

# De-Airing Pugmill

## Instruction Manual

# NVA-04S

Please make sure to read the entire instruction manual thoroughly before initial set-up, operation, maintenance and inspection to ensure proper use.

Please keep this instruction manual in a location that is always available to the user.

## Safety Precautions

Be sure to follow them.

Make sure to read the entire instruction manual thoroughly before initial set-up, operation, maintenance and inspection to ensure proper use. Start using only after you have read about the equipment's function, safety information and precautions.

This instruction manual provides three grades of safety warnings: "Danger", "Warning" and "Caution". All precautions described hereunder concerning safety are to be read carefully. Be sure to follow them.



**Danger**

This indicates the possibility of fire, severe injury, and even death if the user disregards the instruction.



**Warning**

This indicates the possibility of severe injury if the user operates the pug mill improperly.



**Caution**

This indicates the possibility of minor injury or damage if a user operates the pug mill improperly. However, depending on the circumstances, there is still the possibility that severe injury may result. Be sure to follow them.

We categorize the type of those warnings using the following symbols throughout the manual (example):



A reminder to pay close attention.



A prohibited action you must not do.



A forced action you must always do.

## **Danger**

**Installation** These are safety precautions regarding the installation of the pug mill.



**Install on a level surface.**

Securely install the pug mill on a level surface because vibration and/or noise could be increased if the installation place is slanted or otherwise not level.



**Heavy. Be careful when handling.**

If you drop the pug mill on your feet, you could be injured.



**Do not install in places subject to rain, water, and/or moist conditions.**

Failure to follow this could result in fire or malfunction due to electric shock or leakage.



**Do not overload the electric circuit.**







Sharing the same outlet with other electric products could result in fire due to overcurrent.







**Properly ground.**

Be sure to ground to prevent electric shock accidents.

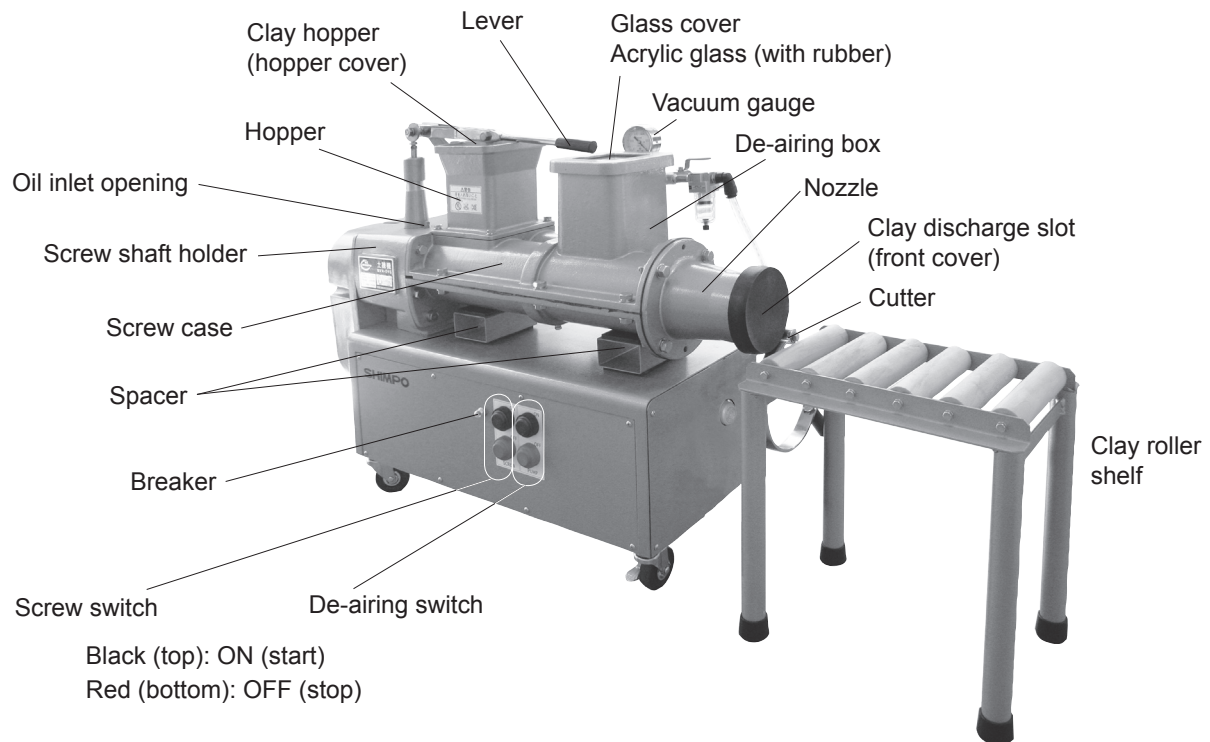
## Operation These are safety precautions regarding the operation of the pug mill.

 <p><b>Do not allow anyone to operate the pug mill without proper instructions and supervision.</b></p> <p>Assign an operation supervisor in a facility where many people may operate the unit, and supervise operation. Children in particular should not be allowed to operate the unit.</p>	 <p><b>Do not insert hands.</b></p> <p>Do not insert hands or fingers into the clay hopper or clay nozzle. They could be caught, resulting in serious injury.</p>
 <p><b>Wear proper clothing.</b></p> <p>Loose fitting ties, aprons and other clothing that may hang above the clay hopper or clay nozzle could be caught in the internal moving parts.</p>	 <p><b>Fix up long hair and keep away from the pug mill.</b></p> <p>It could be caught, resulting in serious injury.</p>
 <p><b>Do not operate any switches with wet hands.</b></p> <p>Operating switches or plug / unplug the power cable with wet hands could result in electrical shock.</p>	 <p><b>Turn off the power when not in use.</b></p> <p>If you do not use a long period of time, or there is a possibility of lightning strike, turn off the power and unplug the power cable.</p>

## Maintenance These are safety precautions regarding the maintenance of the pug mill.

 <p><b>Turn off the power before inspection. Pull out the power plug.</b></p> <p>Do not only turn off the power but also pull out the power plug before cleaning, inspection, adjustment, or replacement.</p>	 <p><b>Hold the power plug at the base when pulling it from the outlet.</b></p> <p>Do not pull or yank the cable when unplugging. Failure to do so could result in fire due to electric shock and/or short circuit.</p>
 <p><b>Do not use the unit with a damaged power plug base and/or cable.</b></p> <p>Do not operate the unit when the power plug base and/or cable are damaged, or if the power outlet is worn out. Failure to follow this could result in fire due to electric shock and/or short circuit.</p>	 <p><b>Do not clean the unit with water.</b></p> <p>Do not use water for cleaning the unit. Failure to follow this could result in fire and/or damage to the unit. Wipe off the unit thoroughly using a cloth.</p> <p>* The clay hopper, screw case, and nozzle can be washed only after disassembly.</p>

## Pug Mill Diagram



## Package description

Description	Quantity	Reference
Drive housing	1	
Clay roller shelf	1	
Hopper cover	1	Cover for clay hopper
Front cover	1	Cover for clay discharge slot
Spacer	2	
Ground wire	1	
Wrench	1	17 × 13 mm
Double-head wrench	1 for each	17 × 13 mm 13 × 10 mm For disassembly of the screw case
Allen Key	1	2.5 mm in width
Hexagon bolt	2	M10 × 25 mm For removal of the nozzle/for disassembly of the screw case
Acrylic glass	1	De-airing box cover (with rubber)
Glass cover	1	Acrylic glass cover
Instruction manual	1	
Warranty card	1	

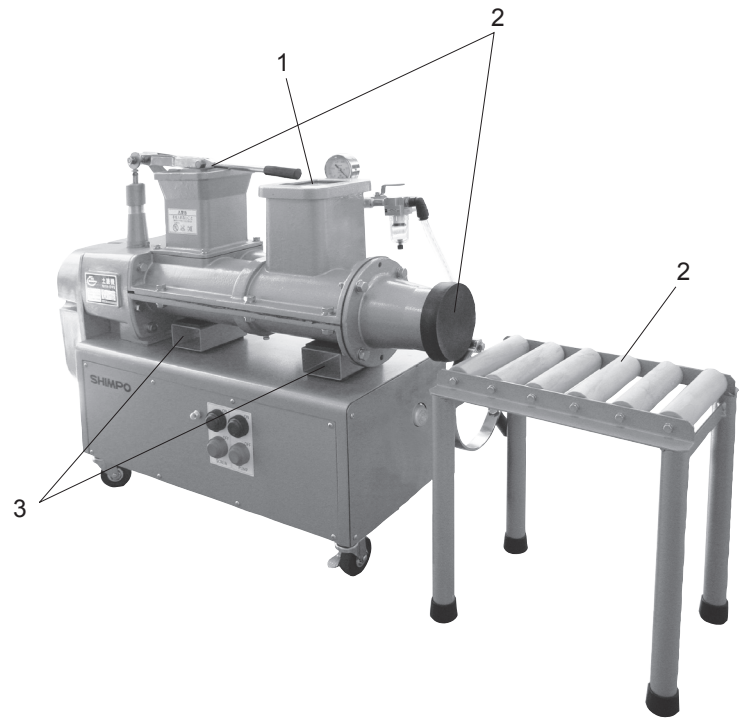
## Installation / Preparation

Install and secure the unit on a level surface.

1. Put the acrylic glass on the top of the de-airing box and place the glass cover on it.
2. Remove the front cover and hopper cover. Place the clay roller shelf in front of the clay discharge slot.
3. Place the spacers in the position as in the figure to support the load.

### Attention

Without placing the spacers, the clay discharge slot could be lowered.



## Operation

### ■ Operation

1. Insert the power plug into the outlet.
2. Turn on the de-airing switch.
3. Turn on the screw switch.
4. Close the valve next to the de-airing box.
5. Close the valve next to the de-airing box.  
Monitor the screw while placing clay into the clay hopper in small amounts.

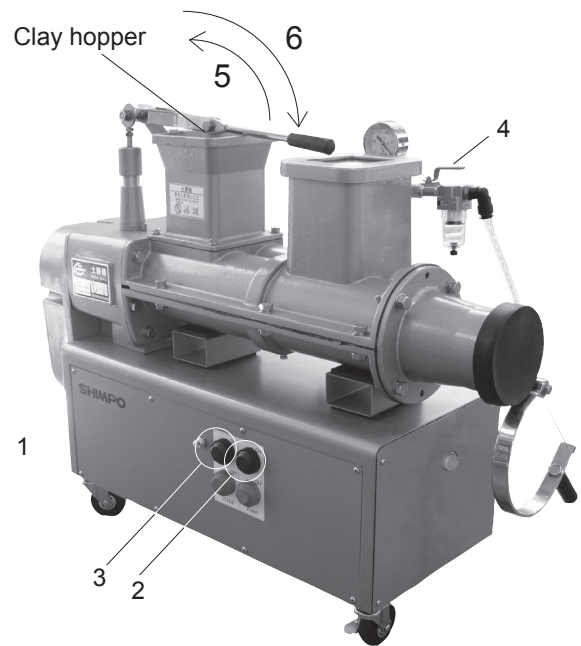
It is normal that the vacuum gauge needle points to 0.09 MPa or more while clay is discharged.

0.09 MPa or more



#### Attention

- The vacuum gauge is a sensitive piece of equipment. Take care not to drop or knock it to avoid the risk of inaccurate readings.
- The vacuum gauge might not indicate 0.09 Mpa or more even in normal condition if ambient air pressure decreases during use at high altitudes, or due to changes in weather.



#### **Danger**

Do not operate the power plug with wet hands.



#### **Danger**

Do not insert hands or fingers into the clay hopper or clay nozzle.

#### Only use clay soft enough to be kneaded by hand.

Do not put in extremely soft clay, and/or dry clay waste.

Doing so could result in the screw stopping, and/or the clay may not mix well.

Be sure to use clay soft enough to be kneaded by hand.

#### Do not load with large chunks of clay.

Doing so could result in the clay not mixing well and could result a poor quality mix.

Load small portions of clay at a steady pace to produce better clay.

6. Pull the lever down (screw rotates).
  - If inappropriately mixed clay is discharged at start of operation, put it through the pug mill two or three times and adjust hardness.

Using excessive force while operating the lever may result in the breaker being activated to shut off the power supply. (Refer to P.9, Operation of breaker (Recovery of operation))

\* The de-airing pug mill can be used at normal pressure without using the vacuum pump (switch off the vacuum pump).

## □ Troubleshooting during operation

### Dry clay comes out from the clay discharge slot

- ➡ Remove the nozzle and clean the internal parts.  
(Refer to P.8, Disassembly Procedure)

### Screw stops

The screw will stop if a chunk of dry clay is loaded into the clay hopper.

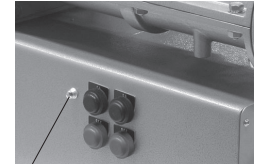
- ➡ Be sure to add water into the clay and make it soft enough to be kneaded by hand before putting it into the clay hopper.

### Operation stops (the breaker is activated to shut off the power supply)

If you load a chunk of dry clay into the clay hopper, or operate the lever with excessive force, the breaker might be activated to shut off the power supply due to overload.

The centre button projects outwards if the breaker is activated.

- ➡ Remove the cause of overload and push the button inside.  
Operation restarts.



Breaker

### Clay does not mix well

Possible causes are as follows:

- (1) Extremely soft clay is put into the clay hopper ➡ When you put in soft clay, put in soft and firm clay alternately in small amounts. As the clay hardness becomes even, you can put in only soft clay to gradually mix better.
- (2) Too-hard clay is put into the clay hopper ➡ If you put in hard clay in sequence, it will blow back and will not mix well. Add water and leave for at least three days. If clay still does not flow, disassemble and clean the internal parts in order to remove the hard-set clay inside the pug mill. (Refer to P.8, Disassembly Procedure)
- (3) Clay has been left in the main unit and hardened up ➡ Disassemble the unit and clean the internal parts. (Refer to P.8, Disassembly Procedure)

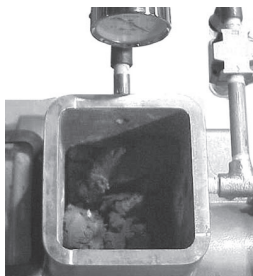
### De-airing does not work well

De-airing might not work well depending on the clay quality.

- ➡ Put the clay through the pug mill several times until the clay condition will improve.

### Clay moves upward to the de-airing box

Clay moves upward to the de-airing box depending on the clay hardness.



◀ Clay is moving upward to the de-airing box. (even the screw cannot be seen)

If a clay wall forms inside the de-airing box, only the top of the de-airing box is evacuated and de-airing does not work while mixing clay.

\* If you can observe the screw rotation delete from above, the de-airing box is in its best condition.

- ➡ Remove the clay inside the de-airing box according to the following procedure.



**Danger**

- Be sure to turn off the power before operation.
- Do not handle the power plug with wet hands.

#### How to remove clay inside the de-airing box

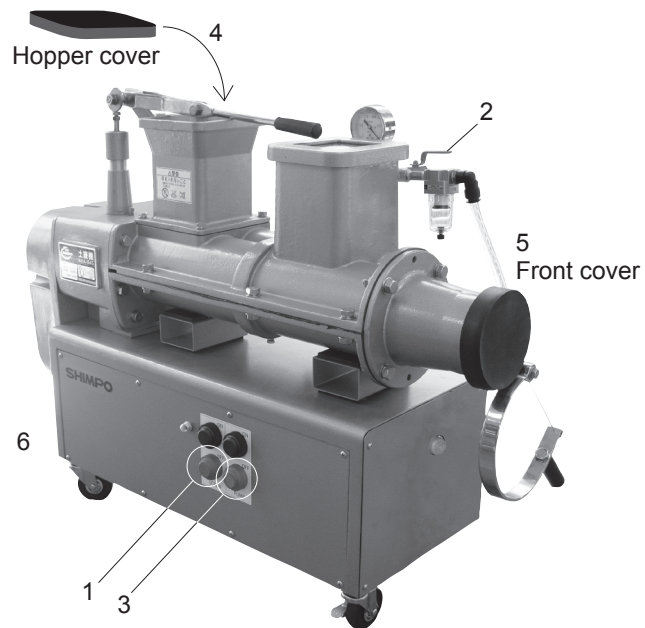
- (1) Turn off the screw switch and de-airing switch and pull out the power plug.
  - (2) Take off the de-airing box cover (glass cover and acrylic glass) and remove the clay carefully.
- \* Completely remove clay using a wet sponge until the screw can be seen. If clay still remains inside the box, it might move upward to the de-airing box again.

Only load clay that is soft enough to be kneaded by hand.

## Operation

### ■ After Operation

1. Turn off the screw switch.
2. Open the valve next to the de-airing box when operation finishes.
3. Run the vacuum pump at idle operation for about one minute to dry water inside, and then turn off the de-airing switch.
4. Pull the lever down and fit the hopper cover on.
5. Fit the front cover on the discharge slot.
6. Pull out the power plug.



#### Dry the inside of the vacuum pump after use.

Failure to follow this could result in damage to the unit.

#### Do not leave clay in the main unit for a long period of time.

If dry clay remains in the main unit, do not operate the pug mill, but disassemble it and remove clay before operation. (Refer to P.8, Disassembly Procedure)

- Disassemble the pug mill according to the procedure for cleaning internal parts or removing clay completely. (Refer to P.8, Disassembly Procedure)



## Maintenance

- **Cleaning** Disassemble the pug mill according to the procedure for cleaning internal parts or removing clay completely.

- Rinse each of the disassembled parts carefully with water and dry them well.
- Clean the screw without removing from the screw holder.
- Do not disassemble parts other than as described, as it could result in damage to the pug mill.

### □ Disassembly Procedure

1. Turn off the de-airing switch and screw switch.  
Check that the power plug is pulled out.
2. Take off the hopper cover and front cover, if attached.
3. Pull out the vacuum pump hose and remove it.  
Push A toward B, and pull out the hose.
4. Take off the four fixed nozzle nuts using the supplied wrench and spanner, and remove the nozzle from the screw case.

If the nozzle is difficult to remove, tighten the supplied bolts into the nozzle screw hole to remove it more easily.  
(Refer to the bottom right diagram 4-1)

5. Take off the seven fixed nuts on the upper and lower sides of the screw case using the supplied wrench and double-head wrench.
6. Take off the six bolts of the screw holder using the wrench and remove the upper screw case.

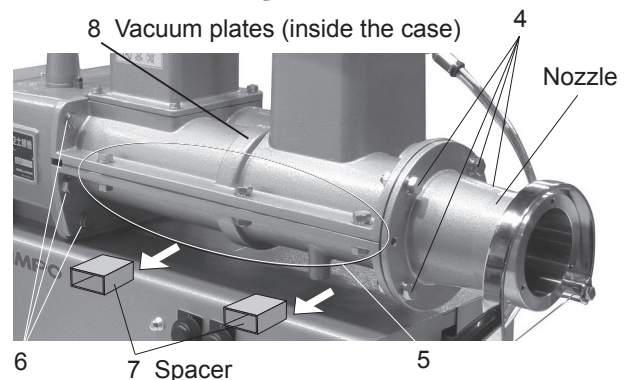
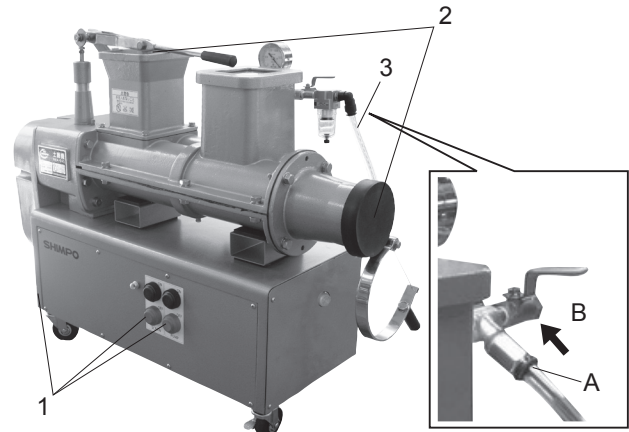
If the screw case is difficult to remove due to hardened clay, insert a flathead screwdriver in between the upper and lower sides of the screw case and move it up and down.  
(Refer to diagram 6-1 on the right)

7. Pull out the spacer and remove the lower screw case from the nozzle side.  
(At this time, as it is hard to remove the screw case when clay is stuck, remove any clay on the back of the screw case.)
8. Take off the bolts securing the vacuum plates each other and remove the plates.
9. Assemble the unit in the reverse order of the above procedure.

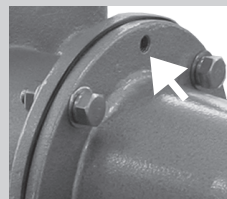


### Danger

- Be sure to turn off the power before operation.
- Do not handle the power plug with wet hands.

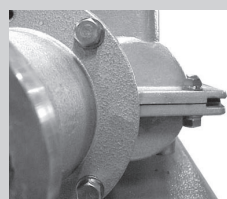


#### 4-1: When it is difficult to remove the nozzle



Tighten the supplied bolts into the nozzle screw hole to remove it more easily.

#### 6-1: When it is difficult to remove the screw case



Insert a flathead screwdriver in between the upper and lower sides of the screw case and move it up and down.



### Danger

Be careful when handling the screw as the sharp tip could cause injury.

## Maintenance

### □ Checking after disassembly or assembly

Run a trial operation after disassembly or assembly and be sure to check that the pug mill operates normally according to the following procedure.

1. Insert the power plug into the outlet.
2. Turn on the vacuum pump switch and check that the vacuum hose is properly installed, and that no air leaks from the hose.
3. Turn on the screw case switch and check that there is no vibration and/or abnormal sound in the main unit. (Do not put in clay at this time).
4. Pull the lever up and check if the screw stops. (If the screw stops, it is in normal condition.)

### ■ Oil filling

In the following cases, remove the screw of the oil inlet opening and lubricate with two or three drops of machine oil.

- When the sound of operation becomes louder
- When using the pug mill for long hours (approximately 50 periods)
- Once a month

- Purchase over-the-counter machine oil.
- Heavy oil or grease are not suitable.
- Do not put foreign materials and/or water into the oil inlet opening.

### ■ Replacement of stainless wire (Clay cutter)

When the stainless wire is broken, replace it according to the following procedure.

- (1) Remove the broken stainless wire.
- (2) Hold the stainless wire on side A.
- (3) Bend the cutter a little in the direction of B, and hold on the stainless wire on the side C.

- Purchase over-the-counter stainless wire (piano wire is ideal).

### ■ Operation of breaker (Recovery of operation)

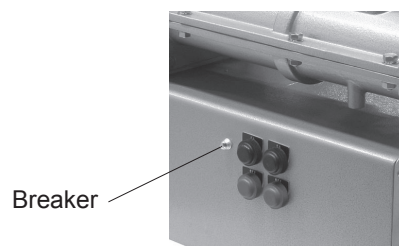
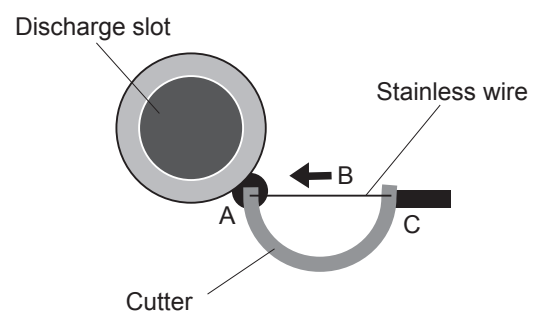
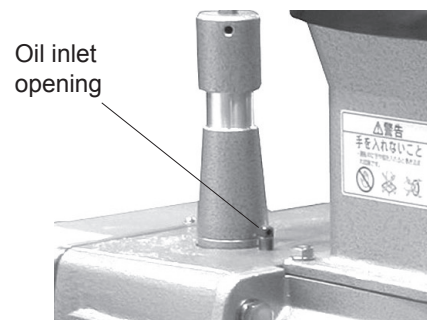
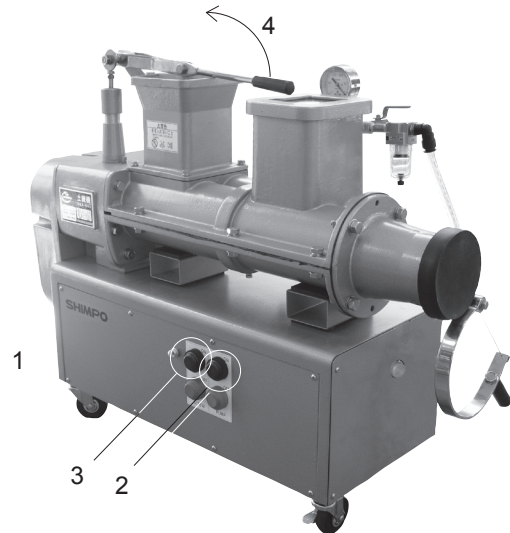
The breaker will not be activated under normal conditions. If you force a large amount of clay or hard clay into the clay hopper, the breaker might be activated to shut off the power.

When the breaker is activated, it will project out a little, and the screw will stop. Press the breaker over its waterproof cap. Operation restarts.



#### Danger

- Do not handle the power plug with wet hands.
- Do not insert hands or fingers into the clay hopper or clay nozzle.



## Disposal Method

- Consult with your local government, as the disposal method will vary.
- Do not disassemble the pug mill when you dispose of it.

## Specifications

Description	NVA-04S
Dimensions	920 (1,320 including the clay roller shelf) × 420 × 750 mm
Weight	Main body: 140 kg Clay roller shelf: 5 kg
Screw rotation	12.5/15 rpm 50/60 Hz
Screw motor	Single phase: 200-240 V 400 W
Vacuum pump	Single phase: 200-240 V 250 W
Discharging capacity	200 kg/hour or more
Screw	Horizontal type Hopper: two shafts Discharge slot: one shaft
Diameter of the discharge slot	Φ 90 mm

Stainless steel is used for the clay hopper, nozzle, clay pushing board, screw, and screw case.

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