704D
SINGLE-PACKAGED AIR CONDITIONER
WITH PURON® (R-410A) REFRIGERANT
1-1/2-5 NOMINAL TONS (SIZES 018-060) 1 & 3 PHASE

bryant®

Installation Instructions

NOTE: Read the entire instruction manual before starting the installation.

NOTE: Installer: Make sure the Owner's Manual and Service Instructions are left with the unit after installation.

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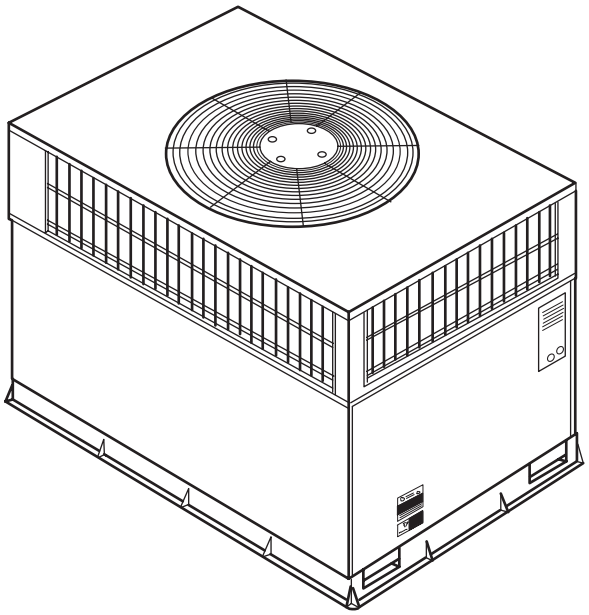

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Fig. 1 - Unit 704D

SAFETY CONSIDERATIONS

Installation and servicing of this equipment can be hazardous due to mechanical and electrical components. Only trained and qualified personnel should install, repair, or service this equipment.

Untrained personnel can perform basic maintenance functions such as cleaning and replacing air filters. All other operations must be performed by trained service personnel. When working on this equipment, observe precautions in the literature, on tags, and on labels attached to or shipped with the unit and other safety precautions that may apply.

Follow all safety codes. Installation must be in compliance with local and national building codes. Wear safety glasses, protective clothing, and work gloves. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit.

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 these signal words: DANGER, WARNING, and CAUTION. 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.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Before installing or servicing system, always turn off main power to system. There may be more than one disconnect switch. Turn off accessory heater power switch if applicable.

INTRODUCTION

The 704D packaged air conditioner is fully self-contained and designed for outdoor installation (See Fig. 1). See Fig. 2 and 3 for unit dimensions. All unit sizes have discharge openings for both horizontal and downflow configurations, and are factory shipped with all downflow duct openings covered. The unit may be installed either on a rooftop, ground-level cement slab, or directly on the ground if local codes permit. (See Fig. 4 for roof curb dimensions.)

RECEIVING AND INSTALLATION

Step 1—Check Equipment

IDENTIFY UNIT

The unit model number and serial number are printed on the unit informative plate. Check this information against shipping papers.

INSPECT SHIPMENT

Inspect for shipping damage while unit is still on shipping pallet. If unit appears to be damaged or is torn loose from its anchorage, have it examined by transportation inspectors before removal. Forward claim papers directly to transportation company. Manufacturer is not responsible for any damage incurred in transit. Check all items against shipping list. Immediately notify the nearest equipment distribution office if any item is missing. To prevent loss or damage, leave all parts in original packages until installation.

Step 2—Provide Unit Support

For hurricane tie downs, contact distributor for details and PE (Professional Engineering) Certificate if required.

ROOF CURB

Install accessory roof curb in accordance with instructions shipped with curb (See Fig. 4). Install insulation, cant strips, roofing, and flashing. Ductwork must be attached to curb.

IMPORTANT: The gasketing of the unit to the roof curb is critical for a water tight seal. Install gasketing material supplied with the roof curb. Improperly applied gasketing also can result in air leaks and poor unit performance.

Curb should be level to within 1/4 in.(6 mm) (See Fig. 6). This is necessary for unit drain to function properly. Refer to accessory roof curb installation instructions for additional information as required.

SLAB MOUNT

Place the unit on a solid, level concrete pad that is a minimum of 4 in. (102 mm) thick with 2 in. (51 mm) above grade. The slab should extend approximately 2 in. beyond the casing on all 4 sides of the unit (See Fig. 7). Do not secure the unit to the slab *except* when required by local codes.

GROUND MOUNT

The unit may be installed either on a slab or placed directly on the ground, if local codes permit. Place the unit on level ground prepared with gravel for condensate discharge.

Step 3—Provide Clearances

The required minimum service clearances are shown in Fig. 2 and 3. Adequate ventilation and outdoor air must be provided. The outdoor fan draws air through the outdoor coil and discharges it through the top fan grille. Be sure that the fan discharge does not recirculate to the outdoor coil. Do not locate the unit in either a corner or under an overhead obstruction. The minimum clearance under a partial overhang (such as a normal house overhang) is 48 in. above the unit top. The maximum horizontal extension of a partial overhang must not exceed 48 in. (1219 mm).

IMPORTANT: Do not restrict outdoor airflow. An air restriction at either the outdoor-air inlet or the fan discharge may be detrimental to compressor life.

Do not place the unit where water, ice, or snow from an overhang or roof will damage or flood the unit. Do not install the unit on carpeting or other combustible materials. Slab-mounted units should be at least 4 in. (102 mm) above the highest expected water and runoff levels. Do not use unit if it has been under water.

Step 4—Field-Fabricate Ductwork

Secure all ducts to roof curb and building structure on vertical discharge units. Do not connect ductwork to unit. For horizontal applications, unit is provided with flanges on the horizontal openings. All ductwork should be secured to the flanges. Insulate and weatherproof all external ductwork, joints, and roof openings with counter flashing and mastic in accordance with applicable codes.

Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier. If a plenum return is used on a vertical unit, the return should be ducted through the roof deck to comply with applicable fire codes. A minimum clearance is not required around ductwork. Cabinet return-air static shall not exceed -.25 in. wc.

Step 5—Rig and Place Unit

Rigging and handling of this equipment can be hazardous for many reasons due to the installation location (roofs, elevated structures, etc.).

Only trained, qualified crane operators and ground support staff should handle and install this equipment.

When working with this equipment, observe precautions in the literature, on tags, stickers, and labels attached to the equipment, and any other safety precautions that might apply.

Training for operators of the lifting equipment should include, but not be limited to, the following:

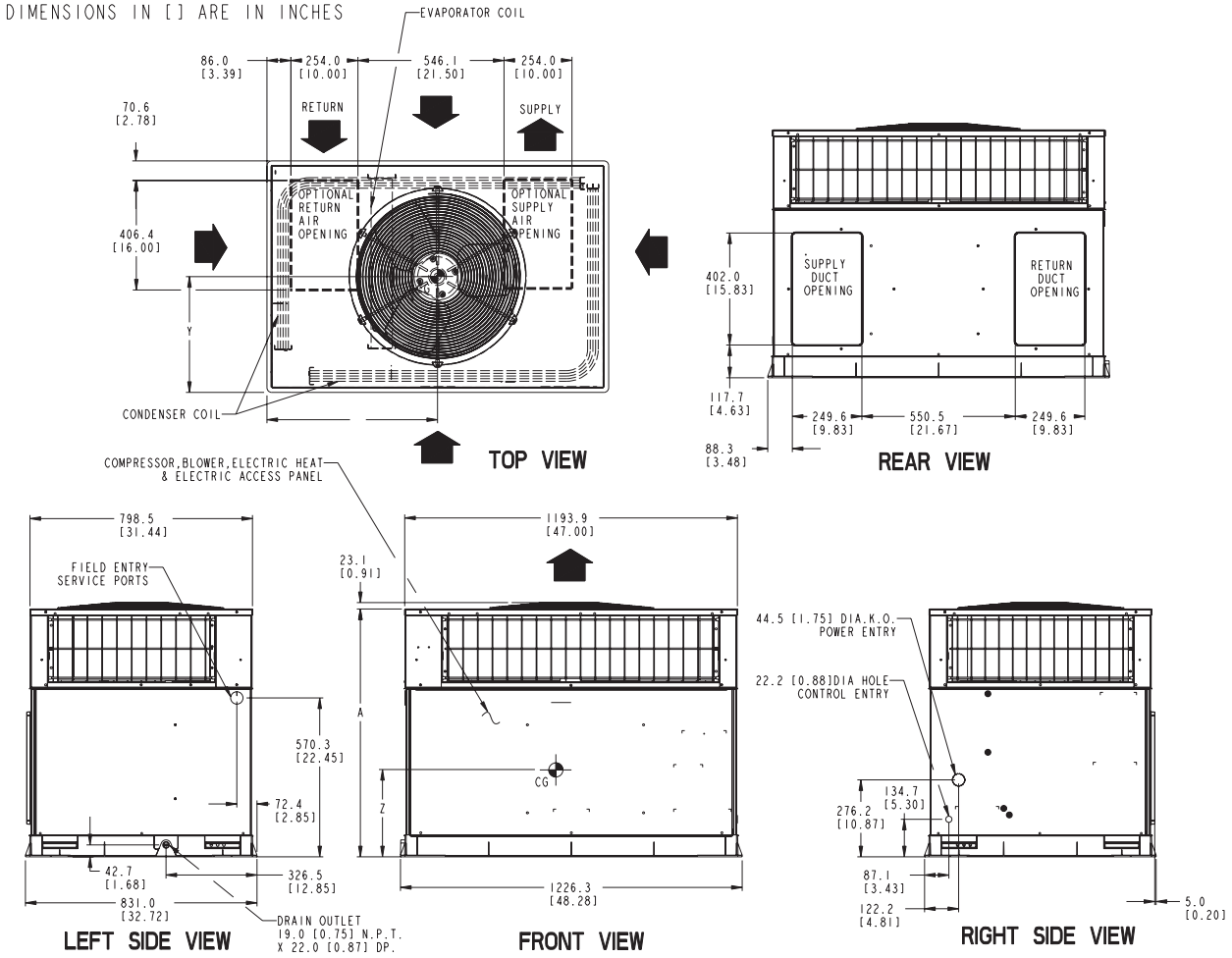
1. Application of the lifter to the load, and adjustment of the lifts to adapt to various sizes or kinds of loads.
2. Instruction in any special operation or precaution.
3. Condition of the load as it relates to operation of the lifting kit, such as balance, temperature, etc.

Follow all applicable safety codes. Wear safety shoes and work gloves.

INSPECTION

The lifting/rigging bracket is engineered and designed to be installed *only* on Small Packaged Products. This bracket is to be used to rig/lift a Small Packaged Product onto roofs or other elevated structures.

Prior to initial use, and at monthly intervals, all rigging brackets and straps should be visually inspected for any damage, evidence of wear, structural deformation, or cracks. Particular attention should be paid to excessive wear at hoist hooking points and load support areas. Brackets or straps showing any kind of wear in these areas must not be used and should be discarded.



REQUIRED CLEARANCE TO COMBUSTIBLE MATL.
(Refer to Maximum Operating Clearances)

	INCHES [mm]
TOP OF UNIT	14.00 [355.6]
DUCT SIDE OF UNIT	2.00 [50.8]
SIDE OPPOSITE DUCTS	14.00 [355.6]
BOTTOM OF UNIT	0.50 [12.7]

NEC. REQUIRED CLEARANCES.

	INCHES [mm]
BETWEEN UNITS, POWER ENTRY SIDE	42.00 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE	36.00 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE	42.00 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

	INCHES [mm]	
EVAP. COIL ACCESS SIDE	36.00 [914.0]	
POWER ENTRY SIDE	42.00 [1066.8]	
(EXCEPT FOR NEC REQUIREMENTS)		
UNIT TOP	48.00 [1219.2]	
SIDE OPPOSITE DUCTS	36.00 [914.0]	
DUCT PANEL	12.00 [304.8]	*

*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 304.8 [12.00] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISE.

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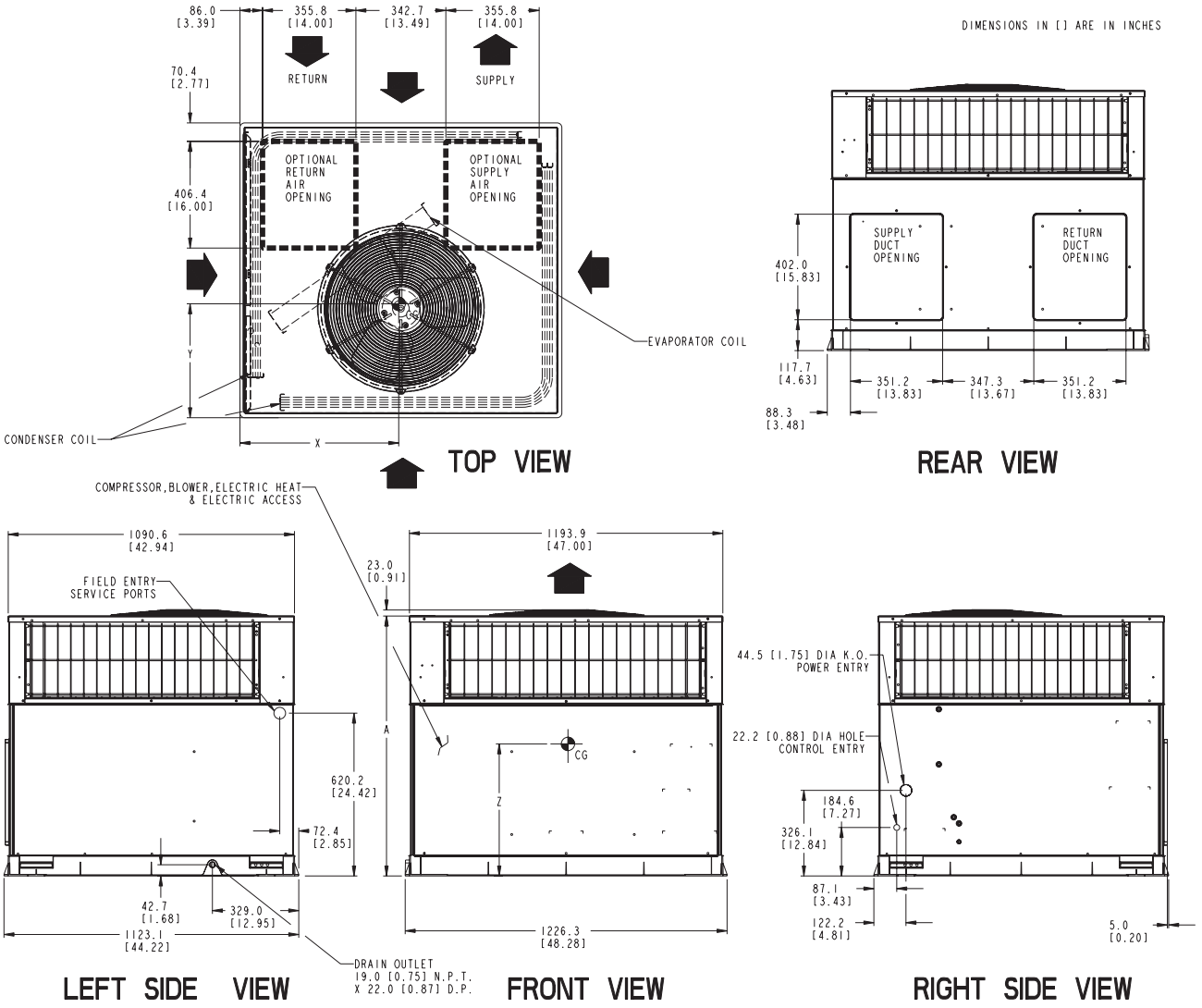
UNIT	ELECTRICAL CHARACTERISTICS	UNIT WEIGHT		UNIT HEIGHT IN. [MM] "A"	CENTER OF GRAVITY IN. [MM]		
		lb	kg		X	Y	Z
704D018	208/230-1-60	250	113.4	37.02 [940]	23.1 [586.7]	14.2 [360.7]	15.5 [393.7]
704D024	208/230-1-60	264	119.7	37.02 [940]	24.0 [609.6]	16.3 [414.0]	15.7 [398.8]
704D030	208/230-1-60, 208/230-3-60	281	127.4	39.02 [991]	23.3 [591.8]	15.7 [398.8]	15.8 [401.3]
704D036	208/230-1-60, 208/230-3-60, 460-3-60	299	135.6	42.98 [1092]	22.6 [574.0]	15.8 [401.3]	16.6 [421.6]

Fig. 2 - 704D018-036 Unit Dimensions



REQUIRED CLEARANCE TO COMBUSTIBLE MAT'L.
(Refer to Maximum Operating Clearances)

	INCHES [mm]
TOP OF UNIT	14.00 [355.6]
DUCT SIDE OF UNIT	2.00 [50.8]
SIDE OPPOSITE DUCTS	14.00 [355.6]
BOTTOM OF UNIT	0.50 [12.7]

NEC. REQUIRED CLEARANCES.

	INCHES [mm]
BETWEEN UNITS, POWER ENTRY SIDE	42.00 [1066.8]
UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE	36.00 [914.0]
UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE	42.00 [1066.8]

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

	INCHES [mm]
EVAP. COIL ACCESS SIDE	36.00 [914.0]
POWER ENTRY SIDE	42.00 [1066.8]
(EXCEPT FOR NEC REQUIREMENTS)	
UNIT TOP	48.00 [1219.2]
SIDE OPPOSITE DUCTS	36.00 [914.0]
DUCT PANEL	12.00 [304.8] *

*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 304.8 [12.00] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISE.

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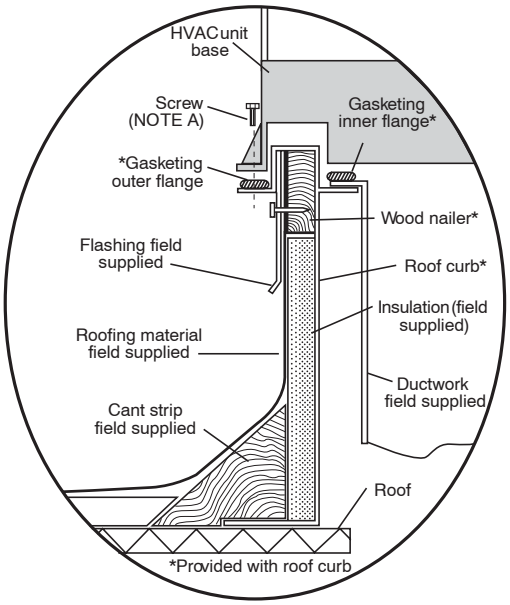
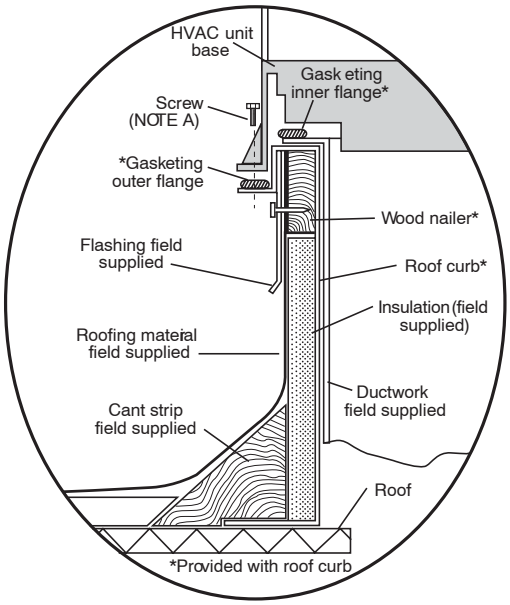
UNIT	ELECTRICAL CHARACTERISTICS	UNIT WEIGHT		UNIT HEIGHT IN. [MM] "A"	CENTER OF GRAVITY IN. [MM]		
		lb	kg		X	Y	Z
704D042	208/230-1-60, 208/230-3-60, 460-3-60	367	166.4	42.98 [1092]	25.5 [647.7]	15.2 [286.1]	17.1 [434.3]
704D048	208/230-1-60, 208/230-3-60, 460-3-60	382	173.2	42.98 [1092]	24.9 [632.5]	15.5 [393.7]	17.4 [442.0]
704D060	208/230-1-60, 208/230-3-60, 460-3-60	412	186.8	46.98 [1193]	25.5 [647.7]	15.5 [393.7]	17.6 [447.0]

Fig. 3 - 704D042-060 Unit Dimensions



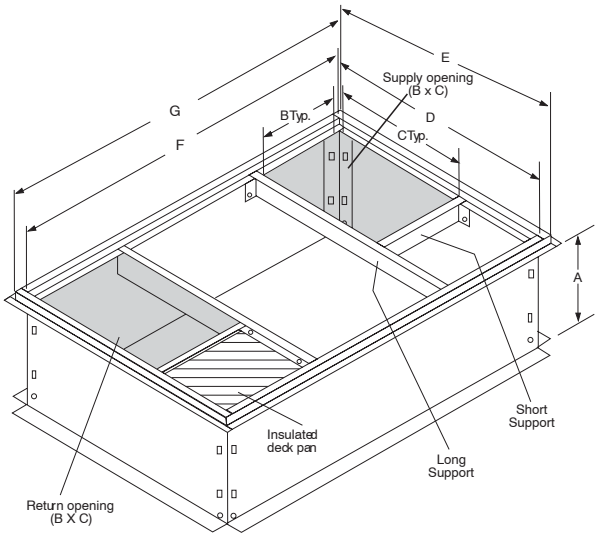
Roof Curb for Small Cabinet

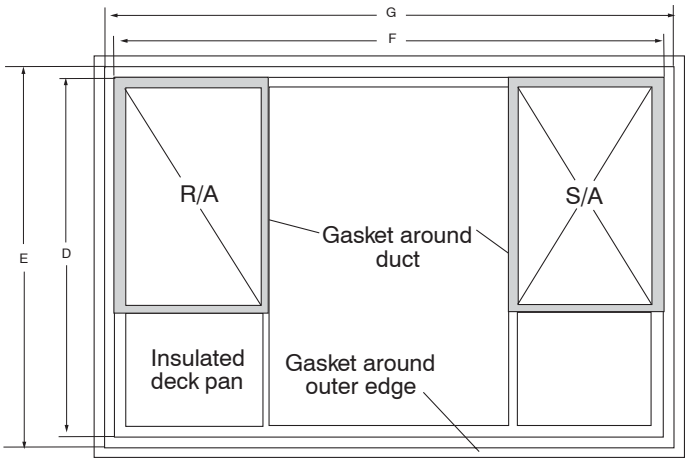
Note A: When unit mounting screw is used, retainer bracket must also be used.



Roof Curb for Large Cabinet

Note A: When unit mounting screw is used, retainer bracket must also be used.





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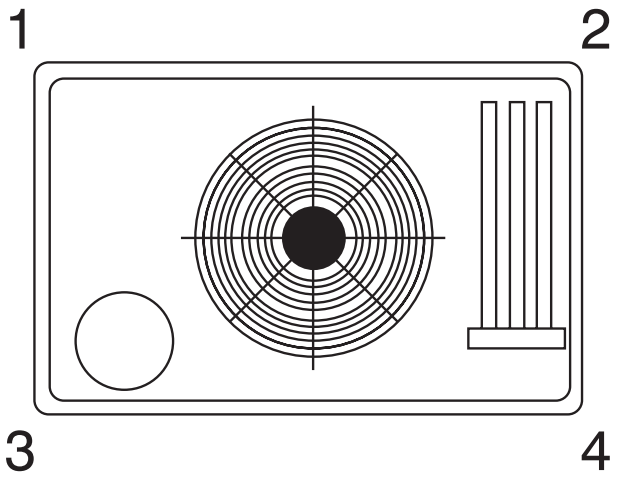
UNIT SIZE	ODS CATALOG NUMBER	A IN. (MM)	B IN. (MM)	C IN. (MM)	D IN. (MM)	E IN. (MM)	F IN. (MM)	G IN. (MM)
704D018-036	CPRFCURB006A00	8 (203)	11 (279)	16-1/2 (419)	28-3/4 (730)	30-3/8 (771)	44-5/16 (1126)	45-15/16 (1167)
	CPRFCURB007A00	14 (356)	11 (279)	16-1/2 (419)	28-3/4 (730)	30-3/8 (771)	44-5/16 (1126)	45-15/16 (1167)
704D042-060	CPRFCURB008A00	8 (203)	16-3/16 (411)	17-3/8 (441)	40-1/4 (1022)	41-15/16 (1065)	44-7/16 (1129)	46-1/16 (1169)
	CPRFCURB009A00	14 (356)	16-3/16 (411)	17-3/8 (441)	40-1/4 (1022)	41-15/16 (1065)	44-7/16 (1129)	46-1/16 (1169)

NOTES:

1. Roof curb must be set up for unit being installed.
2. Seal strip must be applied, as required, to unit being installed.
3. Dimensions are in inches.
4. Roof curb is made of 16-gauge steel.
5. Attach ductwork to curb (flanges of duct rest on curb).
6. Insulated panels: 1-in. thick fiberglass 1 lb. density.
7. When unit mounting screw is used (see Note A), a retainer bracket must be used as well. This bracket must also be used when required by code for hurricane or seismic conditions. This bracket is available through Micrometl.

Fig. 4 - Roof Curb Dimensions



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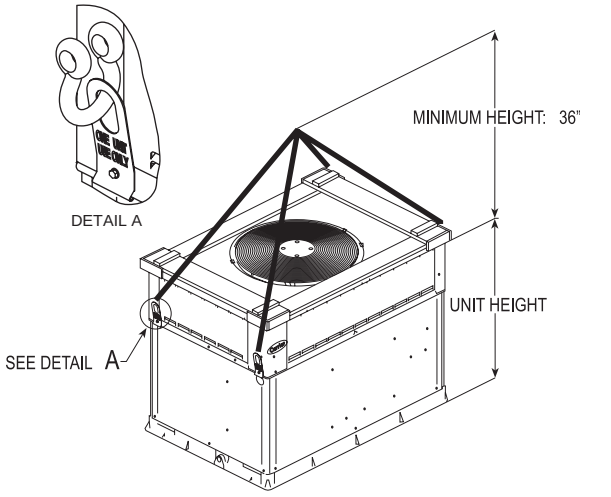

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CORNER WEIGHTS (SMALL CABINET)										CORNER WEIGHTS (LARGE CABINET)						
Unit	018	018	024	024	030	030	036	036		Unit	042	042	048	048	060	060
	lb	kg	lb	kg	lb	kg	lb	kg			lb	kg	lb	kg	lb	kg
Total Weight	250	113.4	264	119.7	281	127.4	299	135.6		Total Weight	367	166.4	382	173.2	412	186.8
Corner Weight 1	30	13.4	53	23.9	50	22.6	62	28.2		Corner Weight 1	62	28.0	40	18.1	22	9.9
Corner Weight 2	79	35.8	75	33.9	85	38.5	82	37.3		Corner Weight 2	109	49.2	141	63.8	174	78.7
Corner Weight 3	58	26.1	72	32.8	70	31.6	78	35.2		Corner Weight 3	113	51.0	84	38.1	75	33.8
Corner Weight 4	84	38.0	64	29.1	77	34.7	77	34.9		Corner Weight 4	84	38.1	117	53.3	142	64.4
Rigging Weight	269	122.0	283	128.3	300	136.1	318	144.2		Rigging Weight	386	175.1	401	181.9	431	195.5
Shipping Weight	304	137.9	318	144.2	335	151.9	353	160.1		Shipping Weight	421	190.9	436	197.7	466	211.3

Fig. 5 – 704D Unit Corner Weights (in Pounds) and Suggested Rigging

⚠ WARNING

UNIT FALLING HAZARD

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

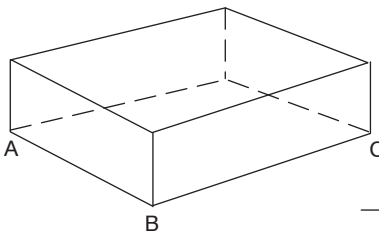
Never stand beneath rigged units or lift over people.

⚠ WARNING

PROPERTY DAMAGE HAZARD

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

Rigging brackets for one unit use only. When removing a unit at the end of its useful life, use a new set of brackets.



MAXIMUM ALLOWABLE DIFFERENCE (in.)		
A-B	B-C	A-C
1/4	1/4	1/4

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Fig. 6 – Unit Leveling Tolerances

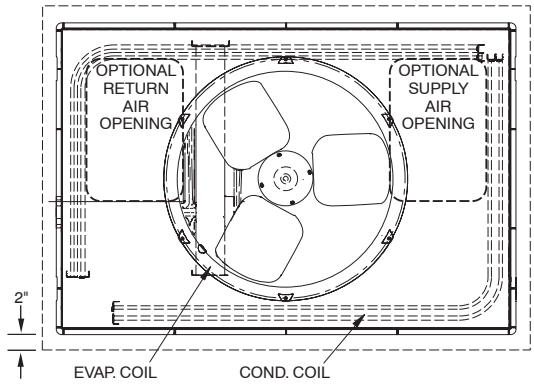

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Fig. 7 – Slab Mounting Detail

USE OF RIGGING BRACKET

Field Installation of Rigging Bracket (if not already installed)

1. Remove unit from shipping carton. Leave top shipping skid on the unit for use as a spreader bar to prevent the rigging straps from damaging the unit. If the skid is not available, use a spreader bar of sufficient length to protect the unit from damage.
2. Remove 4 screws in unit corner posts.
3. Attach each of the 4 metal rigging brackets under the panel rain lip (See Fig. 6). Use the screws removed in step 2 above to secure the brackets to the unit.

⚠ WARNING

PROPERTY DAMAGE HAZARD

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

Rigging bracket MUST be under the rain lip to provide adequate lifting.

⚠ WARNING

PROPERTY DAMAGE HAZARD

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

Do not strip screws when re-securing the unit. If a screw is stripped, replace the stripped one with a larger diameter screw (included). When straps are taut, the clevis should be a minimum of 36 in. (914.4 mm) above the unit top cover.

Rigging/Lifting of Unit

1. Bend top of brackets down approximately 30 degrees from the corner posts.
2. Attach straps of equal length to the rigging brackets at opposite ends of the unit. Be sure straps are rated to hold the weight of the unit (See Fig. 6).
3. Attach a clevis of sufficient strength in the middle of the straps. Adjust the clevis location to ensure unit is lifted level with the ground.
4. Remove corner post screws and rigging brackets, then re-install screws.

After the unit is placed on the roof curb or mounting pad, remove the top crating.

Step 6—Connect Condensate Drain

NOTE: When installing condensate drain connection be sure to comply with local codes and restrictions.

Model 704D disposes of condensate water through a 3/4 in. NPT fitting which exits through the base on the evaporator coil access side. See Fig. 2 & 3 for location.

Condensate water can be drained directly onto the roof in rooftop installations (where permitted) or onto a gravel apron in ground level installations. Install a field-supplied condensate trap at end of condensate connection to ensure proper drainage. Make sure that the outlet of the trap is at least 1 in. lower than the drain pan condensate connection to prevent the pan from overflowing (See Fig. 8). When using a gravel apron, make sure it slopes away from the unit.

Connect a drain tube using a minimum of 3/4 -in. PVC or 3/4 -in. copper pipe (all field-supplied) at the outlet end of the 2-in. trap. Do not undersize the tube. Pitch the drain tube downward at a slope of at least 1-in. for every 10 ft of horizontal run. Be sure to check the drain tube for leaks. Prime trap at the beginning of the cooling season start-up.

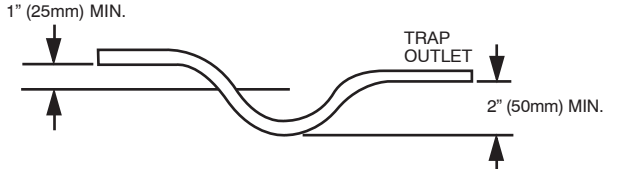

Fig. 8 - Condensate Trap

Step 7—Install Duct Connections

The design and installation of the duct system must be in accordance with the standards of the NFPA for installation of non-residence type air conditioning and ventilating systems, NFPA 90A or residence type, NFPA 90B and/or local codes and ordinances.

Select and size ductwork, supply-air registers, and return air grilles according to ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) recommendations. The unit has duct flanges on the supply- and return-air openings on the side of the unit.

When designing and installing ductwork, consider the following:

1. All units should have field-supplied filters or accessory filter rack installed in the return-air side of the unit. Recommended sizes for filters are shown in Table 1.
2. Avoid abrupt duct size increases and reductions. Abrupt change in duct size adversely affects air performance.

IMPORTANT: Use flexible connectors between ductwork and unit to prevent transmission of vibration. Use suitable gaskets to ensure weather-tight and airtight seal. When electric heat is installed, use fireproof canvas (or similar heat resistant material) connector between ductwork and unit discharge connection. If flexible duct is used, insert a sheet metal sleeve inside duct. Heat resistant duct connector (or sheet metal sleeve) must extend 24-in. from electric heater element.

3. Size ductwork for cooling air quantity (cfm). The minimum air quantity for proper electric heater operation is listed in Table 2. Heater limit switches may trip at air quantities below those recommended.
4. Seal, insulate, and weatherproof all external ductwork. Seal, insulate and cover with a vapor barrier all ductwork passing through conditioned spaces. Follow latest Sheet Metal and Air Conditioning Contractors National Association (SMACNA) and Air Conditioning Contractors Association (ACCA) minimum installation standards for residential heating and air conditioning systems.
5. Secure all ducts to building structure. Flash, weatherproof, and vibration-isolate duct openings in wall or roof according to good construction practices.

CONFIGURING UNITS FOR DOWNFLOW (VERTICAL) DISCHARGE

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Before performing service or maintenance operations on the system, turn off main power to unit and install lockout tag.

1. Open all electrical disconnects and install lockout tag before starting any service work.
2. Remove return duct cover located on duct panel by breaking four (4) connecting tabs with screwdriver and a hammer (See Fig. 9 & 10).
3. To remove supply duct cover, break front and right side connecting tabs with a screwdriver and a hammer. Push louver down to break rear and left side tabs (See Fig. 9 & 10).
4. If unit ductwork is to be attached to vertical opening flanges on the unit composite base (jackstand applications only), do so at this time. Collect ALL screws that were removed. Do not leave screws on rooftop as permanent damage to the roof may occur.

5. It is recommended that the unit base insulation around the perimeter of the vertical return-air opening be secured to the unit base with aluminum tape. Applicable local codes may require aluminum tape to prevent exposed fiberglass.
6. Cover both horizontal duct openings with the duct covers from the accessory duct cover kit. Ensure opening is air-and watertight.
7. After completing unit conversion, perform all safety checks and power up unit.

NOTE:The design and installation of the duct system must be in accordance with the standards of the NFPA for installation of nonresidence-type air conditioning and ventilating systems, NFPA 90A or residence-type, NFPA 90B; and/or local codes and ordinances.

Adhere to the following criteria when selecting, sizing, and installing the duct system:

1. Units are shipped for side shot installation.
2. Select and size ductwork, supply-air registers, and return-air grilles according to American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) recommendations.
3. Use flexible transition between rigid ductwork and unit to prevent transmission of vibration. The transition may be screwed or bolted to duct flanges. Use suitable gaskets to ensure weather-tight and airtight seal.
4. All units must have field-supplied filters or accessory filter rack installed in the return-air side of the unit. Recommended sizes for filters are shown in Table 1.
5. Size all ductwork for maximum required airflow (either heating or cooling) for unit being installed. Avoid abrupt duct size increases or decreases or performance may be affected.
6. Adequately insulate and weatherproof all ductwork located outdoors. Insulate ducts passing through unconditioned space, and use vapor barrier in accordance with latest issue of Sheet Metal and Air Conditioning Contractors National Association (SMACNA) and Air Conditioning Contractors of America (ACCA) minimum installation standards for heating and air conditioning systems. Secure all ducts to building structure.
7. Flash, weatherproof, and vibration-isolate all openings in building structure in accordance with local codes and good building practices.

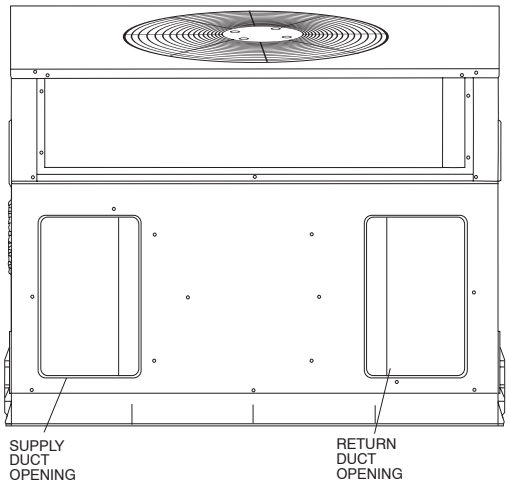

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Fig. 9 - Supply and Return Duct Opening

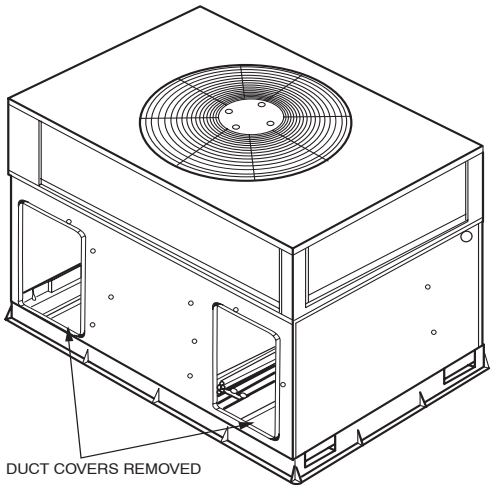

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Fig. 10 - Vertical Duct Cover Removed

Step 8—Install Electrical Connections

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

The unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of an electrical wire connected to the unit ground screw in the control compartment, or conduit approved for electrical ground when installed in accordance with NEC, ANSI/NFPA American National Standards Institute/National Fire Protection Association (latest edition) (in Canada, Canadian Electrical Code CSA C22.1) and local electrical codes.

⚠ CAUTION

UNIT COMPONENT DAMAGE HAZARD

Failure to follow this caution may result in damage to the unit being installed.

1. Make all electrical connections in accordance with NEC ANSI/NFPA (latest edition) and local electrical codes governing such wiring. In Canada, all electrical connections must be in accordance with CSA standard C22.1 Canadian Electrical Code Part 1 and applicable local codes. Refer to unit wiring diagram.
2. Use only copper conductor for connections between field-supplied electrical disconnect switch and unit. DO NOT USE ALUMINUM WIRE.
3. Be sure that high-voltage power to unit is within operating voltage range indicated on unit rating plate. On 3-phase units, ensure phases are balanced within 2 percent. Consult local power company for correction of improper voltage and/or phase imbalance.
4. Do not damage internal components when drilling through any panel to mount electrical hardware, conduit, etc.

HIGH-VOLTAGE CONNECTIONS

The unit must have a separate electrical service with a field-supplied, waterproof disconnect switch mounted at, or within sight from the unit. Refer to the unit rating plate, NEC and local

codes for maximum fuse/circuit breaker size and minimum circuit amps (ampacity) for wire sizing.

The field-supplied disconnect may be mounted on the unit over the high-voltage inlet hole when the standard power and low-voltage entry points are used. See Fig. 2 and 3 for acceptable location.

See unit wiring label and Fig. 11 for reference when making high voltage connections. Proceed as follows to complete the high-voltage connections to the unit.

Single phase units:

1. Run the high-voltage (L1, L2) and ground lead into the control box.
2. Connect ground lead to chassis ground connection.
3. Locate the black and yellow wires connected to the line side of the contactor.
4. Connect field L1 to black wire on connection 11 of the compressor contactor.
5. Connect field wire L2 to yellow wire on connection 23 of the compressor contactor.

Three-phase units:

1. Run the high-voltage (L1, L2, L3) and ground lead into the control box.
2. Connect ground lead to chassis ground connection.
3. Locate the black and yellow wires connected to the line side of the contactor.
4. Connect field L1 to black wire on connection 11 of the compressor contactor.
5. Connect field wire L2 to yellow wire on connection 13 of the compressor contactor.
6. Connect field wire L3 to blue wire from compressor.

SPECIAL PROCEDURES FOR 208-V OPERATION

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Before installing or servicing system, always turn off main power to system. with disconnect switch open, move black wire from transformer (3/16 in.) terminal marked 230 to terminal marked 208. This retaps transformer to primary voltage of 208 vac.

CONTROL VOLTAGE CONNECTIONS

NOTE:Do not use any type of power-stealing thermostat. Unit control problems may result.

Use no. 18 American Wire Gage (AWG) color-coded, insulated (35°C minimum) wires to make the control voltage connections between the thermostat and the unit. If the thermostat is located more than 100 ft from the unit (as measured along the control voltage wires), use no. 16 AWG color-coded, insulated (35°C minimum) wires.

STANDARD CONNECTION

Remove knockout hole located in the electric heat panel adjacent to the control access panel. See Fig. 2 & 3. Remove the rubber grommet from the installer's packet (included with unit) and install grommet in the knockout opening. Provide a drip loop before running wire through panel.

Run the low-voltage leads from the thermostat, through the inlet hole, and into unit low-voltage splice box.

Locate five 18-gage wires leaving control box. These low-voltage connection leads can be identified by the colors red, green, yellow, brown (See Fig. 11). Ensure the leads are long enough to be routed into the low-voltage splice box (located below right side of control box). Stripped yellow wire is located in connection box. Route leads through hole in bottom of control box and make low-voltage connections (See Fig. 11). Secure all cut wires, so that they do not interfere with operation of unit.

TRANSFORMER PROTECTION

The transformer is of the energy-limiting type. It is set to withstand a 30-second overload or shorted secondary condition. If an overload or short is present, correct overload condition and check for blower fuse on control board. Replace fuse as required with correct size and rating.

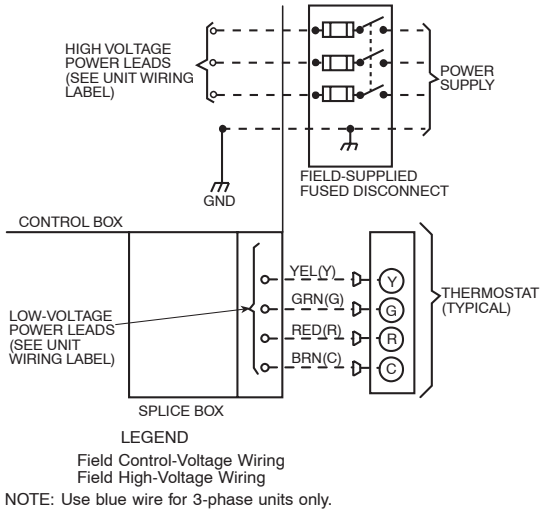

Fig. 11 - High- and Control-Voltage Connections

Table 1—Physical Data-Unit 704D

UNIT SIZE	018	024	030	036	042	048	060
NOMINAL CAPACITY (ton)	1-1/2	2	2-1/2	3	3-1/2	4	5
OPERATING WEIGHT (lb.)	250	264	281	299	367	382	412
OPERATING WEIGHT (kg)	113.4	119.7	127.4	135.6	166.4	173.2	186.8
COMPRESSOR	Scroll						
REFRIGERANT (R-410A) Quantity lb.	5.0	6.9	8.0	9.2	8.8	9.0	10.5
REFRIGERANT (R-410A) Quantity kg	2.3	3.1	3.6	4.2	4.0	4.1	4.8
REFRIGERANT METERING DEVICE	TXV						
OUTDOOR COIL							
Rows…Fins/in.	1…21	2…21	2…21	2…21	2…21	2…21	2…21
Face Area (sq. ft.)	10.2	10.2	11.9	13.6	13.6	19.4	19.4
OUTDOOR FAN							
Nominal Cfm	2200	2200	2800	3000	3500	3500	4200
Diameter (in.)	22	22	22	22	22	22	22
Diameter (mm)	558.8	558.8	558.8	558.8	558.8	558.8	558.8
Motor HP (RPM)	1/8 (825)	1/8 (825)	1/8 (825)	1/8 (825)	1/8 (825)	1/4 (1100)	1/4 (1100)
INDOOR COIL							
Rows…Fins/in.	3…17	3…17	3…17	4…17	3…17	3…17	4…17
Face Area (sq. ft.)	3.7	3.7	3.7	3.7	4.7	5.7	5.7
INDOOR BLOWER							
Nominal Airflow (Cfm)	650	800	1000	1200	1400	1600	1750
Size (in.)	10x10	10x10	10x10	10x10	11x10	11x10	11x10
Size (mm.)	254x254	254x254	254x254	254x254	279.4x254	279.4x254	279.4x254
Motor HP (RPM)	1/4 (825)	1/3 (1050)	1/3 (1050)	1/2 (1000)	1/2 (1075)	1/2 (1075)	1.0 (1040)
HIGH-PRESSURE SWITCH (psig) Cut-out Reset (Auto)	650 +/- 15 420 +/- 25						
LOSS-OF-CHARGE / LOW-PRESSURE SWITCH (Liquid Line) (psig) cut-out Reset (auto)	20 +/- 5 45 +/- 10						
RETURN-AIR FILTERS (IN.)*†	20x24x1			24x30x1	24x36x1		
Throwaway	508x610x25 (mm)			610x762x25 (mm)	610x910x25 (mm)		

*Required filter sizes shown are based on the larger of the ARI (Air Conditioning and Refrigeration Institute) rated cooling airflow or the heating airflow velocity of 300 ft/minute for throwaway type. For permanent filters, follow filter manufacturer's recommendations for filter size based on allowable face velocity. Air filter pressure drop for non–standard filters must not exceed 0.08 in. wc.

† If using accessory filter rack refer to the filter rack installation instructions for correct filter sizes and quantity.

Table 2—Minimum Airflow for Safe Electric Heater Operation (Cfm)

SIZE	018	024	030	036	042	048	060
Cfm	700	800	1000	1200	1400	1600	1750

PRE-START-UP

⚠ WARNING

FIRE, EXPLOSION, ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death and/or property damage.

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Relieve and recover all refrigerant from system before touching or disturbing anything inside terminal box if refrigerant leak is suspected around compressor terminals.
3. Never attempt to repair soldered connection while refrigerant system is under pressure.
4. Do not use torch to remove any component. System contains oil and refrigerant under pressure.
5. To remove a component, wear protective goggles and proceed as follows:
   a. Shut off electrical power to unit and install lockout tag.
   b. Relieve and reclaim all refrigerant from system using both high- and low-pressure ports.
   c. Cut component connecting tubing with tubing cutter and remove component from unit.
   d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove all access panels.
2. Read and follow instructions on all DANGER, WARNING, CAUTION, and INFORMATION labels attached to, or shipped with unit.
3. Make the following inspections:
   a. Inspect for shipping and handling damages, such as broken lines, loose parts, disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak test all refrigerant tubing connections using electronic leak detector, or liquid-soap solution. If a refrigerant leak is detected, see following **Check for Refrigerant Leaks** section.
   c. Inspect all field- and factory-wiring connections. Be sure that connections are completed and tight.
   d. Ensure wires do not touch refrigerant tubing or sharp sheet metal edges.
   e. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
   a. Make sure that outdoor fan blade is correctly positioned in fan orifice (See Fig. 12).
   b. Make sure that condensate drain pan and trap are filled with water to ensure proper drainage.
   c. Make sure that all tools and miscellaneous loose parts have been removed.

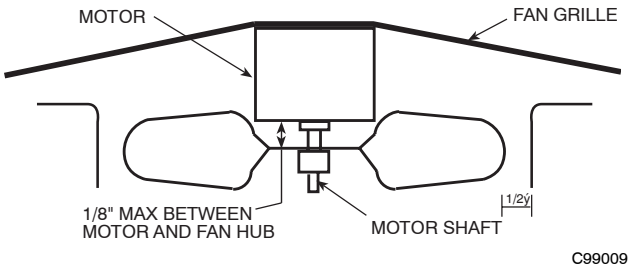

Fig. 12 - Fan Blade Clearance

START-UP

Step 1—Check for Refrigerant Leaks

Proceed as follows to locate and repair a refrigerant leak and to charge the unit:

1. Locate leak and make sure that refrigerant system pressure has been relieved and reclaimed from both high- and low-pressure ports.
2. Repair leak following accepted practices.

NOTE: Install a filter drier whenever the system has been opened for repair.

3. Add a small charge of Puron (R-410A) refrigerant vapor to system and leak-test unit.
4. Recover refrigerant from system and evacuate to 500 microns if no additional leaks are found.
5. Charge unit with Puron (R-410A) refrigerant, using a volumetric charging cylinder or accurate scale. Refer to unit rating plate for required charge.

Step 2—Start-Up Cooling Section and Make Adjustments

Complete the required procedures given in the Pre-Start-Up section before starting the unit. Do not jumper any safety devices when operating the unit. Do not operate the unit when the outdoor temperature is below 40°F (4°C) (unless accessory low-ambient kit is installed). Do not rapid cycle the compressor. Allow 5 minutes between "on" cycles to prevent compressor damage.

CHECKING COOLING CONTROL OPERATION

Start and check the unit for proper cooling control operation as follows:

1. Place room thermostat SYSTEM switch in OFF position. Observe that blower motor starts when FAN switch is placed in ON position and shuts down after 30 second fan time delay expires when FAN switch is placed in AUTO position.
2. Place SYSTEM switch in COOL position and FAN switch in AUTO position. Set cooling control below room temperature. Observe that compressor, condenser fan, and evaporator blower motors start. Observe that compressor and outdoor fan shut down when control setting is satisfied and that indoor blower shuts down after 30 second fan time delay expires.

IMPORTANT: Three-phase, scroll compressors are direction oriented. Unit must be checked to ensure proper compressor 3-phase power lead orientation. If not corrected within 5 minutes, the internal protector will shut off the compressor. The 3-phase power leads to the unit must be reversed to correct rotation. When turning backwards, the difference between compressor suction and discharge pressures will be minimal.

CHECKING AND ADJUSTING REFRIGERANT CHARGE

The refrigerant system is fully charged with Puron (R-410A) refrigerant and is tested and factory sealed.

NOTE: Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper Puron (R-410A)charge.

A superheat charging chart is attached to the outside of the service access panel. The chart includes the required liquid line temperature at given discharge line pressures and outdoor ambient temperatures.

An accurate subcooling, thermocouple- or thermistor-type thermometer, and a gauge manifold are required when using the subcooling charging method for evaluating the unit charge. Do not use mercury or small dial-type thermometers because they are not adequate for this type of measurement.

NOTE: Allow system to operate for a minimum of 15 minutes before checking or adjusting refrigerant charge.

IMPORTANT: When evaluating the refrigerant charge, an indicated adjustment to the specified factory charge must always be very minimal. If a substantial adjustment is indicated, an abnormal condition exists somewhere in the cooling system, such as insufficient airflow across either coil or both coils.

Proceed as follows:

1. Remove caps from low- and high-pressure service fittings.
2. Using hoses with valve core depressors, attach low- and high-pressure gauge hoses to low- and high-pressure service fittings, respectively.
3. Start unit and let run until system pressures stabilize.
4. Measure and record the following:
   a. Outdoor ambient-air temperature (°F (°C) db).
   b. Liquid line temperature (°F (°C)) at TXV.
   c. Suction (high-side) pressure (psig).
5. Using Cooling Charging Charts compare outdoor-air temperature (°F (°C) db) with the discharge line pressure (psig) to determine desired system operating liquid line temperature (See Fig. 16).
6. Compare actual liquid line temperature with desired liquid line temperature. Using a tolerance of ±2°F, add refrigerant if actual temperature is more than 3°F higher than proper liquid line temperature, or remove refrigerant if actual temperature is less than 2°F lower than required liquid line temperature.

NOTE: If the problem causing the inaccurate readings is a refrigerant leak, refer to Check for Refrigerant Leaks section.

INDOOR AIRFLOW AND AIRFLOW ADJUSTMENTS

NOTE: For cooling operation, the recommended airflow is 350 to 450 cfm for each 12,000 Btuh of rated cooling capacity.

Table 3 shows cooling airflows at various external static pressures. Refer to this table to determine the airflow for the system being installed.

NOTE: Be sure that all supply- and return-air grilles are open, free from obstructions, and adjusted properly.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Disconnect electrical power to the unit and install lockout tag before changing blower speed.

Table 3—Dry Coil Air Delivery* — Horizontal Discharge
(Deduct 10% for 208-Volt Operation)

Unit	Motor Speed		External Static Pressure (in. wc)								
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
704D018	Low[1]	Watts	260	243	229	217	209	-----	-----	-----	-----
		CFM	859	775	667	536	382	-----	-----	-----	-----
	High	Watts	340	328	317	307	300	294	-----	-----	-----
		CFM	1064	948	820	680	528	364	-----	-----	-----
704D024	Low[1]	Watts	311	309	304	301	286	290	286	280	-----
		CFM	935	885	820	757	686	583	423	263	-----
	Medium	Watts	411	405	398	390	379	357	357	345	327
		CFM	1195	1155	1100	1028	957	868	769	647	365
	High	Watts	528	518	509	492	477	467	447	435	421
		CFM	1484	1421	1368	1279	1185	1088	970	853	712
704D030	Low	Watts	311	309	304	301	286	290	286	280	-----
		CFM	935	885	820	757	686	583	423	263	-----
	Medium[1]	Watts	411	405	398	390	379	357	357	345	327
		CFM	1195	1155	1100	1028	957	868	769	647	365
	High	Watts	528	518	509	492	477	467	447	435	421
		CFM	1484	1421	1368	1279	1185	1088	970	853	712
704D036	Low[1]	Watts	439	429	415	401	395	380	356	339	329
		CFM	1242	1170	1089	994	917	837	702	570	442
	Medium	Watts	503	491	479	461	450	436	418	404	389
		CFM	1320	1244	1162	1081	1005	897	767	662	541
	High	Watts	641	627	623	609	601	588	571	559	548
		CFM	1362	1288	1205	1119	1033	933	826	714	580
704D042	Low[1]	Watts	559	540	522	503	483	464	445	425	406
		CFM	1405	1370	1330	1283	1230	1171	1106	1034	957
	Medium	Watts	665	647	629	609	589	567	545	521	497
		CFM	1593	1552	1505	1452	1394	1330	1260	1184	1102
	High	Watts	815	795	775	754	734	715	695	676	656
		CFM	1764	1710	1652	1591	1525	1456	1383	1306	1225
704D048	Low	Watts	627	617	607	584	567	548	528	503	480
		CFM	1550	1530	1493	1461	1414	1361	1320	1250	1177
	Medium[1]	Watts	771	755	734	711	690	665	639	607	572
		CFM	1798	1771	1734	1687	1645	1595	1530	1449	1355
	High	Watts	969	941	908	887	858	827	804	767	748
		CFM	2124	2071	2000	1944	1876	1811	1735	1647	1555
704D060	Low	Watts	627	617	607	584	567	548	528	503	480
		CFM	1550	1530	1493	1461	1414	1361	1320	1250	1177
	Medium[1]	Watts	771	755	734	711	690	665	639	607	572
		CFM	1798	1771	1734	1687	1645	1595	1530	1449	1355
	High	Watts	969	941	908	887	858	827	804	767	748
		CFM	2124	2071	2000	1944	1876	1811	1735	1647	1555

*Air delivery values are without air filter and are for dry coil (see Wet Coil Pressure Drop table).

[1]Factory-shipped cooling speed

"NA" = Not allowed for heating speed

Note: Deduct field-supplied air filter pressure drop and wet coil pressure drop to obtain external static pressure available for ducting.

Table 4—704D Wet Coil Pressure Drop (in. wc)

UNIT SIZE	STANDARD CFM (S.C.F.M.)															
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
018	0.011	0.013	0.018	0.022	-	-	-	-	-	-	-	-	-	-	-	-
024	-	0.030	0.037	0.044	0.053	0.063	-	-	-	-	-	-	-	-	-	-
030	-	-	0.037	0.044	0.053	0.063	0.072	0.081	0.105	-	-	-	-	-	-	-
036	-	-	-	-	0.05	0.061	0.072	0.08	0.09	0.11	-	-	-	-	-	-
042	-	-	-	-	-	0.044	0.051	0.059	0.065	0.072	0.080	0.088	0.095	0.105	-	-
048	-	-	-	-	-	-	-	0.044	0.050	0.053	0.059	0.066	0.072	0.077	0.086	-
060	-	-	-	-	-	-	-	-	-	-	0.079	0.087	0.095	0.102	0.113	0.123

Table 5—Filter Pressure Drop Table (in. wc)

FILTER SIZE	CFM																		
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
20X20X1	0.05	0.07	0.08	0.1	0.12	0.13	0.14	0.15	—	—	—	—	—	—	—	—	—	—	—
24X30X1	—	—	—	0.04	0.05	0.06	0.07	0.07	0.08	0.09	0.1	—	—	—	—	—	—	—	—
24X36X1	—	—	—	—	—	—	—	0.06	0.07	0.07	0.08	0.09	0.09	0.10	0.11	0.12	0.13	0.14	0.14

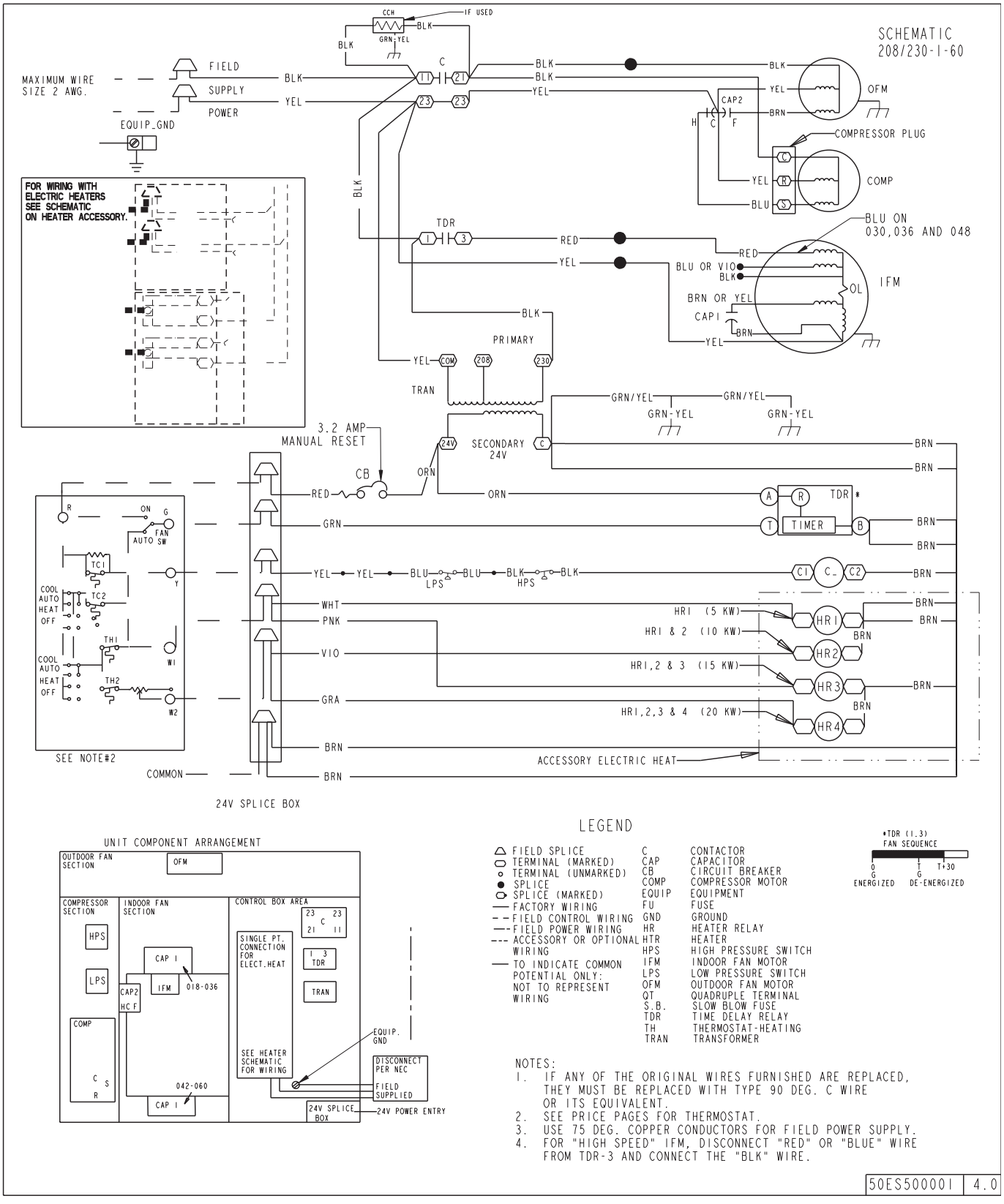

Fig. 13 - Wiring Diagram 208/230-1-60

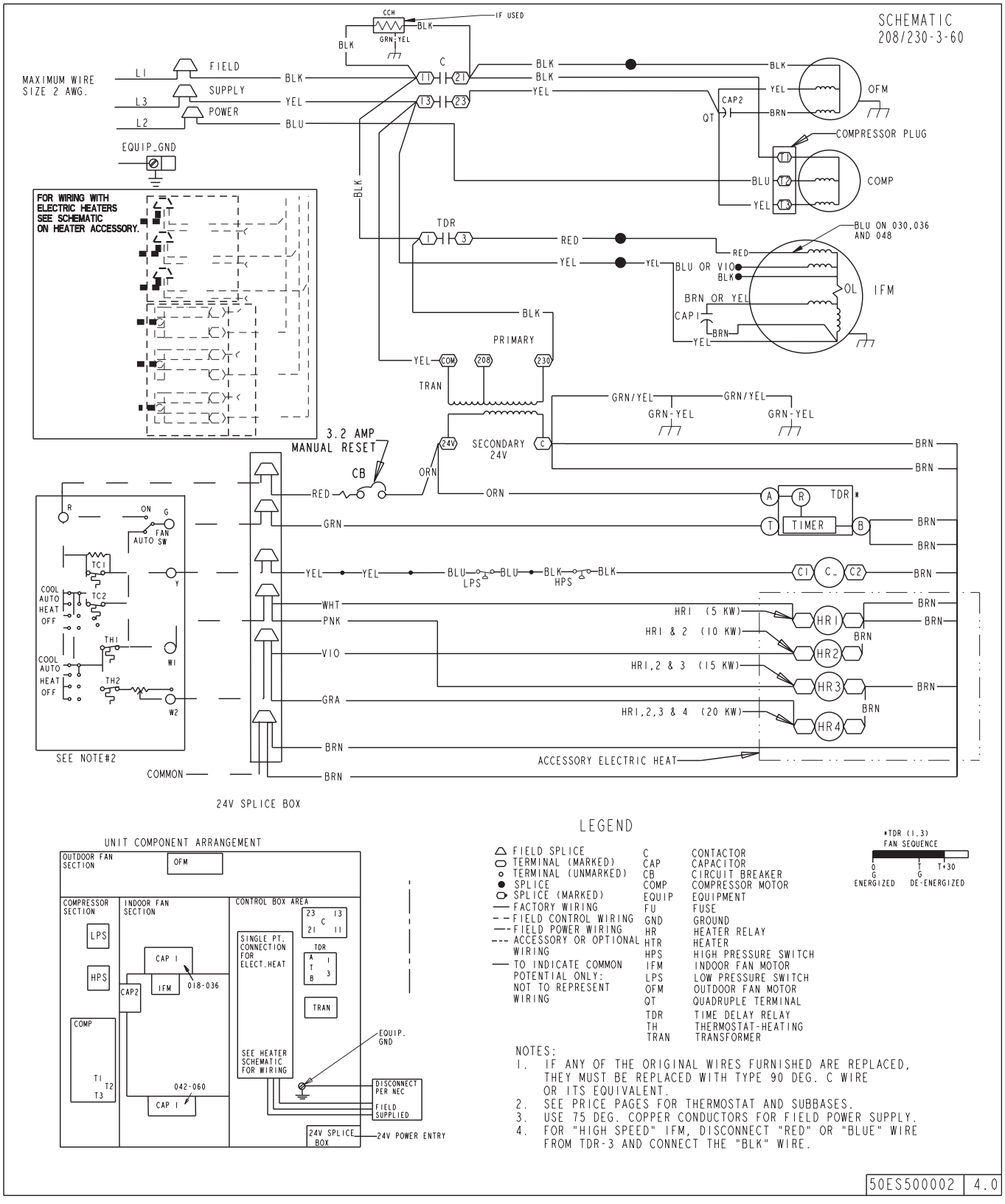

Fig. 14 - Wiring Diagram 208/230-3-60

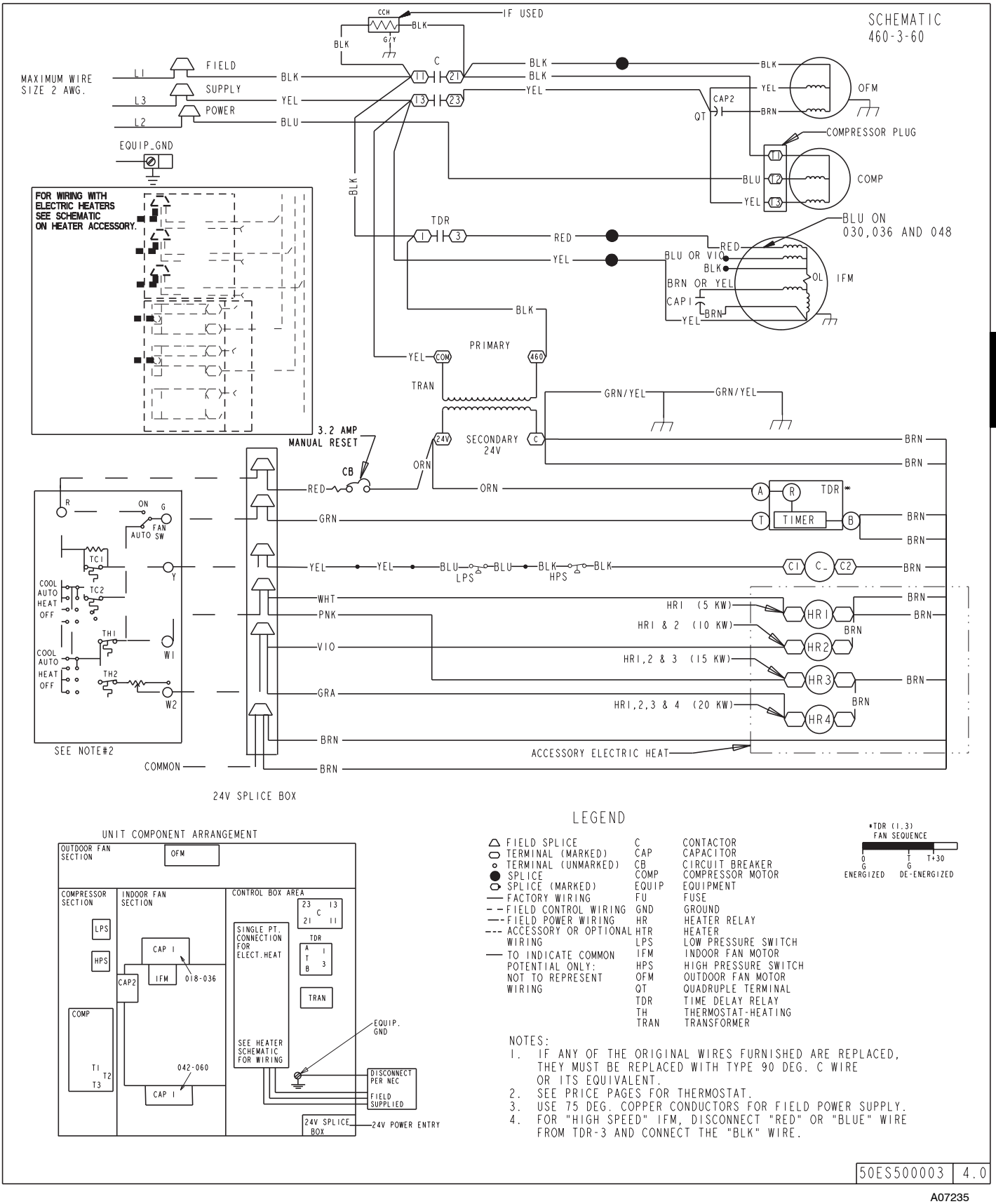

Fig. 15 - Wiring Diagram 460-3-60

Required Subcooling oF (oC)						Required Liquid Line Temperature for a Specific Subcooling (R-410A)																
Model Size	Outdoor Ambient Temperature					Pressure (psig)		Required Subcooling (°F)					Pressure (kPa)		Required Subcooling (°C)				
	75 (24)	85 (29)	95 (35)	105 (41)	115 (46)			5	10	15	20	25			3	6	8	11	14
018	13 (7.2)	14 (7.8)	15 (5.0)	16 (8.9)	16 (8.9)	189	66	61	56	51	46	41	1303	19	16	13	11	8	5
024	10 (5.6)	11 (6.1)	11 (6.1)	12 (6.7)	13 (7.2)	196	68	63	58	53	48	43	1351	20	17	15	12	9	6
030	12 (6.7)	13 (7.2)	14 (7.8)	15 (5.0)	15 (5.0)	203	71	66	61	56	51	46	1399	21	19	16	13	10	8
036	14 (7.8)	14 (7.8)	14 (7.8)	14 (7.8)	14 (7.8)	210	73	68	63	58	53	48	1448	23	20	17	14	11	9
042	11 (6.1)	11 (6.1)	11 (6.1)	10 (5.6)	9 (5.0)	217	75	70	65	60	55	50	1496	24	21	18	15	13	10
048	8 (4.4)	7 (3.9)	7 (3.9)	7 (3.9)	6 (3.3)	224	77	72	67	62	57	52	1544	25	22	19	16	14	11
060	14 (7.8)	13 (7.2)	12 (6.7)	11 (6.1)	10 (5.6)	231	79	74	69	64	59	54	1593	26	23	20	18	15	12
						238	81	76	71	66	61	56	1641	27	24	21	19	16	13
						245	82	77	72	67	62	57	1689	28	25	22	20	17	14
						252	84	79	74	69	64	59	1737	29	26	23	21	18	15
						260	86	81	76	71	66	61	1792	30	27	25	22	19	16
						268	88	83	78	73	68	63	1848	31	29	26	23	20	17
						276	90	85	80	75	70	65	1903	32	30	27	24	21	19
						284	92	87	82	77	72	67	1958	33	31	28	25	22	20
						292	94	89	84	79	74	69	2013	35	32	29	26	23	21
						300	96	91	86	81	76	71	2068	36	33	30	27	24	22
						309	98	93	88	83	78	73	2130	37	34	31	28	26	23
						318	100	95	90	85	80	75	2192	38	35	32	29	27	24
						327	102	97	92	87	82	77	2254	39	36	33	31	28	25
						336	104	99	94	89	84	79	2316	40	37	34	32	29	26
						345	106	101	96	91	86	81	2378	41	38	35	33	30	27
						354	108	103	98	93	88	83	2440	42	39	36	34	31	28
						364	110	105	100	95	90	85	2509	43	40	38	35	32	29
						374	112	107	102	97	92	87	2578	44	41	39	36	33	30
						384	113	108	103	98	93	88	2647	45	42	40	37	34	31
						394	115	110	105	100	95	90	2716	46	44	41	38	35	32
						404	117	112	107	102	97	92	2785	47	45	42	39	36	33
						414	119	114	109	104	99	94	2854	48	46	43	40	37	34
						424	121	116	111	106	101	96	2923	49	47	44	41	38	35
						434	123	118	113	108	103	98	2992	50	48	45	42	39	36
						444	124	119	114	109	104	99	3061	51	48	46	43	40	37
						454	126	121	116	111	106	101	3130	52	49	47	44	41	38
						464	128	123	118	113	108	103	3199	53	50	48	45	42	39
						474	129	124	119	114	109	104	3268	54	51	48	46	43	40
						484	131	126	121	116	111	106	3337	55	52	49	47	44	41
						494	132	127	122	117	112	107	3406	56	53	50	47	45	42
						504	134	129	124	119	114	109	3475	57	54	51	48	46	43
						514	136	131	126	121	116	111	3544	58	55	52	49	46	44
						524	137	132	127	122	117	112	3612	58	56	53	50	47	45
						534	139	134	129	124	119	114	3681	59	56	54	51	48	45

Charging Procedure

1- Measure Discharge line pressure by attaching a gauge to the service port.

2- Measure the Liquid line temperature by attaching a temperature sensing device to it.

3- Insulate the temperature sensing device so that the Outdoor Ambient doesn't affect the reading.

4- Refer to the required Subcooling in the table based on the model size and the Outdoor Ambient temperature.

5- Interpolate if the Outdoor ambient temperature lies in between the table values.

6- Find the Pressure Value in the table corresponding to the the measured Pressure of the Compressor Discharge line.

7- Read across from the Pressure reading to obtain the Liquid line temperature for a required Subcooling

8- Add Charge if the measured temperature is higher than the table value.

9 - Remove charge if the measured temperature is lower than the table value.

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Fig. 16 - Cooling Charging Chart

Airflow can be changed by changing the lead connections of the blower motor.

All 704D units are factory wired for low speed, except the 030 through 048 sizes, which are wired for medium speed.

FOR 208/230v

For color coding on the 208/230v motor leads, see Table 6.

Table 6—Color Coding for 208/230v Motor Leads

Black = High Speed
Blue = Medium Speed
Red = Low Speed

To change the speed of the indoor fan motor (IFM), remove the fan motor speed leg lead from the time delay relay (TDR). This wire is attached to terminal-3 of TDR for 3-phase units. To change the speed, remove and replace with lead for desired blower motor speed. Insulate the removed lead to avoid contact with chassis parts.

COOLING SEQUENCE OF OPERATION

With the room thermostat SYSTEM switch in the COOL position and the FAN switch in the AUTO position, the cooling sequence of operation is as follows:

When the room temperature rises to a point that is slightly above the cooling control setting of the thermostat, the thermostat completes the circuit between thermostat terminal R to terminals Y and G. These completed circuits through the thermostat connect contactor coil (C) (through unit wire Y) and time delay relay (TDR) (through unit wire G) across the 24-v secondary of transformer (TRAN).

The normally open contacts of energized contactor (C) close and complete the circuit through compressor motor (COMP) to condenser (outdoor) fan motor (OFM). Both motors start instantly.

The set of normally open contacts of energized relay TDR close and complete the circuit through evaporator blower (indoor) fan motor (IFM).

NOTE: Once the compressor has started and then has stopped, it should not be started again until 5 minutes have elapsed.

The cooling cycle remains on until the room temperature drops to a point that is slightly below the cooling control setting of the room thermostat. At this point, the thermostat breaks the circuit between thermostat terminal R to terminals Y and G. These open circuits deenergize contactor coil C and relay coil TDR. The condenser and compressor motors stop. After a 30-second delay, the blower motor stops. The unit is in a standby condition, waiting for the next call for cooling from the room thermostat.

MAINTENANCE

To ensure continuing high performance, and to minimize the possibility of premature equipment failure, periodic maintenance must be performed on this equipment. This cooling unit should be inspected at least once each year by a qualified service person. To troubleshoot unit, refer to Table 7, Troubleshooting Chart.

NOTE TO EQUIPMENT OWNER: Consult your local dealer about the availability of a maintenance contract.

⚠ WARNING

PERSONAL INJURY AND UNIT DAMAGE HAZARD

Failure to follow this warning could result in personal injury or death and possible unit component damage.

The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment, other than those procedures recommended in the Owner's Manual.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow these warnings could result in personal injury or death:

1. Turn off electrical power to the unit before performing any maintenance or service on this unit.
2. Use extreme caution when removing panels and parts.
3. Never place anything combustible either on or in contact with the unit.

⚠ CAUTION

UNIT OPERATION HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Errors made when reconnecting wires may cause improper and dangerous operation. Label all wires prior to disconnecting when servicing.

The minimum maintenance requirements for this equipment are as follows:

1. Inspect air filter(s) each month. Clean or replace when necessary.
2. Inspect indoor coil, drain pan, and condensate drain each cooling season for cleanliness. Clean when necessary.
3. Inspect blower motor and wheel for cleanliness each cooling season. Clean when necessary.
4. Check electrical connections for tightness and controls for proper operation each cooling season. Service when necessary.
5. Ensure electric wires are not in contact with refrigerant tubing or sharp metal edges.

AIR FILTER

IMPORTANT: Never operate the unit without a suitable air filter in the return-air duct system. Always replace the filter with the same dimensional size and type as originally installed. See Table 1 for recommended filter sizes.

Inspect air filter(s) at least once each month and replace (throwaway-type) or clean (cleanable-type) at least twice during each cooling season and twice during the heating season, or whenever the filter becomes clogged with dust and lint.

INDOOR BLOWER AND MOTOR

NOTE: All motors are pre-lubricated. Do not attempt to lubricate these motors.

For longer life, operating economy, and continuing efficiency, clean accumulated dirt and grease from the blower wheel and motor annually.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Disconnect and tag electrical power to the unit before cleaning and lubricating the blower motor and wheel.

To clean the blower motor and wheel:

1. Remove and disassemble blower assembly as follows:
   a. Remove unit access panel.
   b. Disconnect motor lead from time delay relay (TDR). Disconnect yellow lead from terminal L2 of the contactor.
   c. On all units remove blower assembly from unit. Remove screws securing blower to blower partition and slide assembly out. Be careful not to tear insulation in blower compartment.
   d. Ensure proper reassembly by marking blower wheel and motor in relation to blower housing before disassembly.
   e. Loosen setscrew(s) that secures wheel to motor shaft, remove screws that secure motor mount brackets to housing, and slide motor and motor mount out of housing.
2. Remove and clean blower wheel as follows:
   a. Ensure proper reassembly by marking wheel orientation.
   b. Lift wheel from housing. When handling and/or cleaning blower wheel, be sure not to disturb balance weights (clips) on blower wheel vanes.
   c. Remove caked-on dirt from wheel and housing with a brush. Remove lint and/or dirt accumulations from wheel and housing with vacuum cleaner, using soft brush attachment. Remove grease and oil with mild solvent.
   d. Reassemble wheel into housing.
   e. Reassemble motor into housing. Be sure setscrews are tightened on motor shaft flats and not on round part of shaft.
   f. Reinstall unit access panel.
3. Restore electrical power to unit. Start unit and check for proper blower rotation and motor speeds during cooling cycles.

OUTDOOR COIL, INDOOR COIL, AND CONDENSATE DRAIN PAN

Inspect the condenser coil, evaporator coil, and condensate drain pan at least once each year.

The coils are easily cleaned when dry; therefore, inspect and clean the coils either before or after each cooling season. Remove all obstructions, including weeds and shrubs, that interfere with the airflow through the condenser coil.

Straighten bent fins with a fin comb. If coated with dirt or lint, clean the coils with a vacuum cleaner, using the soft brush attachment. Be careful not to bend the fins. If coated with oil or grease, clean the coils with a mild detergent and water solution. Rinse coils with clear water, using a garden hose. Be careful not to splash water on motors, insulation, wiring, or air filter(s). For best results, spray condenser coil fins from inside to outside the unit. On units with an outer and inner condenser coil, be sure to clean between the coils. Be sure to flush all dirt and debris from the unit base.

Inspect the drain pan and condensate drain line when inspecting the coils. Clean the drain pan and condensate drain by removing all foreign matter from the pan. Flush the pan and drain trough with clear water. Do not splash water on the insulation, motor, wiring, or air filter(s). If the drain trough is restricted, clear it with a "plumbers snake" or similar probe device.

OUTDOOR FAN

⚠ CAUTION

UNIT OPERATION HAZARD

Failure to follow this caution may result in damage to unit components.

Keep the condenser fan free from all obstructions to ensure proper cooling operation. Never place articles on top of the unit.

1. Remove 6 screws holding condenser grille and motor to top cover.
2. Turn motor/grille assembly upside down on top cover to expose the fan blade.
3. Inspect the fan blades for cracks or bends.
4. If fan needs to be removed, loosen the setscrew and slide the fan off the motor shaft.
5. When replacing fan blade, position blade so that the hub is 1/8 in. away from the motor end (1/8 in. of motor shaft will be visible).
6. Ensure that setscrew engages the flat area on the motor shaft when tightening
7. Replace grille.

ELECTRICAL CONTROLS AND WIRING

Inspect and check the electrical controls and wiring annually. Be sure to turn off the electrical power to the unit.

Remove access panel to locate all the electrical controls and wiring. Check all electrical connections for tightness. Tighten all screw connections. If any smoky or burned connections are noticed, disassemble the connection, clean all the parts, restrip the wire end and reassemble the connection properly and securely.

After inspecting the electrical controls and wiring, replace the access panel. Start the unit, and observe at least one complete heating cycle and one complete cooling cycle to ensure proper operation. If discrepancies are observed in either or both operating cycles, or if a suspected malfunction has occurred, check each electrical component with the proper electrical instrumentation. Refer to the unit wiring label when making these checkouts.

NOTE: Refer to the heating and/or cooling sequence of operation in this publication as an aid in determining proper control operation

REFRIGERANT CIRCUIT

Inspect all refrigerant tubing connections and the unit base for oil accumulations annually. Detecting oil generally indicates a refrigerant leak.

⚠ WARNING

UNIT OPERATION AND SAFETY HAZARD

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

This system uses Puron (R-410A) refrigerant which has higher operating pressures than R-22 and other refrigerants. No other refrigerant may be used in this system. Gauge set, hoses, and recovery system must be designed to handle Puron. If you are unsure, consult the equipment manufacturer.

If oil is detected or if low cooling performance is suspected, leak-test all refrigerant tubing using an electronic leak-detector, halide torch, or liquid-soap solution. If a refrigerant leak is detected, refer to Check for Refrigerant Leaks section.

If no refrigerant leaks are found and low cooling performance is suspected, refer to Checking and Adjusting Refrigerant Charge section.

EVAPORATOR AIRFLOW

The heating and/or cooling air-flow does not require checking unless improper performance is suspected. If a problem exists, be sure that all supply- and return-air grilles are open and free from obstructions, and that the air filter is clean. When necessary, refer to Indoor Airflow and Airflow Adjustments section to check the system airflow.

PURON ITEMS

The indoor metering device is a TXV type device.

PRESSURE SWITCHES

Pressure switches are protective devices wired into the control circuit (low voltage). They shut off compressor if abnormally high or low pressures are present in the refrigeration circuit. These pressure switches are specifically designed to operate with Puron (R-410A) systems. R-22 pressure switches must not be used as replacements for the Puron (R-410A) air conditioner.

LOSS OF CHARGE/LOW-PRESSURE SWITCH (AIR CONDITIONER ONLY)

This switch is located on the liquid line and protects against low suction pressures caused by such events as loss of charge, low airflow across indoor coil, dirty filters, etc. It opens on a pressure drop at about 20 psig (958 Pa). If system pressure is above this, switch should be closed.

To check switch:

1. Turn off all power to unit.
2. Disconnect leads on switch.
3. Apply ohmmeter leads across switch. You should have continuity on a good switch.

NOTE: Because these switches are attached to refrigeration system under pressure, it is not advisable to remove this device for troubleshooting unless you are reasonably certain that a problem exists. If switch must be removed, remove and recover all system charge so that pressure gauges read 0 psi (0 Pa). Never open system without breaking vacuum with dry nitrogen.

HIGH-PRESSURE SWITCH

The high-pressure switch is located in the discharge line and protects against excessive condenser coil pressure. It opens at 650 psig (31.1 kPa). High pressure may be caused by a dirty condenser coil, failed fan motor, or condenser air recirculation.

To check switch:

1. Turn off all power to unit.

2. Disconnect leads on switch.
3. Apply ohmmeter leads across switch. You should have continuity on a good switch.

COPELAND SCROLL COMPRESSOR (PURON REFRIGERANT)

The compressor used in this product is specifically designed to operate with Puron (R-410A) refrigerant and cannot be interchanged.

The compressor is an electrical (as well as mechanical) device. Exercise extreme caution when working near compressors. Power should be shut off, if possible, for most troubleshooting techniques. Refrigerants present additional safety hazards.

⚠ WARNING

EXPLOSION HAZARD

Failure to follow this warning could result in personal injury or death and/or property damage.

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

The scroll compressor pumps refrigerant throughout the system by the interaction of a stationary and an orbiting scroll. The scroll compressor has no dynamic suction or discharge valves, and it is more tolerant of stresses caused by debris, liquid slugging, and flooded starts. The compressor is equipped with an anti-rotational device and an internal pressure relief port. The anti-rotational device prevents the scroll from turning backwards and replaces the need for a cycle protector. The pressure relief port is a safety device, designed to protect against extreme high pressure. The relief port has an operating range between 550 (26.3 kPa) and 625 psi (29.9 kPa) differential pressure.

The Copeland scroll compressor uses Mobil 3MAF POE oil. Copeland Ultra 22 CC should be used if additional oil is needed in the field. Mobil Arctic EAL22CC or ICI Emkarate RL22 or 32CF oil may be used to recharge these compressors if Ultra 22 is not available.

REFRIGERANT

⚠ WARNING

UNIT OPERATION AND SAFETY HAZARD

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

This system uses Puron (R-410A) refrigerant which has higher operating pressures than R-22 and other refrigerants. No other refrigerant may be used in this system. Gauge set, hoses, and recovery system must be designed to handle Puron. If you are unsure, consult the equipment manufacturer.

This system uses Puron (R-410A) refrigerant which has higher operating pressures than R-22 and other refrigerants. No other refrigerant may be used in this system. Gage set, hoses, and recovery system must be designed to handle Puron. If you are unsure, consult the equipment manufacturer. Failure to use Puron compatible servicing equipment or replacement components may result in property damage or injury.

COMPRESSOR OIL

The compressor in this system uses a polyolester (POE) oil, Mobil 3MAF POE. This oil is extremely hygroscopic, meaning it absorbs water readily. POE oils can absorb 15 times as much water as other oils designed for HCFC and CFC refrigerants. Take all necessary precautions to avoid exposure of the oil to the atmosphere.

SERVICING SYSTEMS ON ROOFS WITH SYNTHETIC MATERIALS

POE (polyolester) compressor lubricants are known to cause long term damage to some synthetic roofing materials. Exposure, even if immediately cleaned up, may cause embrittlement (leading to cracking) to occur in one year or more. When performing any service that may risk exposure of compressor oil to the roof, take appropriate precautions to protect roofing. Procedures which risk oil leakage include, but are not limited to, compressor replacement, repairing refrigerant leaks, replacing refrigerant components such as filter drier, pressure switch, metering device, coil, accumulator, or reversing valve.

Synthetic Roof Precautionary Procedure

1. Cover extended roof working area with an impermeable polyethylene (plastic) drip cloth or tarp. Cover an approximate 10 x 10 ft (3 x 3 m) area.
2. Cover area in front of the unit service panel with a terry cloth shop towel to absorb lubricant spills, prevent run-offs, and protect drop cloth from tears caused by tools or components.
3. Place terry cloth shop towel inside unit immediately under component(s) to be serviced and prevent lubricant run-offs through the louvered openings in the unit base.
4. Perform required service.
5. Remove and dispose of any oil contaminated material per local codes.

LIQUID LINE FILTER DRIER

The filter drier is specifically designed to operate with Puron. Use only factory-authorized components. Filter drier must be replaced whenever the refrigerant system is opened. When removing a filter drier, use a tubing cutter to cut the drier from the system. Do not unsweat a filter drier from the system. Heat from unsweating will release moisture and contaminants from drier into system.

PURON (R-410A) REFRIGERANT CHARGING

Refer to unit information plate and charging chart. Some R-410A refrigerant cylinders contain a dip tube to allow liquid refrigerant to flow from cylinder in upright position. For cylinders equipped with a dip tube, charge Puron units with cylinder in upright position and a commercial metering device in manifold hose. Charge refrigerant into suction-line.

TROUBLESHOOTING

Refer to the Troubleshooting Chart (Table 7) for troubleshooting information.

START-UP CHECKLIST

Use the Start-Up Checklist at the back of this manual.

AIR CONDITIONER WITH PURON (R-410A) QUICK REFERENCE GUIDE

Puron refrigerant operates at 50-70 percent higher pressures than R-22. Be sure that servicing equipment and replacement components are designed to operate with Puron. Puron refrigerant cylinders are rose colored.

- Puron refrigerant cylinders manufactured prior to March 1, 1999, have a dip tube that allows liquid to flow out of cylinder in upright position.
  Cylinders manufactured March 1, 1999 and later DO NOT have a dip tube and MUST be positioned upside down to allow liquid to flow.
- Recovery cylinder service pressure rating must be 400 psig. DOT 4BA400 or DOT BW400.
- Puron systems should be charged with liquid refrigerant. Use a commercial type metering device in the manifold hose.
- Manifold sets should be 750 psig high-side and 200 psig low-side with 520 psig low-side retard.
- Use hoses with 750 psig service pressure rating.
- Leak detectors should be designed to detect HFC refrigerant.
- Puron, as with other HFCs, is only compatible with POE oils.
- Vacuum pumps will not remove moisture from oil.
- Only use factory specified liquid-line filter driers with rated working pressures no less than 600 psig.
- Do not install a suction-line filter drier in liquid line.
- POE oils absorb moisture rapidly. Do not expose oil to atmosphere.
- POE oils may cause damage to certain plastics and roofing materials.
- Wrap all filter driers and service valves with wet cloth when brazing.
- A Puron liquid-line filter drier is required on every unit.
- Do not use an R-22 TXV.
- Never open system to atmosphere while it is under a vacuum.
- When system must be opened for service, break vacuum with dry nitrogen and replace filter driers.
- Always replace filter drier after opening system for service.
- Do not vent Puron into the atmosphere.
- Observe all warnings, cautions, and bold text.
- Do not leave Puron suction line driers in place for more than 72 hrs.

Table 7—Troubleshooting Chart

SYMPTOM	CAUSE	REMEDY
Compressor and outdoor fan will not start	Power failure	Call power company
	Fuse blown or circuit breaker tripped	Replace fuse or reset circuit breaker
	Defective contactor, transformer, control relay, or high-pressure, loss-of-charge or low-pressure switch	Replace component
	Insufficient line voltage	Determine cause and correct
	Incorrect or faulty wiring	Check wiring diagram and rewire correctly
	User Interface setting too low/too high	Reset UI setting
Compressor will not start but condenser fan runs	Faulty wiring or circuit Loose connections in compressor	Check wiring and repair or replace
	Compressor motor burned out, seized, or internal overload open	Determine cause Replace compressor
	Defective run capacitor, overload, or PTC (positive temperature coefficient) thermistor	Determine cause and replace
	One leg of 3-phase power dead	Replace fuse or reset circuit breaker Determine cause
	Low input voltage (20 percent low)	Determine cause and correct
Three-phase scroll compressor (size 030-060 unit) has a low pressure differential	Scroll compressor is rotating in the wrong direction	Correct the direction of rotation by reversing the 3-phase power leads to the unit
Compressor cycles (other than normally satisfying) cooling/heating calls	Refrigerant overcharge or undercharge	Recover refrigerant, evacuate system, and recharge to capacities shown on rating plate
	Defective compressor	Replace and determine cause
	Insufficient line voltage	Determine cause and correct
	Blocked outdoor coil	Determine cause and correct
	Defective run/start capacitor, overload or start relay	Determine cause and replace
	Faulty outdoor fan motor or capacitor	Replace
	Restriction in refrigerant system	Locate restriction and remove
Compressor operates continuously	Dirty air filter	Replace filter
	Unit undersized for load	Decrease load or increase unit size
	UI temperature set too low	Reset UI setting
	Low refrigerant charge	Locate leak, repair, and recharge
	Air in system	Recover refrigerant, evacuate system, and recharge
	Outdoor coil dirty or restricted	Clean coil or remove restriction
Excessive head pressure	Dirty air filter	Replace filter
	Dirty indoor or outdoor coil	Clean coil
	Refrigerant overcharged	Recover excess refrigerant
	Air in system	Recover refrigerant, evacuate system, and recharge
	Indoor or outdoor air restricted or air short-cycling	Determine cause and correct
Head pressure too low	Low refrigerant charge	Check for leaks, repair and recharge
	Restriction in liquid tube	Remove restriction
Excessive suction pressure	High heat load	Check for source and eliminate
	Reversing valve hung up or leaking internally	Replace valve
	Refrigerant overcharged	Recover excess refrigerant
Suction pressure too low	Dirty air filter	Replace filter
	Low refrigerant charge	Check for leaks, repair and recharge
	Metering device or low side restricted	Remove source of restriction
	Insufficient coil airflow	Check filter–replace if necessary
	Temperature too low in conditioned area	Reset UI setting
	Outdoor ambient below 55°F	Install low-ambient kit
	Filter drier restricted	Replace

START-UP CHECKLIST
(Remove and Store in Job File)

I. Preliminary Information

MODEL NO.:_____

SERIAL NO.:_____

DATE:_____

TECHNICIAN:_____

II. PRE-START-UP (Insert checkmark in box as each item is completed)

( ) VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT

( ) REMOVE ALL SHIPPING HOLD DOWN BOLTS AND BRACKETS PER INSTALLATION INSTRUCTIONS

( ) CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS

( ) CHECK THAT INDOOR (EVAPORATOR) AIR FILTER IS CLEAN AND IN PLACE

( ) VERIFY THAT UNIT INSTALLATION IS LEVEL

( ) CHECK FAN WHEEL, AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS

III. START-UP

ELECTRICAL

SUPPLY VOLTAGE _____

COMPRESSOR AMPS_____

INDOOR (EVAPORATOR) FAN AMPS_____

TEMPERATURES

OUTDOOR (CONDENSER) AIR TEMPERATURE _____DB

RETURN-AIR TEMPERATURE _____DB _____WB

COOLING SUPPLY AIR _____DB _____WB

PRESSURES

REFRIGERANT SUCTION _____PSIG SUCTION LINE TEMP*_____

REFRIGERANT DISCHARGE _____PSIG DISCHARGE TEMP†_____

( ) VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS

*Measured at suction inlet to compressor

†Measured at liquid line leaving condenser.

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