

EMI DUCTLESS CHILL WATER AIR HANDLERS



**CEILING MOUNTED AIR HANDLER
(CCP)**



**WALL MOUNTED AIR HANDLER
WCP**

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Innovative living™

An ISO 9001-2000 Certified Company



P/N# 240004373, Rev. A [1/09]

EMI DUCTLESS CHILL WATER AIR HANDLERS


INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

P/N# 240004373, Rev. A [1/09]

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 *Specific Unit Installation*

Shipping Damage MUST be Reported to the Carrier IMMEDIATELY!!!
Examine the exterior. Remove cover and examine compressor and piping for signs of damage.

This manual is intended as an aid to qualified service personnel for proper installation, operation, and maintenance of the EMI wall or ceiling mounted air handler. Read these instructions thoroughly and carefully before attempting installation or operation. Failure to follow these instructions may result in improper installation, operation, service or maintenance, possibly resulting in fire, electrical shock, property damage, personal injury, or death.

TO THE INSTALLER

- (1) Retain this manual and warranty for future reference.
- (2) Before leaving the premises, review this manual to be sure the unit has been installed correctly and run the unit for one complete cycle to make sure it functions properly.

To obtain technical service or warranty assistance during or after the installation of any EMI unit, check our website @ www.enviromaster.com or call your installing contractor or distributor. Our technical service department may be contacted at 1-800-228-9364.





When calling for assistance, please have the following information ready:

- Model number _____
- Serial number _____
- Date of installation _____

SAFETY INSTRUCTIONS



Read all instructions before using the EMI Air Handler. Install or locate this unit only in accordance with these instructions. Use this unit only for its intended purpose as described in this manual.

-  **Check the rating plate on the EMI Air Handler before installation to make certain the voltage shown is the same as the electrical supply to the unit. Installing a unit with the wrong Voltage may void the warranty!**
-  The EMI Air Handler must be connected to a properly grounded electrical supply. Do not fail to properly ground this unit.
-  Turn off the electrical supply before servicing the EMI Air Handler.
-  Do not use the EMI Air Handler if it has damaged wiring, is not working properly, or has been damaged or dropped.

[Save these instructions]



Recognize this symbol as an indication of Important Safety Information.



COMMON TO ALL AIR HANDLERS

SAFETY INSTRUCTIONS *Continued*

The manufacturer of this unit will not be liable for any damages caused by failure to comply with the installation and operating instructions outlined in this manual.

A rating plate identifying this EMI Air Handler can be found on the unit. When referring to your unit, always have the information listed on the rating plate readily available.



Completely read all instructions prior to assembling, installing, operating, or repairing this product. Inspect all parts for damage prior to installation and start-up. The EMI Air Handler must be installed only by qualified installation personnel.

Check Unit Rating Plate for Proper Power Supply!

THE EMI AIR HANDLER FAMILY

Materials of Construction:

1. Cabinet fabricated of 20-gauge galvanized steel with an off-white powder coat matte finish
 - Plastic tops, fronts constructed of a high impact polystyrene (Hips) material
2. Discharge grill construction of high temperature Noryl plastic (WCP ONLY)
 - Anodized Aluminum discharge grill CCP
3. Condensate drain pan constructed of anticorrosive G90U galvanized steel

The EMI Air Handler is available as a wall or ceiling unit two-pipe chilled water fan coil model. The air handler offers ease of installation, operation, and service. Presently, EMI does not offer a chiller unit that provides chilled water for the WCP and CCP models.

All EMI Air Handlers are subject to on going product development so designs and specifications may change without notice. For more information on a specific air handler, please refer to the corresponding section in this installation manual or please visit our website @ www.enviromaster.com or contact the factory for the appropriate literature.

THE EMI DUCTLESS SPLIT SYSTEM AIR HANDLER FAMILY CONSISTS OF

- **WCP:** Two-pipe chilled water fan coil wall unit available in 9,000, 12,000, 15,000, 18,000, 24,000, and 30,000 nominal Btuh capacities (hot water coil not available).
- **CCP:** Two-pipe chilled water and optional hydronic heat fan coil ceiling units available in 9,000, 12,000, 18,000, 24,000, 30,000, 36,000, 42,000, and 48,000 nominal Btuh capacities.

All EMI Air Handlers are backed by Enviromaster International LLC and are tested and rated in accordance with UL 1995.

INSTALLER SUPPLIED ITEMS

- Low voltage wiring (18 awg required)
- High voltage power supply wiring
- Mounting fasteners (screws, wall anchors, etc.)
- Chilled water, condensate piping
- Hot water piping

COMMON TO ALL AIR HANDLERS *Continued*

ITEMS FOR CONSIDERATION

- Determine the best location for mounting the unit for room air circulation.
- Determine how power wire (high and low voltage) condensate drainage, and water supply piping may be run to and from unit. Knockouts on the air handler may be used for this purpose.
- Serviceability should be considered when locating the unit. The cabinet service panels must be able to be removed without obstruction.
- **CCP** - units can be equipped with hot water coil.

CONTROLS AND COMPONENTS *Factory Installed or Supplied*

- **Unit mount control panel** (standard on and WCP optional on CCP) includes:
 - ¾" backlit LCD display
 - Adjustable operational range from 55° F to 95° F (in one-degree increments)
 - 60 second fan purge
 - Freeze protection
 - Audio feedback on control setting changes
- **Fan operation:** Auto (cycling), High and Low (constant)
 - Dry Mode (operates cooling and electric heat simultaneously to remove humidity when optional electric heat is selected)
 - Test Operation for ease of testing after installation (all timers reduced)
 - Non-volatile Backup Memory (control settings maintained indefinitely during power outages)
 - 24V Low Voltage Transformer

IMPORTANT: *Unit mounted controls are fully functional without the hand-held remote. See page 5*

OPTIONAL CONTROLS & COMPONENTS

- Infrared hand held remote control
- Condensate pump (field or factory installed)
- Chilled water control valve (field installed)
- Wiring for normally closed/power open valve (24V AC, 20VA max. or 8VA max. on units with condensate pumps)

- Open wire electric heaters in 3 sizes (**factory installed ONLY**) with automatic reset high temperature cutout and redundant high temperature fuse link
- Hydronic heat coil with sweat connections (consult factory) CCP only
- 24V wall thermostat compatibility
- 24V thermostat

HIGH VOLT ELECTRICAL WIRING

(SEE THE APPROPRIATE AIR HANDLER SECTION FOR SPECIFIC WIRING INFORMATION.)

All wiring should be in accordance with the National Electric Code (NEC) and the local building codes.

1. Inspect the existing wiring for any deficiencies such as cut or frayed wires. Replace such wiring if found.
2. Check the unit rating plate for circuit ampacity and breaker or fuse size. **Use only HACR type breakers.** Select the proper wire for the ampacity rating.
3. Each unit must have a separate branch circuit protected by a fuse or breaker. Refer to the unit rating plate for the proper wire and breaker or fuse size.
4. Connect the power wire to Black (L1) and the other wire to Red/White (L2) at the power connector location. Connect the ground wire to the ground lug or lead at the same location in the control box.

NOTE: *On units rated 208/230V, the primary side of the transformer is factory wired for 230V. For a 208V power supply, the transformer tap must be changed from orange to red. Refer to the wiring diagram located on the unit.*

IMPORTANT: *When wiring the WCP 18–36 only: If the job site voltage is 208V, the WCP high-low fan speed switch may be rewired to increase air speed. Replace the black and red fan motor wire connections with the blue and orange fan motor wires respectively.*

See unit wire diagram for specific details.

LOW VOLT INTERCONNECT WIRING FOR UNIT MOUNTED CONTROLS

A 24V control transformer is located in the air handler unit. This provides low volt control power to the air handler . Depending on the models selected, the **low Volt** interconnect control wiring may be effected.

Note: All low volt interconnect wiring must be at least 18 awg.

COOLING ONLY UNITS
With or Without Heat

Cooling only units utilize two **low Volt** interconnecting wires between the indoor and outdoor units. Wires (WCP) or terminals (CCP) designated “Y” (yellow) and “C” (brown) of the air handler should be connected to the corresponding “Y” (yellow) and “C” (brown) wires or terminals of the condenser. Other wires or terminals such as “R” (red) or “O” (orange) may not be needed and should be protected by a wire nut from making contact with the junction box or other metal surfaces.

Refer to low Volt interconnect diagram interconnect diagram **Figure 1** for unit mounted controls.

Figure 1

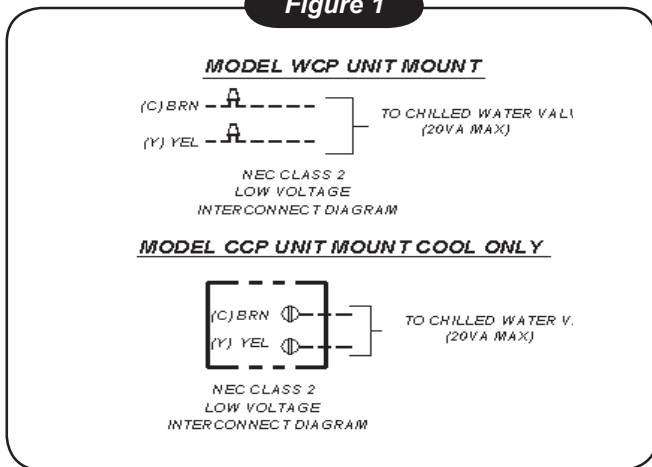
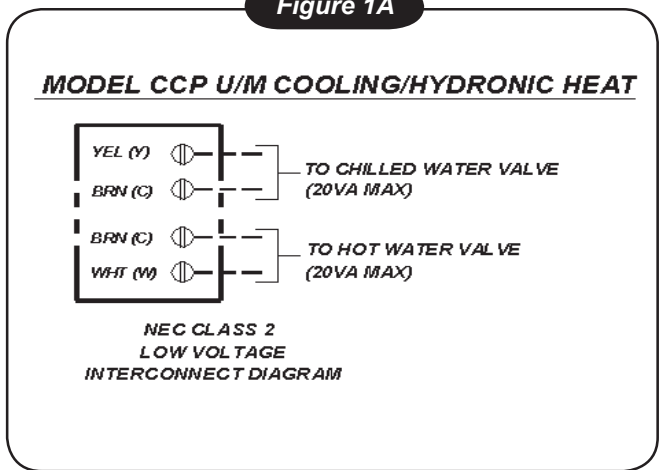


Figure 1A



REMOTE THERMOSTAT CONTROLS

A 24V control transformer is located in the air handler unit. This provides low volt control power to the air handler. Depending on the models selected, the interconnect control wiring may be effected.

Note: All low Volt interconnect wiring must be at least 18 awg.

Choosing a Remote Wall Mounted Thermostat: See “Wall Thermostat Control” section Pg. 15-16

COOLING ONLY UNITS
With or Without Heat

Depending on the thermostat required or selected, cooling only air handles may utilize four to six **low Volt** interconnecting wires between the indoor unit and thermostat. Some thermostats do not require the use of the “C” (brown) connection. In this case, ensure that any unused wires are insulated with a wire nut to prevent them from making contact with the junction box or other metal surfaces.

If the indoor unit has electric heat or hydronic heat then a “W” connection is required between the thermostat and indoor unit.

Refer to low Volt interconnect diagram interconnect diagram **Figure 2** for remote wall thermostat controls

DIP SWITCH SETTINGS *(Unit Mount Control Only)*

Figure 2

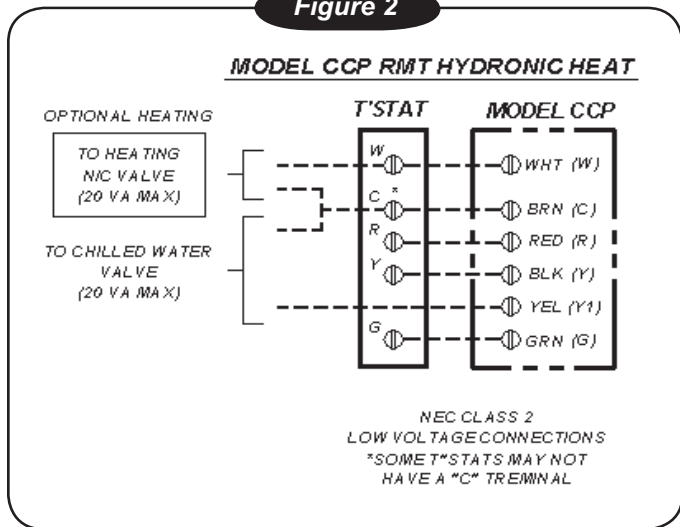


Figure 2 A

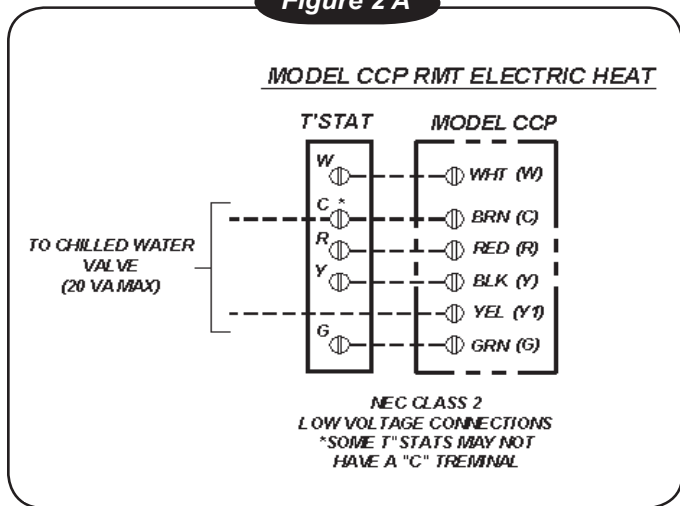
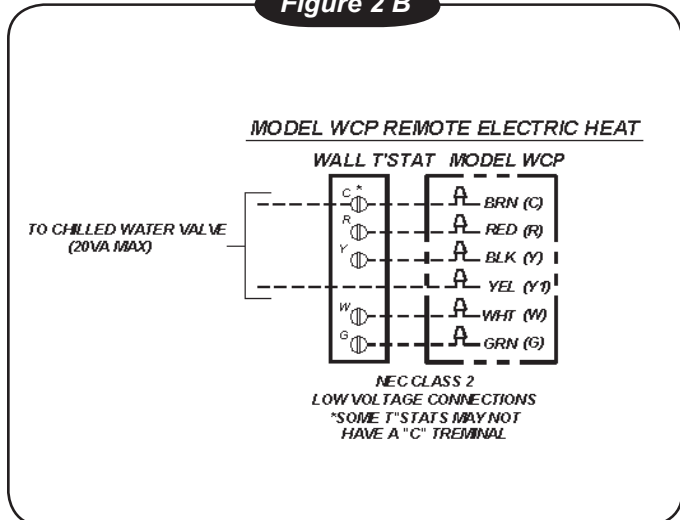


Figure 2 B



There are two dip switches on the relay board that offer different modes of operation. This allows the unit to be matched with either a cooling only or cooling with electric heat.

WARNING

Before accessing the control compartment, disconnect power to the indoor unit. Failure to do so could result in serious injury or electrical shock. DO NOT change dipswitch settings with power applied to the unit.

- **WCP-** to gain access to the relay board, first remove the return air grill from the front of the unit. Then remove any panels or covers to the control section. The relay board is located in the control box of the unit. Set the dipswitches (Figure 3) according to the table below (Figure 4).

- **CCP-** to gain access to the relay board, first remove the return air grill from the bottom of the unit. The relay board is located in the control section. Set the dipswitches (Figure 3) according to the table below (Figure 4).

Once the dipswitches are set and all covers and panels are replaced, power can be applied to the equipment.

Figure 3

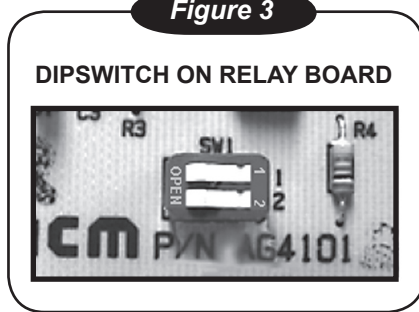


Figure 4

DIP SWITCH SETTINGS		
Switch	1	2
Cooling only	Open	Open
Cooling Electric or Hydronic Heat	On	On
Off = Open On = 1 or 2		

CEILING MOUNTED AIR HANDLER CCP



DESCRIPTION

The EMI CCP is a highly effective ceiling mounted air handler for applications where fully exposed or partially recessed cabinetry can be used. For partially recessed mounting, these units easily adapt to standard T-bar, drop-ceiling openings. The CCP is designed for residential and commercial applications where the unit may be concealed in soffits or other structural spaces with only the intake and discharge grilles exposed. When concealing the unit make provisions to the soffit for future access to the unit for maintenance purposes. When offering the Infra-Red Control option, due to the fact that the infra-red receiver is located on the unit, the CCP model cannot be mounted in a soffit or another structural space.

The aluminum supply air louvers are dual adjustable for air flow direction, to provide air flow throws to suit any installation. The louvers are mounted in a high impact polystyrene front section. The CCP incorporates dual blowers that produce efficient, quiet operation, suitable for both residential and commercial applications. A wide range of options are available for the CCP units, including supplemental electric or hydronic heat options, a factory or field installed condensate pump, and optional digital and hand held IR remote controls.

Hanger brackets and fresh air openings are standard on all models. Optional trim kits are available for surface mounting applications.

NOTE: If equipped with hydronic heat, the CCP will only operate as a single-stage heating unit and not as a two-stage heating unit.

OPTIONAL CONTROLS & COMPONENTS

See page 4 in Common Section for complete list of Optional Controls/Components

MOUNTING PREPARATION

Choose the best location for the unit. Use the cardboard template (provided with unit packing) to "test fit" the unit before installation

1. The CCP Series is designed to be mounted to a horizontal surface which should be plumb and level.
2. Using the template, mark a spot where the piping should penetrate the wall.
3. Determine appropriate hole size and cut through the mounting surface.

Piping for new construction can be roughed in before wallboard or panels are put in place. PVC pipe may be used as a pipe chase.

MOUNTING

1. Remove access panel, attach the front panel and louvers to the chassis section with supplied nuts.

NOTE: Front panel shipped separately in cartoning.

2. Secure the unit to the ceiling using appropriate hardware (screws for wood, anchors for masonry).
3. The CCP unit can be ceiling suspended using threaded rods and double nuts to ensure fasteners won't loosen.
4. Pitch the unit slightly towards the drain for proper condensate removal.
5. Run power wiring and water lines into the unit.

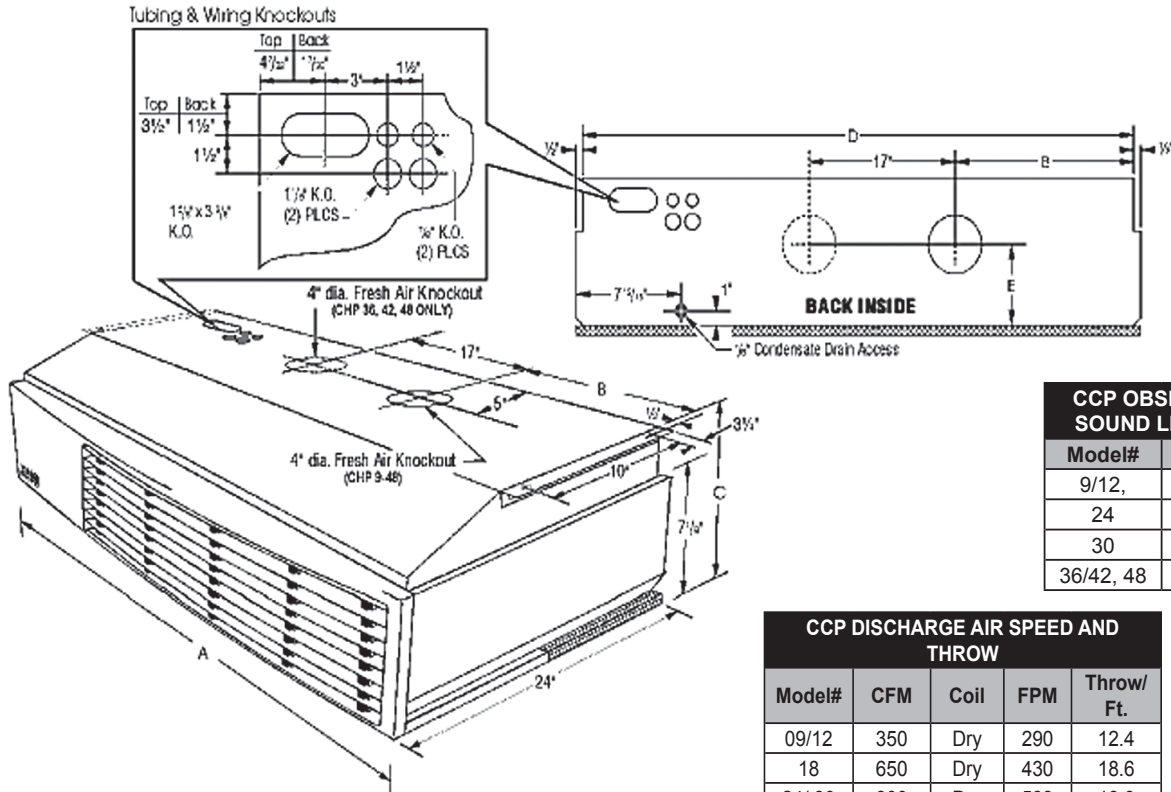
FRESH AIR

This is a 4" round knockout and will accept a 4" round duct. Dampers, wall collars, and outdoor grilles are field supplied. Do not allow moisture or other foreign matter to enter through the fresh air intake. When ducting, pitch slightly to the outside to prevent moisture from entering the chassis.

CCP DIMENSIONS AND SPECIFICATIONS *Continued*

NOTE: Due to ongoing development programs, design and specifications may change without notice.

CCP PHYSICAL DIMENSIONS AND PIPING SPECIFICATIONS								
Model#	Width "A"	Width "B"	Width "C"	Width "D"	Width "E"	Drain Hose	Ship- ping Wt.	CW Line Size (Supply & Return)
09/12	42"	16½"	10¾"	41"	5½"	1/2" I.D.	115	1/2" I.D.
18	49"	19"	10¾"	48"	5½"	5/8" I.D.	135	5/8" I.D.
24	49"	19"	10¾"	48"	5½"	5/8" I.D.	135	5/8" I.D.
30	49"	19"	10¾"	48"	5½"	5/8" I.D.	135	3/4" I.D.
36/42, 48	59"	16⅞"	12¾"	58"	7½"	5/8" I.D.	160	3/4" I.D.



CCP OBSERVED SOUND LEVELS	
Model#	DbA
9/12,	46.3
24	50.8
30	56.0
36/42, 48	64.2

CCP DISCHARGE AIR SPEED AND THROW				
Model#	CFM	Coil	FPM	Throw/ Ft.
09/12	350	Dry	290	12.4
18	650	Dry	430	18.6
24/ 30	800	Dry	533	18.6
36/42, 48	1200	Dry	500	19.0

CCP ELECTRICAL SPECIFICATIONS					
Model#	Voltage	Hertz	Fan FLA	Min. Ampacity *(1)	Max. Fuse *(1)
09/12	115	60	1.4	1.8	15
09/12	208/230	60	0.6	0.8	15
18/24	208/230	60	1.1	1.4	15
30	208/230	60	1.1	1.4	15
36/42	208/230	60	1.1/1.1	2.5	15
48	208/230	60	1.1/1.1	2.5	15

*(1) If electric heaters are installed, use Min Amp and Max Fuse from Heater Options Chart.

CCP HYDRONIC HEAT SPECIFICATIONS (Single-stage Heating Only)				
Model#	EWT °F	GPM	Btuh	PD Ft. H ₂ O
09/12	140	2	14,500	3.4
	180	2	22,900	3.4
18/24	140	4	27,200	5.2
	180	4	43,200	5.2
30	140	4	29,800	5.2
	180	4	47,300	5.2
36/42, 48	140	4	40,300	6.1
	180	4	64,100	6.1

CCP WITH ELECTRIC HEAT OPTIONS						
Model#	Voltage	KW	Htr Amps	Total Amps	Min. Cir. Amps	Max. Fuse
09/12	208/230	3	13.1	13.7	17.1	20
18/24, 30	208/230	5	21.7	22.8	28.6	30
36/42, 48	208/230	7	30.4	32.6	40.8	45



NOTE: Please refer to the Common section in the front of this manual for detailed instructions on: Controls/Components, Electrical Wiring, Start-Up, and more.

WALL MOUNTED AIR HANDLER WCP



PRODUCT DESCRIPTION

The WCP is a chilled water air handler with a contemporary design and an attractive appearance to fit any décor. It offers high efficiency conditioning of small to mid-size commercial or residential spaces. The WCP is equipped with unit mounted infrared compatible controls; an optional hand held remote is available.

The WCP Chilled Water model provides up to a nominal 30,000 Btuh of cooling. Electric Heat options are available for up to 5KW of supplemental heat.

Check page 4 in common section of this manual for a list of Controls and Components .

Check page 4 in common section of this manual for a list of Optional Controls and Components .

NOTE: Unit mounted controls are fully functional without the remote.

ITEMS FOR CONSIDERATION

- Check equipment for damage prior to installation. A foam block has been placed under the blower wheel to prevent shipping damage. **Be sure to remove the foam block before starting the unit.**
- Determine the best location for mounting the unit and room air circulation.
- Determine how water, condensate, and power line may be run to and from unit.
- Determine if the cabinet front can be removed without obstruction.

MOUNTING PREPARATION

The WCP must be mounted plumb and level to a vertically square surface to prevent unit vibration and/or unwanted noise. It is recommended that the WCP be mounted directly to a smooth surface or sheetrock wall-board or similar material. If mounting to a block wall, there should be a smooth square backing between the unit and the block surface to absorb any potential vibration.

NOTE: If excessive noise or vibration is experienced from a unit mounted directly to a block wall, the squareness of the wall should be checked immediately.

UNIT MOUNTING

1. After determining the best location for the unit, use the cardboard template provided in the packaging.
2. Mark the spot where the piping should penetrate the wall.
3. Determine the appropriate hole size and cut through the wall.

NOTE: Piping may be roughed in before wallboard or panels are placed in new construction. PVC pipe (3" or 4" I.D.) may be used as a pipe chase.

4. Use the supplied wall bracket. Secure the bracket to the wall with the appropriate screws (for wood) or anchors (for masonry).
5. Mount the unit to the bracket and make certain it fits properly.

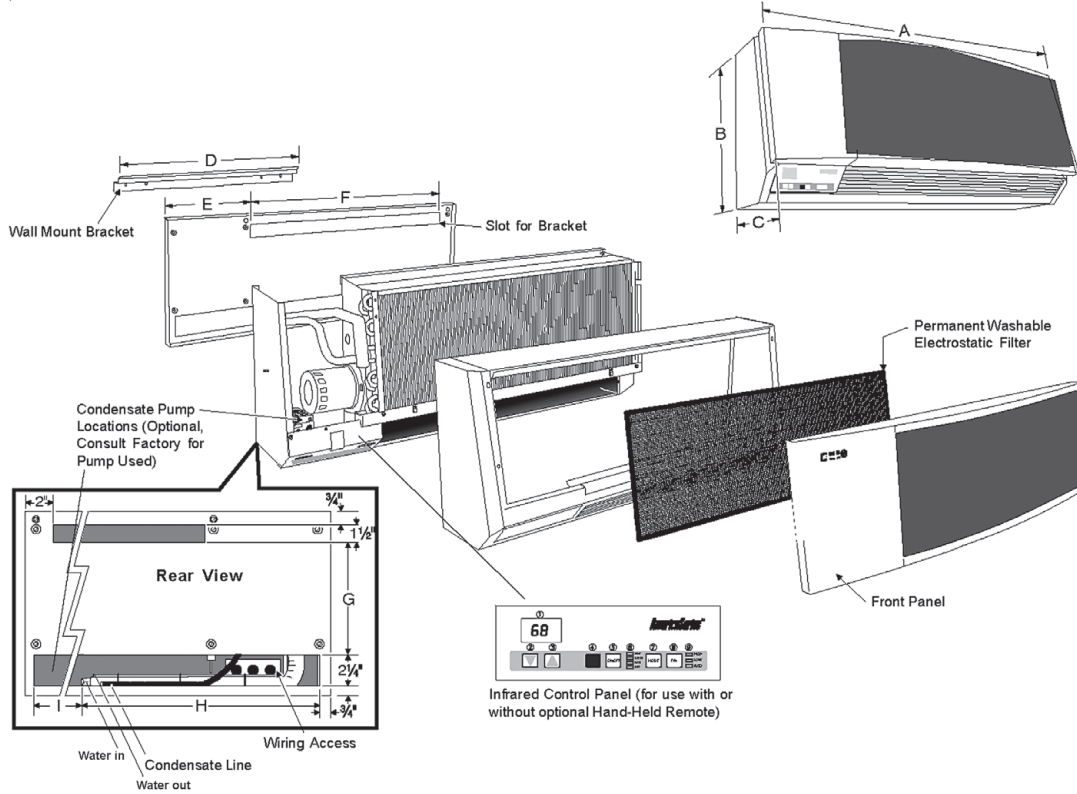
NOTE: The wall hanging bracket slot is NOT located in the center of the unit.

NOTE: Panels should remain on the unit at all times. Service should be performed by a QUALIFIED service agency. An annual system check by a qualified service technician is recommended.

NOTE: Please refer to the Common section in the front of this manual for more details on: Controls/ Components , Electrical Wiring, Start-Up, Operation and Cleaning & Maintenance.

WCP DIMENSIONS AND SPECIFICATIONS

NOTE: Due to ongoing development programs, design and specifications may change without notice.



WCP/WCP PHYSICAL DIMENSIONS										
Model	Width "A"	Height "B"	Depth "C"	Width "D"	Width "E"	Width "F"	Width "G"	Width "H"	Width "I"	Shipping Wt.
09/12	36½"	14½"	10¾"	22"	9"	24½"	8"	18"	16"	85
15/18	47½"	14½"	10¾"	32"	10"	34½"	8"	18"	27"	115
24/30	57½"	14½"	10¾"	42"	10"	44½"	8"	27"	28"	115
36	57½"	17"	11¼"	42"	10"	44½"	10½"	25"	28½"	115

WCP DIMENSIONS AND SPECIFICATIONS

WCP ELECTRICAL SPECIFICATIONS							
Model #	Volts/HZ/Phase	Fan		Total Amps	Min. Volt	Min. Ampacity (1)	Max Fuse (1)
		FLA	HP				
09/12	115/60/1	0.64	0.03	0.64	104	0.8	15
	208/230/60/1	0.34	0.02	0.34	197	0.43	15
15/18	115/60/1	1.2	0.083	1.2	104	1.5	15
	208/230/60/1	0.56	0.07	0.56	197	0.7	15
24/30	115/60/1	1.2	0.083	1.2	104	1.5	15
	208/230/60/1	0.56	0.07	0.56	197	0.7	15

(1) If electric heaters are installed, use Min Amp and Max Fuse from Heater Options Chart.

WCP ELECTRIC HEAT OPTIONS						
Model	Voltage	KW	Heater Amps	Total Amps	Min. Cir. Amps	Max Fuse
9/12	230	3	13.1	13.5	16.8	20
15/18	230	3	13.1	13.6	17	20
24/30	230	5	21.7	22.3	27.9	30
36	230	5	21.7	22.3	27.9	30

DISCHARGE AIR SPEED AND FLOW (230V High Speed Fan)				
Model	CFM	Coil	FPM	Throw/Ft.
9/12	310	Dry	960	16
15/18	600	Dry	1412	26
24/30	750	Dry	1400	25
36	750	Dry	1400	25

WCP CAPACITIES						
Model	Nominal Capacities	Total Capacity	Sensible Capacity	Fluid Temp.	Fluid Flow	PD Ft. H ₂ O
09/12	9,000	7,375	6,732	45	1	0.8
		10,801	8,272	45	2	3.8
		13,270	9,279	45	3	8.0
	12,000	8,387	7,189	40	1	0.8
		12,481	8,950	40	2	3.9
		15,643	10,304	40	3	8.1
15/18	15,000	15,624	13,477	45	2	4.4
		19,761	15,367	45	3	9.1
	18,000	17,724	14,379	40	2	4.5
		23,073	16,763	40	3	9.3
24/30	24,000	20,563	17,564	45	3	2.3
		29,031	21,178	45	6	8.3
		32,320	22,539	45	9	17.7
	30,000	23,600	18,887	40	3	2.4
		34,400	23,423	40	6	8.4
		38,790	25,351	40	9	17.9

WCP OBSERVED SOUND VALUES (230V High Speed Fan)		CONNECTIONS	
Model	DbA	WCP	
		Chilled Line Size	Drain Size
9/12	48	1/2" I.D.	1/2" I.D.
15/18	51	5/8" I.D.	1/2" I.D.
24/30	54	5/8" I.D.	1/2" I.D.
36	54	3/4" I.D.	1/2" I.D.



PREPARATION FOR START UP

See the "Common" section of this manual (on pages 13-16) for control details.

- Confirm that the dip switch settings are correct for your unit (*see page 6*)
- Remove any tools or other obstructions
- Be sure the filter is in place
- Verify that the unit is level
- Separate any lines that contact each other
- Replace the cabinet front onto the chassis

Test each power and circuit connection before powering up the system. Use the unit mounted electronic thermostat controls to start the system. (*See Operating Instructions on Control Operation Section, Thermostat, Unit Mount or Remote.*)

INITIAL START-UP *Unit Mount Controls Only*

UNIT MOUNT INFRARED CONTROL OPERATION

EMI Air Handlers are equipped with a unit mount, infrared compatible control package (optional on the CCP). This user friendly, microprocessor control is designed to protect the system. Operation of the unit can be made by ***either the keypad on the unit or by using the optional hand held infrared controller.***

There are two dipswitches on the relay board that offer different modes of operation. This allows the unit to be operated as either a cooling only or cooling/heating air handler. Dipswitches are factory set for cooling only. If the air handler is operated as a cooling with heating unit, the dipswitches will need to be changed.

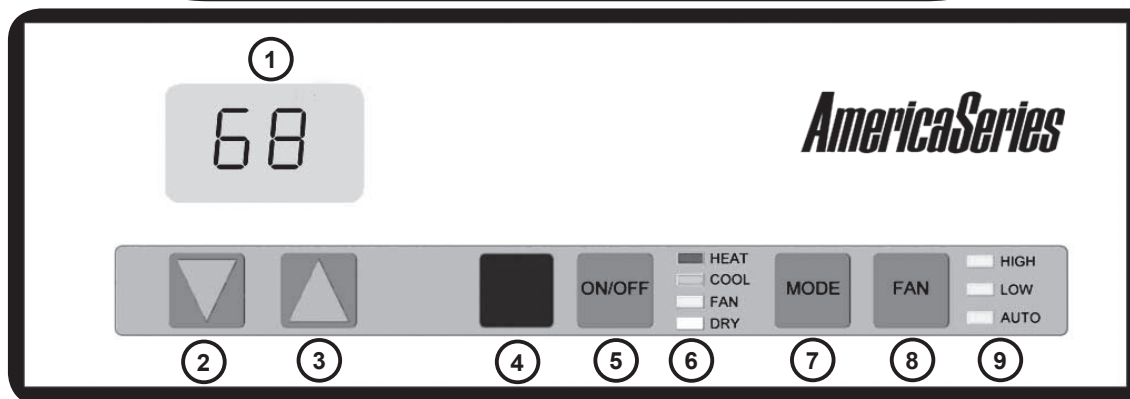
The unit will start in time delay. These are the default settings of the unit mount I/R control microprocessor. Once temperature and mode selections have been made, they will be stored in the microprocessor memory when the unit is switched off. The next time the unit is switched back on via the *On/Off* switch, the stored settings will be used and the unit will resume operation.

Refer to the specific model of Air Handler for more detailed installation instructions.

After starting the unit, complete the Test Unit Performance Data sheet on page 17. Save this information for future servicing. In the event there is a problem with the unit. Perform the test again (if possible) and have both sets of data ready when calling for assistance.

Figure 5

UNIT MOUNTED INFRARED COMPATIBLE CONTROL



- | | | |
|--------------------------------|---|---|
| 1. LCD Display | 4. Infrared Sensor | 7. Mode Selection Button |
| 2. Temp. Set Point Down Button | 5. Power ON/OFF Button | 8. Fan Operation Button |
| 3. Temp. Set Point Up Button | 6. Mode Indicator LEDs (HEAT, COOL, FAN, DRY) | 9. Fan Indicator LEDs (HIGH, LOW, AUTO) |

START-UP FOR UNIT MOUNTED INFRARED COMPATIBLE CONTROL (Only)

ON/OFF SWITCH

The **On/Off** switch is used to turn the equipment on or off. In the **off** mode the display will be blank and all LED indicator lights will be dark. To turn on the unit press the **On/off** button once. Room temperature will be displayed and amber LED indicators will show fan speed and mode selections (Figure 5).

MODE SWITCH
(System Switch)

The **Mode** button will allow the selection of the desired mode of operation. Colored LED indicators will light next to the selected mode. With each successive press of the **Mode** button, selection will rotate between **Heat, Cool, Fan or Dry** mode. If the dipswitches are set for cooling only (off – off) then **Heat** and **Dry** will not be accessible (Figure 5).

FAN OPERATION

The indoor unit utilizes a two-speed motor with three operational fan modes. The **Fan** button will allow the selection of the desired fan setting. An amber LED indicator will light next to the fan speed selection. If **Auto** fan mode is selected then an LED indicator will also light next to **Auto**.

High and **Low** are constant fan settings. The fan will operate continuous regardless of set point or room temperatures. **Auto** mode is a cycling fan setting.

Auto fan mode can only be selected if the unit is in **Heat** or **Cool** mode. In **Auto** mode the fan will cycle with the call for Heat or Cool. Fan speed will be determined by the microprocessor and speed adjustment will be made according to room and setpoint temperatures. The fan will switch to **High** speed when room temperature deviates by

more than two degrees from setpoint. The fan will switch to low speed if the deviation is one degree. When the room temperature reaches setpoint temperature the heat/cool call will then be dropped. The fan will stay on for an additional 60 sec. to purge unit of any residual energy. After the fan has been off for ten minutes, the fan will cycle on for 60 seconds. This is done so the microprocessor can sample the room air and also helps eliminate room temperature stratification.

When the unit is in **Dry** mode the fan speed will remain constant at **low** speed. While the unit is in **Fan** mode, **Auto** is bypassed and only **High** or **Low** are available (Figure 5).

COOLING ONLY OPERATION

For cooling operation first turn the unit on via the **On/off** button. Select **Cool** mode via the **Mode** button. The room temperature will be displayed. Then, by depressing either the **Up** or **Down** arrow once, the setpoint temperature will appear. The setpoint temperature can then be changed with each successive press of the **Up** or **Down** arrow buttons or by holding the button in. Place the setpoint temperature below the room temperature.

OPTIONAL ELECTRIC HEAT OPERATION

Important: The dip switch 1& 2 must be set to ON

For electric heat operation first turn the unit on via the **On/Off** button. Select **Heat** mode via the **Mode** button. The room temperature will be displayed. Then by depressing either the **Up** or **Down** arrow once, the setpoint temperature will appear. The setpoint temperature can then be changed with each successive press of the **Up** or **Down** arrow or by holding the button in. Place the setpoint temperature above room temperature. The electric heat will energize and heating will continue as long as the setpoint remains above room temperature. Once the room temperature is satisfied the electric heat will cycle off. The fan will operate as described in "Fan Operation" (*Figure 5*).

DRY MODE OPERATION

Dry mode will remove humidity from the air while maintaining a specific setpoint temperature. This is done in cooling along with the electric or hydronic heater. Dry mode **will not** maintain a specific humidity level. The unit must be equipped with an optional electric heat element or hydronic coil.

For Dry Mode operation first turn the unit on via the **On/off** button. Select **Dry** mode via the **Mode** button. The room temperature will be displayed. Then by depressing either the **Up** or **Down** arrow once, the setpoint temperature will appear. The setpoint temperature can then be changed with each successive press of the **Up** or **Down** arrow or by holding the button in.

Place the setpoint temperature at a desired room temperature. Depending on the difference between room temperature and set point temperature cooling and/or heating will energize. If the room temperature and setpoint temperature are the same the unit will operate in cooling and the electric heat source will also energize.

Should the room temperature fall below the setpoint temperature by two degrees, cooling will stop and heating will continue to boost the room temperature back up to setpoint temperature. If the room temperature rises above the setpoint temperature by two degrees, heating will stop and cooling will continue to bring the room temperature back down to setpoint temperature. The fan will operate continuously at low speed while in Dry Mode.

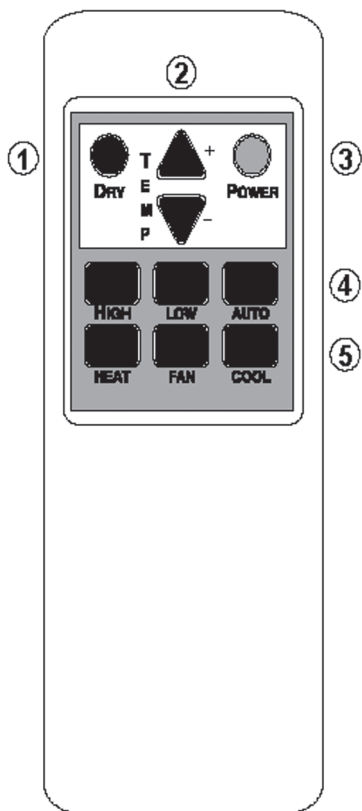
UNITS WITH CONDENSATE PUMPS

EMI Air Handlers are available with an optional condensate pump. Condensate pumps are recommended when it is not possible to gravity drain the condensate from the indoor unit. Depending on the pump manufacture the maximum lift for the pump will vary. Consult the pump instructions for the maximum lift for the particular pump being used or refer to specific pump kit information and instructions as supplied by EMI.

Condensate generated by the evaporator will collect in the pumps' reservoir. When the water level is high enough, a float switch will close and energize the pump motor clearing the water from the reservoir. Should for any reason the water exceed the maximum preset level, a safety switch will open. This will prevent the evaporator from generating more condensate and spilling out of the unit.

Figure 6

INFRARED REMOTE CONTROL OPTION
OPERATIONAL RANGE 55- 90° F (IN 1° INCREMENTS.)



1. Dry Mode Button
2. Temp. Set Point UP/DOWN Button
3. Power ON/OFF Button
4. Fan Speed Button (HIGH, LOW, AUTO)
5. Operational Mode Buttons (HEAT, FAN, COOL)

NOTE: Batteries Included.

START-UP FOR WALL THERMOSTAT CONTROL

CHOOSING A THERMOSTAT

EMI offers several remote thermostats that are compatible with the air handlers. See the latest price list for a list of available thermostats. It is important to choose a thermostat that will match the equipment that you have selected. For single stage cooling or heating choose a single stage Heat/Cool thermostat.

When selecting a thermostat other than those offered by EMI, it is important to choose a 24V thermostat that matches your application. EMI equipment is compatible with most mercury bulb, digital or power stealing thermostats.

COOLING ONLY WITH ELECTRIC HEAT OR HYDRONIC HEAT

Select a thermostat that is compatible with a cooling - electric heat system. The thermostat should have "R", "Y", "W" and "G" terminals. The thermostat may also have a "C" terminal.

FAN OPERATION

Some thermostats are equipped with an **auto/on** fan switch. When this switch is placed in the **on** position the indoor fan will run continuous. When the switch is in the **auto** position the indoor fan will cycle with the call for heating or cooling.

FAN PURGE

The indoor unit is equipped an electronic circuit board with a purge feature. After the room thermostat has been satisfied, the purge feature allows the indoor fan to remain on for an additional 60 seconds. This increases efficiency by pulling the remaining energy from the unit.

COOLING OPERATION

The electronic circuit board of the indoor unit also has an anti-short cycle timer (ASCT) feature designed to prevent short cycling. Once the room temperature is satisfied and the unit switches off, the ASCT will not allow the unit to restart until a three-minute time period has elapsed.

After connecting the thermostat to the unit place the system switch in **cool** mode. Adjust the set-point temperature below the room temperature. For chilled water systems, the coldwater valve will open allowing the flow of water. Place the set-point temperature above the room temperature. The CW valve will close while the indoor fan will remain on for an additional sixty seconds.

ELECTRIC HEAT OPERATION

Place the thermostat system switch in **heat mode**. Adjust the set-point temperature above the room temperature. The electric heat will energize along with the indoor fan motor. Heating will continue so long as the set-point remains above room temperature. Next place the set-point temperature below room temperature. The electric heater will switch off and the indoor fan will remain on for an additional sixty seconds.

HYDRONIC HEAT OPERATION (Optional On CCP Units)

An optional hydronic heat package may be selected in lieu of electric heat. Heating operation is essentially the same as that of units with electric heat. With the thermostat **system switch** set to **heat** and the set-point temperature above room temperature, the hydronic valve will open allowing water to flow through the coil. The indoor fan will also switch on and warm air will flow from the unit. Heating will continue so long as the set-point remains above room temperature. Place the set-point temperature below room temperature. The hydronic valve will close and indoor fan will switch off after the sixty-second purge time has elapsed.

Units with an optional hydronic heat coil or chilled water coil are also equipped with a freeze protection thermostat. The freeze protection thermostat is designed to protect the hydronic coil or chilled water coil from freeze up due to abnormally cold fresh air from the fresh air system. Should the freeze sensor activate, the indoor fan will switch off to eliminate the source of cold fresh air. For units with a hydronic hot water valve installed, the valve will be energized allowing warm water to flow and assist in the defrost process. The system will remain in this state until the freeze condition is satisfied where-by the freeze thermostat will reset.

After starting the unit, complete the Test Unit Performance Data sheet on page 17. Save this information for future servicing. In the event there is a problem with the unit. Perform the test again (if possible) and have both sets of data ready when calling for assistance.

COMMON TO ALL AIR HANDLERS *Continued*

START-UP, MAINTENANCE AND TROUBLESHOOTING PROCEDURE

The Test Unit Performance Data sheet below is provided for use by a qualified service professional. In order for our Technical Service Department to better serve you, please complete and have this information ready when calling.

Make sure to include the Model Number, Serial Number, Date of Installation.

Call our Technical Support Department
@ 1-800-228-9364.

Test Unit Performance Data	
Date:	
Technician:	
Model Number	Mode: Cooling
Serial Number	
Indoor Section	Notes
Evaporator Entering Air - DB	
Evaporator Entering Air - WB	
Evaporator Leaving Air - DB	
Evaporator Leaving Air - WB	
Outdoor Section	
Entering Air	
Leaving Air	
Temperature Split	
Operating Pressures	
Compressor Suction - PSIG	
Compressor Discharge - PSIG	
Power Input	
Compressor - Volts	
Compressor - Amps	
OD Fan Motor - Volts	
OD Fan Motor - Amps	
ID Fan Motor - Volts	
ID Fan Motor - Amps	
Total Volts	
Total Amps	
Temperatures - Degrees F°	
Compressor Suction	
Compressor Discharge	
Liquid Out Cond.	
Liquid before Expansion	
Suction out Evaporator	
Capacity Calculations	
DB - Temp Split at evap.	
Test Summary	
Compressor Superheat	
Sub Cooling	

COMMON TO ALL AIR HANDLERS

MAINTENANCE AND TROUBLESHOOTING PROCEDURE

for EMI Air Handlers with Unit Mount Infrared Controls

MAINTENANCE

Service should be performed by a **qualified** service agency and an annual system check is recommended. EMI units are designed and constructed for reliability and long life with minimal maintenance. You can insure peak operating efficiency by:

1. Cleaning air filters on a monthly basis: The filter is accessed by removing the air intake access panel.
2. Clean with a vacuum cleaner that has a brush attachment or use a garden hose. Allowing dust to collect on the filter will cause the unit to lose efficiency and eventually malfunction.
3. Vacuuming dust from the return air grille and coil surface when cleaning the filter.

TROUBLESHOOTING

EMI AIR HANDLERS WITH UNIT MOUNT INFRARED CONTROLS



WARNING

All service should be performed by a qualified service technician. Before removing access panels or control covers to expose moving parts of non-insulated live electrical components for service, disconnect all high Volt power supplies to both the indoor unit and outdoor unit. Failure to do so could result in physical injury and/or electrical shock.

When trouble-shooting the indoor unit, please refer to the wiring diagram that is supplied with the equipment. It is located either on the on the back of the removable return air grill (WCP) or on the back of the access panel (CCP). If you are unable to locate the wiring diagram please feel free to call the factory technical service line at (800) 228-9364 and one can be faxed or mailed. Please have the full model and serial number available prior to calling.

The number of low Volt interconnect conductors will be three to six depending on heating options and or thermostat selection. Interconnect wire should be at least 18 awg. Refer to the unit wiring diagram for the interconnect diagram that matches your system.

Figure 1

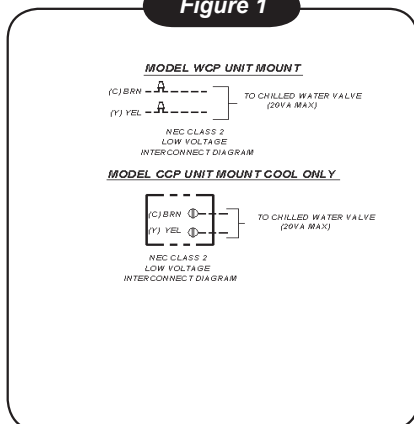
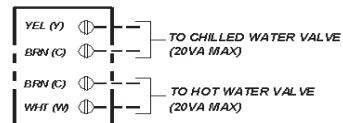


Figure 1A

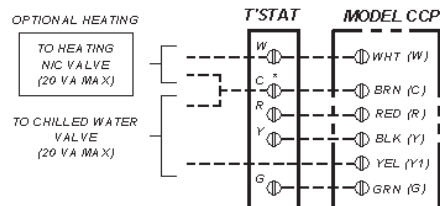
MODEL CCP U/M COOLING/HYDRONIC HEAT



NEC CLASS 2
LOW VOLTAGE
INTERCONNECT DIAGRAM

Figure 2

MODEL CCP RMT HYDRONIC HEAT



NEC CLASS 2
LOW VOLTAGE CONNECTIONS
*SOME T'STATS MAY NOT
HAVE A "C" TERMINAL

Figure 2A

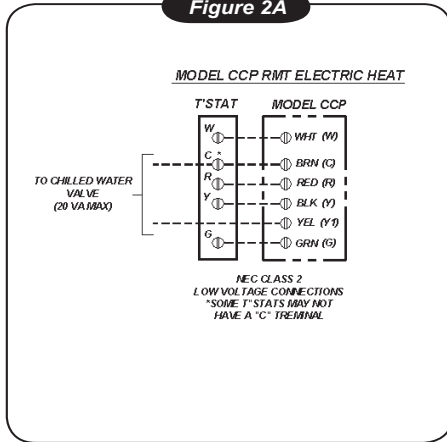
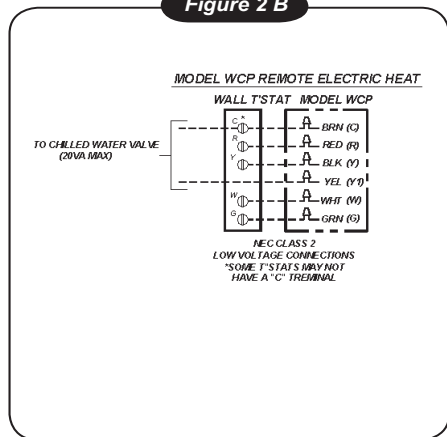


Figure 2B



CAUTION

While in test mode, all timers are eliminated. After system checks are complete, the control must be returned to normal operation. **DO NOT LEAVE THE SYSTEM IN TEST MODE!**

To enter test mode the unit must first be in the **off state**. Next, using the unit mounted keypad depress both the **up** and **down** arrow buttons simultaneously and push the **On/Off** button in for one second. The unit is now in test mode. System function checks can now be made without having to wait for timer delays. To return to normal operation, switch the unit off again via the **On/Off** button for at least 30 seconds. When the system is switched back on, normal operation will resume.

LOW VOLT CONTROLS

COOLING ONLY UNITS

Cooling only units utilize **low Volt** interconnecting wires between the indoor unit and thermostat. For air handlers with unit mounted controls, wires (WCP) or terminals (CCP) designated “Y” (yellow) and “C” (brown) of the indoor air handler should be connected to the corresponding “Y” (yellow) and “C” (brown) wires or terminals. Other wires or terminals such as “R”(red) or “O” (orange) may not be needed and should be protected by a wire nut from making contact with the junction box or other metal surfaces.

Refer to low volt interconnect diagram interconnect diagram **Figure 1** for unit mounted controls and **Figure 2** for remote thermostat connection.

A 24V transformer located in the indoor air handler unit provides low Volt control power to the indoor air handler. The 24V power supply can be measured by placing a meter across the “R” and “C” low Volt terminals. The air handler will switch on and off cooling through the yellow (Y) wire. When the air handler is calling for cooling, 24V can be measured between terminals (wires) Y and C.

POWER SUPPLY CHECK

When troubleshooting any EMI product, it is important to first check the rating plate for proper field voltage and breaker size. Secondly using a voltmeter check the incoming power supply to see that it agrees with the rating plate. The incoming power should not exceed the nameplate voltage. Also, the incoming power should not be below the minimum voltage stated on the rating plate (197V for units rated 208/230V and 104V for units rated 115V).

A check for low voltage power should also be made. By placing a voltmeter across low Volt terminals “R” and “C” at the indoor unit, there should be a reading of 24V.

TEST MODE

Test mode is available only on units with unit mounted controls. Use of the test mode feature can aid in the functional check of the unit. It can also be a helpful tool when trouble shooting to help isolate a problem source.

ELECTRIC HEAT

Units with electric heat utilize a control relay located on the circuit board in the control box. As a safety feature, an auto resetting limit switch located on the heater end plate or on the heater assembly will interrupt power to the heater should an over-heat condition occur. Each electric heat assembly

is also equipped with a one time fuse link. Should electric heat temperatures rise above the auto resetting limit switch, a non-resetting, one time fuse link will open and the heater will remain off.

The following current values apply when the unit is connected to a 230V power supply. These values include fan motor current. If the supply power is different, this will in turn affect the amp draw of the heater.

5kw = 22.3 amps, 4kw = 18 amps, 3kw = 13.5 amps.

Units With Condensate Pumps

EMI Air Handlers are available with an optional condensate pump. Condensate pumps are recommended when it is not possible to gravity drain the condensate from the indoor unit. Depending on the pump manufacture the maximum lift for the pump will vary. Consult the pump instructions for the maximum lift for the particular pump being used.

Condensate generated by the air handler will collect in the pumps' reservoir. When the water level is high enough, a float switch will close and energize the pump motor clearing the water from the reservoir. Should for any reason the water exceed the maximum preset level, a safety switch will open, there by interrupting the (Y) signal. This will prevent the air handler from generating more condensate and spilling out of the unit.

Error Codes

Should for some reason one of the two temperature sensors become disconnected or fail, an error code will appear in the display. The control will not operate properly until the sensor is working.

E1 – Coil Sensor malfunction or disconnected. Check location **J1** on thermostat board.

E2 – Room Air Sensor malfunction or disconnected. Check location **J2** on thermostat board.

Q: The display on the indoor unit is blank. What should I do?

A: Check the power supply (see "Power supply check" Section). If the unit still fails to turn on via the **On/off** button then inspect the control box for any apparent wires that may have come loose during shipping. Also inspect the circuit boards for burnt components. If no obvious problem can be found then replace all circuit boards including the unit keypad. Do not attempt to trouble shoot the individual circuit boards.

Q: The display tends to flicker at times. Is this normal?

A: A small amount of flickering of the display is normal. Depending on the room lighting, flickering may be more noticeable at some times than others.

Q: How long will the fan run?

A: While the unit is in cooling or heating and auto fan mode is selected, Fan speed will be determined by the microprocessor and speed adjustment will be made according to room and setpoint temperatures. The fan will switch to **High** speed when room temperature deviates by more than two degrees from setpoint. The fan will switch to **Low** speed if the deviation is one degree. When the room temperature reaches setpoint temperature the heat/cool call is dropped. The fan will then stay on for an additional 60 sec. to purge unit of any residual energy. If **High** or **Low** is selected then the fan will operate continuous regardless of set point or room temperatures.

Q: What causes my indoor unit to freeze-up?

A: Evaporator freeze up is usually the symptom of another problem. Units with infrared compatible, unit mounted controls are equipped with freeze protection to prevent freeze up from occurring. If freeze up does occur then check the following.

- **Check that the freeze sensor located in the lowest part of the coil. Generally this is where freeze up will begin.**
- Check that the freeze sensor inserted fully and snug in the coil fin. If not another location may need to be selected. Be careful not to insert the sensor directly into the coil tube rather insert the sensor between two tubes.
- Check the indoor air filter. It should be clean and free of dirt. A dirty filter will reduce airflow and efficiency. Also check that the coil is clean. If the coil is dirty then it should be cleaned using an appropriate coil cleaner or mild detergent.