Carrier

# 40RU 14-16
# Packaged Air-Handling Units with Puron® (R-410A) Refrigerant 60 Hz

# Installation, Start-up and Service Instructions

## CONTENTS



## SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

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

Follow all safety codes, including ANSI (American National Standards Institute) Z223.1. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.

It is important to recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, CAUTION, and NOTE. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices, which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

**⚠DANGER**

ELECTRICAL SHOCK HAZARD

Failure to follow this warning will result in personal injury or death.

Before performing service or maintenance operations on unit, turn off main power switch to unit and install lock(s) and lockout tag(s). Ensure electrical service to rooftop unit agrees with voltage and amperage listed on the unit rating plate. Unit may have more than one power switch.

**⚠WARNING**

UNIT OPERATION AND SAFETY HAZARD

Failure to follow this warning could cause personal injury, death and/or equipment damage.

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

**⚠WARNING**

PERSONAL INJURY AND ENVIRONMENTAL HAZARD

Failure to follow this warning could cause personal injury or death.

Relieve pressure and recover all refrigerant before system repair or final unit disposal.

Wear safety glasses and gloves when handling refrigerants. Keep torches and other ignition sources away from refrigerants and oils.

**⚠CAUTION**

CUT HAZARD

Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses, and gloves when handling parts and servicing units.

**⚠CAUTION**

UNIT OPERATION HAZARD

Failure to follow this caution could cause equipment damage.

Ensure voltage listed on unit data plate agrees with electrical supply provided for the unit.

## PRE-INSTALLATION

1. The power supply (v, ph, and Hz) must correspond to that specified on unit rating plate.
2. The electrical supply provided by the utility must be sufficient to handle load imposed by this unit.
3. Refer to Installation, General section (page 2) and Fig. 1 for locations of electrical inlets, condensate drain, duct connections, and required clearances before setting unit in place.
4. This installation must conform with local building codes and with the NEC (National Electrical Code) or ANSI (American National Standards Institute)/NFPA (National Fire Protection Association) latest revision. Refer to provincial and local plumbing or wastewater codes and other applicable local codes.

### Moving and Storage

To transfer unit from truck to storage site, use a fork truck. Do not stack units more than 2 high during storage. If unit is to be stored for more than 2 weeks before installation, choose a level, dry storage site free from vibration. Do not remove plastic wrap or skid from unit until final installation.

### Rigging

All 40RU Series units can be rigged by using the shipping skid. Units are shipped fully assembled. Do not remove shipping skids or protective covering until unit is ready for final placement; damage to bottom panels can result. Use slings and spreader bars as applicable to lift unit.

## INSTALLATION

### General

Allow the following clearances for service access and airflow:

- Rear: 2-1/2 ft (762 mm) [2-1/2 ft (762 mm) with electric heat accessory]
- Front: 2-1/2 ft (762 mm)
- Right Side: 3-1/2 ft (1067 mm)
- Left Side: 2-1/2 ft (762 mm)

For units equipped with an economizer, refer to the accessory installation instructions for additional clearance requirements. Be sure floor, wall, or ceiling can support unit weight (Tables 1-6). See Fig. 1 for dimensions.

### Uncrating

Move unit as near as possible to final location before removing shipping skid.

Remove metal banding, top skid, and plastic wrap. Examine unit for shipping damage. If shipping damage is evident, file claim with transportation agency. Remove base skid just prior to actual installation.

Check nameplate information against available power supply and model number description in Fig. 2.

NOTE: Be sure to remove the foam shipping pad from the thermostatic expansion valve (TXV). Verify that it has been removed. (See Fig. 3.)

### Accessories

Refer to instructions shipped with each accessory for specific information.

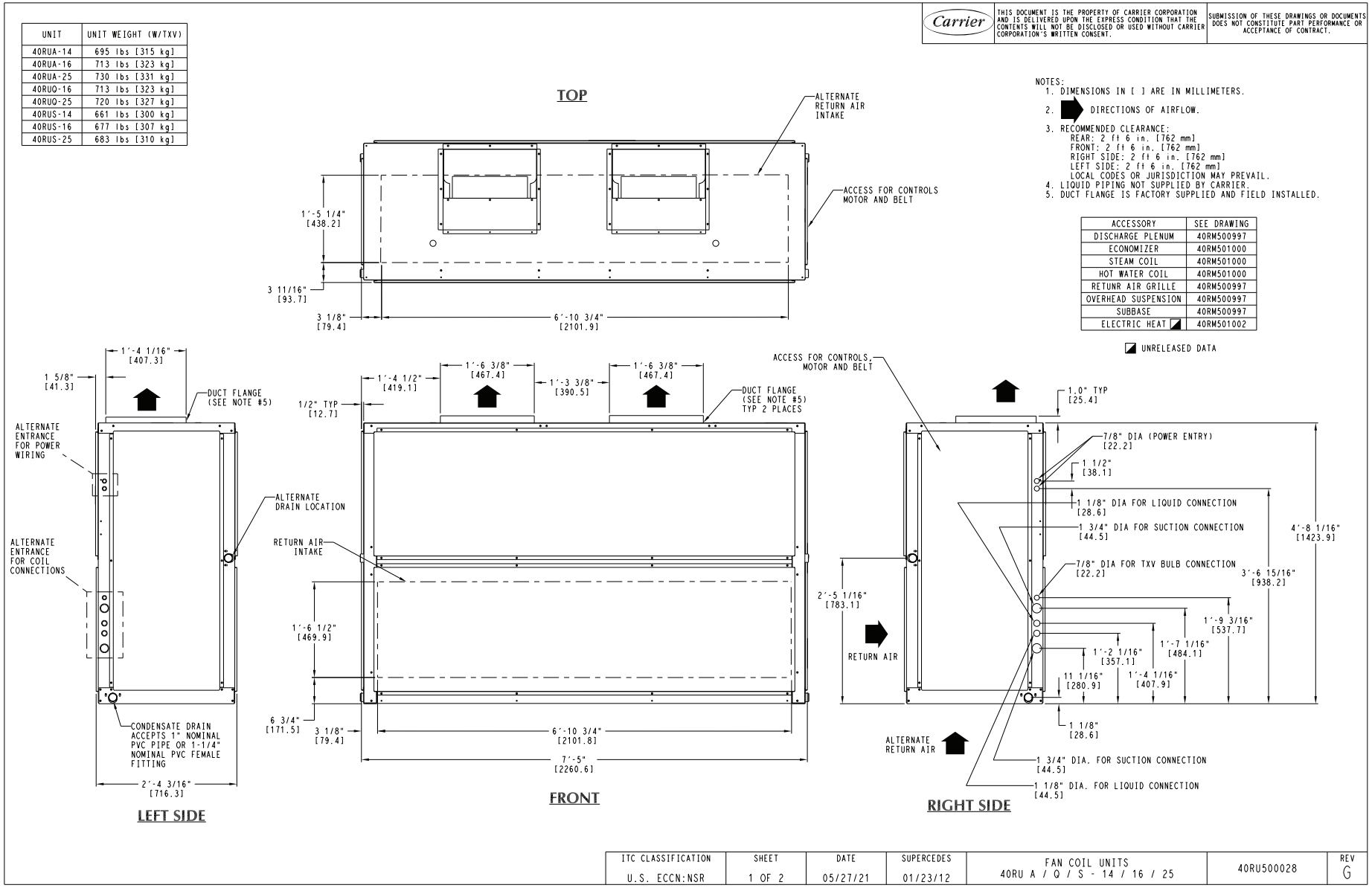
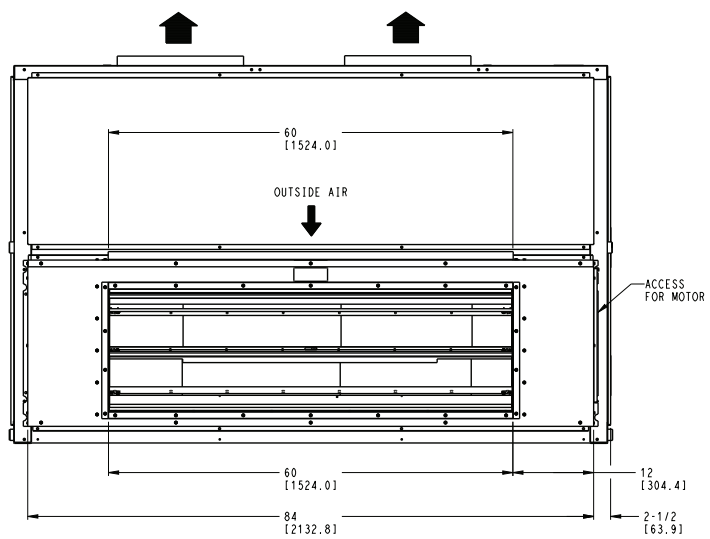
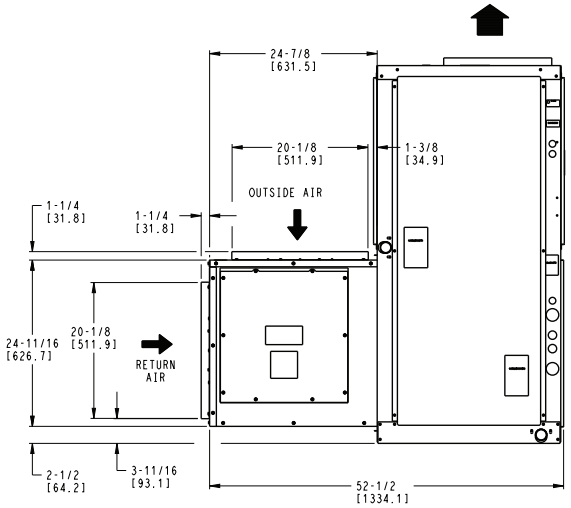



**Fig. 1 — Dimensions – Size 14 and 16**




**FRONT**

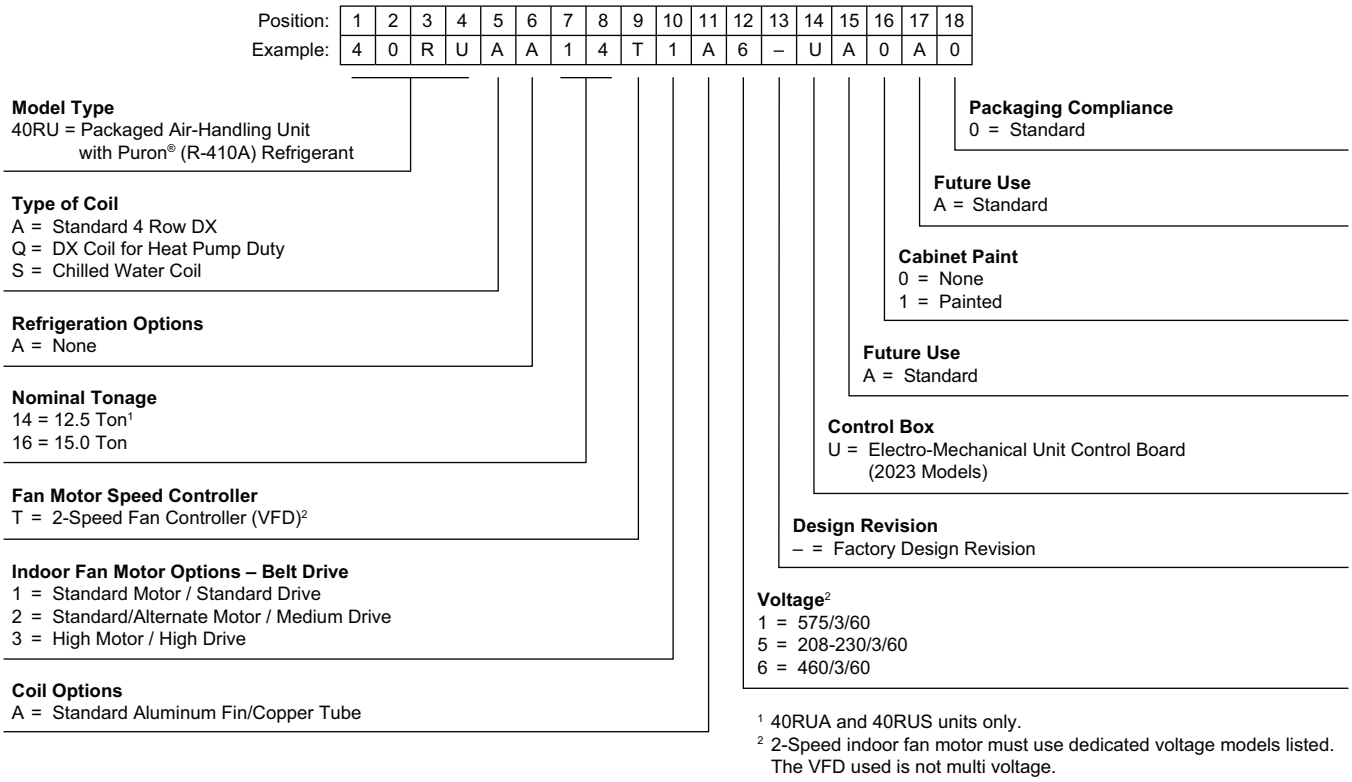



**RIGHT SIDE**

**UNIT WITH ECONOMIZER**

| ITC CLASSIFICATION | SHEET | DATE | SUPERCEDES | | | |
|---|---|---|---|---|---|---|
| U.S. ECCN:NSR | 2 OF 2 | 05/27/21 | 01/23/12 | FAN COIL UNITS<br>40RU A / Q / S - 14 / 16 / 25 | 40RU500028 | REV<br>G |

**Fig. 1 — Dimensions – Size 14 and 16 (cont)**




[1] 40RUA and 40RUS units only.
[2] 2-Speed indoor fan motor must use dedicated voltage models listed. The VFD used is not multi voltage.

**Fig. 2 — Model Number Nomenclature**

## Table 1 — 40RUA Physical Data, English — Cooling Units

| UNIT 40RUA | 14 | 16 |
|---|---|---|
| **NOMINAL CAPACITY (tons)** | 12-1/2 | 15 |
| **OPERATING WEIGHT (lb)** | | |
| **Base Unit with TXV** | 695 | 713 |
| **Plenum** | 225 | 225 |
| **FANS** | | |
| **Qty...Diam. (in.)** | 2...15 | 2...15 |
| **Nominal Airflow (cfm)** | 5000 | 6000 |
| **Airflow Range (cfm)** | 3750-6250 | 4500-7500 |
| **Nominal Motor Hp (Standard Motor)** | | |
| **208/230-3-60 and 460-3-60** | 2.9 | 3.7 |
| **575-3-60** | 3.0 | 3.0 |
| **Motor Speed (rpm)** | | |
| **208/230-3-60 and 460-3-60** | 1725 | 1725 |
| **575-3-60** | 1725 | 1725 |
| **REFRIGERANT** | R-410A | R-410A |
| **Operating Charge (lb) (approx per circuit)[a]** | 2.0/2.0 | 2.5/2.5 |
| **DIRECT EXPANSION COIL** | Enhanced Copper Tubes, Aluminum Sine-Wave Fins | Enhanced Copper Tubes, Aluminum Sine-Wave Fins |
| **Max Working Pressure (psig)** | 650 | 650 |
| **Face Area (sq ft)** | 13.25 | 17.67 |
| **No. of Splits** | 2 | 2 |
| **No. of Circuits per Split** | 12 | 16 |
| **Split Type...Percentage** | Face...50/50 | Face...50/50 |
| **Rows...Fins/in.** | 4...15 | 4...15 |
| **PIPING CONNECTIONS** | | |
| **Quantity...Size (in.)** | | |
| **DX Coil — Suction (ODF)** | 2...1-1/8 | 2...1-1/8 |
| **DX Coil — Liquid Refrigerant (ODF)** | 2...5/8 | 2...5/8 |
| **Steam Coil, In (MPT)** | 1...2-1/2 | 1...2-1/2 |
| **Steam Coil, Out (MPT)** | 1…1-1/2 | 1…1-1/2 |
| **Hot Water Coil, In (MPT)** | 1...2 | 1...2 |
| **Hot Water Coil, Out (MPT)** | 1...2 | 1...2 |
| **Condensate (PVC)** | 1...1-5/8 ODM / 1-1/4 IDF | 1...1-5/8 ODM / 1-1/4 IDF |
| **FILTERS** | Throwaway — Factory Supplied | Throwaway — Factory Supplied |
| **Quantity...Size (in.)** | 4...16 x 20 x 2<br>4...16 x 24 x 2 | 4...16 x 20 x 2<br>4...16 x 24 x 2 |
| **Access Location** | Either Side | Either Side |
| **STEAM COIL[b]** | | |
| **Max Working Pressure (psig at 260°F)** | 20 | 20 |
| **Total Face Area (sq ft)** | 13.33 | 13.33 |
| **Rows...Fins/in.** | 1...10 | 1...10 |
| **HOT WATER COIL[b]** | | |
| **Max Working Pressure (psig)** | 150 | 150 |
| **Total Face Area (sq ft)** | 13.33 | 13.33 |
| **Rows...Fins/in.** | 2...8.5 | 2...8.5 |
| **Water Volume** | | |
| **(gal)** | 13.9 | 13.9 |
| **($ft^3$)** | 1.85 | 1.85 |

NOTE(S):

a. Units are shipped without refrigerant charge.
b. Field-installed accessory only.

LEGEND

**DX** — Direct Expansion
**IDF** — Inside Diameter, Female
**ODF** — Outside Diameter, Female
**ODM** — Outside Diameter, Male
**TXV** — Thermostatic Expansion Valve

## Table 2 — 40RUA Physical Data, SI — Cooling Units

| UNIT 40RUA | 14 | 16 |
|---|---|---|
| **NOMINAL CAPACITY (kW)** | 43 | 52 |
| **OPERATING WEIGHT (kg)** | | |
| **Base Unit with TXV** | 315 | 323 |
| **Plenum** | 102 | 102 |
| **FANS** | | |
| **Qty...Diam. (mm)** | 2...381 | 2...381 |
| **Nominal Airflow (L/s)** | 2360 | 2831 |
| **Airflow Range (L/s)** | 1770-2949 | 2124-3539 |
| **Nominal Motor Hp (Standard Motor)** | | |
| **208/230-3-60 and 460-3-60** | 2.16 | 2.16 |
| **575-3-60** | 2.24 | 2.24 |
| **Motor Speed (r/s)** | | |
| **208/230-3-60 and 460-3-60** | 28.8 | 28.8 |
| **575-3-60** | 28.8 | 28.8 |
| **REFRIGERANT** | | |
| **Operating Charge (kg) (approx per circuit)[a]** | 0.90/0.90 | 1.13/1.13 |
| **DIRECT EXPANSION COIL** | Enhanced Copper Tubes, Aluminum Sine-Wave Fins | Enhanced Copper Tubes, Aluminum Sine-Wave Fins |
| **Max Working Pressure (kPag)** | 4481 | 4481 |
| **Face Area (sq m)** | 0.93 | 1.64 |
| **No. of Splits** | 2 | 2 |
| **No. of Circuits per Split** | 12 | 16 |
| **Split Type...Percentage** | Face...50/50 | Face...50/50 |
| **Rows...Fins/m** | 4...591 | 4...591 |
| **PIPING CONNECTIONS** | | |
| **Quantity...Size (in.)** | | |
| **DX Coil — Suction (ODF)** | 2...1-1/8 | 2...1-1/8 |
| **DX Coil — Liquid Refrigerant (ODF)** | 2...5/8 | 2...5/8 |
| **Steam Coil, In (MPT)** | 1...2-1/2 | 1...2-1/2 |
| **Steam Coil, Out (MPT)** | 1…1-1/2 | 1…1-1/2 |
| **Hot Water Coil, In (MPT)** | 1...2 | 1...2 |
| **Hot Water Coil, Out (MPT)** | 1...2 | 1...2 |
| **Condensate (PVC)** | 1...1-5/8 ODM / 1-1/4 IDF | 1...1-5/8 ODM / 1-1/4 IDF |
| **FILTERS** | Throwaway — Factory Supplied | Throwaway — Factory Supplied |
| **Quantity...Size (mm)** | 4...406 x 508 x 51<br>4...406 x 610 x 51 | 4...406 x 508 x 51<br>4...406 x 610 x 51 |
| **Access Location** | Either Side | Either Side |
| **STEAM COIL[b]** | | |
| **Max Working Pressure (kPag at 126°C)** | 138 | 138 |
| **Total Face Area (sq m)** | 1.24 | 1.24 |
| **Rows...Fins/m** | 1...394 | 1...394 |
| **HOT WATER COIL[b]** | | |
| **Max Working Pressure (kPag)** | 1034 | 1034 |
| **Total Face Area (sq m)** | 1.24 | 1.24 |
| **Rows...Fins/m** | 2...335 | 2...335 |
| **Water Volume** | | |
| **(L)** | 52.6 | 52.6 |
| **($m^3$)** | 0.052 | 0.052 |

NOTE(S):

a. Units are shipped without refrigerant charge.
b. Field-installed accessory only.

LEGEND

**DX** — Direct Expansion
**IDF** — Inside Diameter, Female
**ODF** — Outside Diameter, Female
**ODM** — Outside Diameter, Male
**TXV** — Thermostatic Expansion Valve

## Table 3 — 40RUQ Physical Data, English — Heat Pump Units

| UNIT 40RUQ | 16 |
|---|---|
| **NOMINAL CAPACITY (tons)** | 15 |
| **OPERATING WEIGHT (lb)** | |
| **Base Unit with TXV** | 713 |
| **Plenum** | 225 |
| **FANS** | |
| **Qty...Diam. (in.)** | 2...15 |
| **Nominal Airflow (cfm)** | 5625 |
| **Airflow Range (cfm)** | 4500-7500 |
| **Nominal Motor Hp (Standard Motor)** | |
| **208/230-3-60 and 460-3-60** | 3.7 |
| **575-3-60** | 3.0 |
| **Motor Speed (rpm)** | |
| **208/230-3-60 and 460-3-60** | 1725 |
| **575-3-60** | 1725 |
| **REFRIGERANT** | |
| **Operating Charge (lb) (approx per circuit)[a]** | 3.0/3.0 |
| **DIRECT EXPANSION COIL** | Enhanced Copper Tubes, Aluminum Sine-Wave Fins |
| **Max Working Pressure (psig)** | 650 |
| **Face Area (sq ft)** | 16.56 |
| **No. of Splits** | 2 |
| **No. of Circuits per Split** | 10 |
| **Split Type...Percentage** | Face...50/50 |
| **Rows...Fins/in.** | 4...15 |
| **PIPING CONNECTIONS** | |
| **Quantity...Size (in.)** | |
| **DX Coil — Suction (ODF)** | 2...1-1/8 |
| **DX Coil — Liquid Refrigerant (ODF)** | 2...5/8 |
| **Steam Coil, In (MPT)** | 1...2-1/2 |
| **Steam Coil, Out (MPT)** | 1…1-1/2 |
| **Hot Water Coil, In (MPT)** | 1...2 |
| **Hot Water Coil, Out (MPT)** | 1...2 |
| **Condensate (PVC)** | 1...1-5/8 ODM / 1-1/4 IDF |
| **FILTERS** | Throwaway — Factory Supplied |
| **Quantity...Size (in.)** | 4...16 x 20 x 2 |
| | 4...16 x 24 x 2 |
| **Access Location** | Either Side |
| **STEAM COIL[b]** | |
| **Max Working Pressure (psig at 260°F)** | 20 |
| **Total Face Area (sq ft)** | 13.33 |
| **Rows...Fins/in.** | 1...10 |
| **HOT WATER COIL[b]** | |
| **Max Working Pressure (psig)** | 150 |
| **Total Face Area (sq ft)** | 13.33 |
| **Rows...Fins/in.** | 2...8.5 |
| **Water Volume** | |
| **(gal)** | 13.9 |
| **($ft^3$)** | 1.85 |

NOTE(S):

a. Units are shipped without refrigerant charge.
b. Field-installed accessory only.

LEGEND

**DX** — Direct Expansion
**IDF** — Inside Diameter, Female
**ODF** — Outside Diameter, Female
**ODM** — Outside Diameter, Male
**TXV** — Thermostatic Expansion Valve

## Table 4 — 40RUQ Physical Data, SI — Heat Pump Units

| UNIT 40RUQ | 16 |
|---|---|
| **NOMINAL CAPACITY (kW)** | 52 |
| **OPERATING WEIGHT (kg)** | |
| **Base Unit with TXV** | 323 |
| **Plenum** | 102 |
| **FANS** | |
| **Qty...Diam. (mm)** | 2...381 |
| **Nominal Airflow (L/s)** | 2655 |
| **Airflow Range (L/s)** | 2124-3539 |
| **Nominal Motor Hp (Standard Motor)** | |
| **208/230-3-60 and 460-3-60** | 2.76 |
| **575-3-60** | 2.24 |
| **Motor Speed (r/s)** | |
| **208/230-3-60 and 460-3-60** | 28.8 |
| **575-3-60** | 28.8 |
| **REFRIGERANT** | |
| **Operating Charge (kg) (approx per circuit)[a]** | 1.36/1.36 |
| **DIRECT EXPANSION COIL** | Enhanced Copper Tubes, Aluminum Sine-Wave Fins |
| **Max Working Pressure (kPag)** | 4482 |
| **Face Area (sq m)** | 1.54 |
| **No. of Splits** | 2 |
| **No. of Circuits per Split** | 10 |
| **Split Type...Percentage** | Face...50/50 |
| **Rows...Fins/m** | 4...591 |
| **PIPING CONNECTIONS** | |
| **Quantity...Size (in.)** | |
| **DX Coil — Suction (ODF)** | 2...1-1/8 |
| **DX Coil — Liquid Refrigerant (ODF)** | 2...5/8 |
| **Steam Coil, In (MPT)** | 1...2-1/2 |
| **Steam Coil, Out (MPT)** | 1…1-1/2 |
| **Hot Water Coil, In (MPT)** | 1...2 |
| **Hot Water Coil, Out (MPT)** | 1...2 |
| **Condensate (PVC)** | 1...1-5/8 ODM / 1-1/4 IDF |
| **FILTERS** | Throwaway — Factory Supplied |
| **Quantity...Size (mm)** | 4...406 x 508 x 51 |
| | 4...406 x 610 x 51 |
| **Access Location** | Either Side |
| **STEAM COIL[b]** | |
| **Max Working Pressure (kPag at 126°C)** | 138 |
| **Total Face Area (sq m)** | 1.24 |
| **Rows...Fins/m** | 1...394 |
| **HOT WATER COIL[b]** | |
| **Max Working Pressure (kPag)** | 1034 |
| **Total Face Area (sq m)** | 1.24 |
| **Rows...Fins/m** | 2...335 |
| **Water Volume** | |
| **(L)** | 52.6 |
| **($m^3$)** | 0.052 |

NOTE(S):

a. Units are shipped without refrigerant charge.
b. Field-installed accessory only.

LEGEND

**DX** — Direct Expansion
**IDF** — Inside Diameter, Female
**ODF** — Outside Diameter, Female
**ODM** — Outside Diameter, Male
**TXV** — Thermostatic Expansion Valve

## Table 5 — 40RUS Physical Data, English — Chilled Water Units

| UNIT 40RUS | 14 | 16 |
|---|---|---|
| **NOMINAL CAPACITY (tons)** | 12-1/2 | 15 |
| **OPERATING WEIGHT (lb)** | | |
| **Base Unit** | 661 | 677 |
| **Plenum** | 225 | 225 |
| **FANS** | | |
| **Qty...Diam. (in.)** | 2...15 | 2...15 |
| **Nominal Airflow (cfm)** | 5000 | 6000 |
| **Airflow Range (cfm)** | 3750-6250 | 4500-7500 |
| **Nominal Motor Hp (Standard Motor)** | | |
| **208/230-3-60 and 460-3-60** | 2.9 | 3.7 |
| **575-3-60** | 3.0 | 3.0 |
| **Motor Speed (rpm)** | | |
| **208/230-3-60 and 460-3-60** | 1725 | 1725 |
| **575-3-60** | 1725 | 1725 |
| **CHILLED WATER COIL** | Enhanced Copper Tubes, Aluminum Sine-Wave Fins | Enhanced Copper Tubes, Aluminum Sine-Wave Fins |
| **Max Working Pressure (psig)** | 435 | 435 |
| **Face Area (sq ft) — Upper** | 8.3 | 8.3 |
| **Face Area (sq ft) — Lower** | 5.5 | 8.3 |
| **Rows...Fins/in.** | 3...15 | 3...15 |
| **PIPING CONNECTIONS** | | |
| **Quantity...Size (in.)** | | |
| **Chilled Water — In** | 2...1-3/8 ODM | 2...1-3/8 ODM |
| **Chilled Water — Out** | 2...1-3/8 ODM | 2...1-3/8 ODM |
| **Steam Coil, In (MPT)** | 1...2-1/2 | 1...2-1/2 |
| **Steam Coil, Out (MPT)** | 1...1-1/2 | 1...1-1/2 |
| **Hot Water Coil, In (MPT)** | 1...2 | 1...2 |
| **Hot Water Coil, Out (MPT)** | 1...2 | 1...2 |
| **Condensate (PVC)** | 1...1-5/8 ODM / 1-1/4 IDF | 1...1-5/8 ODM / 1-1/4 IDF |
| **FILTERS** | Throwaway — Factory Supplied | Throwaway — Factory Supplied |
| **Quantity...Size (in.)** | 4...16 x 20 x 2<br>4...16 x 24 x 2 | 4...16 x 20 x 2<br>4...16 x 24 x 2 |
| **Access Location** | Either Side | Either Side |
| **STEAM COIL**[a] | | |
| **Max Working Pressure (psig at 260°F)** | 20 | 20 |
| **Total Face Area (sq ft)** | 13.33 | 13.33 |
| **Rows...Fins/in.** | 1...10 | 1...10 |
| **HOT WATER COIL**[a] | | |
| **Max Working Pressure (psig)** | 150 | 150 |
| **Total Face Area (sq ft)** | 13.33 | 13.33 |
| **Rows...Fins/in.** | 2...8.5 | 2...8.5 |
| **Water Volume** | | |
| **(gal)** | 13.9 | 13.9 |
| **($ft^3$)** | 1.85 | 1.85 |

NOTE(S):

a. Field-installed accessory only.

LEGEND

**IDF** — Inside Diameter, Female
**ODF** — Outside Diameter, Female
**ODM** — Outside Diameter, Male

## Table 6 — 40RUS Physical Data, SI — Chilled Water Units

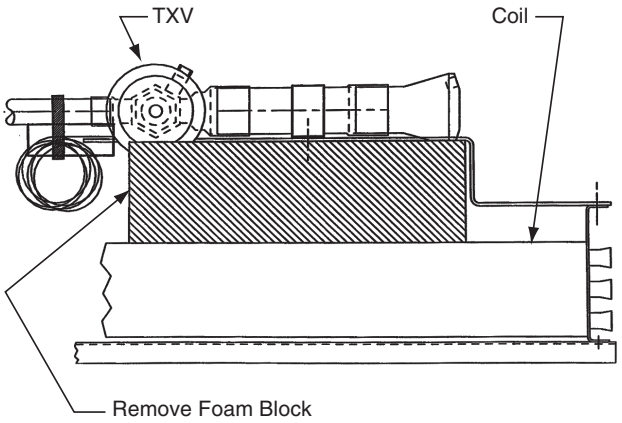
| UNIT 40RUS | 14 | 16 |
|---|---|---|
| **NOMINAL CAPACITY (kW)** | 43 | 52 |
| **OPERATING WEIGHT (kg)** | | |
| **Base Unit** | 300 | 307 |
| **Plenum** | 102 | 102 |
| **FANS** | | |
| **Qty...Diam. (mm)** | 2...381 | 2...381 |
| **Nominal Airflow (L/s)** | 2360 | 2831 |
| **Airflow Range (L/s)** | 1770-2949 | 2124-3539 |
| **Nominal Motor Hp (Standard Motor)** | | |
| **208/230-3-60 and 460-3-60** | 1.79 | 2.76 |
| **575-3-60** | 1.49 | 2.24 |
| **Motor Speed (r/s)** | | |
| **208/230-3-60 and 460-3-60** | 28.8 | 28.8 |
| **575-3-60** | 28.8 | 28.8 |
| **CHILLED WATER COIL** | Enhanced Copper Tubes, Aluminum Sine-Wave Fins | Enhanced Copper Tubes, Aluminum Sine-Wave Fins |
| **Max Working Pressure (kPag)** | 2999 | 2999 |
| **Face Area (sq m) — Upper** | 0.77 | 0.77 |
| **Face Area (sq m) — Lower** | 0.51 | 0.77 |
| **Rows...Fins/m** | 3...591 | 3...591 |
| **PIPING CONNECTIONS** | | |
| **Quantity...Size (in.)** | | |
| **Chilled Water — In** | 2...1-3/8 ODM | 2...1-3/8 ODM |
| **Chilled Water — Out** | 2...1-3/8 ODM | 2...1-3/8 ODM |
| **Steam Coil, In (MPT)** | 1...2-1/2 | 1...2-1/2 |
| **Steam Coil, Out (MPT)** | 1...1-1/2 | 1...1-1/2 |
| **Hot Water Coil, In (MPT)** | 1...2 | 1...2 |
| **Hot Water Coil, Out (MPT)** | 1...2 | 1...2 |
| **Condensate (PVC)** | 1...1-5/8 ODM / 1-1/4 IDF | 1...1-5/8 ODM / 1-1/4 IDF |
| **FILTERS** | Throwaway — Factory Supplied | Throwaway — Factory Supplied |
| **Quantity...Size (mm)** | 4...406 x 508 x 51 | 4...406 x 508 x 51 |
| | 4...406 x 610 x 51 | 4...406 x 610 x 51 |
| **Access Location** | Either Side | Either Side |
| **STEAM COIL**[a] | | |
| **Max Working Pressure (kPag at 126°C)** | 138 | 138 |
| **Total Face Area (sq m)** | 1.24 | 1.24 |
| **Rows...Fins/m** | 1...355 | 1...394 |
| **HOT WATER COIL**[a] | | |
| **Max Working Pressure (kPag)** | 1034 | 1034 |
| **Total Face Area (sq m)** | 1.24 | 1.24 |
| **Rows...Fins/m** | 2...335 | 2...335 |
| **Water Volume** | | |
| **(L)** | 52.6 | 52.6 |
| **($m^3$)** | 0.052 | 0.052 |

NOTE(S):

a. Field-installed accessory only.

LEGEND

**IDF** — Inside Diameter, Female
**ODF** — Outside Diameter, Female
**ODM** — Outside Diameter, Male




LEGEND
**TXV** — Thermostatic Expansion Valve

**Fig. 3 — Foam Block Location**

## Rated Indoor Airflow (cfm)

Tables 7-9 list the rated indoor airflow used for the AHRI (Air-Conditioning, Heating, and Refrigeration Institute) efficiency rating for the units covered in this document.

**Table 7 — 38AUZ with 40RUA**

| MODEL NUMBER | FULL LOAD AIRFLOW (cfm) |
|---|---|
| 38AUZ*14 — 40RUA*14 | 4400 |
| 38AUZ*16 — 40RUA*16 | 6000 |

**Table 8 — 38AUD with 40RUA**

| MODEL NUMBER | FULL LOAD AIRFLOW (cfm) |
|---|---|
| 38AUD*14 — 40RUA*14 | 4400 |
| 38AUD*16 — 40RUA*16 | 5625 |

**Table 9 — 38AUQ with 40RUQ**

| MODEL NUMBER | FULL LOAD AIRFLOW (cfm) |
|---|---|
| 38AUQ*16 — 40RUQ*16 | 5625 |

## Unit Positioning

The unit can be mounted on the floor for vertical application with return air entering the face of the unit and supply air discharging vertically through the top of the unit. The unit can also be applied in a horizontal arrangement with return air entering horizontally and the supply air discharging horizontally. When applying the unit in a horizontal arrangement, ensure the condensate drain pan is located at the bottom center of the unit for adequate condensate disposal. See Fig. 4 for condensate connections for each unit position.

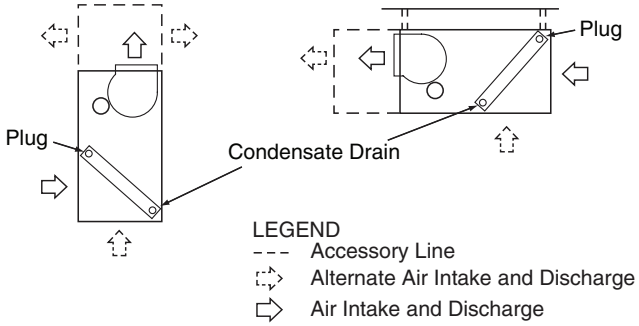



**Fig. 4 — Typical Unit Positioning**

IMPORTANT: Do NOT attempt to install unit with return air entering top panel of unit. Condensate will not drain from unit.

Typical positioning and alternate return air locations are shown in Fig. 4. Alternate return air locations can be used by moving the unit panel from the alternate return air location to the standard return air location. Refer to overhead suspension accessory drawing (see Fig. 5) for preferred suspension technique. The unit needs support underneath to prevent sagging.

## Unit Isolation

Where extremely quiet operation is essential, install isolators between floor and base of unit, or between ceiling and top section of unit.

Be sure that unit is level and adequately supported. Use channels at front and sides of unit for reference points when leveling.

IMPORTANT: Do not bury refrigerant piping underground.

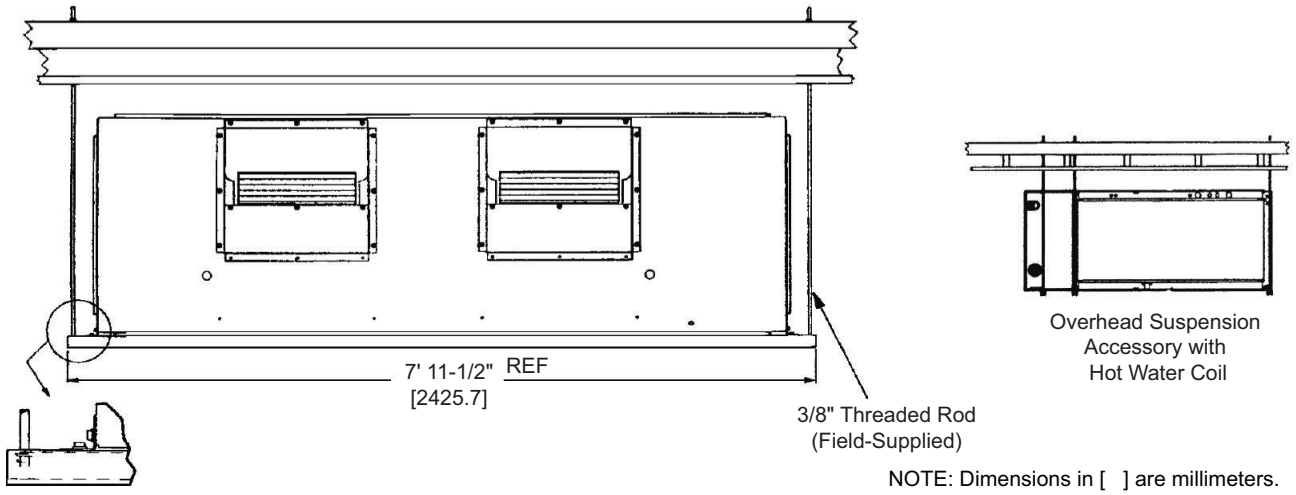



**Fig. 5 — Preferred Suspension Technique**

## Refrigerant Piping

See Tables 1-6 for refrigerant pipe connection sizes. For ease in brazing, it is recommended that all internal solder joints be made before unit is placed in final position.

The 40RU direct-expansion units have internal factory-installed thermostatic expansion valves (TXVs), distributors, and nozzles for use with R-410A. See Table 10 for part numbers. Knockouts are provided in the unit corner posts for 40RU refrigerant piping. See Fig. 6, which also lists recommended knockouts and access holes to use for each 40RU unit size. Recommended fittings are listed in Table 11.

The sensor bulb capillary tubes must be routed from the TXVs inside the unit through one of the piping access holes. Clamp the TXV sensor bulb on a vertical portion of the suction line, outside the unit. (See Fig. 7.)

## Refrigerant and Chilled Water Piping Access

The 40RU Series units come with standard knockouts for refrigerant and chilled water piping. These knockouts are located on both sides of the unit for installation flexibility. The standard knockouts provide sufficient access to the unit's coils for all 40RUA*14 and 16 units. 40RUQ*16 units, as well as 40RUS*14 and 16 units require additional holes that must be field-fabricated to accommodate the piping. See Fig. 6 for the positions and dimensions of the additional access holes required for 40RUQ*16 and 40RUS units. Recommended access hole use is also listed for all units. Note that Fig. 6 shows the access holes on the control-box side of the unit; this is the side of the unit with the coil headers, so it is used most often for piping access.

NOTE: Be sure to remove the foam shipping pad from the TXV. Verify that it has been removed. (See Fig. 3.)

IMPORTANT: Never attach the sensor to the suction manifold. Do NOT mount the sensor on a trapped portion of the suction line.

The 40RU Series evaporator coils have a face-split design. Ensure that lower circuit of coil is first on/last off when connected to the condensing unit and/or system controls. (See Fig. 8.)

External TXV equalizer connections are provided and factory-brazed into the coil suction manifolds.

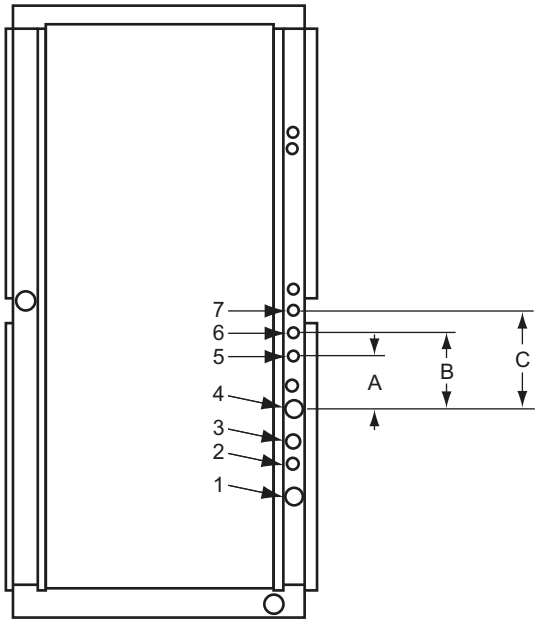
If suction line must be horizontal, clamp bulb to suction line at least 45 degrees above bottom, at approximately the 4 o'clock or 8 o'clock position. (See Fig. 9.)

## Table 10 — Factory-Installed Nozzle and Distributor Data[a]

| UNIT | COIL TYPE STD | TXV QTY...PART NO. | DISTRIBUTOR QTY... PART NO. | FEEDER TUBES PER DISTRIBUTOR[b] QTY...SIZE (in.) | NOZZLE QTY...PART NO. |
|---|---|---|---|---|---|
| **40RUA*14** | 4 Row | 2...HXAE-6-KX | 2...1113 | 12...3/16 | 2...G3 |
| **40RUA*16** | 4 Row | 2...BBIZE—6—GA | 2...1136 | 16...3/16 | 2...G4 |
| **40RUQ*16** | 4 Row | 2...BBIZE—8—GA | 2...1113 | 10...3/16 | 2...G5 |

NOTE(S):

a. Hot gas bypass applications require field-supplied auxiliary side connector.
b. Feeder tube size is 1/4 in. (6.35 mm).




| UNIT | USE HOLE NUMBERS[a] | FIELD-FABRICATED HOLE DIAMETERS in. (mm) | | | FIELD-FABRICATED HOLE POSITION DIMENSIONS, in. (mm) | | |
|---|---|---|---|---|---|---|---|
| | | NO. 5 | NO. 6 | NO.7 | A | B | C |
| **40RUA*14, 16** | 1, 2, 3, 4 | — | — | — | — | — | — |
| **40RUS*14, 16** | 4, 5, 6, 7 | 1-3/4 (44.5) | 1-3/4 (44.5) | 1-3/4 (44.5) | 3.0 (76.2) | 6.0 (152.5) | 10.5 (266.7) |
| **40RUQ*16** | 3[b], 5, 6, 7 | 1-1/8 (28.6) | 1-1/8 (28.6) | 1-3/4 (44.5) | 3.25 (82.6) | 6.125 (155.6) | 10.38 (263.7) |

NOTE(S):

a. Access hole knockouts 1-4 are factory-supplied.
b. Must be enlarged from 1-1/8 in. (28.6 mm) to 1-3/4 in. (44.5 mm)

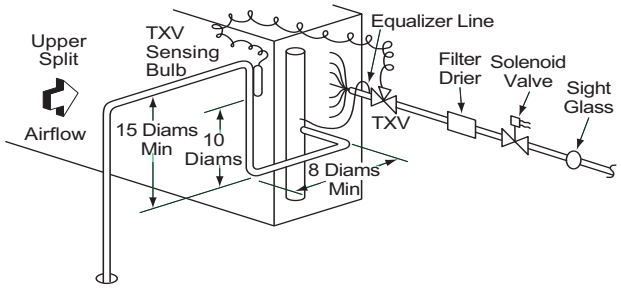
**Fig. 6 — Refrigerant and Chilled Water Piping Access Holes**

## Table 11 — Fitting Requirements

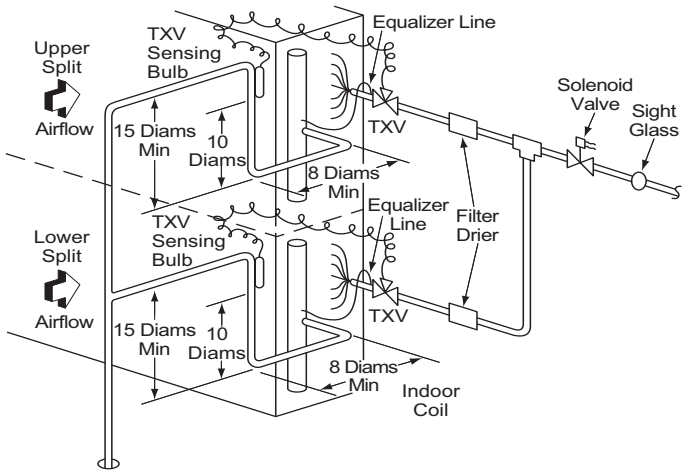
| UNIT | ACCESS HOLE NO.[a] | CONNECTION TYPE | CIRCUIT | FITTING REQUIRED[b] (in.) |
|---|---|---|---|---|
| 40RUA*14 | 1 | Suction | Lower | 1-1/8 Street Elbow<br>1-1/8 Nipple, 7-5/8 L<br>1-1/8 Long Radius Elbow |
| | 2 | Liquid | Lower | 5/8 Street Elbow<br>5/8 Nipple, 1-7/16 L<br>5/8 Long Radius Elbow |
| | 3 | Liquid | Upper | 5/8 Street Elbow<br>5/8 Nipple, 11-1/2 L<br>5/8 Long Radius Elbow |
| | 4 | Suction | Upper | 1-1/8 Nipple, 5-5/8 L<br>1-1/8 Long Radius Elbow<br>1-1/8 Nipple, 13 L<br>1-1/8 Long Radius Elbow |
| 40RUA*16 | 1 | Suction | Lower | 1-1/8 Street Elbow<br>1-1/8 Nipple, 72-3/4 L<br>1-1/8 Long Radius Elbow |
| | 2 | Liquid | Lower | 5/8 Street Elbow<br>5/8 Nipple, 1-3/8 L<br>5/8 Long Radius Elbow |
| | 3 | Liquid | Upper | 5/8 Street Elbow<br>5/8 Nipple, 11-1/2 L<br>5/8 Long Radius Elbow |
| | 4 | Suction | Upper | 1-1/8 Nipple, 5-5/8 L<br>1-1/8 Long Radius Elbow<br>1-1/8 Nipple, 13 L<br>1-1/8 Long Radius Elbow |
| 40RUQ*16 | 3 | Suction | Lower | 1-1/8 Nipple, 3 L<br>1-1/8 Long Radius Elbow |
| | 5 | Suction | Lower | 5/8 Nipple, 2-7/8 L<br>5/8 45° Elbow<br>5/8 Nipple, 1-5/8 L<br>5/8 Long Radius Elbow |
| | 6 | Liquid | Upper | 5/8 Nipple, 2-7/8 L<br>5/8 45° Elbow<br>5/8 Nipple, 4-1/4 L<br>5/8 Long Radius Elbow |
| | 7 | Suction | Upper | 1-1/8 Nipple, 5 L<br>1-1/8 45° Elbow<br>1-1/8 Nipple, 8-3/4 L<br>1-1/8 Long Radius Elbow |
| 40RUS*14<br>40RUS*16 | 4 | Supply | Lower | 1-3/8 Long Radius Elbow<br>1-3/8 Nipple, 3-3/4 L<br>1-3/8 Long Radius Elbow |
| | 5 | Return | Lower | 1-3/8 Long Radius Elbow<br>1-3/8 Nipple, 3-3/8 L<br>1-3/8 Long Radius Elbow |
| | 6 | Return | Upper | 1-3/8 Long Radius Elbow<br>1-3/8 Nipple, 7 L<br>1-3/8 Long Radius Elbow |
| | 7 | Supply | Upper | 1-3/8 Long Radius Elbow<br>1-3/8 Nipple, 11-3/4 L<br>1-3/8 Long Radius Elbow |

NOTE(S):

a. See Fig. 7 for access hole location by number.
b. Fittings are listed in order from header or tee stub connection out to access hole in corner support post.



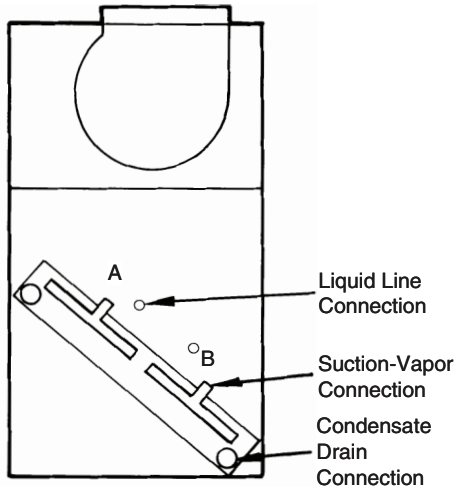

**Single Circuit Coil Piping Configuration — RU**07, 08**
**For single compressor condensing units.**



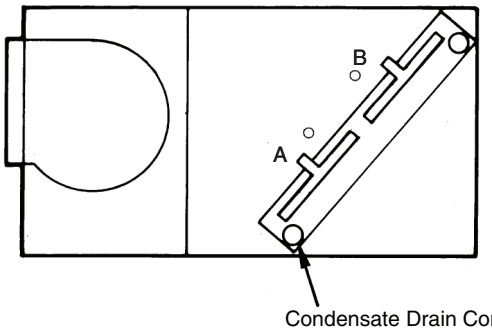

**Dual Circuit Coil Piping Configuration — RU**12-16**
**For single compressor condensing units.**

LEGEND
**TXV** — Thermostatic Expansion Valve
NOTE: Component location arrangement shown for field installation of sight glasses, solenoid valves, filter driers, and TXV sensing bulbs. The TXVs and equalizer lines are factory-installed.

**Fig. 7 — Face-Split Coil and Liquid Line Piping (Typical)**

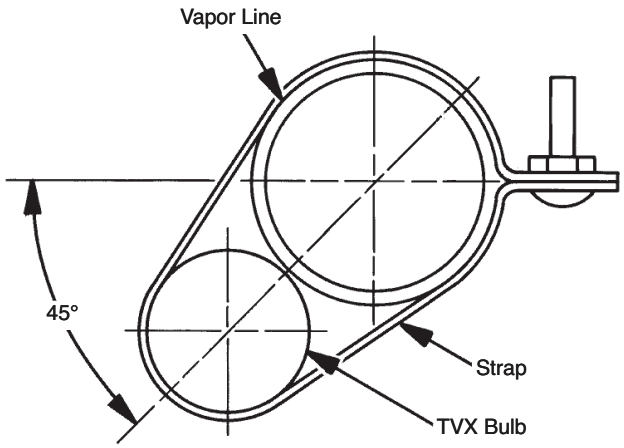



First On/Last Off = B
Vertical Installation




First On/Last Off = A
Horizontal Installation

**Fig. 8 — Typical Evaporator Coil Connections (40RU)**




LEGEND
**TXV —** Thermostatic Expansion Valve
NOTE: The 8 o'clock position is shown above.

**Fig. 9 — TXV Sensing Bulb Location**

## Chilled Water Piping

See Tables 5 and 6 for chilled water connection sizes. For ease in brazing, it is recommended that all internal solder joints be made before unit is placed in final position.

Knockouts are provided in the unit corner posts for 40RUS refrigerant piping. Additional field-fabricated access holes are required for 40RUS chilled water piping. See Fig. 6, which lists recommended knockouts and access holes to use for each 40RUS unit size.

To size, design, and install chilled water piping, consult the Carrier System Design manual. See Fig. 10 for an example of a typical installation. Recommended fittings are listed in Table 11.

To access 40RUS coil vents and drains, remove the unit side panel over the coil header. Vent and drain plugs are on the top and bottom of header, respectively. See the Service section for information on preventing coil freeze-up during winter.

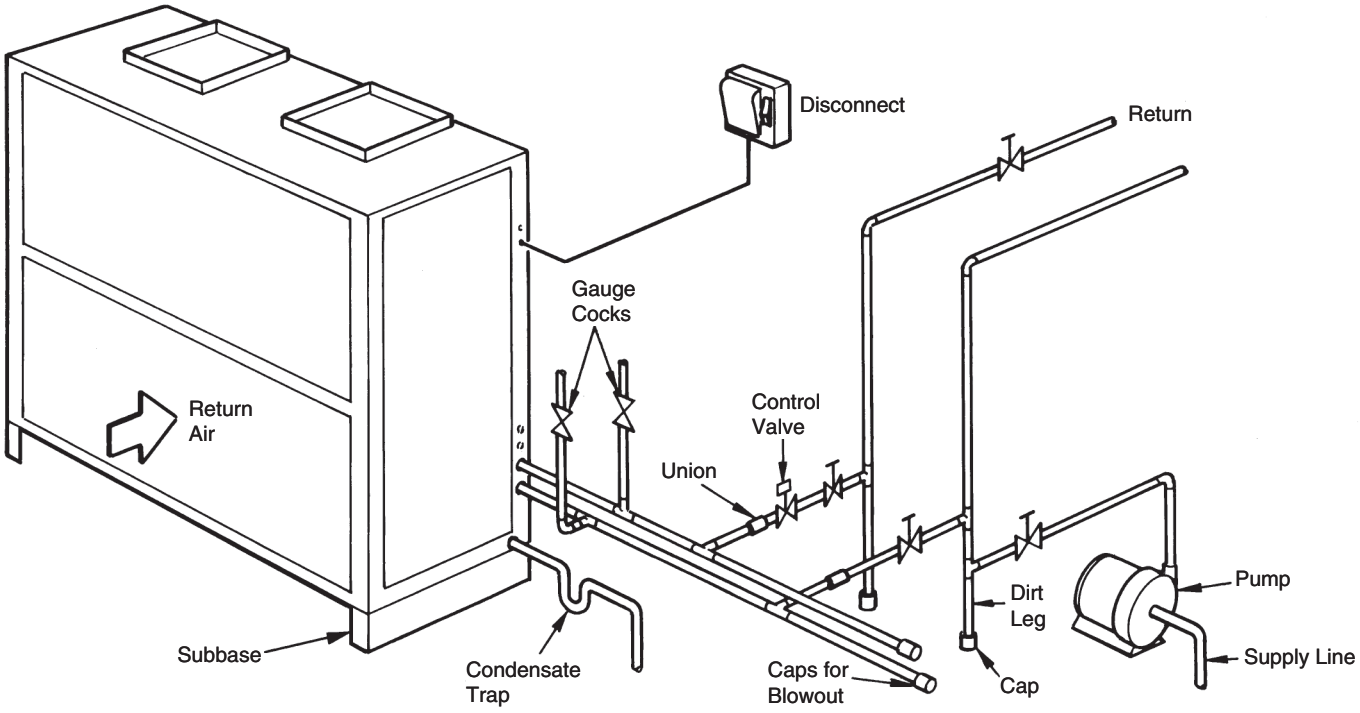



**Fig. 10 — Typical 40RUS Chilled Water Piping**

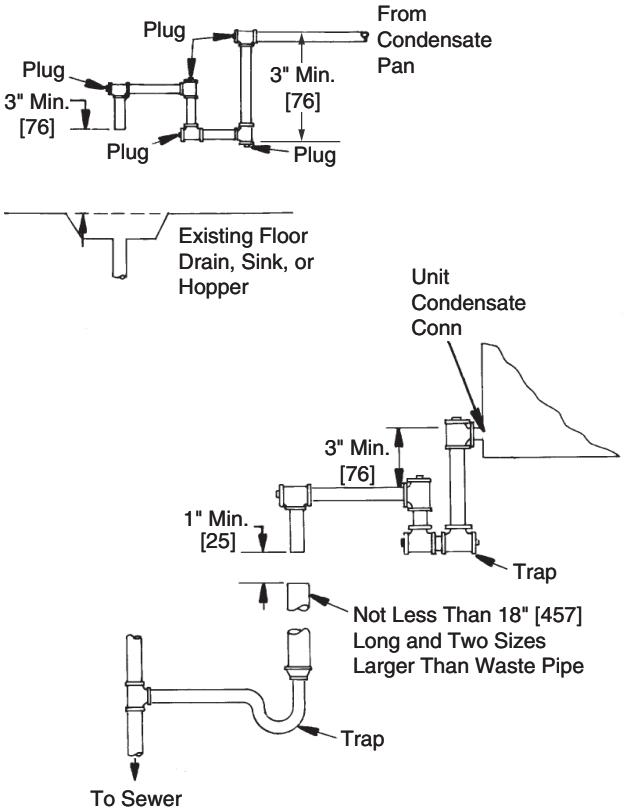
## Condensate Drain

Install a trapped condensate drain line to unit connection as shown in Fig. 11. The unit drain connection is a PVC stub. (See Fig. 12.) Some areas may require an adapter to connect to either galvanized steel or copper pipe. For these applications, install a field-supplied threaded PVC adapter.

NOTE: A trap must be installed in the condensate drain line to ensure that the static pressure of fans is balanced with the water column in the drain line and that condensate can drain completely from pan. Without a trap, air can be drawn up drain line until water level in condensate pan becomes equal to static pressure created by fans, preventing complete drainage. Conditions will worsen as filters become dirty.

Install clean-out plugs in trap. Pitch drain line downward to an open floor drain or sump. Provide service clearance around drain line to permit removal of unit panels. Observe all local sanitary codes.

As shipped, the unit's condensate drain pan is NOT sloped towards the drain connection. The pan slope must be changed to pitch towards the side of the unit with the drain connection. (See Fig. 12.) Loosen the 2 screws next to the drain outlet at both ends of the unit, push drain pan down in the slots near the drain connection, and up in the slots on the opposite end. Re-tighten screws. The pan should have a pitch of at least 1/4 in. over its length toward the drain connection.




NOTE: Dimensions in [ ] are in millimeters

**Fig. 11 — Condensate Drain**

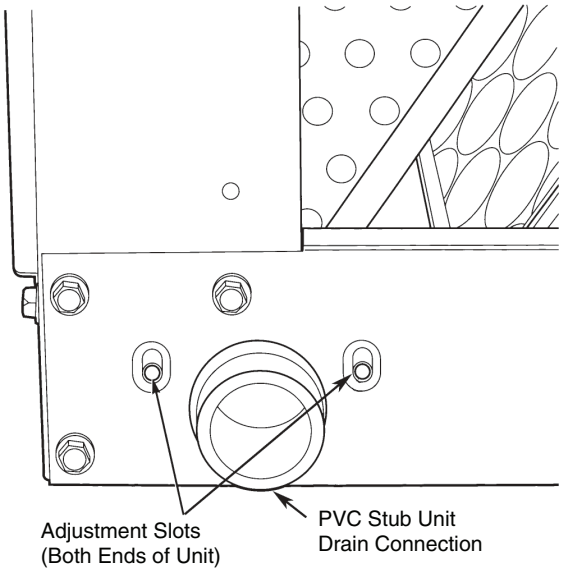



**Fig. 12 — Drain Pan Slope Adjustment**

## Fan Motors and Drives

Motor and drive packages are factory installed in all units. The motor and drive packages consist of the following items:

1 — fan motor

1 — adjustable motor pulley

1 — fan pulley

2 — matched fan belts

(40RUA*14-16, 40RUQ*16, 40RUS*14-16 units)

For instructions on changing fan rotation, changing drive speeds and adjusting drives, see “Pulley and Drive Adjustment” on page 31.

## Power Supply and Wiring

Check the unit data plate to ensure that available power supply matches electrical characteristics of the unit. Provide a disconnect switch with an integrated lock-out feature of size required to provide adequate fan motor starting current. See Table 12 for unit electrical data.

## Table 12 — Electrical Data — Two Speed Motors[a]

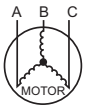
| UNIT | VOLTAGE[b] | IFM TYPE | VOLTAGE LIMITS[c] | | FAN MOTOR | | | POWER SUPPLY[d] | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Hp | kW | FLA[e] | MCA | MOCP |
| 40RUA/S*14 | 208/230 | STD | 187 | 253 | 2.9 | 2.16 | 8.6 | 11.0 | 15 |
| | | MED | 187 | 253 | 2.9 | 2.16 | 8.6 | 11.0 | 15 |
| | | HIGH | 187 | 253 | 3.7 | 2.76 | 10.8 | 14.0 | 20 |
| | 460 | STD | 414 | 506 | 2.9 | 2.16 | 3.8 | 5.0 | 15 |
| | | MED | 414 | 506 | 2.9 | 2.16 | 3.8 | 5.0 | 15 |
| | | HIGH | 414 | 506 | 3.7 | 2.76 | 4.9 | 7.0 | 15 |
| | 575 | STD | 518 | 632 | 3.7 | 2.76 | 4.5 | 6.0 | 15 |
| | | MED | 518 | 632 | 3.7 | 2.76 | 4.5 | 6.0 | 15 |
| | | HIGH | 518 | 632 | 5.0 | 3.73 | 8.0 | 10.0 | 15 |
| 40RUA/S/Q*16 | 208/230 | STD | 187 | 253 | 3.7 | 2.76 | 10.8 | 14.0 | 20 |
| | | MED | 187 | 253 | 3.7 | 2.76 | 10.8 | 14.0 | 20 |
| | | HIGH | 187 | 253 | 5.0 | 3.73 | 18.0 | 23.0 | 40 |
| | 460 | STD | 414 | 506 | 3.7 | 2.76 | 4.9 | 7.0 | 15 |
| | | MED | 414 | 506 | 3.7 | 2.76 | 4.9 | 7.0 | 15 |
| | | HIGH | 414 | 506 | 5.0 | 3.73 | 9.1 | 12.0 | 20 |
| | 575 | STD | 518 | 632 | 3.7 | 2.76 | 4.5 | 6.0 | 15 |
| | | MED | 518 | 632 | 3.7 | 2.76 | 4.5 | 6.0 | 15 |
| | | HIGH | 518 | 632 | 5.0 | 3.73 | 8.0 | 10.0 | 15 |

NOTE(S):

a. Installation with Accessory Electric Heaters: Size the Field Power Wiring between the heater TB1 and the 40RU indoor fan motor per NEC Article 430-28 (1) or (2) (depends on length of conduit between heater enclosure and 40RU power entry location). Install wires in field-installed conduit.
b. Unbalanced 3-Phase Supply Voltage: Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the formula in the example (see example below) to determine the percentage of voltage imbalance.
c. Motors are designed for satisfactory operation within 10% of normal voltage shown. Voltages should not exceed the limits shown in the Voltage Limits column.
d. Minimum circuit amps (MCA) and maximum overcurrent protection (MOCP) values are calculated in accordance with NEC Article 440.
e. Motor FLA values are established in accordance with Underwriters' Laboratories (UL). Standard 1995.

$$\text{\% Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 230-3-60




AB = 224 v
BC = 231 v
AC = 226 v

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3} = 227$$

Determine maximum deviation from average voltage.

(AB) 227-224 = 3 v

(BC) 231-227 = 4 v

(AC) 227-226 = 1 v

Maximum deviation is 4 v.

Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100x \frac{4}{227} = 1.78\%$$

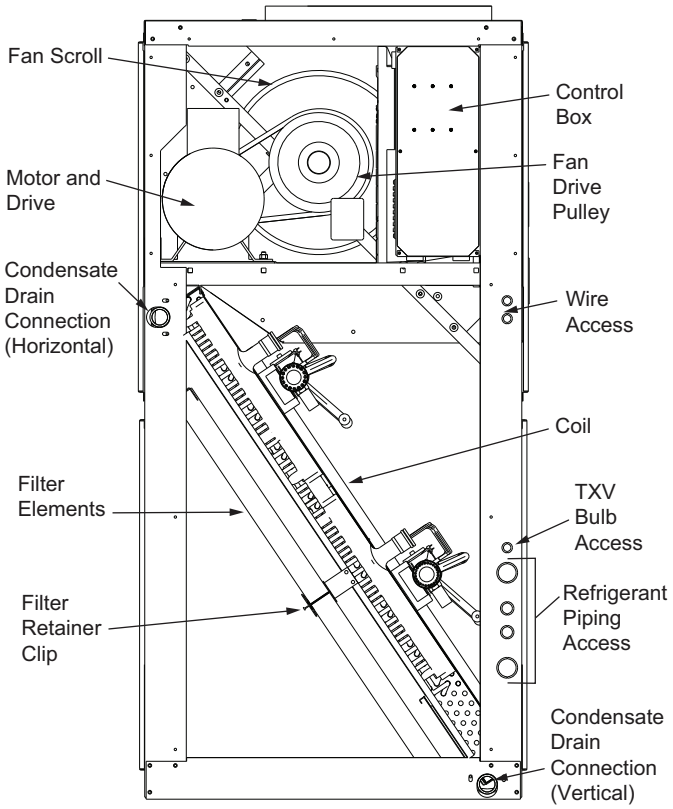
This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

LEGEND

**FLA** — Full Load Amps
**MCA** — Minimum Circuit Amps
**MOCP** — Maximum Overcurrent Protection

Install disconnect switch and power wiring in accordance with all applicable local codes. See Fig. 13-14 and the unit label diagram. For units with motor sizes less than 5 Hp (3.7 kW), connect power wiring to unit with no. 10 ring terminal. For units with motor sizes of 5 Hp (3.7 kW) or more, connect power wiring with 1/4 in. ring terminal.




LEGEND
**TXV** —Thermostatic Expansion Valve

**Fig. 13 — Wiring and Service Access (Side Panel Removed)**

The 40RU size 14-16 units that have motors wired for 460 v, 3 ph, 60 Hz operation can be field-converted to 208/230 v, 3 ph, 60 Hz operation. Rewire the motor according to the diagram plate on the motor. After reconfiguring the motor, mark the motor specifying 208 v or 230 v operation replacing the 460 v sticker information on the units' corner post.

Fan motors are factory-installed on all units. The control box (see Fig. 14) contains a Unit Control Board (UCB) that receives thermostat commands from the thermostat (through the Thermostat Connection Board [TSTAT CB]) and outputs these commands to the condensing unit (through the Indoor Connection Board [IDCB]). The control box also contains a high voltage terminal block and fuses that provide overcurrent protection to the Variable Frequency Drive.

Complete 24-v control circuit wiring. Wire the thermostat to TSTAT CB terminal block (see Fig. 14), according to Fig. 15 and the unit label diagram. If the air handler is part of a split system, complete the wiring from the condensing unit to IDCB terminal block (see Fig. 14). Refer to Fig. 15 and the unit label diagram.

THREE STAGE OPERATION

All units are factory shipped for 2-stage cooling operation. To convert a unit to 3-stage operation, see Fig. 16 adjust the following wires between the control board and two terminal strips on the side of the control box:

1. Remove gray wire from Thermostat CB terminal X.
2. Move orange wire from Thermostat CB terminal Y2 to terminal X.
3. Make connections of blue wire included in factory harness. Connect one end to Thermostat CB terminal Y2 and the other to Indoor Connection Board terminal Y2.
4. Move orange wire from Indoor Connection Board terminal Y2 to terminal X.

The 3-stage system will run the fan at low speed with a G, Y1, and Y1+Y2 call, and at high speed with a call for Y1, Y2, and Y3. A thermostat with 3 cooling stage capability is required for this system configuration.

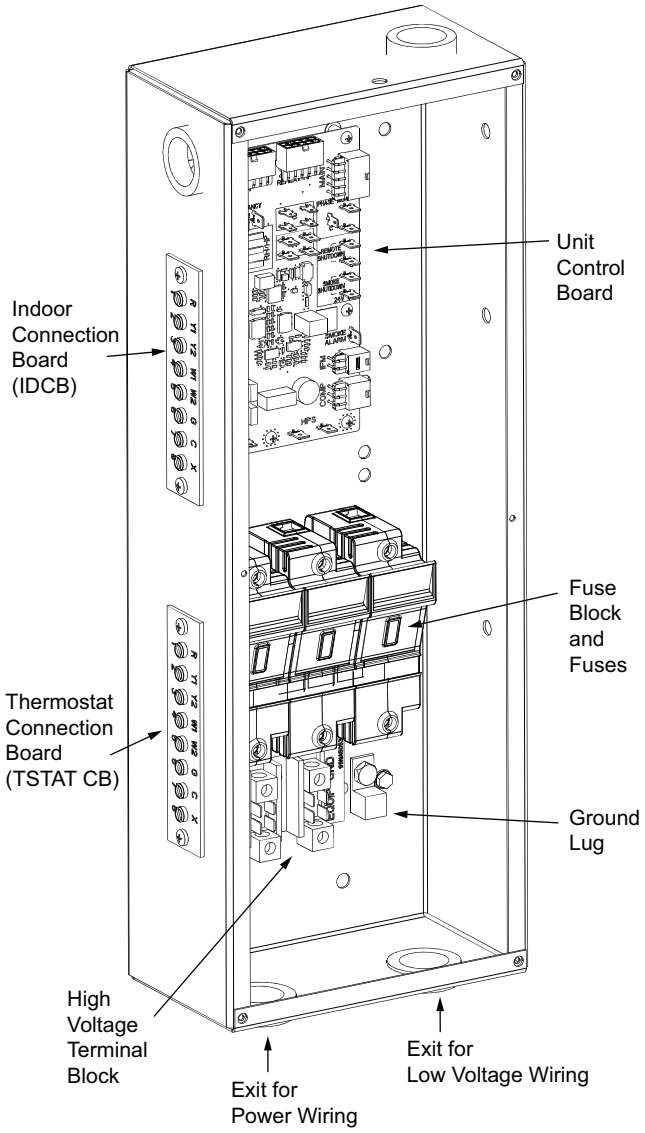
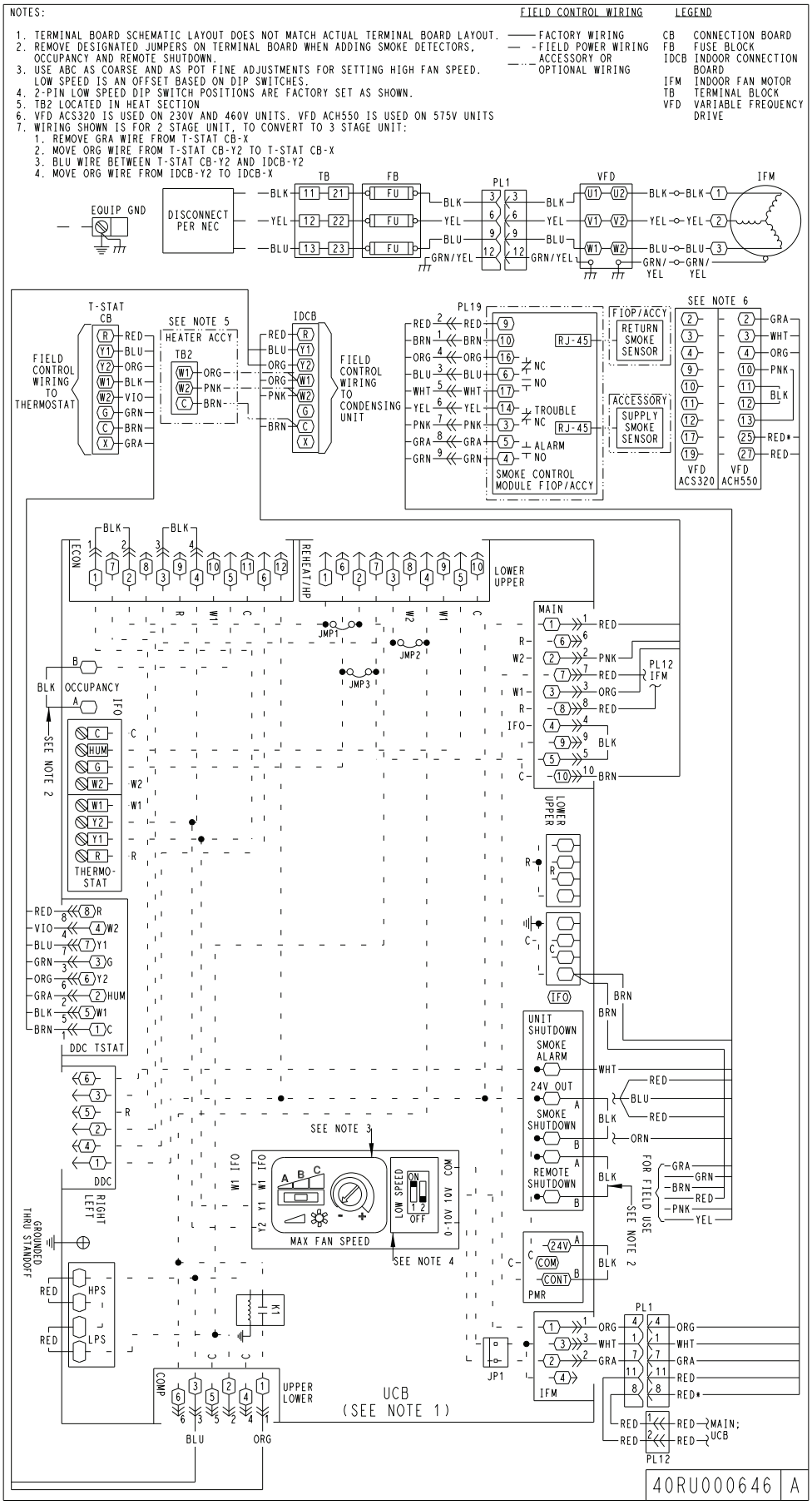



**Fig. 14 — Control Box (Cover Removed) (Typical)**

FREEZE PROTECTION

On select models, there is a factory-installed and wired temperature switch (HH18HB016) to protect the compressor(s) in the condensing unit when frost buildup is present on the indoor coil. The temperature switch is used to prevent the compressor(s) from turning on while the indoor coil is frosted. Refer to the unit wiring label diagram for wiring of this switch.




NOTE: On select units, the black and blue IFM wires are reversed.

**Fig. 15 — Unit Wiring**

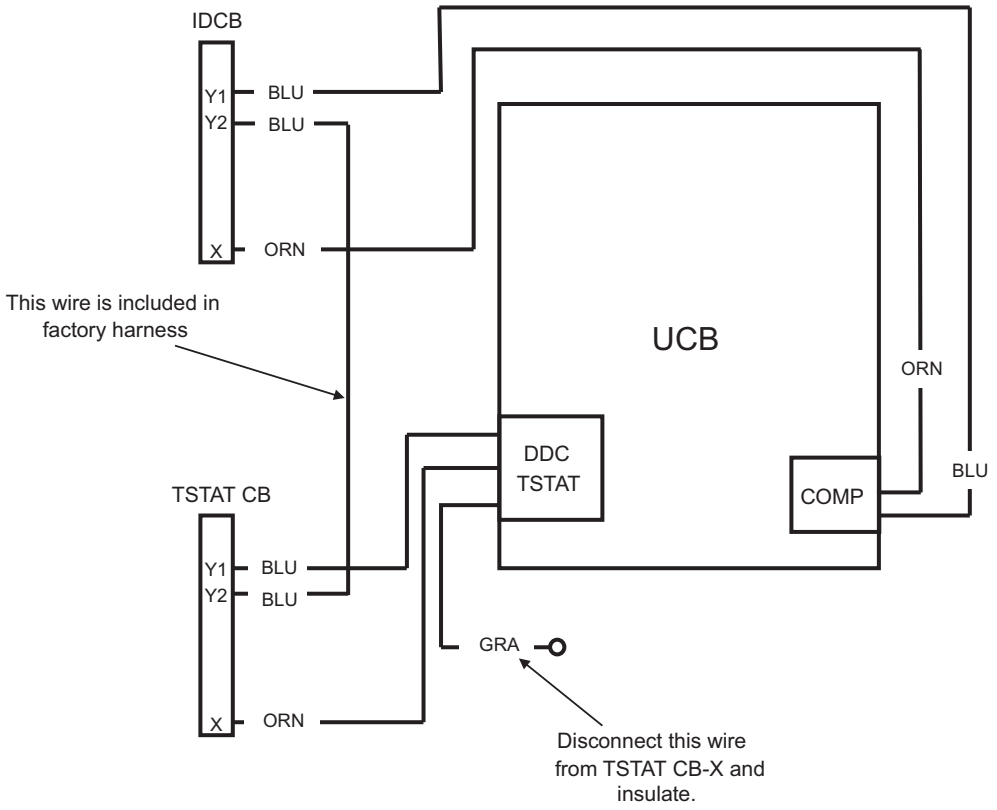



**Fig. 16 — 3-Stage Cooling Diagram**

## Variable Frequency Drive

The unit is equipped with a Variable Frequency Drive (VFD) to control the indoor fan in sequence with the unit's ventilation, cooling, and heating operation. The VFD is controlled through a 0-10vdc signal that is provided by the Unit Control Board (UCB) in the control box. Per ASHRAE 90.1-2016 and IECC-2015 standards, during the first stage of cooling operation, the VFD will adjust the fan motor to provide 66% of the design airflow rate for the unit. When the call for the second stage of cooling is required, the VFD will allow the design airflow rate for the unit established (100%). During heating mode, the VFD will allow total design airflow rate (100%) operation. During ventilation mode, the VFD will operate the fan motor at 66% of full speed.

The ABB ACS320 model (see Fig. 17) is used on 208/230v and 460v units, while the ABB ACH550 model (see Fig. 18) is used on 575v units.

See Fig. 19-20 for location of the VFD.


**Fig. 17 — ACS320 Variable Frequency Drive (VFD)**


**Fig. 18 — ACH550 Variable Frequency Drive (VFD)**

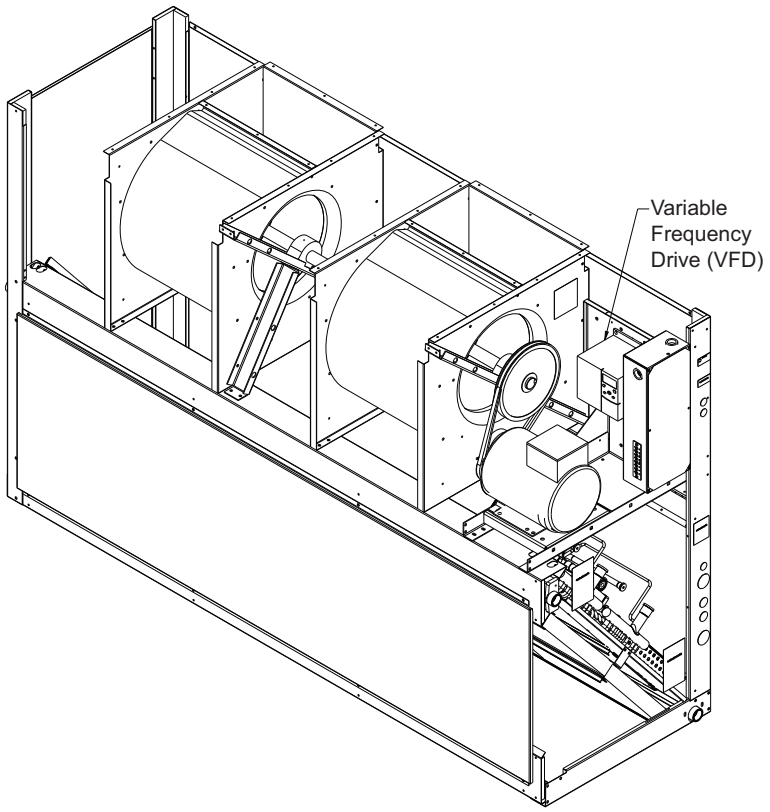



**Fig. 19 — ACS320 VFD Location for the following units: 40RUA/RUS 14-16, 40RUQ 16 (208/230V and 460V only)**

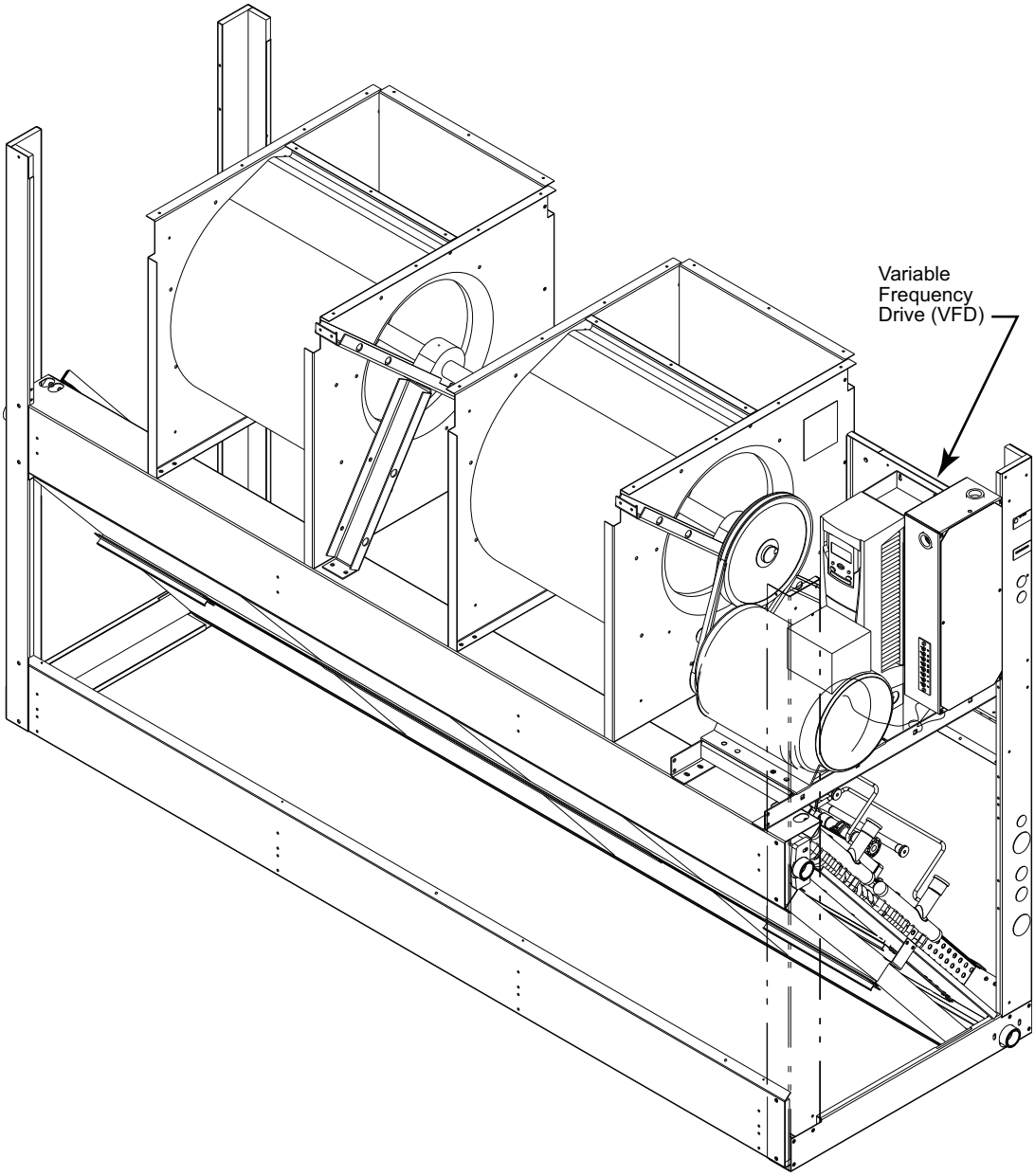



**Fig. 20 — ACH550 VFD Location for the following units: 40RUA/RUS 14-16, 40RUQ 16 (575V only)**

## Connecting Ductwork

Refer to the Carrier System Design Manual for the recommended design and layout of ductwork. Figure 21 shows recommended duct connection to units with 2 fans.

**⚠ CAUTION**

UNIT OPERATION HAZARD

Failure to follow this caution could cause equipment damage.

Do not operate unit without ductwork or discharge plenum unless fan speed has been adjusted for external static pressure of 0 in. wg. Failure to do so may result in motor overload.

DISCHARGE CONNECTIONS

Duct flanges are factory-supplied; they are shipped inside the unit attached to the hairpin end of the coil tube sheet for field installation. Using the existing screws, install the duct flanges on the unit's fan deck. Each fan discharge requires 2 flanges; each flange must be bent in the middle to conform to the discharge opening. (See Fig. 22.) After flanges are installed, connect them to the supply duct using a canvas connection to prevent vibration. It is important that this connection be properly fabricated to prevent high air friction losses and air noise.

RETURN CONNECTIONS

When using return-air ductwork, route return-air duct to the unit's return air inlet near the filter rack, using a canvas connection to prevent transmission of unit vibration. If the duct blocks off the unit's access panel, provide a slip joint in the ductwork to permit removal for servicing.

OUTDOOR-AIR INLET CONNECTIONS

Connect outdoor-air inlet to field-installed accessory economizer. Refer to Economizer Installation Instructions.

## Return-Air Filters

Type and size of filters are shown in Tables 1-6 and are factory-supplied and factory-installed. In all units with 2 fans, a filter replacement tool (hook) is shipped inside the unit for field use when replacing filters. See the Service section for instructions on filter element replacement.

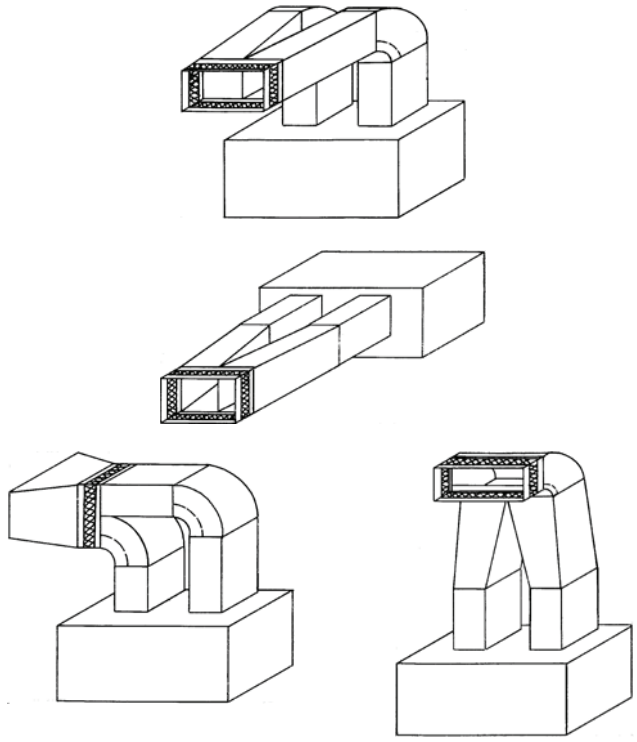


**Fig. 21 — Typical Fan Discharge Connections for Multiple Fan Units**

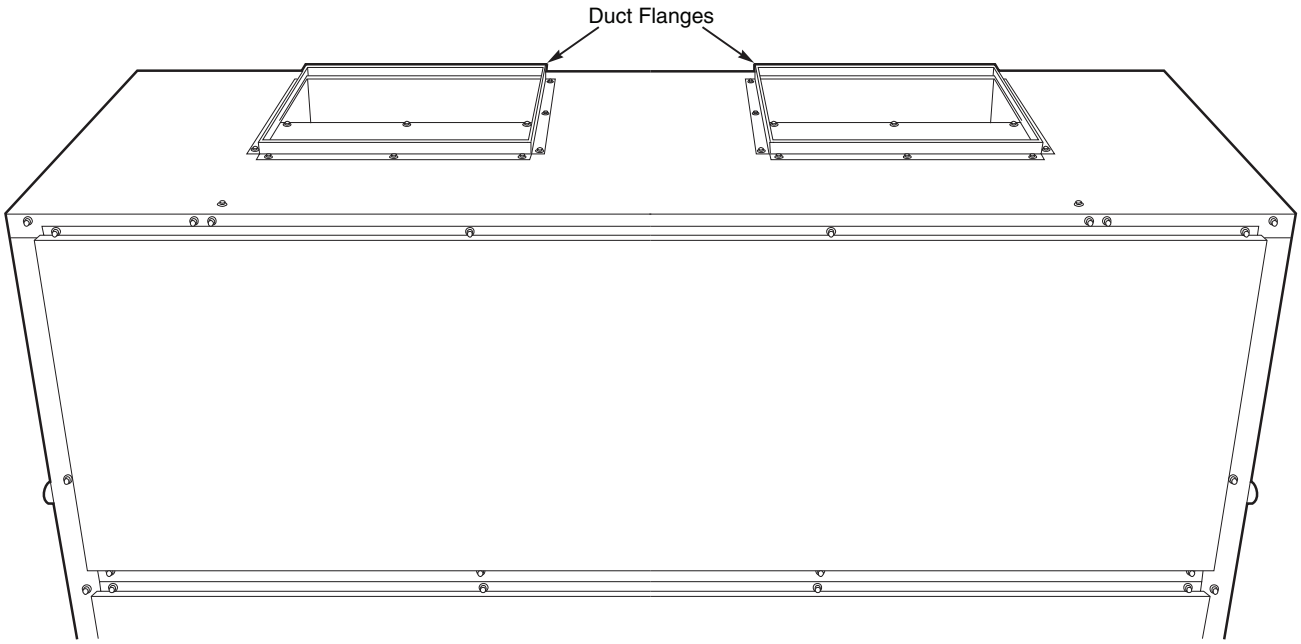



**Fig. 22 — Duct Flange Installation**

## START-UP

Before starting unit, check the following and correct as necessary:

- Is unit solidly supported?
- Is fan adjusted for speed and pulley alignment?
- Are pulleys, motor, and bearings securely mounted?
- Are there any loose parts that will rattle or vibrate?
- Is condensate drain pan pitched for correct drainage?
- Are coil baffle plates tight against coil to prevent air bypass?
- Are all panels securely fastened?
- Are all electrical connections correct and tight?
- Are there any loose or disconnected wires at the VFD or in the control box, or wires in contact with sharp edges or moving parts (pulley, belt)?
- Have all safety, caution, and warning labels been read?

### 40RUA and 40RUQ ONLY

- Is TXV bulb located on suction tube per Fig. 23?
- Is the capillary tube to the bulb free of kinks and not subject to pinching?
- Is the bulb well secured to the suction tube with strap?

Also refer to condensing unit or outdoor heat pump section instructions before starting a split system. A split system start-up checklist is provided at the end of these instructions.

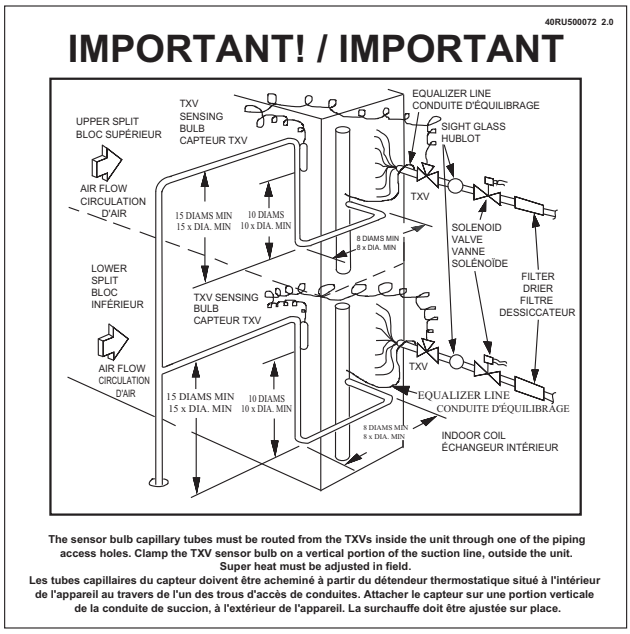



**Fig. 23 — TXV Bulb Location Label**

### Adjusting TXV for Superheat (40RUA and 40RUQ only)

The unit-mounted thermostatic expansion valve(s) is/are factory set to provided superheat at the bulb location in 10°F to 15°F (5.5°C to 8.3°C) range. Actual system load conditions may require adjustment of the factory setting. (See Fig. 24.)

To adjust the TXV superheat setting:

1. Remove the seal cap from the bottom of the TXV body.
2. To increase superheat, turn the stem clockwise. To decrease the superheat, turn the stem counterclockwise. Do not turn the stem more than one full turn.
3. Wait until suction pressure and superheat stabilize. This may take more than 30 minutes.
4. Continue adjustment until superheat reaches 10°F to 15°F (5.5°C to 8.3°C).
5. Replace the seal cap; tighten.

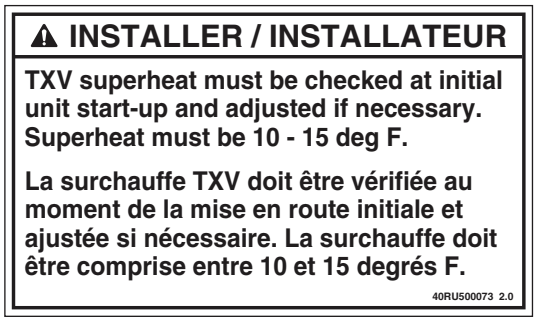



**Fig. 24 — TXV Adjustment Label**

### Compressor Rotation

Follow instructions in Condensing Unit installation instructions. For units equipped with a VFD on the indoor fan motor, the rotation direction of the indoor fan motor and fan cannot be used to visually confirm a correct phase connection to the unit and compressors. Correct phases to equipment for proper compressor rotation. The VFD will maintain the same rotation as input phases are changed. Pressure gages MUST BE USED during cooling system start-up to confirm correct compressor rotation and operation.

### Indoor Fan Motor

Raise the cooling set point at the space thermostat to higher than the space temperature. Switch the thermostat's FAN switch to the CONT (Continuous) position. The fan motor will start and run at reduced speed. Check for fan rotation direction. To reverse the fan rotation, disconnect all power to the unit and then switch two motor power leads between the VFD and the motor. Restore unit power and recheck the fan rotation direction.

Check fan motor speed. Motor shaft should be rotating at 1150 to 1180 rpm (19.2 to 19.7 r/s).

Switch the thermostat's FAN switch to AUTO position. Fan motor will stop.

### Cooling with Staged Air Volume (SAV™)

FIRST STAGE (Y1)

Set the thermostat FAN switch to AUTO and the SYSTEM switch to COOL. Slowly lower the cooling set point until first stage compressor starts. Indoor fan motor also starts and runs at reduced speed.

SECOND STAGE (Y2)

Lower the cooling set point until the second stage compressor starts. The indoor fan speed is dependent on the number of cooling stages:

- 2-Stage Systems: The indoor fan motor will switch to high speed.
- 3-Stage Systems: The indoor fan motor will remain at low speed.

THIRD STAGE (Y3) — 3-STAGE SYSTEMS ONLY

Lower the cooling set point until the third stage compressor starts. The indoor fan motor will switch to high speed.

Check the fan motor speed. Motor shaft should be rotating at 1725 to 1760 rpm (28.8 to 29.3 r/s).

Confirm compressors are running at correct rotation by checking suction and discharge pressures. To reverse the compressor rotation, disconnect unit power and switch two of the unit's main power leads. Restore unit power and recheck compressor operation.

Reset thermostat cooling set point to a position above the space temperature.

Both compressors will shut off. Indoor fan motor will stop immediately.

## Operating Fan for Test and Balance

During the Test and Balance procedure, it is necessary to operate the supply fan in High Speed without concurrent operation of the Cooling or Heating systems. Use the following procedure to force the fan speed to High.

1. Set the space thermostat to SYSTEM OFF and FAN in AUTO.
2. Disconnect unit power. Lock-out/tag out.
3. Open the fan access panel and remove the cover of control box.
4. Adjust the Low Speed 2-Pin DIP switches on the Unit Control Board. Set both switches to "OFF." This will allow the motor to run at full speed in ventilation only.
5. Locate pressure ports or pitot tubes in the return duct and supply duct to measure external static pressure.
6. Replace control box cover.
7. Restore unit power.
8. Set the space thermostat to FAN CONT.
9. Check the motor speed with stroboscope or similar tool. Motor shaft speed must be in 1725 to 1760 rpm (28.8 to 29.3 r/s) range for High Speed.
10. Replace the fan access panel.
11. Perform test and balance procedure.
12. Adjust the supply fan speed according to the Pulley and Drive Adjustment section to deliver the project selection cfm value. Ensure the selection cfm value is not lower that the "Min cfm Per Fan Motor Type" for this unit-size as found in Table 13. See Fan Speed Set-Up Section on page 27 for alternate method of adjusting supply fan speed through the Unit Control Board.

To restore the unit to ready-to-start condition, disconnect the unit power and lock-out/tag-out, set the space thermostat to FAN AUTO, remove the test pressure ports from the external duct locations, and re-set Low Speed 2-Pin DIP switches to factory setting (refer to wiring diagram on control box cover). Replace the supply fan access panel. Restore unit power.

**Table 13 — 40RU Min CFM Per Fan Motor Type**

| UNIT | 2-SPEED FAN MOTOR (AT HIGH SPEED) | 2-SPEED FAN MOTOR (AT LOW SPEED) |
|---|---|---|
| **40RUA/S 14** | 4056 | 2704 |
| **40RUA/S/Q 16** | 4500 | 3000 |

## Fan Speed Set Up

These units contain a variable frequency drive (VFD) fan assembly. The fan operates from a 0-10 Vdc signal.

NOTE: The indoor fan motors are equipped with protection relays designed to disable unit operation when a problem is detected. See Typical Wiring Diagram (see Fig. 15) for the red wires in the Indoor fan control.

Fan motor is wired to connect the motor protection relays in series.

UNITS WITH ELECTRO-MECHANICAL CONTROLS

The fan speed set up controls are located on the lower section of the Unit Control Board (UCB). (See Fig. 25.)

The Unit Control Board (UCB) voltage is set for 10 Vdc from the factory to allow for full speed with belt/pulley adjustments.

The following procedure will allow for fan speed reduction if desired.

1. Check the job specifications for the cfm (cubic feet per minute) and ESP (external static pressure) required.
2. Connect a multimeter to the Vdc terminals on the UCB.
3. Set the Range Switch to either A, B, or C per the Switch Range table. A is the lowest speed range, B is the middle speed range and C is the highest speed range.
4. Using a straight blade screwdriver, turn the Vdc control dial to fine tune the Vdc reading until the unit matches the required airflow setting.
5. Record the reading in the Field Setting field.

NOTE: Fan set-up Vdc is not affected by the operating stage of the unit.

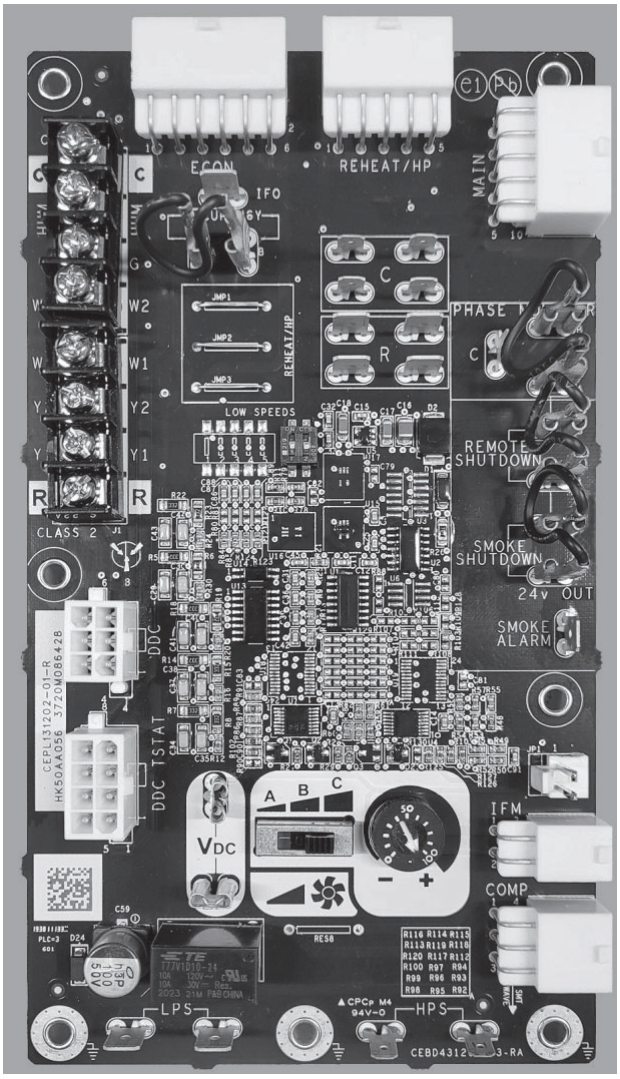



**Fig. 25 — Unit Control Board**

## MAINTENANCE

These items should be part of a routine maintenance program, to be checked every month or two, until a specific schedule for each can be identified for this installation:

### Quarterly Inspection (and 30 days after initial start)

INDOOR SECTION

- Condenser coil cleanliness checked.
- Return air filter replacement
- Outdoor hood inlet filters cleaned
- Fan shaft bearing locking collar tightness checked
- Condensate drain checked

***Heating***

- Power wire connections
- Fuses ready
- Manual-reset limit switch is closed

See Tables 14 and 15 for unit specific maintenance checklists.

### Seasonal Maintenance

These items should be checked at the beginning of each season (or more often if local conditions and usage patterns dictate):

AIR CONDITIONING

- Condenser fan motor mounting bolts tightness
- Compressor mounting bolts
- Condenser fan blade positioning
- Control box cleanliness and wiring condition
- Wire terminal tightness
- Refrigerant charge level
- Evaporator coil cleaning
- Evaporator blower motor amperage

**Table 14 — Outdoor Unit Maintenance Checklist**

| MAINTENANCE CHECKLIST[a] | RECOMMENDED INTERVAL[b] | |
|---|---|---|
| **Outdoor unit specific:** | **Monthly** | **Annual** |
| Clear away debris and vegetation near unit. | X | |
| Inspect cabinet for damage. Replace components that are damaged or severely rusted. | | X |
| Inspect electrical disconnect for proper function. Repair or replace as necessary. | | X |
| Inspect electrical wiring and connections. Tighten loose connections. Inspect and perform functional test of equipment as needed to ensure proper function. Repair or replace damaged or overheated components and wiring. | | X |
| Check refrigerant system subcooling and superheat. | | X |
| Inspect inside of unit. Clean if debris is present. | | X |
| Inspect condenser coil. Clean if dust, dirt, or debris is present. Rinse unit with fresh water.[c] | | X[d] |
| Inspect motor and fan for damage. Make sure fans spin freely. | | X |

NOTE(S):

a. The above list may not include all maintenance items. Inspection intervals may vary depending on climate and opening hours. Consult your Carrier dealer about a service contact for seasonal inspections.
b. Monthly maintenance items and outdoor unit rinsing may be performed by the customer. All other maintenance items and all service work must be performed by a qualified service technician. Read all warning labels.
c. Do not use harsh chemicals or high pressure water on coils. More frequent rinsing is required near a sea coast.
d. Monthly rinsing of the condenser coil is recommended if the unit is located in a corrosive climate.

**Table 15 — Indoor Unit Maintenance Checklist**

| MAINTENANCE CHECKLIST[a] | RECOMMENDED INTERVAL[b] | |
|---|---|---|
| **Indoor unit specific: (for accessories refer to unit specific literature)** | **Monthly** | **Annual** |
| Inspect, clean, or replace air filter if dirty. | X | |
| Inspect and clean blower assembly (includes blower housing, wheel, and motor). Lubricate shaft bearings. | | X |
| Inspect internal and external cabinet. Clean as needed. | | X |
| Inspect electrical disconnect for proper function. Repair or replace as necessary. | | X |
| Inspect electrical components, wiring, and connections. Tighten loose connections. Repair or replace damaged components and wiring. | | X |
| Inspect evaporator coil. Clean if dust, dirt, or debris is present.[c] | | X |
| Clean condensate pan, trap, and drain lines (more frequent maintenance may be required in humid climates — consult your local HVAC dealer). | | X |
| Inspect motor and fan for damage. Make Inspect airflow system (ductwork). Check for leaks and repair as needed. | | X |

NOTE(S):

a. The above list may not include all maintenance items. Inspection intervals may vary depending on climate and opening hours. Consult your Carrier dealer about a service contact for seasonal inspections.
b. Monthly maintenance items and outdoor unit rinsing may be performed by the customer. All other maintenance items and all service work must be performed by a qualified service technician. Read all warning labels.
c. Do not use harsh chemicals or high pressure water on coils. More frequent rinsing is required near a sea coast.

## SERVICE

Inspection and maintenance should be performed at regular intervals and should include the following:

- Complete cleaning of cabinet, fan wheel, cooling coil, condensate pan and drain, heating coils, and return-air grille (if present).
- Inspection of panels and sealing of unit against air leakage.
- Adjustment of fan motor, belt, bearings, and wheels.
- Cleaning or replacement of filters.
- Testing for cooling/heating system leaks.
- Checking of all electrical connections.

**⚠ WARNING**

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before performing service or maintenance operations on unit, always turn off main power switch to unit and install lockout tag. Unit may have more than one power switch.

Most unit service can be performed by removing one or both of the unit's side panels. Coil cleaning, removal or insulation cleaning may require removal of a rear, top, or bottom panel, depending on the unit's orientation. When service is completed, replace unit panels.

### Panels

Panels are fastened to unit frame with sheet metal screws. Fan and coil compartment must be sealed tightly after service to prevent air from bypassing the cooling coil.

### Fan Motor Lubrication

Fan motor supplied with unit is permanently lubricated and requires no further lubrication.

### Fan Shaft Bearings

Sizes 14-16 units have pillow-block bearings (see Fig. 26) that must be lubricated with suitable bearing grease approximately every 3 months. See Table 16 for suitable lubricants.

**Table 16 — Lubricant Data**

| MANUFACTURER | LUBRICANT |
|---|---|
| **Mobil** | Mobilplex EP No. 2 |
| **Sunoco** | Prestige 42 |
| **Texaco** | Multifak 2 |
| **Texaco** | Regal AFB – 2[a] |

NOTE(S):

a. Preferred lubricant, contains rust and oxidation inhibitors.

### Centering Fan Wheel

If fan and fan shaft assembly are not properly centered, blades may scrape against the blower side scroll plate or may create an objectionable whistling noise. It may be necessary to adjust individual fan wheels or move entire fan shaft. See the following 2 sections.

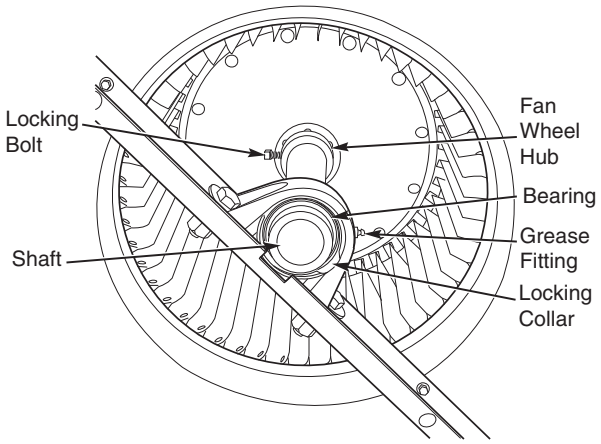



**Fig. 26 — Fan Shaft, Bearings, and Fan Wheel (Typical)**

### Fan Shaft Position Adjustment

Loosen setscrew or locking collar of each fan shaft bearing. Slide shaft into correct position and replace locking collar. (See Fig. 27). To replace locking collar, push collar up against inner face of bearing. Turn collar in direction of fan rotation until tight, and tighten setscrew. Tightening locking collar in direction of fan rotation results in further tightening of collar should setscrew work itself loose.

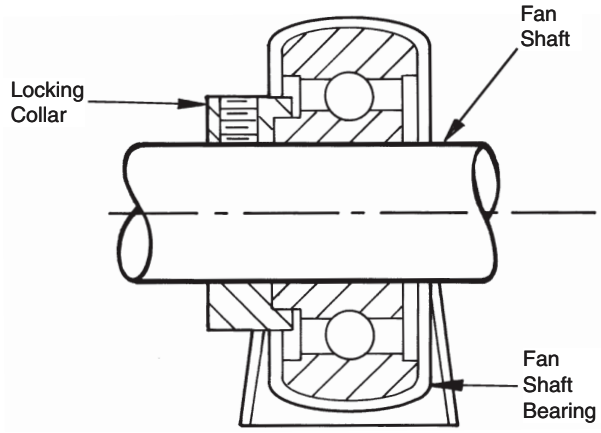



**Fig. 27 — Fan Shaft Bearing**

### Individual Fan Wheel Adjustment

Loosen the 2 locking bolts holding the fan wheel hub to shaft. (See Fig. 26.) Position fan wheel in center of the fan housing and tighten locking bolts. Clearance between wheel and housing should be the same on both sides.

### Fan Belts

Motor mounting plate and motor support angles are slotted to permit both vertical and horizontal adjustment. Adjust belt(s) for correct deflection by loosening motor plate mounting bolts, moving motor/plate assembly forward or back, and re-tightening bolts. Press down on belt with one finger midway between fan and motor pulleys to check deflection. For units with motor sizes up to and including 3.7 Hp (2.76 kW), correct deflection is 3/16 in. (4.8 mm). For larger motor sizes, correct deflection is 1/8 in. (3.2 mm). (See Fig. 28.)

If complete belt replacement is required during servicing, loosen the motor plate mounting bolts (Fig. 28), move motor/plate assembly towards fan pulley, and pull belt(s) off pulleys. Reverse the procedure with new bolts and readjust deflection.

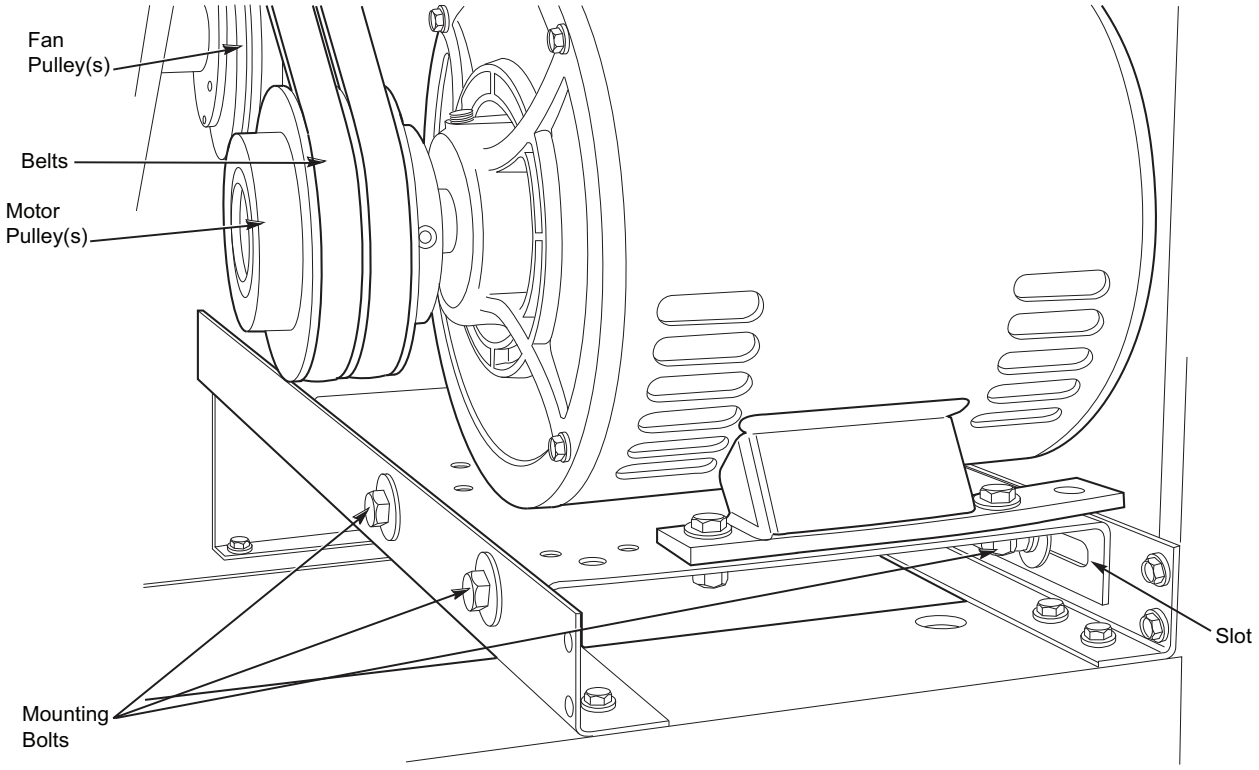



**Fig. 28 — Fan Motor Mounting**

## Fan Rotation

Correct fan rotation with respect to fan outlet is shown in Fig. 29.

To reverse the direction of rotation of a 3-phase fan motor, reverse any 2 of the power leads. Refer to the connection diagram on the inside of motor terminal box cover for proper reversing procedure of a single-phase motor.

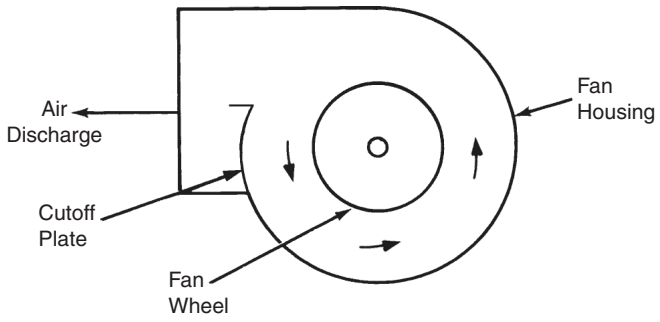



**Fig. 29 — Fan Rotation**

## Fan Pulley Alignment

Align as follows:

1. Loosen setscrews on pulleys.
2. Align pulleys visually and tighten setscrews on fan pulley to lock it in place.
3. Use the methods shown in Fig. 30 to check proper pulley alignment.

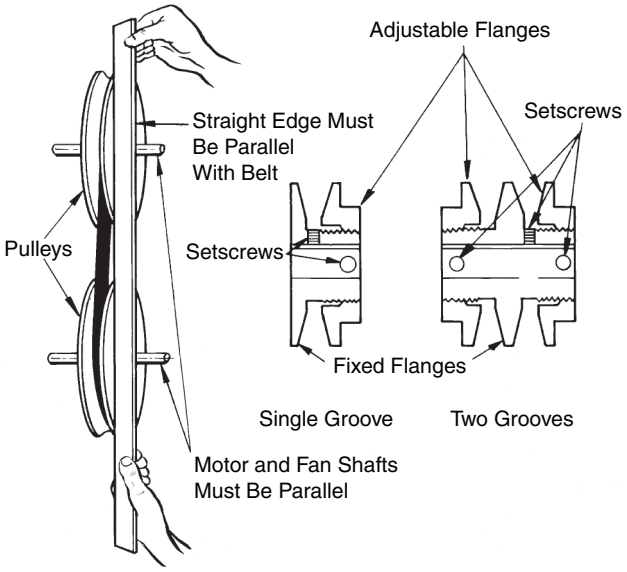



**Fig. 30 — Fan Pulley Adjustments**

4. If pulleys are not in correct alignment, loosen the motor holddown bolts and slide the motor axially until the pulleys are aligned.
5. Tighten motor holddown bolts.

## Pulley and Drive Adjustment

To obtain desired fan speed, refer to the fan motor, drive data and performance data in Tables 17-36 and adjust fan motor pulley as follows:

1. Remove belt from fan motor pulley after loosening motor from motor base.
2. Loosen setscrew in movable flange of pulley. Screw movable flange toward fixed flange to increase the fan speed and away from fixed flange to reduce speed. Before tightening setscrew, make certain that setscrew is over nearest flat surface of pulley hub. (See Fig. 30.)

**⚠ CAUTION**

UNIT OPERATION HAZARD

Failure to follow this caution could cause equipment damage.

Increasing fan speed produces a greater load on motor. Do not exceed rated capacity of motor.

### Table 17 — Fan Motor Data, 40RUA/S Standard Motor, Two Speed — English

| UNIT | 40RUA/S 14 | 40RUA/S 16 |
|---|---|---|
| **208/230-3-60 and 460-3-60** | | |
| **Speed (rpm)** | 1735 | 1750 |
| **Hp** | 2.9 | 3.7 |
| **Frame (NEMA)** | 56HY | 56HY |
| **Shaft Dia (in.)** | 7/8 | 7/8 |
| **575-3-60** | | |
| **Speed (rpm)** | 1710 | 1710 |
| **Hp** | 3.7 | 3.7 |
| **Frame (NEMA)** | 56HY | 56HY |
| **Shaft Dia (in.)** | 7/8 | 7/8 |

### Table 18 — Fan Motor Data, 40RUA/S Alternate Motor, Two Speed — English

| UNIT | 40RUA/S 14 | 40RUA/S 16 |
|---|---|---|
| **208/230-3-60 and 460-3-60** | | |
| **Speed (rpm)** | 1750 | 1755 |
| **Hp** | 3.7 | 5.0 |
| **Frame (NEMA)** | 56HY | 184T |
| **Shaft Dia (in.)** | 7/8 | 1-1/8 |
| **575-3-60** | | |
| **Speed (rpm)** | 1755 | 1755 |
| **Hp** | 5.0 | 5.0 |
| **Frame (NEMA)** | 184T | 184T |
| **Shaft Dia (in.)** | 1-1/8 | 1-1/8 |

### Table 19 — Motor Efficiency 40RUA/S — Two-Speed Motor

| MOTOR HP | EPACT MINIMUM (%) | MOTOR EFFICIENCY (%) |
|---|---|---|
| **2.4** | — | 80.0 |
| **2.9** | — | 86.5 |
| **3.7** | — | 83.6 |
| **5.0** | 89.5 | 89.5 |

LEGEND

**EPACT** — Energy Policy and Conservation Act of 1992

### Table 20 — Fan Motor Data, 40RUA/S Standard Motor, Two Speed — SI

| UNIT | 40RUA/S 14 | 40RUA/S 16 |
|---|---|---|
| **208/230-3-60 and 460-3-60** | | |
| **Speed (r/s)** | 28.92 | 29.17 |
| **Shaft kW** | 2.16 | 2.76 |
| **Frame (NEMA)** | 56HY | 56HY |
| **Shaft Dia (mm)** | 22.2 | 22.2 |
| **575-3-60** | | |
| **Speed (r/s)** | 28.50 | 28.50 |
| **Hp** | 2.76 | 2.76 |
| **Frame (NEMA)** | 56HY | 56HY |
| **Shaft Dia (mm)** | 22.2 | 22.2 |

### Table 21 — Fan Motor Data, 40RUA/S Alternate Motor, Two Speed — SI

| UNIT | 40RUA/S 14 | 40RUA/S 16 |
|---|---|---|
| **208/230-3-60 and 460-3-60** | | |
| **Speed (r/s)** | 29.17 | 29.25 |
| **Shaft kW** | 2.76 | 3.73 |
| **Frame (NEMA)** | 56HY | 184T |
| **Shaft Dia (mm)** | 22.2 | 28.6 |
| **575-3-60** | | |
| **Speed (r/s)** | 29.25 | 29.25 |
| **Hp** | 3.73 | 3.73 |
| **Frame (NEMA)** | 184T | 184T |
| **Shaft Dia (mm)** | 28.6 | 28.6 |

### Table 22 — Fan Motor Data, 40RUQ Standard Motor, Two Speed — English

| UNIT | 40RUQ 16 |
|---|---|
| **208/230-3-60 and 460-3-60** | |
| **Speed (rpm)** | 1750 |
| **Hp** | 3.7 |
| **Frame (NEMA)** | 56HY |
| **Shaft Dia (in.)** | 7/8 |
| **575-3-60** | |
| **Speed (rpm)** | 1710 |
| **Hp** | 3.7 |
| **Frame (NEMA)** | 56HY |
| **Shaft Dia (in.)** | 7/8 |

### Table 23 — Fan Motor Data, 40RUQ Alternate Motor, Two Speed — English

| UNIT | 40RUQ 16 |
|---|---|
| **208/230-3-60 and 460-3-60** | |
| **Speed (rpm)** | 1755 |
| **Hp** | 5.0 |
| **Frame (NEMA)** | 184T |
| **Shaft Dia (in.)** | 1-1/8 |
| **575-3-60** | |
| **Speed (rpm)** | 1755 |
| **Hp** | 5.0 |
| **Frame (NEMA)** | 184T |
| **Shaft Dia (in.)** | 1-1/8 |

### Table 24 — Motor Efficiency 40RUQ — Two-Speed Motor

| MOTOR HP | EPACT MINIMUM (%) | MOTOR EFFICIENCY (%) |
|---|---|---|
| **1.7** | — | 82.0 |
| **2.4** | — | 80.0 |
| **2.9** | — | 86.5 |
| **3.7** | — | 83.6 |
| **3.7[a]** | — | 87.9 |
| **5.0** | 89.5 | 87.9 |

NOTE(S):

a. High Efficiency Motor.

LEGEND

**EPACT** — Energy Policy and Conservation Act of 1992

### Table 25 — Fan Motor Data, 40RUQ Standard Motor, Two Speed — SI

| UNIT | 40RUQ 16 |
|---|---|
| **208/230-3-60 and 460-3-60** | |
| **Speed (r/s)** | 29.17 |
| **Shaft kW** | 2.76 |
| **Frame (NEMA)** | 56HY |
| **Shaft Dia (mm)** | 22.2 |
| **575-3-60** | |
| **Speed (r/s)** | 28.50 |
| **Hp** | 2.76 |
| **Frame (NEMA)** | 56HY |
| **Shaft Dia (mm)** | 22.2 |

### Table 26 — Fan Motor Data, 40RUQ Alternate Motor, Two Speed — SI

| UNIT | 40RUQ 16 |
|---|---|
| **208/230-3-60 and 460-3-60** | |
| **Speed (r/s)** | 29.25 |
| **Shaft kW** | 3.73 |
| **Frame (NEMA)** | 184T |
| **Shaft Dia (mm)** | 28.6 |
| **575-3-60** | |
| **Speed (r/s)** | 29.25 |
| **Hp** | 3.73 |
| **Frame (NEMA)** | 184T |
| **Shaft Dia (mm)** | 28.6 |

### Table 27 — Standard Drive Data, 60 Hz — English

| UNIT | 40RUA/S 14 | 40RUA/Q/S 16 |
|---|---|---|
| **MOTOR DRIVE** | | |
| **Motor Pulley Pitch Diameter (in.)** | 2.8-3.8 | 2.8-3.8 |
| **Pulley Factory Setting Full Turns Open** | 2.5 | 2.5 |
| **FAN DRIVE** | | |
| **Pulley Pitch Dia (in.)** | 9.0 | 9.0 |
| **Pulley Bore (in.)** | 1-1/16 | 1-1/16 |
| **Belt No. — Section** | 1—A | 1—A |
| **Belt Pitch (in.)** | 42.3 | 42.3 |
| **FAN SPEEDS (rpm)** | | |
| **Factory Setting** | 632 | 632 |
| **Range** | 537-728 | 537-728 |
| **Max Allowable Speed (rpm)** | 1200 | 1200 |
| **Change per 1/2 Turn of Movable Motor Pulley Flange** | 19.1 | 19.1 |
| **MAX FULL TURN FROM CLOSED POSITION** | 5 | 5 |
| **SHAFTS CENTER DISTANCE (in.)** | 10.44-12.32 | 10.44-12.32 |

### Table 28 — Medium-Static Drive Data, 60 Hz — English

| UNIT | 40RUA/S 14 | 40RUA/Q/S 16 |
|---|---|---|
| **MOTOR DRIVE** | | |
| **Motor Pulley Pitch Diameter (in.)** | 3.4-4.4 | 3.7-4.7 |
| **Pulley Factory Setting Full Turns Open** | 2.5 | 3.0 |
| **FAN DRIVE** | | |
| **Pulley Pitch Dia (in.)** | 8.2 | 8.6 |
| **Pulley Bore (in.)** | 1-1/16 | 1-1/16 |
| **Belt No. — Section** | 1—A | 1—B |
| **Belt Pitch (in.)** | 41.3 | 41.8 |
| **FAN SPEEDS (rpm)** | | |
| **Factory Setting** | 820 | 842 |
| **Range** | 715-926 | 742-943 |
| **Max Allowable Speed (rpm)** | 1200 | 1200 |
| **Change per 1/2 Turn of Movable Motor Pulley Flange** | 21.1 | 16.7 |
| **MAX FULL TURN FROM CLOSED POSITION** | 5 | 6 |
| **SHAFTS CENTER DISTANCE (in.)** | 10.44-12.32 | 10.44-1.2.32 |

### Table 29 — High-Static Drive Data, 60 Hz — English

| UNIT | 40RUA/S 14 | 40RUA/Q/S 16 |
|---|---|---|
| **MOTOR DRIVE** | | |
| **Motor Pulley Pitch Diameter (in.)** | 3.7-4.7 | 4.3-5.3 |
| **Pulley Factory Setting Full Turns Open** | 3.0 | 3.0 |
| **FAN DRIVE** | | |
| **Pulley Pitch Dia (in.)** | 7.4 | 7.9 |
| **Pulley Bore (in.)** | 1-1/16 | 1-1/16 |
| **Belt No. — Section** | 1—B | 1—B |
| **Belt Pitch (in.)** | 39.8 | 39.8 |
| **FAN SPEEDS (rpm)** | | |
| **Factory Setting** | 979 | 1060 |
| **Range** | 873-1096 | 950-1171 |
| **Max Allowable Speed (rpm)** | 1200 | 1200 |
| **Change per 1/2 Turn of Movable Motor Pulley Flange** | 19.4 | 18.4 |
| **MAX FULL TURN FROM CLOSED POSITION** | 6 | 6 |
| **SHAFTS CENTER DISTANCE (in.)** | 10.44-12.32[a] | 9.16-10.99 |

NOTE(S):

a. 575v unit has a center distance of 9.16-10.99.

### Table 30 — Standard Drive Data, 60 Hz — SI

| UNIT | 40RUA/S 14 | 40RUA/Q/S 16 |
|---|---|---|
| **MOTOR DRIVE** | | |
| **Motor Pulley Pitch Diameter (mm)** | 71.1-96.5 | 71.1-96.5 |
| **Pulley Factory Setting Full Turns Open** | 2.5 | 2.5 |
| **FAN DRIVE** | | |
| **Pulley Pitch Dia (mm)** | 229 | 229 |
| **Pulley Bore (mm)** | 27.0 | 27.0 |
| **Belt No. — Section** | 1—A | 1—A |
| **Belt Pitch (mm)** | 1074 | 1074 |
| **FAN SPEEDS (r/s)** | | |
| **Factory Setting** | 10.5 | 10.5 |
| **Range** | 9.0-12.1 | 9.0-12.1 |
| **Max Allowable Speed (r/s)** | 20.0 | 20.0 |
| **Change per 1/2 Turn of Movable Motor Pulley Flange** | 0.318 | 0.318 |
| **MAX FULL TURN FROM CLOSED POSITION** | 5 | 5 |
| **SHAFTS CENTER DISTANCE (mm)** | 265-313 | 265-313 |

### Table 31 — Medium-Static Drive Data, 60 Hz — SI

| UNIT | 40RUA/S 14 | 40RUA/Q/S 16 |
|---|---|---|
| **MOTOR DRIVE** | | |
| **Motor Pulley Pitch Diameter (mm)** | 86.4-111.8 | 94.0-119.4 |
| **Pulley Factory Setting Full Turns Open** | 2.5 | 3.0 |
| **FAN DRIVE** | | |
| **Pulley Pitch Dia (mm)** | 208 | 218 |
| **Pulley Bore (mm)** | 27.0 | 27.0 |
| **Belt No. — Section** | 1—A | 1—B |
| **Belt Pitch (mm)** | 1049 | 1062 |
| **FAN SPEEDS (r/s)** | | |
| **Factory Setting** | 13.7 | 14.0 |
| **Range** | 11.9-15.4 | 12.4-15.7 |
| **Max Allowable Speed (r/s)** | 20.0 | 20.0 |
| **Change per 1/2 Turn of Movable Motor Pulley Flange** | 0.352 | 0.278 |
| **MAX FULL TURN FROM CLOSED POSITION** | 6 | 6 |
| **SHAFTS CENTER DISTANCE (mm)** | 265-313 | 265-313 |

### Table 32 — High-Static Drive Data, 60 Hz — SI

| UNIT | 40RUA/S 14 | 40RUA/Q/S 16 |
|---|---|---|
| **MOTOR DRIVE** | | |
| **Motor Pulley Pitch Diameter (mm)** | 94.0-119.4 | 109.2-134-.6 |
| **Pulley Factory Setting Full Turns Open** | 3.0 | 3.0 |
| **FAN DRIVE** | | |
| **Pulley Pitch Dia (mm)** | 188 | 201 |
| **Pulley Bore (mm)** | 27.0 | 27.0 |
| **Belt No. — Section** | 1—B | 1—B |
| **Belt Pitch (mm)** | 1011 | 1011 |
| **FAN SPEEDS (R/S)** | | |
| **Factory Setting** | 16.3 | 17.7 |
| **Range** | 14.4-18.3 | 15.8-19.5 |
| **Max Allowable Speed (r/s)** | 20.0 | 20.0 |
| **Change per 1/2 Turn of Movable Motor Pulley Flange** | 0.323 | 0.307 |
| **MAX FULL TURN FROM CLOSED POSITION** | 6 | 6 |
| **SHAFTS CENTER DISTANCE (mm)** | 265-313[a] | 232-279 |

NOTE(S):

a. 575v unit has a center distance of 233-279.

## Table 33 — Fan Performance Data — 40RU, 0.0-1.2 in. wg ESP, 60 Hz — English[a,b,c]

| UNIT | AIRFLOW (cfm) | EXTERNAL STATIC PRESSURE (in. wg)[d] | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.0 | | 0.2 | | 0.4 | | 0.6 | | 0.8 | | 1.0 | | 1.2 | |
| | | rpm | bhp | rpm | bhp | rpm | bhp | rpm | bhp | rpm | bhp | rpm | bhp | rpm | bhp |
| 40RUA*14 40RUS*14 | 3750 | **410** | **0.43** | **467** | **0.55** | 567 | 0.83 | 649 | 1.12 | 721 | 1.41 | 788 | 1.72 | 851 | 2.05 |
| | 4300 | **455** | **0.62** | **504** | **0.74** | 599 | 1.05 | 679 | 1.38 | 748 | 1.70 | 811 | 2.04 | 871 | 2.39 |
| | 5000 | **514** | **0.92** | 556 | 1.06 | 641 | 1.39 | 718 | 1.76 | 786 | 2.14 | 847 | 2.52 | 903 | 2.91 |
| | 5700 | 575 | 1.32 | 612 | 1.47 | 686 | 1.82 | 759 | 2.23 | 825 | 2.66 | 884 | 3.09 | 939 | 3.52 |
| | 6250 | 624 | 1.71 | 657 | 1.87 | 725 | 2.24 | 793 | 2.66 | 856 | 3.12 | 915 | 3.59 | 969 | 4.06 |
| 40RUA*16 40RUQ*16 40RUS*16 | 4500 | **437** | **0.61** | **483** | **0.72** | 576 | 1.01 | 660 | 1.35 | 732 | 1.69 | 797 | 2.03 | 856 | 2.38 |
| | 5300 | **499** | **0.95** | 538 | 1.07 | 617 | 1.37 | 696 | 1.74 | 767 | 2.13 | 830 | 2.53 | 888 | 2.94 |
| | 6000 | **555** | **1.34** | 590 | 1.48 | 659 | 1.79 | 730 | 2.17 | 798 | 2.59 | 860 | 3.04 | 918 | 3.49 |
| | 6800 | 620 | 1.91 | 651 | 2.06 | 712 | 2.39 | 774 | 2.78 | 836 | 3.22 | 896 | 3.71 | 952 | 4.21 |
| | 7500 | 677 | 2.52 | 706 | 2.69 | 761 | 3.04 | 817 | 3.44 | 873 | 3.89 | 929 | 4.39 | 984 | 4.93 |

## Table 34 — Fan Performance Data — 40RU, 1.4-2.4 in. wg ESP, 60 Hz — English[a,b,c]

| UNIT | AIRFLOW (cfm) | EXTERNAL STATIC PRESSURE (in. wg)[d] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1.4 | | 1.6 | | 1.8 | | 2.0 | | 2.2 | | 2.4 | |
| | | rpm | bhp | rpm | bhp | rpm | bhp | rpm | bhp | rpm | bhp | rpm | bhp |
| 40RUA*14 40RUS*14 | 3750 | 912 | 2.39 | 971 | 2.76 | 1028 | 3.14 | 1083 | 3.54 | **1135** | **3.95** | **1185** | **4.36** |
| | 4300 | 928 | 2.75 | 982 | 3.13 | 1036 | 3.53 | 1087 | 3.94 | **1138** | **4.37** | **1187** | **4.81** |
| | 5000 | 956 | 3.30 | 1007 | 3.71 | 1056 | 4.13 | **1104** | **4.56** | **1151** | **5.00** | **1196** | **5.46** |
| | 5700 | 990 | 3.96 | 1039 | 4.40 | 1086 | 4.85 | **1130** | **5.31** | **1174** | **5.78** | — | — |
| | 6250 | 1019 | 4.54 | 1067 | 5.02 | **1112** | **5.50** | **1156** | **5.99** | **1198** | **6.49** | — | — |
| 40RUA*16 40RUQ*16 40RUS*16 | 4500 | 912 | 2.75 | 967 | 3.12 | 1019 | 3.52 | 1070 | 3.92 | 1120 | 4.35 | 1168 | 4.79 |
| | 5300 | 942 | 3.34 | 992 | 3.76 | 1041 | 4.18 | 1088 | 4.61 | 1134 | 5.06 | **1179** | **5.52** |
| | 6000 | 971 | 3.95 | 1020 | 4.40 | 1067 | 4.86 | 1112 | 5.33 | 1156 | 5.81 | **1198** | **6.29** |
| | 6800 | 1005 | 4.72 | 1054 | 5.23 | 1101 | 5.75 | 1145 | 6.27 | **1187** | **6.79** | — | — |
| | 7500 | 1036 | 5.48 | 1084 | 6.04 | 1131 | 6.61 | **1174** | **7.17** | — | — | — | — |

NOTE(S):

a. Maximum allowable fan speed is 1200 rpm for all sizes.
b. Fan performance is based on deductions for wet coil, clean 2 in. filters, and unit casing. See table below for factory-supplied filter pressure drop.
c. Refer to fan motor and drive tables for additional data.
d. **Bold** indicates field-supplied drive is required.
Plain type indicates standard motor and standard drive.
Underlining indicates a different motor and drive combination other than the standard motor and standard drive combination is required. Refer to fan motor and drive tables to complete selection.

### Factory-Supplied Pressure Drop — English

| UNIT | AIRFLOW (cfm) | PRESSURE DROP (in. wg) |
|---|---|---|
| 40RUA*14 40RUS*14 | 3,750 | 0.06 |
| | 5,000 | 0.10 |
| | 6,250 | 0.13 |
| 40RUA*16 40RUQ*16 40RUS*16 | 4,500 | 0.08 |
| | 6,000 | 0.12 |
| | 7,500 | 0.17 |

LEGEND

**bhp** — Brake Horsepower Input to Fan
**ESP** — External Static Pressure

## Table 35 — Fan Performance Data — 40RU 0-300 kPa ESP, 60 Hz — SI[a,b,c]

| UNIT | AIRFLOW (L/s) | EXTERNAL STATIC PRESSURE (Pa)[d] | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | | 50 | | 100 | | 150 | | 200 | | 250 | | 300 | |
| | | r/s | kW | r/s | kW | r/s | kW | r/s | kW | r/s | kW | r/s | kW | r/s | kW |
| 40RUA*14 40RUS*14 | 1770 | **6.84** | **0.32** | **7.78** | **0.41** | 9.46 | 0.62 | 10.82 | 0.83 | 12.02 | 1.05 | 13.13 | 1.28 | 14.19 | 1.53 |
| | 2030 | **7.58** | **0.46** | **8.40** | **0.55** | 9.98 | 0.78 | 11.31 | 1.03 | 12.47 | 1.27 | 13.52 | 1.52 | 14.51 | 1.78 |
| | 2360 | **8.57** | **0.69** | 9.27 | 0.79 | 10.68 | 1.04 | 11.96 | 1.31 | 13.09 | 1.60 | 14.11 | 1.88 | 15.05 | 2.17 |
| | 2690 | 9.59 | 0.99 | 10.20 | 1.10 | 11.44 | 1.36 | 12.64 | 1.66 | 13.74 | 1.98 | 14.74 | 2.30 | 15.65 | 2.63 |
| | 2950 | 10.40 | 1.28 | 10.96 | 1.39 | 12.09 | 1.67 | 13.21 | 1.98 | 14.27 | 2.33 | 15.25 | 2.68 | 16.15 | 3.03 |
| 40RUA*16 40RUQ*16 40RUS*16 | 2120 | **7.28** | **0.45** | **8.05** | **0.54** | 9.60 | 0.75 | 11.00 | 1.00 | 12.21 | 1.26 | 13.28 | 1.15 | 14.27 | 1.78 |
| | 2500 | **8.32** | **0.71** | 8.97 | 0.80 | 10.29 | 1.02 | 11.59 | 1.30 | 12.78 | 1.59 | 13.84 | 1.89 | 14.80 | 2.19 |
| | 2830 | **9.25** | **1.00** | 9.83 | 1.10 | 10.99 | 1.33 | 12.16 | 1.62 | 13.29 | 1.93 | 14.34 | 2.27 | 15.30 | 2.60 |
| | 3210 | 10.33 | 1.42 | 10.85 | 1.54 | 11.87 | 1.78 | 12.90 | 2.07 | 13.93 | 2.40 | 14.93 | 2.76 | 15.87 | 3.14 |
| | 3540 | 11.29 | 1.88 | 11.77 | 2.01 | 12.69 | 2.27 | 13.62 | 2.56 | 14.56 | 2.90 | 15.49 | 3.27 | 16.40 | 3.67 |

## Table 36 — Fan Performance Data — 40RU 350-600 kPa ESP, 60 Hz — SI[a,b,c]

| UNIT | AIRFLOW (L/s) | EXTERNAL STATIC PRESSURE (Pa)[d] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 350 | | 400 | | 450 | | 500 | | 550 | | 600 | |
| | | r/s | kW | r/s | kW | r/s | kW | r/s | kW | r/s | kW | r/s | kW |
| 40RUA*14 40RUS*14 | 1770 | 15.21 | 1.78 | 16.19 | 2.06 | 17.13 | 2.34 | 18.04 | 2.64 | **18.91** | **2.94** | **19.75** | **3.25** |
| | 2030 | 15.46 | 2.05 | 16.37 | 2.33 | 17.26 | 2.63 | 18.12 | 2.94 | **18.96** | **3.26** | **19.78** | **3.59** |
| | 2360 | 15.94 | 2.46 | 16.78 | 2.77 | 17.60 | 3.08 | **18.40** | **3.40** | **19.18** | **3.73** | **19.94** | **4.07** |
| | 2690 | 16.51 | 2.95 | 17.32 | 3.28 | 18.09 | 3.62 | **18.84** | **3.96** | **19.57** | **4.31** | — | — |
| | 2950 | 16.99 | 3.39 | 17.78 | 3.74 | **18.54** | **4.10** | **19.26** | **4.47** | **19.96** | **4.84** | — | — |
| 40RUA*16 40RUQ*16 40RUS*16 | 2120 | 15.21 | 2.05 | 16.11 | 2.33 | 16.98 | 2.62 | 17.83 | 2.93 | 18.66 | 3.24 | 19.47 | 3.57 |
| | 2500 | 15.93 | 2.49 | 16.54 | 2.80 | 17.35 | 3.12 | 18.14 | 3.44 | 18.90 | 3.77 | **19.64** | **4.11** |
| | 2830 | 16.18 | 2.94 | 17.01 | 3.28 | 17.79 | 3.63 | 18.54 | 3.97 | 19.27 | 4.33 | **19.97** | **4.69** |
| | 3210 | 16.75 | 3.52 | 17.57 | 3.90 | 18.34 | 4.29 | 19.08 | 4.67 | **19.78** | **5.06** | — | — |
| | 3540 | 17.26 | 4.09 | 18.07 | 4.50 | 18.84 | 4.93 | **19.57** | **5.35** | — | — | — | — |

NOTE(S):

a. Maximum allowable fan speed is 20 r/s for all sizes.
b. Fan performance is based on deductions for wet coil, clean 51 mm filters, and unit casing. See table below for factory-supplied filter pressure drop.
c. Refer to fan motor and drive tables for additional data.
d. **Bold** indicates field-supplied drive is required.
Plain type indicates standard motor and standard drive.
Underlining indicates a different motor and drive combination other than the standard motor and standard drive combination is required. Refer to fan motor and drive tables to complete selection.

### Factory-Supplied Pressure Drop — SI

| UNIT | AIRFLOW (L/s) | PRESSURE DROP (Pa) |
|---|---|---|
| 40RUA*14 40RUS*14 | 1750 | 15 |
| | 2350 | 24 |
| | 3950 | 33 |
| 40RUA*16 40RUQ*16 40RUS*16 | 2100 | 20 |
| | 2800 | 30 |
| | 3500 | 42 |

LEGEND

**ESP** — External Static Pressure

## Variable Frequency Drive

The VFD switches the indoor fan motor speed between full/high speed (60 Hz motor operation) and reduced/low speed (40 Hz motor operation), as required by ASHRAE 90.1-2016 and IECC-2015 requirements for two-stage HVAC units. The VFD is factory-configured to match the current and power requirements for each motor selection and all wiring connections are completed by the factory; no field adjustments or connections are necessary.

While the basic VFD retains all of its standard capabilities, the SAV 2-speed application uses only a limited portion of these features to provide a 0-10 VDC input based on thermostat demand to the VFD to control the motor speed. With a ventilation or low cooling demand, the Unit Control Board will provide a VDC input corresponding to 66% of design airflow. With a high cooling or heating demand, the Unit Control Board will provide a VDC input corresponding to 100% of design airflow. The fan control signal is based on control board settings (potentiometer and DIP switches) that are factory-set and thermostat demand to the UCB. While the pulley and drive should be adjusted to obtain desired airflow, the potentiometer on the UCB can be used to fine-tune the airflow setting when the fan is running in high speed.

The VFD is not equipped with a keypad. A keypad is available as an accessory (P/N CRDISKIT001A00) for field-installation or expanded service access to VFD parameter and troubleshooting tables. The accessory keypad can only be used for ACS320 and ACH550 drives. See Tables 37-38 for terminal designations and Fig. 31-32 for wiring. See Appendix A for VFD parameters.

The VFD used in the SAV™ system has soft start capabilities to slowly ramp up speeds, eliminating any high in-rush of air volume during speed changes. It also has internal overcurrent protection for the fan motor.

**Table 37 — ACS320 VFD Terminal Designations**

| TERMINAL | FUNCTION |
|---|---|
| U1<br>V1<br>W1 | Three-Phase main circuit input power supply |
| U2<br>V2<br>W2 | Three-Phase AC output to motor, 0V to maximum input voltage level |
| 2 (AI1)<br>3 (GND) | Analog input (0-10V) |
| 4 | 10 VDC Reference Voltage |
| 10 (GND)<br>11 (COMMON) | Factory-supplied jumper |
| 9 (24 VDC)<br>12 (DI-1) | Activate to start drive (Start/Stop) |
| 17 (Relay COM)<br>19 (Relay NO) | Relay Output for Unit Control Board safety chain |

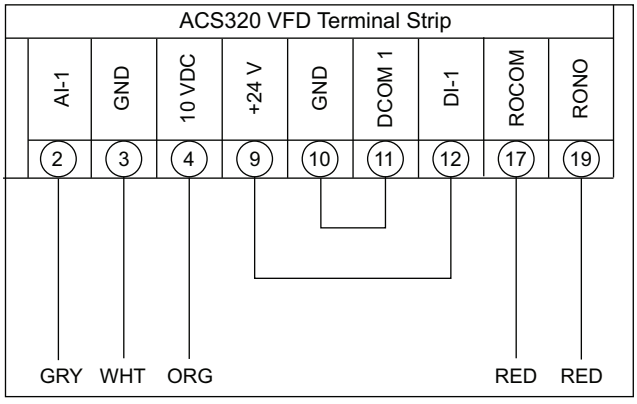



**Fig. 31 — ACS320 VFD Wiring**

**Table 38 — ACH550 VFD Terminal Designations**

| TERMINAL | FUNCTION |
|---|---|
| U1<br>V1<br>W1 | Three-Phase main circuit input power supply |
| U2<br>V2<br>W2 | Three-Phase AC output to motor, 0V to maximum input voltage level |
| 2 (AI2)<br>3 (GND) | Analog input (0-10V) |
| 4 | 10 VDC Reference Voltage |
| 11 (GND)<br>12 (COMMON) | Factory-supplied jumper |
| 10 (24 VDC)<br>13 (DI-1) | Activate to start drive (Start/Stop) |
| 25 (Relay 3 COM)<br>27 (Relay 3 NO) | Relay Output for Unit Control Board safety chain |

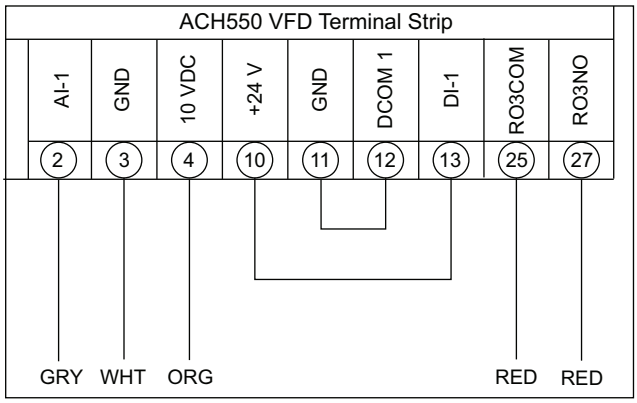



**Fig. 32 — ACH550 VFD Wiring**

INDOOR FAN MOTOR

The indoor fan motors used with the VFD are specially manufactured for use with VFD power circuits. The motor winding insulation is specially formulated to resist breakdown due to voltage stress issues. The motor shaft includes grounding rings to prevent damage to bearings caused by grounding currents. Replace these motors with Factory Authorized Parts available from Replacement Components Division (RCD).

VFD FUSES

Table 39 details the fuse requirement for the VFD installed in 40RU units. Check the control wiring diagram label on the specific unit in use for the fuse location.

FAN FAULT DETECTION

The Variable Frequency Drive is equipped with a relay internal to the drive that is used to prevent the motor from running if there are faults detected by the VFD. If the 40RU is connected to the condensing unit correctly (refer to Power Supply and Wiring section), then the Unit Control Board will also prevent the thermostat signals from being sent to the condensing unit, preventing compressor(s) from energizing if there is a VFD fault or if the VFD is de-energized.

VFD ALARMS AND FAULTS TROUBLESHOOTING

The VFD has two LEDs on its front panel that indicate VFD operating status. These LEDs are GREEN and RED.

- GREEN LED ON STEADY: Power ON to VFD
- GREEN LED FLASHING: Alarm condition detected
- RED LED ON (Steady or Flashing): Fault condition detected

ALARMS

Alarms are advisory in nature. These indicate a problem has been detected by the VFD's diagnostics but this problem will not require that the VFD and its motor be shut down. Typical fault condition on the SAV™ application might be loose connections at the VFD terminal board or damaged conductors between the Fan Speed Board connector J2 and the VFD terminal strip. See Table 40 for a full list.

CLEAR THE ALARM LED

Shut off power to the VFD for five minutes. Restore power and recheck the GREEN LED. If this LED is still flashing, then connect the accessory remote display keypad kit. Use Table 40 to determine if the alarm requires any corrective action (action is not always required) and address the root cause of the problem.

If diagnostics troubleshooting has determined that the drive is defective during the warranty period, contact Carrier.

FAULTS

A fault is a significant internal situation for the VFD or its motor. If the motor was running when the fault was detected, it was shutdown. See Table 41 for a full list of faults, display codes, and recommended actions.

***Clear the Fault LED***

The recommended corrective action for faults is shown in Table 41. The VFD can also be reset to remove the fault. If an external source for a start command is selected and is active, the VFD may start immediately after fault reset.

Connect the accessory remote display keypad kit. To reset a fault indicated by a flashing red LED, turn off the power for 5 minutes. To reset a fault indicated by a red LED (not flashing), press RESET from the control panel or turn off the power for 5 minutes. Depending on the value of parameter 1604 (FAULT RESET SELECT), digital input or serial communication could also be used to reset the drive. When the fault has been corrected, the motor can be started.

**Table 39 — VFD Fuse Requirements, 40RU Units**

| UNIT | HP | VOLTAGE | VFD | MOTOR | STANDARIZED FUSE | FUSE P/N | HARNESS WIRE GAUGE[a] |
|---|---|---|---|---|---|---|---|
| 40RU | 2.9 | 208/230 | HK30WA523 | HD58FE654 | 30A - CLASS CC KTK | HY10KB300 | 10 |
| | | 460 | HK30WA530 | HD58FE654 | 30A - CLASS CC KTK | HY10KB300 | 10 |
| | 3.7 | 208/230 | HK30WA523 | HD58FR236 | 30A - CLASS CC KTK | HY10KB300 | 10 |
| | | 208/230 | HK30WA523 | HD60FE656 | 30A - CLASS CC KTK | HY10KB300 | 10 |
| | | 460 | HK30WA534 | HD58FR236 | 20A - CLASS CC KTK | HY10KB200 | 10 |
| | | 460 | HK30WA534 | HD60FE656 | 20A - CLASS CC KTK | HY10KB200 | 10 |
| | | 575 | HK30WA361 | HD58FE577 | 10A - CLASS CC KTK | HY10KB101 | 10 |
| | 5 | 208/230 | HK30WA524 | HD60FK659 | 30A - CLASS CC KTK | HY10KB300 | 10 |
| | | 460 | HK30WA532 | HD60FK659 | 30A - CLASS CC KTK | HY10KB300 | 10 |
| | | 575 | HK30WA362 | HD60FK577 | 15A - CLASS CC KTK | HY10KB151 | 10 |

NOTE(S):

a. Harness wire gauge between control box and VFD.

**Table 40 — Alarm Codes**

| ALARM CODE | ALARM NAME IN PANEL | DESCRIPTION AND RECOMMENDED CORRECTIVE ACTION |
|---|---|---|
| **2001** | — | Reserved |
| **2002** | — | Reserved |
| **2003** | — | Reserved |
| **2004** | DIR LOCK | The change in direction being attempted is not allowed. Do not attempt to change the direction of motor rotation, or Change parameter 1003 DIRECTION to allow direction change (if reverse operation is safe). |
| **2005** | I/O COMM | Field bus communication has timed out. Check fault setup (3018 COMM FAULT FUNC and 3019 COMM FAULT TIME). Check communication settings (Group 51 or 53 as appropriate). Check for poor connections and/or noise on line. |
| **2006** | AI1 LOSS | Analog input 1 is lost, or value is less than the minimum setting. Check input source and connections. Check the parameter that sets the minimum (3021) and the parameter that sets the Alarm/Fault operation (3001). |
| **2007** | AI2 LOSS | Analog input 2 is lost, or value is less than the minimum setting. Check input source and connections. Check parameter that sets the minimum (3022) and the parameter that sets the Alarm/Fault operation (3001). |
| **2008** | PANEL LOSS | Panel communication is lost and either the VFD is in local control mode (the control panel displays HAND), or the VFD is in remote control mode (AUTO) and is parameterized to accept start/stop, direction or reference from the control panel. To correct, check the communication lines and connections, Parameter 3002 PANEL LOSS, and parameters in groups 10 COMMAND INPUTS and 11 REFERENCE SELECT (if drive operation is REM). |
| **2009** | — | Reserved |
| **2010** | MOT OVERTEMP | Motor is hot, based on either the VFD estimate or on temperature feedback. This alarm warns that a Motor Overload fault trip may be near. Check for overloaded motor. Adjust the parameters used for the estimate (3005 - 3009). Check the temperature sensors and Group 35 parameters. |
| **2011** | UNDERLOAD | Motor load is lower than expected. This alarm warns that a Motor Underload fault trip may be near. Check that the motor and drive ratings match (motor is NOT undersized for the drive). Check the settings on parameters 3013 to 3015. |
| **2012** | MOTOR STALL | Motor is operating in the stall region. This alarm warns that a Motor Stall fault trip may be near. |
| **2013*** | AUTORESET | This alarm warns that the drive is about to perform an automatic fault reset, which may start the motor. To control automatic reset, use parameter group 31 (AUTOMATIC RESET). |

## Table 40 — Alarm Codes (cont)

| ALARM CODE | ALARM NAME IN PANEL | DESCRIPTION AND RECOMMENDED CORRECTIVE ACTION |
|---|---|---|
| **2014** | AUTOCHANGE | This alarm warns that the PFA autochange function is active. To control PFA, use parameter group 81 (PFA) and the Pump Alternation macro. |
| **2015** | PFA INTERLOCK | This alarm warns that the PFA interlocks are active, which means that the drive cannot start any motor (when Autochange is used), or a speed regulated motor (when Autochange is not used). |
| **2016** | — | Reserved |
| **2017*** | OFF BUTTON | This alarm indicates that the OFF button has been pressed. |
| **2018** | PID SLEEP | This alarm warns that the PID sleep function is active, which means that the motor could accelerate when the PID sleep function ends. To control PID sleep, use parameters 4022 - 4026 or 4122 - 4126. |
| **2019** | ID RUN | The VFD is performing an ID run. |
| **2020** | OVERRIDE | Override mode is activated. |
| **2021** | START ENABLE 1 MISSING | This alarm warns that the Start Enable 1 signal is missing. To control Start Enable 1 function, use parameter 1608. To correct, check the digital input configuration and the communication settings. |
| **2022** | START ENABLE 2 MISSING | This alarm warns that the Start Enable 2 signal is missing. To control Start Enable 2 function, use parameter 1609. To correct, check the digital input configuration and the communication settings. |
| **2023** | EMERGENCY STOP | Emergency stop is activated. |

## Table 41 — Fault Codes

| FAULT CODE | FAULT NAME IN PANEL | DESCRIPTION AND RECOMMENDED CORRECTIVE ACTION |
|---|---|---|
| **1** | OVERCURRENT | Output current is excessive. Check for excessive motor load, insufficient acceleration time (parameters 2202 ACCELER TIME 1, default 30 seconds), or faulty motor, motor cables or connections. |
| **2** | DC OVERVOLT | Intermediate circuit DC voltage is excessive. Check for static or transient over voltages in the input power supply, insufficient deceleration time (parameters 2203 DECELER TIME 1, default 30 seconds), or undersized brake chopper (if present). |
| **3** | DEV OVERTEMP | Drive heat sink is overheated. Temperature is at or above 115°C (239°F). Check for fan failure, obstructions in the air flow, dirt or dust coating on the heat sink, excessive ambient temperature, or excessive motor load. |
| **4** | SHORT CIRC | Fault current. Check for short-circuit in the motor cable(s) or motor or supply disturbances. |
| **5** | OVERLOAD | Inverter overload condition. The drive output current exceeds the ratings. |
| **6** | DC OVERVOLT | Intermediate circuit DC voltage is not sufficient. Check for missing phase in the input power supply, blown fuse, or under voltage on main circuit. |
| **7** | AI1 LOSS | Analog input 1 loss. Analog input value is less than AI1 FLT LIMIT (3021). Check source and connection for analog input and parameter settings for AI1 FLT LIMIT (3021) and 3001 AI<MIN FUNCTION. |
| **8** | AI2 LOSS | Analog input 2 loss. Analog input value is less than AI2 FLT LIMIT (3022). Check source and connection for analog input and parameter settings for AI2 FLT LIMIT (3022) and 3001 AI<MIN FUNCTION. |
| **9** | MOT OVERTEMP | Motor is too hot, as estimated by the drive. Check for overloaded motor. Adjust the parameters used for the estimate (3005-3009). Check the temperature sensors and Group 35 parameters. |
| **10** | PANEL LOSS | Panel communication is lost and either drive is in local control mode (the control panel displays LOC), or drive is in remote control mode (REM) and is parameterized to accept start/stop, direction or reference from the control panel.<br>To correct check the communication lines and connections. Check parameter 3002 PANEL COMM ERROR, parameters in Group 10: Command Inputs and Group 11: Reference Select (if drive operation is REM). |
| **11** | ID RUN FAIL | The motor ID run was not completed successfully. Check motor connections. |
| **12** | MOTOR STALL | Motor or process stall. Motor is operating in the stall region. Check for excessive load or insufficient motor power.<br>Check parameters 3010-3012. |
| **13** | RESERVED | Not used. |
| **14** | EXT FAULT 1 | Digital input defined to report first external fault is active. See parameter 3003 EXTERNAL FAULT 1. |
| **15** | EXT FAULT 2 | Digital input defined to report second external fault is active. See parameter 3004 EXTERNAL FAULT 2. |
| **16** | EARTH FAULT | The load on the input power system is out of balance. Check for faults in the motor or motor cable. Verify that motor cable does not exceed maximum specified length. |
| **17** | UNDERLOAD | Motor load is lower than expected. Check for disconnected load. Check parameters 3013 UNDERLOAD FUNCTION through 3015 UNDERLOAD CURVE. |
| **18** | THERM FAIL | Internal fault. The thermistor measuring the internal temperature of the drive is open or shorted. Contact Carrier. |
| **19** | OPEX LINK | Internal fault. A communication-related problem has been detected between the OMIO and OINT boards. Contact Carrier. |
| **20** | OPEX PWR | Internal fault. Low voltage condition detected on the OINT board. Contact Carrier. |

VFD MAINTENANCE

If installed in an appropriate environment, the VFD requires very little maintenance.

Table 42 lists the routine maintenance intervals recommended by Carrier.

**Table 42 — Maintenance Intervals**

| MAINTENANCE | INTERVAL |
|---|---|
| **Heat sink temperature check and cleaning** | Every 6 to 12 months (depending on the dustiness of the environment) |
| **HVAC control panel battery change** | Every ten years |

HEAT SINK CLEANING

The heat sink fins accumulate dust from the cooling air. In a normal environment check, the heat sink annually. In a dusty environment, check more often.

Use the following procedure to clean the heat sink on ASC320 VFDs:

1. Turn off and lock out unit power.
2. Insert a small straight blade screwdriver into the slot and press in to release the top cover as shown in Fig. 33.

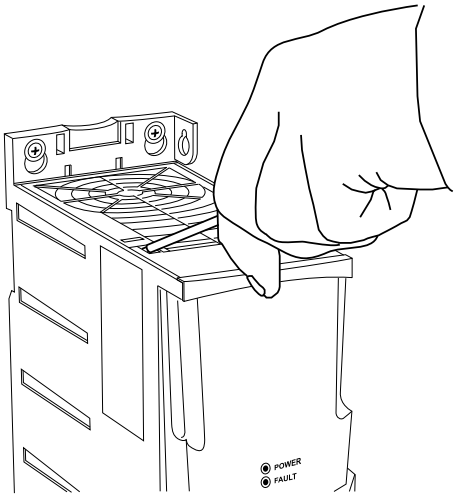



**Fig. 33 — Remove Top Cover on ACS320 VFD**

3. Blow clean compressed air (not humid) from top of ACS320 while simultaneously using a vacuum cleaner at the base to trap the dust.
4. Replace the top cover.

Restore power.

Use the following procedure to clean the heat sink on AHC550 VFDs:

1. Turn off and lock out unit power.
2. Remove the drive cover (see Fig. 34).
3. Press together the retaining clips on the top cover and lift (see Fig. 35).

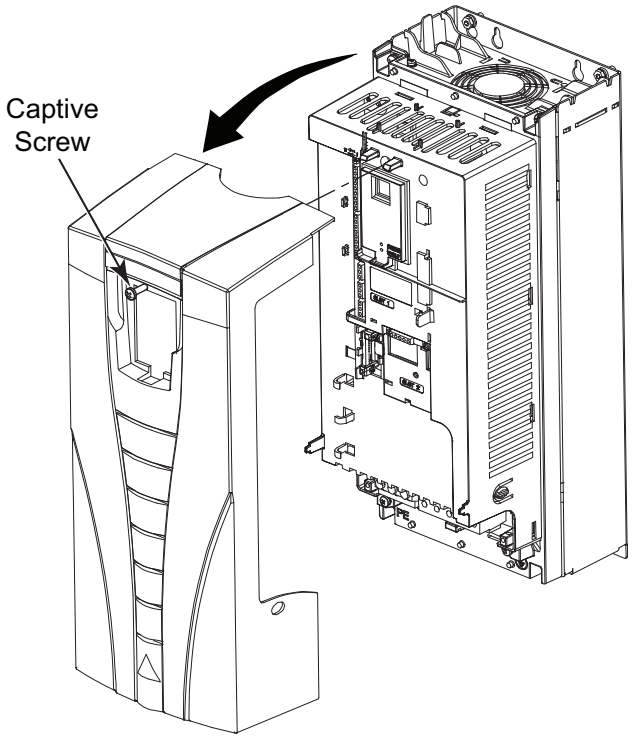



**Fig. 34 — Remove ACH550 VFD Front Cover**

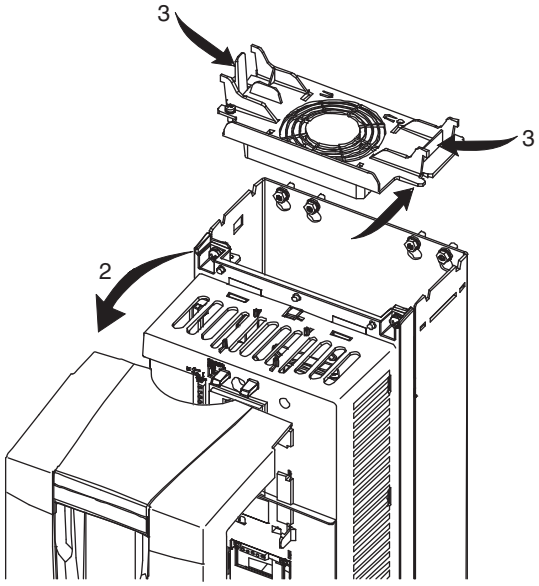



**Fig. 35 — Remove Top Cover on ACH550 VFD**

4. Blow clean compressed air (not humid) from bottom to top while simultaneously using a vacuum cleaner at the air outlet to trap the dust.
5. Replace the cooling fan.
6. Replace the drive cover.
7. Restore power.

## Bypass the VFD

**⚠ WARNING**

Bypassing the VFD is not recommended. This is a temporary procedure to provide cooling or heating operation when a new VFD is required. When in this bypass mode the fire shut down will not turn off the blower and it will continue to run. The bypass should only be used for a short duration until a new VFD has been received.

The factory-installed VFD is wired and agency approved as outlined in this manual. This VFD is utilized to help provide added efficiencies and comfort during the cooling operation.

If there is an occasion where the VFD has malfunctioned and temporary cooling/operation is required, bypass the VFD as shown in Fig. 36.

To bypass VFD:

1. Turn off and lock out unit power.
2. Disconnect the connector linking the fuse to the VFD.
3. Disconnect the connector between the VFD and the indoor fan motor.
4. Disconnect the ground wires at the base of the VFD.
5. Remove the VFD, if required.
6. Connect the lead from the fuse to the lead from the indoor fan motor.
7. Connect the ground wire from the indoor fan motor to the fan deck.
8. Restore power.

## Condensate Drains

Keep condensate drains free of dirt and foreign matter.

## Return-Air Filters

Refer to Replacing Filters section on page 41 for filter accessibility and removal. Replace with clean filters of the sizes listed in Tables 1-6.

## Chilled Water Coil Freeze Protection

Shut off water supply to unit. Remove side panel of unit and remove vent and drain plugs in top and bottom of coil header. Drain coil and blow out remaining water. Reinstall plugs and side panel. Alternative freeze protection methods follow:

- Circulate hot water within the water coil's supply main or supplementary space heating.
- Close off supply lines to unit and open a union or field-supplied drain valve in the return line.

IMPORTANT: Draining from return line will not completely drain water from coils.

- After draining as much water as possible from coils, add sufficient antifreeze to prevent residual water in the coil from freezing.
- Add a sufficient quantity of non-corrosive antifreeze to the entire system to prevent all water within the system from freezing.

## Coil Removal

Remove unit panels and corner posts as required. Disconnect coil connections and remove fastening screws. Remove coil through end or side sections of unit.

## Cleaning Cooling Coil

Remove return-air filters. Remove any heavy dirt that may have accumulated on underside of coil. Coil can be cleaned more easily with a stiff brush, vacuum cleaner, or compressed air when coil is dry. If coil is wet or if water is to be used for cleaning, guard against splashing water on electrical components or damaging surrounding area. Clean coil baffles as applicable and check for tight fit to be sure air does not bypass coil.

## Cleaning Insulation

The insulation contains an immobilized antimicrobial agent that helps inhibit the growth of bacteria and fungi. Clean the inner surface of the insulation according to the separate maintenance instructions shipped with the unit.

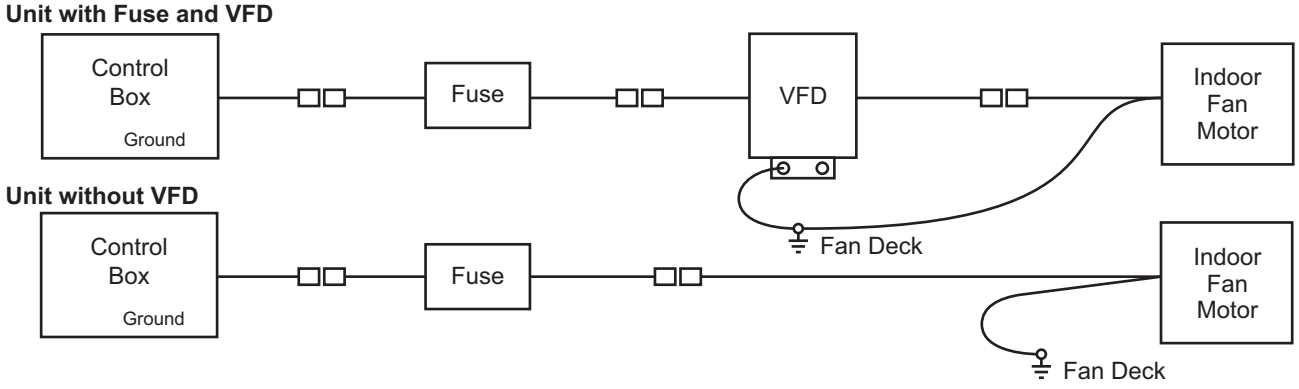



**Fig. 36 — To Bypass VFD**

## Replacing Filters

Filters can be removed and installed from either side of the unit. Install new filters in units that have one fan as follows:

1. Remove the side access panel (retain screws).
2. Remove the filter retainer clip (see Fig. 37).
3. Remove old filters by lifting and tilting them out of the filter track. (See Fig. 13 and 38.)
4. Reverse the procedure to install new filters.

To install new filters in larger units that have 2 fans, follow the preceding steps, but use the factory-supplied filter hook to slide filters within reach for removal. The filter hook is shipped inside the unit in the filter track.

**⚠CAUTION**

EQUIPMENT DAMAGE HAZARD

Failure to follow this CAUTION can result in premature wear and damage to equipment.

DO NOT OPERATE THE UNIT WITHOUT THE RETURN AIR FILTERS IN PLACE.

Dirt and debris can collect on heat exchangers and coils possibly resulting in a small fire. Dirt buildup on components can cause excessive current used resulting in motor failure.

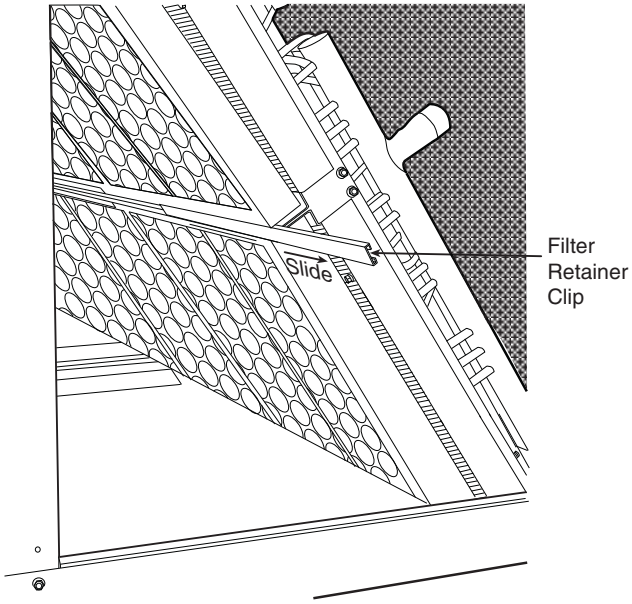



**Fig. 37 — Remove Filter Retainer Clip**

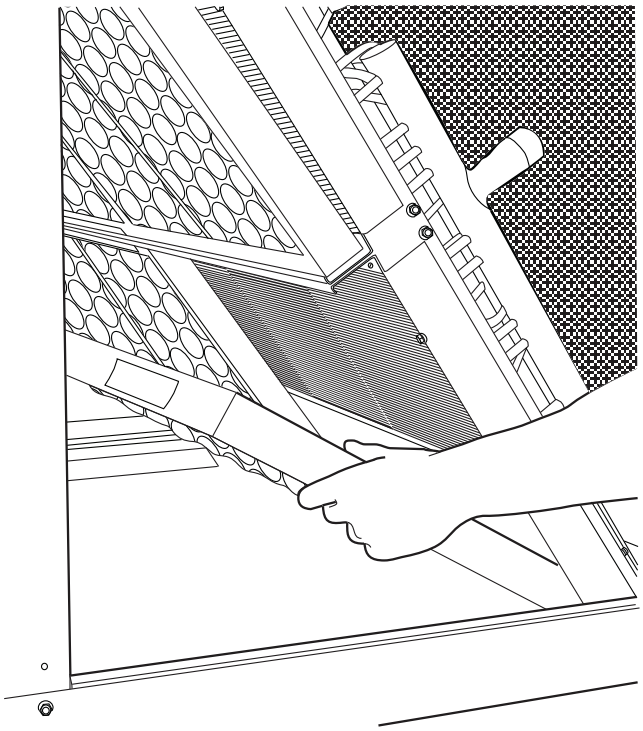


**Fig. 38 — Filter Removal/Replacement**

# APPENDIX A — VFD PARAMETERS

## Table A — ACS320 Common Parameters

| PARAMETERS | DESCRIPTION | SETTING ACS320 |
|---|---|---|
| **1001** | EXT1 Commands | DI1 |
| **1102** | EXT1/EXT2 Sel | EXT1 |
| **1103** | REF1 Select | AI-1 |
| **1201** | Const Speed Sel | DI 2, 3 |
| **1202** | Const Speed 1 | 40Hz |
| **1203** | Const Speed 2 | 60Hz |
| **1204** | Const Speed 3 | 60Hz |
| **1205** | Const Speed 4 | — |
| **1301** | Minimum AI1 | 2% |
| **1401** | Relay Output 1 | FAULT (–1) |
| **1403** | Relay Output 3 | — |
| **1501** | AO1 Content Sel | — |
| **1601** | Run Enable | — |
| **1608** | Start Enable 1 | Not Sel |
| **1611** | Parameter View | 3 |
| **2007** | Minimum Frequency | 0.0 Hz |
| **2008** | Maximum Frequency | 60Hz |
| **2101** | Start FCN | Auto |
| **2102** | Stop FCN | Coast |
| **2201** | Accel/Decel | Not Sel |
| **2202** | Accel | 30s |
| **2203** | DECEL | 30s |
| **2603** | IR COMP Volt | 0 |
| **2606** | Switching Frequency | 4kHz |
| **3102** | Trial Time | 300.0s |
| **3103** | Delay Time | 6.0s |
| **3104** | AR Overcurrent | Enable |
| **5101** | FBA Type | — |
| **5201** | Station ID | — |
| **5202** | Baud Rate | — |
| **5203** | Parity | — |
| **5301** | EFB Protocol ID | — |
| **5302** | EFB Station ID | — |
| **5303** | EFB Baud Rate | — |
| **5304** | EFB Parity | — |
| **5305** | EFB CTRL Profile | — |
| **9802** | COMM Prot Sel | — |
| **9907** | Motor Nominal Frequency | 60Hz |

## Table B — ACH550 VFD Common Parameters

| PARAMETERS | DESCRIPTION | SETTING ACH550 |
|---|---|---|
| **1001** | EXT1 Commands | DI1 |
| **1102** | EXT1/EXT2 Sel | EXT1 |
| **1103** | REF1 Select | AI-1 |
| **1201** | Const Speed Sel | DI 2, 3 |
| **1202** | Const Speed 1 | 40Hz |
| **1203** | Const Speed 2 | 60Hz |
| **1204** | Const Speed 3 | 60Hz |
| **1205** | Const Speed 4 | — |
| **1301** | Minimum AI1 | 2% |
| **1401** | Relay Output 1 | — |
| **1403** | Relay Output 3 | FAULT (–1) |
| **1501** | AO1 Content Sel | — |
| **1601** | Run Enable | — |
| **1608** | Start Enable 1 | Not Sel |
| **2007** | Minimum Frequency | 0.0 Hz |
| **2008** | Maximum Frequency | 60Hz |
| **2101** | Start FCN | Auto |
| **2102** | Stop FCN | Ramp |
| **2201** | Accel/Decel | Not Sel |
| **2202** | Accel | 30s |
| **2203** | DECEL | 30s |
| **2606** | Switching Frequency | 4kHz |
| **3102** | Trial Time | 300.0s |
| **3103** | Delay Time | 6.0s |
| **3104** | AR Overcurrent | Enable |
| **5101** | FBA Type | — |
| **5201** | Station ID | — |
| **5202** | Baud Rate | — |
| **5203** | Parity | — |
| **5301** | EFB Protocol ID | — |
| **5302** | EFB Station ID | — |
| **5303** | EFB Baud Rate | — |
| **5304** | EFB Parity | — |
| **5305** | EFB CTRL Profile | — |
| **9802** | COMM Prot Sel | — |
| **9902** | Application Macro | — |
| **9907** | Motor Nominal Frequency | 60Hz |

## APPENDIX A — VFD PARAMETERS (cont)

### Table C — ACS320 VFD Parameters

| VFD PARAMETERS | PKG ABB ACS320 | MOTOR PART NO. | VFD PART NO. | DRIVE HP | DESC. | VOLTAGE (9905) | N. AMPS (9906) | MOTOR NOM FREQ (Hz) (9907) | N. RPM (9908) | N. HP (9909) | MAX AMPS (2003) | CROSS REFERENCE EM_PKG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40RU000514-DATA** | 40RU000514 | HD60FE656 | HK30WA534 | 5 | 40RU 3.7 HP 460V | 460 | 4.9 | 60 | 1725 | 3.7 | 5.6 | 40RU000514 |
| **40RU000516-DATA** | 40RU000516 | HD60FK657 | HK30WA532 | 7 | 40RU 5.0 HP 460V | 460 | 7.6 | 60 | 1760 | 5.0 | 8.7 | 40RU000516 |
| **40RU000517-DATA** | 40RU000517 | HD60FK657 | HK30WA524 | 7 | 40RU 5.0 HP 230V | 230 | 17.0 | 60 | 1760 | 5.0 | 19.6 | 40RU000517 |
| **40RU000587-DATA** | 40RU000587 | HD58FE654 | HK30WA523 | 3 | 40RU 2.9 HP 230V | 230 | 8.6 | 60 | 1725 | 2.9 | 9.9 | 40RU000587 |
| **40RU000588-DATA** | 40RU000588 | HD58FE654 | HK30WA530 | 3 | 40RU 2.9 HP 460V | 460 | 3.8 | 60 | 1725 | 2.9 | 4.4 | 40RU000588 |
| **40RU000589-DATA** | 40RU000589 | HD60FE656 | HK30WA523 | 5 | 40RU 3.7 HP 230V | 230 | 10.8 | 60 | 1725 | 3.7 | 12.4 | 40RU000589 |

### Table D — ACH550 VFD Parameters

| VFD PARAMETERS | PKG ABB ACS550 | MOTOR PART NO. | VFD PART NO. | DRIVE HP | DESC. | VOLTAGE (9905) | N. AMPS (9906) | MOTOR NOM FREQ (Hz) (9907) | N. RPM (9908) | N. HP (9909) | MAX AMPS (2003) | CROSS REFERENCE EM_PKG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **40RU000513-DATA** | 40RU000513 | HD58FE577 | HK30WA361 | 5.0 | 40RU 3.7 HP 575V | 575 | 4.9 | 60 | 1725 | 3.7 | 5.6 | 40RU000513 |
| **40RU000515-DATA** | 40RU000515 | HD60FK577 | HK30WA362 | 7.5 | 40RU 5.0 HP 575V | 575 | 8.0 | 60 | 1745 | 5.0 | 9.2 | 40RU000515 |

**Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.**

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## START-UP CHECKLIST

(SPLIT SYSTEMS WITH 40RU UNITS)

**NOTE: To avoid injury to personnel and damage to equipment or property when completing the procedures listed in this start-up checklist, use good judgment, follow safe practices, and adhere to the safety considerations/information as outlined in preceding sections of this Installation, Start-Up, and Service document.**

**I. PRELIMINARY INFORMATION**

OUTDOOR: MODEL NO. _____ INDOOR: MODEL NO. _____

SERIAL NO._____ SERIAL NO. _____

ADDITIONAL ACCESSORIES _____

**II. PRE-START-UP**

**OUTDOOR UNIT**

IS THERE ANY SHIPPING DAMAGE? (Y/N)_____

IF SO, WHERE:_____

_____

WILL THIS DAMAGE PREVENT UNIT START-UP? (Y/N)_____

CHECK POWER SUPPLY. DOES IT AGREE WITH UNIT? (Y/N)_____

HAS THE GROUND WIRE BEEN CONNECTED? (Y/N)_____

VERIFY GROUND INTEGRITY WITH CONTINUITY TEST. (Y/N)_____

HAS THE CIRCUIT PROTECTION BEEN SIZED AND INSTALLED PROPERLY? (Y/N)_____

ARE THE POWER WIRES TO THE UNIT SIZED AND INSTALLED PROPERLY? (Y/N)_____

HAVE COMPRESSOR HOLDDOWN BOLTS BEEN LOOSENED? (Y/N)_____

**CONTROLS**

ARE THERMOSTAT(S) AND INDOOR FAN CONTROL WIRING CONNECTIONS MADE AND CHECKED? (Y/N)_____

ARE ALL WIRING TERMINALS (including main power supply) TIGHT? (Y/N)_____

HAVE OUTDOOR UNIT CRANKCASE HEATERS BEEN ENERGIZED FOR 24 HOURS? (Y/N)_____

**INDOOR UNIT**

HAS WATER BEEN PLACED IN DRAIN PAN TO CONFIRM PROPER DRAINAGE? (Y/N)_____

ARE PROPER AIR FILTERS IN PLACE? (Y/N)_____

HAVE FAN AND MOTOR PULLEYS BEEN CHECKED FOR PROPER ALIGNMENT? (Y/N)_____

DO THE FAN BELTS HAVE PROPER TENSION? (Y/N)_____

**PIPING**

**40RUA, 40RUQ**

HAS FOAM SHIPPING BLOCK BEEN REMOVED FROM THE TXV (Thermostatic Expansion Valve)? (Y/N)_____

ARE LIQUID LINE SOLENOID VALVES LOCATED AT THE INDOOR UNIT OR OUTDOOR UNIT COILS AS REQUIRED? (Y/N)_____

HAVE LEAK CHECKS BEEN MADE AT COMPRESSORS, CONDENSERS, INDOOR COILS, TXVs (Thermostatic Expansion Valves) SOLENOID VALVES, FILTER DRIERS, AND FUSIBLE PLUGS WITH A LEAK DETECTOR? (Y/N)_____

LOCATE, REPAIR, AND REPORT ANY LEAKS. _____

HAVE ALL COMPRESSOR SERVICE VALVES BEEN FULLY OPENED (BACKSEATED)? (Y/N)_____

ARE THE COMPRESSOR OIL SIGHT GLASSES SHOWING CORRECT LEVELS? (Y/N)_____

**40RUS**

HAS AIR BEEN BLED FROM SYSTEM? (Y/N)_____

HAVE LEAK CHECKS BEEN MADE AT COMPRESSORS, CHILLERS, VALVES, AND INDOOR COILS? (Y/N)_____

LOCATE, REPAIR, AND REPORT ANY LEAKS. _____

**CHECK VOLTAGE IMBALANCE**

LINE-TO-LINE VOLTS: AB_____ V AC_____ V BC_____ V

(AB + AC + BC)/3 = AVERAGE VOLTAGE =_____ V

MAXIMUM DEVIATION FROM AVERAGE VOLTAGE = _____V

VOLTAGE IMBALANCE = 100 X (MAX DEVIATION)/(AVERAGE VOLTAGE) =_____

IF OVER 2% VOLTAGE IMBALANCE, DO NOT ATTEMPT TO START SYSTEM!

CALL LOCAL POWER COMPANY FOR ASSISTANCE.

**III. START-UP**

CHECK INDOOR FAN MOTOR SPEED AND RECORD.

AFTER AT LEAST 10 MINUTES RUNNING TIME, RECORD THE FOLLOWING MEASUREMENTS:

| | COMP A1 | COMP B1 |
|---|---|---|
| OIL PRESSURE | _____ | _____ |
| SUCTION PRESSURE | _____ | _____ |
| SUCTION LINE TEMP | _____ | _____ |
| DISCHARGE PRESSURE | _____ | _____ |
| DISCHARGE LINE TEMP | _____ | _____ |
| ENTERING OUTDOOR UNIT AIR TEMP | _____ | _____ |
| LEAVING OUTDOOR UNIT AIR TEMP | _____ | _____ |
| INDOOR UNIT ENTERING AIR DB TEMP | _____ | _____ |
| INDOOR UNIT ENTERING AIR WB TEMP | _____ | _____ |
| INDOOR UNIT LEAVING AIR DB TEMP | _____ | _____ |
| INDOOR UNIT LEAVING AIR WB TEMP | _____ | _____ |
| OUTDOOR UNIT ENTERING WATER TEMP (40RUS ONLY) | _____ | _____ |
| OUTDOOR UNIT LEAVING WATER TEMP (40RUS ONLY) | _____ | _____ |
| INDOOR UNIT ENTERING WATER TEMP (40RUS ONLY) | _____ | _____ |
| INDOOR UNIT LEAVING WATER TEMP (40RUS ONLY) | _____ | _____ |
| COMPRESSOR AMPS (L1/L2/L3) | ____/____/____ | ____/____/____ |

CHECK THE COMPRESSOR OIL LEVEL SIGHT GLASSES: ARE THE SIGHT GLASSES SHOWING OIL LEVEL AT 1/8 to 1/3 FULL? (Y/N)_____

NOTES:

_____

_____

_____

_____

_____

_____

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE