



Sharing your passion for making jewelry.  
Products. Service. Know-how.

# Using Your SMT Micro Anodizer<sup>®</sup>

0-120VDC/0-1A

## Installation

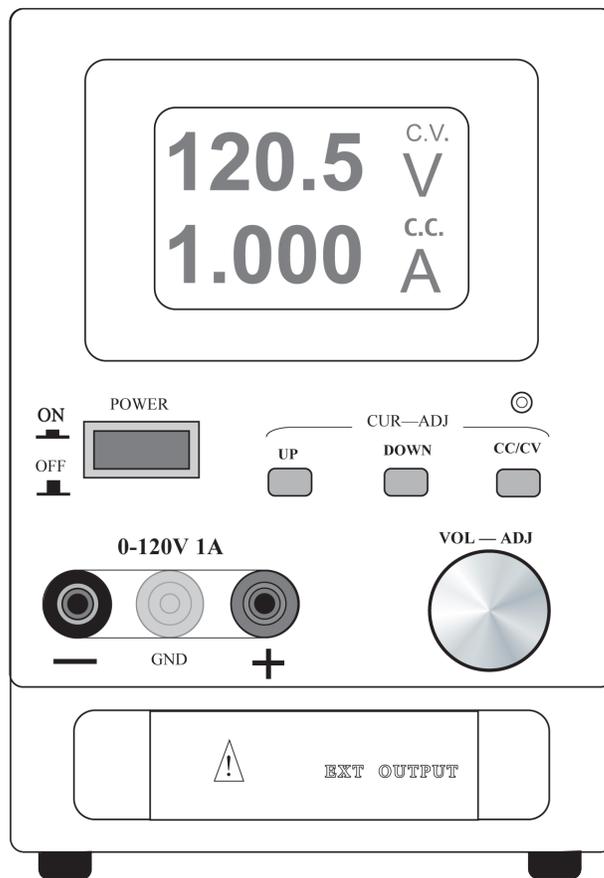
### Inspection

When you receive your power supply, inspect it for any obvious damage that may have occurred during shipment. If there is damage, notify the carrier and Reactive Metals Studio, Inc. immediately.

Warranty information is printed on the inside front cover of the factory manual. Save the shipping carton and packing materials in case the supply has to be returned in the future. If you need to return the supply for service, call for authorization and instruction. Attach a tag identifying the owner and model number. Also include a brief description of the problem.

### Location And Cooling

It is shipped ready for bench operation after connection to an ac 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 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 or next to metal plumbing fittings.**

### Power Cord

This instrument is equipped with a three conductor power cable. The third conductor is the ground conductor and when the cable is plugged into an appropriate receptacle, the instrument is grounded. The offset pin on the power cable three prong connector is the ground connection. In no event should this instrument be operated without an adequate cabinet ground connection.

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

## 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 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 (safety 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).

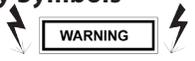
### Do Not Operate in an Explosive Atmosphere

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  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

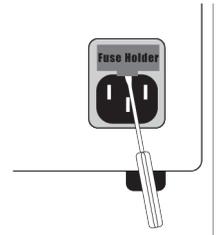
INPUT: 110-127 Vac +/- 10%, 60Hz

OUTPUT: 0-120v, 0 to 1.00a

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)

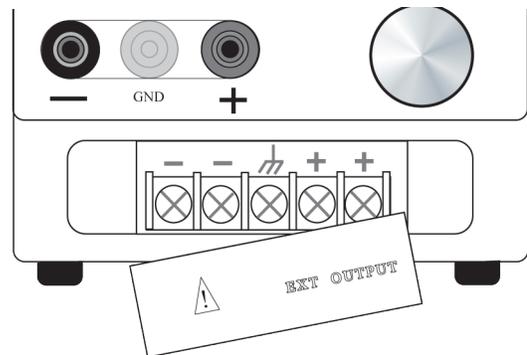
FUSE: F4 A, 250Volts. The fuse is located above the AC input in the back . Above the plug there is a small indent in the plastic. Lift straight up with a small screw driver. The bottom fuse is the one in service. The top fuse is a spare. Test with a volt meter. Fuses are available at Radio Shack and similar outlets. Fuse Holder

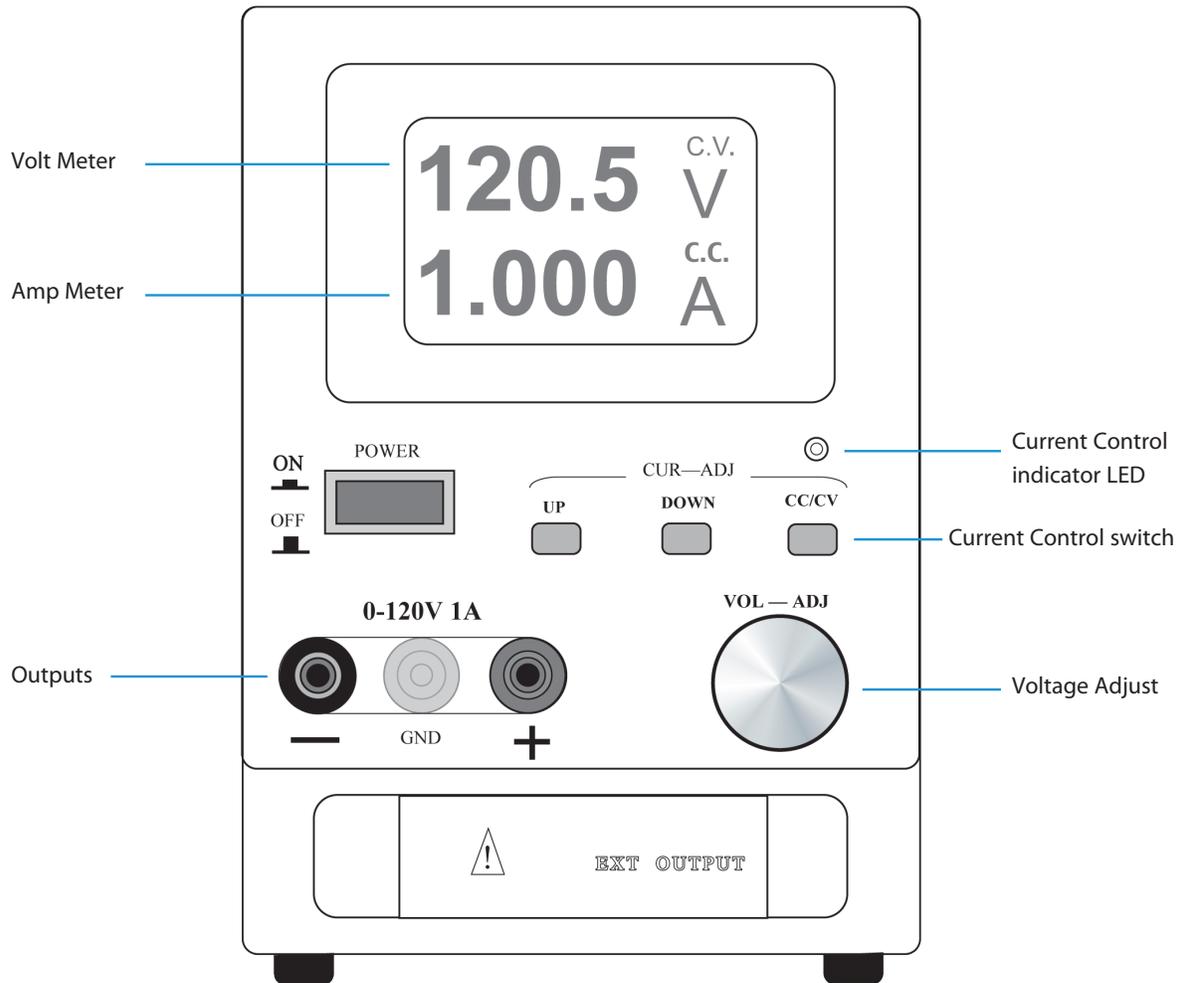


## Permanent Installation

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

\*Replace the cover before attempting to use.





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

The illustration reads 120.5 volts with an available amperage of 1.000A.

## Turn-On Checkout Procedure

The following checkout procedure describes the use of the front panel controls and indicators and ensures that the supply is 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 0 Vdc, then turn fully clockwise to ensure that output voltage increases to the maximum output voltage of approximately 120Vac. Return the voltage to zero.
- Install the two banana leads in the plugs that match their color.  
Black/cathode or –.  
Red/anode or +.
- Clip the two leads together. Turn the voltage up about 1/4 turn. (0 volts will be indicated.) Push in the **CC/CV** button, the green light comes on. It is now operating with Constant Current Control. You can now adjust the amperage through its full range with the **UP/DOWN** buttons. It should indicate .00 to 1.00 amps. Some slight variation may appear due to the input voltage. f. Turn the voltage down and disconnect the two shorted leads.



Shock Hazard  
Disconnect ac power  
before making output  
terminal connections.





**LINE-ON/OFF:** It is very important to turn the unit **OFF** and the **VOLTAGE DOWN** when not in use. It should become a habit. Learning this procedure will help prevent electrical shock.

**VOLTAGE:** The adjust knob is used to set voltage output. 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 comes up. Always turn the voltage **DOWN** when you turn the anodizer 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 applicators and brushes. For most anodizing operations you will want to use **CURRENT CONTROL**. The green **CC/CV** light should be **ON**.

During anodizing the process will draw all the current that is available instantly. As the voltage setting and color nears the current will begin to fall towards 0.

Practice and your own preferences will dictate what current levels you like to work at. The process for checking the current output on the previous page(d & e) are the same as used to preset the current for anodizing.

d. Install the two banana leads in the plugs that match their color.

Black/cathode or -.

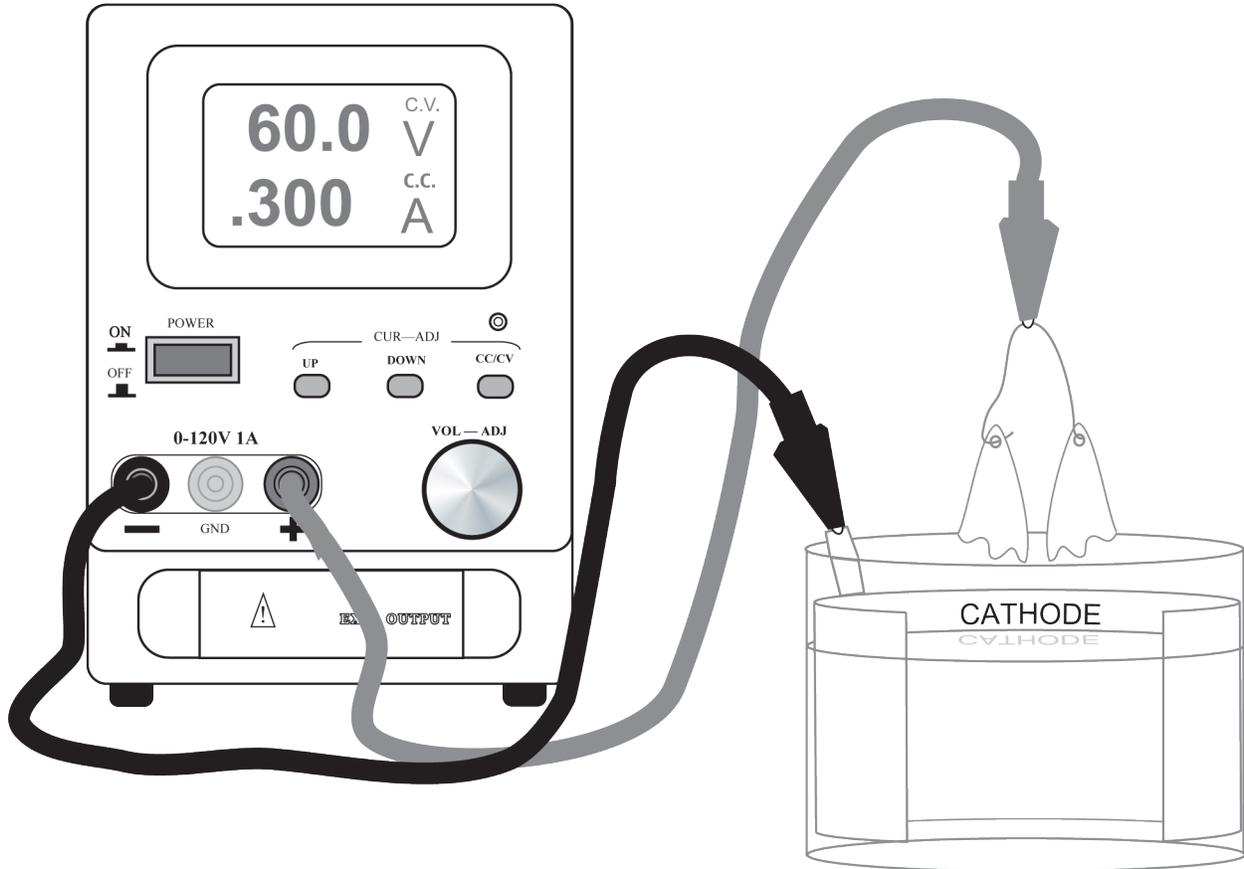
Red/anode or +.

e. Clip the two leads together. Turn the voltage up about 1/4 turn. (0 volts will be indicated.) Push in the **CC/CV** button, the green light comes on. It is now operating with Constant Current Control. You can now adjust the amperage through its full range with the **UP/DOWN** buttons. It should indicate .00 to 1.00 amps. Some slight variation may appear due to the input voltage.

f. Turn the voltage down and disconnect the two shorted leads.

You are now ready to anodize. Current level may be changed at any time. If the anodizing is progressing too fast or heat and steam are being generated, turn the amperage down. It is best to start to slow and speed things up as you get familiar with the process.

## The Completed Anodizing Setup



**OUTPUT:** Plug the **RED** lead into the + or **ANODE OUTPUT**. This is the lead that will always attach to your work.

Plug the **BLACK** lead into the - or **CATHODE OUTPUT**. This lead will attach to the metal cathode strip in your anodizing bath. It will also connect to the cathode in applicators like brushes and sponges.

(The green/center output is ground and is not used during anodizing.)

# 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 anodizer. It contains more detailed information.

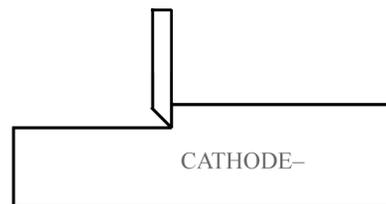
### Electrolyte

Many different solutions (electrolytes) may be used for anodizing. We recommend TSP(Tri Sodium Phosphate). This is a low sudsing 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 cup of dry TSP per gallon of water is sufficient for most anodizing, although as much as two cups can be used. Add the dry ingredient to the water and mix well.

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. 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 the tank edge and will be where the **BLACK(-)** cathode lead attaches.



## The alligator clips cannot be submerged in the electrolyte.

*Only the reactive metals can be in the bath.*

- 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 ON the anodizer.
- 4) Set the CC/CV to ON. Set the amperage level at .30a as described on page 2.
- 5) Set the VOLTAGE to 0 Volts.
- 6) Attach a strip 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 the voltage up to achieve the color.

At this point it would be helpful to make a color chart by voltage for reference.

To learn more see your copy of [Studio Preparation and Coloring of Titanium](#).

# Manufacturer's Guide

Single Output DC Bench Power Supplies With Large LCD

CSI12001X.....0-120VDC/0-1A Regulated Power Supply

## General Description:

Your new DC Regulated Power Source provides accurate & stable DC power. It is ideal for test benches, laboratories, schools & repair facilities. 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 & a built in cooling fan for reliable performance & long life.

### Features:

- \* SMD adhesive sheet element technology for internal pcb construction
- \* Attractive yellow large liquid crystal display shows voltage & current
- \* Built in cooling fan
- \* Multiloop 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

CSI12001X 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

### 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 its' option, repair or replace any defective unit with a working unit after the defective product has been r-eturned, 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 an RMA number prior to returning the unit. Products that are damaged from misuse are not covered by this limited warranty.

## General Specifications:

Description : Utilizes SMD technology

Single/ Dual Output Light and Compact

Output Polarity: Positive and Negative

LCD Display showing Voltage and Current value

Low Ripple Voltage Less Than 1mV P-P

Overload Protection Circuit

Input Voltage 110-127VAC +/- 1 60hz +/- 2%50Hz +/- 2Hz

Voltage Regulation CV <math>\leq 5 \times 10^{-5}</math> mV CV <math>\leq 5 \times 10^{-5}</math> mV

Load Regulation CV <math>\leq 5 \times 10^{-5}</math> mV CV <math>\leq 5 \times 10^{-5}</math> mV

Ripple & Noise CV < 0.5mV r.m.s. CC < 2mA r.m.s.

Protection Current Limiting

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

Accessory Instruction Manual, Power cord, Test Lead

## 2. Operation

### 2.1 Front Panel Controls.

- (1) Current Indication
- (2) Voltage Indication
- (3) Fine (10 Turn) adjustment of Voltage
- (4) Up/Down Adjustment of Current
- (5) Power On/Off
- (6) Negative Output Terminal
- (7) Positive Output Terminal
- (8) Ground Connection
- (9) Constant Current Indicator
- (10) Constant Current Switch
- (11) External Power Output Connection

The unit has one output display. The display has 2 readings. One is Voltage and the second is Current. The Voltage is 0-120 Volts with 0-1Amps. This unit has a fan that turns on when the temperature reaches 140°F(60°C). It takes a standard 110VAC input only and is fuse protected.



### 2.2 Operating Procedure

2.2.1 For constant Voltage mode make sure #10 is depressed and the LED #9 is off.

By rotating the knob of #3 to the right increases the voltage output and rotating it to the left decreases the voltage output.

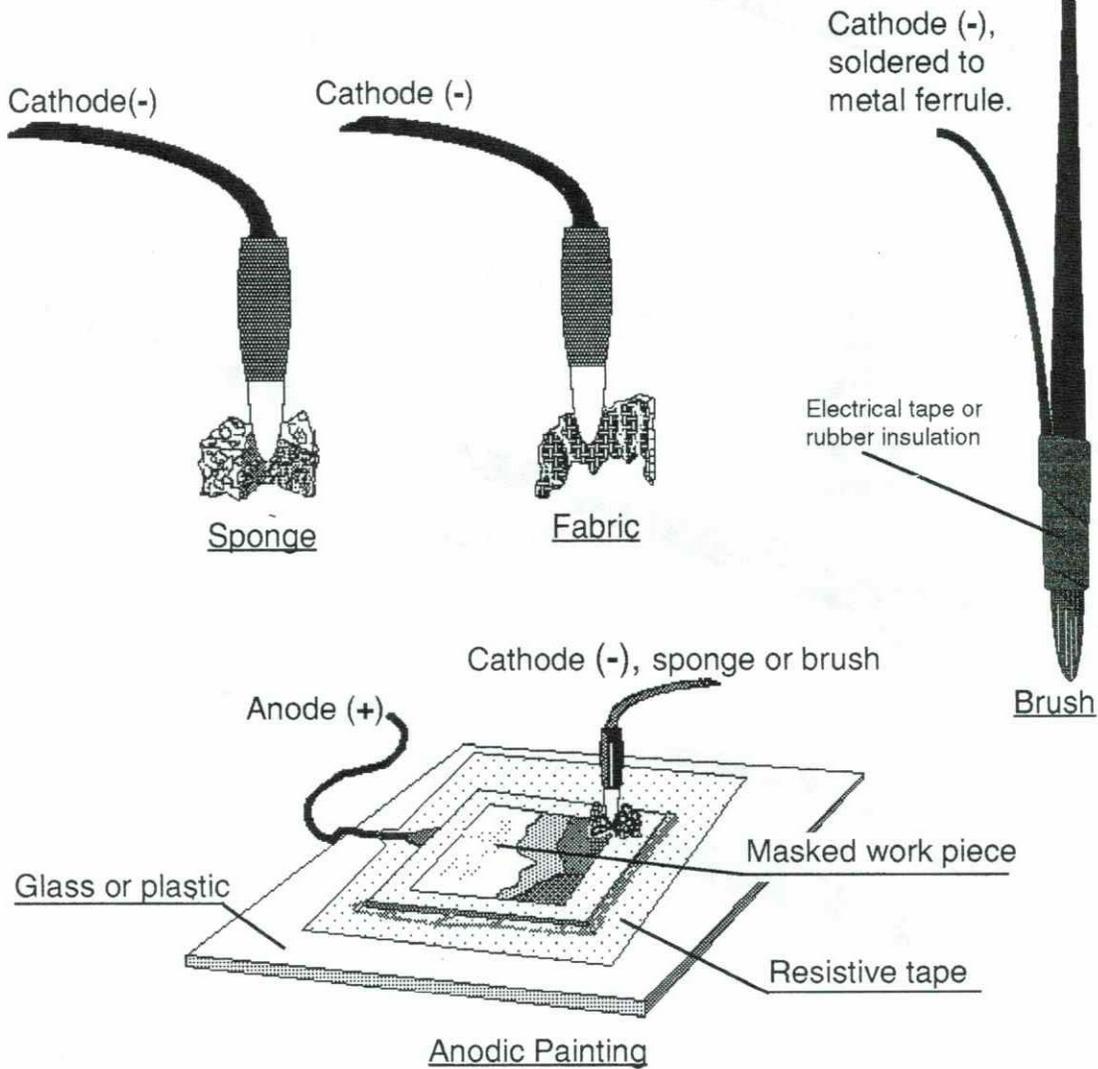
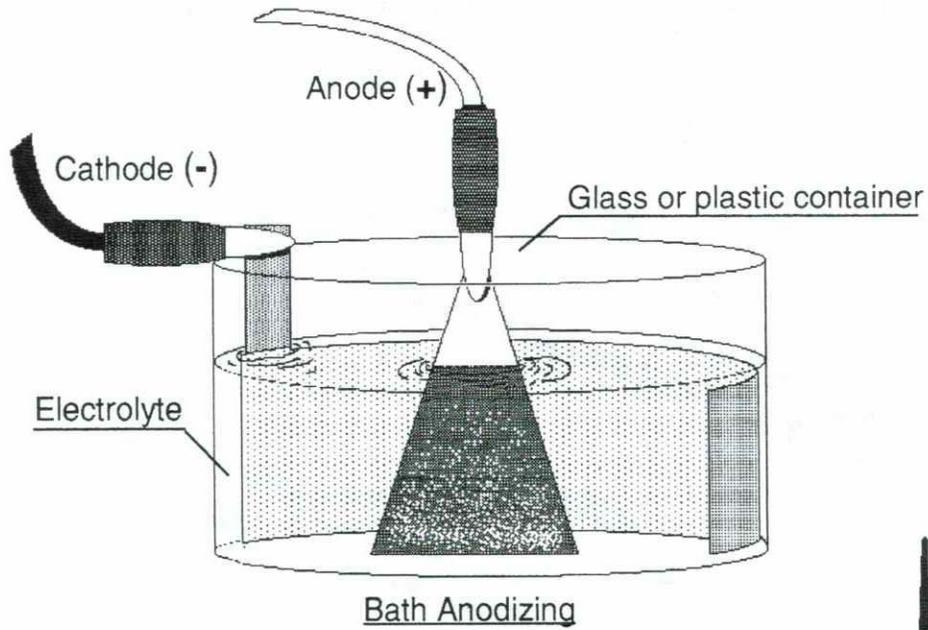
## 3. Attention:

3.1 The mains power must be switched off before servicing and servicing should be referred to a qualified person.

3.2 The unit should be stored in a dry and well ventilated place and the power cord removed for long periods.

## 4. Accessories:

- 4.1 Power cord ————— one piece
- 4.2 Instruction Manual—— one piece
- 4.3 1 set of Banana plug to Alligator Clips
- 4.4 1 set of hook up wires for external hook up.



# Applicators

Almost any absorbent material can be used as an anodize paint brush. Some arrangement must be made with each for a metal cathode to be in contact with the applicator. An artists paint brush should have a wire soldered directly to the metal ferrule (see the diagram). The ferrule should then be protected with shrink tube (available in electronic supply stores) or electrical tape to prevent metal to metal contact which can damage your work and the anodizer.

A piece of sponge, fabric or paper can be pinched into the **black (-)** alligator clip and used to print its texture on the surface. The alligator clip becomes the cathode. Care should be taken not to let the metal cathode come in contact with your work.

