



# The Electropolisher Series

*Electropolishing/Ultrasonic Cleaning System*

## MODEL E782-EP

Combining electropolishing with ultrasonic cleaning  
for an integrated polishing system



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# Features & Specs



## Electropolishing Procedure

1. *Prepare Metal (Pre-cleaning).*  
*Ultrasonic cleaning is an excellent way to remove oils, debris and other impediments that will distort the polishing results*
2. *Electropolishing Process*
3. *Post Cleaning (Rinsing and drying).*  
*Important to remove the residual electrolyte and clean and rinse the part. Ultrasonic cleaning can again be used for this step, as well as warm air drying*

Electropolishing, sometimes called reverse electroplating, is an electrochemical process which polishes a metal surface by removing microscopic amounts of material from the work piece. Electropolishing is generally used to remove a very thin layer of material from the surface of a metal part. The process is of interest because of its ability to enhance the material properties of metal parts in addition to changing their physical dimensions.

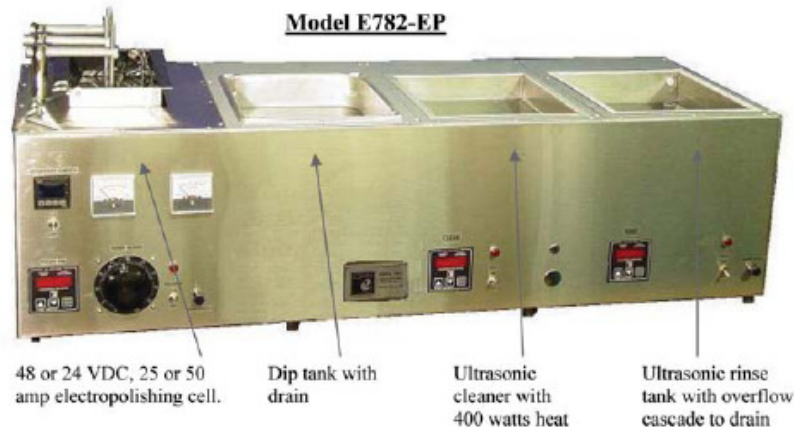
Electropolishing offers a number of benefits to metal surfaces such as:

- Removal of impurities and improvement of corrosion resistance of a metal surface. (PASSIVATES)
- Improvement of the appearance of a metal surface (HIGH LUSTER)
- Improvement of the surface resistance to stain and bacteria.
- The microstructure of the surface can be more accurately inspected.
- Removal of surface defects improving the strength of certain metals.

In general the polishing process requires three important steps:

1. Pre-Cleaning (Prepare Metal). Ultrasonic cleaning is an excellent way to remove oils, debris and other impediments that will distort the polishing results
2. Electropolishing Process. Passage of direct electric current through part while submerged in electrolytic bath.
3. Post Cleaning (Cleaning and Rinsing). Important to remove the residual electrolyte and clean and rinse the part. Ultrasonic cleaning and rinsing should again be used for this step.

*Esma's Model E782-EP combines these steps into a single, space conscious chassis design.*



Some of the features of our equipment are as follows:

- 304 stainless steel cabinet
- Digital controls.
- Thermostatically controlled electrolytic bath.
- Inert cathodes
- 300 watt ultrasonics in the cleaner tank and the rinser tank
- 400 watts internal, adjustable heat on ultrasonic cleaner tank
- Chassis dimensions: 46" x 18" x 12"
- **Units can be modified with cooling coils for use with low temperature electrolytes, such as those used to polish nickel titanium (nitinol)**

**Esma brand electrolytes include:**

- Esma-Brite E272 electrolyte for cobalt-chrome
- Stainless Steel Electropolish E972 for Stainless steel (300 series)
- Nickel Electropolish E581 for high nickel alloys
- Bronze EP E1005 for brass, bronze and other copper alloys v Custom mixing upon request

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# **Instructions for Model E782EP Betman Cleaning-Electropolishing System**

## **Introduction**

The Model E782EP system contains the following:

- Tank 1- 25Amp Electropolishing unit
- Tank 2- Dip Tank
- Tank 3- Ultrasonic Cleaning Tank with 200 watts of heat
- Tank 4- Ultrasonic rinse tank

The E782EP unit consists of two components: The main cleaning-electropolishing unit contains the Stainless Steel tanks housed in a 304 stainless cabinet and a stainless power module cabinet containing the bulk of the electronics.

Each ultrasonic tank has 6 potting transducers mounted on the bottom and is equipped with a ball valve for draining.

The Power Module contains self-tuning modular circuit boards, high velocity fan to cool the electronics.

PLEASE READ THESE INSTRUCTIONS BEFORE INSTALLATION AND OPERATION. If there are any questions, call (800) 276-2466.

## **INSTALLATION**

Place unit on a bench close to a sink or drain. The power module can be placed up to 8 feet away from tank, either on a shelf or in a cabinet.

The power module should not be positioned where it can be splashed with liquids, where it can attract dirt or abrasives, or where the air cooling by the fan can be restricted because of tight enclosures. Clearance of 1" is necessary both at the air intake and exhaust.

Fill ultrasonic tanks with approximately 6 inches of liquid. NEVER OPERATE UNIT WITHOUT LIQUID IN TANK.

## **Plumbing**

Connect your water source to the 1/8" NPT input of the solenoid valve located at the back of tank 4. A solenoid control valve allows hot water to flow at a rate of approximately one gallon per minute through the rinse tank simultaneously with ultrasonic action. The flow starts when timer is activated and automatically stops when time shuts off. If you desire to decrease the hot water flow through tank, the valve at your hot water supply can be adjusted. The excess water will cascade out the overflow to drain. A high level sensor in the tank will shut off the water input so no liquid overflows the tank.

Run drain hose from rinse tanks to sink or floor drain. Make sure drain hose is not crimped or elevated higher than the outlet in back of rinse chambers.

Each tank is supplied with a ball valve drain.

## **Electrical**

The unit is rated at 1950 watts, 120 VAC, 50/60 HZ. The unit is connected to the 120 VAC supply with the NEMA L5-20P plug. A 20amp/120VAC fuse is located on the front panel of the unit.

A 9 pin plug and cord assembly from power module is connected to the unit.

## **ELECTROPOLISHER-Tank 1**

### **Introduction**

The unit polishes stainless or chrome-cobalt alloys with a maximum current carrying capacity of 25amps. The unit has three polishing stations controlled by a digital timer.

The unit, constructed of 304 stainless steel is built to give years of reliable, trouble-free operation. The cathodes and anode clips are built of non-corroding alloys. The polishing solution temperature is automatically controlled by heater-cooling fan combination.

## **Installation**

Pour the electropolishing solution into tank to one inch from top of tank. For stainless steel use Esma E972 and for chrome-cobalt alloys use Esma E272.

**Safety Precautions:** The system is designed with maximum safety features. The electropolishing solutions are mildly acidic solutions and certain precautions are recommended.

- Wear safety goggles when pouring the liquid into tank. If solution gets on your skin, rinse off with plenty of water. In case of eye contact-rinse off with plenty of water and seek medical attention.
- Solution will damage cloth and carpeting.
- A small amount of solution mist is emitted during polishing: avoid inhaling-install near exhaust or ventilated area.

Slide horizontal holding arm (8G) into each of the main posts (6D) and fasten with knurled screw (13A) of main post. The arm with clip (8E) is attached to horizontal holding arm, with part to be polished suspended into solution (diagram 1).

## **Operation**

Turn the MAIN POWER and POLISHER SWITCHES ON. Turn ON the controller and set the temperature. See attached instructions for the OMRON E5GN controller. The unit has been set for 110° F with ON/OFF control. In approximately 20 minutes, when temperature gets within a few degrees of set point, the cooling fan will turn ON.

## **TIMER**

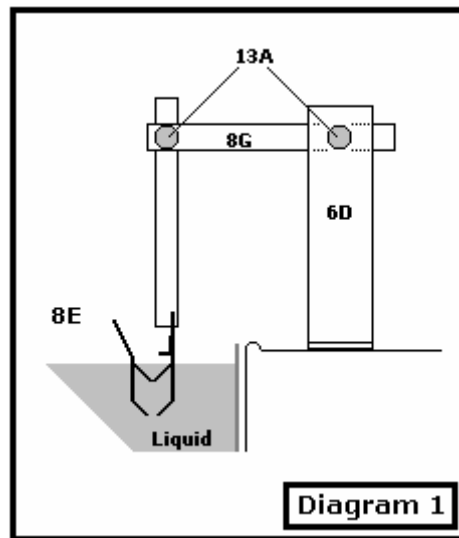
With the MAIN switch on, set the time with the up or down arrows. Push the start button and the process will start with the timer counting down to 0. When the set time expires, an audible beep will sound for a few seconds.

The same LED timers are used on the ultrasonic tanks.

## **Polishing**

- Suspend part to be polished on clip (8E); immerse end of holder into liquid so treated parts are fully submersed, tighten arm (13C) into horizontal arm with knurled screw (13A).
- Set timer for desired time and push START button to begin the polishing.
- Remove holder with polished parts, rinse in water.
- Neutralize part in baking soda solution (teaspoon of soda per cup of water).
- Rinse under running hot water, then air-dry.

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## **Maintenance**

Maintain clean cabinet: wipe off with cloth wetted with mild detergent; polish with a polish for stainless appliances (as Sheila Shine).

Solution should not be spilled on cabinet; shorting of post 6D may take place- wipe off !

Replacement of ESMA E972; during polishing metal and metal oxides are dissolved, some decomposition and drag-out take place.

Replace when action gets slow, solution thick, objectionable odor, non-uniform shine and rapid overheating.

Cleaning polishing cell: \_\_\_\_

- shut off unit and unplug power cord from outlet
- disconnect black wire on tank from black binding post on cabinet.
- slowly lift tank out of unit by holding front and back flanges of tank
- dispose of solution (dispose properly according to local regulations ); rinse tank thoroughly with water, remove any film or build-up from inside, wipe tank walls with soft towel or sponge. THE TANK IS COATED, SO DO NOT USE ANY ABRASIVE MATERIAL while cleaning inside the tank. Dry tank with towel, do not pour solution into wet tank.

## **Trouble Shooting**

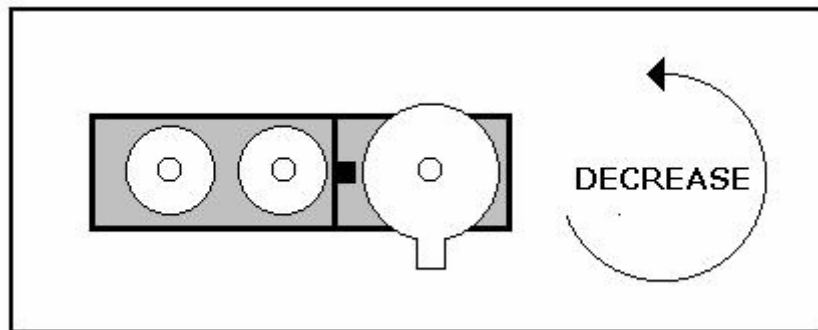
<u>Problem</u>	<u>Possible Cause</u>	<u>Corrective Measures</u>
Blowing fuse	-Part touching -tank cathode	- Re-position part
	-Solution spilled on cabinet and is wetting base of post	- Remove tank, loosen screw under post, remove post, rinse and dry all parts; reassemble making sure insulating washers are in place
	-None of the above	-Contact manufacturer
Odor emitted during heat up	-Solution present on heating plate	-Shut off unit, remove tank and clean up any solution on heating platform
	-Leaking of tank	-If repeated clean-ups do not eliminate odor tank may be leaking
	-Solution needs exchange	-Replace with fresh solution

## **Ultrasonic Cleaning and Rinsing.**

The MAIN switch on the unit is left ON during daily operation.

**Tank 3** is the ultrasonic cleaning tank fitted with 200 watts of heat. The heater is controlled with an adjustable, internal thermo switch. The thermo switch has been adjusted to control the bath temperature at 120° F when tank cover is on. If temperature needs to be changed, there is a port at the rear of the tank module where a screwdriver can be used to adjust the control knob of thermostat.

Adjust thermostat in a clockwise direction to increase the temperature. CAUTION: Before adjusting thermostat, turn MAIN POWER OFF.



**Tank 4** is the ultrasonic rinse tank. When the timer is turned ON, the ultrasonics will start along with the rinse water cascading through the tank and overflowing to drain.

Parts to be cleaned are placed in rack (basket), and rack is positioned into the tanks. Never place parts directly on bottom of tank (tank could eventually be perforated). The basic principle of operation is the enhancement and acceleration of the chemical cleaning by ultrasonic action.

## **MAINTANENCE**

Periodically, the liquid in tanks must be changed:

- Unplug the unit from 120Vac outlet.
- Open ball valve at back of tank chamber to drain.
- Flush out tank with clean water and wipe dry.
- Close ball valve and add fresh solution.

Keep top of unit dry. Unit is manufactured from 304 stainless and can be restored to the original finish with a stainless polish used for kitchen appliance.

### **Modular Circuit Board**

Unit E782EP is equipped with two modular circuit boards that are easily replaced if a problem occurs. Two small indicator lights on the power module indicate that circuit boards are working. If the indicator lights goes out, a replacement circuit board can be shipped immediately. This way the need for shipping the unit back for repairs is eliminated and the disruption is minimal.

### **Warranty**

The unit has a 2 year warranty with a lifetime warranty on transducer bonds and tank weld seams

Call 1-800-276-2466 for technical service.