



Comfort Where It Counts.

UNH-WLH-CAH-S2H
Dual-Zone Heat Pump Air Conditioning System

Rev. A [06/08]

JOB NAME: LOCATION: PURCHASER: ENGINEER: SUBMITTED TO: FOR: REFERENCE [ ] APPROVAL [ ] CONSTRUCTION [ ] SUBMITTED BY: DATE: UNIT DESIGNATION: SCHEDULE #: MODEL #:

CAPACITIES:

Table with 4 columns: Size, Cooling Btuh, Heating Btuh (CAH, WLH/UNH). Rows for sizes 9900, 9200, 2200.

- Indoor Design Temp °F (°C) DB/WB
Cooling ..... 80/67 (26.6/19.4)
Heating ..... 70/60 (21.1/15.6)
Outdoor Design Temp °F (°C) DB/WB
Cooling ..... 95/75 (35/23.9)
Heating ..... 47/43 (8.3/6.1)

STANDARD FEATURES

Evaporator - WLH High Wall Mounted:

- Universal unit mounted, infrared control package, configurable to either unit mount or wall thermostat operation.
24 V wall thermostat control w/anti short cycle protection
24 V Transformer
Condensate pan over flow protection
Indoor coil freeze protection
Fan purge for improved efficiency
Memory back up for auto re-start following power outage
Permanent, washable filter (user accessible)
Motorized supply louver
Integral field condensate pump connector
Dry mode for humidity control (optional electric heat required)

Condenser - S2H series Side Discharge:

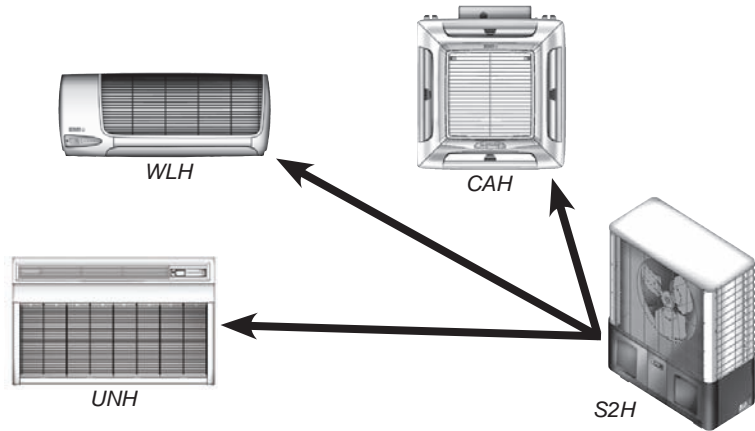
- R-22 refrigerant
Dual rotary compressors on separate circuits
Side discharge / vertically arranged condenser
Coated wire guard for coil and fan
Hard start Assist
Common suction pressure access point
Duratec compressor protection package
- Suction Accumulator
- Hard Start Assist
- Filter dryer
- Thermostatically controlled crankcase Heater

Evaporator - CAH Cassette in Ceiling Mounted:

- Universal unit mounted, infrared control package, configurable to either unit mount or wall thermostat operation
24 V wall thermostat control w/anti short cycle protection
24 V Transformer
Condensate pan over flow protection
Indoor coil freeze protection
Fan purge for improved efficiency
Memory back up for auto re-start following power outage
Permanent, washable filter (user accessible)
Relays and connectors to condensing unit
Fans are backward curved impeller centrifugal design
Single fan w/fire retardant plastic impeller
Motor is multispeed, enclosed type w/thermal protection and sealed lifetime bearings
Branch duct knockouts on two sides for remote discharge locations (Use up to 2 non-adjacent)
Fresh air intake capability on two sides of cabinet
Four plastic air vanes are equipped w/ manually adjusted air vanes

Evaporator-UNH Floor or Ceiling Mounted:

- Ceiling-Suspended or Floor Console mounted without any field modification
Internally Enhanced Copper Tube/Enhanced Aluminum Fin Indoor Coil
Universal unit mounted, infrared control package, configurable to either unit mount or wall thermostat operation.
Control programming stored in non-volatile memory Unit will restart following power failure
Indoor coil freeze protection
Anti-short cycle compressor protection
Fan purge
Dry mode for humidity control (requires electric heat)
Factory-installed condensate pan overflow protection
Factory-supplied molex-type connector for condensate pump power and control connections
24-7 programing
One year Limited Parts Warranty



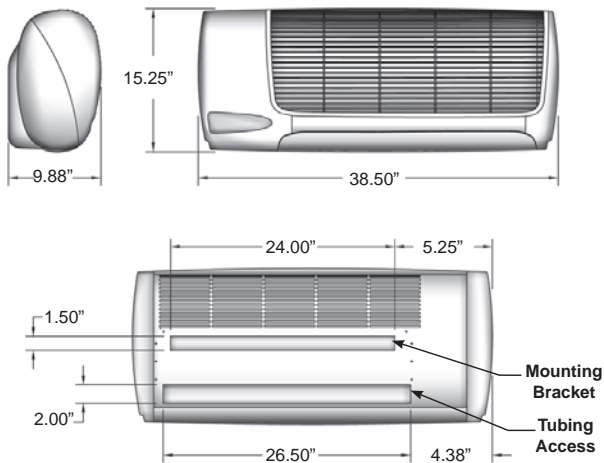
EMI ENGINEERING SUBMITTAL



# EMI ENGINEERING SUBMITTAL UNH-WLH-CAH-S2H

## WLH DIMENSIONS AND SPECIFICATIONS

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

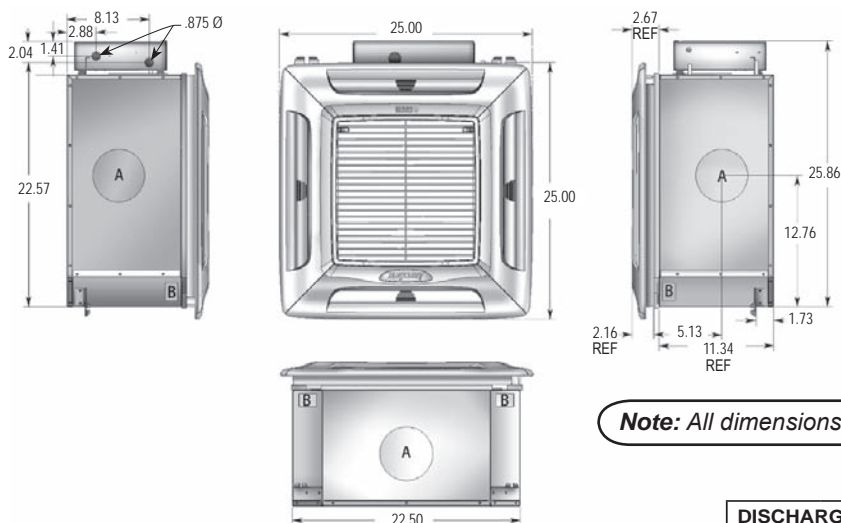


Model	SOUND VALUES (230V High Speed Fan)	SHIPPING WEIGHT
	dBA	Lbs.
09	45	58 (26.3 kg)
12	45	61 (27.7 kg)

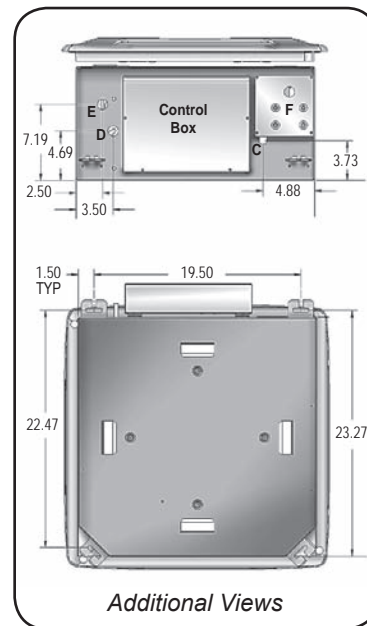
DISCHARGE AIR SPEED AND FLOW @ 230V					
Model	High CFM	Low CFM	Coil	FPM	Throw/Ft.
09/12	400 (189 l/s)	350 (165 l/s)	Dry	900 (4.6 m/s)	15 (4.6 m)

WLH INTERCONNECTING LINE SIZE IN O.D.		
Model	Liquid	Suction
09/12	1/4"	1/2"

## CAH DIMENSIONS AND SPECIFICATIONS



Note: All dimensions in inches.



Model	SOUND VALUES		SHIPPING WEIGHT Lbs.
	Speed		
	High	Low	
CAH12	41	39	70 (31.8 kg)

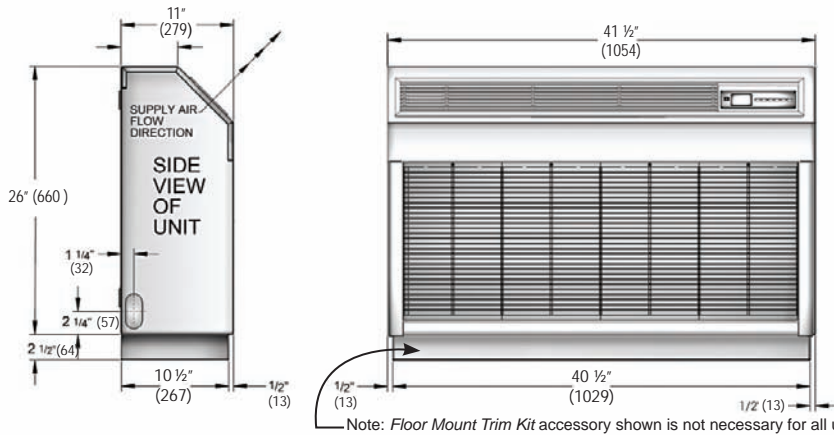
CAHA INTERCONNECTING LINE SIZE IN O.D.		
Model	Liquid	Suction
CAH12	1/4"	1/2"

DISCHARGE AIR VOLUME "Dry Coil"		
Model	High Speed CFM	Low Speed CFM
CAH12	380 (180 l/s)	335 (158 l/s)

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## UNH DIMENSIONS AND SPECIFICATIONS

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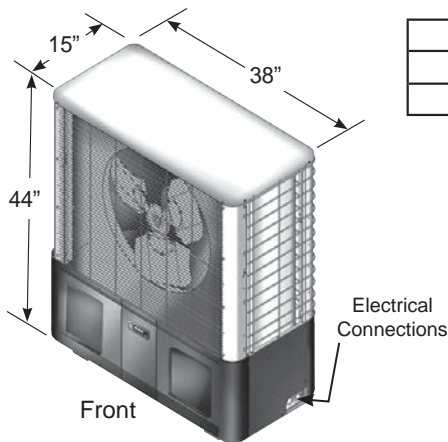


UNH INTERCONNECTING LINE SIZE IN O.D.		
Model	Liquid	Suction
09/12	1/4"	1/2"

Model	SOUND VALUES (230V High Speed Fan)	SHIPPING WEIGHT
	dBA	Lbs.
09	45	58 (26.3 kg)
12	45	61 (27.7 kg)

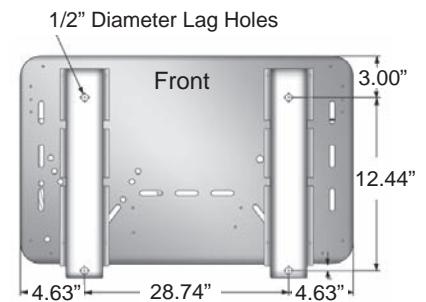
DISCHARGE AIR SPEED AND FLOW @ 230V					
Model	High CFM	Low CFM	Coil	FPM	Throw/Ft.
09/12	425 (200 l/s)	375 (175 l/s)	Dry	900 (4.6 m/s)	15 (4.6 m)

## S2H SPECIFICATIONS AND DIMENSIONS



INTERCONNECTING TUBING SPECIFICATIONS				
Max.Length	Max. Lift	Liquid Line O.D.	Suction Line O.D.	Ref.
100' (30 m)	35' (10.6 m)	1/4"	1/2"	R-22

SOUND DATA		Shipping Weight
Size Btuh	dBA	Lbs.
9900	64	159 (72.3 kg)
2200	65	187 (85.0 kg)
9200	65	197 (89.5 kg)



INDOOR UNIT ELECTRICAL SPECIFICATIONS							
Model	Volts/HZ/PH	Fan RLA	Heater K.W.	Amps	Total Amps	M.C.A. Amps	HACR BRKR
WLH09 / WLH12	208/230/60/1	0.34	No Electric Heat		0.34	0.4	15
	208/230/60/1	0.34	3.00	13.04	13.38	16.7	20
UNH09 / UNH12	208/230/60/1	0.34	No Electric Heat		0.34	0.4	15
	208/230/60/1	0.34	3.00	13.04	13.38	16.7	20
CAH12	208/230/60/1	0.35	No Electric Heat		0.40	0.5	15
CAH12	208/230/60/1	0.35	1.50	6.52	6.90	8.6	15

S2HA DUAL- ZONE HEAT PUMP OUTDOOR UNIT			
Configuration *	Power Supply Volts/Hz/PH	MCA Amps	Max Fuse
9900	208/230/60/1	8.6	15
9200	208/230/60/1	9.5	15
2200	208/230/60/1	10.4	15

\* 9 - 9000 Btuh circuit, 2 - 12000 Btuh circuit

## EMI ENGINEERING SUBMITTAL UNH-WLH-CAH-S2H

### ▲ **PART ONE "GENERAL"**

The heat pump air conditioning system shall be an EMI AmericaSeries dual-zone split system per the equipment schedule. The system shall consist of two indoor air handler models per the air handler equipment schedule and matching America Series dual-zone condenser per the condenser equipment schedule. The units shall be made within North America. The units shall be listed by Intertek Testing Service (ITS) and bear the ETL label. All wiring shall be in accordance with the National Electrical Code (N.E.C.). The units shall be rated in accordance with ARI Standard 210/240 and bear the ARI label. The units shall be manufactured in a facility certified to ISO 9001, which is an international standard used to provide guidance in the development and implementation of an effective Quality Management System. The condensing unit shall contain R-22 refrigerant charge for the evaporator section and condenser section. The system efficiency shall meet or exceed 2006 Federal Standards.

### ▲ **PART TWO "WARRANTY"**

The units shall have a manufacturer's warranty for a period of (1) year from date of installation. The compressors shall have a warranty of (5) years from date of installation. If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of Enviromaster International LLC. This warranty does not include labor. Manufacturer shall have twenty years experience in the U.S. market.

### ▲ **PART THREE "PERFORMANCE"**

**[COOLING]** Each indoor unit, specified by the air handler equipment schedule, shall provide a total minimum capacity, SEER, and EER at ARI standard conditions per the chart below. The system net minimum total cooling capacity and circulating air rate at 80°F (DB)/67°F(WB) (22.6°C/19.4°C) entering the indoor coil and 95°F (DB)(35°C) air entering the outdoor coil for the circuit combinations on the equipment schedule shall be rated per the chart below. Cooling mode will operate down to 35°F (1.6°C) OD and then shut down the compressor.

**[HEATING]** The system shall provide a heating capacity, HSPF, and COP per chart below at ARI conditions, which are 70°F (DB)(21.1°C) entering the indoor coil, and 47°F(DB)/43°(WB)(8.3/6.1°C) air entering the outdoor coil.

### ▲ **PART FOUR "INDOOR UNITS"**

Each dual-zone condenser shall be matched with any of the following indoor units. See equipment schedule for corresponding air handler selection.

<b>SYSTEM PERFORMANCE</b>								
<b>S2H Model</b>	<b>Airhandler Model(s)</b>	<b>Cooling Capacity Btuh</b>	<b>SEER</b>	<b>SHR</b>	<b>EER</b>	<b>Heat Capacity Btuh</b>	<b>HSPF</b>	<b>COP</b>
9900	WLH/UNH09 + WLH/UNH09	18,600	13.0	0.80	12.2	16,000	7.7	3.3
9900	CAH12 + CAH12	18,600	13.0	0.79	11.7	15,700	7.7	3.1
9900	WLH/UNH09 + CAH12	18,600	13.0	0.80	11.9	15,900	7.7	3.2
9200	WLH/UNH09 + WLH/UNH12	20,600	13.0	0.76	12.0	18,200	7.7	3.3
9200	CAH12 + CAH12	20,600	13.0	0.77	11.6	18,000	7.7	3.1
9200	WLH/UNH09 + CAH12	20,600	13.0	0.77	11.8	18,100	7.7	3.3
9200	CAH12 + WLH/UNH12	20,600	13.0	0.75	11.8	18,100	7.7	3.3
2200	WLH/UNH12 + WLH/UNH12	22,600	13.0	0.72	12.0	20,400	7.7	3.3
2200	CAH12 + CAH12	22,600	13.0	0.75	11.6	20,200	7.7	3.1
2200	WLH/UNH12 + CAH12	22,600	13.0	0.73	11.8	20,200	7.7	3.2

**WLH (Wall Series)** - The indoor unit shall be factory assembled, wired and contain a low voltage transformer. The cabinet will be ABS plastic with a light gray finish and have a galvanized steel sub chassis. The evaporator fan shall be an assembly with a tangential blower, direct driven by a single motor. The fan shall be statically and dynamically balanced and run on permanently lubricated bearings. Motorized louver shall be provided with the ability to change the airflow vertically. Horizontal-manually adjustable discharge louvers will be provided that can be placed in a fixed position. Return air shall be filtered by means of a washable, reusable mesh filter. The evaporator coil shall be of nonferrous construction with louvered fins bonded to rifled copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phosphor or silver alloy. The coil shall be pressure tested at the factory. A condensate management system with over flow protection, condensate drain pan with anti-corrosion coating and drain shall be provided under the coil. System refrigerant flow shall be controlled by means of an orifice piston in the indoor unit. The unit electrical power shall be 208/230 or 115 Volts, 1 phase, 60 Hertz. The system shall be capable of satisfactory operation within the voltage limits of 197 min/240 max for the 208/230 V and 104 min/120 max for the 115 Volts.

**UNH**(*Universal Series*) - The indoor unit shall be factory assembled, wired and contain a low voltage transformer. The cabinet will be constructed of 20 gage G-90U galvanized steel with an off white, textured powder coat finish. The evaporator fan shall be an assembly with a tangential blower, direct driven by a single motor. The fan shall be statically and dynamically balanced and run on permanently lubricated bearings. Manually adjustable discharge louvers will be provided that can be placed in a fixed position. Return air shall be filtered by means of a washable, reusable mesh filter. The evaporator coil shall be of nonferrous construction with louvered fins bonded to rifled copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phosphor copper or silver alloy. The coil shall be pressure tested at the factory. A condensate management system with over flow protection, condensate drain pan with anti-corrosion coating and drain shall be provided under the coil. System refrigerant flow shall be controlled by means of an orifice piston in the indoor unit. The unit electrical power shall be 208/230 or 115 Volts, 1 phase, 60 Hertz. The system shall be capable of satisfactory operation within the voltage limits of 197 min/240 max for the 208/230 V and 104 min/120 max for the 115 Volts.

**CAH** (*Cassette Series*) - The indoor unit shall be factory assembled, wired, and contain a low voltage transformer. The unit shall fit in the ceiling and have the capability of accepting a branch supply duct as well as a fresh air duct. The cabinet shall consist of a galvanized steel sub chassis with fire-resistant thermal and acoustic foam insulation, light grey ABS plastic fascia and manually adjustable discharge louvers that can be placed in a fixed position. Return air shall be filtered by means of an easily removable filter. The evaporator fan shall be backward curved impeller centrifugal design, dynamically and statically balanced, and mounted on integral mounting rails. The evaporator motor shall be multispeed, enclosed type with thermal protection and sealed lifetime bearings. The evaporator coil shall be of nonferrous construction with louvered fins bonded to rifled-copper tubing. The tubing shall have inner grooves for high efficiency heat exchange. All tube joints shall be brazed with phosphor copper or silver alloy. The coil shall be pressure tested at the factory. A condensate pan and drain shall be provided under the coil. An integral condensate pump capable of lifting 36 inches (0.9 m) shall be provided. System refrigerant flow shall be controlled by means of an orifice piston in the indoor unit. The unit electrical power shall be 208/230 Volts, 1 phase, 60 Hertz. The system shall be capable of satisfactory operation within voltage limits of 197 min/240 max Volts.

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### **PART FIVE "CONTROL SYSTEM"**

**WLH/UNH** (*Wall/Universal Series*) - The control system shall consist of a universal unit mounted, infrared compatible control package, configurable to either unit mount or wall thermostat operation. Interconnected low voltage wiring shall run from indoor unit to outdoor unit direct, **NO SPLICES**. When running low voltage wiring a double insulated, 18 gage cable is mandatory or use shielded cable. The microprocessor shall be factory wired and located within the indoor unit. The control unit will have a large LCD backlit display and be configurable to either unit mount or remote wall thermostat operation. Unit mount-control operation allows the use of an optional IR hand held controller. The control shall have the capability of sensing return air temperature and indoor coil temperature. The operational range will have adjustable set points from 55°F to 90°F (13°C/32°C) in one degree increments. The universal control can be used in cooling only, cooling with optional electric heat, heat pump or heat pump with optional second stage electric heat. Operation modes include, cool, heat, fan, auto change over and dry. Fan operation of auto (*cycling*), high and low (*constant*), auto fan operation automatically selects fan speed according to heating or cooling demand. Dry mode operates cooling and optional electric heat simultaneously to remove humidity (*optional electric heat required*). Test mode allows for ease of testing after installation (*all timers are eliminated*). Room air sampling (*fan auto mode*) cycles the fan on periodically to remove temperature stratification. Fan purge runs the indoor fan for 60 seconds after call is dropped for cool/heat, improving unit efficiency. Unit protection features include, anti short cycling compressor protection, minimum compressor run time, freeze protection to prevent evaporator freeze, filter change indicator, condensate pan overflow switch, and integral condensate pump safety-switch connection. With this feature the control monitors the condensate pump safety switch and displays an error code if a fault occurs. The unit shall also provide non-volatile back up memory, where control settings are maintained for an indefinite period during a power outage. When power is restored the equipment will resume operation after a 3 minute compressor time delay. The control Voltage shall be 24 Vac generated from the indoor units transformer.

**CAH** (*Cassette Series*) - The control system shall consist of a universal, infrared compatible control package, configurable to either a hand-held IR (*infrared*) controller or wall thermostat operation. Interconnected low voltage wiring shall run from indoor unit to outdoor unit or wall thermostat direct, **NO SPLICES**. When running low voltage wiring a double insulated, 18 gage cable is mandatory or use shielded cable. The microprocessor shall be factory wired and be located within the indoor unit. The handheld controller will have a large LCD backlit display. The main control shall have the capability of sensing return air temperature and indoor coil temperature. The handheld operational range will have adjustable set points from 55°F to 90°F (13°C/32°C) in one degree increments. The universal control can be used in cooling only, cooling with optional electric heat, heat pump, or heat pump with optional second stage electric heat. Operation modes include, cool, heat, fan, auto change over, and dry. Fan operation modes of high (*constant*), low (*constant*), and auto fan, which automatically selects fan speed according to heating or cooling demand. Dry mode cycles cooling operation to remove humidity. Test mode allows for ease of testing after installation (*all timers are eliminated*). Fan purge runs the indoor fan for 60 seconds after call is dropped for cool/heat, improving unit efficiency (Remote wall thermostat operation only). Unit protection features include, anti short cycling compressor protection, minimum compressor run time, freeze protection to prevent evaporator freeze, filter change indicator, condensate pan overflow switch, and integral condensate pump safety-switch connection. With this feature the control monitors the condensate pan safety switch and displays an error code if a fault occurs. The unit shall also provide non-volatile back up memory, where control settings are maintained for an indefinite period during a power outage. When power is restored the equipment will resume operation after a 3 minute compressor time delay. The control voltage shall be 24 Vac generated from the indoor unit's transformer.

## EMI ENGINEERING SUBMITTAL UNH-WLH-CAH-S2H

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### **PART SIX "OUTDOOR UNIT"**

The outdoor unit shall be completely factory assembled, piped and wired. The cabinet shall be fabricated of 18 and 20 AWG aluminized steel, finished in light gray and black. The paint shall be a corrosion inhibiting polyester powder-coated paint tested to 2000 hours of salt spray. The cabinet shall also incorporate a black scratch and dent resistant injection molded from access panel. The unit shall be furnished with (1) large diameter, direct drive, high efficiency propeller type fan. The motor shall be PSC type with internal overload protection and shall be permanently lubricated and resiliently mounted for quiet operation. The fan shall be provided with a guard to prevent contact with moving parts. The compressor shall be of the high performance rotary type with Duratec package consisting of an oversized accumulator, factory installed solid core filter drier and thermal overloads. The compressor shall be mounted as to avoid the transmission of vibration. The condenser shall have easy access hose connections at 45° from valve body and a common suction access point. The refrigeration system shall be equipped with loss of charge switch, and have the capability to operate with a maximum height difference of 35 feet (10.6 m) and overall refrigerant tubing length of 100 equivalent feet (30 m) between indoor and outdoor sections without the need for line size changes or additional oil. The condenser coil shall be U-shaped and protected by a wire coil guard. Coil construction is seamless copper tubing with enhanced aluminum fins. The tubes are mechanically expanded for secure bonding to the fin. On WLH/UNH units with unit mounted controls, the system shall be controlled by the microprocessor or 24 V wall thermostat in the indoor matching unit. The CAH is controlled by either the unit mounted control and optional IR controller or a 24 V wall thermostat. Heating expansion is controlled by a TXV in the outdoor unit. The electrical power shall be 208/230 Volts, 1 phase, 60 Hertz. The system shall be capable of satisfactory operation within voltage limits of 197 min / 240 max Volts.

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### **PART SEVEN "OPTIONAL EQUIPMENT"**

- **Hand Held Infrared Remote Controller** – for use with WLH (*wall series*) and CAH (*cassette series*) indoor units
- **Electric Heat** with automatic reset high temperature cutout and redundant high temperature fuse link
  - 9,000 & 12,000 Btuh;
    - WLH/UNH, 3 KW
    - CAH, 1.5 KW
- **Internal Condensate Pump** – field installed or factory installed and shall have the following head lift:
  - WLH/UNH wall mounted indoor units (*both sizes*) – 4' (1.2 m) lift – from base of unit
  - CAH recessed ceiling indoor units (*both sizes*) – with 3' (0.9 m) lift – from base of unit
- **Wind Baffle Kit** – field installed, consists of a set of louvered panels for the condenser surface areas, which can be left on year round:
  - Wind Baffles also provide an attractive protective covering for the condenser coil surface as well as serving as a hail guard
- **Copper-Copper Condenser Coils** – for protection against galvanic corrosion.
- **Sea Coast Coated Coils**