INSTRUCTION MANUAL

LIGHT OBSCURATION PARTICLE COUNTER

KL-05

RION CO., LTD.

3-20-41 Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan
http://www.rion.co.jp/english/

ECO GREEN

Organization of this manual

This manual describes the features and operation principles of the light obscuration particle counter KL-05. For information regarding the operation of other equipment in the case of incorporating the KL-05 into a measurement system with other equipment, always make sure to refer to the documentation of the other equipment. The following pages contain important information on safety. Be sure to read this part.

This manual contains the following sections.

Outline

Describes the features of the unit.

Panel Explanation

Briefly identifies and explains the buttons, lamps, connectors and all other parts of the unit on the front, side and rear panel.

Preparation

Describes how to connect the sampling tube, drain tube, power cord and other parts of the unit.

Start up

Describes how to start / stop the unit.

Measurements

Provides a basic explanation of measurement.

Performance-Test

Provides a basic explanation of Performance-Test.

Calibration

Provides a basic explanation of Calibration.

Backup / Restore

Describes how to backup / restore measurement data by using the USB flash drive.

Password Setting

Provides a basic explanation of how to set the password.

Automatic Logout

Describes how to make settings for automatic logout.

Operator Management

Describes how to register operators and how to set / change their access authorizations.

Certificate Management

Describes how to manage certifications.

Set Clock

Describes how to set the clock.

System Administration

Provides a basic explanation of how to connect to a network, how to connect a printer, and how to make serial communication settings.

Audit Trail

Describes the audit trail function.

Password Expiration Time

Describes how to make settings for password expiration.

System Information

Provides a basic explanation of system information.

Screen Snapshot

Provides a basic explanation of the screen snapshot function.

Print

Provides a basic explanation of printing.

Electronic Signature

Describes how to manage electronic signatures.

Export Measurement Data

Describes how to export measurement data via a communication link.

Connection of Options

Describes how to connect or install separately available options.

Maintenance

Describes the inspection and maintenance of the unit and how to change the syringe.

Troubleshooting

Describes checking procedures and countermeasures in case there is a problem during start up and operation.

Specifications

Lists the technical specifications of the unit.

Open source software

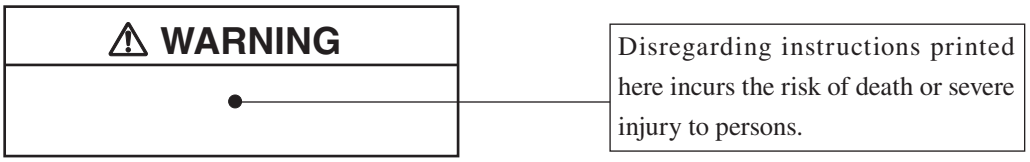
This product contains the open source software of the following licenses.

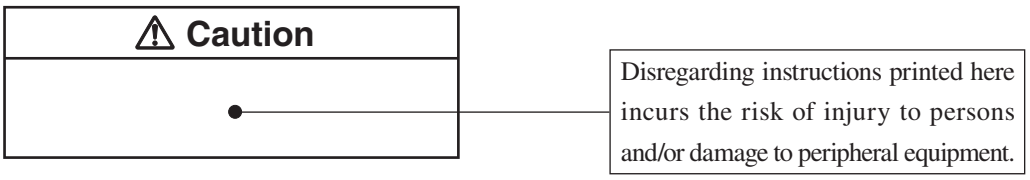
1. GPL
2. LGPL
3. MIT
4. Apache License Ver. 2

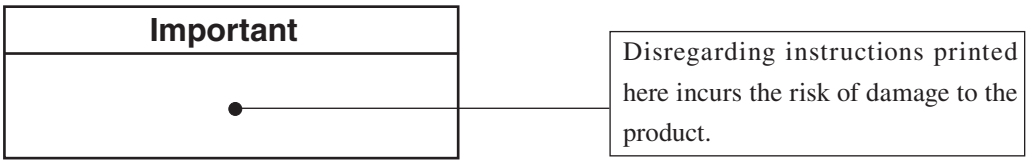
Those source codes of the open source software according to the license agreement will be given. If you wish to disclose the source code, please contact the supplier.
Note that we assume no responsibility for the source code.
Note that we are not responsible for exact details of the source code.
For details on the license, click [Manual] - [Open Source License] folder on the supplied CD-ROM.

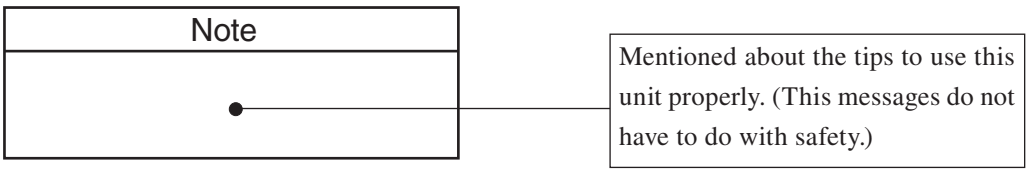
FOR SAFETY

In this manual, important safety instructions are specially marked as shown below. To prevent the risk of death or injury to persons and severe damage to the unit or peripheral equipment, make sure that all instructions are fully understood and observed.









⚠ WARNING

Types of sample fluids and cleaning fluids

The unit is designed for measuring the particle number concentration in liquid. The particle count is determined for various sizes.

Never use the unit with the liquid types listed below, to prevent false measurement and the possibility of accidents and damage to the unit.

- Explosive liquid or mixtures containing explosive fluid
- Hydrofluoric acid or other fluids which can cause corrosion of fluid-contacting parts (their materials are described in the specifications) or mixtures containing such fluid

  [Example]

  The corroding influence of hydrofluoric acid, sodium hydroxide solutions, ammonia water, or nitric acid on fluid-contacting parts may differ depending on conditions such as the type of liquid, concentration, and temperature.

  [Note]

  The above information has been compiled by Rion to the best of our knowledge, but it does not cover all possible cases or applications.

  Be sure to check for corroding influence on fluid-contacting parts also with regard to fluids other than those listed above before introducing them into the system.
- Liquid with a temperature of less than +15°C or more than +30°C

When using different types of sample fluid where mixing can lead to reactions such as thermal build-up, hardening, or particle generation, always perform thorough cleaning to ensure complete replacement.

⚠ WARNING

Sample fluid danger prevention

When toxic sample fluid comes into contact with any part of the human body or when toxic gases generated by the sample fluid are breathed, there is a danger of severe injury or death. When sample fluid comes into contact with other objects in the vicinity, there is a risk of fire, explosion, corrosion, deformation or other effects. Observe the following points closely to prevent leakage and adherence of sample fluid.

- In case of accidental contact with any potentially harmful fluid, immediately wash the affected part with plenty of water and contact a physician.
- Do not pass hydrofluoric acid or other sample fluids which can cause corrosion of fluid-contacting parts (their materials are described in the specifications) through the system.
- Observe the following points when setting up or dismantling a measurement system.
  - Check for any possible risks or toxicity of the intended sample fluid.
  - Take any required steps to prevent sample fluid leaks, spray, or exposure of the body to sample fluid.
  - Always use protective measures such as wearing dual gloves when connecting or disconnecting tubes and connectors. Dispose of gloves which have come into contact with fluid in such a way that the gloves do not come into contact with persons or equipment.
  - To prevent leaks, do not exert strong force or bending stress on tube joints.
  - As far as possible, tubes and other piping parts should be built up as a fixed installation.
  - Do not start to pass sample fluid through the system before all connections have been checked.
- When using sample fluid which may generate harmful gases, provide adequate ventilation as prescribed by applicable laws and regulations.
- Before and after measurement, clean the entire sample fluid system thoroughly to remove any remnants. Otherwise unwanted effects such as thermal build-up, hardening, particle accumulation etc. can occur. This is especially important to prevent the possibility of serious accidents when using the unit to measure different types of sample fluids.
- After use, perform purging while observing any precautions regarding the mixing of fluids. As the last step, purge with pure water and verify neutrality (pH7). Then fill the unit with ethyl alcohol and seal it.

- Dispose of waste sample fluid only as prescribed by applicable laws and regulations.
- Never mix waste sample fluid with other substances unless absolute safety has been established.
- Always follow the sequence: purging, measurement, exchange, measurement.
- When using fluids of different properties, always thoroughly purge the fluid system, and verify complete exchange before starting the next measurement. This is to prevent unwanted effects such as sudden thermal build-up, hardening, particle accumulation etc. that can be caused by mixing. If this precaution is not properly observed, there is a risk of a serious accident.
- Pay attention to measurement, exchange, purging sequence.
- Some fluids may be subject to emulsification, temperature rise, or other effects when mixed with water. In some combinations, hardening or precipitation may also occur. Before introducing sample fluid, make sure that there is no possibility of a chemical reaction.

  Some possibly hazardous combinations and their effects are listed below. (This list is not comprehensive. There may be other hazardous combinations as well.)

  - Do not introduce water after sulfuric acid
    A high-temperature reaction will occur.
  - Combination of oxidizing substances and reducing substances is prohibited
    Example: nitric acid and isopropyl alcohol
    A violent reaction (explosion etc.) will occur.
  - Acidic and alkaline substances
    Example: introducing ammonia water after nitric acid is prohibited
    Damage and stress due to neutralization heat and reaction heat may occur.
    Always purge with pure water in between.
  - Water and oil, water and organic solvent, or oil and organic solvent
    Emulsification may occur.
    Purge with plenty of ethyl alcohol (followed by n-hexane if required).

  [Note]
  The above information has been compiled by Rion to the best of our knowledge, but it does not cover all possible cases or applications. Be aware that other risks or dangers may exist depending on usage conditions.

Warning labels

The following types of warning labels are used with this unit.

● The unit uses a laser source

This unit is designated as a class 1 laser product according to IEC 60825-1 (2014). The internal particle detector mechanism uses a laser, but it is fully shielded so that the beam cannot exit from the enclosure. The identification label shown at right is affixed to the front of the unit.

● Laser precautions

The particle detector mechanism in this unit uses a laser classified as a class 3B laser product according to IEC 60825-1 (2014). The laser source beam can cause blindness if viewed directly, and can cause skin injuries if the skin is exposed directly to the beam. Never open the cover, because this involves the risk of exposure to the laser beam.
The identification label shown at right is affixed to the top of the unit.

● Transport label

Instructs the user to purge the sample fluid system with pure water and fill it with ethyl alcohol for maintenance or servicing. When sending the units, please follow any related laws and regulations, and the instructions of your shipping carrier.
The label is affixed to the rear of the unit.

- **Warning label regarding inlet and outlet, sample fluid pressure, and sample fluid type**

Instructs the user not to exert strong force on the inlet and outlet.

Warns the user that sample fluid pressure must not exceed 50 kPa (gauge pressure).

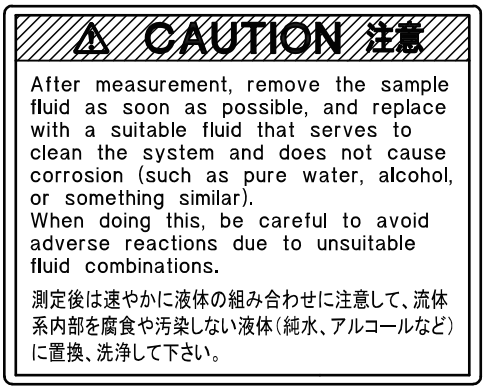
Instructs the user not to introduce hydrofluoric acid or similar fluids that may corrode the fluid-contacting parts into the system.

The label is affixed to the left side of the unit.

- **Caution label for removing the sample fluid and cleaning the system after measurement**

Instructs the user that the sample fluid should be removed after measurement and replaced by a suitable fluid that serves to clean the system and does not cause corrosion.

The label is affixed to the top of the syringe pump on the left side.



- **Caution label for transport**

To assure continued operating accuracy, carefully protect the unit from shocks and vibrations during transport and installation.

The label is affixed to the rear of the unit.

Caution:

Control, adjustment, or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Precautions

- Operate the unit only as described in this manual.
- Be aware of the possibility of leaks from fluid system parts such as tubes and connectors. These parts are consumables and must be regularly replaced.
- Pay attention to the following points when using or storing the unit:
  - Use the unit where the environmental temperature is +15°C to +30°C and the relative humidity is 90% or below.
  - Do not store this unit where the environmental temperature and humidity may be out of specified ranges (–10°C to +50°C, max. 90% RH).
  - Do not store or use this unit in environments where sudden temperature changes may lead to condensation.
  - Do not store or use this unit in environments where it may be exposed to splashes of water or other liquids.
  - Do not store or use this unit in environments where it may be exposed to direct sunlight.
  - Do not store or use this unit in environments where it may be subject to air with high salt or sulphur content or to chemicals or gases.
  - Do not store or use this unit on a slanted or unstable surface.
  - Do not store or use this unit in environments where it may be subject to vibrations or to shocks.
  - Do not store or use this unit on its side or upside down.
- If the unit is used in a manner not specified by the manufacturer, the protection provided by the unit may be impaired.
- Before using the unit, make sure that all cable, cord, and tube connections are correctly and safely established. Do not bend the cable, cords, tube connections to the unit, or otherwise subject them to excessive force. When detaching cables, cords and tubes, grip them by the plug or connector.
- Use a stable power supply, which meets the conditions stated in the specifications and has low levels of electrical noise and voltage fluctuation. Excessive electrical noise or voltage fluctuation can cause the unit to operate abnormally or malfunction.
- The unit must be properly grounded, using a three-prong plug. Connecting to a power supply without grounding could cause electric shock.

- If the unit operates abnormally, disconnect the power code plug from an AC outlet for power shutdown.
- Do not disassemble the unit or attempt internal alterations.
- In case of malfunction, do not attempt any repairs. Note the condition of the unit clearly and contact the supplier.
- The end plugs are required to seal the unit when storing or returning it for maintenance or servicing. Store the plugs in a safe location for later use.
- The sample fluid system of the unit must always be filled with fluid (during measurement, storage, and transport). If the sample fluid system dries up, particle detector assembly problems (see page 214) can occur.
- When disposing of the unit, be sure to observe all applicable legal regulations and guidelines in your country and community.
- Observe the following precautions for using and storing USB flash drive. Otherwise damage or malfunction can occur.
  - Do not force the USB flash drive into the port on this unit.
  - Do not bend the USB flash drive or subject it to strong shocks.
  - Discharge any static electricity before connecting or removing the USB flash drive.
  - Store the USB flash drive in a location protected from heat, water and humidity, and direct sunlight.
- There is a limit on how often data can be rewritten on a USB flash drive. When this limit is exceeded, operation may become unreliable.
- If a USB flash drive is stored for an extended period without using it, data may be lost. Do not use a USB flash drive for long-term storage of important data.
- Before using a USB flash drive, perform a virus check to make sure that is clean.

Weight

The weight of the unit is about 10 kg.
When transporting or otherwise moving the unit, use a suitable trolley or other implement and ensure safety to prevent the risk of injury.
When setting the unit, hold the handle tight with one hand and with the other hand hold the cut-out on the opposite side panel.

This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.

이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

环保使用期限标识

该标记用于表示在中国销售的电子信息产品的环保使用期限。只要您遵守该产品在安全和使用等方面的规定，则从制造之日开始算起的使用年限内，它不会对环境、人体及财产带来严重影响。

有毒有害物质或元素的名称及含量

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
KL-05	×	×	×	×	×	×

○： 表示该有毒有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下。

×： 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求。

（上表中的 × 印记也包含有在本产品制造阶段未经确认的情报。因此，在得到技术验证后，会没有事先通告即变更本表中的含有量。）

Contents

Outline

The light obscuration particle counter KL-05 detects particles suspended in a fluid and measures their size and number concentration using the light-obscuration method.
The unit is an automatic particle measurement system specially designed for process step control and quality management for example in medical production. The light-obscuration principle is optimal for performing insoluble particulate matter tests for injections as prescribed by the Japanese Pharmacopeia (JP), United States Pharmacopeia (USP), European Pharmacopeia (EP) and Korean Pharmacopeia (KP) and Chinese Pharmacopeia (ChP).
This unit incorporates regulatory compliance functions related to electronic records and electronic signatures as defined in the FDA's "21 CFR Part 11", "PIC/S GMP Annex 11" and the "Ministry of Health, Labor and Welfare Guidelines".

The features of the unit are as follows.

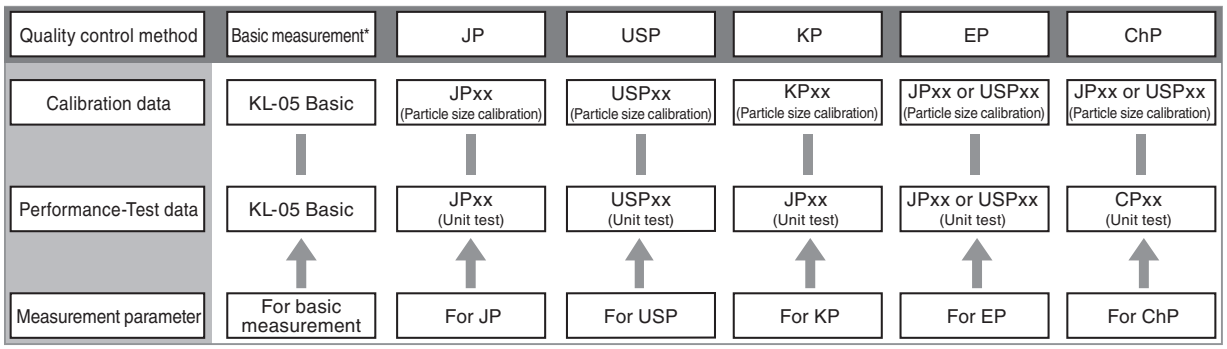
- Measurable particle size range of 1.3 µm to 100 µm.
- The rated flow rate is 25 mL/min (10 mL/min also available as a factory option).
- Built-in syringe pump enables measurement without connecting to other flow control systems.
- Up to 20 particle size ranges can be set.
- Internal storage capacity for several years worth of measurement data.
- USB flash drive enables backups and restoration of data saved on the unit.
- The measurement data can be exported in TSV (Tab Separated Values) or PDF (Portable Document Format) format by using the USB flash drive.
- Whether the measurement result is acceptable or not can be decided.
- Electronic signature function allows adding an electronic signature to measurement data.
- All major operations related to electronic recording such as measurement data creation, modification, deletion etc. can be recorded in an audit trail that can be viewed and printed.
- Automatic logout function after a certain period of inactivity.
- Expiration time of password can be set.
- Optional printer can be connected, for printout of measurement results etc.
- Access control for functions such as measurement data modification and deletion can be set for individual operators.
- Measurement results can be exported via serial communication or Ethernet.
- Optional external display can be connected.
- Small volume measurements are supported, and a 10 mL syringe is available as a factory option.
- Compliance with national pharmacopeia is available as a factory option.

Relationship between Calibration, Performance-Test and measurement

When the unit is shipped from the factory, a maximum of 6 optional Calibrations, including options, is supplied as well as the Performance-Test, used to confirm that the measurement system is appropriate [based on the methods decided by RION Co., Ltd. (basic measurement) and each Pharmacopeia].

The Calibration data is the data used on each calibration method when the unit is shipped from the factory. By applying one of these calibration settings, the unit can be set to the same condition as the time when it was initially calibrated. The tests confirming whether the system condition is appropriate or not are called Performance-Tests and their results are called Performance-Test data. The Calibration data applied to each unit and the results of Performance-Test are recorded in the Performance-Test data. Passing the Performance-Test indicates that the unit is in the same condition as at the time when it was calibrated.

The relationship between Calibration, Performance-Test and measurement is shown on the chart below.



* The basic measurement means that the unit is calibrated based on the method decided by RION Co., Ltd.

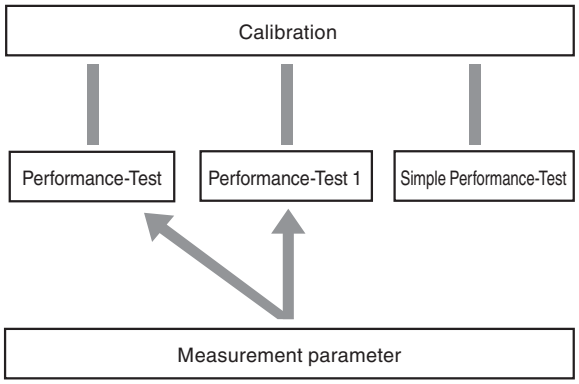
Note
Since there is no provision for calibration and performance test in the EP, the JP or the USP will instead be applied according to the customer's specification.
Since there is no provision for calibration in the ChP, the JP or USP will instead be applied for calibration according to the customer's specification.
In the KP, since the prescribed calibration and performance test contents are similar to the JP, this unit applies the JP calibration and JP performance test instructions.

In the chart, when the quality control method is a basic measurement, the unit is calibrated based on the method decided by RION Co., Ltd. upon shipment. The data used there is the Calibration data "KL-05 Basic". The results obtained when confirming that the condition of the unit is appropriate, by applying the Calibration data "KL-05 Basic", are the Performance-Test data "KL-05 Basic".

Also, before a measurement can be done the Performance-Test data must be selected in the measurement parameters. Which Calibration data apply to the unit is decided by selecting the Performance-Test data.
In other words, if the Performance-Test data “KL-05 Basic” is selected, the Calibration data “KL-05 Basic” is applied to the unit and the unit is in the calibrated condition based on the method decided by RION Co., Ltd.

Important

The Performance-Test data complying with the purpose of the quality control test must be selected. An accurate measurement cannot be performed when wrong Performance-Test data are selected.



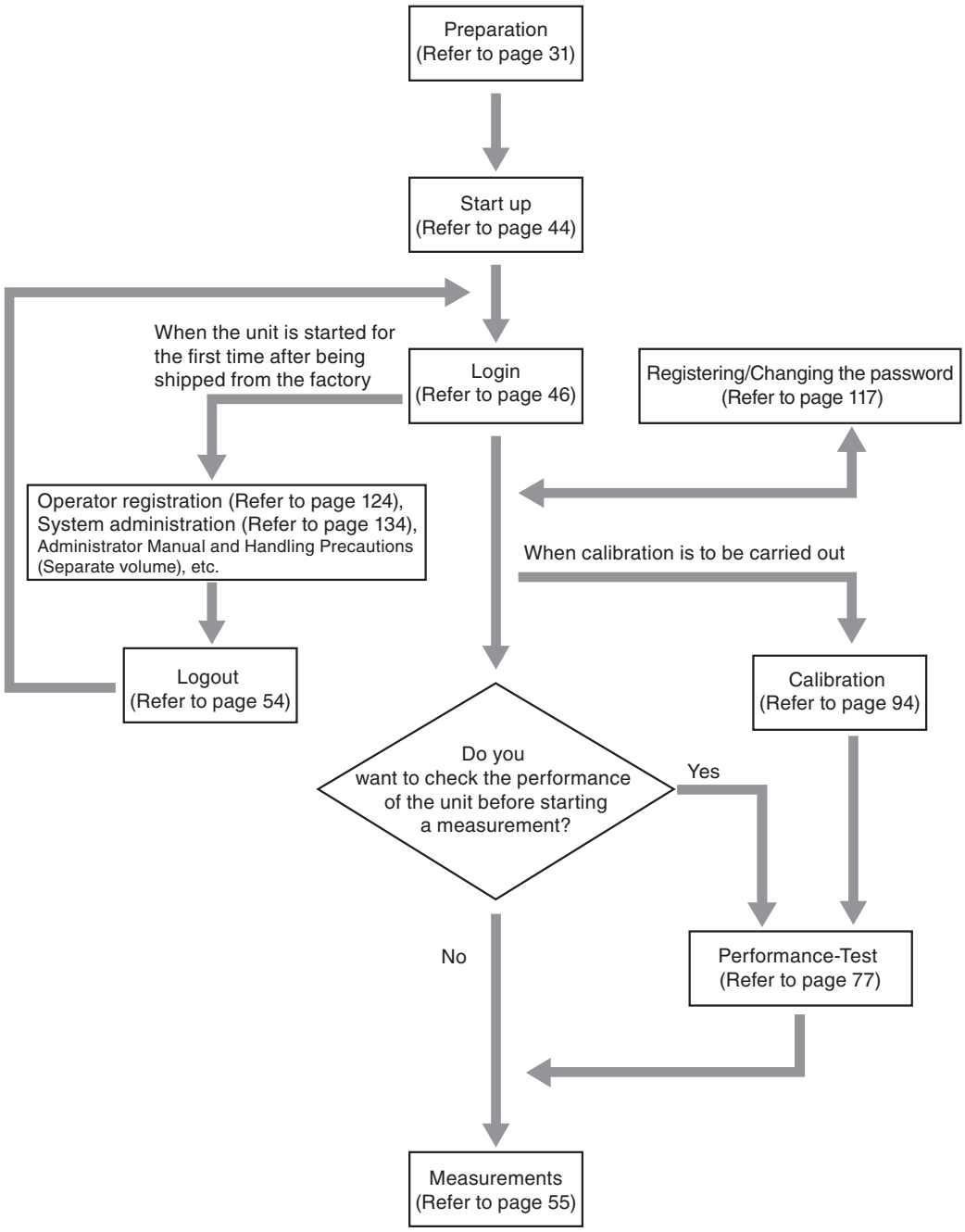
Multiple Performance-Test parameters (condition of test, condition of acceptance or rejection) can be registered to the same Calibration data. This is useful when carrying out the Performance-Test as an inspection before starting any measurement.
A formal Performance-Test must be implemented to judge if the condition of the unit is appropriate. However, it is possible to confirm the condition of the unit by setting up a Performance-Test parameter with a name different from the formal Performance-Test, such as the chart on the right, and implement the Performance-Test when needed, such as at an inspection before commencement. In other words, multiple Performance-Test parameters, such as formal Performance-Test and simple Performance-Test, can be set to the same Calibration data and used appropriately.

Note

Performance-Test data obtained with appropriate or equivalent (to a chosen pharmacopeia) Performance-Test parameters must be selected for a measurement. The measurement cannot be carried out properly if the Performance-Test data is obtained with inappropriate Performance-Test parameters.

Procedure from preparation to measurement

The flow chart below shows the general procedure from preparation to measurement. Detailed information on each procedure is described in the page number referenced in the chart.



*Password registration and change are carried out by operators after they log-in, if necessary.

About the electronic signature function

Electronic signature in this unit is, when managing measurement data as an electronic document, it is to prevent counterfeiting or falsification using certificate certificated by the certificate authority.

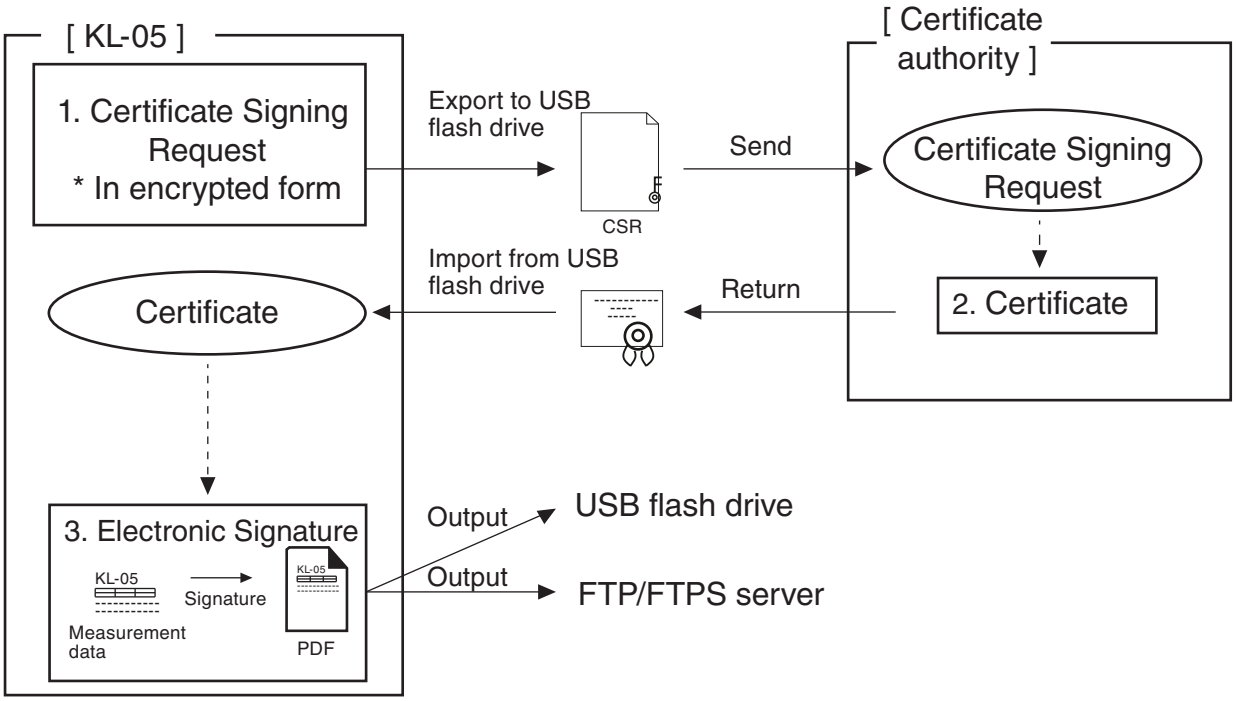
To meet these requirements and ensure authentication on a par with a written signature, the unit implements a management standard based on the relevant stipulations for electronic signatures in the FDA's "21 CFR Part 11", "PIC/S GMP Annex 11", and the "Ministry of Health, Labor and Welfare Guideline". For more information about our policy on these standards, please contact the supplier.

Procedure flow for electronic signature

In this unit, an electronic signature can be attached to measured data, to prove that the signature is authentic and the signed document has not been tampered with.

The unit has a function to request the signing of a certificate from the certificate authority. This certificate must then be installed in the unit, making it possible to attach an electronic signature to a document.

Note
For information on the procedure for issuing an electronic signature, refer to "Electronic Signature" on page 175. For information on how to request a certificate, refer to "Certificate Management" on page 126.



Note
When an electronically signed document is exported from this unit, it is moved, not copied.

Light source service life

The life expectancy of a laser diode such as used in the KL-05 is shorter than that of other semiconductor devices. When the laser diode nears the end of its service life, the optical power falls below the rated level.

There are considerable differences in service life between individual diodes. Some may fail after several thousand operation hours.

Particle size detection

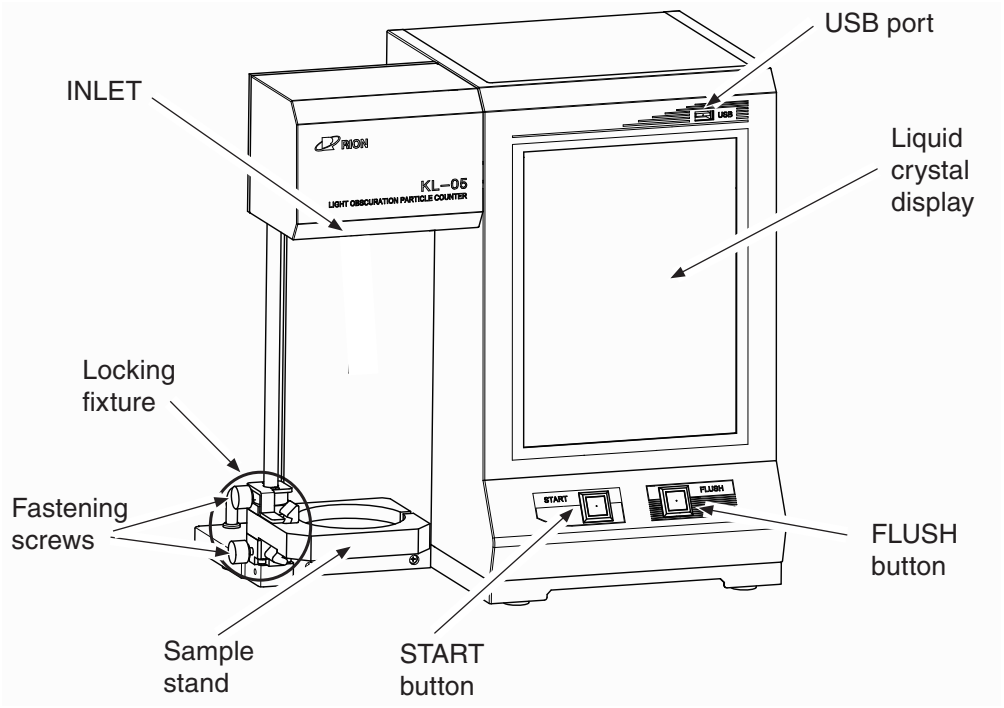
The unit is calibrated at the factory, using particles of known diameter and refractive index [monodisperse polystyrene latex (PSL) spheres with a refractive index of 1.6] in pure water. Since the amount of light obscured by a particles is used as reference to determine the particle size, the measured size corresponds to the light-obscuring size of polystyrene latex spheres.

Dissolved air in sample fluid

If there is a supersaturation of dissolved air in the sample fluid, air bubbles may form in the unit, leading to unreliable measurement results.
Since the syringe pump aspiration causes negative pressure in the unit, bubbles may be generated.
To obtain reliable results, ensure that the level of dissolved air in the sample fluid is below the saturation point before starting the measurement.

Panel Explanation

Front Panel



START button

Press the button to start the measurement. During measurement, the button lights up.

FLUSH button

Press the button to start cleaning. During cleaning, the button lights up.

Liquid crystal display

Shows operation screen. (see page 11)

USB port

Serve for connection of equipment with a USB interface. Supported devices are as follows.

- Mouse (see page 35)
- Keyboard (see page 35)
- USB flash drive (see page 36)
- Printer (see page 190)

INLET

Sample fluid inlet. Connects to the sampling tube (see page 39)

Locking fixture

Tighten the fastening screws at the sample stand position. Used for repeatedly positioning the sample container.

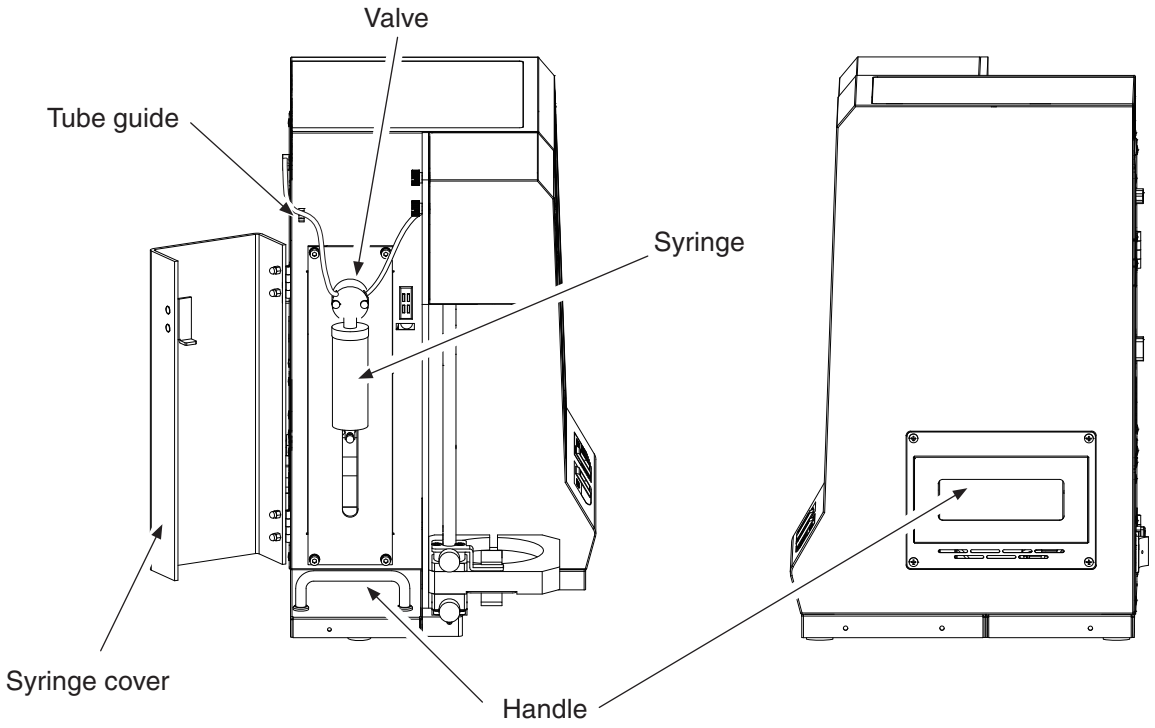
Sample stand

Position the sample container, adjust the height, and tighten the fastening screws to secure the sample stand position.

Fastening screws

One screw to secure the locking fixture. The other screw to secure the sample stand position.

Side Panel



Syringe cover

This transparent plastic cover prevents splashing of sample fluid onto the syringe side. If the cover is open, the syringe will not operate.

Tube guide

Fixes the drain tube.

Valve

The INLET opens when drawing in sample fluid and the OUTLET opens when discharging it during draining.

Syringe

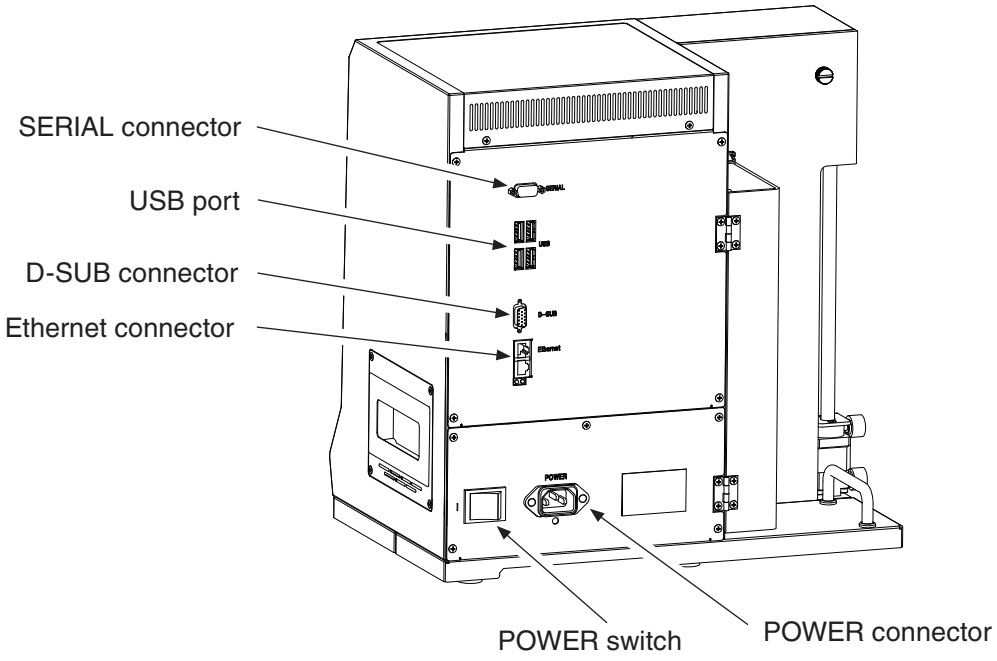
A pump which draws up and discharges sample fluids. Provision for accurate capacity, precision and measurement flow rate is provided through controlling the speed of the plunger in the syringe. The syringe also controls the discharge flow rate of sample fluids.

Handle

Used when setting the unit.

⚠ Caution
When positioning the unit, firmly grasp the handles on both sides.

Rear panel



SERIAL connector

The serial interface services for communication with external equipments (see page 186). It can be used for connection to a computer.

USB port

Serve for connection of equipment with a USB interface. Supported devices are as follows.

- Mouse (see page 35)
- Keyboard (see page 35)
- USB flash drive (see page 182)
- Printer (see page 190)

D–SUB connector

Connects to a display (see page 193).

Ethernet connector

Serves for connection to a network. Only the top connector is used (see page 192).

POWER switch

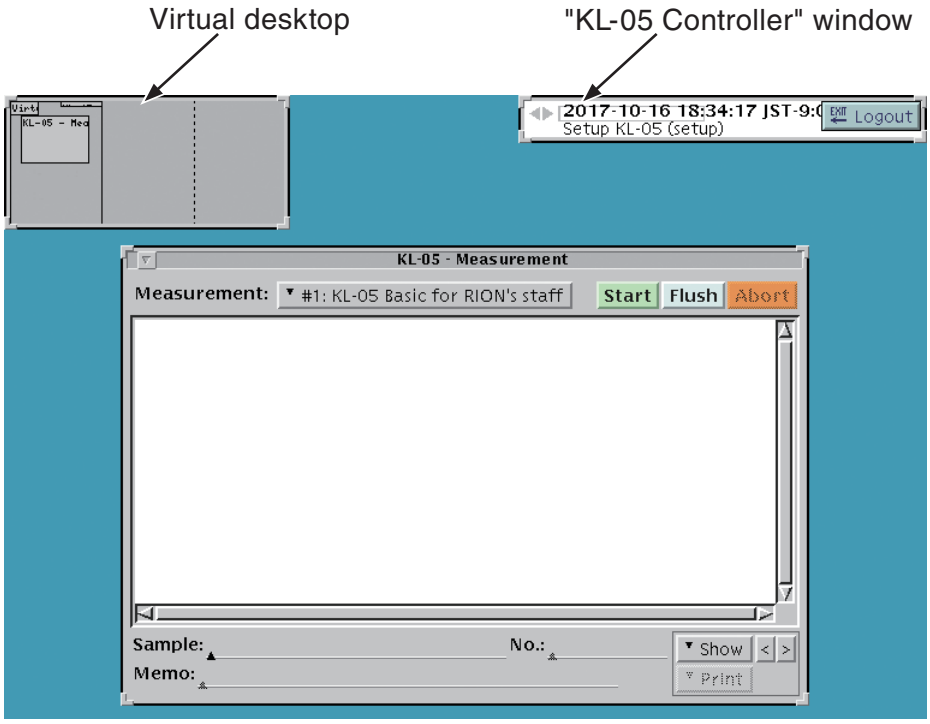
Press the ON side (|) to turn the unit on. When the unit is shut down, the switch automatically flips and power is cut off (for information on shutdown, see page 54).

Note
Do not turn the unit off with the POWER switch. Otherwise the unit may cease to function correctly.

POWER connector

Connects to the supplied power cord (see page 32).

Desktop screen



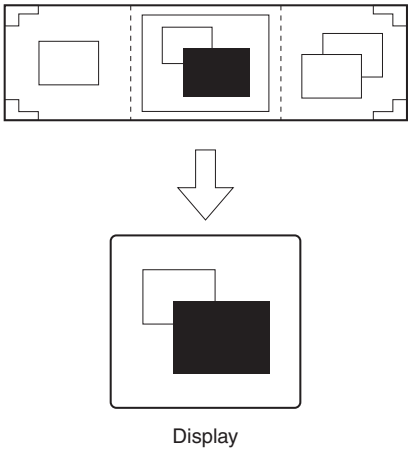
Virtual desktop

Shows the relationship between the several virtual screens of the unit and the screen currently shown on the display (see the next page).

“KL-05 Controller” window

The name of the logged-in operator, the current time, the syringe operating status and various other information is shown (see “KL-05 Controller” window on page 50).

Virtual desktop

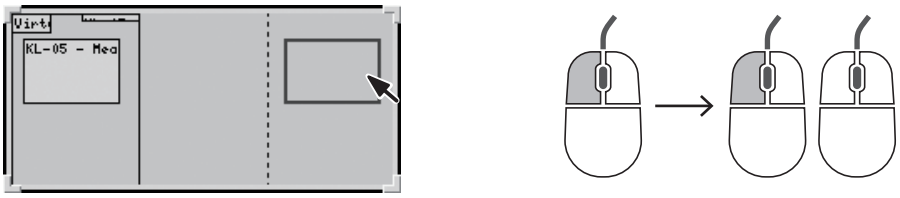


The unit contains multiple virtual screens but only one of them appears on the actual display, as per the diagram on the right.

When displaying multiple windows on a screen, the windows overlap each another and it may become confusing to use. It is convenient to divide and arrange the windows on separate screens. The “Virtual desktop” controls how windows are arranged on the screen and which screen appears on the display.

How to move windows

The “Virtual desktop” shows which window is open. Drag the relevant window to the screen to which you want to move it.

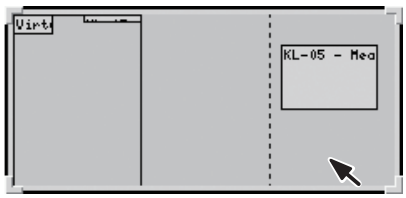


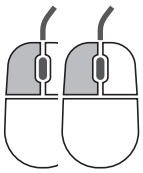
How to select the screen to be displayed on the display

There are three ways to select the screen to be displayed on the display.

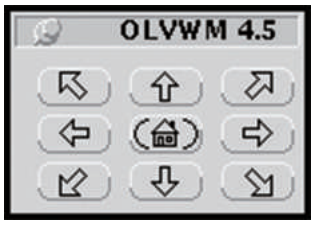
- Drag the display frame on "Virtual Desktop" to the screen you want to display on the display.

- Double-click the screen on the “Virtual desktop” you want to display.





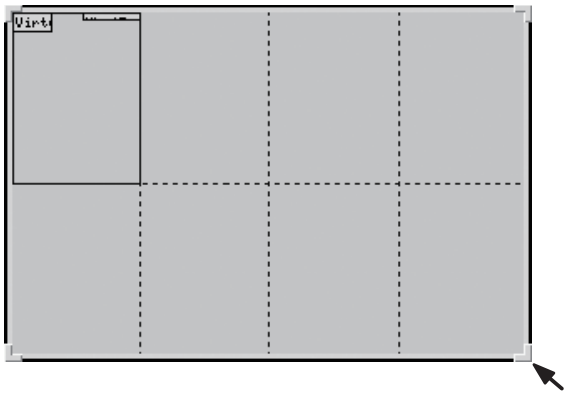
- The “OLVWM 4.5” window will appear by clicking the right button on the “Virtual desktop” (where the window is not displayed).
  Click the arrow “ ⇨ ” or the home “ ⌂ ” button. (The left button click is described as ‘click’ in this instruction manual.)

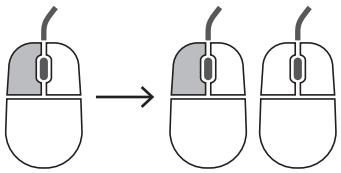


Note
The screen will be moved in the direction of the clicked arrow based on the screen displayed. The left top screen will appear by clicking the home “ ⌂ ” button.

How to change the number of screens in the “Virtual desktop”

The number of screens in the “Virtual desktop” can be changed by putting the cursor on the corner of the “Virtual desktop” and dragging it to increase or decrease the number of screens.

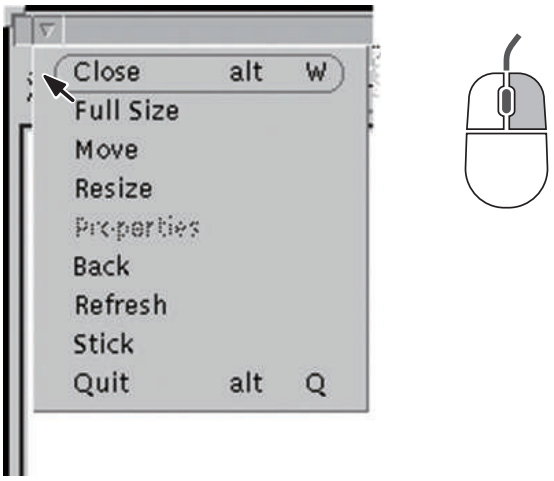




Window menu

The window menu can be displayed by clicking the left or right button on the window menu button ( ), which is on the header of window. The window menu displays the window's possible operations.

Note
The window menu can also be displayed by clicking with the right mouse button on the header or the frame of window. Right-click on the frames of windows without a header.

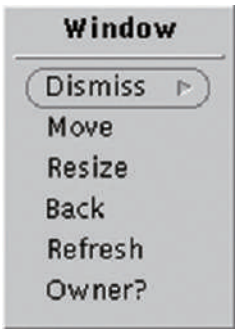


The window menu contains the following commands. (example)

Close:	Displays the window as an icon.
Full Size:	Maximizes the window size.
Move:	Moves the window by dragging to the new position you want.
Resize:	Enlarges or reduces the window size by dragging it to the position you want.
Back:	Takes the focus away from the current window and moves the window to the back.
Refresh:	Refreshes the display of the window if it crashes.
Stick:	Freezes the display of the window when the virtual screen is switched over on the "Virtual desktop".
Quit:	Closes the window.

Pop-up window

The base window opens when you log on. Sometimes the pop-up window opens as well as the base window, depending on the user's operation or the operational condition of the unit. The pop-up window is dependent on the base window. Therefore, if the base window is closed when the pop-up window is open, the pop-up window will also be closed.



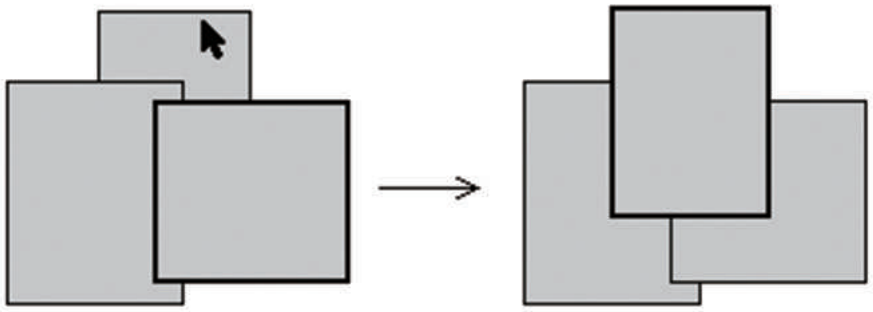
The pop-up window contains the following commands. (example)

Dismiss:	Closes the pop-up window.
Move:	Moves the window by dragging it to the position you want.
Resize:	Enlarges or reduces the window size by dragging to the position you want.
Back:	Takes the focus away from the current window and moves the window to the back.
Refresh:	Refreshes the display of the window if it crashes.
Owner?:	Returns to the base window.

Changing the overlap order of the windows

As windows can overlap each other it is usual that a part or the whole of a window will be hidden by other windows.

When part of window is hidden by another window, click on the header or the frame of that window. The hidden window moves to the front and the whole window appears.

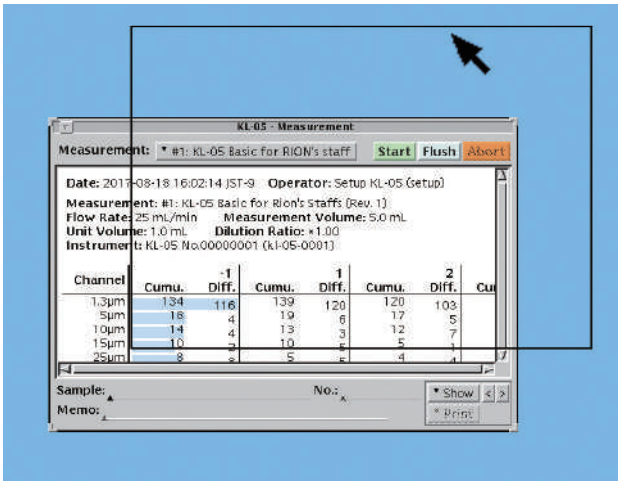


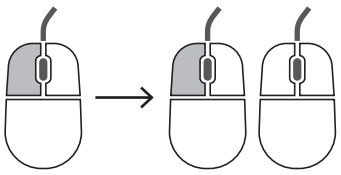
Also, the window hiding the other window can be moved to the back to display the hidden part by selecting “Back” on the window menu. Most windows can overlap in any order. However, some of the pop-up windows displayed by certain operations on a window will not be hidden by the other windows. In this case, the pop-up window needs to be closed or the other windows need to be moved.

Moving a window

A window can be moved by dragging its header or frame to the desired place by holding down the left mouse button, and then releasing it.

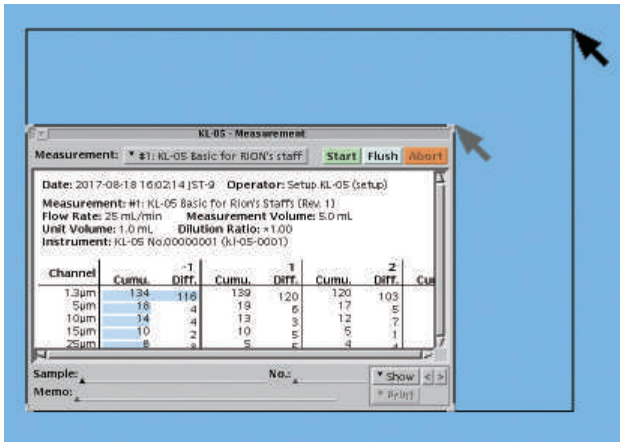
Note
When dragging the pop-up window, it may move outside the area of the original window. In such a case, close the pop-up window and then open it again.

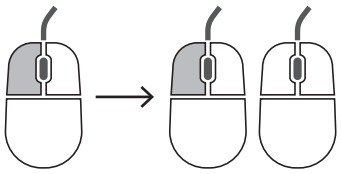




Changing the window size

The size of window can be changed by dragging its resize corners (the L-shaped marks on the corner) to the size you want by holding down the left mouse button and then releasing it.





Note
If a window does not have resize corners, the size of the window cannot be changed. Also, some of the window sizes cannot be changed even though it has resize corners.

Selecting window

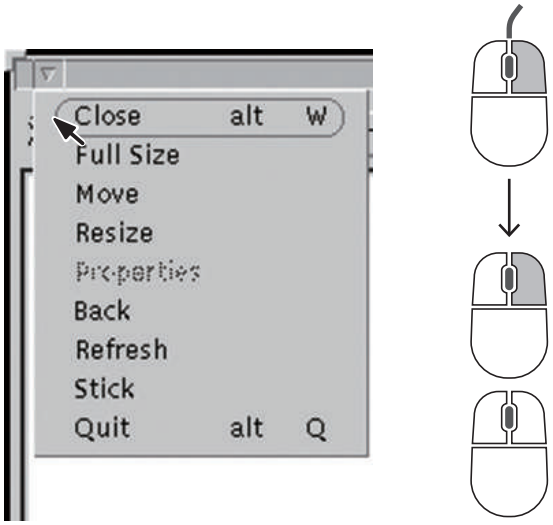
A window can be selected by clicking the left mouse button on the header or the frame. The window in this condition is called the active window. Only the active window can receive input data from the keyboard. The header of the active window appears as below.

Quitting window

If the window has buttons such as “Quit” and “Dismiss”, the window can be closed by clicking these buttons. If the window does not have these buttons, selecting “Quit” from the window menu can close the window. Some windows open a pop-up window when closing and require confirmation.

Note
The quitting operation on windows can be refused by the unit depending on its operational condition. In this case, appropriate steps must be taken after confirming the operational condition.

Displaying a window as an icon



A window can be displayed as an icon by selecting “Close” on the window menu. Also, the icon can be displayed as a window by opening the window menu of the icon and selecting “Open”.

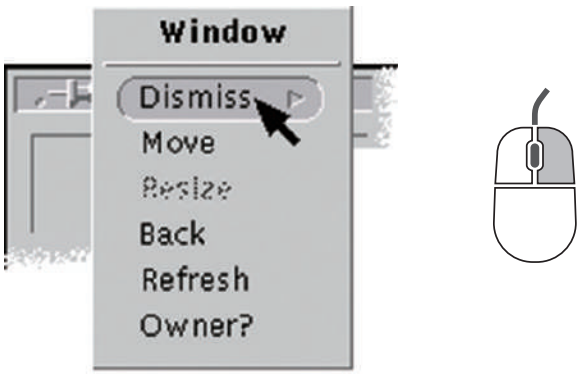
The window displayed as an icon maintains its operational condition. When the window is not needed, it has to be completely closed (refer to the quitting window section).

Quitting pop-up windows

Most of the pop-up windows of the KL-05 have a “Dismiss” button on the bottom and the pop-up window can be closed by clicking the button. Some windows have a “Cancel” button instead of a “Dismiss” button, which has almost the same function.

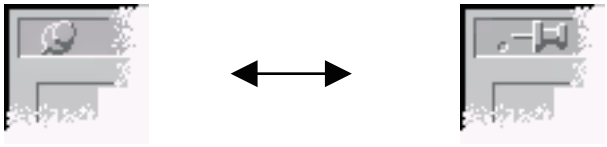
Some pop-up windows have only a button with a label such as “OK”. If so, the pop-up window can be closed by clicking the button.

If the pop-up window does not have any buttons to close it, click the right button on the header or the frame to open another pop-up window and then select “Dismiss” to close the window.



When the pop-up window is fixed by a push-pin, the pop-up window can be closed by clicking the push-pin.

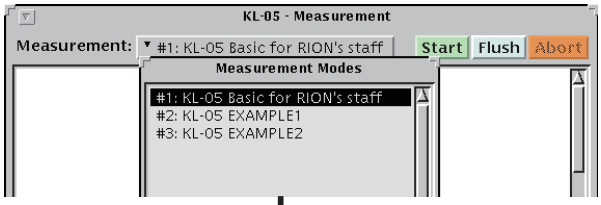
Push-pin (when fixed) Push-pin (when released)



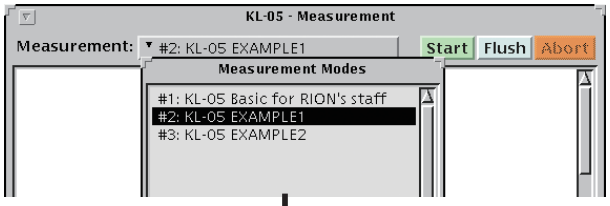
Switching the button selection

Each time the button showing ▼ and the item is right-clicked, the parameter changes. However, the buttons at the bottom of the window do not change.

Before right-click



After right-click



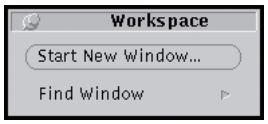
Operation limitations according to privileges

When an operator without privileges has called up a window, certain buttons and menus will be grayed out which means that they are not available. A lock icon may also be shown on the window (see “Operator Management” on page 120).

Diagram of screen transitions

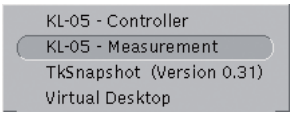
Desktop screen

[Workspace] menu

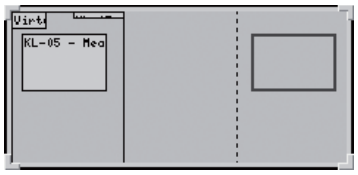


[Start New Window] window

[Find Window]

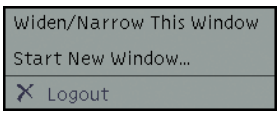


Virtual desktop



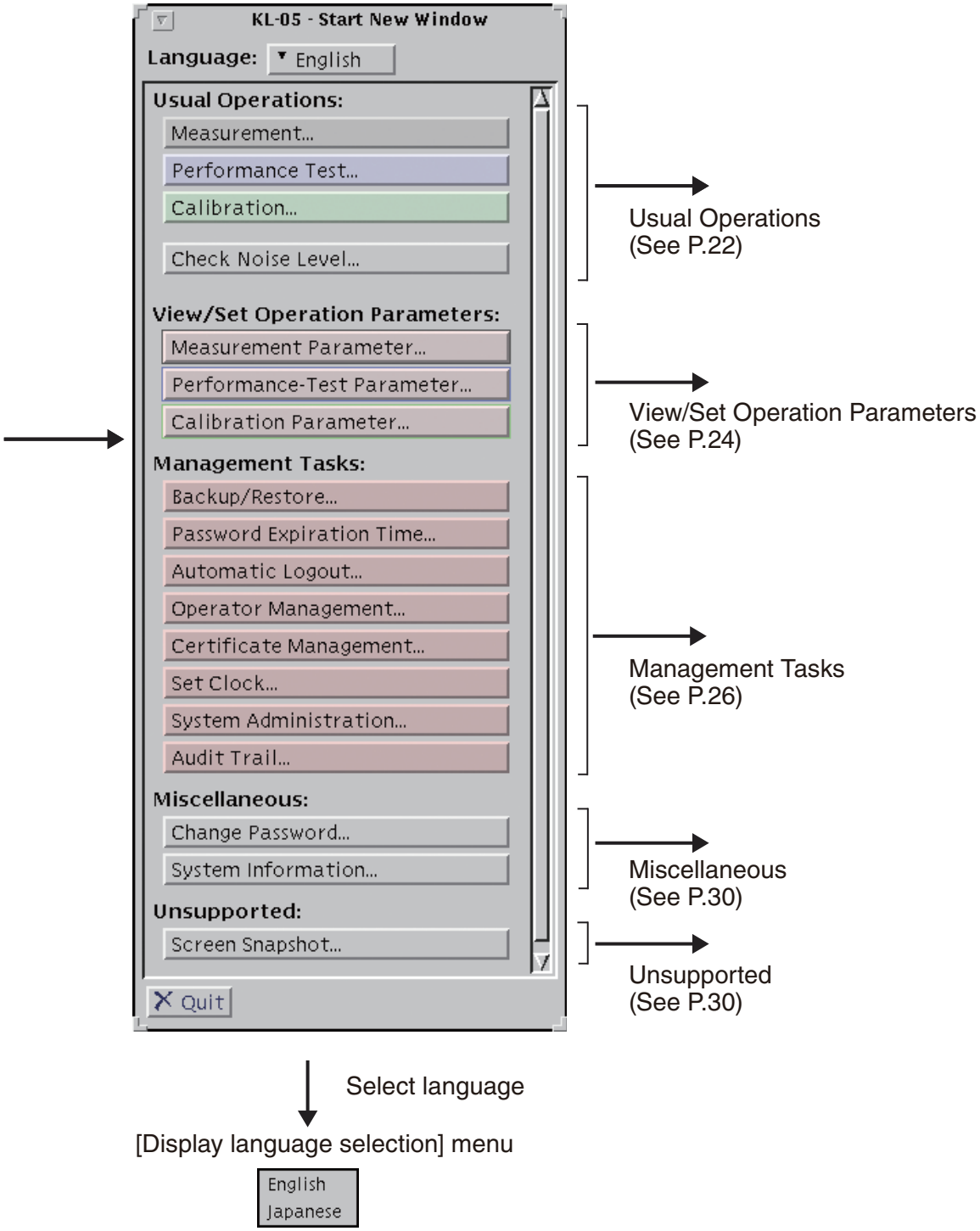
[Controller] window

Menu



[Logout] window

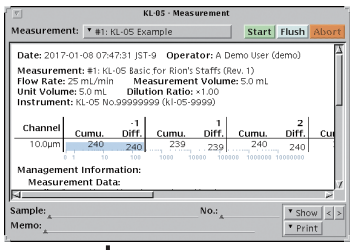
[KL-05-Start New Window] window



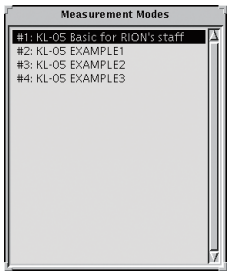
Usual Operations

Measurement

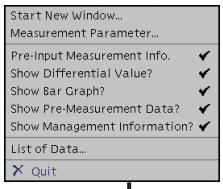
[KL-05 - Measurement] window



Measurement:
[Measurement Modes] window

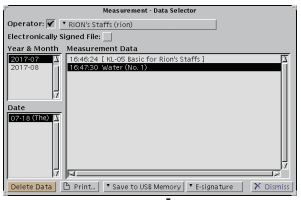


Show
[Show] menu



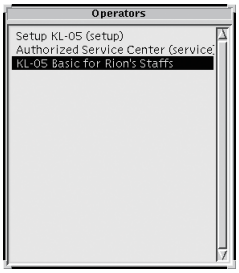
List of Data

[Measurement - Data Selector]
window



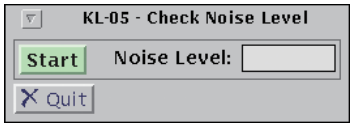
Operators

[Operators] window

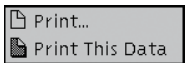


Check Noise Level

[KL-05-Check Noise Level] window



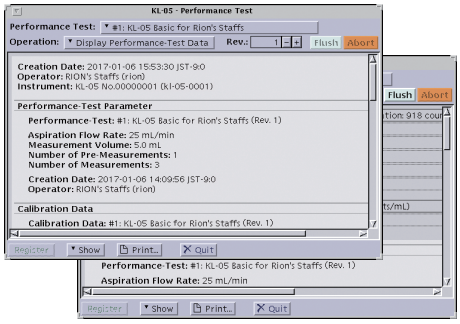
[Print] menu



Print window

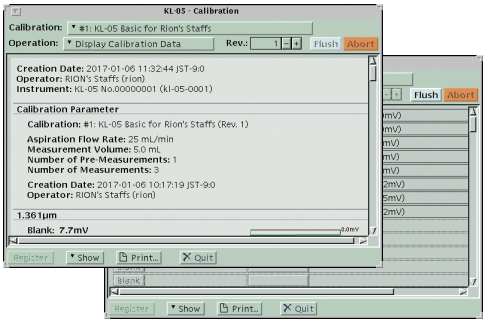
Performance Test

[KL-05 - Performance Test] window

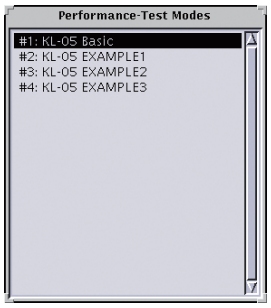


Calibration

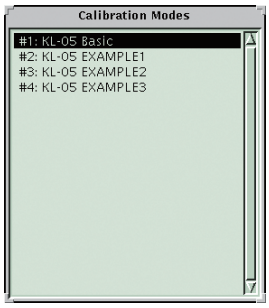
[KL-05 - Calibration] window



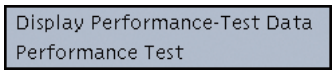
Performance Test:
[Performance-Test Modes] window



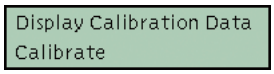
Calibration:
[Calibration Modes] window



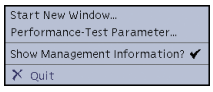
Operation:
[Operation] menu



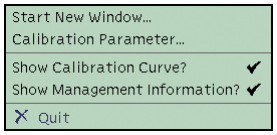
Operation:
[Operation] menu



Show
[Show] menu



Show
[Show] menu



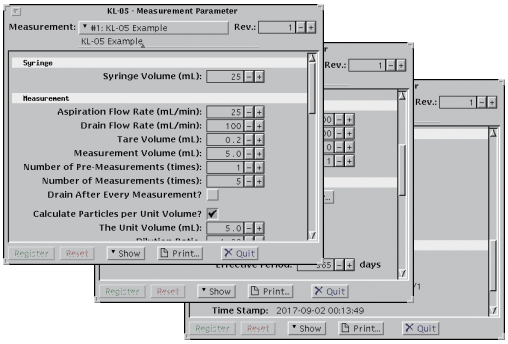
Print
Print window

Print
Print window

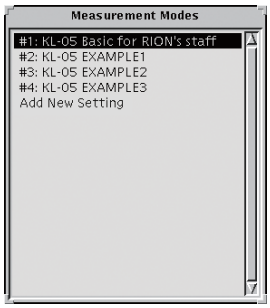
View / Set Operation Parameters

Measurement Parameter

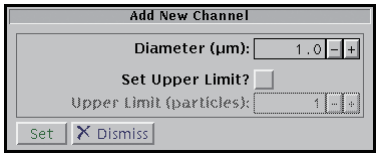
[KL-05 - Measurement Parameter] window



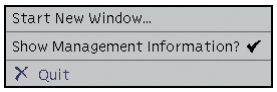
Measurement:
[Measurement Modes] window



[Channel] - [Add] button
[Add New Channel] window



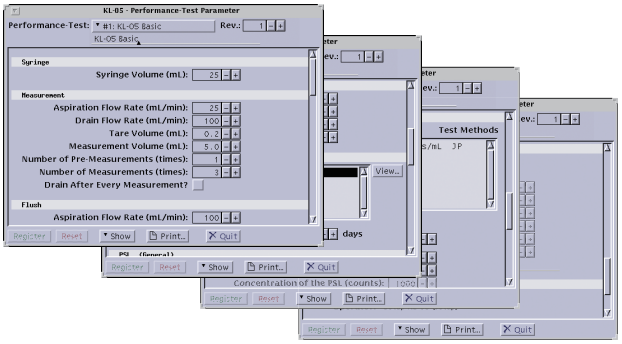
Show
[Show] menu



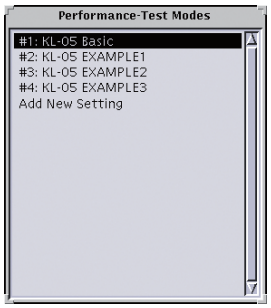
Print
Print window

Performance-Test Parameter

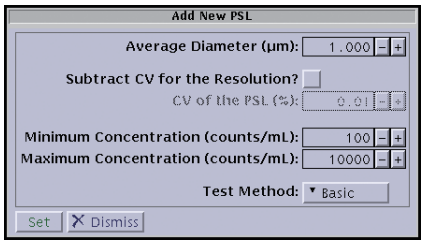
[KL-05 - Performance-Test Parameter] window



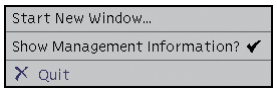
Performance-Test:
[Performance-Test Parameter] window



[PSL(General)] - [Add] button
[Add New PSL] window



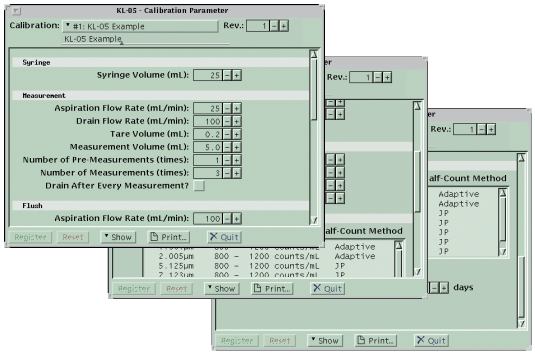
Show
[Show] menu



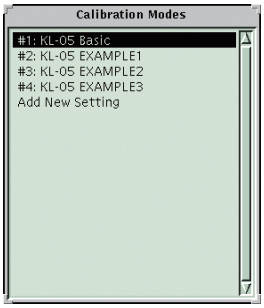
Print
Print window

Calibration Parameter

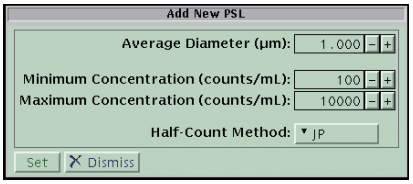
[KL-05 - Calibration Parameter] window



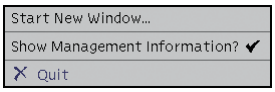
Calibration:
[Calibration Modes] window



[PSL] - [Add] button
[Add New PSL] window



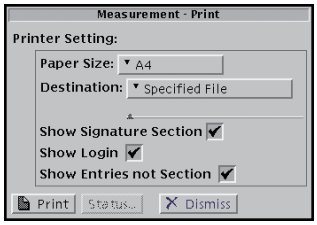
Show
[Show] menu



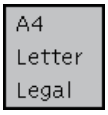
Print
Print window

Print window

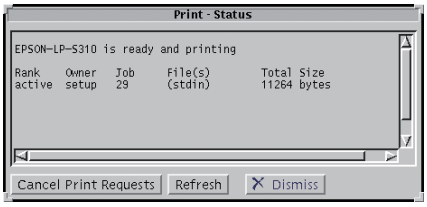
[Print] window



Paper Size:
[Paper Size] menu



Status
[Print - Status] window



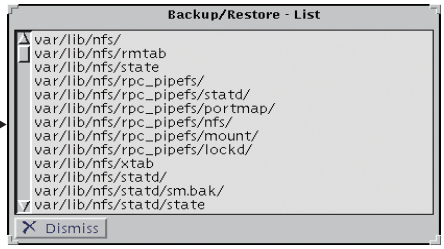
Management Tasks

Backup/Restore

[KL-05 - Backup/Restore] window

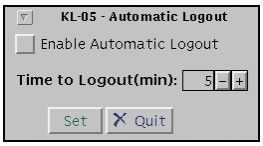
Restore from the USB Memory
List Files in the USB Memory

[Backup/Restore - List] window



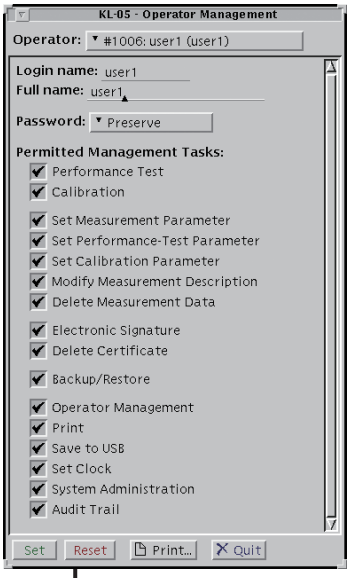
Automatic Logout

[KL-05 - Automatic Logout] window



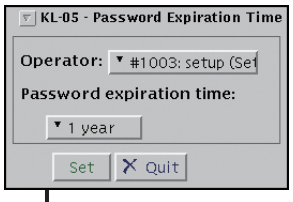
Operator Management

[KL-05 - Operator Management] window



Password Expiration Time Setting

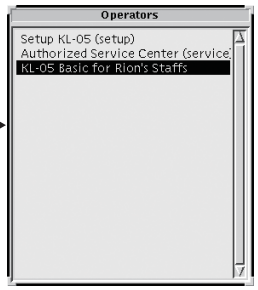
[KL-05 - Password Expiration Time] window



[Password Expiration Time] menu

Operators:

[Operators] window

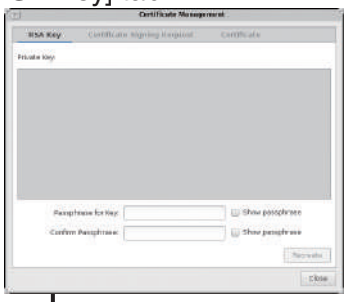


Password:

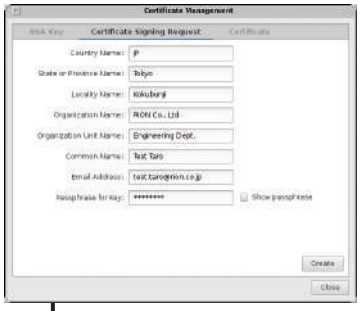
[Password] menu

Certificate Management

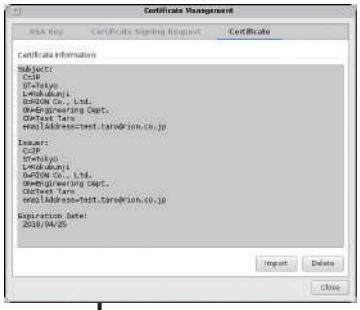
[Certificate Management] window
[RSA Key] tab



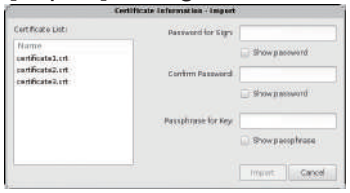
[Certificate Management] window
[Certificate Signing Request] tab



[Certificate Management] window
[Certificate] tab

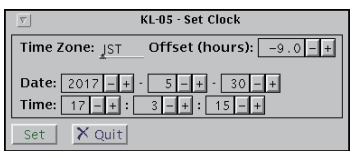


[Import] dialog



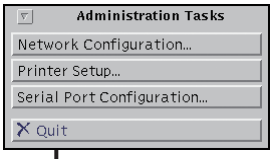
Set Clock

[KL-05 - Set Clock] window



System Administration

[Administration Tasks] window



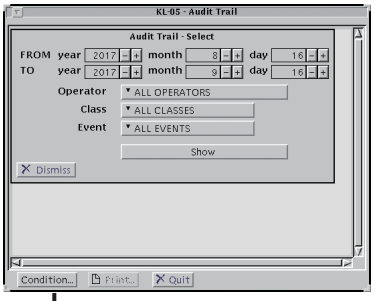
Network settings

Printer settings

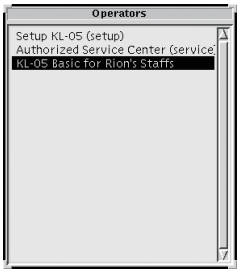
Serial port settings

Audit Trail

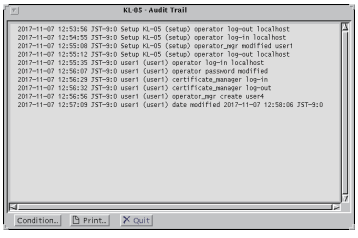
[Audit Trail - Select] window



Operator:
[Operators] window



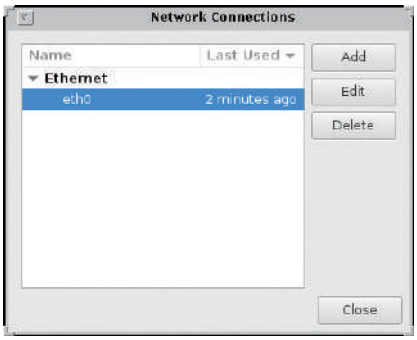
Show:
[KL-05 - Audit Trail] window



[Administration Tasks] window

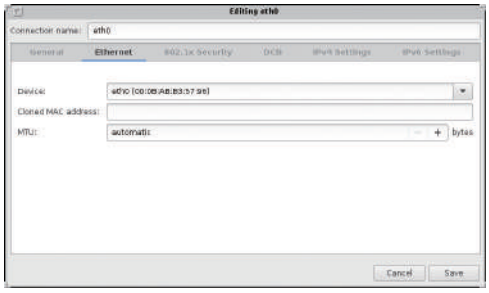
Network Settings

[Network Connections] window



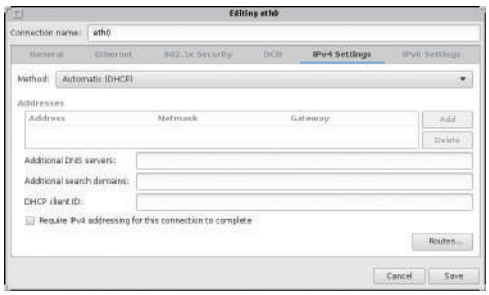
eth0

[Editing eth0] window
[Ethernet] tab



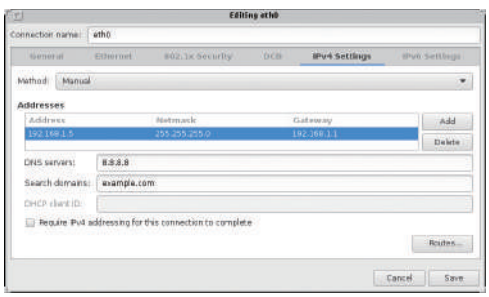
[IPv4 Setting] tab

[Editing eth0] window
[IPv4 Settings] tab
[Method: Automatic(DHCP)]



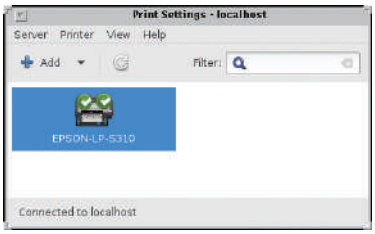
When specify a static IP address

[Editing eth0] window
[IPv4 Settings] tab
[Method: Manual]

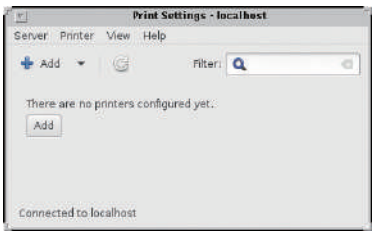


Printer Settings

[Print Settings - localhost] window

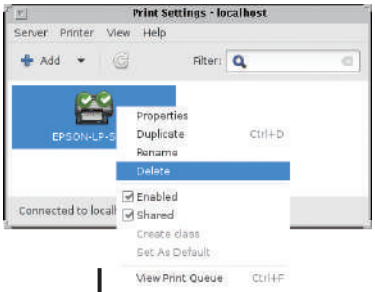


When no printers are configured
[Print Settings - localhost] window
[Add] button is shown



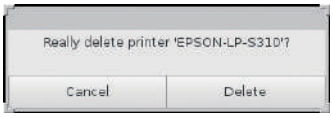
Delete printer

[Print Settings - localhost] window
[Add] button is shown



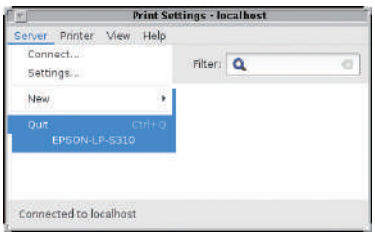
Popup

[Delete] menu



Quit

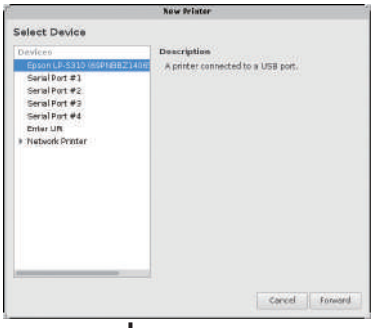
[Print Settings - localhost] window
Select [Server] tab - [Quit]



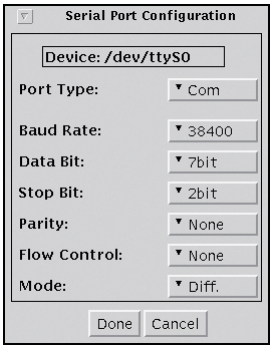
Add printer

Serial Port Settings

[New Printer] window



[Serial Port Configuration] window

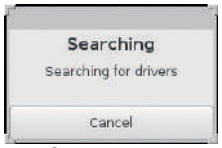


Adjust firewall settings

Popup [Adjust Firewall]

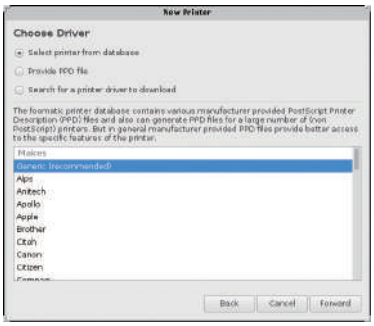
Searching for drivers

Popup [Searching]



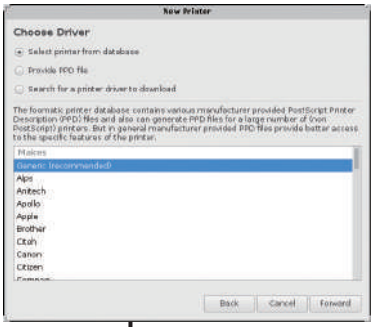
If no driver is found

[New Printer] window - [Choose Driver]



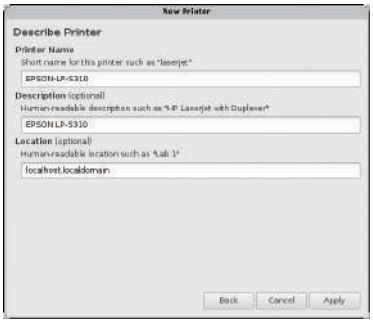
Printer model selection screen

[New Printer] window - [Choose Driver]



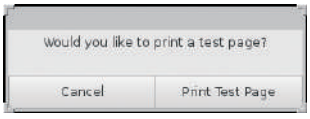
Printer description Screen

[New Printer] window - [Choose Driver]



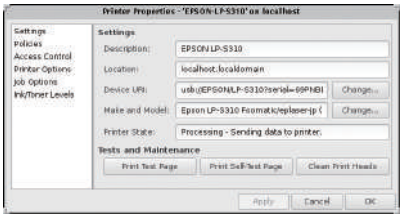
Test printing

Popup [Test Page]



After test printing

[Printer Properties] window



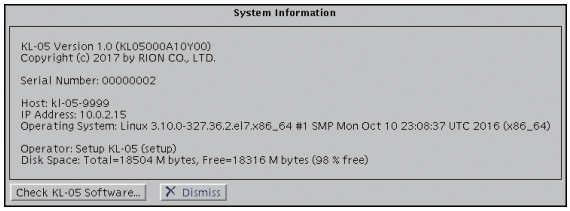
Miscellaneous

Change Password

[Information] window

System Information

[System Information] window



Enter the new password

[Query] window

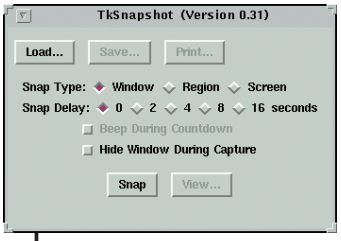
Password mismatch

Not meet password policy requirements, etc.

[Error] window

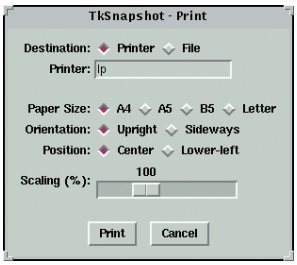
Screen Snapshot

[TkSnapshot (Version 0.31)] window



[Print] button

[TkSnapshot] window



Unsupported

Preparation

Place of installation

Select an installation location for the unit, taking into account the points listed in the "Precautions" section (see page x).

Also observe the following points.

- Leave at least 15 cm of space around the unit to allow for heat radiation. In particular, do not block the slits, which are intended for ventilation. Do not attach any foreign objects.

Important
When transporting the unit using the handles, proceed carefully and do not swing it or put it down roughly.

Precautions against condensation

The surface temperature of the flow cell inside the sensor section is approximately equal to the sample fluid temperature. You should control the environmental temperature and humidity at the location where the unit is being used so that no condensation occurs.

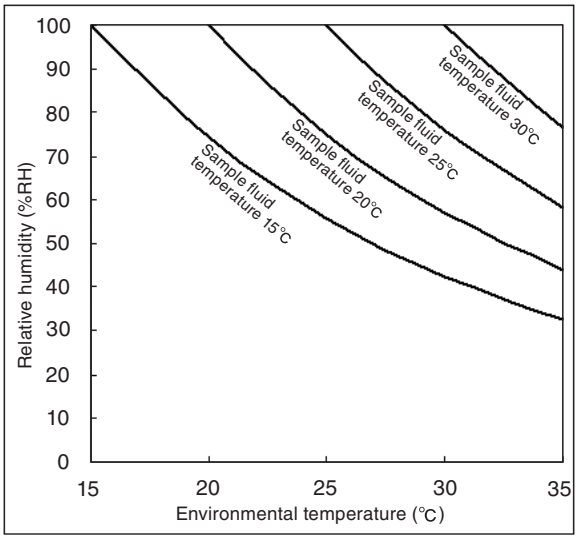
The upper limit for humidity H_u (%RH) at which no condensation on the flow cell occurs can be calculated from the sample fluid temperature and the environmental temperature, using the formula given below.

$$H_u = 10^{\left[\frac{7.5t_a}{t_a+237.3}-\frac{7.5t_b}{t_b+237.3}\right]} \times 100$$

t_a: Sample fluid temperature (°C)
t_b: Environmental temperature (°C)

For example, if the sample fluid temperature is 20°C and the environmental temperature 25°C, H_u will be 74 (%RH). The environmental humidity should not be allowed to exceed this value.

The graph below plots environmental temperature and relative humidity for different sample fluid temperatures. In the region to the top right of the respective curve, condensation on the flow cell may occur.

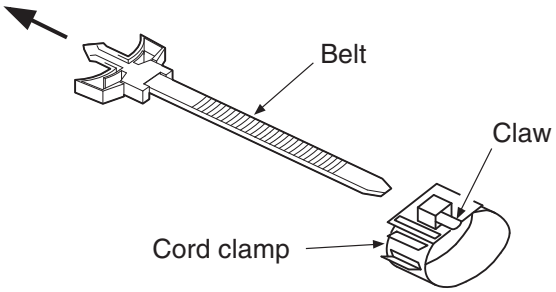


Power cord connection

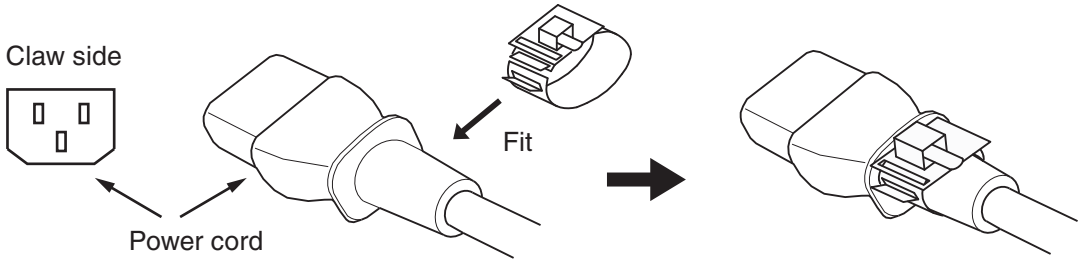
Securing the connection between power cord and POWER connector

If the power cord is disconnected while the unit has not been shut down correctly, damage may occur. It is therefore recommended to use the cord clamp to secure the connection between the power cord and the unit, so that the power cord cannot be accidentally disconnected during operation. Attach the cord clamp as described below.

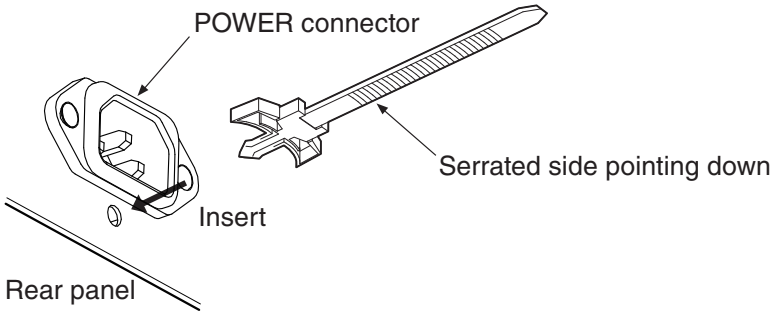
1. Raise the small claw of the cord clamp and remove the belt.



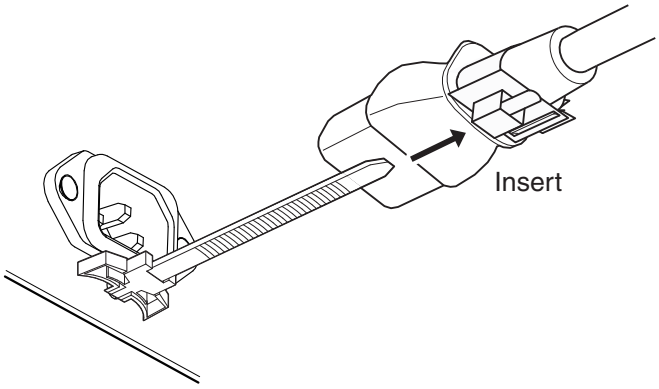
2. Fit the cord clamp onto the plug of the power cord and fasten it.



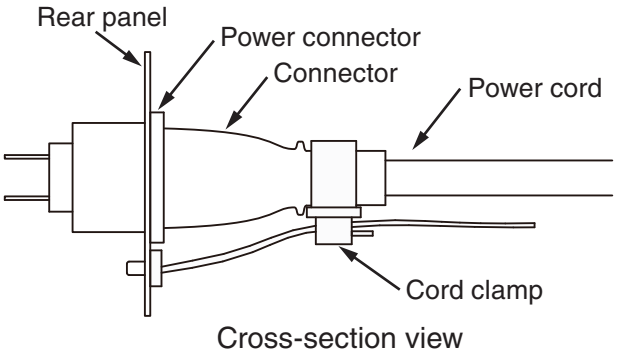
3. Insert the belt into the hole under the POWER connector.



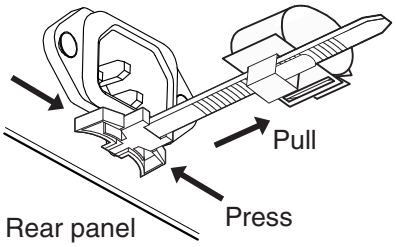
4. Insert the belt into the cord clamp fitted in step 3.



5. Insert the plug of the power cord fully into the POWER connector and pull the belt tight.

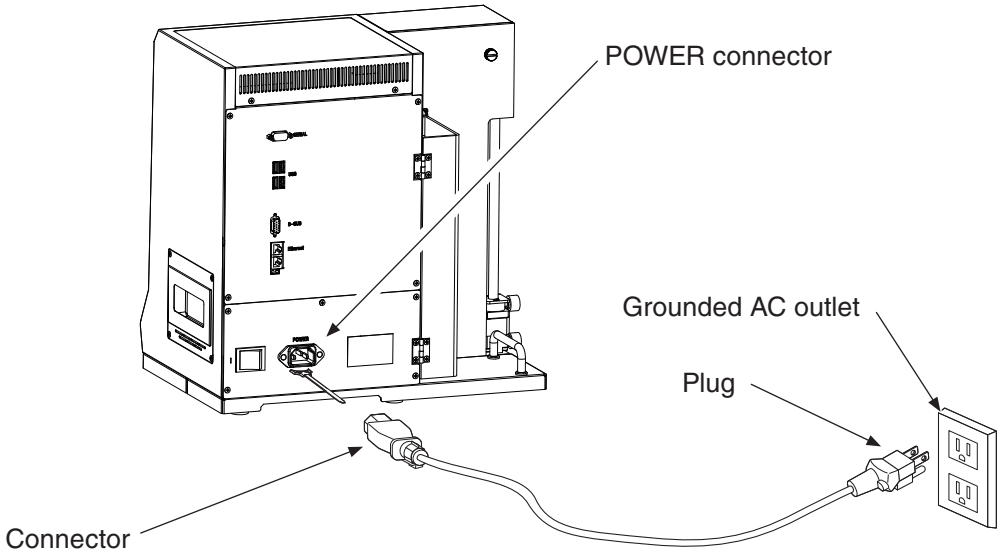


To remove, press the two sides of the cord clamp belt tip inwards and pull the belt out.



Power cord connection

1. Set the power switch of the unit to OFF.
2. Insert the connector of the power cord into the POWER connector on the rear panel of the unit and plug the other end into a grounded 100 V to 240 V AC outlet.



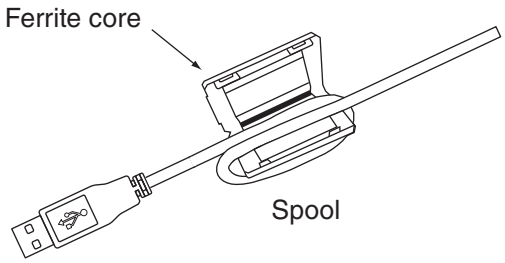
⚠ WARNING
To reduce risk of electrical shock, connect the power cord to a grounded AC outlet.
The supplied power cord is only for use with 100 V AC in Japan. Do not use it overseas. Provide a suitable power cord depending on the voltage that the unit is used with.
Before plugging in the power cord, make sure that the outlet rating fulfills the requirements given in the “Specifications” section. Using a power supply that does not match the requirements will cause the unit to break down.

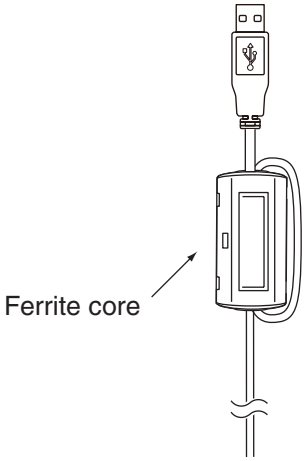
Important
If power is disconnected while the unit has not been shut down correctly, damage may occur. To prevent inadvertent disconnection, fasten the power cord with the cord clamp (see page 32)

Connecting the keyboard and mouse

Mounting the ferrite core

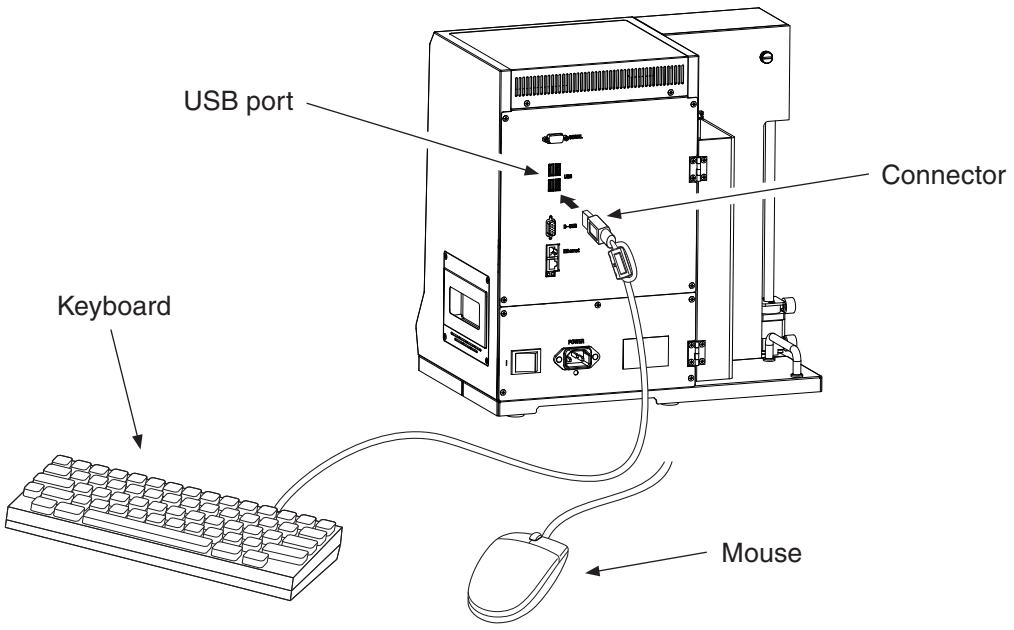
Before using the supplied keyboard, mount the ferrite core (supplied ferrite core FCA8k made by Morimiya Electric or equivalent) on the keyboard cable about 3 cm from the plug, winding two turns of the cable on the core.





Making the connection

1. Connect the supplied mouse lead to the USB port on the rear panel or front panel of the unit. Any USB port can connect the mouse lead.



Important
Be sure to mount the ferrite core on the keyboard cable.

Note
If the keyboard is equipped with a USB port, the mouse can also be connected there.

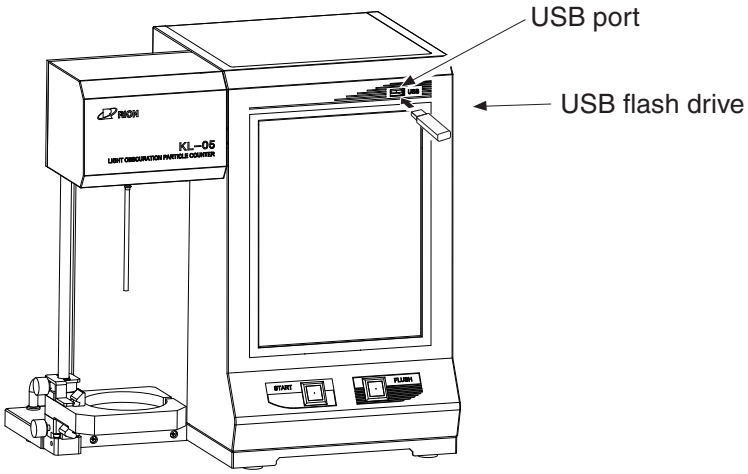
Use a USB flash drive

A USB flash drive can be used for the following operations.

- Export measurement data (see page 182)
- Backup / Restore (see page 109)
- Output a certificate signing (see page 128)
- Import the certificate (see page 129)

For details refer to the respective sections in the manual.

1. Connect the supplied USB flash driver to the USB port on the rear panel or front panel of the unit. Any USB port can connect the mouse lead.



Important
If a USB flash drive is inserted in the USB port on the rear, make sure that there is enough clearance between the unit and surrounding objects, so that no strong force will be exerted on the USB flash drive. Otherwise drive may be damaged.

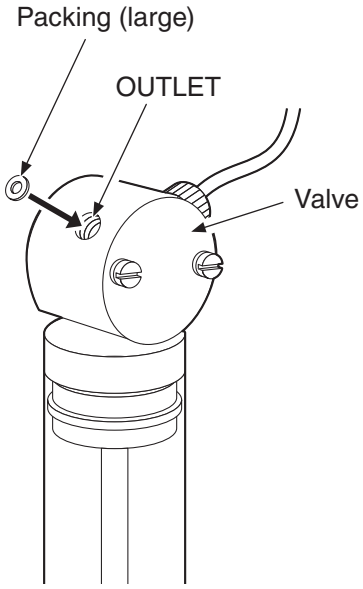
Note
The first partition of the USB flash drive must have been formatted with the FAT32 file system.
If two or more USB flash drives are plugged into the unit, only the USB flash drive that was last plugged in will be accessed.

Connecting the drain tube

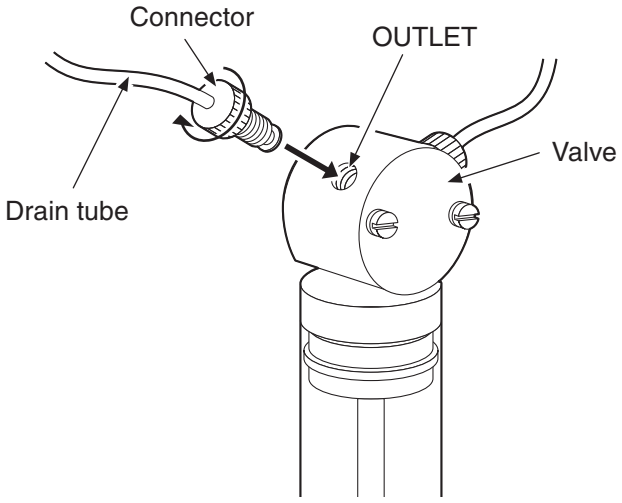
The supplied drain tube set contains the drain tube (2 mm × 3 mm dia. length 150 cm) and a packing. They need to be mounted according to the following procedure.

1. Open the syringe-cover and insert the packing in the valve OUTLET.

Note
The packing is supplied in both the SUS sampling tube set and the drain tube set and each one has a distinctive size. The packing in the drain tube set is larger than in the sampling set.

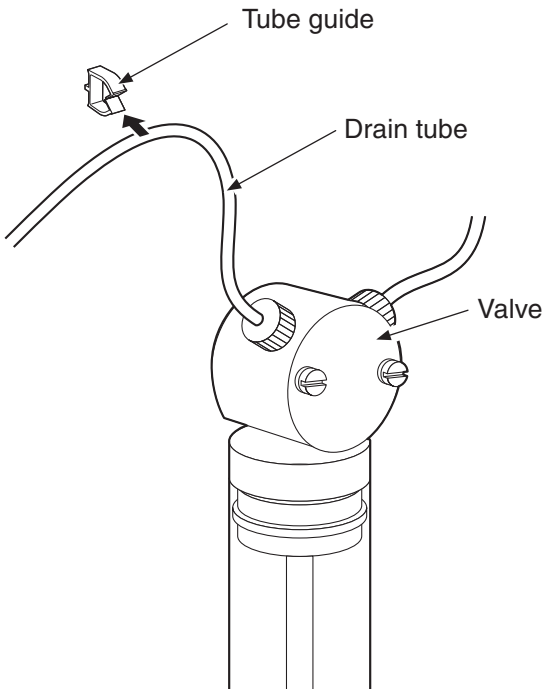


2. Connect the drain tube to the OUTLET of the valve and rotate the connector about five and a half times to fasten it.

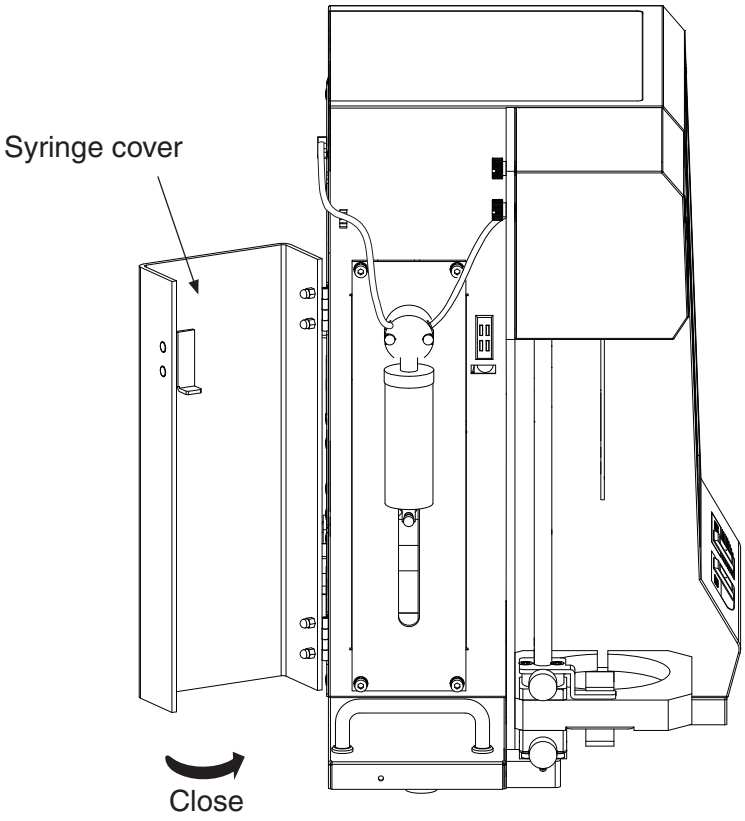


Important
Please do not over-tighten the connector. The valve can be damaged if the connector is over-tightened.

3. Push the drain tube into the tube guide to secure it.



4. Close the syringe-cover.

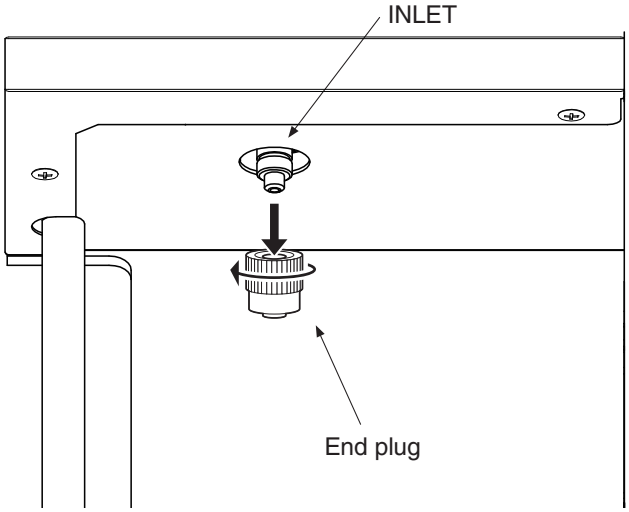


Important
If the syringe cover is open, an interlocking feature prevents syringe operation. In this case “Measurement Error” is displayed and measurement cannot be carried out. When the syringe cover is closed, blank suction is performed and syringe operation becomes possible.

Connecting sampling tube

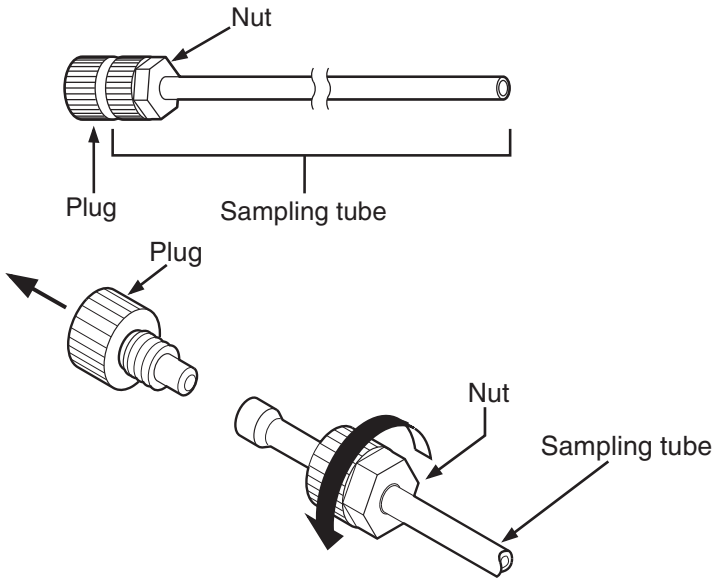
The supplied PFA sampling tube set contains a sampling tube (2 mm × 4 mm dia. length 10 cm) and nut. They need to be connected according to the following procedure.

1. Remove the end plug from the INLET port by turning the end plug counterclockwise.



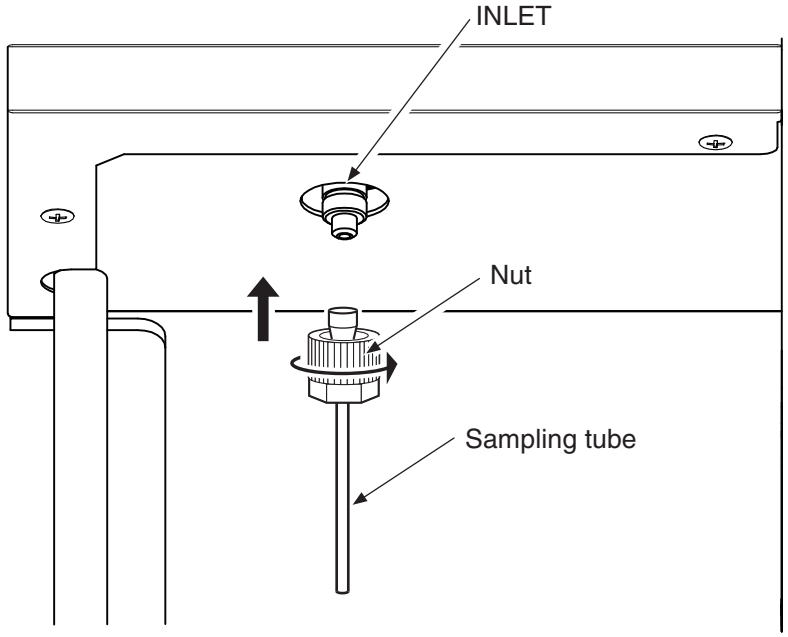
Important
When mounting the end plug, ensure that the screw threads are properly matched and then rotate the plug clockwise for about three and a half turns to fasten it.
Please do not over-tighten the end plug. The INLET can be damaged if the end plug is over-tightened.

2. Loosen the nut of the sampling tube by turning it counterclockwise, and remove the plug from the sampling tube.



Important
Store the end plug and plug together in a safe place. The end plug will be needed when the unit is sent to the supplier for servicing and maintenance. The plugs will be needed again when removing the sampling tube for storage.

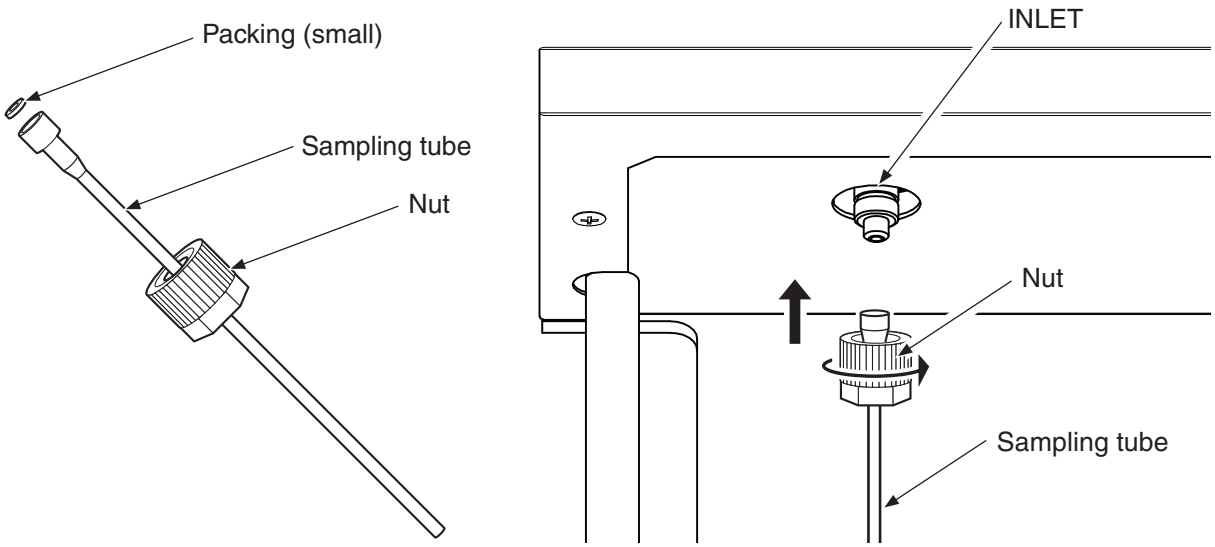
3. Slide the tip of the sampling tube onto the INLET port and turn the nut clockwise to secure it.



Note
Fit the sampling tube onto the INLET port and ensure that the screw threads of the INLET and the sampling tube nut are properly matched. Then tighten the nut to secure the tube.

When using the optional SUS sampling tube set (KL-04-S11, KL-04-S12)

The SUS sampling tube set comprises a sampling tube (dia. 1 mm x dia. 2 mm or dia. 2 mm x dia. 3 mm, length 10 cm), nut, and packing (2 pcs.) Connect it as described below. Insert one packing into the sampling tube and then connect the sampling tube to the INLET. First slide the tip of the sampling tube onto the INLET and then turn the nut clockwise about three and a half times to secure it.



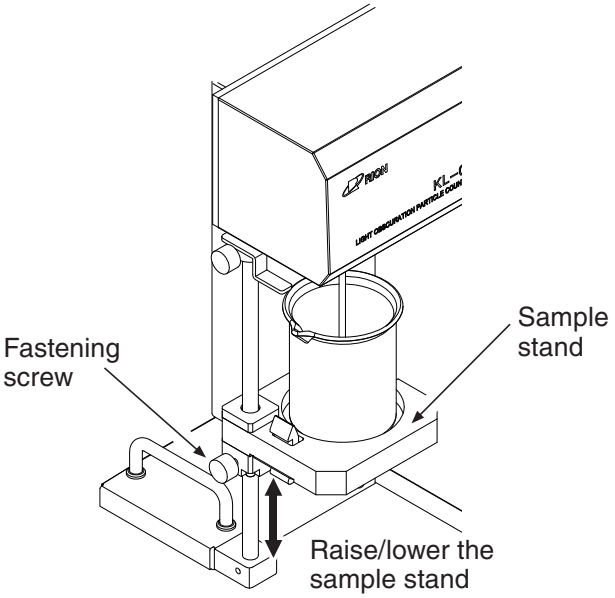
Important
Please do not over-tighten the nut. The INLET can be damaged if the nut is over-tightened.
Store the end plug in a safe place. The end plug will be required when the unit is shipped to the supplier for service and maintenance.

Note
The packing is supplied in both the SUS sampling tube set and the drain tube set and each one has a distinctive size. The packing in the sampling tube set is smaller than in the drain tube set.
Fit the sampling tube onto the INLET port and ensure that the screw threads of the INLET and the sampling tube nut are properly matched. Then tighten the nut to secure the tube.

Securing the sample stand

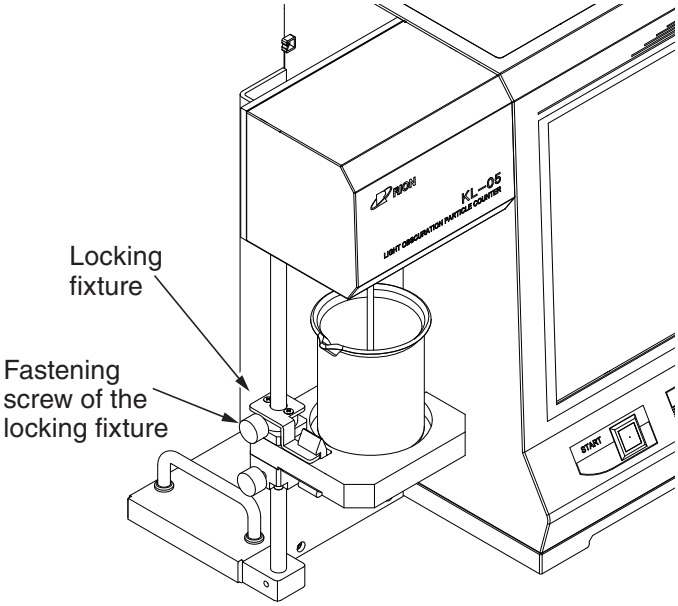
Secure the sample stand as follows.

1. Place the sample container on the sample stand. Adjust the height, and tighten the fastening screw to secure the sample stand position.

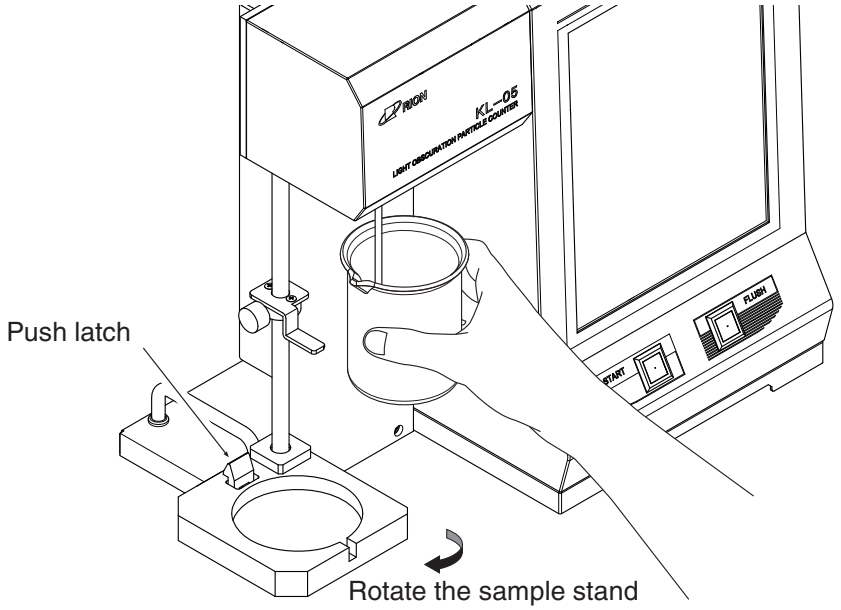


Note
The correct sample container size appropriate to the sample stand specification must be used (see page 222).

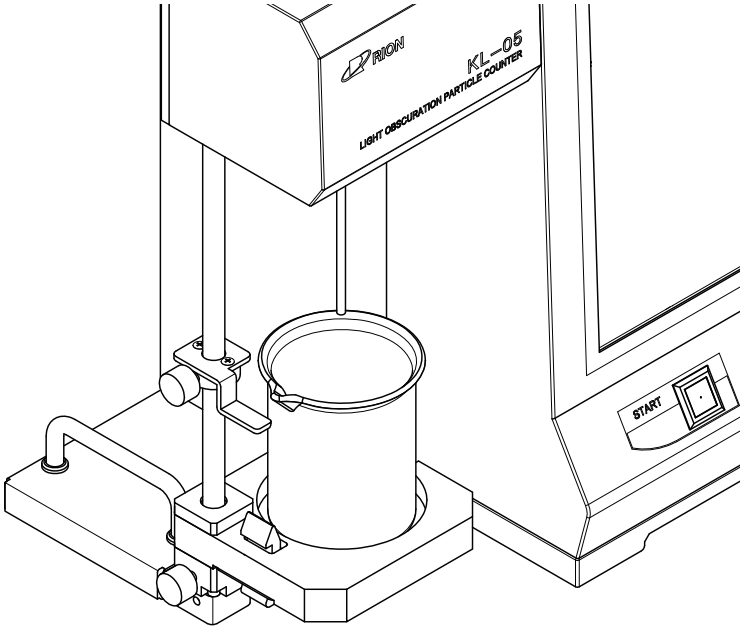
2. When using the same size sample container repeatedly, tighten the fastening screw of the locking fixture to keep it in place.



3. Loosen the fastening screw of the sample stand, release the push latch, and remove the sample container from the sample stand.



4. Replace the sample container and position it on the sample stand. Lock the push latch of the sample stand and tighten the fastening screw.

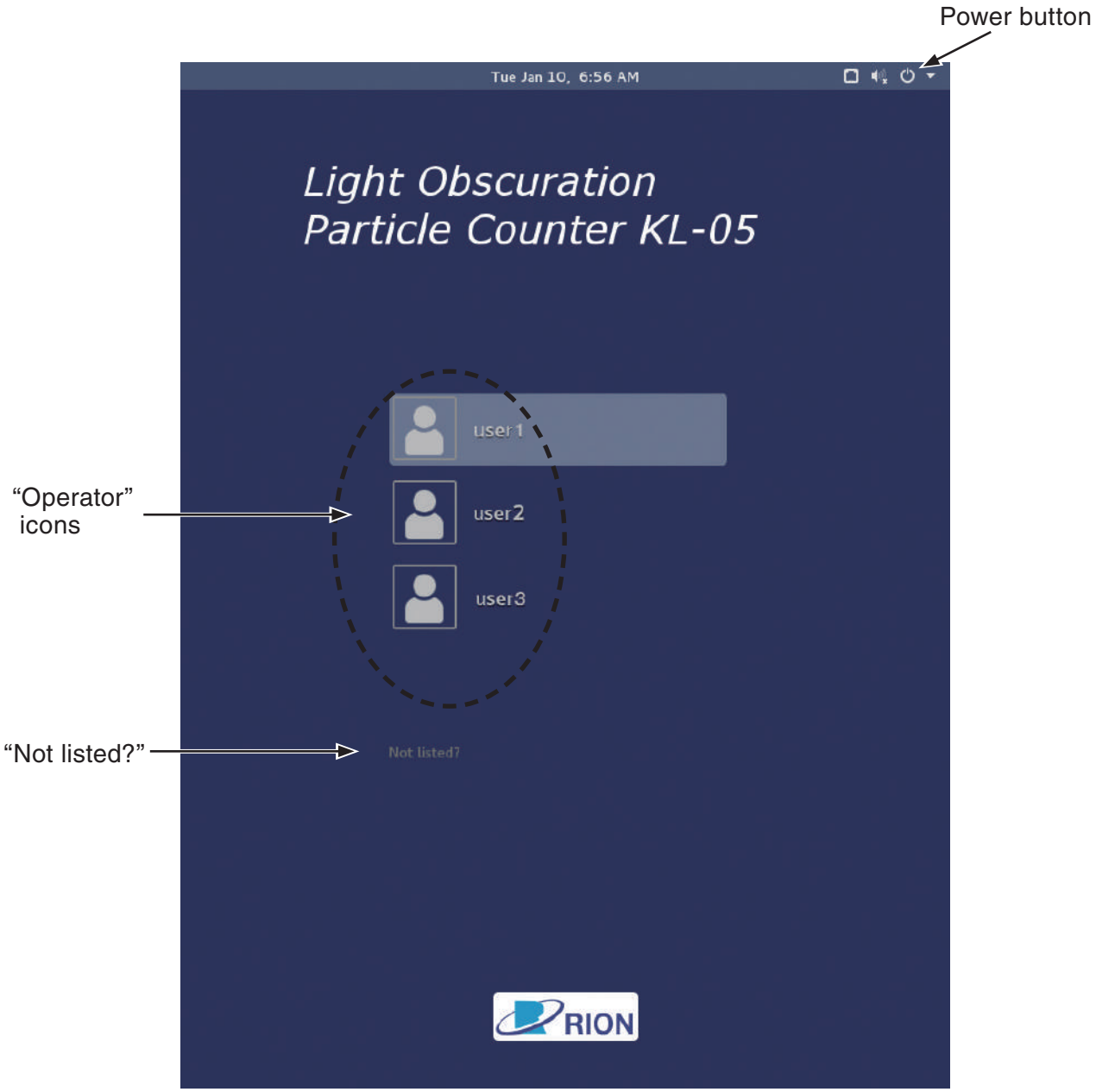


Important
Proceed with care during sampling tube insertion into the sample container to prevent touching the tube or generating air bubbles.

Start up

Power on

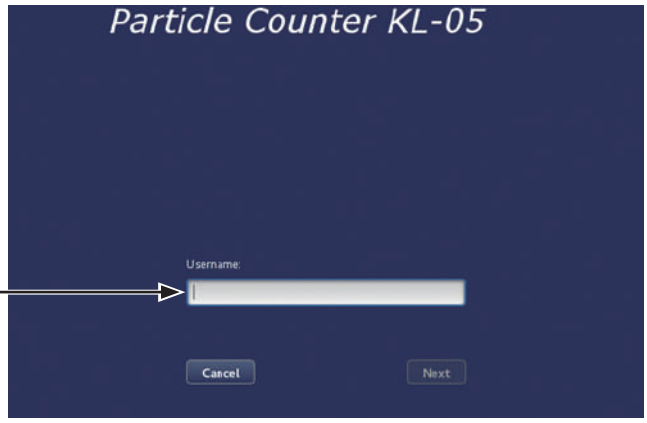
1. Set the POWER switch to the (|) side (power on).
2. Immediately after power-on the logo appears briefly on the LCD panel on the front side of the unit, and the unit then goes into the startup preparation phase. During this period, the display is black and the START and FLUSH buttons light up for about 20 seconds.
3. After startup, the START and FLUSH buttons go out and the login screen appears.



Login screen

If one or more operators are registered, the operator icon list appears. In the factory default condition, the operator icon list will not be shown.

To log in as an administrator, select “Not listed?” and use the Username given in the Administrator Manual to log in.



“User name” field

Important
Since the login information is described in the Administrator Manual, please be careful with handling and be sure to store and manage.

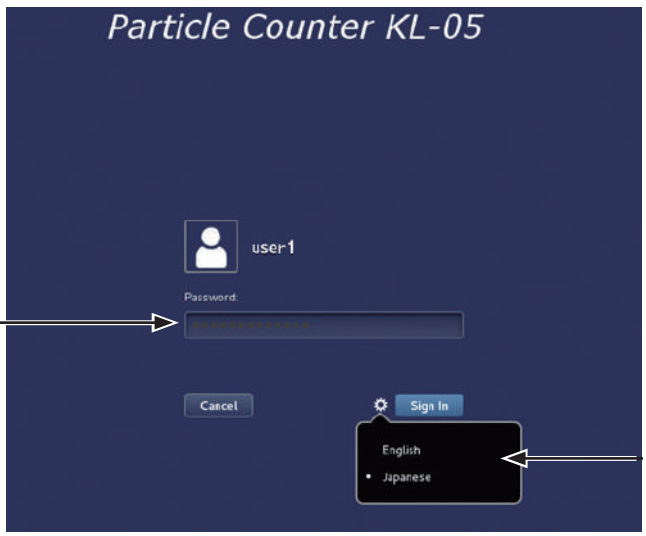
Note
Administrator icons (setup, rion, service) are not shown on the login screen.

If a password has been set, a password prompt will appear when an operator is selected. On the password input screen, the display language to use can also be selected.

Language selection:

When inputting the password, clicking the system symbol “⚙” allows changing the language to use after login. The default language setting is English.

Note
The language selection setting can only be made at the password input screen. To change the language later, refer to “Registering/ Changing the password” on page 117 and perform the steps for setting the password.

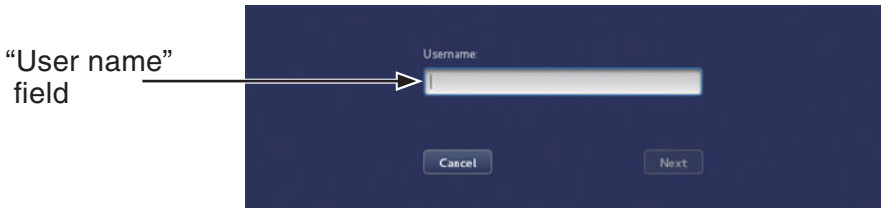


“Password” field

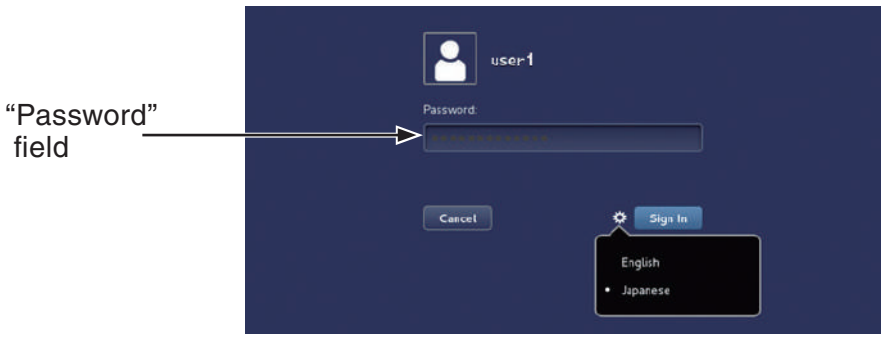
Language selection

Login procedure

1. On the login screen, select the operator icon or “Not listed?”. Enter the operator name in the “Username” field and press Enter.



2. On the password input screen, enter the previously set password string in the “Password” field.
   If the password matches, login can be performed.
   After login, clicking the system symbol “⚙” allows changing the language.



Note
When a password has been set, the “Username” field changes to a “Password” field. Enter the password string into the field and press Enter. If no password has been set, login can be performed without password input.
If the entered password string is incorrect, the following message appears: "The password is incorrect. Try again or cancel. If you enter incorrect password for 3 times, you are returned to login screen." Re-enter the operator name and the correct password. If password input fails three times, the login screen appears again.
If login is successful, the date and time of the previous login are shown on the display. Example: Last login: “Mon” “Jan” “10” “9:00:00” JST “2017” on: 0
If login is successful and there has been a previous failed login attempt, the date and time of this login attempt are shown on the display. Example: Last failed login: “Mon” “Jan” “10” “9:00:00” JST “2017” from: 0 on: 0
If login is successful and there has been a previous failed login attempt, the number of failed login attempts is shown on the display. If there have been no failed login attempts, no message is shown. Example: There was 1 failed login attempt since the last successful login.
The time zone of date and time information shown on the login screen is JST, but after login, the selected time (see “Set Clock” on page 132) will apply.

If the password has expired

If the expiration time of the password has elapsed, the password must be changed. This is indicated by a number of lines below the password input field, as follows.

"You are required to change your password immedi..."

"Your password has expired, please change it now."

"Changing password for <operator name>"

If the end of the expiration time of the password is less than one week away

A message appears below the password input field, and the desktop screen appears.

"Warning: your password will expire in <days> days"

If there is a password mismatch

The following message appears below the password input field.

"Sorry, that didn't work. Please try again."

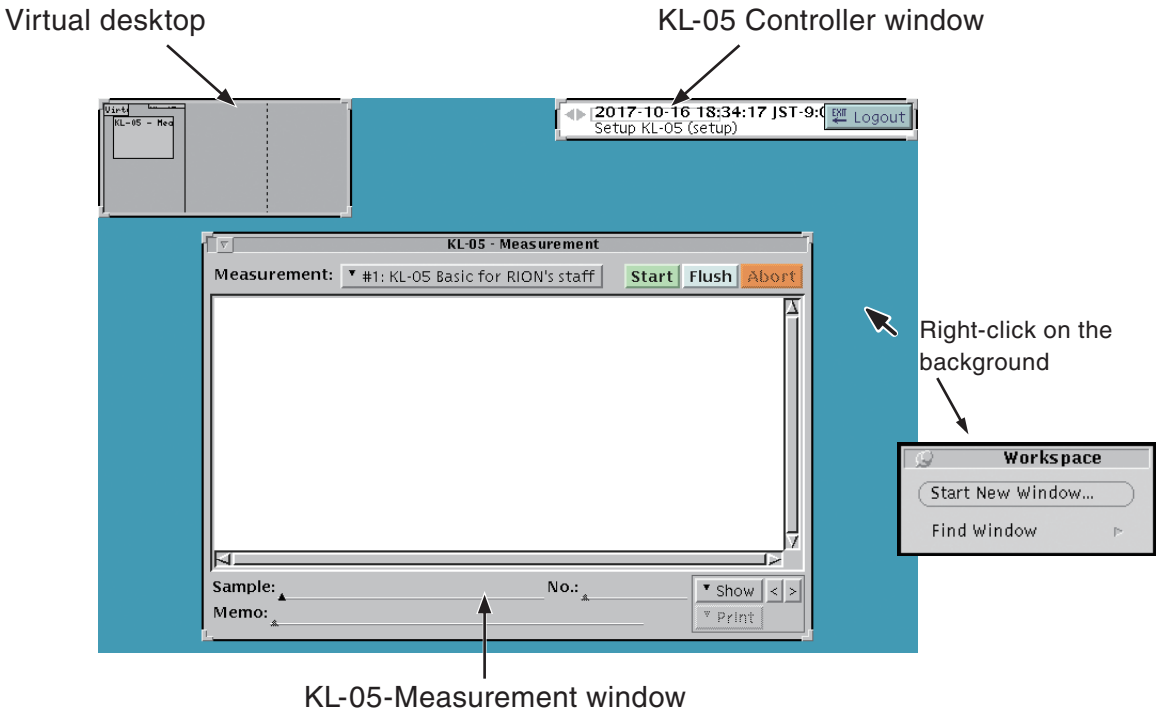
Note
If there has been a password mismatch three times, the unit returns to the main screen.
Password changes are recorded in the audit trail.

After login

After the firmware version has been shown on the display, the virtual desktop, "KL-05 Controller" window and the "KL-05 - Measurement" window appear. Verify that the date and time information shown in the "KL-05 Controller window is correct. If not, correct the setting as described in "Set Clock" (page 132) and then restart the unit.

Desktop screen

After login, the following window will be displayed.



Note
Proper measurement data can not be obtained unless the time is set correctly.

Settings before use

Please refer to the following items before setting each function.

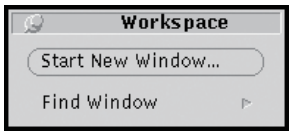
- Password Setting (see page 114)
- Automatic Logout (see page 118)
- Operator Management (see page 120)
- Certificate Management (see page 126)
- Set Clock (see page 132)
- System Administration (see page 134)
  - Network settings (see page 135)
  - Printer settings (see page 138)
  - Serial port settings (see page 144)
- Password Expiration Time (see page 154)

These settings should be done by the administrator. Also, if you have optional items, please refer to “Connection of Options” on page 190 and connect.

“Workspace” menu

Click the right mouse button on the display background (where no window is displayed) to show the “Workspace” menu.

The “Workspace” menu is used to show the “KL-05 - Start New Window” window or “Find Window” on the front of the display hidden by overlapping.



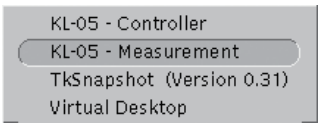
“Start New Window...”:

Click to display “KL-05 - Start New Window” window. Please read the following page 51 for “KL-05 - Start New Window”.

“Find Window”:

Click to show the description list of all currently opened windows.

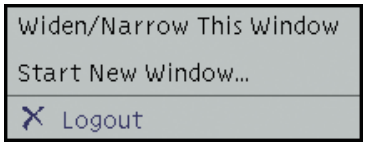
Click on the required title from the list to show it on the front of the display.



“KL-05 Controller” window

After logging in to the system, this window is shown at the top right of the desktop.

Menu: Clicking on the “KL-05 Controller” window brings up the following menu.



Widen/Narrow This Window:

Click to enlarge the “KL-05 Controller” window to fully show any error messages generated during operation.

When an item is selected while the “KL-05 Controller” window is enlarged, it returns to the original size.

Start New Window:

Click to bring up the “KL-05 Start New Window” window.

Logout:

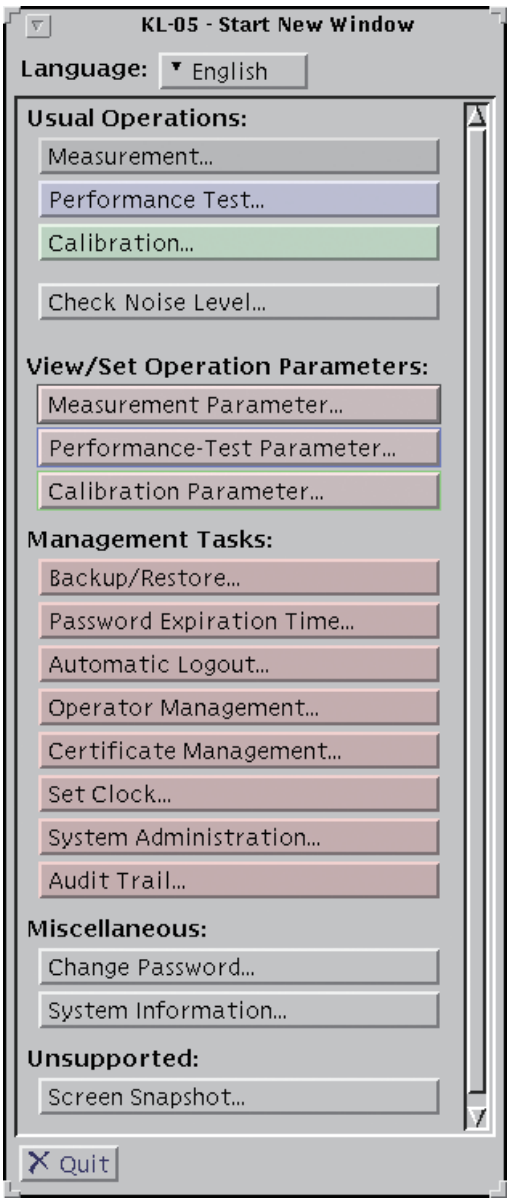
Click to bring up the logout confirmation message.

Selecting “Logout” brings up the login screen.

Clicking “Cancel” clears the “KL-05 - Logout?” message and cancels logout.

“KL-05 - Start New Window” window

The unit shows a window for the functional settings and commands executed by each button on the “KL-05 - Start New Window” window. The operation of the unit can be done in this window.



Display method

The “KL-05 - Start New Window” window display can be made available by any of the following methods.

- On the “KL-05 Controller” window, press and hold either of mouse buttons to select a “Start New Window...” from the displayed menu.
- Click the “Show” button on the “KL-05 - Measurement” window etc., then select a “Start New Window...” from the displayed menu.
- Select “Start New Window...” from the “Workspace”, which can be opened by clicking the right mouse button on the areas in which windows are not open.

Function

Click each button on the “KL-05 - Start New Window” window to open the following windows.
The reference pages indicate functional details and relevant information.

Usual Operations:

“Measurement...” button:

The “KL-05 - Measurement” window appears.
Click when measurement is shall be done. See page 57.

“Performance Test...” button:

The “KL-05 - Performance Test” window appears.
Click when a Performance-Test is shall be done. See page 78.

“Calibration...” button:

The “KL-05 - Calibration” window appears.
Click when Calibration is shall be done. See page 94.

“Check Noise Level...” button:

The “KL-05 - Check Noise Level” window appears.
Click when the noise level shall be measured. See page 207.

View/Set Operation Parameters:

"Measurement Parameter..." button:

The "KL-05 - Measurement Parameter" window appears.

Click to check the measurement parameters or change the settings. See page 69.

"Performance-Test Parameter..." button:

The "KL-05 - Performance-Test Parameter" window appears.

Click to check the Performance-Test parameters or change the settings. See page 85.

"Calibration Parameter..." button:

The "KL-05 - Calibration Parameter" window appears.

Click to check the Calibration parameters or change the settings. See page 102.

Management Tasks:

"Backup/Restore..." button:

The "KL-05 - Backup/Restore" window appears.

Click when data backup or restoration shall be done. See page 110.

"Password Expiration Time..." button

The "KL-05 - Password Expiration Time" window appears.

Click this to perform the steps for setting the password expiration time. See page 154.

"Automatic Logout..." button:

The "KL-05 - Automatic Logout" window appears.

Click this to perform the steps for making automatic logout settings. See page 118.

"Operator Management..." button:

The "KL-05 - Operator Management" window appears.

Click to add operator(s) or modify operator registration details. See page 120.

"Certificate Management..." button:

The "Certificate Management" window appears.

Click this to perform certificate management. See page 126.

"Set Clock..." button:

The "KL-05 - Set Clock" window appears.

Click to set the clock. See page 132.

"System Administration..." button:

The "Administration Tasks" window appears.

Click for network, printer and condition of serial communication setting. See page 134.

"Audit Trail..." button:

The "KL-05 - Audit Trail" window appears.

Operators who have the required access privileges can view the audit trail. See page 146.

Miscellaneous:

"Change Password..." button:

The "Information" pop-up window appears.

Click to set or change the password of the operator who is logged-in.

See page 114.

"System Information..." button:

The "System Information" pop-up window appears.

Click to check the computer's system information. On the "System Information" pop-up window are the main computer's firmware versions, production numbers etc.

See page 156.

Unsupported:

"Screen Snapshot..." button:

The "TkSnapshot (Version 0.31)" window appears.

Click to file displayed screen images. See page 157.

Change displayed language

Click the display language button to the right of "Language:" to show a list and select the appropriate language from the list (English, Japanese).

After selection of a language, each window will be displayed with its selected language when opened.

Note
The setting here is a temporary one. Once logged out, the setting returns to default.

To change the default setting, use the "The language selection" on the login screen. Please refer to "Power on" page 44 for the setting.

Logout and shutdown

1. Click the logout button "Logout" in the "KL-05 Controller" window. A popup window with a logout confirmation prompt appears. Click the logout button "Logout" in this window to return to the login screen.
2. Clicking the power button "⏻" in the top right of the login screen brings up the following screen.

Note
When an Ethernet connection has been detected, the indication "Wired Connected" is shown. For details on the Ethernet connector, refer to page 135.

3. Clicking the shutdown button "⏻" brings up the shutdown confirmation screen on the display.

Shutdown confirmation screen

4. Clicking "Power Off" initiates shutdown processing. After a while the screen disappears and the POWER switch goes into the OFF position. Power is now cut off. If 60 seconds have elapsed after the shutdown confirmation screen has appeared, shutdown processing is performed automatically. Clicking "Cancel" returns to the login screen.

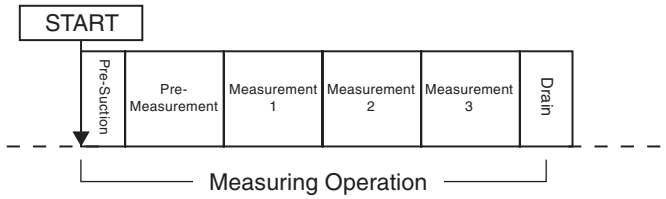
Important
If power is disconnected without performing shutdown processing, damage may occur. Never set the POWER switch to OFF before shutdown processing is completed.

Measurements

Example for measurement parameters

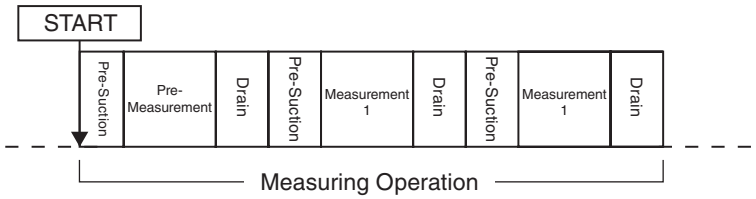
An example for operation of the unit is shown below. The standard syringe volume is 25 mL.

(1) Draining not performed after every measurement



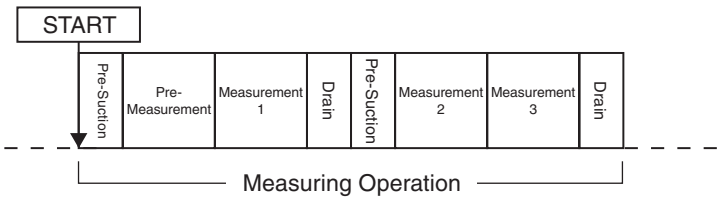
Tare Volume:	2 mL
Number of Pre-Measurements:	1 time
Number of Measurements:	3 times
Measurement Volume:	5 mL
Drain After Every Measurement?:	No

(2) Draining performed after every measurement



Tare Volume:	2 mL
Number of Pre-Measurements:	1 time
Number of Measurements:	2 times
Measurement Volume:	5 mL
Drain After Every Measurement?:	Yes

(3) Draining performed if measurement volume exceeds syringe volume



Tare Volume:	2 mL
Number of Pre-Measurements:	1 time
Number of Measurements:	3 times
Measurement Volume:	10 mL
Drain After Every Measurement?:	No

When 'Drain After Every Measurement?' is not set (see page 71), and the combined total of Pre-Suction (i.e., Tare) Volume and total measured volume (total of the measured volume per single Measurement × (Pre-Measurement plus the Measurement)) is smaller than the syringe capacity, the system continues to measure until the syringe capacity is reached, then drains the sample after all Measurements are completed.

If the combined total volume exceeds the syringe capacity, the system continues up to the measurable number within the syringe capacity level, drains the sample then measures the remainder.

On the other hand, when drain after every Measurement is set, the sample is drained after each Measurement.

In the following sample operation example (1), the total of Pre-Suction Volume (2 mL) plus the total measured volume (5 mL × 4 times = 20 mL) is smaller than the syringe volume (25 mL, Standard product). Pre-Suction, Pre-Measurement and three Measurements can therefore be carried out during in one measuring operation, after which the sample must be drained. After this, the measuring operation is finished.

The following operations are carried out for Pre-Suction, Pre-Measurement, Measurement and Drain.

Pre-Suction:

To flush a sample in the particle sensor or stabilize the flow rate, a number of samples must be purged through to the particle sensor. No particle measurement is done.

Pre-Measurement:

The particle measurement is done and the result is displayed but is not used for calculation of the average.

Dead volume:

It is necessary to draw a certain amount of sample fluid to the detection unit that will perform particle measurement. This amount is called the dead volume. Only perform measurement after introducing sufficient sample fluid by performing pre-suction or pre-measurement.

Measurement:

Particle measuring status.

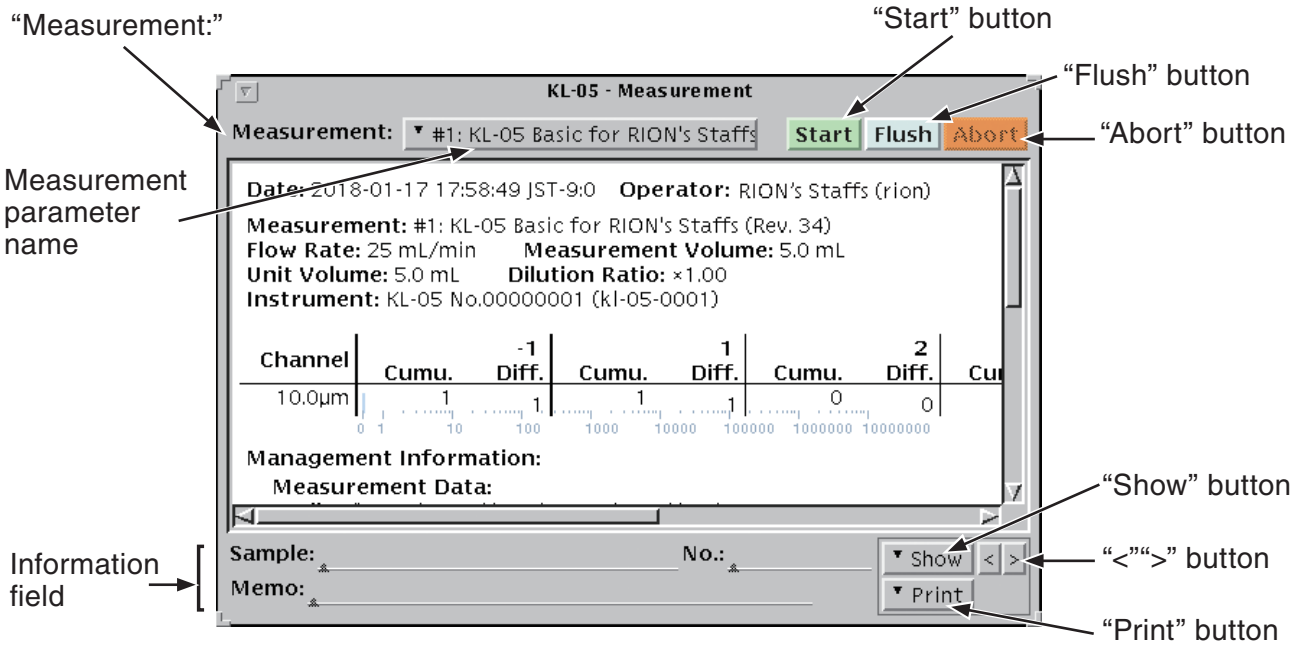
Drain:

To drain the aspired sample.

Note
Before starting any measurements, please set the conditions correctly.

“KL-05 - Measurement” window

This screen is shown on the desktop after login. It also appears when clicking the “Measurement...” button in the “KL-05-Start New Window” window.



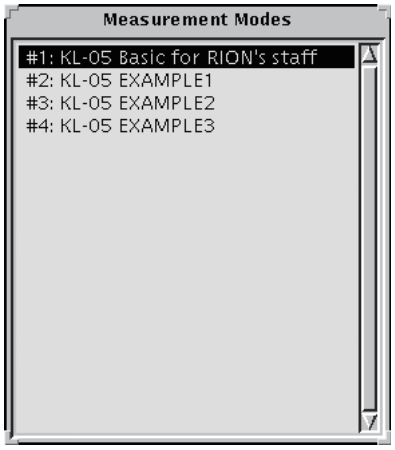
“Measurement:” button:

Clicking a button with a measurement parameter name brings up the “Measurement Modes” list window, letting you select a measurement parameter. For information on how to register measurement parameters, refer to “Setting/Registering Measurement Parameters” on page 76.

Measurement parameters are displayed in the following format:

“#” + “Number” + “Measurement parameter”.

Up to 1000 measurement parameters can be registered.



"Start" button:

Clicking this button starts the measurement. The measurement can also be started by pressing the START button on the unit.

If "Pre-input Measurement Info" in the "Show" menu has been selected, the "KL-05 - Measurement Information" window appears, for input of "Sample", "No." and "Memo" prior to measurement.

"Flush" button:

Clicking this button starts the flushing process. The flushing process can also be started by pressing the FLUSH button on the unit.

"Abort" button:

Clicking this button cancels a measurement or flushing in progress. The button is only available if a measurement or flushing process has been started.

Information field:

An operator with "Edit measurement data info field" privileges can fill in or edit the information field for past measurement data ("▲" or "⁂.").

However, measurement data that belong to "rion", "service", or "setup" cannot be altered (No symbol).

Information field available for input

Information field not available for input

"Sample:":

Allows input or editing of sample name for measurement data.

"No.:":

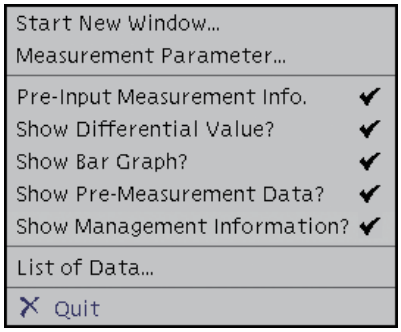
Allows input or editing of sample number for measurement data.

"Memo:":

Allows input or editing of a text note for measurement data. Clicking the "Start" button will clear the information in the "Memo" field.

"Show" button:

Clicking this button brings up the "Show" menu.



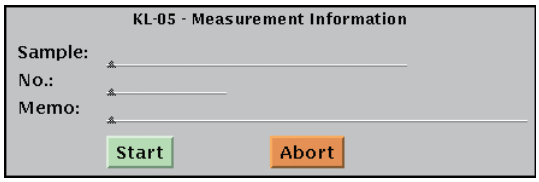
"Start New Window...":

Selecting this brings up the "KL-05 - Start New Window" window (see "KL-05 - Start New Window" window on page 51).

"Measurement Parameter...":

Selecting this brings up the "KL-05 - Measurement Parameter" window for setting parameters (see "Measurement parameters" on page 69).

"Pre-Input Measurement Info.":



When this is selected, the "KL-05 - Measurement Information" window will appear when the "Start" button is clicked or the START button pressed, to allow input of "Sample", "No." and "Memo" before measurement.

When this is not selected (default), the window for measurement information input will not appear and measurement starts immediately.

"Show Differential Value?":

When this is selected, differential values are shown for measurement data.

"Show Bar Graph":

When this is selected, measurement data are also shown in bar graph format.

"Show Pre-Measurement Data?":

When this is selected, pre-measurement data are also shown as measurement data.

"Show Management Information?":

When this is selected, management information for measurement data is shown.

"List of Data...":

When this is selected, the "Measurement-Data Selector" window for selecting measurement data is shown. For details, refer to "Displaying past measurement data" on page 65.

"Quit":

Selecting this closes the "KL-05 - Measurement" window.

"<" ">" buttons:

These buttons can be used to move to earlier or later measurement data in the "KL-05 - Measurement" window.

"Print" button:

Clicking this button brings up the "Print" menu. If there are no measurement data being shown in the "KL-05 - Measurement" window, the "Print" button is not available.

"Print...":

Selecting this brings up the "Print" window for printing measurement data (see "Printing Measurement Data" on page 166).

"Print This Data":

Selecting this causes the current measurement data to be printed directly using the current printing settings, without showing the "Print" window.

Measuring sequence

⚠ WARNING
Always perform a leak test before supplying sample fluid.
Observe the pressure limits for the sample fluid system.

Important
Always verify that the date/time setting of the unit is correct before starting a measurement. See page 132 for the “Set Clock”
Before turning on the power and starting measurement, make sure that all cables and cords are correctly connected. Fill the sample fluid system with fluid before turning on the unit. If the interior of the flow cell is dry, the laser beam may burn contamination into the flow cell, leading to an error such as deteriorated detection capacity.

Measurement procedure example

The following is an example of a measuring sequence: Show the windows, check measurement parameters, clean the tubes, measure the blanks, measure the sample, and comment on the inputs.

1. Click the “Measurement...” button from the “Usual Operations” menu on the “KL-05 - Start New Window” window. The “KL-05 - Measurement” window appears.

Note
See page 51 for the “KL-05 - Start New Window” window display method.
When the “KL-05 - Measurement” window is displayed immediately after the login, no “KL-05 - Measurement” window needs to be displayed again.

2. Click the measurement parameter name shown to the right of “Measurement:” on the “KL-05 - Measurement window”. A “Measurement Modes” list will be displayed. Click the required measurement parameter name from the list.
3. Click the “Show” button on the “KL-05 - Measurement” window. Select measurement parameter from the displayed menu. The “KL-05 - Measurement Parameter” window appears. Check the contents. After checking, click the “Quit” button to close the “KL-05 - Measurement Parameter” window.

Note
It is necessary to set the measurement parameter prior to the actual measurement. See page 76 for the “Setting/Registering Measurement Parameters”.

4. Set out a sample to clean.
5. Clean by either clicking the “Flush” button or pressing the “FLUSH” button on the front of the unit.

Important
When operating by pressing the “FLUSH” and “START” buttons on the unit, ensure that the “KL-05 - Measurement” window is set in an active window in which the required Measurement Parameter name is displayed. If it is not in an active window, operations may be different from the specified Parameter.

6. Carry out a blank measurement. To do this, measure either by clicking the “Start” button on the display or pressing the “START” button on the front of the unit.
7. If the blank measurement exceeds the target value, return to step 5.
   If it is less than the target value, set out a measuring sample.
   To add information before measurement, refer to “Entering Pre-input Measurement Info.” on page 63.
8. Measure the sample. For this, either click the “Start” button or press the “START” button on the front of the unit. The measuring operation starts. During this operation, a window indicating the measuring status is displayed.
   When the measurement is completed, the measurement result will be displayed on the “KL-05 - Measurement” window.

Important
During measurement, do not switch the “KL-05 - Measurement” window for example to view past data. Otherwise proper processing may not be performed (for example using parameters that are different from the specified parameters).

9. If required, enter a sample name in the “Sample:” space, the sample number in the “No.:” space, and memos in the “Memo:” space.

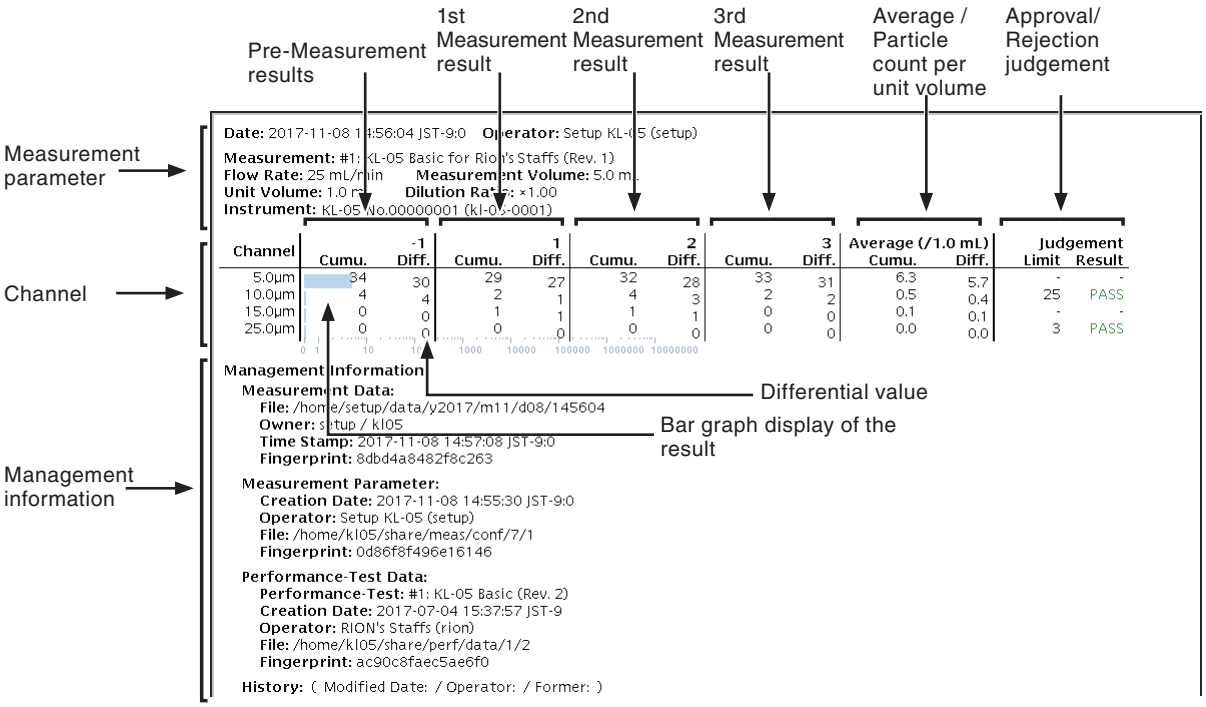
Note
Sample names, sample numbers and memos can be written-in to the displayed measurement (accessible during the measuring operation). The sample number will be incremented for each measurement startup when the ‘Clear “No.” Field at Measurement Start?’ is not checked on the measurement parameter and figures are entered. The “Memo” spaces will be cleared on each measuring startup.
The measured data will be stored to the storage every time.
To enter a sample name, sample number and memo before measurement, click the “Show” button in the “KL-05 - Measurement” window and put a check mark next to the “Pre-input measurement info.” item in the menu. Clicking the “Start” button will then bring up a window for entering this information.

Entering Pre-input Measurement Info.

1. Click the “Show” button and put a check mark next to “Pre-input measurement info”.
2. Click the “Start” button to start the measurement. The measurement can also be started by pressing the “START” button.
3. The “KL-05 - Measurement” window appears, letting you enter the “Sample”, “No.” and “Memo” information.
4. Click the “Start” button in the window to update the information and start the measurement.
5. After measurement is completed, the measurement results are shown in the “KL-05 - Measurement” window.

Note
The timing for updating the “Sample:”, “No.:” and “Memo:” information in the “KL-05 - Measurement” window is as follows. • When the Enter key is pressed in the “Sample:”, “No.:” or “Memo:” field • When measurement data are printed • When the “KL-05 - Measurement” window is closed • When measurement data are selected in the “Measurement - Data Selector” window • When printing or saving to USB flash drive is carried out in the “Measurement - Data Selector” window

The measurement result



Pre-Measurement result

Click the “Show” button to display the menu and then click ‘Show Pre-Measurement Data?’ from the menu to display it.

Bar graph display of the result

Click the “Show” button to display the menu and then click ‘Show Bar Graph?’ from the menu to display the pre-measurement data.

Differential value(s) of the measurement result

Click the “Show” button to display the menu and then click ‘Show Differential Value?’ from the menu to display it.

Average

Shows the average particle count for the number of measurements specified as a measurement parameter.

Depending on the number of measurements for averaging, the number of decimal places differs. This is because the more data have been acquired, the higher the reliability of the measurement data. The number of significant digits is listed below.

1 to 4 measurements: No decimal places
5 to 49 measurements: 1 decimal point
50 to 100 measurements: 2 decimal points

Particle count per unit volume

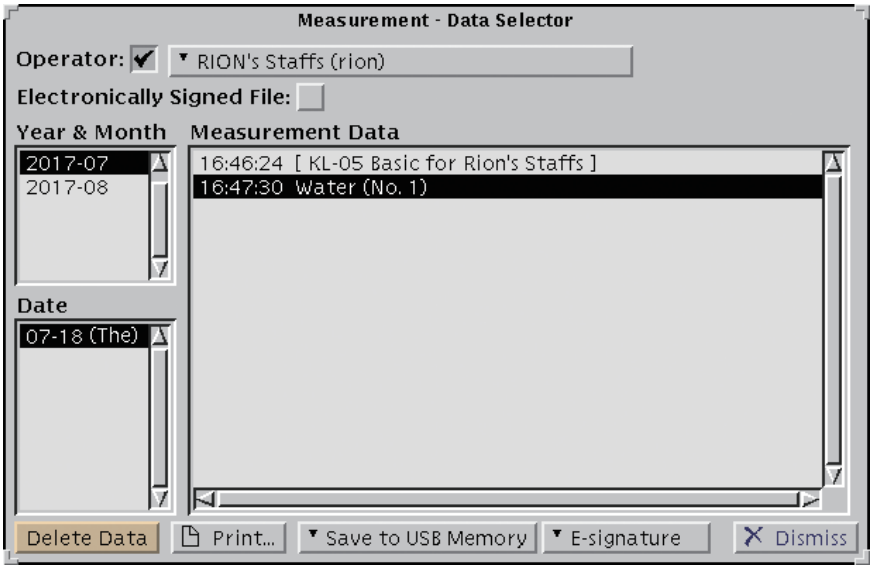
This item is shown when “Calculate Particle per Unit Volume?” has been selected in the measurement parameters. When calculating the average number of particles per unit volume, the number of decimal places is based on the following equation.

Calculated values are rounded down.

$$\text{Significant digit} = \log\left(\frac{\text{Measurement volume} \times \text{Measurement count}}{\text{Unit volume} \quad \times \quad \text{Dilution rate}} \times 2\right)$$

Example: When Measurement volume = 5 mL, Measurement count = 3 times, Unit volume = 1.0 mL, Dilution rate = 1.00, the significant digit is one digit

Displaying past measurement data



Follow the sequence below to show the previously measured data.

Note
Immediately after the measurement, the latest measurement data appears.

1. Click the “Show” button on the “KL-05 - Measurement” window to show the menu. Select “List of Data” from the menu.
   The “Measurement - Data Selector” window appears.
2. Select required measured data year and month from the “Year & Month” list and the date from the “Date” list.
   The selected measurement data appears on the “KL-05 - Measurement” window.

Note
The time shown for a measurement data file name is the time when measurement that resulted in these data was started.
The operators who have the privileges about measurement data modification can edit the sample names, sample numbers and memos of the measurement data (see page 120).
When measurement data are selected, this is indicated in the respective field of the “KL-05 - Measurement” window.

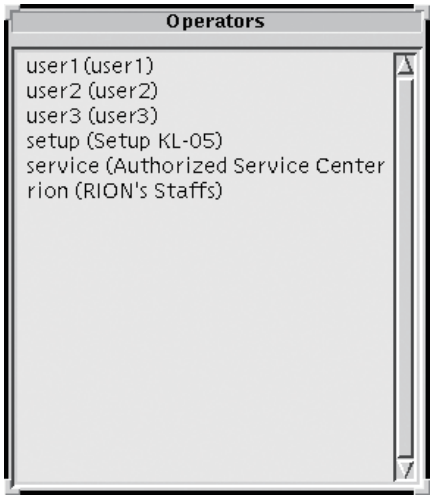
“Measurement - Data Selector” window

The explanation of each item on the “Measurement - Data Selector” window is as follows;

“Operator:”:

When a measured result by each operation is required, check the box. With this, the operator name shown on the right hand side becomes effective.

Select an operator name from the “Operations” list which can be displayed by clicking the operator name.



“Electronically signed file”:

If the operator has electronic signature privileges, the check box to the right of “Electronically signed file” becomes available. For information about electronic signatures, refer to “Electronic Signature” on page 175.

“Year & Month” list:

Select the measuring year and month for the measurement data.

“Date” list:

Select the measuring date for the measurement data.

“Measurement Data” list:

Select the measurement data to display.

“Delete Data” button:

Delete the selected measurement data.

Deletion of the measurement data may only be performed by the permitted operator (see page 120).

Note
When deleting data, multiple data can be selected by holding down the Shift key while clicking on the respective data, or by holding down the mouse button while moving the pointer. A right-click while holding down the Shift key selects all data.

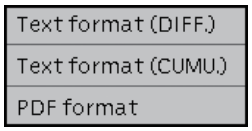
"Print..." button:

Print the selected measurement data.

Note
Printing can be performed only by an operator with printing privileges.
While displaying an electronically signed file, the "Print..." item is not available.

"Save to USB memory" button:

This enables storage of selected measurement data on a USB flash drive. Clicking this button brings up the menu.



"Text format (DIFF.)"

The differential values of the selected measurement data are stored on the USB flash drive as a TSV (Tab Separated Values) format file.

"Text format (CUMU.)"

The cumulative values of the selected measurement data are stored on the USB flash drive as a TSV (Tab Separated Values) format file.

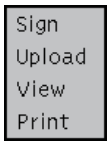
"PDF format"

The selected measurement data are stored on the USB flash drive as a PDF format file.

Note
For information about the storing procedure, refer to "Exporting data to USB memory" on page 182.
Storing data on USB flash memory can be performed only by an operator with USB flash drive storage privileges.
The signed measurement data in the unit is moved (not copied).

"E-signature" button:

This button is available if the operator has electronic signature privileges. Clicking this button brings up the menu (see page 175).



Note
This button is not available if multiple measurement data are selected in the “Measurement - Data Selector” window.
If the operator has not installed the certificate, the menu is not available. For details on installing a certificate, refer to “Certificate Management” on page 126.

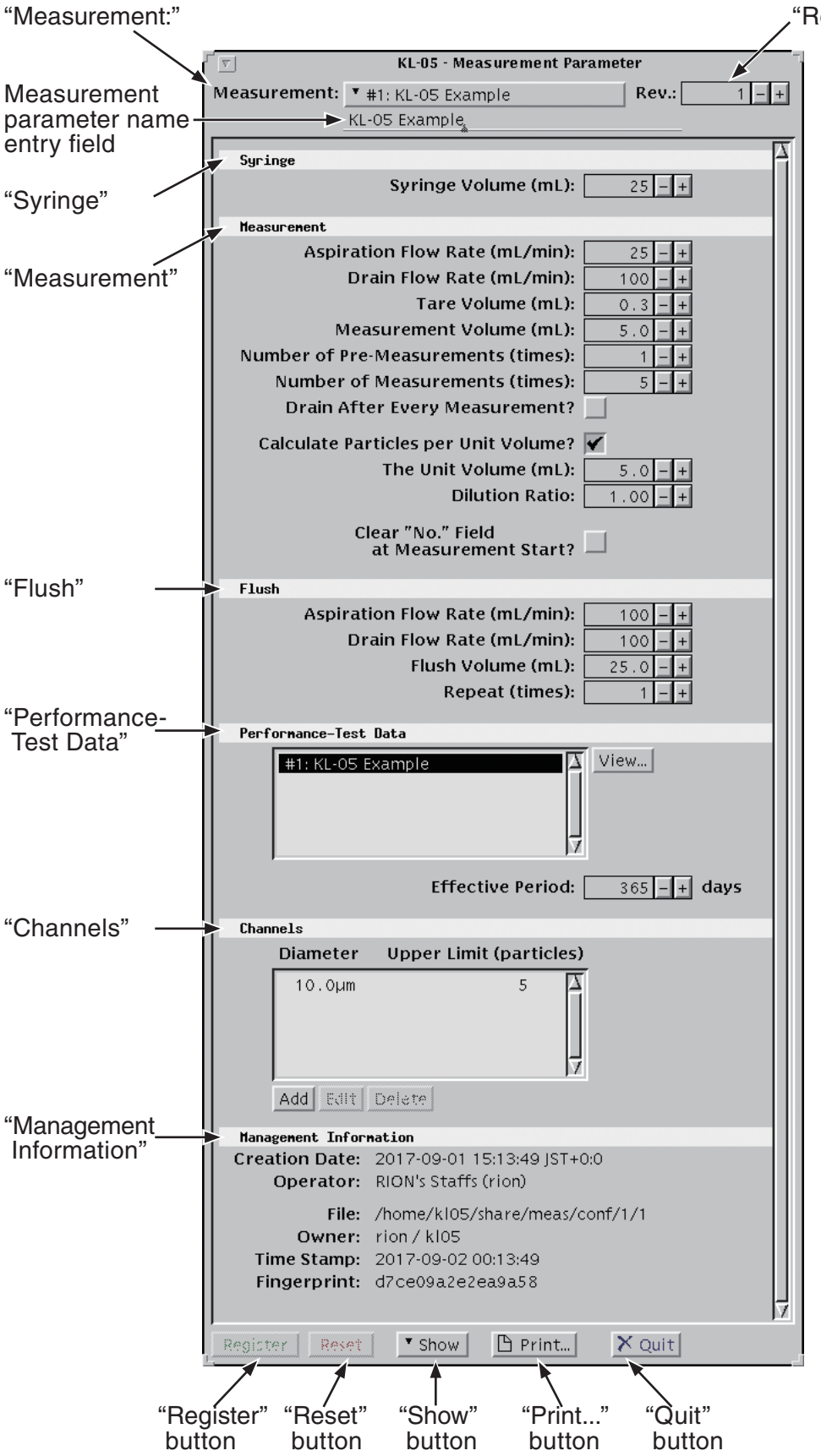
“Dismiss” button:

Click the “Dismiss” button to close the “Measurement-Data Selector” window.

Measurement parameters

“KL-05 - Measurement Parameter” window

Clicking the “Measurement Parameter...” button in the “KL-05 - Start New Window” window or selecting “Measurement Parameter...” in the “Show” menu of the “KL-05 - Measurement” window brings up the “KL-05 - Measurement Parameter” window.

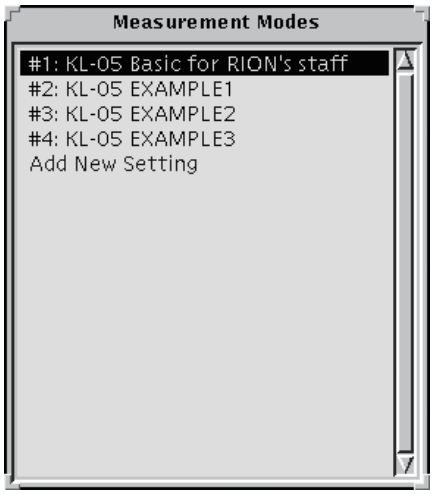


If a key icon is shown at the bottom left of the “KL-05 - Measurement Parameter” window, operation is limited to displaying and printing measurement parameters (see “Operation limitations according to privileges” on page 19).
The “KL-05 - Measurement Parameter” window shows the latest revision of the #1 parameter.

“Measurement:”:

Clicking a button with a measurement parameter name brings up the “Measurement Modes” list window, letting you select a measurement parameter.

Note
The “Measurement Modes” window shows measurement parameter names in ascending order of ID. If there are more than 1000 measurement parameter entries, the latest 1000 are shown.



If a measurement parameter was selected (switched), its latest revision is shown in the “KL-05 - Measurement Parameter” window.

“Rev.:” (Revision):

Shows the measurement parameter revision. The “–” and “+” buttons allow moving among revisions. The respective revision will be shown in the “KL-05 - Measurement Parameter” window.

Measurement parameter name entry field:

The measurement parameter name is entered here. Maximum allowable length is 98 characters.

“Syringe”:

“Syringe Volume (mL):”:

The syringe volume (mL) setting range is 5 to 25 (1 mL steps).

The syringe volume (mL) setting may not be lower than the tare volume (mL) + measurement volume (mL) and the flush volume.

“Measurement”

“Aspiration Flow Rate (mL/min):”:

The aspiration flow rate (mL/min) setting range is 5 to 100 (1 mL/min steps).

“Drain Flow Rate (mL/min):”:

The drain flow rate (mL/min) setting range is 5 to 100 (1 mL/min steps).

“Tare Volume (mL):”:

The tare volume (mL) setting range is 0.2 to 10.0 (0.1 mL steps).

The tare volume (mL) setting may not be larger than the syringe volume (mL) – measurement volume (mL).

If the standard PFA sampling tube is used for measurement, the dead volume from the inlet tip to the sensor is 0.5 mL. Therefore the setting value should be 0.5 mL or higher. If the optional SUS sampling tube is used, the setting should be 0.2 mL or higher.

“Measurement Volume (mL):”:

The measurement volume (mL) setting range is 0.2 to [syringe volume (mL) – tare volume (mL)]. (0.1 mL steps).

“Number of Pre-Measurement (times):”:

The number of pre-measurements (times) setting range is 0 to 10 (1 time steps).

“Number of Measurement (times):”:

The number of measurements (times) setting range is 1 to 100 (1 time steps).

“Drain After Every Measurement?”:

Determines whether draining is performed after every measurement.

The setting is only valid if the combined “number of pre-measurements (times)” + “number of measurements (times)” is 2 or higher.

“Calculate Particle per Unit Volume?”:

Determines whether calculation of particle count per unit volume is performed. When this item has been selected, the “Unit Volume (mL)” and “Dilution Ratio” items become available.

“Unit Volume (mL):”:

The unit volume (mL) setting range is 0.2 to 100.0 (0.1 mL steps).

“Dilution Ratio:”:

The dilution ratio (times) setting range is 1.00 to 100.00 (0.01 times steps).

“Clear “No.” Field at Measurement Start?”:

Determines whether the “No.” field is cleared at measurement start. If this item is selected, the “No.” field in the “KL-05 - Measurement” window is cleared when measurement begins. If this item is not selected, the “No.” field in the “KL-05 - Measurement” window is incremented by +1 when measurement begins.

"Flush"

"Aspiration Flow Rate (mL/min):":

The setting range of the aspiration flow rate (mL/min) for flushing is 5 to 100 (1 mL/min steps).

"Drain Flow Rate (mL/min):":

The setting range of the drain flow rate (mL/min) for flushing is 5 to 100 (1 mL/min steps).

"Flush Volume (mL/min):":

The flush volume (mL) setting range is 0.2 to 25.0 (0.1 mL steps). The flush volume (mL) cannot be set to a higher value than the syringe volume (mL).

"Repeat (times):":

The setting range for the number of flush repeats (times) is 1 to 100 (1 time steps).

"Performance-Test Data"

"Performance-Test Date" list:

The registered performance test data name list will be displayed. Selects the positions to be measured. Select the appropriate performance test data to carry out a measurement. Performance test data are shown in the following format: "#" + "No." + "Performance Test Parameter Name"

Note
Please note that incorrect data selection will not enable you to carry out a correct measurement.

The following data are registered at upon shipment of this unit.

KL-05 Basic: For use of general measurement

JPxx: For measurement in accordance with the Japanese Pharmacopeia (JP) Standards.
(Registered only for those who have ordered option(s))

USPxx: For measurement in accordance with the United States Pharmacopeia (USP) Standards.
(Registered only for those who have ordered option(s))

EPxx: For measurement in accordance with the European Pharmacopeia (EP) Standards.
(Registered only for those who have ordered option(s))

KPxx: For measurement in accordance with the Korean Pharmacopeia (KP) Standards.
(Registered only for those who have ordered option(s))

ChPxx: For measurement in accordance with the Chinese Pharmacopeia (ChP) Standards.
(Registered only for those who have ordered option(s))

Notes: xx indicates each pharmacopeia's revision number or version number.

"View" button:

When this button is clicked, the performance test data selected in the performance test data name list will be displayed in the "KL-05 - Performance Test" window (see "Performance-Test" on page 77).

"Effective Period":

This sets the validity period for the use of the Performance-Test data.

The allowable setting range is between 1 to 9999 days (1 day steps).

Important

If the effective period for the set Performance-Test data has expired, an error occurs during the measurement which disables the measurement.

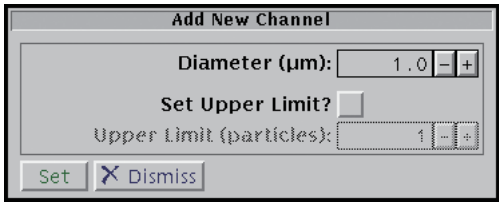
"Channels"

"Channels" list:

A list of registered channels (particle size categories) will be displayed. For each channel, the upper particle size limit (in µm) is shown. Particle sizes are shown to one decimal point. If "Show Upper Limit?" is not selected, the upper limit part will not be shown.

"Add" button:

Clicking this button brings up the "Add New Channel" window.



"Diameter (µm):":

The particle diameter (µm) setting range is 1.0 to 100.0 (0.1 µm steps).

"Set Upper Limit?":

When this is selected, the "Upper Limit (particles)" setting becomes available.

"Upper Limit (particles)":

The particle upper limit setting range is 1 to 9999999 (1 particle steps).

The "Upper Limit (particles)" setting is used for evaluation of measurement data.

"Set" button:

Registers the channel in the "Channels" list and closes the "Add New Channel" window. If a channel for the same particle size already exists in the "Channels" list, the existing channel will be overwritten.

"Dismiss" button:

Closes the "Add New Channel" window without registering the channel in the "Channels" list.

"Edit" button:

When a channel is selected in the "Channels" list, this button becomes available. Clicking this button brings up the "Edit Channel Setting" window for editing the settings of the selected channel. The settings in this window are the same those of the "Add New Channel" window.

"Delete" button:

When a channel is selected in the "Channels" list, this button becomes available. Clicking this button deletes the selected channel.

"Management Information"

These items are displayed when "Show Management Information?" in the "Show" menu is selected.

"Creation Date:":

Shows the date and time of measurement parameter creation, with time zone information.

"Operator:":

Shows the full name (login name) of the operator who created the measurement parameters.

"File:":

Shows the full path to the file in which measurement parameters are saved.

"Owner:":

Shows the login name/group name of the owner of the measurement parameters.

"Time Stamp:":

Shows the time stamp of the measurement parameters.

"Fingerprint:":

Shows the fingerprint of the measurement parameters.

Note
If the fingerprint of the measurement parameters and the measurement data are not matched, data falsification may have occurred.

"Register" button:

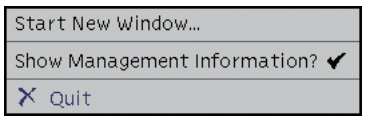
This button becomes available only when a measurement parameter was changed. Clicking this button registers the measurement parameter. If a new measurement parameter was added, the revision number will be "1". If an existing parameter was changed, the revision will be incremented by 1 when the "Register" button is clicked.

"Reset" button:

This button becomes available only when a measurement parameter was changed. Clicking this button returns the measurement parameter to the condition before editing.

"Show" button:

Clicking this button brings up the "Show" menu.



"Start New Window...":

Selecting this brings up the "KL-05 - Start New Window" window.

"Show Management Information?":

When this is selected, management information for measurement parameters is shown.

When this is not selected (default), management information for measurement parameters is not shown.

The setting condition is registered and will also be retained for the next time the "KL-05 - Measurement Parameter" window is opened.

"Quit":

Click the button to exit the "Show" menu.

"Print" button:

Clicking the button brings up the window for printing measurement parameters. The parameters can then be printed by clicking the "Print" button in the "Print" window.

If the operator does not have printing privileges, the button is not available (see "Operation limitations according to privileges" on page 19).

If no measurement parameters have been changed, registered, or reset, the button is not available.

"Quit" button:

Click the "Quit" button to close the "KL-05 - Measurement Parameter" window.

Setting/Registering Measurement Parameters

1. Display the “KL-05 - Start New Window” window and click the “Measurement Parameter...” button under “View/Set Operation Parameters”.
   The “KL-05 - Measurement Parameter” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

2. Click a measurement parameter name shown to the right of “Measurement” to show the “Measurement Modes” list. Click on “Add New Setting” from the list.
   To modify a measurement parameter, click the parameter name in the “Measurement Modes” list that comes up.

Important
The “#1 KL-05 Basic for RION’s Staffs” of the measurement parameter names has been registered by RION at the time of dispatch from the factory and is used for our inspection. Please do not change this parameter setting.

Note
Click the measurement parameter name to be copied from the “Measurement Modes” list. Then click on “Add New Setting” to copy the parameter.

3. Enter the Measurement Parameter name in the space underneath “Measurement:”.
4. If required, enter figures or checks in the measurement parameter field.

Note
See page 69, “Measurement parameters” for the explanations of each measurement parameter.

5. Click the “Register” button.
6. When the measurement parameter registration is completed, click the “Quit” button.

Note
When the measurement parameter has been modified and the “Register” button is then clicked, the parameter is registered and the revision number is incremented by 1.

Performance-Test

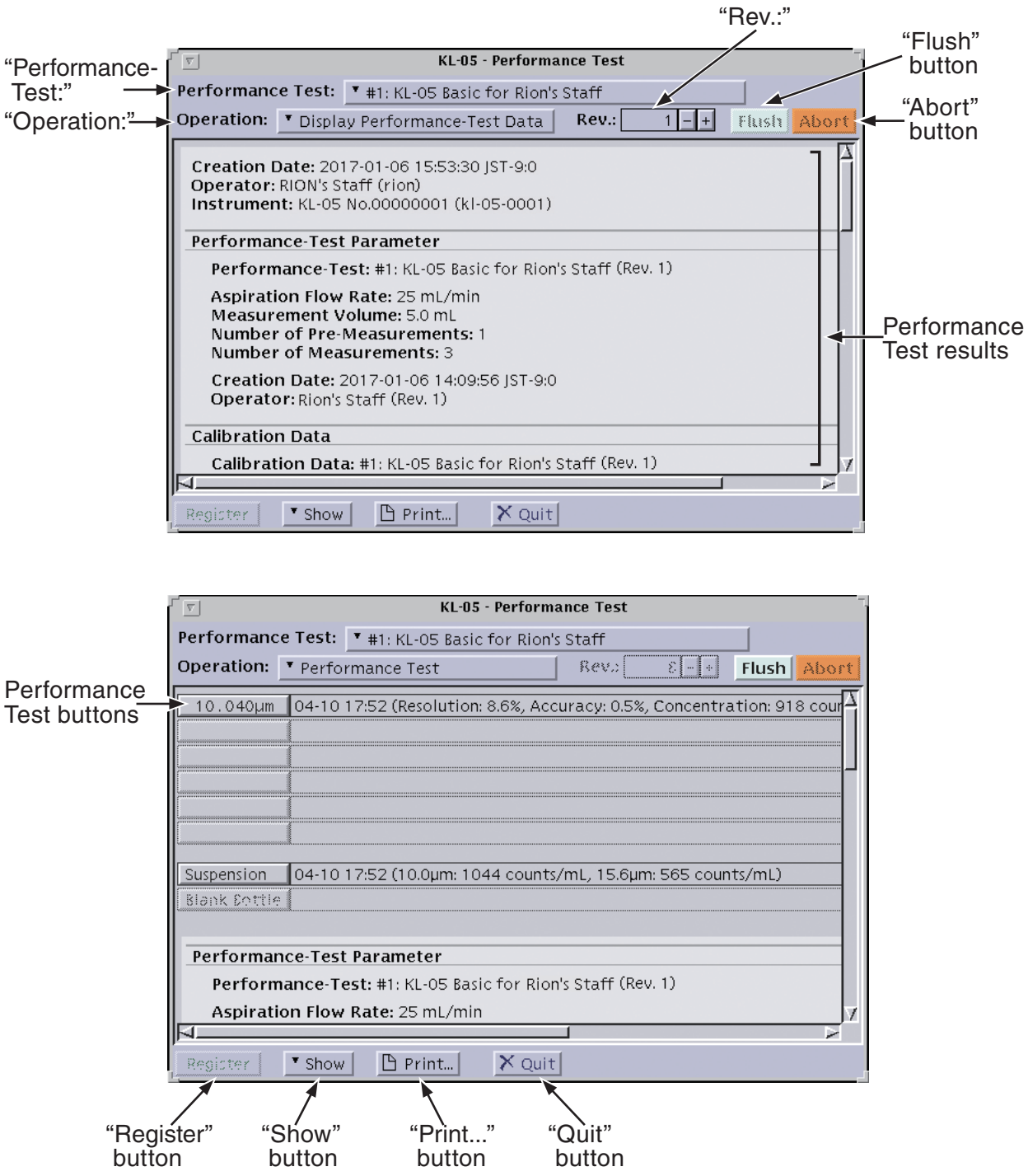
The Performance-Test serves to verify if the performance requirements are met by the calibration data of the system.
The pharmacopeia defines the requirements both for calibration and testing. If the calibration method is different, the Performance-Test content will also differ.
A proper Performance-Test should be carried out using a Performance-Test parameter in order to verify whether the system is operating according to the respective. However, if a simple system check is sufficient, other Performance-Test parameters can be set in addition to the specified Performance-Test, in order to separate several Performance-Tests.
At the time of shipment, the Performance-Test data is registered with the confirmation of the calibrated result on the unit as satisfactory after carrying out a maximum of four(4) types of Performance-Test, including an option.

Please carry out the Performance-Test regularly in order to check if the system works correctly.

Note
The Performance-Test parameters such as JPxx registered at the time of shipment (only for those who have ordered this option) are in accordance with every pharmacopeia.
When a simple Performance-Test is required, copy the Performance-Test parameter registered at the time of shipment, then register it is a new Performance-Test parameter.

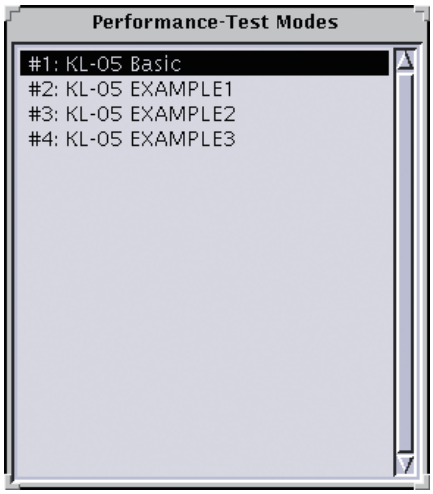
“KL-05 - Performance Test” window

Clicking the “Performance Test” button in the “KL-05 - Start New Window” window brings up the “KL-05 - Performance Test” window. Alternatively, clicking the “Show” button for performance test data in the “KL-05 - Measurement Parameter” window brings up the “KL-05 - Performance Test” window.



“Performance Test:”:

Clicking a button with the performance test parameter name brings up the “Performance - Test Modes” list window, allowing selection of a performance test parameter.

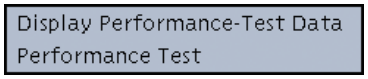


“Rev.:” (Revision):

Shows the Performance Test revision. The “–” and “+” buttons allow moving among revisions. The respective revision will be shown in the “KL-05 - Performance Test” window.

“Operation:”:

Clicking a button with an operation name brings up a menu that gives the following two choices. When the operation is changed to “Performance Test”, the window switches from performance test data to performance test operation. This window contains buttons with the various test items.



If the operator does not have performance test privileges, the performance test is not available (see “Operation limitations according to privileges” on page 19).

“Flush” button:

Clicking this button starts the flushing process. The flushing process can also be started by pressing the FLUSH button on the unit.

“Abort” button:

Clicking this button cancels a measurement or flushing in progress. The button is only available if a measurement or flushing process has been started.

Performance Test buttons (“Size µm”, “Suspension” and “Blank Bottle” buttons):

Clicking this button starts the performance test process. If the test item is a particle performance test, the button shows “Size µm”. This value is set with the performance test parameters.

When the performance test starts, the “Measurement in progress” window appears. (See “KL-05 - Controller” window on page 50)

When the performance test is complete, the obtained data are saved as performance test particle data, performance test suspension data, or performance test blank data, according to the selected test item.

The performance test results are later compiled from these data, and are shown in the “KL-05 - Performance Test” window to the right of the test item buttons.

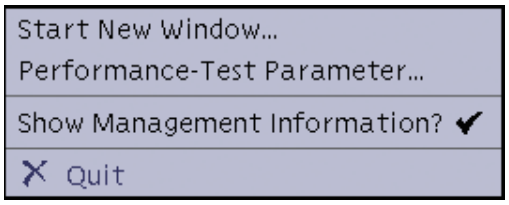
If there are buttons whose items did not pass the performance test, the first such button will be shown as active. Performance testing for an item whose button is active can also be started by clicking the “START” button.

“Register” button:

When the operation is “performance test” and all performance items have passed the test, this button becomes available and performance test data can be registered.

“Show” button:

Clicking this button brings up the “Show” menu.



“Start New Window...”:

Selecting this brings up the “KL-05 - Start New Window” window (see “KL-05 - Start New Window” on page 51).

“Performance-Test Parameter... ”:

Clicking this item brings up the “KL-05 - Performance Test Parameter” window for setting performance test parameters (see “Performance-Test Parameters” on page 85).

"Show Management Information?":

When this item is selected, management information for measurement parameters is shown. When this item is not selected (default), management information for measurement parameters is not shown.

The item setting condition is registered and will also be retained for the next time the "KL-05 - Performance Test" window is opened.

"Quit":

Click the button to exit the "Show" menu.

"Print" button:

Clicking this button brings up the window for printing performance test data (see "Print" on page 162). The performance test data can then be printed by clicking the "Print" button in the "Print" window (see "Printing Performance-Test Data" on page 167).

If no performance test data are shown in the "KL-05 - Performance Test" window, the "Print" button is not available.

"Quit" button:

Click the "Quit" button to close the "KL-05 - Performance - test" window.

Performance-Test sequence

Note
The Performance-Test parameters must be set prior to the Performance-Test. See page 93 onwards for "Setting/Registering Performance Test Parameters".

The Performance-Test sequence is as follows;

1. Display the "KL-05 - Start New Window" window and click the "Performance Test..." button under "Usual Operations:"
   The "KL-05 - Performance Test" window appears.

Note
See page 46 for the login method and see page 51 for the "KL-05 - Start New Window" window display method.

2. Click the required parameter name as shown at the right of "Performance Test".
   A "Performance Test Modes" list appears. Click a Parameter name to select it from the list.

3. Click the “Show” button on the “KL-05 - Performance Test” window. Select the required Performance-Test parameter name from the displayed menu.
   The “KL-05 - Performance-Test Parameter” window appears. Please check the settings. After checking, click the “Quit” button to close the “KL-05 - Performance-Test Parameter” window.
4. Select a “Performance Test” from the displayed list, which can be obtained by clicking on the operation items (Performance-Test data display) shown at the right of “Operation”. The window display will change to the one for the Performance-Test.
5. Set a sample for cleaning purposes, then click the “Flush” button on the display or press the “FLUSH” button on the front of the unit.

Important
When operating by pressing the “FLUSH” and “START” buttons on the unit, ensure that the “KL-05 - Performance Test” window is set in an active window in which the required Performance-Test parameter name is displayed. If it is not in an active window, the operations may be different from the specified parameter.

6. Carry out the Performance-Test. Prepare the sample(s) then click a button for the required test item shown on the list.
   After the test is completed, the test results will be displayed to the right of the items.

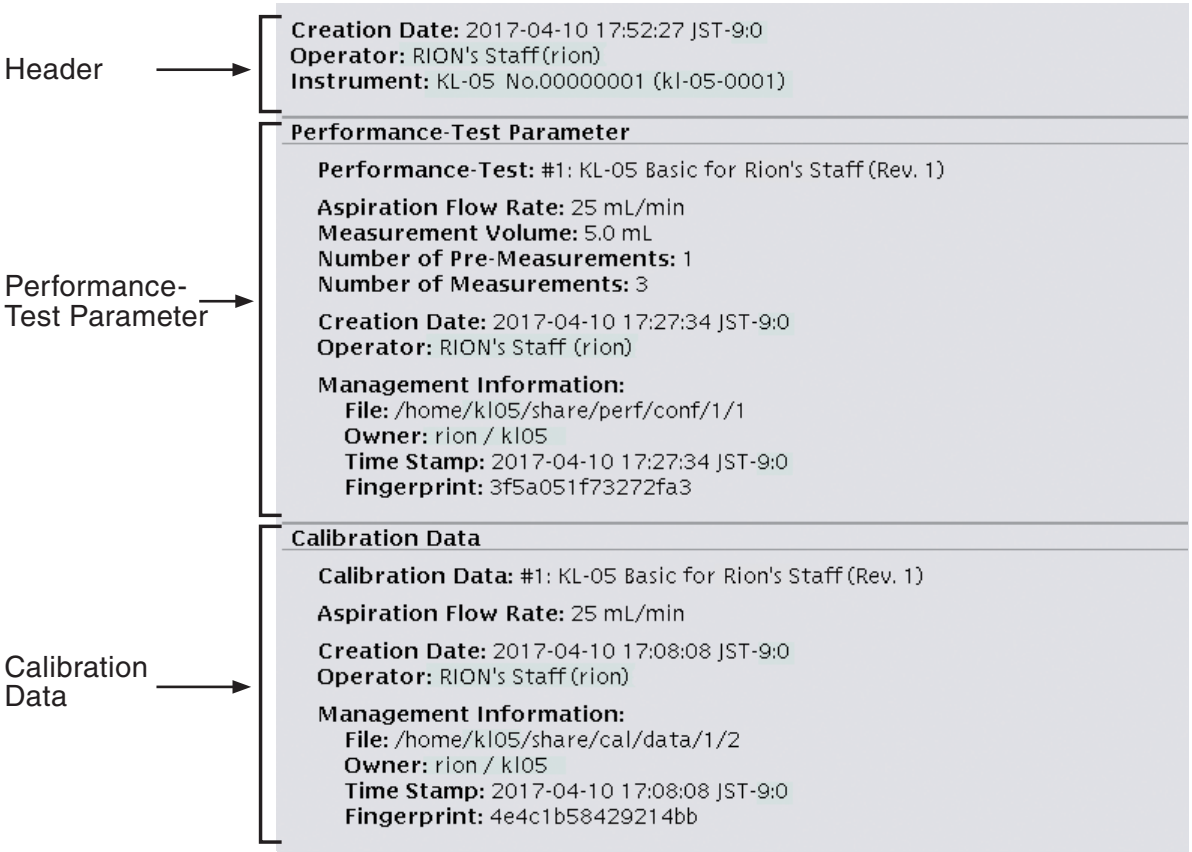
Note
The test result will be displayed in black if accepted by the system, and in red if not accepted.

7. If more test items are required, repeat the sequence from No. 5 to No. 6 for the number of test items only.
   After all test items are completed, click the “Register” button to register the test result. The registration is not available for rejected test results.
8. Click the “Quit” button upon completion of the test.

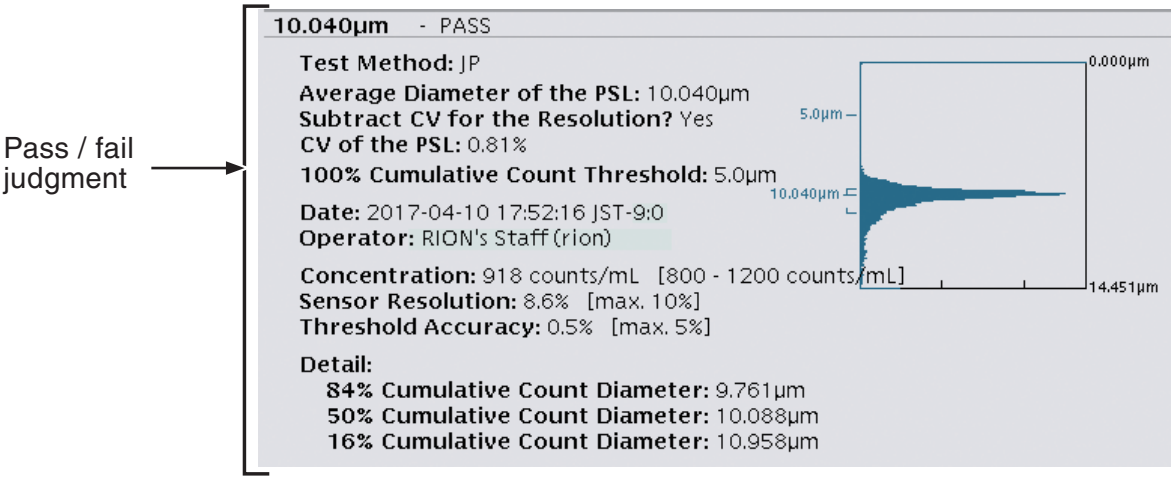
Note
The Performance-Test series should be fully completed within 72 hours. If this time limit is exceeded, the test result becomes void.

The Performance-Test result

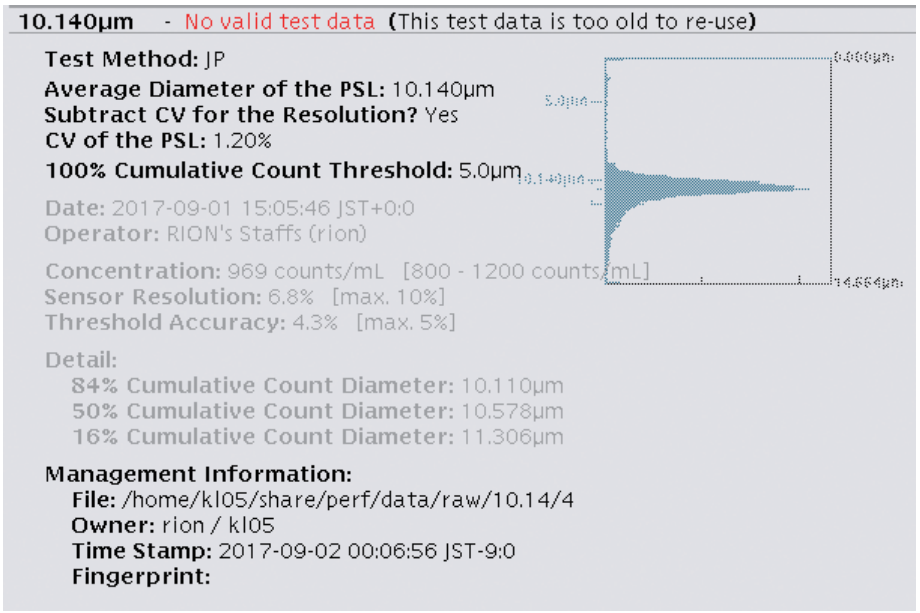
Display 1: Header, Performance-Test Parameter, Calibration Data



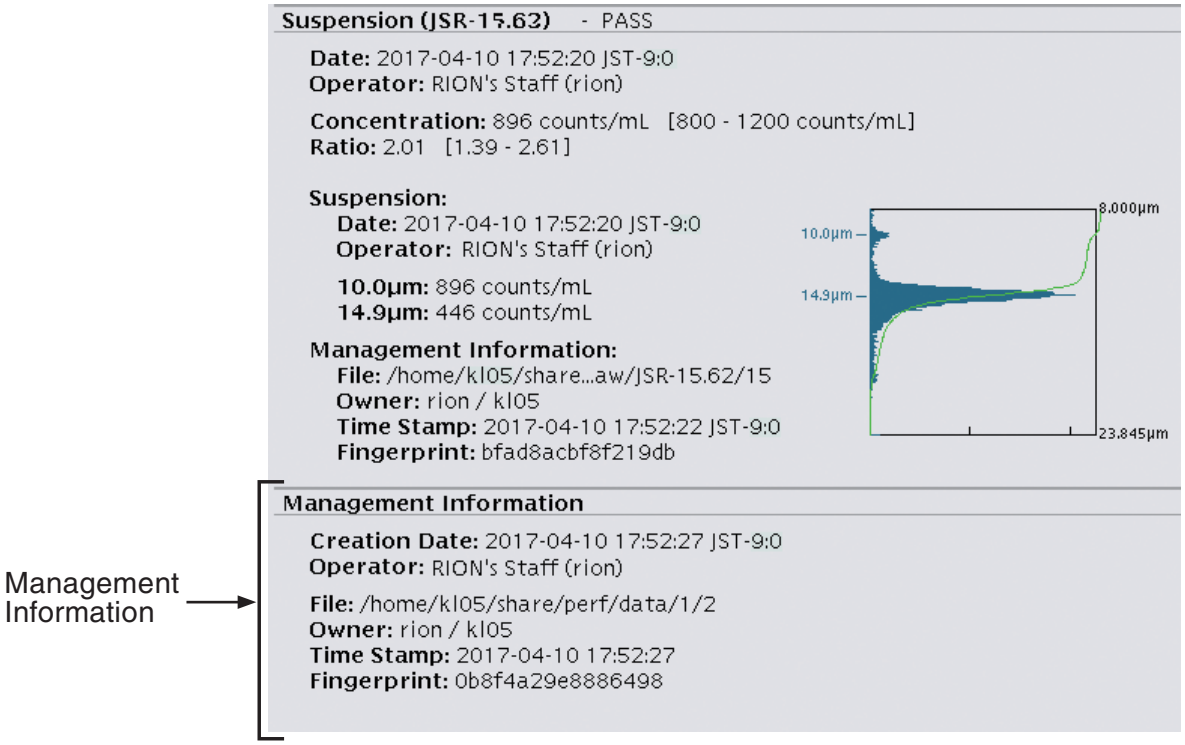
Display 2: (test results for test particle sizes)



Display 3: (if there is a problem with performance test data) performance test results



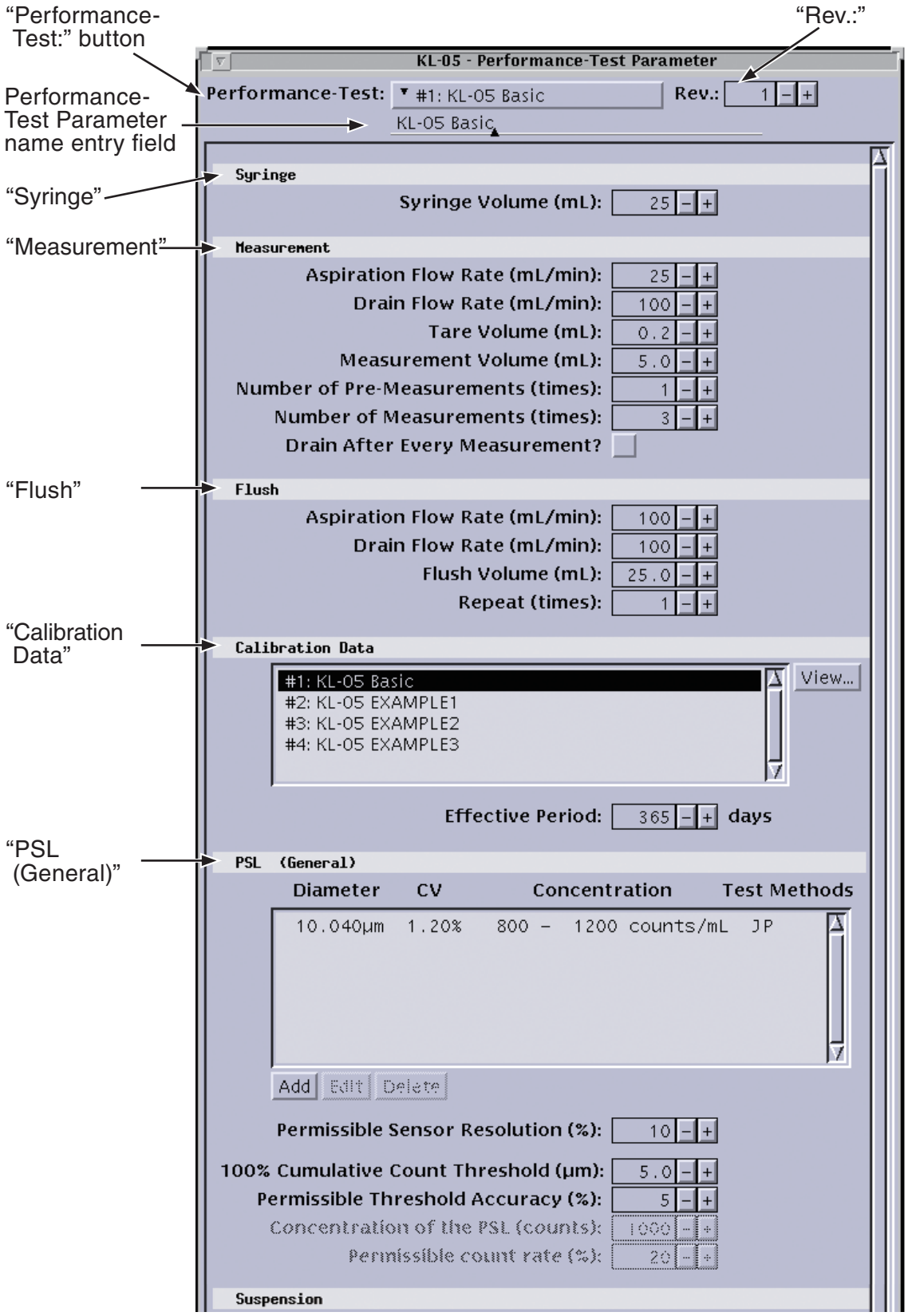
Display 4: (suspension related test results, performance test results, management information)

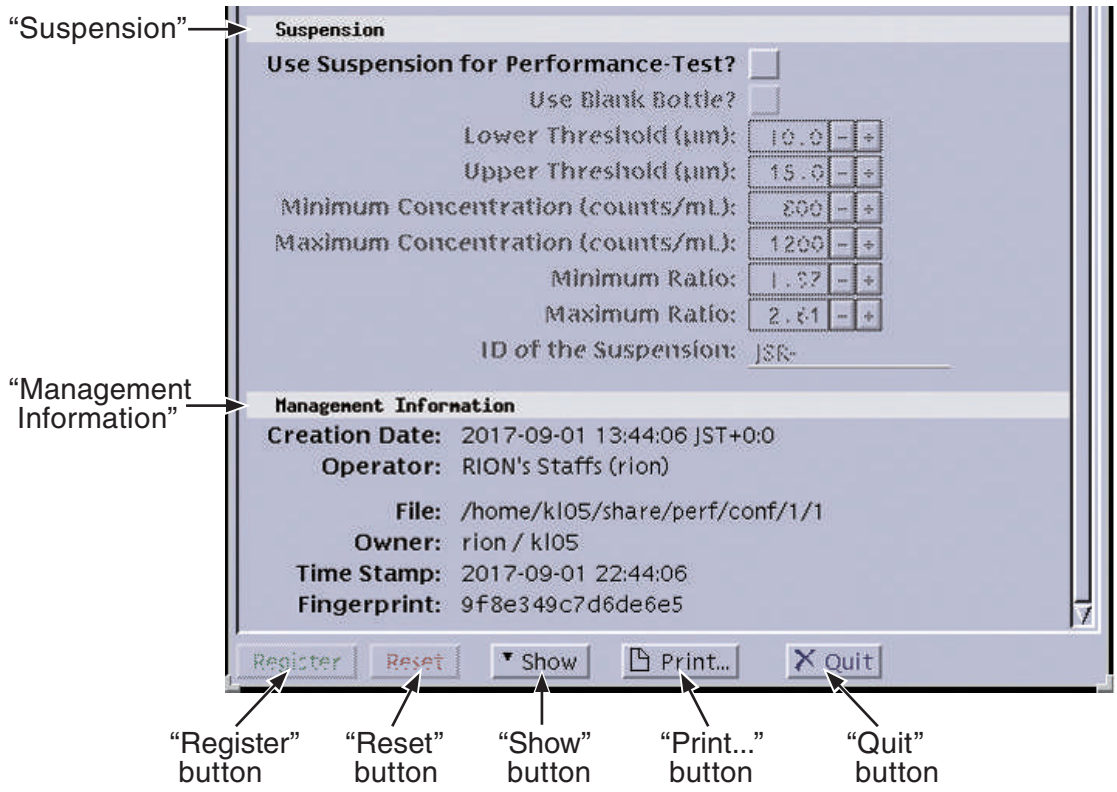


Performance-Test Parameters

“KL-05 - Performance-Test Parameter” window

Clicking the “Performance-Test Parameter...” button in the “KL-05 - Start New Window” window or selecting “Performance Test Parameter...” in the “Show” menu of the “KL-05 - Performance-Test Parameter” window brings up the “KL-05 - Performance-Test Parameter” window.



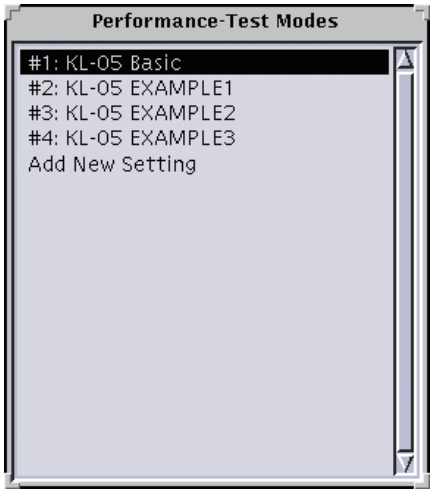


If a key icon is shown at the bottom left of the "KL-05 - Performance-Test Parameter" window, operation is limited to displaying and printing measurement parameters (see "Operation limitations according to privileges" on page 19).

The "KL-05 - Performance-Test Parameter" window shows the latest revision of the #1 parameter.

“Performance-Test:” button:

Clicking a button with a Performance-Test name brings up the “Performance-Test Modes” list window, letting you select a Performance-Test Parameter.



If performance test parameters were selected (switched), the latest revision of these parameters is shown in the “KL-05 - Performance-Test Parameter” window.

If the operator has performance test parameter setting privileges, the last item in the “Performance-Test Modes” list window will be as shown below, allowing the addition of performance test parameters.

If “Add a New Setting” is selected, the setting values in the “KL-05 - Performance-Test Parameter” window are inherited as defaults, except for the performance test parameter name and the revision.

“Rev.:” (Revision):

Shows the performance-test data revision. The “–” and “+” buttons allow moving among revisions. The respective revision will be shown in the “KL-05 - Performance-Test Parameter” window.

Performance-Test Parameter name entry field:

The Performance-Test Parameter name is entered here. Maximum allowable length is 93 characters.

“Syringe”

“Syringe Volume (mL):”:

The syringe volume (mL) setting range is 5 to 25 (1 mL steps).

The syringe volume (mL) setting may not be lower than the tare volume (mL) + 0.2 mL + measurement volume (mL).

"Measurement"

"Aspiration Flow Rate (mL/min):":

The aspiration flow rate (mL/min) setting range is 5 to 100 (1 mL/min steps).

"Drain Flow Rate (mL/min):":

The drain flow rate (mL/min) setting range is 5 to 100 (1 mL/min steps).

"Tare Volume (mL):":

The tare volume (mL) setting range is 0.2 to 10.0 (0.1 mL steps).

The tare volume (mL) setting may not be larger than the syringe volume (mL) - measurement volume (mL) – 0.2.

If the standard PFA sampling tube is used for measurement, the dead volume from the inlet tip to the sensor is 0.5 mL. Therefore the setting value should be 0.5 mL or higher. If the optional SUS sampling tube is used, the setting should be 0.2 mL or higher.

"Measurement Volume (mL):":

The measurement volume (mL) setting range is 0.2 to [syringe volume (mL) – tare volume (mL) + 0.2]. (0.1 mL steps).

"Number of Pre-Measurement (times):":

The number of pre-measurements (times) setting range is 0 to 10 (1 time steps).

"Number of Measurement (times):":

The number of measurements (times) setting range is 1 to 100 (1 time steps).

"Drain After Every Measurement?:":

Determines whether draining is performed after each measurement.

The setting is only valid if the combined "number of pre-measurements (times)" + "number of measurements (times)" is 2 or higher.

"Flush"

"Aspiration Flow Rate (mL/min):":

The setting range of the aspiration flow rate (mL/min) for flushing is 5 to 100 (1 mL/min steps).

"Drain Flow Rate (mL/min):":

The setting range of the drain flow rate (mL/min) for flushing is 5 to 100 (1 mL/min steps).

"Flush Volume (mL/min):":

The flush volume (mL) setting range is 0.2 to 25.0 (0.1 mL steps). The flush volume (mL) cannot be set to a higher value than the syringe volume (mL).

"Repeat (times):":

The setting range for the number of flush repeats (times) is 1 to 100 (1 time steps).

"Calibration data"

"Calibration Data" list:

A list of registered calibration data names is shown and the calibration data to use for the performance test can be selected.

"View..." button:

Clicking this button brings up the "Calibration" window which shows the calibration data selected from the "Calibration Data" list (see "Calibration" on page 94).

"Effective Period:":

This sets the validity period for the use of the "Calibration Data".

The allowable setting range is between 1 to 9999 days (1 day steps).

"PSL (General)"

"PSL (General)" list:

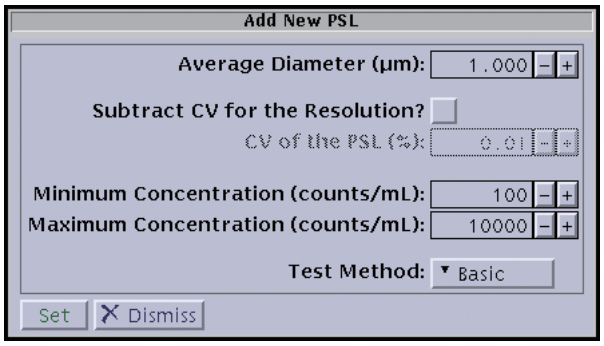
Displays a list of registered PSL (General) (Test particles).

The list uses the following format: "Size (µm), CV of the PSL (%), Minimum Concentration – Maximum Concentration (counts/mL), Test Method".

Performance testing is performed with the PSL types shown in the list.

"Add" button:

Clicking this button brings up the "Add New PSL" window for adding a PSL (General) category



You can register up to six categories. When this limit is reached, the button becomes unavailable.

"Average Diameter (µm):":

The average diameter (µm) setting range is 1.000 to 150.000 (0.001 µm steps).

"Subtract CV for the Resolution?":

Determines whether the CV value is subtracted when determining the resolution. When the item is selected, the "CV of the PSL (%)" setting becomes available.

"CV of the PSL(%):":

The PSL CV value (%) setting range is 0.01 to 9.99 (0.01% steps).

"Minimum Concentration (counts/mL):":

The minimum concentration (counts/mL) setting range is 100 to 9999 (1 counts/mL steps).

"Maximum Concentration (counts/mL):":

The maximum concentration (counts/mL) setting range is 101 to 10000 (1 counts/mL steps).

"Test Method:":

The following test method settings are available: Basic JP, USP, EP/JP, EP/USP, KP/JP, KP/USP, ChP.

The test items belonging to the respective test method can be manipulated.

"Set" button:

Registers the PSL (General) in the "PSL (General)" list and closes the "Add New PSL" window. If a PSL (General) of the same diameter already exists in the PSL (General) list, the existing entry is overwritten.

"Dismiss" button:

Closes the "Add New PSL" window without adding a PSL (General) to the "PSL (General)" list.

"Edit" button:

When a PSL (General) is selected in the "PSL (General)" list, this button becomes available. When the button is clicked, the "Edit PSL Parameter" window for editing the selected PSL (General) appears. The settings in the "Edit PSL Parameter" list are the same as in the "Add New PSL" window.

"Delete" button:

When a channel is selected in the "PSL (General)" list, this button becomes available. Clicking the button deletes the selected PSL (General).

"Permissible Sensor Resolution (%):":

The permissible sensor resolution (%) setting range is 1 to 50 (1 % steps).

"100% Cumulative Count Threshold (µm):":

The 100% cumulative count threshold (µm) setting range is 0.1 to 100.0 (0.1 µm steps).

"Permissible Threshold Accuracy(%):":

The permissible threshold accuracy (%) setting range is 1 to 50 (1 % steps).

"Concentration of the PSL (counts):":

The concentration of the PSL (counts) setting range is 1000 to 9999 (1 count steps).

"Permissible count rate (%):":

The permissible count rate (%) setting range is 1 to 50 (1 % steps).

"Suspension"

"Use Suspension for Performance-Test?:":

Determines whether suspension is used for performance testing.

When the item is selected, the following items become available.

"Use Blank Bottle?":

Determines whether a blank bottle is used for performance testing.

"Lower Threshold (µm):":

The lower threshold (µm) setting range is 1.0 to 99.9 (0.1 µm steps).

"Upper Threshold (µm):":

The upper threshold (µm) setting range is 1.1 to 100.0 (0.1 µm steps).

"Minimum Concentration (Counts/mL):":

The minimum concentration (counts/mL) setting range is 100 to 9999 (1 counts/mL steps).

"Maximum Concentration (Counts/mL):":

The maximum concentration (counts/mL) setting range is 101 to 10000 (1 counts/mL steps).

"Minimum Ratio:":

The minimum ratio setting range is 1.00 to 4.99 (0.01 steps).

"Maximum Ratio:":

The maximum ratio setting range is 1.01 to 5.00 (0.01 steps).

"ID of the Suspension:":

Enter the suspension ID here (max. 18 characters). Allowable characters are lower-case and upper-case alphabetic characters and numerals. The first character must be an alphabetic character.

"Register" button:

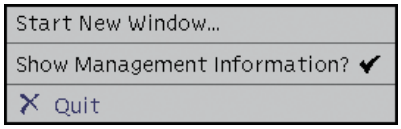
This button becomes available only when a measurement parameter was changed. Clicking this button registers the measurement parameter. If a new measurement parameter was added, the revision number will be "1". If an existing parameter was changed, the revision will be incremented by 1 when the "Register" button is clicked.

"Reset" button

This button becomes available only when a measurement parameter was changed. Clicking this button returns the measurement parameter to the condition before editing.

"Show" button:

Clicking this button brings up the "Show" menu.



"Start New Window...":

Selecting this brings up the "KL-05 - Start New Window" window.
(see "KL-05 - Start New Window" on page 51).

"Show Management Information?":

When this is selected, management information for performance test data is shown.

When this is not selected (default), management information for performance test data is not shown.

The setting condition is registered and will also be retained for the next time the "KL-05 - Performance-Test Parameter" window is opened.

"Quit":

Click the button to exit the "Show" menu.

"Print" button:

Clicking the button brings up the window for printing performance test parameters (see "Printing" on page 162). The parameters can then be printed by clicking the "Print" button in the "Print" window (see "Printing Performance-Test Parameter" on page 171).

If no performance test parameters have been changed, registered, or reset, the button is not available.

"Quit" button:

Click the "Quit" button to close the "KL-05 - Performance-Test Parameter" window.

Setting/Registering Performance Test Parameters

1. Display the “KL-05 - Start New Window” window and click the “Performance Test Parameter...” button under “View/Set Operation Parameters”.
   The “KL-05 - Performance-Test Parameter” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

2. Click the Performance-Test Parameter name shown to the right of “Performance-Test”, then click “Add New Setting” on the displayed “Performance-Test Modes” list.

Note
Already registered parameters can be used by copying them in the following sequence. First, select the Performance-Test parameter name from the “Performance-Test Modes” list. Then click “Add New Setting” to copy the parameter.

3. Enter the Performance-Test Parameter name in the space underneath “Performance-Test:”.
4. If required, enter figures or checks in the Performance-Test Parameter field.

Note
See page 85, “Performance- Test Parameters” for the explanations of each Performance-Test Parameter.

5. Click the “Register” button.
6. When the Performance-Test Parameter registration is completed, click the “Quit” button.

Note
When the Performance-Test Parameter has been modified and the “Register” button is then clicked, the parameter is registered and the revision number is incremented by 1.

Calibration

These data serve as reference values that determine the setting (threshold) values for particle classification (size per channel) during measurement.

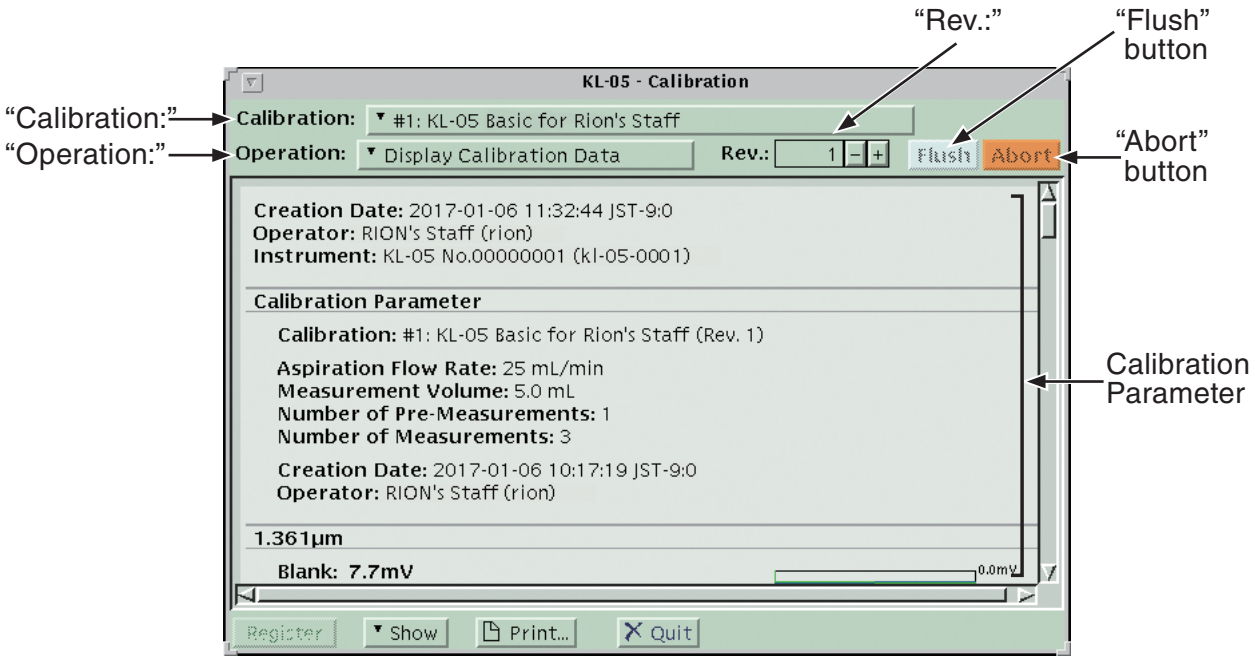
To enable measurement based on Calibration data, it is first necessary to carry out the Performance-Test and to register the Performance-Test data.

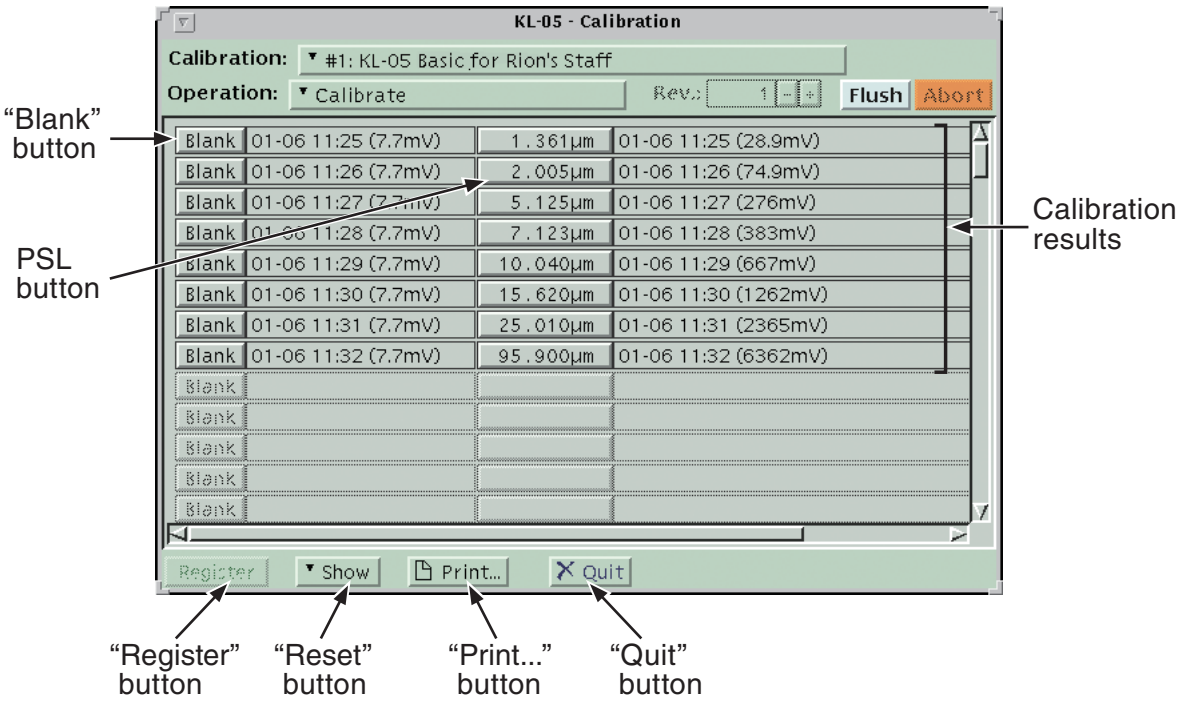
Note
The Calibration parameters, such as JPxx, registered at the time of shipment (registered only for those who requested this option) are the officially approved ones (in accordance with each Pharmacopeia).
When Calibration is required, copy the Calibration parameter registered at the time of shipment, then copy and modify it and register it as a new Calibration parameter for use.

Calibration task

“KL-05 - Calibration” window

Clicking the “Calibration ...” button in the “KL-05- Start New Window” window or clicking the “Show” button for calibration data in the “KL-05 - Performance-Test Parameter” window brings up this window.

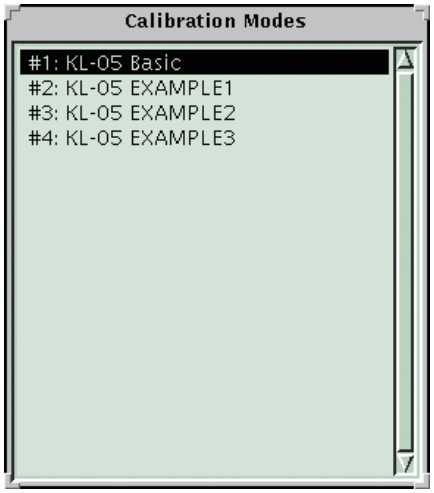




If a key icon is shown at the bottom left of the window, operation is limited to displaying and printing calibration data (see "Operation limitations according to privileges" on page 19). The "KL-05 - Calibration" window shows the latest revision of the calibration data.

Calibration:

Clicking a button with a calibration parameter name brings up the "Calibration Modes" window, letting you select a calibration parameter.



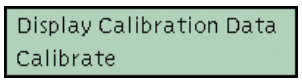
If a calibration parameter was selected (switched), the latest calibration data for that parameter will be shown in the "KL-05 - Calibration" window.
If no calibration data are available, nothing is displayed.

"Rev.:" (Revision):

Shows the calibration data revision. The "–" and "+" buttons allow moving among revisions. The respective revision will be shown in the "KL-05 - Calibration" window.

"Operation:":

Clicking a button with an operation name brings up a menu that gives the following two choices.



If the operator does not have "calibration" privileges, the "Calibrate" is not available. When the operation is changed to "Calibrate", the window switches from "Display Calibration Data" to "Calibrate". This window contains "Blank" buttons, "PSL" buttons with the particle diameter size, and "Flush" button becomes available.

"Flush" button:

Clicking this button starts the flushing process. The flushing process can also be started by pressing the FLUSH button on the unit.

"Abort" button:

Clicking this button cancels a blank measurement, calibration, or flushing in progress. The button is only available if a blank measurement, calibration, or flushing process has been started.

"Blank" button:

Clicking this button starts the blank measurement.

When the blank measurement starts, the "Measurement in progress" window appears. (See "KL-05-Controller" window on page 50.)

When blank measurement is completed, the obtained data are saved as blank data for calibration use.

PSL button:

The button shows the particle diameter as "Size µm". Clicking the button starts calibration for the respective particle diameter. Particle diameter sizes are shown to three decimal points.

When calibration measurement starts, the "Measurement in progress" window appears. (see "KL-05 - Controller" window on page 50).

When calibration measurement is completed, the obtained data are saved as particle data for calibration use.

When blank measurement and calibration are completed, the blank data from each operation and the particle data are used to compile the calibration results which are shown to the right of the "Blank" button and PSL button and in the "KL-05 - Calibration" window. Until the "Register" button is used to save the data, the created calibration data are only temporary and cannot be used for performance testing.

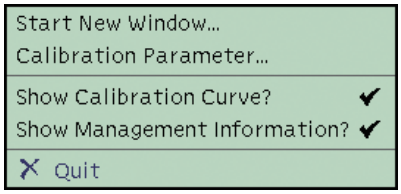
"Register" Button:

This button which serves for saving calibration data is only available if the operation mode is "Calibration" and data for all particles registered as calibration parameters have been obtained.

Clicking this button causes regular calibration data to be created from the temporary data.

"Show" Button:

Clicking this button brings up the "Show" menu.



"Start New Window...":

Selecting this brings up the "KL-05 - Start New Window" window (see "KL-05 - Start New Window" on page 51).

"Calibration Parameter...":

Clicking this item brings up the "KL-05 - Calibration Parameter" window (see "Calibration parameters" on page 102) for setting calibration parameters.

"Show Calibration Curve?":

When this item is selected, the calibration curve for the calibration data is shown. When this item is not selected (default), the calibration curve for the calibration data is not shown.

"Show Management Information?":

When this is selected, management information for calibration data is shown. When this is not selected (default), management information for calibration data is not shown.

The setting condition is registered and will also be retained for the next time the "KL-05 - Calibration" window is opened.

"Quit":

Click the button to exit the "Show" menu.

"Print" button:

Clicking this button brings up the window for printing calibration data (see "Printing" on page 162). The calibration data can then be printed by clicking the "Print" button in the "Print" window (see "Printing Calibration Data" on page 169).

If no calibration data are shown in the "KL-05 - Calibration" window, the "Print" button is not available.

"Quit" button:

Click the "Quit" button to close the "KL-05 - Calibration" window.

Calibration sequence

Important
Before doing a calibration, turn the power on for one hour as warm-up time.

Note
The preliminary calibration parameter setting is required for Calibration of the unit. See the “Setting/Registering Calibration Parameter” shown from page 108 onwards for this.

The Calibration sequence is as follows;

1. Display the “KL-05 - Start New Window” window and click the “Calibration...” button under “Usual Operations:”.
   The “KL-05 - Calibration” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

2. Click the Calibration parameter shown to the right of “Calibration:” then click a test parameter name in the displayed “Calibration Modes” list.
3. Click the “Show” button from the “KL-05 - Calibration” window, then select the required Calibration parameter.
   The “KL-05 - Calibration Parameter” window will appear. Check the details. Upon completing the check, click the “Quit” button to close the window.
4. Select “Calibrate” from the list by clicking operation items (Calibration data display) shown to the right of “Operation”. The window contents will change to the ones for Calibration.
5. Set a sample for cleaning purposes, then click the “Flush” button on the display or press the “FLUSH” button on the front of the unit.

Important
When operating by pressing the “FLUSH” and “START” buttons on the unit, ensure that the “KL-05 - Calibration” window is set in an active window, in which the required Calibration parameter name is displayed. If it is not in an active window, operations may be different from the specified Parameters.

6. Set up the sample for the blank measurement, then click the “Blank” button (displayed on the left side of the same row) to select the particle size (e.g. 10.350 μm) from the Calibration particle size list.
   Upon completion of the blank measurement, the result will be displayed on the right side of the “Blank” button.

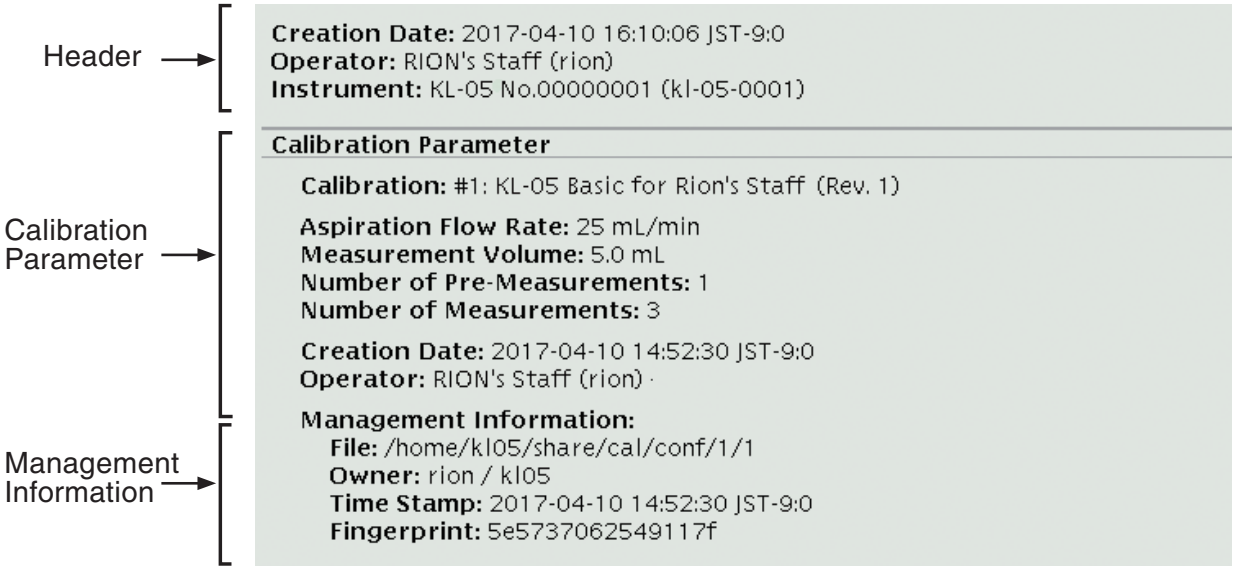
7. Calibrate. Set sample(s) for Calibration then select the specific required Calibration particle size (e.g. 10.350 μm) from the list.
   Upon completion of the Calibration task, the calibrated particle size will be displayed at the right of the particle size.

Note
The Calibration result will be displayed in black if it is accepted, and in red if not accepted.

8. If other size Calibration is required for one after another, repeat the sequence from No. 5 to No. 7 for the number of calibrating particle sizes.
   Upon completion of the Calibration, click the “Register” button to register the Calibration result. If the result is rejected, this means the registration cannot be accessed.

9. Upon completion of the Calibration, click the “Quit” button.

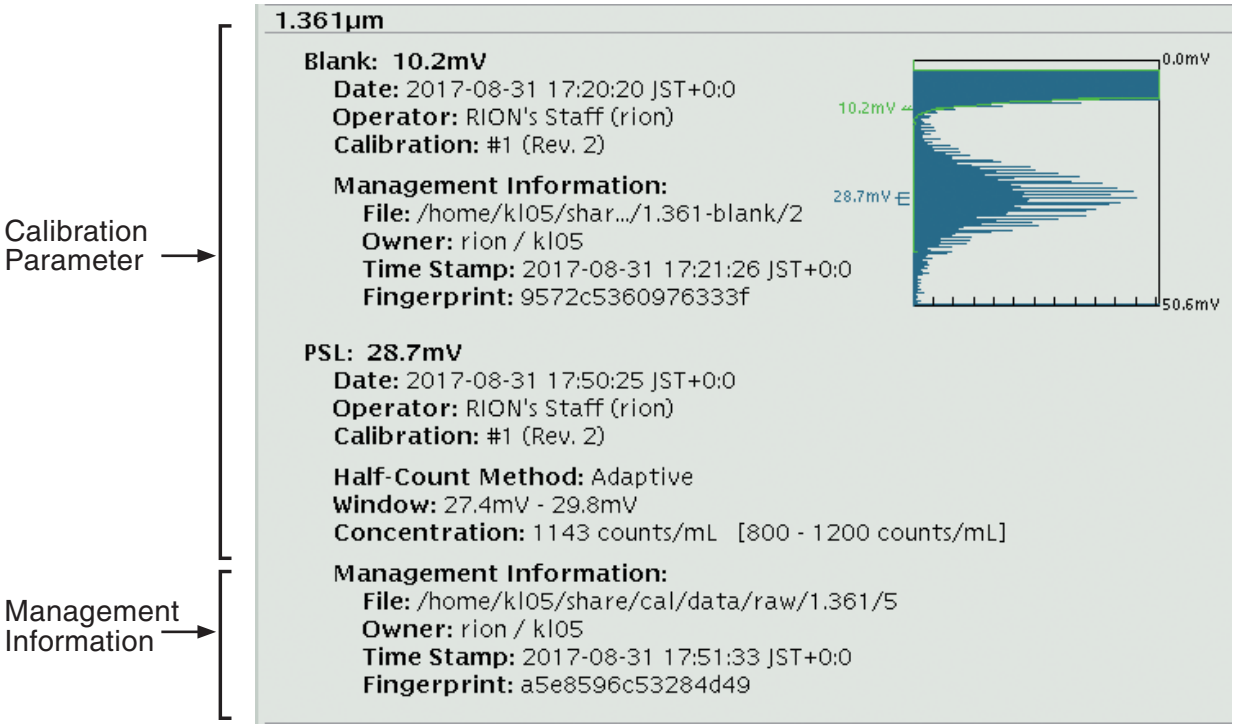
The Calibration results

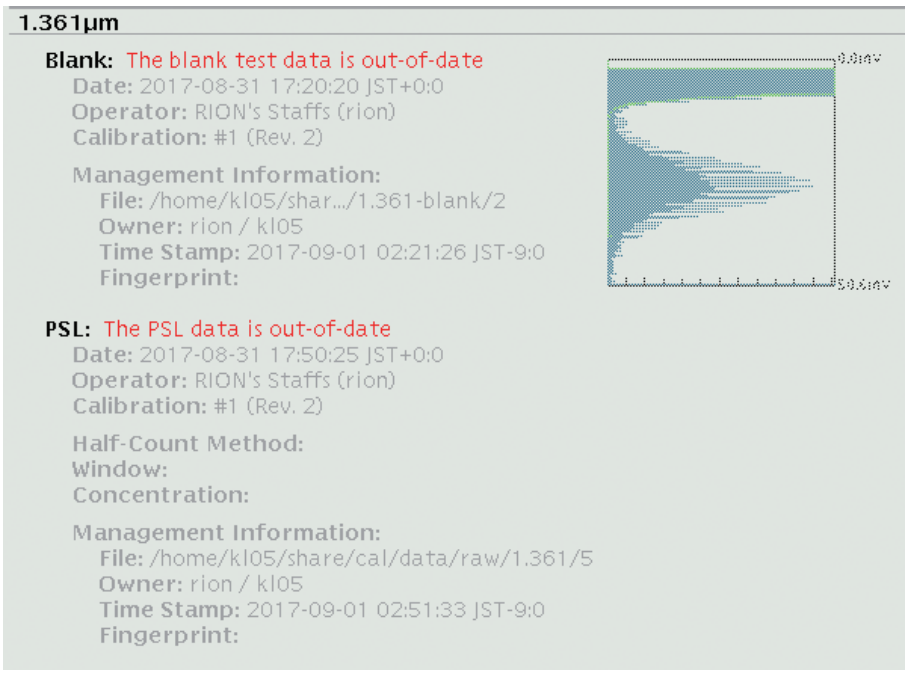


The actual Calibration parameters will be displayed.

Click on the “Show” button and select “Show Management Information?” to display management information.

The Calibration result for an individual particle size

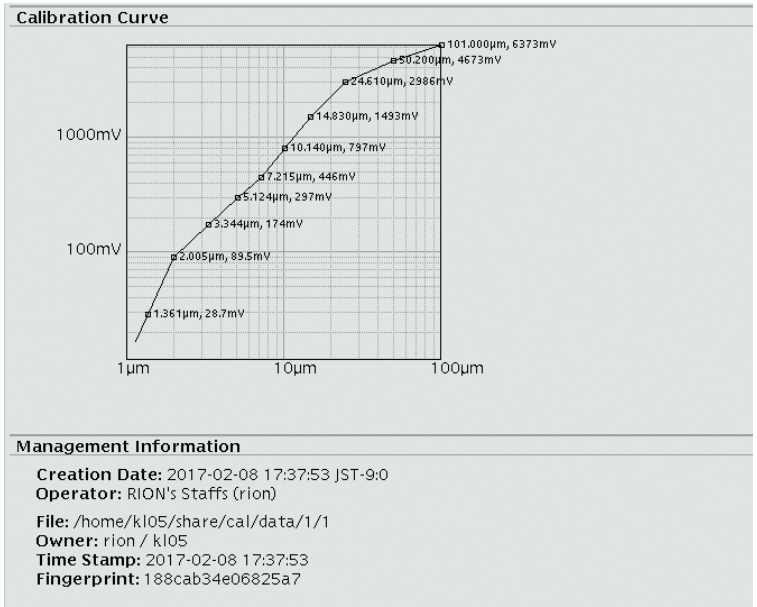




The blank measurement, and the Calibration result for each calibrated particle size, will be displayed with a graph.

Click on the “Show” button and select “Show Management Information?” to display the management information.

Calibration curve

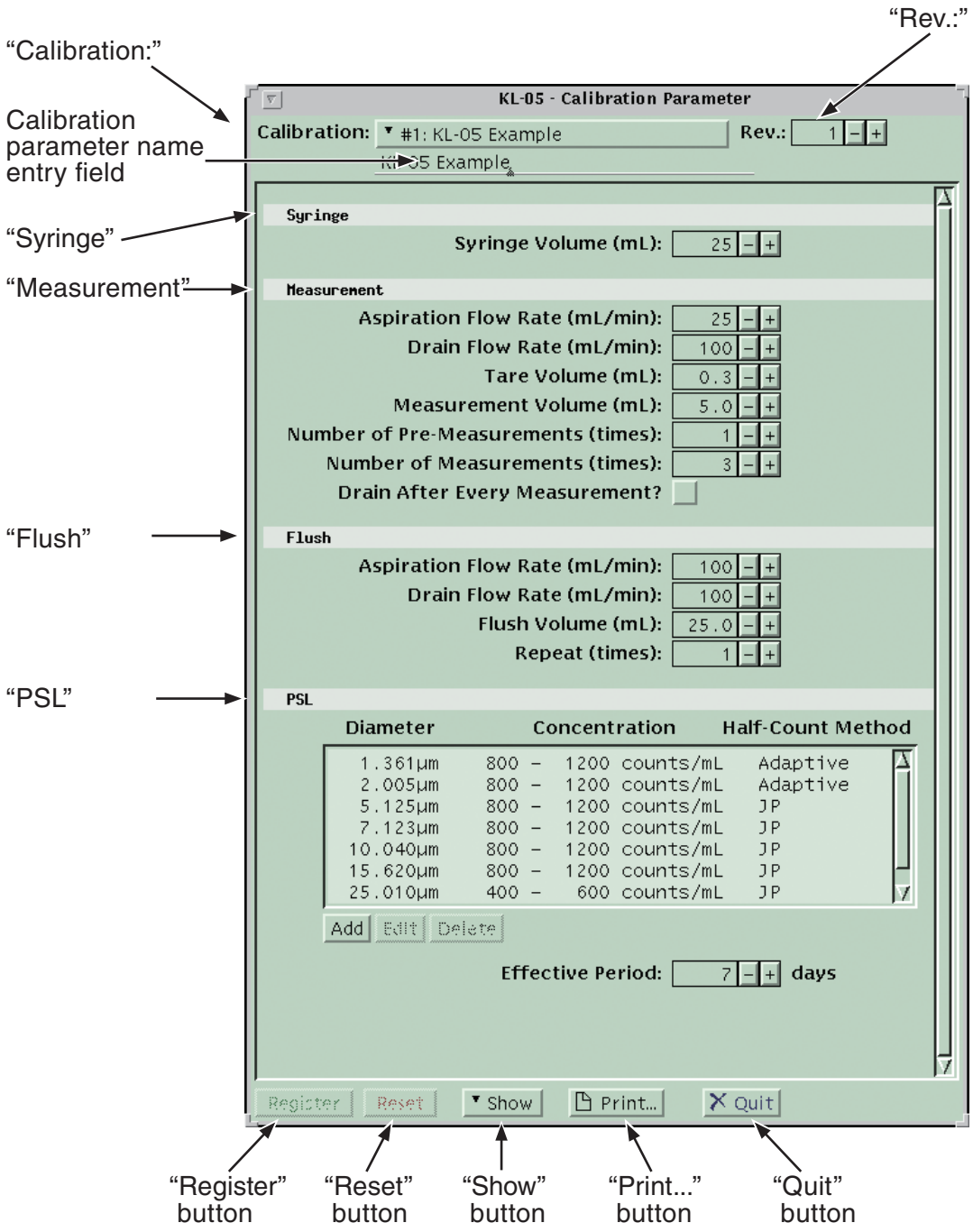


Click on the “Show” button and select “Show Calibration Curve?” to display the calibration curve.

Calibration parameters

“KL-05 - Calibration Parameter” window

Clicking the “Calibration Parameter...” button in the “KL-05 - Start New Window” window or selecting “Calibration Parameter...” in the “Show” menu of the “KL-05 - Calibration” window brings up the “KL-05 - Calibration Parameter” window.



If a key icon is shown at the bottom left of the window, operation is limited to displaying and printing calibration data (see “Operation limitations according to privileges” on page 19). When opening the “KL-05 - Calibration Parameter” window, the latest revision of the #1 calibration parameter is shown.

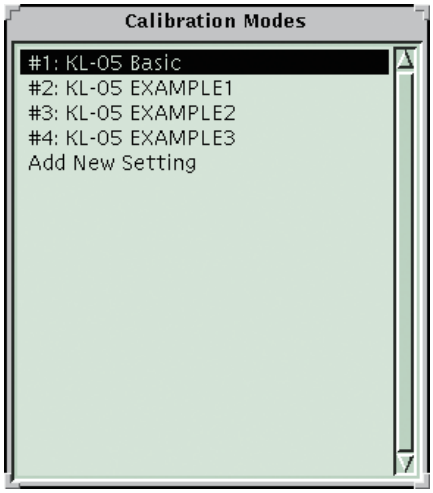
“Calibration:”

Clicking a button with a calibration parameter name brings up the “Calibration Modes” window, letting you select a calibration parameter.

If a calibration parameter was selected (switched), the latest revision of the calibration parameter is shown in the “KL-05 - Calibration Parameter” window.

If the operator has calibration parameter setting privileges, a new calibration parameter can be added as the last item in the “Calibration Modes” list window.

If “Add a New Calibration Parameter” was selected, the setting values in the “KL-05 - Calibration Parameter” window are inherited as defaults, except for the calibration parameter name and the revision. The calibration parameter name field will be blank, and the revision is 1.



“Rev.:” (Revision):

Shows the Calibration Parameter revision. The “–” and “+” buttons allow moving among revisions. The respective revision will be shown in the “KL-05 - Calibration Parameter” window.

Calibration parameter name entry field:

The calibration parameter name is entered here. Maximum allowable length is 93 characters.

"Syringe"

"Syringe Volume (mL):":

The syringe volume (mL) setting range is 5 to 25 (1 mL steps).

The syringe volume (mL) setting may not be lower than the tare volume (mL) + 0.2 mL + measurement volume (mL).

"Measurement"

"Aspiration Flow Rate (mL/min):":

The aspiration flow rate (mL/min) setting range is 5 to 100 (1 mL/min steps).

"Drain Flow Rate (mL/min):":

The drain flow rate (mL/min) setting range is 5 to 100 (1 mL/min steps).

"Tare Volume (mL):":

The tare volume (mL) setting range is 0.2 to 10.0 (0.1 mL steps).

The tare volume (mL) setting may not be larger than the syringe volume (mL) – measurement volume (mL) – 0.2.

If the standard PFA sampling tube is used for measurement, the dead volume from the inlet tip to the sensor is 0.5 mL. Therefore the setting value should be 0.5 mL or higher. If the optional SUS sampling tube is used, the setting should be 0.2 mL or higher.

"Measurement Volume (mL):":

The measurement volume (mL) setting range is 0.2 to [syringe volume (mL) – tare volume (mL) + 0.2] (0.1 mL steps).

"Number of Pre-Measurement (times):":

The number of pre-measurements (times) setting range is 0 to 10 (1 time steps).

"Number of Measurement (times):":

The number of measurements (times) setting range is 1 to 100 (1 time steps).

"Drain After Every Measurement?":

Determines whether draining is performed after each measurement.

The setting is only valid if the combined "number of pre-measurements (times)" + "number of measurements (times)" is 2 or higher.

"Flush"

"Aspiration Flow Rate (mL/min):":

The setting range of the aspiration flow rate (mL/min) for flushing is 5 to 100 (1 mL/min steps).

"Drain Flow Rate (mL/min):":

The setting range of the drain flow rate (mL/min) for flushing is 5 to 100 (1 mL/min steps).

"Flush Volume (mL/min):":

The flush volume (mL) setting range is 0.2 to 25.0 (0.1 mL steps). The flush volume (mL) cannot be set to a higher value than the syringe volume (mL).

"Repeat (times):":

The setting range for the number of flush repeats (times) is 1 to 100 (1 time steps).

"PSL"

"PSL" list:

This brings up a list of registered PSL (calibration particles).

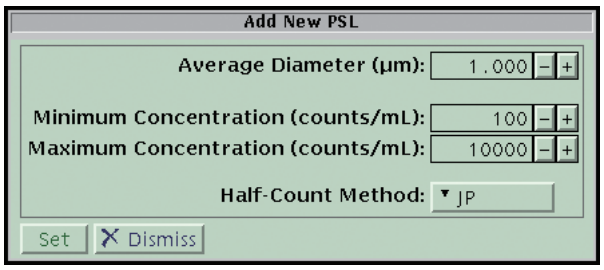
The list uses the following format:

"Size (µm), Minimum Concentration – Maximum Concentration (counts/mL), Half-Count Method".

Particle diameter sizes are shown to three decimal points.

"Add" button:

Clicking this button brings up the "Add New PSL" window for adding a PSL category



You can register up to 15 categories. When this limit is reached, the button becomes unavailable.

"Average Diameter (µm):":

The average diameter (µm) setting range is 1.000 to 150.000 (0.001 µm steps).

"Minimum Concentration (counts/mL):":

The minimum concentration (counts/mL) setting range is 100 to 9999 (1 counts/mL steps).

"Maximum Concentration (counts/mL):":

The maximum concentration (counts/mL) setting range is 101 to 10000 (1 counts/mL steps).

"Half-Count Method:":

The half-count method can be "JP" (default), "USP", or "Adaptive".

If settings for other PSLs were made or edited before clicking the "Add" button, the values for the most recent PSL will be shown as default values.

"Set" button:

Registers the PSL in the "PSL" list and closes the "Add New PSL" window. If a PSL of the same diameter already exists in the PSL list, the existing entry is overwritten.

"Dismiss" button:

Closes the "Add New PSL" window without adding a PSL to the "PSL" list.

"Edit" button:

When a PSL is selected in the "PSL" list, this button becomes available. When the button is clicked, the "Edit PSL Parameter" window for editing the selected PSL appears. The settings in the "Edit PSL Parameter" list are the same as in the "Add New PSL" window.

"Delete" button:

When a channel is selected in the "PSL" list, this button becomes available. Clicking the button deletes the selected PSL.

"Effective Period:":

The PSL effective period setting range is 1 to 9999 (1 day steps).

"Register" button:

This button becomes available only when a calibration parameter was changed. Clicking this button registers the calibration parameter. If a new calibration parameter was added, the revision number will be "1". If an existing parameter was changed, the revision will be incremented by 1 when the "Register" button is clicked.

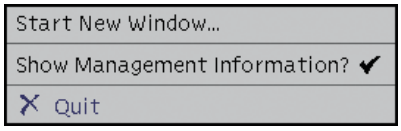
Registering a calibration parameter causes the respective parameter to be generated.

"Reset" button:

This button becomes available only when a calibration parameter was changed. Clicking the button returns the calibration parameter to the condition before editing.

"Show" button:

Clicking this button brings up the "Show" menu.



"Start New Window...":

Selecting this brings up the "KL-05 - Start New Window" window.

(see "KL-05 - Start New Window" on page 51).

"Show Management Information?":

When this is selected, management information for calibration parameters is shown.

When this is not selected (default), management information for calibration parameters is not shown.

The setting condition is registered and will also be retained for the next time the "KL-05 - Calibration Parameter" window is opened.

"Quit":

Click the button to exit the "Show" menu.

“Print” button:

Clicking this button brings up the window for printing calibration parameter (see “Printing” on page 162). The calibration parameter can then be printed by clicking the “Print” button in the “Print” window (see “Printing Calibration Parameter” on page 172).

If no calibration parameters have been changed, registered, or reset, the button is not available.

“Quit” button:

Click the “Quit” button to close the “KL-05 - Calibration Parameter” window.

Setting/Registering Calibration Parameter

1. Display the “KL-05 - Start New Window” window and click the “Calibration Parameter...” button under “View/Set Operation Parameters”.
   The “KL-05 - Calibration Parameter” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

2. Click the calibration parameter name shown to the right of “Calibration:”, then click “Add New Setting” on the displayed “Calibration Modes” list.

Note
Already registered parameters can be used by copying them in the following sequence. First, select the calibration parameter name from the “Calibration Modes” list. Then click “Add New Setting” to copy the parameter.

3. Enter the Calibration Parameter name in the space underneath “Calibration:”.
4. If required, enter figures or checks in the Calibration Parameter field.

Note
See page 102, “Calibration parameters” for the explanations of each Calibration Parameter.

5. Click the “Register” button.
6. When the Calibration Parameter registration is completed, click the “Quit” button.

Note
When the Calibration Parameter has been modified and the “Register” button is then clicked, the parameter is registered and the revision number is incremented by 1.

Backup / Restore

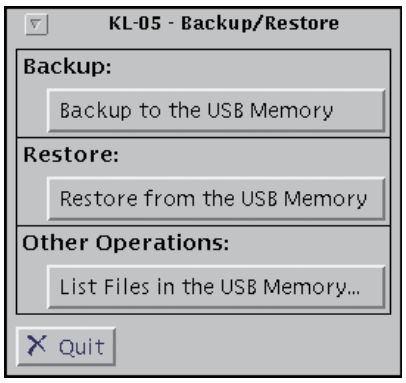
The connected USB flash drive enables data file backup / restore.
We recommend regular data file backup to prevent data file damages caused by unexpected incidents such as storage damage or power failure etc.

Important
Be sure to use a separate USB flash drive for each KL-05 unit. If you restore backup data from a USB flash drive made in one KL-05 in another KL-05, data mismatching and other problems may occur. We recommend to write the serial number of the KL-05 unit onto the USB flash drive to prevent mixups. For information on how to find the serial number, see “System Information” on page 156, or the nameplate attached on the back of unit.
All saved data in the USB flash drive are cleared after the backup. Save beforehand the important data in the USB flash drive.

Note
The backup data when shipping the unit is saved in the supplied USB flash drive.
The use of USB flash drive media purchased from Rion is recommended. As an optional accessory, a different sized USB flash drive is available.
The USB flash drive can be removed at any time, provided that it is currently not being accessed.
If two or more USB flash drive media are inserted, the USB flash drive inserted last will be recognized.

KL-05 - Backup/Restore window

Clicking the “Backup / Restore ...” button in the “KL-05 - Start New Window” window brings up the “KL-05 - Backup/Restore” window.

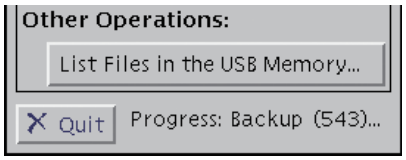


If a key icon is shown at the bottom left of the window, only the “Quit” button is available (see “Operation limitations according to privileges” on page 19).

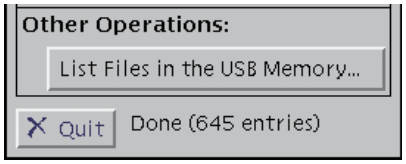
“Backup:”:

“Backup to the USB Memory” button:

When this button is clicked, a confirmation message appears in a popup window. Clicking the “Backup” button in this window causes all data on the USB flash drive to be erased before backup starts. Clicking the “Cancel” button will abort the process without erasing data or starting the backup process. During backup, the progress status is shown to the right of the “Quit” button.



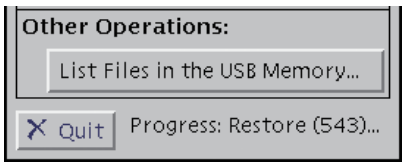
When the backup process is complete, “Done” and the number of entry backup files are shown to the right side of the “Quit” button.



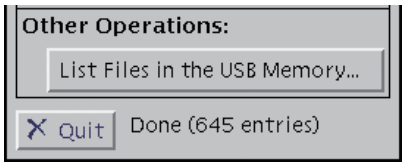
“Restore:”:

“Restore from the USB Memory” button:

Clicking this button starts the restore process. If a file with the same name as a backup file exists in the unit, it will be overwritten by the backup file. During the restore process, files that are currently being processed are shown in the “Backup/Restore List” window. The progress status is also shown to the right of the “Quit” button in the “KL-05 - Backup/Restore” window.



When the restore process is complete, “Done” and the number of entry files are shown to the right side of the “Quit” button.

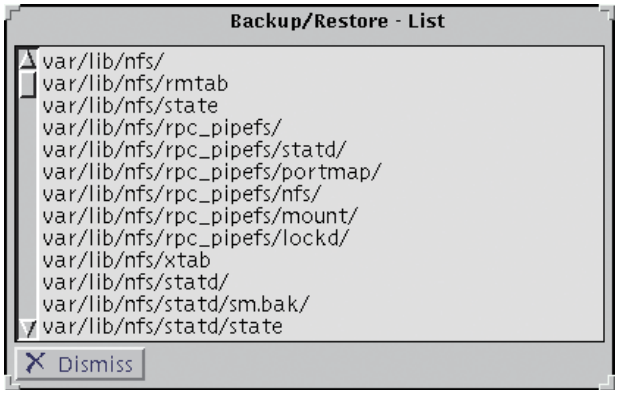


“Other Operations:”:

“List Files in the USB Memory” button:

Clicking this button brings up the “Backup/Restore - List” window.

This window shows files backed up to the USB flash drive. The progress status is also shown to the right of the “Quit” button in the “KL-05 - Backup/Restore” window.



“Dismiss” button:

Click the “Dismiss” button to close the “KL-05 - Backup/Restore - List” window.

“Quit” button:

Click the “Quit” button to close the “KL-05 - Backup/Restore” window.

Backup sequence

1. Connect the USB flash drive to the USB port on the rear panel or front panel of the unit. (see on page 36).
2. Display the “KL-05 - Start New Window” window and click the “Backup/Restore...” button under “Management Task:”
   The “KL-05 - Backup/Restore” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

3. Click the “Backup to the USB Memory” button. The “Parameter - Backup?” window appears.
4. Click the “Yes, Do Backup” button. The backup is started.
5. When the backup process is complete, remove the USB flash drive.

Important
Do not modify or edit data files being backed up to USB flash drive. If a modified file is restored, data may be corrupted and a malfunction will occur.

Note
It is recommended to make a backup before performing actions such as maintenance or shipping the unit.

Restore sequence

1. Display the “KL-05 - Start New Window” window and click the “Backup/Restore...” button under “Management Task:”
   The “KL-05 - Backup/Restore” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

2. Connect the required USB flash drive to the USB port on the rear panel or front panel of the unit. Any USB port can connect the USB flash drive.

Note
If the content of a measurement data file has changed after a backup was created, restoring the data will overwrite the changes and cause the file to revert to the previous condition. For example, if entries were made in the modification column after the backup, restoring will cause the entries to be lost.

3. Click “Restore from the USB Memory” button.
4. When the restore process is complete, remove the USB flash drive.

Password Setting

“Information” window

Clicking “Change Password...” in the “KL-05 - Start New Window” brings up the “Information” window. If the operator password has not yet been set, the “Information” window is skipped and the “Query” window comes up.

“(current) UNIX password:”:

Enter the current password in this field.

“Cancel” button:

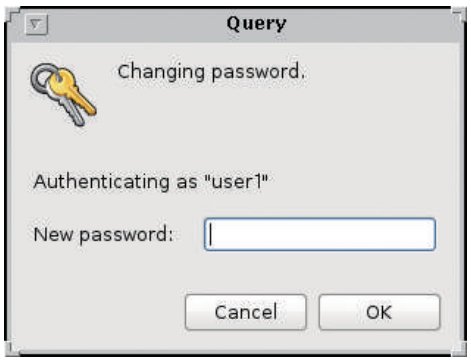
Aborts the password change process and closes the “Information” window.

“OK” button:

If the password entered in the password field matches the current operator’s password, the “Query” window for entering a new password appears.

If the password entered in the password field does not match the current operator’s password, the error message shown below appears in a popup window, and the “Information” window closes.

Entering the correct password for the current operator in the “Information” window and clicking the “OK” button brings up the “Query” window for entering a new password.



“New password:”:

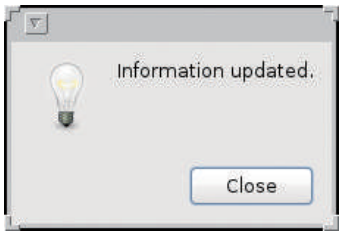
Enter the new password in the password field. The password must be at least 6 characters (no upper limit). Invalid passwords such as repetitions of the same string, dictionary words, palindromes, the current password, strings that include the operator's login name etc. will be rejected when the “OK” button is clicked.

“Cancel” button:

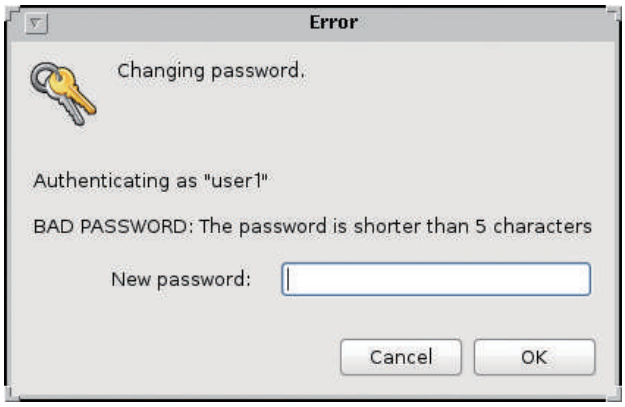
Aborts the password change process and closes the “Query” window.

“OK” button:

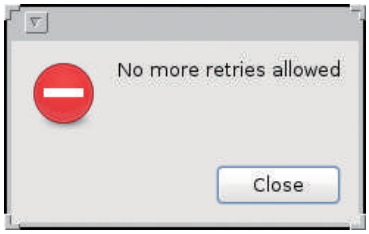
If the password entered into the password field is valid, a screen for entering the password again appears. If the re-entered password matches, the “Query” window closes and a popup window appears, providing confirmation that the password has been updated.



If the entered password was not valid, or if the re-entered password did not match the first entry, an error message appears in the “Query” window.



If entry of a new password was attempted unsuccessfully three times, an error message appears in a popup window and the “Query” window closes.



Registering/Changing the password

The password can be registered or changed as follows.

1. Display the “KL-05 - Start New Window” window and click the “Change Password...” button under “Miscellaneous:”.
   The “Information” pop-up window appears.

2. Type in the current password, then click the “OK” button.
   The “Information” pop-up window reappears.

Note
When a password is not set, there is no step No. 2.
When the password is typed wrongly, the “Error” pop-up window appears. Click the “OK” button to close the window, then start the sequence from No. 1 again.

3. Type a new password then click the “OK” button.
   The “Information” pop-up window reappears.

Note
The password must be at least 6 characters long. There is no upper limit on the length of the password string.
When a password other than specified or a simple password (i.e., repetition of the same letter) are inserted, the “The password you typed is invalid, Please try again” pop-up window appears. Click the “OK” button to close the window and repeat the sequence from No. 1.

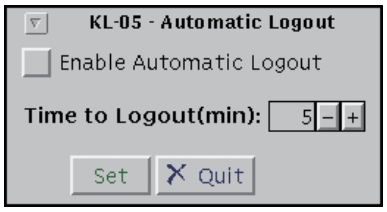
4. Enter a new password then click the “OK” button.

Note
When a wrong password is entered, an “Error” pop-up window appears. Click the “OK” button to close the window and repeat the sequence from No. 3.

Automatic Logout

“KL-05 - Automatic Logout” window

The unit can be set to automatically perform logout after a certain period of inactivity. Inactivity means that no mouse or keyboard operation has occurred and the START and FLUSH buttons have not been pressed.



“Enable Automatic Logout?”:

The check box is used to select whether the automatic logout function is enabled or disabled.

“Time to Logout (min)”:

The time to logout (min) setting range is 1 to 300 (1 min steps).

“Set” button:

When the button is clicked, an information message is shown in a popup window and the setting is applied.

“Quit” button:

Click the “Quit” button to close the “KL-05 - Automatic Logout” window.

Note
If the unit currently is operating, such as carrying out a measurement, the “Time to Logout” countdown will begin after the operation is finished.

Enabling automatic logout

1. Display the “KL-05 - Start New Window” window and click the “Automatic Logout...” button under “Management Operations”.
   The “KL-05 - Automatic Logout” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

2. Select the “Enable Automatic Logout?” check box and set the “Time to Logout (min):”.
3. Click the “Set” button.

Note
If automatic logout was performed, the previous screen and operation results are not saved.
The laser in the unit will continue to operate while power is on. It is therefore recommend to perform a shutdown if the unit is not be used for an extended time.

Operator Management

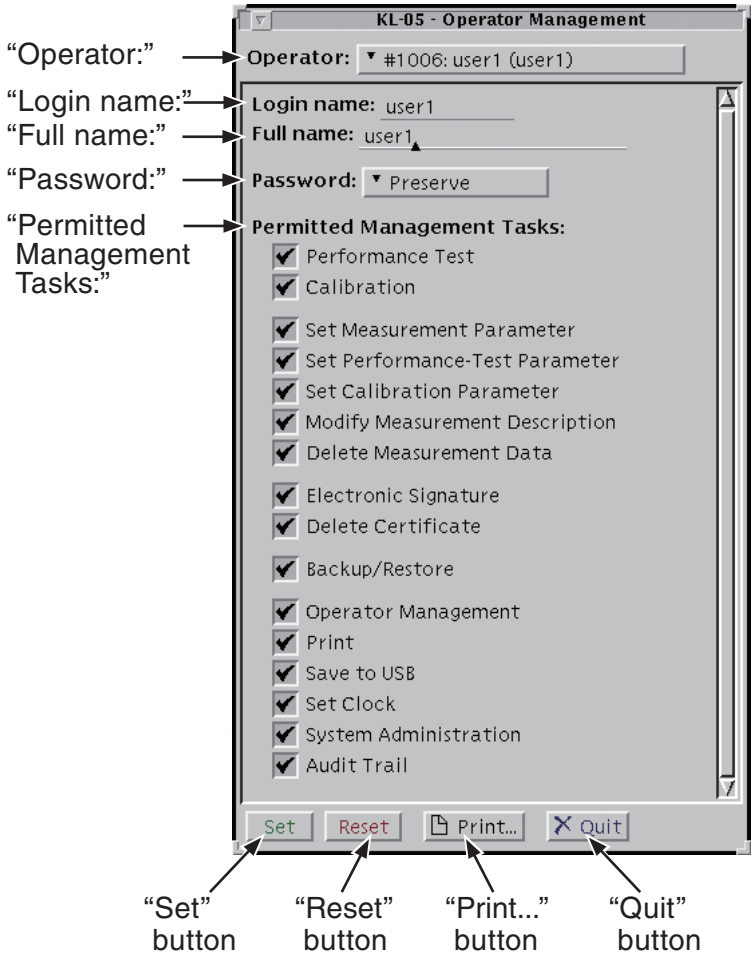
Besides setting measurement parameters and carrying out steps for measurement, the KL-05 also allows a number of administrative tasks, such as performing calibration, checking and ensuring continued Performance-Test compliance, performing data backup, setting the clock, etc.

For these tasks, the unit provides an operator management facility that makes it possible to specify access privileges for individual operators (e.g. Measurement is available, but other management tasks are not permitted). Authorization of one operator to carry out all management tasks is of course also possible.

Note that the steps for regular measurement can be carried out by all registered operators. Measurement is therefore not included in the list of tasks for which access privileges can be set (see below). Also note that an operator cannot change the privilege settings applying to himself.

“KL-05 - Operator Management” window

Clicking “Operator Management...” in the “KL-05 - Start New Window” brings up this window.

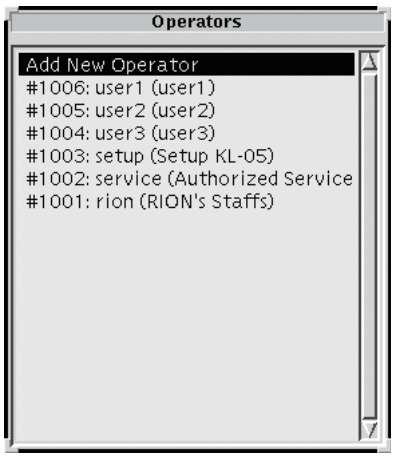


If a key icon is shown at the bottom left of the window, operator registration and operation registration modification cannot be performed (see “Operation limitations according to

privileges” on page 19).
The “KL-05 - Operator Management” window will show a recently registered operator as the initial display.

“Operator:”:

Clicking this button with the operator name on it brings up the “Operators” list window which allows selecting another operator.



If an operator was selected (switched), the registration contents for that operator are shown in the “KL-05 - Operator Management” window.
Selecting “Add a New Operator” causes the “Login name:” and “Full name:” fields to go blank. For “Password”, “Clear” is selected, and the “Permitted Management Tasks:” are all deselected.

“Login name:”:

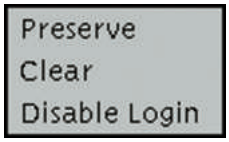
Shows the name selected under “Operator” and allows editing.
If “Add New Operator” was selected, a new login name can be entered here.
The login name can be up to 8 characters long. Only alphanumeric characters and the hyphen “-” can be used.

“Full name:”:

Shows the full name of the operator selected under “Operator” and allows editing. Maximum allowable length is 30 alphanumeric characters.
If “Add New Operator” was selected and this field was blank, the login name is set here.

“Password:”:

Clicking one of the items shown at right brings up a menu for the respective password operation.
If a new operator is being added, the button indication shows “Clear” and the button is not available.



"Preserve":

No change is made to the password (default) (see "Registering/Changing the password" on page 117).

"Clear":

The password for the selected operator is cleared.

"Disable Login":

Login is disabled for this operator. The operator cannot access the system and the operator name is not shown on the login screen list.

"Permitted Management Tasks:":

The level of authorization to undertake management tasks for each individual operator may be set.

When setting the authorization, put check marks in the check boxes.

"Performance Test":

Permit Performance-Test tasks.

"Calibration":

Permit Calibration tasks

"Set Measurement Parameter":

Permit the measurement parameter setting tasks.

"Set Performance-Test Parameter":

Permit the Performance-Test parameter setting tasks.

"Set Calibration Parameter":

Permit the Calibration parameter setting tasks.

"Modify Measurement Description":

Permit making entries in the measurement data modification columns (Sample, No., Memo).

"Delete Measurement Data":

Permit measurement data deletion steps.

"Electronic Signature":

Enables electronic signature operations.

"Delete Certificate":

Enables deleting a certificate.

"Backup/Restore:

Permit data backup stored on the storage and the restore tasks. The connected USB flash drive with USB port of the unit is used for data backup.

"Operator Management":

Enables performing registration and privileges management for other operators, as well as making automatic logout and password expiration settings.

"Print":

Enables printing operations.

"Save to USB":

Enables USB flash drive operations.

"Set Clock":

Permit authorization for the setting of the system clock.

"System Administration:

Permit network setting tasks.

"Audit Trail":

Permit viewing of audit trail.

"Set" button:

If "Add New Operator" was selected, clicking this button allows registration of the new operator. The password will not be set. If an existing operator is selected, the registration content is changed.

"Reset" button:

This button becomes available when the operation registration content has changed. Clicking this button returns the operator registration content to the condition before editing.

"Print..." button:

Clicking this button brings up the window for printing the operator registration content (see "Print" on page 162). The operator registration content can then be printed by clicking the "Print" button in the "Print" window (see "Printing Operator List" on page 173).

"Quit" button:

Clicking this button closes the "KL-05 - Operator Management" window. If the button is clicked after changing the operator registration content or adding a new operator but without having clicked the "Set" button, a confirmation message appears in a popup window. Clicking the "Quit" button in the window closes the "KL-05 - Operator Management" window (any changes in settings will not be preserved). Clicking the "Cancel" button causes the "KL-05 - Operator Management" window to remain open.

Making operator registration settings

In the factory default condition, no “operator” is registered on the login screen. It is therefore necessary to first create and register an operator who is enabled to then perform registration and make settings for other operators. To do this, proceed as follows. For adding an operator, start from step 3.

1. Input the login name provided by RION in the “Username” space on the Login screen. The “Username” space display will change to a “Password” space.
2. Input the password provided by RION to the “Password” space then press the “Enter” key to login.
3. Display the “KL-05 - Start New Window” window and click the “Operator Management...” button under “Management Tasks”.
   The “KL-05 - Operator Management” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

4. Click the operator name shown to the right of “Operator:”, then click “Add New Operator” from the displayed “Operators” list.
5. Type a login ID of not more than 8 letters into the “Login name” space.

Important
A login name can include small letters, numbers and hyphens (-).

6. If required, input a “Full name” in up to a maximum of 30 letters / figures. If this is not entered, an assumed “Login name” will be set.
7. Check the respective operation items of “Permitted Management Tasks:” which the operator will be enabled to perform (privileges).

Note
See page 120 for the task item details.

8. Click the “Set” button.
9. Click the “Quit” button to close the window.

Note
The login name and the password provided by RION are common to all KL-05 products. We recommend that you change the password and the login name provided by RION after registering an operator who has the “Operator Management” authorization. This is to avoid a login by a third party. See page 117 for the “Registering/Changing the password”.

Change of operator registration details

1. Display the “KL-05 - Start New Window” window and click the “Operator Management...” button under “Management Tasks”.
   The “KL-05 - Operator Management” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

2. Click the operator name shown to the right of “Operator:”, then click “Add New Operator” from the displayed “Operators” list.
3. If necessary, check each task item on the “Permitted Management Tasks”, then set the required authorization.

Note
See the “KL-05 - Operator Management” window shown on the following page 120 for task item details.

4. Click the “Set” button.
5. Click the “Quit” button to close the window.

Certificate Management

Certificate Management

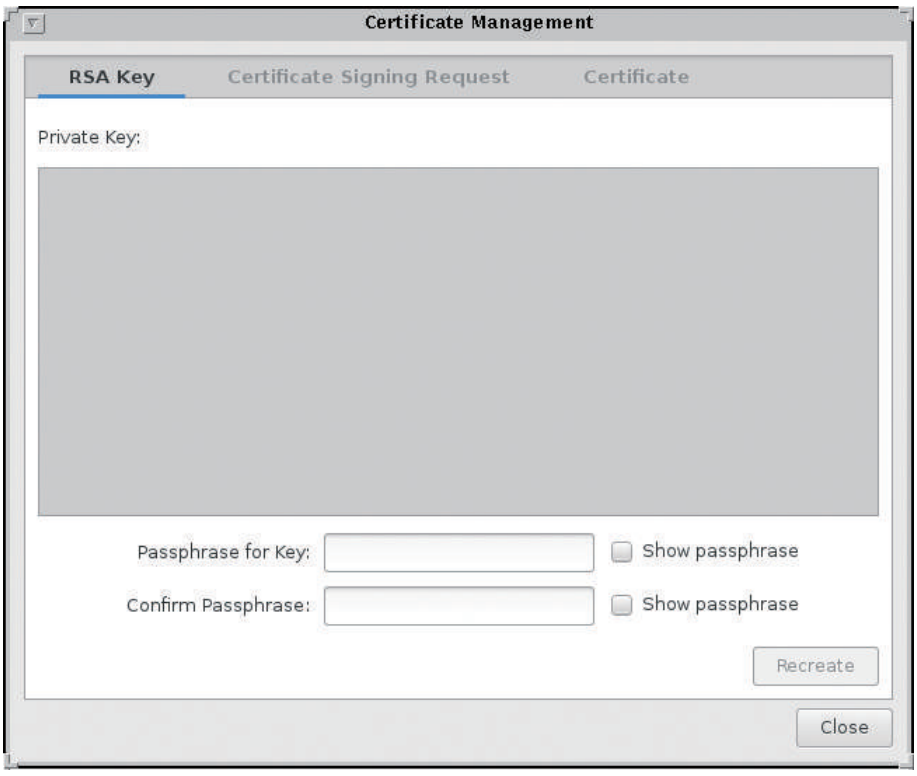
This chapter describes how to manage certificates to be electronically signed on this unit. The procedure for acquiring certificates is described on page 4.

“Certificate Management” window

Clicking the “Certificate Management...” button in the “KL-05 - Start New Window” window brings up the “Certificate Management” window

“RSA Key” tab

Serves for managing the RSA key which is used for a certificate signing request, and also when creating a personal information exchange file (PFX format) for an electronic signature.



“Private Key:”:

When the RSA key has been created, the private RSA key information (encrypted) is shown here.

“Passphrase for Key:”:

Enter the passphrase for creating the RSA key. Allowable characters are lower-case and upper-case alphabetic characters, numerals and the hyphen. The first character must be an alphabetic character. The passphrase must be between 6 and 256 characters in length. If the “Show passphrase” check box is not selected, the input will be masked with asterisks (*).

“Confirm Passphrase:”:

Re-enter the same passphrase here for confirmation. If the “Show passphrase” check box is not selected, the input will be masked with asterisks (*).

“Show passphrase”:

If the check box is selected, the entered character string is shown. If the check box is not selected (default), the string entered into the passphrase field will be masked with asterisks (*).

“Create” / “Recreate” button:

Click the button to create or recreate the RSA key. The button becomes available if the entered RSA key passphrase is 6 characters or more and the input into both fields matches.

If no RSA key currently exists, the button is labeled “Create”. If RSA key exists, the button is labeled “Recreate”.

Important
When an RSA key has been recreated, any certificates associated with the previous RSA key will be deleted. You should therefore proceed with care when recreating the RSA key because deleted certificates cannot be re-used.

“Close” button:

Click the “Close” button to close the “Certificate Management” window.

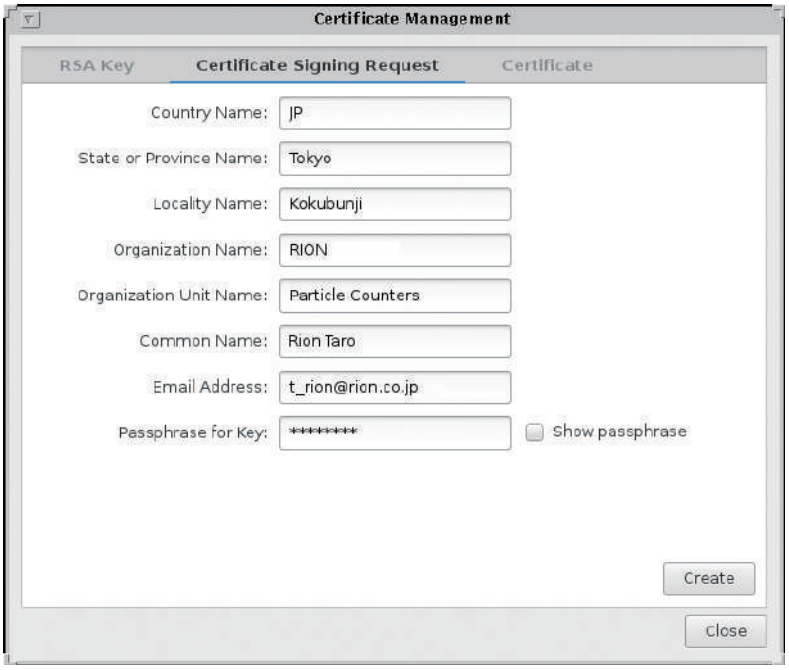
Certificate creation

“Certificate Signing Request” tab

Serves for entering the required information (distinguishing name) for the certificate signing request and exporting the request in PEM format.

The maximum length of the Country Name string is 256 characters.

Because string requirements for the other input fields are dependent on the certificate authority, no limitations are set in this window.



“Country Name:”:

Enter the country name (2-character ISO 3166 code). This is a required item.

“State or Province Name:”:

Enter the state or province name. This is a required item.

“Locality Name:”:

Enter the locality name. This is a required item.

“Organization Name:”:

Enter the organization name. This is a required item.

“Organization Unit Name:”:

Enter the organization unit name. This is an optional item.

“Common Name:”:

Enter the common name (usually the full name of the operator). This is a required item.

“Email Address:”:

Enter the email address of the contact person. This is an optional item.

“Passphrase for Key:”:

Enter the RSA key passphrase. If the “Show passphrase” check box is not selected, the input will be masked with asterisks (*).

“Show passphrase”:

If this check box is selected, the entered character string is shown. If this check box is not selected (default), the string entered into the passphrase field is masked with asterisks (*).

“Create” button:

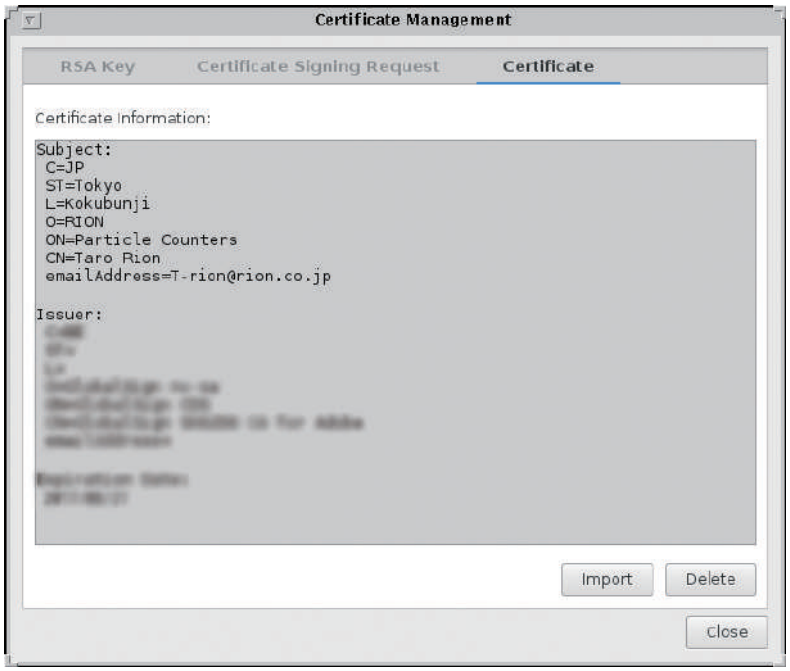
A certificate signing request file with the file name “Operator name” + “extension” (.csr) is output to the USB flash drive.

“Close” button:

Click the “Quit” button to close the “Certificate Management” window.

“Certificate” tab

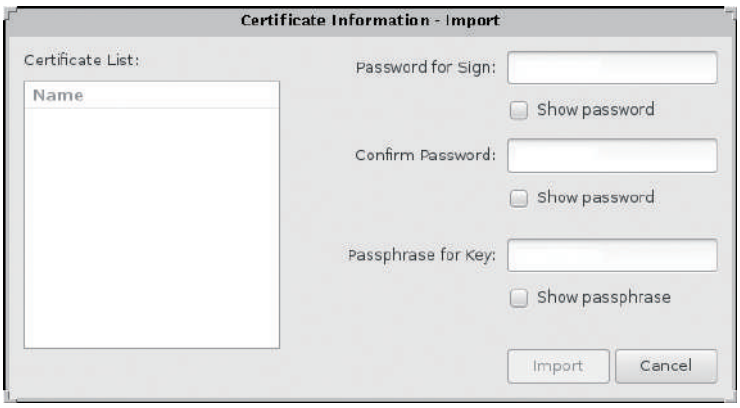
Displays the subject and issuer information in the certificate.



“Import” button:

Imports a certificate from a USB flash drive. x509 certificates encoded in PEM format or individual information exchange files can be imported. If an RSA key has been created, certificates linked to a certificate signing request exported by the unit can be imported.

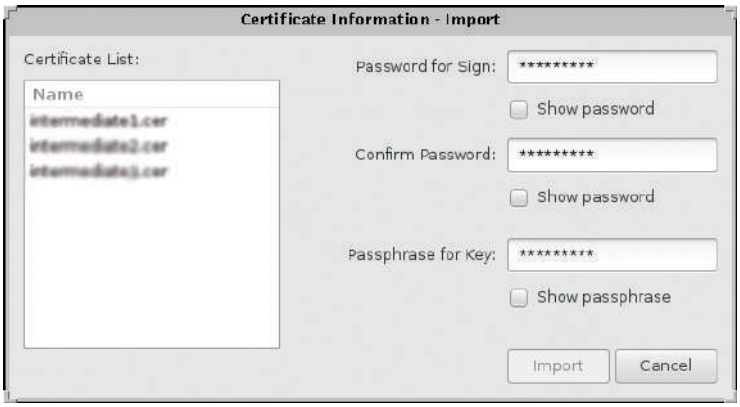
Clicking the button brings up a dialog box. If no USB flash drive is inserted, an error message will appear.



“Certificate List:”:

Shows a list of certificates on the USB flash drive that can be imported. Files with the extension .crt and .cer, or .Pfx and .P12 are listed.

In order for the certificate list to appear, the USB flash drive must already be inserted into the unit before calling up the dialog box. If a USB flash drive is inserted at a later point, the certificate list will not be updated.



“Password for Sign:”:

Enter the password for your Electronic Signature. If the “Show password” check box is not selected, the input will be masked with asterisks (*).

“Confirm Password:”:

For confirmation, re-enter the same string that was entered into the “Password for Sign” field. If the “Show password” check box is not selected, the input will be masked with asterisks (*).

“Show password”:

If this check box is selected, the entered character string is shown. If this check box is not selected (default), the string entered into the password field is masked with asterisks (*).

“Passphrase for Key:”:

Enter the RSA key passphrase (See page 126). If the “Show passphrase” check box is not selected, the input will be masked with asterisks (*).

“Show passphrase”:

If this check box is selected, the entered character string is shown. If this check box is not selected (default), the string entered into the passphrase field is masked with asterisks (*).

“Import” button:

Imports the selected certificate. The button is only available if all of the following conditions are met:

- The “Password for Sign” and the “Confirm Password” strings are at least 6 characters.
- The “Password for Sign” and the “Confirm Password” strings match.
- The “Passphrase for Key” has been input.

“Cancel” button:

Cancels the certificate import process and closes the dialog box.

“Delete” button:

Deletes the certificate. The button is not available if no certificate exists.

Clicking the button brings up a confirmation dialog box.

“Close” button:

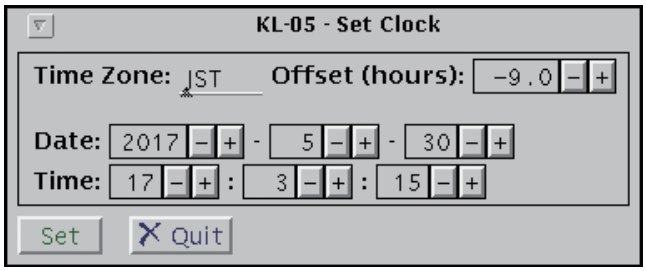
Closes the “Certificate Management” window.

Note
When an individual information exchange file has been selected, no input is required for the “Confirm Password” and “Passphrase for Key” fields.

Set Clock

“KL-05 - Set Clock” window

Clicking the “Set Clock...” button under “Management Tasks:” in the “KL-05 - Start New Window” window brings up the “KL-05 - Set Clock” window.



If a key icon is shown at the bottom left of the window, only the “Quit” button is available (see “Operation limitations according to privileges” on page 19).

“Time Zone:”:

Input the appropriate time (i.e., to use this unit) in the designated space.

“Offset (hours):”:

Input the time difference between the setting region and the UTC.

Note
At the time of shipment, the Japanese time zone is set as JST, with minus 9.0 hours for the offset.

“Date:”:

Input the year in the left space, the month in the middle and the date in the right space.

“Time:”:

Input the hour in the left space, minutes in the middle and seconds in the right space.

“Set” button:

Clicking this button accepts the date and time settings.

When this button is clicked, a confirmation message appears in a popup window.

“Quit” button:

Click the button to close the “KL-05 - Set Clock” window (the clock will not be set).

Set clock

1. Display the “KL-05 - Start New Window” window and click the “Set Clock...” button under “Management Tasks:”.
   The “KL-05 - Set Clock” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

2. Input the required settings.

Note
See page 132 for more details on each feature of the “KL-05 - Set Clock” window.
Enter only three letters in the “Time Zone:” space.

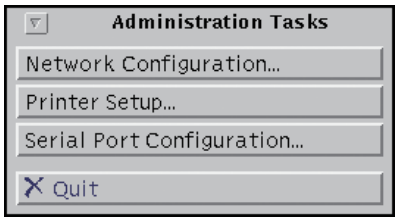
3. Click the “Set” button.
   The confirmation message appears.
4. Click the “Yes, Set the Clock” button.
   A message appears recommending a logout.
5. Click the “Dismiss” button to close the message.
6. Log out then log in again.

Important
After setting the clock, be sure to logout to ensure that subsequent operations are recorded with the correct time information.

System Administration

“Administration Tasks” window

Clicking the “System Administration...” button in the “KL-05 - Start New Window” window brings up the “Administration Tasks” window.



If a key icon is shown at the bottom left of the window, only the “Quit” button is available (see “Operation limitations according to privileges” on page 19).

“Network Configuration...” button:

Brings up the “Network Connections” window for making network settings (see page 135).

“Printer Setup...” button:

Brings up the “Print Settings” window (see page 138).

“Serial Port Configuration...” button:

Brings up the “Serial Port Configuration” window (see page 144).

“Quit” button:

Click the “Quit” button to close the “Administration Tasks” window.

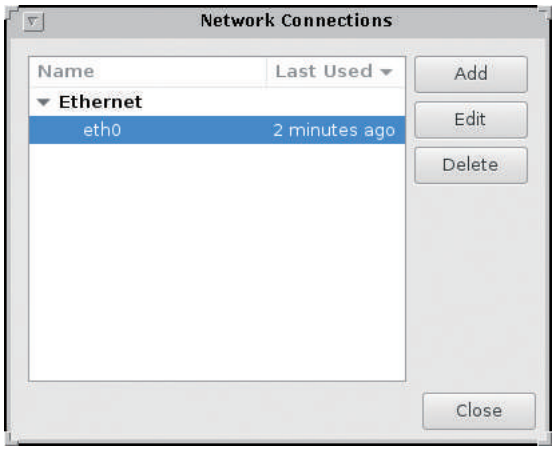
Network settings

Network settings must be set up when using a network printer, performing access via FTP, or for other uses of the Ethernet connector. For network connection using the Ethernet connector, see page 192.

Settings

“Network Connections” window

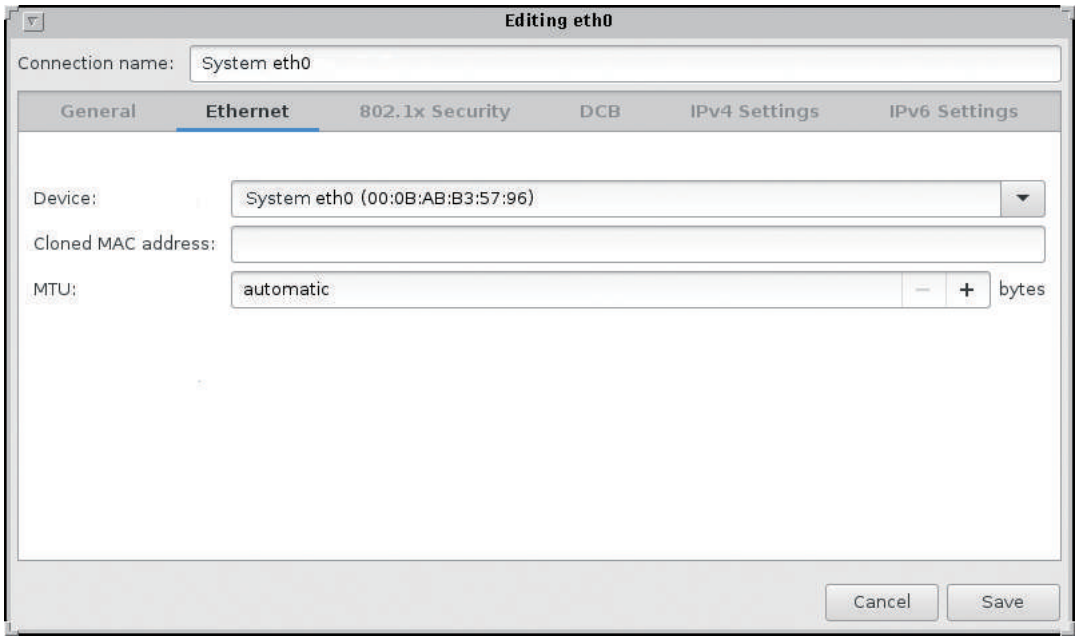
Clicking the “Network Configuration...” button in the “Administration Tasks” window brings up this window.



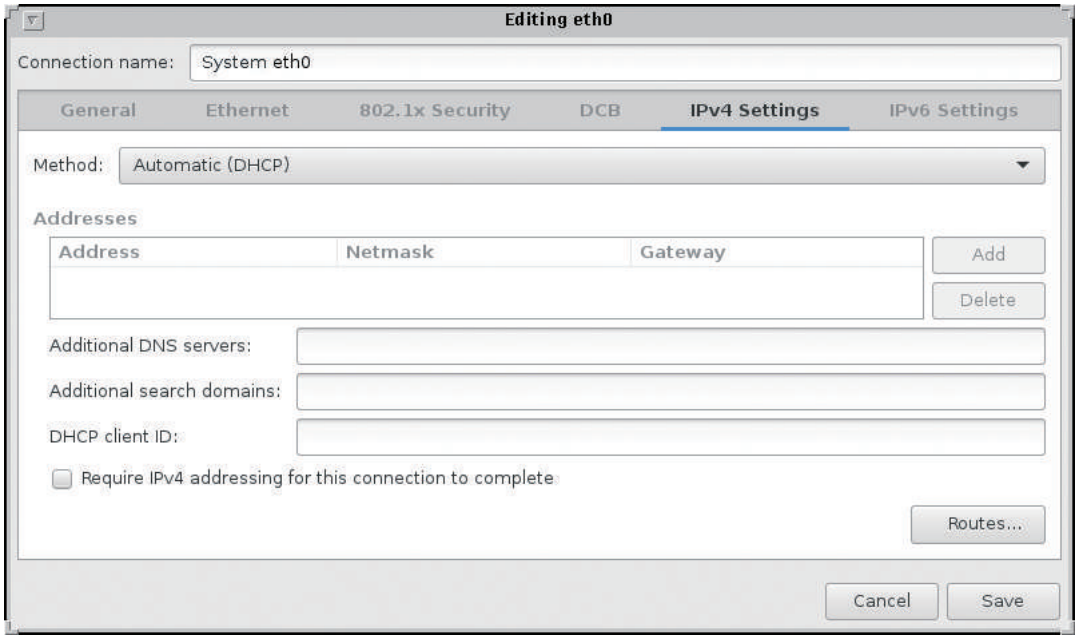
“System eth0” is the network interface name used by the system. Clicking “System eth0” and then clicking the “Edit” button brings up the “Editing eth0” window.

“Editing eth0” window

The “Editing eth0” window allows input of network settings.

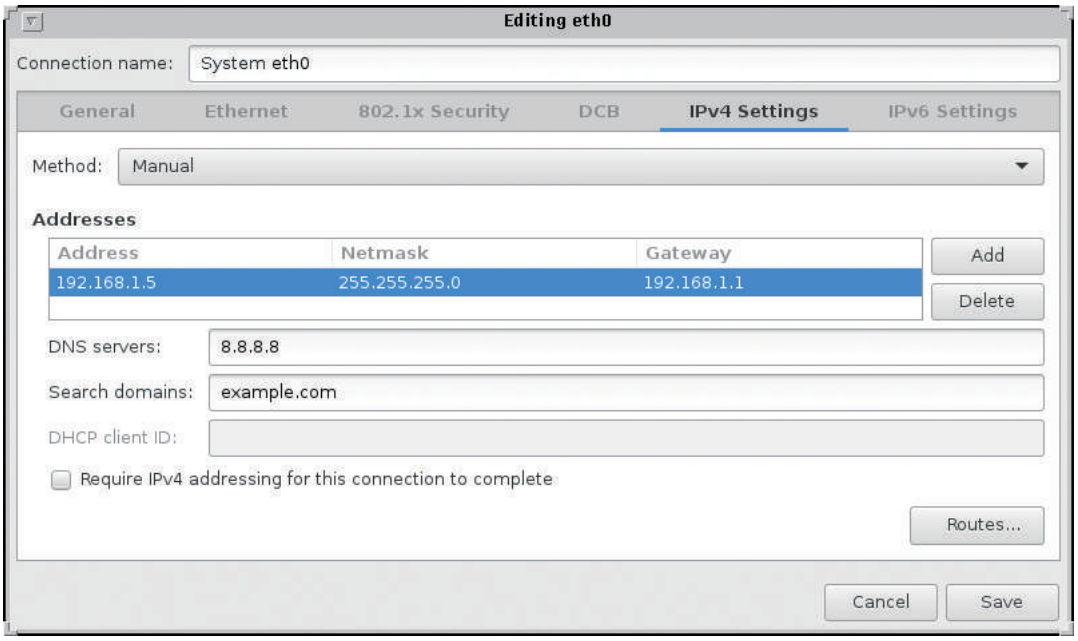


The network settings are made under the “IPv4 Settings” tab in the above window. Opening the “IPv4 Settings” tab switches to the screen for making IP address settings.



The IP address setting method can be selected from “Method:”. The default setting is “Automatic (DHCP)”.

To specify a static IP address, set “Method:” to “Manual” and enter the required information.



“Addresses” field:

Enter the IP address, subnet mask, and the default gateway.

“DNS servers:” field:

Enter the DNS servers (multiple specifications separated by a comma are allowed).

“Search domains:” field:

Enter the domain name (multiple specifications separated by a comma are allowed).

* Entries except for IP address and subnet mask are optional.

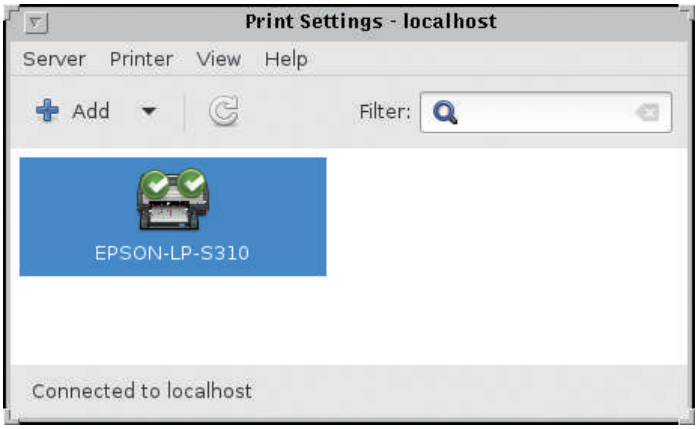
Clicking the “Save” button accepts and saves the settings.
In order to enable the settings, the system must be restarted.

Printer settings

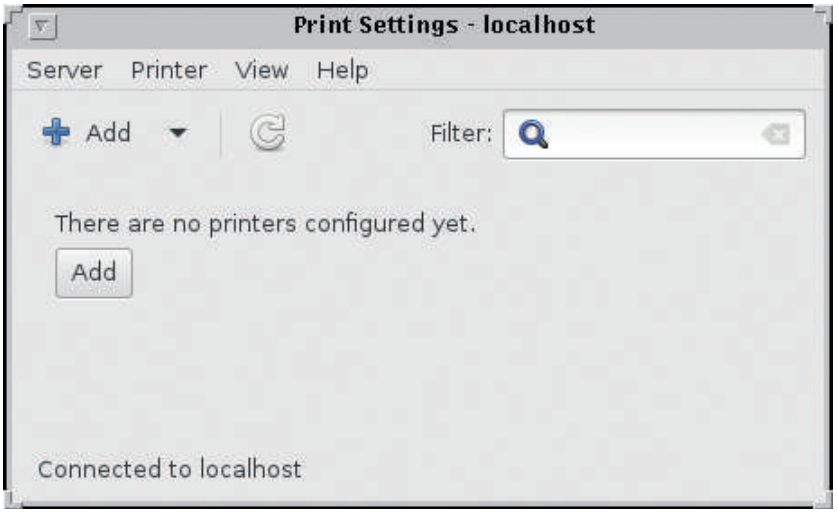
Settings

“Print Settings” window

Clicking the “Print Settings...” button in the “Administration Tasks” window brings up this window.



If no printers have been configured, the message “There are no printers configured yet” is shown, along with an “Add” button.

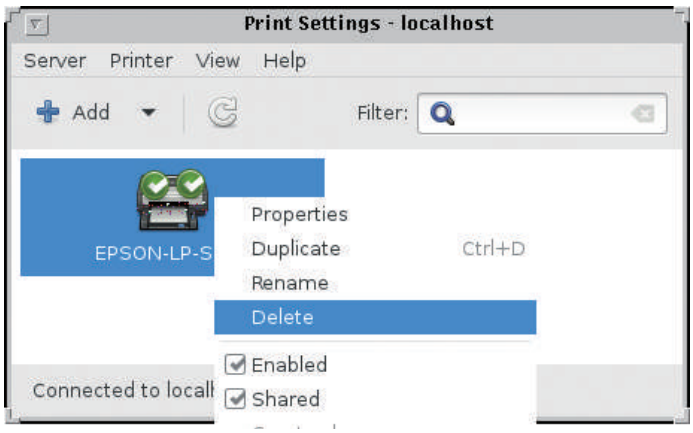


Adding a printer:

Clicking the “+Add” button or the “Add” button brings up the “New Printer” window for adding a printer.

Deleting a printer:

Right-clicking the icon for a registered printer brings up a menu. Select “Delete” from this menu to delete the registered printer.

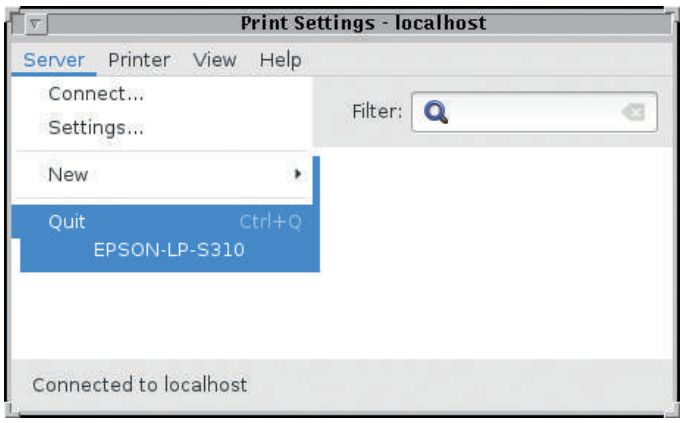


Selecting “Delete” brings up a confirmation popup.

If “Cancel” in this window is clicked, the printer will not be deleted. Clicking the “Delete” button deletes the printer.

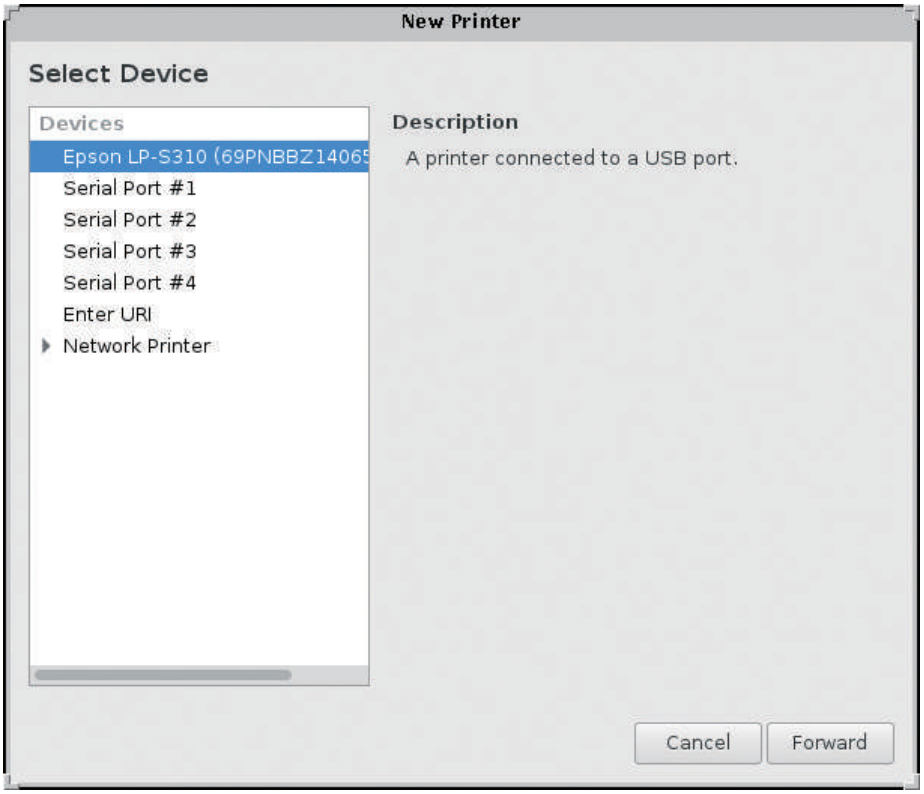
Closing the “Print Settings” window:

Selecting “Quit” from the “Server” menu closes the “Print Settings” window.

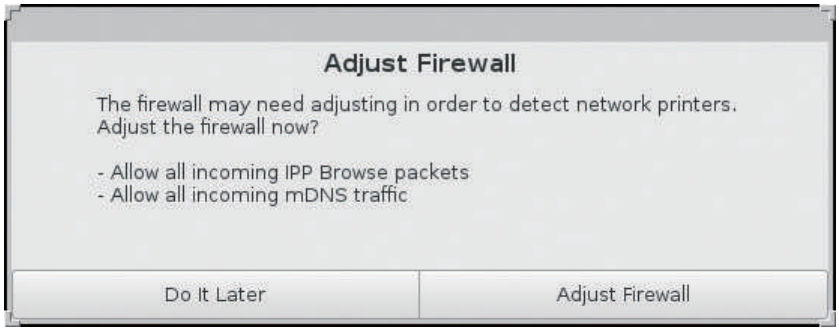


New Printer window

Clicking the “Add” button in the “Print Settings” window brings up this window. Here you can add a printer connected via USB or a network printer.

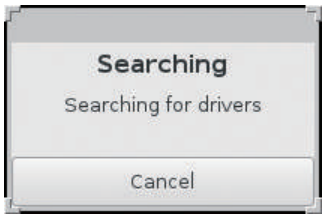


A recognized printer will appear in the “Devices” list. If the unit is connected to a network, recognized printers on the network will be shown under “Network Printer”. When the window is displayed for the first time, a configuration popup appears, asking for permission to adjust the firewall settings to allow searching for a network printer.

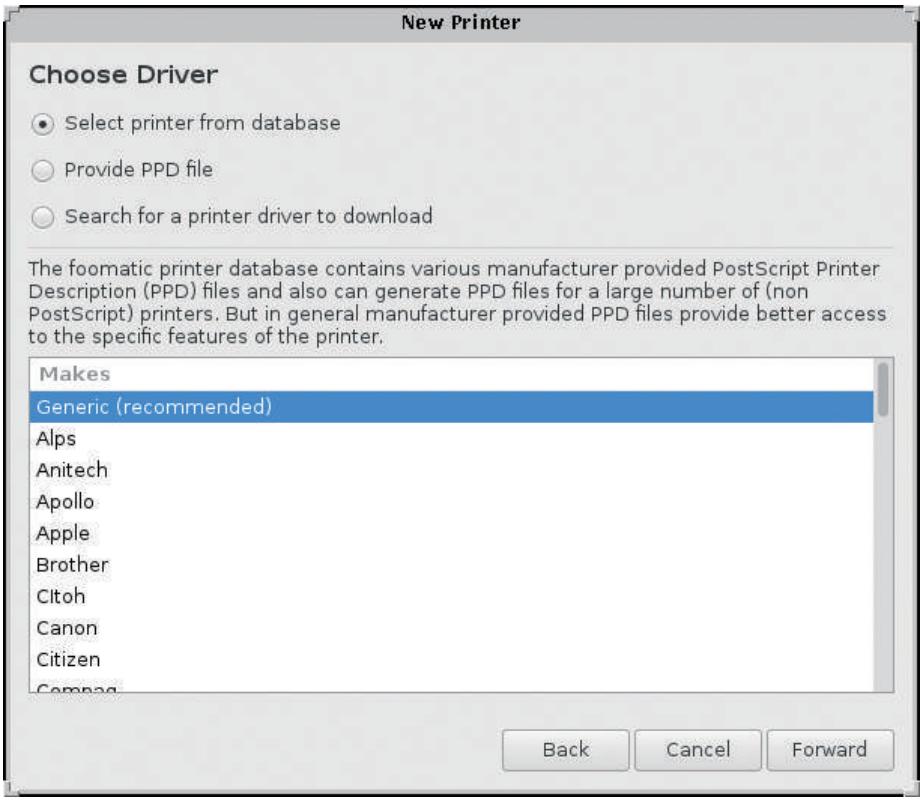


If you click the “Do It Later” button, the firewall settings are not adjusted (the dialog box will appear again the next time the window is opened). If you click the “Adjust Firewall” button, the firewall settings are adjusted.

Select the device corresponding to the printer to registered and click the “Forward” button. The message shown below will appear, indicating that the system is searching for drivers.

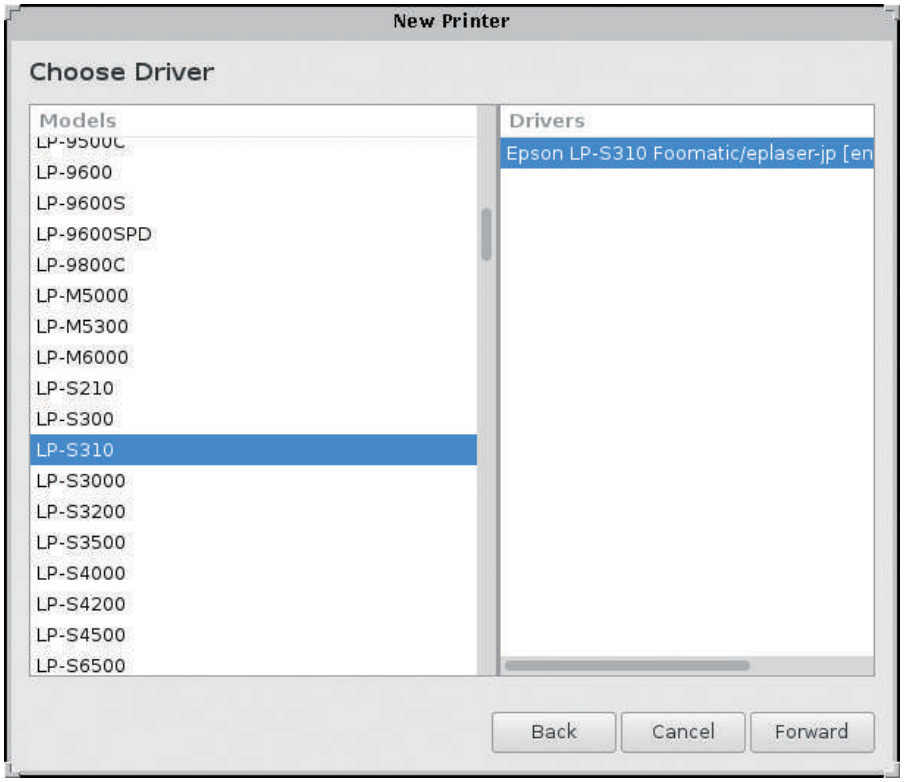


If no driver was found, the screen changes as shown below, allowing you to select a driver.

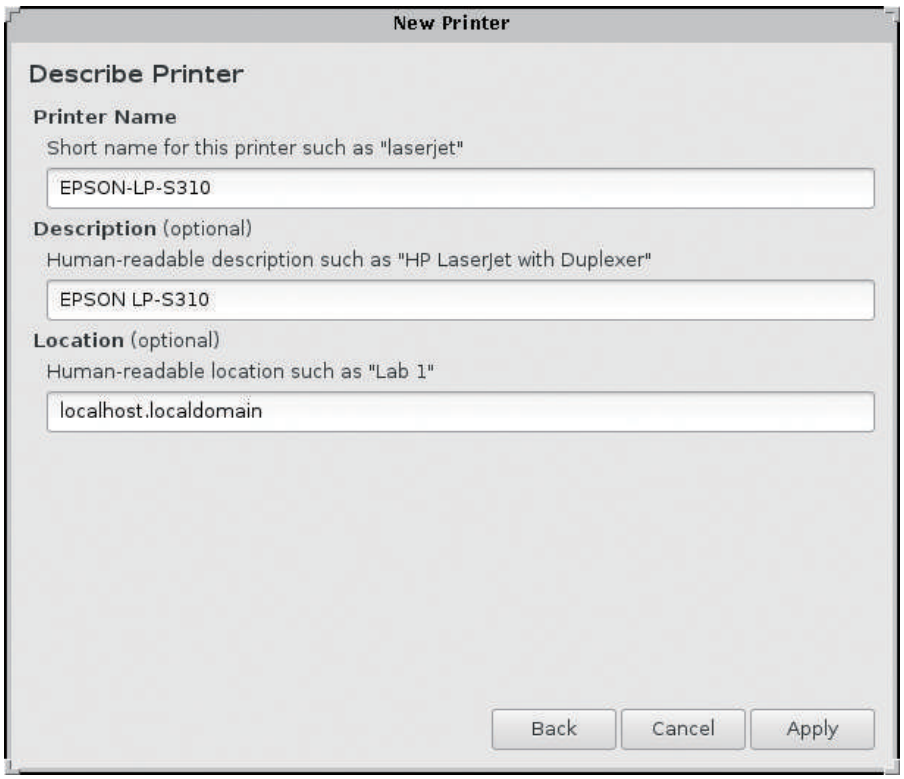


First select a printer manufacturer and then click the “Forward” button to bring up a screen with the printer models of that manufacturer. (This possibly may not include all existing models.)

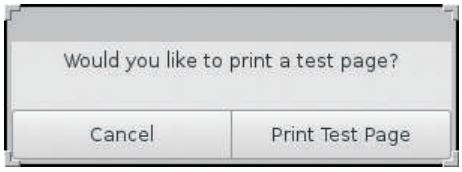
Select the printer model and driver.



After the driver has been found automatically or selected manually, a screen for entering printer information appears.



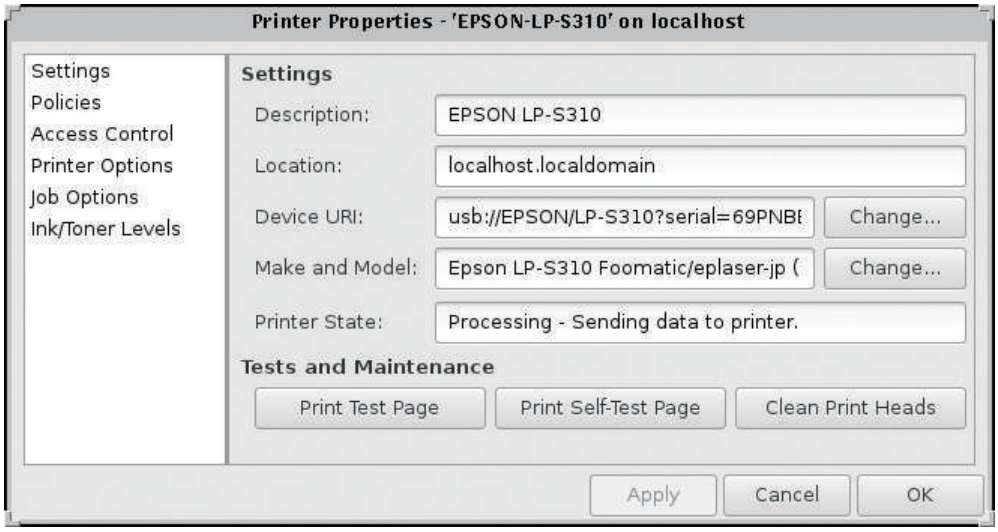
Clicking the “Apply” button on this screen causes the printer to be added. A popup window for performing a test printout appears.



If you click the “Cancel” button, the test page is not printed.

If you click the “Print Test Page” button, the test page is printed.

When you close the test printout popup window, the “Printer Properties” window appears.



Click the “OK” button to close the “Printer Properties” window.

Note
Printer options can be set under the “Printer Option” tab in the “Printer Properties” window. The available options will differ depending on the printer model.

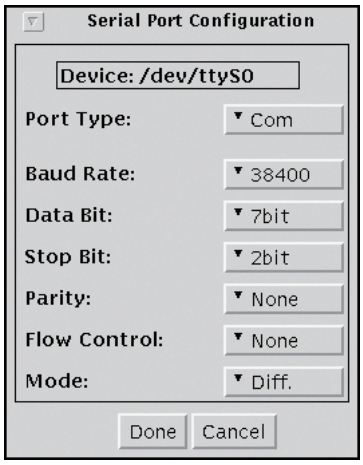
Serial port settings

The settings for using the serial port on the rear of the unit can be made as follows.
For serial communication, the separately available CC-61A cable (option) is required. For details on the connection method, see page 191, and for details on measurement data communication, see page 186.

Settings

“Serial Port Configuration” window

Clicking the “Serial Port Configuration...” button in the “Administration Task” window brings up the “Serial Port Configuration...” window.



“Device:”:

Shows the serial port device name of the unit.

“Port Type:”:

The serial port type can be set to “Com” (default) or “USB-Com”.
Selecting “Com” enables serial data transfer using the SERIAL port on the rear panel. Selecting “USB-Com” enables serial data transfer using the USB port.

“Baud Rate:”:

The baud rate [bps] can be set to “9600”, “19200”, “38400” (default) or “57600”.

“Data Bit:”:

The data word length can be set to “7bit” (default) or “8bit”.

“Stop Bit:”:

The stop bit can be set to “1bit” or “2bit” (default).

“Parity:”:

The parity can be set to “None” (default), “Even” or “Odd”.

“Flow Control:”:

Sets the flow control (XON/XOFF). When “Yes” is selected, flow control is enabled. When “No” is selected, flow control is disabled.

“Mode:”:

Specifies the output format for measurement data values. The “Diff.” setting (default) enables differential values, and the “Cumm.” setting enables cumulative values.

“Done” button

Closes the “Serial Port Configuration” window.

“Cancel” button:

Closes the “Serial Port Configuration” window without saving the settings.

Audit Trail

Audit trail

The audit trail function is compliant with regulations for electronic recording, such as the "FDA 21 CFR Part 11".

The KL-05 continuously records operation history data (when/who/which operation).

These data can be displayed, searched (by time period, operator, class, event), and the display contents can be printed.

Access to this function can be set for each operator using the "Permitted management tasks" (see page 122). This makes it possible to clearly distinguish between administrators and operators, and to transparently manage the production of documents (printouts).

Operations recording in the audit trail

For operations listed in the table below, audit trail information is recorded at the point where the operation is completed, or where the file is created in the case of operations that create a file upon completion.

For information on class names, event names, and notes, please refer to the recording format for each item below

Operation	Class	Event	Note
Power-ON*1	system	power-on	
Power-OFF*1	system	power-off	
Log-in	operator	log-in	localhost
Log-out	operator	log-out	localhost
Password modification	operator	password modified	
Measurement data creation	file	create	target file name
Measurement data annotation change	file	modified	target file name
Export the measurement data	file	export	serial output successful or serial output fail
Measurement data deletion	file	delete	target file name or target directly name
Output of measurement data to USB flash drive	file	export	usb_memory
Measurement parameter creation	file	create	target file name
Performance test data registration	file	create	target file name
Performance test parameter creation	file	create	target file name
Calibration data registration	file	create	target file name
Calibration parameter creation	file	create	target file name
Printing and PS file output	file	print	target file name

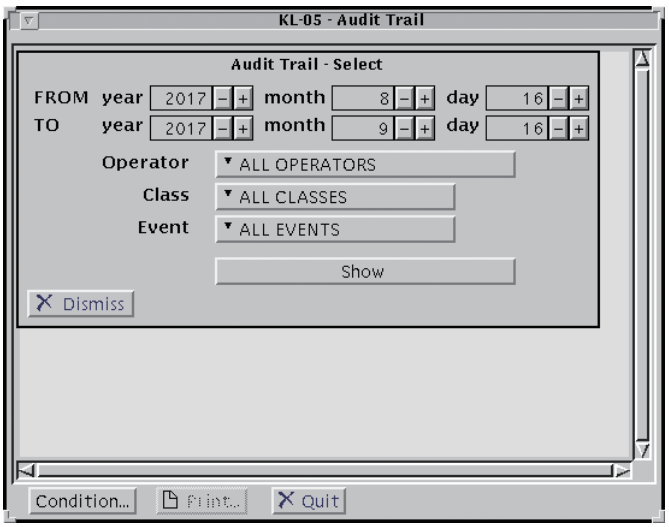
Audit trail printing and output to PS file	Audit Trail	print	Printing screen search conditions
Backup	usb_memory	backup	successful or fail, and checked item names successful|fail,All Operators' Files, System Files *2
Restore	usb_memory	restore	successful or fail, and checked item names successful|fail, System Files *2
Add operator	operator_mgr	create	newly created operator name
Change operator privileges or password of other operator	operator_mgr	modified	name of operator with changed privileges
Date/time change	date	modified	Date/time after it changes
Operator has opened network configuration screen	network	modified	
Operator has opened printer configuration screen	printer	modified	
Operator has opened serial port configuration screen	serial	modified	
Certificate request export	certificate	export	target file name
Certificate import	certificate	import	target file name
Certificate deletion	certificate	delete	target file name
RSA key (private) creation	es	create	secret key
Electronic signature for measurement data	es	write	target file name (PDF)
Output of electronically signed PDF file to FTP/FTPS server	es	export	target file name or target server URL
Printing of electronically signed PDF file	file	print	target file name
Login to certificate management screen	certificate_manager	log-in	
Logout from certificate management screen	certificate_manager	log-out	

*1 Operation operator is always recorded as “root”.

*2 The successful fail indication refers to either successful or fail being specified.

“Audit Trail - Select” window

Clicking the “Audit Trail...” button in the “KL-05- Start New Window” window brings up the “Audit Trail - Select” window and the “KL-05 - Audit Trail” window.



If a key icon is shown to right of the “KL-05 - Audit Trail” window, only the “Quit” button is available (see “Operation limitations according to privileges” on page 19). In this case the “KL-05 - Audit Trail” window is not displayed.

“FROM”:

Enter the start date. When using the window the first time, the date when the window is shown is displayed.

“Year”: The year setting range is 1970 to 2069 (1 year steps).

“Month”: The month setting range is 1 to 12 (1 month steps).

“Day”: The day setting range is 1 to 31 (1 day steps).

“TO”:

Enter the end date. When using the window the first time, the date when the window is shown is displayed.

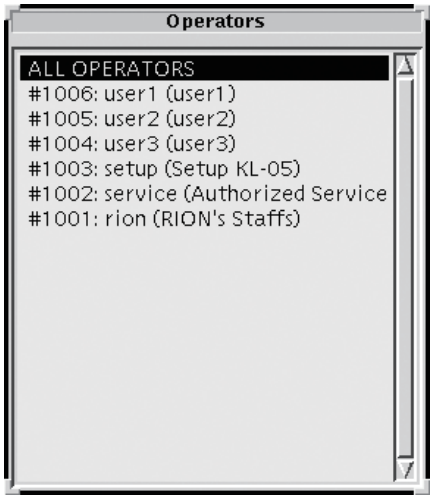
“Year”: The year setting range is 1970 to 2069 (1 year steps).

“Month”: The month setting range is 1 to 12 (1 month steps).

“Day”: The day setting range is 1 to 31 (1 day steps).

“Operator”:

Clicking the button with the operator name on it brings up the “Operators” list window which allows selecting the operator who recorded the audit trail. Selecting the top item “ALL OPERATORS” causes audit trails recorded by all operators to be searched (default).



“Class”:

Clicking a button with a class name brings up a menu to select an audit trail class (operation category). The following classes can be selected.
Selecting “ALL CLASSES” causes all classes to be searched (default).

ALL CLASSES
file
operator
system
operator_mgr
date
network
printer
Audit Trail
usb_memory
serial
certificate
es
certificate_manager

"Event":

Clicking a button with an event class name brings up a menu to select an audit trail event (operation name). The following events can be selected. Selecting "ALL EVENTS" causes all events to be searched (default).

ALL EVENTS
create
write
modified
delete
import
export
log-in
log-out
power-on
power-off
password modified
backup
restore
print

"Show" button:

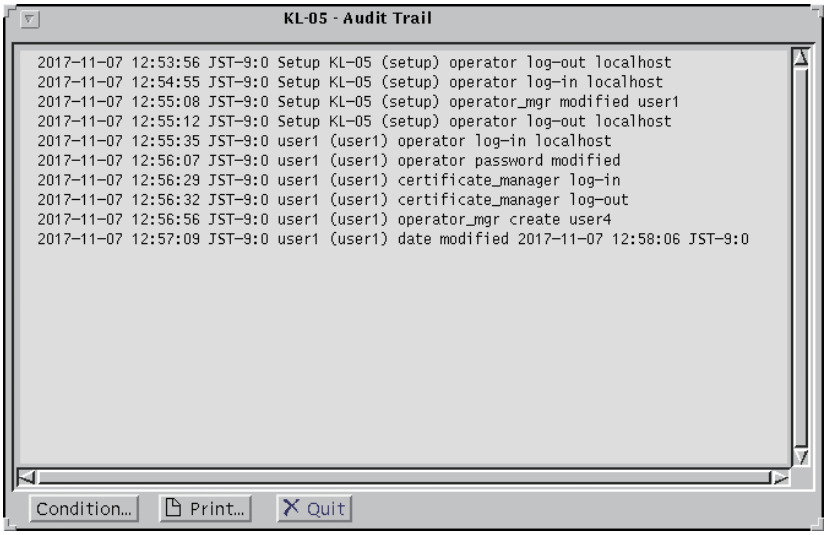
Clicking this button brings up the "KL-05 - Audit Trail" window.

"Dismiss" button:

Clicking this button closes the "Audit Trail - Select" window.

“KL-05 - Audit Trail” window

Clicking this button brings up the “Audit Trail - Select” window. This window shows audit trail entries according to the conditions set in the “Audit Trail - Select” window, in the order that the operations were carried out.



If a key icon is shown to right of the “KL-05 - Audit Trail” window, only the “Quit” button is available (see “Operation limitations according to privileges” on page 19).

“Conditions...” button:

Clicking this button closes the “Audit Trail - Select” window.

“Print” button:

Clicking this button brings up the window for printing audit trail search results. The results can then be printed by clicking the “Print” button in the “Print” window.

If there are no audit trail search results, the button is not available.

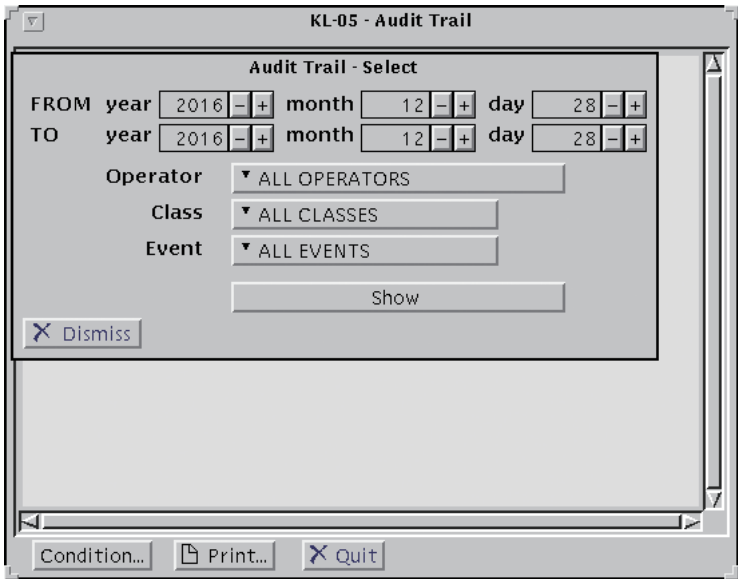
“Quit” button:

Clicking this button closes the “KL-05 - Audit Trail” window.

Searching and viewing the audit trail file

1. Display the “KL-05 - Start New Window” window and click the “Audit Trail...” button under “Management Operations”.
   The “KL-05 - Audit Trail” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.
For operators whose full name was changed in the past, only the current full name will be used as a search target. To view the audit trail for the past full name, select “ALL OPERATORS”.



2. In the “Audit Trail - Select” window, select the display conditions using the time stamp fields (FROM year/month/day and TO year/month/day) and the buttons for Operator, Class, and Event. Then click the “Show” button to show the pertinent information in the “KL-05 - Audit Trail” window.

Note
If you have selected “ALL OPERATORS”, “ALL CLASSES”, and “ALL EVENTS”, the entire audit trail information will be shown.

3. Click the “Dismiss” button in the “Audit Trail - Select” window to close the window.

Note
By clicking the “Print...” button in the “KL-05 - Audit Trail” window, you can print out the currently displayed audit trail information (see page 174).

4. When you click the “Conditions...” button in the “KL-05 - Audit Trail” window, the “Audit Trail - Select” window appears again.
5. To close the “KL-05 - Audit Trail” window, click the “Quit” button.

Audit trail backup and restore

The audit trail information is always included in a backup. During restore, the audit trail file will not be overwritten. When restore has been performed, an asterisk (*) will be shown to the left of the audit trail item, which indicates that the item pertains to the condition before restore. If restore is carried out multiple times, the audit trail information is also retained in multiple levels. When an item with an asterisk is included, the same recorded content will be shown in the audit trail multiple times.

For details on the backup and restore functions, see the section “Backup / Restore ” starting on page 109.

Password Expiration Time

You can set the expiration time of a password as described below. Starting from seven days before the end of the expiration time, a comment will appear during login. When the expiration time has elapsed, a window requiring a change of password will appear at login.

“KL-05 - Password Expiration Time” window

Clicking “Set Password Expiration Time...” in the “KL-05 - Start New Window” brings up this window.

If a key icon is shown at the bottom left of the window, only the “Quit” button is available (see “Operation limitations according to privileges” on page 19).

Note
The administrator can set the password expiration time for other operators.

“Password expiration time:”:

Clicking one of the items shown at right brings up a menu for selecting the password expiration time.

“OFF”: No expiration time is set for password.

“1 month”: Password expiration time is set to 30 days.

“3 month”: Password expiration time is set to 90 days.

“6 month”: Password expiration time is set to 180 days.

“1 year”: Password expiration time is set to 365 days.

“Set” button:

Clicking this button accepts the password expiration time settings and closes the “KL-05 - Password Expiration Time” window.

“Quit” button:

Clicking this button closes the “KL-05 - Password Expiration Time” window.

Password expiration time setting

1. Display the “KL-05 - Start New Window” window and click the “Set Password Expiration Time...” button under “Management Tasks”.
   The “KL-05 - Password Expiration Time” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

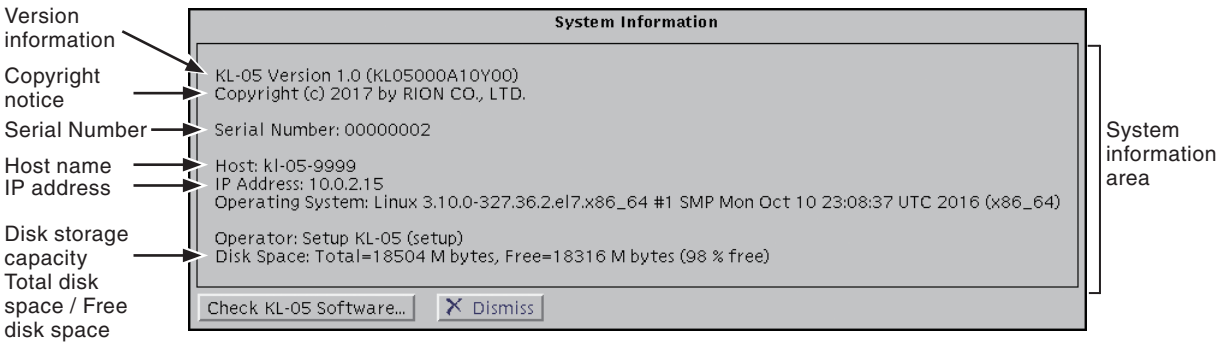
2. Select the password expiration time.
3. Click the “Set” button.

Note
The password expiration is updated at 9:00 a.m.

System Information

“System Information” window

Clicking “System Information...” in the “KL-05 - Start New Window” brings up “System Information” window.



System Information area:

Shows various information about the system.

“Check KL-05 Software...” button

Clicking this button will check the fingerprint (MD5 checksum) of the KL-05 software and display the inspection result in a pop - up window.

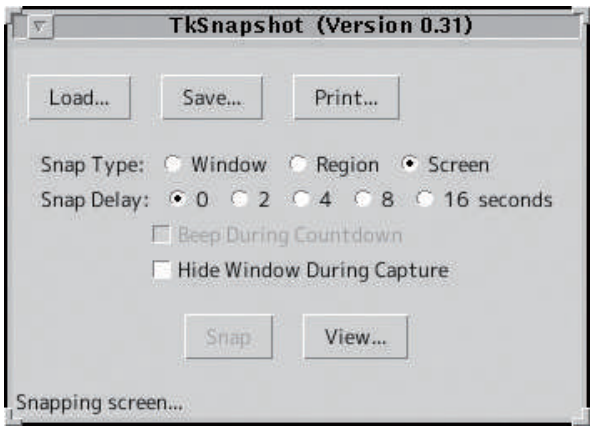
“Dismiss” button:

Click the “Dismiss” button to close the “System Information” window.

Screen Snapshot

“TKSnapshot (Version 0.31)” window

Clicking the “Snapshot...” button in the “KL-05 - Start New Window” brings up the TkSnapshot (Version 0.31) window.



“Load...” button:

Clicking this button brings up a file selection dialog box which allows loading snapshot data taken previously.

“Save...” button:

This button is available when a snapshot has been taken, or when previously taken snapshot data are loaded. Clicking the button brings up a file save dialog box which allows loading saving snapshot data. The image format can be selected from the following options: Automatic, SunRaster, GIF, PNG, PPM, TIFF, BMP, XBM, XWD, EPSF (default: XWD).

Note
The KL-05 does not support printing from the “TKSnapshot (Version 0.31)” window. For information on snapshot image printing, refer to page 161.

“Snap Type:”:

“Window”:

When this item is selected, the snapshot target is a single window.

“Region”:

When this item is selected, the snapshot target is a rectangular area. After clicking the “Snap” button, use the mouse to drag the rectangle to the desired size to take a snapshot of this area.

“Screen”:

When this item is selected, the snapshot target is the entire screen.

“Snap Delay:”:

Allows setting a delay time (in seconds) for taking the snapshot. When the “Snap Type” is set to “Region”, this is not available.

“Beep During Countdown”:

This becomes available when “Snap Delay:” has been enabled and a time other than “0” has been selected. When the item is selected, a beep tone is heard every second until the snapshot is taken.

“Hide Window During Capture”:

When this item is selected, the snapshot window is not shown when a screenshot is taken.

“Snap” button:

Clicking this button causes the screenshot selected with “Snap Type:” to be taken.

“View...” button

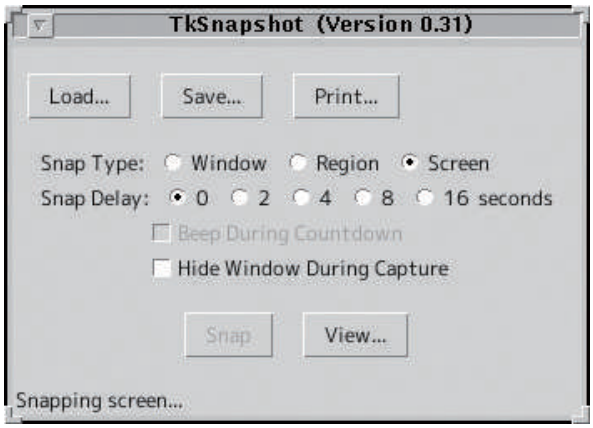
This button is available when a snapshot has been taken, or when previously taken snapshot data are loaded. Clicking this button displays the captured snapshot on the screen.

Taking a snapshot

The snapshot function saves the current screen image as a file for viewing and printing.

1. Display the “KL-05 - Start New Window” window and click the “Snapshot...” button under “Unsupported”.
   The “TkSnapshot (Version 0.31)” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

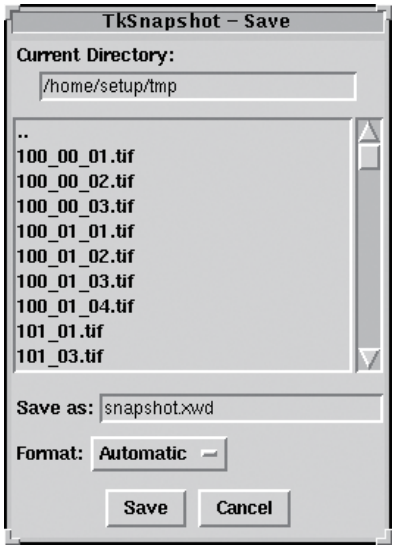


2. Select required settings.

Note
See page 157 for explanation of each item in the “TkSnapshot (Version0.31)” window.

3. Click “Snap” button.
   Click or drag on areas of the screen, matching the item selected in “Snap Type”.
   - “Window”: Click anywhere on the desired window.
   - “Region”: Drag over the desired region.
   - “Screen”: Click anywhere on the display.

4. Click the “Save” button.
   The “TkSnapshot - Save” window appears.



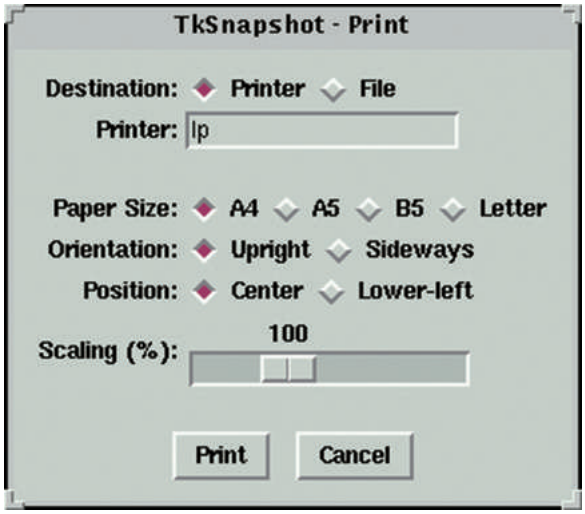
5. Enter a name for the image file to “Save as:”, then select a file format from “Format:”, then click the “Save” button.

Snapshot image printing

Clicking on an image called up with the “view...” button brings up a menu box in the “Commands” window.

Click on “File” - “Print” to bring up the “Browse” window, and click on “A4”.
The snapshot image is output without scaling to A4 size paper.

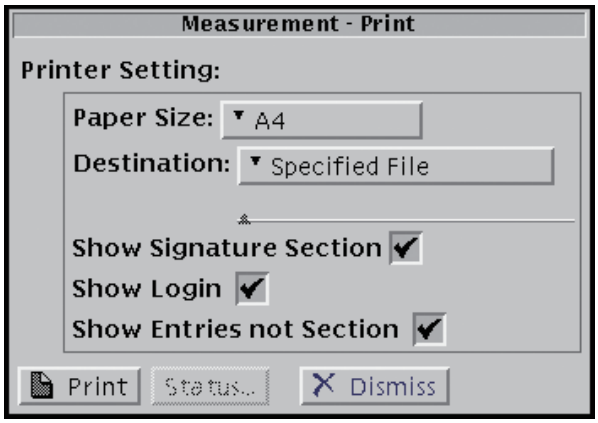
Note
If the paper size is changed, the image will be scaled to fit the respective size.



Print

Printouts are available for measurement data, performance-test data, calibration data, measurement parameter, performance-test parameter, calibration parameter, operator list and audit trail. Please refer to “Printer settings” on page 138.

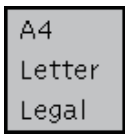
“Print” window



“Printer Setting:”:

“Paper Size:”:

Clicking this button brings up a menu with the options “A4” (default), “Letter”, and “Legal”.



“Destination:”:

Clicking this button brings up a menu for selecting the printer or “No Printer” (when no printer has been set) and “Specified File” (default). By default, the first entry in the menu is selected.

If “Specified File” is selected, a field for entering the file name appears.

Only alphanumeric characters and the hyphen can be used for the file name.

“Show Signature Section”:

When this item is selected (default), the signature section will be shown on the print result.

When this item is not selected, signature section will not be shown on the print result.

“Show Login”:

When this item is selected (default), the login name section be shown on the print result.

When this item is not selected, the login name section will not be shown on the print result.

"Show Entries not Section":

When this item is selected (default), blank sections will also be shown on the print result.

When this item is not selected, blank sections will not be shown on the print result.

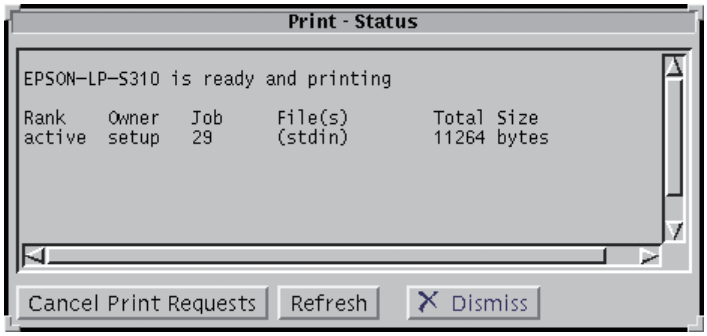
The setting of item 5 above is registered and will also be retained for the next time the "Print" window is opened.

"Print" button:

Clicking this button starts the print process and closes the "Print" window.

"Status..." button:

This button is available if a printer was selected under "Destination:". Clicking the button brings up the "Print - Status" window for checking the progress of printing or canceling the print request.



"Cancel Print Requests" button:

This button is available if there are unprocessed printing requests. It allows canceling such requests.

"Refresh" button

Clicking this button updates the print progress display.

"Dismiss" button:

Click the "Dismiss" button to close the "Print - Status" window.

"Dismiss" button:

Click the "Dismiss" button to close the "Print" window.

Printing

Printouts are available in the following sequence for measured data, performance-test data, calibration data, measurement parameter, performance-test parameter, calibration parameter, operator list and audit trail.

Note
Please ensure the printer is properly connected before printing. See “Connection to a printer (local printer)” on page 138, 190.
Connection to a printer connected to a network is available. However, please contact the system administrator to clarify the status as the particular environment may differ depending on the network. See page 135 for the basic setting.

1. An operator with privileges to each of management tasks must log in.
2. This enables display either of the windows for each parameter setting for printing, or individual work windows.
3. Click the “Print...” button on each window.
   The “xxxxxxxxxxxxxxxxx - Print” window appears.
   (The xxxxxxxxxxxxxxxxx indicates the mode window name.)
4. Click the “Paper Size:” button and select the desired paper size from the list that appears. Click the “Destination” button and select the destination printer or output to file from the list that appears.
   To show the signature section in the print result (page 166), select the “Show Signature Section” check box. To show the login name, select the “Show Login” check box. To show items with blank values, select the “Show Entries not Section” check box.
   Click the “Print” button to start printing.

Note
If a “Specified file” is selected to “Destination:”, it will be output as a PostScript file “/home/login name/tmp” on directory.

Click the “Status...” button to display the “Print - Status” window.
Deletion of the print status check or print request is possible in this window.

Printing from KL-05 - Measurement window

When you click the “Print” button in the “KL-05 - Measurement” window, you can select one of two printing methods: “Print...” and “Print This Data”.

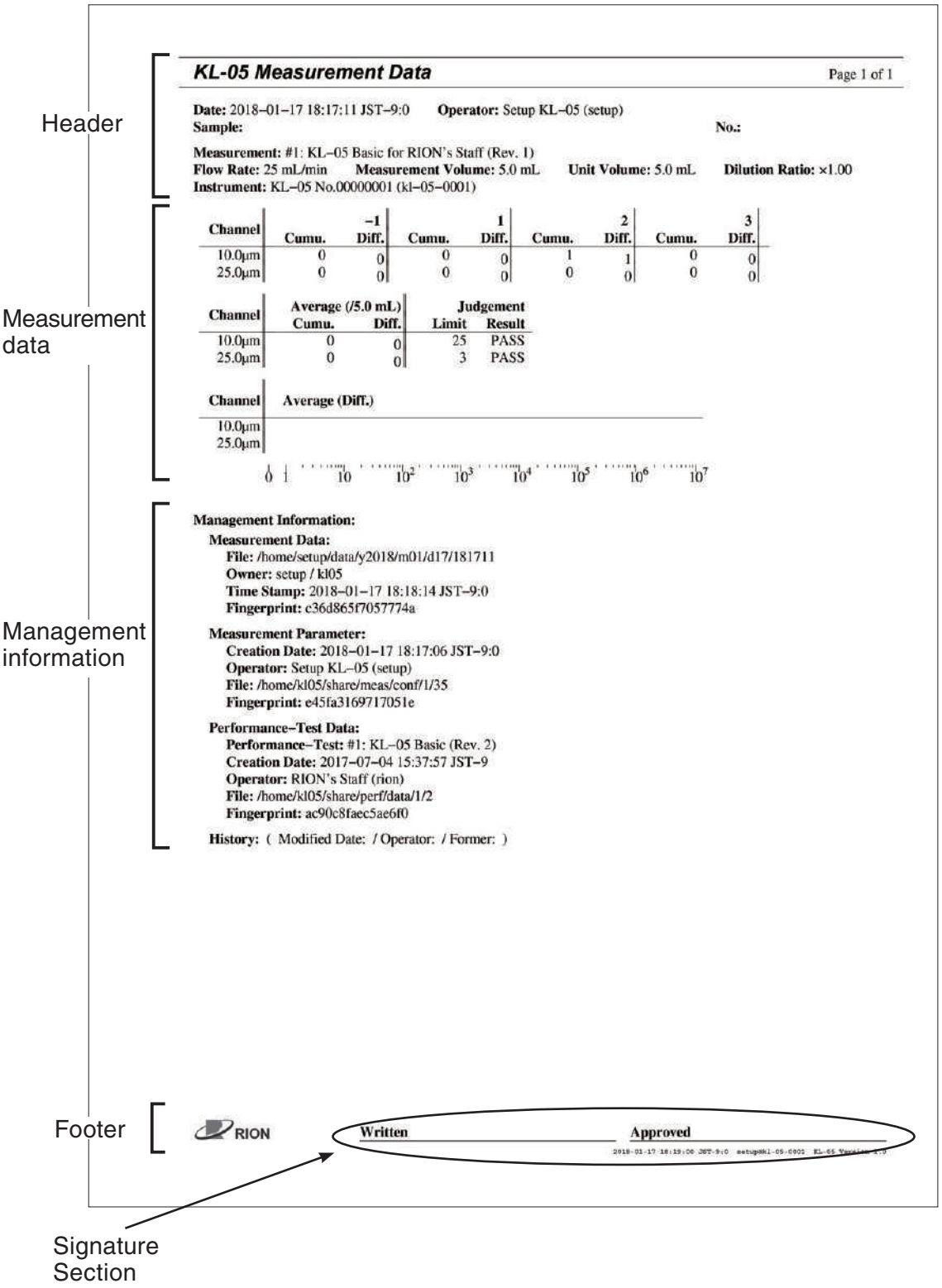
If you select “Print This Data”, the “Print” window will not appear, and the previously selected settings for printing data will be succeeded (selected at any previous window after “Print...” not only for printing measurement data).

“Print” in the menu with the electronic signature of “Measurement-Data Selector” window is the same operation.

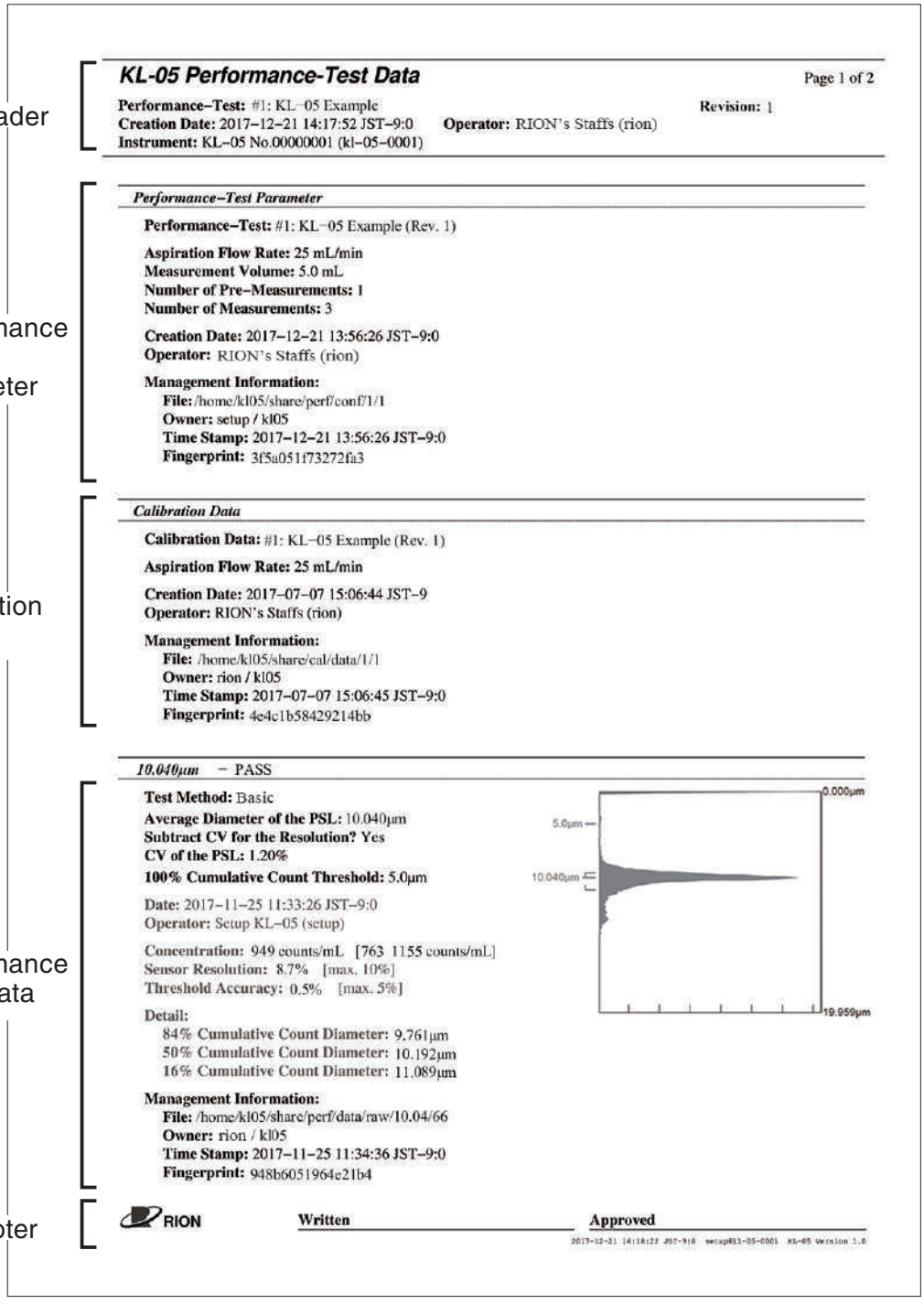
Note
Start printing after the completion of measurement operation (after the draining of the syringe sample). Otherwise the printing may not be right.

Print samples

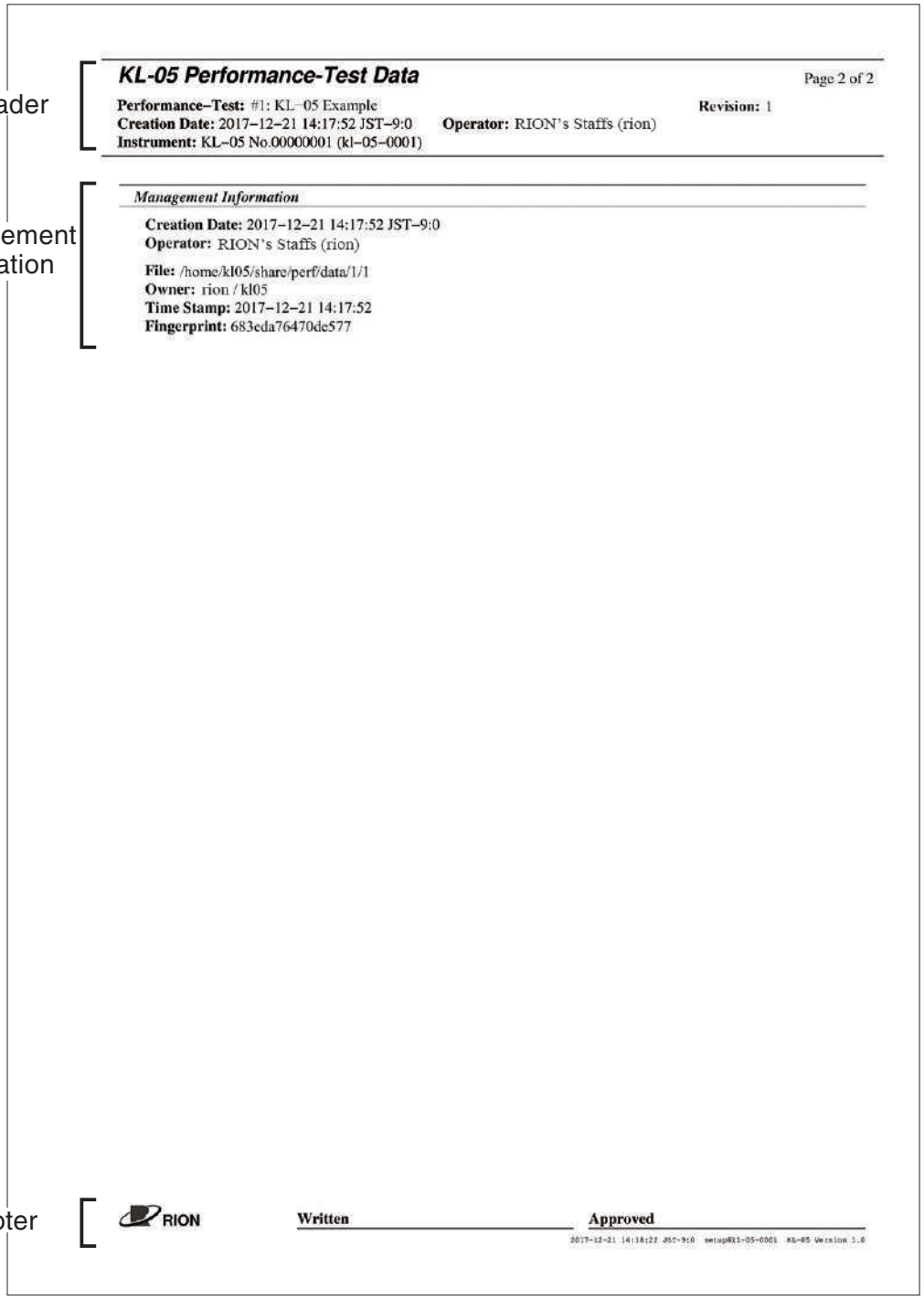
Printing Measurement Data



Printing Performance-Test Data (Page 1 of 2)



Printing Performance-Test Data (Page 2 of 2)



Printing Calibration Data

Header

Calibration Parameter

Calibration Data

Management Information

Footer

KL-05 Calibration Data Page 1 of 3

Calibration: #2: KL–05 Basic for Rion's Staff **Revision:** 1
Creation Date: 2017–08–20 10:11:21 JST–9:0 **Operator:** Setup KL–05 (setup)
Instrument: KL–05 No.00000001 (kl–05–0001)

Calibration Parameter

Calibration: #2: KL–05 Basic for Rion's Staff (Rev. 1)

Aspiration Flow Rate: 25 mL/min
Measurement Volume: 5.0 mL
Number of Pre–Measurements: 1
Number of Measurements: 3

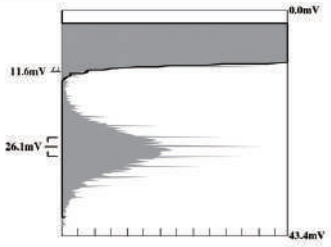
Creation Date: 2017–08–20 10:00:48 JST–9:0
Operator: Setup KL–05 (setup)

Management Information:
File: /home/kl05/share/cal/conf/2/3
Owner: setup / kl05
Time Stamp: 2017–08–20 10:00:48 JST–9:0
Fingerprint: a1210dd4b1780a79

1.361µm

Blank: 11.6mV
Date: 2017–08–20 09:36:22 JST–9:0
Operator: Setup KL–05 (setup)
Calibration: #2: KL–05 Basic for Rion's Staff (Rev. 1)

Management Information:
File: /home/kl05/share/cal/data/raw/1.361–blank/4
Owner: setup / kl05
Time Stamp: 2017–08–20 09:37:29 JST–9:0
Fingerprint: cb78353a95b86ff9



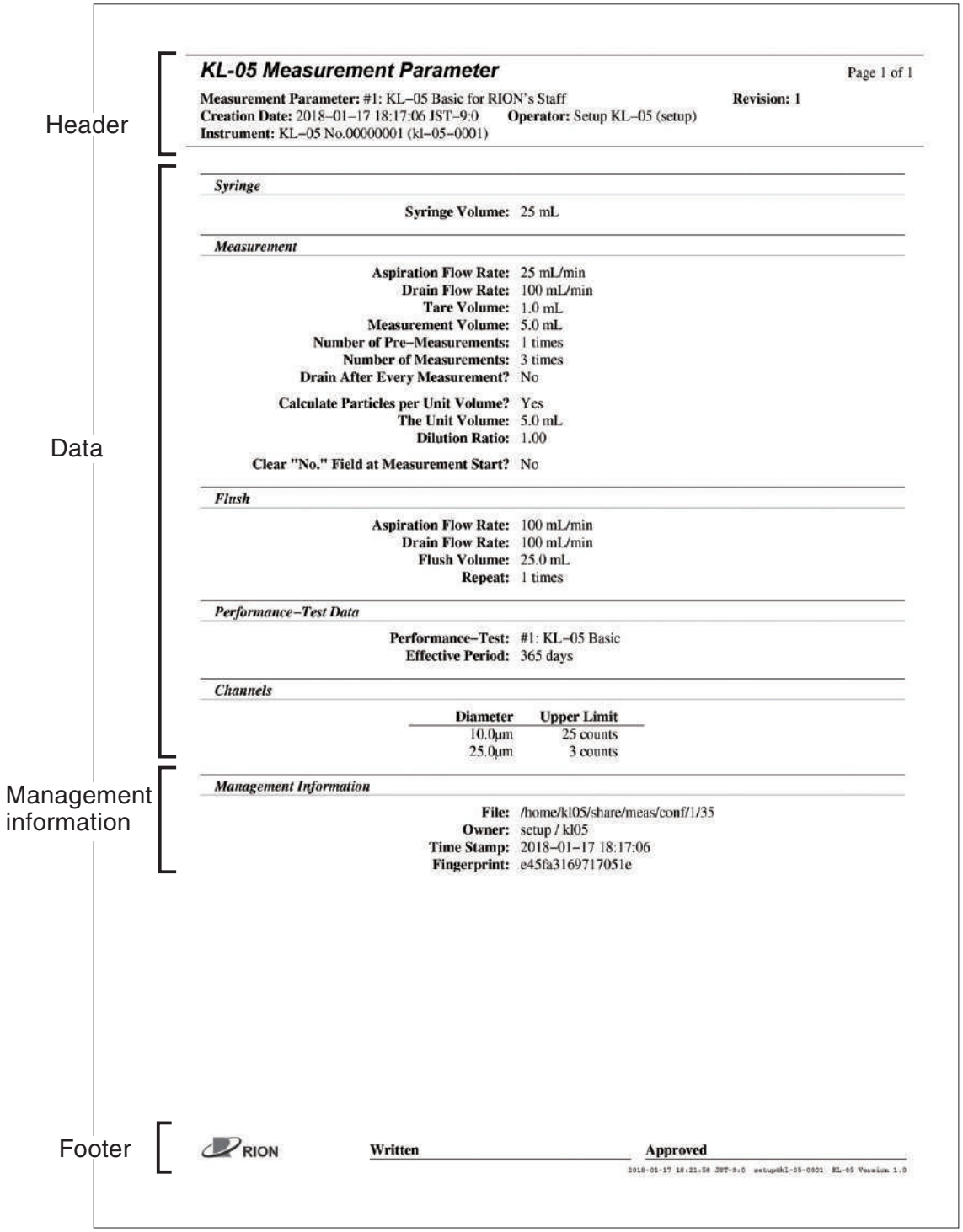
PSL: 26.1mV
Date: 2017–08–20 09:42:00 JST–9:0
Operator: Setup KL–05 (setup)
Calibration: #2: KL–05 Basic for Rion's Staff (Rev. 1)

Half–Count Method: Adaptive
Window: 24.4mV – 27.8mV
Concentration: 885 counts/mL [800 – 1200 counts/mL]

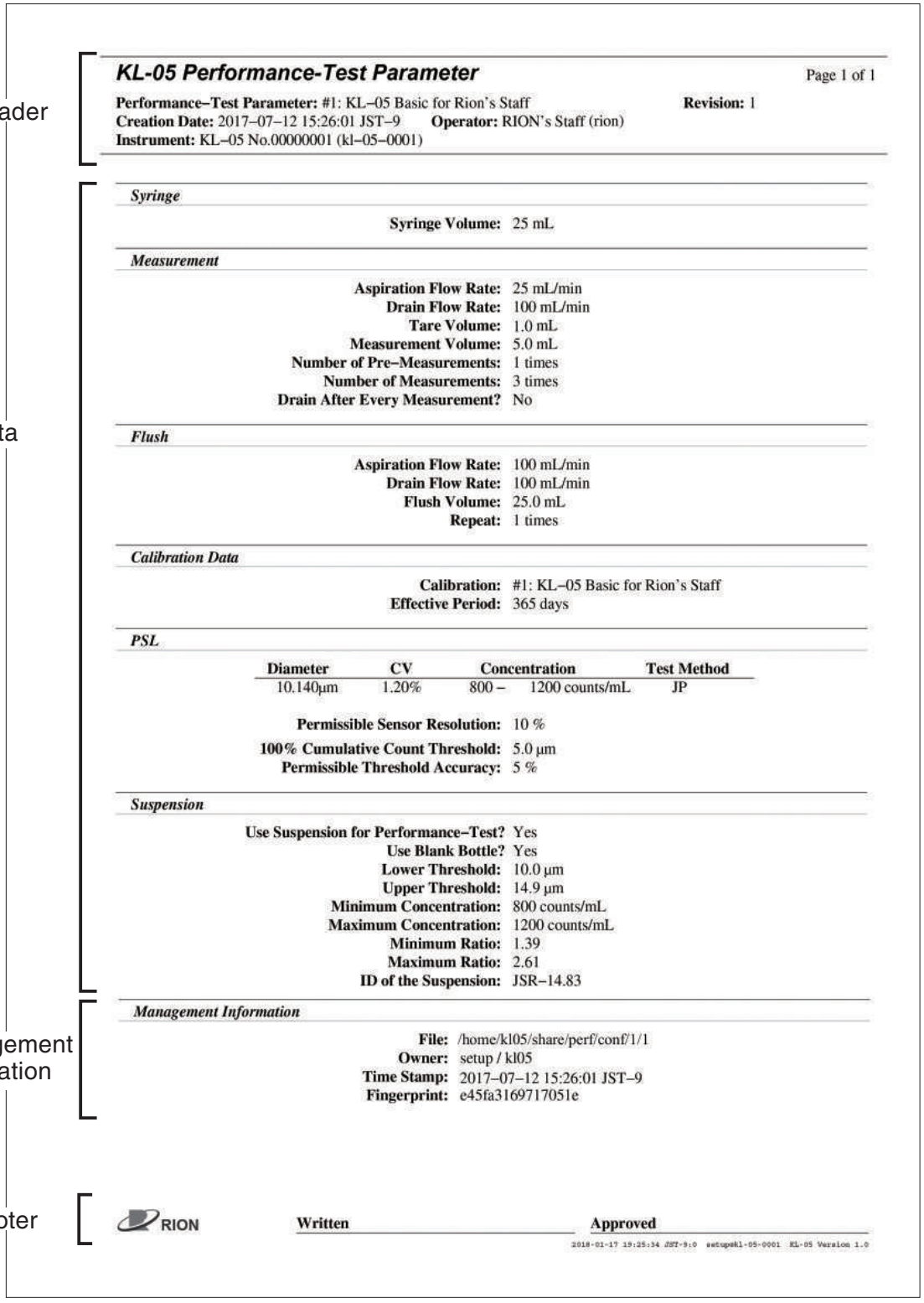
Management Information:
File: /home/kl05/share/cal/data/raw/1.361/21
Owner: setup / kl05
Time Stamp: 2017–08–20 09:43:06 JST–9:0
Fingerprint: 971d031276cac5b5

RION **Written** **Approved**

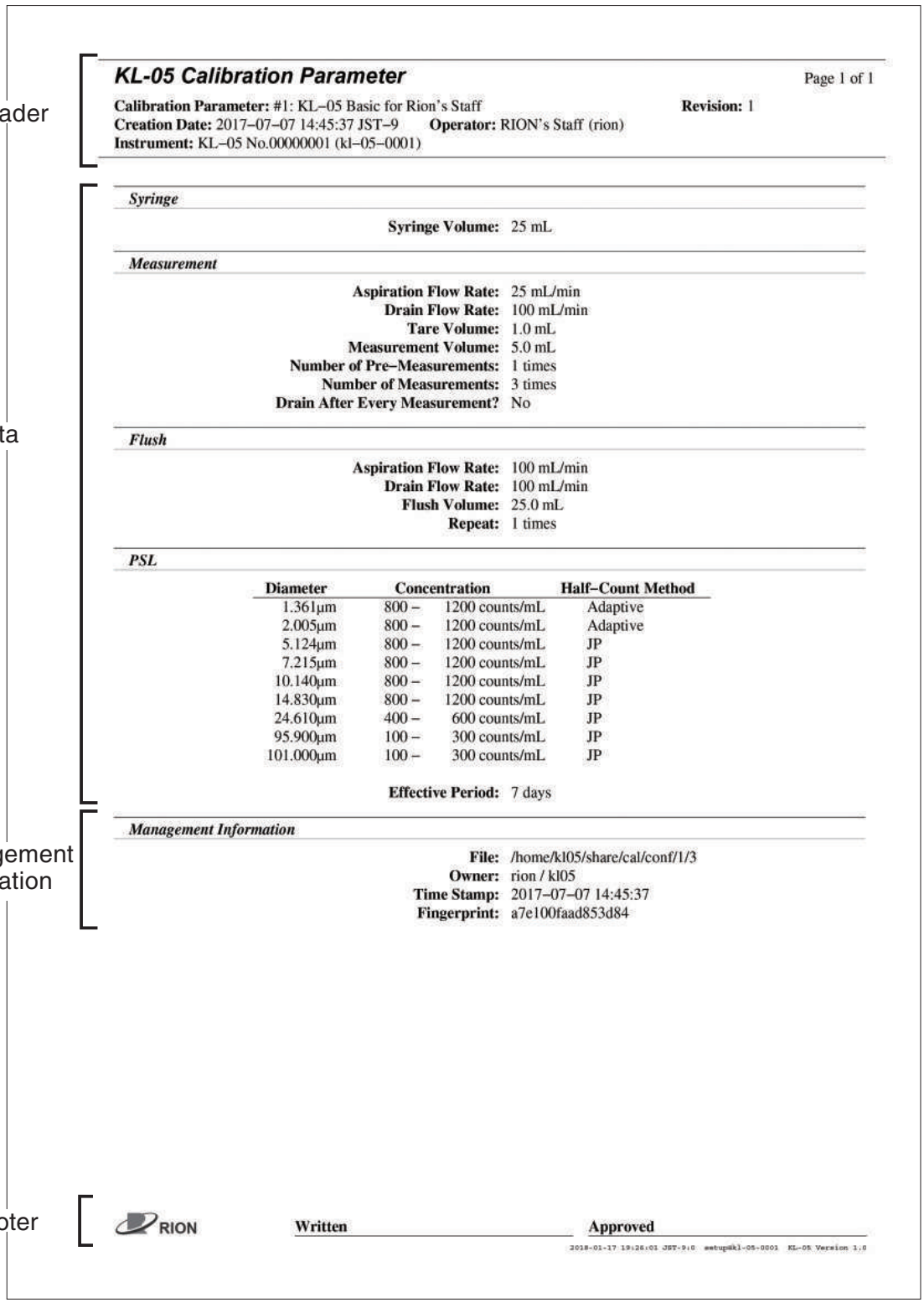
Printing Measurement Parameter



Printing Performance-Test Parameter



Printing Calibration Parameter



Header

Data

Management information

Footer

KL-05 Calibration Parameter

Page 1 of 1

Calibration Parameter: #1: KL–05 Basic for Rion's Staff **Revision:** 1
Creation Date: 2017–07–07 14:45:37 JST–9 **Operator:** RION's Staff (rion)
Instrument: KL–05 No.00000001 (kl–05–0001)

Syringe

Syringe Volume: 25 mL

Measurement

Aspiration Flow Rate: 25 mL/min
Drain Flow Rate: 100 mL/min
Tare Volume: 1.0 mL
Measurement Volume: 5.0 mL
Number of Pre–Measurements: 1 times
Number of Measurements: 3 times
Drain After Every Measurement? No

Flush

Aspiration Flow Rate: 100 mL/min
Drain Flow Rate: 100 mL/min
Flush Volume: 25.0 mL
Repeat: 1 times

PSL

Diameter	Concentration	Half–Count Method
1.361µm	800 – 1200 counts/mL	Adaptive
2.005µm	800 – 1200 counts/mL	Adaptive
5.124µm	800 – 1200 counts/mL	JP
7.215µm	800 – 1200 counts/mL	JP
10.140µm	800 – 1200 counts/mL	JP
14.830µm	800 – 1200 counts/mL	JP
24.610µm	400 – 600 counts/mL	JP
95.900µm	100 – 300 counts/mL	JP
101.000µm	100 – 300 counts/mL	JP

Effective Period: 7 days

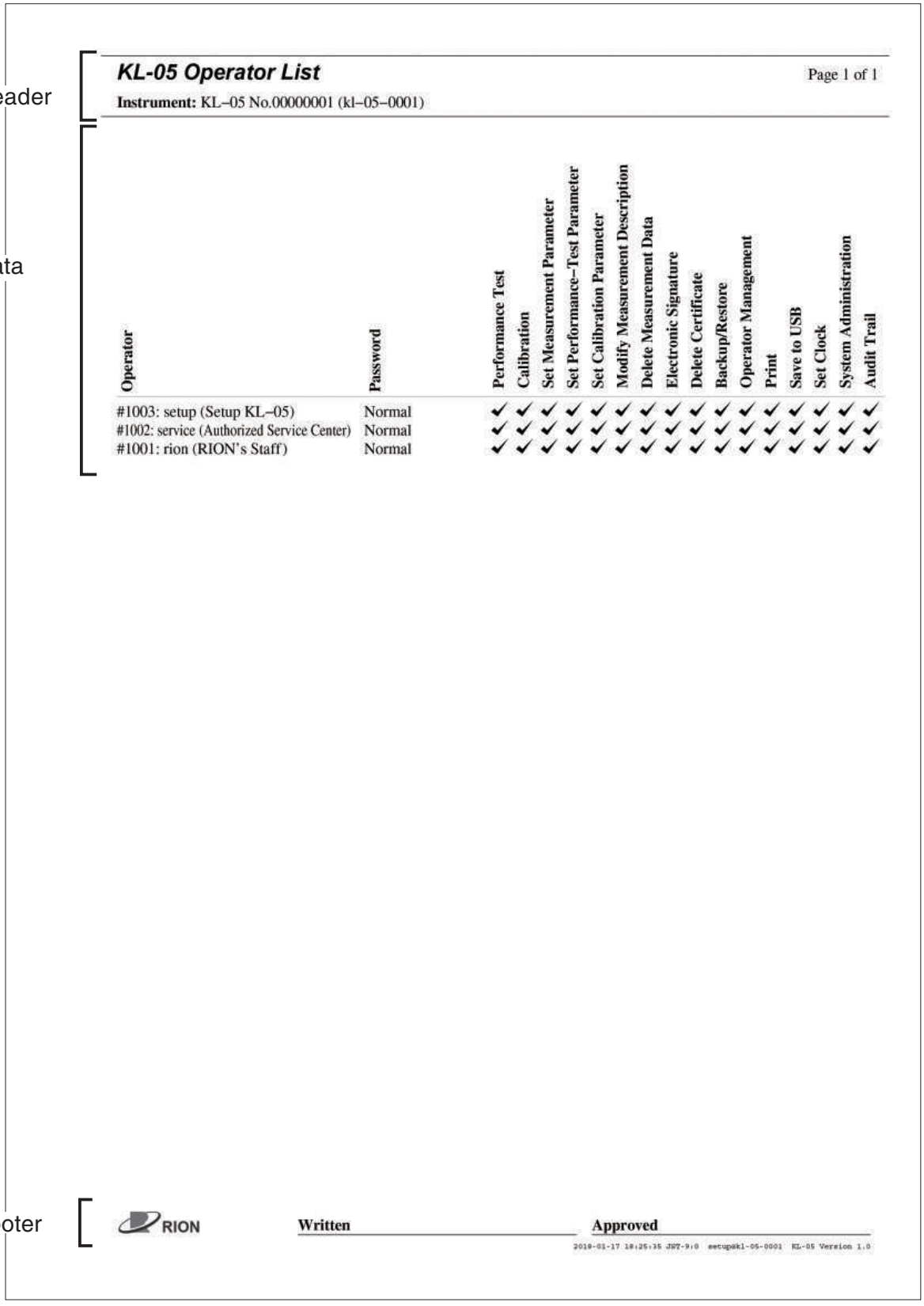
Management Information

File: /home/kl05/share/cal/conf/1/3
Owner: rion / kl05
Time Stamp: 2017–07–07 14:45:37
Fingerprint: a7e100faad853d84

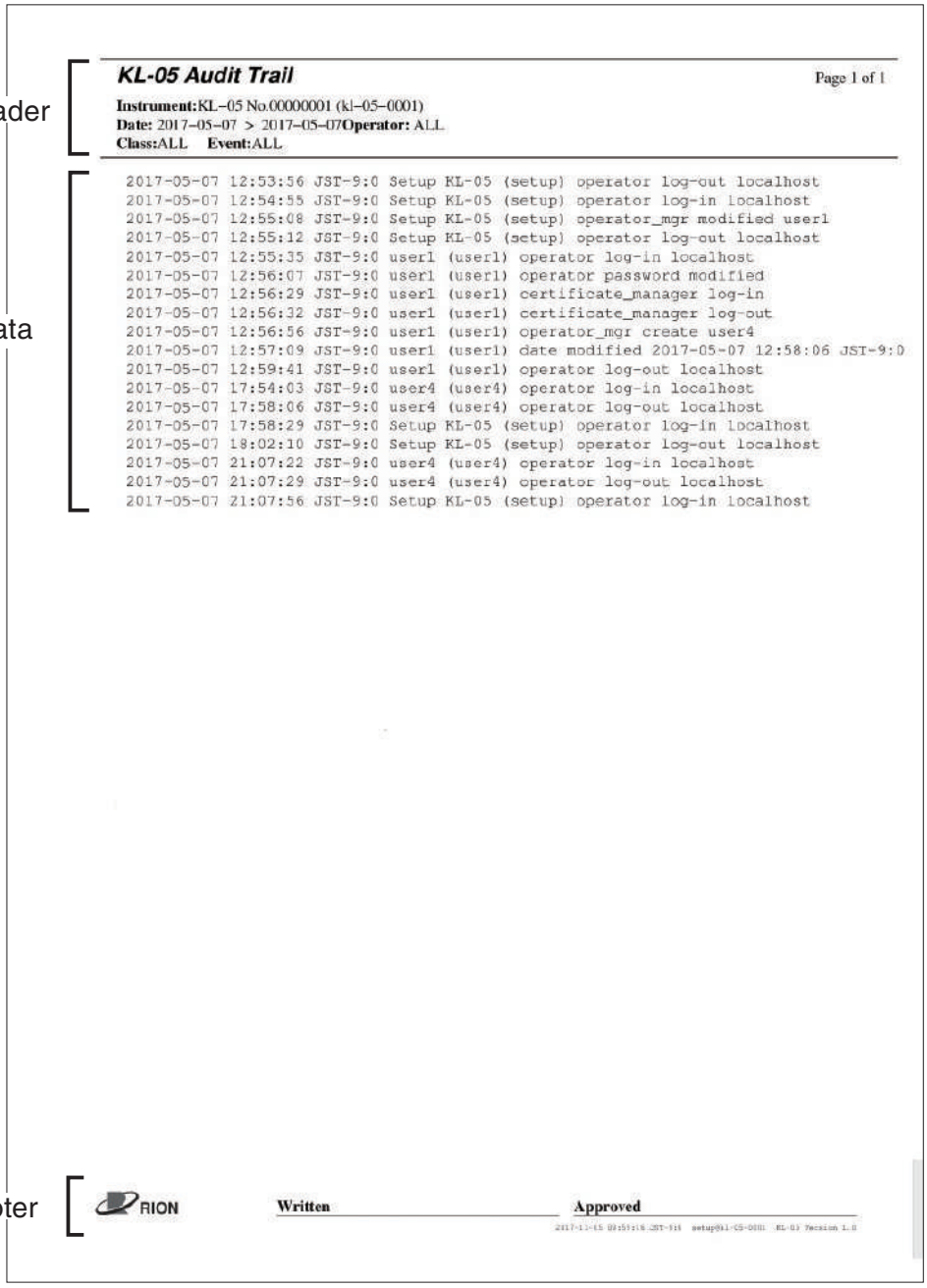
RION **Written** **Approved**

2018-01-17 19:26:01 JST-9:0 setup@kl-05-0001 KL-05 Version 1.0

Printing Operator List



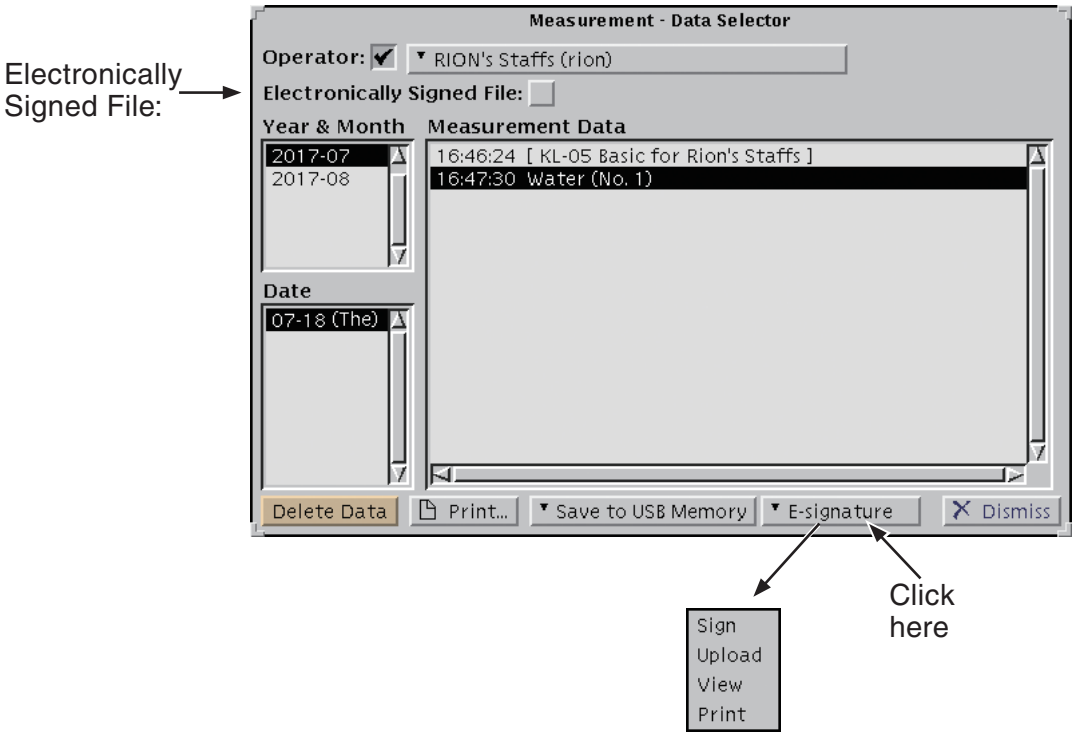
Printing Audit Trail



Electronic Signature

“Measurement - Data Selector” window

Selecting a file to sign from the “Measurement - Data Selector” window gives access to the following functions: “Sign”, “Upload”, “View”, and “Print”.



“Electronically Signed File:”:

For signed documents, select the “Electronically Signed File” check box.

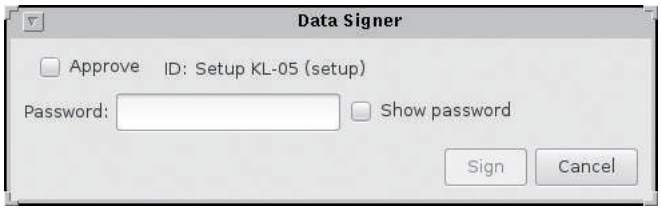
A list of electronically signed measurement data appears.

Note
For details on the “E-signature” button, refer to page 67.

"E-Signature" button:

"Sign":

A dialog box appears which allows signing selected unsigned measurement data or already signed measurement data (PDF file).



"Approve":

If this check box is selected when clicking the "Sign" button, the signing will be as "Approved".

If the check box is not selected, the signing will be as "In Charge".

"ID:":

Indicates the ID of the operator who registered the measurement data.

"Password:":

The password entry field is shown.

"Show password":

If this check box is selected, the string entered in the password field is shown without masking. If this check box is not selected (default), the string entered into the password field is masked with asterisks (*).

"Sign" button:

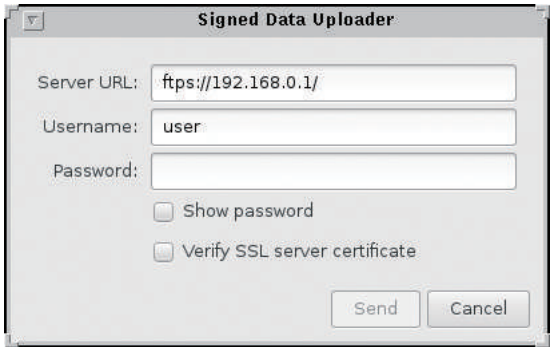
When the password that was registered when installing the certificate has been entered in the password field, the data are signed.

"Cancel" button:

Closes the window without signing.

“Upload”:

Displays a dialog box for sending the selected and signed measurement data PDF file via FTP/FTS server.



“Server URL:”:

Enter the URL of the server where the file is to be sent.

“User name:”:

Enter the user name for accessing the server here.

“Password”:

Enter the password for accessing the server here. Unless the “Show password” check box is selected, the input will be masked with asterisks (*).

“Show password”:

If the check box is selected, the entered character string is shown. If this check box is not selected (default), the string entered into the password field is masked with asterisks (*).

“Verify SSL server certificate”:

If this check box is selected (default), the SSL server certificate will be verified when connecting to an FTPS server. If the check box is not, the SSL server certificate will not be verified.

“Send” button:

According to the entered information, the electronically signed measurement data (PDF file) will be sent to the server when this button is clicked.

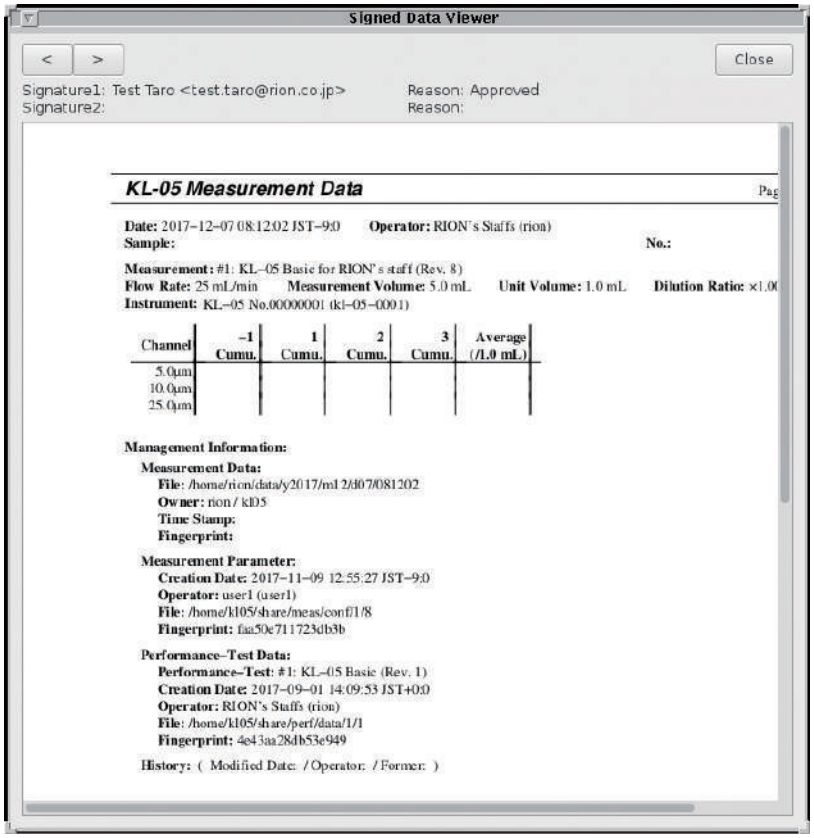
“Cancel” button:

Closes the window.

"View":

Brings up a dialog box for viewing the selected electronically signed measurement data.

The button is available if the "Electronically Signed File:" check box is selected.



"<" ">" buttons:

These buttons serve for moving between pages when the measurement data being viewed consist of several pages.

"Signature 1:":

The common name, email address and reason of the first signature are shown here.

"Signature 2:":

The common name, email address and reason of the second signature are shown here.

The format for the common name and email address used by the signer for the certificate is as shown below.

Test Taro<test.taro@rion.co.jp>

Common name Email address

Note
For documents with three or more signatures, only the information for the first and second are shown.

"Close" button:

Click the "Close" button to close the "Signed Data Viewer" window.

"Print":

Prints the selected electronically signed measurement data directly without displaying the "Print" window.

Electronic signature procedure

Sign the measurement data

Note
In order to use the electronic signature function, a certificate issued by a certificate authority is required. For details on installing a certificate, refer to “Certificate Management” on page 126.

1. Display the “Measurement - Data Selector” window and select the data to be signed electronically from the measurement data list.
   For documents that are already electronically signed, select the “Electronically signed file” check box and then select the file.
2. Click “Sign” on the electronic signature menu. The “Data Signer” window appears.
3. Enter the password that has been set for certificate management.
4. Click “Sign” to sign the data.
   Depending on the setting of the “Approve” check box, a distinction will be made between the person approving and the person in charge.

Electronically signed file transfer

This function sends an electronically signed PDF file to a server.
For information on exporting the data to a USB flash drive, refer to page 182.

Note
When transferring an electronically signed file, the file on the unit will be deleted.

1. Display the “Measurement - Data Selector” window and select the data to be signed electronically from the measurement data list.
   For documents that are already electronically signed, select the “Electronically signed file” check box and then select the file.
2. Click “Transfer” on the electronic signature menu. The “Signed Data Uploader” window appears.
3. Enter the server URL, user name, and password and select the “Verify SSL server certificate” as necessary.
4. Click “Transfer” to initiate the transfer of the electronically signed PDF file to the file server. A message will appear in a popup window.

Viewing an electronically signed file

You can view an electronically signed PDF file as follows.
The signed common name, e-mail address, signature reason will be shown.

1. Display the “Measurement - Data Selector” window and select the data to view from the measurement data list.
   For documents that are already electronically signed, select the “Electronically signed file” check box and then select the file.
2. Click “View” on the electronic signature menu. The “Signed Data Viewer” window appears.
3. Click the “Close” button to close the “Signed Data Viewer” window.

Printing an electronically signed PDF file

This function allows printing of an electronically signed PDF file for checking purposes.

1. Display the “Measurement - Data Selector” window and select the data to be printed from the measurement data list.
   For documents that are already electronically signed, select the “Electronically signed file” check box and then select the file.
2. Click “Print” on the electronic signature menu.
3. Click the “Print” button, the “Electronically signed file” will be printed.

Note
For information on print settings, refer to “Print” on page 162. For “Specified File”, no saving is performed.

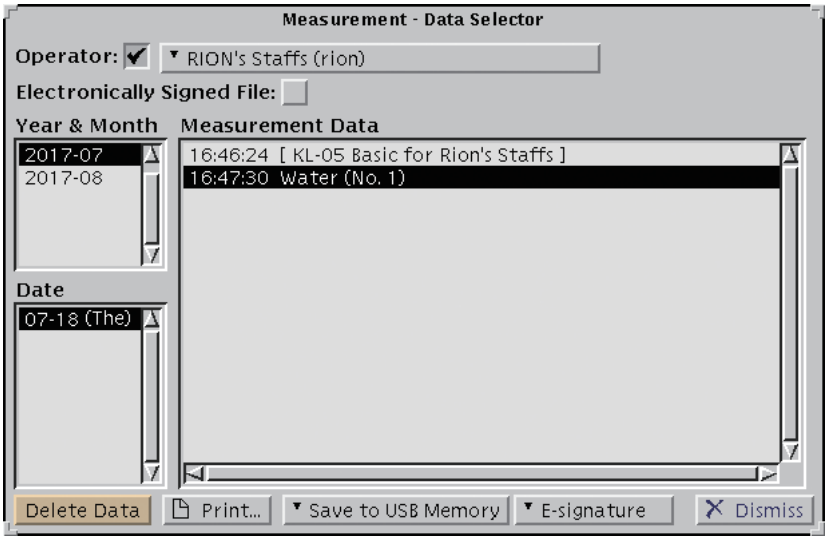
Export Measurement Data

Exporting data to USB flash drive

Measured data can be recorded as TSV (Tab Separated Values) type files or PDF type files on a USB flash drive to enable the measured data to work on word processing software or spread sheet software.

Note
The use of USB flash drive media purchased from Rion is recommended.
To format the USB flash drive, use an external computer. Select FAT32 as the file format.
The character code is Shift-JIS.
The USB flash drive can be removed at any time, provided that it is currently not being accessed.
If two or more USB flash drive media are inserted simultaneously, the USB flash drive inserted first will be recognized.
If the USB flash drive contains backup data, a warning message window appears, and data cannot be stored.

1. Connect the USB flash drive to the USB port on the rear panel or front panel of the unit. (See page 36)
2. Select the “List of Data...” from the menu displayed when the “Show” button is clicked on the “KL-05 - Measurement” window.
   “Measurement - Data Selector” window appears.



3. Select the year and month of the measured data which you wish to transfer from the “Year & Month” list, and the measured date from the “Date” list. Select the measured data from the “Measurement Data” list. Multiple selection is available for measured data obtained on the same day.
4. Click the “Save to USB memory” button to select “Write Selected Data to USB memory” from the displayed menu.
   Once the export is completed, a message appears.

Note
File names will be automatically allocated to the transferred data according to each measured date and these will be displayed on the message.
When multiple data are transferred, the output will be in the order in which the data were selected.
No extension is allocated to files stored in the TSV format.

5. Click the “Dismiss” button. Remove the USB flash drive.

Data sample

Shows data samples transferred to the USB flash drive.

DATE[TAB]2009-10-16 19:06:26
OPERATOR[TAB]RION's Staffs (rion)
INSTRUMENT[TAB]KL-05 No.00710003 (KL-05-2)
SAMPLE[TAB]
NUMBER[TAB]
MEMO[TAB]

MEASUREMENT[TAB]#3: USP24 (Rev. 4)
SAMPLE-VOLUME[TAB]5mL
PRE-MEASUREMENT[TAB]1
REPEAT[TAB]3
MODE[TAB]Differential

2.1um[TAB]281[TAB]276[TAB]289[TAB]316
5um[TAB]61[TAB]46[TAB]60[TAB]54
10um[TAB]5[TAB]5[TAB]8[TAB]4
15um[TAB]0[TAB]1[TAB]0[TAB]0
20um[TAB]0[TAB]0[TAB]0[TAB]0
25um[TAB]0[TAB]0[TAB]0[TAB]0
50um[TAB]0[TAB]0[TAB]0[TAB]0

* [TAB] indicates a control code TAB.

Data description

DATE: Measurement date

OPERATOR: Measurement operator name

INSTRUMENT:
Measurement instrument number

SAMPLE: Characters entered in the “Sample” of “KL-05 - Measurement” window

NUMBER: Number(s) entered in the “No.” of “KL-05 - Measurement” window

MEMO: Letters input to “Memo:” of “KL-05 - Measurement” window

MEASUREMENT:
Measurement parameter name

SAMPLE-VOLUME:
Measurement volume

PRE-MEASUREMENT:
Number of Pre-measurements

REPEAT: Number of repeated measurements

MODE: Output format

2.1um	TAB	281	TAB	276	TAB	289	TAB	316
5um	TAB	61	TAB	46	TAB	60	TAB	54
10um	TAB	5	TAB	5	TAB	8	TAB	4
15um	TAB	0	TAB	1	TAB	0	TAB	0
20um	TAB	0	TAB	0	TAB	0	TAB	0
25um	TAB	0	TAB	0	TAB	0	TAB	0
50um	TAB	0	TAB	0	TAB	0	TAB	0

:

: Measurement particle sizes and measured values

Serial communication

This unit can be connected to the serial port of a computer via a USB-RS-232C conversion cable. Measurement results can then be sent to the computer over the serial link.
The explanation in this manual assumes general familiarity with computers and serial interfaces.

Communication parameters

Transmission configuration	Asynchronous, full-duplex
Baud rate	9600 bps / 19200 bps / 38400 bps / 57600 bps
Data word length	7 bits / 8 bits
Stop bits	1 bit / 2 bits
Parity	Even / Odd / none
Terminator	*<LF>*
Character code	ASCII

Note
Serial communication parameters must be set to the same values at the unit and external equipment.
Terminators are used to mark commands and data. *<LF>* : Line feed ($0A_H$)

Serial connector

Connector pin assignment

Pin. No.	Signal type	Designation	Flow direction
1	Carrier detect	CD	Input
2	Receive data	RD	Input
3	Send data	SD	Output
4	Data terminal ready	ER	Output
5	Signal ground	SG	Not specified
6	Data set ready	DR	Input
7	Request to send	RS	Output
8	Clear to send	CS	Input
9	Open	CI	

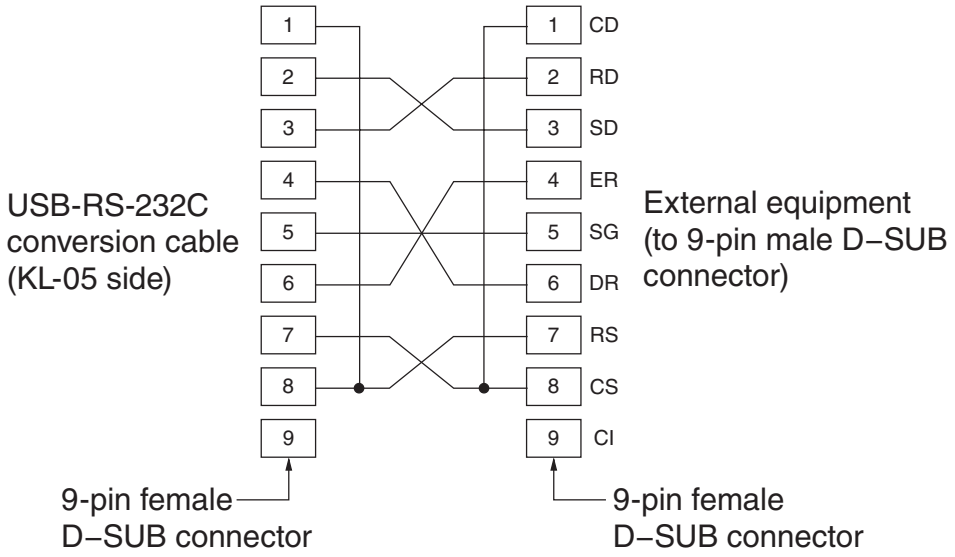
Communication cable

For connecting the unit to external equipment, you need to select the correct communication cable.

The serial communication cables CC-61A, CC-63A, and the USB-RS-232C conversion cable for a USB terminal are available as options.

Note
Carefully check the electrical interface specifications and pin allocation at the equipment to which you intend to connect the unit. Even if the shape of the connector is correct, a mismatch in electrical specifications or pin allocation can lead to damage of the equipment.
Turn off the unit and external equipment when connecting the cable.

CC-61A/CC-63A: For connection to equipment with 9-pin male D–SUB connector



The CC-61A and CC-63A (with 2 m shielded cable) differ in the type of connector fastening screw.

The CC-61A has metric pitch screws at both ends. The CC-63A has metric pitch screws at one end and inch pitch screws at the other. Select the correct type depending on the external equipment with which the cable is used.

Message format

Messages

In this document, a “message” refers to a sequence of characters delimited by the terminator.
ASCII codes are used for the characters, and coding type is EUC.
The terminator indicates the end of a message. <*LF*> is used.

<*LF*>: The Line Feed control character
Character code ($0A_H$)

Note
In this manual, the terminator is indicated as <*EOL*>.

Message output timing

Messages are sent once only, after completion of measurement. Even if message transfer fails, the message will not be resent.

Example of message output

DATE=2010-02-26 19:25:59 JST-9:0<*EOL*>
OPERATOR=RION’s Staffs (rion) <*EOL*>
INSTRUMENT=KL-05 No.00000002 (kl-05-prt2) <*EOL*>
SAMPLE=Sample_Water<*EOL*>
NUMBER=2<*EOL*>
MEMO=Test data<*EOL*>
MEASUREMENT=#8: test_param (Rev. 3) <*EOL*>
SAMPLE-VOLUME=5.0mL<*EOL*>
PRE-MEASUREMENT=1<*EOL*>
REPEAT=2<*EOL*>
MODE=Differential<*EOL*>
1.3um,276,280,270<*EOL*>
2.0um,60,62,59<*EOL*>
2.5um,52,48,45<*EOL*>
5.0um,1,0,0<*EOL*>

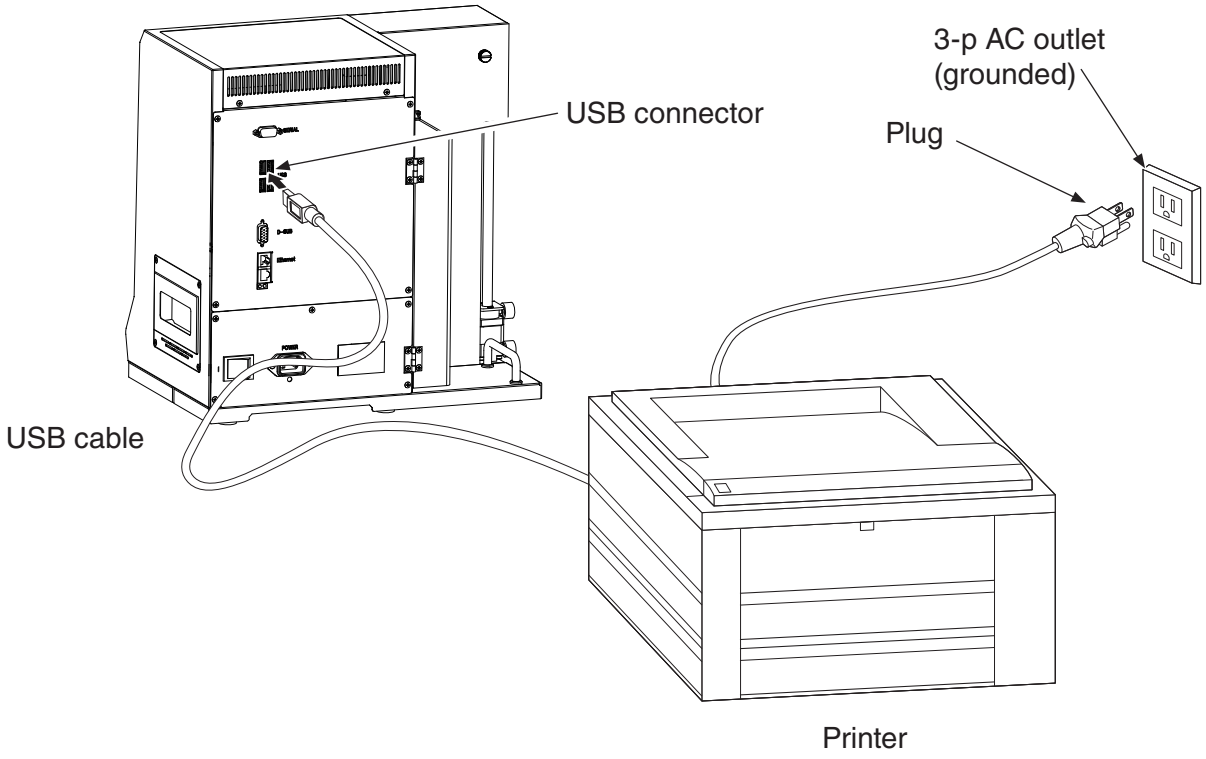
Message format

DATE:	Measurement date
OPERATOR:	Operator name
INSTRUMENT:	Number of measurement unit
SAMPLE:	Character input to “Sample:” on “KL-05 - Measurement” window
NUMBER:	Character input to “No:” on “KL-05 - Measurement” window
MEMO:	Character input to “MEMO:” on “KL-05 - Measurement” window
MEASUREMENT:	Measurement parameter name
SAMPLE-VOLUME:	Measurement Volume
PRE-MEASUREMENT:	Number of Pre-Measurements
REPEAT:	Number of Measurements
MODE:	Output format
1.3um,276,280,270: 2.0um,60,62,59 2.5um,52,48,45 5.0um,1,0,0:	Measurement particle size and measured values

Connection of Options

Connection to a printer (local printer)

1. Connect the power cord of the printer to its connector, and then plug the other end into a 3-p AC outlet (grounded outlet).
2. Connect a USB cable to the USB port on the rear panel or the front panel of the unit. Any USB port can connect the USB cable.
3. Turn power to the printer on.
4. Turn power to the unit on (see page 44).

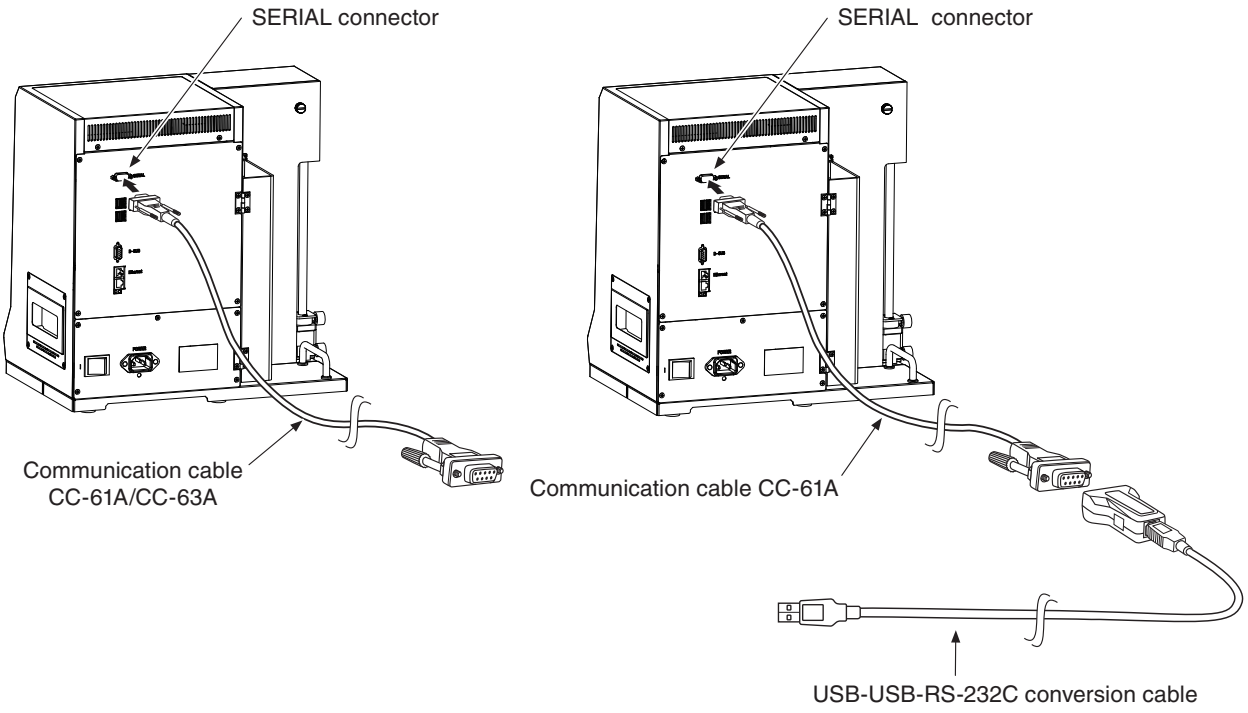


Note
A network printer can also be connected with the unit. However, an inquiry must be made to the system administrator, as the environment will be different depending on the network installed.
According to the following connection systems, a set up of a printer is needed. - When a printer is connected by the USB cable Refer to “Printer settings” on page 138. - When a printer is connected to the network Refer to “Network settings” on page 135.

Connection via serial cable

When using the serial port for data output

1. Plug the serial communication cable (CC-61A or CC-63A, option) into the SERIAL port on the rear panel of the unit.
   Select the serial cable according to the requirements of the other device.
   (a) To make a connection to a serial port, use the serial communication cable (CC-61A or CC-63A, option).
   (b) To make a connection to a USB port, use the serial communication cable CC-61A together with a USB to RS-232C conversion cable (option).



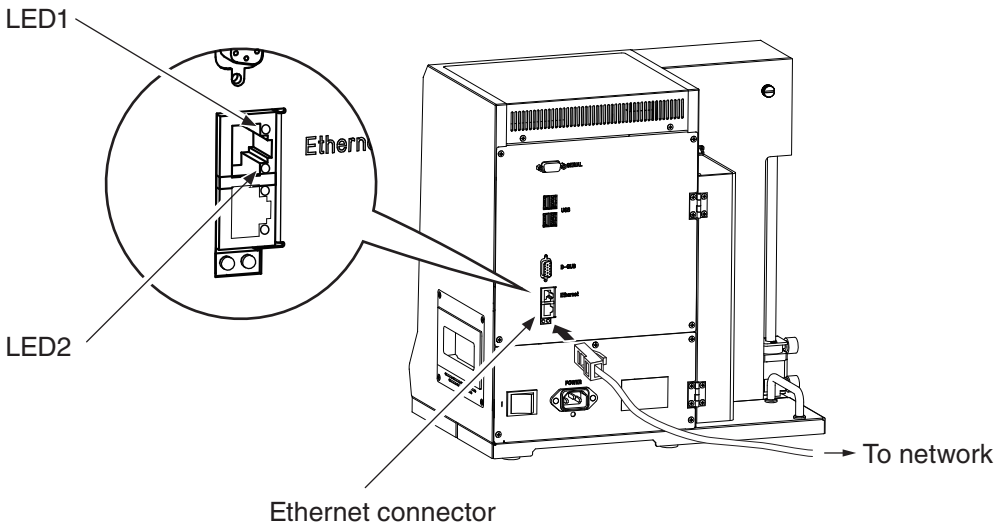
(a) (b)

2. Connect the other end of the cable to the target device.
3. Set the communication parameters (see “Serial port settings” on page 144).
   Set “Port Type:” to “Com” and select the other parameter settings as required.

Connecting to a network (LAN cable)

1. Connect a LAN cable to the ETHERNET connector on the rear panel of the unit.

Note
Make sure the ETHERNET connector correspondents to 10 / 100 / 1000 BASE-T.



2. Turn power to the unit on and verify that LED1 is constantly lit and LED2 flashes.

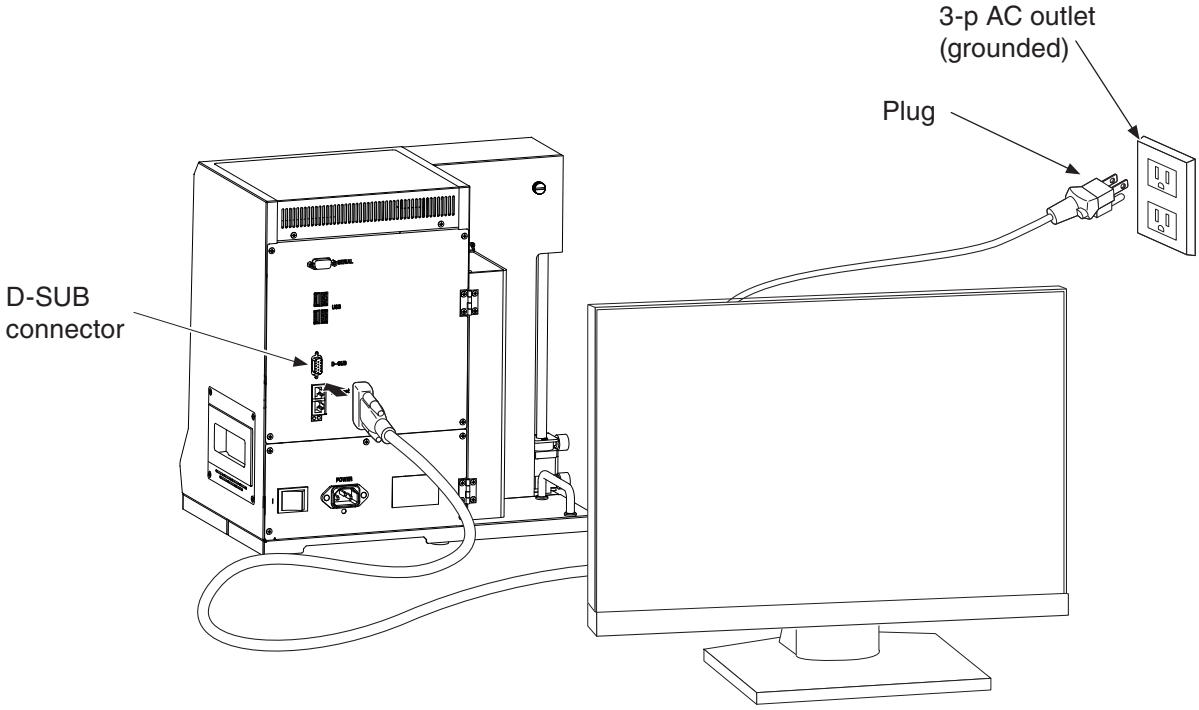
Note
Use the top connector for the Ethernet connection. The bottom connector is not functional on this unit.
When the terminal is not connected, LED1 will not be lit and LDE2 will not flash.

Connecting the external display

1. Connect the power cord of the external display to its connector, and then plug the other end into a 3-p AC outlet (grounded outlet).
2. Connect the cable of the external display to the D-SUB connector on the rear panel.

Important
Make sure that power to this unit and to the external display is turned off before performing the following steps. If power is on, the display screen may not appear properly, and there is a risk of damaging the external and/or the built-in display.

3. Turn power to the display on.
4. Turn power to the unit on (see page 44).



Important
Always turn on power to the display first and then turn on power to the KL-05. Otherwise the image may not be displayed correctly.

Note
Using a full HD display (resolution 1920 x 1080 pixels) is recommended.

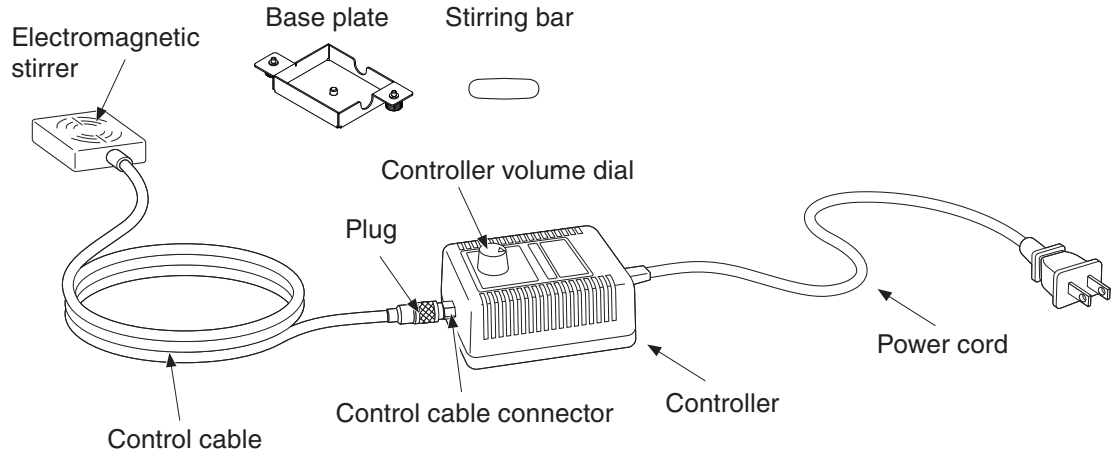
Electromagnetic stirrer set

When measuring particles suspended in a fluid, the sample fluid must not be contaminated and particles suspended in the sample fluid must be equally dispersed to obtain a reliable result.

The electromagnetic stirrer (option) can equally disperse particles suspended in the sample fluid by turning a stirring bar in the sample fluid using external electromagnetic induction. A Cimarec i Micro (Produced by Thermo Fisher Scientific) is used as an electromagnetic stirrer.

The electromagnetic stirrer (option) set consists of an electromagnetic stirrer, a stirring bar and a base plate.

Part names



Note
The control cable connector for the electromagnetic stirrer and the power cord are rated for 100 V AC as used in Japan. Regarding use in other countries, please consult your supplier first.

Electromagnetic stirrer

Installed in the base plate

Control cable

The plug connects to the control cable connector on the controller with.

Control cable connector

Connects to the control cable plug of the electromagnetic stirrer.

Controller volume dial

Turns the power supply ON or OFF and adjusts the turning frequency of the stirring bar. Turn the volume dial to the right for a higher revolution speed of the stirring bar. Turn the volume dial all the way to the left to cut the power supply off.

Controller

Turns the power supply ON or OFF and adjusts the revolution speed of the stirring bar by rotating the volume dial.

Power cord

Connects to the AC outlet.

Base plate

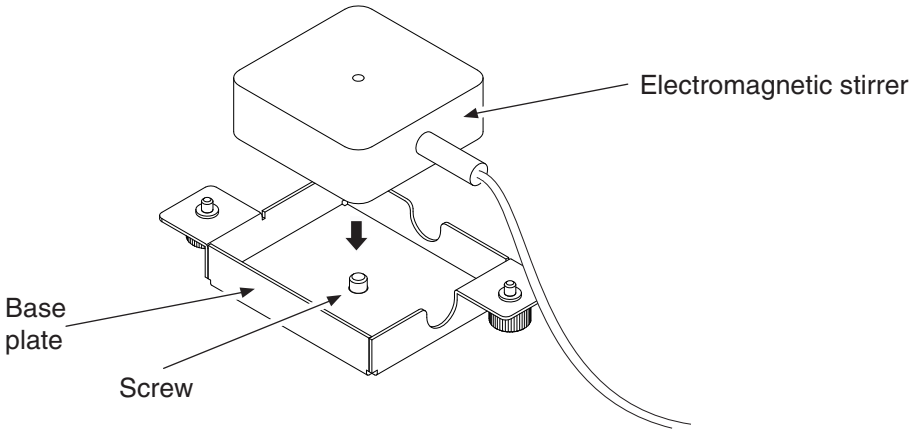
Installed in the sample stand of the KL-05.

Stirring bar

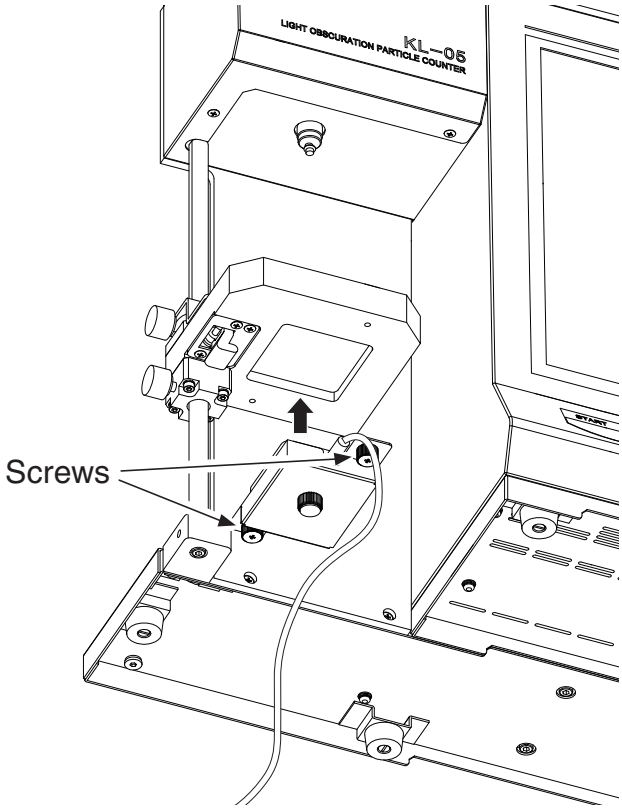
Insert the bar into the sample container. The bar will begin to rotate when the electromagnetic stirrer is turned on.

How to install

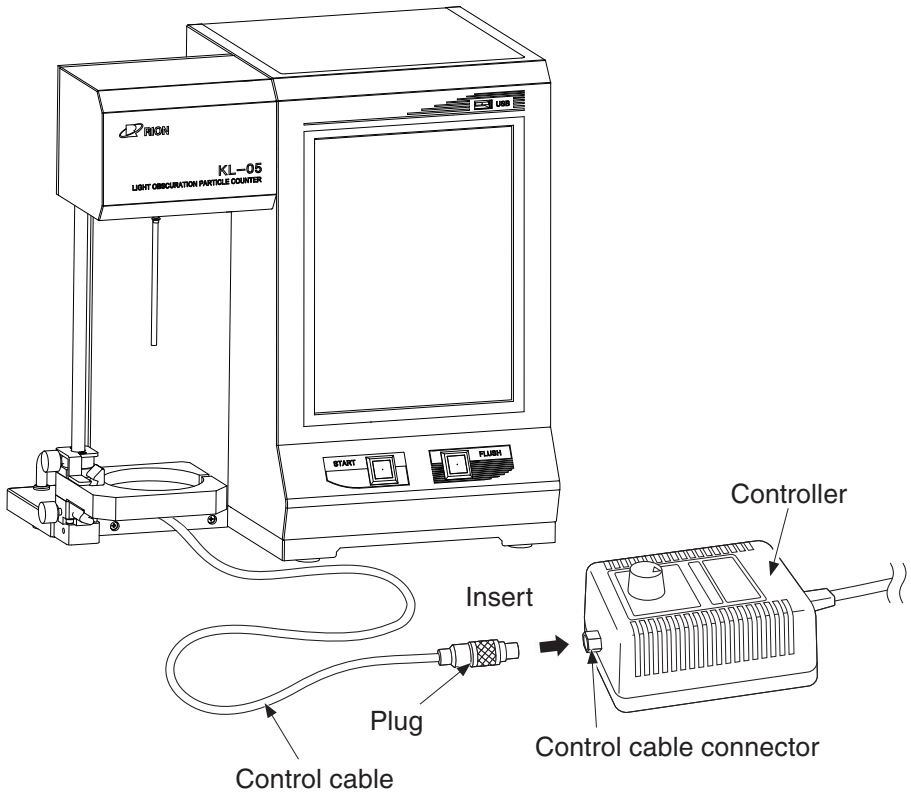
1. Fit the electromagnetic stirrer into the optional base plate and fasten it with the screw.



2. Push the base plate into the sample stand and fasten it with the two screws.



3. Plug the control cable of the electromagnetic stirrer into the control cable connector of the controller.

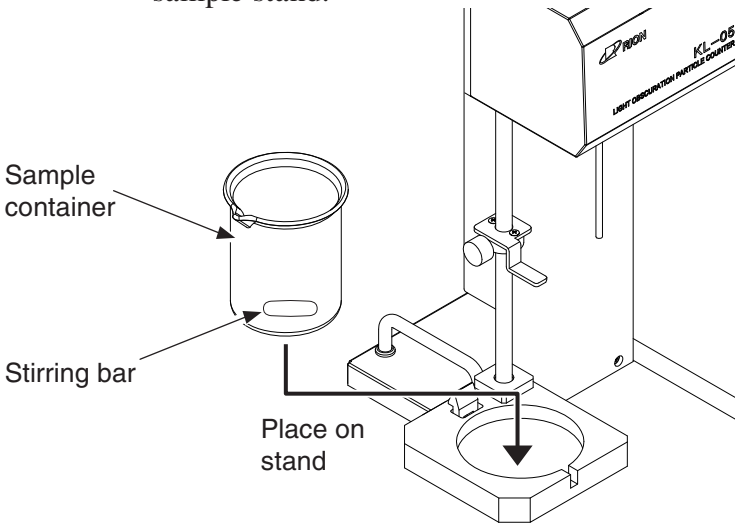


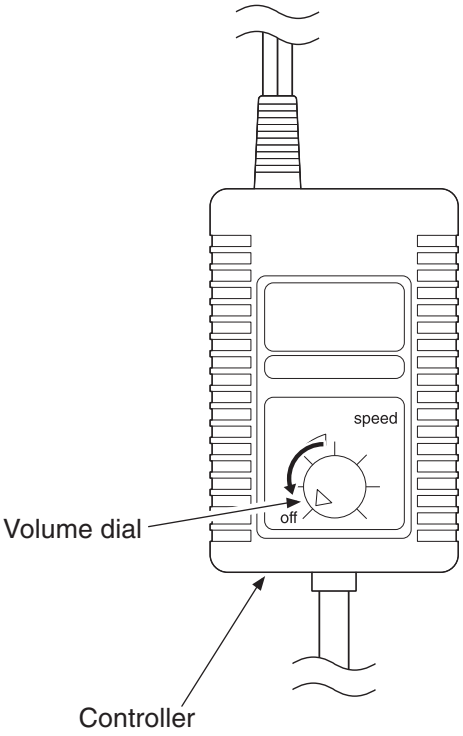
⚠ Caution

The controller must not come into contact with any fluid. If the controller is in contact with fluid, an electric shock as well as malfunction of the controller can occur.

How to use

1. Ensure that the volume dial on the controller is at “off” position.
   Completely turn the volume dial to the left until it stops as per the diagram on the right.
2. Connect the power cord to the AC outlet.
3. Insert the stirring bar supplied with the electromagnetic stirrer into the sample container and place the container on the sample stand.

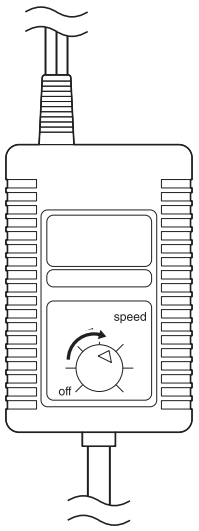




⚠ Caution
The sample container must be set on the sample stand after ensuring the volume dial on the controller is “off”. If the sample container is set when the volume dial is in the state of “on”, the stirring bar may jump around, which can cause splashing of the fluid and damage to the sample container. Also the level of fluid in the sample container must be controlled to prevent it from overflowing when the stirring bar is revolving at high speed. The standard level of sample fluid is 80% of the displayed capacity of the sample container.
The surface material of the stirring bar is glass. Some sample fluids can cause corrosion, dissolving and other chemical reactions to the stirring bar. Ingredients of sample fluids must be checked before they are put in the sample container.
If the stirring bar is not cleaned adequately contamination of sample fluids and chemical reactions can occur. The cleanness of the stirring bar must be ensured before putting into the sample container.

Note
The correct sample container size appropriate to the volume of the sample fluid must be used. A container with less internal diameter and a flat bottom is preferred. A container with less internal diameter is more efficient in agitation, when the capacity is the same.

4. Turn the volume dial to the right to start the stirring bar revolving.
   Turn the volume dial to "off" to cut the power supply of the controller and stop the stirring bar revolving.

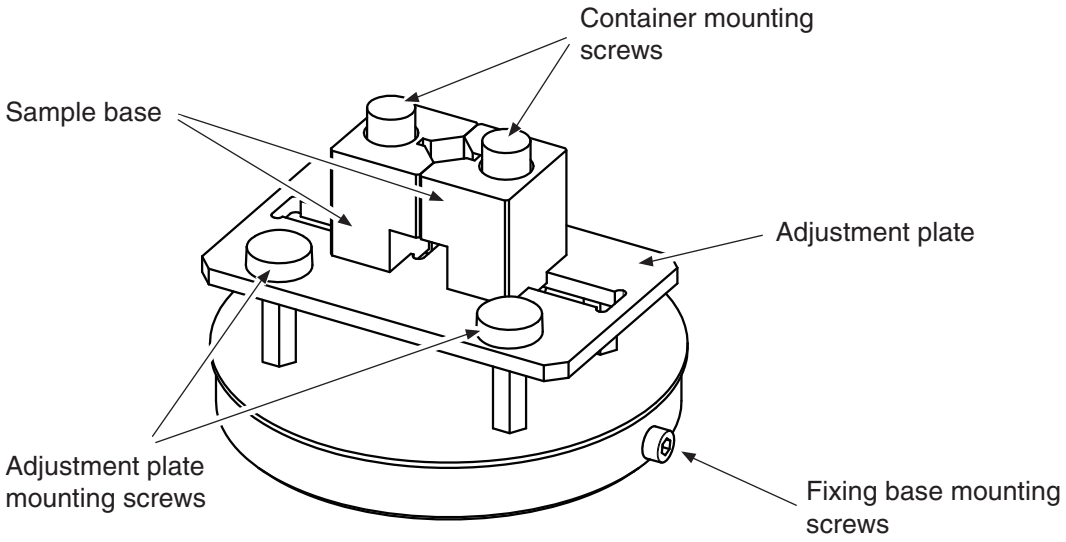


Important
When revolving a stirring bar at high speed, bubbles can form in the sample fluid, which can affect measurement results. Also, if the magnetic coupling between the electromagnetic stirrer and the stirring bar is not strong or fails, the stirring bar will not revolve properly. The revolution speed must be adjusted according to the condition of the stirring bar and the sample fluid.
The stirring bar is magnetic. The electromagnetic stirrer is also magnetic when the power is on. Objects which can be affected by magnetism, such as USB flash drives and watches, must be kept away from the stirring bar and the electromagnetic stirrer.

Note
When revolving the stirring bar at low speed, at first the speed must be set slightly higher to stabilize the revolution and then changed back to the lower speed.

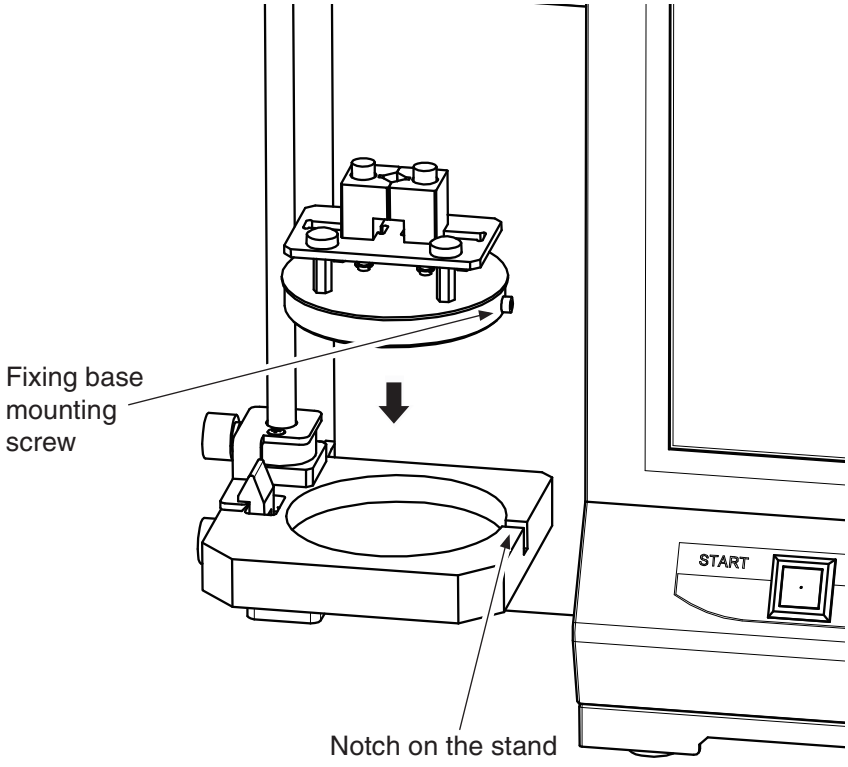
Attaching the fixing base of the small volume container

This sample stand serves for fixing small volume containers. Containers between 8 mm and 20 mm in width can be used.

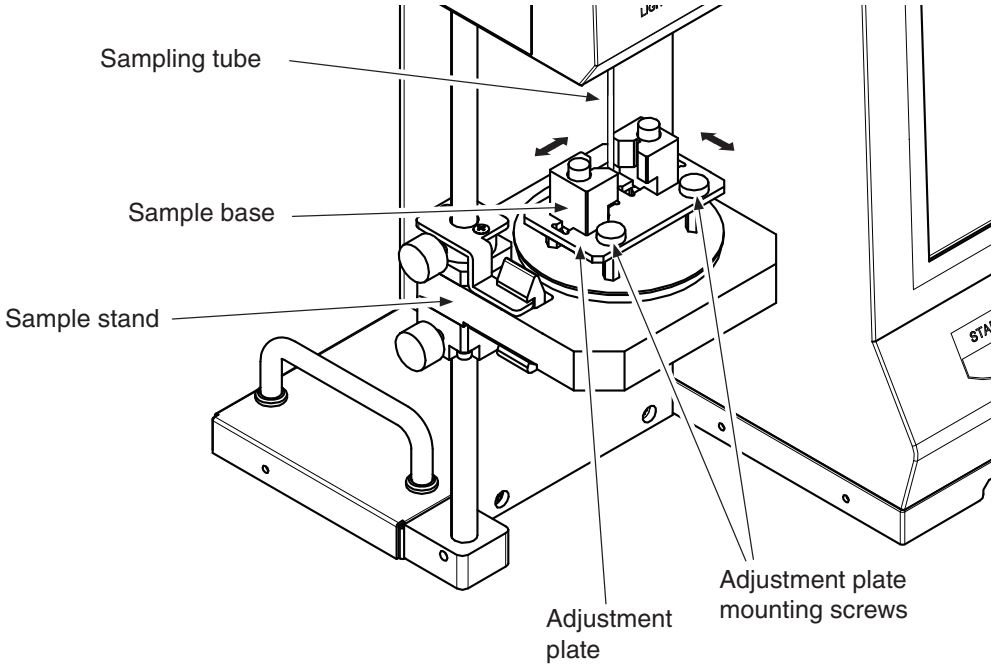


How to install

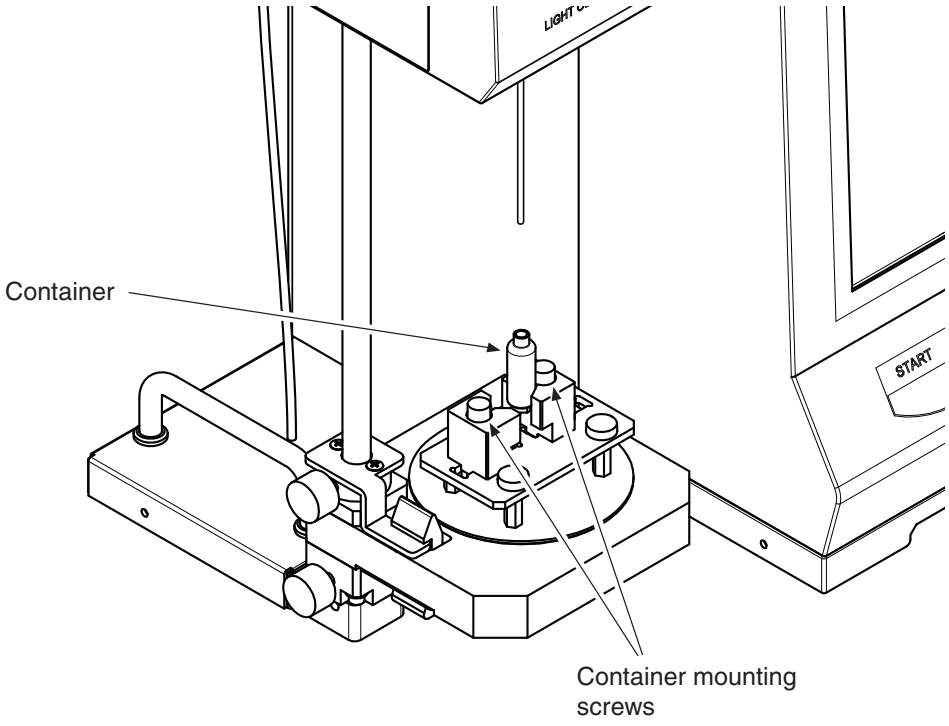
1. Insert the assembly into the sample stand so that the screw of the fixing base fits into the notch on the stand.



2. Adjust the position of the adjustment plate so that the sampling tube will properly enter the container when the sample stand is raised.
3. Provisionally adjust the position of the sample base.



4. Fix only the mounting screw on one side of the container, and fix the opposite side screw when installing the container to clamp it with the sample base.



After fastening the sample stand, proceed as described in “Measuring sequence” on page 61.

Maintenance

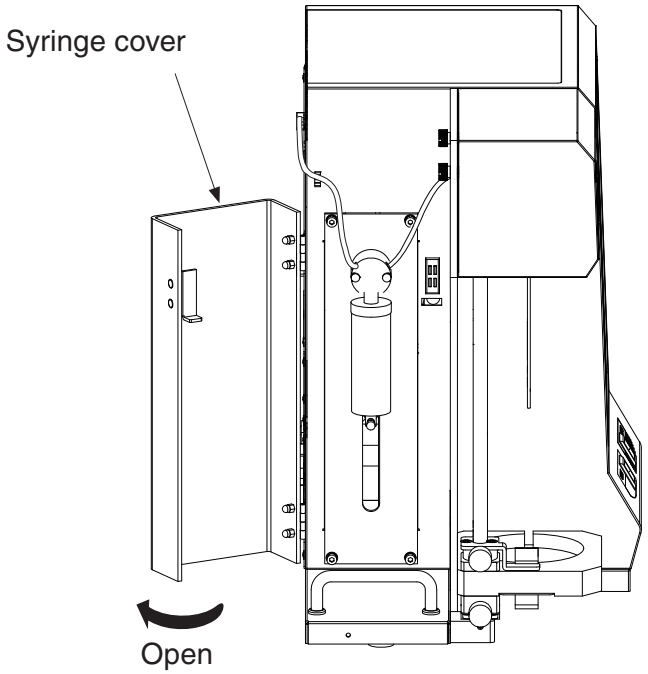
Syringe replacement

Important
The syringe may wear out. If foams appear from the sliding piston during suction or when sample liquid is leaking while draining, please replace the syringe.

1. Click the “FLUSH” button to start the operation.

Note
The “FLUSH” button is not functional until log in. For details, refer to “Login procedure” page 46.

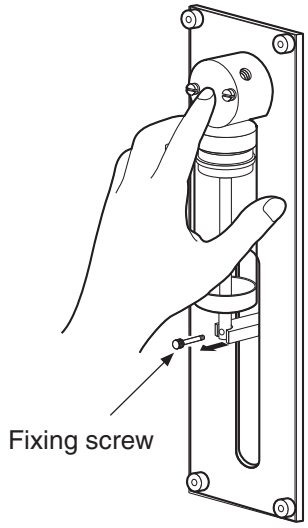
2. When the plunger has drawn 15 mL to 20 mL, open the syringe cover then stop the operation (the plunger stops at that position).



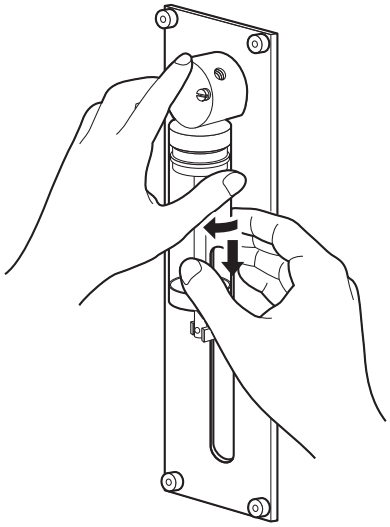
3. Perform the logout and shutdown procedure to turn the power off (see page 54).

Important
Be sure to complete power shutdown before performing the following steps. Otherwise there is a risk of accidents.

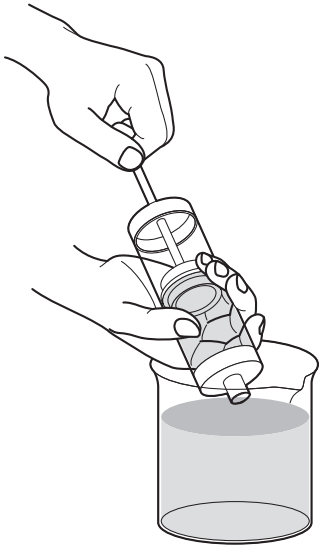
4. While pressing the syringe lightly with one hand, turn the fixing screw on the lower side of the syringe counterclockwise with the other hand to remove the screw.



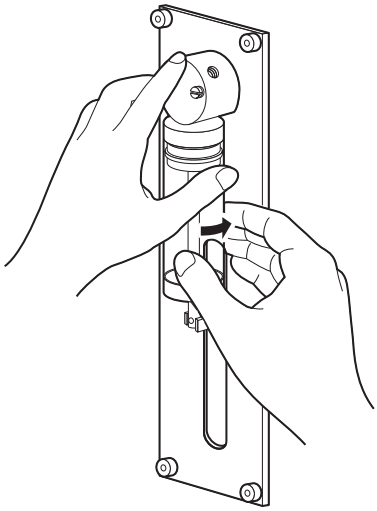
5. While pressing the syringe lightly with one hand, lower the syringe outer chamber by turning it left with the other hand. The syringe will be removed from the valve.

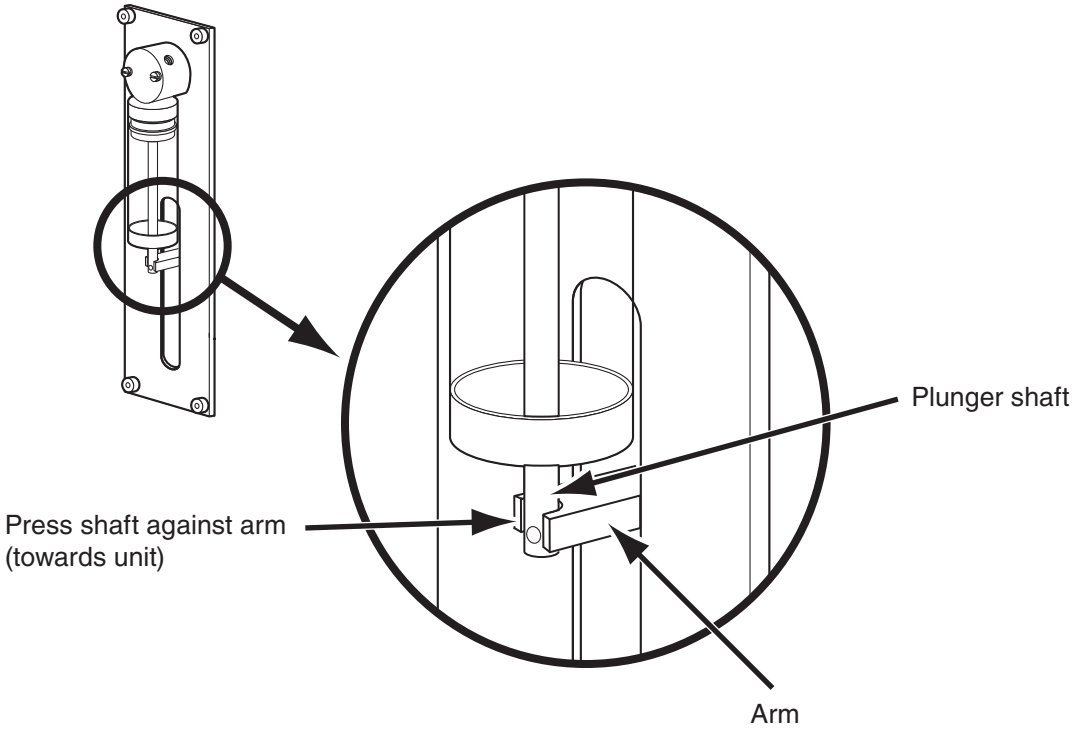


6. While immersing the end of a new syringe in water, pull the plunger.

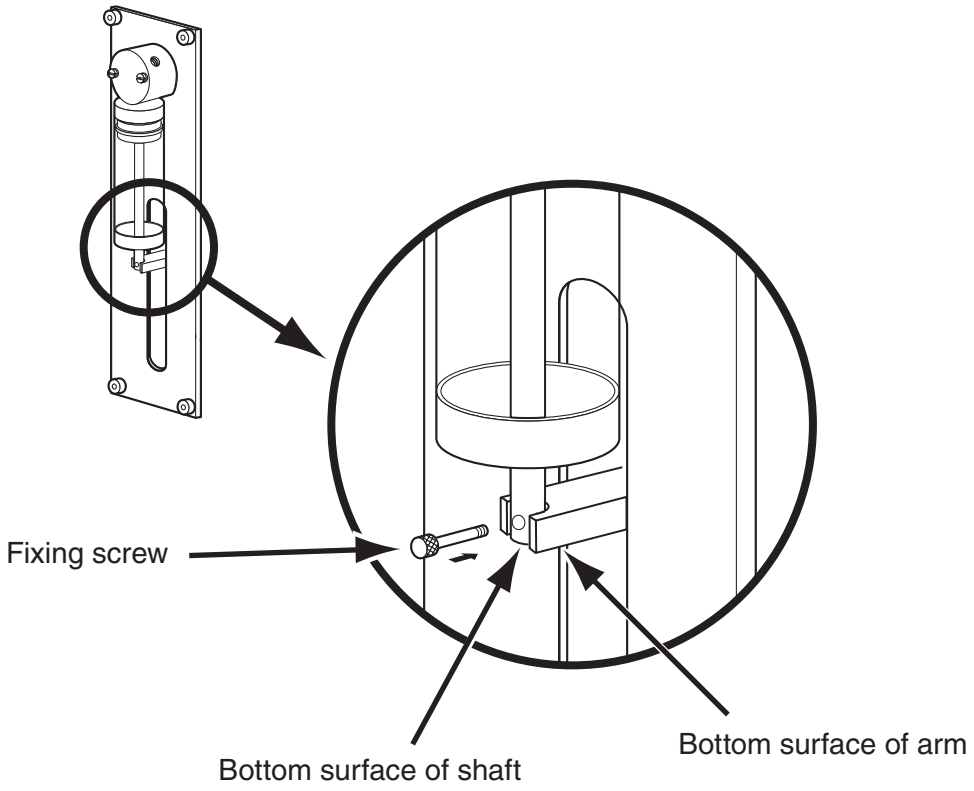


7. Insert the screw area of the new syringe into the syringe fixing hole on the valve. While pressing the syringe lightly with one hand, turn the syringe outer chamber right to install it.
   At this time, press the plunger shaft firmly against the arm so that the shaft does not move, and make sure that the syringe is upright and not slanted when turning the syringe outer chamber. If the shaft is not kept stable while attaching the syringe, the plastic screw thread of the syringe mount may be damaged, which can lead to air being sucked in or sample fluid leaking out.
   Take care not to over-tighten the outer chamber when turning it.





8. Turn the fixing screw clockwise to fix the syringe firmly.
   At this time, align the hole in the shaft and the hole in the arm by making sure that the bottom surface of the shaft and the arm are flush. Otherwise the screw will not go all the way in and the syringe cannot be fastened properly.



9. Close the syringe cover.
10. Set the POWER switch to the (|) side (power on).
11. Log in.
    The plunger returns to the specified location (water inside the syringe will be drained).

Handling the syringe

The sealed piston of the KL-05 syringe can easily be damaged as it is made of Teflon. Please make sure to follow the instructions below in order to maintain the syringe in optimum condition for as long as possible.

- Prior to using the syringe, make sure the sealing area is fully moistened, using pure water such as distilled water or deionized water, etc., to operate the syringe. Never carry out a dry run.
- When removing the plunger from the outer syringe, and when re-inserting it, please be sure to handle it in the same manner as above.
- After measuring, clean the inside of the syringe thoroughly using pure water such as distilled water or deionized water, etc., (repeat over five full strokes).
- Clean the inside of the syringe every one or two weeks using methods A or B shown below. (Select the method depending on the type of measuring sample or the measuring frequency.)
  - A. Cleaning by detergent or bleach
    1. Immerse the syringe in diluted detergent or diluted bleach for approx. 30 minutes.
    2. Clean it fully using pure water such as distilled water or deionized water etc.
  - B. Cleaning with acid or alkali
    1. Immerse the syringe in NaOH (10% concentration) for approx. ten minutes.
    2. Clean it fully using pure water such as distilled water or deionized water.
    3. Immerse the syringe in HCl (10% concentration) for approx. ten minutes.
    4. Clean it fully using pure water such as distilled water or deionized water.
- If air bubbles are produced continuously from the piston seal, the syringe needs to be replaced. Please contact the supplier.
- Because glass can break due to temperature changes, avoid situations where the syringe is warmed up or cooled down rapidly.
- When using or cleaning a microsyringe, proceed with extra care because shocks may break the glass.
- Perform drying after cleaning only with the plunger removed from the glass body and at temperatures lower than 60 degrees centigrade.
- Immersion in an organic solvent or a strong acid for a long time can lead to problems, because these substances may permeate the adhesive, causing bonded sections to come apart.
- When operating the plunger, avoid twisting motions that could damage the inside of the glass or the plunger surface, resulting in loss of airtight sealing.

Cleaning main unit

- When cleaning main unit, use neutral detergent and wipe up with soft cloth. Please make sure not to erase the printings, paintings, and markings when cleaning main unit.
- The printings, paintings, and marking on the main unit are very important information for safety operation and serious accidents might be caused if operated without them

Handling the external display

Observe the following precautions to prevent damage to the LCD.

- Do not push on or scratch the surface of the LCD with a hard object. Also avoid touching the LCD surface with your hands to prevent smudges.
- If the LCD surface has become dirty, wipe it clean with absorbent cotton or a soft cloth.
- If there is saliva, water or other fluid on the LCD surface, wipe it off quickly. Otherwise the LCD surface may deteriorate.
- If an unchanging pattern is shown on the display for a very long time, burn-in may occur. This will disappear after a certain period, but it is recommended to turn off the display when not using it.
- If a powerful light is directed onto the LCD, components and display characteristics may deteriorate. Do not expose the LCD to ultraviolet light for an extended period.

Noise level check and flow cell cleaning

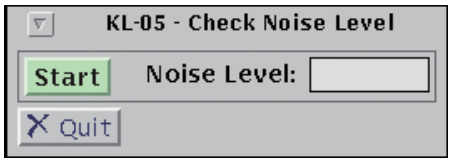
When a sample exceeds the specified maximum particle number concentration, or a sample is mixed with air bubbles, or contamination has occurred, or moisture condensation has formed on the flow cell or the detection system, the letters / figures on the “KL-05 Controller” window turn to orange. If this occurs during measurement, the “Bad Sensing Condition” warning message appears after completion of the measurement. Check the noise level and clean the flow cell area in the following way.

Note
You should periodically check the noise level in order to maintain proper detection capability.

Noise level check

“KL-05 - Check Noise Level” window

Clicking the “Check Noise Level...” button in the “KL-05 - Start New Window” window brings up the “KL-05 - Check Noise Level” window.



“Start” button:

Clicking this button starts the measurement for noise level checking. Measurement is performed for one minute without sample fluid suction, and the voltage when an accumulated total of 10 particles is measured is shown in the “Noise Level:” field.

“Noise Level:”:

When the button is clicked, the noise level voltage is shown in the field in mV units.

“Quit” button:

Click the “Quit” button to close the “KL-05 - Check Noise Level” window.

Noise level check sequence

1. Supply pure water to the unit to replace the sample liquid. If the sample liquid undergoes a chemical reaction with water, first replace it with a suitable liquid which does not cause a reaction, then replace that liquid with pure water.
2. Run pure water over the unit to clean it.
3. Display the “KL-05 - Start New Window” window and click the “Check Noise Level...” button under “Usual Operations:”.
   The “KL-05 - Check Noise Level” window appears.

Note
See page 46 for the login method and see page 51 for the “KL-05 - Start New Window” window display method.

4. Click the “Start” button.

Note
To check the noise level, clean the flow system thoroughly with purified water, then fill it completely with purified water and carry out the check.

   The “KL-05 Controller - Measurement in Progress” window appears.
   Upon completion of the check, the noise level will be displayed after “Noise Level:”.
5. Record the noise level, and then click the “Quit” button.
6. Clean the flow cell as described below. If the noise level has increased, clean the flow cell. If the noise level has decreased, the sensor may be defective. Please contact the supplier.

Flow cell cleaning

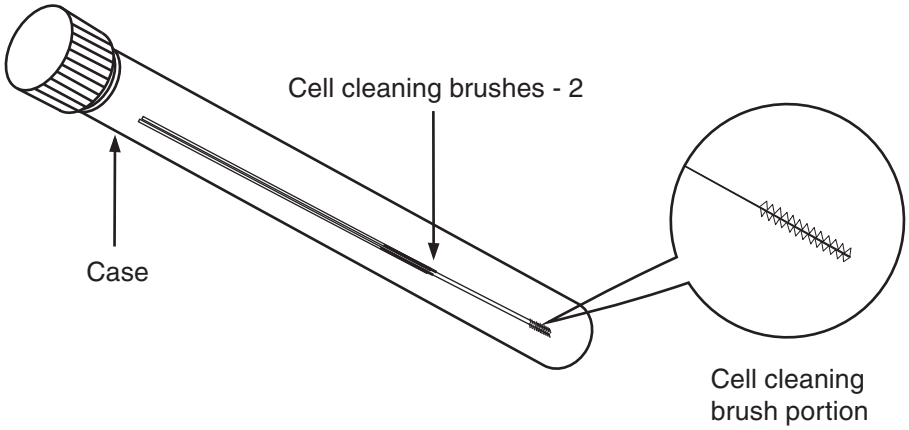
1. Supply pure water to the unit to replace the sample liquid. If the sample liquid undergoes a chemical reaction with water, first replace it with a suitable liquid which does not cause a reaction, then replace that liquid with pure water.
2. Run pure water over the unit to clean it.
3. After cleaning thoroughly, purge the unit with pure water at the sample flow rate (25 mL/min, 10 mL/min for the factory option).
   When the letters / figures on the "KL-05 Controller" window change to black, the cleaning is complete. If the letters / figures on the "KL-05 Controller" window remain orange, repeat the cleaning further (follow the steps from No. 4).
4. Purge the unit with cleaning liquid without contamination.

Note
For cleaning liquid, please use detergent used for optical parts or alcohol etc., without any solids.

5. After sufficient purging, replace the cleaning liquid with pure water.
6. Supply pure water at the rated sample flow rate (25 mL/min, 10 mL/min for factory option) to the unit. If the letters / figures on the "KL-05 Controller" window change to black, cleaning is complete. Check the noise level again according to the procedure on the previous page and confirm the noise level has fallen.
7. If the letters / figures on the "KL-05 Controller" window remain orange or the noise level is still high, clean using the supplied cell cleaning brushes (see next page).

Cleaning using a cell cleaning brush

Use the supplied cell cleaning brushes to clean the flow cell.
Two cell cleaning brushes are provided in a special case.



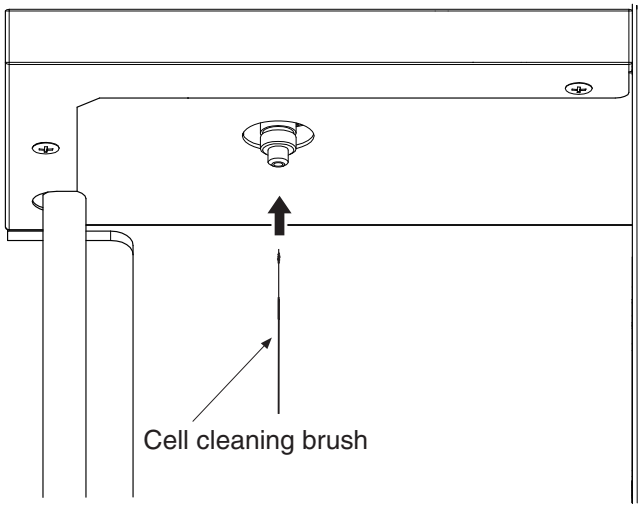
Important
Handle the cell cleaning brushes with care since they are easily bent.

To clean the flow cell using a cell cleaning brush, follow the steps described below.

1. Remove the sampling tube from the unit while the sample fluid system is still filled with pure water.

Important
If a cell cleaning brush is inserted into the flow cell while it is dry, there is the risk of the flow cell being damaged. Always make sure that the flow cell is filled with water before cleaning with a cell cleaning brush.

2. Take the cell cleaning brush out of the case and moisten the end of the brush with pure water.
3. Holding the cell cleaning brush approximately 70 mm away from the end, insert it slowly and carefully, straight into the INLET.
   Slight resistance may be felt when the cleaning brush reaches the entrance to the flow cell. Continue to slowly and carefully insert the cleaning brush until resistance is no longer felt.



Important
Applying excess pressure can result in damage to the flow cell and cell cleaning brush. If the cell cleaning brush does not enter the flow cell, pull out the cell cleaning brush and check for damage or bending of the end of the brush. If the end of the brush is damaged or bent, replace it with another cell cleaning brush.
If the cell cleaning brush is inserted with excessive force, it may cause damage to the fluid system. Please do not insert it by more than approximately 70 mm from the end.

4. Pull out the cell cleaning brush slowly.
5. Repeat steps 3 and 4 several times.
6. Connect the sampling tube to the INLET of this unit, and clean by purging with pure water.
7. Supply pure water to the unit at the rated sample flow rate (25 mL/min, 10 mL/min for factory option). If the letters / figures on the “KL-05 Controller” window change to black, cleaning is complete. Check the noise level again according to the “Noise level check sequence” on page 208 and confirm the noise level has fallen.

Note
If the “KL-05 Controller” window is shown with orange still remaining, there may be excessive contamination or damage of the flow cell area. Please contact the supplier.

Periodic maintenance

In order to maintain continued measurement precision, it is recommended to have the unit checked and serviced once per year. Contact the supplier regarding periodic maintenance.

The standardization of units by the regional pharmacopeia

The effective period is set for the standardization of the unit in every region (Calibration, Performance-Test). It is therefore necessary to carry out the standardization (Calibration, Performance-Test) prior to the end of the effective period.
If standardization (Calibration, Performance-Test) of units at each region is required from us, please contact the supplier.

Transport

Before returning the unit for maintenance or servicing, purge the sample fluid system thoroughly with pure water to remove any sample fluid remnants. Then fill the piping with alcohol (ethyl alcohol) and seal it with the end plugs. Wipe the outside of the unit clean so that there are no remnants of chemical substances on the unit.
Before transporting or moving the unit, be sure to backup the system and all data. This is to guard against the possibility of data loss and storage failure that can occur if the storage drive is exposed to shocks during transit. When sending the units, please follow any related laws and regulations, and the instructions of your shipping carrier.

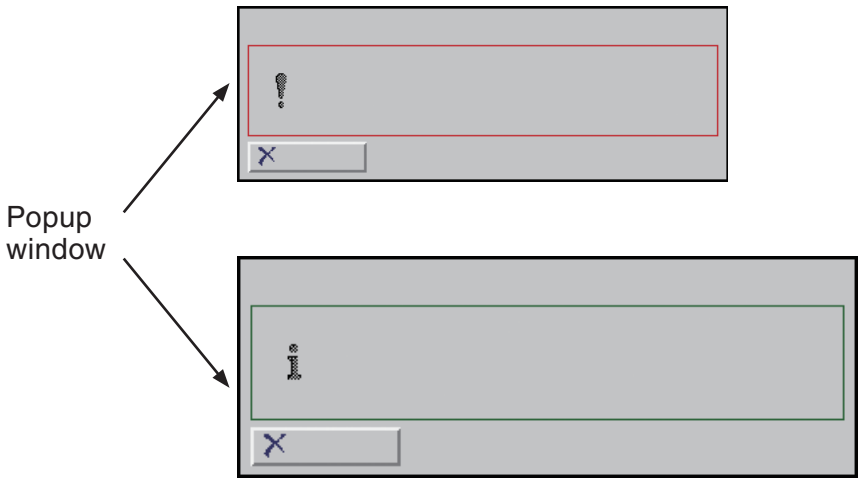
Troubleshooting

About pop-up window

Error messages and similar are shown in a popup window (a window that overlays an existing window).

When this happens, resolve the error as indicated in the popup window. Clicking the “Close” or “Dismiss” button in the popup window closes the window.

If a popup with unknown content is shown, refer to “Problem list” on page 214.



Problem list

Problem situations are listed below.

Specific troubleshooting methods start on the next page.

	Message categories	Problem description	Page
General problems	–––	Unit does not operate	215
	Message	Cannot measure	215
Clock setting problems	“KL-05-Controller” window “KL-05-Set Clock” window	Clock settings are not retained	132/ 216
Printer setting problems	–––	Cannot print	162/ 216
Boot problems	–––	System does not start	44/ 216
Particle detector assembly problems	Message	Sensor degraded	217
	Message	Detection status has deteriorated	217
	“KL-05-Measurement” window	Problem with measurement results	217
	“KL-05-Controller” window	The letters / figures are shown in red or orange	217
Backup/ Restore problems	“KL-05-Backup/Restore” window	Cannot restore	218
Other problems	Message	About available disk space	218
	Message	About internal errors	219
	Message	“Broken or incompatible file” message is shown	219
	Message	Performance test fails	219
	Message	“KL-05 Controller window replied an error: - 623 - syringe sampler replied “/0g”(Device not initialized)” message appears	220
	Message	“ExpandTheFilename: no home directory: uid=1003” message appears	220
	–––	Measurement results are not saved	220
	–––	The syringe pump does not operate	220
	–––	Nothing is shown on the display	220

Problem solving

This section explains the nature and causes of problems, and methods for their solution, in order of descending likelihood of occurrence. If multiple solutions are explained, the best solutions are given first.

If a problem cannot be solved by the steps described in this section, please contact the supplier.

General problems

[Description] Unit does not operate.

[Cause] Power cord plug has become disconnected.

[Solution] Connect the supplied power cord correctly (see "Power cord connection" on page 32).

[Cause] Fuse is blown.

[Solution] Please contact the supplier.

[Cause] Problem with internal PCB.

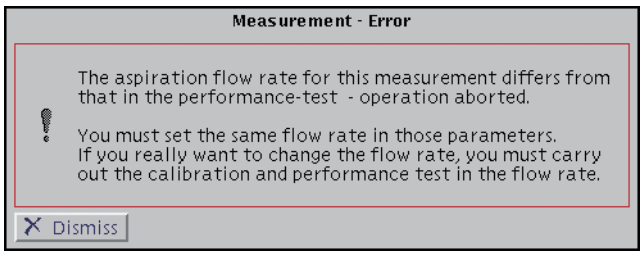
[Solution] Please contact the supplier.

[Description] Cannot perform measurement.

[Cause] The validity of a performance test specified as measurement parameter has expired.

[Solution] Check the expiration date. If the calibration cycle prescribed by the respective pharmacopoeia has passed, the unit needs to be standardized again. Please contact the supplier.

[Description] The message "The aspiration flow rate for this measurement differs from that in the performance-test - operation aborted" is shown.

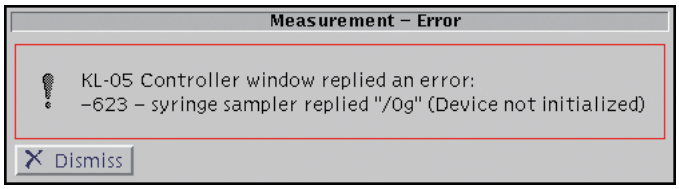


[Cause] Aspiration flow rate is different from performance test.

[Solution] This message appears when the aspiration flow rate for the Performance-Test data selected during measurement parameter specification is different from the aspiration flow rate specified for measurement. In such a case, measurement cannot be carried out.

Change the setting so that the aspiration flow rate values for the measurement parameter and Performance-Test data are the same (see page 77).

[Description] Cannot perform measurement.



[Cause] Syringe sampler is offline.

[Solution] If the syringe cover is open, an interlocking feature prevents syringe operation. Close the syringe cover. If this does not resolve the problem, please contact the supplier.

Clock setting problems

[Description] Clock settings are not retained.

[Cause] The backup battery has deteriorated or its voltage is too low, so that settings cannot be saved (CMOS is cleared).

[Solution] Please contact the supplier.

Printer setting problems

[Description] Cannot print.

[Cause] No printer is set.

[Solution] Perform the steps for setting a printer as described on page 138. For information on availability of a printer driver, please contact the supplier.

[Cause] Printer does not receive data.

[Solution] Check whether the printer is connected correctly. Restart and retry the printing process. If this does not resolve the problem, please contact the supplier.

Boot problems

[Description] System does not start.

[Cause] The storage is defective.

[Solution] Please contact the supplier.

Particle detector assembly problems

[Description] The message “Sensor degraded” is shown in the measurement result.

[Cause] This indicates that the output of the laser diode of the particle sensor has fallen below the specified level.

[Solution] The laser diode may be damaged, or may have some problems. Please contact the supplier.

[Description] The message “Bad Sensing Condition” is shown in the measurement result.

[Cause] A sample exceeding the specified maximum particle number concentration, or a sample mixed with air bubbles, or contamination, or condensation has occurred on the particle detection flow cell area.

[Solution] Remove any deposits and air bubbles in the flow channel. If this problem persists even after repeated cleaning of the flow cell, the flow cell or detection system may be damaged. Please contact the supplier.

[Description] Problem with measurement results.
The letters / figures on the “KL-05 Controller” window appear in red.

[Cause] This indicates that the output of the laser diode of the particle sensor has fallen below the specified level.

[Solution] The laser diode may be damaged, or may have some problems. Please contact the supplier.

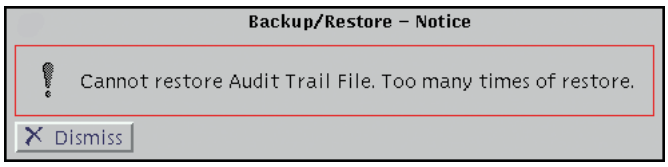
[Description] Problem with measurement results.
The letters / figures on the “KL-05 Controller” window appear in orange.

[Cause] A sample exceeding the specified maximum particle number concentration, or a sample mixed with air bubbles, or contamination, or condensation has occurred on the particle detection flow cell area.

[Solution] Remove any deposits and air bubbles in the flow channel. If this problem persists even after repeated cleaning of the flow cell, the flow cell or detection system may be damaged. Please contact the supplier.

Backup/Restore problems

[Description] The message “Cannot restore Audit Trail File. Too many times of restore” is shown.

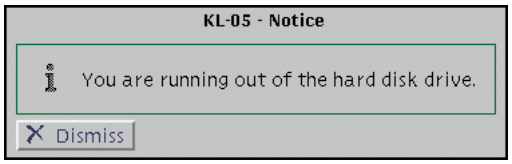


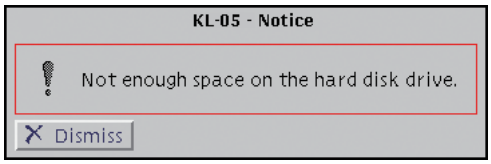
[Cause] An attempt is made to perform more than 999 restore operations in a single month.

[Solution] No more restore operations can be carried out. When the month changes, restore can be carried out again.

Other problems

[Description] The message “You are running out of the storage drive.” or “Not enough space on the storage drive.” appears.

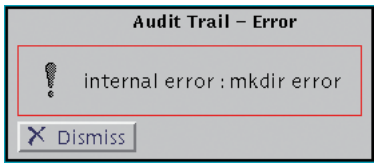




[Cause] The remaining free space on the storage drive in the KL-05 is low, or the storage has become full.

[Solution] Erase data that are no longer needed, or contact the supplier.
When storing data at a rate of 100 per day, the storage of the KL-05 will not become full by measurement and other data alone over a period of 5 to 6 years. However, after several years, performing regular backups is important, because the risk of mechanical failure of the storage increases. It may therefore be advisable to replace the storage in some instances. Please contact the supplier.

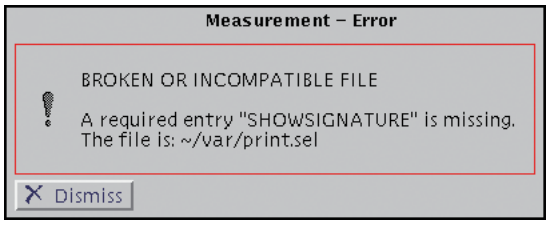
[Description] The message “internal error” appears.



[Cause] There may be a hardware or software fault.

[Solution] Turn power to the KL-05 off and then on again. If the message window no longer appears, there is no problem. If the message window appears again, note the content of the error message and contact the supplier.

[Description] The message “BROKEN OR INCOMPATIBLE FILE” appears.



[Cause] This message appears when a print operation is performed in any window after performing the firmware version upgrade of the unit.

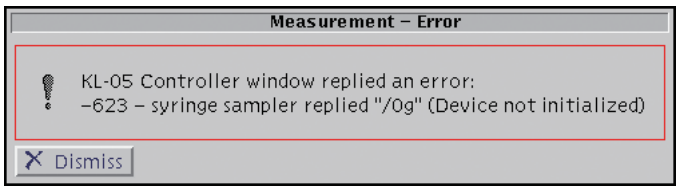
[Solution] Close the window and proceed with the print operation. The message will not appear the next time. This is a temporary occurrence and does not indicate a problem. However, the temporary error window will appear for each operator separately.

[Description] Performance test fails.

[Cause] There is a problem with performance test parameters, test particles or similar.

[Solution] Check that there are no problems with the Performance-Test parameters, the condition of the test particles, and no mistakes on the test, then repeat the Performance-Test again.
If the failure persists even after several Performance-Tests, there may be problems with the particle detector etc. Please contact the supplier.

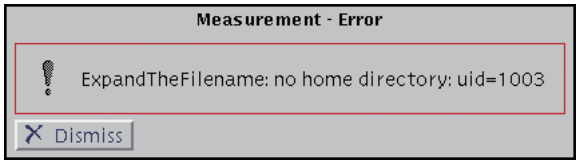
[Description] The message “KL-05 Controller window replied an error: - 623 - syringe sampler replied “/0g” (Device not initialized)” appears.



[Cause] KL-05 cannot be initialized as the syringe does not respond normally due to any reason.

[Solution] Verify that the syringe cover is properly closed and that there are no obstacles to syringe movement. Turn power to the KL-05 off and then on again. This message does not indicate a problem with the KL-05 itself, but if the message appears again after a restart, the syringe or a related part may be defective. Please contact the supplier.

[Description] The message window “ExpandTheFilename: no home directory: uid=1003” appears.



[Cause] System processing and file access occurred simultaneously.

[Solution] This has no adverse influence on the unit. Measurement results will not be affected. Click the Dismiss button to close the message.

[Description] Measurement results are not saved.

[Cause] The storage is defective.

[Solution] Please contact the supplier.

[Description] The syringe pump does not operate.

[Cause] The syringe is defective.

[Solution] Please contact the supplier.

[Description] Nothing is shown on the display.

[Cause] Power to the display is not turned on.

[Solution] Start the KL-05 only after power to the display was turned on. If this does not resolve the problem, please contact the supplier.

Specifications

Optical system	Light-obscuration method
Light source	Laser diode (rated output: 4.5 mW, wavelength: 790 nm)
Laser product class	Class 1, IEC 60825-1 (2014)
	Class 3B laser is used in the internal particle detection mechanism.
Light detector	Photodiodes
Materials of component parts exposed to sample fluid	
Flow cell	Synthetic quartz
Syringe	Borosilicate glass, PTFA
Syringe pump	Kel-F(PCTFE), PTFE
Tube / Packing / Connector	PFA, PTFE, PCTFE, perfluoro (fluorocarbon rubber)
Sample container plate	Polyacetal
Allowable sample fluid type	
	Fluids which do not cause corrosion to the parts in contact with the fluid
Calibration	Using polystyrene latex (PSL) particles (refractive index 1.6) in pure water
Minimum detectable particle size	
	1.3 µm (with PSL particles of refractive index 1.6 in pure water)
Measurable particle size range	
	1.3 µm to 100 µm (with PSL particles of refractive index 1.6 in pure water)
Size range	Can be set freely up to 20 increments within the measurable particle size range (0.1 µm steps)
Counting efficiency	100% ±5% (measuring PSL particles in the vicinity of 10 µm in pure water and comparing 5 µm and above count with reference unit)
Threshold accuracy	5% or less (when particle number concentration is less than 6000 particles / mL in the vicinity of 10 µm and 15 µm PSL particles in pure water)
Size resolution	10% or less (in the vicinity of 10 µm PSL particles in pure water)
Sampling volume accuracy	
	Within ± 2%
	(using 25 mL syringe, flow rate 25 mL/min, 10 mL measurement)
Sampling flow rate accuracy	
	Within ± 2%
	(using 25 mL syringe, flow rate 25 mL/min, 10 mL measurement)
Maximum particle number concentration	
	10000 particles / mL (when the counting loss is 10% in the vicinity of 10 µm PSL particles in pure water)

Flow rate 25 mL / min
Syringe volume 25mL
Minimum measurable volume
0.2mL
Sample fluid dead volume
0.5 mL or less (When using KL-04-S12, KL-04-S13, or KL-04-S14)
0.2 mL or less (When using KL-04-S11)
Sample container
Maximum size (diameter)
79 mm (using JIS R3503-2007 300 mL beaker)
Maximum height 112 mm (using JIS R3503-2007 200 mL beaker)
Sample container plate
Internal diameter 77mm, depth 10mm
Sample fluid temperature range
+15°C to +30°C (no condensation on flow cell)
Sample INLET / OUTLET
INLET 2 mm × 4 mm dia. Flare processing
OUTLET 2 mm × 3 mm dia. Flange processing
Maximum sample fluid pressure
50 kPa (gauge pressure)
Maximum sample fluid viscosity
30 mPa · s (at 25°C)
Measurement conditions
Measurement
Drain flow rate
5 mL/min to 100 mL/min (1 mL/min steps)
Measurement volume
0.2 mL to 24.8 mL (0.1 mL steps)
Number of Measurements
1 time to 100 times (1 time steps)
Tare Volume
0.2 mL to 10.0 mL (0.1 mL steps)
Number of Pre Measurements
0 time to 10 times (1 times step)
Flushing
Aspiration flow rate
5 mL/min to 100 mL/min (1 mL/min steps)
Drain flow rate
5 mL/min to 100 mL/min (1 mL/min steps)
Flush Volume
0.2 mL to 25.0 mL (0.1 mL steps)

Repeat	1 time to 100 times (1 time steps)	
Measured value display		
	Cumulative value / Differential value	
Error Information	Indicates sensor degradation / detection status deterioration	
Display section		
Display method	10.4 in. TFT LCD (Anti Glare) (with LED backlight)	
	XGA 1024 x 768	
Display language	English / Japanese	
Display items	Measurement screen, Calibration screen, Performance-test screen,	
	Other various setting screens	
LED		
START	Lights up in green when measurement starts	
FLUSH	Lights up in white during flushing	
Operation section		
Button		
START	Start measurement	
FLUSH	Start flushing	
Input / Output connectors		
Ethernet	10/100/1000BASE-T TCP/IP RJ-45 × 1	
SERIAL	EIA-232C-E compliant	
	Connector	D-SUB 9 pin, male × 1
D-SUB	Maximum resolution	WQXGA (2560 × 1600)
	Connector	mini D-SUB 15 pin, female × 1
USB	Type A, female × 5 (front: 1 port, rear 4 ports)	
Internal storage device		
	64 GB	
Input device	Keyboard, 3-button mouse	
Function		
Audit trail function		
	Record operation history	
Electronic recording function		
	Save measured data in digital format	
Electronic signature function		
	Create electronically signed data	
	Identify the person who signed	
	Transfer electronically signed data	

Backup / Restore function
- Backup various data in the USB memory
- Restore backed up data from USB memory

Security function
- Password registration for each operator
- Set password expiration date
- Automatic logout when you do not operate for a fixed time

Network / Printer / Serial Port Settings
- Set network / printer / serial port

Snap shot: Taking snapshots of the screen

Calender: 1970 to 2064 (adjusts for leap years), monthly difference ± 2 minutes (normal temperature)

Environmental Requirements

Operational Environments
- Indoor Use Only

Altitude: Up to 2000 m

Supply Voltage Fluctuations
- 100 V to 240 V AC ±10%

Overvoltage Category
- Ⅱ

Pollution Degree: 2

Protection Class: Ⅰ

Environmental conditions for operation
- +15°C to +30°C, 20% to 80% RH (no condensation)

Environmental conditions for storage
- −10°C to +50°C, 90% RH or less
- (no condensation and no freezing of internal piping)

Power switch: With electromagnetic reset function

Power: 100 V to 240 V AC, 50 / 60 Hz, Approx. 80 VA

Dimensions: Approx. 366 mm (H) × 360 mm (W) × 236 mm (D) (excluding protruding parts)
Approx. 369 mm (H) × 375 mm (W) × 236 mm (D) (maximum)

Weight: Approx. 10 kg

Supplied accessories

PFA sampling tube (2 mm × 4 mm dia., length 10 cm) set (includes a nut) KL-04-S13	1
Drain tube (2 mm × 3 mm dia., length 150 cm) set (includes a connector and a piece of packing)	1
Mouse	1
Keyboard	1
Ferrite core	1
USB flash drive (8 GB) for backup	1
Power cord (2.5 m)	1
Cell cleaning brush (included in one case) KR-41-022	1
Cable clamp	1
CD-ROM for KL-05	1
Administrator manual and handling precautions	1
Liquid-borne particle counter usage precautions	1
Instruction sheet for “Transport and Installation”	1
Inspection certificate	1

Factory option

The standardization of units by the regional pharmacopeia

JP

Particle size calibration

Particle size calibration using particles from 1.3 µm to 100 µm which have domestic or international size traceability and uncertainty within ± 3%. However, for calibration of 4 µm and below, Rion employs an in-house method.

Performance test

Sample fluid volume accuracy test
Sample fluid flow rate accuracy test
Count ratio test, threshold accuracy test and particle size resolution test using Clintex (counting reference standard solution) manufactured by JSR Corporation

USP

Particle size calibration

Particle size calibration using particles from 1.3 µm to 100 µm (NIST standard reference substance with traceability). However, for calibration of 4 µm and below, Rion employs an in-house method.

Performance test

Sample fluid volume accuracy test
Sample fluid flow rate accuracy test
Count accuracy test and ratio value test using USP-PC-RS
Particle size resolution test using calibrated 10 µm particles

EP

Particle size calibration

Compliant with JP or USP

Performance test

Compliant with JP or USP

Note: EP does not have stipulations for particle size calibration and performance testing

KP

Particle size calibration

Particle size calibration using particles from 1.3 µm to 100 µm which have domestic or international size traceability and uncertainty within ± 3%. However, for calibration of 4 µm and below, Rion employs an in-house method

Performance test

Sample fluid volume accuracy test

Sample fluid flow rate accuracy test

Count ratio test, threshold accuracy test and particle size resolution test using Clintex (counting reference standard solution) manufactured by JSR Corporation

ChP

Particle size calibration

Compliant with JP or USP

Performance test

Sample fluid volume accuracy test

Sample fluid flow rate accuracy test

Particle size resolution test and counting tolerance test using a counting reference standard solution manufactured by Beijing Hai'an Hongmeng Standard Substance Technology Limited Li-ability Company

Compliant with 10 mL syringe volume

The syringe volume

10 mL

The rated flow rate

10 mL/min

Measurement

Drain Flow Rate

5 mL/min to 100 mL/min (1 mL/min steps)

Measurement Volume

0.2 mL to 9.8 mL (0.1 mL steps)

Number of Measurement

1 time to 100 times (1 time steps)

Tare Volume

0.2 mL to 9.8 mL (0.1 mL steps)

Number of Pre-Measurement

0 time to 10 times (1 time steps)

Flushing

Aspiration Flow Rate

5 mL/min to 100 mL/min (1 mL/min steps)

Drain Flow Rate

5 mL/min to 100 mL/min (1 mL/min steps)

Flush Volume

0.2 mL to 10.0 mL (0.1 mL steps)

Repeat

1 time to 100 times (1 time steps)

Sample fluid volume accuracy

Within ± 5%

(when measuring a volume of 0.5 mL with a 10 mL syringe)

Sample fluid flow rate accuracy

Within ± 5%

(when measuring a volume of 0.5 mL with a 10 mL syringe)

The rated flow rate 10 mL/min changing

The rated flow rate

10 mL/min

Sample fluid volume accuracy

Within ± 2%

(when measuring a volume of 10 mL with a 25 mL syringe)

Within ± 5%

(when measuring a volume of 0.5 mL with a 10 mL syringe)

Sample fluid flow rate accuracy

Within ± 2%

(when measuring a volume of 10 mL with a 25 mL syringe)

Within ± 5%

(when measuring a volume of 0.5 mL with a 10 mL syringe)

The rated flow rate 10 mL/min Addition

The rated flow rate

10 mL/min

Sample fluid volume accuracy

Within ± 2%

(when measuring a volume of 10 mL with a 25 mL syringe)

Within ± 5%

(when measuring a volume of 0.5 mL with a 10 mL syringe)

Sample fluid flow rate accuracy

Within ± 2%

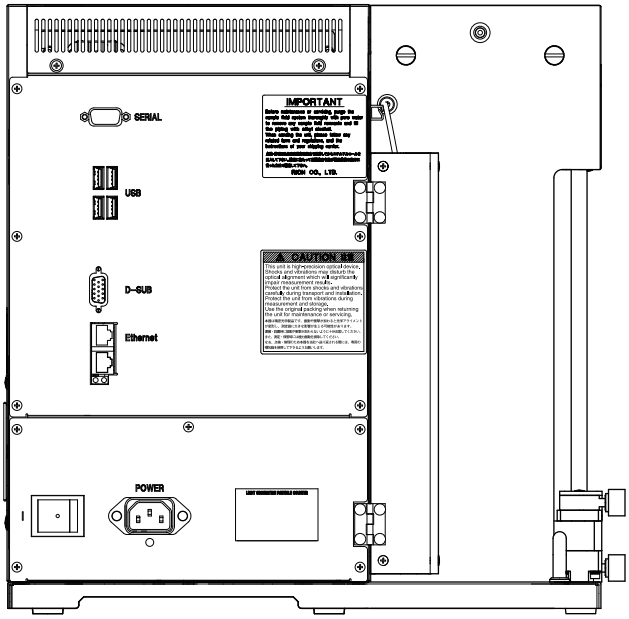
(when measuring a volume of 10 mL with a 25 mL syringe)

Within ± 5%

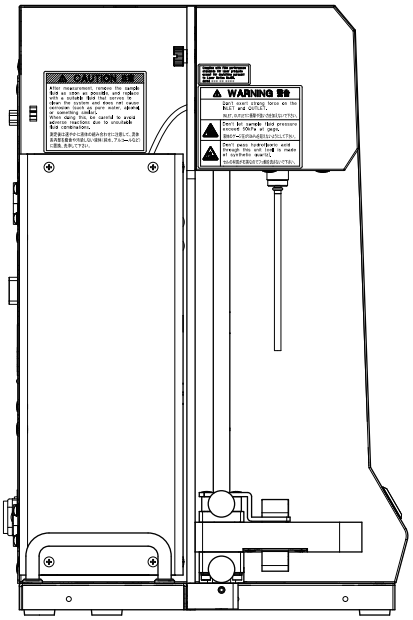
(when measuring a volume of 0.5 mL with a 10 mL syringe)

Optional accessories

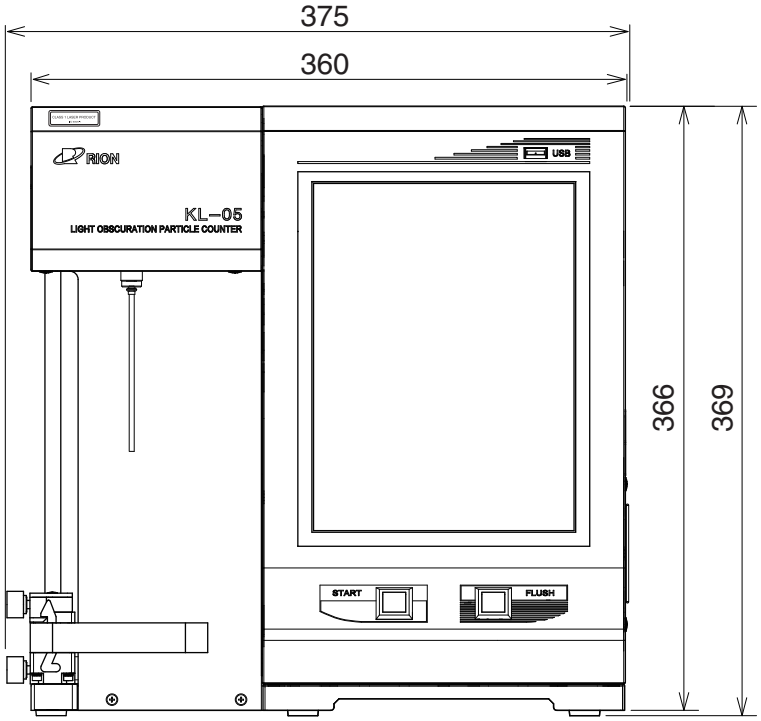
PFA Sampling tube (2 mm × 4 mm dia., length 10 cm) set (includes a nut)	KL-04-S14
SUS Sampling tube (2 mm × 3 mm dia., length 10 cm) set (includes a nut and 2 pieces of packing)	KL-04-S12
SUS Sampling tube (1 mm × 2 mm dia., length 10 cm) set (includes a nut and 2 pieces of packing)	KL-04-S11
Electromagnetic stirrer set	KL-05-S21
Cell cleaning brush (2 pieces)	KR-41-022
25 mL syringe	
10 mL syringe	
USB flash drive (8 GB)	
USB flash drive (32 GB)	
Printer	
USB cable for printer, Type A to Type B (2 m)	
External display	
Sample stand adapter for small volume containers	KL-05-S22
USB-RS-232C conversion cable	
Communication cable	CC-61A
Communication cable	CC-63A



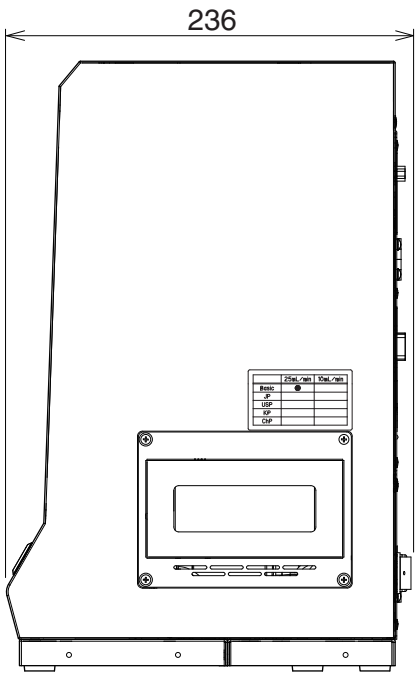
Rear view



Left side view



Front view



Right side view

Unit:mm

Dimensional Drawings

This product is environment-friendly. It does not include toxic chemicals on our policy.

No. 62531 18-10