SVB	Sample amount for TAL analysis (Tank2)	ml	It is the amount of sample to be collected to analyze the alkalinity.
71	PWB	TAL pure water addition amount	ml	The amount of water used to dilute the sample to analyze alkalinity.
72	AFB	TAL initial addition amount	ml	The amount of titrant to analyze alkalinity is the amount added unconditionally initially.
73	VAB	TAL addition coefficient A	ml	The amount of one drop of titrant to be added unconditionally per titration step.
74	VBB	TAL addition coefficient B	ml	It is a coefficient used in the case of calculation titration.
75	EPB	TAL end point judgment value	pH	It is a numerical value that determines the end point judgment value by pH electrode measurement of alkalinity.
76	CVB	TAL high speed low speed switching value	pH	The titration speed is initially fast, and it will be titrated slowly near the end point.
77	MTB	TAL maximum titer	ml	It is a numerical value that determines the volume of the titration solution and the maximum volume.
78	TRB	TAL loading time		The normal reading time is set by the lower 3 and 4 digits, and the reading time after low speed switching is set by the lower 2 and 1.
79	DFB	TAL derivative filter		Blindfold constant titers. Fix it at -1.
80	SVA	Sample amount for FAL analysis (Tank2)	ml	It is the amount of sample to be collected to analyze the alkalinity.
81	PWA	FAL pure water addition amount	ml	The amount of water used to dilute the sample to analyze alkalinity.
82	AFA	FAL initial addition amount	ml	The amount of titrant to analyze alkalinity is the amount added unconditionally initially.
83	VAA	FAL addition coefficient A	ml	The amount of one drop of titrant to be added unconditionally per titration step.
84	VBA	FAL addition coefficient B	ml	It is a coefficient used in the case of calculation titration.

85	EPA	FAL end point judgment value	pH	It is a numerical value that determines the end point judgment value by pH electrode measurement of alkalinity.
86	CVA	FAL high speed low speed switching value	pH	The titration speed is initially fast, and it will be titrated slowly near the end point.
87	MTA	FAL maximum titer	ml	It is a numerical value that determines the volume of the titration solution and the maximum volume.
88	TRA	FAL loading time		The normal reading time is set by the lower 3 and 4 digits, and the reading time after low speed switching is set by the lower 2 and 1.
89	DFA	FAL derivative filter		Blindfold constant titers. Fix it at -1.
90	SVB	Sample amount for TAL analysis (Tank2)	ml	It is the amount of sample to be collected to analyze the alkalinity.
91	PWB	TAL pure water addition amount	ml	The amount of water used to dilute the sample to analyze alkalinity.
92	AFB	TAL initial addition amount	ml	The amount of titrant to analyze alkalinity is the amount added unconditionally initially.
93	VAB	TAL addition coefficient A	ml	The amount of one drop of titrant to be added unconditionally per titration step.
94	VBB	TAL addition coefficient B	ml	It is a coefficient used in the case of calculation titration.
95	EPB	TAL end point judgment value	pH	It is a numerical value that determines the end point judgment value by pH electrode measurement of alkalinity.
96	CVB	TAL high speed low speed switching value	pH	The titration speed is initially fast, and it will be titrated slowly near the end point.
97	MTB	TAL maximum titer	ml	It is a numerical value that determines the volume of the titration solution and the maximum volume.
98	TRB	TAL loading time		The normal reading time is set by the lower 3 and 4 digits, and the reading time after low speed switching is set by the lower 2 and 1.
99	DFB	TAL derivative filter		Blindfold constant titers. Fix it at -1.
100	ADB	FAL adjustment factor B(Tank1)		Alkali obtained by analysis Value to add to M (Analysis value =M×ADA+ADB)
101	ADA	FAL adjustment factor A(Tank1)		Alkali obtained by titration Value to be multiplied by M (Analysis value=M×ADA+ADB)
102	BDB	TAL adjustment factor B(Tank1)		Alkali obtained by analysis Value to add to M (Analysis value =M×ADA+ADB)
103	BDA	TAL adjustment factor A(Tank1)		Alkali obtained by titration Value to be multiplied by M (Analysis value=M×ADA+ADB)
104	DDB	pH adjustment factor		Alkali obtained by analysis Value to add to M (Analysis value

		B(Tank1)		=M×ADA+ADB)
105	DDA	pH adjustment factor A(Tank1)		Alkali obtained by titration Value to be multiplied by M (Analysis value=M×ADA+ADB)
110	PMT	pH measurement time	sec	The time to measure as the initial pH value at the beginning of the titration.
111	AMT	Absorbance measurement time	sec	It is the reading time of the light sensor when measuring the absorbance.
112	CLV	Cell level detection value	mV	The sensor determines that water has been collected in the titration cell and outputs an alarm.
113	ZOF	Accelerator Empty Titer	ml	The amount of titration solution will be brought to the tip of the titration tube at the time of accelerator measurement.
114	LVL	Limit light intensity	mV	An alarm occurs when the blank potential goes below this value
115	BUP	Increase potential	mV	Value to be unconditionally added to the measured potential
116	BU2	Increase potential 2	mV	Value to be unconditionally added to the measured potential
118	SVD	pH sample volume	ml	Amount of sample added for pH measurement
120	X1C	AR1 Addition amount	ml	Addition amount of reagent 1
121	WT1	AR1 Reaction waiting time	sec	Wait time until the reaction is completed after addition of reagent 1
130	A2B	FAL adjustment factor B(Tank2)		Alkali obtained by analysis Value to add to M (Analysis value =M×ADA+ADB)
131	A2A	FAL adjustment factor A(Tank2)		Alkali obtained by titration Value to be multiplied by M (Analysis value=M×ADA+ADB)
132	B2B	TAL adjustment factor B(Tank2)		Alkali obtained by analysis Value to add to M (Analysis value =M×ADA+ADB)
133	B2A	TAL adjustment factor A(Tank2)		Alkali obtained by titration Value to be multiplied by M (Analysis value=M×ADA+ADB)
134	D2B	pH adjustment factor B(Tank2)		Alkali obtained by analysis Value to add to M (Analysis value =M×ADA+ADB)
135	D2A	pH adjustment factor A(Tank2)		Alkali obtained by titration Value to be multiplied by M (Analysis value=M×ADA+ADB)
140	LMT	Max Analysis time		If the analysis is not completed within the set time, the process will end.
141	SO2	System option 2		Set up the device options.
145	PBX	pH calibration solution Arcari pH		
146	PNX	pH calibration solution Neutral pH		
147	PAX	pH calibration solution Acidic pH		

148	APC	pH automatic calibration Existence (1/0)		Select whether to perform pH calibration automatically. (1 or 0)
149	SP2	Replenishment operation option		Option selection for refill operation
150	PHV	pH STD-L potential	mV	Potential of pH STD-L obtained by pH calibration
151	PHA	pH conversion factor A	mV/pH	Record the potential of pH 6.68 obtained by pH calibration.
152	PHB	pH Conversion factor B	mV	Record the potential obtained by pH calibration.
154	UPW	User password		In addition to the master password, one user password can be set. The password is in the range of 1000-9999.
155	SIM,	Simulator		Setting the range from 5050 to 5052 puts the unit into simulator mode.
156	USD	Unit selection		The number set for each digit can be used to set the unit displayed for each analysis value.0>g / L 1>ml / L 2>pt 3>% 4>N 5>g 6>ml 7>℃ 8>M 9>None
157	DTS	Device type selection		You may be able to specify the type of sample to be analyzed on the device.
158	SOP	System option		Set up the device options.
159	DAD	Device number		Set the number to identify the device by data communication.
160	AHH	pH-HH (Tank2)	pt	Upper limit of pH control range, setting to issue an alarm. In the case of automatic supply from the device, the supply operation is stopped. Error signal
161	AHC	pH-H (Tank2)	pt	It is setting of pH control range upper limit value.
162	ASV	pH nominal value	pt	It is setting of pH control range target value.
163	ALC	pH-L	pt	It is setting of pH control range lower limit value.
164	ALL	pH-LL	pt	Lower limit of pH control range, setting to issue alarm. In the case of automatic supply from the device, the supply operation is stopped. Error signal
165	AMR	pH Maximum amount of replenishment at one time	L	Limit the maximum amount of one supply.
166	ACR	pH metered replenishment	L	Set when performing quantitative supply.
167	ASC	pH supply factor	L/pt	Amount of replenisher required to increase the analysis value 1 pt with respect to 1000 L of treatment solution (L)-Reference-The relationship between mass (Kg) and volume (L) is (Kg) / (Sg) = (L) --Sg: specific gravity (= density g / cm3)
168	ART	pH accumulated supply amount	L	The device will automatically add the replenishment amount.

169	APR	pH supply pump	L/min	It is the discharge amount for 1 minute at the maximum discharge of the supply pump.
170	BHH	FAL -HH (Tank2)	pt	Upper limit of alkalinity control range, setting to issue an alarm. In the case of automatic supply from the device, the supply operation is stopped. Error signal
171	BHC	FAL -H	pt	It is the setting of the alkalinity control range upper limit value.
172	BSV	FAL -nominal value	pt	It is the setting of alkalinity control range target value.
173	BLC	FAL -L	pt	Alkalinity control range lower limit setting.
174	BLL	FAL -LL	pt	Lower limit of alkalinity control range, setting to issue an alarm. In the case of automatic supply from the device, the supply operation is stopped. Error signal
175	BMR	FAL maximum once supply amount	L	Limit the maximum amount of one supply.
176	BCR	FAL quantitative supply	L	Set when performing quantitative supply.
177	BSC	FAL supply factor	L/pt	Amount of replenisher required to increase the analysis value 1 pt with respect to 1000 L of treatment solution (L)-Reference-The relationship between mass (Kg) and volume (L) is (Kg) / (Sg) = (L) --Sg: specific gravity (= density g / cm3)
178	BRT	FAL replenishment accumulated amount	L	The device will automatically add the replenishment amount.
179	BPR	FAL supply pump	L/min	It is the discharge amount for 1 minute at the maximum discharge of the supply pump.
180	BHH	TAL -HH (Tank2)	pt	Upper limit of alkalinity control range, setting to issue an alarm. In the case of automatic supply from the device, the supply operation is stopped. Error signal
181	BHC	TAL -H	pt	It is the setting of the alkalinity control range upper limit value.
182	BSV	TAL -nominal value	pt	It is the setting of alkalinity control range target value.
183	BLC	TAL -L	pt	Alkalinity control range lower limit setting.
184	BLL	TAL -LL	pt	Lower limit of alkalinity control range, setting to issue an alarm. In the case of automatic supply from the device, the supply operation is stopped. Error signal
185	BMR	TAL maximum once supply amount	L	Limit the maximum amount of one supply.
186	BCR	TAL quantitative supply	L	Set when performing quantitative supply.
187	BSC	TAL supply factor	L/pt	Amount of replenisher required to increase the analysis value 1 pt with respect to 1000 L of treatment solution (L)-Reference-The relationship between mass (Kg) and volume (L) is (Kg) / (Sg) = (L) --Sg: specific gravity (= density g / cm3)

188	BRT	TAL replenishment accumulated amount	L	The device will automatically add the replenishment amount.
189	BPR	TAL supply pump	L/min	It is the discharge amount for 1 minute at the maximum discharge of the supply pump.

4.1.2. Print format

Number of digits	Number	Meaning
1	0	Print analysis result Not print at all
1	1	Print analysis result Print all analysis values on one line
1	2	Print analysis result Large printing for each item
2	0	Titration process Not print at all
2	1	Titration process 1 or more: EP = xxxxxx End point information 1 line printing
2	2	Titration process 2 or more: Titration initial potential printing
2	3	Titration process Printing at each step (raw potential)
2	4	Titration process Print every step (comparison value)
3	0	Absorbance measurement Not print at all
3	1	Absorbance measurement 1 or more: One line printing such as Blank = xxxmV
3	2	Absorbance measurement 2 or more: Sensor information addition (ref, smp potential)
4	0	Supply information Not print at all
4	1	Supply information Turn number 1 line printing and this time supply amount printing
4	2	Supply information Supply integrated amount printing
4	3	Supply information Detailed printing including supply pulses

4.1.3. System options

Number of digits	Number	Meaning
1	0	
1	1	
2	0	Reagent leveler Not use
2	1	Reagent leveler Use

4.2. Analysis operation and parameter setting

4.2.1. Analysis flow and parameters

When you start the analysis, the analysis will proceed according to a certain procedure. Indicates the parameter related to this operation.

Drain the cell Fixed amount
Cell pure water cleaning Repeat twice Fixed amount
Wash the titration cell with pure water AWV(52) WPT(53)
Sample line replacement SPP(50) SOV(55) SSV(57)
Sample collection SVA(60/70)
Return the sample of pH measurement cell to the tank SPP(50)
Inject pure water into the sample line and return it to the tank TSG(51)
Dilute the titration sample with pure water AWV(52)
Start titration
AFA(62/72)VAA(63/73)VBA(64/74)EPA(65/75)CVA(66/76)
MTA(67/77)TRA(68/78)
Alkaline concentration calculation T1C(06) ADA(101) ADB(100)
Analysis value printout PPF(4)
Supply calculation execution AHH(10)から APR(19)
Titration cell drainage WPT(53)
Titration cell washing AWV(52)
Wait for next analysis APT(05)

4.2.2. Supply operation

The replenishment system of this unit is a proportional replenishing system that adds the replenisher volume proportional to the difference between the analysis value and the set value.

Below is the calculation formula of supply amount in PCC-PK5.

Measured concentration	M	pt
Nominal value	N	pt
Tank capaciaty	T	L
Replenishment coefficient	C	L/pt

The L number of replenishing liquid required to raise 1 pt for 1000 L of processing solution

Supply amount of this time	R	L

$$R = (N - M) \times (C / 1000) \times T$$

Pump discharge amount	P	L/min	
Pump drive time		T	sec

$$T = R / P \times 60$$

Turn on the supply pump according to this number of seconds.

If the supply cycle (second) is set to a value other than 0, supply is completed when the pump turns ON for a fixed time within the supply cycle and the total reaches the pump drive time. On the other hand, if the replenishment cycle (second) is 0, the pump is continuously driven for the refill pump driving time.

4.3.Information on various alarms

4.3.1. Operation by equipment

"Alarm generated during analysis"
"Alarm due to wear of equipment parts"
"Operation alarm" there is.
When an alarm occurs, its contents are printed on the printer.
All warning messages begin with "!!".

The buzzer or warning light that sounds at the same time as the alarm sounds when the "alarm release button" is pressed.

The contents of the alarm are shown below.

Table 2 Parameter setting alarm

!! 701 Printer Pape	No printer paper
!! 717 Mon or Day Check	Clock alignment error
!! 718 CycleTime OV	Analysis cycle is 1441 or more
!! 719 Check Sol.Conc	Setting of calibration value Relationship between H and L is reversed
!! 723 Sample Vol.	Sample quantity is too small
!! 731 Supply SetVal	Supply set value setting

701-731, signal tower red + buzzer operation

Table 3 Device Hardware Alarm

!! 502 Printer Error	Printer response	
!! 506 Parameter Area	Parameter not initialized	
!! 512 A/D Response	A / D response abnormality	
!! 513 A/D Adjust	A / D reference value error	
!! 514 EM-Motor Pulse	EM-1 Encoder motor error (EP 2 pump)	
!! 515 EM-Motor Pulse	EM-2 Encoder motor error (EP 3 pump)	
!! 516 RTC COUNT UP	Clock response fault Second does not advance	Resetting the clock
!! 517 RTC SET INCORRECT	Time setting error	

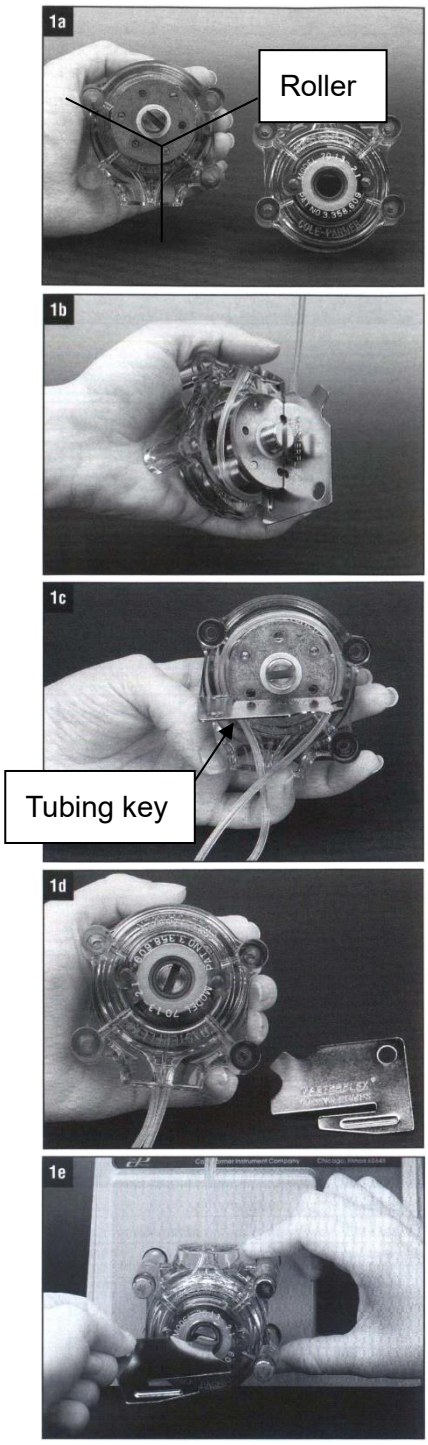
Chapter 5

In order to use forever

Pump Tube Replacement
Refill printer paper
Sample Line Maintenance
Guidelines for maintenance

5.1.Pump Tube Replacement

Tube that is attached to the metering pump head, please replace the prospect of six months. The exchange method is shown below. Please work with the supplied tubing key to replace the tube.



（Step1）

Hold the pump head as figure, and place three rollers at 2, 6 and 10 o'clock.

（Step2）

Fix the tube along two rollers and grooves. Next, Insert the tubing key behind the roller shaft and set the tubing key parallel to diagonal line of setting hole. Please push the key as you can.

（Step3）

Push the tube to the rotor strongly with turning the tubing key un-clockwise.

（Step4）

Round the rotor with the tube and fix it into groove with a thumb. And fit one side of pump head with a shaft and a snap shaft. (Notes) Please fit to engage the positioning pin correctly.

（Step5）

Pull out the tubing ley from the pump head, and insert the pump head to the motor shaft. Turn the shaft until fitting very well, and fix the pump head with the thumbscrew.

!! Failure to observe the replacement cycle will damage the pump head and tubing, making correct analysis impossible.

After tube setting, the tube mounting on the fixed quantity pump head has to be connected with the tube for solution sending. We can supply the tube pre-mounting the joint. Please contact with our sales division.

5.2.Refill printer paper

A red line comes out on both sides of the paper when the printer paper becomes about 50cm remaining. Please replace the paper with a predetermined heat-sensitive roll.

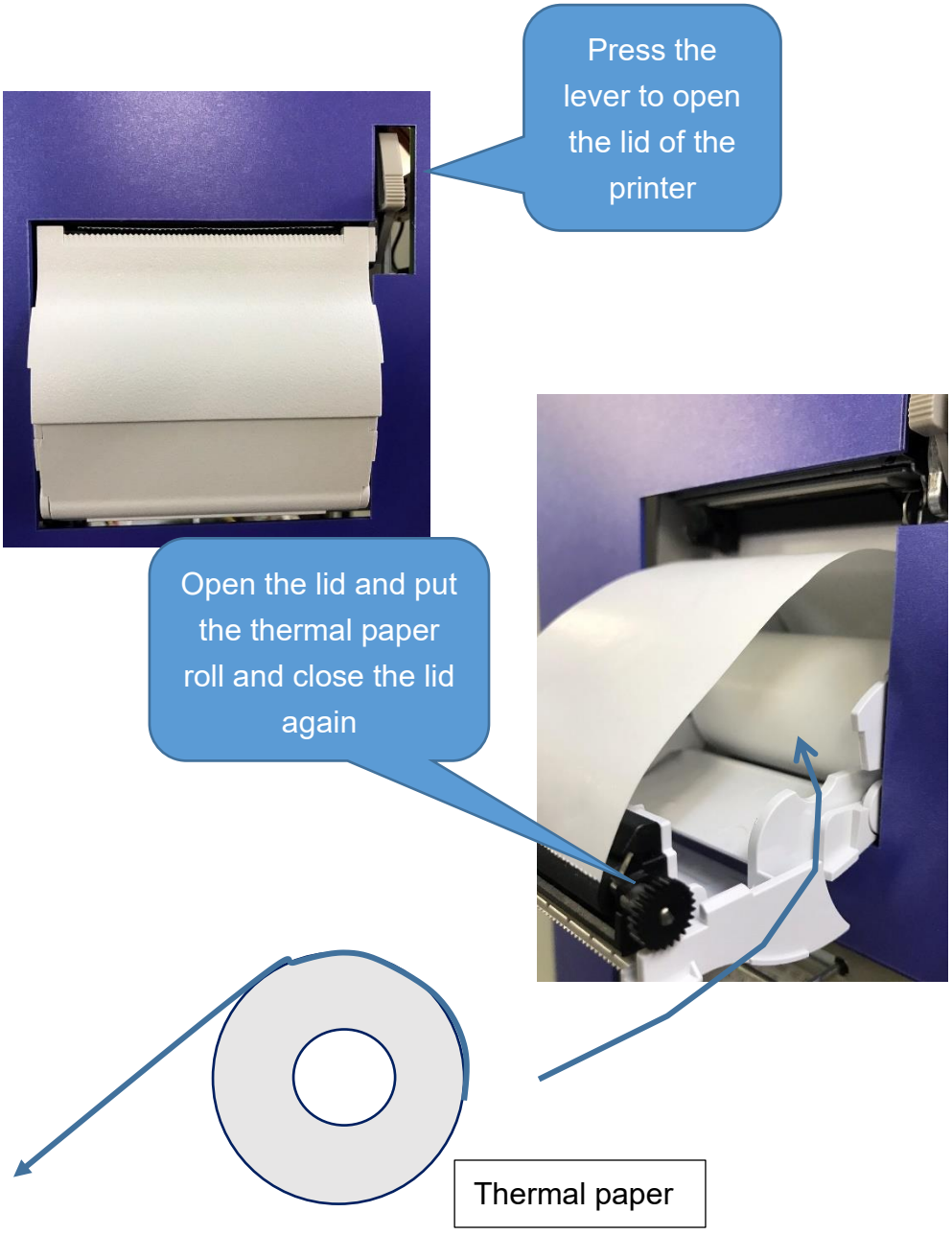


Figure 5-1　Replacing printer paper

5.3.Sample line maintenance

Usually use the Teflon tube which inner diameter is 2mm or the Polyethylene tube which inner diameter is 4mm. According to the analysis objective liquids, it will be clogged by the dust and/or the precipitation. Once it clogged, sometimes it is difficult to remove the clogging. We recommend a regular "Cleaning". But, in case of the liquid, which has no reason to clog, it is no need to clean.

Show the way using compressed air as a sample for "Cleaning". Please follow your working standard.

Disconnect the instrument sample line at the rear connection point.
Connect the mouth of the air gun to the sample line and blow it.
This will blow away the jam at once.

Release the sample line at the backside connecting point. Connect the air gun nozzle with the sample line, and blow inside tube.

Caution!!
Sometimes the inner liquid of sample line will blow out reason for putting out of joint etc. Please be careful for surround. Please formulate the safety measures such as safety glass.

Others
Sometimes the insides of pure water tank get a mold. If the device draw in the mold, sometimes the solenoid valve will break down. Please conduct a regular check for pure water tank and wash it if necessary.

5.4.Guidelines for each maintenance

Maintenance items necessary for this equipment and rough cycle to be carried out are shown below.

Table 5-1 Maintenance items

Item	Cycle	Reference item
Supply reagent and/or pure water	Supply early timing	Chapter 2 “ Fill up reagent”
Supply papers to printer	When red line is printed.	Chapter 7 “Supply papers to printer”
Supply inner liquid of pH electrode	When the liquid surface becomes lower than 10 mm from bottom of KCL tank. Please	Chapter 7 “Supply KCL inner liquid”
Replace a of the tube pump	6 months	Chapter 7 “ Replace a pump tube”
Replace a of the metering pump motor	1 year	Replace at the time of periodic inspection
Replace a of the pH electrode	It is recommended to replace in one year.	
Confirm sample line	According to site condition	Chapter 7 “Maintenance of sample line”

Chapter 6

For better use

Explanation of analysis and measurement
Analysis value (measured value) combined
Drawings and Parameters Table

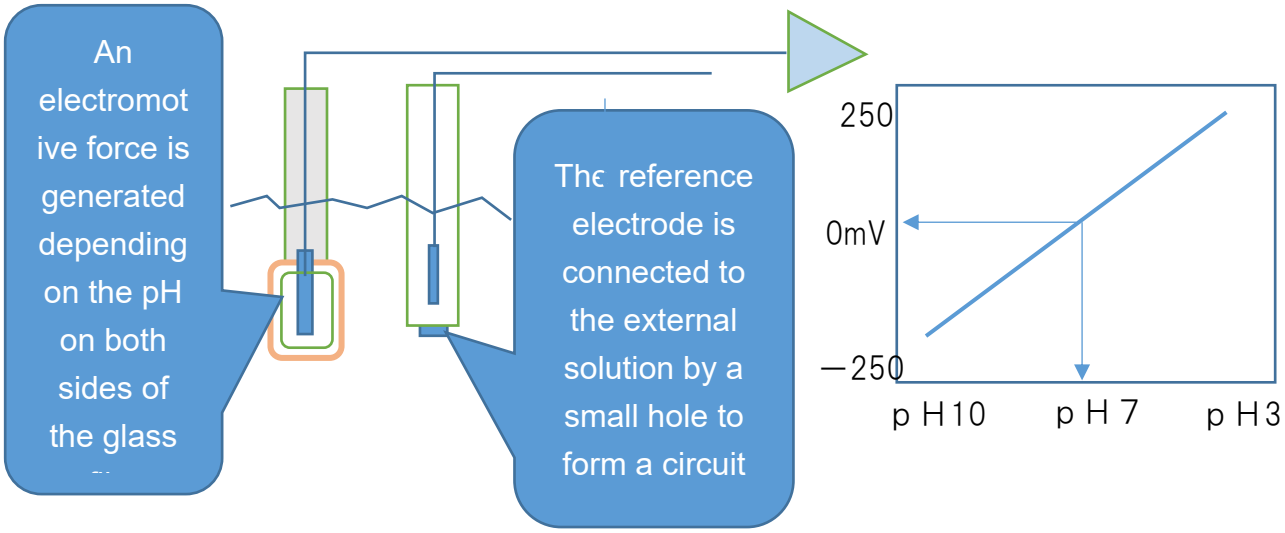
6.1.Explanation of analysis and measurement

In normal operation, you do not need to be conscious of this chapter much. However, in order to better understand the operation and contents of the device, we will explain what kind of setting and what kind of operation procedure is being performed here.

6.1.1. pH measurement

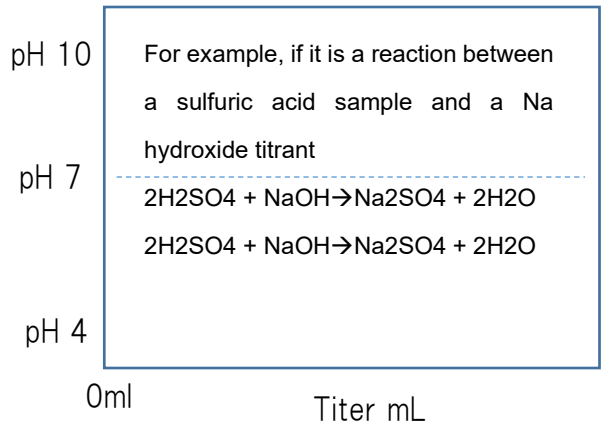
When the glass electrode (pH sensor) is dipped in sample liquid directly, the electric potential difference (voltage) will generate between the glass electrode and the reference electrode. Regarding to proportional pH with this potential difference, the sample pH will be decided. The potential difference changes 58mV by changing one amount of pH value. The potential difference indicates about 0mV at neutral 0 of pH. In case of acid sample it indicates positive potential. In case of alkaline sample it indicates negative potential.

Measurement pH = (Measured potential - Calibration Solution A potential)×Conversion factor+Calibration Solution A pH



6.1.2. Neutralizing titration

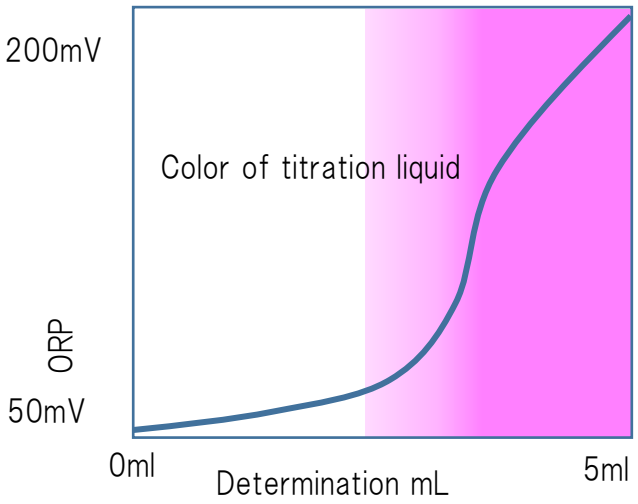
An alkaline solution is added to a certain amount of acidic sample to change the pH to around neutrality.
Alternatively,acidicsolution (titrant) is added to a certain amount of basic sample to change the pH to around neutrality. A method of determining the acidity or basicity of a sample from the amount of titrant required to change the pH to neutral.



MK 2 uses a lot of neutralization titration. Depending on the sample, it may be terminated halfway without titrating to complete neutrality. This prevents hydroxides and the like from being influenced by the titration amount at the same time in the vicinity of neutrality.

6.1.3. Redox titration

Redox reaction with sample and titrant.
The combination of oxidation and reduction depends on the type of sample and titrant.
For example, when the sample is hydrogen peroxide (H 2 O 2), permanganate K (KMnO 4) is used.
The oxidation-reduction reaction appears as a change in oxidation-reduction potential (ORP).
However, when permanganate K is used as a titrant, coloration due to permanganate K occurs at the time when the oxidation-reduction reaction is completed, so this is detected.
Election of coloration uses a colorimetric sensor mounted in a reaction cell.



For example, the reaction between hydrogen peroxide and permanganate is as follows
2KMnO4 + 5H2O2 + 3H2SO4
➔ 2MnSO4 + K2SO4 + 5O2 + 8H2O
Per manganic acid immediately turns into colorless MnSO 4, but when the reaction is complete the per manganic acid becomes excessive and it becomes colored with the color of per manganic acid.

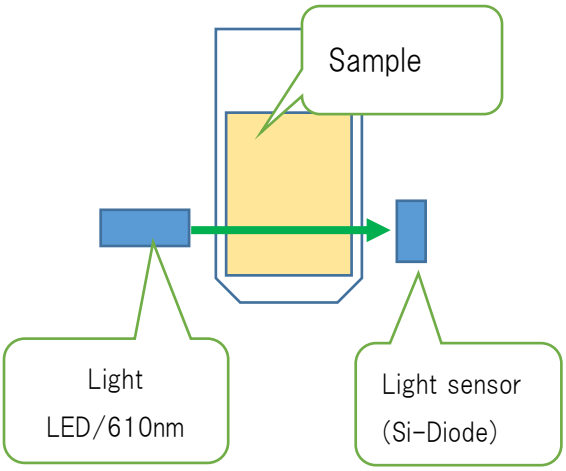
6.1.4. Absorbance method (Colorimetric titration)

A method of determining the concentration using a property that a sample absorbs for a specific wavelength of light.

Absorption of light is expressed as absorbance.

Absorbance is Can be expressed in Abs = − log(S / B)

S is a sample,B means blank, pure water containing samples is used.

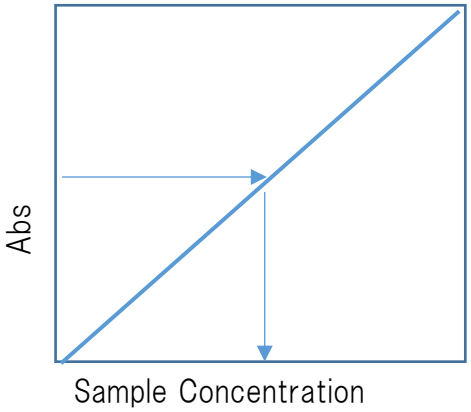


Abs

Abs and concentration follow the Lambert-Beer's law shown below.

Abs = K × L × C

K is the coefficient L, the optical path length C is the concentration



Since L is constant in MK2, the concentration C can be obtained if Abs and the coefficient K are determined. The determination of K can be made by analyzing a sample whose concentration is known. This operation is preparation of a calibration curve.

In MK2, it is possible to select three light source wavelengths (450, 550, 610 nm) depending on the sample.

For measuring the absorbance of Ni 2 + ions, 550 nm (green)

A light source of 610 nm (red) is used for measuring the absorbance of Cu 2 + ions.

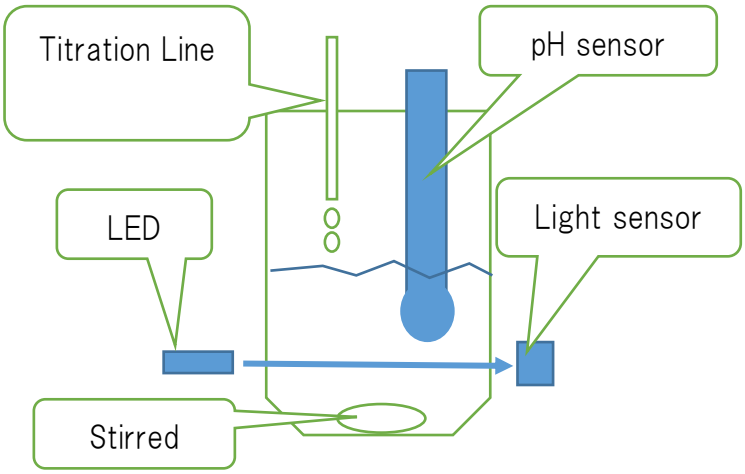
6.1.5. The measurement unit used in the equipment

Indicates the measurement part in actual equipment.

It incorporates a pH sensor and a colorimetric sensor that can measure the absorbance method.

The pH sensor may occlude the light path (the part through which light passes) of the light sensor.

Therefore,themounting position of the pH sensor is important.



6.2. Analysis value (measured value) combined

The analyzed values of the instrument are calculated arithmetically from the set titration solution concentration and sample volume.
However, in fact, analysis values at the site may not agree with analyzed values of the equipment due to differences in analytical methods etc.
(However, the tendency of the concentration change agrees).
Therefore, it is possible to linearly convert the device by setting density adjustment coefficients A and B.
However, irrespective of this coefficient, the calibration operation directly calculates the concentration conversion coefficient from the obtained absorbance, measurement potential, etc.

Actual analysis value ＝ (analysis value × concentration adjustment factor A) ＋ concentration adjustment factor B

As can be seen from this equation, when the concentration adjustment coefficient A becomes 0, the actual analysis value becomes the value of the concentration adjustment coefficient B, which is meaningless. For example, when shifting the analysis value, it can be realized by setting adjustment coefficient A to 1 and changing only adjustment coefficient B.

As a way of thinking, if the adjustment coefficient A is 1 and the adjustment coefficient B is 0.01, when the analysis value of the apparatus is lower by 0.02 than the manual analysis, it is necessary to shift to the current adjustment coefficient B It should be set to 0.02 + 0.01 = 0.03 added.
In other words, there is a method of adjusting either ″shift″ or ″slope″ as adjustment method.

In addition, the one with the xx conversion coefficient in the parameter represents the parameter for which the device determines the coefficient in the automatic calibration, and the role differs from the xx adjustment factor.

Number	Meaning	
105	Adj. Factor A of pH	Generally an around 1
104	Adj. Factor B of pH	A positive or negative value is entered
101	Adj. Factor A of FAL	Generally an around 1
100	Adj. Factor B of FAL	A positive or negative value is entered
103	Adj. Factor A of TAL	Generally an around 1
102	Adj. Factor B of TAL	A positive or negative value is entered

6.3.Drawings and parameters table

6.3.1. Piping flow diagram

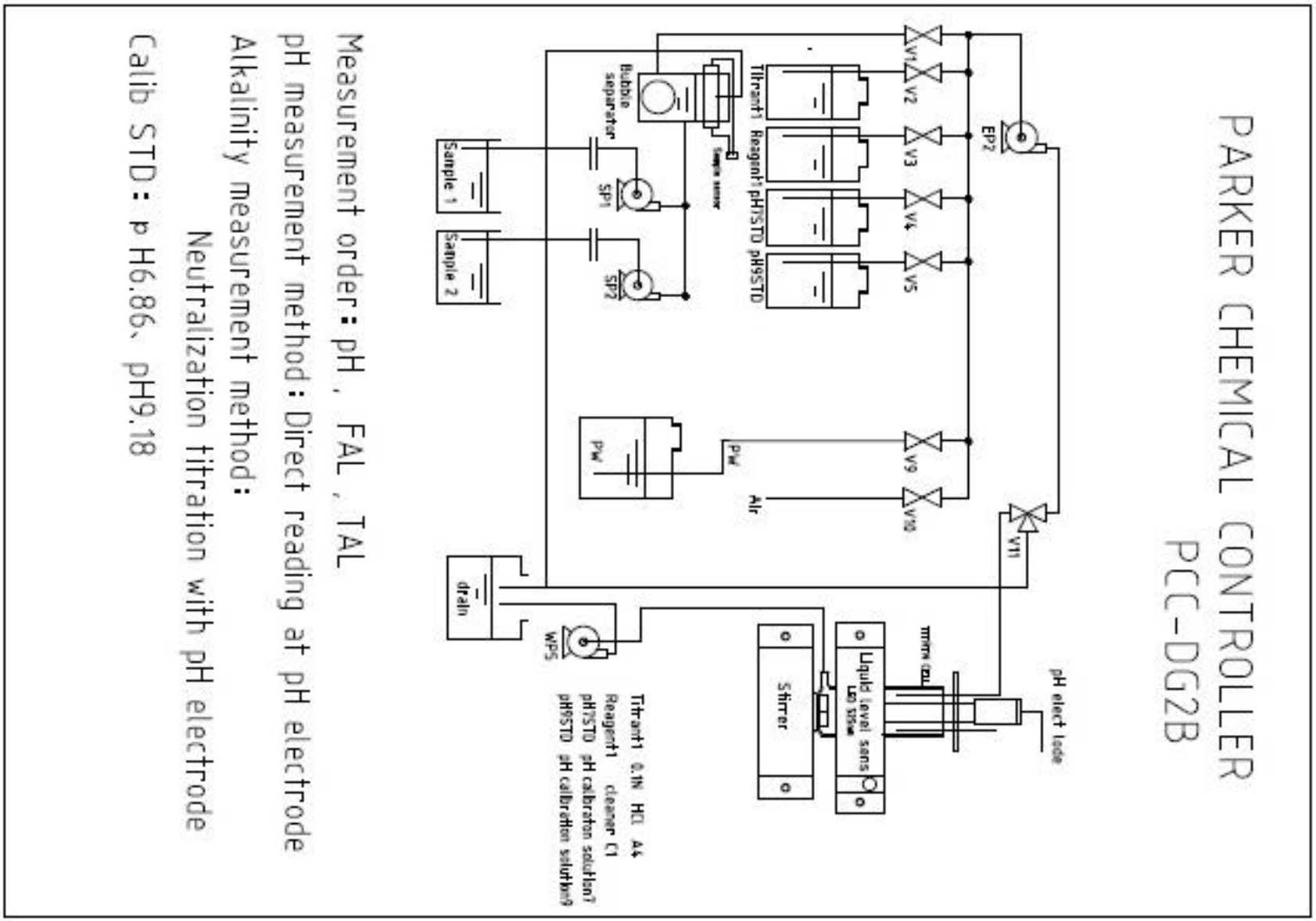
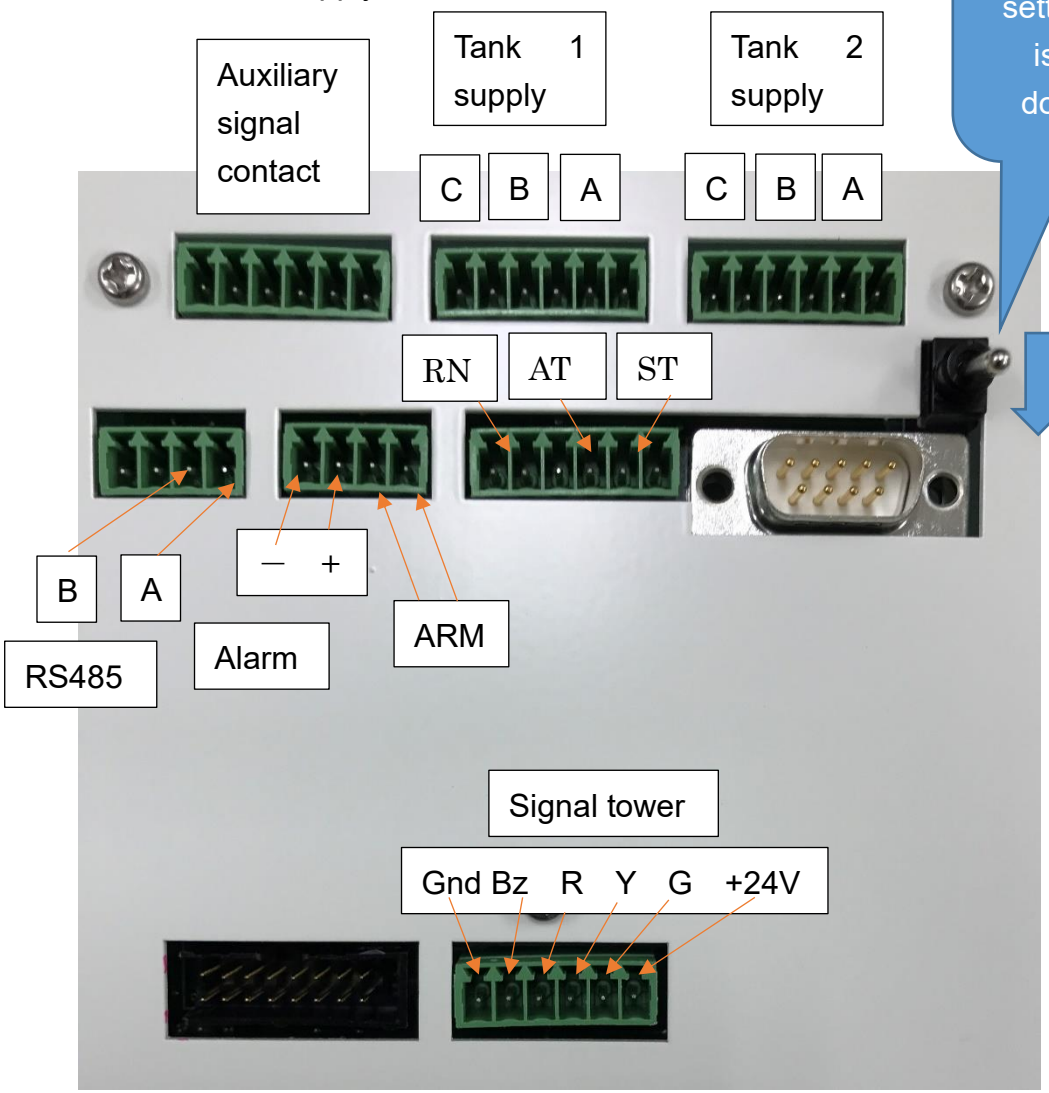


Figure 6-1 Piping flow

6.3.2. Rear terminal diagram

It shows the rear terminal of the unit and the supply control unit.



Normally program mode setting switch is always downward.

Supply signals are represented by A, B, C series. The signal is a signal specification with no voltage contact. It can not directly drive a power circuit such as a pump.
ST is an external start signal and connects to the no-voltage contact.

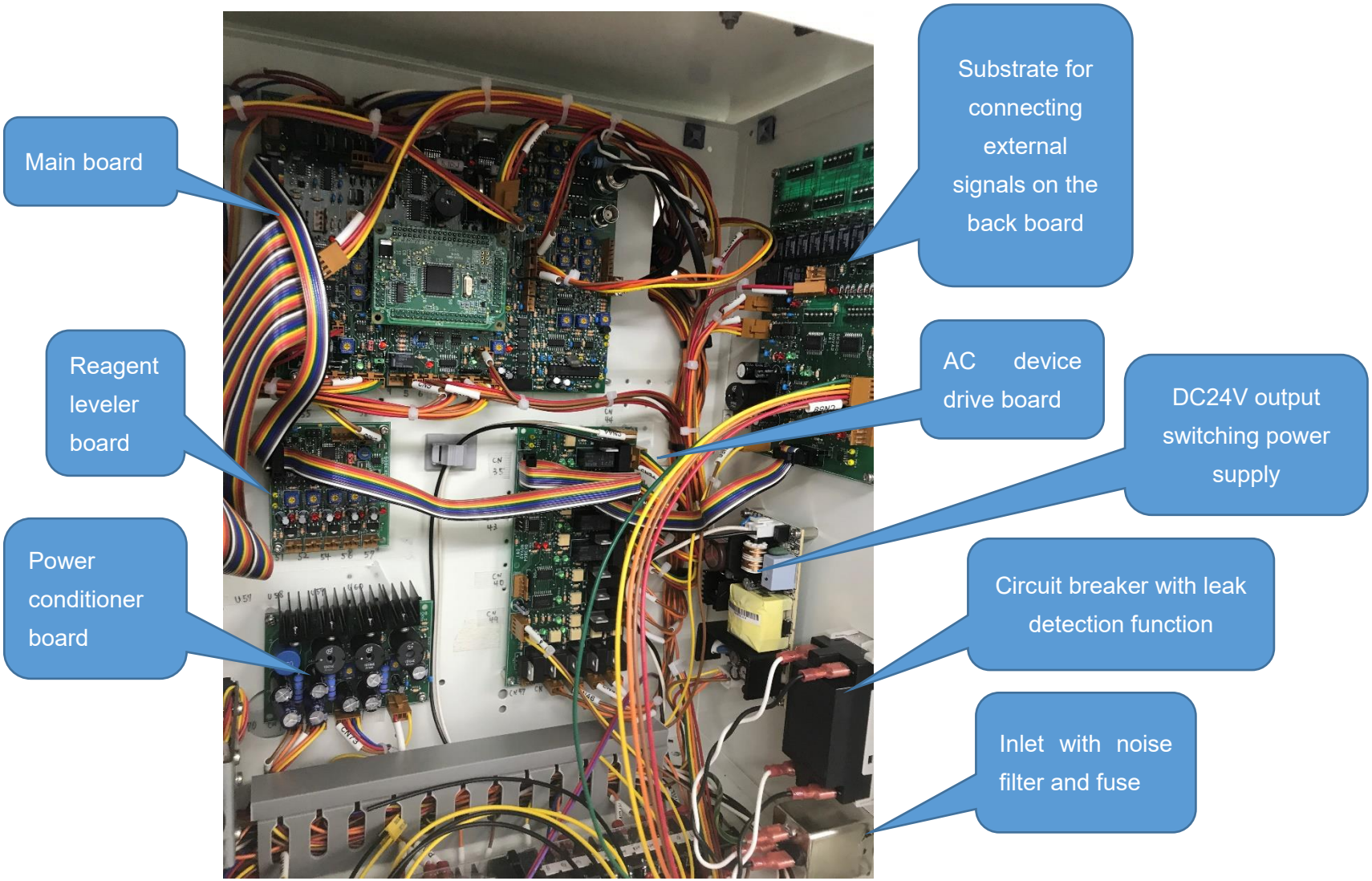
AT is a no-voltage contact signal that represents operation.
RN is an OC signal indicating CPU drive.
Alarm output is output as a no-voltage contact from ARM. + - will be output at 24 V when an alarm is issued.

Connect the A and B signals to the RS485.
Connect buzzer, red, yellow, green as control signal of signal tower. G, + 24V.

Figure 6-2 Rear terminal panel

6.3.3. Internal equipment Arrangement Diagram

The arrangement of the control equipment on the right side of the main body is shown.



Parameter table (varies according to model)

The parameters are listed and listed. Vertical represents 10's and horizontal represents 1's.

For example, the integrated pH supply amount (ART) is at address 18.

Table 2 Parameter table

Basic device information			Tie Parker Tank 1: Tank 2:
ORDER	Type	Program	L number required to increase replenisher concentration of 1000L by 1pt
PCC	St2-5	DG2B	

Reagent information																	
Reagent 1		Reagent 2		Reagent 3		Titrant 1		Titrant 2		Titrant 3		pH STD-A		pH STD-B	
C1						HCl						H3PO4	7	H3BO3	9

Series information	A series	B series	C series

Parameter table

	0	1	2	3	4	5	6	7	8	9
00-09 Basic setting	Access key				Print selection	Analysis cycle	Titration 1 concentration (N)		Tank volume (Tank1)	Tank volume (Tank2)
	AKY				PPF	ATP	T1C		TKV	TK2
						min	N		ton	ton
10-19 Upper and lower limit setting (Tank1)	pH HH	pH H	pH nominal value (N)	pH L	pH LL	pH supply amount up to once	pH quantitative supply	pH supply factor	pH accumulated supply amount (Tank1)	pH supply pump discharge amount (Tank1)
	AHH	AHC	ASV	ALC	ALL	AMR	ACR	ASC	ART	APR
								pt/L	L	L/min

	0	1	2	3	4	5	6	7	8	9
20-29 Upper and lower limit setting (Tank1)	FAL measured value HH	FAL measured value H	FAL measured value Nominal value (N)	FAL measured value L	FAL measured value LL	FAL supply amount up to once	FAL quantitative supply	FAL supply factor	FAL accumulated supply amount (Tank1)	FAL supply pump discharge amount (Tank1)
	BHH	BHC	BSV	BLC	BLL	BMR	BCR	BSC	BRT	BPR
	pt	pt	pt	pt	pt	L	L		L	L/min
30-39 Upper and lower limit setting (Tank1)	TAL measured value HH	TAL measured value H	TAL measured value Nominal value (N)	TAL measured value L	TAL measured value LL	TAL supply amount up to once	TAL quantitative supply	TAL supply factor	TAL accumulated supply amount (Tank1)	TAL supply pump discharge amount (Tank1)
	CHH	CHC	CSV	CLC	CLL	CMR	CCR	CSC	CRT	CPR
	pt	pt	pt L	L	pt					L/min
40-49										Replacement time (Tank2)
										S2P
										sec

	0	1	2	3	4	5	6	7	8	9
50-59 Sampling setting	Replacement time	Water segment amount	Pure water injection amount for cleaning	Drainage pump operation amount	Amount of cleaning solution added	Sample overflow time	Sample line Air cleaning	Sample sensor sensing LV	Air blow cycle	Analysis display maximum retention time
	SPP	TSG	AWV	WPT	VCL	SOV	SAF	SSV	ABP	DMM
	sec	ml	ml	sec	ml	sec	sec	mV	min	Hr
60-69 Titration setting FAL (Tank1)	FAL sample amount	FAL amount of pure water added	FAL) titrant initial addition amount	FAL titrant addition amount A	FAL titrant addition amount B	FAL end point judgment value	FAL fast/slow switching value	FAL maximum titration	FAL loading time	FAL derivative filter
	SVA	PWA	AFA	VAA	VBA	EPA	CVA	MTA	TRA	DFA
	ml	ml	ml	ml	ml	pH	pH	ml	sec	
70-79 Titration setting TAL (Tank1)	TAL sample amount	TAL amount of pure water added	TAL titrant initial addition amount	TAL titrant addition amount A	TAL titrant addition amount B	TAL end point judgment value	TAL fast/slow switching value	TAL maximum titration	TAL loading time	TAL derivative filter
	SVB	PWB	AFB	VAB	VBB	EPB	CVB	MTB	TRB	DFB
	ml	ml	ml	ml	ml	pH	pH	ml	sec	
80-89 Titration setting FAL (Tank2)	FAL sample amount	FAL amount of pure water added	FAL) titrant initial addition amount	FAL titrant addition amount A	FAL titrant addition amount B	FAL end point judgment value	FAL fast/slow switching value	FAL maximum titration	FAL loading time	FAL derivative filter
	S2A	P2A	A2A	V2A	VYA	E2A	C2A	M2A	T2A	DYA
	ml	ml	ml	ml	ml	pH	pH	ml	sec	

	0	1	2	3	4	5	6	7	8	9
90-99 Titration setting TAL (Tank2)	TAL sample amount	TAL amount of pure water added	TAL titrant initial addition amount	TAL titrant addition amount A	TAL titrant addition amount B	TAL end point judgment value	TAL fast/slow switching value	TAL maximum titration	TAL loading time	TAL derivative filter
	S2B	P2B	A2B	V2B	VYB	E2B	C2B	M2B	T2B	DYB
	ml	ml	ml	ml	ml	pH	pH	ml	sec	
100-109 Concentration adjustment factor	FAL adjustment factor B (Tank1)	FAL adjustment factor A (Tank1)	TAL adjustment factor B (Tank1)	TAL adjustment factor A (Tank1)	pH adjustment factor B (Tank1)	pH adjustment factor A (Tank1)				
	ADB	ADA	BDB	BDA	DBC	DAC				
110-119 Reagents and sensors	PH measurement time	Absorbance measurement time	Cell level detection value	Promoter empty quantitative	Limit light intensity	Increase potential	Increase potential 2		pH sample amount	End Signal Time
	PMT	AMT	CLV	ZOF	LVL	BUP	BU2		SVD	PET
	sec	sec	mV	mV	mV	mV	mV		ml	sec
120-129 Reagent related	Addition amount of AR1 C1	Reaction waiting time A								
	X1C	WT1								
	ml	sec								

	0	1	2	3	4	5	6	7	8	9
130-139	FAL adjustment factor B (Tank2)	FAL adjustment factor A (Tank2)	TAL adjustment factor B (Tank2)	TAL adjustment factor A (Tank2)	pH adjustment factor B (Tank2)	pH adjustment factor A (Tank2)				
	A2B	A2A	B2B	B2A	D2B	D2A				
140-149	Max Analysis Time	System Option 2				pH calibration solution Alkali	pH calibration solution neutral	pH calibration solution Acid	Automatic calibration function	Replenishment operation options
	LMT	SO2				PBX	PNX	PAX	APC	SP2
			mV	mV/pH	mV					
150-159 pH conversion factor and option settings	pH potential B	pH conversion factor A	pH conversion factor B	Hardware Selection	Password (1000-9999)	Simulator set 5050	Unit selection	Device type selection	System option	Device address
	PHV	PHA	PHB	SHD	UPW	SIM	USD	DTS	SOP	DAD
	mV	mV/pH	mV					0		
160-169 Upper and lower limit setting (Tank2)	pH HH	pH H	pH nominal value (N)	pH L	pH LL	pH supply amount up to once	pH quantitative supply	pH supply factor	pH accumulated supply amount (Tank2)	pH supply pump discharge amount (Tank2)
	AH2	AX2	AS2	AL2	AY2	AM2	AC2	AZ2	AR2	AP2

	0	1	2	3	4	5	6	7	8	9
170-179 Upper and lower limit setting (Tank2)	FAL measured value HH	FAL measured value H	FAL measured value Nominal value (N)	FAL measured value L	FAL measured value LL	FAL supply amount up to once	FAL quantitative supply	FAL supply factor	FAL accumulated supply amount (Tank2)	FAL supply pump discharge amount (Tank2)
	BH2	BX2	BS2	BL2	BL2	BY2	BC2	BZ2	BR2	BP2
	pt	pt	pt	pt	pt	pt	pt	pt	pt	pt
180-189 Upper and lower limit setting (Tank2)	TAL measured value HH	TAL measured value H	TAL measured value Nominal value (N)	TAL measured value L	TAL measured value LL	TAL supply amount up to once	TAL quantitative supply	TAL supply factor	TAL accumulated supply amount (Tank2)	TAL supply pump discharge amount (Tank2)
	CH2	CX2	CS2	CL2	CY2	CM2	CC2	CSC	CRT	CPR
	pt	pt	pt L	L	pt	pt	pt	pt L	L	pt

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日付	記号	内容
09/07/17	1.00	K-Ni 用に編集
10/08/11	1.00	ELCU 用に分岐して編集
11/06/10	1.00	ELCU から EL2 用に分岐して編集
17/12/14	1.00	新しく PCC として編集
2026/1/28		タイパーカーライジング様向け DG2B へ編集

最終印刷日時　2026/1/28 5:10:00 PM　改版番号1　改訂番号 39
ファイル名　　《SR0651 PCC マニュアル.docx》　全ページ数　67

脱脂処理液自動管理装置

Parker Chemical Controller／PCC-DG

取扱説明書

脱脂処理液自動管理装置

Parker Chemical Controller／PCC-DG

取扱説明書

エイコー電機株式会社

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