



**THIS MANUAL MUST BE LEFT WITH THE BUILDING OWNER FOR FUTURE REFERENCE**

## **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 licensed professional HVAC installer or equivalent, or service agency.

## **IMPORTANT**

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFCs, HCFCs and HFCs) as of July 1, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for noncompliance.

## **CAUTION**

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

## **WARNING**

To prevent serious injury or death:

1. Lock-out/tag-out before performing maintenance.
2. If system power is required (e.g., smoke detector maintenance), disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are set to the "OFF" position before performing maintenance.
3. Always keep hands, hair, clothing, jewelry, tools, etc. away from moving parts.

# INSTALLATION INSTRUCTIONS

## ELKP Series 6, 7.5 and 10 Ton

HEAT PUMPS  
6, 7.5 AND 10 TONS  
508669-01  
5/2025

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### Shipping and Packing List

Check the unit for shipping damage. If damaged or parts are missing, immediately contact the last shipping carrier.

- 1 - Assembled outdoor unit
- 1 - Installation instructions

### General

This ELKP outdoor air conditioner is designed for use with R-454B refrigerant only. This unit must be installed with an approved indoor air handler or coil and line set as outlined in the ELKP Engineering Handbook. These instructions are intended as a general guide and do not supersede local codes in anyway. Consult local authorities having jurisdiction before installation.

This outdoor unit is designed for use in thermal expansion valve (TXV) systems only.

**NOTE** – The ELKP is a *PARTIAL UNIT AIR CONDITIONER*, complying with *PARTIAL UNIT* requirements of this standard, and must only be connected to other units that have been confirmed as complying to corresponding *PARTIAL UNIT* requirements of this Standard, UL 60335-2-40/ CSA C22.2 No. 60335-2-40, or UL 1995/CSA C22.2 No 236.

## **WARNING**

- The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odor.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

## **CAUTION**

Servicing shall be performed only as recommended by the manufacturer.

## **WARNING**

Ducts connected to an appliance shall not contain a potential ignition source

## **WARNING**

Every working procedure that affects safety means shall only be carried out by competent persons. This appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure they do not play with the appliance.

## **IMPORTANT**

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out.

## **IMPORTANT**

Verify cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects.

## **IMPORTANT**

Pipe work, including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

## **CAUTION**

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need recalibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

## **CAUTION**

Some soaps used for leak detection are corrosive to certain metals. Carefully rinse piping thoroughly after leak test has been completed. Do not use matches, candles, flame or other sources of ignition to check for gas leaks.

## **WARNING**

PARTIAL UNITS shall only be connected to an appliance suitable for the same refrigerant.

## **IMPORTANT**

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed and, since flammability is a consideration, procedures such as safely remove refrigerant following local and national regulations, purging the circuit with inert gas, evacuating (optional for A2L), purging with inert gas (optional for A2L), or opening the circuit by cutting or brazing be adhered to. The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants.

This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

## **IMPORTANT**

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak tested on completion of charging, but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

## **IMPORTANT**

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

## **IMPORTANT**

After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements;

- Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of .2 oz. per year of refrigerant or better, under pressure.
- No leak shall be detected.

## Application Considerations

R-454B is a A2L refrigerant. The system installation must meet the following parameters based upon total refrigerant charge (line set included).

**TAmin** (Total minimum conditioned area) is the minimum allowable conditioned area based upon the total system charge at sea level. Values must be multiplied by altitude adjustment factor at installed altitude.

**Qmin** refers to minimum airflow requirements during refrigerant leak mitigation by the refrigerant detection system, based upon total system charge.

For applications where the final charge is greater than listed in the **TAmin Table**, specific requirements in ANSI/ASHRAE Standard 15, Safety Standard for Refrigeration Systems, may be more stringent than those in UL 60335-2-40 standard. Refer to the ANSI/ASHRAE Standard 15, Safety Standard for Refrigeration Systems, to determine any additional requirements based on total system charge.

**TAmin Table**

Charge (lb)	10.0	15.0	20.0	25.0	30.0
Charge (kg)	4.5	6.8	9.1	11.3	13.6
Minimum Conditioned Area (ft <sup>2</sup> )	149.9	224.9	299.9	374.8	449.8
Minimum Conditioned Area (m <sup>2</sup> )	13.9	20.9	27.9	34.8	41.8

**NOTE** – Multiply values in TAmin table by the Altitude Adjustment Factors to correct TAmin based on installed altitude.

**Altitude Adjustment Factor**

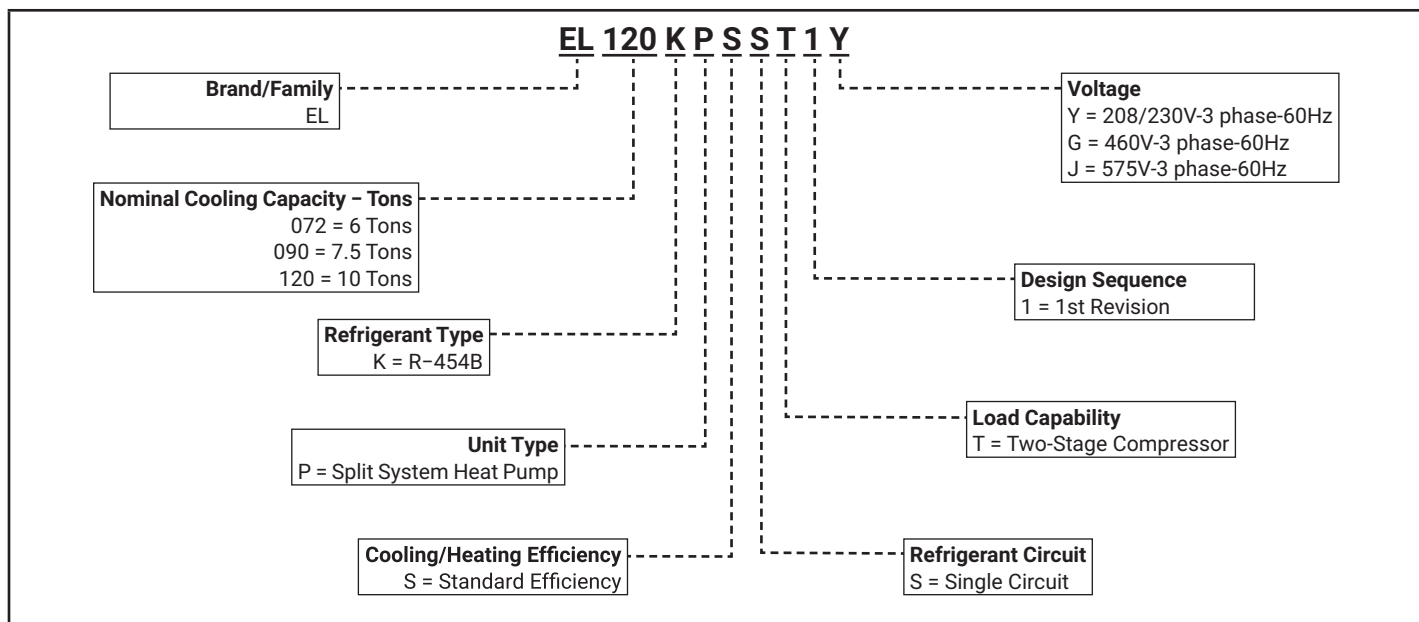
<b>Altitude (m)</b>	0	200	400	600	800	1000	1200	1400	1600	1800	2000
<b>Altitude (ft)</b>	0	660	1310	1970	2620	3280	3940	4590	5250	5910	6560
<b>Adj. Factor</b>	1	1	1	1	1.02	1.05	1.04	1.1	1.12	1.15	1.18

**Qmin Table**

Refrigerant Charge lb (kg)	CFM Required	Refrigerant Charge lb (kg)	CFM Required
5 (2.3)	135	18 (8.1)	487
6 (2.7)	162	19 (8.6)	514
7 (3.2)	189	20 (9.1)	541
8 (3.6)	216	21 (9.5)	568
9 (4.1)	244	22 (10)	595
10 (4.5)	271	23 (10.4)	622
11 (5)	298	24 (10.9)	649
12 (5.4)	325	25 (11.3)	676
13 (5.9)	352	26 (11.7)	704
14 (6.4)	379	27 (12.2)	731
15 (6.8)	406	28 (12.7)	758
16 (7.3)	433	29 (13.2)	785
17 (7.7)	460	30 (13.6)	812

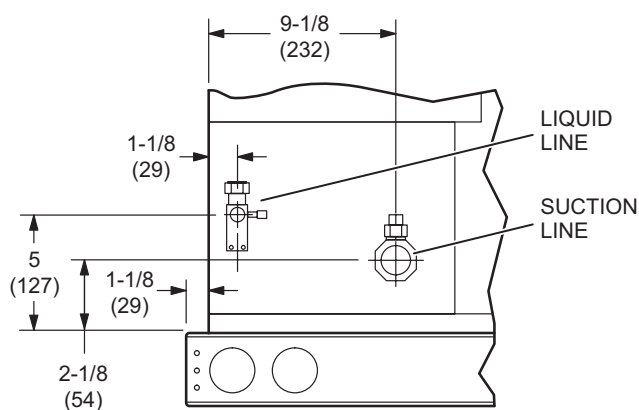
**NOTE** – Qmin minimum airflow requirement for refrigerant leak mitigation.

## Model Number Identification

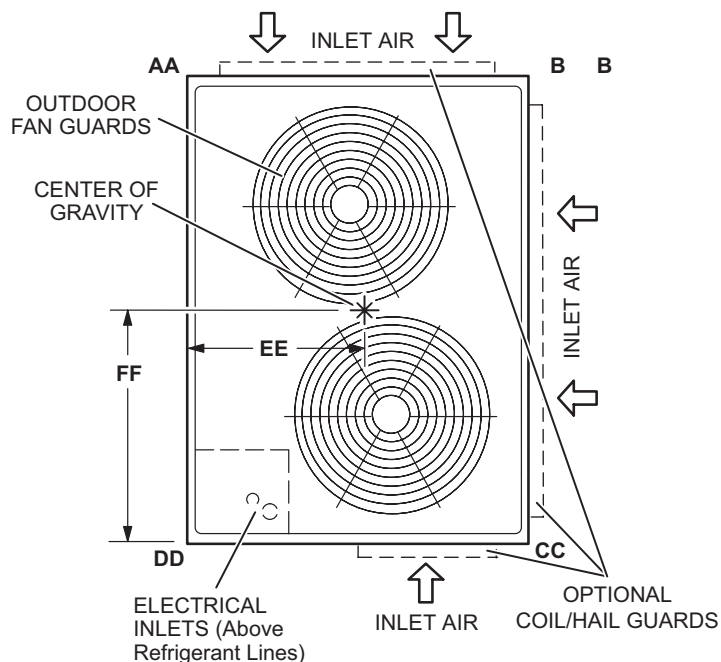


## Unit Dimensions, Corner Weights and Centers of Gravity

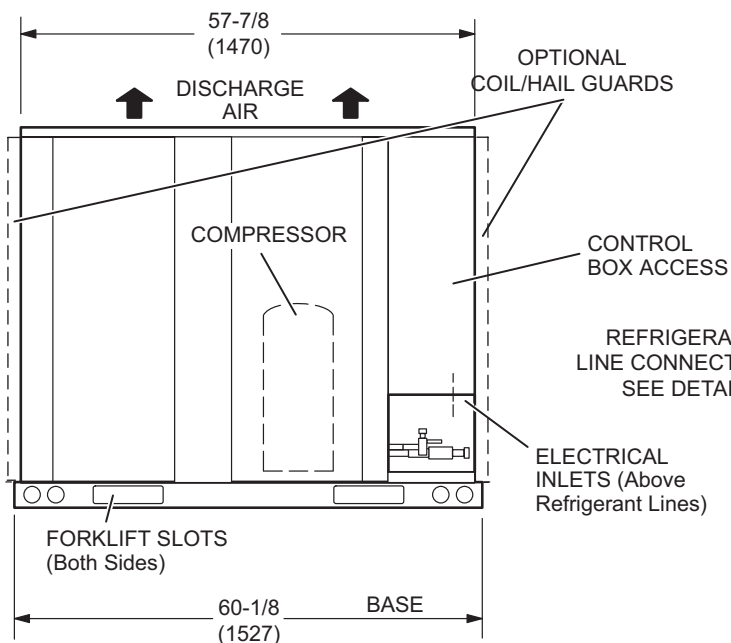
Model No.	CORNER WEIGHTS								CENTER OF GRAVITY			
	AA		BB		CC		DD		EE		FF	
	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	in.	mm	in.	mm
EL072KPSS	103	47	103	47	116	53	118	54	21-1/2	546	27-1/4	689
EL090KPSS	108	49	108	49	114	52	114	52	21-3/4	552	29	737
EL120KPSS	120	54	114	52	139	63	149	68	20	508	25-1/4	641



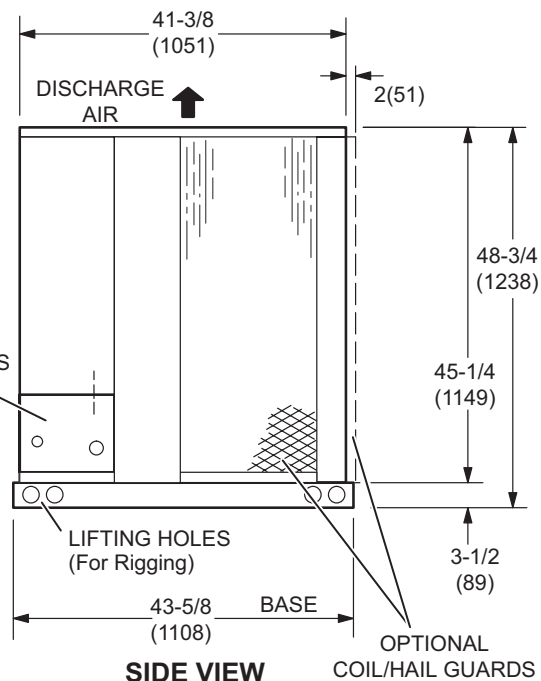
**REFRIGERANT LINE CONNECTIONS DETAIL**



**TOP VIEW**



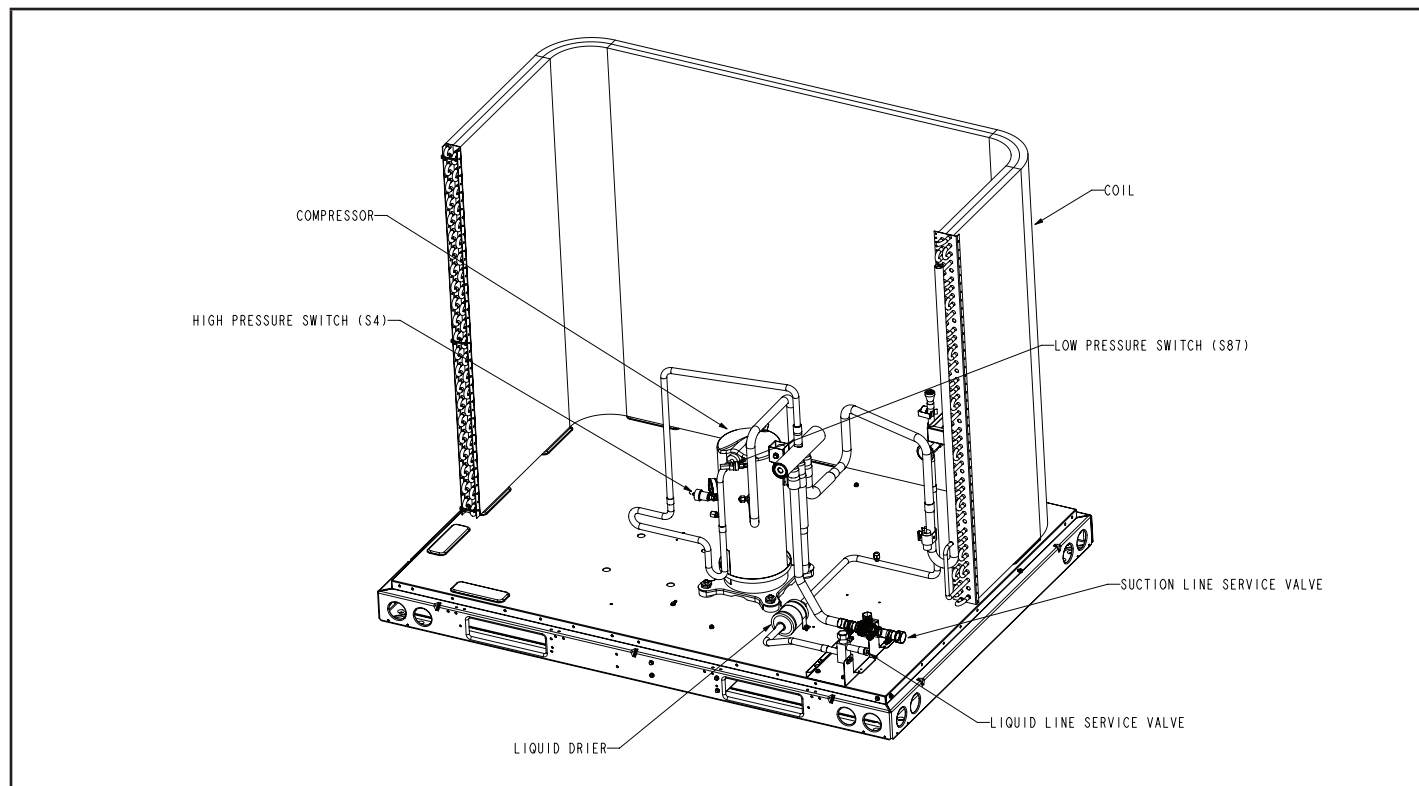
**FRONT VIEW**



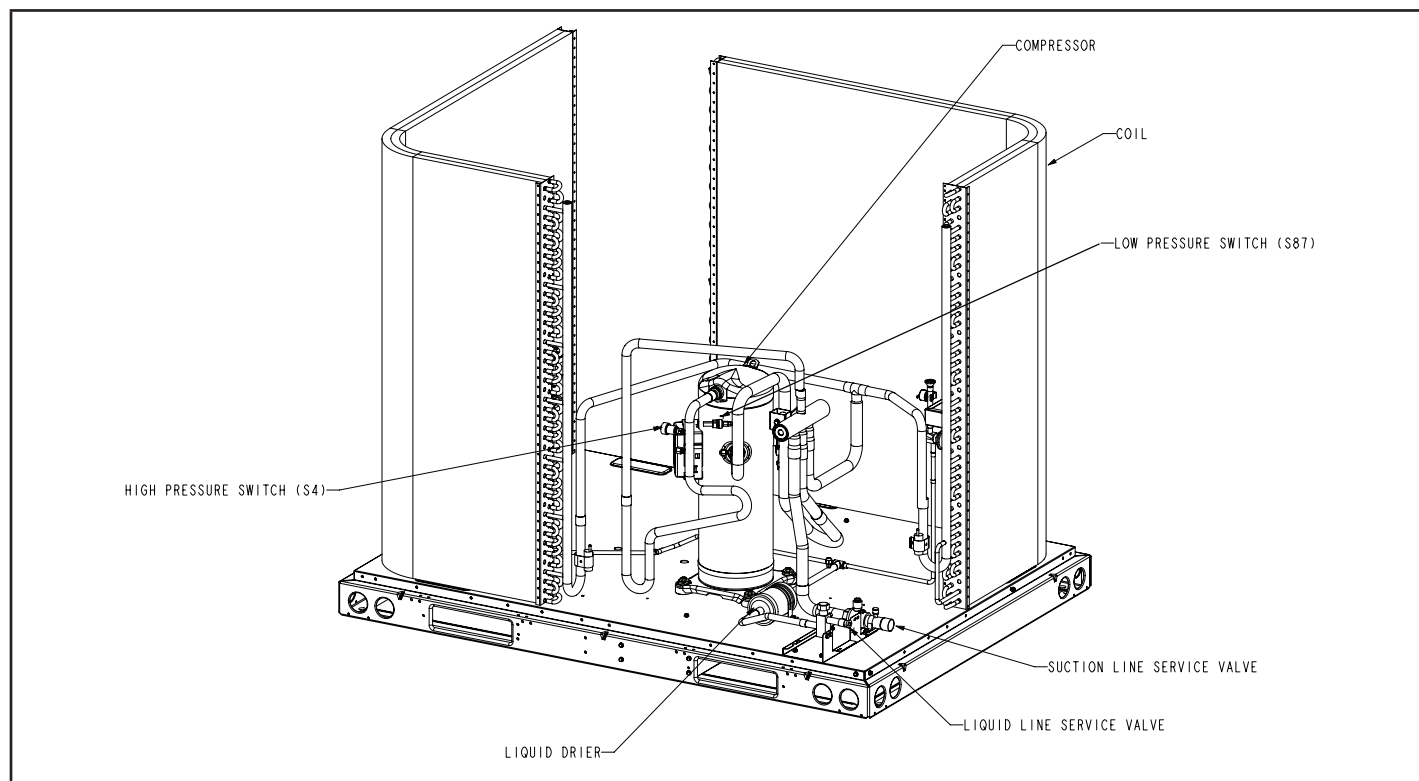
**SIDE VIEW**

## Unit Plumbing Parts Arrangement

EL072KPSS / EL090KPSS

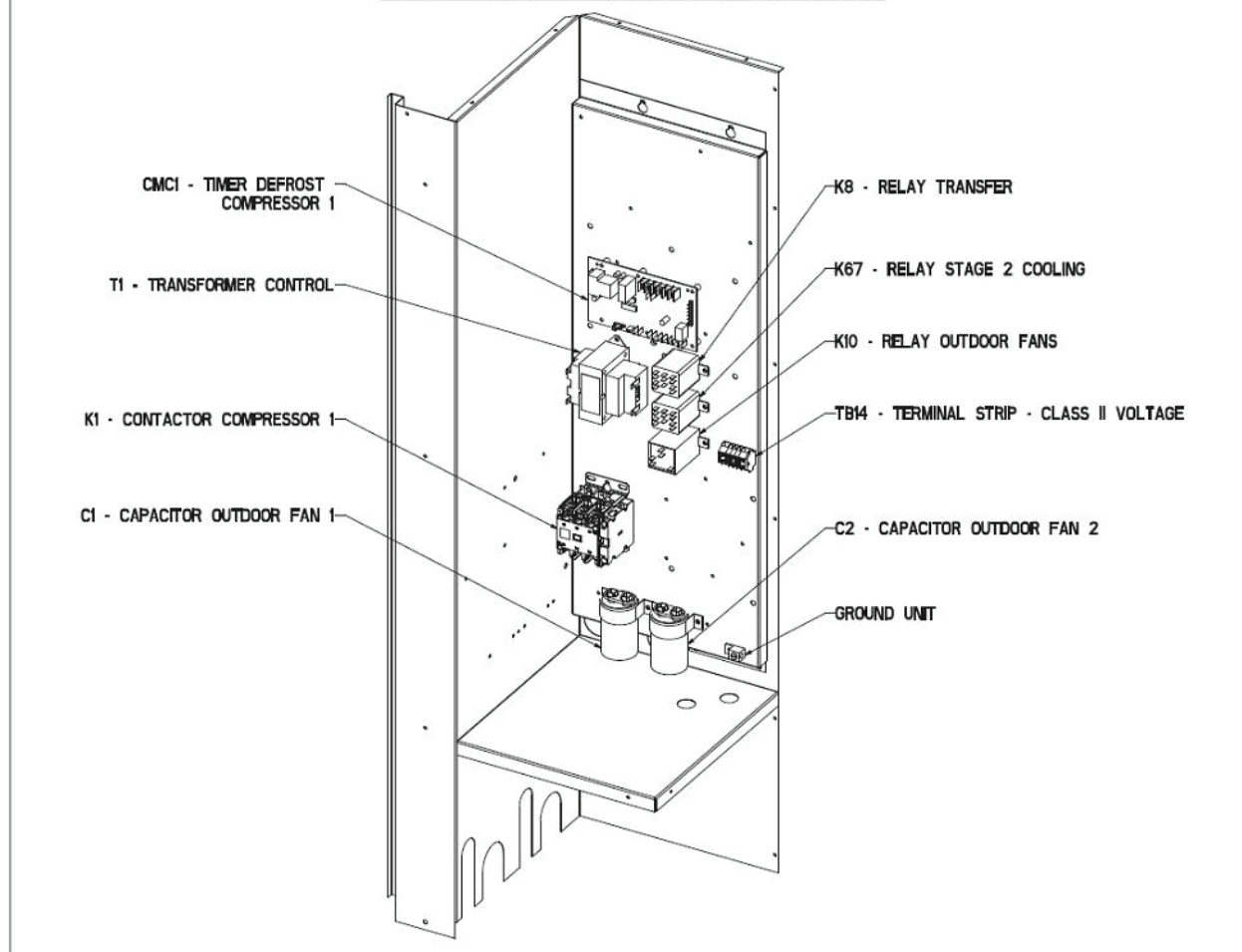


EL120KPSS





### **CONTROL BOX PARTS ARRANGEMENT** **ELITE HEAT PUMP MODELS**



### **Rigging the Unit for Lifting**

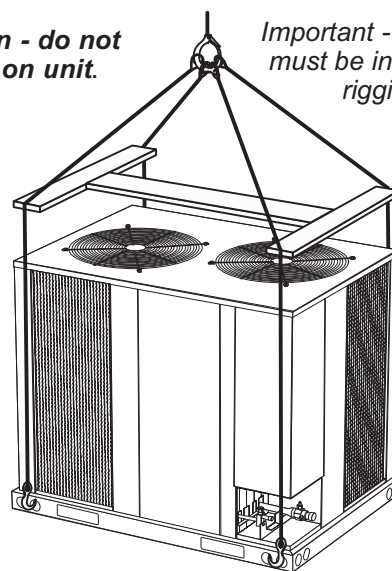
Rig the unit for lifting by attaching four cables to the holes in the base rail of the unit. See FIGURE 1.

- 1 - Remove protective packaging before rigging the unit for lifting.
- 2 - Connect the rigging to the holes in each corner of the unit's base.
- 3 - All panels must be in place for rigging.
- 4 - Place a field-provided H-style frame just above the top edge of the unit. The frame must be of adequate strength and length. (An H-style frame will prevent the top of the unit from being damaged.)

Lifting point should be directly above the center of gravity.

**Caution - do not walk on unit.**

*Important - all panels must be in place for rigging.*



**FIGURE 1. ELKP Heat Pump Models**



## ⚠ IMPORTANT

This unit must be matched with an indoor coil as specified with AHRI. For AHRI Certified system match-ups, see ELKP Engineering Handbook.

## ⚠ WARNING

To prevent personal injury, as well as damage to panels, unit or structure, observe the following:

While installing or servicing this unit, carefully stow all removed panels so that the panels will not cause injury to personnel, objects or nearby structures. Also, take care to store panels where they will not be subject to damage (e.g., being bent or scratched).

While handling or stowing the panels, consider any weather conditions (especially wind) that may cause panels to be blown around and damaged.

## ⚠ IMPORTANT

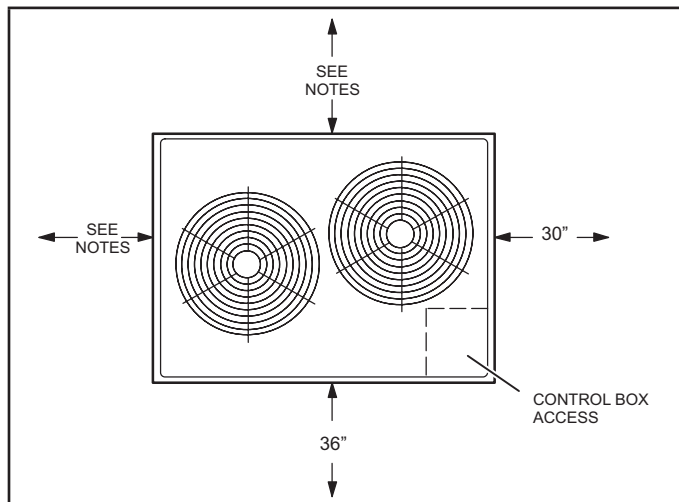
Exhaust vents from dryers, water heaters and furnaces should be directed away from the outdoor unit. Prolonged exposure to exhaust gases and the chemicals contained within them may cause condensation to form on the steel cabinet and other metal components of the outdoor unit. This will diminish unit performance and longevity.

### Installation Clearances

See Unit Dimensions on page 6 for sizing mounting slab, platforms or supports. Refer to FIGURE 2 for mandatory installation clearance requirements.

#### NOTES:

- Clearance to one of the remaining two sides may be 12 in. (305 mm) and the final side may be 6 in. (152 mm).
- A clearance of 24 in. (610 mm) must be maintained between two units.
- 48 in. (1219 mm) clearance required on top of unit.



**FIGURE 2. ELKP Heat Pump Models  
Installation Clearances**

### Line Set

Field refrigerant piping consists of liquid and suction lines connecting the condensing unit and the indoor unit. Liquid and suction service valves are located in a compartment at the corner of the unit below the control box.

Piping can be routed directly from the service valves or field supplied elbows can be added to divert the piping as required.

Refer to TABLE 1 for field-fabricated refrigerant line sizes for runs up to 50 linear feet (15 m).

**TABLE 1. Refrigerant Line Sizes for Runs  
Up to 50 Linear Feet**

Unit	Liquid Line	Suction Line
EL072KP / EL090KP	5/8" (16mm)	1-1/8" (29mm)
EL120KP	5/8" (16mm)	1-1/8" (29mm)

### Refrigerant Line Limitations

You may install the unit in applications that have line set lengths of up to 50 linear feet (15 m) with refrigerant line sizes as outlined in TABLE 1 (excluding equivalent length of fittings). Size refrigerant lines greater than 50 linear feet (15m or greater) according to the Refrigerant Piping Design and Fabrication Guidelines (Corp. 9351-L9) or latest version.

## ⚠ WARNING

Refrigerant can be harmful if it is inhaled. Refrigerant must be used and recovered responsibly.

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

## ⚠ WARNING



When using a high pressure gas such as nitrogen to pressurize a refrigeration or air conditioning system, use a regulator that can control the pressure down to 1 or 2 psig (6.9 to 13.8 kPa).

## ⚠ WARNING



Fire, Explosion and Personal Safety hazard. Failure to follow this warning could result in damage, personal injury or death.

Never use oxygen to pressurize or purge refrigeration lines. Oxygen, when exposed to a spark or open flame, can cause fire and/or an explosion, that could result in property damage, personal injury or death.

## WARNING

Polyolester (POE) oils used with R-454B refrigerant absorb moisture very quickly. It is very important that the refrigerant system be kept closed as much as possible. DO NOT remove line set caps or service valve stub caps until you are ready to make connections.

## WARNING

Every working procedure that affects safety means shall only be carried out by competent persons. This appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Examples of such working procedures are breaking into the refrigerating circuit, opening of sealed components, and opening of ventilated enclosures.

## IMPORTANT


If this unit is being matched with an approved lineset that was previously charged with mineral oil, the line set must be flushed prior to installation.

Take care to empty all existing traps. Polyolester (POE) oils are used in Lennox units charged with R-454B refrigerant. Residual mineral oil can act as an insulator, preventing proper heat transfer. It can also clog the expansion device and reduce system performance and capacity. Failure to properly flush the system per this instruction and the detailed Installation and Service Procedures manual will void the warranty.

## IMPORTANT

Braze-free fittings must conform with UL207 or ISO14903 (latest edition).

## WARNING



Danger of fire. Bleeding the refrigerant charge from only the high side may result in pressurization of the low side shell and suction tubing. Application of a brazing torch to a pressurized system may result in ignition of the refrigerant and oil mixture. Check the high and low pressures before applying heat.

## IMPORTANT

Allow braze joint to cool. Apply additional water-saturated cloths to help cool brazed joint. Do not remove water-saturated cloths until piping has cooled. Temperatures above 250°F will damage valve seals.

## CAUTION


Brazing alloys and flux contain materials which are hazardous to your health.

Avoid breathing vapors or fumes from brazing operations. Perform operations only in well-ventilated areas.

Wear gloves and protective goggles or face shield to protect against burns.

Wash hands with soap and water after handling brazing alloys and flux.

## WARNING




FIRE, PERSONAL INJURY OR PROPERTY DAMAGE may result if you do not wrap a water-saturated cloth around both liquid and suction line service valve bodies and copper tube stub while brazing the line set! The braze, when complete, must be quenched with water to absorb any residual heat.

Do not open service valves until refrigerant lines and indoor coil have been leak-tested and evacuated. Refer to Installation and Service Procedures manual found on [LennoxPros.com](http://LennoxPros.com)

## Electrical Connections

## WARNING



Electric Shock Hazard. Can cause injury or death. Unit must be properly grounded in accordance with national and local codes.

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.

In the United States, wiring must conform with current local codes and the current National Electric Code (NEC). In Canada, wiring must conform with current local codes and the current Canadian Electrical Code (CEC).

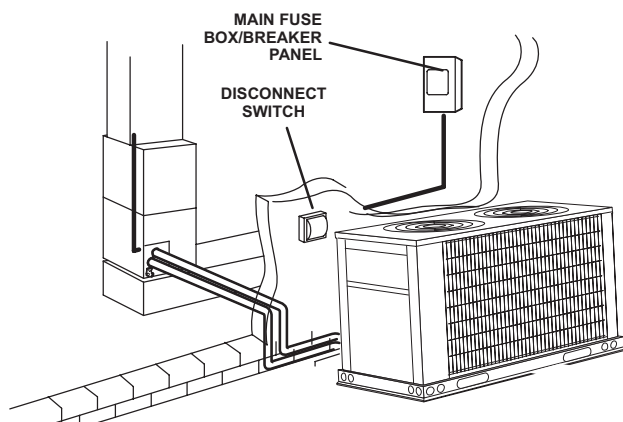
## TRANSFORMER – 24VAC

Units are factory-wired for 240/460/575 volt supply. For 208V supply, remove the insulated terminal cover from the 208V terminal on the control transformer. Move the wire from the transformer 240V terminal to the 208V terminal. Place the insulated terminal cover on the unused 240V terminal.

**NOTE** - Use the transformer provided with the air conditioning unit for low-voltage control power (24V, 90VA).

**NOTE** - The addition of accessories to the system could exceed the 90VA power requirement of the factory-provided transformer. Measure the system's current and voltage after installation is complete to determine transformer loading. If loading exceeds the factory-provided transformer capacity, a larger field-provided transformer will need to be installed in the system.

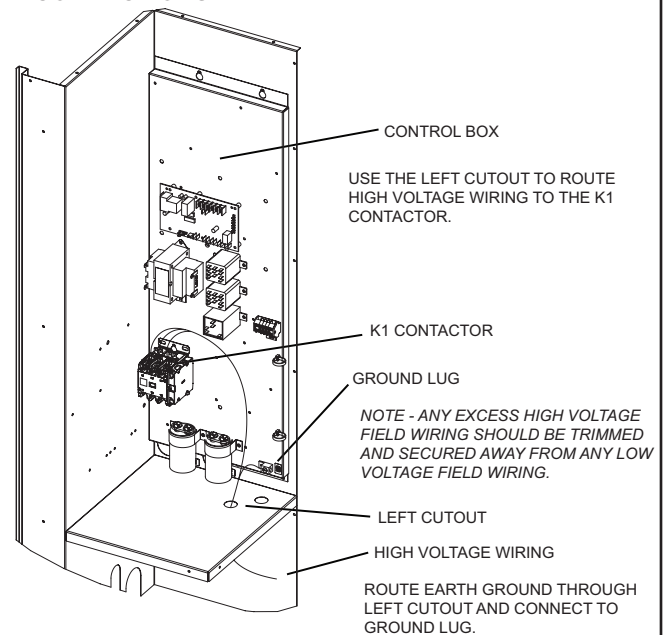
### 1 SIZE CIRCUIT AND INSTALL SERVICE DISCONNECT SWITCH



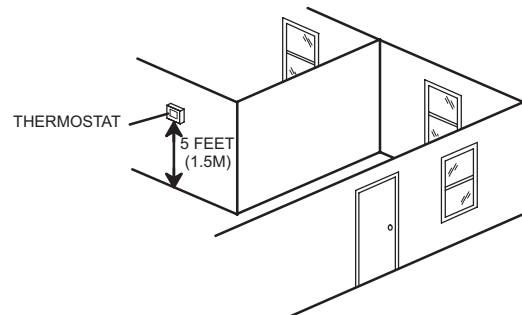
Refer to the unit nameplate for minimum circuit ampacity amperage minimum, and maximum fuse or circuit breaker fusible (HACR per NEC). Install power wiring and properly sized disconnect switch.

**NOTE** — UNITS ARE APPROVED FOR USE ONLY WITH COPPER CONDUCTORS. GROUND UNIT AT DISCONNECT SWITCH OR TO AN EARTH GROUND.

### 2 TYPICAL HIGH VOLTAGE POWER SUPPLY CONNECTIONS

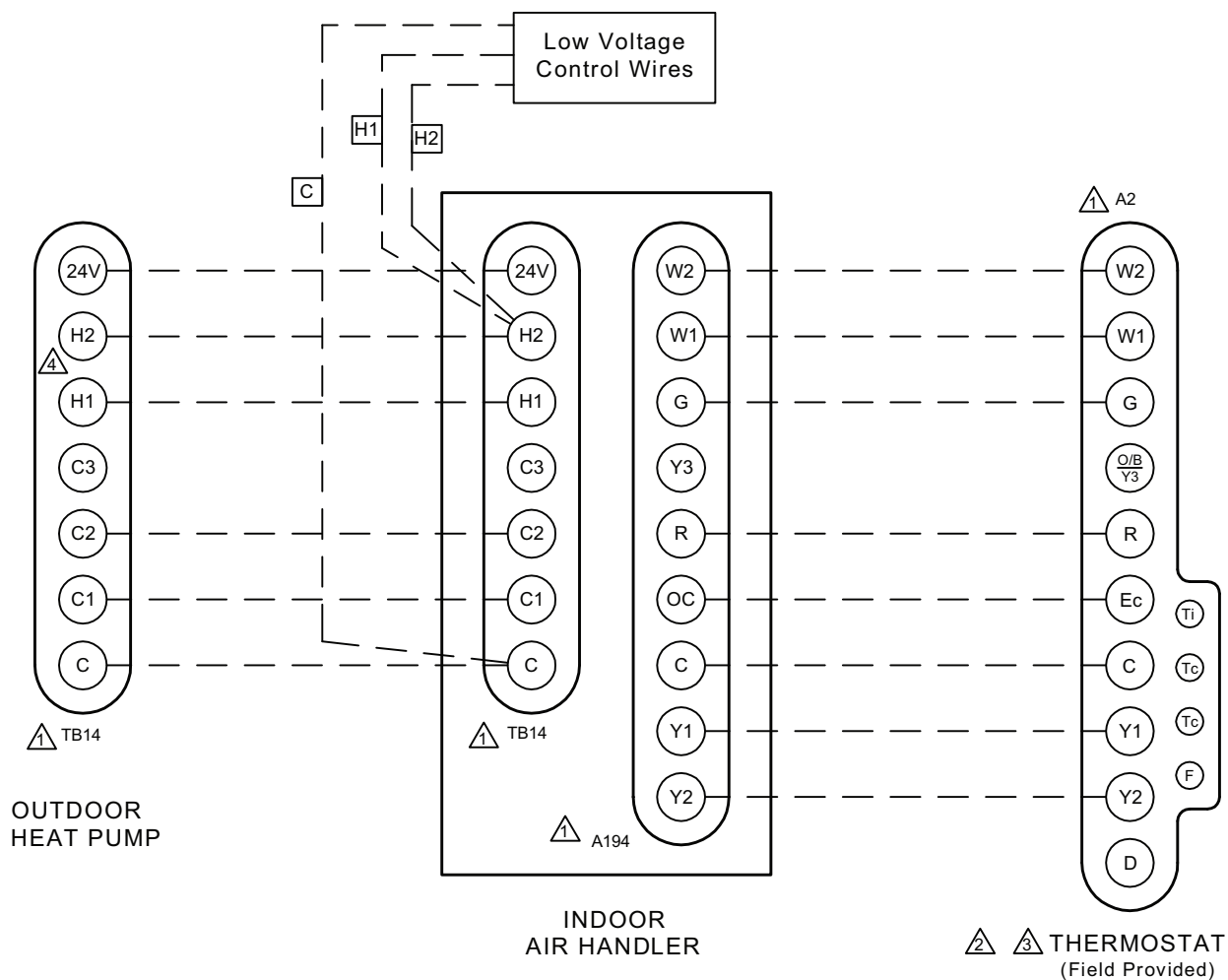


### 3 INSTALL THERMOSTAT



Install room thermostat (ordered separately) on an inside wall approximately in the center of the conditioned area and 5 feet (1.5m) from the floor. It should not be installed on an outside wall or where it can be affected by sunlight, drafts or vibrations.

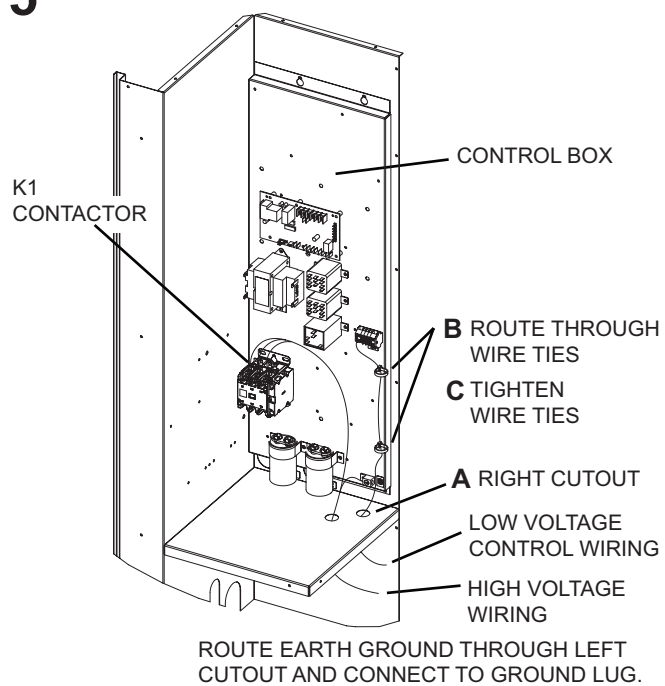
# 4 TYPICAL CONTROL WIRING



- 1 WIRING DIAGRAM KEY NUMBERS
- 2 THERMOSTAT SUPPLIED BY USER
- 3 CS7500 COMMERCIAL MODEL
- 4 (H2) 24V OUTPUT FOR AUX. HEAT ACTIVE DURING OUTDOOR HEAT PUMP DEFROST CYCLE
- — — CLASS II FIELD WIRING

WIRING DIAGRAM		11/24
SPLIT SYSTEMS - HEAT PUMP		
LABEL-WIRING DIAGRAM FIELD CONNECTION ELKA-ELKP		
SECTION C		REV. 0
Supersedes 538313-01	New Form No. 538313-02	

## 5 TYPICAL UNIT CONTROL WIRE CONNECTIONS



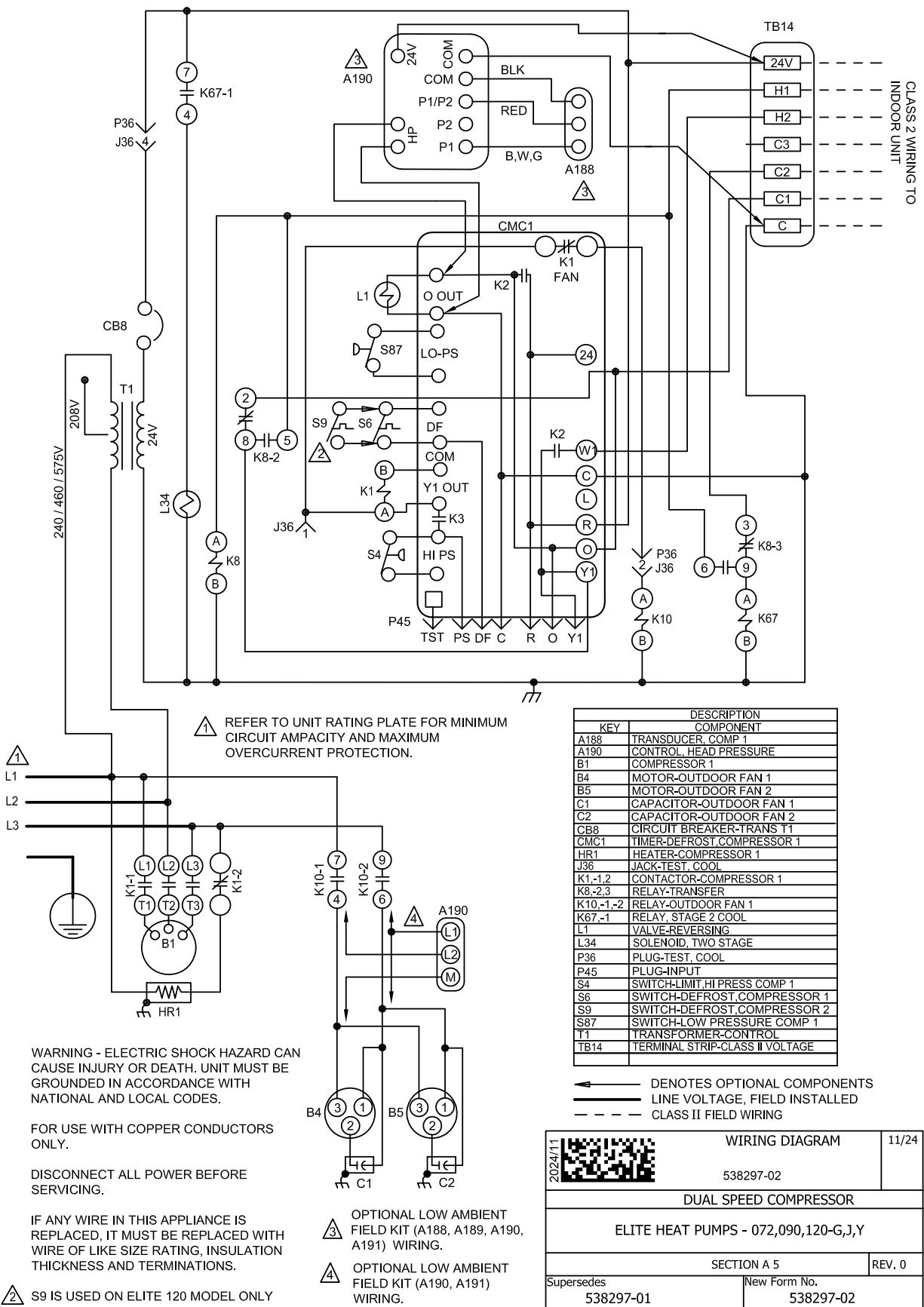
WIRE RUN LENGTH	AWG#	INSULATION TYPE
LESS THAN 100' (30M)	18	TEMPERATURE RATING
MORE THAN 100' (30M)	16	35°C MINIMUM

- A RUN CONTROL WIRES THROUGH RIGHT CUTOUT.
- B RUN CONTROL WIRES THROUGH WIRE TIES.
- C TIGHTEN WIRE TIE TO SECURE 24VDC CONTROL WIRING.

NOTE - FOR PROPER VOLTAGES, SELECT THERMOSTAT WIRE (CONTROL WIRING) GAUGE PER TABLE ABOVE.

NOTE - WIRE TIE PROVIDES LOW VOLTAGE WIRE STRAIN RELIEF AND MAINTAINS SEPARATION OF FIELD INSTALLED LOW AND HIGH VOLTAGE CIRCUITS.

NOTE - DO NOT BUNDLE ANY EXCESS 24VAC CONTROL WIRES INSIDE CONTROL BOX.



**FIGURE 3. Typical Wiring Diagram – ELKP Heat Pumps**



## Refrigerant Charge

The ELKP units have a factory holding charge of 2 pounds of R-454B in each circuit. Additional refrigerant will need to be added during installation. Charge using the R-454B charging information label provided in the unit. The R-454B charging information label in the unit applies to Indoor and Outdoor unit with same full load capacity, see table below. For all other unit matches, please contact Commercial Application department for Charging Procedure Information (form # 508349-02).

**NOTE** - Once the system has been charged, record final charge amount (including factory charge) on the nameplate for future reference and use. Review and verify compliance with requirements in "Application Considerations" section

Split System Matches		
Cooling Unit	Air Handler	Air Handler SCFM
EL072KP	EL090KA	2600
EL090KP	EL090KA	2800
EL120KP	EL120KA	4000

## System Startup and Operation

### IMPORTANT

If unit is equipped with a crankcase heater, it should be energized 24 hours before unit start-up to prevent compressor damage as a result of slugging.

- 1 - Rotate fan to check for binding.
- 2 - Inspect all factory- and field-installed wiring for loose connections.
- 3 - After evacuation is complete, open the liquid line and vapor line service valve stems to release the refrigerant charge (contained in outdoor unit) into the system.
- 4 - Replace the stem caps and tighten to the value listed in TABLE 2.
- 5 - Check voltage supply at the disconnect switch. The voltage must be within the range listed on the unit's nameplate. If not, do not start the equipment until you have consulted with the power company and the voltage condition has been corrected.
- 6 - Connect manifold gauge set for testing and charging.
- 7 - Set the thermostat for a cooling demand. Turn on power to the indoor indoor unit and close the outdoor unit disconnect switch to start the unit.
- 8 - Recheck voltage while the unit is running. Power must be within range shown on the unit nameplate.
- 9 - Check system for sufficient refrigerant using the procedures outlined under *Checking Refrigerant Charge*.
- 10 - Test functionality of Refrigerant Detection System.

## Torque Requirements

When servicing or repairing heating, ventilating and air conditioning components, ensure the fasteners are appropriately tightened. TABLE 2 lists torque values for fasteners.

**TABLE 2  
TORQUE REQUIREMENTS**

Parts	Recommended Torque	
Service valve cap	8 ft.-lb.	11 NM
Sheet-metal screws	16 in.-lb.	2 NM
Machine screws #10	28 in.-lb.	3 NM
Compressor bolts	90 in.-lb.	10 NM
Gauge port seal cap	8 ft.-lb.	11 NM

### IMPORTANT

To prevent stripping of the various caps used, the appropriately sized wrench should be used and fitted snugly over the cap before tightening.

The outdoor unit and indoor unit cycle on demand from the room thermostat. Refer to interconnect diagram (page 12, step 4) for demand signals passed from the indoor unit to the heat pump.

For details on the heat pump component operation based on thermostat demand, refer to TABLE 3.

**TABLE 3. Component Operation**

HEAT PUMPS					
Thermostat Demand	Input Signals at Terminal Strip <sup>2</sup>	Compressor Output	Fans		Reversing Valve
(Key Number <sup>1</sup> )	(TB14)	(B1)	(B4)	(B5)	(L1)
STANDBY	24V	OFF	OFF	OFF	OFF
COOLING 1	C1	LOW	ON	ON	ON
COOLING 2	C1+C2	HIGH	ON	ON	ON
HEATING	H1	HIGH	ON	ON	OFF
AUXILIARY HEAT	H2	Output Signal from CMC1 to Indoor Unit			
Footnotes:					
1. Refer to Component Label or Wiring Diagram for key numbers.					
2. 24V input signals measured between one TB14 (24V) connection listed and TB14-C connection.					

## HIGH PRESSURE SWITCHES (S4)

These units are equipped with an auto-reset high pressure switch (single-pole, single-throw) which is located on the discharge line. The switch shuts off the compressor when discharge pressure rises above the factory setting. High Pressure (auto reset) – trip at 640 psig; reset at 475 psig.

## LOW PRESSURE SWITCH (S87)

These units are equipped with a loss-of-charge switch that is located in the liquid line. The switch is a SPST, auto-reset switch that is normally closed. The switch opens at 40 psi and closes at 90 psi.

## Defrost System

The defrost system includes a defrost thermostat and a defrost control.

### DEFROST THERMOSTAT (S6, S9)

The defrost thermostat is located on the liquid line between the check/expansion valve and the distributor on each coil. When the defrost thermostat switch senses coil temperature at set point or lower (072/090 - 35°F; 120 - 42°F), its contacts close and send a signal to the defrost control board to start the defrost timing. It also terminates defrost when the liquid line warms up to set point (072/090 - 60°F; 120 - 70°F) and its contacts open.

### DEFROST CONTROL (CMC1)

The defrost control board includes the combined functions of a time/temperature defrost control, defrost relay, time delay, diagnostic LEDs, and a terminal strip for field wiring connections.

The control provides automatic switching from normal heating operation to defrost mode and back. During compressor cycle (defrost thermostat is closed, calling for defrost), the control accumulates compressor run times at 30, 60, or 90 minute field adjustable intervals. If the defrost thermostat is closed when the selected compressor run time interval ends, the defrost relay is energized and defrost begins.

Each timing pin selection provides a different accumulated compressor run time period for one defrost cycle. This time period must occur before a defrost cycle is initiated. The defrost interval can be adjusted to 30 (T1), 60 (T2), or 90 (T3) minutes. The maximum defrost period is 14 minutes and cannot be adjusted.

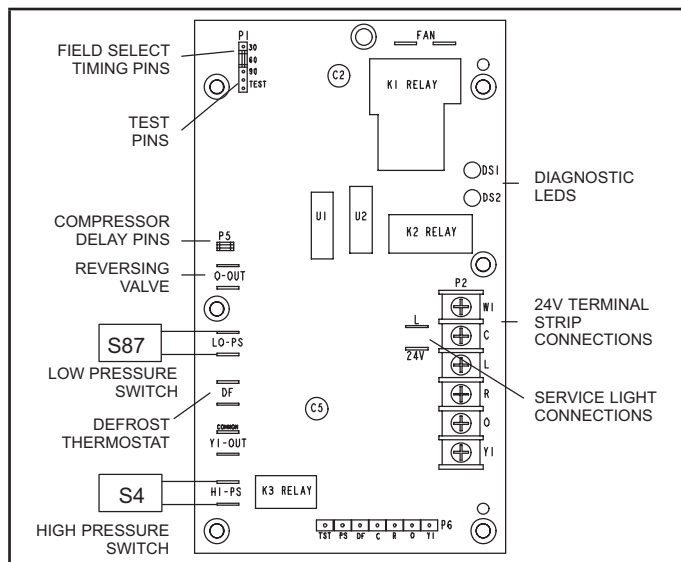
*NOTE – Defrost control part number is listed near the P1 timing pins.*

- Units with defrost control **100269-07 or higher**: The factory default defrost interval is 90 minutes.

If the timing selector jumper is missing, the defrost control defaults to a 90-minute defrost interval.

## Defrost Control Board

### DEFROST CONTROL TIMING PINS



**FIGURE 4. Outdoor Unit Defrost Control Board**

A TEST option is provided for troubleshooting. The TEST mode may be started any time the unit is operating in the heating mode and the defrost thermostat is closed or jumpered. If the jumper is in the TEST position at power-up, the control will ignore the test pins. When the jumper is placed across the TEST pins for two seconds, the control will enter the defrost mode. If the jumper is removed before an additional 5-second period has elapsed (7 seconds total), the unit will remain in defrost mode until the defrost thermostat opens or 14 minutes have passed. If the jumper is not removed until after the additional 5-second period has elapsed, the defrost will terminate and the test option will not function again until the jumper is removed and re-applied.

### COMPRESSOR DELAY

The defrost board has a field-selectable function to reduce occasional sounds that may occur while the unit is cycling in and out of the defrost mode. When the compressor delay jumper is removed, the compressor will be cycled off for 30 seconds going in and out of the defrost mode.

**NOTE** – The 30-second compressor feature is ignored when the TEST pins have been jumpered.

### TIME DELAY

The timed-off delay is five minutes long. The delay helps protect the compressor from short-cycling in case the power to the unit is interrupted or a pressure switch opens. The delay is bypassed by placing the timer select jumper across the TEST pins for 0.5 seconds.

**NOTE** – The board must have a thermostat demand for the bypass function.

### PRESSURE SWITCH CIRCUITS

The defrost control includes two pressure switch circuits. The factory-installed high pressure switch (S4) wires are connected to the board's HI PS terminals (FIGURE 4). The board also includes LO PS terminals to accommodate a field-provided low (or loss-of-charge) pressure

switch (S87).

During a single thermostat cycle, the defrost control will lock out the unit after the fifth time that the circuit is interrupted by any pressure switch that is wired to the control board. In addition, the diagnostic LEDs will indicate a pressure switch lockout after the fifth occurrence of an open pressure switch (TABLE 4). The unit will remain locked out until power is broken then remade to the control or until the jumper is applied to the TEST pins for 0.5 seconds.

**NOTE** – The defrost control board ignores input from the loss-of-charge switch terminals during the TEST mode, during the defrost cycle, during the 90-second start-up period, and for the first 90 seconds each time the reversing valve switches heat/cool modes. **If the TEST pins are jumpered and the 5-minute delay is being bypassed, the LO PS terminal signal is not ignored during the 90-second start-up period.**

### SERVICE LIGHT CONNECTION

The defrost control board includes terminal connections for a service light which provides a signal that activates the room thermostat service light during periods of inefficient operation.

## ! IMPORTANT

After testing has been completed, properly reposition test jumper across desired timing pins.

### DIAGNOSTIC LEDs

The defrost board uses two LEDs for diagnostics. The LEDs flash a specific sequence according to the diagnosis (TABLE 4).

**TABLE 4. Defrost Control Board Diagnostic LEDs**

DS2 Green	DS1 Red	Condition
OFF	OFF	Power problem
Simultaneous Slow Flash		Normal operation
Alternating Slow Flash		5-min. anti-short cycle delay
Fault and Lockout Codes		
OFF	Slow Flash	Loss-of-Charge Fault
OFF	ON	Loss-of-Charge Lockout
Slow Flash	OFF	High Pressure Fault
ON	OFF	High Pressure Lockout

## Preventive Maintenance / Repair

### IMPORTANT MAINTENANCE / REPAIR SAFETY INSTRUCTIONS

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized.

Work shall be undertaken under a controlled procedure to minimize the risk of a flammable gas or vapor being present while the work is being performed.

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times, the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

During repairs to sealed electrical components, the components shall be replaced. Replacement parts shall be in accordance with the manufacturer's specifications.

During repairs to intrinsically safe components, the components must be replaced. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

## CAUTION

Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch.

## IMPORTANT

**Sprinklers and soaker hoses should not be installed where they could cause prolonged exposure to the outdoor unit by treated water. Prolonged exposure of the unit to treated water (i.e., sprinkler systems, soakers, waste water, etc.) will corrode the surface of the steel and aluminum parts, diminish performance and affect longevity of the unit.**

At the beginning of each cooling season, the system should be checked as follows:

### OUTDOOR UNIT

- 1 - Clean and inspect the condenser coil. You can flush the coil with a water hose.
- 2 - The outdoor fan motor is prelubricated and sealed. No further lubrication is necessary.
- 3 - Visually inspect connecting lines and coils for evidence of oil leaks.
- 4 - Check wiring for loose connections.
- 5 - Check for correct voltage at the unit while the unit is operating and while it is off.
- 6 - Check amp-draw of the outdoor fan motor(s).
- 7 - Check amp-draw of the compressor(s).

Unit nameplate \_\_\_\_\_ Actual \_\_\_\_\_

Unit nameplate \_\_\_\_\_

Compressor #1 \_\_\_\_\_

Compressor #2 \_\_\_\_\_

**NOTE** – If the owner complains of insufficient cooling, gauge the unit and check the refrigerant charge. Refer to section on refrigerant charging in this instruction.

## Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely.

Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before starting decommissioning.

- a) Become familiar with the equipment and its operation.
- b) Isolate system electrically.
- c) Before attempting the procedure, ensure that:
  - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
  - all personal protective equipment is available and being used correctly;
  - the recovery process is supervised at all times by a competent person;
  - recovery equipment and cylinders conform to the appropriate standards.

- d) Pump down refrigerant system, if possible.
- e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- f) Make sure that cylinder is situated on the scales before recovery takes place.
- g) Start the recovery machine and operate in accordance with instructions.
- h) Do not overfill cylinders (no more than 80% volume liquid charge).
- i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

- k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.



## IMPORTANT

Equipment shall be labelled stating that it has been decommissioned and emptied of refrigerant. The label shall be signed and dated. Ensure that there are labels on the equipment that state the flammability of the refrigerant used.

### Start-Up and Performance Checklist

Job Name _____	Job no. _____	Date _____
Job Location _____	City _____	State _____
Installer _____	City _____	State _____
Unit Model No. _____ Serial No. _____ Service Technician _____		
Nameplate Voltage _____		
Rated Load Ampacity _____ Compressor Amperage: _____		
Maximum Fuse or Circuit Breaker _____		
Electrical Connections Tight? <input type="checkbox"/>	Indoor Filter clean? <input type="checkbox"/>	Supply Voltage (Unit Off) _____
Indoor Blower RPM _____	S.P. Drop Over Indoor (Dry) _____	Outdoor Coil Entering Air Temp. _____
Vapor Pressure; _____		
<b>Refrigerant Lines:</b> - Leak Checked? <input type="checkbox"/> Properly Insulated? <input type="checkbox"/> Outdoor Fan Checked? <input type="checkbox"/>		
<b>Service Valves:</b> --- Fully Opened? <input type="checkbox"/> Caps Tight? <input type="checkbox"/> Voltage With Compressor Operating _____		
<b>SEQUENCE OF OPERATION</b>		<b>THERMOSTAT</b>
Heating Correct? <input type="checkbox"/>	Cooling Correct? <input type="checkbox"/>	Calibrated? <input type="checkbox"/> Properly Set? <input type="checkbox"/> Level? <input type="checkbox"/>