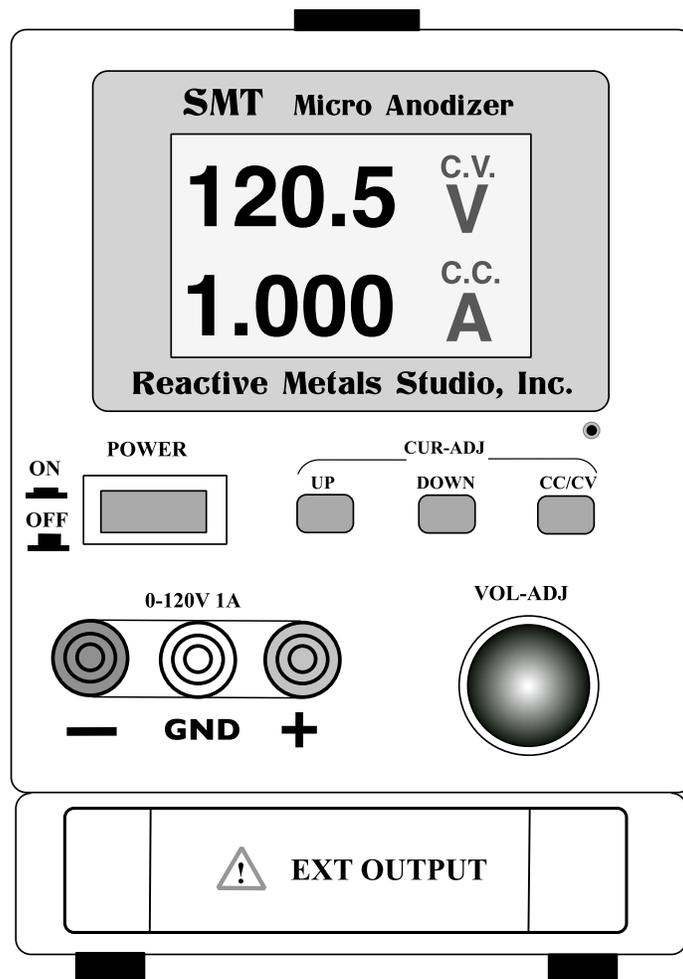


Instructions

SMT Micro Anodizer[®]

0-120VDC/0-1A



Reactive Metals Studio, Inc.

PO Box 890 Clarkdale, AZ 86324
www.reactivemetals.com
928/634-3434 • 800/876-3434 • F928/634-6734

INSTALLATION

Inspection

As you unpack your SMT, inspect it for any obvious damage that may have occurred during shipment. If there is damage, notify the carrier and Reactive Metals Studio, Inc. Warranty information is printed on page 6. Save the shipping carton and packing materials in case the SMT has to be returned. If you need to return the SMT for service, call for authorization and instruction. Attach a tag identifying the owner with a brief description of the problem.

Location And Cooling

Your SMT is ready for bench operation after connection to an 110-120 Vac power source. It is cooled by a thermostatically controlled fan. Sufficient space should be allotted so that a free flow of cooling air can reach the sides and rear of the instrument when it is in operation. It should be used in an area where the ambient temperature does not exceed 40 degrees C (104°F).



Do not install on a metal work surface.

Power Cord

This SMT is equipped with a three conductor power cable. The third conductor or offset pin on the power plug is the ground connection. In no event should this instrument be operated without an adequate ground connection.

SAFETY SUMMARY

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates the safety standards of design, manufacture, and intended use of the instrument. Reactive Metals Studio, Inc assumes no liability for the customer's failure to comply with these requirements.

GROUND

This product is a Safety Class I instrument (provided with a protective earth terminal). To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical ground. The instrument must be connected to the AC power supply mains through a three-conductor power cable, with the third wire firmly connected to an electrical ground at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury. If the instrument is to be energized via an external autotransformer for voltage reduction, be certain that the autotransformer common terminal is connected to the neutral (earthed pole) of the AC power lines (supply mains).

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the instrument in the presence of flammable gases or fumes.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified service personnel. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power, discharge circuits and remove external voltage sources before touching components.

SAFETY SYMBOLS

The  **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a **WARNING** sign until the indicated conditions are fully understood and met.

Specifications

INPUT: 110-127 Vac +/- 10%, 60Hz

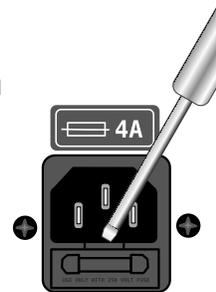
OUTPUT: 0-120Vdc, 0 to 1.00 Amp

Refer to the Operating and Service Manual for detailed specification.

SIZE: 7.25"H x 5.0" W x 10.5"D (18.4cmH x 13cmW x 26cmD)

FUSE: F4 AL, 250 Volt, 5x20mm. The fuse is located below the AC input in the back. Below the plug there is a small indent in the plastic. Pull straight out with a small screw driver. It is like a drawer.

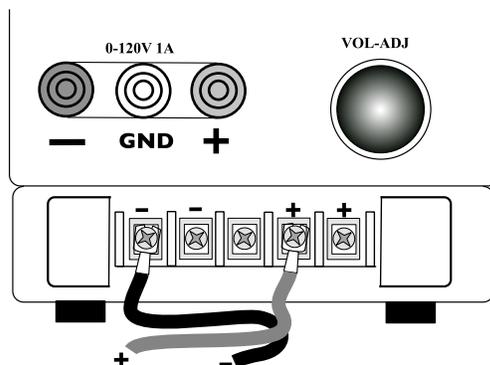
The inside fuse is the one in service. The fuse closest to you is a spare. Test with a multi-meter. Fuses are available at Radio Shack and similar outlets.



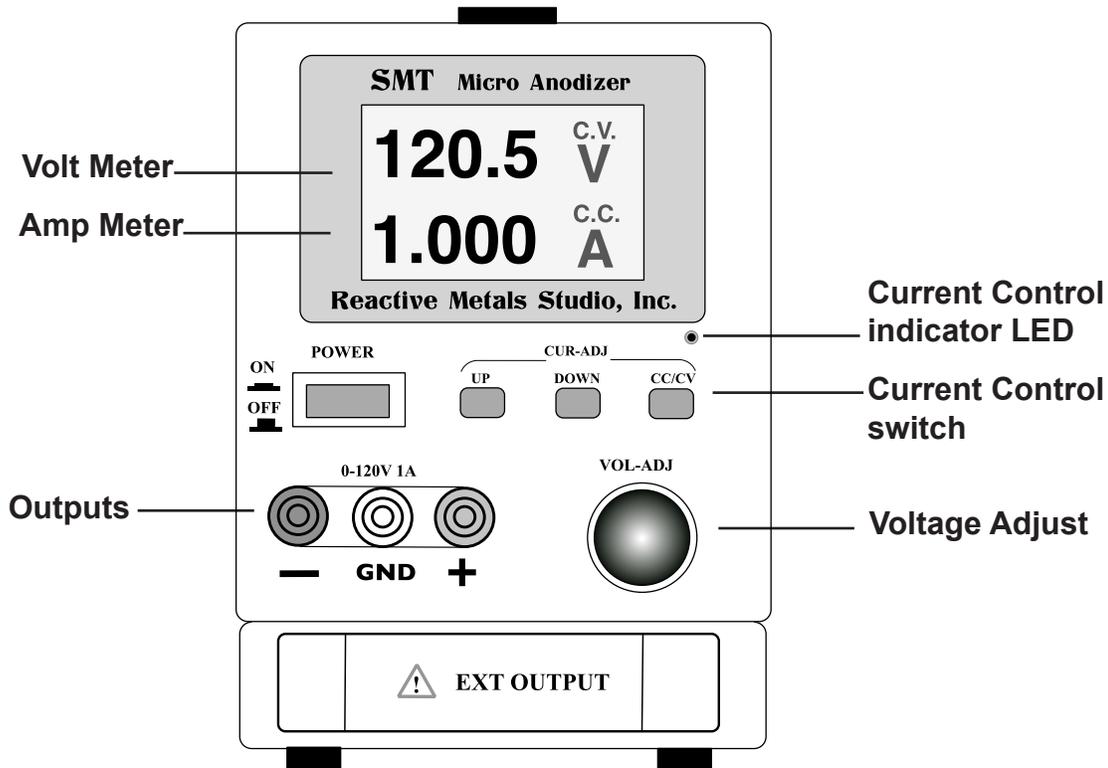
Permanent Installation

There is a removable panel on the front that allows for permanent installation of the leads. To remove the cover slide it up and out.

 **Replace the cover before attempting to use.** 



Note: For the purposes of these instructions the terms Current, Amp and Amperage are used interchangeably.



The built in **Multimeter** shows both **DC VOLTS** and **AMPERAGE**. The voltage is set and can be changed by turning the ten turn **VOLT-AGE ADJUST** knob. Voltage can be set accurately and will be indicated on the top row of numerals. The **AMPS/AMPERAGE** is set with the **UP/DOWN CURRENT ADJUST** buttons. Current output is shown in the bottom row of numerals.

The illustration reads 120.5 Volts dc with an available amperage of 1.000 Amp.

NOTE: Due to small variations in input voltage and component specifications the meters may not always indicate zero output. The indications are tiny and will not affect the anodizing process.

Turn-On Checkout Procedure

The following checkout procedure describes the use of the front panel controls and indicators and ensures that the supply is fully operational:

- Attach the power cord to the rear plug. Connect it to a grounded 120 volt wall outlet.
- Push the **POWER** button to the **ON** position.
- Turn **VOL-ADJ** control fully counter clockwise to ensure that output decreases to its lowest setting, then turn it fully clockwise to ensure that output voltage increases to the maximum of approximately 120 Vdc. Return the voltage to the lowest setting. Press the **POWER** button **OFF**.

Shock Hazard

Be sure the power is OFF before making

output terminal connections.

- Install the two banana leads in the plugs that match their color: Black/cathode or -. Red/anode or +.
- To test and adjust the current output the two leads must be connected together forming a short circuit.
 - Connect the Red and Black leads together with the alligator clips.
 - Turn the SMT **ON**.
 - The amperage should be indicated on the meter. If the indication is less than 1 Amp, turn the voltage up about 1/4 turn. The meter should read 0 Volts and 1.00+ Amps.
 - Push the **CC/CV** button **IN**, the green light indicating the circuit is active comes **ON**. You can now adjust the amperage through its full range with the **UP/DOWN** buttons. Press and hold the **DOWN** button and the meter should indicate decreasing current. It should indicate .000 Amps. Press and hold the **UP** button to increase the current to the original setting. It should indicate 1.00+ Amps. Some slight variation may appear due to the input voltage.
- Turn the voltage **DOWN** and disconnect the two shorted leads.

Having completed this check in procedure you are now ready to set up and start anodizing.

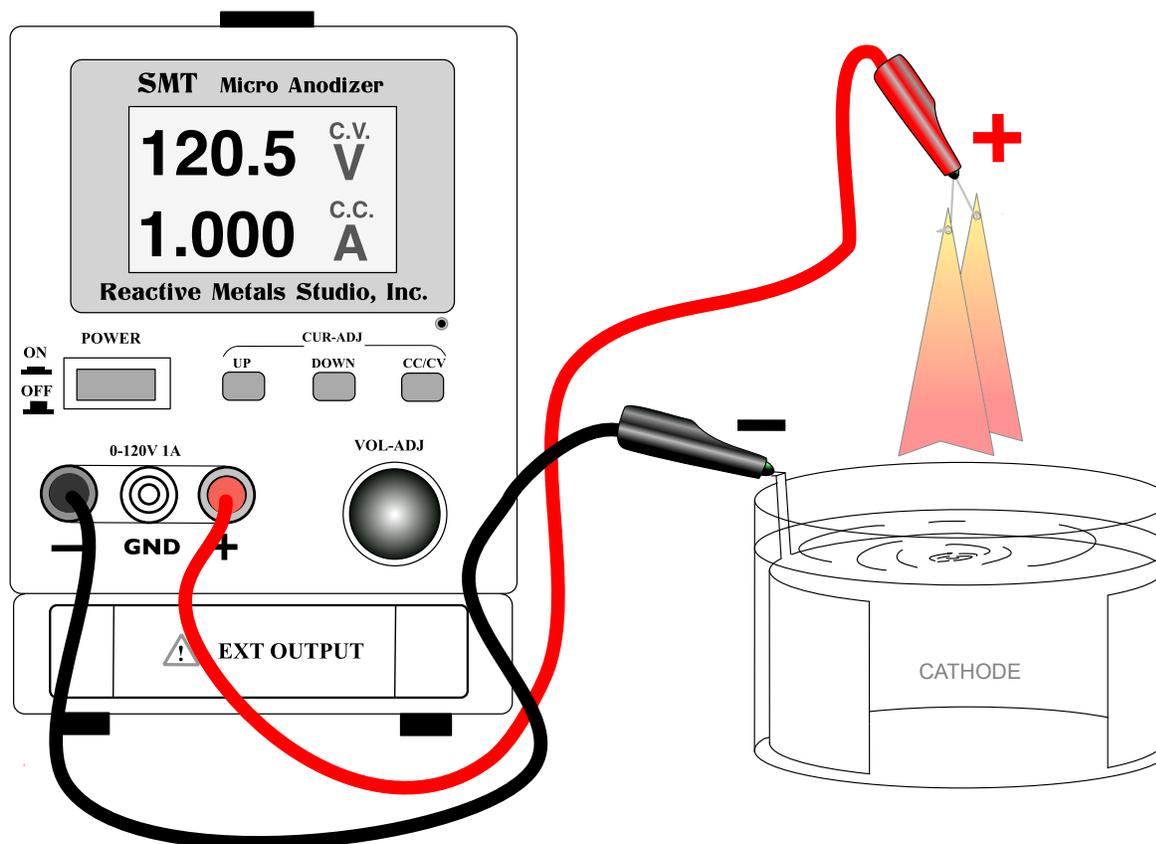


WARNING



ON/OFF: It is very important to turn the unit **OFF** and the **VOLTAGE DOWN TO ZERO** when not in use. It should become a habit!
 This simple procedure will help prevent electrical shock.
DO NOT TURN UP THE VOLTAGE AND PUT YOUR PIECE IN THE BATH.
THIS MAY DAMAGE YOUR MACHINE AND VOID YOUR WARRANTY. ALWAYS START FROM ZERO!

THE BATH ANODIZING SETUP



VOLTAGE: The **VOL-ADJ** knob is used to set voltage output, this in turn controls the color generated. It is a ten turn pot which allows for very accurate control. The voltmeter indicates the voltage available prior to applying a load. The voltage can be adjusted at anytime. During anodizing the voltage will drop and then return as the color develops. Always turn the voltage **DOWN to Zero** when you turn the SMT **OFF**.

CURRENT: The current or amperage that is available controls the speed of anodizing. High current is fast and is good for bath anodizing. Lower current is slow and good for very small applicators and brushes. In practice most anodizing operations you will **NOT** require **CURRENT CONTROL**. The green **CC/CV** light should be **OFF**. Current limiting is rarely used. During anodizing the process will draw all the current that is available. As the voltage setting and color nears the current will begin to fall towards 0.

Practice will dictate the current levels and speeds you prefer. The process for checking the current output on the previous page(d & e) are the same as used to preset the current for anodizing.

OUTPUT: Plug the **RED** lead into the **+** or **ANODE OUTPUT**. This is the lead that will always connect to your work. Plug the **BLACK** lead into the **-** or **CATHODE OUTPUT**. This lead will attach to the metal cathode strip in the anodizing bath. It will also connect to the cathode in applicators like brushes and sponges.

(The **GREEN** center plug is **GROUND** is not used in this process.)

ANODIZING QUICK START



Electrical shock hazard!

Wear rubber gloves at all times.

The following is a step by step procedure to quick start you into anodizing. Please read the copy of Studio Preparation and Coloring of Titanium that came packed with your SMT. It contains more detailed information.

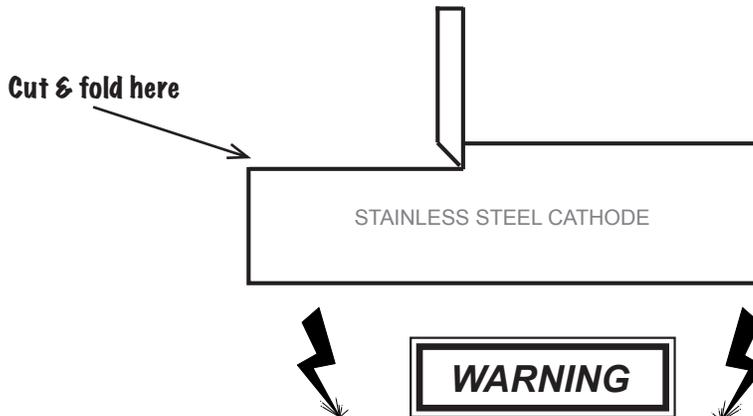
Electrolyte

Many different solutions (electrolytes) may be used for anodizing. We recommend TSP-PF a low sudsing, phosphate free detergent. Products similar to this include automatic dish washer detergents and may be substituted. The water can be distilled or demineralized bottled water. Do not use tap or well water. A 1/2 cup of dry TSP-PF per gallon of water is sufficient for most anodizing, although as much as 1 cup can be used. Add the dry ingredient to the water and mix well. (For standard TSP use 1-1/3 cups to a gallon of distilled water).

A lidded plastic container is best suited for an anodizing tank. Pick a small container, no more than a quart (liter). It should relate to the size of your work and can be as small as a cup. Mark the container well, so that it will not be confused with other containers or used for food.

Cathode

A stainless steel foil strip was included in your package. This will wrap around the inside of your container as shown in the illustration. Cut a 1/4 x 3 inch long strip along the top edge and fold it up. This should reach above the container edge and will be where the **BLACK(-)** cathode lead attaches. The plastic mesh can be used to line the inside of the tank and help prevent contact.



The alligator clips cannot be submerged in the electrolyte.

Only reactive metals can be in the bath as the anode.

- 1) The bath is ready, cathode is in place and the **BLACK(-)** lead is connected to the cathode.
- 2) **Put on your rubber gloves.**
- 3) Turn the SMT **ON**.
- 4) Set the CC/CV to **OFF**. (Green light OFF.)
- 5) Set the VOLTAGE to zero.
- 6) Attach a piece of titanium or niobium to the **RED(+)** lead.
- 7) Submerge the metal in the center of the bath. (Not the alligator clip!)
- 8) Turn the voltage up slowly. As the color begins to appear slowly lift the metal out of the bath. This will produce a rainbow of color. Practice and you will soon be able to run the full range. To get a solid color, simply immerse the metal and turn up the voltage to achieve the color you desire. At this point it would be helpful to make a color chart by voltage for reference. **DO NOT TURN UP THE VOLTAGE AND PUT YOUR PIECE IN THE BATH. THIS MAY DAMAGE YOUR MACHINE AND VOID YOUR WARRANTY. ALWAYS START FROM ZERO!**

To learn more see your copy of Studio Preparation and Coloring of Titanium.

Anodizing Applicators

Almost any absorbent material can be used as an anodic brush. Some arrangement must be made with each for a metal cathode to be in contact with the material. The cathode alligator clip can simply be clipped to the metal ferrule of an artists brush (nylon bristle). Safer and easier to handle is a brush with a cathode lead wire permanently soldered to the metal ferrule. The ferrule can then be protected with electrical tape or shrink tubing. A banana plug can be installed to the end of the wire for easy plug in to the SMT Micro.

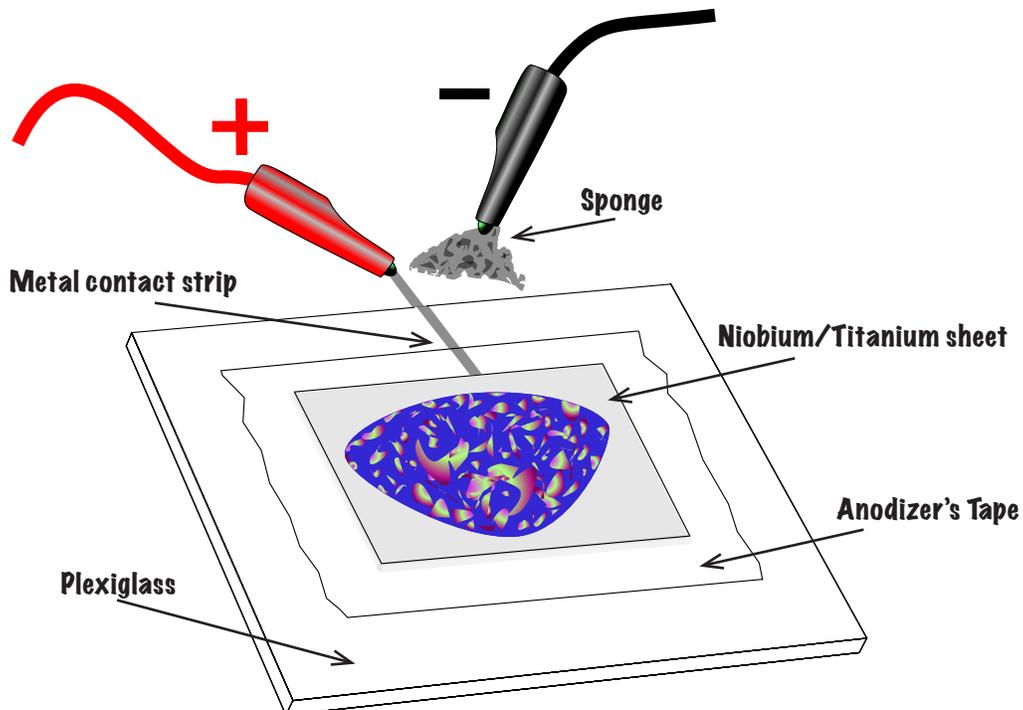
Solder here.



Wrap with electrical insulation.



A piece of sponge, fabric or even paper can be moistened in the electrolyte, attached to the Cathode alligator clip and used to paint or even print its image. Your metal can be taped to a non-conductive surface and worked on like a canvas.



General Description:

Your new DC Regulated Power Source provides accurate & stable DC power. The multi-turn voltage control knob helps the user accurately dial in a precise voltage. The large easy to read LCD accurately displays the outputs (voltage & current) . This product incorporates SMT PC boards (Surface Mount Technology) & a built in cooling fan for reliable performance & long life.

Features:

- *SMT adhesive sheet element technology for internal printed circuit board construction
- *Attractive yellow large liquid crystal display shows voltage & current
- *Built in cooling fan
- *Multi-loop high precision voltage regulation
- *Progressive current regulation
- *Dual terminal system. Safety banana style or expandable screw terminals
- *Overload protection circuit
- *Low ripple voltage: < 1mV P-P
- *Output polarity: positive or negative
- *Rugged reinforced metal frame construction

Specifications:

Voltage Current Display

RMS12001X 0-120VDC 0-1A 100mV 1mA

Source effect: $5 \times 10^{-4} = 2\text{mV}$

Load effect: $5 \times 10^{-4} = 2\text{mV}$

Ripple coefficient: < 250uV

Stepped current: 30mA +/- 1mA

Voltage Indication Accuracy LCD +/- 1% + 2 Digits

Current Indication Accuracy LCD +/- 2% + 2 Digits

Ambient Temperature 0 ~ +40 o C

Humidity < 90%

Dimensions (Single) 18cm(W) x 13cm(H) x 26cm(D)

Weight 6.8kg

Warranty Statement:

The manufacturer warrants this product to be free from defects caused by workmanship or production error for a period of 12 months after the initial purchase date. The manufacturer will, at it's option, repair or replace any defective unit with a working unit after the defective product has been returned, freight prepaid. Should you have a defect that is covered by this limited warranty, please contact Reactive Metals Studio, Inc. (1-800-876-3434/ 928/634-3434) for return authorization prior to shipping. Products that are damaged from misuse are not covered by this limited warranty.