

DP110E

Operation Manual



Operation Manual



**DLP 3D PRINTER
DP110E**

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Equipment Operation Manual

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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 6 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 tank 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 optical engine

Lifetime of optical engine lamp is 3,000 ours, and brightness of the lamp can be reduced by exceeding its lifetime. Replace the lamp after using it for 3,000 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.

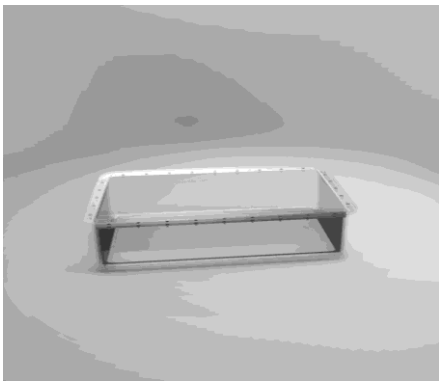
- A/S can be much easier if the user explains the situation clearly.

Product Information

1. Product Spec

Model Name	DP110E
Resolution of DLP engine	1024 x 768
Build size (mm)	110 x 82 x 190
Layer thickness (mm)	0.025 [0.025/0.05/0.075/0.1 (4 steps)]
X,Y Resolution	100μm
Product size (mm)	380 x 255 x 743
Product weight (kg)	19
Rating	100~240V, 50/60Hz, 2.5A, 260W
Material used	ACRYLIC
System control	Control using touch-type embedded screen included
Environment	18°C ~ 26°C (temperature) / 20% ~ 50% (humidity)

2. Consumables



[Special VAT]

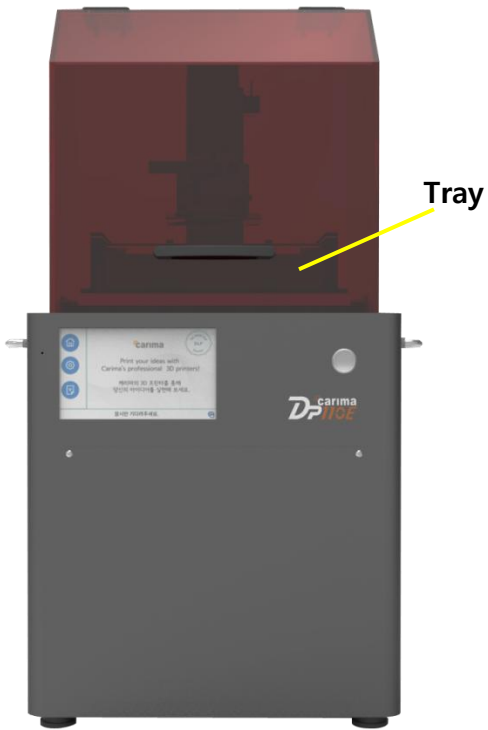


[RESIN]



[LAMP]

Names of Parts



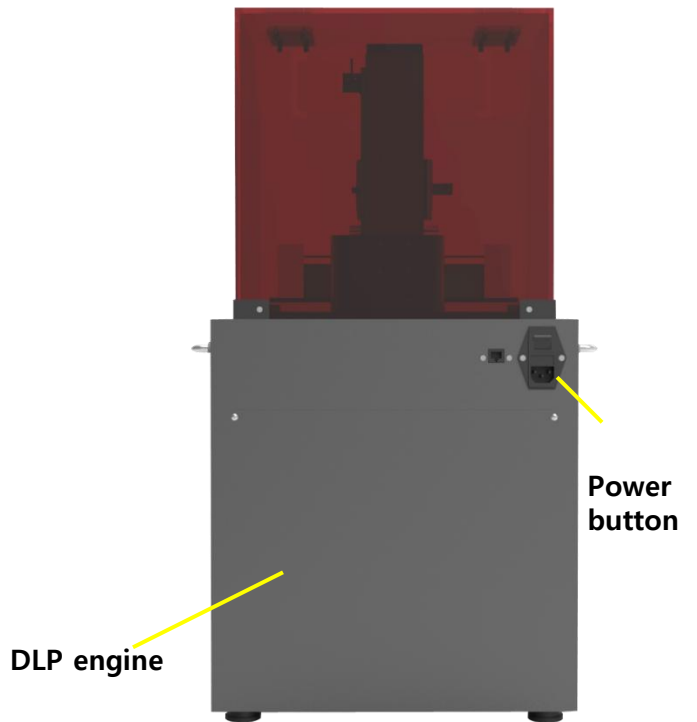
[Front]



[Right side]



[Left side]



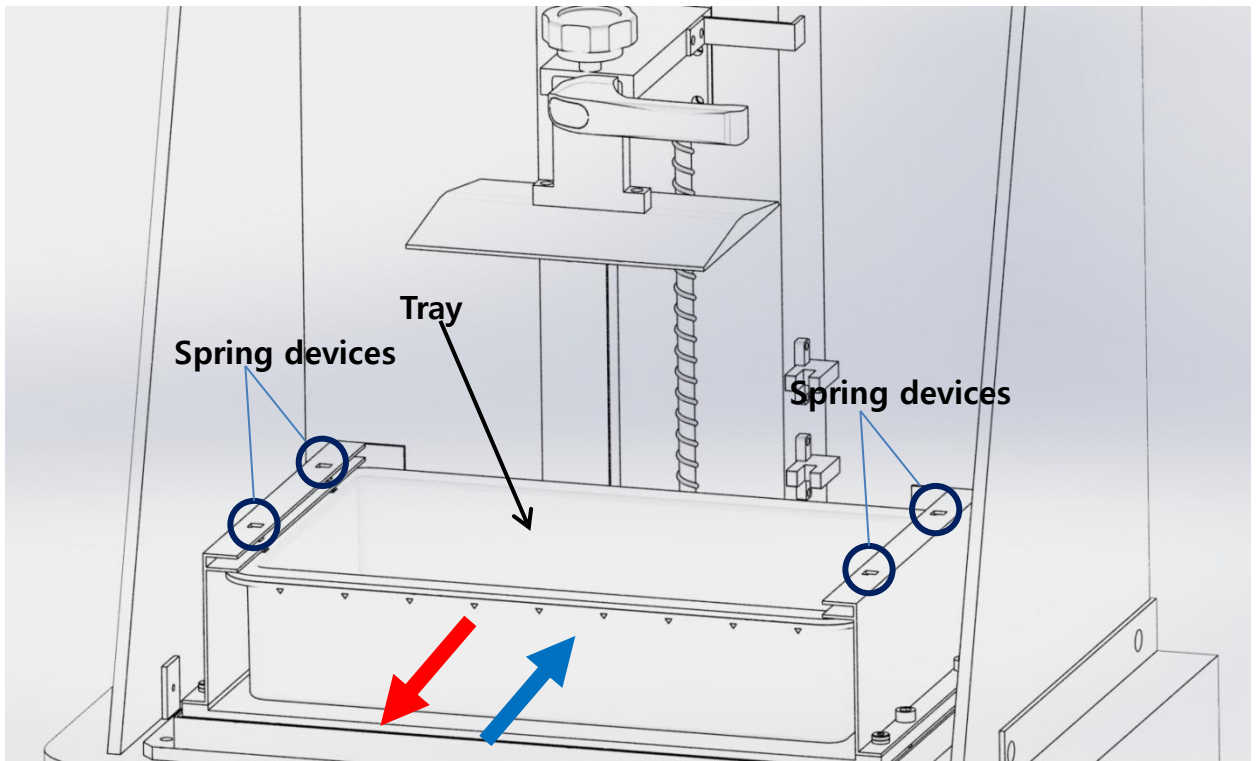
[Back]

Equipment Operation Manual



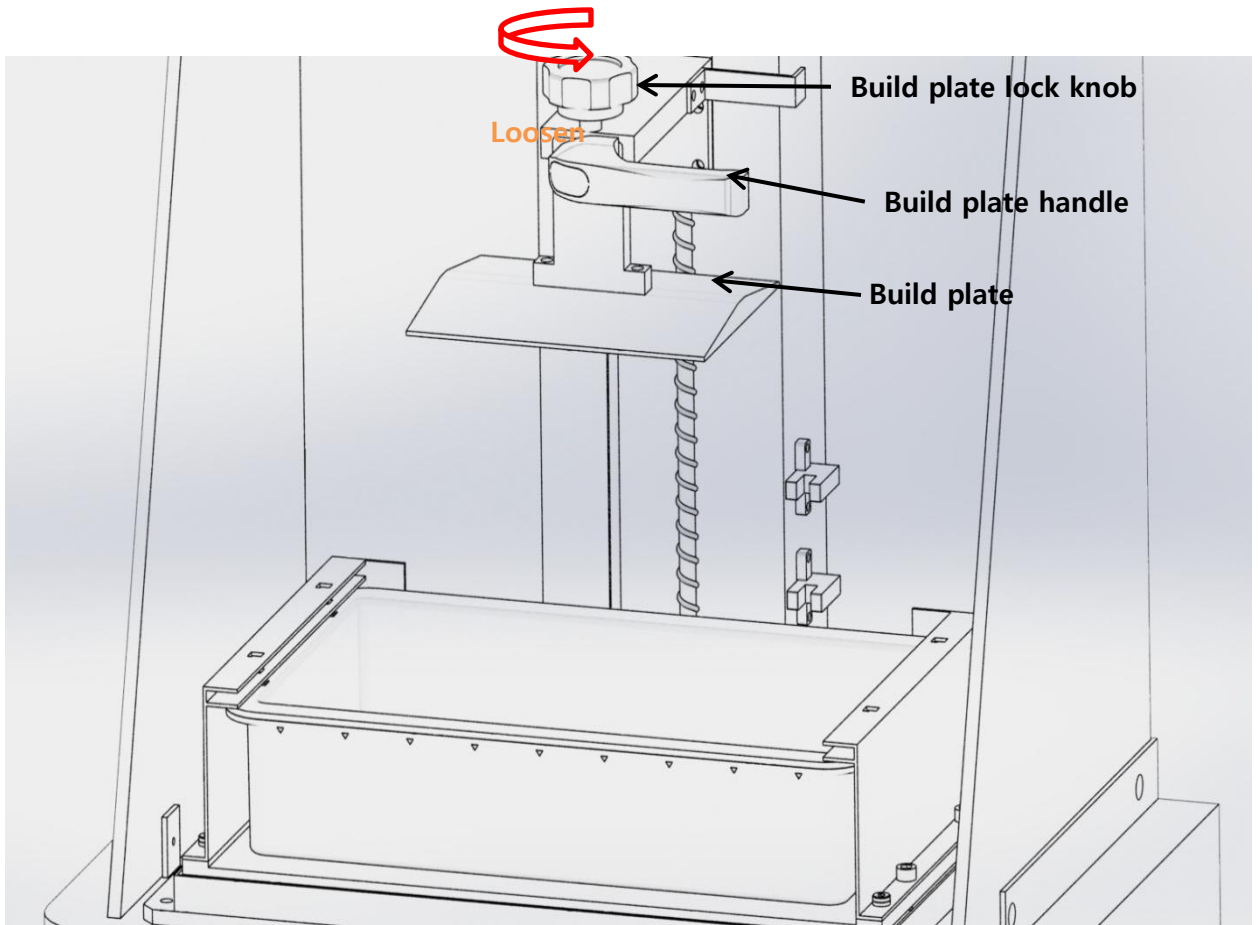
DLP 3D PRINTER DP110E

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



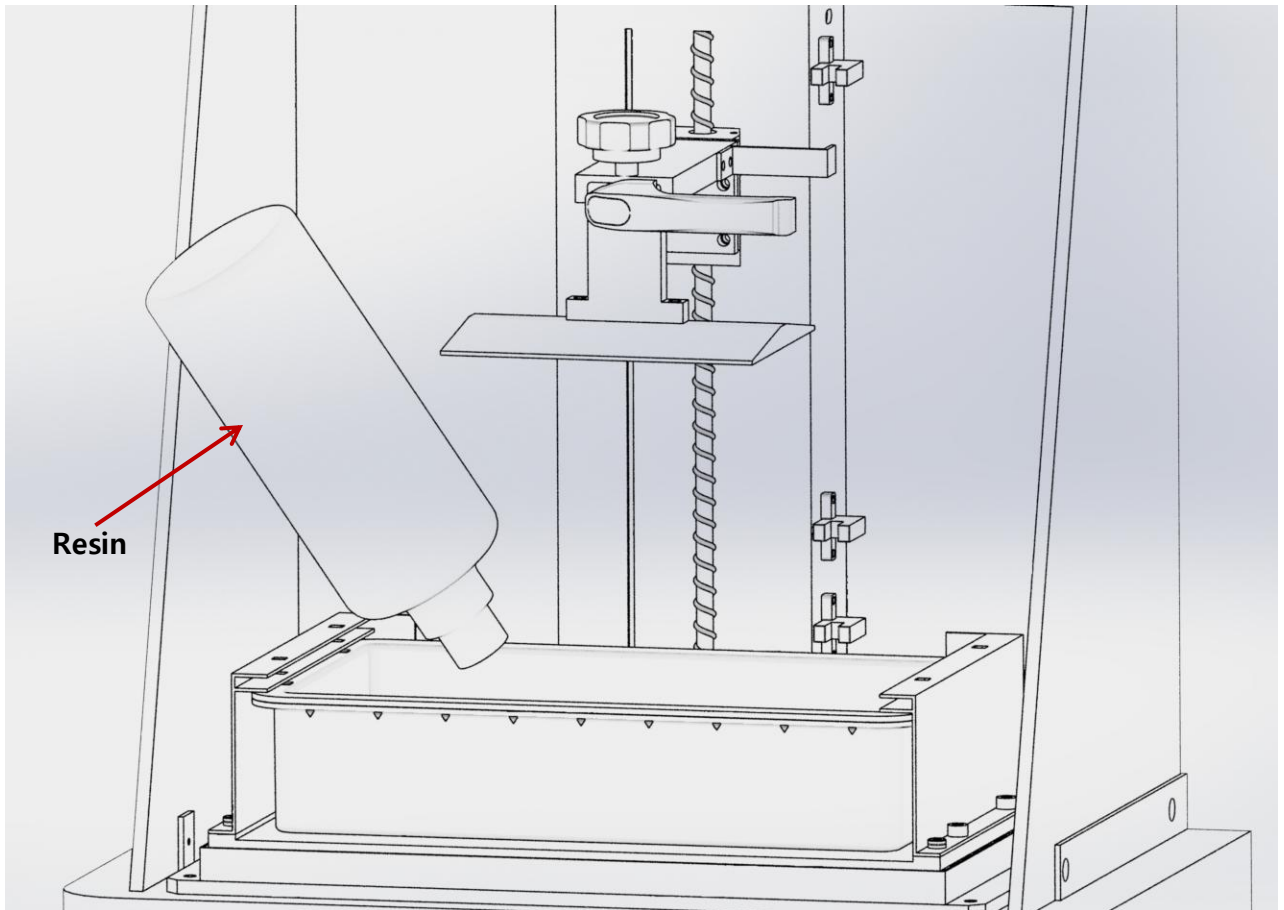
When printing is done, loosen the build plate to detach it by rotating build plate lock knob counterclockwise. Grab build plate handle and take out. Reverse the order when attaching the build plate.

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

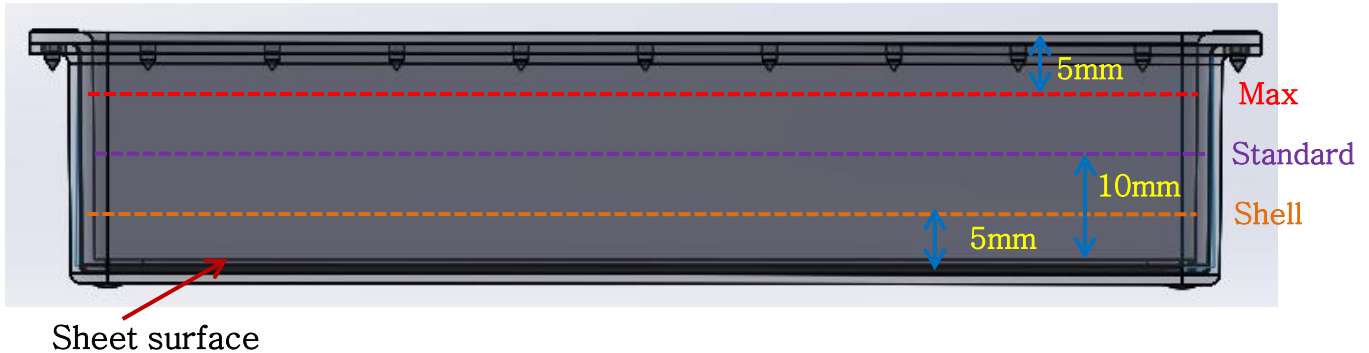


Refill resin as shown in the figure.

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.

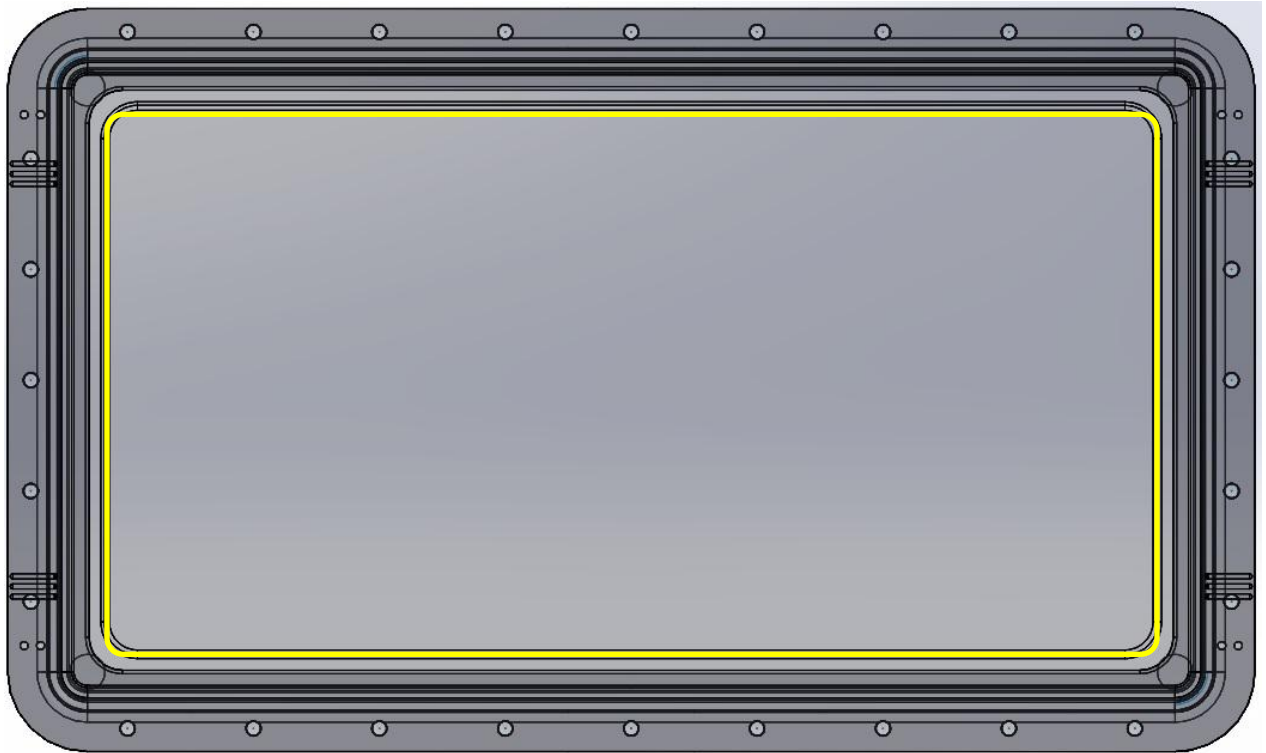
Amount of Resin Refill



In general, we recommend filling resin between shell line (250g) and standard line (500g). Do not exceed max line (800g) 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.

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



DLP 3D PRINTER DP110E

Control Screen Manual

1. (DP110) LCD Screen Information

2. Initial Setting

- 1) Zero Setting

3. System Control

- 1) Motor Control
- 2) Engine Control

4. Print Setting

5. Preparation for Printing

6. Start Printing

7. Pause Printing

8. Stop Printing

9. Printing Option

- 1) Temporary Check on Mold
- 2) Auto Exit

10. Exit System

Ch1. LCD Screen Information

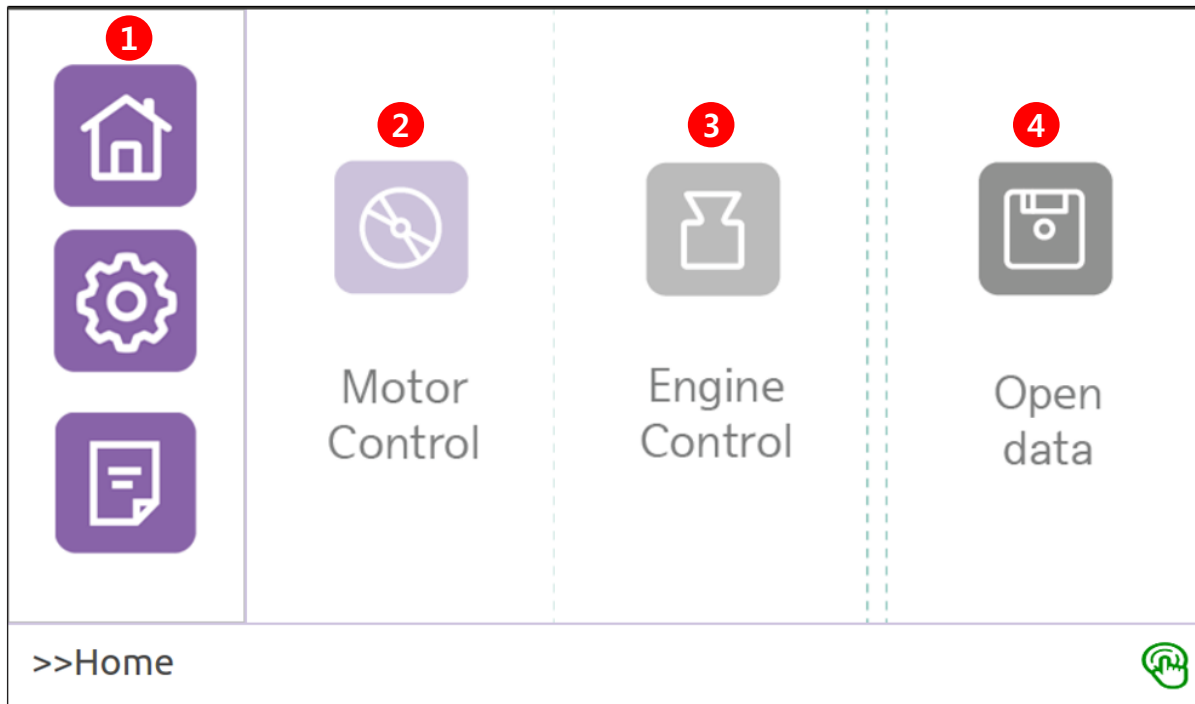
Composition of Loading Screen



Function	Description	Page
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.	

Ch1. LCD Screen Information

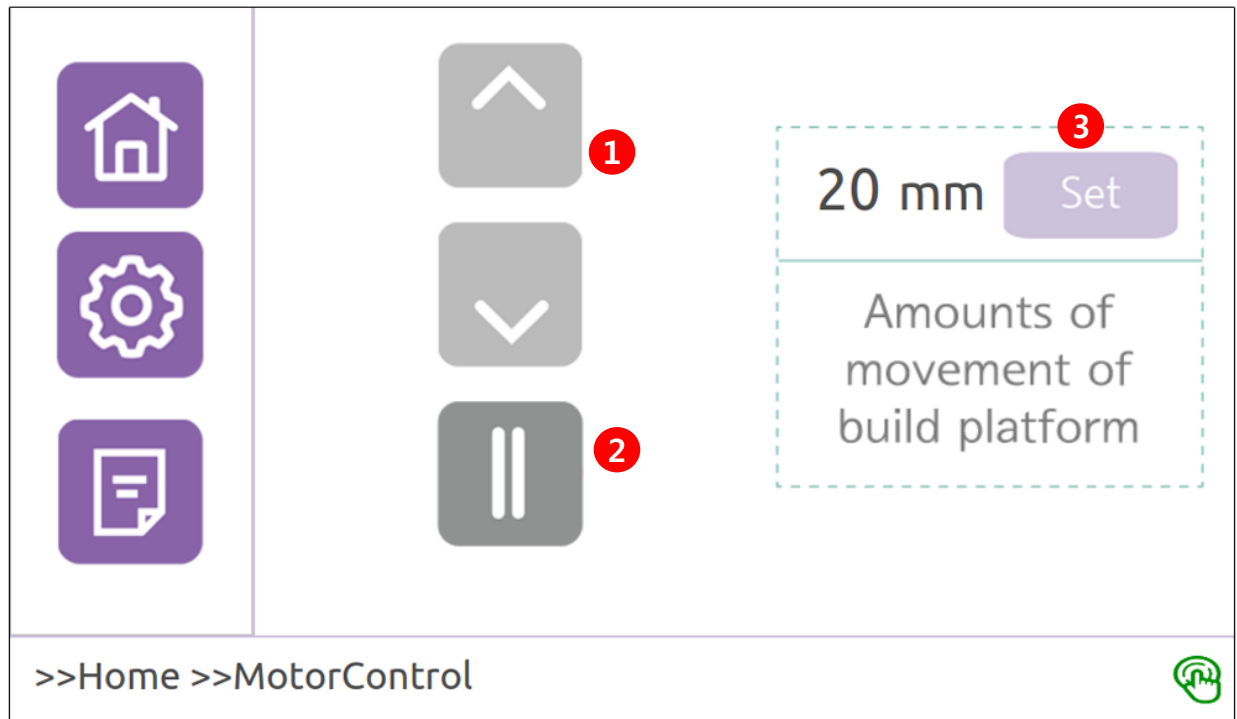
Composition of Home Screen



Function	Description	Page
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.	

Ch1. LCD Screen Information

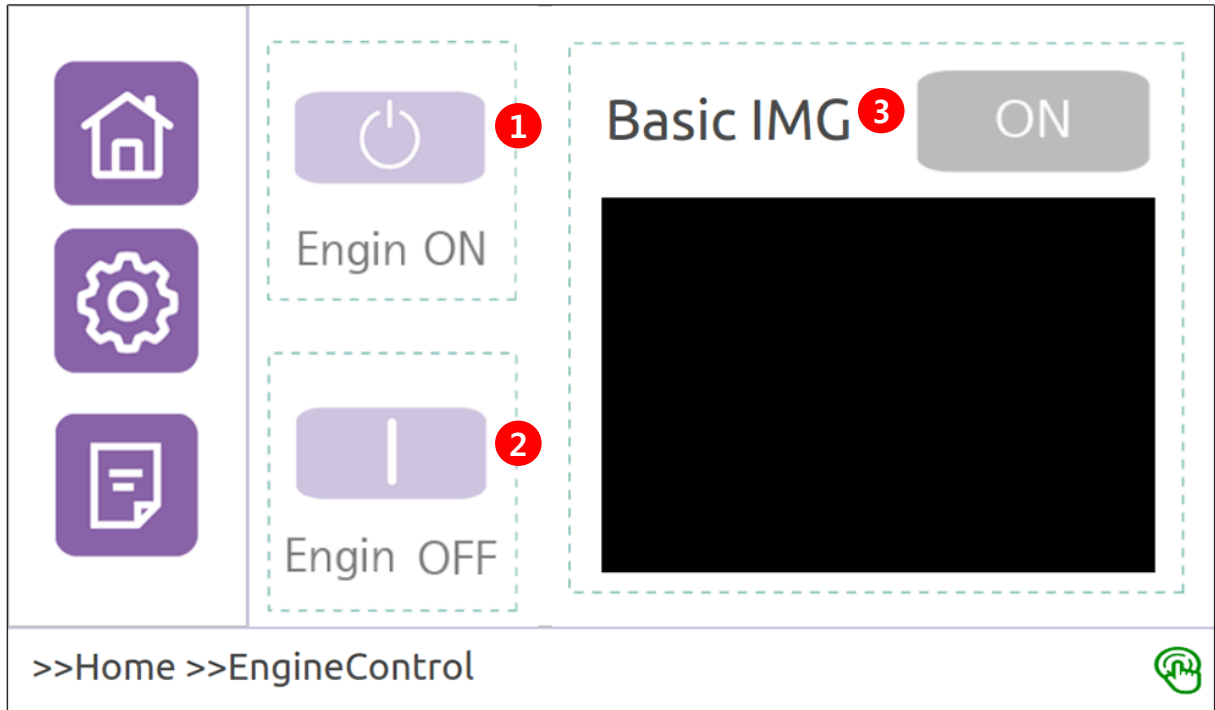
Composition of Motor Control Screen



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.

Ch1. LCD Screen Information

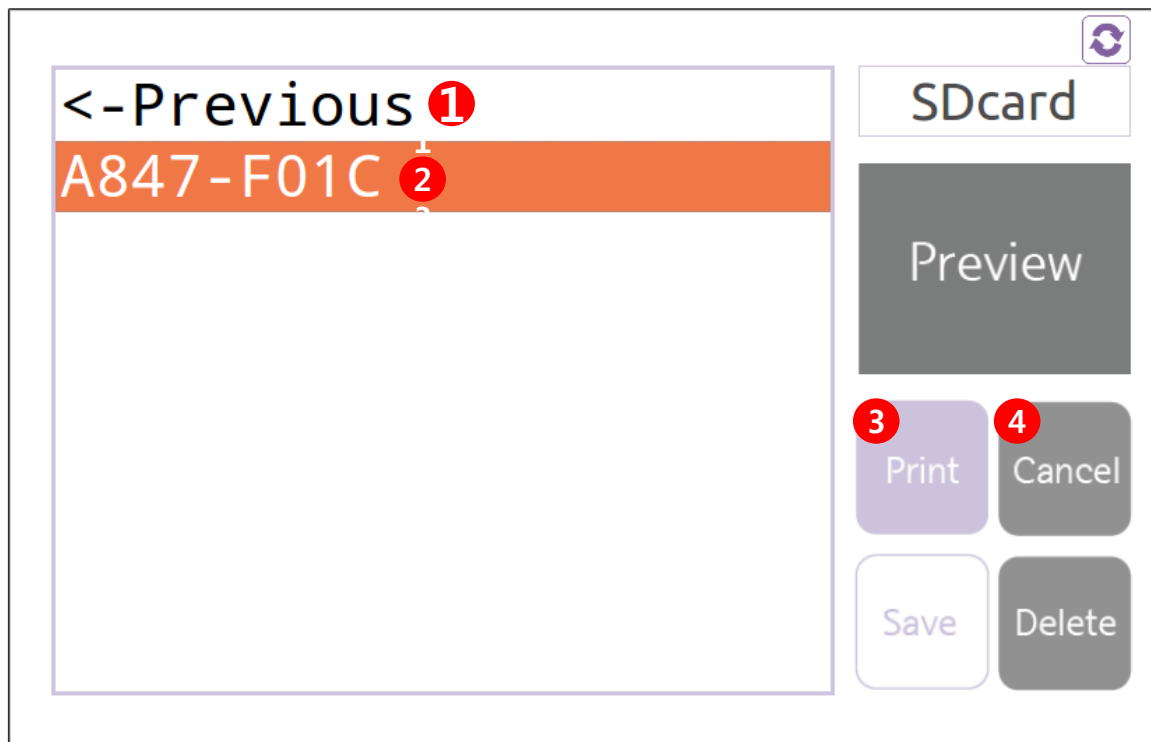
Composition of Engine Control Screen



Function	Description
① Engine ON	Optical engine ON
② Engine OFF	Optical engine OFF
③ View Default Image	Optical engine projects default image.

Ch1. LCD Screen Information

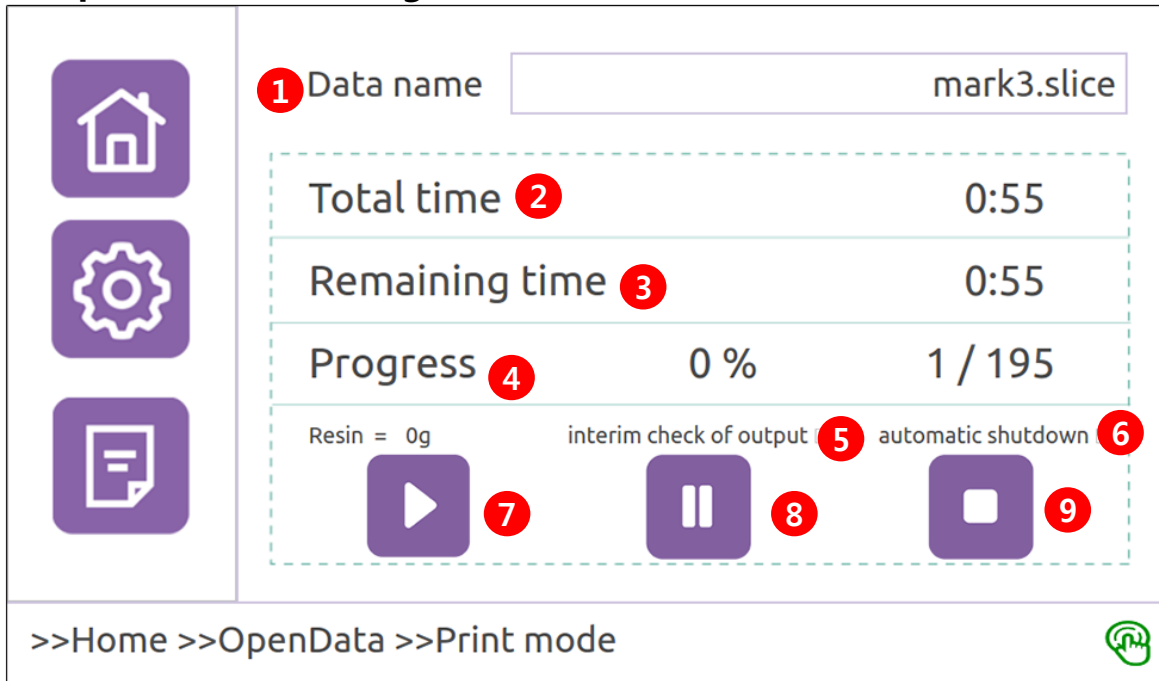
Composition of Data Open Screen



Function	Description
① Previous	This moves to previous folder.
② Folder List	This displays name of the folder list.
③ Print	Press Print to move to printing mode screen.
④ Cancel	Press Cancel to return to previous screen.

Ch1. LCD Screen Information

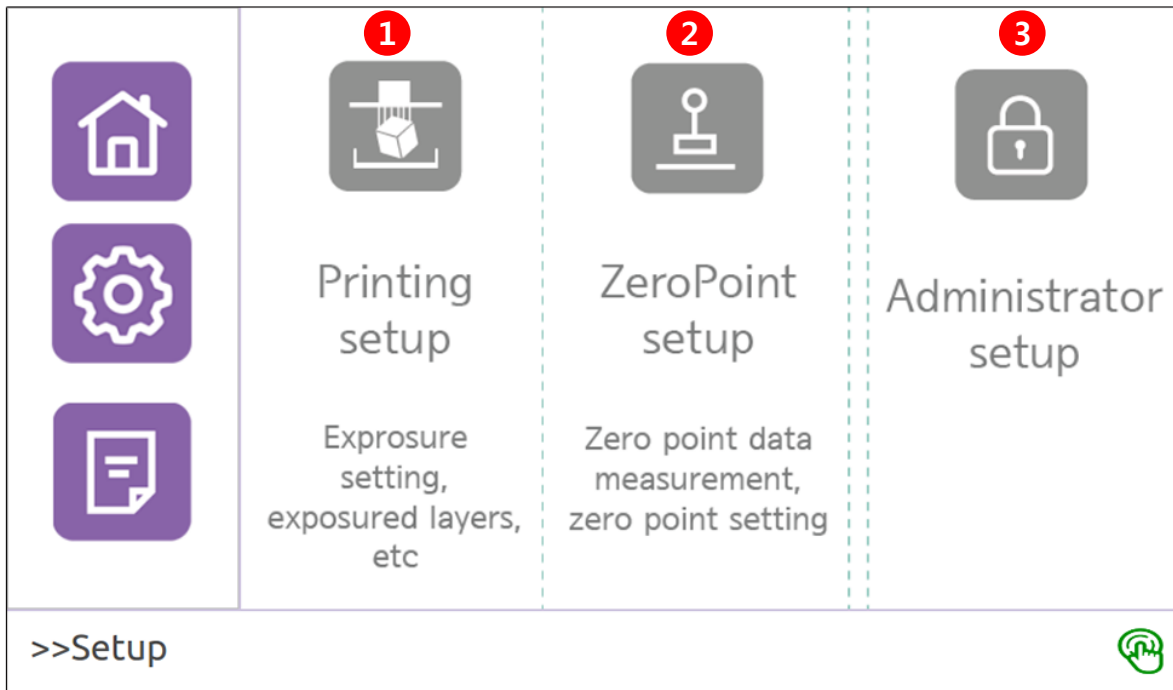
Composition of Printing Mode Screen



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 Temporary Check on Mold	This function is used to check the mold while molding. (Refer to description on Print Setting)
⑥ Auto Exit	This function exits the printer automatically once molding is complete.
⑦ Start	Starts printing
⑧ Pause	Pauses printing
⑨ Stop	Stops printing

Ch1. LCD Screen Information

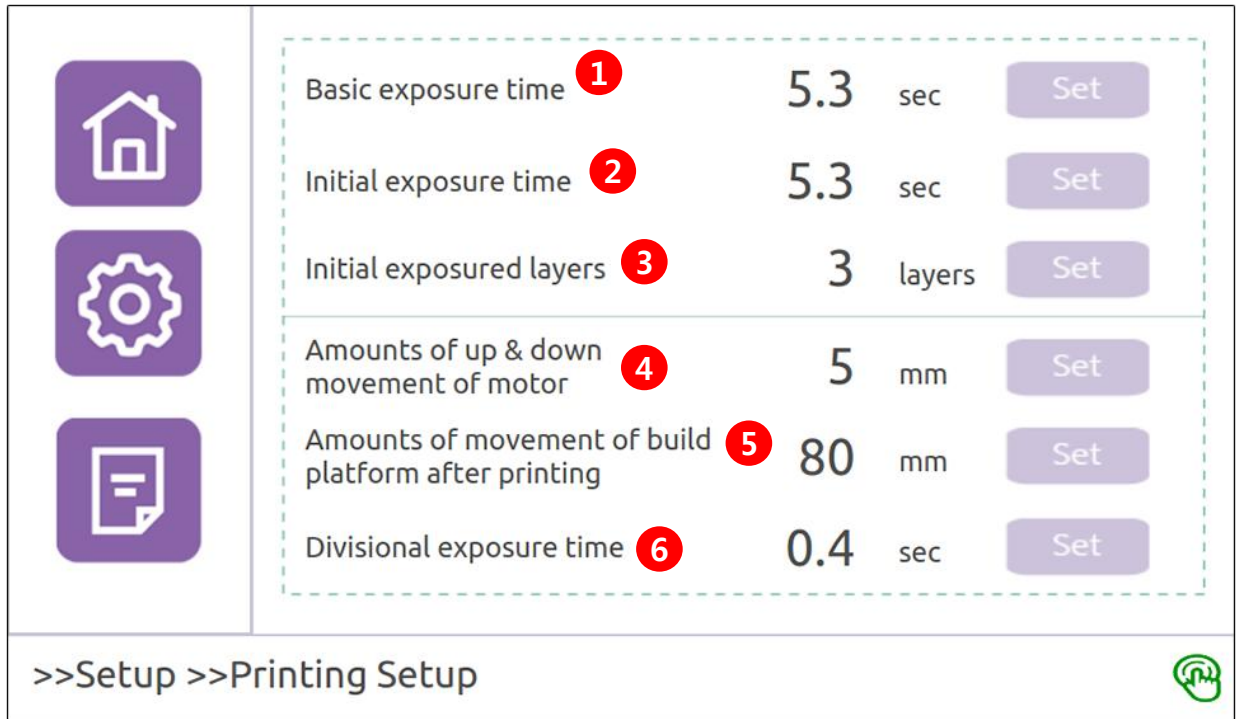
Composition of Setting Screen



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

Ch1. LCD Screen Information

Composition of Print Setting Screen



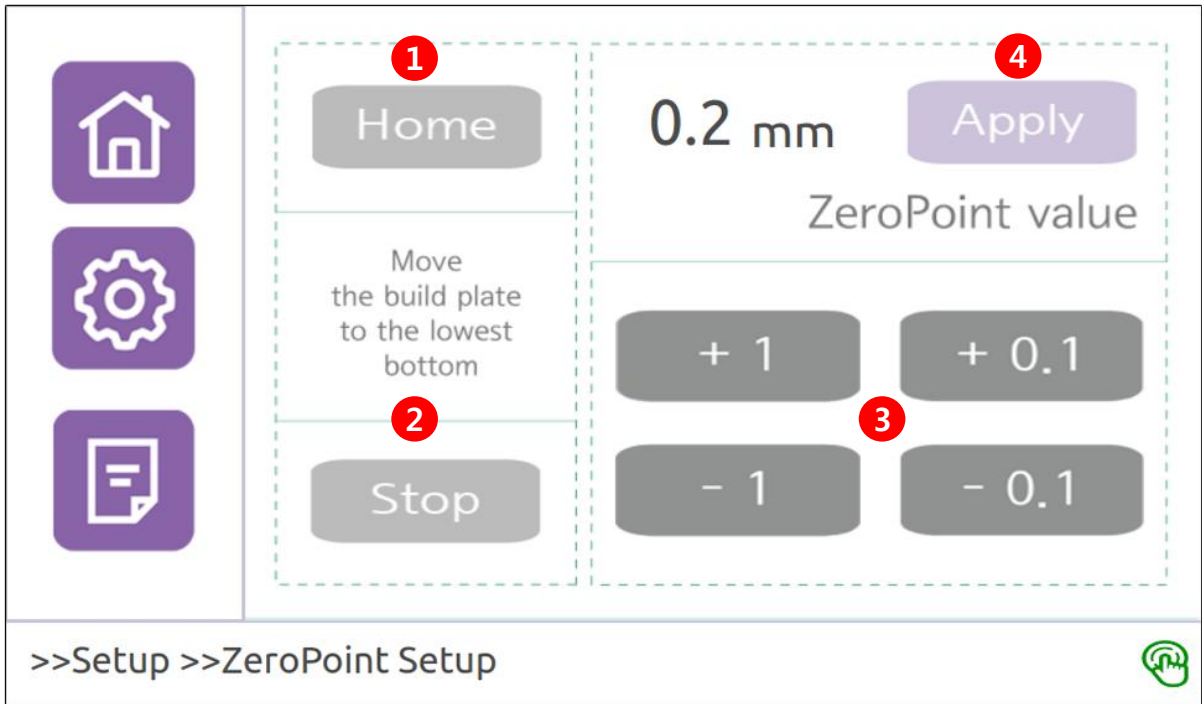
The screenshot displays the 'Printing Setup' screen. On the left, there are three navigation icons: a home icon, a gear icon, and a document icon. The main area shows six settings, each with a red circled number (1-6) indicating its position in a sequence. The settings are: Basic exposure time (5.3 sec), Initial exposure time (5.3 sec), Initial exposed layers (3 layers), Amounts of up & down movement of motor (5 mm), Amounts of movement of build platform after printing (80 mm), and Divisional exposure time (0.4 sec). Each setting has a 'Set' button to its right. At the bottom, the navigation path '>>Setup >>Printing Setup' is shown, along with a hand icon.

Function	Description
① Default 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 Exposure Layer	This refers to the number of layers to which initial exposure time is to be applied.
④ Movement of Build Plate While Building	This refers to movement of the build plate on every layer.
⑤ Movement of Build Plate After Building	This refers to movement of the build plate after completion of building.
⑥ Split Exposure Time	This refers to split exposure time.

Function	Description
① Default 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 Exposure Layer	This refers to the number of layers to which initial exposure time is to be applied.
④ Movement of Build Plate While Building	This refers to movement of the build plate on every layer.
⑤ Movement of Build Plate After Building	This refers to movement of the build plate after completion of building.
⑥ Split Exposure Time	This refers to split exposure time.

Ch1. LCD Screen Information


Composition of Zero Setting 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	Applies and saves zero point

Ch1. LCD Screen Information

Composition of Information Screen

DP110E 


2.2.0.0 **1** DP 110E software version

22.05 **2** DP 110E firmware version

jessie/sid **3** OS version

192.168.0.80 **4** D0:50:99:66:4B:F3
IP address

1920x1080(1024x768) **5** Resolution X : Y

>>Information 

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).

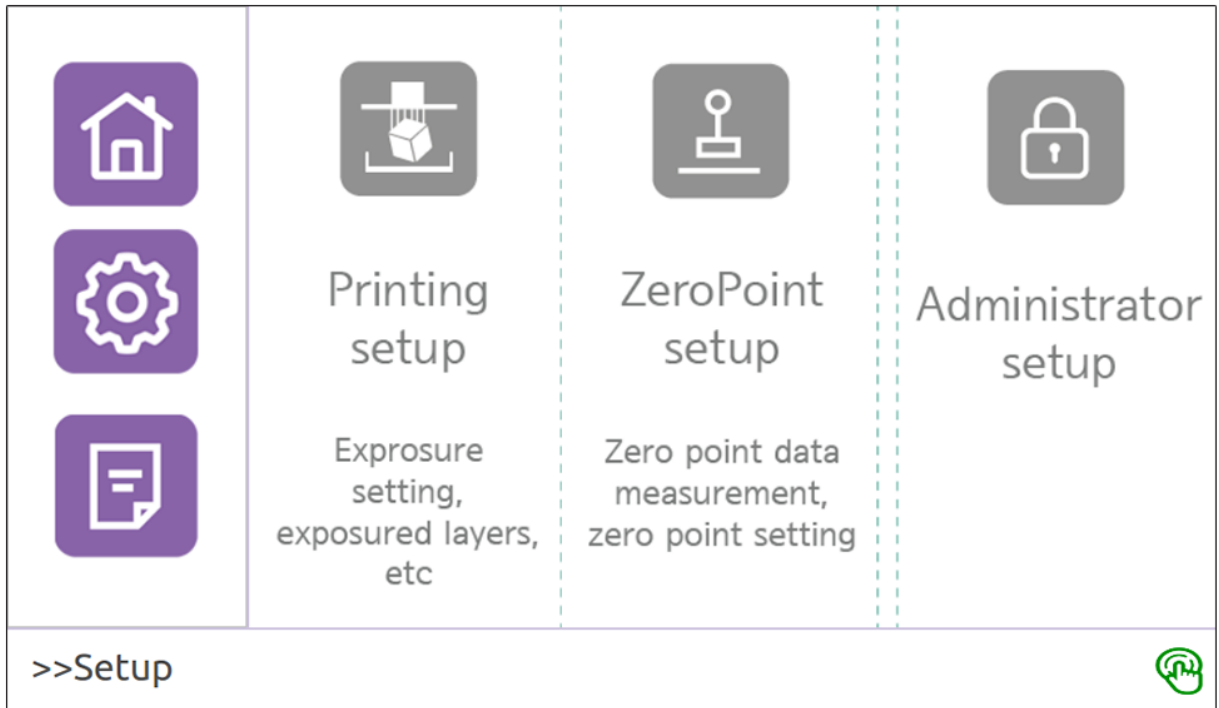
Ch2. Initial Setting

1. Zero Setting

Zero setting finds 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 setting completed. Therefore, this setting is unnecessary unless there is a problem in the setting.

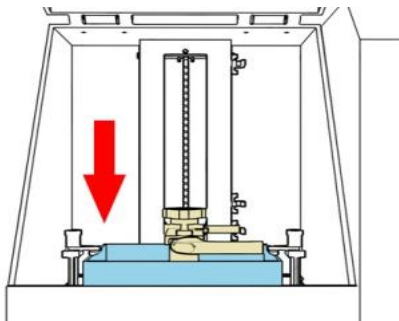
1) Select 'Setting' on the left tab menu to show Print Setting, Zero Setting and Administrator Setting. Select Zero Setting.



2) Zero setting screen appears.

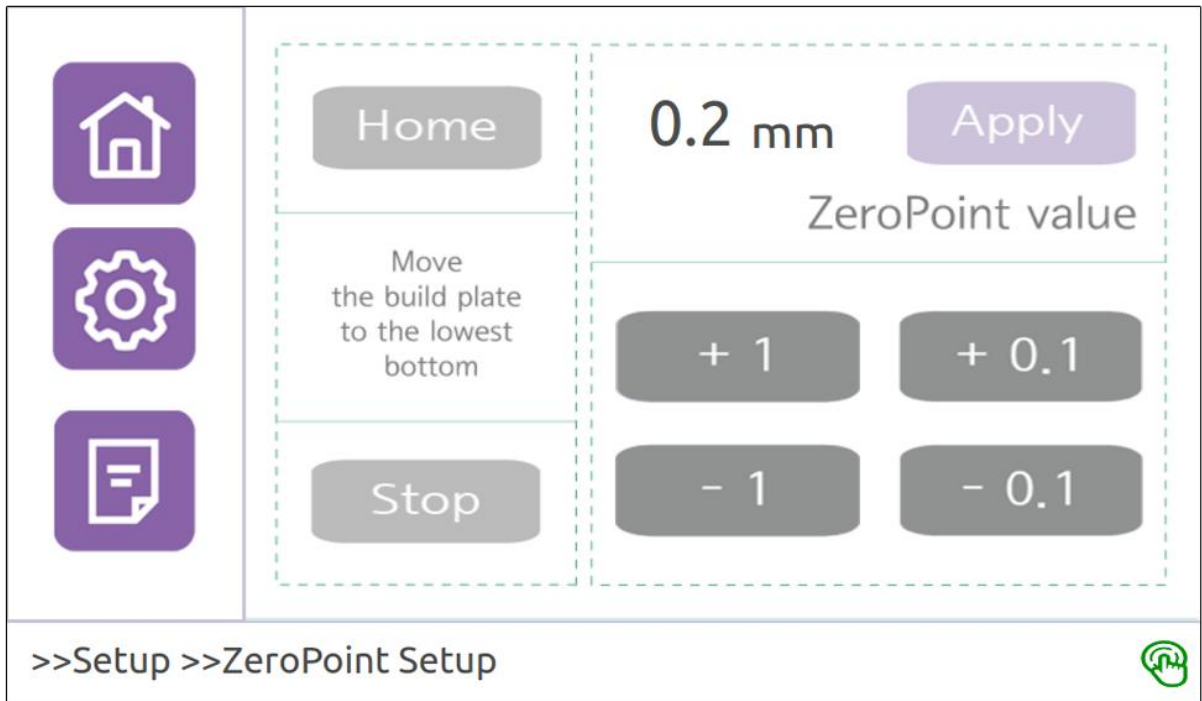
3) Zero setting method

1. Press Home button.

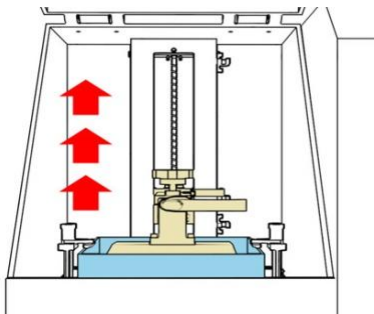


- The build plate moves to sensor point near the tray (starting point of zero setting).

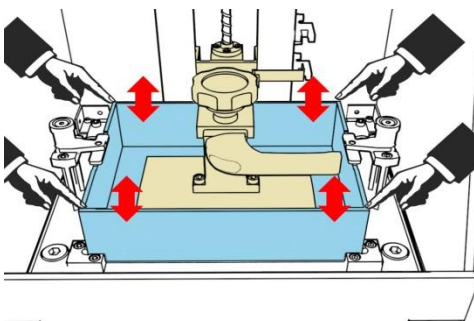
Ch2. Initial Setting



- Zero point is reset to 0mm. (The reset value is not saved unless Apply button is pressed.)
 - The tray is stopped while being pressed.
- Use 2, +1, +0.1, -1 and -0.1 buttons to adjust position of the build plate.



- Adjust position of the build plate until 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 is displayed once adjustment of the build plate is done. Click 'Apply' button to finish zero setting.

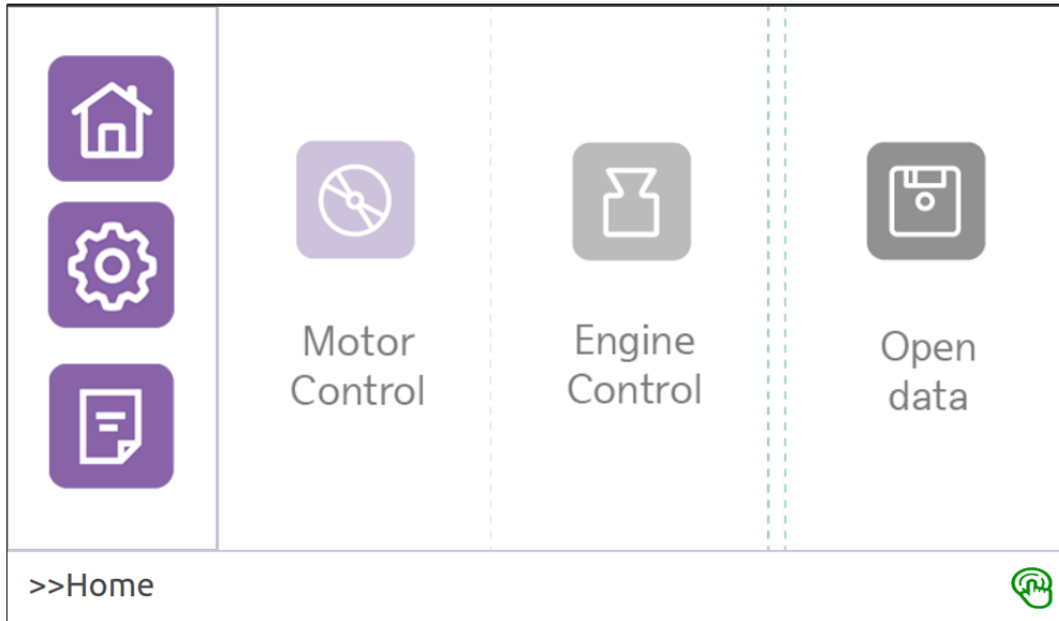
- 'Apply' button must be clicked to save the value.

Ch3. System Control

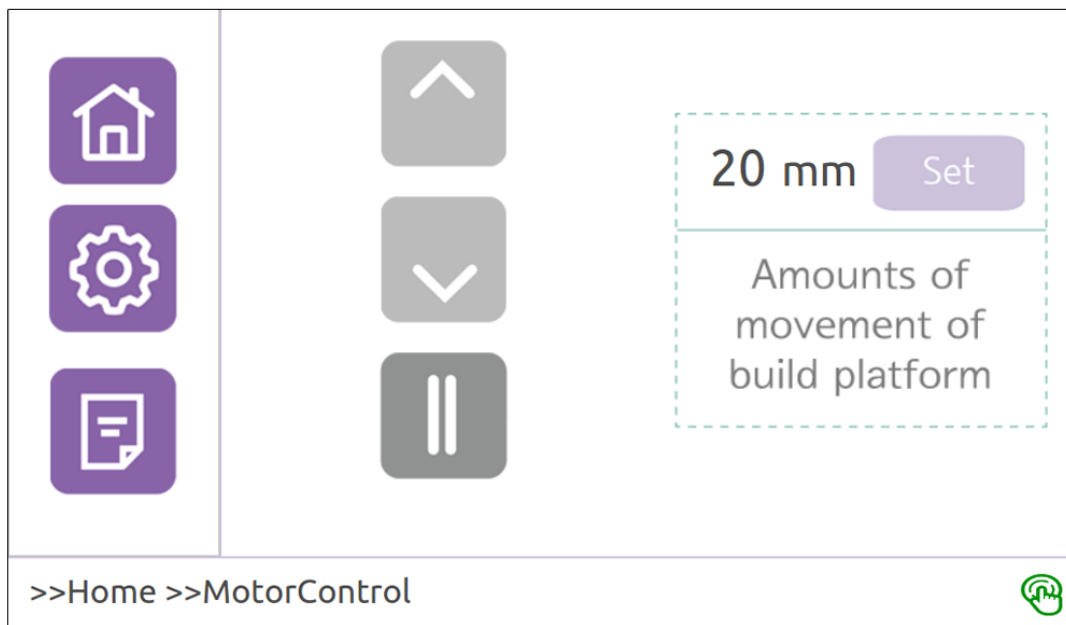
This function is used to control the equipment manually and check problems in the motor and the optical engine before printing starts.

1. Motor Control

1) Select 'Home' on the left tab menu to show Motor Control, Engine Control and Open data items. Select Motor Control.



2) Motor control screen appears.



3) Motor control method

1. Use ↑, ↓ and || buttons to move the build plate.

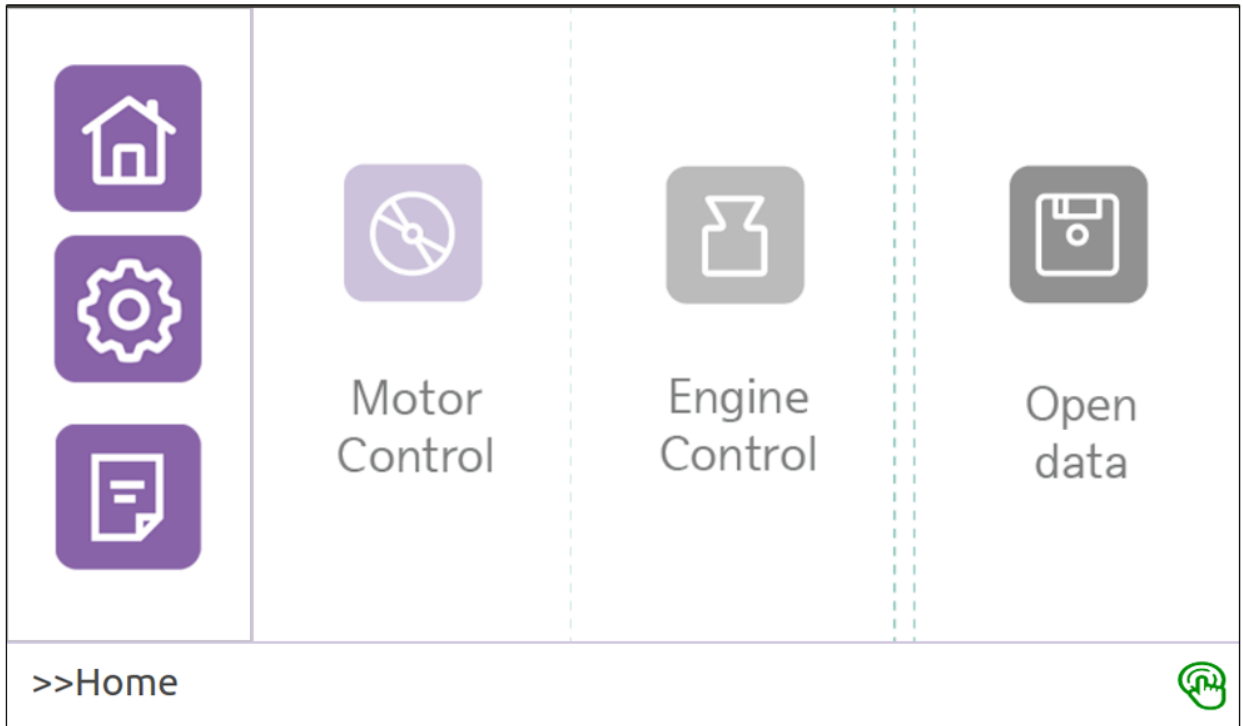
- Use Setting button to adjust movement distance of the build plate.
- Movement distance of the build plate is 20mm with initial setting.

2. Problem in the motor can be determined through motor control.

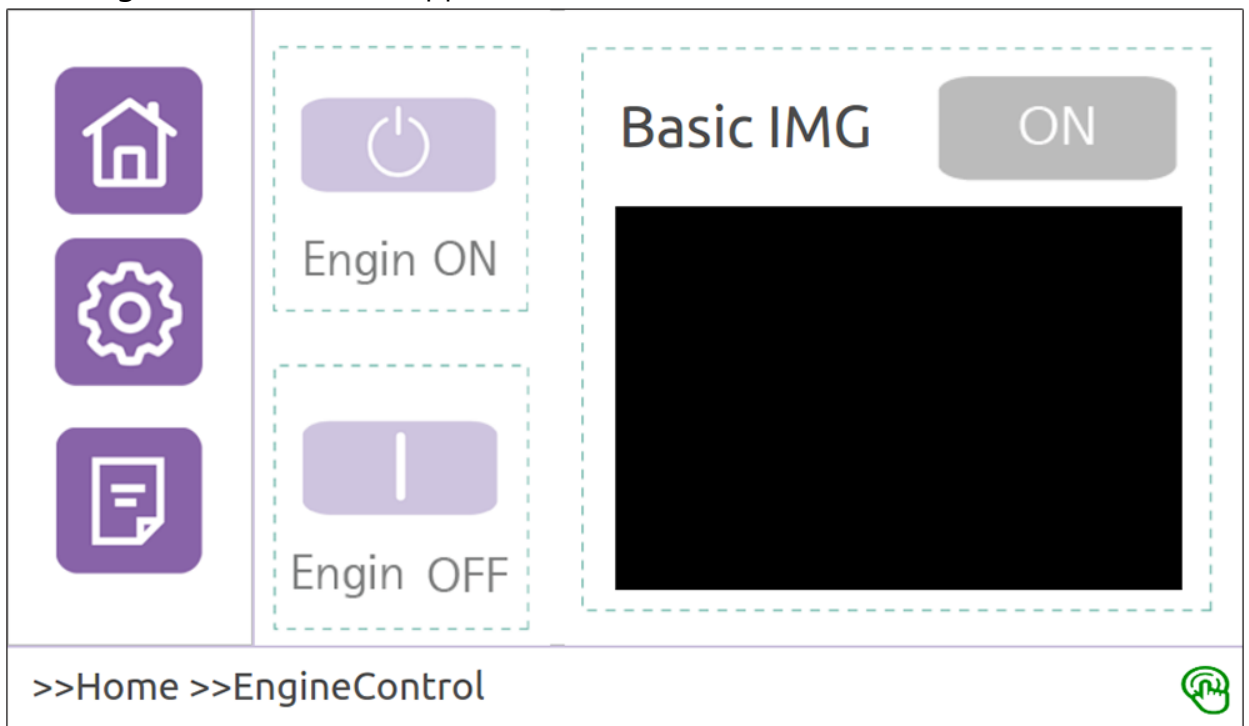
Ch3. System Control

2. Engine Control

1) Select 'Home' on the left tab menu to show Motor Control, Engine Control and Open Data items. Select Engine Control.



2) Engine control screen appears.



Ch3. System Control

3) Optical Engine Control Method

1. Engine ON and OFF buttons can be used to turn the optical engine ON/OFF.
 - Since the optical engine is a lamp-type engine that cannot be turned ON/OFF immediately and requires warm-up, it requires booting time from 20 seconds to 2 minutes.
 - Do not turn OFF the power switch when the engine is turned ON. This can reduce lifetime of the lamp.
 - Turn OFF the printer according to the program exit procedure similar to computer.
2. View Default Image button shows error in engine output and size of output.
 - Use Hide button to deactivate View Default Image button.
3. Problem in the optical engine can be determined through engine control.

Ch3. System Control

3. Print Setting

1) Select 'Setting' on the left tab menu to show Print Setting, Zero Setting and Administrator Setting items. Select Print Setting.

	Printing setup	ZeroPoint setup	Administrator setup
	Exposure setting, exposed layers, etc	Zero point data measurement, zero point setting	

>>Setup

2) Print setting screen appears.

	Basic exposure time	5.3	sec	Set
	Initial exposure time	5.3	sec	Set
	Initial exposed layers	3	layers	Set
	Amounts of up & down movement of motor	5	mm	Set
	Amounts of movement of build platform after printing	80	mm	Set
	Divisional exposure time	0.4	sec	Set

>>Setup >>Printing Setup

Ch3. System Control

3) Print Setting 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.

2. Initial exposure time should add 1~3 seconds to default exposure time.

3. If 'Movement of Build Plate While Building' is short, building time is shortened. If movement distance is too short, it can have adverse effects on output. This distance is 5~15mm in general.

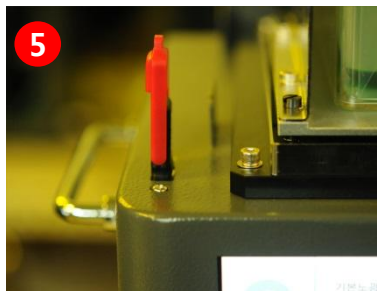
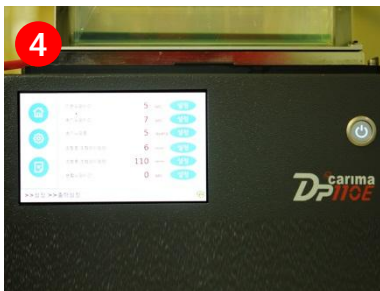
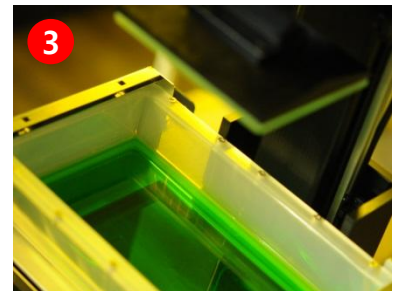
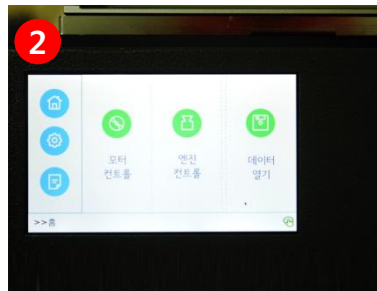
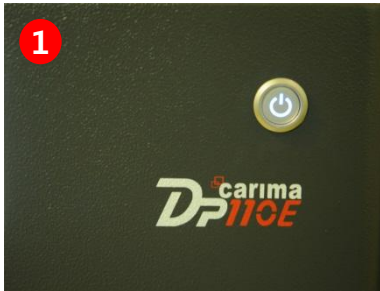
4. 'Movement of Build Plate After Building' refers to distance by which the build plate is lifted automatically after building. Value of 40~60mm is most convenient.

5. Split exposure time refers to time that splits exposure time. Since light of the optical engine contains high energy, long-time exposure has adverse effects on the tray. Therefore, setting of split exposure time can lessen damage on the tray. Value is 3~5 seconds in general. This function is deactivated by setting split exposure time to 0.

Ch3. System Control

5. Preparation for Printing

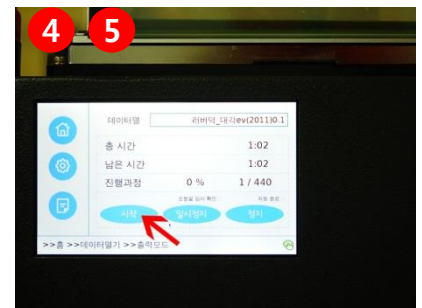
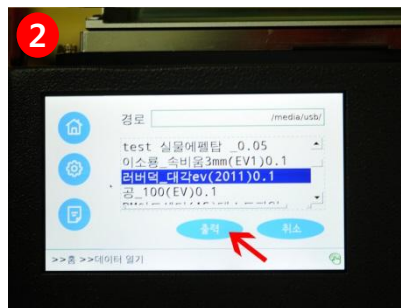
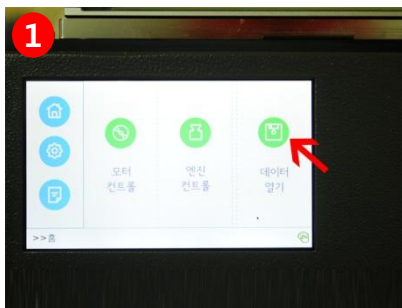
This is preparation for printing. Follow the instructions below.



1. Turn ON the 3D printer power switch and turn power ON.
2. Wait for a moment until Home screen appears from Login screen.
3. Check cleaning of VAT, cleaning of the build plate, existence of resin and resin scraps.
4. Check accurate input of resin exposure time.
5. Insert USB with output data into the port.

6. Start Printing

This is the procedure to start printing. Follow the instructions below.



1. Select Open Data on Home screen.
2. Select data to be printed and click Print button.
3. Print data will be loaded.
4. Printing mode screen appears once loading of print data is done.
5. Click Start button on the printing mode screen to move the build plate to the bottom and start printing.

Ch3. System Control

7. Pause Printing

Printing can be paused.



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.

8. Stop Printing

This explains how to stop printing.



1. Select Stop button while printing.

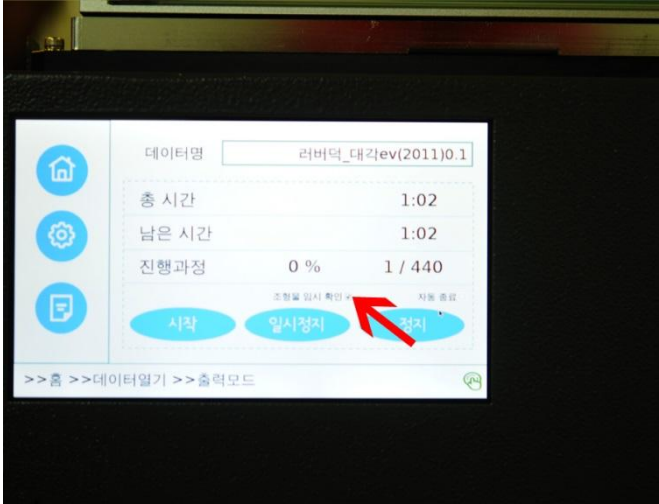
2. Confirmation message appears. Select 'OK' button to stop printing.

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

Ch3. System Control

9. Printing Option

1) Temporary Check on Mold



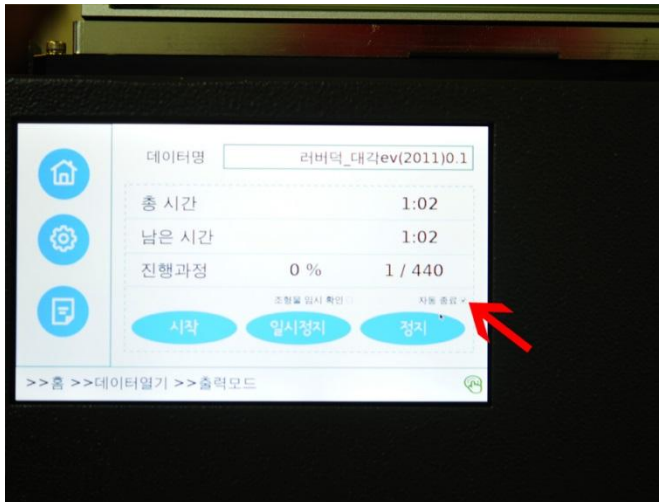
While printing, check 'Temporary Check on Mold' on the printing mode screen and press Pause to check the output.

Press Pause again to return to previous printing position and restart printing.

This function cannot be used if printing is progressed over 140mm.

Summary) Temporary Check on Mold -> Click Pause -> Check the mold -> Click Pause -> Restart printing

2) Auto Exit



While printing, check 'Auto Exit' item on the printing mode screen. Power of the optical engine and the program are turned OFF automatically once printing is done.

* In case of the optical engine, power is turned OFF after 20 seconds ~ 2 minutes for stabilization.

Summary) Auto Exit (check) -> Printing complete -> Run Auto Exit function

Ch3. System Control

10. Exit System

Follow the given route to exit the program.

If the program is turned OFF while printing, it may have adverse effects on lifetime of the optical engine. If possible, turn the program OFF after printing is done.

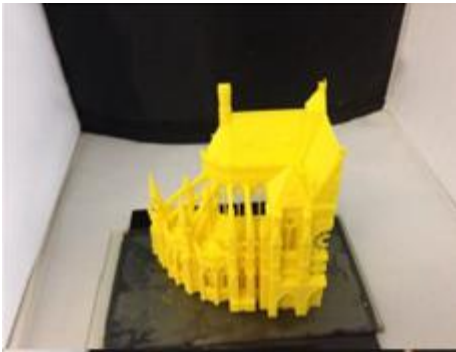
- 1) Select 'Power Icon' at the bottom right corner to exit the program with Auto Exit message.
- 2) Since the optical engine takes from 20 seconds to 2 minutes to be turned OFF, lower the power switch after confirming the that optical engine turns OFF.

Precautions for Post Work

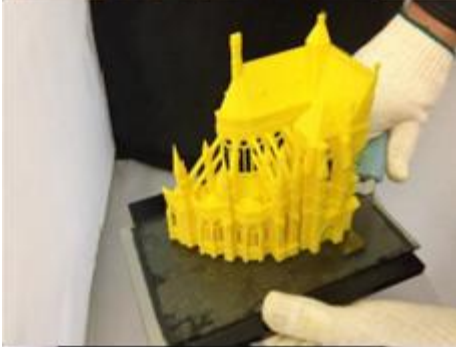
Preparation for post work: Materials (cutter blade, spatula, cleaning alcohol, pincers, toothbrush)

<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.



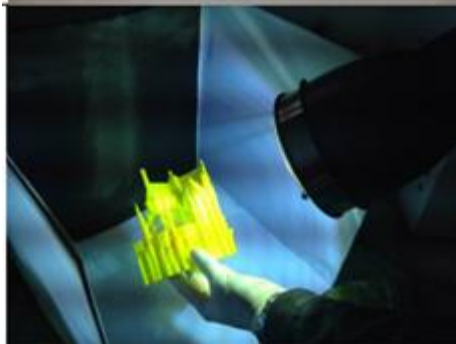
Use the cutter blade to remove the mold from the build plate.



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).
- **Items below are handled as general wastes.**
 - └ Household chemicals like soap and detergent
 - └ Solid wastes after printing
 - └ Toilet paper and paper without chemicals