



ENGINEERING DATA

HEAT PUMP OUTDOOR UNITS

XPG20

DAVE LENNOX SIGNATURE® COLLECTION
Solar-Assist - R-410A - Two-Stage Compressor

Bulletin No. 210527

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Supersedes October 2009



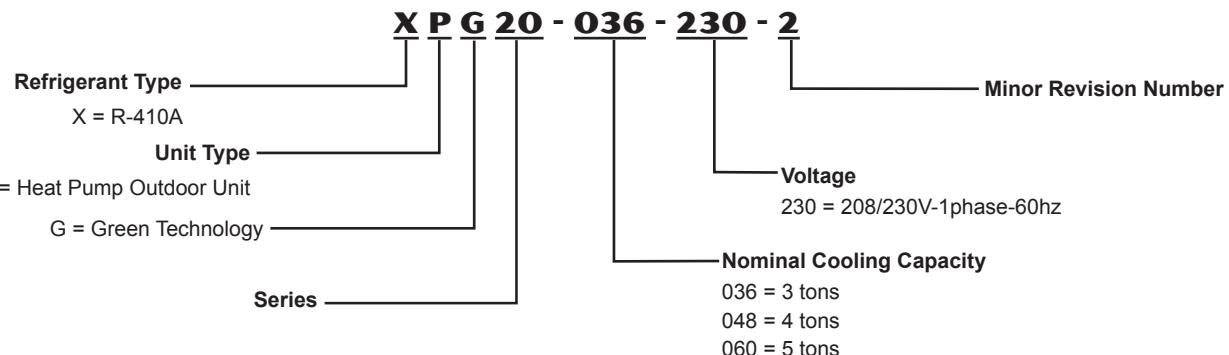
SUN SOURCE™



**SEER up to 18.2
3 to 5 Tons**

**Cooling Capacity - 35,000 to 59,500 Btuh
Heating Capacity - 32,600 to 57,500 Btuh**

MODEL NUMBER IDENTIFICATION



FEATURES

CONTENTS

AHRI System Matches.....	11
Dimensions	8
Dimensions - Solar Panel	9
Electrical Data.....	7
Features.....	2
Field Wiring.....	10
Installation Clearances	9
Model Number Identification	1
Optional Accessories	7
Required Solar Components	7
Sound Data	9
Specifications.....	7

SOLAR-ASSIST HEAT PUMP OVERVIEW

Patent-pending solar-assist technology uses a combination of solar energy and electricity to reduce peak demand on home electric usage.

Required system components consists of XPG20 heat pump outdoor unit, 205W solar module with mounting hardware and a remotely installed air handler, indoor coil, or indoor coil with gas furnace.

NOTE - All components must be ordered separately.

During peak daylight hours, the SunSource™ comfort system gets help from a solar module to provide heating and cooling. It uses renewable solar energy to power the outdoor fan motor, reducing the utility company provided electricity needed for operation.

The solar-assist increases the system efficiency, reducing the power consumed by as much as 8%.

SunSource™ makes use of all available solar energy to reduce electric consumption - full sun is not a requirement.

On days with limited sun exposure, SunSource™ continues to operate efficiently using metered electricity provided by your electric company.

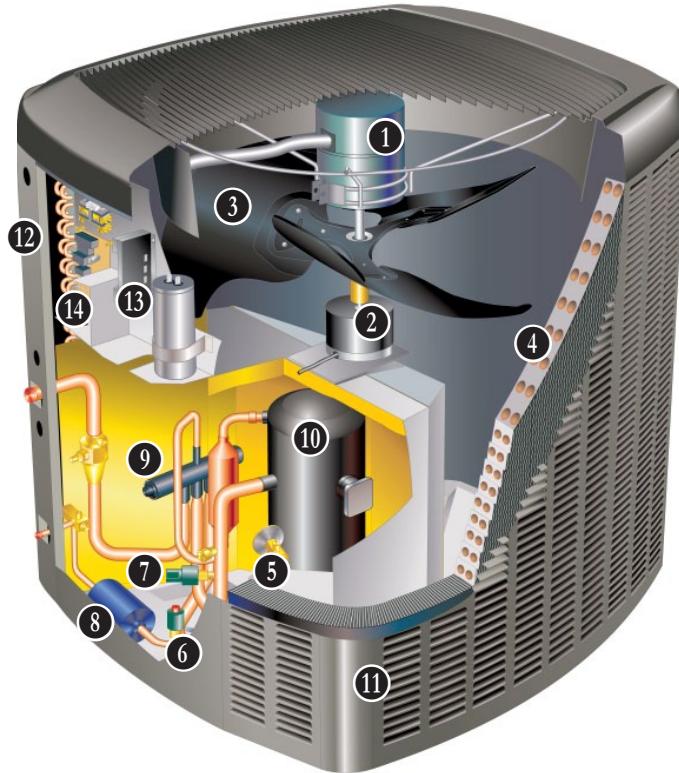
EQUIPMENT WARRANTY

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

All other covered components - ten years in residential installations and one year in non-residential installations.

Refer to Lennox Equipment Limited Warranty certificate included with unit for specific details.

Solar module warranted by module manufacturer.



APPROVALS

Certified in accordance with USE certification program which is based on AHRI Standard 210/240-2008.

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.

Heat pumps and components within bonded for grounding to meet safety standards for servicing required by UL, NEC and CEC.

Units are UL and ULC listed.

ISO 9001 Registered Manufacturing Quality System.

ENERGY STAR® certified units are designed to use less energy, help save money on utility bills, and help protect the environment.

For expanded ratings, see www.lennoxdavenet.com.

FEATURES

APPLICATIONS

SEER up to 18.20 (without solar-assist).
HSPF (region IV) up to 9.70 (without solar-assist).
3 to 5 ton
Single phase power supply.
Sound levels as low as 72 dBA.
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 handlers or add-on indoor coils See Indoor Coils and Air Handlers sections for indoor unit data.
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 and solar module connections to complete job.

REFRIGERATION SYSTEM

R-410A Refrigerant

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



Unit is factory pre-charged with refrigerant. Total system refrigerant charge is dependant on outdoor unit size, indoor unit size and refrigerant line length. Refer to "Installation Instructions for Indoor Unit Match-Up and Sub-Cooling Charge Levels" to determine correct amount of charge required.

See Specification table.

1 Outdoor Fan Motors with Solar-Assist Technology

Patent-pending solar-assist technology uses two electronically commutated motors (ECM), one AC powered the other DC powered.

An AC powered, variable-speed outdoor fan motor for quiet operation and a 24VDC Electronically Commutated Motor (ECM) directly coupled to each other.

2 The DC motor is wired to the output of the single solar module. When the solar module produces electricity and the heat pump fan is running, the DC motor applies a torque on the fan shaft and reduces the load of the AC motor.

The inverter controls in the AC motor sense the reduction in load and reduces the power the AC motor uses. The more sunlight that is available the more assist the DC motor will produce, and the less utility power is consumed by the AC motor.

Motors are totally enclosed for maximum protection from weather, dust and corrosion.

Fan service access accomplished by removal of fan guard.

Both the fan motors are inherently protected.

3 Outdoor Fan with SilentComfort™ Technology

Specially-designed, SilentComfort fan guard uses Passive Vortex Suppression to reduce air noise. Constructed of corrosion-resistant PVC (polyvinyl chloride) coated steel. Specially designed fan blades reduce operating sound levels. Direct drive fan moves large air volumes uniformly through entire outdoor coil for high refrigerant cooling capacity. Vertical air discharge minimizes operating sounds and eliminates damage to lawn and shrubs.

4 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.

5 Expansion Valve - Outdoor Unit

Designed and sized specifically for use in heat pump system.

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

Factory installed and piped.

Discharge Temperature Switch

Shuts off unit if operating conditions cause the compressor discharge line temperature to rise above set point.

Protects compressor from excessive pressure / temperature.

Automatic reset when temperature drops below set point.

6 High Pressure Switch

Shuts off unit if abnormal operating conditions cause the discharge pressure to rise above setting. Protects compressor from excessive condensing pressure.

Manual reset.

FEATURES

REFRIGERATION SYSTEM (CONTINUED)

7 Low Pressure Switch

Shuts off unit if suction pressure falls below setting.
Provides loss of charge and freeze-up protection.
Automatic reset.

8 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.

9 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.

OPTIONS

Expansion Valve Kits

Must be ordered extra and field installed on certain indoor units. See Expansion Valve Kit 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 it's set point.
Opens at 29°F and closes at 58°F.

Refrigerant Line Kits

Refrigerant lines (suction & liquid) are cleaned, dried, pressurized, and sealed at factory.
Suction line fully insulated.
L15 lines are stubbed at both ends.
See Specifications table for selection.

SOLAR-ASSIST

REQUIRED COMPONENTS - ORDERED

SEPARATELY

Solar Module

The Lennox SunSource solar-assisted heat pump utilizes a single solar module to offset the utility power consumed by the outdoor fan motor.



A photo-voltaic (solar) module converts sunlight into electricity. The sunlight excites electrons and the circuit in the solar module creates a path for the electrons to flow. This flow of electrons is electricity.

The output of a solar module is proportional to the sunlight intensity. As the sunlight intensity increases so does the current and voltage.

High efficient, multi-crystal photo-voltaic module.

Solar efficiency of the solar cell is over 16%.

Cells are encapsulated between a tempered glass cover and a pottant with backsheet to provide efficient protection from the elements. The entire laminate is installed in an anodized aluminum frame to provide structural strength and ease of installation.

Module needs to be installed in full sun light. Any shade on any of the cells can significantly decrease performance.

Module should be mounted so that it faces southwest and tilted at an angle that is equal to 2/3's of the local latitude.

Module must be securely fastened with frames or mounting hardware designed for photo-voltaic module applications.

Module is equipped with "+" and "-" MC4 connectors for wiring the solar module to the heat pump. See Field Wiring and Installation Instructions for details on wiring.
Module is UL1703 listed.

See Specifications table for electrical information.

MC Connector Wire

Wire for solar module connection

12 ga., 10 feet in length

One end has female MC4 (multi-contact) connector, the other end has a male MC4 connector.

Weatherproof Electrical Enclosure Kit

For field connections of the solar module.

Terminal bus bars, DC GFI and 15A DC disconnect installed in a weatherproof enclosure.

Solar Module Mounting Kits

Module should be mounted facing southwest when possible.

Trees, buildings, etc. should not shade module. Even partial shading of one cell of the module can reduce the output of the module by 50%.

Modules should be mounted with proper gap for ventilation air to flow under the module for cooling.

Stainless Steel hardware (nuts and bolts) is recommended.

Two Mounting Kits are available; one pole mount and one roof mount.

See Specifications table for catalog numbers.

NOTE - Pole for pole mount kit is not furnished and must be field supplied. Pole Mount Kit is intended for a 2-1/2 inch, schedule 40 steel pole, outside diameter 2-7/8 inches and includes U-bolts and necessary mounting hardware.

FEATURES

10 COMPRESSOR

Copeland Scroll Ultra Tech™ Two-Stage Compressor

Compressor features high efficiency with uniform suction flow, constant discharge flow and 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 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 be worked toward the center and discharged.

On the fixed scroll there are two bypass ports in the first suction pocket.

On the outside of the fixed scroll there is a "slider ring" that is controlled by an internal solenoid that will rotate and cover the bypass ports. When the thermostat calls for first-stage cooling, the bypass ports are open and the compressor operates at 67% capacity, creating more cost-effective and efficient compressor operation.

The bypassed refrigerant is returned to the compressor housing through the bypass ports.

When the thermostat calls for second-stage cooling, the internal solenoid is energized, the slider ring rotates and covers the bypass ports, and the compressor operates at full capacity.



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.

11 CABINET

Heavy-gauge steel construction

Pre-painted cabinet finish.

Pre-painted base section.

Compressor and control box located in a separate compartment, insulated with thick fiberglass insulation.

Compartment provides protection from the weather and keeps sound transmission at a minimum.

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.

12 SmartHinge™ Louvered Coil Protection

Steel louvered panels provide 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

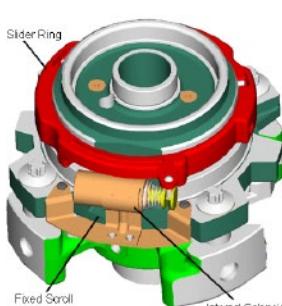
Vapor and liquid lines are located on corner of unit cabinet and are made with sweat connections. See dimension drawing.

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.

Vapor and liquid line service valves and gauge ports are located inside the cabinet.

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

Solar module terminal block is installed on the control panel for ease of field wiring.



FEATURES

CONTROLS

13 Lennox System Operations Monitor

Provides detailed information for proper preventive maintenance and fast, easy servicing.

Displays the most common fault conditions through indicator LED's.

Monitor detects both mechanical and electrical system problems.

Monitors only and does not provide safety protection.

When an abnormal condition is detected, communicates the specific condition through the ALERT and TRIP lights.



POWER LED (green) - indicates voltage within the range of 19-28VAC is present at the power connection.

ALERT LED (yellow) - communicates an abnormal system condition through a unique flash code. The ALERT LED will flash a number of times consecutively, pause and then repeat the process. The number of consecutive flashes, defined as the Flash Code, correlates to a particular abnormal condition.

The codes can indicate one of the following: long run time, system pressure trip (discharge or suction pressure out-of-limits or compressor overloaded), short cycling, locked rotor, open circuit, open start circuit (current present only in run circuit), open run circuit (current present only in start circuit), welded contactor (compressor runs continuously), or low voltage (control circuit < 17VAC).

TRIP LED (red) - indicates there is a demand signal from the thermostat but no current to the compressor is detected by the monitor.

14 Defrost Control

Solid-state 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.

Terminates DC fan motor operation during defrost cycle.

Diagnostic LED's furnished as an aid in troubleshooting.

Conveniently located in control box.

OPTIONS

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.

Indoor Blower Off Delay Relay

Delays the indoor blower-off time during the cooling cycle.

See AHRI System Matches for usage.

ComfortSense® 7000 Touchscreen Thermostat

Electronic 7-day, universal, multi-stage, programmable, touchscreen thermostat.

4 Heat/2 Cool.

Auto-changeover.

Controls humidity during cooling mode.

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



Easy-to-use, menu driven thermostat with a back-lit, LCD touchscreen.

Remote outdoor temperature sensor (optional) allows the thermostat to display outdoor temperature. Required in dual fuel and Humiditrol® applications.

See the ComfortSense 7000 Engineering Handbook bulletin in the Controls section for more information.

Low Ambient Kit

Outdoor units will operate 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.

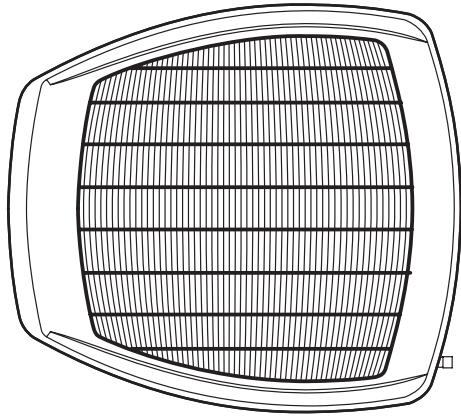
Outdoor Thermostat Kit

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

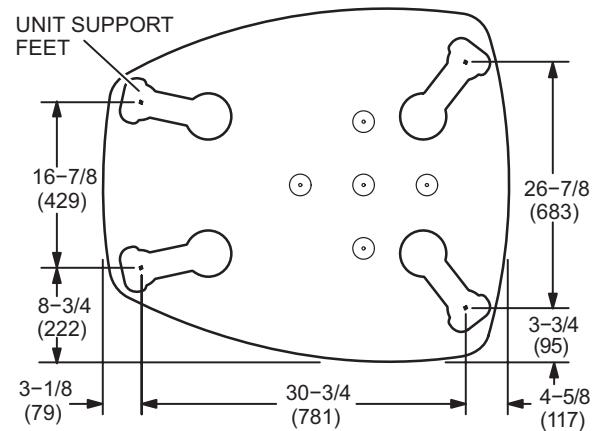
Outdoor thermostat maintains the heating load on the low power input as long as possible before allowing the full power load to come on the line.

Thermostat kit and mounting box must be ordered extra.

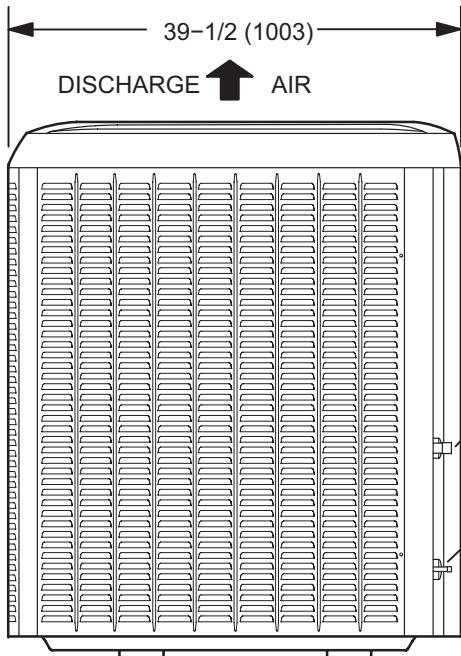
DIMENSIONS - INCHES (MM)



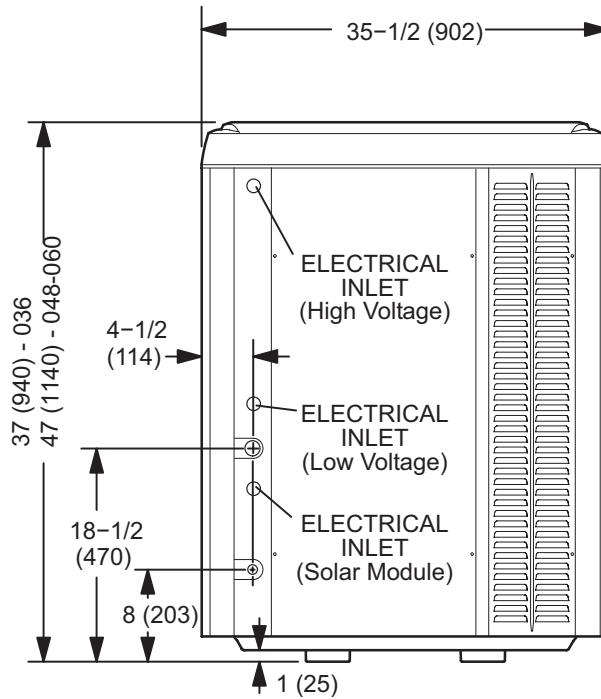
TOP VIEW



TOP VIEW BASE SECTION

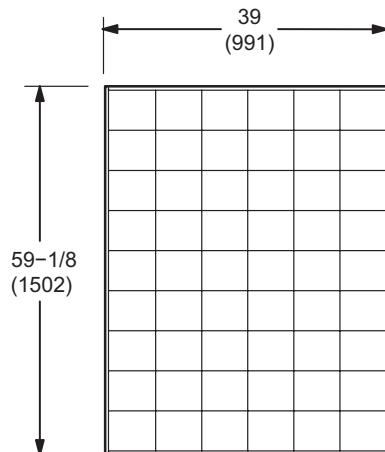


SIDE VIEW

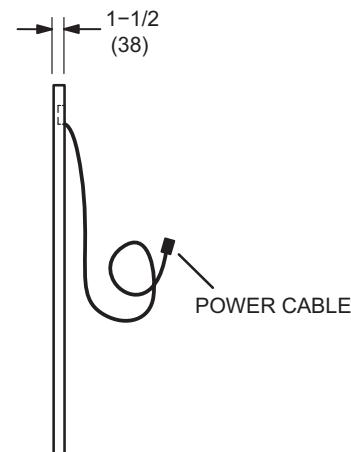


ACCESS VIEW

DIMENSIONS - SOLAR PANEL - INCHES (MM)



FRONT VIEW



SIDE VIEW

SOUND DATA

¹ Unit Model No.	Octave Band Sound Power Levels dBA, re 10^{-12} Watts Center Frequency - HZ								¹ Sound Rating Number (dB)
	63	125	250	500	1000	2000	4000	8000	
XPG20-036 without solar assist	49.0	55.5	63.5	68.5	65.5	60.0	53.5	47.0	72
XPG20-036 with solar assist	50.0	58.0	68.5	71.5	69.0	63.5	56.5	49.5	75
XPG20-048 with or without solar assist	49.5	60.0	64.5	68.5	66.0	62.0	56.5	46.5	73
XPG20-060 with or without solar assist	50.5	57.0	64.5	68.0	67.0	62.5	56.0	49.5	73

NOTE - the octave sound power data does not include tonal correction.

¹ Tested according to AHRI Standard 270-95 test conditions.

INSTALLATION CLEARANCES - INCHES (MM)

NOTES:

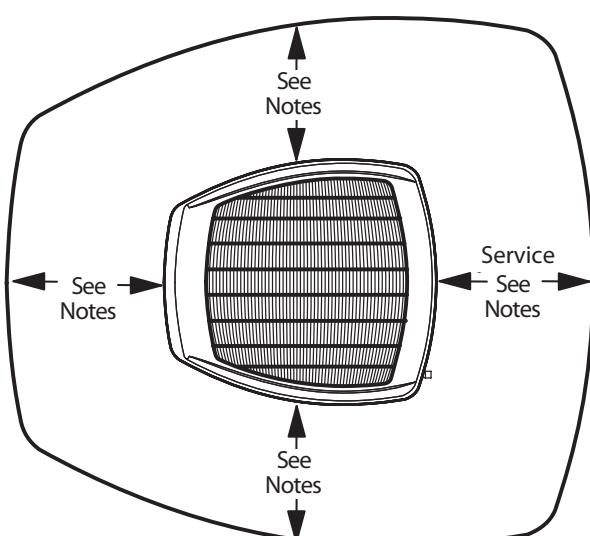
Service clearance of 30 in. (762 mm) must be maintained on one of the sides adjacent to the control box.

Clearance to one of the other three sides must be 36 in. (914 mm)

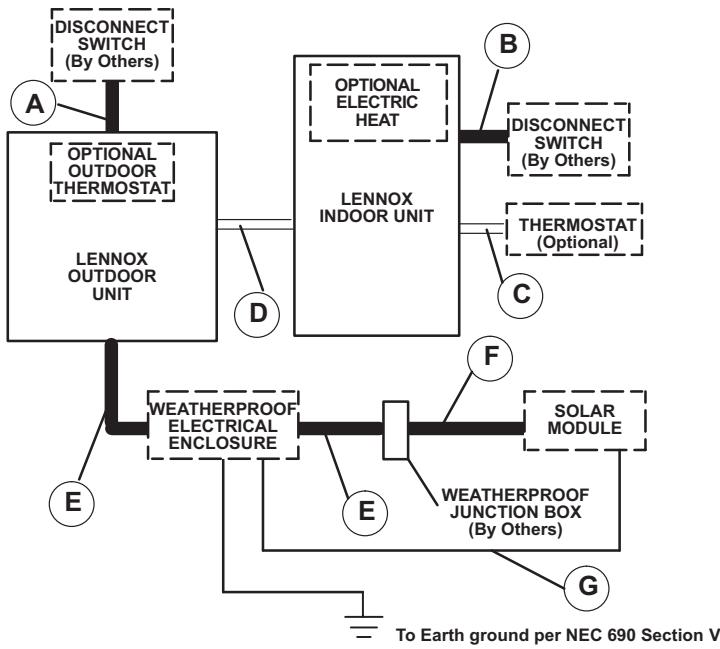
Clearance to one of the remaining two sides may be 12 in. (305 mm) and the final side may be 6 in. (152 mm).

A clearance of 24 in. (610 mm) must be maintained between two units.

48 in. (1219 mm) clearance required on top of unit.



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
 - E — Two Wire Copper - 10 to 14 ga.
 - F — Two Wire with MC connectors
 - G — Single Bare Wire Copper Ground
- *Field Wiring Not Furnished* —

All wiring must conform to NEC or CEC and local electrical codes.

*THERMAL EXPANSION VALVES (TXV)

Model No.	Order No.
XPG20-036	49L24
XPG20-048	91M02
XPG20-060	91M02

*CX34 coils and all air handlers (except CB26UH "R") - the factory installed expansion valve does not need to be changed out..
C33 and CH33 coils and CB26UH "R" air handlers - replace the factory installed RFC with the expansion valve listed above.
CR33 and CH23 - use the expansion valve listed above.

MOST POPULAR MATCHES

Outdoor Unit Model No.	Indoor Unit Model No
XPG20-024	CBX32MV-036
XPG20-036	CBX32MV-048
XPG20-048	CBX32MV-060
XPG20-060	CBX32MV-060

AHRI SYSTEM MATCHES

Model No.	Capacity	SEER	EER	Heat Capacity		HSPF	Coil or Air Handler	Furnace	AHRI Reference
				High	Low				
XPG20-060-230 (V)	59,000	14.90	11.55	55,500	34,000	6.95	CX34-62C		3509472
XPG20-060-230 (V)	58,500	16.45	11.75	54,500	33,400	7.20	CX34-62D	G60UHV-60D-135	3509453
XPG20-060-230 (V)	58,500	16.10	11.50	55,000	33,800	7.15	CX34-62D	G61MPV-60D-135	3509449
XPG20-060-230 (V)	58,500	14.65	11.45	55,000	34,000	6.95	CX34-62D		3509475

NOTES:

Heat Pump suffixes:

-230 (IV) = HSPF Region IV

-230 (V) = HSPF Region V

When used with gas furnaces, a dual-fuel control (i.e. FM21), a control system with dual-fuel capabilities (LZP-2 or LZP-4), or a thermostat with dual-fuel capabilities must be used (ordered extra).

Certified in accordance with USE certification program which is based on AHRI Standard 210/240 with 25 ft. of connecting refrigerant lines;

Cooling Ratings - 95°F outdoor air temperature and 80 °F db/67° F wb entering indoor coil air.

High Temperature Heating Ratings - 47° F db/43° F wb outdoor air temperature and 70 °F db entering indoor coil air.

Low Temperature Heating Ratings - 17 °F db/15° F wb outdoor air temperature and 70 °F db entering indoor coil air.

All ratings include the use of a blower time delay relay (TDR). All Lennox variable-speed furnaces and Air Handlers have time delay capabilities. Other Furnaces and Air Handlers may require an optional time delay relay (**58M81**) for field installation. See furnace or air handler specifications to determine if relay is needed.

REVISIONS

Sections	Description of Change
Specifications	Updated hard start kits for -036-048-060.
AHRI Ratings	Updated all



Visit us at www.lennox.com

For the latest technical information, www.lennoxdavenet.com

Contact us at 1-800-4-LENNOX

NOTE - Due to Lennox' ongoing commitment to quality, Specifications, Ratings and Dimensions subject to change without notice and without incurring liability. Improper installation, adjustment, alteration, service or maintenance can cause property damage or personal injury. Installation and service must be performed by a qualified installer and servicing agency.

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