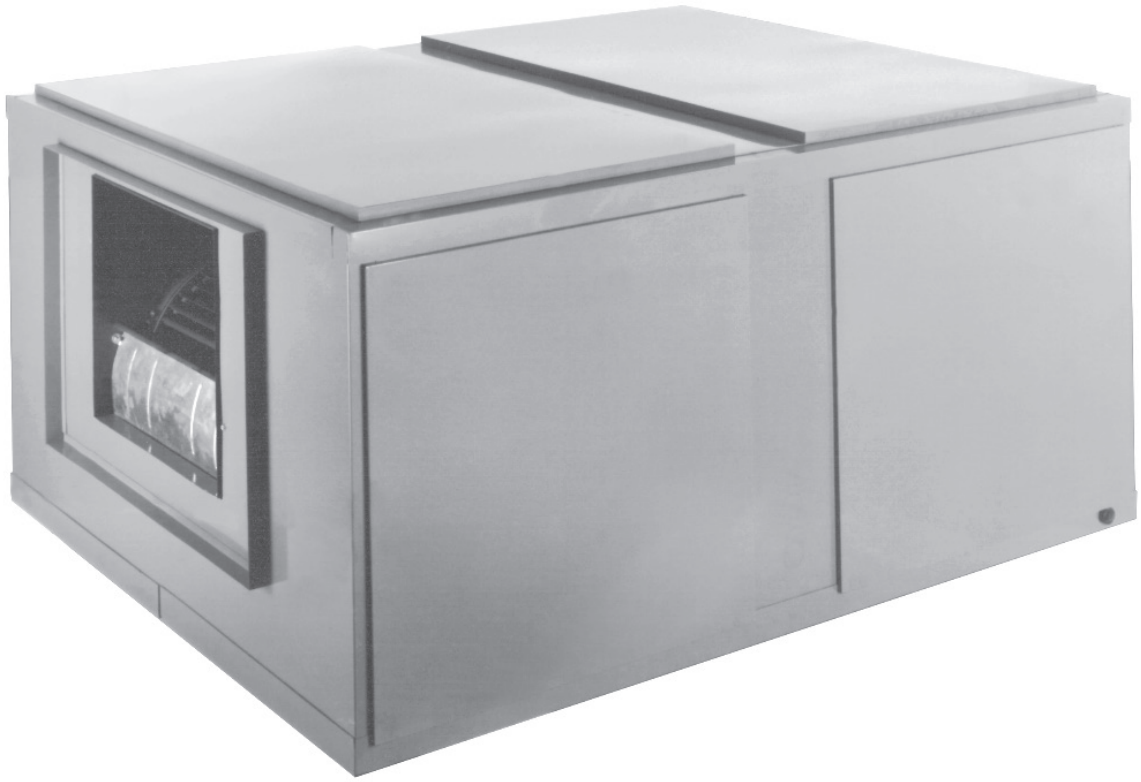
INSTALLATION INSTRUCTIONS

RHCL: COMMERCIAL AIR HANDLER WITH VARIABLE FREQUENCY DRIVE (VFD)
R-410A REFRIGERANT
2-STAGE AIR-FLOW



c UL us LISTED

Contact your distributor for available models.

Accredited by the RvA

ABS Quality Evaluations, Inc. Management System Certification

ANAB ACCREDITED

ISO 9001:2008

Certificate Number: 30164

⚠ Recognize this symbol as an indication of Important Safety Information!

DO NOT DESTROY

PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.

⚠WARNING

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED, LICENSED SERVICE PERSONNEL FOR PORPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS UNIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING INSTALLATION OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTEMANCE POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

92-106595-02-00

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

⚠ WARNING

Disconnect all power to unit before installing or servicing. More than one disconnect switch may be required to de-energize the equipment. Hazardous voltage can cause severe personal injury or death.

⚠ WARNING

If removal of the blower assembly is required, all disconnect switches supplying power to the equipment must be de-energized and locked (if not in sight of unit) so the field power wires can be safely removed from the blower assembly. Failure to do so can cause electrical shock resulting in personal injury or death.

⚠ WARNING

Because of possible damage to equipment or personal injury, installation, service, and maintenance should be performed by a trained, qualified service personnel. Never operate the unit with the access panels removed.

⚠WARNING

Carbon Monoxide (CO) Poisoning Can Cause Severe Injury or Death.

Carbon Monoxide from the exhaust of motor vehicles and other fuel burning devices can be drawn into the living space by the operation of the central heating and air conditioning system.

Exhaust from motor vehicles, generators, garden tractors, mowers, portable heaters, charcoal and gas grills, gasoline powered tools, and outdoor camping equipment contains carbon monoxide, a poisonous gas that can kill you. You cannot see it, smell it, or taste it.

- **Do NOT operate an automobile or any engine in a garage for more than the few seconds it takes to enter or exit the garage.**
- **Do NOT operate any fuel-burning device in an enclosed or partly enclosed space, or near building windows, doors or air intakes.**

The U.S. Consumer Product Safety Commission (CPSC) and Health Canada recommend the installation of UL or CSA certified Carbon Monoxide Alarm(s) in every home.

1.0 SAFETY INFORMATION

⚠ WARNING

Duct leaks can create an unbalanced system and draw pollutants such as dirt, dust, fumes and odors into the building causing property damage. Fumes and odors from toxic, volatile or flammable chemicals, as well as automobile exhaust and carbon monoxide (CO), can be drawn into the occupied space through leaking ducts and unbalanced duct systems causing personal injury or death (see Figure 1).

- **If air-moving equipment or ductwork is located in garages or off-garage storage areas - all joints, seams, and openings in the equipment and duct must be sealed to limit the migration of toxic fumes and odors including carbon monoxide from migrating into the living space.**
- **If air-moving equipment or ductwork is located in spaces containing fuel burning appliances such as water heaters or boilers – all joints, seams, and openings in the equipment and duct must also be sealed to prevent depressurization of the space and possible migration of combustion byproducts including carbon monoxide into the occupied space.**

⚠ WARNING

These instructions are intended as an aid to qualified, licensed service personnel for proper installation, adjustment and operation of this unit. Read these instructions thoroughly before attempting installation or operation. Failure to follow these instructions may result in improper installation, adjustment, service or maintenance possibly resulting in fire, electrical shock, property damage, personal injury or death.

⚠ WARNING (SEE SECTION 3.11.3: GROUNDING)

The unit must be permanently grounded. Failure to do so can result in electrical shock causing personal injury or death.

⚠ WARNING (SEE SECTION 3.5: DUCTWORK)

Do not, under any circumstances, connect return ductwork to any other heat producing device such as fireplace insert, stove, etc. Unauthorized use of such devices may result in fire, carbon monoxide poisoning, explosion, personal injury or property damage.

⚠ WARNING (SEE SECTION 3.6: AIR FILTER)

Do not operate the system without filters. A portion of the dust entrained in the air may temporarily lodge in the duct runs and at the supply registers. Any circulated dust particles could be heated and charred by contact with the heating elements. This residue could soil ceilings, walls, drapes, carpets and other articles in the building.

Soot damage may occur even with filters in place when certain types of candles, oil lamps or standing pilots are burned.

⚠ WARNING

The first 36 inches of supply air plenum and ductwork must be constructed of sheet metal with no openings, registers or flexible air ducts located in it as required by NFPA 90B if an electric heater accessory is installed. If flexible supply air ducts are used they may be located only in the vertical walls of a rectangular plenum, a minimum of 6 inches from the solid bottom.

⚠ CAUTION (SEE SECTION 3.3: AUXILIARY OVERFLOW PAN)

In compliance with recognized codes, an auxiliary drain pan must be installed under all equipment containing evaporator coils that are located in any area of a structure where damage to the building or building contents may occur as a result of an overflow of the coil drain pan or a stoppage in the primary condensate drain piping.

⚠ WARNING

PROPOSITION 65: This appliance contains fiberglass insulation. Respirable particles of fiberglass are known to the State of California to cause cancer.

All manufacturer products meet current Federal OSHA Guidelines for safety. California Proposition 65 warnings are required for certain products, which are not covered by the OSHA standards.

California's Proposition 65 requires warnings for products sold in California that contain or produce any of over 600 listed chemicals known to the State of California to cause cancer or birth defects such as fiberglass insulation, lead in brass, and combustion products from natural gas.

All "new equipment" shipped for sale in California will have labels stating that the product contains and/or produces Proposition 65 chemicals. Although we have not changed our processes, having the same label on all our products facilitates manufacturing and shipping. We cannot always know "when, or if" products will be sold in the California market.

You may receive inquiries from customers about chemicals found in, or produced by, some of our heating and air-conditioning equipment, or found in natural gas used with some of our products. Listed below are those chemicals and substances commonly associated with similar equipment in our industry and other manufacturers.

- **Glass Wool (Fiberglass) Insulation**
- **Carbon Monoxide (CO)**
- **Formaldehyde**
- **Benzene**

More details are available at the websites for OSHA (Occupational Safety and Health Administration), at www.osha.gov and the State of California's OEHHA (Office of Environmental Health Hazard Assessment), at www.oehha.org. Consumer education is important since the chemicals and substances on the list are found in our daily lives. Most consumers are aware that products present safety and health risks, when improperly used, handled and maintained.

⚠ NOTICE

When used in cooling applications, excessive sweating may occur when unit is installed in an unconditioned space. This can result in property damage.

⚠ NOTICE

Improper installation, or installation not made in accordance with the Underwriters Laboratory (UL) certification or these instructions, can result in unsatisfactory operation and/or dangerous conditions and are not covered by the unit warranty.

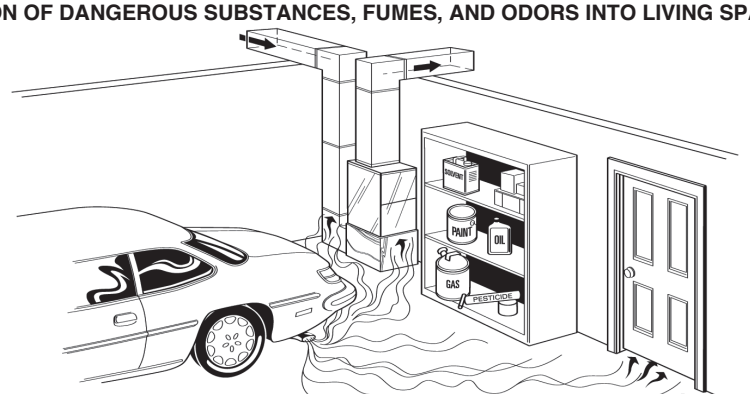
⚠ NOTICE

Use of this air-handler during construction is not recommended. If operation during construction is absolutely required, the following temporary installation requirements must be followed:

Installation must comply with all Installation Instructions in this manual including the following items:

- **Properly sized power supply and circuit breaker/fuse**
- **Air-handler operating under thermostatic control;**
- **Return air duct sealed to the air-handler;**
- **Air filters must be in place;**
- **Correct air-flow setting for application**
- **Clean air-handler, duct work, and components including coil upon completion of the construction process and verify proper air-handler operating conditions according as stated in this instruction manual.**
- **NOTE: Electric strip heater elements tend to emit a burning odor for a few days if dust has accumulated during construction. Heater elements are easily damaged. Take great care when cleaning them. Low pressure compressed air is recommended for cleaning elements.**

FIGURE 1
MIGRATION OF DANGEROUS SUBSTANCES, FUMES, AND ODORS INTO LIVING SPACES



Adapted from *Residential Duct Diagnostics and Repair*, with permission of Air Conditioning Contractors of America (ACCA).

⚠ WARNING

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2.0 GENERAL INFORMATION

2.1 IMPORTANT INFORMATION ABOUT EFFICIENCY & INDOOR AIR QUALITY

Central cooling and heating equipment is only as as the duct system that carries the cooled or heated air. To maintain comfort and good indoor air quality, it is important to have the proper balance between the air being supplied to each room and the air returning to the cooling and heating equipment.

Proper balance and sealing of the duct system improves the of the heating and air conditioning system and improves the indoor air quality of the home by reducing the amount of airborne pollutants that enter homes from spaces where the ductwork and/or equipment is located. The manufacturer and the U.S. Environmental Protection Agency's Energy Star Program recommend that central duct systems be checked by a

2.2 CHECKING PRODUCT RECEIVED

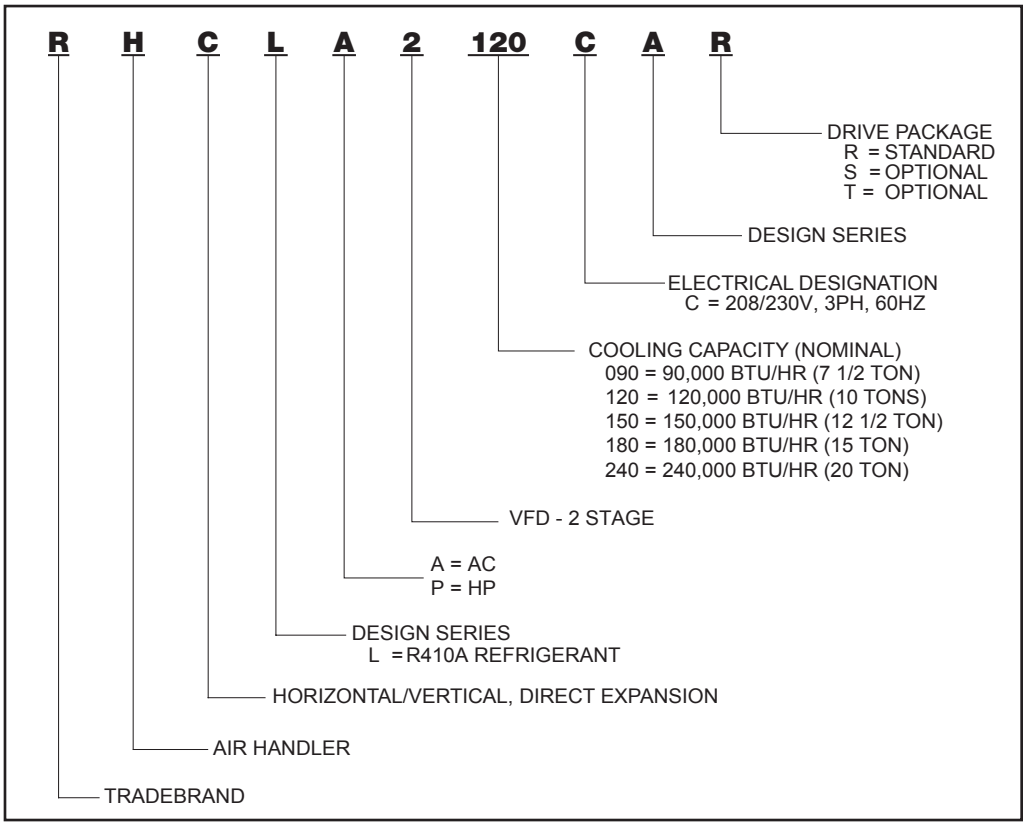
Immediately upon receipt, all cartons and contents should be inspected for transit damage. Units with damaged cartons should be opened immediately. If damage is found, it should be noted on the delivery documents and a damage claim with the delivering carrier.

After unit has been delivered to the job site, remove the unit from the packaging taking care not to damage the unit. Check the unit rating plate for unit model number, unit size,

Reference the unit data plate for the following information:

- Model Number
- Serial Number
- Country of Origin
- Rated Voltage and Frequency

2.3 MODEL NUMBER NOMENCLATURE

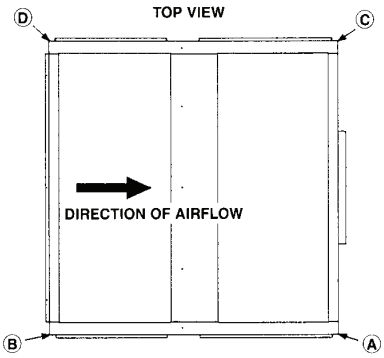


2.4 AVAILABLE MODELS

Available 230/230V/3-Phase/60 Hz Models

(-)HCLA2090CAR	(-)HCLP2090CAR
(-)HCLA2090CAS	(-)HCLP2090CAS
(-)HCLA2090CAT	(-)HCLP2090CAT

2.5 PHYSICAL DIMENSIONS – INCHES [mm]

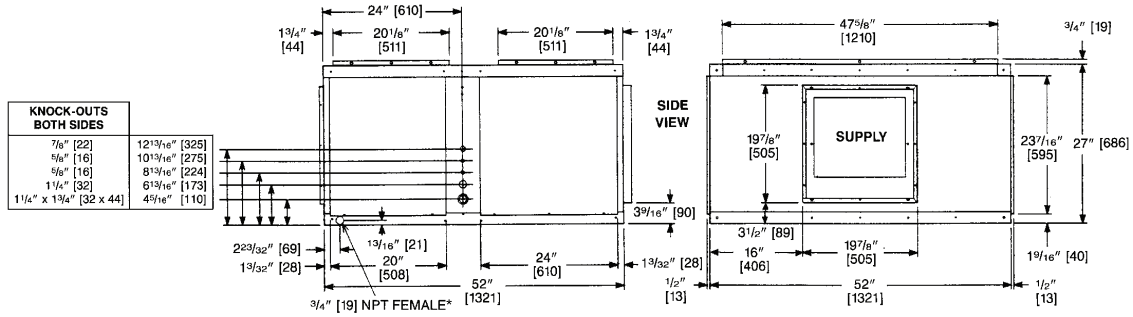


RETURN AIR OPENINGS = 47³/₈″ [1203] WIDTH x 19⁷/₈″ [505] HEIGHT

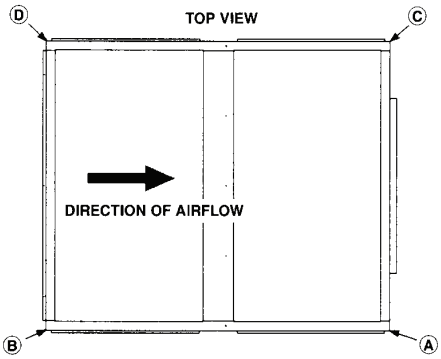
(-)HCLA
7½ AND 10 NOMINAL TONS
[26 AND 35 kW]

MODEL	REFRIGERANT STUB SIZES, IN. [mm]			
	DUAL LIQ.	DUAL SUC.	SINGLE LIQ.	SINGLE SUC.
090	1/2, 1/2 [13, 13]	7/8, 7/8 [22, 22]	1/2 [13]	1 1/8 [29]
120	1/2, 1/2 [13, 13]	7/8, 7/8 [22, 22]	5/8 [16]	1 3/8 [35]

MODEL	REFRIGERANT STUB SIZES, IN. [mm]				TOTAL WEIGHT	GROSS WEIGHT
	A	B	C	D		
090	127 [57]	57 [25]	50 [22]	131 [59]	365 [165]	409 [185]
120	127 [57]	57 [25]	50 [22]	131 [59]	365 [165]	409 [185]



*Drain connections are provided on both sides of the drain pan. The drain can be connected to either side of the drain pan, but not both. The drain must be trapped.

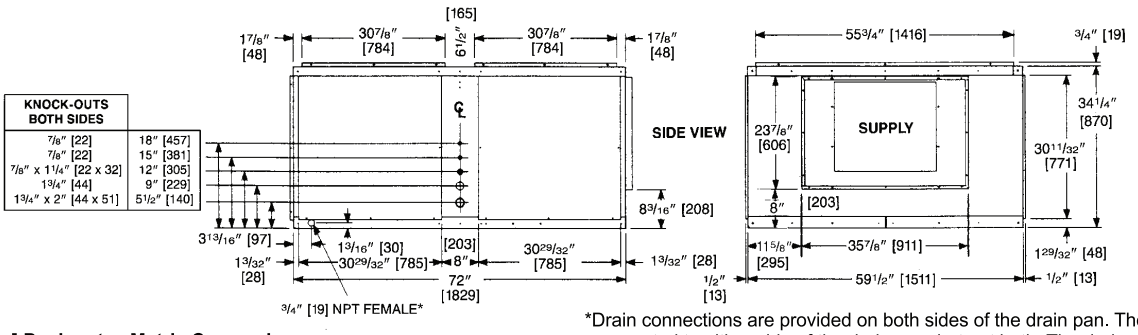


RETURN AIR OPENINGS = 55¹/₂″ [1410] WIDTH x 30⁹/₁₆″ [776] HEIGHT

(-)HCLA
15 AND 20 NOMINAL TONS
[53 & 70 kW]

MODEL	REFRIGERANT STUB SIZES, IN. [mm]			
	DUAL LIQ.	DUAL SUC.	SINGLE LIQ.	SINGLE SUC.
150	1/2, 1/2 [13, 13]	1 1/8, 1 1/8 [29, 29]	5/8 [16]	1 5/8 [41]
180	5/8, 5/8 [16, 16]	1 3/8, 1 3/8 [35, 35]	7/8 [22]	1 5/8 [41]
240	5/8, 5/8 [16, 16]	1 3/8, 1 3/8 [35, 35]	7/8 [22]	1 5/8 [41]

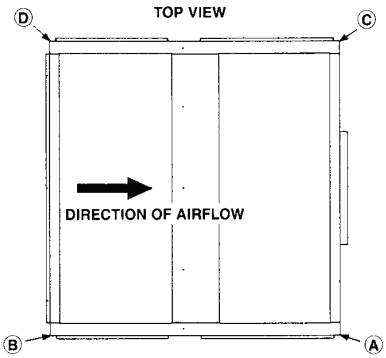
MODEL	CORNER WEIGHTS, LBS. [kg]				TOTAL WEIGHT
	A	B	C	D	
150	144 [65]	127 [58]	117 [53]	105 [48]	495 [225]
180	159 [72]	142 [64]	129 [59]	115 [52]	545 [247]
240	159 [72]	142 [64]	129 [59]	115 [52]	545 [247]



[ ] Designates Metric Conversions

*Drain connections are provided on both sides of the drain pan. The drain can be connected to either side of the drain pan, but not both. The drain must be trapped.

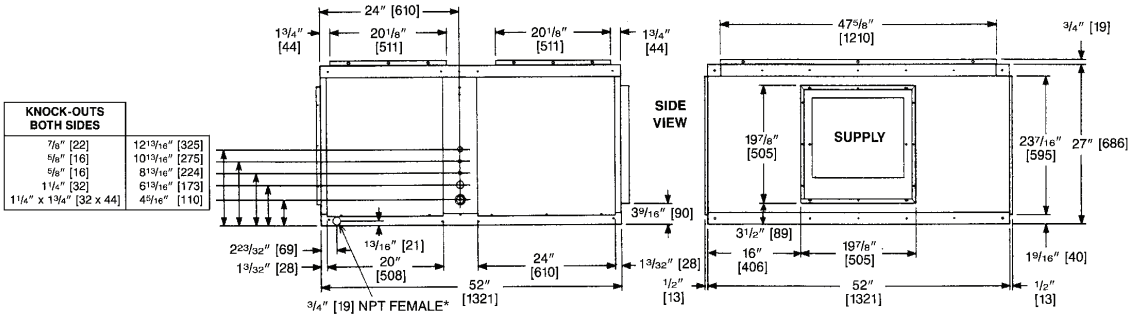
RHCLP
7 1/2 AND 10 NOMINAL TONS
[26 AND 35 kW]



RETURN AIR OPENINGS = 47 3/8″ [1203] WIDTH x 19 7/8″ [505] HEIGHT

MODEL	REFRIGERANT STUB SIZES, IN. [mm]			
	DUAL LIQ.	DUAL SUC.	SINGLE LIQ.	SINGLE SUC.
090	1/2, 1/2 [13, 13]	7/8, 7/8 [22, 22]	1/2 [13]	1 1/8 [29]
120	1/2, 1/2 [13, 13]	7/8, 7/8 [22, 22]	5/8 [16]	1 3/8 [35]

MODEL	REFRIGERANT STUB SIZES, IN. [mm]				TOTAL WEIGHT	GROSS WEIGHT
	A	B	C	D		
090	127 [57]	57 [25]	50 [22]	131 [59]	365 [165]	409 [185]
120	70 [31]	145 [65]	123 [55]	66 [29]	403 [182]	447 [202]

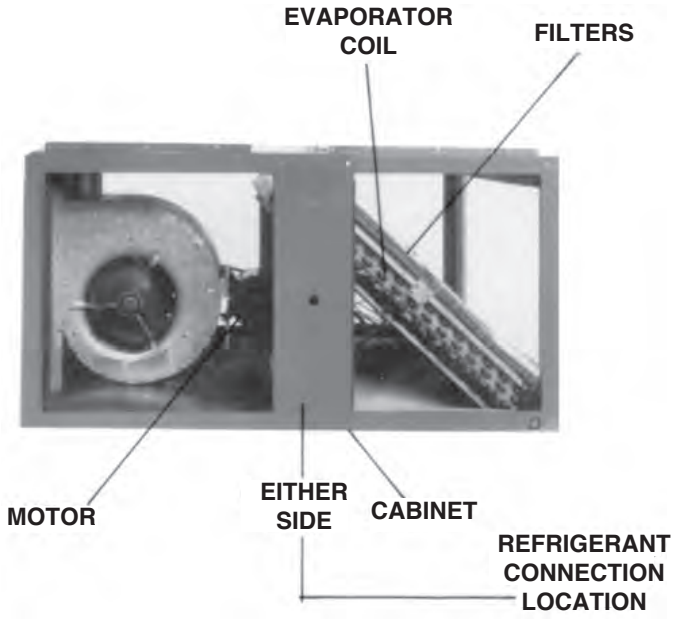


*Drain connections are provided on both sides of the drain pan. The drain can be connected to either side of the drain pan, but not both. The drain must be trapped.

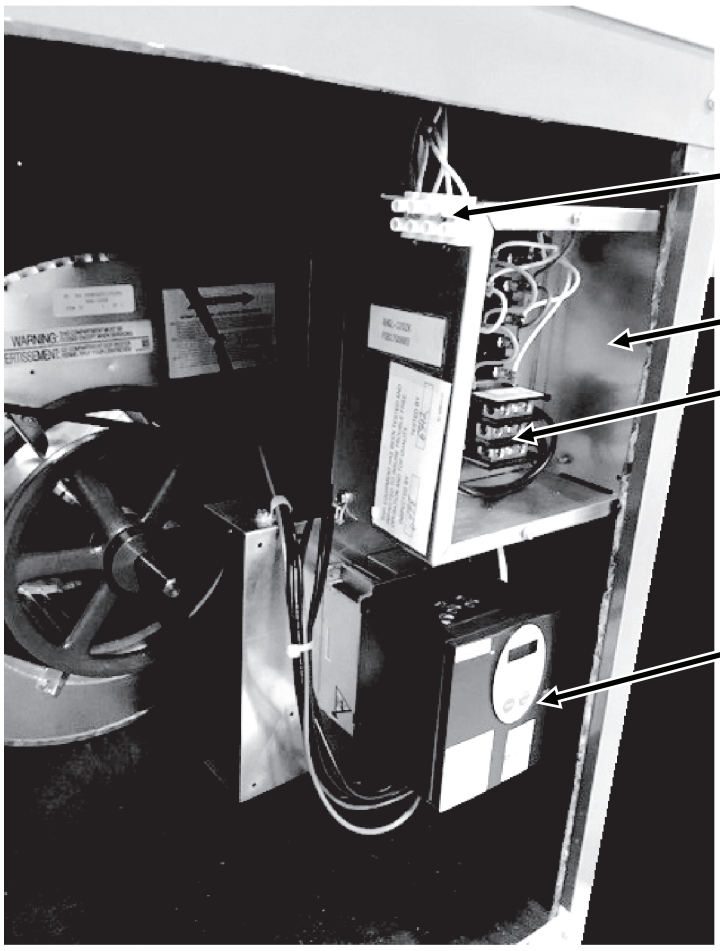
2.6 PHYSICAL DATA

		(-)HCLA2	(-)HCLA2	(-)HCLP2	(-)HCLP2
Cooling Size		090	120	090	120
Nominal size (tons)		7-1/2	10	7-1/2	10
Nominal CFM @ Rated E.S.P. (2nd Stage)		3000 @ .25”	4000 @ .30”	3000 @ .35”	4000 @ .35”
# of Blower Speeds		2	2	2	2
1 st Stage Blower RPM %		63%	63%	63%	63%
MOTOR HORSE-POWER	Standard-				
	1750 RPM 3 phase	2 HP	2 HP	2 HP	2 HP
	Optional-				
	1750 RPM 3 phase	2 HP, 3 HP	2 HP, 3 HP	2 HP, 3 HP	2 HP, 3 HP
Blower Size - diameter x width		12 X 12	12 X 12	12 X 12	12 X 12
Blower Shaft Diameter		3/4	3/4	3/4	3/4
Motor Sheave	1750 RPM 3 phase	1VP50	4.4 - 5.0	1VP50	AVL40
Belt Type & Size Std.		A-50	V-54	A-50	A-52
Coil Face Area (sq. ft.)		10.2	10.2	10.2	10.2
Coil Tube Diameter		3/8	3/8	3/8	3/8
Coil, Rows Deep-Fins Per Inch		4/15	4/15	4/15	4/15
T.X. Valve Refrigerant Control		(2) CBBIZE-5-GA	(2) CBBIZE-5-GA	(2) CBBIZE-5-GA	(2) CBBIZE-6-GA
Filter Size (std.)* No. Req’d		(4) 16 X 25 X 1	(4) 16 X 25 X 1	(4) 16 X 25 X 1	(4) 16 X 25 X 1
CABINET:					
Finish		Prepaint	Prepaint	Prepaint	Prepaint
Sheet Metal		Galvanized	Galvanized	Galvanized	Galvanized
Gauge: Top		18	18	18	18
Sides		16	16	16	16
Bottom		18	18	18	18
Door and Covers		20 min.	20 min.	20 min.	20 min.
UNIT WEIGHTS:					
Operating		330 (R & S Drive) 341 (T Drive)	347 (R & S Drive) 358 (T Drive)	330 (R & S Drive) 341 (T Drive)	447 (R & S Drive) 458 (T Drive)
Shipping		396 (R & S Drive) 407 (T Drive)	413 (R & S Drive) 435 (T Drive)	365 (R & S Drive) 376 (T Drive)	513 (R & S Drive) 535 (T Drive)
OPTIONAL ACCESORIES WEIGHTS:					
Hot Water Coils		200	200	200	200
Steam Heating Coils		200	200	200	200

2.7 MAJOR COMPONENTS



Unit shown with side panel removed for coil connections and air filter access.



Note: Remove panel with unit data plate to access this compartment

2.8 IMPORTANCE OF PROPER INDOOR/OUTDOOR MATCH-UPS

To assure many years of reliable operation and optimum customer comfort and to assure the outdoor unit warranty remains valid, an air-handler model should be selected that is properly matched to the outdoor unit. This is especially critical for heat pump systems to assure proper refrigerant charge balance between the cooling and heating modes. The recommended approach is to select an air-handler model that has an AHRI match with the outdoor unit. Refer to the AHRI directory at **www.ahridirectory.org** to the AHRI Directory.

2.9 IMPORTANCE OF A QUALITY INSTALLATION

A quality installation is critical to assure safety, reliability, comfort, and customer satisfaction. Strict adherence to applicable codes, the information in this installation manual, the outdoor unit installation manual, and the thermostat installation manual are key to a quality installation. Read the entire instruction manuals before starting the installation.

IMPORTANT: This product has been designed and manufactured to meet AHRI capacity and ratings with the appropriate outdoor units. However, proper refrigerant charge, proper and refrigerant line sizing are critical to achieve optimum capacity and and to assure reliable operation. Installation of this product should follow the manufacturerõs refrigerant charging and instructions located in the outdoor unit installation instructions and the charging chart label to the outdoor unit. Failure to proper charge and may reduce energy - ciency and shorten equipment life.

The equipment has been evaluated in accordance with the Code of Federal Regulations, Chapter XX, Part 3280.

Install the unit in accordance with applicable national, state, and local codes. Latest editions are available from: ñNational Fire Protection Association, Inc., Batterymarch Park, Quincy, MA 02269.òThese publications are:

- ÅANSI/NFPA No. 70-(Latest Edition) National Electrical Code.
- ÅNFPA90A Installation of Air Conditioning and Ventilating Systems.
- ÅNFPA90B Installation of Warm Air Heating and Air Conditioning Systems.

Install the unit in such a way as to allow necessary access to the coil/ er rack and blower/control compartment.

3.0 INSTALLATION

3.1 TOOLS & REFRIGERANT

3.1.1 TOOLS REQUIRED FOR INSTALLING AND SERVICING R-410A MODELS

Manifold Sets:

ÅUp to 800 PSIG High-Side

ÅUp to 250 PSIG Low-Side

Å550 PSIG Low-Side Retard

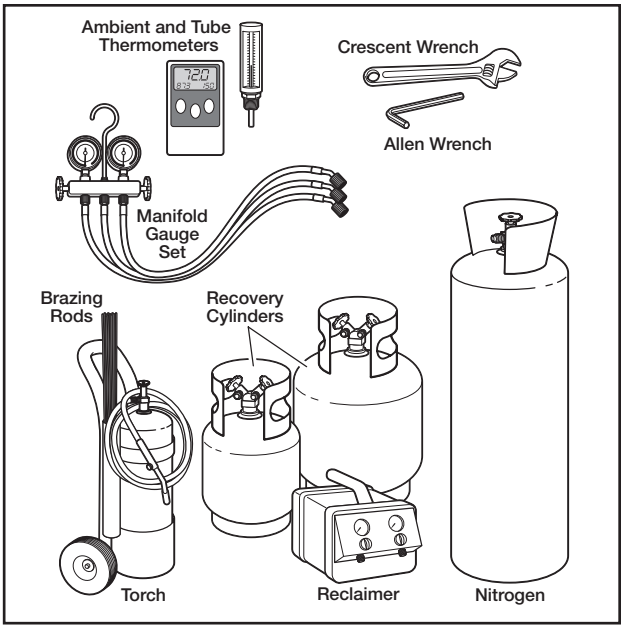
Manifold Hoses:

ÅService Pressure Rating of 800 PSIG

Recovery Cylinders:

Å400 PSIG Pressure Rating

ÅDept. of Transportation 4BA400 or BW400



⚠ NOTICE

R-410A systems operate at higher pressures than R-22 systems. Do not use R-22 service equipment or components on R-410A equipment.

3.1.2 SPECIFICATIONS OF R-410A

Application: **R-410A is not a drop-in replacement for R-22.** Equipment designs must

Physical Properties: R-410A has an atmospheric boiling point of -62.9ÁF [-52.7ÁC] and its saturation pressure at 77ÁF [25ÁC] is 224.5 psig.

Composition: R-410A is a near-azeotropic mixture of 50% by weight

Pressure: The pressure of R-410A is approximately 60% (1.6 times) greater than R-22. Recovery and recycle equipment, pumps, hoses, and the like must have design pressure ratings appropriate for R-410A. Manifold sets need to range up to 800 psig high-side and 250 psig low-side with a 550 psig low-side retard. Hoses need to have a service pressure rating of 800 psig. Recovery cylinders need to have a 400 psig service pressure rating, DOT 4BA400 or DOT BW400.

Combustibility: At pressures above 1 atmosphere, a mixture of R-410A and air can become combustible. **R-410A and air should never be mixed in tanks or supply lines or be allowed to accumulate in storage tanks. Leak checking should never be done with a mixture of R-410A and air.** Leak-checking can be performed safely with nitrogen or a mixture of R-410A and nitrogen.

3.1.3 QUICK-REFERENCE GUIDE FOR R-410A

Å R-410A refrigerant operates at approximately 60% higher pressure (1.6 times) than R-22. Ensure that servicing equipment is designed to operate with R-410A.

Å R-410A refrigerant cylinders are light rose in color.

Å R-410A, as with other HFCs, is only compatible with POE oils.

Å Vacuum pumps will not remove moisture from POE oil used in R-410A systems.

Å R-410A systems are to be charged with liquid refrigerants. Prior to March 1999, R-410A refrigerant cylinders had a dip tube. These cylinders should be kept upright for equipment charging. Post-March 1999 cylinders do not have a dip tube and should be inverted to ensure liquid charging of the equipment.

Å

Å A factory-approved outdoor liquid line drier is shipped with every unit and must be installed in the liquid line at the time of installation. If only the air-handler is being replaced on an existing system, the existing drier must be replaced at the time of installation with a supplied drier. **IMPORTANT:** A drier must be used for heat pump applications. Filter driers must be rated for minimum working pressure of 600 psig. The drier will only have adequate moisture-holding capacity if the system is properly evacuated.

Å Desiccant (drying agent) must be compatible for POE oils and R-410A refrigerant.

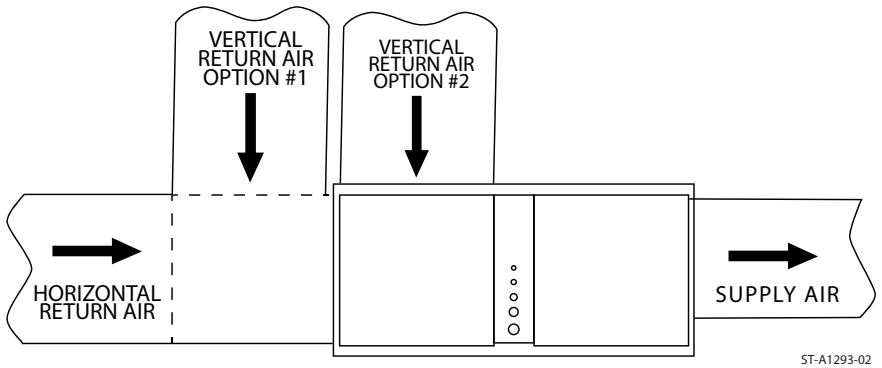
3.2 APPLICATIONS & ORIENTATION

IMPORTANT: The air-handler is suitable for indoor applications only.

3.2.1 HORIZONTAL DISCHARGE

The air-handler may be installed in the horizontal discharge with either a vertical or horizontal return duct as shown in Figure 2. For a vertical return duct, relocate the return air panel on top of the air-handler to cover the side return air opening.

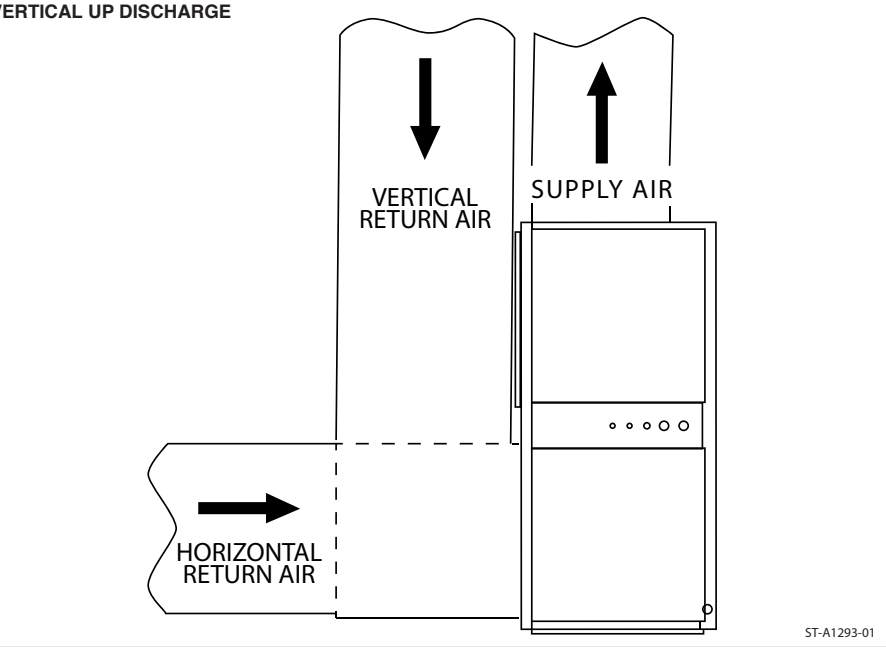
FIGURE 2
HORIZONTAL DISCHARGE



3.2.2 VERTICAL UP DISCHARGE

The air-handler may be installed in the vertical discharge with a horizontal return duct as shown in Figure 3. Relocate the return air panel to cover the other return air opening to allow for the horizontal return duct.

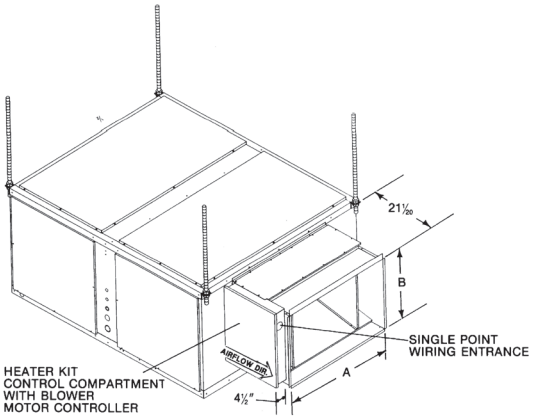
FIGURE 3
VERTICAL UP DISCHARGE



3.2.3 APPLICATIONS REQUIRING ELECTRIC HEAT

For applications that require resistance electric heat, installed heater kits are available that attaches to the discharge side of the air-handler. See Figure 4. The heater kit is compatible for both horizontal and vertical discharge applications. The supply duct must be attached to the discharge end of the heater kit. The blower motor contactor and supply wiring is provided with the heater kit. See Section 6.1 for information concerning the available heater kits.

FIGURE 4
APPLICATIONS REQUIRING ELECTRIC HEAT



OPTIONAL ELECTRIC HEATER KIT SHOWN INSTALLED IN HORIZONTAL POSITION AND CONNECTED DIRECTLY TO THE AIR HANDLER. THE HEATER KIT MAY ALSO BE INSTALLED WITH THE AIR HANDLER SET IN THE VERTICAL POSITION. IN EITHER POSITION THE HEATER KIT CONTROL COMPARTMENT MUST BE ON THE LEFT SIDE FACING THE AIR DISCHARGE OPENING

NOTE: DISCHARGE PLENUM AND GRILLE CANNOT BE USED WITH ELECTRIC HEATER KIT

3.2.4 SUSPENDING UNIT

Four heavy gauge angles are furnished in the parts bag shipped with the air-handler for suspending the unit from all four corners as shown in Figure 4 above. Ì òminimum support rods are recommended. If ñAll-Threadò rods are used, it is recommended that two nuts and two lock washers be tightened securely against the suspension angles.

When the air-handler is suspended as illustrated, hot water or steam coils, mixing boxes, and discharge air plenums cannot be mounted due to weight limitations. In these applications, an alternate suspension method such as supplied angles or channels must be located underneath the air-handler.

3.2.5 INSTALLATION IN AN UNCONDITIONED SPACE

The exterior cabinet of an air handler has a greater risk of sweating when installed in an unconditioned space than when it is installed in the conditioned space. This is primarily due to the temperature of the conditioned air moving through the air handler and the air circulating around the unit where it is installed. For this reason, the following is recommended for all air handler applications, but special attention should be paid to those installed in unconditioned spaces:

Å

Å Supply and return duct attachment: If other than the factory are used, the attachment of ducting must be insulated and tight to prevent sweating.

Å Apply caulking around all cabinet penetrations such as power wires, control wires, refrigerant tubing and condensate line where they enter the cabinet. Seal the power wires on the inside where they exit conduit opening. Sealing is required to prevent air leakage into the unit which can result in condensate forming inside the unit, control box, and on electrical controls. Take care not to damage, remove or compress insulation when applying the caulk.

Å In some cases, the entire air handler can be wrapped with insulation. This can be done as long as the unit is completely enclosed in insulation, sealed and service access is provided to prevent accumulation of moisture inside the insulation wrap.

Å An auxiliary ove w pan is recommended to protect the structure from excessive cabinet sweating or a restricted coil drain line. (See Section 3.3)

3.2.6 INSTALLATION IN CORROSIVE ENVIRONMENTS

The metal parts of this unit may be subject to rust or deterioration if exposed to a corrosive environment which can shorten its life. In addition to exposure to the exterior of the cabinet, chemical contaminants inside the building that can be drawn into the unit from the return air grille and attack structural metal parts, electrical components and the indoor coil, causing premature failure of the unit. If the unit is to be installed in an area where contaminants are likely to be a problem, special attention should be given to isolate the unit and return grille from contaminants.

3.3 AUXILIARY OVERFLOW PAN

In compliance with recognized codes, an auxiliary pan must installed under all equipment containing evaporator coils that are located in any area of a structure where damage to the building or building contents may occur as a result of an of the coil drain pan or a stoppage in the primary condensate drain piping.

3.4 CLEARANCES

A minimum of 24ò is required on both sides of the air-handler for servicing the unit.

3.5 DUCTWORK

Field ductwork must comply with the National Fire Protection Association NFPA 90A, NFPA 90B and any applicable local ordinance.

⚠ WARNING

Do not, under any circumstances, connect return ductwork to any other heat producing device such as fireplace insert, stove, etc. Unauthorized use of such devices may result in fire, carbon monoxide poisoning, explosion, personal injury or property damage.

Sheet metal ductwork run in unconditioned spaces must be insulated and covered with a vapor barrier. Fibrous ductwork may be used if constructed and installed in accordance with SMACNA Construction Standard on Fibrous Glass Ducts. Ductwork must comply with National Fire Protection Association as tested by U/L Standard 181 for Class I Air Ducts. Check local codes for requirements on ductwork and insulation.

- Duct system must be designed within the range of external static pressure the unit is designed to operate against. It is important that the system be adequate. Make sure supply and return ductwork, grills, accessories, etc. are accounted for in total resistance. Refer to the performance tables in this manual to determine the available external static pressure for the particular air-handler model being installed.
- Design the duct system in accordance with ñACCAò Manual ñQò ï Low Pressure, Low Velocity Duct System Design. Latest editions are available from: ñACCAò Air Conditioning Contractors of America, 1513 16th Street, N.W., Washington, D.C. 20036. If duct system incorporates **flexible air duct,** be sure **pressure drop** information (straight length plus all turns) shown in ñACCAò Manual ñDò is accounted for in system.
- Supply plenum e unit.
- **IMPORTANT:** If an elbow is included in the plenum close to the unit, it must not be
- **IMPORTANT:** The front on the return duct if connected to the blower casing must not be screwed into the area where the power wiring is located. Drills or sharp screw points can damage insulation on wires located inside unit.
- Secure the supply and return ductwork to the unit using proper fasteners for the type of duct used and tape or caulk the duct-to-unit joint as required to prevent air leaks.

3.6 RETURN AIR FILTERS

An internal rack is provided that can be accessed by removing one or both of the side service access panels (See Section 2.7). Remove the hitch pins to remove the - ter retainer angles. 1ò thick throw-away are provided from the factory,

Reduced can reduce system performance and shorten the life of the system components such as the compressor, indoor coil, heater elements, over-temperature limits, and relays. Therefore, it is important to change the on a regular basis to assure optimum performance and reliability of the system.

IMPORTANT: High pleated typically have higher pressure drop than standard especially when they become dirty. The additional pressure drop of such must be added into the external static pressure of

WARNING: Do not operate the air-handler without filters. A portion of the dust entrained in the air may temporarily lodge in the duct runs and at the supply registers. Any circulating dust particles could be heated and charred by contact with the electric heating elements. This residue could soil ceilings, wall, carpets, and other articles inside the building. Operating the system without a filter will also allow lint and dirt particles to accumulate on the indoor oil fins and restrict airflow through the coil.

3.7 REFRIGERANT LINE CONNECTIONS & CHARGING

3.7.1 PREPARATION

The coil is shipped with a low pressure (5-10 psig) charge of dry nitrogen which will be released when the rubber plugs are removed. Leave the rubber plugs in the refrigerant connection stubs on the air-handler until the refrigerant lines are ready to be brazed to the refrigerant connection stubs to prevent contaminants from entering the coil. Clean the ends of the tubing and coil connection stubs (inside and outside) with an alcohol wipe before inserting the line set tubes into the coil connection stubs to assure a quality leak-free braze joint.

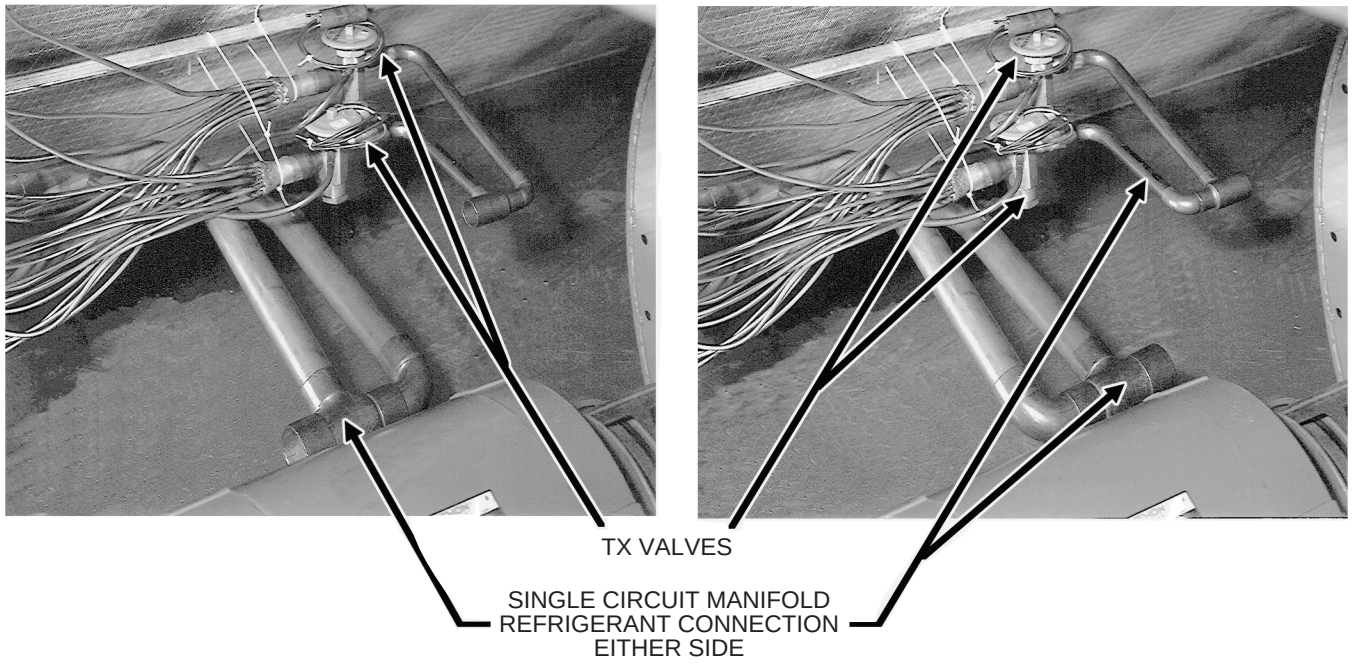
Refer to the outdoor unit installation instructions for details on refrigerant line sizing and installation.

Route the refrigerant tubing in a manner than does not block service access to the front of the air-handler.

3.7.2 CONFIGURING AIR-HANDLER FOR A SINGLE OR DUAL REFRIGERANT CIRCUITS

All models are provided with dual circuit coil manifolds that can be for dual condensing unit applications. The coil is circuited to provide full face coil operation for each system. Knock-outs are provided on both sides of the unit to allow the refrigerant tubing to enter from either side. Remove the rubber grommets from the parts bag and install them in the appropriate holes prior to running the line set tubing into the cabinet to seal around and protect the tubing. Copper are provided in the parts bag to allow the two refrigerant circuits to be tied together for single condensing unit applications. The may be installed to allow the tubing to enter the unit from either side as shown in Figure 5.

FIGURE 5



3.7.3 REFRIGERANT LINES

The following will be of help in accomplishing a successful installation.

1. Size liquid line for no more than 50 PSIG pressure drop.
2. Size suction lines for no more than 2ÁF loss which corresponds to approximately 5 PSIG pressure drop.
3. When evaporator is installed below condensing unit, do not exceed the recommended suction line O.D. This will insure adequate velocities for proper oil return.
4. Install strainer-drier and sight glass in liquid line.
5. Pitch all horizontal suction lines downward in the direction of
6. When making up refrigerant piping, take every precaution to prevent dirt and moisture from entering the piping.
7. Locate the condensing unit and evaporator(s) as close together as possible to minimize piping runs.
8. A liquid line solenoid installed just ahead of the expansion valve is recommended.
9. See tables below for general refrigerant line sizing and equivalent length of valves
10. Refer to the vapor and liquid line selection procedure and charts in the outdoor unit installation manual or literature for more refrigerant line sizing information. When dual outdoor units are matched with the air-handler using dual circuits, size the refrigerant lines for each system independently.

EQUIV. LENGTH TO EVAP. (FT.)	LIQUID LINE O.D.	SUCTION LINE O.D.
		10 [35kW]
0-50 [0-15m]	5/8 [26mm]	1 3/8 [35mm]
51-100 [16-30m]	5/8 [26mm]	1 5/8 [41mm]
101-150 [31-46m]	5/8 [26mm]	1 5/8 [41mm]

EQUIVALENT LENGTH, FT. [m] OF STRAIGHT TYPE "L" TUBING FOR NON-FERROUS VALVES AND FITTINGS (BRAZED)

TUBE SIZE INCHES [mm] O.D.	SOLE-NOID VALVE	ANGLE VALVE	SHORT RADIUS ELL	LONG RADIUS ELL	TEE LINE FLOW	TEE BRANCH FLOW
1/2 [13]	12 [3.7]	8.3 [2.5]	1.6 [0.5]	1.0 [0.3]	1.0 [0.3]	3.1 [0.9]
5/8 [16]	15 [4.6]	10.4 [3.2]	1.9 [0.8]	1.2 [0.4]	1.2 [0.4]	3.6 [1.1]
3/4 [19]	18 [5.5]	12.5 [3.8]	2.1 [0.7]	1.4 [0.4]	1.4 [0.4]	4.2 [1.3]
7/8 [22]	21 [6.4]	14.8 [4.4]	2.4 [0.7]	1.6 [0.5]	1.6 [0.5]	4.8 [1.5]
1 1/8 [29]	12 [3.7]	18.8 [5.7]	3.0 [0.9]	2.0 [0.6]	2.0 [0.6]	6.0 [1.8]
1 3/8 [35]	15 [4.6]	22.9 [7.0]	3.6 [1.1]	2.4 [0.7]	2.4 [0.7]	7.2 [2.2]
1 5/8 [41]	18 [5.5]	27.1 [8.3]	4.2 [1.3]	2.8 [0.8]	2.8 [0.8]	8.4 [2.6]
2 1/8 [54]	21 [6.4]	35.4 [10.8]	5.3 [1.6]	3.5 [1.1]	3.5 [1.1]	10.7 [3.3]

3.7.4 LIQUID LINE FILTER DRIER

A new liquid drier must be installed every time any part of the system has been open to the atmosphere, even if it is for a short period of time. The drier should be installed close to the air-handler for a system started up in the cooling mode and near the outdoor unit for a heat pump system started up in the heating mode. This allows the drier to catch any contaminants in the liquid line before they can enter the indoor or outdoor TXV inlet screen. A drier must be installed in the liquid line of each circuit for dual circuit applications.

3.7.5 BRAZING

Air inside the tubing and coil should be displaced with dry nitrogen prior to the brazing process to prevent the formation of harmful copper oxide inside the tubing. It is very important not to pressurize the system with nitrogen while brazing or pin-hole leaks will form in the braze joint. This is accomplished by removing the gauge port valve core on one of the outdoor unit service valves to allow the pressure to be relieved as the heated nitrogen expands. Fill the system with dry nitrogen through the other service valve

Protect the TXVs and outdoor unit service valves from overheating using a wet rag or heat sink compound. Leave the wet rag or heat sink material in place until the joint and surrounding tubing cools down to a safe temperature. Double tip torches can help minimize brazing time and heat conduction to the heat sensitive components if the is turned down and held on the joint just long enough to make the braze joint. With both single and double tip torches, turning the up too much and keeping the on the joint too long will damage the heat sensitive components even when a wet rag or heat sink compound is used.

3.7.6 LEAK TESTING

After all braze joints are completed, replace the valve core removed when purging with nitrogen and then leak test the system by pressurizing to 150 psig with dry nitrogen and allow the system to sit for at least 15 minutes (longer if possible) to assure the pressure does not drop.

3.7.7 EVACUATION

If no leaks are detected, open the outdoor unit service valves for outdoor units shipped with a nitrogen holding charge and evacuate the system down to 500 microns or below before charging the system. Failure to reach 500 microns of vacuum is a sign of a leak or excessive moisture inside the system. For outdoor units shipped charged with R-410A, do not open the service valves until the evacuation process is complete.

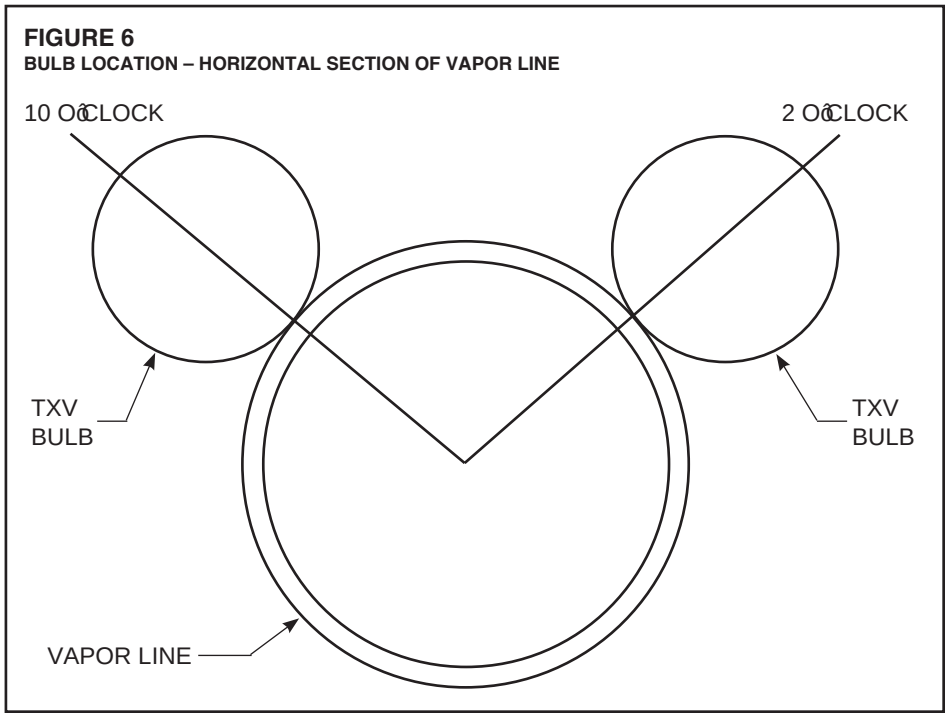
3.7.8 REFRIGERANT CHARGING

Once the evacuation process is completed, break the vacuum with the refrigerant from a refrigerant cylinder (or with refrigerant stored in the outdoor unit by opening the outdoor unit service valves if the outdoor unit is charged with R-410A). The charging process cannot be completed until the remaining steps in the installation process are completed the proper level. See Section 4.4 for further details.

3.8 TXV SENSING BULB ATTACHMENT

IMPORTANT: DO NOT perform any brazing with the TXV bulb attached to the vapor line. After brazing operations have been completed and the tubing has cooled to the touch, clamp each TXV bulb securely on a horizontal section of its corresponding vapor line at the 10 to 2 o'clock position (see Figure 6) with the strap provided in the parts bag.

FIGURE 6
BULB LOCATION – HORIZONTAL SECTION OF VAPOR LINE



3.9 CONDENSATE DRAIN

Two drain connections are provided, one on each side of the unit. Plug the unused drain connection using the plug provided in the parts bag.

IMPORTANT: When making drain connections to the drain pan, use a thin layer of

IMPORTANT: When making drain connections to drain pan, do not overtighten.

Å Install drain lines so they do not block service access to front of the unit. Minimum

Å It is recommended that the air-handler cabinet be pitched slightly downward toward the primary drain connection to assure the condensate drains completely from the drain pan. The downward pitch should be approximately 1/8ò per foot and in both axes.

Å Do not reduce drain line size less than connection size provided on condensate drain pan.

Å All drain lines must be pitched downward away from the unit a minimum of 1/8ò per foot of line to ensure proper drainage.

Å Do not connect condensate drain line to a closed or open sewer pipe. Run condensate to an open drain or outdoors.

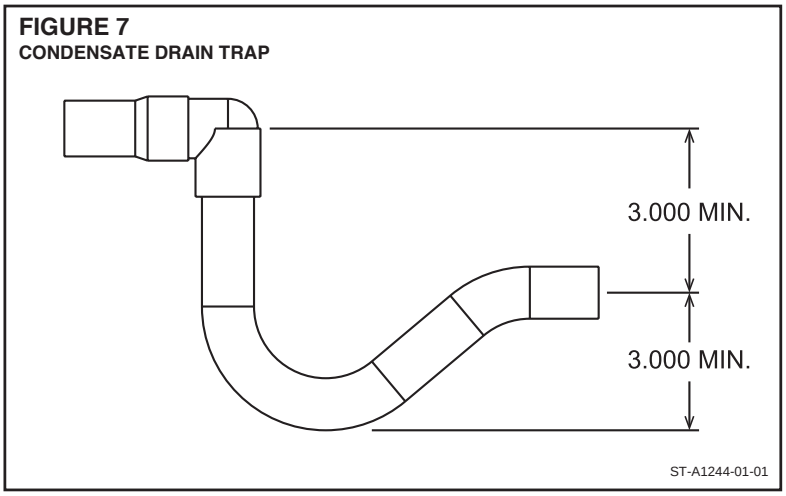
Å The drain line should be insulated where necessary to prevent sweating and damage due to condensate forming on the outside surface of the line.

Å Make provisions for disconnecting and cleaning of the primary drain line should it become necessary. Install a 3 in. trap in the primary drain line as close to the unit as possible. Make sure that the top of the trap is below connection to the drain pan to allow complete drainage of pan (See Figure 7).

Å Plug the unused drain connection with the plug provided in the parts bag, using a thin

Å Test the condensate drain pan and drain line after installation is complete. Pour water into drain pan, enough to drain trap and line. Check to make sure drain pan is draining completely, no leaks are found in drain line and water is draining from the open end of the primary drain line.

FIGURE 7
CONDENSATE DRAIN TRAP



3.10 THERMOSTAT

See instructions for the condensing unit or heat pump for recommended room thermostats.

Å Choose an appropriate thermostat for the application.

Å The thermostat should be mounted 4 to 5 feet above the on an inside wall of the conditioned space or a hallway that has good air circulation from the other rooms being controlled by the thermostat. It is essential that there be free air circulation at the location of the same average temperature as other rooms being controlled. Movement of air should not be obstructed by furniture, doors, draperies, etc. The thermostat should not be mounted where it will be affected by drafts, hot or cold water pipes or air ducts in walls, radiant heat from lamps, the sun, T.V. or an outside wall. See instruction sheet packaged with thermostat for mounting and installation instructions.

3.11 ELECTRICAL WIRING

Field wiring must comply with the National Electric Code (C.E.C. in Canada) and any applicable local ordinance.

3.11.1 POWER WIRING

It is important that proper electrical power is available for connection to the unit model being installed. See the unit nameplate, wiring diagram and electrical data in the installation instructions.

Å Install a circuit disconnect of adequate size, located within sight of, and readily accessible to the unit.

- **IMPORTANT:** Units with electric heater kits installed may be equipped with one or more branch circuit fuses. These fuses protect the internal wiring in the event of a short circuit.

Å Supply circuit power wiring must be 75ÁC minimum copper conductors only. See Electrical Data in Sections 3.11.3 and 3.11.4 for ampacity, wire size and circuit protector requirement. Supply circuit protective devices may be either fuses or circuit breakers.

3.11.1.1 NO-HEAT APPLICATIONS

If electric heat is not installed, connect the incoming line voltage wires to the line voltage terminal block (TB1) inside the air-handler control box.

3.11.1.2 ELECTRIC HEAT APPLICATIONS

If an RXHE electric heater kit is installed, the blower motor contactor is provided in the heater kit with leads that must be routed to the air-handler control box and connected to the line voltage terminal block (TB1) inside the air-handler control box.

IMPORTANT: The variable speed Drive (VFD) must to powered continuously and controlled by the thermostat signals to prevent premature failure of the VFD.
Therefore, the blower motor power supply leads from the blower contactor located in the RXHE electric heat kit must be moved from the load side of the blower contactor (T1,T2,T3) to the line side of the blower connector (L1,L2,L3).

3.11.2 GROUNDING

Å This product must be grounded in accordance with National Electrical Code (C.E.C. in Canada) and any applicable local ordinance.

⚠ WARNING

The unit must be permanently grounded. Failure to do so can result in electrical shock causing personal injury or death.

Å Grounding may be accomplished by grounding metal conduit when installed in accordance with electrical codes to the unit cabinet.

Å Grounding may also be accomplished by attaching ground wire to ground lug provided in the air-handler control box.

3.11.3 ELECTRICAL DATA – WITHOUT ELECTRIC HEAT

MODEL NUMBER	DRIVE PACKAGE	AIR HANDLER MOTOR					MINIMUM CIRCUIT AMPACITY	RECOMMENDED MINIMUM COPPER WIRE SIZE/ MAX. RUN IN FEET	MAXIMUM OVERCURRENT PROTECTION AMPS
		hp	VOLTS	PHASE	"RATING PLATE AMPS"	"MOTOR LRA"			
AC									
(-)HCLA2090C	R,S	2	208/230	3	6.2	47	15	#14 / 165	15
(-)HCLA2090D	R,S	2	460	3	3	24	15	#14 / 275	15
(-)HCLA2090C	T	3	208/230	3	9.2	74.5	15	#14 / 135	15
(-)HCLA2090D	T	3	460	3	4.6	38.1	15	#14 / 230	15
(-)HCLA2120C	R,S	2	208/230	3	6.2	47	15	#14 / 165	15
(-)HCLA2120D	R,S	2	460	3	3	24	15	#14 / 275	15
(-)HCLA2120C	T	3	208/230	3	9.2	74.5	15	#14 / 135	15
(-)HCLA2120D	T	3	460	3	4.6	38.1	15	#14 / 230	15
HP									
(-)HCLP2090C	R,S	2	208/230	3	6.2	47	15	#14 / 165	15
(-)HCLP2090D	R,S	2	460	3	3	24	15	#14 / 275	15
(-)HCLP2090C	T	3	208/230	3	9.2	74.5	15	#14 / 135	15
(-)HCLP2090D	T	3	460	3	4.6	38.1	15	#14 / 230	15
(-)HCLP2120C	R	2	208/230	3	6.2	47	15	#14 / 165	15
(-)HCLP2120D	R	2	460	3	3	24	15	#14 / 275	15
(-)HCLP2120C	S, T	3	208/230	3	9.2	74.5	15	#14 / 135	15
(-)HCLP2120D	S, T	3	460	3	4.6	38.1	15	#14 / 230	15

3.11.4 ELECTRICAL DATA – WITH ELECTRIC HEAT

AIR HANDLER MODEL	HEATER KIT				Heating Capacity		Min Circuit Ampacity	Max Fuse or HACR Breaker Size
	Model	Voltage	KW	AMPS	kW	MBH		
AC								
RHCLA2090C	RXHE-DE020CA	208/240	20	43.1/48.9	15.6/20.2	53.2/68.9	67/73	70/80
RHCLA2090C	RXHE-DE030CA	208/240	30	60.8/70.2	11.0/29.6	75.1/101	89/100	90/100
RHCLA2090D	RXHE-DE020DA	480	20	24.7	20.2	68.9	37	40
RHCLA2090D	RXHE-DE030DA	480	30	35	29.7	101.3	50	50
RHCLA2120C	RXHE-DE020CA	208/240	20	43.1/48.9	15.6/20.2	53.2/68.9	67/73	70/80
RHCLA2120C	RXHE-DE030CA	208/240	30	60.8/70.2	11.0/29.6	75.1/101	89/100	90/100
RHCLA2120D	RXHE-DE020DA	480	20	24.7	20.2	68.9	37	40
RHCLA2120D	RXHE-DE030DA	480	30	35	29.7	101.3	50	50
HP								
RHCLP2090C	RXHE-DE020CA	208/240	20	43.1/48.9	15.6/20.2	53.2/68.9	67/73	70/80
RHCLP2090C	RXHE-DE030CA	208/240	30	60.8/70.2	11.0/29.6	75.1/101	89/100	90/100
RHCLP2090D	RXHE-DE020DA	480	20	24.7	20.2	68.9	37	40
RHCLP2090D	RXHE-DE030DA	480	30	35	29.7	101.3	50	50
RHCLP2120C	RXHE-DE020CA	208/240	20	43.1/48.9	15.6/20.2	53.2/68.9	67/73	70/80
RHCLP2120C	RXHE-DE030CA	208/240	30	60.8/70.2	11.0/29.6	75.1/101	89/100	90/100
RHCLP2120D	RXHE-DE020DA	480	20	24.7	20.2	68.9	37	40
RHCLP2120D	RXHE-DE030DA	480	30	35	29.7	101.3	50	50

3.11.5 COPPER WIRE SIZE - AWG. (3% VOLTAGE DROP)

SUPPLY WIRE LENGTH FEET																		
200 [61]	12	10	8	8	8	6	6	6	4	4	3	3	2	2	1	0	00	
150 [46]	12	10	10	10	8	8	6	6	6	4	4	3	3	2	1	0	00	
100 [30]	14	12	10	10	8	8	8	6	6	4	4	3	3	2	1	0	00	
50 [15]	14	12	10	10	8	8	8	6	6	4	4	3	3	2	1	0	00	
	15	20	25	30	35	40	45	50	60	70	80	90	100	110	125	150	175	
SUPPLY CIRCUIT AMPACITY																		

NOTE: WIRE BASED ON COPPER CONDUCTORS 75ÁC MINIMUM RATING.
FOR MORE THAN 3 CONDUCTORS IN A RACEWAY OR CABLE, SEE
N.E.C. FOR DERATING THE AMPACITY OF EACH CONDUCTOR.

3.11.6 ELECTRIC HEATER KIT IDENTIFICATION LABEL

Mark the appropriate box on the Electric Heater Kit Label (See Figure 8 below) located on the air-handler cabinet for the and safety of future service technicians.

FIGURE 8

SUITABLE FOR USE WITH HEATER KITS

INSTALLER TO INDICATE WHICH HEATER IF ANY HAS BEEN INSTALLED. REFERENCE HEATER KIT RATING PLATE FOR BRANCH CIRCUIT DATA IF OPTIONAL HEATER KIT IS INSTALLED.

NO SUPPLEMENTARY ELECTRIC HEAT INSTALLED ☐

RXHE-DE020CA ☐

RXHE-DE030CA ☐

RXHE-DE020DA ☐

RXHE-DE030DA ☐

3.11.7 CONTROL WIRING

IMPORTANT: Class 2 low voltage control wire should not be run in conduit with power wiring and must be separated from power wiring unless class 1 wire of proper voltage rating is used. After installation, separation of control and power wiring has been maintained. Low voltage control wiring must be 18 awg and color coded. For lengths longer than 100 ft., refer to Table 1 below for the correct control wire sizing.

TABLE 1

FIELD WIRE SIZE FOR 24 VOLT THERMOSTAT CIRCUITS

Thermostat Load - Amps	SOLID COPPER WIRE - AWG.					
3.0	16	14	12	10	10	10
2.5	16	14	12	12	10	10
2.0	18	16	14	12	12	10
	50	100	150	200	250	300
	Length of Run - Feet (1)					

(1) Wire length equals twice the run distance.

NOTE: Do not use control wiring smaller than No. 18 AWG between thermostat and outdoor unit.

3.11.7.1 NO-HEAT APPLICATIONS

The appropriate thermostat control wires (C, G, Y2) must also be connected to the low voltage terminal block (TB2) located on the outside of the air-handler control box. Knockouts are provided on each side of the air-handler for connecting low voltage conduit or plastic bushing. Refer to the wiring connection diagrams in Section 3.11.8 for typical wiring connections for non-electric heat applications.

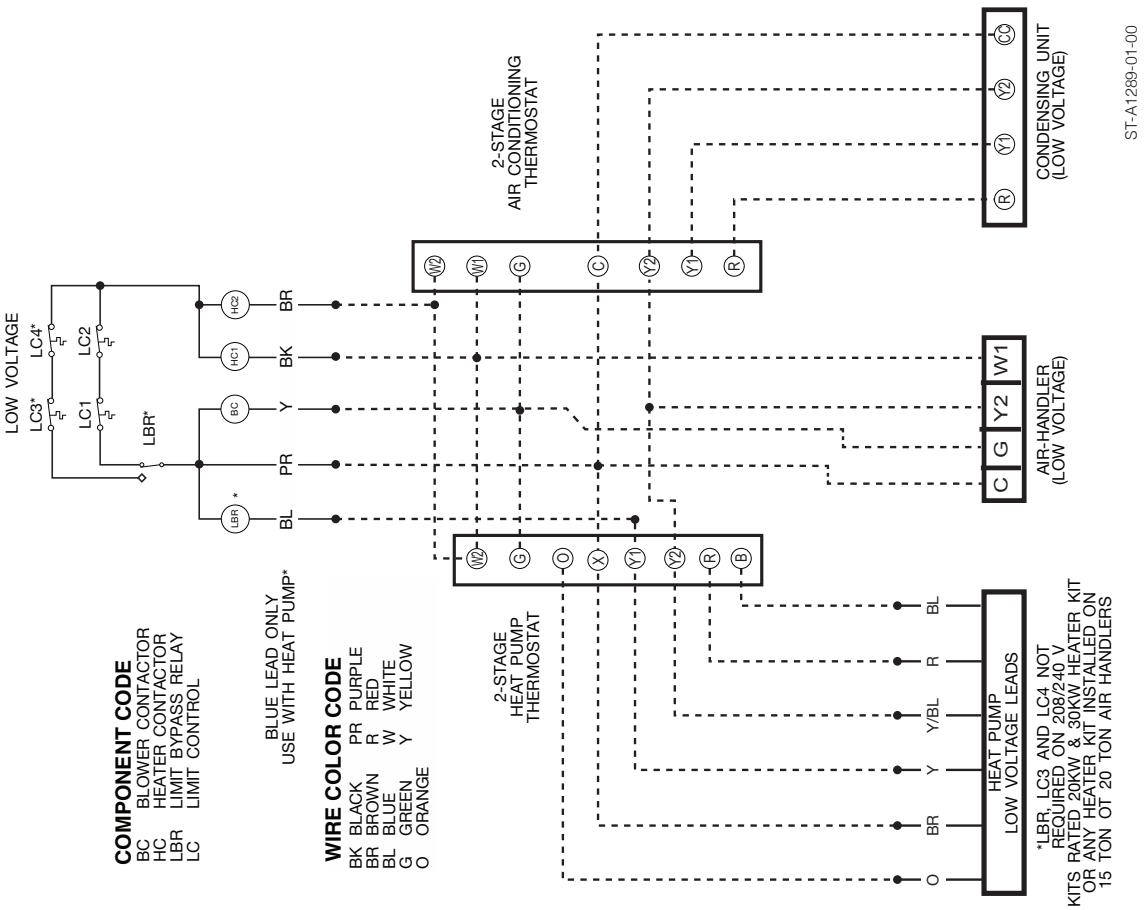
3.11.7.2 ELECTRIC HEAT APPLICATIONS

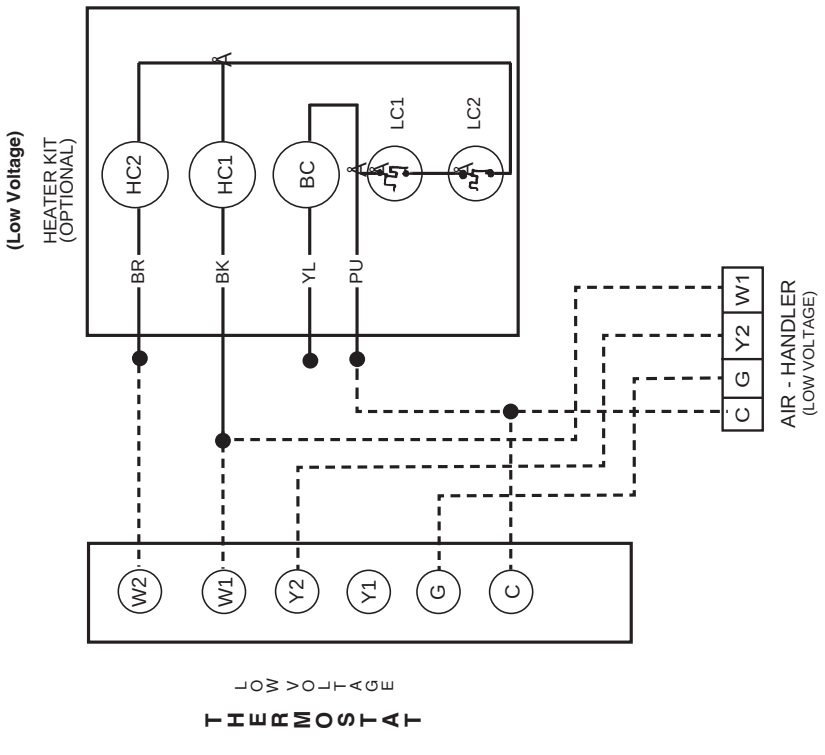
The appropriate thermostat control wires must be connected to the thermostat pigtails on the heater kit and to the C, G, Y2, and W1 terminals on the low voltage terminal block located on the outside of the air handler control box. Refer to the wiring connection diagrams in Section 3.11.8 for typical wiring connections for electric heat applications.

3.11.7.3 CONFIGURING OUTDOOR UNIT TRANSFORMER FOR 208V APPLICATIONS

For 208V applications, the control transformer in the outdoor unit will need to be re-con- to assure adequate secondary control voltage (24V). Refer to the outdoor unit installation manual, wiring diagram, and/or the transformer label for the transformer for 208V applications.

3.11.8 WIRING CONNECTION DIAGRAMS





** IMPORTANT NOTE ABOUT OPTIONAL HEATER KIT:
(SEE ATTACHED TEXT)

NOTE:
INDOOR BLOWER MOTOR OPERATES AT FULL SPEED FOR 2ND STAGE COOLING AND FOR BOTH STAGES OF ELECTRIC HEAT.

3.12 AIR-FLOW

The air-handler is equipped with a Variable Frequency Drive (VFD) that provides a reduction in air-flow in the continuous fan mode, 1st stage cooling mode, and 1st stage heat pump heating mode.

Full air-flow is delivered for the 2nd stage of cooling mode, 2nd stage of heat pump heating mode, and all stages of electric heat. The VFD output frequency and air-flow level is based on the 24VAC thermostat inputs. Energizing the G low voltage terminal located on the air-handler low voltage terminal block causes the VFD to operate at 37.5 Hz (63% of full air-flow). Energizing the Y2 or W1 terminals on the low voltage terminal block causes the VFD to operate at 60Hz (full air-flow). The VFD is programmed at the factory for optimum performance and therefore requires no adjustment when air-handler is installed.

The blower performance charts in Section 3.12.2 is based on a dry coil with the factory 1" fiberglass filters in place and the VFD operating at 60Hz (100%). A component resistance chart is provided in Section 3.12.3 to provide the pressure drop for the various accessories that will need to be added to the external static pressure of the duct system before selecting a drive package and motor sheave setting. Keep in mind that high efficiency pleated filters will likely have more pressure drop than the factory filters, so that additional pressure drop will also need to be taken into account. Refer to the filter manufacturer's pressure drop data for more information.

3.12.1 DRIVE PACKAGE DATA

(-)HCLP2120 Drive Package Data (2nd Stage Operation)

	Sheave Selection											
Drive	Motor		Blower		Belt	Motor	APROXIMATE BLOWER RPM @ MOTER SHEAVE TURNS OPEN					
	Part No.	Dia	Part No.	Dia		HP/[KW]	0	1	**2**	3	4	5
R	1VL40	3.75	AK79H	7.75	A49	2 [1491.4]	816	770	**723**	681	630	586
S	1VP50	4.75	AK79H	7.75	A50	3 [2237.1]	1040	998	955	912	869	**823**
T	1VP56	5.35	AK79H	7.75	A51	3 [2237.1]	1149	1113	1077	1035	996	**952**

NOTES:
1. Factory sheave settings are shown in bold type and shaded.
2. Do not set motor sheave below minimum or maximum turns open shown.
3. Re-adjustment of sheave required to achieve rated airflow at AHRI minimum External Static Pressure
4. Drive data shown is for horizontal airflow with dry coil. Add component resistance (below) to duct resistance to determine total External Static Pressure.

(-)HCLA2090 & (-)HCLP2090 Drive Package Data (2nd Stage Operation)

	Sheave Selection					Motor						
Drive	Motor		Blower		Belt	HP/[KW]	APROXIMATE BLOWER RPM @ MOTER SHEAVE TURNS OPEN					
	Part No.	Dia	Part No.	Dia			0	1	**2**	3	4	5
R	1VP50	4.75	AK104	10.25	A50	2.0 [1491.4]	801	**768**	732	696	662	627
S	1VL-44	4.15	AK71H	6.95	A44	2.0 [1491.4]	998	955	911	865	819	**773**
T	1VL-44	4.15	AK59	5.75	A42	3 [2237.1]	1220	1164	1109	1049	990	**926**
U	1VP-65	6.5	AK79	7.75	A48	3 [2237.1]	1322	1280	1240	1197	1153	**1109**

NOTES:
1. Factory sheave settings are shown in bold type and shaded.
2. Do not set motor sheave below minimum or maximum turns open shown.
3. Re-adjustment of sheave required to achieve rated airflow at AHRI minimum External Static Pressure
4. Drive data shown is for horizontal airflow with dry coil. Add component resistance (below) to duct resistance to determine total External Static Pressure.

AIRFLOW PERFORMANCE — RHCLP2120 10 TON [35.1kW] — 60 Hz — SIDEFLOW

Air Flow CFM [L/s]	(-)HCLP2120 Voltage 208/230, 460, 575 — 3 phase 60 Hz																																					
	External Static Pressure — Inches of Water [kPa]																																						
	0.1 [.02]		0.2 [.05]		0.3 [.07]		0.4 [.10]		0.5 [.12]		0.6 [.15]		0.7 [.17]		0.8 [.20]		0.9 [.22]		1.0 [.25]		1.1 [.27]		1.2 [.30]		1.3 [.32]		1.4 [.35]		1.5 [.37]		1.6 [.40]		1.7 [.42]		1.8 [.45]		1.9 [.47]		2.0 [.50]	
	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W
3200 [1510]	–	–	–	–	591	1058	623	1093	653	1132	684	1174	713	1219	743	1268	771	1320	800	1375	827	1434	854	1496	881	1562	907	1631	933	1703	958	1778	983	1857	1007	1939	1031	2025	1054	2114
3300 [1557]	–	–	–	–	601	1093	632	1131	662	1171	692	1215	721	1263	750	1313	778	1367	806	1425	834	1486	861	1550	887	1617	913	1688	938	1762	963	1840	987	1921	1011	2005	1035	2092	1057	2183
3400 [1604]	–	–	–	–	610	1132	641	1172	671	1214	700	1260	729	1310	758	1362	786	1419	813	1478	840	1541	867	1607	893	1676	918	1749	943	1825	968	1905	992	1988	1015	2074	1038	2163	1061	2256
3500 [1652]	–	–	589	1137	620	1175	650	1217	680	1261	709	1309	738	1361	766	1415	793	1473	821	1535	847	1600	873	1668	899	1739	924	1814	949	1892	973	1974	997	2059	1020	2147	1042	2238	1065	2333
3600 [1699]	–	–	599	1182	630	1222	659	1265	689	1312	718	1362	746	1415	774	1472	801	1532	828	1595	854	1662	880	1732	905	1806	930	1883	954	1963	978	2046	1001	2133	1024	2223	1047	2317	1068	2414
3700 [1746]	–	–	610	1230	640	1272	669	1318	698	1366	726	1418	754	1474	782	1532	809	1594	835	1660	861	1729	887	1801	912	1876	936	1955	960	2037	984	2123	1006	2211	1029	2304	1051	2399	1072	2498
3800 [1793]	590	1242	620	1282	650	1326	679	1374	707	1424	736	1478	763	1536	790	1596	817	1660	843	1728	869	1799	894	1873	918	1950	942	2031	966	2115	989	2203	1012	2293	1034	2388	1055	2485	1076	2586
3900 [1840]	601	1296	631	1338	660	1384	689	1433	717	1486	745	1542	772	1601	799	1664	825	1730	851	1800	876	1872	901	1949	925	2028	949	2111	972	2197	995	2286	1017	2379	1039	2475	1060	2574	1081	2678
4000 [1888]	612	1353	641	1398	670	1446	699	1497	727	1552	754	1610	781	1671	807	1736	833	1804	859	1875	884	1950	908	2028	932	2110	955	2194	978	2282	1001	2374	1022	2469	1044	2567	1065	2669	1085	2773
4100 [1935]	623	1414	652	1461	681	1511	709	1564	737	1621	764	1681	790	1744	816	1811	842	1881	867	1955	891	2031	915	2111	939	2195	962	2282	984	2372	1006	2465	1028	2562	1049	2662	1070	2766	1090	2873
4200 [1982]	635	1480	663	1528	692	1580	719	1635	747	1694	773	1756	799	1821	825	1890	850	1962	875	2038	899	2116	923	2198	946	2284	969	2373	991	2465	1013	2560	1034	2659	1054	2761	1075	2867	1094	2976
4300 [2029]	646	1548	675	1599	703	1653	730	1710	757	1771	783	1835	809	1902	834	1973	859	2047	883	2124	907	2205	931	2289	953	2377	976	2467	998	2562	1019	2659	1040	2760	1060	2864	1080	2972	1099	3082
4400 [2076]	658	1621	686	1674	714	1730	741	1789	767	1851	793	1917	819	1987	844	2059	868	2136	892	2215	916	2298	939	2384	961	2473	983	2566	1004	2662	1025	2762	1046	2864	1066	2971	1085	3080	1104	3193
4500 [2123]	670	1697	698	1752	725	1810	752	1871	778	1936	803	2004	828	2075	853	2150	877	2228	901	2309	924	2394	947	2482	969	2573	990	2668	1011	2766	1032	2868	1052	2973	1072	3081	1091	3192	1109	3307
4600 [2171]	682	1777	710	1834	736	1894	763	1957	788	2024	814	2094	838	2167	863	2244	886	2324	910	2407	933	2494	955	2584	977	2677	998	2774	1019	2874	1039	2978	1059	3085	1078	3195	1097	3308	1115	3425
4700 [2218]	694	1861	721	1920	748	1982	774	2047	799	2116	824	2188	849	2263	872	2342	896	2424	919	2509	941	2598	963	2690	985	2785	1005	2884	1026	2986	1046	3092	1065	3200	1084	3313	1102	3428	1120	3547
4800 [2265]	707	1949	733	2009	760	2073	785	2140	810	2211	835	2285	859	2362	882	2443	905	2527	928	2614	950	2705	972	2799	993	2897	1013	2997	1033	3102	1053	3209	1072	3320	1090	3434	1109	3551	1126	3672

Airflow CFM [L/s]	AIRFLOW CORRECTION FACTORS *			COMPONENT AIRFLOW RESISTANCE						
				Wet Coil	Downflow	Downflow Economizer RA Damper	Horizontal Economizer RA Damper	Concentric Grill RXRN-FA65 or	Concentric Grill RXRN-AA61 or	Concentric Grill RXRN-AA66 or
	Total MBH	Sensible MBH	Power kW	Resistance — Inches of Water [kPa]						
3200 [1510]	0.96	0.87	0.98	0.06 [.01]	0.00 [.00]	0.09 [.02]	0.05 [.01]	0.31 [.08]	–	–
3300 [1557]	0.97	0.88	0.99	0.07 [.02]	0.00 [.00]	0.10 [.02]	0.05 [.01]	0.34 [.08]	–	–
3400 [1604]	0.97	0.90	0.99	0.07 [.02]	0.00 [.00]	0.10 [.02]	0.06 [.01]	0.37 [.09]	–	–
3500 [1652]	0.98	0.92	0.99	0.07 [.02]	0.00 [.00]	0.11 [.03]	0.06 [.01]	–	–	–
3600 [1699]	0.98	0.93	0.99	0.08 [.02]	0.00 [.00]	0.11 [.03]	0.06 [.01]	–	0.16 [.04]	–
3700 [1746]	0.99	0.95	1.00	0.08 [.02]	0.00 [.00]	0.12 [.03]	0.06 [.01]	–	0.18 [.04]	–
3800 [1793]	0.99	0.97	1.00	0.08 [.02]	0.00 [.00]	0.12 [.03]	0.07 [.02]	–	0.19 [.05]	–
3900 [1840]	1.00	0.99	1.00	0.08 [.02]	0.00 [.00]	0.13 [.03]	0.07 [.02]	–	0.20 [.05]	–
4000 [1888]	1.00	1.00	1.01	0.09 [.02]	0.00 [.00]	0.13 [.03]	0.07 [.02]	–	0.21 [.05]	–
4100 [1935]	1.00	1.02	1.01	0.09 [.02]	0.00 [.00]	0.14 [.03]	0.07 [.02]	–	0.23 [.06]	–
4200 [1982]	1.01	1.04	1.01	0.09 [.02]	0.00 [.00]	0.14 [.03]	0.08 [.02]	–	0.24 [.06]	–
4300 [2029]	1.01	1.06	1.01	0.10 [.02]	0.00 [.00]	0.15 [.04]	0.08 [.02]	–	0.25 [.06]	–
4400 [2076]	1.02	1.07	1.02	0.10 [.02]	0.00 [.00]	0.15 [.04]	0.08 [.02]	–	0.27 [.07]	–
4500 [2123]	1.02	1.09	1.02	0.10 [.02]	0.00 [.00]	0.16 [.04]	0.09 [.02]	–	–	–
4600 [2171]	1.03	1.11	1.02	0.10 [.02]	0.00 [.00]	0.16 [.04]	0.09 [.02]	–	–	0.30 [.07]
4700 [2218]	1.03	1.12	1.03	0.11 [.03]	0.00 [.00]	0.17 [.04]	0.09 [.02]	–	–	0.31 [.08]
4800 [2265]	1.04	1.14	1.03	0.11 [.03]	0.00 [.00]	0.17 [.04]	0.10 [.02]	–	–	0.32 [.08]

* Multiply correction factor times gross performance data — resulting sensible capacity cannot exceed total capacity.

[ ] Designates Metric Conversions

AIRFLOW PERFORMANCE RHCLA2090 & RHCLP2090— 7.5 TON [26.4kW] — 60 Hz — SIDEFLOW

Air Flow CFM [L/s]	(-)HCLA2090, (-)HCLA2090 & (-)HCLP2090 Voltage 208/230, 460 — 3 phase 60 Hz																																			
	External Static Pressure — Inches of Water [kPa]																																			
	0.1 [.02]		0.2 [.05]		0.3 [.07]		0.4 [.10]		0.5 [.12]		0.6 [.15]		0.7 [.17]		0.8 [.20]		0.9 [.22]		1.0 [.25]		1.1 [.27]		1.2 [.30]		1.3 [.32]		1.4 [.35]		1.5 [.37]		1.6 [.40]		1.7 [.42]		1.8 [.45]		1.9 [.47]		2.0 [.50]	
	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W
2400 [1133]	–	–	626	590	673	644	720	696	767	745	803	792	843	854	883	915	921	976	959	1036	995	1095	1004	1103	1035	1157	1066	1212	1096	1268	1126	1327	1156	1387	1185	1449	1214	1513	1237	1497
2500 [1180]	–	–	641	634	688	688	734	741	780	790	815	835	855	898	893	961	931	1023	968	1084	1004	1145	1013	1162	1044	1219	1075	1277	1105	1337	1135	1399	1164	1463	1193	1528	1222	1595	1246	1582
2600 [1227]	–	–	657	680	703	736	748	788	793	838	828	883	867	948	904	1012	941	1075	977	1138	1012	1200	1023	1226	1054	1286	1084	1347	1114	1411	1144	1476	1173	1542	1202	1611	1230	1681	1256	1672
2700 [1274]	628	671	673	730	718	786	763	839	806	890	840	936	878	1003	915	1068	951	1133	987	1197	1001	1233	1033	1294	1063	1357	1094	1422	1124	1489	1153	1557	1182	1627	1210	1699	1242	1717	1266	1767
2800 [1321]	645	724	690	783	734	839	778	893	815	926	853	995	890	1063	927	1130	962	1196	996	1261	1012	1302	1043	1367	1073	1433	1103	1504	1133	1571	1162	1643	1191	1716	1219	1791	1252	1814	1276	1867
2900 [1368]	663	779	707	839	750	896	793	951	829	989	866	1059	903	1128	938	1196	973	1264	1006	1331	1022	1376	1053	1444	1083	1514	1113	1585	1142	1658	1172	1733	1200	1810	1228	1888	1262	1914	1286	1970
3000 [1416]	682	838	725	898	767	956	806	985	843	1057	879	1128	915	1199	950	1269	983	1338	1016	1406	1032	1455	1063	1526	1093	1599	1123	1674	1152	1750	1181	1828	1209	1908	1248	1959	1272	2020	1296	2079
3100 [1463]	701	900	743	961	784	1019	820	1056	857	1130	893	1203	928	1275	961	1346	994	1416	1012	1466	1043	1539	1074	1613	1104	1689	1133	1767	1162	1847	1191	1928	1219	2011	1258	2066	1282	2130	1306	2192
3200 [1510]	720	965	761	1026	802	1085	836	1133	871	1208	906	1283	940	1356	973	1429	1005	1500	1023	1551	1054	1627	1084	1705	1114	1784	1143	1865	1172	1948	1201	2033	1229	2119	1268	2177	1293	2244	1316	2310
3300 [1557]	740	1033	780	1095	815	1139	851	1216	886	1292	920	1368	953	1442	985	1516	1017	1590	1035	1640	1065	1720	1095	1801	1125	1883	1154	1968	1182	2054	1211	2142	1254	2222	1279	2293	1303	2363	1326	2432
3400 [1604]	760	1104	799	1167	831	1225	866	1303	900	1381	934	1458	966	1534	998	1610	1015	1654	1046	1735	1076	1817	1106	1901	1135	1987	1164	2075	1193	2164	1221	2255	1265	2339	1290	2413	1314	2487	–	–
3500 [1652]	781	1179	812	1236	847	1316	882	1396	915	1475	948	1554	979	1631	1010	1708	1027	1749	1057	1833	1088	1919	1117	2006	1146	2096	1175	2187	1203	2279	1250	2382	1276	2461	1300	2538	1324	2615	–	–
4000 [1888]	868	1677	900	1766	931	1853	962	1940	991	2026	997	2006	1028	2101	1058	2198	1088	2296	1118	2397	1147	2499	1175	2602	1204	2708	1186	2303	1214	2399	1261	2505	1287	2587	1311	2668	–	–	–	–

Airflow CFM [L/s]	AIRFLOW CORRECTION FACTORS *			COMPONENT AIRFLOW RESISTANCE						
				Wet Coil	Downflow	Downflow Economizer RA Damper	Horizontal Economizer RA Damper	Concentric Grill RXRN-FA65 or	Concentric Grill RXRN-AA61 or	Concentric Grill RXRN-AA66 or
	Total MBH	Sensible MBH	Power kW	Resistance — Inches of Water [kPa]						
2400 [1133]	0.93	0.73	0.96	0.04 [.01]	0.00 [.00]	0.05 [.01]	0.03 [.01]	–	–	–
2500 [1180]	0.93	0.74	0.96	0.05 [.01]	0.00 [.00]	0.06 [.01]	0.03 [.01]	–	–	–
2600 [1227]	0.94	0.76	0.97	0.05 [.01]	0.00 [.00]	0.06 [.01]	0.04 [.01]	0.17 [.04]	–	–
2700 [1274]	0.94	0.78	0.97	0.05 [.01]	0.00 [.00]	0.07 [.02]	0.04 [.01]	0.19 [.05]	–	–
2800 [1321]	0.95	0.80	0.97	0.05 [.01]	0.00 [.00]	0.07 [.02]	0.04 [.01]	0.21 [.05]	–	–
2900 [1368]	0.95	0.81	0.97	0.06 [.01]	0.00 [.00]	0.08 [.02]	0.04 [.01]	0.23 [.06]	–	–
3000 [1416]	0.95	0.83	0.98	0.06 [.01]	0.00 [.00]	0.08 [.02]	0.05 [.01]	0.25 [.06]	–	–
3100 [1463]	0.96	0.85	0.98	0.06 [.01]	0.00 [.00]	0.09 [.02]	0.05 [.01]	0.28 [.07]	–	–
3200 [1510]	0.96	0.87	0.98	0.06 [.01]	0.00 [.00]	0.09 [.02]	0.05 [.01]	0.31 [.08]	–	–
3300 [1557]	0.97	0.88	0.99	0.07 [.02]	0.00 [.00]	0.10 [.02]	0.05 [.01]	0.34 [.08]	–	–
3400 [1604]	0.97	0.90	0.99	0.07 [.02]	0.00 [.00]	0.10 [.02]	0.06 [.01]	0.37 [.09]	–	–
3500 [1652]	0.98	0.92	0.99	0.07 [.02]	0.00 [.00]	0.11 [.03]	0.06 [.01]	–	–	–
3600 [1699]	0.98	0.93	0.99	0.08 [.02]	0.00 [.00]	0.11 [.03]	0.06 [.01]	–	0.16 [.04]	–
3700 [1746]	0.99	0.95	1.00	0.08 [.02]	0.00 [.00]	0.12 [.03]	0.06 [.01]	–	0.18 [.04]	–
3800 [1793]	0.99	0.97	1.00	0.08 [.02]	0.00 [.00]	0.12 [.03]	0.07 [.02]	–	0.19 [.05]	–
3900 [1840]	1.00	0.99	1.00	0.08 [.02]	0.00 [.00]	0.13 [.03]	0.07 [.02]	–	0.20 [.05]	–
4000 [1888]	1.00	1.00	1.01	0.09 [.02]	0.00 [.00]	0.13 [.03]	0.07 [.02]	–	0.21 [.05]	–

* Multiply correction factor times gross performance data — resulting sensible capacity cannot exceed total capacity.

[ ] Designates Metric Conversions

3.12.3 COMPONENT AIR-RESISTANCE DATA

CFM [L/s]	1800 [850]	2200 [1038]	2600 [1227]	3000 [1416]	3400 [1605]	3800 [1793]	4200 [1982]	4600 [2171]	5000 [2360]
Electric Heater 20KW, 30KW	.060 [.015]	.100 [.025]	.140 [.034]	.160 [.040]	.230 [.057]	.320 [.080]	.410 [.102]	.500 [.124]	.600 [.150]
Mixing Box (R/A Damper Open)	.006 [.001]	.008 [.002]	.012 [.003]	.024 [.006]	.038 [.009]	.053 [.013]	.068 [.017]	.080 [.020]	.095 [.024]
Discharge Grille (Set Max. Open)	.008 [.002]	.011 [.003]	.015 [.004]	.020 [.005]	.025 [.006]	.031 [.008]	.039 [.010]	.046 [.012]	.055 [.014]
Inlet Grille	.008 [.002]	.010 [.002]	.014 [.003]	.020 [.005]	.026 [.006]	.032 [.008]	.039 [.010]	.049 [.012]	.058 [.014]
Discharge Plenum	.02 [.005]	.04 [.010]	.05 [.012]	.065 [.016]	.085 [.021]	.100 [.025]	.120 [.030]	.150 [.037]	.180 [.045]

3.12.4 SELECTING THE PROPER BLOWER DRIVE & MOTOR SHEAVE SETTING

To select the proper blower drive, the following information is required.

- Target air-flow in CFM or L/s
- Total static pressure of the duct system in inches of water or kPa
- Component Resistance (See Section 3.12.3)

Add the total static pressure of the duct system to the component resistance to determine the External Static Pressure (E.S.P.) that the air-handler must work against. Locate the target CFM [L/s] row on the air-flow performance table and move to the right along that row to the correct E.S.P. column. If the target CFM and E.S.P. are between the values shown on the table, it will be necessary to interpolate between rows and lines.

There are heavy lines dividing blower drives from left to right with the “R” drive being everything left of the first heavy line, “S” drive being for everything between the 1st and 2nd heavy lines, “T” drive being for everything between the 2nd and 3rd heavy lines, and so forth.

Once the correct blower drive is determined, confirm the air-handler being installed has the correct drive package or can be converted to the correct drive with field supplied sheaves and belt(s). In some cases, a motor change is also required for field supplied blower drives. See Section 3.12.5 for more details on field supplied blower drives.

Determine the correct blower RPM from the air-flow performance chart at the intersection of the target air-flow and E.S.P. Then refer to the Blower Package Data table to determine the correct setting in turns open for the variable pitch motor sheave. The variable pitch motor sheave can be adjusted in half turns to provide finer adjustments of the blower RPM if needed. Adjust the variable pitch motor sheave to the correct setting using the instructions found in Section 3.12.6.

3.12.5 FIELD SUPPLIED BLOWER DRIVES

For applications where the blower drive packages available from the factory cannot provide enough External Static Pressure (E.S.P.), the motor sheave and/or blower sheave and the belt(s) can be changed to a factory authorized optional field supplied blower drive that will extend the E.S.P. range of the air-handler. Please note that In some cases, a higher horsepower motor may have to be substituted for the factory motor per the specifications in the Blower Package Data table. Factory authorized field supplied blower drive specifications are provided in the Blower Package Data table and the air-flow performance tables include data for the factory authorized field supplied blower drives.

IMPORTANT: Do not deviate from the specifications for the factory authorized field supplied blower drive packages to assure the motor is not overloaded and to assure that a known air-flow level can be achieved.

3.12.6 ADJUSTING THE VARIABLE PITCH MOTOR SHEAVE

The adjustable pitch sheave which is mounted on the motor shaft controls the fan speed. To adjust the fan speed refer to figure at right, proceed as follows:

a. Loosen the set screw, item 1.

b. Rotate the adjustable sheave, item 2, to the desired position.

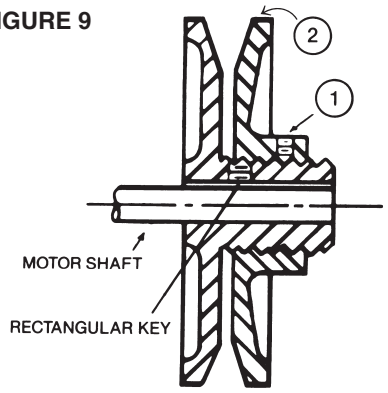
c. Lock the adjustable sheave in place by tightening the set screw, item 1.

NOTE: The adjustable sheave is not to be used to adjust belt tension.

⚠ WARNING

BEFORE MAKING FAN ADJUSTMENTS, BE SURE THE MAIN ELECTRICAL DISCONNECT SWITCH IS IN THE “OFF” POSITION TO PREVENT POSSIBLE INJURY DUE TO ACCIDENTAL OPERATION OF THE MOTOR.

FIGURE 9



3.12.7 DRIVE BELT ALIGNMENT & ADJUSTMENT

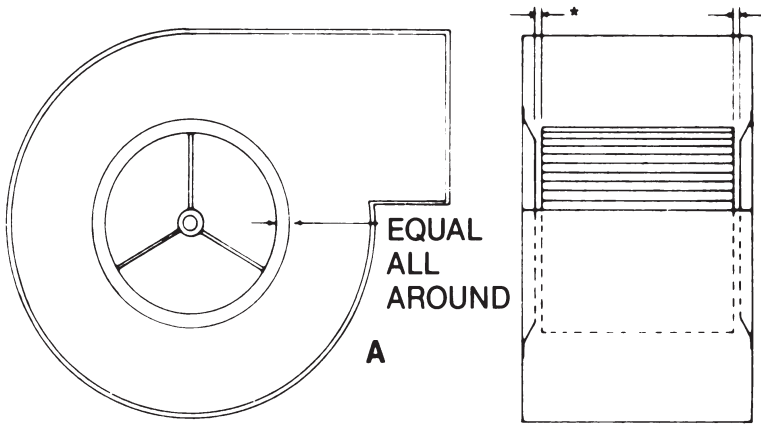
Place belt on the groove of the blower sheave and motor sheave to obtain the approximate alignment and belt tension. Remove the belt and align the blower sheave and motor sheave using a straight edge. When both sheaves are properly aligned, re-install belt. Do not force or pry the belt onto the sheaves. With the belt in place, adjust so that all the slack is on one side of the drive. The belt should have from 3/4" to 1" [19 to 25 mm] of slack at 3 lbs. [21 kPa] pressure. Adjust the belt to this tension, by raising or lowering the swing base via the adjusting rods and nuts.

4.0 START-UP

4.1 PRE-START CHECKLIST

1. Leak test entire system.
2. Check motor mounting to make sure all nuts are tight.
3. Check motor and blower sheaves to make sure they are in proper alignment and set screws are tight.
4. Check belt tension—belts should be fairly tight for the initial "start-up".
5. Check bearing—collar set screws on blower shaft to make sure they are tight.
6. Ball type bearings are factory lubricated and do not require additional grease before starting.
7. Rotate blower shaft by hand to be sure it is free.
8. Check motor and blower rotation.
9. Check all screws, bolts, set screws and piping connections for tightness.
10. Check drain.
11. Insure that filters are in place.
12. Insure all outdoor unit service valves are open.
13. Be sure that electrical controls and motors are properly wired and fused in accordance with applicable codes.
14. Check wheel position in blower housing. See Figures 10A and 10B.

FIGURE 10



4.2 SYSTEM START-UP & OPERATIONAL CHECK-OUT

- Once everything on the Pre-Start Check-List has been confirmed, turn the electrical power disconnect on and adjust the thermostat to call for continuous fan operation. Confirm the blower has the correct rotation and is circulating air in the duct system.
- If the blower is running backwards, disconnect power to the unit and switch two of the motor leads in the junction box to reverse the motor rotation. Restore electrical power to the unit and confirm proper blower rotation.
- Confirm the blower is turning the correct RPM using a strobe light or other device capable of measuring RPM.
- Confirm the full load motor amps listed on the unit data plate are not being exceeded by more than the 15% service factor rating of the motor.
- If the blower is unusually noisy, disconnect power to the unit and check for improper alignment of the blower wheel or belt or for something loose.
- If field installed accessories have been installed, confirm proper functioning of those accessories.

4.3 CHECKING INDOOR AIR-FLOW RATE

4.3.1 ESTIMATING AIR-FLOW RATE USING EXTERNAL STATIC PRESSURE

A common method of checking indoor is to measure the external static pressure that the air-handler is working against and then referring to the air-flow data in Section 3.12. Measuring external static pressure to a high degree of precision in the field is challenging, so keep in mind that the air-flow rate determined by this method is an estimate, but is accurate enough for all practical purposes.

To determine external static pressure, the static pressure should be measured in inches of water column across the air-handler using an incline manometer, digital static pressure meter, or a Magnahelic. The static pressure inside the return plenum should be measured as close to the air-handler as possible and must be measured between any external filter rack and the unit so the pressure drop across the filter is accounted for. The static pressure inside the supply plenum should be measured at a point about halfway between the air-handler and the first elbow or the end of the plenum. Total external static pressure is the sum of the return and supply plenum static pressures. Even though the return plenum static pressure is a negative pressure, it must be added to the supply plenum static pressure, ignoring the negative sign. The supply and return plenum static pressure tubing can also be connected to both pressure ports of the pressure measuring device which will automatically add the two pressures together.

4.3.2 ESTIMATING AIR-FLOW RATE USING ELECTRIC HEAT TEMPERATURE RISE

If the air-handler is equipped with an electric heater, the air-flow can be estimated using the air temperature rise across the air-handler with the heater and blower both energized once the unit has run long enough for the temperatures to stabilize. As with determining air-flow rate using external static pressure, the air-flow rate determined by this method is an estimate, but is accurate enough for all practical purposes. Measure the return air temperature as close to the unit as possible and the supply air temperature about half way from the air-handler to the first elbow or end of the supply plenum. Use the following formula to calculate air-flow rate once the temperature rise is determined.

CFM = Heating BTUH / (Elevation Factor × Temp Rise °F)

L/s = (895 × Heating kW) / (Elevation Factor × Temp Rise °C)

Note: Refer to Sections 4.3.3 and 4.3.4 to determine Heating Capacity and the following chart for Elevation Factor.

Elevation -ft [m]	Elevation Factor
Sea Level	1.08
500 [152]	0.98
1000 [305]	0.96
1500 [451]	0.95
2000 [610]	0.93
2500 [762]	0.91
3000 [914]	0.90
3500 [1067]	0.88
4000 [1219]	0.86
5000 [1524]	0.83
6000 [1829]	0.83
7000 [2134]	0.77
8000 [2438]	0.74
9000 [2743]	0.72
10000 [3048]	0.69

4.3.3 CORRECTING ELECTRIC HEAT kW FOR VOLTAGE

The actual electric heat kW varies with the supply voltage. Use the following formula to correct the heater rated kW at voltages other than rated voltage.

Actual kW = Rated kW × (Actual Voltage^2 / Rated Voltage^2).

4.3.4 CALCULATING ELECTRIC HEAT CAPACITY IN BTUH

Use the following formula to convert heater kW to heating capacity in BTUH.

BTUH Capacity = kW × 3412
(Where 3412 = BTUH per kW)

4.4 CHECKING REFRIGERANT CHARGE

System refrigerant charging should only be performed after the indoor air-flow is confirmed to be correct for the application. Once the air-flow is confirmed, refer to the manufacturer's outdoor unit charging chart and installation manual for the proper charging procedure for the system.

4.5 SEQUENCE OF OPERATION

4.5.1 COOLING & HEAT PUMP HEATING MODES

When the 2-stage thermostat calls for 1st stage of cooling or heat pump heating and the thermostat fan setting is set to the AUTO position, the G signal from the thermostat causes the Variabe Frequency Drive (VFD) to ramp the motor to the low speed air-flow level (37.5 Hz) which is 63% of full air-flow. If the thermostat fan setting is set on the ON position (continuos fan), the motor will already be operating at the low speed air-flow level when there is a call for 1st stage cooling or heat pump heating.

If the 2-stage thermostat calls for 2nd stage of cooling or heat pump heating, the Y signal from the thermostat will cause the VFD to ramp the motor to the high speed air-flow level (60 Hz). As the thermostat cycles between stages, the VFD and motor will cycle between the low and high speed air-flow levels.

When the call cooling or heat pump heating at the thermostat is satisfied or the thermostat is turned to the OFF position, the VFD will ramp down to 0 Hz and the motor will stop if the thermostat fan settings is set to AUTO position. If the thermostat fan setting is set to the ON position (continuos fan), the VFD will continue to drive the motor at the low speed level (37.5 Hz).

4.5.2 ELECTRIC HEAT MODE

When the thermostat calls for the 1st stage of heat, the 1st stage heater contactor (HC1) in the electric heater kit closes which energizes the 1st stage heater elements. If the thermostat fan setting is set to the AUTO position, the G signal from the thermostat causes the VFD to ramp the motor up to the high speed air-flow level (60Hz). If the thermostat fan setting is set to the ON (continuous fan) position, then the VFD will ramp the motor from low speed air-flow (37.5 Hz) to high speed air-flow (60Hz).

If the thermostat calls for the 2nd stage of heat, the 2nd stage heater contactor (HC2) in the electric heater kit closes which energizes the 2nd stage heater elements. The heater will then cycle between the 1st and 2nd stages of heat at the direction of the thermostat.

When the call for heat at the thermostat is satisfied or the thermostat is turned to the OFF position, the heater contactor(s) open and de-energize the electric heater elements. If the thermostat fan setting is set to the AUTO position, the VFD will ramp down to 0 Hz and the motor will stop. If the thermostat fan setting is set to the ON (continuous fan) position, the VFD will ramp down to the low speed air-flow level (37.5 Hz) until the next call for electric heat.

4.5.3 SUPPLEMENTAL HEATING DURING THE HEAT PUMP HEATING & DEFROST MODES

Should the room temperature continue to fall when the system is operating in the heat pump heating mode, the thermostat will energize supplemental electric heat as required if an electric heater kit has been installed.

If the purple pigtail connected to the “D” terminal on the outdoor unit defrost control is connected to the W1 input (black pigtail) on the electric heater kit, the 1st stage of electric heat will be energized during the defrost cycle. This prevents cold air from being discharged from the supply registers during the defrost cycle. For the most economical operation when discharge air temperature during defrost is not an issue, do not make this connection.

4.5.4 EMERGENCY HEAT (HEAT PUMP)

If heat pump thermostat is set to the “Emergency Heat” mode, the outdoor unit will be prevented from operating and heat will be provided solely by the electric heater. The electric heater elements and indoor blower motor will be energized any time there is a call for heat with no compressor and outdoor fan operation. A jumper should be installed between the W1 and E terminals on the thermostat sub-base so a call for emergency heat will be transferred to the 1st stage of heat of the thermostat. The indoor blower will cycle on and off with the electric heater elements when the thermostat fan setting is set to the “auto” mode.

4.5.5 THERMOSTAT FAN SETTING

If the thermostat “FAN” setting is adjusted to the “AUTO” position, the indoor blower motor will only operate when there is a call for cooling or heating. If the setting is adjusted to the “ON” position, the indoor blower motor will operate continuously at the low speed air-flow level.

5.0 FIELD INSTALLED ACCESSORIES & KITS

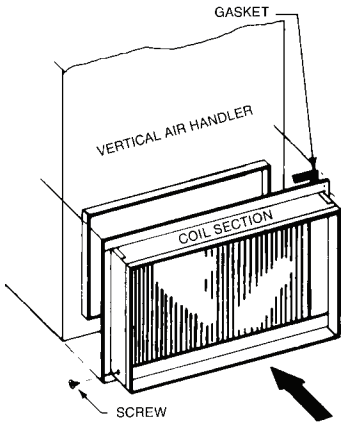
RXHM MIXING BOX

RXHE ELECTRIC HEATER KIT

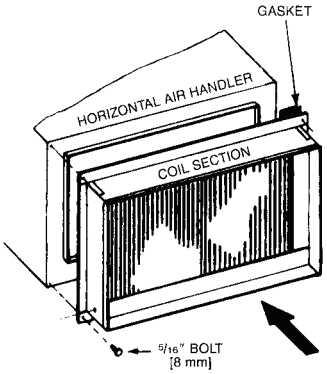
ACCESSORY DESCRIPTION	MODEL NUMBER	SIZE USED ON	NET WEIGHT (LBS) [kg]
Hot Water Coil	RXHC-C74W	090,120	200 [91]
	RXHC-C76W	150,180,240	200 [91]
Steam Coil	RXHC-C74S	090,120	200 [91]
	RXHC-C76S	150,180,240	200 [91]
Filter Frame Coil	RXHF-B74A	090,120	90 [41]
	RXHF-B76A	150,180,240	117 [53]
Inlet Grille Kit	RXHG-C74A	090,120	9 [4]
	RXHG-C76A	150,180,240	12 [5]
Discharge Grille Kit	RXHG-C74B	090,120	15 [7]
	RXHG-C76B	150,180,240	23 [10]
Discharge Plenum Kit	RXHL-C74B	090,120	38 [17]
	RXHL-C76B	150,180,240	62 [28]
Mixing Box	RXHM-BC74H	090,120	120 [54]
	RXHM-BC76H	150,180,240	195 [88]
Auxiliary Heater Kit	RXHE-DE020*A	090,120	75 [34]
	RXHE-DE030*A	090,120	75 [34]
	RXHE-CE030*C	150,180,240	90 [41]
	RXHE-CE040*C	150,180,240	98 [44]

NOTE: *Designates "C", "D" or "Y" Voltage
[ ] Designates Metric Conversions

HOT WATER OR STEAM COILS



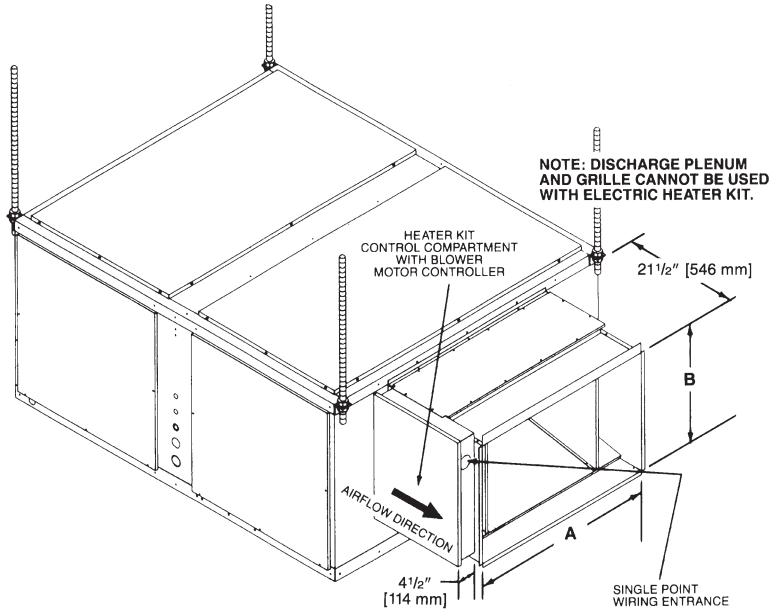
(090, 120) RXHC-C74W RXHC-C74S
or
(150, 180, 240) RXHC-C76W RXHC-C76S



(090, 120) RXHC-C74W RXHC-C74S
or
(150, 180, 240) RXHC-C76W RXHC-C76S

5.1 ELECTRIC RESISTANCE HEATER KITS

OPTIONAL ELECTRICAL HEATER KIT SHOWN INSTALLED IN HORIZONTAL POSITION AND CONNECTED DIRECTLY TO THE AIR HANDLER. THE HEATER KIT MAY ALSO BE INSTALLED WITH THE AIR HANDLER SET IN THE VERTICAL POSITION. IN EITHER POSITION THE HEATER KIT CONTROL COMPARTMENT MUST BE ON THE LEFT SIDE FACING THE AIR DISCHARGE OPENING.



AUXILIARY HEATER KIT

MODEL NO.	IN. [mm]	
	A	B
RXHE-DE****A	20 [508]	20 [508]

[ ] Designates Metric Conversions

5.2 MIXING BOX KITS

ACCESSORY MODEL RXHM-A74F

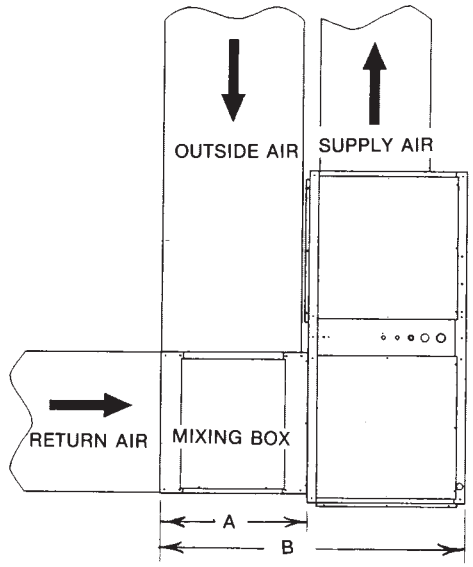
COOLING SEASON—Thermostat set at "Cool" and "Fan Auto," outside air damper goes to "minimum fresh air" position when cooling thermostat closes, energizing mechanical cooling. When cooling thermostat is satisfied, mechanical cooling is de-energized, and outside air damper closes.

INTERMEDIATE SEASON—Same as for cooling season, except that cooling thermostat closes, starting indoor blower motor, the enthalpy control, mounted on outside air, determines if "free" cooling or mechanical cooling should be utilized. If outside air conditions are suitable for cooling, the mechanical cooling remains off and the mixed air controller modulates the damper motor to assume the proper damper position to maintain mixed air setting. If outside conditions are not suitable for cooling, then the dampers go to "minimum fresh air" position and mechanical cooling is energized.

HEATING SEASON—Damper always stays at "minimum fresh air" position while fan motor is operating. Outside air damper closes when blower motor is off. "Minimum fresh air" position must not allow mixed air temperatures to air handler below 50°F. during heating seasons.

CAUTION: Because of the possibility of freeze damage, it is not recommended that hot water or steam coils be used with the mixing box accessory, unless provision is made to shut-off the outside air duct 100% during freezing conditions.

Another possible system enhancement would be to install an air proving switch in the air handler supply duct wired in series with the compressor contactor coil (24V) which would lock out the compressor in the event of air flow failure.



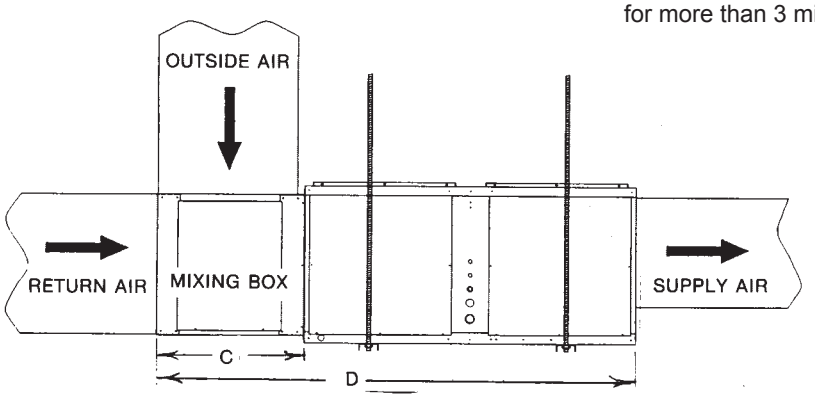
VERTICAL APPLICATION

A	B
27	54

HORIZONTAL APPLICATION

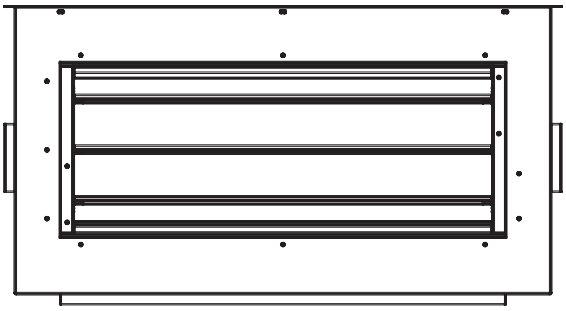
C	D
27	79

NOTE:
The bottom of the air handler should be sloped in two planes that pitch the condensate to the drain connection. The drain pan shall not leave puddles larger than 2 inches in diameter and 1/8 inch deep for more than 3 minutes.

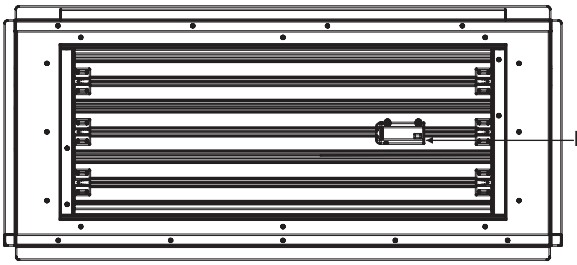


5.2 MIXING BOX KITS (continued)

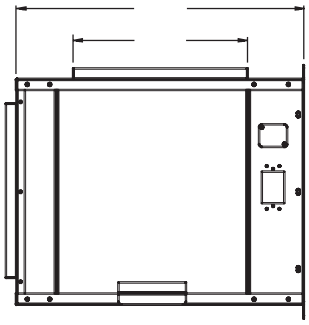
Field - Installed Mixing Box Dimensions



TOP VIEW



FRONT VIEW



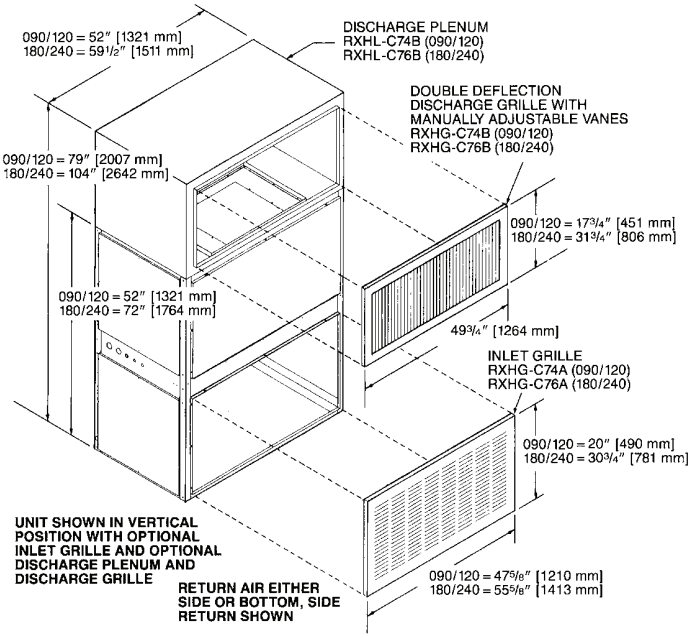
SIDE VIEW

MODEL NO.	AIR HANDLER SIZES USED ON	FLANGED DUCT OPENING		IN. [mm]
		LENGTH IN. [mm]	WIDTH IN. [mm]	"X"
RXHMBC-74H	090, 120	42 [1067]	16 7/8 [1229]	27 [686]
RXHMBC-76H	150, 180, 240	48 3/8 [1229]	22 [559]	32 [813]

5.3 DISCHARGE PLENUM, DISCHARGE GRILLE, & INLET GRILLE KITS

AIR HANDLER ACCESSORIES (con't)

UNIT WITH ACCESSORIES
7.5 THROUGH 10 NOMINAL TONS [26 THROUGH 35 kW]



DOUBLE DEFLECTION DISCHARGE GRILLE

MODEL NO.	AIR HANDLER SIZES USED ON	NOMINAL CFM [L/s]	FT. [m] OF THROW
RXHG-C74B	090	3000 [1416]	0° DEFLECTION - 43' [13.1] 22° DEFLECTION - 37' [11.3] 45° DEFLECTION - 22' [6.7]
	120	4000 [1888]	0° DEFLECTION - 53' [16.2] 22° DEFLECTION - 46' [14] 45° DEFLECTION - 27' [8.2]
RXHG-C76B	180	6000 [2831]	0° DEFLECTION - 52' [15.8] 22° DEFLECTION - 36' [11] 45° DEFLECTION - 18' [5.5]
	240	8000 [3775]	0° DEFLECTION - 65' [19.8] 22° DEFLECTION - 45' [13.7] 45° DEFLECTION - 22' [6.7]

TYPICAL APPLICATION
7.5, 10, 15 AND 20 NOMINAL TONS [26, 35, 53 AND 70 kW]

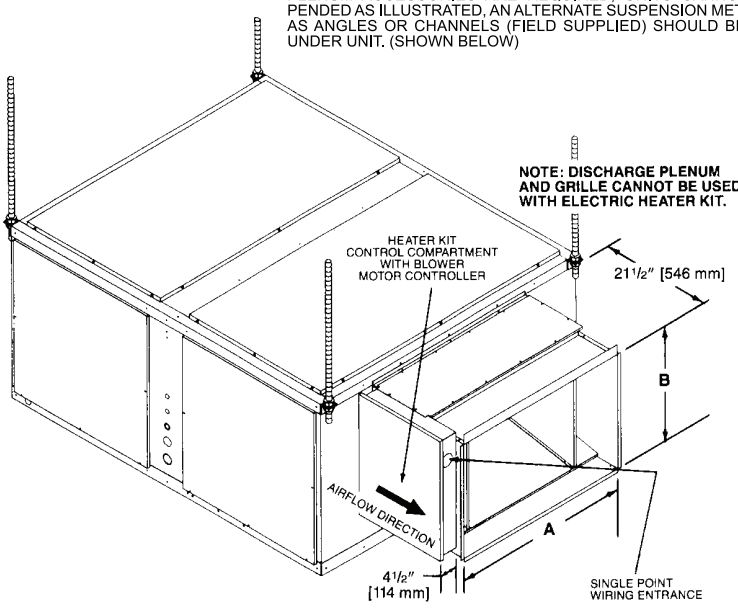
OPTIONAL ELECTRICAL HEATER KIT SHOWN INSTALLED IN HORIZONTAL POSITION AND CONNECTED DIRECTLY TO THE AIR HANDLER. THE HEATER KIT MAY ALSO BE INSTALLED WITH THE AIR HANDLER SET IN THE VERTICAL POSITION. IN EITHER POSITION THE HEATER KIT CONTROL COMPARTMENT MUST BE ON THE LEFT SIDE FACING THE AIR DISCHARGE OPENING.

MODEL NO.	AIR HANDLERS SIZES USED ON	IN. [mm]	
		A	B
RXHE-DE****A	090, 120	20 [508]	20 [508]
RXHE-CE****C	150,180,240	36 [914]	24 [610]

THE BOTTOM OF THE AIR HANDLER SHOULD BE SLOPED IN TWO PLANES THAT PITCH THE CONDENSATE TO THE DRAIN CONNECTION. THE DRAIN PAN SHOULD NOT LEAVE PUDDLES LARGER THAN 2 INCHES IN DIAMETER AND 1/8 INCH DEEP FOR MORE THAN 3 MINUTES.

FOUR HEAVY GAUGE ANGLES ARE FURNISHED (SHIPPED LOOSE) FOR SUSPENDING UNITS FROM ALL FOUR CORNERS, MINIMUM OF 1/2" [13] SUPPORT RODS ARE RECOMMENDED. IF ALL-THREAD IS USED, IT IS ALSO RECOMMENDED THAT TWO NUTS AND TWO LOCKWASHERS BE TIGHTENED SECURELY AGAINST THE SUSPENSION ANGLES.

WHEN HOT WATER OR STEAM COIL, MIXING BOX OR DISCHARGE AIR PLENUM ACCESSORIES ARE REQUIRED, UNITS CANNOT BE SUSPENDED AS ILLUSTRATED, AN ALTERNATE SUSPENSION METHOD SUCH AS ANGLES OR CHANNELS (FIELD SUPPLIED) SHOULD BE LOCATED UNDER UNIT. (SHOWN BELOW)

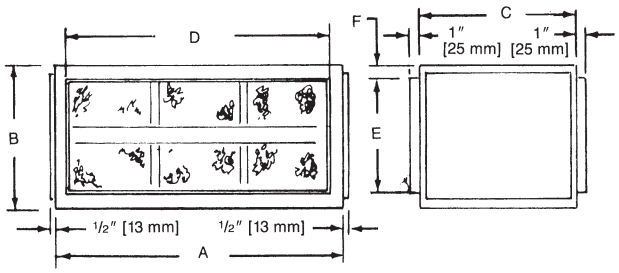


[ ] Designates Metric Conversions

5.4 FILTER FRAME KITS

The filter rack accessory can be connected directly to the hot water/steam coil accessory.

MODEL NO.	IN. [mm]					
	A	B	C	D	E	F
RXHF-B74A	51 1/2 [1308]	24 [610]	25 1/8 [638]	47 3/8 [1203]	19 7/8 [505]	2 1/16 [52]

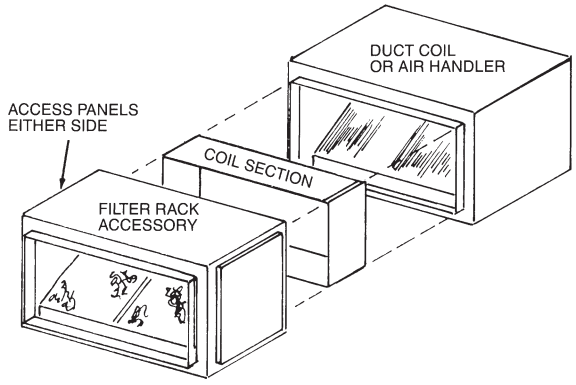


MODEL NO.	FILTER SIZE (QTY.) TYPE
RXHF-B74A	16×20×1 (4) Disposable 20×20×1 (2) Disposable

[ ] Designates Metric Conversions

FILTER PRESSURE DROP:

MODEL NO.	CFM [L/s] × 1000 [472]								
	2	3	4	5	6	7	8	9	10
RXHF-B74A	.01 [2]	.02 [4]	.03 [7]	.07 [16]	.10 [22]	.15 [33]	—	—	—



5.5 HOT WATER & STEAM COILS

PHYSICAL SPECIFICATIONS

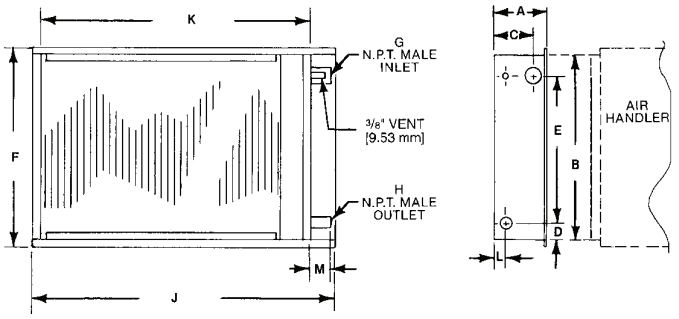
NOMINAL TONS [kW]	FINNED HEIGHT– IN. [mm]	FINNED LENGTH– IN. [mm]	FACE AREA FT² [m²]	CIRCUITS & TUBES HIGH
7 1/2 [26.38]-10 [35.17]	18 [457]	40 [1016]	5.0 [.46]	12
15 [52.75]-20 [70.34]	27 [686]	48 [1219]	9.0 [.84]	18

GROSS COIL PERFORMANCE

NOMINAL TONS [kW]	NOMINAL BTUH		NOMINAL CFM [L/s]	VELOCITY FPM
	STEAM	WATER		
7 1/2 [26.38]	242,500	185,000	3,000 [1416]	600
10 [35.17]	285,000	240,000	4,000 [1888]	800
15 [52.75]	465,000	375,000	6,000 [2832]	667
20 [70.34]	540,000	464,000	8,000 [3776]	888

1. Entering air temperature @ 60°F
2. Entering steam @ 5 PSIG
3. Entering water @ 200°F
4. Face velocity = $\frac{\text{CFM}}{\text{Face Area}}$

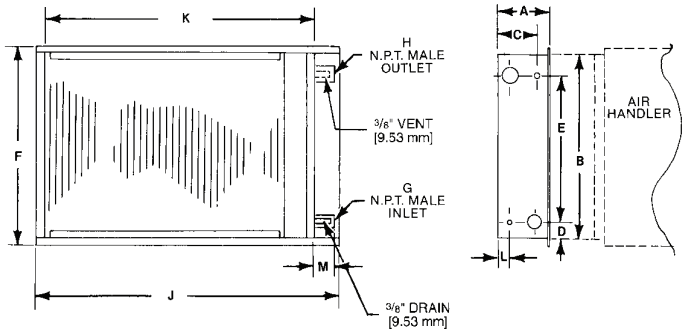
STEAM COIL



STEAM COIL COIL DIMENSIONS—INCHES [mm]

MODEL	NOMINAL TONS [kW]	A	B	C	D	E	F	G	H	J	K	L	M
RXHC-C74	7 1/2 [26.38]-10 [35.17]	9 1/16 [230]	21 3/8 [543]	5 3/8 [137]	3 3/16 [81]	15 [381]	24 [610]	1 1/2 [38]	1 1/4 [32]	51 1/2 [1308]	47 5/8 [1210]	2 13/16 [71]	3 1/4 [83]
RXHC-C76S	15 [52.75]-20 [70.34]	9 1/16 [230]	30 7/8 [784]	5 3/8 [137]	3 3/16 [81]	24 [610]	35 [889]	2 [51]	1 1/2 [38]	59 1/2 [1511]	55 5/8 [1413]	2 13/16 [71]	3 1/2 [89]

HOT WATER COIL



HOT WATER COIL DIMENSIONS—INCHES [mm]

MODEL	NOMINAL TONS [kW]	A	B	C	D	E	F	G	H	J	K	L	M
RXHC-C74W	7 1/2 [26.38]-10 [35.17]	9 1/16 [230]	21 3/8 [543]	5 3/8 [137]	3 3/16 [81]	15 [381]	24 [610]	1 1/4 [32]	1 1/4 [32]	51 1/2 [1308]	47 5/8 [1210]	2 13/16 [71]	3 [76]
RXHC-C76W	15 [52.75]-20 [70.34]	9 1/16 [230]	30 7/8 [784]	5 3/8 [137]	3 3/16 [81]	24 [610]	35 [889]	1 1/2 [38]	1 1/2 [38]	59 1/2 [1511]	55 5/8 [1413]	2 13/16 [71]	3 1/4 [83]

[ ] Designates Metric Conversions

6.0 MAINTENANCE

For continuing high performance, and to minimize possible equipment failures, it is essential that periodic maintenance be performance on this equipment. This section provides general guidelines on what items require periodic maintenance and the recommended frequency for maintenance.

6.1 AIR-FILTERS

Check the system filter every 30-90 days or as often as found to be necessary depending on the application. Clean or replace filters if found to be obstructed. New filters are available from a local distributor or industrial supply store.

A qualified installer, service agency or HVAC professional should change the filters or instruct the building owner's maintenance personnel on how to access and change/clean the filters and how often this maintenance must should be performed.

IMPORTANT: Do not operate the system without a filter in place as this will result in lint and contaminants accumulating on the coil resulting in reduced performance and possible icing of the coil.

6.2 COIL, DRAIN PAN, DRAIN LINE

Inspect the indoor coil, drain pan, and drain line once each year for cleanliness and clean as necessary. Remove the filters and check the return side of the coil for lint and contaminants and flashlight.

IMPORTANT: Do not use caustic household drain cleaners with bleach in the condensate pan or near the indoor coil. Drain cleaners will quickly damage the indoor coil and condensate pan.

6.3 BLOWER LUBRICATION & CLEANING

The ball bearing motor is pre-lubricated and does not require the addition of grease at time of installation. However, periodic cleaning out and renewing the grease in ball bearings may be necessary. Please note that extreme care must be exercised to prevent foreign matter from entering the bearing.

Over time, dust and contaminants may collect on the motor, especially if the air-filters have not been replaced or cleaned on a regular basis. The motor should be inspected annually and the exterior surface should be cleaned as needed and the air vents vacuumed out to remove any obstruction.

6.4 BLOWER SHAFT BEARINGS, BEARING COLLAR SET SCREWS, BLOWER WHEEL, SHEAVES, & BLOWER DRIVE BELT(S)

Inspection of the blower shaft bearings, bearing collar set screws, blower wheel, and the blower drive belt(s) is recommended every 6 months. Check bearing-collar set screws on the blower shaft to make sure they are still tight. Check the blower shaft bearings for smooth operation and lubricate or replace bearings if necessary. Inspect the blower wheel for accumulation of lint and contaminants or damage. Remove blower wheel and clean or replace if necessary. Inspect the motor and blower sheaves for excessive wear or damage and check set-screws or D bushing bolts for tightness. Replace sheaves and tighten screws and bolts as necessary. Check alignment of sheaves and adjust if necessary. Inspect the blower drive belt(s) for wear and proper tension. Replace the belt(s) and re-adjust the tension if necessary.

6.5 MOTOR REPLACEMENT

Only replace the blower motor with one with the equivalent voltage, horsepower rating, amp rating, and NEMA frame size to maintain factory performance and reliability.

6.6 REPLACEMENT PARTS

Any replacement part used to replace parts originally supplied on equipment must be the same as or an approved alternate to the original part supplied. The manufacturer will not be responsible for replacement parts not designed to physically fit or operate within the design parameters the original parts were selected for.

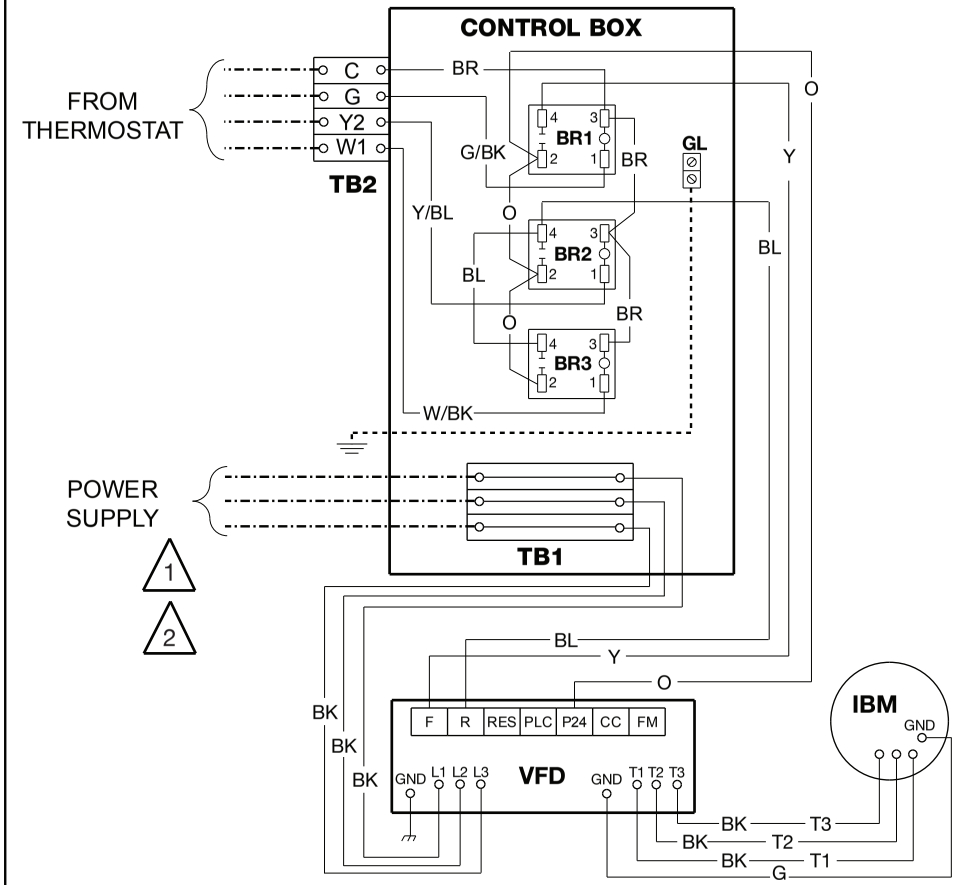
These parts include but are not limited to: Heater controls, heater limit controls, heater elements, motor, motor capacitor, blower contactor, blower wheel, indoor coil, sheaves, blower shaft, bearings, and sheet metal parts.

When ordering replacement parts, it is necessary to order by part number and include with the order the complete model number and serial number from the unit data plate. (See Parts List for unit component part numbers).

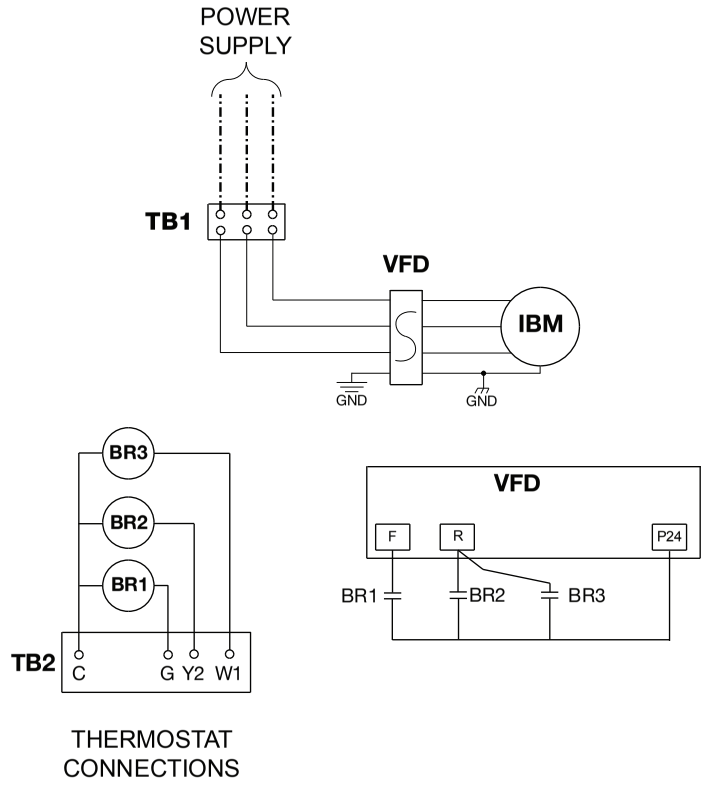
7.0 DIAGNOSTICS

Problem	Possible Cause (Suggested Fix)
Blower motor will not operate or no air-flow	• Failed run capacitor (H voltage only) • Failed motor (replace) • Loose wiring connection or broken wire (check connections & wiring) • Failed transformer on outdoor unit (replace) • Circuit breaker or fuse is turned off or has tripped due to overcurrent or shorted circuit (check for shorts, reset breaker) • Belt loose, broken, or off (adjust or replace belt) • Corrupted VFD program (reprogram) • Failed VFD (replace)
Excessive vibration	• Blower wheel out of balance (replace or clean blower wheel)
Water overflowing drainpan	• Plugged drain (clear drain) • Unit not level (level unit)
Electric heater not heating properly or not heating at all, but blower motor is operating	• Over temperature limit has tripped (check for low air-flow) • Over temperature limit has failed (replace) • Contactor has failed (replace) • One or more heating elements have burned out (replace)
Coil is frozen up	• System low on refrigerant charge (check for leaks and adjust charge) • Dirty return air filter (replace filter) • Inadequate air-flow due to incorrect blower sheave adjustment (adjust sheave to achieve proper air-flow) or excessively restrictive duct system (correct duct system) • Belt loose, broken, or off (adjust or replace belt)
Excessive air-flow	• Incorrect blower sheave adjustment (adjust sheave to achieve proper air-flow)
Water blow-off from coil	• Excessive air-flow (adjust sheave to achieve proper air-flow) • Contaminants on coil fans (clean coil) • Damaged coil fins (comb out fins or replace coil)
TXV not controlling properly	• TXV bulb not positioned correctly or clamp not tight (Check position of TXV sensing bulb and tightness of clamp) • Failed TXV (replace) • Plugged TXV inlet screen (clean or replace screen or replace TXV)

WIRING DIAGRAM



WIRING SCHEMATIC



WIRING INFORMATION

LINE VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED

LOW VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED

REPLACEMENT WIRE
-MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105°C. MIN.)

WARNING
-CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., NATIONAL WIRING REGULATIONS, AND LOCAL CODES AS APPLICABLE.

NOTES

1. SUPPLY WIRE MUST BE RATED AT 75°C MIN. SEE INSTRUCTIONS FOR SIZE.
2. POWER SUPPLY MUST MATCH VOLTAGE, PHASE AND HERTZ SHOWN ON RATING PLATE.

COMPONENT CODES

BR	BLOWER RELAY
GL	GROUND LUG
GND	GROUND
IBM	INDOOR BLOWER MOTOR
TB	TERMINAL BLOCK
VFD	VARIABLE FREQUENCY DRIVE

WIRE COLOR CODE

BK.....BLACK	G.....GREEN	PR.....PURPLE
BR.....BROWN	GY.....GRAY	R.....RED
BL.....BLUE	O.....ORANGE	W.....WHITE
		Y.....YELLOW

ELECTRICAL WIRING DIAGRAM

COMMERCIAL
VFD AIR-HANDLER

APPROVED:	CHECKED:	ORIGINAL RELEASE NO.: H-1032S000
MODELED BY: TEW	DATE: 05-01-17	
PART NO.: 90-106710-01		REV: 00

97B0136N01 | CM 0418

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