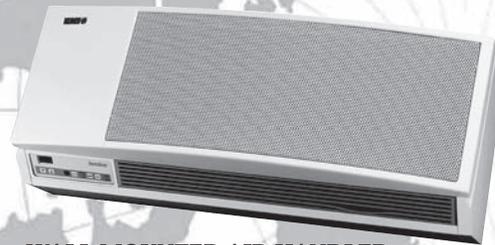


# EMI DUCTLESS SPLIT SYSTEM AIR HANDLERS



**CEILING MOUNTED AIR HANDLER  
(CHP)**



**WALL MOUNTED AIR HANDLER  
(WCP/WHP)**



**FLOOR MODEL AIR HANDLER  
(FCP/FHP)**

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An **ECR International Brand**  
An ISO 9001-2000 Certified Company



P/N# 240004373, Rev. 1.6 [9/06]

# EMI DUCTLESS SPLIT SYSTEM AIR HANDLERS

## INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

P/N# 240004373, Rev. 1.6 [9/06]

### TABLE OF CONTENTS

<b>Common To All Air Handlers</b> .. 1-7 Continued 21-32	
Safety Instructions .....	2
The EMI Air Handler Family .....	3
Installer Supplied Items .....	3
Items for Consideration.....	4
Controls and Components .....	4
Optional Controls/Components .....	4
High Volt Electrical Wiring .....	4
Low Volt Electrical Wiring .....	5-7
Dip Switch Settings.....	5

Floor Model Air Handler (FCP/FHP) .....	8-12
Ceiling Mounted Air Handler (CCP/CHP) .....	13-14
Wall Mounted Air Handler (WCP/WHP) .....	15-17
Preparation for Start-up .....	18
Unit Mount Control Start-Up .....	18-20
Wall Thermostat Start-Up .....	21-22
Test Unit Performance Data .....	23
Maintenance and Troubleshooting .....	24--27
Warranty .....	28

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 ductless split system floor, wall, corner, 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](http://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 (WHP/WCP ONLY)
  - Anodized Aluminum discharge grill FHP/FCP & CHP/CCP
3. Condensate drain pan constructed of anticorrosive G90U galvanized steel

The EMI Air Handler is available as a (Dx) direct expansion straight cool, heat pump – floor, wall, or ceiling units – and two-pipe chilled water fan coil model. The air handler offers ease of installation, operation, and service, and can be matched with EMI's SCC/SHC single-zone condensing unit or either of the company's multi-zone outdoor units, the MC2/MH2 or MC4/MH4. Presently, EMI does not offer a chiller unit that provides chilled water for the FCP, 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, for information on EMI Condensing Units, please visit our website @ [www.enviromaster.com](http://www.enviromaster.com) or contact the factory for the appropriate literature.

### THE EMI DUCTLESS SPLIT SYSTEM AIR HANDLER FAMILY CONSISTS OF

- ▲ **FCP:** Two-pipe chilled water fan coil floor unit available in 9,000, 12,000, 18,000, 24,000, 30,000, 36,000, 42,000, and 48,000 nominal Btuh capacities (can be equipped with optional hot water coil).
- ▲ **FHP:** Dx straight cool/heat pump floor unit, available in 9,000, 12,000, 15,000, 18,000, 24,000, 30,000, 36,000, 42,000, and 48,000 nominal Btuh capacities (with optional hot water coil).
- ▲ **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).
- ▲ **WHP:** Dx straight cool/heat pump wall unit available in 9,000, 12,000, 15,000, 18,000, 24,000, 30,000, and 36,000 nominal Btuh capacities (hot water coil not available).
- ▲ **CCP:** Two-pipe chilled water fan coil ceiling unit available in 9,000, 12,000, 18,000, 24,000, 30,000, 36,000, 42,000, and 48,000 nominal Btuh capacities (with optional hot water coil).
- ▲ **CHP:** Dx Straight cool only Design Revision B ceiling unit available in 9,000, 12,000, 18,000, 24,000, nominal Btuh capacities (with optional hot water coil). (Design Revision is found in the 15<sup>th</sup> position of the model number.)

All EMI Air Handlers are backed by Enviromaster International LLC and are tested and rated in accordance with ARI standards 210/240 and UL 1995.

**NOTE:** *CHP 12 and WHP 12/18/30 the units built after 4/05 may need a Piston/Orifice change at time of installation (factory supplied) see page 12 (CHP), page 16 (WHP).*

### INSTALLER SUPPLIED ITEMS

- Low voltage wiring (18 awg required)
- High voltage power supply wiring
- Mounting fasteners (screws, wall anchors, etc.)
- Chilled water, condensate, and refrigerant piping
- Refrigerant (for interconnect charge)
- Hot water piping
- Flare nuts for refrigerant piping (FHP&CHP models only)

## COMMON TO ALL AIR HANDLERS *Continued*

### ITEMS FOR CONSIDERATION

- ▲ Determine the best location for mounting the unit for room air circulation. Locate outdoor and indoor units as close together as possible.
- ▲ Determine how power wire (high and low voltage) condensate drainage, and refrigerant or water supply piping (for chilled water units) may be run to and from unit. Knockouts on the air handler may be used for this purpose.
- ▲ **FHP, WHP, and CHP ONLY** - Ensure that interconnect tubing is within the maximum allowable length of 100' including a maximum 35' lift.
- ▲ Serviceability should be considered when locating the unit. The cabinet service panels must be able to be removed without obstruction.
- ▲ **FCP/FHP/CCP/CHP** - units can be equipped with hot water coil.

### CONTROLS AND COMPONENTS *Factory Installed or Supplied*

- ▲ **Unit mount control panel** (standard on FHP/FCP and WHP/WCP optional on CCP/CHP) includes:
  - ¾" backlit LCD display
  - Adjustable operational range from 55° F to 95° F (in one-degree increments)
  - Anti-short cycle compressor protection
  - Minimum compressor run time
  - 60 second fan purge
  - Freeze protection
  - Audio feedback on control setting changes
  - Universal control board for straight cool or heat pump condenser operation
  - Two-stage heating w/optional electric heat and heat pump condenser
- ▲ **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 eliminated)
  - 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) FCP/FHP and CCP/CHP 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 WHP 18–36 only: If the job site voltage is 208V, the WHP high-low fan speed switch must be rewired. 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

As of 12/01/04, the 24V control transformer is located in the air handler unit. This provides low volt control power to both the air handler and condenser. 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/WHP) or terminals (CCP/CHP/FCP/FHP) 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.

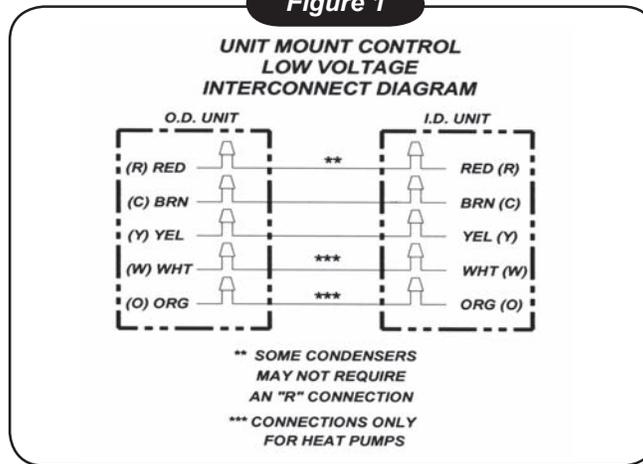
Refer to low Volt interconnect diagram interconnect diagram **Figure 1** for unit mounted controls.

In addition to the "Y" and "C" connections required for cooling, heat pumps require a reversing valve control wire "O" (orange) that is energized in the cooling mode. If the indoor unit has an electric heater then a "W" (white) wire connection may also be needed to energize the indoor electric heat. Heat pumps models SHC require an "R" connection between the indoor and outdoor unit to provide power to the defrost control board in the condenser. Heat pump models MH2 and MH4 do not require an "R" connection **after 12/01/04** since the transformer is located in the air handler.

**Note: Two-stage heating requires the combination of a heat pump condenser and an indoor unit that is equipped with an electric strip heater. The indoor electric heater will energize as the second stage heat source, when the room temperature falls by two degrees or more below the set point, and also during the defrost mode for models SHC. For limited range heat pumps models MH2 and MH4, heat pump operation will cease when the outdoor temperature falls below 35°F. In this case the electric strip heater will remain sole heat source.**

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

Figure 1



HEAT PUMP CONNECTION - UNIT MOUNT  
CONTROLS Two-Stage Heating

When connecting to a defrosting heat pump, such as EMI model SHC, indoor units with electric heat utilize five interconnecting **low Volt** wires between the indoor and outdoor units. When connecting to limited range heat pumps such as EMI models MH2 and MH4 **built after 12/01/04**, indoor units with electric heat utilize four interconnecting low Volt wires. In this case the "R" (red) may not be needed and should be protected by a wire nut from making contact with the junction box or other metal surfaces.

REMOTE THERMOSTAT CONTROLS

As of 12/01/04, the 24V control transformer is located in the air handler unit. This provides low volt control power to both the air handler and condenser. 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. 21-22

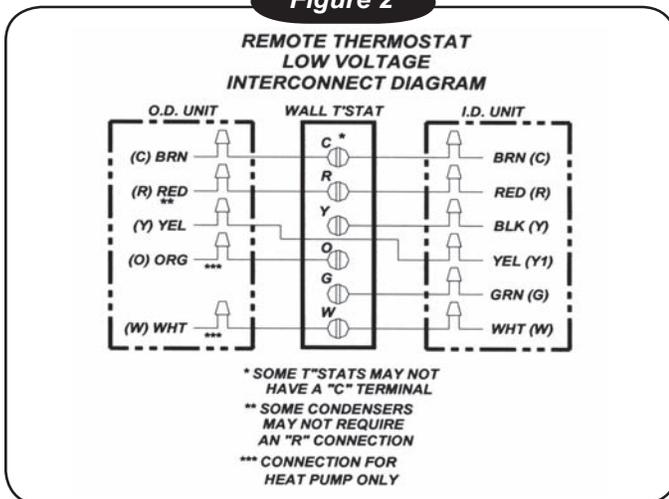
**COOLING ONLY UNITS**  
With or Without Heat

Depending on the thermostat required or selected, cooling only air handles may utilize four to six **low Volt** interconnecting wires between the indoor unit, thermostat and outdoor unit. 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.

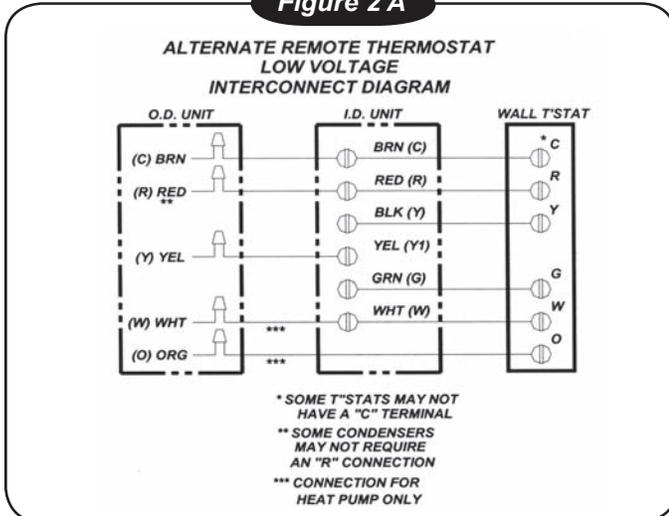
If the indoor unit has electric heat or hydronic heat then a “W” connection is required between the thermostat and indoor unit.

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

**Figure 2**



**Figure 2 A**



**HEAT PUMP CONNECTION - REMOTE THERMOSTAT**  
Two-stage Heating

Since heat pump mode is a function of the thermostat and outdoor unit, connections between the indoor unit and thermostat are the same as for cooling only applications.

Depending on the thermostat required or selected, the air handler may utilize four to six **low Volt** interconnecting wires between the indoor unit, thermostat and outdoor unit. Some thermostats do not require the use of the “C” (brown) connection.

Heat pump operation requires the connection of the “O” (orange) terminal from the outdoor unit to the thermostat. The reversing valve is energized in the cooling mode for EMI models SHC heat pump condensers. If the indoor unit has an electric heater then a “W” connection is also required between the condenser and the indoor unit. For two-stage heating, a “W” (sometimes called “W2”) connection is also required at the thermostat. Refer to the instructions provided with the thermostat for the proper thermostat connections for a two stage heat, single stage cooling system.

Ensure that any unused wires are insulated with a wire nut to prevent contact with the junction box or other metal surfaces.

**NOTE:** Two-stage heating requires the combination of a heat pump condenser and an indoor unit that is equipped with an electric strip heater. The indoor electric heater will energize as the second stage heat source (the temperature is dependent on the thermostat selected) and also during the defrost mode for models SHC. For limited range heat pumps models MH2 and MH4, heat pump operation will cease when the outdoor temperature falls below 35°F. In this case the electric strip heater will remain sole heat source.

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

**DIP SWITCH SETTINGS** *(Unit Mount Control Only)*

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, cooling with electric heat or heat pump condenser. Dipswitches are factory set for a cooling only condenser. If the indoor unit is matched with an EMI single zone or multi-zone heat pump condenser, the dipswitches will need to be changed.

**⚠ WARNING ⚠**

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

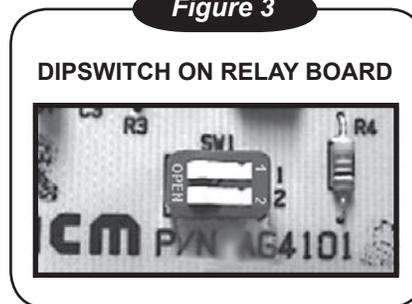
- **WHP/WCP-** to gain access to the relay board, first remove the return air grill from the front of the unit. Then remove any panels or covers to the control section. The relay board is located in the control box of the unit. Set the dipswitches (*Figure 3*) according to the table below(*Figure 4*).

- **CHP/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*).

- **FHP/FCP-** to gain access to the relay board, first remove the return air grill from the bottom front 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. When 24V power is applied, the microprocessor will read the dipswitch setting.

**Figure 3**



**Figure 4**

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

## FLOOR MODEL AIR HANDLER (FCP/FHP)



**NOTE: The FHP utilizes a molded plastic top. DO NOT sit or stand on it as you may damage the unit.**

### DESCRIPTION

The FHP 09-30 and 36-48 is available in two cabinet sizes with nine capacities in Cooling Only or Heat Pump (depending on condenser match).

FHP units are equipped with a unit mounted control that allows the unit to operate in either straight cool or heat pump mode. The unit is configured by changing dip switch settings prior to installation. FHP units are compatible with any AmericaSeries outdoor unit.

FHP units are shipped from the factory **set in cooling only** mode and will need to be reset for heat pump applications.

The FCP is a Chilled Water model with electric or hot water heating options and is compatible with any chilled water source of matching capacity.

A unit mounted, electronic, digital control is standard and an optional infrared handheld remote control is available. Fresh air knockouts and anti-short cycle protection are standard features on all FCP/FHP units

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

### ITEMS FOR CONSIDERATION

- EMI's FHP evaporator requires 24V power for control operation. (As of 12/01/04 a transformer is supplied in the indoor unit).
- Ensure that the FHP interconnect tubing is within a maximum allowable length of 100' including, a maximum 35' lift.
- Liquid line filter dryer.

### OPTIONAL CONTROLS & COMPONENTS

- Fan-Induced fresh air (FHP only)

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

### MOUNTING PREPERATION

1. Check equipment for damage before mounting.
2. Determine the best location for mounting the unit for optimum air circulation.
3. Locate the indoor and outdoor units as close together as possible. (See outdoor unit requirements.)

### UNIT MOUNTING

The FHP/FCP is designed to sit directly on a finished floor, flush against a wall. Moldings or baseboard must be cut to allow the unit to be mounted flush against the wall.

Units that are installed without a wall box should be test fit for wiring and tubing positions. Place the unit against the wall with the front panels removed. Mark the connection locations on the wall. Shim the unit, if necessary, for square floor to wall positioning.

4. Determine the following:
  - Power supply wire routing
  - Interconnect refrigerant piping routing
  - Chilled water and condensate piping routing (FCP)
  - Low voltage control interconnect wiring
  - Fresh air ducting (if required)

**NOTE: FHP 42 contains Kit# 550-121 that includes a .073" I.D. orifice. The existing factory installed .078" orifice must be replaced with the one supplied in the kit when matching an Air Handler with a 36,000 Btuh Condensing Unit. (See the instructions attached to Kit# 550-121 for proper conversion procedure.)**

## FLOOR MODEL AIR HANDLER (FCP/FHP) *Continued*

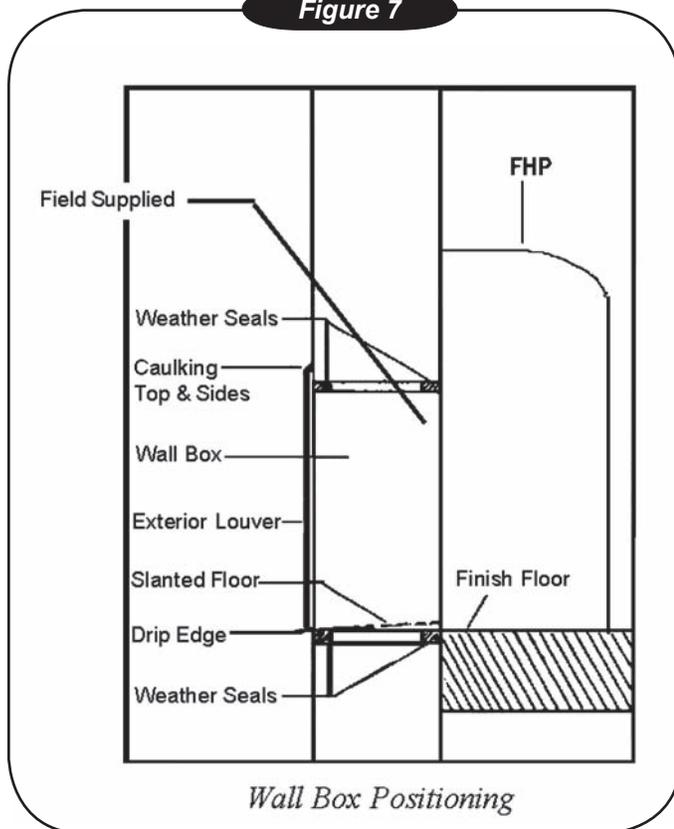
### MOUNTING & INSTALLATION *Continued*

5. Tubing may be run through the knockouts located on the bottom left rear (room side) of the unit, as well through knockouts in the back of the unit.
6. Consider future servicing of the unit when determining mounting location. All FHP service is performed by removing the front (room side) panels.

### OPTIONAL FRESH AIR

Units with a wall box (field supplied only for fresh air) must be checked to ensure the unit is level and the floor of the wall box is pitched down and away from the unit. The drip edge of the wall box must clear the edge of the finished outside wall (See *Figure 7 – Wall Box Positioning*). EMI recommends that all electrical, refrigerant, and condensate lines are routed through the wall or floor to the correct locations to use the knockouts before the unit is mounted in place.

**Figure 7**



If a fresh air connection is necessary for this FHP/FCP installation, please note the following:

- All ducts, collars, and dampers are field supplied. The back side has a 4" knockout for a fresh air duct.
- Block the opening during installation to prevent foreign objects from getting into the unit.
- The duct should be installed with a slight downward pitch away from the unit to prevent moisture from entering the unit.

Secure the unit to the wall using lag screws or other appropriate anchor devices. Then connect all wiring and tubing connections.

### REFRIGERANT PIPING

The FHP is equipped with a Flo-Rater/Piston Expansion Device. Connections are male flare type (***flare nuts not included***).

The suction line (large) must be insulated the entire length with closed cell, foam tube insulation. Do not insulate the liquid line (small). Connect the outdoor unit according to the instructions supplied with unit.

All horizontal piping runs must be level and without dips to trap the oil.

## FLOOR MODEL AIR HANDLER (FCP/FHP) *Continued*

### PIPING DO'S AND DON'TS

- Avoid piping on a rainy day.
- Use refrigerant grade copper tubing.
- Use a tubing bender and avoid unnecessary bending.
- Cap ends of lines until ready for final connections.

### REFRIGERANT PROCESSING



#### WARNING

***It is illegal to discharge refrigerant into the atmosphere. Use proper reclaiming methods and equipment when installing or servicing this unit.***

Finish all pipe connecting before proceeding to charging the system. Follow the instructions in the outdoor unit for line evacuation, opening service valves, and final charge adjustments. Operation charts and charge tables can be found in the EMI Condenser IOMs.

### CHILLED WATER PIPING

Standard connections provided are sweat type. See specifications for line size and actual unit connections.

**NOTE: Water pipe sizes are given in I.D.**

- Use pipe unions or compression fittings to aid future service. Use isolation valves to aid in unit removal.
- Connections can be brazed or soft solder type.

- Follow manufacturer's instructions for any field installed control valves.
- Unit control is provided for a 24V normally closed/ power open valve (20VA max.)
- *Consult factory if other types of valves are used.*
- Insulate supply and return piping with closed cell foam tube insulation.
- Avoid unnecessary bends or kinks (use a tubing bender)
- Make sure glycol solution is compatible with all valves, unions and compression fittings. Ethylene or propylene is recommended.
- Bleed air from system prior to start-up, units are equipped with a standard air bleeder on the highest point on the unit piping.

**CAUTION: Disconnect power when bleeding system. Make certain liquid does not contact any electrical components.**

Finish all piping before balancing the system. Bleed system, adjust temperature and/or water flow rate until desired results are achieved.

**NOTE: Please refer to the Common sections of this manual for detailed instructions on: Controls/Components, Electrical Wiring (pgs. 4-7), Start-Up, and more (pgs. 18-28).**

## FCP/FHP DIMENSIONS AND SPECIFICATIONS

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

### FCP PIPING SPECIFICATIONS

Model#	Chilled Water Line Size (Supply & Return)	Drain Hose
9/12,15	1/2" I.D.	1/2" I.D.
18/24	5/8" I.D.	5/8" I.D.
30	3/4" I.D.	5/8" I.D.
36/42,48	3/4" I.D.	5/8" I.D.

### FCP/FHP DISCHARGE AIR SPEED AND THROW

Model#	CFM Low/High	Coil	FPM	Throw/ft.
9/12,15	350/375	dry	800	12.4
18/24,30	480/700	dry	1500	18.6
36/42,48	1000/1200	dry	1500	19.0

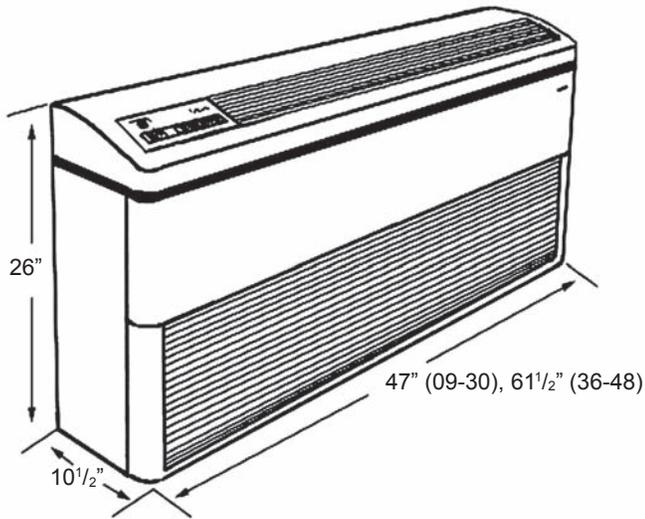
FCP/FHP POWER ASSISTED OUTSIDE AIR		
Model#	Total CFM	Outside Air CFM
9/12, 15	440	180
18/24, 30	725	200
36/ 42, 48	1200	400

### FCP/FHP SOUND LEVELS

Model#	DbA
9/12	48.6
15	56.0
18	57.2
24/30	60.6
36/42, 48	63.2

## (FCP/FHP) DIMENSIONS AND SPECIFICATIONS *Continued*

**NOTE:** Due to EMI's ongoing development programs, designs and specifications may change without notice.



FCP/FHP FRESH AIR SPECIFICATIONS*		
Model #	Total CFM	Outside Air CFM
9/12, 15	440	50
18/24, 30	725	75
36/42, 48	1200	160

\* Open or Motorized Damper

FCP/FHP ELECTRICAL SPECIFICATIONS				
Model #	Voltage/Hz/Ph	Fan FLA	Min. Ampacity*	Max. Fuse*
9/12A	115/60/1	1.5	1.9	15
9/12, 15	208-230/60/1	0.6	0.8	15
18/24	208-230/60/1	0.8	1	15
30	208-230/60/1	1.1	1.4	15
**36/42, 48	208-230/60/1	1.1/1.1	2.5	15

\* If electric heat is installed, use data from FHP Electric Heat Specifications table.  
\*\* 36 requires piston kit #550-121 (see pg 5)

FCP/FHP ELECTRICAL HEAT SPECIFICATIONS						
Model#	Voltage	KW	Heater Amps	Total Amps	Min. Circuit Amps	Max. Fuse Amps
9/12, 15	230	3	13.1	13.7	17.1	20
18/24	230	5	21.7	22.7	28.2	30
30	230	5	21.7	22.8	28.6	30
36/42, 48	230	7	30.4	32.6	40.6	45

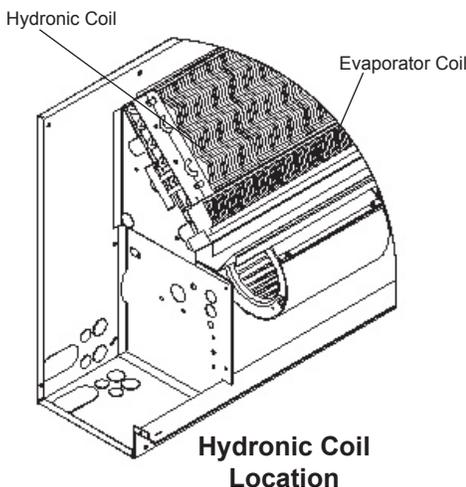
FHP PIPING SPECIFICATIONS			
Model#	Refrigerant Line Size		Drain Hose
	Liquid Flare*	Suction Flare*	
9/12	1/4"	1/2"	1/2" I.D.
15	1/4"	5/8"	1/2" I.D.
18	3/8"	5/8"	5/8" I.D.
24	3/8"	3/4"	5/8" I.D.
30	3/8"	3/4"	5/8" I.D.
36/42, 48	3/8"	3/4"	5/8" I.D.

\* Flare fittings      NOTE: Flare nuts not included.

FHP SHIPPING WT.	
Model#	LBS.
9/12, 15	110
18/24, 30	120
36/42, 48	165

FCP/FHP HYDRONIC HEAT SPECIFICATIONS (Single-stage Heating only)				
Model#	EWT °F	Btuh	GPM	PD Ft. H <sub>2</sub> O
9/12, 15	180	24,300	2.0	3.4
	140	18,400	2.0	3.4
18/24, 30	180	41,500	3.5	5.6
	140	26,200	3.5	5.6
36/42, 48	180	39,500	6.0	8.8
	140	62,400	6.0	8.8

NOTE: Not available with Heat Pump applications.



### FHP's ONLY

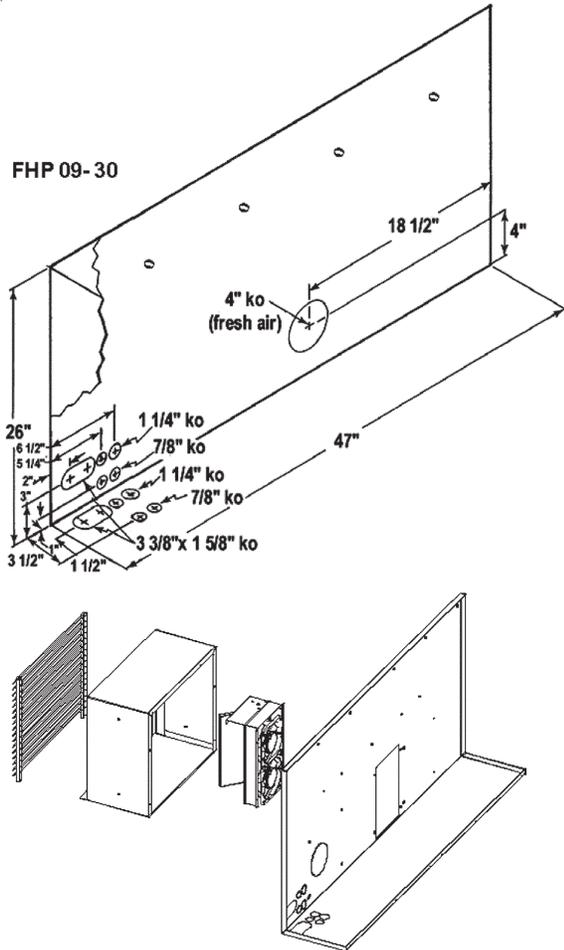


## (FCP/FHP) DIMENSIONS AND SPECIFICATIONS *Continued*

### Connection K.O.s for Open Fresh Air

#### FHP 09- 30 Motorized Damper and Power Assisted Fresh Air (2 Fan Type)

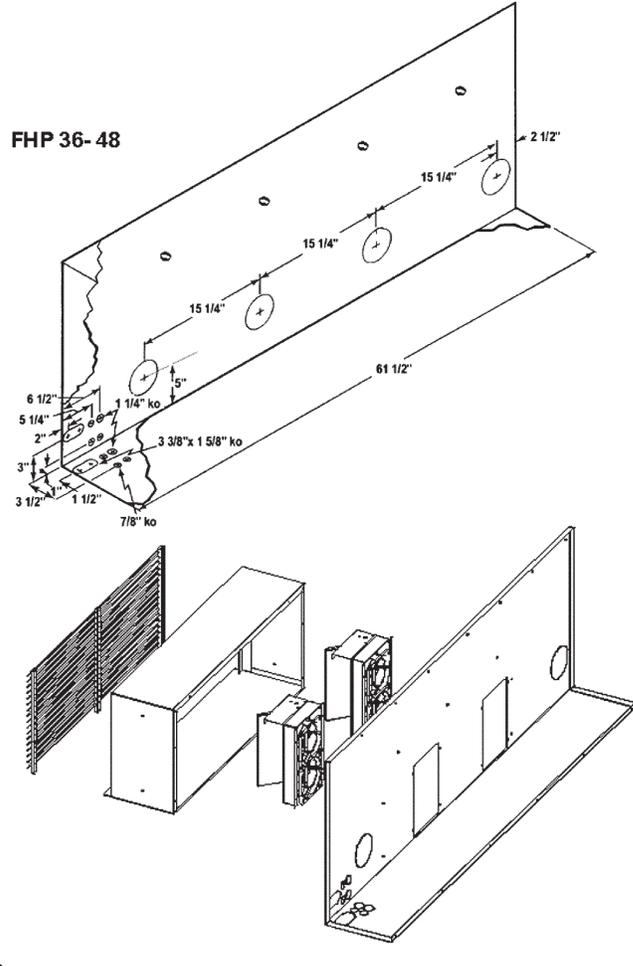
Wall Box Dimensions: 14"  
(from finished floor level) x 17" wide x 8" deep



*Lagging holes positioned 8" on center for optional mounting*

#### FHP 36- 48 Motorized Damper and Power Assisted Fresh Air (4 Fan Type)

Wall Box Dimensions: 14"  
(from finished floor level) x 32" wide x 8" deep



## FIELD INSTALLATION INSTRUCTION CHP12 PISTON/ORIFICE

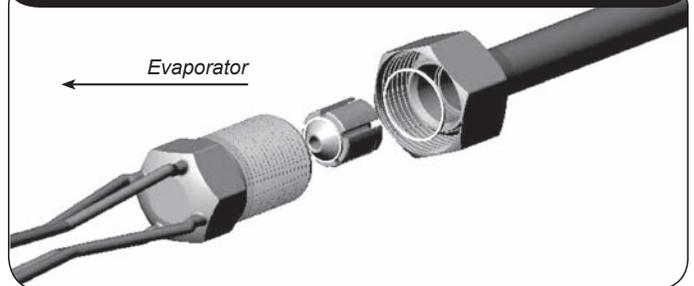
**APPLIES TO CHP 9,000 BTUH - 12,000 BTUH**  
Built After 4/05

**NOTE:** Replace the existing piston (*before* installing the unit) with the piston supplied in Kit Bag when matching a:

- CHP12 with 9,000 Btuh Condenser

(See chart below)

### PROPER INSTALLATION OF PISTON/ORIFICE REPLACEMENT



Model # Air Handler	Condenser Btuh	Factory Installed		Field Changeover	
		Part # Piston/Orifice	Piston/Orifice Size	Part # Piston/Orifice	Piston/Orifice Size
CHP12	9,000	240004064	.044"	240000727	.041"
	12,000			NO CHANGE	

## CEILING MOUNTED AIR HANDLER CHP



### DESCRIPTION

The EMI CHP is a highly effective ceiling mounted evaporator 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/CHP 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 CHP 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 CHP incorporates dual blowers that produce efficient, quiet operation, suitable for both residential and commercial applications. A wide range of options are available for the CHP units, including supplemental electric or hydronic heat options, a factory or field installed condensate pump, and optional digital and hand held IR remote controls.

The CHP models are fast and easy to install with 24V control circuits to the outside unit, standard. 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 CHP will only operate as a single-stage heating unit and not as a two-stage heating unit.**

### ITEM FOR CONSIDERATION

Ensure that the CHP interconnect tubing is within a maximum allowable length of 100' including, a maximum 35' lift.

### 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 CHP 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 CHP 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 refrigerant lines into the unit.

### REFRIGERANT PIPING

CHP units are equipped with a piston flow regulator expansion device. Piping connections are standard flare type (**flare nuts not included**).

**NOTE: See specifications for line sizing and actual unit connections.**

1. Be certain there are no burrs on either side of the tubing.
2. The large line (suction) should be insulated with closed cell foam tube insulation. Do not insulate the small liquid line.

### PIPING DO'S AND DON'TS

- Avoid piping on a rainy day.
- Use refrigerant grade copper tubing.
- Use a tubing bender and avoid unnecessary bending.
- Cap ends of lines until ready for final connections.
- Install a P-trap for every 10' of vertical rise.

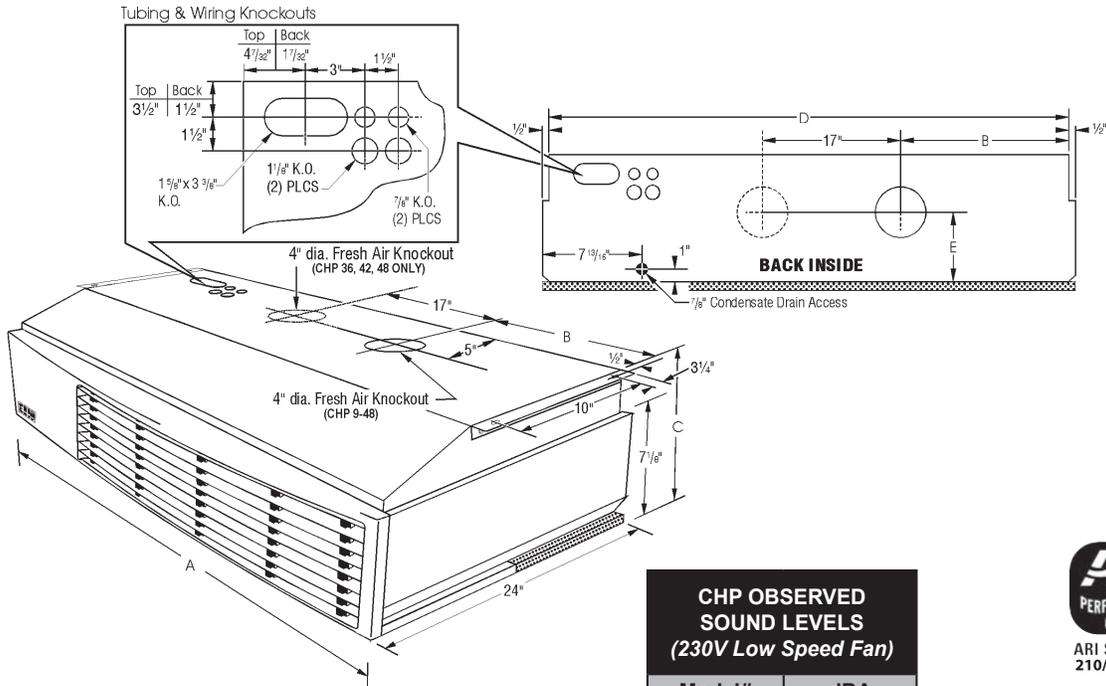
**NOTE: Connections to outdoor sections should be made according to the outdoor section installation instructions.**

### 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.

## CHP DIMENSIONS AND SPECIFICATIONS *Continued*

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



CHP OBSERVED SOUND LEVELS (230V Low Speed Fan)	
Model#	dBA
12	46.3
18	50.8
24	56.0



CHP PHYSICAL DIMENSIONS AND PIPING SPECIFICATIONS									
Model#	Width "A"	Width "B"	Width "C"	Width "D"	Width "E"	Drain Hose	Shipping Wt.	Ref. Line Sizes	
								Liquid (Flare)	Suction (Flare)
12	42"	16½"	10¾"	41"	5½"	1/2" I.D.	115	1/4"	1/2"
18	49"	19"	10¾"	48"	5½"	5/8" I.D.	135	3/8"	5/8"
24	49"	19"	10¾"	48"	5½"	5/8" I.D.	135	3/8"	3/4"
									Flare nuts not included

CHP ELECTRICAL SPECIFICATIONS					
Model#	Voltage	Hertz	Fan FLA	Min. Ampacity *(1)	Max. Fuse *(1)
12	115	60	1.4	1.8	15
12	208/230	60	0.6	0.8	15
18/24	208/230	60	1.1	1.4	15

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

CHP DISCHARGE AIR SPEED AND THROW				
Model#	CFM	Coil	FPM	Throw/Ft.
12	350	Dry	290	12.4
18/24	800	Dry	533	18.6

CHP WITH ELECTRIC HEAT OPTIONS						
Model#	Voltage	KW	Htr Amps	Total Amps	Min. Cir. Amps	Max. Fuse
12	208/230	3	13.1	13.7	17.1	20
18/24	208/230	5	21.7	22.8	28.6	30

CHP HYDRONIC HEAT SPECIFICATIONS (Single-stage Heating Only)				
Model#	EWT °F	GPM	Btuh	PD Ft. H <sub>2</sub> O
12	140	2	14,500	3.4
	180	2	22,900	3.4
18	140	4	27,200	5.2
	180	4	43,200	5.2
24	140	4	29,800	5.2
	180	4	47,300	5.2

**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/WHP)



### PRODUCT DESCRIPTION

The WHP is a ductless type evaporator, while the WCP is a chilled water air handler, both have a contemporary design with an attractive appearance to fit any décor. They offer high efficiency conditioning of small to mid-size commercial or residential spaces. The WHP/WCP is equipped with unit mounted infrared compatible controls; an optional hand held remote is available.

WHP/Heat Pump models provide up to a nominal 33,000 Btuh of cooling and 36,000 Btuh of heating. Electric heat options are available for up to 5KW of supplemental heat. The WCP/Chilled Water models provide up to a nominal 30,000 Btuh of cooling. Electric Heat options are available for up to 5KW of supplemental heat. It can be paired with a matching capacity chilled water source unit.

Check page 3 in common section of this manual for a list of Controls and Components.

Check page 6 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.**
- **WHP's Only** (Not WCP's) Depending on condenser capacity rating in Btuh, the factory installed piston orifice expansion device may need to be changed out with the one in the kit bag supplied with the WHP unit (instructions are included).
- Determine the best location for mounting the unit and room air circulation. Locate outdoor and indoor units as close together as possible.
- Determine how refrigerant and power line may be run to and from unit.
- Determine if the cabinet front can be removed without obstruction.

- Ensure that the WHP interconnect tubing is within a maximum allowable length of 100' including, a maximum 35' lift.
- EMI's WHP evaporator requires 24V power for control operation. (As of 12/01/04 a transformer is supplied in the indoor unit).

### MOUNTING PREPARATION

The WHP/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 WHP 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.

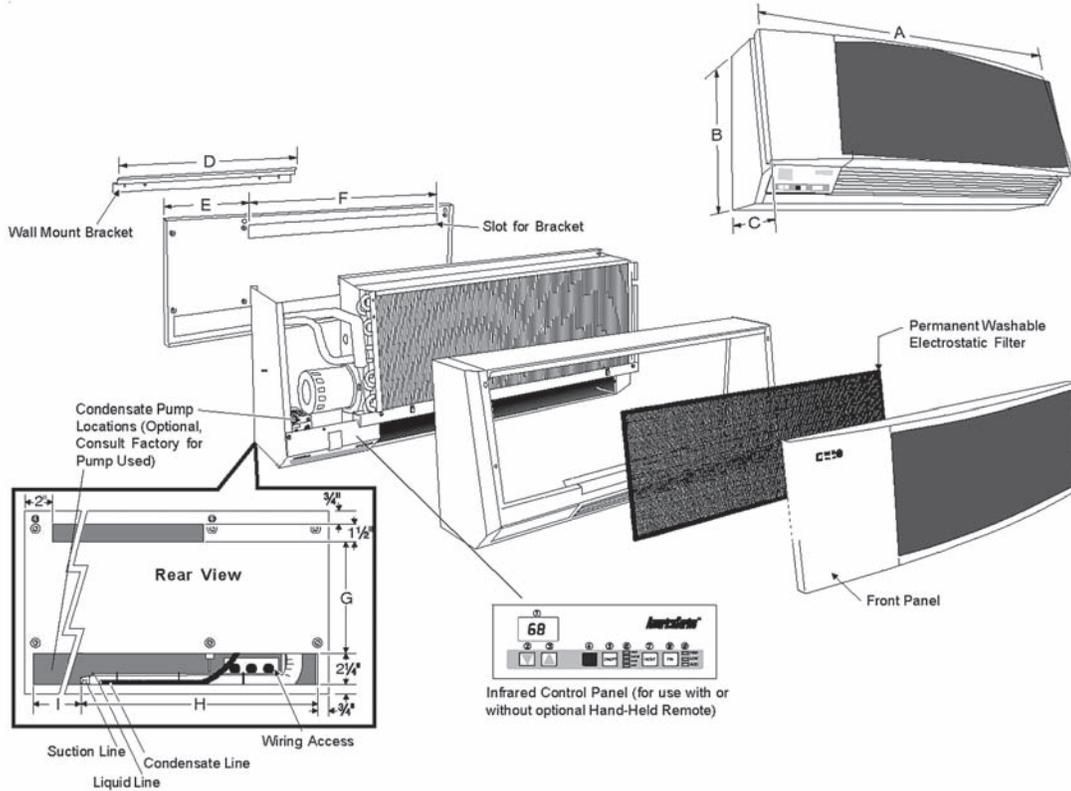
**NOTE: The wall hanging bracket slot is NOT located in the center of the unit.**

**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 (pgs 4-7), Start-Up, Operation and Cleaning & Maintenance (pgs 18-27).**

## (WCP/WHP) DIMENSIONS AND SPECIFICATIONS

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



WCP/WHP 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

## FIELD INSTALLATION INSTRUCTION WHP12/18/30 PISTON/ORIFICE

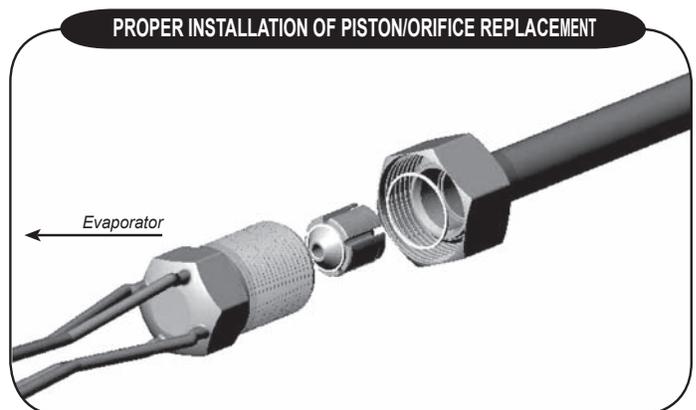
**APPLIES TO WHP 9,000 Btuh -  
30,000 Btuh BUILT AFTER 4/05**

**NOTE:** Replace the existing piston (before installing the unit) with the piston supplied in Kit Bag when matching a:

- WHP12 with 9,000 Btuh Condenser
- WHP18 with 15,000 Btuh Condenser
- WHP30 with 24,000 Btuh Condenser

(See chart below)

Model # Air Handler	Condenser Btuh	Factory Installed		Field Replacement	
		Part # Piston/Orifice	Piston/Orifice Size	Part # Piston/Orifice	Piston/Orifice Size
WHP12	9,000	240-4064	.044"	240-727	.041"
	12,000			NO CHANGE	
WHP18	15,000	240-4111	.053"	240-1010	.049"
	18,000			NO CHANGE	
WHP30	24,000	240-2089	.063"	240-3961	.059"
	30,000			NO CHANGE	



## (WCP/WHP) DIMENSIONS AND SPECIFICATIONS

WHP ELECTRICAL SPECIFICATIONS					
Model	Voltage	Hertz	Fan FLA	Min Amp (1)	Max Fuse (1)
9/12	115	60	0.7	0.8	15
	208/230	60	0.34	0.43	15
15-36	115	60	1.2	1.5	15
	208/230	60	0.56	0.7	15

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

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/WHP 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

CONNECTIONS				
WHP/Refrigerent Line Size			WCP	
Model	Liquid	Suction	Chilled Line Size	Drain Size
9/12	1/4"	1/2" O.D.	1/2" I.D.	1/2" I.D.
15	1/4"	5/8" O.D.	5/8" I.D.	1/2" I.D.
18	3/8"	5/8" O.D.	5/8" I.D.	1/2" I.D.
24/30	3/8"	3/4" O.D.	3/4" I.D.	1/2" I.D.
36	3/8"	7/8" O.D.*	-	1/2" I.D.

\* WHP Suction Connection is 3/4" O.D. and must be bushed down at the WHP Unit.

WCP CAPACITIES						
Model	Nominal Capacities	Total Capacity	Sensible Capacity	Fluid Temp.	Fluid Flow	PD Ft. H <sub>2</sub> 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

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/WHP OBSERVED SOUND VALUES (230V High Speed Fan)	
Model	DbA
9/12	48
15/18	51
24/30	54
36	54



**PREPARATION FOR START UP**

See the "Common" section of this manual (on pages 18-22) for control details.

- Confirm that the dip switch settings are correct for your unit (*Figure 4*)
- 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 pages 18-23 for Operating Instructions on Control Operation Section, Thermostat, Unit Mount or Remote.*)

**NOTE:** *Check the outdoor unit's start-up instructions for specific requirements and procedures.*

Operation of the unit depends on the room temperature. It may be necessary to warm the room before testing the unit's cooling abilities.

**Figure 4**

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

**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/CHP). This user friendly, microprocessor control is designed to optimize system performance and protect the refrigeration system from unwanted short cycling and evaporator freeze-ups. 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 matched with either a cooling only or heat pump condenser. Dipswitches are factory set for a cooling only condenser. If the indoor unit is matched with an EMI single zone or multi-zone heat pump condenser, the dipswitches will need to be changed.

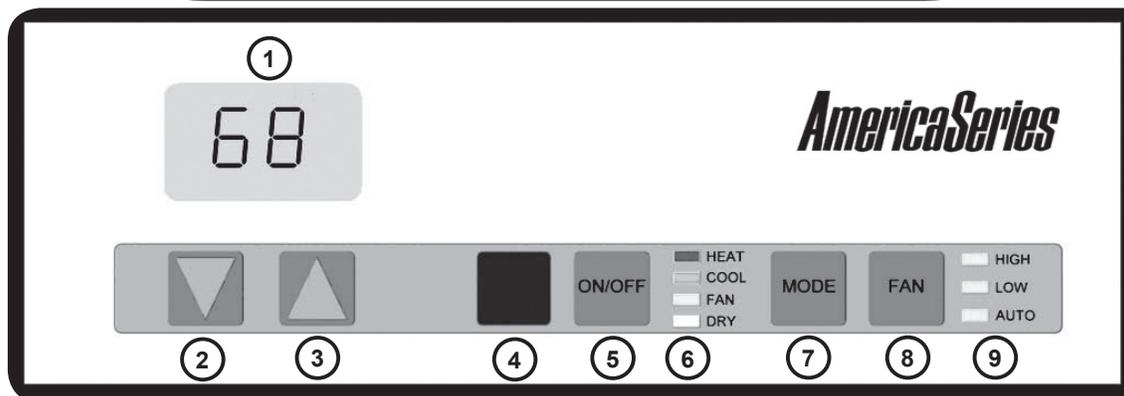
The unit will start in time delay. These are the default settings of the unit mount I/R control microprocessor. Once temperature and mode selections have been made, they will be stored in the microprocessor memory when the unit is switched off. The next time the unit is switched back on via the *On/Off* 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. (Pages 8-12)**

**After starting the unit, complete the Test Unit Performance Data sheet on page 23. 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. The compressor will start and cooling will continue for a minimum of two minutes and as long as the setpoint remains below room temperature. (On initial startup or if power is lost, there is a three-minute delay between compressor re-starts.)

Once the room temperature is satisfied and the two-minute minimum run time has elapsed the compressor will cycle off. The fan will operate as described in “Fan Operation” (Figure 5).

**NOTE: Once the compressor is switched off there is a three-minute delay before it will re-start.**

### OPTIONAL ELECTRIC HEAT OPERATION (Non Heat Pump Condenser Units Only)

**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).

### OPTIONAL HEATPUMP WITH ELECTRIC HEAT (2-Stage Heating)

**Important: The dip switch 1=OFF/Open**  
**The dip switch 2=ON/2**

For heat pump operation with backup electric heat, 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 one-degree above the room temperature. The compressor will start and heating will continue for a minimum of two minutes and as long as the setpoint remains above room temperature. Once the room temperature is satisfied and the two-minute minimum run time has elapsed, the compressor will cycle off.

(\*) *On initial startup (or if power is lost) there is a three-minute delay between compressor re-starts.*

(\*\*) *Some EMI Heat pump condensers are equipped with a low temperature cutout that will shut down the condenser and energize the indoor heat. This is designed to protect the compressor under certain outdoor conditions.*

(\*\*\*) *Some EMI Heat pump condensers energize the indoor unit electric heat during defrost.*

Next, place the setpoint temperature at least two degrees above room temperature. The electric heat will energize along with the compressor (heatpump) thus two-stage heating. The electric heat will continue to run until the deviation between room temperature and setpoint temperature is less than two degrees. At that time the electric heat will switch off and the heatpump will take over the heating demand. Once the room temperature is satisfied and the two-minute minimum run time has elapsed, the compressor

will cycle off. There is then a three-minute delay before the compressor can restart. 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 by energizing the compressor 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 the compressor and/or heat source will energize. If the room temperature and setpoint temperature are the same the compressor will operate in cooling and the electric heat source will also energize.

Should the room temperature fall below the setpoint temperature by two degrees, the compressor 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.

In order to prevent short cycling the minimum on time for both cooling and heating is two minutes. The minimum off time is 3 minutes (Figure 5).

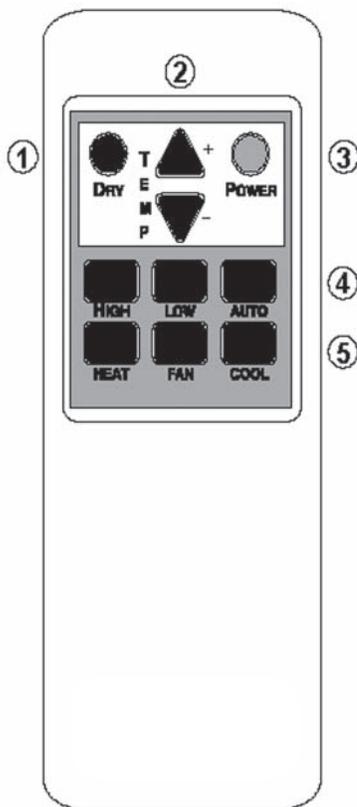
### UNITS WITH CONDENSATE PUMPS

EMI Air Handlers are available with an optional condensate pump. Condensate pumps are recommended when it is not possible to gravity drain the condensation 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.

Condensation 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, thereby interrupting the (Y) signal to the condenser. This will prevent the evaporator from generating more condensation 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 Ductless split system 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. If you have selected an outdoor heat pump unit and an indoor unit with electric heat then chose a two-stage heating, single-stage cooling 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.

**HEAT PUMP WITH ELECTRIC HEAT**

Select a thermostat that is compatible with a single-stage cooling, two-stage heat, heat pump system. The thermostat should have "R", "Y", "O", "W (or W2)" and "G" terminals. The thermostat may also have a "C" terminal. If the indoor unit is not equipped with electric or hydronic heat then a single stage heat pump thermostat is adequate.

**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 protect the compressor from short cycling. The ASCT is activated immediately following the off cycle of the outdoor unit. Once the room temperature is satisfied and the outdoor unit switches off, the ASCT will not allow the outdoor to restart unit a three-minute time period has elapsed.

## COMMON TO ALL AIR HANDLERS - SEQUENCE OF OPERATION *Continued*

After connecting the thermostat to the unit place the system switch in **cool** mode. Adjust the set-point temperature below the room temperature. The compressor and fan motors will start and cooling will begin. For chilled water systems, the coldwater valve will open allowing the flow of water. Place the set-point temperature above the room temperature. The outdoor condenser will stop (or 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 CHP And FHP 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 or from abnormally cold air from the evaporator coil. Should the freeze sensor activate, the indoor fan will switch off to eliminate the source of cold fresh air, and also the outdoor condensing unit will be switched off eliminating cold air

from the refrigeration system. 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.

### HEAT PUMP (Cooling Mode)

Cooling operation in a heat pump unit is described in "Cooling operation" above. Heatpump condensers are equipped with a reversing valve that is energized for cooling and de-energized for heatpump mode.

### OPTIONAL HEAT PUMP WITH ELECTRIC HEAT (2-Stage Heating)

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

After connecting the thermostat to the unit place the system switch in **heat** mode. Adjust the set-point temperature above the room temperature. The compressor and fan motors will start and heating will begin. Depending on the thermostat selected, electric heat will also energize when the deviation between room temperature and set point temperature is greater than two degrees. (See the thermostat owner's manual for this feature) Place the set-point temperature below the room temperature. The outdoor condenser and electric heat will stop while the indoor fan will remain on for an additional sixty seconds.

**After starting the unit, complete the Test Unit Performance Data sheet on page 23. 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	
Model Number	Date:
Serial Number	Technician:
	Mode: Cooling
<b>Indoor Section</b>	<b>Notes</b>
Evaporator Entering Air - DB	
Evaporator Entering Air - WB	
Evaporator Leaving Air - DB	
Evaporator Leaving Air - WB	
<b>Outdoor Section</b>	
Entering Air	
Leaving Air	
Temperature Split	
<b>Operating Pressures</b>	
Compressor Suction - PSIG	
Compressor Discharge - PSIG	
<b>Power Input</b>	
Compressor - Volts	
Compressor - Amps	
OD Fan Motor - Volts	
OD Fan Motor - Amps	
ID Fan Motor - Volts	
ID Fan Motor - Amps	
Total Volts	
Total Amps	
<b>Temperatures - Degrees F°</b>	
Compressor Suction	
Compressor Discharge	
Liquid Out Cond.	
Liquid before Expansion	
Suction out Evaporator	
<b>Capacity Calculations</b>	
DB - Temp Split at evap.	
<b>Test Summary</b>	
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 back of the removable return air grill (WHP/WCP) or on the back of the access panel (CHP/CCP and FHP/FCP). 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.

EMI **America Series** evaporators are designed to operate with EMI **America Series** condensers. The evaporator (indoor unit) and condenser (outdoor unit) are to be independently connected to the electrical service panel and protected by separate time delay fuse or HACR breakers. (See the unit name plate for the correct breaker type and size). The indoor and outdoor units are also connected to each other via a 24V interconnect wiring. **As of 12/01/04, a**

**transformer located in the indoor air-handler** provides the low Volt power source for the controls. 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**

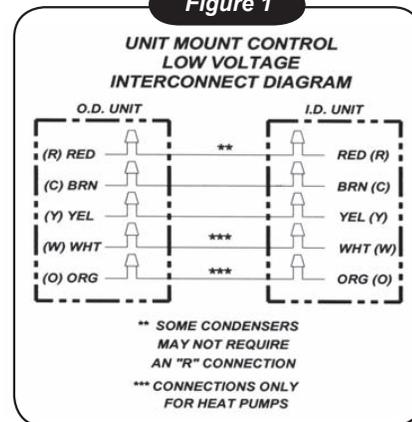


Figure 2

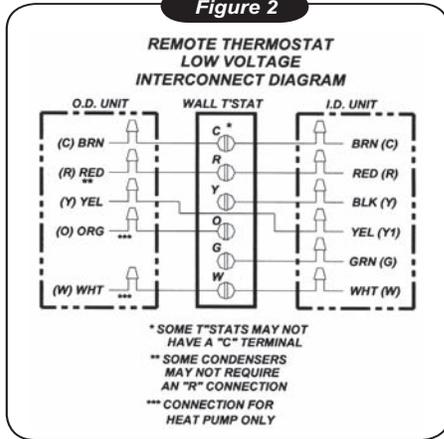
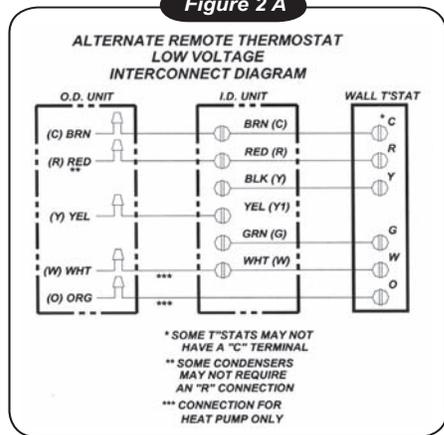


Figure 2 A



**POWER SUPPLY CHECK**

When trouble shooting 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.

**CAUTION**

While in test mode, all timers are eliminated. Avoid short cycling the compressor. 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, outdoor units and thermostat. For air handlers with unit mounted controls, wires (WCP/WHP) or terminals (CCP/CHP/FCP/FHP) 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 of the outdoor condenser. Other wires or terminals such as "R"(red) or "O" (orange) may not be needed and should be protect 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 (as of 12/01/04)** provides low Volt control power to both the indoor air handler and outdoor condenser. The 24V power supply can be measured by placing a meter across the "R" and "C" low Volt terminals of the air handler. The air handler will switch on and off the condenser through the yellow (Y) wire. When the air handler is calling for cooling, 24V can be measured between terminals (wires) Y and C.

**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.

### Optional Heat pump with Electric Heat

Heat pump units with electric heat utilize four to six interconnecting, **low Volt** wires depending control setup and/or thermostat selected. Refer to the low Volt interconnect section and figures 1, 2 and 3 for your particular unit. **As of 12/01/04, a 24V transformer located in the indoor air handler** provides low Volt control power to both the air handler and condenser. With high Volt power supplied to the condenser, 24V can be measured across the red (R) and brown (C) wires at all times.

#### Cooling:

The air handler will cycle the condenser on and off through the yellow (Y) wire. To check for a condenser signal, select cooling mode on the indoor unit or thermostat and place the set-point temperature below room temperature. Then, with a voltmeter check for 24 Volts across the yellow (Y) and brown (C) wires. If no signal is found then re-check all wiring connections to ensure that they match the low volt interconnect diagram. Check the output of the 24V transformer (located in the air handler as of 12/01/04) to ensure that the control voltage is present.

EMI heat pump systems utilize a reversing valve is that is energized in the cooling mode. The reversing-valve signal is provided through the orange (O) low Volt wire of the air handler or thermostat. It should remain energized constantly as long as the indoor unit or thermostat remains in cooling mode. To check for 24V reversing valve voltage, at the outdoor unit, place a voltmeter across the brown (C) and orange (O) wires while in the cooling mode.

#### Heating:

Heat pump units can accommodate two-stage heating when an optional electric strip heater is present along with a heat pump condenser. The first stage being the compressor and the second is electric heat. The air handler or wall thermostat will cycle the condenser through the yellow (Y) wire as it does in cooling however the reversing valve will not be energized. To check for a condenser signal, place the indoor unit or wall thermostat in heating. Next place the set-point temperature one degree above room temperature to call the first stage

of heating. Then, with a voltmeter check for 24 Volts across the yellow (Y) and brown (C) wires at the condenser. The electric heat should be off at this point. Select a set-point temperature that is more than two degrees above the room temperature to call for the second stage of heating. The electric heat should energize along with the 24V compressor signal between "Y" and "C". Check to see that the amp draw corresponds with the electric heat rating.

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

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

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.

### Units With Condensation Pumps

EMI Air Handlers are available with an optional condensate pump. Condensate pumps are recommended when it is not possible to gravity drain the condensation 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.

Condensation 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, there by interrupting the (Y) signal to the condenser. This will prevent the evaporator from generating more condensation 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.

### Frequently Asked Questions

**Q:** The system has just been installed using an EMI indoor unit and a non-EMI condenser. There is no display and the unit will not operate.

**A:** **As of 12/01/04 EMI air handlers will be manufactured with a low Volt transformer installed. At the same time, EMI outdoor condensers will be manufactured without a low Volt transformer.** When connecting an EMI evaporator to a non-EMI condenser, check to ensure that there is a 24V control transformer in either in the indoor unit or outdoor unit. Only one transformer is required. If a transformer is not present then one should be added to the indoor unit. If both the indoor unit and outdoor unit contain a transformer, one must be removed from the system.

**Q:** The condenser will not start although the indoor unit appears normal. What should I do?

**A:** At the indoor unit, make sure that the control is in cooling and the setpoint temperature is below room temperature. Next, using a volt meter, check for 24V across the yellow (Y) and brown (C) wires. If 24V is present then check for wiring breaks or improper connections between the indoor and outdoor units.

**A:** Some EMI condensers are equipped with a manual reset high-pressure switch. It is located on the high side of the system usually on the discharge line of the compressor. To reset, simply push the red button in. If the switch was tripped there will be a "click" when it resets.

**A:** If the unit is equipped with a condensate pump check to see if the safety float has been tripped. This can be done by first disconnecting both ends of the float switch. Then with an Ohmmeter, check for continuity across the switch. If the switch is open then the pump is not clearing or the switch may be bad.

**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.
- Is the equipment being operated in cooling mode when outdoor temperatures are below 65°F? If it is, then the condenser should be fitted with low ambient control so that the proper system pressures are maintained.
- Does the system have the proper refrigerant charge? A system low on refrigerant can cause evaporator freeze-up. To check system charge you will need to contact a qualified refrigeration service technician. Refrigerant charge information can be found in IOM for the outdoor condensing unit.

## ALL PRODUCT LIMITED WARRANTY

Enviromaster International LLC (EMI) warrants to the purchaser/owner that EMI products will be free from defects in material and workmanship under the normal use and maintenance for a period of twelve months for all components and sixty months on unit compressors from the date of original installation, or fifteen months for all components and sixty-three months on unit compressors from the date of manufacture, whichever comes first.

### WHAT WE WILL COVER

EMI will replace any defective part returned to EMI's approved service organization with a new or rebuilt part at no charge. The replacement part assumes that unused portion of this warranty.

### WHAT WE DON'T COVER

THIS WARRANTY DOES NOT INCLUDE LABOR or other costs incurred for repairing, removing, installing, shipping, servicing, or handling of either defective or replacement parts.

### EMI IS NOT RESPONSIBLE FOR:

- Normal maintenance
- Damage or repairs required as a consequence of faulty installation or application by others.
- Failure to start due to voltage conditions, blown fuses, open circuit breakers, or other damages due to the inadequacy or interruption of electrical service.
- Damage or repairs needed as a consequence of any misapplication, abuse, improper servicing, unauthorized alteration, or improper operation.
- Damage as a result of floods, winds, fires, lightening, accidents, corrosive atmosphere, or other conditions beyond the control of EMI.
- Parts not supplied or designated by EMI.
- Products installed outside the United States or Canada.
- Any damages to person or property of whatever kind, direct or indirect, special or consequential, whether resulting from use or loss of use of the product.

### LIMITATION OF WARRANTIES

This warranty is exclusive and in lieu of any implied warranties of merchantability and fitness for a particular purpose and all other warranties express or implied. The remedies provided for in this warranty are exclusive and shall constitute the only liabilities on the part of EMI including any statements made by any individual which shall be of no effect.

### FOR SERVICE OR REPAIR:

- (1) Contact the Installer
- (2) Call the nearest Distributor
- (3) Call or write:



*Comfort Where It Counts.*

**ENVIROMASTER INTERNATIONAL LLC**  
5780 Success Drive, Rome, NY 13440