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Dallas, Texas, USA



**THIS MANUAL MUST BE LEFT WITH THE HOMEOWNER FOR FUTURE REFERENCE**

**⚠ WARNING**

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.  
Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency.

**⚠ WARNING**

The State of California has determined that this product may contain or produce a chemical or chemicals, in very low doses, which may cause serious illness or death. It may also cause cancer, birth defects, or reproductive harm.

**⚠ WARNING**

If this unit is to be installed in a mobile or manufactured home application, the duct system 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 unit performance.

**⚠ WARNING**



Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

# INSTALLATION INSTRUCTIONS

## 13CHAX SERIES UNITS

**PACKAGED ELECTRIC UNIT (2-5 TONS)**  
505,152M (38152A072)  
7/2012  
Supersedes 6/2011

**TP** Technical Publications  
Litho U.S.A.

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### Shipping and Packing List

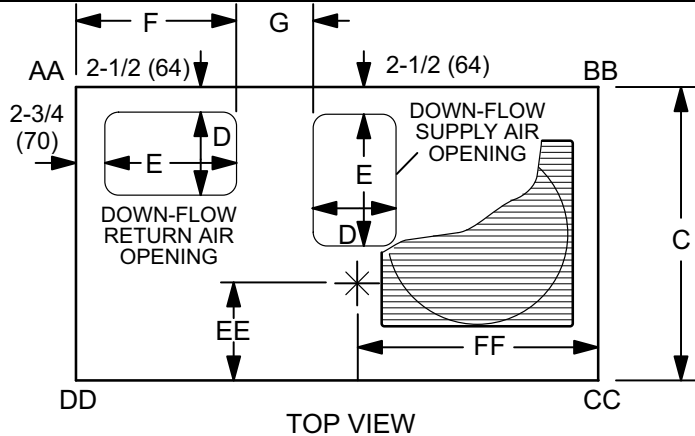
1 - Assembled packaged electric unit  
As soon as the unit is received, it should be inspected for possible damage during transit. If you find any damage, immediately contact the last carrier.

**⚠ CAUTION**

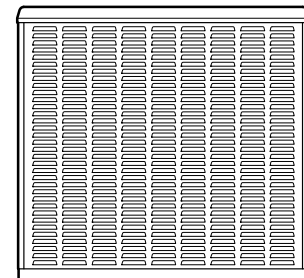
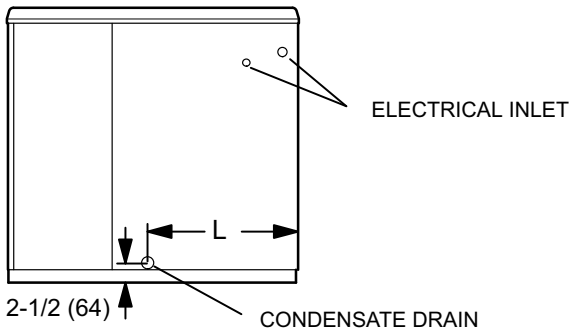
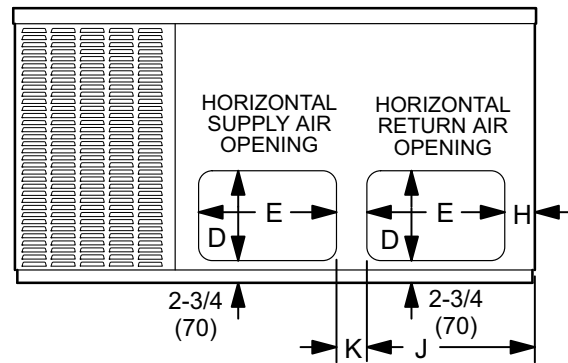
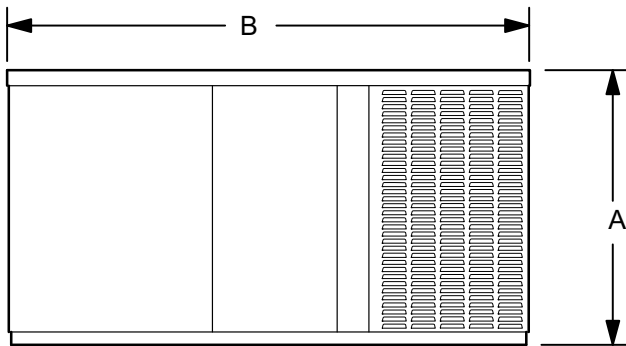
Danger of sharp metallic edges. Can cause injury. Take care when servicing unit to avoid accidental contact with sharp edges.



# 13CHAX Unit Dimensions - inches (mm)



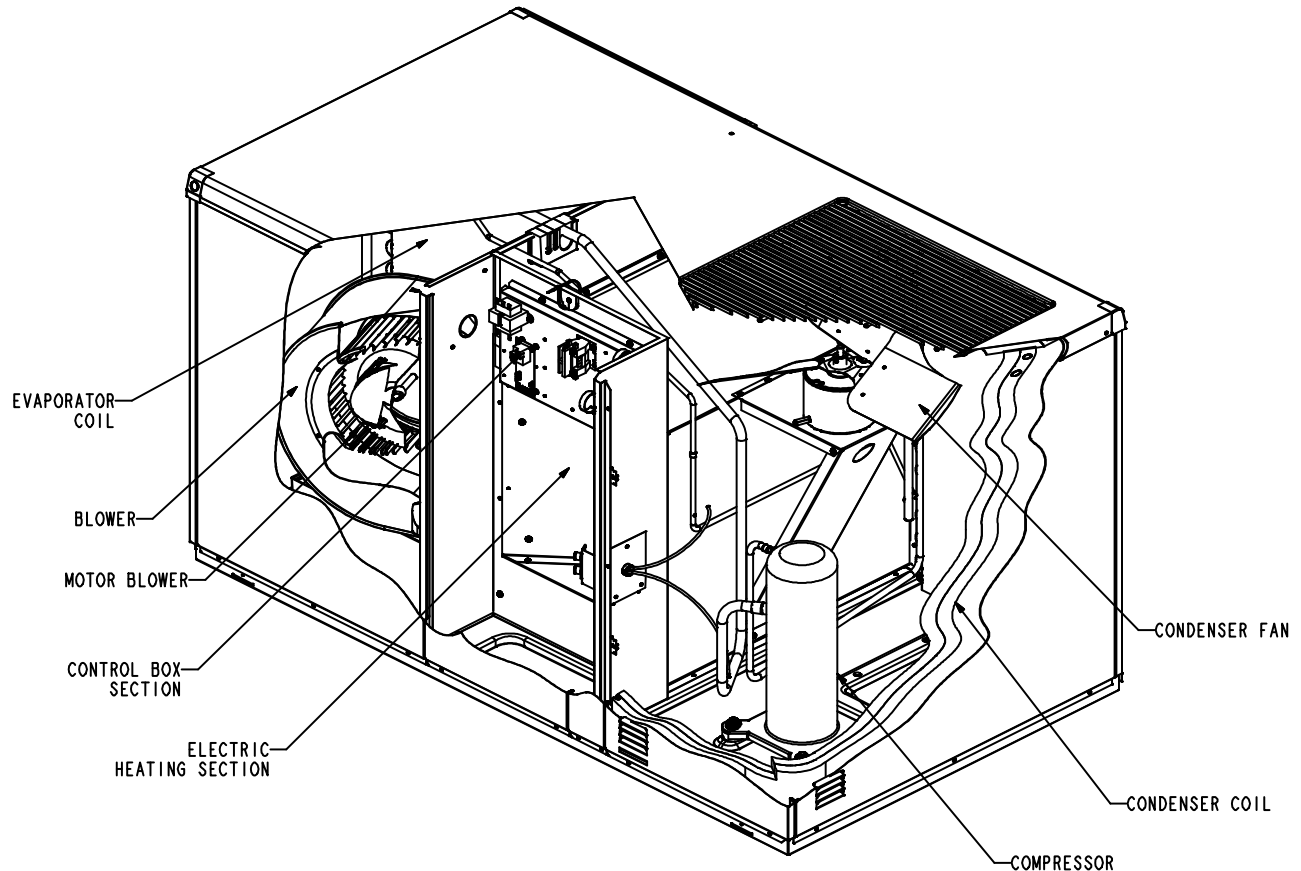
Model Number	Corner Weights				Center Of Gravity	
	AA lbs.	BB lbs.	CC lbs.	DD lbs.	EE in.	FF in.
13CHAXA-24	75	94	117	94	16	29
13CHAXA-30	75	94	117	94	16	29
13CHAXA-36	83	97	121	104	16	30
13CHAXA-42	110	138	163	129	21	33
13CHAXA-48	114	139	164	134	21	33.5
13CHAXA-60	119	145	171	140	21	33.5



Model No.	A		B		C		D		E		F	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
13CHAXAV-24												
13CHAXAV-30	34-1/4	870	65-3/8	1661	36-1/2	927	11-1/4	286	17-1/4	438	20	508
13CHAXAV-36												
13CHAXAV-42	38-1/4	972	75	1905	46	1168	11-1/4	286	19-1/4	489	22	559
13CHAXAV-48												
13CHAXAV-60												

Model No.	F		G		H		J		K		L	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
13CHAXAV-24												
13CHAXAV-30	20	508	8-1/2	216	3	76	20-1/4	514	4-1/2	114	19	483
13CHAXAV-36												
13CHAXAV-42												
13CHAXAV-48	22	559	9-1/4	241	3-1/4	83	22-1/4	572	4	102	16-1/4	413
13CHAXAV-60												

## Parts Arrangement



## General

These installation instructions are intended as a general guide only, for use by an experienced, qualified contractor. The 13CHAX units are single-package electric units designed for outdoor installation on a rooftop or a slab. The units are equipped with a transformer and blower control for applications which do not include electric heat. Electric heat sections are available for separate order.

The unit must be sized based on heat loss and heat gain calculations made according to the methods of the Air Conditioning Contractors of America (ACCA).

The units are shipped assembled. All piping, refrigerant charge, and electrical wiring are factory-installed and tested. The units require electric power, condensate drain and duct connections at the point of installation.

Use of this unit as a construction heater or air conditioner is not recommended during any phase of construction. Very low return air temperatures, harmful vapors and operation of the unit with clogged or misplaced filters will damage the unit.

If this unit has been used for heating or cooling of buildings or structures under construction, the following conditions must be met or the warranty will be void:

- A room thermostat must control the unit. The use of fixed jumpers that will provide continuous heating or cooling is not allowed.
- A pre-filter must be installed at the entry to the return air duct.
- The return air duct must be provided and sealed to the unit.
- Return air temperature range between 55°F (13°C) and 80°F (27°C) must be maintained.
- Air filters must be replaced and pre-filter must be removed upon construction completion.
- The unit components, duct system, air filters and evaporator coil must be thoroughly cleaned following final construction clean-up.
- The unit operating conditions (including airflow, cooling operation, and heating operation) must be verified according to these installation instructions.

## Requirements

These units must be installed in accordance with all applicable national and local safety codes.

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation.

If components are to be added to a unit to meet local codes, they are to be installed at the dealer's and/or customer's expense.

These units are design listed by UL in both the United States and Canada as follows:

- For use as a cooling unit.
- For outdoor installation only.
- For installation on combustible material.

## **⚠ WARNING**

**Product contains fiberglass wool.**

**Disturbing the insulation in this product during installation, maintenance, or repair will expose you to fiberglass wool dust. Breathing this may cause lung cancer. (Fiberglass wool is known to the State of California to cause cancer.)**

**Fiberglass wool may also cause respiratory, skin, and eye irritation.**

**To reduce exposure to this substance or for further information, consult material safety data sheets available from address shown below, or contact your supervisor.**

**Lennox Industries Inc.**

**P.O. Box 799900**

**Dallas, TX 75379-9900**

## Location Selection

Use the following guidelines to select a suitable location for these units.

- 1 - Unit is designed for outdoor installation only. Unit must be installed so all electrical components are protected from water.
- 2 - Condenser coils must have an unlimited supply of air.
- 3 - For ground level installation, use a level pre-fabricated pad or use a level concrete slab with a minimum thickness of 4 inches. The length and width should be at least 6 inches greater than the unit base. Do not tie the slab to the building foundation.

- 4 - Maintain level within a tolerance of 1/4 inch maximum across the entire length or width of the unit.

## Rigging and Setting Unit

Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation. An optional lifting lug kit (92M51) may be purchased separately for use in rigging the unit for lifting. Spreaders **MUST** be used across the top of the unit. Recommended spreader length: 2, 2-1/2, 3-ton units -- 44"; 3-1/2, 4, 5-ton units -- 54".

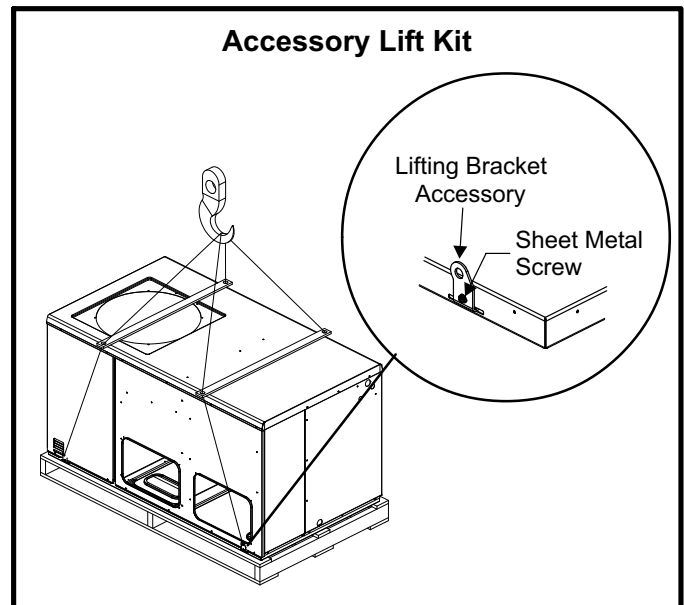


Figure 1

## **⚠ CAUTION**

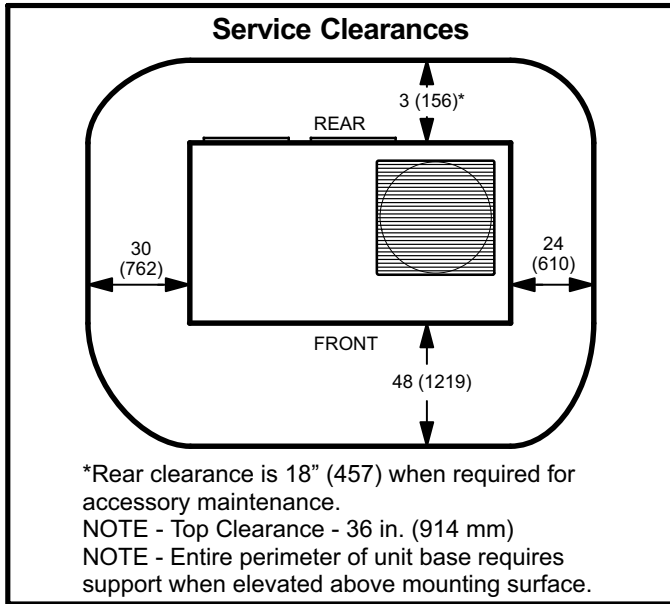
**Before lifting a unit, make sure that the weight is distributed equally on the cables so that it will lift evenly.**

Units may also be moved or lifted with a forklift while still in the factory supplied packaging.

*NOTE - Length of forks must be a minimum of 42 inches.*

## Clearances

All units require certain clearances for proper operation and service. Refer to figure 2 for the clearances required for combustible construction, servicing, and proper unit operation.



**Figure 2**

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

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.

**Existing Common Vent Systems**

The 13CHAX packaged cooling units with auxiliary electric heat may replace an existing furnace which is being removed from a venting system commonly run with separate gas appliances. In this case, the existing vent system is likely to be too large to properly vent the remaining attached appliances.

Conduct the following test while each appliance is operating and the other appliances (which are not operating) remain connected to the common venting system. If the venting system has been installed improperly, you **must** correct the system as indicated in the general venting requirements section.

- 1 - Seal any unused openings in the common venting system.
- 2 - Inspect the venting system for proper size and horizontal pitch. Determine that there is no blockage, restriction, leakage, corrosion, or other deficiencies which could cause an unsafe condition.
- 3 - Close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on clothes dryers and any appliances not connected to the common venting system. Turn on any 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 - Follow the lighting instructions. Turn on the appliance that is being inspected. Adjust the thermostat so that the appliance operates continuously.
- 5 - After the main burner has operated for 5 minutes, test for leaks of flue gases at the draft hood relief opening. Use the flame of a match or candle, or smoke from a cigarette, cigar, or pipe.
- 6 - After determining that each appliance connected to the common venting system is venting properly, (step 3) return all doors, windows, exhaust fans, fireplace dampers, and any other gas-burning appliances to their previous mode of operation.
- 7 - If a venting problem is found during any of the preceding tests, the common venting system must be modified to correct the problem.

Resize the common venting system to the minimum vent pipe size determined by using the appropriate tables in Appendix G. (These are in the current standards of the National Fuel Gas Code ANSI-Z223.1/NFPA 54 in the USA, and the appropriate Category 1 Natural Gas and Propane appliances venting sizing tables in the current standards of the CSA B149 Natural Gas and Propane Installation Codes in Canada.)

## Condensate Drain

The 13CHAX unit is equipped with a 3/4 inch FPT coupling for condensate line connection. Plumbing must conform to local codes. Use a sealing compound on male pipe threads.

The 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 a minimum of 1 inch per 10 feet to prevent clogging of the line. Seal around drain connection with suitable material to prevent air leakage into return air system.

*NOTE - Drain line connection may not carry the weight of the unsupported drain line. Support the drain line, if necessary.*

Drain piping should not be smaller than drain connection at coil. An open vent in drain line will some times be required due to line length, friction and static pressure. Drains should be constructed in a manner to facilitate future cleaning.

*NOTE - The condensate drain line MUST be trapped to provide proper drainage.*

## ⚠ CAUTION

Condensate line connection must be hand-tightened. Do not use tools.

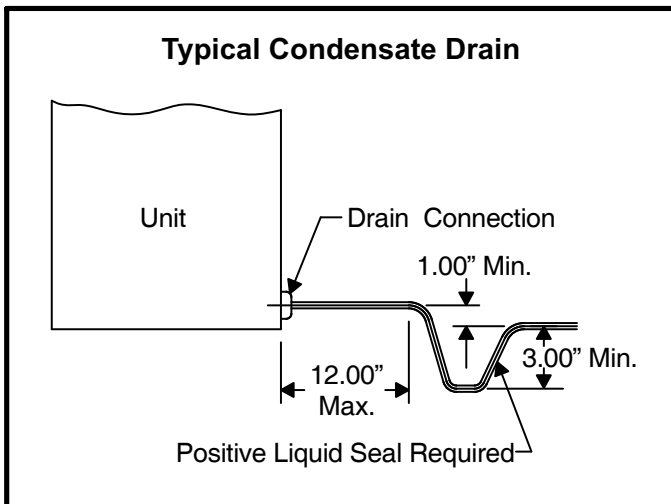


Figure 3

## Filters

Filters are not factory-supplied with the unit; however, optional internally installed filter kits are available. Filter kit 92M54 is used with 2, 2-1/2 and 3-ton units. Filter kit 92M55 is used with 3-1/2, 4 and 5-ton units. The filter kits

accommodate the use of 1", 2" or 4" filters. If the optional filter kit is not used, a filter must be field-installed.

Filters must always be installed ahead of evaporator coil and must be kept clean or replaced. Dirty filters will reduce the airflow of the unit. Filter sizes are shown in table 1.

Table 1  
Unit Filter Size

Unit Model	Filter Size	Filter Quantity
-24, -30, -36	20 in. X 25 in.	1
-42, -48, -60	16 in. X 25 in.	2

## Supply and Return Duct Connections

The duct system 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 simply matching the dimensions of the duct connections on the unit.**

**Ducting installed outdoors MUST be insulated and waterproofed.**

## ⚠ CAUTION

When fastening duct system to side duct flanges on unit, insert screws through duct flanges only. Do not insert screws through casing. Outdoor duct must be insulated and waterproofed.

The 13CHAX unit is shipped ready for horizontal air discharge (side duct connections). If bottom air discharge is desired, the covers must be removed from the supply and return air openings on the bottom of the unit and re-installed to cover the side openings.

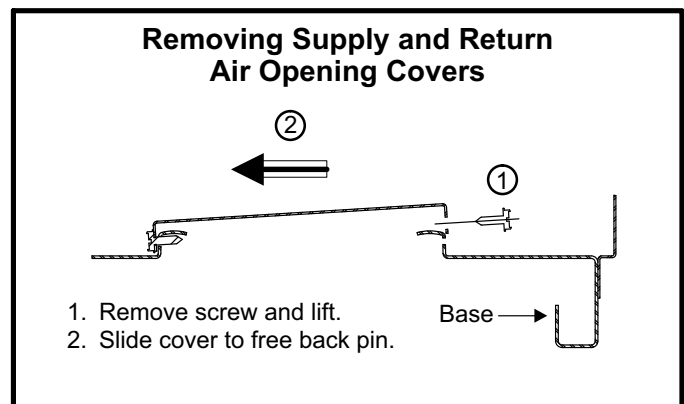


Figure 4

## Compressors

Units are shipped with the compressor mountings factory-adjusted and ready for operation.

## ⚠ CAUTION

Do not loosen compressor mounting bolts.

## Electrical

All wiring should be done in accordance with the current National Electric Code ANSI/NFPA No. 70 in the United States. In Canada, wiring must be done in accordance with the current CSA C22.2 Part 1. Local codes may take precedence.

Use wiring with a temperature limitation of 75°C min.; run the 208 or 230 volt, 60 hertz electric power supply through a fused disconnect switch to control box of unit and connect as shown in the wiring diagram located on the inside of the control access panel. Refer to figure 5 for electrical access.

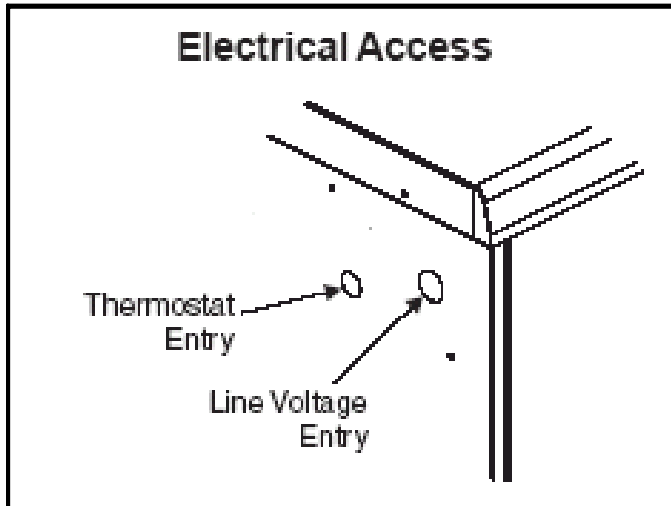


Figure 5

Unit must be electrically grounded in accordance with local codes or in the absence of local codes with the National Electric Code, ANSI/NFPA No. 70 (latest edition) or CSA C22.2 Part 1 (latest edition).

Power supply to the unit must comply with all applicable codes and NEC or 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.

## ⚠ WARNING

Unit is equipped with a single-pole contactor. Line voltage is present at all components when unit is not in operation. 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.

## ⚠ 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.

See figure 7 for typical field wiring connections and figure 8 for typical unit wiring diagram.

### Optional Electric Heat

Optional electric heat is available and must be purchased separately. Install the electric heat section as outlined in the installation instructions packaged with the electric heat section.

### Thermostat

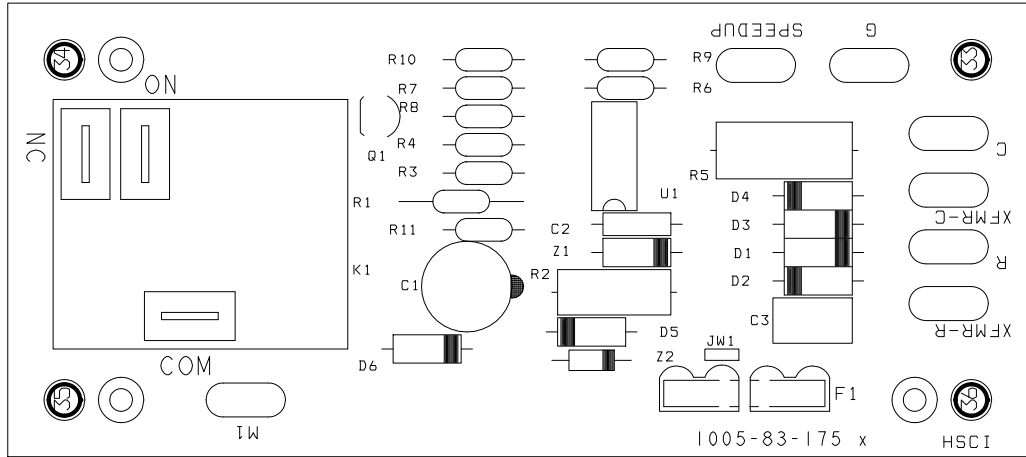
The room thermostat should be located on an inside wall where it will not be subject to drafts, sun exposure or heat from electrical fixtures or appliances. Follow manufacturer's instructions enclosed with thermostat for general installation procedure. Color coded insulated wires (# 18 AWG) should be used to connect thermostat to unit.

### Blower Control Board

The circulating air blower is controlled by a blower control board located in the unit control box. Blower operation is NOT delayed after a call for either heating or cooling. A blower "off" delay of 90 seconds begins when the thermostat demand is satisfied. These delays are not adjustable. See figure 6.

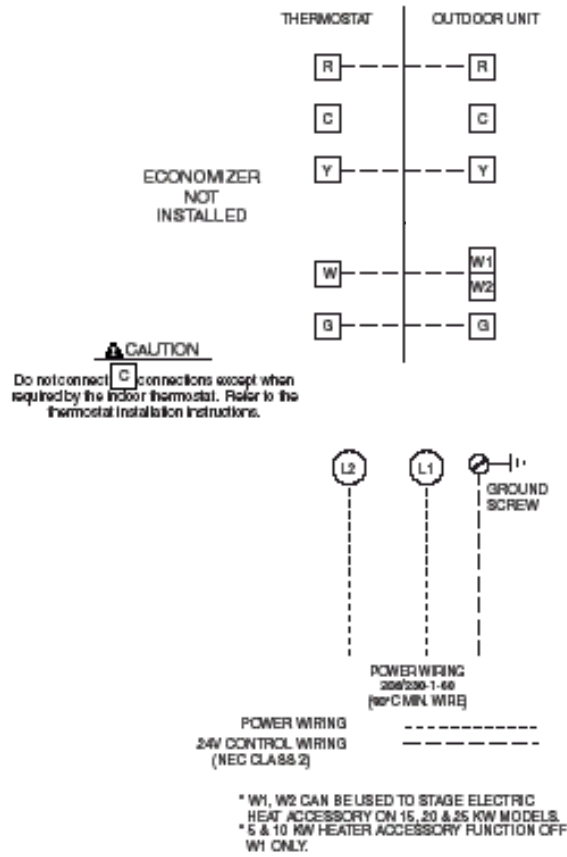
*NOTE - With the proper thermostat and subbase, continuous blower operation is possible by closing the R to G circuit. Cooling blower delay is also functional in this mode.*

## Blower Drive Control



**Figure 6**

## Typical Single-Phase Unit Wiring Connections



**Figure 7**



# 13CHAX Series Packaged Electric Units

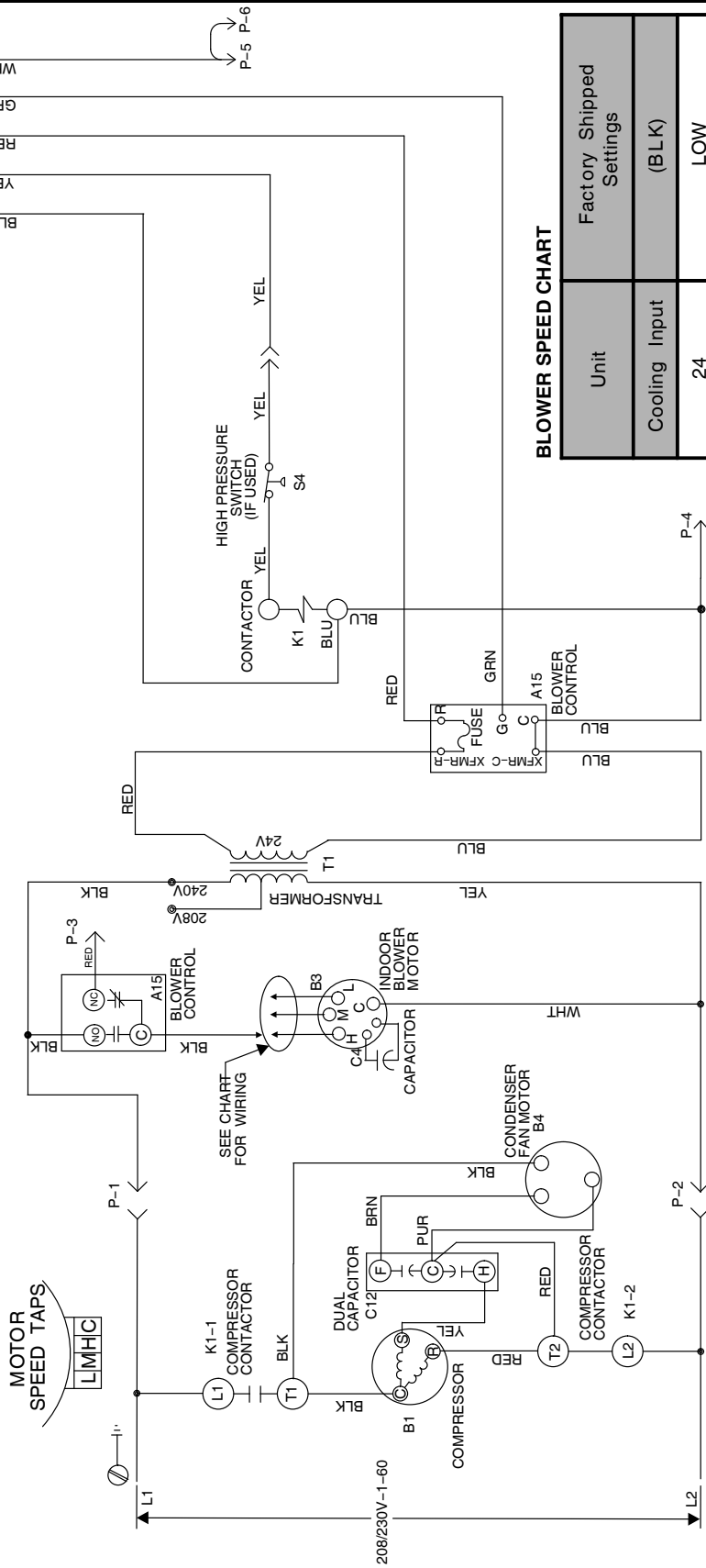
## Typical Wiring Diagram

**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

## Unit Start-Up and Operation

Each 13CHAX packaged cooling unit is factory-charged with R-410A refrigerant. The compressor is hermetically sealed, internally sprung and base-mounted with rubber-insulated hold-down bolts.

### Pre-Start Check List:

- 1 - Make sure refrigerant lines do not rub against the cabinet or each other.
- 2 - Inspect all electrical wiring, both factory- and field-installed, for loose connections.
- 3 - Check voltage at the disconnect switch. Voltage must be within the range listed on the unit nameplate. If not, consult power company and have voltage condition corrected before starting unit.
- 4 - Recheck voltage with unit running. If power is not within the range listed on the unit nameplate, stop the unit and consult the power company. Check unit amperage. Refer to unit nameplate for correct running amps.
- 5 - Make sure filter is in place before unit start-up.

### Cooling Sequence of Operation

When the thermostat calls for cooling, the "R" to "Y" circuit is closed to energize the compressor contactor. The contactor brings on both the compressor and outdoor fan. The thermostat also closes the "R" to "G" circuit to energize the circulating air blower. When the cooling demand is satisfied, the thermostat opens the circuits, as well as the compressor contactor. The compressor and outdoor fan immediately stop. The circulating air blower continues operating through a 90-second delay.

Unit compressors have internal protection. If there is an abnormal rise in the compressor temperature, the protector will open and the compressor will stop.

### System Performance

For maximum performance of this cooling system, the operating temperatures and pressure should be checked and superheat determined at Standard ARI test conditions of 82° F outdoor temperature / 80° F indoor dry bulb / 67° F indoor wet bulb. If superheat measured deviates from values in table 2, refrigerant charge should be adjusted accordingly for maximum performance.

**Table 2**  
**Suction Superheat Values**

Unit Model No.	Suction Superheat 82° F OD / 80° F IDDB / 67° F IDWB
13CHAX-24 13CHAX-30	16°
13CHAX-36	12°
13CHAX-42 13CHAX-48 13CHAX-60	16°

Verify system performance using table 3 as a general guide. Table 3 should not be used for charging unit. Minor variations in these pressures may be expected due to differences in installations. Significant differences could mean that the system is not properly charged or that a problem exists with some component in the system.

Used carefully, this table could serve as a useful service guide. Data is based on 80°F dry bulb / 67°F wet bulb return air. Allow unit operation to stabilize before taking pressure readings.

**Table 3**  
**Normal Operating Pressures**

80°F db / 67°F wb RETURN AIR		Air Temperature Entering Outdoor Coil (°F)											
UNIT	PRESSURE	65	70	75	80	82	85	90	95	100	105	110	115
13CHAX-24	Suction	133	136	138	141	142	143	146	149	150	152	155	157
13CHAX-30		133	135	138	140	141	142	144	147	148	149	151	153
13CHAX-36		140	142	144	146	147	148	150	152	154	155	157	159
13CHAX-42		124	127	130	133	134	135	138	142	142	144	147	149
13CHAX-48		139	140	142	143	144	145	146	148	148	149	150	152
13CHAX-60		142	143	144	146	146	147	148	149	151	152	154	156
13CHAX-24	Liquid	222	245	267	290	299	312	335	358	379	397	429	456
13CHAX-30		232	255	277	300	309	323	345	368	390	408	440	467
13CHAX-36		241	265	288	312	321	336	360	382	409	429	461	488
13CHAX-42		223	247	270	294	303	317	339	364	384	402	434	461
13CHAX-48		239	261	284	306	315	328	349	373	391	408	440	467
13CHAX-60		258	281	303	326	335	349	373	394	420	439	471	498

## Condenser Fan Clearances

The top of the condenser fan should be 1-1/2 inches from the bottom of the top grille. This dimension should be checked and the fan should be adjusted accordingly any time servicing of the outdoor fan system is required.

## Maintenance

At the start of each cooling season, this equipment should be serviced by a qualified technician. Periodic inspection and maintenance normally consists of changing or cleaning filters and (under some conditions) cleaning the main burners.

### Filters

Not supplied. Inspect once a month. Replace disposable or clean permanent type as necessary. DO NOT replace permanent type with disposable.

### Motors

Indoor, outdoor fan and vent motors are permanently lubricated and require no further lubrication. Motors should be cleaned yearly to prevent the accumulation of dust and dirt on the windings or motor exterior.

### Coil

Dirt and debris should not be allowed to accumulate on the coil surfaces or other parts in the air conditioning circuit. Cleaning should be performed as often as necessary. 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.

*NOTE - 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.

## Planned Services

You should expect a service technician to check the following items during an annual inspection. Power to the unit must be shut off for the service technician's safety.

- Fresh air grilles and louvers Must be open and unobstructed to provide air.
- Unit appearance must be inspected for rust, dirt, signs of water, burnt or damaged wires, or components. A good coat of auto wax can extend the appearance.
- Blower access door must be properly in place.
- Return air duct must be properly attached and provide an air seal to the unit.
- Operating performance — Unit must be observed during operation to monitor proper performance of the unit and the vent system.

Problems detected during the inspection may make it necessary to temporarily shut down the unit until the items can be repaired or replaced.

Pay attention to your unit. Situations can arise between annual unit inspections that may result in unsafe operation.

## Accessories

The following repair parts are available from your local dealer. When ordering parts, include the complete model number and serial number which are printed on the unit rating plate. All service must be performed by a licensed professional installer (or equivalent) or service agency.

Accessories	
Description	LENNOX Cat. Number
Filter Kit (2-ton to 3-ton capacity units)	92M54
Filter Kit (3-1/2-ton to 5-ton capacity units)	92M55