ExionLC Rack Changer

User Guide

RUO-IDV-05-1844

April 2015

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Contents

Introduction 1

Read this manual thoroughly before using the Exion LC Rack Changer. This guide describes the installation, operation, usage cautions, and accessories and options for this product. Read this guide thoroughly before using the product and operate the product in accordance with the instructions in this guide.

For additional safety information and for the installation procedure, hardware validation, and so forth, refer to the *ExionLC System Guide*. Keep this guide for future reference.

- If the user or usage location changes, make sure that this guide is always kept together with the product.
- If this documentation or the warning labels on the module become lost or damaged, promptly obtain replacements from a SCIEX representative.
- To ensure safe operation, contact a SCIEX representative if product installation, adjustment, or re-installation (after the product is moved) is required.

Contact Us

SCIEX and its representatives maintain a staff of fully-trained service and technical specialists located throughout the world. They can answer questions about the system or any technical issues that might arise. For more information, visit the SCIEX Web site at www.sciex.com.

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Documentation Symbols and Conventions

The following symbols and conventions are used throughout the guide.

DANGER! Danger signifies an action which leads to severe injury or death.

WARNING! Warning signifies an action that could cause personal injury if precautions are not followed.

CAUTION: Caution signifies an operation that could cause damage to the system or corruption or loss of data if precautions are not followed.

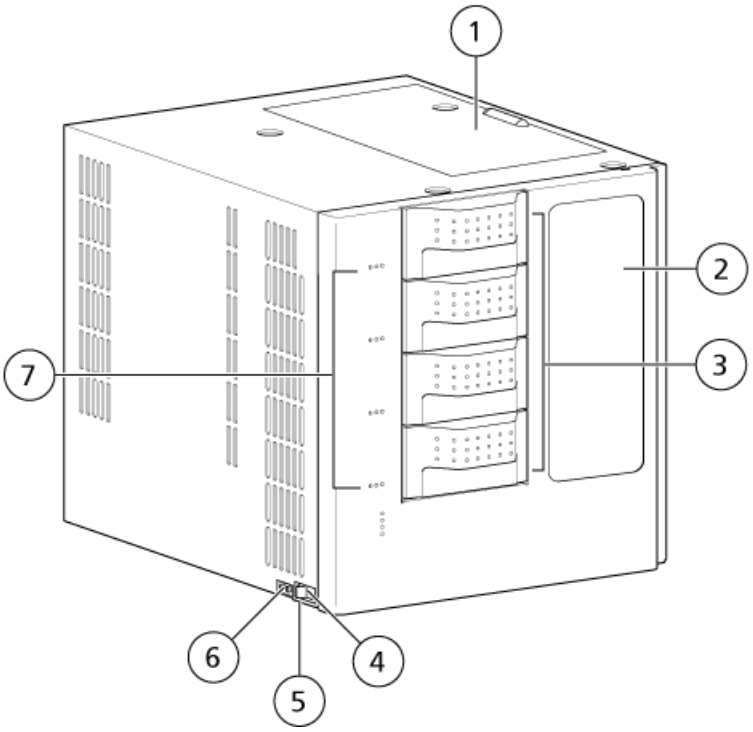
Note: Note emphasizes significant information in a procedure or description.

Tip! Tip provides useful information that helps apply the techniques and procedures in the text for a specific need and provides shortcuts, but is not essential to the completion of a procedure.

Overview 2

This module is a high capacity autosampler accessory designed specifically for the ExionLC AC and AD series autosamplers. It allows a maximum of 12 microtiter plates, deep-well plates, or dedicated 1.5 mL vial plates (option) can be loaded in the autosampler automatically. This module is not compatible with other types of autosamplers. If this module is combined with the ExionLC AC or AD series autosamplers, then samples can be cooled or heated within the temperature range of 4 to 40 °C.

Figure 2-1 Front Cover

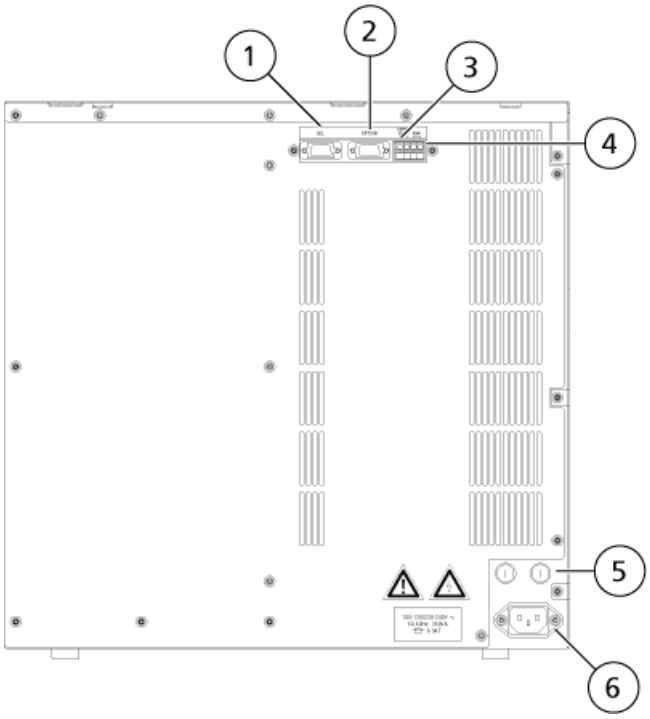


Item	Label	Description
1	Status panel	Comprising LED indicators. Refer to *Status Panel on page 44*.
2	Top panel	Allows access to interior of rack changer for removal or adjustment of plates.

Item	Label	Description
3	Front window	The internal LED lamp illuminates during operation. Verify the operating conditions of the unit through this front window.
4	Stack	Insert microtiter plates, deep-well plates, or 1.5 mL vial plates using the supplied racks.
5	Power switch	Used to turn the power on or off.
6	Leakage drain outlet	Attach drain tubing to allow for leakage to drain away from the module.
7	Condensation drain outlet	Connect the supplied drain tubing only when using the cooling function.

Note: While a rack is being loaded, the autosampler status panel indicates the stack from which the rack is removed. Do not pull the stack that is indicated on the status panel screen.

Figure 2-2 Back Panel



Item	Label	Description
1	SIL connector	Connect to the CHANGER connector at the autosampler using the supplied RS-232C cable.
2	Option connector	Not used with this module.
3	OUTPUT ERROR connector	This connector is used for relay contact output. If an error occurs in the module, then it is shown on the screen of the autosampler and the contact is closed.
4	RSVD connector	Not used with this module.
5	Fuse holders (2 pc)	Holds the fuses.
6	Power cord connector	Connects the power cord.

Preparation 3

Sample Preparation

For more information about sample preparation, refer to the *User Guide* for the ExionLC system.

Stack Applications Setup

The Exion LC Rack Changer has four stacks. Each of the four stacks can hold three plates, thus supporting up to 12 plates. For each stack, determine the plate type and then set the needle stroke of the autosampler. The plate type (stack code) to be used can be set on the autosampler status panel.

Note: The needle stroke setting range and the default value for each plate type in combination with the Exion LC Rack Changer is shown in the following table.

Stack code set value	Plate used	Needle stroke set range	Needle stroke default value
0	96-well microtiter plate	10 to 52	45 mm
1	96-well microtiter plate	10 to 52	45 mm
2	1.5 mL vial plate	10 to 46	44 mm
3	384-well microtiter plate	10 to 52	45 mm
4	384-well microtiter plate	10 to 52	45 mm

Multiple Types of Plates

Use plates of the same type in a single stack. Different types of plates can be used in different stacks.

Example:

- Stack A: 96-well microtiter plates

- Stack B: 96-well deep-well plates

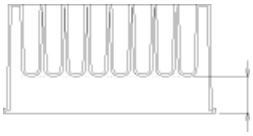
Note: The following settings must be made in advance:

1. Needle position adjustment for each type of plate. Refer to *Adjust the Needle Position on page 26*.
2. Needle stroke setting. Refer to *on page ?*.
3. STACK A to D CODE setting

Note:

- At the time of shipment, the four stacks are set to "96-well microtiter plate".
- If microtiter plates and deep-well plates that have the same number of wells are used, then the distance from the plate corner to the A1 well and the lateral and longitudinal distances between the wells must be consistent for all of the plates to be used.
- When using microtiter plates or deep-well plates, set the needle stroke to 47 mm or smaller to avoid the needle tip of the autosampler from contacting the bottom of vial. When using 1.5 mL vial plates, set the needle stroke to 45 mm or smaller to avoid the needle tip of the autosampler from contacting the bottom of vial.
- Do not use microtiter plates and deep-well plates having different distances from the well bottom to the plate bottom in the same stack.

Figure 3-1 Distance Between Bottom of Wells and Bottom of Plate



Operating Instructions 4

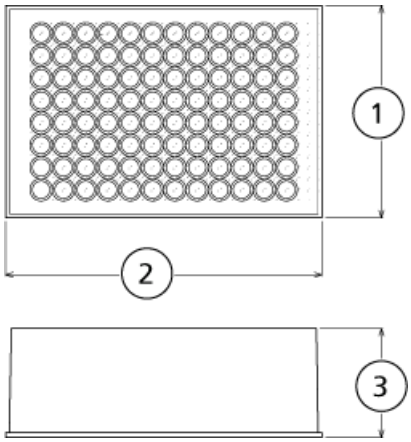
Plate Placement

This section describes the method for setting plates containing prepared samples in the racks.

Microtiter and deep-well plates come in various sizes, some of which cannot be used with this module. The size of microtiter and deep-well plates that can be used is shown in *Figure 4-1*. It is recommended that the microtiter plates, deep-well plates, and corresponding mats given in the following table are used with this module.

Refer to the *User Guide* for the ExionLC system for more information about the well-inset sealing mat and the heat sealing mat.

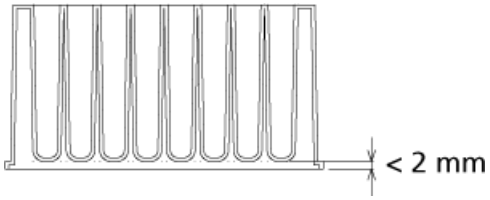
Figure 4-1 Plate Placement



Item	Description
1	84 mm to 86 mm
2	126 mm to 128 mm
3	Maximum height: 45 mm (including mat thickness)

Note: When cooling samples, do not use a microtiter or deep-well plate with a raised bottom, shallow wells, or a gap of more than 2 mm between the bottom of the wells and the bottom of the plate, even if it is the type of plate that can be mounted to the module racks. Using this type of plate will create a gap between the cooling plate on the rack and the microtiter plate or deep-well plate. Water condensation might occur in this gap, making it impossible to obtain accurate analysis results because of temperature gradient formation. Refer to *Figure 4-2*.

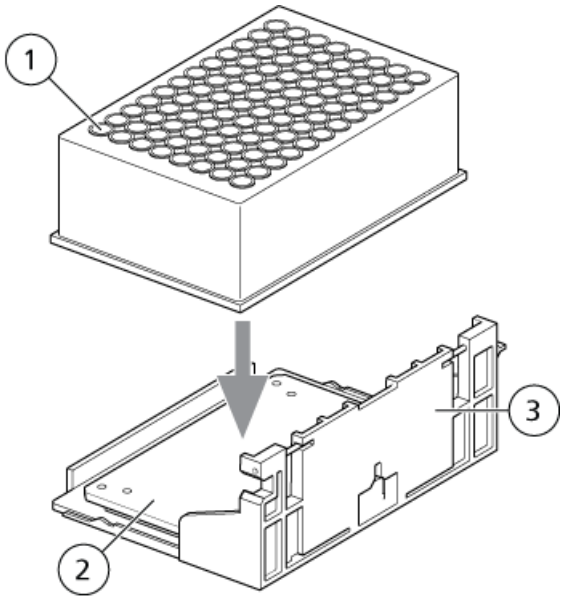
Figure 4-2 Gap Between the Bottom of the Wells and the Plate



Install Plates in Racks

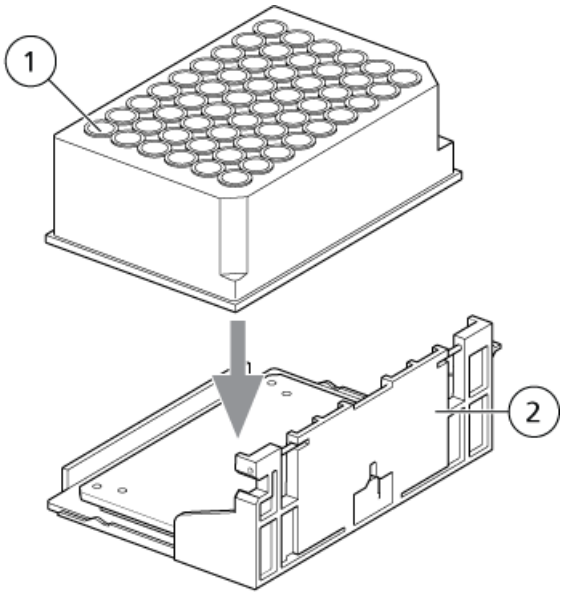
- Set a microtiter plate, deep-well plate, or 1.5-mL vial plate, equipped with samples, in the rack as shown in *Figure 4-3*. In the case of microtiter plates or deep-well plates, mount the plate while keeping the A1 well in the position shown in the figure.

Figure 4-3 Set Plate in Rack



Item	Label
1	A1 well
2	Rack
3	Cooling plate

Figure 4-4 Vial Plate



Item	Label
1	No. 1 vial
2	Rack

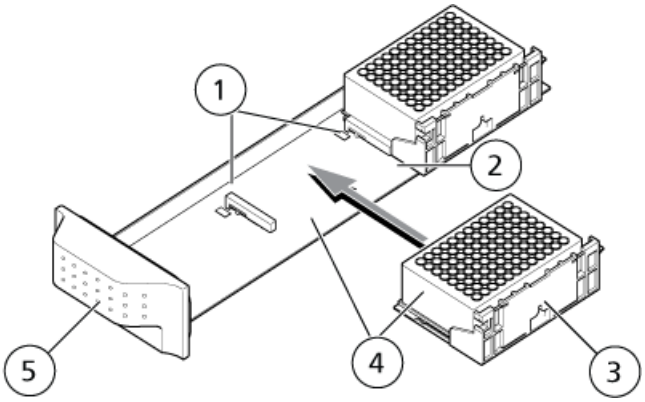
Note: Mount each microtiter plate, deep-well plate, or 1.5 mL vial plate on the rack from above, and then push it down to make sure that the bottom of the wells are firmly in contact with the cooling plate.

Install the Racks in Stacks

Use this method for inserting the racks, with plates mounted, in the stacks. A maximum of 12 microtiter plates, deep-well plates, or 1.5 mL vial plates can be inserted in four stacks.

- Insert each rack into the stack until it hits the guide. With the exception of the condensation-prevention rack, all 12 racks provided with the module have the same shape and any rack can be set in any position. If, however, a rack is removed after the method has been defined, then be sure to return it to the original position.

Figure 4-5 Insert Racks in Stacks



Item	Label
1	Rack guide
2	Insert the rack as far as it will go.
3	Rack
4	Bring here into close contact.
5	Stack

Tip!

- Insert the racks so that they are horizontal (that is, parallel to the stack). Carry the stack horizontally using both hands.
- Before inserting the racks, make sure that the stack setting is suitable for the type of plates to be used. Refer to *Stack Applications Setup on page 10*.

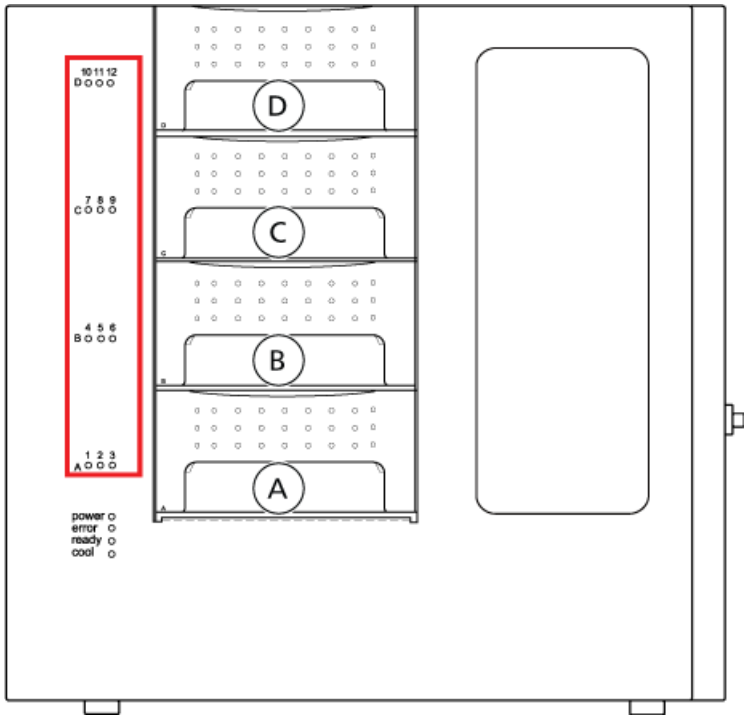
Tip! When cooling samples, insert racks with empty microtiter plates, deep-well plates, or 1.5 mL vial plates to prevent dew condensation. If a force greater than usual is required to remove a rack from the stack, dew condensation water might collect in large quantity between the rack and the stack. If a large quantity of dew condensation water is found on the rack and the stack, wipe it off completely.
Refer to *Wipe Off Condensation (when the autosampler is equipped with cooling function) on page 35*.

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.

Install the Stacks in the Exion LC Rack Changer

This section describes the method for setting stacks equipped with racks in the module. Users can determine the types of plates to be used for each stack. The stacks are labeled with stack symbols A, B, C, and D. Set the stacks in the module in accordance with the symbols A, B, C, and D, which are displayed on the front of the module.

Figure 4-6 Stack Symbols

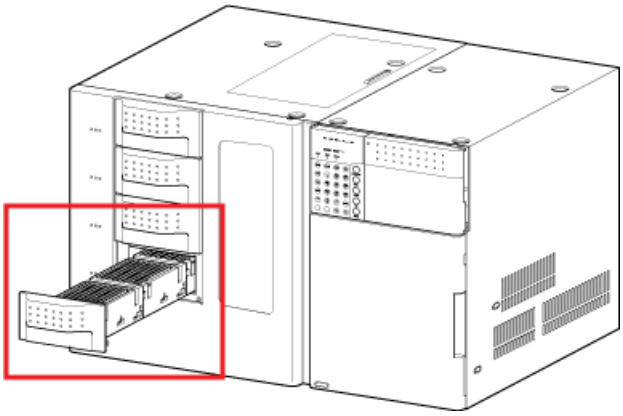


Stack symbol	Rack number (rack number input in the sample table)
A	[1], [2], and [3] from the stack handle side
B	[4], [5], and [6] from the stack handle side
C	[7], [8], and [9] from the stack handle side
D	[10], [11], and [12] from the stack handle side

1. Push the stacks into the module until they hit the end of the module. The magnet on the inside of the handle makes contact with the chassis.

Note: When removing a stack from the module, pull it out slowly with both hands, keeping it horizontal. Be careful not to drop it on the table or the floor as shown in *Figure 4-7*.

Figure 4-7 Stack



2. Set the unused stacks in the module.

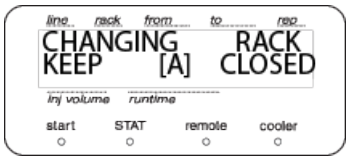
When the 1 to 12 indicators and the Ready indicator are flashing, a rack is being loaded. The internal LED lamp illuminates during initialization and while a rack is being loaded so that the loading status by the driving unit can be viewed through the front window.

Note: When the user selects performs a rack check operation automatically on completion of setting a stack (RC STACK SCAN = 0), if any of the stacks has not been pushed into the module properly, then the three indicators for that stack will flash. Four stacks must be installed in the module before initialization or rack loading to the autosampler can start.

When the autosampler is equipped with cooling function. At the same time as initialization starts, cooling or heating of the samples set in the module also starts. The setting temperature is indicated at the temperature set value (default: 15 °C) of the autosampler. The cool indicator starts flashing when cooling or heating starts and stays permanently illuminated when the monitor temperature reaches the set temperature.

Note: While a rack is being loaded, the status panel of the autosampler indicates the stack from which the rack is taken out. Do not pull the stack that is indicated on the status panel.

Figure 4-8 Status Panel



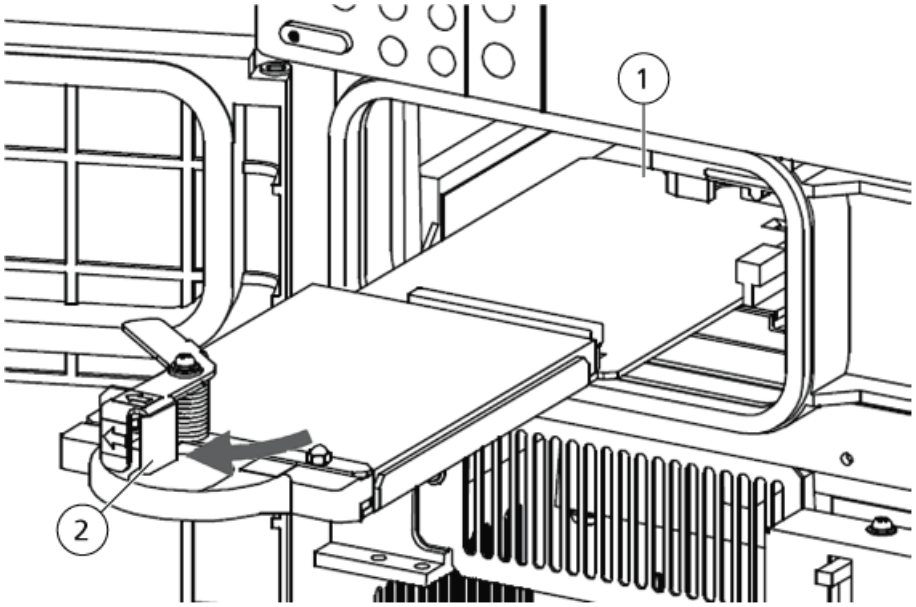
Install the Rack-changer Rack in the Autosampler

The rack-changer rack supplied with the module has a lock mechanism. Release the lock as described in this procedure and then install the rack in the autosampler.

1. Pull the lock lever in the direction shown by the arrow until the lock is released, and then insert the rack-changer rack into the autosampler as far as it will go. Refer to *Figure 4-9*.
2. Push the rack-changer rack along the guides while keeping its undersurface in close contact with the rack plate top surface of the autosampler.

   Make sure that the rear of the rack-changer rack is not raised.

   Figure 4-9 Rack-changer Rack in the Autosampler

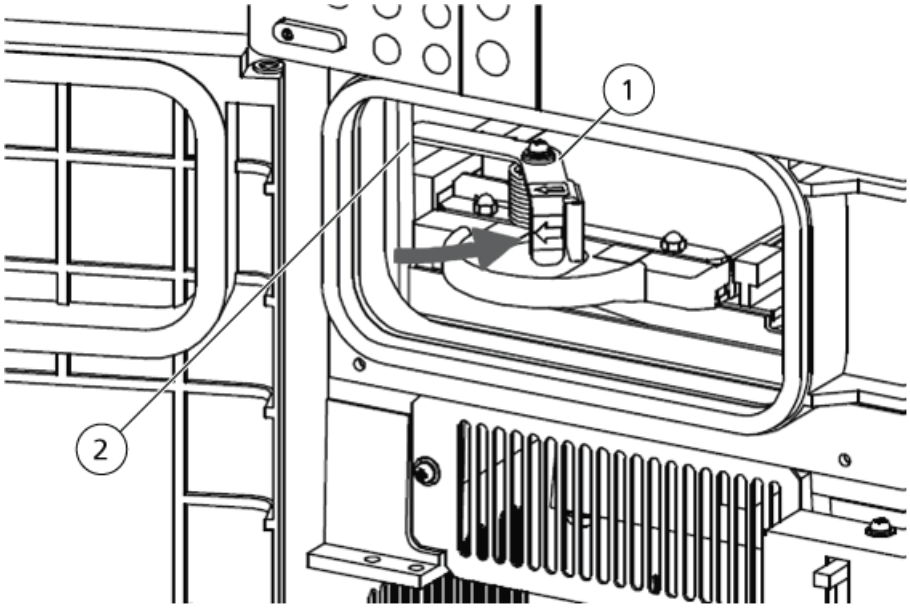


Item	Label
1	Rack-changer rack
2	Lock lever

   The back of the rack-changer rack can be confirmed from the rack insertion entrance of autosampler.

3. Push the lock lever back to its original position in the direction shown by the arrow to lock the rack-changer rack in position. Make sure that the end of the lock lever is in contact with the wall of the autosampler. Refer to *Figure 4-10*.

Figure 4-10 Lock Lever



Item	Label
1	Lock lever
2	Wall

4. Insert the rack-changer rack in the autosampler without anything on it.

   When the autosampler is equipped with a cooling function, a condensation-prevention rack is automatically installed in the rack-changer rack at the start of communication with the autosampler after power-up.

   When a sample rack or condensation-prevention rack is installed in the rack-changer rack, it is not possible to remove the rack-changer rack from the autosampler.

   When removing the rack-changer rack from the autosampler, refer to *Maintenance for Long Periods without Use on page 37*.

Turn on the Module

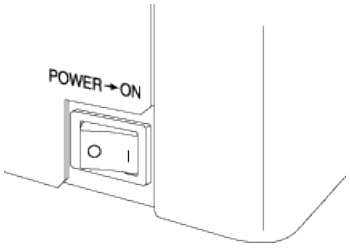
Before starting an analysis, turn on the power switches on the module and the autosampler and then wait until initialization is complete. Follow the procedure in this section.

Note:
Do not pull out a stack during initialization. If it is necessary to pull a stack out, then wait until initialization is complete and the 1 to 12 indicators and the ready indicator are illuminated. The internal LED lamp illuminates during initialization and while a rack is being loaded so that the loading status by the driving unit can be viewed through the front window. If, for some reason, a stack is pulled out during initialization, a warning beep is emitted and operation of the driving units stops temporarily. If the stack is returned, operation continues from the state immediately before the stack was pulled out after performing initialization.

When the autosampler is equipped with cooling function. At the same time as initialization starts, cooling or heating of the samples set in the module also starts. The setting temperature is indicated at the temperature set value (default: 15 °C) of the autosampler. The cool indicator starts flashing when cooling or heating starts and stays permanently illuminated when the monitor temperature reaches the set temperature.

1. Turn on the module power switch, located at the bottom of the left side.

Figure 4-11 Power Switch



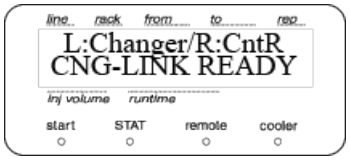
All of the indicators illuminate for approximately one second.

2. Turn on the autosampler connected to the module. The power indicator illuminates.

   The power indicator illuminates. All of the indicators on the status panel screen of the autosampler illuminate, and the autosampler starts initialization. The drive unit of the module also confirms the presence or absence of racks in the module. Indicators 1 to 12 and the ready indicator flash during initialization of the driving units.

3. Verify that the module and the autosampler are connected correctly. When connected, CNG-LINK is shown on the autosampler screen.

Figure 4-12 Autosampler Screen

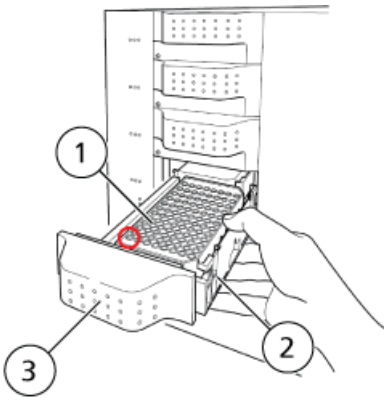


Adjust the Plate Positions

Before starting needle position adjustment with respect to the plate, make sure that a rack-changer rack is set in the autosampler, that both of the power switches at this module and the autosampler are turned on, and that initialization is complete.

1. Set a rack on the plate to which needle position must be adjusted in the No. 1 position (at the front) at stack A (at the bottom) in the module.

Figure 4-13 Well and Vial



Item	Label
1	Plate
2	Rack
3	Stack A

2. Verify that the orientation of the plate is correct. In the case of a 1.5 mL vial plate, set empty vials without septum in positions 1 and 54. Even if the plate is going to be set in position 2 or 3 in stack A or in any position in stack B, C, or D, set the in position 1 in stack A when adjusting the needle position.
3. Select EXIONLC RACK CHANGER on the auxiliary setting screen of the autosampler to show the STACK A CODE screen.
4. Press **enter** and then set the stack code number of the plate for the stack A code.
5. For the stack code number to be input, refer to *Table 4-1*. The results of adjustment are saved for each of five types of plates.

Table 4-1 Stack Code Number

Stack Code Set Value	Plate Used
0	96-well microtiter plate
1	96-well deep-well plate
2	1.5 mL vial plate
3	384-well microtiter plate
4	384-well deep-well plate

6. Press ↑ on the autosampler initial screen.

   The Z HOME screen is shown.

7. Press **enter**.

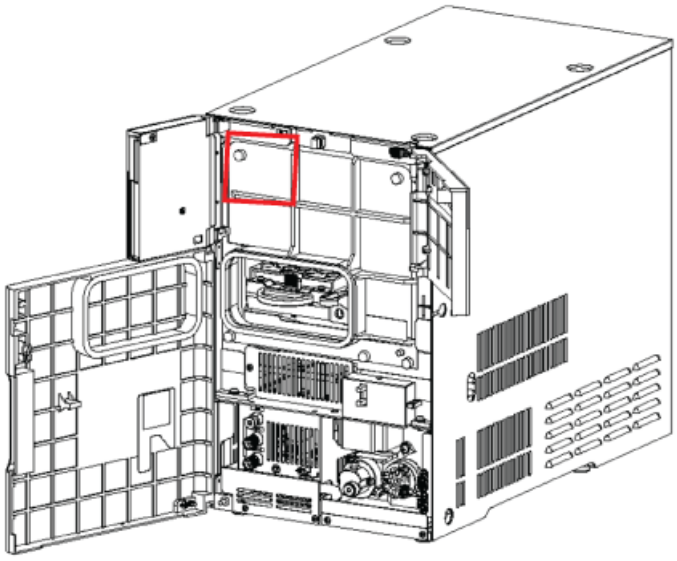
   The needle moves up fully and then moves to the center of the module.

8. If the autosampler door open or close state is to be automatically detected (the default setting), cancel automatic door open/close detection at the autosampler.

Tip! Select **CALIBRATION** on the VP function screen of the autosampler, and then input the password to show the **CANCEL DOORSW** screen. Select 1: Yes.

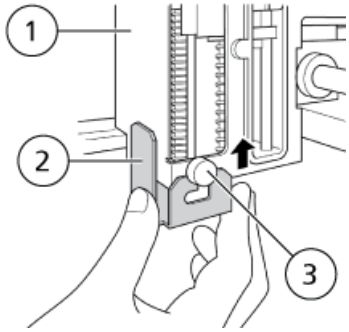
9. Turn off the power switch of the autosampler from the AC mains supply.
10. Disconnect the power cable of the autosampler.
11. Open the front door of the autosampler, and then remove panel F. Refer to the *User Guide* for the ExionLC system.

Figure 4-14 Front Door



12. Loosen one screw at the bottom right of the Z mount.
13. Move the needle position adjusting the fixture from the bottom of the Z mount in the direction shown by the arrow.

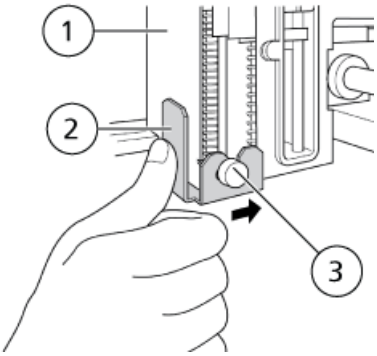
Figure 4-15 Z Mount



Item	Label
1	Z mount
2	Screw
3	Needle position adjusting fixture

14. Move the needle position adjusting fixture toward the back of the module in the direction shown by the arrow, and then tighten the screw.

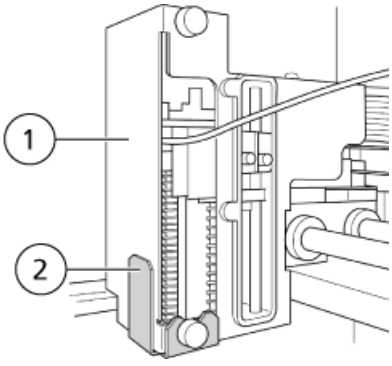
Figure 4-16 Slide the Needle Position



Item	Label
1	Z mount
2	Screw
3	Needle position adjusting fixture

15. Insert the needle position adjusting fixture so that it comes in close contact with the Z mount cover.

Figure 4-17 Needle With the Needle Position Adjusting Fixture Mounted



Item	Label
1	Z mount cover
2	Needle position adjusting fixture

16. Insert the power plug of the autosampler, and then turn on the power.

WARNING! Personal Injury Hazard. Never insert fingers or anything into the instrument when the autosampler power is on. The Z mount will move even if the autosampler front door is open.

The Z mount moves back to the position above the high-pressure valve and the needle moves down to the injection port.

Adjust the Needle Position

Adjust the needle position with respect to the plate set in position 1 of stack A in the module.

Note: The results of adjustment are saved separately for each of five types of plates.

1. Select CALIBRATION on the auxiliary setting screen of the autosampler and then press **func**.
2. Enter the password (default: "00000") and then press **enter**.

   The ADJUSTMTP screen is shown.

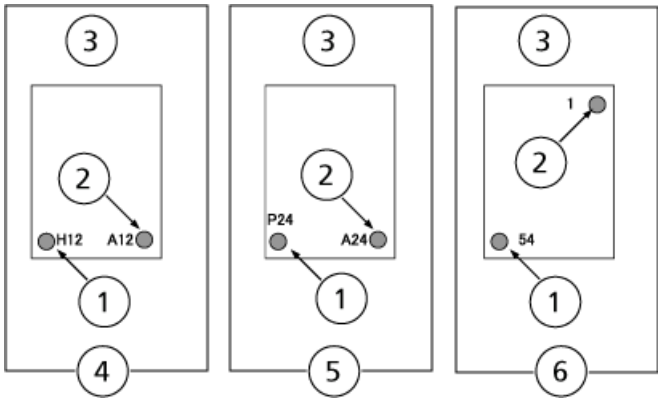
   Note: When the entered password is correct, the ADJUST MTP screen is shown.

3. Press **enter** to automatically move the rack in position 1 (front) in stack A (bottom) to the plate in the autosampler. The needle moves close to position 1 and then stops.

   WARNING! Personal Injury Hazard. Never insert fingers or anything into the instrument when the autosampler power is on. The Z mount will move even if the autosampler front door is open.

   Note: The locations of position 1 and position 2 vary depending on the plate type, as shown *Figure 4-18*.

Figure 4-18 Plate Types



Item	Label
1	Position 1 (Autosampler, front)
2	Position 2
3	Autosampler, rear
4	96-well microtiter plate or 96-well deep-well plate
5	384-well microtiter plate or 384-well deep-well plate
6	1.5 mL vial plate

4. Move the needle using the arrow keys until the needle tip comes to the position that allows it to move down into the center of the hole in position 1.

Note: This position adjustment is not intended to determine the depth to which the needle moves down. Set the depth at NEEDLE STROKE.

Arrow Key	Direction of Needle Movement
←	The needle moves 0.1 mm to the left.
→	The needle moves 0.1 mm to the right.
↑	The needle moves to the top.
↓	The needle moves down 4 mm the first time. The needle moves down 0.2 mm afterwards.
Ins	The needle moves down 4 mm the first time. The needle moves down 1.0 mm afterwards.

Arrow Key	Direction of Needle Movement
func	The needle moves 0.1 mm to the front.
back	The needle moves 0.1 mm to the rear.

5. Press **enter**.

   The adjusted position is determined and saved. The needle moves close to position 2 and then stops.

   Note: To stop the adjustment halfway, press **CE**. The needle position is not set.

6. Repeat step 4 to adjust the needle for position 2.
7. Press **enter**.

   The adjusted position is determined and saved. Adjustment has been completed, and the needle moves to the injection port.

8. When the needle position has been adjusted, press ↑ on the initial autosampler screen.

   The Z HOME screen is shown.

9. Press **enter**.

   The needle moves up fully and then moves to the center of the module.

10. On the autosampler, reset the automatic door open or close detection to the default setting.

    Tip! Select CALIBRATION on the VP function screen of the autosampler, and input the password to show the CANCEL DOORSW screen. Select 0: No.

11. Turn off the autosampler.
12. Disconnect the autosampler from the AC mains supply.
13. Open the front door of the autosampler and loosen one screw at the bottom right of the Z mount, and then remove the needle position adjusting fixture from the Z mount.

    Note: Be careful not to lose the needle position adjusting fixture after it is removed.

14. Open the front door of the autosampler, and install panel F with five screws.
15. Insert the power plug of the autosampler, and turn on the power. The Z mount moves back to the position above the high-pressure valve and the needle moves down to the injection port.

    Note: Close the front door of the autosampler.

    The Z mount will not move if the front door of the autosampler is open.

Setting Sample Well Numbers

The installed microtiter plates, deep-well plates, or 1.5-mL vial plates are assigned rack numbers shown above. Refer to *Install the Stacks in the Exion LC Rack Changer on page 16*.

The injection order of the plates can be set freely using these rack numbers.

For details about the sample well number setting procedure, refer the *User Guide* for the ExionLC system.

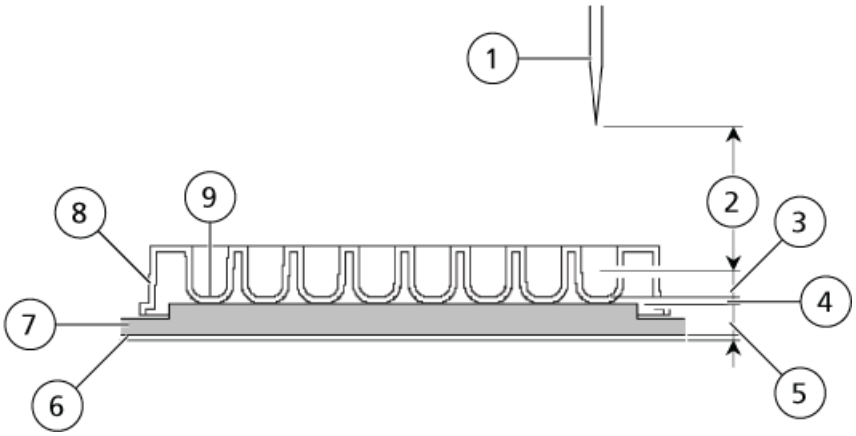
The set stack code is shown on the autosampler screen.

Set the Needle Stroke

Note: The needle stroke must be set so that there will be at least 1 mm left between the needle tip and the bottom of the vial or well. If there is no space between the needle tip and the bottom of the vial or well, the needle tip will contact the vial or well and might fail in sample aspiration, resulting in false analysis results. In addition, even if the same kinds of microtiter plates or deep-well plates are used with the same needle stroke setting, the distance between the needle tip and the well bottom might vary up to 3 mm due to the rack structure depending on whether the autosampler is used independently or is used in combination with a Exion LC Rack Changer.

When the autosampler is used with the Exion LC Rack Changer (rack-changer rack) and if the well bottom thickness at the microtiter plate is 1 mm and the needle stroke setting is 45 mm (default), then the needle tip will move down to the depth 3 mm from the well bottom surface as shown in *Figure 4-19*.

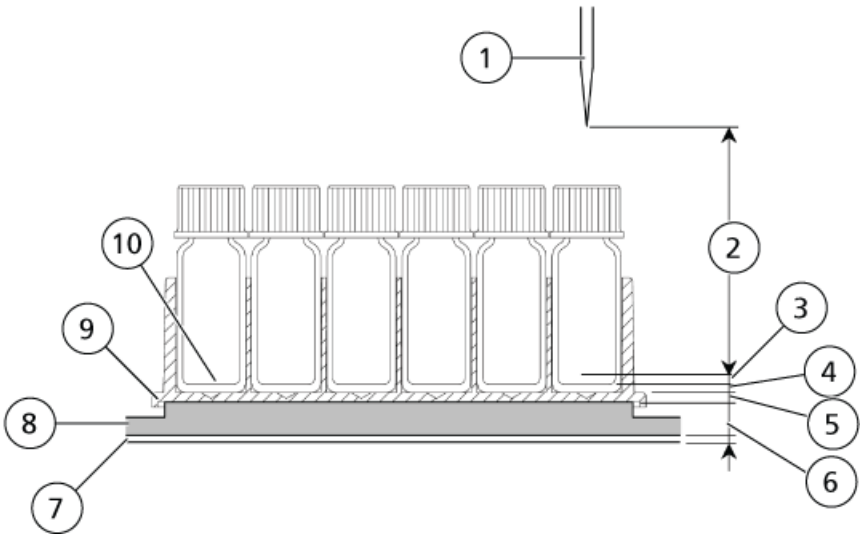
Figure 4-19 Default Needle Stroke Setting



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: 3 mm
4	Well bottom thickness: 1 mm
5	Rack bottom thickness: 6 mm
6	Rack-changer rack (thickness: 2 mm)
7	Rack
8	Microtiter plate or deep-well plate
9	Well bottom

When 1.5 mL vial plates are used with vials having a bottom thickness of 1.5 mm on the Exion LC Rack Changer and the needle stroke setting is 44 mm (default), the needle tip will move down to the depth 2 mm from the vial bottom surface.

Figure 4-20 Default Needle Stroke Setting



Item	Label
1	Needle (in its home position)
2	Needle stroke setting (descending distance of the needle): 44 mm
3	Gap between the needle tip and the well bottom: 2 mm

Item	Label
4	Vial bottom thickness: 1.5 mm
5	Plate bottom thickness: 1.5 mm
6	Rack bottom thickness: 6 mm
7	Rack-changer rack (thickness: 2 mm)
8	Rack
9	1.5 mL vial plate
10	Vial bottom

CAUTION: Potential System Damage. When using plastic vials or small-capacity vials with narrow tips, set 42 (mm) or less for the needle stroke. If a value greater than 42 (mm) is set, and because the bottom position of these vials is higher than that of glass vials, the needle might hit the bottom of the vial, resulting in variations in the amount of sample injection or breakage of the needle tip.

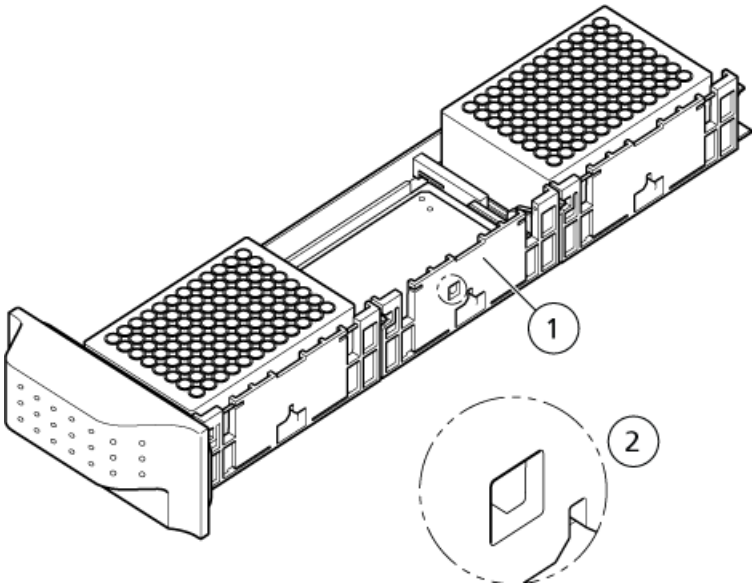
Injection Preparation

Analysis can be started from the autosampler. Refer to the autosampler user guide for more information.

Note: Each rack corresponds to the rack number indicator on the front panel of the module. When the autosampler starts analysis of the plate where the rack is contained, the corresponding rack number indicator on the front panel changes from on to flashing. When the autosampler is equipped with cooling function, the rack number whose indicator is flashing during sample cooling or heating is holding a condensation-prevention rack.

Note:
If a stack holding a condensation-prevention rack is pulled out, do not remove or change the position of the condensation-prevention rack.

Figure 4-21 Condensation-prevention Rack



Item	Description
1	Condensation-prevention rack
2	A square hole is provided

When the 1 to 12 indicators and the [ready] indicator are flashing on the front panel, a rack is being loaded. Refer to *Figure 4-22*. If it is necessary to pull a stack out, wait until the 1 to 12 indicators and the [ready] indicator are illuminated. The internal LED lamp illuminates during initialization and while a rack is being loaded so that the loading status by the driving unit can be viewed through the front window.

If a stack is pulled out while a rack is being loaded, then a warning beep sounds and the drive unit stops temporarily. If the stack is moved back, then initialization will start and the motion resumes from the position at which the stack was pulled out.

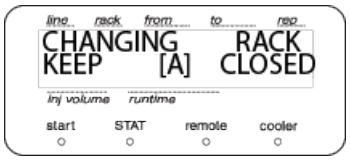
Do not open the door of the autosampler while a rack is being loaded. If the door is opened, the loading operation stops temporarily for safety reasons. When the door is closed, however, operation continues from the state immediately before the door was opened.

When "0" (default) is set for RC STACK SCAN, that is, the function of verifying the presence or absence of a rack before inserting it into a stack, the module will start the rack verification operation after a stack is opened and closed to verify the presence or absence of a rack in the stack. When "1" is set for RC STACK SCAN, the module

will not start the rack check operation after a stack is opened and closed because it is not necessary to verify the presence or absence of a rack in the stack.

While a rack is being loaded, the status panel on the autosampler indicates the stack from which the rack is taken out. Do not pull the stack that is indicated on the status panel.

Figure 4-22 Status Panel



Maintenance 5

It is necessary to perform periodic inspections of this module to ensure its safe use. It is possible to have these periodic inspections performed by a SCIEX service representatives on a contractual basis. For information about the inspection & maintenance contract, contact a SCIEX representative.

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

Clean the Module Surfaces

Required Materials

• Dry, soft rags, or tissue paper
• For persistent stains
  • Diluted, neutral detergent
  • Water

1. Wipe the module surfaces with the rag or tissue paper.
2. If the stains persist, 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.

Wipe Off Condensation (when the autosampler is equipped with cooling function)

Do not allow spilled water to remain on the module surface, and do not use alcohol or thinner-type solvents to clean the surfaces. These can cause rusting and discoloration.

- If a significant amount of condensation builds up on a stack, rack, or cooling plate inside the module, wipe it off with a soft, dry cloth or with wiper paper.

Recommended Maintenance Schedule

Regularly clean and maintain the system for optimal performance. *Table 5-1* provides a recommended schedule for cleaning and maintaining the system.

Table 5-1 Maintenance Tasks

Component	Three Years	Six Years	For more information...
Fuse replacement	x		Refer to *Replace Fuses on page 36*.
Lubrication of the Z-axis feed screw	x		Ask a SCIEX representative to lubricate the component. Sampler grease is used.
Lubrication of the Z-axis linear guide	x		Ask a SCIEX representative to lubricate the component. Sampler grease is used.
Lubrication of the X-axis linear guide	x		Ask a SCIEX representative to lubricate the component. Sampler grease is used.
Lubrication of the Y-axis linear guide	x		Ask a SCIEX representative to lubricate the component. Sampler grease is used.
Replacement of packing on the right side of the Exion LC Rack Changer		x	Ask a SCIEX representative to lubricate the component. Carry out when condensation in the sample cooler has become excessive.
Replacement of stack handles		x	Ask a SCIEX representative to lubricate the component. Carry out when condensation in the sample cooler has become excessive.

After completion of inspection or maintenance, turn on the power switches at the module and the autosampler and then make sure that initialization completes correctly. If initialization completes correctly, then the ready indicator stops flashing and remains permanently illuminated. Refer to *Troubleshooting and Corrective Action on page 38* if initialization does not complete correctly.

Replace Fuses

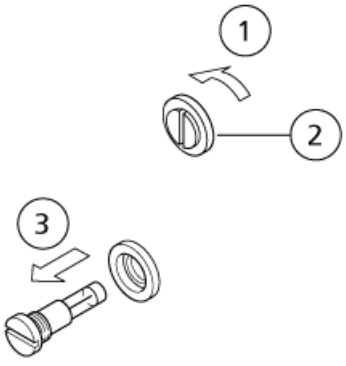
WARNING! Electrical Shock Hazard. Always turn off the power and then unplug the instrument prior to performing inspection and maintenance. Otherwise, fire, electric shock, or a malfunction might occur.

WARNING! Electrical Shock Hazard. Before replacing fuses, turn off the power and unplug the module. For replacement, only use fuses of the correct type and rating. Failure to heed the above could result in fire, electric shock or short circuits.

Required Materials
• Flat-bladed screwdriver

1. Pull out the fuse holder by using, for example, a flat-head screwdriver.

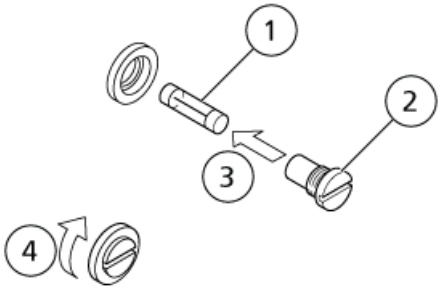
Figure 5-1 Removing the Fuse



Item	Description
1	Loosen (counter-clockwise)
2	Fuse holder
3	Remove

2. Install the new fuse in the fuse holder.
3. Install the fuse holder and then secure it with a flat-bladed screwdriver.

Figure 5-2 Installing the Fuse



Item	Description
1	Fuse
2	Fuse holder
3	Install
4	Tighten

Maintenance for Long Periods without Use

If the Exion LC Rack Changer is not used for a long time, then remove microtiter plates, deep-well plates, or 1.5 mL vial plates from the module. Remove the rack-changer rack from the autosampler. Before the rack-changer rack is removed, however, all of the racks (including the condensation-prevention rack) must be removed from the rack-changer rack using this procedure. The autosampler can be used on a stand-alone basis.

1. Turn on the power switches at the Exion LC Rack Changer and the autosampler.
2. Execute REMOVE RACK using the keypad on the autosampler, and then remove the racks from the rack changer rack to keep the rack changer rack empty.

Note: The racks are returned to the original rack number positions in the Exion LC Rack Changer. The condensation prevention rack, if used, is returned to its storage position.

3. Pull the lock lever at the rack-changer rack toward you to unlock the lever, and then remove the rack changer rack from the autosampler.
4. Turn off the power switches at the Exion LC Rack Changer and the autosampler.

Troubleshooting 6

Troubleshooting and Corrective Action

This section describes the probable causes of issues that can arise, and the corrective action to be taken to eliminate the causes. For more detailed procedures, refer to the indicated page. If the problem is not solved even after you took the action described in this section or if there is a problem not described in this section, contact a SCIEX representative.

Symptom	Possible Cause	Corrective Action
Power does not turn on when the power switch is turned on	The power plug is disconnected.	Connect plug correctly.
	The power cord internal wires are cut.	Replace with a new cord of the same type.
	The power supply does not meet specifications for this module.	Use power supply that meets specifications for this module.
	The fuse is blown.	Replace the fuse.
A microtiter or deep-well microtiter plate cannot be installed in a rack.	The external dimensions of the plate are too large or too small.	Use a plate with appropriate dimensions
The stack cannot be set in the module.	A plate is too tall.	Use a plate with appropriate dimensions.
	A rack is not set in the stack properly.	Push the racks into the stacks until they fit the end of the module.
The stack is hard to move in and out of the module.	Dew condensation water gathers between the rack and the stack.	Wipe dew condensation water off the rack and stack.
Initialization does not start when the power switch is turned on.	A stack is not set in the module properly.	If a stack is not set properly, the three indicators corresponding to that stack flash. Insert the stack fully to the end of the module. The magnet on the inside of the handle makes contact with the chassis. If initialization or rack-check operation is completed normally, the ready indicator on the front of the module illuminates.
The initialization or rack verification operation does not start when the stack is set in the module.		

Symptom	Possible Cause	Corrective Action
	The top panel is open.	Close the top panel and then turn the power off and on.
	The front door of the autosampler is open.	For safety reasons, the module will stop temporarily if the door of the autosampler is opened. Close the door to resume operation.
	1 is set for RC STACK SCAN. When 1 is set, rack check operation is not performed when a stack has been installed.	• Set 0 for RC STACK SCAN. When 0 is set, the rack verification operation is automatically performed when a stack has been installed.
The module cannot be controlled by the autosampler.	• The module is not connected to the autosampler correctly with the dedicated cable. • The rack-changer rack is not installed in the autosampler.	• Connect the dedicated RS-232C cable between the SIL connector at the back of the module and the **CHANGER** connector at the back of the autosampler. • Set the rack-changer rack in the autosampler. When the above-mentioned two points are filled, **CNG-LINK** is shown on the autosampler screen
The rack-changer rack cannot be removed from the autosampler.	The rack for which analysis is being performed or a condensation-prevention rack is installed in the rack-changer rack.	• Remove the rack or condensation prevention rack from the rack-changer rack using the keys on the autosampler. • Refer to *Install the Rack-changer Rack in the Autosampler on page 19*.
The heating or cooling temperature of the sample cooler does not reach the set temperature.	The room temperature is greater than 30 °C.	Temperature control at 4 °C is possible only for room temperatures below 30 °C. Temperature control operation, however, continues even if the room temperature exceeds 30 °C.
Analysis does not start. (Automatic loading motion stops halfway from the module to the autosampler.)	The top panel is open.	Close the top panel and then turn the power off and on.

Symptom	Possible Cause	Corrective Action
	The front door of the autosampler is open.	For safety reasons, the module will stop its rack setting motion temporarily if the door of the autosampler door is opened. Close the door to resume operation.
There are no peaks or the peaks obtained are very small.	The autosampler needle hits the bottom of the plate or hits an irregular position.	Adjust the needle position with respect to the rack in the autosampler
	The rack position specified for analysis in the sample table method does not contain a plate with samples.	Set a plate containing samples in the rack.
	The flow line is clogged with small particles from the plate materials.	Verify for blockages in the tubing and perform reverse cleaning or replace the tubing. Use the recommended material types.
A plate or rack has fallen.	• A stack is inserted forcefully. • The rack is damaged.	• Insert the stack slowly. • Replace the rack.
The plate or rack falls when a stack is inserted.	The rack guide is loosened or damaged.	Replace the rack guide.

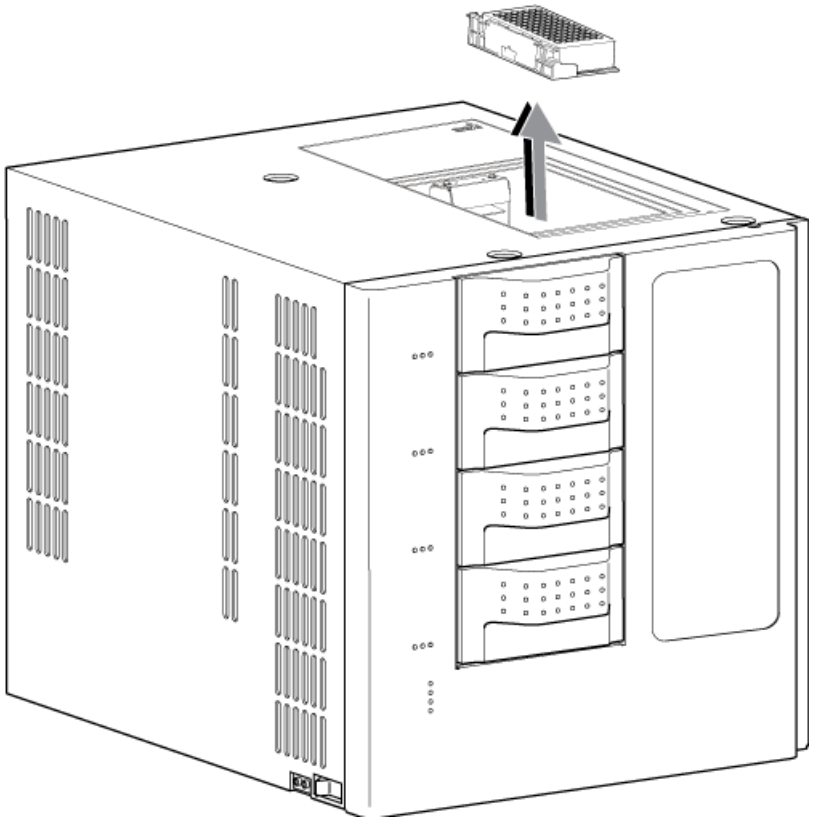
How to Handle a Fallen Plate

If a plate or rack has fallen in the module, the plate cannot be changed correctly, and an error might occur. Inspect the inside of the module through the front window, and if a rack is fallen, then follow this procedure.

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

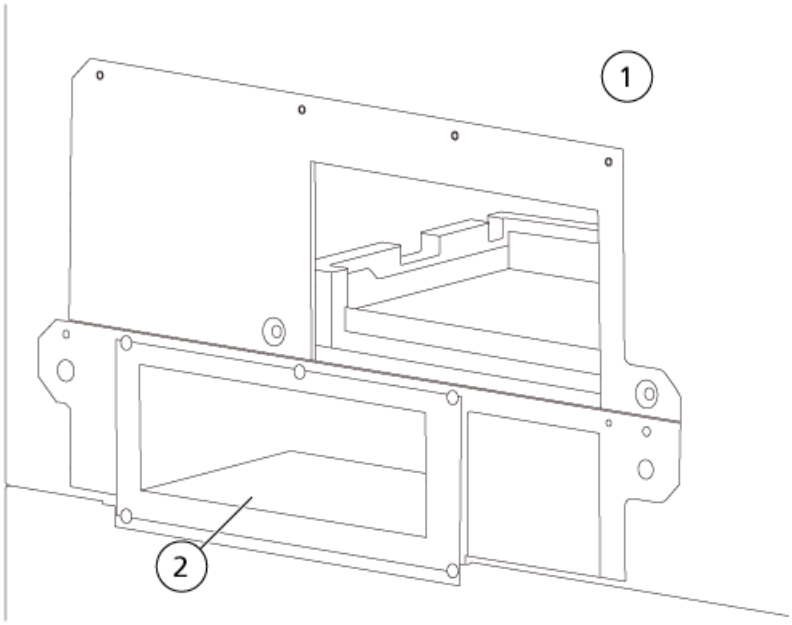
1. Turn the power off.
2. Touch the back panel to dissipate static electricity.
3. Disconnect the power cord from the power cord connector.
4. Remove six screws from the top panel.
5. Hold the louver-shaped handle and remove the top panel.
6. Remove the fallen plate or rack.

Figure 6-1 Remove Fallen Plate or Rack



7. If the fallen rack is a condensation-prevention rack, then return it to the condensation-prevention rack box. If it is a normal rack, then return it to an empty stack.

Figure 6-2 Condensation-prevention Rack Box



Item	Description
1	Autosampler
2	Condensation-prevention rack box

8. Close the top panel in the original position and then secure it with six screws.
9. Insert the power cord, and then turn on the power.

How to Handle RC NO RACK Errors

If the RC NO RACK error occurs on completion of initialization, perform the following procedure on the autosampler.

1. Press **CE** twice to display the initial screen
2. Press **func** repeatedly until RACK CHANGER is shown.
3. Press **enter**.
4. Press **func** repeatedly until Clear RACK INFO is shown.
5. Press **enter**.
6. Cleared Reboot Changer is shown. Turn off the power to the Exion LC Rack Changer and then after a few seconds turn it back on.

If another error such as motor slip occurs during initialization, contact a SCIEX representative.

Names and Functions of the Status Panel

A

This section describes the names and functions of the components in the status panel at the front panel of the module.

Operate the module using the keys on the autosampler operation panel. Verify its operating status on the autosampler screen.

Status Panel

The status panel consists of five LEDs. Names and functions of the status panel elements are shown in *Figure A-2*.

Figure A-1 Rack Status

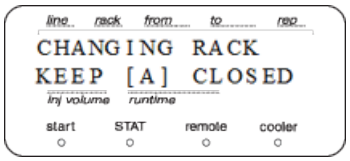
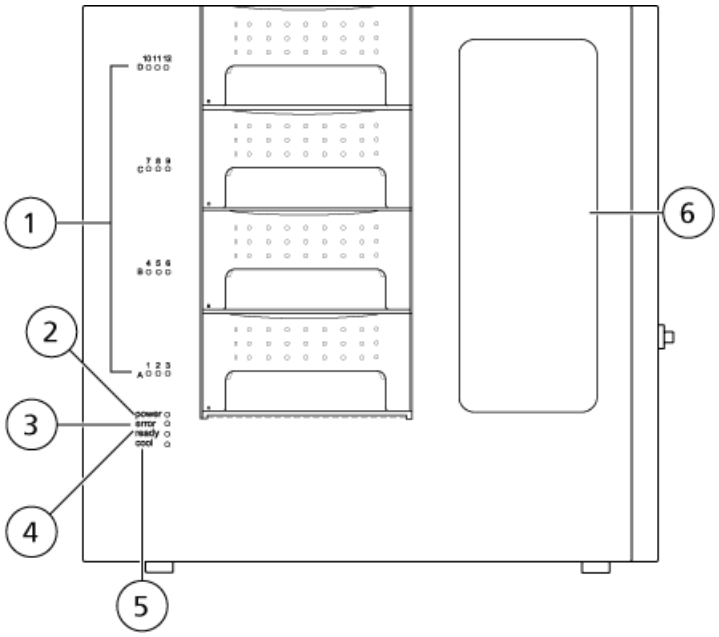


Figure A-2 Status Panel



Item	Description
1	Rack number: The indicators illuminate when racks are set for the corresponding numbers. When a rack is set in the autosampler and is being analyzed, the indicator of the corresponding rack number flashes. All the indicators flash at initialization and while a rack is being transported. Refer to *Figure A-1*.
2	Power: The indicators illuminate when power is on.
3	Error: This indicator illuminate when an error occurs in the module and flashes when a warning occurs in the module. The operating status, in such cases, is shown on the status screen of the autosampler.
4	Ready: This indicator lights when initialization has been completed and the module gets ready to start loading to the autosampler. The indicator flashes during initialization and loading. Refer to *Figure A-1*.
5	Cool (when the autosampler is equipped with cooling function): This indicator illuminates if, during temperature control of the sample cooler, the monitor temperature changes to a temperature within 1 °C of the set temperature. The indicator flashes while the monitoring temperature is outside of this range.
6	Front window: The internal LED lamp illuminates during initialization and while a rack is being loaded so that the loading status by the driving unit can be viewed through the front window.

Note: While a rack is being loaded, the status panel screen on the autosampler indicates the stack from which the rack is taken out. Do not pull the stack that is indicated on the status panel.

Auxiliary Functions B

Parameter Setting

Command	Description
DISP RACK STAT US	Shows the status of racks 1to12 in the Exion LC Rack Changer.
STACK A CODE	Enter the stack code of stack A.
STACK B CODE	Enter the stack code of stack B.
STACK C CODE	Enter the stack code of stack C.
STACK D CODE	Enter the stack code of stack D.
STACK A STRK	Set the needle stroke for stack A.
STACK B STRK	Set the needle stroke for stack B.
STACK C STRK	Set the needle stroke for stack C.
STACK D STRK	Set the needle stroke for stack D.
REMOVE RACK	Set when removing the rack-changer rack from the autosampler.
SET DUMMY RACK	Set the dummy rack on the rack-changer rack.
AUTO EXCHANGE	Changes the rack to the next one during sample analysis of the last well.
REMOVE DUMMY	Set whether or not to remove the rack-changer rack from the autosampler at the end of analysis.
RC STACK SCAN	Set whether or not to verify the presence or absence of racks when inserting a stack.
Clear RACK INFO	Deletes the rack presence/absence information as well as dummy rack position.
RC INITIALIZE	Verifies the presence or absence of racks at all the stacks.
LED LIGHT	The LED in Exion LC Rack Changer lighting can be illuminated only for about ten seconds.

Consumables and Spares 9

Table 9-1 Electrical Parts

Part	Part No.	Remark
Fuse, 218 06.3	4412723	
Power supply cable (100 V)	071-60821-08	
Power supply cable (230 V)	071-60825-51	

Table 9-2 Control Parts

Part	Part No.	Remark
Remote Cable	4425081	

Table 9-3 Sample Cooler Parts

Part	Part No.	Remark
Tray-dehumidifying Sponge	4426276	

Table 9-4 Others

Part	Part No.	Remark
Needle position adjusting fixture	228-50895-91	
Rack ASSY	228-43544-91	1 pc only
Rack-changer rack	228-45499-92	
Stack ASSY	228-43666-92	1 pc only
Sampler grease	228-40638-91	

Error Messages C

If any issues arises, an alarm beep will sound and an error message will be displayed on the autosampler's screen. (Note that ROM or RAM errors are not shown on the autosampler screen.)

The following list describes the error messages, along with the causes and corrective actions.

Note: Each message is classified into the following three types. The type is indicated under the type column.

Table C-1 Message Classifications

Type	Description
Fatal	The module stops operating. Pressing **CE** does not clear the error message.
Alarm	The module stops operating. Press **CE** to clear the error message.
Warning	The module does not stop operating. Press **CE** to clear the error message. For the column oven, this is a set temperature error.

Error Code	Error Message	Possible Cause	Recommended Action
(ROM error) L E D 1 - 1 2 (Flash) L E D e r r o r (Light)	Fatal	ROM error (electronic failure).	Turn the power off and then contact a SCIEX representative.
(RAM error) L E D 1 - 1 2 (Flash) L E D e r r o r (Flash)	Fatal	ROM error (electronic failure).	Turn the power off and then contact a SCIEX representative.
ERR RC SLIP X (Motor X slip error)	Fatal	X-axis (rack removal) movement of the motor is incorrect.	Turn the power off and then contact a SCIEX representative.
ERR RC SLIP Z (Motor Z slip error)	Fatal	Z-axis (up or down) movement of the motor is incorrect.	Turn the power off and then contact a SCIEX representative.

Error Code	Error Message	Possible Cause	Recommended Action
ERR RC SLIP Y (Motor Y slip error)	Fatal	Y-axis (forward or backward) movement of the motor is incorrect.	Turn the power off and then contact a SCIEX representative.
ERR HAND HOME X (Motor X origin error)	Fatal	X-axis movement of the motor (that is, taking out the rack) is incorrect.	Turn the power off and then contact a SCIEX representative.
ERR HAND HOME R (Motor R origin error)	Fatal	R-axis (rotating the rack) movement of the motor is incorrect.	Turn the power off and then contact a SCIEX representative.
ERR HAND HOME Z (Motor Z origin error)	Fatal	Z-axis (up or down) movement of the motor is incorrect.	Turn the power off and then contact a SCIEX representative.
ERR HAND HOME Y (Motor Y origin error)	Fatal	Y-axis (forward or backward) movement of the motor is incorrect.	Turn the power off and then contact a SCIEX representative.
ERR RELEASE RACK (Rack release error)	Fatal	The rack was not released correctly.	Turn the power off and then contact a SCIEX representative.
NO CATCH RACK (Rack catch error)	Fatal	An error occurred while a rack was being removed. The plate fell while it is being loaded or dew condensation water gathered in large quantity between the rack and the stack, requiring a force greater than usual for removing a rack from the stack.	• If the plate has fallen, then open the top panel and return the plate to the original position. Refer to *How to Handle a Fallen Plate on page 40*. • If dew condensation water gathers, wipe water off the rack and the stack, set the rack and the stack again, and then turn off and on the power to the module. • If the error occurs persistently, turn off the power and contact a SCIEX representative.
ERR SET RACK (Rack set error)	Fatal	An error occurred while the rack was being set.	Turn the power off and then contact a SCIEX representative.
ERR RC TEMP SENS	Fatal	An error occurred in the temperature sensor of the sample cooler.	Turn the power off and then contact a SCIEX representative.

Error Code	Error Message	Possible Cause	Recommended Action
ERR RC COOLER (Cooler error)	Fatal	An abnormality occurred in the cooler control unit.	Turn the power off and then contact a SCIEX representative.
ERR RC HEATER (Heater error)	Fatal	An error occurred in the heating unit for the sample cooler.	Turn the power off and then contact a SCIEX representative.
ERR RC TOP PANEL (Top panel error)	Fatal	The top panel is open. An emergency stop takes place.	Close the top panel and then turn the module off and on.
RC NO RACK (No rack error)	Alarm	No rack was installed in the position specified for analysis. Scheduled analysis was stopped.	Set a rack in a position with the flashing indicator and turn power to the module off and on. If the error occurs persistently, the rack position or condition has changed before and after the power was turned on. Execute Clear RACK INFO on the autosampler to delete the rack information, and then turn the power to the module off and on.
RC FULL RACK (Full rack error)	Alarm	While a rack is being analyzed, another rack is set in its rack position.	Remove the incorrect rack or change it to the condensation-prevention rack in the analysis rack position with the flashing indicator, Turn the power to the module off and on.
ERR DISCONNECT (Communication error)	Alarm	The communication between the module and the autosampler is cut off due to a communication error.	Make sure that the RS-232C cable is connected correctly, or replace the RS-232C cable with a new one.
SET RACK (Rack set warning)	Warning	A stack is installed that does not contain a rack. When analysis is performed for this rack, the RC NO. RACK error is shown and the scheduled operation is stopped.	Set a rack in the rack position specified in the method. When the autosampler is equipped with cooling function, set racks with empty microtiter plates or deep-well plates in all unused stacks to prevent dew condensation.

Error Code	Error Message	Possible Cause	Recommended Action
CLOSE STACK (Stacks close warning)	Warning	A stack is open. If it is not closed within 30 minutes, then the COOLER OFF error is shown and the sample cooler is turned off.	Close the stack.
COOLER OFF (Cooler off warning)	Warning	A stack was left open for more than 30 minutes. The sample cooler has been turned off.	Close the stack to turn the sample cooler on again.
COOLER ON AGAIN (Cooler restart warning)	Warning	The stack was closed. The sample cooler is turned on.	None.
REMOVE RACK (Rack removed warning)	Warning	While a rack is being analyzed, another rack is installed in its rack position. When analysis of the current rack has been completed, the RC FULL RACK error is shown and the scheduled analysis ends.	Remove the incorrect rack or change it to the condensation-prevention rack in the analysis rack position with the flashing indicator before the RC FULL RACK error is shown.