

RAM-C™

(115/230 VAC)

USER'S MANUAL

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

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RECOMMENDATIONS

General Comments

Read the entire instruction manual *before* installation or operation of the RAM-C chemical mixing 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

General Comments

When using your RAM-C chemical mixing 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

DESCRIPTION

General Comments

The RAM-C is a fully automatic, high volume chemical mixer. It is constructed of welded steel, and has a fine, corrosion resistant, baked epoxy finish. The RAM-C mixes and maintains six gallon tanks of both developer and fixer from containers of concentrated chemistry. This is accomplished through the use of high precision, bellows metering pumps. These tanks are then used to supply up to six processors with fresh chemistry. This unit also provides timer controlled recirculation pumps that keep the chemistry well mixed. Each tank on the unit is monitored with a pair of float switches. The switches keep the tanks full, and also shut off the recirculation pump if the tanks ever run low.

SPECIFICATIONS

General Comments

Electrical: 115 VAC, 50/60 Hz, 350 W

Chemical Tanks: 10 gallons maximum capacity, 6 gallons operating capacity each.

Dimensions: 19" D x 24 1/3" W x 25 3/4" H

Pump Rates: Dev – 450 mls/min. Dev. Water – 2,000 ml/min.
Fix – 450 mls/min. Fix Water – 2,000 ml/min.

Water Supply: 16 ft. hose with fittings.

Net Weight: 60 lbs.

Installation: The unit is internally preplumbed and is complete with all fittings.

INSTALLATION

General Comments

Refer to Figure 2 for installation diagram.

1. Remove the RAM-C from the shipping container and check for signs of damage such as cracked tanks, broken fittings, etc. Notify the shipping company immediately if any damage exists. Remove all packing materials and save.
2. Position the system within six feet of a grounded 120 VAC, 5 Amp power source.
3. The metering pumps are preset to mix at approximately a 4 1/2:1 ratio of water to chemistry. This ratio may be changed by recalibrating the pumps. Refer to the pump recalibration section below.
4. Insert the developer and fixer pump chemistry inlet pipes into the drum or cube of concentrated chemistry.
5. Connect the developer and fixer inlets to the processor replenisher pump (up to six) to the sides of the RAM-C.
6. Connect the 16 ft. water inlet hose to a cold water source.
7. Connect the fixer and developer tank overflows to a drain or containment unit as required.
8. For the initial start-up, it is recommended that you mix a batch of chemistry and manually fill the developer and fixer holding tanks. This will prevent unnecessary strain on the metering pumps during the initial start-up period.

CAUTION: Use hose clamps on all connections to prevent leaks.

Pump Recalibration

1. Disconnect the outlets of the two (or three) bellows of the pump requiring calibration.
2. Place the concentrate inlet tube of the metering pump into a bucket of water. (For fix with hardener, place the inlet tube for the hardener into the bucket of water also.)
3. Run tubes from the outlets of the pump bellows into an empty bucket.
4. Run the pump until all the lines are primed, then stop the pump.
5. The developer metering pump has two bellows: (1) 2" bellows which pump 2 liters/minute at 100% setting and (1) 1" bellows which pumps 450 mls/minute at 100% setting. The fixer metering pump contains three bellows: (1) 2" bellow, (1) 1" bellow, and (1) 1/2" bellow which pumps 45 mls/minute at 100% for the hardener.
6. Place the outlet for the 2" water bellows into a graduated cylinder and run the pump for 15 seconds. Multiply this by 4 to obtain the flow rate per minute. Repeat three times and compare the results.
7. Discard the liquid in the graduate and measure the 1" bellows.
8. Divide the two numbers to obtain the mix ratio. Adjust one of the bellows as needed and remeasure its output as in steps 5 and 6. Consult your chemistry supplier for the appropriate ratio.

Example: If a 5:1 ratio of water to chemistry is required, set the water bellows at 100% and adjust the chemistry bellows output to 400 mls/minute.

It is recommended to operate the bellows as close to 100% as possible while still keeping the desired ratio. If the ratio is less than 4 1/2:1, decrease the water bellows. If the ratio is greater than 4 1/2:1, decrease the chemistry bellows.

9. The third bellows on the fixer pump is a 1/2" bellows used for adding hardener. This bellows has a maximum rate of flow of 45 mls/minute. Consult your chemistry manufacturer for the appropriate amount of hardener to be added to the fixer. One fluid ounce equals 29.57 mls.
10. Drain the water from the pump concentrate inlet tube before inserting it into the concentrate tank. (Also drain the hardener line before using it.)
11. Reattach the pump outlets to the fittings to the original locations.

NOTE: For best performance of the metering pump, operate the bellows between 50% to 100%.

CONTROLS

General Comments

(Electronic Controls)

The RAM-C is controlled by a state-of-the-art, microprocessor based, Programmable Logic Controller (PLC). This PLC is versatile and able to be updated easily by just changing the software program. The PLC uses the input from the float switches and the manual switches, then provides control for all the pumps and the low level alarm. The PLC keeps the tanks full by monitoring the high level switches and makes sure the tanks don't run dry by monitoring the low level switches, and sounding the alarm if any tank falls below this level. Following is a table of the automatic switches and what they do:

TABLE I

<u>Item</u>	<u>Function</u>
1. Fixer Concentrate Tank Liquid Level Switch	Turns ON the alarm and turns OFF both fixer pumps when open.
2. Developer Concen. Tank Liquid Level Switch	Turns ON the alarm and turns OFF both developer pumps when open.
3. Water Tank Liquid Level Switch	Turns ON the alarm and turns OFF all pumps when open.
4. Bottom of Fixer Tank Liquid Level Switch	Turns ON the alarm and turns OFF the fixer recirculation pump when open.
5. Bottom of Developer Tank Liquid Level Switch	Turns ON the alarm and turns OFF the developer recirculation pump when open.
6. Top of Fixer Tank Liquid Level Switch	Turns ON both fixer pumps when closed.
7. Top of Developer Tank Liquid Level Switch	Turns ON both developer pumps when closed.

In addition, the PLC has a timing function that cycles the recirculation pumps ON for two minutes and OFF for five minutes, except when the low level alarm is ON.

Control Panel Functions

(See Figure 1)

1. Power Switch

This switch controls all electrical power to the RAM-C. The ON position provides electricity to the PLC, level switches, and pump motors. The green light above the switch glows when there is power to the unit.

2. Developer Bulk Add Switch

This is a momentary switch which activates the developer metering pump to mix additional developer and pump it into the front holding tank. As long as the switch is held in the UP position, the metering pump will operate and the green indicator light will illuminate.

3. Fixer Bulk Add Switch

This is a momentary switch which activates the developer metering pump to mix additional fixer and pumps it into the front holding tank. As long as the switch is held in the UP position, the metering pump will operate and the green indicator light will illuminate.

NOTE: Both of the bulk add switches override all other functions of the unit. While the unit is functioning normally, there should be no need to use these switches. If using a bulk add switch, be careful not to overfill the front holding tanks.

4. Low Level Alarm Switch

Each tank is equipped with a low level switch. If any tank level fall low enough to activate the switch, the red alarm light will flash and a buzzer will sound. The low level alarm switch will silence the buzzer for 15 minutes, after which time it will sound again if the low level condition is not corrected. The red alarm light will continue to flash until the low level condition is corrected.

CONTROL PANEL, RAM-C

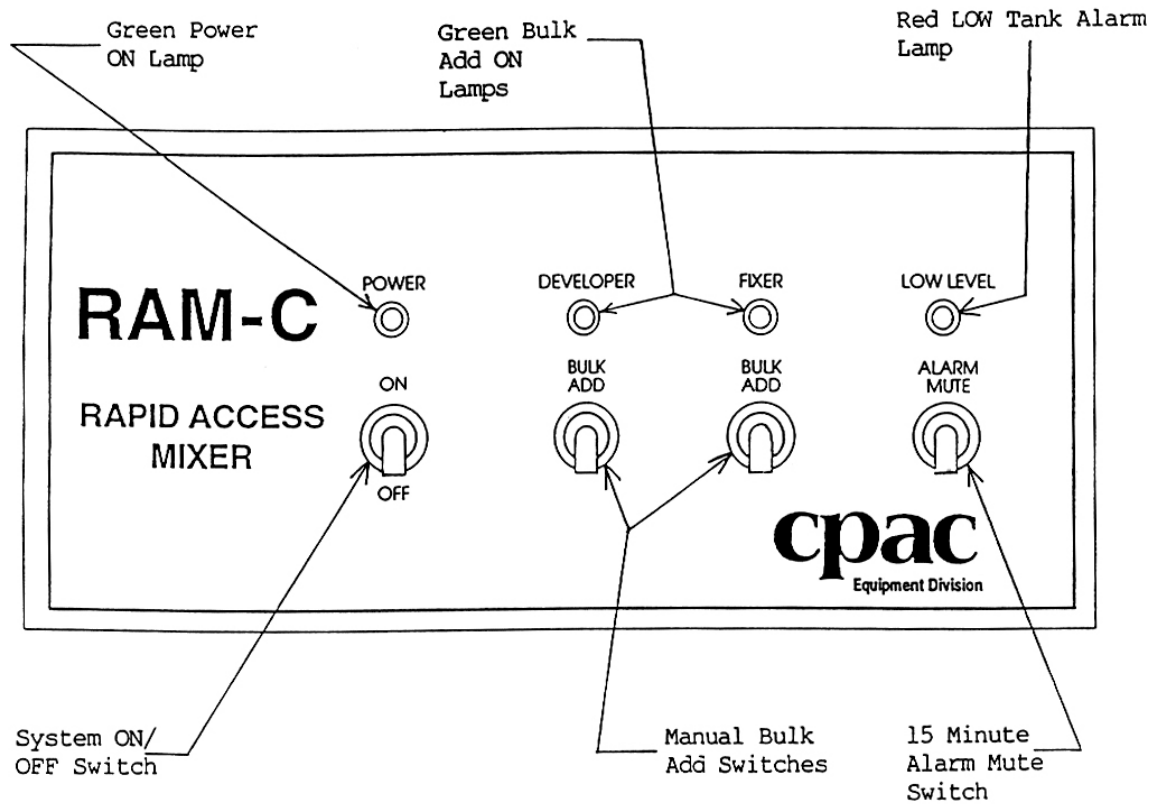
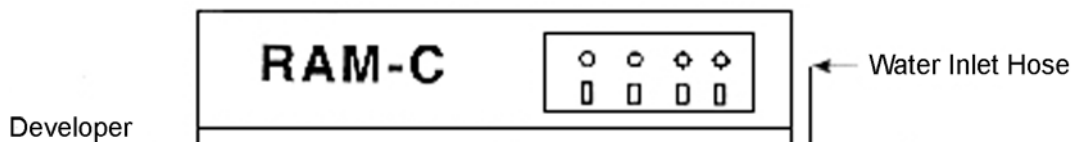


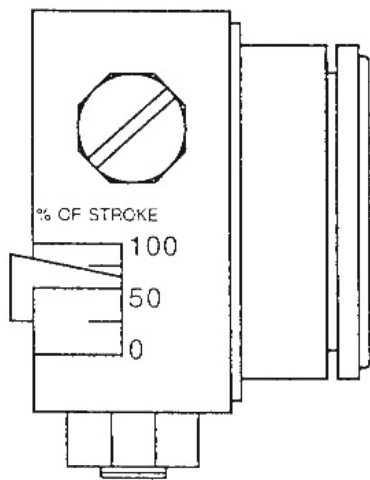
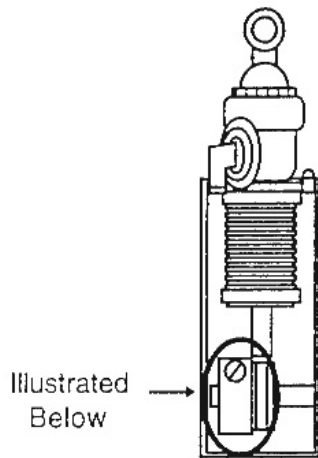
Figure 1

**RAM-C
Recommended Operating Configuration**



FLOW ADJUSTING INSTRUCTIONS FOR

COMPACT BELLOWS PUMP

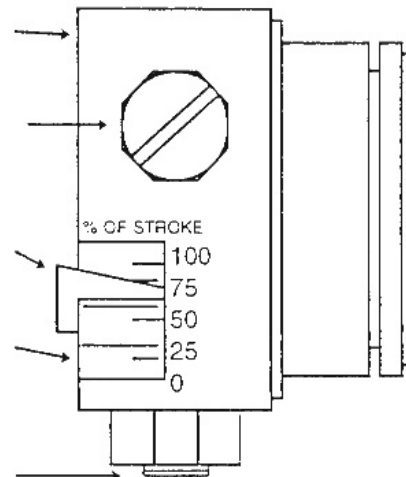


1/2" BELLOWS

CRANK
ADJUSTING SCREW
(5/16 HEX w/SLOT)

STROKE INDICATOR
STROKE SCALE

SET SCREW



S 1" to 1-1/2" BELLOWS

1. Do not attempt to adjust flow while pump is running.
2. Clockwise rotation of the adjusting screw increases pump stroke until achieving 100% stroke. Do not attempt forced rotation of the adjusting screw after indicator reaches 100% and a "bottoming" resistance is experienced.
3. Counter-clockwise rotation of adjusting crew decreases stroke.
4. Only eight clockwise revolutions adjust stroke from 0 - 100%. One-half inch bellows pump requires four revolutions.
5. It is not necessary to loosen set screw.

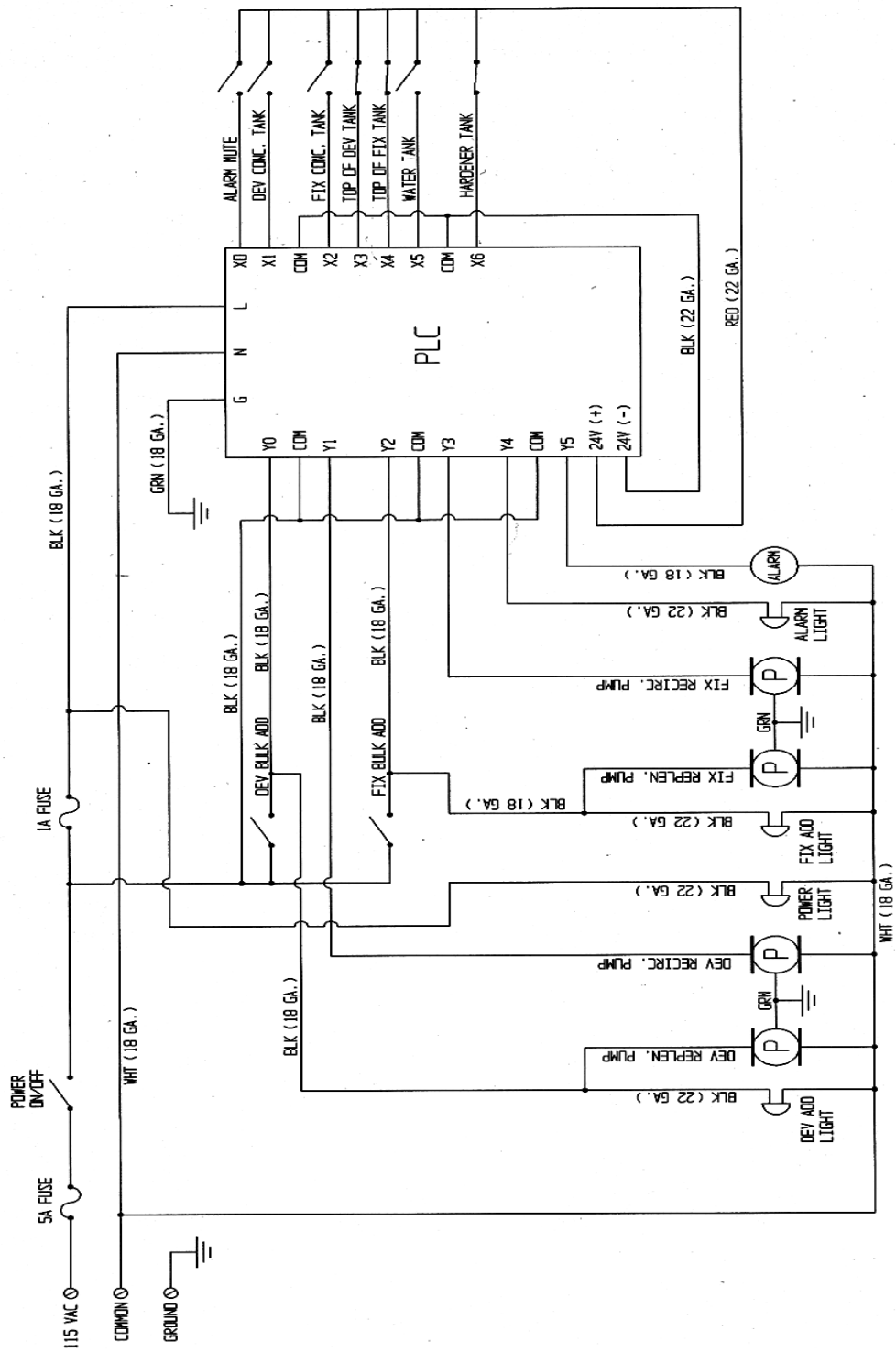
NOTE: Do not add lubricants to any pump mechanism.

TROUBLESHOOTING GUIDE

Problem	Cause	Solution
Alarm sounds	Developer concentrate tank low Fixer concentrate tank low Water tank low, valve broken Water tank low, water OFF Fixer/Developer holding tank low, pump not delivering Low level float switch broken	Refill developer concentrate tank Refill fixer concentrate tank Replace valve Turn ON water Check metering pump Replace switch
Power light does not illuminate	Unit not plugged in Unit not turned ON No power to outlet	Plug in Turn unit ON Check outlet and fuses
Pumps do not run	Blown fuse on control box	Replace fuse
Pumps not delivering	Stuck check valve Pump not primed Loose nut on outlet elbow Lines plugged Hose restricted Water not turned ON Broken adjustment screw Split bellow	Clean out, replace if necessary Prime with water Hand tighten nut Flush with warm water Check hoses Turn ON water Replace Replace
Incorrect mixture	Check float valve in water tank Water not turned ON Improper pump calibration Pumps not delivering	Clean, replace if necessary Turn ON Recalibrate pumps Check poppet valves

RAM-C
PARTS LIST

<u>Part Number</u>	<u>Description</u>
700050	Fuse, 5A Norm 125V AGC-5
38-113P2213	Filter, Chem Tank, 500 Microns
703451	PLC, 12 Input, 8 Output
01-126B6000C	Pump, Mag. Drive, March #1A-MD-1/2
702508	Pump, GRI.16003-001 G010 F001 F004 F31 H3
702509	Pump, GRI.16002-001 G006 F004 F31 H3
700606	Switch, Liq. Lvl. 10VA LS-3
42-113P2110	Valve, Float with Brass Body and SS Seat, #RM66
19-111P2003	Fuse, 1 Amp, Bussman (P-UL)
15-143P2011	LS-7 Level Switch, Type 3, #125748



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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 585-382-3223.