DT-110
Operation Manual

since 1983
carima

operation Manual

UVLED 3D PRINTER
DT-110

since 1983
carima

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since 1983 carima | **Product Warranty**

Thank you for your purchase.
The product is made from precise parts and managed by our quality control.
Carima warrants the product in accordance with following terms If the product fails during normal use.

● Warranty terms

1. If a defect arises with regard to the product during the warranty period, CARIMA will repair or replace the defective parts of the product with new parts.
2. The warranty period applies for a period of 12 months from the date the Product was first installed by a consumer.
3. Please contact us at the following numbers.
4. Please keep the original warranty card for future service request.

● Exclusions and Limitations

1. If the product or Accessory malfunctions after the Warranty Period expires, there is no warranty of any kind.
2. It doesn't apply to damage caused by operating the product outside
3. It doesn't apply to damage caused by accident, abuse, misuse, flood, fire, earthquake, or under abnormal conditions
4. It doesn't apply to the Product damaged in shipping, transit, or on-site handling during installation.
5. It doesn't apply to a product or part that has been modified to alter functionality without the written permission of carima
6. If things including item description, installation date, signature are removed, Carima is not responsible for the loss.

▶ **During the warranty period, Carima will either repair or replace any defective product at no charge.**

▶ **If a defect arises in the product after warranty period or in the event of warranty exclusions, we may charge you a fee.**

Installation date : _____ . _____ . _____ .
Item description : _____

Please contact us for support at +82-2-3663- 8877

Safety precautions

- **Read this manual carefully for proper handling and operation, before installing, operating, maintaining and inspecting.**
- **It is designed to help ensure your own personal safety and to help protect your equipment from potential damage.**
- **Failure to observe the safety notes may lead to serious injuries and to significant damages to the system.**

! Place the machine in well-ventilated place due to smell of the resin.

! Do not insert tools or parts of body into machine during the printing process.

! Never look directly into light beam in order to protect your eyes.

! Never use gasoline for printing. Please keep it away from the machine.
Also, 3D prints or resin residue shouldn't be swallowed, as It could cause disorientation and suffocation.

! Stop the printer from processing and take the resin tray out not to overflow resin. and then turn off the machine and move it.

! Do not turn power switch off when it's on. It reduces life span of engine and could be one of errors. Get it ended as given in manual

! Putting some of liquid or metal pieces into printer is harmful for fire disease or electric shock. Also, Do not operate the machine with wet hands protecting from fire or electric shock.

! Do not ruin main power of printer. Neither change or ruin USB cables or supply power raised from outside.

! Carefully choose place for installation protecting from pet or child injuries made by printer

! Standard accessories include sharp tools such as cutter or nipper. Be careful not to cut yourself on any sharp edges.

! The space inside machine is designed to be taken up by light of engine.
please do not insert anything else inside.

! Protect the machine from dampness, such as rain and now, and dusty weather.

! Install and operate the machine on a flat level and dry surface. Keep the machine away from flammable liquids, gases, and aerosols.

! Do not impose excessive force on the machine. The external housing of your machine may be damaged Also, Read all instructions before using the machine.

Use of resin

! Be careful about resin from contacting skin or body part.
- If in contact, rinse in running water and make sure to wear gloves during work.

Replacement of resin

! Remove alien substances and scraps at the bottom of tray.
- Remaining scraps may have adverse effects on the output.
! After replacing resin, stir well before use since precipitates can be formed.

Cleaning of build plate and tray

! Check for alien substances and scraps on build plate and tray every time.
- Remaining scraps may have adverse effects on the output.
- Regular management and cleaning of tray are necessary.
! Coating can be damaged if the tray is cleaned with a sharp object.
- Use a spatula or dry cotton cloth as cleaning tool.
! Poor cleaning can lead to poor quality of output and lifting or cracking of floor.

Lifetime of UVLED engine

Lifetime of UVLED engine lamp is 20,000 hours, and brightness of the lamp can be reduced by exceeding its lifetime. Replace the lamp after using it for 20,000 hours to increase quality of output.

Preparation for A/S request

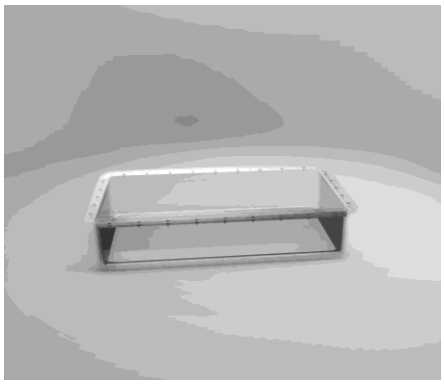
Record error situation, interior of the printer, and LCD display as photograph or video.
- A/S can be much easier if the user explains the situation clearly.

Product Information

1. Product Spec

Model Name	DT-110
Resolution of UVLED engine	1024 x 760
Build size (mm)	110 x 62 x 150
Layer thickness (mm)	0.025 [0.025/0.05/0.075/0.1 (4 steps)]
X,Y Resolution	50μm
Product size (mm)	304 x 316 x 622
Product weight (kg)	20
Rating	100~240V, 50/60Hz
Material used	ACRYLIC(Undefined)
System control	Control using touch-type embedded screen included
Environment	18℃ ~ 26℃ (temperature) / 20% ~ 50% (humidity)

2. Consumables

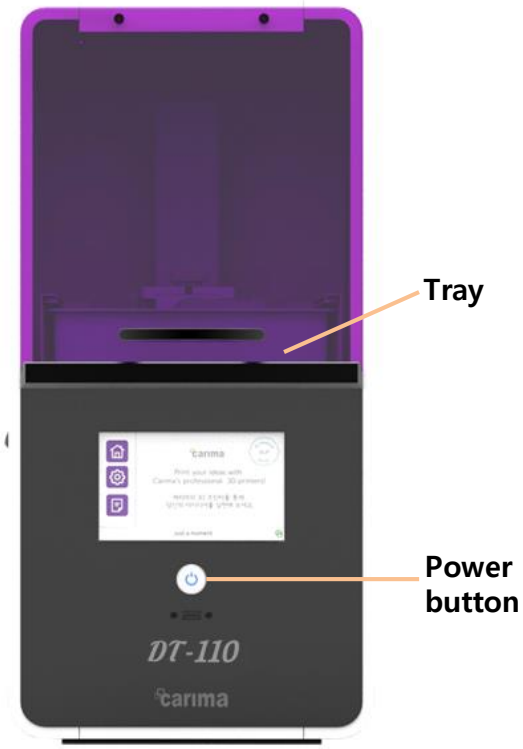


[Special VAT]

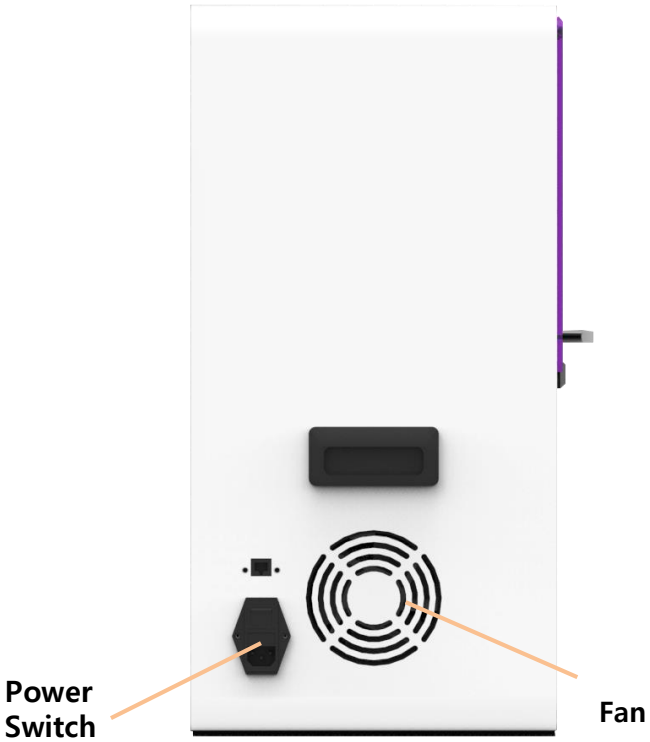
[RESIN]

[LAMP]

Names of Parts

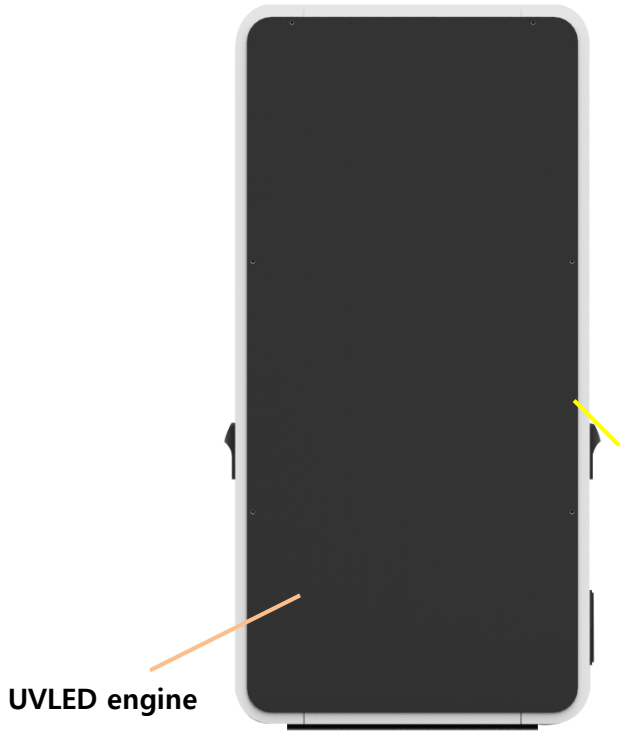


[Front]



[Left side]

[Right side]

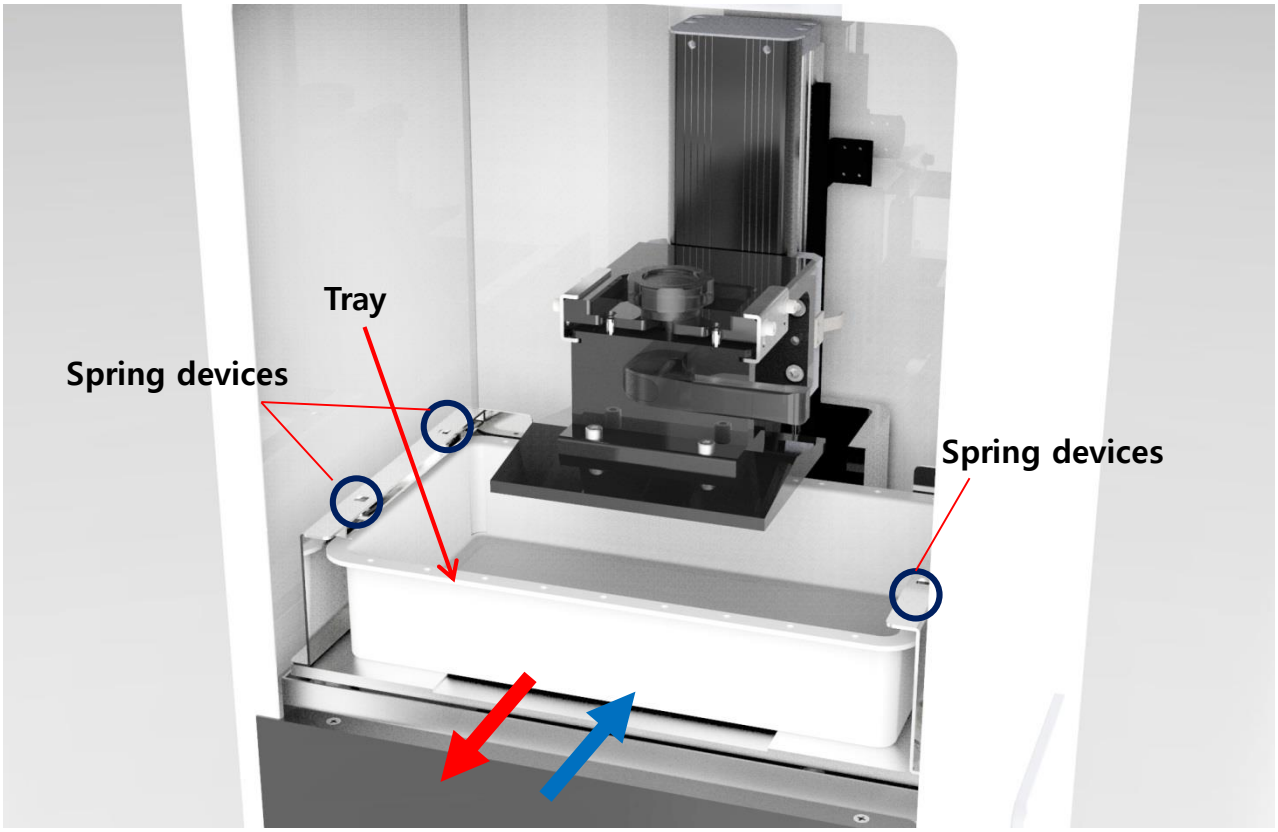


[Back]

Equipment Operation Manual

UVLED 3D PRINTER
DT-110

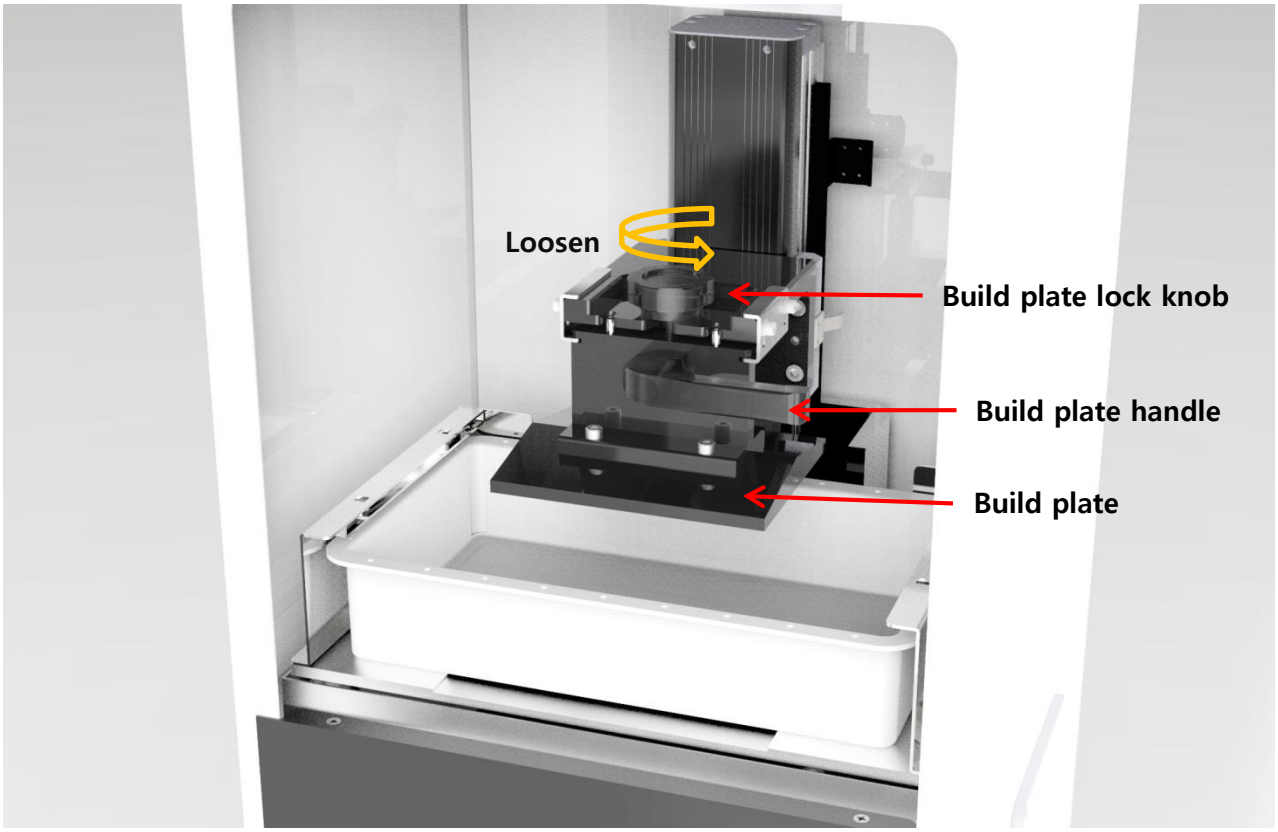
How to Attach & Detach Tray



1. Since the tray is pressed down by spring devices, pull the tray out. (Be careful when pulling out the tray as resin inside can overflow and stain the equipment.)

2. Push in the reverse order to attach the tray.
   The tray will make "clicking" sound with the spring devices.
   (Be careful when pushing in the tray as resin inside can overflow and stain the equipment.)

How to Detach & Attach Build Plate

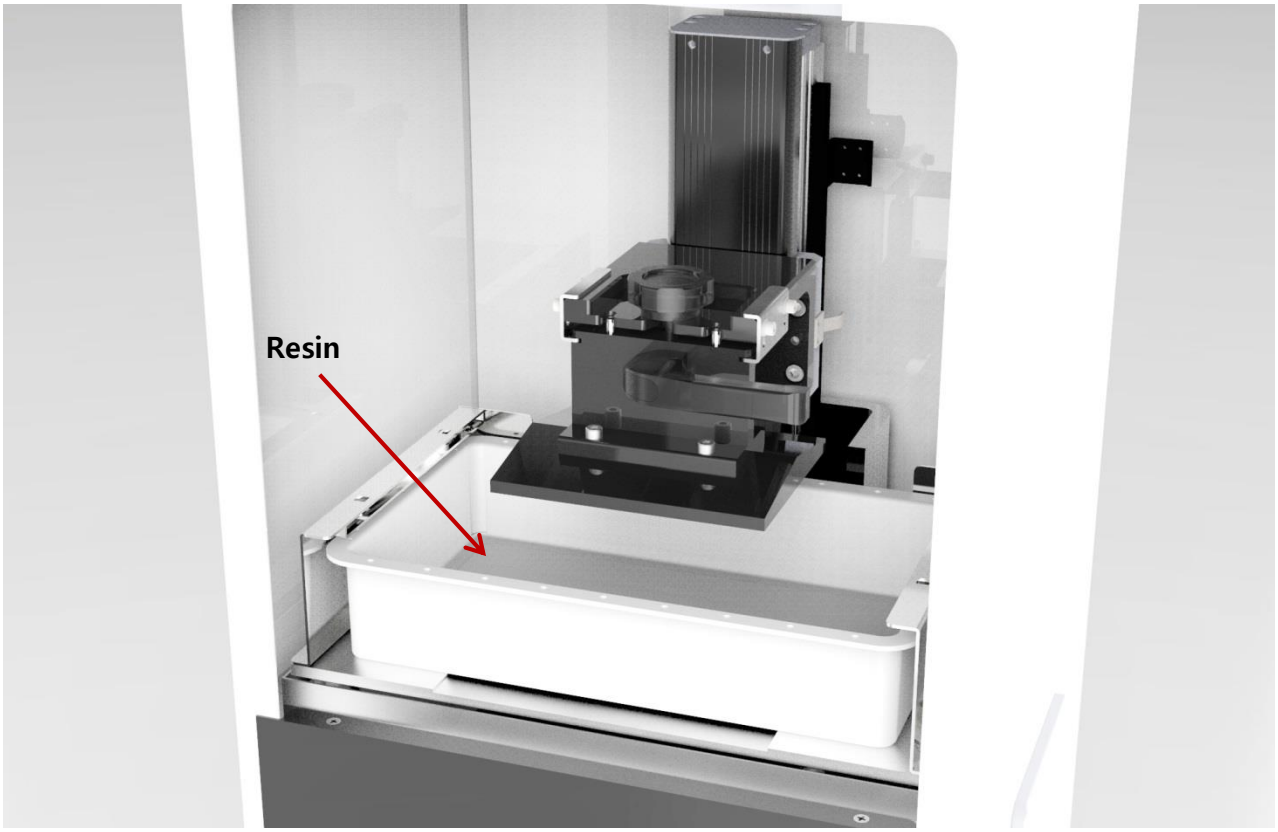


When printing is done, loosen the build plate to detach it by rotating build plate lock knob counterclockwise. Grab build plate handle and take out. Reverse the order when attaching the build plate.

Precaution

When detaching the build plate, resin on the build plate may fall off or spatter over the exterior or equipment to damage or contaminate the equipment. After removing output, the build plate must be wiped out cleanly to remove any remaining resin.
Resin left intact for long time can harden and affect output.

How to Refill Resin

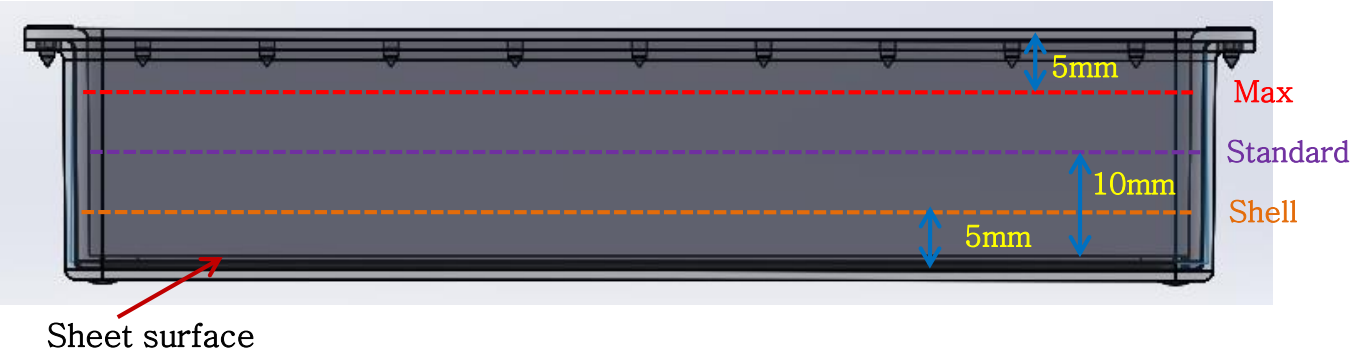


Refill resin as shown in the figure.

Precaution

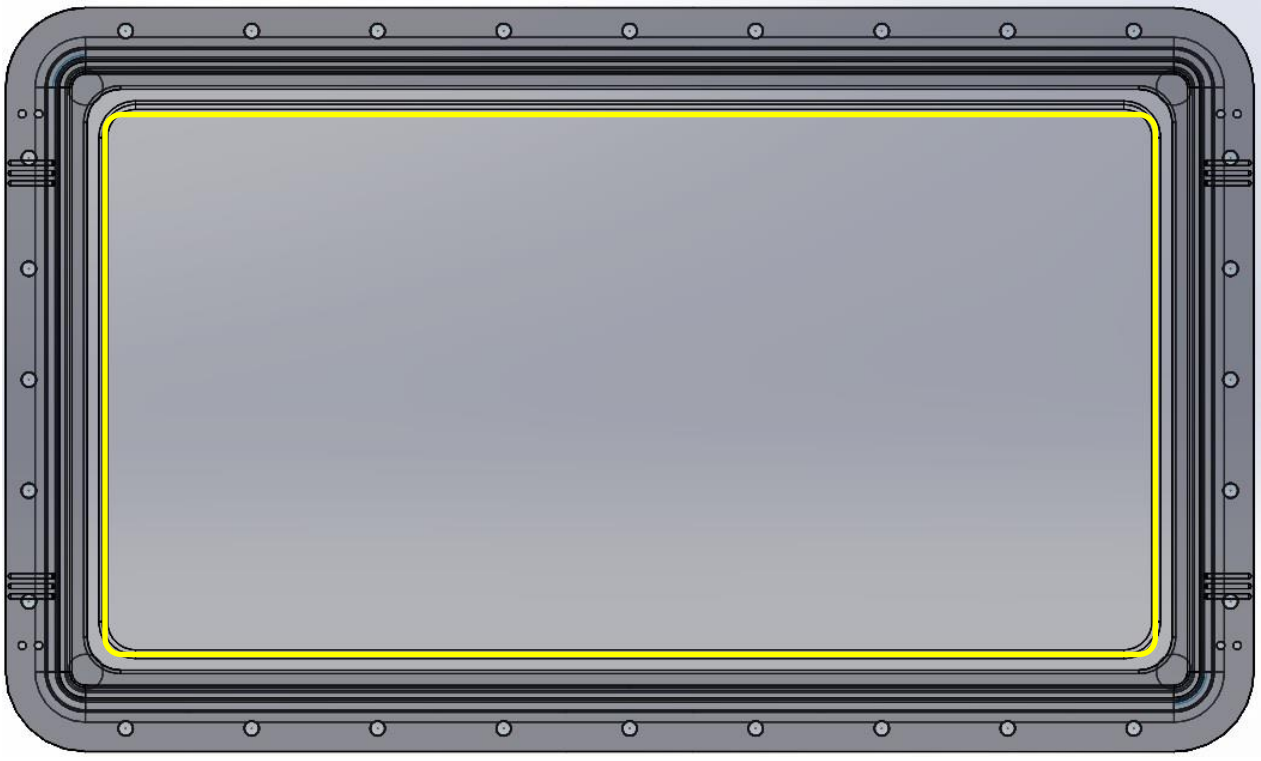
If possible, refill resin before printing. If it is inevitable to refill resin while printing, press "pause" button and slowly add resin after the work comes to a complete stop. Refilling resin while printing can result in foams that have adverse effects on output.

Amount of Resin Refill



In general, we recommend filling resin between shell line (250g) and standard line (500g). Do not exceed max line (800g) even when printing large output.
When filling resin above the max line, resin can flow over the tray with up-down motion of motor depending on shape of output.

Tray(VAT) Check



Surface of VAT sheet shows holes, ripping and loosening. These are natural phenomena that appear when it is used for long time. When the sheet surface has hole or ripping, resin will enter into the hole or ripping and result in printing failure. Attach a new VAT in this case.

This appears in short time if surface of the sheet is scratched by output or hardened scrap made carelessly by the user.

Maintenance

Cleaning the dust and rubbish off the projector will help use the projector without any malfunctions.

Warning:

1. *Turn the projector off and unplug at least 30 minutes prior to cleaning the projector. It may cause a serious burn if not.*

2. *Use a damp cloth. Be careful not to have any water seep into the ventilation outlet.*

3. *If any water has penetrated into the projector while cleaning, leave it in well ventilated area before connecting the power supply.*

4. *If a large amount water penetrated into the projector while cleaning, please inquire for repair at the service center.*

To clean the lens

Lens cleaning agent can be purchased from a lens store. Clean the lens as the following instructions.

1. Wet a clean and soft cloth with a small amount of lens leaning agent. (Do not apply the lens cleaning agent directly on the lens.)
2. Clean the lens in light circular motion.

Notes:

1. *Do no use any polishing agent or solvent.*
2. *Using detergent on the project case may cause discoloring or color fading.*

To clean the case

Please clean the projector case as the following instructions.

1. Clean any dust with a clean damp cloth.
2. Wet a cloth with warm water with soft detergent added in it such as dishwashing liquid to wipe the case with.
3. Remove any detergent on the cloth and wipe the projector again.

Notes:

1. *Do not use polishing agent or detergent containing alcohol since it may cause discoloring or color fading.*

Control Screen Manual

UVLED 3D PRINTER
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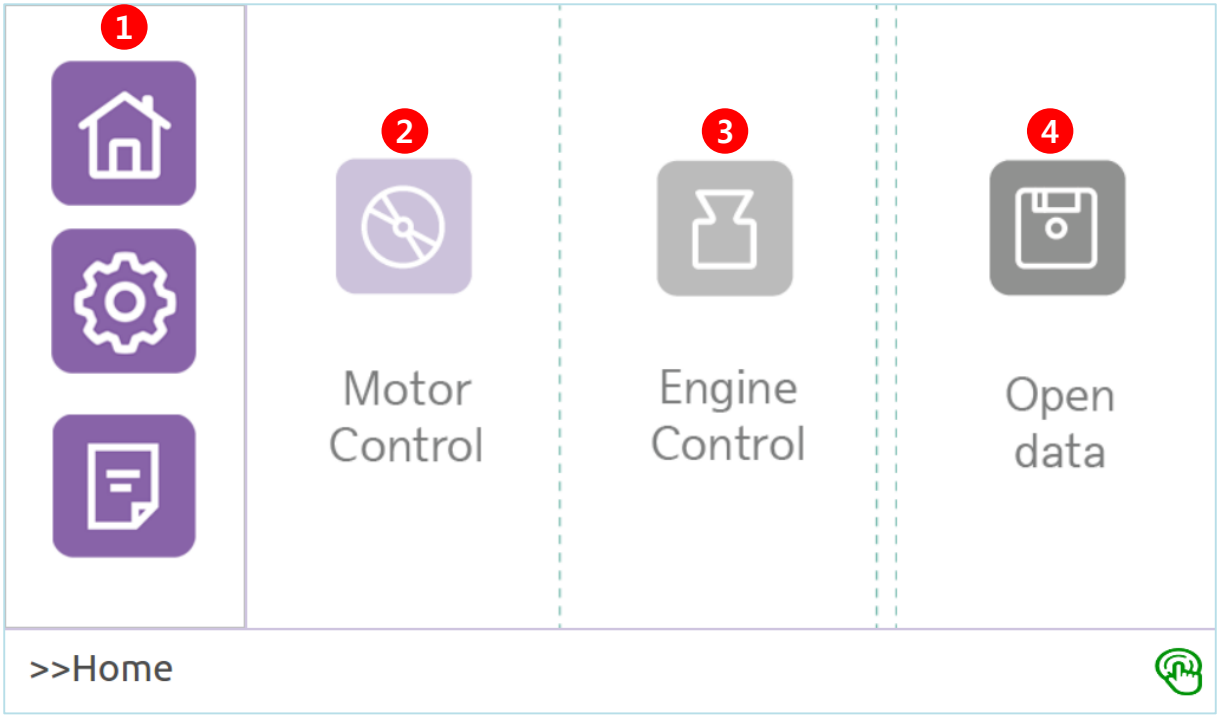
LCD Screen Information

1) Composition of Loading Screen

Function	Description
① **Loading Image**	Please wait a moment until home screen appears.
② **Status Message**	This pops a message to display current status.
③ **Exit Button**	This exits the system.

LCD Screen Information

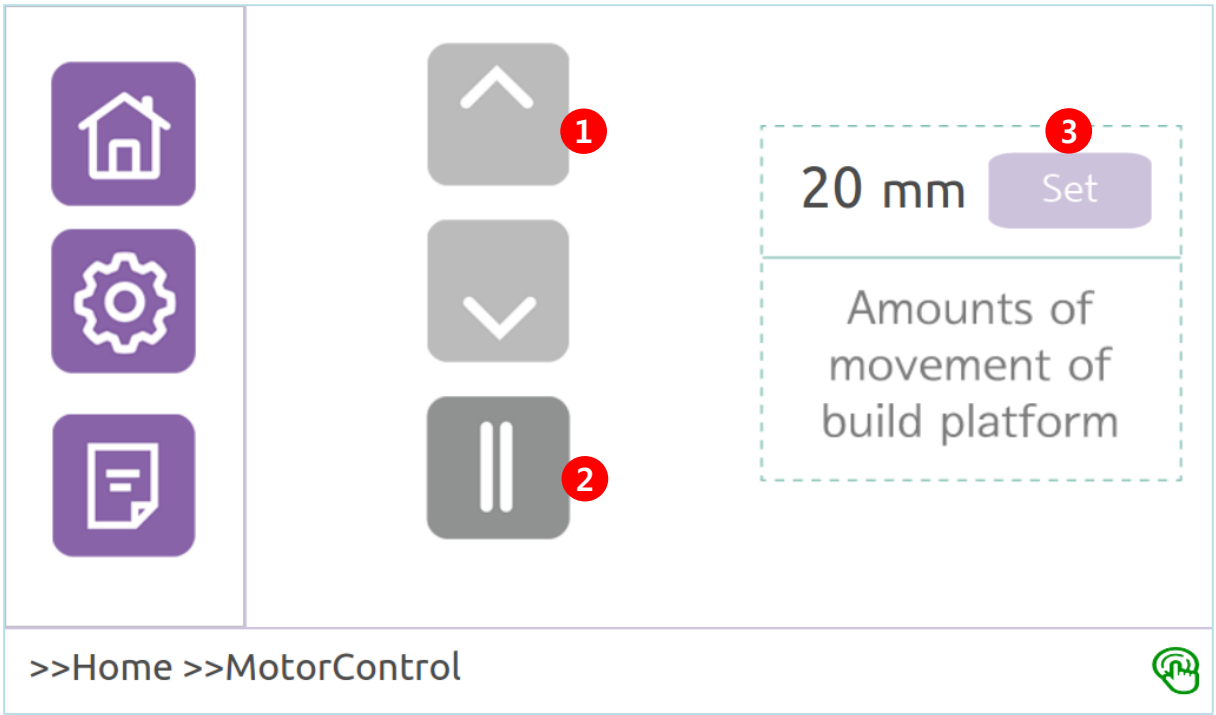
2) Composition of Home Screen



Function	Description
① **Home, Setting, Information Tabs**	These tabs move to Home, Setting and Information menus.
② **Motor Control**	This moves to Motor Control menu.
③ **Engine Control**	This moves to Engine Control menu.
④ **Open Data**	This shows list of data to be printed.

LCD Screen Information

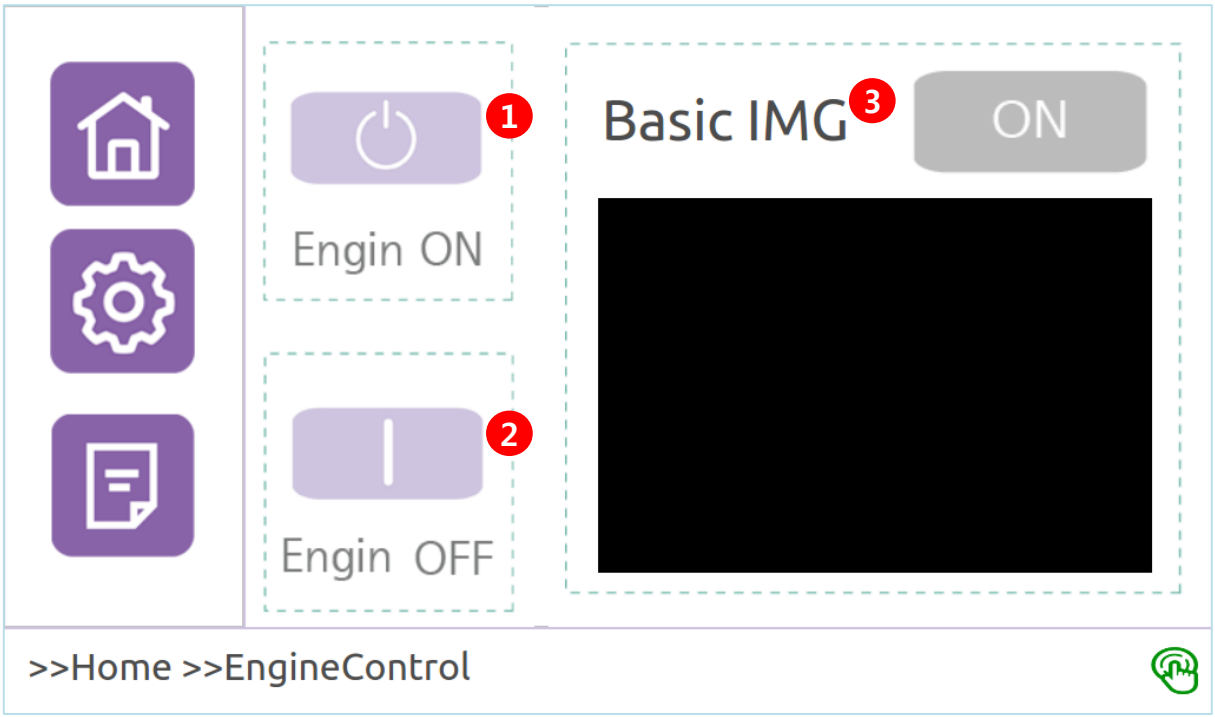
2-1) Motor Control Screen



Function	Description
① ↑ ↓	The build plate moves up and down.
② ||	The build plate stops.
③ **Setting**	This sets movement distance of the build plate.

☞ Problem in the motor can be determined through motor control.
Movement distance of the build plate is 20mm with initial setting.

2-2) Engine Control Screen



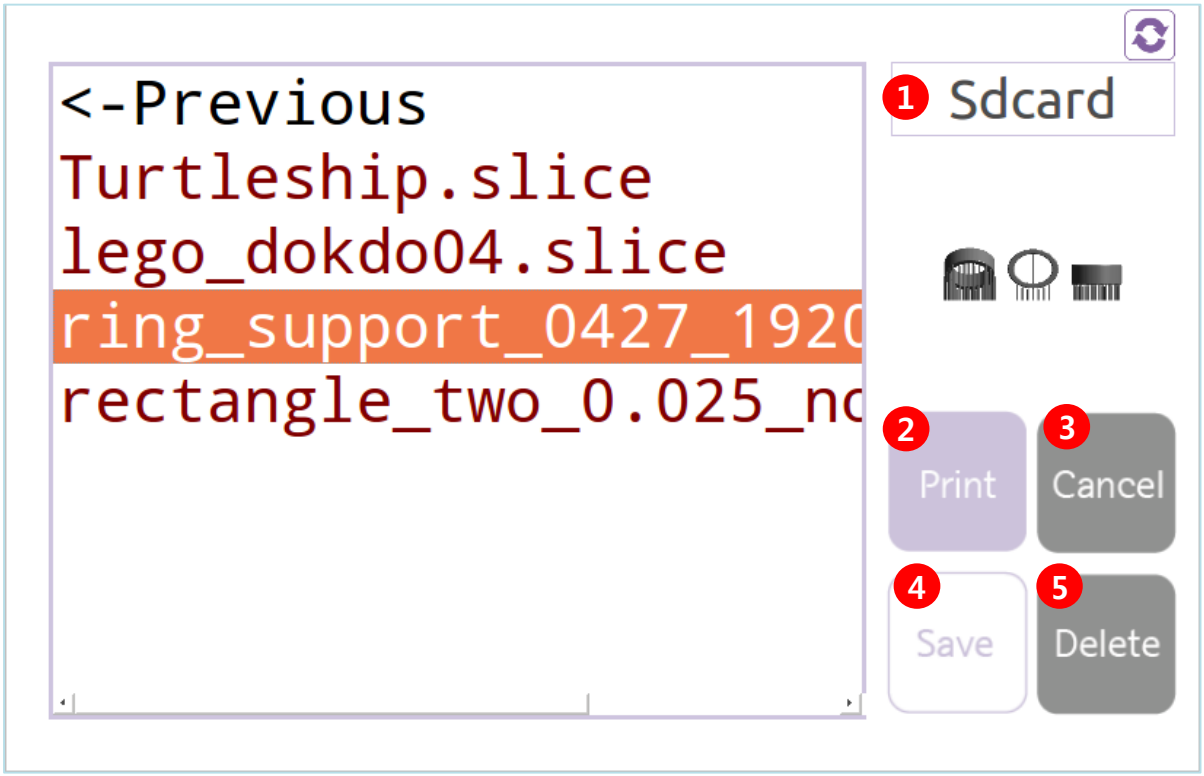
Function	Description
① **Engine ON**	This button can be used to turn the optical engine ON.
② **Engine OFF**	This button can be used to turn the optical engine OFF.
③ **View Default Image**	Optical engine projects default image.

☞ Problem in the optical engine can be determined through engine control.

1. Engine ON and OFF buttons can be used to turn the optical engine ON/OFF.
   - Do not turn OFF the power switch when the engine is turned ON. This can reduce lifetime of the lamp or may cause damage to the SDCARD.
   - Turn OFF the printer according to the program exit procedure similar to computer.

2. Through View Default Image Function, you can check error in engine output and the size of output.
   - Use Hide button to deactivate View Default Image button.

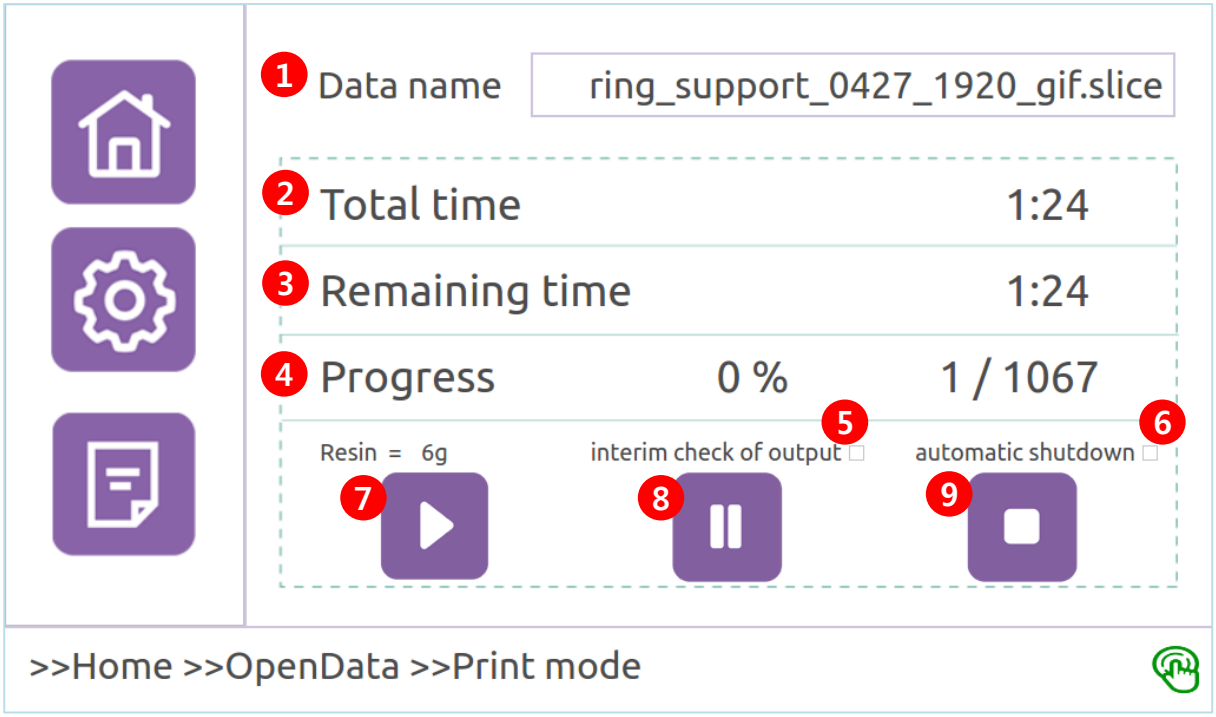
2-3) Open Data Screen



Function	Description
① **Storage device**	There are the data files of the list on the device.
② **Print**	Press Print to move to printing mode screen(Refer to the p20).
③ **Cancel**	Press Cancel to return to previous screen.
④ **Save**	It saves the data in USB to Sdcard.
⑤ **Delete**	It deletes the selected data.

Printing mode screen

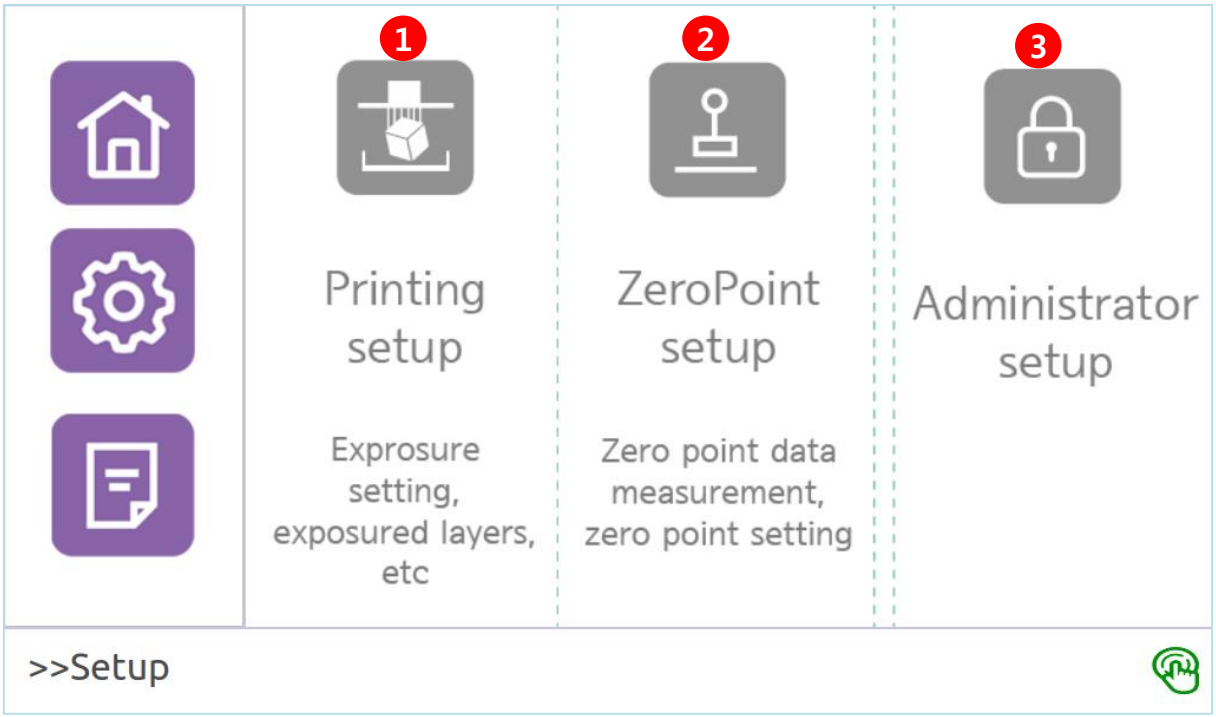
☞ **The result screen after clicking Print button in Open Data Screen**



Function	Description
① **File name**	This is name of the file being printed.
② **Total time**	This is total time taken to print.
③ **Remaining time**	This is remaining time until completion of printing.
④ **Progress**	This displays current progress rate and layer.
⑤ **Interim check of output**	This function is used to check the mold while molding. (Refer to description on Print Setting of the page 28.)
⑥ **Automatic shutdown**	This function exits the printer automatically once molding is completed(Refer to the page 28).
⑦ **Start**	Starts printing
⑧ **Pause**	Pauses printing
⑨ **Stop**	Stops printing

LCD Screen Information

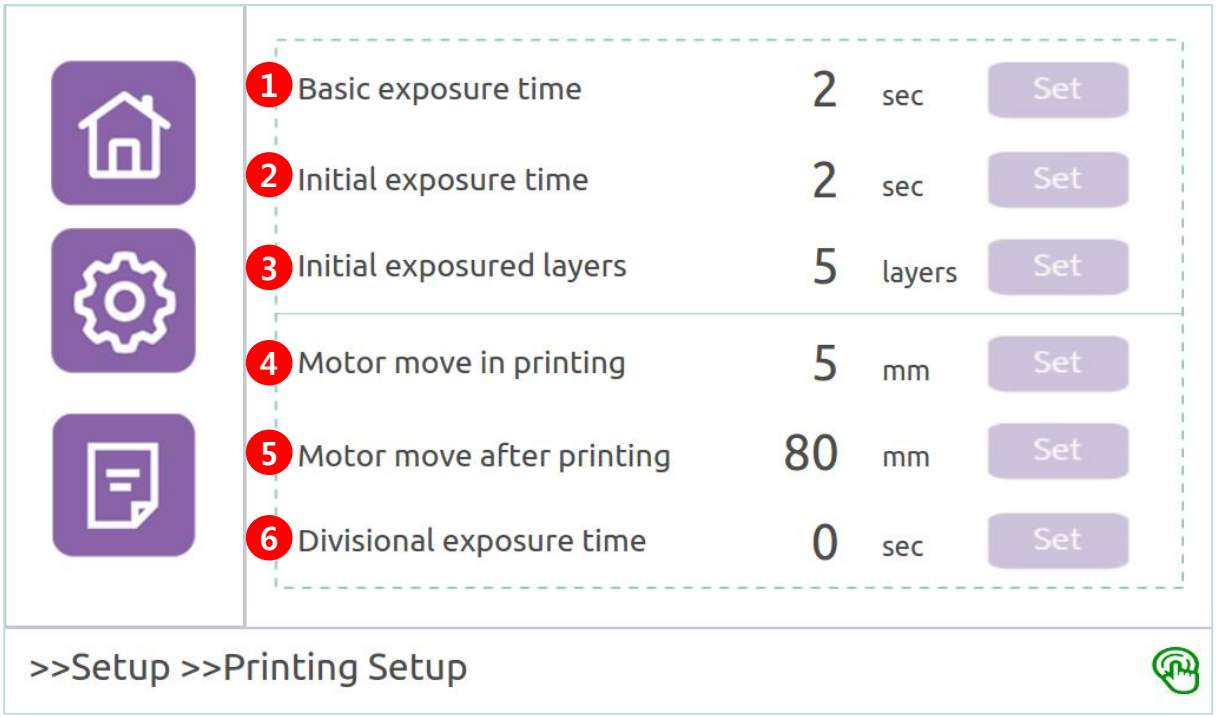
3) Composition of Environment Setup Screen



Function	Description
① **Printing setup**	This sets setting values (exposure time and exposure layer) necessary for printing.
② **Zero Point setup**	This sets zero point on Z axis for stable printing.
③ **Administrator setup**	This checks and sets printer settings (system, optical, password, etc.).

LCD Screen Information

3-1) Printing Setup Screen



Function	Description
① **Basic exposure time**	This refers to default time for which output image is exposed in the optical engine.
② **Initial exposure Time**	This refers to exposure time to attach output to the build plate.
③ **Initial exposured layers**	This refers to the number of layers to which initial exposure time is to be applied.
④ **Motor move in printing**	This refers to movement of the build plate on every layer.
⑤ **Motor move after printing**	This refers to movement of the build plate after completion of building.
⑥ **Divisional exposure time**	This refers to split exposure time.

Printing Setup Know-how

1. Exposure time refers to time during which output image is exposed in the optical engine when printing a layer.

- Long exposure time causes over-hardening of output and short exposure time causes under-hardening. It is necessary to enter accurate time for resin being used.
- Initial exposure time should add 1~3 seconds to default exposure time. Even so, it depends on resin being used.

2. If 'Motor move in printing' is short, building time is shortened.

- This distance is 5~10mm in general.
  ☞ If movement distance is too short, it can have adverse effects on output.

3. 'Motor move after printing' refers to distance by which the build plate it lifted automatically after building.

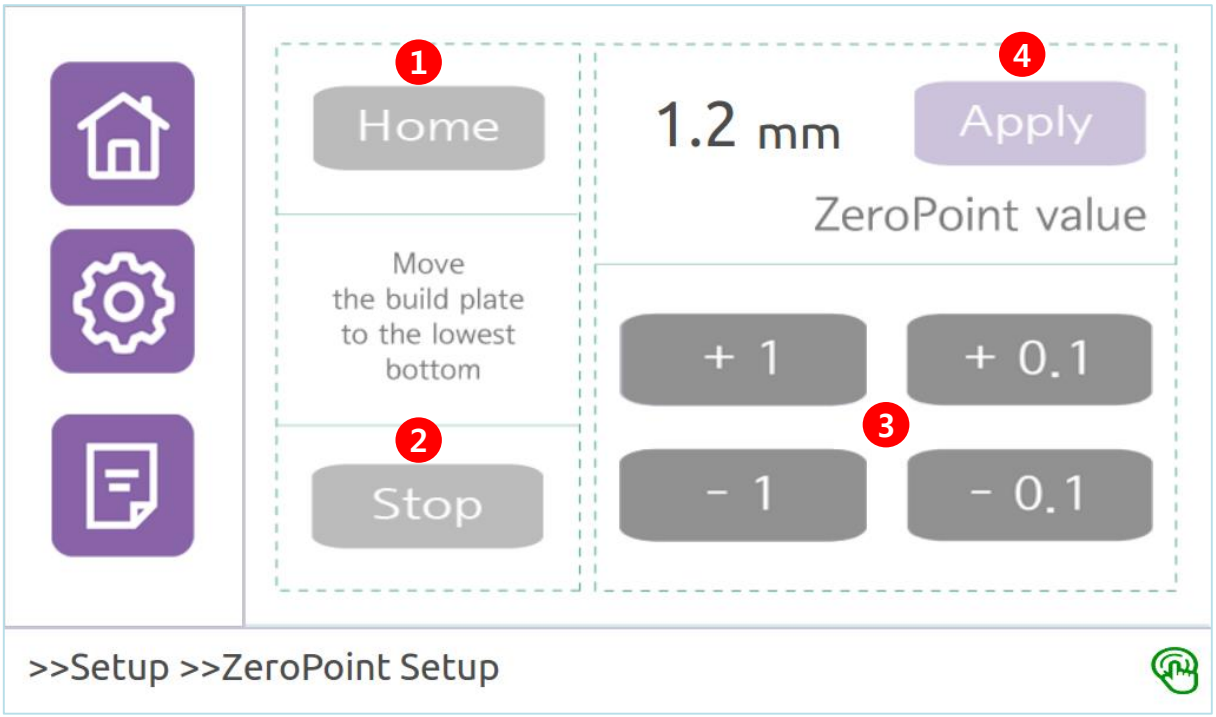
- Value of 40~60mm is most convenient.

4. Divisional exposure time refers to additional exposure time for uniformity.

- Value is 0.1~1 seconds in general.
  ☞ This function is deactivated by setting divisional exposure time to 0.

LCD Screen Information

3-2) Zero Point Setup Screen



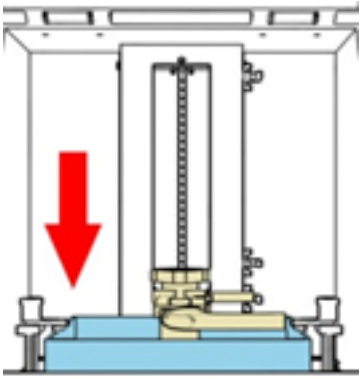
Function	Description
① **Home**	Moves to the lowest point of the build plate (starting point of zero setting)
② **Stop**	Stops the build plate
③ **+1, -1. +0.1, -0.1**	Moves the build plate by the indicated value
④ **Apply Zero Point value**	Applies and saves zero point

※ Zero Point Setup means to find the accurate point at which the build plate contacts the tray surface at the beginning of printing. Our products are delivered to customers with Zero Point Setup completed. Therefore, this setting is unnecessary unless there is a problem in the setting.

How to do Zero Point Setup

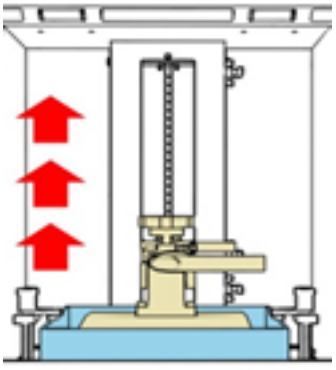
※ Zero Point Setup means to find the accurate point at which the build plate contacts the tray surface at the beginning of printing. Our products are delivered to customers with Zero Point setting completed. Therefore, this setting is unnecessary unless there is a problem in the setting.

1. Press Home button.



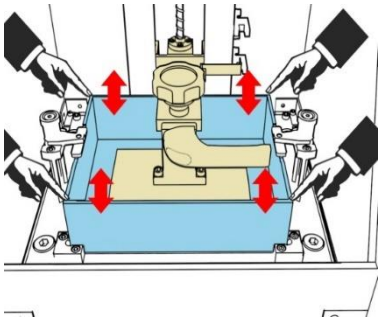
- The build plate moves to sensor point near the tray(starting point of Zero Point setting).
- Zero Point value is reset to 0mm. (The reset value is not saved unless Apply button is pressed.)
- The build plate will be stopped while the tray is pressed.

2. Move unit buttons(+1, +0.1, -1 and -0.1) can be used to adjust position of the build plate.



- Adjust the position of the build plate until the pressing of the tray is removed.
- Pick up the corner of the tray with hand and shake it. Adjust the build plate when shaking of the corner cannot be felt.
- Gap between the tray and the build plate must be just enough to insert a thin paper.

3. Zero Point value is displayed once adjustment of the build plate is done.



- Click 'Apply' button to finish Zero Point setup.
- 'Apply' button must be clicked to save the value.

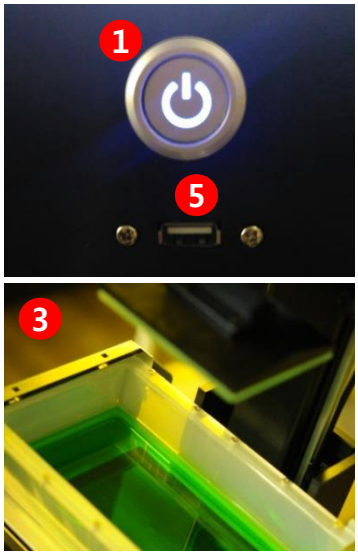
LCD Screen Information

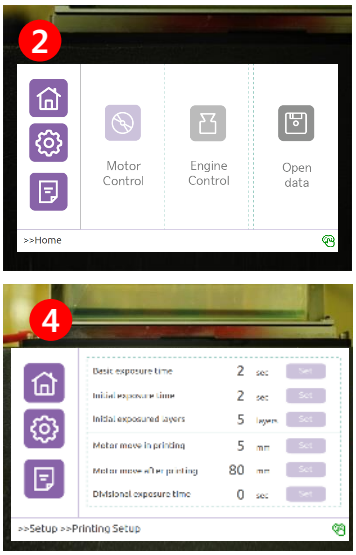
4) Composition of Information Screen

Function	Description
① **S/W Version**	This shows software version.
② **F/W Version**	This shows firmware version.
③ **OS Version**	This shows OS version.
④ **IP Address**	This displays internal IP address.
⑤ **Resolution**	This shows engine resolution (actual resolution).

Printing Process

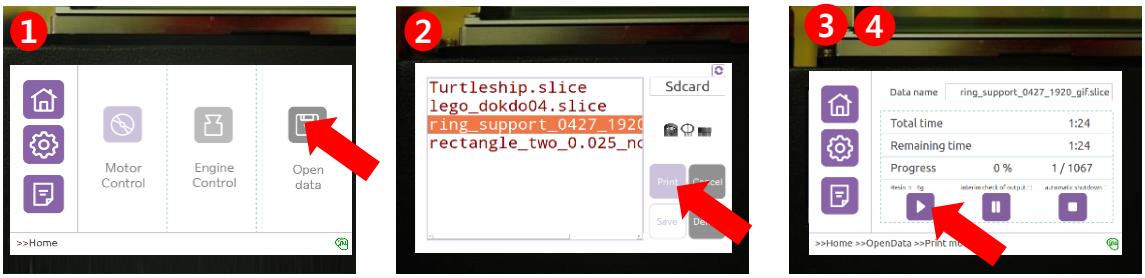
1. Preparation for Printing





1. Press the power button on the front after turning on the power switch on the left side of 3D printer.
2. Wait for a moment until Home screen appears on the LCD screen.
3. Check cleaning of VAT, cleaning of the build plate, amounts of resin and resin scraps.
4. Check accurate inputs on the Printing setup screen.
5. Insert USB with data for printing into the port.

2. Start Printing



1) Click 'Open Data' on Home screen.
2) Select data to be printed and press Print button.
3) Printing mode screen appears once the data loading is done.
4) Press Start button, then the build plate moves to the bottom for printing.

3. Pause Printing

1) Select Pause button while printing.
2) Printing is paused when the optical engine emits light.

☞ Printing is not paused immediately after selecting Pause button in order to maintain stable printing.

3) Press Pause button once again after printing stops to restart printing.

4. Stop Printing

1) Select Stop button while printing.
2) Confirmation message appears, then press 'OK' button to stop printing.

☞ When Stop button is pressed while the optical engine is emitting light, printing will be stopped after emission process.

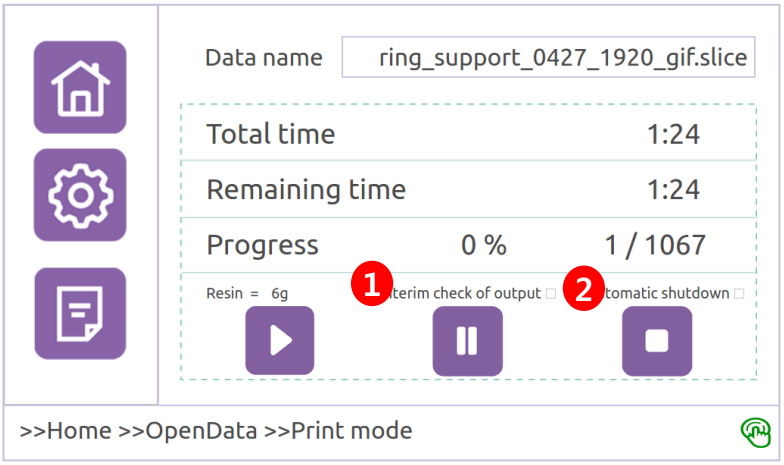
5. Printing Option

1) interim check of output
- While printing, check 'interim check of output' on the printing mode screen and press Pause to check the output. Then the printing will be paused.
- The output will be checked after Motor automatically goes up and stops.
- Press Pause again to return to previous printing position and restart printing.
- This function cannot be used if printing is progressed over 140mm.

☞ Summary : interim check of output(Check) >> Click Pause >>
Check the output >> Click Pause >> Restart printing

2) Automatic shutdown
- While printing, check 'Automatic shutdown' item on the printing mode screen.
- The optical engine will be OFF and the program automatically shuts down once the printing is done.

☞ Summary : Automatic shutdown (check) >> Printing completed >>
Run Automatic shutdown function



6. System Shutdown

- Select 'Power Icon' at the bottom right corner to shut down the system.
- Auto Exit message appears and the system automatically shuts down.
- You must press the power switch on the left side after confirming beep sound, because it takes about 10 seconds for LCD panel to be turned OFF.

☞ **Important :** Follow the given route to shut down the system.
If the system is turned OFF while printing, it may have adverse effects on lifetime of the optical engine and cause damage to SDCARD. If possible, shut down the system after printing is done.

Precautions for Post Work

※ Materials : cutter blade, spatula, cleaning alcohol, pincers, toothbrush

<Precautions>

- Use of cutter blade: The mold can be damaged if taken off by hand or ordinary knife. The build plate can be damaged if it adsorbs strongly to the build plate.

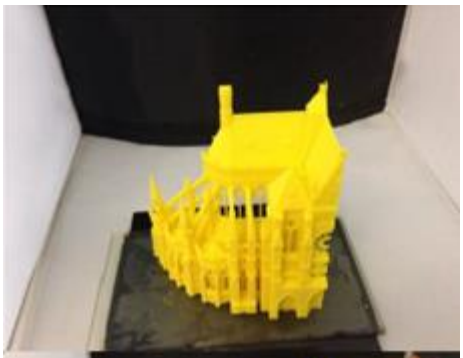
- Alcohol: Only use pure ethanol. Never inhale alcohol since it is hazardous.

- Air compressor: Use an air compressor with 1 horsepower or above so that remaining residues can be wiped out sufficiently. If the compressor is not ready, dry alcohol completely at room temperature.

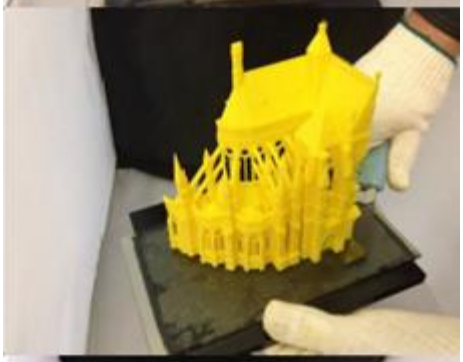
- Cleaning time: Since the mold can be deformed if immersed in alcohol for long time, make sure to clean it quickly after detachment.

- Hardening time: Hardening is done in about 10 minutes since secondary hardening (UV hardener) can cause bending or deformation of thin mold.

- Treatment of waste after printing: Wastes are separated into liquid and solid. Liquid is entrusted to a waste treatment company, and solid is treated as general waste. (Refer to the back page)



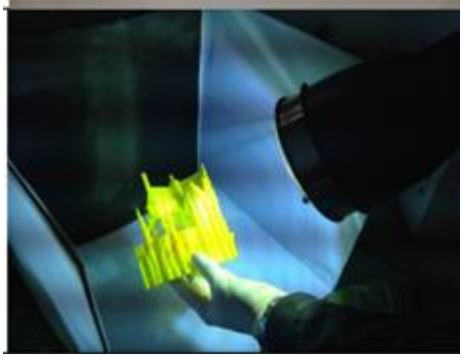
Take the mold out and place it on the work table.



Use the cutter blade to remove the mold from the build plate.

Remove remaining resin cleanly using alcohol. Use a toothbrush with thin hairs to clean gaps between.

Since the mold can be deformed by alcohol, use the air compressor to clean it.



Dry the cleaned mold using the UV hardener.
Since light of the UV hardener is extremely intense, make sure to wear protective equipment before using it.

Handling Resin Waste

1. Overview

Method of safely managing and lawfully handling chemical substances and general wastes generated while using the device according to environmental safety regulations

2. Type and Definition of Waste

1) Wastewater from cleaning of output
Wastewater generated when cleaning liquid resin on output

2) Output waste
Solid waste generated from printing of output

3) Hazardous waste (liquid)
Waste resin liquid remaining after printing of output

3. Waste Handling Procedure

1) Wastewater from cleaning of output
It can be drained if there is a treatment system in the building. It must be entrusted for treatment by a waste treatment company if the building does not have a treatment system.

2) Output waste
Output waste and general wastes listed below are handled as general wastes instead of entrusting to a company.

3) Hazardous waste (liquid)
It is entrusted to a waste treatment company in a way that general wastes are not mixed with hazardous waste (liquid).

4. Items below are handled as general wastes.

1) Household chemicals like soap and detergent
2) Solid wastes after printing
3) Toilet paper and paper without chemicals