

Resin Heater User Guide

Version 1.0

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Contents of the package

Heater frame with controller

AC/DC Power adaptor (110V/220V -> 12V / ~60W)*

Power cable (110/220V)*

Power extension cable with 5.2mm plug and jack on both ends**

Power splitting cable with two 5.2mm jacks and one plug on both ends**

* Only if purchased together with dedicated Power Supply

** Only if purchased without dedicated Power Supply

Parts and their functions

1. Display
2. Control buttons
3. MicroUSB connector for firmware updates
4. DC power connector (∅ 5.2mm, inner pin is + terminal)
5. Chassis protrusion for fixing the heater into the resin vat/printer
6. Heating elements
7. Temperature sensors

Safety precautions

Check the heater for scratches or other damage. **Do not use it if there is any visible damage.**

The heater has built-in safety measures. It cuts off the heating power if it detects something potentially harmful, high voltage/current, abnormal behaviour of controller or any other unexpected behaviour. However, it is still possible that an external damage causes a short-circuit which cause excessive heat and can be dangerous.

The heater has been designed to allow leaving it inside the printer for long printing sessions. However, **we cannot guarantee it will be completely safe under all and any circumstances.**

Operating

Placing Resin Heater to the printer

Be careful when placing the heater to the printer and removing it from there. Do not use force. Verify that vat is placed precisely to it's place on printer. Unaligned vat thus heater will be hit by building plate of the printer and cause fatal damage to printer's LCD, vat's film and heater.

Keep the controller unit safe from resin splatters and stains. The unit is relatively resistant against small splashes of liquid, but the power jack and the MicroUSB jack are not weather resistant.

Printer: Photon / Photon-S

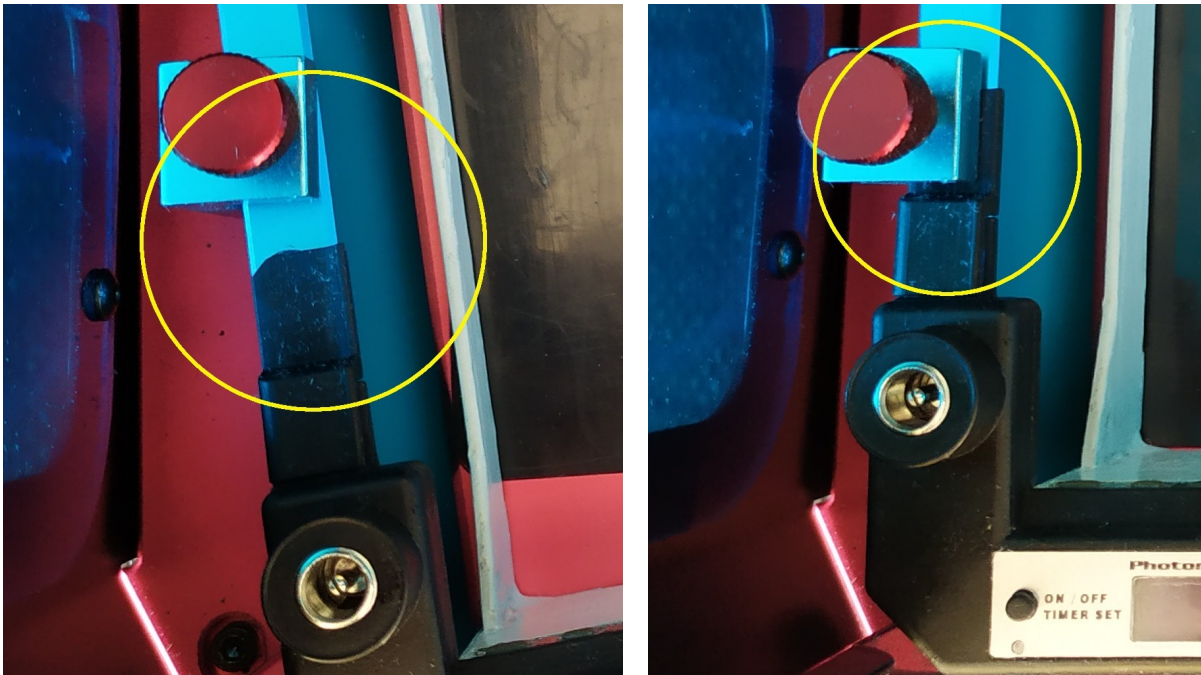
Put the vat into printer slightly angled as an image below:



Place the Heater in the vat as on image below. You may need to do this in two phases, first pushing the vat in, then moving the heater a bit, then moving the vat again. Repeat such a movement few times until vat slip into place.



The protrusion in the chassis of the heater control unit must go over the screw hole of the vat, under the screw which is inside the printer as shown on image below. The screw must be up before the vat and the heater are put into the printer.



When the vat and the heater are in the correct place, you can tighten the screws. Be careful that the vat, the heater and the screw are correctly aligned. Do not use much force. **Warning:** Wrongly aligned vat thus heater will be hit by buildplate of the printer and cause fatal damage to printer's LCD, vat's film and heater.

Other Printers

Put the vat into the printer. Put the heater into the vat in the same manner you put the vat, lowering it from above the vat directly downwards so that the pin of the printer goes into the hole of the heater chassis protrusion.

Connecting power

With the included or user supplied power adapter

Connect the power adapter's 5.2mm plug into the power input jack. Set the cord so that it cannot go near the buildplate when the plate goes down, and so that it comes out from between the printer's door and frame but does not prevent the door closing. If there is much daylight in room then consider making of hole to rear panel of heater's chassis and wire supply cable through it.

Connect the power adapter to a wall socket. The heater will be turned on; heating is OFF.

With the power cable connected to the printer's power source

Connect the power adapter's 5.2mm plug into the power input jack. Set the cord so that it cannot go near the buildplate when the plate goes down, and so that it comes out from between the printer's door and frame but does not prevent the door closing.

Connect the splitter end of the cord between the printer's power jack and its power adapter's plug. When the power adapter is plugged into the splitter, the heater will be turned on; heating is OFF.

Adjusting power budget

Heater is consuming around 44W @ 12V at full power. If power supply is not able to provide enough power or power supply is shared with printer then adjust amount of power heater is consuming. Disconnect heater from power supply or PC, hold down ON/OFF button and while holding the button, connect power supply or PC to heater. Power selection appears. Release ON/OFF button. Choose suitable power budget for heater by +/- buttons. Click ON/OFF button to confirm selection.

Photon users: Use 50% of power budget if you share same power supply with printer. **Warning:** higher power selection may cancel printing (printer reset may occur) due to lack of power both for printer and heater. In this case decrease power value.

Setting the temperature

Use the +/- buttons to increase or decrease the target temperature. This can be done when heating is ON or OFF. Metrics between Celsius/Fahrenheit units can be changed by holding down ON/OFF button and at the same time pressing + button (select Celsius) or – button (select Fahrenheit). Selected values are stored in heater's memory.

Setting the timer

Push the ON/OFF/Timer Set button down for ~3 seconds. Timer value will be highlighted. This can be done when heating is ON or OFF.

Use +/- buttons to set the time longer or shorter. Keep the button pressed for quickly flipping through values. Press the ON/OFF button when the wanted value is reached.

When heating is ON, the timer is in effect and separation mark between hours and minutes is going to blink. The time will count down to 00:00 and heating will go OFF. The previously set value is remembered if heater was in OFF state; Press ON/OFF to start heating again.

Heating

At first heating is OFF. Press the ON/OFF button to start heating. The previously set timer value is used. The timer will count down to 00:00 and heating will go OFF automatically. The heater will continue heating until the target temperature has been reached. Then it will keep the target temperature.

When heating is ON, press the ON/OFF button to stop heating.

Reading the display

The display shows the following information:

Heating ON/OFF	Time left (hours : minutes)
Measured temperature	Target temperature °C/F

Turning off

When heating is ON, press the ON/OFF button to stop heating. There is no power off function. Remove power cable to completely turn off the heater.

When the device is powered but OFF (not heating), it consumes about max 0.8W (@16V).

Removing Heater from the printer

The procedure for removing is reverse of installing.

After use

It is important to keep the heater clean. Otherwise the printing resin may stick to the elements.

Keep the controller unit safe from resin splatters and stains. The unit is relatively resistant against small splashes of liquid, but the power jack and the Micro-USB jack are not protected.

For cleaning use the same alcohol based solution with which the printer and other items are cleaned. Use soft cloth or paper.

Check the heater for scratches or other damage. Do not use it if there is any visible damage.

Tips for good printing results

The best results will be achieved if resin temperature is optimal according to manufacturer's specification and temperature of the resin is equal over whole printing area. Following tips helps to reach that goal:

- Turn heater on before printing for few minutes so that resin can pre-heat up to desired temperature faster. Use about five degrees higher temperature to speed up initial heating process before printing. Decrease temperature value to desired value at the beginning of printing.
- Fill resin up to horizontal edges of the heater elements so that heater elements can transfer heat to resin efficiently. Less resin will decrease efficiency of heat transfer thus reaching desired temperature of the resin will be slower process
- Stir resin before printing to equalize resin temperature over whole vat. Note resin will be heat up faster at edges but not so fast at centre so stirring resin from centre to edges will equalize/unify temperature over the vat. Monitor temperature value from panel during stirring until temperature wont drop much during stirring which means temperature starts to be equal over the whole area
- Heat up printing plate by controlling it's position to low level from printer's menu and sink it into resin during preheating before actual printing (optional)

Warning: Resins are sensitive to temperature so don't overheat the resin in long time to avoid unwanted polymerization (curing) of the resin.

Firmware updates

Go to the manufacturer's website and read the changelog to see if there are changes you may need. Do not update if there are no such changes. Download the control software.

Open the control software on a Windows PC. Attach heater to a USB port of the PC with a Micro-USB cable. Check that the status bar of the software tells that connection is OK. Select Tools → Update Firmware. Uploading the firmware to the device should take under 10 seconds. The device is restarted. The status bar of the control software shows 'USB error' for a moment, then the device is reconnected again.

Technical specifications

Maximum input power on 5.2mm power jack: 19V

Polarity of 5.2mm power terminal:

inner tap: positive (+)

outer ring: negative (-)

Heater maximum power at 12V power supply: 48W

Maximum heating temperature: 46°C/115°F (limited by software)

Upper limit of critical temperature: 50°C/122°F (limited by software)

PC Connection: Micro-USB

<http://camremotes.com>