

# INSTALLATION AND MAINTENANCE INSTRUCTIONS (2,4)SA13 Series Electric Cooling Package Unit

## ⚠ WARNING

Improper installation, adjustment, alteration, service, or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information, consult a qualified installer or service agency.

## ⚠ WARNING

Installation and servicing of air conditioning equipment can be hazardous due to internal refrigerant pressure and live electrical components. Only trained and qualified service personnel should install or service this equipment. Installation and service performed by unqualified persons can result in property damage, personal injury, or death.

## ⚠ WARNING

Sharp metal edges can cause injury. When installing the unit, use care to avoid sharp edges.

## ⚠ WARNING

If this unit is to be installed in a mobile or manufactured home application, the ductwork must be sized to achieve static pressures within the manufacturer's guidelines. All other installation guidelines must also be followed. Failure to do so may result in equipment damage, personal injury, and improper performance of the unit.

## TABLE OF CONTENTS

INSTALLATION .....	2
OPERATION .....	7
MAINTENANCE .....	8
WIRING DIAGRAM .....	9
WARRANTY .....	10



Manufactured By  
**A.A.C.**

***A Lennox International Inc. Company***

421 Monroe Street  
Bellevue, OH 44811

## ⚠ CAUTION

The installation of this appliance must conform to the requirements of the National Fire Protection Association; the National Electrical Code, ANSI/NFPA No. 70 (latest edition) in the United States; the Canadian Electrical Code Part 1, CSA 22.1 (latest edition) in Canada; and any state or provincial laws or local ordinances. Local authorities having jurisdiction should be consulted before installation is made. Such applicable regulations or requirements take precedence over the general instructions in this manual.

## INSTALLATION

These instructions, and any instructions packaged with mating components and/or accessories, should be carefully read prior to beginning installation. Note particularly any **CAUTIONS** or **WARNINGS** in these instructions and all labels on the units.

These instructions are intended as a general guide only, for use by qualified personnel and do not supersede any national or local codes in any way. Compliance with all local, state, provincial, or national codes pertaining to this type of equipment should be determined prior to installation.

These instructions explain the recommended method of installation of the SA electric cooling unit and associated electrical wiring.

The SA unit is designed and approved for use as a self-contained air-to-air air conditioning system.

The unit is factory equipped with a transformer and blower control for applications without auxiliary heat. An electric heat accessory kit (PHK) can be ordered for field installation of additional heat where required.

**IMPORTANT:** This product has been designed and manufactured to meet ENERGY STAR criteria for energy efficiency. However, proper refrigerant charge and proper air flow are critical to achieve rated capacity and efficiency. Installation of this product should follow the manufacturer's refrigerant charging and air flow instructions. **Failure to confirm proper charge and airflow may reduce energy efficiency and shorten equipment life.**

### Inspection of Shipment

Upon receipt of equipment, carefully inspect it for possible shipping damage. If damage is found, it should be noted on the carrier's freight bill. Take special care to examine the unit inside the carton if the carton is damaged. File a claim with the transportation company.

If any damages are discovered and reported to the carrier **DO NOT INSTALL THE UNIT, as claim may be denied.**

**Check the unit rating plate to confirm specifications are as ordered.**

### Limitations

The unit should be installed in accordance with all national and local safety codes.

Limitations of the unit and appropriate accessories must also be observed.

The unit must not be installed with any ductwork in the outdoor air stream. The outdoor fan is not designed to operate against any additional static pressure.

## Location

The unit is designed to be located outdoors with sufficient clearance for free entrance to the air inlet and discharge air openings. The location must also allow for adequate service access.

The unit must be installed on a solid foundation that will not settle or shift. Adequate structural support must be provided. Maintain minimum clearances as shown in Table 1 and install the unit in level position. Isolate the base from the building structure to avoid possible transmission of sound or vibration into the conditioned space.

	To Combustible Material	For Service	For Proper Operation
Front	0"	48"	3"
Rear	0"	24"	3"
Condenser End	0"	24"	3"
Blower End	0"	30"	0"
Top	0"	36"	36"

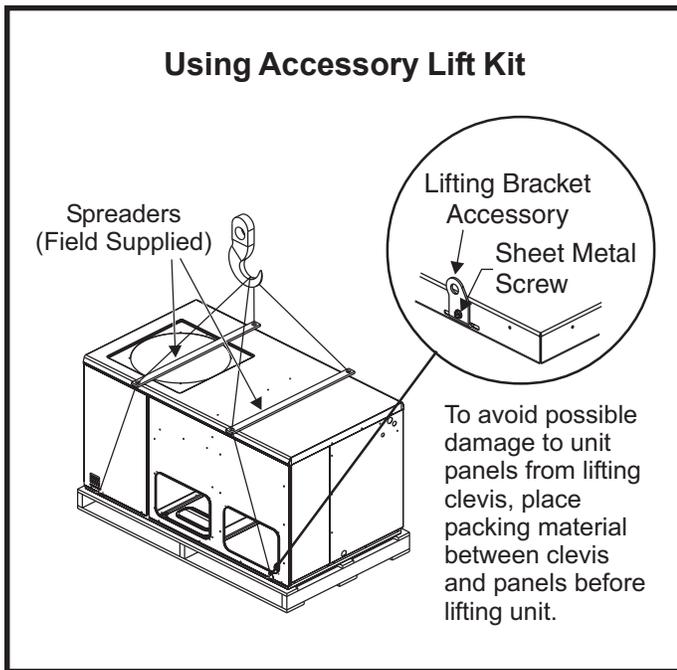
**Table 1**

**Avoid placing the unit near quiet areas such as sleeping quarters or study rooms.** Normal operating sound levels may be objectionable if the unit is placed near certain rooms.

**Do not permit overhanging structures or shrubs to obstruct condenser air discharge inlet or outlet.**

**For improved start-up performance, the indoor coil should be washed with suitable detergent to remove any residue from manufacturing processes.**

Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation. An accessory lift kit can be purchased to aid in rigging (see Figure 1). Spreaders whose length exceed the largest dimension across the unit **must be used across the top of the unit.** Recommended spreader length: 3 ton and smaller package units – 44", 3.5 ton and larger units – 54".



**Figure 1**

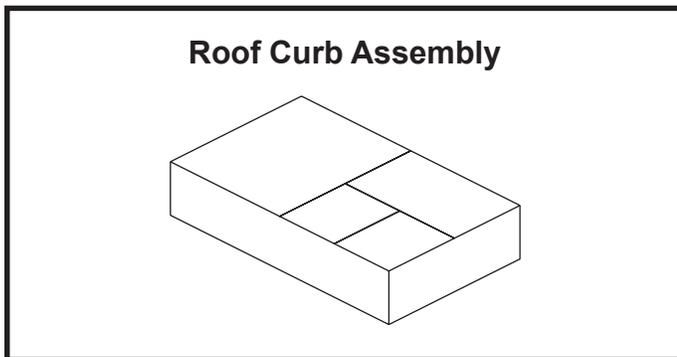
Units may also be moved or lifted with a forklift while still in the factory-supplied packaging. **The lengths of the forks of the forklift must be a minimum of 42".**

**CAUTION**

Before lifting a unit, make sure that the weight is distributed equally on the cables so that it will lift evenly.

**Roof Curb Installation**

If a roof curb is used, follow the manufacturer's Installation Instructions and be sure that all required clearances are observed (see following **Clearances** section).



**Figure 2**

**Clearances**

All units require certain clearances for proper operation and service. Refer to Table 1 for the minimum clearances to combustibles as well as minimum clearances necessary for servicing and proper unit operation.

In the U.S., units may be installed on combustible floors made from wood or class A, B, or C roof covering material. In Canada, units may be installed on combustible floors.

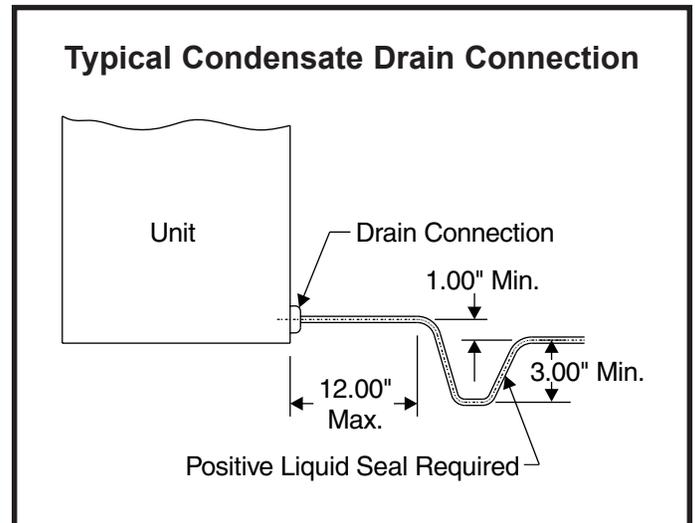
**Service Access**

Access to all serviceable components is provided by four removable panels: filter compartment, blower compartment, heater compartment, and top panel.

**Condensate Drain**

The SA package unit is equipped with a 3/4" FPT coupling for condensate line connection. Plumbing must conform to local codes. Use a sealing compound on male pipe threads.

**The condensate drain line must be properly trapped and routed to a suitable drain.** See Figure 3 for proper drain arrangement. The drain line must pitch to an open drain or pump to prevent clogging of the line. Seal around the drain connection with suitable material to prevent air leakage into the return air system.



**Figure 3**

**Ductwork**

Ductwork should be designed and sized according to the methods in Manual Q of the Air Conditioning Contractors of America (ACCA).

A closed return duct system shall be used. This shall not preclude use of economizers or outdoor fresh air intake. It is recommended that supply and return duct connections at the unit be made with flexible joints.

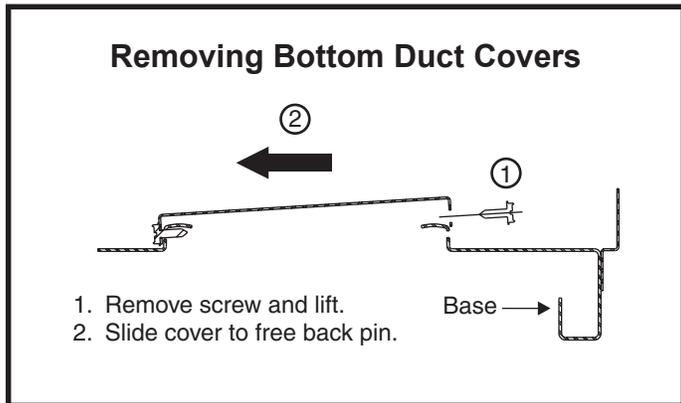
The supply and return air duct systems should be designed for the CFM and static requirements of the job. **They should not be sized by matching the dimensions of the duct connections on the unit.**

**Outdoor ductwork must be insulated and waterproofed.**

Equipment is shipped for side ductwork connection. The unit can be converted to bottom ductwork connection by removing the duct covers located over the bottom duct openings and placing these covers over the side duct openings (see Figure 4).

To remove the bottom duct cover over supply opening:

1. Remove screw on cover nearest side opening.
2. Lift end of cover slightly and push to slide back screw/pin free from duct flange.
3. Slide duct cover out the side duct opening.



**Figure 4**

**⚠ CAUTION**

When fastening ductwork to side duct flanges on unit, insert screws through duct flanges only; do not insert screws through casing. If using bottom duct work, do not use screws to secure ductwork to bottom duct opening under drain pan side. Using screws to secure bottom duct may damage drain pan.

**Filters**

Air filters are to be used with this heating/cooling unit. Filters are not factory supplied in the unit. **However, a filter frame accessory is available from the manufacturer that allows filters to be installed within the unit.** If the filter frame accessory is not used, a filter must be installed in the duct work by the installer. Filters must always be installed ahead of the evaporator coil and must be kept clean or replaced. Dirty filters will reduce the

airflow of the unit. Filters should be sized in accordance with Table 2.

Nominal Cooling	Filter Area (sq. ft.)
24,000	2.67
30,000	3.33
36,000	4.00
42,000	4.67
48,000	5.33
60,000	6.67

**Table 2**

**Electrical Wiring**

**⚠ WARNING**

Line voltage is present at all components when unit is not in operation on units with single pole contactors. Disconnect all remote electric power supplies before opening access panel. Unit may have multiple power supplies. Failure to disconnect all power supplies could result in personal injury or death.

**All wiring should be done in accordance with the National Electrical Code, ANSI/NFPA No. 70 (latest edition); Canadian Electrical Code Part 1, CSA C22.1 (latest edition); or local codes where they prevail.** Use wiring with a temperature limitation of 75°C minimum. Run the 208 or 230 volt, 60 hertz electric power supply through a fused disconnect switch to the connection box of the unit and connect as shown in the wiring diagram located on the inside of the control access panel.

**⚠ CAUTION**

When connecting electrical power and control wiring to the unit, waterproof type connectors must be used so that water or moisture cannot be drawn into the unit during normal operation.

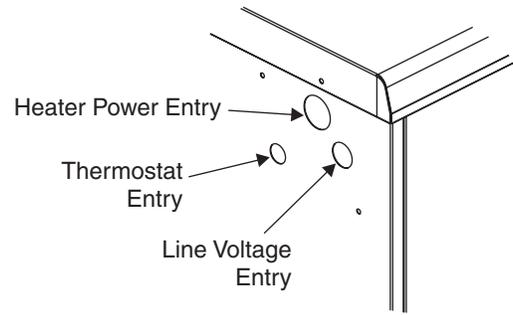
**⚠ WARNING**

Unit must be grounded in accordance with national and local codes. Failure to ground unit properly can result in personal injury or death.

Power supply to the unit must comply with all applicable codes and the National Electrical Code (NEC) or Canadian Electrical Code (CEC). A fused disconnect switch should be field provided for the unit. The switch must be separate from all other circuits.

If any of the wire supplied with the unit must be replaced, replacement wire must be of the type shown on the wiring diagram. Electrical wiring must be sized to carry minimum circuit ampacity marked on the unit. **Use copper conductors only.** Each unit must be wired with a separate branch circuit and be properly fused.

**Electrical Access**

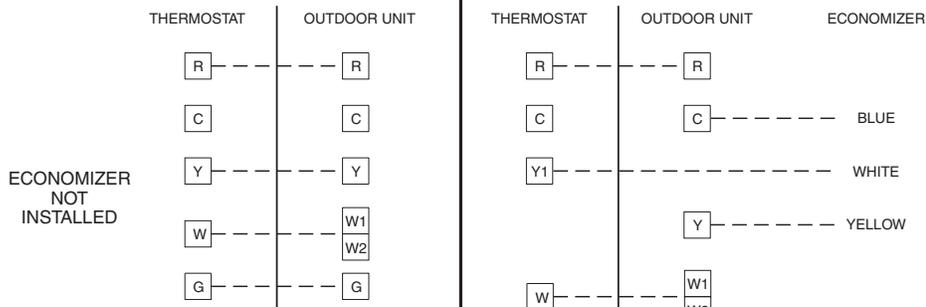


**Figure 5**

**Thermostat**

The room thermostat should be located on an inside wall where it will not be subject to drafts, sun exposure, or heat from electrical fixtures or appliances. Follow the

**Typical Wiring Connections**

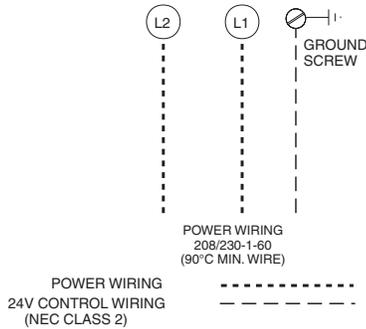


**⚠ CAUTION**

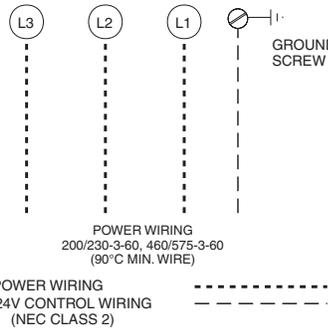
Do not connect **C** connections except when required by the indoor thermostat. Refer to the thermostat installation instructions.

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**TYPICAL WIRING CONNECTION  
1 PHASE**



**TYPICAL WIRING CONNECTION  
3 PHASE**

**Figure 6**

manufacturer's instructions enclosed with thermostat for general installation procedure. Color-coded insulated wires (#18 AWG) should be used to connect thermostat to unit. Four wires are required for cooling.

### Compressor

Units are shipped with compressor mountings factory-adjusted and ready for operation. **Caution: Do not loosen compressor mounting bolts.**

### Heater Kit Accessory (if used)

The unit is fully equipped for cooling operation without auxiliary heat. A heater kit accessory may also be used.

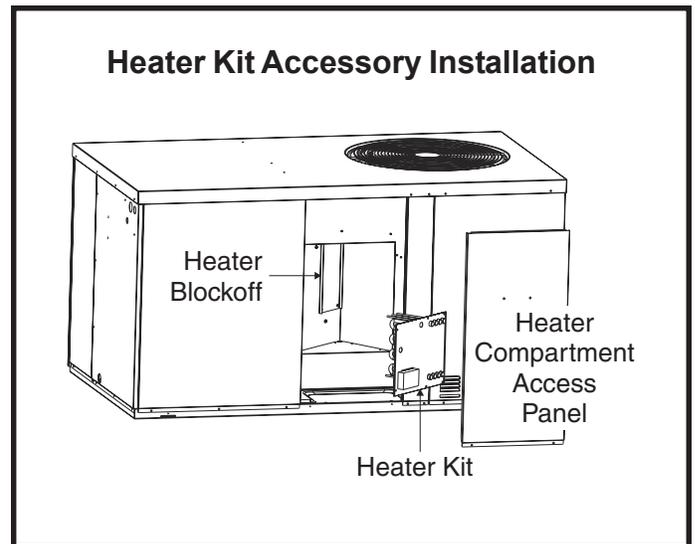
To install the heater kit accessory (see Figure 7):

1. Disconnect the power and remove the heater compartment access panel.
2. Disconnect the plug separating the high voltage wire harness. Remove the high voltage wire harness plug and discard.
3. Remove the heater blockoff by removing the four screws holding it in place.
4. Insert the heater into the control panel and fasten in the same mounting holes.
5. Plug the heater wiring harness into the wire harness on the control assembly. Field wiring of the auxiliary heater is separate from the unit power supply. Wire the power supply wiring for the heater to the appropriate connections on the heater kit.
6. Replace the heater compartment access panel and reconnect the power.

### Removal of Unit from Common Venting System

When an existing indoor furnace is removed from a common venting system serving other appliances, the venting system is likely to be too large to properly vent the remaining attached appliances. The following test should be conducted with each appliance while the other appliances connected to the common venting system are not in operation.

1. Seal any unused openings in the common venting system.
2. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion, or other deficiencies which could cause an unsafe condition.
3. Insofar as is practical, close all building doors and windows between the space in which the appliances remaining connected to the common venting system



**Figure 7**

are located and other spaces in the building. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.

4. Following the lighting instructions, place the unit being inspected in operation. Adjust the thermostat so the appliance will operate continuously.
5. Test for spillage at the draft control relief opening after 5 minutes of main burner operation. Use the flame of a match or candle.
6. Follow the preceding steps for each appliance connected to the common venting system.
7. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers, and any other fuel burning appliance to their previous condition of use.
8. If improper venting is observed during any of the above tests, the common venting system must be corrected. **See National Fuel Gas Code, ANSI Z223.1 (latest edition) or CAN/CGA B149.1 & .2 Canadian Installation Codes to correct improper operation of common venting system.**

## OPERATION

### Sequence of Operation

#### Cooling

Upon cooling demand, the thermostat closes circuit R and Y. Closing R and Y closes the unit contactor, starting the compressor and outdoor fan. The thermostat automatically closes R to G circuit which also brings on the indoor blower at the same time. Upon satisfying cooling demand, the thermostat will open the above circuits and open the main contactor, stopping the compressor and outdoor fan. If the unit is equipped with a delay timer, the blower will continue to operate for 90 seconds which improves system efficiency.

#### Circulating Air Blower

The circulating air blower is controlled by a timing circuit in the blower control. Timings are not adjustable.

There is no blower "on" delay after a call for heating or cooling. Blower "off" delay is 90 seconds after the thermostat is satisfied.

#### Cooling System Performance

For maximum performance of the cooling system, operating temperatures and pressure should be checked. Superheat should be determined at Standard ARI test conditions of 82°F outdoor and 80°F indoor dry bulb/67°F wet bulb. If superheat measured deviates from values found in Table 3, refrigerant charge should be adjusted accordingly for maximum performance.

Suction Superheat		
Size	Suction Superheat @ ARI Conditions 82° OD - 80° IDDB/67° IDWB	
	R22	410A
24	22°	15°
30	20°	15°
36	20°	12°
42	20°	12°
48, 60	20°	10°

Table 3

## MAINTENANCE

### WARNING

#### ELECTRICAL SHOCK, FIRE, OR EXPLOSION HAZARD

Failure to follow the safety warnings exactly could result in dangerous operation, serious injury, death, or property damage.

Improper servicing could result in dangerous operation, serious injury, death, or property damage.

- Before servicing, disconnect all electrical power to unit.
- When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.
- Verify proper operation after servicing.

At the beginning of each heating season, system should be checked as follows by a qualified service technician: Periodic inspection and maintenance normally consists of changing or cleaning the filters and cleaning the outdoor coil. On occasion, other components may also require cleaning.

#### Filters

Filters should be checked at least every 6 weeks. Disposable filters should be replaced when dirty, and cleanable filters should be cleaned regularly. It is important to keep the air filters clean, as dirty filters can restrict airflow and the blower motor depends upon sufficient air flowing across and through it to keep from overheating.

#### Motors

Indoor and outdoor fan and vent motors are permanently lubricated and require no maintenance.

#### Outdoor Coil

Dirt and debris should not be allowed to accumulate on the outdoor coil surface or other parts in the air circuit. Cleaning should be as often as necessary to keep coil clean. Use a brush, vacuum cleaner attachment, or other suitable means. If water is used to clean the coil, be sure the power to unit is shut off prior to cleaning. **Care should be used when cleaning the coil so that the coil fins are not damaged.**

**Do not permit the hot condenser air discharge to be obstructed by overhanging structures or shrubs.**

### Owner Record

Model # \_\_\_\_\_

Serial # \_\_\_\_\_

Installation Date \_\_\_\_\_

Installed by: \_\_\_\_\_

Dealer \_\_\_\_\_

Address \_\_\_\_\_

Telephone # \_\_\_\_\_

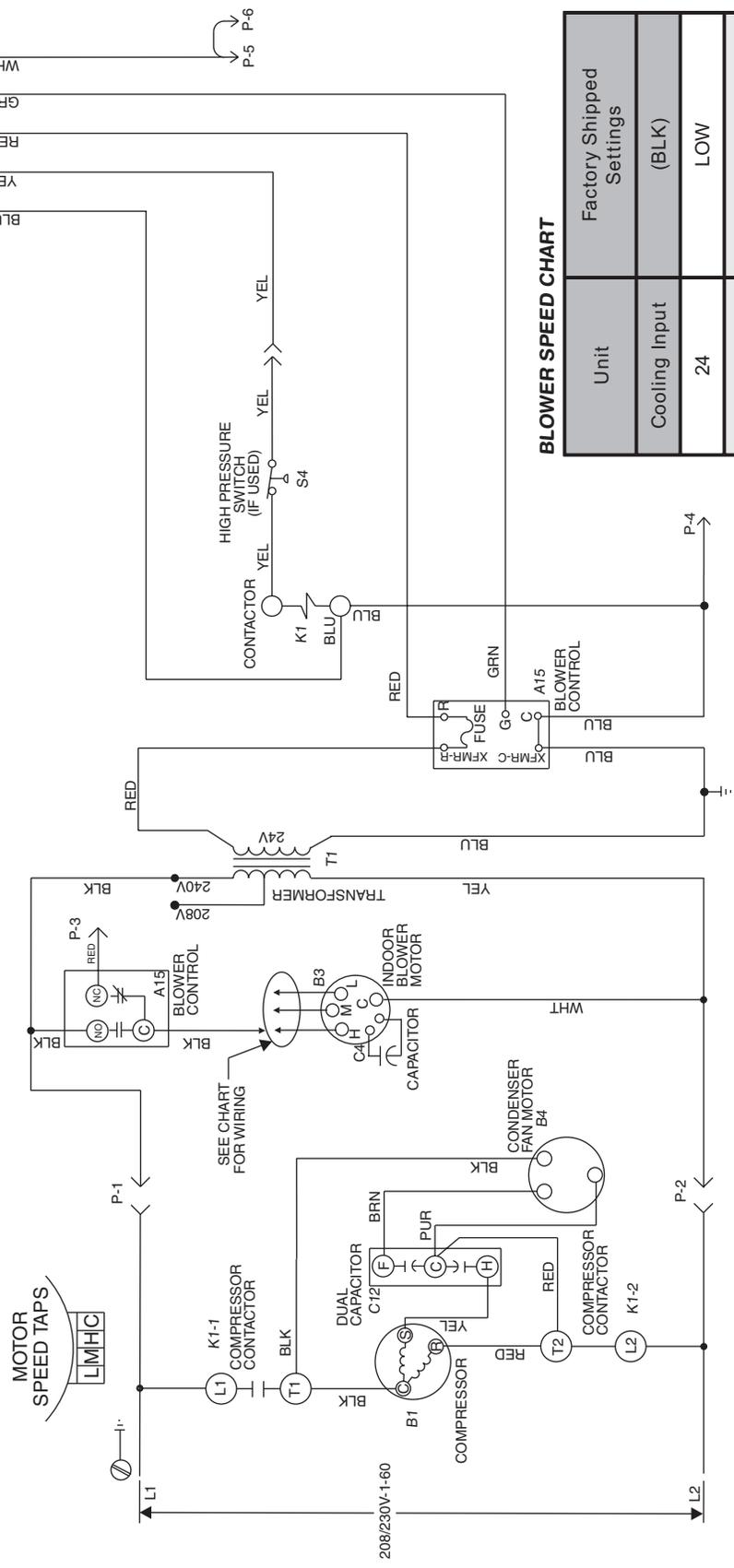
License # \_\_\_\_\_

**WARNING-**  
ELECTRIC SHOCK HAZARD. UNIT MUST BE GROUNDED  
IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.

**NOTE:**  
IF ANY OF THE ORIGINAL WIRE IS REPLACED,  
THE SAME SIZE AND TYPE WIRE MUST BE USED.  
USE COPPER CONDUCTOR ONLY, MIN 75°C WIRE.

W1 & W2 CAN BE USED TO STAGE ELECTRIC HEAT ACCESSORY ON 15 & 20KW MODELS.  
5, 7.5 & 10KW HEATER ACCESSORIES FUNCTION OFF W1 ONLY.

LINE VOLTAGE FIELD INSTALLED.



**BLOWER SPEED CHART**

Unit	Factory Shipped Settings
Cooling Input	(BLK)
24	LOW
30	MED
36	HIGH
42	LOW
48	MED
60	HIGH

**Wiring Diagram**  
**P/N 48396-001**