Roland

# OA-RA-240
# OA-RA-180

# How to Use the Rotary Axis Unit

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- The specifications of this product and the contents of this operation manual are subject to change without notice.
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# Introduction

## About this Manual

This document is the user's manual for the OA-RA-240 and the OA-RA-180. This document uses the following notations to distinguish between the models where necessary.

- OA-RA-240
- OA-RA-180

Most of the figures in this document depict the OA-RA-240.

## About This Machine

This machine is an optional unit for the Roland DG MO-240 and MO-180.

- Installing this machine on the printer allows for printing on cylindrical objects (media) as they rotate.
- For cautions on use and further details on how to use the printer, see the printer's User's Manual.

☞ User's Manual

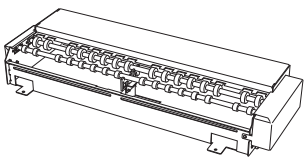
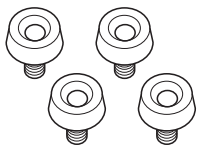
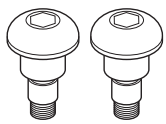
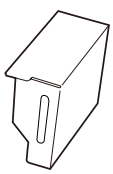
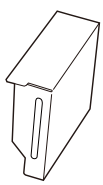
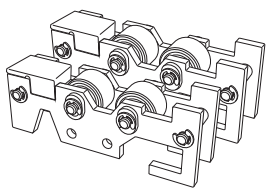
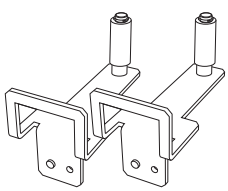
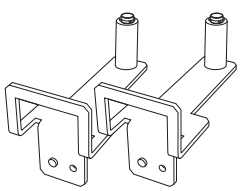
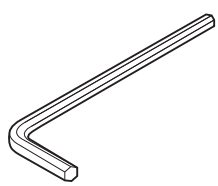
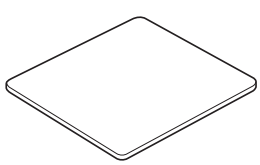
## Operating the Machine

After this machine is installed, you can operate it from the printer's operation panel. For matters regarding the operation panel not included in this manual, see the printer's user's manual.

☞ User's Manual

## Checking the Package Contents

The kit contains the following items. Make sure they are all present and accounted for.

| | | |
|---|---|---|
|  Rotary axis unit (1) |  Mounting screws (8) |  Positioning screws (2) |
|  Short guide (1) |  Long guide (1) |  Small-diameter adapters (2) |
|  Long tail stoppers (2) |  Short tail stoppers (2) |  Hexagonal wrench (3 mm [0.12 in.]) (1) |
|  Manual (1) | | |

## Object (Media) Conditions

**MEMO**

In this manual, the objects to be printed are called the "object" or "media."

However, objects must meet the following conditions.

### Material

Even materials with the same name have many variations with different properties depending on slight differences in ingredients, and even if the ingredients are the same, printing may or may not be possible depending on differences in surface treatment such as plating or coating. Even if a material is listed as a printable material, always be sure to perform a test print to confirm that satisfactory print quality can be achieved.

**When not using primer:**

- ABS
- PET (polyethylene terephthalate)
- PC (polycarbonate)
- TPU (thermoplastic polyurethane)
- Leather
- Wood

**When using primer:**

- Acrylic
- Glass
- Aluminum
- Iron

### Shape

Cylindrical shape

* With an undulating surface that does not affect rotation

### Diameter

10 to 121 mm (0.39 to 4.76 in.)

### Length

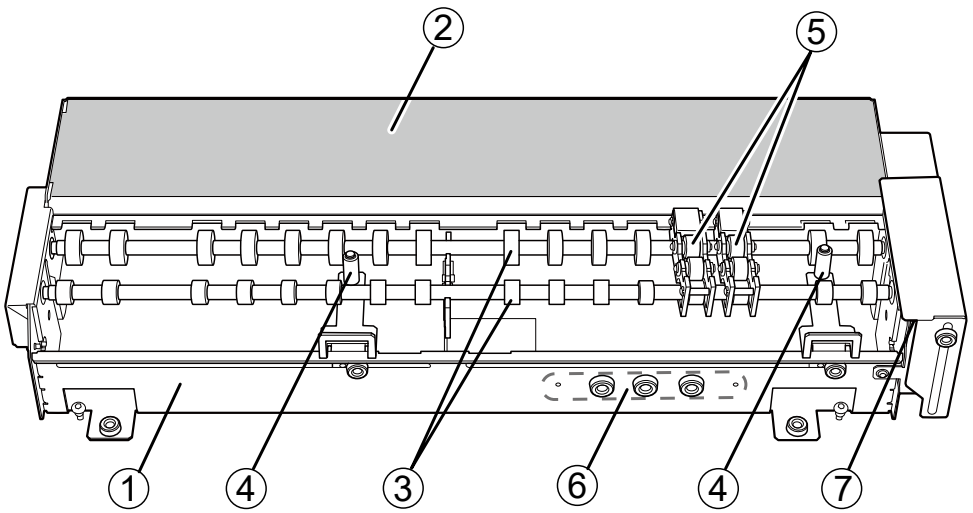
OA-RA-240 : 50 to 540 mm (1.97 to 21.25 in.)

OA-RA-180 : 50 to 388 mm (1.97 to 15.27 in.)

### Weight

0.01 to 3 kg (0.0221 to 6.613 lb.)

## Part Names




| | | | | | |
|---|---|---|---|---|---|
| ① | Rotary axis unit | ② | Printing test stage | ③ | Roller |
| ④ | Tail stoppers*1 | ⑤ | Small-diameter Adapter | ⑥ | Screw holder to prevent loss of screws*2 |
| ⑦ | Guide*1 | | | | |

*1: Two types (short and long) are available. Use the type that matches the diameter of the object.

*2: The screw holder to prevent loss of screws can hold five screws.

When more than five screws are removed, store them in the screw holes for securing the tail stoppers or guide.

# Installing the Machine

## Attaching the Rotary Axis Unit

**⚠ WARNING** **Be sure to perform operations as specified by the instructions here, and never touch any area not specified in the instructions.**

Sudden movement of the machine may cause injury or burns.

**⚠ CAUTION** **Only insert and remove the rotary axis unit connector when the main power is off or when executing [Vacuum Table or Rotary Axis Unit Attachment/Removal] from the printer's operation panel.**

Failure to do so may result in damage to the equipment or electric shock.

**⚠ CAUTION** **Exercise caution to prevent the rotary axis unit from falling when attaching or removing it.**

Failure to do so may result in injury.

### *1.* Carry out preparations on the printer to attach the rotary axis unit.

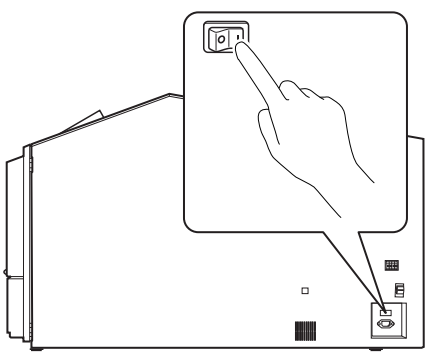
**IMPORTANT**

The vacuum table and the rotary axis unit cannot be attached at the same time.

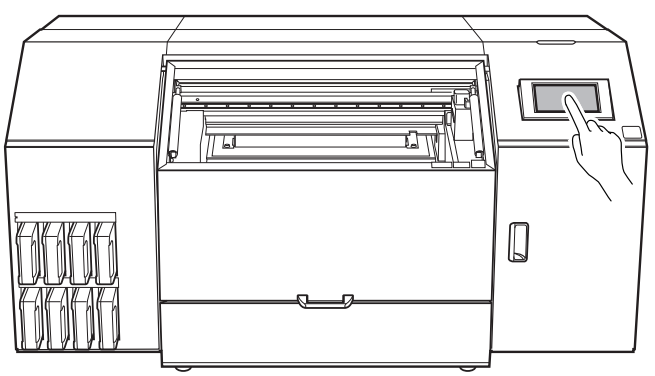
If the vacuum table is attached, remove it.

☞ User's Manual

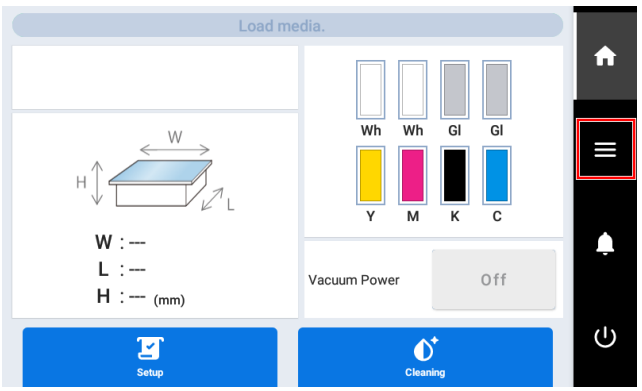
**1** **Switch on the printer's main power.**



**2** **Press the sub power button.**



3 **Tap on the operation panel's home screen.**




4 **Tap [Preferences] - [Vacuum Table or Rotary Axis Unit Attachment/Removal].**

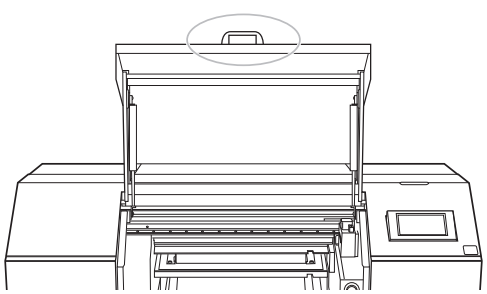
5 **Tap [Execute] for [Move Table to Attachment/Removal Position].**

The flat table moves to a position where the rotary axis unit can be attached.

6 **After the flat table stops, open the front cover.**

**IMPORTANT**

Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed.
If you do not open and close the front cover gently, it may break or you may be injured.



7 **When [Remove devices as necessary.] appears on the operation panel, tap .**

The vacuum table and the rotary axis unit cannot be attached at the same time, so if the vacuum table is already attached, remove it, and then tap .

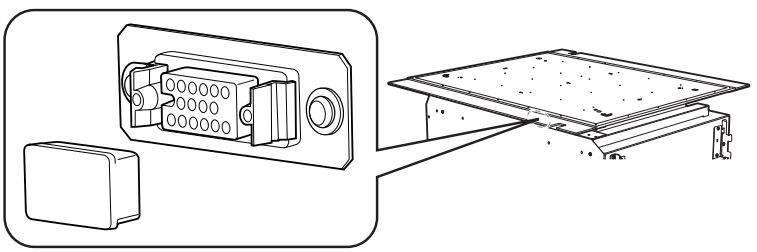
8 **Clean the surface of the flat table with a rag.**

**9** **Remove the cover from the flat table [VACUUM/ROTARY] connector.**

MEMO

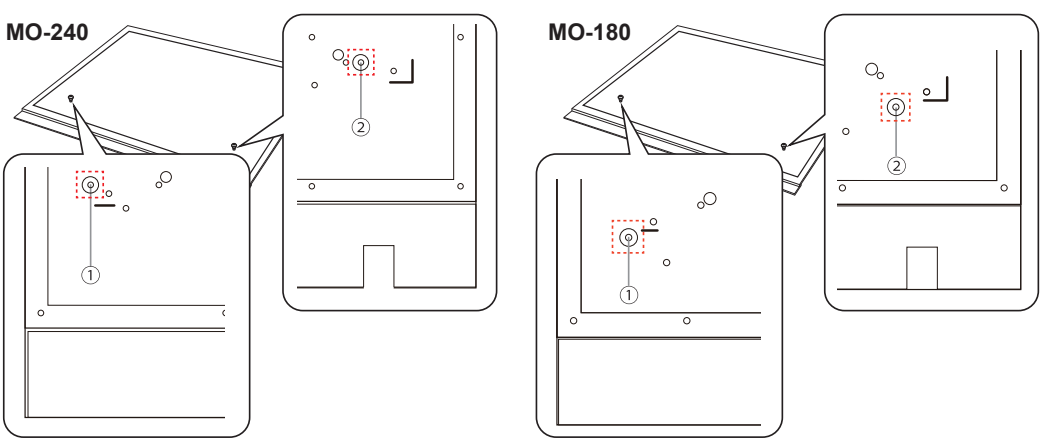
Store the cover carefully so that you do not lose it.

If you are not using the [VACUUM/ROTARY] connector, be sure to attach the cover to prevent dust and debris from adhering to the connector.

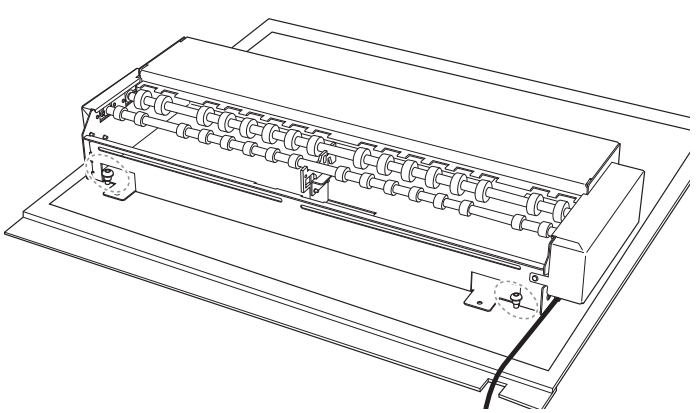


## 2. Install the rotary axis unit.

**1** **Attach the positioning screws to screw holes ① and ② (indicated with round marking lines) on the flat table using the included hexagonal wrench.**

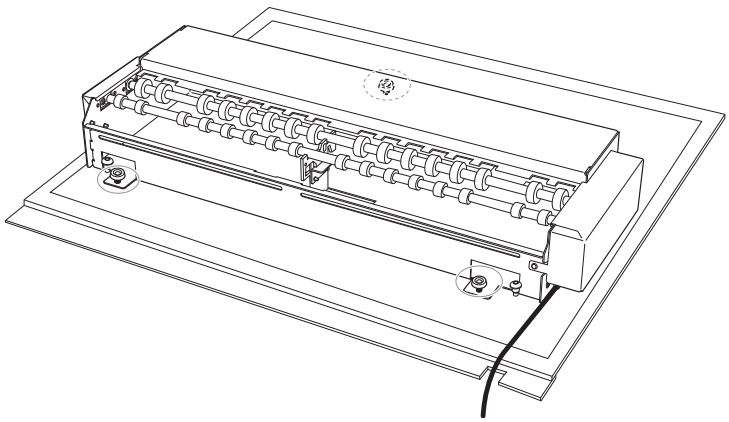



**2** **Lightly push the rotary axis unit into the positioning screws to place this unit on the flat table.**



**3** **Use mounting screws to temporarily secure the rotary axis unit.**

Temporarily tighten the three mounting screws while adjusting the rotary axis unit position.

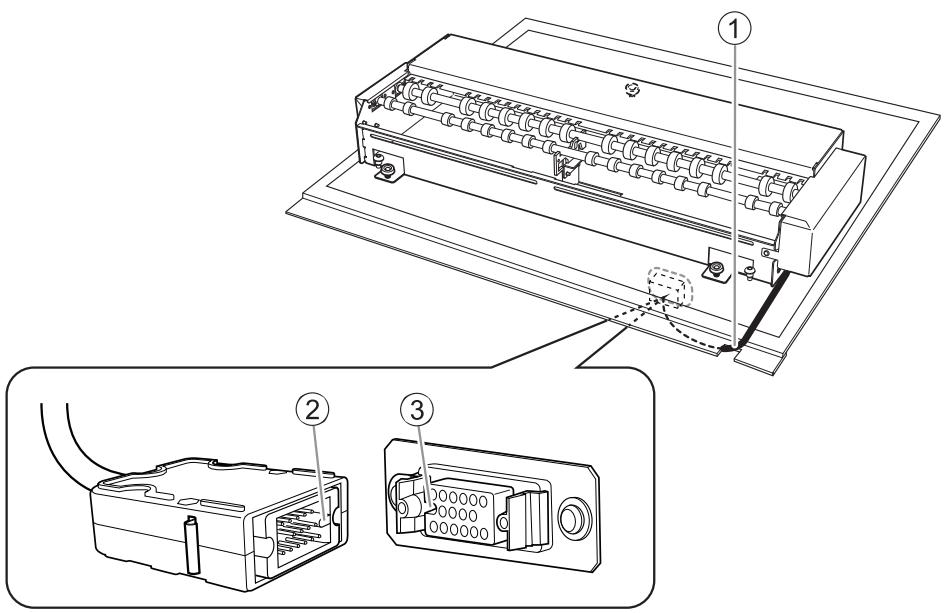


**4** **Fully tighten the mounting screws.**

**5** **Place the rotary axis unit cable in the indentation on the flat table ① , and then connect the rotary axis unit connector to the flat table [VACUUM/ROTARY] connector.**

Align the protrusion ② on the rotary axis unit connector with the indentation ③ on the [VACUUM/ROTARY] connector, and then insert the former into the latter.

Insert the rotary axis unit connector until you hear a click.

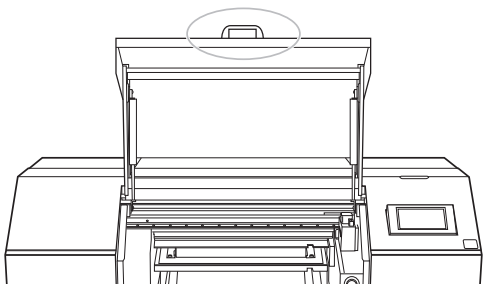


**6** **Close the front cover.**

**IMPORTANT**

Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed.

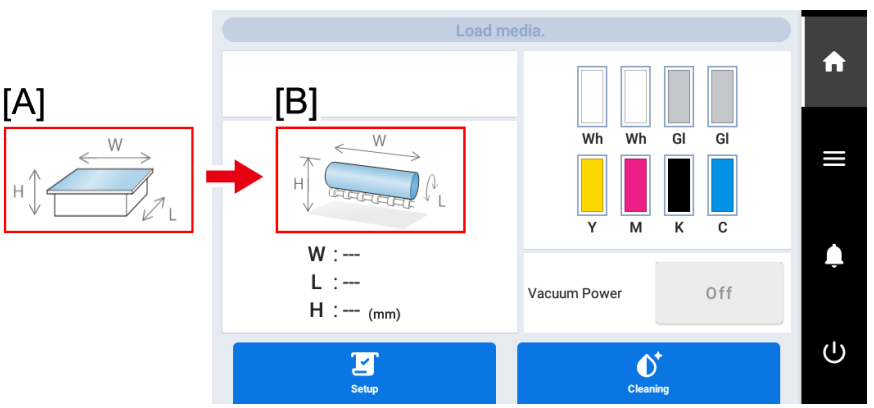
If you do not open and close the front cover gently, it may break or you may be injured.



**7** **Tap [Finish All] on the operation panel.**

**8** **Tap**  **to go back to the original screen.**

When the rotary axis unit is connected, the image shown on the home screen changes from [A] to [B].




| |
|---|
| [A]: Display when the rotary axis unit is not connected |
| [B]: Display when the rotary axis unit is connected |

## Removing the Rotary Axis Unit

**⚠ WARNING** **Be sure to perform operations as specified by the instructions here, and never touch any area not specified in the instructions.**

Sudden movement of the machine may cause injury or burns.

**⚠ CAUTION** **Only insert and remove the rotary axis unit connector when the main power is off or when executing [Vacuum Table or Rotary Axis Unit Attachment/Removal] from the printer's operation panel.**

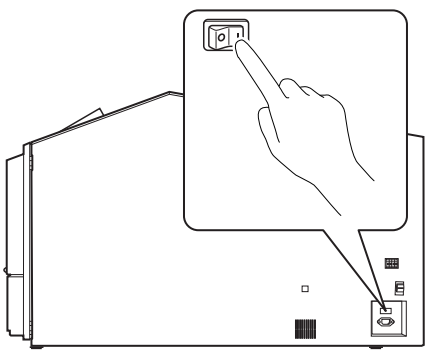
Failure to do so may result in damage to the equipment or electric shock.

**⚠ CAUTION** **Exercise caution to prevent the rotary axis unit from falling when attaching or removing it.**

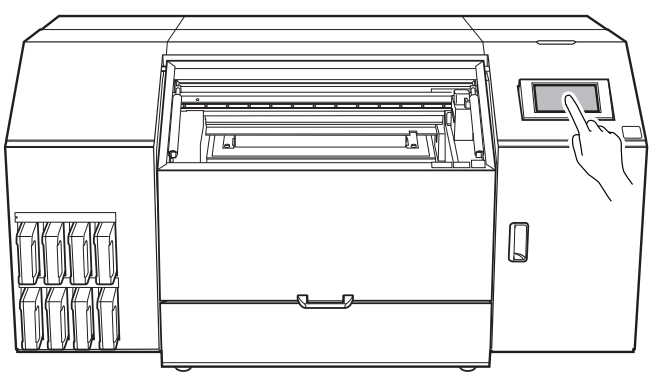
Failure to do so may result in injury.

### *1.* Carry out preparations on the printer to remove the rotary axis unit.

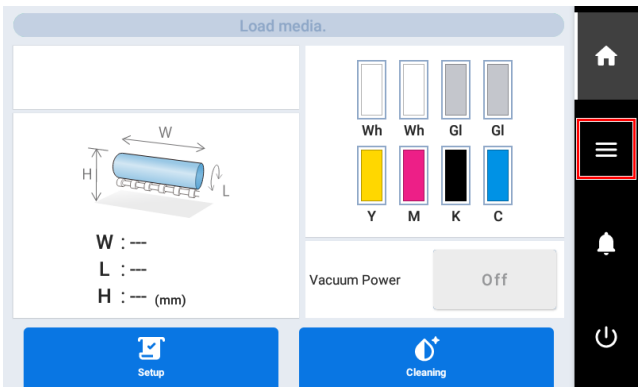
❶ **Switch on the printer's main power.**



❷ **Press the sub power button.**



**3** **Tap on the operation panel's home screen.**




**4** **Tap [Preferences] - [Vacuum Table or Rotary Axis Unit Attachment/Removal].**

**5** **Tap [Execute] for [Move Table to Attachment/Removal Position].**

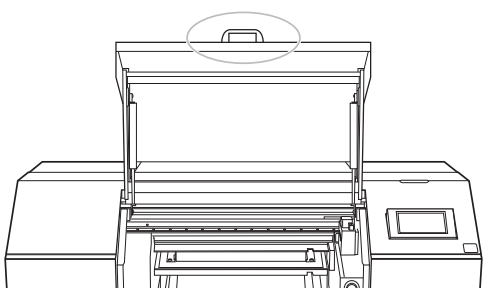
The flat table moves to a position where the rotary axis unit can be removed.

**6** **After the flat table stops, open the front cover.**

**IMPORTANT**

Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed.

If you do not open and close the front cover gently, it may break or you may be injured.



**7** **When [Remove devices as necessary.] appears on the operation panel, start removing the device.**

**MEMO**

To attach the vacuum table after removing the rotary axis unit, tap .

When [Attach devices as necessary.] is displayed, begin the installation work.

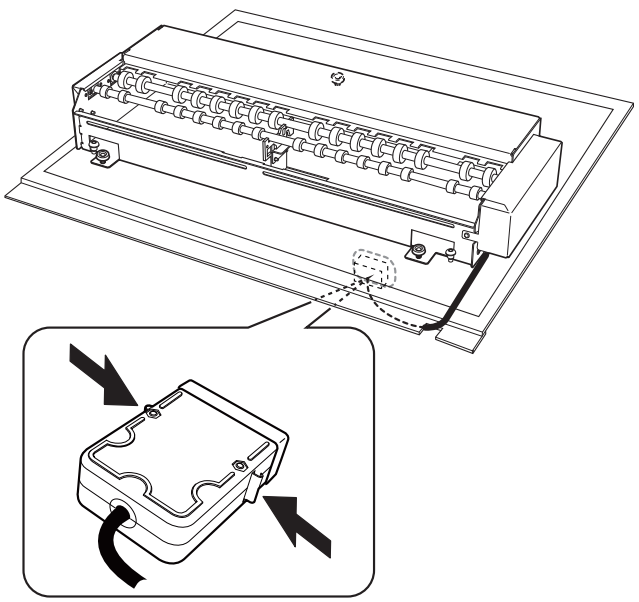
For information on attaching the vacuum table, see the printer's User's Manual.

☞ User's Manual

## 2. Remove the rotary axis unit.

**1 Remove the rotary axis unit connector from the flat table [VACUUM/ROTARY] connector.**

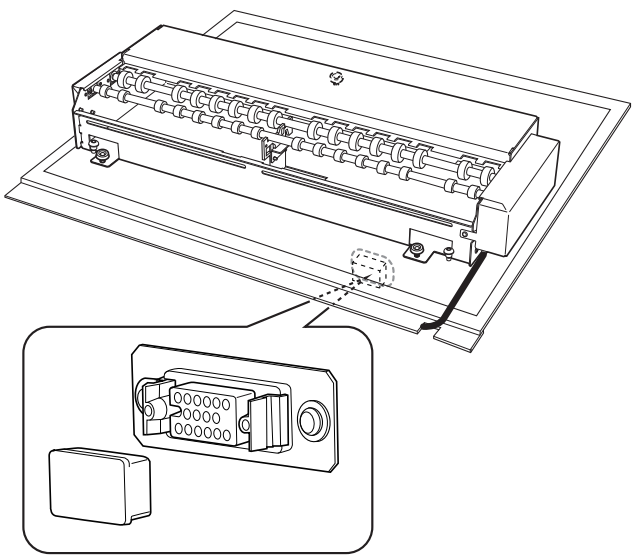
While pressing down on the arrow parts, remove the rotary axis unit connector.



**2 Attach the cover to the flat table [VACUUM/ROTARY] connector.**

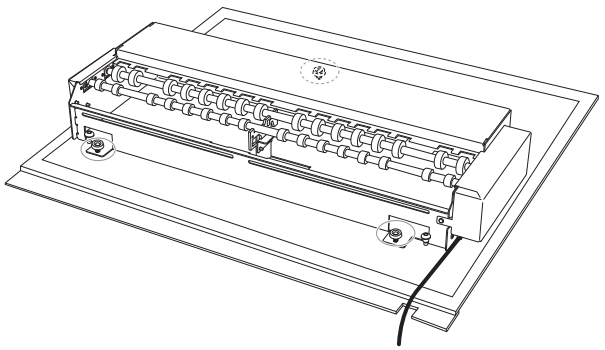
**MEMO**

If you are not using the [VACUUM/ROTARY] connector, be sure to attach the cover to prevent dust and debris from adhering to the connector.

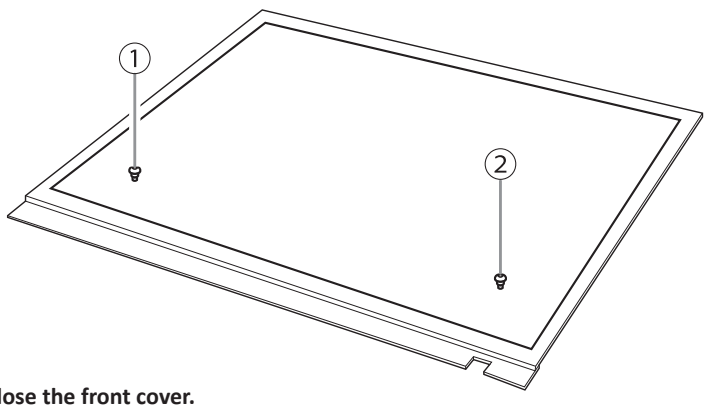


**3** **Remove the rotary axis unit from the flat table.**

Remove the three mounting screws, and then remove the rotary axis unit.



**4** **Remove positioning screws ① and ② using the included hexagonal wrench.**

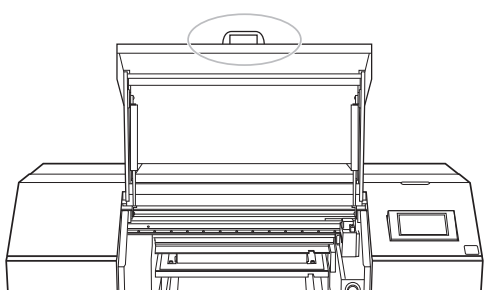



**5** **Close the front cover.**

**IMPORTANT**

Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed.

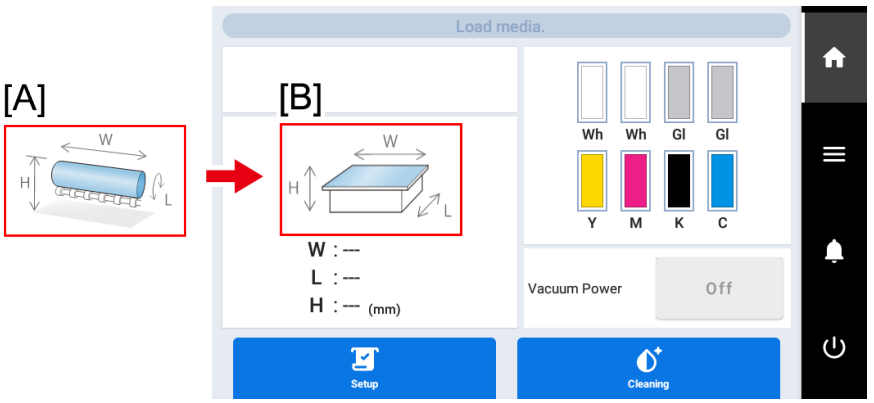
If you do not open and close the front cover gently, it may break or you may be injured.



**6** **Tap [Finish All] on the operation panel.**

**7** **Tap  to go back to the original screen.**

When the rotary axis unit is removed, the image shown on the home screen changes from [A] to [B].




| |
|---|
| [A]: Display when the rotary axis unit is connected |
| [B]: Display when the rotary axis unit is not connected |

## Attaching the Tail Stoppers

The tail stoppers prevent the object attached to the rotary axis unit from moving to the left or right.

Use the tail stoppers when printing around the entirety of a cylinder, when printing layered colors, and in similar situations.

There are two types of tail stoppers: long and short.

- Short tail stoppers

  Use these tail stoppers when the object to load has a diameter more than 35 mm (1.38 in.).

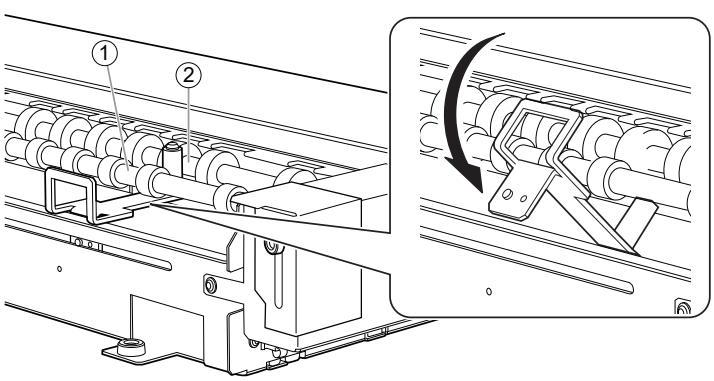
- Long tail stoppers

  Use these tail stoppers when using small-diameter adapters to load an object that has a diameter of 10 to 35 mm (0.39 to 1.37 in.)

For information about purchasing tail stoppers, contact your authorized dealer.

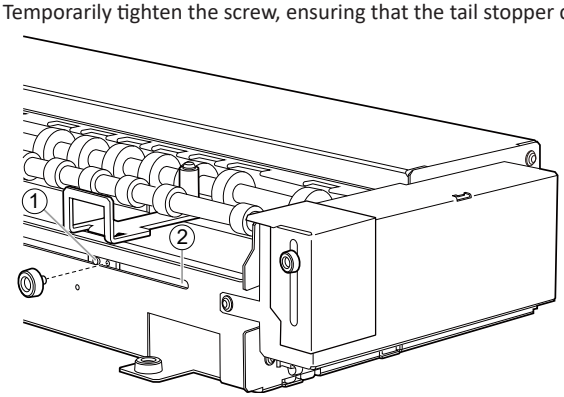
### Procedure

1. **As shown in the figure, place the tip of the tail stopper between the front ① and back ② roller shafts.**




2. **Fit the protrusion ① on the back of the tail stopper into the slide hole ② of the rotary axis unit, and then temporarily secure the tail stopper with a mounting screw.**

   Temporarily tighten the screw, ensuring that the tail stopper can still slide to the left and right.



## Attaching the Small-diameter Adapters

Use the small-diameter adapters when loading an object that has a diameter of 10 to 35 mm (0.39 to 1.37 in.)
For information about purchasing small-diameter adapters, contact your authorized dealer.

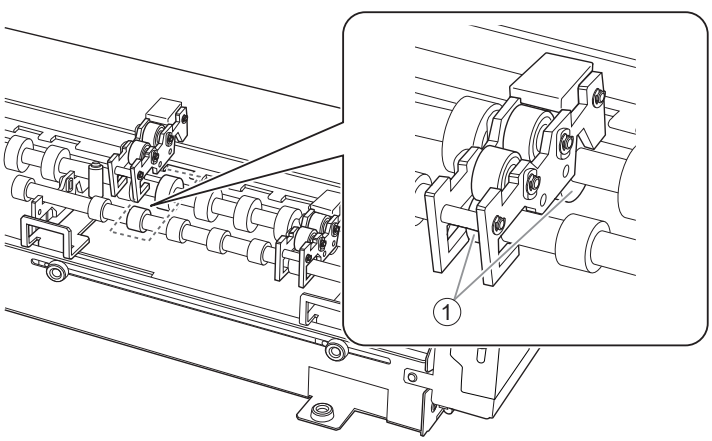
### Procedure

**1** **Place the small-diameter adapter as shown in the figure.**

Determine where to set the adapter according to the length of the object to be printed on.

**MEMO**

Set the small-diameter adapter on the rollers ①.



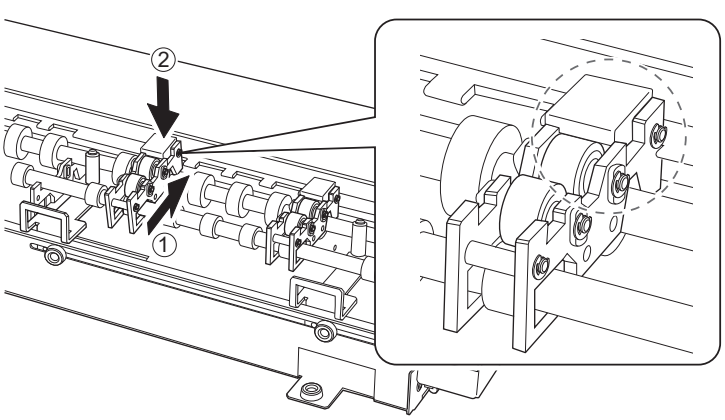

**2** **Attach the small-diameter adapter.**

① **Catch the tip of the adapter on the front roller shaft.**

② **Push the back of the adapter to fit it into the groove.**

**MEMO**

Make sure that the back of the small-diameter adapter is seated properly.



## Attaching the Guide

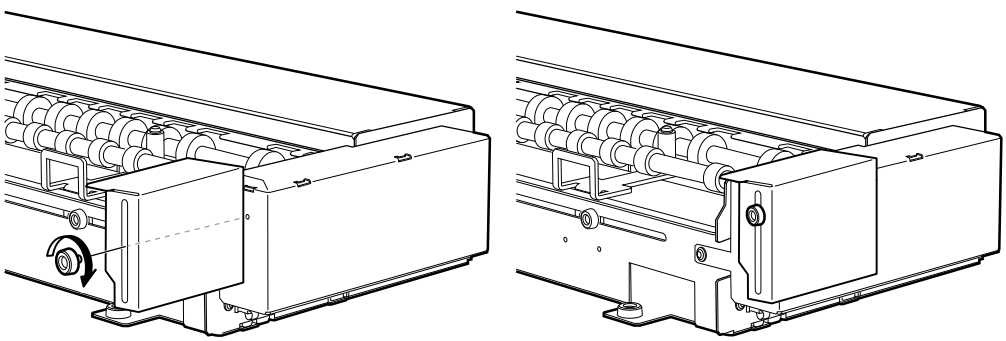
The guide is available in two types: short and long. Use the type that matches the diameter of the object.

- Short guide: Use this type when loading an object with a diameter of 10 to 75 mm (0.39 to 2.95 in.).
- Long guide: Use this type when loading an object with a diameter of 75 to 121 mm (2.96 to 4.76 in.).

### Attaching the Guide

**1** **Attach the short or long guide to the rotary axis unit.**

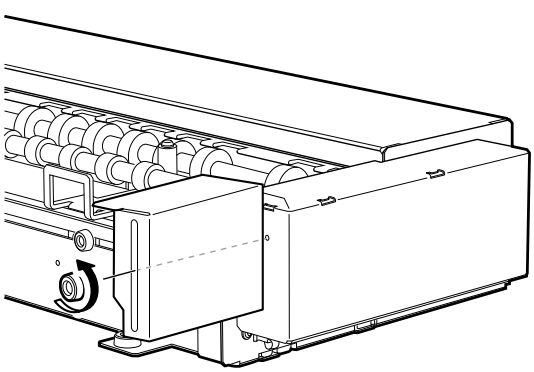
Attach the short or long guide and secure it temporarily with a screw.



### Removing the Guide

**1** **Remove the short or long guide.**

Remove the screw, and then remove the short or long guide.



## Performing a Nozzle Drop-out Test

**If you are using white ink**

Before performing the nozzle drop-out test at the start of daily operations, mix the white ink.

☞ User's Manual

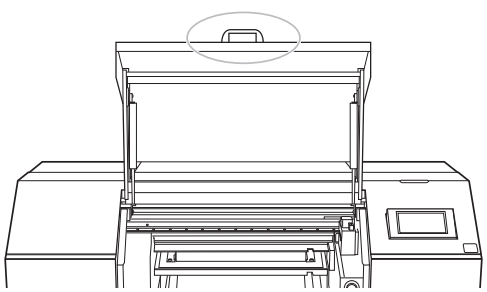
### Procedure

**1** **Open the front cover.**

**IMPORTANT**

Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed.

If you do not open and close the front cover gently, it may break or you may be injured.



**2** **Check the type of guide attached to the rotary axis unit.**

**Short guide:**

Loosen the screw and position the guide at the lowest point.

**Long guide:**

Loosen the screw and remove the long guide.

Leave the guide removed until the nozzle drop-out test finishes.

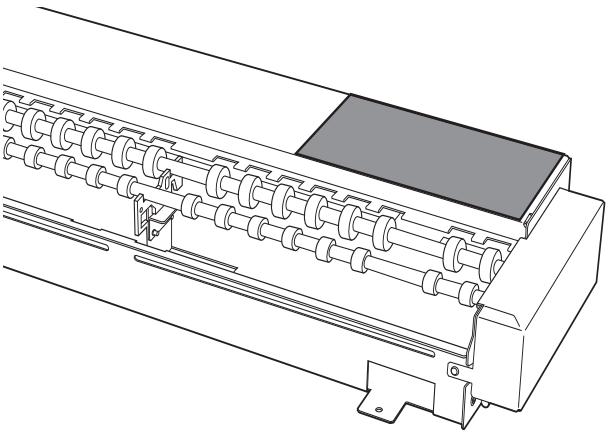
**IMPORTANT**

Executing the nozzle drop-out test with the long guide attached may cause the head gap sensor to collide with the long guide, resulting in printer damage.

**3 As shown in the figure, load the printing test object on the right end of the printing test stage of the rotary axis unit.**

For printing tests, prepare an object with the following dimensions: W (width) = 200 mm (7.88 in.) or more, L (length) = 100 mm (3.94 in.) or more, and H (height) = less than 0.5 mm (0.01 in.).

Secure the object with tape or other means to prevent it from becoming loose or misaligned.

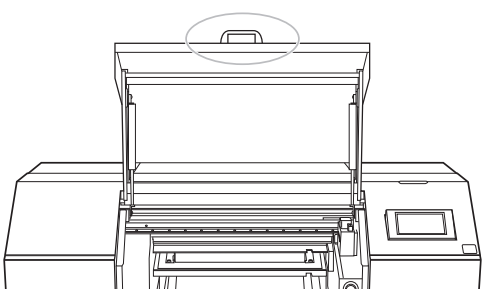


**4 Close the front cover.**

**IMPORTANT**

Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed.

If you do not open and close the front cover gently, it may break or you may be injured.



**5 Tap [Setup] on the printer's operation panel.**

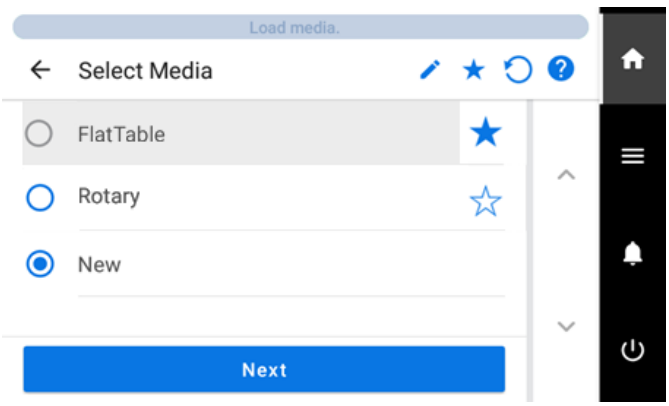
If the home screen is not displayed, tap .

**6 Determine the [Preset].**

① **Tap [Select] for [Preset].**

② **Tap [New], and then tap [Next].**

Assuming this is the first object to be printed on, select [New].




If the media is already registered to the rotary axis unit, select the media (printing settings) from the list of existing media, tap [Next], and proceed to step 7 .

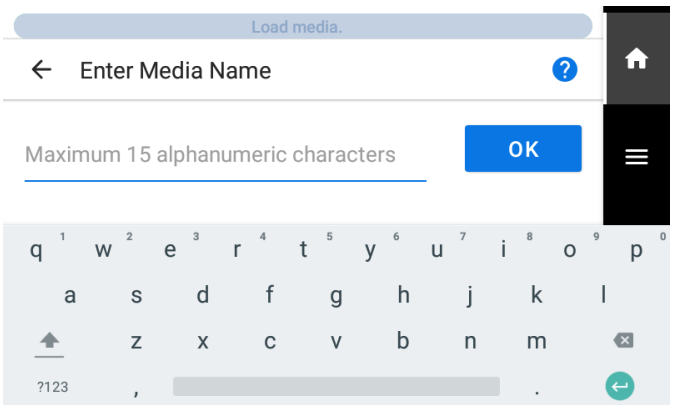
**MEMO**

- Media registered to the flat table or vacuum table cannot be selected for the rotary axis unit.
- Tapping makes it possible to search the registered media by keyword.
  To reset the entered keyword, tap .
- Tapping to the right of the media name will change the symbol to , and the media will be registered to Favorites.
  Tap the Favorites filter at the top of the operation panel to turn the filter on and show only favorited media.
  Tap to turn the Favorites filter off.
- Keyword searching and the Favorites filter can be used at the same time.
  Tap to turn the Favorites filter off ( ) and reset all keywords.

③ **Enter the name of the object, and then tap [OK].**

Tap on the keyboard displayed on the screen to input the object name.

You can use up to 15 alphanumeric characters.




④ **Check the name you entered and tap [Next].**

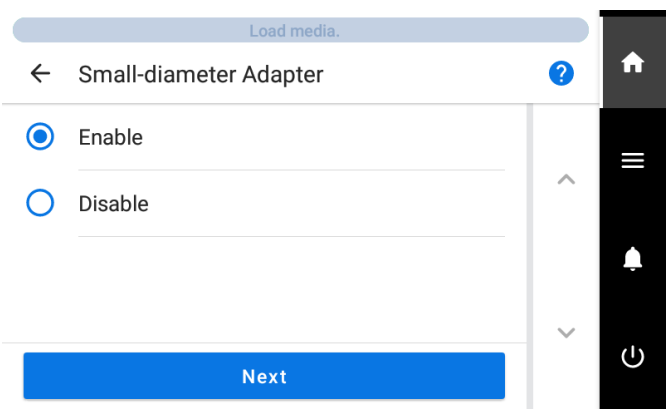
To make corrections, tap the name you entered.

⑤ **Configure the [Small-diameter Adapter] setting.**

Select [Enable] when using the small-diameter adapter, and [Disable] when not using it.

**MEMO**

For the nozzle drop-out test, a test pattern will be printed on the printing test stage. The small-diameter adapter setting can be set to either [Enable] or [Disable].




After selecting a setting, tap [Next].

⑥ **Select the appropriate reflective intensity for the object.**

This machine offers two options for [Media Reflective Intensity Selection Method]: [Simple] and [Advanced].

[Media Reflective Intensity Selection Method] can be changed in the printer's [Preferences] settings.

For details, refer to "Media Reflective Intensity Selection Method" in the printer's User's Manual.

☞ User's Manual

**With [Media Reflective Intensity Selection Method] set to [Simple]**

Select [High].

**MEMO**

Select [High] when performing the nozzle drop-out test.

**With [Media Reflective Intensity Selection Method] set to [Advanced]**

Select [Opaque].

**MEMO**

Select [Opaque] when performing the nozzle drop-out test.

After selecting a setting, tap [Save].

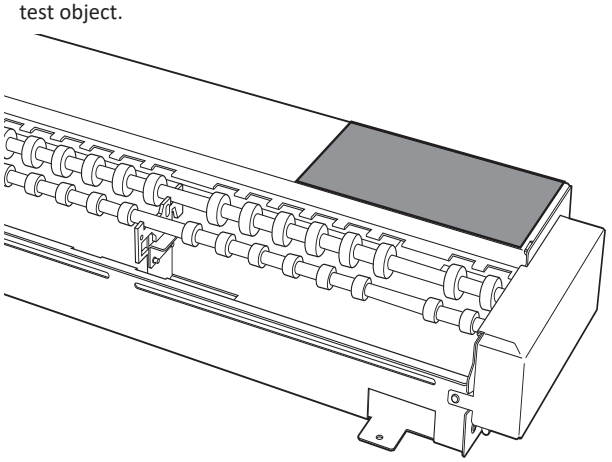
**7** **Tap [Complete Setup] on the [Setup] screen.**

**IMPORTANT**

When the rotary axis unit is connected, the printer will print the test pattern on the right side of the printing test stage. You do not need to set [Table Height] or [Printing Area].

As the printing test position cannot be changed, you cannot perform printing tests alongside one another horizontally or vertically.

When performing consecutive printing tests, subsequent printing tests will be performed over the position used for the first printing test. When performing consecutive printing tests, make sure to replace the printing test object.



**8** **Tap [Nozzle Drop-out Test] on the home screen.**

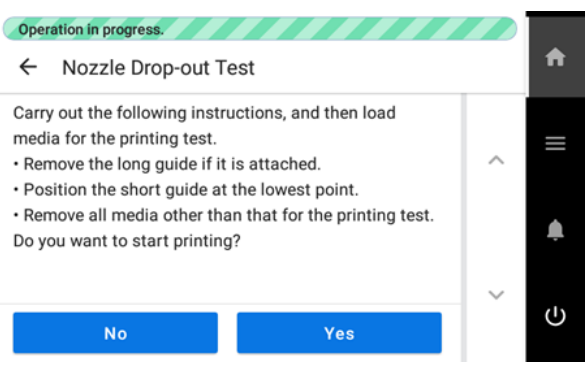
**IMPORTANT**

- Check that nothing other than the printing test object is loaded on the printing test stage before tapping this icon.
- Check that the object is not attached above the rotary axis unit rollers.

  Failure to do so may lead to collisions between the head gap sensor and the object, resulting in machine damage.

**9** **Tap [Execute] for [Printing Test].**

When the following screen is displayed on the operation panel, tap [Yes].
Printing of the test pattern starts.



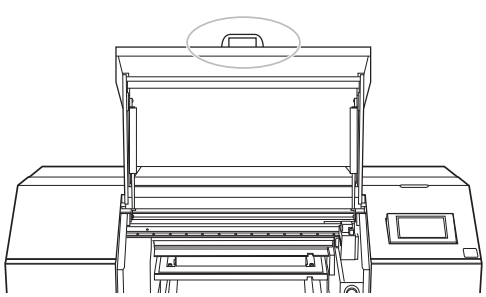

**MEMO**

Depending on the color of the object used, it may be difficult to check the white ink test pattern.
On the home screen, tap [Nozzle Drop-out Test]. Select [Cleaning] - [Printing Test] - [Nozzle Drop-out Test (Base: Black)], and then tap [Execute] - [Yes] to make the base of the white ink black, making it easier to check the white ink.
[Nozzle Drop-out Test (Base: Black)] is not displayed if the machine is not equipped with white ink.

**10** **Open the front cover.**

**IMPORTANT**

Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed.
If you do not open and close the front cover gently, it may break or you may be injured.



**⓫ Check whether there is dot drop-out or dot displacement in the test pattern.**

Missing blocks indicate dot drop-out. Collapsed or inclined blocks indicate dot displacement.

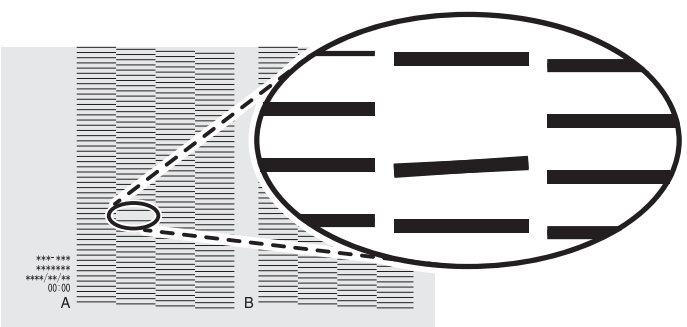
If no dot drop-out or dot displacement occurs, preparations for output are finished.

If dot drop-out or dot displacement occurs, perform cleaning of the print heads (normal cleaning).

☞ "User's Manual" (Normal Cleaning Method)

**MEMO**

If a rotary axis unit is installed, [After cleaning, perform a printing test.] will not be displayed on the [Normal Cleaning] screen.



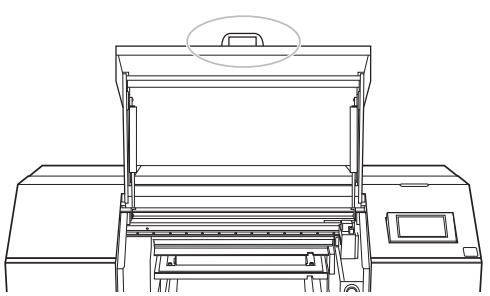

**⓬ If you removed the long guide in step ❷ , attach it.**

**⓭ Close the front cover.**

**IMPORTANT**

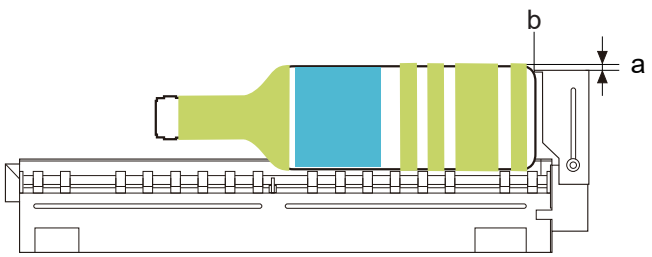
Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed.

If you do not open and close the front cover gently, it may break or you may be injured.



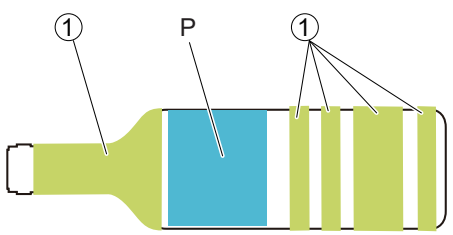
## Shielding the Object from Light

If the object is transparent, it is necessary to shield it from light in order to prevent UV light reflected off the inside of the object from striking the print head surface. UV light striking the print head surface will harden the ink on this surface, leading to discharge issues. The shielding method depends on the object to be printed on. When adhering masking tape to the outside of the object, avoid the rollers of the rotary axis unit.



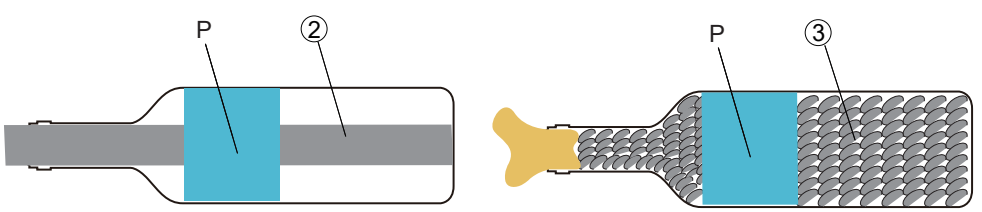

**Non-empty bottle**

Shield the object with masking tape, avoiding the rollers of the rotary axis unit.



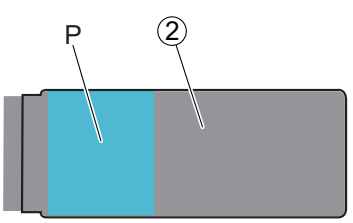

**Empty bottle**

Shield the object by inserting dark-colored paper or beads.




**Glass bottle, thermos, etc.**

Shield the object by inserting dark-colored paper.




| | | | | | |
|---|---|---|---|---|---|
| a | 2 mm (0.08 in.) | P | Printing area | ② | Dark-colored paper, cloth, etc. |
| b | Gently bring the object into contact with the guide. | ① | Masking tape | ③ | Dark-colored beads, etc. |

# Attaching the Object

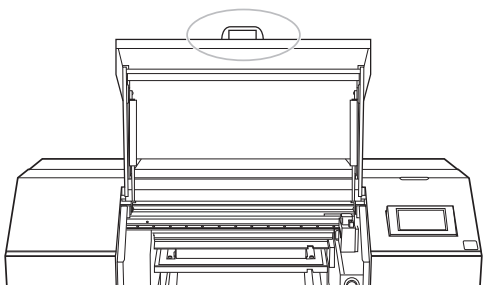
## Procedure

**1** **Open the front cover.**

**IMPORTANT**

Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed.

If you do not open and close the front cover gently, it may break or you may be injured.



**2** **Measure the diameter of the objects.**

Write down the measured result. Enter the result measured in step **9** - ② on P.50 "Performing Printing".

**3** **Prepare to attach the objects.**

### Rotary axis unit

- **When loading objects that have a diameter of 10 to 35 mm (0.39 to 1.37 in.)**

  Attach a small-diameter adapter ① and the short guide ② to the rotary axis unit.

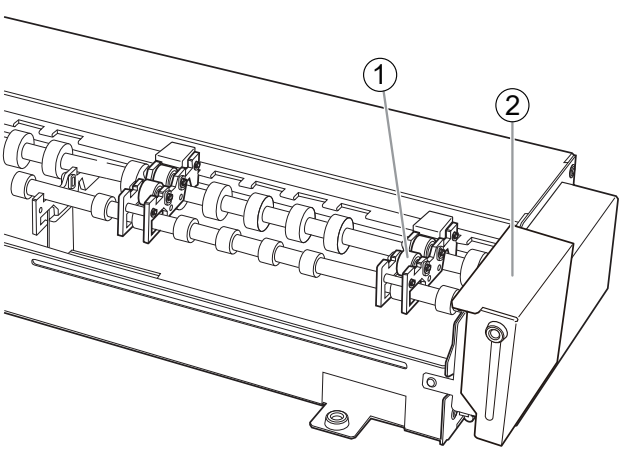
  ☞ P.17 "Attaching the Small-diameter Adapters"

  ☞ P.18 "Attaching the Guide"

**MEMO**

Temporarily tighten the short guide's screw.

Adjust the height of the short guide when you place the objects on the rotary axis unit.



- **When loading objects that have a diameter of 35 to 75 mm (1.38 to 2.95 in.)**

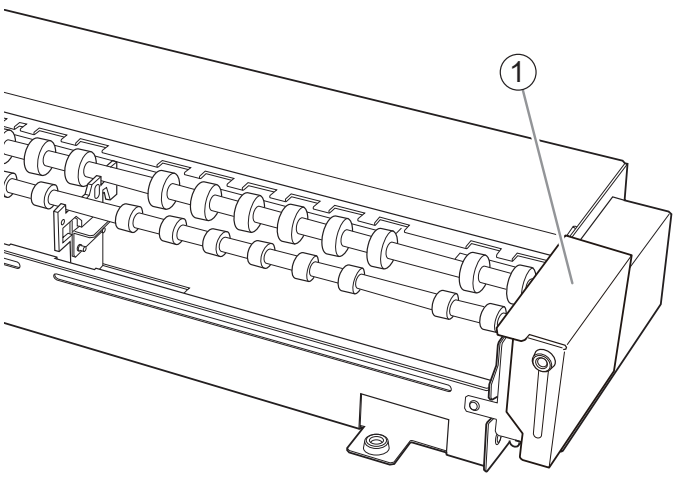
  Attach the short guide ①.

  ☞ P.18 "Attaching the Guide"

  **MEMO**

  Temporarily tighten the short guide's screw.

  Adjust the height of the short guide when you place the objects on the rotary axis unit.




- **When loading objects that have a diameter of 75 to 121 mm (2.96 to 4.76 in.)**

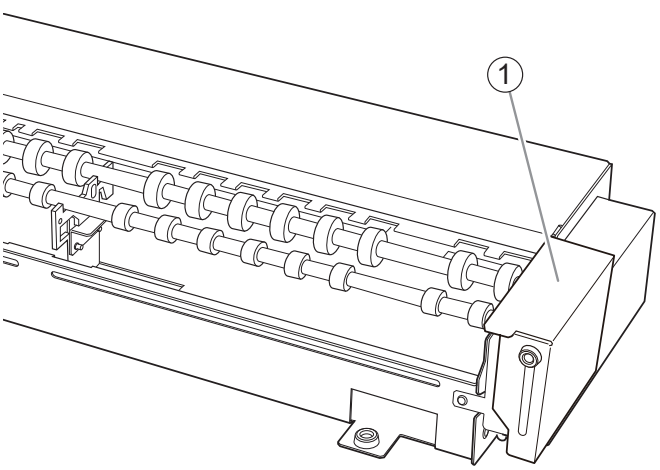
  Attach the long guide ①.

  ☞ P.18 "Attaching the Guide"

  **MEMO**

  Temporarily tighten the long guide's screw.

  Adjust the height of the long guide when you place the objects on the rotary axis unit.



**Object to be printed on**

If the objects are transparent, shield them.

For the shielding methods, see P.26 "Shielding the Object from Light".

If the objects are opaque, shielding is not necessary.

MEMO

Determine whether the objects are transparent or opaque according to the following standard.

- Transparent: A hand placed on the other side of the object to be printed on can be seen through it.
- Opaque: A hand placed on the other side of the object to be printed on cannot be seen through it.

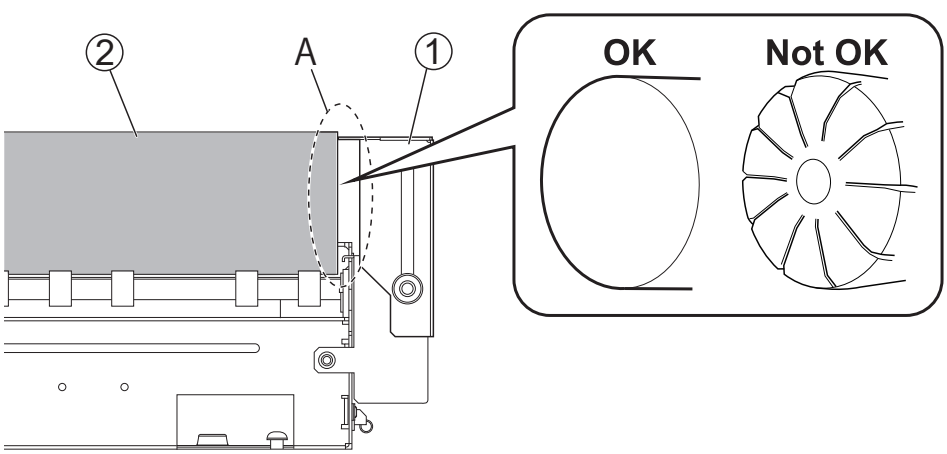
**4 Place the object on the rollers of the rotary axis unit.**

Place the object according to the guide.

Gently bring the object ② into contact with the left edge of the guide ① .

MEMO

- Rotation may be impeded if the object forcefully pushes against the guide, leading to defective printing. Attach the object so it touches the guide gently.
- Make sure that edge A of the object, which touches the guide, is perpendicular to the print surface and is a flat, even surface. If a rough surface that is not flat touches the guide, the object will move to the left and right, leading to misalignment in the printing position and other such reductions in quality.
- Media with the following shapes cannot be placed on the rotary axis unit.
  - Any media that does not have a cylindrical shape
  - Media with an undulating surface that affects rotation



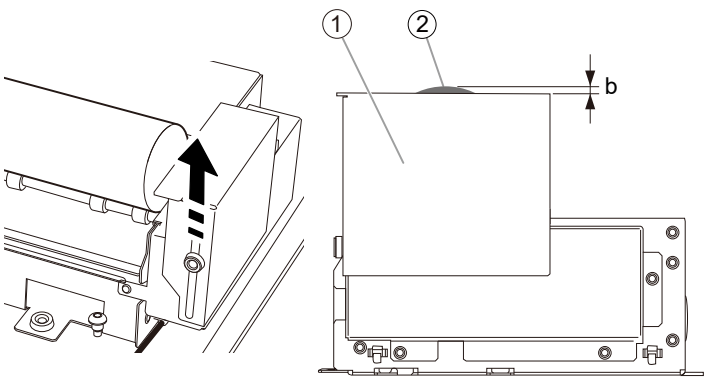
### 5 Adjust the height of the guide.

Adjust the guide so that the distance, b, from the highest position on the object ② to the top of the guide ① is 2 mm (0.08 in.).

**IMPORTANT**

When tightening the guide's retaining screw, push the guide against the rotary axis unit to prevent the guide from tilting.

After tightening the retaining screw, check that the guide is not tilted. If you tighten the screw without pushing the guide against the rotary axis unit, distance b may be different.




**MEMO**

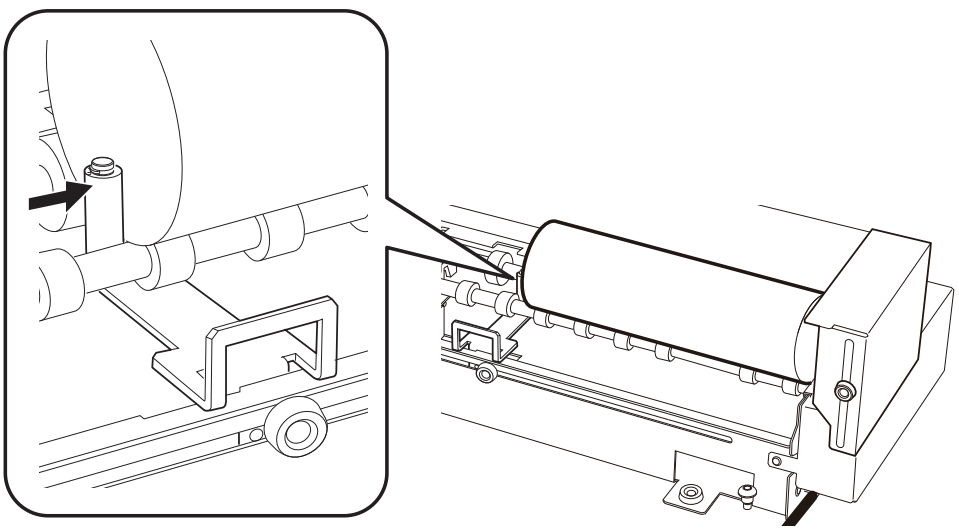
After the guide height adjustment is complete, once more check that the object is gently touching the guide. Rotation may be impeded if the object forcefully pushes against the guide, leading to defective printing.

### 6 Attach the tail stopper.

Use the tail stoppers when printing around the entirety of a cylinder, when printing layered colors, and in similar situations.

Gently bring the tail stopper into contact with the object to prevent it from moving left or right, and then tighten the mounting screw.

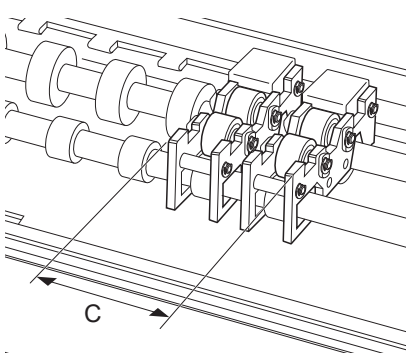
☞ P.16 "Attaching the Tail Stoppers"



**IMPORTANT**

The tail stoppers cannot be used when:

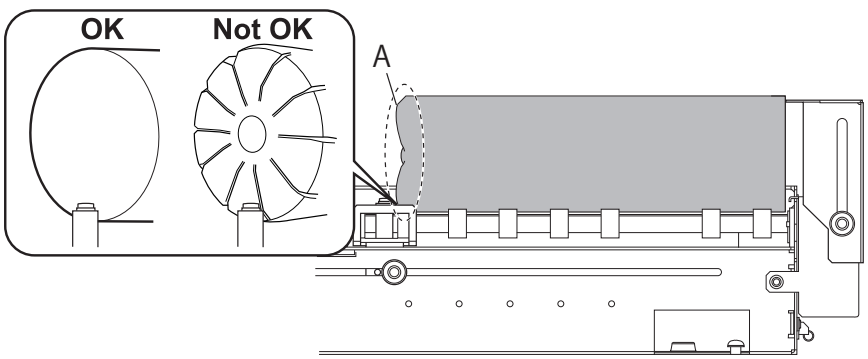
- The object to be printed on is shorter than the width C of the small-diameter adapters attached next to each other.




- The outer diameter of the object to be printed on, such as a bottle, differs on its left and right ends, making it impossible to touch the tail stopper to the object.
- A tail stopper is placed outside of the range covered by its slide hole.

MEMO

- Rotation may be impeded if the tail stoppers forcefully push against the objects, leading to defective printing. Attach the tail stopper so it touches the object gently.
- Make sure that edge A of the object, which touches the tail stopper, is perpendicular to the print surface and is a flat, even surface. If a rough surface that is not flat touches the tail stopper, the object will move to the left and right, leading to misalignment in the printing position and other such reductions in quality.

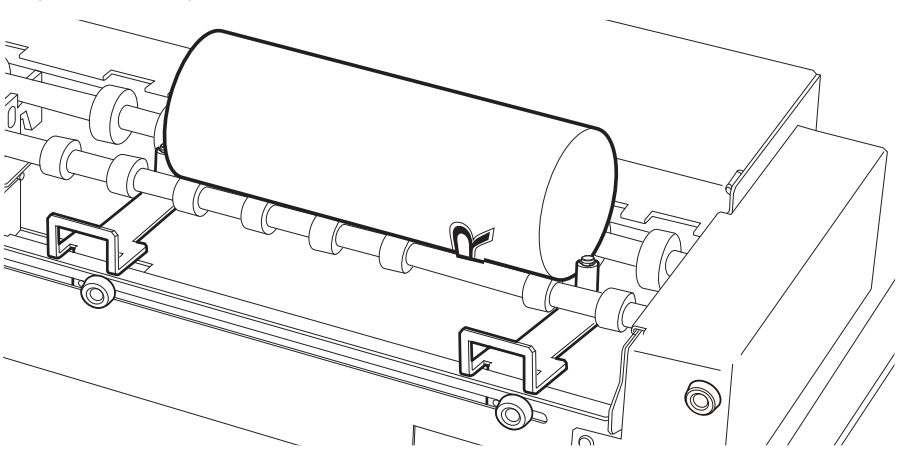



- If the object has undergone embossing, place the object so its embossed part does not touch the roller of the rotary axis unit.

  If the right edge of the object to be printed on cannot be brought into contact with the long guide or short guide, remove the long or short guide and attach tail stoppers.

  You can only place tail stoppers at the right edge or both edges of the object to be printed on when this object is opaque.

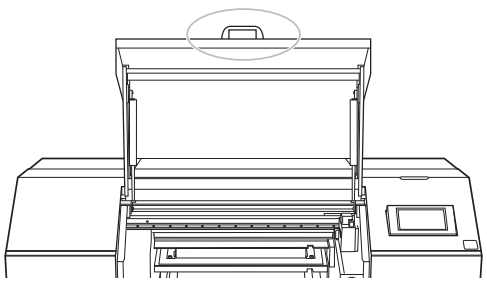
  When tail stoppers are placed at the right edge or both edges of the object to be printed on, the length of the object that can be placed is reduced.



**7** **Close the front cover.**

**IMPORTANT**

Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed.
If you do not open and close the front cover gently, it may break or you may be injured.



## Attaching Multiple Objects

You can attach multiple objects that have the same material, shape, and size.

**IMPORTANT**

Attaching multiple objects is not possible if the length of the object is longer than the following.

- OA-RA-240: 260 mm (10.23 in.)
- OA-RA-180: 185 mm (7.28 in.)

  * The above are the longest possible lengths when tail stoppers are not placed on the left side of the object to be printed on.

**MEMO**

- You cannot attach multiple transparent objects.
- Only multiple opaque objects can be attached.
- When placing multiple objects each having a diameter of 10 to 35 mm (0.39 to 1.37 in.), you have to purchase small-diameter adapters (sold separately).

  For information about purchasing small-diameter adapters, contact your authorized dealer.
- To attach multiple objects to the rotary axis unit in a line, you will need to purchase separate tail stoppers.

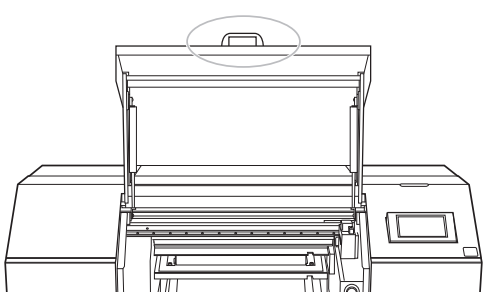
  For information about purchasing tail stoppers, contact your authorized dealer.

### Procedure

1 **Open the front cover.**

**IMPORTANT**

Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed. If you do not open and close the front cover gently, it may break or you may be injured.



2 **Measure the diameter of the objects.**

Write down the measured result. Enter the result measured in step 9 - ② on P.50 "Performing Printing".

**3** **Prepare to attach the objects.**

**Rotary axis unit**

- **When loading objects that have a diameter of 10 to 35 mm (0.39 to 1.37 in.)**

  Attach a small-diameter adapter ① and the short guide ② to the rotary axis unit.

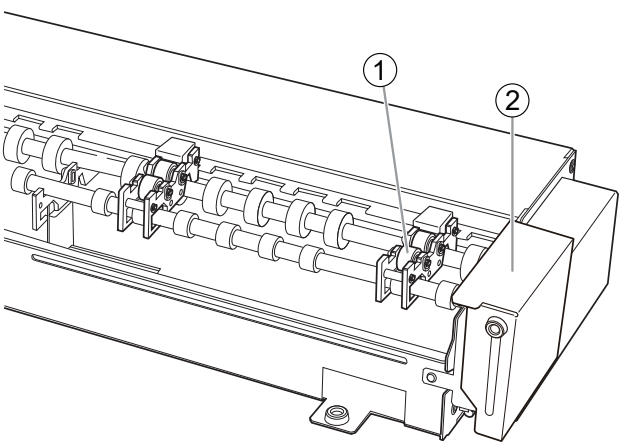
  ☞ P.17 "Attaching the Small-diameter Adapters"

  ☞ P.18 "Attaching the Guide"

  MEMO

  Temporarily tighten the short guide's screw.

  Adjust the height of the short guide when you place the objects on the rotary axis unit.




- **When loading objects that have a diameter of 35 to 75 mm (1.38 to 2.95 in.)**

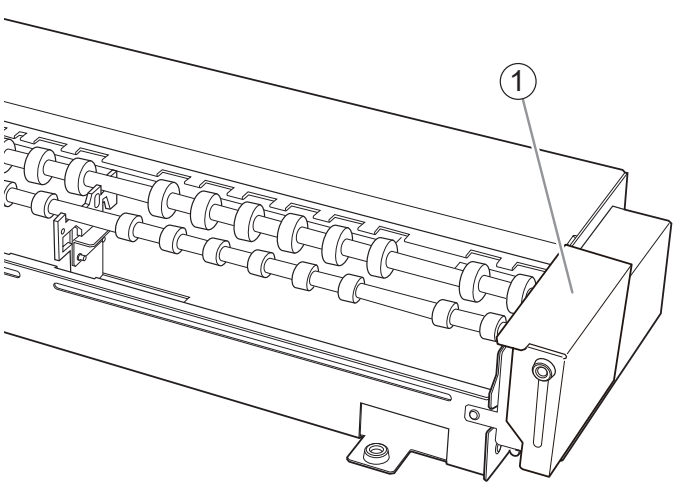
  Attach the short guide ① .

  ☞ P.18 "Attaching the Guide"

  MEMO

  Temporarily tighten the short guide's screw.

  Adjust the height of the short guide when you place the objects on the rotary axis unit.



- **When loading objects that have a diameter of 75 to 121 mm (2.96 to 4.76 in.)**

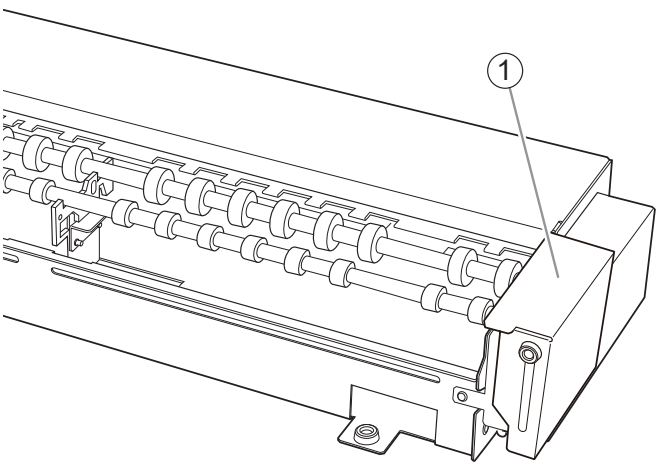
  Attach the long guide ①.

  ☞ P.18 "Attaching the Guide"

  **MEMO**

  Temporarily tighten the long guide's screw.

  Adjust the height of the long guide when you place the objects on the rotary axis unit.



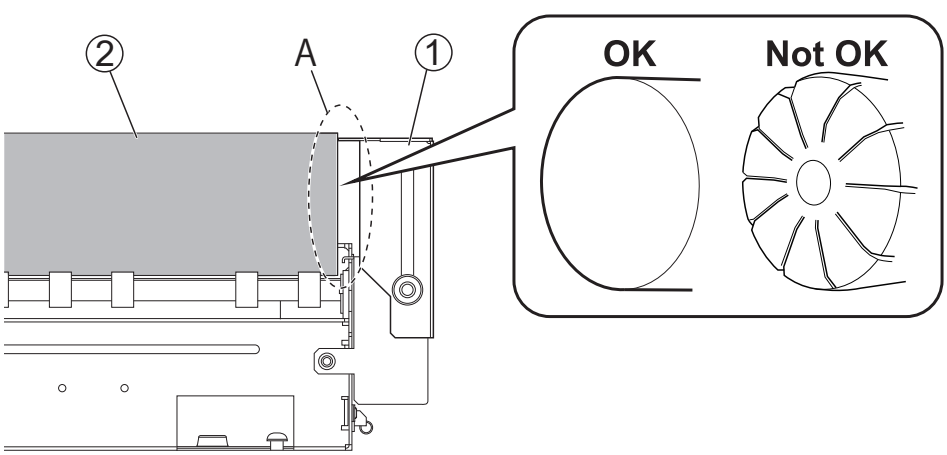
**4 Place the first object on the rollers of the rotary axis unit.**

Place the object according to the guide.

Gently bring the object ② into contact with the left edge of the guide ① .

**MEMO**

- Rotation may be impeded if the object forcefully pushes against the guide, leading to defective printing. Attach the object so it touches the guide gently.
- Make sure that edge A of the object, which touches the guide, is perpendicular to the print surface and is a flat, even surface. If a rough surface that is not flat touches the guide, the object will move to the left and right, leading to misalignment in the printing position and other such reductions in quality.
- Media with the following shapes cannot be placed on the rotary axis unit.
  - Any media that does not have a cylindrical shape
  - Media with an undulating surface that affects rotation



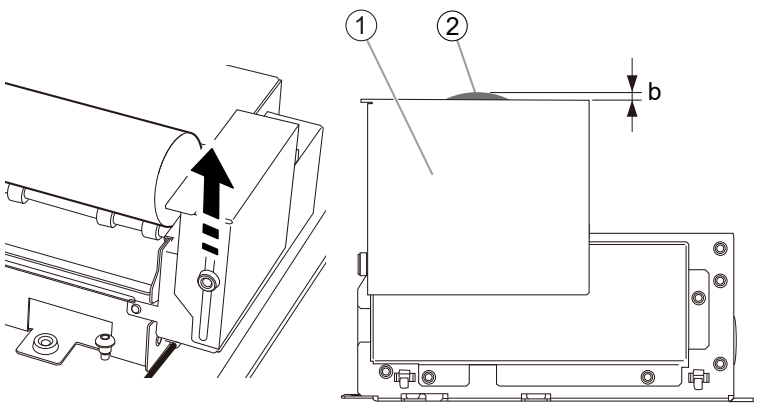
### 5 Adjust the height of the guide.

Adjust the guide so that the distance, b, from the highest position on the object ② to the top of the guide ① is 2 mm (0.08 in.).

**IMPORTANT**

When tightening the guide's retaining screw, push the guide against the rotary axis unit to prevent the guide from tilting.

After tightening the retaining screw, check that the guide is not tilted. If you tighten the screw without pushing the guide against the rotary axis unit, distance b may be different.

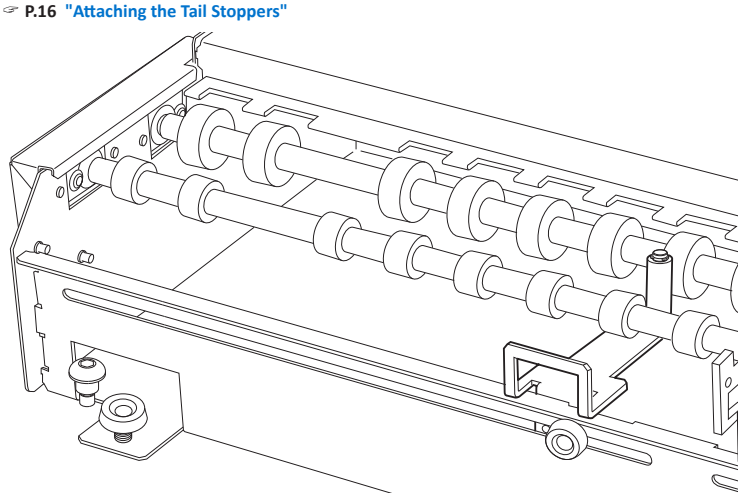



**MEMO**

After the guide height adjustment is complete, once more check that the object is gently touching the guide. Rotation may be impeded if the object forcefully pushes against the guide, leading to defective printing.

### 6 Attach the tail stopper.

☞ P.16 "Attaching the Tail Stoppers"



### 7 Place the second object on the rollers of the rotary axis unit.

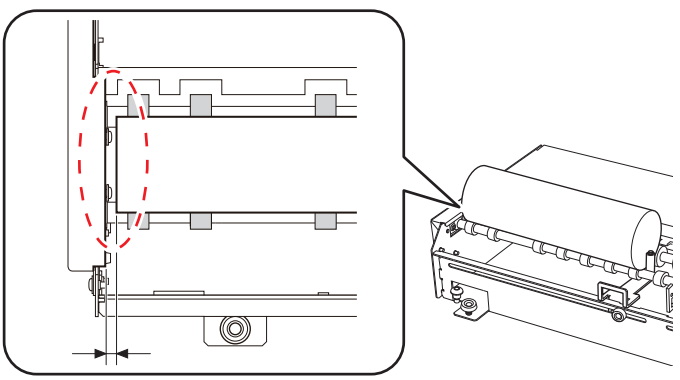
Place the object according to the tail stopper.

Gently bring the object into contact with the tail stopper.

**MEMO**

Place the second object so it does not touch the rotary axis unit's cover.

Object rotation will be impeded if the second object touches the cover.



### 8 Attach the tail stopper.

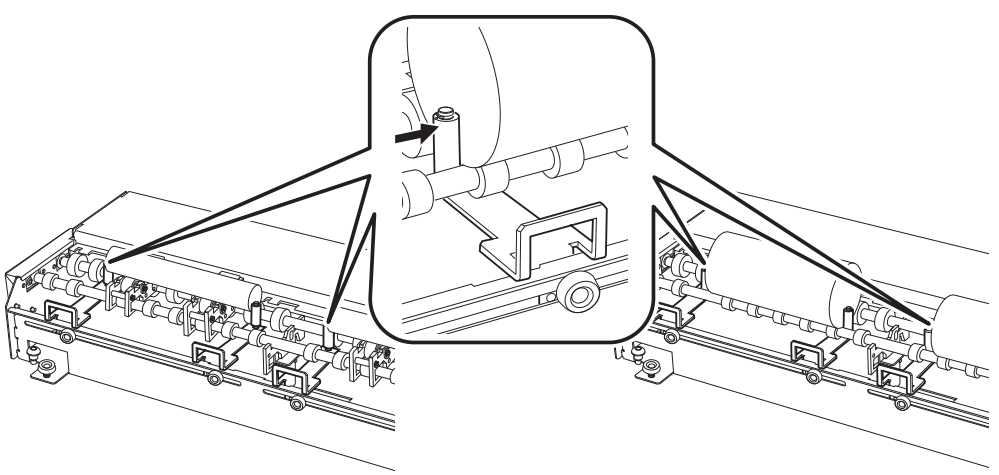
Use the tail stoppers when printing around the entirety of a cylinder, when printing layered colors, and in similar situations.

Gently bring the tail stopper into contact with the object to prevent it from moving left or right, and then tighten the mounting screw.

☞ P.16 "Attaching the Tail Stoppers"

**MEMO**

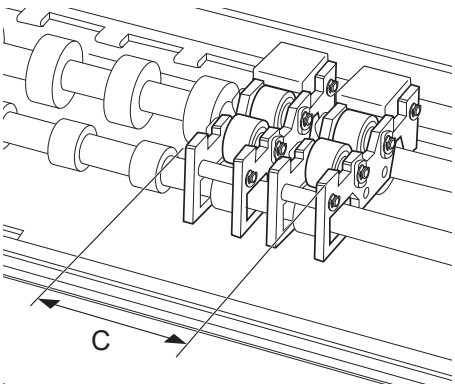
When a tail stopper is placed at the left edge of the object, the lengths of the multiple objects that can be placed are reduced.



**IMPORTANT**

The tail stoppers cannot be used when:

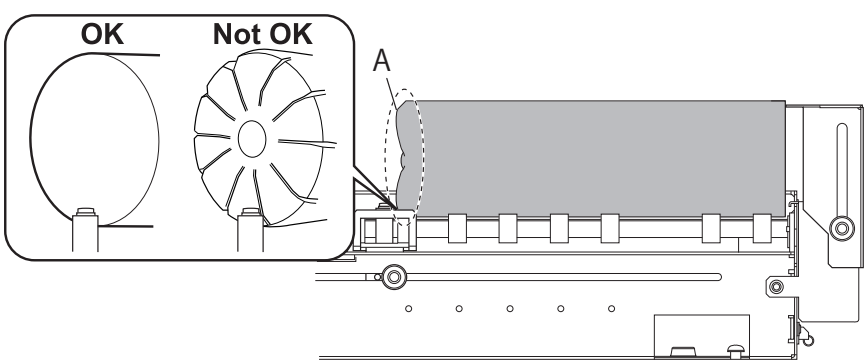
- The object to be printed on is shorter than the width C of the small-diameter adapters attached next to each other.




- The outer diameter of the object to be printed on, such as a bottle, differs on its left and right ends, making it impossible to touch the tail stopper to the object.
- A tail stopper is placed outside of the range covered by its slide hole.

**MEMO**

- Rotation may be impeded if the tail stoppers forcefully push against the objects, leading to defective printing. Attach the tail stopper so it touches the object gently.
- Make sure that edge A of the object, which touches the tail stopper, is perpendicular to the print surface and is a flat, even surface. If a rough surface that is not flat touches the tail stopper, the object will move to the left and right, leading to misalignment in the printing position and other such reductions in quality.

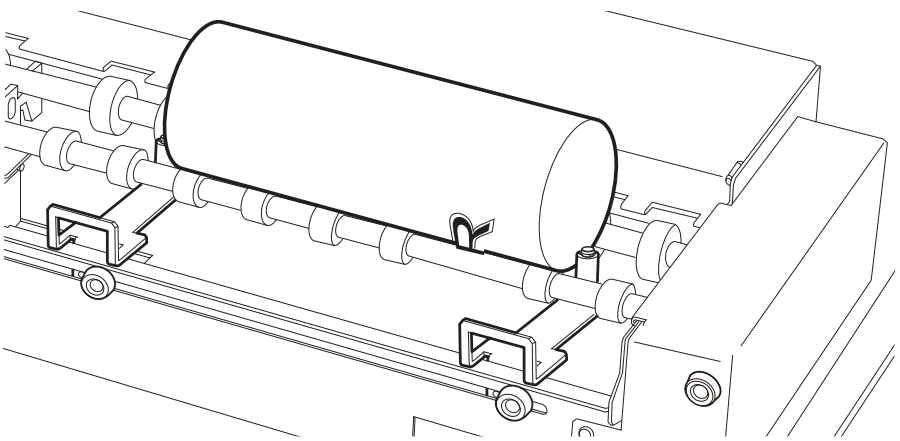


- If the object has undergone embossing, place the object so its embossed part does not touch the roller of the rotary axis unit.

  If the right edge of the object to be printed on cannot be brought into contact with the long guide or short guide, remove the long or short guide and attach tail stoppers.

  You can only place tail stoppers at the right edge or both edges of the object to be printed on when this object is opaque.

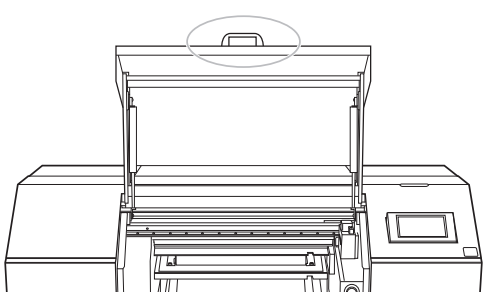
  When tail stoppers are placed at the right edge or both edges of the object, the lengths of the multiple objects that can be placed are reduced.



**9 Close the front cover.**

**IMPORTANT**

Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed. If you do not open and close the front cover gently, it may break or you may be injured.



## Determining the Print Surface Height and Printing Position

**MEMO**

Set [Table Height], and then set [Print Origin].

[Table Height] adjusts the table height and rotates the object to be printed on to ensure appropriate clearance between the object and the print heads.

This is why [Table Height] must be set before [Print Origin], otherwise [Print Origin] may be misaligned.

[Table Height], [Print Origin], and [Printing Area] can all be set with the front cover open.

**1** **Tap [Setup] on the printer's operation panel.**

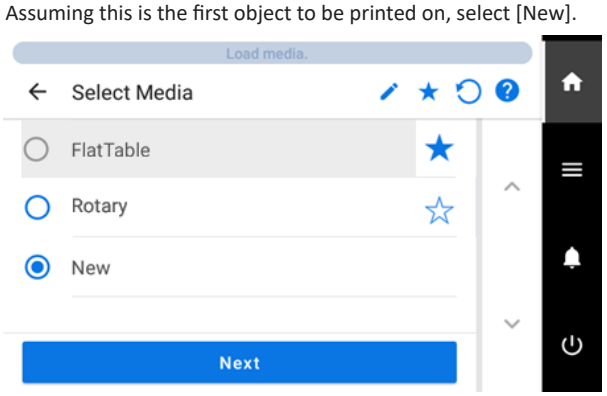
If the home screen is not displayed, tap .

**2** **Determine the [Preset].**

① **Tap [Select] for [Preset].**

② **Tap [New], and then tap [Next].**

Assuming this is the first object to be printed on, select [New].




If the media is already registered to the rotary axis unit, select the media (printing settings) from the list of existing media, tap [Next], and proceed to step **3** .

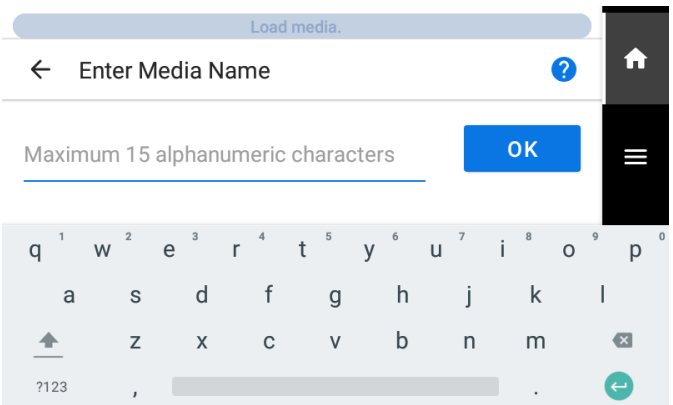
**MEMO**

- Media registered to the flat table or vacuum table cannot be selected for the rotary axis unit.
- Tapping makes it possible to search the registered media by keyword.
  To reset the entered keyword, tap .
- Tapping to the right of the media name will change the symbol to , and the media will be registered to Favorites.
  Tap the Favorites filter at the top of the operation panel to turn the filter on and show only favorited media.
  Tap to turn the Favorites filter off.
- Keyword searching and the Favorites filter can be used at the same time.
  Tap to turn the Favorites filter off ( ) and reset all keywords.

③ **Enter the name of the object, and then tap [OK].**

Tap on the keyboard displayed on the screen to input the object name.

You can use up to 15 alphanumeric characters.




④ **Check the name you entered and tap [Next].**

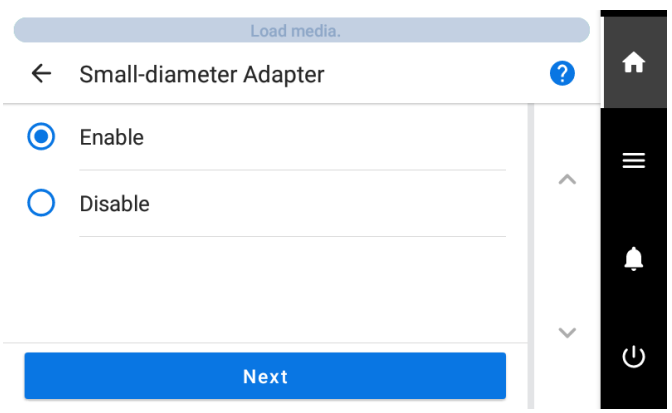
To make corrections, tap the name you entered.

⑤ **Configure the [Small-diameter Adapter] setting.**

Select [Enable] when using the small-diameter adapter, and [Disable] when not using it.

**IMPORTANT**

Be sure to select [Enable] when using the small-diameter adapter. Selecting [Disable] will cause the object to rotate in a different direction, preventing correct printing.




After selecting a setting, tap [Next].

⑥ **Select the appropriate reflective intensity for the object.**

MEMO

This machine offers two options for [Media Reflective Intensity Selection Method]: [Simple] and [Advanced].
[Media Reflective Intensity Selection Method] can be changed in the printer's [Preferences] settings.
For details, refer to "Media Reflective Intensity Selection Method" in the printer's User's Manual.

☞ User's Manual

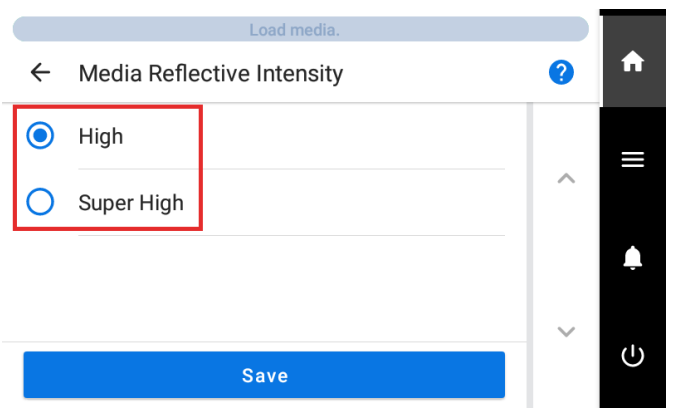
MEMO

Set the reflective intensity based on whether the object is transparent or opaque.
Determine whether the objects are transparent or opaque according to the following standard.

- Transparent: A hand placed on the other side of the object to be printed on can be seen through it.
- Opaque: A hand placed on the other side of the object to be printed on cannot be seen through it.

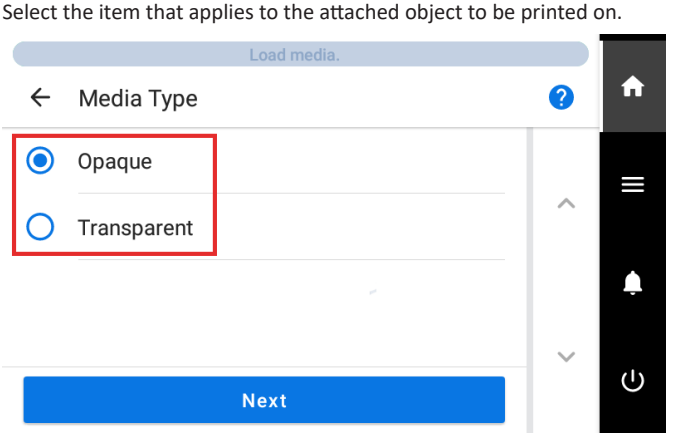
**With [Media Reflective Intensity Selection Method] set to [Simple]**

Select [High] if the object is opaque. Select [Super High] if the object is transparent.




**With [Media Reflective Intensity Selection Method] set to [Advanced]**

Select the item that applies to the attached object to be printed on.

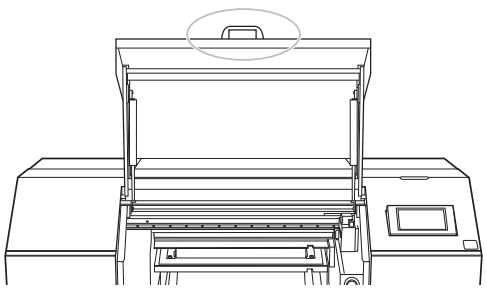



Tap [Save].

**3** **Open the front cover.**

**IMPORTANT**

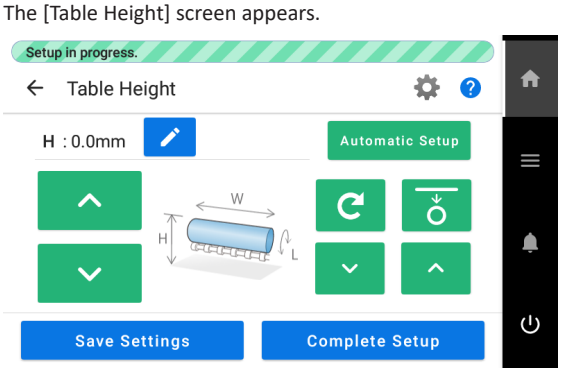
Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed.
If you do not open and close the front cover gently, it may break or you may be injured.



**4** **Set [Table Height].**

① **Tap [Change] for [Table Height].**

The [Table Height] screen appears.




② **Tap**  **.**

The table will automatically move to the location for setting the table height.

**MEMO**

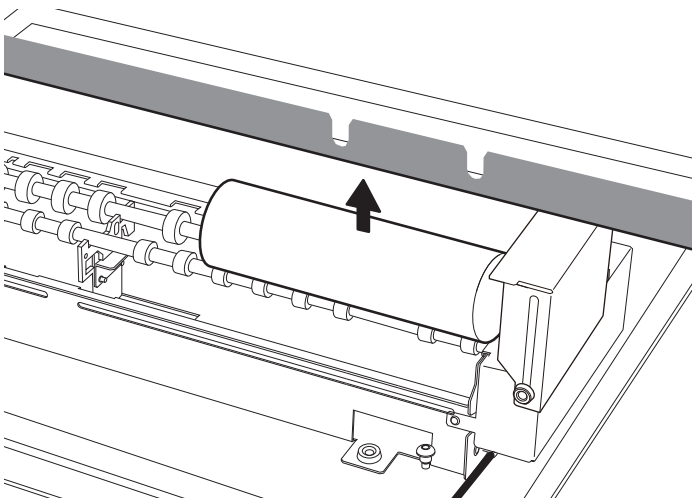
You can also tap  or  on the right side of the operation panel to move the table manually.

③ **Move the print surface so that it is close to the head gap sensor.**

Move the print surface as close as possible to the head gap sensor beforehand to avoid needlessly increasing the time required for automatic height setting.

Tap or long tap  or  on the left side of the operation panel.

A long tap will speed up the movement after 2 seconds, so take care to avoid going too far.



④ **Tap [Automatic Setup].**

The height of the object to be printed on will be set automatically to a position about 1 mm (39.4 mil) away from the print head's ink emission surface.

MEMO

- You can also tap  and then enter a value to set the height.
- Tap  to enable the setting of [Table Lowering Amount].

  For details, see "Adjusting the Distance between the Object to Be Printed On and the Print Heads" in the printer's User's Manual.

  ☞ User's Manual

⑤ **Tap [Save Settings].**

MEMO

To complete setup here, tap [Complete Setup]. Tapping [Complete Setup] will finish setup, and you will be returned to the home screen.

Use this function when changing [Printing Area] or [Print Origin] is not necessary, such as when duplicating media.

## 5 Set the [Print Origin] and [Printing Area].

① **Tap [Change] for [Printing Area].**

The [Print Origin] screen appears.

**MEMO**

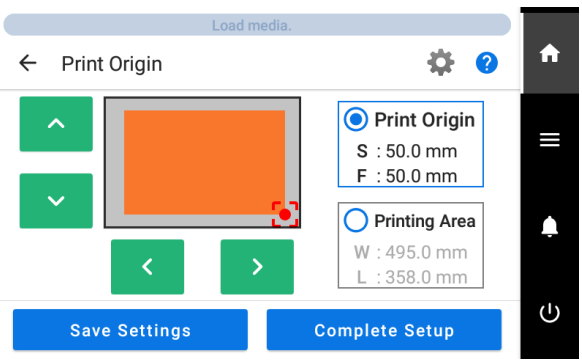
Tap ⚙ to change the operation performed when configuring the settings.

For details, see "Changing the Operation Performed When Setting Up the Printing Area" in the printer's User's Manual.

☞ User's Manual

If a rotary axis unit is installed, [Return to Maximum Printing Area] will not be displayed.

If a rotary axis unit is installed and [Base Printing Position] is set to [Center], [Use coordinates to specify the printing area without moving the carriage or table.] will not be displayed.

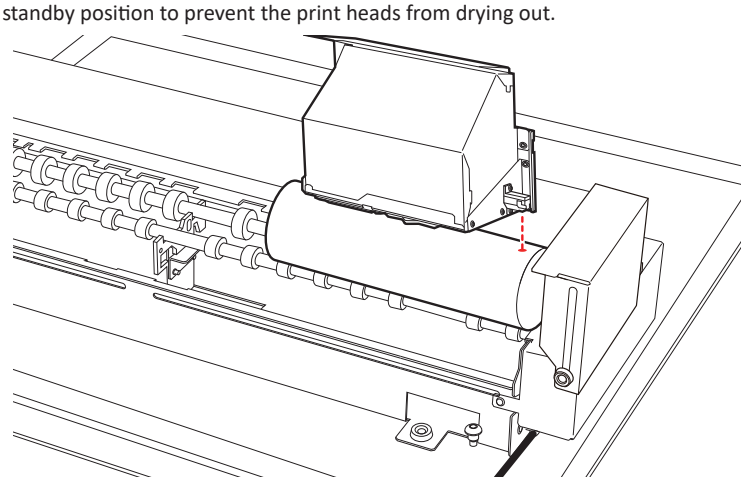



② **Tap ^, v, <, or >.**

The print-head carriage moves to the bottom right point of the currently set printing area, and the pointer is lit.

**MEMO**

If left without user input for approximately 3 minutes, the print-head carriage automatically returns to the standby position to prevent the print heads from drying out.



③ **Tap or long tap , , , or .**

Align the pointer with the start location (origin) of the printing area of the loaded object.

**MEMO**

**When the pointer is difficult to see**

Depending on the material of the object to be printed on, such as transparent media or high-gloss media with dark colors used on the print surface, the pointer may be difficult to see. In such cases, the pointer may become more visible by placing masking tape on the print surface or on the back.

**MEMO**

- [Print Origin] cannot be changed if [Base Printing Position] is set to [Center] and [Printing Area] is set to the maximum. If [Printing Area] is set to the maximum, perform [Printing Area Settings] first.
- If [Base Printing Position] is set to [Center], select [Center on the Media] under [Printing Position] in VersaWorks.

④ **Tap [Printing Area].**

The print-head carriage moves to the top left point of the currently set printing area, and the pointer is lit.

⑤ **Tap or long tap , , , or .**

Set the printing area in the left/right (SCAN) direction and in the rotation direction for the loaded object using the pointer.

*6* **Tap [Complete Setup].**

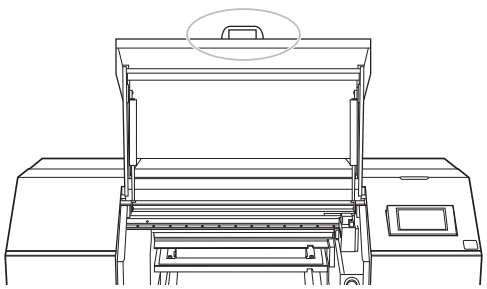
**MEMO**

To reconfigure [Table Height], tap [Save Settings]. Tap [Save Settings] to return to the setup item selection screen and change the settings as necessary.

**7** **Close the front cover.**

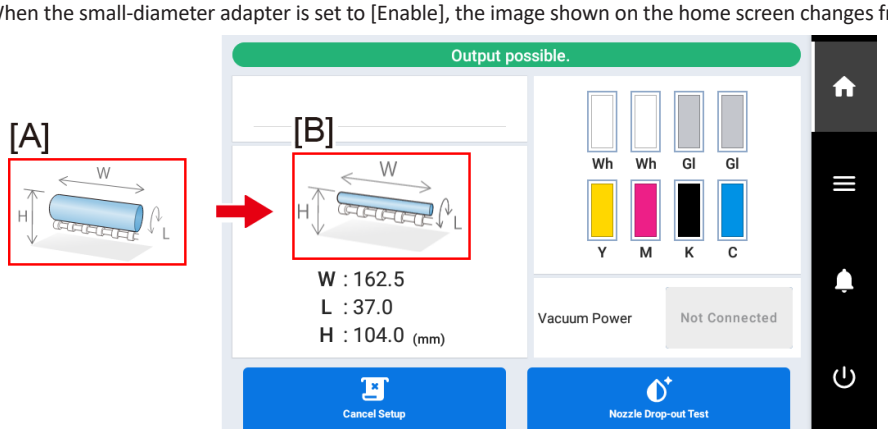
**IMPORTANT**

Be sure to hold the handle of the front cover and keep holding it until the cover is completely opened or closed.
If you do not open and close the front cover gently, it may break or you may be injured.



**MEMO**

When the small-diameter adapter is set to [Enable], the image shown on the home screen changes from [A] to [B].




| |
|---|
| [A]: Display when the small-diameter adapter is disabled |
| [B]: Display when the small-diameter adapter is enabled |

## Performing Printing

Print data is created and then output to the machine using VersaWorks.
Print data is created in an application such as Adobe Illustrator and then saved in a file format (e.g., PDF or EPS) that can be read by VersaWorks.
The methods for creating print data differ depending on the color layering and whether a primer has been applied.
See the "VersaUV Usage Guide" for a description of how to create typical print data.

**1 Start VersaWorks.**

**2 Click the printer to use.**

Check that:

- **The printer to use is connected.**
- **The machine's status is "Ready to Print."**

**3 Click the [Gear Icon] of the folder (one of A to E) where you want to enter the print data.**

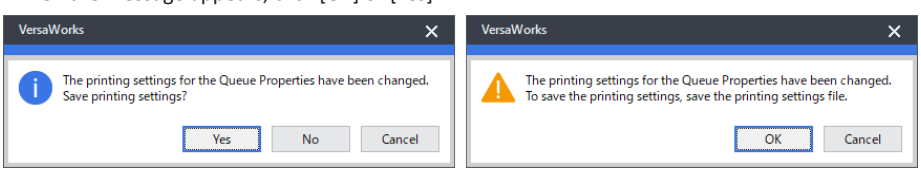
The [Queue Properties] window appears.

**4 Click [Get Media Width].**

Obtain and set the printing area from the printer as set in "Determining the Print Surface Height and Printing Position."
For other VersaWorks settings, see the VersaWorks manual.

**5 Click [OK].**

When you click [OK], a message indicating that the settings have been changed appears.
When the message appears, click [OK] or [Yes].




**6 Enter the print data in the queue folder for which the size was obtained in step 4 .**

Drag the print data to the job list in the target queue folder.

**7 Double-click the entered print data.**

The job settings screen is displayed.
Use this window to fit the print data in the printing area and adjust its position.
The white part in the layout area is the loaded print area. Print data that does not fit within this area will be split.

**8** **For [Media Type] on the Quality tab, select [Rotary].**

**9** **On the Printer Controls tab, set [Nozzle Amount to Use in Printing] for [Rotary Controls].**

① **Click [Automatic Calculation].**

② **Enter [Media Diameter].**

③ **Click [Apply].**

[Nozzle Amount to Use in Printing] is calculated automatically.

**10** **Once setup is complete, click [OK].**

**11** **Click the [Printing Icon].**

The [Advanced Print Settings] window appears.

Set [Print Count], and then click [Print].

Printing starts.

The operation panel will change to the display indicating that printing is in progress.

**MEMO**

If the expected printing quality cannot be obtained or ink mist is a concern, adjust [Nozzle Amount to Use in Printing].

Reducing [Nozzle Amount to Use in Printing] increases the printing quality but also increases the printing time. Increasing [Nozzle Amount to Use in Printing] reduces the printing time but affects the printing quality due to issues such as the generation of mist because the printed surface is far away. Consider the printing quality and the printing time while making adjustments.

# Managing the Media Settings

## Changing the Media Settings

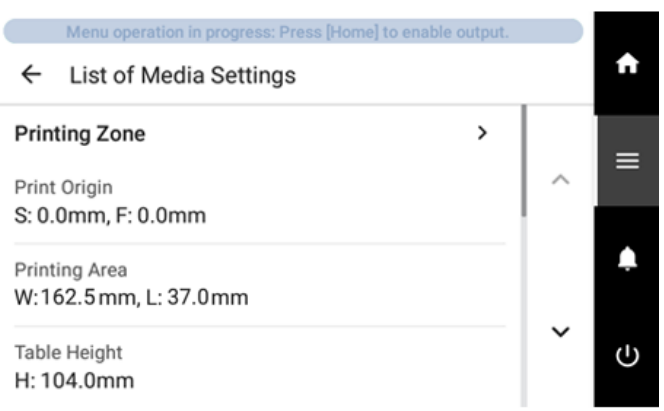
This section explains how to change media settings during setup.

### Procedure

1. **Tap** on the operation panel's home screen.
   If the home screen is not displayed, tap .
2. **Tap [Media Settings] - [List of Media Settings].**
3. **Tap > next to the setting you want to change to move to the screen for editing this setting.**
   The media settings that can be changed are as follows.

   MEMO

   [Table Height] and [Table Lowering Amount] cannot be changed under [List of Media Settings].




| [List of Media Settings] | Reference |
|---|---|
| [Printing Zone] | P.42 "Determining the Print Surface Height and Printing Position" Steps 5 - ② to 5 - ⑤ |
| [Media Reflective Intensity] | "With [Media Reflective Intensity Selection Method] set to [Simple]" in Step 2 - ⑥ of P.42 "Determining the Print Surface Height and Printing Position" |
| [Small-diameter Adapter] | P.42 "Determining the Print Surface Height and Printing Position" Step 2 - ⑤ |
| [Printing Movement Range] | User's Manual: "Speeding Up Printing for Narrow Objects" |

4. **If you have changed a setting, tap [Save Settings] or [Save].**
5. **Tap to return to the home screen.**

## Changing the Settings with Batch Media Settings

This section explains how to change media settings as a batch during setup.

### Procedure

1. **Tap**  on the operation panel's home screen.
   If the home screen is not displayed, tap .

2. **Tap [Media Settings] - [Batch Media Settings].**
   Change the following settings in order: [Print Origin], [Printing Area], [Media Reflective Intensity], [Small-diameter Adapter], [Nozzle Drop-out Test], [Printing Movement Range].

3. **Change the [Print Origin] and [Printing Area] settings.**
   Refer to Steps 5 - ② to 5 - ⑤ in **P.42** "Determining the Print Surface Height and Printing Position" to change the settings.
   When you have finished configuring the settings, tap [Save and Proceed].

4. **Change the reflective intensity of the object to be printed on with [Media Reflective Intensity].**
   Refer to "With [Media Reflective Intensity Selection Method] set to [Simple]" in Step 2 - ⑥ of **P.42** "Determining the Print Surface Height and Printing Position".
   When you have finished configuring the settings, tap [Save and Proceed].

   MEMO

   If you want to stop after making changes up to this point, tap [Save] - .

5. **Change the [Small-diameter Adapter] setting.**
   Refer to Step 2 - ⑤ of **P.42** "Determining the Print Surface Height and Printing Position" to change the setting.
   When you have finished configuring the settings, tap [Save and Proceed].

   MEMO

   If you want to stop after making changes up to this point, tap [Save] - .

6. **Perform [Nozzle Drop-out Test].**
   If a rotary axis unit is installed, [Change Output Start Location] will not be displayed. Tap [Next] if [Printing Test] and [Cleaning] will not be performed.

   MEMO

   If you want to stop after making changes up to this point, tap .

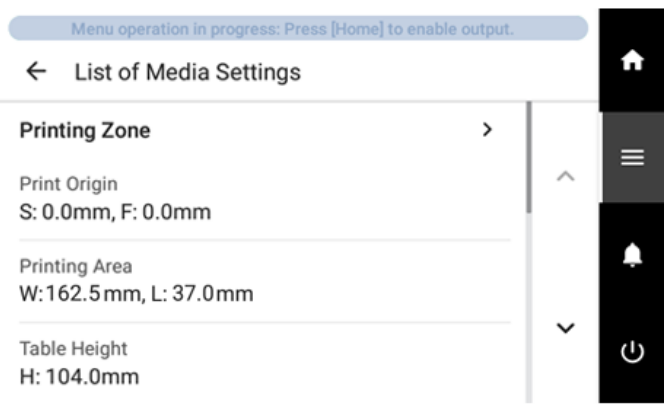
7. **Change [Printing Movement Range].**
   Refer to "Speeding Up Printing for Narrow Objects" in the User's Manual to change the setting.
   When you have finished configuring the settings, tap [Save and Exit].

8. **Tap**  **to return to the home screen.**

## Checking the Registered Media Settings

### Procedure

1. **Tap** on the operation panel's home screen.
   If the home screen is not displayed, tap .
2. **Tap [Media Management].**
   The registered media are displayed in a list.
3. **Tap a media setting.**
4. **Tap [List of Media Settings].**
   The registered media setting values are displayed in a list.




| [List of Media Settings] |
|---|
| [Printing Zone] |
| [Media Reflective Intensity] |
| [Small-diameter Adapter] |
| [Printing Movement Range] |

5. **Tap to return to the home screen.**

## Cleaning the Machine

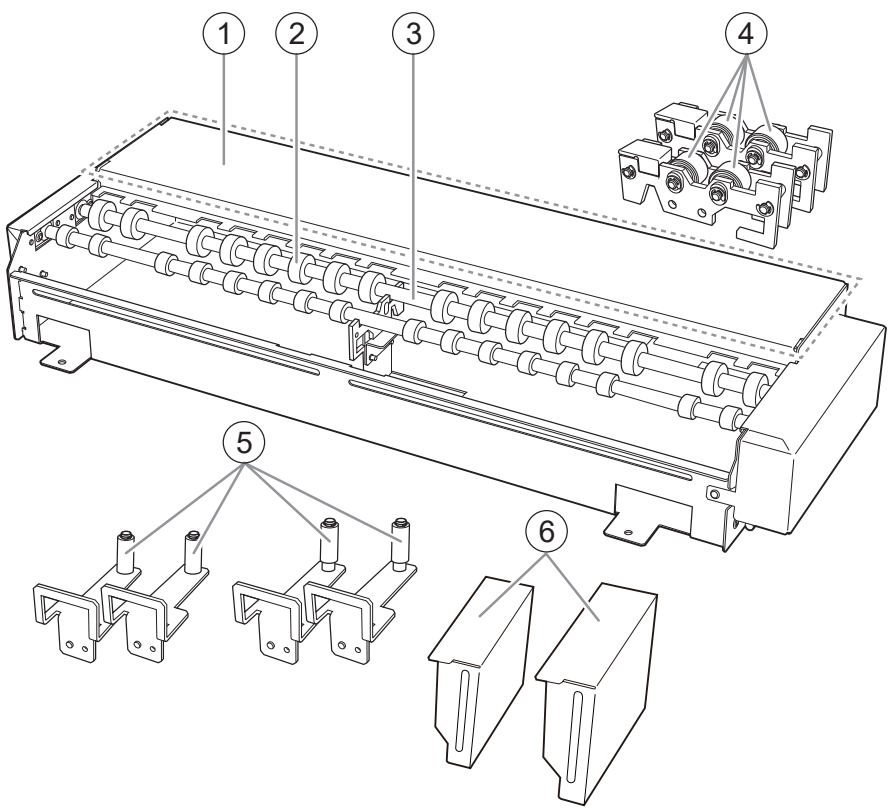
**⚠WARNING** **Never use a solvent such as gasoline, alcohol, or thinner to perform cleaning.**
Doing so may cause a fire.

**⚠WARNING** **Always unplug the power cord when attaching or removing parts and optional parts and when performing maintenance that does not require the machine to be connected to a power source.**
Attempting such operations while the machine is connected to a power source may result in injury or electrical shock.

Wipe away any ink or grime on the printing test stage ①, rollers ②, shafts ③, small-diameter adapters ④, tail stoppers ⑤, and guides ⑥ as part of the daily cleaning procedure. Clean by wiping with a cloth moistened with neutral detergent diluted with water then wrung dry.

**MEMO**

- This machine is a precision device and is sensitive to dust and dirt. Perform cleaning on a daily basis.
- Never attempt to oil or lubricate the machine.
- Frequently clean the inside of the rotary axis unit using a vacuum cleaner or by wiping with a cloth moistened with water then wrung dry. If dust and dirt accumulate, they are likely to affix to printed materials.



# Troubleshooting

## The Machine Doesn't Run

| | |
|---|---|
| **Is the cable connected correctly?** | Make sure the cable is securely connected.<br>☞ **P.6 "Attaching the Rotary Axis Unit"** |

## The Machine Rotates in Reverse or in One Direction

| | |
|---|---|
| **Is the cable connected correctly?** | Make sure the cable is securely connected.<br>☞ **P.6 "Attaching the Rotary Axis Unit"** |
| **Even though the small-diameter adapter is in use, is it set to [Disable]?** | Set [Small-diameter Adapter] to [Enable] on the printer's operation panel.<br>☞ **P.42 "Determining the Print Surface Height and Printing Position"** |

## The Operation Panel of the Machine Does Not Recognize the Rotary Axis Unit

| | |
|---|---|
| **Is the cable connected correctly?** | Make sure the cable is securely connected.<br>☞ **P.6 "Attaching the Rotary Axis Unit"** |

## Dust and Dirt Adheres to the Object

| | |
|---|---|
| **Is cleaning performed on a daily basis?** | Clean the printer and the rotary axis unit.<br>Rotary axis unit<br>☞ **P.55 "Cleaning the Machine"**<br>Printer unit<br>☞ **"User's Manual" (Cleaning the Machine)** |

## The Object Does Not Rotate Smoothly

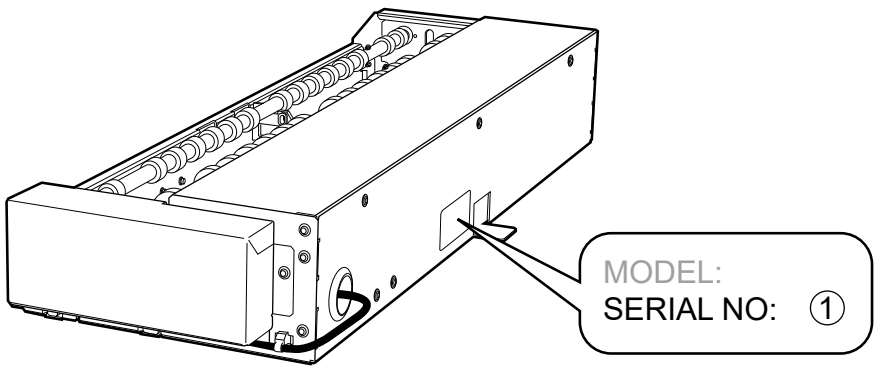
| | |
|---|---|
| **Is rotation impeded because a tail stopper is forcefully pushing against an object?** | Attach the tail stopper so it touches the object gently. |
| **Is rotation impeded because the object is forcefully pushing against the guide?** | Attach the object so it touches the guide gently. |

## The Printing Position Is Offset

| | |
|---|---|
| **Does the object move left or right during printing?** | If a tail stopper is not attached, attach one.<br>Gently bring the object into contact with the guide. |
| **Has the small-diameter adapter been attached correctly?** | Make sure that the back of the small-diameter adapter is seated properly.<br>☞ **P.17 "Attaching the Small-diameter Adapters"** |

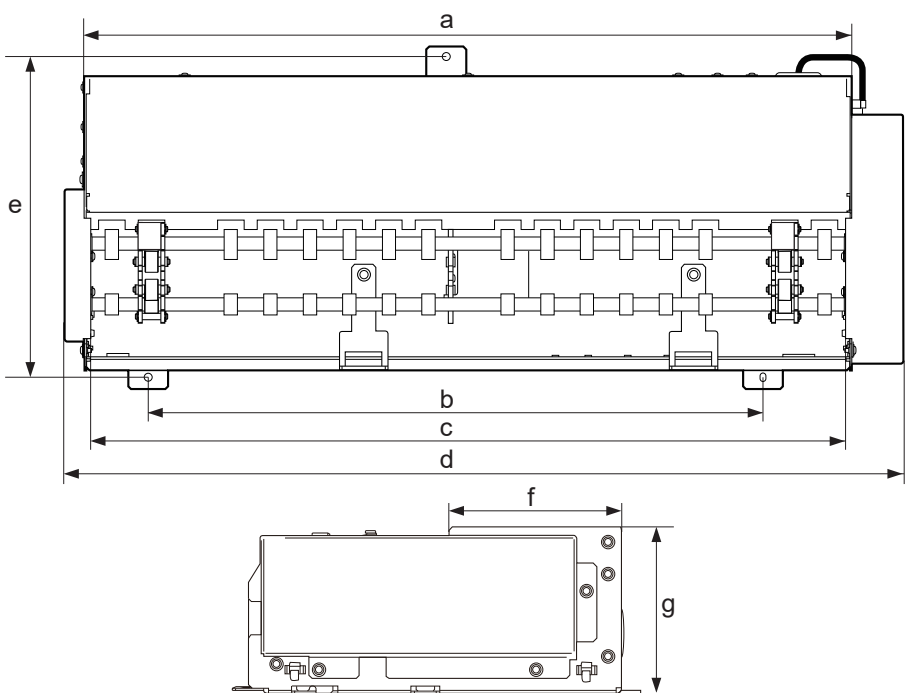
# Specifications

## Location of the Serial Number Label




| | |
|---|---|
| ① | This number is required when you seek maintenance, servicing, or support. Never remove the label. |

## Dimensional Drawings




| | OA-RA-240 | OA-RA-180 |
|---|---|---|
| a | 581 mm (22.87 in.) | 429 mm (16.89 in.) |
| b | 466 mm (18.35 in.) | 314 mm (12.36 in.) |
| c | 572 mm (22.52 in.) | 420 mm (16.54 in.) |
| d | 633 mm (24.92 in.) | 481 mm (18.94 in.) |
| e | 243 mm (9.57 in.) | 243 mm (9.57 in.) |
| f | 103 mm (4.06 in.) | 103 mm (4.06 in.) |
| g | 100 mm (3.94 in.) | 100 mm (3.94 in.) |

## Specifications

| | | OA-RA-240 | OA-RA-180 |
|---|---|---|---|
| Rotation method | | Motor drive | |
| Rotation angle | | ± 360° or higher | |
| Loadable objects | Shape | Cylindrical shape (with an undulating surface that does not affect rotation) | |
| | Length | 50 to 540 mm (1.97 to 21.25 in.) | 50 to 388 mm (1.97 to 15.27 in.) |
| | Diameter | 10 to 121 mm (0.39 to 4.76 in.) | |
| | Weight | 0.01 to 3 kg (0.0221 to 6.613 lb. | |
| Maximum printing area | Width | 540 mm (21.25 in.) or less | 388 mm (15.27 in.) or less |
| | Feed direction | Circumference of the object | |
| Dimensions (Width × Depth × Height) | | 633 mm (24.92 in.) × 259 mm (10.2 in.) × 100 mm (3.94 in.) | 481 mm (18.94 in.) × 259 mm (10.2 in.) × 100 mm (3.94 in.) |
| Weight | | 5 kg (11.03 lb.) | 3.9 kg (8.60 lb.) |
| Included items | | Small-diameter adapters, tail stoppers, guides, screws, manual, etc. | |



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