

CAC CASSETTE DUCTLESS SPLIT SYSTEM EVAPORATOR

STRAIGHT COOL

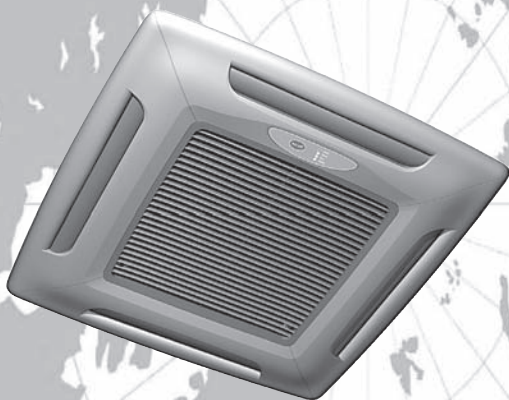
Nominal Circuit Capacities:

9,000 - 12,000 - 18,000 - 24,000

30,000 - 36,000 Btuh



EMI  **AmericaSeries**

Comfort Where It Counts.



9/12 Model Shown
CAC

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Rome, NY 13440
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An  **ECR** International Brand
An ISO 9001-2000 Certified Company 

P/N# 240006022 Rev. 1.1 [08/06]

CAC CASSETTE HIGH EFFICIENCY EVAPORATOR

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

P/N 240006022, Rev. 1.1 [08/06]

This manual is intended as an aid to a qualified service personnel for proper installation, operation, and maintenance of EMI AmericaSeries high efficiency evaporators. 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. Remove cover and examine compressor and piping for signs of damage.

TO THE INSTALLER

EMI AmericaSeries Unit are Certified 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 website @ www.enviromaster.com or call your installing contractor or distributor. Our technical service department may be contacted at 1-800-228-9364.

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

- Model Number _____
- Serial Number _____
- Date of installation _____

DANGER

Tampering with the EMI AmericaSeries condensing unit is dangerous and may result in serious injury or death. Tampering voids all warranties. Do not attempt to modify or change this unit in any way.

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 evaporator. 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 evaporator before installation to make certain the Voltage shown is the same as the electric supply to the unit.
- ▲ The EMI AmericaSeries evaporator 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 evaporator. 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 evaporators if it has damaged wiring, is not working properly, or has been damaged or dropped.

[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 Evaporator is available in three cabinet sizes with six cooling output capacities from 9,000-36,000 Btuh in DX refrigeration. Key features include a condensate pump with safety switch and a 36" 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 (18-36 only). The CAC 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 working 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.*

This American-made CAC Cassette Evaporator produces system SEER's meeting or exceeding 13, when matched with EMI's S1C single zone or S2C dual zone side discharge condensing units or with T2C, T3C, or T4C 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 and rated 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. A Styro-foam 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.

STANDARD FEATURES

Continued

- Single Fan models (09-24) designed with fire retardant plastic or aluminum impellers.
- Twin Fan models (30-36) designed with fire retardant plastic impellers.
- Motors are multispeed, enclosed type with thermal protection and sealed life-time bearings.
- Permanent, washable filter (user accessible).
- Branch duct knockouts on two sides for remote discharge locations.
- Fresh air intake capability on three sides of cabinet (2 on CAC 09-12).
- Four plastic air vanes; motor driven with auto sweep or fixed position stop setting on models 18-36 (models 09-12 equipped with manually adjusted air vanes).

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

▲ **Refrigeration Circuit** - Units are equipped with a serviceable fixed orifice expansion device.

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

- Connections for 24V remote wall thermostat.
- Custom control board featuring anti-short cycle timer; 60 second post purge fan relay; and on board 30 amp electric heat relay.
- Relays and connectors to condensing unit.
- Condensate Pump with 36" lift – measured from base of unit.
- 24V Transformer.

▲ **System Options:**

- 24V remote wall thermostat.
- Electric Heat (@ 230V)
 - 1.5KW (9,000-12,000 Btuh)
 - 3KW (18,000-24,000 Btuh)
 - 5KW (30,000-36,000 Btuh)

CAC CASSETTE CONTROLS AND COMPONENTS

Continued

▲▼ **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, etc.)

▲▼ **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" or less.

▲▼ **Air vanes:** Air outlet vanes are manually adjustable on the 9-12K units or driven by an electric motor on all other model units. 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.

▲▼ **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. It is usually advised that the fresh air volume is approximately 7-10% of the unit's published maximum air flow.

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 opposing sides may be blanked off.

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

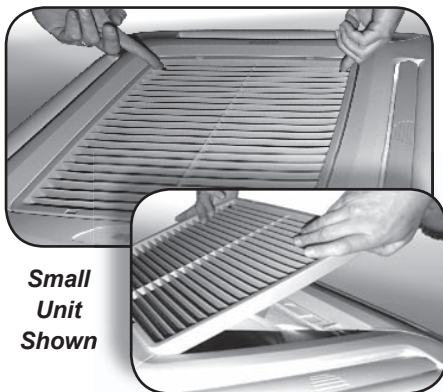
BLANKING OFF (Optional)

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.

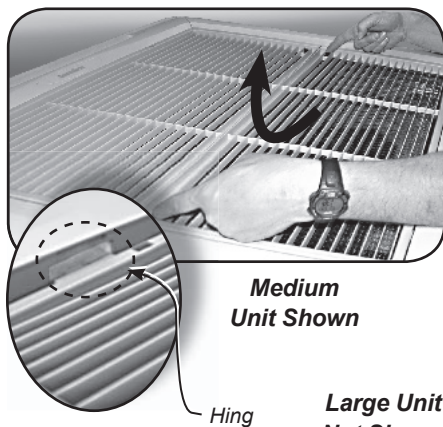
If the fascia discharge slot needs blanking off:

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

The small unit has is one grille and one filter.



Medium units have two hinged grills that open in the middle and two filters.



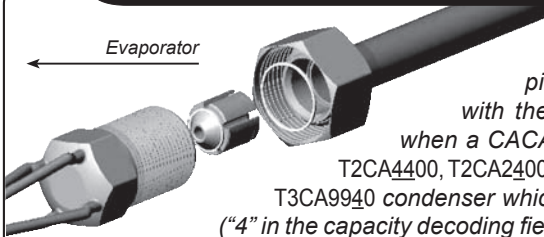
The large units have three hinged grills and three filters.

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.



PISTON/ORIFICE INSTALLATION INSTRUCTION



Important - Replace the existing piston (**before** installing the unit) with the piston supplied in the Kit Bag: when a CACA24 evaporator is matched with a T2CA4400, T2CA2400, T2CA8400 or T3CA9240, T3CA2240, T3CA9940 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. *

Your EMI evaporator unit contains the appropriate piston for your model. Refer to this document to determine if a change is required based on your condenser rating. If your match is **not listed** below **no piston change** is required. (See chart)

Model # Evaporator	Condenser Btuh	Factory Installed Piston-Orifice Size	Field Changeover Piston-Orifice Size
CACA24	T2CA4400	.059"	.063"
	T2CA2400		
	T2CA8400		
CACA24	T3CA9240	.059"	.063"
	T3CA2240		
	T3CA9940		

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

CAC 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.
2. The unit should be positioned at least 5 ft. 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') in any horizontal run between Cassette and drain. Maximum condensate pump lift is 36".

6. There should be a minimum 1" clearance above the depth of the Cassette and the false ceiling for proper installation, shown below (see the "CAC Dimensions" section in the back of this IOM for cabinet sizing):

Figure #1

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



Small Cabinet Dimension A = 12 $\frac{3}{4}$ " min.
 Medium Cabinet Dimension A = 11 $\frac{1}{2}$ " min.
 Large Cabinet Dimension A = 13 $\frac{1}{2}$ " min.

CAC CASSETTE CHASSIS POSITIONING AND INSTALLATION

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. Therefore the installation should be selected with the following points in mind:

1. Position the thermostat approximately 5 ft. 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 CAC CASSETTE CEILING EVAPORATOR

▲ 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.

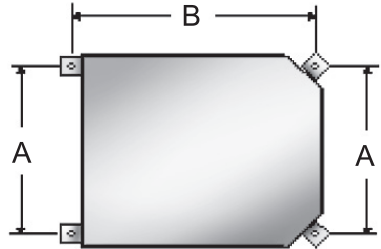
An opening in the false ceiling will have to be cut to the following sizes:

Small cabinet $23\frac{1}{4}" \times 23\frac{1}{4}"$

Medium cabinet $33\frac{7}{8}" \times 33\frac{7}{8}"$

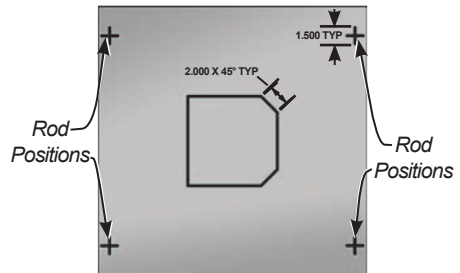
Large cabinet $46 \times 33\frac{7}{8}"$

Figure #2



Cabinet	A	B
Small	19 $\frac{1}{2}"$	23"
Medium	29 $\frac{9}{16}"$	31 $\frac{1}{2}"$
Large	29 $\frac{9}{16}"$	43 $\frac{11}{16}"$

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

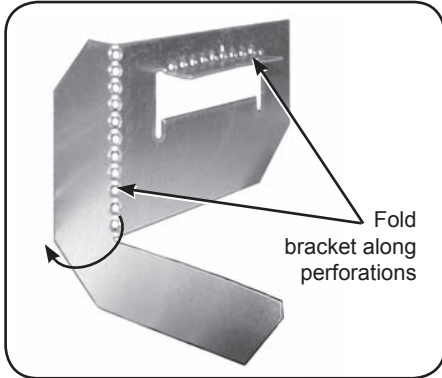


NOTE: Make sure the ceiling grid is supported separately from the Cassette. The ceiling must not be supported by any part of the Cassette unit, fascia or any associated wiring or pipe work.

1. Use the template (provided) to cut the ceiling opening and determining the rod positions.

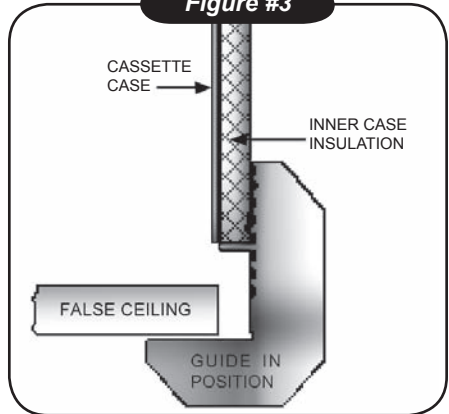
CAC CASSETTE CHASSIS POSITIONING AND INSTALLATION

2. Install hanger bolts using 3/8 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.

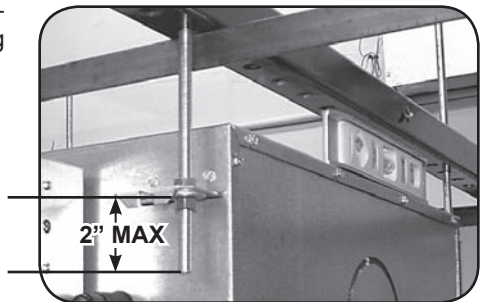


4. Lift the Cassette onto the hanging rods. Leveled at the correct distance from the ceiling with the aid of the installation guides as shown **Figure #3**.
5. Secure unit in position with locknuts and washers on either side of the Cassette bracket.
6. Ensure threaded rod does not protrude more than 2" below the mounting bracket.

Figure #3



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" toward the condensate drain is allowed. Any slight discrepancy between the Cassette and ceiling will be taken up by the fascia foam seal.



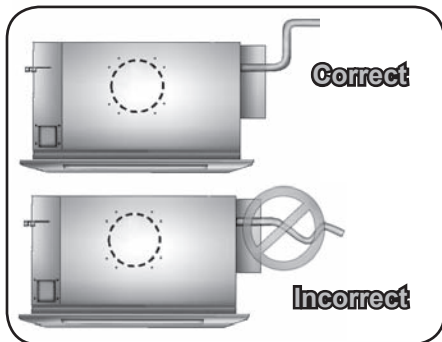
CONDENSATE PIPING

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

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

1. Maximum pump lift is 36".
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.

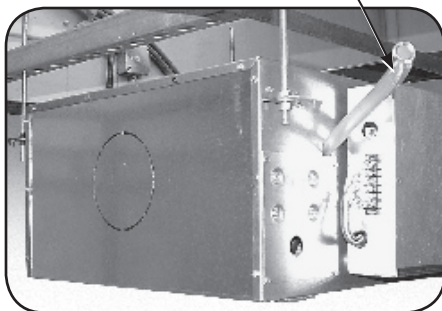
NOTE: There is a check valve at the pump discharge to prevent water from draining back into the unit. This piping technique will minimize any issues should the check valve become stuck open from airborne debris.



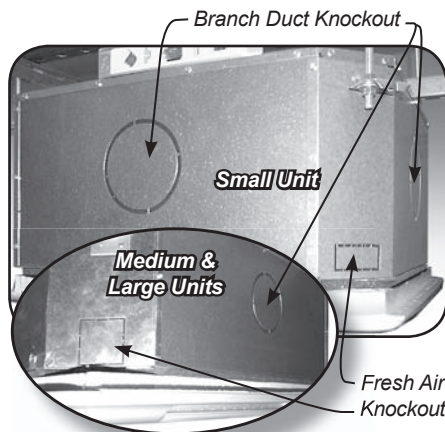
3. Condensate pipework should slope downwards in the direction of water flow with a minimum gradient of (1" per 10'). There must not be any uphill gradients other than in the first 36" of pipework from the Cassette.
4. When multiple Cassettes are connected to a common condensate drain, ensure the drain 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.

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

Condensate Drain Connection



1. Locating the knock-out holes.



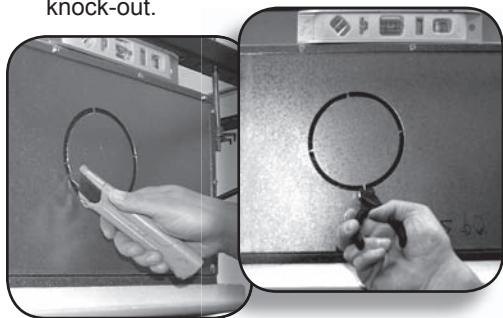
Notes: The number of knock-outs varies depending on unit size.

- Branch duct knock-outs are 5¼" round
- Fresh air knock-outs are 1¼" x 2½" rectangular on 12k, and 3" square on 24-36k

Recommendation: No more than 10' of branch duct or fresh air duct should be installed.

CONDENSATE PIPING

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.

The CAC 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 must be level and without dips to trap the oil.

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!

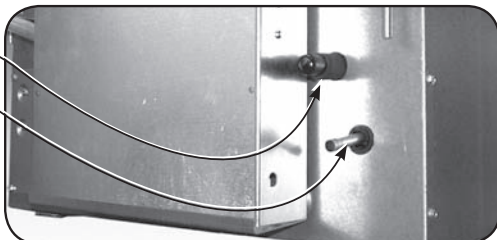
PIPE INSTALLATION NOTES

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

When matching a the CAC24 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 CAC24 unit needs to be reduced to 5/8" at the CAC24 unit connection to match the 5/8" line of the condenser.

Suction Line

Liquid Line



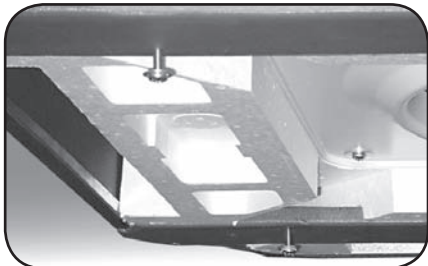
5/8" bushing goes on suction line
(Only when matched to an 18,000 Btuh condenser)

CAC CASSETTE EVAPORATOR FASCIA INSTALLATION INSTRUCTIONS

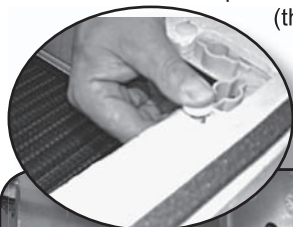
Assembly Instructions

1. To install the four fascia mounting bolts:

- Remove the bolts and washers from the supplied kit bag.
- Put washers onto the bolts.
- Screw the mounting bolt with washer into the chassis leaving approximately 1" to hang the fascia.



2. Ensure the white fir tree fasteners holding the fascia polystyrene are pushed firmly in (they 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 18-36k units connect the vane motor plug by plugging it into the socket connection on the chassis.

- Ensure that the connector is in the proper orientation.

Female vane motor plug on chassis



Male vane motor plug on fascia

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

5. 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.



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.



CAC CASSETTE EVAPORATOR INSTALLATION INSTRUCTIONS

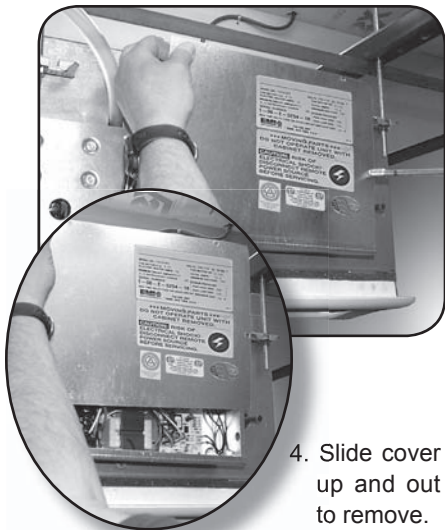
Electrical Wiring

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.

All wiring should be in accordance with the National Electric 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 is found.
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).

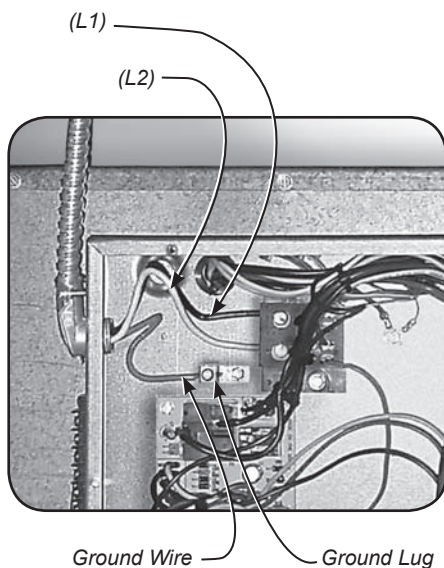
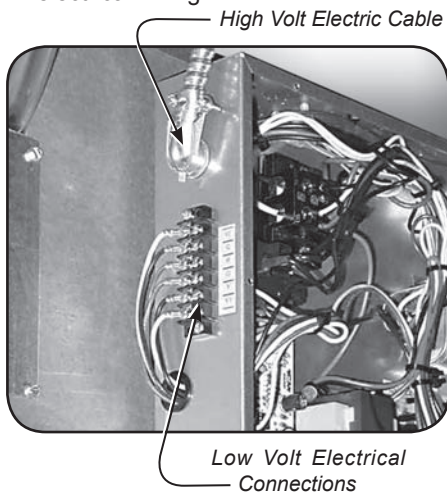


6. Check the unit rating plate for circuit ampacity and breaker or fuse size. **Use only HACR type breakers.** Select the proper wire for the ampacity rating.
7. Each unit must have a separate branch circuit protected by a fuse or breaker. Refer to the unit rating plate for the proper wire and breaker 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.

CAC CASSETTE EVAPORATOR INSTALLATION INSTRUCTIONS

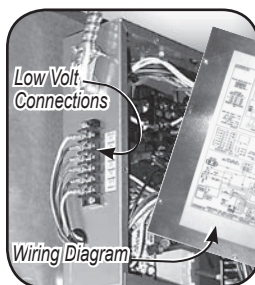
High Volt Electrical Wiring

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 below) to connect the ground wire to the ground lug.
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).

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.



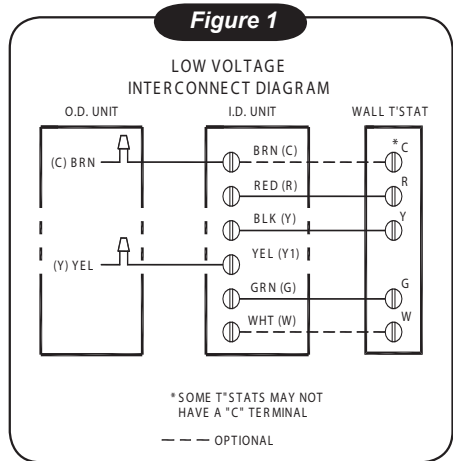
NOTE: All low Volt interconnect wiring must be at least 18 awg.

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.

LOW VOLTAGE INTERCONNECT WIRING

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.

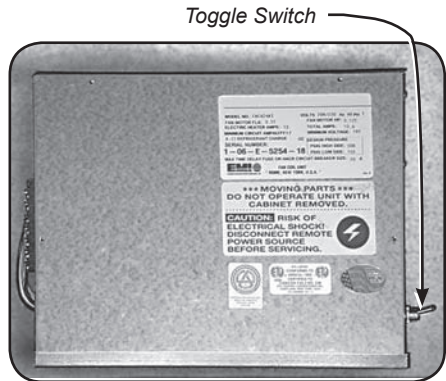


START-UP FOR WALL THERMOSTAT CONTROL

Refer to low Voltage interconnect diagram **Figure 1** for remote wall thermostat controls.

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

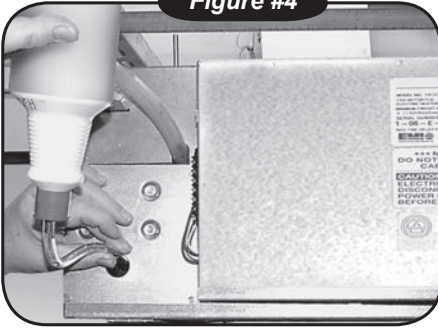
1. After 24 hours, the compressor should be isolated by removing the connection at the “Y” terminal on the outdoor unit. Main power can now be applied to the indoor and outdoor units. A system electrical check can now be carried out.
2. Switch on the indoor Cassette unit and check that the fan cycles correctly.
3. On models 18-36, 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.
4. For units with electric heat, check the operation of the heat elements by switching the system to the heating mode and set the room temperature above the set point.
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.



START -UP FOR WALL THERMOSTAT CONTROL

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 #4**.

Figure #4



- Adding water will activate the float switch and the pump. Water must flow regular-

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

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.

WARNING!

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

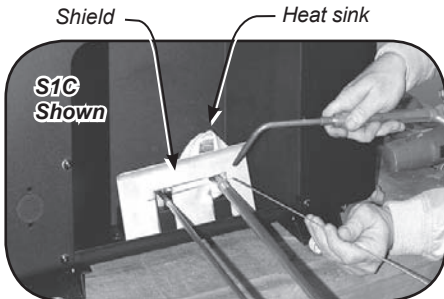
Finish all pipe connecting before proceeding to charging the system.

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

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

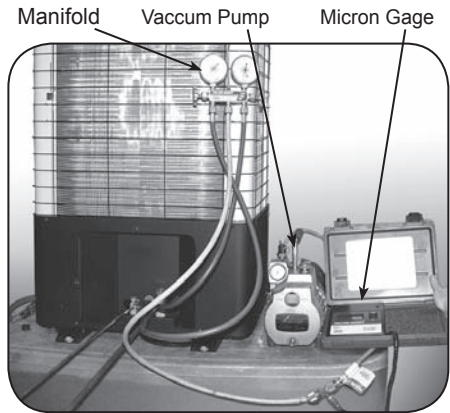


2. Protect the valves by wrapping with a wet rag "heat sink" before brazing.

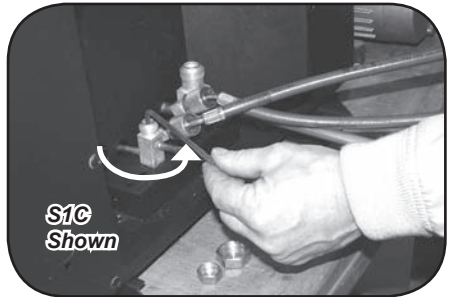


3. We recommend the use of a shield (can be made from some scrap metal) to protect the paint.
4. Braze tubing into fittings.

5. Attach manifold set.



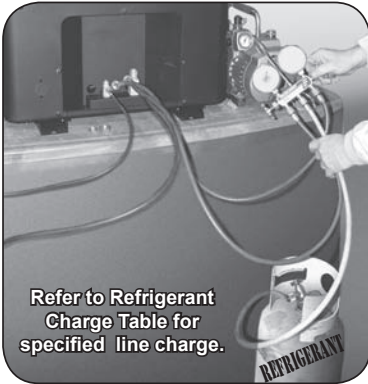
6. Evacuate line to 500 microns or less to ensure all moisture has been removed and there are no leaks.



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.

REFRIGERANT PROCESSING



Refer to Refrigerant Charge Table for specified line charge.

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

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

IMPORTANT NOTES:

1. To find the charge adjustment and system charge for any evaporator 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.

S1C REFRIGERANT CHARGE TABLE

Condenser	Evaporator Pairing	Line Chg/Ft	Factory Charge	Ref.
S1CA9	CACA12	.25 oz.	37 oz.	R-22
S1CA2	CACA12	.25 oz.	40 oz.	R-22
S1CA8	CACA24	.56 oz.	51 oz.	R-22
S1CA4	CACA24	.56 oz.	65 oz.	R-22
S1CA3	CACA36	.56 oz.	72 oz.	R-22
S1CA6	CACA36	.56 oz.	90 oz.	R-22

S2C REFRIGERANT CHARGE TABLE

Condenser	Evaporator Pairing	Line Chg/Ft	Factory Charge	Ref.
S2CA99	CACA12	.25 oz.	28 oz./ 28 oz.	R-22
S2CA22	CACA12	.25 oz.	33 oz./ 33 oz.	R-22
S2CA92	CACA12+CACA12	.25 oz.	28 oz./ 33 oz.	R-22

TOP DISCHARGE REFRIGERANT CHARGE CHART

Circuit Capacity	Line Chg/Ft	Factory Charge	Ref.
09	.25 oz.	28 oz.	R-22
12	.25 oz.	30 oz.	R-22
18	.56 oz.	48 oz.	R-22
24	.56 oz.	60 oz.	R-22

REMOTE THERMOSTAT OPERATION for CAC Ductless Split Air Handler

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

▲▼ **Selecting a Thermostat "By Others":** When selecting a thermostat other than those offered by EMI, it is important to choose a 24V thermostat that matches your application. EMI equipment is compatible with **most** mercury bulb, digital or power stealing thermostats.

▲▼ **Cooling Only With Electric Heat or Hydronic Heat:** Select a thermostat that is compatible with a cooling - electric heat system. The thermostat should have "R", "Y", "W" and "G" terminals. The thermostat may also have a "C" terminal.

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

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

▲▼ **Cooling Operation:** The electronic circuit board of the indoor unit also has an anti-short cycle timer (ASCT) feature designed to protect the compressor from short cycling. The ASCT is activated immediately following the off cycle of the outdoor unit. Once the room temperature is satisfied and the outdoor unit switches off, the ASCT will prevent the outdoor from restarting unit after a three-minute time period has elapsed.

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

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

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
Evaporator Entering Air - DB	
Evaporator Entering Air - WB	
Evaporator Leaving Air - DB	
Evaporator Leaving Air - WB	
Outdoor Section	
Entering Air	
Leaving Air	
Temperature Split	
Operating Pressures	
Compressor Suction - PSIG	
Compressor Discharge - PSIG	
Power Input	
Compressor - Volts	
Compressor - Amps	
OD Fan Motor - Volts	
OD Fan Motor - Amps	
ID Fan Motor - Volts	
ID Fan Motor - Amps	
Total Volts	
Total Amps	
Temperatures - Degrees F°	
Compressor Suction	
Compressor Discharge	
Liquid Out Cond.	
Liquid before Expansion	
Suction out Evaporator	
Capacity Calculations	
DB - Temp Split at evap.	
Test Summary	
Compressor Superheat	
Sub Cooling	

MAINTENANCE AND TROUBLESHOOTING PROCEDURE

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).



Small Unit Shown



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).

TROUBLESHOOTING PROCEDURE

For CAC Air Handlers With Remote Thermostat Controls

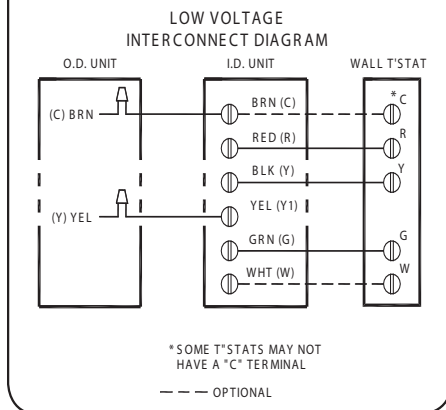
WARNING

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

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

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

Figure 1



Power Supply Check

Power supply check

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

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

Low Volt Controls

▲▼ **Cooling Only Units:**

Cooling only units require 18awg low Volt interconnecting wires between the indoor unit, outdoor units and thermostat. Terminals designated "Y1" (yellow) and "C" (brown) of the indoor air handler should be connected to the corresponding "Y" (yellow) and "C" (brown) wires or terminals of the outdoor condenser. Other wire(s) or terminals such as "R" (red) may not be needed and should be protect from making contact with the junction box or other metal surfaces.

Terminals "R", "Y", "G", "W" and "C" need to connect to the indoor, wall mounted thermostat.

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

Refer to low Volt interconnect diagram interconnect diagram figure 1 for remote thermostat connection.

A 24V transformer located in the indoor air handler unit provides low Volt control power to both the indoor air handler and outdoor condenser. The 24v-power supply can be measured by placing a meter across the "R" and "C" low Volt terminals of the air handler. The remote wall mounted thermostat will switch on and off the condenser through the yellow (Y) and black (Y1) wires. When the thermostat is calling for cooling, 24V can be measured between terminals (wires) Y and C.

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 minute delay before the condenser is allowed to re-start.

▲▼ **Electric Heat:**

Units with electric heat utilize a control relay located on the circuit board in the control box. As a safety feature, an auto resetting limit switch located on the heater assembly will interrupt power to the heater should an over-temperature condition occur. Each electric heat assembly is also equipped with a one time fuse link. Should electric heat temperatures rise above the auto resetting limit switch, a non-resetting, one time fuse link will open and the heater will remain off. If this occurs the limit switch assembly must be replaced. Contact EMI technical service for a replacement.

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

5kw = 22.3 amps,
3kw = 13.5 amps,
1.5kw = 6.9 amps.

▲▼ **Units with Condensation Pumps:**

EMI CAC is equipped with an internal condensate pump capable of removing condensate up to a three foot vertical lift. Condensation generated by the evaporator will collect in the pumps' reservoir. When the water level is high enough, a float switch will close and energize the pump motor clearing the water from the reservoir. Should, for any reason, the water exceed the maximum preset level, a safety switch will open, there by interrupting the (Y1) signal to the condenser. This will prevent the evaporator from generating additional condensation and spilling out of the unit.

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 CAC air handlers is manufactured with a low Volt transformer installed. EMI outdoor condensers are manufactured without a low Volt transformer. When connecting an EMI evaporator to a non-EMI condenser, check to ensure that there is a 24V control transformer in either in the indoor unit or outdoor unit. Only one transformer is required. If 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 Volt meter, check for 24V across the yellow (Y) and brown (C) wires. If 24V is present then check for wiring breaks or improper connections between the indoor and outdoor units.

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

A: CAC 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.

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

A: Evaporator freeze up is usually the symptom of another problem. CAC air handler units are equipped with freeze protection to prevent freeze up from occurring. If freeze up does occur then check the following.

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

Frequently Asked Questions *Continued*

- Is the equipment being operated in cooling mode when outdoor temperatures are below 65°F? If it is, then the condenser should be fitted with low ambient control so that the proper system pressures are maintained.
- Is the equipment being operated in cooling mode when outdoor temperatures are below 65°F? If it is, then the condenser should be fitted with low ambient control so that the proper system pressures are maintained.

CAC PERFORMANCE DATA

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

DISCHARGE AIR VOLUME "Dry Coil"			
Model	High Speed CFM	Med. Speed CFM	Low Speed CFM
09-12	380	335	270
18/24	700	620	540
30-36	1,300	1,160	960

CAC TECHNICAL DATA			
REFRIGERATION	09-12	18-24	30-36
Refrigerant Type	R22		
CONNECTIONS	09-12	18-24	30-36
Suction	1/2"	3/4"*	3/4"
Liquid	1/4"	3/8"	3/8"
Condensate Drain	1/2" I.D.	1/2" I.D.	1/2" I.D.
Branch Duct	6" Ø	6" Ø	6" Ø
Fresh Air Duct	1 1/4 x 2 1/2"	3" x 3"	3" x 3"
FILTRATION	09-12	18-24	30-36
Type	Washable Mesh		
Quantity	1	2	3
Efficiency	80%		
CONDENSATE PUMP	09-12	18-24	30-36
Maximum Head	36" **		
Min. Flow Rate (GPH)	2.5 GPH		

INDOOR SOUND LEVELS (dBa)			
Model	High Speed	Medium Speed	Low Speed
09-12	41	39	39
18/24	44	42	39
30-36	51	49	44

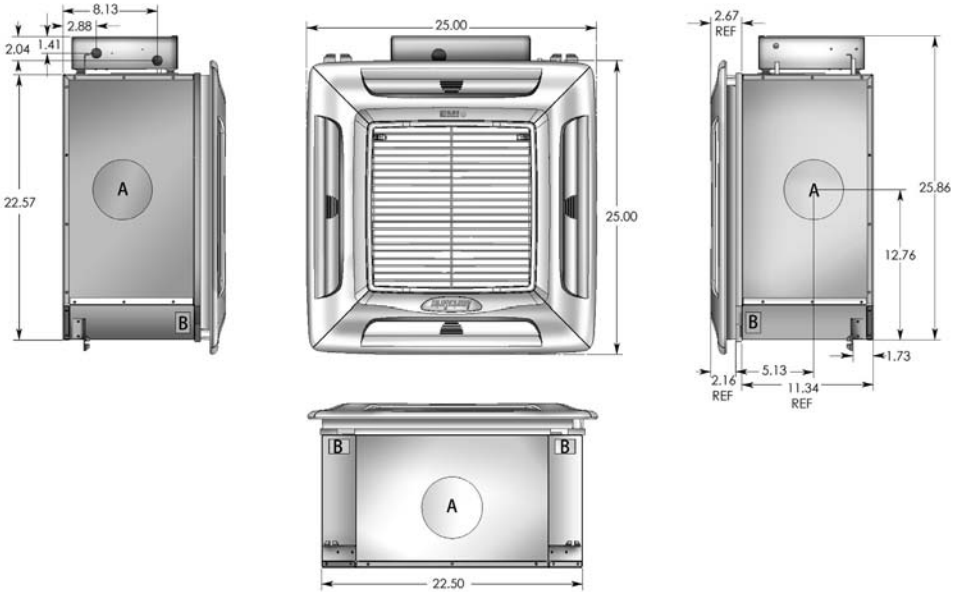
SHIPPING WEIGHT	
Model Size	Lbs.
09-12	70
18/24	108
30-36	146

*Must bushdown to 5/8" interconnect for 18K system.

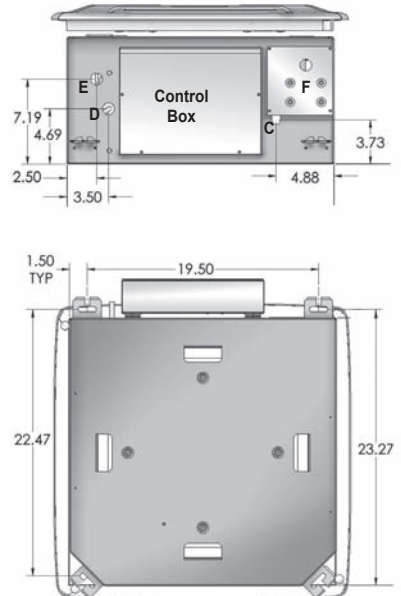
** Measured from bottom of unit.

CAC CASSETTE DIMENSIONS

Small Cabinet • CAC 9,000 - 12,000

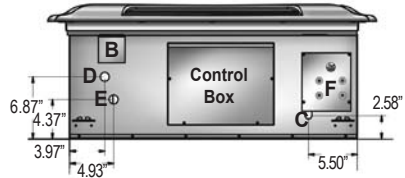
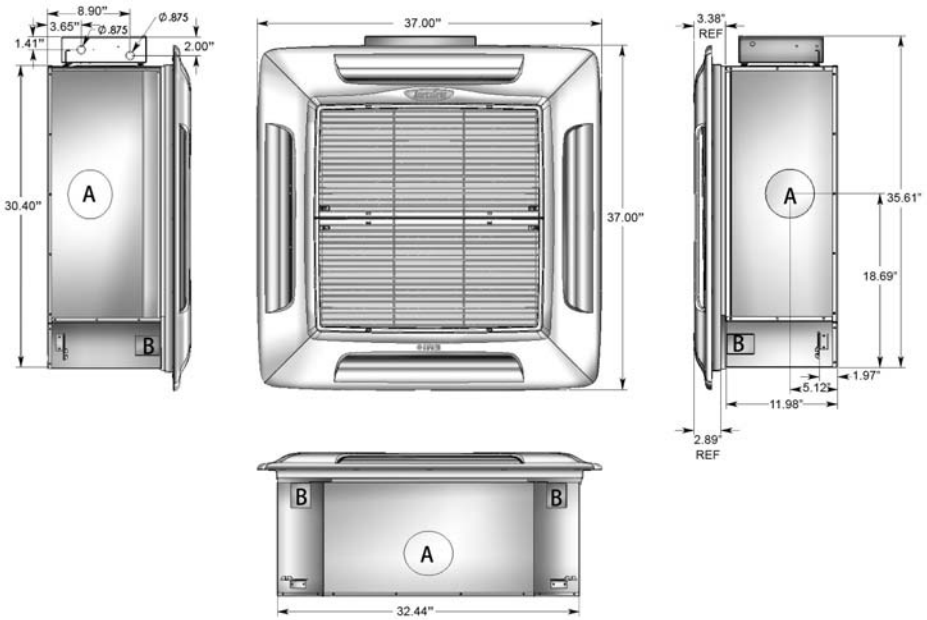


FEATURE	QTY.	SIZE
A Optional Discharge Knockout	3	3" Ø
B Fresh Air Inlet Knockout	2	1¼" x 2½"
C Condensate Discharge	1	½" Ø
D Suction	1	½" Ø
E Liquid	1	¼" Ø
F Condensate Pump Access	1	-

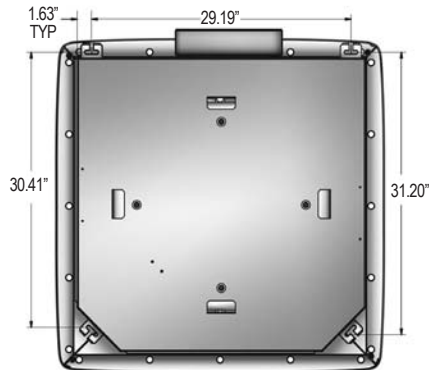


CAC CASSETTE DIMENSIONS

Medium Cabinet • CAC 18,000 - 24,000

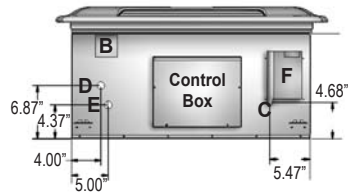
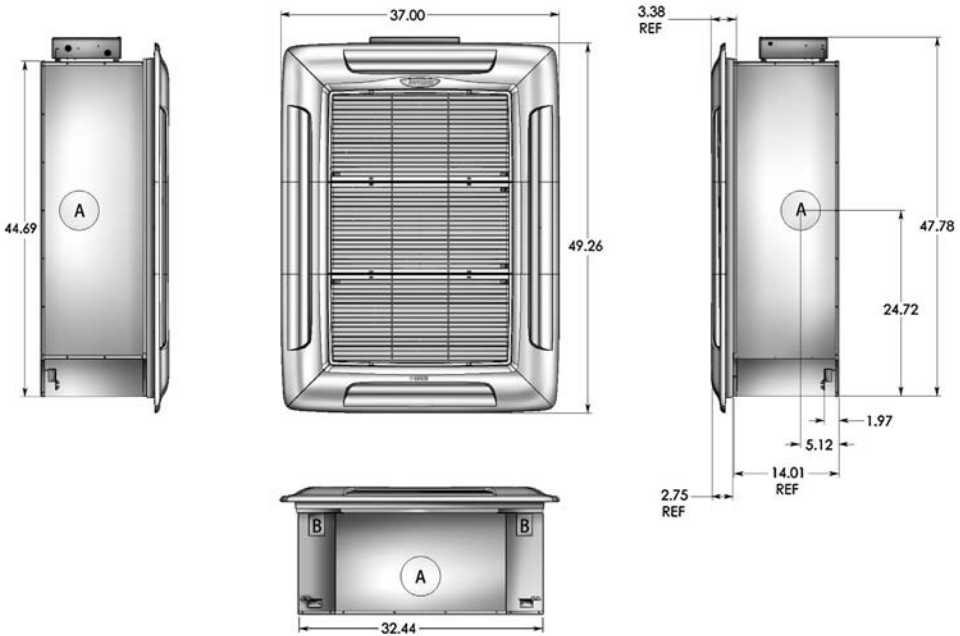


	FEATURE	QTY.	SIZE
A	Optional Discharge Knockout	3	3" Ø
B	Fresh Air Inlet Knockout	3	3" x 3"
C	Condensate Discharge	1	1/2" Ø
D	Suction	1	3/4" Ø
E	Liquid	1	3/8" Ø
F	Condensate Pump Access	1	-

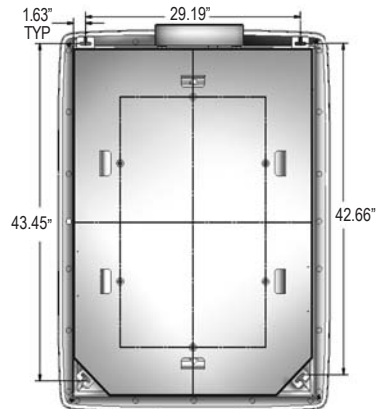


CAC CASSETTE DIMENSIONS

Large Cabinet • CAC 30,000 - 36,000



	FEATURE	QTY.	SIZE
A	Optional Discharge Knockout	3	3" Ø
B	Fresh Air Inlet Knockout	3	3" x 3"
C	Condensate Discharge	1	1/2" Ø
D	Suction	1	3/4" Ø
E	Liquid	1	3/8" Ø
F	Condensate Pump Access	1	-

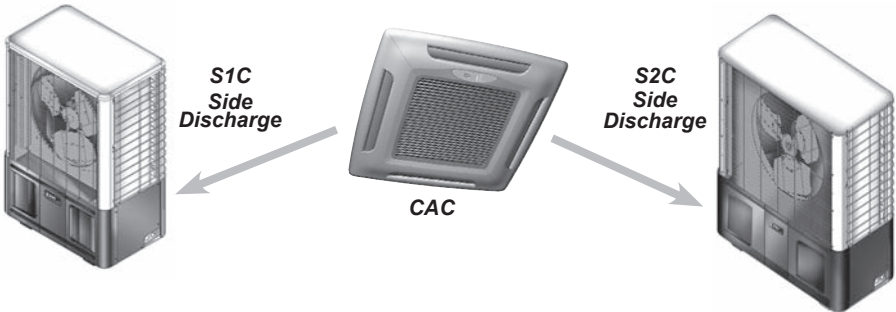


CAC ELECTRICAL SPECIFICATIONS

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

CAC ELECTRICAL SPECIFICATIONS									
Model #	Fan Motor			Elect Heat		Total AMPS	Min Volt	M.C.A.	HACR BRKR
	Volts/HZ/PH	RLA	H.P.	K.W.	AMPS				
Small Cabinet 09/12									
CAC09/12	208/230/60/1	0.35	1/10	–	–	0.4	197	0.5	15
CAC09/12	208/230/60/1	0.35	1/10	1.5	6.52	6.9	197	8.6	15
Medium Cabinet 18/24									
CAC18/24	208/230/60/1	0.55	1/8	–	–	0.6	197	0.7	15
CAC18/24	208/230/60/1	0.55	1/8	3	13.04	13.6	197	17.0	20
Large Cabinet 30/36									
CAC30/36	208/230/60/1	0.5, 0.5	1/10, 1/10	–	–	1.0	197	1.2	15
CAC30/36	208/230/60/1	0.5, 0.5	1/10, 1/10	5	21.74	22.7	197	28.3	30

CAC CASSETTE SYSTEM MATCHES



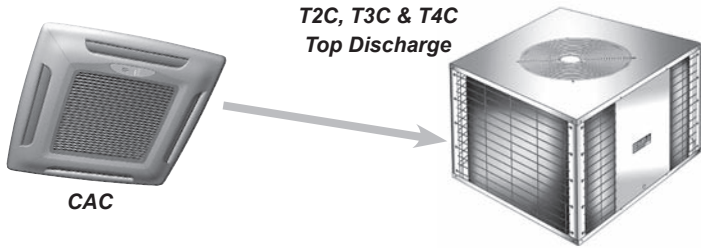
COOLING SYSTEMS WITH CASSETTE UNITS

Condenser	Cassette	Btuh	SEER	SHR	EER	Ref.
S1CA9	CACA12	9,000	13.0	.79	11.7	R22
S1CA2	CACA12	12,000	13.0	.72	12.2	R22
S1CA8	CACA24	18,000	13.0	.76	12.3	R22
S1CA4	CACA24	23,000	13.0	.67	11.8	R22
S1CA3	CACA36	30,000	13.5	.82	12.5	R22
S1CA6	CACA36	36,000	13.0	.74	12.6	R22

COOLING SYSTEMS WITH S2C SIDE DISCHARGE

Cassette	Condenser	Btuh	SEER	SHR	EER	Ref.
CACA12	S2CA99	18,000	13.0	.81	11.7	R22
CACA12	S2CA22	23,000	13.0	.74	11.8	R22
CACA12	S2CA92	21,000	13.0	.77	11.8	R22

CAC CASSETTE SYSTEM MATCHES



SYSTEM OPTIONS WITH T2C TOP DISCHARGE

Cassette(s)	Condenser	Btuh	SEER	SHR	EER	Ref.
CACA24	T2CA88	34,000	13.0	.79	11.8	R22
CACA24	T2CA44	45,200	13.0	.69	11.7	R22
CACA12+CACA24	T2CA98	27,000	13.0	.82	11.8	R22
CACA24	T2CA84	39,000	13.0	.74	11.7	R22
CACA12+CACA24	T2CA24	34,600	13.0	.75	11.8	R22

SYSTEM OPTIONS WITH T3C TOP DISCHARGE

Cassette(s)	Condenser	Btuh	SEER	SHR	EER	Ref.
CACA12+CACA24	T3CA994	40,600	13.0	.82	11.7	R22
CACA12	T3CA999	27,000	13.0	.87	11.8	R22
CACA12	T3CA222	36,000	13.0	.76	11.8	R22
CACA12+CACA24	T3CA928	39,000	13.0	.80	11.7	R22
CACA12+CACA24	T3CA924	43,600	13.0	.79	11.7	R22
CACA12+CACA24	T3CA228	42,000	13.0	.76	11.7	R22
CACA12	T3CA922	33,000	13.0	.80	11.8	R22
CACA12	T3CA992	30,000	13.0	.83	11.8	R22
CACA12+CACA24	T3CA998	36,000	13.0	.83	11.8	R22
CACA12+CACA24	T3CA224	46,600	13.0	.75	11.7	R22

SYSTEM OPTIONS WITH T4C TOP DISCHARGE

Cassette	Condenser	Btuh	SEER	SHR	EER	Ref.
CACA12	T4CA9999	36,000	13.0	.87	11.8	R22
CACA12	T4CA2222	48,000	13.0	.76	11.8	R22
CACA12	T4CA9222	45,000	13.0	.77	11.8	R22
CACA12	T4CA9992	39,000	13.0	.79	11.8	R22
CACA12	T4CA9922	42,000	13.0	.82	11.8	R22



**ARI Standard
210/240 UAC**

ALL PRODUCT LIMITED WARRANTY

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

WHAT WE WILL COVER

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

WHAT WE DON'T COVER

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

EMI IS NOT RESPONSIBLE FOR:

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

LIMITATION OF WARRANTIES

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

FOR SERVICE OR REPAIR:

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



Comfort Where It Counts.

Enviromaster International LLC

5780 Success Drive, Rome, NY 13440

www.enviromaster.com

EMI'S HIGH EFFICIENCY PRODUCT LINE

EVAPORATORS

WLC/WLH
High Wall Evaporator



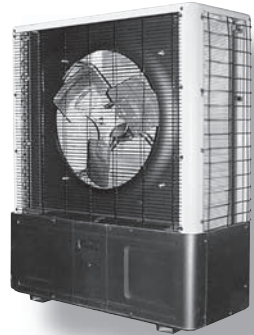
CAC
Cassette Evaporator



CONDENSERS



S1C & S1H Single Zone
Side Discharge



S2C Dual Zone
Side Discharge



T2C, T3C & T4C 2, 3 & 4 Zone
Top Discharge

