



The Jewel Master Pro HD

Users Guide



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Welcome

Congratulations on purchasing your *Jewel Master Pro Series* bench-top plating system. With the *Jewel Master Pro Series* you will be able to easily set-up and perform many important plating operations that were not feasible with any other plating system. The *Jewel Master Pro Series* was designed to meet exacting specifications to allow professional plating results with a self contained, easy-to-use system.

First Step:

You should read the safety section of this manual, including the Safety Data Sheets.

Second Step:

We recommend that you read this manual to learn about the features and components of the *Jewel Master Pro Series*. After you have familiarized yourself with the plating process using your new system, you should plate the item(s) included with your Quick Start Guide to see how simple bench-top plating can be.

Safety

The person using the *Jewel Master Pro Series* should read this safety section completely before beginning operation of the *Jewel Master Pro Series*. The user should review and understand the Safety Data Sheets (SDS) for all the products being used prior to using the *Jewel Master Pro Series* plating system. The “SDS” sheets should be kept in a location that will make them readily accessible in the event of accidental exposure or spillage of the product.

Using your Jewel Master Pro Series safely depends on following a few simple safety rules. While we have taken extensive measures to protect the user, there are several common sense rules that are important to follow in using your Jewel Master Pro Series Plating system:

Personal Protection

The first safety consideration is the use of proper personal protection equipment such as a face shield, safety goggles or safety glasses. Whichever you choose, it is imperative that the solution is prevented from getting into the eyes. Should this happen, the eyes should be flushed with water and medical attention received as indicated on the Safety Data Sheet for the product that caused the exposure. We recommend the use of rubber or latex gloves to prevent contact of the solutions with the skin. It is also advisable to use chemical resistant sleeves and an apron to protect clothing since it is possible that some of the solutions can damage clothing. Certain processes such as electro-cleaning and activation and some plating operations can produce corrosive vapors that may irritate the eyes, nose, throat and skin. Use of the *Jewel Master Pro Series* should be done in a well-ventilated area. The use of a fan to disperse vapors can reduce the risk of excessive exposure to corrosive vapors.

Handling Chemicals Safely

The chemicals you will be using with your *Jewel Master Pro Series* plating system are serious electroplating solutions that could provide a significant risk to personal health and safety. The solutions may be either a corrosive or toxic liquid or in some cases, both. Improper use of the solutions provided with your *Jewel Master Pro Series* could lead to serious injury or death. Any of the solutions provided may be harmful or fatal if swallowed and could cause serious chemical burns to exposed skin. These solutions are intended for professional use, only to be used by responsible, trained adults. The person using the *Jewel Master Pro Series* should read this safety section completely before beginning operation of the *Jewel Master Pro Series*. This Safety section includes the Safety Data Sheets, (SDS) for the chemicals that come with the system. These sheets will inform you of many important aspects of the chemicals that you will be using.

Chemical Storage Safety

The chemicals provided with your *Jewel Master Pro Series* plating system and the rinse water generated by using the *Jewel Master Pro Series* must be properly stored in a secure, cool location that is not accessible to children or other un-authorized persons. **Never store any of these solutions in un-marked containers or in any container that could lead to improper use or disposal of the solutions or rinse water.** The rinse water produced by the plating operation may be considered a hazardous material that must be collected, stored and disposed of in accordance with all local, state and federal laws. If you are unsure of the applicable laws you can check with the local water reclamation district (sanitary sewer district), local or state environmental health and the federal Environmental Protection Agency.

Electrical Hazard

In the event of failure of the *Jewel Master Pro Series* Plating console to operate as indicated in this manual, call Gold Plating Services for recommendations on how to proceed. Do not open the power supply or plating console, there are not any user serviceable components inside and opening the unit will revoke the warranty.

Make sure the power supply is connected to a properly grounded outlet. If the *Jewel Master Pro Series* is going to be used near fixed plumbing we recommend that the outlet be “Ground Fault Protected”. The actual pretreatment and plating voltages are normally very low, usually less than 12 Volts Direct Current. The heater is electrically isolated and should not produce an electrical shock hazard under normal operating conditions. Never immerse the Power Supply or Plating Console in water. Immersion of either of these units could damage the electrical components and void the warranty. The AC power input cords should be maintained in good condition. The cord to the control can be replaced with any “computer style” cord if damaged. Should the white heater cord attached to the Plating Console become damaged, return the plating console to Gold Plating Services for replacement. When returning the Plating Console for repairs do not send any chemicals, busses, anodes, plating cells or beakers unless directed to do so by a representative of Gold Plating Services Technical Department, (see obtaining service in the Warranty section).

Storage of Chemicals When Not In Use

One of the most beneficial features of the *Jewel Master Pro Series* is the ease with which it can be put away for short or long term storage when not in use. If you expect to use your *Jewel Master Pro Series* within the next week or two then you should just make sure the lids on the plating cells are fairly tight. If you expect to be storing your *Jewel Master Pro Series* for a longer period of time we recommend that the solutions be returned to the original containers.

Safety Data Sheets

The Safety Data Sheets (SDS) for the solutions provided with your system are supplied as an appendix to this manual. If you order other chemical products, be sure to ask for the appropriate SDS. You should keep the SDS information for the chemicals you use in a location that is readily accessible to the user of the *Jewel Master Pro Series*.

Setting up your New Machine

Choosing a location to work

You should choose a well-lighted, ventilated area to set up your *Jewel Master Pro Series*. An un-congested workbench with ready access to AC power is preferable to running extension cords. While the *Jewel Master Pro Series* can be moved with relative ease it is best to set up where you won't have to move it.

Connecting the power supply to the AC power source

Plug the small output cord from the power supply into the round connector on the left rear of the plating console. Next, plug the heater cord, (white AC cord), and the AC input cord from the power supply into an appropriate AC power outlet. The power supply requires a maximum of 250 Watts and the solution heater uses up to 35 Watts.



Flip the Power switch on the plating console to the “ON” position and make sure the red power indicator is illuminated. Rotating the Plating Voltage control knob clockwise will increase the output voltage to the plating cell. The full range of output voltage should be between 0 VDC and 12 VDC when there is no plating load. All three plating cells will be controlled. Each solution will have its recommended voltage to use. We always suggest starting on the lower end of the recommended voltage and work your way up to meet your projects needs.

Connecting the Heater to the AC power source

VERY IMPORTANT: The heating elements, supplied by the white heater cord, must be connected to 120 Volts AC only! When working in an area with supply voltage higher than 120Volts, an adaptor must be used that provides the proper voltage to the heater, (120 VAC only). Connecting the white heater cord to voltage higher than 120Volts will result in permanent damage to the heating element; this is a very expensive repair and is not covered by the warranty.

Filling the Plating Cells

Remove the caps from the plating cells and position them in the plating console. Carefully pour the Electro-Clean, activator solution, and appropriate plating solution into the beakers. The left plating cell is usually where your Electro-Cleaner will go. Our current version has a heater built in to increase the temperature.

After pouring out the solutions into the beaker, “top off” the solution level to the line on the plating beaker just below the cap threads using distilled water.

NOTE: The Electro-Cleaner and Surface Activator Solution may lighten or lose their color with use. This does not affect the effectiveness of the solution. However, it can cause confusion if the plating cells are moved from their location. We recommend that you mark each plating beaker using a Permanent marker.

For best results, the solution should be maintained to a level at the ring on the cell just below the cap screws. Over time, the heated plating solution will evaporate and should be replenished with **pure distilled water or more of the same solution. You don't want to over dilute the solution either.**

Once you have used a beaker or lid for any solution, it is best not to use it for another type of solution unless it is thoroughly cleaned with hot soapy water and then rinsed. We recommend that you mark the lid and beaker with a black magic marker to indicate the solution in the beaker. Additional beakers can be purchased for a small charge from Gold Plating Services.

Setting up Rinse Water

The other three beakers provided can be set up as your rinse water. The rinse water must be free of any dirt, oil or anything else that could contaminate an expensive plating solution. You will need one rinse beaker set immediately in front of each solution cell. These rinse beakers should be filled with “distilled water”, the distilled water available at any grocery store will do. For higher volume plating you may want to set up an additional “rough” rinse beaker which would be the first rinse beaker you use after electro-cleaning, activation or plating. This rough rinse beaker will remove the bulk of the pre-treatment or plating solution. After rinsing in the rough rinse beaker then you should rinse in the distilled beaker before putting the part into the next solution. The rough rinse water should be the only water that will become contaminated. It should be changed out when it becomes visibly contaminated with the solutions.

Remember, this contaminated rinse water must be disposed of according to local, state and federal regulations. We can refer an excellent nation wide disposal company if you need help finding one in your area.

The distilled water is your final barrier to contamination of the plating solutions. Make sure it is clean and maintained as indicated in the “Rinse Cycle” section of “The Plating Operation” heading.

Installation of Anodes

One of the best features of the *Jewel Master Pro Series* plating system is the Easy Anode system of attaching and electrifying the process anodes. It is a very simple matter to plug the banana plug on the bottom of the anode into the powered anode jack on the plating console behind each of the beakers. Before immersing the anode into the solution you should make sure the anode is clean and free of any dirt or other material; you can do this by rinsing the anode under clear running water. The anode that will go into the plating solution should also be rinsed in distilled water prior to being put into place. The Electro-clean, Surface Activator and plating



anodes must be in place for all of the processes.

Special anodes are required for some solutions

We have custom fabricated Copper, Nickel, Graphite, Stainless Steel and Platinized Titanium to fit the needs or all our solutions. Once you have used an anode for any solution, it is best not to use it for another type of solution unless it is thoroughly cleaned with hot soapy water and then rinsed. We recommend that you mark an anode with the process you intend to use it for using a black magic marker on the vertical back of the anode just above the banana plug ledge.

Installation of Titanium Buss Bars – “Busses”

The buss bars are a key component of the *Jewel Master Pro Series* plating system. These “Busses” will not only hold your work for you but they will also provide the proper electrical charge. The busses are plugged into the black jacks in the front of the Hot Tray as shown below.



It is important to keep these buss bars clean so that electrical contact can be maintained between the buss bar and the rack. There may be time when you won't use the Buss bars; you may want to simply hold the work in the common lead. In this event, you can plug your common lead into any of the black jacks on the front of the plating console or the common output port.

Remove buss bars and clean with damp cloth after plating to prevent corrosion. You can also use some sand paper to softly remove any corrosion buildup if needed. Rinse thoroughly before using.

Ready To Plate

Heating your plating solutions / temperature control

The *Jewel Master Pro Series* plating console has a heating element under the electro-cleaner cell and the plating cell. It is important that spilled solutions be removed from the heater cell with a paper towel or rag. When cleaning the heating element surface, don't use excessive amounts of liquid cleaners or any abrasive cleaners.

Under normal operation, the “High” setting on the heater control will keep the plating solution between 120° F and 130° F. This temperature is appropriate for rhodium or decorative nickel. Rotating the heater control knob to the “Low” setting will keep the plating solution between 95° F and 105° F. This temperature is correct for the 24K Hard acid gold. Variations in conditions can affect the actual solution temperature. If improper temperature is suspected, you may want to monitor the temperature using the supplied glass lab thermometer.

Because the *Perfect Temp* system is intended only to maintain proper solution temperature it will not quickly heat the solutions to operating temperature. It can take up to 1 hour to raise the rhodium plating solution temperature from room temperature to 120° F. Excessive solution warm-up periods can be avoided in several ways.

1. The opened container of solution can be heated in a microwave oven for 1 to 2 minutes. This will quickly bring the gold, palladium or nickel up to operating temperature. The plating console heater will maintain it from there. We do not suggest that any of the plating solutions be placed in a microwave that may be used for the preparation of food. Remember the solutions are either corrosive or harmful and sometimes both.
2. The beaker with a lightly secured lid can be placed in a pan of shallow hot water. The pan of hot water can then be placed on a warm hot plate or stove to warm the solution.
3. The solution can be heated in a glass beaker directly on a hot plate or stove and then transferred to the plating cell.



Under no circumstances should the Nalgene-plating cell be placed directly onto any heat source such as a hot plate or stove that is more than 350°F. This could result in melting the beaker and releasing the solution. Never leave the Jewel Master Pro Series plating console un-attended for long periods of time with the heating element in the “ON” position. Doing so could result in the evaporation of all of the plating solution, damage to the beaker and possible damage to the heating element.

The Plating Operation

Preparation of surface to be plated

There have been entire books written on the polishing, finishing, and preparation of metal for plating. We have several Technical Data Sheets available for specific types of metals. To keep this User’s Guide more general we want to stress the most important aspects of surface preparation. Should you have specific requirements or questions we encourage you to contact our technical support department. There are two very important steps for preparation of work in any electroplating operation. The **first step** is pre-finishing. Pre-finishing involves preparation of the surface prior to the plating process and normally includes some form of polishing. The pre-finishing or polishing process determines the quality of the finished plate. For many plating applications that would likely be done with the *Jewel Master Pro Series*, this pre-treatment will probably involve some form of abrasive polishing.

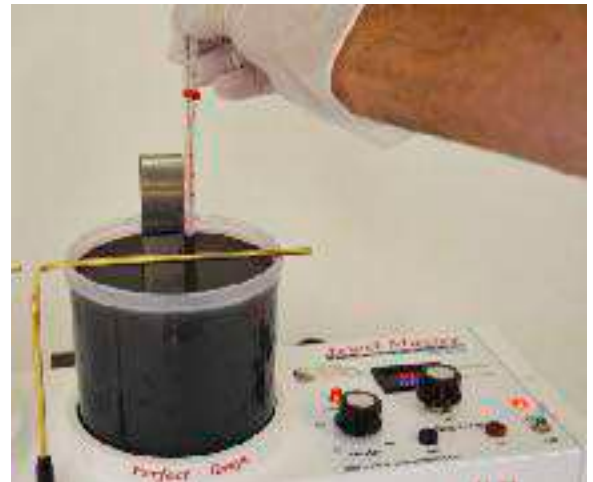
The **second step** for preparation of work to be plated is to insure that after the surface has been polished to the desired luster and quality of finish, the surface must be made accessible to the plating process solutions. What this means is that the surface is absolutely clean, completely free from grease, oil or dirt and free from corrosion, significant oxides or any other surface film. This crucially important step can be a little tricky because many of the methods of polishing can actually leave trace deposits that can seriously affect one or more of the plating processes.

In summary;

1. The finish of the pre-plated part should have the luster and brightness that you will be expecting in the final finish.
2. The part must be absolutely clean before you can begin the plating process.

Checking initial set-up and solution temperatures

When you have the parts polished, cleaned, and on the rack you are just about ready to plate. Now is the time to see that the plating solution is the correct temperature. The proper temperature for each plating solution is noted on the technical data sheet and the solution container.



Initial voltage settings

Your *Jewel Master Pro Series* is supplied with a voltage controlled power supply. This power supply is electronically protected against short circuits and produces direct current. Adjust the Plating Voltage output control knob so that the initial plating voltage is set to match what is indicated on the solution you are using. Some solutions will give a range for your plating voltage is a good starting point to start at the lower end. After the item being plated has been immersed in the solution the voltage can be set to the final voltage/current required.



Racking your parts

With your *Jewel Master Pro Series* you received a sample rack that is made of copper wire and then gold plated to insure that the copper making contact with the gold plated buss bars doesn't corrode causing interruption of the current during the pretreatment or plating process. The racks are usually made specifically for the parts you will be plating. You can fabricate the racks yourself or have our technical staff make them up for a nominal charge. Visit our website for more detail on making your own rack.

Electro-Cleaning

Electro-cleaning is a final cleaning to make sure the surface does not have any contamination that can cause water breaks or beading of the water. If this happens, there may be some oil, film or something on the surface that will prevent the part from being properly plated. After electro-cleaning when the part is pulled from the rinse water, the rinse water should sheet off the part evenly without any areas where the water beads up or forms break lines (hydrophobic surface areas). The entire surface must be hydrophilic, “wet out”, so the electroplating steps will properly treat the surface of the part.

Immerse the part into the electro-cleaning cell with the rack sitting on the buss bar. The pretreatment voltages are automatic and pre-set to a level that should result in a light to medium amount of gassing (bubbles being formed and releasing) at the surface of the work. Once the gassing begins you will want to leave the rack or part in the Electro-Cleaner for 20 to 30 seconds. This should be sufficient as a final cleaning on a surface that has been properly pre-cleaned.

The Rinse Cycle

Remove the part from the electro-cleaning beaker and dip into the Rough rinse water you prepared earlier. Swish it around for 5 to 10 seconds to allow the electro-cleaner solution to be rinsed off. Pull it from the rough rinse and hold it in the light so you can visually inspect the surface. This is where you will be able to detect any surface film or other surface condition that could negatively affect the plating process.

If the part is properly cleaned, the water will sheet off evenly without any “Water Breaks”. A Water Break occurs when the water beads off or dries from the surface in a given area more quickly than an adjacent area. A water break is an indication that there is something left on the surface of the part. If you proceed with the plating after noting a water break, you will more than likely be able to detect a cloud or line in the final plating. If there is a water break, you need to re-clean the part until there are no water breaks.

If there are no water breaks after the rough rinse, dip into the distilled rinse for a few seconds and remove, re-inspect for water breaks.

Surface Activation or Acid Dip

After you have determined that the surface is clean and the water sheets off evenly, dip the rack/part into the Surface Activator solution with the rack making contact with the gold plated buss bar. The surface activation voltage is automatic and pre-set to a level that should result in a light to medium amount of gassing (bubbles being formed and releasing) at the surface of the work. Once the gassing begins you will want to leave the rack or part in the Surface Activator solution for 20 seconds. This will neutralize any remaining Electro-Clean solution that may be on the part. In the case of nickel or copper, activation will also reduce or remove any fine oxides that could affect adhesion of the final plate. You will now repeat the rinse cycle.

Activation When Plating Stainless Steel

Plating onto stainless steel items is essentially the same up to this point. The primary difference is in the activation of the work. For stainless steel items you will activate the surface using Wood's Nickel Strike or TriVal Gold Strike in the middle plating cell for 15 - 20 seconds. When contact is made with the buss bar or when the part connected to the grounding clip is immersed in the solution there should be light to moderate gassing at the work surface. Please note that a nickel anode is required for the Wood's Nickel Strike and a Graphite or Platinized Titanium anode is needed for the TriVal Gold Strike.

Plating with Gold

At this point the item(s) you want to plate has been polished, cleaned, and activated and is hanging in the rack ready to plate. The plating voltage has been set to the recommend "initial voltage" and the solution temperature is within the recommended range.

Thickness of the Plating

Two questions that come to mind when gold plating are: How thick is the gold? & What is the cost? Since gold is sold by weight and thicker plating weighs more, the answer to the question of cost is directly related to the thickness of the gold plating. You can control the thickness of gold plating using this important principal:

The thickness of an electroplated deposit is a function of the current density, the plating time, and the solution's efficiency.

How thick you want your electro deposited finish varies greatly on the purpose of the plating and the cost allowance. The gold thickness of a typical decorative gold plate is between 10 to 20 micro-inches. The gold solution that comes with the *Jewel Master Pro Series* Plating system will plate up to 100 micro-inches or 2.5 microns (millionths of a meter). This is much heavier than is required for most applications. Plating a hardened gold thicker than 100 micro-inches can result in surface tension that could be detrimental to the quality of the deposit.

With the *Jewel Master Pro Series* set at 3-4 volts the gold will be deposited at the rate of 5-7 micro-inches per minute. Generally speaking 2-3 minutes will give a heavy decorative gold plate. If a gold plate heavier than 100 μ " is required, a special non hardened gold plating solution can be ordered that will allow thicker deposits.

Voltage and Current Density

Current density is the amount of electrical current, (measured in amperes) that is flowing between the solution and work - per unit area of work surface. Current density may be measured in amperes per square foot or amperes per square decimeter. With the *Jewel Master Pro Series* plating system we usually reflect current density in tenths of an ampere per square inch. We use this scale because the parts being plated are usually small and the area in square inches is easy to estimate. For example a quarter has a total surface area of approximately 1.5 square inches. The current density is a function of various factors such as the applied

voltage, solution conductivity, distance from solution electrode etc. Under normal conditions, with a given system such as your *Jewel Master Pro Series*, if the applied voltage is correct, the current density will self adjust for the size of the piece. This means that at the proper voltage if you change the surface area being plated, the total current will change to maintain the proper current density.

To make the process as simple as possible, we have indicated normal plating voltages for the solutions that you will be using. These are a good starting point and the current density range is usually quite broad. As you begin plating you will soon learn what works best for you. We recommend you keep a plating journal with notes about your plating experience.

Time

The amount of time you leave the work in the plating solution will depend on how thick you want the deposit.

Post-Plating treatment of work

Typical post treatment of work plated with the *Jewel Master Pro Series* is limited to careful rinsing and application of a carnauba-based polish or island glow wax in some cases. Gold has a tendency to water spot quite easily so the application of a wax may help prevent spotting and fingerprints.

When You Have Finished Plating

Shutting down

When you have completed your plating you should turn the power switch off, unplug the wall adaptor & turn off and un-plug the heater. Then you should remove and rinse the anodes and buss bars. After the plating solution has cooled to near room temperature. Replace the beaker lids and clean any spilled solution with a damp cloth.

Storage of System

If you plan on using the *Jewel Master Pro Series* again in the next few weeks, the beaker lids are adequate for storage. If you are planning on a long-term storage, 1 month or more we recommend that you replace the solutions to the original containers and rinse the plating beakers.

Care and cleaning of the *Jewel Master Pro Series*

Cleaning of the *Jewel Master Pro Series* should be done with a damp cloth. Cleaning of the panel face of the Power and Control Console is not recommended.

Proper Disposal of Rinse Water and Spent Solutions

Note: It is your responsibility to ensure compliance with all local, State, Federal or any other government regulations regarding disposal of process wastewater or spent solutions.

Register with EPA

You should consult with your local authorities to determine what laws may be applicable to as far as registration as a hazardous waste generator. If required you may be able to register with the Federal EPA through your state Department of Environmental Quality. Normally the local Water Reclamation department (the sewer district) is interested in anyone that may be discharging into the sewer. Discharge of process wastewater into the sanitary sewer is normally strictly regulated and usually requires a permit. You may have the option to enter into a “No Discharge” agreement with the sewer district. Generally speaking this means that you agree not to discharge any wastewater or process solutions into the sewer.

Finding a disposal company

Since the vast majority of the rinse water produced by using the *Jewel Master Pro Series* is simply water, proper and legal disposal is easy and inexpensive. These disposal companies are normally experts in the industry and are a great resource for disposal of process residue and spent solutions. You can find companies in the yellow pages. One nationwide company that we have recommended in the past is ***PSC Environmental Services***; an internet search will give you their home page with locations available around the country.



Jewel Master Pro Series Plating Kit

Limited Warranty

Gold Plating Services Inc., (Seller), warrants the *Jewel Master Pro Series* Plating Kit internal components and external AC Wall Adaptor to be free from defects in material and workmanship for a period of one, (1), year from the date of purchase. If the internal components or the AC Wall Adaptor should prove defective in the material or workmanship Gold Plating Services, at its sole discretion, will repair or replace the defective item. Service under this warranty can only be obtained by receiving a warranty return authorization and then delivering or shipping the equipment with all shipping or delivery charges prepaid to:

Gold Plating Services
378 North Main #112
Layton, UT 84041

This warranty does not apply to any application handles, leads, power connectors, application bits, application sleeves or accessory components. This warranty does not apply to corrosion or shell damage caused by user failure to clean as required. This warranty does not apply to damage caused by accident, misuse, abuse, or neglect.

Gold Plating Services makes no express warranties, including any warranty of merchantability or fitness. This warranty expressly excludes all incidental and consequential damages. (Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitations or exclusions may not apply to you.) This warranty gives you specific rights and you may have other rights that vary from jurisdiction to jurisdiction.

Warning: The individual user should take care to determine prior to use whether this device is suitable, adequate and safe for the use intended. Since individual applications are subject to great variation, the manufacturer makes no representation or warranty as to the suitability or fitness of this equipment for any specific application except as explicitly described in the written material provided by Gold Plating Services Inc.