cpac, INC. Equipment Division

RU-4™

(115/230 VAC, 50/60 Hz)

USER'S MANUAL

- **INSTALLATION**
- **OPERATION**
- **MAINTENANCE**

CPAC Equipment Division 2364 Leicester Road, Leicester, NY 14481
(716) 382-3223 * Fax (716) 382-3031 * www.cpac-fuller.com

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RECOMMENDATIONS

Read the entire instruction manual *before* installation or operation of the RU-4 silver recovery system. It will help you to understand the operation of the system, how various sub-assemblies work together, and the operating sequence of the controls.

WARNING: NEVER ATTEMPT TO PERFORM ANY ELECTRICAL TROUBLESHOOTING ADJUSTMENT(S) OR SERVICE(S) UNLESS YOU ARE A QUALIFIED ELECTRICIAN, ELECTRONICS TECHNICIAN OR FACTORY TRAINED SERVICE TECHNICIAN.

IMPORTANT SAFEGUARDS

When using your RU-4 silver recovery system, these basic safety precautions should be followed:

1. Read and understand all instructions.

2. Care must be taken to avoid burns from touching hot parts.

3. Do not operate this appliance with a damaged cord or if the appliance has been dropped or damaged until it has been examined by a qualified service technician.

4. Do not let power cord hang over edge of table or counter or touch hot surfaces.

5. An extension cord should not be used with this unit. The unit should be plugged directly into a power outlet.

6. To protect against electrical shock hazard, do not immerse this appliance in water or other liquids.

7. To avoid electrical shock hazard, do not disassemble this appliance. Call a qualified service technician when service or repair work is required. Incorrect reassembly can cause electric shock hazard when the appliance is switched ON.

SAVE THESE INSTRUCTIONS

INTRODUCTION

These silver recovery units are designed to remove silver electrolytically from photographic fixer solution. These compact efficient units are manufactured from the finest materials and components, thus insuring many years of reliable trouble-free operations.

Items included in shipping container:

1. Power Head Assembly

    a. Power supply
    b. Motor drive
    c. Cathode drum
    d. Two carbon anodes

2. Tank Assembly

    a. Factory installed fittings

3. Hook-up Kit

    a. 10 feet, 1/2" tubing
    b. One PVC coupling, 1/2" x 1/2"
    c. One PVC reducer, 3/4" x 1/2"
    d. Two hose clamps

4. Information Kit

    a. Instruction manual
    b. Illustrated service parts lists
    c. Parts price list
    d. Silver test paper and color comparison chart
    e. Warranty registration car

INSTALLATION AND OPERATION

1. Attach tubing to processor overflow wire, and connect to inlet on the silver recovery unit. *CAUTION: No kinks or bends should be in tubing.*

2. Install tubing on silver recovery unit drain outlet. Place open end of tubing in proper drain to sewer.

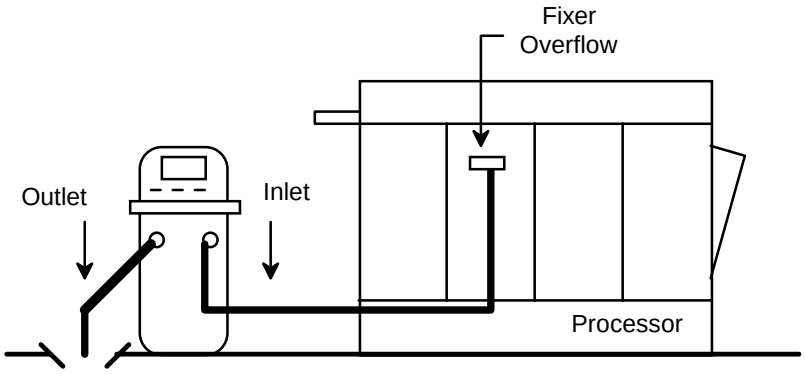
3. Pre-fill the silver recovery unit tank with silver laden fixer. Tank holds 1.8 gallons.

4. Plug electrical cord into appropriate line voltage AC grounded outlet.

5. If using 2 1/2 gallons of fixer or less per 8 hour day, place on LOW power setting. If over 2 1/2 gallons of fixer per day, place on HIGH setting.

6. To obtain additional information and safety precautions, read entire instructional manual.

How to Connect the RU-4 Unit to a Processor (Continuous Tailing)



1. Place the silver recovery unit in a convenient location within easy access to a drain and a 115 volt A.C. grounded electrical supply.

2. Inspect all bulkhead fittings (inlet, outlet) on RU-4 tank to insure tightness.

3. Securely attach the silver recovery unit inlet tubing to processor's fixer over-flow wire. *CAUTION: Severe bends and kinks in tubing will result in blockage of flow.* For your convenience a tubing hook-up kit consisting of one PVC 1/2" x 1/2" coupling and one PVC 3/4" x 1/2" reducer has been provided.

4. Place RU outlet tubing in the nearest chemical resistant drain to the sewer. (In any event, conform to prevailing local ordinances.) If the sewer drain is higher than RU unit, place the unit on a stand which elevates the outlet above the sewer drain.

5. Plug the RU power cord into a 115 volt A.C. electrical outlet which is properly grounded. Some processors have 115 volt A.C. accessory electrical outlets which may be used.

6. Pre-fill the tank with silver-laden fixer to the level of the outlet fitting.

7. Turn unit on. It has been factory programmed to plate on the LOW setting, which will handle 1 to 2 1/2 gallons of fixer per day. If fixer usage is more than 2 1/2 gallons per day, set power control switch to HIGH.

8. The pilot light will go on and the ammeter will indicate plating amperage depending on silver concentration of fixer.

When and How to Desilver the Cathode

Ideally, wait until you have recovered approximately 5 to 15 pounds of silver on the cathode (1/8" to 7/16" buildup) before stripping the silver. You may remove the silver yourself or have a qualified refiner or service organization handle it for you. If you decide to do it yourself, follow these steps:

Desilvering Cathode by User

1. The following equipment will be required for the user to desilver the cathode:

   a. 1/2 inch wrench
   b. Strong putty knife, approximately 1 inch wide
   c. Large plastic bag, similar to waste can liner

2. Turn recovery unit OFF.

3. Lift the top half of the unit (power head and cathode) straight up from the tank. The silver-laden cathode is attached to the top of the tank. Set the top down on a flat surface, preferably on a piece of plastic, or in a shallow pan, to catch fixer drips.

4. To remove cathode, loosen the Hex head screw on the cathode coupling with standard 1/2 inch wrench. Power head will easily separate from silver-laden cathode.

5. With a putty knife or similar tool, scrape the silver from cathode. Experience has shown that it may be cleaner and more convenient if you put the cathode in a large plastic bag during scraping.

6. Reinstall the cathode by inserting it into the cathode coupling; securely tighten the coupling screw, and replace power head on tank.

7. To insure proper and continuing operation, check all hoses for possible leaks, kinks and to be sure that outlet hose is in the appropriate drain to sewer.

Desilvering Cathode by a Silver Service Organization

An alternative to desilvering the cathode yourself would be to have a reliable silver service organization do it. Eastman Kodak's publication J-10 *"Recovering Silver from Photographic Materials"* and DuPont's "*Silver Recovery from Black & White Photography"* list many companies which handle silver in the United States and Canada.

A service organization can provide an invaluable service. Their business is dependent on utilizing their expertise and knowledge to insure that you recover the maximum amount of silver. In addition, they can answer many questions you may have regarding how to turn your scrap film and photographic paper into significant profits.

Preventive Maintenance

The moving parts of the recovery unit are designed and built so they do not need frequent lubrication. The flanged sleeve bearing in the tank cover hub, and the gear motor never need to be lubricated after they leave the factory.

Regular Cleaning and Inspection – IMPORTANT

Keep the unit clean by using a damp cloth and mild household cleaner. Pay particular attention to cleaning the area of the anode brackets since these brackets will corrode if fixer comes in contact with them. (Corrosion can result in lower plating efficiency.)

Visually check the ammeter and pilot light to insure that the unit is working properly and the power is ON.

Yearly, or when unit is moved from place to place, check plumbing for signs of leaking, restrictive kinks, etc.

A qualified technician should check all electrical screw-attached points for good conductivity, such as back of the meter. An especially important point to check is the set screws in the bronze motor coupling and cathode coupler to make sure they are tight.

SERVICE AND MAINTENANCE
TO BE DONE ONLY BY A QUALIFIED TECHNICIAN

1. Remove cover by taking out the four screws on the sides of the power head.

2. Remove the four screws that hold the entire electrical assembly from the plastic tank cover.

3. Remove contact brush from between the motor coupling and the tensioner spring.

4. Lift the electrical assembly straight up.

5. Reassemble, using a small amount of grease on the shaft in bearing area. Make sure the stainless steel washer is installed between the bronze motor coupling and top of red flanged bearing. If this washer is not installed, the flanged bearing will wear excessively. When reassembling, be sure the set screw is tight -- it must dig into the shaft. Allow approximately .020 end play between cathode coupler and bearing. (.020 thickness is approximately the thickness of a business card.)

6. Check and tighten all electrical connections.

7. If anode brackets are corroded, they should be replaced. Make sure all bolts are tight.

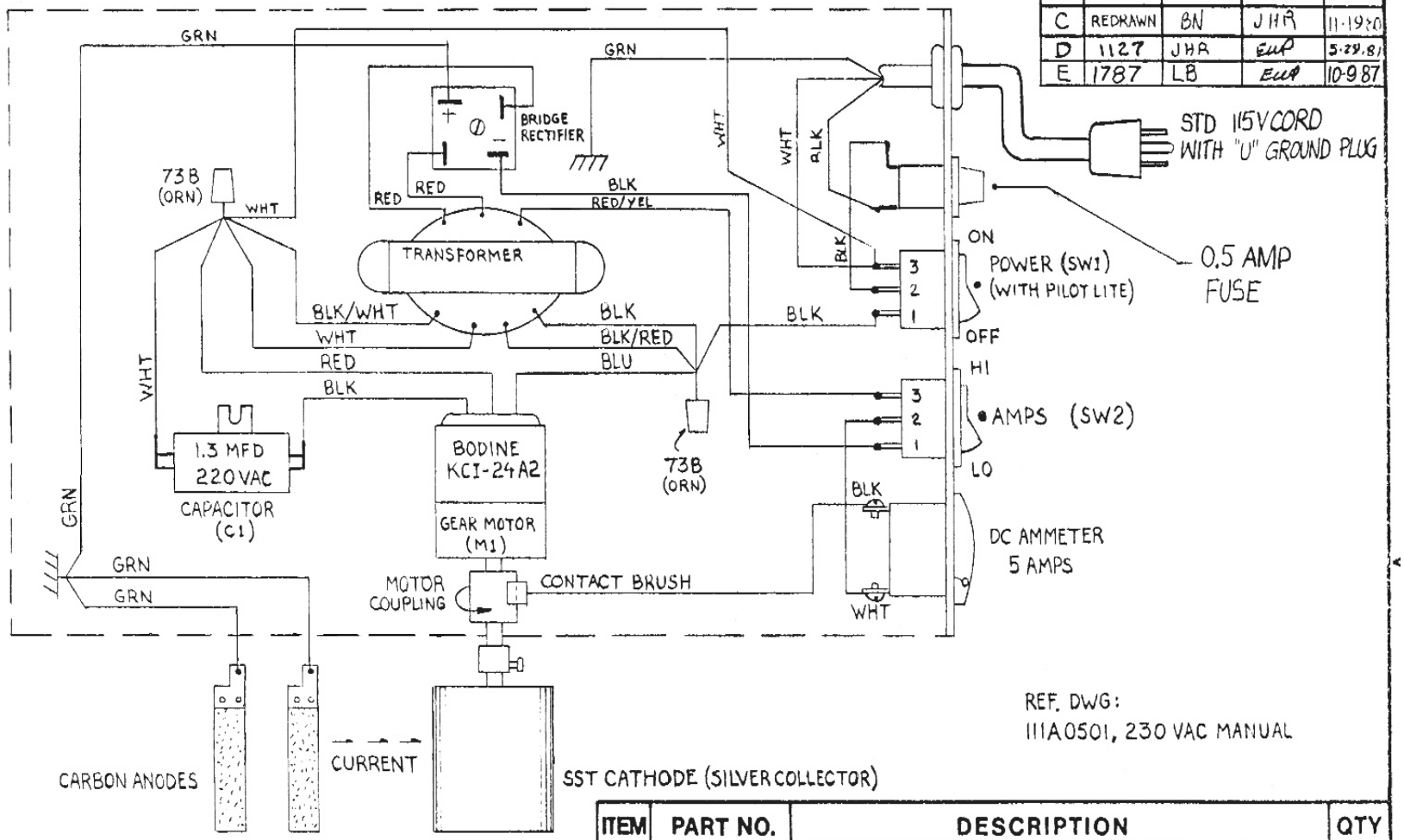
8. Reassemble, taking care that you do not bend the contact brush spring tensioner too much. It must supply pressure to the brush.

9. Check all lines and see they are trimmed so there is no potential of kinking. The drain must be completely free.

TROUBLESHOOTING GUIDE		
Symptoms	**Possible Cause**	**Probable Solution**
Ammeter oscillating more than a couple of Amps within a second.	Unit just turn ON	Wait 15 minutes to allow meter to normalize.
	Cathode contact brush damaged or worn out.	Replace cathode contact brush.
	Looseness in cathode brush mount assembly.	Tighten assembly.
Ammeter is not working	Stuck meter.	Tap side of meter to dislodge needle.
	Disconnect or loose anode ground wire.	Tighten anode ground wire to anode ground strap.
	Power range switch not engaged	Choose a power setting.
	Unit on X-LOW setting & no silver in solution.	No harm.
Motor not running and pilot light not ON	Unit incorrectly installed and not getting power.	Check electrical source.
	Unit not turned ON.	Turn power supply ON
	Pilot Light malfunction.	Replace pilot light.
	Cathode grossly overloaded with silver.	Remove silver from cathode.
	Capacitor burned out.	Replace capacitor.
	Motor burned out or gears malfunction.	Replace motor.
Fuse	Faulty transformer.	Replace transformer
	Electrical short.	Have a qualified serviceman repair unit.
	Diode malfunction.	Replace diode.

TROUBLESHOOTING GUIDE		
Symptoms	**Possible Cause**	**Probable Solution**
No Power	Fixer corroded anode ground wire lead. Fixer corroded electrical plug. Cathode not securely fastened to power head.	Connect terminals to anode ground wire. Clean plug contacts or replace plug. Securely tighten cathode coupling screw to power head.
Sulfiding	Unit has been ON for too long a period of time. All of the silver has been removed. Recovery unit ON too high a power setting.	Turn system OFF when not processing. Choose a lower power setting.
Silver falling off cathode	Recovery unit ON too long. Recovery from bleach/fix. Unit set on too high a setting. Cathode contaminated with grease and/or oil.	Turn system OFF when not processing. Unit won't recover silver from bleach/fix. Choose a lower power setting. Clean cathode with a clean cloth and scouring powder and water; rinse thoroughly with water to remove contamination.
No silver collection on cathode	No fixer in solution. Poor contact to anode ground strap. Power head plug contaminated. Cathode contact brush worn out.	Use silver laden fixer. Anode ground wire not connected to ground strap. Anode wire broken. Clean plug contacts. Replace cathode contact brush.

CHG	E.O.	BY	CHK	DATE
C	REDRAWN	BN	JHR	11-19-80
D	1127	JHR	ECP	5-29-81
E	1787	LB	ECP	10-9-87



ITEM	PART NO.	DESCRIPTION	QTY

PRNT DATE

INCH TOL'S UNLESS OTHERWISE SPEC'D
DIM'S APPLY BEFORE FINISHES
DRILLED HOLES (ALL -.001)
UP THRU: 1/8 +.002, 1/4 +.004, 1/2 +.006, 3/4 +.008, UP +.010
THREADS: UN-2A & 2B
DO NOT SCALE DWG.
DEBURR .01-.02 R.-45°
.X ±.050 ANG'L'R ±
.XX ±.020 CONC. TIR
.XXX ±.005 MACH. FIN. 63
FRAC± MAX. FILL.

DRN NAMIE	11-19-80	ENG	
CHK		APV	
DSN		APV	

SUB ASSY | QTY | FINAL ASSY | QTY

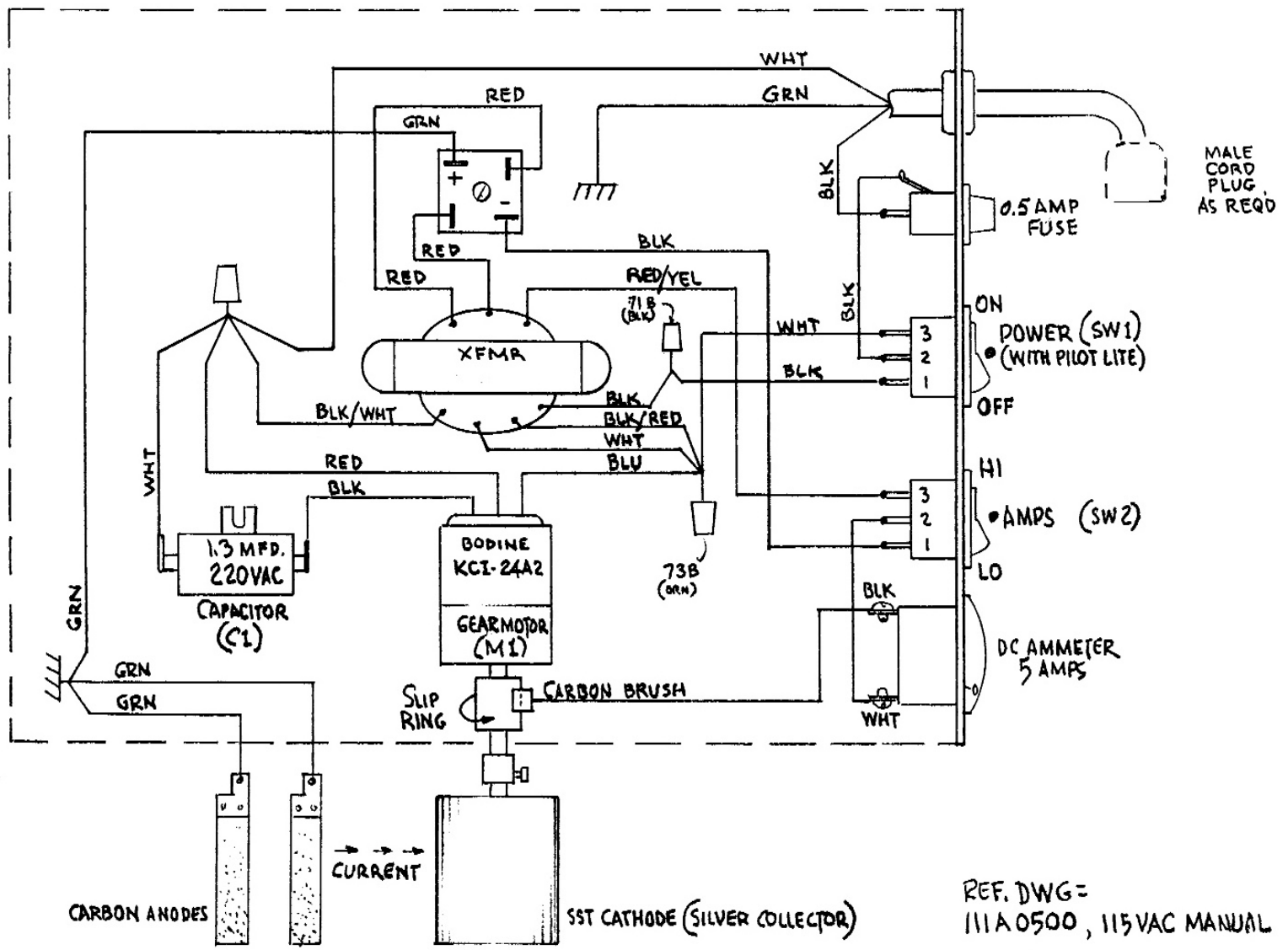
H.T.: —
FIN.: —
MAT'L: —

IMG IMG PHOTO PRODUCTS

SCALE: NONE | SHEET: 1 of 1

WIRING DIAG. 115 VAC MANUAL BODINE MOTOR
RU-4 SILVER RECOVERY UNIT

111A0500 | CHG E



REF. DWG = 111A0500, 115 VAC MANUAL

230V 50/60 Hz SUPPLY

IMG PHOTO PRODUCTS 1733 ROGERS AVENUE SAN JOSE, CA 95112, USA	SMW 24 FEB 78	WIRING DIAG, **230VAC** MANUAL RU-4 SILVER RECOVERY UNIT	111A0501	CHG C 3-9-81

RU-4™
(115 VAC, 50/60Hz)
SPARE PARTS LIST

Minimum Order: $50.00

(All prices are in US dollars and subject to change without notice)

CPAC Part Number	**Description**	**List Price/Each**
19-107P2007	Fuse Holder without Fuse	$6.60
SP-107A8012	Cathode Brush Assembly	$26.20
08-107A9020D	Cathode Contact Spring	$7.20
SP-107M0088	Bearing, Flanged	$16.20
SSP-111M8004	Powerhead Housing with Label	$101.40
18-111P2002	5 Amp DC Meter	$31.50
54-111P2021	Hose Clamp	$1.60
SP-111A8006	Cathode	$135.60
70-111A9015A	Carbon Anode	$23.80
SP-111M0001	Motor Assembly with Capacitor	$237.95
SP-111M0002	Gear Box, Oriental	$109.00
SP-111M0004	Motor Coupling and Shaft Assembly	$64.40
SP-111M0005	Motor Coupling Kit	$29.80
SSP-111M0006	ON/OFF and Pilot Light Switch	$19.50
SSP-111M0007	HI/LOW Power Setting Switch	$16.90
SP-111M0009	Anode Ground Plate Kit	$10.80
SP-111A0924A	Power Cord	$15.00
SP-111M0014	Transformer	$42.20
SP-111M0015	Bridge Rectifier	$21.30
SSP-111M0017	Bulkhead Fitting, Inlet or Outlet	$16.60
SP-111M0020	Tank Cover, Sub-Assembly	$67.00
SP-111M0023	Cathode Coupling Assembly	$36.40
SP-111M0090	Cathode Contact Kit	$20.40
SP-111M0086	Power Head Complete without Anodes	$597.60
SSP-111M8003	Tank Complete with Fittings.	$151.60

EVERY EFFORT HAS BEEN MADE TO INSURE THE COMPLETE ACCURACY OF THE CONTENTS OF THIS MANUAL. NO LIABILITY ARISING FROM ITS USE, HOWEVER, CAN BE ACCEPTED BY THE COMPANY, WHO RESERVES THE RIGHT, WITHOUT PRIOR NOTICE, TO ALTER THE SPECIFICATIONS, CONSTRUCTION, OR CONTENT OF ITS EQUIPMENT AT THE COMPANY'S OWN DISCRETION.

Statement of Warranty

All equipment is manufactured to exacting standards and has been tested and inspected for proper workmanship and performance before shipping.

Any parts which are defective will be repaired or replaced within a one year period after date of shipment, provided the equipment has been used according to the instruction manual and have not been abused or tampered with.

The company will not be responsible for any damage resulting from leakage of water or chemicals caused by improper installation, operator carelessness or defective/loose plumbing fittings associated with installation and operation of the equipment. The company assumes no responsibility for damage in transit and the customer should present any claim for such damage to the carrier.

This warranty gives you specific legal rights. You may also have additional rights that vary from state to state.

Any unit to be repaired under warranty must be shipped, freight prepaid, or delivered to a facility authorized to render services provided hereunder. Returned unit must be either in its original package or a similar package affording an equal degree of protection. All units must have a Material Return Authorization code (MRA) visible on the returned item. MRA's can be obtained by calling 716-382-3223.