

## Installation, Start-Up and Service Instructions

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### SAFETY CONSIDERATIONS

Installing and servicing air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install and service air-conditioning equipment.

Untrained personnel can perform basic maintenance, such as cleaning and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe safety precautions in literature and on tags and labels attached to the unit.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for brazing operations. Have a fire extinguisher available. Read these instructions thoroughly. Consult local building codes and National Electrical Code (NEC) for special installation requirements.

### ⚠ WARNING

Before installing or servicing system, always turn off main power to system. Electrical shock can cause personal injury.

### GENERAL

The 42WKN Hydronic Fan Coil Unit (Fig. 1) water connections are fixed to the unit body to avoid breaks when the pipes are connected. The upper coil connection is supplied with an air purge valve, the lower connection is supplied with a water purge valve. Minimum entering water temperature for the water circuit is 39 F; maximum is 180 F. If room temperature goes down to 32 F or lower, it is advisable to empty the water circuit to avoid the potential for ice breaks.

### INSTALLATION

#### Step 1 — Complete Pre-Installation Checks

**UNPACK UNIT** — Store unit in its original packaging until it is moved to the final site for installation. Carefully remove fan coil, control box, and plastic bag which contains drain connector and mounting screws. When removing fan coil unit from carton make sure it is lifted by its 4 corners and NOT by the condensate drain or water connections. The grille is packed separately for additional protection.

**INSPECT SHIPMENT** — Upon receipt of shipment check unit (Fig. 1) for damage. Forward claims papers directly to the transportation company. Manufacturer is not responsible for damage incurred in transit.

After checking shipment, leave all parts in the original packaging until installation.

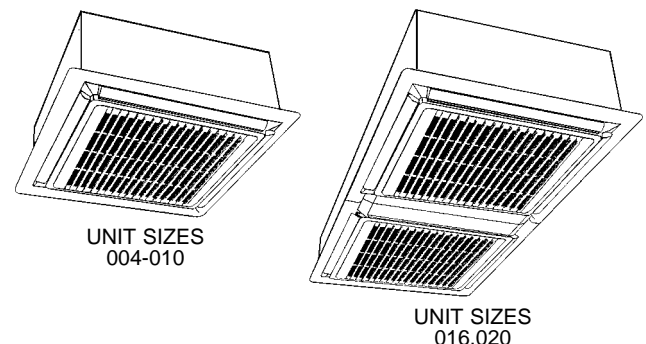


Fig. 1 — 42WKN Hydronic Fan Coil Units

**Step 2 — Select Location** — Consult local building codes and NEC for special installation requirements. Do not install unit in rooms where flammable gas or alkaline acid are present. Unit components can be damaged. Do not install unit in workshops or kitchens, oil vapors drawn into unit may deposit on the coil and alter their performance, or internal parts of the unit may be damaged.

The ceiling-mounted fan coil unit may be installed several ways. As a typical installation, these instructions focus on mounting the unit above a false ceiling to wooden beams, newly built concrete slabs, metal structure, or a previously-built concrete slab.

Before you begin, plan carefully, measure carefully, and follow accepted building practices and NEC. Listed below are some guidelines that should be followed when installing a unit.

1. Position unit as close to the center of the room as possible to ensure air is distributed evenly.
2. Allow sufficient space for airflow clearance, wiring, refrigerant piping, and servicing unit. Also, when determining the final location of the unit, consider if conditioned air will be discharged to an adjacent room or ventilated air will be used.
3. Install removable ceiling panels adjacent to the unit for servicing.
4. Make sure thermostat is away from the fan coils' direct air discharge.

### Step 3 — Mount Unit in Ceiling

1. Remove enough ceiling panels to provide clearance space for mounting unit to ceiling joists. In some ceilings it may be necessary to temporarily remove sustaining T-bars.
2. Determine mounting method. On wooden beams, use threaded rods, washers, and nuts to suspend support brackets. With metal structures, secure threaded rods on an existing angle or install a new support angle (field-supplied). On newly built concrete slabs, secure threaded rods with inserts and embedded bolts. For previously built concrete slabs, install hanging bolts with an expansion anchor.
  - a. Refer to Fig. 2 and 3 for distance between the holes for supporting brackets. Mark distance on the ceiling joists before drilling holes for securing rods, to ensure they will line up with the holes on the unit.
  - b. Securely fasten  $\frac{3}{8}$ -in. threaded rods to ceiling joists. Refer to Fig. 4.
  - c. Place support bracket on the threaded rod  $5\frac{5}{16}$ -in. from false ceiling. Double-nut support brackets for safety. Install one nut and washer above the support bracket. Make sure extension rods do not protrude down through support bracket more than  $\frac{3}{8}$  inch; otherwise, the unit cannot be easily attached to the bracket. Refer to Fig. 5.

NOTE: the final tightening of the nuts and counter nuts on the support bracket should be done when all the connections are completed.

3. Secure and level fan coil unit.
  - a. Carefully lift unit at the 4 corners to insert it onto the support brackets. The unit may have to be inclined to be lifted over the sustaining T-bars (Fig. 6). After the unit is inserted onto the support bracket, screw in safety screws.

- b. Place a carpenter's level on the unit. Refer to Fig. 7. A maximum slope of  $\frac{1}{8}$  in. toward the condensate drain is allowed.

NOTE: See Start-Up section for procedure that tests the drain pan condensate flow.

4. Unpack grille and grille frame.
  - a. On 42WKN004, 008 and 010 units, mount grille frame using the 4 screws provided.
  - b. On 42WKN016 and 020 units that have a 2-piece frame, be sure to align and securely lock the dovetail (Fig. 8). Connect the frame with the 8 screws provided.

NOTE: On all units, the frame should align with the false ceiling as shown in Fig. 9.

If alignment is incorrect, re-adjust height and re-level. If the unit is too high, do not use excessive force on frame mounting screws. However, internal gaskets must be sealed properly to prevent airflow between inlet and outlet sides. Make sure the grille frame lines up with the false ceiling. Also make sure the grille frame gasket seals are against the ceiling, keeping the unconditioned air from entering the occupied space.

- c. Hang grille on the support hooks and swing grille up into frame. Fasten by turning the slotted screws.

### Step 4 — Connect Condensate Drain Line and Water Lines

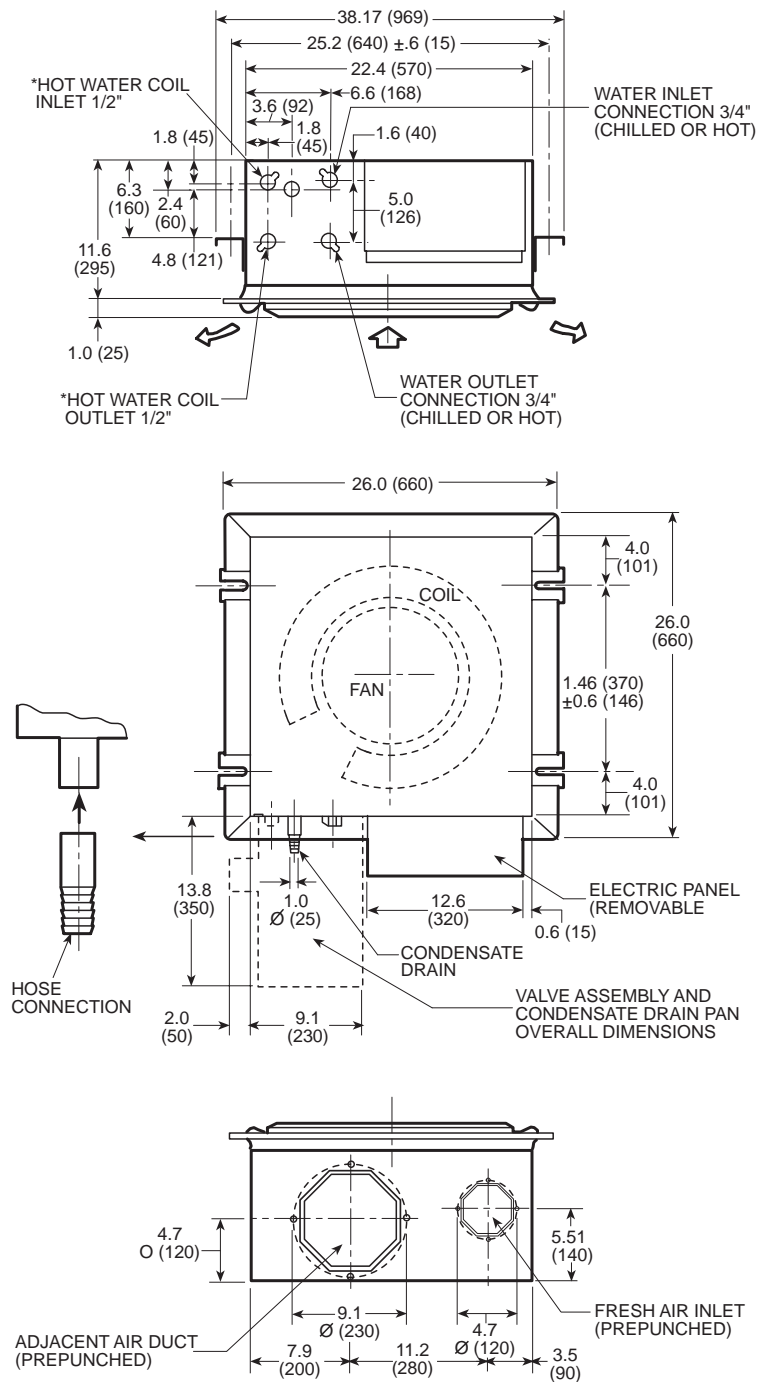
— Observe all local sanitary codes when installing condensate drain and water lines.

1. Connect drain line by inserting the field-supplied hose connector onto the condensate drain. Then place 1-in. rigid PVC pipe over the hose connector. See Fig. 10.

#### ⚠ CAUTION

The drain tube extension must be securely fastened to the condensate drain. Failure to do so can result in condensate water dripping onto the floor, creating a hazardous condition.

2. To ensure regular flow of condensate water, the drain pipe should be pitched toward open drain or sump at a downward slope. Refer to Fig. 10. Also, be sure that the line continually slopes with no rise or sags as shown in lower right-hand side of Fig. 10.
3. Provide a trap of a least 2 in. near the end of the drain line to prevent odors from entering rooms. Refer to Fig. 10.
4. Connect water lines using threaded connections from valve package. The valve package includes the tubing to connect the valve to the unit. Valve connections are threaded at the point they meet the unit. Valve connections are sweat type between the valve kit and the supply water. See Table 1 for connection sizes.
5. Insulate condensate drain line and water line. Insulate the condensate drain lines that are located in or above the occupied area with a condensate-proof material, such as polyurethane or neoprene. Insulate water line valve and connecting pipe with anti-condensate material such as expanded neoprene or polyurethane  $\frac{3}{8}$ -in. to  $\frac{1}{2}$ -in. thick.

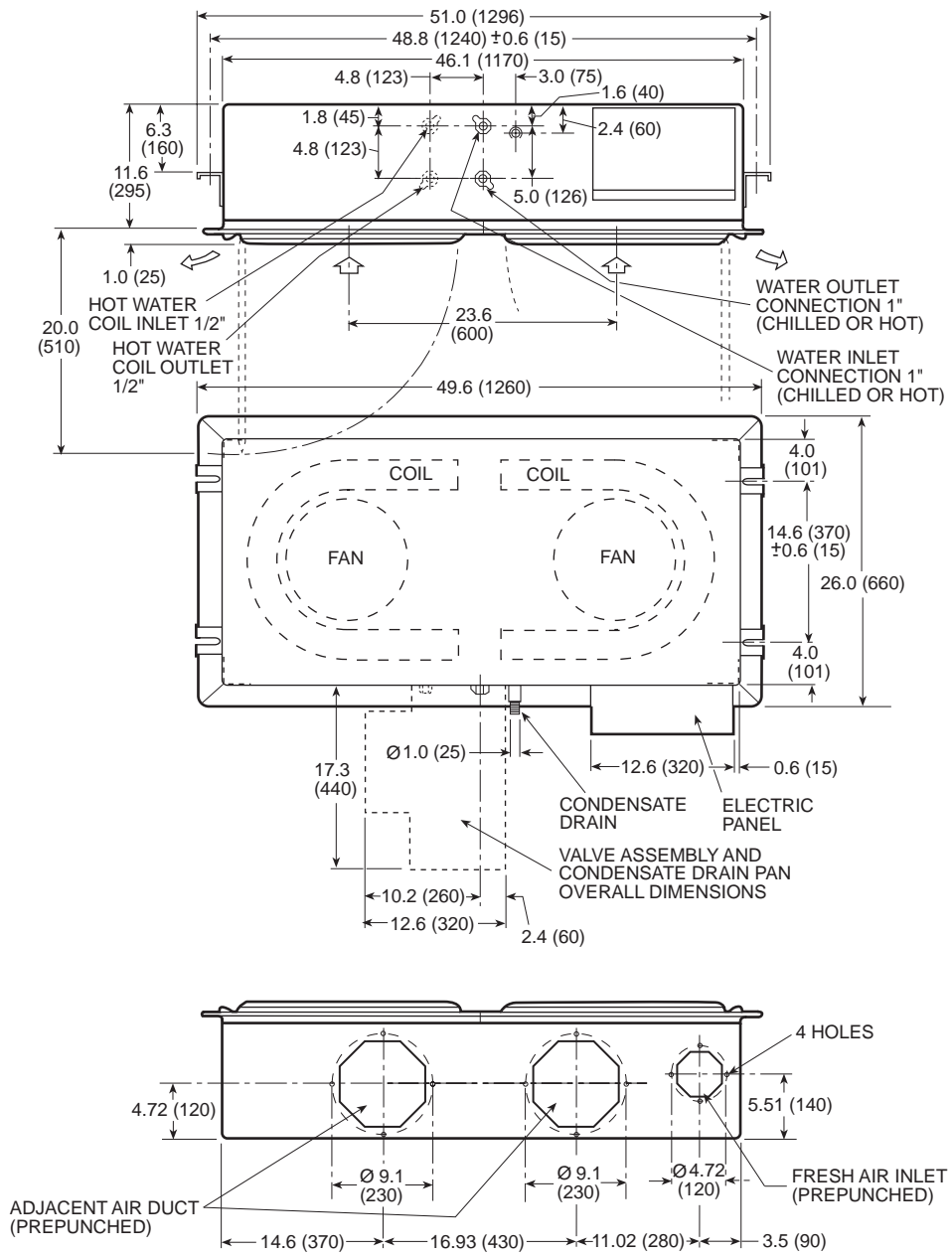


\*Four-pipe version only.

NOTE: Dimensions in ( ) are in mm.

| UNIT SIZE<br>42WKN | NET WEIGHT<br>(lb/kg) |                |
|--------------------|-----------------------|----------------|
|                    | 2-Pipe Version        | 4-Pipe Version |
| 004                | 57.8                  | —              |
| 008                | 60.0                  | —              |
| 010                | 64.4                  | 65.6           |

Fig. 2 — Dimensional Drawing — Unit Sizes 004-010



\*Four-pipe version only.

NOTE: Dimensions in ( ) are in mm.

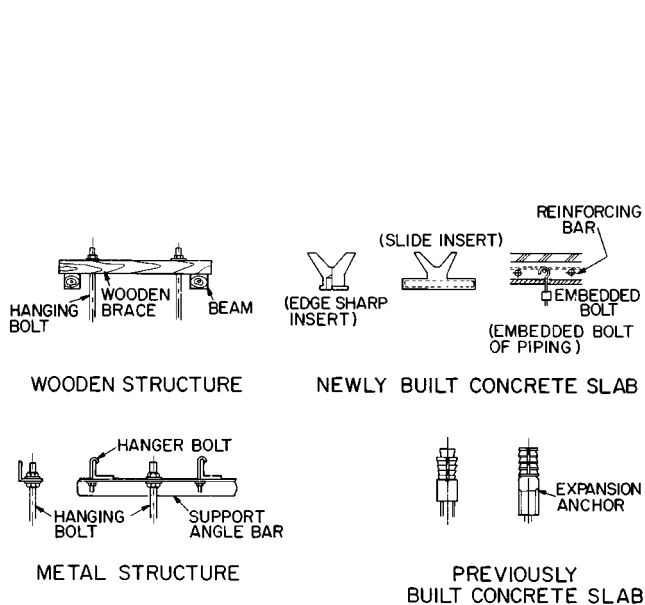
| UNIT SIZE<br>42WKN | NET WEIGHT<br>(lb/kg) |                |
|--------------------|-----------------------|----------------|
|                    | 2-Pipe Version        | 4-Pipe Version |
| 016                | 108.9                 | —              |
| 020                | 115.6                 | 117.8          |

Fig. 3 — Dimensional Drawing — Unit Sizes 016, 020

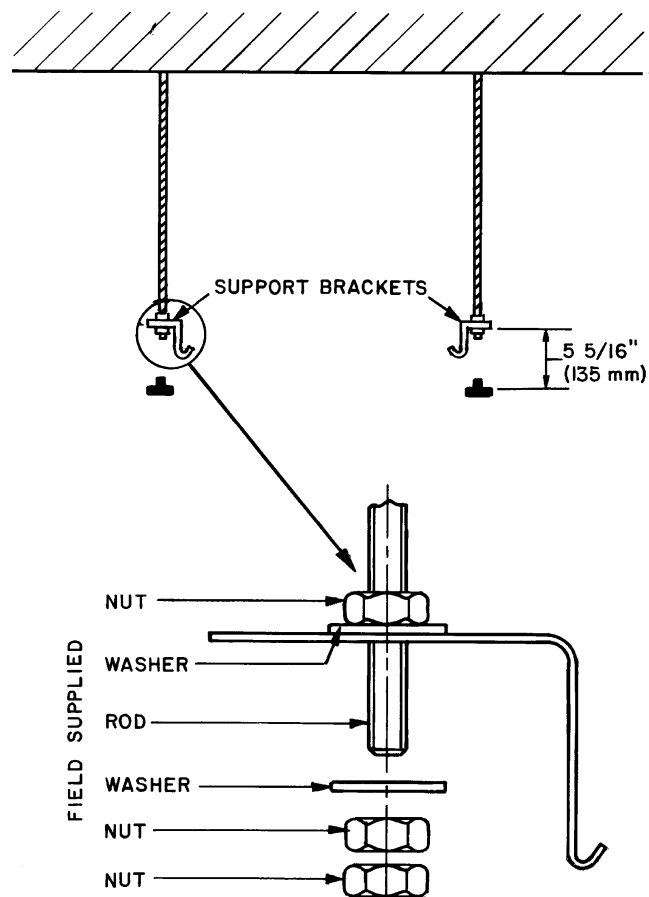
**Table 1 — Physical Data**

| UNIT 42WKN                      |                                       | 004  | 008  | 010  |      | 016   | 020   |       |
|---------------------------------|---------------------------------------|------|------|------|------|-------|-------|-------|
| PIPE VERSION                    |                                       | 2    | 2    | 2    | 4    | 2     | 2     | 4     |
| OPERATING WEIGHT (lb)           |                                       | 57.8 | 60.0 | 64.4 | 68.6 | 108.9 | 115.6 | 117.8 |
| MAXIMUM ENTERING WATER TEMP (F) |                                       | 180  | 180  | 180  | 180  | 180   | 180   | 180   |
| FAN<br>Rpm                      | High                                  | 1    | 1    | 1    | 1    | 2     | 2     | 2     |
|                                 | Med                                   | 755  | 755  | 1015 | 1015 | 755   | 1140  | 1140  |
|                                 | Low                                   | 540  | 550  | 730  | 730  | 550   | 880   | 880   |
| NOMINAL CFM                     | High                                  | 350  | 360  | 650  | 650  | 360   | 785   | 785   |
|                                 | Med                                   | 420  | 420  | 390  | 420  | 840   | 920   | 975   |
|                                 | Low                                   | 320  | 320  | 300  | 300  | 600   | 740   | 740   |
| COIL                            | Rows                                  | 280  | 280  | 280  | 280  | 560   | 675   | 675   |
|                                 | Face Area (sq ft)                     | 1    | 2    | 3    | 3    | 2     | 3     | 3     |
|                                 | No. of Circuits                       | —    | —    | —    | 1    | —     | —     | 1     |
| CONNECTIONS                     | 2-Pipe Valve Tubing Connections (in.) | 2.7  | 2.7  | 2.5  | 2.5  | 5.4   | 5.2   | 5.2   |
|                                 | 4-Pipe Valve Tubing Connections (in.) | —    | —    | —    | 2.5  | —     | —     | 5.6   |
|                                 | Condensate Drain, Barbed (in.)        | 2    | 3    | 4    | 4    | 3     | 4     | 4     |
|                                 | Heating*                              | —    | —    | —    | 1    | —     | —     | 1     |

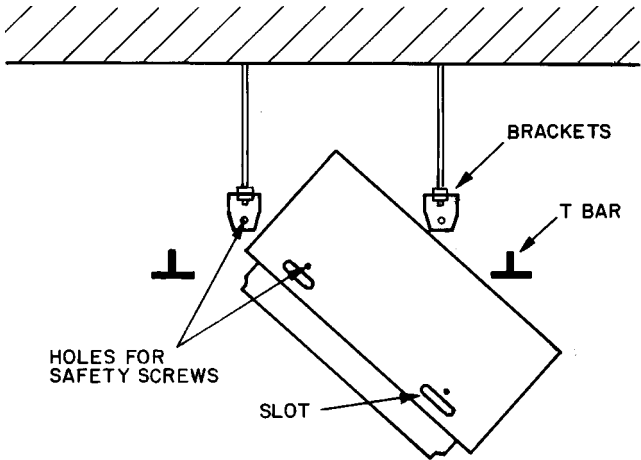
\*Heating available for 4-pipe versions only.



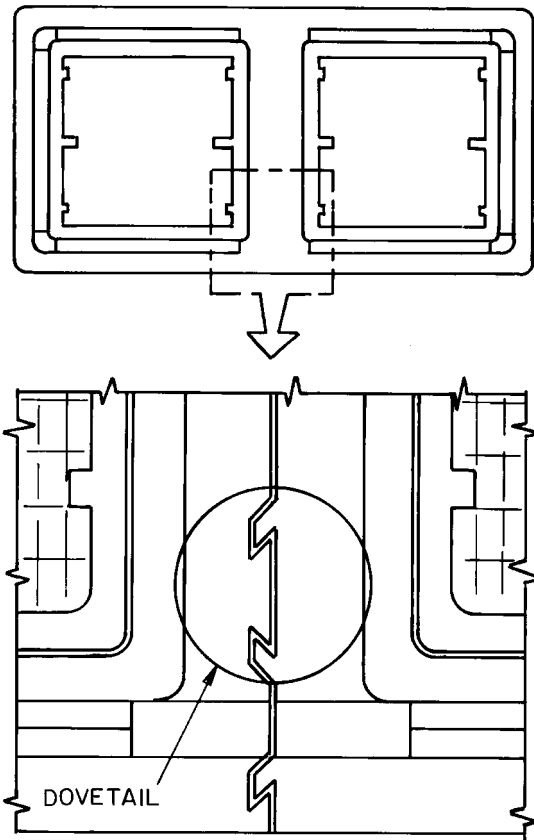
**Fig. 4 — Mounting Methods  
(Hardware is Field Supplied)**



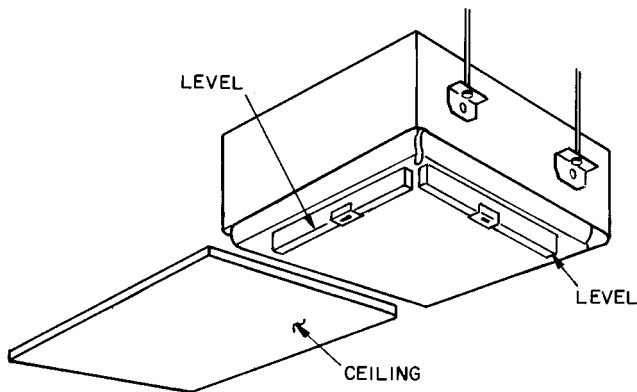
**Fig. 5 — Support Bracket Installation**



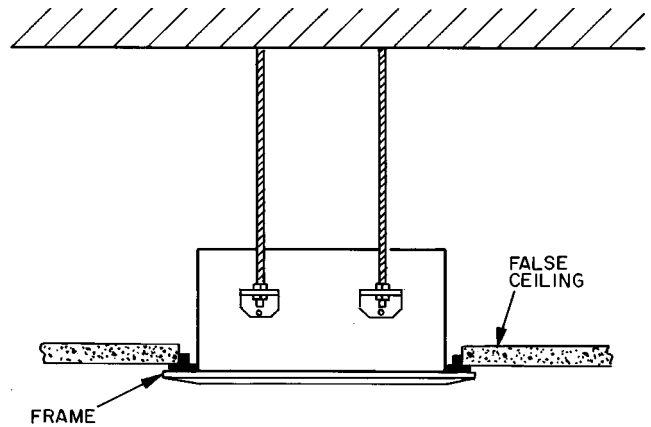
**Fig. 6 — Unit Inclined for Insertion Over T-Bars**



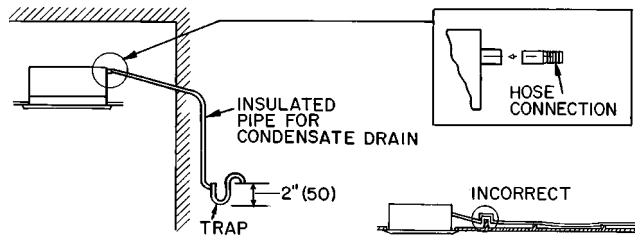
**Fig. 8 — Dovetail Connection**



**Fig. 7 — Level Unit**



**Fig. 9 — Line Up Frame with the False Ceiling**



**Fig. 10 — Drainage System**

**Step 5 — Make Electrical Connections** — Be sure field wiring complies with local building codes and NEC. Also check that unit voltage is within limits as shown in Table 2 for permissible operating limits. See page 11 for wiring diagram.

Contact local power company for correction of improper line voltage.

**⚠ WARNING**

To avoid personal injury or damage to unit, do not make electrical connections until all power sources have been shut down, locked out, and tagged out.

**⚠ CAUTION**

Operation of unit on improper line voltage constitutes abuse and could affect warranty. Refer to Table 2 for permissible operating limits. Do not install unit in system where voltage may fluctuate above or below permissible limits.

1. Install electrical control box. With the 2 screws provided, attach the electrical control box to the fan coil unit.
2. Route line power leads from indoor disconnect to the fan coil unit.
  - a. Place wiring through top hole on right side of control box.
  - b. Using Fig. 11 wiring diagram, connect power from disconnect wire to high voltage terminal board (TB1) and ground.

NOTE: Indoor disconnect should be within sight and readily accessible per NEC. Do not route the power leads from the outdoor unit.

3. Install wall-mounted thermostat and control power wiring.

**⚠ CAUTION**

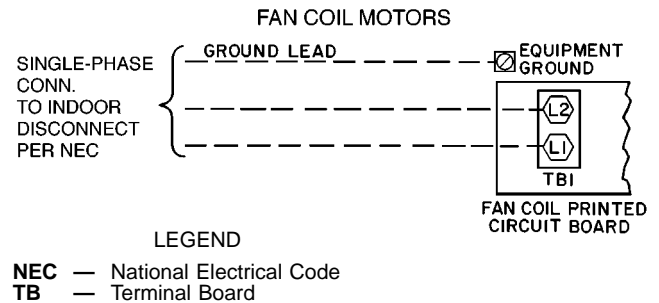
Do not short circuit the transformer. It is fused. The transformer can be short circuited by connecting the wrong wires or by touching a live wire to the side of the grounded control box.

- a. Place thermostat in same room as fan coil unit. Make sure the thermostat is away from direct air discharge.
- b. Run 24-v control wires from indoor unit to the thermostat. Units are factory-wired for 230/24-v transformer operation. For 208/24-v operation, interchange

- blue (208-v) and red (240-v) wires at the primary connection. Cap unused wires with wire nuts.
  - c. At the fan coil unit, connect 24-v control wire to TB2 as shown in wiring diagram in the back of this book.
4. Connect unit plugs. Using wiring diagram connect unit plug (PL-4) from control box to mating fan coil plug.
  5. Water valves are field-installed and field-wired.

Two-pipe systems: connect water service valve 1 (WSV1) coil lead to valve contactor 1 (CV1), terminal 14. Connect the other lead of the coil to terminal block 3 (TB3), which connects to V1.

Four-pipe systems: connect WSV1 coil lead to CV1, terminal 14. Connect the other lead of the coil to TB3, which connects to V1. Connect WSV2 coil lead to CV2, terminal 14.



**Fig. 11 — Line Power Leads**

**Step 6 — Adjust Louvered Discharge Diffusers**

**HEATING AND COOLING** — Direct diffusers so air blows outward across the ceiling (Fig. 12).

**REDISTRIBUTE AIRFLOW** — Close one or two diffusers.

**⚠ CAUTION**

Never close more than two diffusers on fan coil or the effectiveness of the safety devices will be limited. Refer to Fig. 13.

NOTE: If a unit must be placed in a ceiling against a wall, close the diffuser on the wall side before installing. Also, to take advantage of the unit's flexibility, the outside air option or conditioned air branch duct option can be used. Depending on the length and restrictions of the ductwork, 1 or 2 discharge diffusers may have to be closed. Refer to the Installation Options section for more details.

**Table 2 — Electrical Data**

| UNIT<br>42WKN | V-PH-Hz  | OPERATIONAL<br>VOLTAGE |      | INDOOR FAN |      |       | MCA | MAXIMUM FUSE OR HACR<br>TYPE BRK AMPS |
|---------------|----------|------------------------|------|------------|------|-------|-----|---------------------------------------|
|               |          | Max*                   | Min* | FLA        | Hp   | Watts |     |                                       |
| 004           | 230-1-60 | 253                    | 187  | 0.35       | 1/20 | 38    | 15  | 15                                    |
| 008           | 230-1-60 | 253                    | 187  | 0.50       | 1/20 | 38    | 15  | 15                                    |
| 010           | 230-1-60 | 253                    | 187  | 0.50       | 1/20 | 38    | 15  | 15                                    |
| 016           | 230-1-60 | 253                    | 187  | 0.78       | 1/15 | 48    | 15  | 15                                    |
| 020           | 230-1-60 | 253                    | 187  | 1.04       | 1/15 | 48    | 15  | 15                                    |

**LEGEND**

- FLA — Full Load Amps
- HACR — Heating, Air Conditioning and Refrigeration
- Hp — Horsepower
- LRA — Locked Rotor Amps
- MCA — Minimum Circuit Amps

\*Permissible limits of the voltage range at which units will operate satisfactorily.

## START-UP

The following checks should be made before system start-up. Refer to the outdoor unit Installation, Start-Up, and Service manual for system start-up instructions.

1. Check condensate drainage system.
  - a. Remove grille and frame from unit.
  - b. On the opposite side of the drain connection, insert a water bottle up into the fan coil unit and fill drain pan. Refer to Fig. 14. Water must flow regularly with condensate pump energized. If water does not, check the pipe slope or see if there are any pipe restrictions.

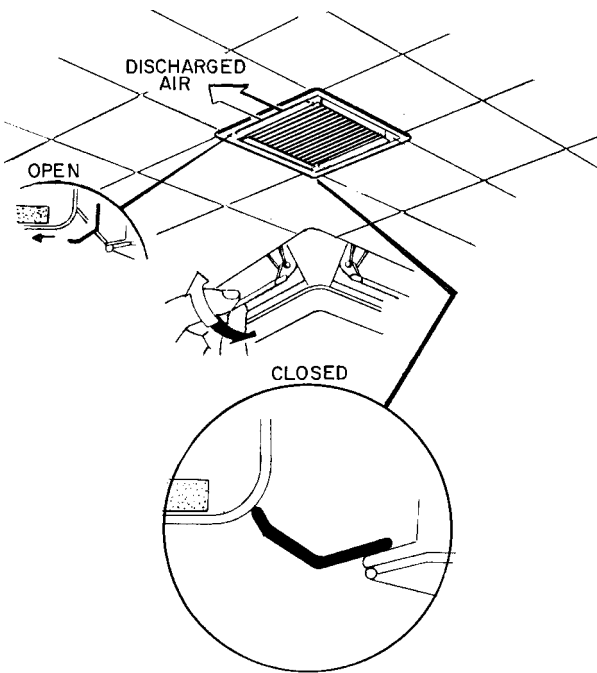
**NOTE:** The unit is equipped with a safety float switch to deenergize the compressor if the drain water level gets too high.

Water connections are fixed to the unit body to avoid breaks when pipes are connected; be sure the connections are tightened with a spanner before starting unit.

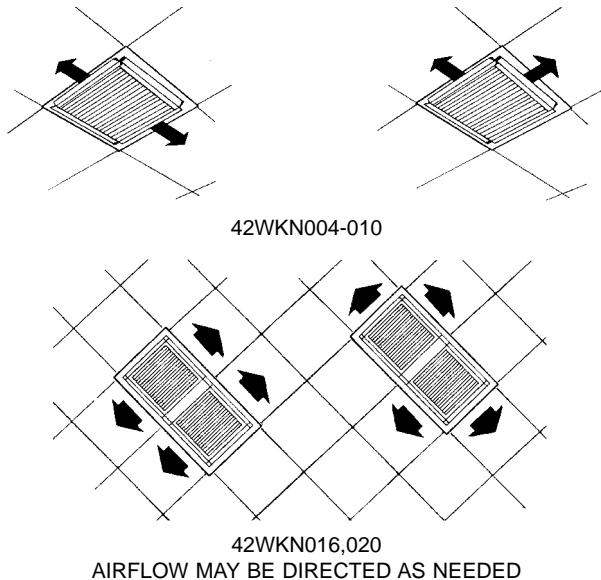
2. Make sure that all wiring connections are correct and that they are tight.
3. Make sure that barriers, covers, and panels are in place and secure.
4. Ensure the filters and return air grilles have been installed and that the discharge louvers have been correctly positioned.

### **⚠ WARNING**

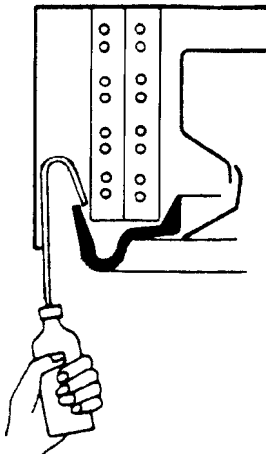
Never operate unit without a filter or with grille removed. Damage to unit or personal injury may result.



**Fig. 12 — Diffuser Adjustments**



**Fig. 13 — Directing Airflow**



**Fig. 14 — Inserting Water into Drain Pan**

## Sequence of Operation

**TWO-PIPE SYSTEMS** — A 24-v electromechanical relay printed control board (PCB) controls unit operation through the wall mounted 24-v solid-state thermostat. When a call for cooling is initiated by the thermostat the 24 v signal is completed between R and Y1. This closes the main control relay CR1. At the same time Y1 energizes the pump delay relay (PDR). This relay starts the condensate pump. It allows the condensate pump to run a few seconds after the relay is deenergized. When CR1/Y1 is energized, the water service valve (WSV1), at 230-v is energized through the contactor valve (CV1). The WSV is connected between terminal 14 of CR1 and V1 of terminal board 3 (TB3).

**FOUR-PIPE SYSTEMS** — Operate similarly to 2-pipe systems with the exception that chilled water and hot water can be sequenced through the two separate coils by means of the auto-changeover thermostat. The Carrier Duct-Free System (DFS) Thermostat will not allow for simultaneous operation of chilled and hot water. The Carrier DFS Heat Pump Thermostat will allow sequencing of chilled and hot water.



## SERVICE AND MAINTENANCE

Remove unit grille, filter and condensate pan for cleaning, lubricating, or replacing parts.

### ⚠ WARNING

To avoid personal injury or damage to the unit, do not service until all power sources have been shut down, locked out, and tagged out.

## Servicing

### TO CLEAN OR REPLACE RETURN AIR FILTERS

1. Open intake grille by turning screws as shown in Fig. 15.
2. Slide filter out.
3. Vacuum or wash filter with soapy water. Rinse under gentle, clean water stream and allow to air dry. If filter needs replacing, filters are available from the local dealer.

### ⚠ CAUTION

If filter is not replaced in the unit, dust and dirt gather in the air conditioner and operation becomes impaired.

### TO CLEAN OR REPLACE DRAIN PAN

1. Place a plastic sheet on the floor to catch any water that may spill from drain pan.
2. Remove the air intake and distribution assembly. Remove the condensate water in the drain pan by pulling out the rubber drain plug (Fig. 16) and letting the water drain into a 3-gallon bucket.

### ⚠ CAUTION

Do not use a screwdriver or any other tool to pry drain pan out of assembly. It could damage the pan.

3. Remove screws holding the drain pan. Carefully hold the drain pan while removing it from assembly.
4. Re-install the drain pan using the screws. Center and align the metal fan inlet orifice with the fan. Ensure the fan spins freely.

## Minimum Maintenance

1. Check, clean, or replace air filter each month, or as required.
2. Check cooling coil, drain pan, condensate trap, and condensate drain pan each cooling season for cleanliness. Clean as necessary.
3. Check fan motor and wheel for cleanliness each heating and cooling season.
4. Check electrical connections for tightness and controls for proper operation each heating and cooling season. Service as needed.

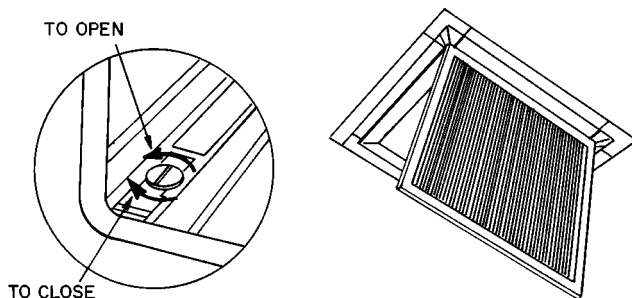


Fig. 15 — Intake Grille Slotted Screws

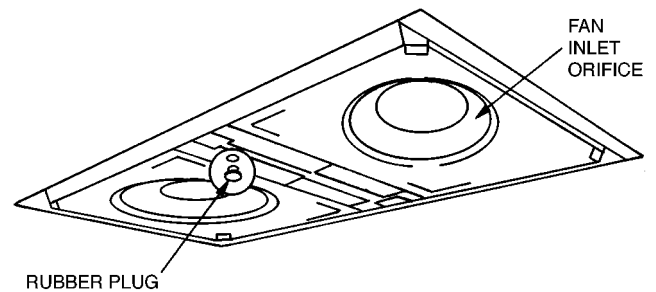


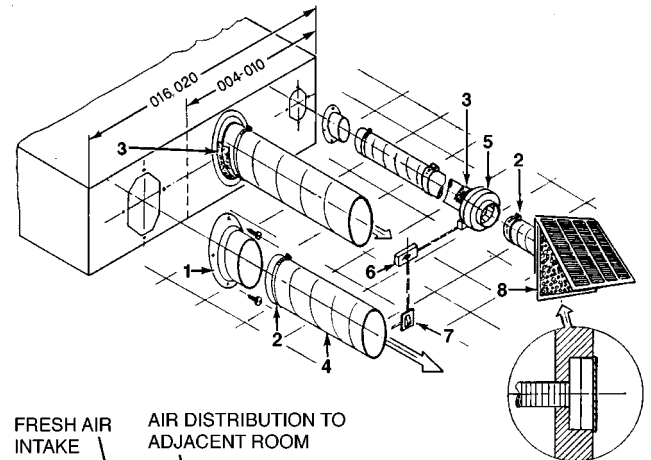
Fig. 16 — Drain Plug

## INSTALLATION OPTIONS

The 42WKN provides for the field addition of air conditioning to an adjacent room or fresh air ventilation. Plan your installation carefully. Before you begin. Measure carefully, follow acceptable building practices, and NEC.

### Ventilation Air Option

1. Using Fig. 2 or 3, locate and remove the factory-installed insulation from the side of the unit where the prepunched knockouts are located.
2. Remove the prepunched knockouts for fresh air intake. Refer to Fig. 17. Be careful not to damage internal parts such as the heat exchanger coil.
3. Install ductwork using field-supplied, insulated flex duct, or insulated sheet metal suitable for working temperatures up to 155 F.
4. Use Fig. 18 and Table 3 to determine the allowable static pressure loss for the ductwork airflow. The ductwork design must not exceed this value or the job airflow requirements will not be met.



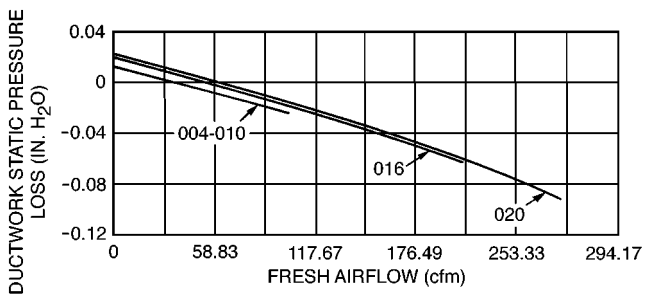
FRESH AIR INTAKE  
AIR DISTRIBUTION TO ADJACENT ROOM  
PUNCH  
KNOCK-OUT OF MICROJOINED SHEET METAL PANELS

### LEGEND

- 1 — Pipe Fitting Entry
- 2 — Clamp
- 3 — Neoprene Gasket, 6 mm
- 4 — Insulated Flexible Conduit
- 5 — Power Vent Air Fan Motor
- 6 — Speed Regulator
- 7 — ON-OFF Switch with Fuses
- 8 — Intake Grille with Filter Holder Frame

NOTE: Unit is shown with grille up.

Fig. 17 — Field Addition of Air Ventilation or Air Conditioning to an Adjacent Room



**Fig. 18 — Ventilation Airflow for Fan Coil Units**

5. Use an accessory fan if airflow does not meet job requirements. Refer to Fig. 17.

**IMPORTANT:** Ventilated air must not exceed 20% of the total airflow or problems with operation will result.

6. Install a filter and grille on outside wall at fresh air inlet. Refer to Fig. 17.

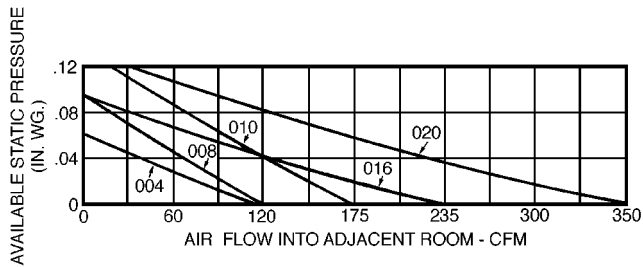
**Table 3 — Maximum and Minimum Fresh Airflow for Fan Coil Units**

| 42WKN UNIT SIZE | MAXIMUM FRESH AIRFLOW (Cfm, High Speed) | MINIMUM FRESH AIRFLOW (10% Permitted Limit) (Cfm) |
|-----------------|---|---|
| 004             | 300                                     | 30  |
| 008             | 285                                     | 30  |
| 010             | 375                                     | 40  |
| 016             | 585                                     | 60  |
| 020             | 900                                     | 90  |

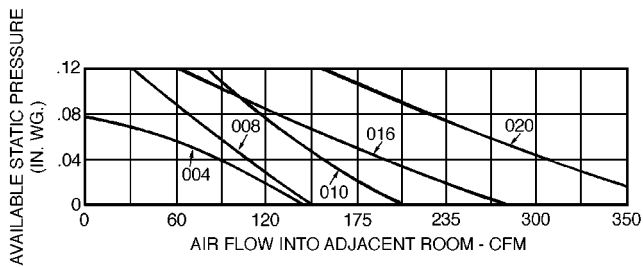
NOTE: Ventilated air must not exceed 10% of total airflow.

**Conditioned Air Discharge Option**

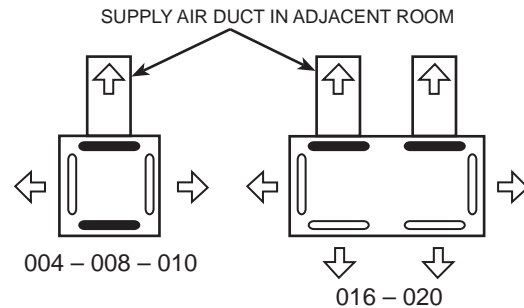
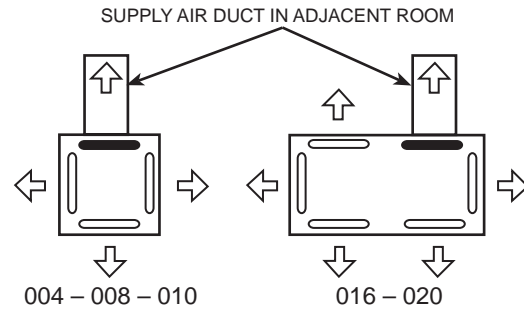
1. Follow Ventilation Air Option, Steps 1-6, but install filter and grille in adjacent room instead of outside wall. Refer to Fig. 2 and 3 for location of prepunched knockouts.
2. Completely insulate all ductwork to prevent condensation.
3. Close one or two discharge diffusers on the unit to increase the airflow to the adjacent room. See Fig. 19.
4. Provide a path for return air. See Fig. 20 for examples.



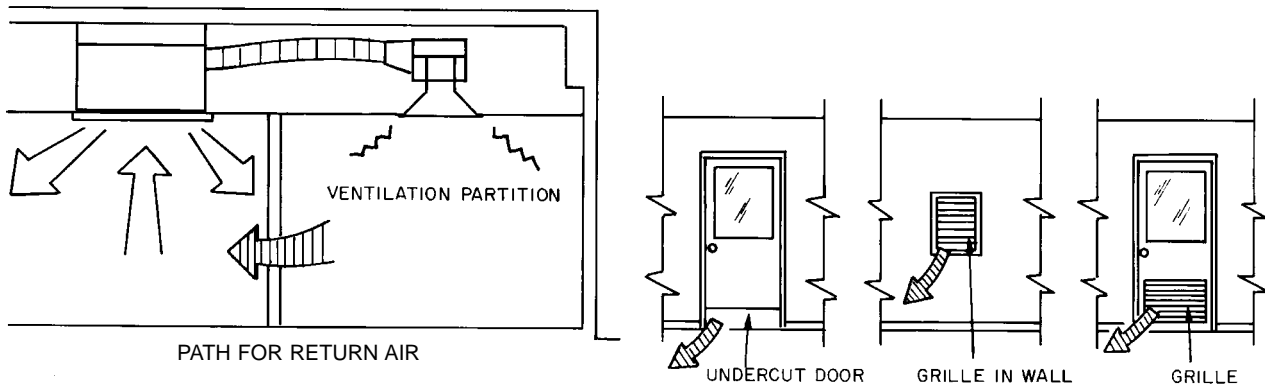
ONE OUTLET CLOSED



TWO OUTLETS CLOSED



**Fig. 19 — Available Static Pressure and Discharge Configuration for Adjacent Room**

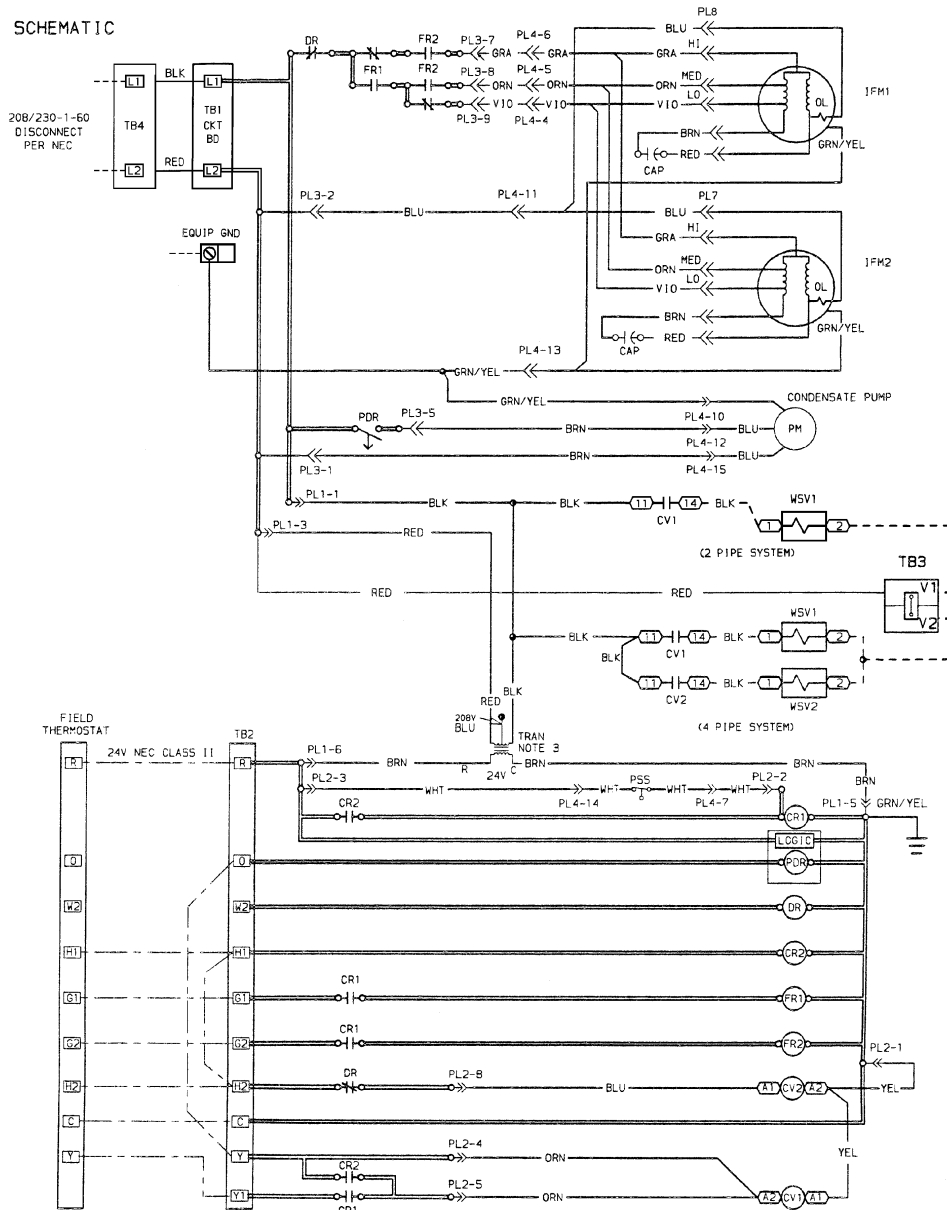


**Fig. 20 — Installation Examples for Return Air Path**

# TROUBLESHOOTING

Use Fig. 21 when troubleshooting 42WKN units.

## SCHEMATIC

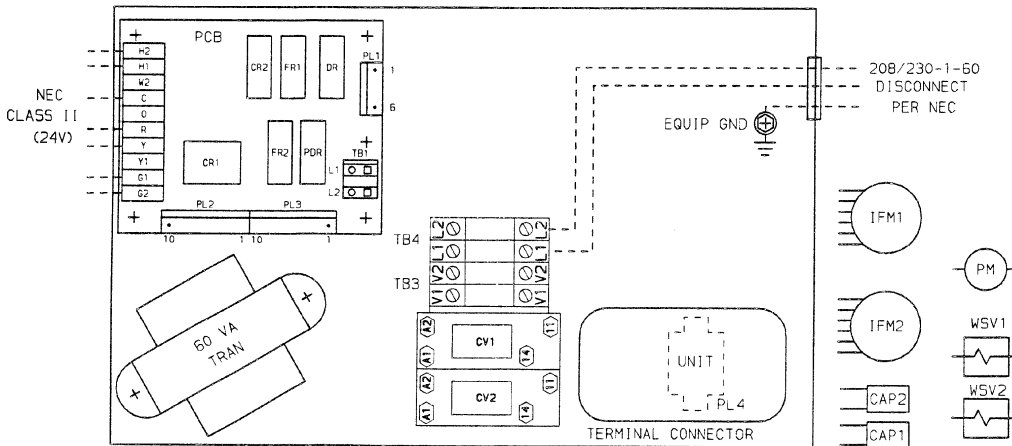


## LEGEND

- BD** — Board
  - CAP** — Capacitor
  - CKT** — Circuit
  - CR** — Control Relay
  - CV1** — Cooling Relay
  - CV2** — Heating Relay
  - DR** — Defrost Relay
  - EQUIP GND** — Equipment Ground
  - GND** — Ground
  - FL** — Fuse Link
  - FR** — Fan Relay
  - IFM** — Indoor Fan Motor
  - NEC** — National Electrical Code
  - OL** — Overload
  - PDR** — Pump Delay Relay
  - PL** — Plug
  - PM** — Pump Motor
  - PSS** — Pump Shut-Off Switch
  - TB** — Terminal Block
  - TRAN** — Transformer
  - WSV** — Water Solenoid Valve
- 
- Terminal (Marked)
  - Terminal (Unmarked)
  - Splice
  - Terminal Block
  - Factory Wiring
  - Field Control Wiring
  - Field Power Wiring
  - Printed Circuit Board
  - Accessory or Optional Wiring

- NOTES:**
1. If any of the original wire furnished must be replaced, it must be replaced with type 90° C wire or its equivalent.
  2. Wire in accordance with National Electrical Code (NEC) and local codes.
  3. Transformer is thermally protected and will reset automatically.
  4. IFM(s) are inherently thermally protected.
  5. Use copper conductors only.

| FAN SPEEDS | ENERGIZED RELAYS |
|------------|------------------|
| LOW        | FR1              |
| MED        | FR1 & FR2        |
| HIGH       | FR2              |



## COMPONENT ARRANGEMENT

**Fig. 21 — Typical Wiring Schematic**

