

***S1C/S1H SINGLE-ZONE & S2C DUAL-ZONE
SIDE DISCHARGE DUCTLESS SPLIT SYSTEM
CONDENSING UNITS***

STRAIGHT COOL/HEAT PUMP S1C/S1H

Nominal Circuit Capacities S1C/S1H:

9,000, 12,000, 18,000, 24,000 Btuh and

S1C 30-36 Btuh

COOLING ONLY S2C

Nominal Circuit Capacities:

9,000-12,000 Btuh

EMI  **AmericaSeries**

Comfort Where It Counts.




S1C/S1H



S2C

Enviromaster International LLC
5780 Success Dr.
Rome, NY 13440
www.enviromaster.com

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



P/N# 240005897 Rev. B [05/08]

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 condensing units. 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

- (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 _____



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

- ▲▼ Read all instructions before using the EMI AmericaSeries high efficiency condensing unit. Install or locate this unit only in accordance with these instructions. Use this unit only for its intended use as described in this manual.
- ▲▼ Check the rating plate on the EMI AmericaSeries condensing unit before installation to make certain the voltage shown is the same as the electric supply to the unit.
- ▲▼ The EMI AmericaSeries condensing unit must be connected only to a properly grounded electrical supply. Do not fail to properly ground this unit.
- ▲▼ Turn off the electrical supply before servicing the EMI AmericaSeries condensing unit.
- ▲▼ Do not use the EMI AmericaSeries condensing unit if it has damaged wiring, is not working properly, or has been damaged or dropped.

[Save These Instructions]

PRODUCT DESCRIPTION

The AmericaSeries S1C/H and S2C condensing units are, air-cooled, vertically arranged side discharge, high efficiency units designed specifically to meet or exceed a 13 SEER rating.

The S1C 9,000-36,000 Btuh and S1H 9,000-24,000 Btuh capacity condensing unit will provide cooling for a single evaporator, as identified in the "S1C Specifications and Dimensions" section on pages 23-24.

The S2C 18,000 (99) - 21,000 (92) and 23,000 (22) Btuh capacity condensing units will provide cooling for two evaporators, as identified on page 25 in the "S2C Specifications and Dimensions" section. The S1C/H and S2C are quiet units that can be recommended for both commercial and residential applications.

Installation of the S1C/H and S2C condensing units is simplified by a 24V control interconnection from the evaporator and multiple units can be lined up in close proximity to an exterior wall. Service valves are recessed to reduce tampering and all 9,000-12,000 Btuh units are equipped with a Duratec Performance Package that includes an oversized suction accumulator with surge baffles and enhanced oil management, a factory installed solid core filter drier and loss of charge switch. A field installed crankcase heater is standard on S1H 09 & 12 (Thermostatically controlled) models, and is available as optional equipment on other models.

INSTALLER SUPPLIED ITEMS

- Power wiring
- Low Volt wiring (18 awg minimum)
- Secure mounting pad or foundation
- Refrigerant piping (if not purchased from EMI)
- High Volt Disconnect
- Refrigerant for charging interconnect piping (see charge table on page 10)

CONTROLS AND COMPONENTS (Factory Installed or Supplied)

- Compressor and fan motor contactor
- Run capacitor
- Loss of charge switch (09 - 12 only)
- Low voltage terminal connections
- Large capacity suction accumulator (09 - 12 only)
- Solid core filter drier (09 - 12 only)
- Thermostatically controlled crankcase heater (09 - 12 S1H's)
- H.P.S. (High pressure switch)
 - Standard on S1H's (heat pumps)
 - Standard on S1C's 18K and above.
- Low Ambient controls for operation down to 32° F standard, factory installed on all S1H's (heat pumps)

Thermostatically controlled crankcase heater – This feature energizes the crankcase heater only when needed, removes the heater from the electrical circuit at conditions where it's not required, saving unnecessary Watts, and increasing overall system efficiency.

SYSTEM OPTIONS

- Field installed crankcase heater for straight cool units (standard on 9,000-12,000 Btuh S1H's Thermostatically controlled)
- Straight cool hard start (standard on all S1H's)
- 115V (9,000-12,000 Btuh only)
- Copper/copper coils (sea coast use)
- Low Ambient controls for operation down to 32° F, specify this option for S1C or S2C systems (standard on S1H's) that will be operated in cooling mode at outside temperatures below 60° F (field installed kit)
- Low Ambient for operation down to 0° F for S1C, S1H or S2C systems (consult factory for availability)

Low Ambient controls are required when the system is asked to cool at outdoor temperatures below 60° F, this may cause damage to the compressor and coil, and may

SYSTEM OPTIONS (cont.)

void the warranty. A **Field Installed Low-Ambient Kit** is good for operation down to 32° F. This is accomplished by cycling the condenser fan on and off, which will in turn maintain a constant low side pressure providing a steady cooling effect and keeping the air handler from frosting-up.

ITEMS FOR CONSIDERATION

- Locate the unit as close to the indoor section as possible. (See Tubing Specifications chart on page 7.)
- If the unit is used for low ambient cooling down to 32°F, this option must be specified to prevent system damage.
- Avoid high traffic areas and prevailing wind locations.
- Surface must be flat and level.
- Mount unit above typical snow fall levels.

Ensure free flow of air through the unit. Air must not recirculate from discharge to intake. Air is drawn through the coil and side discharged through the fan grille. **A minimum 48" clearance is necessary for the condenser discharge. Rear intake (coil side) clearance is 12" minimum.** Consider how power will be run to the unit from the power source. Refrigerant piping should be a direct line to the indoor unit.

INSTALLATION INSTRUCTIONS

SITE PREPARATION

1. Place the unit on a flat concrete surface or pad if on the ground. Roof mounting should use a build up platform to avoid intake of hot air from the roof.
2. **In areas of heavy snowfall, condensers should be set above the level of maximum anticipated snowfall (12" is usually adequate).**

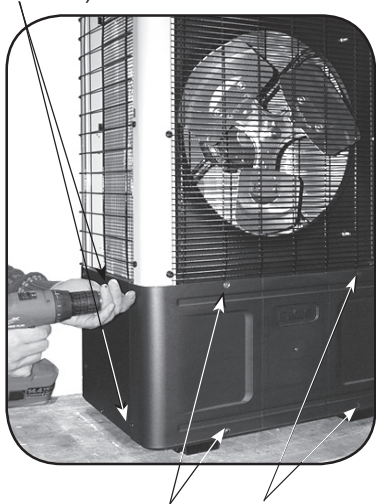
INSTALLATION INSTRUCTIONS

UNIT MOUNTING INSTRUCTIONS

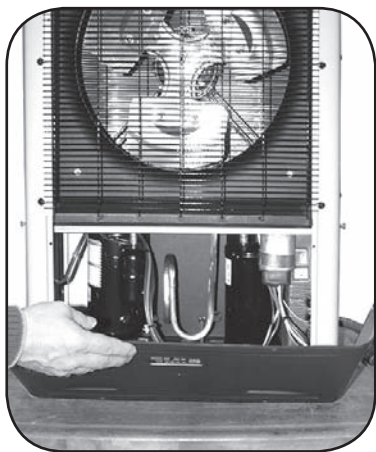
S1C is shown

Side discharge unit allows for permanent mounting through the feet. **This is highly recommended due to the vertical design of the unit.**

1. Loosen the screws on left and right sides of the front panel. (Do not remove these screws.)



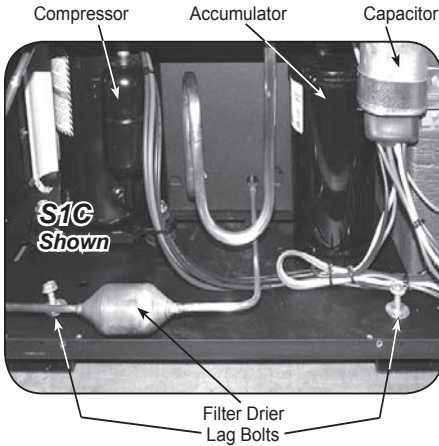
2. Remove the screws on the front of the panel.
3. To remove front panel:



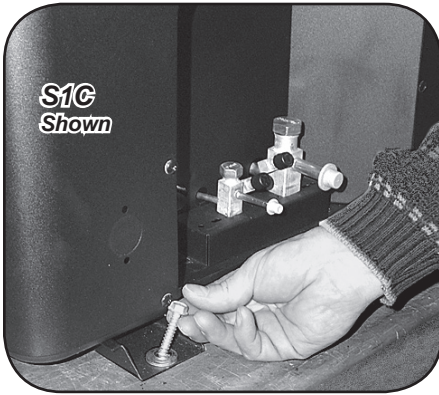
4. Slide front panel forward to clear side screws and remove.

INSTALLATION INSTRUCTIONS

UNIT MOUNTING INSTRUCTIONS *Continued*



5. Insert lag bolts through the holes in the bottom of the unit and tighten to secure.



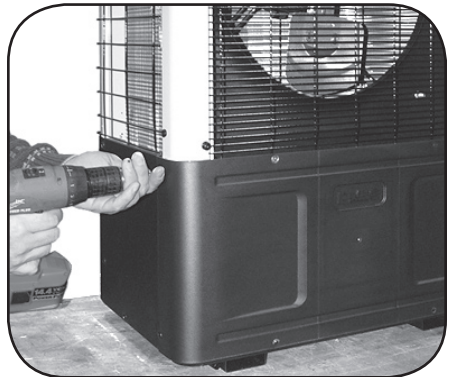
6. Insert lag bolts through the holes in the feet on the back of the unit and tighten to secure.
7. Replace the front panel, **do not** tighten the side screws at this time.

ELECTRICAL WIRING

1. All electrical wiring must be run according to NEC and local codes.
2. Refer to the unit rating plate for voltage, minimum circuit ampacity and over current protection requirements.



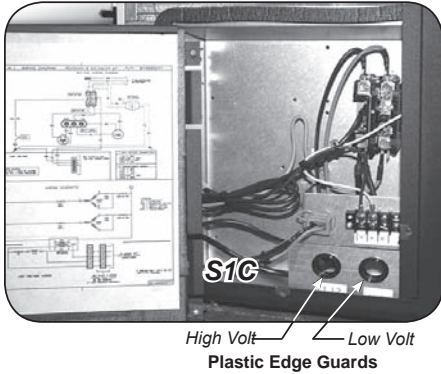
3. Use only HACR type breakers or time delay fuses. Select the wire size according to the ampacity rating.
4. To access electrical connections and wiring diagram:
 - a) Remove the screws on the side panel adjacent to the back panel.



- b) The screws adjacent to the front panel should already be loose (don't remove them).

INSTALLATION INSTRUCTIONS

- c. Slide the side panel out to access the high/low electrical connections and wire diagram.



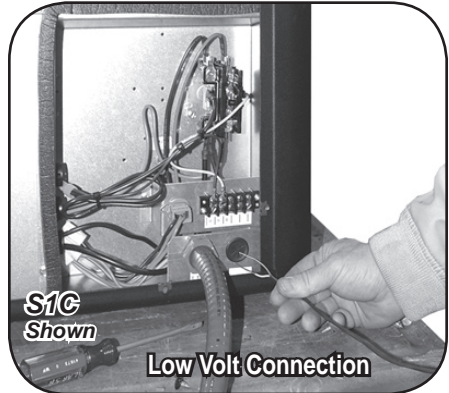
Note: Remove the plastic edge guards from the holes and replace with a water-tight strain relief fitting (High V) and a split grommet fitting (Low V)

5. Power should be run to a weather proof disconnect box usually within 3 feet of the unit.
6. From the disconnect box, run the power through the 7/8" hole on the side of the unit and into the electrical box and anchor with the strain relief fitting.



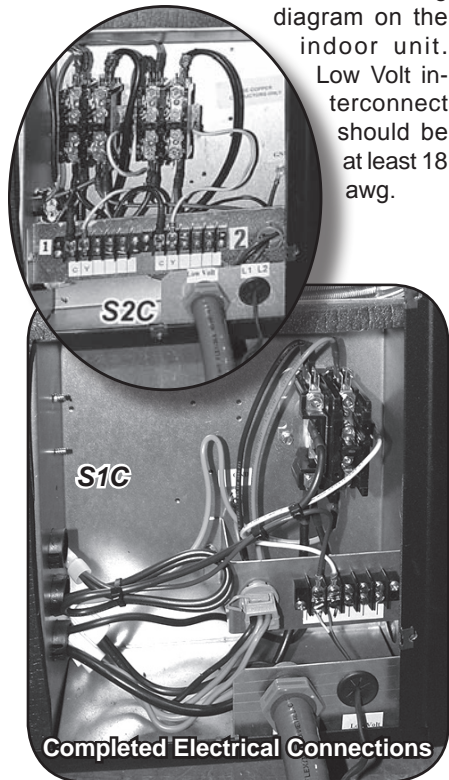
7. Run wires to the high Volt pigtail in the control box and attach L1 and L2 connections. Also run green wire to ground wire.

8. Check wiring diagram for the required number of low voltage wires to be run between indoor and outdoor sections.



9. Connect the 24 Volt wiring matching color to color. Refer to the wiring diagram on the inside panel of the condenser, and also

refer to the wiring diagram on the indoor unit. Low Volt interconnect should be at least 18 awg.

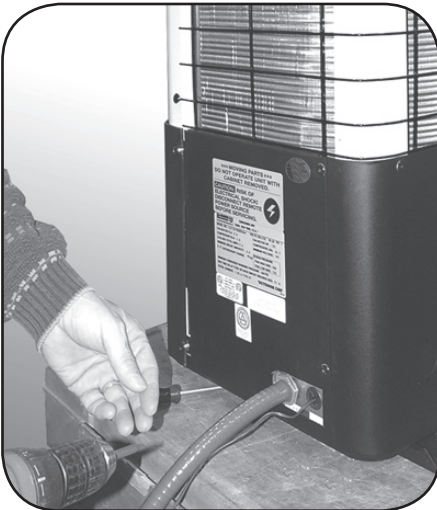


INSTALLATION INSTRUCTIONS

ELECTRICAL WIRING *Continued*



10. To replace side panel slide the slotted holes of the panel onto the loosened screws of the front panel so that the edge of the front panel covers the edge of the side panel.



11. Fasten all remaining loose screws.

REFRIGERANT PIPING

INTERCONNECTING TUBING SPECIFICATIONS

S1 Model	MAX. Length	Max. Lift	Liquid Line O.D.	Suction Line O.D.
09	100'	35'	1/4"	1/2"
12	100'	35'	1/4"	1/2"
18	100'	35'	3/8"	5/8"
24	100'	35'	3/8"	3/4"
30	100'	35'	3/8"	3/4"
36	100'	35'	3/8"	3/4"

S2C TUBING SPECIFICATIONS

Circuit Size	Line Sizes O.D.	
	Liquid	Suction
09, 12	1/4"	1/2"

The system will support refrigerant runs to the inside unit of up to 100' equivalent feet with a 35' rise included. The units are furnished with sweat connections and are equipped with refrigerant valves and Schrader fittings for charging and taking pressure readings. The following precautions should be made:

- Be certain no burrs remain on the fittings.
- Use only clean refrigeration tubing.
- Use tube benders to guard against kinking.
- Avoid piping on wet and rainy days and ***insulate suction line***. Be certain that plastic end caps remain in place when inserting through wall openings. Isolate tubing from transmitting vibration to the building or unit and avoid contact with sharp edges. **Refrigeration valves should be wrapped with a wet rag "heat sink" to protect valves while brazing.**

NOTE: It is recommended that a filter drier be installed in liquid line, at the indoor unit on models that a filter drier is not already factory installed (i.e. 18K and larger).

INSTALLATION INSTRUCTIONS

P-TRAP INSTALLATION

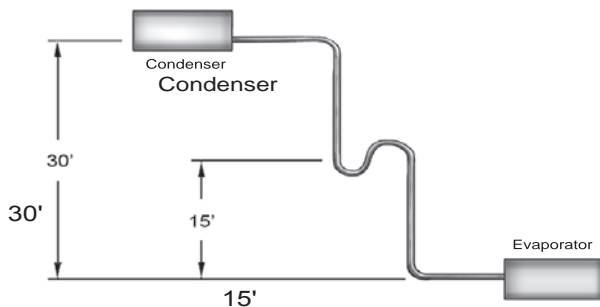
- A P-trap is recommended when the suction riser is equal to or greater than 20 feet in height.
- When the condenser is installed above the evaporator, the P-trap will help the return of oil back to the compressor.
- The placement of the P-trap should be at the halfway mark of the suction riser. For example if the suction riser is 30 feet tall then a P-trap is recommended at the 15 foot mark of the suction riser (see Figure 1).
- A P-trap may be fabricated using (2) street elbows and (2) regular elbow. A prefab-

ricated trap may be purchased from a wholesaler or distributor however the trap should be shallow as the (3) elbow configuration. Each elbow is approximately 2 equivalent feet. One P-trap is equal to approximately 12 equivalent feet.

NOTE: *Avoid excessive oil buildup. The P-trap should have a shallow depth and a short horizontal section.*

- P-traps are not required at the foot of the hot gas risers due to increased oil flow at higher temperatures.

Figure 1



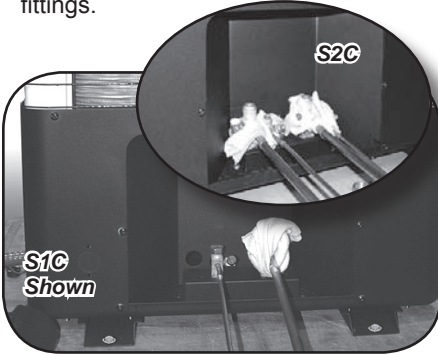
Evaporator

INSTALLATION INSTRUCTIONS

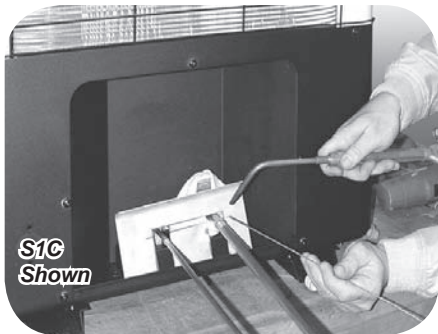
REFRIGERANT PIPING

Continued

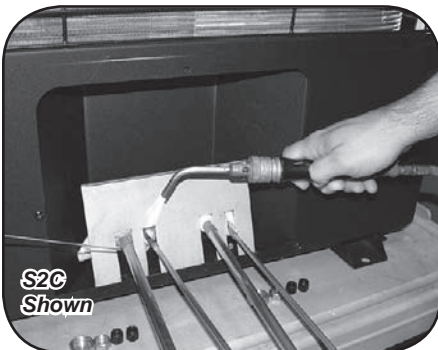
1. Clean the ends of tubing and insert into fittings.



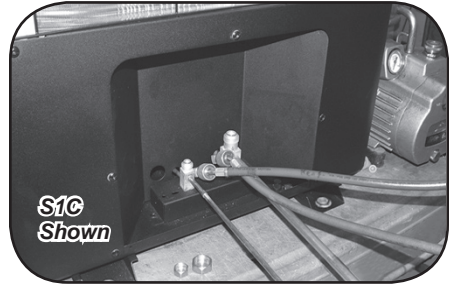
2. Protect the valves by wrapping with a wet rag "heat sink" before brazing.



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

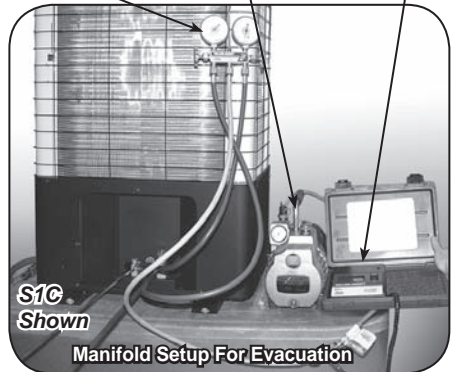


4. Braze tubing into fittings.

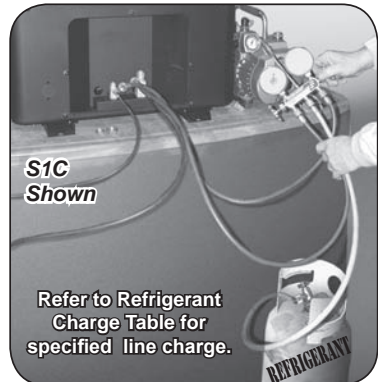


5. Attach manifold set.

Manifold Vacuum Pump Micron Gage



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

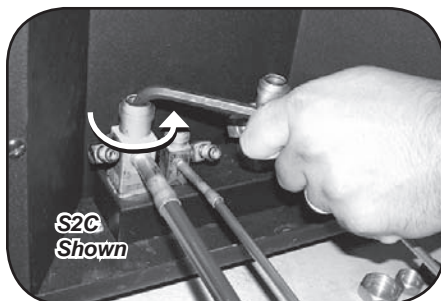
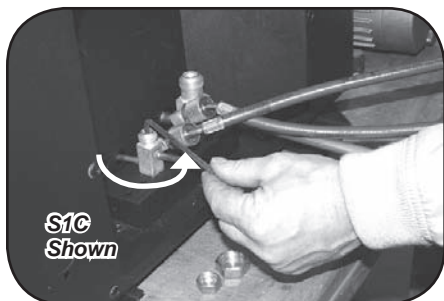


7. Once certain of a good evacuation and leak free joints, back-seat the valves (counter-clockwise) to open and allow factory charge to fill lines and indoor unit.

INSTALLATION INSTRUCTIONS

COMPLETE PIPING CONNECTIONS

- Charge to proper weight, charge based on feet of interconnect (tables starting on page 10).
- Refer to Charts on page 12 to “fine tune” the refrigerant charge to meet your conditions.



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

REFRIGERANT PROCESSING

IMPORTANT NOTES:

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

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

$$\text{System Total} = \text{Factory Charge} + \text{Line Adjustment}$$
- Round to the nearest ounce and allow for gauges and hoses.

S1C REFRIGERANT CHARGE TABLE

CONDENSER	EVAPORATOR PAIRING	LINE CHG/FT	FACTORY CHARGE
S1C9	CAH12	.25 oz.	37 oz.
S1C2	CAH12	.25 oz.	40 oz.
S1C8	CAH24	.56 oz.	51 oz.
S1C4	CAH24	.56 oz.	65 oz.
S1C3	CAC36	.56 oz.	72 oz.
S1C6	CAC36	.56 oz.	90 oz.
S1C9	WLH09/UNH09	.25 oz.	37 oz.
S1C2	WLH12/UNH12	.25 oz.	40 oz.
S1C8	WLH24/UNH24	.56 oz.	51 oz.
S1C4	WLH24/UNH24	.56 oz.	65 oz.
S1C3	WLC30/UNC36	.56 oz.	72 oz.
S1C6	WLC36/UNC36	.56 oz.	90 oz.

S1H (HEAT PUMP) REFRIGERANT CHARGE TABLE

CONDENSER	EVAPORATOR PAIRING	LINE CHG/FT	FACTORY CHARGE
S1H9	WLH09/UNH09	.25 oz.	41 oz.
S1H2	WLH12/UNH12	.25 oz.	44 oz.
S1H8	WLH24/UNH24	.56 oz.	53 oz.
S1H4	WLH24/UNH24	.56 oz.	67 oz.

INSTALLATION INSTRUCTIONS

REFRIGERANT PROCESSING *Continued*

S2C REFRIGERANT CHARGE TABLE			
CONDENSER	EVAPORATOR PAIRING	LINE CHG/FT	FACTORY CHARGE
S2C99	WLH09	.25 oz.	28 oz./ 28 oz.
S2C22	WLH12	.25 oz.	33 oz./ 33 oz.
S2C92	WLH09+WLH12	.25 oz.	28 oz./ 33 oz.
S2C99	CAC12	.25 oz.	28 oz./ 28 oz.
S2C22	CAC12	.25 oz.	33 oz./ 33 oz.
S2C92	CAC12	.25 oz.	28 oz./ 33 oz.
S2C99	UNH09	.25 oz.	28 oz./ 28 oz.
S2C22	UNH12	.25 oz.	33 oz./ 33 oz.
S2C92	UNH09+UNH12	.25 oz.	28 oz./ 33 oz.

WARNING

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

The units are delivered precharged with refrigerant for the condenser coil and the evaporator. Charging of the field installed piping is required. Refer to the refrigerant charge table for the proper amount to be added for the applications interconnect piping. Unit service valves are solid brass, for sweat connections.

IMPORTANT: All systems require field charge adjustments. Refer to the "Refrigerant Charge Tables" for proper weight charge and to the supplied "Operational Charts" for proper system pressures and temperature at different outdoor conditions. Superheat should be used for final system charge.

When charging and checking pressures/temperatures on system supplied with Low Ambient Option, the fan cycle switch should be jumped out of the circuit temporarily to obtain accurate data.

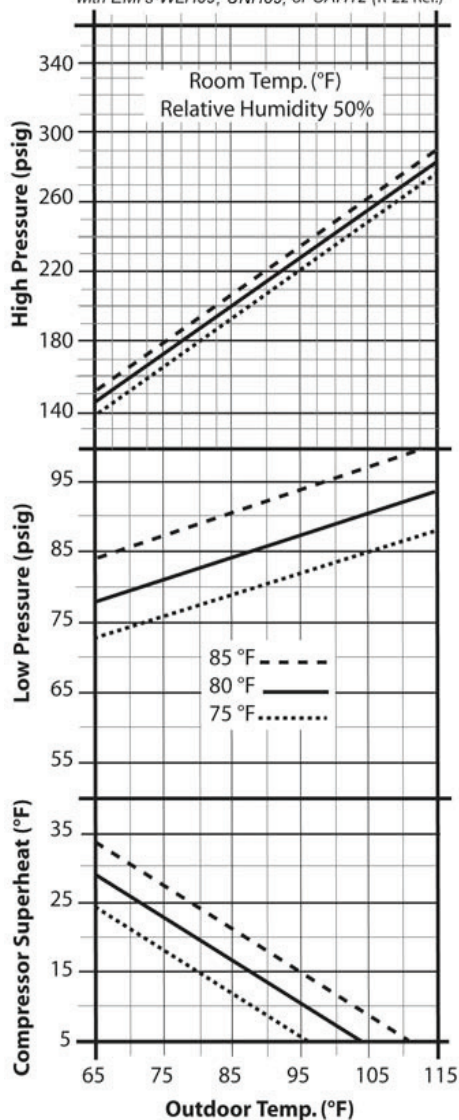
Note: The following air handlers are equivalent in electrical specifications and system combinations.

WLH09 = UNH09
WLH12 = WLH12
WLH24 = UNH24
WLC30 = UNC36
WLC36 = UNC36

SINGLE ZONE OPERATION CHARTS

Cooling Cycle Models S1C9, S1H9

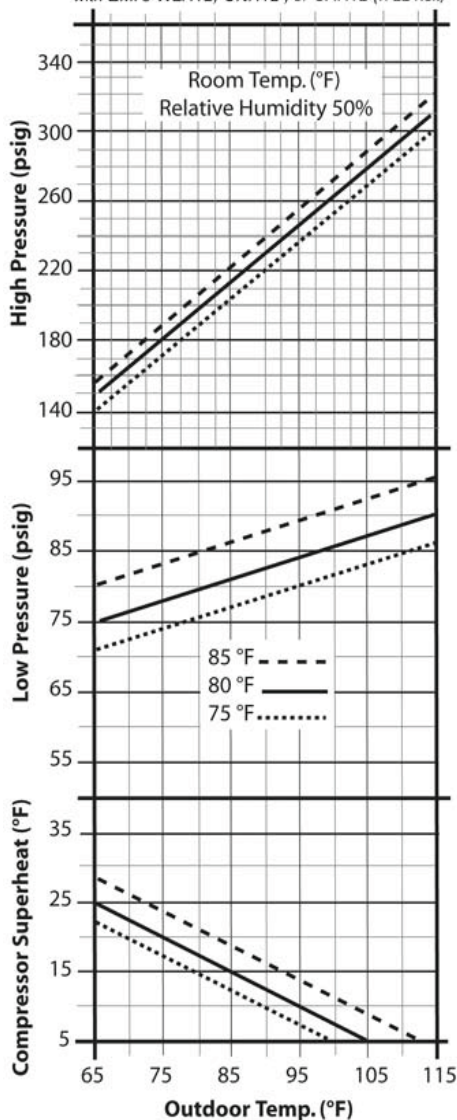
with EMI's-WLH09, UNH09, or CAH12 (R-22 Ref.)



Note: Minimum compressor superheat 5° F

Cooling Cycle Models S1C2, S1H2

with EMI's-WLH12, UNH12, or CAH12 (R-22 Ref.)

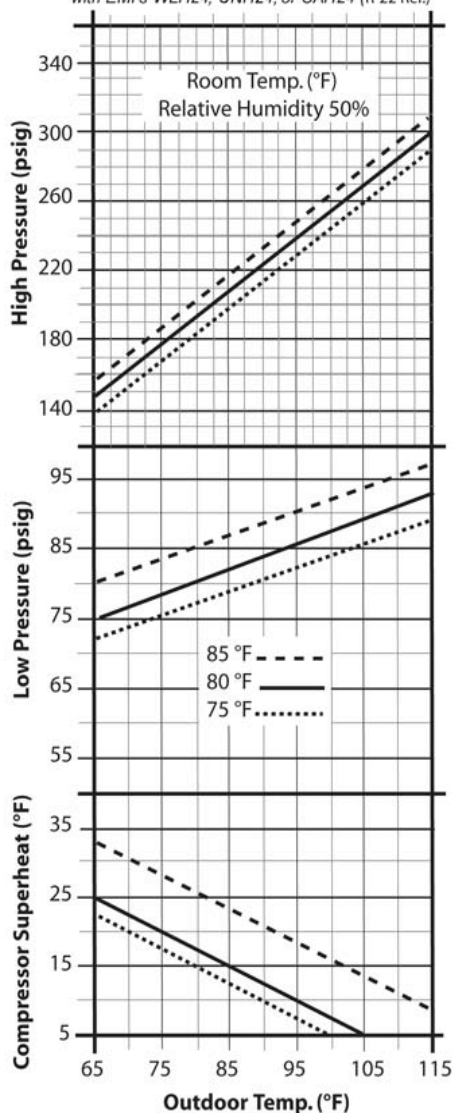


Note: Minimum compressor superheat 5° F

SINGLE ZONE OPERATION CHARTS

Cooling Cycle Models S1C8, S1H8

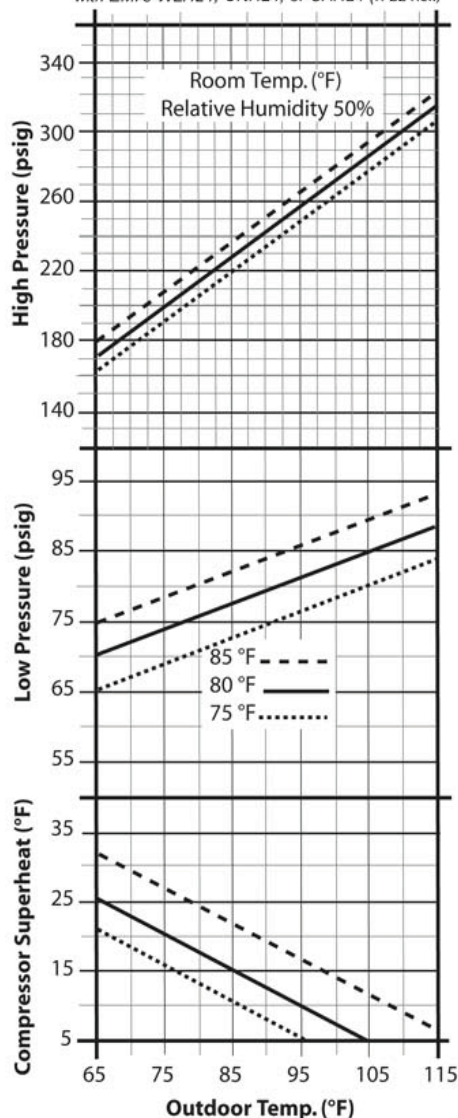
with EMI's-WLH24, UNH24, or CAH24 (R-22 Ref.)



Note: Minimum compressor superheat 5° F

Cooling Cycle Models S1C4, S1H4

with EMI's-WLH24, UNH24, or CAH24 (R-22 Ref.)



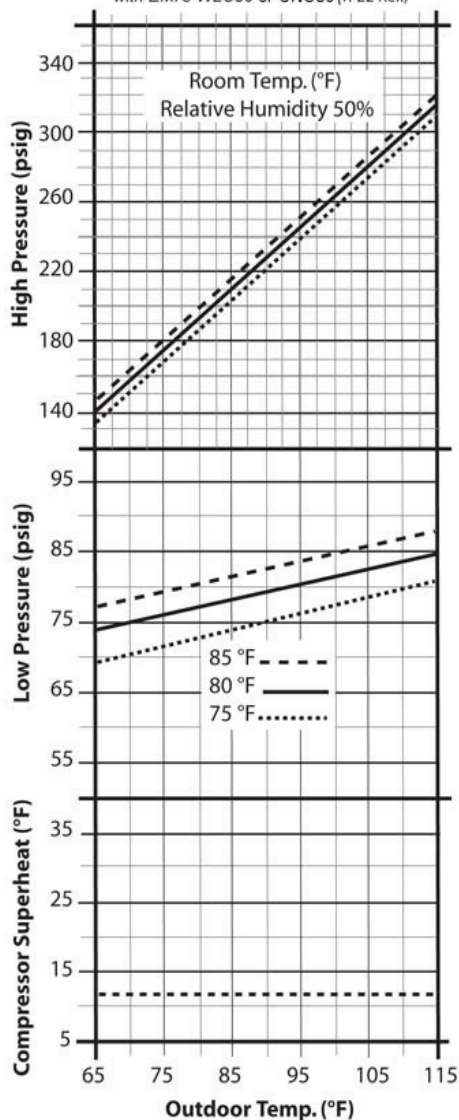
Note: Minimum compressor superheat 5° F

SINGLE ZONE OPERATION CHARTS

Cooling Cycle

Models S1C3

with EMI's-WLC30 or UNC36 (R-22 Ref.)

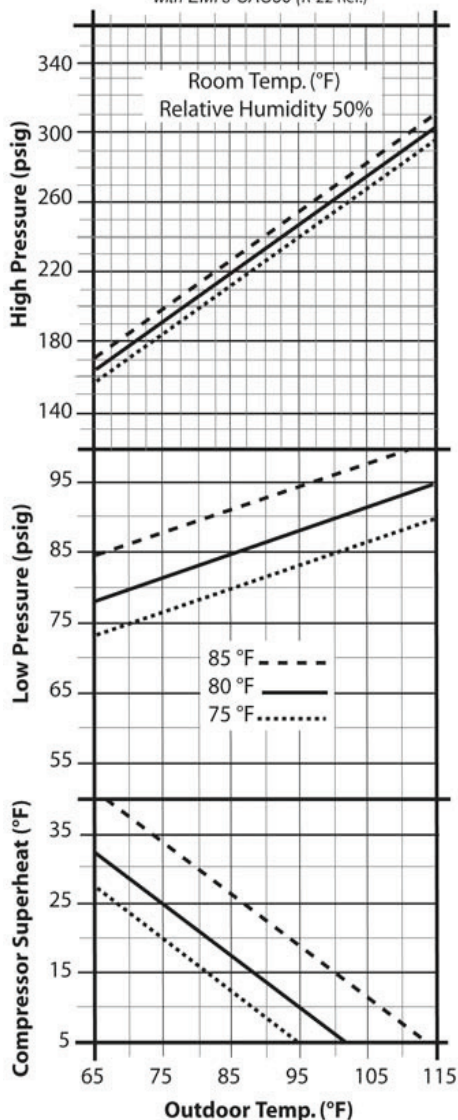


Note: Only 1 superheat line (TXV)

Cooling Cycle

Models S1C3

with EMI's-CAC36 (R-22 Ref.)

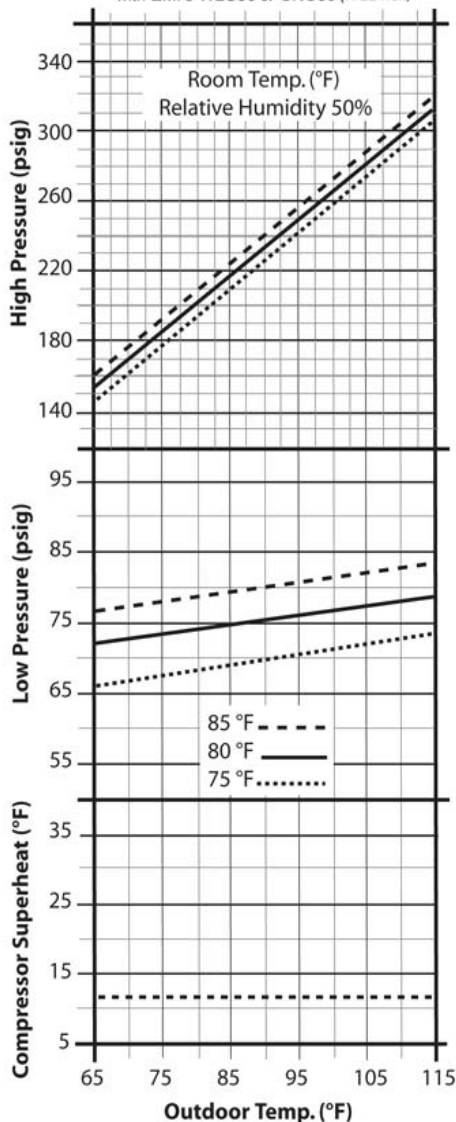


Note: Minimum compressor superheat 5° F

SINGLE ZONE OPERATION CHARTS

Cooling Cycle Models S1C6

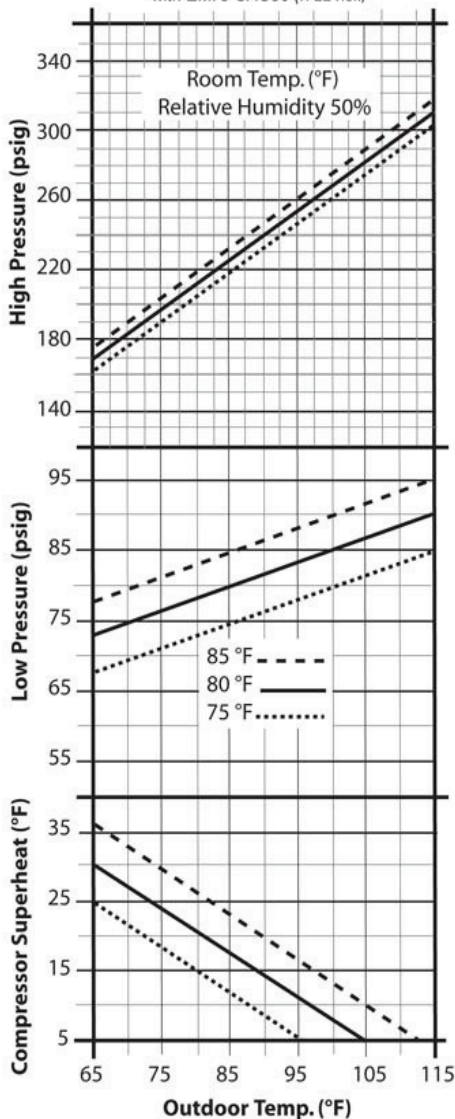
with EMI's-WLC36 or UNC36 (R-22 Ref.)



Note: Only 1 superheat line (TXV)

Cooling Cycle Models S1C6

with EMI's-CAC36 (R-22 Ref.)

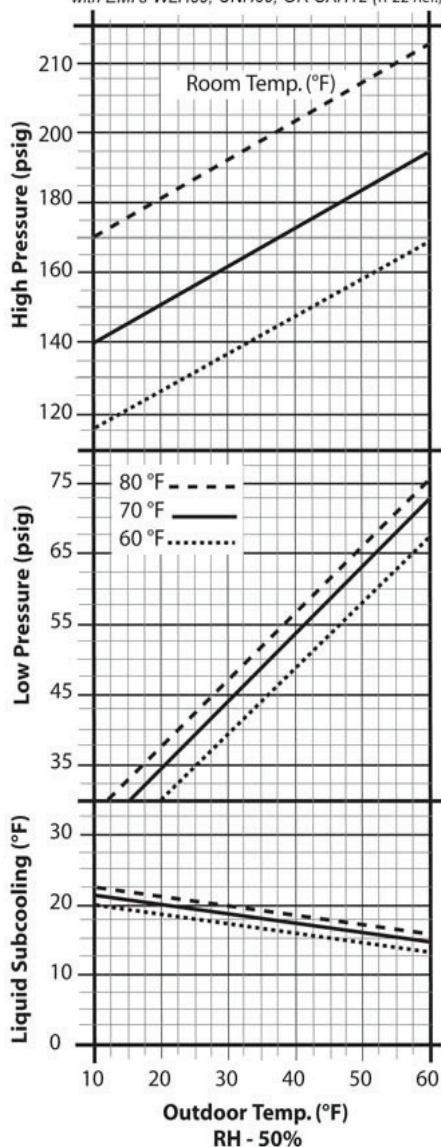


Note: Minimum compressor superheat 5° F

SINGLE ZONE HEAT PUMP OPERATION CHARTS

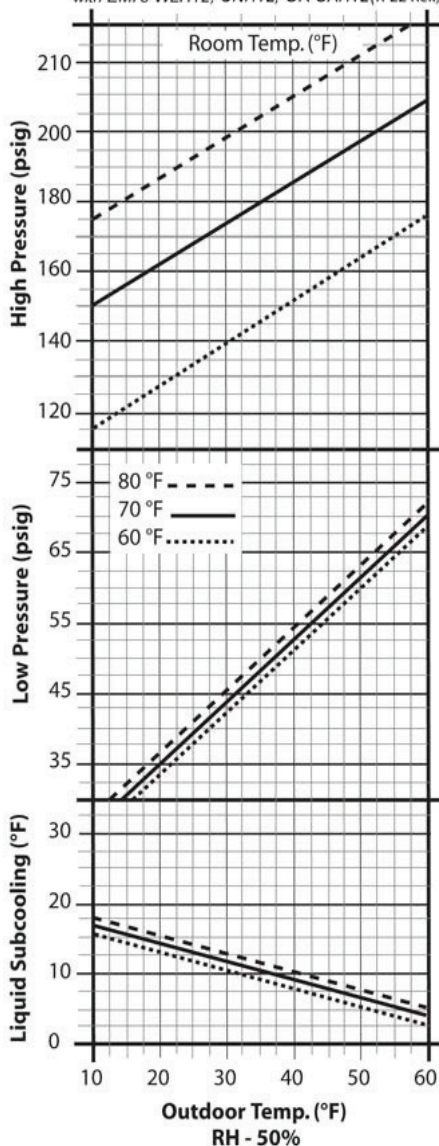
Heat Cycle Models S1H9

with EMI's-WLH09, UNH09, OR CAH12 (R-22 Ref.)



Heat Cycle Models S1H2

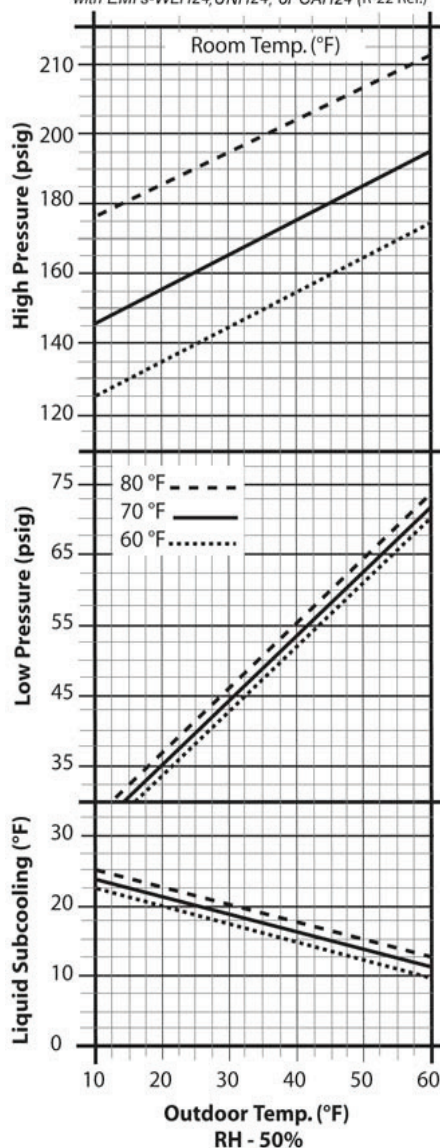
with EMI's-WLH12, UNH12, OR CAH12(R-22 Ref.)



SINGLE ZONE HEAT PUMP OPERATION CHARTS

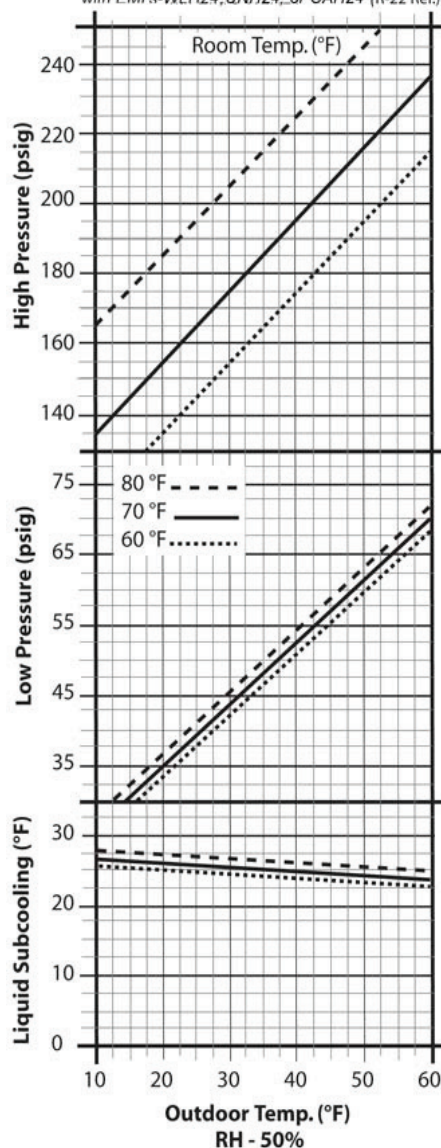
Heat Cycle Models S1H8

with EMI's-WLH24, UNH24, or CAH24 (R-22 Ref.)



Heat Cycle Models S1H4

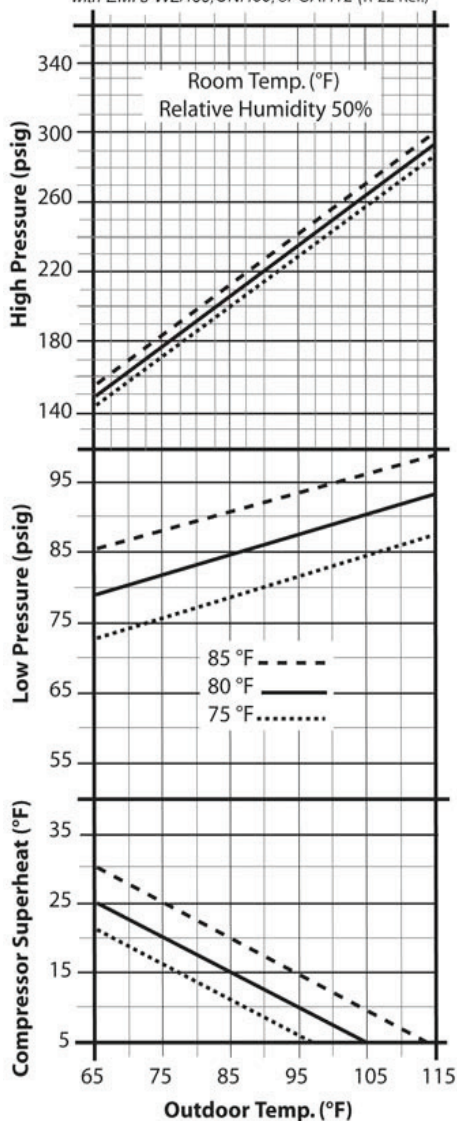
with EMI's-WLH24, UNH24, or CAH24 (R-22 Ref.)



DUAL ZONE OPERATION CHARTS

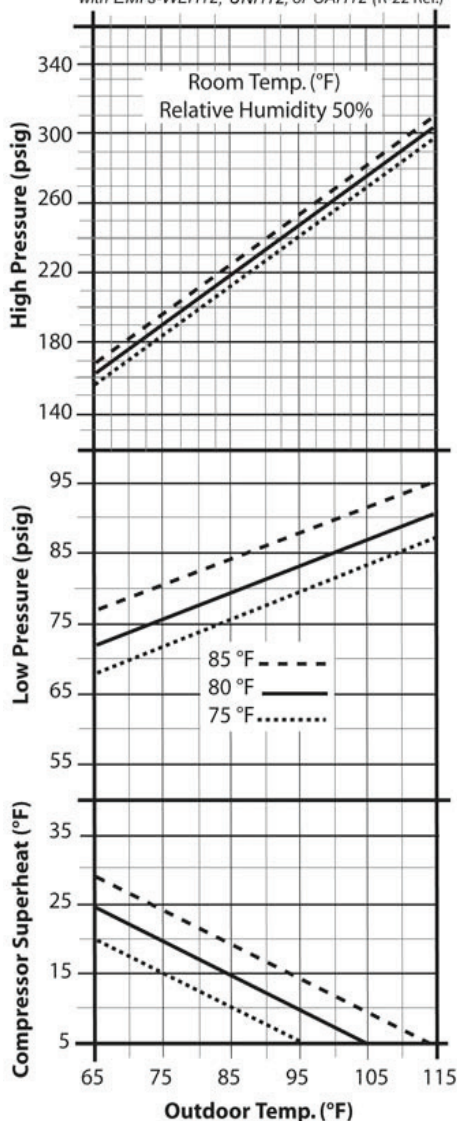
Cooling Cycle Models S2C99

with EMI's-WLH09, UNH09, or CAH12 (R-22 Ref.)



Cooling Cycle Models S2C22

with EMI's-WLH12, UNH12, or CAH12 (R-22 Ref.)



PREPERATION FOR START-UP

STARTING THE UNIT

- In low ambient cooling 9-12 Btuh units, if a crankcase heater is installed, power the system 24 hours before attempting to start the unit in cool weather (below 60° F).
- After doing a final system check using the Operation Charts (supplied on previous pages). Record results on Test Unit Data Sheet on page 26.

- Remove gauge set. Mount all access panels and make sure they are properly secured.
- Make final visual inspection and repair any deficiencies.

NOTE: *A hard start kit may be required for units in low voltage applications.*

OPERATION AND MAINTENANCE

The S1C/H and S2C outdoor sections are the compressor bearing units of the system. It operates at the command of the indoor section or room thermostat. Therefore, the system operation will be described in the manual pertaining to the indoor section.

EMI units are designed and constructed for reliability and long life with minimal maintenance. You can assure peak operating efficiency by regularly inspecting for free air passage into and through the coil. If debris collects on the air coil, it should be cleaned by "back-flushing" with a spray of water or vacuuming. **TURN OFF POWER SUPPLY FIRST.** Outdoor units may be cleaned or waxed if desired. Use a non-abrasive car wax (on metal surfaces only).

This unit is equipped with a permanently lubricated motor. Although oiling is not necessary, adding a few drops through the oiling ports twice yearly will extend the life of the motor. **Do not over oil.**

Panels should remain on the unit at all times. Service should be performed by a **QUALIFIED** service agency only.

SPECIFIC CHANGES

All EMI products are subject to on-going development programs so design and specifications may change without notice. Please consult the factory for more information.

SINGLE-ZONE AND DUAL-ZONE CONDENSER SEQUENCE OF OPERATION

EMI America Series condensers are designed to operate with EMI America Series evaporators. Both the condenser (outdoor unit) and evaporator (indoor unit) have a high volt service connection. Each is to be independently connected to the electrical service panel. (See the unit name plate for the correct breaker type and size). The outdoor and indoor units are also connected to each other through a low volt interconnect wiring. A 24V transformer located in the indoor unit provides the low Volt power source.

Straight cool condensers are designed to operate as a single stage cooling unit. Heat pump condensers are designed to operate as a single stage cooling two stage heating unit. For proper operation the unit must be matched with an appropriate EMI indoor unit with unit mounted controls and/or wall mounted thermostat. For two-stage heating operation the indoor unit must be equipped with an electric strip heater.

Note: For remote wall mounted thermostat operation be sure to select EMI p/n 240004180 or a suitable 24V, two stage heating, heat pump thermostat.



Condenser operation: The transformer located in the indoor unit provides 24V, low-Volt control power to the condenser (outdoor unit). This can be measured across low-Volt terminals "R" and "C".

Single zone heat pump condensers utilize a reversing valve to provide reverse cycle operation. Therefore the outdoor unit will act as either a condenser or an evaporator thereby providing comfort cooling or heating to the indoor space. The reversing valve is energized in cooling. Should the valve fail to actuate, the system will default to the heating mode of operation.



Cooling operation, single-zone and dual-zone: Cooling operation requires that the control (either unit mount or remote wall mount thermostat) make a connection between low-Volt terminals "R" and "Y" along with "R" and "O" (heat pumps only). When the indoor control is placed in cooling mode, with the set point temperature below the room temperature, the reversing valve will energize (R & O heat pumps only) along with the compressor and outdoor fan (R & Y). When the indoor control is satisfied and the room temperature falls below the set temperature, the compressor and fan will de-energize. The anti-short cycle timer (ASCT) will prevent the compressor from re-starting for three minutes.



Heating operation (heat pumps only): Heating operation requires that the control (either unit mount or remote wall mount, heat pump thermostat) make a connection between low-Volt terminals "R" and "Y" only. When the indoor control is placed in heating mode, with the set point temperature above room temperature, the compressor and outdoor fan

(R & Y) will energize. When the indoor control is satisfied and the room temperature rises above the set temperature, the compressor and fan will de-energize. The anti-short cycle timer (ASCT) will prevent the compressor from re-starting for three minutes.



Defrost controls with short cycle protection (heat pumps only): The unit is equipped with a logic control circuit designed to keep system operating at peak efficiency. The 24V circuit provides control to the indoor and outdoor systems including a three minute, anti-short cycle timer (ASCT) compressor protection.

The defrost control circuit is designed to keep the condenser coil free from frost and ice during heating mode. This is accomplished through the precise switching sequence of the outdoor fan, reversing valve and indoor auxiliary heater.



Defrost initiation: The defrost-sensor is located on either the end plate or the return bend of the condenser coil. A defrost cycle will initiate after the sensor closes (approx. 30° F) and remains closed for the length of time selected on the control board (either 30, 60 or 90 minutes)*.

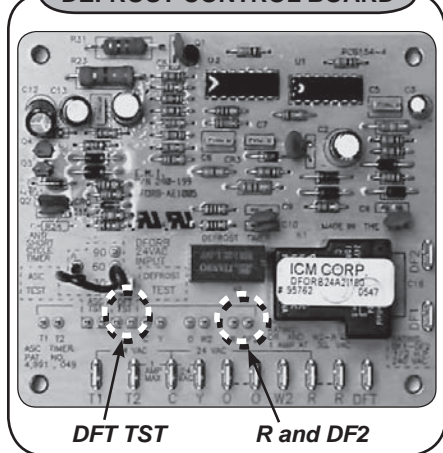
At the start of the defrost cycle, the reversing valve will change from heating to cooling mode. The condenser fan will also switch off thereby allowing pressure and temperature to rise within the condenser coil to melting off any ice build-up. At the same time the unit will switch on the indoor electric strip heater to temper the cold air being discharged from the evaporator unit. This will continue until either the defrost-sensor opens (approx. 60° F) or a 10-minute maximum cycle time has elapsed. Defrost times will vary depending on outdoor temperature and moisture conditions. When the defrost cycle is complete the unit will return to normal heating operation.

***Factory settings 9-24k Btu = 90 minutes**

SINGLE-ZONE AND DUAL-ZONE SEQUENCE OF OPERATION

TESTING DEFROST OPERATION USING TEST PINS

DEFROST CONTROL BOARD



WARNING!

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

Defrost operation can be initiated using the test pins located on the circuit board of the condensing unit. “Defrost test operation” will be a time compressed version of the actual defrost cycle.

With the system “off”, using two small alligator clips, jumper the following sets of test pins. “R and DF2” and “DFT TST”.

▲ **Defrost control board:** Apply power to the indoor and outdoor units. Place the indoor unit in heating mode with the set point temperature well above room temperature. This is to ensure that the condenser will remain on during the entire defrost test operation.

The condenser will operate in heating for approximately 20 seconds. At that point the unit will enter defrost mode for approximately 2 seconds. During this time the condenser fan will switch off, the reversing valve will energize and the defrost board will energize the indoor electric heat relay through the “W” terminal. After the two second defrost cycle is complete, the unit will switch back to heating operation for another 20 seconds. This process will repeat until the jumpers are removed from the test pins.

Note: If the condenser coil is heavily frosted up with ice, it is likely that the “Defrost Sensor” is already closed. In this case the “R and DFT” jumper can be eliminated. To initiate defrost, momentarily jump pins marked “DFT TST” until the defrost cycle begins. The unit will remain in defrost mode until the condenser coil is defrosted and then it will return to heating mode. When testing is complete be sure to remove the jumper(s). DO NOT leave the unit in test mode with jumper(s) in place.

▲ **Low ambient operation:** If the unit is equipped with low ambient fan control for cooling, the fan will remain off (while in cooling mode) until the condenser pressure reaches 210psi. The fan will then energize and run until the condenser pressure falls below 150psi. This will happen only in the cooling mode (or when the reversing valve is energized). In heating (reversing valve not energized), the fan will run continuous so long as the connection is made between “R” and “Y”.

S1C/S1H SPECIFICATIONS AND DIMENSIONS

NOTE: All EMI products are subject to ongoing development. Design and specifications may change without notice.

SHIPPING WEIGHT	
Size Btuh	Lbs.
9-12	98
18-24	156
30-36	210

MOUNTING DIMENSIONS				
Model Size	A	B	C	D
S1C/S1H9, S1C/S1H2	4 5/8"	14 11/16"	3"	12 7/16"
S1C/S1H8, S1C/S1H2	4 5/8"	22 11/16"	3"	12 7/16"
S1C3, S1C6	7"	23 15/16"	3"	12 7/16"

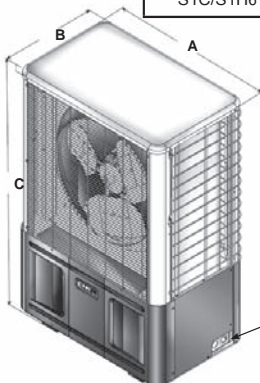
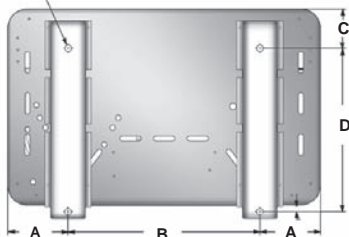


Easy access interconnects on back of unit

SOUND DATA		
	Size Btuh	dBA
Heat Pump & Cool	09	59
	12	59
	18	62
	24	63
Cool Only	30	68
	36	68

PHYSICAL DIMENSIONS			
Model Size	A	B	C
S1C/S1H9	24"	15"	36"
S1C/S1H2	24"	15"	36"
S1C/S1H8	32"	15"	36"
S1C/S1H4	32"	15"	40"
S1C/S1H3	38"	15"	44"
S1C/S1H6	38"	15"	48"

1/2" Diameter Lag Holes



Electrical connections

S2C SPECIFICATIONS AND DIMENSIONS

PHYSICAL DIMENSIONS			
Model Size S2C	A	B	C
99	32"	15"	36"
22, 92	32"	15"	40"

SHIPPING WEIGHT	
Model Size	Lbs.
99	129
22	167
92	157

MOUNTING DIMENSIONS				
Model Size S2C	A	B	C	D
99, 92, 22	4 5/8"	22 11/16"	3"	12 7/16"

SOUND DATA	
Model Size	dBA
99	64
22	65
92	65

S2C ELECTRICAL SPECIFICATIONS

Capacity	Volts/HZ/Phase	Fan Mtr.		Compressor				Total AMPS	MCA	HACR BRKR	Min. Volt
				Circuit #1		Circuit #2					
		AMPS	HP	RLA	LRA	RLA	LRA				
9900	208-230/60/1	0.8	0.125	3.5	19	3.5	19	7.8	8.7	15	197
9200	208-230/60/1	0.8	0.125	3.5	19	4.5	21	8.8	10.0	15	197
2200	208-230/60/1	0.8	0.125	4.5	21	4.5	21	9.8	11.0	15	197

Circuit Designators: 9 = 9,000 Btuh • 2 = 12,000 Btuh

ex. - Model 9200 consists of one 9,000 Btuh compressor and one 12,000 Btuh compressor
Always refer to the rating plate for Minimum Circuit Ampacity on all multiple compressor units

S1C/S1H SPECIFICATIONS AND DIMENSIONS

NOTE: All EMI products are subject to ongoing development. Design and specifications may change without notice.

S1C ELECTRICAL SPECIFICATIONS

Model #	Volts/HZ/PH	Fan Motor		Compressor		Total AMPS	Min Volt	M.C.A.	HACR BRKR
		AMPS	HP	RLA	LRA				
S1C9A	115/60/1	1.4	0.125	6.7	29.0	8.1	104	9.8	15
S1C2A	115/60/1	1.4	0.125	8.4	44.0	9.8	104	11.9	20
S1C9D	208/230/60/1	0.8	0.125	3.5	19.0	4.3	197	5.2	15
S1C2D	208/230/60/1	0.8	0.125	4.5	21.0	5.3	197	6.4	15
S1C8D	208/230/60/1	0.8	0.125	5.4	36.0	6.2	197	7.6	15
S1C4D	208/230/60/1	0.8	0.125	8.0	53.5	8.8	197	10.8	15
S1C3D	208/230/60/1	1.8	0.330	9.8	60.0	11.6	197	14.1	20
S1C6D	208/230/60/1	1.8	0.330	11.8	78.0	13.6	197	16.6	25

System Performance Data: Matched With EMI AmericaSeries Indoor Units

COOLING SYSTEMS WITH WALL UNITS

Condenser	Wall Unit	Btuh	SEER	SHR	EER	Ref.
S1C9	WLH09	9,000	13.0	.79	11.8	R22
S1C2	WLH12	12,000	13.0	.74	12.9	R22
* S1C8	WLH24	18,000	14.0	.78	13.0	R22
S1C4	WLH24	24,000	13.0	.70	12.5	R22
S1C3	WLC30	30,000	13.0	.72	12.6	R22
S1C6	WLC36	33,600	13.0	.69	12.1	R22



WLC/WLH

COOLING SYSTEMS WITH CASSETTE UNITS

Condenser	Cassette	Btuh	SEER	SHR	EER	Ref.
S1C9	CAH12	9,000	13.0	.79	11.7	R22
S1C2	CAH12	12,000	13.0	.72	12.2	R22
S1C8	CAH24	18,000	13.0	.76	12.3	R22
S1C4	CAH24	23,000	13.0	.67	11.8	R22
* S1C3	CAC36	30,000	14.0	.82	12.0	R22
S1C6	CAC36	36,000	13.0	.74	12.6	R22



CAC

COOLING SYSTEMS WITH UNIVERSAL UNITS

Condenser	Universal	Btuh	SEER	SHR	EER	Ref.
S1C9	UNH09	9,000	13.0	.77	11.6	R22
S1C2	UNH12	11,800	13.0	.76	12.3	R22
S1C8	UNH24	18,000	13.0	.76	12.4	R22
S1C4	UNH24	24,000	13.0	.69	12.0	R22
S1C3	UNC36	28,500	13.0	.71	12.0	R22
S1C6	UNC36	31,000	13.0	.67	12.0	R22



UNC/UNH

* **Important** - This system has been designed and manufactured to meet ENERGY STAR criteria for energy efficiency. However, proper refrigerant charge and proper air flow are critical to achieve rated capacity and efficiency. Installation of this product should follow the manufacturer's refrigerant charging and air flow instructions. Failure to confirm proper charge and airflow may reduce energy efficiency and shorten equipment life.



S1C/S1H SPECIFICATIONS AND DIMENSIONS

NOTE: All EMI products are subject to ongoing development. Design and specifications may change without notice.

S1H ELECTRICAL SPECIFICATIONS

Model #	Volts/HZ/PH	Fan Motor		Compressor		Total AMPS	Min Volt	M.C.A.	HACR BRKR
		AMPS	HP	RLA	LRA				
S1H9A	115/60/1	1.4	0.125	6.6	39.2	8.0	104	9.7	15
S1H2A	115/60/1	1.4	0.125	8.6	48.3	10.0	104	12.2	20
S1H9D	208/230/60/1	0.8	0.125	3.4	23.0	4.2	197	5.1	15
S1H2D	208/230/60/1	0.8	0.125	4.3	27.0	5.1	197	6.2	15
S1H8D	208/230/60/1	0.8	0.125	5.4	36.0	6.2	197	7.6	15
S1H4D	208/230/60/1	0.8	0.125	8.0	53.5	8.8	197	10.8	15

System Performance Data: Matched With EMI AmericaSeries Indoor Units

HEAT PUMPS SYSTEM OPTIONS WITH WALL UNITS

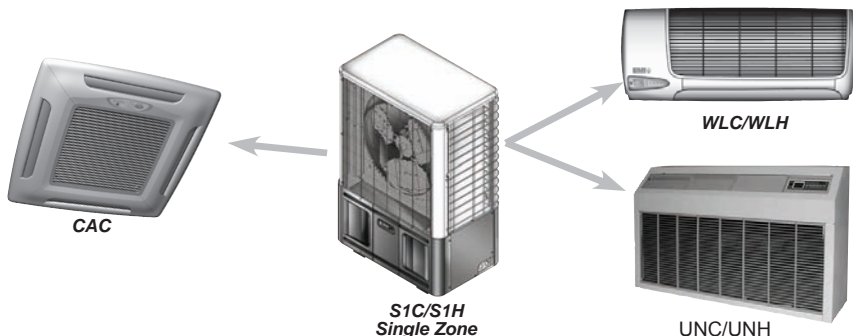
Condenser	Wall Unit	Cooling Btuh	Heating Btuh	SEER	HSPF	SHR	EER	COP	Ref.
S1H9	WLH09	9,000	8,600	13.0	8.0	.75	11.6	3.6	R22
S1H2	WLH12	11,400	10,600	13.0	8.0	.73	11.5	3.4	R22
S1H8	WLH24	18,000	16,400	13.0	7.7	.73	12.1	3.8	R22
S1H4	WLH24	23,000	20,600	13.0	8.3	.71	11.9	3.5	R22

HEAT PUMP SYSTEM OPTIONS WITH UNIVERSAL UNITS

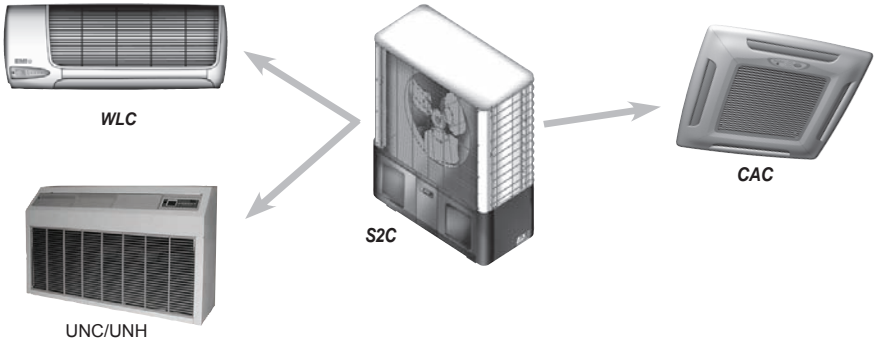
Condenser	Universal	Cooling Btuh	Heating Btuh	SEER	HSPF	SHR	EER	COP	Ref.
S1H9	UNH09	8,800	7,800	13.0	7.7	.73	11.6	3.4	R22
S1H2	UNH12	11,600	10,200	13.0	7.7	.73	11.5	3.5	R22
S1H8	UNH24	18,000	16,400	13.0	7.7	.71	11.7	3.5	R22
S1H4	UNH24	23,000	20,600	13.0	7.7	.69	12.0	3.5	R22

SYSTEMS WITH HEAT PUMP CASSETTE UNITS

Condenser	Cassette	Cooling Btuh	Heating Btuh	SEER	HSPF	SHR	EER	COP	Ref.
S1H9000	CAH_12	9,000	8,000	13.0	7.7	0.80	11.6	3.3	R22
S1H2000	CAH_12	11,600	10,800	13.0	8.0	0.72	11.4	3.4	R22
S1H8000	CAH_24	18,000	15,000	13.0	7.7	0.78	12.0	3.3	R22
S1H4000	CAH_24	23,000	20,000	13.0	7.7	0.69	11.7	3.3	R22



S2C SPECIFICATIONS AND DIMENSIONS



COOLING SYSTEMS WITH S2C SIDE DISCHARGE

Air Handler	Condenser	Btuh	SEER	SHR	EER	Ref.
UNH09 + UNH09	S2C99	18,000	13.0	.73	11.5	R22
UNH12 + UNH12	S2C22	23,000	13.0	.73	12.0	R22
UNH09 + UNH12	S2C92	21,000	13.0	.73	11.6	R22

COOLING SYSTEMS WITH S2C SIDE DISCHARGE

Wall Unit (s)	Condenser	Btuh	SEER	SHR	EER	Ref.
WLH09+WLH09	S2C99	18,000	13.0	.80	11.9	R22
WLH12+WLH12	S2C22	23,000	13.0	.72	12.4	R22
WLH09+WLH12	S2C92	21,000	13.0	.72	12.0	R22

COOLING SYSTEMS WITH S2C SIDE DISCHARGE

Cassette	Condenser	Btuh	SEER	SHR	EER	Ref.
CAC12 + CAC12	S2C99	18,000	13.0	.81	11.7	R22
CAC12 + CAC12	S2C22	23,000	13.0	.74	11.8	R22
CAC12 + CAC12	S2C92	21,000	13.0	.77	11.8	R22



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	
Model Number	
Serial Number	
Indoor Section	
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	

EMI'S PRODUCT LINE

INDOOR UNITS

WLC/WLH
High Wall Air Handler



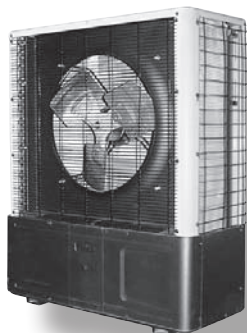
CAC/CAH
Cassette Air Handler



UNC/UNH
*Universal Floor or Ceiling
Air Handler*



OUTDOOR UNITS



S2C & S2H
*Dual Zone
Side Discharge*



S1C & S1H
*Single Zone
Side Discharge*

**T2C, T3C, T4C and
T2H, T3H, T4H; 2, 3 and 4
Zone Top Discharge**



