# INSTALLATION INSTRUCTIONS

## FRONT RETURN AIR HANDLERS

## EARTH-FRIENDLY R-410A REFRIGERANT:

**RFIT** High Efficiency

**RFIP** Standard Efficiency



**RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION!**

### ⚠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.**

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Accredited by the RvA

ABS Quality Evaluations, Inc. Management System Certification

ANAB ACCREDITED

ISO 9001:2008

Certificate Number: 30164

**DO NOT DESTROY THIS MANUAL**

**PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE BY A SERVICEMAN**

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**⚠ WARNING** (SEE SECTION 4.0: ELECTRICAL WIRING)

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** (SEE SECTION 12.5: BLOWER ASSEMBLY REMOVAL & REPLACEMENT)

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. Consumer service is recommended only for filter cleaning/ replacement. Never operate the unit with the access panels removed.

# 1.0 SAFETY INFORMATION

**⚠ WARNING**

Duct leaks can create an unbalanced system and draw pollutants such as dirt, dust, fumes and odors into the home 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 living 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 living 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 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.

**⚠ WARNING** (SEE SECTION 4.3: GROUNDING)

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

**⚠ WARNING** (SEE SECTION 12.0: MAINTENANCE)

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.

**⚠ WARNING** (SEE SECTION 5.0: 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.

Continued on next page ➜

## ⚠ 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.**

## ⚠ WARNING (SEE SECTION 12.6: MOTOR REPLACEMENT)

**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. long blunt nose thread forming. Screws longer than 1/4 in. may contact the motor winding.**

## ⚠ WARNING (SEE SECTION 7.0: 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 air handler elements. This residue could soil ceilings, walls, drapes, carpets and other articles in the house.**

**Soot damage may occur 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 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.**

## ⚠ CAUTION (SEE SECTION 2.1: RECEIVING)

**In compliance with recognized codes, it is recommended that an auxiliary drain pan be installed under all evaporator coils or units 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.**

## ⚠ CAUTION

**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:**

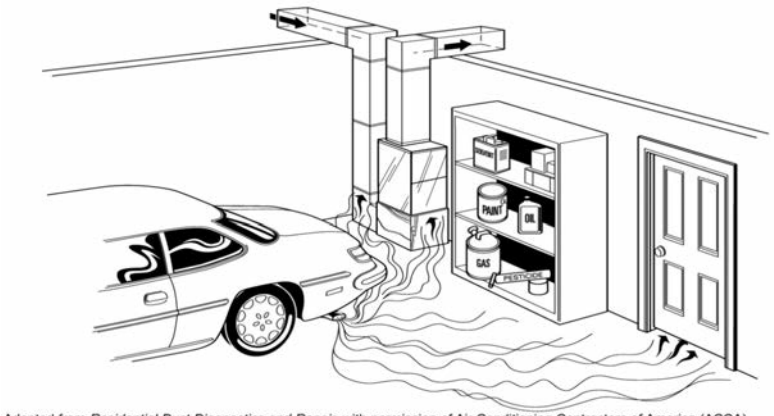
- **Properly sized power supply and circuit breaker/fuse**
- **Air-handler operating under thermostatic control;**
- **Return air duct sealed to the air-handler;**
- **Air filters must be in place;**
- **Correct air-flow setting for application**
- **Removing the coil and storing it in a clean safe place is highly recommended until construction is completed and the outdoor unit is installed.**
- **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.**

# 2.0 GENERAL INFORMATION

## 2.1 IMPORTANT INFORMATION ABOUT EFFICIENCY AND INDOOR AIR QUALITY

Central cooling and heating equipment is only as efficient as the duct system that carries the cooled or heated air. To maintain efficiency, comfort and good indoor air quality, it is

**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

**Duct leaks can create an unbalanced system and draw pollutants such as dirt, dust, fumes and odors into the home 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 living 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 living space.**

## ⚠ 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.**

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 efficiency 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 qualified contractor for proper balance and sealing.

## ⚠ NOTICE

**In compliance with recognized codes, it is recommended that an auxiliary drain pan be installed under all evaporator coils or units 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.**

## 2.2 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.

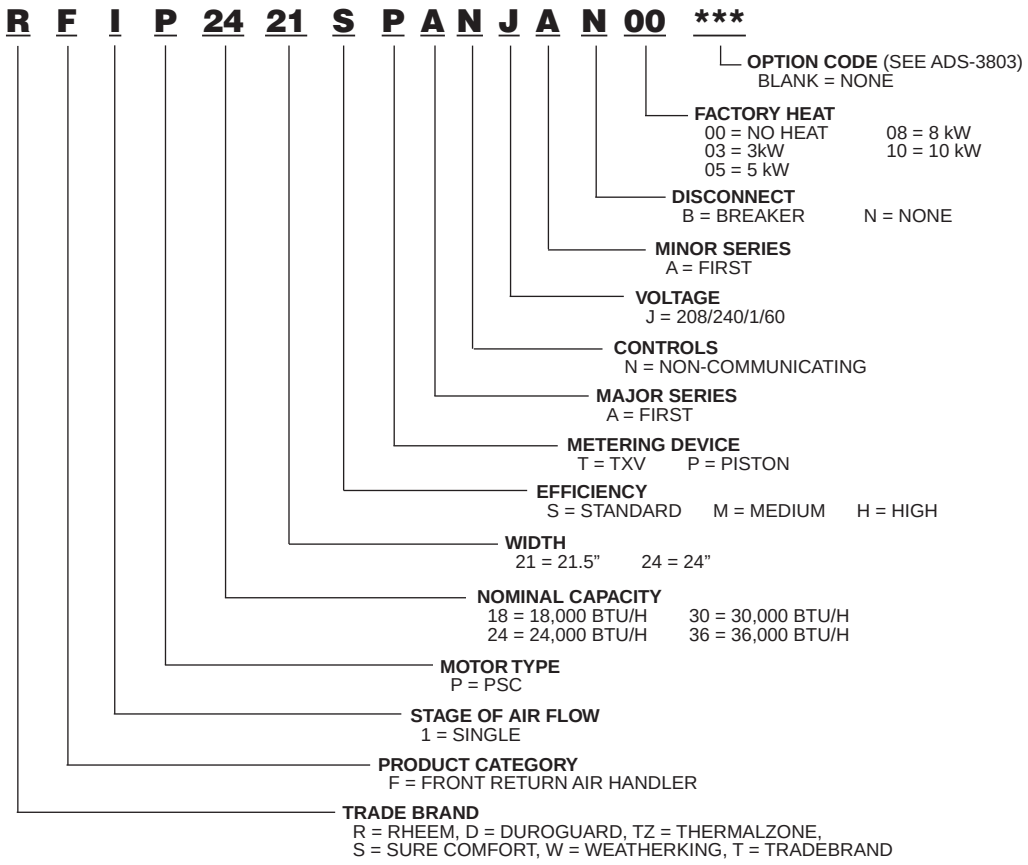
- After unit has been delivered to job site, remove carton taking care not to damage unit.
- Check the unit rating plate for unit size, electric heat, coil, voltage, phase, etc. to be sure equipment matches what is required for the job specification.
- Read the entire instructions before starting the installation.
- 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 pre-vent 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 necessary access to the coil/filter rack 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".
- 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.

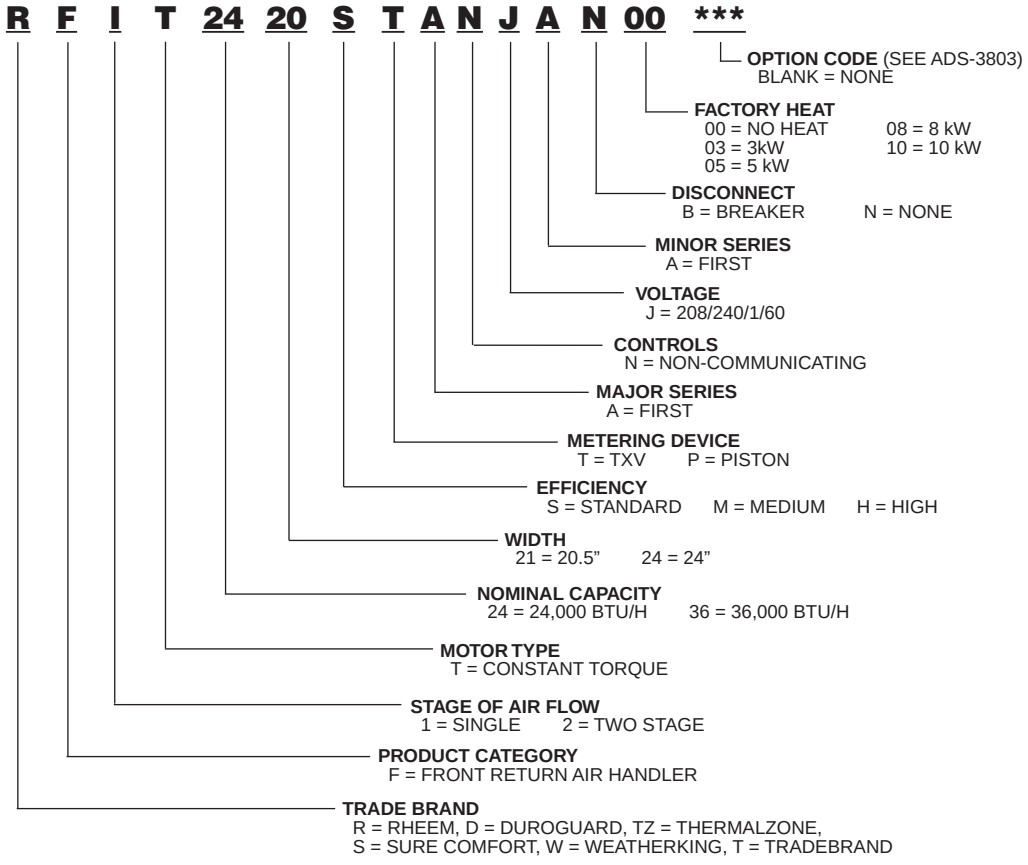
## 2.3 CLEARANCES

- All units are designed for "0" inches clearance to combustible material on all cabinet surfaces.
- Units with electric heat require a one inch clearance to combustible material for the first three feet of supply plenum and ductwork.
- All units require 24 inches minimum access to the front of the unit for service.
- These units may be installed in either ventilated or non-ventilated spaces.

## 2.4 MODEL NUMBER EXPLANATION

**FIGURE 2**
**MODEL NUMBER EXPLANATION**



## 2.4A AVAILABLE MODELS

**AVAILABLE MODELS AT J VOLTAGE**

| | | |
|---|---|---|
| RFIP1821SPAN | | RFIP3624STAN |
| RFIP2421SPAN | | RFIT3624STAN |
| RFIP3024SPAN | | RFIT2421STAN |
| RFIP3624SPAN | | |

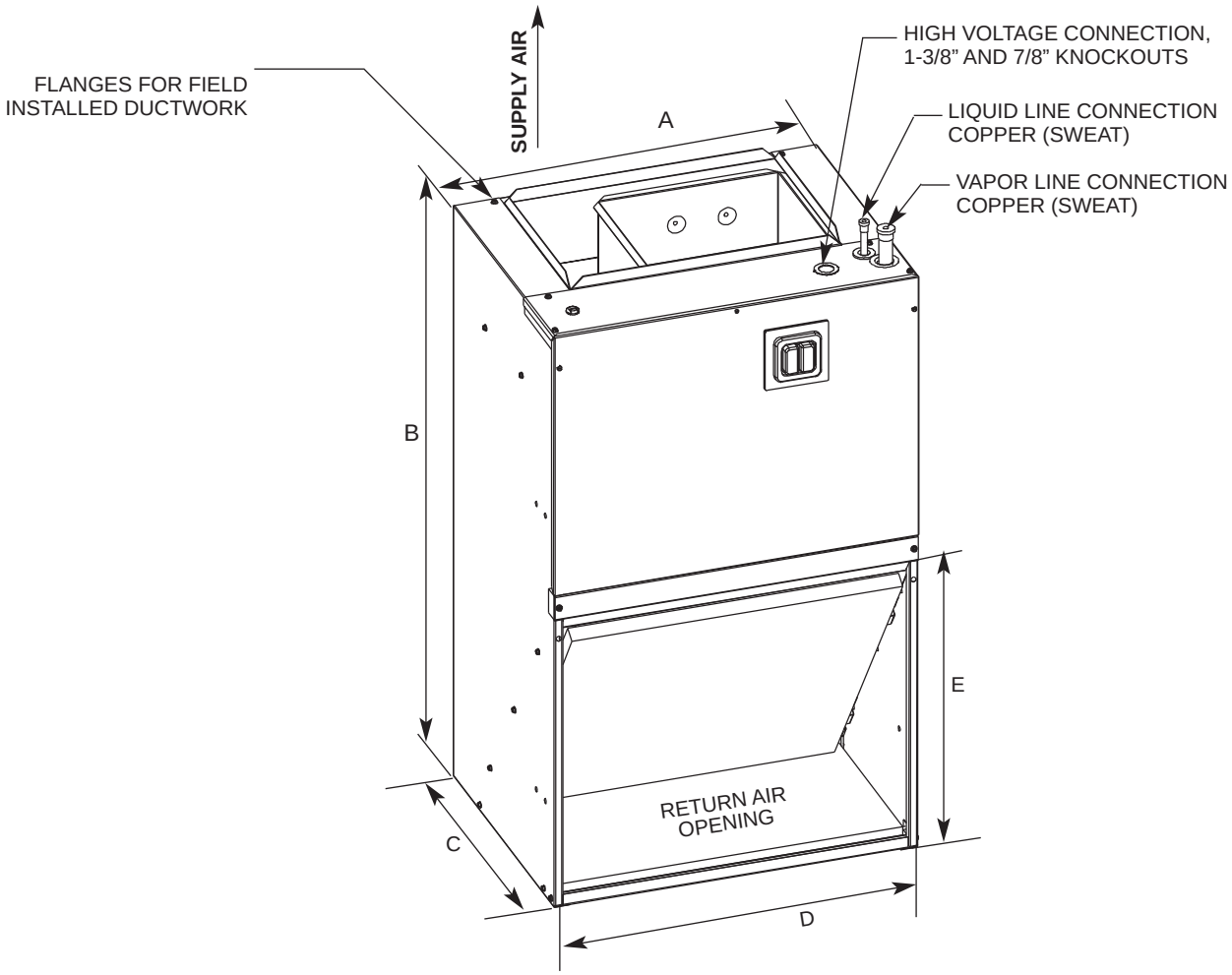
**Notes:**

- Supply circuit protective devices may be fuses or “HACR” type circuit breakers.
- Largest motor load is included in single circuit and multiple circuit 1.
- If non-standard fuse size is specified, use next size larger fuse size.
- J Voltage (208/240V) single phase air handler is designed to be used with single or three phase 208/240V power. In the case of connecting 3-phase power to the air handler terminal block, bring only two leads to the terminal block. Cap, insulate and fully secure the third lead.
- The air handlers are shipped from the factory with the proper indoor coil installed, and cannot be ordered without a coil.

## 2.5 DIMENSIONS & WEIGHTS

**FIGURE 3**
**DIMENSIONS AND WEIGHTS**

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




ALL UNITS ARE CONFIGURED FOR VERTICAL UPFLOW. UNITS CANNOT BE INSTALLED IN ANY OTHER CONFIGURATION.

**FRONT RETURN SHOWN. UNITS MAY ALSO BE INSTALLED AS BOTTOM RETURN. SEE THE APPLICATIONS SECTION FOR MORE DETAIL.**

### DIMENSIONAL DATA

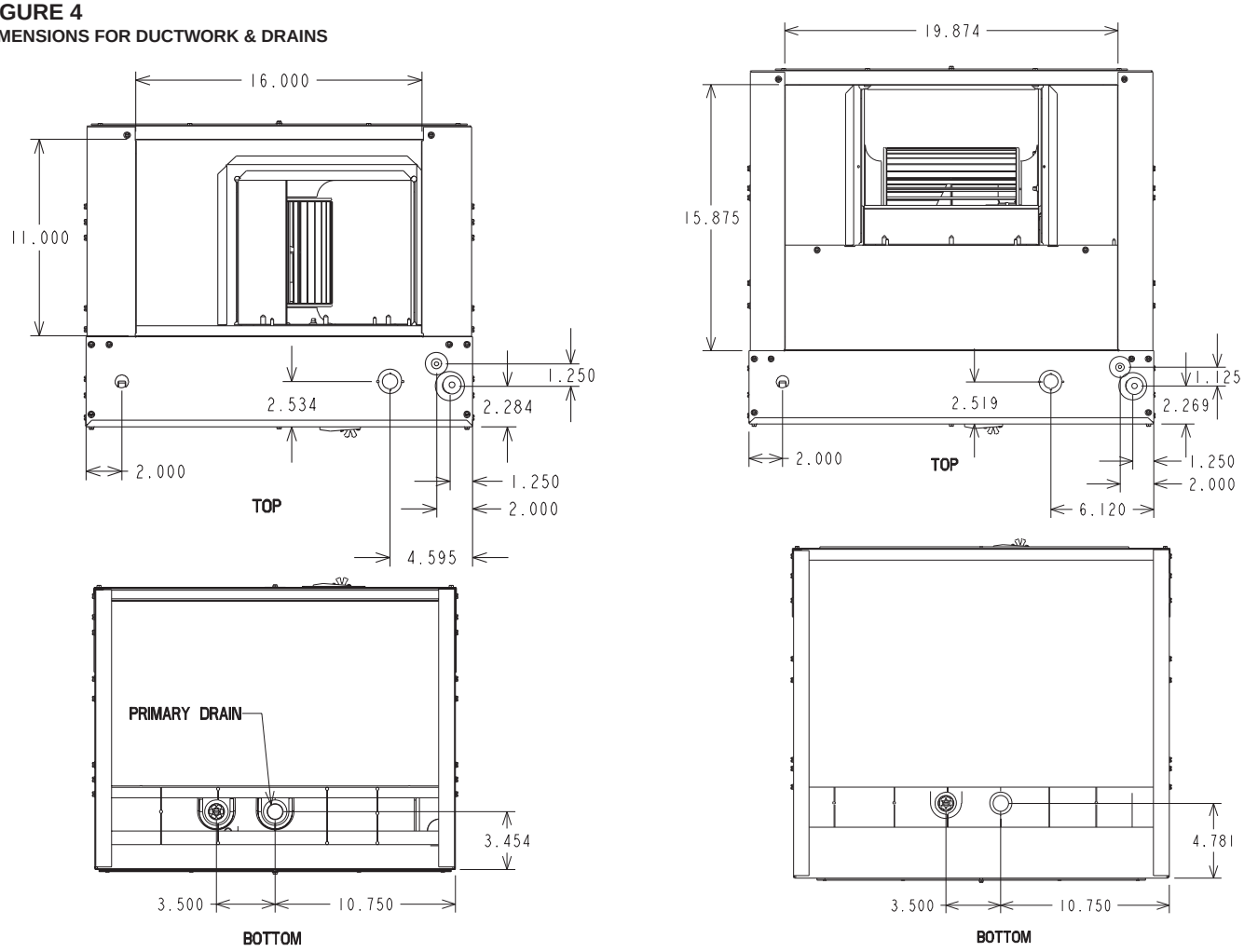
| MODEL | (A) UNIT WIDTH IN. [mm] | (B) UNIT HEIGHT IN. [mm] | (C) UNIT DEPTH IN. [mm] | (D) RETURN AIR OPENING WIDTH IN. [mm] | (E) RETURN AIR OPENING HEIGHT IN. [mm] | AIRFLOW COIL / [L/s] | UNIT WEIGHT / SHIPPING WEIGHT LBS. / [kg] |
|---|---|---|---|---|---|---|---|
| **RFIP18** | 21-1/2 [546.1] | 36 [914.4] | 17 [431.8] | 20 [508] | 17-7/16 [442.9] | 600 [283] | 80/90 [36]/[41] |
| **RFIP24** | 21-1/2 [546.1] | 36 [914.4] | 17 [431.8] | 20 [508] | 17-7/16 [442.9] | 800 [378] | 80/90 [36]/[41] |
| **RFIP30** | 24 [609.6] | 36 [914.4] | 21 [533.4] | 23 [584.2] | 21-3/8 [542.9] | 1000 [472] | 95/105 [43]/[48] |
| **RFIP36** | 24 [609.6] | 36 [914.4] | 21 [533.4] | 23 [584.2] | 21-3/8 [542.9] | 1200 [566] | 95/105 [43]/[48] |
| **RFIT24** | 21-1/2 [546.1] | 36 [914.4] | 17 [431.8] | 20 [508] | 17-7/16 [442.9] | 600/800 [283/378] | 80/90 [36]/[41] |
| **RFIT36** | 24 [609.6] | 36 [914.4] | 21 [533.4] | 23 [584.2] | 21-3/8 [542.9] | 1000/1200 [472/566] | 95/105 [43]/[48] |

# 3.0 APPLICATIONS

## 3.1 VERTICAL UPFLOW

- Vertical Upflow is the factory configuration for all models (see Figure 3).
- If return air is to be ducted, install duct flush with floor. Use fireproof resilient gasket 1/8 to 1/4 in. thick between duct, unit and floor. Set unit on floor over opening.

**FIGURE 4**
**DIMENSIONS FOR DUCTWORK & DRAINS**




# 4.0 AIR HANDLER MOUNTING OPTIONS

The air handler comes standard with two different options for mounting, wall mount or frame mount. Both mounting options require the unit to be level from side to side and from front to back in order to allow condensate to properly drain from the unit. Failure to do this will result in condensate to leak out from the unit potentially causing structural damage to the surrounding support structures, dry wall, carpet, etc. around the unit. Also, both mounting structures require the ability to accommodate a minimum of 150 lb. load. Failure to do this will cause damage to the support structure and potentially damage the unit.

## 4.1 WALL MOUNT

The air handler comes standard with a wall mounting bracket and air handler mounting bracket. Reference figure 5 for more detail.

1. Remove the wall mounting bracket from the back of the unit by removing one screw which attaches the bracket to the air handler. Note: Discard the screw after you have removed the wall mounting bracket.
2. Install bracket one the wall by using 6 wood screws (not provided). Make sure the bracket is level in order to provided proper drainage from the unit. Note: Do not attach the wall mounting bracket into unsupported dry wall. Make sure that the wood screws are going into a structure that can support a minimum of 150 lb load.

3. Lift the air handler above the wall mounting bracket and attached the unit to the installed bracket. Reference figure 5.

## 4.2 FRAME MOUNT

The air handler comes with 8 clearance holes 4 on each side. These holes are used to mount the air handler inside of a frame structure (see figure 6). When mounting in this fashion, make sure that the wood screws are mounted from within the air handler and not outside of the unit. Installing the screws from the outside could cause damage to the coil.

**FIGURE 5**
**WALL MOUNT**

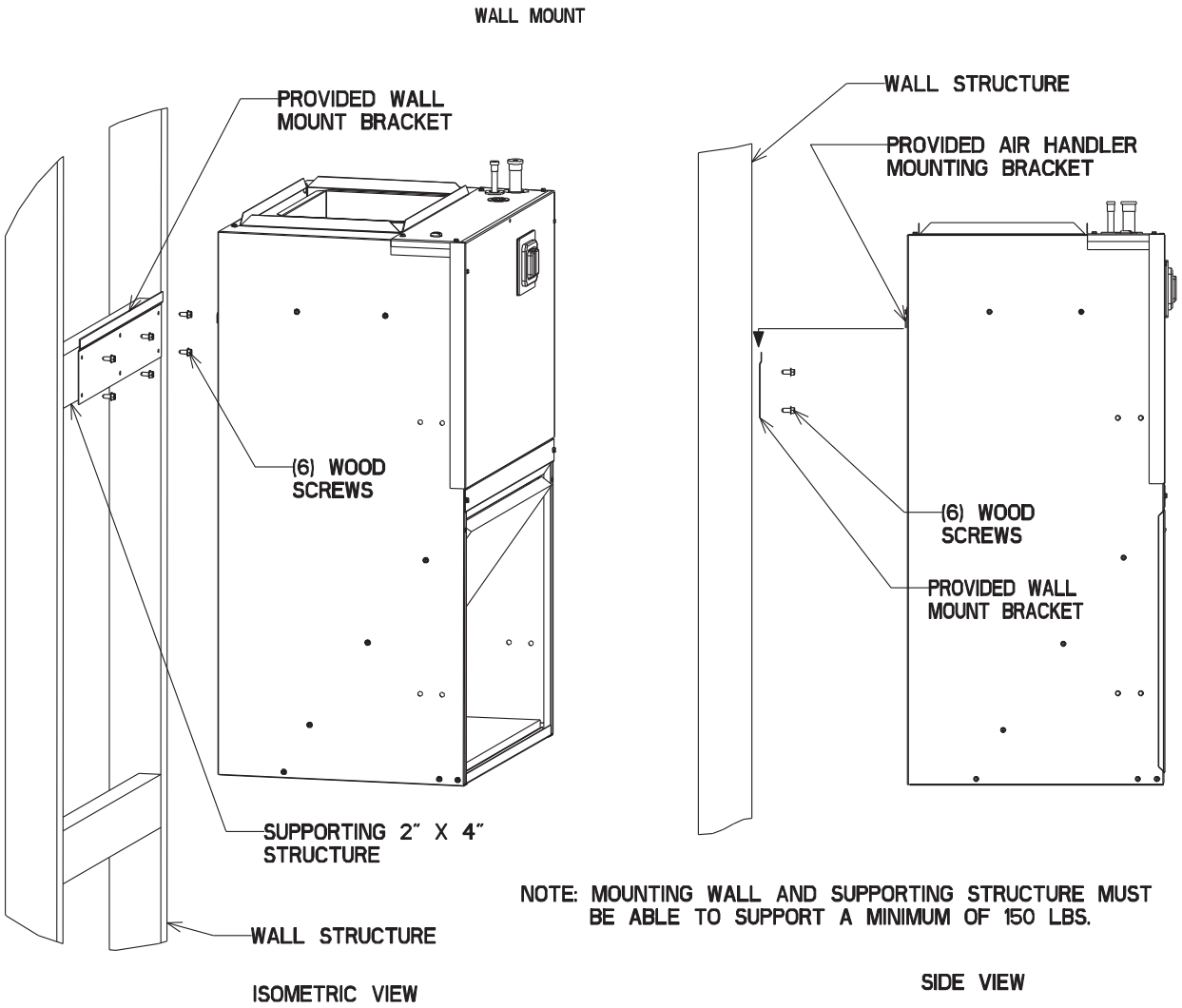
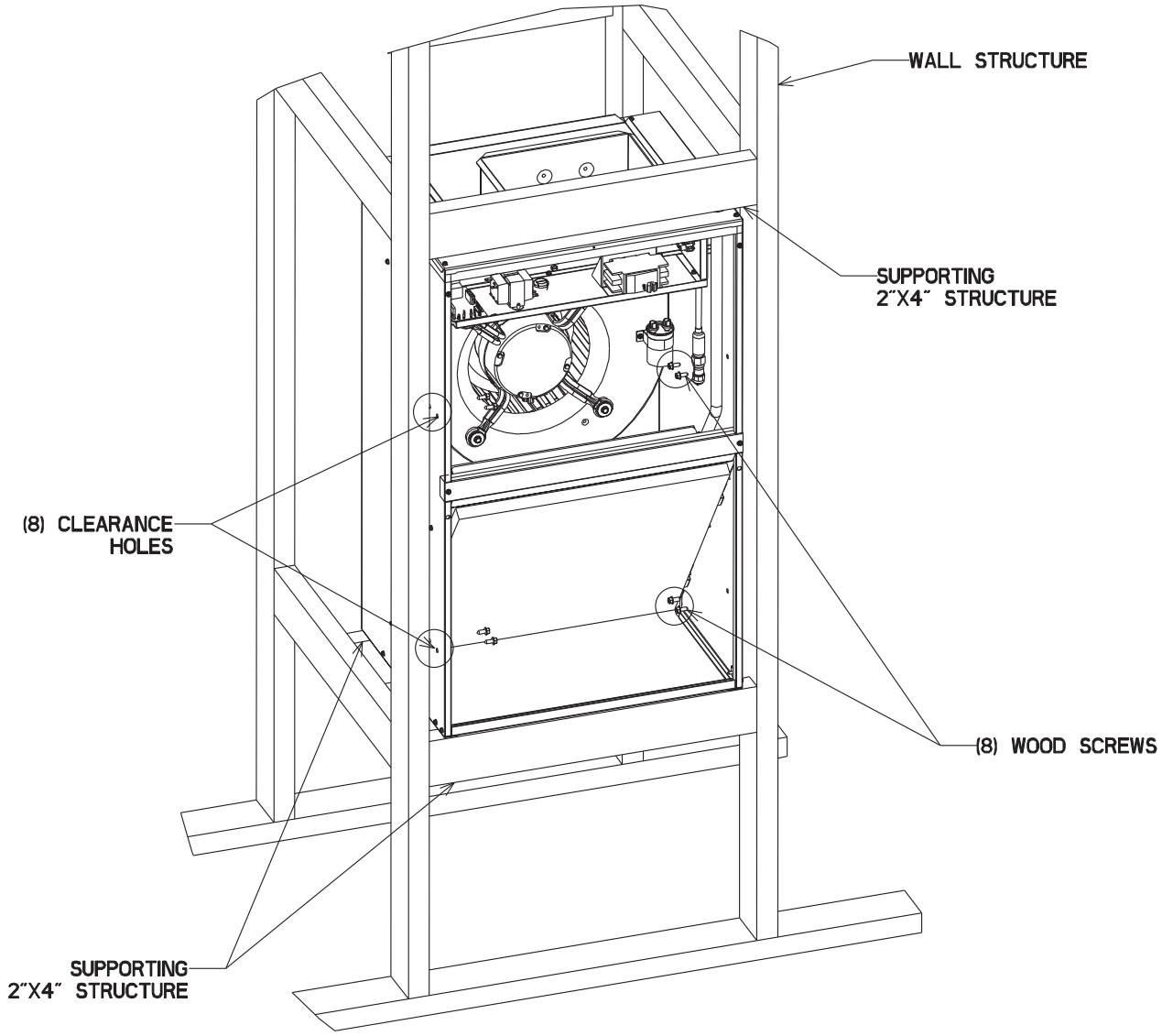


**FIGURE 6**
**FRAME MOUNT**




# 5.0 ELECTRICAL WIRING

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

**⚠ 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.**

## 5.1 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.

- If required, install a branch circuit disconnect of adequate size, located within sight of, and readily accessible to the unit.
- **IMPORTANT:** After the Electric Heater is installed, units may be equipped with a circuit breaker. This circuit breaker protects the internal wiring in the event of a short circuit and serves as a disconnect. Circuit breakers installed within the unit do not pro-

vide 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 in this section for ampacity, wire size and circuit protector requirement. Supply circuit protective devices may be either fuses or “HACR” type circuit breakers.
- Power wiring is connected through the $^{7}/_{8}$” or $1^{3}/_{8}$” knockout located on the top right hand side of the unit.
- Power wiring is connected to the power terminal block in unit control compartment.

## 5.2 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. For lengths longer than 100 ft., 16 Awg. wire should be used.
- Low voltage control connections are made to low voltage pigtails extending from top of air handler. Connections for control wiring are made with wire nuts. Control wiring knockouts are also provided on the left side of the unit.
- See wiring diagrams attached to indoor and outdoor sections to be connected, or control wiring diagram booklet supplied with outdoor heat pump section for wiring connection.
- Make sure, after installation, separation of control wiring and power wiring has been maintained.

## 5.3 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.
- Use of multiple supply circuits require grounding of each circuit to lug(s) provided in unit.

## 5.4 ELECTRICAL WIRING

**POWER WIRING**

- Field wiring must comply with the National Electrical Code (C.E.C. in Canada) and any applicable local ordinance.
- Supply wiring must be 75°C minimum copper conductors only.
- See electrical data for product Ampacity rating and Circuit Protector requirement.

**GROUNDING**

- This product must be sufficiently grounded in accordance with National Electrical Code (C.E.C. in Canada) and any applicable local ordinance.
- A grounding lug is provided.

## 5.5 ELECTRICAL DATA – BLOWER MOTOR ONLY – NO ELECTRIC HEAT

### 5.5A Electrical Data – Blower Motor Only – No Electric Heat: RFIP

| MODEL/ NOMINAL COOLING TONS | VOLTAGE | PHASE | HERTZ | HP | RPM | SPEEDS | CIRCUIT AMPS | MINIMUM CIRCUIT AMPACITY | MAXIMUM CIRCUIT PROTECTION |
|---|---|---|---|---|---|---|---|---|---|
| RFIP18 | 208/230 | 1 | 60 | 1/5 | 1075 | 2 | 1.5 | 3 | 15 |
| RFIP24 | 208/230 | 1 | 60 | 1/5 | 1075 | 2 | 1.5 | 3 | 15 |
| RFIP30 | 208/230 | 1 | 60 | 1/4 | 1075 | 2 | 2.5 | 4 | 15 |
| RFIP36 | 208/230 | 1 | 60 | 1/3 | 1075 | 2 | 2.5 | 4 | 15 |

### 5.5B Electrical Data – Blower Motor Only – No Electric Heat: RFIT

| MODEL/ NOMINAL COOLING TONS | VOLTAGE | PHASE | HERTZ | HP | RPM | SPEEDS | CIRCUIT AMPS | MINIMUM CIRCUIT AMPACITY | MAXIMUM CIRCUIT PROTECTION |
|---|---|---|---|---|---|---|---|---|---|
| 1.5 | 208/230 | 1 | 60 | 1/3 | 300-1100 | 4 | 1.6 | 3 | 15 |
| 2 | 208/230 | 1 | 60 | 1/3 | 300-1100 | 4 | 1.6 | 3 | 15 |
| 2.5 | 208/230 | 1 | 60 | 1/2 | 300-1100 | 4 | 2.7 | 4 | 15 |
| 3 | 208/230 | 1 | 60 | 1/2 | 300-1100 | 4 | 2.7 | 4 | 15 |

*Blower motors are all single phase motors.

## 5.6 ELECTRICAL DATA – WITH ELECTRIC HEAT

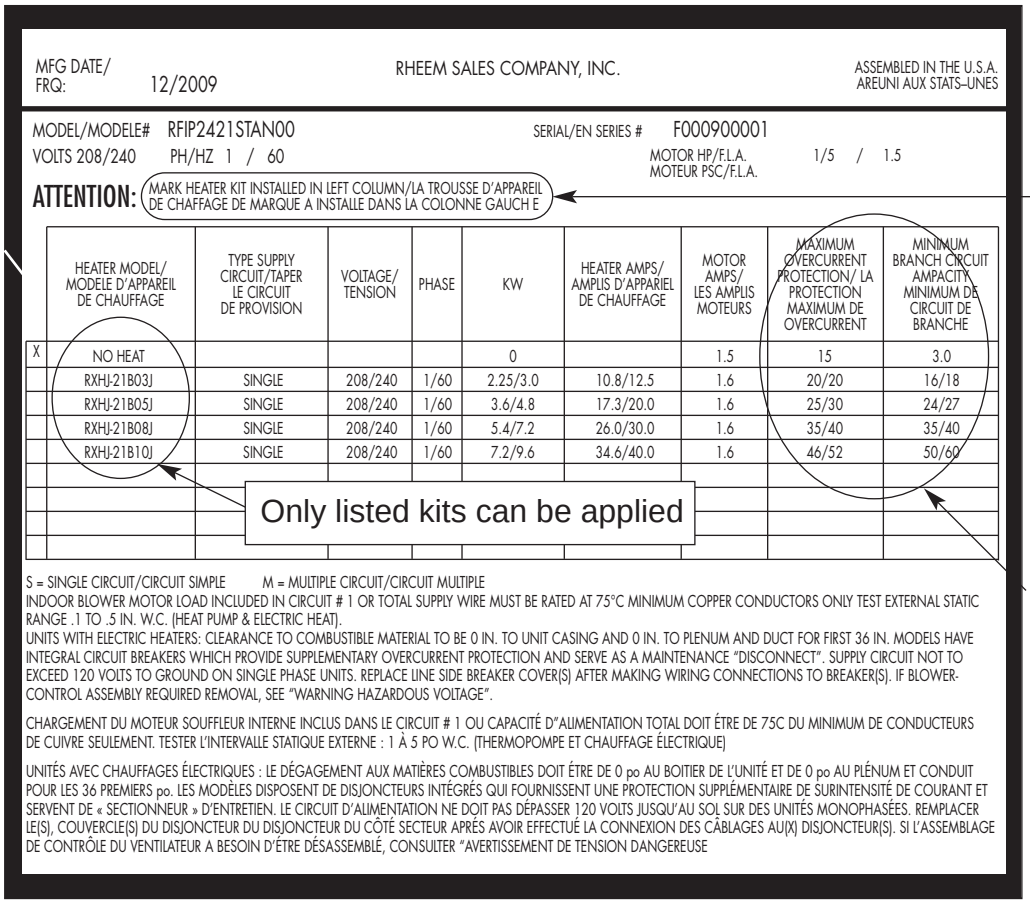
**Installation of the UL Listed original equipment manufacturer provided heater kits listed in the following table is recommended for all auxiliary heating requirements.**

## 5.6A ELECTRICAL DATA – WITH ELECTRIC HEAT: RFIP/RFIT

| COOLING CAPACITY TONS | MODEL NO. | HEATER KW (208/240V) | PH/HZ | NO. ELEMENTS - KW PER | TYPE SUPPLY CIRCUIT | CIRCUIT AMPS. | MOTOR AMPACITY | MINIMUM CIRCUIT AMPACITY | MAXIMUM CIRCUIT PROTECTION |
|---|---|---|---|---|---|---|---|---|---|
| RFIP/RFIT 18 | RXHJ-21B03J | 2.25/3.0 | 1/60 | 1-3.0 | SINGLE | 10.8/12.5 | 1.5 | 16/18 | 20/20 |
| | RXHJ-21B05J | 3.6/4.8 | 1/60 | 1-4.8 | SINGLE | 17.3/20.0 | 1.5 | 24/27 | 25/30 |
| | RXHJ-21B08J | 5.4/7.2 | 1/60 | 2-3.6 | SINGLE | 26.0/30.0 | 1.5 | 35/40 | 35/40 |
| RFIP/RFIT 24 | RXHJ-21B03J | 2.25/3.0 | 1/60 | 1-3.0 | SINGLE | 10.8/12.5 | 1.5 | 16/18 | 20/20 |
| | RXHJ-21B05J | 3.6/4.8 | 1/60 | 1-4.8 | SINGLE | 17.3/20.0 | 1.5 | 24/27 | 25/30 |
| | RXHJ-21B08J | 5.4/7.2 | 1/60 | 2-3.6 | SINGLE | 26.0/30.0 | 1.5 | 35/40 | 35/40 |
| | RXHJ-21B10J | 7.2/9.6 | 1/60 | 2-4.8 | SINGLE | 34.6/40.0 | 1.5 | 46/52 | 50/60 |
| RFIP/RFIT 30 | RXHJ-24B03J | 2.25/3.0 | 1/60 | 1-3.0 | SINGLE | 10.8/12.5 | 2.5 | 17/19 | 20/20 |
| | RXHJ-24B05J | 3.6/4.8 | 1/60 | 1-4.8 | SINGLE | 17.3/20.0 | 2.5 | 25/29 | 25/30 |
| | RXHJ-24B08J | 5.4/7.2 | 1/60 | 2-3.6 | SINGLE | 26.0/30.0 | 2.5 | 36/41 | 40/45 |
| | RXHJ-24B10J | 7.2/9.6 | 1/60 | 2-4.8 | SINGLE | 34.6/40.0 | 2.5 | 47/54 | 50/60 |
| RFIP/RFIT 36 | RXHJ-24B03J | 2.25/3.0 | 1/60 | 1-3.0 | SINGLE | 10.8/12.5 | 2.5 | 17/19 | 20/20 |
| | RXHJ-24B05J | 3.6/4.8 | 1/60 | 1-4.8 | SINGLE | 17.3/20.0 | 2.5 | 25/29 | 25/30 |
| | RXHJ-24B08J | 5.4/7.2 | 1/60 | 2-3.6 | SINGLE | 26.0/30.0 | 2.5 | 36/41 | 40/45 |
| | RXHJ-24B10J | 7.2/9.6 | 1/60 | 2-4.8 | SINGLE | 34.6/40.0 | 2.5 | 47/54 | 50/60 |

**NOTES:**
- Electric heater BTUH - (heater watts + motor watts) x 3.414 (see airflow table for motor watts.)
- Supply circuit protective devices may be fuses or “HACR” type circuit breakers.
- If non-standard fuse size is specified, use next size larger standard fuse size.
- Largest motor load is included in single circuit or circuit 1 of multiple circuits.
- J Voltage (230V) single phase air handler is designed to be used with single or three phase 230 volt electric heaters. In the case of connecting 3 phase power to air handler terminal block without the heater, bring only two leads to terminal block, cap, insulate and fully secure the third lead.

## 5.6B HEATER KIT SUPPLEMENTAL INFORMATION



MFG DATE/ FRQ: 12/2009

RHEEM SALES COMPANY, INC.

ASSEMBLED IN THE U.S.A. AREUNI AUX STATS–UNES

MODEL/MODELE# RFIP2421STAN00 SERIAL/EN SERIES # F000900001

VOLTS 208/240 PH/HZ 1 / 60 MOTOR HP/F.L.A. 1/5 / 1.5
MOTEUR PSC/F.L.A.

ATTENTION: MARK HEATER KIT INSTALLED IN LEFT COLUMN/LA TROUSSE D'APPAREIL DE CHAFFAGE DE MARQUE A INSTALLE DANS LA COLONNE GAUCH E

| | HEATER MODEL/ MODELE D'APPAREIL DE CHAUFFAGE | TYPE SUPPLY CIRCUIT/TAPER LE CIRCUIT DE PROVISION | VOLTAGE/ TENSION | PHASE | KW | HEATER AMPS/ AMPLIS D'APPARIEL DE CHAUFFAGE | MOTOR AMPS/ LES AMPLIS MOTEURS | MAXIMUM OVERCURRENT PROTECTION/ LA PROTECTION MAXIMUM DE OVERCURRENT | MINIMUM BRANCH CIRCUIT AMPACITY MINIMUM DE CIRCUIT DE BRANCHE |
|---|---|---|---|---|---|---|---|---|---|
| X | NO HEAT | | | | 0 | | 1.5 | 15 | 3.0 |
| | RXHJ-21B03J | SINGLE | 208/240 | 1/60 | 2.25/3.0 | 10.8/12.5 | 1.6 | 20/20 | 16/18 |
| | RXHJ-21B05J | SINGLE | 208/240 | 1/60 | 3.6/4.8 | 17.3/20.0 | 1.6 | 25/30 | 24/27 |
| | RXHJ-21B08J | SINGLE | 208/240 | 1/60 | 5.4/7.2 | 26.0/30.0 | 1.6 | 35/40 | 35/40 |
| | RXHJ-21B10J | SINGLE | 208/240 | 1/60 | 7.2/9.6 | 34.6/40.0 | 1.6 | 46/52 | 50/60 |

Only listed kits can be applied

S = SINGLE CIRCUIT/CIRCUIT SIMPLE M = MULTIPLE CIRCUIT/CIRCUIT MULTIPLE

INDOOR BLOWER MOTOR LOAD INCLUDED IN CIRCUIT # 1 OR TOTAL SUPPLY WIRE MUST BE RATED AT 75°C MINIMUM COPPER CONDUCTORS ONLY TEST EXTERNAL STATIC RANGE .1 TO .5 IN. W.C. (HEAT PUMP & ELECTRIC HEAT).

UNITS WITH ELECTRIC HEATERS: CLEARANCE TO COMBUSTIBLE MATERIAL TO BE 0 IN. TO UNIT CASING AND 0 IN. TO PLENUM AND DUCT FOR FIRST 36 IN. MODELS HAVE INTEGRAL CIRCUIT BREAKERS WHICH PROVIDE SUPPLEMENTARY OVERCURRENT PROTECTION AND SERVE AS A MAINTENANCE "DISCONNECT". SUPPLY CIRCUIT NOT TO EXCEED 120 VOLTS TO GROUND ON SINGLE PHASE UNITS. REPLACE LINE SIDE BREAKER COVER(S) AFTER MAKING WIRING CONNECTIONS TO BREAKER(S). IF BLOWER-CONTROL ASSEMBLY REQUIRED REMOVAL, SEE "WARNING HAZARDOUS VOLTAGE".

CHARGEMENT DU MOTEUR SOUFFLEUR INTERNE INCLUS DANS LE CIRCUIT # 1 OU CAPACITÉ D"ALIMENTATION TOTAL DOIT ÊTRE DE 75C DU MINIMUM DE CONDUCTEURS DE CUIVRE SEULEMENT. TESTER L'INTERVALLE STATIQUE EXTERNE : 1 À 5 PO W.C. (THERMOPOMPE ET CHAUFFAGE ÉLECTRIQUE)

UNITÉS AVEC CHAUFFAGES ÉLECTRIQUES : LE DÉGAGEMENT AUX MATIÈRES COMBUSTIBLES DOIT ÊTRE DE 0 po AU BOITIER DE L'UNITÉ ET DE 0 po AU PLÉNUM ET CONDUIT POUR LES 36 PREMIERS po. LES MODÈLES DISPOSENT DE DISJONCTEURS INTÉGRÉS QUI FOURNISSENT UNE PROTECTION SUPPLÉMENTAIRE DE SURINTENSITÉ DE COURANT ET SERVENT DE « SECTIONNEUR » D'ENTRETIEN. LE CIRCUIT D'ALIMENTATION NE DOIT PAS DÉPASSER 120 VOLTS JUSQU'AU SOL SUR DES UNITÉS MONOPHASÉES. REMPLACER LE(S), COUVERCLE(S) DU DISJONCTEUR DU DISJONCTEUR DU CÔTÉ SECTEUR APRÈS AVOIR EFFECTUÉ LA CONNEXION DES CÂBLAGES AU(X) DISJONCTEUR(S). SI L'ASSEMBLAGE DE CONTRÔLE DU VENTILATEUR A BESOIN D'ÊTRE DÉSASSEMBLÉ, CONSULTER "AVERTISSEMENT DE TENSION DANGEREUSE

Contractor should "mark or check" the left column for the kit installed

These are the required maximum and minimum circuit breaker sizes for overcurrent protection and should not be confused with the size of the breakers installed in the heater kit.

Heater Kit Supplemental Information: What allows the manufacturer to use standard Circuit Breakers up to 60 amps inside the air handler, when using an approved Heater Kit?

National Electric Code (Section 424-22b) and our UL requirements allow us to subdivide heating element circuits, of less than 48 amps, using breakers of not more than 60 amps and, additionally by, NEC 424-3b, a rating not less than 125 percent of the load and NEC 424-22c, which describes the supplementary overcurrent protection required to be factory-installed within, or on the heater. The breakers in the heater kit are not, and have never been, by NEC, intended to protect power wiring leading to the air handler unit. The breakers in the heating kit are for short circuit protection. All internal unit wiring, where the breakers apply, has been UL approved for short circuit protection.

Ampacity, (not breaker size), determines supply circuit wire size. The ampacity listed on the unit rating plate and the Maximum and Minimum circuit breaker size (noted above) or in the units specification sheet or installation instructions provides the information to properly select wire and circuit breaker/protector size. The National Electric Code (NEC) specifies that the supply or branch circuit must be protected at the source.

# 6.0 AIRFLOW PERFORMANCE

Airflow performance data is based on cooling performance with a 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 .3 to .7 in W.C. external static range. Units with coils should be applied with a minimum of .1 in W.C. external static.

## 6.1 AIRFLOW OPERATING LIMITS

| **Cooling Tons Nominal** | **1.5** | **2** | **2.5** | **3** |
|---|---|---|---|---|
| Heat Pump or Air Conditioning Maximum Heat/Cool CFM [L/s] (37.5 CFM [18 L/s]/1,000 BTUH) (450 CFM [212 L/s]/Ton Nominal) | 675 [319] | 900 [425] | 1125 [531] | 1350 [637] |
| Heat Pump or Air Conditioning Nominal Heat/Cool CFM [L/s] (33.3 CFM [16 L/s]/1,000 BTUH) (400 CFM [189 L/s]/Ton Nominal) | 600 [283] | 800 [378] | 1000 [472] | 1200 [566] |
| Heat Pump or Air Conditioning Minimum Heat/Cool CFM [L/s] (30.0 CFM [14 L/s]/1,200 BTUH) (360 CFM [170 L/s]/Ton Nominal) | 540 [255] | 720 [340] | 900 [425] | 1080 [510] |
| Maximum kW Electric Heating & Minimum Electric Heat CFM [L/s] | 8 450 [212] | 10 690 [325] | 10 690 [325] | 10 690 [325] |
| Maximum Electric Heat Rise °F [°C] | 53° [11.65] | 93° [33.8] | 93° [33.8] | 93° [33.8] |

## 6.2 240V AIRFLOW PERFORMANCE DATA – RFIP (PSC MOTOR)

| Nominal Cooling Capacity Tons | Manufacturer Recommended Air-Flow Range (Max/Min) CFM | Blower Size/ Motor HP # of Speeds | Motor Speed From Factory | Motor Speed | PSC CFM Dry Delivery/filter/heaters/RPM/Watts External Static Pressure-Inches W.C. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 0.10 | 0.20 | 0.30 | 0.40 | 0.50 | 0.60 | 0.70 |
| 1.5 | 873/438 | 10X6 1/5 Hp 2 speed dual voltage | High | High | CFM | 873 | 828 | 785 | 751 | 707 | — | — |
| | | | | | RPM | 897 | 923 | 948 | 955 | 981 | — | — |
| | | | | | Watts | 288 | 286 | 283 | 280 | 274 | — | — |
| | | | | Low | CFM | 572 | 543 | 508 | 477 | 438 | — | — |
| | | | | | RPM | 706 | 753 | 791 | 830 | 869 | — | — |
| | | | | | Watts | 184 | 181 | 187 | 178 | 172 | — | — |
| 2 | 1137/764 | 10X6 1/5 Hp 2 speed dual voltage | High | High | CFM | 1137 | 1097 | 1034 | 985 | 933 | 868 | 810 |
| | | | | | RPM | 1101 | 1104 | 1114 | 1118 | 1124 | 1130 | 1136 |
| | | | | | Watts | 438 | 444 | 446 | 421 | 391 | 377 | 360 |
| | | | | Low | CFM | 867 | 855 | 827 | 798 | 764 | — | — |
| | | | | | RPM | 864 | 902 | 948 | 978 | 1002 | — | — |
| | | | | | Watts | 324 | 317 | 290 | 285 | 283 | — | — |
| 2.5 | 1148/802 | 10X8T 1/4 Hp 2 speed dual voltage | High | High | CFM | 1148 | 1104 | 1040 | 980 | 926 | 855 | 750 |
| | | | | | RPM | 862 | 889 | 918 | 943 | 962 | 984 | 1012 |
| | | | | | Watts | 411 | 420 | 379 | 367 | 369 | 350 | 317 |
| | | | | Low | CFM | 1000 | 958 | 910 | 853 | 802 | — | — |
| | | | | | RPM | 788 | 823 | 855 | 889 | 914 | — | — |
| | | | | | Watts | 343 | 344 | 346 | 322 | 317 | — | — |
| 3 | 1363/1048 | 10X8T 1/3 Hp 2 speed dual voltage | High | High | CFM | 1363 | 1303 | 1240 | 1169 | 1096 | 1030 | — |
| | | | | | RPM | 1029 | 1047 | 1060 | 1082 | 1095 | 1104 | — |
| | | | | | Watts | 515 | 514 | 468 | 428 | 428 | 394 | — |
| | | | | Low | CFM | 1196 | 1158 | 1105 | 1048 | — | — | — |
| | | | | | RPM | 958 | 984 | 1012 | 1037 | — | — | — |
| | | | | | Watts | 423 | 402 | 402 | 360 | — | — | — |

**NOTE:**

- All 208/240V PSC motors have voltage taps for 208 and 240 volts.
- All 208/240V PSC motors have shipped on high speed and 240 volts.
- If the application external static is less than 0.5" WC, adjust the motor speed to the low static speed as described below.
  - Unplug the black motor wire off the relay on the control board and plug in the red motor wire.
  - Replace the cap on the black motor wire.
- Voltage change (208/240V motors):
  - Move the orange lead to transformer 208V tap. Replace the wire cap on 240V tap.
  - Unplug the purple motor wire off the transformer and plug in the yellow motor wire.
  - Replace the cap on the purple motor wire.
- The above airflow table lists the airflow information for air handlers with maximum heater allowed for each mode.

## 6.3 208/240V AIRFLOW PERFORMANCE DATA – RFIT (CONSTANT TORQUE MOTOR)

| Nominal Cooling Capacity Tons | Manufacturer Recommended Air-Flow Range (Max/Min) CFM | Blower Size/ Motor HP # of Speeds | Motor Speed From Factory | Motor Speed | X-13 CFM Dry Delivery/filter/heaters/RPM/Watts External Static Pressure-Inches W.C. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 0.10 | 0.20 | 0.30 | 0.40 | 0.50 | 0.60 | 0.70 |
| 1.5 | 825/510 | 10X6 1/3 Hp 2 speed dual voltage | 5 | 3 | CFM | 852 | 823 | 792 | 770 | 738 | 713 | 690 |
| | | | | | RPM | 847 | 881 | 915 | 949 | 989 | 1026 | 1057 |
| | | | | | Watts | 162 | 151 | 144 | 168 | 182 | 196 | 178 |
| | | | 5 | 2 | CFM | 669 | 628 | 593 | 552 | 510 | — | — |
| | | | | | RPM | 669 | 713 | 760 | 806 | 852 | — | — |
| | | | | | Watts | 80 | 87 | 82 | 94 | 86 | — | — |
| 2 | 973/733 | 10X6 1/3 Hp 2 speed dual voltage | 5 | 5 | CFM | 973 | 945 | 922 | 896 | 872 | 852 | 833 |
| | | | | | RPM | 956 | 991 | 1020 | 1054 | 1082 | 1117 | 1145 |
| | | | | | Watts | 222 | 221 | 247 | 256 | 253 | 261 | 260 |
| | | | 5 | 4 | CFM | 841 | 807 | 780 | 753 | 733 | — | — |
| | | | | | RPM | 849 | 890 | 925 | 957 | 992 | — | — |
| | | | | | Watts | 160 | 168 | 179 | 187 | 187 | — | — |
| 2.5 | 1145/894 | 10X8 1/2 Hp 2 speed dual voltage | 5 | 3 | CFM | 1145 | 1122 | 1084 | 1064 | 1055 | 1025 | 1002 |
| | | | | | RPM | 767 | 780 | 797 | 820 | 855 | 900 | 954 |
| | | | | | Watts | 240 | 237 | 239 | 245 | 274 | 276 | 306 |
| | | | 5 | 2 | CFM | 1037 | 1005 | 956 | 924 | 894 | — | — |
| | | | | | RPM | 798 | 845 | 901 | 945 | 980 | — | — |
| | | | | | Watts | 199 | 213 | 196 | 226 | 237 | — | — |
| 3 | 1306/1040 | 10X8 1/2 Hp 2 speed dual voltage | 5 | 5 | CFM | 1306 | 1268 | 1223 | 1195 | 1162 | 1128 | 1093 |
| | | | | | RPM | 887 | 933 | 986 | 1019 | 1056 | 1096 | 1133 |
| | | | | | Watts | 307 | 313 | 313 | 339 | 373 | 356 | 370 |
| | | | 5 | 4 | CFM | 1201 | 1163 | 1129 | 1094 | 1065 | 1040 | — |
| | | | | | RPM | 866 | 914 | 964 | 999 | 1032 | — | — |
| | | | | | Watts | 278 | 286 | 301 | 324 | 348 | — | — |

**NOTE:**
Constant torque speed changes

All constant torque motors have 5 speed taps. Speed tap 1 is for continuous fan. Speed tap 2 (low static) and speed tap 3 (high static) are for lower tonnage. Speed tap 4 (low static) and speed tap 5 (high static) are for higher tonnage.

Constant torque air handlers are always shipped from factory at speed tap 5. To change to 1.5-ton or 2.5 ton airflow, move the blue wire to speed tap 2 or 3 on the constant torque motor.

The low static speed tap 2 (lower tonnage) and 4 (higher tonnage) are used for external static below 0.5" WC. The high static speed tap 3 (lower tonnage) and 5 (higher tonnage) are used for external static exceeding 0.5" WC. Move the blue wire to the appropriate speed tap as required by the application needs.

- The airflow for continuous fan (speed tap 1) is always set at 50% of the speed tap 4.
- The above airflow table lists the airflow information for air handlers with maximum heater allowed for each model.

# 7.0 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 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” duct flanges supplied with the unit. Attach flanges around the blower outlet.

**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.

- **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.
- 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.

# 8.0 REFRIGERANT CONNECTIONS

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

Coil is shipped with a low (5 - 10 PSIG) pressure charge of dry nitrogen. Evacuate the system before charging with refrigerant.

Install refrigerant tubing so that it does not block service access to the front of the unit.

Nitrogen should flow through the refrigerant lines while brazing.

Use a brazing shield to protect the cabinet from being damaged by torch flames.

After the refrigerant connections are made, seal the gap around the connections with pressure sensitive gasket. If necessary, cut the gasket into two pieces for a better seal (See Figure 4.)

## 8.1 CONDENSATE DRAIN TUBING

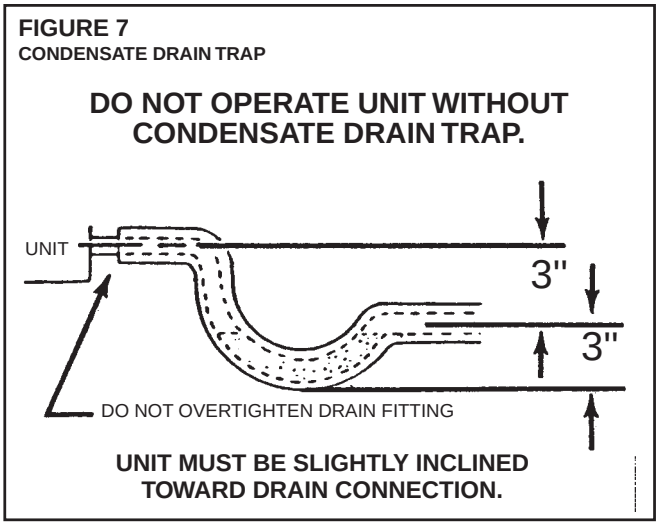
Consult local codes or ordinances for specific requirements.

**IMPORTANT:** When making drain fitting connections to the 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 overtighten. Overtightening fittings can split pipe connections on the drain pan.

- Install drain lines so they do not block service access to front of the unit. Minimum clearance of 24 inches 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 water will drain completely from the pan. (See Figure 7.)
- Do not reduce drain line size less than connection size provided on condensate drain pan.

**FIGURE 7**
**CONDENSATE DRAIN TRAP**




- All drain lines must be pitched downward away from the unit a minimum of 1/8” 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 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).
- Auxiliary drain line should be run to a place where it will be noticeable if it becomes operational. Occupant should be warned that a problem exists if water should begin running from the auxiliary drain line.
- Plug the unused drain connection with the plugs provided in the parts bag, using a thin layer of teflon paste, silicone or teflon tape to form a water tight seal.
- Test condensate drain pan and drain line after installation is complete. Pour 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.

# 9.0 AIR FILTER

Filter application and placement are critical to airflow, which may affect the heating and cooling system performance. Reduced airflow can shorten the life of the system’s major components, such as motor, limits, elements, heat relays, evaporator coil or compressor. Consequently, we recommend that the return air duct system have only one filter location. Systems with a return air filter grill or multiple filter grills, can have a filter installed at each of the return air openings.

If high efficiency filters or electronic air cleaners are used in the system, it is important that the airflow is not reduced to maximize system performance and life. Always verify that the system’s airflow is not impaired by the filtering system that has been installed, by performing a temperature rise and temperature drop test.

**IMPORTANT:** DO NOT DOUBLE FILTER THE RETURN AIR DUCT SYSTEM. DO NOT FILTER THE SUPPLY AIR DUCT SYSTEM.

## ⚠ WARNING

**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 air handler elements. This residue could soil ceilings, walls, drapes, carpets and other articles in the house.**

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

# 10.0 SYSTEM CHARGING

## 10.1 ORIFICE SIZE

The air handler comes standard with a flow check piston installed. The piston may need to be changed to a different orifice size depending upon the outdoor unit. The table below lists the recommended orifice size for various outdoor units.

| INDOOR UNIT | FACTORY PISTON | SEER RATING OD UNIT | NOMINAL TONS | REFRIGERANT | ORIFICE SIZE |
|---|---|---|---|---|---|
| RFIP1821SPAN | 0.047 | 13 | 1.5 | R410a | 0.047 |
| | | 14 | 1.5 | R410a | 0.049 |
| | | 13 | 1.5 | R22 | 0.049 |
| | | 12 | 1.5 | R22 | 0.051 |
| | | 10 | 1.5 | R22 | 0.053 |
| RFIP2421SPAN | 0.053 | 13 | 2 | R410a | 0.053 |
| | | 14 | 2 | R410a | 0.057 |
| | | 13 | 2 | R22 | 0.057 |
| | | 12 | 2 | R22 | 0.061 |
| | | 10 | 2 | R22 | 0.063 |
| RFIP3024SPAN | 0.061 | 13 | 2.5 | R410a | 0.061 |
| | | 14 | 2.5 | R410a | 0.063 |
| | | 13 | 2.5 | R22 | 0.065 |
| | | 12 | 2.5 | R22 | 0.065 |
| | | 10 | 2.5 | R22 | 0.065 |
| RFIP3624SPAN | 0.065 | 13 | 3 | R410a | 0.065 |
| | | 14 | 3 | R410a | 0.068 |
| | | 13 | 3 | R22 | 0.069 |
| | | 12 | 3 | R22 | 0.070 |
| | | 10 | 3 | R22 | 0.070 |

## 10.2 CHARGING CHARTS

Follow charging procedure outlined in the outdoor unit I & O.

# 11.0 SEQUENCE OF OPERATION

## 11.1 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).

## 11.2 HEATING (ELECTRIC HEAT ONLY)

- When the thermostat “calls for heat,” the circuit between R and W is completed, and the heater sequencer ($HR_1$) is energized. The heating elements (HE) and the indoor blower motor (IBM) will come on. Units with a second heater sequencer ($HR_2$) can be connected with the first sequencer ($HR_1$) to W on the thermostat sub-base or connected to a second stage $W_2$ on the sub-base.

## 11.3 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 $W_2$ is completed by the second-stage heat room thermostat. Circuit R-$W_2$ energizes a heat sequencer ($HR_1$). The completed circuit will energize supplemental electric heat. Units with a second heater sequencer ($HR_2$) can be connected with first sequencer ($HR_1$) to $W_2$ on thermostat or connected to a third heating stage $W_2$ on the thermostat sub-base. A light on the thermostat indicates when supplemental heat is being energized.

## 11.4 BLOWER TIME DELAY (HEATING OR COOLING)

- All models are equipped with a blower time delay (BTD) in lieu of a blower relay (BR) (see wiring diagram). The blower will run for 30 seconds after the blower time delay (BTD) is de-energized.

## 11.5 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 W on the thermostat. 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.
- 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.

## 11.6 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 $W_2$ 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.

## 11.7 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 ($HR_1$) (see wiring diagram on unit), heat anticipator setting should be .16.
- On units with two electric heat sequencers ($HR_1$ & $HR_2$) (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 ($HR_1$ & $HR_2$) are connected to separate stages.

  **NOTE:** Some thermostats contain a fixed, non-adjustable heat anticipator. Adjustment is not permitted.
- The thermostat should be mounted 4 to 5 feet 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.

# 12.0 CALCULATIONS

## 12.1 CALCULATING TEMPERATURE RISE

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

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

Where: 3.16 = Constant, CFM = Airflow

## 12.2 CALCULATING BTUH HEATING CAPACITY

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

  BTUH Heating = Watts x 3.412

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

## 12.3 CALCULATING AIRFLOW CFM

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

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

## 12.4 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:

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

# 13.0 PRE-START CHECKLIST

| PRE-START CHECKLIST | |
|---|---|
| ❍ YES ❍ NO | Is unit properly located, level, secure and serviceable? |
| ❍ YES ❍ NO | Has auxiliary pan been provided under the unit with separate drain? (Units installed above a finished ceiling). |
| ❍ YES ❍ NO | Is condensate line properly sized, run, trapped, pitched and tested? |
| ❍ YES ❍ NO | Is ductwork correctly sized, run, taped and insulated? |
| ❍ YES ❍ NO | Have all cabinet openings and wiring been sealed with caulking? |
| ❍ YES ❍ NO | Is the filter clean, in place and of adequate size? |
| ❍ YES ❍ NO | Is the wiring tight, correct and to the wiring diagram? |
| ❍ YES ❍ NO | Is the unit properly grounded and protected (fused)? |
| ❍ YES ❍ NO | Is the thermostat heat anticipator been set properly? |
| ❍ YES ❍ NO | Is the unit circuit breaker(s) rotated properly “on” up - “off” down? |
| ❍ YES ❍ NO | Are the unit circuit breaker(s) line lug cover(s) in place? |
| ❍ YES ❍ NO | Are all access panels in place and secure? |
| Refer to outdoor unit installation instructions for system start-up instructions and refrigerant charging instructions. | |

# 14.0 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 the “Safety Information” section at the front of this manual.

## ⚠ 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.**

## 14.1 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.

### FILTER MAINTENANCE

Have your qualified installer, service agency or HVAC professional instruct you on how to access your filters for regular maintenance.

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

- New filters are available from your local distributor.

## 14.2 INDOOR COIL - DRAIN PAN - DRAIN LINE

Inspect the indoor coil once each year for cleanliness and clean as necessary. In some cases, it may be necessary to remove the filter and check the return side of the coil with a mirror and flashlight.

It is recommended that upon initial start up and annually thereafter, the coil should be cleaned using an evaporator coil cleaner (Part # 85-401 or equivalent). This will help to insure proper drainage of condensate from the coil assembly.

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

## 14.3 BLOWER MOTOR AND WHEEL

Inspect the blower motor and wheel for cleanliness. 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.

## 14.4 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.

## 14.5 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. 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.**

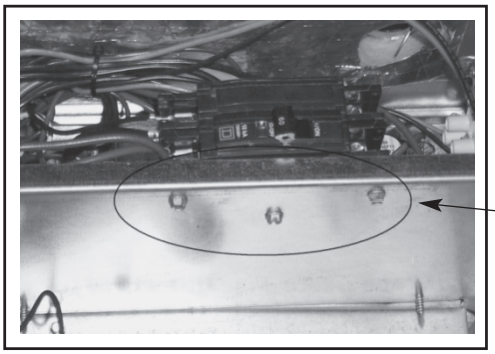
- Mark field power supply wiring (for replacement) attached to terminal block or circuit breaker(s) on blower assembly. Remove wiring from terminal block or circuit breaker(s).
- Mark low voltage control wiring (for replacement) where attached to unit control pigtails on right side of blower housing.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

### ⚠ WARNING

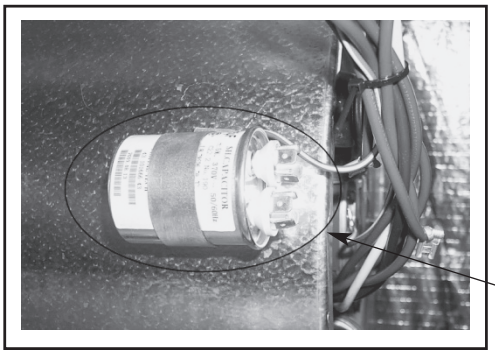
**To avoid electrical shock which can result in personal injury or death, use only the screws furnished in the motor shell mounting holds. Screws are #8-18 x .25 in. long blunt nose thread forming. Screws longer than 1/4 in. may contact the motor winding.**

## 14.6 BLOWER MOTOR REMOVAL PROCEDURE (RFIP30, RFIP36 AND RFIT36)

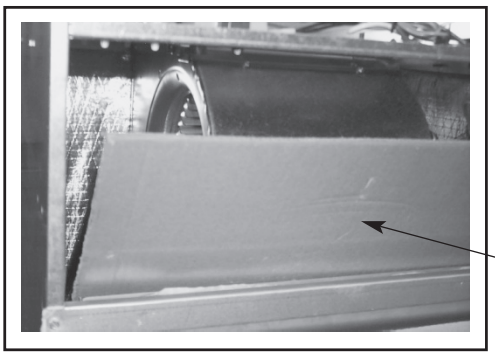
1. Disconnect all power to the air handler.
2. Disconnect all blower motor leads from the control board, capacitor, and speed tap. Reference wiring diagram for more detail.
3. If equipped with a heater kit, remove the 3 screws which attach the breaker/terminal block assembly to the blower shelf. This will help gain access to the screws in step 8. (1/4" Socket)



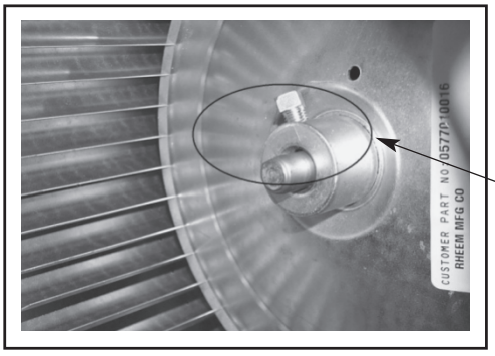

4. Remove capacitor to help prevent damage to the coil. (1/4" Socket)



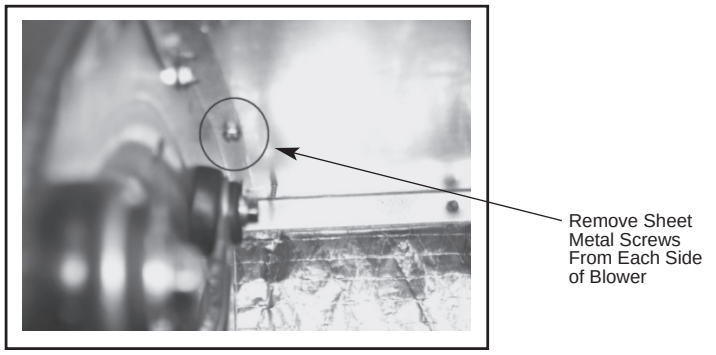

5. Install a 21" x 24" piece of cardboard over the coil as illustrated below to help protect the coil from damage.



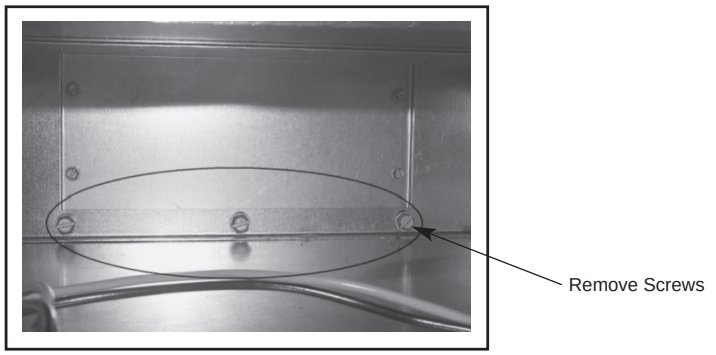

6. Remove/loosen set screw from the hub located on the left side of the blower.



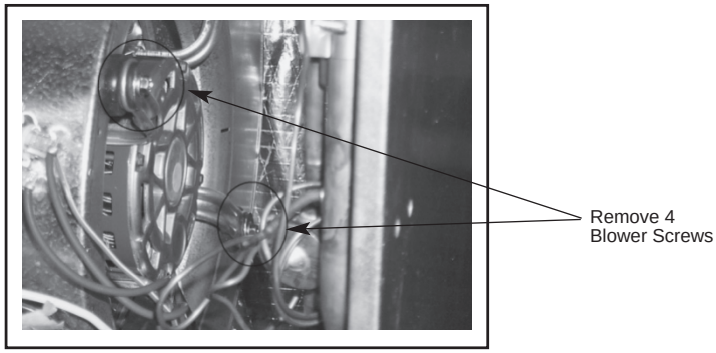
7. Remove the 2 sheet metal screws that attached the blower to the bottom of the blower shelf. (1/4” Socket)



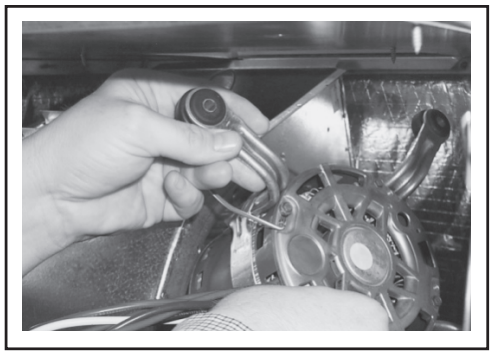

8. Remove the 3 sheet metal screws which attached the blower to the blower shelf located in the air handler control box. (3/8” Socket)



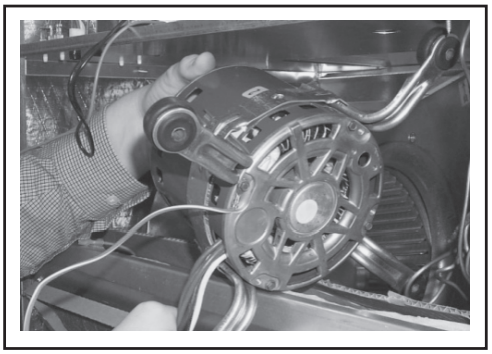

9. Lower the blower and slide the blower to the left side of the air handler.
10. Remove the 4 motor mount screws from the right side of the blower housing. (3/8” Socket)




11. Remove the motor assembly from the blower housing by sliding the motor shaft out of the blower hub.

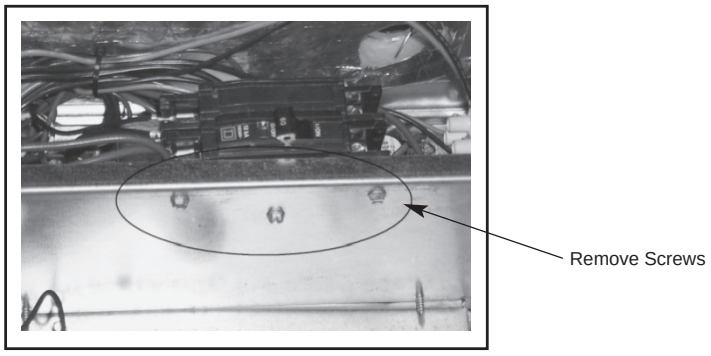


12. Remove the motor assembly from the air handler.

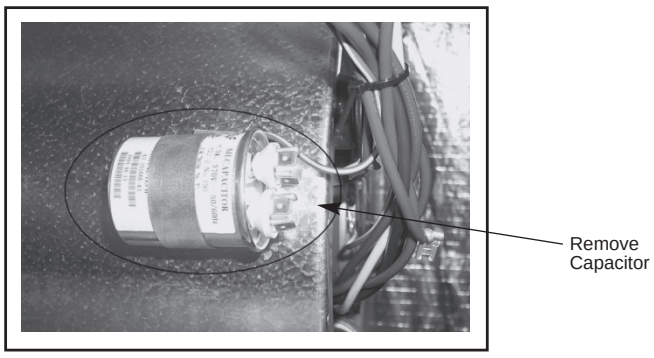


## 14.7 SMALL CABINET BLOWER ASSEMBLY REMOVAL PROCEDURE (RFIP18, RFIP24, AND RFIT24)

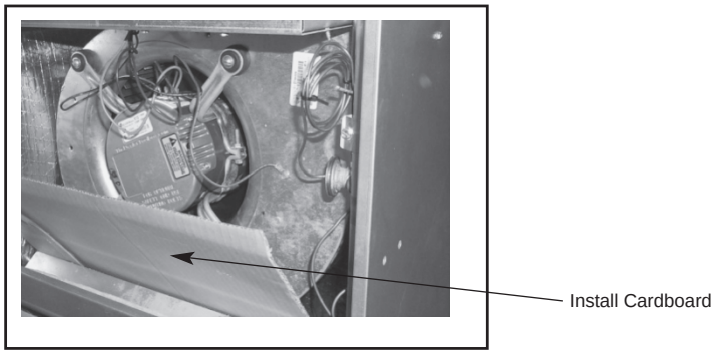
1. Disconnect all power to the air handler.
2. Disconnect all blower motor leads from the control board, capacitor, and speed tap. Reference wiring diagram for more detail.
3. If equipped with a heater kit, remove the 3 screws which attach the breaker/terminal block assembly to the blower shelf. This will help gain access to the screws in step 6. (1/4" Socket)



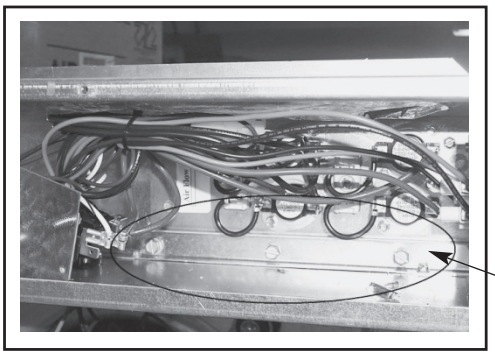

4. Remove capacitor to help prevent damage to the coil. (1/4" Socket)



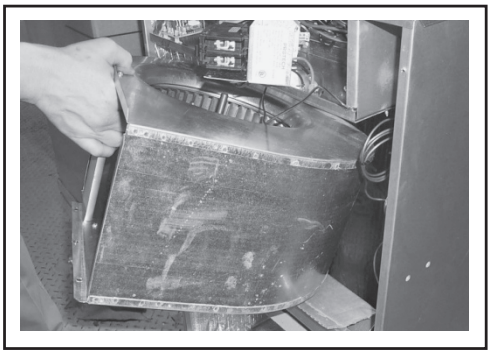

5. Install an 18" x 20" piece of cardboard over the coil as illustrated below to help protect the coil from damage.



6. Remove the 3 sheet metal screws which attached the blower to the blower shelf located in the air handler control box. (3/8” Socket)

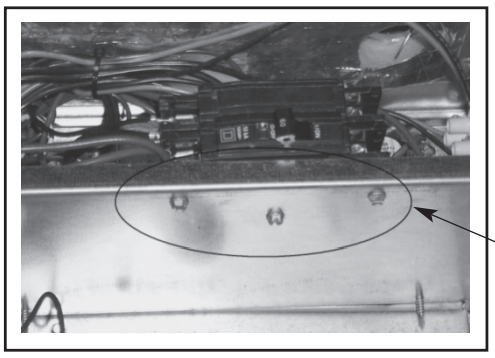



7. Lower the blower and remove from air handler.

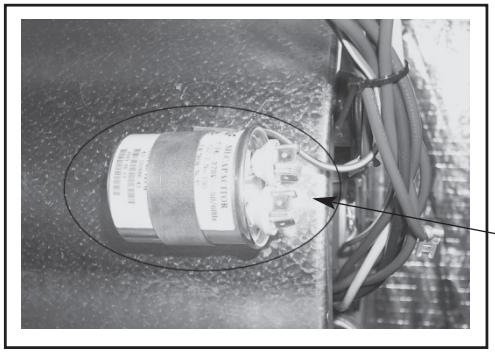


## 14.8 LARGE CABINET BLOWER ASSEMBLY REMOVAL PROCEDURE (RFIP30, RFIP36, AND RFIT36)

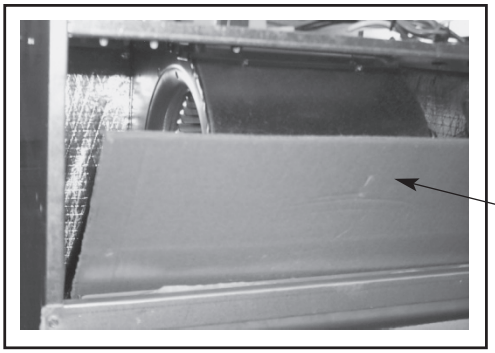
1. Disconnect all power to the air handler.
2. Disconnect all blower motor leads from the control board, capacitor, and speed tap. Reference wiring diagram for more detail.
3. If equipped with a heater kit, remove the 3 screws which attach the breaker/terminal block assembly to the blower shelf. This will help gain access to the screws in step 8. (1/4” Socket)



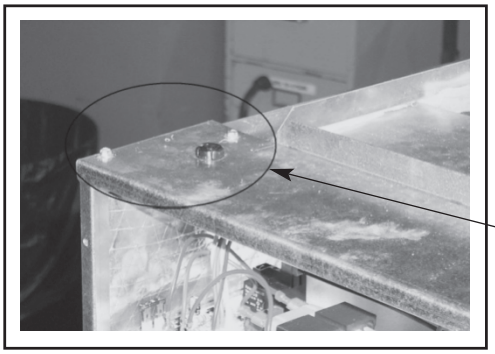

4. Remove capacitor to help prevent damage to the coil. (1/4” Socket)



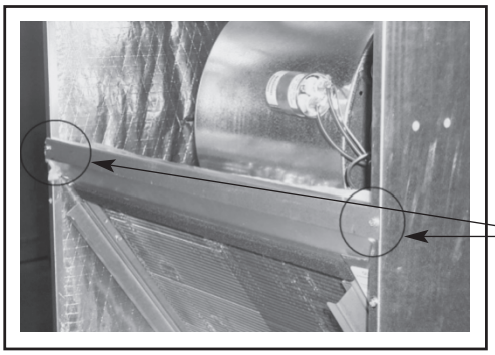
5. Install a 21” x 24” piece of cardboard over the coil as illustrated below to help protect the coil from damage.



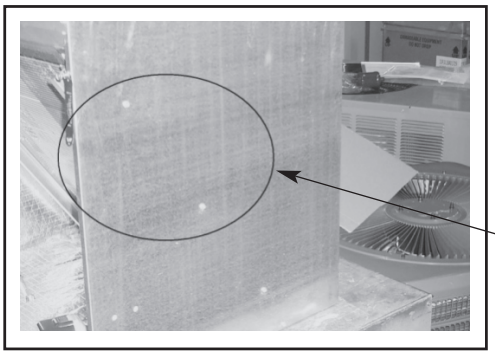

6. Remove the top plate of the air handler by removing the 6 sheet metal screws attaching the plate to the top of the air handler. (1/4” Socket)



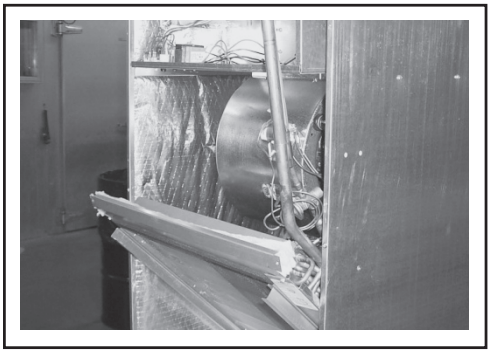

7. Remove 2 sheet metal screws attaching the middle brace to the air handler cabinet. (1/4” Socket)



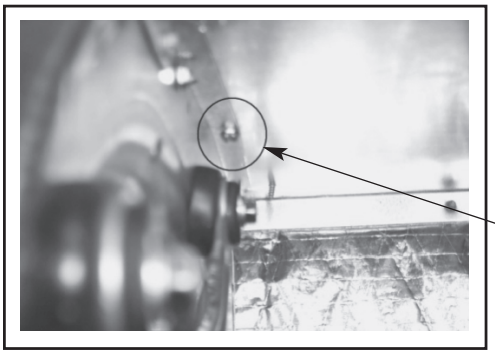

8. Remove 4 sheet metal screws (2 on each side of the air handler)



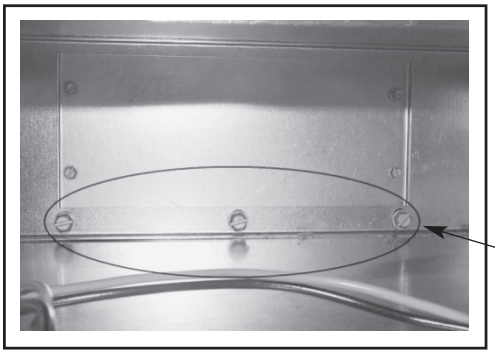
9. Tilt the coil assembly forward. (Note: Depending upon the amount of slack in the refrigerant lines, the system may have to be evacuated and the suction and liquid line of the air handler may have to be uninstalled from the system in order to prevent damage to the refrigerant lines which could result in a total loss of refrigerant)



10. Remove the 2 sheet metal screws that attached the blower to the bottom of the blower shelf. (1/4" Socket)




11. Remove the 3 sheet metal screws which attached the blower to the blower shelf located in the air handler control box. (3/8" Socket)




12. Lower the blower and turn assembly counter clockwise with the motor pointing towards the top of the air handler.



13. Remove the blower assembly from the air handler.



# 15.0 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).

# 16.0 ACCESSORIES-KITS-PARTS

- **Drain Pan Over Flow Switch RXHK-A01** is used to detect condensate drain blockage and will shut down the outdoor unit in order to prevent structural damage to the surrounding structures of the air handler. This accessory is also available as a factory installed option.

**FIGURE 8**

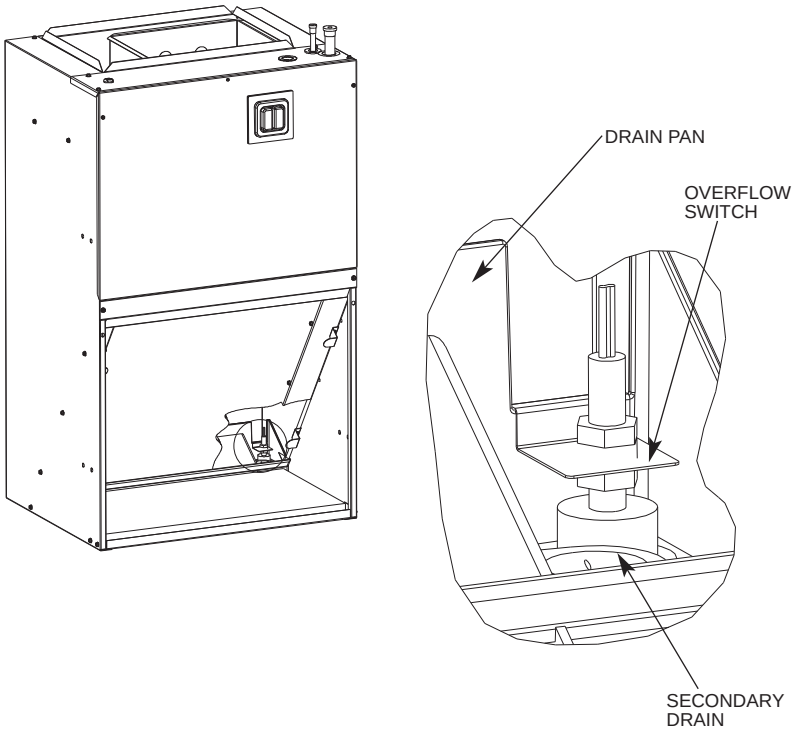
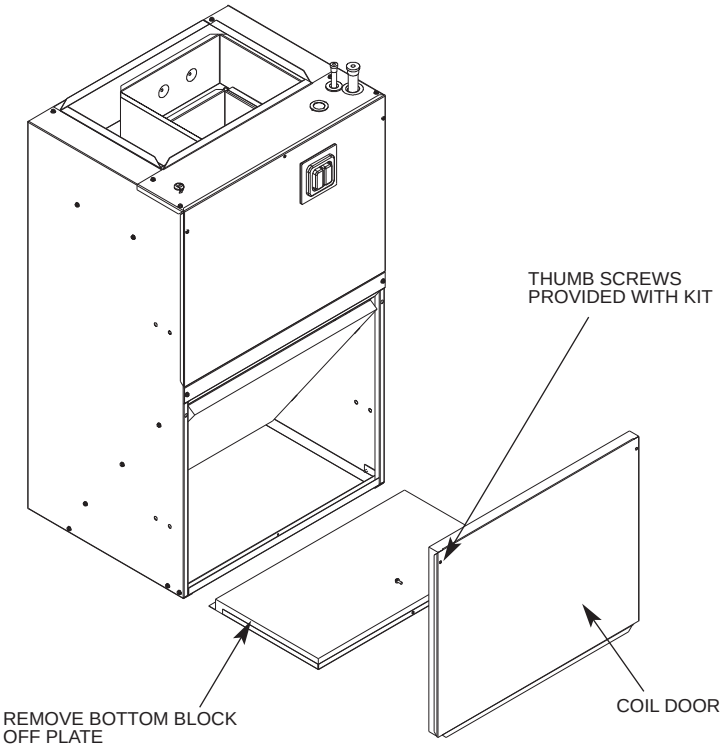


**FIGURE 9**

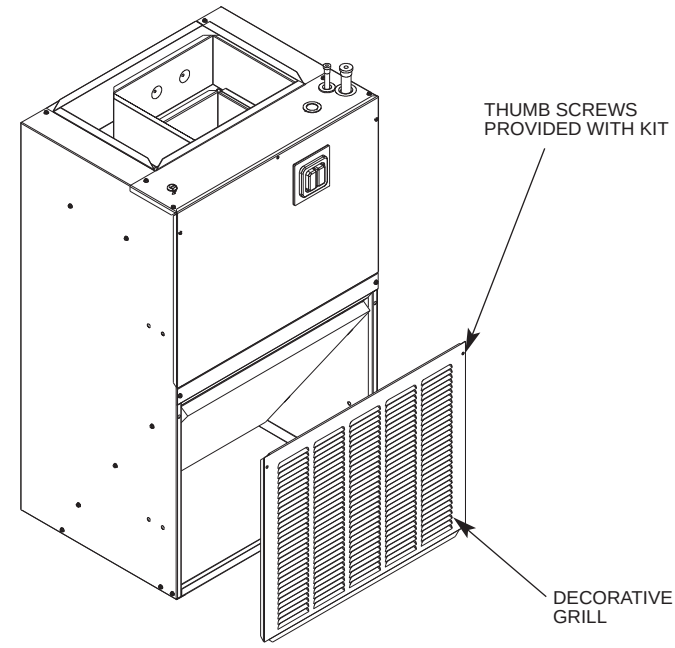



- **Bottom Return Conversion Kit RXHK-** is used to divert the return air from the factory standard front return to a bottom return.

| Accessory Number | Indoor Unit |
|---|---|
| RXHK-B01 | RFIP18 |
| | RFIP24 |
| | RFIT24 |
| RXHK-B02 | RFIP30 |
| | RFIP36 |
| | RFIT36 |

- **Louvered Cabinet Grill RXHK-** is used as decorative grill which covers the return air opening of the front return air handler.

**FIGURE 10**



| Accessory Number | Indoor Unit |
|---|---|
| RXHK-C01 | RFIP18 |
| | RFIP24 |
| | RFIT24 |
| RXHK-C02 | RFIP30 |
| | RFIP36 |
| | RFIT36 |

- **Decorative Wall Grill RXHK-D01/RXHK-D02** is used in applications where the air handler is installed in a closet or interior wall and allows adequate return air back to the unit.

**FIGURE 11**

