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Dallas, Texas, USA



**RETAIN THESE INSTRUCTIONS
FOR FUTURE REFERENCE**

Shipping & Packing List

1 - Assembled heat pump package unit

As soon as the unit is received, inspect the unit for possible damage during transit. If damage is evident, the extent of the damage must be noted on the carrier's freight bill. Make a separate request for inspection by the carrier's agent.

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.

⚠ 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

INSTALLATION INSTRUCTIONS

12CHP SERIES UNITS

PACKAGED HEAT PUMP UNIT (2-5 TONS)
504,176M
06/03
Supersedes 01/00

TP Technical
Publications
Litho U.S.A.

Table of Contents

Shipping & Packing List	1
General	1
Unit Dimensions	2
Parts Arrangement	3
Requirements	3
Clearances	4
Rigging & Setting Unit	4
Condensate Drain	4
Filters	4
Supply & Return Connections	5
Outdoor Fan Clearances	5
Compressors	5
Optional Electric Heat	5
Electrical	6
System Performance	7
Sequence of Operation	10
Maintenance	11
Repair Parts List	11

General

These instructions explain the recommended method of installation of the heat pump unit, and associated electrical wiring.

This unit is designed and approved for use as a self-contained air to air outdoor heat pump system.

The units are factory equipped with a transformer and blower control for applications without auxiliary heat. Electric heat accessory kits (ECH29) can be ordered for field installation of additional heat where required.

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 Notes 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.



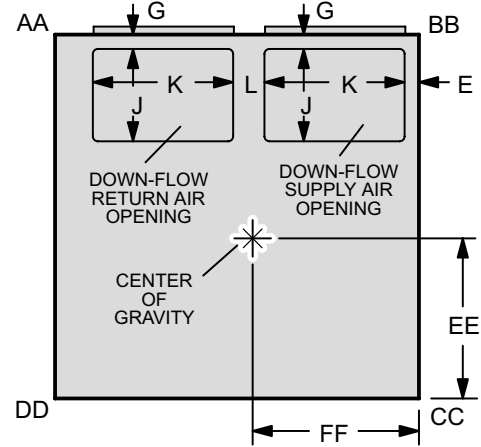
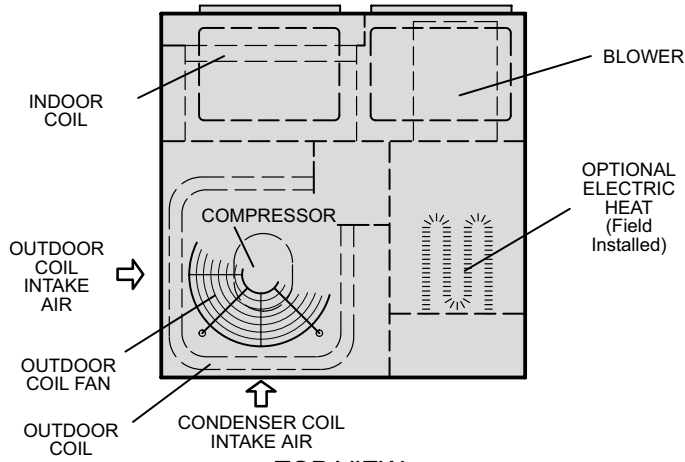
Unit Dimensions - inches (mm)

CORNER WEIGHTS — lbs. (kg)

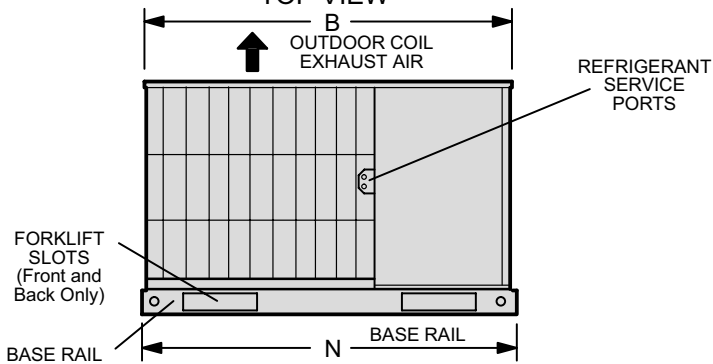
Model Number	AA		BB		CC		DD	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg
12CHP024	77	35	56	25	61	28	82	37
12CHP030	86	39	63	29	69	31	92	42
12CHP036	117	53	85	39	93	42	125	57
12CHP042	118	54	86	39	94	43	126	57
12CHP048	121	55	88	40	96	44	129	59
12CHP060	127	57	92	42	101	46	135	61

CENTER OF GRAVITY — inches (mm)

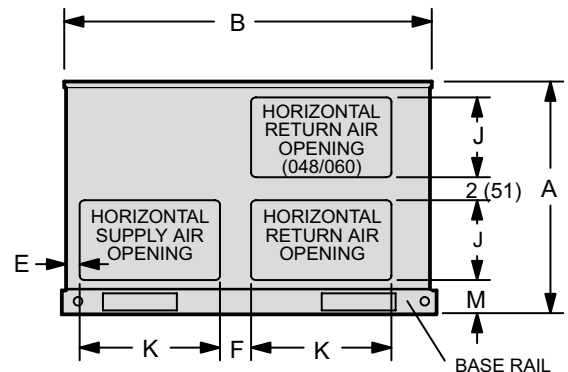
Model Number	EE		FF	
	inch	mm	inch	mm
12CHP024	21-7/8	556	26-1/2	673
12CHP030	21-7/8	556	26-1/2	673
12CHP036	23-3/4	603	31-1/4	794
12CHP042	23-3/4	603	31-1/4	794
12CHP048	23-3/4	603	31-1/4	794
12CHP060	23-3/4	603	31-1/4	794



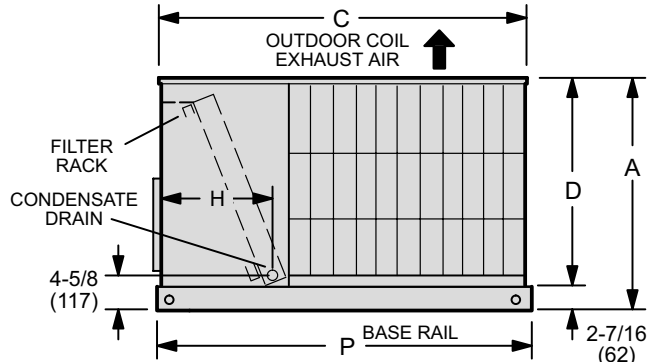
TOP VIEW BASE SECTION



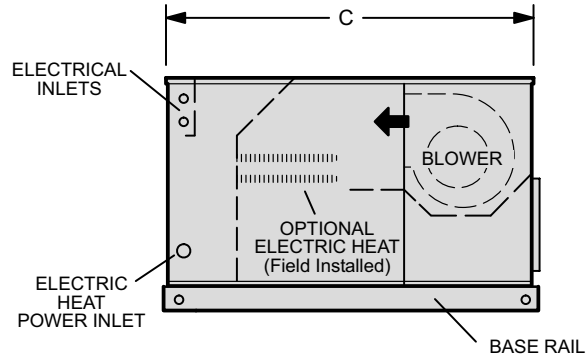
FRONT VIEW



BACK VIEW



LEFT SIDE



RIGHT SIDE

Model Number	A		B		C		D		E		F		G	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
-024	27-11/16	703	45-5/8	1159	45-5/8	1159	25-1/4	641	1-13/16	46	4	102	1-7/8	48
-030	31-11/16	805	45-5/8	1159	45-5/8	1159	29-1/4	743	1-13/16	46	4	102	1-7/8	48
-036, -042, -048, -060	33-11/16	856	54-11/16	1389	49-5/8	1260	31-7/16	799	1-1/8	29	6-1/4	159	2-1/4	57

Model Number	H		J		K		L		M		N		P	
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
-024	15-5/8	397	11-1/2	292	17-1/2	445	4	102	5	127	46-3/8	1179	46-3/8	1179
-030	15-5/8	397	11-1/2	292	17-1/2	445	4	102	5	127	46-3/8	1179	46-3/8	1179
-036, -042, -048, -060	17-1/8	435	12	305	21-1/2	546	5-5/8	143	4-1/8	105	55-1/4	1403	50-1/2	1283

Parts Arrangement

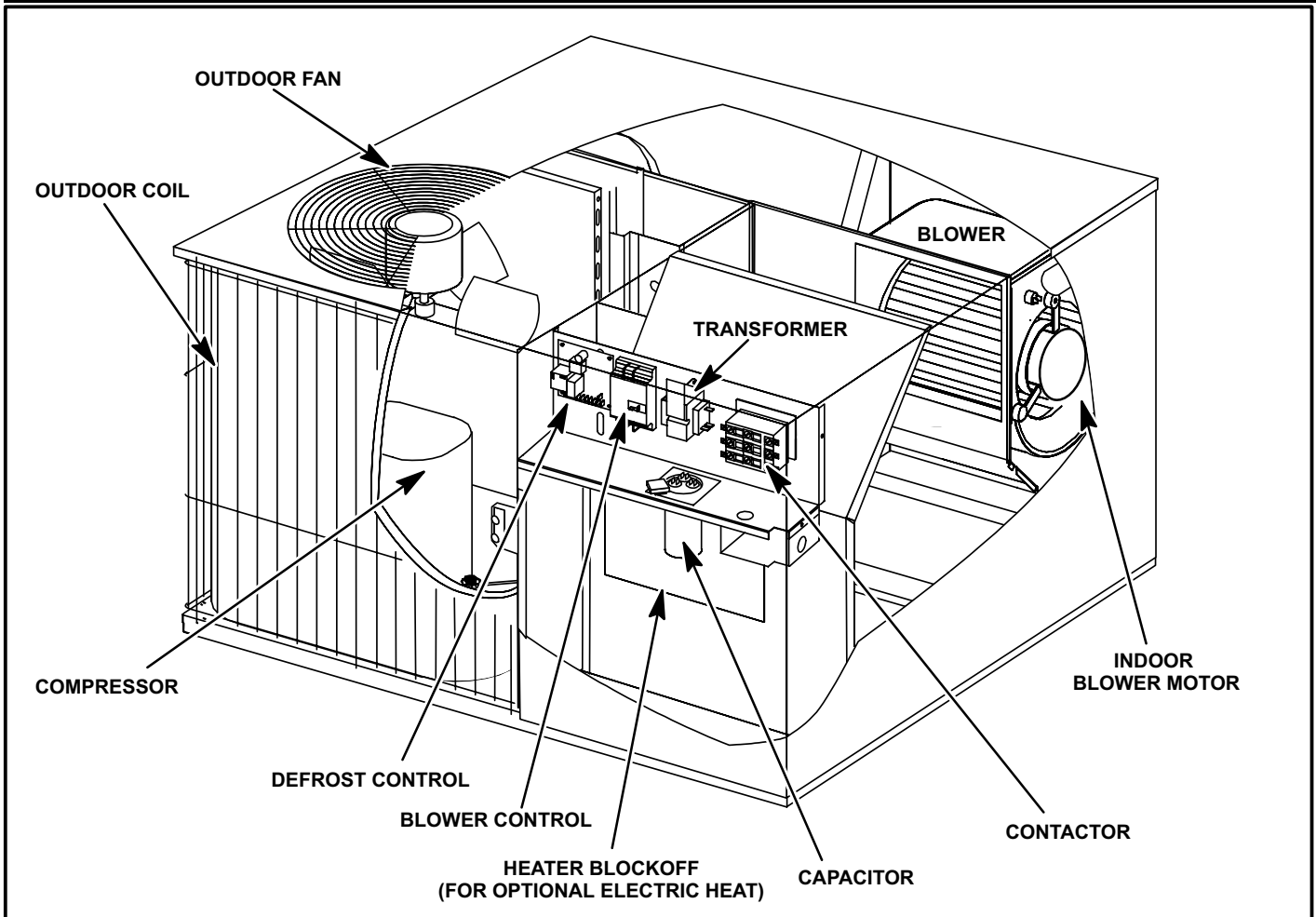


FIGURE 1

Requirements

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer or service agency.

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

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

Limitations for unit and appropriate accessories must also be observed.

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

Minimum and maximum operating conditions must be observed to assure maximum system performance with minimum service required.

Clearances

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. Units must be installed outdoors.

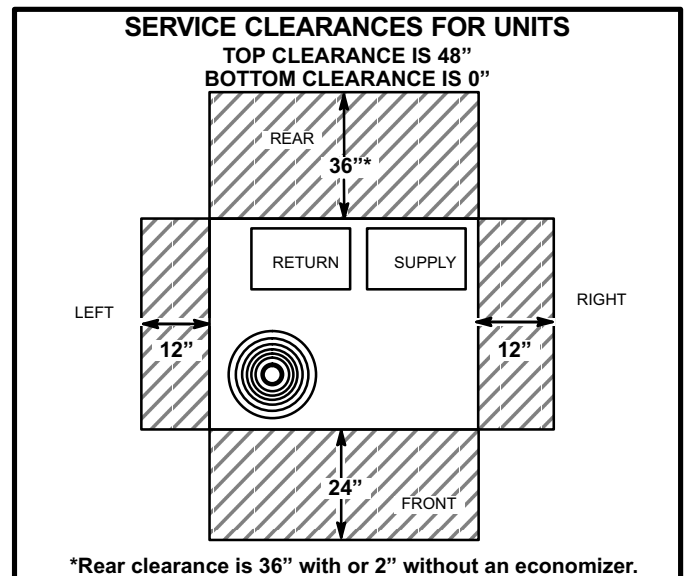


FIGURE 2

Rigging & Setting Unit

Exercise care when moving the unit. Do not remove any packaging until unit is near the place of installation. A sling assembly may be used to lift the unit. Spreaders which are longer than the largest dimension across unit **MUST** be used across the top of the unit.

⚠ 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.

FORKS MUST BE A MINIMUM OF 42 INCHES LONG.

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

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

Specially designed roof curbs are available for these units. Using any other roof curb may result in water leaking into conditioned space. The specified roof curb is designed to allow water from the bottom of the condensing coil to run off.

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 illustration and install unit in level position. Isolate the base from the building structure to avoid possible transmission of sound or vibration into conditioned space.

Unit foundation should be raised to a minimum of 3" above finish grade. In areas which have prolonged periods of temperature below freezing and snowfall, the unit should be elevated above the average snow line. Also extra precaution should be taken to allow free drainage of condensate from defrost cycles to prevent ice accumulation. Unit should not be located near walkways to prevent possible icing of surface from defrost condensate.

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

Condensate Drain

The packaged heat pumps are equipped with a 3/4" fpt coupling for condensate line connection. The drain line must be properly trapped and routed to a suitable drain. See illustration for proper drain arrangement. The drain line must pitch to an open drain or pump to prevent clogging of the line.

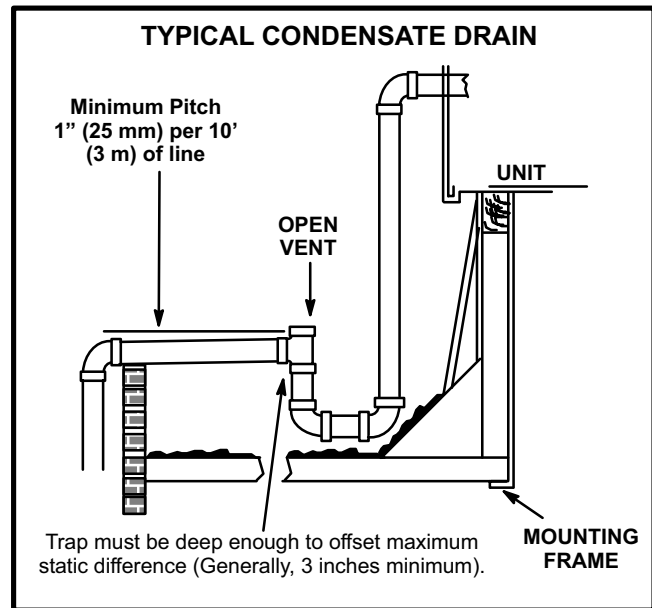


FIGURE 3

Filters

No filters are supplied with the unit. Filters must be installed ahead of the evaporator coil and must be cleaned or replaced as necessary. Dirty filters will reduce the airflow of the unit. Filters should be sized in accordance with Table 1 below.

TABLE 1
FILTER SIZES

UNIT MODEL	FILTER SIZE
12CHP-024, -030	24" X 25"
12CHP-036, -042, -048, -060	30" X 30"

Supply & Return Connections

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 to match the dimensions of the duct connections on the unit.**

⚠ 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.

Outdoor Fan Clearances

Figure 4 illustrates the critical measurements of the outdoor fan system. This dimension should be checked and fan adjusted accordingly anytime servicing of the outdoor fan system is required.

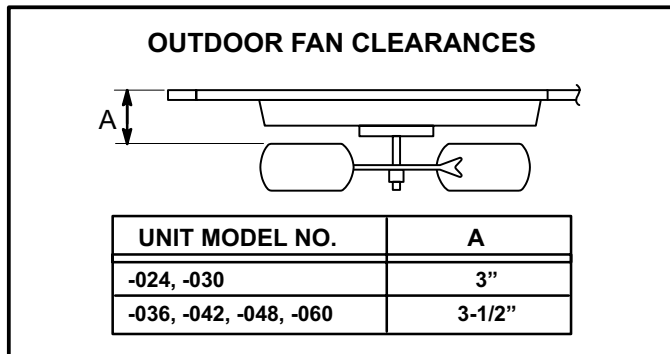


FIGURE 4

Compressors

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

⚠ CAUTION

Do not loosen compressor mounting bolts.

Optional Electric Heat

The unit is fully equipped for heat pump operation without auxiliary heat.

Installing Optional Electric Heat Section

- 1 - Disconnect power and open main control access.
- 2 - Disconnect the plug separating the high voltage wire harness.
- 3 - Remove the high voltage wire harness plug and discard.
- 4 - Remove the heater blockoff by removing the four screws holding it in place.
- 5 - Cut away insulation covering opening, using the hole in the panel as a template.
- 6 - Insert the heater into the control panel and fasten in the same mounting holes. See figure 5.
- 7 - Plug the heater wiring harness into the wire harness on the control assembly.
- 8 - Field wiring of auxiliary heater is separate from unit power supply. Wire power supply wiring for the heater to appropriate connections on heater kit.

OPTIONAL ELECTRIC HEAT INSTALLATION

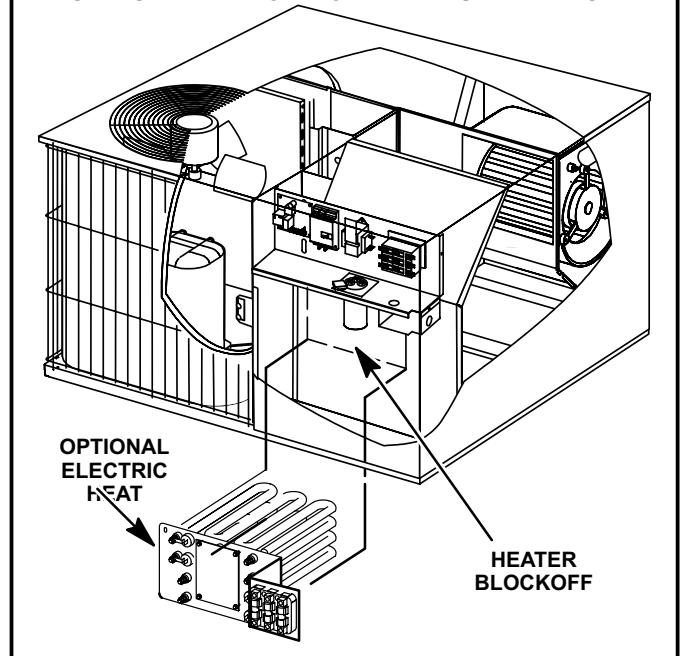


FIGURE 5

Electrical

USE COPPER CONDUCTORS ONLY

All field wiring must be done in accordance with National Electric Code recommendations, local codes and applicable requirements of UL or in accordance with Canadian Electrical Code, local codes and CSA Standards. Power wiring, disconnect means, and over-current protection are to be supplied by installer. See unit rating plate for maximum over-current protection, minimum circuit ampacity, as well as operating voltage. The power supply must be sized and protected according to specifications supplied. See figure 6 for field connection of line voltage wiring and figures 7 and 8 for typical wiring diagrams.

⚠ 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.

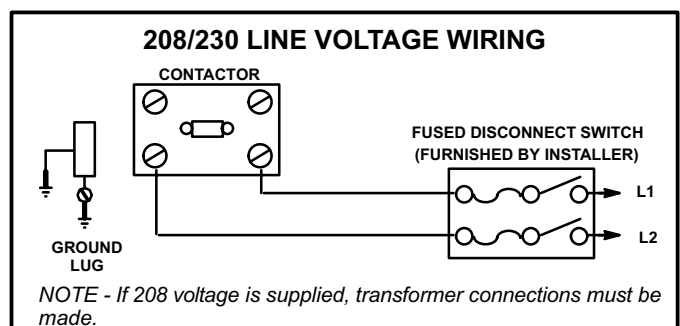


FIGURE 6

12CHP Series Heat Pump Packaged Units Typical Wiring Diagram (Does not Include 12CHP060)

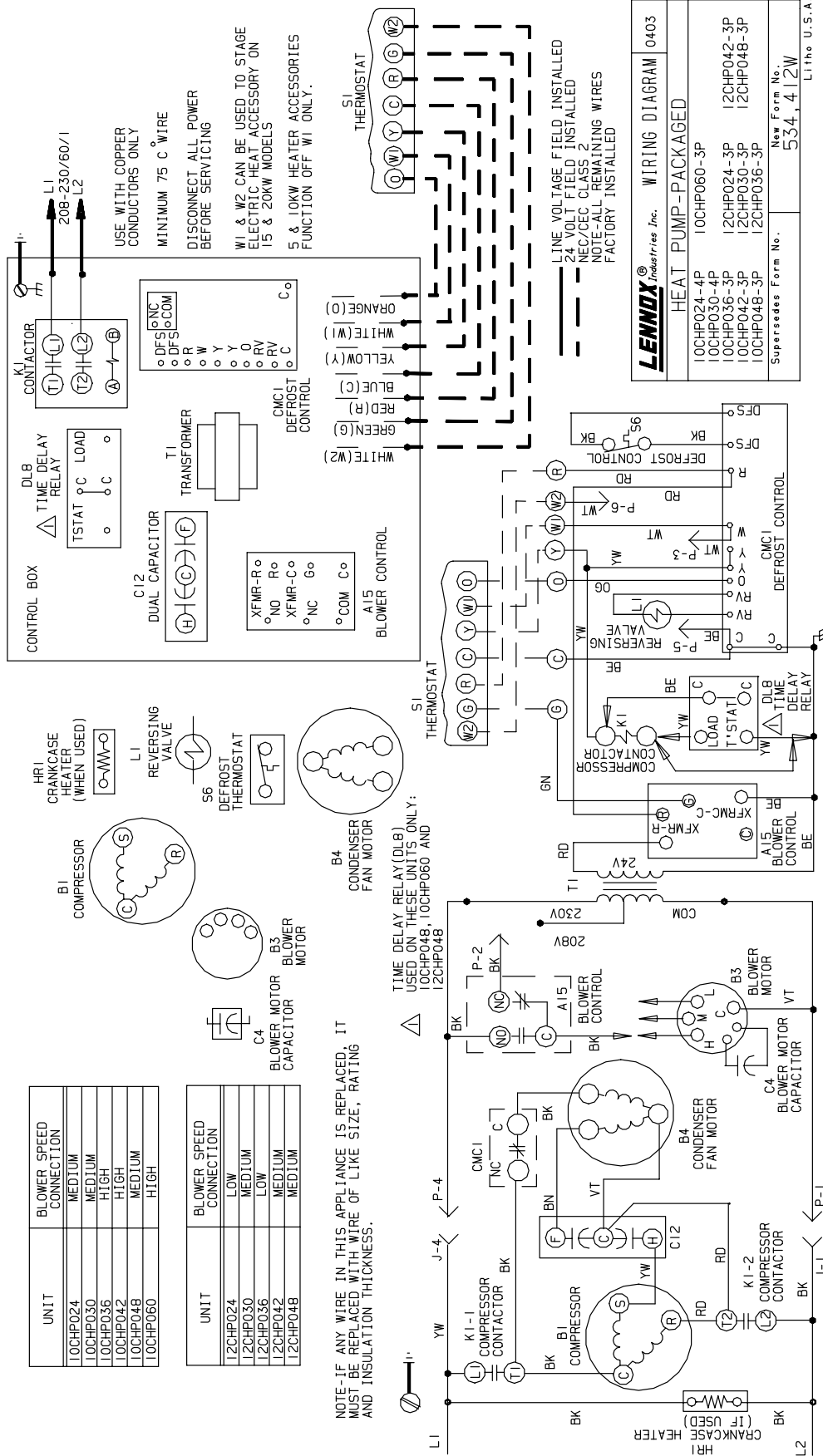


FIGURE 7

Typical Wiring Diagram

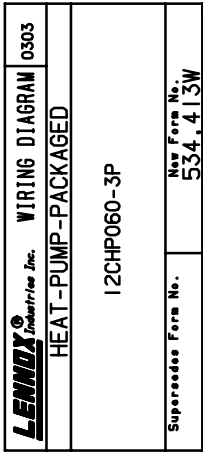


FIGURE 8

Unit must be grounded with separate ground conductor. The unit wiring diagram is located inside the unit access panel. Low voltage control wiring are pigtail leads located below the main control box and are color coded to match the connection called out on the wiring schematic.

If any of the original unit wiring is replaced, the same size and type wire must be used. Electrical wiring must be sized to carry minimum circuit ampacity marked on the unit. Each unit must be wired with a separate branch circuit and be properly fused.

System Performance

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

Verify system performance using table 3 or table 4 as a

general guide. These tables should not be used for charging the 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. Table 3 should be used when unit is charged during the heating mode. If outdoor ambient is below 45°F, run unit through defrost cycle first, wait 15 minutes for system pressures to stabilize, then take pressures. Data in table 3 is based on 70°F dry bulb return air. Data in table 4 is based on 80°F dry bulb / 67°F wet bulb return air. Allow unit operation to stabilize before taking pressure readings.

**TABLE 2
SUCTION SUPERHEAT TABLE**

UNIT MODEL NO.	SUCTION SUPERHEAT 82°F OD minus 80°F IDDB / 67°F IDWB
12CHP-030, -036	18 - 20°
12CHP-024	
12CHP-030	
12CHP-036	
12CHP-042, -048, -060	

**TABLE 3
NORMAL OPERATING PRESSURES -- HEATING MODE**

70°F db RETURN AIR		AIR TEMPERATURE ENTERING OUTDOOR COIL (°F)												
MODEL	PRESSURE	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°
12CHP-024	SUCTION	17	20	24	28	33	38	43	49	55	62	69	74	81
12CHP-030		14	17	21	25	29	34	39	45	51	56	63	70	78
12CHP-036		14	17	21	25	29	34	39	45	51	56	63	70	78
12CHP-042		16	19	23	27	31	36	41	45	51	55	62	68	76
12CHP-048		15	18	22	26	30	35	40	45	51	55	62	68	76
12CHP-060		14	17	21	25	29	34	39	44	50	54	61	67	75
12CHP-024	LIQUID	181	191	200	209	219	228	237	247	256	265	275	284	293
12CHP-030		168	173	179	184	189	195	200	205	211	216	221	227	232
12CHP-036		165	172	178	184	191	197	203	210	216	222	229	235	241
12CHP-042		167	174	181	187	194	201	207	214	221	227	234	241	247
12CHP-048		203	211	220	229	237	246	255	263	272	281	289	298	307
12CHP-060		163	170	177	183	190	197	203	210	217	223	230	237	243

TABLE 4
NORMAL OPERATING PRESSURES -- COOLING MODE

80°F db / 67°F wb RETURN AIR		AIR TEMPERATURE ENTERING OUTDOOR COIL (°F)												
MODEL	PRESSURE	65°	70°	75°	80°	82°	85°	90°	95°	100°	105°	110°	115°	125°
12CHP-024	SUCTION	78	79	81	82	83	84	85	87	89	90	92	93	96
12CHP-030		78	79	81	82	83	84	85	87	89	90	92	93	96
12CHP-036		75	77	80	82	83	84	87	89	91	94	96	98	103
12CHP-042		80	81	82	84	84	85	86	87	88	89	90	92	94
12CHP-048		78	79	80	82	82	83	84	85	86	87	88	90	92
12CHP-060		78	79	80	82	82	83	84	85	86	87	88	90	92
12CHP-024	LIQUID	140	155	170	184	190	199	213	228	243	257	272	286	316
12CHP-030		145	159	173	187	193	202	216	230	244	258	273	287	316
12CHP-036		146	161	176	191	197	206	221	236	251	266	281	296	326
12CHP-042		155	170	185	200	206	215	230	245	260	275	290	305	335
12CHP-048		164	180	196	213	219	229	245	261	277	293	309	326	358
12CHP-060		166	182	198	214	220	229	245	261	277	293	308	324	356

Sequence of Operation

Blower Delay - Cooling

When the thermostat is in the cooling mode, the O circuit is powered which energizes the reversing valve. Upon cooling demand, the thermostat closes circuit R and Y. Closing R and Y closes unit contactor starting compressor and outdoor fan. Thermostat automatically closes R to G circuit which also brings on the indoor blower at the same time. Upon satisfying cooling demand, thermostat will open above circuits and open main contactor, stopping compressor and outdoor fan.

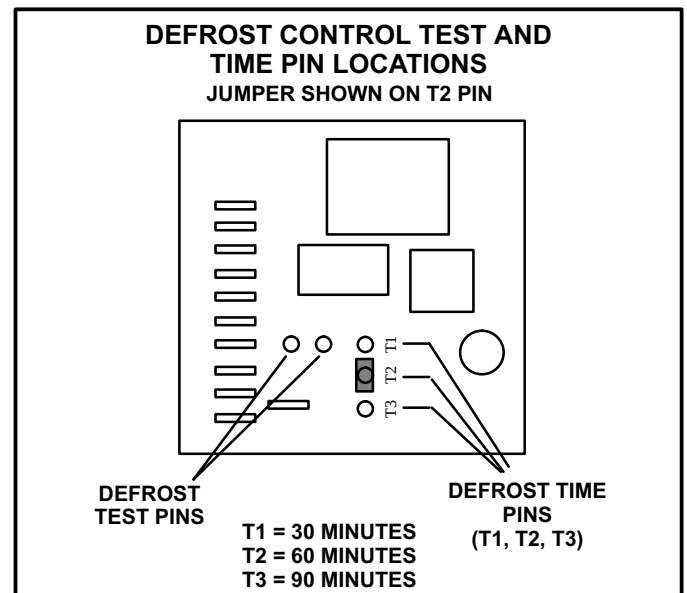
Blower Delay - Heating

Upon heating demand the thermostat closes circuit R to Y, closing unit contactor, starting compressor and outdoor fan. The reversing valve is not energized in the heating mode. The thermostat again automatically brings on the indoor blower at the same time. Upon satisfying heating demand, the thermostat opens above circuits and stops unit operation.

Defrost Cycle

If outdoor ambient conditions are such that frost forms on the outdoor coil, the defrost control monitors the need for and initiates and terminates defrost cycles as necessary to maintain system performance. The defrost control is time/temperature initiated and temperature terminated with a maximum defrost time (time-out) of 10 minutes. Time between defrost cycles is pre-set at 60 minute intervals at the factory, but can be field adjusted between 30, 60 or 90 minutes. See figure 9 for field adjustment of defrost timing.

The defrost control will initiate a defrost cycle if time period has elapsed and the defrost sensor detects a temperature below freezing. At the start of defrost cycle, the defrost control will energize the reversing valve solenoid, shifting the reversing valve and de-energizing the outdoor fan. The defrost relay will also close energizing tempering heat for increased comfort during defrost, if the unit is so equipped. The unit will remain in the defrost mode until the defrost sensor has determined that the frost has been removed from the coil or a 10 minute time period has elapsed.



The defrost control is also equipped with a set of test pins to aid in troubleshooting of the defrost system. The following is a brief outline of the testing of the defrost system.

Defrost sensor will be closed at 32° F or below. If temperatures are such that switch is not closed, jumper between defrost sensor terminals on defrost control.

Start system in Heating Operation.

Jumper test pins. A 1/4" quick connect terminal crimped onto a solid wire or brazing rod works well for test jumper. Closing test pins speeds up time interval by a factor of 256.

Defrost Control Defrost Test Cycle Time

T1-30 minutes	7 seconds
T2-60 minutes	14 seconds
T3-90 minutes	21 seconds

After closing test pins and appropriate cycle time has elapsed, the reversing valve should shift to defrost mode and outdoor fan should stop. After 2 seconds of defrost operation, reversing valve should shift back to heating operation and outdoor fan should start.

Adjustments - 12CHP060 Only

12CHP060 units are equipped with a variable speed indoor blower motor. The blower speed is factory-set and should not require field adjustment; however, air volume can be increased by 5 percent, if necessary. Follow the procedure below.

- 1 - Disconnect power.
- 2 - Locate the blower control board wiring harness.
- 3 - To increase air volume (CFM) in the cooling mode, use a pin extractor to remove the wire from harness pin position 5 (violet wire).
- 4 - To increase air volume (CFM) in the heating mode, use a pin extractor to remove the wire from harness pin position 11 (pink wire)

NOTE - If a pin extractor is not available, cut the wire and tape off both ends.

Maintenance

Periodic inspection and maintenance normally consists of changing or cleaning filters and (under some conditions) cleaning the coils.

! 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.

Filters

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

Outdoor Motor

The outdoor fan motor is permanently lubricated and requires no maintenance.

Outdoor Coil

Dirt 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 coil, be sure power to the unit is shut off prior to cleaning.

NOTE - Care should be used when cleaning the coil so that the coil fins are not damaged.

Repair Parts List

When ordering parts, include the complete model number and serial number which are printed on the rating plate located on the unit.

Control Group

Transformer

Blower Group

Blower Housing Assembly
Blower Wheel
Blower Motor
Blower Motor Mount
Blower Motor Capacitor (if used)
Fan Blade
Fan Motor
Fan Motor Capacitor

Cooling Group

Compressor
Coil-Evaporator
Drier
Cap Tube or Expansion Valve
Contactor
Time Delay Relay
Fan Relay
Capacitor
Coil-Condenser
Defrost Control
Reversing Valve Solenoid

Accessories

Description	Kit Number	LENNOX Cat. Number
Low Ambient Control	ALOAM111-1	42K88
High Pressure Cut-out Kit	AHPSW436-1	42K89
Outdoor Thermostat	LB-29740BA	56A87
Timed Off Control	ATIMR446-1	42K90