

AIR₂O™

NATURE'S
AIR CONDITIONER®

DESCRIPTION

CRS-2500 IDEC coolers are designed for outdoor installation.
Only utility and duct connections are required at the point of installation.
Field-installed Thermostat is required (Single phase only)



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**WARNING – TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK,
OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:**

- A. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire rated construction.
- B. When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.
- C. More than one disconnect switch may be required to de-energize the equipment for servicing.

INTRODUCTION

The CRS-2500 is a highly efficient, environmentally benign, and low maintenance cooling system. Because of the unique nature compared to conventional refrigerant air conditioners, a thorough reading of this manual is highly recommended to assure that you benefit from its comfort and energy advantages.

The unit delivers 100% out-door air, filtered through a water saturated media. Unlike air conditioners that use a refrigerant gas to provide cooling, our units use evaporation, nature's way of cooling.

The following features show why this is an entirely new class of air conditioner:

- 80% reduction in energy consumption
- Intelligent controls enable the unit to precisely maintain water quality, reducing maintenance and conserving water.
- Easy access to all components simplifies maintenance and repairs.

To begin using your CRS-2500 immediately, read *Getting Started*. To fully understand how to operate, read the *Operations* section. To learn the principals of operation, refer to the sections *General use* and *How IT Works*. To assure reliable, efficient operation for many years, refer to *Maintenance and Service*.

GETTING STARTED

THESE INSTRUCTIONS will allow you to start using your CRS-2500 immediately.

To fully understand how to benefit from its features, it is important that you read the *Operation* section.

- Insure power is connected.
- Insure water supply is connected and turned on.
- Your HVAC installer should check to make sure that the float arm is properly aligned to the indicated sump water level. This float signals the solenoid inlet valve to introduce more water into the sump. If it has become misaligned in shipment it can cause the unit to introduce more water than is necessary. This water will not leak or cause damage since it goes out the overflow discharge but it is to a certain degree unnecessarily wasteful.
- Turn Power on (See Operation Section)
- The system will then commence operation and will automatically go through the following steps; Solenoid Valve will open and the sump will fill with water, once the thermostat signals a call for cooling, the fans and circulation pumps will start and the unit will begin to supply cool conditioned air.
- If the cooler fails to operate as described in the *Sequence of Operation* section of this manual, refer to *Maintenance and Service*.

NOTE: When you first start up the unit you may notice a slight odor. This odor results from the Celdek direct cooling media and is common to all sophisticated evaporative coolers that use this high quality material. The odor will disappear within a few hours of use.

OPERATION

Note: The unit is designed to work with any standard heat pump thermostat (Not Included)

Turn Thermostat switch to cooling mode (This energizes the unit control board and the following sequence is initiated every time the thermostat mode is changed from either “Heat” or “Off” mode to cooling mode.

- Begin Cooling Mode
- Thermostat energizes system
- Water inlet solenoid valve opens and water reservoir fills

SYSTEM IS NOW IN COOLING MODE

- System will cycle on whenever indoor room temperature at Thermostat is greater than Thermostat set point.
- To maintain low total dissolved solids (*TDS*) of the sump water, drain pump will activate on preset intervals. Factory setting is every 8 hours. Intervals are field adjustable from 0 to 30 hour intervals using dip switch combinations. Supply water hardness determines length of intervals. Once pump is activated, the pump remains on for a preset duration. Factory setting is 8 minutes and is field adjustable from 0 to 60 minutes using dip switch combinations.
- Water circulation pump automatically turns off when indoor temperature reaches thermostat set point. Blower will continue to run for preset length of time to dry out media. Factory setting is six minutes. Duration is field adjustable from 0 minutes to 30 minutes.
- When indoor temperature reaches thermostat set point secondary fan will continue to run for preset length of time to dry out cooling tower media. Factory setting is 12 minutes. Duration is field adjustable from 0 to 30 minutes.

BEGIN SHUT DOWN MODE (UNIT OFF)

- Turn thermostat switch from Cool Mode to either “Off” or “Heat” mode.
- Water inlet solenoid valve closes and circulating pump stops.
- Drain pump starts for preset time described in step 2 in “Cooling Mode” operation above
- Blower and secondary fan will run to dry the system for the same times as in steps 3 and 4 in “Cooling Mode” Operation above.

SYSTEM IS NOW SHUT DOWN.

HOW IT WORKS

PRINCIPAL OF OPERATION

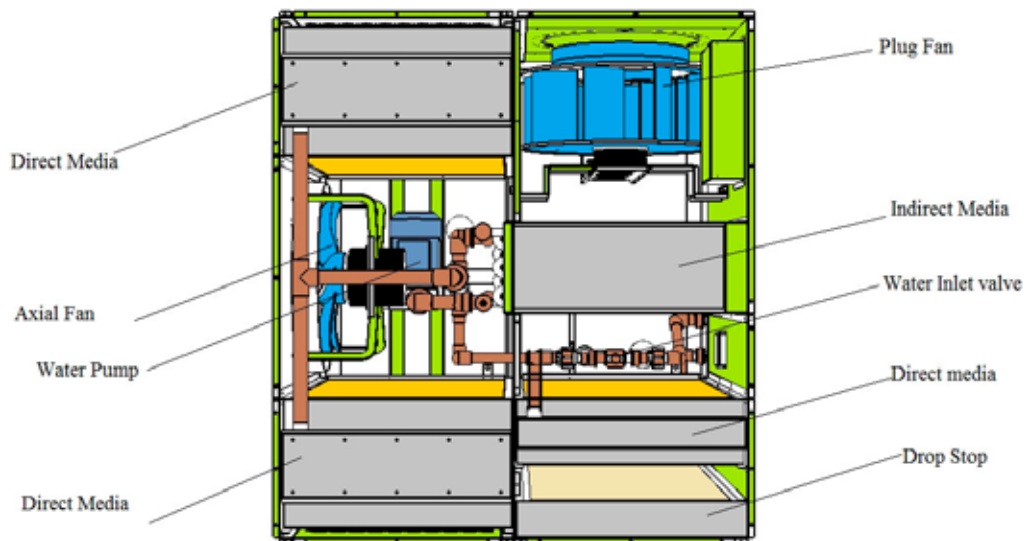
Your CRS-2500 uses the natural evaporation of water to provide cooling in a two-stage process that produces lower air temperatures with less absolute humidity than direct evaporative coolers. A working air stream flows through a direct cooling media causing the sump water to cool. This chilled water is pumped through our “indirect cooling media” (ICM) providing the first stage of cooling without adding any humidity. The air stream then passes through a wetted media and sensibly cooled to below the ambient outdoor wet bulb temperature.

AUTOMATIC ELECTRICALLY OPERATED “fill” and “drain” valves maintain water quality. A float switch in the reservoir both maintains the proper water level and measures the rate of water replacement. A computerized control integrates the operation of the blower, valves, and pump, and maintains the correct water quality.

WATER CONSUMPTION

Water use varies greatly depending on how much you operate the unit, water quality, and weather conditions. Water consumption may be as little as 4 gallons per day and as much as 20 gallons per day. Because water quality is closely maintained, water discharged from the reservoir may be used for landscape watering.

INTERNAL COMPONENT LAYOUT



MAINTENANCE and SERVICE

It is recommended that you arrange with your installer for an annual maintenance and service inspection.

GENERAL Troubleshooting

ODORS

The direct cooling media DCM cellulose material is treated with binders during manufacturing which may emit odors during the first few hours of operation. The odors will gradually dissipate and should not be noticeable after one week of regular use. Flushing the reservoir (sump) several times in the first day of operation is another way to remove these binders.

MOLD CONCERNS

As with all HVAC equipment there is always the consideration of mold growth. Mold growth is a real concern in single stage evaporative “swamp coolers”. The Air2O is designed with several features that will prevent mold growth. If properly installed and maintained there should be no mold growth in the unit. As part of the annual service and maintenance of the unit a visual inspection should be made to ensure that these features are working properly and that mold is not present in the unit.

1. The Dump Cycle prevents the build-up of dirty water.
2. The Dry Out Cycle avoids the moist environment conducive to mold growth.
3. A biocide additive is available and should be used if the unit is installed in a climate area that experiences periods of relatively high humidity.

WINTERIZATION

If you live in an area subject to freezing temperatures, at the end of the cooling season turn off water supply to the unit and ensure that the supply connection is drained and that the unit is dry by opening the side drainage ports to completely drain the sump. It is advisable to cover the unit to prevent infiltration of cold outdoor air.

REQUESTING SERVICE

If you have difficulty contacting your installing contractor or service representative, please e-mail Speakman at cooling@speakmancompany.com.

MAINTENANCE INSTRUCTIONS

MAINTENANCE SCHEDULE

MONTHLY

Check all systems for correct operation with specific reference to:

1. PUMPS

- a. Check for bearing noise
- b. Check bleed down pipes
- c. Check piping for leaks
- d. Check water levels in sump
- e. Check control sequence operation.

2. Fans

- a. Check for bearing noise

3. Wet Pack

- a. Check for scale forming
- b. Check for algae – bromide floater or a small quantity of chlorine (5 ppm) in the sump will solve such problems
- c. Check for equal water distribution

4. Filters

Wash as and when required.

5. Water Condition

Check the water condition in the sump.

a. IN WINTER

The unit sump may be emptied and the unit left to dry out on its own. Switch the reticulating pump off.

b. IN SUMMER

Any signs of algae can be treated as for any swimming pool by light Chlorine dosing.

A pill in a basket every 2 weeks into the sump should supply sufficient protection.

Recommended chlorine level is 3 – 5 ppm.

MAINTENANCE SCHEDULE CONTINUED

SIX MONTHLY SCHEDULES

1. Electrical

Check all connections on switchboard as well as motor connection terminals

2. Controls

Set selector controls through all settings and check for proper operation.

3. Water Flow

Check for free water flow and even distribution over cooling pads.

SPECIAL ATTENDANCE

1. Filters

The conditions on site should establish the frequency of filter washing, which should vary between 2 to 4 weeks (dirty environment) to 8 weeks (clean environment).

Check for the following signs to establish the filter wash frequency:

- Airflow is decreased and room temperature consequently starts rising.

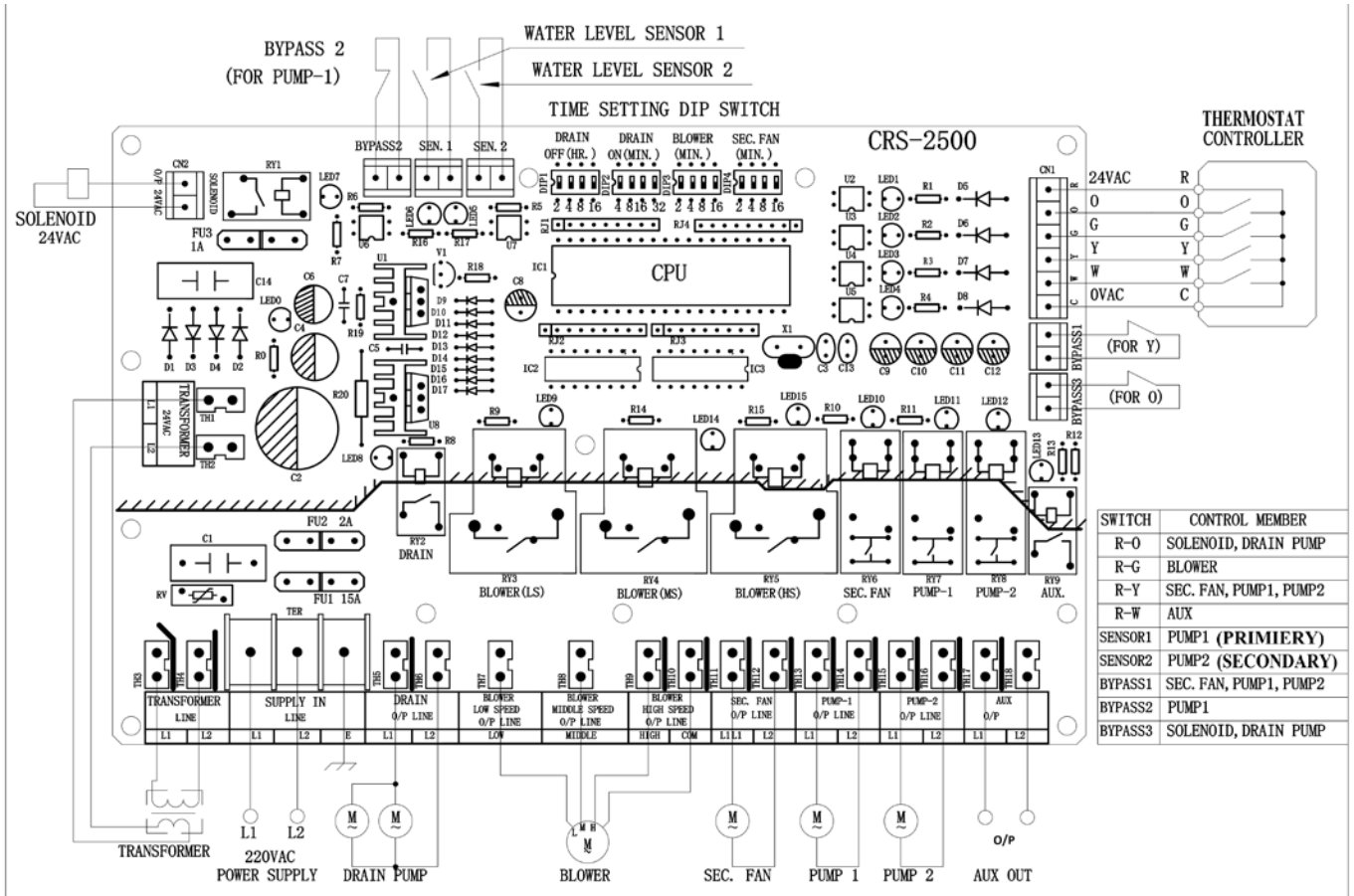
2. Paper Packs:

Cooling Pads should have a lifetime of 10000 hours or longer provided that excess scaling does not occur on surface. Check paper pack face from fan side occasionally (once every 2 months) and if a white deposit starts forming, open bleed down slightly until deposit does not increase.

This white deposit is a first sign of scale forming and a small amount will not harm the pad. Large deposits will block the airways and this is to be prevented. If increased bleed down does not solve the problem, a water treatment plant must be considered.

ELECTRICAL

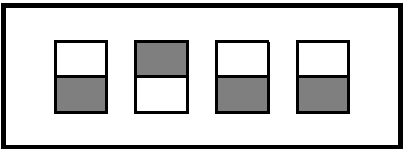
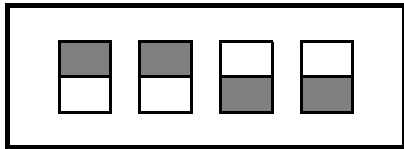
WIRING DIAGRAM



ELECTRICAL CONTINUED

DIP SWITCH INSTRUCTIONS

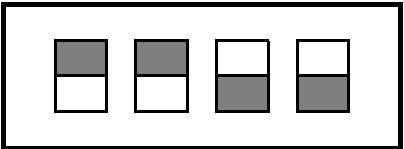
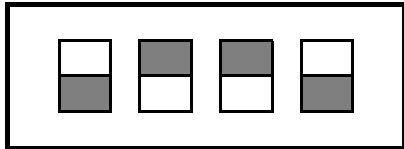
Maintain Water Quality (Prevent buildup of Total Dissolved Solids)

DIP SWITCH 1 Water Reservoir Refresh Cycle (Hours)	DIP SWITCH 2 Water Reservoir Refresh Duration (Minutes)
	
Hours 2 4 8 16	Minutes 4 8 16 32
How often the sump refreshes The harder the water the less hours. Factory default is 4 hours as indicated above	How long the pump and purge runs. Factory default is 12 minutes as indicated above Don't change this setting

Water quality is maintained by periodically draining and filling the reservoirs. The harder the water the shorter the cycle time. The softer your local water is the longer (hours) the refresh cycle can be. If you see white powder developing on the paper media, shorten the refresh cycle.

Add up the combination of On hours for total refresh cycle times. Possible cycles are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28 and 30 hours (all dip switches up).

Media Dry Out Time

DIP SWITCH 3 Primary Media Dry Out Duration	DIP SWITCH 4 Secondary Media Dry Out
	
Minutes 2 4 8 16	Minutes 2 4 8 16
Factory default is 6 minutes as indicated above Adjust setting so media dries out daily	Factory default is 12 minutes as indicated above Adjust setting so media dries out daily

Paper media should dry out completely at least one time each day. When indoor thermostat setting is reached, the water pump(s) turn off but the fan(s) run for a set period of time based on the dip switch settings. This allows the paper media to dry out. This prevents bacteria or algae growth on the pads. The drier the climate, the less time is needed to run fans to dry out. The more humid the climate the longer the fans need to run to dry out media.

TROUBLE SHOOTING GUIDE

Problem: INADEQUATE COOLING

PROBABLE CAUSE	SUGGESTED REMEDIES
Cooling Machine Undersized	Replace with larger Machine
Clogged or dirty Filters	Clean as per suggested method
Dry pads or lack of water while cooler is operating	Check water distribution system for possible obstruction in tubing. Check pump
Insufficient air discharge openings or inadequate exhaust from area being cooled, causing humidity built up and discomfort.	Make sure that there is adequate provision for exhausting air from the area being cooled, recommended four square feet per 2,500 cfm
Excessive Humidity	In some areas there may be a few days during the summer when the relative humidity is high, resulting in complaints about poor cooling. The limitations of an evaporative cooling system under conditions of high wet bulb temperature have to be considered.

Problem: BLOWER FAILS TO START

PROBABLE CAUSE	SUGGESTED REMEDIES
No fuse or fuse blown	Replace fuse
Loose electrical connection	Check all electrical connections
Defective starter/switch	Replace switch
Motor Brunt out	Install new Motor

TROUBLE SHOOTING GUIDE

Problem: **MOTOR OVERHEATS OR BURNS OUT**

PROBABLE CAUSE	SUGGESTED REMEDIES
Improper amperage setting causing motor overload.	Check amperage to ensure that the motor amperage is within the rated capacity of the motor amperes noted on the name plate of motor.
Low voltage	Check Incoming voltage and provide adequate safely.
Incorrect power supply	Check incoming power supply against rated voltage on motor plate.

Problem: **PUMP FAILS TO OPERATE**

PROBABLE CAUSE	SUGGESTED REMEDIES
Pump motor failure	Replace pump
Improper wiring of pump leads to motor or switch.	Recheck pump leads, connect to power and switch.
Loose electrical connections	Check electrical connections
Pump switch faulty	Replace pump switch

Problem: **PUMP RUNS BUT PADS LACK WATER**

PROBABLE CAUSE	SUGGESTED REMEDIES
Insufficient water in bottom tank	Check float adjustment, water should be maintained at approx 2 ½” depth
Pump suction screen plugged	Clean screen
Clogged tubing	Clean the tubing
Foreign matter lodged in tubing	Remove pump tube and clean out the foreign matter

TROUBLE SHOOTING GUIDE

Problem: **COOLER NOISY**

PROBABLE CAUSE	SUGGESTED REMEDIES
Wheel rubbing on housing	Re position wheel
Wheel out of balance due to dust etc	Check wheel and clean
Cooler delivering more air than needed	Check for proper external static pressure

Problem: **CONTINUES OVERFLOW OF WATER**

PROBABLE CAUSE	SUGGESTED REMEDIES
Float valve adjustment incorrect	Adjust float valve
Valve stuck open because of lime deposit	Clean valve and adjust

Problem: **RAPID FORMATION OF SALT DEPOSIT OF PADS**

PROBABLE CAUSE	SUGGESTED REMEDIES
High mineral content of supply water	Reduce the time interval setting on Dip Switch #1. Frequency of flushing will depend on water quality

TROUBLE SHOOTING GUIDE

Problem: WATER BEING THROWN INTO DUCT OR BLOWER SECTION

PROBABLE CAUSE	SUGGESTED REMEDIES
Loose distribution tubing or pipe connections	Check and tighten all pipe connections
Break in the water pipe line	Replace any cracked or broken pipes
Pads shifted or distributor not properly installed	Make sure there is no water carry over from any part of the water distribution system
Pads have become choked because of dust and/or salt and therefore there is a water carryover	Clean pads as per suggested procedure or replace as required

Problem: FORMATION OF FOAM OR SUDS

PROBABLE CAUSE	SUGGESTED REMEDIES
Because of water quality the pump is churning up suds	Drain and refill sump with fresh water, may have to repeated at required for severe cases
Algae in sump water	Drain cooler bottom and clean thoroughly, fill with fresh water, review pump and drain dip switch settings
Pads remain wet after shut down	Increase time settings on Dip Switch #3 and 4 as appropriate