Carrier®
HEATING & COOLING

50GL
Single Package Electric Cooling Units with Puron® (R-410A) Refrigerant

Visit www.carrier.com

Installation, Start-Up, and Operating Instructions
Sizes 024-060

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

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NOTE TO INSTALLER — Before the installation, READ THESE INSTRUCTIONS CAREFULLY AND COMPLETELY. Also, make sure the User's Manual and Replacement Guide are left with the unit after installation.

SAFETY CONSIDERATIONS

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

Untrained personnel can perform basic maintenance functions of cleaning coils and 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. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations. Consult a qualified installer or service agency for information or assistance. The qualified installer or agency must use only factory-authorized kits or accessories when modifying this product.

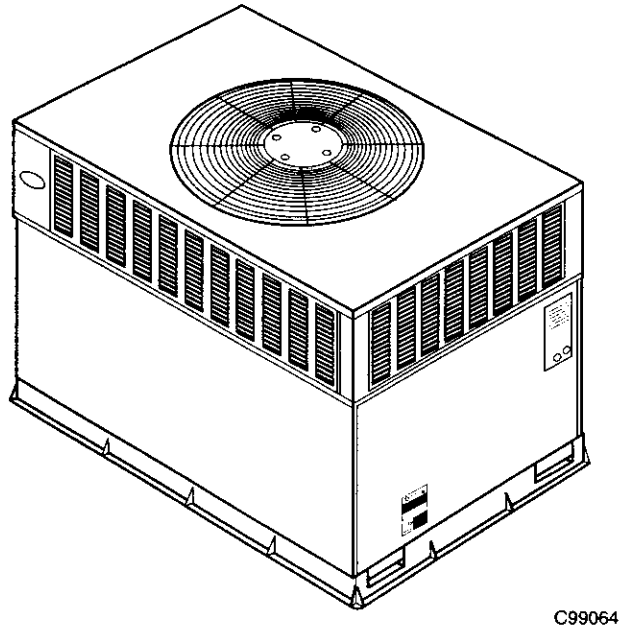

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Fig. 1—Model 50GL

⚠ WARNING

Before performing service or maintenance operations on system, turn off power to unit. Turn off accessory heater power switch, if applicable. Electrical shock can cause serious injury or death.

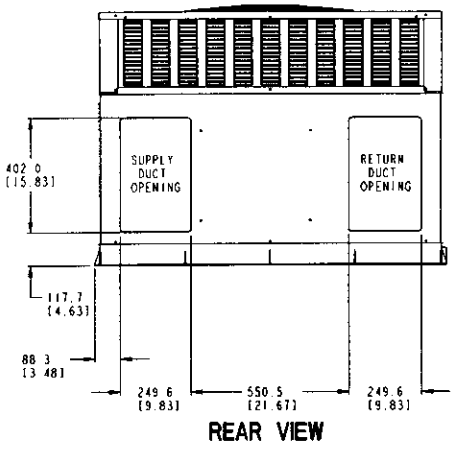
⚠ CAUTION

Puron (R-410A) systems operate at higher pressures than standard R-22 systems. Do not use R-22 service equipment or components on Puron (R-410A) equipment. Ensure service equipment is rated for Puron (R-410A).

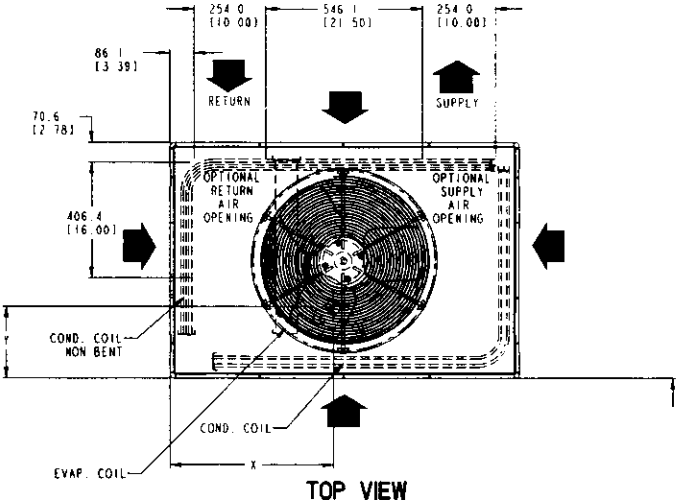
RULES FOR SAFE INSTALLATION AND OPERATION

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol in instructions or manuals, be alert to the potential for personal injury.

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



REAR VIEW



TOP VIEW

REQ'D CLEARANCES FOR OPERATION AND SERVICING. in. (mm)

Evaporator coil access side	36 (914)
Power entry side (except for NEC requirements)	36 (914)
Unit top	48 (1219)
Side opposite ducts	36 (914)
Duct panel	12 (304.8)*

*Minimum distances: If unit is placed less than 12 in. (304.8 mm) from wall system, then the system performance may be compromised.

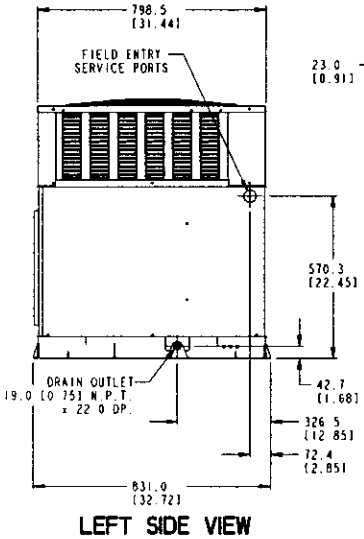
REQ'D CLEARANCES TO COMBUSTIBLE MAT'L. in. (mm)

Top of unit	14 (355.6)
Duct side of unit	2 (50.8)
Side opposite ducts	14 (355.6)
Bottom of unit	0.50 (12.7)
Flue panel	36 (914.4)

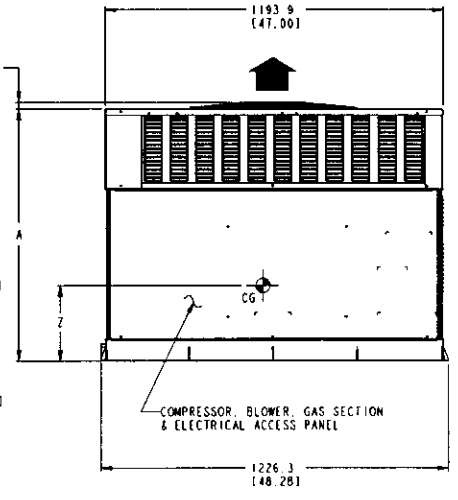
NEC REQ'D CLEARANCES. in. (mm)

Between units, power entry side	42 (1066.8)
Unit and ungrounded surfaces, power entry side	36 (914)
Unit and block or concrete walls and other grounded surfaces, control box side	42 (1066.8)

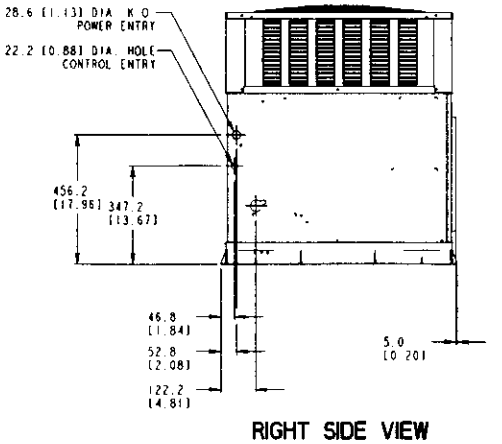
LEGEND
CG - Center of Gravity
COND - Condenser
EVAP - Evaporator
NEC - National Electrical Code
REQ'D - Required
Note: Dimensions are in in. (mm)



LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW

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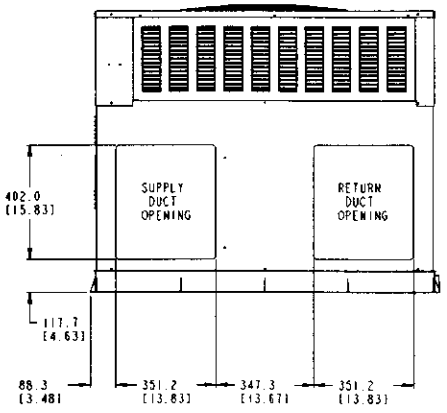
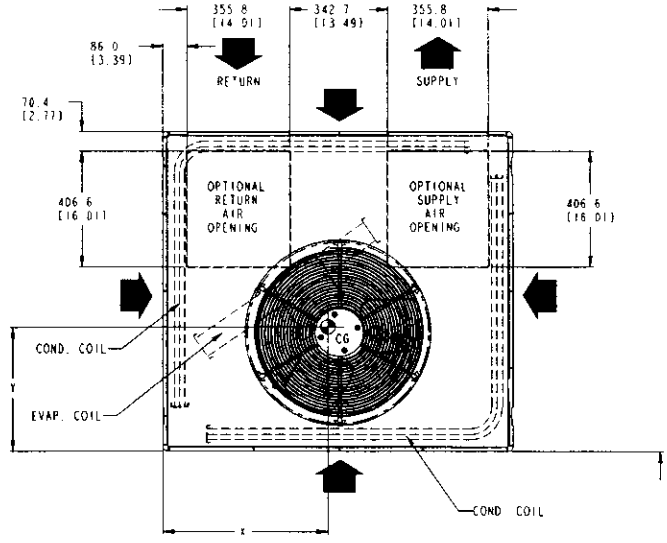
Fig. 2—50GL024-036 Unit Dimensions

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WEIGHT		UNIT HEIGHT IN. [MM] "A"	CENTER OF GRAVITY IN. [MM]		
		lb	kg		X	Y	Z
50GL024	208/230-1-60	270	122.5	37.02 [940.3]	18.5 [469.9]	14.5 [368.3]	16.0 [406.4]
50GL030	208/230-1-60, 208/230-3-60	291	132.0	39.02 [991.1]	19.5 [495.3]	15.5 [393.7]	17.6 [447.0]
50GL036	208/1-60, 208/230-3-60, 460-3-60	299	135.6	35.02 [889.5]	19.5 [495.3]	15.3 [387.4]	16.5 [419.1]



REAR VIEW



TOP VIEW

REQUIRED CLEARANCE FOR OPERATION AND SERVICING

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

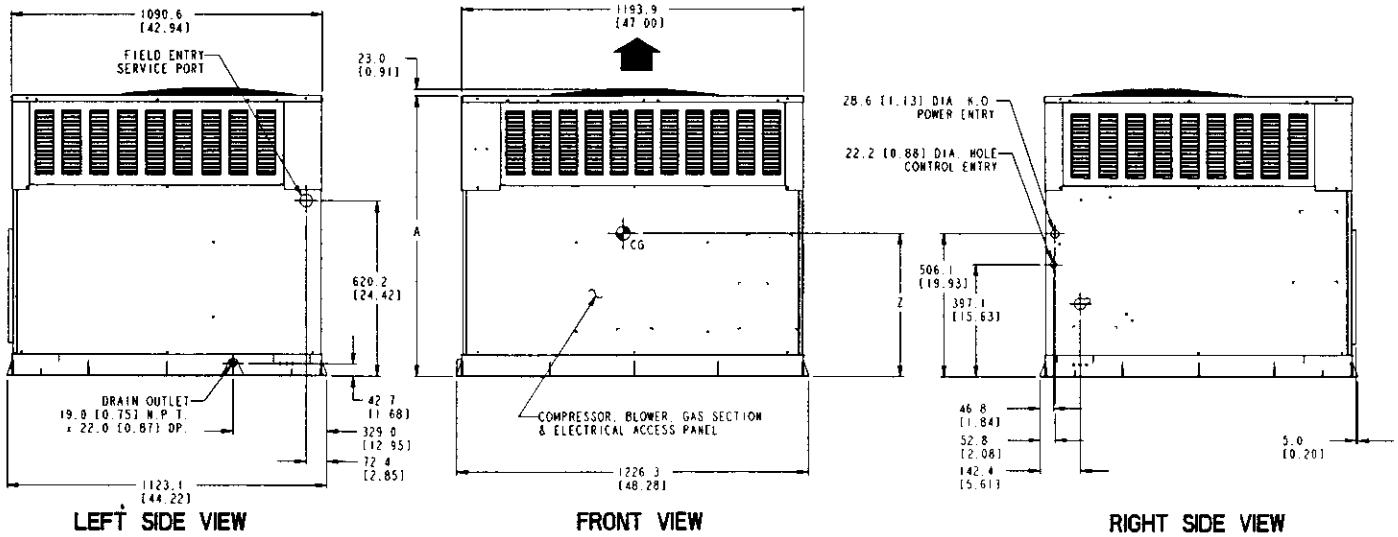
*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 12.00 [304.8] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISE.

REQUIRED CLEARANCE TO COMBUSTIBLE MATL.

	in. [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]
ELECTRIC HEAT PANEL	36.00 [914.4]

NEC. REQUIRED CLEARANCES.

	MILLIMETERS [IN.]
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]



LEFT SIDE VIEW | FRONT VIEW | RIGHT SIDE VIEW

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Fig. 3—50GL042-060 Unit Dimensions

UNIT	ELECTRICAL CHARACTERISTICS	UNIT WEIGHT		UNIT HEIGHT IN. [MM] "A"	CENTER OF GRAVITY IN. [MM]		
		lb	kg		X	Y	Z
50GL042	208/230-1-60, 208/230-3-60, 460-3-60	321	146	38.98 [990.2]	20.5 [520.7]	16.8 [425.5]	16.6 [421.6]
50GL048	208-230-1-60, 208/230-3-60, 460-3-60	326	148	38.98 [990.2]	19.5 [495.3]	17.6 [447.6]	18.0 [457.2]
50GL060	208/230-1-60, 208/230-3-60, 460-3-60	399	181	42.98 [1091.1]	20.5 [520.7]	16.2 [412.8]	17.6 [447.0]

The power supply (volts, phase, and hertz) must correspond to that specified on unit rating plate.

The electrical supply provided by the utility must be sufficient to handle load imposed by this unit.

This installation must conform with local building codes and with NEC (National Electrical Code) and NFPA 70. NFPA 54/ANSI Z223.1 latest revision, and NFGC (National Fuel Gas Code). Refer to provincial and local plumbing or waste water codes and other applicable local codes.

Approved for outdoor installation on wood flooring or on class A, B or C roof covering materials.

These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances, these instructions exceed certain local codes and ordinances, especially those that may not have kept up with changing residential construction practices. We require these instructions as a minimum for a safe installation.

GENERAL — The 50GL units are 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 duct openings covered . Units 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 stamped on unit identification plate. Check this information against shipping papers and job data.

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 Carrier Air Conditioning office if any item is missing. To prevent loss or damage, leave all parts in original packages until installation.

Step 2—Provide Unit Support

ROOF CURB — Install accessory roof curb in accordance with instructions shipped with curb (See Fig. 4 for roof curb dimensions). 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 watertight seal. Install gasketing material supplied with the roof curb. Improperly applied gasketing can also result in air leaks and poor unit performance. Curb should be level to within 1/4 in. (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. thick with 2 in. above grade. The slab should extend 2 in. on sides of the unit. Do not secure the unit to the slab *except* when required by local codes.

GROUND LEVEL — If local codes permit, the unit can be placed directly on the ground. Prepare a level gravel foundation for proper drainage.

Step 3—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. wg.

Step 4—Provide Clearances

The required minimum operating and service clearances are shown in Fig. 2 and 3. Adequate ventilation and condenser air must be provided.

⚠ CAUTION

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

The condenser fan draws air through the condenser coil and discharges it through the top fan grill. Be sure that the fan discharge does not recirculate to the condenser 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 36-in. above the unit top. The maximum horizontal extension of a partial overhang must not exceed 48 in.

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, tile, or other combustible materials.

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.

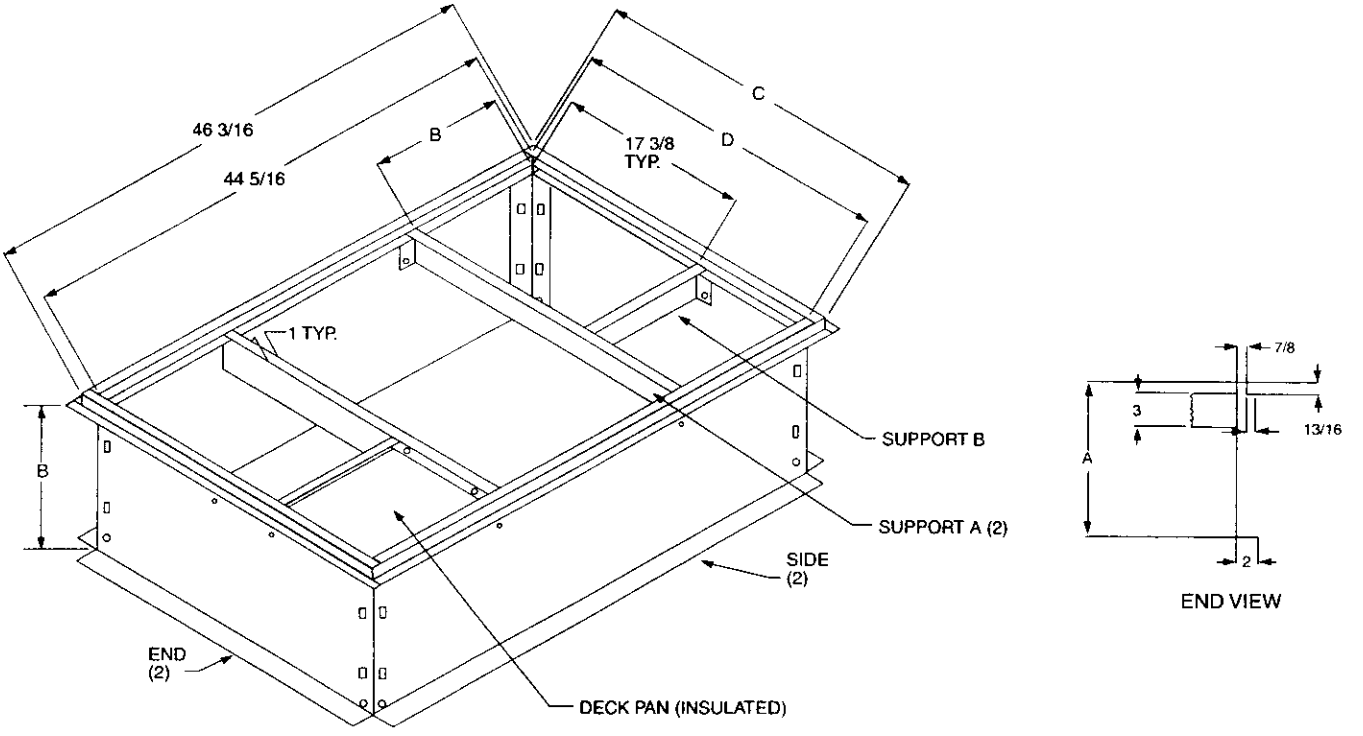
When working with this equipment, observe precautions in the literature, on tags, stickers and labels attached to the equipment, and any other safety precautions that might apply.

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

INSPECTION — 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.

INSTALLATION

1. Remove unit from shipping carton. Leave top shipping skid on the unit as a spreader bar to prevent the rigging straps from damaging the unit. If the wood skid is not available, use a spreader bar of sufficient length to protect unit from damage.
2. Position the lifting bracket assembly around the base of the unit. Be sure the strap does not twist.
3. Place each of the 4 metal lifting brackets into the handholds in the composite pan.
4. Thread lifting bracket strapping around bottom perimeter of unit as follows:
   a. Open lever of tension buckle (ratchet type).
   b. Feed strapping through tension buckle (See Fig. 8).



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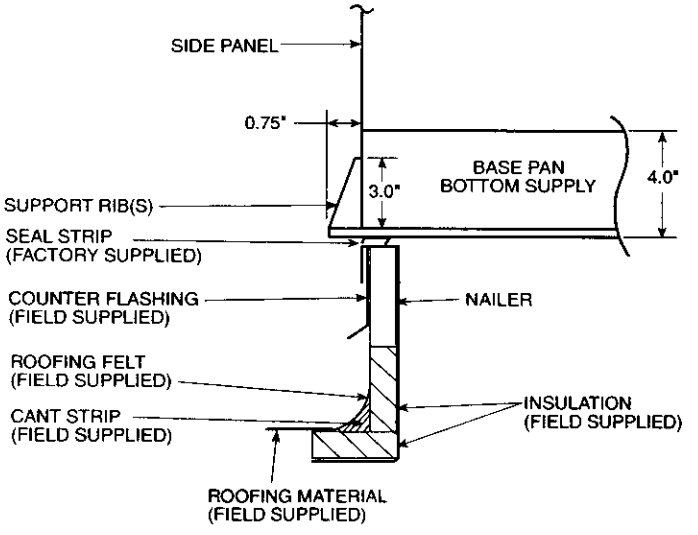

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50GL	UNIT SIZE	ODS CATALOG ORDERING NO.	A IN. [MM]	B IN. [MM]	C IN. [MM]	D IN. [MM]
ROOF CURB	024-036	CPRFCURB006A00	8 [203]	11-27/32 [301]	30-5/8 [778]	28-3/4 [730]
		CPRFCURB007A00	14 [356]	11-27/32 [301]	30-5/8 [778]	28-3/4 [730]
	042-060	CPRFCURB008A00	8 [203]	15-27/32 [402]	42-1/8 [1070]	40-1/4 [1022]
		CPRFCURB009A00	14 [356]	15-27/32 [402]	42-1/8 [1070]	40-1/4 [1022]

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 in [ ] are in millimeters.
4. Roof curb is made of 16 gage steel.
5. Table lists only the dimensions per ODS Catalog Ordering Number that have changed.
6. Attach ductwork to curb (flanges of duct rest on curb).
7. Insulated panels: 1-in. thick fiberglass 1 lb density.

Fig. 4—Roof Curb Dimensions

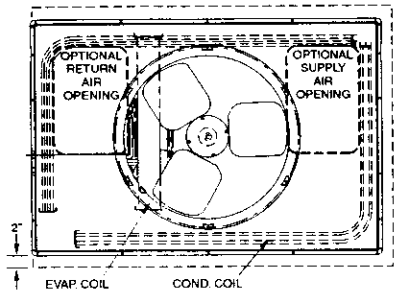

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Fig. 5—Slab Mounting Details

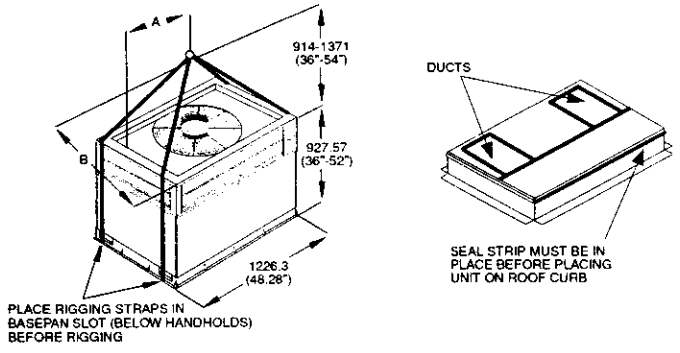

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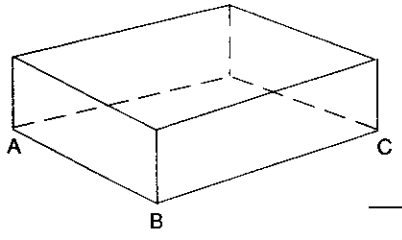
Fig. 6—Suggested Rigging

SIZE	MAXIMUM WEIGHT		A		B	
	lb	kg	in.	mm	in.	mm
024	292	132.5	18.5	469.9	14.50	368.3
030	313	142.5	19.5	495.3	15.50	393.7
036	321	145.6	19.5	495.3	15.25	387.4
042	343	155.6	20.5	520.7	16.75	425.5
048	348	157.9	19.5	495.3	17.62	447.6
060	421	191.0	20.5	520.7	16.25	412.8



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

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Fig. 7—Unit Leveling Tolerances

c. Pull strapping through tension buckle unit taut.

d. Snap lever down to lock strap in tension buckle. To release strapping, squeeze safety latch, lift lever, and pull webbing outward.

5. Tighten the tension buckle until it is taut. Lifting brackets must be secure in the handholds.

6. Attach field-supplied clevis or hook of sufficient strength to hole in the lifting bracket (See Fig. 9).

7. Attach the 2 safety straps directly to the clevis or hook at the 4 rigging brackets. **DO NOT** attach the safety straps to the lifting brackets (See Fig. 9).

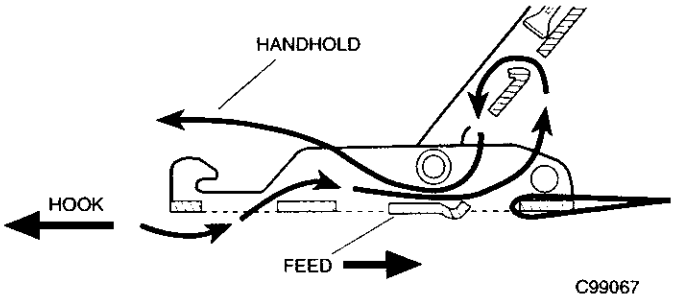

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Fig. 8—Belt Threading

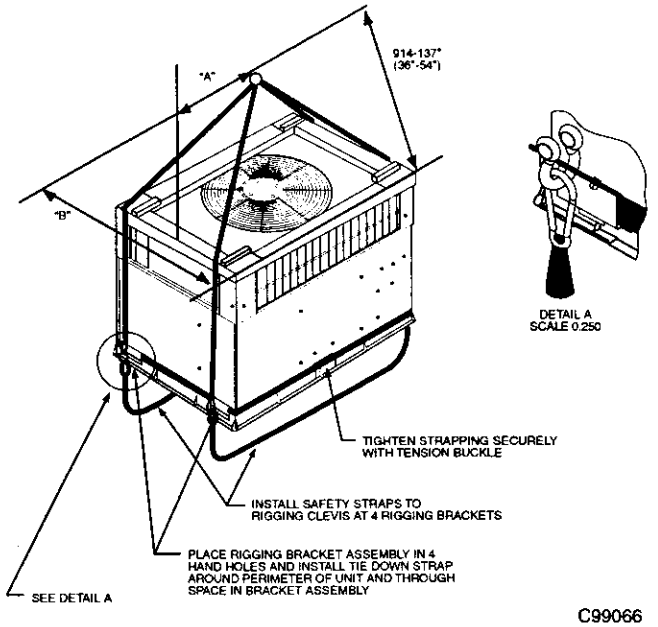

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Fig. 9—Lifting Point

8. Position lifting point directly over the unit's center of gravity.

9. Lift unit. When unit is directly over the roof curb, remove the 2 safety straps. Lower the equipment onto the roof curb.

Step 6—Connect Condensate Drain

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

Model 50GL 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 and 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 drainpan condensate connection to prevent the pan from overflowing (See Fig. 10). 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 one 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.

Step 7—Install Duct Connections

The unit has duct flanges on the supply- and return-air openings on the side and bottom of the unit. For downshot applications the ductwork can be connected to the roof curb (See Fig. 2 and 3 for connection sizes and locations).

Table 1—Physical Data — Unit 50GL

UNIT SIZE	024	030	036	042	048	060
NOMINAL CAPACITY (ton)	2	2-1/2	3	3-1/2	4	5
OPERATING WEIGHT (lb)	270	291	299	321	326	399
COMPRESSOR	Scroll					
REFRIGERANT (R-410A) Quantity (lb)	5.0	5.5	6.9	9.0	9.5	10.0
REFRIGERANT METERING DEVICE	Accurater® Piston					
Orifice ID (in.)	.057	.057	.065	.070	.073	.086
CONDENSER COIL Rows...Fins/in. Face Area (sq ft)	1...17 10.9	1...17 12.7	2...17 9.1	2...17 12.3	2...17 12.3	2...17 16.4
CONDENSER FAN Nominal Cfm Diameter (in.) Motor Hp (Rpm)	2350 22 1/8 (825)	2350 22 1/8 (825)	2350 22 1/8 (825)	2350 22 1/8 (825)	3300 22 1/4 (1100)	3300 22 1/4 (1100)
EVAPORATOR COIL Rows...Fins/in. Face Area (sq ft)	3...15 3.7	3...15 3.7	3...15 3.7	3...15 4.7	4...15 4.7	4...15 4.7
EVAPORATOR BLOWER Nominal Airflow (Cfm) Size (in.) Motor (hp)	800 10x10 1/4	1000 10x10 1/4	1200 10x10 1/2	1400 11x10 3/4	1600 11x10 3/4	1750 11x10 1
HIGH-PRESSURE SWITCH (psig) Cutout Reset (Auto)	610 ± 15 420 ± 25					
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (Liquid Line) (psig) Cutout Reset (Auto)	20 ± 5 45 ± 10					
RETURN-AIR FILTERS (in.)* Throwaway	20x20x1	20x20x1	20x24x1	20x30x1	24x30x1	24x30x1

* 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/min for throwaway type or 450 ft/min for high-capacity type. Air filter pressure drop for non-standard filters must not exceed 0.08 in. wg.

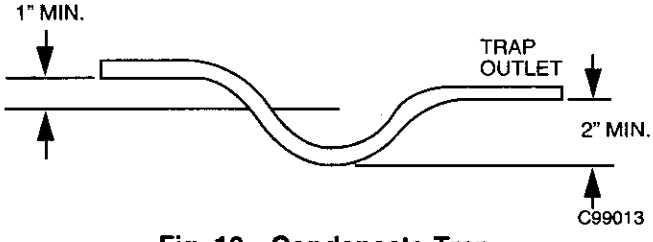


Fig. 10—Condensate Trap

IMPORTANT: Use flexible connectors between ductwork and unit to prevent transmission of vibration. Use suitable gaskets to ensure weathertight and airtight seal. When electric heat is installed, use fire proof 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 the unit connections flanges into the ductwork.

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

SIZE					
024	030	036	042	048	060
800	1000	1200	1400	1600	2000

CONFIGURING UNITS FOR DOWNFLOW (VERTICAL) DISCHARGE

⚠ WARNING

Before performing service or maintenance operations on the system, turn off main power to unit or electrical shock could result.

1. Open all electrical disconnects before starting any service work.
2. Remove side duct covers to access bottom return and supply knock out covers (See Fig. 12).
3. To remove supply and return duct covers, break front and right side connecting tabs with a screwdriver and a hammer. Push cover down to break rear and left side tabs.
4. If unit ductwork is to be attached to vertical opening flanges on the unit basepan (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 basepan insulation around the perimeter of the vertical return-air opening be secured to the basepan with aluminum tape. Applicable local codes may require aluminum tape to prevent exposed fiberglass.
6. Cover both horizontal duct openings with the duct covers shipped on the unit from the factory. 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:

8. Select and size ductwork, supply-air registers, and return-air grilles according to American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) recommendations.
9. 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 weathertight and airtight seal.

10. 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.
11. 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.
12. 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.
13. Flash, weatherproof, and vibration-isolate all openings in building structure in accordance with local codes and good building practices.

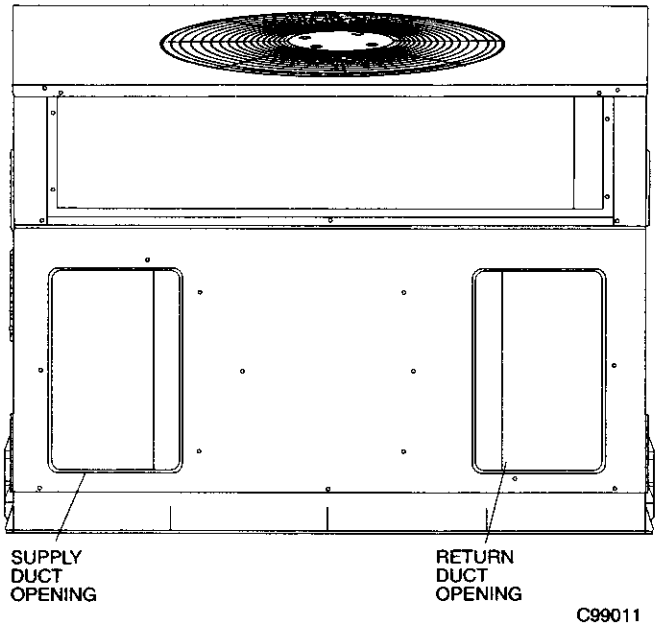


Fig. 11—Supply and Return Duct Opening

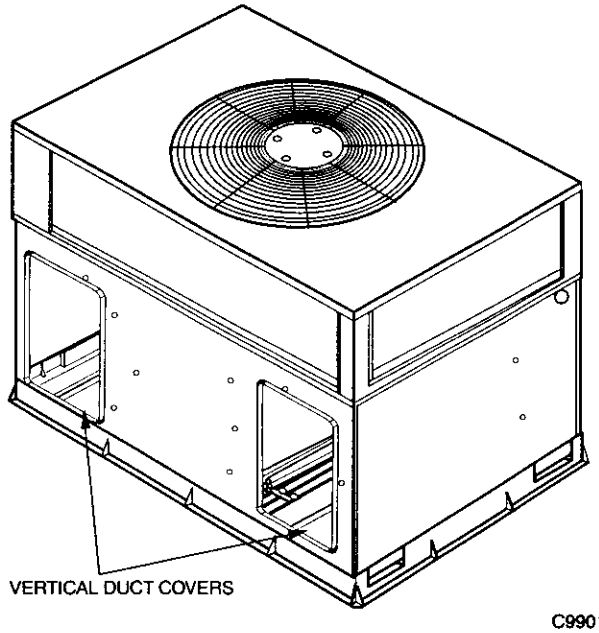


Fig. 12—Vertical Duct Cover Removed

Step 8—Install Electrical Connections

⚠ WARNING

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 lug in the control compartment, or conduit approved for electrical ground when installed in accordance with NEC (National Electrical Code) ANSI/ NFPA (latest edition) (in Canada, Canadian Electrical Code CSA [Canadian Standards Association] C22.1) and local electrical codes. Failure to adhere to this warning could result in personal injury or death.

⚠ CAUTION

Failure to follow these precautions could 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.
4. Do not damage internal components when drilling through any panel to mount electrical hardware, conduit, etc. On 3-phase units, ensure phases are balanced within 2%. Consult local power company for correction of improper voltage and/or phase imbalance.

HIGH-VOLTAGE CONNECTIONS — The unit must have a separate electrical service with a field-supplied, water-proof, disconnect switch mounted at, or within sight from, the unit. Refer to the unit rating plate for maximum fuse/ circuit breaker size and minimum circuit amps (ampacity) for wire sizing (See Table 3 for electrical data).

The field-supplied disconnect switch box 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. 13 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 leads into the control box.
2. Connect ground lead to chassis ground connection.
3. Connect L1 to pressure lug connection 11 of the compressor contactor.
4. Connect L2 to pressure lug connection 23 of the compressor contactor.

Three phase units:

1. Run the high-voltage (L1, L2, L3) and ground leads into the control box.
2. Connect ground lead to chassis ground connection.
3. Locate the black and yellow wires connected to the lines side of the contactor.

Table 3—Electrical Data

UNIT 50GL SIZE	V-PH-HZ	VOLTAGE RANGE		COMPRESSOR		OFM	IFM	ELECTRIC HEAT		POWER SUPPLY		
		Min	Max	RLA	LRA	FLA	FLA	Nominal kW*	FLA	MCA	Max Fuse or CRCT Breaker	MOCP
024	208/230-1-60	187	253	13.5	61.0	0.8	2.0	-/- 3.8/5.0 7.5/10.0	-/- 18.1/20.8 36.1/41.7	19.7/19.7 25.1/28.5 47.6/54.6	25/25 25/30 50/60	- - -
030	208/230-1-60	187	253	14.7	73.0	0.8	2.1	-/- 3.8/5.0 7.5/10.0	-/- 18.1/20.8 36.1/41.7	21.3/21.3 25.2/28.7 47.8/54.7	25/25 25/30 50/60	- - -
	208/230-3-60	187	253	9.6	63.0	0.8	2.1	-/- 3.8/5.0 7.5/10.0	-/- 10.4/12.0 20.8/24.1	14.9/14.9 15.7/17.7 28.7/32.7	20/20 20/20 30/35	- - -
036	208/230-1-60	187	253	15.4	83.0	0.8	3.6	-/- 3.8/5.0 7.5/10.0 11.3/15.0	-/- 18.1/20.8 36.1/41.7 54.2/62.5	23.7/23.7 27.1/30.5 49.6/56.6 72.2/82.6	30/30 30/30 50/60 -	- - - 80/90
	208/230-3-60	187	253	12.2	77.0	0.8	3.6	-/- 3.8/5.0 7.5/10.0 11.3/15.0	-/- 10.4/12.0 20.8/24.1 31.3/36.1	19.7/19.7 19.7/19.7 30.6/34.6 43.6/49.6	25/25 25/25 35/35 45/50	- - - -
	460-3-60	414	506	5.1	35.0	0.8	1.9	- 5.0 10.0 15.0	- 6.0 12.0 18.0	9.1 9.9 17.4 24.9	15 15 20 25	- - - -
042	208/230-1-60	187	253	18.6	105.0	1.6	4.1	-/- 3.8/5.0 7.5/10.0 11.3/15.0 15.0/20.0	-/- 18.1/20.8 36.1/41.7 54.2/62.5 72.2/83.3	28.2/28.2 28.2/31.2 50.3/57.2 72.8/83.3 95.4/109.3	35/35 35/35 60/60 - -	- - - 80/90 100/110
	208/230-3-60	187	253	13.8	88.0	1.6	4.1	-/- 3.8/5.0 7.5/10.0 11.3/15.0 15.0/20.0	-/- 10.4/12.0 20.8/24.1 31.3/36.1 41.6/48.0	22.2/22.2 22.2/22.2 31.2/35.2 44.2/50.2 57.1/65.1	30/30 30/30 35/40 45/60 -	- - - - 60/70
	460-3-60	414	506	6.3	39.0	0.9	2.0	- 5.0 10.0 15.0 20.0	- 6.0 12.0 18.0 24.1	10.7 10.7 17.5 25.1 32.6	15 15 20 30 35	- - - - -
048	208-230-1-60	187	253	20.5	109.0	1.6	4.1	-/- 3.8/5.0 7.5/10.0 11.3/15.0 15.0/20.0	-/- 18.1/20.8 36.1/41.7 54.2/62.5 72.2/83.3	31.3/31.3 31.3/31.3 50.3/57.2 72.8/83.3 95.4/109.3	40/40 40/40 60/60 - -	- - - 80/90 100/110
	208/230-3-60	187	253	14.7	91.0	1.6	4.1	-/- 3.8/5.0 7.5/10.0 11.3/15.0 15.0/20.0	-/- 10.4/12.0 20.8/24.1 31.3/36.1 41.7/48.1	24.1/24.1 24.1/24.1 31.2/35.2 44.2/50.2 57.1/65.1	30/30 30/30 35/40 45/60 -	- - - - 60/70
	460-3-60	414	506	6.5	46.0	0.9	2.0	- 5.0 10.0 15.0 20.0	- 6.0 12.0 18.0 24.1	11.0 11.0 17.5 25.1 32.6	15 15 20 30 35	- - - - -
060	208/230-1-60	187	253	27.6	158.0	1.6	6.2	-/- 3.8/5.0 7.5/10.0 11.3/15 15.0/20.0	-/- 18.1/20.8 36.1/41.7 54.2/62.5 72.2/83.3	42.3/42.3 42.3/42.3 52.9/59.8 75.4/85.9 98.0/111.9	50/50 50/50 60/60 - -	- - - 80/90 100/125
	208/230-3-60	187	253	18.1	137.0	1.6	6.2	-/- 3.8/5.0 7.5/10.0 11.3/15.0 15.0/20.0	-/- 10.4/12.0 20.8/24.1 31.3/36.1 41.6/48.0	30.4/30.4 30.4/30.4 33.8/37.8 46.8/52.9 59.7/67.7	35/35 35/35 35/40 50/60 -	- - - - 60/70
	460-3-60	414	506	9.0	62.0	0.9	3.2	- 5.0 10.0 15.0 20.0	- 6.0 12.0 18.0 24.1	15.4 15.4 19.0 26.6 34.1	20 20 20 30 35	- - - - -

* Heater capacity (KW) based on heater voltage of 208v, 240v, & 480v. If power distribution voltage to unit varies from rated heater voltage, heater KW will vary accordingly.

LEGEND

FLA — Full Load Amps
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
RLA — Rated Load Amps

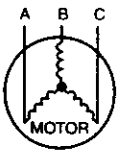
NOTES:

1. In compliance with NEC (National Electrical Code) requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be Power Supply fuse. The CGA (Canadian Gas Association) units may be fuse or circuit breaker.
2. Minimum wire size is based on 60 C copper wire. If other than 60 C wire is used, or if length exceeds wire length in table, determine size from NEC.
3. Unbalanced 3-Phase Supply Voltage
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

   % Voltage imbalance

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

   EXAMPLE: Supply voltage is 460-3-60.



   AB = 452 v
   BC = 464 v
   AC = 455 v

   $$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

   $$= \frac{1371}{3}$$

   $$= 457$$

   Determine maximum deviation from average voltage.
   (AB) 457 452 = 5 v
   (BC) 464 457 = 7 v
   (AC) 457 455 = 2 v

   Maximum deviation is 7 v.

   Determine percent of voltage imbalance.

   $$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457}$$

   $$= 1.53\%$$

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

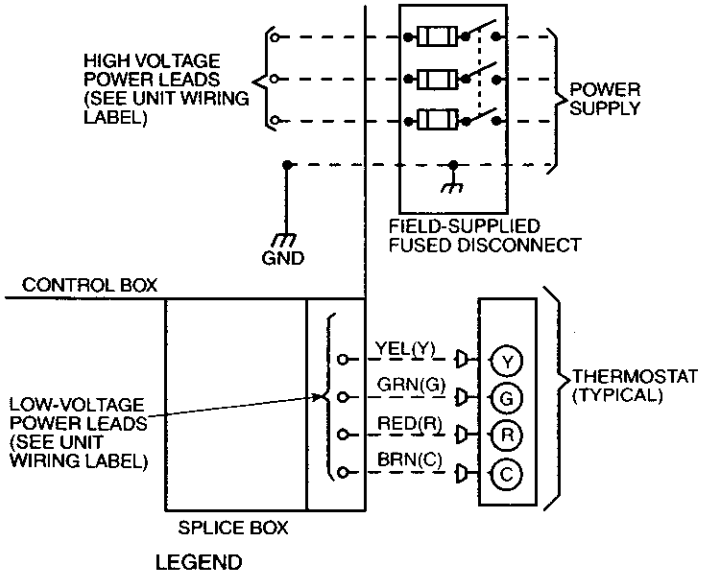
IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

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

Make sure that the power supply to the unit is switched OFF before making any wiring changes. With disconnect switch open, move yellow wire from transformer (3/16 in.) terminal marked 230 to terminal marked 200. This retaps transformer to primary voltage of 208 vac. Electrical shock could cause serious injury or death.



LEGEND

Field Control-Voltage Wiring
Field High-Voltage Wiring

NOTE: Use blue wire for 3-phase units only.

C99010

Fig. 13—High- and Control-Voltage Connections

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 service access panel (See Fig. 2 and 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, and white (See Fig. 10). 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. 13). 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-sec overload or shorted secondary condition.

PRE-START-UP

⚠ WARNING

Failure to observe the following warnings could result in serious injury or death:

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
3. Do not remove compressor terminal cover until all electrical sources are disconnected.
4. Relieve and recover all refrigerant from both high- and low-pressure sides of system before touching or disturbing anything inside terminal box if refrigerant leak is suspected around compressor terminals.
5. Never attempt to repair soldered connection while refrigerant system is under pressure.
6. Do not use torch to remove any component. System contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
   a. Shut off electrical power to unit.
   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 startup:

1. Remove access panel.
2. Read and follow instructions on all 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, halide torch, or liquid-soap solution. If a refrigerant leak is detected, see Check for Refrigerant Leaks section under Start-Up.
   c. Inspect all field- and factory-wiring connections. Be sure that connections are completed and tight.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.

Verify the following conditions:

a. Make sure that condenser-fan blade is correctly positioned in fan orifice. Leading edge of condenser-fan blade should be 1/2 in. maximum from fan orifice (See Fig. 14).

b. Make sure that air filter(s) is in place.

c. Make sure that condensate drain trap is filled with water to ensure proper drainage.

d. Make sure that all tools and miscellaneous loose parts have been removed.

START-UP

CHECK FOR REFRIGERANT LEAKS — Proceed as follows to locate and repair a refrigerant leak and to charge the unit:

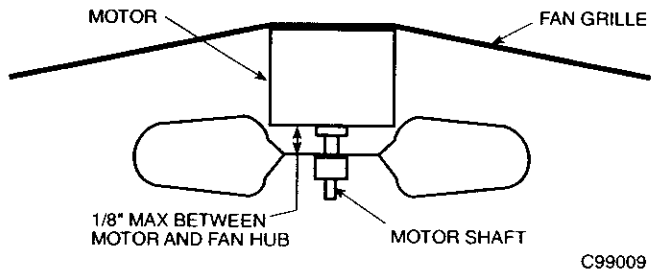


Fig. 14—Fan Blade Clearance

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: Replace filter drier whenever the system has been opened for repair.

3. Charge unit with R-410A refrigerant, using a volumetric-charging cylinder or accurate scale. *Refer to unit rating plate for required charge.*

START UP COOLING SECTION AND MAKE ADJUSTMENTS

⚠ CAUTION

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 compressor when the outdoor temperature is below 40°F (unless accessory low-ambient kit is installed). Do not rapid-cycle the compressor. Allow 5 min 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 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 cooling cycle shuts down when control setting is satisfied. The evaporator fan will continue to run for 30 sec.
3. When using an auto-changeover room thermostat, place both SYSTEM and FAN switches in AUTO positions. Observe that unit operates in heating mode when temperature control is set to "call for heating" (above room temperature) and operates in cooling mode when temperature control is set to "call for cooling" (below room temperature).

IMPORTANT: Three-phase, scroll compressor units (50GL030-060) are direction-oriented. These units must be checked to ensure proper compressor 3-phase power lead orientation. If not corrected within 5 min, the internal protector will shut off the compressor. Any two of the 3-phase power leads to the unit must be reversed to correct rotation. When turning backwards, scroll compressors emit elevated noise levels, and the difference between compressor suction and discharge pressures may be dramatically lower than normal.

CHECKING AND ADJUSTING REFRIGERANT CHARGE — The refrigerant system is fully charged with R-410A refrigerant, tested, and factory-sealed.

NOTE: Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper R-410A charge. The charging label and the tables shown refer to system temperatures and pressures.

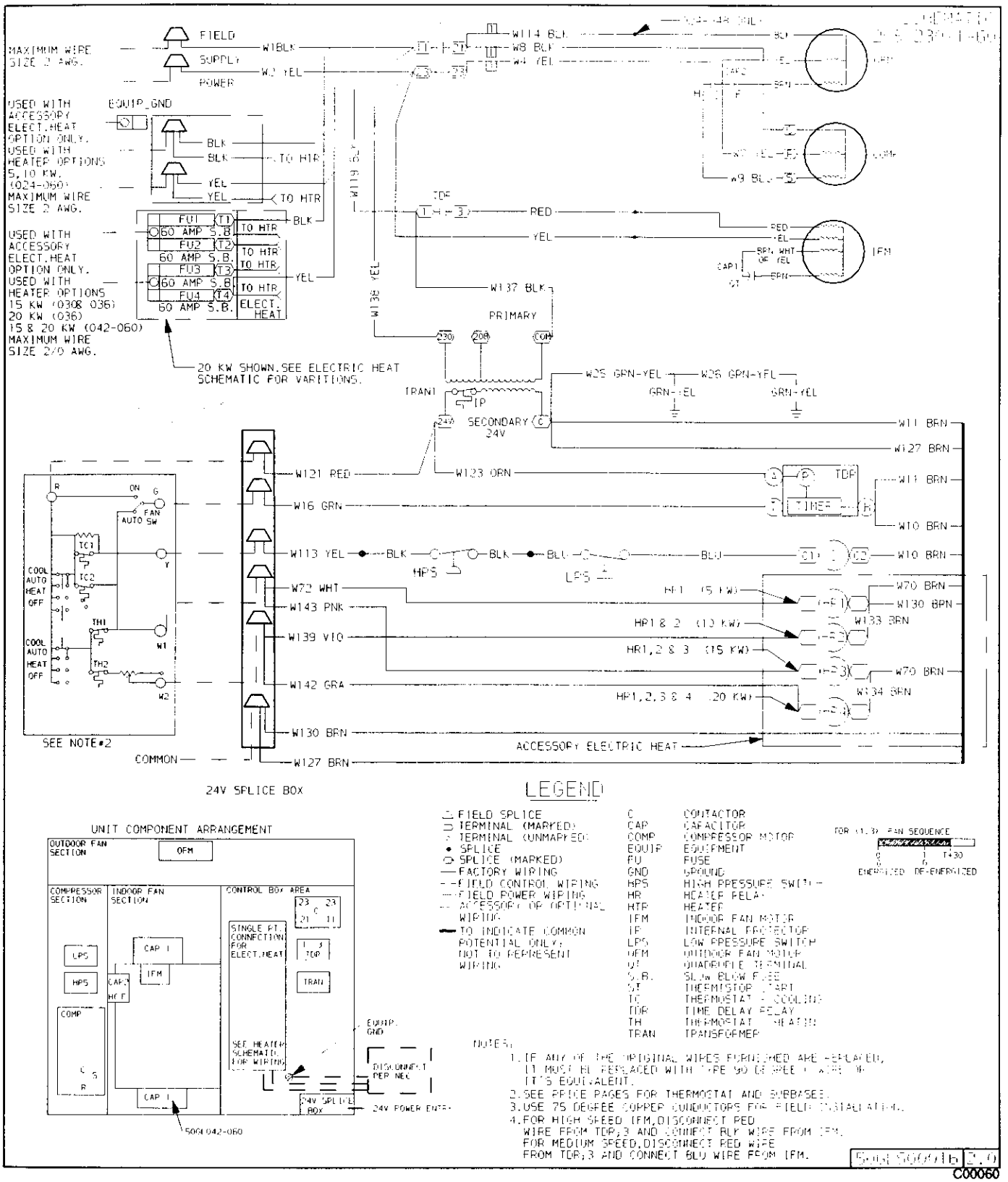


Fig. 15—208/230-1-60 Wiring Diagram

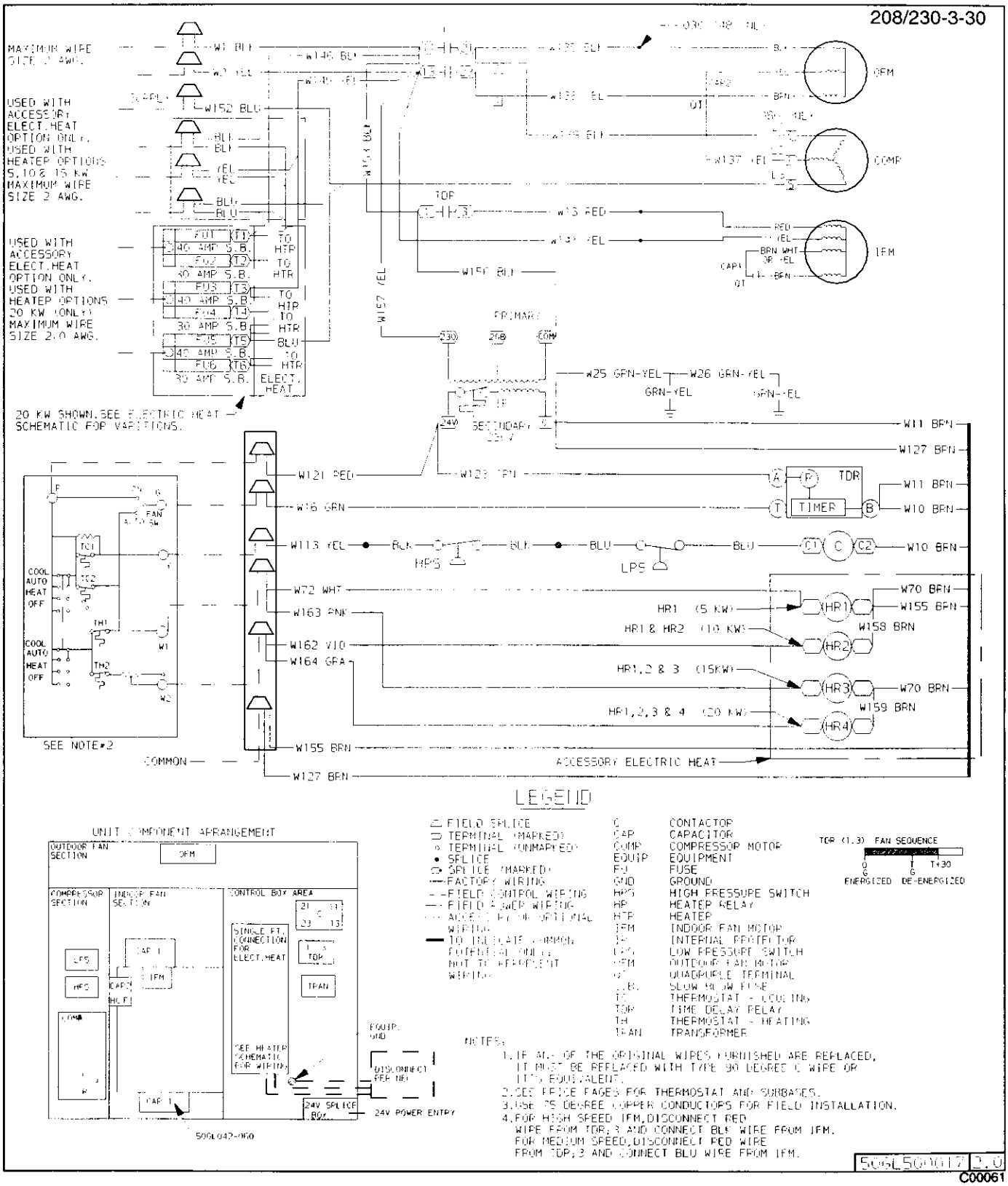
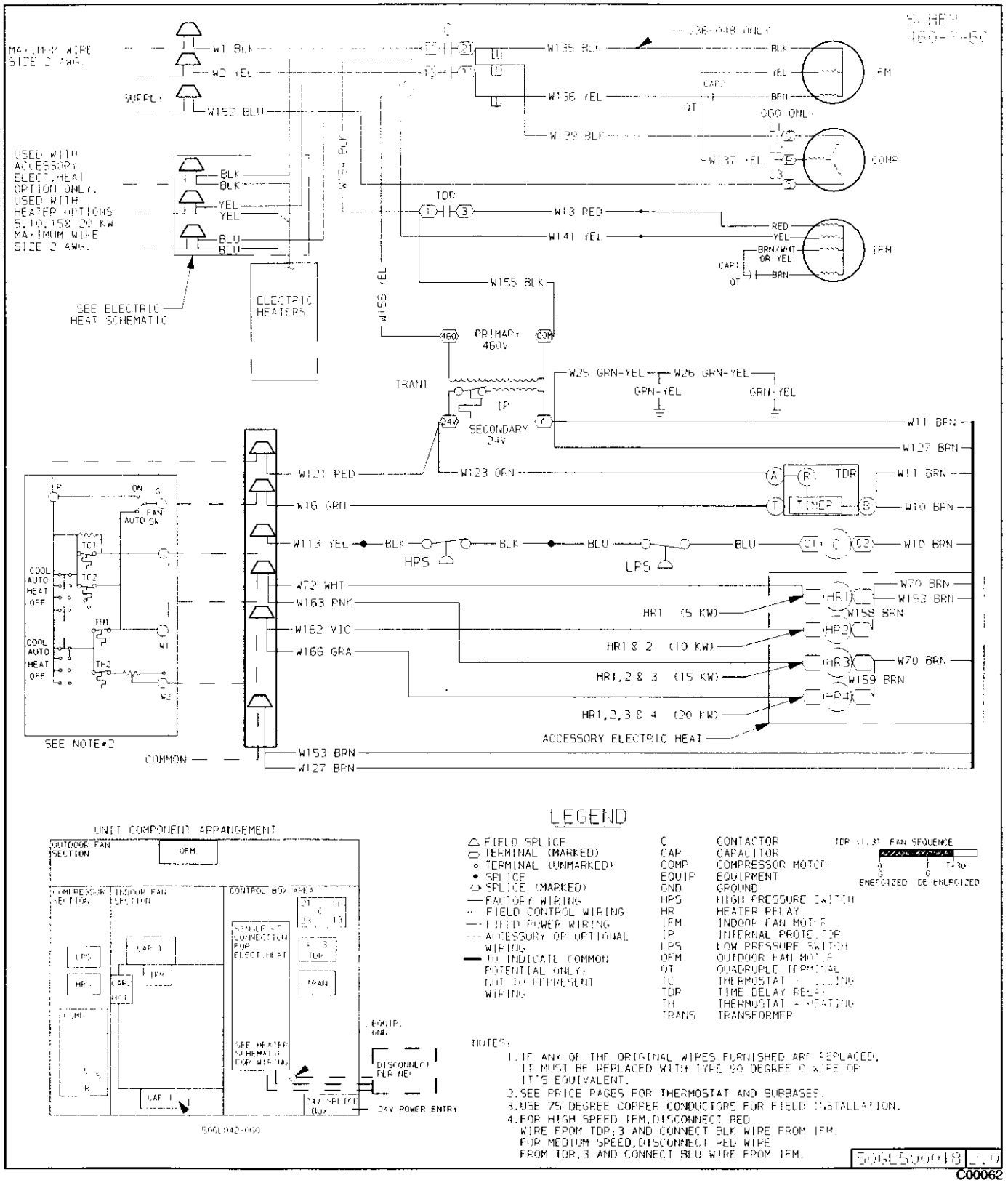


Fig. 16—208/230-3-60 Wiring Diagram



UNIT COMPONENT ARRANGEMENT

LEGEND

△	FIELD SPLICE
▭	TERMINAL (MARKED)
○	TERMINAL (UNMARKED)
•	SPLICE
◇	SPLICE (MARKED)
—	FACTORY WIRING
- -	FIELD CONTROL WIRING
—	FIELD POWER WIRING
---	ACCESSORY OR OPTIONAL WIRING
▬	TO INDICATE COMMON POTENTIAL ONLY; NOT TO REPRESENT WIRING.

C	CONTACTOR
CAP	CAPACITOR
COMP	COMPRESSOR MOTOR
EQUIP	EQUIPMENT
GND	GROUND
HPS	HIGH PRESSURE SWITCH
HR	HEATER RELAY
IFM	INDOOR FAN MOTOR
IP	INTERNAL PROTECTOR
LPS	LOW PRESSURE SWITCH
OFM	OUTDOOR FAN MOTOR
OT	QUADRUPLE TERMINAL
TC	THERMOSTAT - COOLING
TDR	TIME DELAY RELAY
TH	THERMOSTAT - HEATING
TRANS	TRANSFORMER

TDR (T,3) FAN SEQUENCE

NOTES:
1. IF ANY OF THE ORIGINAL WIRES FURNISHED ARE REPLACED, IT MUST BE REPLACED WITH TYPE 90 DEGREE C WIRE OR IT'S EQUIVALENT.
2. SEE PRICE PAGES FOR THERMOSTAT AND SUBBASES.
3. USE 75 DEGREE COPPER CONDUCTORS FOR FIELD INSTALLATION.
4. FOR HIGH SPEED IFM, DISCONNECT RED WIRE FROM TDR;3 AND CONNECT BLK WIRE FROM IFM. FOR MEDIUM SPEED, DISCONNECT RED WIRE FROM TDR;3 AND CONNECT BLU WIRE FROM IFM.

50GL500018 2.0

C00062

Fig. 17—460-3-60 Wiring Diagram

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.

Refrigerant charge

The amount of refrigerant charge is listed on the unit nameplate. Refer to the Refrigeration Service Techniques Manual, Refrigerants section.

Unit panels must be in place when unit is operating during charging procedures.

No charge

Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant (refer to system data plate).

Low charge cooling

Measure outdoor ambient using Cooling Charging Charts (Figs. 18-23). Vary refrigerant until the conditions of the chart are met. Note that charging charts are different from type normally used. Charts are based on charging the units to correct superheat for the various operating conditions. Accurate pressure gage and temperature sensing devices are required. Connect the pressure gage to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that the outdoor ambient does not effect the reading. Indoor air CFM must be within the normal operating range of the unit.

To use cooling charging charts

Take the outdoor ambient temperature and read the suction pressure gage. Refer to the chart to determine what the suction temperature should be.

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

INDOOR AIRFLOW AND AIRFLOW ADJUSTMENTS

⚠ CAUTION

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

Table 4 shows cooling airflows at various external static pressures. Refer to these tables 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

Disconnect electrical power to the unit before changing blower speed. Electrical shock can cause serious injury or death.

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

All 50GL units are factory wired for low speed and may need to be wired for medium or high speed in the field.

FOR 208/230-V — The motor leads are color-coded as follows:

3-SPEED	2-SPEED
black = high speed	black = high speed
blue = medium speed	-
red = low speed	red = low speed

To change the speed of the blower motor (BM), remove the fan motor speed leg lead from the blower relay (BR). This wire is attached to terminal BM for single-phase and 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.*

FOR 460-V GE MOTORS — The motor leads are color coded as follows:

3-SPEED	2-SPEED
black = high	black = high
violet = jumper	blue = jumper
orange = medium	-
red = low	red = low

To change the speed of the blower motor (BM), remove fan motor speed lead from the blower relay (BR) and replace with the lead for the desired blower motor speed. The motor speed lead is attached to terminal BM. For low and medium speeds black must be connected to the jumper wire. *Insulate removed lead end to avoid contact with chassis parts.* To select high speed on 460-v GE motors, separate the black female quick connect (QC) from the jumper lead male quick connect (QC) and connect the black lead to the BR. Insulate the jumper to avoid contact with any 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 blower relay coil (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 min have elapsed.

The cooling cycle remains "on" until the room temperature drops to 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-sec 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 heating or cooling of units, refer to tables at the back of the book.

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

Table 4—Wet Coil Air Delivery (Deduct 10% for 208v)*
Horizontal and Downflow Discharge
Unit 50GL024-060

230 AND 460 VOLT												
Unit	Motor Speed		External Static Pressure (in. wg)									
			0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
024	Low	Watts	281	282	281	278	276	-	-	-	-	-	-
		Cfm	833	776	702	638	554						
	Med	Watts	-	-	-	375	370	363	357	352	-	-	-
		Cfm	-	-	-	894	800	754	636	518	-	-	-
	High	Watts	-	-	-	-	-	468	457	444	431	423	-
		Cfm	-	-	-	-	-	884	802	697	467	397	-
30	Low	Watts	246	244	243	241	-	-	-	-	-	-	-
		Cfm	910	806	749	680	-	-	-	-	-	-	-
	Med	Watts	343	339	336	332	328	322	317	-	-	-	-
		Cfm	1148	1104	1028	958	850	782	645	-	-	-	-
	High	Watts	-	-	-	-	441	432	421	410	400	-	-
		Cfm	-	-	-	-	1102	988	896	783	529	-	-
36	Low	Watts	-	470	458	445	430	415	399	384	-	-	-
		Cfm	-	1352	1257	1240	1199	1107	1015	924	-	-	-
	Med	Watts	-	-	514	501	487	471	455	438	422	-	-
		Cfm	-	-	1338	1295	1288	1181	1111	968	813	-	-
	High	Watts	-	-	-	646	636	626	614	602	589	-	-
		Cfm	-	-	-	1385	1268	1196	1159	1032	948	-	-
42	Low	Watts	-	625	614	605	593	574	549	518	485	454	-
		Cfm	-	1540	1510	1473	1396	1348	1288	1192	1124	1037	-
	Med	Watts	-	-	-	-	726	695	661	625	591	561	540
		Cfm	-	-	-	-	1648	1593	1530	1446	1352	1237	1114
	High	Watts	-	-	-	-	-	-	-	790	766	742	713
		Cfm	-	-	-	-	-	-	-	1616	1492	1394	1283
48	Low	Watts	-	588	577	572	566	556	539	517	491	-	-
		Cfm	-	1514	1543	1467	1408	1374	1324	1237	1161	-	-
	Med	Watts	-	756	738	719	699	676	650	623	596	572	555
		Cfm	-	1785	1765	1706	1628	1577	1503	1421	1357	1298	1253
	High	Watts	-	-	-	-	896	862	829	800	775	752	728
		Cfm	-	-	-	-	1880	1804	1704	1547	1565	1406	1367
60	Low	Watts	903	898	873	842	814	792	777	764	743	701	618
		Cfm	2190	2158	2081	2026	1958	1866	1822	1744	1678	1535	1377
	Med	Watts	-	1002	978	960	941	914	880	839	798	764	750
		Cfm	-	2389	2291	2216	2120	2020	1952	1852	1727	1617	1549
	High	Watts	-	-	-	1080	1080	1066	1041	1008	972	938	-
		Cfm	-	-	-	2316	2181	2122	2101	2000	1802	1672	-

* Air delivery values are based on operating voltage of 230 v or 460 v, wet coil, without filter or electric heater. Deduct filter and electric heater pressure drops to obtain static pressure available for ducting.

NOTES: 1. Do not operate the unit at a cooling airflow that is less than 350 cfm for each 12,000 Btuh of rated cooling capacity. Evaporator coil frosting may occur at airflows below this point.

2. Dashes indicate portions of table that are beyond the blower motor capacity or are not recommended.

⚠ WARNING

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 User's Manual. FAILURE TO HEED THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND POSSIBLE DAMAGE TO THIS EQUIPMENT.

⚠ WARNING

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

1. Turn off electrical power to the unit before performing any maintenance or service on the unit.
2. Use extreme caution when removing panels and parts. As with any mechanical equipment, personal injury can result from sharp edges, etc.
3. Never place anything combustible either on, or in contact with, the unit.

⚠ CAUTION

Errors made when reconnecting wires may cause improper and dangerous operation. Label all wires prior to disconnection 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 and check lubrication each heating and cooling season. Clean when necessary.
4. Check electrical connections for tightness and controls for proper operation each heating and cooling season. Service when necessary.

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 Tables 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 heating and cooling season or whenever the filter(s) becomes clogged with dust and lint.

EVAPORATOR BLOWER AND MOTOR

NOTE: All motors are prelubricated. 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

Disconnect and tag electrical power to the unit before cleaning the blower motor and wheel. Failure to adhere to this warning could cause serious injury or death.

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 blower relay (BR). 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 heating and cooling cycles.

CONDENSER COIL, EVAPORATOR 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 tube with clear water. Do not splash water on the insulation, motor, wiring, or air filter(s). If the drain tube is restricted, clear it with a "plumbers snake" or similar probe device. Ensure that the auxiliary drain port above the drain tube is also clear.

CONDENSER FAN

⚠ CAUTION

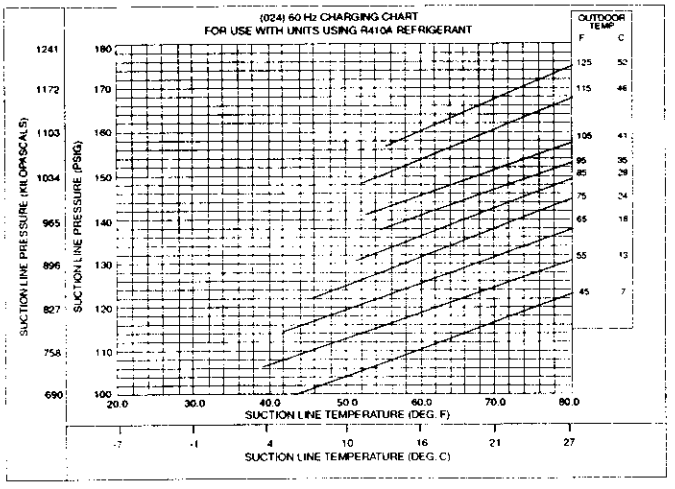
Keep the condenser fan free from all obstructions to ensure proper cooling operation. Never place articles on top of the unit. Damage to unit may result.

4. Remove 6 screws holding condenser grille and motor to top cover.
5. Turn motor/grille assembly upside down on top cover to expose the fan blade.
6. Inspect the fan blades for cracks or bends.
7. If fan needs to be removed, loosen the setscrew and slide the fan off the motor shaft.
8. 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).
9. Ensure that setscrew engages the flat area on the motor shaft when tightening.
10. 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.*

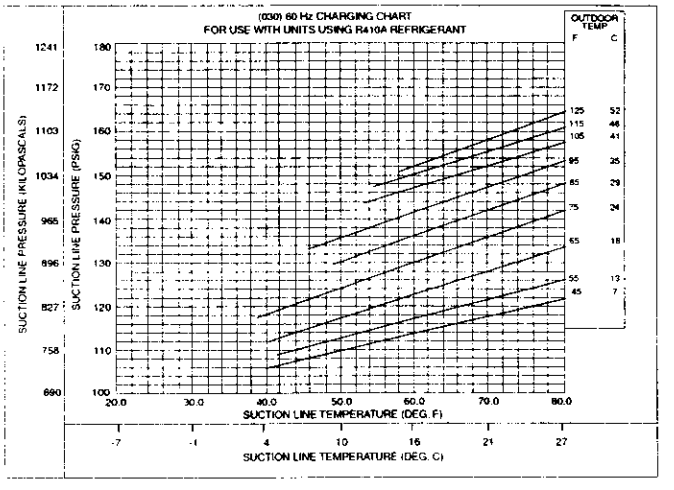
Remove access panel to locate all the electrical controls and wiring. Check all electrical connections for tightness. Tighten all screw connections. If any smoky or burned connections are noticed, disassemble the connection, clean all the parts, restrip the wire end and reassemble the connection properly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



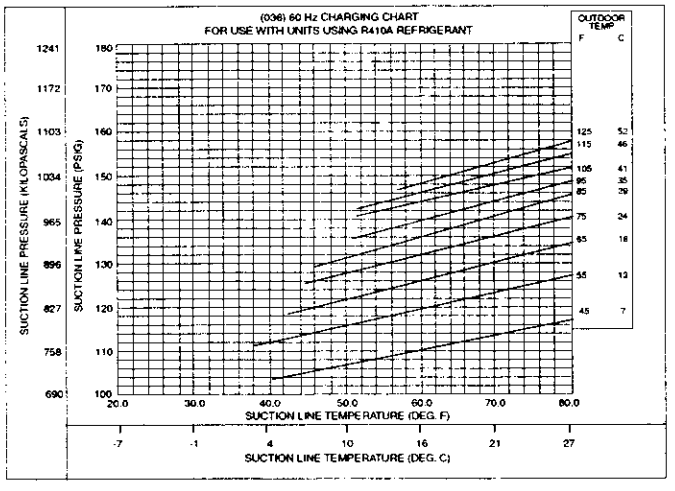
C99079

Fig. 18—Cooling Charging Chart, 50GL024 Units



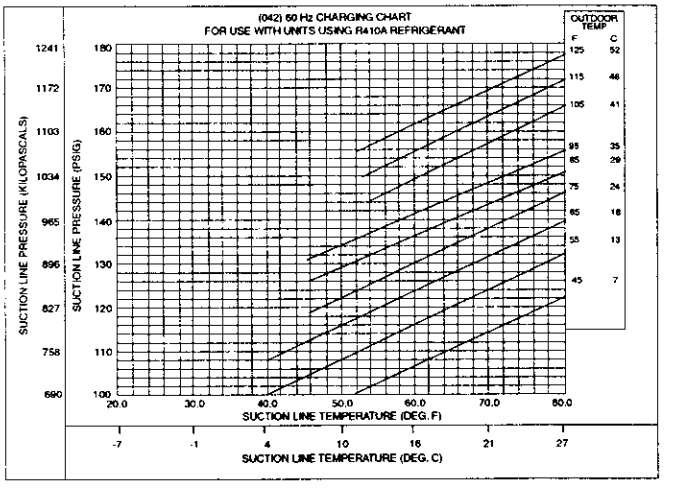
C99080

Fig. 19—Cooling Charging Chart, 50GL030 Units



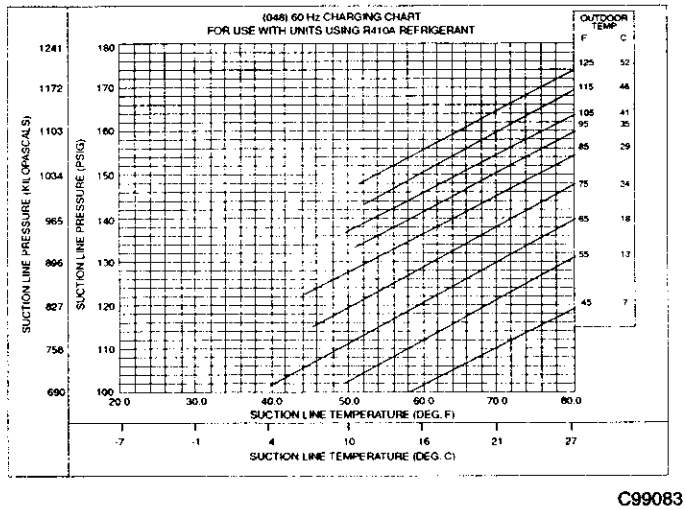
C99081

Fig. 20—Cooling Charging Chart, 50GL036 Units



C99082

Fig. 21—Cooling Charging Chart, 50GL042 Units



C99083

Fig. 22—Cooling Charging Chart, 50GL048 Units

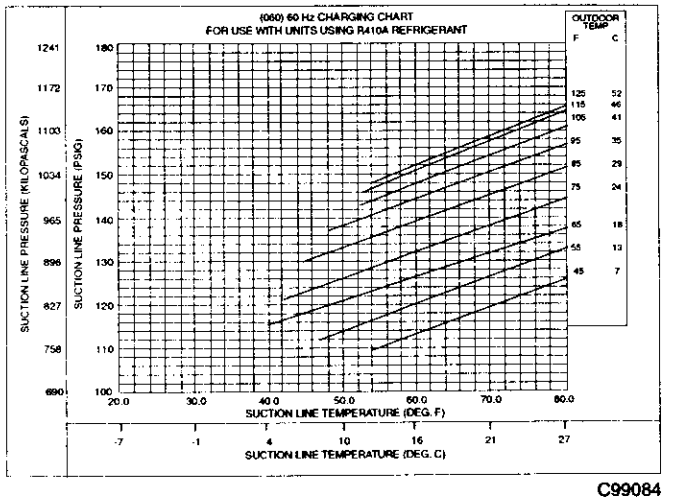


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Fig. 23—Cooling Charging Chart, 50GL060 Units

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

System under pressure. Relieve pressure and recover all refrigerant before system repair or final unit disposal to avoid serious injury or death. Use all service ports and open all flow-control devices, including solenoid valves.

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 airflow 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.

METERING DEVICE—ACCURATOR® PISTON — This metering device is a fixed orifice and is contained in the brass hex-body in the liquid line.

PRESSURE SWITCHES — Pressure switches are protective devices wired into 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. 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 ohmeter 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 gages read 0 psi. 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 610 psig.

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 ohmeter 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

Wear safety glasses and gloves when handling refrigerants. Keep torches and other ignition sources away from refrigerants and oils. Failure to follow this warning can cause a fire, serious injury, or death.

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 and 625 psi differential pressure.

The Copeland scroll compressor uses Mobil 3MA POE oil. This is the only oil allowed for oil recharge.

REFRIGERANT SYSTEM

REFRIGERANT

⚠ CAUTION

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 3MA 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. area.
2. Cover area in front of the unit service panel with a terry cloth shop towel to absorb lubricant spills and 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 base pan.
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.

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

Puron refrigerant operates at 50%-70% 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 5—Troubleshooting — Cooling

SYMPTOM	CAUSE	REMEDY
Compressor and condenser fan will not start	Power failure	Call power company
	Fuse blown or circuit breaker tripped	Replace fuse or reset circuit breaker
	Defective thermostat, contactor, transformer, control relay, high pressure, or loss-of-charge swtich	Replace component
	Insufficient line voltage	Determine cause and correct
	Incorrect or faulty wiring	Check wiring diagram and rewire correctly
	Thermostat setting too high	Lower thermostat setting below room temperature
Compressor will not start but condenser fan runs	Faulty wiring or loose connections in compressor circuit	Check wiring and repair or replace
	Compressor motor burned out, seized, or internal overload open	Determine cause. Replace compressor
	Defective run/start capacitor, overload, start relay	Determine cause and replace
	One leg of 3-phase power dead	Replace fuse or reset circuit breaker Determine cause
Three-phase scroll compressor (50GL030-060) makes excessive noise, and there may be a low pressure differential	Scroll compressor is rotating in the wrong direction	Correct the direction of rotation by reversing two of the 3-phase power leads to the unit. Shut down unit to allow pressures to equalize
Compressor cycles (other than normally satisfying thermostat)	Refrigerant overcharge or undercharge	Recover refrigerant, evacuate system, and recharge to capacities shown on nameplate
	Defective compressor	Replace and determine cause
	Insufficient line voltage	Determine cause and correct
	Blocked condenser	Determine cause and correct
	Defective run/start capacitor, overload or start relay	Determine cause and replace
	Defective thermostat	Replace thermostat
	Faulty condenser-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
	Thermostat set too low	Reset thermostat
	Low refrigerant charge	Locate leak, repair, and recharge
	Leaking valves in compressor	Replace compressor
	Air in system	Recover refrigerant, evacuate system, and recharge
	Condenser coil dirty or restricted	Clean coil or remove restriction
Excessive head pressure	Dirty air filter	Replace filter
	Dirty condenser coil	Clean coil
	Refrigerant overcharged	Recover excess refrigerant
	Air in system	Recover refrigerant, evacuate system, and recharge
	Condenser 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
	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 evaporator airflow	Increase air quantity. Check filter — replace if necessary
	Temperature too low in conditioned area	Reset thermostat.
	Outdoor ambient below 40 F	Install low-ambient kit
	Field-installed 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

___ Verify that all packing materials have been removed from unit

___ Verify that condensate connection is installed 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 and setscrew tightness

III. START-UP

Supply Voltage L1-L2 _____ L2-L3 _____ L3-L1 _____

Compressor Amps L1 _____ L2 _____ L3 _____

Indoor (Evaporator) Fan Amps _____

TEMPERATURE

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 tables

___ Verify that 3-phase scroll compressor (50GL030-060) is rotating in correct direction

* Measured at suction inlet to compressor
† Measured at liquid line leaving condenser

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