

Vacuum Mixer  
Thinky Mixer  
ARV-310

# Instruction Manual



**! WARNING**

- For your safety, read this manual carefully before starting the operation of the unit and be sure to understand the contents.
- Always keep this manual in the designated place for easy access when needed.

# Introduction

---

Thinky Mixer “ARV-310” is a planetary centrifugal mixer for mixing several liquid or powder materials and de-aerating them at the same time.

Be sure to carefully read this manual and understand the contents before using ARV-310.

Some parts inside of this unit are driven on hazardous voltage, rotate with high rpm, or operate for vacuum decompression. Although the unit has been designed with most residual dangers well protected, ignoring safety precautions or operation procedures described in the manual could deteriorate these safety features and cause human injury.

If you have any questions or need further information about this manual, contact us or the THINKY dealer you purchased the unit from. Never use the unit without clarifying unclear points.

- Question and Inquiries

Dealer or THINKY Sales Representative or  
THINKY Corporation

Marketing Office Tokyo, Japan (HQ) :

3-7-16 Iwamoto-cho Chiyoda-ku Tokyo, 101-0025 Japan

TEL : +81-03-5821-7455    FAX : +81-03-3865-7833

- **Indications Used in this Manual**

In this manual, safety precautions are classified into the following 3 levels only to prevent possible accidents based on mishandling or incorrect operation.

Be sure to carefully read these safety precautions and understand the contents before using the unit.

| Symbol                                                                              | Definition                                                                                                             |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
|    | Indicates an imminently hazardous situation which, if the warning is ignored, will result in death or serious injury.  |
|    | Indicates a potentially hazardous situation which, if the warning is ignored, could result in death or serious injury. |
|  | Indications a potentially hazardous situation which, if the clause is ignored, may result in minor or moderate injury. |

In addition to the above symbols, this manual have the following marks throughout the pages.

Be sure to make note of the following explanation to handle the unit correctly.

| Symbol                                                                              | Definition                                                                                                                                                           |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Indication referential information or points to which special attention should be paid while handling the unit. If the clause is ignored, the unit could be damaged. |
|  | Indicates referential information or points which are helpful for handling the unit.                                                                                 |
|  | Indicates sections and items to be referred to.                                                                                                                      |

- Any result caused by the use not described in the manual is entirely out of Thinky's responsibility.
- Details of all illustrations and explanation in this manual are subject to change without prior notice following continual improvement of the unit.
- Any reproduction of this manual without notice is prohibited.
- At the time of resale or leasing out the unit to any third party, make sure to include with the unit this manual and any other documents supplied at the time of initial delivery.

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# 1. Safety Precautions

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## 1-1 Safety Precautions

---

### 1-1-1 General Remarks



- Never use this unit for other purposes than mixing and de-aerating.
- Never disassemble or modify this unit.
- Do not use the unit under the following circumstances:
  - In volatile atmosphere or where gas and steam are generated
  - Around flammable substances
- Do not handle the power plug with wet hand(s).



- Do not step on the unit.
- Do not place anything on the unit.
- Do not insert your fingers or any other thing into the opening.
- Do not put anything inside or spill liquid over the unit.
- Do not splash water over the unit or wet it.
- Do not use the unit if the exterior has any damage such as a rupture or large dent.
- Do not obstruct heat release.
- Do not operate the unit continuously for a long time. Keep some cooling time.
- While not using the unit, keep the power plug pulled off from the consent.



- When pulling off the power plug, do not pull the cable but hold the power plug to pull it off.
- Do not supply other voltages than the rated one.

### 1-1-2 Installation



- Do not install or use the unit in the following places:
  - Unstable place
  - Where vibration or impact is observed
  - A place exposed to water, oil or chemicals, or where there is excessive dust, metal powder or salt
  - Where there is excessive humid or dew condensation due to abrupt temperature change
  - Where there is direct sunlight or rain
  - Where working ambient environment for the unit is NOT as specified.
- Do not damage, modify or forcibly bend or pull the power cable. Do not put anything on the power cable either.
- Do not use a damaged power cable.

### 1-1-3 Operation



- Do not open the lid during the operation.
- Do not operate the unit with the lid open.



- Do not operate the unit with wet hands.
- Do not shake or relocate the unit during the operation.
- If abnormal vibration, noise, smell or smoke is observed, immediately turn off the POWER switch and pull off the power plug.
- Turn OFF the POWER switch in case of a power failure.

### 1-1-4 Maintenance



- Pull off the power plug before opening the cover for maintenance work.



- Do not disassemble any parts for your own inspection and repair.

## 1-2 Labels

---

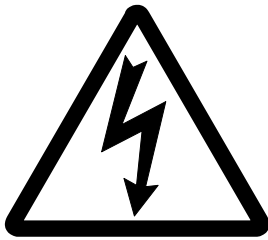
This unit has the following labels on it. Understand the contents of these labels fully before using the unit.

If any label gets dirty, damaged or illegible, immediately contact the dealer where you purchased the unit. A new one will be supplied at your own cost.

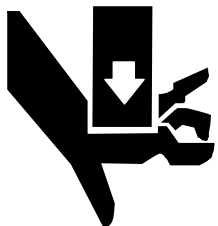


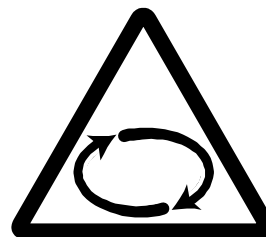
**WARNING** • Do not remove or stain any label.

### 1-2-1 Seals and Warning Labels



|                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>WARNING</b>                                                                                                                             |
| <ul style="list-style-type: none"> <li>▪ Use the mixer ONLY as instructed in the manual.</li> <li>▪ Never disassemble or modify this unit.</li> <li>▪ Do NOT make any spillage inside the main unit by materials.</li> </ul> |
|  <b>CAUTION</b>                                                                                                                             |
| <p>Do not repeat batches many times consecutively.<br/>Take time interval between batches to cool the unit.</p>                                                                                                              |

|                                                                                    |                                                                                                                                                                      |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  <b>CAUTION</b><br><b>Pinch Hazard</b><br>Close the door slowly holding the handle. |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|



|                                              |                      |
|----------------------------------------------|----------------------|
| <b>AWATORI RENTARO</b>                       |                      |
| <b>MODEL</b>                                 | <b>ARV-310</b>       |
| <b>SERIAL NO.</b>                            | <input type="text"/> |
| あわとり 錬太郎<br>THINKY Corporation MADE IN JAPAN |                      |

100V AC  
50/60Hz

Pump  
Side

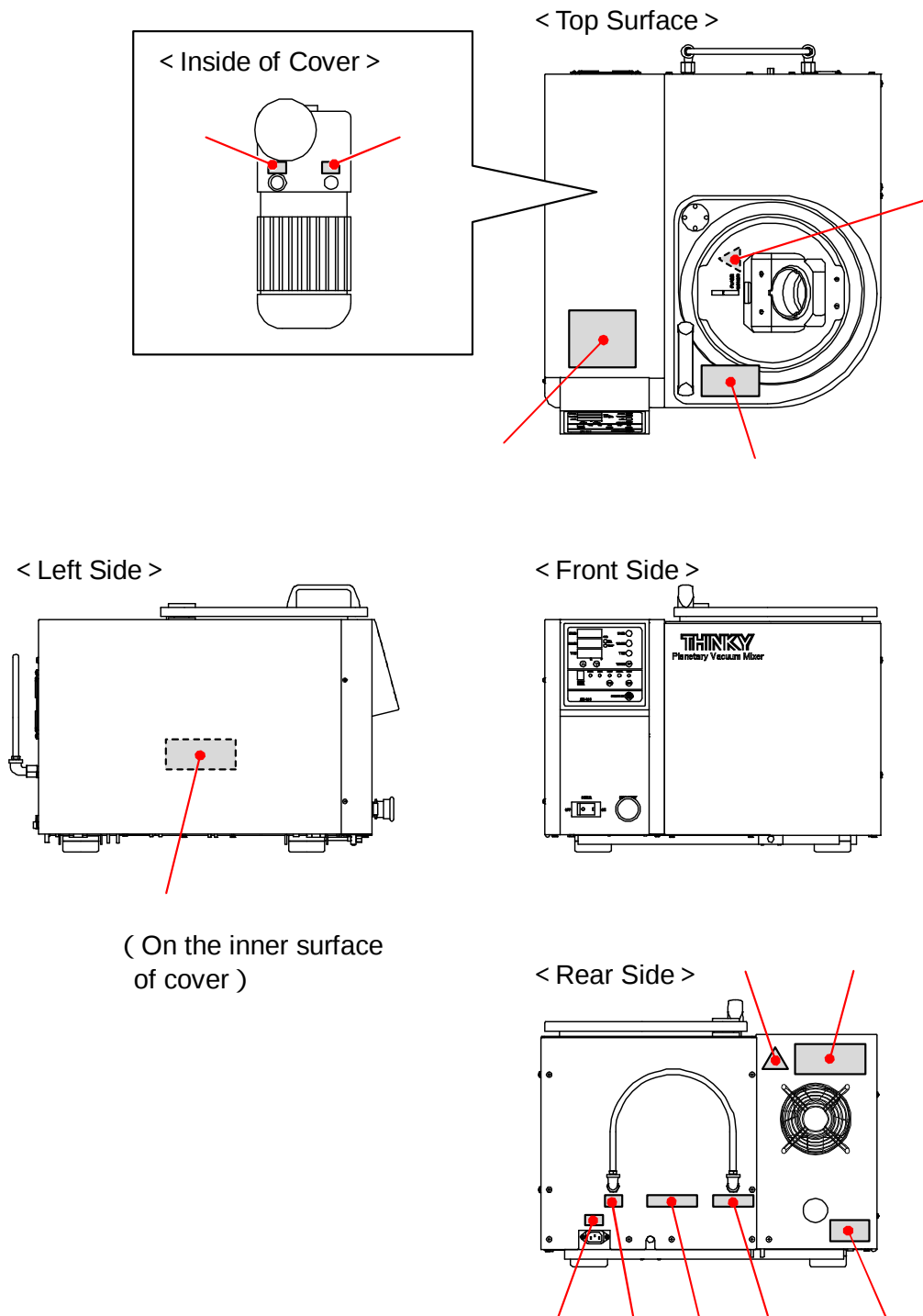
Vacuum  
Chamber Side

← Airflow Direction

Oil Inlet

Exhaust  
Outlet

## 1-2-2 Locations of Seals and Labels



## 2. Outline and Specifications

---

### 2-1 Outline

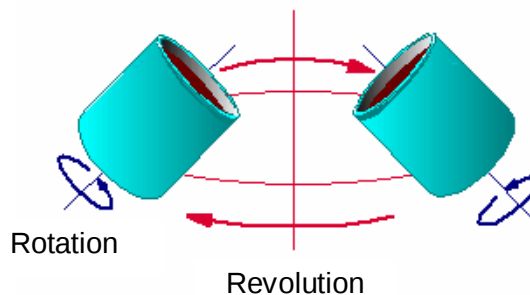
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- Purpose of this Unit

Thinky Mixer “ARV-310” is a planetary centrifugal mixer for mixing several liquid or powder materials and de-aerating them at the same time.

- Principle of Operation

Material container is to rotate while revolving in a set radius. This uninterrupted planetary motion makes a big centrifugal force, which compresses introduced air bubbles, out of the materials and mixes them at the same time.



- Features

- Materials of max. 200ml/310g (gross weight) can be mixed and de-aerated at one time in a special container.
- In addition to mixing and de-aerating by rotation (max. 1000 rpm)/revolution (max. 2000 rpm), vacuum decompression (with free setting) achieves higher performance of de-aeration.
- Because of non-contact method (with no mixing blade), material deterioration can be prevented.
- High viscosity resins can be de-aerated in a short period of time without overflow.
- Highly constant reproducibility can be expected in mixing and de-aerating with no variation, no matter who runs it.

## 2-2 Specifications

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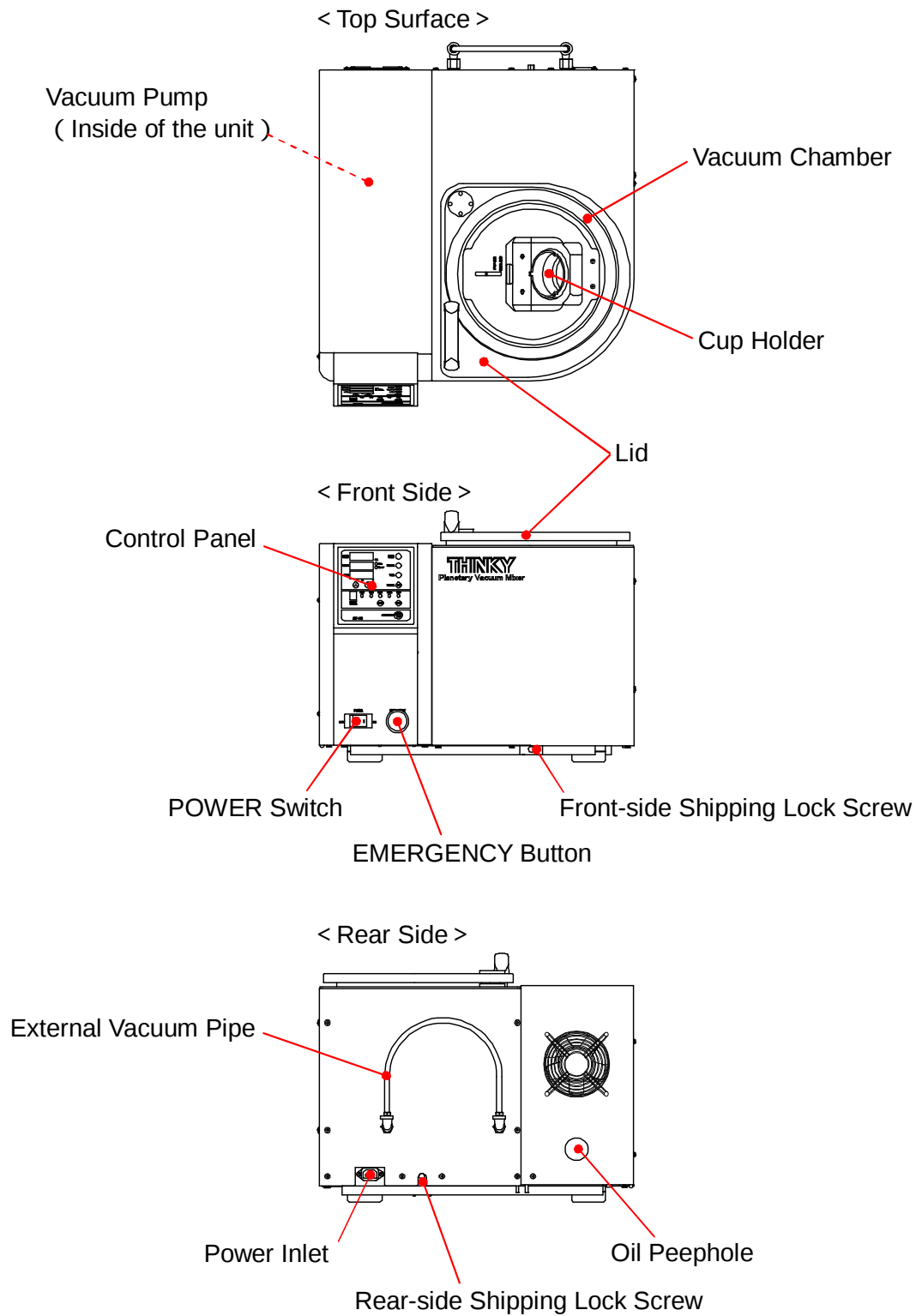
|                                                                   |                      |                                                                                               |  |
|-------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------|--|
| Product                                                           |                      | Vacuum mixer “Thinky Mixer”                                                                   |  |
| Model                                                             |                      | ARV-310                                                                                       |  |
| Method                                                            |                      | Vacuum-type, planetary, propeller-less mixing method                                          |  |
| Operating time setting range                                      |                      | 0 sec. – 30 min. (Max. 30 min. run/Setting in the unit of 1 sec.)                             |  |
| Revolution speed                                                  |                      | Max. 2,000 rpm (0 rpm and 200 rpm – 2,000 rpm / Increment per 10 rpm)                         |  |
| Rotation speed                                                    |                      | Max. 1,000 rpm (1/2 of revolution speed)                                                      |  |
| Standard container                                                |                      | Inner volume: 300 ml and 150 ml、 Material: HDPE                                               |  |
| Max. mixing volume                                                | At ambient pressure: | For 300 ml-container: 250 ml, 310 g (net weight)                                              |  |
|                                                                   |                      | For 150 ml-container: 150 ml, 310 g (net weight)                                              |  |
|                                                                   | At vacuum            | For 300 ml-container: 200 ml, 310 g (net weight)                                              |  |
|                                                                   |                      | For 150 ml-container: 120 ml, 310 g (net weight)                                              |  |
| Vacuum chamber                                                    |                      | Rotating part vacuum chamber                                                                  |  |
| Vacuum pump capacity                                              |                      | 266 Pa (About 2 Torr), 100 lit./min.                                                          |  |
| Vacuum pump oil                                                   |                      | SAE #10 ( ISO #VG32 )                                                                         |  |
| Ultimate pressure in vacuum chamber                               |                      | 660 Pa (About 5 Torr) at use of jER (epicoat) #828 <sup>(*)</sup>                             |  |
| Ultimate pressure reaching time                                   |                      | Less than 1 min. to reach 2.66 Pa (About 20 Torr) at use of jER (epicoat) #828 <sup>(*)</sup> |  |
| Time for releasing pressure in vacuum chamber to ambient pressure |                      | Less than 20 sec. (Duration of time till air is released to ambient pressure)                 |  |
| Supply power                                                      | Voltage              | Single phase, 100Vac ± 10%, 50/60 Hz                                                          |  |
|                                                                   | Consumption power    | At standby: 50 VA, During operation: Max. 1,000 VA (excl. start time)                         |  |

|                             |                                             |
|-----------------------------|---------------------------------------------|
| Working ambient environment | 10 - 35 , 35 - 85% RH (no dew condensation) |
| External dimensions         | 440 mm (H) × 555 mm (W) × 645 mm (D)        |
| Main unit mass              | Approximately 90 kg                         |



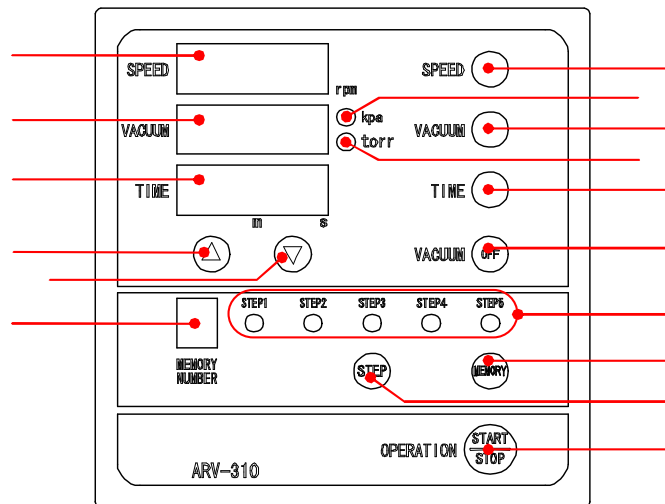
- If this unit is left for long hours at the situation of less than 10 degree C, the oil used for the vacuum pump may clot and damage the pump. If the oil gets clotted, leave the unit at normal temperature for a while before using the unit.
- \*: Do not decompress materials to below saturated vapor pressure of water, organic solvent, etc. that exists in the materials.

## 2-3 Name of Each Component



## 2-4 Names of Functions of Operating Parts

### 2-4-1 Control Panel

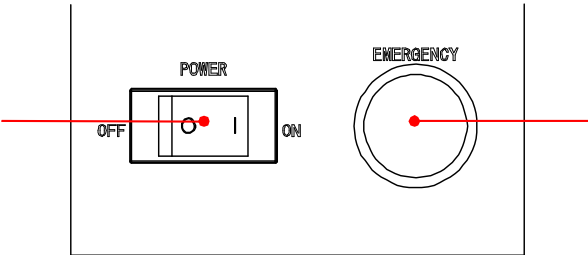


| No. | Name             | Function                                                                                                                             |
|-----|------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|     | SPEED indicator  | Indicates the revolution speed by 0 or within the range of 200 rpm through 2,000 rpm.                                                |
|     | SPEED button     | Used for setting revolution speed.<br>Press to select the revolution speed setting mode, and press again to cancel the setting mode. |
|     | VACUUM indicator | Indicates the value of vacuum decompression pressure in the vacuum chamber by the unit of kPa or Torr.                               |
|     | kpa lamp         | Lights up while the VACUUM indicator indicates the vacuum decompression pressure value by the unit of kPa.                           |
|     | torr lamp        | Lights up while the VACUUM indicator indicates the vacuum decompression pressure value by the unit of Torr.                          |

| No. | Name              | Function                                                                                                                                                                                                                                                                                                                |
|-----|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | VACUUM button     | <p>Used for setting vacuum decompressing conditions.</p> <p>Press to select the vacuum decompression setting mode, and press again to cancel the setting mode.</p> <p>Every press of the button for more than 1 sec. changes over the unit display (kPa or Torr) in indicating vacuum decompression pressure value.</p> |
|     | TIME indicator    | Displays the operating time within the range of 00 min. 00 sec. through 30 min. 00 sec.                                                                                                                                                                                                                                 |
|     | TIME button       | <p>Used for setting operating time.</p> <p>Press to select the operating time setting mode, and press again to cancel the setting mode.</p> <p>Used for setting the mode for de-aeration only with vacuum decompression.</p>                                                                                            |
|     | UP button         | Used for increasing the value when setting revolution speed, vacuum decompression pressure, and operating time.                                                                                                                                                                                                         |
|     | DOWN button       | Used for decreasing the value when setting revolution speed, vacuum decompression pressure, and operating time.                                                                                                                                                                                                         |
|     | VACUUM OFF button | <p>Used for setting vacuum decompression not to be used when setting vacuum decompression pressure.</p> <p>Pressing this button during vacuum pump operation stops the vacuum pump and air in the vacuum chamber is released to ambient pressure.</p>                                                                   |

| No. | Name                        | Function                                                                                                                                                                                                                                                                      |
|-----|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | MEMORY NUMBER indicator     | Indicates the selected MEMORY number (1-9).                                                                                                                                                                                                                                   |
|     | STEP No. lamp               | The lamp of the selected STEP No. (STEP 1–5) lights up.                                                                                                                                                                                                                       |
|     | MEMORY button               | Used for selecting the MEMORY number, registering operating conditions, and calling the registered operating conditions.<br>Press to change the MEMORY number in the order from MEMORY number 1 thru 9.<br>Pressing it for more than one sec. registers operating conditions. |
|     | STEP button                 | Used for selecting the STEP number.<br>Press to change the STEP number in the order from STEP 1 thru 5.                                                                                                                                                                       |
|     | OPERATION START/STOP button | Used for starting or pausing operation.                                                                                                                                                                                                                                       |

2-4-2 Other Operating Parts



| No. | Name             | Function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | POWER switch     | Used for turning ON/OFF the power.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|     | EMERGENCY button | <p>Used for stopping operation in emergency. Press to stop the container rotation and the vacuum pump operation. Air in the vacuum chamber is released to ambient pressure.</p> <p>In addition, all lamps ( 、 、 ) and “ALM” indications of all indicators ( 、 、 ) on the control panel start blinking with a buzzer sound.</p> <p>This button is locked when pushed in (push-lock type).</p> <p>For restarting, turn the button C.W. to release the lock, turn OFF (O) the POWER switch, and turn it ON (I).</p> |

## 3. Installation

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### 3-1 Checking of Accessories

---

This Thinky ARV-310 is packed together with the following accessories in addition to the main unit. After unpacking the case, check the contents immediately.

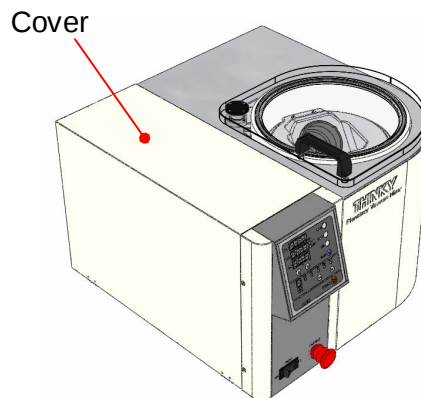
|                                         |                                                                                                       |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------|
| Instruction manual<br>(this manual)     | 1 copy                                                                                                |
| Vacuum pump oil                         | 1 bottle (200 cc)                                                                                     |
| 300 ml-container                        | 3 pieces                                                                                              |
| 150 ml-container                        | 1 piece                                                                                               |
| Lid with a hole for 300<br>ml-container | 3 pieces                                                                                              |
| Lid with a hole for 150<br>ml-container | 1 piece                                                                                               |
| Adaptor for 150<br>ml-container         | 1 unit (incl. rubber ring for replacement)                                                            |
| Special tool                            | 3 pieces<br>(Box wrench for transport lock, hexagon<br>wrench for attaching/detaching vacuum<br>pump) |
| Power cable                             | 1 piece                                                                                               |

## 3-2 Filling Vacuum Pump with Pump Oil

---

After unpacking, fill the vacuum pump in the unit with pump oil in the following procedure.

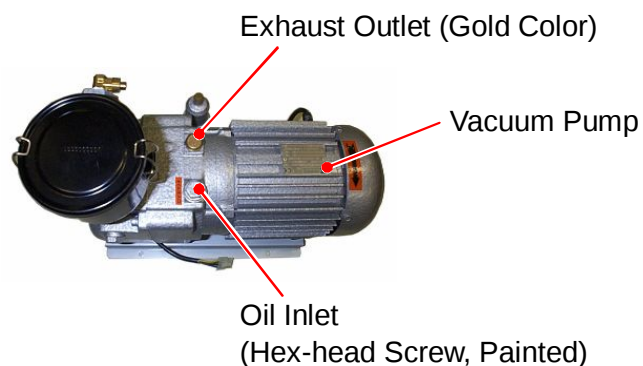
- 1) Remove four screws and open the cover on the left side of the unit.



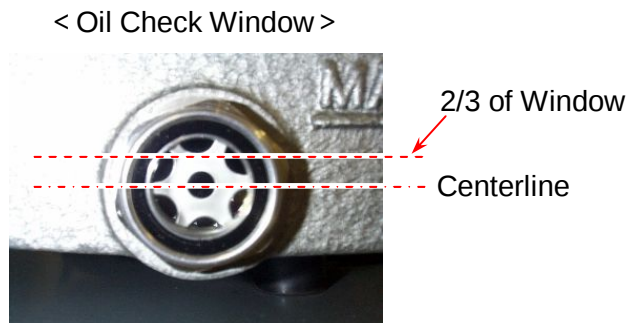
- 2) Open the cap of oil inlet of the vacuum pump.



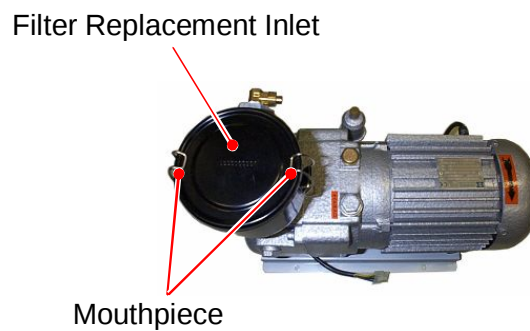
DO NOT confuse the oil inlet with the exhaust outlet.



- 3) Feed the standard oil to the level of two-thirds ( $\frac{2}{3}$ ) of the oil check window.



- 4) Close the cap of the oil inlet.
- 5) Release the mouthpiece of the filter replacement inlet and open the cover of the replacement inlet.



- 6) Confirm the filter is in the pump.
- 7) Close the replacement inlet cover and fasten it with the mouthpiece.

- 8) Close the cover on the left side of the unit and fix it with four screws.



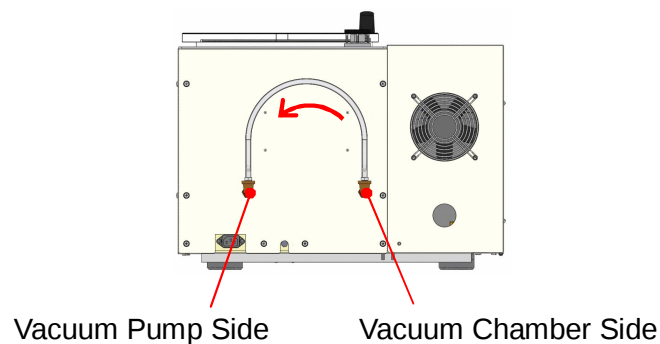
Take oil out of the vacuum pump if you transport the unit again.

### 3-3 External Vacuum Pipe

This describes the external vacuum pipe on the rear side of the unit.

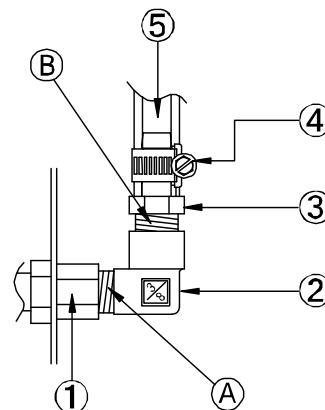
- Airflow Direction of External Vacuum Pipe

Air flows from the vacuum chamber side to the vacuum pump side.

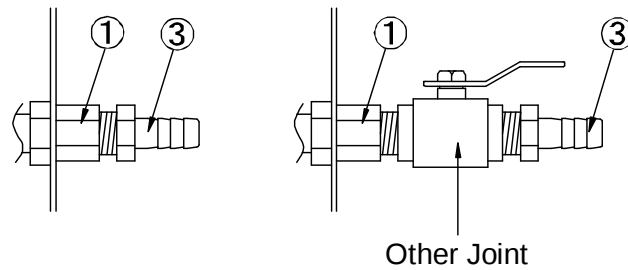


- Standard Joints

- ① Extraction Mouth
- ② Elbow Joint
- ③ Hose Joint
- ④ Hose Band
- ⑤ Vacuum Hose (ID: 11 mm)
- Ⓐ 3/8 PT Screw for Pipes (with Tape Seal)
- Ⓑ 3/8 PT Screw for Pipes (with Tape Seal)



- Fitting of Other Joint



Fitting part (1) can be attached with the joint with 3/8 PT screw.

Fix the fitting part firmly using an adjustable wrench, etc. and turn the joint to detach (or attach) it.



Affix tape seal to the screw part to avoid air leakage.

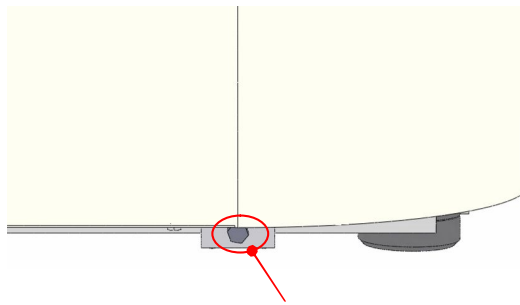
## 3-4 Removal of Shipping Locks

---

The Thinky ARV-310 is locked with two (2) fasteners for fixing the unit's rotating mechanism and preventing damages during shipment.

Loosen the shipping locks in the following procedure to install the mixer.

- 1) Turn the front-side shipping lock screw with the standard box wrench clockwise until the wrench stops.
  - The fixed rotating mechanism base part on the front side is released.



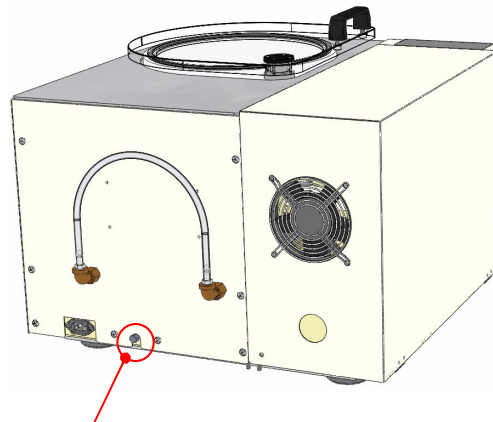
Front-side Shipping Lock Screw



- The shipping lock screw is a reverse screw (loosened in CW turning). Turn the screw clockwise to release the shipping lock.
- When the shipping lock screw is turned clockwise, the portion circled in the figure below moves to the right and the shipping lock is released.



- 2) Turn the rear-side shipping lock screw with the standard box wrench clockwise until the wrench stops in the same procedure for the front side one.
  - The fixed rotating mechanism base part on the rear side is released.



Rear-side Shipping Lock Screw



When transporting the unit again, make sure to tighten the shipping lock screws to fix the rotating mechanism.

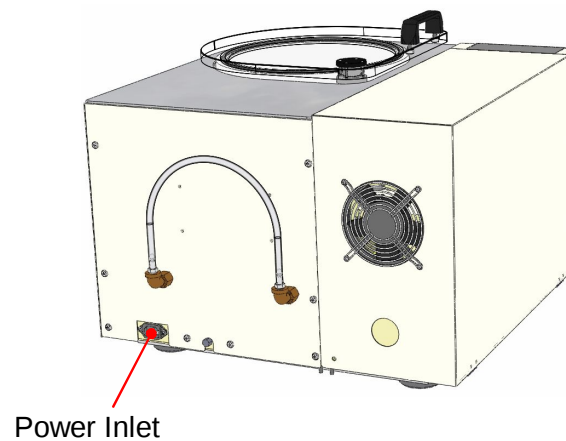
At this time, tighten each of the front-side/rear-side shipping lock screws alternately little by little. Tightening either of them firmly at a time may incline the base plate causing damage of the unit.

## 3-5 Power Connection

---

After removing the transfer lock, connect the power cable in the procedure below:

- 1) Connect the attached power cable to the power inlet on the rear side.



- 2) Insert the plug of the power cable into the power outlet.

## 4. Operation

### 4-1 Preparation



- Observe a rated amount of the materials to be put in the container.

#### 4-1-1 Container and Rated Amount

The maximum amount of the materials to mix and de-aerate with this unit is as shown below.

Be sure never to load either container with the amount exceeding this rated range.

| Container Type   | Material Maximum Amount<br>(Volume / Mass <sup>(*)</sup> ) |                                           |
|------------------|------------------------------------------------------------|-------------------------------------------|
|                  | At Ambient Pressure                                        | At Reduced Vacuum Pressure <sup>(*)</sup> |
| 300 ml-container | 250 ml / 310 g                                             | 200 ml / 310 g                            |
| 150 ml-container | 150 ml / 310 g                                             | 120 ml / 310 g                            |



\* 1 :In case of mixing/de-aerating material of lower viscosity at reduced vacuum pressure, put less than maximum amount of the material in the container.

\* 2 :Maximum mass is the gross weight of the container and material (when 300 ml-container is used), or of the container, material and adaptor (when 150 ml-container is used).

## 4-1-2 Preparation of Materials and Container

Have the materials to mix and de-aerate and either of suitable container ready.

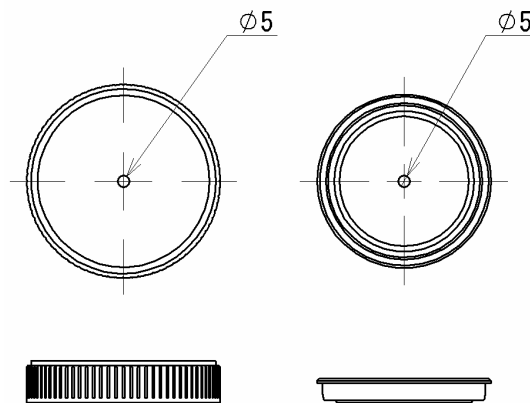


- Only use the container as designated.
- In case of performing mixing/de-aerating at ambient pressure, make sure to use the inner and outer lids with no holes.
- In case of performing mixing/de-aerating at reduced vacuum pressure, make sure to use the inner and outer lids with holes.

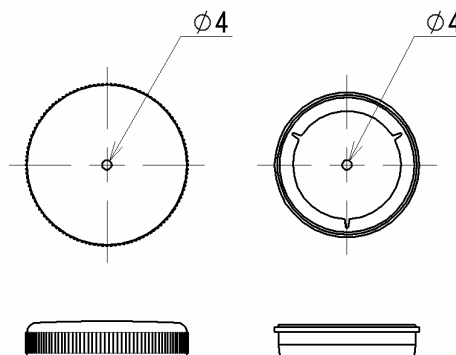


Specifications of outer and inner lids with holes

- Outer and inner lids with holes for 300 ml-container



- Outer and inner lids with holes for 150 ml-container



### 4-1-3 Supplying Materials

Supply materials into the container in the procedure below:

- 1) Open the outer lid of the container and remove the inner lid.

- 2) Put the materials into the container.



Be careful the supplied materials won't adhere around the container's lip and be sure to wipe it off in case they do.



For higher mixing efficiency, put the materials as follows:

- Put liquid and paste materials first and powder materials afterwards.
- Put the materials of a lighter specific gravity first and materials of a heavier specific gravity afterwards.
- Put the materials of a lower viscosity first and the ones of a higher viscosity afterwards.

- 3) Close the inner lid and outer lid of the container tight.



- Be sure to securely tighten the inner lid and outer lid of the container so they may not get loose or removed during revolution.
- Make sure to check that the thread section of the container is free from dirt, wear or damage.
- Do not use any container that is damaged or with a lid that cannot be closed securely.

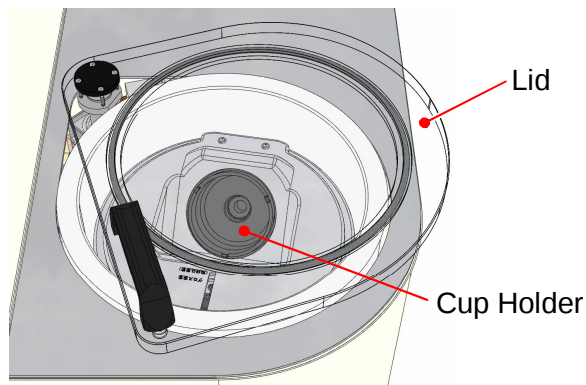
#### 4-1-4 Loading Container

Load the material container into the mixer unit as follows:

- 150 ml-container
  - 1) Weigh the mass of 150 ml-container with materials and the adaptor for 150 ml-container.
  - 2) Open the lid of the unit.



Hold and pull the handle of the lid upward, and turn it counter-clockwise to open the lid.



- 3) Insert the adapter for 150ml-container into the cup holder aligning three (3) keyways of the adapter with three (3) projections of the cup holder.
- 4) Insert the 150 ml-container with materials into the adapter.



Push it until it comes into contact with the rear end.

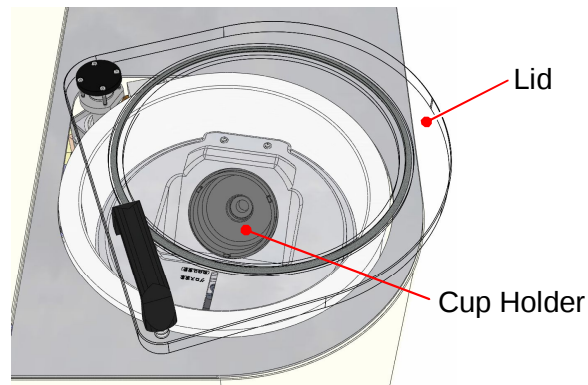
- 300 ml-container

1) Weigh the mass of a 300 ml-container with materials.

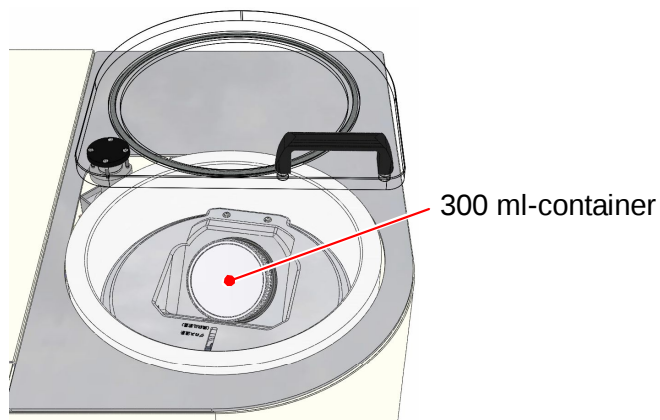
2) Open the lid of the unit.



Hold and pull the handle of the lid upward, and turn it counter-clockwise to open the lid.



3) Insert the 300ml container into the cup holder adjusting three (3) keyways on the container wall to three (3) projections of the cup holder.



### 4-1-5 Adjustment of Counter Balance

After setting the container, adjust the counter balance.

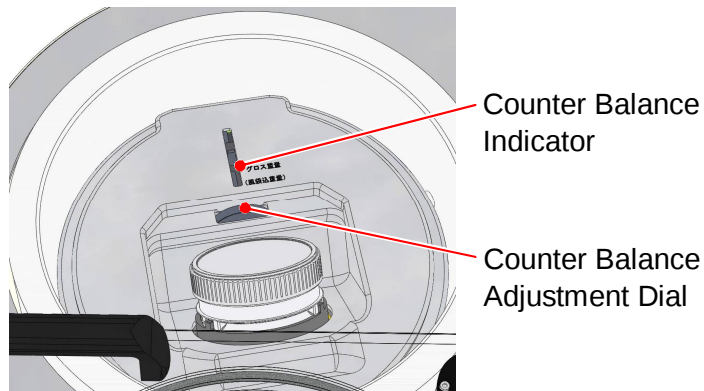


Before starting the operation, make sure to adjust the counter balance.

This unit is designed with the container to be set only on one side of the rotator. Therefore, the system equips adjustable dummy weight on the opposite side of the cup holder to keep the balance in high speed spinning motion.

If this adjustment is incorrect, the counter balance is disrupted and vibration or abnormal noise would rise, imposing excessive loads on the revolution mechanism, and this would cause damage to the unit.

Adjust the counter balance dial to the measured gross weight of material container in the step 1) described in “4-1-4 Loading Container”.



## 4-1-6 Closing Lid

After adjusting the revolution balance, close the lid of the unit.



Hold and pull the handle of the lid upward, and turn it clockwise until the lid is closed



Check that no part of the cloth or foreign object is pinched anywhere on the unit at this time.

## 4-2 Turning ON/OFF of Power

---

### 4-2-1 Turning ON of Power

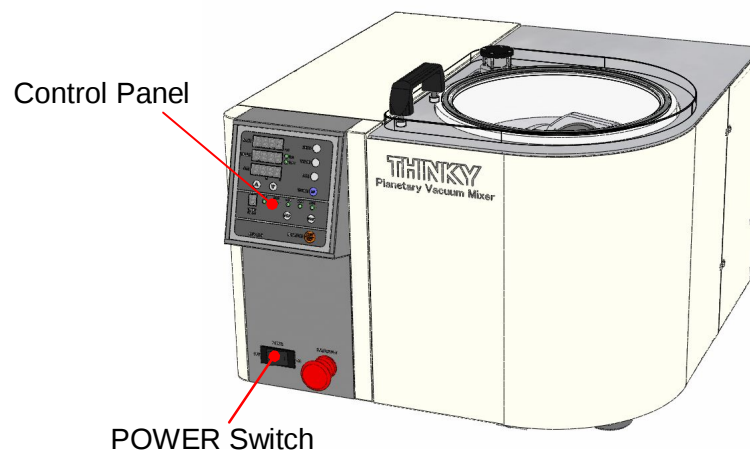
Turn ON the power to the unit in the procedure below:

- 1) Connect one power cable to the power inlet and the outlet of this unit.



For details, refer to “3-5 Power Connection”.

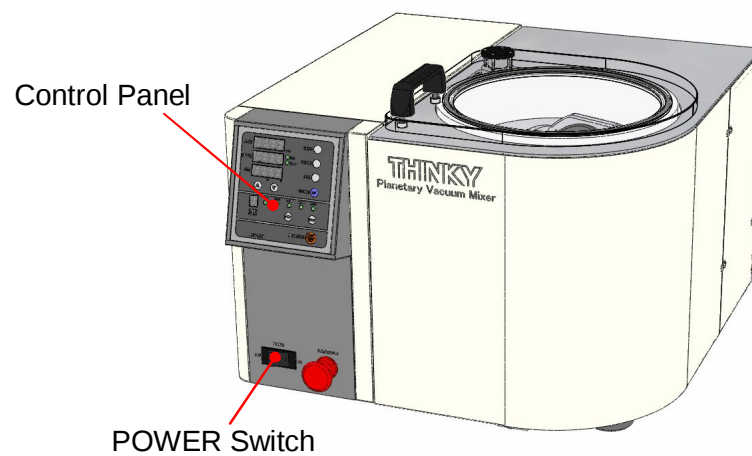
- 2) Press the POWER switch to turn the power ON (I).
  - When the power is supplied, the lamps and indicators on the control panel light up.
  - Now the unit became ready for operation.



### 4-2-2 Turning OFF of Power

Turn OFF the power to the unit in the procedure below:

- 1) Press the POWER switch to turn the power OFF (O).
  - The lamps and the indicators on the control panel light out.



- 2) Pull off the power plug from the outlet.

## 4-3 Operation

### 4-3-1 Setting of Mixing Recipes

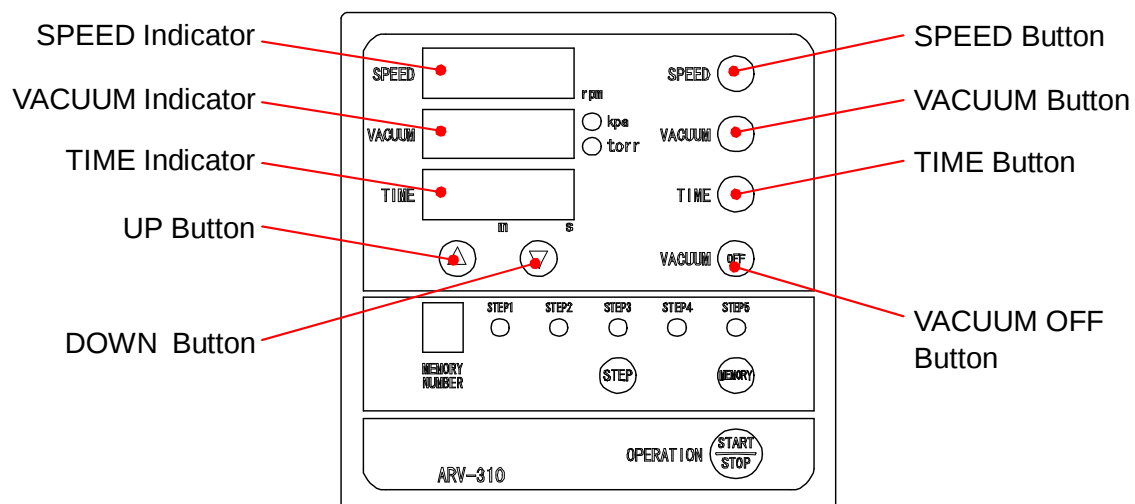
After turning ON the power, set the mixing recipes.

Mixing recipes to set are as follows:

- Revolution speed:  
Set the revolution speed per step.  
The set value is displayed on the SPEED indicator.
- Vacuum decompressed pressure value:  
Set the target decompression value per step.  
The set value is displayed on the VACUUM indicator.
- Processing time:  
Set the processing time per step.  
The set value is displayed on the TIME indicator.



- Right after turning ON the power, the set value of the MEMORY 1 is displayed on every indicator.
- The factory shipment values have been set for delivery.



This unit has three operation modes with a combination of rotating/revolving motion and vacuum decompression. Set the mixing recipes according to operation modes as below shows.

1. Operation by rotating/revolving motion and vacuum decompression

Set the revolution speed, vacuum decompression pressure value, processing time.



For details, refer to “1. Setting Procedure for Rotating/Revolving Motion and Vacuum Decompression”.

2. Operation by rotating/revolving motion only

Set the revolution speed and processing time and turn OFF the vacuum decompression pressure value (on the VACUUM indicator).



For details, refer to “2. Setting Procedure for Rotating/Revolving Motion”.

3. Operation by vacuum decompression only

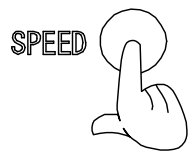
Turn OFF the revolution speed (on the SPEED indicator) and the processing time (on TIME indicator) and set the vacuum decompression pressure value.



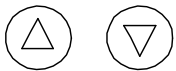
For details, refer to “3. Setting Procedure for Vacuum Decompression”.

## 1. Setting Procedure for Rotating/Revolving Motion and Vacuum Decompression

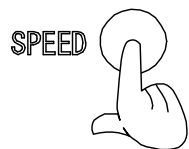
When performing mixing and de-aerating by rotating/revolving motion as well as performing vacuum decompression, set the mixing recipes in the following procedure.



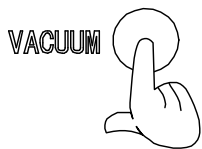
- 1) Press the SPEED button.
  - The brightness of the SPEED indicator changes and then you can set the revolution speed.



- 2) Press the UP or DOWN button to display the revolution speed to set on the SPEED indicator.



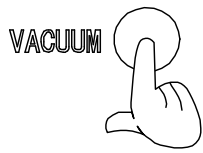
- 3) Press the SPEED button.
  - The revolution speed is set.



- 4) Press the VACUUM button.
  - The brightness of the VACUUM indicator changes and then you can set the vacuum decompression pressure value.



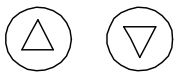
- 5) Press the UP or DOWN button to display the vacuum decompression pressure value to set on the VACUUM indicator.



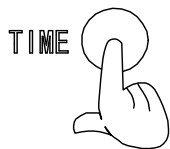
- 6) Press the VACUUM button.
- The vacuum decompression pressure value is set.



- 7) Press the TIME button.
- The brightness of the TIME indicator changes and then you can set the operating time.



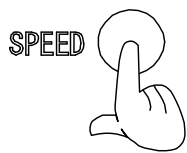
- 8) Press the UP or DOWN button to display the operation time to set on the TIME indicator.



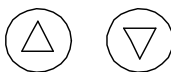
- 9) Press the TIME button.
- The operation time is set.

## 2. Setting Procedure for Rotating/Revolving Motion

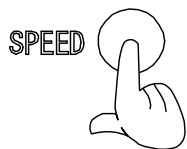
When performing mixing and de-aerating only by rotating/revolving motion without performing vacuum decompression, set the mixing recipes in the following procedure.



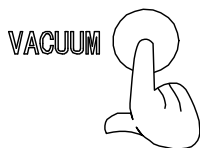
- 1) Press the SPEED button.
  - The brightness of the SPEED indicator changes and then you can set the revolution speed.



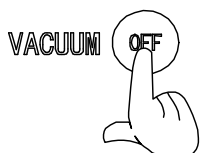
- 2) Press the UP or DOWN button to display the revolution speed to set on the SPEED indicator.



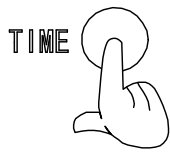
- 3) Press the SPEED button.
  - The revolution speed is set.



- 4) Press the VACUUM button.
  - The brightness of the VACUUM indicator changes and then you can set the vacuum decompression pressure value.



- 5) Press the VACUUM OFF button.
  - The VACUUM indicator lights out and then setting the vacuum decompression pressure value becomes impossible.

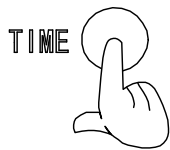


6) Press the TIME button.

- The brightness of the TIME indicator changes and then you can set the operating time.



7) Press the UP or DOWN button to display the operation time to set on the TIME indicator.

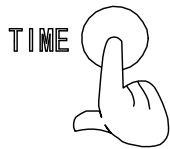


8) Press the TIME button.

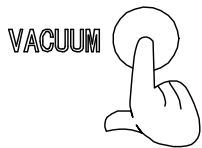
- The operation time is set.

### 3. Setting Procedure for Vacuum Decompression

When performing de-aerating only by vacuum decompression without performing rotating/revolving motion, set the mixing recipes in the following procedure.



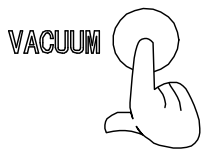
- 1) Press the TIME button for more than 1 second.
  - The SPEED and TIME indicators light out and then setting the rotating/revolving motion becomes impossible.



- 2) Press the VACUUM button.
  - The brightness of the VACUUM indicator changes and then you can set the vacuum decompression pressure value.



- 3) Press the UP or DOWN button to display the vacuum decompression pressure value to set on the VACUUM indicator.



- 4) Press the VACUUM button.
  - The vacuum decompression pressure value is set.

## 4-3-2 Operation



- Process your materials for a short time to check how the temperature rises for intensive shear applied on the materials. Then, extend the process time eventually.
- Do not decompress materials to below saturated vapor pressure of water, organic solvent, etc. that exists in the materials.
- Do not splash and spill materials in the unit.



- The attached special container is made of HDPE, which may be softened or deformed at around 80 °C. Process the materials in a range of 15 to 30 seconds first to check how the temperature rises. Set the processing time within a range where containers may not be deformed.

When materials include low-boiling point substances, in particular, be carefully attentive to temperature rise during mixing.

- When performing de-aeration by vacuum decompression only, depending on degree of viscosity of materials, air bubbles may not burst and the material may flow over the container. Set the processing time shorter to check the material status before starting operation. When you expect the material overflow from the container, immediately stop operation. When the material flows over the container, the material is scattered around with centrifugal force and the unit may be damaged.

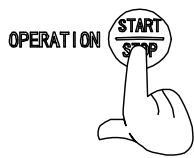


- As soon as the unit gets started, the lid gets locked and cannot be opened until the operation is finished. To open the lid during operation, stop the unit.
- During vacuum decompression, vacuum forms inside of the vacuum chamber and the lid is sealed against the chamber with air pressure. Open the lid after the unit stops completely and the reduced vacuum pressure in the vacuum chamber has been released to ambient pressure.

- Starting Operation

Start the operation through the following procedure:

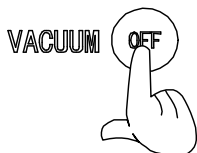
1) Check that the lid of the unit is closed.



2) Press the OPERATION START/STOP button.

- Operation starts.
- When rotating/revolving motion has been set, countdown of the processing time on the TIME indicator starts and the motion stops when the indicated number reaches “0”.
- When vacuum decompression has been set, the vacuum pump stops after the vacuum decompression pressure value reaches the set value, and the air pressure in the vacuum chamber is released to ambient pressure.
- When the operation finishes and any motion stops completely, the buzzer beeps.

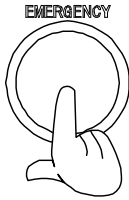
- Stopping of Vacuum Pump



Press the VACUUM OFF button to stop the vacuum pump only.

- The vacuum pump stops and the air pressure in the vacuum chamber is released to ambient pressure.

- Emergency Stop



Press the EMERGENCY button to stop operation in emergency.

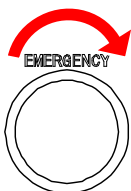
- The container rotation and the vacuum pump operation stop. Air pressure in the vacuum chamber is released to ambient pressure.
- The buzzer beeps.
- All lamps and the “ALM” indications on the all indicators on the control panel start blinking.



This button is locked when pushed in (push-lock type).

- Cancel of Emergency Stop

To restart operation after emergency stop, cancel the emergency stop status in the following procedure.



- 1) Turn the EMERGENCY button C.W. to release the lock.

- 2) Turn OFF (O) the POWER switch and turn it ON (I) again.

- The buzzer stops and the blinking lamps and indicators on the control panel light out.
- The power is supplied and the lamps and indicators on the control panel light up as part of usual power-on operation.

### 4-3-3 Taking Out Container

After the operation has finished, take out the container.

- 1) Open the lid of the unit.

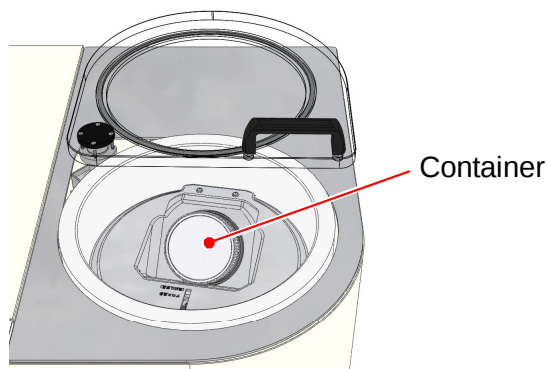


Hold and pull the handle of the lid upward, and turn it counter-clockwise to open the lid.

- 2) Take out the container.



For the 150 ml-container, turn it little by little to take it out from the adapter.



- 3) Open the outer lid of the container and remove the inner lid.

- 4) Check the finished status.



- If the finished status is insufficient, adjust the processing time and repeat mixing/de-aerating operation.
- The finished status varies depending on the type, viscosity and specific gravity of materials as well as property and amount of additives, even when the mixing recipes are identical.

It is advisable to change the conditions several times and set the standard time.

## 4-4 Memory Registration

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Desired mixing recipes (revolution speed, vacuum decompression pressure value and processing time) can be registered in nine (9) memory slots.

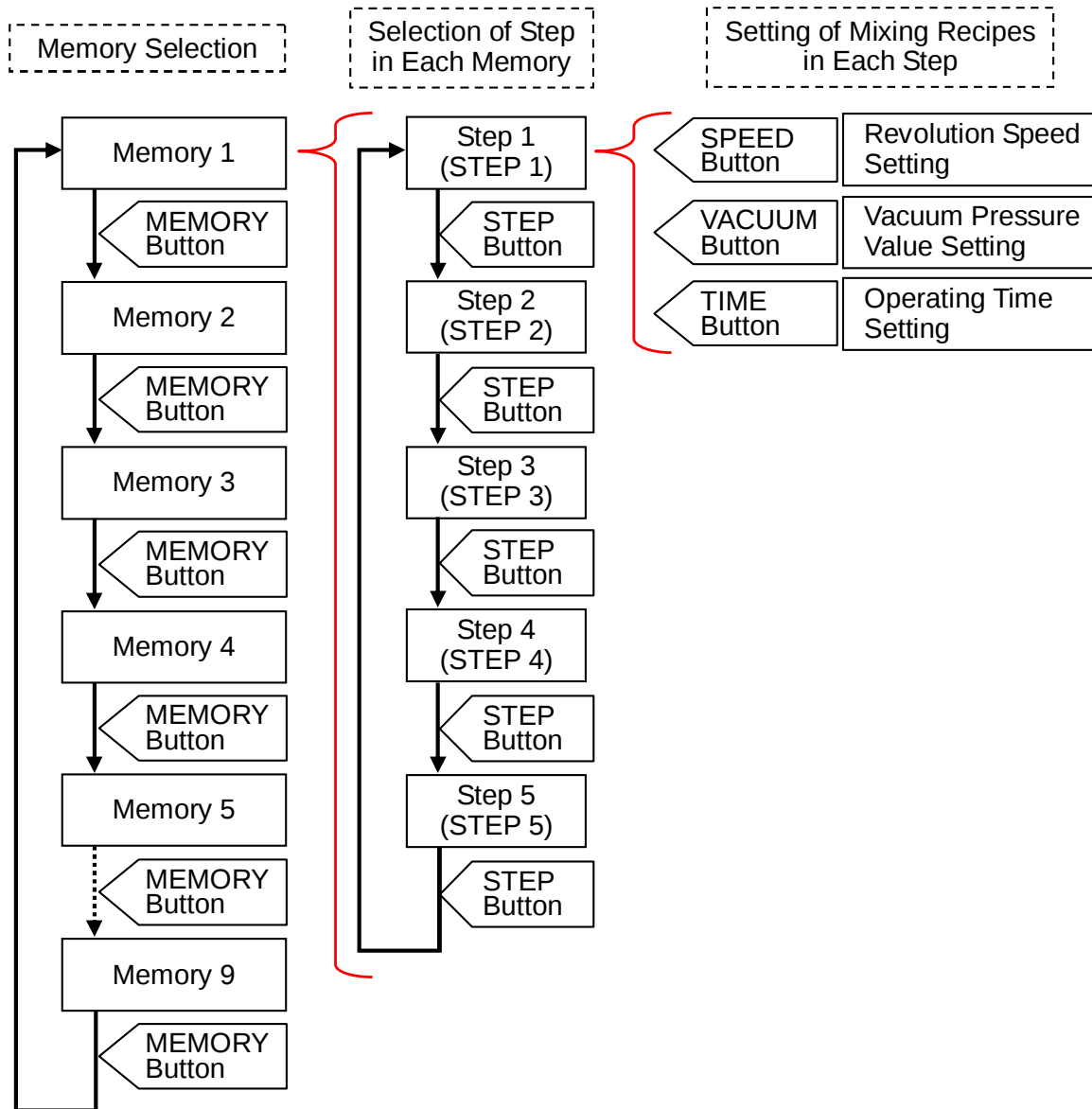
The outline of the memory registration is as follows:

- Nine (9) different cycles can be programmed into memory slots.
- One cycle takes maximum of 5 mixing profiles with revolution speed, vacuum compression pressure value and processing time.
- Each step will be executed sequentially in a cycle.



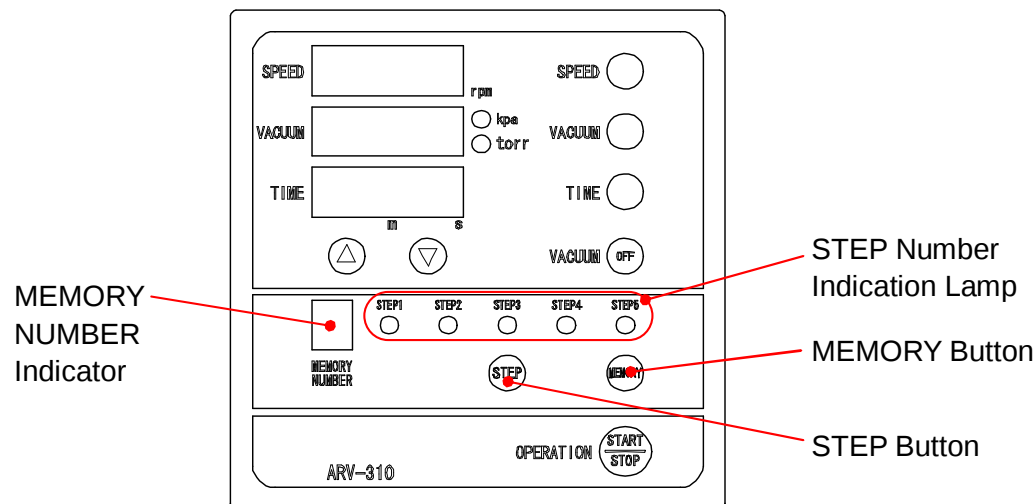
- The contents registered in the memory are not lost even after the power is turned OFF.
- When contents are registered in each of the nine (9) memories and further recipes are required for the operation, set another to execute the process irrespective of the selected memory number. Such recipes, however, are lost once the power gets turned OFF or when another memory is recalled. To keep such recipes, register or overwrite them in one of the nine (9) memories.

- Flow of Memory Registration



- Procedure for Memory Registration

Register memories through the following procedure:



- 1) Press the MEMORY button to display the number of the memory to check on the MEMORY NUMBER indicator.



The memory number indication lamp turns lit in order of the memory number 1 → 2 → 3 → 4 → 5 ... → 9 each time the MEMORY button is pressed.



- 2) Press the STEP button to light up the STEP number indication lamp indicating the number of the step to register operating condition.



The STEP number indication lamp turns lit in order of the STEP number STEP 1 → STEP 2 → STEP 3 → STEP 4 → STEP 5 each time the STEP button is pressed.

## 3) Set the mixing recipes.



For setting the mixing recipes, refer to “4-3-1 Setting of Mixing Recipes”.

## 4) Repeat the steps 2) and 3) above to set the mixing recipes for all step numbers to set.



## 5) Press the MEMORY button for more than 1 second.

- The set mixing recipes (step) is registered in the memory with a selected number.
- The MEMORY NUMBER indication lamp blinks and the buzzer beeps.



The mixing recipes to be registered in the memory have numbers from [STEP 1] through [Currently displayed step number].

The mixing recipes with the following step numbers are all deleted at the time of the memory registration.

To register them in the memory, make sure to light up the last STEP number of the step to register.

- Change of Contents of Memory Registration

Registering them again can change the contents registered in the memory.

- Recalling of Memory

To operate the unit under the mixing recipes registered in the memory, recall the memory to execute before the operation.

To recall the memory, press the MEMORY button to display the number of the memory to execute on the MEMORY NUMBER indicator.



The memory number indication lamp turns lit in order of the memory number 1 → 2 → 3 → 4 → 5 ... → 9 each time the MEMORY button is pressed.

- Checking Contents of Memory Registration

The contents registered in the memory (mixing recipes registered in each step) can be checked as follows:



- 1) Press the MEMORY button to display the number of the memory to check on the MEMORY NUMBER indicator.



- 2) Press the STEP button to light up the STEP number indication lamp indicating the number of the step to display the contents.

- After the step number is lit up, the mixing recipes registered to that step number are displayed.



The STEP number indication lamp turns lit in order of the STEP number STEP 1 → STEP 2 → STEP 3 → STEP 4 → STEP 5 each time the STEP button is pressed.

## 5. Maintenance

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### 5-1 Inspection

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For using the Thinky ARV-310 in a safe manner, perform inspections regularly.



• Pull off the power plug before performing inspection.

#### 5-1-1 Daily Inspection

Check the followings every day.

- Check if any materials or foreign objects are adhering inside or around the cup holder and rotary sections.  
If any adhesion is observed, clean it.



For details of cleaning, refer to “5-2 Cleaning”.

- Check whether or not the unit exterior is damaged with a rupture or large dent.

Do not use the unit whose exterior has any damage.

## 5-1-2 Weekly Inspection

Check the followings once a week.

- Check the status of the vacuum pump oil.  
When the oil is contaminated, change the oil.  
 For details, refer to “5-3-1 Checking Oil”.
- Check if any dust or foreign objects are adhering the vacuum pump filter.  
If any adhesion is observed, remove it.  
 For details, refer to “5-3-3 Filter Checking”.

## 5-2 Cleaning

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If the Thinky ARV-310 becomes dirty, clean it in the procedure below:



• Pull off the power plug before performing cleaning.

- 1) Press the POWER switch to turn the power OFF (O).
- 2) Pull off the power plug from the consent.
- 3) Wipe off dirt (materials, etc.) from inside and around the cup holder, rotary sections, control panel, etc., using a cloth, waste cloth or paper towel.

If dirt or stain cannot be removed by dry cloth, use a cloth, waste cloth or paper towel moistened with water or ethanol.



- For cleaning, do not use other materials than water or ethanol.
- Do not splash the unit directly with water or ethanol.

## 5-3 Changing of Vacuum Pump Oil

---

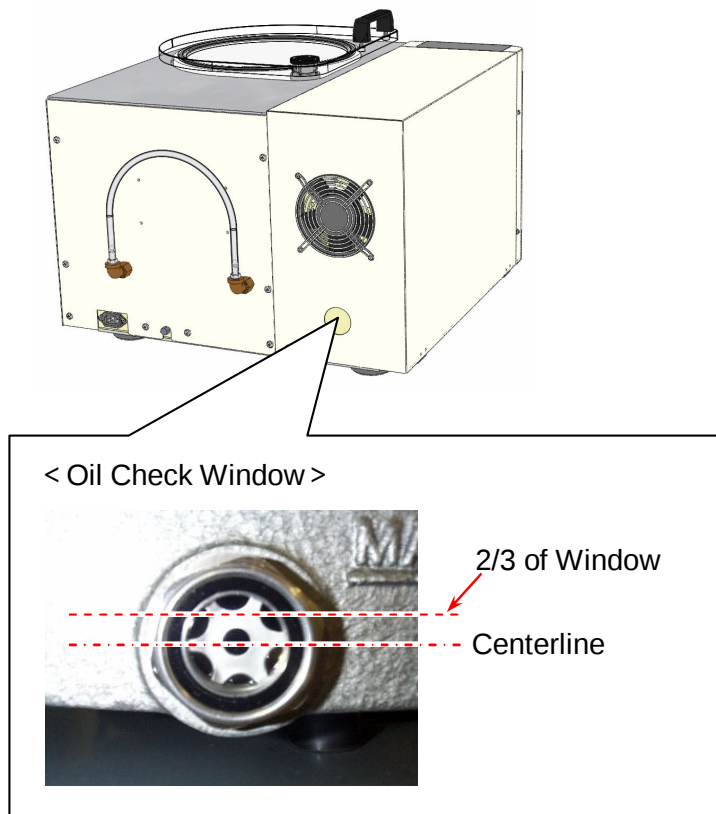
### 5-3-1 Checking Oil

Check the followings for the status of the vacuum pump oil once a week.

1. Oil condition and level
2. Time to reach vacuum decompression

#### 1. Oil Condition and Level

Check the oil contamination and oil level through the window placed on the rear side of the unit.



When the oil is contaminated, change the oil.



For changing oil, refer to “5-3-2 Oil Change”.

If the oil level has lowered to the center of the oil check window, add oil to the level of two-thirds (2/3) of the window.



For replenishing oil, refer to “5-3-2 Oil Change”.

## 2. Time to Reach Vacuum Decompression

Perform vacuum decompression to check the period of time required to finish decompression referring to the followings as a guideline.

- Time required for decompression (guideline):

Within 1 min. (60 sec.) to 2.66 kPa (about 20 Torr), and  
within 3 min. (180 sec.) to 530 – 660 Pa (about 4 – 5 Torr)

If decompression operation does not finish within the above guideline, change the oil.



For changing oil, refer to “5-3-2 Oil Change”.

After the oil change, perform decompression for about 15 minutes to check if decompression operation finishes within the above guideline.



- Depending on materials that got mixed in the oil, changing oil only once may not be sufficient. In such case, repeat changing oil two or three times.
- Odor of solvents, etc. is difficult to get rid of. It cannot be completely eliminated.

### 5-3-2 Oil Change

Change or add oil for the vacuum pump in the following procedure.



Use oil with viscosity grade of SAE 10 (ISO VG32).



**DANGER**

- When changing oil, make sure to pull off the power plug first.



**CAUTION**

- The vacuum pump and oil are hot after operation. Leave the system for cooling for more than 5 minutes before changing oil.

- 1) Press the POWER switch to turn the power OFF (O).
- 2) Pull off the power plug from the consent.
- 3) Remove four screws and open the cover on the left side of the unit.

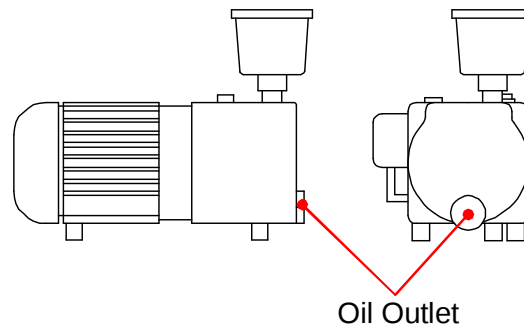


- 4) Open the oil outlet on the vacuum pump and drain the oil in the vacuum pump.



For replenishing oil, go to the step 6), skipping the step 4) and 5).

< Vacuum Pump >

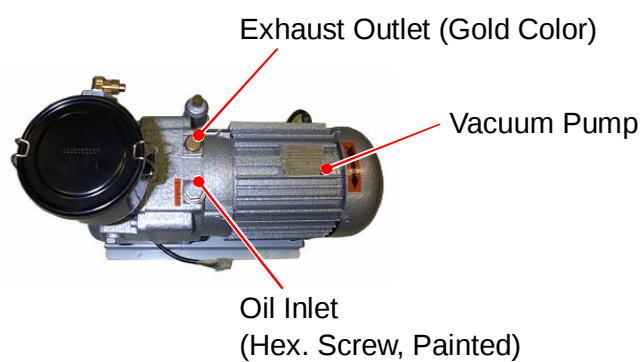


- 5) Close the oil outlet.

- 6) Open the cap of the oil inlet.



DO NOT confuse the oil inlet with the exhaust outlet.

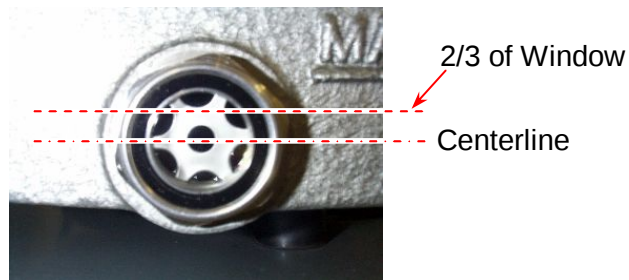


- 7) Feed new oil to the level of two-thirds ( $\frac{2}{3}$ ) of the oil check window.



For replacing entire oil, the amount of oil to feed is about 0.2 lit.

< Oil Check Window >



- 8) Close the cap of the oil inlet.
- 9) Close the cover on the left side of the unit and fix it with four screws.

### 5-3-3 Filter Checking

Inspect the filter in the vacuum pump in the following procedure.

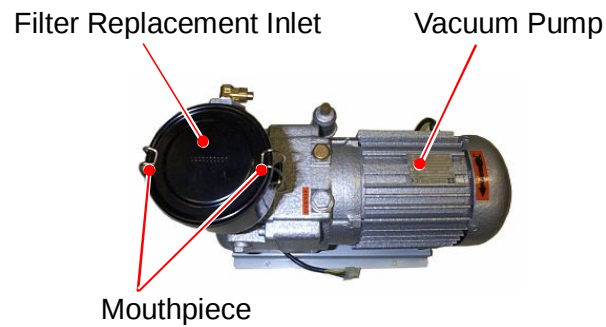


- When checking the filter, make sure to pull off the power plug first.

- 1) Press the POWER switch to turn the power OFF (O).
- 2) Pull off the power plug from the consent.
- 3) Remove four screws and open the cover on the left side of the unit.



- 4) Remove the mouthpiece from the vacuum pump replacement inlet and open the cover of the replacement inlet.



- 5) Check if any dust or foreign objects are on the filter.
- 6) If any, remove it.
- 7) Close the replacement inlet cover and fasten it with the mouthpiece.
- 8) Close the cover on the left side of the unit and fasten it with four screws.

## 5-4 Troubleshooting

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If you have any troubles or problems with the Thinky ARV-310, check the followings first before asking for repair.

If the problem still cannot be cleared after checking, contact the dealer where you purchased the unit or Thinky.



For details of the contact, refer to "Introduction" in this Manual.

| Phenomenon                                                  | Check Item                                                                                                                           | Reference                           |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| The power cannot be turned ON.                              | Check if the power cable is plugged correctly into the outlet and the unit inlet.                                                    | 3-5 Power Connection                |
|                                                             | Check if the POWER switch is turned to ON (I).                                                                                       | 4-2-1 Turning ON of Power           |
| Operation won't start with the OPERATION START/STOP button. | Check whether or not the OPERATION START/STOP button is pressed with the lid open. Close the lid first.                              | 4-3-2 Operation                     |
| Abnormal vibration or noise is observed.                    | Check if the counter balance is adjusted properly. Otherwise, the counter balance is disrupted, causing abnormal vibration or noise. | 4-1-5 Adjustment of Counter Balance |

| Phenomenon                                    | Check Item                                                                                                      | Reference                       |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------|
| Mixing or de-aerating can't be properly done. | Check if processing time has been properly set.                                                                 | 4. Operation                    |
|                                               | Check if vacuum decompression pressure value has been properly set.                                             |                                 |
|                                               | Check if the memory contents have been changed.                                                                 |                                 |
|                                               | Check if the amount of each material is incorrect.                                                              |                                 |
| Vacuum decompression cannot be properly done. | Check if vacuum pump oil is contaminated.<br>Moisture, solvents, etc. may get mixed in the oil. Change the oil. | 5-3 Changing of Vacuum Pump Oil |

## 5-5 Error Display

The Thinky ARV-310 incorporates a lid sensor, vibration sensor and revolution sensor. If any error occurs during revolution, a relative message is displayed on the control panel and operation stops accordingly.

Major possible causes and measures for correction are listed below.

If the cause of an error is clear, remove it.

If the causes or the contents of the error are not clear, contact the dealer where you purchased the unit or Thinky direct.



For details of the contact, refer to "Introduction" in this Manual.

| Error Display        | Cause                                                               | Measures                                                                                 |
|----------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Err1                 | Operation was started with the lid open.                            | Close the lid to operate.                                                                |
|                      | The lid was opened during operation.                                |                                                                                          |
| Err2                 | Abnormal vibration occurred abruptly during operation.              | Check if the container has not been detached, flown away or any parts have been damaged. |
|                      | The vibration value exceeded the rated value.                       | Adjust the counter balance.                                                              |
| Err3 - Err6<br>Err10 | Revolution speed does not increase after the operation has started. | Contact the dealer where you purchased the unit or Thinky direct.                        |

| Error Display | Cause                                                                            | Measures                                                                      |
|---------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Err7 - Err9   | All these are related to electronic circuit malfunction or the control software. | Contact the dealer where you purchased the unit or Thinky direct.             |
| ECon          | Inverter detected an abnormality.                                                | Restart the unit.                                                             |
| ErVA          | Reduced vacuum pressure does not reach the set value.                            | Contact the dealer where you purchased the unit or Thinky direct.             |
| tttt          | Processing time was set longer than 30 min. 00 sec.                              | Press the DOWN button to cancel the value.                                    |
| ALM           | EMERGENCY button was pressed.                                                    | Turn the EMERGENCY button clockwise to cancel the lock, and restart the unit. |

## 5-6 Limited Warranty and After-Sale Service

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THINKY warrants all THINKY products to be free from hardware defects in material and workmanship for 12 month from the date of purchase throughout the duration of the warranty period. The date of purchase will be determined by a valid proof of purchase or by the product purchase history database maintained by THINKY.

In the event that this product should fail during this period, THINKY reserves the right to either replace or repair the product at its own discretion. If the product becomes defective during the warranty period, THINKY will repair or replace any defective component part except consumables at no charge to the original owner, subject to the limitations and requirements listed. Units purchased second hand are NOT covered by this warranty and THINKY will service these products for charge. All returns are for repair or replacement at THINKY discretion. There are no returns for credit or refunds.

THE FOLLOWING IS REQUIRED BY THINKY when requesting warranty service:

The small units that unit weigh up to 250lb must be returned to the identified place by THINKY or authorized distributors, within return policy time period, with the evidence of purchase from THINKY or from authorized distributors. The product must be packed in the original shipping carton or in suitable packing offering a similar degree of protection. To avoid scratches or other damage to the product during shipping, separate items such as power cables. Each should be individually wrapped and placed in the same package.

The limited warranty provided by THINKY does not cover :

1. Damage during Transportation of delivery. Any damages during shipment must be claimed within 5 days for insurance claims after equipment is received.
2. The cost of returning the product to THINKY (i.e. this is the user's responsibility)
3. Any product removed serial numbers or identification altered in any way
4. Exterior cosmetic damage
5. Damage, defect or failure caused by or resulting from: improper installation or operation of the unit from incorrect voltages or power supply, improper service by an unauthorized service facility, abuses, neglects, accidents, misuse, fire, flood, or acts of God, unauthorized modification by end user, units serviced by unauthorized service personnel.
6. Damages resulting from loss of time or inconvenience, cost of temporary replacement unit or spares, property damage caused by this unit or its failure to work, or any other incidental or consequential damages.
7. Damages caused by user's misuse, ignorance of instruction, material spillage and/or dropping objects into inside of the mixer, or any other damages from which may or may not be supplied with the product is not covered by this Limited Warranty.
8. Any defects on the units distributed by unauthorized distributors in the area.
9. Troubles or accidents caused by scatter and spill of mixing substances and solvent.
10. Damages resulting from flaws and dents on the System arose while it is in operation.
11. Troubles or damages caused by using improper operating procedure, mishandling and abusing the mixer, and careless handling.
12. Following expendables are out of the scope of the warranty.
  - Containers
  - Vacuum piping tubes
  - Vacuum pump oil
  - Drive belts.

- Damage and liability

National or local administrative law must be observed upon use of the System and disposal of the System components.

Be sure to read and understand this manual thoroughly prior to the use of this system, and use the system only as instructed.

Warnings and precautions defined in this manual shall always be observed.

The Company is not liable for damages caused by Customer's inappropriate operation or maintenance of this System.

Thinky Corporation's liability under this warranty shall not be available for the any troubles and damages caused by unauthorized revision and alteration of this manual.

Even with the use of components or parts acquired from those appointed by the Company, the Company is not liable for any damages caused by defective components or parts.

The Company would be legally condemned for bodily injuries caused by act of the Company or operation of the System when operation of the System was normal.