SINTERIT LISA
USER MANUAL

Version 1.2

Table of Contents

1. SINTERIT LISA PACKAGE CONTENTS

- 3D printer SINTERIT LISA;
- Dedicated software SINTERIT STUDIO 2016 on external media such as Pendrive;
- Sinterit Lisa User Manual and Sinterit Studio User Manual;
- Protective packaging for accessories;
- 4 liters of black polyamide powder (PA12 BLACK) in two containers 2l each:
  - container No. 1 FRESH POWDER;
  - container No. 2 PRINT READY POWDER;
- 1x protective glasses;
- 2x protective dust mask;
- 1x protective gloves;
- 1x plate for carrying the prints (2 parts in the kit);
- 1x mold to cool prints;
- 1x spatula for getting out the prints;
- 1x set of large brushes, 2 pieces (nylon bristles, bronze bristles);
- 1x set of small brushes, 3 pieces (nylon bristles, metal bristles, bronze bristles);
- 1x brush;
- 2x metal detail purifier;
- 1x set of plastic spatulas;
- 1x metal strainer;
- 1x plastic measuring cup for measuring powder in ml
- 1x Alcohol Salicylic 100 ml (only in European Union);
- 1x Laser protective glass for mounting;
- 1x security key;
- 1x stylus pen;
- 1x power cable.

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2. INFORMATION ABOUT LEGAL REGULATIONS

No part of this publication may be reproduced, stored in any information retrieval system, or transmitted in any form or by any means (electronically, mechanically, photocopied, recorded, or otherwise) without the written consent of Sinterit Sp. z o.o.

There will be no liability for patent infringement in connection with the use of information contained in this manual. There will be no liability for damage resulting from the use of the information contained in this manual.

This manual contains content exclusively for the provision of information and the use by individuals professionally trained and engaged in the operation and maintenance of the equipment described below.

This manual serves to assist in the correct use of the device, perform basic maintenance and, if necessary, to solve simple problems, allowing to maintain the device in good condition.

The information contained in this document is intended for the use only with the product made by Sinterit Sp. z o.o. and called Sinterit Lisa. The company Sinterit Sp. z o.o. is not responsible for any use of this information in relation to other products.

Due to the constant development of Sinterit Sp. z o.o.'s products the information contained in this manual, specifications and markings are subject to change without notice.

3. DISCLAIMER

Although every effort has been taken to provide accurate information about the product, the company Sinterit Sp. z o.o. assumes no responsibility for any incorrect information or omissions. Sinterit Sp. z o.o. reserves the right to correct any errors and disclaims any liability in situations resulting from these errors.

Sinterit Sp. z o.o., nor any of the parties involved in the creation, production or delivery shall not be liable to the purchaser of this product or third parties for damages, losses, costs or expenses resulting from accident, misuse or use of a product not according to specifications

or unauthorized modifications, repairs or alterations to this product, or failure to observe the manual Sinterit Sp. z o.o. on operating and maintenance.

The Sinterit Sp. z o.o. company shall not be liable for defects in the printer's firmware SINTERIT LISA.

The Sinterit Sp. z o.o. company is not responsible for any damage or problems arising from the use of other supplies than those designated by Sinterit Sp. z o.o. as dedicated.

4. TRADEMARKS

SINTERIT product name and LISA SINTERIT logo are registered trademarks of Sinterit Sp. z o.o.

All other brand names, products and trademarks are the property of their respective companies.

5. SOFTWARE LICENSE AGREEMENT

The company Sinterit Sp. z o.o grants the Buyer a license to use the control software SINTERIT STUDIO simultaneously on up to three PCs, which are on the use of the Buyer, designed for use with the supplied SINTERIT LISA printer. Sinterit Sp. z o.o. includes a 24 month period update SINTERIT STUDIO with the selling price of the printer.

6. TERMS OF WARRANTY

1. Sinterit Sp. z o.o. company hereinafter referred to as the Seller, guarantees to the Buyer the correct functioning of SINTERIT LISA printer for 2000 hours or 12 months (whichever comes first) on the basis described below.
2. The remaining liability of the Seller, including the warranty for defects in the product is excluded.
3. The device should be used in accordance with the manual provided.
4. The holder of the original, properly completed Warranty Card or the proof of purchase (invoice, receipt) of the Printer is entitled to guarantee.
5. Requirements for warranty coverage are as follows:
    a. statement of claim in the written form within the period of 14 days of failure occurrence and not using the printer from the discovery of the defect;
    b. sending your application together with the data downloaded by the application supporting the printer with a copy of proof of purchase/Warranty Card;
    c. Sinterit Sp. z o.o. determines the method of repair as follows:
        ▪ commissioning a simple repair to the Buyer (sending the necessary parts and instructions);
        ▪ sending the device at the expense of Sinterit Sp. z o.o. to the service indicated by Sinterit Sp. z o.o., the Buyer is responsible for the Printer's safe packing;
        ▪ Printers exchange for a new one.

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d. In the event of an error for reasons of misuse of the Printer, Sinterit Sp. z.o.o. surcharges the Buyer with the costs of repairs, parts, and transport of equipment.

e. Within 14 days of filing the complaint Seller shall notify the Buyer about the way it has been handled.

f. The warranty period shall be extended by the time repair.

6. The risk of accidental loss or damage to the printer from the time its release or dispatch to the Seller charges the Buyer.

7. In case the equipment sent for repair under warranty is unjustified, the Buyer shall be charged the costs of transport in both directions and inspection costs of the device according to the price list.

8. The buyer is obligated to make a copy of data stored in the Printer's memory. Seller is not responsible for any loss of Buyer's data during carrying out the service procedures.

9. Sinterit Sp. z o.o. reserves the right to change the terms of the warranty. The new warranty will not be applied retroactively to previously purchased products.

7. EXCLUSION OF WARRANTIES

1. The warranty does not cover the maintenance parts: replaceable infrared heaters, replaceable recoater's drive roller, exchangeable glass protecting laser.

2. The warranty does not cover printing powder.

3. The warranty applies only to the media on which the Software is recorded. It does not include the software provided by Sinterit Sp. z o.o.

4. The warranty does not include the right holder of the warranty to claim reimbursement of lost benefits due to defects of the device. Sinterit Sp. z o.o. is not responsible for damage to property caused by a defective product

5. The warranty also does not cover:
    a. damages arising from chance events/unforeseeable circumstances (electrical fault, fire, inundation, flood, etc.);
    b. mechanical, chemical fault and defects caused by them;
    c. damage resulting from installation and operation the device under conditions or in a manner incompatible with the manufacturer's specifications, and used against safety regulations;
    d. damage caused by the fault or by the user's lack of knowledge;
    e. activities described in the manual, the holder of a guarantee is required to do on their own and at their own expense;
    f. transport damage caused during moving the device to the service indicated by Sinterit Sp. z o.o., in particular, when for transporting non-original packaging without transport security was used;
    g. damage arising from the use of other supplies than those recommended by Sinterit Sp. z o.o.;
    h. damage and malfunctions resulting from repairs, alterations, fine-tuning or structural changes made without the written consent of Sinterit Sp. z o.o. or outside the service station indicated by the mentioned above company;
    i. where it is found by the Sinterit Sp. z o.o. that the violation of the seals placed in the printer and components included has taken place or the incompleteness of the device.

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j. malfunction caused by conflict or incompatibility between the installed applications and the impact of computer viruses.

8. MARKING TEXT CONVENTIONS USED IN DOCUMENT

Listed below are descriptions of the symbols used on the device. They constitute a warning or convey the information to protect the user, other individuals and surrounding objects, and ensure correct and safe use of the device.

⚠️	**WARNING!** Warns that the initiation, omission of a specific procedure or inattention can cause physical injury or death to the user.
⚠️	**ATTENTION!** Announces that initiation or omission of a specific procedure can cause physical damage to the equipment.
⚡	**WARNING!** The warning symbol indicates an inevitably dangerous situation which can result in death or serious injury, if not avoided. Before working with any equipment, you should be aware of the dangers associated with the flow of electric current, and become familiar with the standard procedures to prevent accidents.
⚡	**ATTENTION!** Warns of the possibility of electrical shock
🔥	**CAUTION!** Note, high temperature – do not touch. Excess heat dissipation can cause burns.
☢️	**CAUTION!** Note the laser light. Looking into the laser beam can cause blindness and burn the skin.
✋	**CAUTION!** Beware of moving parts which can crush hands.
🚫	**STOP!** Action prohibited.
❗	**IMPORTANT!** Getting to know with the information that is needed to perform a specific task.
🧤	**ATTENTION!** It is necessary to wear protective gloves. Mandatory action when working with powder.

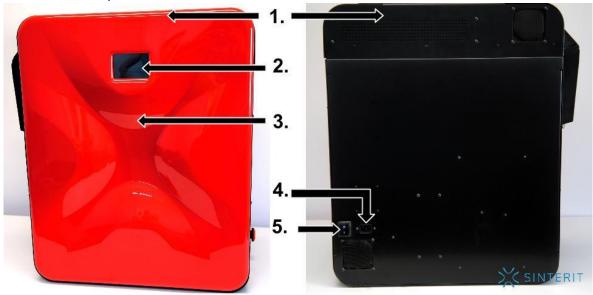|	ATTENTION! It is necessary to wear protective face mask. Mandatory action when working with powder.
	IMPORTANT! You must read the instructions before taking action.

9. GLOSSARY

In the manual are accepted and interchangeably used listed below terms and conventions.

- **SINTERIT PRINTER LISA** *(3D printer, printer, machine, device, product)* - incremental technology printer (3D) type LS (laser sintering, selective laser sintering). The device is designed for professional and quick execution of spatial prototypes or creating three-dimensional objects' models.
- **SINTERIT STUDIO** – control and support software SINTERIT LISA printer's work.
- **PA12** *(polyamide powder, nylon powder, PA powder, PA12 powder, powder)* - polyamide powder with a granulation of 20-100 micrometers, black, tailored to the capabilities of the SINTERIT LISA printer.
- **RECOATER** – a device in the shape of the roller/cylinder, which is driven on the guide and cord, to move PA12 powder during printing.
- **SOURCE BED** *(source)* – a chamber for new not sintered powder.
- **PRINT BED** – a chamber in which the layers of powder are sintered and the PA12 print takes place
- **OVERFLOW BIN** – overflow chamber for the extra not sintered powder, displaced from FEED BED to PRINT BED by RECOATER.
- **FRESH POWDER** *(container No. 1)* - fresh powder that must be mixed in the proper proportions with the PRINT READY POWDER. FRESH POWDER alone is not suitable for printing (printing may fail).
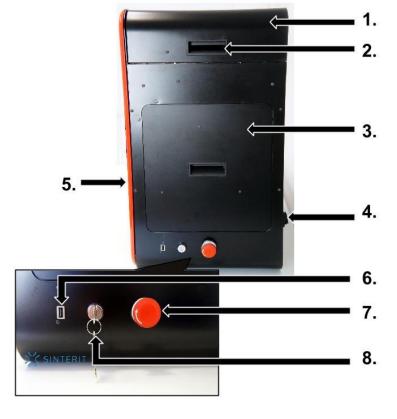- **PRINT READY POWDER** *(container No. 2)* - powder ready to work with the printer.

10. DESCRIPTION OF THE CONSTRUCTION OF A PRINTER SINTERIT LISA

Photo 1. View of the printer from the front and the rear.

1. Printer lid
2. LCD panel/Camera view
3. Front panel
4. Power
5. Power button

Photo 2. The view on the right side of the printer.

1. Printer lid
2. The handle for opening lid
3. Overflow Bin
4. Power button
5. Front panel
6. USB port
7. Safety button
8. Safety key switch and keys

Photo 3. View of the printer on the left side and from the top.

1. Viewing window in the lid
2. Hinges lid
3. Front panel

Photo 4. Inside View the beds in the printer.

1. the guide of the Recoater
2. the cable of the Recoater
3. the gap of the Overflow Bin
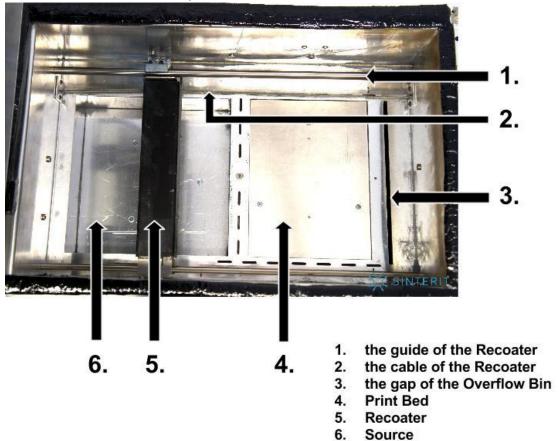4. Print Bed
5. Recoater
6. Source

Photo 5. The inner side of the printer lid

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1. Infrared heaters I (long, red)
2. Glass protecting the laser
3. Laser
4. the two wing bolts bonding the heaters unit
5. Infrared heaters II (short, white) 4 pieces on each side of the protective glass

Photo 6. View of the inside of the printer (the location of of pyrometers and camera)

1. pyrometers
2. camera recording a working printer with closed lid

11. SPECIFICATIONS

1. General technical data	
Size of the device (mm/in)	650x550x400 // 25,60x21,65x15,75
Size of the package (mm/in)	800x600x900 // 31,50x23,62x35,43
Unit weight (kg/lb)	35 kg // 77,16 lb
Package weight (kg/lb)	Up to 60kg // up to 132,3 lb
2. Parameters	
Printing technology	Laser sintering (LS)
The size of the working chamber (mm/in)	150x200x150 mm // 5,91x7,87x5,91 in
Max. print working area (X/Y/Z) (m/in) [2]	110x150x130 mm // 4,33x5,90x5,12 in
Min. print wall thickness	0,5 mm // 0,02 in
Recommended print wall thickness XY	0,8 mm // 0,3 in
The layer height Z (min – max)	0,06-0,15 mm // 0,002-0,006 in // 2,4-5,9 mils
Efficiency [2]	20 cm^3/h // 1,22 in^3/h
Print speed	10 mm/h // 0,39 in/h * depends on model and material
Type of material	poliamid 12 (PA12 black), TPU,
Material / powder diameter	20-100 μm
Max. working temperature(inside the machine)	190º C // 374º F
Storage temperature (min – max)	10-40º C // 50-104º F
Humidity	10-90% without condensation
3. Power	
Power	Single phase, 220-240V AC, 50Hz, 7A // 100-130V AC, 60Hz, 15A
Maximum power consumption	2 kW / 1,5 kW
Laser safety class	class 1
Type of laser	class 4, infrared LED 5W; λ = 808 nm
LCD panel	resistive, color, 4 ''

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4. Safety	
Fire protection class	Class 2
5. Software	
Control software/firmware/dedicated	Sinterit Studio 2016 compatible with Windows
Operated file formats	STL, OBJ[1], 3DS[1],FBX[1]
External communication	USB, WiFi[1]
Additional equipment	built-in camera
[1] - Available in the future [2] - It depends on the type of powder	

12. TECHNICAL SUPPORT

The latest information and versions of the manual are available in the technical support of Sinterit Sp. z o.o. or by contact@sinterit.com

The list of distributors and technical support from particular countries is available on the www.sinterit.com.

13. IMPORTANT SAFEGUARDS AND WARNINGS

To ensure safe use of the SINTERIT LISA product, please read and follow the instructions below.

Keep this manual for future use. Also, be sure to follow all warnings and instructions marked on the product.

	WARNING! - Only trained and qualified personnel should install, replace or service the equipment. - The device should be installed in accordance with these instructions and by trained personnel

13.1. Environment and the place of installation:

- The printer SINTERIT LISA should be placed at room temperature.
- The room must be well ventilated adequate to its size.
- The product should be placed on a flat, stable surface that extends beyond all edges of the product. If you place the product by the wall the distance between the product and the wall should be greater than 50 cm (20 in). The product will not work properly if it is set at an angle.

> ⚠️ **ATTENTION!**
> <u>Do not place</u> or store the product:
> - outdoors;
> - in areas with high dust;
> - in places subject to shocks, vibrations, high temperature and/or humidity, and extreme changes in temperature and humidity;
> - near water, or heat sources;
> - near inflammable and volatile substances, concentrated acids or corrosive vapors;
> - in places easily accessible to children and animals.

> ⚠️ **ATTENTION!**
> - Never use wood, equipment with wooden elements and flammable substances at work with the printer.
> - The minimum distance between the printer and wooden parts is 20 cm.
> - The printer emits large amounts of heat, and therefore it is prohibited to put it on the wood and wood furniture.

13.2. Power supply:

- Use only the power cord supplied with the product.
- The printer must be connected to a grounded outlet to prevent electric shock in the event of a fault.
- When connecting/disconnecting the plug to/from the power source always hold the cover, not the cord.

> ⚡ **WARNING!**
> Do not use cables from other devices. Using the power cables from other devices or connecting the power cord supplied with the product to other devices may cause a fire or electric shock.

> ⚡ **ATTENTION!**
> Never disassemble, modify or repair the power cord, plug, devices inside the printer, except as described in the product's manual.

- The product should be placed near a wall outlet, which can be easily unplugged.
- It is recommended to use the UPS units that in the case of a momentary power failure printing process is not interrupted.
- When an extension cord is used for the power supply of the product, make sure that the total power consumption of all devices connected to it does not exceed the extension cord's limit. Also, make sure that the total current drawn by connected equipment does not exceed the ampere rating for AC wall outlet.

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- Power cables should be placed in such a place that they are not rubbed, cut, pulled or twisted.

	ATTENTION!
	- <u>Do not</u> place objects on the power wires.
	- <u>Do not</u> place power cords in path where people will have to walk or run.
	- <u>Pay special attention</u> to the fact that the power cables are not bent at the points of connection of the printer.
	- Disconnect the plug whenever it is planned to shift/transfer the machine.

In the following situations, unplug the product from the power supply and contact a qualified service personnel:
- ➢ The power cord or plug is damaged,
- ➢ some liquid got into the product,
- ➢ the product has been dropped or the case damaged;
- ➢ the product does not operate properly or clear changes in efficiency have been observed.
- ➢ Do not adjust controls that are not described in the manual.

	ATTENTION!
	<u>Do not:</u>
	- spill liquid on the product;
	- put any containers on the equipment, in particular containing water;
	- handle it with wet hands;
	- block or cover the vents and openings in the product;
	- touch live parts

	ATTENTION!
	If the device is not used for a long time (e.g. vacation), unplug the power cord from the socket.

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14. INFORMATION ON SUPPLIES

- When working with the polyamide powder or other designated printer powder for the SINTERIT LISA printer always wear protective kit attached to the above-mentioned device (glasses, gloves, dust mask).

⚠️	**WARNING!**
	When working with a polyamide powder, avoid inhalation or swallowing and contact with skin and eyes.
	  ➢ If the PA powder is inhaled, move to a place with fresh air and gargle thoroughly with plenty of water. If coughing develops, contact a physician.
	  ➢ If you eat a PA powder, rinse your mouth with water and drink 1-3 glasses of water to dilute stomach contents. If necessary, contact your doctor.
	  ➢ If the PA powder gets in your eyes, rinse them thoroughly with water. In case of persisting eye irritation, contact a physician.
	  ➢ When the PA powder gets in contact to your skin, wash it with soap and water.

- Polyamide powder should be stored in tightly closed containers, in a room at room temperature and low humidity.
- Powder should be stored out of reach of children and pets.
- If the device is not used for a long time, the powder should be stored in a sealed package.
- When printing the smell of burning material may be emitted in quantities which do not affect the health of users. However, in the case of long-term operation of the printer in a poorly ventilated room, the smell may become unpleasant and irritating. Adequate ventilation is recommended in order to create the best printing conditions.

⚠️	**WARNING!**
	  ➢ Do not attempt to burn/melt polyamide powder. The resulting sparks and hot mass, the powder is converted into can cause severe burns.
	  ➢ Keep the polyamide powder away from fire.

🚫	**STOP!** Do not dispose in municipal waste! The used polyamide powder should be stored in sealed containers and disposed in accordance with local policy of waste plastic material.

15. WORKING WITH POWDER

1. Always wear protective clothing (goggles, mask, gloves) when working with powder PA12 and others used in the printer Sinterit Lisa.

2. When you first use your printer Sinterit Lisa pour the powder only from the container no. 2 (PRINT READY POWDER).

3. Pay attention to the messages on the screen, after the print has finished. Firmware Sinterit Lisa calculates the amount of FRESH POWDER that must be added to the inside of the printer. Failure to do so may result failure of the next print.

4. Even if you do not plan to run the next print at once, mix together the two types of powder in the proportions shown after the print is completed. Store in a container no. 2 at PRINT READY POWDER.

16. INSTALLING THE SINTERIT STUDIO 2016

1. Connect the USB stick, to the computer's USB port.
2. Find the folder SINTERIT STUDIO 2016.
3. Click the icon SinteritStudio.exe twice.
4. Follow the on-screen installation instructions***

	IMPORTANT! Be sure to carefully read the license agreements and accept them.

5. After the installation of the program, the printer is ready to work.

*** Software compatible with Windows 7 and higher.

17. FIRST TIME MACHINE IS ON – FIRST STEPS

1. Unpack the printer from the packaging, keeping in mind the delicate downloading security foil and paper.
2. Place it on a hard and stable surface (recommended work place of the printer). Connect the power cord of the printer.
3. Turn on the power button on the back (from "0" to "1"). Put the key in the key switch and turn a quarter of a turn to the right clockwise.

Photo 7. Position key: turned off and on

4. Check if the red safety button is released. If not, then release it by turning it clockwise a quarter of a turn (black ring).
5. To open the printer unlock the magnetic lock on the lid (**PRINT // UNLOCK LID,** photo 8). The lock releases the blockade for 10 seconds.

Photo 8. Unlock lid

6. Lightly press the and then gently lift the lid of the printer.
7. Turn off the printer and pull the power cord from the wall socket.
8. Remove the transport protection from the inside.
9. Install the glass protecting the laser.
   a. Wear protective gloves to protect against possible hand injury on the edge of the heating system.
   b. Holding the heaters unit (see photo 9) unscrew the two wing bolts bonding the unit with printer's lid.
   c. Gently lower the heaters unit on the lower part of the printer.

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Photo 9. Correct holding unit heaters while loosening

d. Remove the glass protecting the laser of the box (from the package with accessories). Wipe its surface gently with a paper towel / microfiber (see if there are no fibers left).
e. Lay the longer side gently in the niche (see photo 10).

Photo 10. Incorrect and correct positioning of the protective glass laser module heaters.

f. Raise the heaters unit to the lid. Holding the two parts, twist/bend them together using the wing screws.
g. Wipe the glass with a towel dampened in alcohol from possible fingerprints and stains.

10. Check (using gloves or paper) if the IR heaters are firmly fixed to their seats. If there is some dust on light bulbs blow it with air.
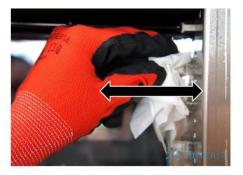

Photo 11. Methods of checking seat heater.

> **ATTENTION!**
> Remember, do not touch the heating bulbs with your fingers or greasy objects (eg. a dirty cloth).
> Dirt and grease may cause local overheating and burn the heaters or explosion during printing.

18. PRINTER'S CONNECTION WITH THE WI-FI NETWORK [1]

1. On the Printer's touch screen, select **ADVANCED**//**SELECT WI-FI.**
2. Find the network you want to connect to and click on the name.
3. Enter your password if necessary and press **OK**.
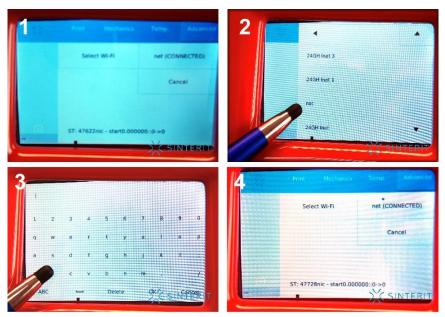4. Next to the SELECT WI-FI you see the combined network.

Photo 12. Connect to Wi-Fi

19A. LOADING FILE BY THE USB AND START PRINTING

1. Prepared in SINTERIT STUDIO 2016 file save on the media from USB (flash drive recommended).
2. Plug in the USB media enabled printer.
3. To load a file, select **PRINT** //**LOAD MODEL**//**LOAD FROM USB**//**file name**. Charging may take a few minutes (depending on the size of the file).
4. After loading the file into the printer, press ►**START**.

19B. LOADING FILE BY THE WI-FI AND START PRINTING [1]

1. Generate a file in SINTERIT STUDIO 2016.
2. To send a file to the printer, select: **FILE**//**EXPORT TO**//**PRINTER SINTERIT LISA.** Charging may take a few minutes (depending on the size of the file).
3. After loading the file into the printer, press ►**START.**

[1] - available soon

20. PREPARATION OF THE PRINTER TO WORK (FIRST USE)

1. Wear protective clothing supplied with the kit (mask, goggles, gloves).

2. Turn on the power button (from "0" to "1") on the back. Put the key in the key switch and turn a quarter of a turn to the right clockwise.

⚠	**ATTENTION!** Make sure the safety button is released. If not, release it by turning it clockwise.

Photo 16. Position key: turned off and on

3. To open the printer unlock magnetic lid's lock (press on the screen: **PRINT**//**UNLOCK LID**).

Photo 17. Unlock lid.

4. Lightly press the and then open the lid of the printer, remember that the lock is unlocked for 10 seconds.

5. Check the operational readiness of the SOURCE BED AND PRINT BED (position "0" for each of them), cable tension, the purity of the RECOATER's guide.

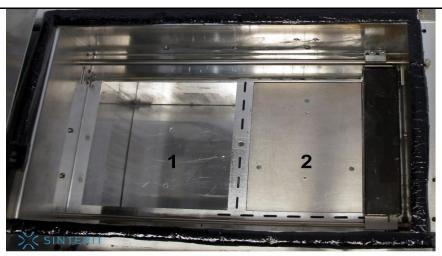|	**IMPORTANT!**
	The "0" position for SOURCE is the maximum drop down.
	The "0" position for the PRINT BED is the maximum protrusion to the top.

Photo 18. Starting points for SOURCE'A (1) and PRINT BED'A (2)

6. Move the RECOATER maximum to the right (**MECHANICS**//**RECOATER**//▶).

	ATTENTION!
	Manual moving of the RECOATER is forbidden. It is only permitted with the electronic control on the monitor screen.

7. Put the PA12 powder from the container 2 (PRINT READY POWDER) to the SOURCE (maximum capacity is 6l of powder). Align the surface and gently knead. Proceed gently, so that no dust would float in the air (using spatula to cast the powder is recommended).
8. Move the RECOATER up to the left (**MECHANICS**//**RECOATER**//◀).
9. Check that the PRINT BED is aligned with the cover (prepare the first layer). If necessary, press on the screen **MECHANICS**//**PRINT**//▲.
10. Raise the SOURCE BED to the height of approx. 2 mm (**MECHANICS**//**SOURCE** ▲).
11. Move the RECOATER maximum to the right (**MECHANICS**//**RECOATER**//▶). It will move the powder to the PRINT BED, slowly covering the surface.
12. Move the RECOATER up to the left (**MECHANICS**//**RECOATER**//◀).
13. Repeat the steps 10-12 times until the powder covers the entire surface of the PRINT BED.
14. Gently blow the infrared heaters with air (red and white, see photo 19).
15. Gently wipe the video windows of the camera and infrared thermometers (pyrometers) and the glass protecting the laser with an alcohol wipe (see photo 19).
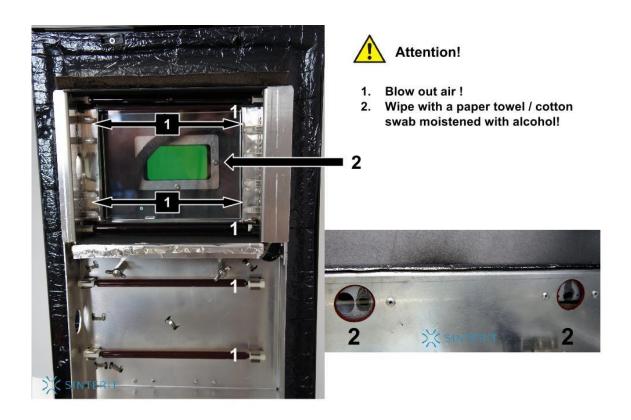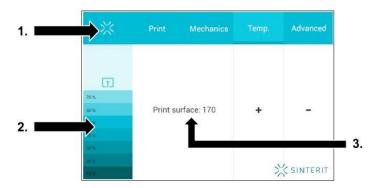16. Close the lid of the printer.

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Attention!

1. Blow out air !
2. Wipe with a paper towel / cotton swab moistened with alcohol!

Photo 19. Final steps before printing.

21. INFORMATION AND ACTIVITIES WHILE PRINTING

1. There is the status of the print on the main screen (left side of the screen), warming and cooling (tab TEMP, see photo 20), the remaining time of laser work.

2. By clicking on the SINTERIT logo on the screen (upper left corner, see photo 20) we go to review mode of the camera. Review time is 10 seconds.

1. Camera view
2. Print status, time of laser operation
3. Temperature display inside; indicates the state of overheating and cool down

Photo 20. The main screen during printing

3. If during the printing, in the camera or the top vision window, visible problems appear with the print, you can reduce / increase the temperature (TEMP // +/-).

4. While the printer is working do not touch other elements besides: LCD, safety button, USB port and power switch

> **ATTENTION!**
> Do not lower the temperature inside too quickly. The permissible standard is 0,5ºC on one layer.

> **ATTENTION!**
> If there is smoke or irritating odor coming from the printer while printing or other disturbing circumstances occur, press the Security Button. It immediately cuts the power off. Remember, however, that is not possible to open it in such case.

22. END OF PRINT / PRINT FINISHED

1. Wear protective clothing supplied with the kit (mask, goggles, gloves).

2. When the printing is completed and the print is cooled the **PRINT FINISHED** command will appear on the main screen. Click it to complete the printing process and open the printer.

> **IMPORTANT!**
> The blockade of the printer operates until the inside temperature of the machine is more than 49ºC.
> It is not possible of open the lid earlier.

3. To open the printer unlock the magnetic lock of the (**PRINT**//**UNLOCK LID**). The lock releases the blockade for 10 seconds.
4. Gently press down the lid to the printer, and then lift it up, pulling it up

> **IMPORTANT!**
> Pay attention to the information after the slicing flie in SINTERIT STUDIO. It informs about the amount of FRESH POWDER, that is to be added to the PRINT READY POWDER from inside of the printer.
> Failure to do so may result failure of the next print.

5. Move the RECOATER up to the left (**MECHANICS**//**RECOATER**//◄). Make sure that the move of the RECOATER through/across BEDS is save and undisturbed.

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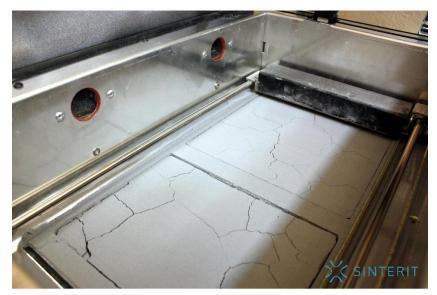| ⚠	**ATTENTION!**
	Manual moving of the RECOATER is forbidden. It is only permitted with the electronic control on the monitor screen.

Photo 21. The correct state of powder after printing (visible cracks on the surface of both BED)

6. Remove the powder from the OVERFLOW BIN. After sieving through the supplied strainer, the powder can be reused. If you do not plan to print again, put the powder into the container 2 to the PRINT READY POWDER
7. Insert the OVERFLOW BIN back into place.

Photo 21. Correct removal and insertion the OVERFLOW BIN

8. To remove the print out of the PRINT BED press **MECHANICS//PRINT//▲** on the screen. The entire contents of PRINT BED should come out in the form of a compact cuboid. (see photo 22).

9. Using the spatula for getting out the prints move carefully to the plate for carrying the prints the entire contents of PRINT BED and next move it to the mold supplied with the kit. Leave the print mass to cool for at least an hour (see photo 22).
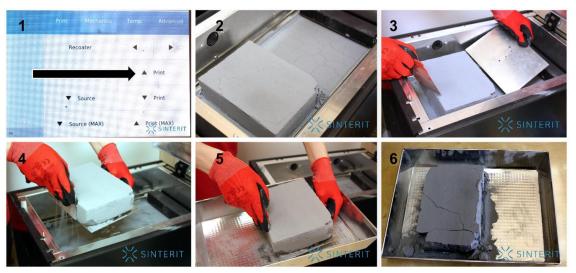

Photo 22. Correct removal of printouts from PRINT BED (pt. 8-9)

10. Clean PRINT BED thoroughly from the rest of the powder that has not been sintered, also located around the BEDS (it is best to move it to the OVERFLOW BIN and place in the mold with taken out printing, see photo 23)

11. Remove the powder remaining in the SOURCE and sieve it using the strainer supplied with the kit. The powder may be combined with the rest left in the OVERFLOW BIN and reused. If you do not plan to print again, put the powder into the container No. 2 for the PRINT READY POWDER.

Photo 23. Removing the remaining powder from inside

12. Lower the SOURCE to the maximum (**MECHANICS**//**SOURCE**//▼).

	STOP!
🚫	Do not use any lubricants or oils to the guide of the RECOATER. This may cause damage to the machine. For cleaning it is recommended to use a brush with soft bristles (supplied with the printer) or compressed air (when there is no powder inside the printer).

13. Make sure all parts are in place (RECOATER, LASER).
14. Check the cable of the RECOATER (the tension, the technical condition).
15. Check the purity of the glass protecting the laser (the cleaning is recommended after every third printing).
    a. To clean the glass, unscrew the two wing bolts on the right side of the glass while holding the heaters unit.
    b. Lower the module and pull the glass out of the cover frame.

	STOP!
🚫	● Be aware of the bulb of the heating system of the machine. ● Do not clean the glass in running water, also the cleaning process run outside of the device.

    c. Wipe the glass with a cotton swab well moistened with salicylic acid; next (in order to remove arisen streaks) spray the glass with a glass cleaner and wipe with a soft cloth or paper towel to dry (see photo 24).
    d. Put the glass back in the frame cover and tighten the heating module with the wing screws.

Photo. 24. Cleaning the protective glass laser

16. Close the lid of the printer.

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23. CLEANSING OF THE PRINTS

1. Use a brush with the nylon bristles to clean the print from the powder that has not been sintered, until the outline of prints appears. If the mass is still hot, continue to cool it..

2. Disconnect the prints from the mass and clean them with the nylon brush supplied with the kit. Mash the remaining lumps of powder in the mold (this will help to sieve the remaining powder through a strainer).
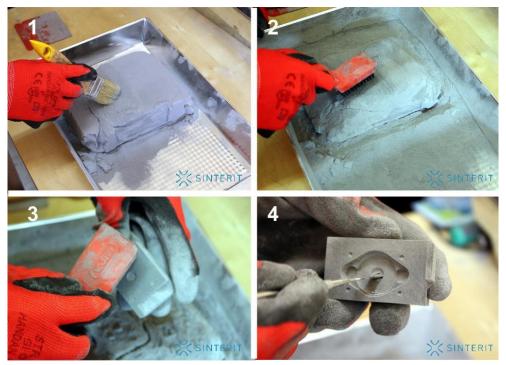

Photo 25. Cleanup prints

Photo 26. The method of crushing the remnants of print and pre-sieving

3. After the first cleaning of the print, you can use the sand spreader* or use a brush with a gold / brown bristles and the detail purifier (included, supplied with the kit).

4. The powder from the PRINT BED put together with the remaining powder in the SOURCE and the OVERFLOW BIN after it had been sieved through a strainer.

5. Add the amount of FRESH POWDER from the container No.1 as indicated by the SINTERIT STUDIO software and mix together two types of powder. If you do not plan to start the printing again, put the powder into the container No. 2 on the PRINT READY POWDER.
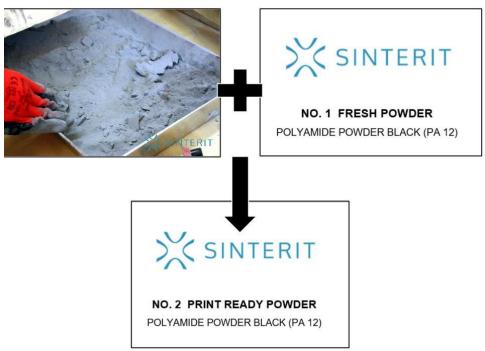
Photo 27. Diagram of mixing powders to be printed (pts. 4-5)

6. After the cleansing, the print has its full durability and can be immediately used.

    * The sand spreader is not included in the kit. Contact the Sinterit company or the sand spreaders dealer for the selection of abrasive material, which can be used for cleansing the PA12.

24. MAINTENANCE AND SERVICE OF THE SINTERIT PRINTER LISA

In order for the Printer to work efficiently and last a long time, ensure regular maintenance. The basic maintenance work:

- cleaning the protective glass of the pyrometers and the camera before each printing;
- check the status of the cord of the recoater;
- clean the glass protecting the laser – the cleaning is recommended after every third printing;
- clean the surface under the BEDS – the cleaning is recommended after every third printing.

⚠ **PRZESTROGA!** ⚠ **UWAGA!**	**Before cleaning, turn the printer off!** **Pay attention to the indications inside!** ➔ In order to clean the surface under the BEDS hold the front panel of the printer with both hands and lift it up (the fixing springs should raise and set the front panel in the correct position). ➔ Gently sweep the set powder off using a brush, minding the BEDS' engines. ➔ Close the printer in the same way to the opening.

10A. REPLACEMENT OF THE GLASS PROTECTING LASER

1. Holding the heaters' unit, unscrew the two wing bolts that secure the module with the lid of the printer (see photo 28. pt. 1).
2. Gently lower the heaters' unit on the lower part of the printer (see photo 28. pt. 2).
3. Remove the glass protective laser out of the box. Wipe its surface gently with a paper towel / microfiber (see if there are no fibers left, see photo 28. pt. 3).
4. Gently Lay the longer side in the niche (see photo 28. pt. 4).
5. Raise the heaters unit to the lid. Holding the two parts, attach them together using the wing screws (patrz zdjęcie 28. pkt. 5-6).
6. Wipe the glass from possible fingerprints and stains with a towel dampened in alcohol.

Photo 28. Replacement of the glass protecting laser

10B. REPLACEMENT OF INFRARED HEATING UNITS PLACED AROUND THE PROTECTING GLASS.

1. Wear protective gloves or use a clean cloth / paper towel while replacing the heating unit. Do not touch the heaters with your hands.
2. Make sure the heaters are not hot. Carry the operation out when the machine is cold and switched off.
3. Gently grab the heater with your fingers and remove it parallel to its seat. Do not twist in any direction, it may cause damage to the heater's slot (see photo 29)
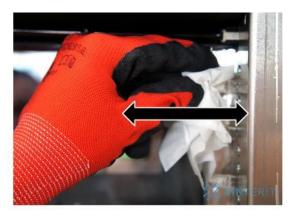4. In the same way, insert the new heater to the nest.

Photo 29. Correct removal of the old and installing the new infrared heaters

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