

INSTALLATION INSTRUCTIONS

(50 HZ & 60 HZ MODELS)

(-)BHC ELECTRIC FURNACE
ELECTRIC HEAT WITH OR WITHOUT
INDOOR COOLING COIL

(-)BHC FAN COIL UNIT
WITHOUT ELECTRIC HEAT WITH OR
WITHOUT INDOOR COOLING COIL

(-)BHC HEAT PUMP AIR HANDLERS
WITH OR WITHOUT ELECTRIC HEAT



(60 HZ DOMESTIC
MODELS ONLY)



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 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.

**FIGURE 1
MODEL NUMBER EXPLANATION**

(-)	B	H	C	17	J	11	S	F	D	H	Additional Inform.
Trade Name	Blower Unit	Type Unit	Design Series	Nom. Cab. Width [mm]	Electrical Designations	Electrical Heat [Kw] Designation See Electrical Heat Data for Actual KW at 208 Volts.	Control Designation	Airflow Direction	Coil Code	High Static Motor Option	Motor H.P. [W] Blower CFM [L/s] Lo/Hi Speed Blower Wheel Dia./Width [mm] Filter Size Width/Length [mm] Nominal Outdoor Unit Size
		H = Air Handler		14 17 21 24	A = 115V, 1PH, 60HZ J = 208/240V, 1PH, 60HZ C = 208/240V, 3PH, 60HZ D = 480V, 3PH, 60HZ (Some D Models Are 1PH) T = 220/240V, 1PH, 50HZ N = 380/415V, 3PH, 50HZ	00 = No Heat 06 = 4.9 kW 07 = 7.0 kW 09 = 9.8 kW 11 = 10.0 kW 13 = 12.5 kW 14 = 14.0 kW 18 = 17.5 kW 20 = 20.0 kW 21 = 21.0 kW 25 = 25.0 kW	M = Circuit Breakers Multi-Supply Circuit N = No Circuit Breakers Single Supply Circuit S = Circuit Breaker(s) Single Supply Circuit	F = Front Upflow Connection Options	A = w/o Coil With Casing	Available On 24.5" Wide Cabinet Only	
				14 14.0" [356]	A, J, or T	00	N		A = No Coil D = RCBA-2457 E = RCGA-24A1 F = RCGA-24A2 G = RCHA-24A1 H = RCHA-24A2	High Static Motor Not Available	1/6 H.P. [124] LO-600 CFM [142] HI-800 CFM [378] 11.9 x 3.81 [302 x 97] 12.75 x 21 [324 x 533] -018 -024
				17 17.5" [445]	A	00	N		A = No Coil D = RCBA-3765 E = RCGA-37A1 F = RCGA-36A2 G = RCHA-36A1 H = RCHA-36A2	High Static Motor Not Available	1/4 H.P. [186] LO-1000 CFM [472] HI-1200 CFM [566] 11.9 x 5.29 [302 x 134] 16.25 x 21 [413 x 533] -030 -036
				21 21.0" [533]	J or T	00, 06, 07, 11 06, 07, 11, 14	N S	H = Horizontal Left Front Connection Option	A = No Coil C = RCBA-4882 E = RCGA-48A1 G = RCHA-48A1	High Static Motor Not Available	1/3 H.P. [249] LO-1400 CFM [661] HI-1600 CFM [755] 11.9 x 7.12 [302 x 181] 19.75 x 21 [502 x 533] -042 -048
				24 24.5" [622]	A	00	N		A = No Coil B = RCBA-6089 E = RCGA-60A1 G = RCHA-60A1	Blank = Std Motor H = High Static Motor	1/2 H.P. [373] LO-1800 CFM [850] (2-Speed Only) HI-2000 CFM [944] 11.9 x 9.50 [302 x 241] 23.25 x 21 [591 x 533] -060 -065
					J or T	00, 11 11, 14, 18, 21	N S				
					C	11, 14* 18, 21*	S M				
					D or N	1PH 09-3PH, 16-3PH, 21-3PH	N				

- NOTES:**
- Coil piston size indicated by last two digits of RCBA- coil model number.
 - Electric heater BTUH = (heater watts + motor watts) x 3.412 (See airflow table for motor watts).
 - Models with **BOLD** numerals in the electrical heater (kw) column, have watt restrictor and defrost heat controls.
 - Electric heat models with one asterisk "*" represent 3 phase models with unbalanced loads.

[] Designates Metric Conversions

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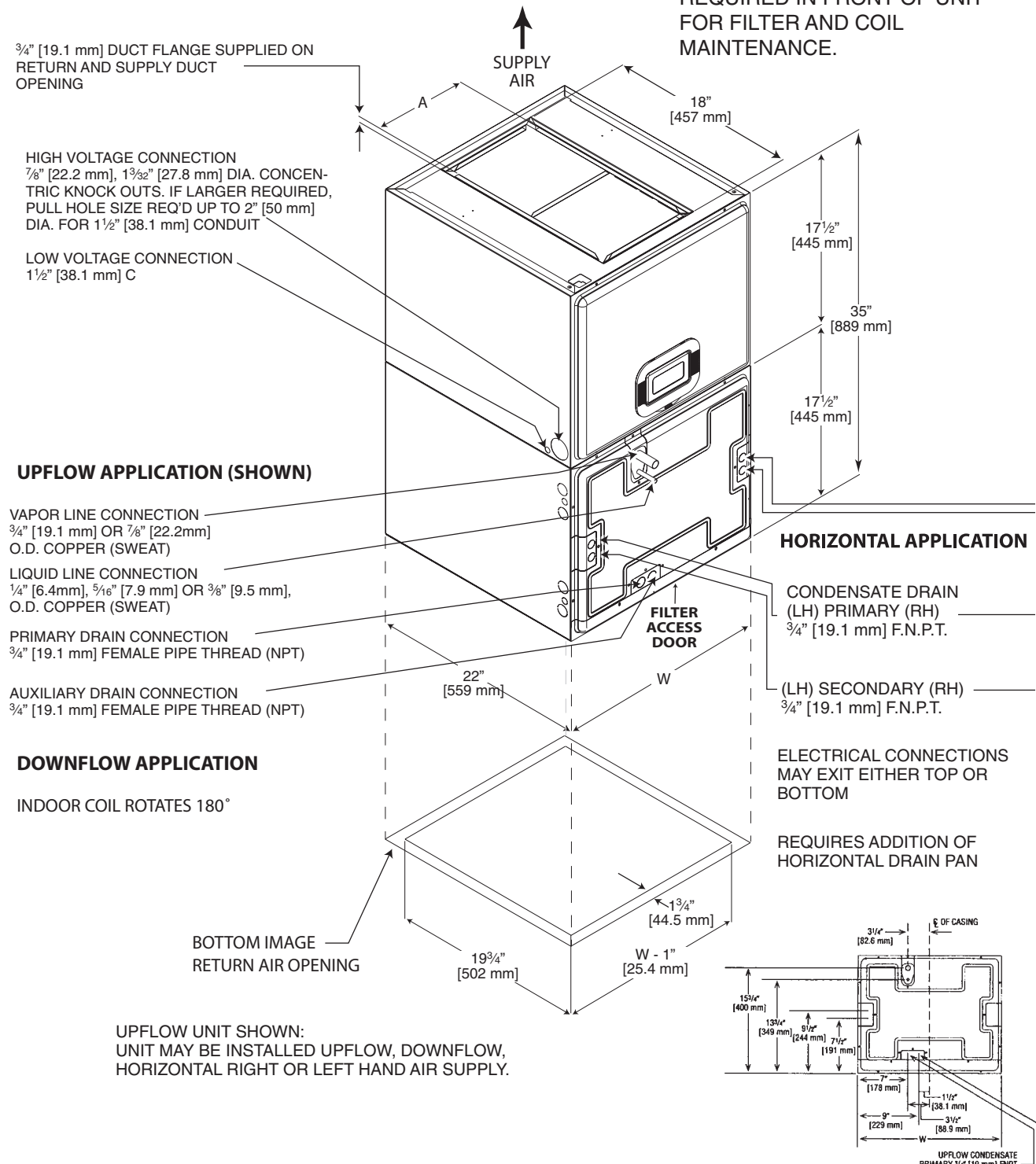
RECEIVING

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 papers, and a damage claim filed with the last carrier.

- After unit has been delivered to job site, remove carton taking care not to damage unit.
- Check the unit rating plate for unit size, electric heat, coil, voltage, phase, etc. to be sure equipment matches what is required for the job specification.
- Read the entire instructions before starting the installation. This is particularly important if this is the first installation for this specific model series.

**FIGURE 2
DIMENSIONS AND WEIGHTS**

**NOTE: 24" [609.6 mm] CLEARANCE
REQUIRED IN FRONT OF UNIT
FOR FILTER AND COIL
MAINTENANCE.**



Unit Dimensions & Weights

Model Number SBHC-	Unit Width "W" In. [mm]	Supply Duct "A" In. [mm]	Unit Weight/Shipping Weight (Lbs.) [kg]		
			Unit Width Coil (Max. kW)	Unit Without Coil	Unit Without Coil Casing
14	14 [356]	6 3/32 [155]	81/88 [37/40]	66/73 [30/33]	49/54 [22/24]
17	17 1/2 [445]	7 9/16 [192]	92/99 [42/45]	72/79 [33/36]	53/59 [24/27]
21	21 [533]	9 7/16 [240]	109/117 [49/53]	83/91 [38/41]	63/69 [29/31]
24	24 1/2 [622]	11 3/4 [298]	125/134 [57/61]	93/102 [42/46]	71/78 [32/35]

NOTE: Subtract 1.5 lbs. [68 kg] for each heater element less than maximum

GENERAL

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

▲ WARNING

PROPOSITION 65: THIS APPLIANCE CONTAINS FIBERGLASS INSULATION. RESPIRABLE PARTICLES OF FIBERGLASS ARE KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

▲ 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.

▲ CAUTION

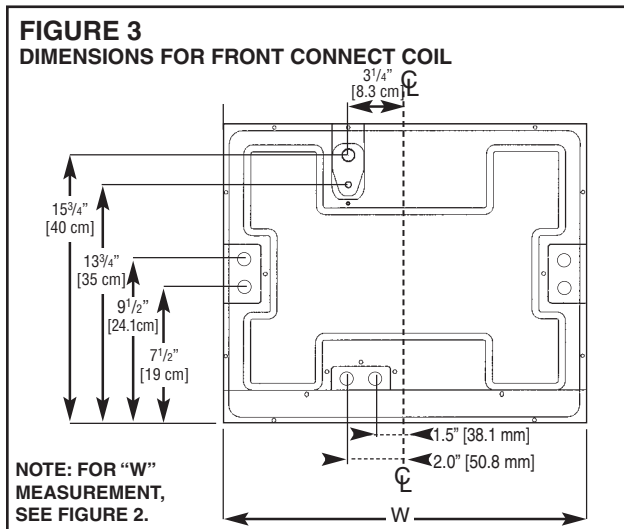
When installing a unit with cooling coil over a finished ceiling and/or living space, installation of a secondary field fabricated drain pan under the entire unit, to avoid damage to ceiling, is recommended.

▲ 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

BECAUSE OF POSSIBLE DAMAGE TO EQUIPMENT OR PERSONAL INJURY, INSTALLATION, SERVICE AND MAINTENANCE SHOULD BE PERFORMED BY A TRAINED, QUALIFIED SERVICE PERSON. CONSUMER SERVICE IS RECOMMENDED ONLY FOR FILTER CLEANING/REPLACEMENT. NEVER OPERATE THE UNIT WITH THE ACCESS PANELS REMOVED.



▲ WARNING (SEE WARNINGS IN REGARD TO DUCTWORK)

DO NOT INSTALL THIS UNIT IN MANUFACTURED (MOBILE) HOMES. IMPROPER INSTALLATION IS MORE LIKELY IN MANUFACTURED HOUSING DUE TO DUCTWORK MATERIAL, SIZE, LOCATION, AND ARRANGEMENT. INSTALLATIONS IN MANUFACTURED HOUSING CAN CAUSE A FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

EXCEPTION: MANUFACTURED HOUSING INSTALLATIONS ARE APPROVED ONLY WITH DOCUMENTATION BY A RECOGNIZED INSPECTION AUTHORITY THAT THE INSTALLATION HAS BEEN MADE IN COMPLIANCE WITH THE INSTRUCTIONS AND ALL WARNINGS HAVE BEEN OBSERVED.

▲ CAUTION

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

- Some building codes require extra cabinet insulation and gasketing when unit is installed in attic applications.
- If installed in an unconditioned space, apply caulking around the 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. Caulking is required to prevent air leakage into and condensate from forming inside the unit, control box, and on electrical controls.
- Install the unit in such a way as to allow free access to the coil/filter compartment and blower/control compartment.
- Install the unit in a level position to ensure proper condensate drainage. Make sure unit is level in both directions within 1/8" [3.18 mm].
- Install the unit in accordance with any local code which may apply and the national codes. Latest editions are available from: "National Fire Protection Association, Inc., Batterymarch Park, Quincy, MA 02269." These publications are:
 - ANSI/NFPA No. 70-(Latest Edition) National Electrical Code.
 - NFPA90A Installation of Air Conditioning and Ventilating Systems.
 - NFPA90B Installation of warm air heating and air conditioning systems.
- The equipment has been evaluated in accordance with the Code of Federal Regulations, Chapter XX, Part 3280.

UNIT CONFIGURATION

All units are modular construction allowing installer to disassemble unit into two 17-1/2" [444.5 mm] high components, coil casing and blower unit, for ease of installation, then reassemble in location.

TO DISASSEMBLE:

Remove both access panels and remove six screws holding coil casing to blower unit, lift blower unit from coil casing.

TO REASSEMBLE:

To attach coil casing to blower unit, make sure 3/4" [19.1 mm] flanges on back and sides of return air opening of blower casing are bent along perforated edge to inside of casing. Clearance holes in flange should match up with drive holes on inside of blower casing. Make sure 3/4" [19.1 mm] flanges on coil casing are bent up (back and 2 sides only) on supply air side of coil casing along perforated edge. Do not bend flange on front of coil casing. Set supply air side of coil casing (3/4" flanges) into return air opening of blower casing. Replace 6 - #8 screws through flange in coil casing, flange in blower casing and into drive holes on inside of blower casing, two screws in back and two screws in each side. Do not overtighten sheet metal screws, they will strip easily if overtightened.

IMPORTANT: Configure the unit with the indoor coil casing installed on inlet (return) side of the blower section. Do not try to configure unit with indoor coil on discharge (supply) side of blower section.

CLEARANCES

- All units are designed for 0" clearance to combustible material on all cabinet surfaces.
- Some units require supply duct clearances and combustible floor bases depending on the heating kW. The following table should be used to determine these requirements:

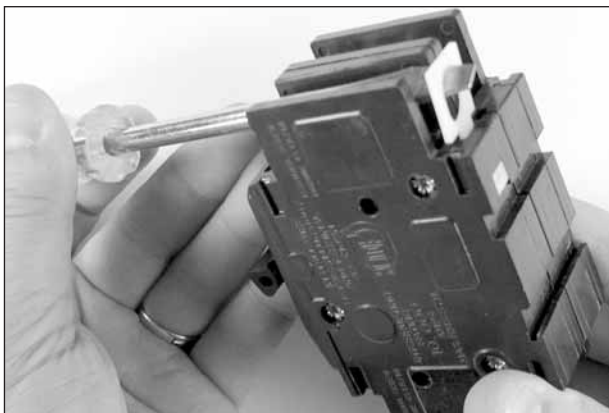
Model Cabinet Size	14	17	21	24
Model Designation kW	06	15	25	25

Units with electric heating kW above that listed in the table require a one inch clearance to combustible material for the first three feet of supply plenum and ductwork. **Additionally, if these units are installed downflow, a combustible floor base is required.**

Units with electric heating kW equal to or less than the values listed in the table do not require supply ductwork clearances or combustible floor bases.

- vertical units require clearance on at least one side of the unit for electrical connections. Horizontal units require clearance on either top or bottom for electrical connections. Refrigerant and condensate drain connections are made on the front of the unit.
- All units require 24 inches [609.6 mm] free access to the front of the unit for service.
- These units may be installed in either ventilated or non-ventilated spaces.

**FIGURE 4
ROTATING CIRCUIT BREAKER**



VERTICAL UPFLOW

- Electrical connections can be made from either the left or right side of the unit. Refrigerant and condensate drain connections are made on the front of the unit (see Figures 2 & 3).
- If a side or back return air opening is required, field fabricate a return air plenum with an opening large enough to supply unit and strong enough to support unit weight.
- If return air is to be ducted, install duct flush with floor. Use fireproof resilient gasket 1/8" [3.2 mm] to 1/4" [6.4 mm] thick between duct, unit and floor. Set unit on floor over opening.

▲ WARNING

IF UNIT IS TO BE INSTALLED WITHOUT AN INDOOR COIL, RETURN DUCT OR PLENUM, IT MUST NOT BE INSTALLED DIRECTLY OVER COMBUSTIBLE MATERIAL. IF INSTALLED WITHOUT AN INDOOR COIL WITH A RETURN DUCT OR PLENUM, THE AIR PLENUM OR DUCT MUST HAVE A SOLID SHEET METAL BOTTOM WITH NO RETURN AIR OPENINGS, REGISTERS OR FLEXIBLE AIR DUCTS LOCATED DIRECTLY UNDER THE UNIT. EXPOSING COMBUSTIBLE MATERIAL TO THE RETURN OPENING OF AN UPFLOW UNIT WITHOUT AN INDOOR COIL CAN CAUSE A FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

VERTICAL DOWNFLOW

Conversion to Vertical Downflow: A vertical upflow unit may be converted to vertical downflow. (See Figures 2, 3 & 4)

- Remove the indoor coil.
- Rotate unit into the downflow position, with the coil compartment on top and the blower compartment on bottom. **NOTE:** In the vertical downflow position, the internal filter is no longer in the "toolless access" position, therefore the coil door must be removed for filter maintenance.
- Reinstall the indoor coil in its new position (see Figure 6).
- Rotate the circuit breaker(s) 180° (see instructions for rotating breaker(s) that follow).

IMPORTANT: To comply with certification agencies and the National Electric Code, units with circuit breaker(s) on vertical units must have circuit breakers installed so that the breaker switch "on" position and marking is up and, "off" position and marking is down.

- To turn breaker(s): Rotate one breaker pair (circuit) at a time starting with the one on the right. Loosen both lugs on the load side of the breaker. Wires are bundles with wire ties, one bundle going to the right lug and one bundle going to the left lug.
- Using a screwdriver or pencil, lift white plastic tab with hole away from breaker until breaker releases from mounting opening (see Figure 4).
- With breaker held in hand, rotate breaker so that "on" position is up, "off" position is down with unit in planned vertical mounting position. Insert right wire bundle into top right breaker lug, ensuring all strands of all wires are inserted fully into lug, and no wire insulation is in lug.
- Tighten lug as tight as possible while holding circuit breaker. Check wires and make sure each wire is secure

and none are loose. Repeat for left wire bundle in left top circuit breaker lug.

- Replace breaker by inserting breaker mounting tab opposite white pull tab in opening, hook mounting tab over edge in opening.
- With screwdriver or pencil, pull white tab with hole away from breaker while setting that side of breaker into opening. When breaker is in place, release tab, locking circuit breaker into location in opening.
- Repeat above operation for remaining breaker(s) (if more than one is provided).
- Replace single point wiring jumper bar, if it is used, on line side of breaker and tighten securely.
- Double check wires and lugs to make sure all are secure and tight. Check to make sure unit wiring to circuit breaker load lugs match that shown on the unit wiring diagram.
- Electrical connections can be made from either the left or right side of the unit. Refrigerant and condensate drain connections are made on the front of the unit (see Figure 2).
- RXBB-AA combustible floor base is used for all unit sizes. Unit must be centered on combustible base in the width dimension (14³/₈" [365 mm]).

▲ WARNING

THE RXBB-AA COMBUSTIBLE FLOOR BASE IS REQUIRED WHEN SOME UNITS WITH ELECTRIC HEAT ARE APPLIED DOWNFLOW ON COMBUSTIBLE FLOORING. FAILURE TO USE THE BASE CAN CAUSE A FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH. SEE CLEARANCES FOR UNITS REQUIRING A COMBUSTIBLE FLOOR BASE.

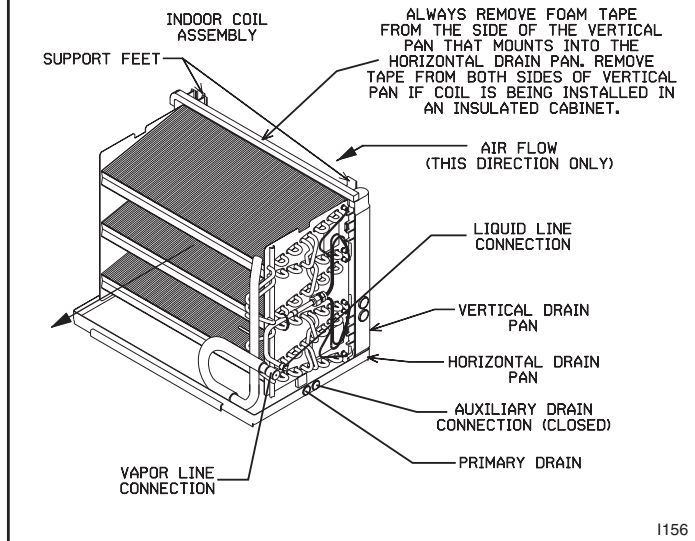
▲ WARNING

THE FIRST 36 INCHES [91.4 CM] OF SUPPLY AIR PLENUM AND DUCTWORK MUST BE CONSTRUCTED OF SHEET METAL AS REQUIRED BY NFPA 90B. THE SUPPLY AIR PLENUM OR DUCT MUST HAVE A SOLID SHEET METAL BOTTOM DIRECTLY UNDER THE UNIT WITH NO OPENINGS, REGISTERS OR FLEXIBLE AIR DUCTS LOCATED IN IT. 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. METAL PLENUM OR DUCT MAY BE CONNECTED TO THE COMBUSTIBLE FLOOR BASE, IF NOT, IT MUST BE CONNECTED TO THE UNIT SUPPLY DUCT FLANGES SUCH THAT COMBUSTIBLE FLOOR OR OTHER COMBUSTIBLE MATERIAL IS NOT EXPOSED TO THE SUPPLY AIR OPENING FROM THE DOWNFLOW UNIT. EXPOSING COMBUSTIBLE (NON-METAL) MATERIAL TO THE SUPPLY OPENING OF A DOWNFLOW UNIT CAN CAUSE A FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

EXCEPTIONS TO DOWNFLOW WARNINGS:

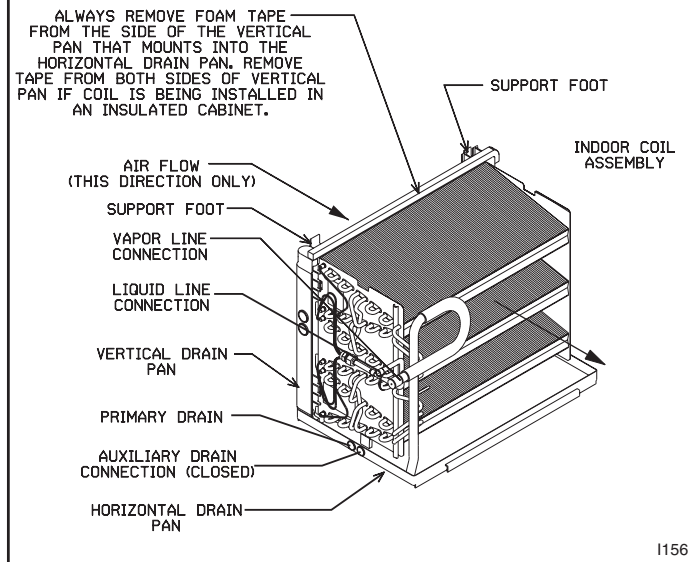
- INSTALLATIONS ON CONCRETE FLOOR SLAB WITH SUPPLY AIR PLENUM AND DUCTWORK COMPLETELY ENCASED IN NOT LESS THAN 2 INCHES [50.8 MM] OF CONCRETE (SEE NFPA 90B).

**FIGURE 5
INDOOR COIL AND DRAIN PAN SET-UP
HORIZONTAL LEFT-HAND AIR SUPPLY**



1156

**FIGURE 6
INDOOR COIL AND DRAIN PAN SET-UP
HORIZONTAL RIGHT-HAND AIR SUPPLY**



1156

- INSTALLATIONS OF UNITS WITHOUT ELECTRIC HEATERS.

HORIZONTAL

Units with an "H" (left-hand air supply) in the airflow direction position in the model number are factory configured for installation in the horizontal position.

Conversion to Horizontal: A vertical upflow unit may be converted to horizontal by removing the indoor coil and installing horizontal drain pan on coil as shown for right hand or left hand air supply. Reinstall coil in unit as shown for right or left hand air supply. See Figures 5 & 6.

Conversion in Horizontal Direction: Horizontal left-hand supply can be changed to horizontal right-hand supply by removing the indoor coil and installing the drain pan as shown in figures 5 & 6 for appropriate air supply direction.

▲ CAUTION

HORIZONTAL UNITS MUST BE CONFIGURED FOR RIGHT HAND AIR SUPPLY OR LEFT HAND AIR SUPPLY. HORIZONTAL DRAIN PAN MUST BE LOCATED UNDER INDOOR COIL. FAILURE TO USE THE DRAIN PAN CAN RESULT IN PROPERTY DAMAGE.

Horizontal Drain Pan Model RXBD-CB: This drain pan is used on all coil models and fits all unit sizes either right or left hand air supply.

- Install horizontal drain pan as shown for right hand or left hand supply. Drain pan connections must be toward front of coil (header connection end). Install coil assembly into horizontal pan as shown with coil endplates fitting into "V" shaped supports in the front and back of the horizontal pan. Mounting tabs on vertical drain pan fit over the air inlet side of the horizontal pan with vertical pan inside horizontal drain pan. Horizontal pan must be under indoor coil when in the installed position. Note primary and auxiliary drain pan positions for horizontal right vs. horizontal left. Drain connection with 3/4" [19.1 mm] hole must be connected to primary drain. connection with 3/8" [9.5 mm] knockout is the auxiliary drain connection.
- Electrical connections may be made from the top or bottom of the unit. Refrigerant and condensate drain connections must be made on the front of the unit. (See unit dimensions and horizontal right hand supply and horizontal left hand supply figures.)

IMPORTANT: Units cannot be installed horizontally laying on or suspended from the back of the unit. Horizontal units must be supported or suspended from one side or the other when in the horizontal position.

- Support along the length of the unit, all units installed horizontally. Do not support or suspend unit from both ends without support in the center of the cabinet. If unit is to be supported or suspended from corners, run two reinforcing rails length of unit and support or suspend from reinforcing rails.

NOTE: When converting a vertical upflow to horizontal, the foam tape must be removed from both sides of the vertical pan going into the horizontal pan. When converting a horizontal left-hand to horizontal right-hand, the foam tape must be moved to the appropriate location.

▲ WARNING

THE SUPPLY AIR PLENUM OR DUCT MUST HAVE A SOLID SHEET METAL BOTTOM WITH NO SUPPLY AIR OPENINGS, REGISTERS OR FLEXIBLE AIR DUCTS LOCATED IN IT FOR THE FIRST 36 INCHES [91.4 CM] OF HORIZONTAL SURFACE ON UNITS WITH ELECTRIC HEATERS. FAILURE TO OBSERVE SUPPLY PLENUM, DUCT WARNINGS CAN CAUSE A FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

ELECTRICAL WIRING

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

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.

- If required, install a branch circuit disconnect of adequate size, located within sight of, and readily accessible to the unit.
- Units with factory installed circuit breaker(s) meet UL and CSA requirements as a service disconnect and should make above requirement for a field installed branch circuit disconnect unnecessary.
- **IMPORTANT:** Units may be equipped with one, two, or three 60 amp. circuit breakers. These breaker(s) protect the internal wiring in the event of a short circuit and serve as a disconnect. Circuit breakers installed within the unit do not provide over-current protection of the supply wiring and therefore may be sized larger than the branch circuit protection.
- Supply circuit power wiring must be 75°C minimum copper conductors only. See electrical data for ampacity, wire size and circuit protector requirement. Supply circuit protective devices may be either fuses or "HACR" type circuit breakers.
- Power wiring may be connected to either the right or left side (vertical) top or bottom (horizontal). A 7/8" [22 mm], 1-3/32" [28 mm] dia. concentric knockout is provided for connection of power wiring to unit. If a larger opening is required, dependent upon kW electric heat supplied, pull appropriate size hole required for conduit size being used. Using a conduit hole punch (Greenlee type), center punch using outside cabinet around 7/8" [22 mm] knockout as a template to center punch location and pull desired hole size. Holes may be pulled for any size conduit up to a 2" [50.8 mm] hole for 1-1/2" [38.1 mm] conduit.
- Power wiring is connected to either the power terminal block or circuit breaker(s) in unit control compartment.
- Single phase units above 10.5 kW may be supplied with circuit breaker(s) requiring separate supply circuits. Units come standard with a jumper bar assembly connecting separate circuits into one single supply circuit (excluding 18 kW and 21 kW "C" voltage units).
- Jumper bar assemblies are connected to the line side lugs of the circuit breakers. Jumper bar is assembled for left (upflow) cabinet power wiring entrance. To convert to right (upflow) power entrance: Remove jumper cover, remove jumper bar from circuit breakers, remove screw on back holding left lug in upper hole to bar, reassemble lug in lower hole and retighten screw. Use the same procedure to move the right lug to the upper mounting hole. Reassemble jumper bar into circuit breakers and tighten lugs. Jumper bar is now ready for wiring from the opposite side.
- If a factory supplied jumper bar for single supply circuit is removed from unit to make multiple supply circuits the line side of the individual circuit breakers must be covered with finger safe covers. (See information on accessories for part numbers.)
- After wiring is complete, make sure finger safe cover(s) are replaced over circuit breaker(s) lugs covering lug where field connections are made. On units with jumper bar, make sure jumper bar cover is replaced and secured in place. Covers provided for jumper bar must have side of cover broken off on the side wiring has been connected so that field supply will clear under appropriate side of cover. Units with circuit breakers must have covers in place to meet requirements as a service disconnect.

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.

- Low voltage control wiring should be 18 AWG. color-coded (105°C minimum). For lengths longer than 100 ft. [305 m], 16 Awg. wire should be used.

- Control wiring should be routed through 1/2" [12.7 mm] dia. knockout near power wiring entrance on either left or right side of unit. After opening selected knockout, install bushing (supplied in parts bag) in openings.
- If control wiring is routed through right side (upflow), it must be routed through extruded holes in lower front of blower housing behind power raceway to the left side of blower housing. If routed through left side (upflow), it should be routed through extruded hole in lower front left blower side.
- Field control connections are made to low voltage pig-tails extending from right side of control compartment (upflow position). Connections for control wiring are made with wire nuts.
- See wiring diagrams attached to indoor and outdoor sections to be connected and control wiring diagram booklet supplied with outdoor heat pump section.
- Do not leave excess field control wiring inside unit, pull excess control wire to outside of unit and provide strain relief for field control wiring on inside of cabinet at point wiring penetrates cabinet.

- Make sure, after installation, separation of control wiring and power wiring has been maintained.

GROUNDING

▲ WARNING

THE UNIT MUST BE PERMANENTLY GROUNDED. FAILURE TO DO SO CAN RESULT IN ELECTRICAL SHOCK CAUSING PERSONAL INJURY OR DEATH.

- Grounding may be accomplished by grounding metal conduit when installed in accordance with electrical codes to the unit cabinet.
- Grounding may also be accomplished by attaching ground wire(s) to ground lug(s) provided in the unit wiring compartment.
- Ground lug(s) are located close to wire entrance on left side of unit (upflow). Lug(s) may be moved to marked locations near wire entrance on right side of unit (upflow), if alternate location is more convenient.
- Use of multiple supply circuits require grounding of each circuit to lug(s) provided in unit.

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

S U P P L Y	L E N G T H	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	2	1	0	00
		100 [30]	14	12	10	10	8	8	6	6	6	4	4	3	3	2	2	1	0	00
		50 [15]	14	12	10	10	8	8	6	6	6	4	4	3	3	2	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 75°C MINIMUM RATING.
FOR MORE THAN 3 CONDUCTORS IN A RACEWAY OR CABLE, SEE
N.E.C. FOR DERATING THE AMPACITY OF EACH CONDUCTOR.

BLOWER MOTOR ELECTRICAL DATA (-)BHC SERIES - 60 HZ MODELS

Model Size/Elec. Designation	Voltage	Phase	Hertz	HP	RPM	Speeds	Circuit Amps	Min. Circuit Ampacity	Max. Circuit Protector
14A	115	1	60	1/6	900	2	3.2	4.0	15
17A	115	1	60	1/4	900	2	4.5	5.7	15
21A	115	1	60	1/3	900	2	7.2	9.0	15
24A	115	1	60	1/2	900	1	9.9	12.4	15
14J	200/230	1	50/60	1/6	900	2	1.3	1.7	15
17J	200/230	1	50/60	1/4	900	2	2.1	2.7	15
21J	200/230	1	50/60	1/3	900	2	3.2	4.0	15
24J	200/230	1	50/60	1/2	900	1	2.9	3.7	15
The above motors are also used on "C" electrical designation with electric heat.									
21D	480	1	60	1/3	900	2	1.5	1.9	15
24D	480	1	60	1/2	900	1	1.9	2.4	15

BLOWER MOTOR ELECTRICAL DATA (-)BHC SERIES - 50 HZ MODELS

Model Size/Elec. Designation	Voltage	Phase	Hertz	HP [W]	RPM	Speeds	Circuit Amps	Minimum Circuit Ampacity	Maximum Circuit Protector
14T	220/240	1	50/60	1/6 [124]	900	2	1.6	2.0	15
17T	220/240	1	50/60	1/4 [186]	900	2	2.5	3.2	15
21T	220/240	1	50/60	1/3 [249]	900	2	3.2	4.0	15
24T	220/240	1	50/60	1/2 [373]	900	1	3.7	4.7	15
21N	380/415	1	50	1/3 [249]	690	2	1.6	2.0	15
24N	380/415	1	50	1/2 [373]	690	1	1.9	2.4	15
24N 2 SPD	380/415	1	50	1/2 [373]	900	2	1.2	1.5	15
24N-H 2 SPD	380/415	1	50	1/2 [373]	825	2	2.2	2.8	15
24T 2 SPD	220/240	1	50	1/2 [373]	900	2	2.9	3.7	15
24T-H 2 SPD	220/240	1	50	1/2 [373]	825	2	3.7	4.7	15

Maximum Heater Elements

Model Cabinet Size	Max. Heater Elements	
	Number	kW
-14	3	11
-17	4	14
-21	5	18
-24	6	21

Electric Heat Electrical Data - 60 HZ MODELS

Model Elec./kW Designation	Heater kW 208/240V	PH/Hz	Heater No. /kW	Type Supply Circuit Single Circuit Multiple Circuit*	Circuit Amps.	Minimum Circuit Ampacity	Maximum Circuit Ampacity
J06	3.7/4.9	1/60	2/2.5	Single Circuit	20.9/23.6	26.2/29.5	30/30
J07	5.3/7.0	1/60	2/3.5	Single Circuit	28.5/32.4	35.7/40.5	40/45
J11	7.3/9.8	1/60	3/3.3	Single Circuit	38.4/43.8	48.0/54.8	50/60
J14	10.5/14.0	1/60	4/3.5	Single Circuit	53.8/61.6	67.3/77.0	70/80
				Multiple Ckt. 1	28.5/32.4	35.7/40.5	40/45
				Multiple Ckt. 2	25.3/29.2	31.7/36.5	35/40
J18	13.2/17.5	1/60	5/3.5	Single Circuit	66.4/76.2	83.0/95.3	90/100
				Multiple Ckt. 1	41.1/47.0	51.4/58.8	60/60
				Multiple Ckt. 2	25.3/29.2	31.7/36.5	35/40
J21	15.8/21.0	1/60	6/3.5	Single Circuit	79.0/90.8	98.8/113.5	100/125
				Multiple Ckt. 1	41.1/47.0	51.4/58.8	60/60
				Multiple Ckt. 2	37.9/43.8	47.4/54.8	50/60
C08	5.5/7.4	3/60	3/2.5	Single Circuit	18.2/20.5	22.8/25.7	25/30
C11	7.5/10.0	3/60	3/3.3	Single Circuit	23.7/26.9	29.7/33.7	30/35
C14	10.5/14.0	3/60	4/3.5	Single Circuit	36.5/41.7	45.7/52.2	50/60
C18	13.2/17.5	3/60	5/3.5	Multiple Ckt. 1	24.7/28.5	30.9/35.7	35/40
				Multiple Ckt. 2	21.9/25.3	27.4/31.7	35/35
C21	15.8/21.0	3/60	6/3.5	Multiple Ckt. 1	24.7/28.5	30.9/35.7	35/40
				Multiple Ckt. 2	21.9/25.3	27.4/31.7	30/35
480 Volts							
D09	9.8	3/60	3/3.3	Single Circuit	13.7	17.2	20
D16	14.7	3/60	6/2.5	Single Circuit	19.4	24.3	25
D21	21.0	3/60	6/3.5	Single Circuit	27.0	33.8	35

* Supply circuit protective devices may be fused or "HACR" type circuit breakers.

* If non-standard fuse size is specified, use next size larger standard fuse sizes.

* Unit shipped from factory wired for single circuit. Unit may be field converted to multiple supply circuit.

* Largest motor load is included in single circuit and circuit 1 multiple circuit.

* Heater loads are balanced on 3 PH. models with 3 or 6 heaters only.

Electric Heat Electrical Data - 50 HZ MODELS

Model Elec./kW Designation	Heater kW 208/240 V.	PH/Hz	Heater No./kW	Type Supply Circuit Single Circuit Multiple Circuit*	Circuit Amps.	Minimum Circuit Ampacity	Maximum Circuit Protector
T07*	5.9/7.0	1/50	2/3.5	Single Circuit	30.5/32.9	38.1/41.2	40/45
T11*	8.9/10.5	1/50	3/3.5	Single Circuit	43.8/47.5	54.8/59.4	60/60
T14*	11.8/14.0	1/50	4/3.5	Single Circuit	56.9/61.7	71.1/77.2	80/80
				Multiple Ckt. 1	30.2/32.6	37.7/40.7	40/45
				Multiple Ckt. 2	26.8/29.2	33.4/36.5	35/40
T18*	14.7/17.5	1/50	5/3.5	Single Circuit	70.6/76.7	88.3/95.9	90/100
				Multiple Ckt. 1	43.8/47.5	54.8/59.4	60/60
				Multiple Ckt. 2	26.8/29.2	33.5/36.5	35/40
T21*	17.6/21.0	1/50	6/3.5	Single Circuit	83.9/91.3	104.9/114.2	110/125
				Multiple Ckt. 1	43.8/47.5	54.8/59.4	60/60
				Multiple Ckt. 2	40.1/43.8	50.2/54.8	60/60
380/415V							
N08	6.2/7.4	3/50	3/2.5	Single Circuit	11.3/12.1	14.2/15.2	15/20
N11	8.8/10.5	3/50	3/3.5	Single Circuit	15.3/16.5	19.1/20.7	20/25
N15	12.3/14.7	3/50	6/2.5	Single Circuit	20.6/22.3	25.8/27.9	30/30
N16	13.2/15.7	3/50	2/2.6, 3/3.5	Single Circuit	26.9/29.1	33.7/36.4	35/40
N21	17.6/21.0	3/50	6/3.5	Single Circuit	28.7/31.2	35.9/39.0	40/40

* Supply circuit protective devices may be fused or "HACR" type circuit breakers.

* If non-standard fuse size is specified, use next size larger standard fuse sizes.

* Unit shipped from factory wired for single circuit. Unit may be field converted to multiple supply circuit.

* Largest motor load is included in single circuit and circuit 1 multiple circuit.

* Heater loads are balanced on 3 PH. models with 3 or 6 heaters only.

[] Designates Metric Conversion

DUCTWORK

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

▲ WARNING (SEE SPECIFIC AIRFLOW POSITION FOR ADDITIONAL WARNINGS)

UNITS ARE FOR DUCTED APPLICATIONS ONLY. A MINIMUM OF 36 INCHES [91.4 CM] OF SUPPLY AIR PLENUM AND DUCTWORK IS REQUIRED. NO SUPPLY AIR OPENINGS, REGISTERS OR FLEXIBLE AIR DUCTS MAY BE LOCATED WITHIN THE FIRST 36 INCHES [91.4 CM] OF SUPPLY PLENUM AND DUCTWORK ON UNITS WITH ELECTRIC HEATERS. FAILURE TO OBSERVE SUPPLY PLENUM/DUCT WARNINGS CAN CAUSE A FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

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 airflow be adequate. Make sure supply and return ductwork, grills, special filters, accessories, etc. are accounted for in total resistance. See airflow performance tables in this manual.
- Design the duct system in accordance with “ACCA” Manual “D” Design for Residential Winter and Summer Air Conditioning and Equipment Selection. Latest editions are available from: “ACCA” 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 “ACCA” Manual “D” is accounted for in system.
- Supply plenum is attached to the 3/4” [19 mm] duct flanges supplied on the unit around the blower outlet. Flanges are flat for shipping purposes and must be bent up along perforated edge around blower opening. Be sure to bend flanges completely up so they do not interfere with air being discharged from blower.

IMPORTANT: Flanges around blower opening for attaching supply duct must be bent up out of blower discharge even if not used so they do not restrict airflow from blower.

- Supply plenum should be the same size as the flanges provided around the blower outlet and should extend ideally 3 feet [91.4 cm] from the unit before turning or branching off plenum into duct runs. The plenum forms an extension of the blower housing and minimizes air expansion losses from the blower. Changing the size, shape or length will degrade blower performance. If supply discharges directly into a larger duct or plenum as much as .1 in. [2.54 mm] W.C., static pressure will be lost. If 3 feet [91.4 cm] is not possible, even 6 [15 cm], 12 [30.5 cm] or 18 inches [45.7 cm] will help.

IMPORTANT: If an elbow is included in the plenum close to the unit, it must not be smaller than the dimensions of the supply duct flange on the unit.

- Some units with electric heaters require 1 in. [2.54 cm] clearance to supply plenum and branch ducts to combustible material for the first 3 feet [91.4 cm] from the unit. See CLEARANCES on page 4.

- A 3/4” [19.1 mm] return duct flange is supplied on all sides of the air inlet opening of the unit coil casing. If the unit is to be installed without a coil casing (no indoor coil), a 3/4” [19.1 mm] flange is supplied on the back and sides of the air inlet opening of the blower casing. No flange is provided on the front of the opening to the blower casing. If return duct is attached to the inlet of the blower casing, the front flange of the duct should be run up into the opening or 90° brake made on the front flange to tape to the front of the blower casing.
- **IMPORTANT:** The front flange 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.
- Return duct flanges on blower or coil casing are flat for shipping purposes and must be bent out along perforated edge around opening.
- Secure the supply and return ductwork to the unit flanges, using proper fasteners for the type of duct used and tape the duct-to-unit joint as required to prevent air leaks.

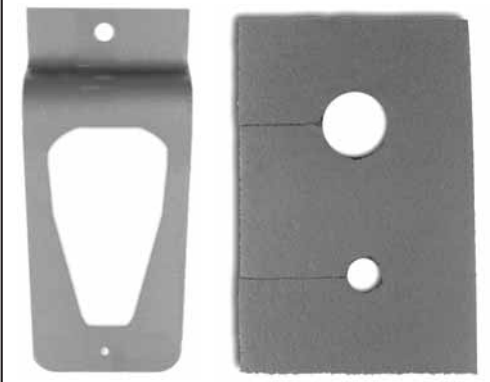
REFRIGERANT CONNECTIONS

Keep coil connections sealed until refrigerant connections are to be made. See outdoor unit manual for details on line sizing, tubing installation, evacuation and charging information.

- To install the refrigerant connections, first install the refrigerant block-off plate (located in the Parts Bag, see Figure 7) around the refrigerant connections. Braze all fittings. When refrigerant lines have cooled, insert the foam gasket (located in the parts bag, see Figure 7) around the refrigerant lines, between the coil and the refrigerant block-off plate.
- **IMPORTANT: The refrigerant block-off plate MUST be installed around the refrigerant connections before brazing.**
- When making braze connections close to outside of cabinet, use a brazing shield to protect cabinet paint from being damaged from torch flame.
- If the installation is in a tight location, it might be convenient to make some external tubing connections before setting unit in place.

IMPORTANT: Install refrigerant tubing so it does not block service access to front of unit. 24 in. [61 cm] clearance is required for filter, coil or blower removal and service access.

FIGURE 7
REFRIGERANT BLOCK-OFF PLATE
AND FOAM GASKET



FLOWCHECK PISTONS

See outdoor unit installation instructions for correct flow-check piston sizes and proper piston installation instructions.

- Indoor coil piston size is indicated by the digits underscored in the indoor coil model number.

IMPORTANT: It is important that the proper piston sizes be used dependent on indoor coil, outdoor unit combination and application.

CONDENSATE DRAIN TUBING

Consult local codes or ordinances for specific requirements that may apply.

- The coil door is shipped from the factory with the condensate drain knockout attached. Knockout must be removed and the condensate block-off plate (included in parts bag, see Figure 8) must be installed to access the front drain.
- Vertical units (vertical drain pan) are supplied with a 3/4" [19.1 mm] female pipe thread primary drain connection and a 3/4" [19.1 mm] female pipe thread auxiliary drain connection. (See unit dimensions figures for drain locations.)

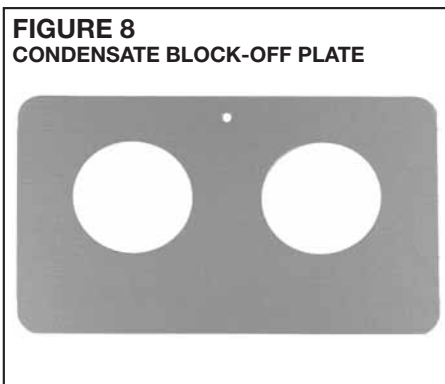
IMPORTANT: All drain connections on vertical drain pans have a plastic web covering opening. Connection(s) used must be broken out before connection(s) are made. Break out only connection(s) to be used.

- Horizontal units (horizontal drain pan) are supplied with a 3/4" [19.1 mm] female pipe thread primary drain connection and a 3/4" [19.1 mm] female pipe thread auxiliary drain connection. (See unit dimensions and position figures for drain locations).

IMPORTANT: All horizontal pans have plastic web over the secondary drain connection. Plastic web covering secondary connection must be broken out if used. Secondary connection is lowered by 3/8" [9.5 mm]. Do not get primary and secondary connections interchanged.

- Removal of door knockouts required for drain connections can be made much easier with the door removed from the cabinet.
- Install drain lines so they do not block service access to front of unit. 24 in. [61 cm] clearance is required for filter, coil or blower removal and service access.
- Make sure unit is level or pitched slightly toward primary drain connection so that drain pan will drain completely without water standing in pan.

FIGURE 8
CONDENSATE BLOCK-OFF PLATE



IMPORTANT: 2-6" [152.4 mm] PVC lengths are provided for making drain connection. When making drain fitting connections to drain pan, use a thin layer of teflon paste, silicone or teflon tape and install hand tight.

IMPORTANT: When making drain fitting connections to drain pan, do not over torque. Overtorquing fittings can split pipe connections on drain pan.

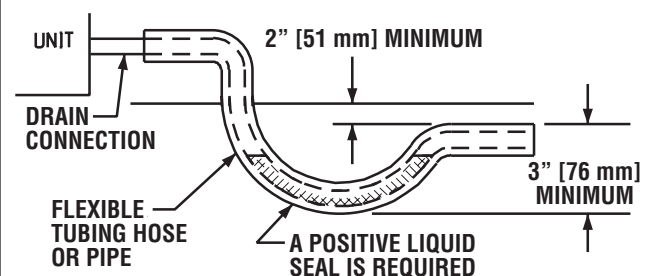
- Do not reduce drain line size less than connection size provided on condensate drain pan.
- All drain lines must be pitched downward away from the unit a minimum of 1/8 in. [3.2 mm] per foot of line to ensure proper drainage.
- Do not connect condensate drain line to a closed or open sewer pipe. Run condensate to an open drain or outdoors.
- The drain line should be insulated where necessary to prevent sweating and damage due to condensate forming on the outside surface of the line.
- Make provisions for disconnecting and cleaning of the primary drain line should it become necessary.
- Install a 2 in. [51 mm] 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.

IMPORTANT: Do not operate unit without a drain trap (see Figure 9). The condensate drain is on the negative side of the blower, therefore, air being pulled in through the condensate line will prevent positive drainage without a proper trap.

- Auxiliary drain if used should be run to a place where it will be noticeable if it become operational. Occupant should be warned that a problem exists if water should begin running from the auxiliary drain line.
- Test condensate drain pan and drain line after installation is complete. Pour several quarts of water into drain pan, enough to fill drain trap and line. Check to make sure drain pan is draining completely, no leaks are found in drain line fittings, and water is draining from the termination of the primary drain line.

FIGURE 9
CONDENSATE DRAIN TRAP

INSTALL CONDENSATE DRAIN TRAP SHOWN BELOW. USE DRAIN CONNECTION SIZE OR LARGER. DO NOT OPERATE UNIT WITHOUT TRAP. UNIT MUST BE LEVEL OR SLIGHTLY INCLINED TOWARD DRAIN.



AIRFLOW OPERATING LIMITS

Model/Cabinet Size	14		17		21		24
Cooling BTUH x 1,000 Cooling Tons Nominal	-018 1.5	-024 2	-030 2.5	-036 3	-042 3.5	-048 4	-060 5
Heat Pump or Air Conditioning Maximum Heat/Cool CFM (37.5 CFM/1,000 BTUH) [L/s] (450 CFM/Ton Nominal)	675 [319]	900 [425]	1125 [531]	1350 [637]	1575 [743]	1800 [850]	1930 [911]
Heat Pump or Air Conditioning Nominal Heat/Cool CFM (33.3 CFM/1,000 BTUH) [L/s] (400 CFM/Ton Nominal)	600 [283]	800 [378]	1000 [472]	1200 [566]	1400 [661]	1600 [755]	1800 [850]
Heat Pump or Air Conditioning Minimum Heat/Cool CFM (30.0 CFM/1,000 BTUH) [L/s] (360 CFM/Ton Nominal)	540 [255]	720 [340]	900 [425]	1080 [510]	1260 [595]	1440 [680]	1620 [765]
Blower Motor Speed	Low	High	Low	High	Low	High	High
Maximum kW Electric Heating & Minimum Electric Heat CFM [L/s]	13 490 [231]	13 490 [231]	20 900 [425]	20 900 [425]	25 1220 [595]	25 1220 [595]	25 1500 [708]
Maximum Electric Heat Rise °F	85	85	70	70	65	65	55

AIRFLOW PERFORMANCE DATA – 60 HZ STANDARD MODELS

Model Cabinet Size	Electric Heaters	Blower Motor		CFM [L/s] (Watts)/External Static Pressure—Inches W.C. [kPa]											
		Speed	Volts*	.00	.10 [.02]	.20 [.05]	.30 [.07]	.40 [.10]	.50 [.12]	.60 [.15]	.70 [.17]	.80 [.20]	.90 [.22]	1.0 [.25]	
	None	Low	230	CFM	723 [341]	711 [336]	693 [327]	671 [317]	644 [304]	612 [289]	▲575 [271]	▲533 [252]	▲487 [230]	▲436 [206]	▲379 [179]
				RPM	588	626	663	701	738	776	813	850	888	925	963
				Watts	210	209	208	205	202	197	192	187	180	172	164
				Amps	1.01	1.01	0.99	0.98	0.97	0.93	0.93	0.90	0.86	0.83	0.78
	3 (Max.)	Low	230	CFM	†	658 [311]	649 [306]	632 [298]	609 [287]	577 [272]	▲539 [254]	▲492 [232]	▲439 [207]	▲378 [178]	▲309 [146]
				RPM	†	640	679	718	757	796	835	875	914	953	992
				Watts	†	204	203	200	197	193	188	182	175	167	157
				Amps	†	0.94	0.94	0.92	0.90	0.84	0.85	0.82	0.79	0.74	0.70
-14	None	Low	208	CFM	707 [334]	699 [330]	686 [324]	668 [315]	644 [304]	615 [290]	▲581 [274]	▲542 [256]	▲497 [235]	▲488 [211]	▲393 [185]
				RPM	587	624	662	699	736	774	811	848	886	923	960
				Watts	207	207	206	204	201	197	192	186	179	172	163
				Amps	1.05	1.04	1.03	1.02	1.00	0.99	0.96	0.94	0.90	0.87	0.81
	3 (Max.)	Low	208	CFM	†	666 [314]	652 [308]	632 [298]	606 [28]	573 [270]	▲535 [252]	▲491 [232]	▲441 [208]	▲385 [182]	▲323 [152]
				RPM	†	633	672	712	752	791	831	870	910	949	989
				Watts	†	204	203	201	198	194	189	182	175	166	157
				Amps	†	1.02	1.03	1.02	1.00	0.97	0.93	0.91	0.87	0.84	0.79
	None	High	230	CFM	943 [445]	926 [437]	906 [428]	881 [416]	853 [403]	821 [387]	▲785 [370]	▲745 [352]	▲702 [331]	▲655 [309]	▲604 [285]
				RPM	751	775	799	822	846	870	893	917	941	964	988
				Watts	312	309	304	300	294	288	281	274	266	257	248
				Amps	1.44	1.43	1.41	1.39	1.36	1.33	1.30	1.26	1.23	1.19	1.15
	3 (Max.)	High	230	CFM	†	†	854 [403]	833 [393]	806 [380]	772 [364]	▲732 [345]	▲685 [323]	▲632 [298]	▲572 [270]	▲506 [239]
				RPM	†	†	804	831	857	884	910	937	963	989	1016
				Watts	†	†	297	294	290	284	277	268	258	247	235
				Amps	†	†	1.33	1.32	1.29	1.26	1.22	1.18	1.14	1.10	1.04

*For 115 and 460 volt units use 230 volt data shown above except for amps. 115 volt amps = 2 x 230 volt amps. 460 volt amps = 0.5 x 230 volt amps.

† Airflow becomes unstable at low static pressures.

▲ WARNING: Observe airflow operating limits if operating in area of airflow table shown in bold.

[] Designates Metric Conversions

AIRFLOW PERFORMANCE DATA (continued)

Model Cabinet Size	Electric Heaters	Blower Motor		CFM [L/s] (Watts)/External Static Pressure—Inches W.C. [kPa]											
		Speed	Volts*	.00	.10 [.02]	.20 [.05]	.30 [.07]	.40 [.10]	.50 [.12]	.60 [.15]	.70 [.17]	.80 [.20]	.90 [.22]	1.0 [.25]	
-14	None	High	208	CFM	973 [459]	956 [451]	935 [441]	911 [430]	883 [417]	851 [402]	▲815 [385]	▲775 [366]	▲732 [345]	▲684 [323]	▲633 [299]
				RPM	762	785	808	831	854	877	900	923	946	969	992
				Watts	326	321	317	311	305	299	292	284	277	268	259
				Amps	1.64	1.63	1.60	1.57	1.56	1.54	1.49	1.47	1.41	1.38	1.33
	3 (Max.)	High	208	CFM	†	†	879 [415]	860 [406]	834 [394]	801 [378]	▲762 [360]	▲717 [338]	▲664 [313]	▲606 [286]	▲540 [255]
				RPM	†	†	822	847	871	895	919	943	968	992	1016
				Watts	†	†	316	311	305	298	290	281	272	261	249
				Amps	†	†	1.52	1.51	1.48	1.46	1.41	1.37	1.32	1.27	1.20
-17	None	Low	230	CFM	1130 [533]	1114 [526]	1095 [517]	1072 [506]	1045 [493]	1015 [479]	▲981 [463]	▲944 [446]	▲902 [426]	▲858 [405]	▲809 [382]
				RPM	650	681	712	743	775	806	837	868	899	931	962
				Watts	368	366	362	358	352	345	338	329	319	308	296
				Amps	1.73	1.70	1.66	1.64	1.60	1.57	1.53	1.49	1.43	1.38	1.32
	4 (Max.)	Low	230	CFM	1140 [538]	1123 [530]	1100 [519]	1070 [505]	1035 [488]	993 [469]	946 [446]	892 [421]	833 [393]	†	†
				RPM	702	733	763	794	824	855	885	916	946	†	†
				Watts	374	369	363	356	348	339	329	318	306	†	†
				Amps	1.70	1.67	1.63	1.62	1.57	1.51	1.47	1.42	1.35	†	†
	None	Low	208	CFM	1176 [555]	1161 [548]	1141 [538]	1118 [528]	1091 [515]	1060 [500]	▲1025 [484]	▲986 [465]	▲944 [446]	▲897 [423]	▲847 [400]
				RPM	673	702	731	760	789	818	847	877	906	935	964
				Watts	395	392	387	381	375	367	359	350	339	328	315
				Amps	1.99	1.96	1.94	1.90	1.86	1.82	1.77	1.72	1.68	1.60	1.54
	4 (Max.)	Low	208	CFM	1182 [558]	1156 [546]	1127 [532]	1094 [516]	1057 [499]	1015 [479]	970 [458]	921 [435]	867 [409]	†	†
				RPM	727	755	784	813	841	870	899	928	956	†	†
				Watts	390	385	379	372	364	355	349	332	319	†	†
				Amps	1.97	1.95	1.90	1.84	1.81	1.74	1.71	1.63	1.58	†	†
	None	High	230	CFM	1363 [643]	1340 [632]	1314 [620]	1284 [606]	1251 [590]	1214 [573]	▲1173 [554]	▲1129 [533]	▲1081 [510]	▲1030 [486]	▲976 [461]
				RPM	775	797	818	840	862	883	905	926	948	969	991
				Watts	476	470	463	455	445	435	423	411	397	382	366
				Amps	2.14	2.11	2.09	2.05	1.99	1.94	1.88	1.83	1.79	1.72	1.65
	4 (Max.)	High	230	CFM	1334 [630]	1315 [621]	1289 [608]	1256 [593]	1216 [574]	1169 [552]	1116 [527]	1055 [498]	988 [466]	913 [431]	832 [393]
				RPM	815	836	858	879	901	922	944	965	987	1008	1030
				Watts	464	458	451	442	431	420	407	393	378	361	343
				Amps	2.08	2.06	2.02	1.97	1.92	1.87	1.82	1.75	1.67	1.60	1.57
None	High	208	CFM	1445 [540]	1418 [669]	1389 [656]	1357 [640]	1322 [624]	1284 [606]	▲1242 [586]	▲1198 [565]	▲1151 [543]	▲1101 [520]	▲1048 [495]	
			RPM	814	833	852	871	891	910	929	949	968	987	1006	
			Watts	516	508	499	489	479	469	458	446	434	421	408	
			Amps	2.56	2.52	2.48	2.42	2.37	2.32	2.26	2.22	2.14	2.08	2.01	
4 (Max.)	High	208	CFM	1407 [664]	1384 [653]	1355 [639]	1319 [622]	1276 [602]	1226 [579]	1169 [552]	1105 [522]	1034 [488]	957 [452]	872 [412]	
			RPM	857	876	894	912	931	949	967	986	1004	1022	1041	
			Watts	504	497	489	479	468	456	443	428	413	396	377	
			Amps	2.52	2.46	2.41	2.36	2.31	2.26	2.17	2.13	2.05	1.96	1.82	
-21	None	Low	230	CFM	1547 [730]	1527 [721]	1503 [709]	1474 [696]	1440 [680]	1402 [662]	▲1360 [642]	▲1312 [619]	▲1260 [595]	▲1204 [568]	▲1143 [539]
				RPM	646	674	703	731	760	788	817	846	874	903	931
				Watts	541	536	531	525	518	510	501	491	479	467	454
				Amps	2.38	2.36	2.32	2.30	2.26	2.22	2.19	2.14	2.08	2.01	1.94
	5 (Max.)	Low	230	CFM	1490 [703]	1476 [697]	1455 [687]	1425 [673]	1388 [655]	1342 [633]	▲1288 [608]	▲1227 [579]	▲1157 [546]	▲1079 [509]	▲994 [469]
				RPM	672	702	732	762	792	822	852	882	912	942	972
				Watts	529	528	524	519	511	502	491	479	464	448	430
				Amps	2.35	2.33	2.29	2.26	2.23	2.18	2.13	2.08	2.00	1.92	1.81
	None	Low	230	CFM	1555 [734]	1542 [728]	1523 [719]	1498 [707]	1467 [692]	1431 [675]	▲1389 [656]	▲1342 [633]	▲1289 [608]	▲1230 [580]	▲1166 [550]
				RPM	651	679	708	736	765	793	822	850	879	907	935
				Watts	549	546	542	536	529	522	512	502	491	478	464
				Amps	2.69	2.66	2.63	2.59	2.56	2.51	2.46	2.41	2.35	2.29	2.19
	5 (Max.)	Low	230	CFM	1521 [718]	1505 [710]	1482 [699]	1452 [685]	1414 [667]	1369 [646]	▲1317 [622]	▲1257 [593]	▲1190 [562]	▲1116 [527]	▲1034 [488]
				RPM	680	709	739	768	798	827	857	886	916	945	975
				Watts	543	540	535	529	521	512	501	488	474	458	440
				Amps	2.63	2.62	2.60	2.56	2.51	2.46	2.39	2.33	2.27	2.17	2.08

*For 115 and 460 volt units use 230 volt data shown above.

† Airflow becomes unstable at low static pressures.

▲ WARNING: Observe airflow operating limits if operating in area of airflow table shown in bold.

[] Designates Metric Conversions

AIRFLOW PERFORMANCE DATA (continued)

Model Cabinet Size	Electric Heaters	Blower Motor		CFM [L/s] (Watts)/External Static Pressure—Inches W.C. [kPa]											
		Speed	Volts*	.00	.10 [.02]	.20 [.05]	.30 [.07]	.40 [.10]	.50 [.12]	.60 [.15]	.70 [.17]	.80 [.20]	.90 [.22]	1.0 [.25]	
-21	None	High	230	CFM	1744 [823]	1725 [814]	1700 [802]	1671 [789]	1637 [773]	1598 [754]	▲1555 [734]	▲1506 [711]	▲1453 [686]	▲1395 [658]	▲1332 [629]
				RPM	729	752	775	798	821	844	867	890	913	937	960
				Watts	654	649	643	636	627	618	607	594	581	566	551
				Amps	2.88	2.85	2.81	2.78	2.73	2.67	2.60	2.57	2.52	2.46	2.37
	5 (Max.)	High	230	CFM	1707 [806]	1688 [797]	1662 [784]	1628 [768]	1587 [749]	1538 [726]	▲1482 [699]	▲1418 [669]	▲1346 [635]	▲1267 [598]	▲1180 [557]
				RPM	754	777	801	825	849	873	896	920	944	968	991
				Watts	646	642	635	627	616	604	591	575	558	539	518
				Amps	2.83	2.81	2.77	2.73	2.68	2.63	2.55	2.48	2.41	2.32	2.22
	None	Low	208	CFM	1821 [859]	1796 [848]	1766 [833]	1733 [367]	1696 [800]	1654 [781]	▲1609 [759]	▲1559 [736]	▲1505 [710]	▲1447 [683]	▲1385 [654]
				RPM	752	773	795	817	839	860	882	904	926	947	969
				Watts	690	683	674	665	655	644	632	619	605	590	574
				Amps	3.32	3.29	3.23	3.18	3.12	3.10	3.01	2.95	2.90	2.82	2.72
5 (Max.)	Low	208	CFM	1764 [833]	1741 [822]	1711 [808]	1675 [791]	1632 [770]	1583 [747]	▲1527 [721]	▲1464 [691]	▲1394 [658]	▲1318 [622]	▲1236 [583]	
			RPM	785	806	828	849	871	892	914	935	957	978	1000	
			Watts	676	668	660	650	638	625	611	595	578	560	540	
			Amps	3.27	3.21	3.16	3.13	3.07	3.02	2.93	2.85	2.78	2.68	2.57	
-24	None	Low	230	CFM	1984 [936]	1961 [925]	1932 [912]	1895 [894]	1851 [874]	1800 [850]	▲1741 [822]	▲1675 [791]	▲1602 [756]	▲1521 [718]	▲1433 [676]
				RPM	652	680	708	736	764	791	819	847	875	903	931
				Watts	713	710	706	702	695	688	680	670	660	648	635
				Amps	3.17	3.14	3.14	3.12	3.10	3.09	3.07	3.06	3.03	3.01	2.97
	6 (Max.)	Low	230	CFM	1935 [913]	1902 [898]	1861 [878]	1811 [855]	1753 [827]	1687 [796]	▲1612 [761]	▲1529 [722]	▲1438 [679]	▲1338 [631]	†
				RPM	684	712	741	769	798	827	855	884	912	941	†
				Watts	699	696	693	687	680	671	661	649	635	620	†
				Amps	3.13	3.12	3.11	3.10	3.08	3.08	3.02	3.00	2.97	2.93	†
	None	High	208	CFM	2062 [973]	2033 [959]	1998 [943]	1956 [923]	1907 [900]	1852 [874]	▲1790 [845]	▲1722 [813]	▲1647 [777]	▲1566 [739]	▲1478 [698]
				RPM	678	704	731	757	783	810	836	863	889	916	942
				Watts	745	742	738	733	727	720	712	703	694	683	672
				Amps	3.70	3.69	3.67	3.64	3.63	3.62	3.61	3.58	3.54	3.53	3.48
6 (Max.)	High	208	CFM	12003 [945]	1973 [931]	1934 [913]	1885 [890]	1826 [862]	1757 [829]	▲1677 [791]	▲1588 [749]	▲1489 [703]	▲1380 [651]	▲1261 [595]	
			RPM	704	732	759	786	813	840	867	895	922	949	976	
			Watts	747	742	736	729	720	710	698	685	670	654	637	
			Amps	3.72	3.70	3.70	3.65	3.63	3.60	3.58	3.56	3.53	3.49	3.41	

*For 115 and 460 volt units use 230 volt data shown above.

▲ **WARNING: Observe airflow operating limits if operating in area of airflow table shown in bold.**

† Airflow becomes unstable at low static pressures.

[] Designates Metric Conversions

AIRFLOW PERFORMANCE DATA—50 HZ MODELS

Model Cabinet Size	Electric Heaters	Blower Motor		CFM [L/s] (Watts)/External Static Pressure—Inches W.C. [kPa]										
		Speed	Volts*	.00	.10 [.02]	.20 [.05]	.30 [.07]	.40 [.10]	.50 [.12]	.60 [.16]	.70 [.17]	.80 [.20]	.90 [.22]	1.0 [.25]
-14	None	Low	240	818 [386]	792 [374]	759 [358]	719 [339]	672 [317]	619 [292]	—	—	—	—	—
			220	742 [350]	718 [339]	688 [325]	651 [307]	608 [287]	558 [263]	—	—	—	—	—
	None	High	240	968 [457]	941 [444]	904 [427]	859 [405]	804 [379]	740 [349]	—	—	—	—	—
			220	905 [427]	885 [418]	856 [404]	816 [385]	765 [361]	705 [333]	—	—	—	—	—
-17	None	Low	240	1263 [596]	1226 [579]	1182 [558]	1133 [535]	1077 [508]	1015 [479]	—	—	—	—	—
			220	1174 [554]	1140 [538]	1099 [519]	1053 [497]	1000 [472]	942 [444]	—	—	—	—	—
	None	High	240	1386 [654]	1342 [634]	1292 [610]	1233 [582]	1167 [551]	1093 [516]	—	—	—	—	—
			220	1314 [620]	1273 [601]	1226 [579]	1172 [553]	1113 [525]	1046 [494]	—	—	—	—	—
-21	None	Low	415	1745 [824]	1667 [787]	1581 [746]	1479 [698]	1349 [637]	1183 [558]	—	—	—	—	—
			380	1681 [793]	1620 [765]	1544 [729]	1449 [684]	1329 [627]	1180 [557]	—	—	—	—	—
			240	1665 [786]	1636 [772]	1596 [753]	1546 [729]	1485 [701]	1413 [667]	—	—	—	—	—
			220	1543 [728]	1523 [719]	1492 [704]	1449 [684]	1393 [657]	1325 [625]	—	—	—	—	—
	None	High	415	1794 [847]	1713 [808]	1619 [764]	1503 [709]	1369 [646]	1204 [568]	—	—	—	—	—
			380	1767 [834]	1684 [795]	1595 [753]	1491 [704]	1363 [643]	1201 [567]	—	—	—	—	—
			240	1811 [855]	1772 [836]	1724 [814]	1667 [787]	1600 [755]	1524 [719]	—	—	—	—	—
			220	1715 [810]	1684 [795]	1642 [775]	1590 [750]	1528 [721]	1457 [687]	—	—	—	—	—
-24 (1-speed- China Option 804)	None	High	415	2311 [1091]	2184 [1031]	2066 [975]	1933 [912]	1758 [830]	1516 [715]	—	—	—	—	—
			380	2240 [1057]	2132 [1006]	2024 [955]	1899 [896]	1735 [819]	1515 [715]	—	—	—	—	—
			240	2133 [1006]	2084 [983]	2023 [955]	1951 [921]	1868 [882]	1773 [837]	—	—	—	—	—
			220	1984 [937]	1946 [919]	1895 [894]	1830 [863]	1751 [826]	1659 [783]	—	—	—	—	—

AIRFLOW PERFORMANCE DATA: 2-SPEED STANDARD MOTOR -24 STANDARD MODEL - 50 HZ

Model Cabinet Size	Electric Heaters	Blower Motor		CFM [L/s] (Watts)/External Static Pressure—Inches W.C. [kPa]									
		Speed	Volts	.10 [.02]	.20 [.05]	.30 [.07]	.40 [.10]	.50 [.12]	.60 [.16]	.70 [.17]	.80 [.20]	.90 [.22]	1.0 [.25]
-24 (2-speed Std. Motor)	None	Low	220/380	1732 [817]	1702 [803]	1681 [793]	1585 [748]	1497 [707]	1401 [661]	1180 [557]	945 [446]	731 [345]	461 [218]
	None	Low	240/415	1804 [851]	1761 [831]	1707 [806]	1637 [773]	1566 [739]	1454 [686]	1316 [621]	972 [459]	726 [343]	477 [225]
	None	High	220/380	2000 [944]	1922 [907]	1856 [876]	1789 [844]	1693 [799]	1608 [759]	1409 [665]	1272 [600]	916 [432]	560 [264]
	None	High	240/415	2003 [945]	1955 [923]	1885 [890]	1823 [860]	1751 [826]	1649 [778]	1515 [715]	1308 [617]	853 [403]	571 [269]

AIRFLOW PERFORMANCE DATA: 2-SPEED MOTOR -24 HIGH STATIC MODEL - 50 HZ

Model Cabinet Size	Electric Heaters	Blower Motor		CFM [L/s] (Watts)/External Static Pressure—Inches W.C. [kPa]									
		Speed	Volts	.10 [.02]	.20 [.05]	.30 [.07]	.40 [.10]	.50 [.12]	.60 [.16]	.70 [.17]	.80 [.20]	.90 [.22]	1.0 [.25]
-24 (2-speed High Static Motor)	None	Low	220/380	1900 [897]	1872 [883]	1840 [868]	1807 [853]	1741 [822]	1672 [789]	1520 [717]	1421 [671]	1090 [514]	765 [361]
	None	Low	240/415	2094 [988]	2060 [972]	2026 [956]	1978 [934]	1918 [905]	1842 [869]	1750 [826]	1602 [756]	1417 [669]	876 [413]
	None	High	220/380	2180 [1029]	2124 [1002]	2078 [981]	2032 [959]	1960 [925]	1887 [891]	1761 [831]	1634 [771]	1356 [640]	866 [409]
	None	High	240/415	2355 [1111]	2304 [1087]	2251 [1062]	2185 [1031]	2108 [995]	2016 [951]	1907 [900]	1765 [833]	1546 [730]	1189 [817]

Airflow becomes unstable at low static pressures.

AIR FILTER

Filter should be used only if the unit is readily accessible for filter cleaning or replacing after installation.

- If unit is not readily accessible for filter maintenance, a remote filter installed in the return air system.
- If a remote filter is installed, it should be sized for a maximum of 300 feet/min. [7.62 m] air velocity or that recommended for the type filter installed.

IMPORTANT: Do not operate system without a filter. A filter is required to protect the coil, blower and internal parts from excessive dirt and dust.

- See unit position figures for location of filter in unit cabinet and service panel giving access to unit filter.

AIRFLOW PERFORMANCE

Airflow performance data is based on cooling performance with dry coil and filter in place. Select performance table for appropriate unit size, voltage and number of electric heaters to be used. Make sure external static applied to unit allows operation within the minimum and maximum limits shown in table below for both cooling and electric heat operation. For optimum blower performance, operate the unit in the .2 [5.1 mm] to .5 in [12.7 mm] W.C. external static range. Units with coils should be applied with a minimum of .1 in [2.54 mm] W.C. external static range.

Units without coils should be applied with a minimum of .2 in [5.5 mm] W.C. external static pressure. In general, the indoor motor speed tap should be as shown in table for the appropriate cooling capacity shown, however, at extremes of external static, voltage and number of heaters the higher or lower speed tap may be necessary or more desirable. Always check to make sure proper motor speed tap is connected as units are shipped from the factory connected for high speed operation.

SEQUENCE OF OPERATION

Cooling (cooling only or heat pump)

- When the thermostat “calls for cooling,” the circuit between R and G is completed, causing the blower relay (BR) to energize. The N.O. contacts will close, causing the indoor blower motor (IBM) to operate. The circuit between R and Y is also completed: This circuit closes the contactor (CC) in the outdoor unit starting the compressor (COMP) and outdoor fan motor (OFM).

Heating (electric heat only)

- When the thermostat “calls for heat,” the circuit between R and W is completed, and the heater sequencer (HR₁) is energized. A time delay will follow then: The heating elements (HE) and the indoor blower motor (IBM) will come on. Units with a second heater sequencer (HR₂) can be connected with the first sequencer (HR₁) to W on the thermostat sub-base or connected to a second stage W₂ on the sub-base.

Heating (heat pump)

- When the thermostat “calls for heat,” the circuits between R and B, R and Y and R and G are completed.

Circuit R and B energizes the reversing valve (RV) switching it to the heating position (remains energized as long as selector switch is in “heat” position). Circuit R and Y energizes the contactor (CC) starting the outdoor fan motor (OFM) and compressor (COMP). Circuit R and G energizes the blower relay (BR) starting the indoor blower motor (IBM).

- If the room temperature should continue to fall, circuit R and W₂ is completed by the second-stage heat room thermostat. Circuit R-W₂ energizes a heat sequencer (HR₁). The completed circuit will energize supplemental electric heat. Units with a second heater sequencer (HR₂) can be connected with first sequencer (HR₁) to W₂ on thermostat or connected to a third heating stage W₂ on the thermostat sub-base. A light on the thermostat indicates when supplemental heat is being energized.

BLOWER TIME DELAY (Heating or Cooling)

- Some models may be equipped with a blower time delay (BTD) in lieu of a blower relay (BR) (see wiring diagram). If so equipped, the blower will run for 60 seconds after the blower time delay (BTD) is de-energized.

WATT RESTRICTOR (Heating - Heat Pump)

- Heat pump air handlers with supplemental electric heat above a specific kW dependent on unit size and total heater kW are equipped with a patented watt restrictor. Models so equipped are Cabinet Model Size -14 with more than 6 kW Cabinet Model Size -17, -21 and -24 with more than 11 kW Watt restrictor (WR) may directly control a heater element in the heater circuit or may be in the control circuit controlling heater sequencer (HR₂) indirectly controlling two or three heater elements (HE) (see unit wiring diagram).
- The watt restrictor (WR) will restrict the amount of supplemental electric heat that can be energized dependent on the heat output of the heat pump (temperature of the air leaving the indoor heat pump coil).

Since the heat output of the heat pump is dependent upon the outdoor air temperature, this control performs the same function as a field installed outdoor thermostat.

An additional benefit of the watt restrictor is that it can sense a degradation in heat pump performance due to causes other than outdoor temperature and react accordingly to bring on more supplemental electric heat.

DEFROST (Defrost Heat Control)

- For sequence of operation for defrost controls, see outdoor heat pump installation instructions.
- Supplemental heat during defrost can be provided by connecting the purple (PU) pigtail in the outdoor unit to the purple (PU) pigtail in the indoor unit. This will complete the circuit between R and W through a set of contacts in the defrost relay (DR) when the outdoor heat pump is in defrost. This circuit, if connected, will help prevent cold air from being discharged from the indoor unit during defrost.
- Defrost heat control (DHC) is used in series on the circuit described above on units where the supplemental heat is more than would be required to offset the defrost cooling capacity. Defrost heat control (DHC) is provided

on the same models described above having watt restrictors.

- When the outdoor unit goes into defrost, the circuit between R and W is completed through a set of contacts on the defrost relay (DR) in series with the contacts on the defrost heat control (DHC). Purple (PU) pig-tails on the indoor unit and outdoor units must be connected to make circuit. During defrost, the defrost heat control (DHC) senses the air temperature leaving the indoor unit and cycles the supplemental electric heat to maintain comfort [(75° to 85°F) (24° to 29°C)] air temperature and prevent objectionable cold air during defrost. This limits the electric heat output to the minimum required, to conserve energy and prevent the thermostat from being satisfied with electric heat and preventing completion of the defrost cycle.
- For most economical operation, if cold air is not of concern during defrost, the purple wire can be left disconnected. Supplemental heat will then come on only when called for by second stage room thermostat.

EMERGENCY HEAT (Heating Heat Pump)

- If selector switch on thermostat is set to the emergency heat position, the heat pump will be locked out of the heating circuit, and all heating will be electric heat. Jumper should be placed between W₂ and E on the thermostat sub-base so that the electric heat control will transfer to the first stage heat on the thermostat. This will allow the indoor blower to cycle on and off with the electric heat when the fan switch is in the auto position.

ROOM THERMOSTAT (ANTICIPATOR SETTING)

See instructions with outdoor section, condensing unit or heat pump for recommended room thermostats.

- On units with one electric heat sequencer (HR₁) (see wiring diagram on unit), heat anticipator setting should be .16.
- On units with two electric heat sequencers (HR₁ & HR₂) (see wiring diagram on unit), heat anticipator setting should be .32 if both are connected to same stage on thermostat. Setting should be .16 if (HR₁ & HR₂) are connected to separate stages.
- The thermostat should be mounted 4 to 5 feet [122 to 152 cm] above the floor on an inside wall of the living room 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 fireplace, lamps, the sun, T.V. or an outside wall. See instruction sheet packaged with thermostat for mounting and installation instructions.

CALCULATING TEMPERATURE RISE

- The formula for calculating air temperature rise for electric resistance heat is:

60 HZ

$$\text{Temperature Rise } ^\circ\text{F} = \frac{3.16 \times \text{Watts}}{\text{CFM}}$$

Where: 3.16 = Constant, CFM = Airflow

PRE-START CHECK

<input type="radio"/> YES <input type="radio"/> NO	Is unit properly located, level, secure and service-able?
<input type="radio"/> YES <input type="radio"/> NO	Has auxiliary pan been provided under the unit with separate drain? (Units installed above a finished ceiling).
<input type="radio"/> YES <input type="radio"/> NO	Is condensate line properly sized, run, trapped, pitched and tested?
<input type="radio"/> YES <input type="radio"/> NO	Have the supply duct flanges on the unit been turned up?
<input type="radio"/> YES <input type="radio"/> NO	Is ductwork correctly sized, run, taped and insulated?
<input type="radio"/> YES <input type="radio"/> NO	have all cabinet openings and wiring been sealed with caulking?
<input type="radio"/> YES <input type="radio"/> NO	Is the indoor coil flowcheck piston size correct?
<input type="radio"/> YES <input type="radio"/> NO	Is the filter clean, in place and of adequate size?
<input type="radio"/> YES <input type="radio"/> NO	Is the wiring tight, correct and to the wiring diagram?
<input type="radio"/> YES <input type="radio"/> NO	Is the unit properly grounded and protected (fused)?
<input type="radio"/> YES <input type="radio"/> NO	Is the thermostat heat anticipator been set properly?
<input type="radio"/> YES <input type="radio"/> NO	Is the unit circuit breaker(s) rotated properly "on" up - "off" down?
<input type="radio"/> YES <input type="radio"/> NO	Are the unit circuit breaker(s) line lug cover(s) in place?
<input type="radio"/> YES <input type="radio"/> NO	Are all access panels in place and secure?

Refer to outdoor unit installation instructions for system start-up instructions and refrigerant charging instructions.

50 HZ

$$\text{Temperature Rise } ^\circ\text{C} = \frac{0.82 \times \text{Watts}}{\text{L/s}}$$

Where: 0.82 = Constant, L/s = Airflow

CALCULATING WATTS HEATING CAPACITY

- The formula for calculating WATTS heating capacity for electric resistance heat is:

$$\text{BTUH Heating} = \text{Watts} \times 3.412$$

Where: 1 kW = 1000 Watts, 3.412 = Btuh/Watt
Watts = Watts

CALCULATING AIRFLOW CFM / L/s

- The formula for calculating airflow using temperature rise and heating BTUH for units with electric resistance heat is:

60 HZ

$$\text{CFM} = \frac{\text{Heating BTUH}}{1.08 \times \text{Temp. Rise}}$$

$$\frac{50 \text{ HZ}}{\text{L/s}} = \frac{\text{Heating BTUH}}{4.17 \times \text{Temp. Rise}}$$

CALCULATING CORRECTION FACTOR

- For correction of electric heat output (kW or BTUH) or temperature rise at voltages other than rated voltage multiply by the following correction factor:

$$\text{Correction Factor} = \frac{\text{Applied Voltage}^2}{\text{Rated Voltage}^2}$$

MAINTENANCE

For continuing high performance, and to minimize possible equipment failure, it is essential that periodic maintenance be performed on this equipment. Consult your local dealer as to the proper frequency of maintenance and the availability of a maintenance contract.

IMPORTANT: Before performing any service or maintenance procedures, see “WARNINGS” listed on page 3 of these installation instructions.

▲ WARNING

UNITS WITH CIRCUIT BREAKER(S) MEET REQUIREMENTS AS A SERVICE DISCONNECT SWITCH, HOWEVER, IF ACCESS IS REQUIRED TO THE LINE SIDE (COVERED) OF THE CIRCUIT BREAKER, THIS SIDE OF THE BREAKER(S) WILL BE ENERGIZED WITH THE BREAKER(S) DE-ENERGIZED. CONTACT WITH THE LINE SIDE CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.

AIR FILTER

Check the system filter every ninety days or as often as found to be necessary and if obstructed, clean or replace at once.

IMPORTANT: Do not operate the system without a filter in place.

- The filter in the unit is a cleanable type. Clean filter using cold water and allow filter to dry. no oiling or coating of the filter is required or recommended.
- New filters to replace those supplied in unit are available from your local distributor.

TO ACCESS AIR FILTER:

- Locate thumb screws on filter access door and remove.
- Remove filter access door by tilting it down from the top.
- Slide filter out.
- Internal filter is NOT used in downflow air configuration.

INDOOR COIL - DRAIN PAN - DRAIN LINE

Inspect the indoor coil once each year for cleanliness and clean as necessary. It is necessary to remove the filter and check the return air side of the coil for debris.

- Generally, the coil can be easily cleaned when it is dry. If the coil is coated with dirt or lint, blow compressed air or nitrogen through the supply side of the coil fins blowing dirt or lint from the return air side of the coil onto the filter or cardboard placed between filter and coil. Be sure lint and dirt is removed from the filter and return air system.

- If the coil is coated with oil or grease, clean it with a mild detergent and water solution. Rinse the coil thoroughly with clear water. Be careful not to splash water excessively into unit and system.
- Inspect the drain pan and condensate drain at the same time the cooling coil is checked. Clean the drain pan and condensate drain by removing any foreign matter from the pan. Flush the pan and drain tube with clear water.
- If the drain tube is restricted, it can generally be cleaned with high pressure water. Remove the drain line from the unit away from the pan and coil to clear the drain line.

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

BLOWER MOTOR AND WHEEL

Inspect the blower motor and wheel for cleanliness. With the system air filter in place, it should be several years before it would become necessary to clean the blower motor and wheel.

- If it becomes necessary to remove the blower assembly from the unit, see instructions on removal and disassembly of motor, blower and heater parts.
- The blower motor and wheel may be cleaned by using a vacuum with a soft brush attachment. Remove grease with a mild solvent such as hot water and detergent. Be careful not to disturb the balance weights (clips) on the blower wheel blades. Do not drop or bend wheel as balance will be affected.

LUBRICATION

The blower motor sleeve bearings are pre-lubricated by the motor manufacturer and do not have oiling ports. Motor should be run for an indefinite period of time without additional lubrication.

BLOWER ASSEMBLY REMOVAL AND REPLACEMENT

Removing the blower assembly is not required for normal service and maintenance. Removal is necessary for replacement of defective parts such as motor, blower wheel and electric heater(s). After extended use, removal of the blower assembly may become necessary for a thorough cleaning of the blower motor and wheel.

▲ 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.

- Mark field power supply wiring (for replacement) attached to terminal block or circuit breaker(s) on blower assembly. Remove wiring from terminal block or circuit breaker(s).
- Mark low voltage control wiring (for replacement) where attached to unit control pigtailed on right side of blower housing. Remove wire nuts attaching field control wiring to unit control pigtailed.

- Remove two screws holding blower assembly to front channel of cabinet and pull blower assembly from cabinet.
- To replace blower assembly, slide blower assembly into blower deck. Make sure blower assembly engages lances in deck properly. If assembly hangs up, check to make sure top and bottom are lined up in proper locations.
- Slide blower assembly to back of cabinet and make sure it is completely engaged.
- Replace two screws holding blower assembly to front channel of cabinet. Take care not to strip screws, just snug into place.
- Replace low voltage control wiring with wire nuts and make sure wiring is to wiring diagram and a good connection has been made.
- Replace field power wiring to terminal block or circuit breaker(s) on control area of blower assembly. Make sure wires are replaced as they were, check wiring diagram if necessary. Tighten supply power wiring securely to terminal lugs.
- Make sure wiring is within cabinet and will not interfere with access door. Make sure proper separation between low voltage control wiring and field power wiring has been maintained.
- Replace blower assembly control access panel before energizing equipment.

ELECTRIC HEATER REPLACEMENT

With the blower assembly removed, electric heater(s) can be removed and replaced from the blower housing without disturbing the motor or blower wheel.

- Remove both wires from the heater to be removed and remove three screws from outside of blower wrap holding heater brackets to blower wrap.
- One screw is located under the control mounting plate and is a little difficult to get at. A 1/4" [6.4 mm] box end or open end wrench should be used to remove and replace this screw
- With three screws removed, lift heater element and heater terminals through mounting holes in top of blower wrap.
- Lift heater from blower wrap and with terminal end of heater headed for blower cut off and to the outside of the blower side, remove heater.
- To replace the heater element, reverse the above process to replace heater.
- Make sure bend on heater near terminals end is down in place flush or below outlet flanges on blower assembly. Replace screws in heater brackets and tighten.
- Make sure terminals on heater are straight with at least 1/2" [12.7 mm] clearance to control mounting plate and 1/2" [12.7 mm] clearance to access panel. Use a straight edge across front flanges on blower assembly to check clearance (bend if necessary for proper clearance).

- Replace wiring, make sure connections are tight and are made in accordance with the unit wiring diagram.

MOTOR REPLACEMENT

With the blower assembly removed, the indoor blower motor can be removed and replaced using the following procedure:

- Remove motor leads from the motor capacitor and blower relay. Note lead locations for ease of reassembly. Pull leads from plastic bushing in blower side.
- Loosen the set screw holding blower wheel onto the motor shaft. Shaft extends through blower hub so that a wrench can be used on the extended shaft to break the shaft loose if necessary. Be careful not to damage shaft. A wheel puller can be used on the groove in the blower hub if necessary.
- Remove 12 sheet metal screws holding motor mounts to blower side and remove motor from blower assembly.
- To install new motor, remove 8 screws holding motor mounts to motor shell and remove mounts (four) from motor.
- Install (four) motor mounts to motor using same screws or screws supplied with replacement motor.

▲ WARNING

TO AVOID ELECTRICAL SHOCK WHICH CAN RESULT IN PERSONAL INJURY OR DEATH, USE ONLY THE SCREWS FURNISHED IN THE MOTOR SHELL MOUNTING HOLDS. SCREWS ARE #8-18 X .25 IN. [6.4 MM] LONG BLUNT NOSE THREAD FORMING. SCREWS LONGER THAN 1/4 IN. [6.4 MM] MAY CONTACT THE MOTOR WINDING.

- To reassemble, insert motor shaft through hub in blower wheel and orient motor to original position with motor leads and motor label to front of blower (control area).
- Reassemble 12 sheet metal screws through motor mounts into blower side. Do not overtighten screws, blower side is light gage sheet metal, just snug screws tight enough to hold motor mounts in position.
- Turn motor shaft so that flat on shaft is located under blower wheel setscrew, and blower wheel is centered in blower housing with the same distance on each side between the inlet venturi and outside of blower wheel. Tighten setscrew on motor shaft. Turn wheel by hand to make sure it runs true without hitting blower sides.
- Reassemble motor wiring to capacitor and blower relay making sure that wires match wiring diagram and are tight and secure.

BLOWER WHEEL REPLACEMENT

With the blower assembly removed and the motor assembly removed (see above instructions), remove the two screws holding the blower wrap (cutoff) to the blower sides.

IMPORTANT: It is not necessary to remove heating element(s), if provided, to remove the blower wheel.

- With wrap (cutoff) screws removed, cut off end of blower wrap will spring up. Lifting wrap blower wheel is removed through the discharge opening in the blower housing.

- To replace, make sure wheel is oriented properly with hub to the opposite side from the motor. Lift blower wrap and insert blower wheel through discharge opening in the blower housing.
- Hold blower wrap down into position and replace two screws holding blower wrap to blower sides.
- See motor replacement and blower assembly instructions for remaining assembly procedure.

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: Circuit breakers, heater controls, heater limit controls, heater elements, motor, motor capacitor, blower relay, control transformer, blower wheel, filter, indoor coil 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).

ACCESSORIES-KITS-PARTS

- **Combustible Floor Base RXBB-AA (for standard units)** for downflow applications, see section of this manual covering combustible floor base.
- **Jumper Bar Kit 2 Ckt. to 1 Ckt. RXBJ-A21** is used to convert single phase multiple two circuit units to a single supply circuit. Kit includes cover and screw for line side terminals.
- **Jumper Bar Kit 3 Ckt. to 1 Ckt. RXBJ-A31** is used to convert single phase multiple three circuit units to a single supply circuit. Kit includes cover and screw for line side terminals.

NOTE: No jumper bar kit is available to convert three phase multiple two circuit units to a single supply circuit.

If a factory supplied jumper bar for single supply circuit is removed from unit to make multiple supply circuits, the line side of the circuit breakers must be covered with finger safe covers. Each circuit breaker pole must be covered with a finger safe cover.

- **Finger Safe Circuit Breaker Cover - Part number 45-23203-01.** One is required for each circuit breaker pole, if jumper bar is removed to provide multiple supply circuits.
- **Replacement Filters**

Model Cabinet

Size	Filter Size	Part Number
-14	12.75 [32.4 cm] x 21 [53.3 cm]	54-23217-01
-17	16.25 [41.3 cm] x 21 [53.3 cm]	54-23217-02
-21	19.75 [50.2 cm] x 21 [53.3 cm]	54-23217-03
-24	23.25 [59 cm] x 21 [53.3 cm]	54-23217-04

- **Filter Kit** is required if a separate cased coil is field attached to a blower section and a unit filter is desired. Separate cased coils do not have filter or filter racks. The filter kit includes filter, 2 filter racks and 4 mounting screws. Filter kit is also required if filter access is needed in downflow/counterflow. **NOTE:** Filter kit not available.

Model Cabinet

Size	Filter Size	Part Number
-14	12.75 [32.4 cm] x 21 [53.3 cm]	RXBF-AA14
-17	16.25 [41.3 cm] x 21 [53.3 cm]	RXBF-AA17
-21	19.75 [50.2 cm] x 21 [53.3 cm]	RXBF-AA21
-24	23.25 [59 cm] x 21 [53.3 cm]	RXBF-AA24

- **Horizontal Drain Pan Model RXBD-CB:** all unit sizes. See section of this manual covering horizontal drain pan.
- **RXBM-AA06** - Exterior horizontal drain pan. (One size fits all models).

NOTE: Accessory pan will not fit units with two (2) indoor coils or high-heat units.

