



OPERATORS MANUAL FOR Mi-T-M®
ECF-0M1R/ECF-0M1D
ELECTROCOAGULATION
AND FLOCCULATION
SYSTEM



CAUTION
RISK OF INJURY!

READ MANUAL BEFORE OPERATING!

This manual is an important part of the Electrocoagulation System
and must remain with the unit when you sell it!

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INTRODUCTION

Congratulations on the purchase of your new Mi-T-M Electrocoagulation System! You can be assured your Mi-T-M Electrocoagulation System was constructed and designed with quality and performance in mind. Each component has been rigorously tested to ensure the highest level of acceptance.

This operator's manual was compiled for your benefit. By reading and following the simple safety, installation, operation, maintenance and troubleshooting steps described in this manual, you will receive years of trouble free operation from your new Mi-T-M Electrocoagulation System. The contents of this manual are based on the latest product information available at the time of publication. Mi-T-M reserves the right to make changes in price, color, materials, equipment, specifications or models at any time without notice.

! IMPORTANT !

These paragraphs are surrounded by a "SAFETY ALERT BOX". This box is used to designate and emphasize Safety Warnings that must be followed when operating this Electrocoagulation System.

Accompanying the Safety Warnings are "signal words" which designate the degree or level of hazard seriousness. The "signal words" used in this manual are as follows:

DANGER: Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

WARNING: Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.



CAUTION: Indicates a potentially hazardous situation which, if not avoided MAY result in minor or moderate injury.



The symbols set to the left of this paragraph are "Safety Alert Symbols". These symbols are used to call attention to items or procedures that could be dangerous to you or other persons using this equipment.



ALWAYS PROVIDE A COPY OF THIS MANUAL TO ANYONE USING THIS EQUIPMENT. READ ALL INSTRUCTIONS BEFORE OPERATING THIS ELECTROCOAGULATION SYSTEM AND ESPECIALLY POINT OUT THE "SAFETY WARNINGS" TO PREVENT THE POSSIBILITY OF PERSONAL INJURY TO THE OPERATOR.



Once the unit has been uncrated, immediately write in the serial number of your unit in the space provided below.

SERIAL NUMBER _____

Inspect for signs of obvious or concealed freight damage. If damage does exist, file a claim with the transportation company immediately. Be sure that all damaged parts are replaced and that the mechanical and electrical problems are corrected prior to operation of the unit. If you require service, contact Mi-T-M Customer Service.

CUSTOMER SERVICE
CALL OUR TOLL-FREE NUMBER
for the Sales or Service Center nearest you!
800-553-9053

Please have the following information available for all service calls:

1. Model Number
2. Serial Number
3. Date and Place of Purchase

CONTENTS OF THE ELECTROCOAGULATION SYSTEM

Carefully unpack your new Mi-T-M Electrocoagulation System. Check the contents against the packing list. Contact the freight line if a damage claim is required on any component. The following items are the basic equipment sent with your Electrocoagulation System.

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Water recycling treatment system Platform <ol style="list-style-type: none"> a. Sump Pump B. Transfer Pump C. Pressurized Water Storage Tank D. Waste Oil Decanter e. Reaction Chambers f. Flocculating Tank g. Product Tank* | <ol style="list-style-type: none"> 2. Three Unattached Floats for Sump Pit <ol style="list-style-type: none"> a. Blue: Protects sump pump low level. b. Red: To fill pit from the fresh water inlet. c. Green: High pit level discharge. 3. Manual 4. pH Sensor Probe 5. ORP Sensor Probe 6. Conductivity Meter |
|--|--|

*on Recycle Unit Only

SPECIFICATIONS

MODEL	ECF-0M1R	ECF-0M1D
Maximum Flow	10 GPM*	
Electrical	230 Volt 1 Phase 30Amps	
Sump Pump	3/4 HP	
Transfer Pump **	1/2 HP	N/A
Operating Capacity	350 gallons	
Dimensions	72" x 60" x 100"	60" x 60" x 100"
Net Weight	1100 lbs.	1000 lbs.

*Flow rate will depend on the contents of the waste water and what the quality of the product water is expected.

** Transfer pump only on Recycle System

PURPOSE

What is Electrocoagulation?

Electrocoagulation is the electrolytic addition of coagulating metal ions directly from sacrificial electrodes.

As electricity passes between the metal plates and through the water, charged particles are neutralized in the water. This includes metal ions, colloids, and the soap micelles that make up emulsified oil.

Metal ions are released from the anode of the sacrificial electrode into the water. These metal ions coagulate with pollutants in the water, in a similar manner to the addition of coagulating chemicals such as alum and ferric chloride, and allow for easier removal of the pollutants.

The electrolytic addition of these ions has a number of advantages over the addition of coagulating chemicals by themselves. Mainly, the system produces half to one third of the sludge. Greater activity means less metal ions required and a wider range of pollutants can be removed.



IMPORTANT SAFETY WARNINGS



WARNING: When using this product, basic precautions should always be observed, including the following:

READ ALL SAFETY WARNINGS BEFORE USING ELECTROCOAGULATION SYSTEM

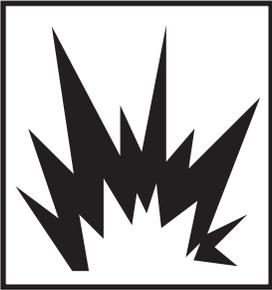
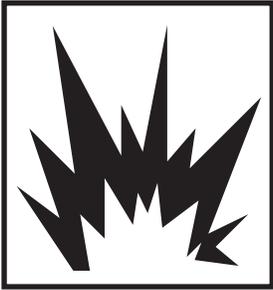
HAZARD	POTENTIAL CONSEQUENCE	PREVENTION
<p data-bbox="180 268 532 327">RISK OF ELECTRIC SHOCK OR ELECTROCUTION</p> 	<p data-bbox="555 268 966 489">Serious injury or death could occur if the Electrocoagulation System is not properly grounded. Your Electrocoagulation System is powered by electricity and may cause electric shock or electrocution if not installed properly.</p> <p data-bbox="555 1087 966 1171">Electrical shock may occur if Electrocoagulation System is not operated properly.</p> <p data-bbox="555 1325 966 1409">Serious injury or death may occur if electrical repairs are attempted by unqualified persons.</p>	<p data-bbox="995 268 1529 352">Installation of this unit, including all electrical connections, must comply with all local, state and national codes.</p> <p data-bbox="995 369 1529 541">This product must be grounded. Connect to a GFCI circuit breaker when available. If the unit should malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. Do not ground to a gas supply line.</p> <p data-bbox="995 558 1529 705">Improper connection of the equipment-grounding conductor can result in a risk of electrocution. Check with a qualified electrician or service personnel if you are in doubt as to whether the system is properly grounded.</p> <p data-bbox="995 722 1529 869">Always be certain the unit is receiving proper voltage (+/- 5% of the voltage listed on the nameplate). Before installing electrical connections, be certain the power switches are in the "OFF" position.</p> <p data-bbox="995 886 1529 907">Keep all connections dry and off the ground.</p> <p data-bbox="995 924 1529 1071">Do not touch pump, pump motor, discharge piping or water when the unit is connected to the power supply; regardless of whether the unit is operating correctly or experiencing an operation failure.</p> <p data-bbox="995 1087 1529 1171">DO NOT allow metal components of the Electrocoagulation System to come in contact with live electrical components.</p> <p data-bbox="995 1188 1529 1304">Never operate the Electrocoagulation System with safety guards/covers removed or damaged. Ensure all electrical covers are securely in place when unit is operating.</p> <p data-bbox="995 1320 1529 1436">Any electrical wiring or repairs performed on this Electrocoagulation System should be done by Authorized Service Personnel in accordance with National and Local electrical codes.</p> <p data-bbox="995 1453 1529 1799">Before opening any electrical enclosure, always shut off the Electrocoagulation System and drain the water. Disconnect the Electrocoagulation System from the power source. If the power disconnect is not in sight, lock it in the open position and tag it to prevent power usage. (Never assume the Electrocoagulation System is safe to work on just because it is not operating, it could restart at any time! Always disconnect from the power source.) Allow the Electrocoagulation System components to cool down.</p>



IMPORTANT SAFETY WARNINGS



READ ALL SAFETY WARNINGS BEFORE USING ELECTROCOAGULATION SYSTEM

HAZARD	POTENTIAL CONSEQUENCE	PREVENTION
<p>RISK OF EXPLOSION OR FIRE</p>  	<p>Serious injury or death could occur from an explosion or fire caused by a system electric spark.</p>	<p>This unit must be placed in an area that is well ventilated, free of flammable vapors, combustible dust, gases or other combustible materials.</p>
<p>RISK OF BURSTING</p> 	<p>Serious injury or death could occur from bursting caused by excessive pressure in the system.</p> <p>Serious injury may occur if attempting to start the Electrocoagulation System when the pump is frozen.</p>	<p>Do not mistreat the pressure gauges on the system. Pressure gauges will malfunction if they are subjected to excessive pressure, vibration, pulsation or temperature or if they are placed in an environment which causes corrosion of parts. Incorrect readings on a pressure gauge could mislead the operator and place him in a dangerous working condition.</p> <p>Do not use a booster pump or any type of additional pumping system. Pressurizing the suction of the pump may cause the pump body to explode.</p> <p>Do not use this Electrocoagulation System to pump flammable material! An explosion could occur from a gas vapor buildup inside the system.</p> <p>In freezing temperatures, the unit must always be warm enough to ensure there is no ice formation in the pump. Do not start the Electrocoagulation System if it has been in a freezing environment without first allowing the pump to thaw.</p>
<p>RISK OF BURNS</p> 	<p>Serious injury may occur from touching the electrical motor. This area can remain hot for some time after the Electrocoagulation System is shutdown.</p>	<p>Never allow any part of your body to contact the electrical motor until cooled.</p>



IMPORTANT SAFETY WARNINGS



READ ALL SAFETY WARNINGS BEFORE USING ELECTROCOAGULATION SYSTEM

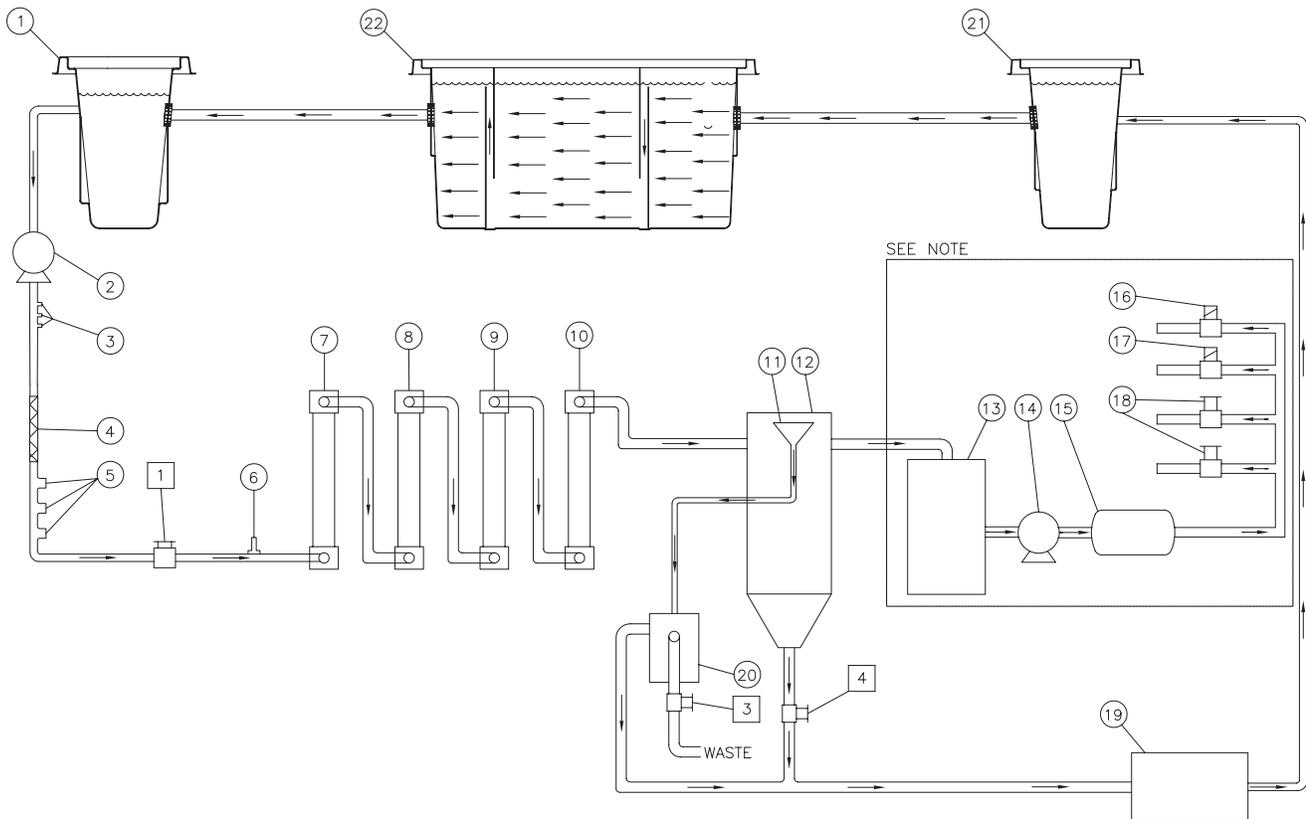
HAZARD	POTENTIAL CONSEQUENCE	PREVENTION
<p>RISK FROM MOVING PARTS</p> 	<p>Serious injury may occur to the operator from moving parts on the Electrocoagulation System.</p>	<p>Do not operate the unit without all protective covers in place.</p> <p>Follow the maintenance instructions specified in the manual.</p>
<p>RISK OF BODILY INJECTION</p> 	<p>Injury may occur from the Electrocoagulation System.</p>	<p>DO NOT DRINK THE WATER IN THE ELECTROCOAGULATION SYSTEM!! This is non-potable water and is not suitable for consumption.</p> <p>DO NOT allow children to operate this unit.</p> <p>DO NOT overreach or stand on unstable support.</p> <p>Wet surfaces can be slippery, wear protective foot gear and keep good footing and balance at all times.</p> <p>Know how to stop the Electrocoagulation System. Be thoroughly familiar with controls.</p> <p>Before servicing components, ALWAYS shut off the Electrocoagulation System.</p> <p>Consult Material Safety Data Sheets (MSDS) for safe handling of system, especially oxidizers and acids.</p>



!SAVE THESE INSTRUCTIONS!



ELECTROCOAGULATION SYSTEM FLOW CHART



FLOW DIAGRAM-ECF 050808-PJH

The **Sump Pump (2)** draws water from the **Sump Pit (1)** into the unit. Water is sent through the **Chemical Enhancement Piping (3)** which induces pH, ORP and conductivity adjustment. The water then passes by the **Static Mixer (4)** and the **Sensing Probes (5)** to insure appropriate pH, ORP and conductivity. Then the **Flow Control Valve [1]** and past the **Flowmeter (6)**. The water then flows through **Reaction Chamber (RC) 1 (7)**, **RC 2 (8)**, **RC 3 (9)** and **RC 4 (10)**. As water is pumped through the RC's it passes between metal plates that have DC current running between them.

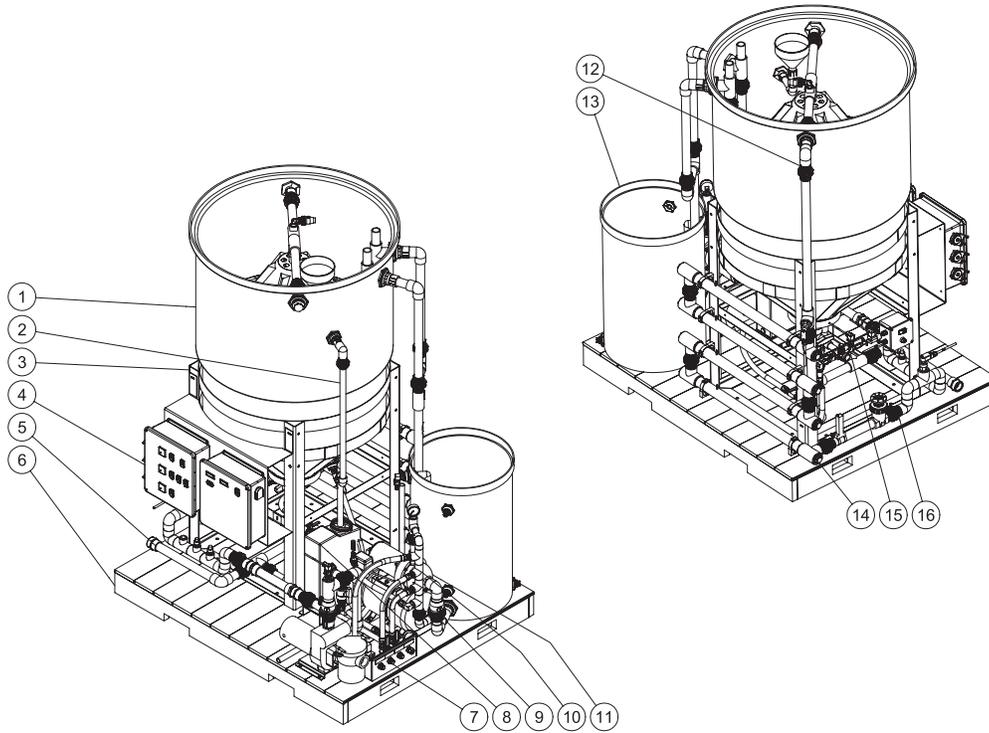
The treated water then passes into the **Coalescing/Flocculating Tank (12)**. Where bonded contaminants coagulate and flocculate out of the water and deemulsified oils float to the top of the water. The oils are then removed through the **Oil Decanter Cone (11)**. Then product water flows into the **Product Tank (13)**, where it waits to be pumped through the **Transfer Pump (14)** and into the **Pressure Tank (15)**, providing water to the **Low Profile Manifold (18)**. The **Rain Water Overflow (17)** discharges water to a sanitary sewer when too much water enters the system. The **Fresh Water Inlet (16)** adds water to the system when water is needed in the system.

Water and oils flow through the **Oil Decanter Cone (11)** to the **Oil Decanter (20)**. Overflow from the **Oil Decanter (20)** flows through the **Sludge Box (19)** and back to the **Wash Water Catch Pit (21)**. The waste water in the **Wash Water Catch Pit (21)** then flows into the **Three Stage Settling Pit (22)** and finally to the **Sump Pit (1)**.

The drainage from the **Flocculating Tank (12)** goes through **valve [4]**, then the solids are filtered out in the **Sludge Box (19)**. The water then flows back to the **Collection Pit (21)**.

ELECTROCOAGULATION SYSTEM FEATURES ECF-0M1R

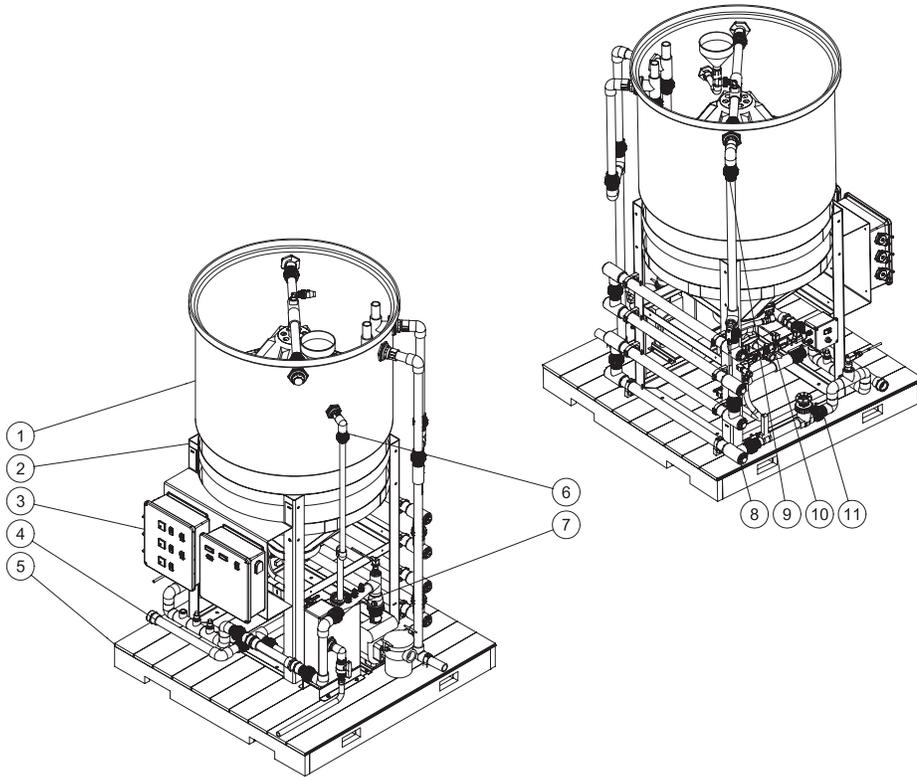
ECF-01MR FEATURES-040809-CJB



ECF-0M1R-042809-CJB			
ECF-0M1R			
ITEM	DESCRIPTION	Mi-T-M #	QTY
1	300 GALLON ASSEMBLY - ECF-0M1R	N/A	1
2	OIL DECANter PLUMBING - ECF	N/A	1
3	TANK STAND - 300 GAL - PAINTED	20-0597A01	1
4	CONTROL BOXES ASSEMBLY	N/A	1
5	DRAIN LINE ASSEMBLY - ECF-0M1R	N/A	1
6	5' X 6' PALLET	35-0035	1
7	LOW PROFILE MANIFOLD ASS'Y - ECF-0M1R	N/A	1
8	OIL DECANter ASSEMBLY - ECF	N/A	1
9	TRANSFER PUMP INLET - ECF-0M1R	N/A	1
10	OUTLET PLUMBING ASSYEMBLY - ECF-0M1R	N/A	1
11	TRANSFER PUMP & PRESSURE TANK ASSYEMBLY	N/A	1
12	CHAMBER TO TANK - ECF-0M1R	N/A	1
13	OVERFLOW TANK - ECF-0M1R	N/A	1
14	ECF CELLS - ASSYEMBLY	N/A	1
15	WX-0013 - ECF-0M1R	N/A	1
16	INLET PLUMBING - ECF-0M1R	N/A	1

ELECTROCOAGULATION SYSTEM FEATURES ECF-0M1D

ECF-0M1D FEATURES-040809 CJB



ECF-0M1D 040809 CJB			
ECF-0M1D			
ITEM	DESCRIPTION	Mi-T-M #	QTY
1	300 GALLON ASSEMBLY - ECF-0M1D	N/A	1
2	TANK STAND - 300 GAL - PAINTED	20-0597A01	1
3	CONTROL BOXES ASSYEMBLY - ECF-0M1D	N/A	1
4	DRAIN LINE ASSEMBLY - ECF-0M1D	N/A	1
5	5' X 5' PALLET	35-0083	1
6	OIL DECANter PLUMBING - ECF	N/A	1
7	OIL DECANter ASSEMBLY - ECF	N/A	1
8	ECF CELLS - ASSY	N/A	1
9	CHAMBER TO TANK - ECF	N/A	1
10	WX-0013 - ECF-0M1D	N/A	1
11	INLET PLUMBING - ECF-0M1D	N/A	1

INSTALLATION

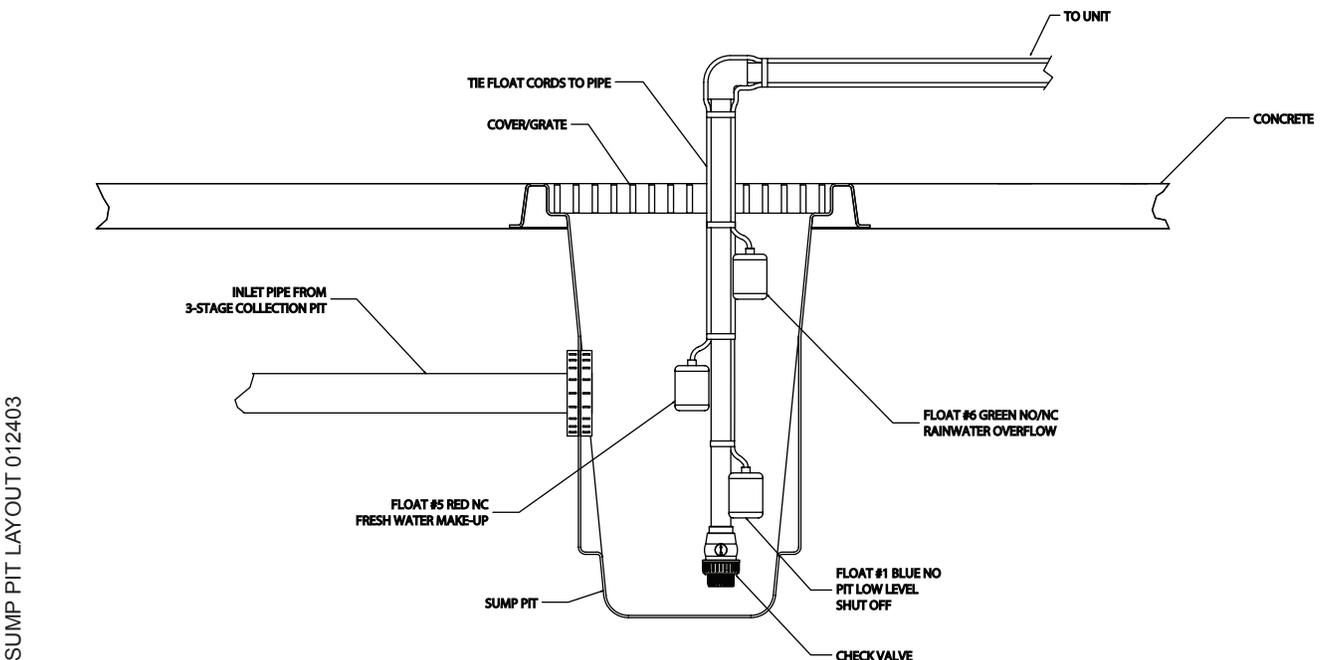
ATTIRE:

1. Proper attire is essential to your safety. It is advised to utilize whatever means necessary to protect eyes, ears, and skin with appropriate PPE.

INSTALLATION:

1. A Collection Pit System must already be an established structure before installing the WLP-Series water recycling treatment system. A well designed pit system is critical for the proper operation of the recycle system. Consult your dealer for installation requirements.
2. Place the water recycling treatment system platform on a hard, level surface in an area free of flammable vapors, combustible dust, gases or other combustible materials.
3. Set the unit so you have access to all four sides.
4. Do not place unit in an area:
 - a. with insufficient ventilation.
 - b. where environmental hazards (i.e. rain and snow) can come in contact with the water recycling treatment system.
 - c. where the unit may freeze.
5. The water recycling treatment system is shipped with some union connections loosened to protect the unit from shipping damage. Tighten all union connections at this time.
6. Use schedule 80 PVC slip connections.
 - a. Install plumbing from the Sump Pit to the **Sump Pump** using minimum connection sizes of 2".
 - b. Install a check valve in the **Sump Pit**.
 - c. Install plumbing from **BOTH Outlet Return To Pit** to the **Wash Water Catch Pit** using a minimum pipe size of 3".
7. Install the three floats in the **Sump Pit**. Allow a 2" tether and enough room for them to move freely without interfering with the plumbing.
 - a. Float #1 Blue: Pit low level shut-off. Attach this float 10" above the inlet.
 - b. Float #5 Red: Fresh water makeup. Height of this float must be adjusted to the individual pit system.
 - c. Float #6 Green: Rain water overflow. Height of this float must be adjusted to the individual pit system.

NOTE: The above information is for reference only. Professional installers or architects may use this guideline to meet specific site requirements.



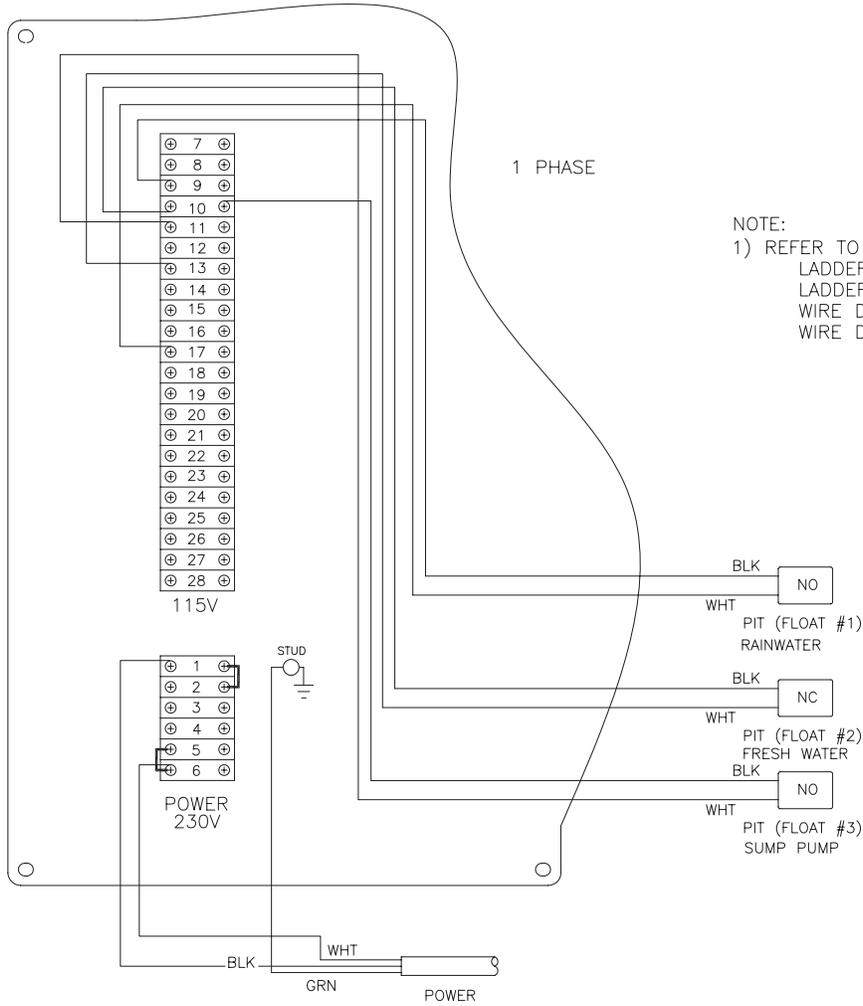
INSTALLATION



WARNING

RISK OF ELECTROCUTION! TO REDUCE THE RISK OF ELECTROCUTION, KEEP ALL CONNECTIONS DRY AND OFF THE GROUND.

ECF-0M1R



NOTE:

- REFER TO THE FOLLOWING DRAWINGS:
 LADDER DIAGRAM CONTROL BOX 1 - ECF-0M1R
 LADDER DIAGRAM CONTROL BOX 2 - EC-0M1R
 WIRE DIAGRAM CONTROL BOX 1 - EC-0M1R
 WIRE DIAGRAM CONTROL BOX 2 - EC-0M1R

FIELD WIRING DIAGRAM-ECF-0M1R-042409-CJB

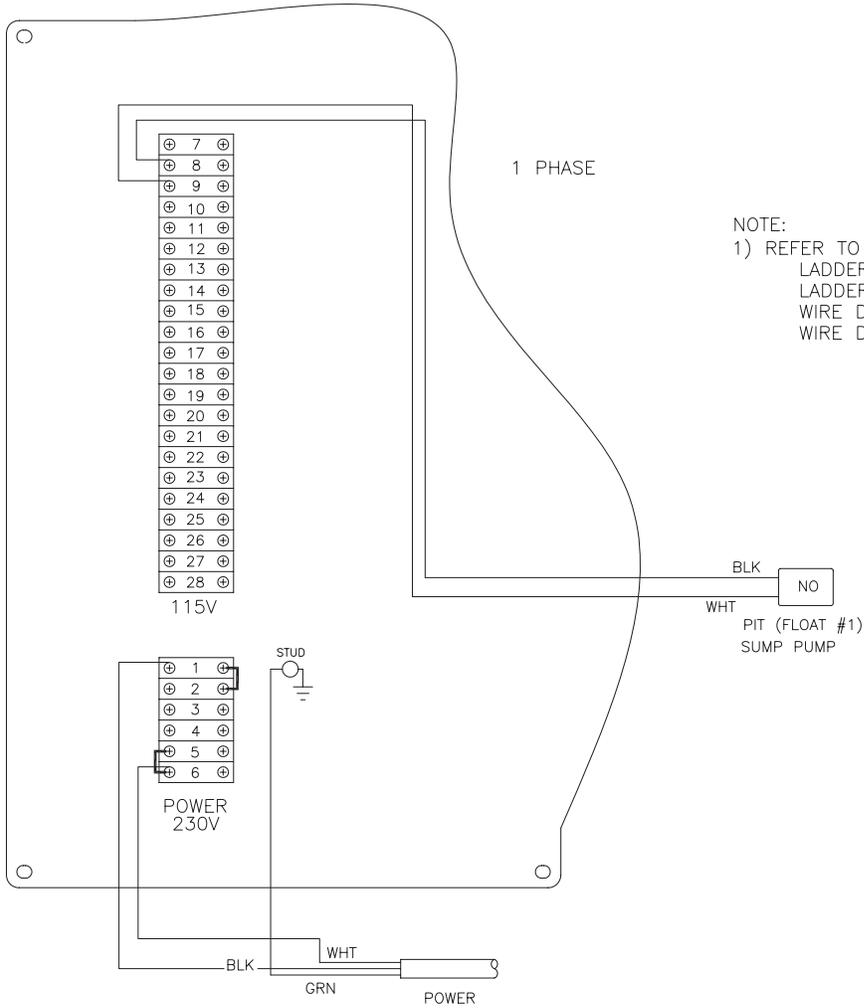
INSTALLATION



WARNING

RISK OF ELECTROCUTION! TO REDUCE THE RISK OF ELECTROCUTION, KEEP ALL CONNECTIONS DRY AND OFF THE GROUND.

ECF-0M1D



NOTE:

- 1) REFER TO THE FOLLOWING DRAWINGS:
LADDER DIAGRAM CONTROL BOX 1 - ECF-0M1D
LADDER DIAGRAM CONTROL BOX 2 - EC-0M1D
WIRE DIAGRAM CONTROL BOX 1 - EC-0M1D
WIRE DIAGRAM CONTROL BOX 2 - EC-0M1D

FIELD WIRING DIAGRAM-ECF-0M1D-042409-CJB

INSTALLATION

INSTALLATION OF PH, ORP AND CONDUCTIVITY PROBES:

CAUTION

RISK OF PROBE DAMAGE!

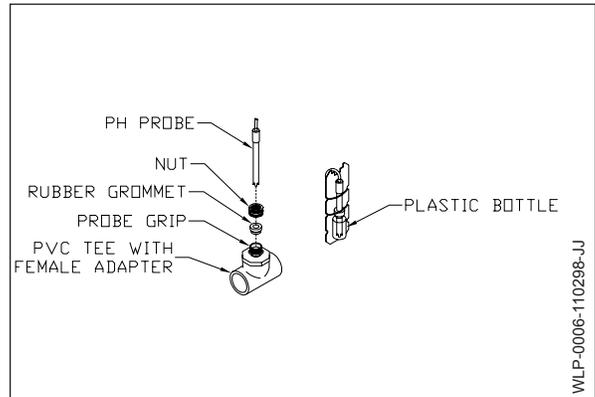
-DO NOT ALLOW PROBES TO BE EXPOSED TO AIR. ONCE PROBES ARE IN PLACE, TURN WATER ON IMMEDIATELY.

-HANDLE PROBES CAREFULLY AS THEY ARE MADE OF GLASS.

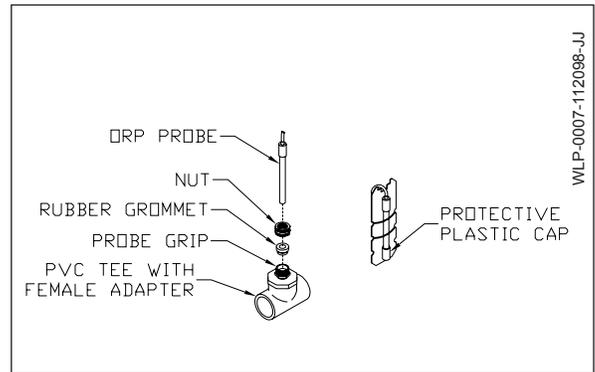
-DO NOT ALLOW PROBES TO BE EXPOSED TO FREEZING ENVIRONMENTS. KEEP THE ORIGINAL CONTAINERS IN WHICH THE PROBES WERE SHIPPED. THEY WILL BE NEEDED FOR PROBE STORAGE DURING WINTERIZING.

1. Turn off the **Sump Pump Switch (40)** and ensure no water is being discharged.
2. Locate the probe grips at the **Chemical Injectors (16E & 17E)** and unscrew the nut from one of the grips.
3. Remove one of the probes (pH or ORP) from its storage container. (Be certain to save the container for probe storage during winterizing.)
4. Carefully slide the probe grip nut over the glass probe.
5. Gently push the probe through the probe grip approximately 2 inches and tighten the nut onto the probe grip.
6. Repeat process for the remaining probe.
7. Gently screw the Conductivity Probe into the appropriate part provided (make sure to wrap threads in teflon tape to insure proper seal).
8. Turn on the **Sump Pump Switch (40)** and the **pH/ORP Meters Switch (43)**.

pH SENSOR PROBE



ORP SENSOR PROBE



1. General Description pH/ORP Meter

The Model SK-252 is a 1/16 DIN microprocessor based, on-off controller for a pH or ORP. It accepts any combination electrode for an input and has a relay, or SSR, or 4-20mA control signal for an output. All functions are programmable from the front panel, programmed values remain in memory when the power is turned off. Dual digital displays indicate the process value (pH or ORP) and the control set point. The process value is displayed in RED and the set point in GREEN. The power supply is universal and operates on 100 to 240VAC, 50/60Hz. Automatic temperature compensation terminals on the pH controller allow this to be performed with a 1000 ohm pt sensor, or manual with fixed resistors.

Specifications:

Model.....	SK-252	SK-252-ORP
Range	0 to 14 pH	-1000 to +1000mV
Resolution.....	.01 pH	1 mV
Accuracy	+/- .2 pH	+/- 0.2% of span
Dead band	Front panel adjustable 0 to 50% of span	
Main Output Relay.....	S. P. D. T. Relay 3 Amp @115VAC, Resistive Load	
Power	100 to 240 VAC 50/60 Hz @ 3 Watts	
Operating temperature range	-10 to +50°C	
Storage temperature range	-20 to +60°C	
Display.....	4 Digit red LEDs (pH, ORP), 4 Digit green LED's (Set Point)	
Dimensions.....	48 x 48 x 78.8 mm (1/16 DIN)	
Memory.....	Non - volatile	

INSTALLATION

1. General Description Conductivity Meter

The Model TSC-20 is a microprocessor programmable controller that accepts a conductivity electrode as an input. Outputs are; one on-off 1 relay; 3A mechanical contacts. The output can be programmed to operate above or below the set point. The power source is from 100 to 240 VAC, 50/60Hz free voltage there is no need to change connections for different voltages. The controller is programmable from the front panel via 3 switches, and calibration is done using two front panel adjustment pots.

The front panel is a 1/16 DIN, NEMA 4X rated and mounting hardware is provided.

CRU, RU approvals are standard.

Specifications:

Range	0 to 1000 ppm
Resolution.....	1ppm
Accuracy.....	+/- 2% span
Output Relay.....	S. P. D. T. Relay 3 Amp @115VAC, Resistive Load
Power	100 to 240 VAC 50/60 Hz @ 3 Watts
Operating temperature range	-10 to +50°C
Storage temperature range	-20 to +60°C
Display.....	4 Digit red LEDs (Conductivity), 4 Digit green LED's (Set Point)
Dimensions	48 x 48 x 78.8 mm (1/16 DIN)
Memory.....	Non - volatile

STOP

TO ENSURE YOUR WATER RECYCLE/TREATMENT SYSTEM OPERATES SAFELY AND EFFICIENTLY, COMPLETE THE PRE-OPERATION CHECKLIST BEFORE PROCEEDING.

PRE-OPERATION CHECKLIST

Before proceeding, answer all the questions on this checklist.	YES	NO
CODES: 1. Does the electrical wiring meet all codes? 2. Does plumbing meet all codes?		
LOCATION: 1. Is the unit located on a hard level surface free of flammable vapors, combustible dust, gases or other combustible materials? 2. Is the unit located in a large ventilated area?		
ELECTRICAL: 1. Is the unit properly grounded? 2. Does the power supply, voltage and amperage match the data plate?		
PLUMBING: 1. Is the plumbing sized correctly? 2. Are all plumbing connections secure?		
GENERAL: 1. Have all operators using this unit read and understood this entire manual? 2. Has the unit been installed by qualified service people who followed the instructions listed in this manual?		
IF "NO" WAS MARKED TO ANY OF THESE QUESTIONS, CORRECT THE SITUATION BEFORE OPERATING.		

PRE-OPERATION PROCEDURES

- Be certain all switches on the **Control Panel** are in the "OFF" position
- Check to make sure the Pit Float and Main Power are wired into the correct locations (see wiring diagram for Control Box 1)
- Position the valves on the EC System to the following configuration for start-up
 - Sump Pump Pressure Control Valve:** Turn valve fully open
 - Flow Control Valve:** Turn valve one rotation short of completely closed
 - Transfer Pump Flow Control Valve:** Turn valve one rotation short of completely closed
- Unit's Main Power Switch is located on the cover of Control Box 1.
 - This switch must be in the "On" position for any of the equipment on the unit to receive power.
- Prime Chemical Enhancement lines before starting flow through the system.
- Prime the Sump Pump by removing the pump lid and filling the line with water. Once line is completely full, replace the lid and make sure o-ring is in the correct position to avoid leaking and lose of pump pressure. Next turn the Sump Pumps power on to supply the unit with water from the collection pit.
 - Fresh water will have to be supplied to the Collection Pit until the unit and all of its components are filled with water.
 - With water flowing through the unit check for leaks and tighten any unions or connections that require tightening.
- Once the system is full of water adjust the cone on the oil decanter by turning the piping until the cone is submerged to an appropriate depth and water is just barely trickling over the lip. (Warning: Turn off power to reaction chambers, do not adjust cone while power is being supplied to the reaction chambers)
 - The cone will have to be adjusted for any increase (up) or decrease (down) in flow rate in order to function properly.
- A large storage tank may be required after the E.C. unit to allow the coagulated particles to completely settle out of the water.

OPERATION PROCEDURES

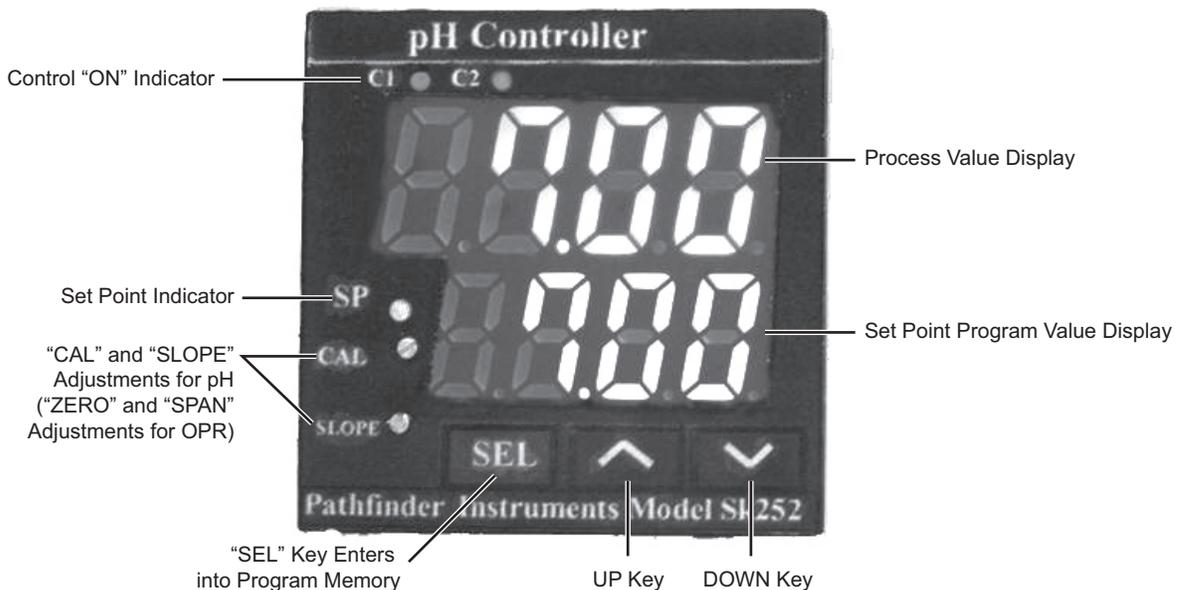
1. To begin with, flow should be kept between 4-10 GPM to make sure sufficient exposure to the electrodes is provided to the dirty water for coagulation to occur.
 - a. If it appears that the water is cleaned to the standards that are required at 4 GPM then incrementally increase flow so that required standards are still met.
 - b. Once the sump pump is switched on and system is full of water, turn on power to the reaction chambers.
 - i. The switches will not light up until water is flowing through all of the chambers (Pressure on switch from effluent of sump pump and Switch after Reaction Chamber 4 is activated).
 - c. During operation keep the amperage for the Reaction Chambers at or below 50 amps. Otherwise the power sources will shut down and will not restart until the power to that reaction chamber is shut off for a 5 minutes.
2. Adjust Transfer Pump **Flow Control Valve [49]** so that water is flowing at an appropriate flowrate.

Note: if the Valve is opened to far the transfer pump will cycle excessively. Shortening the life of the pump.

Operation pH/ORP Meter

Note: pH should be slightly basic 7.75, and ORP should be at 550 or higher

Front Panel Description



OPERATION PROCEDURES

KEYPAD OPERATION

1. "SEL" key; changes upper display to the first programming menu, advances the display through the menu and sets the programmed information into memory.
2. Δ up arrow key, increases value displayed in the green (lower) display.
3. ∇ down arrow key, decreases value displayed in the green (lower) display.
4. Press and hold "SEL" key for approximately 3 seconds and "HYS" will appear in the upper display. Hold the "SEL" key for approximately 6 seconds and P-n1 will appear.

PROGRAMMING

1. How to change the set point
Press and hold the up Δ or ∇ down arrow until the correct number appears, the new set point will be active after 5 seconds.
2. How to change the control action (Relay activates above or below the set point)
Hold the "SEL" key for approximately 6 seconds and "p-n1" will appear in the upper display, the control code will appear in the lower display, "0" or "1" will actuate below the set point, "2" or "3" will actuate above the set point. Press the "SEL" switch once, the value will flash, change the value with the "up" or "down" keys, and press the "SEL" key again to set it in memory. Holding the "SEL" key for approximately 2 seconds will return to normal operation.
3. How to program Hysteresis
Hold the "SEL" key for approximately 3 seconds and "HYS" will appear in the upper display, the hysteresis amount will appear in the lower display, press the "SEL" key once and the amount will flash, change the amount to the desired value with the "up" or "down" keys, press "SEL" again to set it in memory. Holding the "SEL" key for approximately 2 seconds will return to normal operation.

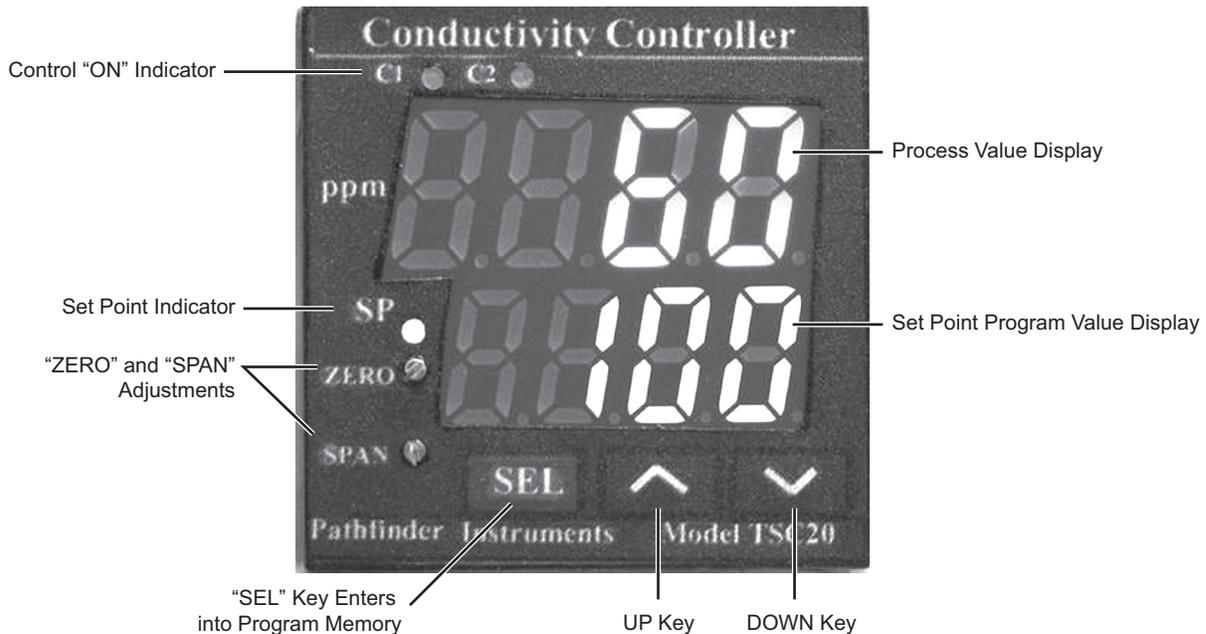
Calibration

1. How to calibrate pH
The front panel has two adjustments labeled "CAL" and "SLOPE", always adjust the CAL first. Place the pH electrode in a # 7.00 buffer solution wait for the reading to stabilize and adjust the CAL for 7.00. Rinse the electrode and place it in a #4.00 buffer solution, wait for the reading to stabilize and adjust the slope for reading of 4.00. Calibration complete.
2. How to calibrate ORP
The front panel has two adjustments labeled "ZERO" and "SPAN", the ORP controller can be calibrated with a millivolt source substituted for a probe.
Short the input connector and adjust the ZERO adjustment for reading 0000. Apply +500 mV from an accurate millivolt source and adjust the SPAN adjustment for reading of 0500.
To verify the accuracy of the ORP probe an ORP calibration kit is available from PATHFINDER INSTRUMENTS, it consists of enough materials to do 30 tests, it contains reagents, stirrers beakers and instructions. It costs \$40, ask for stock #B-125.

OPERATION PROCEDURES

Operation Conductivity Controller

Note: Conductivity should be at 750 or higher for EC to work properly.



KEYPAD OPERATION

1. "SEL" key; changes upper display to the first programming menu, advances the display through the menu and sets the programmed information into memory.
2. Δ up arrow key, increases value displayed in the green (lower) display.
3. ∇ down arrow key, decreases value displayed in the green (lower) display.
4. Press and hold "SEL" key for approximately 3 seconds and "HYS" will appear in the upper display. Hold the "SEL" key for approximately 6 seconds and P-n1 will appear.

PROGRAMMING

1. How to change the set point
Press and hold the up Δ or ∇ down arrow until the correct number appears, the new set point will be active after 5 seconds.
2. How to change the control action (Relay activates above or below the set point)
Hold the "SEL" key for approximately 6 seconds and "p-n1" will appear in the upper display, the control code will appear in the lower display, "0" or "1" will actuate below the set point, "2" or "3" will actuate above the set point. Press the "SEL" switch once, the value will flash, change the value with the "up" or "down" keys, and press the "SEL" key again to set it in memory. Holding the "SEL" key for approximately 2 seconds will return to normal operation.
3. How to program Hysteresis
Hold the "SEL" key for approximately 3 seconds and "HYS" will appear in the upper display, the hysteresis amount will appear in the lower display, press the "SEL" key once and the amount will flash, change the amount to the desired value with the "up" or "down" keys, press "SEL" again to set it in memory. Holding the "SEL" key for approximately 2 seconds will return to normal operation.

Calibration

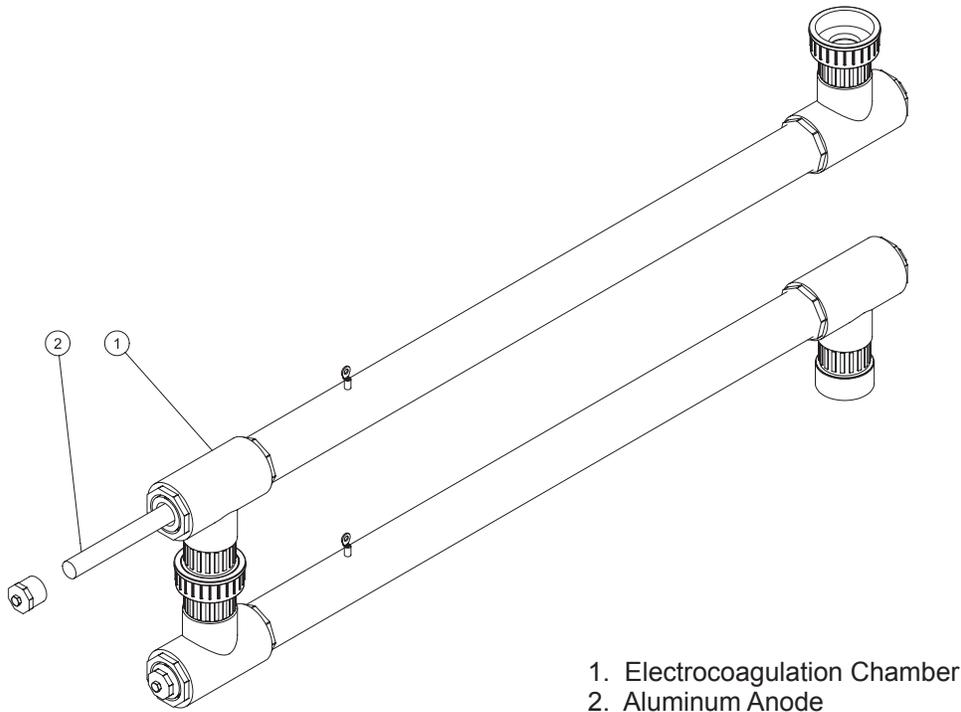
How to calibrate

The front panel has two adjustments labeled "Zero" and "SPAN", always adjust the Zero first. Allow the controller to warm up for at least 30 minutes. Place the conductivity electrode in air, wait for the reading to stabilize and adjust the "SERO" pot for a reading of 0000, place the electrode in a calibration solution of 1000 ppm, allow the reading to stabilize and adjust the "SPAN" pot for a reading of 1000.

MAINTENANCE

ROUTINE MAINTENANCE

1. Turn off power to the reaction chambers and using a multi meter check the conductivity through the reaction chambers. This can be done by placing the two multi meter testing wands on the two terminals of the reaction chamber. (Note: water must be in the reaction chamber for this test to work) if there is still conductivity across the chamber the chamber should be working properly. If there is not conductivity through the chamber and the amperage is lower than required then the chambers should be replaced.
2. Completely drain the system of water by opening up the flocculating tank drain and removing the plug from the product water tank.
3. Power down entire system (main power switch) and move all switches on the control boxes to the off position. Then turn off power at the wall disconnect.
4. Remove the cones from the flocculating tank and clean them with a low pressure hose. Wash down the inside of the flocculating tank before re-installing the cones into the flocculating tank.
5. Remove the plug from the product water tank and wash out any solids that have settled in the tank. Put plug back in place once tank is clean.
6. Clean collection pits of any solids that have settled out (mi-t-m's pit cleaning system is designed to perform this tank).
7. Once system is cleaned, turn on power and fill with water. At this point continue normal operation.
8. When system performance decreases below acceptable levels replace cells to restore original performance levels.



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MAINTENANCE

WINTERIZING

1. Turn all switches on the Control Panel to the "OFF" position and disconnect power to the Unit.
2. Follow the instructions in the Maintenance section of the manual and drain all of the water out of the Tanks (including all of the plumbing assembly).
3. Remove the drain plug from the Pumps.
4. Empty the plumbing from the pit system to the Pump.
5. Clean the Flocculating and Product Tanks as outlined in the ROUTINE MAINTENANCE section of the manual.

TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	REMEDY
<p><u>SUMP PUMP</u> Sump Pump will not run.</p>	<p>Floats are not adjusted correctly in the Sump Pit.</p> <p>Not enough water in the Sump Pit.</p> <p>Float 1 is defective.</p> <p>High Sump Pump Float in the Flocculating Tank has flipped up.</p> <p>Circuit overload/breaker has tripped.</p> <p>Motor overload.</p>	<p>Readjust.</p> <p>Add water to the Sump Pit.</p> <p>Replace.</p> <p>Wait for water to drain from flocculating tank or push High Sump Pump Float down.</p> <p>Reset breaker or replace fuse at power source.</p> <p>Allow motor to cool. Motor will automatically restart when cool.</p>
<p>Sump Pump motor starts and stops frequently.</p>	<p>This is a common occurrence on initial start-up while pits are filling.</p> <p>Motor is defective.</p> <p>Excessive water flow to reclaim unit.</p> <p>Sump Pump impeller is clogged.</p> <p>Motor overload.</p> <p>Sump Pit is not large enough.</p>	<p>Allow pits to fill.</p> <p>Replace pump.</p> <p>Turn valve clockwise to reduce flow.</p> <p>Disconnect power and unclog impeller.</p> <p>Allow motor to cool. Motor will automatically restart when cool.</p> <p>Expand size of pit.</p>
<p>Sump Pump runs, but there is little or no water discharge.</p>	<p>Strainer basket in Sump Pump is clogged.</p> <p>Water level is below pump inlet.</p> <p>There is an air lock in the Sump Pump.</p> <p>Low voltage.</p>	<p>Clean, repair or replace.</p> <p>Ensure Float 1 is not caught in plumbing.</p> <p>Manually fill the inlet pipe with water.</p> <p>Ensure wire size is capable of handling the rated amperage of the unit. If wire size is correct, contact your distributor.</p>
<p>Sump Pump will not turn off.</p>	<p>Clogged impeller or worn pump parts.</p> <p>Defective switch inside Float 1.</p> <p>Pump is air locked.</p>	<p>Contact your distributor.</p> <p>Replace.</p> <p>Cycle pump in one minute increments several times to clear air from pump.</p>

TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	REMEDY
<hr/>		
<p><u>ELECTRICAL</u> No power at Control Panel.</p> <p>Power Indicator Light is OFF.</p>	<p>Power failure to Control Panel.</p> <p>Power not hooked up to correct terminals.</p> <p>Main power switch is bad.</p>	<p>Check circuit breaker at power source or contact your local distributor.</p> <p>Check wiring diagram to ensure correct wiring, contact your distributor.</p> <p>Check voltage across inlet power terminals, replace if necessary.</p>
<hr/>		
<p><u>COAGULATION/FLOCCULATING TANK</u> Water will not flow into the Coagulating/Flocculating tank.</p>	<p>Sump Pump is not turned on.</p> <p>Circuit breaker has tripped or is "OFF".</p> <p>High Sump Pump Float in Flocculating Tank is malfunctioning.</p> <p>Strainer basket in Sump Pump is clogged.</p> <p>Dirt is lodged in the check valve.</p> <p>Sump Pump impeller is clogged.</p> <p>Lines or valves contain frozen water.</p> <p>Pressure Switch malfunctioning</p> <p>Flow switch malfunctioning</p>	<p>Move Sump Pump Switch to "ON".</p> <p>Reset or turn breaker "ON".</p> <p>Check On/Off with voltmeter, repair or replace.</p> <p>Clean, repair, or replace.</p> <p>Clean.</p> <p>Disconnect power and clean.</p> <p>Allow to thaw. Inject with warm water. water if necessary.</p> <p>Take out and make sure eye is clean, if it is may need to replace.</p> <p>Take out and inspect for damage, if present, replace.</p>
<hr/>		
<p><u>SHAFT SEALS</u> Water is leaking at pumps.</p> <p>Short seal life.</p>	<p>Damaged stationary shaft seal.</p> <p>Unexpected temperature and chemical usage.</p>	<p>Seal ran dry. Ensure seal chamber is filled with liquid.</p> <p>Replace.</p>

TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	REMEDY
<p><u>TRANSFER PUMP</u> Transfer Pump runs but there is low water discharge.</p>	<p>Water is not available.</p> <p>Low Transfer Pump Float is not functioning.</p> <p>Plumbing is obstructed or too small.</p>	<p>Reduce flow from pump or contact your local distributor.</p> <p>Check On/Off with voltmeter. Repair or replace.</p> <p>Remove obstruction or use larger plumbing.</p>
<p>Transfer Pump cycles excessively.</p>	<p>Pump sucking air.</p> <p>Flow rate to the pump is high.</p>	<p>Eliminate leaks and tighten all connections on intake line.</p> <p>Reduce by closing gate valve after transfer pump.</p>
<p>Transfer Pump does not turn off.</p>	<p>Impeller is obstructed.</p> <p>Float in holding tank is malfunctioning.</p> <p>Effluent from pump is too low of flow rate.</p>	<p>Contact your local distributor.</p> <p>Check float, replace if necessary.</p> <p>Open gate valve after pump to get desired results.</p>
<p><u>ODOR</u> Excessive odor in water system. low water discharge.</p>	<p>Water remains dormant in the system too long causing bacteria buildup.</p>	<p>Use regularly.</p>
<p><u>CHEMICALS</u> Low chemical usage (with possible odor.)</p>	<p>Chemical pumps are not working.</p>	<p>Replace chemical hose inside pump. Recalibrate pH and ORP Meters.</p>
<p><u>WATER FLOW</u> Air shoots from Water Outlet.</p> <p>Water quality is bad from outlet</p>	<p>This is a common occurrence while pump is priming.</p> <p>Transfer Pump is sucking air at suction inlet.</p> <p>Electrodes are spent or dirty.</p> <p>Flow Rate is set to high.</p>	<p>Air will stop shooting from the water outlet when pump is primed.</p> <p>Eliminate leaks or tighten connection.</p> <p>Inspect/Clean electrodes and determine if they should be replaced. Call local distributor.</p> <p>Choke down flow to an appropriate rate to get desired results.</p>



STATEMENT OF WARRANTY

Mi-T-M warrants all parts (except those referred to below) of your new Electrocoagulation System to be free from defects in materials and workmanship during the following periods:

For One (1) Year from the date of original purchase:

Defective parts not subject to normal wear and tear will be repaired or replaced at Mi-T-M's option during the warranty period. In any event, reimbursement is limited to the purchase price paid.

EXCLUSIONS

1. The motor is covered under separate warranty by its respective manufacturer and is subject to the terms set forth therein.
2. Normal wear parts:

Seals	Filters	Gaskets
O-rings	Packings	Valve Assembly
Brushes		
3. Parts damaged due to:
 - normal wear, misapplication, modifications/alterations, abuse,
 - operation at other than recommended speeds, pressures or temperature,
 - the use of caustic liquids,
 - chloride corrosion or chemical deterioration,
 - fluctuations in electrical or water supply,
 - operating unit in an abrasive, corrosive or freezing environment.
4. Parts damaged by failure to follow recommended:
 - installation, operating and maintenance procedures.
5. This warranty does not cover the cost of:
 - normal maintenance or adjustments,
 - labor charges,
 - transportation charges to Service Center,
 - freight damage.
6. The use of other than genuine Mi-T-M parts will void warranty.

Parts returned, prepaid to Mi-T-M's factory or to an Authorized Service Center will be inspected and replaced free of charge if found to be defective and subject to warranty. There are no warranties which extend beyond the description of the face hereof. Under no circumstances shall Mi-T-M bear any responsibility for loss of use of the unit, loss of time or rental, inconvenience, commercial loss or consequential damages.

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