

# 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. Vibration and/or noise could increase if the location of installation 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 the pug mill to prevent electrical shock.

**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 plan on using for an extended 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. Unplug the unit.</b></p> <p>Make sure to turn off the power as well as unplug the unit 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>* If the power code is damaged, please contact your dealer or our office.</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>
 <p><b>Cleaning and user maintenance shall not be made by children without supervision.</b></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	
Wrench	1	17 x 13 mm
Double-head wrench	1 for each	17 x 13 mm 13 x 10 mm For disassembly of the screw case
Allen wrench	1	2.5 mm in width
Hexagon bolt	2	M10 x 25 mm For removal of the nozzle/for disassembly of the screw case
Acrylic glass	1	De-airing box cover (with rubber)
Metal cover	1	Metal 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 then place the metal cover over it. (Place the rubber side downward.)
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

Failure to place the spacers will cause the screw case to sag. Clay will not extruded on the roller table.

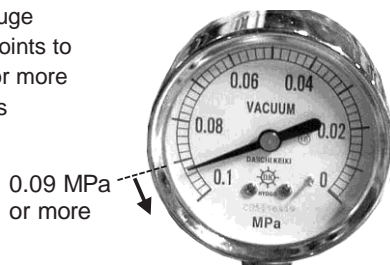


# Operation

## ■ Operation

1. Insert the power plug into an outlet.
2. Turn on the breaker.
3. Turn on the de-airing switch.
4. Turn on the screw switch.
5. Close the valve next to the de-airing box.
6. 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 for the vacuum gauge needle to point to 0.09 MPa or more while clay is discharged.



### 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.



	<b>Danger</b>	Do not operate the power plug with wet hands.
	<b>Danger</b>	Do not insert hands or fingers into the clay hopper or clay nozzle.

### **Only use clay soft enough to be wedged 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 wedged 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 amounts of clay at a steady pace to produce better clay.

7. Pull the lever down (screw rotates).
  - If clay is not mixed well when it first extrudes at start-up, run it through the pug mill two or three more times to adjust the clay's consistency.

Using excessive force while operating the lever may result in the breaker being activated to shut off the power supply.

If it is used continuously for a long time, the pug mill may become hot due to friction with clay. After using for 15 minute, allow 30 minute or more for cooling time.

\* 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

It happens when clay adheres to the inside of the nozzle. ➔ 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 to the clay and make it soft enough to be wedged 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. ➔ You can restart by turning off the breaker switch and then turning it on again.



Breaker

### Clay does not mix well

Possible causes are as follows:

(1) Extremely soft clay is put into the clay hopper ➔ If you add too soft clay, it may not extrude. Add firmer clay into the hopper until it runs through. Remix several times until the clay consistency gets harder.

(2) Too-hard clay is put into the clay hopper ➔ If you add too much hard clay, 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 has hardened ➔ Disassemble the unit and clean the internal parts. (Refer to P.8, Disassembly Procedure)

### De-airing does not work well

Possible causes are as follows:

(1) The valve next to the de-airing box is not closed completely. ➔ Please close the valve completely.

(2) The acrylic glass placed on top of the de-airing box is misaligned or the rubber side faces upward. ➔ Correct the position of the acrylic glass and place the rubber side downward.

(3) The air filter is loose or the vacuum pump hose is disconnected. ➔ Close the hole in the de-airing box with your finger and check if air is flowing in.

\* If air is flowing in, the vacuum gauge indicates 0.09 MPa or more.

(4) De-airing does not work well depending on the condition of clay. ➔ Load the clay several times until the clay is in good condition.

## Clay moves upward to the de-airing box

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



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

If clay builds up inside the de-airing box, the clay in the barrel will not be properly de-aired.

\* If you can observe the auger screws rotating, then the clay should be properly de-airing.



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



### 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 (metal 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 pugging is completed.
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. Turn off the breaker.
5. Pull the lever down and place the hopper cover on.
6. Fit the front cover on the nozzle.
7. Unplug the unit



### 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 sits in the barrel for too long, do not run the pug mill. Disassemble the barrel and remove all clay before running it again. (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.

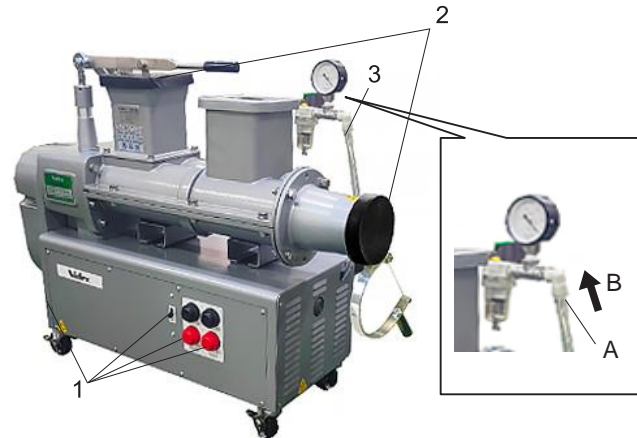
- Rinse each of the disassembled parts carefully with water and dry them well.
- Clean the screw without removing from the screw holder.
- Do not disassemble parts other than as described, as it could result in damage to the pug mill.

## □ Disassembly Procedure

1. Turn off the de-airing switch and screw switch and breaker. 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.

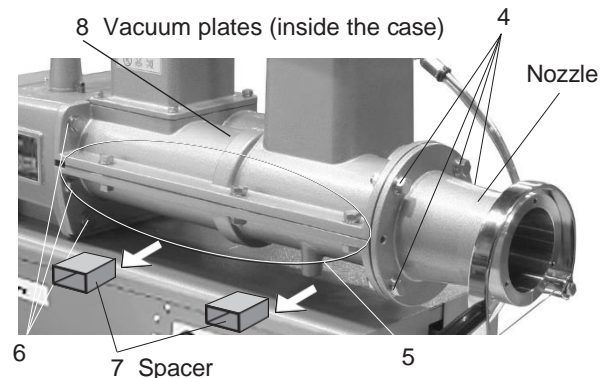
 **Danger**

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



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)

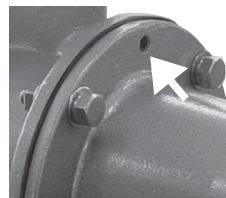
5. Take off the seven fixed nuts on the upper and lower sides of the screw case using the supplied wrench and double-head wrench.
6. Take off the six bolts of the screw holder using the wrench and remove the upper screw case.



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)

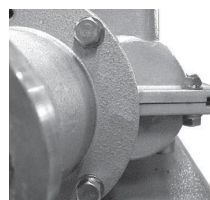
7. Pull out the spacer and remove the lower screw case from the nozzle side.  
(At this time, as it is hard to remove the screw case when clay is stuck, remove any clay on the back of the screw case.)
8. Take off the bolts securing the vacuum plates to each other and remove the plates.
9. Assemble the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

### 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.

## □ 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 breaker.
3. Turn on the vacuum pump switch and check that the vacuum hose is properly installed, and that no air leaks from the hose.
4. 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).
5. 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 for the oil inlet opening and lubricate with two or three drops of machine oil.

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

- Purchase over-the-counter machine oil (ISO VG40 or less).
- 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)

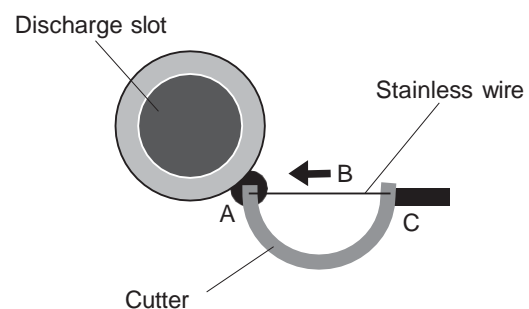
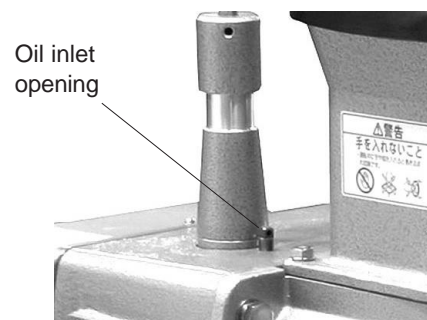
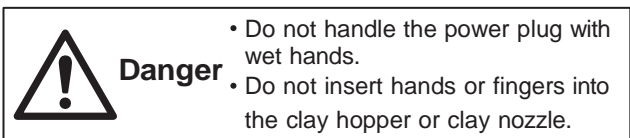
When the stainless wire is broken, replace it according to the following procedure.

- (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).

### Note)

Packing (rubber ring) may degrade over time due to continuous usage and/or various external conditions. Please check regularly and replace accordingly to maintain optimum vacuum performance.



## 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) x 420 x 750 mm
Weight	Main body: 145 kg Clay roller shelf: 5 kg
Screw rotation	12.5/15 rpm 50/60 Hz
Screw motor	Three 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.

# NIDEC DRIVE TECHNOLOGY CORPORATION

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## NIDEC DRIVE TECHNOLOGY CORPORATION

NIDEC SHIMPO CORPORATION change its company name to NIDEC DRIVE TECHNOLOGY CORPORATION on April 1, 2023.