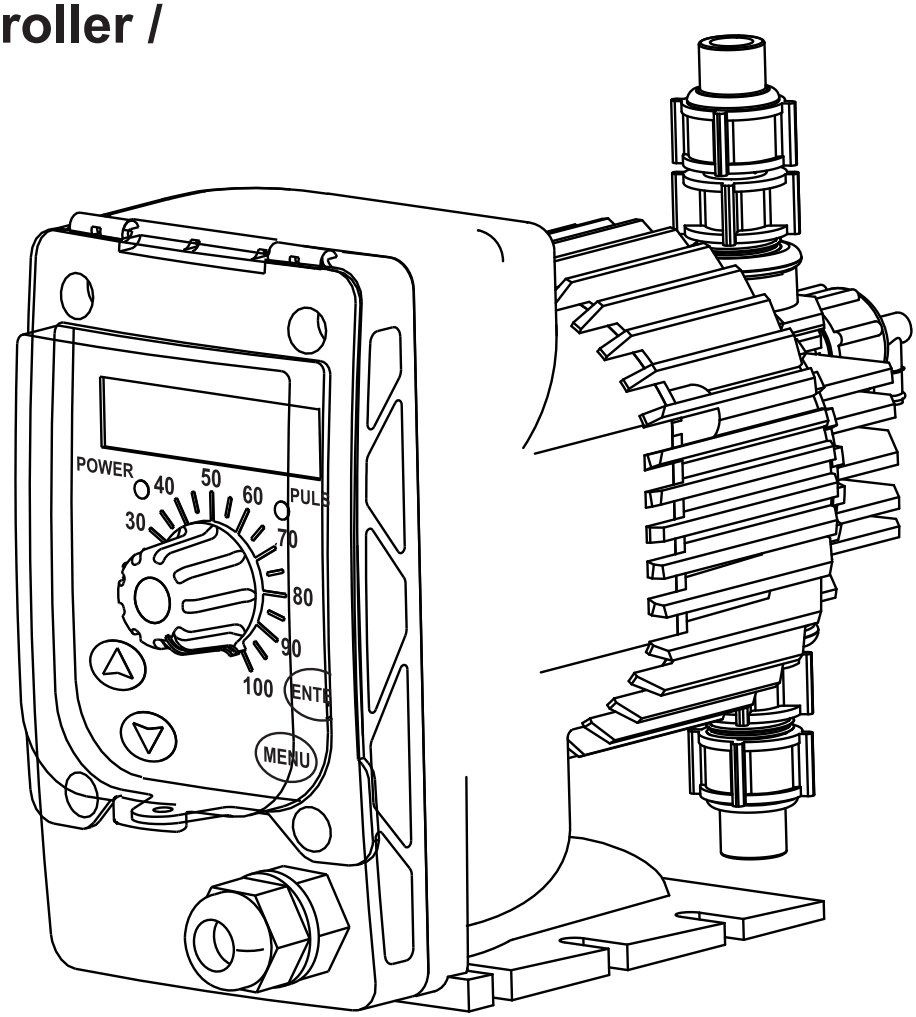
Nu-Calgon — *Manual*

CMS-IV

Conductivity Controller / Metering Pump

Installation
Maintenance
Repair
Manual



IMPORTANT:
Read Prior To Installation!

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Nu-Calgon

CMS-IV
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I. Introduction

The CMS-IV Monitor/Pump unit combines a chemical metering pump with the control of total dissolved solids (TDS) in recirculating cooling water systems in terms of electrical conductivity measured in MicroSiemens/cm (uS/cm). When the conductivity exceeds the user-defined limit (Set Point), the relay output activates, sending current to a solenoid bleed valve to release water from the system. The CMS-IV will also automatically inject chemical to the water system based on one of several automatic feed methods.

This manual covers all facets of operation of the CMS-IV Monitor/Pump, including unpacking, mounting, electrical and plumbing connection, and start-up. Safety, maintenance and repair, warranty, and factory information is also provided. Please read this manual completely before proceeding.

Observe safety protocols and heed all warnings and precautions.

II. Unpacking

The unit has been shipped as a complete package, ready for installation. If the shipping carton shows any signs of damage, notify the shipping company immediately upon receipt. Nu-Calgon cannot be held responsible for damage from shipping.

Unpack the carton and insure the following items are present:

1. CMS-IV pump/controller
2. Suction, discharge and bleed tubing (not with piping connections)
3. Foot valve and weight
4. Injection fitting
5. Instruction manual
6. Conductivity probe and T assembly (unless otherwise ordered)
7. A two wire cable for possible connection to a contacting head water meter (attached to monitor).

III. Safety Considerations

NOTE: All units are primed with water before leaving the factory. If the solution to be pumped is not compatible with water, disassemble the pump fluid end before use. After disassembly, thoroughly dry the pump head, valves, and seals before pump is reassembled and used.

A. Chemical Compatibility

The CMS-IV Pump's wet ends are designed to work with most liquid chemicals. A chemical resistance chart is available for determining specific compatibility with a wide variety of chemicals. If you have further compatibility questions, contact Nu-Calgon at 1-800-554-5499 or via email at www.nucalgon.com.

B. Safety Equipment and Preparation

Always wear the proper protective clothing and gear when working around chemicals and chemical metering pumps. Safety glasses, gloves, and aprons are critical in preventing accidental exposure to dangerous chemicals.

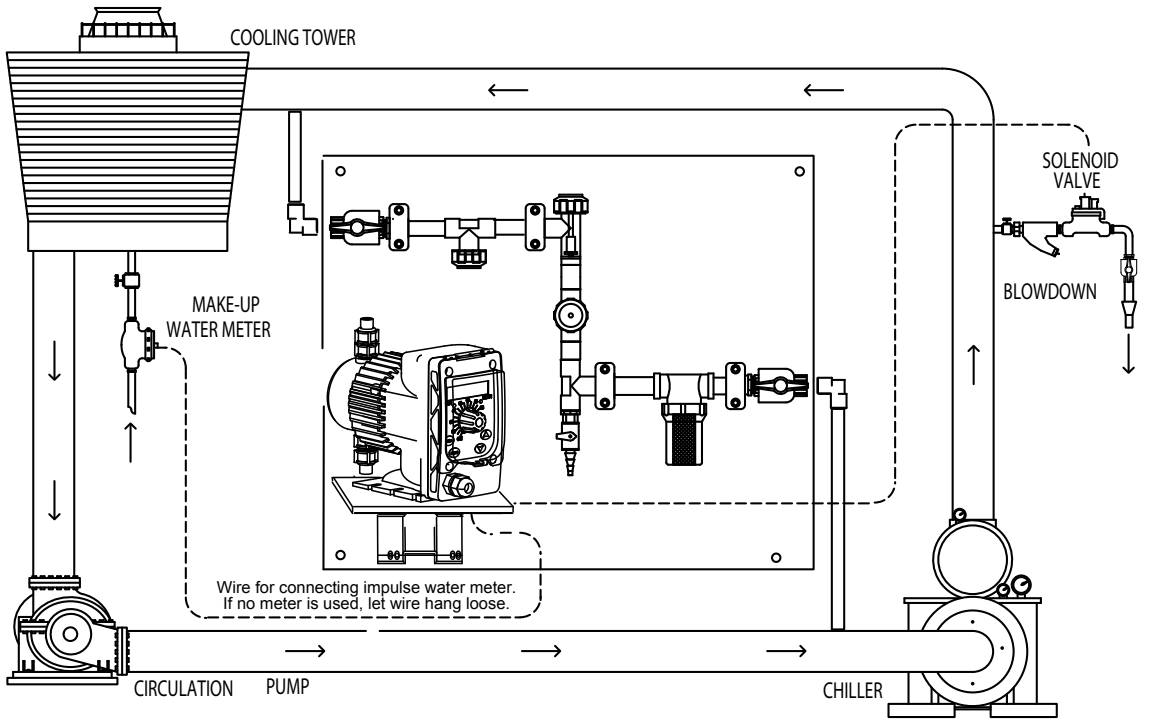
C. In Case of Accident

If a chemical spillage occurs, consult the Material Safety Data Sheet (MSDS) for specific instructions regarding the chemical being used.

D. Liquids Under Pressure

Liquids under pressure can present a special hazard when a line or seal is punctured resulting in the spraying of chemical many yards away.

IV. Installation



A. Mounting

The CMS-IV is prewired for easy installation. Select a secure mounting location convenient to electrical and plumbing connections that is accessible by the operator. Do not install the pump in a location where the ambient temperature exceeds 120°F and 50°C. The pump is suitable for most outdoor installations, shielding from direct exposure to the elements is recommended. The properties of solutions to be metered should also be considered concerning temperature changes and effects to poly tubing.

Accessory item 4610-5 (plastic mounting bracket) is recommend for a secure installation.
See page 17 for pump footprint.

B. Electrode (Conductivity Cell) Installation

The CMS-IV is provided with a CMS-TE-4A quick disconnect probe and T assembly on an 8' lead. The tee has ¾ " female slip connections. The probe must be installed in a sample line having an inlet pressure higher than the outlet and 3-10 gpm flow for proper operation. Isolation valves on both sides of the probe assembly are needed to allow for easy removal of the probe for cleaning. See page 17 for probe diagram. The conductivity probe's lead wire can be extended up to 75 feet if necessary. If extending, use 22 guage shielded cable.

NOTE: Chemical injection must be downstream from the probe!

C. Electrical

1. The unit has a voltage regulated internal power supply capable of operating in the range of approximately 95 to 135 VAC. Use a supply voltage of 100 to 120 VAC for best results. The 3-wire grounded plug must be used in a 3-wire wall plug.

2. With a 220 volt option, the unit has a voltage regulated internal power supply capable of operating in the range of approximately 195 to 260 VAC. Use a supply voltage of 210 to 250 VAC for best results. Pump is supplied without a country specific plug unless otherwise specified.

CAUTION: Never remove ground wire from plug

3. Control relay output voltage is equal to incoming line voltage with a 5 amp fused relay output.

   Note: An isolated circuit breaker with a true earth ground is highly recommended to insure uninterrupted operation.

D. Chemical Injection Plumbing

1. Piping Connections

The CMS-IV uses carefully matched components to achieve a predictable metering output. This predictability can only be maintained if all fitting sizes remain unaltered. **Do not** attempt to reduce tubing size. All tubing connection should be double checked to insure against leakage. If hazardous chemicals are being pumped, use shielding around discharge tubing.

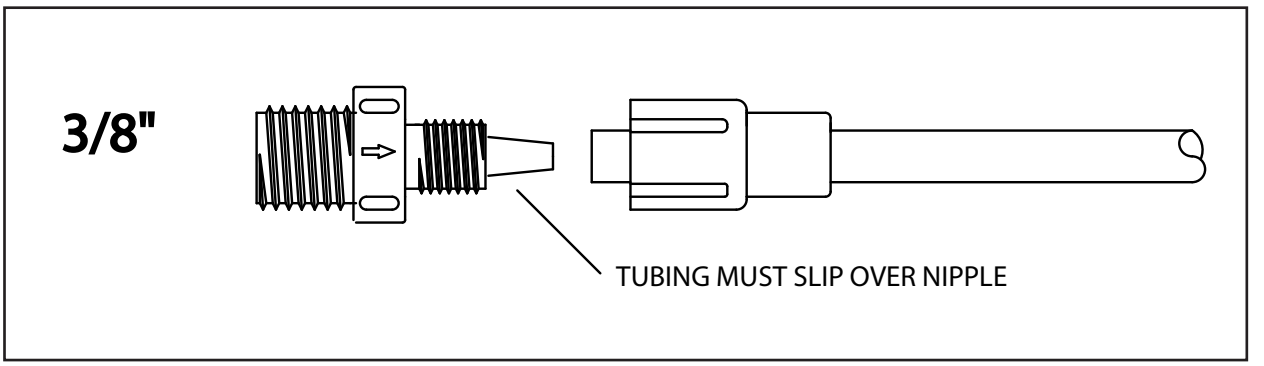
NOTE: When cutting lengths of tubing for your installation, ensure a clean, square cut. Keep lengths of tubing as short as possible and use as few connections as possible.

2. Tubing Nuts

Do not overtighten the tubing connectors. Tighten the fittings no more than 1/4 turn after the fitting contacts the seal. Hand tighten only. **Do not use a wrench or pliers** as they may damage the fittings. Do not use Teflon tape except on NPT fittings. **Be sure to observe applicable local plumbing codes.**

WARNING: Clear flexible tubing is not intended for pressurized use.

3. Tubing Connections

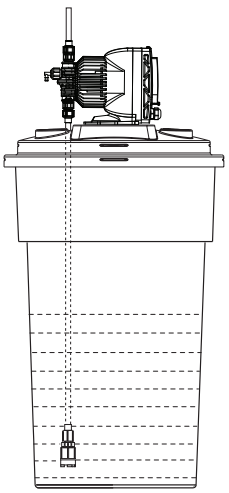


4. Suction Lift vs Flooded Suction Applications

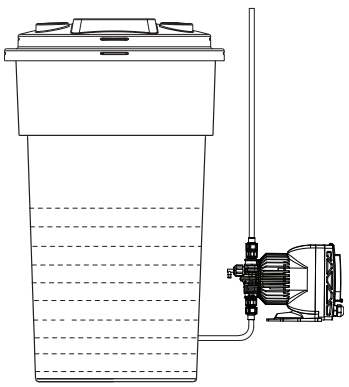
Suction Lift Installation
Mount the unit around the top of the solution tank, not to exceed 5 feet from pump to bottom of tank.

Flooded Suction
This installation is recommended for very low outputs, solutions that gasify and high viscosity solutions. Priming is easier and loss of prime is reduced. Failure of the pump diaphragm or rupture of the solution tubing can cause loss of solution in the tank.

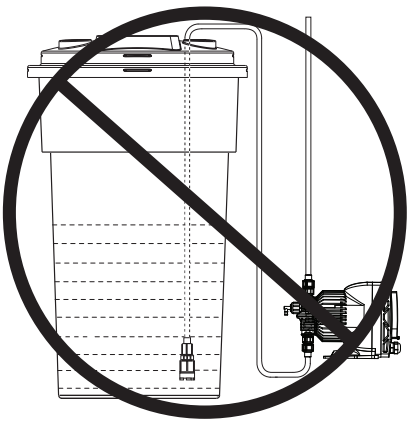
Suction lift
Not to exceed 5 ft.



Flooded Suction



Not Recommended



5. Foot Valve Installation

A weight is provided to hold the tubing and foot valve in a vertical position at the bottom of the tank. **Do not allow the foot valve to lay horizontally in the chemical container.** This defeats the action of the valve and causes the pump to lose prime. Keep suction tubing reasonably short and avoid high spots or bends.

6. Wall Mounting

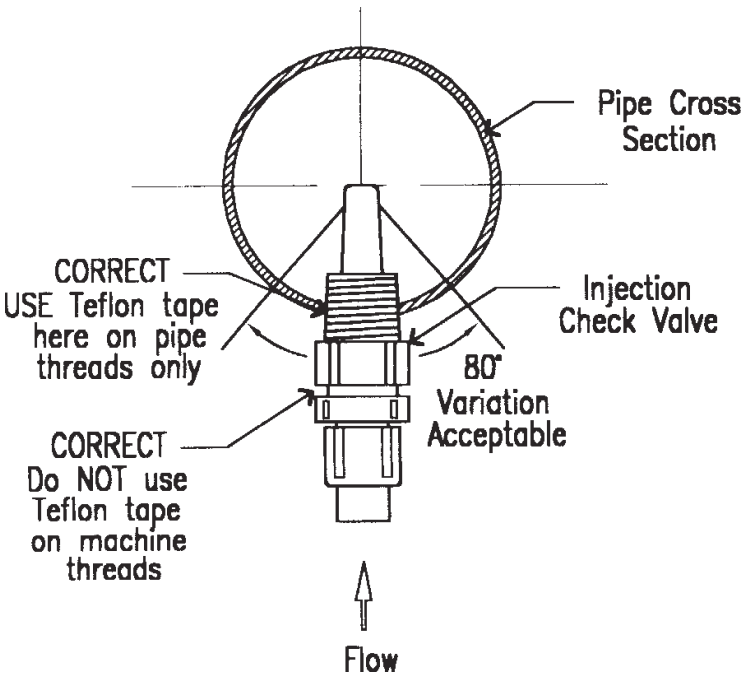
The fluid end portion (head assembly) of the pump is set up to accomodate mounting of the pump to the chemical container, either as a flooded suction, or a suction lift.

The pump head must be kept in a vertical position for proper operation. The head can be removed and rotated 90° if needed to keep the inlet and outlet valves in a vertical position.

7. Injection Valve Installation

The injection valve is designed to prevent a back flow and to inject chemical into the line. To work properly, this valve must be mounted within 45 degrees of vertical (see drawing below). One end of the injection valve is 1/2" MNPT. Install this end into the piping system. Use Teflon tape on this fitting only.

Connect the pump's discharge tubing to the opposite end of the injector. Do not use Teflon tape or joint compound on this fitting. Connect tubing between this fitting and the pump discharge fitting at the pump.



Injection Valve

NOTE: When installation is made into a line with zero pressure or when pumping into an open vessel, use of a back pressure anti syphon injection valve is recommended, and this can be accomplished with an optional three function valve.

8. Optional Three Function Valve is available upon reqest. (Order part # CMS-R03250)

Anti-siphon feature allows metering of liquids “down hill” or into the suction side of a circulating pump. It provides protection against an accidental application of suction pressure at the fluid injection point. Its Teflon coated diaphragm provides a positive anti-siphon action.

Back pressure function permits metering into atmospheric discharge (open container) without overpumping.

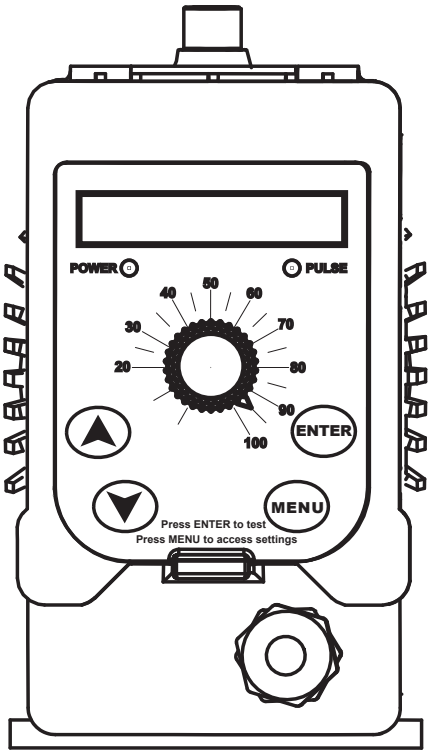
Line check permits removal of discharge tubing without release of system fluid.

9. Priming/Bleed Valve Connection

The CMS-IV includes a priming valve that is built into the head. Clear poly tubing comes connected to the outlet of this valve from the factory. The other end of the tube should be placed in the chemical container above the fluid level.

V. Operation

A. Front Panel Description



CMS-IV has the following standard panel features:

- 1x16-backlit LCD display
- On/Off power indicator light
- Pulse or Stroke indicator light
- Up and Down arrow keys for setting adjustments
- MENU key to enter and exit pump set-up
- ENTER key to save desired adjustments

B. Priming the pump

CAUTION: Prior to priming the pump, it is important to insure that the frequency is set at max (125 strokes/min) and the stroke is set at 100%. Therefore, pump priming should only occur after you are familiar with settings as described on Pages 10 and 13.

1. **Settings** - Plug in pump. Set stroke knob in 100% and strokes per minute to 125. As stated, a maximum setting is needed for easy priming. **Note: See stroke lenth instructions on page 10 and menu map on page 13.**

2. To prime the pump, simply press and hold ENTER while the pump is in the Run mode (conductivity is displayed). This allows the pump to prime at the maximum programmed rate.

3. **Priming/Bleed valve**
   If fluid is not moving up the suction line, open bleed valve located on pump head approximately one turn until fluid begins to move. When suction line fills, close bleed valve. **Do not over tighten bleed valve. Damage may occur.**

C. Set Up Mode Explanation (See Set Up Menu Map on Page 13)

The readout will display one of two modes: Set Up or Run Mode. To enter Set-up mode, press MENU. Notice that a cursor appears on the screen signifying that an adjustment can be made. To change the figure above the cursor press the UP or DOWN keys until the desired setting appears, then press ENTER to save. Continue pressing ENTER to toggle past the other displays. When all settings are made, press MENU to return to **RUN** mode.

D. Run Mode Explanation (See Run Mode Menu Map on Page 13)

Run mode is displayed only while the pump is in normal operation. The screen will display the current conductivity value and indicate if it is calling for bleed. If conductivity functions are deactivated, the display will show the pump speed setting. Manual activation of the relay (bleed solenoid) and pump feed can be accomplished by touching the ENTER key while the unit is in the RUN mode. This will manually activate both functions of the unit for 3 minutes. After three minutes or if the ENTER key is touched during the 3 minute test, it will revert to automatic.

E. Stroking Speed or Frequency

The pump allows for exact number of strokes to be set and read on the front panel LCD meter. It is adjustable from 1 to 125 strokes per minute. When set at 125 strokes per minute, and the stroke length at 100%, the pumps capacity is 15.1 gallons per day or 453 gallons per month. In addition, for applications requiring very low outputs, it can be set in strokes per hour, from 1 to 125. When set at 125 strokes per hour and the stroke length at 100% the pump capacity is now 0.25 gpd or 7.55 gal/month.

F. Stroke Length

The stroke length can be adjusted. This adjustment is a mechanical adjustment made using the large knob on the control panel. To avoid damage to the pump, this adjustment should only be made while the pump is running at a high stroking rate. (See previous Section E.)

Always start adjusting your pump's output down by reducing the pump's speed (frequency). By leaving the stroke length or stroke adjustment as long as possible, you decrease any chance of loosing prime.

G. Calculating Output

The pump's output per minute can be determined by dividing the maximum rated gallons per day by 1440 (minutes per day). For example, this 15.1 gpd (0.63 gph) pump at a maximum stroke length of 100% and a maximum speed setting of 125 strokes per minute (spm), will pump 0.000083 gallons per stroke (gps). This is shown as:

15.1 ÷ 1440 = 0.0104 gpm ÷ 125 spm = 0.000083 gallons per stroke (gps)

With this value and a given stroke frequency, you can calculate your pump's output at it's rated pressure. For example, this 15.1 gpd pump set at 50 strokes per minute and 100% stroke length:

50spm x .000083gps x 1440 (minutes per day) = 5.98 gallons per day (gpd)

Additonally, reducing the stroke length will reduce the pump's output again. If the stroke length setting in the above example is reduced by 50%, the 5.98 gallons per day output is reduced to 2.99. (example: 5.98 gpd x 0.50 = 2.99 gpd)

Also, if the required pump output (feed rate of chemical) is ever less than 0.033 gallons per day (1.0 gallon/month), the frequesncy operation should be switched to strokes per hour. At 100% stroke length, each stroke will still provide 0.000083 gallons of feed. A higher product viscosity will reduce the output. Pressures lower than the pump's rating can increase output.

H. Conductivity Calibration

The units are factory calibrated for conductivity. The reading should be verified for accuracy and adjusted as per these instructions. It can usually be one point calibrated by leaving the cleaned probe in a known solution and entering that value in the calibration screen of the menu. The zero point may be calibrated with the probe out-of-solution and dry by entering zero in the reset zero screen of the menu.

Note: Prior to setting up as directed in Section VIII, have the following information available: Monthly or daily requirement of chemical and bleed in gal/minute. Also, familiarize yourself with the different Feed Timer options discussed in Section VI and How to Make Settings in Section VII.

See the Set-Up Mode Menu map on page 13.

VI. Feed Timer Options

The unit includes a user-selectable chemical feed timer options, and these will control how the chemical will be fed in relation to time. The operator can choose one of the five different feed modes below that best meet the system's needs.

1. **No Timer** - This selection is the simplest; it allows the pump to feed for the same amount of time as the unit bleeds.

2. **Lockout Timer** - Chemical feed is simultaneous with bleed as in #1. However, a timer can be set from 1-90 minutes to limit the amount of feed time during any bleed cycle, preventing accidental overfeed.

3. **Post Bleed Timer** – Chemical feed occurs after a bleed cycle. The timer can be set for 1-100% of the bleed time, and also has a total feed time limit, which can be set from 1-240 minutes. A 100% post bleed time would be typical, but lower percentages couple with higher feed rates (frequency, stroke) can be utilized to achieve a target feed of chemical.

4. **Pulse Timer** – This timer accepts pulses from a make-up contacting head water meter. It can accumulate 1-99 contacts to activate the feed timer. The timer can be set from 1 second to 10 minutes and 59 seconds, and chemical will be fed for the time set.

   NOTE: A two wire cable connected to the pump is supplied for connecting to a contacing head water meter in the make-up water line. If this feed mode option is not selected, the cable will not be used and can be left to hang loose as received.

5. **Percent Timer** – Chemical feed is turned on for 1-100% of a 10-30 minute repeating cycle time. Two settings will be made: percent of the 10-30 minute time period and the time period itself (10-30 minutes).

   See Feed Timer Menu Map on Page 13

VII. Determining Feed Settings

Before proceeding to Section VIII where all settings will be made, it is necessary to establish the following pieces of information: maximum conductivity setting and feed settings (stroke frequency and stroke length).

✓ Maximum Conductivity Setting. This will be a multiple of the makeup water's conductivity, and it will be based on an analysis of the water and the water treatment product to be used. If such a determination is not available, use a maximum conductivity setting of four times (4x) the makeup conductivity.

✓ Feed Settings (stroke frequency + stroke length). In order to make these two settings, it is first necessary to know the gallons/day requirement of treatment or feed chemical. If provided in gallon per month, divide by 30 to arrive at gallons per day.

With the daily requirement of feed known, it then becomes an exercise in selecting stroke frequency and stroke length settings that will accomplish it. The unit can stroke as fast as 125 strokes per minute to as slow as one stroke per hour. And the stroke length can be set at 100% but no lower than 20%. Actually, the stroke length should always be as high as possible as it is a mechanical movement.

At 100% stroke length, each stroke will dispense 0.000083 gallons of feed. Therefore, it is a simple case of determining how many of these strokes are required per day (in 24 hours) to deliver the daily feed of treatment. Recall we can use as many as 125 per minute to as few as 1 per hour. A secondary decision will involve whether or not to adjust the stroke length. Here are three examples:

Example1:

- ✓ Chemical Feed Requirement: 6.0 gal/mo, or 0.20 gal/day.
- ✓ 0.20 gal/day required divided by 0.000083 gal/stroke = 2410 strokes/day.
- ✓ We can set the frequency at 2 strokes/min (rounded up from 1.67) or 101 strokes/hour.
- ✓ We would leave the stroke length at 100%.

Example 2:

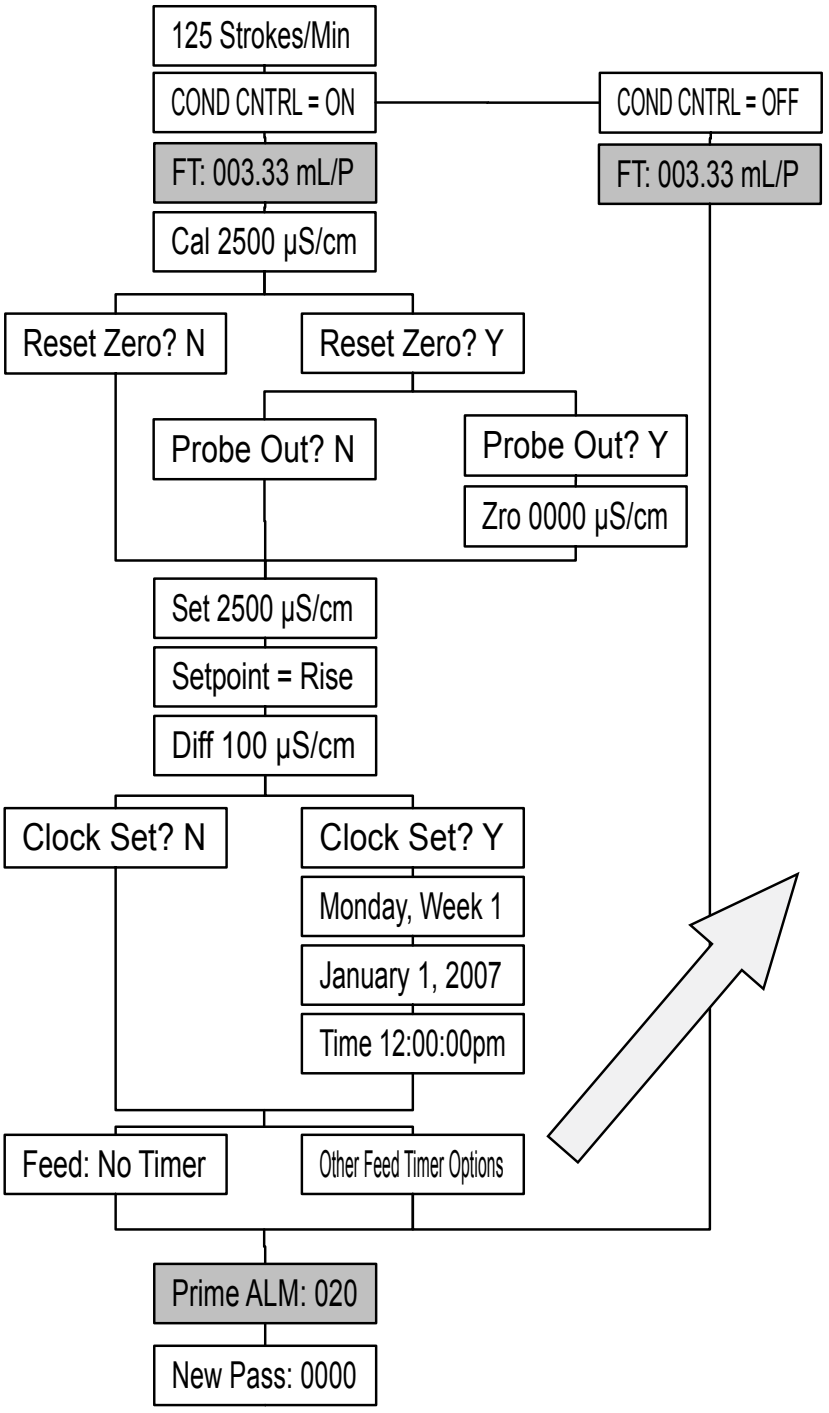
- ✓ Chemical Feed Requirement: 1.5 gal/mo, or 0.05 gal/day.
- ✓ 0.05 gal/day divided by 0.000083 gal/strokes = 602 strokes/day.
- ✓ We can set the frequency at 25 strokes/hour (602÷24), or we can set the frequency at 1 stroke/min and adjust the stroke length to 42% (602÷1440 min/day = 42% of 1 stroke).

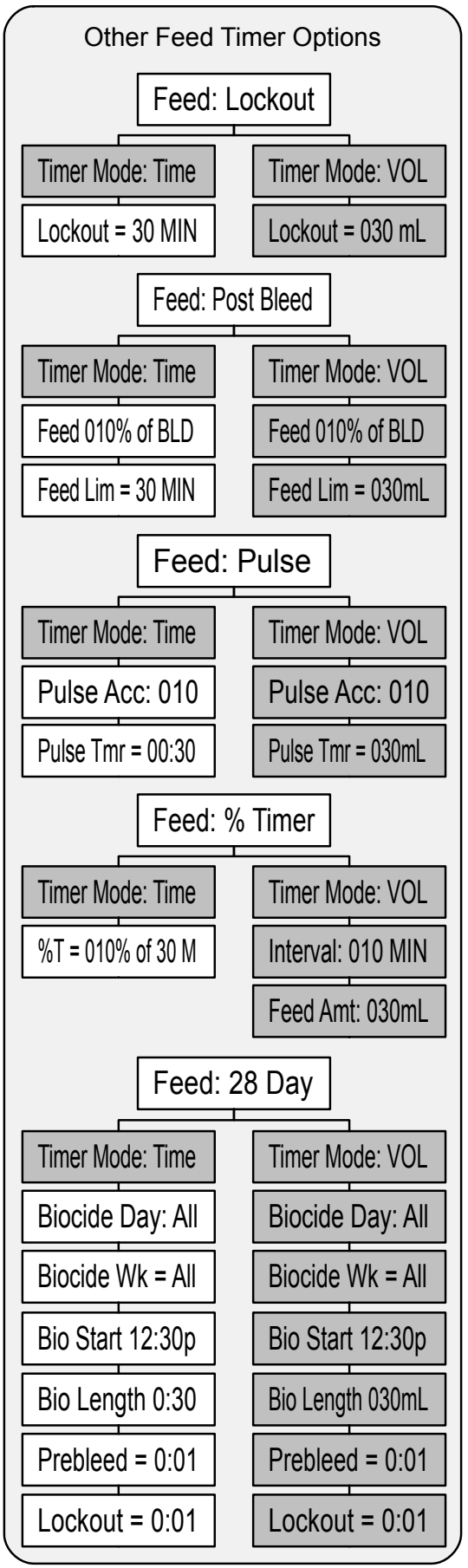
Example 3:

- ✓ Chemical Feed Requirement: 0.5 gal/mo, or 0.0167 gal/day.
- ✓ 0.0167 gal/day divided by 0.000083 gal/stroke = 201 strokes/day.
- ✓ We can set the frequency at 9 strokes/hour (rounded up from 8.4)

VIII. Menu Maps

Use the ARROW keys to change values and the ENTER key to continue to next menu item.





Grayed out menu items are available only when FloTracker option is enabled.

Clock and Biocide Timer Set-Up

Our pump feeds chemical based on a 28 day timer for the daily, weekly or monthly addition of chemicals. The option also provides a built in three digit number password to prevent unauthorized changes to the program. The following menu steps will appear after the timer selection on page 10.

Setting Pump Clock Settings

1. With display reading **Day HH:MM:SSpm** arrow in correct day of the week and press **ENTER**.
   The curser will then be under the hour **HH** setting, arrow in correct hour taking note of the am/pm and press **ENTER** continue this process until the minutes, seconds and am/pm settings are complete.
2. With display reading **Wk=? Month Day, yy** arrow in the current week of a four week cycle and press **ENTER.** Continue this process to set the month, date and year.

Setting Biocide Timer Settings

1. Display reading **Biocide Day = xxx** arrow in the desired day(s) for the biocide to be fed and press **ENTER** to continue.
2. Display will read **Biocide Wk = xxx,** arrow in the desired week(s) and press **ENTER.**
3. Display will read **Bio Start H:MMam,** arrow in desired hour press **ENTER**, continue to finish setting the time for the biocide feed to start.
4. Display will read **Length H:MM**, arrow in desired lenth of run time for the biocide injection.
5. Display will read **Prebleed H:MM**, arrow in the desired amount of bleed off to be done before the biocide is added. Press **ENTER** to continue.
6. Display will read **Lockout H:MM**, arrow in the desired amount of time that the bleed relay will be locked out. Press **ENTER** to continue.

Setting Password

The display will show **New Password=0000**, arrow in desired four numbers pressing enter after each key. A value of 0000 will disable the password function.

IX. Maintenance

The Nu-Calgon CMS-IV is designed for long service life with minimum maintenance. If for any reason, maintenance is necessary or desireable, the unit is easily maintained.

Before any maintenance or service is performed, observe the following precautions:

1. Disconnect the unit from power source.

2. Drain chemical from discharge tubing.

3. Disconnect discharge tubing from pump.

4. If the CMS-IV is used in a flooded suction application, remove foot valve from chemical container.

5. Observe relevant safety protocols when handling parts which have been in contact with hazardous chemicals.

NOTE: Tighten pump head screws after pump's initial week of operation.

A. Diaphragm Replacement

1. Remove fluid end cover by lightly prying it loose from the fluid end.
2. Remove the four screws attaching the fluid end to pump body.
3. Remove the fluid end from the pump body.
4. Unscrew the diaphragm from the pump shaft in a counter-clockwise direction. Be careful that diaphragm support ring does not fall out.
5. Do not allow sharp or abrasive objects to come in contact with pump parts.
6. Inspect end of shaft to assure that threads are in good condition. Replace shaft bellows if necessary. No further disassembly is recommended.
7. Screw new diaphragm onto pump shaft until it bottoms out on shoulder of shaft. It is not necessary to tighten further.
8. Replace fluid end. Make sure that screws are evenly tightened.
9. Replace fluid end cover.
10. Reconnect plumbing and power. Prime the pump.

B. Check Valve Replacement

NOTE: When installing check valves, remember that the seats are always installed at the bottom.

1. Disconnect tubing from pump.
2. Remove fluid end per previous procedure.
3. Unscrew valve fitting from pump head.
4. Remove check valve from valve body and replace.
5. Remove O-ring from cavity in fluid end.
6. Remove check valve from pump and replace.
7. Install new O-ring in cavity of fluid end.
8. Replace valve fitting with check valve in fluid end.
9. Replace fluid end. Make sure that screws are evenly tightened.
10. Reconnect plumbing and power. Prime the pump.

C. Cleaning Conductivity Probe

1. Record the current conductivity reading.

2. Turn off water flow through the electrode loop , bleed pressure from the line and remove electrode.

3. Use a clean cloth and a mild cleaning solution to remove loose dirt etc., from the flat surface of the electrode.

4. If the electrode has deposits such as scale attached to the electrode surface a more aggressive cleaning approach will be needed. There are several ways to do this, the preferred method being the one that is easiest for the user.

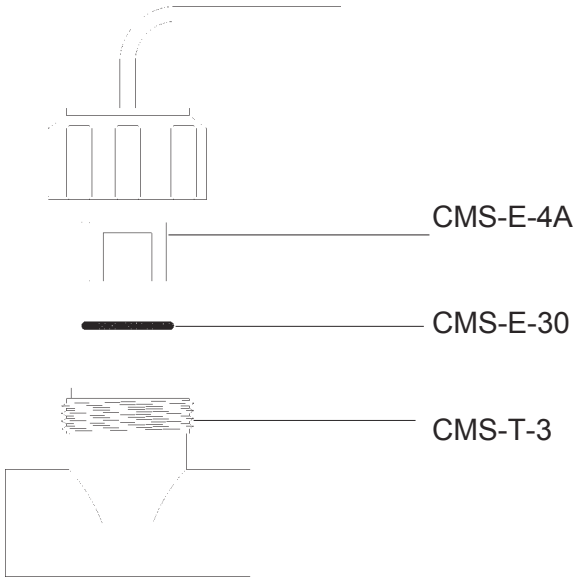
    a. Use a mild acid solution to dissolve deposits.
    b. Use a pocket knife with a flat blade to scrape across the probe surface PERPENDICULAR to the carbons.
    c. Lay a piece of sandpaper (200 grit or finer) on a flat surface such as a bench top. “Sand” electrode to remove stubborn deposits. (Do not wipe surface with your finger. Oil from your skin will foul carbon tips.

5. Reinstall the electrode in the system. After the reading stabilizes, calibrate the unit to a reliable test reading.

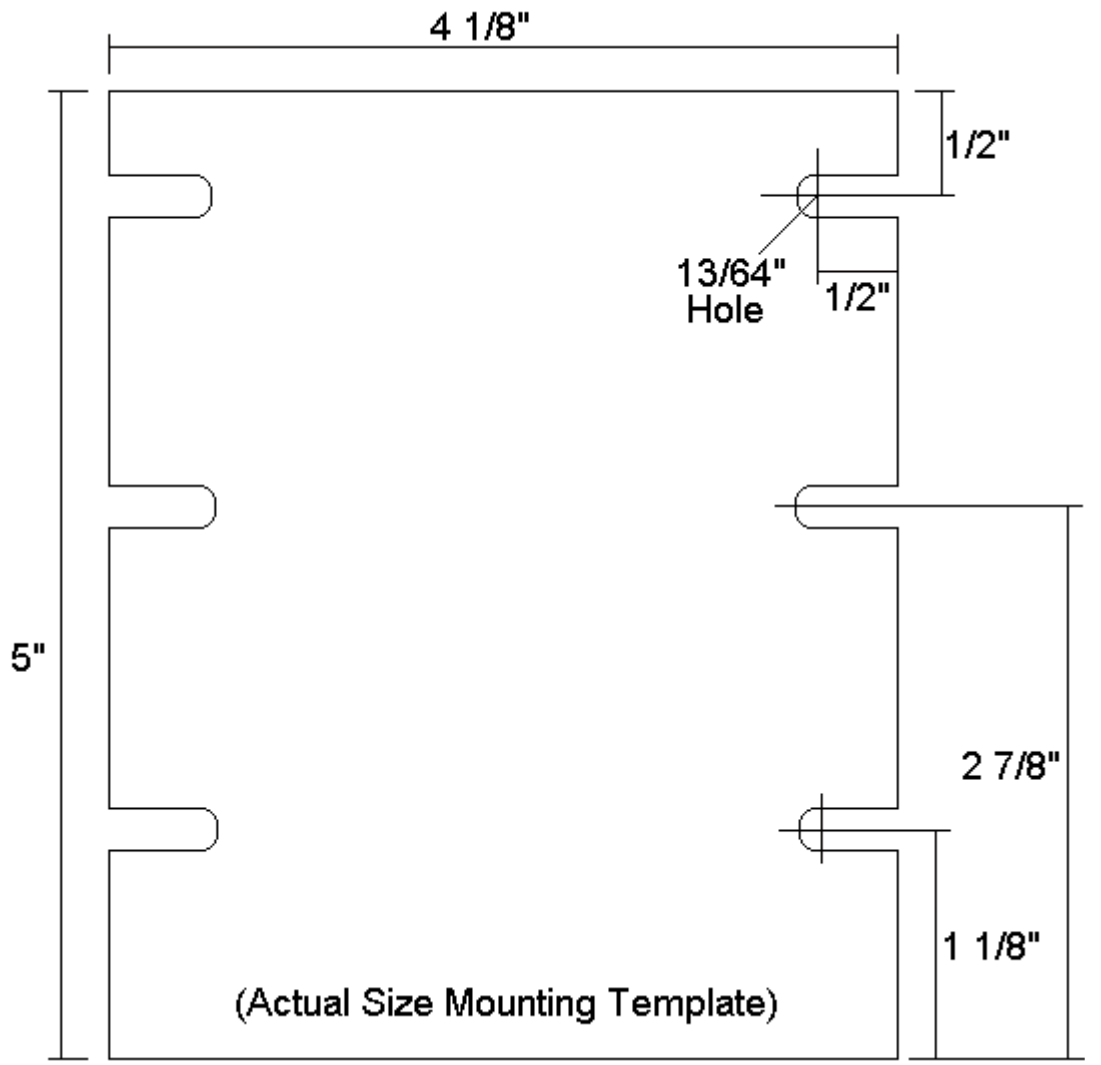
Many times an electrode can appear to be clean, but the unit still cannot be calibrated. If this is the case, use one of the more aggressive electrode cleaning procedures listed in step 4 above. Recheck the calibration after completion of this procedure. If no change was observed in the reading, replace the electrode. If a change occurred but the unit still will not calibrate, repeat procedure as many times as necessary.

X. Diagrams

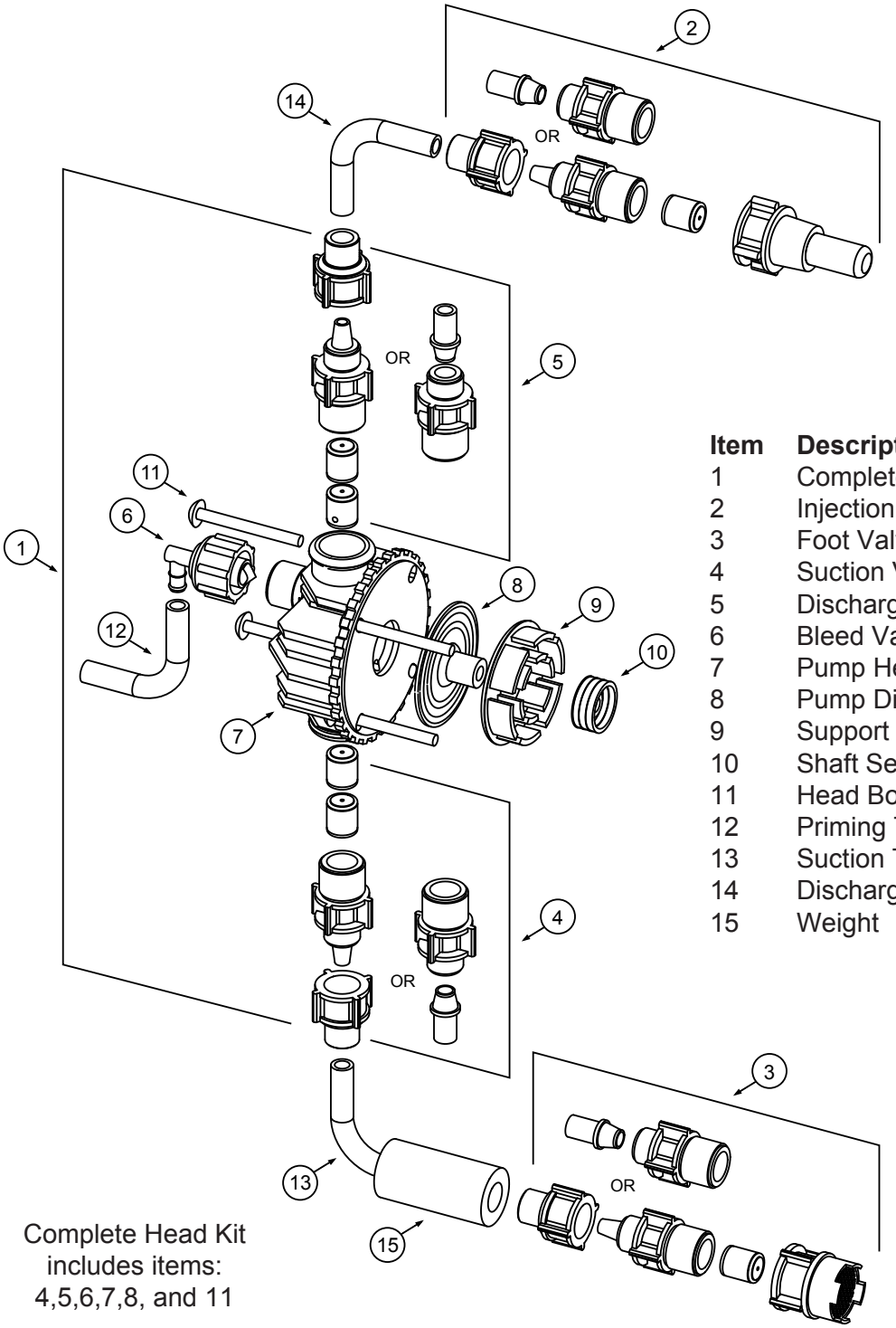
A. Standard CMS-TE-4A Electrode



B. Pump Foot Print



C. Liquid End Diagram



Item	Description	Part #
1	Complete Head Kit	CMS-CKR-2PVC1
2	Injection Valve	CMS-R03208
3	Foot Valve	CMS-R03201
4	Suction Valve	CMS-R03203
5	Discharge Valve	CMS-R03206
6	Bleed Valve Assy.	CMS-R03602
7	Pump Head	CMS-R00039
8	Pump Diaphragm	CMS-R00006
9	Support Ring	CMS-R00068
10	Shaft Seal	CMS-R00050
11	Head Bolts	CMS-R00045
12	Priming Tube	CMS-R00255
13	Suction Tubing	CMS-R00255
14	Discharge Tubing	CMS-R00122
15	Weight	CMS-R00139

Complete Head Kit includes items: 4,5,6,7,8, and 11

XI. Trouble Shooting Guide

PROBLEM	CAUSE	REMEDY
Pump does not achieve or maintain prime	Air trapped in suction line	Straighten suction line so as to eliminate high spots.
	Foot valve contaminated or improperly installed	Inspect foot valve screen and assure that foot valve is in a vertical position below fluid level.
	Excessive lift	Maximum suction lift is 5 feet with water or fluids of similar specific gravity; less with heavier liquids such as acids. Mount pump in a lower position relative to the chemical container.
	Suction fittings not properly tightened	Check fittings. Overtightening may cause restriction. Conversely, if **any** leakage occurs, pump will suck air and fail to prime.
	Worn or contaminated check valves	Inspect check valves in fluid end for cleanliness. Clean or replace as necessary.
	Kink or pinch in suction tube	Inspect suction tube through its full length to assure that there are no splits at the connections or other restrictions.
		Move any objects or equipment which impinges upon suction tube or reroute as required to assure a smooth transition from foot valve to pump.
	Low chemical level	Check fluid level in chemical supply tank.
Insufficient fluid	Stroke adjustment set too low	Check operation of stroke limiter knob. If pump delivers too low adjustable rate, check settings. Readjust as required.
	Worn or contaminated check valves	Inspect, clean or replace as necessary.
	Obstruction in suction line	Check suction line for obstructions, clogging, kinks or pinch points.
	Clogged foot valve screen	Clean or replace foot valve screen.
	Output (system) pressure too high	Relocate the injector to a lower pressure part of the the system.
	Diaphragm worn or torn	Replace diaphragm, making sure that it is screwed on fully to shoulder of shaft.
	Electronic failure	Consult dealer or factory.
Excessive fluid	Failure or lack of antisiphon valve	Inspect or add anti-siphon valve. This is caused when system is in a vacuum condition or valve in delivery applications with flooded suction which feeds systems at very low pressures.
	Excessive stroke rate	Lower the stroke rate if adjustable on your pump.
	Improper stroke length	Reduce stroke length.

PROBLEM	CAUSE	REMEDY
Pump will not pump	System pressure too high	Check system pressure to assure that it is within system rated paramaters of the pressure.
	Diaphragm improperly installed	Make sure that diaphragm is screwed fully unto shaft.
	Check valves worn or clogged	Clean or replace as required.
Pump will not run or not plugged in	Pump not turned on or not plugged in	Check outlet with meter to assure that 95-135 VAC is present and that power supply cord is in good condition and plugged in.
	Electronic failure	Consult dealer or factory.
Excessive noise	Pump not prime	Prime pump.
	No output pressure	Add an anti-siphon valve to provide 25 PSI restriction on pump discharge.

XII. Warranty and Factory Service Policies

Nu-Calgon warrants units to be free of defects in material or workmanship. Liability under this policy extends for 24 months from date of installation. Liability is limited to repair or replacement of any failed equipment or part proven defective in material or workmanship upon manufacturer's examination. Removal and installation costs are not included under this warranty. Manufacturer's liability shall never exceed the selling price of equipment or part in question.

Nu-Calgon disclaims all liability for damage caused by its products by improper installation, maintenance, use or attempts to operate products beyond their intended functionality, intentionally or otherwise, or any unauthorized repair. Nu-Calgon is not responsible for damages, injuries or expense incurred through the use of its products.

The above warranty is in lieu of other warranties, either expressed or implied. No agent of ours is authorized to provide any warranty other than the above.