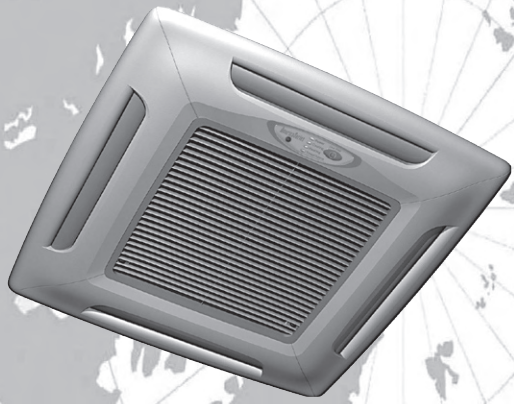
INSTALLATION, OPERATION AND MAINTENANCE MANUAL

# CACA/CAHA & CACB/CAHB CASSETTE DUCTLESS SPLIT SYSTEM AIR HANDLERS

***HEAT PUMP***
***Nominal Circuit Capacities:***
**9,000 - 12,000 - 18,000 - 24,000 Btuh**

***STRAIGHT COOL***
***Nominal Circuit Capacities:***
**30,000 - 36,000 Btuh**

EMIO AmericaSeries
*Comfort Where It Counts.*



**CAHB12**
*Model Shown*

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An ECR International Brand
An ISO 9001-2000 Certified Company
P/N 240006022 Rev. 1.4 [1/08]

## INSTALLATION, OPERATION AND MAINTENANCE MANUAL

This manual is intended as an aid to a qualified service personnel for proper installation, operation, and maintenance of EMI AmericaSeries high efficiency air handlers. Carefully read these instructions 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.

***Shipping Damage MUST be Reported to the Carrier IMMEDIATELY!!! Examine the exterior.***

### TO THE INSTALLER

***EMI AmericaSeries Units are Approved for R-22 Refrigerant ONLY.***

(1) Retain this manual and warranty for future reference.

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

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

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

• Model Number_____

• Serial Number_____

• Date of installation_____

### SAFETY INSTRUCTIONS

*This unit has been designed and manufactured to meet international safety standards.*

- Read all instructions before installing or using the EMI AmericaSeries high efficiency air handlers. Locate and install this unit only in accordance with these instructions. Use this unit only for its intended purpose as described in this manual. Care must be taken to obtain the best results.
- Check the rating plate on the EMI AmericaSeries air handlers before installation to make certain the voltage shown is the same as the electric supply to the unit.
- The EMI AmericaSeries air handlers 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 EMI AmericaSeries air handlers. Ensure that there is no power to any part of the equipment and both the indoor and outdoor units are switched off.
- Do not use the EMI AmericaSeries air handlers if it has damaged wiring, is not working properly, or has been damaged or dropped.
- Follow all safety instructions in this manual and on any tags or labels on the unit.

*[Save These Instructions]*

**⚠ WARNING ⚠**

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

## PRODUCT DESCRIPTION

The EMI AmericaSeries 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*, electric heat is a factory installed option ONLY ***(there are no field installed electric heat kits available)***, fresh air inlet and branch duct knockouts, and motorized air vanes (Cassette 24 & 36 only). 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.

** Condensate pump lift measured from the base or bottom of the unit.*

These American made Cassette Air Handlers produce system SEER's meeting or exceeding 13, when matched with EMI's S1CA/S1HA single zone, S2CA/S2HA dual zone side discharge condensing units, T2CA/T2HA, T3CA/T3HA, or T4CA/T4HA top discharge multi-zone condensing units. Refer to specifications contained in this document.

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

## STANDARD FEATURES

▲▼***Materials of Construction -*** Galvanized steel cabinet with fire-resistant thermal and acoustic foam insulation and light grey high-impact ABS fascia, and an 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, Cassette 12 & 24, are designed with fire retardant plastic or aluminum impellers.
- Twin Fan models, Cassette 36, are 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).
- Fresh air intake capability on three sides of cabinet (only two on the Cassette 12's).
- Four plastic air vanes; motor driven with auto sweep or fixed position stop setting on the Cassette 24 and 36 models (Cassette 12's are equipped with manually adjusted air vanes).

## STANDARD FEATURES *Continued*

▲▼***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 R22 refrigerant only.

▲▼***Controls and Components*** *(factory installed or supplied):*

- Connections for 24V remote wall thermostat.
- Custom control board featuring programmability, configuration, and multiple modes of operation. (CACB/CAHB 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.

## STANDARD FEATURES
*Continued*

▲▼***System Options:***
- Infrared Hand Held Controller (CACB/CAHB only)
- 24V remote wall thermostat
- Electric Heat (@ 230V)
  - 1.5 kW (Cassette 12's)
  - 3 kW (Cassette 24's)
  - 5 kW (Cassette 36's)

▲▼***Electromechanical Operation (Standard):*** An optional thermostat can be obtained through EMI or your local distributor.

> ***NOTE:*** make sure the thermostat is suitable for unit operation (i.e., cooling only, cooling/electric heat, heat pump.)

▲▼***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 is fitted to stop the cooling action (shut 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 Cassette 12's or driven by an electric motor on the Cassette 24's and 36's. 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 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.

## PREPARATION FOR INSTALLATION

▲▼***Unpacking:*** The Cassette fascia and main chassis are packaged together for increased protection.
- Remove the banding straps and lift the cardboard lid.
- Fascia is packed in bubble wrap and on top of the chassis (fascia is not attached to the chassis for shipping).
- Cardboard template is between the chassis and the fascia (***DO NOT*** throw template away with packaging!).
- Lift the fascia and template from the box and set aside.
- Remove the Cassette chassis from the box utilizing the four corner brackets for lifting. ***DO NOT*** use the drain or refrigerant connections for lifting.
- In order to protect the fascia from dirt and damage, it should be returned to the box until it is ready to be installed.

▲▼***Blanking off:*** When branch ducting is to be used, two polystyrene pieces for blanking off fascia openings are Included with the fascia packing. Up to two non-adjacent sides may be blanked off.

> ***DO NOT*** throw the two polystyrene blanking off pieces out with packaging!

## BLANKING OFF *(Optional)*

The fascia discharge slot(s) will need blanking off when ducts are used to channel the conditioned air to other areas. The two polystyrene blanking off strips (provided) will need to be positioned in the fascia discharge slots to direct the air to the ducts.

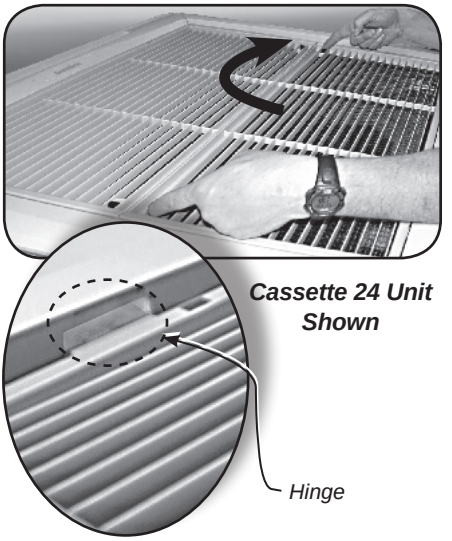
If the fascia discharge slot needs blanking off:

1. Remove the inlet grille(s) and filter(s).

*The Cassette 12 unit has is one grille and one filter.*

***Cassette 12 Unit Shown***

*Cassette 24 units have two hinged grills that open in the middle and two filters.*




***Cassette 24 Unit Shown***

***Cassette 36 Unit Not Shown***

*The Cassette 36 units have three hinged grills and three filters.*

2. Once the grille(s) and filter(s) are removed turn the fascia over so the polystyrene insulation is exposed.

3. Take one of the polystyrene blanking off pieces and push it into the recess in the polystyrene fascia insulation.

***NOTE:*** *Up to two non-adjacent sides can be blanked off.*

## PISTON/ORIFICE INSTALLATION INSTRUCTION

***Important** - Replace the existing piston (**before** installing the unit) with the piston supplied in the Kit Bag: when a Cassette 24 air handler is matched with a T2CA/T2HA4400, T2CA/T2HA2400, T2CA/T2HA8400, T3CA/T3HA9240, T3CA/T3HA2240, or T3CA/T3HA9940 condenser which has a 24,000 Btuh compressor ("4" in the capacity decoding field) the piston will need replacement **only** on the 24,000 Btuh zone. **

*EMI air handlers units contain the appropriate piston for the model. Refer to this document to determine if a change is required based on the condenser rating. If the match is **not listed** below **no piston change** is required. (See chart)*

| Model # Air handlers | Condenser Btuh | Factory Installed Piston-Orifice Size | Field Changeover Piston-Orifice Size |
|---|---|---|---|
| CAHA / CAHB24 | T2CA/T2HA4400<br>T2CA/T2HA2400<br>T2CA/T2HA8400 | .059" | .063" |
| CAHA / CAHB24 | T3CA/T3HA9240<br>T3CA/T3HA2240<br>T3CA/T4HA9940 | .059" | .063" |

*** "4" in the capacity decoding field = 24,000 Btuh*

## CASSETTE PREPARATION AND POSITIONING

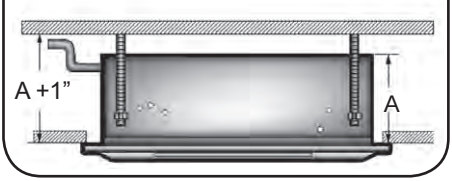
### POSITIONING

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

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

***Figure #1***

***Dimension A + 1" = minimum space above the false ceiling for installation***




| Cabinet | Dimension A |
|---|---|
| Cassette 12 | 11.84" (0.3 m) min. |
| Cassette 24 | 12.55" (0.32 m) min. |
| Cassette 36 | 14.51" (0.37 m) min. |

## ELECTROMECHANICAL THERMOSTAT

An optional thermostat can be obtained through EMI or your local distributor. 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 CASSETTE CEILING AIR HANDLERS

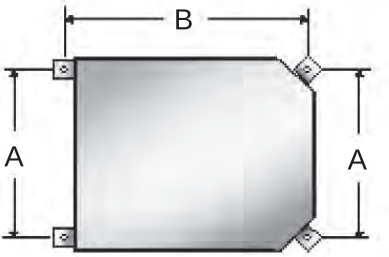
▲▼***Ceiling opening:***

- 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.

An opening in the false ceiling will have to be cut to the following sizes:

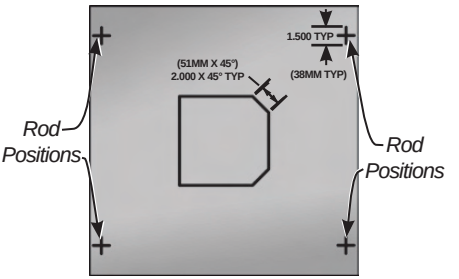
| Cabinet | Opening Size |
|---|---|
| Cassette 12 | 23¼" x 23¼" (591 x 591mm) |
| Cassette 24 | 33⅞" x 33⅞" (860 x 860mm) |
| Cassette 36 | 46" x 33⅞" (1168 x 860mm) |

***Figure #2***




| Cabinet | A | B |
|---|---|---|
| Cassette 12 | 19.50" (495mm) | 22.87" (581mm) |
| Cassette 24 | 29.19" (740mm) | 30.80" (782mm) |
| Cassette 36 | 29.19" (740mm) | 43.06" (1094mm) |

A template for ceiling cut-out and rod positions can be found with the Cassette unit.



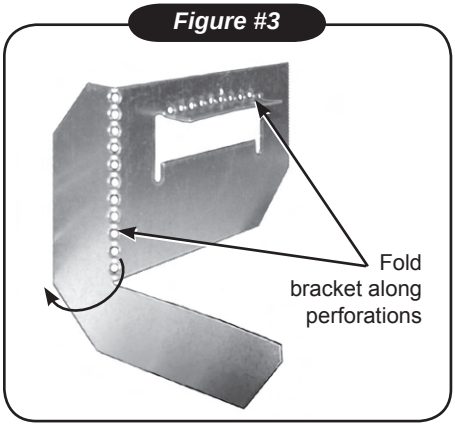

**NOTE:** *Make sure the ceiling grid is supported separately from the Cassette. The ceiling must not be supported by any part of the Cassette unit, fascia or any associated wiring or pipe work.*

1. Use the template (provided) 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 ***Figure #2***.

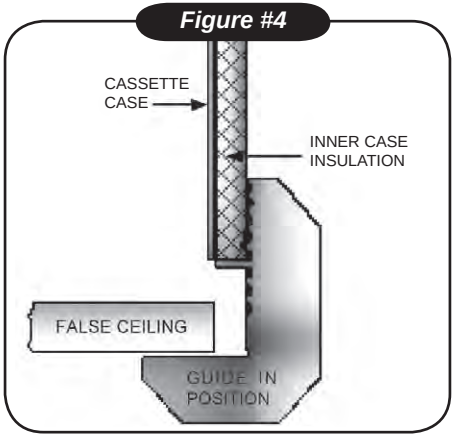
3. Prepare the installation guides by folding the metal bracket by hand along the perforations, see ***Figure #3***.

***Figure #3***




4. Lift the Cassette onto the hanging rods. Level at the correct distance from the ceiling with the aid of the installation guides as shown ***Figure #4***.

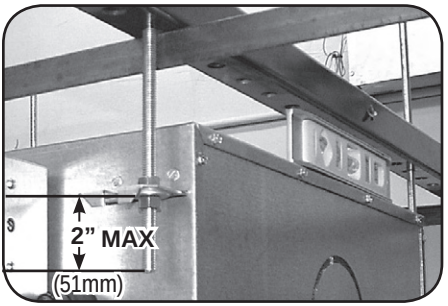
***Figure #4***




5. Secure unit in position with locknuts and washers on either side of the Cassette bracket.

6. Ensure threaded rod does not protrude more than 2" (51mm) below the mounting bracket.

***NOTE:*** *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.*

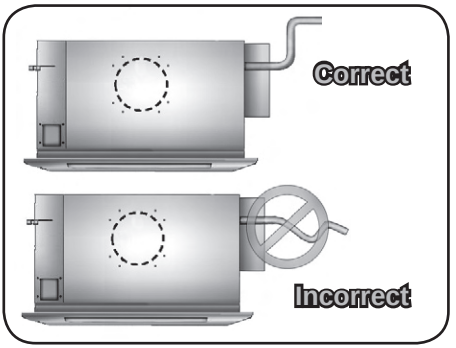


The unit can now be piped up in accordance with good refrigeration and/or plumbing practices.

The Cassette is supplied with a 1/2" I.D. flexible PVC hose for connection to copper or plastic drain pipework. When installing the Cassette the following points should be noted:

1. Maximum pump lift is 36" (0.9m).
2. The highest point in the condensate pipework 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.

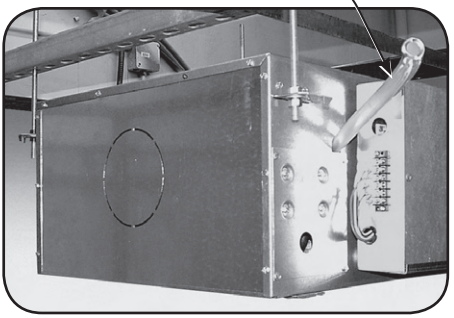
***NOTE:*** *There is a check valve at the pump discharge to prevent water from draining back into the unit. This piping technique will minimize any issues should the check valve become stuck open from airborne debris.*




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 not be any 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 volume of condensate from several Cassettes. It is also recommended to have an air vent in the condensate pipe work to prevent any air locks.

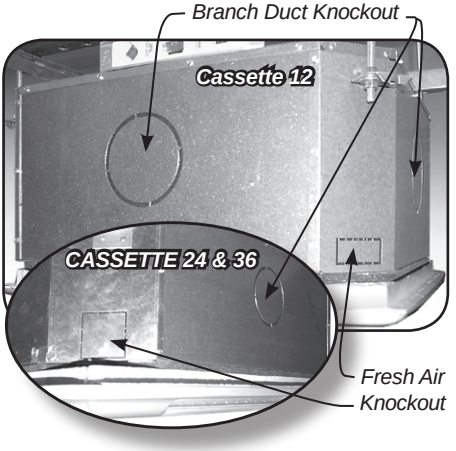
***NOTE:*** *A drain line vent may be required to prevent siphoning of water from the drain pan and associated noise.*

*Condensate Drain Connection*



▲▼***Duct collars:*** Branch duct and fresh air duct collars can be attached to the Cassette chassis by following the steps below:

1. Locating the knock-out holes.



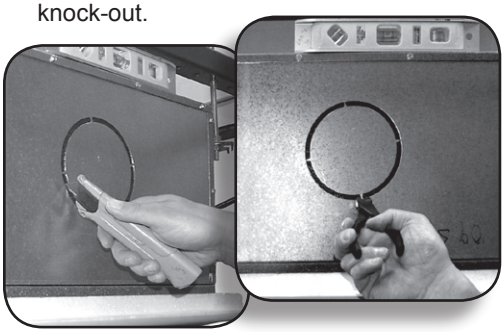

***NOTES:*** *The number of knock-outs varies depending on unit size.*

- *Branch duct knock-outs are 5¼" (133mm) round*
- *Fresh air knock-outs are 1¼" x 2½" (32 x 64mm) rectangular on Cassette 12 and 3" (76mm) square on Cassette 24 & 36.*

***Recommendation:*** *No more than 10' (3m) of branch duct or fresh air duct should be installed.*

## CONDENSATE PIPING AND DUCT CONNECTIONS

2. Cut the black insulation around the knock-out.



3. Snip the tabs holding the knock-out in place.
4. Remove the metal knock-out and the black insulation behind it.
5. Attach the duct collars (field supplied) to the chassis using self tapping screws. (Repeat steps 1-5 for remaining duct work.)

## REFRIGERATION PIPING

Once the unit is mounted and level the Cassette piping connections can be made.

### PIPING DO'S AND DON'TS

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

***NOTE:*** Refrigerant and condensate pipes should be insulated right up to the Cassette chassis.

### PIPE INSTALLATION NOTES

1. Maximum equivalent pipe run should be no more than 100' (30.5m), with a maximum rise of 35' (10.7m).
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.

The Cassette is equipped with a Flo-Rater/Piston Expansion device. Connections are sweat type.

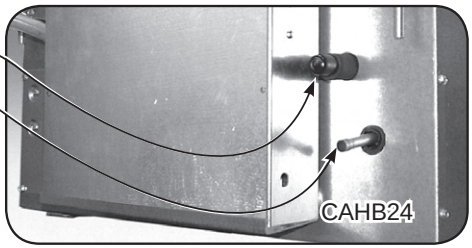
The suction line (large) must be insulated the entire length with closed cell, foam tube insulation. Do not insulate the liquid line (small). Connect the outdoor unit according to the instructions supplied with unit.

All horizontal piping runs should be without dips to trap the oil and slightly inclined, so as to encourage oil flow in the direction of the compressor.

Any change in the diameter of the tubing ***MUST be made at the indoor connection***. Line-set diameter is determined by the condenser valve size.

***Use of a larger line can harm the compressor!***

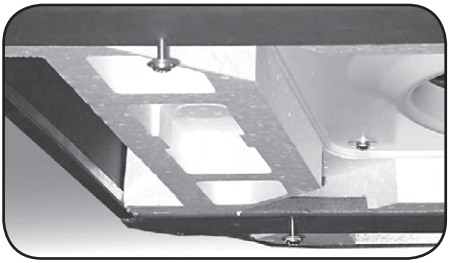
When matching a the Cassette 24 with an 18,000 Btuh condenser, the interconnecting suction line needs to be 5/8" O.D. to match the condenser service valve connection. Therefore the 3/4" O.D. suction connection of the Cassette 24 unit needs to be reduced to 5/8" at the Cassette 24 unit connection to match the 5/8" line of the condenser.



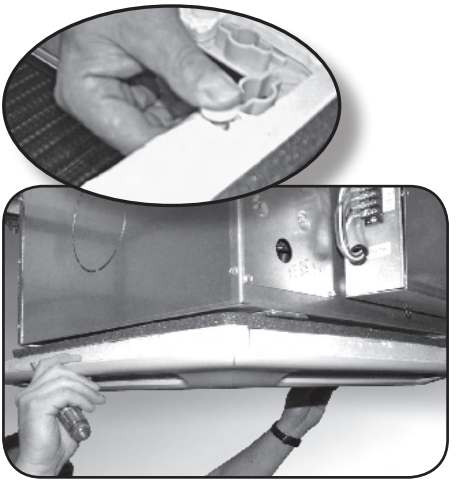

*5/8" bushing goes on suction line*
*(**Only** when matched to an 18,000 Btuh condenser)*

## 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.

***NOTE:*** The fascia only fits correctly one way. Position the fascia so that the AmericaSeries logo is on the control box end of the chassis.

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.

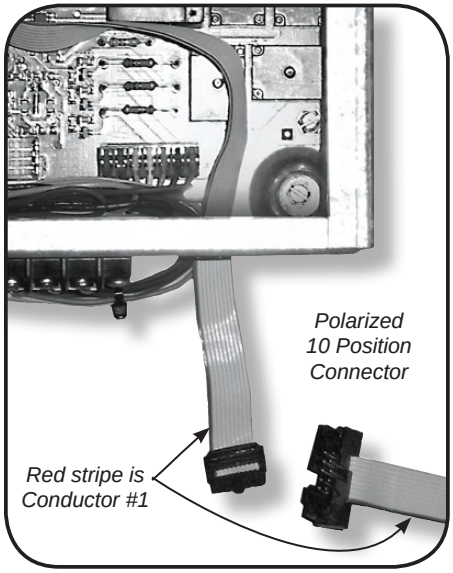
*Female vane motor plug on chassis*

*Male vane motor plug on fascia*

   b) Route the wires in a way that ensures they won't become trapped, cut, broken or chaffed.

5. ONLY Cassette "B" models (CACB/CAHB) contain a second cable connection to the control box for the Infrared Unit Mount Control.

a) Ensure that the polarized (10 position) connector is in the proper orientation and connected.

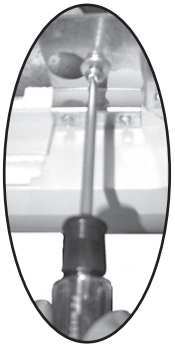



b) Route the wires in a way that ensures that they won't become trapped, cut, broken, or chaffed.

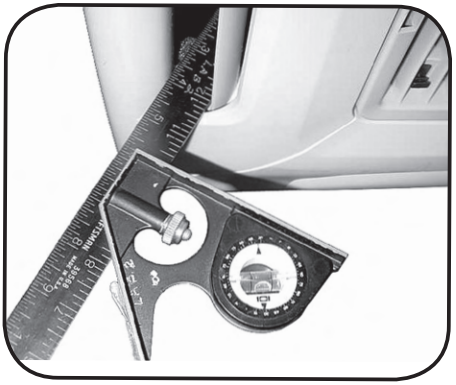
6. The fascia can now be tightened up to the Cassette chassis. ***Make sure a good seal is obtained between fascia and chassis, this is necessary to prevent recirculation.***

***NOTE:*** Do not over tighten the bolts. To do so may cause damage to the fascia and drain pan.

With filter(s) in place, the inlet grille(s) can now be installed onto the fascia.



To complete the installation adjust the louver position to 30° from plumb, this is recommended for "optimum" system performance.



## Electrical Wiring

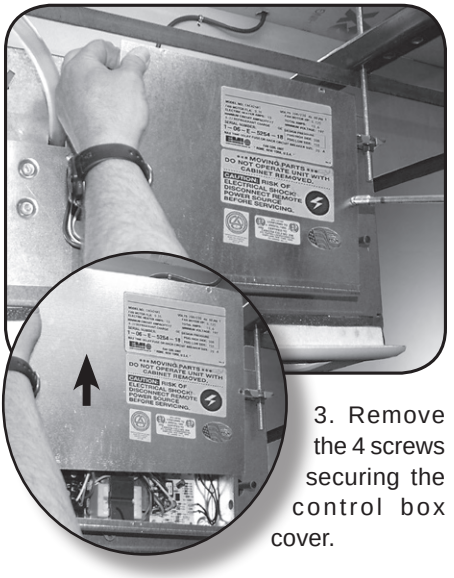
The standard unit voltage is 208/230V (60Hz, 1Ph). Check the unit's rating plate for your models' electrical requirements.

- The wires should be capable of carrying the maximum load current under non-fault conditions at the stipulated voltages.
- Avoid large voltage drops on cable runs, particularly in low voltage wiring.
- The correct cable size must be used to ensure a voltage drop of less than 1 Volt in the control wiring.
- Once the refrigeration pipe work is complete, the electrical supply can be connected.
- Low volt wiring must be at least 18 AWG.

***NOTE:*** All wiring should be in accordance with the National Electrical Code (NEC) and the local building codes.

1. ***Make sure power is off.***
2. Inspect the existing wiring for any deficiencies such as cut or frayed wires. Replace if any such wiring if found.

## Electrical Wiring- *Continued*




3. Remove the 4 screws securing the control box cover.

4. Slide cover up and out to remove.

5. The rating plate is located on the outside of control box cover (see *Low Volt Interconnecting Wiring* section for location of wiring diagram).

6. Check the unit rating plate for circuit ampacity and breaker or fuse size. **Use only HACR type breakers.** Select the proper wire for the ampacity rating.

7. Each unit must have a separate branch circuit protected by a fuse or breaker. Refer to the unit rating plate for the proper wire and breaker or fuse size.

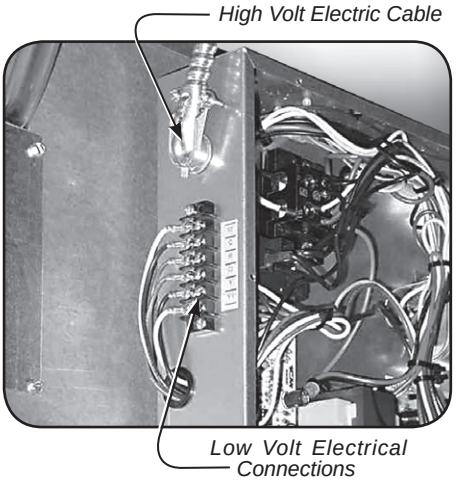
8. It is also recommended that a local disconnect switch be connected within 3' of the unit. In some areas this may be a code requirement.

## High Volt Electrical Wiring

1. Route the cable through the appropriate hole in the control box for the High Volt electrical wiring.

2. Secure the cable.

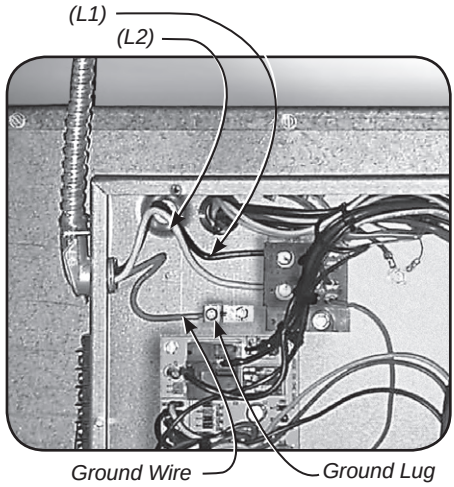
3. Refer to the wiring diagram (see following page) to connect the ground wire to the ground lug.



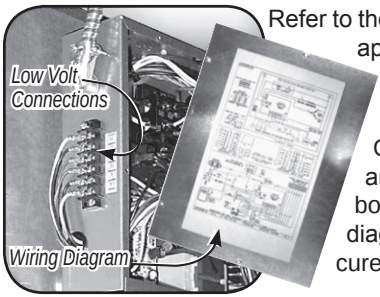
## High Volt Electrical Wiring - *Continued*

4. Then refer to the wiring diagram to connect the power wire to (L1) and the other wire to (L2) at the power connector location (terminal block).

*(See "Electrical Specifications" Section in the back of this manual for more information.)*




## Low Volt Interconnect Wiring




Refer to the wiring diagram to connect the low Volt wiring to the appropriate terminals. The wiring diagram located on the inside of the control box cover.

Once the connections are made replace control box cover with the wiring diagram facing in and secure with the four screws.

***NOTE:*** *All low volt interconnect wiring must be at least 18 AWG.*

**The 24V control transformer is located in the air handler unit.** This provides low volt control power to both the air handler and condenser. Depending on the models selected, the ***low volt*** interconnect control wiring may be different.

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. In this case, ensure that any unused wires are insulated to prevent them from making contact with the junction box or other metal surfaces.

If the indoor unit has electric heat then a "W" connection is required between the thermostat and the indoor unit.

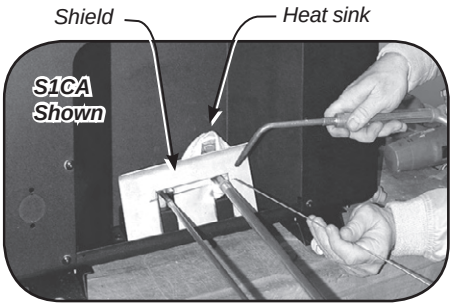
***IMPORTANT:***
***It is illegal to discharge refrigerant into the atmosphere. Use proper reclaiming methods and equipment when installing or servicing this unit.***

***Finish all pipe connecting before proceeding to charging the system.***

Follow the instructions in the outdoor unit for line evacuation, opening service valves, and final charge adjustments. Operation charts and charge tables can be found in the EMI Condenser IOMs.

1. Clean the ends of tubing and insert into fittings.

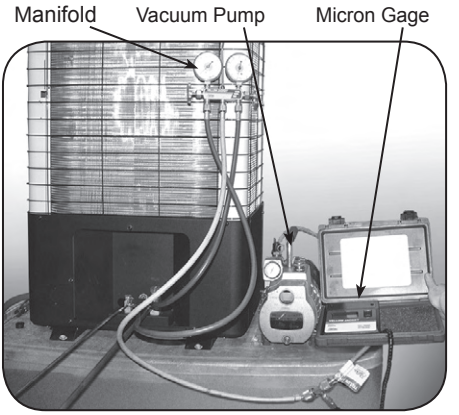
2. Protect the valves by wrapping with a wet rag "heat sink" before brazing.



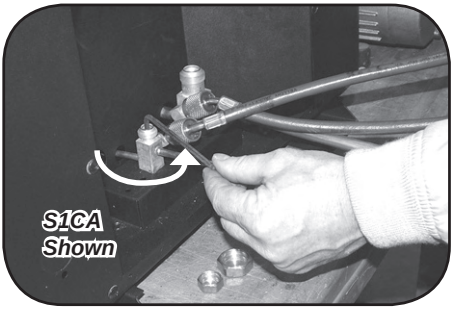

3. The use of a heat shield is recommended to protect the paint. (A heat shield can be made from scrap metal.)

4. Braze tubing into fittings.

5. Attach manifold set.

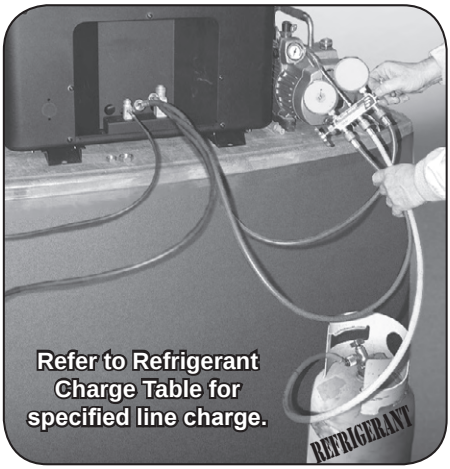



6. Evacuate line to 500 microns or less to ensure all moisture has been removed and there are no leaks.




7. 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.

*Refer to Charts in condenser manual to "fine tune" the refrigerant charge.*




8. Charge to proper weight, charge based on the length of interconnect (see below).

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

***IMPORTANT NOTES:***

I. To find the charge adjustment and system charge for any air handlers and tubing length:

*Line Adjustment = (Line Chg/Ft) x Line Length*
*System Total = Factory Charge + Line Adjustment*

2. Round to the nearest ounce and allow for gauges and hoses.
3. Use R22 refrigerant.

***NOTE:*** *CAH_ refers to CAHA or CAHB*
*CAC_ refers to CACA or CACB*

| S1CA/S1HA REFRIGERANT CHARGE TABLE | | | | |
|---|---|---|---|---|
| **Condenser** | **Air handlers Pairing** | **Line Chg/Ft** | **Factory Charge** | **Ref.** |
| S1CA/S1HA9000 | CAH_12 | .25 oz./ft (23g/m) | 37 oz. (1048g) | R-22 |
| S1CA/S1HA2000 | CAH_12 | .25 oz./ft (23g/m) | 40 oz. (1134g) | R-22 |
| S1CA/S1HA8000 | CAH_24 | .56 oz./ft (52g/m) | 51 oz. (1446g) | R-22 |
| S1CA/S1HA4000 | CAH_24 | .56 oz./ft (52g/m) | 65 oz. (1842g) | R-22 |
| S1CA3000 | CAC_36 | .56 oz./ft (52g/m) | 72 oz. (2041g) | R-22 |
| S1CA6000 | CAC_36 | .56 oz./ft (52g/m) | 90 oz. (2551g) | R-22 |

| S2CA /S2HA REFRIGERANT CHARGE TABLE | | | | |
|---|---|---|---|---|
| **Condenser** | **Air handlers Pairing** | **Line Chg/Ft** | **Factory Charge** | **Ref.** |
| S2CA/S2HA9900 | (2) CAH_12 | .25 oz./ft (23g/m) | 28 oz (794g) | R-22 |
| S2CA/S2HA2200 | (2) CAH_12 | .25 oz./ft (23g/m) | 33 oz (936g) | R-22 |
| S2CA/S2HA9200 | (2) CAH_12 | .25 oz./ft (23g/m) | 28 oz./ 33 oz. (794/936g) | R-22 |

| TOP DISCHARGE REFRIGERANT CHARGE CHART | | | | |
|---|---|---|---|---|
| **Circuit Capacity** | **Line Chg/Ft** | **A/C Factory Charge** | **H/P Factory Charge** | **Ref.** |
| 9,000 | .25 oz./ft (23g/m) | 28 oz. (794g) | 42 oz. (1190g) | R-22 |
| 12,000 | .25 oz./ft (23g/m) | 30 oz. (850g) | 46 oz. (1304g) | R-22 |
| 18,000 | .56 oz./ft (52g/m) | 48 oz. (1360g) | 63 oz. (1786g) | R-22 |
| 24,000 | .56 oz./ft (52g/m) | 60 oz. (1701g) | 80 oz. (2268g) | R-22 |

Refer to low voltage interconnect diagrams ***Figure #12*** and ***Figure #13.***

> ***NOTE:*** *Apply power to the Condensing Unit's crankcase heater for 24 hours before start up to boil off any liquid refrigerant that may be present in the compressor.*

1. After 24 hours, the compressor should be isolated by removing the connection at the "Y" terminal on the outdoor unit. Main power can now be applied to the indoor and outdoor units. A system electrical check can now be carried out.

***CACA/CAHA – REMOTE THERMOSTAT OPERATION:***

2A. Switch on the indoor Cassette unit and check that the fan cycles correctly.

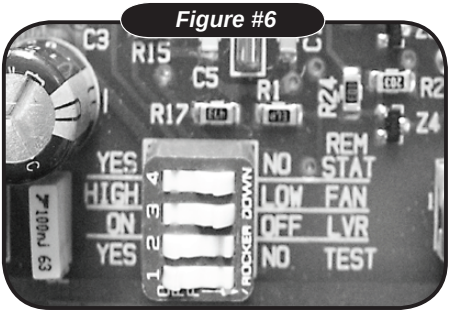
3A. On models CAHA24 and CACA36, check that the motorized vane sweep functions correctly by toggling the function on or off, via the toggle switch on the side of the electrical box ***Figure #5***.

***Figure #5***

*Toggle Switch*

4A. For units with electric heat, check the operation of the heat elements by switching the system to the heating mode and the setpoint above the room temperature.

***Figure #6***




**CACB/CAHB – UNIT MOUNT CONTROL USING THE *OPTIONAL* INFRARED HAND HELD CONTROLLER:**

2B. Verify that the DIP switch #4 (Remote Thermostat Operation) is OFF and #1 *(Test Mode)* is ON within the control box of the air handler. Refer to ***Figure #6***. All subsequent operations are accomplished with the *Optional* Infrared Hand Held Controller. (See *Optional* Infrared Hand Held Controller Operation section of this document for details.)

3B. Turn on the unit, verify fan operation and louver function. Adjust fan speed and louver function with the *Optional* Infrared Hand Held Controller.

4B. If the unit has *Optional* Electric Resistance Heat, ensure that the *Optional* Infrared Hand Held Controller is properly configured for the outdoor unit.

***Cooling Only Systems*** (See *Configuration Mode* section of this document for details)

Heat Source – ON
Heat Pump – OFF

Place the *Optional* Infrared Hand Held Controller into *Heat Mode* with the setpoint temperature above room temperature. Verify that the supply air is warmer than room temperature.

***Heat Pump Systems*** (See Configuration Mode section of this document for details)

Heat Source – ON
Heat Pump – ON

Place the *Optional* Infrared Hand Held Controller into heat mode with the set-point temperature at least 2°F above room temperature. Verify that the supply air is warmer than room temperature.

**CACB/CAHB – *REMOTE THERMOSTAT OPERATION:***

2C. Verify that the DIP switches are configured properly within the control box of the air handler. Refer to ***Figure #6***. (See Sequence of Operation – *Remote Thermostat Mode* section of this document for details.)

#4 (Remote Thermostat Operation)
– ON
#3 (Remote Thermostat Fan Speed Selection)
– OFF – Low Fan Speed
– ON – High Fan Speed
#2 (Remote Thermostat Louver Operation)
– OFF – No Louver Motion
– ON – Moving Louvers
#1 *(Test Mode)* is
– ON

3C. Using the wall thermostat turn on the fan, verify fan operation and louver function. Adjust either with the DIP switches to preference.

4C. If the unit has *Optional* Electric Resistance Heat, verify the operation of the heating elements. (See Sequence of Operation – Remote Thermostat Operation section of this document for details) and (Refer to the Thermostat Owner's Manual) for additional details regarding the setpoint required to energize the heating elements. Due to the large number of compatible thermostat models that it is possible to apply to this system, comprehensive instructions can not be provided. For additional assistance, please contact our Technical Service Department at 1-800-228-9364.

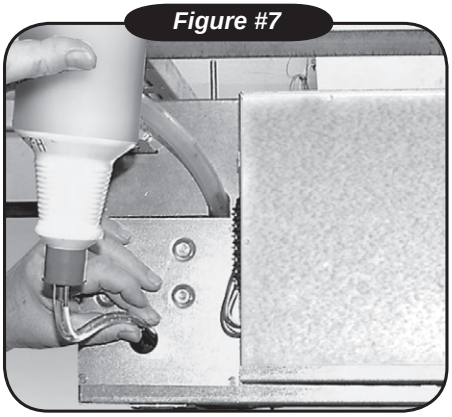
5. Ensure that the Condensing Unit start up procedure has been carried out as detailed in the corresponding installation manual.

6. The compressor signal "Y" (disconnected in step 1) can now be reconnected and main power applied to the outdoor unit.

7. To check the operation of the condensate pump remove an adjacent ceiling tile to access the condensate pump access:

   • Insert a squeeze water bottle nozzle through the opening in the condensate pump access panel and fill drain pan. Refer to ***Figure #7.***

***Figure #7***



   • 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.

8. Ensure that all covers, panels and filters are in place and discharge louvers are correctly positioned.

9A. ***ALL CACA/CAHA COOLING ONLY SYSTEMS:***

Turn the system power on and set the cooling mode to the lowest thermostat set point to run the compressor.

***ALL CAHA HEAT PUMP SYSTEMS:***

Set the heating mode to the highest thermostat set point to run the compressor.

***NOTE:*** The Anti-Short Cycle Timer remains in effect on the CACA/CAHA control, compressor restart will take three minutes or more.

9B. ***ALL CACB/CAHB SYSTEMS:***

Place the system controls into cooling mode, with the setpoint below room temperature. Verify compressor start up, noise, vibration, and overall system operation. Then place the control setpoint above room temperature, verify that the compressor shuts down, wait for the blower post purge to complete, and verify that the system shut down properly. Be sure to return the DIP switch #1 *(Test Mode)* to OFF before leaving the system.

***HEAT PUMP SYSTEMS ONLY***

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. 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).

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

If using the unit mounted control and the *Optional* Infrared Hand Held Controller refer to the "*Optional* Heat Pump with Electric Heat (2-stage heating)" section of this document or the Thermostat Owner's Manual for additional information. If additional assistance is required, please contact our Technical Service Department at 1-800-228-9364. Be sure to return the DIP switch #1 *(Test Mode)* to OFF before leaving the system.

***NOTE:*** 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.

10. Repeat the above procedure for all Cassettes in the same systems.

## EMI MICROPROCESSOR CONTROLLED AIR HANDLER OPERATION INSTRUCTIONS

### *CASSETTE CONTROL DIP SWITCH SELECTIONS (CAHB/CACB ONLY)*

**⚠ WARNING ⚠**

***Before removing the control box cover to select DIP switch settings, make sure that all power is removed from both the indoor Cassette unit and outdoor condenser. Failure to do so can result in serious injury or electric shock.***

A set of DIP switches is located on the main circuit board inside the control box. These DIP switches are used to select the type of user interface for the Cassette. The DIP switches also set the fan speed and louver functions for Remote Thermostat Operation, and the use of *Test Mode*. Below is a list of DIP switch settings.

***NOTE:*** For infrared hand held operation an *optional* Infrared Hand Held Controller is required.

***Table # 1*** – DIP Switch Selections

| DIP Switch | Setting | Operation | Factory Setting |
|---|---|---|---|
| ***#1*** Test Mode | **ON** | Enables Test Mode. All timers are shortened for check of unit operation. | OFF |
| | **OFF** | Disables Test Mode. | |
| ***#2*** Remote Thermostat Louver Operation | **ON** | While DIP Switch #4 is "On" enables louver operation. | OFF |
| | **OFF** | While DIP Switch #4 is "On" disables louver operation. | |
| ***#3*** Remote Thermostat Fan Speed Selection | **ON** | While DIP Switch #4 is "On" selects Fan Speed High. | ON |
| | **OFF** | While DIP Switch #4 is "On" Selects Fan Speed Low. | |
| ***#4*** Remote Thermostat Operation | **ON** | Disables Infrared Hand Controller and enables Remote Thermostat Operation. Also Enables DIP Switches #3 and #2 | ON |
| | **OFF** | Enables Infrared Hand Controller and disables Remote Thermostat Operation. | |

***#1 Test Mode***

*Test Mode* is a feature whereby timers are reduced or eliminated and can be used while in *Remote Thermostat or Infrared Hand Held Controller Mode. Test Mode* is intended to aid the technician while checking system operation after installation or during troubleshooting. *Test Mode* is not intended for the end user or for normal operation.

To enter *Test Mode* set DIP switch #1 to ON. While in *Test Mode* the Timer/Alarm LED will flash 5 times and repeat. The operation of the unit can be checked, using shortened time delays. To exit the *Test Mode* set DIP switch # 1 to OFF.

The three (3) minute anti-short cycle delay and the two (2) minute minimum on time shall be four (4) times faster, forty five (45)

seconds and thirty (30) seconds respectively.

The sixty (60) second post-purge timing shall be reduced to fifteen (15) seconds and the thirty (30) second stagger start timing shall be reduced to seven and a half (7.5) seconds.

***CAUTION:*** Do not cycle the unit on and off repeatedly while in *Test Mode* as this will cause damage to the compressor. Do not leave the unit in *Test Mode*.

***#2 LOUVER OSCILLATION ON/OFF*** *(APPLIES TO MODELS CAHB24 AND CACB36 ONLY)*

DIP switch #2 is for Remote Thermostat Mode only and will enable or disable louver operation. By setting DIP switch #2 to ON the louvers will oscillate while the fan is on. Setting to OFF will disable louver oscillation. The louvers will remain fixed in their last position.

***#3 REMOTE FAN SPEED SELECTION***

DIP switch #3 is for Remote Thermostat Mode only and will allow the selection of fan speed. By setting DIP switch #3 to ON the fan speed will be set at High. Setting to OFF the fan speed is set to Low.

***#4 REMOTE THERMOSTAT OPERATION***

The Cassette is capable of being controlled though a remote thermostat or an *optional* Infrared Hand Held Controller. For remote thermostat operation set DIP switch #4 to ON or REM STAT YES. While in Remote Thermostat Mode, the Cassette control will ignore all signals from the Infrared Hand Held Controller. By setting to DIP switch #4 to ON, this enables DIP switches #3 and #2. Also the clean filter time will default to 1000 hrs.

***UNIT MOUNTED KEY PAD INTERFACE***

The Cassette User Interface uses Light Emitting Diodes (LED's) to display the operational modes of the unit. ***Figure #8*** There are four (4) LED's and one (1) Clear Filter Warning button. The Power LED will illuminate to show the unit is on or in stand-by awaiting commands depending on the mode of operation. When the control is configured for Remote Thermostat Operation the Power LED will illuminate constantly so long as power is applied to the unit. When configured for the *optional* Infrared Hand Held Controller the power LED will illuminate when the unit is in the *On Mode*. When in the *Off Mode* the power LED will be dark.

The Cooling LED will illuminate when the system is operating in Cooling. The Heating LED will illuminate when the unit is operating in Heating.

The Timer/Alarm LED will illuminate when the unit is placed in *Sleep Timer Mode* through the *optional* Infrared Hand Held Controller. The Timer/Alarm LED will also blink or flash different codes, indicating a control fault or that the unit is *Test Mode*.

When the Clean Filter Alarm code is flashing the Timer/Alarm LED (4 blinks), pushing the Clear Filter Warning Button for three (3) seconds will clear the alarm. The control will respond with a beep to indicate that the timer has been reset. At that time the Cassette's filter(s) should be removed and cleaned.

***NOTE:*** When power is first applied to the Cassette or after a power outage there is a three (3) minute delay before the compressor or electric heat will energize. This is to protect the unit from short cycling.

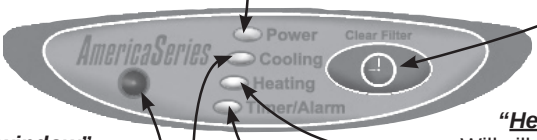
## CASSETTE USER INTERFACE

*Figure #8*

### Unit Mount Control

***"Power LED"*** In *Remote Thermostat Mode*, will illuminate when power is applied to the unit. In *Hand Held Controller Mode*, will illuminate while the Cassette is in the *On Mode*.

***"Clear Filter Warning Button"*** When held for 3 seconds will clear the Clean Filter warning.




***"Infrared receiver window"*** Receives Infrared signals from the *Optional* Hand Held Controller.

***"Heating LED"*** Will illuminate while calling for heat.

***"Cooling LED"*** Will illuminate when the system is running in Cooling.

***"Timer/Alarm LED"*** Will illuminate steady when the Cassette is in *Sleep Timer Mode*. Will also flash to indicate a fault code.

*Figure #9*

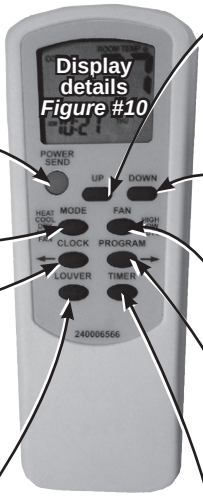
### *Optional* Infrared Hand Held Controller

***"POWER/SEND"*** When pressed momentarily, used to turn the Cassette on or off. When held for two seconds, transmits all settings to the main controller.

***"MODE"*** Used to select mode of operation, *Heat, Cool, Auto Change Over, Dry* and *Fan Modes*.

***" ← CLOCK"*** When held for 3 seconds used to enter the *Set Time Mode*. When pressed again momentarily, will exit the *Set Time Mode*. Also used to enter the previous selection in *Program Mode*.

***"LOUVER"*** Used to turn the motorized louver ON or OFF (CAHB24, CACB36 only).




***"UP"*** arrow button, Used to increased the set point temperature. Also used to increment the settings in *Configuration, Set Time* and *Program Modes*.

***"DOWN"*** arrow button, Used to decrease the set point temperature. Also used to decrement the settings in *Configuration, Set Time* and *Program Modes.*

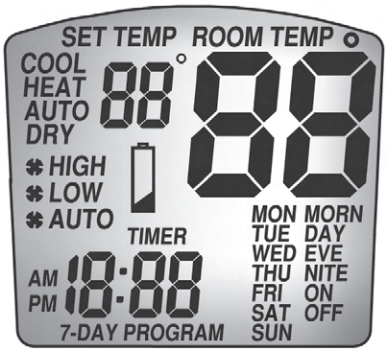
***"FAN"*** Used to select fan speed High or Low.

***"PROGRAM →"*** Used to enter or exit the *Pre-program Run Mode*. Also used to enter the next selection in *Configuration, Set Time* and *Program Mode*.

***"TIMER"*** Used to enter or exit *Timer Mode*.

***Figure #10***

***LCD Display – All Segments Lit***




***Two Button Push Commands***

"MODE + PROGRAM ➔ "

While in the *Off Mode*, held for five (5) seconds will enter the *Configuration Mode*. Pressed again momentarily will exit the *Configuration Mode*.

"PROGRAM ➔ + ➔ CLOCK"

Held for three (3) seconds will enter the *7-Day Programming Mode.* Pressed again momentarily will exit the *7-Day Programming Mode.*

"FAN + PROGRAM ➔ "

While in *7-Day Program Mode*, when held for three (3) seconds will copy the settings from the selected day to the rest of the week.

***OPTIONAL INFRARED HAND HELD CONTROLLER OPERATION***

**IMPORTANT NOTES:**

For *Optional* Infrared Hand Held Controller operation the DIP switch selections on the Cassette's main control board must be set properly first. (Refer to ***Table #1***) Be sure to select Remote Thermostat Operation, Off or No for *optional* Infrared Hand Held Controller operation. While in *Hand Held Mode* the Cassette's main control board will ignore all remote thermostat inputs. (See Cassette Control DIP switch selections)

When power is first applied to the control or after a power outage there is a three (3) minute delay before the compressor or electric heat will energize. This is to protect the unit from short cycling.

When entering commands into the *optional* Infrared Hand Held Controller, (***Figure #9***) make sure it is directed toward the Cassette's Infrared Receiver window. The Cassette will respond with a beep indicating that it has successfully received the transmitted information.

There may be occasions when the *optional* Infrared Hand Held Controller and the Cassette's main control board loose synchronization or are not in the same mode. This may happen if commands are entered into the *optional* Infrared Hand Held Control but it is not directed at the Cassette. To re-synchronize simply enter any command into the *optional* Infrared Hand Held Controller while pointing it at the Cassette's Infrared Receiver window. Also, by holding the POWER/SEND button for two seconds, all of the *optional* Infrared Hand Held Controller settings will be transmitted to the Cassette. The Cassette will respond with a beep indicating that it has successfully received the transmitted information.

The room temperature displayed on the *optional* Infrared Hand Held Controller is the temperature at the *optional* Infrared Hand Held Controller. The microprocessor control located in the Cassette does not read the *optional* Infrared Hand Held Controller's temperature, it uses a sensor located in the return air of the Cassette. Therefore, the warming or cooling of the *optional* Infrared Hand Held Controller 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 *optional* Infrared Hand Held Controller.

The *optional* Infrared Hand Held Controller 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.

If there is no activity on the Infrared Hand Held Controller for ten (10) minutes, it will enter a *Hibernate Mode* and the display will go dark. While in *Hibernate Mode*, pressing any button will awaken the *optional* Infrared Hand Held Controller. The *optional* Infrared Hand Held Controller will awaken in the last mode it was in prior to entering *Hibernate Mode.*

***CONFIGURATION MODE:***

For *optional* Infrared Hand Held Controller operation, the control must be configured through the *Configuration Mode*. While the unit is in the *Off Mode*, pressing the MODE + PROGRAM ➔ buttons simultaneously for five (5) seconds will enter the *Configuration Mode*. While in *Configuration Mode,* pressing the MODE + PROGRAM ➔ buttons simultaneously again or left idle for twenty (20) seconds, will save the new settings and exit the *Configuration Mode.*

While in *Configuration Mode*, pressing the UP or DOWN ARROW buttons will allow for selection of the value. Pressing the PROGRAM ➔ button will advance to the next selection. ***Table #2*** specifies the user selectable settings in the *Configuration Mode:*

| Table #2 | Configuration Mode | | |
|---|---|---|---|
| **Setting Item** | **LCD Title Display** | **Possible Value (Flashing)** | **Factory Settings** |
| 1) - Temperature scale | "01 F-C" | "F" (Fahrenheit)<br>"C" (Celsius) | "F" |
| 2) - Heat Source | "02 HEAT" | "ON" (Heat source available)<br>"OFF" (Not available) | "ON" If El. heat<br>"OFF" If no El. Ht. |
| 3) - Heat pump<br>(This setting is skipped if Heat source setting is "Off" as it's not needed) | "03 H-P" | "ON" (Heat pump available)<br>"OFF" (Not available) | "OFF" |
| 4) - Auto-changeover differential<br>(This setting is skipped if Heat source setting is "Off") Used with optional Infrared Hand Held Controller for heating/cooling change over. | "04 d-b" | Between "2 – 6" degrees | "2" |
| 5) - Check filter time | "05 F:Lt" | "2" (250 hours)<br>"5" (500 hours)<br>"7" (750 hours)<br>"10" (1000 hours)<br>"12" (1250 hours) | "10" |

***POWER/SEND***

Pressing the POWER/SEND button momentarily will switch the unit either on or off. In the *Off Mode*, the Liquid Crystal Display (LCD) will display the time of day and day of the week. In the *On Mode* the LCD will also display the room temperature, mode of operation *Cooling, Heating, Auto (Auto changeover), Dry* or *Fan Mode.* While in the *On Mode*, the setpoint temperature will display momentarily with the push of any button except the POWER/SEND button. Also, when held down for two (2) seconds, transmits all *optional* Infrared Hand Held Controller information to the Cassette.

***NOTE:*** *Heating, Auto Changeover (Auto)* or *Dry Modes* will not display if Heat Source is set to Off in the *Configuration Mode.*

***MODE OF OPERATION***

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.

***NOTE:*** *Heating, Auto (Auto Changeover)* or *Dry Modes* will not appear if Heat Source is set to Off in the *Configuration Mode.*

***FAN OPERATION***

The indoor unit utilizes a two-speed motor with three (3) 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. Auto Fan Mode can only be selected if the unit is in Heating, Cooling or *Auto Changeover Modes. In Auto Fan Mode the speed is determined by the microprocessor and speed adjustment will be made according to room and setpoint temperatures. The fan will switch to High speed when room temperature deviates by more than two (2) degrees from setpoint. The fan will switch to Low speed if the deviation is one (1) degree or less.*

***LOUVER OPERATION CAHB 24 AND CACB 36 ONLY:***

The louver can be set to oscillate on or switched off for at a fixed setting. Pressing the Louver button, the word "Lou", will display for two (2) seconds along with "ON or "OFF" to indicate that the louver setting has been changed, see ***Figure #11***.

***Figure #11***

***LCD Display – Louver Operation***

In *Cooling, Heating, Auto changeover* or *Fan Modes*, when the louver is on, the louver will oscillate continuously. When the louver is off, the louver will remain in a fixed position.

***COOLING MODE:***

For cooling operation first turn the unit ON via the POWER/SEND button. *Select Cooling Mode* via the MODE button. The room temperature and set point temperature will be displayed. 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.

Place the setpoint temperature below the room temperature. The compressor will start and cooling will continue for a minimum of two (2) minutes and as long as the setpoint remains below room temperature. The Cooling LED will illuminate so long as the unit is calling *Cooling Mode.* Once the room temperature is satisfied for at least sixty (60) seconds and the two (2) minute minimum run time has elapsed the compressor will cycle off. The fan will operate as described in Fan Operation.

***NOTE:*** Once the compressor is switched off, or after a power outage there is a three (3) minute delay before the compressor will re-start.

## *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, Heat pump – OFF). See: *Configuration Mode.*

For electric heat operation, first turn the unit ON via the POWER/SEND button. Then select *Heating Mode* via the MODE button. The room temperature and setpoint temperature will be displayed. Press either the UP or DOWN ARROW buttons to change the setpoint temperature. The setpoint temperature will change by one (1) degree with each successive press of the UP or DOWN ARROW buttons. Holding the button down will change the temperature rapidly.

Place the setpoint temperature above room temperature. The electric heat will energize and heating will continue so long as the setpoint remains above room temperature. The Heating LED will illuminate so long as the unit is calling *Heating Mode.* When the room temperature has been satisfied for at least sixty (60) seconds and the two (2) minute minimum on time has expired, the electric heat will switch off. The fan will operate as described in “Fan Operation”.

***OPTIONAL HEAT PUMP WITHOUT ELECTRIC HEAT (HEAT PUMP UNIT OUTDOORS)***

***NOTE:*** 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, not deliver any heat below 35°F outdoors when matched with a limited range multi-zone heat pump condenser, and not deliver any heat below 0°F outdoors when matched with a 9,000 or 12,000 Btuh heat pump condenser.

For heat pump operation without electric heat the control must first be configured properly (Heat source – ON, Heat pump – ON). See: *Configuration Mode.*

For heat pump operation, turn the unit ON via the POWER/SEND button. Select *Heating Mode* via the MODE button. The room temperature and setpoint temperature will be displayed. Press either the UP or DOWN ARROW buttons to change the setpoint temperature. The setpoint temperature will change by one (1) degree with each successive press of the UP or DOWN ARROW buttons. Holding the button down will change the temperature rapidly.

Place the setpoint temperature above room temperature. The outdoor unit will energize in heat pump mode and heating will continue so long as the setpoint remains above room temperature. The Heating LED will illuminate so long as the unit is calling *Heating Mode*. When the room temperature has been satisfied for at least sixty (60) seconds and the two (2) minute minimum on time has expired, the electric heat will switch off. The fan will operate as described in “Fan Operation”.

***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, Heat pump – ON). See: *Configuration Mode.*

For heat pump operation with optional electric heat, turn the unit ON via the POWER/SEND button. Then select *Heating Mode* via the MODE button.

The room temperature and setpoint temperature will be displayed. Press either the UP or DOWN ARROW buttons to change the setpoint temperature. The setpoint temperature will change by one (1) degree with each successive press of the UP or DOWN ARROW buttons. Holding the button down will change the temperature rapidly.

Place the setpoint temperature above the room temperature by one (1) degree. The compressor will start and heating will continue for a minimum of two (2) minutes and as long as the setpoint remains above room temperature. The Heating LED will illuminate so long as the unit is calling for *Heating Mode.* When the room temperature has been satisfied for at least sixty (60) seconds and the two (2) minute minimum on time has elapsed, the compressor will switch off. The fan will operate as described in “Fan Operation”.

Next, place the setpoint temperature above the room temperature by at least two (2) degrees. The compressor will start and, the electric will also energize after a thirty (30) second delay, thus two-stage heating. The electric heat will run for a minimum of two (2) minutes and until the deviation between room temperature and setpoint temperature is less than two (2) degrees. At that time the electric heat will switch off and the heat pump (compressor) will take over the heating demand. The electric heater will not re-start until a three (3) minute delay has elapsed. Once the room temperature is satisfied and the two (2) minute minimum run time has elapsed, the compressor will cycle off. The compressor will not re-start until a three (3) minute delay has elapsed. The fan will operate as described in “Fan Operation”.

***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. Select *Dry Mode* via the MODE button. The room temperature and setpoint temperature will be displayed. Press either the UP or DOWN ARROW buttons to change the setpoint temperature. The setpoint temperature will change by one (1) degree with each successive press of the UP or DOWN ARROW buttons. Holding the button down will change the temperature rapidly.

Place the setpoint temperature at a desired room temperature. Depending on the difference between room temperature and setpoint temperature the compressor will either remain on constantly, cycle on/off, or remain off.

If the room temperature is greater than the setpoint temperature by more than two (2) degrees the unit will run *Cooling Mode* constantly. If the room temperature is within ± two (2) degrees of setpoint, the unit will cycle cooling on seven (7) minutes and off seven (7) minutes to remove humidity from the air while not over cooling the room. If the room temperature is less than the setpoint temperature by more than two (2) degrees, cooling will remain off.

***AUTO CHANGEOVER MODE:***

For Auto *Changeover Mode* (ACO) the unit must have a heat source. Also the control must first be configured properly (Heat source – ON). See: *Configuration Mode.*

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.* (See *Configuration Mode*)

For *Auto Changeover Mode,* first turn the unit ON via the POWER/SEND button. Select *Auto Mode* via the MODE button. The room temperature and setpoint temperature will be displayed. Press either the UP or DOWN ARROW buttons to change the setpoint temperature. The setpoint temperature will change by one (1) degree with each successive press of the UP or DOWN ARROW buttons. Holding the button down will change the temperature rapidly.

Place the setpoint temperature below the room temperature by the auto change over differential amount selected in the *Configuration Mode*. The compressor will start and the unit will run cooling operation as described under *Cooling Mode.*

If the setpoint temperature is above the room temperature by the auto change over differential amount selected in the *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.* The ◄ CLOCK button is used to enter or exit the *Set Time Mode*. The *Set Time Mode* can be entered while the control is in any mode, including the *Off Mode.* To enter the Set Time Mode, press the ◄ CLOCK button for three (3) seconds. Pressing the PROGRAM ► button will advance to the next item. The order is (1) Day of week, (2) Hour and (3) Minute. The time of day and day of week can be changed using the UP or DOWN ARROW buttons.

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.

> ***NOTE:*** The unit will not adjust for Day Light Savings time.

***7-DAY PROGRAMMING MODE:***

The *7-day Programming Mode* is used to store the settings for the *Pre-Program Run Mode*. 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 (3) seconds. When the PROGRAM ► + ◄ CLOCK buttons are pressed simultaneously again or left idle for twenty (20) seconds, the control will save the new settings and return to the previous interface mode.

While in the 7-Day Programming Mode, the words "7-DAY PROGRAM" are displayed on the LCD. Use the UP or DOWN ARROW buttons to change the time, temperature or period settings. Use the ◄ CLOCK or PROGRAM ► buttons to select the mode to be changed.

Settings for; a) Day of week, b) Period of day, c) Hour, d) Minute, e) Cooling setpoint temperature, f) Heating setpoint temperature, and g) Auto setpoint temperature can be entered.

***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 (3) 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 control through the *7-Day Programming Mode.*

The *Pre-Program Run Mode* can be entered from *Cooling Mode*, *Heating Mode* or *Auto Mode* only. *Pre-Program Run Mode* cannot be entered from *Dry* or *Fan Modes*. Pressing the PROGRAM ➔ button momentarily will enter or exit the *Pre-Program Run Mode*. The word "PROGRAM" will appear in the LCD display. With the passing of time, 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.* Select a mode of operation *(Cooling, Heating, Auto)* and press the PROGRAM ➔ button to enter *Pre-Program Run Mode*. As time passes the setpoint temperature will be selected according to the time of day and 7-Day Program settings.

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. 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* of the *Optional* Infrared Hand Held Controller. Available settings are 250, 500, 750, 1000, and 1250 hours. If an evaporator 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.

***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 (30) minutes then switch off. To turn the unit back on, press the POWER/SEND button momentarily.

***SEQUENCE OF OPERATION – REMOTE THERMOSTAT MODE***

For Remote Thermostat Operation the control must be configured through the DIP switches located on the control board located in the control box. Set DIP switch #4 (REM STAT) to ON or YES (***See Table #1***).

In *Remote Thermostat Mode* the control will not accept commands from the *optional* Infrared Hand Held Controller. Also the filter check timer will default to 1000 Hrs.

***CHOOSING A THERMOSTAT:***

EMI offers several remote thermostats that are compatible with the Cassette Ductless Split System air handler. Check latest price list or contact EMI 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 choose a two (2) stage heating, single-stage cooling thermostat.

***SELECTING A THERMOSTAT "BY OTHERS":***

When selecting a thermostat other than those offered by EMI, it is important to choose a 24 V 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. The thermostat 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 (2) 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, a single stage heat pump thermostat is adequate. 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.*

***FAN OPERATION:***

The indoor unit utilizes a two speed motor. For Remote 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. See ***Table #1*** for other available DIP switch selections.

The remote thermostat will control the call for fan operation (on or off) through the low volt terminals "R" and "G". When the remote 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.

***COOLING OPERATION:***

The remote thermostat will control the call for cooling operation (on or off) through the low Volt terminals R and Y. After connecting the thermostat to the unit, place the system switch in *Cooling Mode*. Adjust the setpoint temperature below the room temperature. The compressor and fan motors will start and cooling will begin. Next, place the setpoint temperature above the room temperature. The outdoor condenser will stop. The fan will operate as described in "Fan Operation".

***NOTE:*** Once the cooling has cycled off or following a power outage, the compressor will not restart for at least three (3) minutes (See 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.*

***ELECTRIC HEAT OPERATION:***

The remote thermostat will control the call for electric heat operation (on or off) through the low Volt terminals "R" and "W". After connecting the thermostat to the unit, place the system switch in *Heating Mode*. Adjust the setpoint temperature above the room temperature. The electric heat will energize along with the indoor fan motor. Heating will continue so long as the setpoint remains above room temperature. 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 (60) seconds.

***NOTE:*** Once the heating has cycled off or following a power outage, heating will not re-start for at least three (3) minutes. (See Anti-Short Cycle Timer)

***OPTIONAL HEAT PUMP WITH ELECTRIC HEAT (TWO (2) STAGE HEATING):***

The remote thermostat will control the call for electric heat operation (on or off) through the low Volt terminals "R" and "W" and for compressor (heat pump) heating through terminals "R" and "Y". After connecting the two (2) stage heating thermostat to the unit, place the system switch in *Heating Mode.* Adjust the setpoint 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 setpoint temperature is high enough to call for second stage heating. (See the thermostat owner's manual for this feature) Place the setpoint temperature below the room temperature. The outdoor Heat Pump unit and electric heat will stop while the indoor fan will remain on for an additional sixty (60) seconds.

***CLEAN FILTER ALARM (REMOTE 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 (4) times to indicate that the filter needs to be cleaned. For Remote Thermostat Operation, the default clean filter time is 1000 hours. Also, if an evaporator freeze condition is detected four (4) times within a 24 hour period, the Clean Filter Alarm will appear on the Cassette User Interface.

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.

## OTHER FEATURES

***ANTI-SHORT CYCLE TIMER (ASCT):***

The Cassette control incorporates an Anti-Short Cycle Timer (ASCT) feature designed to protect the unit from short cycling. The ASCT is activated immediately following the off cycle of *Cooling* or *Heating Mode.* Once the room temperature is satisfied and the unit switches off, the ASCT will not allow heating or cooling to restart unit a three (3) minute time period has elapsed.

This feature will prevent the compressor and heat source from rapid re-starts.

Once switched off, including following a power outage, the compressor or heat source will not re-start for a minimum of three (3) minutes unless the unit is in *Test Mode* then it's forty five (45) seconds.

***STAGGERED START PROTECTION (Optional Infrared Hand Held Controller only)***: Designed for systems with electric heat in heat pump unit, the staggered start feature will prevent the compressor and electric heater from starting simultaneously. There is a thirty (30) second delay between the start of the compressor and start of the electric heater in a heat pump system unless the unit is in *Test Mode* then it's seven and a half (7.5) seconds.

***MINIMUM RUN TIME (OPTIONAL INFRARED HAND HELD CONTROLLER ONLY):*** Once started, the Minimum Run Time prevents either the compressor or heat source from cycling off prematurely. The minimum run time for both the compressor and electric heat is two (2) minutes. The Minimum Run Time feature is available only while the control is configured for *optional* Infrared Hand Held Control operation. Minimum Run Time is disabled while in *Remote Thermostat Mode.* In Test Mode, Minimum Run Time is thirty (30) seconds.

***DRAIN PAN SENSOR:*** The drain pan sensors monitor the condensate level in the unit's drain pan. Should the water in the pan reach a critical level, the monitor will automatically signal the main control unit. The controls microprocessor will switch off the condensing unit for a minimum of three (3) minutes AND until the fault condition has been cleared, to prevent further condensate production. A fault code of two (2) blinks will flash on the Timer/Alarm LED and will automatically reset once the fault condition is cleared.

***ANNUNCIATION:*** The unit is equipped with an annunciation feature whereby the main control will beep providing the user with audio feedback confirming that the microprocessor has successfully received commands from the *Optional* Infrared Hand Held Controller. The main control will also beep when the Clear Filter Alarm button is held for three (3) seconds indicating that the filter check timer has been reset.

***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, after a three (3) minute time delay, the control will return to the mode of operation that it was in prior to the power failure.

| LED Trouble Blink Codes (Timer/Alarm LED) | |
|---|---|
| **Number of Blinks** | **Trouble** |
| 1 | Room sensor fault |
| 2 | Condensate fault |
| 3 | Coil sensor fault |
| 4 | Clean filter |
| 5 | Test mode |

***ROOM AIR SENSOR FAULT 1 BLINK:*** 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.

***CONDENSATE FAULT 2 BLINKS:***

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, so long as the thermostat is calling for cooling the compressor will re-start.

***ID COIL SENSOR FAULT 3 BLINKS:***

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 an evaporator freeze condition four (4) times within a 24 hour period, the clean filter indicator will appear.

***CLEAN FILTER WARNING 4 BLINKS:***

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* of the *optional* Infrared Hand Held Controller. Available settings are 250, 500, 750, 1000, and 1250 hours. For *Remote Thermostat Mode* the default time is 1000 hrs. This cannot be changed. If an evaporator 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.

PROGRAMMING SCHEDULE

| | | Monday | | Tuesday | | Wednesday | | Thursday | | Friday | | Saturday | | Sunday | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *Time* | *Temp* | *Time* | *Temp* | *Time* | *Temp* | *Time* | *Temp* | *Time* | *Temp* | *Time* | *Temp* | *Time* | *Temp* |
| **Morning** | *Cool* | | | | | | | | | | | | | | |
| | *Heat* | : | | : | | : | | : | | : | | : | | : | |
| | *Auto* | | | | | | | | | | | | | | |
| **Day** | *Cool* | | | | | | | | | | | | | | |
| | *Heat* | : | | : | | : | | : | | : | | : | | : | |
| | *Auto* | | | | | | | | | | | | | | |
| **Evening** | *Cool* | | | | | | | | | | | | | | |
| | *Heat* | : | | : | | : | | : | | : | | : | | : | |
| | *Auto* | | | | | | | | | | | | | | |
| **Night** | *Cool* | | | | | | | | | | | | | | |
| | *Heat* | : | | : | | : | | : | | : | | : | | : | |
| | *Auto* | | | | | | | | | | | | | | |

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.

## TEST UNIT PERFORMANCE DATA SHEET

The Test Unit Performance Data sheet below 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 and have this information ready when calling. Make sure to include the Model Number, Serial Number, Date of Installation.

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

| Test Unit Performance Data | | | |
|---|---|---|---|
| | | Date: | |
| Model Number | | Technician: | |
| Serial Number | | Mode: | Cooling |
| | | | |
| Indoor Section | | Notes | |
| Air handlers Entering Air - DB | | | |
| Air handlers Entering Air - WB | | | |
| Air handlers Leaving Air - DB | | | |
| Air handlers 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 handlers | | | |
| Capacity Calculations | | | |
| DB - Temp Split at evap. | | | |

| Test Summary | |
|---|---|
| Compressor Superheat | |
| Sub Cooling | |

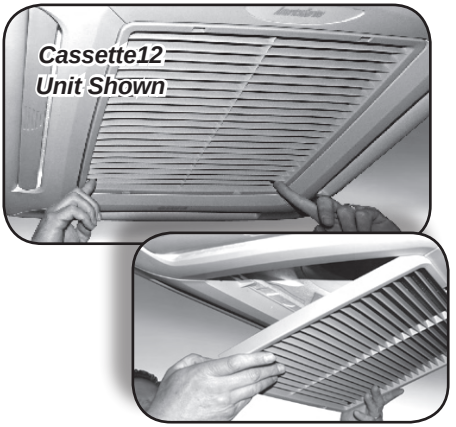
## MAINTENANCE

**⚠ WARNING ⚠**

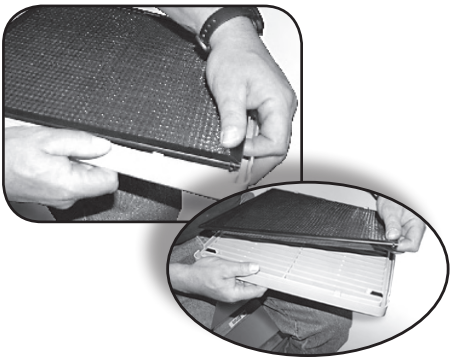
Turn the ***POWER OFF*** to the unit before servicing or cleaning.

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

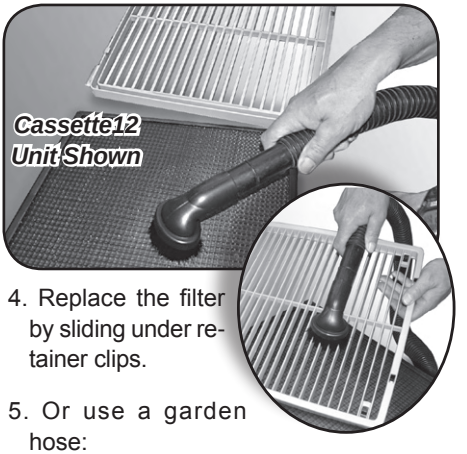
1. Clean air filter(s) on a monthly basis:
   a) The filter(s) are accessed by removing the air intake access grille(s).




2. Remove the filter by carefully twisting and lifting to clear the retaining clips.



3. 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.




4. Replace the filter by sliding under retainer clips.

5. Or use a garden hose:
   - Remove the grille and filter and hose off.
   - Let filter(s) and grille(s) dry before replacing.

***Allowing dust to collect on the filter will cause the unit to lose efficiency and may eventually malfunction.***

6. The unit may be wiped with a damp cloth when needed.

7. Be sure to replace filters and grill before running the unit.

***NOTE:*** *Do not run the unit without the filter(s) or the grille(s).*

**⚠ WARNING ⚠**

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

When troubleshooting the indoor unit, refer to the wiring diagram that is supplied with the equipment. It is located on the back of the control access panel. If unable to locate the wiring diagram call the factory technical service line at (800) 228-9364 and one can be faxed or mailed. Please have the full model and serial number available prior to calling.

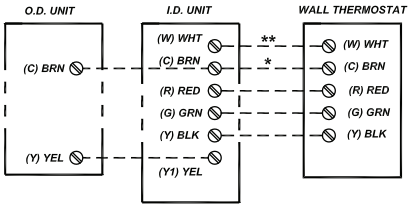
EMI America Series air handlers are designed to operate with EMI America Series condensers. The air handler (indoor unit) and condenser (outdoor unit) are to be independently connected to the electrical service panel and protected by separate time delay fuse or HACR breakers. (See the unit name plate for the correct breaker type and size). The indoor and outdoor units are also connected to each other via a 24 Vac, 18 AWG interconnect wiring. A transformer provides the low volt power source for the controls. The number of low Volt interconnect conductors will be dependent on the control, heating options and thermostat selected. Interconnect wire should be at least 18 AWG. Refer to the unit wiring diagram for the interconnect diagram that matches your system

***Figure #12***

***WALL THERMOSTAT CONTROL INTERCONNECT DIAGRAM***
***MODELS CAHA12, CAHA24, AND CACA36***

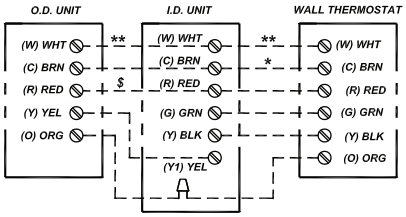
***Cassette w/ Wall Thermostat Control***
***LOW VOLTAGE INTERCONNECT DIAGRAM***

***Straight Cool Applications***




** - Some thermostats do not use a "C" terminal*
*** - Electric heat option*

***Heat Pump Applications***




** - Some thermostats do not use a "C" terminal*
*** - Electric heat option*
*$ - "R" Connection for S1H Single Zone only*

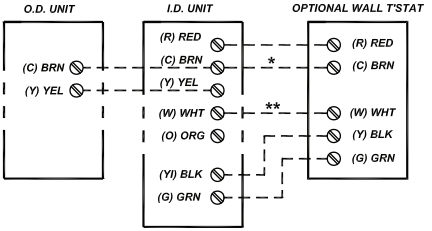
***Figure #13***

## *INFRARED CONTROLLER W/ OPTIONAL WALL THERMOSTAT INTERCONNECT DIAGRAM – MODELS CAHB12, CAHB24, AND CACB36*

***Cassette w/ IR Controller***

***LOW VOLTAGE INTERCONNECT DIAGRAM***

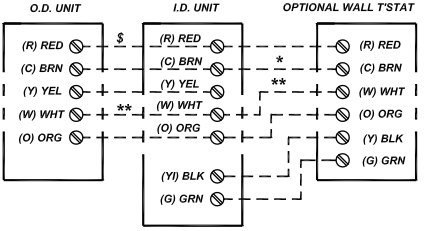
***Straight Cool Applications***




** - Some thermostats do not use a "C" terminal*

*** - Electric heat option*

***Heat Pump Applications***




** - Some thermostats do not use a "C" terminal*

*** - Electric heat option*

*$ - "R" Connection for S1H Single Zone only*

### *POWER SUPPLY CHECK*

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

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

### *LOW VOLT CONTROLS*

The Cassette air handler, outdoor unit and optional wall mounted thermostat (*) are connected using low Volt (24 Vac), 18 AWG interconnect wiring. The interconnect wiring provides control communication between each device. A 24 Vac transformer located in the indoor air handler unit provides low Volt control power to the system. All low Volt wiring must be routed away from sharp edges or objects that might otherwise damage the wiring. For proper interconnect wiring refer to ***Figures #12 or #13***.

The 24 Vac power supply can be measured by placing a voltmeter across low Volt terminals “R” and “C” of the indoor or outdoor unit. If 24 Vac is not present, check to ensure that the high Volt power is supplied to the indoor unit.

(*) ***NOTE:*** For units with the *optional* Infrared Hand Held Controller, a wall thermostat is not required.

## WALL THERMOSTAT CONTROL – MODELS CAHA AND CACA

***COOLING ONLY UNITS***

Cooling only units, require an 18 AWG low volt interconnecting wires between the indoor and outdoor units. Also, an interconnect wire is required between the indoor unit and wall thermostat. Refer to low Volt interconnect diagram ***Figures #12 or #13*** for remote thermostat connection.

***NOTE:***
"W" is required for units with electric heat only.
"C" may not be needed on some thermostats.

The wall mounted thermostat will switch on and off the outdoor unit 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 or "Y1" 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 thermostat is satisfied there will be a three minute delay before the outdoor unit is allowed to re-start.

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 or "Y1" and "C" of the Cassette.

For *optional* wall thermostat operation, 24 Vac can also be measured across low Volt terminals "G" and "C" of the Cassette.

***HEAT PUMP UNITS***

Heat pump units, require an 18 AWG low volt interconnecting wire between the indoor and outdoor units. Also, an interconnect wire is required between the indoor unit and wall thermostat. Refer to low Volt interconnect diagram ***Figures #12 or #13*** for remote thermostat connection.

The wall mounted thermostat will switch on and off the outdoor unit through the black "Y" and yellow "Y1" wires. When the thermostat is calling for cooling or heating, 24 Vac can be measured across terminals "Y" and "C" of the outdoor unit or "Y1" and "C" of the Cassette.

EMI heat pump systems utilize a reversing valve is that is energized in the cooling mode. Heat pump units will operate the compressor in heating mode while the reversing valve is de-energized. The reversing valve signal is provided through the orange "O" low Volt wire of the thermostat. It should remain energized constantly as long as the thermostat's system switch remains in *Cooling Mode.* 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

***NOTE:***
"O" is required for heat pump operation. The reversing valve is energized in cooling.
"W" is required for units with electric heat only.
"C" may not be needed on some thermostats.

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 re-start.

While the wall thermostat is calling for cooling or heating and the ASCT delay has elapsed, 24 Vac can be measured between terminals "Y" and "C" of the outdoor unit or "Y1" and "C" of the Cassette.

For *optional* wall thermostat operation, 24 Vac can also be measured across the Cassette's low Volt terminals "G" and "C" for the *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 electric *Heat Mode* with the setpoint temperature above room temperature. Then place a clamp-on type ammeter on one leg of the incoming power supply. When working correctly the amp reading should correspond with the values in the table below.

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 |

The electric heat relay can also be verified by placing a voltmeter across the high volt relay output terminal and the incoming power L2 terminal. If working correctly the reading should be the same as measured across the incoming power supply.

As a safety feature, an auto resetting limit switch located on the heater assembly that will interrupt power to the heater if an overtemperature condition occurs. Each limit switch is also equipped with a one-time fuse link. 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. If this occurs the limit switch assembly must be replaced. Contact EMI technical service for a replacement.

To check if the fuse link has failed will require an Ohm reading across the limit switch. **MAKE SURE TO FULLY DISCONNECT ALL POWER TO BOTH THE INDOOR CASSETTE AND OUTDOOR UNIT.**

After disconnecting all power to the unit, disconnect the wires from the fuse link. Then with an ohmmeter, check the continuity across the fuse link. 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 volt terminals “G” and “C” for the fan signal and “W” and “C” for electric heat signal.

***TWO STAGE HEATING***

Two stage heating combines heat pump and electric heat operation. Heat pump units require an 18 AWG low volt interconnecting wire between the indoor unit and the condenser. Also, an interconnect wire is required between the indoor unit and wall thermostat. Refer to low volt interconnect diagram ***Figures #12 or #13*** for remote thermostat connection.

After connecting a two stage heating thermostat to the unit, place the system switch in *Heat Mode*. Adjust the setpoint temperature above the room temperature so that first stage heating is activated. The compressor and fan motors will start and heating will begin. Heating will continue so long as the setpoint temperature remains above room temperature.

To check for a low volt signal, place a voltmeter across terminals “Y” and “C” of the outdoor unit or “Y1” and “C” of the Cassette. When working correctly, there should be a reading of 24 Vac.

Next, place the setpoint further above room temperature to activate second stage heating. 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). Heating will continue so long as the setpoint temperature is above the room temperature and the thermostat is calling for second stage heating.

## WALL THERMOSTAT CONTROL – MODELS CAHA AND CACA *Continued*

To check for an electric heat signal, place a voltmeter across terminals "W" and "C" of the indoor unit. When working correctly, there should be a reading of 24 Vac.

To stop heating operation, place the set-point temperature below the room temperature. The outdoor unit and electric heat will stop while the indoor fan will remain on for an additional sixty (60) seconds.

For *optional* wall thermostat operation, 24 Vac can also be measured across low Volt terminals "G" and "C" of the Cassette.

## INFRARED CONTROLLER WITH *OPTIONAL* WALL THERMOSTAT CONNECTION – MODELS CAHB AND CACB ONLY

***NOTE:*** Cassette operation can be controlled through either a wall mounted thermostat or an *optional* Infrared Hand Held Controller. For selection of which control method refer to the Cassette Control DIP Switch Selections located under CACB/CAHB Sequence of Operation.

***COOLING ONLY UNITS, INFRARED HAND HELD CONTROLLER, MODEL CACB***

Cooling only units require an 18 AWG low Volt interconnecting wires between the indoor and outdoor units. If the Cassette controller is configured for wall thermostat operation then a connection is also required between the air handler and wall thermostat. Refer to low volt interconnect diagram ***Figure #13*** for low Volt interconnect wiring connection.

***NOTE:***
"W" is required for units with electric heat only
"C" may not be needed on some thermostats

The Infrared Hand Held Controller or wall mounted thermostat will switch on and off the outdoor unit through the yellow "Y" low volt 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 volt 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 (3) minute delay before the outdoor unit s allowed to re-start.

The *optional* Infrared Hand Held Controller or wall mounted thermostat will also control the indoor fan by switching high Volt power to the fan motor with the fan relay. When energized, high Volt 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 volt terminals "G" and "C" of the Cassette.

***HEAT PUMP UNITS, INFRARED HAND HELD CONTROLLER, MODELS CAHB***

Heat pump units require an 18 AWG low Volt interconnecting wire between the indoor unit and outdoor units. If the Cassette controller is configured for wall thermostat operation then a connection is also required between the air handler and wall thermostat. Refer to low Volt interconnect diagram ***Figure #13*** for low Volt interconnect wiring connection.

***NOTE:***
"O" is required for heat pump operation. The reversing valve is energized in cooling.
"W" is required for units with electric heat only.
"C" may not be needed on some thermostats.

## Frequently Asked Questions

**Q:** *The system has just been installed using an EMI indoor unit and a non-EMI condenser and the unit will not operate.*

**A:** The Cassette air handler is manufactured with a low Volt transformer installed. EMI outdoor condensers are manufactured without a low Volt transformer. When connecting an EMI air handlers to a non-EMI condenser, check to ensure that there is a 24V control transformer in either in the indoor unit or outdoor unit. Only one transformer is required. If both the indoor unit and outdoor unit contain a transformer, one must be removed from the system.

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

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

**A:** 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 sec. 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 handlers 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 65°F (18°C)? If it is, then the condenser should be fitted with low ambient control so that the proper system pressures are maintained.

## Frequently Asked Questions *Continued*

- 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.

## CASSETTE PERFORMANCE DATA

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

| CASSETTE TECHNICAL DATA | | | |
|---|---|---|---|
| **REFRIGERATION** | **12** | **24** | **36** |
| Refrigerant Type | R22 | | |
| **CONNECTIONS** | **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** | **12** | **24** | **36** |
| Type | Washable Mesh | | |
| Quantity | 1 | 2 | 3 |
| Efficiency | 80% | | |
| **CONDENSATE PUMP** | **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.*

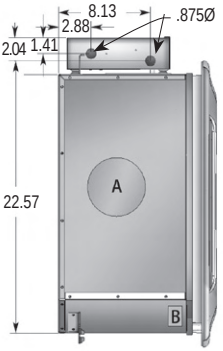
| SHIPPING WEIGHT | |
|---|---|
| **Model Size** | **Lbs.** |
| 12 | 70 (31.8 kg) |
| 24 | 108 (49.1 kg) |
| 36 | 146 (66.4 kg) |

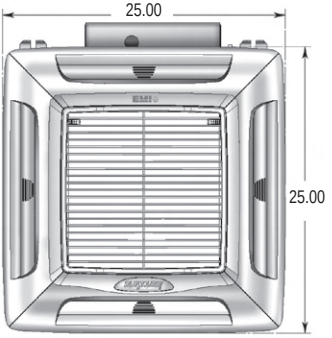
| INDOOR SOUND LEVELS (dBA) | | |
|---|---|---|
| **Model** | **High Speed** | **Low Speed** |
| 12 | 41 | 39 |
| 24 | 44 | 42 |
| 36 | 51 | 49 |

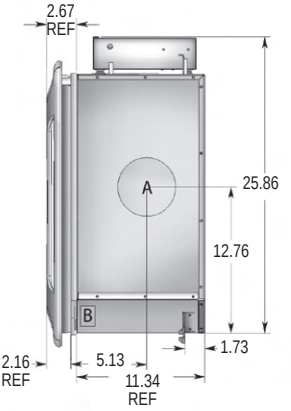
| DISCHARGE AIR VOLUME "Dry Coil" | | |
|---|---|---|
| **Model** | **High Speed CFM** | **Low Speed CFM** |
| 12 | 380 (180 L/S) | 335 (158 L/S) |
| 24 | 700 (330 L/S) | 620 (293 L/S) |
| 36 | 1,300 (614 L/S) | 1,160 (548 L/S) |

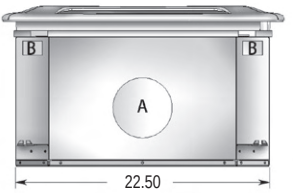
## CASSETTE DIMENSIONS

### Small Cabinet • Cassette 12 • 9,000-12,000 Btuh



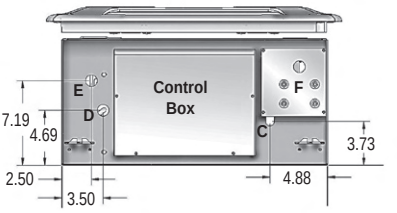



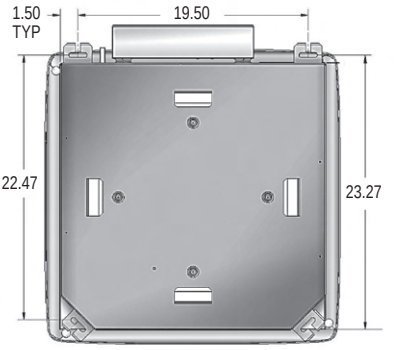




***Note:*** *All dimensions in inches.*

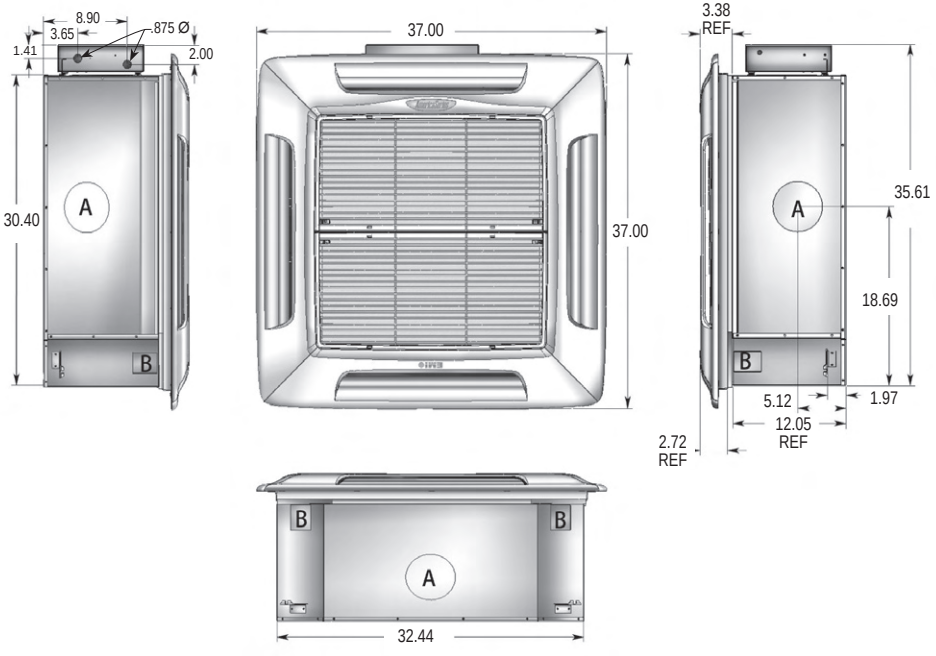
Cassette 12

| | FEATURE | QTY. | SIZE |
|---|---|---|---|
| **A** | Optional Discharge Knockout | 3 | 5¼" Ø |
| **B** | Fresh Air Inlet Knockout | 2 | 1¼" x 2½" |
| **C** | Condensate Discharge | 1 | ½" Ø |
| **D** | Suction | 1 | ½" Ø |
| **E** | Liquid | 1 | ¼" Ø |
| **F** | Condensate Pump Access | 1 | - |



## Medium Cabinet • Cassette 24 • 18,000 - 24,000 Btuh

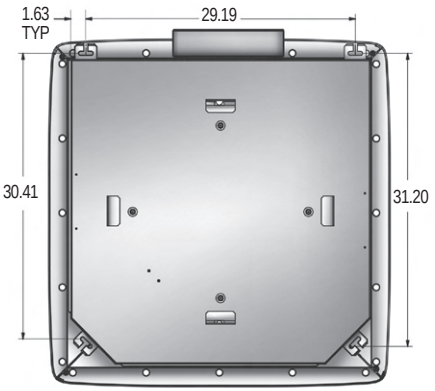



***Note:*** *All dimensions in inches.*

Cassette 24

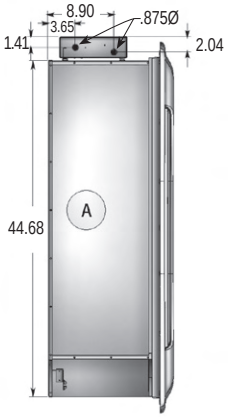
| | FEATURE | QTY. | SIZE |
|---|---|---|---|
| A | Optional Discharge Knockout | 3 | 5¼" Ø |
| B | Fresh Air Inlet Knockout | 3 | 3 x 3" |
| C | Condensate Discharge | 1 | ½" Ø |
| D | Suction | 1 | ¾" Ø* |
| E | Liquid | 1 | ⅜" Ø |
| F | Condensate Pump Access | 1 | - |

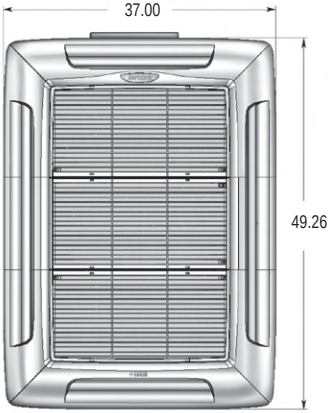
**18,000 Btuh must be bushed down to ⅝"*

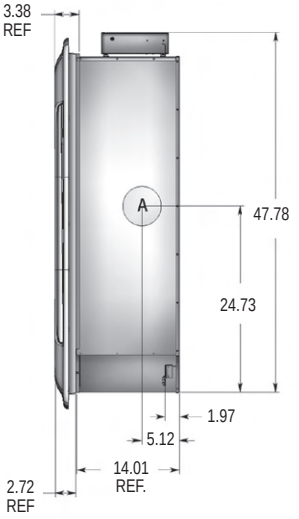


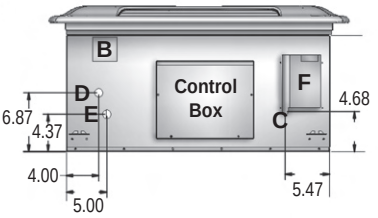
## CASSETTE DIMENSIONS

### Large Cabinet • Cassette 36 • 30,000 - 36,000 Btuh



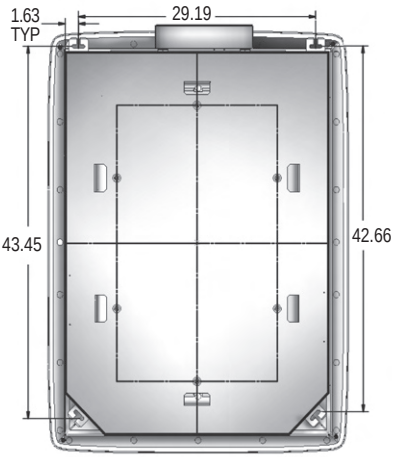






***Note:*** *All dimensions in inches.*

Cassette 36

| | FEATURE | QTY. | SIZE |
|---|---|---|---|
| A | Optional Discharge Knockout | 3 | 5¼" Ø |
| B | Fresh Air Inlet Knockout | 3 | 3 x 3" |
| C | Condensate Discharge | 1 | ½" Ø |
| D | Suction | 1 | ¾" Ø |
| E | Liquid | 1 | ⅜" Ø |
| F | Condensate Pump Access | 1 | - |



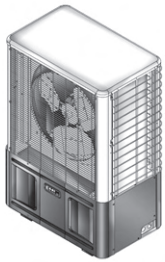
## CASSETTE ELECTRICAL SPECIFICATIONS

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

| CASSETTE ELECTRICAL SPECIFICATIONS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Model # | Fan Motor | | | Elect Heat | | Total AMPS | Min Volt | M.C.A. | HACR BRKR |
| | Volts/HZ/PH | RLA | H.P. | kW | AMPS | | | | |
| CAH_12 | 208/230/60/1 | 0.35 | 1/10 | – | – | 0.4 | 197 | 0.5 | 15 |
| CAH_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 |

## CASSETTE SYSTEM MATCHES

***Cassette***



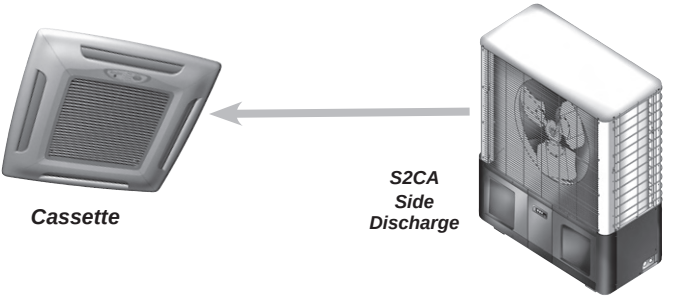
***S1CA/S1HA Side Discharge***

***NOTE:*** *CAH_ refers to CAHA or CAHB*
*CAC_ refers to CACA or CACB*

| COOLING SYSTEMS WITH CASSETTE UNITS | | | | | | |
|---|---|---|---|---|---|---|
| Cassette | Condenser | Btuh | SEER | SHR | EER | Ref. |
| CAH_12 | S1CA9000 | 9,000 | 13.0 | 0.79 | 11.7 | R22 |
| CAH_12 | S1CA2000 | 11,800 | 13.0 | 0.72 | 12.2 | R22 |
| CAH_24 | S1CA8000 | 18,000 | 13.0 | 0.76 | 12.3 | R22 |
| CAH_24 | S1CA4000 | 23,000 | 13.0 | 0.67 | 11.8 | R22 |
| CAC_36 | S1CA3000 | 30,000 | 13.0 | 0.82 | 12.0 | R22 |
| CAC_36 | S1CA6000 | 36,000 | 13.0 | 0.74 | 12.0 | R22 |

| SYSTEMS WITH HEAT PUMP CASSETTE UNITS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Cassette | Condenser | Cooling Btuh | Heating Btuh | SEER | HSPF | SHR | EER | COP | Ref. |
| CAH_12 | S1HA9000 | 9,000 | 8,000 | 13.0 | 7.7 | 0.80 | 11.6 | 3.3 | R22 |
| CAH_12 | S1HA2000 | 11,800 | 10,800 | 13.0 | 7.7 | 0.72 | 11.4 | 3.4 | R22 |
| CAH_24 | S1HA8000 | 18,000 | 15,000 | 13.0 | 7.7 | 0.78 | 12.0 | 3.3 | R22 |
| CAH_24 | S1HA4000 | 23,000 | 20,000 | 13.0 | 7.7 | 0.69 | 11.7 | 3.3 | R22 |

## CASSETTE SYSTEM MATCHES




***NOTE:*** *CAH_ refers to CAHA or CAHB*
*CAC_ refers to CACA or CACB*

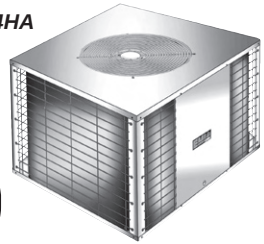
| COOLING SYSTEMS WITH S2CA SIDE DISCHARGE | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cassette | Qty | Condenser | **Btuh** | **SEER** | **SHR** | **EER** | Ref |
| CAH_12 | 2 | S2CA9900 | 17,600 | 13.0 | 0.81 | 11.3 | R22 |
| CAH_12 | 2 | S2CA2200 | 23,000 | 13.0 | 0.74 | 11.4 | R22 |
| CAH_12 | 2 | S2CA9200 | 20,400 | 13.0 | 0.77 | 11.4 | R22 |

| SYSTEM OPTIONS WITH S2HA SIDE DISCHARGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Cassette | Qty | Condenser | Cooling Btuh | Heating Btuh | SEER | SHR | EER | COP | Ref |
| CAH_12 | 2 | S2HA9900 | 18,600 | 15,700 | 13.0 | 0.79 | 11.7 | 3.1 | R22 |
| CAH_12 | 2 | S2HA2200 | 22,600 | 20,000 | 13.0 | 0.75 | 11.6 | 3.1 | R22 |
| CAH_12 | 2 | S2HA9200 | 20,600 | 18,000 | 13.0 | 0.77 | 11.6 | 3.1 | R22 |

## CASSETTE SYSTEM MATCHES

*Cassette*

***T2CA/T2HA,***
***T3CA/T3HA, & T4CA/T4HA***
***Top Discharge***



***NOTE:*** *CAH_ refers to CAHA or CAHB*
*CAC_ refers to CACA or CACB*

| SYSTEM OPTIONS WITH T2CA TOP DISCHARGE | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cassette(s) | Qty | Condenser | **Btuh** | **SEER** | **SHR** | **EER** | Ref. |
| CAH_24 | 2 | T2CA8800 | 34,000 | 13.0 | 0.79 | 11.4 | R22 |
| CAH_24 | 2 | T2CA4400 | 45,000 | 13.0 | 0.69 | 11.2 | R22 |
| CAH_12+CAH_24 | 1+1 | T2CA9800 | 26,400 | 13.0 | 0.82 | 11.4 | R22 |
| CAH_24 | 2 | T2CA8400 | 39,000 | 13.0 | 0.74 | 11.3 | R22 |
| CAH_12 + CAH_24 | 1+1 | T2CA2400 | 34,000 | 13.0 | 0.75 | 11.4 | R22 |

| SYSTEM OPTIONS WITH T2HA TOP DISCHARGE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Cassette | Qty | Condenser | Cooling Btuh | Heating Btuh | SEER | SHR | EER | COP | Ref |
| CAH_24 | 2 | T2HA8800 | 36,000 | 26,400 | 13.0 | 0.75 | 12.6 | 3.1 | R22 |
| CAH_24 | 2 | T2HA8400 | 42,000 | 32,600 | 13.0 | 0.71 | 12.4 | 3.1 | R22 |
| CAH_24 | 2 | T2HA4400 | 48,000 | 40,000 | 13.0 | 0.67 | 12.0 | 3.1 | R22 |
| CAH_12 + CAH_24 | 1+1 | T2HA9800 | 27,200 | 21,200 | 13.0 | 0.76 | 12.2 | 3.1 | R22 |
| CAH_12 + CAH_24 | 1+1 | T2HA2400 | 35,000 | 30,000 | 13.0 | 0.69 | 11.8 | 3.1 | R22 |

| SYSTEM OPTIONS WITH T3CA TOP DISCHARGE | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cassette(s) | Qty | Condenser | **Btuh** | **SEER** | **SHR** | **EER** | Ref. |
| CAH_12 + CAH_24 | 2 + 1 | T3CA9940 | 40,000 | 13.0 | 0.82 | 11.3 | R22 |
| CAH_12 | 3 | T3CA9990 | 26,400 | 13.0 | 0.87 | 11.4 | R22 |
| CAH_12 | 3 | T3CA2220 | 34,400 | 13.0 | 0.76 | 11.4 | R22 |
| CAH_12 + CAH_24 | 2 + 1 | T3CA9280 | 37,800 | 13.0 | 0.80 | 11.3 | R22 |
| CAH_12 + CAH_24 | 2 + 1 | T3CA9240 | 42,500 | 13.0 | 0.79 | 11.3 | R22 |
| CAH_12 + CAH_24 | 2 + 1 | T3CA2280 | 40,500 | 13.0 | 0.76 | 11.2 | R22 |
| CAH_12 | 3 | T3CA9220 | 31,800 | 13.0 | 0.80 | 11.4 | R22 |
| CAH_12 | 3 | T3CA9920 | 29,000 | 13.0 | 0.83 | 11.4 | R22 |
| CAH_12 + CAH_24 | 2 + 1 | T3CA9980 | 35,200 | 13.0 | 0.83 | 11.4 | R22 |
| CAH_12 + CAH_24 | 2 + 1 | T3CA2240 | 45,500 | 13.0 | 0.75 | 11.2 | R22 |

## CASSETTE SYSTEM MATCHES

***NOTE:*** *CAH_ refers to CAHA or CAHB*
*CAC_ refers to CACA or CACB*

**SYSTEM OPTIONS WITH T3HA TOP DISCHARGE**

| Cassette | Qty | Condenser | Cooling Btuh | Heating Btuh | SEER | SHR | EER | COP | Ref |
|---|---|---|---|---|---|---|---|---|---|
| CAH_12 | 3 | T3HA9920 | 29,800 | 25,800 | 13.0 | 0.78 | 11.7 | 3.1 | R22 |
| CAH_12 + CAH_24 | 2+1 | T3HA9980 | 36,400 | 29,000 | 13.0 | 0.77 | 12.2 | 3.1 | R22 |
| CAH_12 + CAH_24 | 2+1 | T3HA9940 | 42,500 | 35,800 | 13.0 | 0.72 | 11.9 | 3.1 | R22 |
| CAH_12 | 3 | T3HA9220 | 31,800 | 27,800 | 13.0 | 0.76 | 11.6 | 3.1 | R22 |
| CAH_12 + CAH_24 | 2+1 | T3HA9280 | 38,500 | 31,000 | 13.0 | 0.75 | 12.1 | 3.1 | R22 |
| CAH_12 + CAH_24 | 2+1 | T3HA9240 | 44,500 | 37,800 | 13.0 | 0.71 | 11.8 | 3.1 | R22 |
| CAH_12 + CAH_24 | 2+1 | T3HA2280 | 40,500 | 33,200 | 13.0 | 0.75 | 12.0 | 3.1 | R22 |
| CAH_12 + CAH_24 | 2+1 | T3HA2240 | 46,500 | 40,000 | 13.0 | 0.71 | 11.8 | 3.1 | R22 |
| CAH-12 | 3 | T3HA2220 | 34,000 | 30,000 | 13.0 | 0.75 | 11.6 | 3.1 | R22 |

**SYSTEM OPTIONS WITH T4CA TOP DISCHARGE**

| Cassette | Qty | Condenser | Btuh | SEER | SHR | EER | Ref. |
|---|---|---|---|---|---|---|---|
| CAH_12 | 4 | T4CA9999 | 35,200 | 13.0 | 0.87 | 11.4 | R22 |
| CAH_12 | 4 | T4CA2222 | 46,000 | 13.0 | 0.76 | 11.4 | R22 |
| CAH_12 | 4 | T4CA9222 | 43,000 | 13.0 | 0.77 | 11.4 | R22 |
| CAH_12 | 4 | T4CA9992 | 37,800 | 13.0 | 0.79 | 11.4 | R22 |
| CAH_12 | 4 | T4CA9922 | 40,500 | 13.0 | 0.82 | 11.4 | R22 |

**SYSTEM OPTIONS WITH T4HA TOP DISCHARGE**

| Cassette | Qty | Condenser | Cooling Btuh | Heating Btuh | SEER | SHR | EER | COP | Ref |
|---|---|---|---|---|---|---|---|---|---|
| CAH_12 | 4 | T4HA9999 | 37,200 | 31,800 | 13.0 | 0.80 | 11.9 | 3.2 | R22 |
| CAH_12 | 4 | T4HA9992 | 39,000 | 33,800 | 13.0 | 0.78 | 11.8 | 3.1 | R22 |
| CAH_12 | 4 | T4HA9922 | 41,000 | 35,800 | 13.0 | 0.77 | 11.7 | 3.1 | R22 |
| CAH_12 | 4 | T4HA9222 | 43,000 | 37,800 | 13.0 | 0.75 | 11.5 | 3.1 | R22 |
| CAH_12 | 4 | T4HA2222 | 45,000 | 40,000 | 13.0 | 0.75 | 11.6 | 3.1 | R22 |

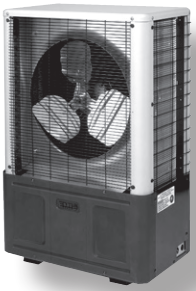
## AIR HANDLERS

***WLCA/WLHA***
***High Wall Air Handlers***

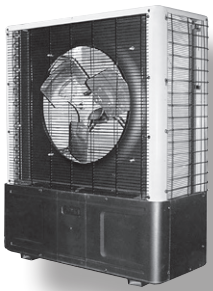
***CACA/CAHA & CACB/CAHB***
***Cassette Air Handlers***

**UNCA/UNHA**
**Universal Air Handler**

## CONDENSERS



***S1CA & S1HA Single Zone***
***Side Discharge***



***S2CA/S2HA Dual Zone***
***Side Discharge***

***T2CA/T2HA, T3CA/T3HA, T4CA/T4HA 2, 3 & 4 Zone***
***Top Discharge***