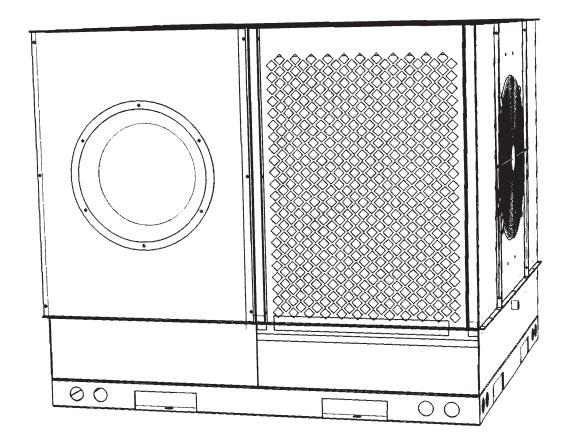


Installer's Guide CRS-2500

Single Packaged Two Stage Indirect-Direct Evaporative Cooler 2500 CFM (4250 CMH)

ALL phases of this installation must comply with NATIONAL, STATE AND LOCAL CODES

Important — This Document is customer property. Please return to service information pack and give this Installer's Guide to the homeowner upon completion of work.



WARNING: HAZARDOUS VOLTAGE - DISCONNECT POWER BEFORE SERVICING

SAFETY CONSIDERATIONS

IMPORTANT: Read this entire manual before beginning installation procedures.

Read this manual carefully before attempting to install, operate, or perform maintenance on this unit. Installation and maintenance should be performed by qualified service technicians only. NOTE: "Warnings" and "Cautions" appear at appropriate places in this manual. Your personal safety and the proper operation of this product require that you follow them carefully. The manufacturer assumes no liability for installations or servicing performed by unqualified personnel.

NOTICE

Warning and Cautions appear at appropriate locations throughout this guide. Read these carefully.

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. It may also be used to alert against unsafe practices and where property-damage-only accidents could occur.

MARNING

SAFETY HAZARD! This information is for use by individuals having adequate backgrounds of electrical and mechanical experience. Any attempt to repair a product may result in personal injury and/or property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

MARNING

SAFETY HAZARD! Bodily injury can result from high voltage electrical components, fast moving fans. For protection from these inherent hazards during installation and service, the electrical supply must be disconnected. If operating checks must be per-formed with the unit operating, it is the technicians responsibility to recognize these hazards and proceed safely.

A WARNING

SAFETY HAZARD! Do not operate the unit without the fan or coil access panels in place. Reinstall the access panels after performing maintenance procedures on the fan. Operating the unit without the access panels properly installed may result in severe personal injury or death.

A CAUTION

RECONNECT ALL GROUNDING DEVICES.

All parts of this product that are capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

A CAUTION

CAUTION

Caution must be taken at all times to avoid personal injuries and/or damage to equipment.

IMPORTANT: Wear appropriate gloves, arm sleeve protectors, and eye protection when servicing or maintaining this equipment.

Introduction

Read this manual carefully before attempting to install, operate, or perform maintenance on this unit. Installation and maintenance should be performed by qualified service technicians only.

Model CRS-2500 IDEC units are designed for outdoor mounting with a horizontal discharge. They can be located either at ground level or on a roof in accordance with local codes.

STEP 1-INSPECT SHIPMENT

- Check for damage after the unit is unloaded.
 Report promptly to the carrier any damage found to the unit. Do not drop the unit.
- 2. Check the unit's nameplate to determine if the unit is correct for the intended application. The power supply must be adequate for both the unit and all accessories.

Step 2—REVIEW LOCATION AND RECOMMENDATION INFORMATION



Caution must be taken at all times to avoid personal injuries and/or damage to equipment.

NOTE: The unit is shipped for horizontal installation.

Horizontal Airflow Units

- Location of the unit must allow service clearance around it to ensure adequate serviceability, maximum capacity, and peak operating efficiency.
- These units are design certified for outdoor installation. They may be installed directly on a slab, or on Class A, B, or C roof covering material. The discharge air from the axial fans must be unrestricted for a minimum of 3 feet.
- 3. Check the handling facilities to ensure the safety of personnel and the unit(s).
- 4. The unit must be mounted level for proper operation and drainage of water through the

- drain holes in the base pan.
- 5. The unit should not be exposed to direct roof water runoff.
- Flexible duct connectors must be of a flame retardant material. All duct work outside of the structure must be insulated and weatherproofed in accordance with local codes.
- 7. Holes through exterior walls or roof must be sealed in accordance with local codes.
- 8. All fabricated outdoor ducts should be as short as possible.

CLEARANCES

- 1. The recommended clearances for single-unit installations are 1 meter on all sides except primary air discharge side.
- Any reduction of the unit clearances indicated in these figures may result in coil starvation or the recirculation of warm moist air. Actual clearances, which appear to be inadequate should be reviewed with a local engineer.
- 3. See figure 1 for critical dimensions.

AIR₂O | Model CRS-2500 CRITICAL DIMENSIONS

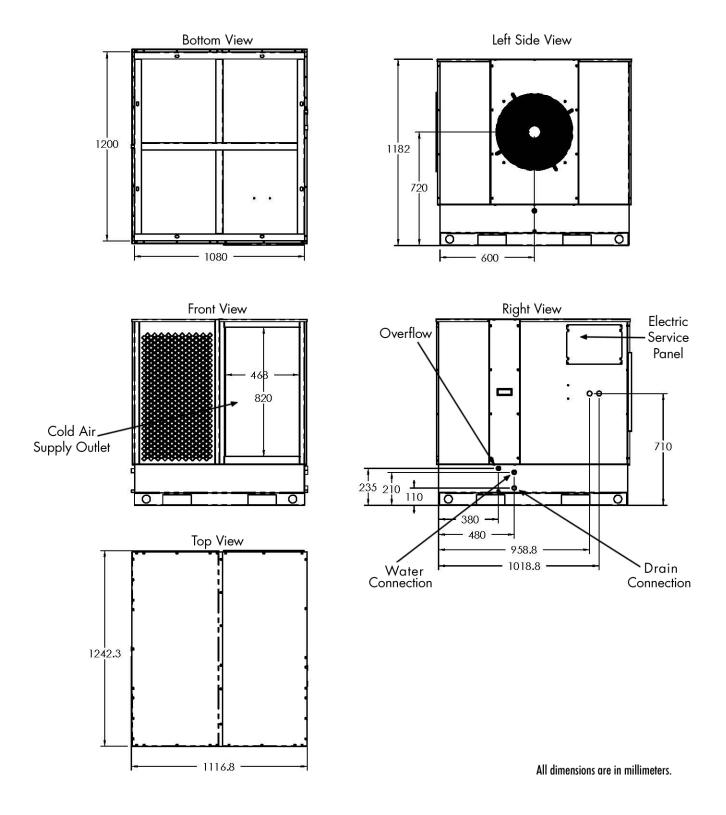


Figure 1. Critical Dimensions

STEP 3-UNIT INSTALLATION

NOTE: The factory ships this unit for horizontal installation.

GROUND LEVEL INSTALLATION

To install the unit at ground level:

- 1. Place the unit on a pad the size of the unit or larger. The unit must be mounted level for proper drainage of water through the holes in the base pan. The pad must not come in contact with the structure (see Figure 13.) Be sure the outdoor portion of the supply air ducts are as short as possible. Unit requires vibration support as indicated in Figure 2 below.
- 2. Location of the unit must allow service clearance around it. Clearance of the unit must be given careful consideration.

NOTE: Any reduction of the unit clearances indicated may result in the recirculation of warm air. Actual clearances, which appear to be inadequate should be reviewed with a local engineer. **IMPORTANT:** The air outlet duct must have 1" clearance to combustible material downstream from the unit.

- 3. Attach the supply air ducts to the unit as explained in the following Ductwork Installation section.
- 4. Flexible duct connectors must be of a flame retardant material. Insulate any ductwork outside of the structure with at least two (2) inches of insulation and weatherproof. There must be a weatherproof seal where the duct enters the structure.
- Do not expose the unit to direct roof water runoff.
- 6. Seal all holes through exterior walls in accordance with local codes.

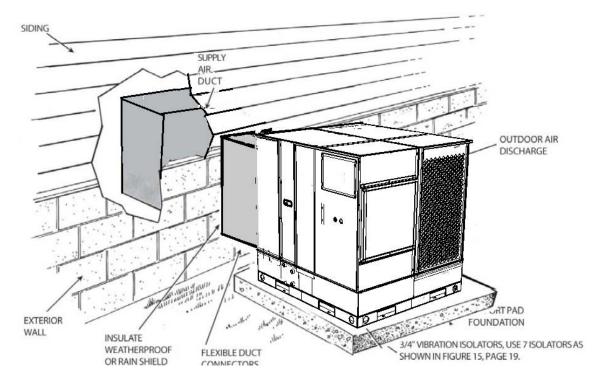


Figure 2. Typical Ground Level Installation

LIFTING AND RIGGING

IMPORTANT: Do not lift the unit without test lifting for balance and rigging. Do not lift the unit in windy conditions or above personnel. Do not lift the unit by attaching clevis, hooks, pins, or bolts to the unit casing, casing hardware, corner lugs, angles, tabs, or flanges. Failure to observe these warnings may result in equipment damage.

- 1.Before preparing the unit for lifting, check the unit for center of gravity for lifting safety. Because of placement of internal components, the unit's weight may be unevenly distributed.
- 2. When hoisting the unit, be sure that a proper method of rigging is used. Use slings and spreader bars for protection during lifting. Always test-lift the unit to determine the exact unit balance and stability before hoisting it to the installation location.
- 3. When the curb and air ducts have been properly installed, the unit is ready to be hoisted to the roof and set in position.

IMPORTANT: To prevent damage to the sides and top of the unit when hoisting, use "spreader bars".

IMPORTANT: The unit must be lowered into position.

ROOFTOP INSTALLATION -- FRAME MOUNTING

For roof top applications using field fabricated frame and ducts, use the following procedure:

- Locate and secure the frame to the roof by bolting or welding. Frame must provide adequate center support via a cross member centrally located channel rail. Vibration isolators should be installed, adjust as necessary for your frame. The isolators must be placed on base pan. Add flashing as required. Flashing must conform to local building codes.
- 2. Prepare the hole in the roof in advance of installing the unit.
- 3. Secure the horizontal or down airflow ducts to the roof.
- 4. All fabricated outdoor ducts should be as short as possible.
- 5. Place the unit on the frame.
- 6. The unit must be mounted level for proper

- drainage of water through the holes in the base pan.
- 7. Secure the unit to the frame.
- 8. Insulate any ductwork outside of the structure with at least two(2) inches of insulation and then weatherproof. There must be a weatherproof seal where the duct enters the structure.
- 9. The unit should not be exposed to direct roof water runoff.
- 10. Flexible duct connectors must be of a flame retardant material. All duct work outside of the structure must be insulated and weatherproofed in accordance with local codes.
- 11. Access and service clearances for the unit must be given careful consideration when locating the duct entrance openings.
- 12. Continue with the following installation sections to complete the installation: Ductwork, Filter, and Electrical Wiring.

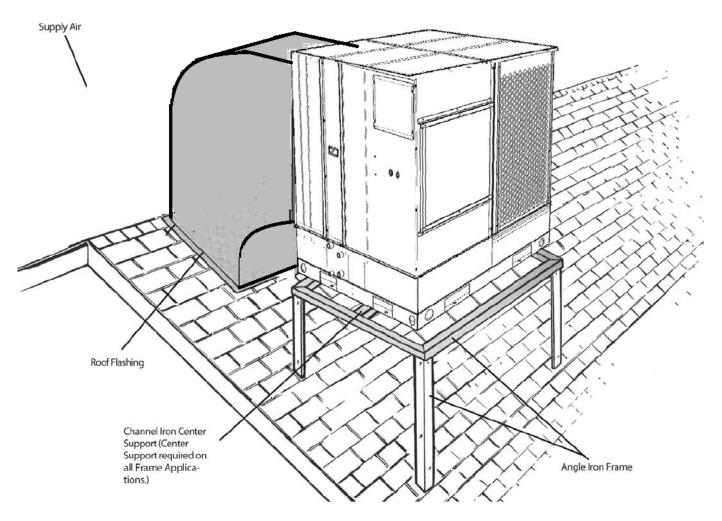


Figure 3. Typical Rooftop Installation

DUCTWORK INSTALLATION

Attaching Horizontal Ductwork to Unit All conditioned air ductwork should be insulated to minimize heating and cooling duct losses. Use a minimum of two (2) inches of insulation with a vapor barrier. The outside ductwork must be weatherproofed between the unit and the building. When attaching ductwork to a horizontal unit, provide a flexible watertight connection to prevent noise transmission from the unit to the ducts. The flexible connection must be indoors and made out of heavy canvas.

NOTE: Do not draw the canvas taut between the solid ducts.

DRAIN PIPING

A 3/4-inch male NPT drain connection is provided on the end of the unit. Follow local codes and standard piping practices when running the drain line. Pitch the line downward away from the unit. Avoid long horizontal runs. NOTE: Do not use reducing fittings in the drain lines. The drain must be:

- Made of 3/4" pipe size.
- Pitched 1/4" per foot to provide free drainage to convenient drain system.
- Properly vented.

OVERFLOW

 Overflow must not be piped. Overflow indicates a mechanical problem with either float valve or internal piping and requires immediate service to prevent costly water use.

WATER INLET

A 3/4" male NPT pipe connection is provided. Follow local codes and standard piping practices when running the water supply line. Minimum supply pipe use at least 1/2" supply line. Proper freeze protection is necessary for freezing conditions.

AIR FILTER INSTALLATION

The packaged unit requires an air filter. The unit does come with a factory installed filter rack in it, that will allow the installation of a filter within the unit.

ELECTRICAL WIRING

NOTE: This unit is factory wired for 220V. Electrical Connections Electrical wiring and grounding must be installed in accordance with local codes or, in the absence of local codes, with the National Electrical Code ANSI/NFPA70, Latest Revision. Note: 14 AWG is the smallest conductor for power supply wire.

ELECTRICAL POWER

It is important that proper electrical power be available for the unit. Voltage variation should remain within the limits stamped on the unit nameplate.

DISCONNECT SWITCH

Provide an approved weatherproof disconnect within close proximity and within sight of the unit.

OVER CURRENT PROTECTION

The branch circuit feeding the unit must be protected as shown on the unit's rating plate.

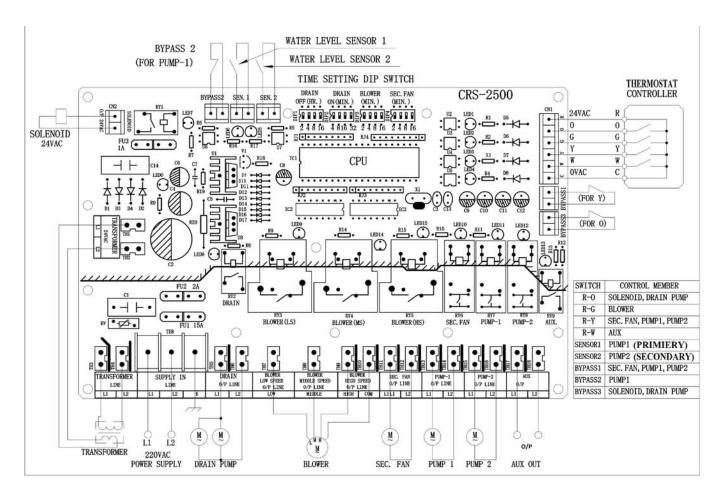
POWER WIRING

The power supply lines must be run in weathertight conduit to the disconnect and into the side of the unit control box. Provide strain relief for all conduit with suitable connectors. Provide flexible conduit supports whenever vibration transmission may cause a noise problem within the building structure.

- Remove the Control access panel. Pass the power wires through the Power Entry hole in the end of the unit.
- 2. Connect the high voltage wires to the appropriate contact or terminals.

Be sure all connections are tight.
GROUNDING: THE UNIT MUST BE ELECTRICALLY GROUNDED IN ACCORDANCE WITH LOCAL CODES OR THE NATIONAL ELECTRIC CODE.

Figure 4. Thermostatic Connections



BYPASS CIRCUITS:

- Bypass 1 (Economizer mode)- Connect optional Outdoor thermostat to turn off pumps and secondary fan when outdoor conditions permit.
- Bypass 2 (Indoor Humidity)- Attach optional Humidistat to operate primary air supply in INDIRECT only cooling when indoor humidity is above set point.
- Bypass 3 (Freeze protection)- If unit is operational during freezing conditions, attach an outdoor thermostat here. Water inlet solenoid will close and the reservoir will drain if outdoor temperature reaches set point. External supply line requires its own freeze protection.

AUX (Heat)- 24 VAC connection for heater control.

Note: Both Primary and Secondary circulation pumps include water limit switch protection.

CONTROL WIRING (CLASS II)

Low voltage control wiring should not be run in conduit with power wiring unless Class 1 wire of proper voltage rating is used. Route the thermostat cable or equivalent single leads of No. 18 AWG colored wire from the thermostat subbase terminals through the rubber grommet on the unit. Make connections as shown on the field wiring diagram. Do not short thermostat wires since this will damage the control transformer. Refer to Table 2 for recommended wire sizes and lengths for installing the unit thermostat. The total resistance of these low voltage wires must not exceed one (1) ohm. Any resistance in excess of 1 ohm may cause the control to malfunction because of the excessive voltage drop.

IMPORTANT: Upon completion of wiring, check all electrical connections, including factory

Table 2. Thermostat Wire Size and Maximum Length	
WIRE SIZE	MAXIMUM LENTGH (Ft)
18	75
16	125
14	200

wiring within the unit, and make sure all connections are tight. Replace and secure all electrical box covers and access panels before leaving the unit or turning on the power to the unit.

Step 4—Set Automatic Cleaning and Water Quality Cycles to Local Conditions

Water quality is automatically maintained by periodic flushing of the reservoir. This flushing removes sediment washed from the air and also prevents the buildup of totally dissolved solids (TDS). High levels of TDS can cause mineral buildup in the evaporative media and heat exchanger. The evaporative media must be dried out at least once every day of operation. Water hardness is the determining factor on how often the water reservoir refreshes. The harder the water the more frequent the refresh is necessary.

Periodic refresh cycles are field adjustable from 2 to 30 hours. The factory setting is 4 hours. If you see white powder developing on the paper media, increase the cycles by changing the num-

ber of hours to lower setting.

The refresh duration is adjustable. The factory setting is 12 minutes. We do not recommend setting this to a higher setting.

We suggest that the factory setting be used and only adjust periodically based on inspection of the paper media. If no white powder is developing, you can increase the hours on Dip Switch #1. If white powder is developing, decrease the hours. Be sure to inspect the paper media whenever you inspect the filter but at least monthly during the first year of operation.

The last two dip switches control the dry out cycle for the paper media.

Please refer to the next page for details on each dip switch.

Finally, whenever the thermostat is turned to Off or Heat, the reservoir will automatically drain. This prevents growth of harmful bacteria and odors by not allowing water to stagnate.

Step 5—Unit Startup

Pre-Start Quick Checklist

- ☐ Is the unit properly located and level with the proper clearance?
- Is the duct work correctly sized, run, taped, insulated, and weather proofed with proper unit arrangement?
- Is the filter of the correct size and quantity? Is it clean and in place?
- ☐ Is the wiring properly sized and run according to the unit wiring diagram?
- ☐ Are all the wiring connections, including those in the unit, tight?
- ☐ Has the unit been properly grounded and fused with the recommended fuse size?
- □ Is the thermostat well located, level, and correctly wired?
- □ Do the axial fan and indoor blower turn free without rubbing, and are they tight on the shafts?
- ☐ Has all work been done in accordance with applicable local and national codes?
- ☐ Are all covers and access panels in place to prevent air loss and safety hazards?

STARTING THE UNIT IN COOLING MODE

MARNING

SAFETY HAZARD. Do not operate the unit without the access panels in place. Reinstall the access panels after performing maintenance procedures on the fan. Operating the unit without the access panels properly installed may result in severe personal injury or death.

MARNING

SAFETY HAZARD. Before starting the system on the cooling cycle, turn the thermostat switch to OFF and close the unit disconnect switch.

Step 6 – Unit Startup

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.

FINAL INSTALLATION CHECKLIST

- ☐ Does the unit run and operate as described in the section on Sequence of Operation?
- ☐ Are the axial fan and primary blower operating correctly with proper rotation and without undue noise?
- ☐ Has the voltage and running current been checked to determine if it is within limits?
- ☐ Has the thermostat been checked for calibration and the air discharge grills adjusted to balance the system?
- ☐ Has the ductwork been checked for air leaks and condensation?
- ☐ Has the unit been checked for tubing and sheet metal rattles? Are there any other unusual noises to be checked?
- □ Are all covers and panels in place and properly fastened?
- ☐ Has the owner been instructed on the proper operation and maintenance of the unit? Be sure to leave this manual with the owner.

MAINTENANCE

Owner Maintenance

Some of the periodic maintenance functions of the unit can be performed by the owner; this includes replacing the disposable or cleaning the permanent air filters, cleaning the unit cabinet, and conducting a general unit inspection on a regular basis.

FILTERS

When the system is in constant operation, inspect the filters at least once each month. If the unit has disposable-type filters, replace them with new filters of the same type and size. Do not attempt to clean disposable filters.

Permanent-type filters can be cleaned by washing them with a mild detergent and water. Make sure that the filters are thoroughly dry before reinstalling them in the unit (or duct system).

NOTE: It may be necessary to replace permanent filters annually if washing fails to clean the filter or if the filter shows signs of deterioration.

Be sure to use the same type and size as was originally installed.

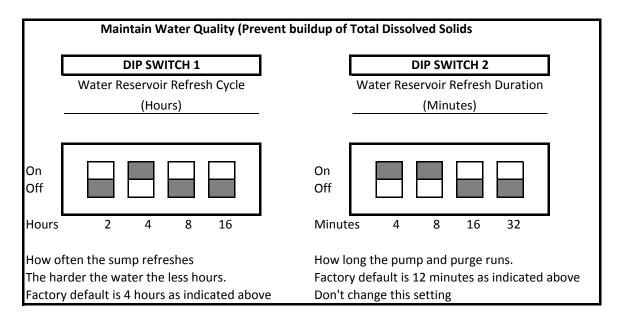
FOR DUCTED INSTALLATIONS, CLASS 1 OR CLASS 2 FILTERS MUST BE USED.

SERVICE MAINTENANCE

Cooling Season

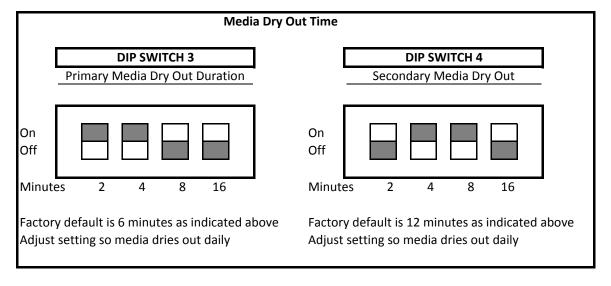
To keep the unit operating safely and efficiently, the manufacturer recommends that a qualified service technician check the entire system at least once each year or sooner if needed. The service technician should examine these areas of the unit:

- filters (for cleaning or replacement
- motors and drive system components
- safety controls (for mechanical cleaning)
- electrical components and wiring (for possible replacement and connection tightness)
- rain (for proper sealing and cleaning)
- unit duct connections (to see that they are physically sound and sealed to the unit casing)
- unit mounting support (for structural integrity)
- the unit (for obvious unit deterioration)
- pumps



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).



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.

Figure 5. Dip Switches

IMPORTANT PRODUCT INFORMATION

Registering your products helps provide you with one of the strongest manufacturer limited warranties available. To register, go to the manufacturer's website or contact your dealer. You will need the serial number, model number, and installation date for each product being registered. Your dealer may have included these on your invoice or can provide a list for you to use. Please take a few moments to record the following information to ensure your product registration process is quick and easy:

Packaged Unit Serial Number
Packaged Unit Model Number
Date of Installation
Dealer
Service Information Call your installing dealer if the unit is inoperative. Before you call, always check the following to be sure service is required:
a. Be sure the main switch that supplies power to the unit is in the ON position.b. Replace any burned-out fuses or reset circuit breakers.c. Be sure the thermostat is properly set.
Service Phone

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Absolutely the best.

400 ANCHOR MILL ROAD | NEW CASTLE, DE 19720 www.speakmancompany.com

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The manufacturer has a policy of continuous product and product data improvement. It reserves the right to change design and specification without notice.