



SAXS Unit Instruction Manual

This manual describes the correct use of the product as well the usage precautions to be observed. To obtain full-expected performance from the product, please read this manual thoroughly.

Also, store this manual at an easily accessible place so that you can promptly refer to it whenever it is necessary.

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Item. No. 2680J111 Manual No. ME12947C01 2018. 07 (First Edition) CONTRACTOR AND

Overview

The SAXS (<u>Small angle X-ray scattering</u>) unit is designed for the measurements using the two-slit transmission SAXS optics with multilayer mirror. This unit is used with the Rigaku SmartLab series automated multipurpose X-ray diffractometer (hereafter called "SmartLab").

The two-slit transmission SAXS optics incorporating a multilayer mirror improves accuracy and S/N ratios than those of conventional SAXS optics. The optical alignment is performed automatically via the control software.

Pore and particle size distribution analysis is supported by the analysis software that uses the deconvolution of the slit function to correct the scattering X-ray profile distortion caused by optics.



SAXS unit

Configuration

Configuration

Table SAXS unit components

Component	Q'ty
Transmission SAXS selection slit SA	1
Transmission SAXS sample plate	1
Transmission SAXS sample holder Sample holder x1, sample frame x3 (t0.1 mm, 1 mm, and 2 mm one each), set screw x4, included	1 set
Vacuum path	1
Vacuum pump nylon tube x1, polyurethane tube x1, connector x1, included	1
Receiving height limiting slit (8 mm, 10 mm, 15 mm)	Optional



Table	SAXS uni	t
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(1) Transmission SAXS selection slit SA	Used for obtaining X-rays used in transmission SAXS measurement.
(2) Transmission SAXS sample plate	The transmission SAXS sample holder will be set on this sample plate.
(3) Transmission SAXS sample holder	A sample will be inserted in this sample holder.
(4) Vacuum path	Reduces the atmospheric X-ray scattering and intensity attenuation of the scattered X-rays from the sample.
(5) Receiving height limiting slit (Option)	Limits the width in longitudinal direction of the X-ray beam received by the detector.

Operations

Before installing the SAXS unit onto SmartLab, the multilayer mirror setting needs to be performed.



The multilayer mirror setting is required before using SmartLab for the first time or after replacing the X-ray tube.

Starting up Transmission SAXS Package

For an alignment of two-slit transmission SAXS optics, the Transmission SAXS Package in the control software is used. Since the configuration of receiving optics differs depending on the detector and control software, optical devices need to be changed, following the instructions of the control software. The transmission SAXS optics alignment will be automatically done while the user sets the SAXS unit optics according to the instructions of the control software.

- **1** Start up SmartLab and the control software.
- **2** Set up the hardware configuration via the control software.
- **3** Start up the Transmission SAXS Package of the control software. For details on measurement Packages, refer to Help of the control software.

Mounting transmission SAXS selection slit SA

Change selection slits, following the instructions of the control software.

1 Remove the currently installed selection slit from the CBO unit.





2 Insert the transmission SAXS selection slit SA.

Mounting vacuum path

Mount the vacuum path, following the instructions of the control software.

1 Perform evacuation of the vacuum path.

- (1) Connect the evacuation port of the vacuum path and vacuum pump with the included tube and connector.
- (2) Turn on the power switch of the vacuum pump and then perform evacuation.
- (3) After evacuation has been performed for about 5 minutes, remove the tube and connector from the evacuation port.
- (4) Turn off the power switch of the vacuum pump to complete the evacuation.





Do not touch the vacuum path window material. Applying force to the window material may result in damaging it.

- Remove Remove Vertication of the second seco
- **2** Remove the mounted parallel slit analyzer and receiving Soller slit with the included tool (Allen wrench).

3 Mount the vacuum path on the ROD and RPS adapters.



4 Fix the vacuum path with the Allen wrench provided.



Preparing sample

Powder sample

Prepare the powder sample and tools shown below. Select the sample frame according to the sample amount.



Tools for preparing sample

1 Affix the double-sided tape to one side of the sample frame and remove the release paper. Then, affix the film onto the double-sided tape. In order to avoid wrinkles and gaps, the film should be stretched while being affixed.



Preparing powder sample (1)

2 Turn the sample frame over and affix the double-sided tape to the other side as well.



Preparing powder sample (2)

3 Fill the middle of the sample frame with the sample and gently remove the release paper of the double-sided tape, avoiding the sample from scattering. Affix the film to the double-sided tape. In order to avoid wrinkles and gaps, the film should be stretched while being affixed.



Preparing powder sample (3)

4 Crimp the film and double-sided tape, avoiding the sample from scattering. Then trim off the extra film.



Preparing powder sample (4)

5 Mount the sample frame prepared in step **4** on the sample folder and fix with the set screws.



Preparing powder sample (5)

Film sample

Prepare the film sample and tools shown below. Select the sample frame according to the sample thickness.



Tools for preparing sample

1 Place a film sample on the sample holder. Then place the sample frame on the sample. Then fix them with the set screws.

When using the sample with orientation, pay attention to the mounting orientation of the sample.



Preparing film sample (1)

2 Trim of the extra film from the sample holder with scissors.



Preparing film sample (2)

Mounting transmission SAXS sample plate

Mount the sample plate, following the instructions of the control software.

1 Remove the mounted sample plate.

Rotate the mounted sample plate counter-clockwise while pressing the bar indicated by an arrow below to remove it.



2 Mount the transmission SAXS sample plate.

Mount the sample plate aligning the parts as indicated by arrows below and then rotate the sample plate clockwise to fix it.



Mounting transmission SAXS sample holder

Mount the sample holder, following the instructions of the control software.

1 Mount the transmission SAXS sample holder on the sample plate, aligning the center of the sample plate with the center position of the sample frame.



Note

To align the center of the transmission SAXS sample plate and the center position of the sample frame, mount the transmission SAXS sample holder as shown in the "good example" below.



Leaf springs **4** and sample frame **b** are on the opposite sides

Leaf springs **d**and sample frame **d**are on the same side

In the "bad example", the sample frame is shifted from the center position which causes calculation errors in measurement results.



Sample frame

Mounting Receiving Height Limiting Slit (Optional)

1 Insert the receiving height limiting slit into the receiving slit box before starting measurement.



Item No.	Name
2680F201	Receiving height limiting slit 8 mm
2680F202	Receiving height limiting slit 10 mm
2680F203	Receiving height limiting slit 15 mm

Tip

The receiving height limiting slit is used for precise limitation of the width in longitudinal direction of the X-ray beam received by the detector during analysis.

Measurement

Execute the measurement following the instructions of the control software. For details on the measurement procedure, refer to Help of the control software.

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