



ExionLC™ 100 System

Hardware User Guide



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Operational Precautions and Limitations

1

This guide describes the basic operation and troubleshooting for the ExionLC™ 100 system . Read this guide thoroughly before using the product and operate the product in accordance with the instructions in this guide.

This guide provides safety instructions and precautions to make sure that the user operates the system safely. Follow all Warning and Caution instructions provided in the guide.

Keep this guide for future reference. Make sure that it is accessible to the operator of the system.

Electrical Precautions



WARNING! Electrical Shock Hazard. Do not remove the covers. Removing the covers might cause injury or malfunctioning of the system. The covers need not be removed for routine maintenance, inspection, or adjustment. Contact a SCIEX Field Service Employee (FSE) for repairs that require the covers to be removed.

- Follow required electrical safe work practices.
- Use cable management practices to control electrical cables. This will reduce the chance of a tripping hazard.

AC Mains Supply

Connect the system to a compatible AC mains supply as instructed in this guide.



WARNING! Electrical Shock Hazard. Use only qualified personnel for the installation of all of the electrical supplies and fixtures, and make sure that all of the installations adhere to local regulations and safety standards.



WARNING! Electrical Shock Hazard. Make sure that the system can be disconnected from the mains supply outlet in an emergency. Do not block the mains supply outlet.



WARNING! Electrical Shock Hazard. Use only the power cables supplied with the system. Do not use power cables that are not properly rated for the operation of this system.

CAUTION: Potential System Damage. Do not unpack or connect any system components. The FSE will unpack, connect, and configure the system for the proper operating voltage.

Guidelines:

- Do not connect the wiring in a manner other than that prescribed by the manufacturer.
- Do not rest heavy objects on the power cable.
- Do not bend or pull on the power cable. To disconnect the system, pull on the plug and not the cable.
- Do not route the power cable near heat-generating equipment.
- Do not modify the power cable in any way.

Protective Earth Conductor

The mains supply must include a correctly installed protective earth conductor. The protective earth conductor must be installed or checked by a qualified electrician before the system is connected.



WARNING! Electrical Shock Hazard. Do not intentionally interrupt the protective earth conductor. Any interruption of the protective earth conductor creates an electrical shock hazard.

Environmental Precautions

Use qualified personnel for the installation of electrical mains, heating, ventilation, and plumbing supplies and fixtures. Make sure that all of the installations comply with local bylaws and biohazard regulations. For information about the required environmental conditions for the system, refer to the *Site Planning Guide*.

Allow access space around the equipment when setting up the system.



WARNING! Fire Hazard. Do not operate the system in the presence of an open flame, or in the same room as equipment that could potentially emit sparks.



WARNING! Biohazard. For biohazardous material use, always comply with local regulations for hazard assessment, control, and handling. This system or any part is not intended to act as a biological containment.

Operational Precautions and Limitations



WARNING! Environmental Hazard. Follow established procedures for disposal of biohazardous, toxic, radioactive, and electronic waste. The customer is responsible for disposal of hazardous substances, including chemical, waste oils and electrical components, in accordance with local laws and regulations.



WARNING! Fire Hazard. Do not use flammable sprays (such as hair sprays or insecticide sprays) near the system. They could ignite and cause a fire.

CAUTION: Potential System Damage. Avoid exposure to corrosive gas and excessive dust.

CAUTION: Potential System Damage. Take precautions to prevent the system from falling in the event of an earthquake.

Electromagnetic Environment

CAUTION: Potential Wrong Result. Do not use this device in close proximity to sources of strong electromagnetic (EMC) radiation (for example, unshielded intentional RF sources), because EMC radiation might interfere with the proper operation and cause a wrong result.

Make sure that a compatible electromagnetic environment for the equipment can be maintained so that the device will perform as intended.

Decommissioning and Disposal

Before decommissioning, decontaminate the entire system following local regulations.

When removing the system from service, separate and recycle different materials according to national and local environmental regulations. Refer to [Storage and Handling](#).

Note: SCIEX will not accept any system returns without a completed Decontamination Form. Contact an FSE to obtain a copy of the form.

Do not dispose of system components or subassemblies, including computer parts, as unsorted municipal waste.

Waste Electrical and Electronic Equipment

Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of waste, electrical, and electronic equipment (WEEE). To safely dispose of this equipment, contact a local Customer Service office for complimentary equipment pick-up and recycling.

Ventilation Precautions

The venting of fumes and disposal of waste must comply with all of the federal, state, provincial, and local health and safety regulations. It is the responsibility of the customer to make sure that the air quality is maintained in compliance with local health and safety regulations.



WARNING! Flammable Chemical Hazard, Biohazard, Ionizing Radiation Hazard, and Toxic Chemical Hazard. Be sure to use the system in a well-ventilated laboratory environment in compliance with local regulations and with appropriate air exchange for the work performed. Solvents used in high performance liquid chromatography are flammable and toxic.

Chemical Precautions



WARNING! Ionizing Radiation Hazard, Biohazard, or Toxic Chemical Hazard. Determine whether decontamination is required prior to cleaning or maintenance. The customer must decontaminate the system prior to cleaning or maintenance if radioactive materials, biological agents, or toxic chemicals have been used with the system.



WARNING! Environmental Hazard. Do not dispose of system components in municipal waste. Follow local regulations when disposing of components.



WARNING! Fire Hazard. If large amounts of flammable waste solvents are collected, then take preventative measures to minimize the risk of electrical fire due to static electricity.

CAUTION: Potential System Damage. Do not submerge the end of the drain tubing in the waste liquid in the waste container.

- Determine which chemicals have been used in the system prior to service and regular maintenance. Refer to the *Safety Data Sheets* for the health and safety precautions that must be followed with chemicals. SCIEX *Safety Data Sheets* can be found at sciex.com/tech-regulatory.
- Always wear assigned personal protective equipment, including powder-free neoprene or nitrile gloves, safety glasses, and a laboratory coat.

Operational Precautions and Limitations

- Avoid ignition sources when working with flammable materials, such as isopropanol, methanol, and other flammable solvents.
- Take care in the use and disposal of any chemicals. Potential risk of personal injury if proper procedures for handling and disposing of chemicals are not followed.
- Avoid skin contact with chemicals during cleaning and wash hands after use.
- Make sure that all exhaust hoses are connected properly and that all connections are functioning as designed.
- Collect all spent liquids and dispose of them as hazardous waste.
- Comply with all of the local regulations for the storage, handling, and disposal of biohazardous, toxic, or radioactive materials.
- (Recommended) Use secondary containment trays beneath the solvent bottles and the waste collection container to capture potential chemical spills.

System Safe Fluids

The following fluids can safely be used with the system.

CAUTION: Potential System Damage. Do not use any other fluid until confirmation is received from SCIEX that it does not present a hazard. This is not an exhaustive list.

- **Organic Solvents**
 - MS-grade acetonitrile; up to 100%
 - MS-grade methanol; up to 100%
 - Isopropanol; up to 100%
 - HPLC-grade or higher water; up to 100%
- **Buffers**
 - Ammonium acetate; less than 1%
 - Ammonium formate; less than 1%
- **Acids and Bases**
 - Formic acid; less than 1%
 - Acetic acid; less than 1%
 - Trifluoroacetic acid (TFA); less than 1%
 - Heptafluorobutyric acid (HFBA); less than 1%
 - Ammonia/ammonium hydroxide; less than 1%

Static Electricity Precautions

Liquid chromatography (LC) uses flammable organic solvents as the mobile phase. LC systems are also often used where large amount of flammable substances are present. Thus, there is a risk of accidents involving fire or explosion.

The major cause of these accidents is static electricity. Devising preventative measures for static electricity can be difficult, because the symptoms before an accident vary and can be hard to detect, because such accidents occur as a result of several simultaneous incidents. Recommended methods for preventing static electricity accidents are provided in the following sections.

Typical Cause of Static Electricity Accidents

Static electricity accidents are generally caused by this sequence of events:

Operational Precautions and Limitations

Table 1-1 Static Electricity Accidents—Sequence of Events

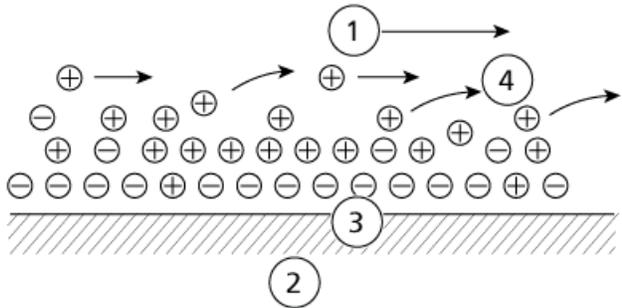
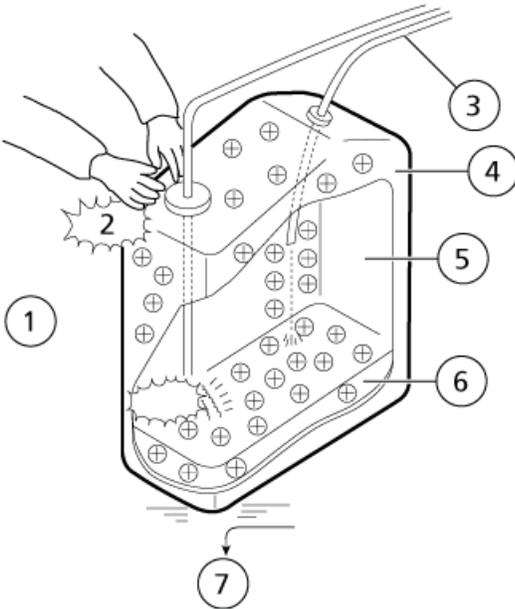
Event	Result										
Generation of static activity. ↓	<p>When liquid is passed through thin tubing at high flow rates, as in liquid chromatography, the electrostatic charges of the flowing matter generate static electricity.</p> <p>Figure 1-1 Generation of Static Electricity by a Liquid Flowing Over a Solid</p>  <p>The diagram shows a cross-section of a solid surface (2) with a layer of immobile charges (4). A flowing liquid (1) is shown above the surface, carrying charges (3) that move with the flow of the liquid. Arrows indicate the direction of flow and the movement of charges.</p> <table border="1" data-bbox="574 957 1459 1226"> <thead> <tr> <th>Item</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Flowing liquid</td> </tr> <tr> <td>2</td> <td>Solid</td> </tr> <tr> <td>3</td> <td>Charges move with the flow of liquid</td> </tr> <tr> <td>4</td> <td>Immobile charges, fixed to the surface of the solid</td> </tr> </tbody> </table>	Item	Description	1	Flowing liquid	2	Solid	3	Charges move with the flow of liquid	4	Immobile charges, fixed to the surface of the solid
Item	Description										
1	Flowing liquid										
2	Solid										
3	Charges move with the flow of liquid										
4	Immobile charges, fixed to the surface of the solid										
Accumulation of static electricity. ↓	<p>If electrostatically charged liquid is allowed to accumulate in an electrically insulated container, then the charge will gradually increase, and can eventually reach several thousand volts.</p>										

Table 1-1 Static Electricity Accidents—Sequence of Events (continued)

Event	Result																
Release of energy through electrical discharge. ↓	If this happens and an electrical conductor is brought within a certain distance of the container, then an electrical discharge occurs, releasing thermal energy that will ignite any flammable gas of sufficient density in the vicinity.																
Ignition of flammable substances.	<p data-bbox="574 533 1101 569">Figure 1-2 Potential Accident Situation</p>  <table border="1" data-bbox="574 1230 1466 1730"> <thead> <tr> <th>Item</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Dry air</td> </tr> <tr> <td>2</td> <td>Spark</td> </tr> <tr> <td>3</td> <td>Liquid flowing through thin tubing at a high rate. Air bubbles in liquid facilitate generation of static electricity.</td> </tr> <tr> <td>4</td> <td>Insulated container of polyethylene or a similar material</td> </tr> <tr> <td>5</td> <td>Flammable gas present in the container</td> </tr> <tr> <td>6</td> <td>Flammable organic solvent with a large electrostatic charge</td> </tr> <tr> <td>7</td> <td>Floor covered with rubber or a similar material cannot conduct electricity away</td> </tr> </tbody> </table>	Item	Description	1	Dry air	2	Spark	3	Liquid flowing through thin tubing at a high rate. Air bubbles in liquid facilitate generation of static electricity.	4	Insulated container of polyethylene or a similar material	5	Flammable gas present in the container	6	Flammable organic solvent with a large electrostatic charge	7	Floor covered with rubber or a similar material cannot conduct electricity away
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Preventing Static Electricity Accidents

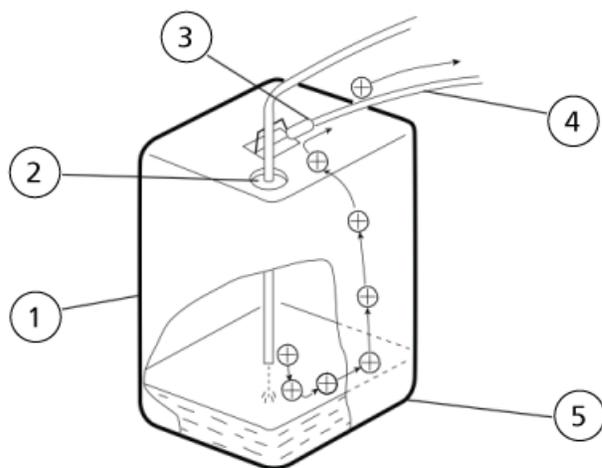
The best way to prevent static electricity accidents is to prevent the occurrence and accumulation of electrostatic charges. If large amounts of flammable solvent are collected in a large container, then the preventive measures identified in [Preventive Measure One](#), [Preventive Measure Two](#), and [Preventive Measure Three](#).

CAUTION: Potential System Damage. Take multiple preventative measures simultaneously. Keep the room at a proper humidity level. Ambient humidity exceeding 65% will prevent static.

Note: For low conductivity (less than 10^{-10} S/m) liquids, take preventive measures 1 to 4. For these liquids, preventive measure 5 has no effect.

Note: Anti-static equipment (anti-static clothing, shoes, and matting) and charge measurement equipment (potentiometer) are sold by specialty manufacturers.

Figure 1-3 Preventative Measures for Static



Item	Description
1	18 L metal can (preferably plated). (Preventive Measure One)
2	Reduce the opening with a cap. (Preventive Measure Two)
3	Connect a clip to metal parts.

Item	Description
4	Connect to a protective earth terminal or other grounding point of the module. (Preventive Measure One) CAUTION: Potential System Damage. Do not connect the grounding wire to the gas tubing, the water service tubing, or the telephone line.
5	Static electricity generated by the liquid will be conducted through the container to the earth.

Preventive Measure One

Use a metal container for the waste liquid, and connect the container to protective earth to make sure that the electrical charges of the container and liquid pass to the earth.

Required Materials (not provided)

- Grounding wire with clip
- 18 L metal container
- 4 L metal container

Guidelines

- Connect the metal waste container to protective earth properly. If the grounding wire is not properly connected to protective earth, then static electricity can build up in the container.

CAUTION: Potential System Damage. Do not connect the grounding wire to the gas tubing, the water service tubing, or the telephone line.

Note: Some metal containers have surfaces that are laminated or oxidized, and therefore do not conduct electricity. After connecting the metal container to protective earth, use a tester to verify that electricity is conducted to the earth.

- If the liquid to be drained into the waste container is virtually nonconductive (10^{-10} S/m or less), then add properly conductive liquid to the tank. This conductive liquid can be added beforehand.

Preventive Measure Two

Cover the spaces between the tubing and the sides of the inlet and outlet openings of the waste container with caps or other protective covering. This prevents any sparks generated outside the container from getting inside.

Operational Precautions and Limitations

Required Materials (not provided)

- Caps for 18 L or 4 L container (with three 3 mm diameter openings)

Preventive Measure Three

Keep electrostatically charged objects, including the human body, away from the waste liquid container.

CAUTION: Potential System Damage. If no other anti-static precautions have been taken, then touch a metal object that is connected to protective earth before coming near the waste liquid container to drain static charges.

Guidelines

- Wear anti-static clothing and shoes.
- Use anti-static wrist straps to connect the human body to protective earth. For safety, the wrist strap should be connected to the earth using an intervening resistor of about 1 M Ω .
- Spread anti-static matting on the floor, to make the floor conductive.

Preventive Measure Four

Use tubing with an inner diameter of at least 2 mm for drain lines with high flow rates.

Guidelines

- Periodically inspect the tubing connections for leaks. Air bubbles in liquid can multiply the electrostatic charge by a factor of 20, 30, or more.

Preventive Measure Five

If it is not possible to use a conductive waste liquid container, then follow these guidelines:

- Make sure that the end of the inflow tubing is always submerged inside of the container. Also, put metal object that is connected to protective earth, such as a ground wire connected to the module, into the liquid.
- Use as small a container as possible to minimize damage in the event of fire.

Equipment Use and Modification



WARNING! Personal Injury Hazard. Contact the SCIEX representative if product installation, adjustment, or relocation is required.



WARNING! Electrical Shock Hazard. Do not remove the covers. Removing the covers might cause injury or malfunctioning of the system. The covers need not be removed for routine maintenance, inspection, or adjustment. Contact a SCIEX Field Service Employee (FSE) for repairs that require the covers to be removed.



WARNING! Personal Injury Hazard. Use SCIEX-recommended parts only. Use of parts not recommended by SCIEX or use of parts for any purpose other than their intended purpose can put the user at risk of harm or negatively impact system performance.



WARNING! Lifting Hazard. Make sure that at least four people or a lifting device are available to lift the LC system. Follow established safe lifting procedures. Refer to the *Site Planning Guide* for the weights of system components.



WARNING! Crushing Hazard. Wear protective footwear when moving heavy objects.

Maintenance, Inspections, and Adjustment



WARNING! Personal Injury Hazard. Contact the SCIEX representative if product installation, adjustment, or relocation is required.



WARNING! Electrical Shock Hazard. Always turn off the power and then disconnect the instrument prior to performing inspection and maintenance. Otherwise, fire, electric shock, or a malfunction might occur.

To maintain the performance of the system and to obtain accurate measurement data, perform daily inspection and periodic calibration.

- For daily maintenance and inspection, refer to [Service and Maintenance](#).
- For planned maintenance, contact a SCIEX representative.
- For replacement parts, refer to [Consumables, Options, and Spares](#).
- Replacement cycles described for periodic replacement parts are estimates. Replacement might be required earlier than the described replacement cycles depending on usage environment and frequency.

Storage and Handling



WARNING! Environmental Hazard. Do not dispose of system components in municipal waste. Follow local regulations when disposing of components.

The environmental requirements for the storage and transport of the ExionLC™ 100 system:

- Altitude not exceeding 1 828 m (6 000 feet) above sea level

- An ambient temperature of 4 °C to 35 °C (39.2 °F to 95 °F)

The rate of temperature change must not exceed 2 °C (3.6 °F) per hour. Ambient temperature fluctuations exceeding these limits will result in higher signal drift and an inconsistent baseline signal from the detector.

For ambient temperatures between 4 °C and 30 °C, a non-condensing relative humidity of between 20% and 85% is required.

For ambient temperatures between 30 °C and 35 °C, a non-condensing relative humidity of between 20% and 70% is required.

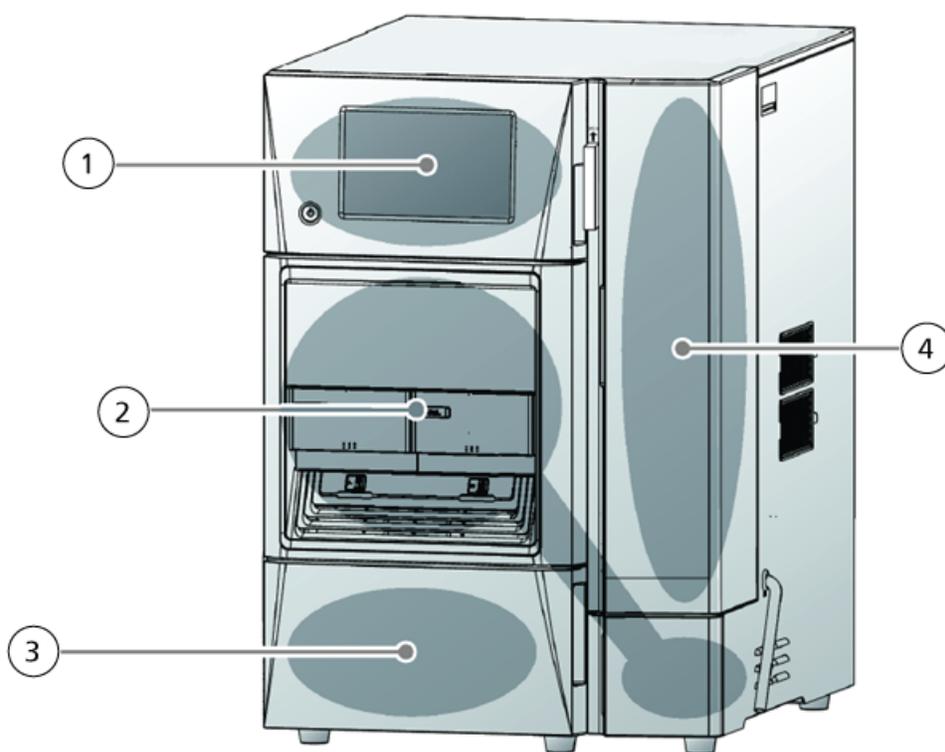
Note: Do not place the system adjacent to heaters or cooling ducts, or in direct sunlight.

The ExionLC™ 100 system is an integrated high performance liquid chromatography system that integrates a pump (quaternary low-pressure gradient), autosampler, and column oven and realizes a comfortable operating environment while automating testing (validation).

This system collects the status of each unit of the pump, autosampler, and column oven for executing control. The network function included as standard enables monitoring of the analysis status from the acquisition computer.

CAUTION: Potential System Damage. Only use the replacement parts specified in the documentation that comes with the system. Use of any other parts might result in instrument damage and malfunction.

Figure 2-1 ExionLC™ 100 System

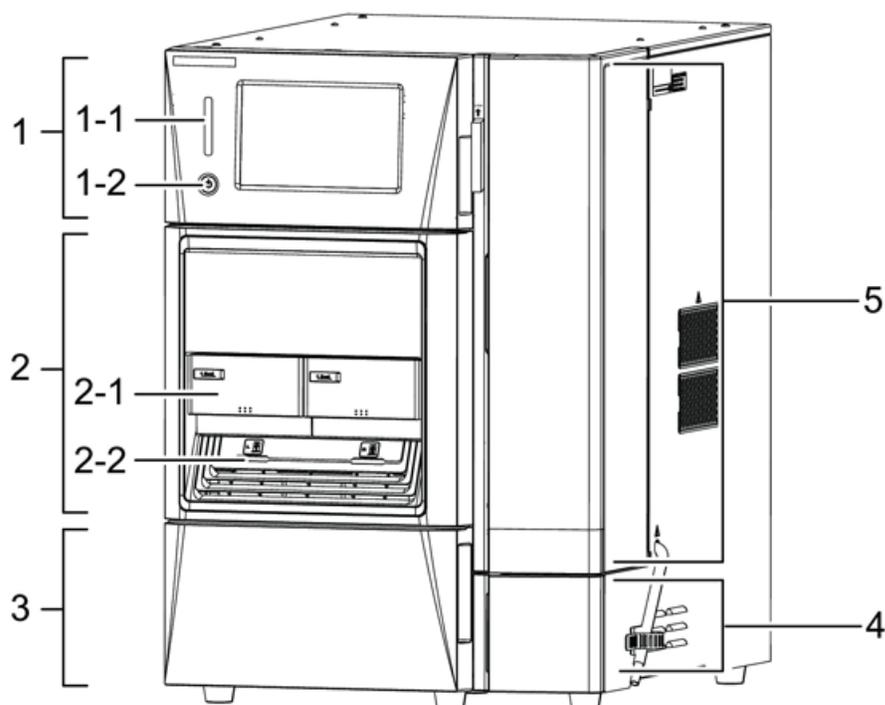


Overview

Item	Description
1	Controller
2	Autosampler
3	Pump
4	Column oven

Front Side

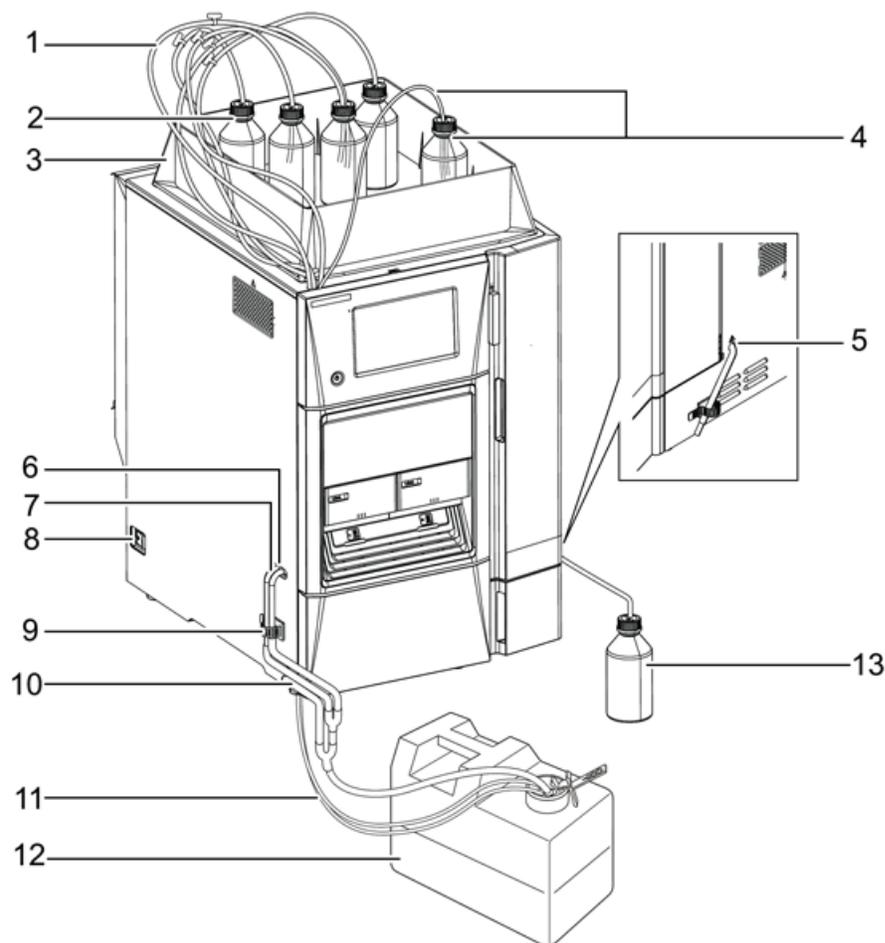
Figure 2-2 Front Side



Item	Description
1	Controller panel. Has a status panel for operation using a touch panel, and if the panel is opened.
1-1	<p>Status indicator. Shows the operating status of the system using different colors of the light that it illuminates.</p> <ul style="list-style-type: none"> • Green: Analyzable • Yellow: Preparing for analysis • Orange: Sleeping • Blue: During analysis • Red: Error
1-2	<p> (power button). Turns the power on and off. When the system is powered on, it is illuminated in white, and when it is off, it is illuminated in orange.</p> <hr/> <p>Note: Even when the system is turned off, a standby current is flowing to the instrument.</p> <hr/> <p>For the power supply on the main unit, refer to Side View.</p> <p>A log in numeric password is requested on the Start screen. The initial value is "00000". To change the value, refer to Change the Login Pass ID.</p>
2	Front panel. A semi-transparent panel that enables inspection of an installed sample. If the front panel is removed, the parts of the autosampler, such as a needle and high-pressure valve, can be maintained.
2-1	Sample rack. Holds sample vials and microtiter plates.
2-2	<p>Rack LED. Illuminated if the sample rack is inserted. After the autosampler needle starts to move, and until injection is completed, the rack LED for injection flashes.</p> <hr/> <p>Note: Do not remove the rack while the rack LED is flashing, because doing so can damage the needle.</p> <hr/>
3	Pump. When the door is open, it is possible to inspect and maintain the inside of the pump, such as the degasser, low-pressure gradient valve, and drain valve.
4	Valve mount door. When the door is open, it is possible to inspect and maintain the inside of the autosampler, such as the measuring pump and low-pressure valve.
5	Column oven door. The door of the column oven. Open this door to install the column.

Side View

Figure 2-3 Side of Instrument



Item	Description
1	Suction tubing. Tube for aspiration of the mobile phase or the rinse solution for the autosampler. A suction filter is attached to the end.
2	Reservoir bottle. Contains the mobile phase or the rinse solution for the autosampler.
3	Reservoir tray. Contains reservoir bottles and seal rinse bottles.
4	(Optional) Automatic rinsing kit. Flushes liquid for rinsing the plunger and plunger seal of the pump.

Item	Description
5	Condensation water drain for oven. Drains the condensation water when the oven is set to a maximum. of room temperature.
6	Rinse liquid drain. Drains the rinse solution of the autosampler.
7	Not applicable
8	Main unit power switch. Turns the power to the entire system on or off. Normally it must be turned on. ¹
9	Clamp. Holds drain tubing together.
10	Leaked liquid drain. Drains the liquid that leaked inside the system.
11	Mobile phase drain tube. Drains the mobile phase waste liquid used to purge the pump manually.
12	Waste tank. Holds waste rinse liquid and leaked liquid drain. ²
13	Waste container. Contains condensation liquid drained from the oven. ³

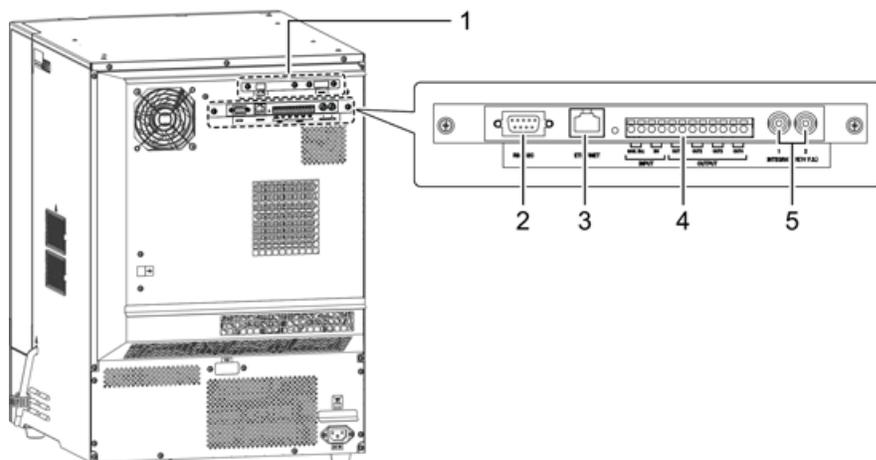
¹ Usually, the power to the system is turned on and off with the power button of the controller. The power can be turned on and off from the front side of the system using the power button of the controller if the main power switch is turned on. When the system will not be used for a long period or when replacing a part, turn off the main power switch.

² Be sure to install the waste tank lower than the drain so that the end of the tube does not contact the liquid surface. In addition, make sure that no part of the tube is higher than the drain. Moreover, be sure to use the drain tube clamp so that the end of the tube does not contact the liquid surface.

³ Do not put the condensation water tubes for the oven and rinse waste liquid tubes in the same waste container. Otherwise, the air containing the organic solvent volatilized from the waste container will flow back into the oven cavity, resulting in a reaction in the gas sensor inside the oven cavity.

Rear Panels

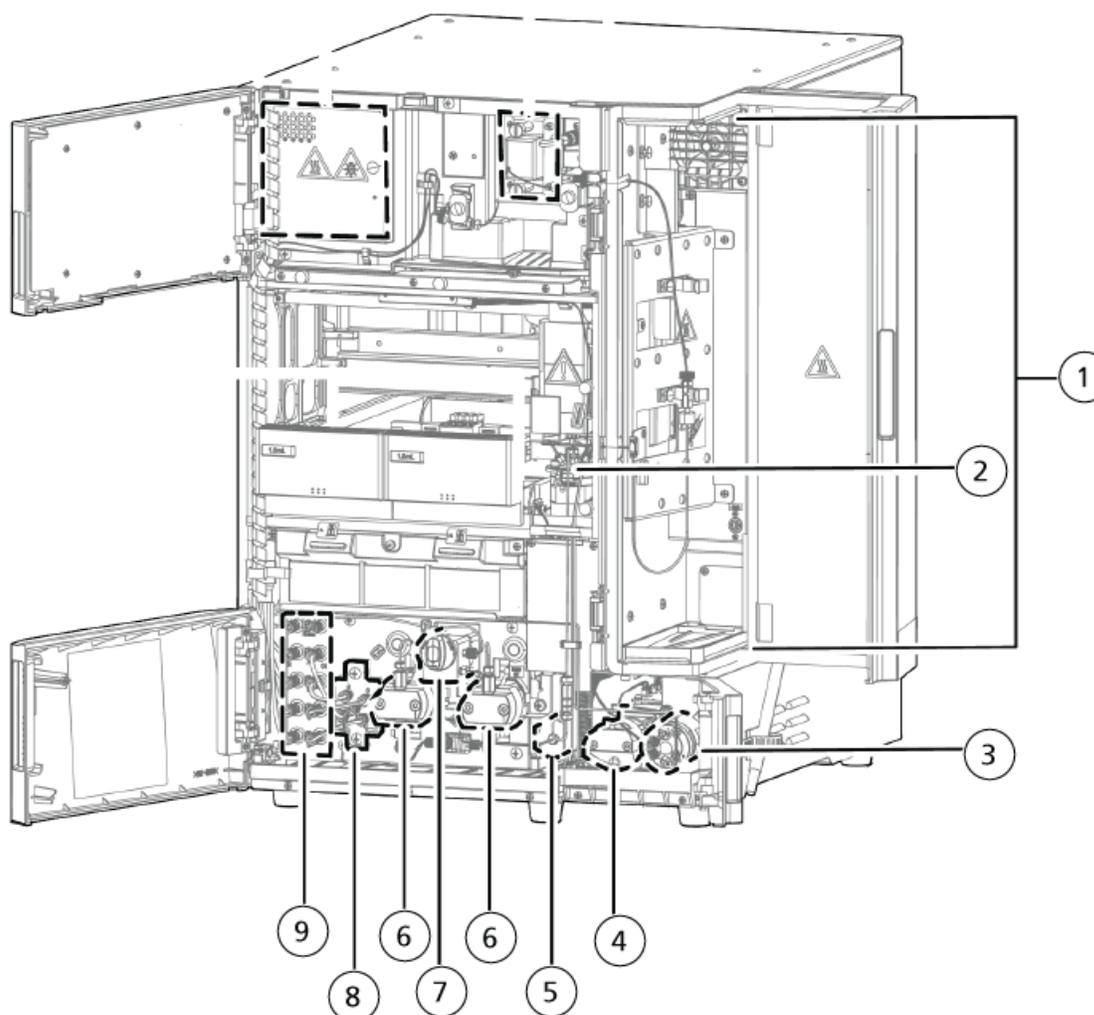
Figure 2-4 Rear Panels



Item	Description
1	Optional board. An optional A/D board or an optional optical board can be installed as an optional part.
2	RS232C connector. Unused.
3	ETHERNET connector. Connects the acquisition computer.
4	External input/output terminal. Connects external devices (including the mass spectrometer) and synchronizes using a relay contact.
5	Analog output terminal (for 2- Channel Output). Unused.

Interior View

Figure 2-5 Interior



Item	Description
1	Column oven. An air circulation-style column oven. The temperature of the column is maintained at a given value.
2	High pressure valve. Switches between high-pressure flow lines.
3	Low pressure valve. Switches between the sample liquid and the rinse solution for measuring with the measuring pump.

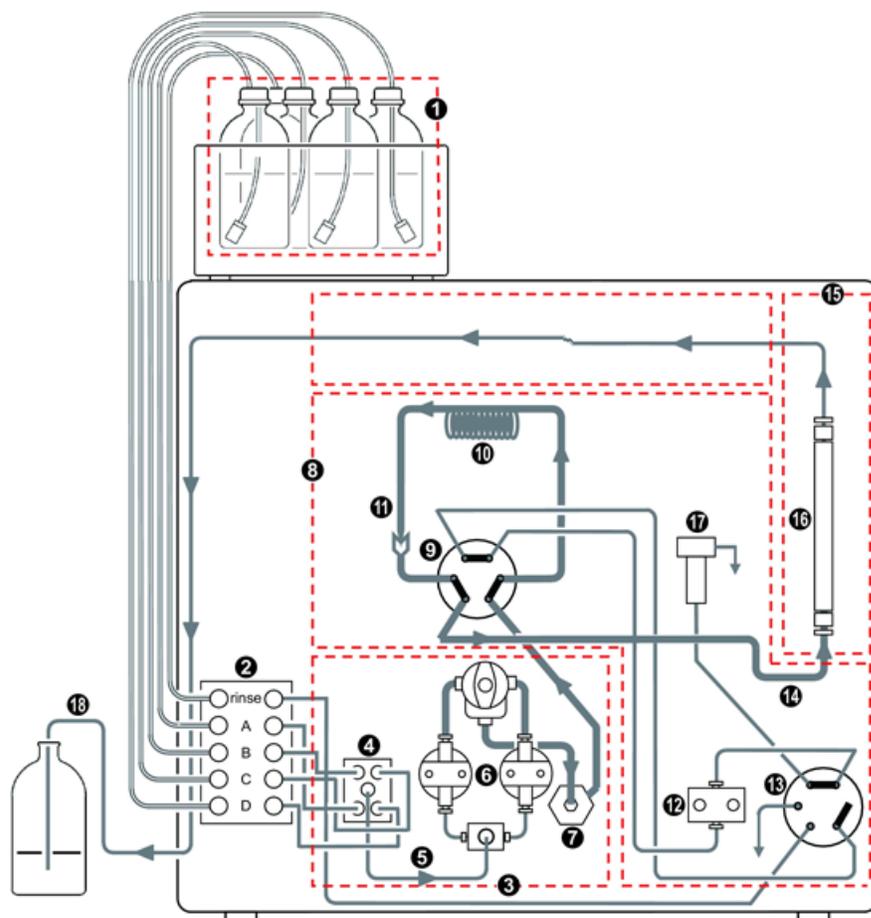
Overview

Item	Description
4	Measuring pump. Aspirates or discharges the predetermined volume of sample and rinse solution.
5	Mixer. Stirs the mobile phase to make it uniform and stabilizes the baseline.
6	Pump. Pumps the mobile phase.
7	Drain valve. Opens the discharge flow line during a manual purge.
8	Low-pressure gradient unit. Mixes a maximum of four types of mobile phases.
9	Degasser. Degases the mobile phase and the rinse solution for the autosampler while online.

Flow Line Diagram

Entire Flow Line

Figure 2-6 Entire Flow Line



Legend	Description
	Low-pressure mobile phase
	High-pressure mobile phase
	Flow line direction

Overview

Item	Description	Item	Description
1	Mobile Phase	10	Sample Loop
2	Degasser	11	Needle
3	Pump	12	Measuring Pump
4	Low-Pressure Gradient Unit	13	Low-Pressure Valve
5	LPGE-OUT Tube	14	Autosampler Outlet Tubing
6	Pump Head	15	Column Oven
7	Mixer (optional)	16	Column
8	Autosampler	17	Rinsing Port
9	High-Pressure Valve	18	Drain (Mobile Phase Waste Liquid)

Inner Volume of Each Flow Line

The following table describes the inner volume of each flow line for the main unit and the optional flow line parts. Refer to [Entire Flow Line](#).

Flow Line Location	Flow Line Part Name	Volume (µL)
3	Pump (Excluding 5 LPGEOUT tube)	275
5	LPGE-OUT tube ⁴	40
7	Mixer ^{5,6}	40
8	Autosampler (Excluding 10 Sample loop and 14 Autosampler outlet tubing)	30
10	Sample loop ⁷	230

⁴ If a buffer solution is used for the mobile phase, then use LPGE-OUT tube (Long). Derive the system delay volume by replacing 40 µL (LPGEOUT tube volume), with 315 µL.

Example: $275 + 315 + 40 + 30 + 230 + 35 = 925 \mu\text{L}$

⁵ If trifluoroacetic acid (TFA) is being used or the mobile phase, then use Mixer MR300 µL (provided with the Delay Volume-Compatible System Kit). Derive the system delay volume by replacing 40 µL (mixer volume), with 300 µL.

Example: $275 + 40 + 300 + 30 + 230 + 35 = 910 \mu\text{L}$

⁶ If a mixing performance higher than that provided by Mixer MR300 µL is required, then use a mixer with a volume of 780 µL or 2 mL. Replace 40 µL (mixer volume) with the appropriate volume, 780 µL or 2 mL, to derive the system delay volume.

Example (780 µL): $275 + 40 + 780 + 30 + 230 + 35 = 1390 \mu\text{L}$

⁷ To increase the injection volume of the sample, add Optional Loop (500 µL) or Optional Loop (2 mL) to the sample loop.

When using Optional Loop (500 µL), add 885 µL to 230 µL (sample loop volume), or when using Optional Loop (2 mL), add 3230 µL to derive the system delay volume.

Example: (Optional Loop [500 µL]): $275 + 40 + 40 + 30 + 230 + 885 + 35 = 1535 \mu\text{L}$

Flow Line Location	Flow Line Part Name	Volume (μL)
14	Autosampler outlet tubing	35
Total System Delay Volume		650

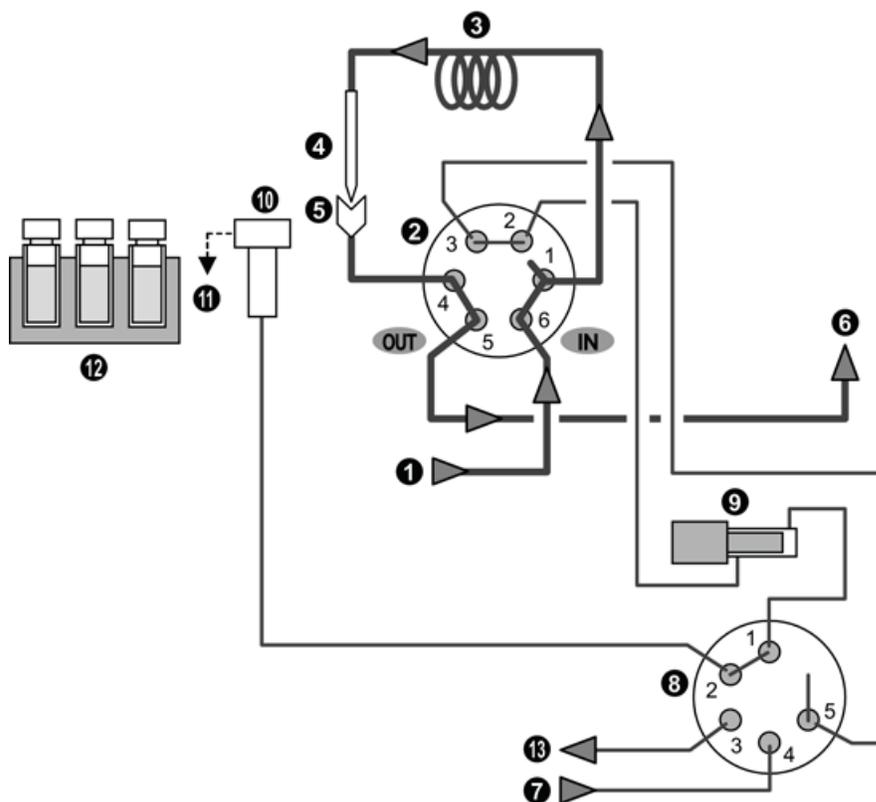
Flow Line During Sample Injection Operations

Sample injection operations occur in the following order.

Ready

The mobile phase sent from the pump goes through the high-pressure valve, sample loop, needle, injection port, then back to the high-pressure valve before reaching the column.

Figure 2-7 Mobile Phase



Overview

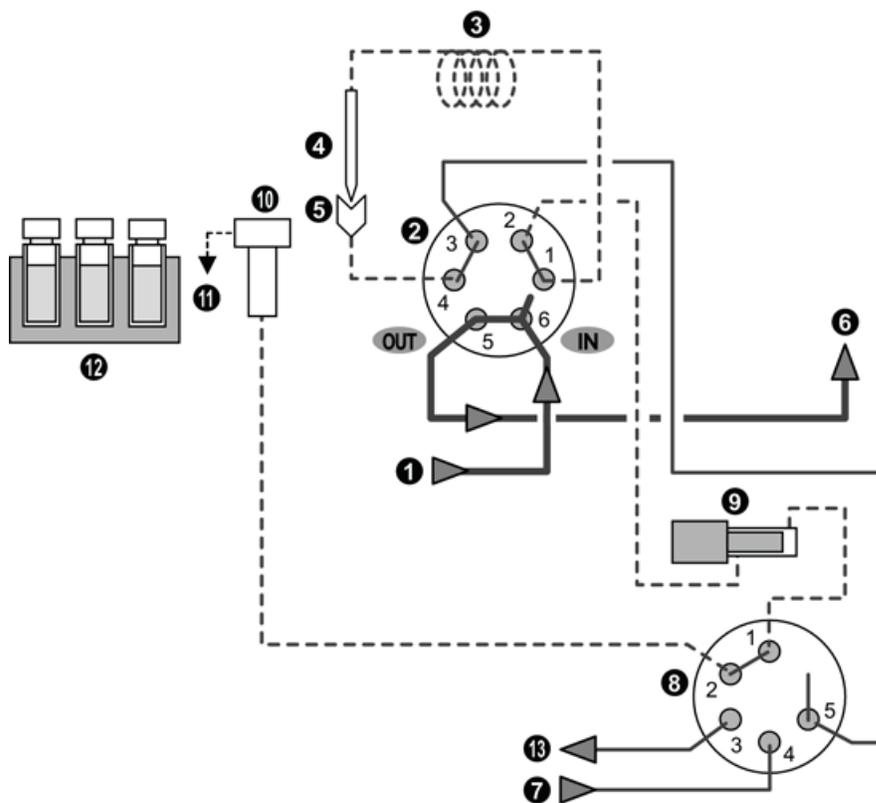
Legend	Description
	Mobile phase
	Flow line direction

Item	Description	Item	Description
1	Pump	8	Low-Pressure Valve
2	High-Pressure Valve	9	Measuring Pump
3	Sample Loop	10	Rinsing Port
4	Needle	11	Drain (Waste Rinse Liquid)
5	Injection Port	12	Sample
6	Column	13	Manual Prime Port
7	Rinse Solution	—	—

Release of Pressure from the Flow Line

The high-pressure valve moves to the load position and releases the pressure in the sample loop.

Figure 2-8 Flow Line



Legend	Description
—	Mobile phase
---	Release of pressure
▶	Flow line direction

Item	Description	Item	Description
1	Pump	8	Low-Pressure Valve
2	High-Pressure Valve	9	Measuring Pump
3	Sample Loop	10	Rinsing Port

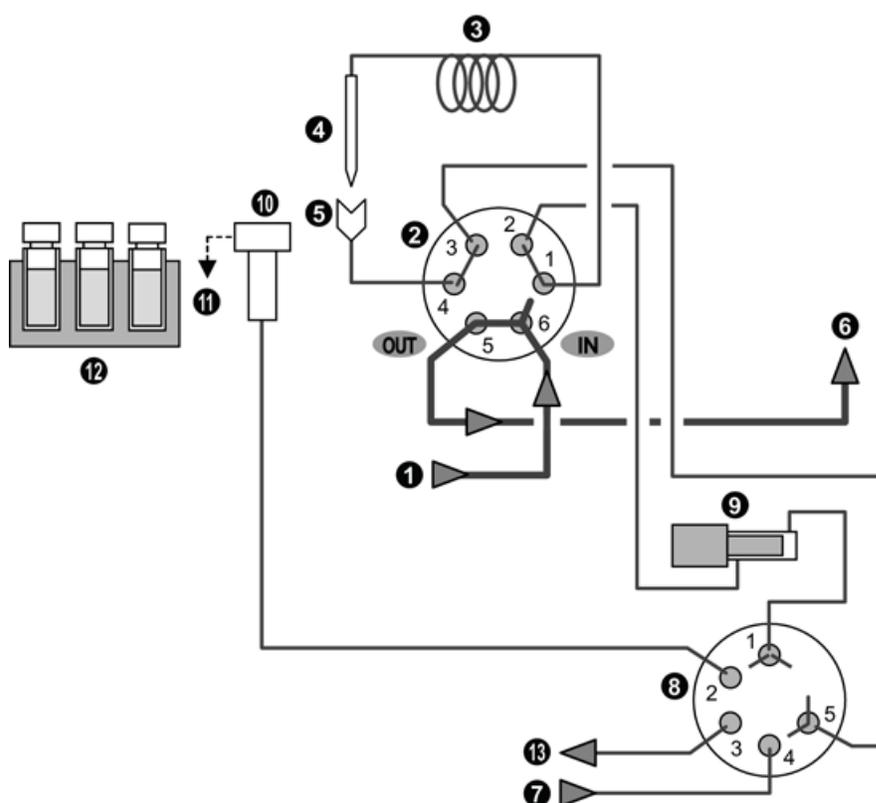
Overview

Item	Description	Item	Description
4	Needle	11	Drain (Waste Rinse Liquid)
5	Injection Port	12	Sample
6	Column	13	Manual Prime Port
7	Rinse Solution	—	—

Needle Movement

After the low-pressure valve has operated, the needle moves up.

Figure 2-9 Needle Movement



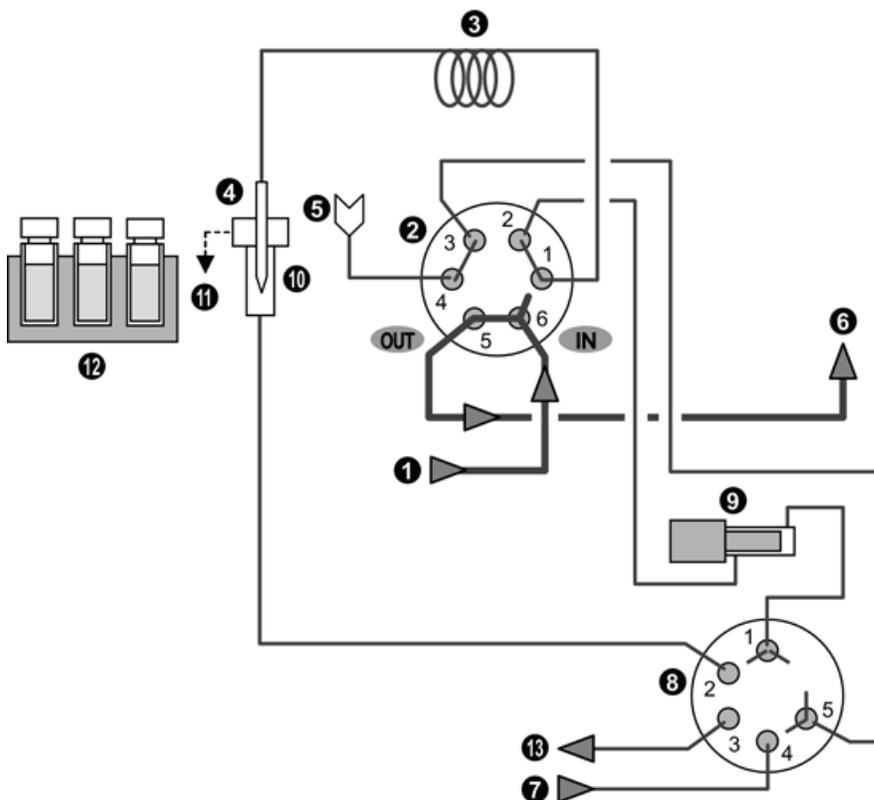
Legend	Description
—	Mobile phase
▶	Flow line direction

Item	Description	Item	Description
1	Pump	8	Low-Pressure Valve
2	High-Pressure Valve	9	Measuring Pump
3	Sample Loop	10	Rinsing Port
4	Needle	11	Drain (Waste Rinse Liquid)
5	Injection Port	12	Sample
6	Column	13	Manual Prime Port
7	Rinse Solution	—	—

Needle Rinse Before Sample Aspiration

The needle is inserted in the rinse port, and the outside of the needle is rinsed with rinse solution in the rinsing port. The system can be configured to omit this rinse step.

Figure 2-10 Needle Rinse



Overview

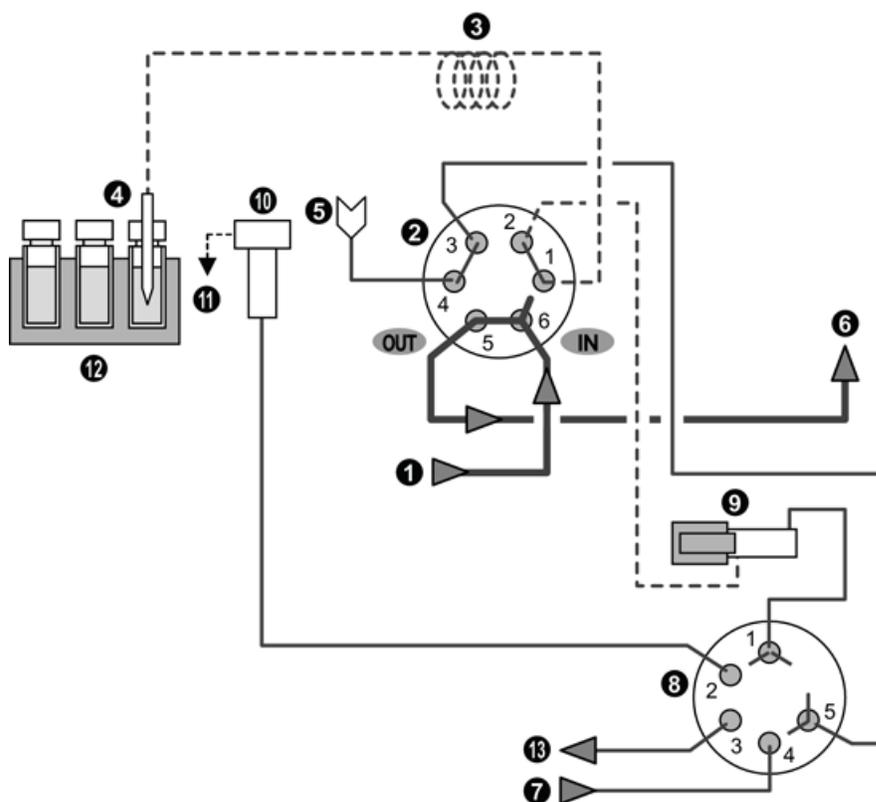
Legend	Description
	Mobile phase
	Flow line direction

Item	Description	Item	Description
1	Pump	8	Low-Pressure Valve
2	High-Pressure Valve	9	Measuring Pump
3	Sample Loop	10	Rinsing Port
4	Needle	11	Drain (Waste Rinse Liquid)
5	Injection Port	12	Sample
6	Column	13	Manual Prime Port
7	Rinse Solution	—	—

Sample Aspiration

When the needle is inserted in the sample vial, the measuring pump is activated and the sample is aspirated in the needle and the sample loop.

Figure 2-11 Flow Line



Legend	Description
—	Mobile phase
- - -	Aspiration
▶	Flow line direction

Item	Description	Item	Description
1	Pump	8	Low-Pressure Valve
2	High-Pressure Valve	9	Measuring Pump
3	Sample Loop	10	Rinsing Port

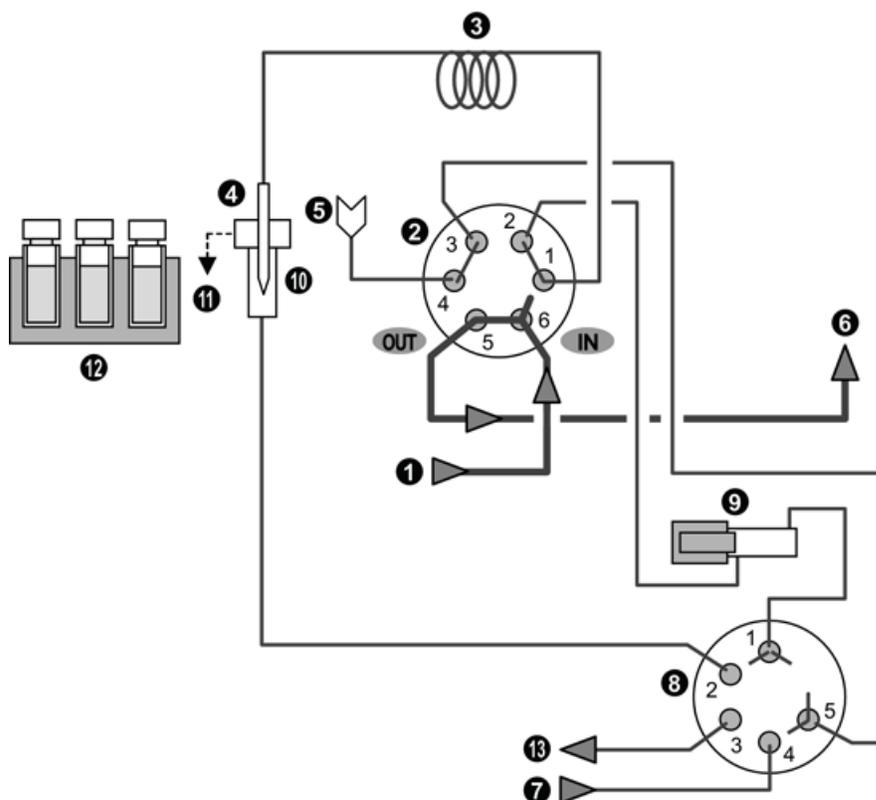
Overview

Item	Description	Item	Description
4	Needle	11	Drain (Waste Rinse Liquid)
5	Injection Port	12	Sample
6	Column	13	Manual Prime Port
7	Rinse Solution	—	—

Needle Rinse After Sample Aspiration

The needle is inserted in the rinsing port, and the outside of the needle is rinsed with rinse solution in the rinsing port. This rinse step can be omitted if required.

Figure 2-12 Needle Rinse



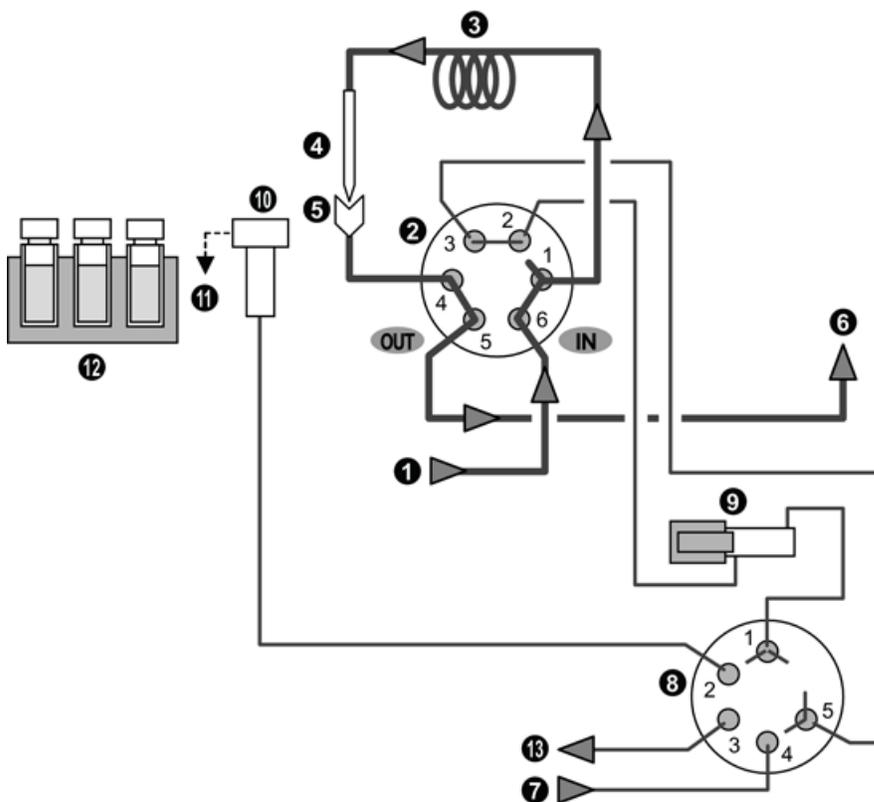
Legend	Description
—	Mobile phase
▶	Flow line direction

Item	Description	Item	Description
1	Pump	8	Low-Pressure Valve
2	High-Pressure Valve	9	Measuring Pump
3	Sample Loop	10	Rinsing Port
4	Needle	11	Drain (Waste Rinse Liquid)
5	Injection Port	12	Sample
6	Column	13	Manual Prime Port
7	Rinse Solution	—	—

Start Analysis

When the needle is inserted in the injection port, the high-pressure valve shifts to the injecting position and analysis starts. Along with the mobile phase solution, the sample goes through the high-pressure valve to the column.

Figure 2-13 Start Analysis



Overview

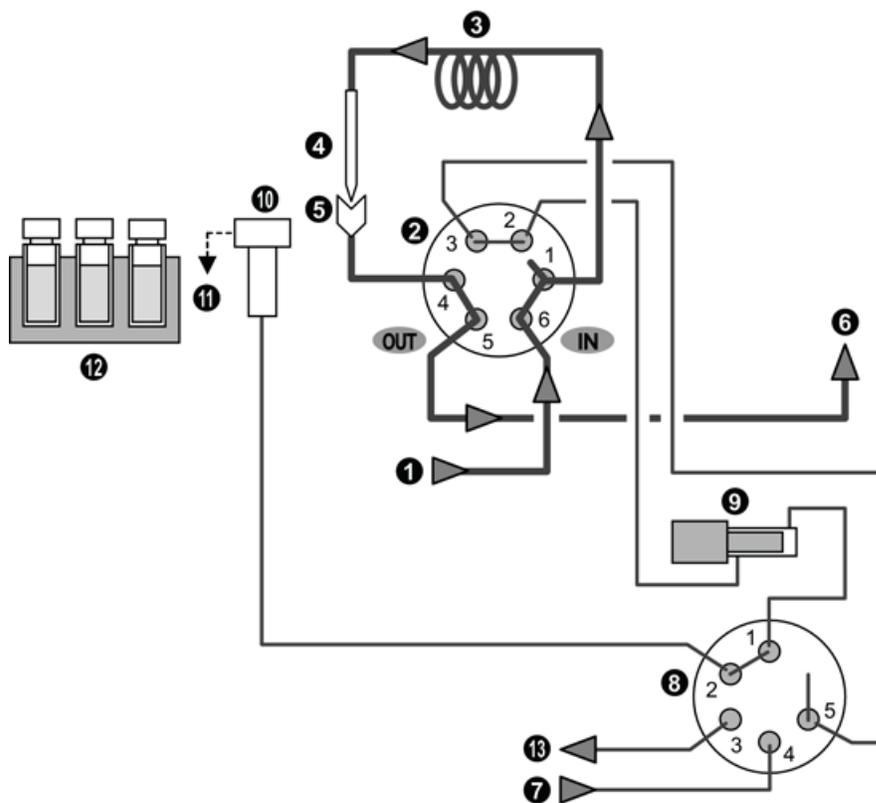
Legend	Description
	Mobile phase
	Flow line direction

Item	Description	Item	Description
1	Pump	8	Low-Pressure Valve
2	High-Pressure Valve	9	Measuring Pump
3	Sample Loop	10	Rinsing Port
4	Needle	11	Drain (Waste Rinse Liquid)
5	Injection Port	12	Sample
6	Column	13	Manual Prime Port
7	Rinse Solution	—	—

Initialize the Measuring Pump

After the low-pressure valve has operated, the measuring pump returns to the initial position.

Figure 2-14 Mobile Phase



Legend	Description
—	Mobile phase
▶	Flow line direction

Item	Description	Item	Description
1	Pump	8	Low-Pressure Valve
2	High-Pressure Valve	9	Measuring Pump
3	Sample Loop	10	Rinsing Port
4	Needle	11	Drain (Waste Rinse Liquid)

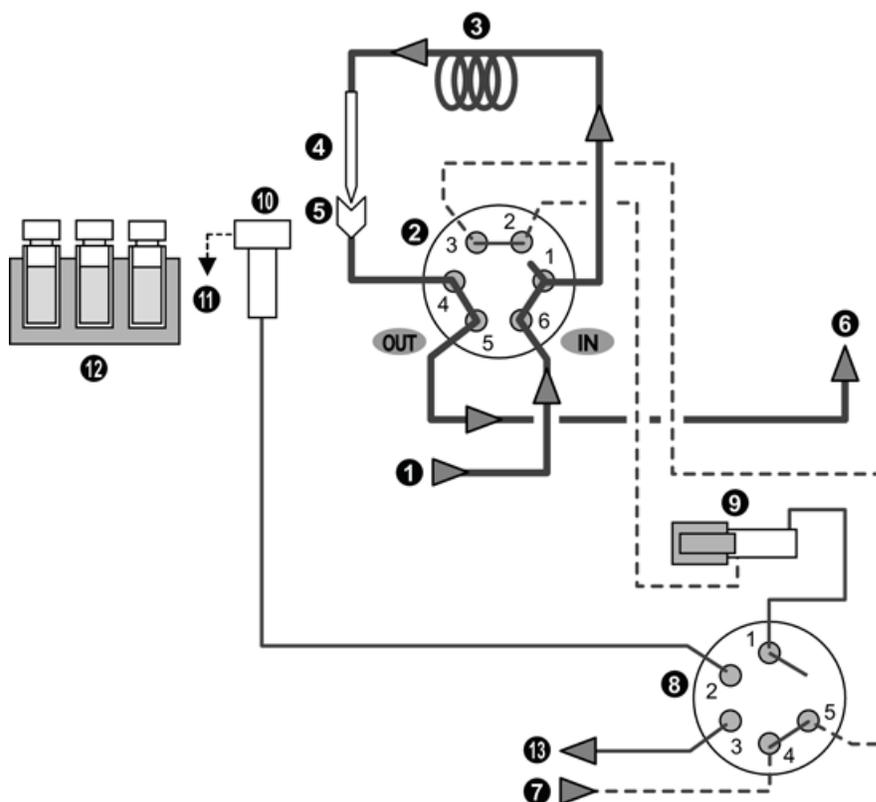
Overview

Item	Description	Item	Description
5	Injection Port	12	Sample
6	Column	13	Manual Prime Port
7	Rinse Solution	—	—

Rinse Solution Aspiration

When the needle is inserted in the sample vial, the measuring pump is activated and the sample is aspirated in the needle and the sample loop.

Figure 2-15 Flow Line



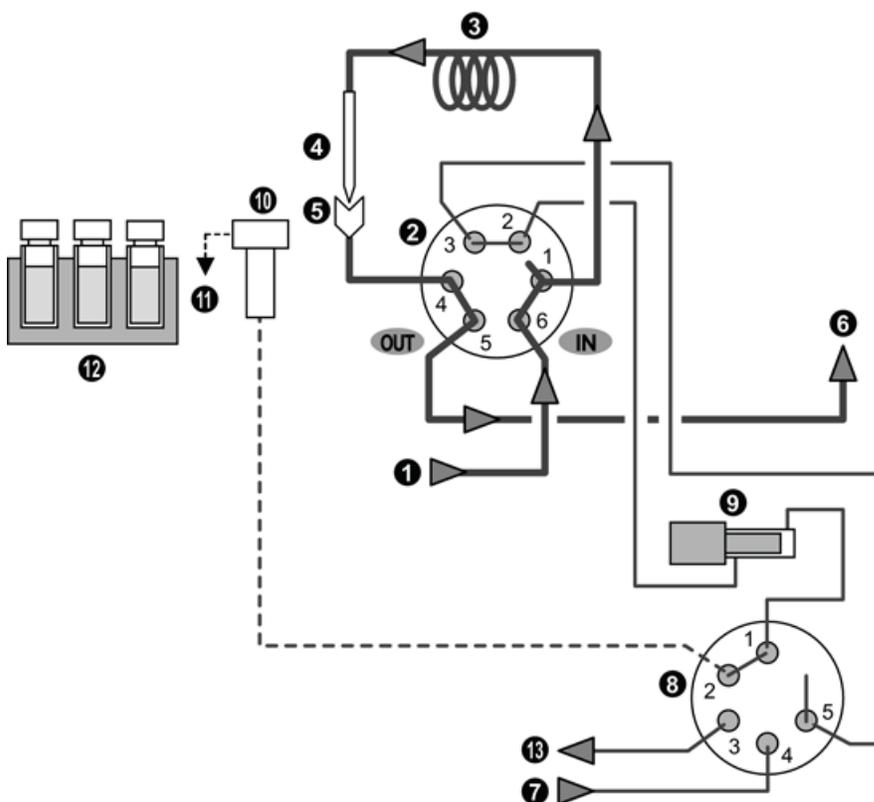
Legend	Description
—	Mobile phase
---	Aspiration
▶	Flow line direction

Item	Description	Item	Description
1	Pump	8	Low-Pressure Valve
2	High-Pressure Valve	9	Measuring Pump
3	Sample Loop	10	Rinsing Port
4	Needle	11	Drain (Waste Rinse Liquid)
5	Injection Port	12	Sample
6	Column	13	Manual Prime Port
7	Rinse Solution	—	—

Rinse Solution Discharge

After the low-pressure valve has operated, the measuring pump discharges the rinse solution into the rinsing port.

Figure 2-16 Flow Line



Overview

Legend	Description
	Mobile phase
	Aspiration
	Flow line direction

Item	Description	Item	Description
1	Pump	8	Low-Pressure Valve
2	High-Pressure Valve	9	Measuring Pump
3	Sample Loop	10	Rinsing Port
4	Needle	11	Drain (Waste Rinse Liquid)
5	Injection Port	12	Sample
6	Column	13	Manual Prime Port
7	Rinse Solution	—	—

To create the hardware profile for the system, refer to the *ExionLC™ System Software User Guide*. Some system configuration tasks can be performed with the touch pad on the controller.

Configure Initial Settings

Show the Calibration Tab

1. Press  (Menu).

Figure 3-1 Menu Button

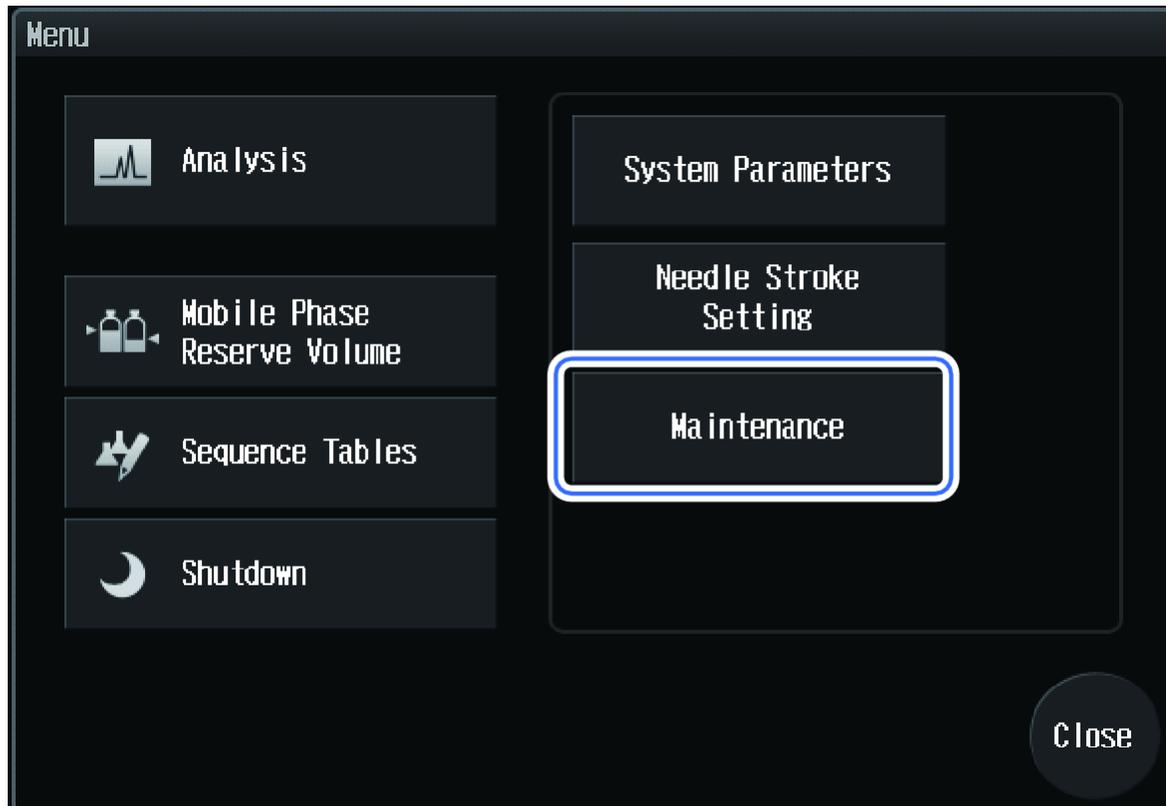


The Menu screen is shown.

Configuration

2. Press **Maintenance**.

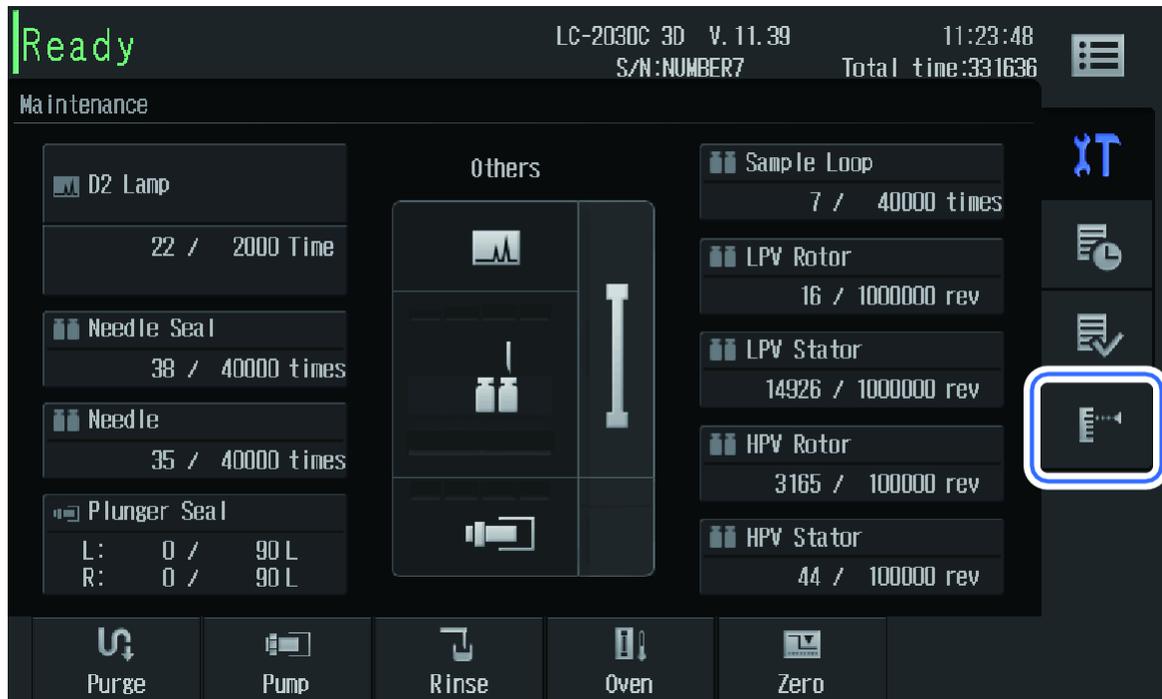
Figure 3-2 Maintenance Button



The Maintenance screen is shown.

3. Press  (Calibration).

Figure 3-3 Calibration Button



The Login screen is shown.

4. Type the system pass ID number in the **Password** field.

The factory default pass ID is "00000".

Figure 3-4 Login Screen



5. Press **OK**.

Configuration

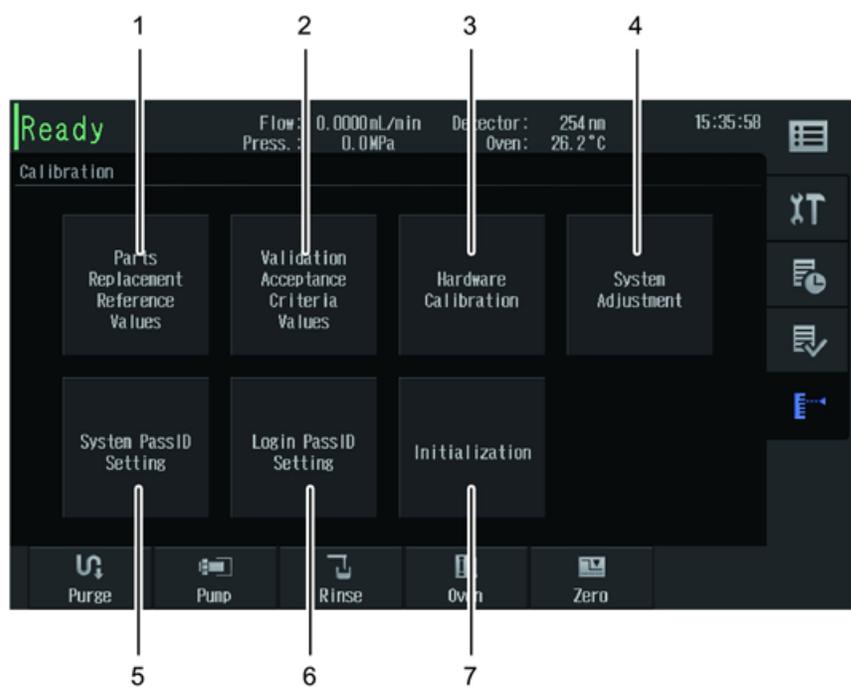
The Calibration screen is shown.

Calibration Tab

Use this screen to perform these tasks:

- Set part replacement guidelines
- Calibrate, teach, and perform other system adjustments
- Change the password
- Initialize the system

Figure 3-5 Calibration Tab



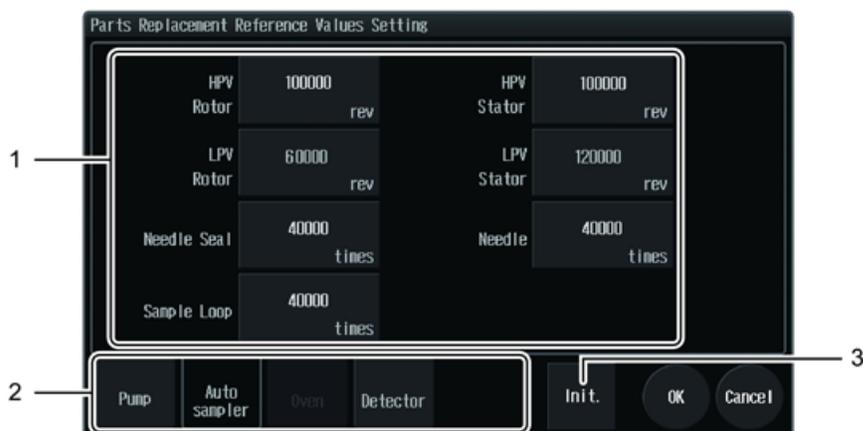
Item	Label	Description
1	Parts Replacement Reference Values	Shows the Parts Replacement Reference Values Setting screen is screen allows the settings for parts replacement time guidelines to be configured.
2	Validation Acceptance Criteria Values	Shows the Validation Acceptance Criteria Values Setting screen. This screen allows the criteria for performance verification and automatic validation to be set.

Item	Label	Description
3	Hardware Calibration	Shows the Hardware Calibration screen. This screen allows execution of hardware calibration for each item.
4	System Adjustment	Shows the System Adjustment screen. This screen enables rack settings, injection port position adjustment, keypad lock, network settings, date settings, safety lock, and automatic vial detection settings to be configured.
5	System PassID Setting	Shows the System PassID Setting screen. This screen allows the system pass ID Number required to show the Calibration Menu screen to be changed. Refer to Change the System Pass ID .
6	Login PassID Setting	Shows the Login PassID Setting screen. This screen allows the login pass ID Number that is required to log on to the module to be changed. Refer to Change the Login Pass ID .
7	Initialization	Shows the Initialization Instrument Parameters screen. This screen allows the instrument parameters, system parameters, and other data to be initialized. The data related to the system check report (such as logs and calibration data) are not initialized. After initialization, the instrument needs to be restarted. Refer Initialize Settings .

Parts Replacement Reference

The buttons of replaceable parts are shown on the tab of each unit. The parts replacement time guidelines for the applicable part can be set by pressing the button.

Figure 3-6 Parts Replacement Reference



Configuration

Item	Label	Description
1	Replacement Parts Button	Shows the replaceable parts. The parts replacement time guidelines for the applicable part can be set.
2	Unit Selection Tab	Switches between replaceable parts lists of the different units. It is not possible to select a unit that has no replaceable parts.
3	Init.	Shows the Initialize parts replacement guide value screen. This screen allows all the parts replacement guidelines to be initialized.

Validation Acceptance Criteria Values Setting Screen

The buttons for validation items are shown on the tab of each unit. The criteria for the applicable validation can be set by pressing this button.

Figure 3-7 Validation Acceptance Criteria Values Setting Screen



Item	Label	Description
1	Item Button	Shows the criteria of each validation. The criteria can be set for the desired validation.
2	Unit Selection Tab	Switches between the different units.
3	Init.	Initializes the criteria of all validations.

Hardware Calibration Screen

The buttons of hardware calibration items are shown in the tab of each unit. Pressing the button shows the applicable Hardware Calibration operation screen.

Figure 3-8 Hardware Calibration Screen



Item	Label	Description
1	Item Button	Shows the items of each hardware calibration. The applicable Hardware Calibration operation screen is shown.
2	Unit Selection Tab	Shows the hardware calibration status for the specific unit.

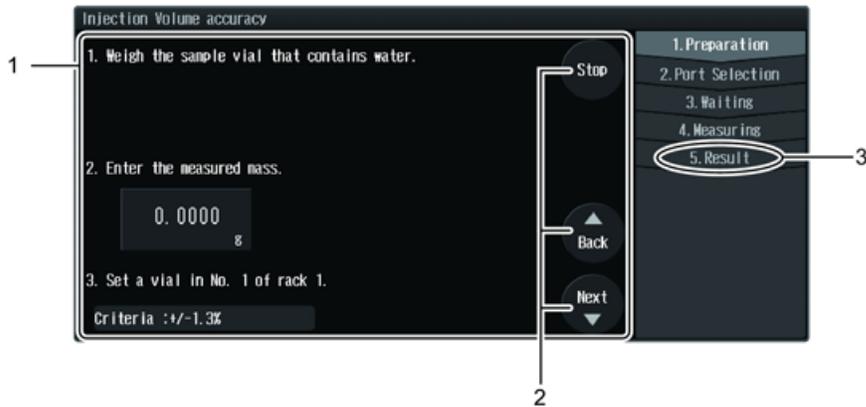
Hardware Calibration Operations Screen

Use this screen to perform hardware calibration. Follow the instructions shown on the screen. The procedure differs depending on the item.

This section uses Injection Volume accuracy as an example.

Configuration

Figure 3-9 Hardware Calibration Operations Screen



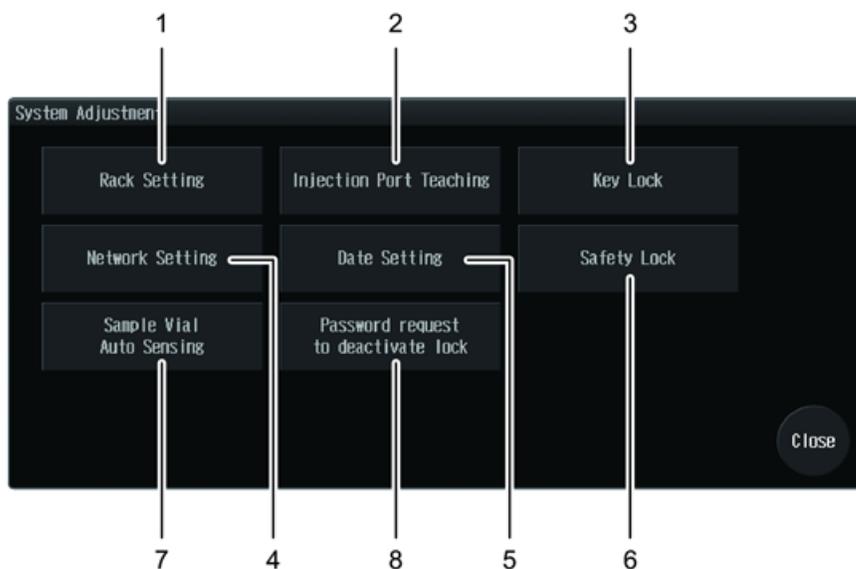
Item	Label	Description
1	Operations Guide Area	Shows the buttons used in the operations guide.
2	Entire Procedure	Shows the entire performance verification procedure.
	Stop	Cancels the performance verification and closes the screen.
	Back	Returns to the previous step.
	Next	Proceed to the next procedure.
3	Finish	Shows when the results are given after all the procedures are finished. Closes the screen.
	Current Procedure	Shows the current step in light gray.

System Adjustment Screen

Use this screen to configure

- Rack settings
- Injection port teaching
- The keypad lock
- Network settings
- Date settings
- Automatic vial detection settings

Figure 3-10 System Adjustment Screen



Item	Label	Description
1	Rack Setting	Shows the Rack Setting screen. The plate type for each rack ID can be specified and rack position adjustment can be performed. Refer to Adjust the Rack Position .
2	Injection Port Teaching	Shows the Injection Port Teaching screen. The injection port position is adjusted. This procedure should be performed by an FSE.
3	Key Lock	Shows the Key Lock screen. The Login Password Input screen is shown at the time of operation to prohibit screen operation unless the login password is input.
4	Network Setting	Shows the Network Setting screen. The network settings can be configured. Configure Network Settings .
5	Date Setting	Shows the Date Setting screen. The date and time settings can be configured. Refer to Set the Date and Time .
6	Safety Lock	Shows the Safety Lock screen. This screen allows setting of the safety lock that stops the arm of the autosampler while the door is open. Refer to Set a Safety Lock .

Configuration

Item	Label	Description
7	Sample Vial Auto Sensing	Shows the Sample Vial Auto Sensing screen.
8	Password request to deactivate lock	Shows the Password request to deactivate lock screen. This option can be set <ul style="list-style-type: none">• When the system starts.• When the lock is canceled.• When the analysis is registered. Refer to Set Password Request to Deactivate the Lock .

Set a Safety Lock

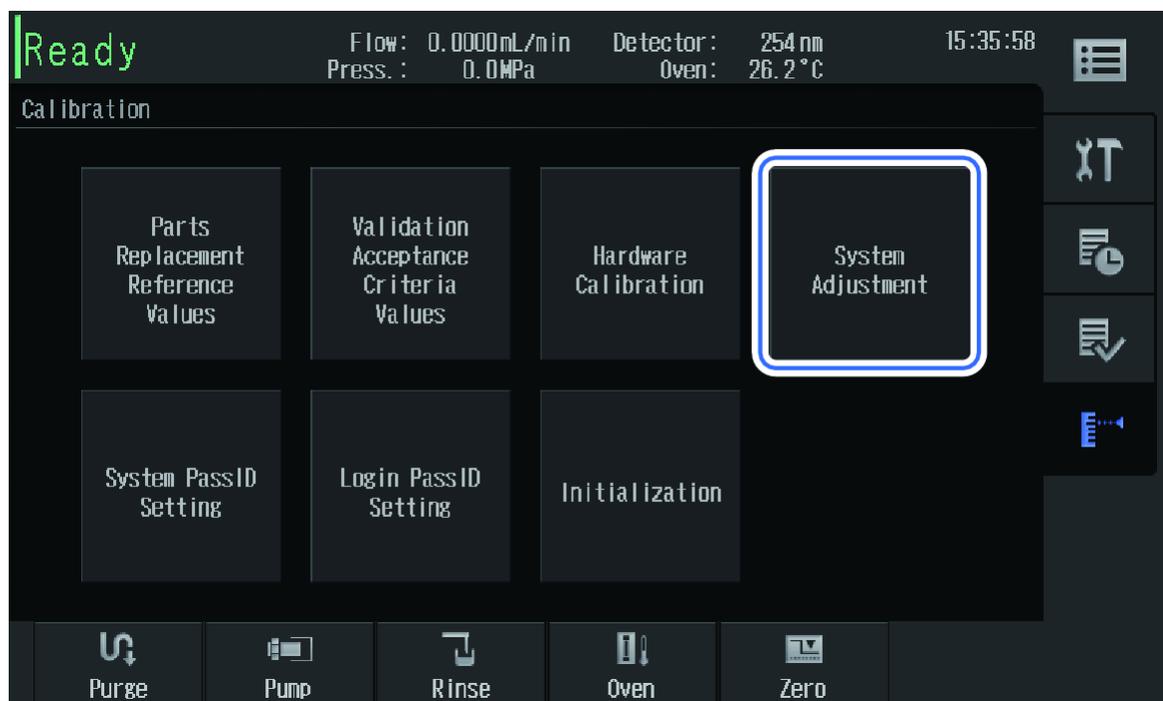
Prerequisite Procedures

- [Show the Calibration Tab](#)

A safety lock can be set to keep the arm of the autosampler stopped while the front panel is open.

1. Press **System Adjustment**.

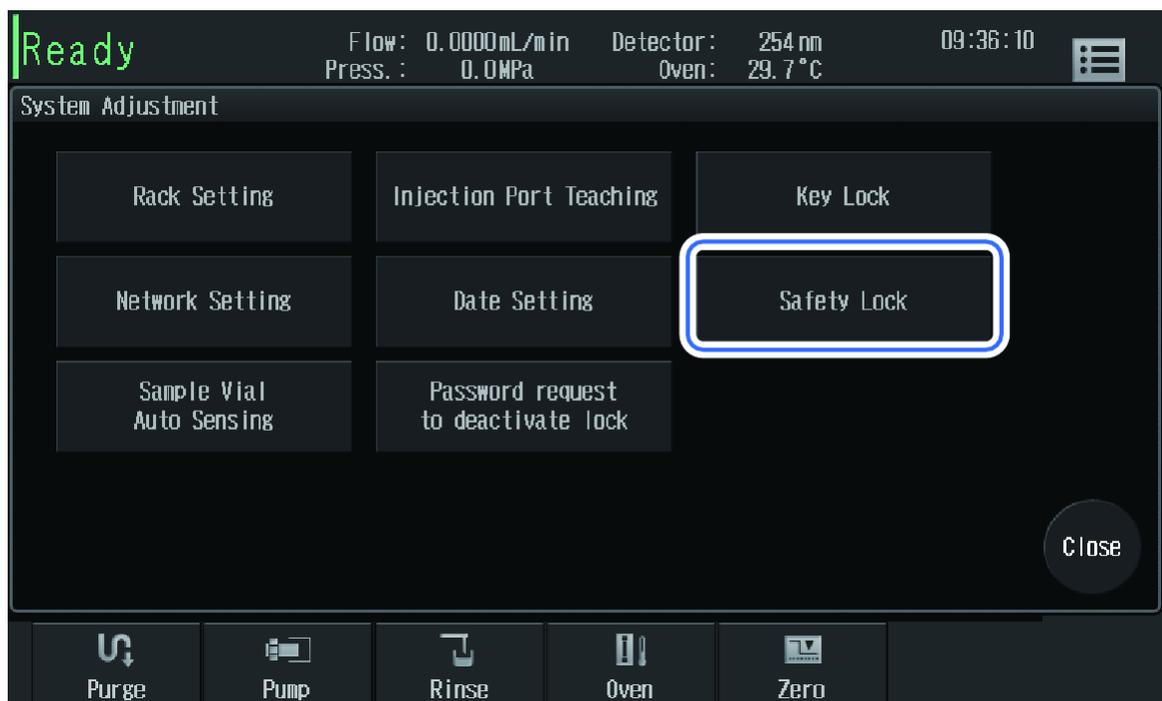
Figure 3-11 System Adjustment Button



The System Adjustment screen is shown.

2. Press **Safety Lock**.

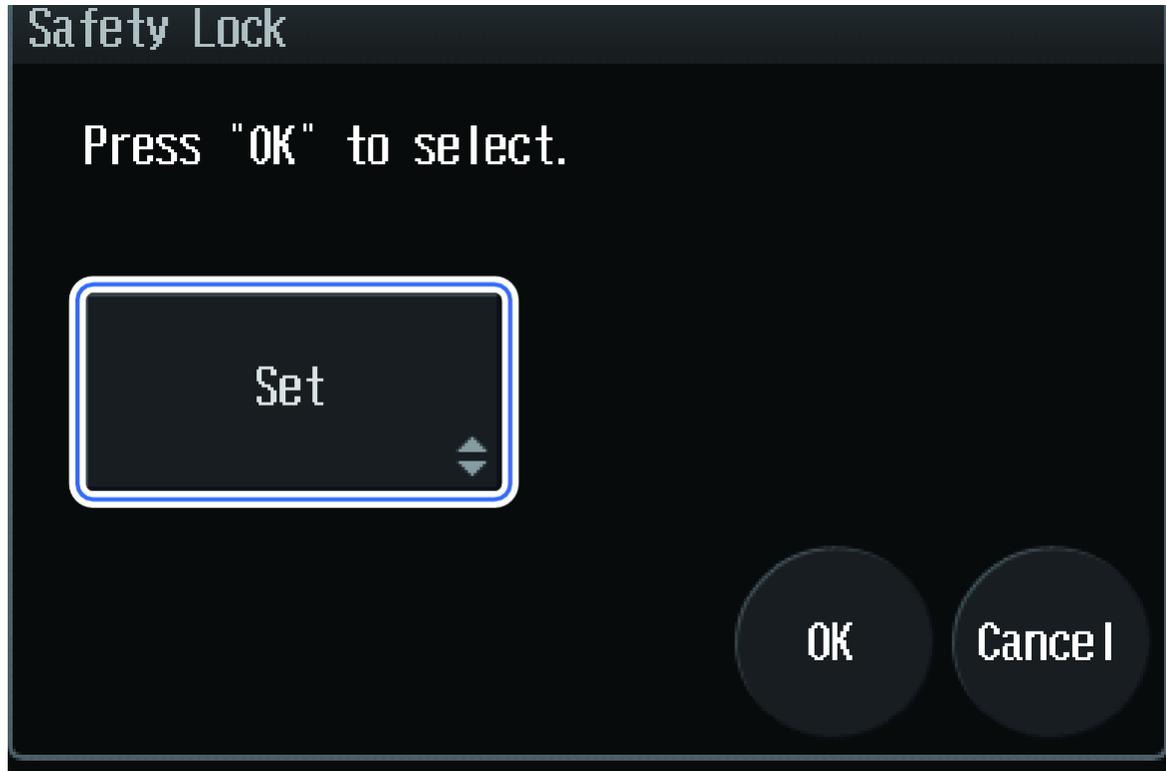
Figure 3-12 Safety Lock Button



The Safety Lock screen is shown.

3. Press the switching button and then select **Set**.

Figure 3-13 Safety Lock screen



Set Password Request to Deactivate the Lock

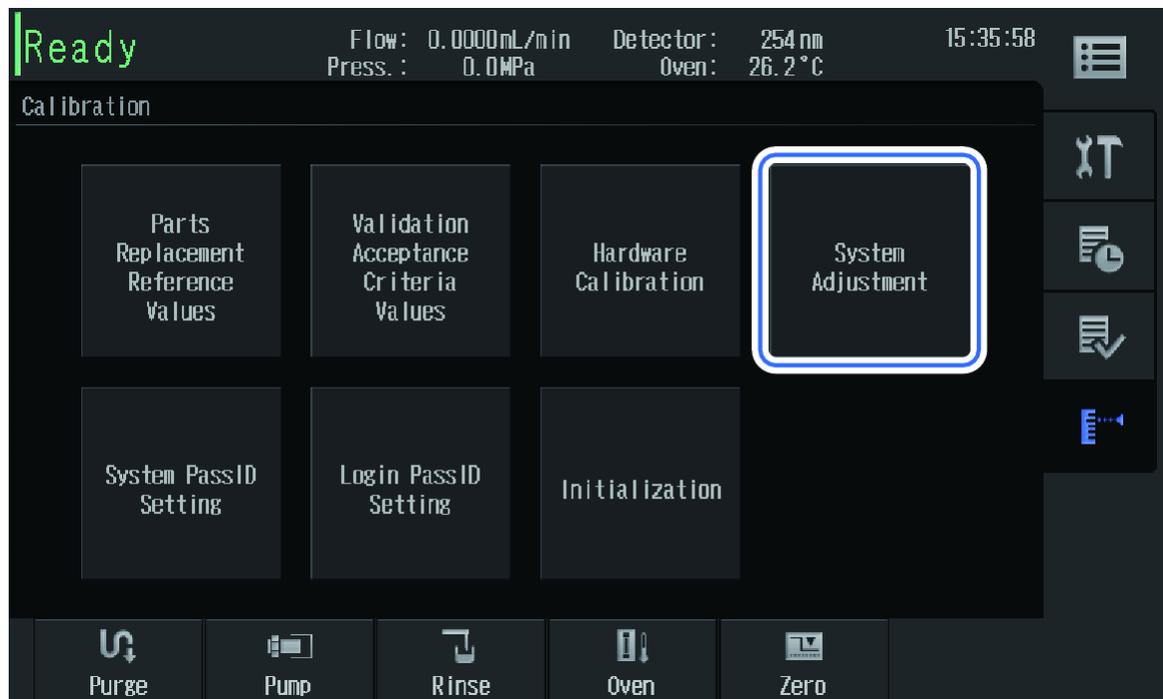
Prerequisite Procedures

- [Show the Calibration Tab](#)

Set whether to show the Login screen when the system starts, the lock is canceled with the **Lock deactivating** button, or the Upload screen is shown with the **Upload** button.

1. Press **System Adjustment**.

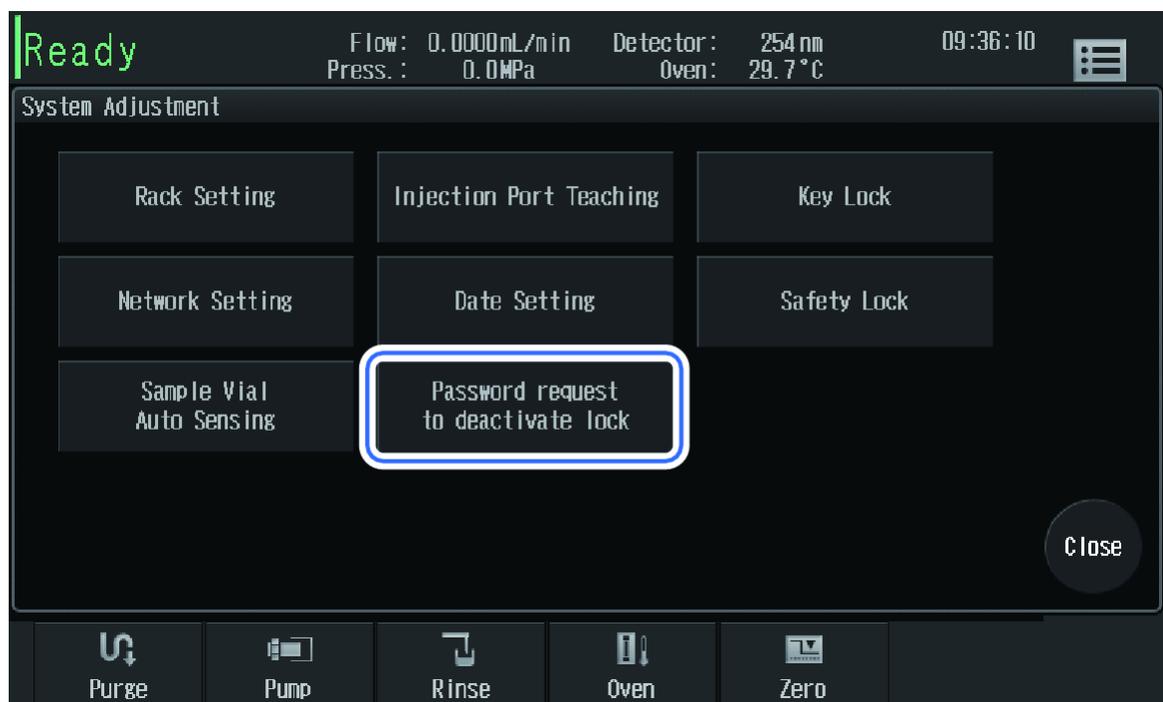
Figure 3-14 System Adjustment Button



The System Adjustment screen is shown.

2. Press **Password request to deactivate lock**.

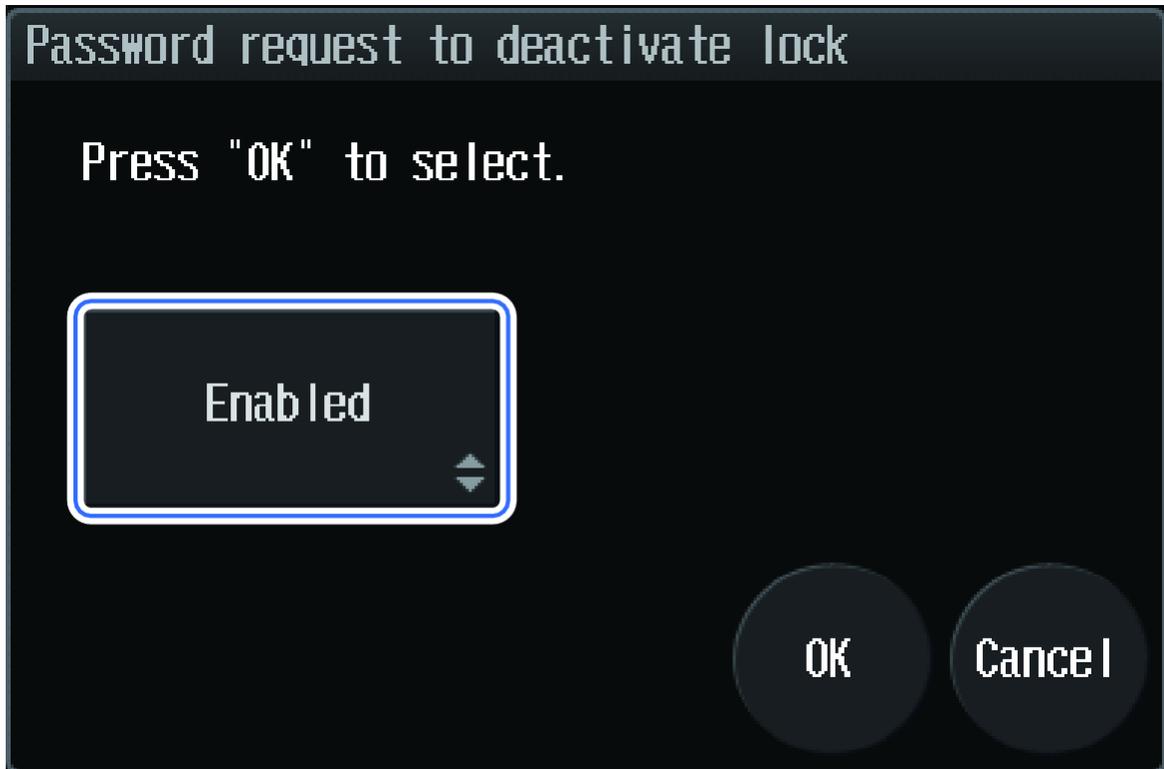
Figure 3-15 Password request to deactivate lock Button



The Password request to deactivate lock screen is shown.

3. Press the switching button and select **Enabled**.

Figure 3-16 Enabled Button



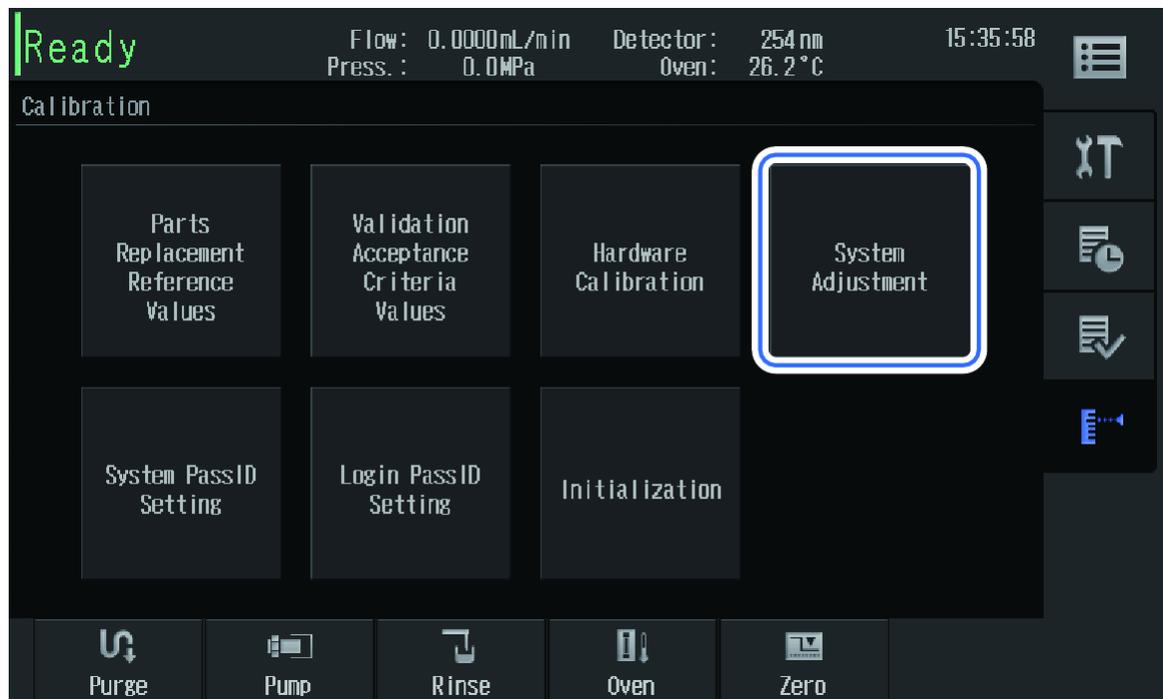
Configure Network Settings

Prerequisite Procedures

- [Show the Calibration Tab](#)

1. Press **System Adjustment**.

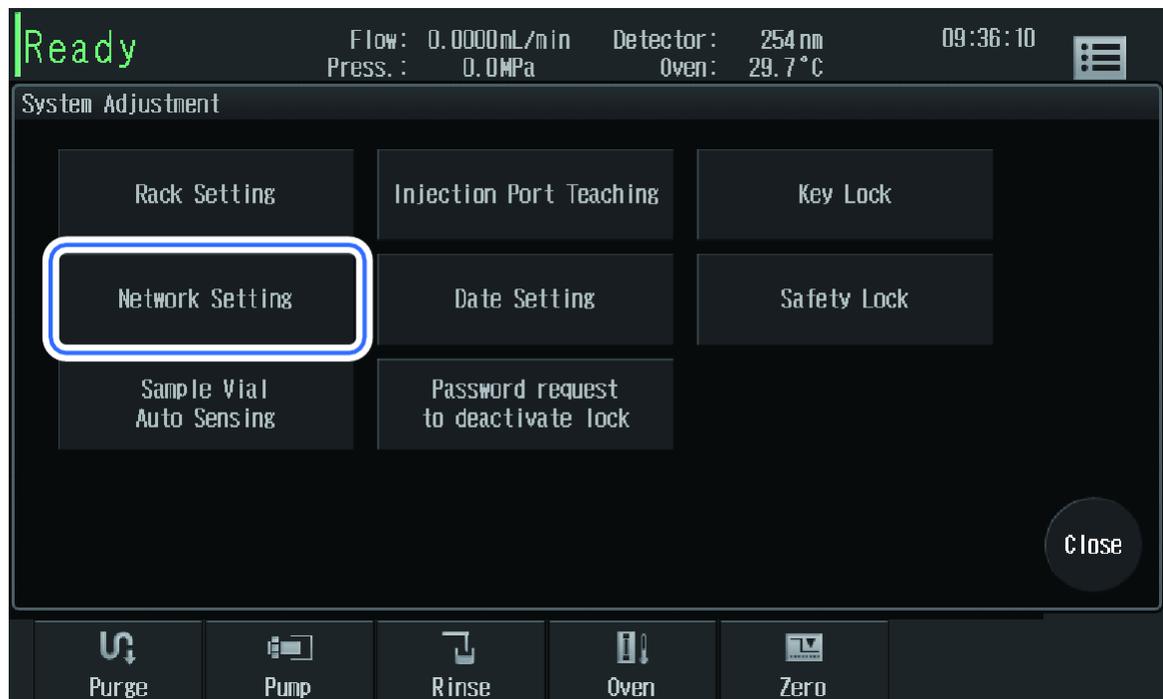
Figure 3-17 System Adjustment Button



The System Adjustment screen is shown.

2. Press **Network Setting**.

Figure 3-18 Network Setting Button



The Network Setting screen is shown.

3. Configure the network settings.

Figure 3-19 Network Settings Screen, Page 1

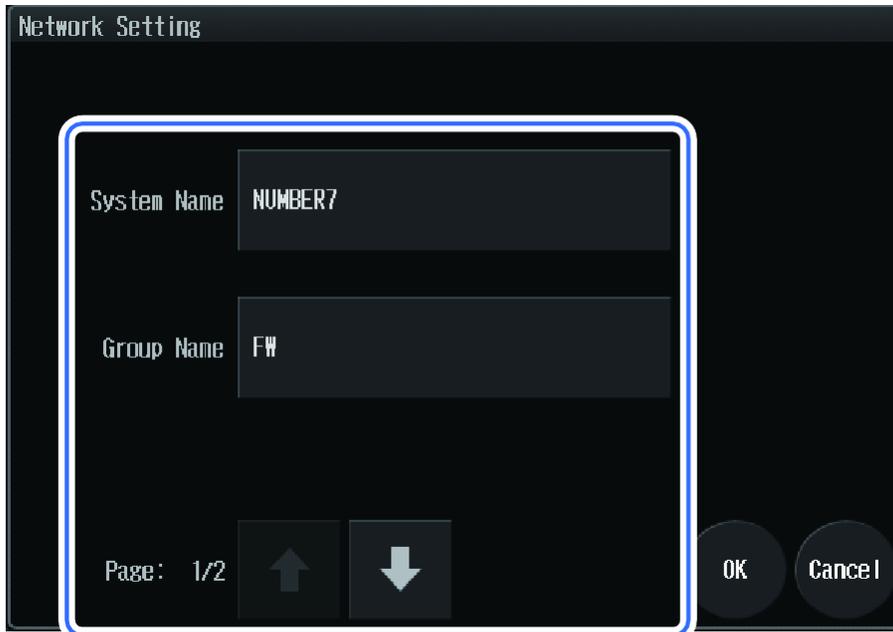


Figure 3-20 Network Settings Screen, Page 2



Table 3-1 Network Settings

Item	Description
System Name	Input the name of the module to be shown on the network.
Group Name	Input the group name to be joined on the network.
IP Address Setting	Select whether to automatically obtain an IP address from the server or to set it manually. When setting it manually, input IP Address , Subnet mask , and Default Gateway .

Note: If the IP address is allocated from a DHCP server (if automatic acquisition is selected), then make sure that the term of the IP address lease is infinite. If the IP address is changed during analysis, then data will be lost.

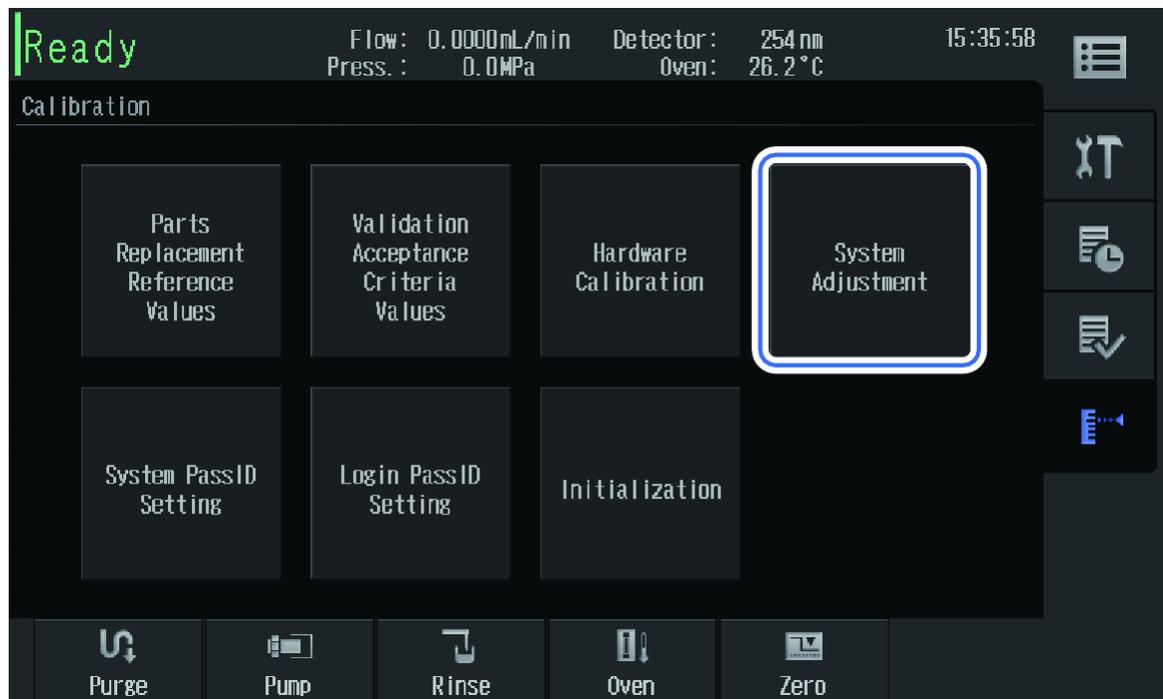
Set the Date and Time

Prerequisite Procedures

- [Show the Calibration Tab](#)

1. Press **System Adjustment**.

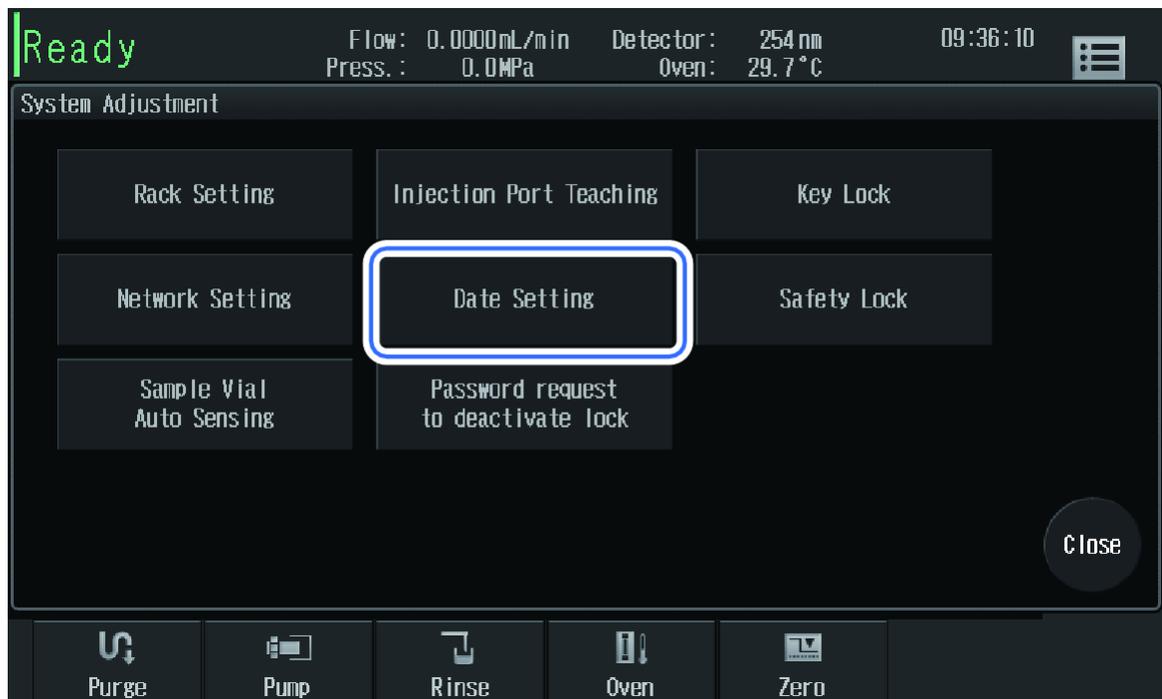
Figure 3-21 System Adjustment Button



The System Adjustment screen is shown.

2. Press **Date Setting**.

Figure 3-22 Date Setting Button



The Date Setting screen is shown.

3. Complete the fields in the Date Setting screen.

Table 3-2 Fields in the Date Setting Screen

Field	Description
Date	Input the date in the Western format.
Time	Input the time using the 24-hour clock system.
Date Format	Specify the order of date components. For example, December 31, 2013, is shown as follows. <ul style="list-style-type: none"> • YYYY/MM/DD: 2013/12/31 • MM/DD/YYYY: 12/31/2013 • DD/MM/YYYY: 31/12/2013

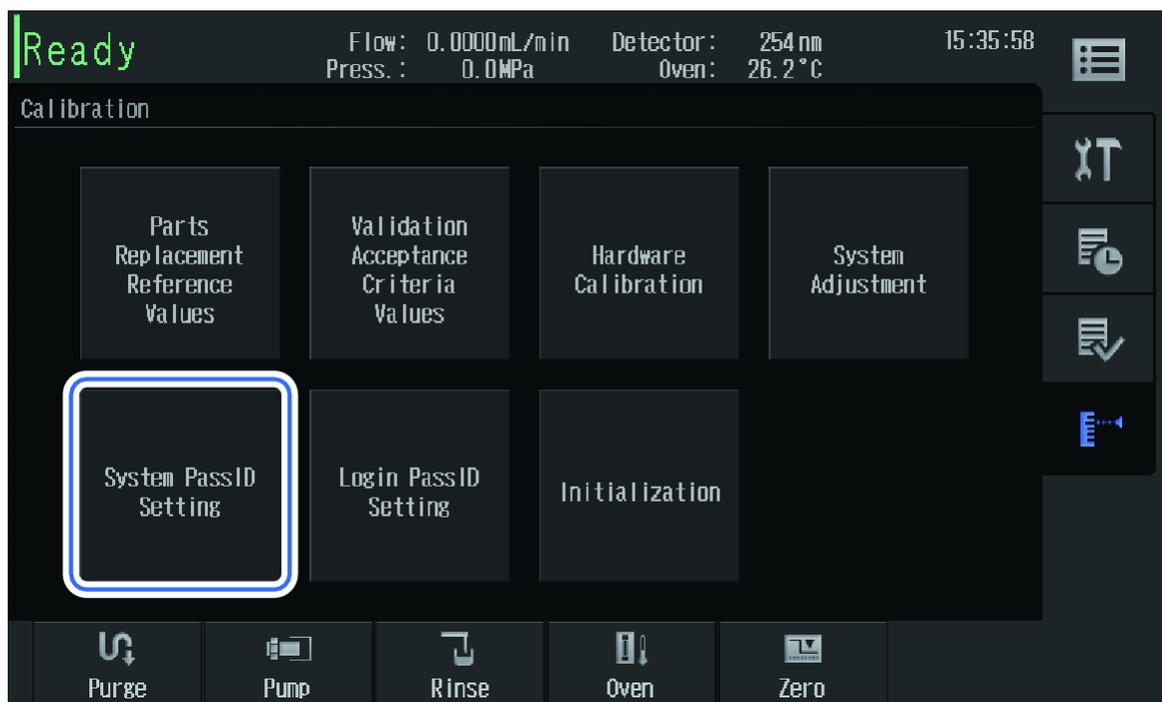
Change the System Pass ID

Prerequisite Procedures

- [Show the Calibration Tab](#)

1. Press **System PassID Setting**.

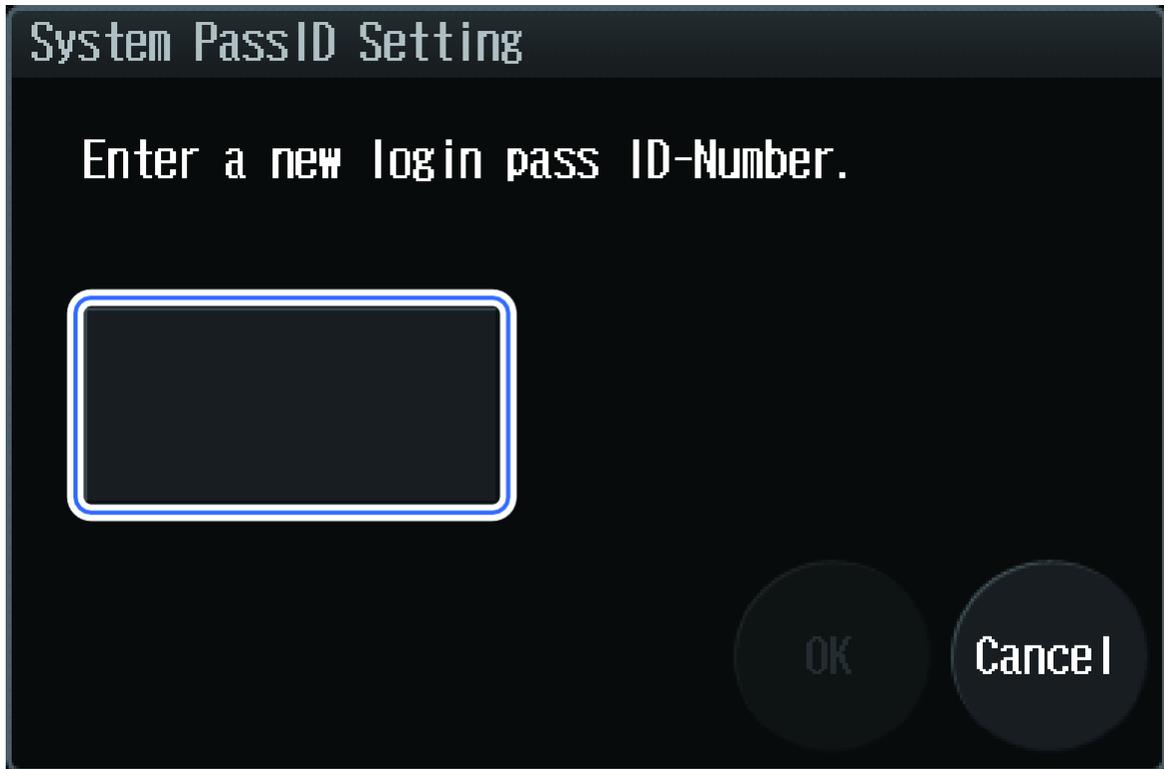
Figure 3-23 System PassID Setting Button



The System PassID Setting screen is shown.

2. Press ********* and then type a new 5-digit system pass ID Number.

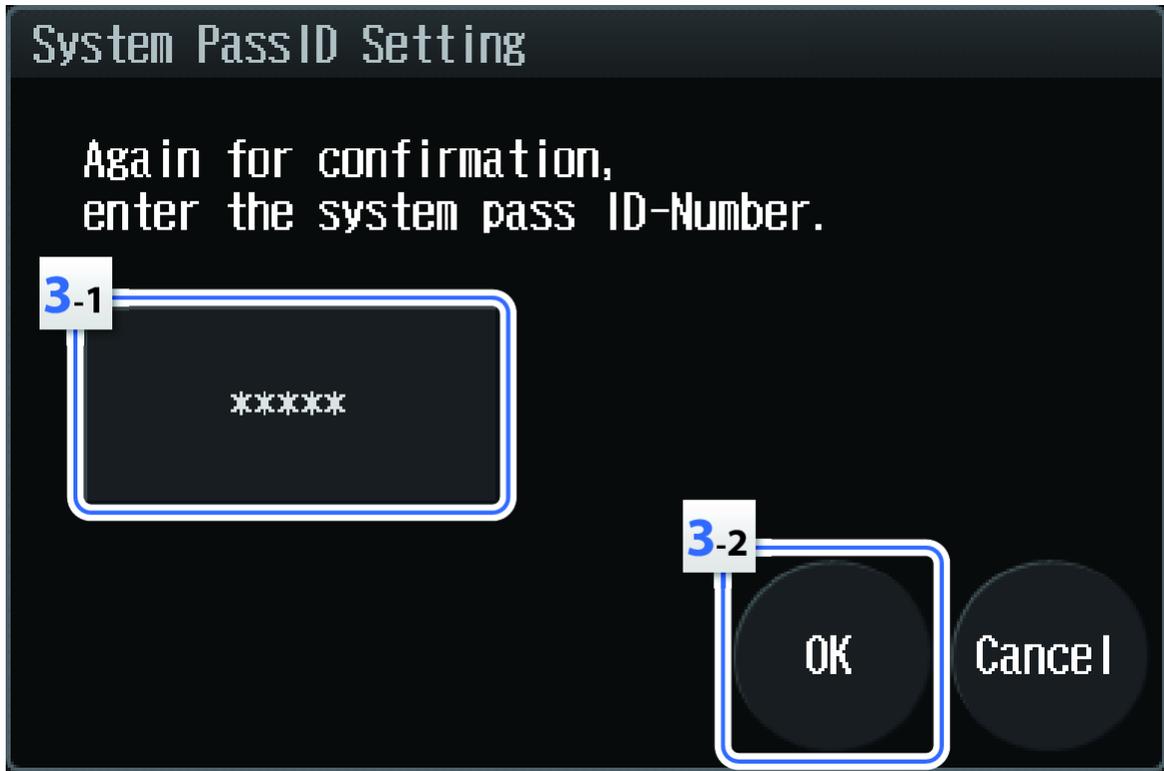
Figure 3-24 System Pass ID Setting Screen



The message following message is shown: Again for confirmation, enter the system pass ID- Number.

3. Press ********, type the new system pass ID Number again, and then press **OK**.

Figure 3-25 System Pass ID Setting Confirmation



The system pass ID Number is changed, and the message, New system pass ID- Number is set, is shown.

Note: If changing the system pass ID Number fails, this message is shown: The system pass ID-Number entered does not match the one for verification purposes. Please change the system pass ID-Number again

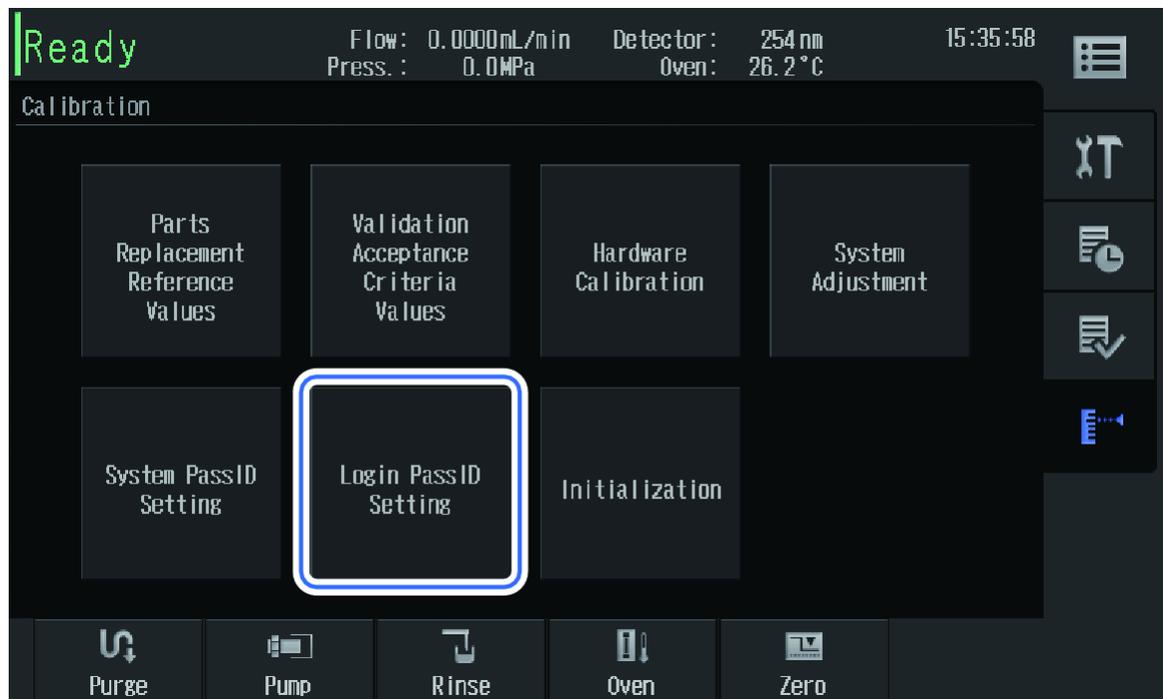
4. Press **Close**.

Change the Login Pass ID

Prerequisite Procedures
<ul style="list-style-type: none">• Show the Calibration Tab

1. Press **Login PassID Setting**.

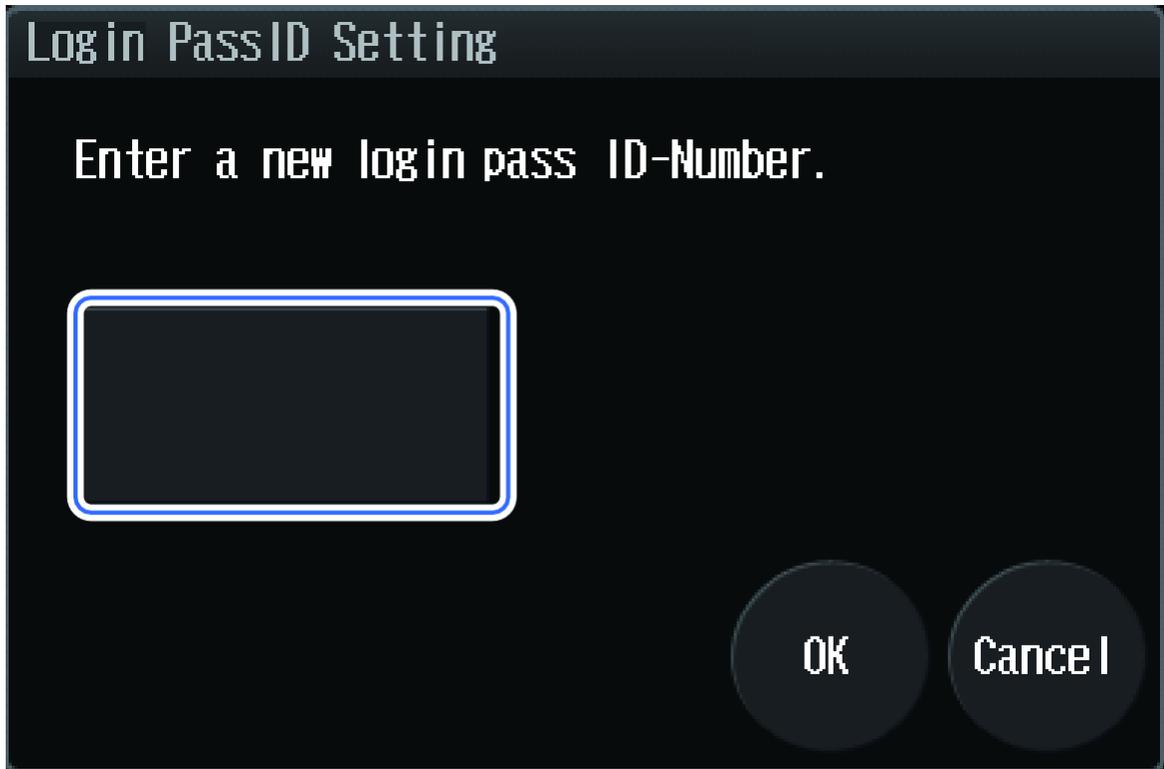
Figure 3-26 Login PassID Setting Button



The Login PassID Setting screen is shown.

2. Press ***** and then type a new 5-digit login pass ID Number.

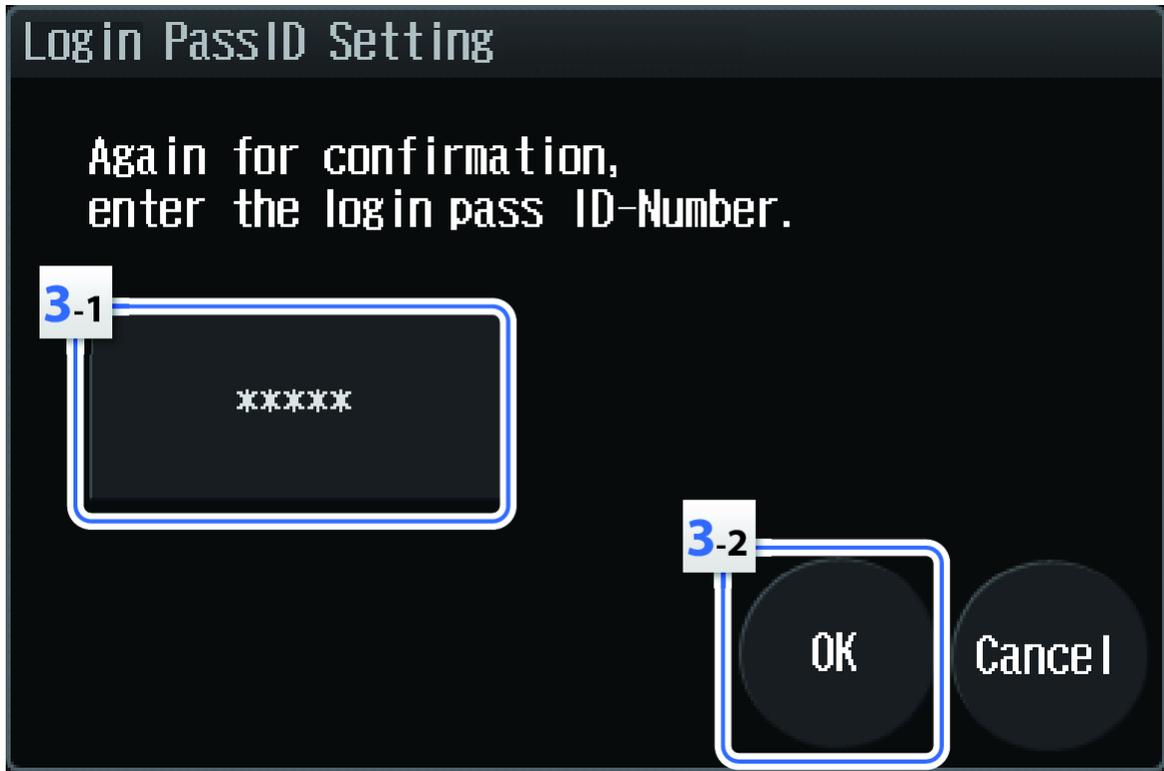
Figure 3-27 Login PassID Setting Screen



The message, Again for confirmation, enter the login pass ID- Number, is shown.

3. Press *********, type the new login pass ID Number again, and then press **OK**.

Figure 3-28 Login PassID Setting Screen Confirmation



The login pass ID Number is changed, and the message, New login pass ID- Number is set, is shown.

Note: If the login pass ID Number is not changed, this message is shown: The login pass ID-Number entered does not match the one for verification purposes. Please change the login pass ID-Number again.

4. Press **Close**.

Initialize Settings

Prerequisite Procedures

- [Show the Calibration Tab](#)

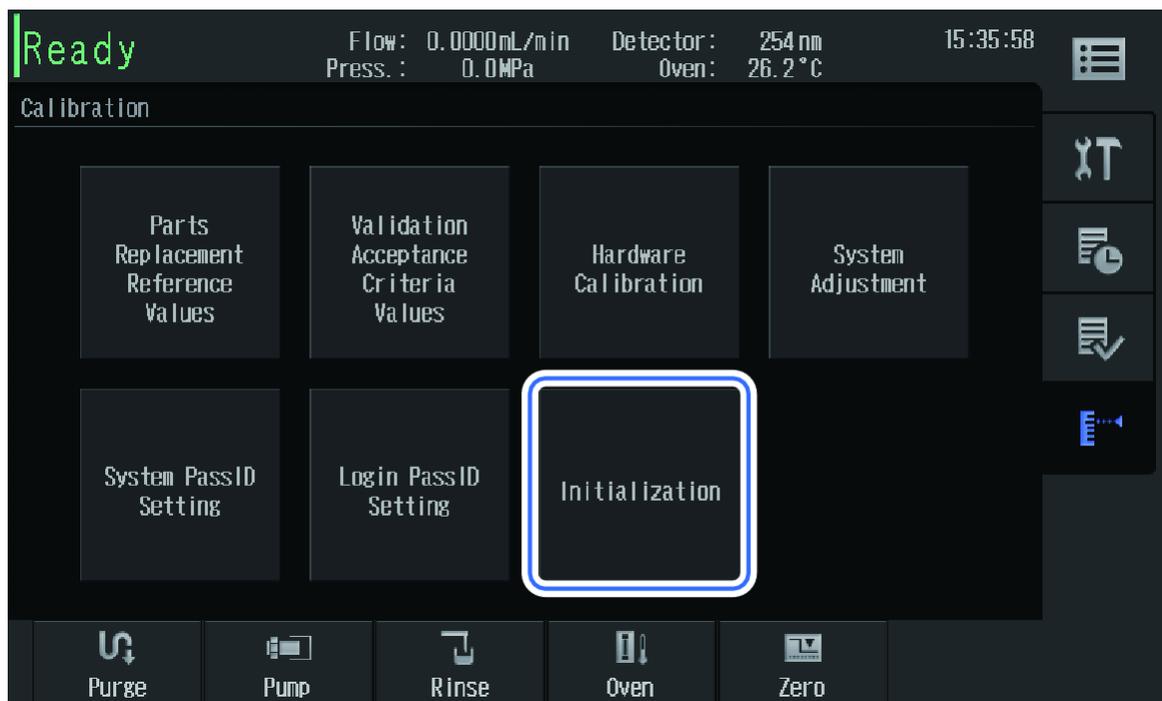
The parameters of parameter settings and system settings can be initialized. The data related to the system check report, for example, logs and calibration data, are not initialized.

Note: After initialization, it is necessary to turn off the main power switch.

Configuration

1. Press **Initialization**.

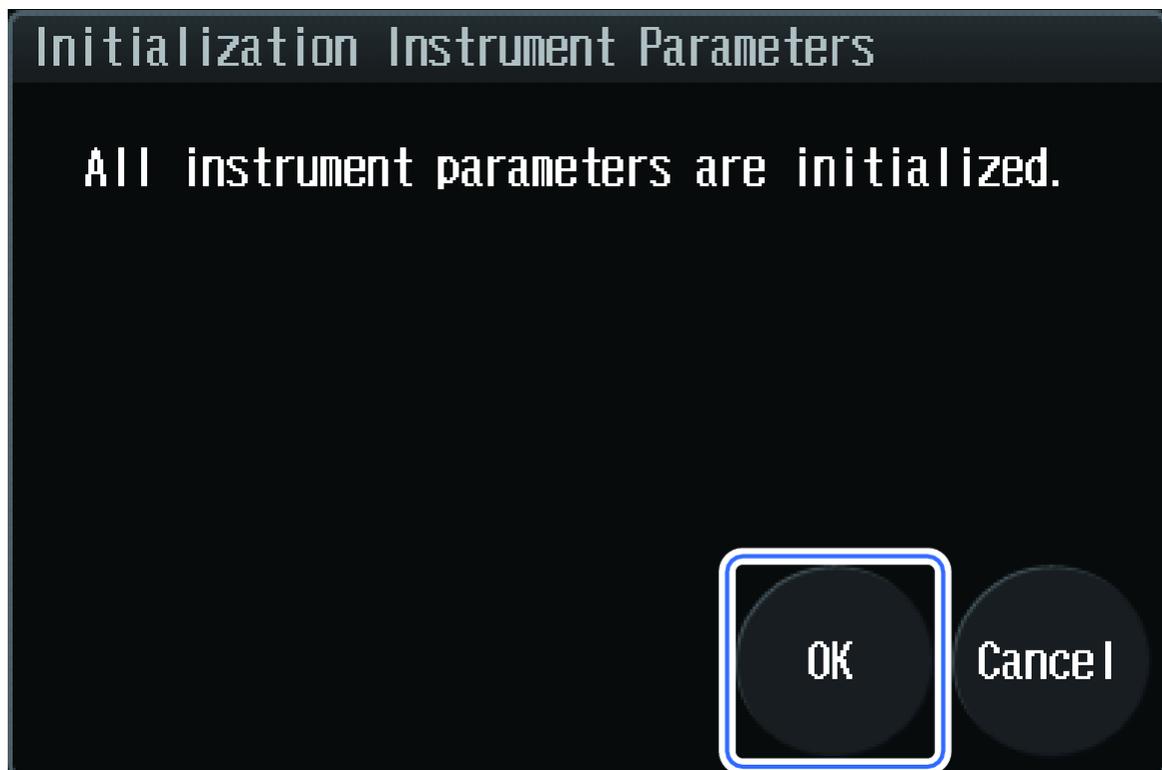
Figure 3-29 Initialization Button



The Initialization Instrument Parameters screen is shown.

2. Press **OK**.

Figure 3-30 Initialization Instrument Parameters



The parameters of parameter settings and system settings are initialized, and this message is shown: All parameters have been initialized. Turn the system power off.

Configure the System to Shut Down after Analysis

Shutdown can be configured so that the system terminates automatically after analysis completion. It is possible to change the oven temperature and mobile phase concentration and flow rate at the time of shutdown, and to turn off the power to the system components.

1. Press  (Menu).

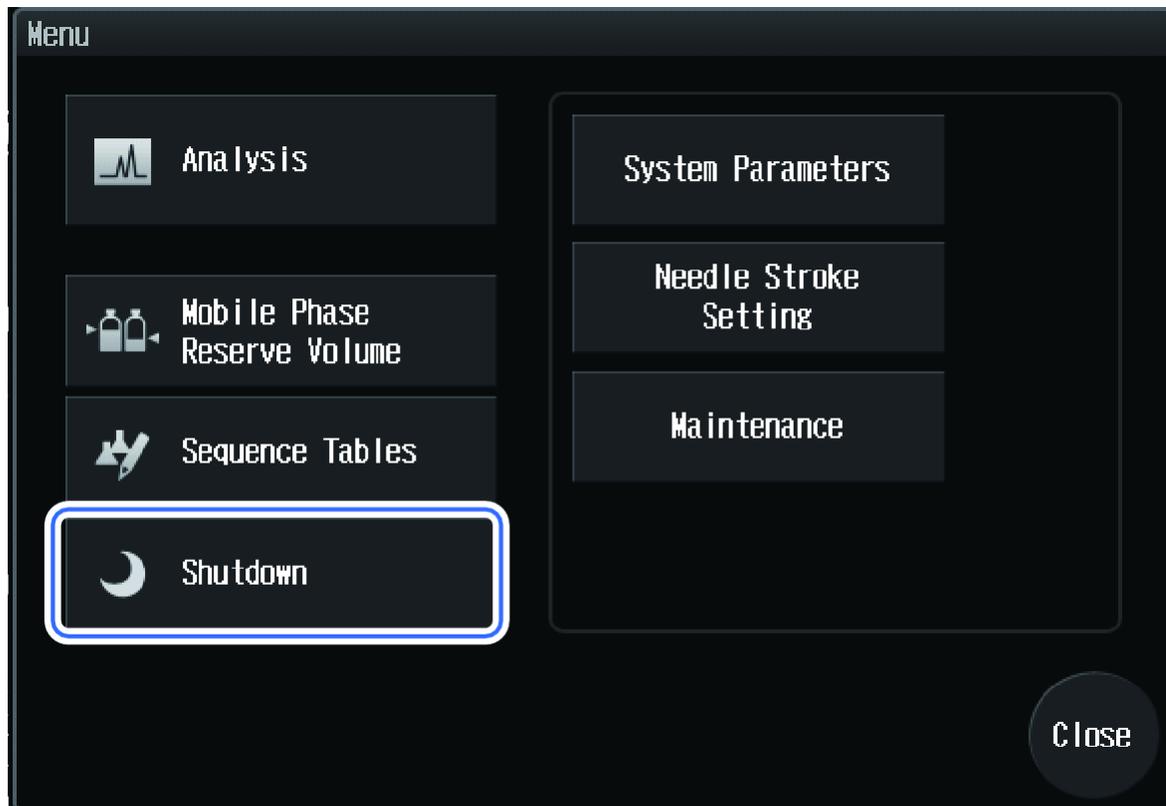
Figure 3-31 Menu Button



The Menu screen is shown.

2. Press **Shutdown**.

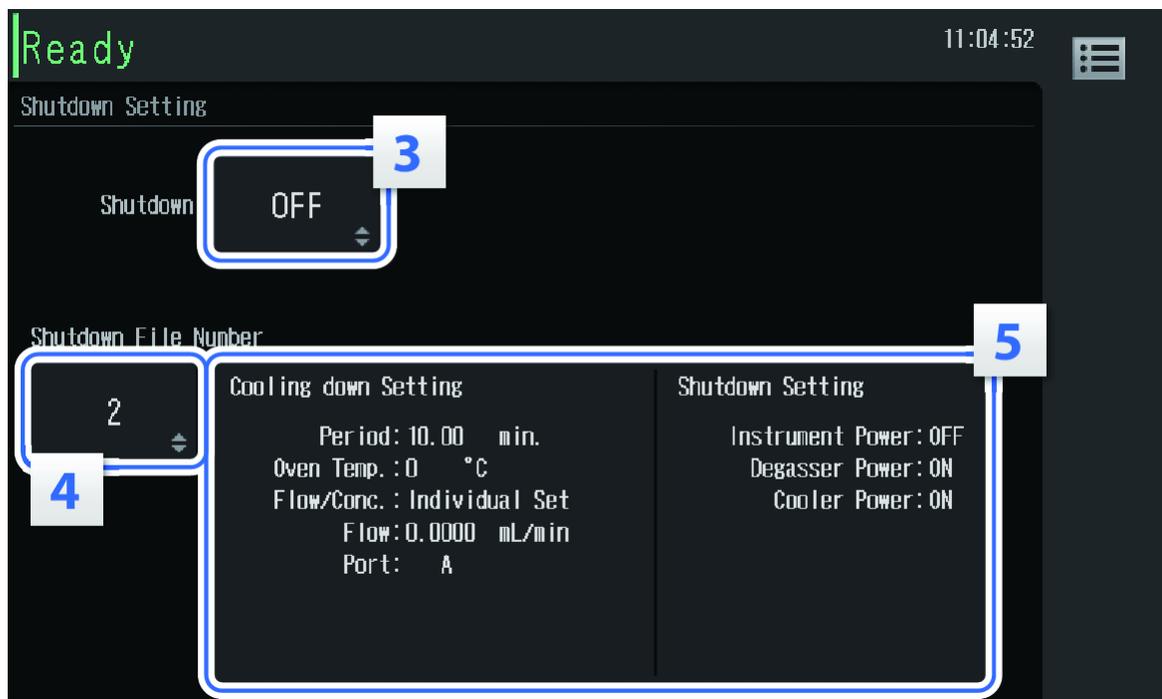
Figure 3-32 Shutdown Button



The Shutdown Setting screen is shown.

3. Set **Shutdown** to **ON**.

Figure 3-33 Shutdown Screen



4. Select the shutdown-file.
5. To change the setting contents, press anywhere in the content area of the shutdown-file No.

The Edit Shutdown File screen is shown.

6. Set the unit parameters after the completion of the analysis.

Operating Instructions

4



WARNING! Hot Surface Hazard. Do not open the column oven door if the high temperature lamp is blinking. The internal temperature of the column oven is 60 °C or greater.



WARNING! Biohazard. Wear personal protective equipment when handling potentially infectious or toxic substances (such as human samples or reagents) in order to prevent contact with the skin.

CAUTION: Potential System Damage. Do not use a high level of organic solvent (greater than 50%) when the column oven is operated at temperatures exceeding 85 °C.

Sample Workflow

Step	To do this...	Refer to....
1	Prepare the mobile phase and rinse solution for the autosampler	Prepare the Mobile Phase and Rinse Solution
2	Prepare the column	Install the Column
3	Turn on the HPLC system and log on	Turn on the HPLC System and Log on to the HPLC System
4	Activate a hardware profile	The <i>Operating Instruction - Hardware Profiles and Projects</i> section in the appropriate <i>System User Guide</i> .
5	Create and select an LC method	<i>ExionLC™ System Software User Guide</i>
6	Prepare the sample	Prepare the Sample
7	Start acquisition	<i>System User Guide</i> for the mass spectrometer
8	Complete acquisition and then turn off the HPLC system	<i>System User Guide</i> for the mass spectrometer

Turn on the HPLC System



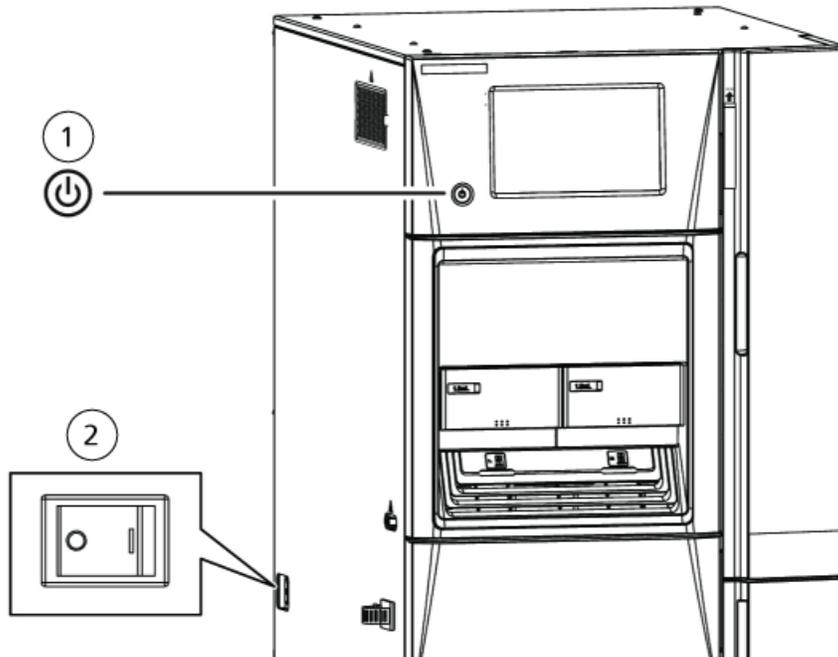
WARNING! Electrical Shock Hazard. Before connecting the mains supply cable to the mains supply, make sure that the system is turned off.

Note: After an emergency, such as a power outage or equipment failure, always inspect the system thoroughly before turning it on.

A login pass ID Number is required on the Start screen. The initial value is 00000. To change the value, refer to [Change the Login Pass ID](#).

1. Make sure that the mains supply cable is connected to the system and that it is plugged in to the mains supply outlet.
2. Make sure that the main power switch is on (I).
3. Press the Power button.

Figure 4-1 Power Button and Power Switch



Item	Description
1	Power button
2	Power switch

The startup screen opens and the system self-check is initiated. If an error occurs, then pump the mobile phase for a while, and then turn the power button off and on.

Note: If the power switch is turned off and on, then the HPLC system starts up.

Log on to the HPLC System

After the system starts, it prompts the user to log in.

Note: The Login screen does not open if the **Password request to deactivate lock** option is set to be invalid.

1. Type the password.

The default ID number is "0000". To change the login password, refer to [Change the Login Pass ID](#).

2. Press **OK**.

The Main Analysis screen opens.

Prepare the Mobile Phase and Rinse Solution



WARNING! Biohazard, Toxic Chemical Hazard. Do not use a cracked or scratched bottle. The bottle might leak.



WARNING! Toxic Chemical Hazard. Install the waste container lower than the instrument, for example, on the floor. If the container is higher than the instrument, then the liquid does not drain and it leaks from the connections.



WARNING! Toxic Chemical Hazard. Do not use solutions of pH 9 or more. Mobile phases above pH 9 might damage the system flow path and cause leaks.

Operating Instructions

CAUTION: Potential System Contamination. Do not use resin parts for the high-pressure tubing while pumping at high pressures. Pumping at high pressure might cause resin tubing to be ruptured or disconnected, which could result in mobile phase leaks. Note the maximum withstand pressure of each part when resin parts are used for the high-pressure tubing.

CAUTION: Potential System Damage. Do not use highly volatile acids, such as acetic acids in high concentration (10% to 50%) or 1% TFA (trifluoroacetic acid) solution, as a mobile phase or rinse solution of the autosampler continually. Doing so can cause metallic parts in the instrument to corrode. If such liquids have been used for analysis, then purge the mobile phase or rinse solution from the flow line with distilled water or other liquid that is less corrosive. Also, turn off the autosampler after analysis and open the front door slightly to let the vapor release from the inside of the instrument.

CAUTION: Potential System Damage. Do not use the following solvents in the degassing unit. They can damage the system.

- Hexafluoroisopropanol (HFIP)
 - (Hydrogen fluoride (HF)
 - Freon 113
 - Fluorinert FC-40, Fluorinert FC-72, or Fluorinert FC-75
 - Perfluoro benzene
 - Perfluoro octane
 - Perfluoro decalin
 - Perfluoro 1-methyldecalin
 - Perfluoro dimethyldecalin
 - Perfluoro methyl-cyclohexane
 - Perfluoro dimethyl-cyclohexane
 - AK-225
 - Nitric acid of 30% or more of concentration
 - Sulfuric acid of 40% or more of concentration
 - Hydrogen peroxide
-

CAUTION: Potential System Damage. If PEEK resin parts are used for tubing connections, then do not use the following mobile phases. They weaken PEEK resin, which might lead to cracked tubing and mobile phase leaks.

- Concentrated sulfuric acid
 - Concentrated nitric acid
 - Dichloroacetic acid
 - Tetrahydrofuran (THF)
 - Dichloromethane
 - Chloroform
 - Dimethyl sulfoxide (DMSO)
 - Fluorine organic solvents such as hexafluoroisopropanol (HFIP)
-

Follow these guidelines when choosing mobile phase solutions:

- Use only HPLC-grade or comparable mobile phase, and filter it with a filter of 0.45 µm mesh or finer before use to remove particulates and foreign matter.
- If stainless steel materials are used, then avoid mobile phases containing halogen ions, such as KCl, NaCl and NH₄Cl, or mobile phases that generate halogen ions in certain reactions. If mobile phases containing halogen must be used, then clean all of the flow lines thoroughly with HPLC-grade water immediately after analysis. Halogen ions can corrode the stainless steel material (SUS316L).
- Avoid ammonia aqueous solution at a concentration exceeding 0.1%. It might damage the plunger of the pump and shorten the service life of the plunger and the plunger seal.
- Always degas the mobile phase, as air bubbles might form during solvent mixing or during temperature or pressure changes. Air bubbles might cause pump malfunctions and noise.
- Understand the properties, including boiling points, firing points, and viscosities, of the mobile phase.

Select a Rinse Solution

CAUTION: Potential Wrong Result. Be sure to turn on the degasser when using the HPLC system. Air bubbles in the rinse solution pipe during sample injection can decrease accuracy.

Select the rinse solution appropriate to the mobile phase.

Reversed Phases, Ion Exchanges, and Aqueous Normal Phases

Use a 1:1 methanol:HPLC-grade water solution, except under these conditions:

Operating Instructions

- If the solution precipitates salt when coming into contact with the sample, then use a solution that is similar in composition to the mobile phase and that does not contain salt.
- If the component to be analyzed tends to cause the sample to remain on the outside of the needle (for example, if it is an acidic, basic, or ionic material), then use the following rinse solutions:
 - Organic solvents, including methanol or acetonitrile, with an acid such as formic acid or acetic acid added.
 - 0.1% trifluoroacetic acid (TFA) aqueous solution or organic solvent solution, or a mixture of the two.

Non-aqueous Normal Phases and GPC

Use the same solution for the rinse as for the mobile phase.

When the target compound is an acid, base, or ionic substance, and the rinse mode is required, use a 0.1% TFA aqueous solution, an organic solvent solution, or a mixture of both.

Guidelines for Using High Concentrations of Volatile Acids

If the rinse solution contains high concentrations of volatile acids (formic acid or acetic acid at a concentration exceeding 1% or TFA at a concentration exceeding 0.1%), then volatile components generated during lengthy serial analyses might cause the metal parts inside of the module to rust, resulting in malfunctions. Follow these guidelines when using high concentrations of volatile acids:

- Avoid using acid solutions with concentrations exceeding the following concentrations by diluting before use:
 - Formic acid and acetic acid solution at a concentration exceeding 1%
 - TFA solution at a concentration exceeding 0.1%
- After the analysis finishes, replace the rinse solution with a liquid that does not contain acid, such as HPLC-grade water or methanol, and then remove the sample racks to ventilate the inside of the module.
- After the analysis finishes, keep the Z mount waiting in a position away from the rinsing port. Rinse solution always accumulates at the rinsing port and its volatilized acid is at a high concentration, especially around the rinse port. When the needle is inserted in the injection port, the Z mount is in the closest position to the rinsing port, which might cause the motor of the Z mount to rust. To avoid rust, on the System Parameter Setting screen, set **Z Home Mode** in the **Autosampler** tab to **Enabled**. This function keeps the Z mount waiting in a position away from the rinsing port when the device shuts down, where the mount is least affected. However, if a buffer solution is used as the mobile phase, be sure to set **Z Home Mode** to **Disabled**. Salt might be precipitated at the tip of the needle and the upper side of the needle seal, which can cause clogging.

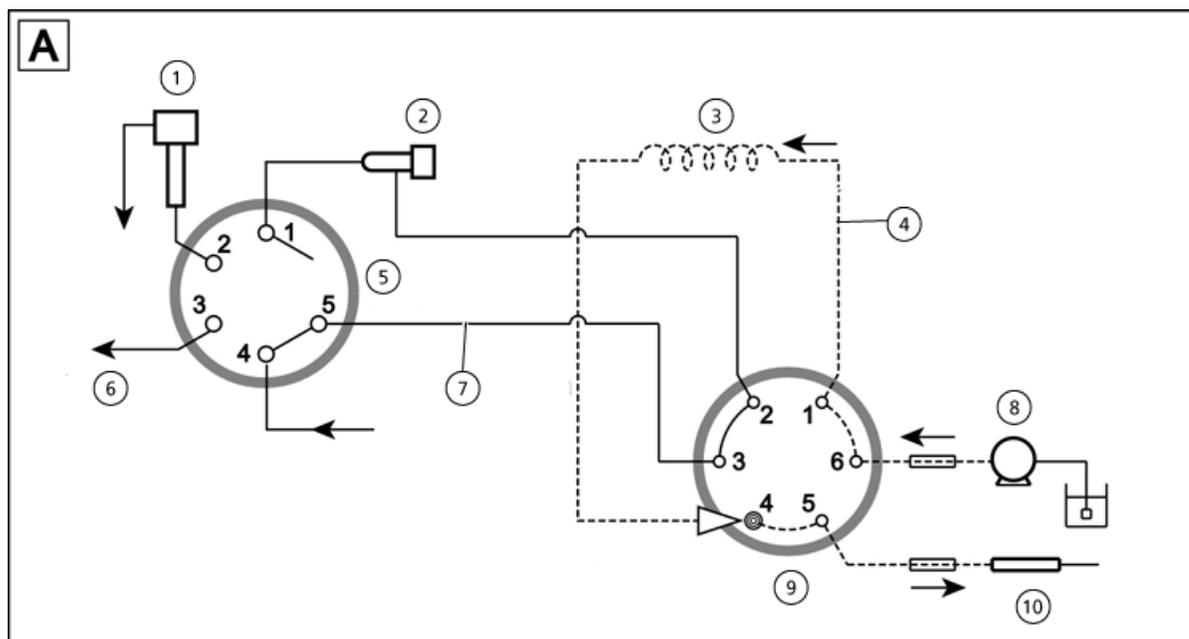
Guidelines for Using a Buffer Solution

When a buffer solution is used as the mobile phase, tubes might become clogged, depending on the buffer solution used. Follow these guidelines:

- During autosampler injection, the rinse solution and the mobile phase are mixed in the tubing between the high-pressure valve and the low-pressure valve. Verify that no salt is precipitated when the rinse solution and the mobile phase are mixed.

- To prevent precipitation of salt, when using a buffer solution with a concentration exceeding 50 mmol/L, keep the concentration of organic solvent in the rinse solution to 50% or less. Refer to [Figure 4-2](#) after injection of the sample, flow lines indicated by solid lines in are filled with rinse solution. Flow lines indicated by dashed lines are filled with mobile phase.

Figure 4-2 Rinse Step A



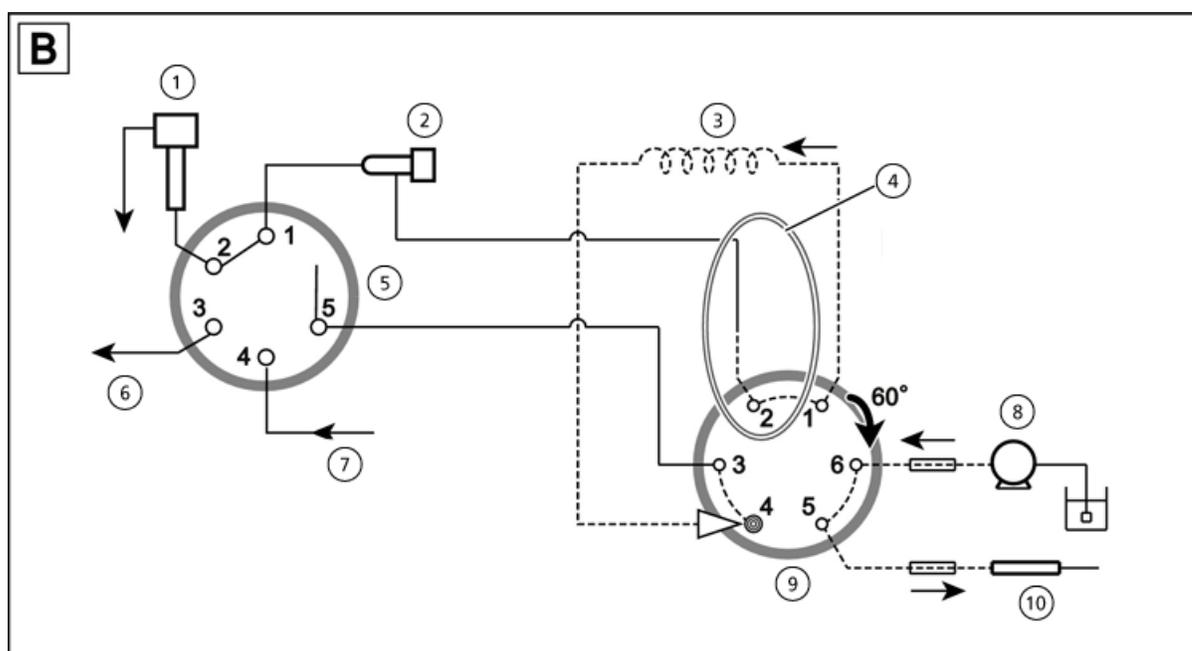
Item	Description
1	Rinsing port
2	Measuring pump
3	Sample loop
4	Mobile phase
5	Low-pressure valve
6	Manual syringe
7	Rinse solution

Operating Instructions

Item	Description
8	Pump
9	High-pressure valve (for injection)
10	Column

Refer to [Figure 4-3](#) before sampling, the high-pressure valve rotates and a portion of mobile phase compressed by high pressure is pushed through the high-pressure valve ports 1 and 2. Depending on the pumping pressure, rinse solution and the mobile phase might be mixed in the area inside the , which might result in salt deposits.

Figure 4-3 Rinse Step B



Item	Description
1	Rinsing port
2	Measuring pump
3	Sample loop
4	Some of the mobile phase and the rinse solution might mix
5	Low-pressure valve
6	Manual syringe
7	Rinse solution
8	Pump
9	High-pressure valve (for loading)
10	Column

- For low-pressure gradient analysis using a highly concentrated buffer solution and an organic solvent, replace the tubing from the outlet of the low-pressure gradient unit to the inlet of the pump with the accessory LPGE-OUT tube long.

Salt precipitated at the interface between the highly concentrated buffer solution and the organic solvent might cause the check valve on the pump inlet side to malfunction and reduce retention time reproducibility.

(Example) Guideline for relevant buffer solutions

- Potassium phosphate buffer solution at a concentration of 10 mmol/L/min
- Sodium phosphate buffer solution at a concentration of 50 mmol/L/min

Generally, potassium salt is more easily precipitated than sodium salt. However, because the precipitation condition of salt depends on the type and concentration of the organic solvent, the buffer solution concentrations in this section are only a guideline.

Note: Replacing the LPGE-OUT tube increases the system delay volume. Change the setting for the delay compensation volume.

Install the Mobile Phase and Rinse Solution on the Reservoir Tray

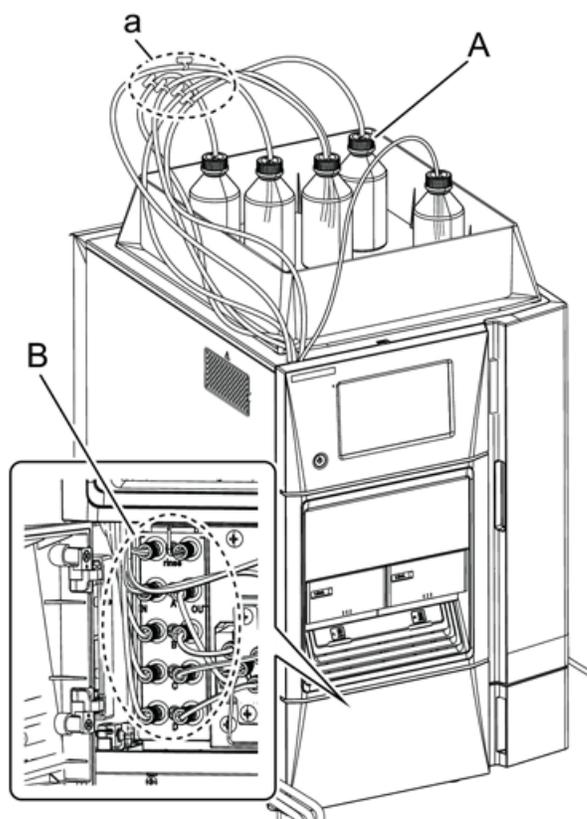
Note: When replacing a residual solvent inside the module with a new mobile phase or when mixing them, replacement with another solvent might be required to prevent precipitation and emulsion. Refer to [Replace the Mobile Phase](#).

1. Prepare a mobile phase and then put it into a dedicated reservoir bottle.

Tip! SCIEX recommends that the mobile phase be filtered it through a membrane filter with a filter size of 0.45 μm or less.

Tip! SCIEX recommends that ultrasonic vibrations for 2 minutes or 3 minutes be used for degassing.

Figure 4-4 Install Mobile Phase



Item	Description
A	Reservoir bottle
a	Tags on suction tubing
B	Degasser ports

- Put the suction filter and the tube of the mobile phase port to be used in the reservoir bottle.

Tags on the suction tubing identify the degasser ports to which the tubing should be connected. Consult the tags and install each tube in the reservoir bottle.

Table 4-1 Tubing Tags

Tag Label	Port Name
Rinse	Rinse solution for autosampler
SOLVENT: A	Mobile phase A
SOLVENT: B	Mobile phase B
SOLVENT: C	Mobile phase C
SOLVENT: D	Mobile phase D

- Install the reservoir bottle on the reservoir tray.

Perform an Autopurge

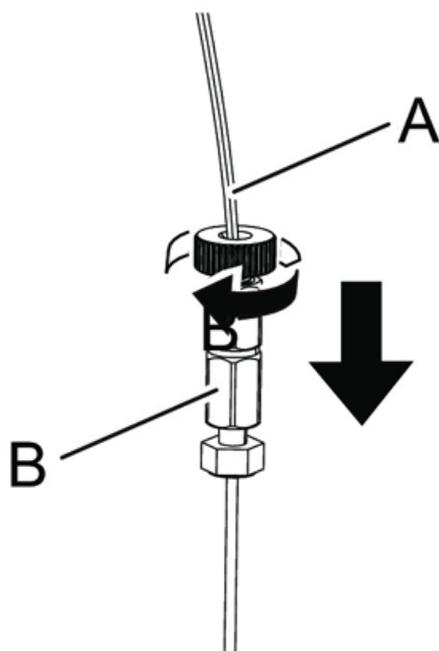
The mobile phase ports and the rinsing port of the autosampler are automatically purged.

- Fill the whole flow line with mobile phase before installing the column.
- Purge mobile phase ports that are not used with a liquid that is equivalent to the mobile phase or that does not affect analysis results. Be careful not to allow air bubbles to remain in the tubes of the mobile phase ports that are not used.
- When the **Rinse solution aspiration rate** in the autosampler settings is 35 $\mu\text{L}/\text{sec}$, the average flow rate of rinse solution pumped by the measuring pump is approximately 1.0 mL/min. To completely replace liquid in the flow line with new rinse solution, perform an autopurge for 25 minutes.

Operating Instructions

- After using a buffer solution as the mobile phase, when replacing or purging the mobile phase with the buffer solution remaining in the column, do not purge with a liquid that easily forms a precipitate in the buffer solution, such as highly concentrated organic solvent. When normal pumping starts after purging, residue of the mobile phase that was last purged, which can be found between the mixer and the autosampler, might flow in the column and precipitate salt. To replace a mobile phase after using a buffer solution, rinse the column with a liquid that does not form a precipitate in the buffer solution, such as HPLC-grade water, and then purge or pump the residual mobile phase.
1. If a column is connected, remove it, and then install the supplied PEEK tubing, or another replacement tube, and the coupling.

Figure 4-5 Preparing for AutoPurge



Item	Description
A	Supplied PEEK tubing
B	Coupling

2. Press **Purge** on the Main Analysis screen.

Figure 4-6 Purge Button

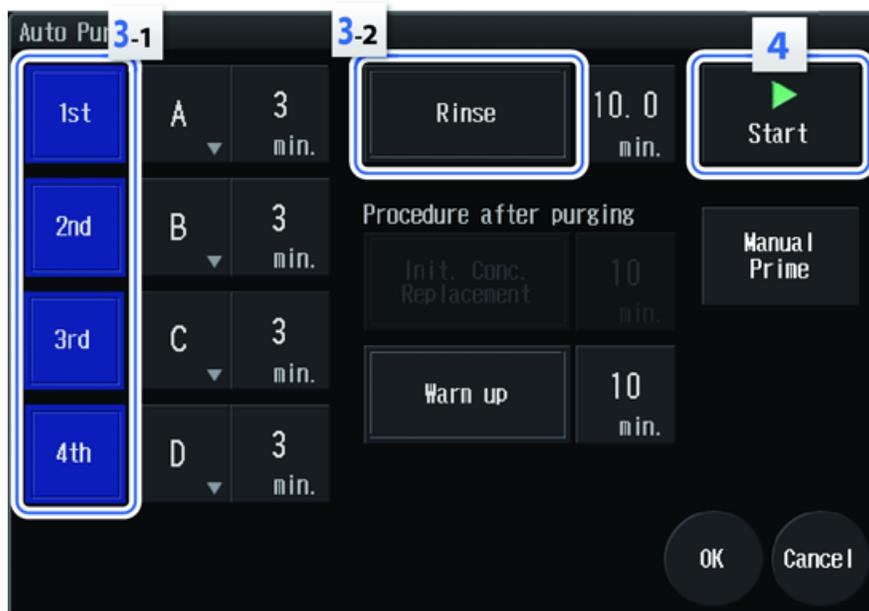


3. Turn ON **1st** to **4th** and **Rinse**. Keep the default purge time. Replace the entire flow line with mobile phase before setting the column.

Note:

- The default purge time is three minutes for mobile phases and ten minutes for rinse solutions. If air bubbles are found in the flow line, set the time two to five minutes longer than the initial value.
- If air bubbles remain in the flow line despite a longer purge time, then open the drain valve of the pump. The flow line from the suction filter to the pump head is purged. After the autopurge finishes, close the drain valve.

Figure 4-7 1st to 4th and Rinse Turned On



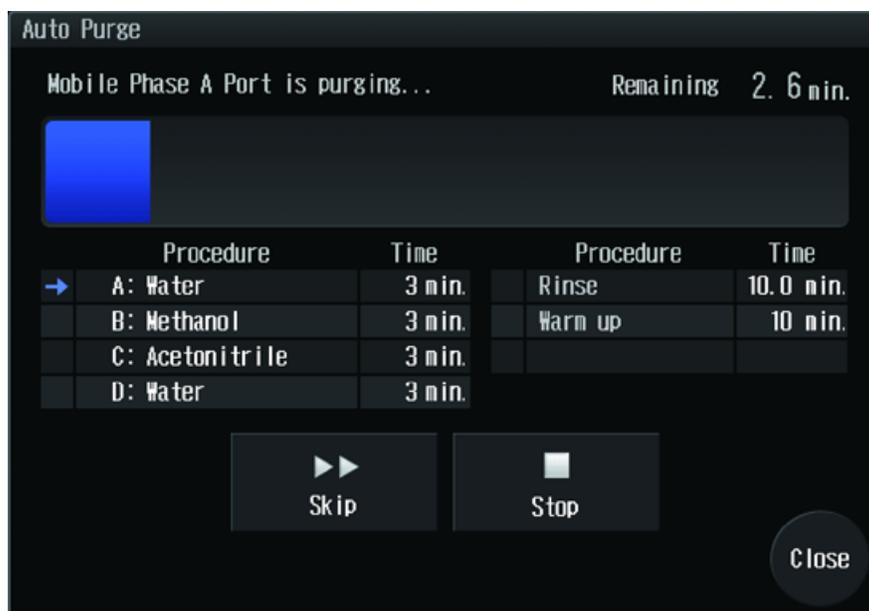
4. Press **Start**.

Note:

- Press **Stop** to cancel the autopurge.
- Press **Skip** to cancel purging of the mobile phase that is currently being purged and start purging of the next mobile phase.
- For another operation, press **Close**. The Running screen closes but the purge continues. To show the Running screen, press **Purge** on the Main Analysis screen.

Autopurging starts and the Running screen opens.

Figure 4-8 Purging In Process



5. After the purge finishes, press **Close**.

The Main Analysis screen opens.

Figure 4-9 Close Button



Operating Instructions

6. Set the flow rate to 1 mL/min and then press **Pump** to start pumping.

The mobile phase in the flow lines of the column oven, which is not replaced through autopurging, is replaced.

7. After 10 minutes, press **Pump** to stop pumping.

- **Init. Conc. Replacement:** Performs an autopurge at the initial flow rate with the initial **GRAD.** settings only when the pumping mode is set to **GRAD.**
- **Warm up:** Pumps the mobile phase at half the initial flow rate with the initial **GRAD.** settings. After the warming up time finishes, the flow rate returns to the initial setting and pumping continues.

Figure 4-10 Init. Conc. Replacement and Warm Up



Install the Column

Install the Column in the Column Oven



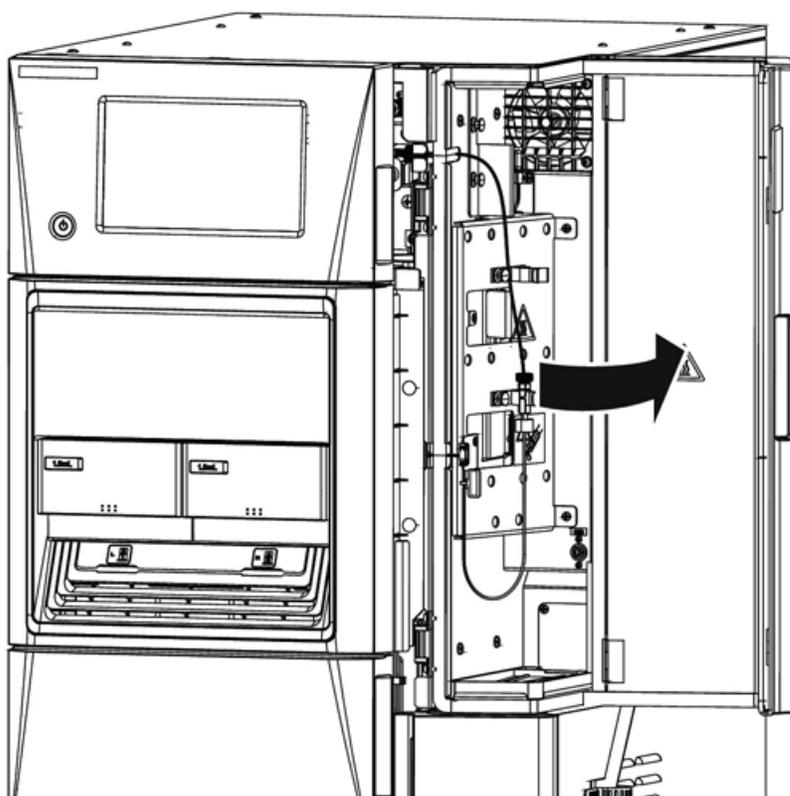
WARNING! Personal Injury Hazard. When opening doors, be careful not to pinch fingers.

Required Materials

- Male nut fitting
- Ferrule
- (Optional) UHPLC fitting

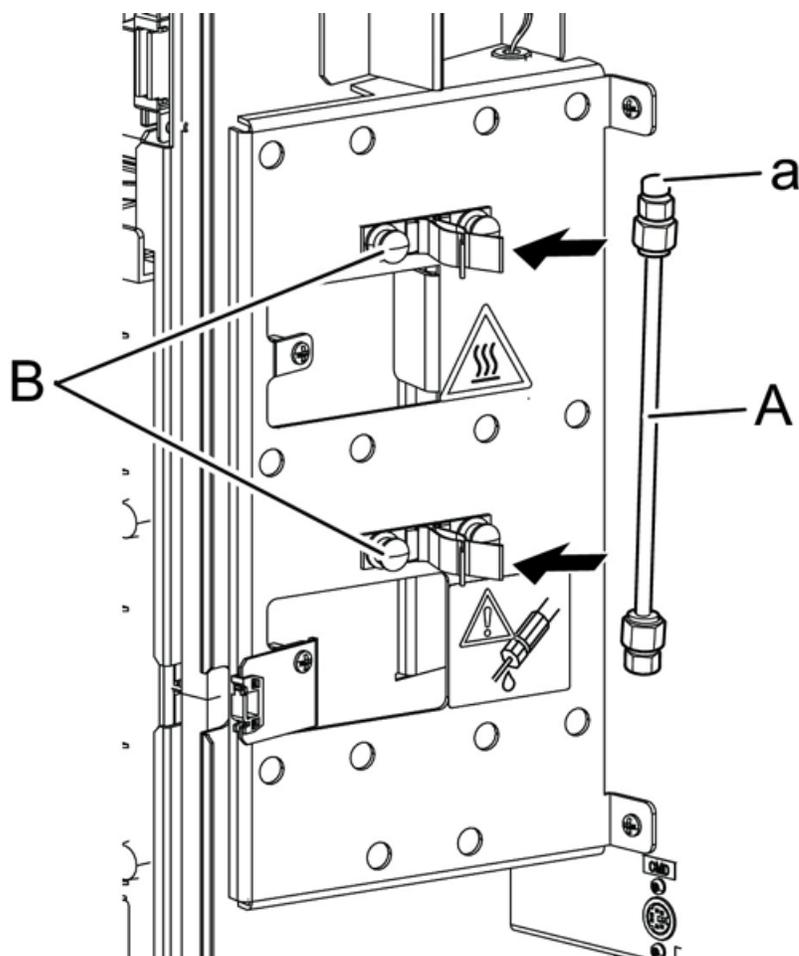
1. Open the column oven door.

Figure 4-11 Opening the Column Oven Door



2. Attach the column (A) to the column clamps (B) with the outlet side (a) turned up.

Figure 4-12 Install Column

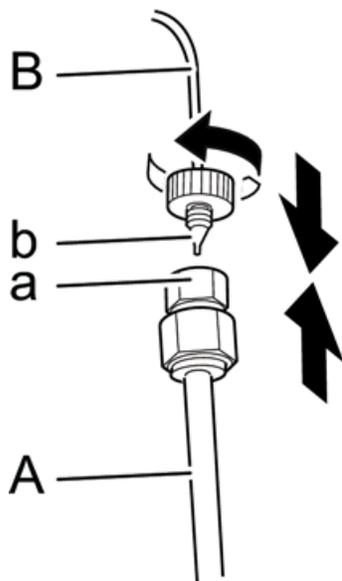


3. Connect the tubing to the column.

Connect the SUS tubing (B) to the inlet side (a) of the column (A) from the autosampler.

Note: For the fittings to be used, refer to [Consumables, Options, and Spares](#).

Figure 4-13 Connect Column Oven Tubing



4. Connect the red PEEK tubing from the outlet side of the column to the ion source.
5. Close the column oven door.

CAUTION: Potential System Damage. Be sure to lock the column oven door after closing it to prevent the door from being opened by mistake during analysis or from being opened while the tubing inside of the column oven is in contact with the door.

Attach Multiple Columns

Installing optional column clamps allows multiple columns to be attached.

Tip! Installing the optional FCV-14AH valve allows automatic switching of multiple columns.

1. Install column clamps in the positions shown in the following figures according to the length and number of columns.
 - **100 mm to 300 mm columns:** Up to 3 columns can be attached. Install column clamps in pattern A or B depending on the length of the columns.
 - **Columns up to 100 mm:** Up to 6 columns can be attached.

Figure 4-14 Columns from 100 mm to 300 mm

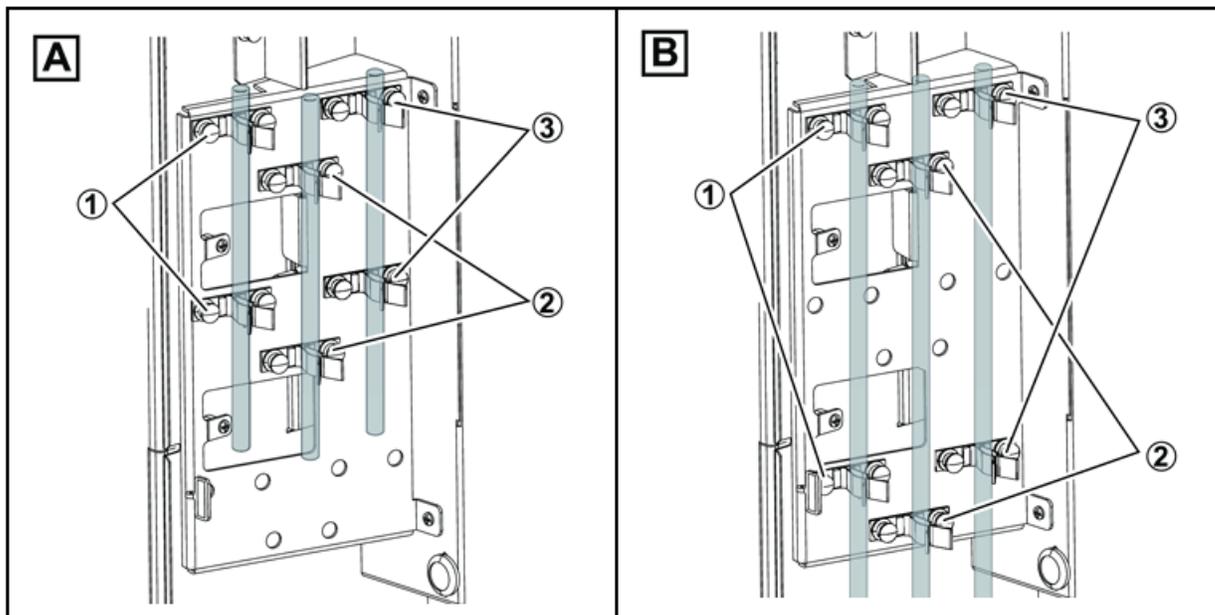
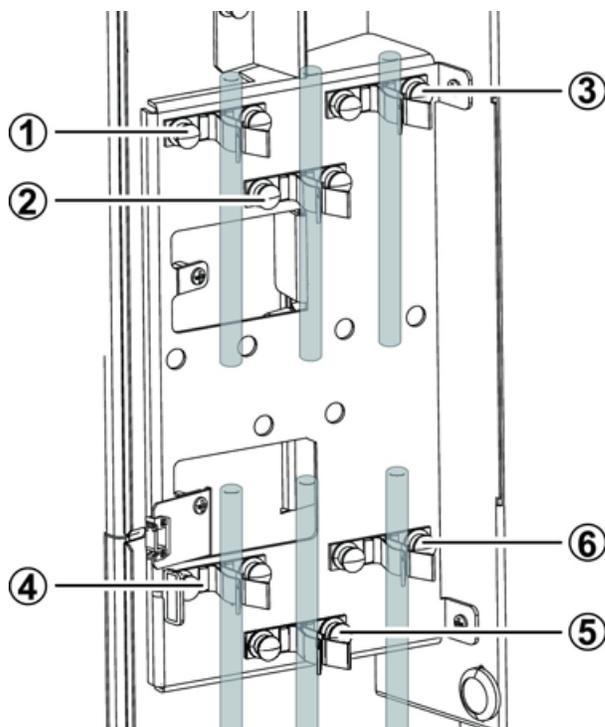


Figure 4-15 Columns up to 100 mm



2. Connect the columns.

Equilibrate the Column

Adjust the temperature of the column according to the column oven.

1. Set the flow rate to one-fifth the set value on the Main Analysis screen.

Note: When the column is at a low temperature, starting pumping might cause an error due to pressure that is too high, or it might damage the column. Pump at a lower flow rate until the oven temperature reaches the set value.

2. Press **Pump** and **Oven**.

Pump and **Oven** are illuminated in blue and the operation starts. When the oven temperature reaches the set value, the status area changes from **Wait Oven** to **Ready**.

3. After the oven temperature reaches the set value, return the flow rate to the set value.

Prepare the Sample

Put the Sample In a Sample Vial



WARNING! Biohazard. Wear personal protective equipment when handling potentially infectious or toxic substances (such as human samples or reagents) in order to prevent contact with the skin.

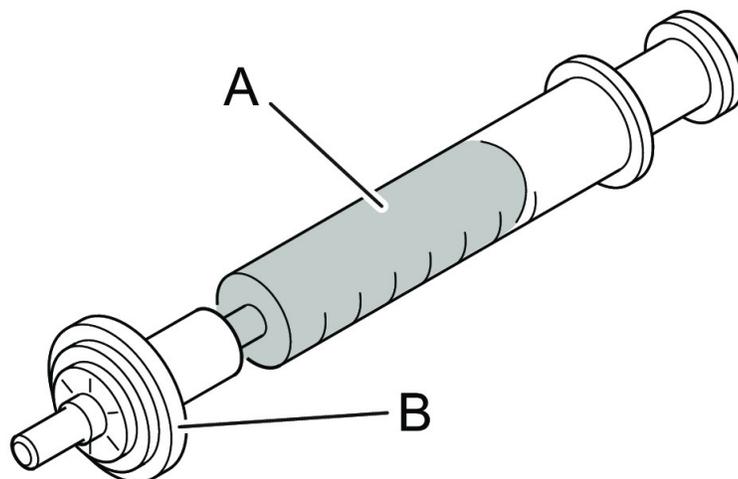
CAUTION: Potential System Damage. Filter the sample in advance using a membrane filter (0.45 μm or less) to remove solid matter and insoluble materials, including dust. Solid matter and insoluble materials such as dust in the sample can cause the flow lines for the needle, needle seal, high-pressure valve stator and rotor, the outlet tubing of the module outlet tubing, and so on, to clog. Also, it might damage the sliding surfaces of the stator and rotor of the high-pressure valve, resulting in liquid leakage in a short period of time.

CAUTION: Potential System Damage. Dilute high viscosity samples before use. High viscosity samples might not be aspirated properly at the set injection volume. In such cases, use the sample at low concentrations or set a lower sample aspiration rate.

CAUTION: Potential Wrong Result. Storing samples at the wrong temperature can result in sample degradation. Analysis of degraded samples might result in incorrect results. Always store samples at recommended temperatures, in and outside of the autosampler.

1. Prepare the sample with a solvent equivalent in composition to the mobile phase, following laboratory operating procedures.
2. If required, filter the sample (A) through the membrane filter (B).

Figure 4-16 Sample and Membrane Filter



CAUTION: Potential System Damage. When using a sample vial, attach the cap with the PTFE surface of the silicone septum turned down, that is, to the liquid side. If the PTFE surface is turned up, then the sample solvent might melt the silicone rubber.

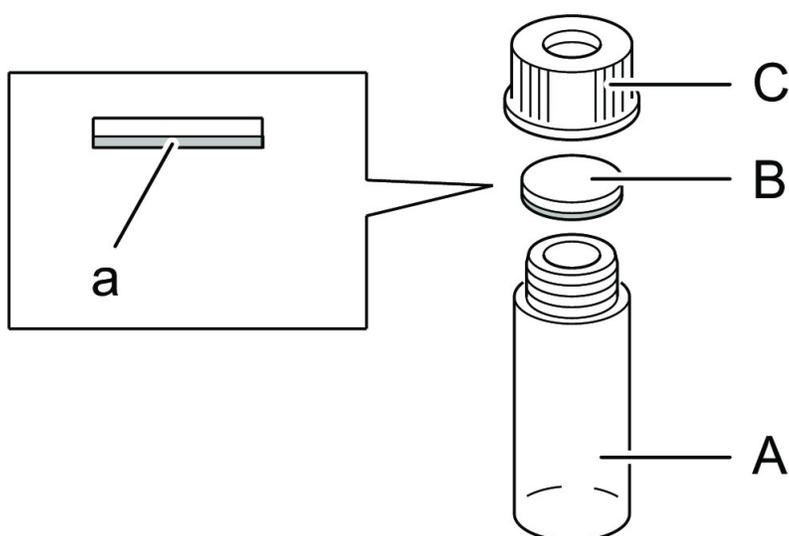
CAUTION: Potential System Damage. Use an appropriate septum. If the septum is not suitable for use, then the flow line might become clogged with septum shavings or the needle might not be able to penetrate the septum.

3. Fill a sample vial (A) or a well of the microtiter plate or deep-well plate with the sample.

Operating Instructions

Note: When using a sample vial, attach the cap (C) with the PTFE sheet surface (a) (deep color) of the septum (B) turned down.

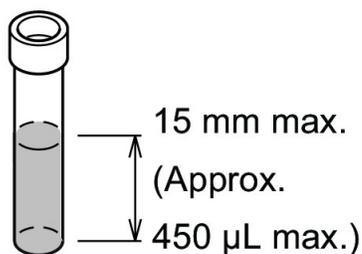
Figure 4-17 Sample Vial



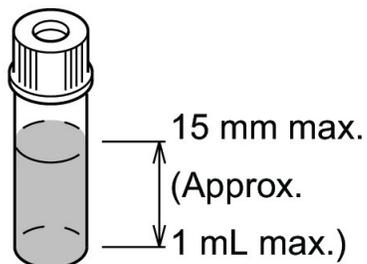
Note: When the sample is cooled, the liquid level should be as indicated in the following [Figure 4-18](#). If it is higher, then the sample might not be sufficiently cooled.

Figure 4-18 Liquid Level

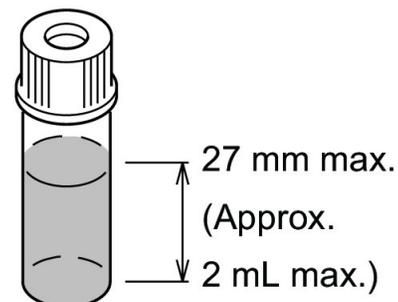
1 mL



1.5 mL



4 mL



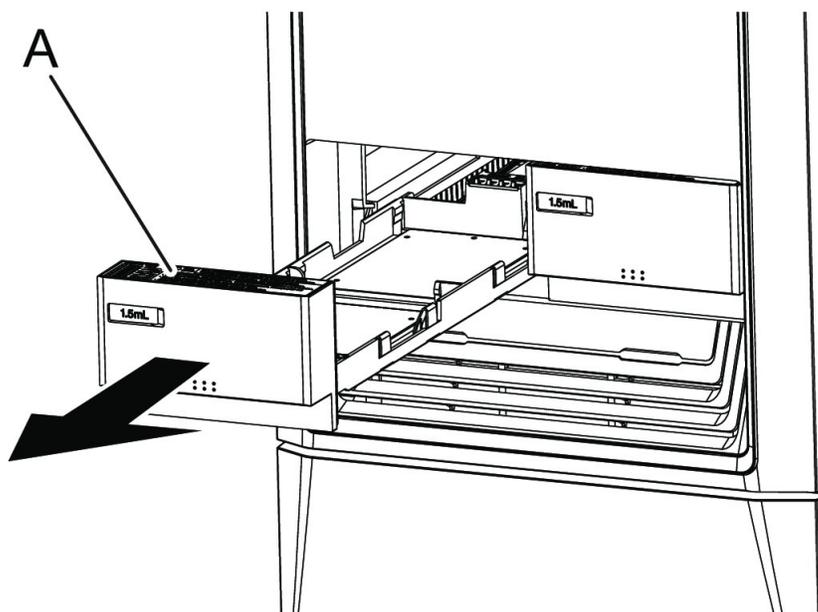
Put the Sample in the Autosampler

Two sample racks can be installed in the autosampler at once, and each sample rack can be loaded with two plates of the same type. Plate types include vial plates (1 mL, 1.5 mL, and 4 mL), microtiter plates (MTPs), and deep-well plates (DWP). The top side of each plate has numbers indicating the respective installation positions of sample vials and well positions. Specify any of the sample numbers when configuring the required settings.

Note: The autosampler is provided with 1.5 mL sample vial plates by default. When using other plates, be sure to adjust the rack ID settings, needle stroke settings, and rack positions. Refer to [Change Sample Racks](#).

1. Remove the sample rack (A).

Figure 4-19 Sample Rack Removal

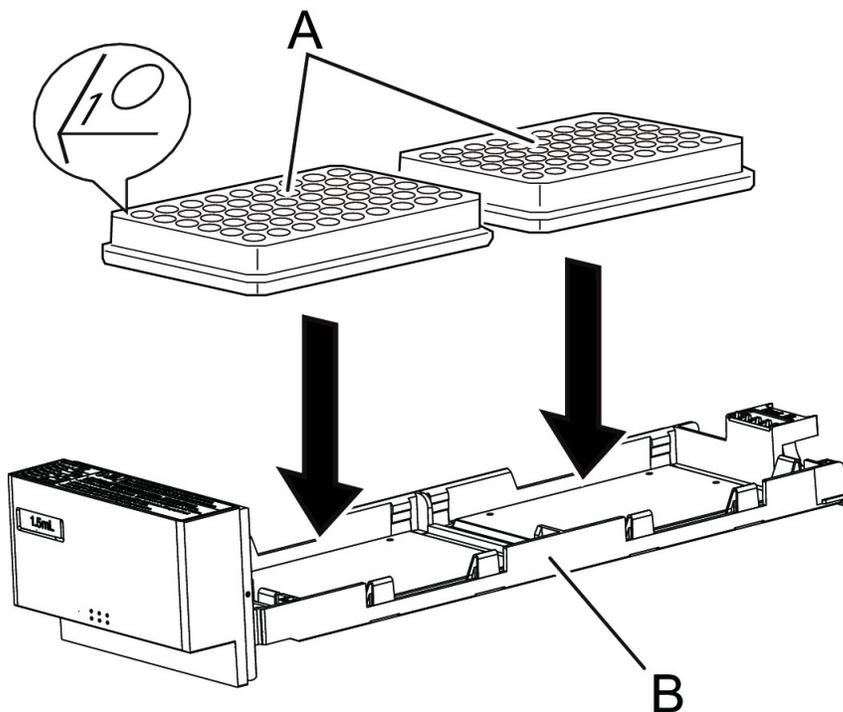


Note: When pulling a sample rack out of the autosampler, pull the rack with one hand horizontally and use the other hand to support it.

Note: Be sure to fully pull out the sample rack before attaching or removing plates.

2. Install the plates (A) filled with sample on the sample rack (B).

Figure 4-20 Installing Sample Plates on the Rack



- Vial plate: Install No. 1 in the front left corner.
- Microtiter plate and deep-well plate: Install the A01 well in the front left corner.

Note: Both plates placed on one sample rack must be of the same type. Placing different types of plates might cause failure in sample injection.

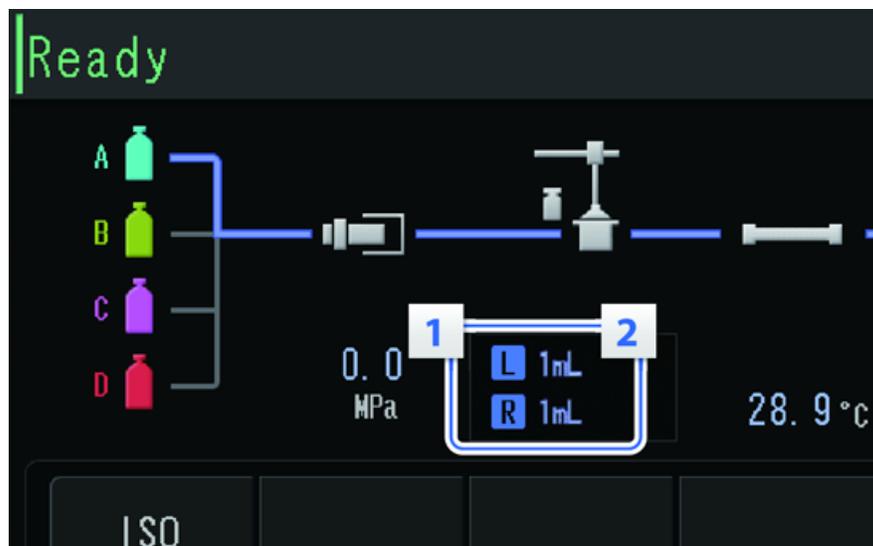
CAUTION: Potential System Damage. Insert the sample rack fully. If it is improperly inserted, then the needle might pierce the wrong position and damage the instrument or become clogged. In addition, the needle might pierce the cap for the sample upon sample aspiration and cause an error.

3. Insert the sample rack all the way horizontally along the guide.

Note: Move the sample racks with the microtitre plates installed horizontally, so that the sample does not spill.

When the sample rack is recognized, the positions of the attached racks (right and left) and the plate types are shown on the Main Analysis screen.

Figure 4-21 Main Analysis Screen



No.	Name	Display
1	Rack Position	L
		R
2	Plate Type	1 mL, 1.5 mL, 4 mL, MTP96, DWP96, MTP384, DWP384

Removal of Sample Racks During Analysis



WARNING! Puncture Hazard. Do not put hands inside the instrument during analysis. The Z mount and the needle continue operating even if a sample rack has been removed.

CAUTION: Potential System Damage. Do not remove a sample rack when its LED is flashing. Doing so might result in damage to the needle. During injection, the rack LED of the sample rack with the plate injected with the sample will flash.

When the LED for a rack (A) is not flashing, the sample rack can be removed, even during analysis.

- Attempting to remove a sample rack with a flashing rack LED pauses the injection. Putting the sample rack back to the original position restarts the injection. If the sample rack to which the sample will be injected is not installed in the rack plate, then the injection will not start. Inserting the sample rack starts the injection.

Operating Instructions

- Turning off the main power switch on the left side of the main unit during injection of a sample, that is, when the rack LED is flashing, might stop the needle while it is in a lower position. With the needle in a lower position, pulling out the sample rack might cause the needle to become bent.

Post-Analysis Procedures

Rinse the Flow Line

CAUTION: Potential System Damage. After analysis using a buffer solution as the mobile phase, clear the flow line with distilled or HPLC-grade water to prevent blockages in the flow line caused by crystals formed due to dehydration of the buffer solution.

For safe use of the system, be sure to rinse the flow line after analysis finishes.

Flow line rinsing after analysis uses the autopurge function in the same way as before analysis. After that, perform rinsing of the entire flow line through pumping.

- After analysis, rinse the flow line using one of the following solvents:
 - For cases when water is used for the mobile phase for analysis, including reversed phases and ion exchanges: Rinse the entire flow line with HPLC-grade water, and then rinse with methanol.
 - For cases when water is not used for the mobile phase for analysis, including non- aqueous normal phases: Rinse the entire flow line with isopropanol.

Turn Off the System

CAUTION: Potential Data Loss. Do not operate the main power switch. Operating the main power switch during analysis or operation might cause corruption of the settings data or failure when saving the settings data.

CAUTION: Potential Data Loss. Do not press and hold the power button for four or more seconds as this forces the module to turn off. Forcing the module to turn off might cause corruption or failure to save the settings data.

Use this procedure in an emergency, or if any issue is detected, such as a burning smell.

Note: After an emergency, such as a power outage or equipment failure, always inspect the system thoroughly before turning it on.

1. Press the power button.

If the power button is pressed for four seconds or more, then the system power goes off. This might cause corruption of the settings data.

The Confirmation screen opens.

2. Press **OK**.
3. Make sure that the power button is orange.
4. Turn off the main power switch.
5. Disconnect the mains supply cable at the rear of the system.



WARNING! Electrical Shock Hazard. Always turn off the power and then disconnect the instrument prior to performing inspection and maintenance. Otherwise, fire, electric shock, or a malfunction might occur.



WARNING! Toxic Chemical Hazard. Before disconnecting parts in the flow line, stop the LC pump and then make sure that the pressure of the mobile phase is decreased to zero.



WARNING! Biohazard. Wear personal protective equipment when handling potentially infectious or toxic substances (such as human samples or reagents) in order to prevent contact with the skin.



WARNING! Hot Surface Hazard. Do not open the column oven door if the high temperature lamp is blinking. The internal temperature of the column oven is 60 °C or greater.

CAUTION: Potential System Damage. Do not allow spilled water to remain on the instrument surface and do not use alcohol or thinner-type solvents to clean the surfaces. Doing so can cause rusting and discoloration.

CAUTION: Potential System Damage. Only use the replacement parts specified in the documentation that comes with the system. Use of any other parts might result in instrument damage and malfunction.

Replace the Mobile Phase

Note:

- It is possible to automatically specify the flow rate and concentration of mobile phase and the oven temperature after analysis finishes. Refer to [Configure the System to Shut Down after Analysis](#).
- For information about storing a used column, refer to the instruction guide provided with the column or contact the manufacturer.
- When replacing the mobile phase with a new mobile phase, or when mixing mobile phases, it might be necessary to replace with another solvent first, to prevent precipitation and emulsion. Refer to [Precautions when Replacing the Mobile Phase](#).

Table 5-1 Examples of Solvent Combinations That Should Not be Replaced or Mixed Directly

Solvent Combination	Possible Problem	Recommended Action
Water and mobile phase with a low dielectric constant (hexane, chloroform, and so on)	Emulsion and separation	Replace the solvent with isopropanol.
Buffer solution and organic solvent (methanol, acetonitrile, tetrahydrofuran, and so on)	Precipitation	Replace the solvent with HPLC-grade water.
Nitric acid and alcohol	Reaction	Replace the solvent with HPLC-grade water.

-
1. Press **Pump** to stop pumping.
 2. Put the suction tubing for the mobile phase into a reservoir bottle with column sealing liquid and then set the bottle on the reservoir tray.
 3. Purge the mobile phase port to which the suction tubing in the previous step is connected. Refer to [Perform an Autopurge](#).
 4. Configure the pump settings.

Figure 5-1 Pump Settings



Table 5-2 Pump Settings

Field	Value
Pumping Mode	ISO
Mobile Phase Port	Mobile phase port whose tubing is connected to the bottle with the column sealing liquid
Flow Rate Setting	One-fifth of the analysis flow rate

5. Press **Pump** to start pumping.

The liquid in the column is replaced with column sealing liquid. After the liquid is replaced, the pressure becomes stable.

6. Wait about 10 minutes until the pump pressure stabilizes, and then press **Pump** to stop pumping.

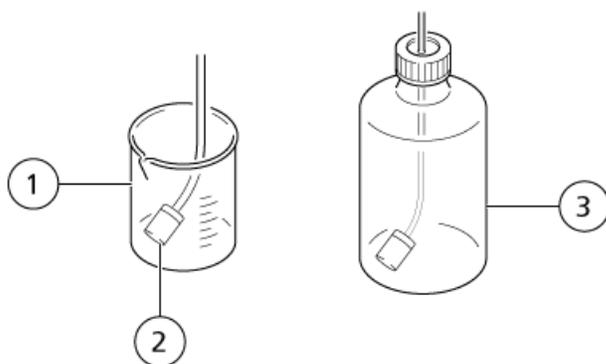
Figure 5-2 Stop Pumping



Replace the Mobile Phase with a Miscible Solvent

1. Pour 100 mL of the new mobile phase into a 200 mL beaker.
2. Remove the suction filter from the reservoir and then put the filter into the beaker filled with the new mobile phase in the preceding step.

Figure 5-3 Replace the Mobile Phase

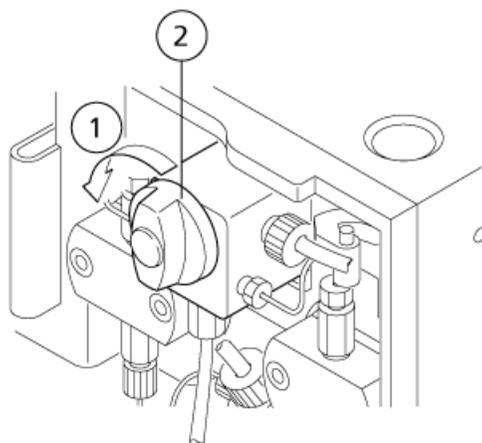


Service and Maintenance

Item	Description
1	Beaker
2	Suction filter
3	Reservoir

3. Shake the filter slightly to mix the mobile phases.
4. Put new mobile phase in the reservoir.
5. Remove the suction filter from the beaker and then put it into the reservoir.
6. Turn the drain valve knob 180 degrees counterclockwise to open the drain valve. Refer to [Figure 5-4](#).

Figure 5-4 Open the Drain Valve



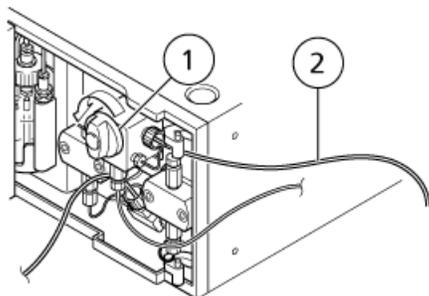
Item	Description
1	Open (counter-clockwise)
2	Drain valve knob

Note: If the drain valve knob is turned more than 180 degrees, then any mobile phase that drains out might contain air bubbles. This is normal.

7. Press **purge**.

The old mobile phase is completely expelled from the flow lines through the drain tubing.

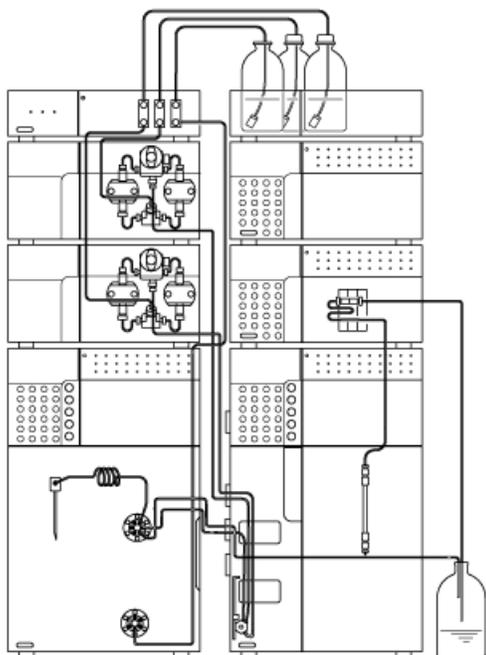
Figure 5-5 Drain the Mobile Phase into the Drain Bottle



Item	Description
1	Drain valve knob
2	Drain tubing, to waste bottle

8. Disconnect the tubing connecting autosampler outlet to the column, and then put the tubing into the waste container.

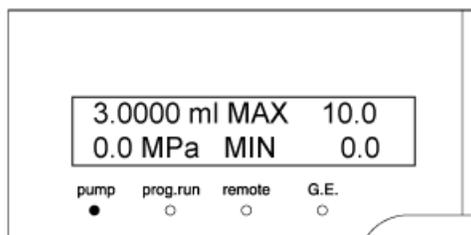
Figure 5-6 Tubing Configuration



Service and Maintenance

9. Close the drain valve. Turn the drain valve knob clockwise as far as possible.
10. Set the flow rate to 1 mL/min to 3 mL/min.

Figure 5-7 Pump Status Panel



11. Press **pump**.

Pumping starts, and the pump indicator illuminates.

12. Wait a couple of minutes, and then press **pump** again.

Pumping stops and the pump indicator goes out.

13. Connect the tubing to the autosampler outlet.

14. Press **pump** again to restart pumping.

The mobile phase in the flow line downstream of the manual injector is replaced.

Note: Make sure that the flow rate is set to a value that maintains the pressure at a setting that is lower than the maximum column pressure.

Precautions when Replacing the Mobile Phase

Replace a Liquid with a Non-Miscible Solvent

Required Materials

- Intermediate rinse solution (such as isopropanol)

Note: Do not use water if the mobile phase is not miscible with water.

1. Replace the old mobile phase with the intermediate rinse solution by following the procedure in [Replace the Mobile Phase with a Miscible Solvent](#).
2. Replace the intermediate rinse solution with the new mobile phase by following the procedure in [Replace the Mobile Phase with a Miscible Solvent](#).

Replace a Buffer Solution Used as a Mobile Phase

CAUTION: Potential System Damage. After analysis using a buffer solution as the mobile phase, clear the flow line with distilled or HPLC-grade water to prevent blockages in the flow line caused by crystals formed due to dehydration of the buffer solution.

Note: Use HPLC-grade water for purging. Organic solvents, such as isopropanol, might cause crystals.

Required Materials
<ul style="list-style-type: none">HPLC-grade water

1. Replace the mobile phase with the water by following the procedure in [Replace the Mobile Phase with a Miscible Solvent](#).
2. Pump at least 20 mL of water through the system.
3. Replace the water with the new mobile phase by following the procedure in [Replace the Mobile Phase with a Miscible Solvent](#).

Replace the Rinse Liquid (if applicable)

The automatic rinsing kit is an optional kit that automatically rinses the plunger and plunger seal of the pump. Select a rinse liquid to use for rinsing as follows.

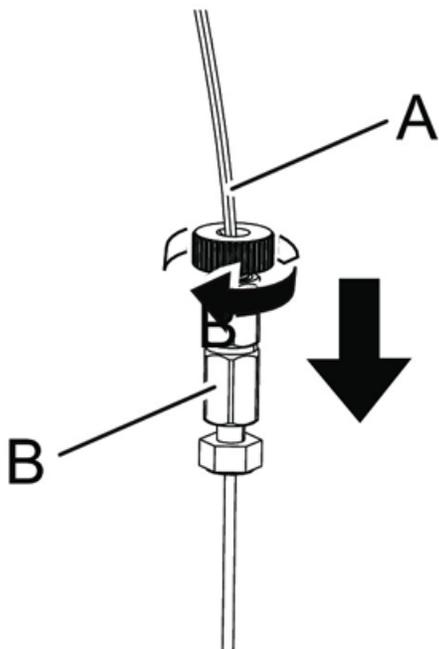
- If water is used for the mobile phase, including reversed phases and ion exchanges, then use 1:9 isopropanol:HPLC-grade water.
- If water is not used for the mobile phase, including non-aqueous normal phases, then no rinse liquid is used.

When using the module or replacing the rinse liquid for the first time, absorb the rinse liquid in the rinse solution bottle into the flow line with the following procedure. In addition, when the rinse liquid is not pumped, perform the same procedure.

Note: If the solution in the rinse solution bottle is dirty, then replace with fresh solution. If it becomes dirty quickly, then replace it daily. Otherwise, replace it at least once a week.

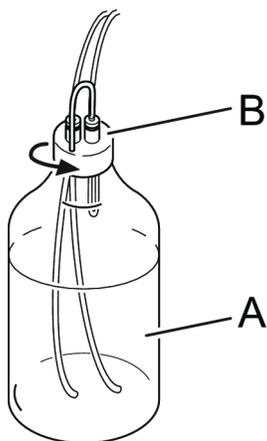
1. If a column is connected, remove it and then install the provided PEEK tubing (or PEEK or SUS tubing equivalent to the one provided) (A) and the coupling (B) instead.

Figure 5-8 Preparing for AutoPurge



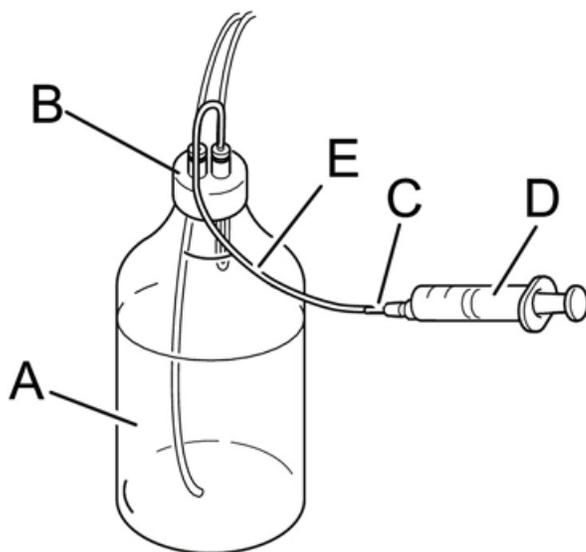
2. Remove the cap (B) from the rinse solution bottle (A) in the automatic rinsing kit and add then 1 L of 1:9 isopropanol:HPLC-grade water.

Figure 5-9 Rinse Bottle Cap Removal



3. Attach the cap (B) of the automatic rinsing kit to the rinse solution bottle (A), and then remove the outlet FEP tubing (E), in the upward U-shape, from the rinse solution bottle.

Figure 5-10 Automatic Rinsing Kit Connections



4. Attach the syringe needle (C) to the end of the FEP tubing (E), in the upward U-shape, and then use the syringe (D) to suction the 10% isopropanol solution out from the rinse flow line.
5. Remove the syringe needle (C) and the syringe (D) from the FEP tubing (E).
6. Press the flow rate settings button and set the flow rate to 3 mL/min.

Figure 5-11 Pump Flow Rate: 3 mL/min



7. Press **Pump**.

Figure 5-12 Pump Button: Turn on Pump



Pump is illuminated in blue and pumping starts.

8. Make sure that the rinse liquid flows from the end of the FEP tube on the outlet side of the automatic rinsing kit.

9. If the rinse liquid is flowing, press **Pump**.

Figure 5-13 Pump Button: Turn off Pump



Pump is turned off, and pumping stops.

10. Return the automatic rinsing kit to the original status.

Purge the Pump Manually

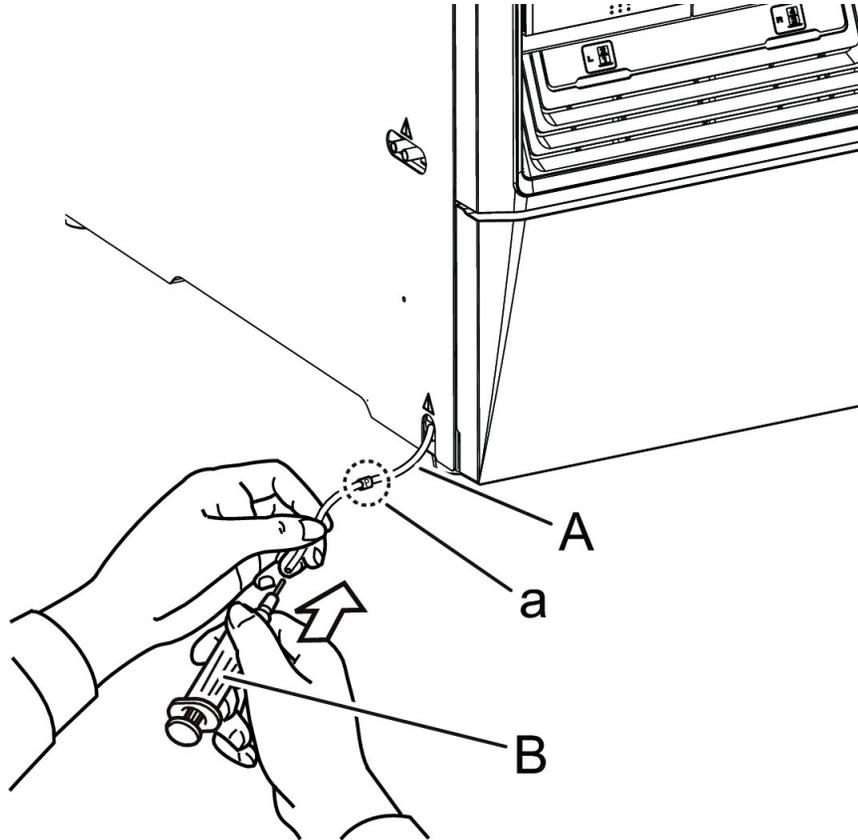
Prerequisite Procedures

- [Turn Off the System](#)

If purging with autopurge is not sufficient or if there is no liquid in the suction tubing, then purge manually with a syringe.

1. Put the suction tubing to be purged in a reservoir bottle to which a mobile phase has been added, and then install the bottle in the reservoir tray.
2. Insert the syringe with needle (B) in the mobile phase drain tube (A) marked with "P" (a).

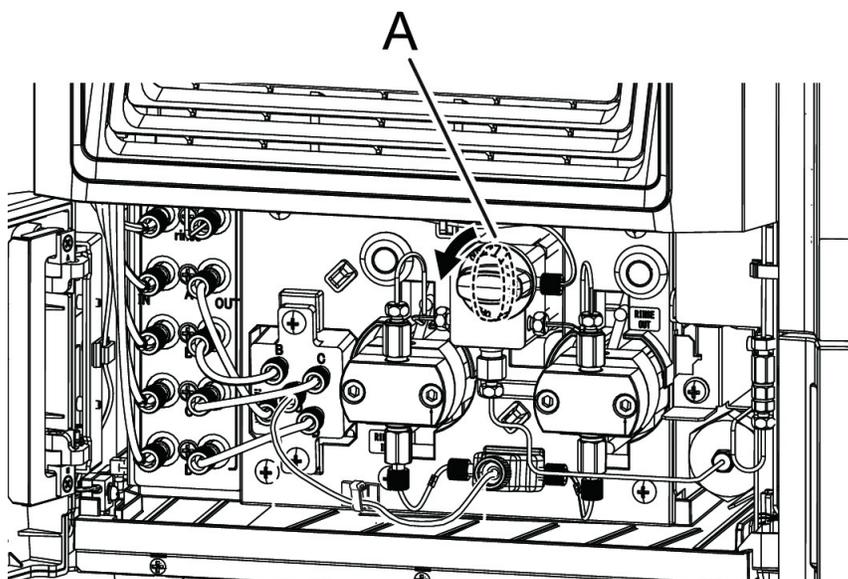
Figure 5-14 Syringe Connection



WARNING! Crushing Hazard. Be careful not to pinch fingers when opening or closing the doors.

3. Open the pump door, rotate the drain valve knob (A) 90 degrees counter-clockwise, and then open the drain valve.

Figure 5-15 Drain Valve



4. Configure the pump settings.

Figure 5-16 Pump Settings



Table 5-3 Pump Settings

Field	Value
Pumping Mode	ISO
Mobile Phase Port	Mobile phase port whose tubing is connected to the bottle with the column sealing liquid
Flow Rate Setting	0.0001 mL/min

5. Press **Pump**.

The pump operates and the valve of the set mobile phase port opens.

Figure 5-17 Manual Purge in Process

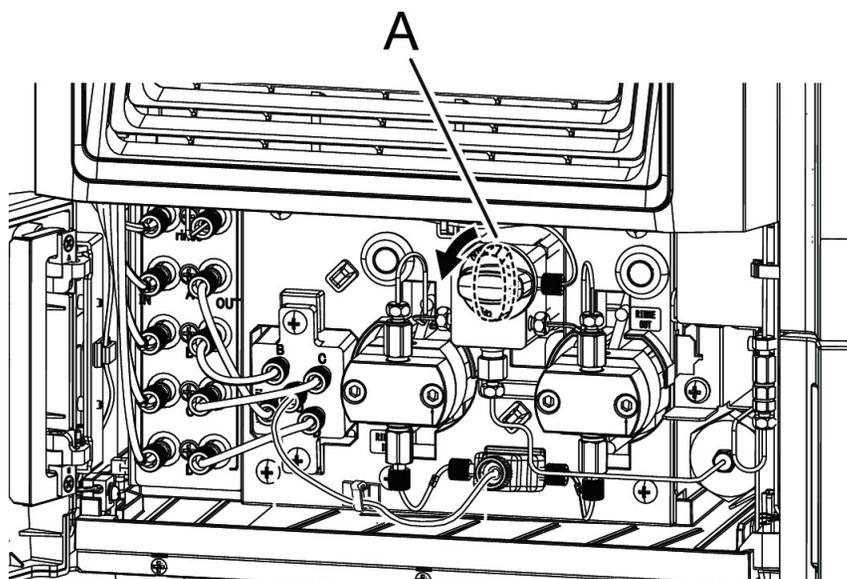


6. Inject the mobile phase with the syringe.

The criterion value for the aspirated volume is 10 mL.

7. When purge another mobile phase port, change the mobile phase ports in the Main Analysis screen and inject the mobile phase port with the syringe.
8. When the purge is complete, press **Pump** to stop pumping.
9. Close the drain valve by rotating the drain valve knob (A) clockwise until the rotation stops.

Figure 5-18 Drain Valve



10. Close the pump door.
11. Remove the syringe.
12. Perform an autopurge for 3 minutes or more. Refer to [Perform an Autopurge](#).

Perform an autopurge for all of the mobile phase ports for which manual purging was performed until there are no air bubbles in the flow line.

Note: In manual purging, the tubes downstream from the pump are not purged. To purge the tubes downstream from the pump, perform autopurging for 3 minutes or more for all of the mobile phase ports for which manual purging was performed until there are no air bubbles in the flow line.

Prime the Autosampler Rinse Solution Manually

If autopurge is not sufficient, or if there is no liquid in the suction tubing, then prime manually with a syringe.



WARNING! Crushing Hazard. Be careful not to pinch fingers when opening or closing the doors.

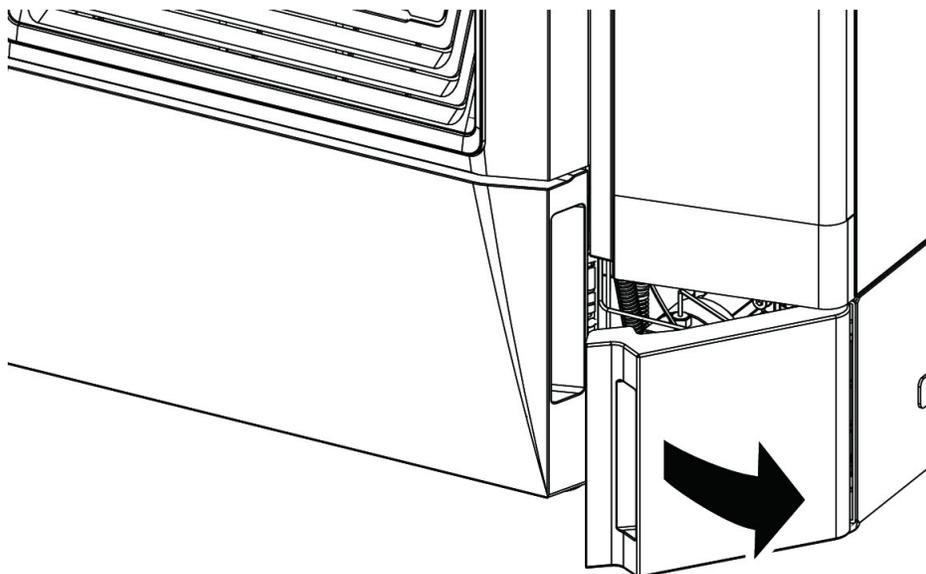
Note: Make sure that the degasser is turned on.

Service and Maintenance

Note: When replacing with a non-miscible solvent, first replace with a miscible solvent as an intermediate rinse solution, and then replace with the required solvent.

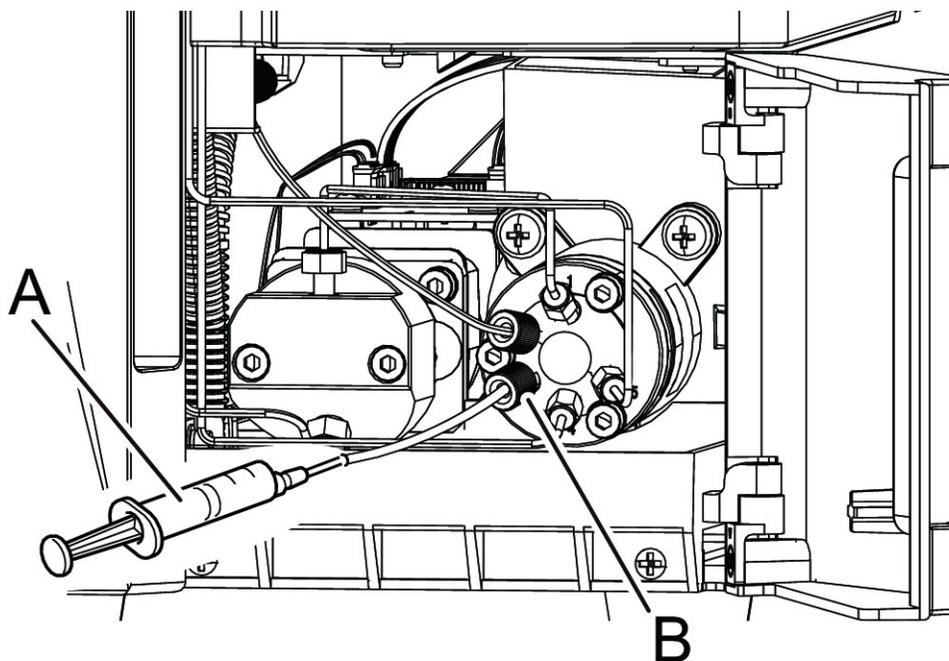
1. Open the valve mount door.

Figure 5-19 Valve Mount Door



2. Insert the syringe with a needle (A) into the tube coming out of low-pressure valve port No. 3 (B).

Figure 5-20 Syringe Installed



3. Press **Purge** on the Main Analysis screen.

Figure 5-21 Purge Button



The Auto Purge screen is shown.

4. Press **Manual Prime**.

Figure 5-22 Prime Button



The flow line switches for manual priming.

5. Pull the plunger of the syringe with needle (A) and aspirate the rinse solution.

The criterion value for the aspiration volume is 5 mL.

6. Press **Close** to finish manual priming.

The Auto Purge screen is shown.

7. Reset the tube and close the valve mount door.
8. Configure the settings for **Rinse** to 10 minutes or more, and then perform an autopurge. Refer to [Perform an Autopurge](#).

Note: After manual priming, the pressure of the measurement line might decrease, generating air bubbles. To remove the air bubbles, perform an autopurge for 10 minutes or more after manual priming.

Change Sample Racks

The system is provided with 1.5 mL sample vial plates as a standard. This section provides the procedure for changing the settings to use other plates.

Set the Rack ID

The rack ID is the ID the module uses to identify the type of plate that has been inserted. Set the rack ID by operating the sliding switch at the rear of the sample rack.

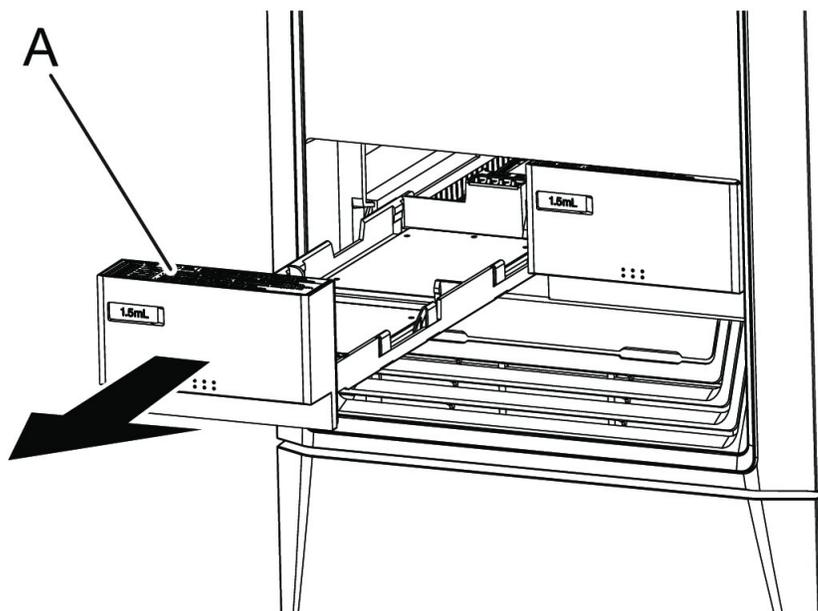
The two sample racks provided with the module have rack IDs set to A and B by default, which means that the needle strokes and rack positions are adjusted for a 1.5 mL sample vial plate.

Note: If the rack ID settings have been changed, then it is necessary to configure the plate type, set the needle stroke from the top, and then adjust the rack position. Refer to the *ExionLC™ 100 System Hardware User Guide* for instructions.

Note: If the plate type is changed but the same rack ID is used, then the needle stroke from the top should be set and the rack position adjusted.

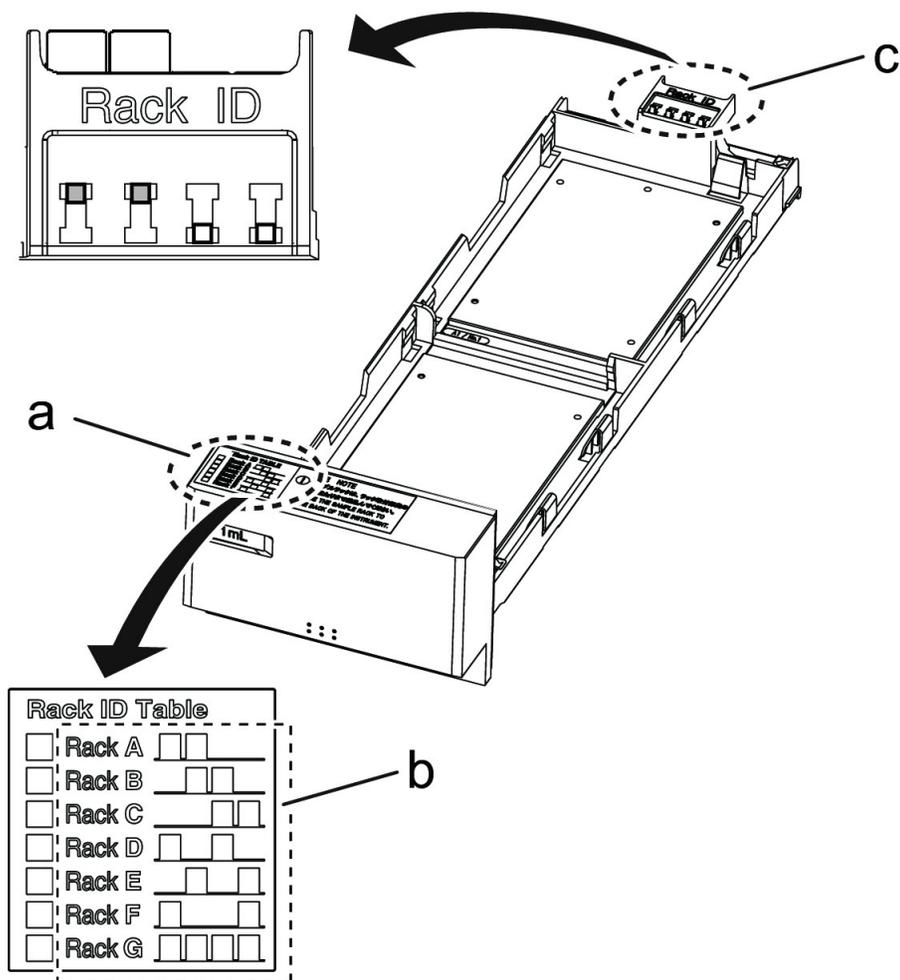
1. Remove the sample rack (A).

Figure 5-23 Sample Rack Removal



2. Inspect the label (a) in front of the sample rack to verify the sliding switch position (b) of the rack ID to be set.

Figure 5-24 Label and Sliding Switch Positions



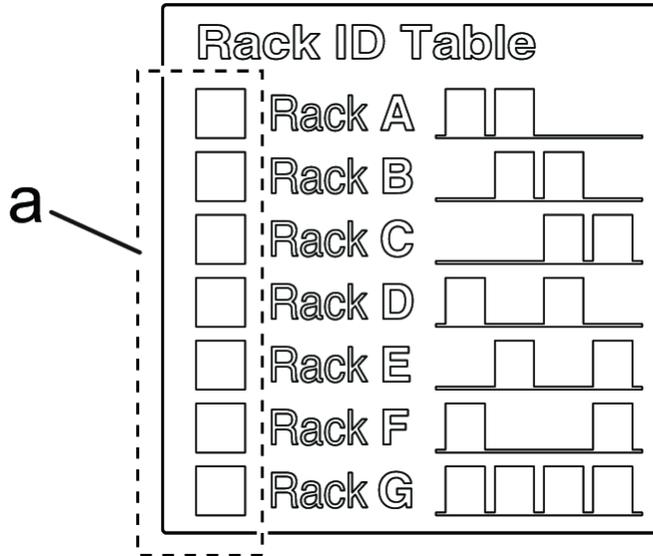
3. Set the sliding switch position (c) at the back of the sample rack.

Note: Move the sliding switch forward or backward after pushing the projection a little.

Note: Set different rack IDs for the left and right sample racks. If the same rack ID is set, this error message is shown Racks that have the same ID are set in the autosampler..

4. Mark the boxes (a) for set rack IDs using a permanent marker.

Figure 5-25 Rack ID Table



Seven different rack types can be selected (A to G)

Table 5-4 Rack Types

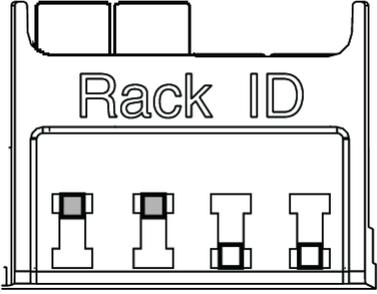
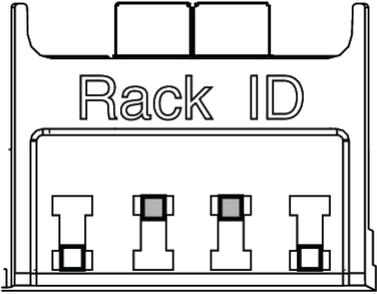
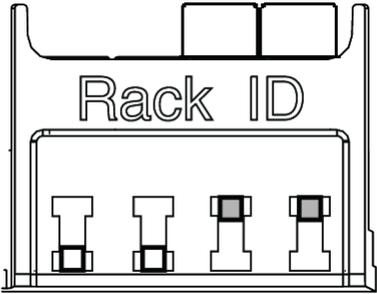
Rack ID	Sliding Switch Position
A	 <p>The diagram shows a rack with two sliding switches at the top, both in the 'up' position. Below them is the text 'Rack ID'. At the bottom, there are four ports: the first two have their covers in the 'up' position, and the last two have their covers in the 'down' position.</p>
B	 <p>The diagram shows a rack with two sliding switches at the top, both in the 'down' position. Below them is the text 'Rack ID'. At the bottom, there are four ports: the first and last have their covers in the 'down' position, while the second and third have their covers in the 'up' position.</p>
C	 <p>The diagram shows a rack with two sliding switches at the top, both in the 'up' position. Below them is the text 'Rack ID'. At the bottom, there are four ports: the first two have their covers in the 'down' position, and the last two have their covers in the 'up' position.</p>

Table 5-4 Rack Types (continued)

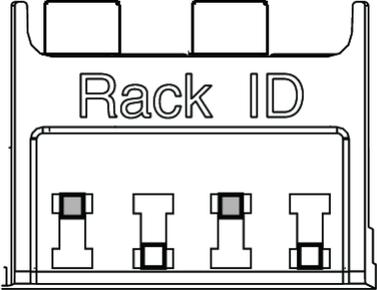
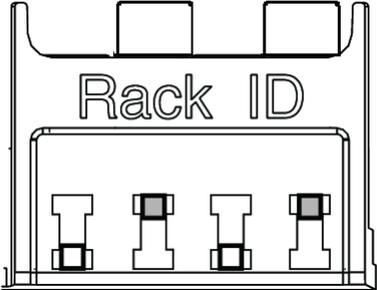
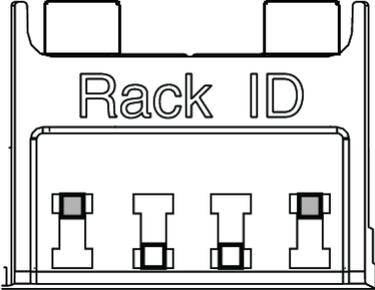
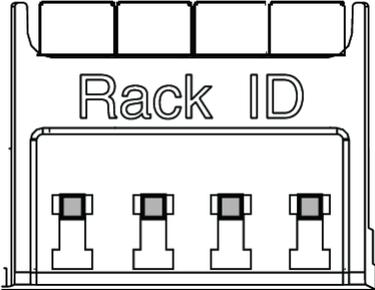
Rack ID	Sliding Switch Position
D	 <p>The diagram shows a rack with a top section containing two rectangular slots. Below this, the text "Rack ID" is printed. The bottom section contains four sliding switches. The first and third switches from the left are in the "up" position, while the second and fourth switches are in the "down" position.</p>
E	 <p>The diagram shows a rack with a top section containing two rectangular slots. Below this, the text "Rack ID" is printed. The bottom section contains four sliding switches. The first and third switches from the left are in the "down" position, while the second and fourth switches are in the "up" position.</p>

Table 5-4 Rack Types (continued)

Rack ID	Sliding Switch Position
F	 <p>The diagram shows a rack handle with a sliding switch in the 'up' position. The text 'Rack ID' is printed on the handle above the switch mechanism. Below the handle, four electrical contacts are visible.</p>
G	 <p>The diagram shows a rack handle with a sliding switch in the 'down' position. The text 'Rack ID' is printed on the handle above the switch mechanism. Below the handle, four electrical contacts are visible.</p>

Labels to Affix to the Front of the Handle

The sample rack is supplied with labels to be put on the handle. When necessary, apply them to a location that can be easily seen, such as the front of the handle.

Figure 5-26 Rack Labels



Install the Plates on the Sample Rack

CAUTION: Potential System Damage. Make sure that the plate type, needle stroke, and rack position are properly configured. If the configured plate type does not match the type of the plate installed, then the needle might strike the plate, instead of descending into the well, resulting in damage to the needle.

Note: The provided sample rack holds a 1.5 mL sample vial plate.

1. Insert the provided plate identification panel into the sample rack. Insert the panel with the vertical position aligned so that the plate type (a) can be seen from the sample rack identification window (b).

Figure 5-27 1.5 mL Sample Vial Plate

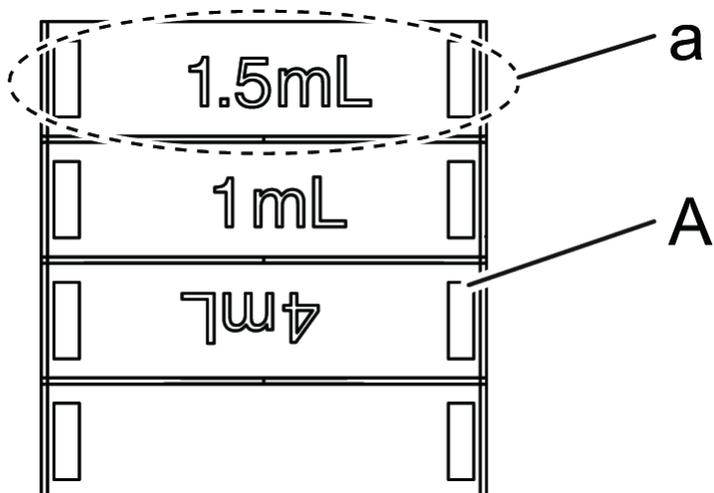
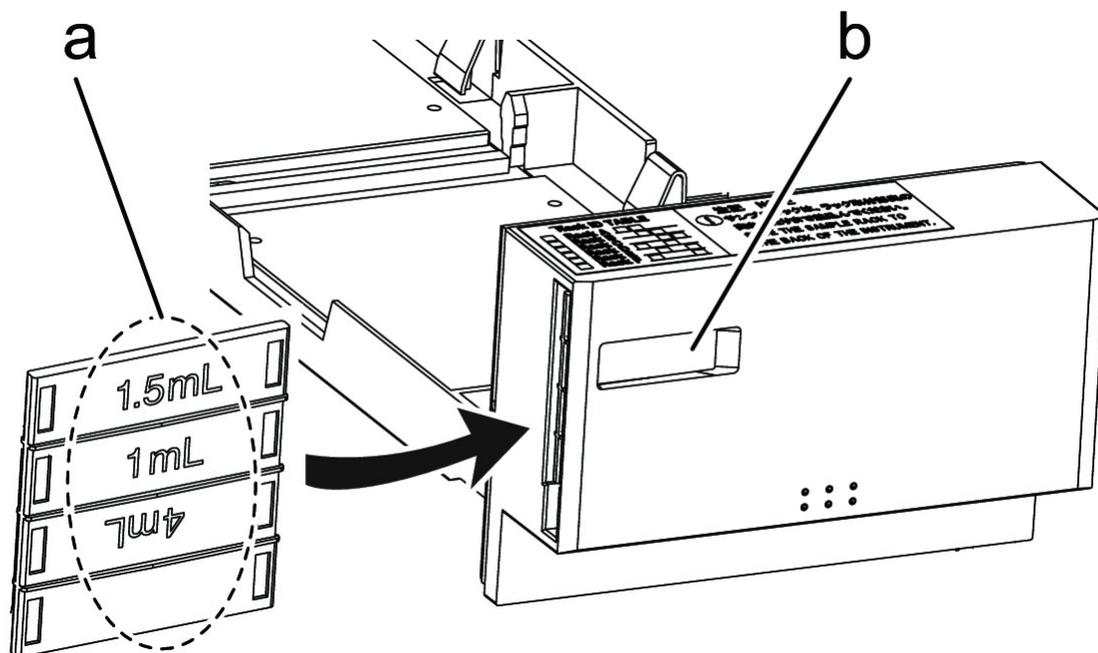


Table 5-5 Indications and Positions of Plate Identification Panels

Plate Type	Display	Position
1 mL sample vial plate	1 mL	Front
1.5 mL sample vial plate	1.5 mL	Front
4 mL sample vial plate	4 mL	Front
96-Well microtiter plate	MTP96	Back
96-Well deep-well plate	DWP96	Back
384-Well microtiter plate	MTP384	Back
384-Well deep-well plate	DWP384	Back

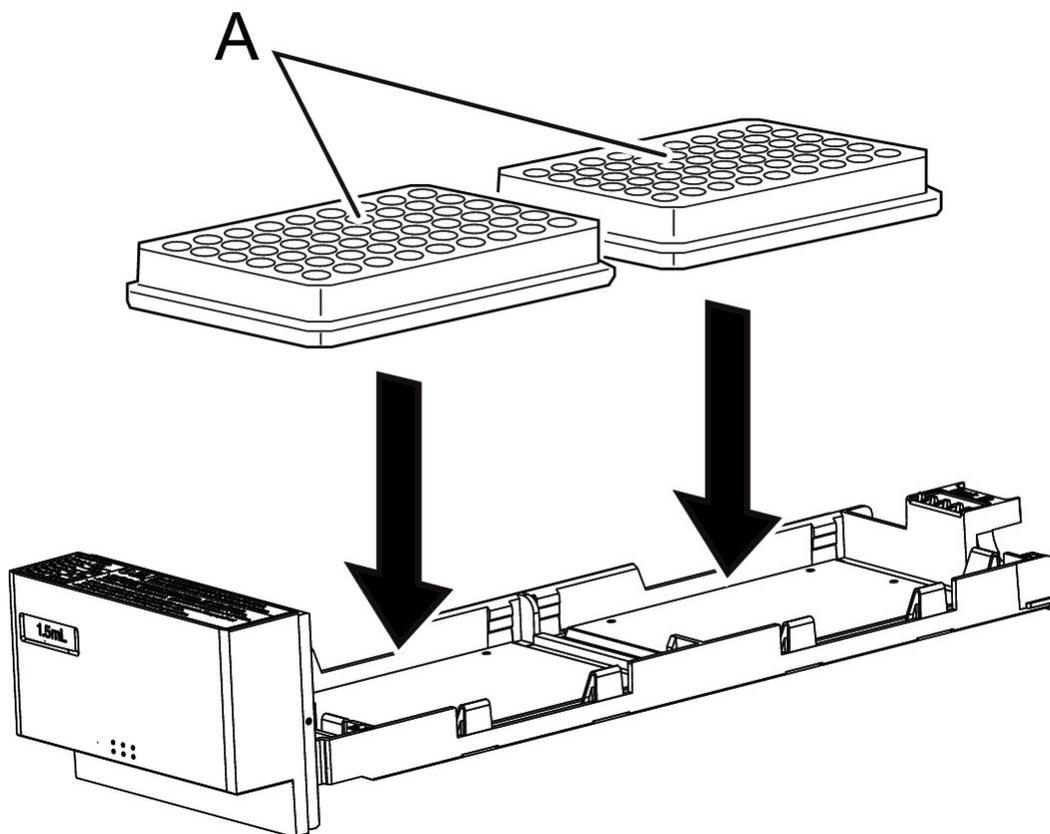
Tip! Flip the panel over and insert it upside down, thus enabling the plate type display to be seen from the identification window.

Figure 5-28 Panel Alignment



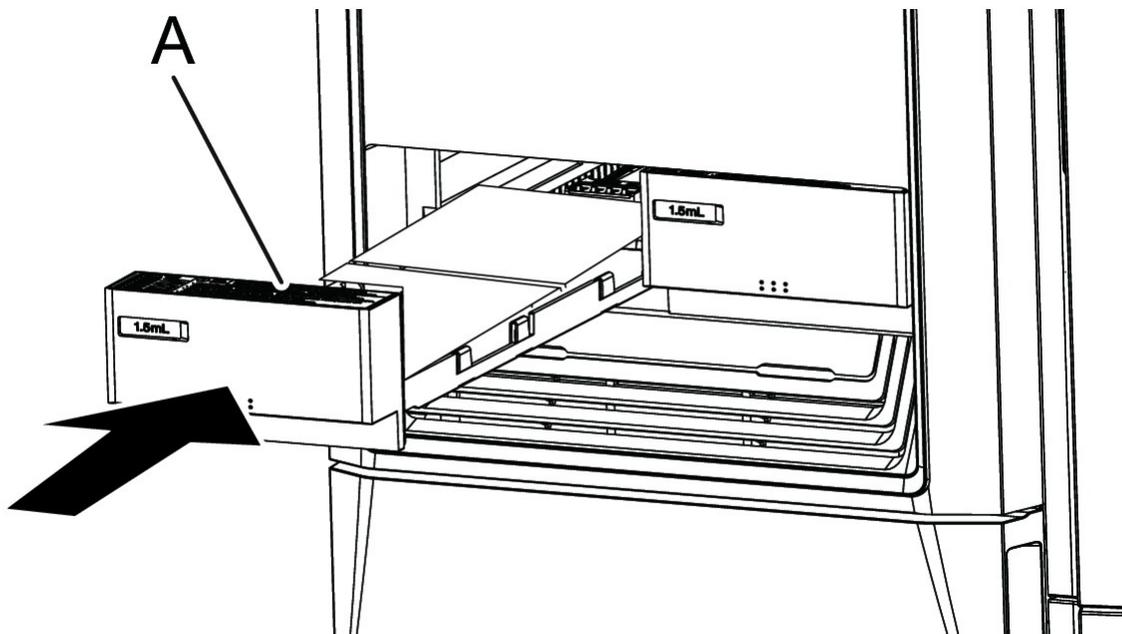
2. Install two plates (A) of the same type on the sample rack.

Figure 5-29 Install Plates on the Sample Rack



3. Install the sample rack (A).

Figure 5-30 Sample Rack Installation



Note: If the same rack ID is set for both the left and right racks, the following error message is shown:
Racks that have the same ID are set in the autosampler.
Change either the left or right rack ID.

Open the Rack Setting Screen

1. Press  (Menu).

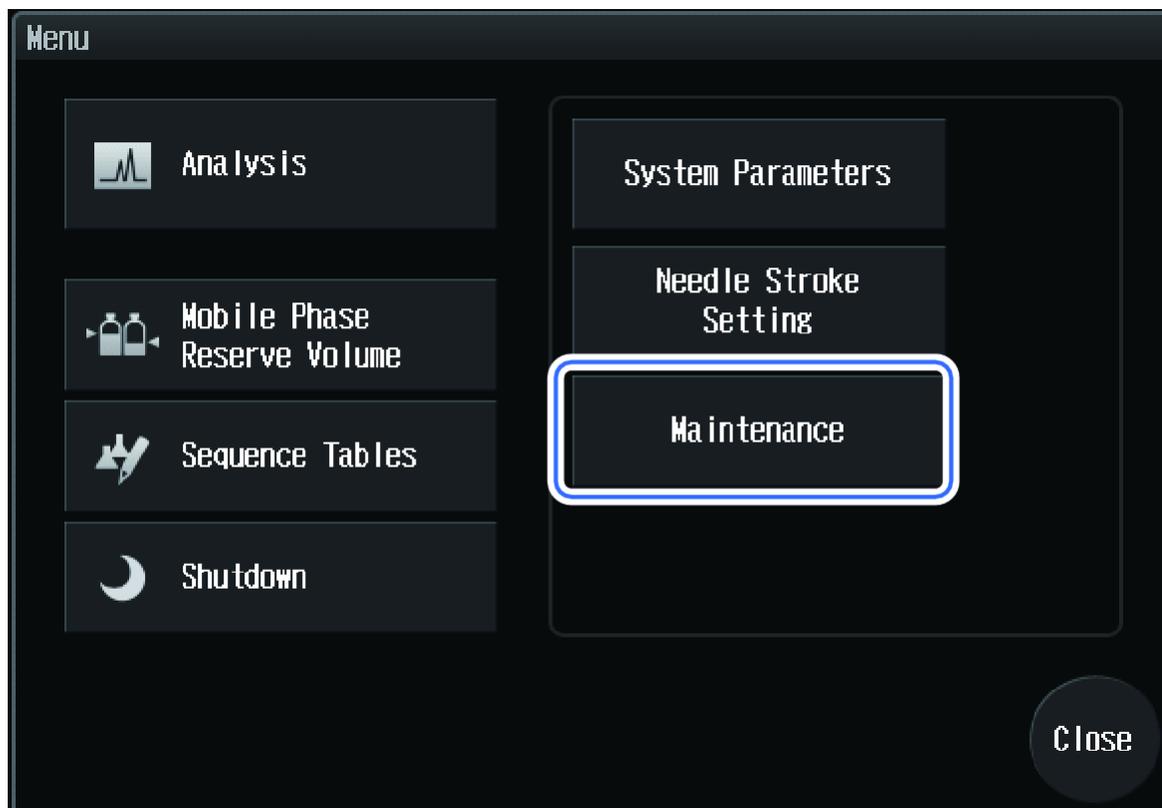
Figure 5-31 Menu Button



The Menu screen is shown.

2. Press **Maintenance**.

Figure 5-32 Maintenance Button



The Maintenance screen is shown.

3. Press  (Calibration).

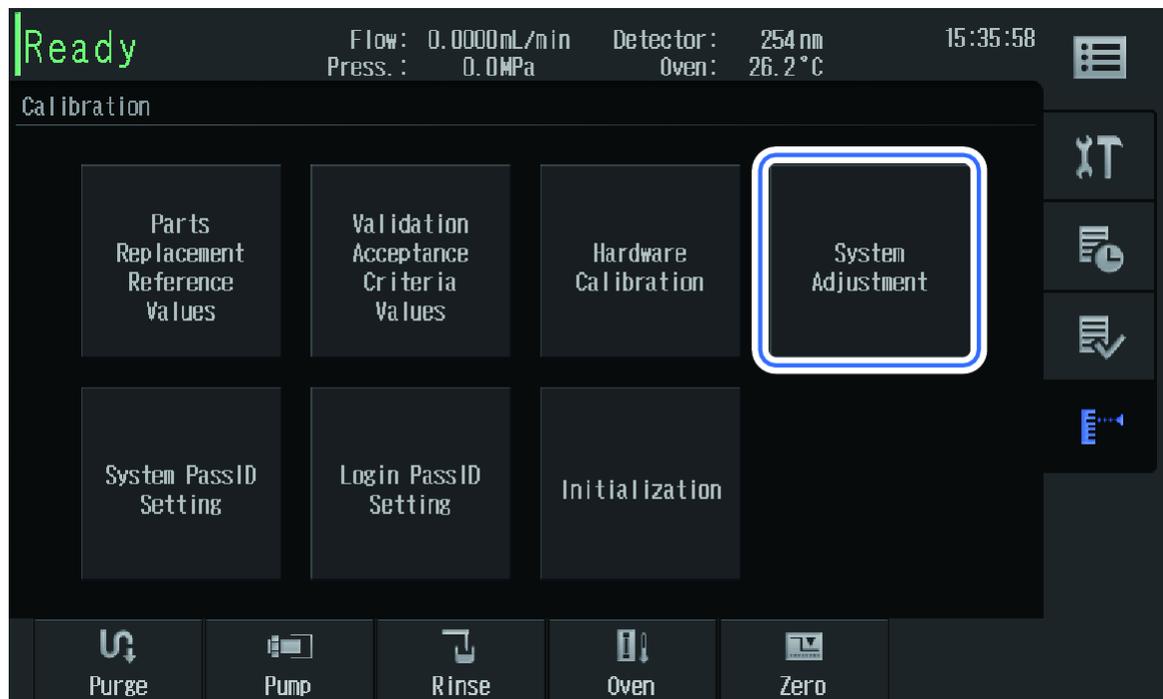
The Login screen is shown.

4. Type the system pass ID Number and then press **OK**. Refer to [Log on to the HPLC System](#).

The Calibration screen is shown.

5. Press **System Adjustment**.

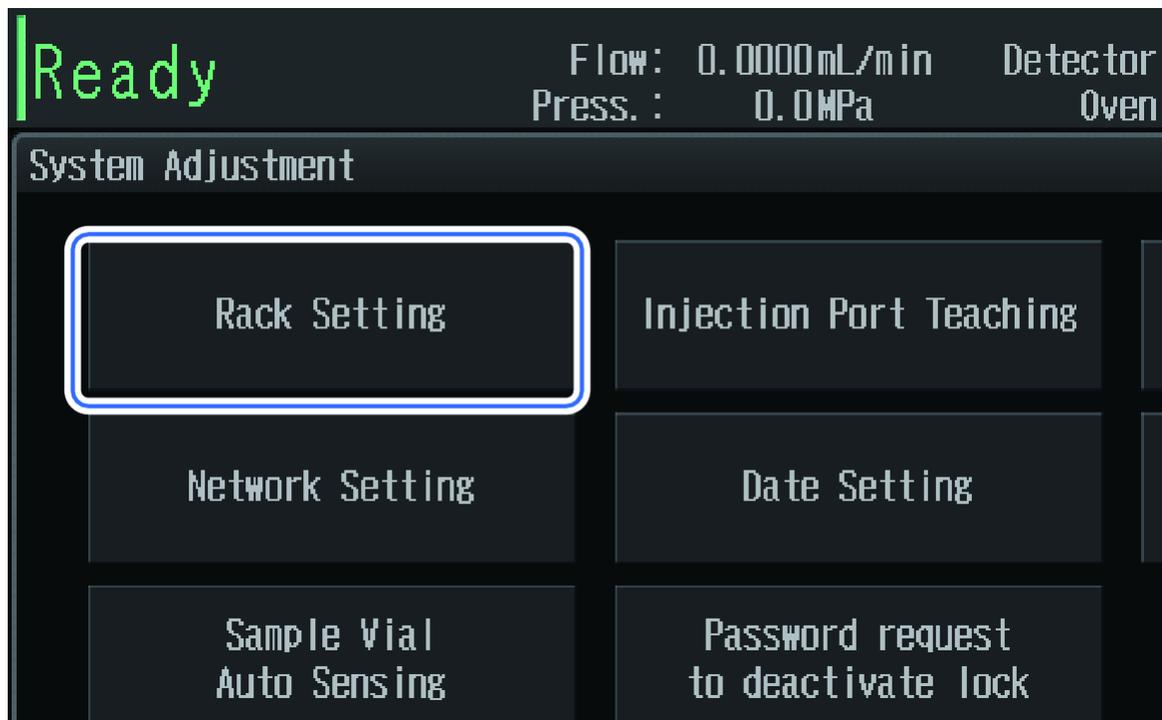
Figure 5-33 System Adjustment Button



The System Adjustment screen is shown.

6. Press **Rack Setting**.

Figure 5-34 Rack Setting Button



The Rack Setting screen is shown.

Set the Plate Type and Needle Stroke from the Top

Prerequisite Procedures
<ul style="list-style-type: none">• Open the Rack Setting Screen

- [Open the Rack Setting Screen](#)

1. Press  to select a rack ID.

2. Press .

The Rack Setting screen is shown.

3. Select a plate type to be used.
4. Set the needle stroke from the top.

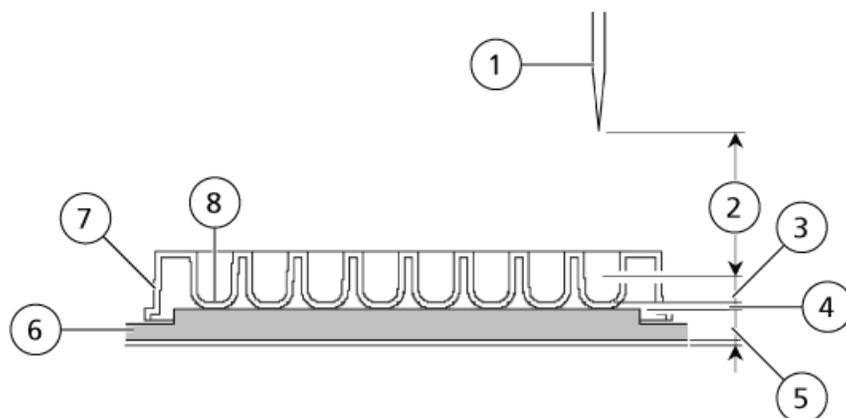
Table 5-6 Plate Type and Needle Stroke from Top

Plate Type	Screen Display	Needle Stroke from the Top	
		Setting Range	Initial Value
1 mL sample vial plate	1 mL	10 mm to 52 mm	47 mm
1.5 mL sample vial plate	1.5 mL	10 mm to 52 mm	47 mm
4 mL sample vial plate	4 mL	10 mm to 52 mm	47 mm
96-well microtiter plate	MTP96	10 mm to 52 mm	45 mm
96-well deep-well plate	DWP96	10 mm to 52 mm	40 mm
384-well microtiter plate	MTP384	10 mm to 52 mm	45 mm
384-well deep-well plate	DWP384	10 mm to 52 mm	40 mm

Note: Configure the set value for the needle stroke so that the gap between the tip of the needle and the vial bottom or the well bottom is 1 mm or more. When there is no gap between the tip of the needle and the vial bottom or well bottom, the tip of the needle will contact the vial bottom or well bottom during sample aspiration, resulting in sample aspiration failure, thereby preventing proper analysis results from being obtained.

Note: When using a microtiter plate: If the needle stroke is set to 45 mm, the initial value, then the tip of the needle is designed to come down about 6 mm from the well bottom when the well bottom thickness of the plate is 1 mm.

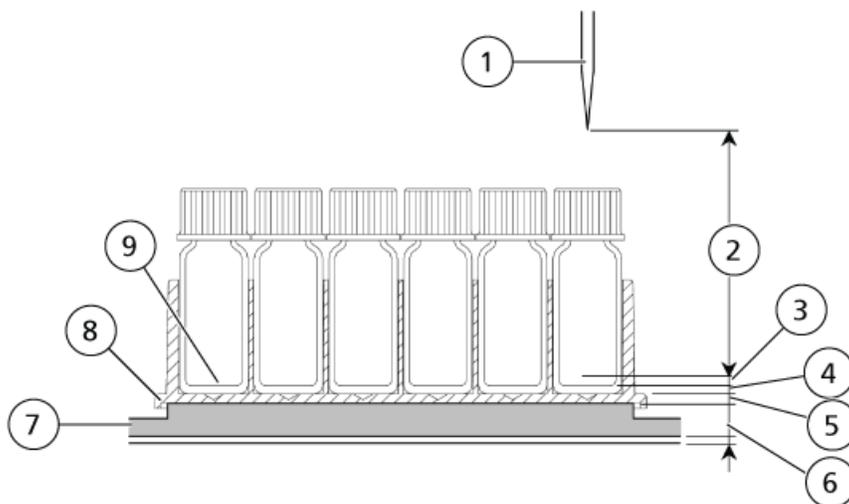
Figure 5-35 Default Needle Stroke Setting



Item	Label
1	Needle (in its home position)
2	Needle stroke setting (= descending distance of the needle): 45 mm
3	Gap between the needle tip and the well bottom: 6 mm
4	Well bottom thickness: 1 mm
5	Rack bottom thickness: 5 mm
6	Rack
7	Microtiter plate or deep-well plate
8	Well bottom

Note: When using a 1.5 mL vial plate: If the needle stroke is set to 47 mm, the initial value, then the tip of the needle is designed to come down to about 2 mm from the vial bottom when the vial bottom thickness is 1.5 mm.

Figure 5-36 Default Needle Stroke Setting



Item	Label
1	Needle (in its home position)
2	Needle stroke setting (= descending distance of the needle): 47 mm
3	Gap between the needle tip and the well bottom: 2 mm
4	Vial bottom thickness: 1.5 mm
5	Plate bottom thickness: 1.5 mm
6	Rack bottom thickness: 5 mm
7	Rack
8	1.5 mL vial plate
9	Vial bottom

Table 5-7 Residual Volume in Bottom 2 mm of Sample Vial and Reagent Bottle

Part	Volume	Part Number	Residual Volume in Bottom 2 mm of Reagent Bottle
1 mL sample vial plate	1 mL	10 mm to 52 mm	47 mm
1.5 mL sample vial plate	1.5 mL	10 mm to 52 mm	47 mm
4 mL sample vial plate	4 mL	10 mm to 52 mm	47 mm
96-well microtiter plate	MTP96	10 mm to 52 mm	45 mm
96-well deep-well plate	DWP96	10 mm to 52 mm	40 mm
384-well microtiter plate	MTP384	10 mm to 52 mm	45 mm
384-well deep-well plate	DWP384	10 mm to 52 mm	40 mm

5. Press **OK**.

Adjust the Rack Position

Prerequisite Procedures

- [Open the Rack Setting Screen](#)



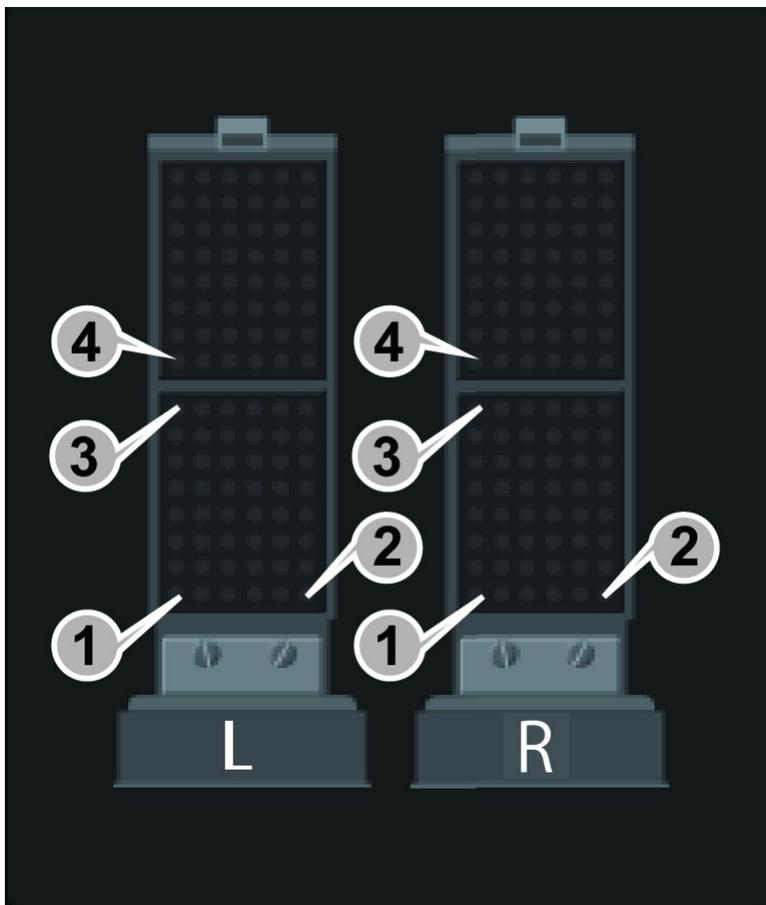
WARNING! Puncture Hazard. Do not put hands inside the instrument while adjusting rack positions. The Z mount and the needle continue operating even if a sample rack has been removed.

Depending on the plate fitted onto the sample rack, adjust the position to which the needle moves down.

Note: The plate placed on the sample rack must be of the type that has been selected on the settings screen. Placing a different type of plate causes incorrect adjustment.

Note: Stored rack positions include combinations of the right and left rack plates, rack IDs, and plate types. Adjust the rack position for all plates to be installed on the sample rack. If the rack IDs or plate types are changed, then adjust the rack positions again.

Figure 5-37 Position Number and Adjustment Position



Position Number	Adjustment Position	Number Shown on Plate				
		1 mL Sample Vial	1.5 mL Sample Vial	4 mL Sample Vial	96 Hole MTP/DWP	384 Hole MTP/DWP
1	Front Left Corner of the Front Plate	1	1	1	A01	A01
2	Front Right Corner of the Front Plate	73	46	22	H01	P01

Service and Maintenance

Position Number	Adjustment Position	Number Shown on Plate				
		1 mL Sample Vial	1.5 mL Sample Vial	4 mL Sample Vial	96 Hole MTP/DWP	384 Hole MTP/DWP
3	Rear Left Corner of the Front Plate	12	9	7	A12	A24
4	Front Left Corner of the Rear Plate	1	1	1	A01	01

Note: When adjusting the rack position for sample vial plates, insert the sample vials into all the adjustment positions. Plates only would not be enough for adjustment to be performed.

1. Press  to select a rack ID.
2. Press **Start teaching**.

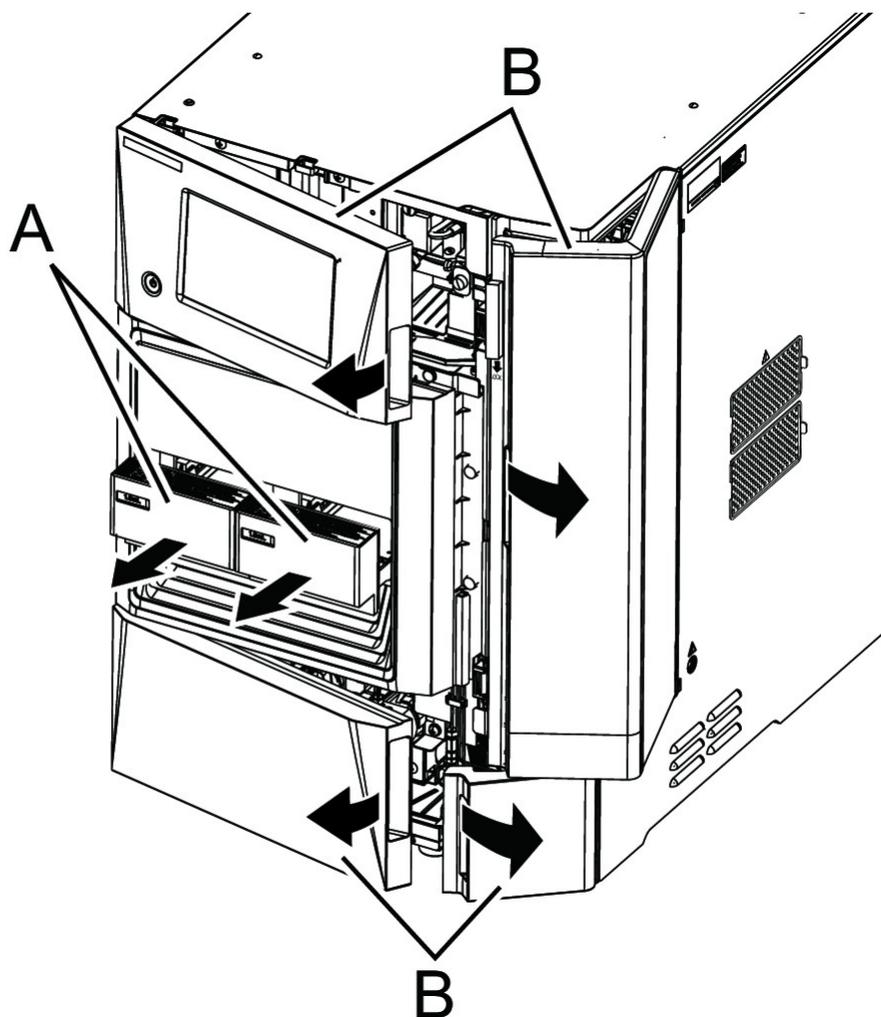
Figure 5-38 Start Teaching Button



The Select Position screen is shown.

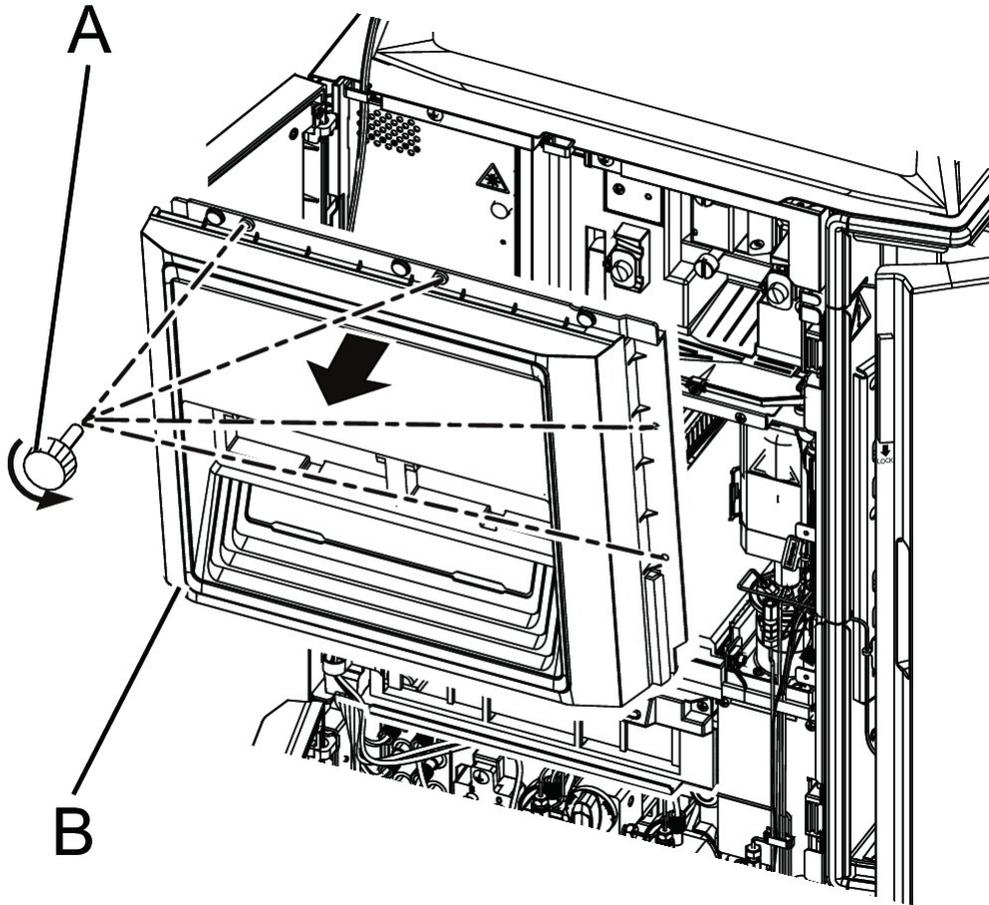
3. Remove the inserted sample racks (A) and open the panels and doors (B).

Figure 5-39 Remove Racks and Open Panels and Doors



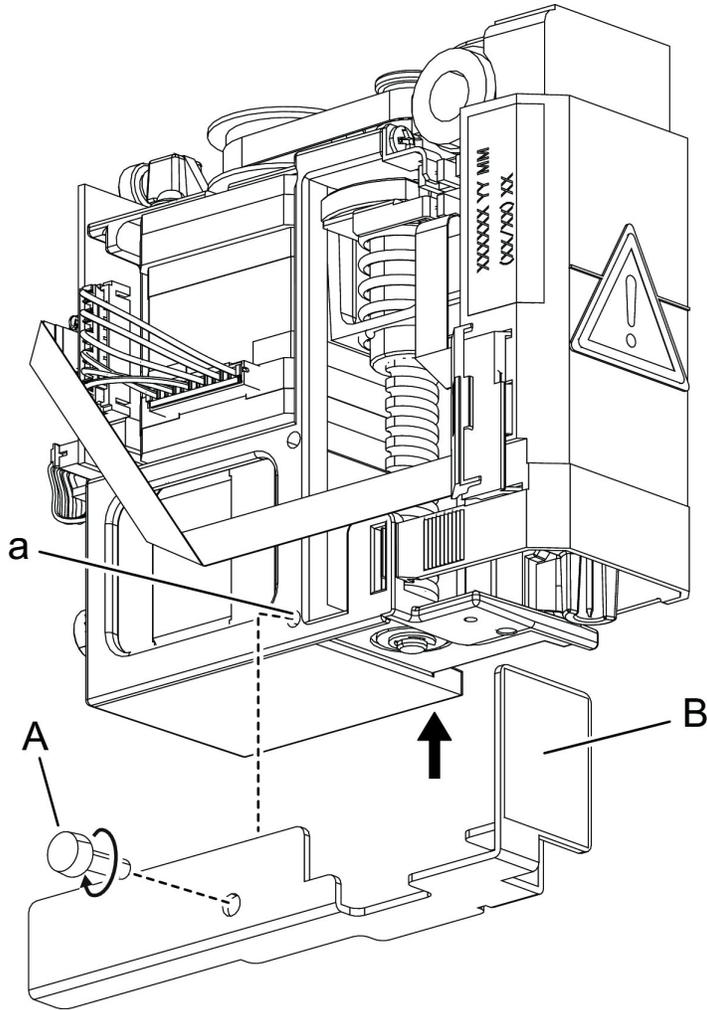
4. Remove the 4 knurled screws (A), pull the front panel (B) forward to the right, disconnect the tube from the left slot of the front panel (B), and then detach the front panel (B).

Figure 5-40 Detach the Front Panel



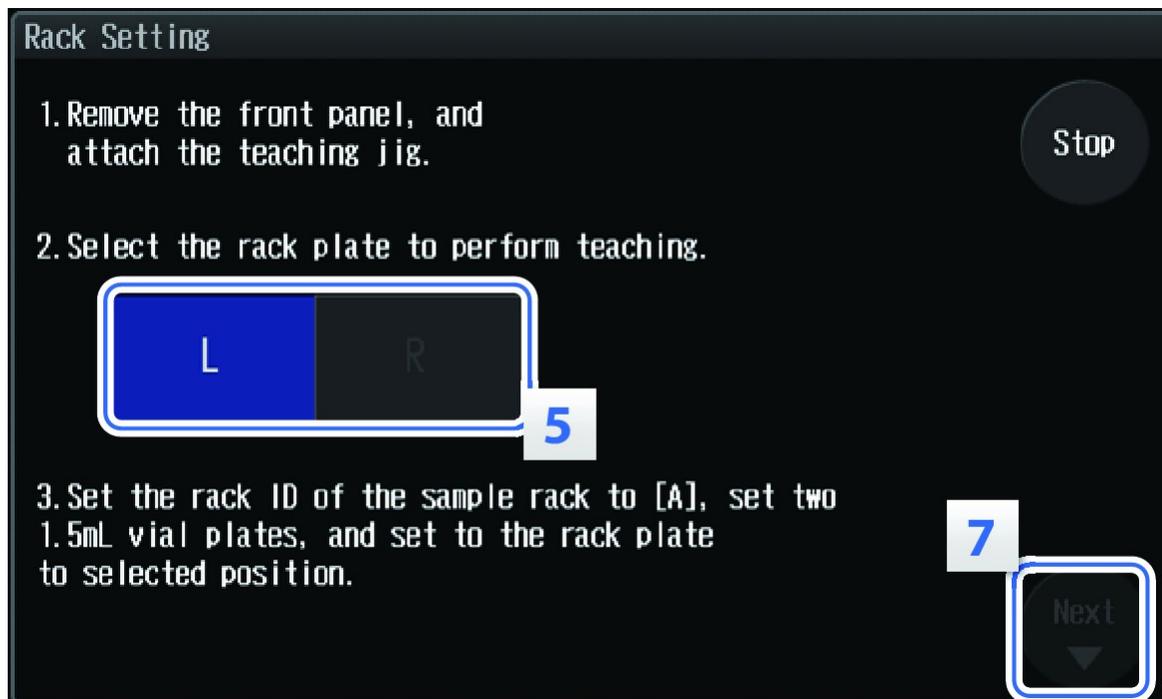
5. Attach the rack teaching jig to the Z mount. Install the rack teaching jig (B) in the threaded screw hole (a) at the bottom of the left side of the Z mount by aligning the jig hole and the screw hole using the cap/knob (A).

Figure 5-41 Install Rack Teaching Jig



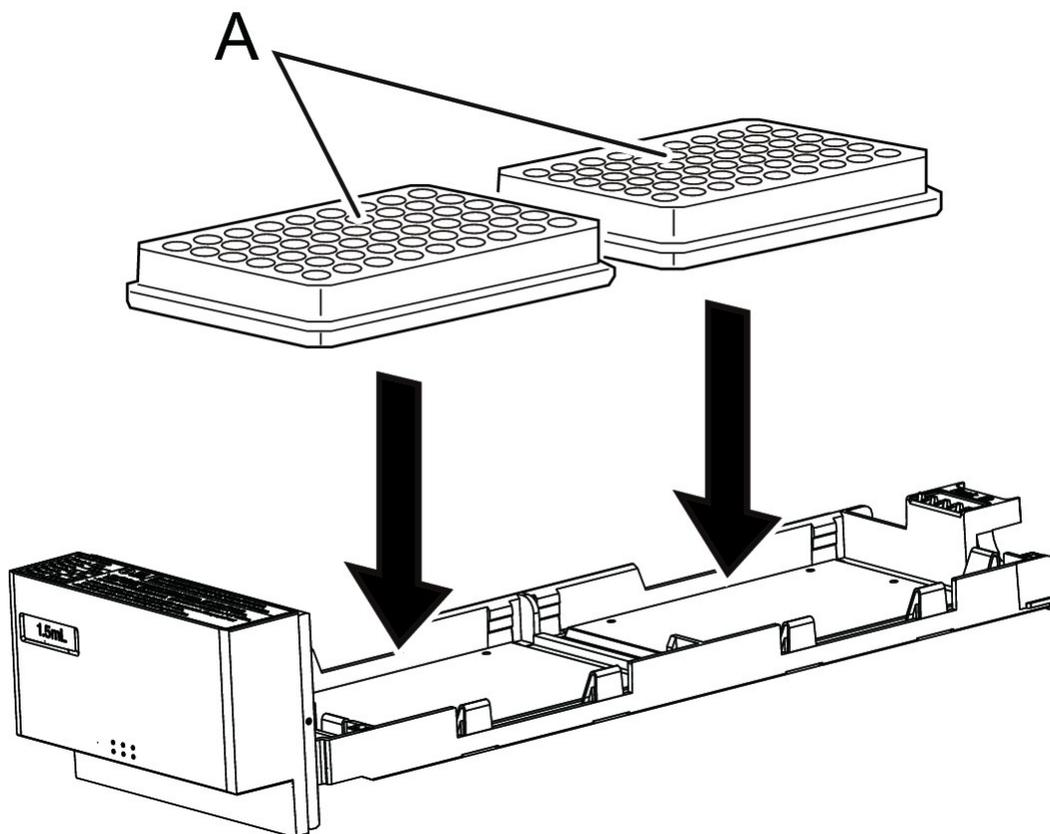
6. Select the rack position (L/R) to be adjusted.

Figure 5-42 Select the Rack Position



7. Put the plates (A) on the sample rack.

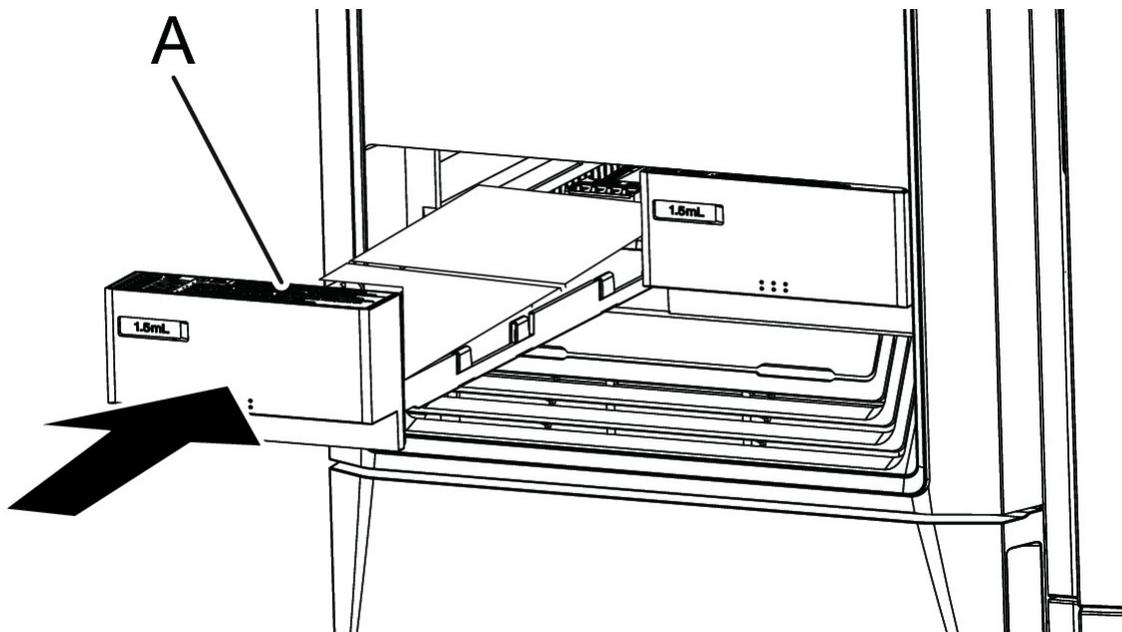
Figure 5-43 Install Plates on the Sample Rack



CAUTION: Potential System Damage. Do not attach the sample vial cap when adjusting the 4 mL vial plate position. The cap might make contact with the teaching jig, which can cause errors. If an error occurs, restart the instrument and adjust the position.

8. Install the sample rack (A) on the side for which the position is being set.

Figure 5-44 Sample Rack Installation



9. Press **Next**.

The Position1 Adjustment screen is shown, and the needle moves to **Position1**.

10. Press **Parallel movement** and **Vertical movement** to move the tip of the needle (A) to the center of the positioning hole (a).

Figure 5-45 Parallel and Vertical Movement Buttons

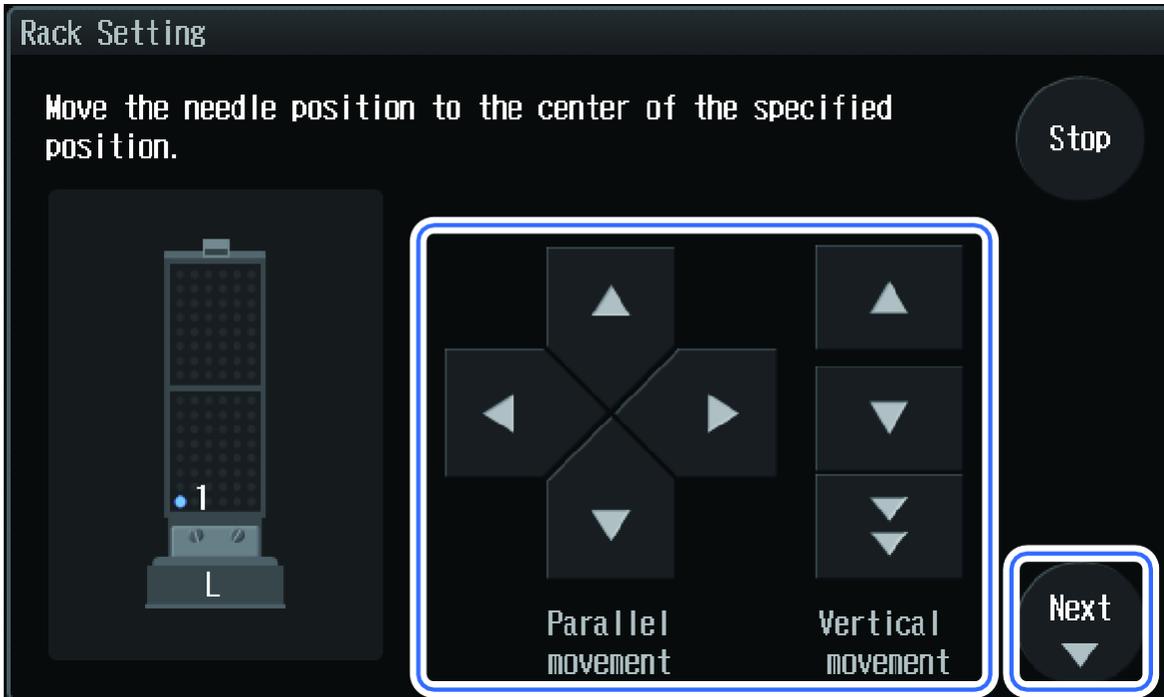
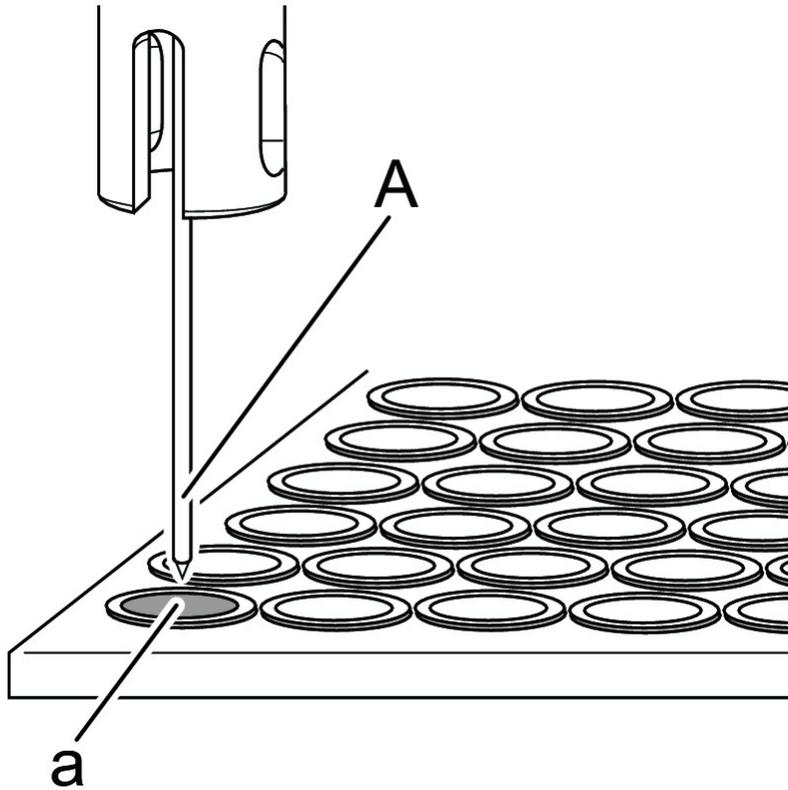


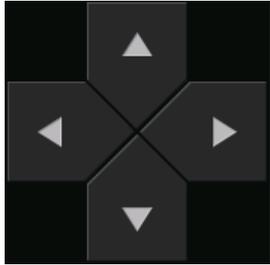
Figure 5-46 Needle and Positioning Hole



Tip!

- Use **Vertical movement** to drop the tip of the needle to a height that makes it easy to verify the relative position between the needle tip and the left-right and front-back positions of the hole.
 - Use **Parallel movement** to align the tip of the needle with the center of the hole.
-

Table 5-8 Needle Distances Moved

Button	Direction	Operation
	Left-Right and Front-Back	The needle moves in 0.1 mm increments.
	Up	The needle moves to the highest point.
	Down	First needle drop: 4.0 mm Second and subsequent drops: 0.2 mm
	Down (Large)	First needle drop: 4.0 mm Second and subsequent drops: 1.0 mm

Note: Press **Stop** to cancel the adjustment during the procedure. The adjustment is finished without updating the needle position.

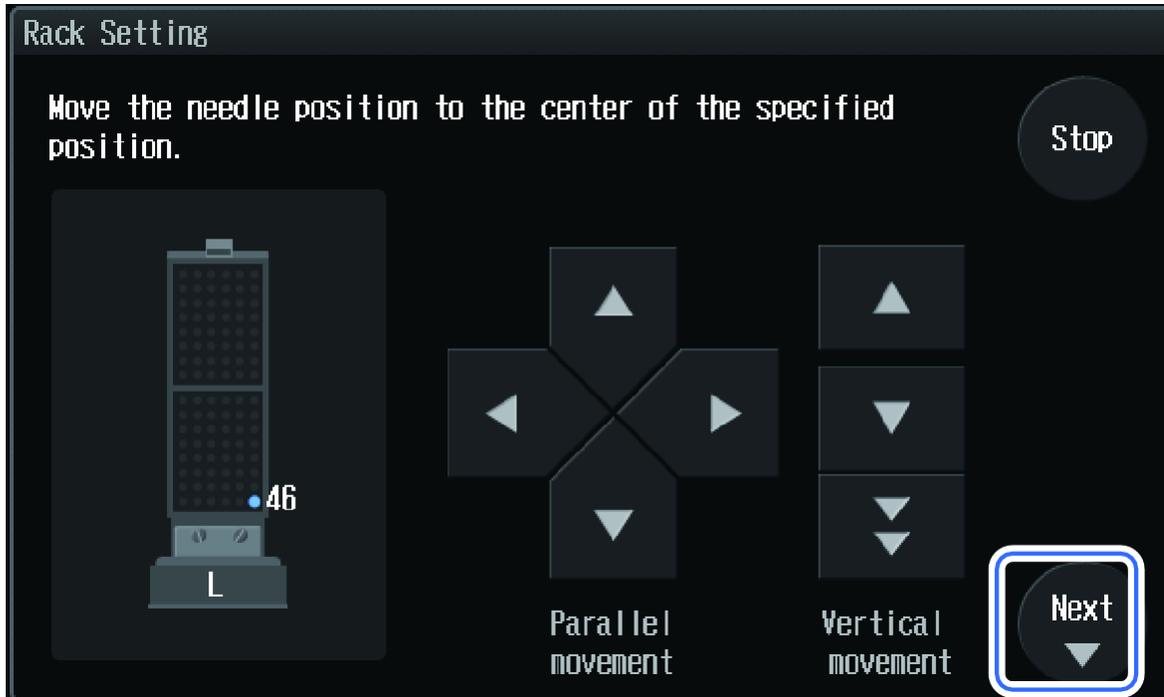
Note: Vertical movement is for verifying the relative position with the hole by bringing the tip of the needle closer to a well or a sample vial. This function is not for deciding the needle stroke.

11. Press **Next**

The next Position Adjustment screen is shown, and the needle moves near the next position.

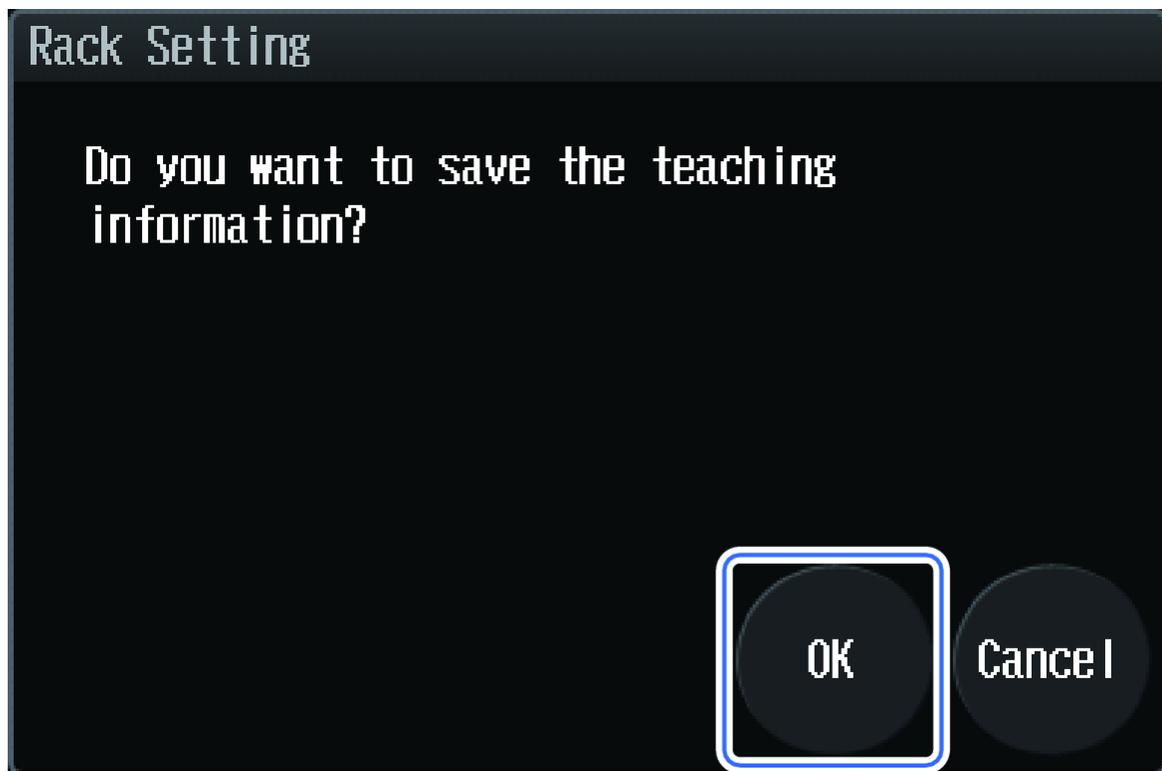
12. Repeat step 10 and step 11 for fine adjustment of the remaining positions.

Figure 5-47 Next Button



After adjustment on the Position4 screen is completed, and **Next** is pressed, the following confirmation screen is shown.

Figure 5-48 Confirmation Screen



Tip! Press **Cancel** to close the message without saving the data.

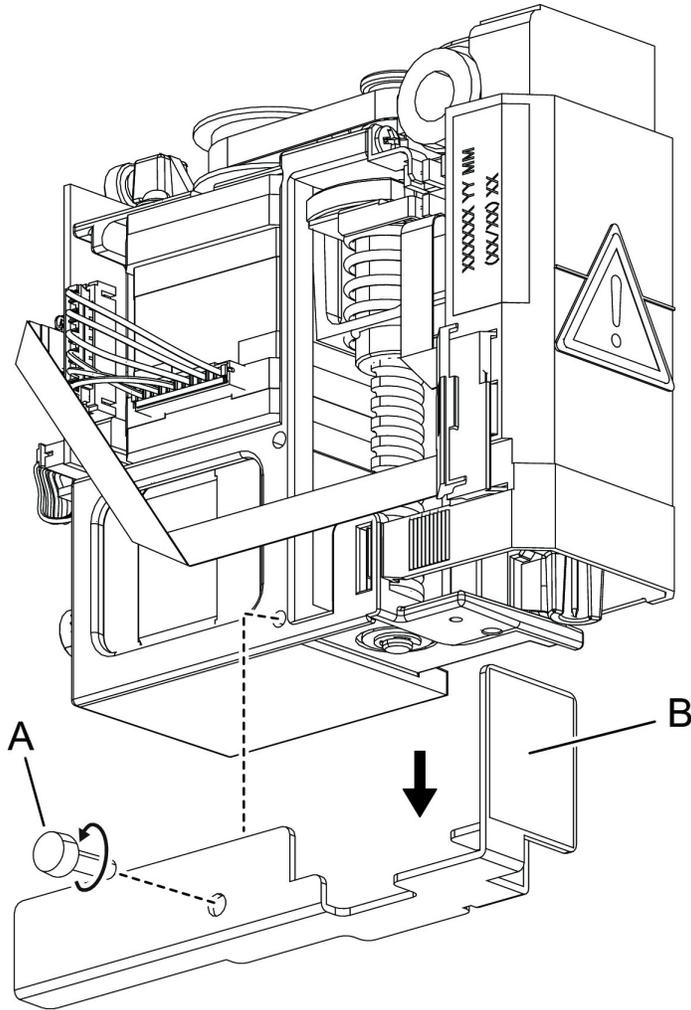
13. Press **OK**.

The following message is shown: Remove the teaching jig.

CAUTION: Potential System Damage. After the rack position adjustment is finished, remove the rack teaching jig and cap/knob. Failure to do so will result in interference with the drive section and that will prevent normal operation. It might also cause damage to the instrument.

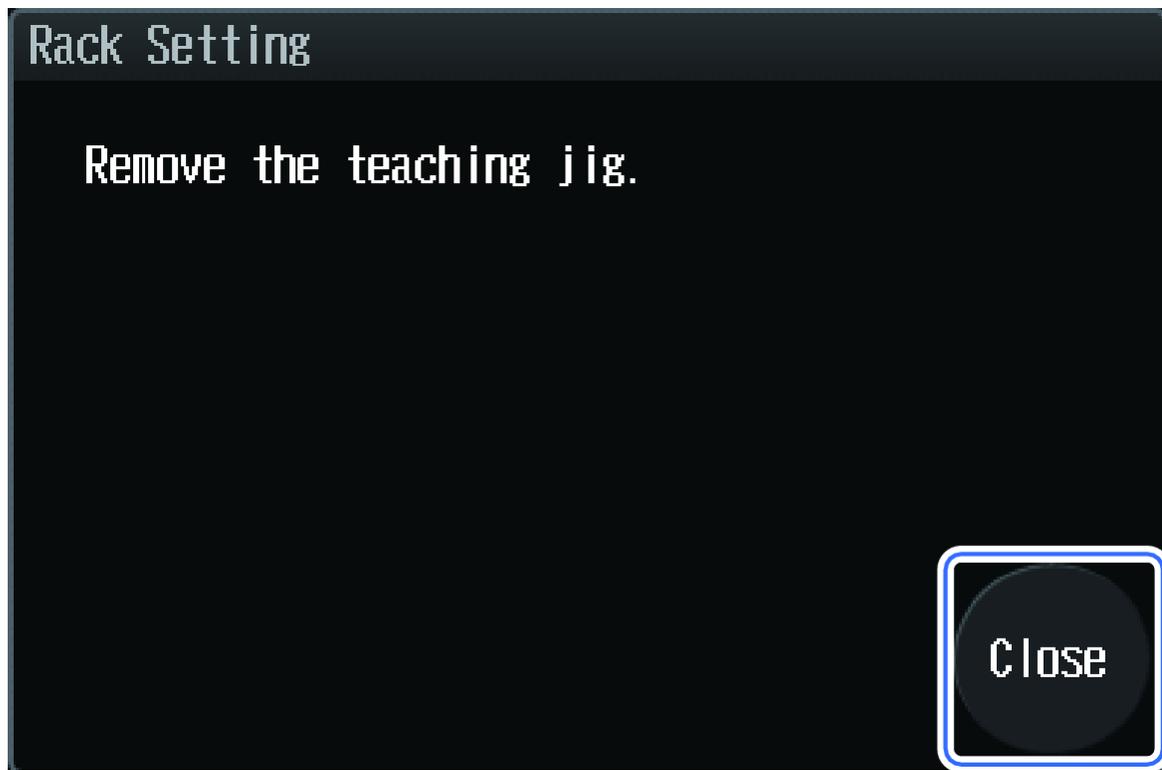
14. Remove the rack teaching jig from the Z mount by remove the cap/knob (A) and then removing the jig (B).

Figure 5-49 Remove the Rack Teaching Jig



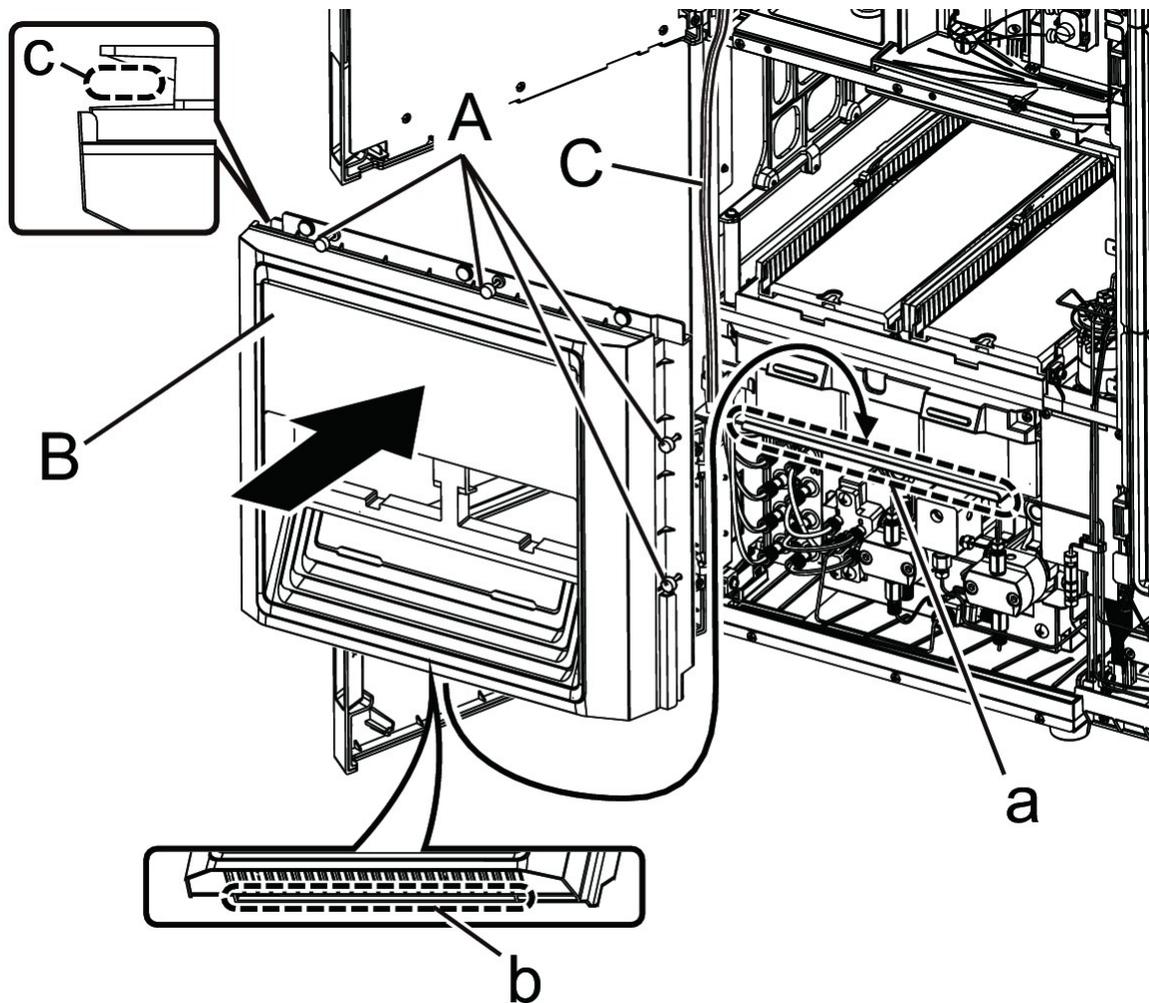
15. Press **Close**.

Figure 5-50 Close Button



16. Remove the sample rack.
17. Align the groove (b) on the bottom of the front panel with the protrusion on the main body frame (a) to insert the front panel.

Figure 5-51 Attaching the Front Panel



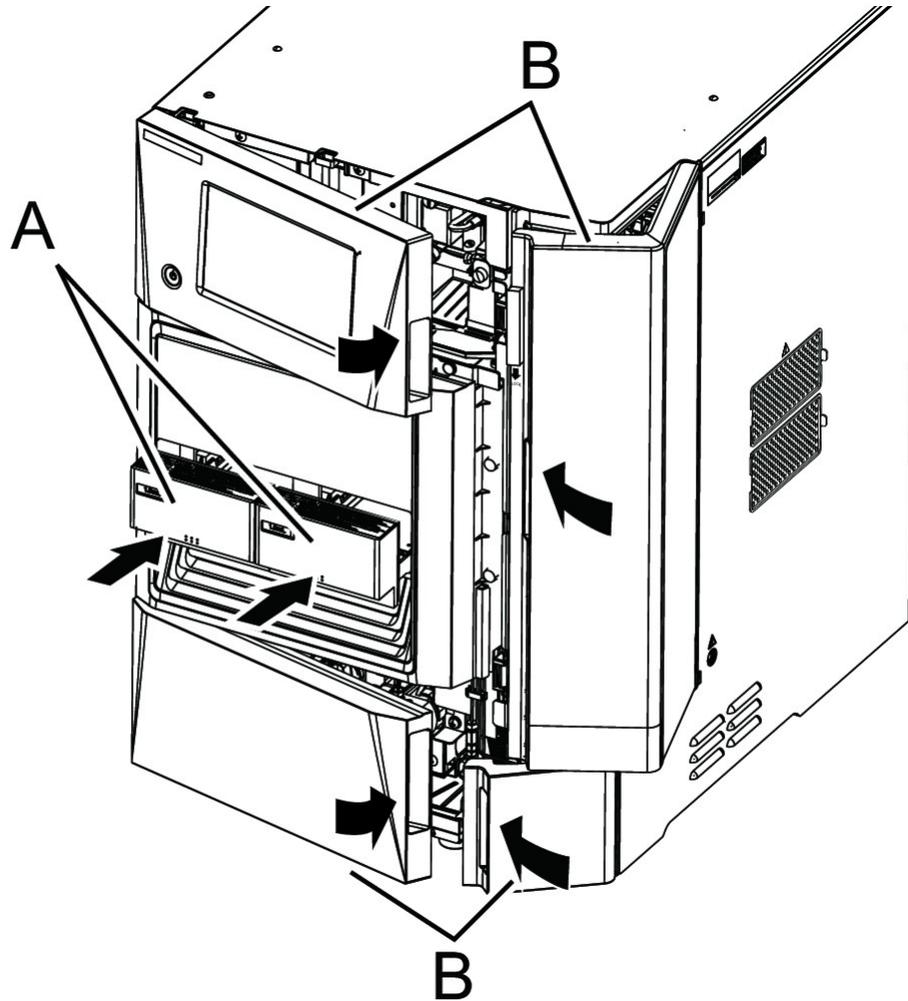
18. Insert the bundle of tubes (C) into the opening (c) on the left side of the front panel.

19. Attach the 4 knurled screws (A).

Note: If the front panel (B) is not attached correctly, then condensation might settle on the rack plate.

20. Attach the removed sample racks (A) and then close the panels and doors (B).

Figure 5-52 Installing the Racks and Closing the Doors

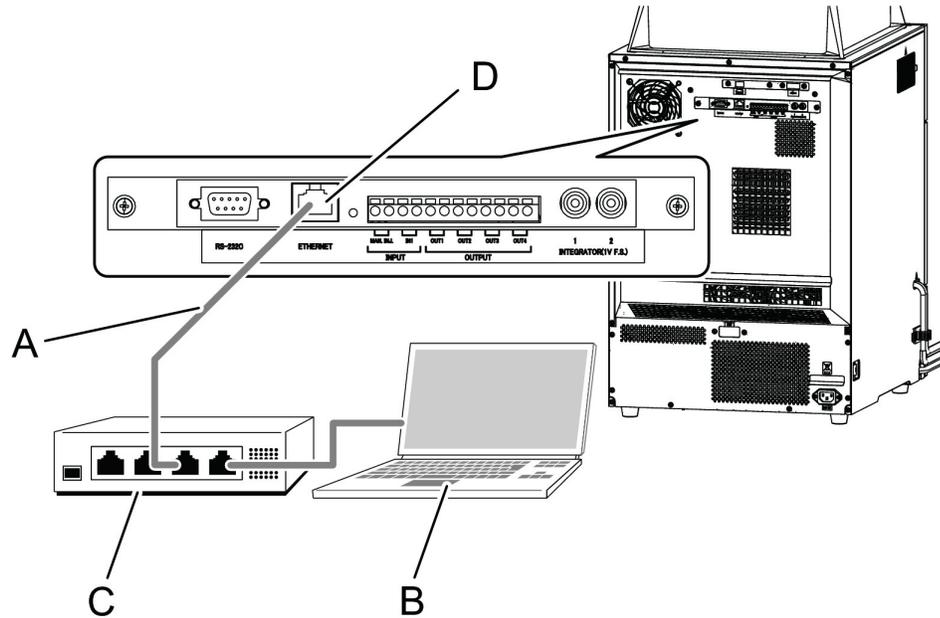


Connect the System to a Computer

Required Materials	Description
Straight LAN cable	Min. Category5 UTP straight cable
Switching Hub	100 Base-TX compatible
Cable Holder	Required when wiring a LAN cable on the floor or wall

1. Connect the straight LAN cable (A) to the Ethernet connector (D) on the back of the module.

Figure 5-53 Connection to the Computer



2. Attach the straight LAN cable (A) connected to the module to the switching hub (C) connected to the PC (B).

Determine the Amount of Mobile Phase and Rinse Solution Remaining

The remaining amount of mobile phases and rinse solution can be determined. It is possible for a warning to be issued when the amount falls below the set level by configuring the initial capacity settings of mobile phases and rinse solution.

1. Press  (Menu).

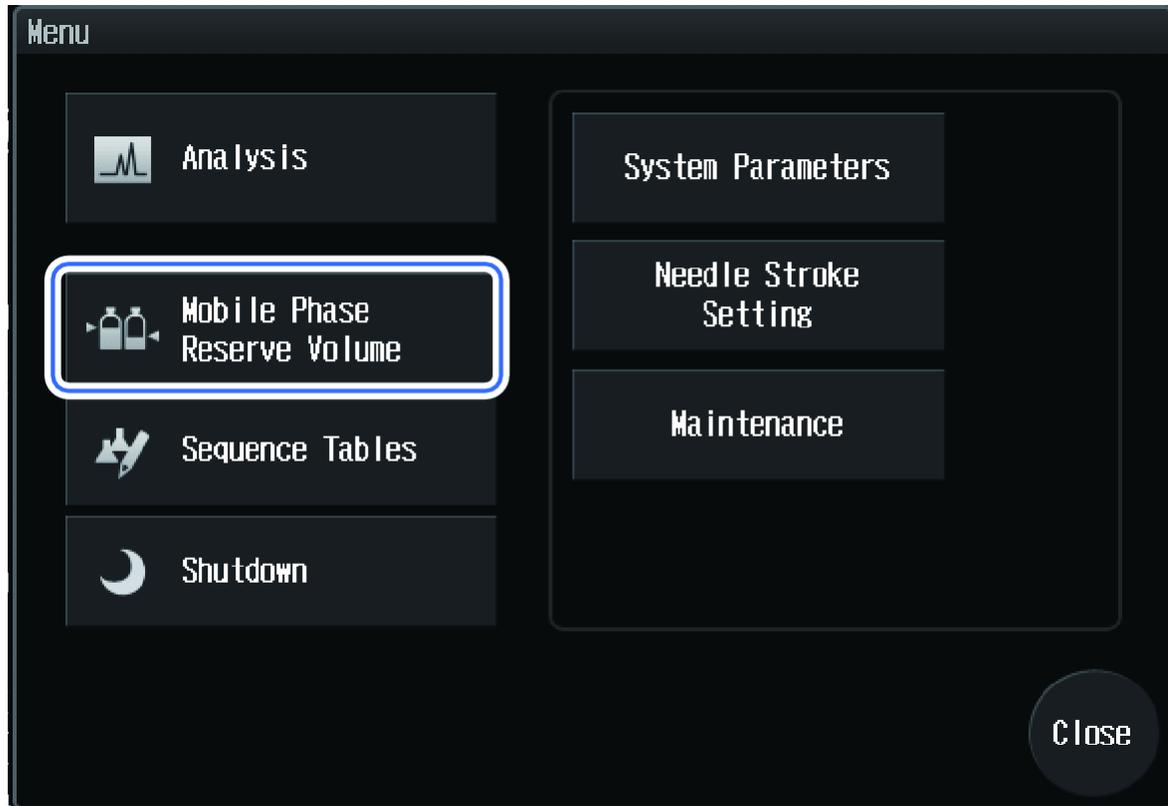
Figure 5-54 Menu Button



The Menu screen is shown.

2. Press **Mobile Phase Reserve Volume**.

Figure 5-55 Mobile Phase Reserve Volume Button



The Mobile Phase & Rinse Reserve Volume Setting screen is shown.

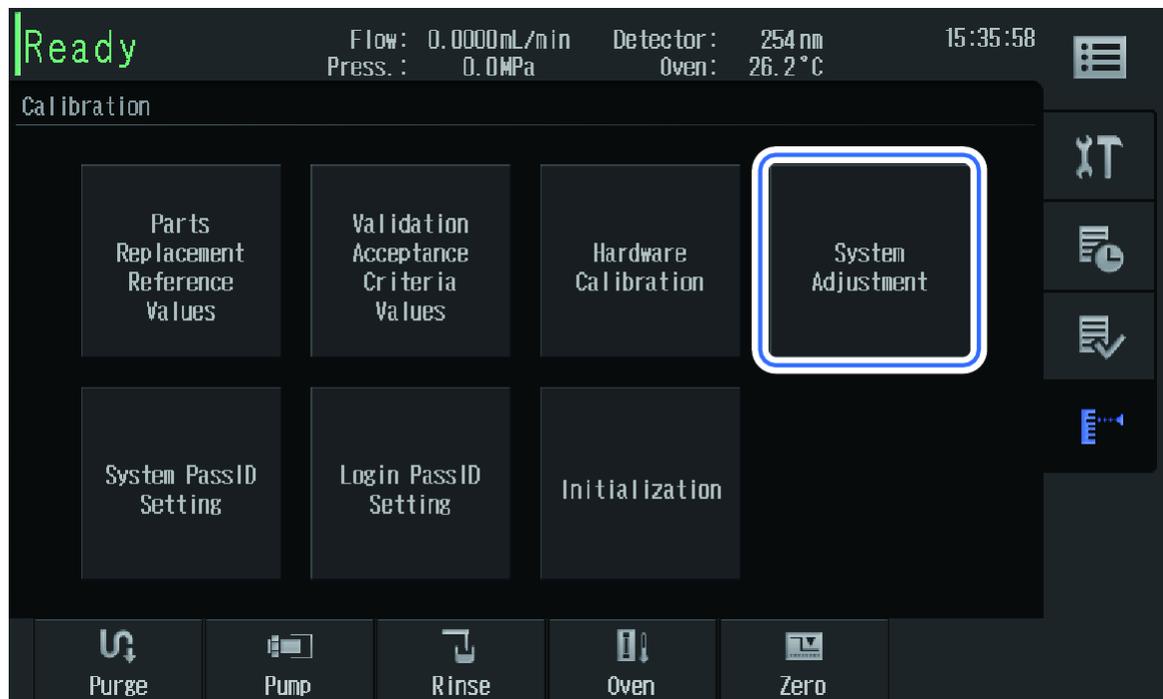
3. Configure the initial capacity and warning settings.

Lock the System

Prerequisite Procedures
<ul style="list-style-type: none">• Show the Calibration Tab

1. Press **System Adjustment**.

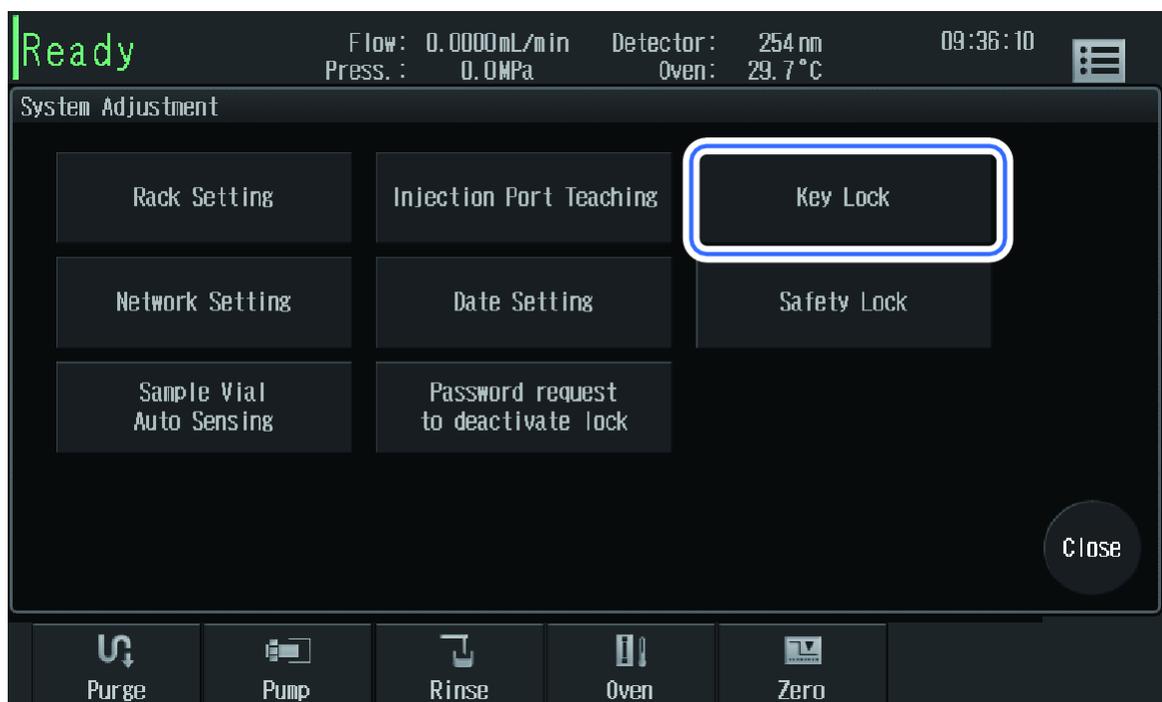
Figure 5-56 System Adjustment Button



The System Adjustment screen is shown.

2. Press **Key Lock**.

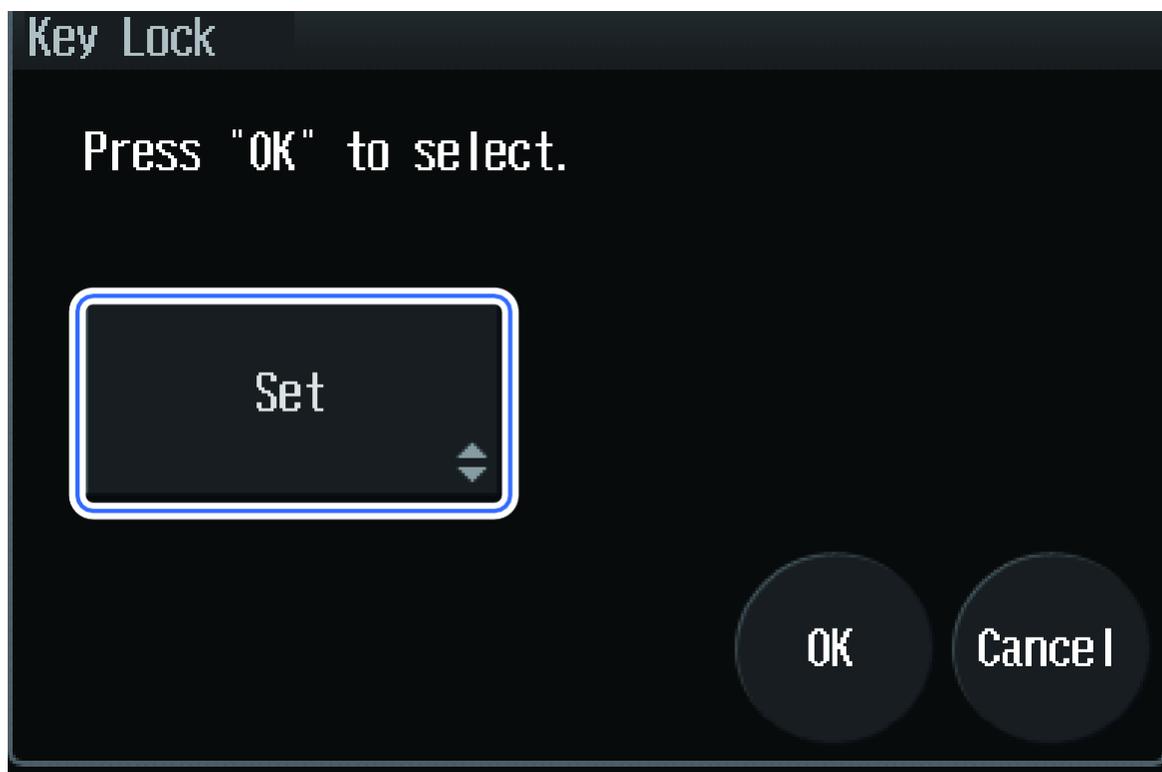
Figure 5-57 Key Lock Button



The Key Lock screen is shown.

3. Press the switching button and then select **Set**.

Figure 5-58 Key Lock Screen



The Login Confirmation screen is shown, and screen operation is prohibited unless the login password is typed.

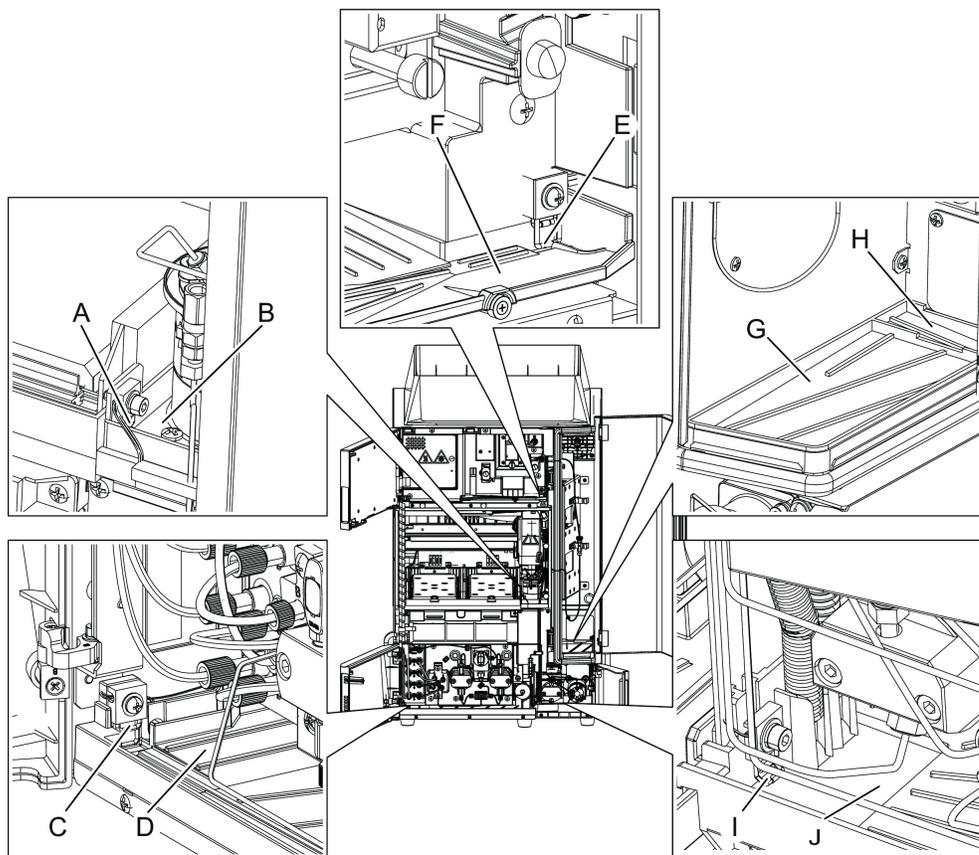
Clean the Leak Sensor and Leak Tray

Wipe away any dirt and liquid adhering to the sensor to keep the leak sensor sensitivity at a normal level.

- If a leak occurs, then completely wipe away the liquid accumulated in the leak tray.

Note: When cleaning the leak sensor and the high-pressure valve leak tray, remove the front panel.

Figure 5-59 Location of the Leak Sensor and Tray in Each Module



Item	Name	Item	Name
A	Leak Sensor of the High-Pressure Valve*1	F	Not applicable
B	High-Pressure Valve Leak Tray*1	G	Column Oven Leak Tray
C	Pump Leak Sensor	H	Column Oven Condensation Water Tray
D	Pump Leak Tray	I	Low-Pressure Valve Leak Sensor
E	Not applicable	J	Low-Pressure Valve Leak Tray

Note: If buffer solution was used as mobile phase solution, then crystals formed from dried leaked buffer solution might cause clogging in the drain of the leak tray. If buffer solution has leaked, then quickly wipe away the liquid accumulated in the leak tray, and if the leak tray gets dirty with buffer solution crystals, then wipe it with water.

Clean the Automatic Rinsing Kit (if applicable)

For systems equipped with the optional automatic rinsing kit, if there is white residue inside the rinse solution bottle in the automatic rinsing kit, then remove it with the following procedure.

Note: If the solution in the rinse solution bottle is dirty, then replace with fresh solution. If it becomes dirty quickly, then replace it daily. Otherwise, replace it at least once a week.

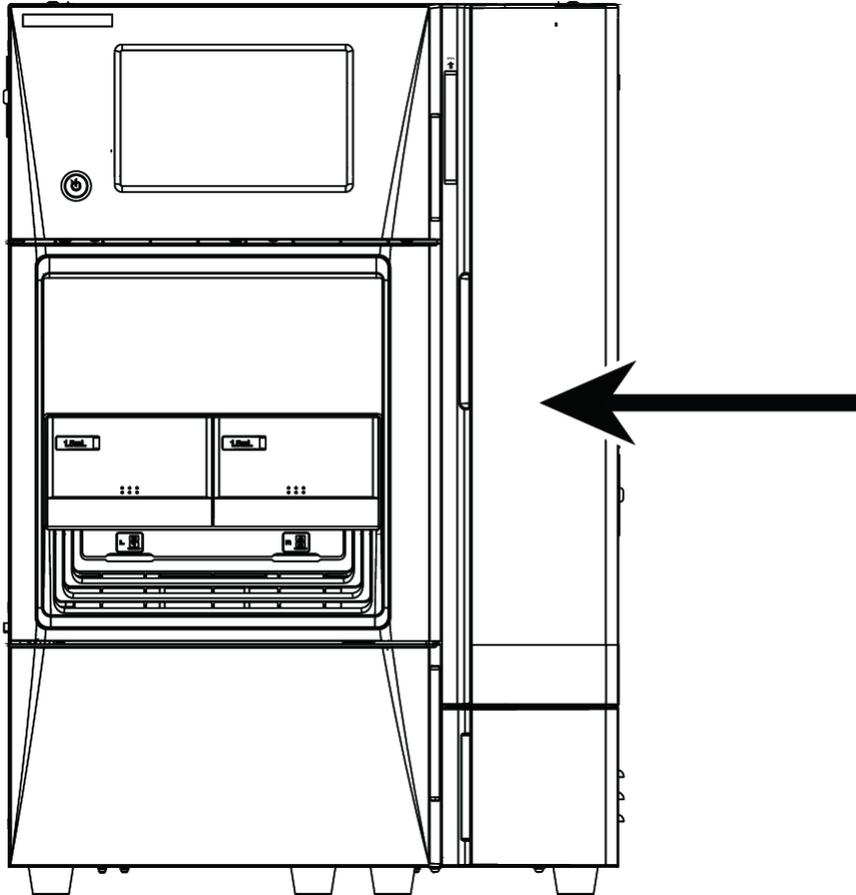
1. Remove the rinse cap of the automatic rinsing kit from the rinse solution bottle.
2. Pour HPLC-grade water into the rinse solution bottle and then clean the inside of the rinse solution bottle using a brush.
3. Pour HPLC-grade water into the rinse solution bottle and then rinse the inside of the rinse solution bottle for 5 minutes using an ultrasonic bath.
4. Pour a new 1:9 isopropanol:HPLC-grade water solution into the rinse solution bottle, replace the cap, and then return the rinse solution bottle to its original position.
5. Replace the rinse tube if the inside of the tube is dirty.

LC Column

If an analysis will not be performed for three or more days, then leaving used mobile phase in the LC column might lead to deterioration of the column. Drying the column can cause a gap inside or can cause the column packing to become cracked. To prepare the column for storage, replace the liquid in the column with column sealing liquid, remove the column from the system, and then store the column.

- Refer to the instruction manual for the LC column.

Figure 5-60 Column



Clean the Monitor Screen



WARNING! Toxic Chemical Hazard. If the liquid crystal screen is damaged, then avoid exposure to liquid crystal material. Follow all safety guidelines for handling, storing, and disposing of chemicals.

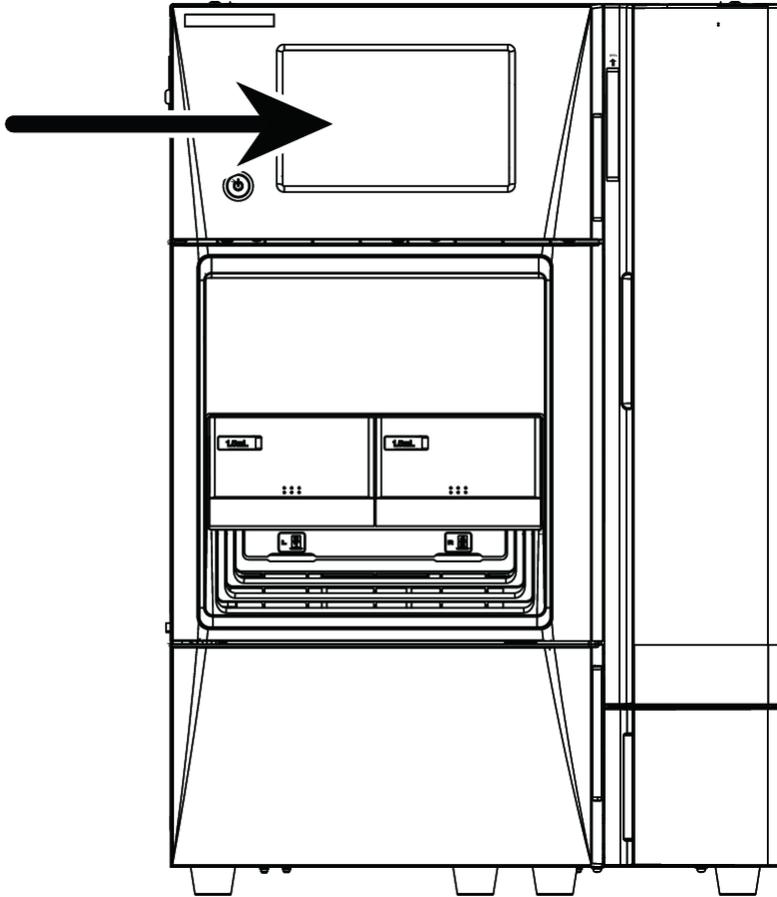
CAUTION: Potential System Damage. Use only the recommended cleaning methods and materials to avoid damaging the equipment.

CAUTION: Potential System Damage. Do not apply excessive pressure or use sharp objects during cleaning.

The monitor screen is a sensitive electronic part. If the screen gets dirty, then use this procedure to remove the dirt.

- Wipe the screen lightly with a soft rag or a rag soaked with a neutral detergent or a small amount of ethanol.

Figure 5-61 Monitor Screen



Clean the Module Surfaces

Required Materials
<ul style="list-style-type: none">• Dry, soft rags, or tissue paper• For persistent stains<ul style="list-style-type: none">• Diluted, neutral detergent• Water

1. Wipe the module surfaces with the rag or tissue paper.

2. If the stains persist, then follow these steps:
 - a. Moisten a rag in the diluted, neutral detergent and then wring it dry.
 - b. Wipe the module surfaces, scrubbing as necessary to remove the stains.
 - c. Moisten a rag in water and then wring it dry.
 - d. Wipe the module surfaces.
 - e. Dry with a dry rag.

CAUTION: Potential System Damage. Do not allow spilled water to remain on the instrument surface and do not use alcohol or thinner-type solvents to clean the surfaces. Doing so can cause rusting and discoloration.

Storage and Handling

If the autosampler is not used for a long period, then raise the needle to prevent a reduction in the service life of the needle seal.

1. Turn the power on.
2. From the initial screen, press  until the Z HOME screen is shown.
3. Press **enter**.

The needle rises to the highest position and then moves to the center of the autosampler.

4. Turn the power off.

Troubleshooting

6

If a problem cannot be resolved by the corrective actions in this section, or if a symptom is not included in the tables in this section, then contact a SCIEX representative.

Hardware Issues

Issue	Possible Cause	Corrective Action
A burning smell is detected.	The instrument has malfunctioned.	Turn off the module and then contact SCIEX. Refer to Turn Off the System .
Even if the main power switch is turned ON, power is not applied.	The power cord is not plugged in.	Plug in the power cord properly.
	The power cord is faulty.	Replace with a power cord of the same type.
	An incorrect power supply is used.	Use a power supply that complies with the specifications of the system.
Pumping is not done at all. (The system does not operate either.)	Pump was not pressed. The pump lamp is not illuminated.	Press Pump . The Pump lamp is illuminated.
	The flow rate is shown as "0".	Set the flow rate.
	Error messages are shown (for example, P-MAX or P-MIN).	Press Clear and then correct the cause of the error.
The system operates but does not pump.	The mobile phase is empty.	Replenish the mobile phase.
	The drain valve is open.	Close the drain valve. ⁸
	Liquid flows from a connection in the flow line.	Tighten the connector. If tightening does not stop the leak, then replace the connector.
	There are air bubbles inside the pump head.	Press Purge to remove air bubbles. Alternatively, connect a syringe to the end connection of the drain tubing to remove the air bubbles. Refer to Purge the Pump Manually .

⁸ If the drain valve is opened when the pressure is high, then the mobile phase spouts from the tip of the drain tubing. Do not open the drain valve when the pressure is high. Be sure to insert the tip of the drain tubing into the waste container so that it is not exposed externally.

Issue	Possible Cause	Corrective Action
	Air comes in from the connection of the suction filter and the pump.	Firmly connect the suction filter fitting.
	The check valve is malfunctioning.	Rinse the check valve by pumping isopropanol at a low flow rate of approximately 0.20 mL/minute.
Pumping is unstable and the pulsating flow of the pump is excessive. The flow rate is less than the set value.	The check valve is malfunctioning.	Rinse the check valve by pumping isopropanol at a low flow rate of approximately 0.20 mL/minute. <hr/> Note: When using a buffer solution, first pump purified water to rinse the check valve. Then pump isopropanol to rinse. If rinsing has no effect, perform an ultrasonic rinse of the check valve or replace it.
	The check valve is dirty.	Rinse the check valve by pumping isopropanol at a low flow rate of approximately 0.20 mL/minute. <hr/> Note: When using a buffer solution, first pump purified water to rinse the check valve. Then pump isopropanol to rinse. If rinsing has no effect, perform an ultrasonic rinse of the check valve or replace it.
	The suction filter is clogged.	Perform an ultrasonic rinse of the suction filter. If the ultrasonic rinse has no effect, then replace the filter.

Troubleshooting

Issue	Possible Cause	Corrective Action
Pumping is unstable and the pulsating flow of the pump is excessive. The flow rate is less than the set value.	Air bubbles have entered the suction filter tube.	Press Purge to wash away the mobile phase completely. Vibrate the suction filter to remove the air bubbles. When the suction filter becomes clogged, perform an ultrasonic rinse. If the ultrasonic rinse has no effect, then replace the filter. Degas the mobile phase. ⁹
	There are air bubbles inside the pump head.	Press Purge to remove air bubbles. Alternatively, connect a syringe to the end connection of the drain tubing to remove the air bubbles. Refer to Purge the Pump Manually .
	Previous mobile phase remains inside the pump head.	Press Purge to wash away the mobile phase completely. Vibrate the suction filter to remove the air bubbles. When the suction filter becomes clogged, perform an ultrasonic rinse. If the ultrasonic rinse has no effect, then replace the filter. Degas the mobile phase. ⁸
	Liquid leaks from the gap between the pump head and head holder.	Contact an FSE to have the plunger seal or plunger replaced, as necessary.
	Liquid flows from the plunger seal.	Contact an FSE to have the plunger seal or plunger replaced, as necessary.
	The drain valve is open.	Close the drain valve. ⁸
	Liquid flows from a connection in the flow line.	Tighten the connector. If tightening does not stop the leak, then replace the connector.
	The line filter is clogged or nearly clogged.	Perform an ultrasonic rinse of the line filter or replace it.
The pressure does not rise.	The drain valve is open.	Close the drain valve. ⁸
	Liquid flow from the connection part of the flow line.	Tighten the connector. If tightening does not stop the leak, then replace the connector.
The pressure becomes too high.	The line filter is clogged.	Perform an ultrasonic rinse of the line filter or replace it.
	The inside diameter of the tubing is too thin.	Use the specified pipe.

⁹ Use the procedure in [Causes of and Countermeasures for Clogging in Flow Lines](#) to remove the connections downstream from the flow line sequentially and check the pressure.

Issue	Possible Cause	Corrective Action
	The column is clogged.	Inspect the pressure of the column, and if the column is clogged, then replace it.
	The flow line is clogged.	Backwash the flow line. Inspect the flow line, and if it is clogged, then replace the part.
The rinse liquid of the automatic rinsing kit increases.	Liquid flows from the plunger seal.	Contact an FSE to have the plunger seal or plunger replaced, as necessary. If the lifetime of the plunger seal is extremely short, then the plunger should also be replaced.
Liquid leaks from the gap in the high-pressure valve.	The seal between the rotor and stator has degraded.	Contact an FSE to inspect and, if necessary, replace the rotor and stator.
Liquid leaks from the gap in the low-pressure valve.	The seal between the rotor and stator has degraded.	Contact an FSE to inspect and, if necessary, replace the rotor and stator.
Liquid leaks from the connection part of the flow line.	The connector is loose or damaged.	Tighten the connector. If tightening does not stop the leak, then replace the connector.
Even though mobile phase spills in the column oven, no error message is shown. Even though mobile phase spills on the leak tray, no error message is shown.	The sensitivity of the gas or leak sensor is poor.	<ul style="list-style-type: none"> • Clean the leak sensor. Refer to Clean the Leak Sensor and Leak Tray. • Contact an FSE to inspect the gas sensor and leak sensor. If it is NG, the sensitivity must be adjusted.
The status does not become Ready. The set temperature is not reached.	The column oven door is open.	Close the column oven door.
	The room temperature is too high or the set temperature is too low.	Set the temperature for the column temperature control properly. The range of adjustable temperatures for the column temperature control depending on to the room temperature. Refer to the <i>ExionLC™ System Software User Guide</i> .
Injection does not occur	The Autosampler is offline.	Make sure that the hardware profile for the system is correct. Refer to the <i>ExionLC™ System Software User Guide</i> .
The pressure changes excessively when switching between high-pressure valves.	The high-pressure valve is clogged.	Contact an FSE to disassemble and clean the high pressure valve. If this does not resolve the issue, the rotor and stator might need to be replaced.

Troubleshooting

Issue	Possible Cause	Corrective Action
	The rotation position of the high-pressure valve is misaligned.	Contact an FSE.
	The flow line is clogged.	Backwash the flow line. Inspect the flow line, and if it is clogged, replace the part. ⁸
A time program cannot be edited.	The system configuration changed after the LC method was created.	Make sure that the LC method is configured correctly. Refer to the <i>ExionLC™ System Software User Guide</i> .
The scheduled end time does not match that of the actual analysis.	An extremely short analysis has been repeated.	The scheduled end time is recalculated as each line of the sequence table is processed. For sequences performing multiple analyses (injections) in a line, the end time is calculated only for the first analysis.
	The oven temperatures was not reached for analysis.	Changing the oven temperature for each analysis causes a Wait Oven status. It is recommended that the oven temperature not be changed if possible.
The external input/output terminal on the back does not operate.	The setting for the event input/output is incorrect.	Contact an FSE to make sure that the controller is installed correctly.
Analysis does not proceed in the Pause status.	The setting for the event input is incorrect.	Contact an FSE to make sure that the controller is installed correctly.
If the CMD information is shown, it turns into garbled characters.	The system is shared with another one.	Make sure that the hardware profile and LC method are configured correctly. Refer to the <i>ExionLC™ System Software User Guide</i> .
It is not possible to log in when starting the system.	The password is incorrect.	Make sure that the password is correct. If the problem persists, contact an FSE.
A connection cannot be established if the installation location is changed.	The network settings for this device and computer are incorrect.	Make sure that the IP addresses, subnet masks, and default gateways of the system and the computer are appropriate for the network environment of the installation location.
The version number shown when connecting a ExionLC™ 100 system differs from the real version number.	The system has been downgraded, or it a different ExionLC™ 100 systems has been connected.	Make sure that the hardware profile is configured correctly. Refer to the <i>ExionLC™ System Software User Guide</i> .

Issue	Possible Cause	Corrective Action
A link to an external detector cannot be established even though it is connected.	The connection with, or settings for, an external detector are incorrect.	<ul style="list-style-type: none"> Inspect for dirt or foreign particles in the optical cable connector. Make sure that the optical cable is fully inserted. Make sure that the link address of the external detector is set to 1.
The connected external detector cannot be properly controlled.	The settings for the external detector are incorrect.	Make sure that the external detector is not in local mode.

Analysis Issues

Issue	Possible Cause	Corrective Action
The peak retention times vary.	The check valve is defective.	<p>Rinse the check valve by pumping isopropanol at a low flow rate of approximately 0.20 mL/minute.</p> <hr/> <p>Note: When using a buffer solution, first pump purified water to rinse the check valve. Then pump isopropanol to rinse. If rinsing has no effect, perform an ultrasonic rinse of the check valve or replace it.</p> <hr/>
	The mobile phase flow rate of the pump is unstable.	Make sure that the pump operates normally, and if there is an abnormality, take corrective action.
	The temperature of the column has changed.	Use the column oven.
	The column has deteriorated.	<ul style="list-style-type: none"> Make sure that the column oven operates normally, and if there is an abnormality, take corrective action. Inspect the column under the known analysis conditions, and if it has deteriorated, replace it.
	The ambient temperature varies excessively.	Install the system in a place where the temperature does not change excessively.

Troubleshooting

Issue	Possible Cause	Corrective Action
	The needle or tubing is clogged.	<ul style="list-style-type: none"> • Backwash the high-pressure valve. • Replace the needle or the tubing if backwashing has no effect. • Rinse the inside of the needle with mobile phase solution. • Replace the needle or the tubing if rinsing has no effect.
	The needle seal is worn.	If the needle seal is worn, replace it.
	The flow line rinsing is insufficient.	Purge or rinse the flow line.
	The flow rate or the composition of the mobile phase has changed.	Inspect the pump and the mobile phase solution.
	Liquid flows from the flow line.	Tighten the connector. If tightening does not stop the leak, then replace the connector.
The peak shape is abnormal. (For example, the peak widths are too large or tailing).	The column has deteriorated.	Inspect the column under the known analysis conditions, and if it has deteriorated, then replace it.
	The tubing of the pump and the column is reversed.	Configure the tubing correctly.
	The needle or tubing is clogged.	<ul style="list-style-type: none"> • Backwash the high-pressure valve. • Replace the needle or the tubing if backwashing has no effect. • Rinse the inside of the needle with mobile phase solution. • Replace the needle or the tubing if rinsing has no effect.
	There is a dead volume in a connection in the flow line.	Inspect the connection, and if there is a dead volume, then connect it properly.
No peak appears.	The column has deteriorated.	Inspect the column under the known analysis conditions, and if it has deteriorated, then replace it.

Issue	Possible Cause	Corrective Action
	The mobile phase solution is not flowing.	Make sure that the pump operates normally, and if there is an abnormality, take corrective action.
	The required amount of sample is not present in the sample vial.	Add the required amount of sample to the sample vial.
	The content of the time program is incorrect.	Inspect the time program and correct it.
	The flow line through which the sample is injected is clogged.	Backwash the flow line. Inspect the flow line, and if it is clogged, replace the part. ¹⁰
	The hole at the tip of the needle is plugged by the bottom of the sample vial.	Change the needle stroke to a smaller value. Refer to Set the Plate Type and Needle Stroke from the Top .

¹⁰If the pumping pressure has risen, then the flow line might be clogged. Use the procedure in "[Causes of and Countermeasures for Clogging in Flow Lines](#)" to remove the connections downstream from the flow line sequentially and then verify the pressure again.

Troubleshooting

Issue	Possible Cause	Corrective Action
A ghost peak occurs.	The tubing, line filter, or suction filter is dirty.	Inspect the suction filter for clogging. ¹¹ Additionally, rinse according to the following procedure. 1. Deliver a 17% phosphoric acid solution at a flow rate of 1 mL/min for about 30 minutes. (Pumping pressure: 1 MPa to 5 MPa) 2. Deliver HPLC-grade water at a flow rate of 9 mL/min for about 30 minutes. (Pumping pressure: 1 MPa to 5 MPa)
	The rinse liquid is not being pumped.	Make sure that there is rinse liquid.
	The rinsing port is dirty.	Set the Rinsing volume , the liquid replacement volume in the rinsing port, to a minimum of 450 µL.
	Previous mobile phase solution remains in the mobile phase flow line.	Rinse the flow line and then replace with the mobile phase solution to be used.
	Previous rinse liquid remains in the rinse liquid flow line.	Rinse the flow line and then replace with the rinse liquid to be used.
	The high pressure analysis flow line, including the needle and the sample loop, is dirty.	Rinse according to the following procedure. 1. Deliver a 17% phosphoric acid solution at a flow rate of 1 mL/min for about 30 minutes. (Pumping pressure: 1 MPa to 5 MPa) 2. Deliver HPLC-grade water at a flow rate of 9 mL/min for about 30 minutes. (Pumping pressure: 1 MPa to 5 MPa)
The retention time of the target component significantly differs from that measured in another system.	The temperature of the column is off.	Validate the temperature accuracy of the column oven. If NG, adjust the temperature accuracy.

¹¹Suction filter clogging inspection: Remove the filter part and record the pressure waveform. If removing the filter improves the pressure waveform, then the suction filter is clogged.

Issue	Possible Cause	Corrective Action
<p>The baseline undulates depending on the pump stroke.</p> 	<p>There are air bubbles inside the pump head.</p>	<p>Press Purge to remove air bubbles. Alternatively, connect a syringe to the end connection of the drain tubing to remove the air bubbles. Refer to Purge the Pump Manually.</p>
<p>Regular spike-shaped noise appears.</p> 	<p>Liquid flows from the plunger seal.</p>	<p>Contact an FSE to have the plunger seal or plunger replaced, as necessary. If the lifetime of the plunger seal is extremely short, then the plunger should also be replaced.</p>
<p>Saw-shaped noise appears. (The baseline drifts in the positive direction and suddenly returns in the negative direction, and this behavior is repeated.)</p> 	<p>Pulsations of the pump are excessive.</p>	<p>Determine whether the noise disappears if pumping is stopped. Inspect the pumping condition (pulsation), and if the pulsation is excessive, then rinse the flow line.</p>

Causes of and Countermeasures for Clogging in Flow Lines

Cause of Clogged Tubing	Corrective Action
Insoluble matter in the mobile phase.	<p>Especially when a buffer solution is used as the mobile phase, filter the buffer solution before use with a commercially available strainer that has a membrane filter with a bore diameter of 0.45 µm maximum. Insoluble matter contained in salt can clog the tubing. Filtering is also important for protecting the column.</p> <p>Required Materials:</p> <ul style="list-style-type: none"> • Filtering apparatus with a filter holder • Membrane filter (with a bore diameter of 0.45 µm max.)
Insoluble matter in the sample.	<p>If the sample solution is turbid or contains insoluble matter, then use a commercially available disposable filter to filter the sample solution before analysis. Insoluble matter contained in the sample can cause clogging in the tubing or the column, just as with insoluble matter in the mobile phase.</p> <p>Required Materials: Disposable filter</p>
Suspended particulates or dirt in the environment.	<p>Avoid a dirty or dusty environment when working with the system panels open. Small dirt or dust in the environment can enter from the injection port and cause clogging. Normally, this is not an issue because analysis is performed with the front panel of the system closed.</p>
Shavings of the needle seal installed in the injection port.	<p>The injection port has a needle seal installed. If a needle become misaligned even a little, then the needle might cut the needle seal. If this generates needle seal shavings, then these shavings might clog the tubing. If the tubing is clogged, then confirm misalignment of the needle on the injection port by selecting Auxiliary Operation > Injection Port Operation Check and moving the needle up and down. If misalignment of the needle is observed, then adjustment of the injection port is necessary.</p>

Cause of Clogged Tubing	Corrective Action
Shavings of the septum used for a sample vial.	<p>Use only high-quality septa and sample vials.</p> <p>Some septa used for sample vials can have shavings that might cause the needle to become clogged. There are various types of septa, and depending on the type, the coating and material of the septum surface might vary. High-quality septa have passed continuous injection tests and resistance to solvents tests.</p> <p>Usually a thin membrane of solvent-resistant material (such as PTFE) is coated on the septum surface, but if a septum that has not been recommended by SCIEX is in use, then when the needle penetrates the septum, septum shavings might be peeled off, which can cause clogging.</p>
Abrasion powder from the PEEK rotor seal for the high-pressure valve.	<p>Disassemble and clean the high-pressure valve approximately once every 10 000 injections. Clogging in the tubing can be avoided by increasing the inside diameter of the tubing. This cannot be a fundamental countermeasure and is essentially not desirable, because foreign particles accumulate at the column inlet instead of the tubing. Therefore, first refer to the preceding cause and the countermeasures.</p> <p>Required Materials: Methanol or isopropanol</p>
Microscopic particles coming out of the LC pump.	<ul style="list-style-type: none"> • When installing a new part, before connecting it to the system, be sure to rinse it by pumping methanol or isopropanol (5 mL/min for 15 minutes), to remove particles from flow line parts. • Replace the line filter periodically to remove particles from worn plunger seals. <p>Required Materials: Methanol or isopropanol</p>
Particles from the tubing.	<p>When replacing tubing, before connecting, rinse the new tubing completely. To rinse tubing, pump methanol or isopropanol (5 mL/min, 15 minutes).</p> <p>Required Materials: Methanol or isopropanol</p>

Consumables, Options, and Spares

A

Order the parts provided in the tables, or their equivalent.

Consumables

Part Name	Part No.	Remark
Power Cord (for UL/CSA)	071-60821-08	
Power Cord (for EU)	071-60825-51	
Cable, LD-CT/BU2/RS	4465787	
Drain Tube ASSY	228-56223-41	
Drain Tube, Silicone	228-25162-04	
PTFE Tubing, OD 7.0 x ID 6.0	4412687	
Drain Tube (EFTE) ASSY	4426026	
Reservoir Bottle	228-38435	
1.5 mL Sample Vial Plate	228-46960	
1.5 mL Sample Vial (5 pcs)	228-38446-92	
20 mL Syringe	4412706	
Syringe Needle	4412820	
Resistance Tube PEEK	228-38994	
Flangeless Fitting ASSY	228-57652-41	
LPGE-OUT tube (Long)	228-58590-41	
Cap/Knob	037-02820-57	
Coupling 1.6C	228-16004-13	
Suction filter	4426106	

Sample Vials for Use with the Autosampler

To prevent the septum from falling off during injection, tighten the cap before using.

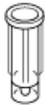
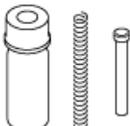
Part Name	Volume	Material	Part Number	Application	Conforming Plate	Description
4 mL Sample Vial 	4 mL	Borosilicate glass	4413362	General	4 mL sample vial plate	With cap/ silicon rubber septum, 100 pieces
4 mL Sample Vial ¹²	4 mL	Polypropylene	4425149	General	4 mL sample vial plate	With cap/ silicon rubber septum, 100 pieces ¹³
1.5 mL Sample Vial 	1.5 mL	Borosilicate glass	228-15652-92	General	1.5 mL sample vial plate ¹⁴	With cap/ silicon rubber septum, 100 pieces
1.1 mL Sample Vial ¹² 	1.1 mL	Borosilicate glass	4413360	General / small volumes	1.5 mL sample vial plate ¹⁴	With cap/ silicon rubber septum, 100 pieces
1 mL Sample Vial	1 mL	Vial: Borosilicate glass Cap: Polyethylene	4425389	General	1 mL sample vial plate	With cap, 250 pieces

¹²For models with sample cooler, depending on the difference of thermal conductivities due to the shapes or materials, the set temperature of the sample cooler might differ from the temperature in the sample vial.

¹³Care must be taken when handling the polypropylene sample vials.

¹⁴Set the needle stroke to 45 mm or less.

Consumables, Options, and Spares

Part Name	Volume	Material	Part Number	Application	Conforming Plate	Description
1 mL Sample Vial ¹² 	1 mL	Vial: Polypropylene Cap: Polyethylene	4425150	General / small volumes Disposable	1.5 mL sample vial plate ¹⁴	With cap, 200 pieces ¹³
0.3 mL Sample Vial ¹² 	300 µL	Borosilicate glass	4412816	Small capacity vial	1.5 mL sample vial plate ¹⁴	With cap/ silicon rubber septum, 100 pieces
0.3 mL Sample Vial (Spare)	300 µL	Borosilicate glass	4412817	Small capacity vial	1.5 mL sample vial plate ¹⁴	100 pieces (glass vials only)
0.3 mL Sample Vial ¹² 	300 µL	Borosilicate glass	228-21284-91	Small capacity vial	4 mL sample vial plate	With spring, 100 pieces Used in 4 mL sample vials
0.3 mL Sample Vial (Spare)	300 µL	Borosilicate glass	4413361	Small capacity vial	4 mL sample vial plate	100 pieces (glass vials only)
0.2 mL Sample Vial ¹² 	200 µL	Vial: Polypropylene Cap: Polyethylene	4425340	For small capacity Disposable	1.5 mL sample vial plate ¹⁴	With cap, 100 pieces ¹³

Sample Vial Material for Use with the Autosampler

Note: Both glass and plastic (polypropylene) sample vials are available for use with the autosampler. However, to prevent any issues during analysis, follow these precautions when selecting the type of sample vial.

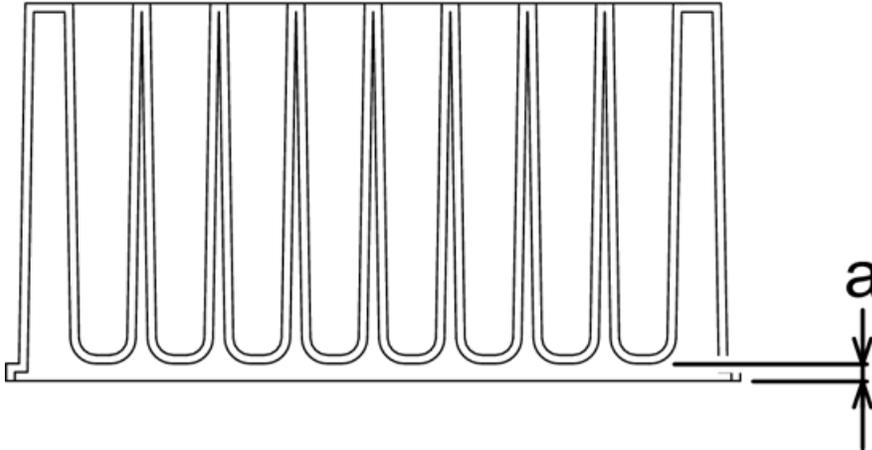
Type	Characteristic	Appropriate Sample Solvent
Glass Sample Vial	Ionic material such as an acid or base might be adsorbed to the surface of the glass. Analyzing the ionic material in such a state would deteriorate the accuracy and precision, affecting the reliability of the analysis. In that case, adjust the sample solvent to restrain adsorption of the material. Also, alkali or hydrogen fluoride might corrode the glass material.	<ul style="list-style-type: none"> 10 mmol/L to 100 mmol/L perchloric acid aqueous solution or mixtures of such with an organic solvent. For the organic solvent, use acetonitrile, methanol, or ethanol. 10 mmol/L trifluoroacetic acid (TFA) organic solvent. For the organic solvent, use acetonitrile, methanol, or ethanol. Trifluoroacetic acid is detected when n absorbance is detected between 200 nm and 220 nm.
Plastic Sample Vial	The hydrophobicity of the material is a cause of surface adsorption. The accuracy and precision of the analysis deteriorates, and sample solvents with a higher polarity are more affected. Using a low polarity sample solvent prevents the hydrophobic substance from being adsorbed, but if the polarity is too low, then the additives in the plastic might elute from the surface of the sample vial. An organic solvent might denaturalize plastic.	Mixtures of water or a buffer solution with an organic solvent. Organic solvent composition ratio: 20 % to 50 % (V/V). For the organic solvent, use acetonitrile, methanol, or ethanol.

Septum for Use with the Autosampler

Part Name	Appearance	Material	Part Number	Conforming Sample Vial	Description
Silicone Rubber Septum		Silicone rubber w/PTFE cover	4412734	<ul style="list-style-type: none"> 1.5 mL sample vial (228-15652-92) 1.1 mL sample vial (228-21283-91) 0.3 mL sample vial (228-16847-92) 	100 pieces
PTFE Septum		PTFE	4426178	<ul style="list-style-type: none"> 1.5 mL sample vial (228-15652-92) 1.1 mL sample vial (228-21283-91) 0.3 mL sample vial (228-16847-92) 	100 pieces
Silicone Rubber Septum		Silicone rubber w/PTFE cover	228-21290-91	4 mL sample vial (228-21287-91) (228-31537-91)	100 pieces
PTFE Septum		PTFE	4426273	4 mL sample vial	100 pieces

Microtiter Plate

Figure A-1 Microtiter Plate



The microtiter plates, deep-well plates, and plate mats recommended for this system are as follows:

Table A-1 Well-fitted Sealings and Compatible Plates

Plate Type	Product	Contact	Description
Microtiter Plate	267245 series	Nalge Nunc International (Thermo Fisher Scientific)	Material: Polypropylene Volume: 0.5 mL
Deep-Well Plate	278752	Nalge Nunc International (Thermo Fisher Scientific)	Material: Polypropylene Volume: 2 mL
	AXYGEN P-DW-20-C	Greiner	Nalge Nunc International (Thermo Fisher Scientific)
Mat	AXYGEN AM-2ML-RD	Greiner	Material: Silicone Too much filled volume in the well might cause the mat to rise to the surface over time.
	276011	Nalge Nunc International (Thermo Fisher Scientific)	
	276002 series	Nalge Nunc International (Thermo Fisher Scientific)	Material: Thermoplastic elastomer

Consumables, Options, and Spares

Table A-2 Heat Sealing Mats and Compatible Plates

Plate Type	Product	Contact	Description
Microtiter Plate	4titude 4Ti-0110	AB gene	Material: Polypropylene Volume: 0.3 mL
Deep-Well Plate	4titude 4Ti-0130	AB gene	Material: Polypropylene Volume: 1.85 mL
Mat	ABgene Easy Peel AB-0745	AB gene	Material: Foil
	4titude Peel-Seal 4Ti-0521	AB gene	Material: Foil
	4titude Pierce-Seal 4Ti-0531	AB gene	Material: Foil
	Permanent sheet PP 298-37851	Wako Pure Chemical Industries	Material: Foil

Table A-3 Adhesive Sealing Mats and Compatible Plates

Plate Type	Product	Contact	Description
Microtiter Plate	267245 series	Nalge Nunc International (Thermo Fisher Scientific)	Material: Polypropylene Volume: 0.5 mL
Deep-Well Plate	278752	Nalge Nunc International (Thermo Fisher Scientific)	Material: Polypropylene Volume: 2 mL

Table A-3 Adhesive Sealing Mats and Compatible Plates (continued)

Plate Type	Product	Contact	Description
	AXYGEN P-DW-20-C	Greiner	Material: Polypropylene Volume: 2 mL
Mat	USA SCIENTIFIC NAL-96 Sealing Film 2923-5000	USA Scientific	Material: Polyethylene (upper layer) Polypropylene (lower layer) <ul style="list-style-type: none"> • There is no adhesive for the well part. • Used exclusively for 96 well plates. • Too much filled volume in the well might cause the mat to rise to the surface over time.

Note: Take care when using mats with the following characteristics because they can cause the flow lines for the needle or the needle seal to clog.

- Mats with adhesive attached to the entire back side (the side in contact with the plate).
Regardless of the type of solvent, if such a mat is used, then the adhesive tends, over time, to become attached to the outer surface of the needle and the inside of the flow line hole. This prevents aspiration of the sample, clogging the flow line or preventing the correct peak area value from being obtained.
- Mats made of polyethylene terephthalate (PET).
When an acetonitrile-based or DMSO-based solvent is used, the sample solvent tends to swell and cause wrinkles in the mat after the mat is sealed, which might prevent airtightness from being maintained.
When the sample solvent is water-based or methanol-based, these mats cause no significant issues.

Pump Spares

Part Name	Part Number	Description
Polyethylene Seal	4427161	Utilized when a nonpolarized organic solvent like hexane or a solvent of alkyl sulfonic acid with TFA added is used.

Autosampler Spares

Part Name	Part Number	Description
Sample Loop (50 µL)	5039278	This is the sample loop for 50 µL injections.
Sample Rack	228-55735-41	Additional sample rack. Useful for switching quickly between multiple types of plates.
1 mL Sample Vial Plate (2 pcs) ¹⁵	228-56197-41	Plate that holds eighty-four 1 mL sample vials. It is possible to install two plates in one sample rack.
1.5 mL Sample Vial Plate (2 pcs) ⁰	228-50830-92	Plate that holds fifty-four 1.5 mL sample vials. It is possible to install two plates in one sample rack.
4 mL Sample Vial Plate (2 pcs) ⁰	228-56197-42	Plate that holds twenty-eight 4 mL sample vials. It is possible to install two plates in one sample rack.
ExionLC™ Rack Changer	5036648	
1.5 mL vial plate kit (3 plates)	4463925	Three 1.5-mL vial plates (for one stack) are included. Four kits are required if 12 plates are used.
Rinsing Port Cover	228-48328-01	
Rinse port cap (without holes)	4426125	For use when rinse solution contains highly volatile acids, such as formic acid, TFA, or acetic acid. Ten per kit.
Rinse port cap (with holes)	4426132	For use with other rinse solutions. Note: Use caps with holes even when using highly volatile acids, if there is a risk of cross-contamination.
Male nut fitting	4426108	Hand-tightened fittings. Usable for analyzing at a pressure of up to 35 MPa.
Male nut, 1.6 MN	4412795	Stainless steel nut
Ferrule, 1.6F, 316L	4462590	Stainless steel ferrule, 3 pieces
Male nut, 1.6 MN, W6	4412813	
Rack Teaching Jig	228-57562-41	

¹⁵For details on plates and sample vials, refer to [Consumables](#).

Column Oven Spares

Part Name	Part Number	Description
Column Clamp ASSY B5	4412791	A suite of clamps to add a column with an outside diameter between 6.4 mm and 9.5 mm.
Column Clamp ASSY B8	4412792	A suite of clamps to add a column with an outside diameter between 9.5 mm and 12.7 mm.
VHP Reusable Fitting 10-32 Coned, for 1/16" o.d. (single)	5037280	Fittings reusable 20 times with a pressure resistance of 130 MPa. For information on how to attach, refer to the documentation that comes with the fittings.

Options

Part Name	Part Number	Description
FCV-14AH	228-45014	Switches between up to six columns.
Mixer MR40 LPGE	5036663	Low-volume gradient mixer (inner volume 40 μ L) exclusively for low - pressure gradient. It allows for high speed analysis when used in conjunction with the low-volume inlet tubing kit (228-56531-41). Can be installed inside the column oven.

Other

Part Name	Part Number	Description
Touch Panel Protecting Sheet	228-59212-41	Protecting sheet for touch panel.
Tool Kit	228-57647-41	Kit containing the necessary tools for preparation, inspection, and maintenance.
ExionLC™ 100 Maintenance Kit (1 Year)	228-58343-41	Kit containing main consumable parts for to the ExionLC™ 100 system.
ExionLC™ 100 Maintenance Kit (Full, UV)	228-58343-42	Kit containing all consumable parts for the ExionLC™ 100 system.
Anti-Earthquake Kit	228-56298-41	Parts for strengthening the fixation of the reservoir tray and the system.

Consumables, Options, and Spares

Part Name	Part Number	Description
1 L Mobile Phase Bottle (5 pcs)	228-38583-42	A set of five 1 L reservoir bottles to put mobile phase in.
Grounding wire with clip	4413363	For static electricity preventative measure one
Caps for 18-L or 4-L container (with three 3-mm diameter openings)	228-21354-91	For static electricity preventative measure two

Error Messages

B

Error Code	Error Message	Type / Cause	Recommended Action
0x0046	Operation mode is local. Set the operation mode to remote.	Warning. Shown when the external detector (RF RID) is set to the local mode.	Set the external detector (RF RID) to the remote mode.
0x870E	Cannot write in EEPROM.	Fatal error. Shown when a writing error occurs the non-volatile memory (EEPROM) of the external detector (RF).	Take the corrective action for the error as described in the instruction manual of the external detector. If the error cannot be removed, contact the FSE.
0x9003	The backup parameters of the controller are corrupted. The method file and sequence file were initialized.	Error 3	Set the method and the sequence again.
0x9004	The backup parameters of the controller are corrupted. The method file and sequence file were initialized.	Error 3. Because the backup parameters are damaged, the method and the sequence have returned to the statuses for the last startup.	Inspect the method and the sequence.
0x9006	Illegal backup parameters. System information has been changed.	Error 3. Because an error was found in the backup parameter, the system information (system name, group name) was initialized.	Set the system information (system name, group name) again.
0x9010	Connection between the external detector and the instrument was disconnected.	Error 1. Communication can no longer be established with the external detector connected to the optical cable connector of the system.	Determine whether the external detector is turned on. If the power of the external detector is turned on, make sure that the optical cable is properly connected.

Error Messages

Error Code		Error Message	Type / Cause	Recommended Action
0x9020		An undefined fatal error has occurred.	Fatal error.	Determine whether the external detector shows an error and take the corrective action provided in the instruction manual for the external detector.
0x9021		An undefined error (Level 1) has occurred.	Error 1. An error (level 1) has occurred in the external detector.	Determine whether the external detector shows an error and take the corrective action provided in the instruction manual for the external detector.
0x9022		An undefined error (Level 2) has occurred.	Error 2. An error (level 2) has occurred in the external detector.	Determine whether the external detector shows an error and take the corrective action provided in the instruction manual for the external detector.
0x9023		An undefined error (Level 3) has occurred.	Error 3. An error (level 3) has occurred in the external detector.	Determine whether the external detector shows an error and take the corrective action provided in the instruction manual for the external detector.
0x9030 0x9031 0x9032 0x9033 0x9034 0x9035 0x9036 0x9037 0x9038	0x9040 0x9041 0x9042 0x9043 0x9044 0x9045 0x9046 0x9047 0x9048	Communication between the instrument and the workstation was disconnected.	Warning. Communication with the workstation was disconnected.	Inspect the network connection status. If the error cannot be removed, contact the FSE.

Error Code	Error Message	Type / Cause	Recommended Action
0x9050 0x9051	The buffer memory of the controller has overflowed.	Warning. The buffer memory for transmission from the system to the workstation is full.	Inspect the network connection status. If the error cannot be removed, contact the FSE.
0x9052	The IP address was set to 192.168.200.96 because the instrument failed to automatically obtain an IP address.	Error 3	Contact the network administrator. Configure the proper settings (Automatically obtain / Manually obtain) for the IP Address.
0x9053	Renewal/refresh of the IP address failed.	Error 2.	Contact the network administrator. Configure the proper settings (Automatically obtain / Manually obtain) for the IP Address.
0x9055	The maximum number of systems (10) that can be registered in the same group was exceeded.	Warning. Ten or more systems were connected in the same group.	Determine the number of systems connected in the system group where the error occurred.
0x9060	A timeout occurred in communication between the pump and controller.	Error 2. An error occurred in the communication between the pump and the controller, and the communication was disconnected.	Clear the error. If the error occurs again, contact the FSE.
0x9061	An error occurred in communication between the pump and controller.	Warning. An error occurred in the communication between the pump and the controller, but the communication was recovered.	Clear the error.
0x9062	A timeout occurred in communication between the autosampler or column oven and controller.	Error 2. An error occurred in the communication between the autosampler or column oven and the controller, and the communication was disconnected.	Clear the error. If the error occurs again, contact the FSE.

Error Messages

Error Code	Error Message	Type / Cause	Recommended Action
0x9063	An error occurred in communication between the autosampler or column oven and controller.	Warning. An error occurred in the communication between the autosampler or column oven and the controller, but the communication was recovered.	Clear the error. If the error occurs again, contact the FSE.
0x9070	An error signal was input from an external device connected to the external input (Alarm Input) on the back of the instrument.	Error 2. An error signal was received from an external device connected to the external input terminal.	Follow the instructions for the external device connected to the external input terminal.
0x9071	The external detector configured on the instrument is not connected.	Error 3. The analysis was started while a different detector from the one configured in the simple parameter in the Main Analysis screen was connected.	Connect the detector configured in the simple parameter in the Main Analysis screen or change the parameter to the connected detector.
0x9074	The system check has timed out.	Warning.	Perform the system test again. If the error cannot be removed, then contact the FSE.
0x9075	Purge was executed because the pump pressure reached the minimum pressure.	Error 2. Because the pump pressure reached the [P.Min] method parameter, a purge was executed.	Inspect the flow line for liquid leakage, and if there is no abnormality, then set the P.Min method parameter to an appropriate value.
0x9076	The injection volume set in the sequence is outside the setting range.	Error 3. The injection volume has exceeded the set value for Max Injection Volume in the system settings.	Set the injection volume to a value that is equal to or lower than the set value for Max Injection Volume in the system settings.
0x9077	A vial number that is different from the sample vial number set in the sequence might have been notified to the instrument.	Error 3	Clear the error and perform analysis again.

Error Code	Error Message	Type / Cause	Recommended Action
0x9078	A rack number that is different from the rack number set in the sequence might have been notified to the instrument.	Error 3	Clear the error and perform analysis again.
0x9079	The temperature of the column oven was not stable.	Error 2. During validation and calibration, the temperature of the column oven did not stabilize at the set temperature.	Inspect the column oven for an abnormality.
0x907A	No sample vial is installed in the autosampler rack.	Warning. No sample vial is installed for the sample vial number set in the sequence.	Install a sample vial for the sample vial number set in the sequence. If Vial Skip in the system settings is set to Enabled , analysis for which no sample vial has been installed will not be executed, but the next analysis will be executed.
0x907C	The power to the instrument was turned OFF during analysis.	Error 2. The power to the system was turned off during analysis.	Determine whether the power for the system and the workstation have been turned off. If they have not, verify the power status.
0x907E	There is no sample vial installed for the next analysis in the autosampler rack.	Warning. No sample vial has been installed for the sample vial number set in the next analysis.	Clear the error. If the error occurs again, contact the FSE.
0x9100	A sealing ability error occurred in the vacuum flow path of the degasser.	Warning	Inspect the vacuum pressure of the degassing unit. If the vacuum pressure is NG, then set the method parameter for the degasser power off and then on. If the vacuum pressure is OK, then there is no problem because the degasser is automatically recovered.

Error Messages

Error Code	Error Message	Type / Cause	Recommended Action
0x9101	The remaining amount of Mobile Phase A-1 liquid is low.	Warning	Replace the mobile phase and then set the mobile phase volume again.
0x9102	The remaining amount of Mobile Phase B-1 liquid is low.	Warning	Replace the mobile phase and then set the mobile phase volume again.
0x9103	The remaining amount of Mobile Phase C-1 liquid is low.	Warning	Replace the mobile phase and then set the mobile phase volume again.
0x9104	The remaining amount of Mobile Phase D-1 liquid is low.	Warning	Replace the mobile phase and then set the mobile phase volume again.
0x9105	The remaining amount of Mobile Phase A-2 liquid is low.	Warning	Replace the mobile phase and then set the mobile phase volume again.
0x9106	The remaining amount of Mobile Phase B-2 liquid is low.	Warning	Replace the mobile phase and then set the mobile phase volume again.
0x9107	The remaining amount of Mobile Phase C-2 liquid is low.	Warning	Replace the mobile phase and then set the mobile phase volume again.
0x9108	The remaining amount of Mobile Phase D-2 liquid is low.	Warning	Replace the mobile phase and then set the mobile phase volume again.
0x9109	The degasser is not connected.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x910A	The leak sensor of the pump is malfunctioning.	Fatal error	
0x910B	The leak sensor of the pump has detected an abnormal condition.	Fatal error	
0x910C	The backup parameters of the pump are corrupted.	Fatal error	

Error Code	Error Message	Type / Cause	Recommended Action
0x910D	The consumable part count data of the pump is corrupted.	Fatal error	
0x910E	The pump pressure exceeded the maximum pressure. Inspect the flow paths for cloggings, and verify the maximum pressure setting.	Error 1. The pump pressure exceeded the maximum pressure.	Inspect the flow line for clogging, and if there is no abnormality, then set the P.Max method parameter to an appropriate value or decrease the flow rate.
0x910F	The pump pressure does not reach the minimum pressure. Inspect the flow paths for leaks, and verify the minimum pressure setting.	Error 2. The pump pressure does not reach the minimum pressure.	Inspect the flow line for liquid leakage, and if there is no abnormality, then set the P.Min method parameter to an appropriate value. Due to this error, the pump will not operate for one minute after pumping starts.
0x9110	The system could not detect the home position of the pump motor.	Error 2	<ol style="list-style-type: none"> 1. Press  (Power button) to turn the power off, then press  (Power button) again to turn the power on. 2. Next, press Pump on the Main Analysis screen. 3. Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9111	The leak sensor of the pump detected a liquid leak.	Error 2	Inspect the flow line for liquid leakage and then wipe off the liquid around the leak sensor.
0x9112	The remaining amount of Mobile Phase A liquid is low.	Warning	Replace the mobile phase and then set the mobile phase volume again.

Error Messages

Error Code	Error Message	Type / Cause	Recommended Action
0x9113	The remaining amount of Mobile Phase B liquid is low.	Warning	Replace the mobile phase and then set the mobile phase volume again.
0x9114	The remaining amount of Mobile Phase C liquid is low.	Warning	Replace the mobile phase and then set the mobile phase volume again.
0x9115	The remaining amount of Mobile Phase D liquid is low.	Warning	Replace the mobile phase and then set the mobile phase volume again.
0x9116	The pressure increased during purge of the pump.	Error 2	Replace the mobile phase and then set the mobile phase volume again.
0x9117	Pump is stopped because a rotation error was detected in the cooling fan for the pump.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9200	There is a mistake in the analysis parameters or settings.	Error 1	Inspect the analysis condition for mistakes or inconsistencies. If no mistake or inconsistency is found, then press  (Power button) to turn the power off, and then contact the FSE.
0x9201	The leak sensor of the autosampler low pressure valve has detected a liquid leak.	Error 2. Liquid leaks from the low-pressure valve, measuring pump, or a unit (such as a high-pressure valve, column oven, or detector) positioned above the low-pressure valve.	Inspect the low-pressure valve, measuring pump, or unit positioned above the low-pressure valve for liquid leakage, and then wipe off the liquid around the leak sensor.
0x9202	The leak sensor of the autosampler high pressure valve has detected a liquid leak.	Error 2. Liquid leaks from the high-pressure valve or a unit (such as a detector) positioned above the high-pressure valve.	Inspect the high-pressure valve or unit positioned above the high-pressure valve for liquid leakage, and then wipe off the liquid around the leak sensor.

Error Code	Error Message	Type / Cause	Recommended Action
0x9203	Could not detect the rotation direction home position of the autosampler measuring pump.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9208	Temperature control is turned off because the autosampler rack L heater has overheated and the thermal fuse has blown.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x920A	Temperature control is turned off because the autosampler rack R heater has overheated and the thermal fuse has blown.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x920B	The leak sensor in the autosampler low pressure valve has detected an abnormal condition.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x920C	The leak sensor in the autosampler low pressure valve is malfunctioning.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x920D	The leak sensor in the autosampler high pressure valve has detected an abnormal condition.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x920E	The leak sensor in the autosampler high pressure valve is malfunctioning.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.

Error Messages

Error Code	Error Message	Type / Cause	Recommended Action
0x920F	Temperature control is turned off because the temperature sensor in autosampler rack L is malfunctioning.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9210	Temperature control is turned off because the temperature sensor in autosampler rack L has detected an abnormal condition.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9213	Temperature control is turned off because the temperature sensor in autosampler rack R is malfunctioning.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9214	Temperature control is turned off because the temperature sensor in autosampler rack R has detected an abnormal condition.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9215	Temperature control is turned off because the temperature sensor in the autosampler dehumidifier unit is malfunctioning.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9217	The backup parameters for the autosampler and column oven are corrupted.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9218	The consumable part count data for the autosampler and column oven is corrupted.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.

Error Code	Error Message	Type / Cause	Recommended Action
0x9219	The front panel of the autosampler might not be attached correctly. Alternatively, the sensor that detects the position of the front panel is malfunctioning.	Fatal error	<ol style="list-style-type: none"> 1. Make sure that the front panel is properly installed. 2. If the problem is not resolved, then press  (Power button) to turn the power off, and then contact the FSE.
0x921A	Temperature control is turned off because a rotation error was detected in the cooling fan of the autosampler.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x921B	A rotation error was detected in the exhaust heat fan at the top of the rear of the instrument.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x921C	The system could not detect the home position of the autosampler high pressure valve.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x921D	Teaching has not been executed for the autosampler injection port.	Error 2	Adjust the position of the needle for the injection port.
0x921E	The system could not detect the X- direction home position of the autosampler needle.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x921F	The system could not detect the Y- direction home position of the autosampler needle.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.

Error Messages

Error Code	Error Message	Type / Cause	Recommended Action
0x9220	The system could not detect the Z- direction home position of the autosampler needle.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9221	The system could not detect the forward and backward home position sensor of the autosampler measuring pump.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9222	There is no sample vial installed in the autosampler rack.	Error 3. No sample vial is installed for the sample vial number set in the sequence.	Install a sample vial for the sample vial number set in the sequence. If Vial Skip in the system settings is set to Enabled , then analysis for which no sample vial has been set will not be executed, but the next analysis will be executed.
0x9223	The system could not detect the home position of the autosampler low pressure valve.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9224	System Error	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9225	The temperature sensor in the autosampler dehumidifier unit has detected an abnormal value.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.

Error Code	Error Message	Type / Cause	Recommended Action
0x9227	Temperature control is turned off because the temperature sensor in autosampler rack plate L has detected an abnormal condition.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9228	Temperature control is turned off because the temperature sensor in autosampler rack plate R has detected an abnormal condition.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9229	Analysis was stopped because the position of the needle for the autosampler rack has not been adjusted.	Error 3. Because the position of the needle for the rack is not adjusted, analysis was stopped.	Adjust the position of the needle for the rack.
0x922A	The position of the needle for the rack installed in autosampler rack plate L has not been adjusted.	Warning. The position of the needle for the left rack is not adjusted.	Adjust the position of the needle for the left rack.
0x922B	The position of the needle for the rack installed in autosampler rack plate R has not been adjusted.	Warning. The position of the needle for the right rack is not adjusted.	Adjust the position of the needle for the right rack.
0x922C	The rack ID of the rack installed in the autosampler is not correct.	Warning. The rack ID is not correct.	Install the correct ID for the rack.
0x922D	The autosampler contains racks that have the same ID.	Warning	Change either the left or right rack ID.

Error Messages

Error Code	Error Message	Type / Cause	Recommended Action
0x9230	The setting for the autosampler sample vial number is outside the setting range.	Error 3. In the sequence, a sample vial number outside the setting range has been set for the installed plate.	Verify the sequence. Alternatively, make sure that the plate is properly installed.
0x9231	The autosampler needle X- direction motor has slipped.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9232	The autosampler needle Y- direction motor has slipped.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9233	The remaining autosampler rinse solution is low.	Warning	Replenish the autosampler rinse solution.
0x9234	When the autosampler needle was lowered, it hit a foreign object causing excessive force to be exerted on it.	Fatal error	Press  (Power button) to turn the power off, and then inspect the inside of the system for masking that prevents the needle from the dropping operation. If the error cannot be removed, then press  (Power button) to turn the power off, and then contact the FSE..
0x9341	The buffer memory of the detector has overflowed.	Error 3. The buffer memory for transmission from the system to the workstation is full.	Verify the communication environment and operating status between the system and the workstation. If the error cannot be removed, then press  (Power button) to turn the power off, and then contact the FSE..

Error Code	Error Message	Type / Cause	Recommended Action
0x9344	The system could not resend the data because the buffer memory of the detector overflowed during analysis.	Error 3. The recovery failed during an attempt to resend the transmission data from the system to the workstation.	Verify the communication environment and operating status between the system and the workstation. If the error cannot be removed, then press  (Power button) to turn the power off, and then contact the FSE..
0x9352	Communication between the instrument and the workstation has timed out.	Warning. Communication between the system and the workstation was disconnected.	Verify the communication environment and operating status between the system and the workstation. If the error cannot be removed, then press  (Power button) to turn the power off, and then contact the FSE..
0x9356	The IP address of the instrument is duplicated.	Error 3. The IP address of the system overlaps with that of another system.	Avoid duplicate IP addresses. If the error cannot be removed, then press  (Power button) to turn the power off, and then contact the FSE..
0x9400	The column oven door is open when the column oven is at high temperature. Close the column oven door as soon as possible in mind, such as burns.	Type: Warning. The column oven door is open with the column oven temperature at 50 °C min.	Clear the error. There will be no alarm sound or error message. Work while taking sufficient care for avoiding burns.

Error Messages

Error Code	Error Message	Type / Cause	Recommended Action
0x9401	Temperature control is turned off because liquid leak was detected inside the column oven.	Error 2	Take action in the following order. <ol style="list-style-type: none"> 1. If organic solvent leaks inside the column oven, take action to stop the leak in the tubing. 2. Inspect around the system for organic solvent gas, and if there is such gas, sufficiently ventilate the room. 3. After confirming that there is no abnormality in the above two points, calibrate the sensitivity of the gas sensor.
0x9402	An error was detected with the flow channel selection valve in the column oven.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9403	The gas sensor of the column oven has detected an abnormal condition.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9404	Temperature control is turned off because the thermal fuse of the column oven has blown.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9405	Temperature control is turned off because the Peltier unit of the column oven has detected an abnormal condition.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.

Error Code	Error Message	Type / Cause	Recommended Action
0x9406	Temperature control is turned off because the Peltier unit of the column oven has detected an abnormal condition.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9407	Temperature control is turned off because a rotation error was detected in the Peltier unit fan(outside) of the oven.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9408	Temperature control is turned off because a rotation error was detected in the Peltier unit fan (inside) of the oven.	Fatal error	If foreign objects such as the tubing prevent the fan from rotating, press  (Power button) to turn the power off, and then remove the foreign objects. If foreign particles cannot be removed or the error cannot be removed, then contact the FSE.
0x9409	Temperature control is turned off because the Peltier unit of the column oven has detected an abnormal condition.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x940A	The room temperature sensor of the instrument has detected an abnormal condition.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.

Error Messages

Error Code	Error Message	Type / Cause	Recommended Action
0x940B	Temperature control is turned off because the temperature of the column oven exceeded the maximum temperature.	Error 1. The column oven temperature has exceeded the set value for the [Temperature Limit(Maximum)] method parameter.	Configure the settings so that the set value for the column oven temperature simple parameter and that for the Temperature Limit(Maximum) method parameter are different by approximately 5 °C. If the difference is too small, then the column oven temperature might exceed the value for the Temperature Limit(Maximum) method parameter before it becomes the set value.
0x940C	Temperature control is turned off because the temperature sensor of the column oven is malfunctioning.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x940D	Temperature control is turned off because the temperature sensor of the column oven is malfunctioning.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x940E	The column oven temperature setting is too low compared to the room temperature.	Warning	Inspect the set value of the oven temperature simple parameter, and if the value is different from the room temperature by 10 °C min., then adjust the setting so that the difference becomes 10 °C maximum.
0x940F	The system failed to write to the column management device (CMD).	Warning. The CMD is defective.	Replace the CMD. If the issue cannot be resolved, then press  (Power button) to turn the power off, and then contact the FSE.

Error Code	Error Message	Type / Cause	Recommended Action
0x9410	Temperature control is turned off because the heater of the column oven is malfunctioning.	Fatal error	Press the Power OFF button in the error window to turn the power to the system off, and then contact the FSE.
0x9411	The upper part of the column oven door might be open. Alternatively, the column oven door sensor is malfunctioning.	Error 1	First, determine whether the column oven door is properly closed. If the issue cannot be resolved, then press  (Power button) to turn the power off, and then contact the FSE.

Glossary of Symbols

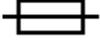
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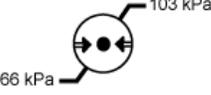
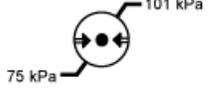
Note: Not all of the symbols in the following table are applicable to every instrument.

Symbol	Description
	Australian Regulatory Compliance Mark. Indicates the products complies with Australian Communications Media Authority (ACMA) EMC Requirements.
	Alternating current
A	Amperes (current)
	Authorized representative in the European community
	Biohazard
	CE Marking of Conformity
	cCSAus mark. Indicates electrical safety certification for Canada and USA.
	Catalogue number
	Caution Note: In SCIEX documentation, this symbol identifies a personal injury hazard.

Symbol	Description
	<p>China RoHS Caution Label. The electronic information product contains certain toxic or hazardous substances. The center number is the Environmentally Friendly Use Period (EFUP) date, and indicates the number of calendar years the product can be in operation. Upon the expiration of the EFUP, the product must be immediately recycled. The circling arrows indicate the product is recyclable. The date code on the label or product indicates the date of manufacture.</p>
	<p>China RoHS logo. The device does not contain toxic and hazardous substances or elements above the maximum concentration values, and it is an environmentally-friendly product that can be recycled and reused.</p>
	<p>Consult instructions for use.</p>
	<p>cTUVus mark for TUV Rheinland of North America.</p>
	<p>Data Matrix symbol that can be scanned by a barcode reader to obtain a unique device identifier (UDI).</p>
	<p>Environmental Hazard</p>
	<p>Ethernet connection</p>
	<p>Explosion Hazard</p>
	<p>Fire Hazard</p>
	<p>Flammable Chemical Hazard</p>

Glossary of Symbols

Symbol	Description
	Fragile
	Fuse
Hz	Hertz
	High Voltage. Electrical Shock Hazard If the main cover must be removed, contact a SCIEX representative to prevent electric shock.
	Hot Surface Hazard
	In Vitro Diagnostic Device
	Ionizing Radiation Hazard
	Keep dry. Do not expose to rain. Relative humidity must not exceed 99%.
	Keep upright.
	Laser Radiation Hazard
	Lifting Hazard
	Manufacturer

Symbol	Description
	Moving Parts Hazard
	Pinch Hazard
	Pressurized Gas Hazard
	Protective Earth (ground)
	Puncture Hazard
	Puncture Hazard
	Reactive Chemical Hazard
	Serial number
	Toxic Chemical Hazard
	Transport and store the system within 66 kPa to 103 kPa.
	Transport and store the system within 75 kPa to 101 kPa.
	Transport and store the system within 10% to 90% relative humidity.

Glossary of Symbols

Symbol	Description
	Transport and store the system within $-30\text{ }^{\circ}\text{C}$ to $+45\text{ }^{\circ}\text{C}$.
	Transport and store the system within $-30\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$.
	USB 2.0 connection
	USB 3.0 connection
	Ultraviolet Radiation Hazard
VA	Volt Ampere (power)
V	Volts (voltage)
	WEEE. Do not dispose of equipment as unsorted municipal waste. Environmental Hazard
W	Watts
	<i>yyyy-mm-dd</i> Date of manufacture

Glossary of Warnings

D

Note: If any of the labels used to identify a component become detached, contact an FSE.

Label	Translation (if applicable)
FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.	FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.