

**EMI** *Ductless*

*Comfort Where It Counts.*

# **CACG/CAHG/CAHJ & CACH/CAHH/CAHK**

High-Efficiency Cassette Ductless Split System Air Handlers

Straight cool / Heat pump nominal capacities				
<b>CAHJ09 CAHK09</b>	<b>CAHJ12 CAHK12</b>	<b>CAHG24 CAHH24</b>		Units
9,000	12,000	18,000	24,000	Btuh
2.6	3.5	5.3	7.0	kW
Straight cooling only				
<b>CACG36 &amp; CACH36</b>				Units
30,000		36,000		Btuh
8.8		10.5		kW

## **Installation, Operation and Maintenance Manual**



**CAHK12**

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innovative living™

An ISO 9001-2008 Certified Company

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**NOTICE**

**Shipping damage MUST  
 be reported to the carrier  
 IMMEDIATELY.**

**Examine the exterior. Remove  
 cover and examine compressor  
 and piping for signs of damage.**

**NOTICE**

The EMI Series of high efficiency air handlers are backed by EMI and ECR International and are tested, rated, and certified in accordance with AHRI Standard 210/240-2008 and UL-1995.

Due to ongoing product development, product designs and specifications may change without notice.

Please contact the factory for more information.

**To the Installer**

Retain this manual and warranty for future reference. 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 this unit, contact your local representative. For a local representative listing, visit our web site:

**[www.enviromaster.com](http://www.enviromaster.com)**

For further assistance call:

**1-800-228-9364**

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

Model Number \_\_\_\_\_

Serial Number \_\_\_\_\_

Date of installation \_\_\_\_\_

## Read Before Proceeding



**Recognize this symbol as an indication of important safety information.**



### WARNING

**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 high efficiency air handler must be installed **ONLY** by qualified installation personnel.



### DANGER

Tampering with this unit is dangerous. Tampering voids all warranties.

**DO NOT** attempt to modify or change this unit in any way.



### DANGER

The EMI unit must:

- Be connected to a properly grounded electrical supply with the proper voltage as stated on the rating plate.
- Have proper overcurrent protection (time-delay fuse/HACR Breaker) as listed on the rating plate.

Ensure there are no power feeds to the unit such as fire alarm circuits, BMS circuits, etc.

Failure to follow these instructions can result in a fire, explosion, or electrical shock causing property damage, personal injury, or death.

## Safety Instructions

This manual is intended as an aid to qualified service personnel for proper installation, operation, and maintenance of the EMI Series high efficiency 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.

Read all instructions before using this unit. Install or locate this unit only in accordance with these instructions. Use this unit only for its intended use as described in this manual.

Check the rating plate on the unit before installation to make certain the voltage shown is the same as the electric supply to the unit. The rating plate is located on the top panel only.

This unit must be connected only to a properly grounded electrical supply. Do not fail to properly ground this unit.

Turn off the electrical supply before servicing the unit.

Do not use the unit if it has damaged wiring, is not working properly, or has been damaged or dropped.

## Verify Unit Before Installing

### NOTICE

Check equipment for damage prior to installation, if damaged contact the wholesale distributor.

### Product description

- The EMI Cassette Air handlers are available in three cabinet sizes with four output capacities from 9,000–24,000 Btuh, and two cooling only capacities from 30,000–36,000 Btuh.
- Key features include a condensate pump with safety switch and a 36" (0.9 m) lift (measured from the base or bottom of the unit), fresh air inlet and branch duct knockouts, and motorized air vanes models 24 and 36 only).
- Electric heat is a factory-installed option ONLY (there are no field installed electric heat kits available). (See NOTICE on next page.)
- The cassette air handler accepts a 24 volt thermostat control (thermostat not included).
- Designed for low noise levels, easy installation and maintenance and a slim line fascia, all ensure minimum intrusion into the conditioned environment.
- Due to ongoing product development, all designs and specifications are subject to change without notice.
- These cassette air handlers produce system SEER's meeting or exceeding 13 when matched with EMI outdoor units:
  - Single-zone condensing units — S1CG/S1HG 09–24 and S1CG 30–36.
  - Dual-zone condensing units — S2CH/S2HH side discharge.
  - Multi-zone, top discharge condensing units — T2CG/T2HG, T3CG/T3HG, or T4CG/T4HG.
  - Refer to specifications contained in this document.
- All EMI air handlers are backed by ECR International Inc and are tested, rated, and certified in accordance with AHRI standards 210/240-2008 and UL 1995.

### Standard features

#### **CACG/CAHG/CAHJ units**

- "G" or "J" units require a remote thermostat for operation. They do not include an onboard controller.
- External thermostat required.

#### **CACH/CAHH/CAHK units**

- "H" or "K" units include an on-board microprocessor controller with infrared remote.
- The remote is required to adjust settings and configure the controller.
- Also included is a bank of DIP switches for setting operating behavior. These can be used to select operation by the on-board controller or by a remote thermostat.
- When operated by remote thermostat, the controller offers limited options.

#### **Materials of Construction**

- Galvanized steel cabinet with fire-resistant thermal and acoustic foam insulation.
- Light grey high-impact ABS fascia.
- Expanded polystyrene drain pan with a tough, fire-retardant thermoplastic liner.

#### **Air Systems**

- Fans are backward-curved impeller centrifugal design; dynamically and statically balanced; and mounted on integral mounting rails.
  - Single-fan models 9, 12 & 24 are designed with fire-retardant plastic or aluminum impellers.
  - Twin-fan model 36 is designed with fire-retardant plastic impellers.
  - Motors are multispeed, enclosed type with thermal protection and sealed lifetime bearings.
- Permanent, washable filter (user accessible).
- Branch duct knockouts on three sides for remote discharge locations (using no more than two non-adjacent sides).

## Verify Unit Before Installing *(continued)*

- Fresh air intake capability on three sides of cabinet (only two on models 9–12).
- Four plastic air vanes, motor driven with auto sweep or fixed position stop setting on models 24 and 36. Models 9–12 are equipped with manually-adjusted air vanes.

### **Coil**

- Coil is seamless, copper tubing, arranged in staggered configuration, with enhanced aluminum fins, tested to 600 psig.
- The tubes are mechanically expanded for secure bonding to fin shoulder.

### **Refrigeration Circuit**

- Units are equipped with a serviceable fixed orifice expansion device and use R410A refrigerant only.

### Controls and Components (factory installed or supplied)

- Connections for 24V wall thermostat.
- Custom control board featuring programmability, configuration, and multiple modes of operation. (CACH/CAHH/CAHK only)
- Controls also feature anti-short-cycle timer, post purge fan relay, and an on-board 30-amp electric heat relay.
- Condensate pump with 36" (0.9 m) lift (measured from base of unit).
- 24V Transformer.

### System options

- 24V wall thermostat.
- Electric Heat (@ 230V)
  - 1.5 kW — models 9–12
  - 3 kW — model 24
  - 5 kW — model 36.

### Heat pump applications

#### **NOTICE**

Electric heat option — EMI heat pumps are intended to operate with an indoor air handler, with electric heat. If an indoor air handler without electric heat is matched with a heat pump condenser, the system will deliver cold air during defrost.

## Verify Unit Before Installing *(continued)*

### Remote thermostat applications

- CACG/CAHG/CAHJ units require a wall thermostat for operation. CACH/CAHH/CAHK units can be operated by a wall thermostat by configuring the unit's DIP switches.
- A thermostat can be obtained through EMI or your local distributor.

### NOTICE

Make sure the thermostat is suitable for unit operation (i.e., cooling only, cooling/electric heat, heat pump.) See thermostat requirements in this manual.

### Mechanical characteristics

#### **Filters**

- Metal framed filters are fitted. These are reusable and may be vacuum cleaned.

#### **Condensate pump**

- A condensate pump is designed to carry water out of the unit. The pump is fixed to a mounting bracket which can be withdrawn from the side of the chassis and incorporates an inspection hole to allow a visual check of the pump during operation. A float switch stops the cooling action (shuts off the compressor) should the pump become blocked or fail. (Important: Total lift for this pump is 36" (0.9 m) or less.)

#### **Air vanes**

- Air outlet vanes are manually adjustable on the models 9 and 12 or driven by an electric motor on the models 24 and 36.
- Where fitted, the motorized air vanes can be set to auto sweep or can be stopped in a fixed position.

#### **Heating**

- The cassette may be fitted with electric heaters which are equipped with over-temperature limit switches. Consult factory for available models with electric heat.

#### **Fresh air connection**

- Fresh air may be introduced to the unit by the addition of ducts connected to the fresh air knockouts on the cassette case.
- Recommended maximum length is 10' (3m) of 4" (0.1m) diameter duct. The fresh air volume is approximately 7–10% of the unit's published maximum air flow (if more than 10% make up air is needed, a fresh air booster fan is required).
- Refer to Performance Data section of this manual for further information.
- The cassette is best installed in new construction or existing construction with a suspended or false ceiling with enough clearance to accommodate concealing the piping and electrical connections to the unit.

**Piston/Orifice Replacement** *(when required)*

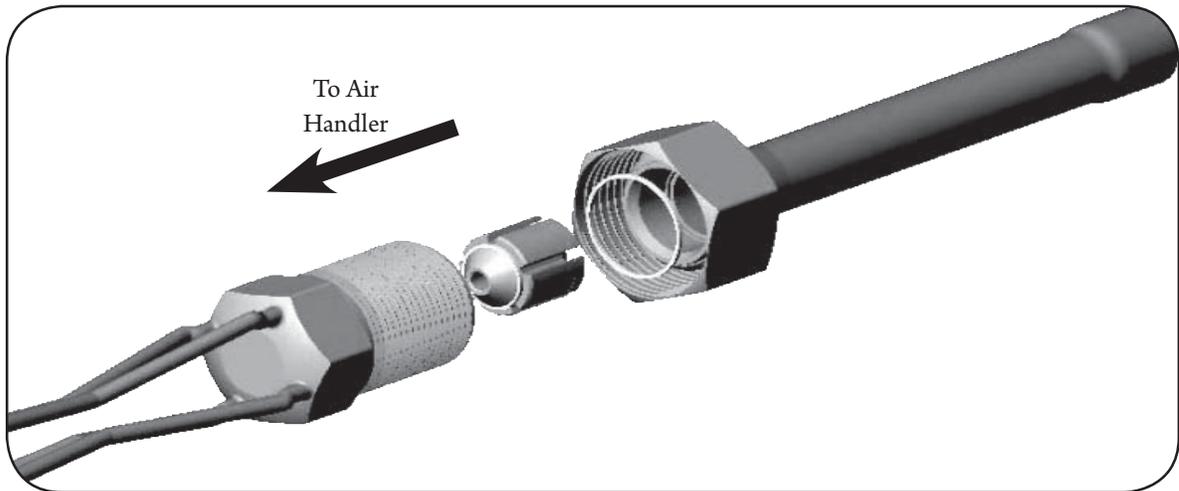
**NOTICE**

**Piston/ Orifice replacement** — The factory-installed piston/orifice must be replaced on **Air-Handler / Condenser** combinations noted in table below . All other applications are to use the factory-installed orifice. To replace the orifice in the noted models use instructions and chart as follows.

Replacing the piston/orifice

1. Disassemble the orifice joint, remove the factory installed orifice, and replace with the orifice listed in Figure 1 (Supplied in the Kit Bag)
2. Make sure the o-ring is in good condition and properly installed.

**Figure 1** Piston/orifice replacement



<b>Model</b>	<b>Condenser</b>	<b>Factory-installed orifice size (Inches)</b>	<b>Replacement orifice size (Inches)</b>
<b>CAHG/CAHH 24</b>	T2C/T2H8800	0.056	0.049
	T2C/T2H9800		
	T3C/T3H9980		
<b>CACG/CACH 36</b>	S1CG3000	0.070	0.063
<b>CACG/CAHH 24</b>	S1CG8000	0.056	0.047
	S1HG8000		
<b>CAHJ/CAHK 12</b>	T2C/T2H 2400	0.041	0.044
	T3C/T3H 2240		
	T3C/T3H 2220		
	T4C/T4H 9922		
	T4C/T4H 9992		
T4C/T4H 2222			

## Mounting the Unit

Before installing, consider:

- 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 piping may be run to and from the unit.
- Ensure that interconnect tubing is within the limits given in Table 1.

**Table 1** Tubing specifications

S1CG or S2CG Model	Max. Length Equivalent feet	Max. Lift	Max. Trap Height	Liquid Line	Suction Line
		"H"	"P"	O.D.	O.D.
09	50' (15 m)	20' (6 m)	15' (5 m)	1/4"	1/2"
12				1/4"	1/2"
18	100' (30 m)	35' (11 m)	20' (6 m)	3/8"	5/8"
24				3/8"	3/4"
30				3/8"	3/4"
36				3/8"	3/4"

### NOTICE

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

### Unpacking

The Cassette fascia and main chassis are packaged together for increased protection.

1. Remove the banding straps and lift the cardboard lid.
2. Fascia is packed in bubble wrap and on top of the chassis (fascia is not attached to the chassis for shipping).
3. Cardboard template is between the chassis and the fascia.

### NOTICE

Do not throw template away with packaging

4. Lift the fascia and template from the box and set aside.
5. Remove the cassette chassis from the box utilizing the four corner brackets for lifting.



### WARNING

Do not use the drain or refrigerant connections for lifting.

6. In order to protect the fascia from dirt and damage, it should be returned to the box until it is ready to be installed.

### NOTICE

Do not throw away the two polystyrene blanking-off pieces with packaging

## Mounting the Unit *(continued)*

### Blanking off

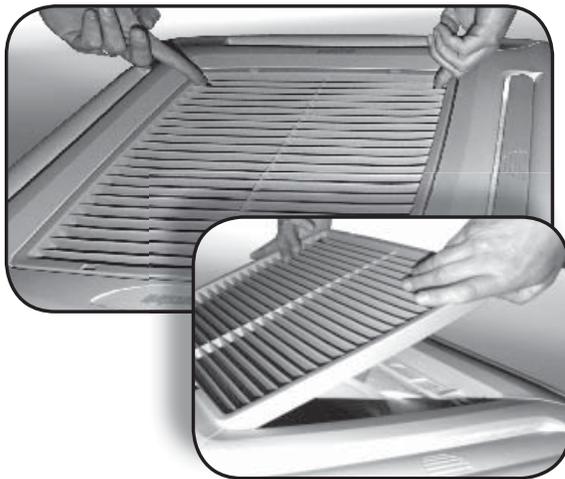
The fascia discharge slot(s) will need blanking off when ducts are used to channel the conditioned air to other areas.

- Position the two polystyrene blanking off strips (provided) in the fascia discharge slots to direct the air to the ducts.
- Up to two non-adjacent sides may be blanked off.

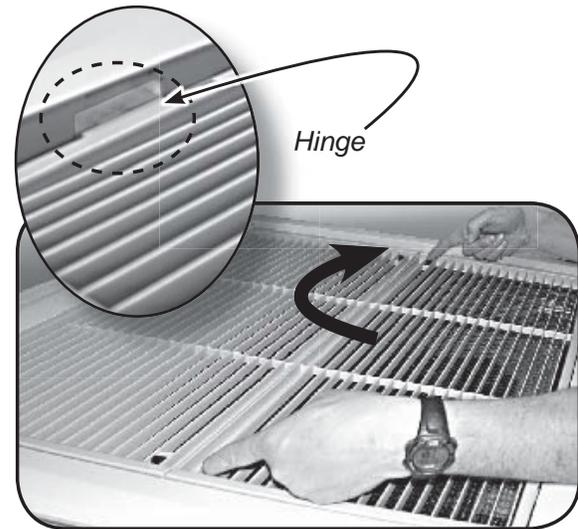
### ***If the fascia discharge slot needs blanking off —***

1. Remove the inlet grilles and filters (see Figure 2, Page 9) and (Figure 3, Page 9).
2. Once the grilles and filters are removed, turn the fascia over so the polystyrene insulation is exposed (Figure 4, Page 9).
3. Push one of the polystyrene blanking-off pieces into the recess in the polystyrene fascia insulation.

**Figure 2** Models 9–12 — one grille & one filter



**Figure 3** Model 24 — two hinged grilles and two filters (Model 36, not shown has three grilles and three filters)



**Figure 4** Applying blanking-off pieces



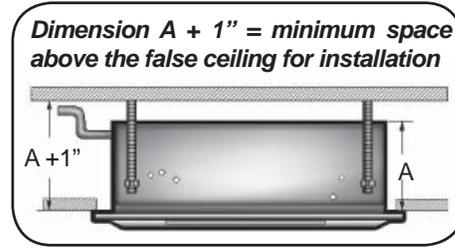
**Mounting the Unit** *(continued)*

**Positioning**

The cassette installation position should be selected with the following in mind:

1. Pipe work, electrical connections, control box and condensate pump access panels should be readily accessible. Refer to the cassette dimensions in the back of this manual.
2. The unit should be positioned at least 5 ft. (1.5m) from a wall or similar obstruction.
3. Position the unit as close to the center of the room as possible to ensure air is distributed evenly.
4. Position the unit so that the discharge air does not blow directly on the remote thermostat, if used.
5. The unit should not be positioned directly above any obstructions.
6. The condensate drain should have sufficient fall — 1" per 10' (8 mm/m) in any horizontal run between cassette and drain.
7. Maximum condensate pump lift is 36" (0.9m).
8. There should be a minimum 1" (25.4mm) clearance above the depth of the cassette and the false ceiling for proper installation. See (Figure 5, Page 10). (See the cassette dimensions in the back of this manual for cabinet sizing).

**Figure 5** Spacing requirements



Model	Dimension A
9 & 12	11.84" (0.3 m) min.
24	12.55" (0.32 m) min.
36	14.51" (0.37 m) min.

**Wall thermostat**

A wall thermostat can be obtained through EMI or your local distributor. The wall thermostat is required for CACG/CAHG/CAHJ units, optional for CACH/CAHH/CAHK units.

In addition to positioning the cassette correctly, it is very important to locate the wall mounted thermostat in the optimum position to ensure good temperature control. The installation should be selected with the following points in mind:

1. Position the thermostat approximately 5 ft. (1.5m) above floor level.
2. Avoid external walls and drafts from windows and doors.
3. Avoid positioning near shelves and curtains as these restrict air movement.
4. Avoid heat sources (direct sunlight, heaters, dimmer switches, etc.)
5. Seal wiring holes in the wall behind the thermostat to avoid drafts.

**Mounting the Unit** *(continued)*

**Mounting method**

- In existing construction, remove enough ceiling panels to provide clearance space for mounting unit to ceiling joists.
- Before beginning the installation, inspect the unit location, test the strength of the ceiling joists to insure they will support the weight of the unit.
- Determine mounting method:
  - On wooden beams use threaded rods, washers, and nuts to suspend support brackets.
  - With metal structures, secure threaded rods on an existing angle or install a new support angle.
  - On newly built concrete slabs secure threaded rods with inserts and embedded bolts.
  - For previously built concrete slabs install hanging bolts with an expansion anchor.
- Follow local building codes for required safety cables, braces, etc.

**Ceiling opening**

**NOTICE**

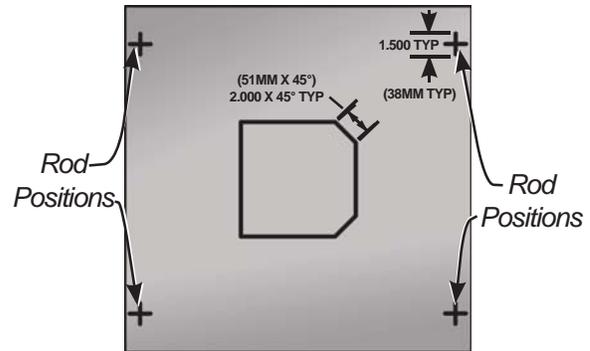
Make sure the ceiling grid is supported separately from the Cassette. The ceiling must not be supported by any part of the Cassette unit, fascia or any associated wiring or pipe work.

Cut an opening in the false ceiling with the size shown in (Table 2, Page 11).

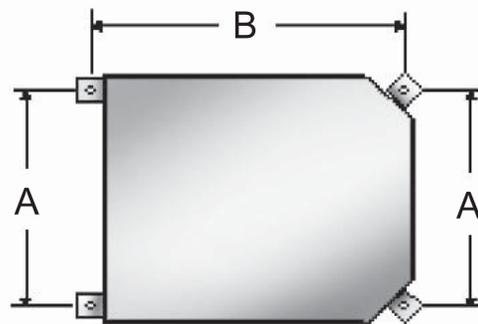
**Table 2** Ceiling opening sizes

Model	Dimensions
9 & 12	23 <sup>1</sup> / <sub>4</sub> " x 23 <sup>1</sup> / <sub>4</sub> " (591 x 591 mm)
24	33 <sup>7</sup> / <sub>8</sub> " x 33 <sup>7</sup> / <sub>8</sub> " (860 x 860 mm)
36	46" x 33 <sup>7</sup> / <sub>8</sub> " (1168 x 860 mm)

**Figure 6** Ceiling cutout/rod placement template (shipped with unit)

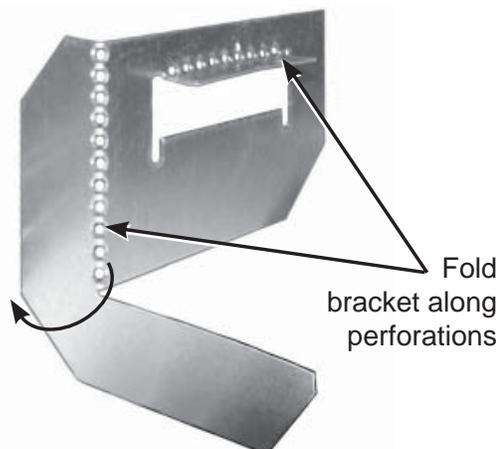


**Table 3** Ceiling rod positions



Model	Dimension A	Dimension B
9 & 12	19.50" (495mm)	22.87" (581mm)
24	29.19" (740mm)	30.80" (782mm)
36	29.19" (740mm)	43.06" (1094mm)

**Figure 7** Mounting brackets

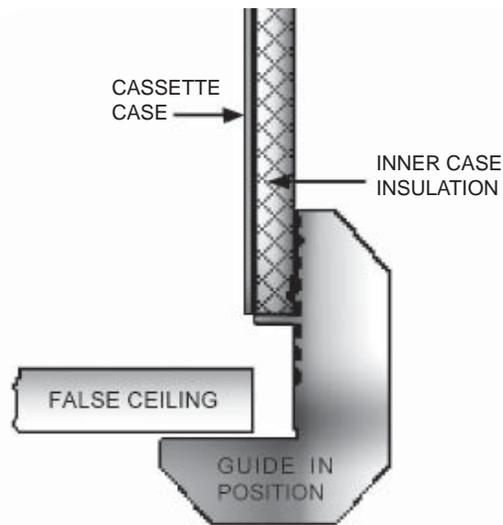


**Mounting the Unit** *(continued)*

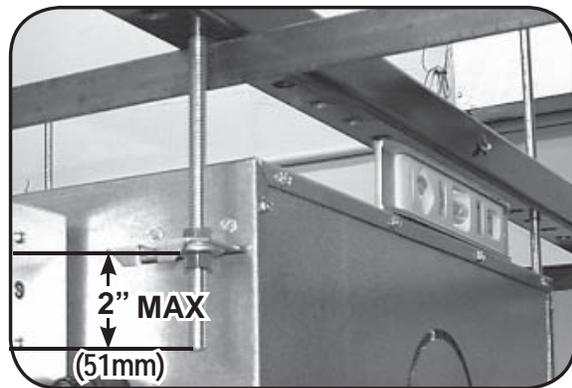
**Mounting**

1. Use the template (see Figure 6, Page 11) to cut the ceiling opening and determining the rod positions.
2. Install hanger bolts using 3/8" (10mm) all-thread rod at the centers shown in (Table 3, Page 11).
3. Prepare the installation guides by folding the metal bracket by hand along the perforations (Figure 7, Page 11).
4. Lift the cassette onto the hanging rods.
5. Level at the correct distance from the ceiling with the aid of the installation guides as shown in (Figure 8, Page 12).
6. Secure the unit in position with locknuts and washers on either side of the cassette bracket.
7. Ensure threaded rod does not protrude more than 2" (51mm) below the mounting bracket see (Figure 9, Page 12).

**Figure 8** Positioning installation guides



**Figure 9** Threaded rods must not protrude more than 2 inches below the mounting brackets



**NOTICE**

If the ceiling is not level or even, it is important that the cassette is installed level to ensure correct pump operation and to maintain fan clearances.

Place a carpenter's level on the unit.

A maximum slope of 1/8" (3mm) over the length of the chassis toward the condensate drain is allowed.

Any slight discrepancy between the cassette and ceiling will be taken up by the fascia foam seal.

## Condensate Piping

The unit can now be piped up in accordance with good refrigeration and/or plumbing practices.

The Cassette is supplied with a 1/2" I.D. flexible PVC hose for connection to copper or plastic drain piping.

When installing the cassette, consider the following:

1. Maximum pump lift is 36" (0.9m).
2. The highest point in the condensate piping should be as close to the unit as possible. This prevents a large volume of water draining back into the unit when it is switched off.

### NOTICE

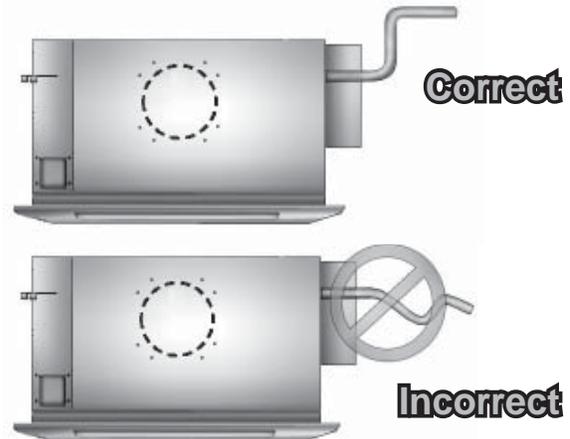
There is a check valve at the pump discharge to prevent water from draining back into the unit. This piping technique will minimize any issues should the check valve become stuck open from airborne debris.

3. Condensate pipe-work should slope downwards in the direction of water flow with a minimum gradient of 1" per 10' (8mm/1m). There must be no uphill gradients other than in the first 36" (0.9m) of pipe-work from the cassette.
4. When multiple cassettes are connected to a common condensate drain, ensure the drain is large enough to handle the total volume of condensate.

### NOTICE

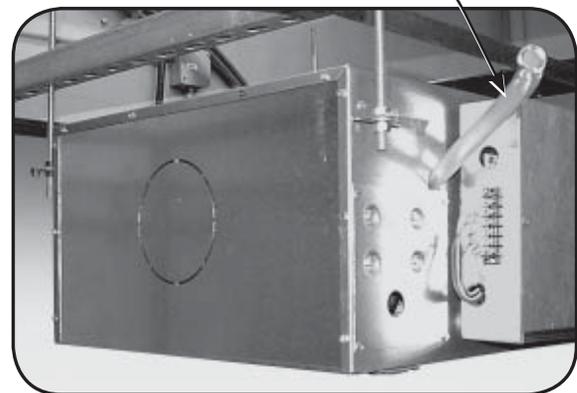
A drain line vent may be required to prevent siphoning of water from the drain pan and associated noise.

**Figure 10** The highest point of the condensate piping should be as close to unit as possible



**Figure 11** Condensate drain

*Condensate Drain Connection*



## Duct Connections

Branch duct and fresh air duct collars can be attached to the cassette chassis by following the steps below.

### NOTICE

Recommendation — no more than 10 feet (3m) of branch duct or fresh air duct should be installed.

1. Locate the knock-out holes (Figure 12, Page 14).

### NOTICE

The number of knockouts varies with unit size.

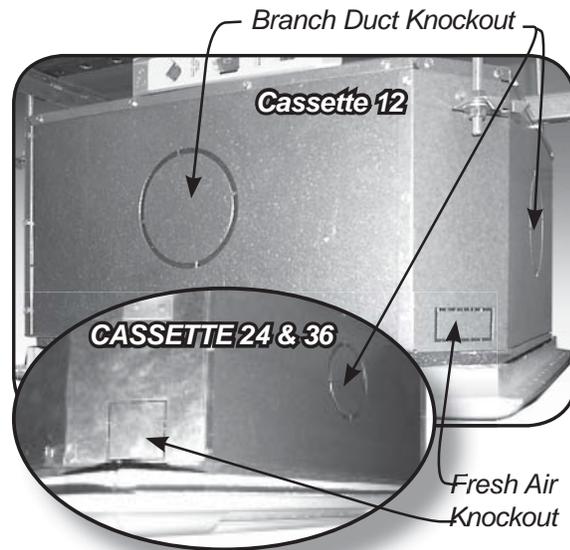
Branch duct knock-outs are 5¼” (133mm) round.

Fresh air knockouts are:

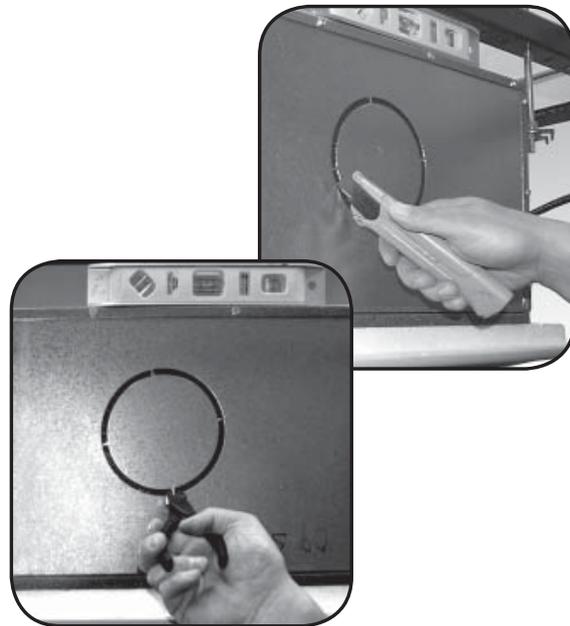
- 1¼” x 2½” (32 x 64mm) rectangular on models 9 & 12.
- 3” (76mm) square on models 24 and 36.

2. Cut the black insulation around the knock-out (Figure 13, Page 14).
3. Snip the tabs holding the knock-out in place (Figure 13, Page 14).
4. Remove the metal knock-out and the black insulation behind it.
5. Attach the duct collars (field supplied) to the chassis using self-drilling screws.
6. Repeat steps above for remaining duct work.

**Figure 12 Knockouts**



**Figure 13 Cut insulation and snip out knockouts**



## Refrigerant Piping

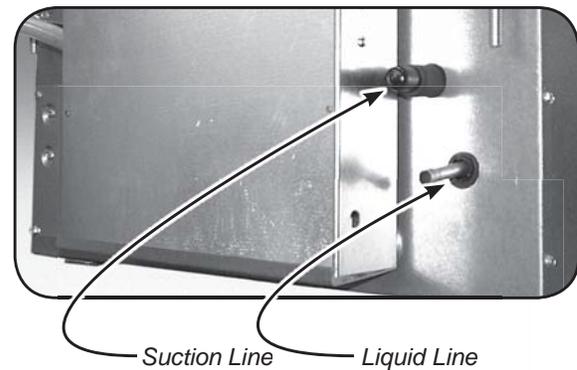
### ⚠ CAUTION

- Avoid piping on wet and rainy days.
- Use only clean, refrigeration-grade copper tubing.
- Use tubing benders to guard against kinking.
- Be certain no burrs remain on the fittings.
- Cap ends of lines until ready for connections. Be certain that plastic end caps remain in place when inserting through wall openings.
- Insulate the suction and condensate lines all the way to the cassette.
- Isolate tubing from transmitting vibration to the building or unit and avoid contact with sharp edges.
- Wrap refrigeration valves with a wet rag “heat sink” to protect valves while brazing. (See Figure 16, Page 16.)
- **DO NOT** use a suction line size larger than the condenser service valve connection. This can harm the compressor. Install a reducer, when used, only on the inside connection.

### NOTICE

The cassette is equipped with a Flo Rater piston expansion device. Connections are sweat type.

**Figure 14** Piping connections at unit



*(When a reducing bushing is required, install only at the indoor suction-line connection.)*

### Line sizing

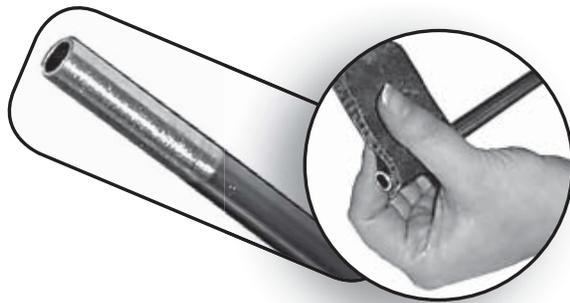
1. Size lines per (Table 11, Page 60).
2. The suction line size must match the condenser service valve connection.
  - a. When matching the model 24 with an 18,000-Btuh condenser, you must use a 5/8-inch suction line, with a reducer installed as shown in (Figure 14, Page 15).

**Refrigerant Piping** *(continued)*

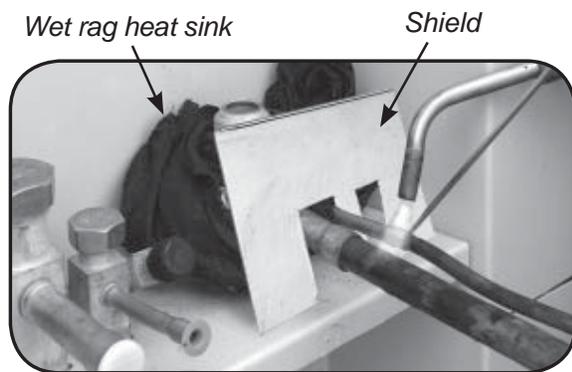
**Refrigerant piping**

1. Clean the ends of tubing and insert into fittings (Figure 15).
2. Before brazing (Figure 16):
  - a. Protect valves by wrapping with a wet rag “heat sink” before brazing.
  - b. Use a shield to protect the paint as shown. (The shield can be made from scrap metal.)
3. Braze tubing into fittings, using a continuous nitrogen purge.
4. The suction line must be insulated the entire length with closed cell, foam tube insulation.
5. Do not insulate the liquid line.
6. Connect the outdoor unit according to the instructions supplied with unit.

**Figure 15** Clean ends of tubing



**Figure 16** Place wet rag “heat shield” over valves plus a sheet metal shield to protect paint



**NOTICE**

1. Maximum equivalent pipe run should comply with (Table 1, Page 8).
2. Horizontal pipe runs should be slightly inclined, so as to encourage oil to flow in the direction of the compressor, for better oil return.
3. Good refrigeration practices must be employed to ensure the correct pressure drop and good oil return.



**CAUTION**

**Pressure test** all field installed piping with nitrogen. Using a suitable vacuum pump, evacuate the tubing and indoor unit to 500 microns or less, with service valves remaining front seated (closed).

**Refrigerant Piping** *(continued)*

**Refrigerant processing**

1. Attach manifold set (Figure 17).
2. Evacuate line to 500 microns or less to ensure all moisture has been removed and there are no leaks.
3. Once certain of a good evacuation and leak free joints, back-seat the valves (counter-clockwise) to open and allow factory charge to fill lines and indoor unit (Figure 18, Page 17).

**NOTICE**

Refer to refrigerant charge table for specified charge.

4. Use only R410A refrigerant. Add and remove **only** liquid, **never** vapor.
5. Charge to proper weight, charge based on feet of interconnect (Figure 19, Page 17). See tables on page 18.

**CAUTION**

Refer to the charts in the condenser manual to “fine tune” the refrigerant charge.

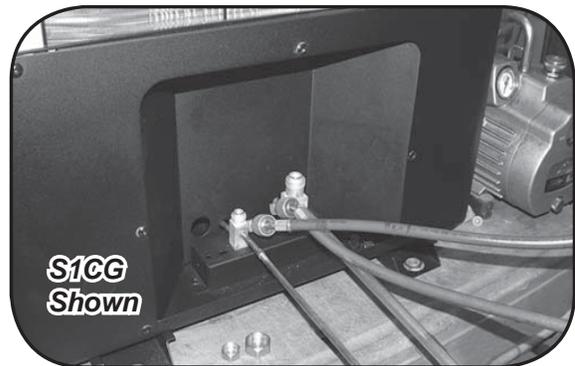
**CAUTION**

Charging should be done with a dial-a-charge or weighed in with a scale.

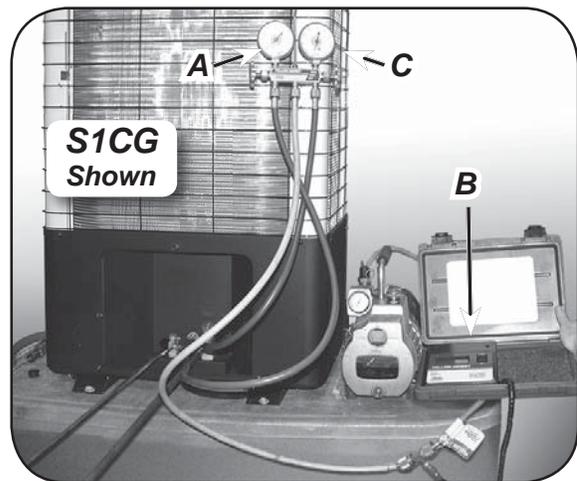
**WARNING**

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

**Figure 17** Manifold set connections at unit

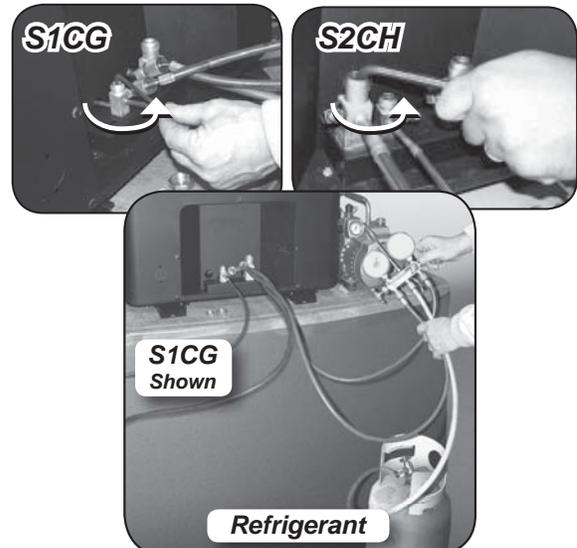


**Figure 18** Manifold set up for evacuation



- A Manifold
- B Vacuum pump
- C Micron gage

**Figure 19** Charging the unit



## Refrigerant Processing

### NOTICE – to find charge adjustment

- To find the charge adjustment and system charge for any air handler and tubing length:

$$\text{Line Adjustment} = (\text{Line Charge/FT}) \times \text{Line Length}$$

$$\text{System Total} = \text{Factory Charge} + \text{Line Adjustment}$$

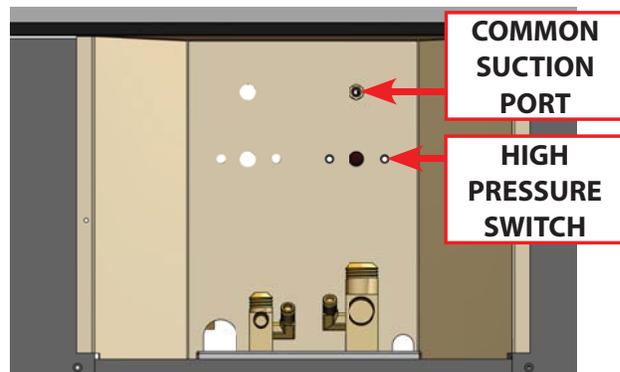
- Round to the nearest ounce and allow for gauges and hoses.

**Table 4** S1CG/S1HG and top discharge R410A refrigerant charge table  
 (CAC\_ refers to CACG/CACH; CAH\_ refers to CAHG/CAHH/CAHJ/CAHK)

Condenser	Cassette pairing	Linecharge per foot	Factory charge	Top discharge, Multi-zone			
				Circuitcapacity	Wall Unit Paring	Line charge per foot	Factory charge
S1CG9	CAH_09	.25 oz./ft (23 g/m)	39.5 oz. (1119 g)				
S1CG2	CAH_12	.25 oz./ft (23 g/m)	33.75 oz. (956 g)				
S1CG8	CAH_24	.64 oz./ft (59 g/m)	65.25 oz. (1764 g)	9,000 Btuh	CAH_09	.25 oz./ft (23 g/m)	46.5 oz. (1318 g)
S1CG4	CAH_24	.64 oz./ft (59 g/m)	63.0 oz. (1786 g)	12,000 Btuh	CAH_12	.25 oz./ft (23 g/m)	45.25 oz. (1282 g)
S1CG3	CAC_36	.64 oz./ft (59 g/m)	97.5 oz. (2764 g)	18,000 Btuh	CAH_24	.64 oz./ft (59 g/m)	96.75 oz. (2742 g)
S1CG6	CAC_36	.64 oz./ft (59 g/m)	80.0 oz. (2267 g)	24,000 Btuh	CAH_24	.64 oz./ft (59 g/m)	78.5 oz. (2225 g)
S1HG9	CAH_09	.25 oz./ft (23 g/m)	51.52 oz. (1460 g)	Side Discharge Multi-zone			
S1HG2	CAH_12	.25 oz./ft (23 g/m)	45.75 oz. (1296 g)	Circuitcapacity	Wall Unit Paring	Line charge per foot	Factory charge
S1HG8	CAH_24	.64 oz./ft (59 g/m)	63.0 oz. (1786 g)	9,000	CAH_09	.25 oz./ft (23 g/m)	44 oz. (1247 g)
S1HG4	CAH_24	.64 oz./ft (59 g/m)	60.75 oz. (1722 g)	12,000	CAH_12	.25 oz./ft (23 g/m)	39 oz. (1105 g)

**Figure 20** Common Suction

All Heat Pump Saturated Suction Pressures should be measured at the “Common Suction Port” not the vapor Service Valve. The “Common Suction Port” includes the pressure drop and temperature increase through the reversing valve resulting in a more accurate and complete system charge. This port may also be used to charge the system in heating mode when both sides of the line set are at high system pressures or to determine the saturated evaporator pressure while in heating mode.

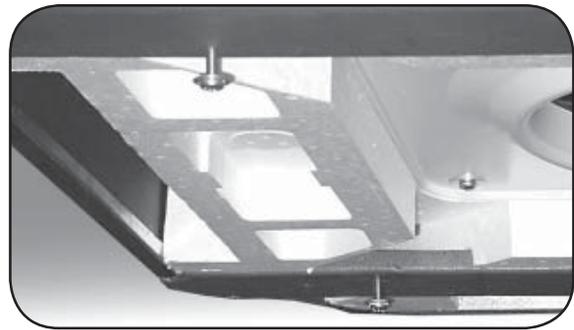


## Final Assembly

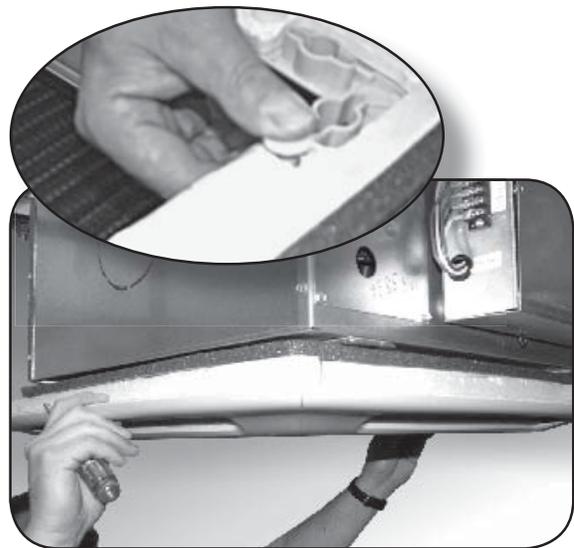
### Assembly instructions

1. To install the four fascia mounting bolts:
  - a. Remove the bolts and washers from the supplied kit bag.
  - b. Put washers onto the bolts.
  - c. Screw the mounting bolt with washer into the chassis leaving approximately 1" (25mm) to hang the fascia.
2. Ensure the white panel fasteners holding the fascia polystyrene are pushed firmly in (fasteners may have loosened in transit).
3. Lift the fascia onto the chassis mounting bolts. Align the key hole brackets with the mounting bolts and slide the fascia forward to lock into position.
4. On Cassette 24 and 36 units connect the vane motor plug by plugging it into the socket connection on the chassis.
  - a. Ensure that the polarized connector (2 position) is in the proper orientation and connected.
  - b. Route the wires in a way that ensures they won't become trapped, cut, broken or chaffed.
5. **ONLY** Cassette "H" or "K" models (CACH/CAHH/CAHK) contain a second cable connection to the control box for the Infrared Unit Mount Control.
6. Ensure that the polarized (10 position) connector is in the proper orientation and connected.
7. Route the wires in a way that ensures that they won't become trapped, cut, broken, or chaffed (Figure 23, Page 19).
8. The fascia can now be tightened up to the Cassette chassis. make sure a good seal is obtained between fascia and chassis, this is necessary to prevent recirculation.
9. With filter(s) in place, the inlet grille(s) can now be installed onto the fascia.

**Figure 21** Mounting bolts



**Figure 22** White panel fasteners must be pushed in



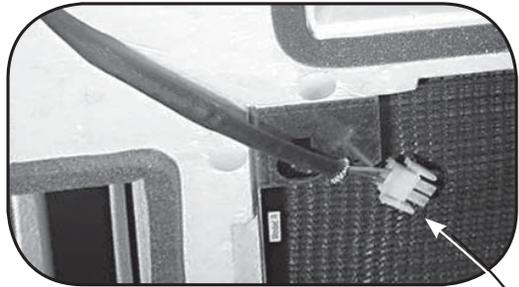
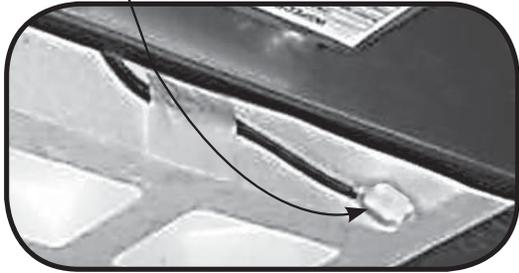
**Figure 23** Wire routing



**Final Assembly** *(continued)*

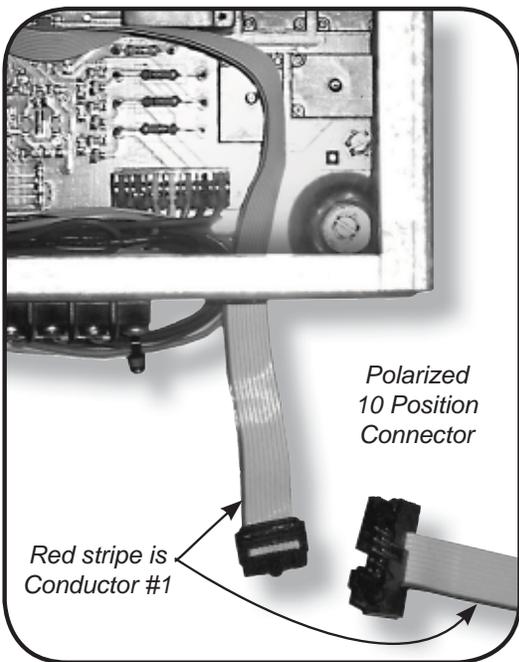
**Figure 24** Connect vane motor plug into socket on chassis

*Female vane motor plug on chassis*



*Male vane motor plug on fascia*

**Figure 25** Connect infrared unit cable (“H” or “K” units only)



*Polarized  
10 Position  
Connector*

*Red stripe is  
Conductor #1*

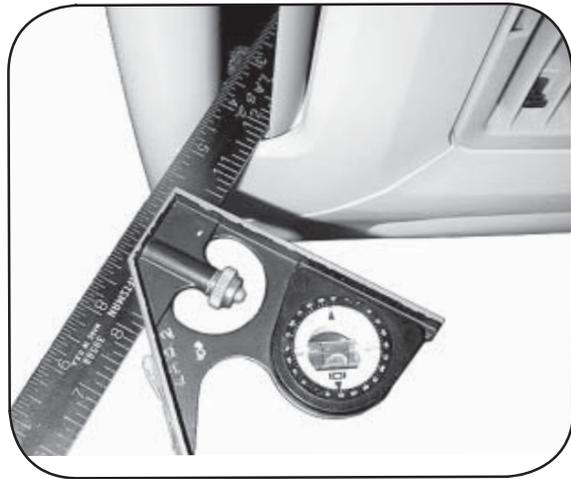
**Figure 26** Secure fascia to chassis

**CAUTION**

DO NOT over-tighten the bolts — This could cause damage to the fascia and drain pan.



**Figure 27** Adjust louver position to 30° from plumb



## Electrical Wiring

### NOTICE

All electrical wiring must be run according to NEC and local codes.

### General requirements



### WARNING

**Electrical shock hazard** — Make sure the power is off before proceeding.

1. The standard unit voltage is 208/230V (60Hz, 1Ph). Check the unit's rating plate for your model's electrical requirements.
2. The wires should be capable of carrying the maximum load current under non-fault conditions at the stipulated voltages.
3. Avoid large voltage drops on cable runs, particularly in low-voltage wiring.
4. The correct cable size must be used to ensure a voltage drop of less than 1 volt in the control wiring.
5. Once the refrigeration pipe work is complete, the electrical supply can be connected.
6. Low-voltage wiring must be at least 18 awg.

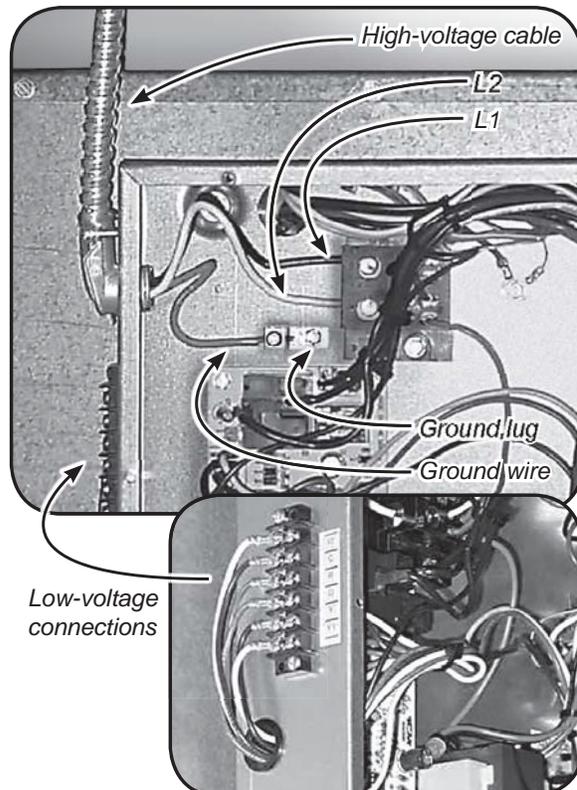
### Connect wiring

1. To access high-voltage wiring, loosen the four screws on the front of the control box cover. Then slide the cover up and off (Figure 28, Page 21).
2. The rating plate is located on the outside of control box cover (Figure 28, Page 21).
3. Each unit must have a separate branch circuit protected by a fuse or breaker. Check the rating plate for circuit ampacity and breaker or fuse size. Use only HACR type breakers. Select the proper wire for the ampacity rating.

**Figure 28** Removing control box cover



**Figure 29** Electrical connections



**Electrical Wiring** *(continued)*

4. It is also recommended that a local disconnect switch be connected within 3 feet of the unit. In some areas this may be a code requirement.

**High-voltage electrical wiring**

1. Inspect the existing wiring for any deficiencies such as cut or frayed wires. Replace if any such wiring is found.
2. Refer to the wiring diagram (Figure 30, Page 22).
3. Route the cable through the appropriate hole in the control box for the high-voltage electrical wiring. Connect the power wire to L1 and the neutral wire to L2 at the power connector location. (Figure 29, Page 21).
4. Connect the ground wire to the ground lug or lead at the same location in the control box.



**WARNING**

Terminate ALL unused wires with a wire nut or crimp connector.

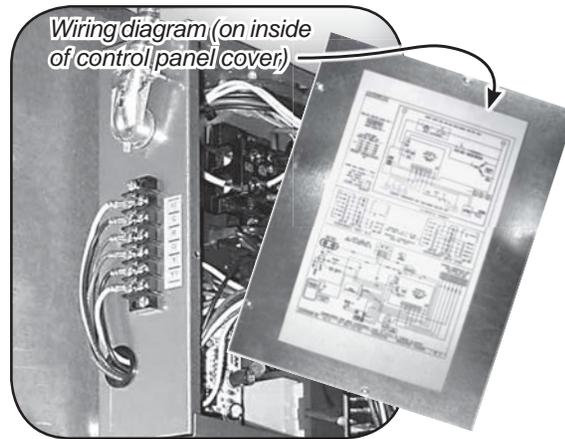
**Low-voltage electrical wiring**

**NOTICE**

All low-voltage interconnect wiring must be at least 18 AWG.

1. The 24V control transformer is located in the air handler. This provides low-voltage control power to both the air handler and condenser. Depending on the models selected, the low-voltage interconnect control wiring may be different.
2. Refer to the wiring diagram to connect the low-voltage wiring to the appropriate terminals.
3. Once the connections are made, replace control box cover with the wiring diagram facing in and secure with the four screws.

**Figure 30** Wiring diagram location



4. Depending on the thermostat required or selected, cooling-only air handlers may utilize three to five low-voltage interconnecting wires between the indoor unit, thermostat and the outdoor unit. Some thermostats do not require the use of the “C” (brown) connection. For these applications, ensure that any unused wires are insulated to prevent them from making contact with the junction box or other metal surfaces.
5. If the indoor unit has electric heat, then a “W” connection is required between the thermostat and the indoor unit.

**NOTICE**

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 inside of the control box cover (Figure 30, Page 22).

**Wall Thermostat Selection** (optional for CACH/CAHH/CAHK)**NOTICE****CACG/CAHG/CAHJ units**

- All are operated by a wall thermostat.

**CACH/CAHH/CAHK units**

- The unit's DIP switch #4 must be set to OFF to enable wall thermostat operation.
- The controller will configuration will have to be set for the unit's cooling/heating functions.
- Follow instructions beginning on page 28 to set up the controller and DIP switches before proceeding.

**THERMOSTAT selection****EMI thermostats**

EMI offers several wall thermostats that are compatible with EMI split system air handlers.

- See the latest price list for 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.

**Field-supplied thermostats**

When selecting a thermostat other than one 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**

Select a thermostat that is compatible with a cooling system.

The thermostat should have "R", "Y" and "G" terminals and may also have a "C" terminal.

**Cooling only with electric 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 heat, then a single-stage heat pump thermostat is adequate.

## Wall Thermostat Operation *(optional for CACH/CAHH/CAHK) (continued)*

### FAN operation

The wall thermostat will control the call for fan operation (on or off) through the low-voltage terminals “R” and “G”. When the wall thermostat connects “R” to “G” the fan will energize. After the thermostat has been satisfied and the call for heating or cooling has been removed, the indoor fan will remain on for an additional sixty (60) seconds. This increases efficiency by pulling the remaining energy from the unit.

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.

CACH/CAHH/CAHK units only — The indoor unit utilizes a two speed motor. For wall Thermostat Operation, fan speed selection can be made through the DIP switch settings located on the main control board. By setting DIP switch #3 Remote Thermostat Fan Speed Selection to ON, the fan speed will be set to High. Switching to OFF, the fan speed is set to Low.

### COOLING operation

The wall thermostat will control the call for cooling operation (on or off) through the low-voltage terminals, R and Y.

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.

Next, place the set-point temperature above the room temperature.

- The outdoor condenser will stop.
- The fan will operate as described in FAN operation.

### NOTICE

Once cooling has cycled off or following a power outage, the compressor will not start for at least three minutes (short-cycle protection).

**Wall Thermostat Operation** (optional for CACH/CAHH/CAHK) (continued)**Electric heat operation**

For wall thermostat operation with electric heat the control must be configured properly (Remote Thermostat ON) [Table 6, pg. 32], Heat Source ON [Figure 36, pg. 35].

The wall thermostat will control the call for electric heat operation (On or Off) through the low-voltage terminals, R and W.

After connecting the thermostat to unit, place the 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 as 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.

**NOTICE**

Once heating has cycled off or following a power outage, heating will not start for at least three minutes (short-cycle protection).

**Optional HEAT PUMP WITH ELECTRIC HEAT** (*Two-stage heating*)

For wall thermostat operation for two-stage heating including a heat pump condenser and indoor electric heat, the control must first be configured properly (Remote Thermostat ON) [Table 6, pg. 32], Heat Source ON [Figure 36, pg. 35]

The wall thermostat will control the call for electric heat operation (on or off) through the low-voltage terminals, R and W, and compressor (heat pump) heating through terminals R and Y.

After connecting the two-stage heating 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 high enough to call for second stage heating. (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.

**NOTICE**

Once heating has cycled off or following a power outage, heating will not start for at least three minutes (short-cycle protection).

**Initial Start-Up — CACG/CAHG/CAHJ Units ONLY**

**NOTICE**

**CACG/CAHH/CAHK units**

- These units require setting of DIP switches and controller functions before proceeding with start-up.
- Follow instructions beginning on page 28.

**NOTICE**

**To test cooling operation**

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

**NOTICE**

When power is first applied to the control or after a power outage there is a three minute delay before the compressor or electric heat will energize. This is to protect the unit from short cycling due to loss of power.



**WARNING**

**Electrical shock hazard** — Turn off power to indoor and outdoor units is off before proceeding.

**Perform complete inspection**

**NOTICE**

To perform a system electrical check:

- Turn off all power to the indoor and outdoor units.
- Isolate the compressor (to prevent it from operating until the check is completed) by removing the connection at the "Y" terminal on the outdoor unit.

**Figure 31** CAHG/CACG louver toggle switch



*Toggle Switch* —

1. Remove any tools or other obstructions.
2. Inspect all electrical connections.
3. Separate any lines that contact each other.
4. Replace the control panel cover, filters and grilles.
5. Test each power and circuit connection before powering up the system.

**Perform electrical circuit checks**

1. Switch on the cassette unit and verify that the fan cycles correctly.
2. Models CAHG24 and CACG36 only — Check motorized vane operation by turning on with the toggle switch located on the side of the electrical box (Figure 31, Page 26).
3. For units with electric heat, check operation of the heating elements by switching the system to the heating mode. Adjust the thermostat setpoint above room temperature.
4. Ensure that the outdoor unit start-up procedure has been completed as directed in the unit's instruction manual.

**Initial Start-Up — CACG/CAHG/CAHJ Units ONLY** *(continued)*

**⚠ WARNING**

**Electrical shock hazard** — Turn off power to indoor and outdoor units is off before proceeding.

5. Reconnect the wire to “Y” on the outdoor unit to enable the compressor.
6. Turn on power to the indoor and outdoor units.

**Check condensate pump operation**

1. Remove an adjacent ceiling tile to access the condensate pump cover panel.
2. Insert a squeeze water bottle nozzle through the opening in the condensate pump access panel and fill drain pan. See Figure 32, Page 27.
3. Adding water will activate the float switch and the pump. Water must flow regularly with condensate pump energized. If water does not, check the pipe slope or see if there are any pipe restrictions.
4. Ensure that all covers, panels and filters are in place and discharge louvers are correctly positioned.

**NOTICE**

The unit is equipped with a safety switch that will activate the pump when the condensate reaches a critical level. The safety switch will also de-energize the compressor if the water level becomes too high.

**Check cooling operation**

1. Cooling-only systems — Turn the system power on and turn down the system setpoint to activate the compressor.

**Figure 32** Checking condensate pump operation



**Check heat pump operation**

1. Heat pump systems — Turn up the system setpoint to activate heat pump (compressor) operation.
2. Place the system controls into heating mode, with the setpoint 1°F above room temperature (or meeting the requirements for 1st stage heating operation). Verify compressor start up, noise, vibration, and overall system operation.
3. Next, alter the setpoint until the 2nd stage of heat is called (this action is dependent on both options and controls contained in the system).

**NOTICE**

Second stage heating requires both optional electric heat and a means of control.

**Additional cassette units**

1. Repeat the start-up procedure for all cassette units in the system.

**Initial Start-Up — CACH/CAHH/CAHK Units ONLY**

**NOTICE**

**To test cooling operation**

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

**NOTICE**

When power is first applied to the control or after a power outage there is a three minute delay before the compressor or electric heat will energize. This is to protect the unit from short cycling due to loss of power.

 **WARNING**

**Electrical shock hazard** — Turn off power to indoor and outdoor units is off before proceeding.

Perform complete inspection

**NOTICE**

To perform a system electrical check:

- Turn off all power to the indoor and outdoor units.
- Isolate the compressor (to prevent it from operating until the check is completed) by removing the connection at the “Y” terminal on the outdoor unit.

1. Remove any tools or other obstructions.
2. Inspect all electrical connections.
3. Separate any lines that contact each other.
4. Replace the control panel cover, filters and grilles.
5. Test each power and circuit connection before proceeding further.

Set DIP switches

1. DO NOT turn on power until the DIP switches have been set and the control panel cover replaced.
2. To access the DIP switches, remove the control panel cover (Figure 28, Page 21). See Figure 34, Page 31 for location of the switches on the control board.
3. Model CACH/CAHH/CAHK units have four DIP switches, as described in Table 6, Page 32.
  - a. DIP switch #1, Test mode, is used only during start-up and servicing, to reduce time required for automatic timers.
  - b. DIP switches #2, #3 and #4 are related to the (optional) use of a remote thermostat. Switches #2 and #3 are operational only if switch #4 is set to NO, enabling wall thermostat operation.
4. Set the switches as desired for the application.

Set controller configuration

1. Review the information in Figure 35, Page 33 through Figure 38, Page 36 for general operation of the controller and handheld remote.
2. Figure 36, Page 34 explains how to set up the controller using the handheld infrared remote. (NOTE that the remote is a line-of-sight device, and must be pointed at the receiver on the unit-mounted display.)
3. Turn on power to the indoor unit so the controller can be operated.
4. Press and hold both the MODE and PROGRAM buttons on the remote for 5 seconds to enter **Configuration** mode (as shown in Figure 36, Page 34).
5. Configure the controller using Figure 37, Page 35.
6. After the configuration is completed, point the remote at the cassette unit's display. Then press and hold the POWER/

SEND button for 2 seconds. This will transmit information from the remote to the cassette. The cassette will respond with a beep, indicating it has received the information. (This step is necessary, because it is possible that information entered into the remote may not have been received if the remote was not pointed directly at the receiver.)

7. Do not set the time or 7-day program settings yet. This should be done after start-up is completed.

### Perform electrical circuit checks

1. Turn on power to the cassette unit.
2. Verify fan and louver operation using the handheld remote. Use the procedures given in Figure 36, Page 34.
  - a. Make sure the fan can be set to high, low and auto.
  - b. Make sure the louver can be set to run at full open or oscillation.



### **WARNING**

**Electrical shock hazard** — Turn off power to indoor and outdoor units is off before proceeding.

3. Reconnect the wire to “Y” on the outdoor unit to enable the compressor.
4. Turn on power to the indoor and outdoor units.

### Verify compressor operation — all systems

1. Place the system controls into cooling mode, with the setpoint below room temperature.
2. Verify compressor start up, noise, vibration, and overall system operation.
3. Then place the control setpoint above room temperature.
4. Verify that the compressor shuts down.
5. Wait for the blower post purge to complete. Then verify that the system shuts down properly.

6. Be sure to return DIP switch #1 (Test mode) to NO before leaving the system.

### Verify cooling-only operation

1. This arrangement uses a cooling-only outdoor unit with no heat source in the cassette (indoor) unit.
2. The configuration (Figure 37, Page 35) should be set for Heat Source OFF, Heat Pump OFF.
3. Use the remote to set MODE to Cool (see Figure 36, Page 34).
4. Use the remote to adjust setpoint temperature below the room temperature (at the cassette unit).
5. The compressor should come on. Verify that supply air is cooler than room air.

### Verify cooling with electric heat

1. This arrangement uses a cooling-only outdoor unit with electric heat option in the cassette unit.
2. The configuration (Figure 37, Page 35) should be set for Heat Source ON, Heat Pump OFF.
3. Use the remote to set MODE to Cool (see Figure 36, Page 34).
4. Use the remote to adjust setpoint temperature below the room temperature (at the cassette unit).
5. The compressor should come on. Verify that supply air is cooler than room air.
6. Use the remote to set MODE to Heat (see Figure 36, Page 34).
7. Use the remote to adjust setpoint temperature above the room temperature (at the cassette unit).
8. The electric heaters should come on. Verify that supply air is warmer than room air.
9. For automatic changeover between heat/cool, use the remote to enable auto changeover (see Figure 36, Page 34).

Verify heat pump operation (no electric heat)

1. This arrangement uses a heat pump outdoor unit with no heat source in the cassette (indoor) unit.
2. The configuration (Figure 37, Page 35) should be set for Heat Source OFF, Heat Pump ON.
3. Use the remote to set MODE to Cool (see Figure 36, Page 34).
4. Use the remote to adjust setpoint temperature below the room temperature (at the cassette unit).
5. The compressor should come on. Verify that supply air is cooler than room air.
6. Use the remote to adjust setpoint temperature above the room temperature (at the cassette unit).
7. Verify that supply air is warmer than room air.

Verify heat pump operation (with electric heat option)

1. This arrangement uses a heat pump outdoor unit with the optional electric heat source in the cassette (indoor) unit.
2. The configuration (Figure 37, Page 35) should be set for Heat Source ON, Heat Pump ON.
3. Use the remote to set MODE to Cool (see Figure 36, Page 34).
4. Use the remote to adjust setpoint temperature below the room temperature (at the cassette unit).
5. The compressor should come on. Verify that supply air is cooler than room air.
6. Use the remote to adjust setpoint temperature 1°F above the room temperature (at the cassette unit), or just enough needed to activate first stage heating.
7. The compressor should come on.
8. Verify that supply air is warmer than room air.
9. Increase the setpoint until the second stage heating (electric heaters) activates.

10. Verify operation.

Check condensate pump operation

1. Remove an adjacent ceiling tile to access the condensate pump cover panel.
2. Insert a squeeze water bottle nozzle through the opening in the condensate pump access panel and fill drain pan. See Figure 33, Page 30.
3. Adding water will activate the float switch and the pump. Water must flow regularly with condensate pump energized. If water does not, check the pipe slope or see if there are any pipe restrictions.
4. Ensure that all covers, panels and filters are in place and discharge louvers are correctly positioned.

**Figure 33** Checking condensate pump operation



**NOTICE**

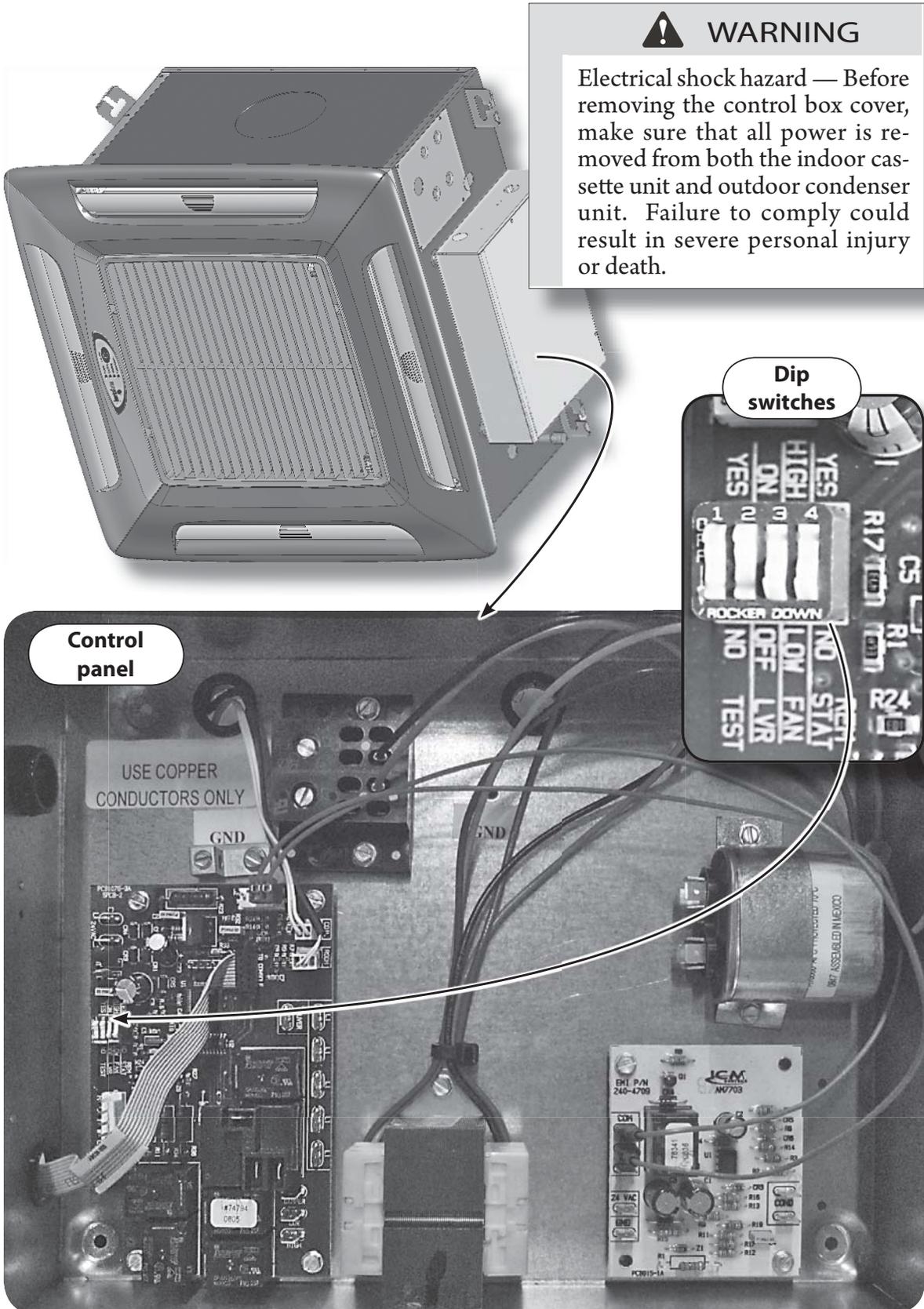
The unit is equipped with a safety switch that will activate the pump when the condensate reaches a critical level. The safety switch will also de-energize the compressor if the water level becomes too high.

Additional cassette units

1. Repeat the start-up procedure for all cassette units in the system.

**CACG/CAHH/CAHK Microprocessor Controller Overview**

**Figure 34 EMI unit-mounted microprocessor controller — control panel**



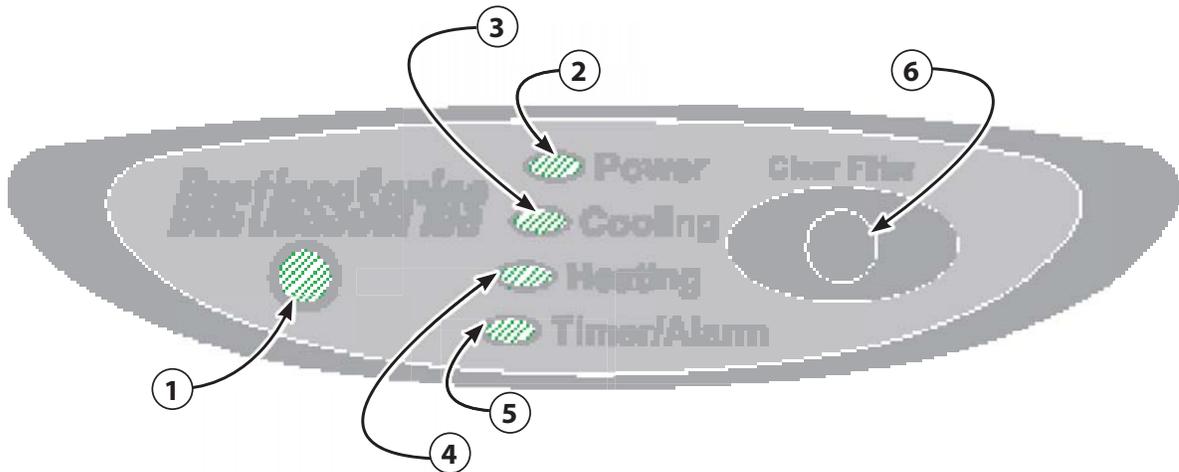
## CACH/CAHH/CAHK Microprocessor Controller Overview *(continued)*

**Table 6 CACG/CAHH/CAHK Microprocessor controller — dip switch settings**

DIP Switch	Setting	Operation	Factory Setting
<b>#1</b> Test mode	ON	<p><b>Enables Test</b> mode. All timers are shortened, allowing quicker operational testing.</p> <ul style="list-style-type: none"> <li>• Anti-short-cycle time reduces from 3 minutes to 45 seconds.</li> <li>• Minimum on-time reduces from 2 minutes to 30 seconds.</li> <li>• Postpurge time reduces from 60 to 15 seconds.</li> <li>• Stagger start time reduces from 30 to 7.5 seconds.</li> </ul> <p><b>⚠ CAUTION</b> — DO NOT cycle the unit on and off repeatedly in Test mode. This will damage the compressor. DO NOT leave the unit in Test mode after setup. Return dip switch #1 to the OFF position for normal operation.</p>	OFF
	OFF	<b>Disables Test</b> mode.	
<b>#2</b> Louver oscillation (for wall thermostat mode only)	ON	If DIP Switch #4 is ON, <b>enables louver oscillation</b> during operation.	OFF
	OFF	If DIP Switch #4 is ON, <b>disables louver oscillation</b> during operation.	
<b>#3</b> Fan speed setting (for wall thermostat mode only)	ON	While DIP Switch #4 is ON, selects fan speed <b>HIGH</b> .	ON
	OFF	While DIP Switch #4 is ON, selects fan speed <b>LOW</b> .	
<b>#4</b> Select infrared handheld controller or wall thermostat control	ON	<p><b>Disables infrared hand controller</b> and enables wall thermostat operation and enables dip switches #3 and #2.</p> <p>Clean filter time automatically defaults to 1000 hours.</p>	ON
	OFF	<b>Enables infrared hand controller</b> and disables wall thermostat operation.	

**CACH/CAHH/CAHK Microprocessor Controller Overview** *(continued)*

**Figure 35 Unit-mounted controller — chassis-mounted keypad/display**



① **Infrared receiver window .**

**Power LED —**

② In Wall Thermostat mode — on when power is applied to the unit.  
 In Infrared Controller mode — on while the cassette unit is in the ON mode; off while unit is in the OFF mode.

③ **Cooling LED —** On when the unit is in cooling operation.

④ **Heating LED —** On during calls for heat.

⑤ **Timer/Alarm LED —** On steady while the unit is in Sleep Timer mode; flashes to indicate fault codes.

⑥ **Clear Filter warning button —** Hold for 3 seconds to clear the Clean Filter warning (indicated when Timer/Alarm LED, item 5, flashes 4 times)

**CACH/CAHH/CAHK Microprocessor Controller Overview** (continued)

**Figure 36 CACH/CAHH/CAHK Microprocessor Controller — infrared remote control**

	POWER SEND	●	Press to turn unit on or off. Press and hold for 2 seconds to transmit all settings to the unit-mounted controller.
	MODE	●	Press to toggle through operating modes — Heat, Cool, Auto Changeover, Dry or Fan.
	CLOCK	●	Normal operation — hold for 3 seconds to enter <b>Set Time mode</b> ; press again to finish and exit. In programming mode — press to enter the selection displayed.
	LOUVER	●	CAHH24 & CACH36 only — press to toggle motorized louver on or off.
	UP	●	Normal operation — press to increase the setpoint temperature. Configuration, Set Time or Programming mode — press to increase the setting.
	DOWN	●	Normal operation — press to decrease the setpoint temperature. Configuration, Set Time or Programming mode — press to decrease the setting.
	FAN	●	Press to toggle between fan modes — High, Low or Auto.
	PROGRAM	●	Normal operation — Press to toggle between manual operation and Pre-programmed (7-day) run mode. Configuration, Set Time or Programming mode — press to enter the next selection.
	TIMER	●	Press to toggle Timer mode on/off.
	MODE + PROGRAM	●	With unit in OFF mode — Press and hold for 5 seconds to enter <b>Configuration mode</b> ; press again to exit.
	PROGRAM + CLOCK	●	Press and hold 3 seconds to enter <b>7-Day Programming mode</b> ; press again to exit.
	FAN + PROGRAM	●	With unit in 7-Day Programming mode — Press and hold 3 seconds to copy the settings for the selected day to all other days.

## Setting the CACH/CAHH/CAHK Controller

**Figure 37** Configuration settings for CACH/CAHH/CAHK

Setting Item	Display	Possible Value (flashing)	Factory Settings	Overview	
<p><b>To access:</b> Press MODE and PROGRAM together for 5 seconds, repeat to exit</p> <p><b>Navigating through settings:</b> Press PROGRAM to move to the next setting or CLOCK to move to the previous setting; to change values, use the UP and DOWN keys; when value is reached, move to the next setting using the PROGRAM or CLOCK button; values are stored on exit from programming mode.</p>					
<b>Temperature scale</b>	01 F-C	F C	Fahrenheit Celsius	F	Select temperature scale for display and operating settings.
<b>Heat source</b>	02 HEAT	ON OFF	Available Not available	See Note 3	Set this to ON if the unit is equipped with the electric heater option, or matched with a heat pump condenser. The electric heater is required for DRY mode operation and for automatic changeover operation.
<b>Heat pump</b> (see Note 1)	03 H-P	ON OFF	Available Not available	OFF	Set this to ON if the unit is built for heat pump operation and connected to an appropriate compressor unit.
<b>Auto changeover differential</b> (see Note 2)	04 d-b	x	2° – 6°	2°	Auto changeover automatically operates the unit in heating or cooling based on room temperature versus setpoint. This setting is the dead band temperature: <ul style="list-style-type: none"> <li>• Cooling is on while room temperature is at setpoint PLUS dead band.</li> <li>• Heating is on while room temperature is at setpoint MINUS dead band.</li> <li>• Example: setpoint = 68°F, dead band is 3°F — cooling is on with room temperature at or above 71°F — heating is on with room temperature at or below 65°F.</li> </ul>
<b>Check filter time</b>	05 F:Lt	2 5 7 10 12	250 hours 500 hours 750 hours 1000 hours 1250 hours	10	Set this time for automatic notice of time to change the filter. At the end of the time period, the control will display a FILTER CHECK warning. This warning will also appear if four coil freeze-ups should occur in a 24-hour period. Reset the warning, restarting the time period, by pressing MODE and FAN buttons together for 3 seconds.
<p><b>Note 1</b> Setting 03, Heat pump, is SKIPPED if setting 02, Heat source, is OFF.</p> <p><b>Note 2</b> Setting 04, Auto changeover, is SKIPPED if setting 02, Heat source, is OFF. This setting is for operation with handheld controller.</p> <p><b>Note 3</b> Factory setting is ON if electric heat is installed in unit, or OFF if electric heat is not installed.</p>					

**Setting the CACH/CAHH/CAHK Controller** *(continued)*

**Figure 38** 7-day programming options for CACH/CAHH/CAHK

Item	Setting	Values	Overview
<p><b>To access:</b> Press and hold PROGRAM and CLOCK buttons simultaneously for 3 seconds; use arrow keys to select position; save selection and exit by repeating the button press.</p> <p><b>Quick copy</b> — Hold FAN and PROGRAM buttons for 3 seconds to copy current day's settings to all other days.</p> <p><b>Navigating through settings:</b> Press PROGRAM to move to the next setting or CLOCK to move to the previous setting; to change values, use the UP and DOWN keys; when value is reached, move to the next setting using the PROGRAM or CLOCK button; values are stored on exit from programming mode.</p>			
<b>7-Day programming</b> <small>(use Table 7, Page 37 to record settings)</small>	Day of week	Mon, Tue, Wed, Thu, Fri, Sat, Sun	The louver is closed when the fan is off.
	Period of day	Morning Day Evening Night	The periods provide four time settings to initiate a change in cooling/heating setpoints. They allow adjustments for setback (such as night setback, daytime setback and occupied settings for residential applications). Set the hour/minute for each time as well as the cooling and heating setpoints below.
	Hour	0–12 a 0–12 p	Set the time to begin the period.
	Minute	0–59	
	Cooling setpoint	55–90 F	The unit will default to this setpoint when set to Cooling in pre-programmed run mode.
	Heating setpoint	55–90 F	The unit will default to this setpoint when set to Heating in pre-programmed run mode.
	Auto setpoint	55–90 F	The unit will default to this setpoint when set to Auto in pre-programmed run mode. (The unit will auto changeover between heating and cooling.)

**Setting the CACH/CAHH/CAHK Controller** *(continued)*

**Table 7** Programming schedule (when using 7-day programming)

	Morning			Day			Evening			Night		
	Auto	Heat	Cool	Auto	Heat	Cool	Auto	Heat	Cool	Auto	Heat	Cool
<b>Monday</b>	Time	:		Time	:		Time	:		Time	:	
	Temp			Temp			Temp			Temp		
<b>Tuesday</b>	Time	:		Time	:		Time	:		Time	:	
	Temp			Temp			Temp			Temp		
<b>Wednesday</b>	Time	:		Time	:		Time	:		Time	:	
	Temp			Temp			Temp			Temp		
<b>Thursday</b>	Time	:		Time	:		Time	:		Time	:	
	Temp			Temp			Temp			Temp		
<b>Friday</b>	Time	:		Time	:		Time	:		Time	:	
	Temp			Temp			Temp			Temp		
<b>Saturday</b>	Time	:		Time	:		Time	:		Time	:	
	Temp			Temp			Temp			Temp		
<b>Sunday</b>	Time	:		Time	:		Time	:		Time	:	
	Temp			Temp			Temp			Temp		

To copy the settings from any day to the entire week:

- 1) Select the day to be copied.
- 2) Simultaneously press the **"FAN"** and **"PROG"** buttons for three seconds.

## CACH/CAHH/CAHK Microprocessor Controller Operation

### NOTICE

When power is first applied to the control or after a power outage there is a three minute delay before the compressor or electric heat will energize. This is to protect the unit from short cycling due to loss of power.

### NOTICE

The controller must be configured with **Remote Thermostat NO** to operate using the infrared remote controller. See (Table 6, pg. 32) for details. (Remote Thermostat YES means the unit will be controlled by a wall thermostat.)

### Handheld remote operation

When power is first applied to the control or after a power outage there is a three minute delay before the compressor or electric heat will energize. This is to protect the unit from short cycling.

#### **Pointing the remote**

When entering commands into the remote, make sure it is pointed toward the cassette's infrared receiver window (see Figure 35, Page 33). The cassette will respond with a beep indicating that it has successfully received the transmitted information.

#### **Synchronization**

There may be occasions when the remote and the cassette's main control board mode synchronization or are not in the same mode. This can happen if commands are entered into the remote, but it is not pointed at the cassette.

To re-synchronize:

- Enter any command into the remote while pointing it at the cassette's infrared receiver window.

- Alternatively, hold the POWER/SEND button for two seconds. All of the optional remote's settings will be transmitted to the cassette. The cassette will respond with a beep, indicating that it has successfully received the transmitted information.

#### **Temperature indication**

The room temperature displayed on the remote is the temperature at the remote. The microprocessor control located in the cassette does not read the remote's temperature — it uses a sensor located in the return air of the cassette.

Therefore, the warming or cooling of the remote alone will not effect the operation of the Cassette. The Cassette will react to its local temperature sensing element and the setpoint selected and transmitted by the remote.

#### **Transmission limits**

The remote has a useful transmission distance approximately twenty (20) feet when perpendicular to the face of the Cassette. However, this distance will vary and decrease when the angle of transmission is not perpendicular. This distance may also vary depending on the lighting in the room.

#### **Hibernate mode**

If there is no activity on the remote for ten minutes, it will enter a hibernate mode and the display will go dark. While in hibernate mode, pressing any button will awaken the remote. The remote will return to the mode it was in prior to entering hibernate mode.

**CACH/CAHH/CAHK Microprocessor Controller Operation** *(continued)***POWER/SEND**

Pressing the POWER/SEND button momentarily will switch the unit either on or off.

1. In the OFF mode, the liquid crystal display (LCD) will display the time of day and day of the week.
2. In the ON mode the LCD will also display the room temperature, mode of operation Cooling, Heating, Auto (Auto changeover), Dry or Fan mode.
3. While in the ON mode, the setpoint temperature will display momentarily with the push of any button except the POWER/SEND button.
4. Also, when POWER/SEND is held down for two (2) seconds, the remote transmits all optional Infrared Hand Held Controller information to the Cassette.

**Mode****NOTICE**

Heating, Auto Changeover (Auto) or Dry modes will not display if Heat Source is set to OFF in the Configuration mode.

The MODE button allows the selection of the mode of operation — Cooling, Heating, Auto Changeover (ACO), Dry or Fan mode.

In Fan mode either “HIGH” or “LOW” will appear on the LCD.

**Fan Operation**

The indoor unit utilizes a two-speed motor with three operational fan modes — High, Low and Auto.

The FAN button will allow the selection of the desired fan setting in all modes except Dry mode.

In **Dry** mode, the fan will operate constantly at low speed. The LCD will indicate the fan speed selection.

**High** and **Low** are constant fan settings. The fan operates continuously, regardless of setpoint or room temperatures.

**Auto** fan mode is for auto ramping of fan speeds.

1. Auto fan mode can only be selected if the unit is in Heating, Cooling or Auto Changeover modes.
2. In Auto fan mode, the speed is determined by the microprocessor.
  - a. Speed adjustment will be made according to room and setpoint temperatures.
  - b. The fan will switch to High speed when room temperature deviates by more than two degrees from setpoint.
  - c. The fan will switch to Low speed if the deviation is one degree or less.

**Louver operation — CAHH 24 and CACH 36 only**

The louver can be set to oscillate during fan operation or open to a fixed setting.

When LOUVER is pressed, the word “Lou”, will display for two seconds along with “ON” or “OFF” to indicate that the louver setting has been changed.

**CACH/CAHH/CAHK Microprocessor Controller Operation** *(continued)***Cooling mode**

For cooling operation, first turn the unit on via the POWER/SEND button.

1. Select Cooling mode via the MODE button.
2. The room temperature and set point temperature will be displayed.
3. The setpoint temperature will change by one degree with each successive press of the UP or DOWN ARROW buttons. Holding the button in will change the temperature rapidly.
4. Place the setpoint temperature below the room temperature.
5. The compressor will start and cooling will continue for a minimum of two minutes and as long as the setpoint remains below room temperature.
6. The Cooling LED will illuminate as long as the unit is calling for cooling.
7. Once the room temperature is satisfied for at least sixty seconds and the two-minute minimum run time has elapsed the compressor will cycle off.
8. The fan will operate as described in “Fan Operation.” see pg. 39

**NOTICE**

Once the cooling has cycled off or following a power outage, the compressor will not restart for at least three minutes (anti-short-cycle timer).

**Heating mode****Optional Electric heat operation (Air Conditioning unit outdoors)**

For operation with electric heat the control must first be configured properly (Heat Source – ON (Table 6, pg. 32), Heat Pump – OFF (Figure 36, pg. 35)).

For electric heat operation, first turn the unit on via the POWER/SEND button.

1. Then select Heating mode via the MODE button.
2. The room temperature and setpoint temperature will be displayed.
3. Press either the UP or DOWN ARROW buttons to change the setpoint temperature.
4. The setpoint temperature will change by one degree with each successive press of the UP or DOWN ARROW buttons. Holding the button down will change the temperature rapidly.
5. Place the setpoint temperature above room temperature.
6. The electric heat will energize and heating will continue as long as the setpoint remains above room temperature.
7. The Heating LED will illuminate as long as the unit is calling Heating mode.
8. When the room temperature has been satisfied for at least sixty seconds and the two-minute minimum on-time has expired, the electric heat will switch off.
9. The fan will operate as described in “Fan Operation.” see pg. 39

**CACH/CAHH/CAHK Microprocessor Controller Operation** *(continued)***Optional Heat pump without Electric heat (Heat Pump unit outdoors)****NOTICE**

EMI heat pumps are intended to operate with an indoor air handler, with electric heat. If an indoor air handler without electric heat is matched with a heat pump condenser, the system will deliver cold air during defrost.

For heat pump operation without electric heat the control must first be configured properly (Heat Source – ON Table 6, pg. 32, Heat Pump – OFF Figure 36, pg. 35).

For heat pump operation, turn the unit on via the POWER/SEND button.

1. Select Heating mode via the MODE button.
2. The room temperature and setpoint temperature will be displayed.
3. Press either the UP or DOWN ARROW buttons to change the setpoint temperature.
4. The setpoint temperature will change by one degree with each successive press of the UP or DOWN ARROW buttons. Holding the button down will change the temperature rapidly.
5. Place the setpoint temperature above room temperature.
6. The outdoor unit will energize in heat pump mode and heating will continue as long as the setpoint remains above room temperature.
7. The Heating LED will illuminate as long as the unit is calling for heat.
8. When the room temperature has been satisfied for at least sixty seconds and the two-minute minimum on-time has expired, the compressor will switch off.
9. The fan will operate as described in “Fan Operation.” see pg. 39

**Optional Heat pump with Electric heat (2-stage heating)**

For heat pump operation with electric heat the control must first be configured properly (Heat source – ON Table 6, pg. 32, Heat pump – OFF Figure 36, pg. 35).

For heat pump operation with optional electric heat, turn the unit on via the POWER/SEND button.

1. Then select Heating mode via the MODE button.
2. The room temperature and setpoint temperature will be displayed. Press either the UP or DOWN ARROW buttons to change the setpoint temperature.
3. The setpoint temperature will change by one degree with each successive press of the UP or DOWN ARROW buttons. Holding the button down will change the temperature rapidly.
4. Place the setpoint temperature above the room temperature by one degree. The compressor will start and heating will continue for a minimum of two-minutes and as long as the setpoint remains above room temperature.
5. The Heating LED will illuminate as long as the unit is calling for Heating mode.
6. When the room temperature has been satisfied for at least sixty seconds and the two-minute minimum on-time has elapsed, the compressor will switch off.
7. The fan will operate as described in “Fan Operation.” see pg. 39
8. Next, place the setpoint temperature above the room temperature by at least two degrees.
9. The compressor will start and, the electric will also energize after a thirty-second delay, thus two-stage heating.
10. The electric heat will run for a minimum of two minutes and until the deviation between room temperature and setpoint temperature is less than two degrees.

**CACH/CAHH/CAHK Microprocessor Controller Operation** *(continued)*

11. At that time the electric heat will switch off and the heat pump (compressor) will take over the heating demand.
12. The electric heater will not restart until a three-minute delay has elapsed.
13. Once the room temperature is satisfied and the two-minute minimum run time has elapsed, the compressor will cycle off.
14. The compressor will not restart until a three-minute delay has elapsed.
15. The fan will operate as described in “Fan Operation.” see pg. 39
8. If the room temperature is within  $\pm$  two degrees of setpoint, the unit will cycle cooling on seven minutes and off seven minutes to remove humidity from the air while not over cooling the room.
9. If the room temperature is less than the setpoint temperature by more than two degrees, cooling will remain off.

**Dry mode**

Dry mode will remove humidity from the air while maintaining a specific setpoint temperature. This is done by cycling Cooling mode. Dry mode will NOT maintain a specific humidity level. The fan will remain on constantly at low speed while in Dry mode.

For Dry mode operation, first turn the unit on via the POWER/SEND button.

1. Select Dry mode via the MODE button.
2. The room temperature and setpoint temperature will be displayed.
3. Press either the UP or DOWN ARROW buttons to change the setpoint temperature.
4. The setpoint temperature will change by one degree with each successive press of the UP or DOWN ARROW buttons. Holding the button down will change the temperature rapidly.
5. Place the setpoint temperature at a desired room temperature.
6. Depending on the difference between room temperature and setpoint temperature, the compressor will either remain on constantly, cycle on/off, or remain off.
7. If the room temperature is greater than the setpoint temperature by more than two degrees, the unit will run Cooling mode constantly.
- Auto Changeover mode

**Auto Changeover mode**

For Auto Changeover mode (ACO), the unit must have a heat source. The control must first be configured properly (Heat source – ON). (Table 6, pg 32).

In Auto Changeover mode, the cassette will operate in either Cooling mode or Heating mode. The control will select the mode of operation depending on the setpoint temperature, room temperature and the differential setting selected in the Configuration mode.

For Auto Changeover mode, first turn the unit on via the POWER/SEND button.

1. Select Auto mode via the MODE button.
2. The room temperature and setpoint temperature will be displayed.
3. Press either the UP or DOWN ARROW buttons to change the setpoint temperature.
4. The setpoint temperature will change by one degree with each successive press of the UP or DOWN ARROW buttons. Holding the button down will change the temperature rapidly.
5. Place the setpoint temperature below the room temperature by the auto change over differential amount selected in the Configuration mode.
6. The compressor will start and the unit will run cooling operation as described under Cooling mode.
7. If the setpoint temperature is above the room temperature by the auto change over differential amount selected in the

**CACH/CAHH/CAHK Microprocessor Controller Operation** *(continued)*

Configuration mode, the unit will run heating operation as described under Heat mode.

### Set Time mode

The clock is used by the 7-day programming mode.

1. The  CLOCK button is used to enter or exit the Set Time mode.
2. The Set Time mode can be entered while the control is in any mode, including the Off mode.
3. To enter the Set Time mode, press the  CLOCK button for three (3) seconds.
4. Pressing the PROGRAM  button will advance to the next item.
5. The order is (1) Day of week, (2) Hour and (3) Minute.
6. The time of day and day of week can be changed using the UP or DOWN ARROW buttons.
7. When the  CLOCK button is pressed again or left idle for twenty (20) seconds, the control will save the new settings and return to the previous mode.

### NOTICE

The unit will not automatically adjust for Day Light Savings time.

### 7-Day Programming mode

The 7-day Programming mode is used to store the settings for Pre-Program Run mode.

1. When the unit is in either the Off or On mode, the 7-Day Programming mode can be entered by pressing the PROGRAM  +  CLOCK buttons simultaneously for three seconds.
2. When the PROGRAM  +  CLOCK buttons are pressed simultaneously again or left idle for twenty seconds,

the control will save the new settings and return to the previous interface mode.

3. While in the 7-Day Programming mode, the words “7-DAY PROGRAM” are displayed on the LCD.
4. Use the UP or DOWN ARROW buttons to change the time, temperature or period settings.
5. Use the  CLOCK or PROGRAM  buttons to select the mode to be changed.
6. Settings can be entered for:
  - a. Day of week
  - b. Period of day
  - c. Hour
  - d. Minute
  - e. Cooling setpoint temperature
  - f. Heating setpoint temperature
  - g. Auto setpoint temperature.

### Quick Copy

Quick copy is a feature of the 7-Day Programming mode. It is used to copy the settings of any day to the rest of the week.

While in 7-Day Programming, select the day to be copied. Then press the FAN + PROGRAM  buttons simultaneously for three seconds. The selected day will be copied to the rest of the week.

### Manual Run mode

This is the normal operating non Pre-Program Run mode. Settings for temperature, mode and fan speed are selected by the user and will not change with the passing of time. The word “PROGRAM” does NOT display on the LCD.

### Pre-Program Run mode

This feature allows the setpoint temperature to be changed according to the pre-program setpoint and time of day settings. The setpoint and time settings are programmed into the

**CACH/CAHH/CAHK Microprocessor Controller Operation** *(continued)*

control through the 7-Day Programming mode.

1. The Pre-Program Run mode can be entered from Cooling mode, Heating mode or Auto mode only.
2. Pre-Program Run mode cannot be entered from Dry or Fan modes.
3. Pressing the PROGRAM  button momentarily will enter or exit the Pre-Program Run mode.
4. The word “PROGRAM” will appear in the LCD display.
5. The setpoint will change to the programmed setting at the selected time.

To use the Pre-Program Run mode first enter the program settings through the 7-Day Programming mode.

1. Select a mode of operation (Cooling, Heating, Auto) and press the PROGRAM  button to enter Pre-Program Run mode.
2. As time passes, the setpoint temperature will be selected according to the time of day and 7-Day Program settings.
3. To override the setpoint while in Pre-Program Run mode, adjust the temperature using the UP or DOWN ARROW buttons. The override setting will remain in effect until the next scheduled event. (Morning, Day, Evening, Night) At that time, the setpoint will be the value selected in 7-Day Programming mode.

**Clean Filter Alarm**

To aid in filter maintenance, the cassette controller will indicate when a scheduled filter cleaning is required by flashing the Timer/Alarm LED. During normal operation, the microprocessor will keep track of the units run time.

1. When the clean filter time has elapsed, the Timer/Alarm LED will flash four times to indicate that the filter needs to be cleaned.
2. The clean filter time is selectable through the Configuration mode of the Optional Infrared Hand Held Controller.
3. Available settings are 250, 500, 750, 1000, and 1250 hours.
4. If a coil freeze condition is detected four times within a 24-hour period, the Clean Filter Alarm will appear.

After filter maintenance has been performed, press the Clear Filter Warning button for three seconds. The control will respond with a beep to indicate that the timer has been reset.

**Sleep timer**

The sleep timer feature allows the user, with the push of a single button, to have the unit switch off using the preset timer. When the control is in the On mode, pressing the TIMER button will enter or exit the Sleep Timer mode.

When in Sleep Timer mode, the word “TIMER” will appear on the LCD display. The unit will continue to operate for thirty minutes, then switch off.

To turn the unit back on, press the POWER/SEND button momentarily.

## CACH/CAHH/CAHK Wall Thermostat Operation

### Set DIP switch #4 to ON

For Wall Thermostat Operation the control must be configured through the DIP switches located on the control board located in the control box.

1. Set DIP switch #4 to YES (see Table 6, Page 32).
2. In wall thermostat mode, the control will not accept commands from the infrared remote control.
3. The filter check timer will default to 1000 Hrs.

### Fan Operation

The cassette unit utilizes a two-speed motor. In wall thermostat operation, fan speed selection can be made through the DIP switch settings located on the main control board (Figure 33, Page 31).

1. With DIP switch #3 set to HIGH, the fan speed will be set to High.
2. With DIP switch #3 set to LOW, the fan speed is set to Low.
3. See Table 6, Page 32 for other available DIP switch selections.

The wall thermostat will control the call for fan operation (on or off) through the low-voltage terminals “R” and “G”.

1. When the wall thermostat connects “R” to “G” the fan will energize.
2. After the thermostat has been satisfied and the call for heating or cooling has been removed, the indoor fan will remain on for an additional sixty (60) seconds. This increases efficiency by pulling the remaining energy from the unit.

Some thermostats are equipped with an AUTO/ON fan switch. When this switch is placed in the ON position, the fan will run continuous. When the switch is in the AUTO position, the fan will cycle with the call for heating or cooling.

### Cooling operation

The wall thermostat will control the call for cooling operation (on or off) through the low-voltage terminals R and Y.

1. After connecting the thermostat to the unit, place the system switch in Cooling mode.
2. Adjust the setpoint temperature below the room temperature.
3. The compressor and fan motors will start and cooling will begin.
4. Next, place the setpoint temperature above the room temperature. The outdoor condenser will stop.
5. The fan will operate as described in “Fan Operation.” pg. 39

### NOTICE

Once the cooling has cycled off or following a power outage, the compressor will not restart for at least three minutes (anti-short-cycle timer).

### Reversing Valve

EMI outdoor heat pump units utilize a reversing valve that is energized in Cooling mode. Make sure that the thermostat selected will energize the reversing valve in Cooling mode.

## CACH/CAHH/CAHK Wall Thermostat Operation *(continued)*

### Electric heat operation

The wall thermostat will control the call for electric heat operation (on or off) through the low-voltage terminals “R” and “W”.

1. After connecting the thermostat to the unit, place the system switch in Heating mode.
2. Adjust the setpoint temperature above the room temperature.
3. The electric heat will energize along with the indoor fan motor.
4. Heating will continue as long as the setpoint remains above room temperature.
5. Place the set-point temperature below room temperature.
6. The electric heater will switch off and the indoor fan will remain on for an additional sixty seconds.

### NOTICE

Once the cooling has cycled off or following a power outage, the compressor will not restart for at least three minutes (anti-short-cycle timer).

### Optional Heat pump with Electric heat (Two-stage heating)

The wall thermostat will control the call for electric heat operation (on or off) through the low-voltage terminals “R” and “W” and for compressor (heat pump) heating through terminals “R” and “Y”.

7. After connecting the two (2) stage heating thermostat to the unit, place the system switch in Heating mode.
8. Adjust the setpoint temperature above the room temperature.
9. The compressor and fan motors will start and heating will begin.
10. Depending on the thermostat selected, electric heat will also energize when the deviation between room temperature and setpoint temperature is high enough

to call for second stage heating. (See the thermostat owner’s manual for this feature).

11. Place the setpoint temperature below the room temperature.
12. The outdoor Heat Pump unit and electric heat will stop while the indoor fan will remain on for an additional sixty seconds.

### Clean Filter Alarm (Wall Thermostat mode)

To aid in filter maintenance, the cassette controller will indicate when a scheduled filter cleaning is required by flashing the Timer/Alarm LED.

During normal operation, the microprocessor will keep track of the unit’s run time.

- When the clean filter time has elapsed, the Timer/Alarm LED will flash four times to indicate that the filter needs to be cleaned.
- For wall thermostat operation, the default clean filter time is 1000 hours.
- Also, if a coil freeze condition is detected four times within a 24-hour period, the Clean Filter Alarm will appear on the cassette display.

After filter maintenance has been performed, press the Clear Filter Warning Button for three seconds. The control will respond with a beep to indicate that the timer has been reset.

## CACH/CAHH/CAHK Controller Features

### **Short Cycle Protection (ASCT)**

The electronic control incorporates 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 unit to restart until a three-minute time period has elapsed.

This feature will prevent the compressor and heat source from rapid restarts. Once switched off, or following a power outage, the compressor or heat source shall not restart for a minimum of three minutes.

### **Staggered Start protection**

Designed for systems with electric heat, in heat pump and dry modes the staggered-start feature will prevent the compressor and electric heater from starting simultaneously. There is a thirty-second delay between the start of the compressor and start of the electric heater while in Dry mode and Heat pump mode.

### **Minimum run time**

Once started, the minimum on-time prevents either the compressor or heat source from cycling off prematurely. The minimum on-time for both the compressor and electric heat is two minutes. Minimum on-time is available only while the control is configured for Unit mounted keypad operation. Minimum on-times are disabled while in Remote thermostat mode.

### **LCD Back Light**

The LCD display can be illuminated using the LCD back light feature. The selectable settings are Off, On, and Intermittent, and can be set in the Configuration.

- By selecting OFF, the backlight will remain off at all times.
- By selecting ON, the backlight will remain on at all times, including while in the Off mode interface.

- If Intermittent is selected, the backlight will remain for 10 seconds after the push of any button while the control is in the On mode or after the push of the ON/OFF button while in the Off mode interface.

### **Drain Pan Sensor**

The drain pan sensors monitor the condensate level in each of the units drain pans. Should the water in either pan reach a critical level, the monitor will automatically signal the main control unit. The controls microprocessor will, in turn, switch off the condensing unit for a minimum of three minutes and until the fault condition has been cleared, to prevent further condensate production. A fault code, E02, will then flash on the controller's LCD display and will automatically reset once the fault condition is cleared.

### **Annunciation**

The unit is equipped with an annunciation feature — the controller will beep, providing the user with audio feedback confirming that the microprocessor has received its commands. The annunciation feature must be activated in the configuration. The selections are OFF and ON. If OFF is selected, annunciation will remain off. If ON is selected, then annunciation will beep with the push of any button in the On mode or with the push of the ON/OFF button while in the off mode.

While in Wall thermostat mode, only the FAN and TIME buttons are activated and will beep when pressed.

### **Memory Backup**

In the event of a power failure the control will retain all of its settings, including the mode of operation. When power is restored, the control will return to the mode of operation that it was in prior to the power failure, after a three minute time delay.

## CACH/CAHH/CAHK Controller Fault Conditions

**Table 8** CACH/CAHH/CAHK microprocessor controller fault indications

Timer/Alarm LED — number of flashes:	Fault condition	Description
1	Room air sensor fault	If the room air sensor is disconnected, damaged or malfunctions the Timer/Alarm LED will flash one (1) time to signify that a fault has occurred. Operation of heating and cooling will stop. The fan will continue to operate.
2	Condensate fault	If the control senses a condensate fault condition, either through the condensate pumps safety switch or the drain pan sensors, the Timer/Alarm LED will flash two (2) times to signify that a fault has occurred. The compressor will switch off for a minimum of three (3) minutes AND until the fault condition is corrected. After that, as long as the thermostat is calling for cooling the compressor will restart.
3	ID coil sensor fault	The indoor coil sensor monitors the temperature of the indoor coil. If a freeze condition is detected continuously for three (3) minutes, the Timer/Alarm LED will flash three (3) times to signify that a fault has occurred. The compressor will switch off for a minimum of three (3) minutes AND until the fault condition is corrected. Also, if the microprocessor detects a coil freeze condition four (4) times within a 24 hour period, the clean filter indicator will appear.
4	Clean filter	To aid in filter maintenance, the cassette controller will indicate when a schedule filter cleaning is required by flashing the Timer/Alarm LED. During normal operation the microprocessor will keep track of the unit's run time. When the clean filter time has elapsed, the Timer/Alarm LED will flash four (4) times to indicate that the filter needs to be cleaned. The clean filter time is selectable through the Configuration mode. Available settings are 250, 500, 750, 1000, and 1250 hours. For Wall Thermostat mode, the default time is 1000 hrs. This cannot be changed. If a coil freeze condition is detected four (4) times within a 24 hour period, the Clean Filter Alarm will appear.  After filter maintenance has been performed, press the Clear Filter Warning Button for three (3) seconds. The control will respond with a beep to indicate that the timer has been reset.
5	Test mode	<b>See Table 6, Page 32 for information.</b>

**Maintenance**

**⚠ WARNING**

Service should be performed by a **qualified service agency** and an annual system check is recommended.

**Electrical shock hazard** — Before removing the access panels, make sure that all power is disconnected from the unit. Failure to do so could result in injury or electric shock.

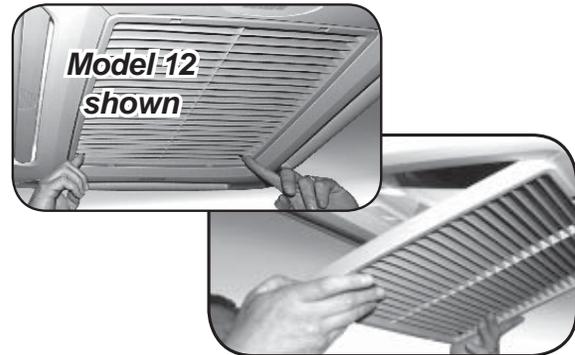
**Clean the filter**

1. Clean air filter on a monthly basis:
  - a. Access the filters by removing the air intake access grilles (Figure 39, Page 49).
  - b. Remove the filter by carefully twisting and lifting to clear the retaining clips (Figure 40, Page 49).
  - c. Lift the filter off the grille. Place filter on a flat surface and vacuum any away dust and debris (vacuum all filters and grills). Also vacuum any accessible parts on the unit. (Figure 41, Page 49)
  - d. Or use a garden hose:
    - Wash the grille and filter with a hose.
    - Let filters and grilles dry before replacing.
  - e. Replace filters, clips and front grille before operating the unit. (Replace the filters by sliding under retainer clips.)
2. The unit may be wiped with a damp cloth when needed (Figure 42, Page 49).

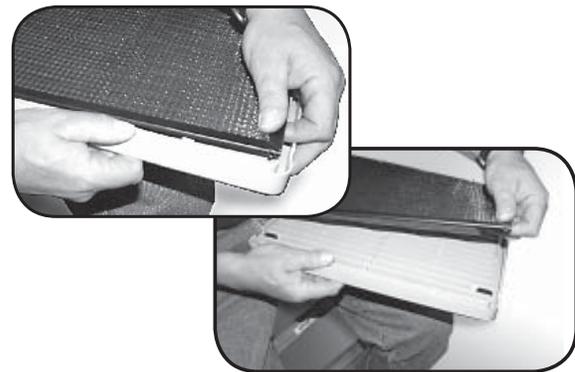
**⚠ WARNING**

**DO NOT** operate the unit without the filters and grilles in place.

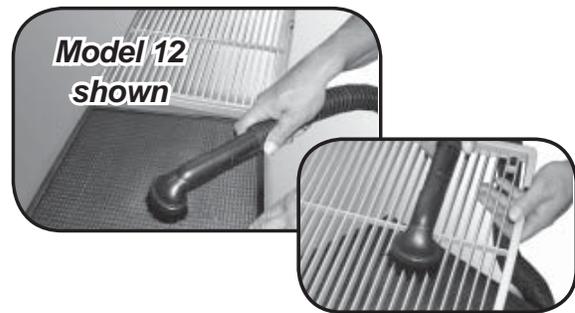
**Figure 39** Remove the grille



**Figure 40** Removing the filter



**Figure 41** Cleaning with a vacuum



**Figure 42** Cleaning with a damp cloth



## Troubleshooting — General

### **WARNING**

Service should be performed by a **qualified service agency** and an annual system check is recommended.

**Electrical shock hazard** — Before removing access panels or control covers to expose moving parts of non-insulated live electrical components for service, disconnect all high-voltage power supplies to both the indoor unit and outdoor unit. Failure to do so could result in physical injury and/or electrical shock.

### Wiring diagram

When trouble shooting the indoor unit, please refer to the wiring diagram that is supplied with the equipment.

- The wiring diagram is located on the inside surface of the control panel cover (see Figure 30, Page 22).
- If you are unable to locate the wiring diagram, please call the factory technical service line at (800) 228-9364, and one can be faxed, mailed or e-mailed. Please have the full model and serial number available prior to calling.

### Wiring requirements

EMI air handlers are designed to operate with EMI condensers.

- The air handle (indoor unit) and condenser (outdoor unit) must 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. (Figure 43, Page 51 or Figure 44, Page 51)
- A transformer provides the low-voltage power source for the controls. The number of low-voltage interconnect conductors will be two 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.

### Power supply check

When troubleshooting any EMI product, it is important to first check the rating plate for proper field voltage and breaker size.

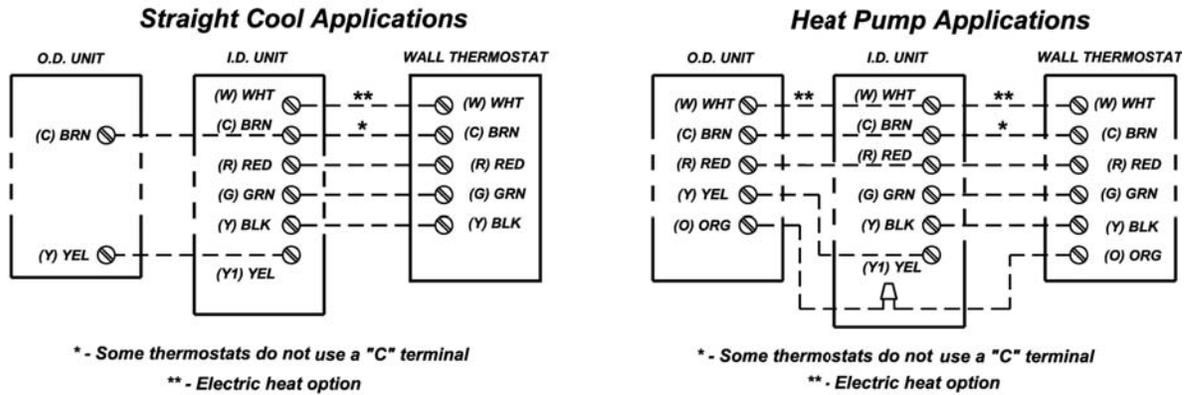
Then use a voltmeter to check the incoming power supply to verify that it agrees with the rating plate.

- The incoming power must not exceed the nameplate voltage.
- The incoming power must not be below the minimum voltage stated on the rating plate (197V for units rated 208/230V and 104V for units rated 115V).

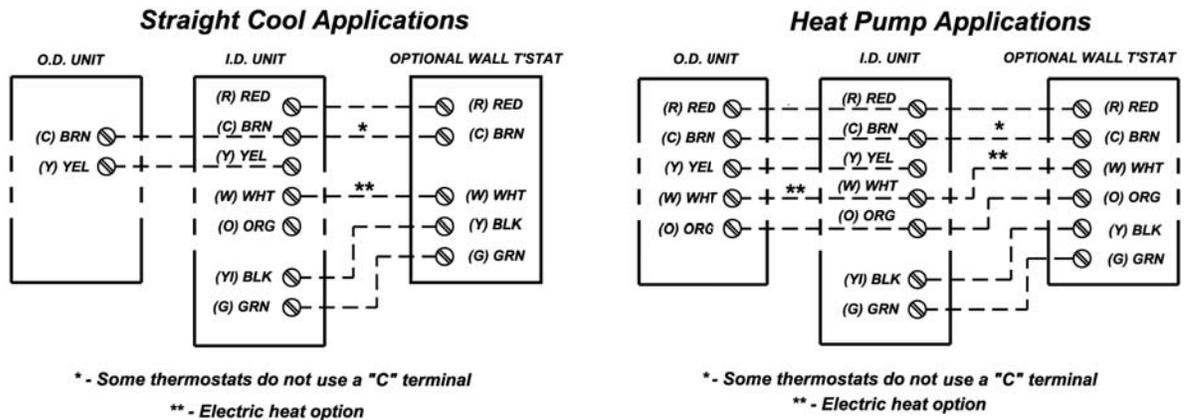
Also verify low-voltage power — place a voltmeter across low-voltage terminals R and C at the indoor unit. The voltage should be 24V.

**Troubleshooting — General** *(continued)*

**Figure 43** Models CACG/CAHG/CAHJ — Low-voltage interconnections — wall thermostat operation



**Figure 44** Models CACH/CAHH/CAHK — Low-voltage interconnections — with/without optional wall thermostat operation



## Troubleshooting — CACH/CAHG/CAHJ Units

### Cooling-only units

Cooling only units require 18 AWG low-voltage interconnecting wires between the indoor and outdoor units. Also, interconnect wiring is required between the indoor unit and wall thermostat. Refer to low-voltage interconnect diagram, Figure 43, Page 51, for low-voltage connections.

#### NOTICE

Terminal “W” is required for units with electric heat only.

Terminal “C” may not be needed on some thermostats.

The wall mounted thermostat will switch the outdoor unit on and off through the black, “Y,” and yellow, “Y1,” wires.

When the thermostat is calling for cooling, 24 Vac can be measured across terminals:

- “Y” and “C” of the outdoor unit.
- “Y1” and “C” of the cassette.

The cassette contains an electronic anti-short-cycle timer feature (ASCT) that will prevent the outdoor unit from short cycling. After the thermostat is satisfied there will be a three minute delay before the outdoor unit is allowed to restart.

While the wall thermostat is calling for cooling and the ASCT delay has elapsed, 24 Vac can be measured between terminals:

- “Y” and “C” of the outdoor unit.
- “Y1” and “C” of the cassette.
- “G” and “C” of the cassette (fan signal).

### Heat pump units

Heat pump units require 18 AWG low-voltage interconnecting wire between the indoor and outdoor units. Also, interconnect wiring is required between the indoor unit and wall thermostat. Refer to low-voltage interconnect diagram, Figure 43, Page 51, for low-voltage connections.

The wall mounted thermostat will switch the outdoor unit on and off through the black, “Y,” and yellow, “Y1,” wires.

When the thermostat is calling for cooling or heating, 24 Vac can be measured:

- “Y” and “C” of the outdoor unit.
- “Y1” and “C” of the cassette.

EMI heat pump systems utilize a reversing valve is that is energized in the cooling mode.

1. Heat pump units will operate the compressor in heating mode while the reversing valve is de-energized.
2. The reversing valve signal is provided through the orange, “O,” low-voltage wire of the thermostat. It should remain energized constantly as long as the thermostat’s system switch remains in Cooling mode.
3. To check for 24 Vac reversing valve voltage at the outdoor unit, place a voltmeter across the brown, “C,” and orange, “O,” wires while in the Cooling mode. The meter should read 24 Vac.

#### NOTICE

Terminal “O” is required for heat pump operation. The reversing valve is energized in cooling.

Terminal “W” is required for units with electric heat only.

Terminal “C” may not be needed on some thermostats.

**Troubleshooting — CACG/CAHG/CAHJ Units** *(continued)*

The indoor unit contains an electronic anti-short-cycle timer feature (ASCT) that will prevent the outdoor condenser from short cycling. After the thermostat is satisfied there will be a three (3) minute delay before the condenser is allowed to restart.

While the wall thermostat is calling for cooling and the ASCT delay has elapsed, 24 Vac can be measured between terminals:

- “Y” and “C” of the outdoor unit.
- “Y1” and “C” of the cassette.
- “G” and “C” of the cassette (fan signal).

**Electric heat (optional)**

Units with electric heat utilize a control relay located on the circuit board in the control box. When the wall thermostat is calling for electric heat the relay will energize.

To check for electric heat operation, place the wall thermostat in Heat mode with the set-point temperature above room temperature.

1. Then place a clamp-on type ammeter on one leg of the incoming power supply.
2. When the unit is working correctly, the amp reading should correspond with the values in the table below.
3. The following current values apply when the unit is connected to a 230 Vac power supply. These values include fan motor current. If the supply voltage is different, this will affect the amp draw of the heater.

5kW = 22.7 A	3kW = 13.6 A	1.5kW = 6.9 A
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4. The electric heat relay can also be verified by placing a voltmeter across the high-voltage relay output terminal and the incoming power L2 terminal.
5. If the unit is working correctly, the reading should be the same as measured across the incoming power supply.

As a safety feature, an auto-reset limit switch is located on the heater assembly.

1. The limit will interrupt power to the heater if an over-temperature condition occurs.
2. Each limit switch is also equipped with a one-time fuse link.
3. Should electric heat temperatures rise above the auto resetting limit switch, the non-resetting, one-time fuse link will open and the heater will remain off.
4. If this occurs the limit switch assembly must be replaced. (Contact EMI technical service for a replacement.)

**Checking fuse link**

 **WARNING**

**Electrical shock hazard** — Make sure to fully disconnect all power to both the indoor cassette and outdoor unit where indicated in these instructions.

To check if the fuse link has failed requires an Ohmmeter reading across the limit switch.

1. After disconnecting all power to the unit, disconnect the wires from the fuse link.
2. With an ohmmeter, check the continuity across the fuse link.
3. If the fuse link is open, it must be replaced.

For optional wall thermostat operation, 24 Vac can also be measured across the Cassettes low-voltage terminals:

- “G” and “C” (fan signal).
- “W” and “C” (electric heat signal).

## Troubleshooting — CACG/CAHG/CAHJ Units *(continued)*

### Two-stage heating

Two-stage heating combines heat pump and electric heat operation. Heat pump units require an 18 AWG low-voltage interconnecting wire between the indoor unit and the condenser. Also, interconnect wiring is required between the indoor unit and wall thermostat. Refer to low-voltage interconnect diagram, Figure 43, Page 51, for low-voltage connections.

After connecting a two-stage heating thermostat to the unit, place the system switch in Heat mode.

1. Adjust the setpoint temperature above the room temperature so that first stage heating is activated.
2. The compressor and fan motors will start and heating will begin.
3. Heating will continue as long as the setpoint temperature remains above room temperature.

To check for a low-voltage signal, place a voltmeter across terminals :

- “Y” and “C” of the outdoor unit.
- “Y1” and “C” of the cassette.

When the unit is working correctly, there should be a reading of 24 Vac.

Next, place the setpoint further above room temperature to activate second stage heating.

1. Electric heat will energize (along with the compressor) when the deviation between room temperature and setpoint temperature is high enough to call for second stage heating. (See the thermostat owner’s manual for this feature).
2. Heating will continue as long as the setpoint temperature is above the room temperature and the thermostat is calling for second stage heating.
3. To check for an electric heat signal, place a voltmeter across terminals “W” and “C” of the indoor unit.
4. When the unit is working correctly, there should be a reading of 24 Vac.
5. To stop heating operation, place the setpoint temperature below the room temperature.
6. The outdoor unit and electric heat will stop while the indoor fan will remain on for an additional sixty seconds.

## Troubleshooting — CACH/CAHH/CAHK Units

### NOTICE

Cassette operation can be controlled through either a wall thermostat or an optional infrared handheld controller.

To select control method, refer to DIP switch options, Table 6, Page 32.

### Cooling-only units, Model CACH

Cooling only units require an 18 AWG minimum low-voltage interconnecting wires between the indoor and outdoor units. If the cassette controller is configured for wall thermostat operation, then a wiring connection is also required between the air handler and wall thermostat. Refer to low-voltage interconnect diagram, Figure 44, Page 51, for low-voltage connections.

### NOTICE

Terminal “W” is required for units with electric heat only.

Terminal “C” may not be needed on some thermostats.

The cassette controller or wall thermostat will switch the outdoor unit on and off through the yellow, “Y,” low-voltage terminal.

When the thermostat is calling for cooling, 24 Vac can be measured across terminals “Y” and “C” of the indoor or outdoor units.

For optional wall thermostat operation, 24 Vac can also be measured across low-voltage terminals “Y I” and “C” of the cassette.

The indoor unit contains an electronic anti-short-cycle timer feature (ASCT) that will prevent the outdoor unit from short cycling. After the room temperature is satisfied there will be a three-minute delay before the outdoor unit is allowed to restart.

The cassette controller or wall thermostat will also control the indoor fan by switching high-voltage power to the fan motor with the fan relay. When energized, high-voltage

power can be measured between the relay output and the L2 terminal of the incoming power supply.

For optional wall thermostat operation, 24 Vac can also be measured across low-voltage terminals “G” and “C” of the cassette.

### Heat Pump Units, Model CAHH/CAHK

Heat pump units require an 18 AWG minimum low-voltage interconnecting wire between the indoor unit and outdoor units. If the cassette controller is configured for wall thermostat operation, then a wiring connection is also required between the air handler and wall thermostat. Refer to low-voltage interconnect diagram, Figure 44, Page 51, for low-voltage connections.

### NOTICE

Terminal “O” is required for heat pump operation. The reversing valve is energized in cooling.

Terminal “W” is required for units with electric heat only.

Terminal “C” may not be needed on some thermostats.

### Checking fuse link



### WARNING

**Electrical shock hazard** — Make sure to fully disconnect all power to both the indoor cassette and outdoor unit where indicated in these instructions.

To check if the fuse link has failed requires an Ohmmeter reading across the limit switch.

1. After disconnecting all power to the unit, disconnect the wires from the fuse link.
2. Then with an ohmmeter, check the continuity across the fuse link.
3. If the fuse link is open, it must be replaced.

## Frequently Asked Questions

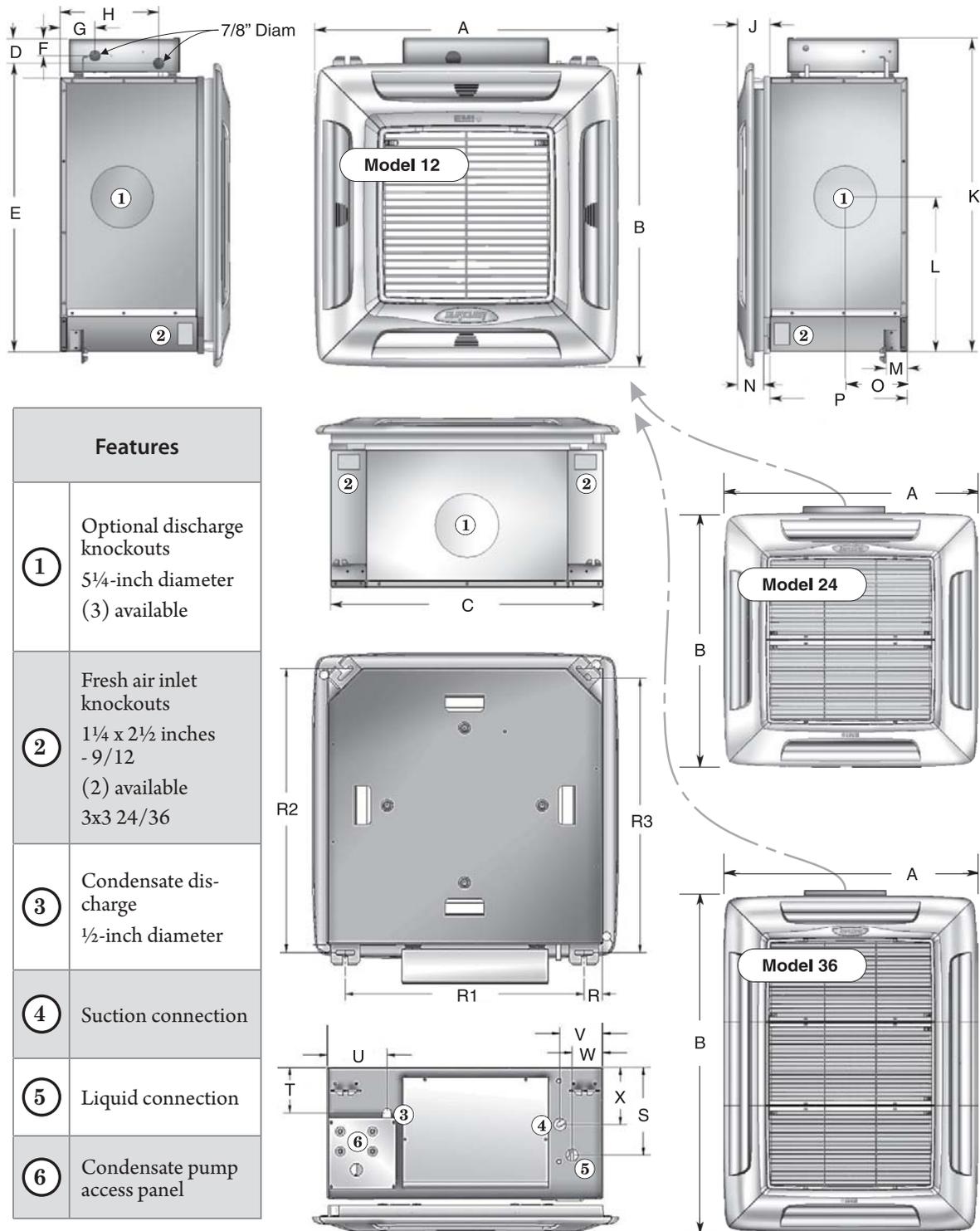
- Q:** The condenser will not start although the indoor unit appears normal. What should I do?
- A:** At the indoor thermostat, make sure that the control is in cooling and the setpoint temperature is below room temperature. Next, using a Voltmeter, check for 24V across the yellow (Y) and brown (C) wires. If 24V is present then check for wiring breaks or improper connections between the indoor and outdoor units.
- A:** EMI condensers are equipped with a manual reset high-pressure switch. It is located on the high side of the system usually on back panel above service valves. To reset, push the red button in. If the switch was tripped there will be a click when it resets.
- A:** The cassette air handlers are equipped with an internal condensate pump with a high level safety switch. If the condensate reaches a critical level or if power is lost to the indoor unit, the safety circuit will open and low Volt power to the condenser (terminal “Y1”) will be removed. The condensate pump should be checked for obstruction. The condensate pump assembly can be removed through the side access panel. After removal, inspect the drain pan to determine if the condensate is not being removed properly from the unit. Inspect all drain lines to ensure there is no blockage preventing condensate removal.
- Q:** How long will the fan run?
- A:** While the unit is in cooling or heating and auto fan mode is selected, the fan will cycle with the call for cooling or heating. When the room temperature reaches setpoint temperature, the heat/cool call is dropped. The fan will then stay on for an additional 60-second to purge unit of any residual energy. Placing the fan selection switch on the wall mounted thermostat in the ON position will cause the fan to run continuously regardless of the set point temperature.
- Q:** What causes my indoor unit to freeze-up?
- A:** Air handler freeze up is usually the symptom of another problem. The Cassette air handler is equipped with freeze protection to prevent freeze up from occurring. If freeze up does occur then check the following.
- Check that the freeze sensor inserted fully and snug in the coil fins. 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 35°F (2°C)? 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 air handlers 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.
- 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.

**Frequently Asked Questions** *(continued)*

- A: EMI air handlers are manufactured with a low-voltage transformer installed. When connecting an EMI air handler to a non-EMI condenser, check to ensure that there is no 24v control transformer in the outdoor unit. Only one transformer is required. If both the indoor unit and outdoor unit contain a transformer, one must be removed from the system.

**Dimensions**

**Figure 45** Dimensions — Models 9, 12, 24 and 36 (see dimensions, Table 9, Page 59)



Features	
①	Optional discharge knockouts 5¼-inch diameter (3) available
②	Fresh air inlet knockouts 1¼ x 2½ inches - 9/12 (2) available 3x3 24/36
③	Condensate discharge ½-inch diameter
④	Suction connection
⑤	Liquid connection
⑥	Condensate pump access panel

**NOTICE**

Due to ongoing product development, designs, specifications, and performance are subject to change without notice. Please consult the factory for further information.

## Dimensions *(continued)*

**Table 9** Dimensions — Models 9, 12, 24 and 36 (see drawing, Figure 45, Page 58)

Dimension	Models 9 & 12		Model 24		Model 36	
	Inches	mm	Inches	mm	Inches	mm
A	25.00	635	37.00	940	37.00	940
B	25.00	635	37.00	940	49.26	1251
C	22.50	572	32.44	824	32.44	824
D	2.04	52	2.00	51	2.04	52
E	22.57	573	30.40	772	44.68	1135
F	1.41	36	1.41	36	1.41	36
G	2.88	73	3.65	93	3.65	93
H	8.13	207	8.90	226	8.90	226
J (ref)	2.67	68	3.38	86	3.38	86
K	25.86	657	35.61	904	47.78	1214
L	12.76	324	18.69	475	24.73	628
M	1.73	44	1.97	50	1.97	50
N (ref)	2.16	55	2.72	69	2.72	69
O	5.12	130	5.12	130	5.12	130
P (ref)	11.34	288	12.05	306	14.01	356
R (typical)	1.50	38	1.63	41	1.63	41
R1	19.50	495	29.19	741	29.19	741
R2	23.27	591	31.20	792	42.66	1084
R3	22.47	571	30.41	772	43.45	1104
S	7.19	183	6.87	174	6.87	174
T	3.73	95	2.58	66	4.98	126
U	4.88	124	5.50	140	5.47	139
V	3.50	89	4.93	125	5.00	127
W	2.50	64	3.97	101	4.00	102
X	4.69	119	4.37	111	4.37	111

### NOTICE

Due to ongoing product development, designs, specifications, and performance are subject to change without notice. Please consult the factory for further information.

## Specifications

**Table 10** Electrical Specifications (CAC\_ refers to CACG/CACH; CAH\_ refers to CAHG/CAHH/CAHJ/CAHK)

Model	Fan Motor			Elect Heat		Total AMPS	Min Volt	M.C.A.	HACR BRKR
	Volts/HZ/PH	RLA	H.P.	kW	AMPS				
CAH 9/12	208/230/60/1	0.35	1/10	–	–	0.4	197	0.5	15
CAH 9/12	208/230/60/1	0.35	1/10	1.5	6.52	6.9	197	8.6	15
CAH 24	208/230/60/1	0.55	1/8	–	–	0.6	197	0.7	15
CAH 24	208/230/60/1	0.55	1/8	3	13.04	13.6	197	17.0	20
CAC 36	208/230/60/1	0.5, 0.5	1/10, 1/10	–	–	1.0	197	1.2	15
CAC 36	208/230/60/1	0.5, 0.5	1/10, 1/10	5	21.74	22.7	197	28.3	30

**Table 11** Technical data

Refrigerant Type	R410A
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CONNECTIONS	Model		
	9 & 12	24	36
Suction	½"	¾" *	¾"
Liquid	¼"	⅜"	⅜"
Condensate Drain	½" I.D.	½" I.D.	½" I.D.
Branch Duct	5¼" Ø	5¼" Ø	5¼" Ø
Fresh Air Duct	1¼ x 2½"	3" x 3"	3" x 3"

FILTRATION	Model		
	9 & 12	24	36
Type	Washable Mesh		
Quantity	1	2	3
Efficiency	80%		

CONDENSATE PUMP	Model		
	9 & 12	24	36
Maximum Head	36" (0.9 m) **		
Min. Flow Rate	2.5 GPH (9.5 l/h)		

\*Must bush down to 5/8" interconnect for 18K system.  
 \*\* Measured from bottom of unit.

**Table 12** Discharge air volume (dry coil)

Model	High Speed CFM (L/S)	Low Speed CFM (L/S)
9 & 12	380 (180)	335 (158)
24	700 (330)	620 (293)
36	1,300 (614)	1,160 (548)

**Figure 46** Shipping weights

Model	Shipping weight — lbs (kg)
9 & 12	70 (31.8 kg)
24	108 (49.1 kg)
36	146 (66.4 kg)

**Figure 47** Indoor sound levels (dBA)

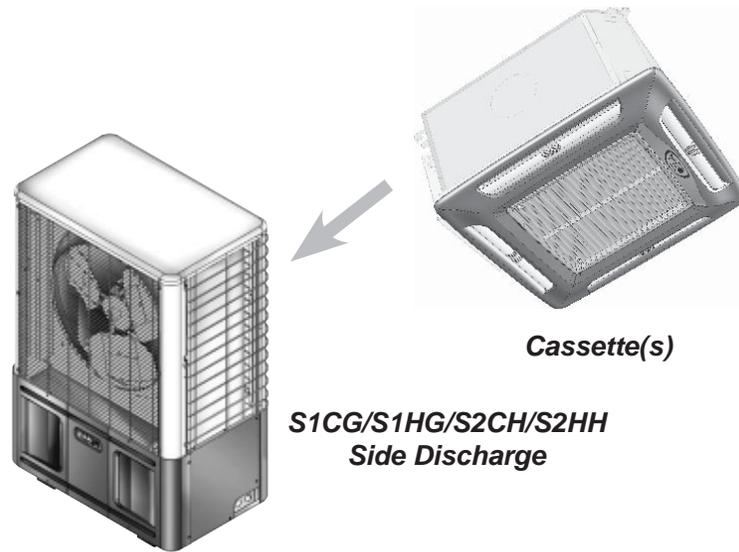
Model	High Speed	Low Speed
9 & 12	41	39
24	44	42
36	51	49



### NOTICE

Due to EMI's ongoing product development program, all designs and specifications are subject to change without notice.

## System Options


**Table 13** Cooling systems (CAC\_ refers to CACG/CACH; CAH\_ refers to CAHG/CAHH/CAHJ/CAHK)

Condenser	Cassette	Btuh	SEER	SHR	EER	Ref.
S1CG9000	CAH_09	9,000	13.0	0.72	11.4	R410A
S1CG2000	CAH_12	12,000	13.0	0.67	11.5	R410A
S1CG8000	CAH_24	18,000	13.0	0.75	12.7	R410A
S1CG4000	CAH_24	24,000	13.0	0.69	12.1	R410A
S1CG3000	CAC_36	30,000	13.0	0.77	12.4	R410A
S1CG6000	CAC_36	36,000	13.0	0.72	11.5	R410A
S2CH9900 (2)	(2)CAH_09	18,000	13.0	0.76	11.5	R410A
S2CH9200 (1)	1 CAH_09 1 CAH_12	21,000	13.0	0.72	11.5	R410A
S2CH2200 (2)	(2)CAH_12	24,000	13.0	0.68	11.5	R410A

**Table 14** Heat pump systems (CAH\_ refers to CAHG/CAHH/CAHJ/CAHK)

Condenser	Cassette	Cooling Btuh	Heating Btuh	SEER	HSPF	SHR	EER	COP	Ref.
S1H9000	CAH_09	9,000	8,200	13.0	7.7	0.74	11.8	3.2	R410A
S1H2000	CAH_12	12,000	9,600	13.0	7.7	0.67	11.5	3.0	R410A
S1H8000	CAH_24	18,000	16,400	13.0	7.7	0.76	12.1	3.4	R410A
S1H4000	CAH_24	24,000	20,400	13.0	7.7	0.69	12.0	3.3	R410A
S2HH9900	(2) CAH_09	18,000	16,000	13.0	7.7	0.76	11.5	3.0	R410A
S2HH9200	1 CAH_09 1 CAH_12	21,000	17,600	13.0	7.7	0.72	11.5	3.0	R410A
S2HH2200	(2) CAH_12	24,000	19,000	13.0	7.7	0.68	11.5	3.0	R410A


**Cassette(s)**

**T2CG/T2HG, T3CG/  
T3HG and  
T4CG/T4HG 2, 3 and 4  
Zone  
Top Discharge**
**Table 15** Heat pump systems with cassette units (\_\_\_ = G, H, J, or K)

Condenser	Cassette	Cooling Btuh	Heating Btuh	SEER	HSPF	SHR	EER	COP	Ref.
T2HG2400	CAH_12/CAH_24	35,800	32,200	13.0	7.7	0.70	11.5	3.1	410A
T2HG4400	(2)CAH_24	47,500	42,000	13.0	7.7	0.70	11.6	3.2	410A
T2HG9800	CAH_09/CAH_24	27,000	24,600	13.0	7.7	0.74	11.6	3.2	410A
T2HG8800	(2)CAH_24	36,000	33,000	13.0	7.7	0.78	11.9	3.4	410A
T3HG9980	(2) CAH_09/CAH_24	36,000	32,500	13.0	7.7	0.77	11.5	3.3	410A
T3HG2240	(2) CAH_12/CAH_24	47,500	39,400	13.0	7.7	0.70	11.5	3.0	410A
T3HG2220	(3)CAH_12	36,000	27,600	13.0	7.7	0.70	11.5	3.0	410A
T3HG9920	(2) CAH_09/CAH_12	30,000	25,200	13.0	7.7	0.75	11.5	3.0	410A
T3HG9990	(3)CAH_09	28,400	24,000	13.0	7.7	0.77	11.5	3.1	410A
T4HG2222	(4)CAH_12	48,000	32,800	13.0	7.7	0.70	11.5	3.0	410A
T4HG9922	(2)CAH_09/(2) CAH_12	42,900	29,400	13.0	7.7	0.75	11.5	3.0	410A
T4HG9992	(3)CAH_09/CAH_12	39,600	33,200	13.0	7.7	0.75	11.5	3.0	410A
T4HG9999	(4)CAH_09	36,000	32,000	13.0	7.7	0.77	11.5	3.1	410A

**Table 16** Straight cool systems with cassette units (\_\_\_ = G, H, J, or K)

Condenser	Cassette	Cooling Btuh	SEER	SHR	EER	Ref.
T2CG2400	CAH_12/CAH_24	35,800	13.0	0.70	11.5	410A
T2CG4400	(2)CAH_24	47,500	13.0	0.70	11.6	410A
T2CG9800	CAH_09/CAH_24	27,000	13.0	0.74	11.6	410A
T2CG8800	(2)CAH_24	36,000	13.0	0.78	11.9	410A
T3CG9980	(2) CAH_09/CAH_24	36,000	13.0	0.77	11.5	410A
T3CG2240	(2) CAH_12/CAH_24	47,500	13.0	0.70	11.5	410A
T3CG2220	(3)CAH_12	36,000	13.0	0.70	11.5	410A
T3CG9920	(2) CAH_09/CAH_12	30,000	13.0	0.75	11.5	410A
T3CG9990	(3)CAH_09	28,400	13.0	0.77	11.5	410A
T4CG2222	(4)CAH_12	48,000	13.0	0.70	11.5	410A
T4CG9922	(2)CAH_09/(2) CAH_12	42,900	13.0	0.75	11.5	410A
T4CG9992	(3)CAH_09/CAH_12	39,600	13.0	0.75	11.5	410A
T4CG9999	(4)CAH_09	36,000	13.0	0.77	11.5	410A

## Test Unit Performance Data Sheet

**NOTICE**

The Test Unit Performance Data sheet is provided for use by a qualified service professional in the event that there is a problem with the unit. In order for our Technical Service Department to better serve you, please complete.

Have this information ready when calling. Make sure to include the model Number, Serial Number, and Date of installation.

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

Model Number	Date:
	Technician:
Serial Number	Mode:    Cooling
Indoor Section	Notes
Cassette Entering Air – DB	
Cassette Entering Air – WB	
Cassette Leaving Air – DB	
Cassette 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 Air handler	
Capacity Calculations	
DB – Temp Split at Air handler	
Test Summary	
Compressor Superheat	
Sub Cooling	

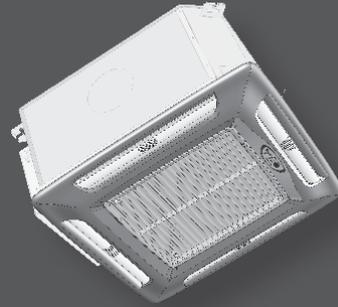
**EMI's Product Line**

**Indoor Units**

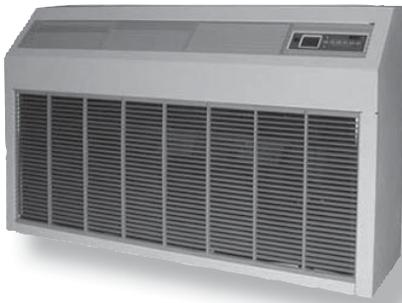
**WLCG/WLHG**  
*High Wall Air Handler*



**CACG/CAHG/CAHJ**  
*Cassette Air Handler*

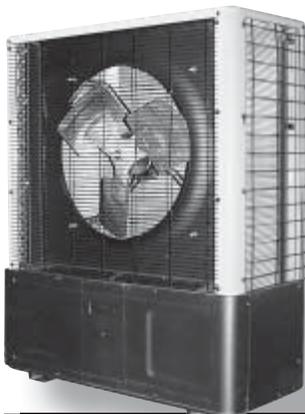


**UNCG/UNHG**  
*Universal Floor or Ceiling Air Handler*



**Outdoor Units**

**S2CH/S2HH Dual Zone**  
*Side Discharge*



**S1CG/S1HG**  
*Single Zone Side Discharge*

**T2CG/T2HG, T3CG/  
T3HG and  
T4CG/T4HG 2, 3 and 4  
Zone  
Top Discharge**

