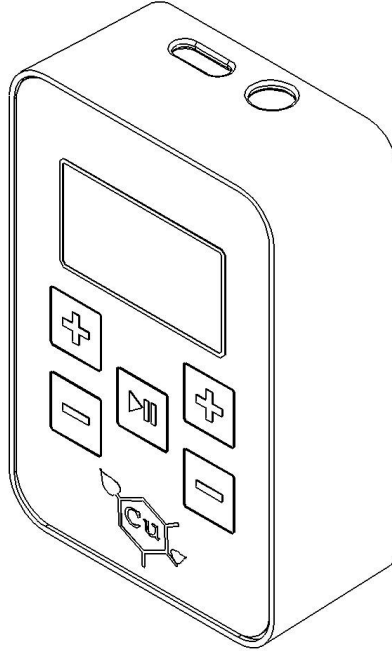


# Cu MiniForm XL

5 Amp Power Supply



Cu MiniForm XL Power Supply (rectifier) Specifications:  
Input (USB Type C): 5V 3A, 12V 3A, 20V 3.25A  
Output (5mm barrel type): 0-9VDC,  
Adjustable Constant Current 0.10-5.00A (0.01A increments)  
Handmade and assembled in the USA

USB-C Wall Adapter Specifications:  
Input (North American Standard): 100-240V 50/60Hz  
Output (USB Type C): 5V 3A, 12V 3A, 20V 3.25A  
Wall adapter made in China

## Set Up

Connect the red lead wire clip to the anode, and the black lead wire clip to the cathode.

Plug in the provided USB-C wall adapter to power on.

Tap the increase and decrease buttons to adjust the output current to the calculated amps. The coarse adjustment buttons (left side) will make large changes to the amperage setpoint, while the fine adjustment buttons (right side) will make small changes to the amperage setpoint.

To begin a project, tap the center start button. The lightning bolt indicator will illuminate when power is applied to the output leads.

While in use MiniForm may be warm to the touch, this is normal. Regardless of any power supply used, high current can generate significant heat if poor connections are made. Although MiniForm will attempt to regulate its own temperature, it cannot sense the temperature of external connections. Always ensure connections are clean and tight.

Do not allow liquid or moisture to contact the power supply.

Prevent corrosion by unclipping the output leads when not in use.

## Features

### Auto Regulated Voltage

When using MiniForm, the user will only need to set the amperage output, as the voltage will be self regulated based on the amperage setting, bath conductance, and resistance of the conductive paint.

### MilliRamp

MiniForm offers a unique feature called the MilliRamp, which improves the deposit of the initial layer of copper. The current will gradually increase over a short period until the set current level is reached. This will prevent over-plating of the suspension wire and initial copper layer while the early stages of plating are equalizing the surface resistance of the object.

To start a new project and reset the MilliRamp feature, either leave MiniForm on pause mode for 5+ minutes, or unplug and replug the unit from the USB-C wall adapter.

### Voltage View Mode

Press and hold the center start button for longer than 2 seconds to view the real time voltage being applied to the project. The display will revert back to normal operation as soon as the button is released.

### Temporarily Bypass MilliRamp

If the center start button is held for 5+ seconds, the output warning indicator will blink 3 times and MiniForm will jump to the user amperage setpoint. The center start button may be released at any time, or continue to be held to view voltage.

### Illuminated Indicators



Power Status



USB Warning



Output Warning

## Troubleshooting

### **Solid USB Warning Indicator**

The USB wall adapter and/or cable is not compatible with MiniForm. MiniForm will automatically limit the maximum amperage setpoint depending on the capabilities of the USB wall adapter. If the provided wall adapter and cable are being used, inspect for corrosion.

### **Solid Output Warning Indicator**

An abnormally high voltage is detected, this can be due to very small surface area, series connected baths, or poor connections. This will not always mean something is wrong, but that the setup should be double checked. Sometimes this indicator will temporarily illuminate if the initial copper growth is slower than normal. Refer to Table 4 in the technical datasheet for suggested series connections.

### **Connection Issues**

MilliRamp begins by applying an extremely low current for 30 to 60 seconds to attempt to establish a copper bond with the conductive paint. While this is happening, the output warning indicator will not illuminate, even if there is a poor connection. After this time, if an open connection is detected in the circuit, the output warning indicator will illuminate.

Output warning errors can be caused by a superficial connection between a conductive busbar and the suspension wire, or if corrosion is present. Check that the lead wire clips are securely connected to the anode and cathode wires, and that the anode and cathodes are not touching. Scrub clean any corrosion present.

To maintain a good connection, keep MiniForm's surface, lead wire clips, anode, conductive bus bar, and suspension wire free from corrosion, which can be caused by splashes, droplets, or prolonged proximity to the electroforming solution.

Only use bare copper for the cathode suspension wire and anode. Do not use products that have a coating or anti-tarnishing film over the conductive wire. This will block the current from flowing through the circuit.

For troubleshooting on the electroforming process, consult the tutorial manual.

The Cu MiniForm XL was proudly designed, fabricated, programmed, and hand assembled in the U.S.A. by Mike Smith of MicroDean Systems.

See the electroforming manual for full instructions on how to electroform using the Cu MiniForm XL:

**[Enchantingleaves.com/Electroforming-Tutorial](https://enchantingleaves.com/electroforming-tutorial)**

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