HEAT PUMP OUTDOOR UNITS

# XP16

## ELITE® Series

## R-410A - Two-Stage Compressor

PRODUCT SPECIFICATIONS

Bulletin No. 210851
March 2019
Supersedes February 2019

ELITE® SERIES


**SEER up to 17.00**
**HSPF up to 9.50**
**2 to 5 Tons**
**Cooling Capacity - 23,600 to 59,000 Btuh**
**Heating Capacity - 21,000 to 61,500 Btuh**

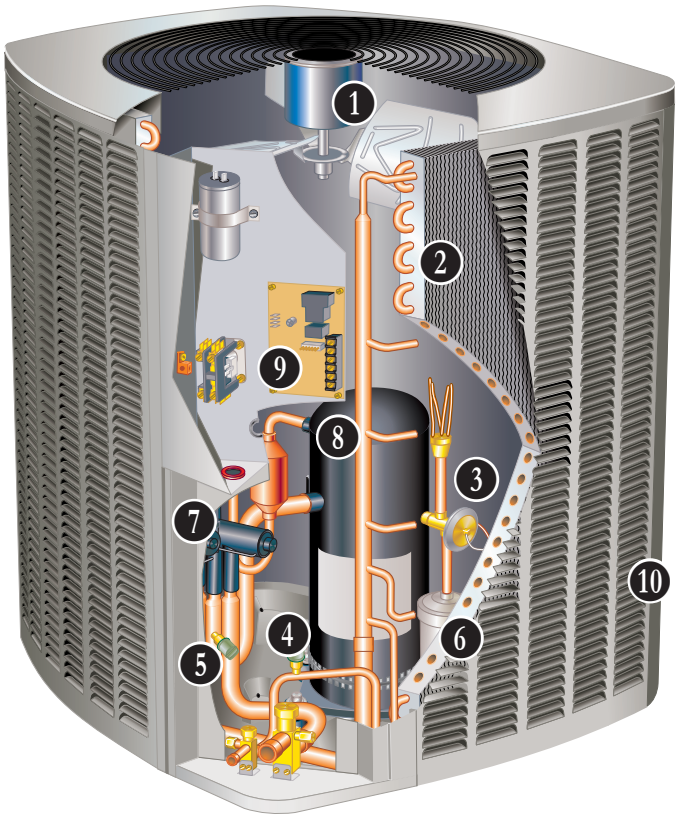
## MODEL NUMBER IDENTIFICATION

**X P 16 - 036 - 230 - 6**

- **Refrigerant Type**
  X = R-410A
- **Unit Type**
  P = Heat Pump Outdoor Unit
- **Series**
- **Nominal Cooling Capacity**
  024 = 2 tons
  036 = 3 tons
  048 = 4 tons
  060 = 5 tons
- **Voltage**
  230 = 208/230V-1phase-60hz
- **Minor Revision Number**

## CONTENTS






## WARRANTY

**Compressor -** Limited warranty for **ten years** in residential installations and five years in non-residential installations.

**All other covered components -** Five years in residential installations and one year in non-residential installations.
Refer to Lennox Equipment Limited Warranty certificate included with unit for specific details.

## APPROVALS

AHRI Certified to AHRI Standard 210/240.

For AHRI Certified system match-ups and expanded ratings, visit www.LennoxPROs.com.

Sound rated in Lennox reverberant sound test room in accordance with test conditions included in AHRI Standard 270-2008.

Tested in the Lennox Research Laboratory environmental test room.

Rated according to U.S. Department of Energy (DOE) test procedures.

Air conditioners and components within bonded for grounding to meet safety standards for servicing required by UL and CEC.

Units are ETL certified for the U.S. and Canada.

ISO 9001 Registered Manufacturing Quality System.

## APPLICATIONS

2 through 5 ton.

Sound levels as low as 74 dB.

Single phase power supply.

Vertical air discharge allows concealment behind shrubs at grade level or out of sight on a roof.

Designed for applications with remotely located indoor air handler units or gas furnaces with indoor add-on coils.

When heat pumps are used with gas furnaces, a dual-fuel compatible thermostat or a zone control system with dual-fuel capabilities must be used (order separately).

Units shipped completely factory assembled, piped, and wired. Each unit is test operated at the factory insuring proper operation.

Installer must set heat pump, connect refrigerant lines, and make electrical connections to complete job.

## FEATURES

### REFRIGERATION SYSTEM

**R-410A Refrigerant**
Non-chlorine, ozone friendly, R-410A.

Unit is factory pre-charged. See Specification table.


Total system refrigerant charge is dependant on outdoor unit size, indoor unit size and refrigerant line length.

Refer to the unit-mounted charging sticker to determine correct amount of charge required.

1 **Outdoor Coil Fan**
Direct drive fan moves large air volumes uniformly through entire condenser coil for high refrigerant cooling capacity. 060 models have a variable-speed outdoor fan motor for quiet operation.

Vertical air discharge minimizes operating sounds and eliminates damage to lawn and shrubs.

Fan motor has sleeve bearings and is inherently protected.

Motor totally enclosed for maximum protection from weather, dust and corrosion

Fan guard constructed of corrosion-resistant PVC (polyvinyl chloride) coated steel.

Fan service access accomplished by removal of fan guard.

2 **Copper Tube/Enhanced Fin Coil**
Lennox designed and fabricated coil.

Ripple-edged aluminum fins.

Copper tube construction.

Lanced fins provide maximum exposure of fin surface to air stream resulting in excellent heat transfer.

Fin collars grip tubing for maximum contact area.

Inverted coil circuiting prevents ice buildup at coil base in low ambients. Discharge gas enters bottom of coil during defrost and heat of refrigerant flows counter to water drainage resulting in extremely clean and unobstructed fins and tubes.

Fin spacing allows rapid and complete water drainage.

Flared shoulder tubing connections/silver soldering construction.

Coil is factory tested under high pressure to insure leakproof construction.

Entire coil is accessible for cleaning.

3 **Expansion Valve - Outdoor Unit**
Designed and sized specifically for use in heat pump system.

Sensing bulb is located on the line between reversing valve and the coil thus sensing suction temperature in the heat cycle.

Factory installed and piped.

**Discharge Temperature Switch**
Shuts off unit if operating conditions cause the compressor discharge line temperature to rise above setpoint.

Protects compressor from excessive pressure / temperature.

Automatic reset when temperature drops below setpoint.

4 **High Pressure Switch**
Shuts off unit if abnormal operating conditions cause the discharge pressure to rise above setting.

Protects compressor from excessive condensing pressure.

Auto-reset.

5 **Low Pressure Switch**
Shuts off unit if suction pressure falls below setting.

Provides loss of charge and freeze-up protection.

Auto-reset.

6 **Hi-Capacity Liquid Line Drier**
Factory installed in the liquid line, the drier traps moisture or dirt that could contaminate the refrigerant system.

100% molecular-sieve bead type drier.

7 **Reversing Valve**
4-way interchange reversing valve effects a rapid change in direction of refrigerant flow resulting in quick changeover from cooling to heating and vice versa.

Valve operates on pressure differential between outdoor unit and indoor unit of the system. Factory installed.

### Optional Accessories

**Expansion Valve Kits**
Must be ordered separately and field installed on certain indoor units. See TXV Usage table.

Chatleff style fitting.

**Freezestat**
Installs on or near the discharge line of the evaporator or on the suction line.

Senses suction line temperature and cycles the compressor off when suction line temperature falls below its setpoint.

Opens at 29°F and closes at 58°F.

**Refrigerant Line Kits**
Refrigerant lines (suction & liquid) are shipped refrigeration clean. Lines are cleaned, dried, pressurized, and sealed at factory.

Suction line fully insulated.

L15 lines are stubbed at both ends.

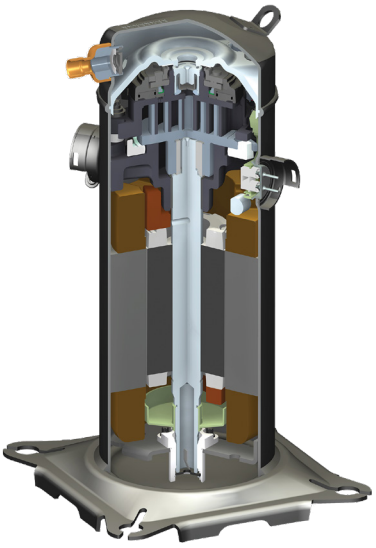
See Specifications table for selection.

Not available for -060 model and must be field fabricated.

## FEATURES

### COMPRESSOR

**8 Two-Stage Compressor**



Compressor features high efficiency with uniform suction flow, constant discharge flow, high volumetric efficiency and quiet operation.

Compressor consists of two involute spiral scrolls matched together to generate a series of crescent shaped gas pockets between them.

During compression, one scroll remains stationary while the other scroll orbits around it.

Gas is drawn into the outer pocket, the pocket is sealed as the scroll rotates.

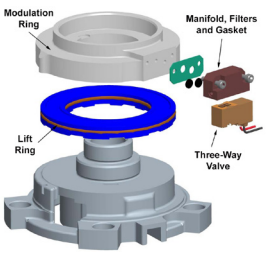
As the spiral movement continues, gas pockets are pushed to the center of the scrolls. Volume between the pockets is simultaneously reduced.

When the pocket reaches the center, gas is now at high pressure and is forced out of a port located in the center of the fixed scrolls. During compression, several pockets are compressed simultaneously resulting in a smooth continuous compression cycle.

Continuous flank contact, maintained by centrifugal force, minimizes gas leakage and maximizes efficiency. Scroll compressor is tolerant to the effects of slugging and contaminants. If this occurs, scrolls separate, allowing liquid or contaminants to to be worked toward the center and discharged.

During the compression process, there are several pockets in the scroll that are compressing gas. Modulation is achieved by venting a portion of the gas in the first suction pocket back to the low side of the compressor thereby reducing the effective displacement of the compressor.

A 24-volt DC solenoid valve inside the compressor controls staging. When the 3-way solenoid is energized it moves the lift ring assembly to block the ports and the compressor operates at full-load or 100% capacity. When the solenoid is de-energized the lift ring assembly moves to unblock the compressor ports and the compressor operates at part-load or approximately 67% of its full-load capacity.




The “loading” and “unloading” of the two stage scroll is done “on the fly” without shutting off the single-speed compressor motor between stages.

Low gas pulses during compression reduces operational sound levels.

Compressor motor is internally protected from excessive current and temperature.

Compressor is installed in the unit on specially formulated, resilient rubber mounts for better sound dampening and vibration free operation.

**Crankcase Heater**

Crankcase heater prevents migration of liquid refrigerant into compressor and ensures proper compressor lubrication.

#### Optional Accessories

**Compressor Sound Cover**

A reinforced vinyl compressor cover containing a 1-1/2 inch thick batt of fiberglass insulation.

All open edges are sealed with a one-inch wide hook and loop fastening tape.

### CONTROLS

**9 Defrost Control**

Control furnished as standard.

Gives a demand defrost cycle whenever system heating performance falls below optimum levels. The sensing element on coil determines when defrost cycle is required and when to terminate cycle.

Anti-short cycle (5 minutes) incorporated into the board.

Diagnostic LED’s furnished as an aid in troubleshooting.

Conveniently located in control box.

#### Optional Accessories

**Blower Relay Kit**
**(For Use With EL195E and ML180E Gas Furnaces)**

Allows furnace blower speed changes when matched with two-stage heat pumps.

## CONTROLS (continued)

### Optional Accessories (continued)

**iComfort® E30 Smart Wi-Fi Thermostat**
Wi-Fi enabled, electronic 7-day, universal, multi-stage, programmable, touchscreen thermostat.


3 Heat/2 Cool.

Auto-changeover.

Dual-fuel control with optional outdoor sensor.

Controls dehumidification during cooling mode and humidification during heating mode.

Offers enhanced capabilities including humidification / dehumidification / dewpoint measurement and control, *Humiditrol*® control, and equipment maintenance reminders.

Easy to read 7 in. color touchscreen (measured diagonally).

LCD display with backlight shows the current and set temperature, time, inside relative humidity, system status (operating mode and schedules) and outside temperature (optional outdoor sensor required).

Smooth Setback Recovery starts system early to achieve setpoint at start of program period.

Compressor short-cycle protection (5 minutes).

Up to four separate schedules are available plus Schedule IQ™.

One-Touch Away Mode - A quick and easy way to set the cooling and heating setpoints while away.

Smart Away™ - Uses geo-fencing technology to determine when the homeowner is within a predetermined distance from the home to operate the system when leaving, away and arriving.

Apple HomeKit™ enabled, making it easy to control the E30 thermostat from an iPhone, iPad or iPod device. Use Siri® voice commands to control the E30 thermostat.

Amazon® Alexa-enabled, smart-home compatible. It works with Amazon Echo, Echo Dot and Tap devices.

Wi-Fi remote monitoring and adjustment through a home wireless network for desktop PCs, laptops and apps for smartphones or tablets.

High Definition Color Display, Mag-Mount, Smart Hub Controller, wallplate (for retrofit installations) furnished for easy installation.

Additional indoor air quality comfort products (PureAir™ Air Purification System, *Healthy Climate*® Humidifiers, *Humiditrol*® Enhanced Dehumidification Accessory, *Healthy Climate*® Energy/Heat Recovery Ventilators, *Healthy Climate*® Germicidal Lights) can be added to the system for a complete total-comfort system.

See the iComfort® E30 Smart Wi-Fi Thermostat Product Specifications bulletin in the Controls section for more information.

**Remote Outdoor Temperature Sensor**
Used with the iComfort® E30 Smart Thermostat.

When installed outdoors, sensor allows thermostat to display outdoor temperature. Sensor is auto-detected when connected to thermostat.

*NOTE - Sensor is required for Dual-Fuel and the Enhanced Dehumidification Accessory (EDA).*

**Compressor Hard Start Kit**
Single-phase units are equipped with a PSC compressor motor.

This type of motor normally does not need a potential relay and start capacitor.

In conditions such as low voltage, kit may be required to increase the compressor starting torque.

Hard start kit is required in applications where the supply voltage is less than 230V.

**Blower Relay Kit (for use with furnaces equipped with constant torque blower motors)**
Allows furnace blower speed changes when matched with two-stage air conditioners.

**Indoor Blower Off Delay Relay**
Delays the indoor blower-off time during the cooling cycle.

See AHRI Rating Tables for usage.

**Indoor Blower Speed Relay Kit**
Relay kit provides the option of changing blower speeds on standard permanent split capacitor (PSC) multi-tap blower motors during cooling operation.

Provides optimum humidity control conditions by automatically reducing indoor blower speed during continuous fan operation or low stage compressor operation to reduce humidity levels.

**Low Ambient Kit**
Heat pump will operate in the cooling mode satisfactorily down to 45°F outdoor air temperature without any additional controls.

Kit can be added in the field enabling unit to operate properly down to 30°F.

A Freezestat should be installed on compressors equipped with a low ambient kit.

A Compressor Low Ambient Cut-Off should be added to terminate compressor operation below recommended operation conditions (on/off operation, 30°F or modulating operation, 0°F.

**Mild Weather Kit**
Heat pump units operate satisfactorily in the heating mode at outdoor air temperatures up to 75°F.

Mild Weather Kit can be field installed, allowing heating operation above 75°F.

## CONTROLS (continued)

### Optional Accessories (continued)

**Monitor Kit - Service Light**
Contains ambient compensating thermistor and service light thermostat.

For use with thermostats requiring input for indicator lights.

**Outdoor Thermostat Kit**
An outdoor thermostat can be used to lock out some of the electric heating elements on indoor units where two-stage control is applicable.

Outdoor thermostat maintains the heating load on the low power input as long as possible before allowing the full power load to come on the line.

Thermostat kit and mounting box must be ordered extra.

## CABINET

Heavy-gauge steel construction

Pre-painted cabinet finish.

Control box is conveniently located with all controls factory wired.

Large removable panel provides service access.

Drainage holes are provided in base section for moisture removal.

High density polyethylene unit support feet raise the unit off of the mounting surface, away from damaging moisture.

**PermaGuard™ Unit Base**
Durable zinc-coated base section resists rust and corrosion.

**10 SmartHinge™ Louvered Coil Protection**
Steel louvered panels provides complete coil protection.

Panels are hinged to allow easy cleaning and servicing of coils.

Panels may be completely removed.

Interlocking tabs and slots assure tight fit on cabinet.

**Refrigerant Line Connections, Electrical Inlets and Service Valves**
Vapor and liquid lines are located on corner of unit cabinet and are made with sweat connections. See dimension drawing.

Fully serviceable brass service valves prevent corrosion and provide access to refrigerant system. Vapor valve can be fully shut off, while liquid valve may be front seated to manage refrigerant charge while servicing system.

Refrigerant line connections and field wiring inlets are located in one central area of the cabinet. See dimension drawing.

### Optional Accessories

**Snow Guards**
For use in locations where the possibility of heavy snow or freezing rain accumulation may occur.

Heavy gauge powder coated steel guard deflects snow and ice away from the outdoor fan and prevents build-up on the fan guard.

## SPECIFICATIONS

| General | Model No. | XP16-024 | XP16-036 | XP16-048 | XP16-060 |
|---|---|---|---|---|---|
| Data | Nominal Tonnage | 2 | 3 | 4 | 5 |
| Connections | Liquid line (o.d.) - in. | 3/8 | 3/8 | 3/8 | 3/8 |
| (sweat) | Vapor line (o.d.) - in. | 3/4 | 7/8 | 7/8 | 1-1/8 |
| Refrigerant | [1] R-410A charge furnished | 7 lbs. 14 oz. | 10 lbs. 11 oz. | 9 lbs. 9 oz. | 11 lbs. 8 oz. |
| Outdoor | Net face area - sq. ft. Outer coil | 15.21 | 22.17 | 22.17 | 29.09 |
| Coil | Inner coil | 14.50 | 21.51 | 21.51 | 28.16 |
| | Tube diameter - in. and No. of Rows | 5/16 - 2 | 5/16 - 2 | 5/16 - 2 | 5/16 - 2 |
| | Fins per inch | 22 | 22 | 2 | 22 |
| Outdoor | Diameter - in. and No. of Blades | 18 - 3 | 26 - 3 | 26 - 3 | 26 - 3 |
| Fan | Motor hp | 1/10 | 1/3 | 1/3 | 1/3 |
| | Cfm - 1st stage | 2232 | 4100 | 4100 | 3690 |
| | 2nd stage | - - - | - - - | - - - | 4250 |
| | Rpm - 1st stage | 1035 | 850 | 855 | 700 |
| | 2nd stage | - - - | - - - | - - - | 820 |
| | Watts - 1st stage | 145 | 295 | 265 | 130 |
| | 2nd stage | - - - | - - - | - - - | 195 |
| Shipping Data - lbs. 1 pkg. | | 222 | 273 | 294 | 353 |

## ELECTRICAL DATA

| | | | | | |
|---|---|---|---|---|---|
| Line voltage data - 60hz | | [4] 230V-1ph | [4] 230V-1ph | [4] 230V-1ph | [4] 230V-1ph |
| [2] Maximum overcurrent protection (amps) | | 25 | 35 | 45 | 60 |
| [3] Minimum circuit ampacity | | 15.3 | 20.8 | 28.3 | 36.8 |
| Compressor | Rated load amps | 11.70 | 15.3 | 21.20 | 27.1 |
| | Locked rotor amps | 58.3 | 83 | 104 | 152.9 |
| | Power factor | 0.98 | 0.99 | 0.99 | 0.99 |
| Outdoor Coil Fan Motor | Full load amps | 0.7 | 1.7 | 1.8 | 2.8 |

## CONTROLS

| | | | | | |
|---|---|---|---|---|---|
| iComfort® E30 Smart Thermostat | 15S63 | • | • | • | • |
| [5] Outdoor Temperature Sensor | X2658 | • | • | • | • |
| [6] Discharge Air Temperature Sensor | 88K38 | • | • | • | • |

## OPTIONAL ACCESSORIES - ORDER SEPARATELY

| | | | | | |
|---|---|---|---|---|---|
| Blower Relay Kit (for constant torque gas furnaces) | 85W66 | • | • | • | • |
| Compressor Hard Start Kit - Required in applications with less than 230V | 63W22 | • | | | |
| | 10J42 | | • | • | |
| | 63W24 | | | | • |
| Compressor Sound Cover | 27W55 | • | • | | |
| | 27W56 | | | • | • |
| Freezestat 3/8 in. tubing | 93G35 | • | • | • | • |
| Freezestat 5/8 in. tubing | 50A93 | • | • | • | • |
| Indoor Blower Speed Relay Kit | 40K58 | • | • | • | • |
| Indoor Blower Off Delay Relay | 58M81 | • | • | • | • |
| [7] Low Ambient Kit | 54M89 | • | • | • | |
| | 68M04 | | | | • |
| Mild Weather Kit | 33M07 | • | • | • | • |
| Monitor Kit - Service Light | 76F53 | • | • | • | • |
| Outdoor Thermostat | 56A87 | • | • | • | • |
| Thermostat Kit Mounting Box | 31461 | • | • | • | • |
| Refrigerant Line Sets L15-41-20 L15-41-40 L15-41-30 L15-41-50 | | • | | | |
| L15-65-30 L15-65-40 L15-65-50 | | | • | • | |
| Field Fabricate | | | | | • |
| [8] Snow Guards 28-1/2 x 27-1/2 in. | X8781 | • | | | |
| 39-1/2 x 35-5/8 in. | Y1033 | | • | • | • |

NOTE - Extremes of operating range are plus 10% and minus 5% of line voltage.

[1] Refrigerant charge sufficient for 15 ft. length of refrigerant lines. For longer line set requirements see the Installation Instructions for information about line set length and additional refrigerant charge required.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

[4] Hard Start Kit is required in applications where the supply voltage is less than 230V.

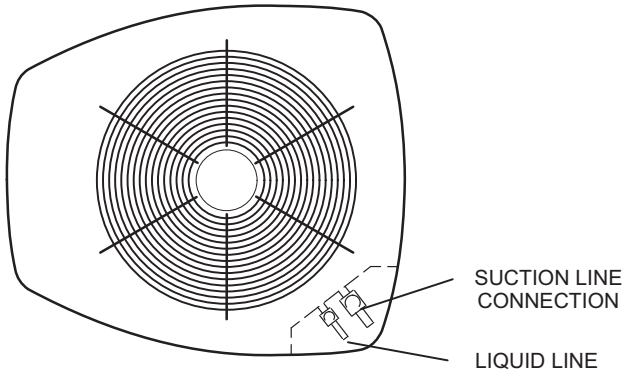
[5] The Optional Outdoor Air Temperature Sensor may be ordered for use with a conventional outdoor unit. Allows the thermostat to display outdoor temperature. Required for Dual-Fuel and Humiditrol® applications.

[6] Optional for service diagnostics.

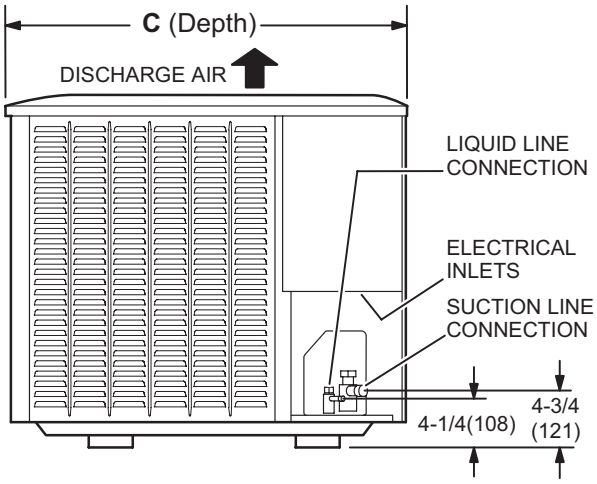
[7] Freezestat is recommended with Low Ambient Kit.

[8] Adds 11-1/2 inches (292 mm) to unit height.

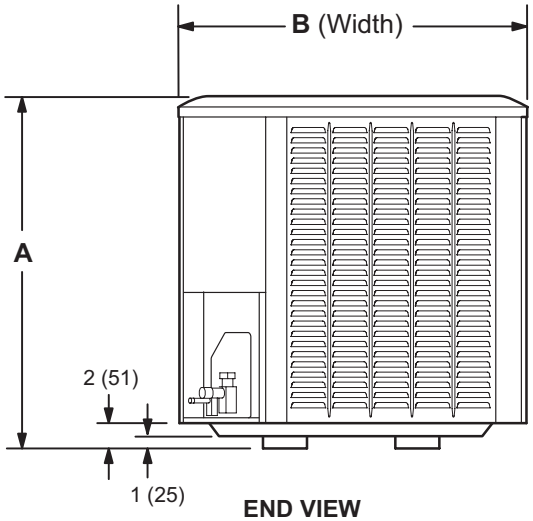
## DIMENSIONS



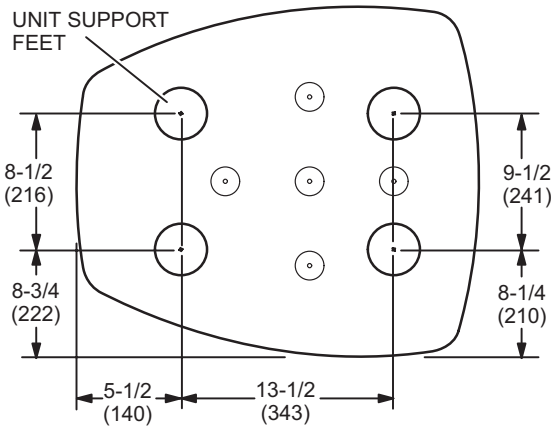

**TOP VIEW**



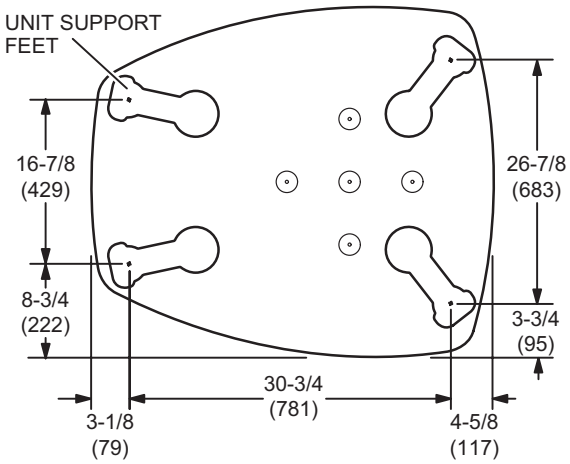

**SIDE VIEW**




**END VIEW**



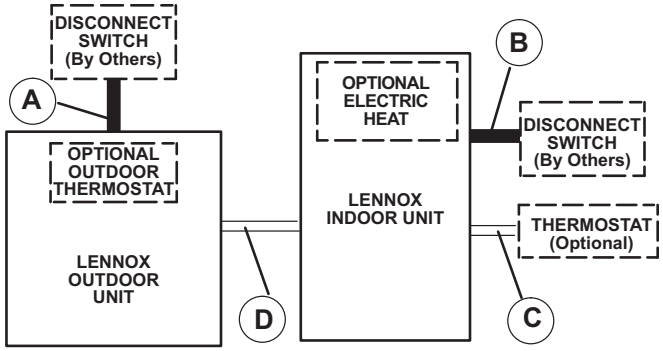

**XP16-024 BASE SECTION**
**(Small Base)**




**XP16-036 TO -060 BASE SECTION**
**(Large Base)**

| Model No. | A | | B | | C | |
|---|---|---|---|---|---|---|
| | in. | mm | in. | mm | in. | mm |
| XP16-024 | 35 | 889 | 27 | 686 | 28 | 711 |
| XP16-036 | 35 | 889 | 35-1/2 | 902 | 39-1/2 | 1003 |
| XP16-048 | 35 | 889 | 35-1/2 | 902 | 39-1/2 | 1003 |
| XP16-060 | 45 | 1143 | 35-1/2 | 902 | 39-1/2 | 1003 |

## FIELD WIRING




A - Two Wire Power (see Electrical Data)
B - Two or Three Wire Power (size to heater capacity)
C - Twelve Wire Low Voltage 18 ga. minimum
Fourteen Wire Low Voltage with Optional Outdoor Thermostat
D - Eight Wire Low Voltage 18 ga. minimum
Ten Wire Low Voltage with Optional Outdoor Thermostat
*NOTE - Field Wiring Not Furnished*
All wiring must conform to NEC or CEC and local electrical codes.

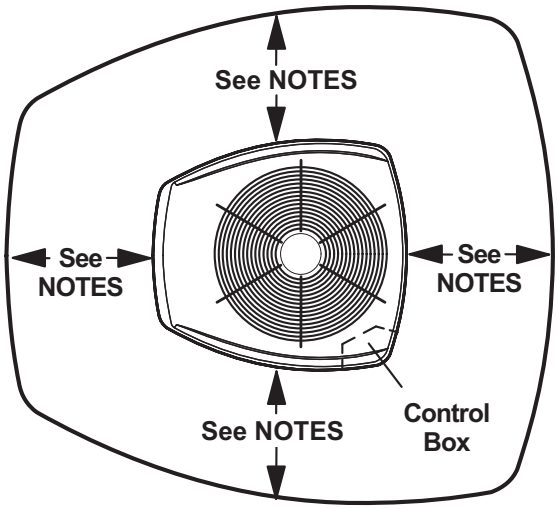
## SOUND DATA

| [1] Unit Model No. | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | [1] Sound Rating Number (dB) |
|---|---|---|---|---|---|---|---|---|
| XP16-024 | 72.0 | 70.0 | 69.5 | 68.5 | 63.5 | 58.0 | 56.5 | 74 |
| XP16-036 | 72.5 | 71.5 | 73.0 | 70.5 | 66.0 | 60.5 | 58.5 | 76 |
| XP16-048 | 72.5 | 71.5 | 73.0 | 70.5 | 66.0 | 60.5 | 58.5 | 76 |
| XP16-060 | 72.5 | 73.5 | 77.5 | 72.5 | 67.0 | 62.5 | 58.5 | 78 |

NOTE - the octave sound power data does not include tonal correction.
[1] Tested according to AHRI Standard 270-2008 test conditions.

## INSTALLATION CLEARANCES

**NOTES:**
Service clearance of 30 in. (762 mm) must be maintained on one of the sides adjacent to the control box.
Clearance to one of the other three sides must be 36 in. (914 mm)
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. must be maintained between two units.
48 in. (1219 mm) clearance required on top of unit.



## TXV USAGE

**Use this table for C35, CH23, CH33, CH35 and CR33 Field Installed TXV Match-Ups.**

| Model No. | Order No. |
|---|---|
| XP16-024 | **12J18** |
| XP16-036 | **12J19** |
| XP16-048 | **12J20** |
| XP16-060 | **12J20** |

CX35 and CX38 upflow coils and all Lennox air handlers are shipped with a factory installed TXV. In most cases, no change out of the valve is needed.

C35 and CH33/CH35 coils - Replace the factory installed orifice with the expansion valve listed.

CR33 and CH23 - Use the expansion valve listed.

## MOST POPULAR MATCHES

| Outdoor Unit Model No. | Indoor Unit Model No |
|---|---|
| XP16-024 | CBX32MV-024/030 |
| XP16-036 | CBX32MV-036 |
| XP16-048 | CBX32MV-060 |
| XP16-060 | CBX32MV-060 |

## AHRI STANDARD 210/240

Cooling or heating capacities are net values, including the effects of blower motor heat, and do not include supplementary heat. Power input is the total power input to the compressor(s) and fan(s), plus any controls and other items required as part of the system for normal operation.

Units which do not have an indoor air-circulating blower furnished as part of the model, i.e., split system with indoor coil only, is established by subtracting from the total cooling capacity 1250 Btu/h per 1,000 cfm, and by adding the same amount to the heating capacity. Total power input for both heating and cooling is increased by 365 W per 1,000 cfm of indoor air circulated.

## REVISIONS

| Sections | Description of Change |
|---|---|
| Optional Accessories | Updates to Control section. |
| Specifications | Revised refrigerant charges for XP16-024 and XP16-048. |



LENNOX®

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**Contact us at 1-800-4-LENNOX**