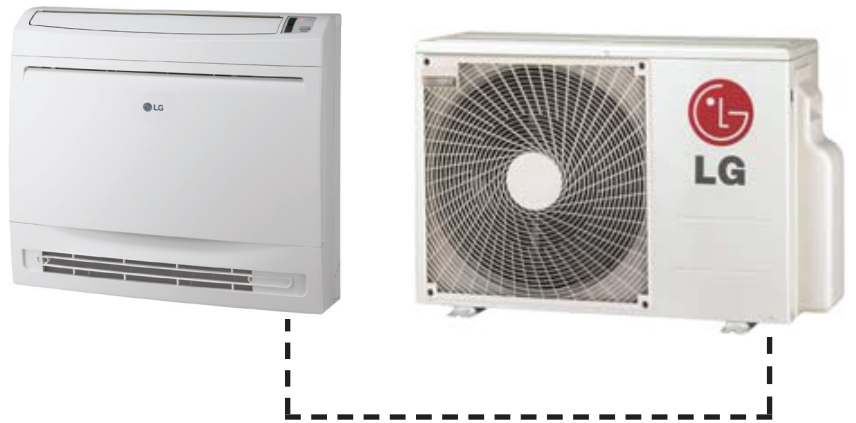




# SINGLE ZONE LOW WALL CONSOLE ENGINEERING MANUAL

Heat Pump Systems



LQ090HV (9,000 Btu/h)  
LQ120HV (12,000 Btu/h)

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A summary list of safety precautions is on page 4.

Proper sizing and installation of equipment is critical to achieve optimal performance. Split system air conditioners and heat pumps (excluding ductless systems) must be matched with appropriate coil components to meet ENERGY STAR® criteria. Ask your contractor for details or visit [www.energystar.gov](http://www.energystar.gov).

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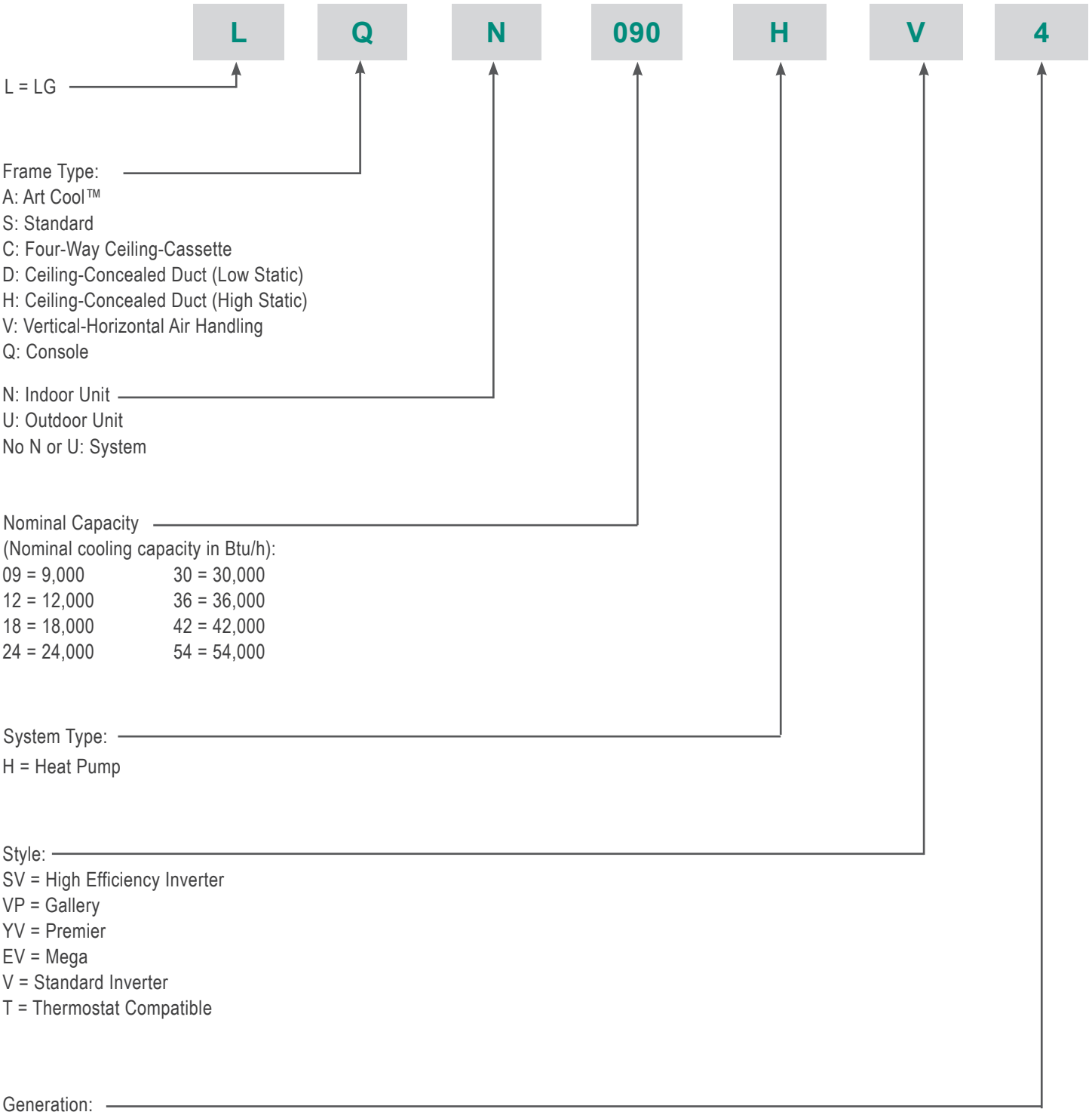
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## TABLE OF SYMBOLS

 <b>DANGER</b>	<i>This symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.</i>
 <b>WARNING</b>	<i>This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.</i>
 <b>CAUTION</b>	<i>This symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.</i>
<b>Note:</b>	<i>This symbol indicates situations that may result in equipment or property damage accidents only.</i>
	<i>This symbol indicates an action that must not be performed.</i>

# UNIT NOMENCLATURE



# LG AIR CONDITIONER TECHNICAL SOLUTION (LATS)

## LG Air Conditioner Technical Solution (LATS) Software

A properly designed and installed refrigerant piping system is critical to the optimal performance of LG air-conditioning systems. To assist engineers, LG offers, free of charge, LG Air Conditioner Technical Solution (LATS) software—a total design solution for LG air conditioning systems. Contact your LG Rep for the best software program for your application.

### Note:

To reduce the risk of designing an improper applied system or one that will not operate correctly, LG requires that LATS software be used on all projects.

### Formats

LATS is available to LG customers in three user interfaces: LATS HVAC, LATS CAD2, and LATS Revit. All three LATS formats are available through [www.myLGHVAC.com](http://www.myLGHVAC.com), or contact an LG Sales Representative.

**LATS HVAC** is a Windows®-based application that aids engineers in designing LG Variable Refrigerant Flow (VRF), Multi F / Multi F MAX, Single-Zone, and Energy Recovery Ventilator (ERV) systems.

\*Windows® is a registered mark of Microsoft® Corporation.

**LATS CAD2** combines the LG LATS program with AutoCAD® software\*\*. It permits engineers to layout and validate LG Multi V Variable Refrigerant Flow (VRF), Multi F / Multi F MAX, Single-Zone, and Energy Recovery Ventilator (ERV) systems directly into CAD drawings.

**LATS Revit** integrates the LG LATS program with Revit® software\*\*. It permits engineers to layout and validate Multi V VRF systems directly into Revit drawings.

\*\*AutoCAD® and Revit® are both registered marks of Autodesk, Inc.

### Features

All LG product design criteria have been loaded into the program, making LATS simple to use: double click or drag and drop the component choices. Build systems in Tree Mode where the refrigerant system can be viewed. Switch to a Schematic diagram to see the electrical and communications wiring.

LATS software permits the user to input region data, indoor and outdoor design temperatures, modify humidity default values, zoning, specify type and size of outdoor units and indoor units, and input air flow and external static pressure (ESP) for ducted indoor units.

The program can also:

- Import building loads from a separate Excel file.
- Present options for outdoor unit auto selection.
- Automatically calculate component capacity based on design conditions for the chosen region.
- Verify if the height differences between the various system components are within system limits.
- Provide the correct size of each refrigerant piping segment and LG Y-Branches and Headers.
- Adjust overall piping system length when elbows are added.
- Check for component piping limitations and flag if any parameters are broken.
- Factor operation and capacity for defrost operation.
- Calculate refrigerant charge, noting any additional trim charge.
- Suggest accessories for indoor units and outdoor units.
- Run system simulation.

### Note:

Features depend on which LATS program is being used, and the type of system being designed.

Figure 1: Example of LATS CAD2.



# LG AIR CONDITIONER TECHNICAL SOLUTION (LATS)

## LATS Generates a Complete Project Report

LATS software also generates a report containing project design parameters, cooling and heating design data, system component performance, and capacity data. The report includes system combination ratio and refrigerant charge calculations; and provides detailed bill of material, including outdoor units, indoor units, control devices, accessories, refrigerant pipe sizes segregated by building, by system, by pipe size, and by pipe segments. LATS can generate an Excel GERP report that can imported into the LG SOPS pricing and ordering system.

## Proper Design to Install Procedure

LG encourages a two report design-to-install-procedure. After the design engineer determines building / zone loads and other details, the engineer opens the LATS program and inputs the project's information. When the design is complete, the "Auto Piping" and "System Check" functions must be used to verify piping sizes, limitations, and if any design errors are present. If errors are found, engineers must adjust the design, and run Auto Piping and System Check again. When the design passes the checks, then the engineer prints out a project "Shop Drawing" (LATS Tree Diagram) and provides it to the installing contractor. The contractor must follow the LATS Tree Diagram when building the piping system, but oftentimes the design changes on the building site:

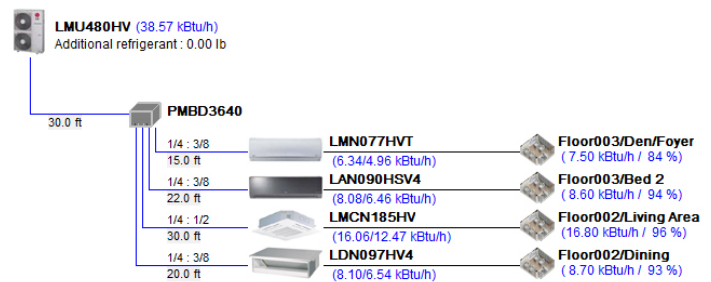
- Architect has changed location and/or purpose of room(s).
- Outdoor unit cannot be placed where originally intended.
- Structural elements prevent routing the piping as planned.
- Air conditioning system conflicts with other building systems (plumbing, gas lines, etc.).

The contractor must mark any deviation from the design on the Shop Drawing, including as-built straight lines and elbows. This "Mark Up" drawing must be returned to the design engineer or Rep, who must input contractor changes into the LATS file. (Copy the original LATS software file, save and rename as a separate file, and modify all piping lengths by double-clicking on each length and editing information.) Like the shop drawing, the Auto Piping and System Check must also be run on this new "As Built" drawing. The design engineer or Rep must then provide the final As Built file to the contractor. The Mark Up version must be compared to the As Built version for the following:

- Differences in pipe diameter(s). If incorrect diameters have been installed, the piping must be changed out. If pipe diameters have changed, check to see if Y-Branches will also need to be changed.
- Changes to outdoor unit and indoor unit capacities. Capacities changes may impact line length changes.
- Additional refrigerant charge quantity ("Trim Charge"). Trim charge will change if piping lengths and diameters change. The As Built version must reflect installed piping lengths to ensure correct trim charge.

All documents submitted by the contractor, as well as the Shop Drawing and the As Built Drawing files must be provided for commissioning purposes. Model and serial numbers for all system components must also be submitted. If the steps previously detailed are not followed, and all documents are not provided to the LG Commissioner, the project runs the risk of not being commissioned and voiding any limited warranty LG offers on the equipment.

Figure 2: Example of a LATS Tree Diagram.



# LOW WALL CONSOLE UNIT PRODUCT DATA

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# MECHANICAL SPECIFICATIONS

## Single Zone Low Wall Console System

### General

#### System

LG single zone Low Wall Console system comprises of a single frame outdoor unit connected to a single indoor unit with a single refrigerant circuit. An LG single zone Low Wall Console system can operate in either cooling or heating mode. The system is capable of changing mode within a maximum time of three (3) minutes to ensure indoor temperature can be properly maintained. LG components are manufactured in a facility registered to ISO 9001 and ISO 14001, which is a set of standards applying to environmental protection set by the International organization for Standardization (ISO). The system components comply with Underwriters Laboratories (UL) 1995 Heating and Cooling Equipment Standard for Safety and bear the CSA label. Wiring in these units are in accordance with the national Electrical Code (NEC). LG single zone Low Wall Console systems have published performance ratings certified by AHRI (Air- Conditioning, Heating, and Refrigeration Institute) and are listed in the AHRI Standard 210/240 certified product directory.

#### Outdoor Unit

The outdoor unit has sound levels not exceeding 52 dB(A) tested in an anechoic chamber under ISO Standard 3745.

#### Indoor Unit

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Low Wall Console units have a sound rating no higher than 39 dB(A) as tested per KSA0701 ISO Low 3745.

### Temperature Ranges

#### 9,000 and 12,000 Btu/h Low Static Operating Ranges

- Operating ranges for outdoor units of -4°F to +118°F (DB) for cooling, -4°F to +64°F (WB) for heating.
- Operating ranges for indoor units of 57°F to 77°F (WB) for cooling; 59°F to 81°F (DB) for heating.
- Indoor unit temperature setting range of 65°F to 86°F (DB) for cooling; 61°F to 86°F (WB) for heating.

### Casing / Frame

#### Outdoor Unit

The outdoor condensing unit case is constructed from pre-coated metal (PCM) that has been tested in accordance with ASTM B-117 salt spray procedure for a minimum of 1,000 hours. Case has a removable panel to allow access to major internal components, and legs to secure the unit during installation.

#### Indoor Unit

The units mount on a vertical surface. They are shipped with a separate back plate that secures the unit to the wall, protruding no more than nine (9) inches. Refrigerant piping can be installed in one (1) of four (4) different directions.

### Refrigerant System

The system is designed for use with R410A refrigerant, and consists of a single refrigeration circuit. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. The outdoor unit is provided with factory installed components, including a refrigerant strainer, accumulator, four-way reversing valve, electronic expansion valve (EEV), high and low side charging ports, service valves, and interconnecting piping. All refrigerant lines from the outdoor unit to the indoor unit are field-installed and must be insulated separately.

### Compressors

The 9,000 ~ 12,000 Btu/h outdoor units are equipped with one hermetically sealed, digitally controlled, inverter-driven twin rotary compressor to modulate capacity (modulation in 1 Hz increments). Teflon coated bearings, overcurrent protection, and vibration isolation are integrated with the compressor.

Frequency ranges for the 9,000 ~ 12,000 Btu/h outdoor units are:

- 9k Btu/h = 20 Hz to 100 Hz
- 12k Btu/h = 20 Hz to 100 Hz

Figure 3: Low Wall Console System.





# MECHANICAL SPECIFICATIONS

## Single Zone Low Wall Console System

### Coil

#### Outdoor Unit

Heat pump outdoor unit coils are made of nonferrous louvered aluminum fins protected with an integral coil guard. The coil for each outdoor unit has a minimum of 14 fins per inch (FPI); heat exchanger has two rows. The coil fins have a factory applied corrosion resistant GoldFin™ material with hydrophilic coating tested in accordance with ASTM B-117 salt spray test procedure for a minimum of 1,000 hours. Coils are factory tested to a pressure of 551 psig.

#### Indoor Unit

Indoor unit coils are factory built and are comprised of aluminum fins mechanically bonded to copper tubing. Each indoor unit has a minimum of two rows of coils, which are pressure tested to 551 psig at the factory. Each unit is provided with a factory installed condensate drain pan below the coil.

### Fans and Motors

#### Outdoor Unit

The 9,000 Btu/h (LUU090HV), 12,000 Btu/h (LUU120HV) outdoor units include one direct drive, variable speed axial / propeller type fan with a horizontal air discharge. Fan blades are made of Acrylonitrile Butadiene Styrene (ABS) material, and have a Brushless Digitally Controlled (BLDC) fan motor. The fan motor has inherent protection, permanently lubricated bearings, and variable speed with a maximum speed up to 950 rpm. Raised guards are provided to limit contact with moving parts.

#### Indoor Unit

The unit has a single, direct-drive, turbo fan made of high strength ABS plastic. The fan motor is brushless digitally controlled (BLDC) with permanently lubricated and sealed ball bearings. The fan / motor assembly is mounted on vibration attenuating rubber grommets. Fan speed is controlled using a microprocessor-based direct digitally controlled algorithm that provides pre-programmed, field-selectable fixed or auto fan speeds in the Heating and Cooling modes. For Low Wall Console units, the indoor fan has Low, Med, High, Jet Cool, and Auto settings for Cooling mode; and has Low, Med, High, Jet Heat, and Auto settings for Heating mode. The Auto setting adjusts the fan speed based on the difference between the controller setpoint and space temperature. Also, the separate Chaos setting provides a simultaneous and random change in fan speed and flow direction at the discharge, simulating a natural outdoor breeze.

### Electrical

The system is designed to operate using 208–230 / 60 / 1 power with voltage variances of  $\pm 10\%$  and includes overcurrent protection. The indoor unit is powered through the outdoor unit.

### Air Filter - Indoor Unit

The return air inlet has a factory-supplied primary removable, washable filter. The filter is accessed from the front of the unit without the use of tools.

### Airflow Guide Vanes

A factory-installed motorized guide vane controls the direction of airflow up and down. Side to side control is manual. A motorized louver provides an automatic change in airflow by directing the air up and down for uniform air distribution.

### Microprocessor Control

The indoor unit has an integrated control panel to communicate with the outdoor unit. All unit operation parameters are stored in non-volatile memory resident on the unit microprocessor. The microprocessor controls space temperature through using the value provided by the temperature sensor within the indoor unit. The microprocessor control will activate indoor unit operation when the indoor room temperature falls below or rises above a setpoint temperature, at which point, a signal is sent to the outdoor unit to begin the appropriate mode. The microprocessor also provides self-diagnostics and auto restart functions. A field-supplied four-wire power / communications cable must be installed to connect the indoor unit(s) to the outdoor unit.

### Controls

The indoor unit casing has a factory-low, integral infrared sensor to communicate with the supplied LG wireless handheld remote controller. An optional LG supplied wired controller is available as an additional accessory. Communication between the indoor units and the outdoor unit is accomplished through 14 AWG, four-core, stranded and shielded power / communication cable. The indoor unit has an option for wi-fi and can be controlled with LG's SmartThinQ app on a smart device. A field-supplied wi-fi network and smart device are required. The SmartThinQ app is free and is available for Android and iOS smart devices.

### Condensate



The unit is designed for gravity draining of condensate and includes a flexible drain hose capable of installation in one of two directions. The unit also includes a connection that is compatible with the AquaGuard® AG-9300-LG condensate sensor.

# GENERAL DATA

## Pairing Table

The following table shows the available outdoor and indoor unit.

Table 1: Console System Pairing Table

Outdoor Unit Model	Indoor Unit Model
<p data-bbox="280 474 389 531">LUU090HV LUU120HV</p>  A white outdoor air conditioning unit with a large circular fan grille on the left and the LG logo on the right.	<p data-bbox="857 474 979 531">LQN090HV4 LQN120HV4</p>  A white indoor air conditioning unit with a horizontal vent at the bottom and the LG logo on the front panel.

**Note:**

The above units require any LG wired remote controller for operation. The LG wired remote controller is sold separately.

# GENERAL DATA / SPECIFICATIONS

## Single Zone Low Wall Console System

Table 2: Console System General Data.

Type	Single Zone Console	
	LQ090HV LQN090HV4 / LUU090HV	LQ120HV LQN120HV4 / LUU120HV
Cooling Capacity (Min / Rated / Max) (Btu/h)	4,270 ~ 9,000 ~ 11,500	4,500 ~ 10,200 ~ 13,460
Cooling Power Input <sup>1</sup> (Min / Rated / Max) (W)	350 ~ 714 ~ 1,220	400 ~ 809 ~ 1,350
EER <sub>2</sub> @ 95°F	12.6	12.6
SEER <sub>2</sub>	21.0	20.8
Heating Capacity (Min / Rated / Max) (Btu/h)	4,600 ~ 10,100 ~ 13,000	5,970 ~ 13,000 ~ 15,000
Heating Power Input <sup>1</sup> (Min / Rated / Max) (W)	420 ~ 850 ~ 1,450	550 ~ 1,225 ~ 1,580
COP @ 47°F	3.48	3.10
HSPF <sub>2</sub>	10.4	10.2
<b>Rated Low Heating Capacity (Btu/h)</b>		
Outdoor 17°F (WB) / Indoor 70°F (DB)	6,800	9,200
Low COP @ 17°F	2.88	2.72
<b>Maximum Heating Capacity (Btu/h)</b>		
Outdoor 17°F (DB) / Indoor 70°F (DB)	10,640	12,080
Outdoor 5°F (DB) / Indoor 70°F (DB)	10,200	10,800
Outdoor 0°F (DB) / Indoor 70°F (DB)	9,656	10,420
Outdoor -4°F (DB) / Indoor 70°F (DB)	9,380	9,960
ENERGY STAR 6.1 / Cold Climate	Yes / Yes	Yes / Yes
Power Supply V, Ø, Hz <sup>2</sup>	208-230 / 1 / 60	
Power Wiring / Communications Cable (No. x AWG) <sup>2</sup>	4 x 14	
<b>Outdoor Unit Operating Range</b>		
Cooling (°F DB)	-4 to 118	-4 to 118
Heating (°F WB)	-4 to 64	-4 to 64
<b>Indoor Unit Operating Range</b>		
Cooling (°F WB)	57 to 77	57 to 77
Heating (°F DB)	59 to 81	59 to 81
<b>Indoor Temperature Setting Range</b>		
Cooling (°F DB)	65 to 86	
Heating (°F WB)	61 to 86	
<b>Unit Data</b>		
Refrigerant Type <sup>3</sup> / Refrigerant Control	R410A / EEV	
Indoor Unit Sound Pressure Level dB(A) (H / M / L) <sup>4</sup>	38 / 32 / 27	39 / 32 / 27
Outdoor Unit Sound Pressure Level dB(A) (Cool / Heat) <sup>4</sup>	49 / 52	49 / 52
Indoor Unit Net / Shipping Weight (lbs.)	35.9 / 42.5	35.9 / 42.5
Outdoor Unit Net / Shipping Weight (lbs.)	74.5 / 80	74.5 / 80
Compressor (Type x Qty.)	Twin Rotary x 1	
Dehumidification Rate (pts./hr.)	2.0	2.5

EEV: Electronic Expansion Valve, IDU: Indoor Unit, ODU: Outdoor Unit. This unit comes with a dry helium charge.

This data is rated 0 ft above sea level, with 24.6 ft of refrigerant line per indoor unit and a 0 ft level difference between outdoor and indoor units.

Cooling capacity rating obtained with air entering the indoor coil at 80°F dry bulb (DB) and 67°F wet bulb (WB); and outdoor ambient conditions of 95°F dry bulb (DB) and 75°F wet bulb (WB).

Heating capacity rating obtained with air entering the indoor unit at 70°F dry bulb (DB) and 60°F wet bulb (WB); and outdoor ambient conditions of 47°F dry bulb (DB) and 43°F wet bulb (WB).

<sup>1</sup>Power Input is rated at high speed.

<sup>2</sup>All power wiring/communication cables from ODU to IDU are field supplied and are to be minimum 14 AWG, 4-conductor, stranded, shielded or unshielded (if shielded, must be grounded to chassis at

ODU only), and must comply with applicable local and national codes.

<sup>3</sup>Take appropriate actions at the end of HVAC equipment life to recover, recycle, reclaim or destroy R410A refrigerant according to applicable regulations (40 CFR Part 82, Subpart F) under section 608 of CAA.

<sup>4</sup>Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745 and are the same in both cooling and heating mode. These values can increase due to ambient conditions during operation.

<sup>5</sup>Piping lengths are equivalent.

<sup>6</sup>Cooling range can be extended from 0°F/ 5°F down to -4°F using the Low Ambient Wind Baffle Kit (sold separately).

# GENERAL DATA / SPECIFICATIONS

## Single Zone Low Wall Console System

Table 3: Console System General Data.

Type		Single Zone Console	
System (Model) (Indoor Unit / Outdoor Unit)		LQ090HV LQN090HV4 / LUU090HV	LQ120HV LQN120HV4 / LUU120HV
<i>Fan</i>			
Indoor Unit Type x Qty. / Outdoor Unit Type x Qty.		Turbo x 1 / Propeller x 1	
Motor / Drive		Brushless Digitally Controlled / Direct	
<i>Airflow Rate</i>			
Indoor Unit (Max / H / M / L [CFM])		318 / 300 / 237 / 177	353 / 318 / 244 / 184
Outdoor Unit (CFM)		988	988
<i>Piping</i>			
Liquid (in.)	Connection size	1/4	
	Pipe size	1/4	
Vapor (in.)	Connection size	3/8	
	Pipe size	3/8	
Indoor Unit Condensate Drain O.D. / I.D. (in.)		1-1/4 / 1	
Additional Refrigerant Charge (oz./ft.)		0.22	
Maximum Pipe Length (ft.)		66	
Piping Length <sup>5</sup> (no additional refrigerant, ft.)		24.6	
Maximum Elevation Difference (ft.)		49	

EEV: Electronic Expansion Valve, IDU: Indoor Unit, ODU: Outdoor Unit. This unit comes with a dry helium charge.

This data is rated 0 ft above sea level, with 24.6 ft of refrigerant line per indoor unit and a 0 ft level difference between outdoor and indoor units.

Cooling capacity rating obtained with air entering the indoor coil at 80°F dry bulb (DB) and 67°F wet bulb (WB); and outdoor ambient conditions of 95°F dry bulb (DB) and 75°F wet bulb (WB).

Heating capacity rating obtained with air entering the indoor unit at 70°F dry bulb (DB) and 60°F wet bulb (WB); and outdoor ambient conditions of 47°F dry bulb (DB) and 43°F wet bulb (WB).

<sup>1</sup>Power Input is rated at high speed.

<sup>2</sup>All power wiring/communication cables from ODU to IDU are field supplied and are to be minimum 14 AWG, 4-conductor, stranded, shielded or unshielded (if shielded, must be grounded to chassis at

ODU only), and must comply with applicable local and national codes.

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<sup>5</sup>Piping lengths are equivalent.

<sup>6</sup>Cooling range can be extended from 0°F/ 5°F down to -4°F using the Low Ambient Wind Baffle Kit (sold separately).

# ELECTRICAL DATA

Table 4: Console System Electrical Data.

Nominal Tons	Unit Model No.	Hertz	Voltage	Voltage Range (Min. to Max.)	MCA	MOP	Compressor Quantity	Compressor Motor RLA (Cooling)	Condenser Fan Motor(s)	
									Condenser Fan Quantity.	Condenser Fan Motor FLA
3/4	LUU090HV	60	208 - 230	187 - 253	11.9	15	1	9.0	1	0.2
1	LUU120HV				12.3					

Voltage tolerance is ±10%.

Maximum allowable voltage unbalance is 2%.

RLA = Rated Load Amps.

MCA = Minimum Circuit Ampacity.

Maximum Overcurrent Protection (MOP) is calculated as follows:  
 (Largest motor FLA x 2.25) + (Sum of other motor FLA) rounded down  
 to the nearest standard fuse size.

# FUNCTIONS, CONTROLS, AND OPTIONS

## Indoor Unit

### Functions, Controls, and Options for LQN090HV4, LQN120HV4

Table 5: Indoor Unit—Functions, Controls, and Options.

Indoor Unit Type		LQN090HV4	LQN120HV4
Airflow	Air supply outlets	2	2
	Airflow Direction Control (Left & Right)	Manual	Manual
	Airflow Direction Control (Up & Down)	Auto	Auto
	Auto Swing (Up & Down)	0	0
	Natural Wind (Auto Wind)	0	0
	Jet Cool / Jet Heat (Power Wind)	0 / 0	0 / 0
	Comfort Air	0	0
	Fan speed steps (fan / cool / heat)	4 / 5 / 5	4 / 5 / 5
Prefilter (Washable) <sup>1</sup>		0	0
Operation	Drain pump	X	X
	Hot Start	0	0
	Self diagnostics	0	0
	De-ice Control (Defrost)	0	0
	Auto changeover	0	0
	Auto restart	0	0
	Child lock <sup>2</sup>	0	0
	Sleep mode	0	0
	Timer (on / off)	0	0
	Weekly schedule <sup>2</sup>	0	0
	Two thermistor control <sup>2</sup>	0	0
	Outdoor Silent Mode	0	0
	Low Ambient Operation	0	0
	Controllers	Wired Remote Controller (PREMTA000)	Optional
Wired Remote Controller (PREMTC000)		Optional	Optional
Wireless LCD remote control <sup>2</sup>		0	0
Dry contact		0	0
Special Functions	Wi-Fi <sup>3</sup>	Optional	Optional
	Water Level Sensor Connection	0	0
	Mode Lock (Cooling Only or Heating Only)	0	0

<sup>1</sup>Primary washable filters.

<sup>2</sup>Requires wired zone controller.

<sup>3</sup>Requires Wi-Fi module PWFMD200.

√ = Standard feature

o = Unit option

X = Not Available

# FUNCTIONS, CONTROLS, AND OPTIONS

Outdoor Unit

## Functions, Controls, and Options for LUU090HV, LUU120HV

Table 6: Outdoor Unit—Functions, Controls, and Options.

Outdoor Unit			
Category	Functions	LUU090HV	LUU120HV
Reliability	Defrost / Deicing	O	O
	High pressure sensor	X	X
	Phase protection	X	X
	Restart delay (3-minutes)	O	O
	Self diagnosis	O	O
	Soft start	O	O
Convenience	Night Quiet Operation	X	X
	Mode Lock	X	X
	Pump Down (Forced Cooling Operation)	X	X
	Network solution (LGAP)	X	X
Central Controller	AC Smart 5	X	X
	ACP 5	X	X
	PI485	X	X
Remote Controller	MultiSITE CRC1	PREMTBVC0	PREMTBVC0
	MultiSITE CRC1+	PREMTBVC1	PREMTBVC1
Integration Solution	MultiSITE Communications Manager	X	X

√ = Standard feature

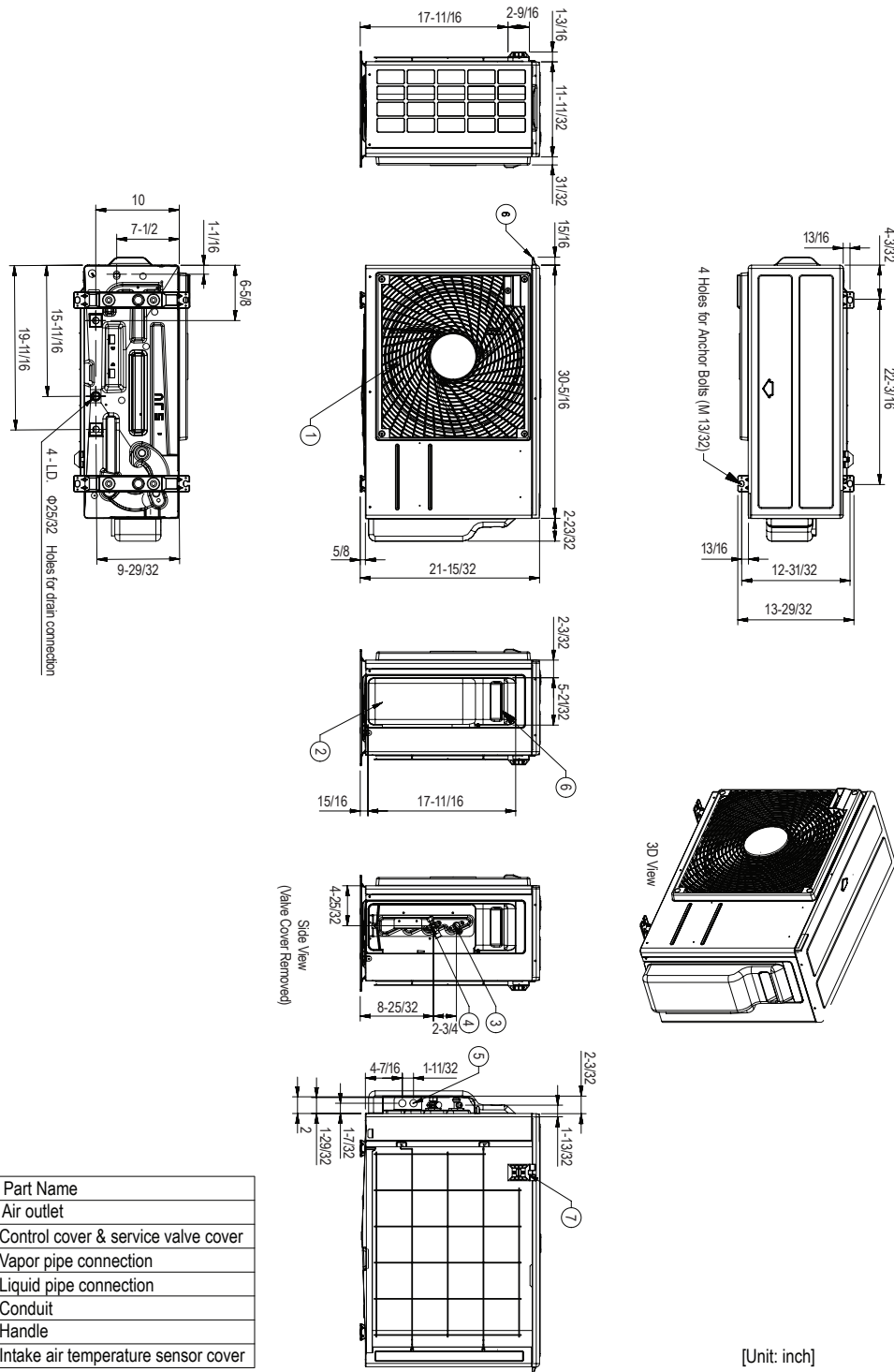
O = Unit option

X = Not Available

# OUTDOOR UNIT DIMENSIONS

## Dimensions for LUU090HV, LUU120HV

Figure 4: Outdoor Unit Dimensions.



No.	Part Name
1	Air outlet
2	Control cover & service valve cover
3	Vapor pipe connection
4	Liquid pipe connection
5	Conduit
6	Handle
7	Intake air temperature sensor cover

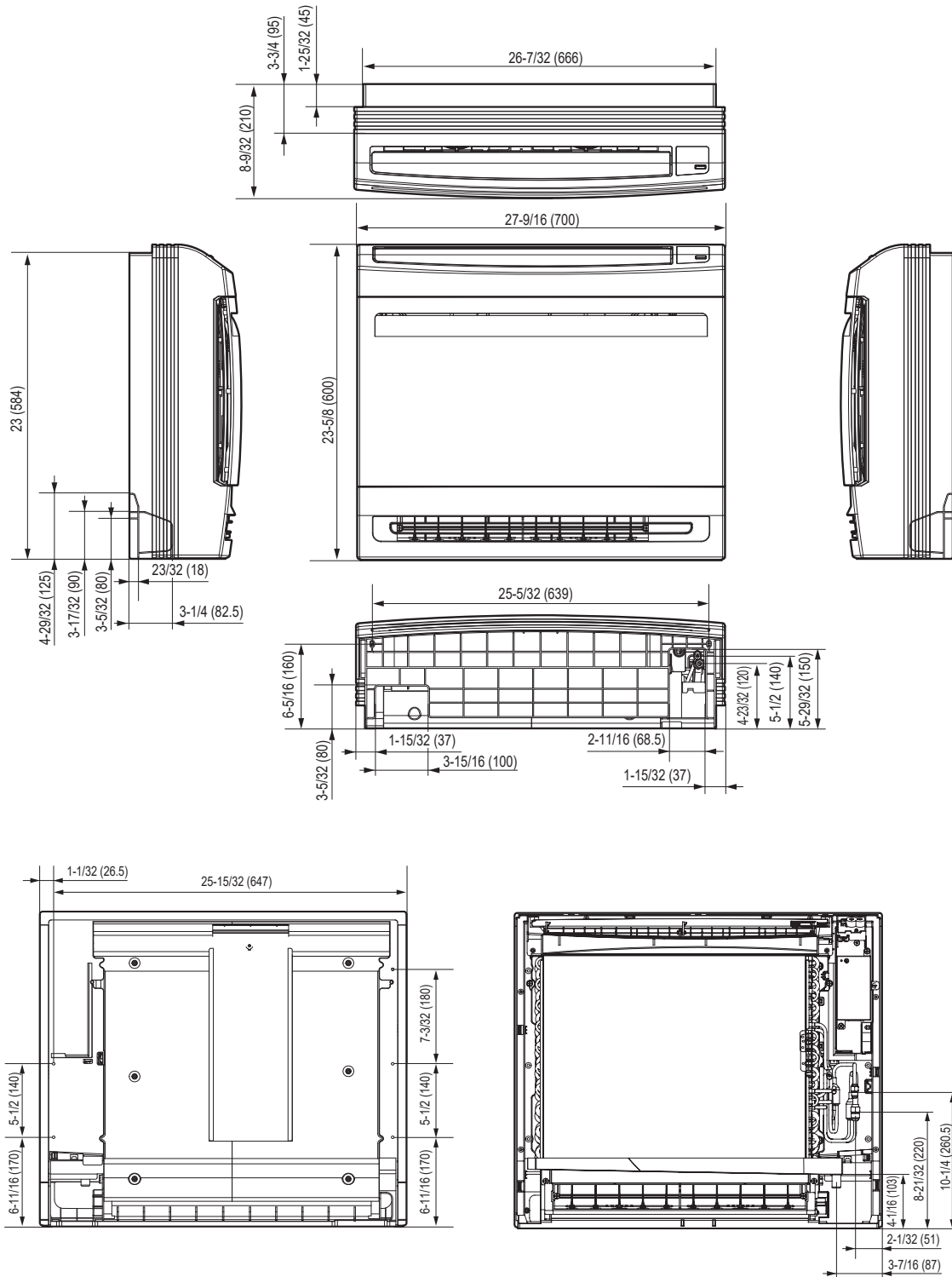
[Unit: inch]



# INDOOR UNIT DIMENSIONS

## Dimensions for LQN090HV4, LQN120HV4

Figure 5: Indoor Unit Dimensions.

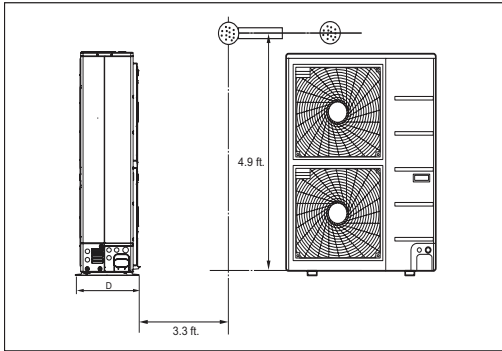


# ACOUSTIC DATA

## Sound Pressure for Outdoor Units

### Outdoor Unit Sound Pressure Level Measurement

Figure 6: Console Outdoor Unit Sound Pressure Level Measurement Location.



- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound power levels are measured in dB(A)±1.
- Tested in anechoic chamber per ISO Standard 3745.

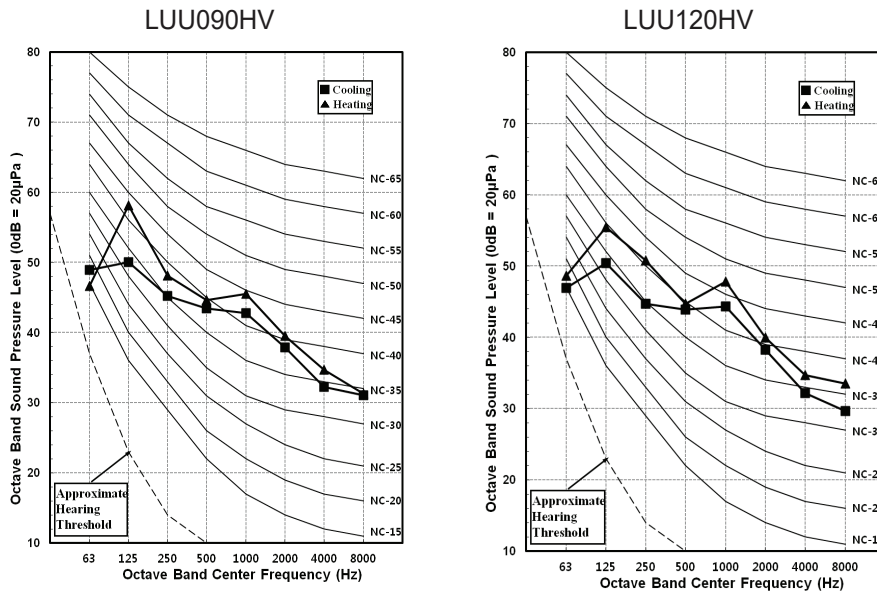
### Outdoor Unit Sound Pressure Levels

Table 7: Console Outdoor Unit Sound Pressure Levels (dB[A]).

Model	Sound Pressure Levels (dB[A])	
	Cooling	Heating
LUU090HV	49	52
LUU120HV	49	52

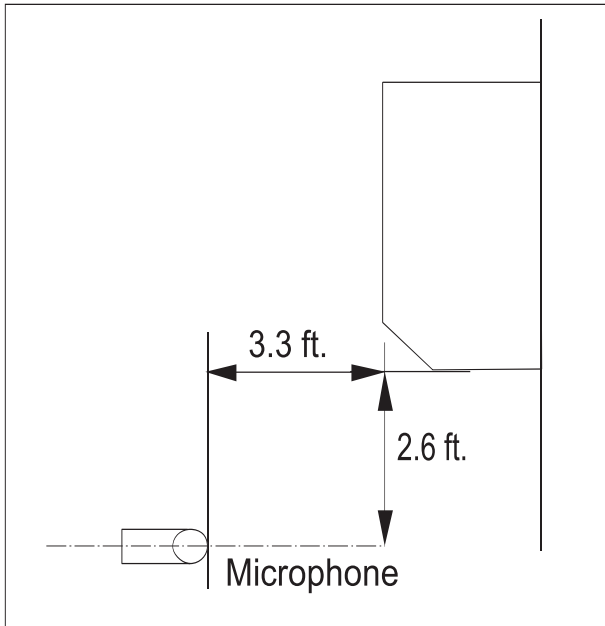
### Sound Pressure Diagrams for LUU090HV, LUU120HV

Figure 7: Console Outdoor Unit Sound Pressure Level Diagrams.



### Indoor Unit Sound Pressure Measurement

Figure 8: Indoor Unit Sound Pressure Level Measurement Location.



- Measurement taken 2.6ft. below the bottom of the unit and at a distance of 3.3ft. from the face of the unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound power levels are measured in dB(A)±1.
- Tested in anechoic chamber per ISO Standard 3745.

### Indoor Unit Sound Pressure Levels

Table 8: Console Indoor Unit Sound Pressure Levels (dB[A]).

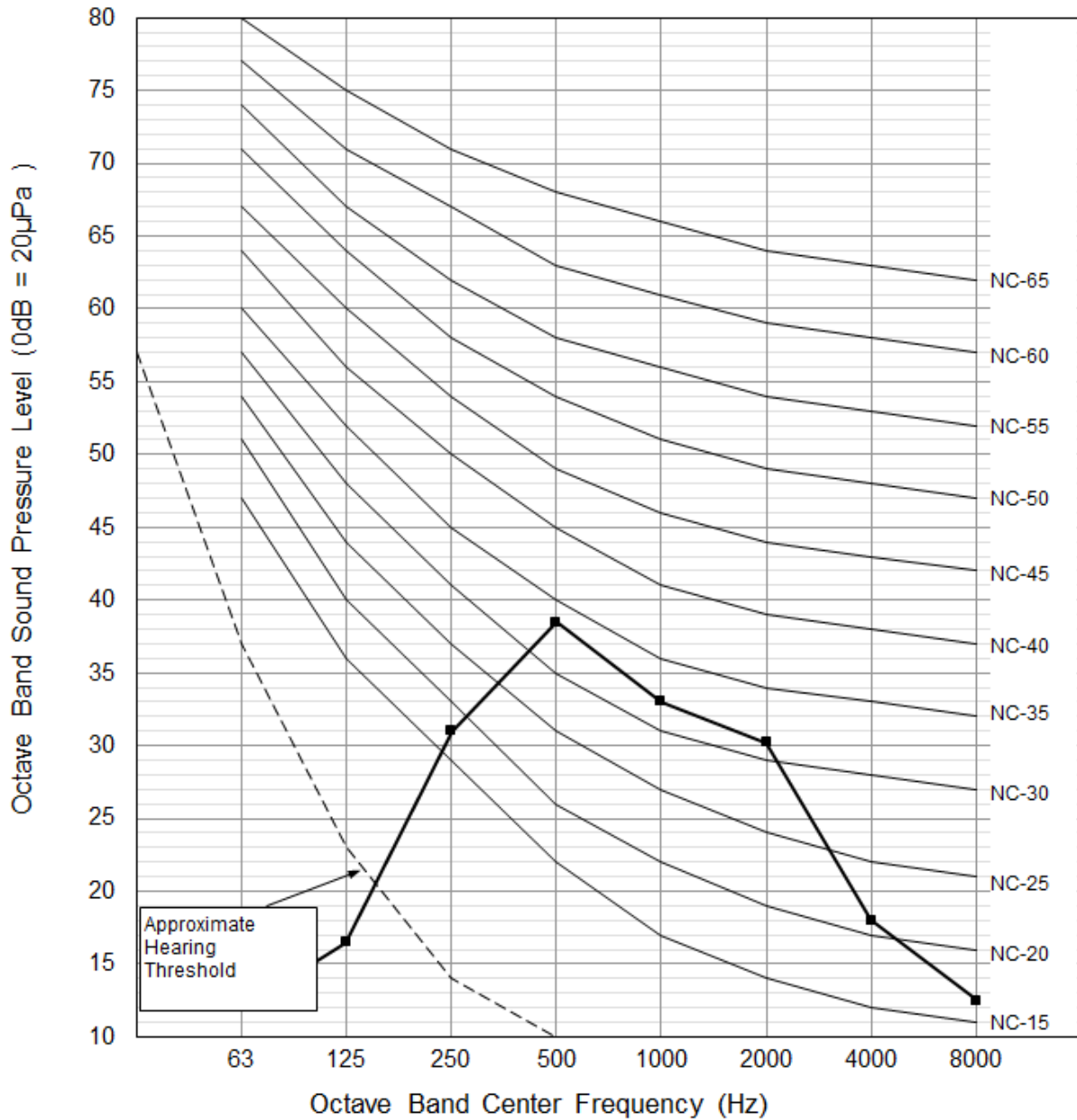
Model	Sound Pressure Levels (dB[A])		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LQN090HV4	38	32	27
LQN120HV4	39	32	27

# ACOUSTIC DATA

## Sound Pressure for Indoor Units

### Sound Pressure Diagrams for LQN090HV4, LQN120HV4

Figure 9: Indoor Unit Sound Pressure Level Diagrams.



# ACOUSTIC DATA

## Sound Power for Indoor Units

### Indoor Unit Sound Power Levels

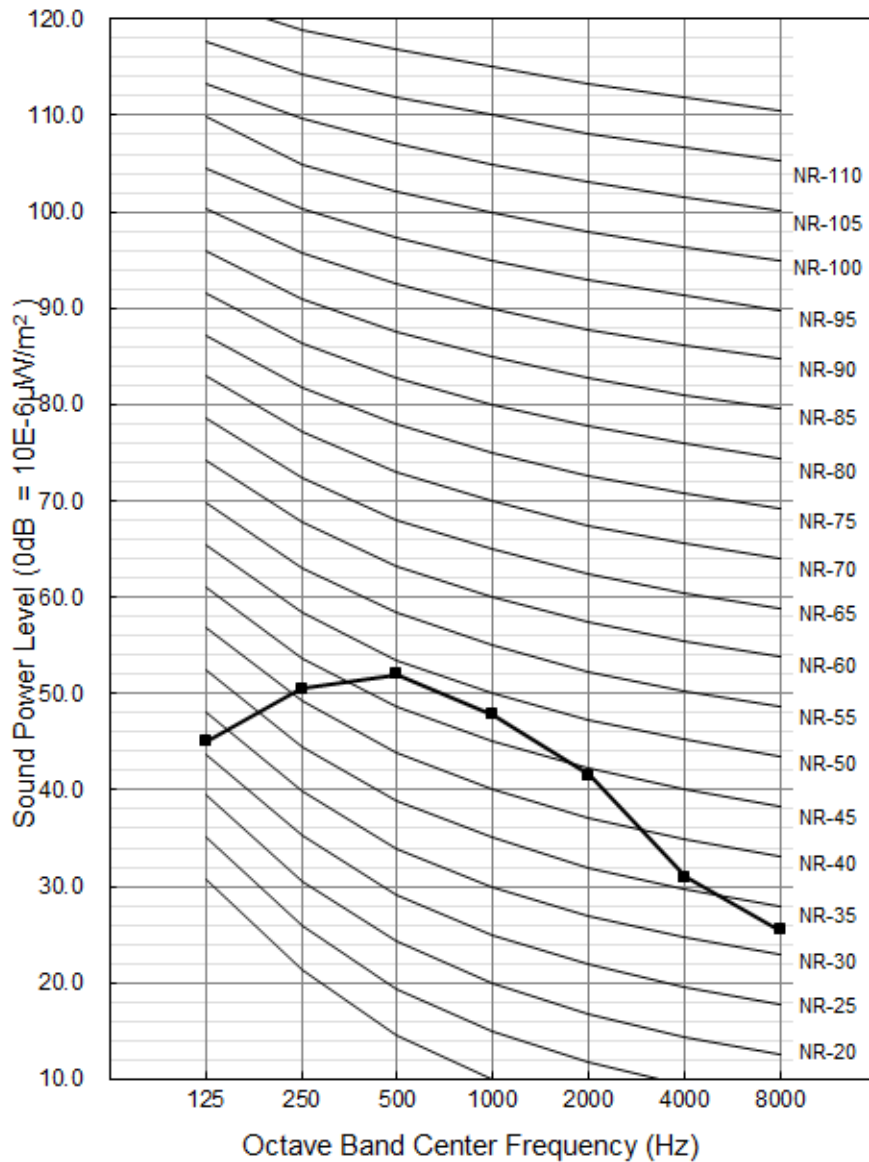
Table 9: Console Indoor Unit Sound Power Levels (dB[A]).

Model	Sound Power Levels (dB[A])
	High Fan Speed
LQN090HV4	53
LQN120HV4	56

### Sound Power Diagrams for LQN090HV4, LQN120HV4

#### Indoor Unit Sound Power Diagrams - LQN090HV4

Figure 10: Indoor Unit Sound Power Level Diagrams.



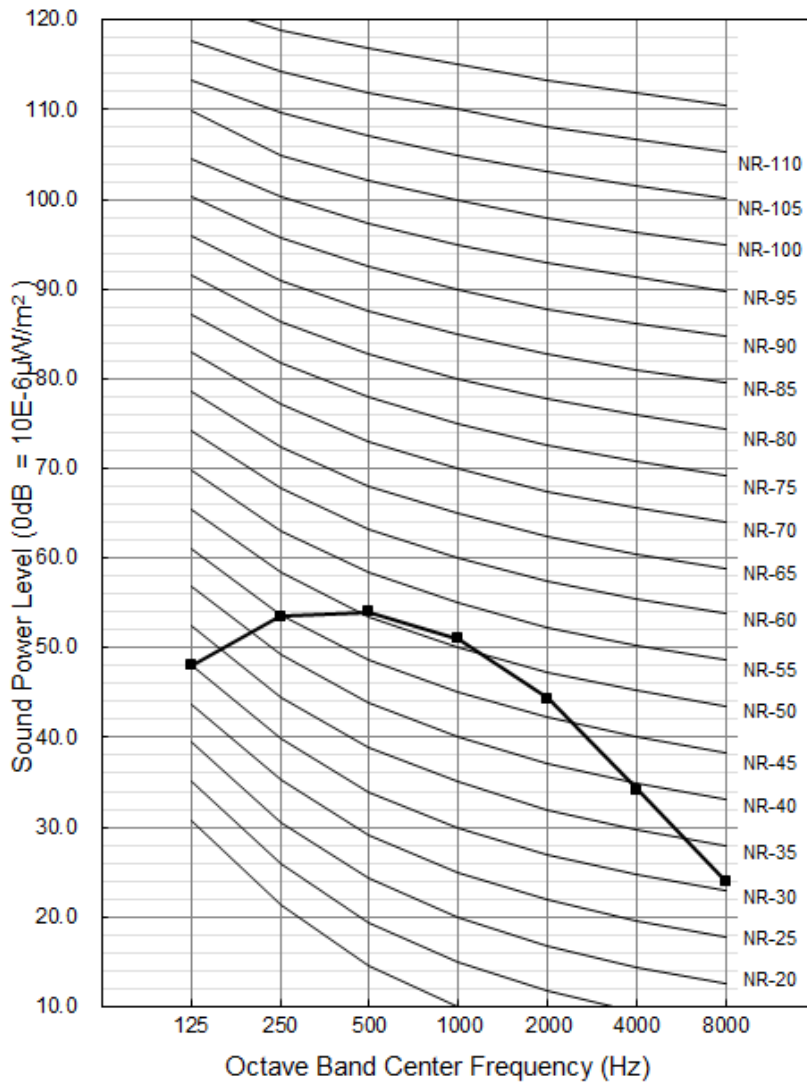
# ACOUSTIC DATA

## Sound Power for Indoor Units

### Sound Power Diagrams for LQN090HV4, LQN120HV4

#### Indoor Unit Sound Power Diagrams - LQN120HV4

Figure 11: Indoor Unit Sound Power Level Diagrams.



# OUTDOOR UNIT REFRIGERANT FLOW DIAGRAM

## Refrigerant Flow Diagram for LUU090HV, LUU120HV

Figure 12: LUU090HV and LUU120HV Outdoor Unit Refrigerant Flow Diagram.

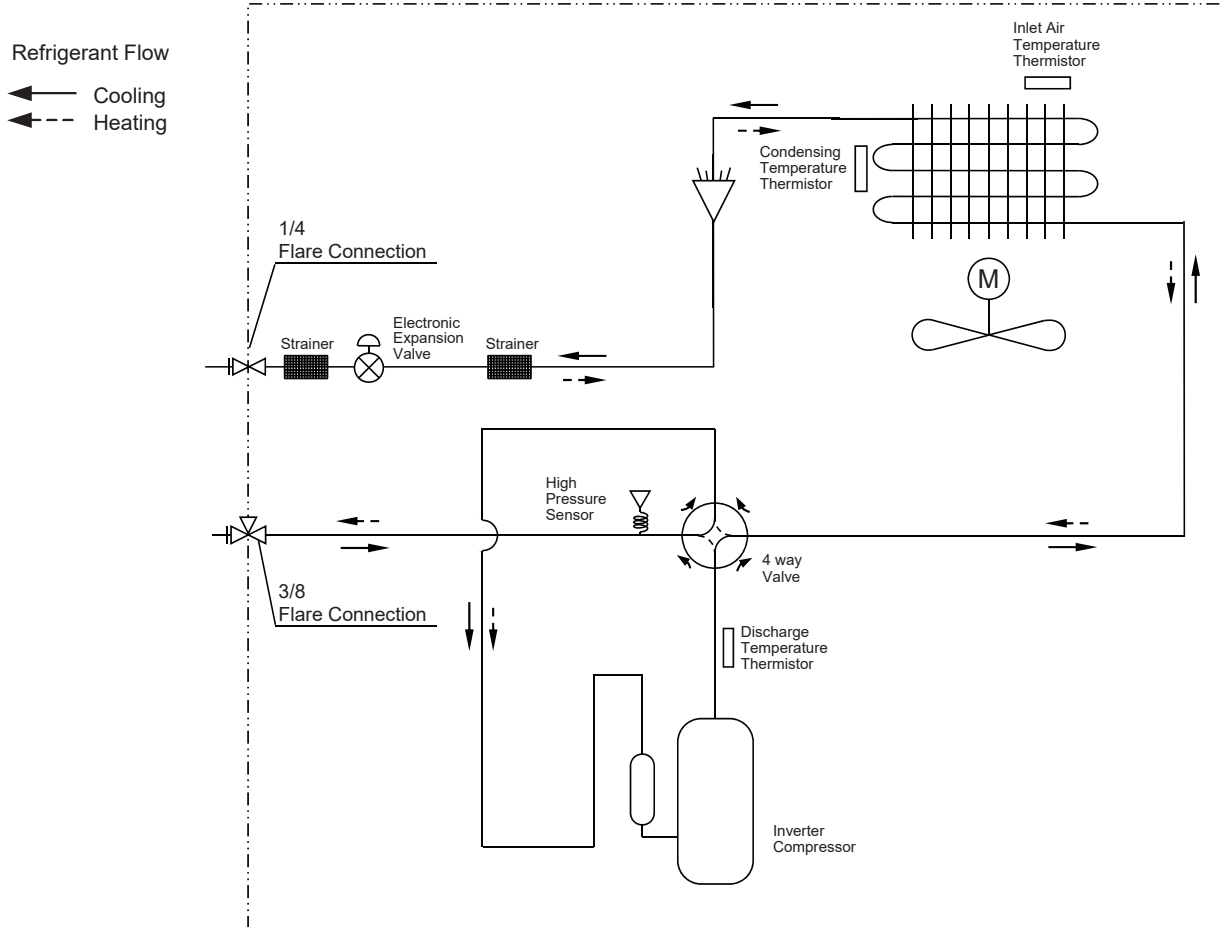


Table 10: LUU090HV and LUU120HV Outdoor Unit Thermistor Details.

Description	PCB Connector
Condenser Inlet Temperature Thermistor	CN-AIR
Discharge Temperature Thermistor	CN-DISCHARGE
Condensing Temperature Thermistor	CN-MID
High Pressure Sensor	CN-H_PRESSURE
Electronic Expansion Valve	CN-EEV_A

# INDOOR UNIT REFRIGERANT FLOW DIAGRAM

## Refrigerant Flow Diagram for LQN090HV4, LQN120HV4

Figure 13: Refrigerant Flow Diagram.

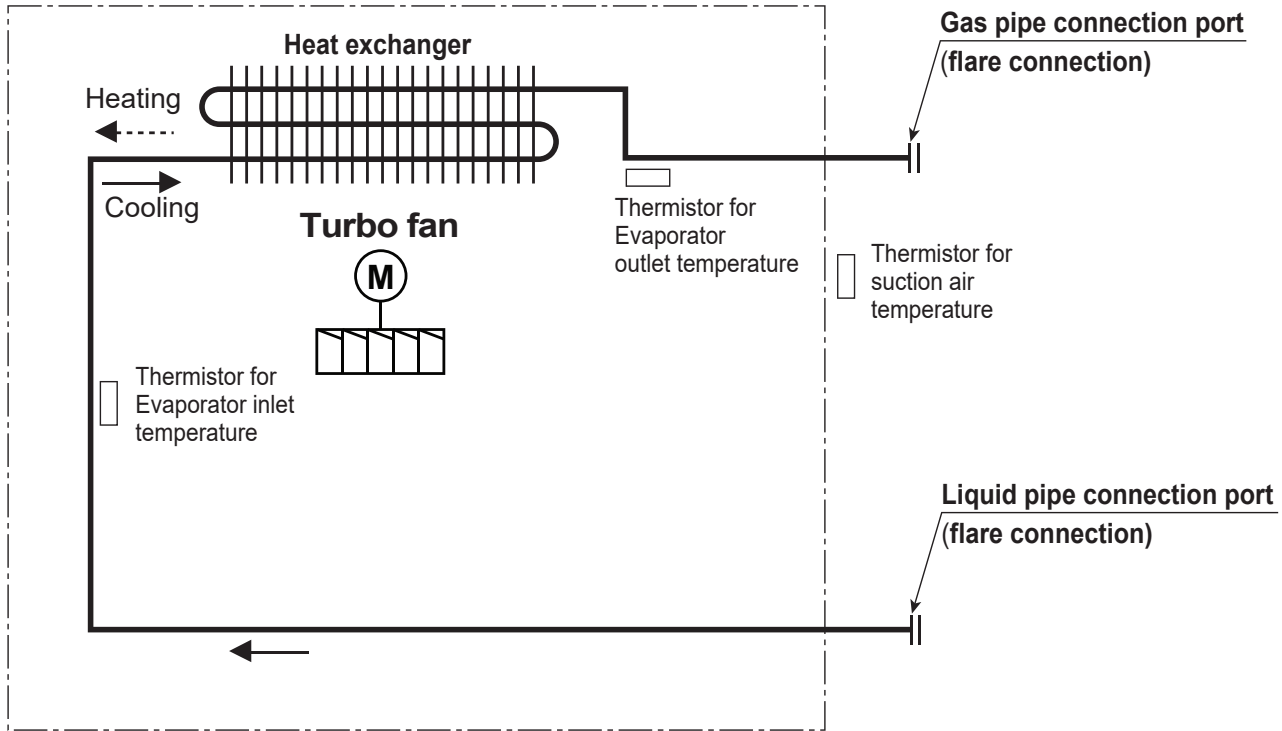


Table 11: Indoor Unit Thermistor Details.

Description (Based on Cooling Mode)	PCB Connector
Indoor Air Temperature Thermistor	CN-ROOM
Evaporator Inlet Temperature Thermistor	CN-PIPE/IN
Evaporator Outlet Temperature Thermistor	CN-PIPE/OUT

Table 12: Indoor Unit Refrigerant Pipe Connection Port Diameters.

Model No.	Vapor (inch)	Liquid (inch)
LQN090HV4	3/8	1/4
LQN120HV4	3/8	1/4

Table 13: Indoor Unit Refrigerant Pipe Connections.

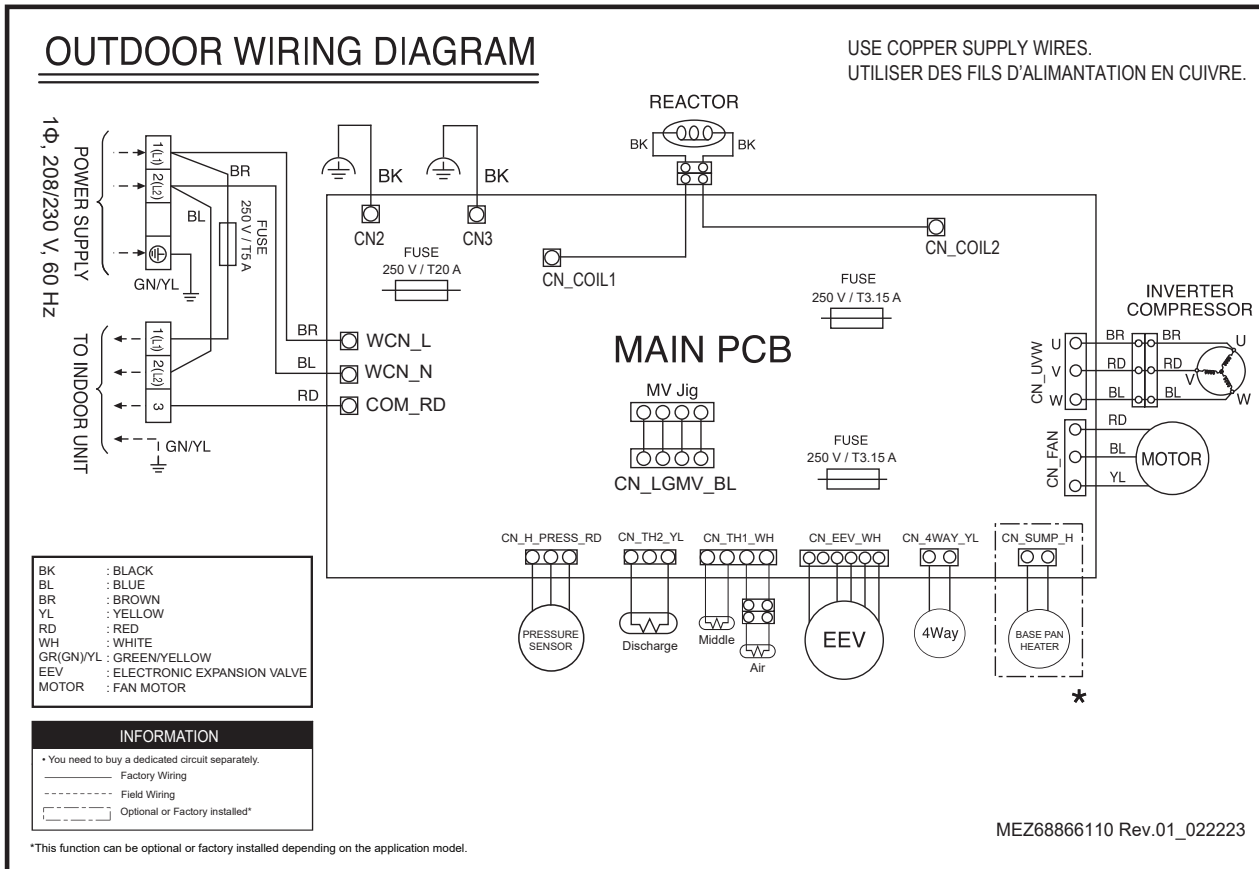
Model No.	Vapor (inch)	Liquid (inch)
LQN090HV4	3/8	1/4
LQN120HV4	3/8	1/4



# OUTDOOR UNIT WIRING DIAGRAM

## Wiring Diagram for LUU090HV, LUU120HV

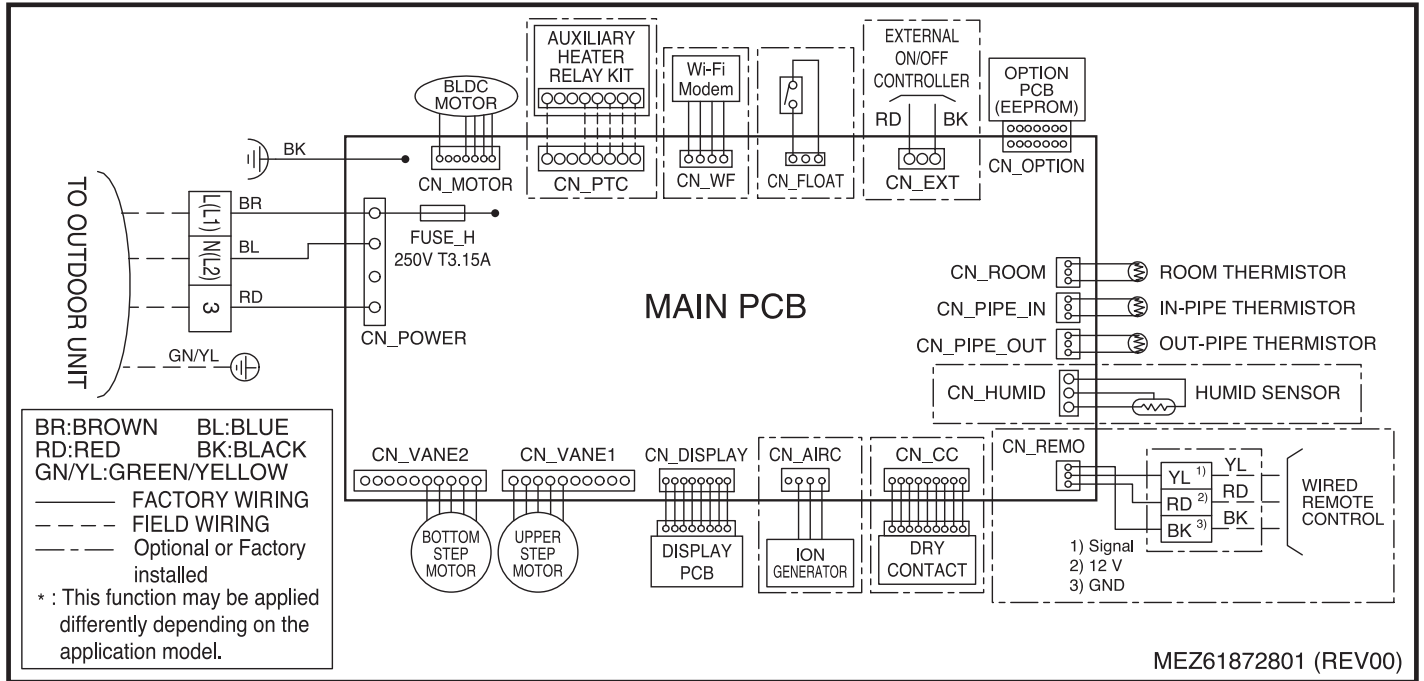
Figure 14: LUU090HV and LUU120HV Outdoor Unit Wiring Diagram.



# INDOOR UNIT WIRING DIAGRAM

## Wiring Diagram for LQN090HV4, LQN120HV4

Figure 15: LQN090HV4, LQN120HV4 Indoor Unit Wiring Diagram.



# ELECTRICAL CONNECTIONS

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## General Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams displayed on the inside of the control box cover.
- Have a separate power supply for the indoor units.
- Provide a circuit breaker switch between the power source and the indoor unit.
- Confirm power source specifications.
- Properly ground the outdoor unit and the indoor unit per NEC and local codes.
- Connect the wiring firmly so that the wires cannot be easily pulled out.
- Confirm that the electrical capacity is sufficient.
- Power supply to the outdoor unit must be selected based on NEC and local codes. Maximum allowable voltage fluctuation  $\pm 10\%$  or name-plate rated value.
- It is recommended that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system. Add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.
- Any openings where the field wiring enters the cabinet must be completely sealed.

⊗ Do not install power wiring to the outdoor unit and the communication / connection (power) cable to the indoor unit in the same conduit. Use separate conduits.

## Power Wiring / Communications Cable Specifications

- Power wiring to the outdoor unit must be solid or stranded, and must comply with the applicable local and national electric codes.
- Communication cable from the outdoor unit to the indoor unit must be a minimum of 14 AWG, four (4) conductor, shielded or unshielded (if shielded, must be grounded to chassis at ODU only) and must comply with applicable local and national codes.
- Communication cable from indoor unit to remote controller(s) is to be 22 AWG, 3-conductor, twisted, stranded, unshielded. Wiring must comply with all applicable local and national codes.

### **WARNING**

- *Terminal screws may become loose during transport. Properly tighten the terminal connections during installation or risk electric shock, physical injury, or death.*
- *Loose wiring may cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.*

### **Note:**

- *Terminal screws may loosen during transport. Properly tighten the terminal connections during installation or risk equipment malfunction or property damage.*
- *Loose wiring may cause unit malfunction, the wires to burnout or the terminal to overheat and catch fire. There is a risk of equipment malfunction or property damage.*

*A voltage drop may cause the following problems:*

- *Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.*
- *Compressor will not receive the proper starting current.*

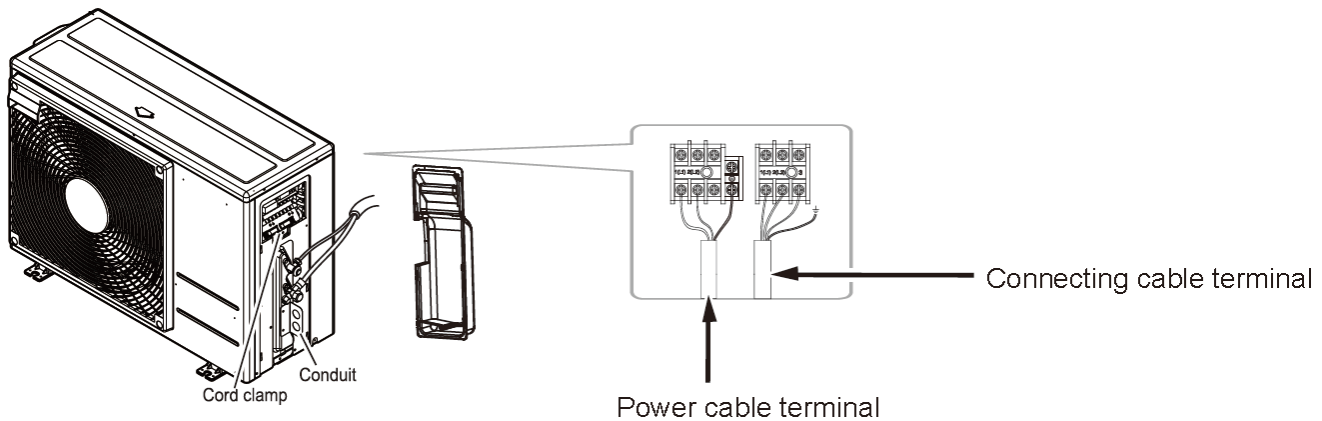
# ELECTRICAL CONNECTIONS

## Outdoor Unit Power Wiring / Communications Cable Connections

### LUU090HV, LUU120HV Outdoor Unit Connections

1. Remove the cover or control cover from the unit by loosening the fastening screws.
2. Take off the caps on the conduit panel.
3. Connect both the power supply and low voltage lines to the corresponding terminals on the terminal block.
4. Be sure to ground the unit by following local codes.
5. Allow for enough length (add several inches) for each wiring.
6. Secure the cable with the cord clamp.
7. Secure conduit tubes with lock nuts.
8. Reattach the control cover to the original position with the fastening screws.

Figure 16: LUU090HV, LUU120HV ODU Terminal Block Location.



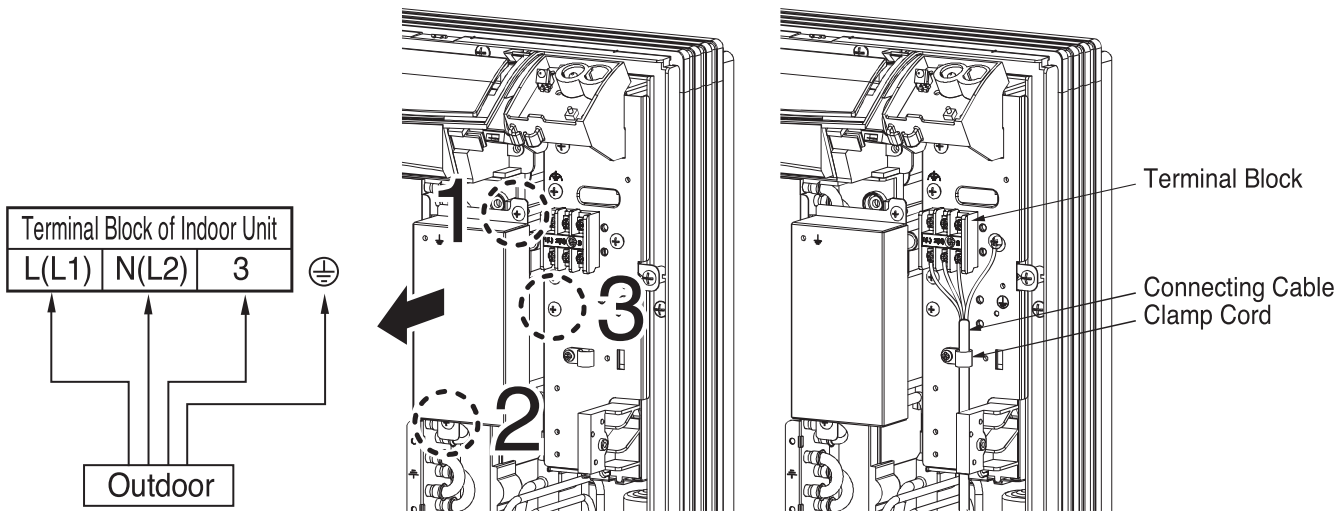
# ELECTRICAL CONNECTIONS

## Indoor Unit Power Wiring / Communications Cable Connections

### LQN090HV4, LQN120HV4 Indoor Unit Connections

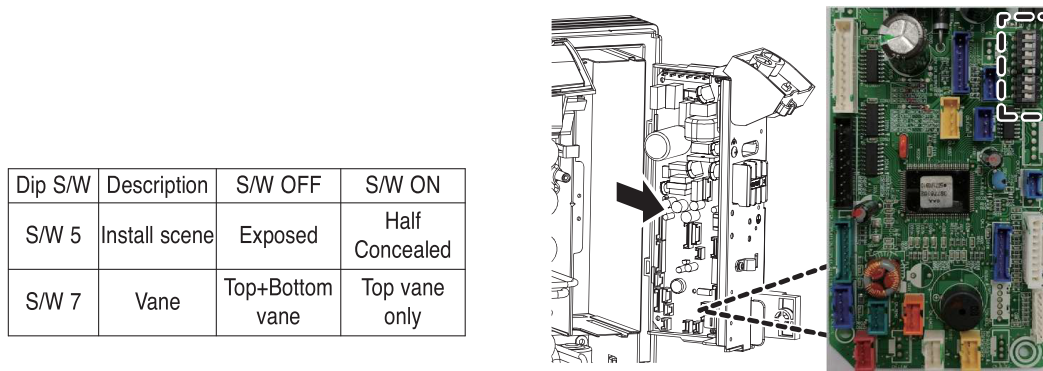
1. Loosen No 1,2 screws of control box cover.
2. Connect the cable to the Terminal block as shown below in the diagram.

Figure 17: LQN090HV4, LQN120HV4 IDU Terminal Block Location.



3. Secure the cable onto the Control panel with the Clamp cord.
4. If indoor unit's setting is needed, loosen No.3 screw and lift up the PCB. (option: usage of bottom vanes, limit angle of top vane)

Figure 18: LQN090HV4, LQN120HV4 IDU Control Panel.



# ELECTRICAL CONNECTIONS

## LQN090HV4, LQN120HV4 Indoor Unit Connections, continued.

Figure 19: LQN090HV4, LQN120HV4 IDU Terminal Block Location / Using a Conduit

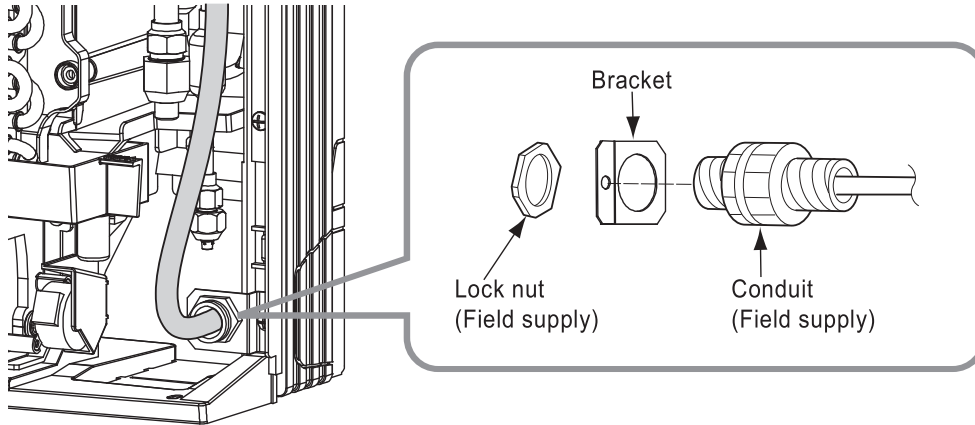
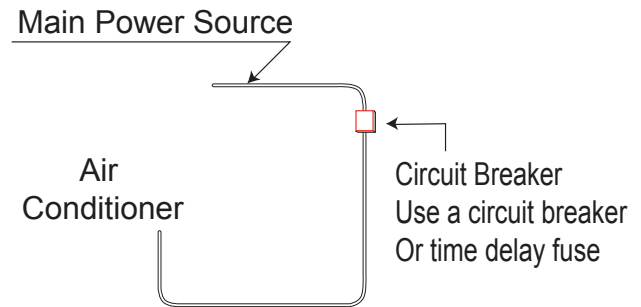


Figure 20: Circuit Breaker/Time Delay Fuse Connection.



### Note:

Always use a circuit breaker or time delay fuse when connecting electrical wiring to the unit.

### ⚠ WARNING

- Separately wire the high and low voltage lines. There is a risk of electric shock, physical injury, or death.
- Use heat-proof electrical wire capable of withstanding temperatures up to 167°F to avoid wiring malfunction and electrical shock, which may cause physical injury or death.
- Ensure you connect the wire firmly. Loose wiring may cause unit malfunction, the wires to burnout or the terminal to overheat and catch fire. There is a risk of electric shock, physical injury or death.
- Use outdoor and waterproof connection cable rated up to 300V for the connection between the indoor and outdoor unit to avoid electrical shock, which may cause physical injury or death.

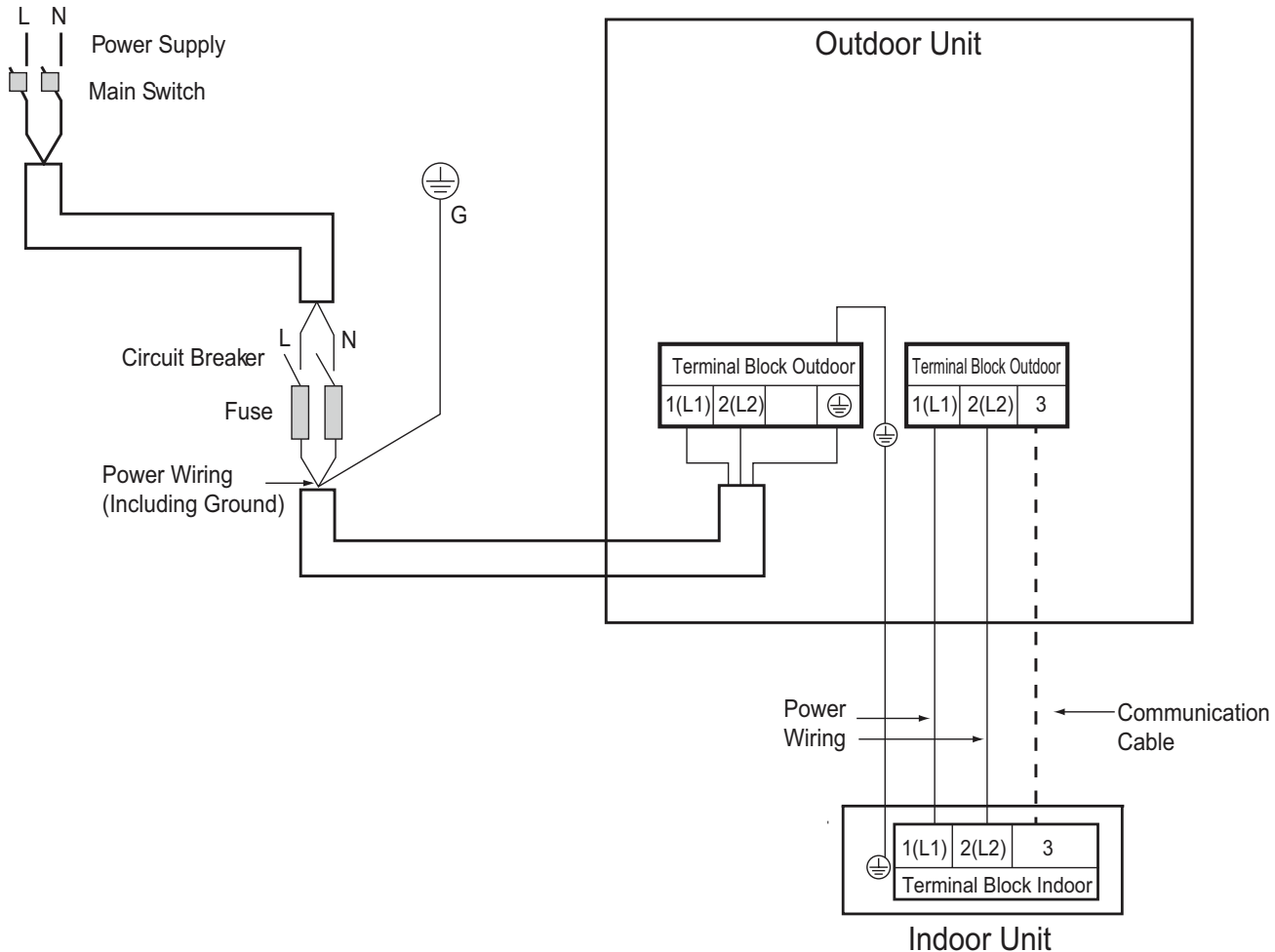
### Note:

- Separately wire the high and low voltage lines to avoid damage to unit.
- Use heat-proof electrical wire capable of withstanding temperatures up to 167°F to avoid damage to unit.
- Always use a circuit breaker or time delay fuse when connecting electrical wiring to the unit.
- Connect the wire firmly. Loose wiring may cause unit malfunction, the wires to burnout or the terminal to overheat and catch fire. There is a risk of equipment malfunction or property damage.
- Use outdoor and waterproof connection cable rated up to 300V for the connection between the indoor and outdoor unit to avoid damage to the unit.
- Comply with local codes while running wire from the indoor unit to the outdoor unit.
- ⓧ Do not allow wire to touch refrigerant tubing, the compressor or any moving parts since it can lead to mechanical failure.

# ELECTRICAL CONNECTIONS

## Wiring Connections

Figure 21: Detailed Power / Communications System Schematic.



### Note:

- Power wiring and communications cable sizes must comply with applicable federal UL / ETL, state, and local codes.
- Separately wire the high and low voltage lines to avoid damage to the unit.
- Local codes may require field-installed disconnect switches from outdoor unit to indoor unit.
- Use heat-proof electrical wire capable of withstanding temperatures up to 167°F to avoid damage to unit.
- Always use a circuit breaker or time delay fuse when connecting electrical wiring to the unit.
- Firmly connect the wire. Loose wiring may cause unit malfunction, the wires to burnout or the terminal to overheat and catch fire. There is a risk of equipment malfunction or property damage.
- Use outdoor and waterproof connection cable rated up to 300V for the connection between the indoor and outdoor unit to avoid damage to the unit.
- Comply with local codes while running wire from the indoor unit to the outdoor unit.
- ⚠ Do not allow wire to touch refrigerant tubing, the compressor or any moving parts since it can lead to mechanical failure.

# ELECTRICAL CONNECTIONS

## Wired Controller Connections

Optional controllers can connect to the Single Zone Console indoor unit in one of two different ways.

1. LG Wired Remote Extension Cable with Molex plug (PZCWRC1; sold separately) that connects to the CN-REMO terminal on the indoor unit PCB.
2. Field-supplied controller cable that connects to the indoor unit terminal block (must be at least UL2547 or UL1007, and at least FT-6 rated if local electric and building codes require plenum cable usage). Communication cable from indoor unit to remote controller(s) is to be 22 AWG, 3-conductor, twisted, stranded, unshielded. Wiring must comply with all applicable local and national codes.

Figure 22: PZCWRC1 LG Wired Remote Extension Cable

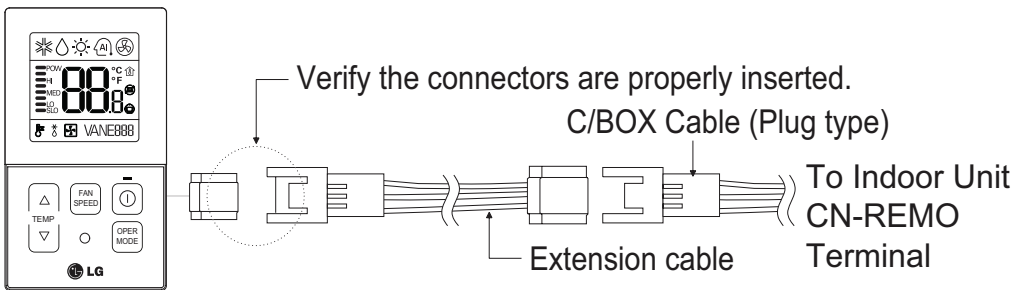
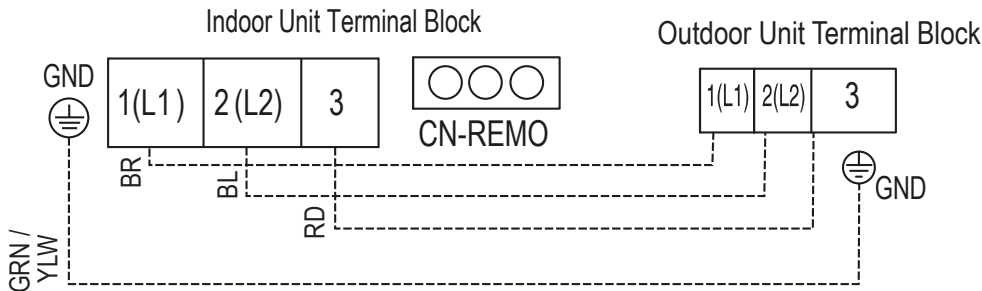


Figure 23: Wired Controller Connection on the Indoor Unit Terminal Block.



### Note:

When using field-supplied controller cable, make sure to connect the yellow to yellow (communications wire), red to red (12V power wire), and black to black (ground wire) terminals from the remote controller to the indoor unit terminal blocks.



# ELECTRICAL CONNECTIONS

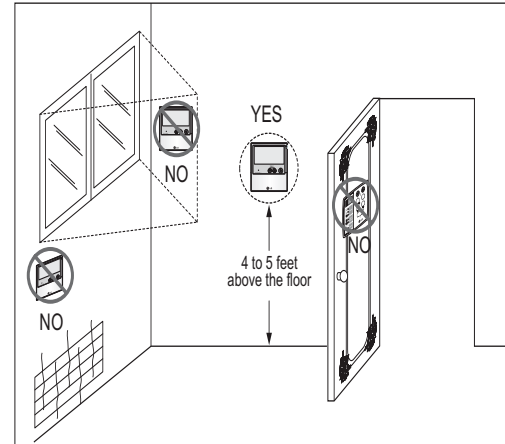
## Wired Controller Placement

Wired controllers include a sensor to detect room temperature. To maintain comfort levels in the conditioned space, the wired controller must be installed in a location away from direct sunlight, high humidity, and where it could be directly exposed to cold air. Controller must be installed four (4) to five (5) feet above the floor where its LED display can be read easily, in an area with good air circulation, and where it can detect an average room temperature.

⊘ Do not install the wired controller near or in:

- Drafts or dead spots behind doors and in corners.
- Hot or cold air from ducts.
- Radiant heat from the sun or appliances.
- Concealed pipes and chimneys.
- An area where temperatures are uncontrolled, such as an outside wall.

Figure 24: Proper Location for the Wired Controller.



## Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential.

# ACCESSORIES

## Drain Pan Heater

Figure 25: Drain Pan Heater.



Table 14: Drain Pan Heater Capacities.

ODU	Heater kW	Accessory Model	Note
LUU090HV	120W	PQSH1202	Optional
LUU120HV	120W	PQSH1202	Optional

## LG Monitoring View (LGMV) Diagnostic Software and Cable

LGMV software allows the service technician or commissioning agent to connect a computer USB port to the outdoor unit main printed circuit board (PCB) using an accessory cable without the need for a separate interface device. The main screen for LGMV allows the user to view the following real time data on one screen:

- Actual inverter compressor speed
- Target inverter compressor speed
- Actual outdoor fan speed
- Target outdoor unit fan speed
- Actual superheat
- Target superheat
- Actual subcooler circuit superheat
- Target subcooler circuit superheat
- Main EEV position
- Subcooling EEV position
- Inverter compressor current transducer value
- Outdoor air temperature
- Actual high pressure/saturation temperature
- Actual low pressure/saturation temperature
- Suction temperature
- Inverter compressor discharge temperature
- Constant speed compressor discharge temperature
- Front outdoor coil pipe temperature
- Back outdoor coil pipe temperature
- Liquid line pipe temperature
- Subcooler inlet temperature
- Subcooler outlet temperature
- Average indoor unit (IDU) pipe temperature
- Inverter compressor operation indicator light
- Four-way reversing valve operation indicator light
- Pressure graph showing actual low pressure and actual high pressure levels
- Error code display
- Operating mode indicator
- Target high pressure
- Target low pressure
- PCB (printed circuit board) version
- Software version
- Installer name

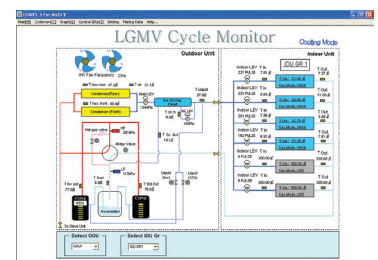


- Model no. of outdoor units
- Site name
- Total number of connected indoor units
- Communication indicator lights
- Indoor unit capacity
- Indoor unit operating mode
- Indoor unit fan speed
- Indoor unit EEV position
- Indoor unit room temperature
- Indoor unit inlet pipe temperature
- Indoor unit outlet pipe temperature
- Indoor unit error code

Additional screens can be accessed by tabs on the main screen:

1. Cycleview: Graphic of internal components including:
  - Compressors showing actual speeds
  - EEVs
  - Indoor Units
  - Liquid injection valves
  - Temperature and pressure sensors
  - Four-way reversing valve
  - Outdoor fans showing status and speeds
2. Graph: Full screen graph of actual high and low pressures and high and low pressure limits. A sliding bar enables user to go back in time and view data.
3. Control IDU: Enables user to turn on all IDU's default setpoints of 86°F in heat mode or 64°F in cool mode.
4. Setting: Converts metric values to imperial values.
5. Making Data: Recording of real time data to a separate file created to be stored on the user's computer.
6. Loading Data: Recorded data from a saved ".CSV" file can be loaded to create an LGMV session.
7. Electrical Data: The lower half of main screen is changed to show the following:
  - Inverter compressor
    - Amps
    - Volts
    - Power Hz
    - Inverter control board fan Hz
  - Constant compressor
    - Current transducer value
    - Phase

Figure 26: Sample Cycleview.



In lieu of connecting to the outdoor unit, user has the option to connect to the indoor unit with the use of a USB to RS-485 connector kit. When connected through the indoor unit, user will not be able to record data.

This software can be used to both commission new systems and troubleshoot existing systems. LGMV data can be recorded to a ".CSV" file and emailed to an LG representative to assist with diagnostic evaluations.

### Recommended Minimum PC Configuration:

- CPU: Pentium® IV 1.6 GHz
- Operating System: Windows® NT/2000/XP/Vista
- Main Memory: 256 MB
- Hard Disk: 600 MB when operating
- Web Browser: Internet Explorer® 5.0

**LGMV is available in different formats, including Mobile LGMV, which is a app for use on wireless devices. Contact your LG Sales Representative for more information.**

# ACCESSORIES

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## LG ThinQ®

LG ThinQ is a built-in Wi-Fi module, along with a free smart phone app that provides monitoring and remote control capabilities for certain LG single zone systems. The app has the following features and benefits:

- Sign in to the app using LG credentials, or using Google® or Facebook® login credentials. Users only have to log in to the app once; the app remembers login details for subsequent logins.
- View current temperature settings of the air conditioning unit and change temperature, fan speed, and air flow direction from anywhere in the house or at a remote location (through the use of wireless connection). Multiple users can control the household air conditioning unit remotely.
- Monitor filter usage of the unit.
- Set up weekly schedules to start and stop air conditioner activity.
- Set up the unit to run in different Modes, depending on the user's schedule. Set up specific temperatures for when the user is home, away on vacation, or sleeping.
- Troubleshoot problems, and view tips on general maintenance of the system using the Smart Diagnosis function.

*\*Google is a registered trademark of Google Inc.; Facebook is a registered trademark of Facebook.*

**Contact your LG Sales Representative or visit [www.lg-dfs.com](http://www.lg-dfs.com) for system requirements, how to download the app, a user's manual, or other information.**

# LOW WALL CONSOLE UNIT PERFORMANCE DATA

[Cooling Capacity Data on page 38](#)

[Heating Capacity Data on page 40](#)

[Maximum Heating Capacity Data on page 42](#)

# PERFORMANCE DATA

## Cooling Capacity Tables

### Cooling Capacity Table for LQ090HV (LQN090HV4 + LUU090HV)

Table 15: Cooling Capacity Table.

Outdoor Air Temp. (°F DB)	Indoor Air Temperature: °F DB / °F WB																	
	68 / 57			72 / 61			77 / 64			80 / 67			86 / 72			90 / 75		
	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
-4	8.85	6.43	0.42	9.40	6.79	0.44	9.95	6.57	0.45	10.34	6.71	0.46	11.05	6.77	0.47	11.60	6.90	0.48
-0.4	8.84	6.46	0.43	9.39	6.83	0.44	9.94	6.61	0.46	10.34	6.75	0.46	11.04	6.81	0.47	11.59	6.94	0.48
5	8.84	6.52	0.43	9.38	6.89	0.45	9.93	6.67	0.47	10.33	6.81	0.47	11.03	6.87	0.48	11.58	7.00	0.49
10	8.83	6.57	0.44	9.38	6.94	0.46	9.93	6.72	0.47	10.32	6.86	0.48	11.02	6.92	0.49	11.57	7.05	0.50
15	8.82	6.62	0.45	9.37	7.00	0.46	9.92	6.77	0.48	10.31	6.92	0.49	11.01	6.98	0.49	11.56	7.11	0.50
20	8.82	6.68	0.45	9.36	7.05	0.47	9.91	6.83	0.49	10.31	6.97	0.49	11.01	7.03	0.50	11.55	7.16	0.51
25	8.81	6.73	0.46	9.36	7.11	0.48	9.90	6.88	0.49	10.30	7.03	0.50	11.00	7.08	0.51	11.54	7.22	0.52
30	8.80	6.78	0.47	9.35	7.16	0.48	9.90	6.93	0.50	10.29	7.08	0.51	10.99	7.14	0.52	11.54	7.27	0.53
35	8.80	6.83	0.47	9.34	7.21	0.49	9.89	6.99	0.51	10.28	7.13	0.51	10.98	7.19	0.52	11.53	7.33	0.53
40	8.79	6.88	0.48	9.33	7.27	0.50	9.88	7.04	0.51	10.27	7.19	0.52	10.97	7.25	0.53	11.52	7.38	0.54
45	8.78	6.93	0.49	9.33	7.32	0.50	9.87	7.09	0.52	10.27	7.24	0.53	10.96	7.30	0.54	11.51	7.44	0.55
50	8.78	6.98	0.49	9.32	7.38	0.51	9.87	7.14	0.53	10.26	7.29	0.53	10.96	7.36	0.54	11.50	7.49	0.56
55	8.77	7.03	0.50	9.31	7.43	0.52	9.86	7.20	0.54	10.25	7.35	0.54	10.95	7.41	0.55	11.49	7.55	0.56
60	8.76	7.09	0.50	9.31	7.49	0.52	9.85	7.25	0.54	10.24	7.40	0.55	10.94	7.46	0.56	11.48	7.60	0.57
65	8.76	7.14	0.51	9.30	7.54	0.53	9.84	7.30	0.55	10.24	7.45	0.56	10.93	7.52	0.57	11.47	7.66	0.58
70	8.75	7.19	0.52	9.29	7.59	0.54	9.84	7.35	0.56	10.23	7.51	0.56	10.92	7.57	0.57	11.47	7.71	0.58
75	8.54	7.07	0.55	9.08	7.48	0.57	9.62	7.25	0.59	10.01	7.41	0.59	10.71	7.48	0.60	11.25	7.63	0.62
80	8.33	6.95	0.57	8.87	7.36	0.59	9.41	7.14	0.62	9.80	7.30	0.62	10.49	7.38	0.63	11.03	7.54	0.65
85	8.12	6.82	0.60	8.66	7.24	0.62	9.20	7.03	0.65	9.59	7.20	0.65	10.28	7.28	0.67	10.82	7.44	0.68
90	7.91	6.69	0.63	8.45	7.11	0.65	8.99	6.92	0.68	9.37	7.09	0.68	10.06	7.18	0.70	10.60	7.34	0.71
95	7.68	6.62	0.66	8.22	7.05	0.68	8.75	6.87	0.71	<b>9.00</b>	<b>6.93</b>	<b>0.71</b>	9.83	7.14	0.73	10.36	7.31	0.74
100	7.50	6.45	0.68	8.03	6.87	0.71	8.57	6.70	0.74	8.88	6.82	0.74	9.64	6.99	0.76	10.17	7.16	0.77
105	7.31	6.27	0.71	7.84	6.69	0.74	8.38	6.54	0.77	8.77	6.72	0.77	9.45	6.84	0.79	9.99	7.01	0.81
110	7.12	6.05	0.74	7.66	6.47	0.77	8.19	6.34	0.80	8.58	6.51	0.81	9.26	6.64	0.82	9.80	6.82	0.84
115	6.94	5.87	0.77	7.47	6.29	0.80	8.01	6.17	0.83	8.39	6.35	0.84	9.08	6.48	0.85	9.61	6.66	0.87
118	6.82	5.83	0.79	7.36	6.25	0.81	7.89	6.14	0.84	8.28	6.32	0.85	8.96	6.46	0.87	9.50	6.65	0.89
122	6.79	5.82	0.81	7.32	6.24	0.84	7.86	6.13	0.87	8.24	6.31	0.88	8.93	6.45	0.89	9.46	6.64	0.91

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

PI = Power input (KW). Power input (KW) includes compressor and fan(s).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor unit. Corresponding refrigerant piping length is accordance with standard length of each outdoor unit.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80°F dry bulb (DB) and 67°F wet bulb (WB), and outdoor ambient conditions of 95°F dry bulb (DB) and 75°F wet bulb (WB).

Cooling range can be extended from 0°F down to -4°F using the Low Ambient Wind Baffle Kit (sold separately).

# PERFORMANCE DATA

## Cooling Capacity Tables

### Cooling Capacity Table for LQ120HV (LQN120HV4 + LUU120HV)

Table 16: Cooling Capacity Table.

Outdoor Air Temp. (°F DB)	Indoor Air Temperature: °F DB / °F WB																	
	68 / 57			72 / 61			77 / 64			80 / 67			86 / 72			90 / 75		
	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
-4	10.03	7.09	0.48	10.65	7.49	0.50	11.27	7.26	0.51	11.72	7.41	0.52	12.52	7.47	0.53	13.14	7.61	0.54
-0.4	10.02	7.13	0.48	10.64	7.54	0.50	11.27	7.30	0.52	11.72	7.45	0.53	12.51	7.51	0.54	13.13	7.66	0.55
5	10.01	7.20	0.49	10.64	7.60	0.51	11.26	7.36	0.53	11.71	7.52	0.53	12.50	7.58	0.54	13.12	7.72	0.56
10	10.01	7.25	0.50	10.63	7.66	0.52	11.25	7.42	0.54	11.70	7.58	0.54	12.49	7.64	0.55	13.11	7.78	0.56
15	10.00	7.31	0.51	10.62	7.72	0.52	11.24	7.48	0.54	11.69	7.64	0.55	12.48	7.70	0.56	13.10	7.85	0.57
20	9.99	7.37	0.51	10.61	7.78	0.53	11.23	7.54	0.55	11.68	7.70	0.56	12.47	7.76	0.57	13.09	7.91	0.58
25	9.98	7.43	0.52	10.60	7.84	0.54	11.22	7.60	0.56	11.67	7.76	0.57	12.46	7.82	0.58	13.08	7.97	0.59
30	9.98	7.48	0.53	10.60	7.90	0.55	11.22	7.65	0.57	11.66	7.81	0.57	12.45	7.88	0.58	13.07	8.03	0.60
35	9.97	7.54	0.54	10.59	7.96	0.55	11.21	7.71	0.58	11.65	7.87	0.58	12.44	7.94	0.59	13.06	8.09	0.60
40	9.96	7.60	0.54	10.58	8.02	0.56	11.20	7.77	0.58	11.64	7.93	0.59	12.44	8.00	0.60	13.05	8.15	0.61
45	9.95	7.65	0.55	10.57	8.08	0.57	11.19	7.83	0.59	11.64	7.99	0.60	12.43	8.06	0.61	13.04	8.21	0.62
50	9.95	7.71	0.56	10.56	8.14	0.58	11.18	7.89	0.60	11.63	8.05	0.61	12.42	8.12	0.62	13.03	8.27	0.63
55	9.94	7.77	0.56	10.56	8.20	0.59	11.17	7.94	0.61	11.62	8.11	0.61	12.41	8.18	0.62	13.02	8.33	0.64
60	9.93	7.82	0.57	10.55	8.26	0.59	11.16	8.00	0.61	11.61	8.17	0.62	12.40	8.24	0.63	13.01	8.39	0.65
65	9.92	7.88	0.58	10.54	8.32	0.60	11.16	8.06	0.62	11.60	8.23	0.63	12.39	8.30	0.64	13.00	8.45	0.65
70	9.92	7.93	0.59	10.53	8.38	0.61	11.15	8.12	0.63	11.59	8.29	0.64	12.38	8.36	0.65	12.99	8.52	0.66
75	9.68	7.80	0.62	10.29	8.25	0.64	10.91	8.00	0.66	11.35	8.18	0.67	12.13	8.26	0.68	12.75	8.42	0.70
80	9.44	7.67	0.65	10.05	8.12	0.67	10.66	7.89	0.70	11.11	8.06	0.71	11.89	8.15	0.72	12.50	8.32	0.73
85	9.20	7.53	0.68	9.81	7.99	0.71	10.42	7.76	0.73	10.87	7.94	0.74	11.65	8.04	0.75	12.26	8.21	0.77
90	8.96	7.39	0.71	9.57	7.85	0.74	10.18	7.64	0.77	10.62	7.82	0.77	11.40	7.93	0.79	12.01	8.11	0.81
95	8.71	7.31	0.74	9.31	7.78	0.77	9.92	7.58	0.80	<b>10.20</b>	<b>7.65</b>	<b>0.81</b>	11.14	7.89	0.82	11.74	8.07	0.84
100	8.50	7.11	0.78	9.10	7.58	0.80	9.71	7.40	0.83	10.07	7.53	0.84	10.92	7.72	0.86	11.53	7.91	0.88
105	8.28	6.92	0.81	8.89	7.39	0.84	9.50	7.22	0.87	9.94	7.41	0.88	10.71	7.55	0.89	11.32	7.74	0.91
110	8.07	6.68	0.84	8.68	7.15	0.87	9.29	6.99	0.90	9.72	7.19	0.91	10.50	7.33	0.93	11.11	7.53	0.95
115	7.86	6.48	0.87	8.47	6.95	0.90	9.07	6.81	0.94	9.51	7.01	0.95	10.29	7.16	0.96	10.89	7.36	0.98
118	7.73	6.44	0.89	8.34	6.90	0.92	8.95	6.77	0.96	9.38	6.98	0.97	10.16	7.13	0.99	10.77	7.34	1.01
122	7.69	6.42	0.92	8.30	6.89	0.95	8.90	6.76	0.98	9.34	6.97	0.99	10.12	7.12	1.01	10.72	7.33	1.03

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

PI = Power input (KW). Power input (KW) includes compressor and fan(s).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor unit. Corresponding refrigerant piping length is accordance with standard length of each outdoor unit.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80°F dry bulb (DB) and 67°F wet bulb (WB), and outdoor ambient conditions of 95°F dry bulb (DB) and 75°F wet bulb (WB).

Cooling range can be extended from 0°F down to -4°F using the Low Ambient Wind Baffle Kit (sold separately).

# PERFORMANCE DATA

## Heating Capacity Tables

### Heating Capacity Table for LQ090HV (LQN090HV4 + LUU090HV)

Table 17: Heating Capacity Table.

Outdoor Air Temp.		Indoor Air Temperature: °F DB											
		60		64		68		70		72		75	
°F DB	°F WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
-13	-13	3.53	0.49	3.15	0.51	3.21	0.52	3.19	0.53	3.17	0.54	3.01	0.55
-4	-4	4.92	0.54	4.59	0.56	4.54	0.57	4.49	0.58	4.44	0.59	4.25	0.61
0	-0	5.57	0.56	5.25	0.58	5.16	0.60	5.09	0.61	5.03	0.61	4.81	0.63
5	5	6.33	0.59	6.04	0.60	5.89	0.62	5.80	0.63	5.72	0.64	5.49	0.66
10	9	6.84	0.61	6.57	0.63	6.38	0.65	6.28	0.66	6.19	0.67	5.94	0.69
17	15	7.41	0.64	7.15	0.66	6.93	0.68	6.80	0.69	6.70	0.70	6.44	0.72
20	19	7.75	0.66	7.50	0.68	7.25	0.70	7.12	0.71	7.01	0.72	6.74	0.75
25	23	8.32	0.68	8.08	0.70	7.80	0.72	7.65	0.74	7.53	0.75	7.25	0.77
30	28	8.90	0.71	8.63	0.73	8.33	0.75	8.18	0.77	8.06	0.78	7.76	0.80
35	32	9.48	0.73	9.18	0.75	8.87	0.77	8.71	0.79	8.58	0.80	8.27	0.82
40	36	9.97	0.75	9.69	0.77	9.38	0.80	9.21	0.81	9.08	0.82	8.76	0.85
45	41	10.57	0.77	10.32	0.80	10.01	0.82	9.85	0.84	9.71	0.85	9.36	0.88
47	43	10.81	0.78	10.57	0.81	10.27	0.84	<b>10.10</b>	<b>0.85</b>	9.97	0.86	9.60	0.89
50	46	10.84	0.78	10.62	0.80	10.36	0.83	10.21	0.84	10.09	0.85	9.75	0.87
55	51	10.90	0.77	10.72	0.79	10.52	0.81	10.40	0.82	10.30	0.82	10.00	0.84
60	56	10.95	0.76	10.81	0.78	10.67	0.79	10.58	0.80	10.51	0.80	10.24	0.81
63	59	10.98	0.76	10.86	0.77	10.77	0.78	10.69	0.79	10.63	0.79	10.39	0.80
68	64	11.01	0.75	10.92	0.76	10.86	0.77	10.81	0.77	10.76	0.77	10.54	0.78

TC = Total Capacity (kBtu/h).

PI = Power input (KW). Power input (KW) includes compressor and fan(s).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor unit. Corresponding refrigerant piping length is accordance with standard length of each outdoor unit.

The shaded table rows indicate reference data. When operating at this temperature, these values can be different if the system is not running consistently.

Nominal heating capacity rating obtained with air entering the indoor unit at 70°F dry bulb (DB) and 60°F wet bulb (WB), and outdoor ambient conditions of 47°F dry bulb (DB) and 43°F wet bulb (WB).



# PERFORMANCE DATA

## Heating Capacity Tables

### Heating Capacity Table for LQ120HV (LQN120HV4 + LUU120HV)

Table 18: Heating Capacity Table.

Outdoor Air Temperature		Indoor Air Temperature: °F DB											
		60		64		68		70		72		75	
°F DB	°F WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
-13	-13	5.95	0.70	5.40	0.72	5.44	0.74	5.40	0.75	5.36	0.76	5.10	0.78
-4	-4	7.42	0.77	6.94	0.79	6.85	0.81	6.76	0.83	6.69	0.84	6.40	0.86
0	-0	8.09	0.80	7.65	0.82	7.51	0.85	7.40	0.86	7.31	0.87	7.00	0.90
5	5	8.89	0.83	8.49	0.86	8.28	0.89	8.15	0.90	8.04	0.91	7.71	0.94
10	9	9.43	0.87	9.05	0.90	8.80	0.92	8.65	0.94	8.53	0.95	8.19	0.98
17	15	10.02	0.92	9.67	0.95	9.37	0.97	9.20	0.99	9.06	1.00	8.72	1.03
20	19	10.38	0.95	10.05	0.98	9.72	1.01	9.53	1.03	9.39	1.04	9.03	1.07
25	23	10.98	0.98	10.66	1.01	10.29	1.04	10.09	1.06	9.94	1.07	9.56	1.10
30	28	11.59	1.02	11.24	1.05	10.85	1.08	10.65	1.10	10.49	1.12	10.11	1.15
35	32	12.21	1.05	11.82	1.08	11.41	1.12	11.21	1.14	11.05	1.15	10.65	1.19
40	36	12.83	1.08	12.47	1.12	12.07	1.15	11.86	1.17	11.69	1.19	11.27	1.22
45	41	13.60	1.12	13.28	1.16	12.89	1.19	12.67	1.21	12.50	1.23	12.05	1.27
47	43	13.92	1.13	13.60	1.17	13.22	1.21	<b>13.00</b>	<b>1.23</b>	12.83	1.25	12.36	1.28
50	46	13.96	1.13	13.67	1.16	13.34	1.19	13.14	1.21	12.99	1.23	12.55	1.26
55	51	14.02	1.12	13.79	1.14	13.54	1.17	13.38	1.18	13.26	1.19	12.87	1.22
60	56	14.09	1.10	13.91	1.12	13.74	1.15	13.62	1.15	13.53	1.16	13.18	1.18
63	59	14.13	1.10	13.98	1.11	13.86	1.13	13.76	1.14	13.69	1.14	13.37	1.15
68	64	14.17	1.09	14.05	1.10	13.98	1.12	13.91	1.12	13.85	1.12	13.56	1.13

TC = Total Capacity (kBtu/h).

PI = Power input (KW). Power input (KW) includes compressor and fan(s).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor unit. Corresponding refrigerant piping length is accordance with standard length of each outdoor unit.

The shaded table rows indicate reference data. When operating at this temperature, these values can be different if the system is not running consistently.

Nominal heating capacity rating obtained with air entering the indoor unit at 70°F dry bulb (DB) and 60°F wet bulb (WB), and outdoor ambient conditions of 47°F dry bulb (DB) and 43°F wet bulb (WB).

# PERFORMANCE DATA

## Maximum Heating Capacity Tables

### Maximum Heating Capacity Table for LQ090HV (LQN090HV4 + LUU090HV)

Table 19: Max. Heating Capacity Table.

Outdoor Air Temp.		Indoor Air Temp.: °F DB											
		61.0		64.0		68.0		70.0		72.0		75.0	
°F DB	°F WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
-13	-13.4	9.21	1.25	9.00	1.29	8.75	1.33	8.60	1.35	8.49	1.37	8.18	1.41
-4	-4.4	10.04	1.33	9.82	1.38	9.54	1.42	9.38	1.44	9.26	1.46	8.92	1.51
0	-0.4	10.34	1.38	10.11	1.43	9.82	1.47	9.66	1.50	9.53	1.52	9.18	1.57
5	4.5	10.92	1.42	10.67	1.47	10.37	1.51	10.20	1.54	10.06	1.56	9.70	1.61
10	9	11.12	1.44	10.87	1.48	10.56	1.53	10.39	1.56	10.25	1.58	9.88	1.63
17	15	11.39	1.45	11.13	1.50	10.82	1.54	10.64	1.57	10.50	1.59	10.12	1.64
20	19	11.75	1.43	11.49	1.48	11.16	1.53	10.98	1.55	10.83	1.57	10.44	1.62
25	23	12.11	1.42	11.84	1.46	11.50	1.51	11.31	1.54	11.16	1.56	10.76	1.60
30	28	12.56	1.40	12.28	1.44	11.93	1.49	11.74	1.51	11.58	1.53	11.16	1.58
35	32	12.92	1.38	12.63	1.43	12.27	1.47	12.07	1.50	11.91	1.52	11.48	1.56
40	36	13.28	1.36	12.99	1.41	12.62	1.45	12.41	1.48	12.25	1.50	11.80	1.55
45	41	13.74	1.34	13.43	1.39	13.04	1.43	12.83	1.46	12.66	1.48	12.20	1.52
47	43	13.92	1.34	13.60	1.38	13.22	1.43	<b>13.00</b>	<b>1.45</b>	12.83	1.47	12.36	1.51
50	46	13.96	1.33	13.67	1.37	13.34	1.41	13.14	1.43	12.99	1.45	12.55	1.49
55	51	14.02	1.31	13.79	1.35	13.54	1.38	13.38	1.39	13.26	1.41	12.87	1.44
60	56	14.09	1.30	13.91	1.33	13.74	1.35	13.62	1.36	13.53	1.37	13.18	1.39
63	59	14.13	1.29	13.98	1.31	13.86	1.33	13.76	1.34	13.69	1.34	13.37	1.36
68	64	14.17	1.28	14.05	1.30	13.98	1.32	13.91	1.32	13.85	1.32	13.56	1.33

TC = Total Capacity (kBtu/h).

PI = Power input (KW). Power input (KW) includes compressor and fan(s).

The shaded table rows indicate reference data. When operating at this temperature, these values can be different if the system is not running consistently.

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor unit. Corresponding refrigerant piping length is accordance with standard length of each outdoor unit.

Nominal heating capacity rating obtained with air entering the indoor unit at 70°F dry bulb (DB) and 60°F wet bulb (WB), and outdoor ambient conditions of 47°F dry bulb (DB) and 43°F wet bulb (WB).

# PERFORMANCE DATA

## Maximum Heating Capacity Tables

### Maximum Heating Capacity Table for LQ120HV (LQN120HV4 + LUU120HV)

Table 20: Max. Heating Capacity Table.

Outdoor Air Temp.		Indoor Air Temp.: °F DB											
		61.0		64.0		68.0		70.0		72.0		75.0	
°F DB	°F WB	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
-13	-13.4	9.25	1.36	9.05	1.41	8.79	1.45	8.64	1.48	8.53	1.50	8.22	1.54
-4	-4.4	10.66	1.46	10.42	1.51	10.12	1.56	9.96	1.58	9.82	1.60	9.47	1.65
0	-0.4	11.15	1.52	10.90	1.57	10.59	1.62	10.42	1.64	10.28	1.67	9.91	1.72
5	4.5	11.56	1.39	11.30	1.44	10.98	1.48	10.80	1.51	10.66	1.53	10.27	1.58
10	9	12.15	1.49	11.88	1.54	11.54	1.59	11.35	1.61	11.20	1.64	10.79	1.69
17	15	12.93	1.56	12.64	1.61	12.28	1.66	12.08	1.69	11.92	1.71	11.49	1.76
20	19	13.38	1.54	13.08	1.59	12.70	1.65	12.50	1.67	12.33	1.70	11.88	1.75
25	23	13.82	1.53	13.51	1.58	13.13	1.63	12.91	1.66	12.74	1.68	12.28	1.73
30	28	14.38	1.51	14.06	1.56	13.66	1.61	13.44	1.64	13.26	1.66	12.78	1.71
35	32	14.83	1.50	14.50	1.55	14.08	1.60	13.85	1.62	13.67	1.65	13.17	1.69
40	36	15.28	1.48	14.93	1.53	14.51	1.58	14.27	1.61	14.08	1.63	13.57	1.68
45	41	15.83	1.46	15.48	1.51	15.04	1.56	14.79	1.59	14.59	1.61	14.06	1.66
47	43	16.06	1.46	15.70	1.51	15.25	1.55	<b>15.00</b>	<b>1.58</b>	14.80	1.60	14.26	1.65
50	46	16.10	1.45	15.78	1.49	15.39	1.53	15.17	1.56	14.99	1.58	14.48	1.62
55	51	16.18	1.43	15.91	1.47	15.62	1.50	15.44	1.52	15.30	1.53	14.84	1.57
60	56	16.26	1.42	16.05	1.44	15.85	1.47	15.72	1.48	15.61	1.49	15.21	1.51
63	59	16.31	1.41	16.13	1.43	15.99	1.45	15.88	1.46	15.79	1.47	15.43	1.48
68	64	16.36	1.40	16.21	1.42	16.13	1.43	16.05	1.44	15.98	1.44	15.65	1.45

TC = Total Capacity (kBtu/h).

PI = Power input (KW). Power input (KW) includes compressor and fan(s).

The shaded table rows indicate reference data. When operating at this temperature, these values can be different if the system is not running consistently.

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor unit. Corresponding refrigerant piping length is accordance with standard length of each outdoor unit.

Nominal heating capacity rating obtained with air entering the indoor unit at 70°F dry bulb (DB) and 60°F wet bulb (WB), and outdoor ambient conditions of 47°F dry bulb (DB) and 43°F wet bulb (WB).

# LOW WALL CONSOLE UNIT APPLICATION GUIDELINES

**Equipment Selection Procedure on page 45**

**Placement Considerations on page 47**

**Clearances on page 54**

**Installing Outdoor Unit Indoors on page 55**

**Refrigerant Piping Design on page 57**

# EQUIPMENT SELECTION PROCEDURE

## Cooling / Heating Correction Factors

For Console systems, calculate the equivalent length of the liquid line from the outdoor unit to the indoor unit. Also, determine the elevation difference of the indoor unit above or below the outdoor unit. Find corresponding cooling or heating capacity correction factors as shown below. Multiply the correction factors by the cooling or heating capacity obtained from the capacity table using design conditions. The result is the NET cooling or heating capacity.

### Refrigerant Line Length Derates

For air-cooled systems, a capacity correction factor may have to be applied to account for the length of the system's refrigerant pipe. Rate of change in capacity due to increased piping lengths is shown below.

Table 21: Console System Cooling and Heating Capacity Coefficient Factors.

Piping Length (ft.)		16.4	24.6	32.8	49.2	65.6	98.4	131.2	164.0	196.9	229.7	246.0
<i>Cooling Capacity Coefficient Factor</i>												
Rate of Capacity Change (%)	LQ090HV (9,000)	100	100	99.7	99.2	98.7	-	-	-	-	-	-
	LQ120HV (12,000)	100	100	99.7	99.2	98.7	-	-	-	-	-	-
<i>Heating Capacity Coefficient Factor</i>												
Rate of Capacity Change (%)	LQ090HV (9,000)	100	100	99.7	99.2	98.7	-	-	-	-	-	-
	LQ120HV (12,000)	100	100	99.7	99.2	98.7	-	-	-	-	-	-

### Equivalent Piping Length for Piping Components

Table 22: Equivalent Piping Length for Elbows.

Component	Size (Inches)													
	1/4	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2	1-5/8	1-3/4	2-1/8
Elbow (ft.)	0.5	0.6	0.7	0.8	1.2	1.3	1.5	1.6	1.8	2.0	2.1	2.3	2.5	2.8

### Altitude Correction Factor

The impact of air density must be considered on systems installed at a significant altitude above sea level, therefore, locally accepted altitude correction factors must be applied.

# EQUIPMENT SELECTION PROCEDURE

## Defrost Correction Factor for Heating Operation

The outdoor unit heating capacity may need to be adjusted for frost accumulation on air-cooled systems. If design day conditions are below the dewpoint of the surrounding air, frost may not be a problem and no correction factor is needed. In certain weather conditions, however, frost may form and accumulate on the air-cooled outdoor unit coil and impact the coils ability to transfer heat. If significant frost accumulates on the outdoor unit coil, a defrost algorithm will start automatically. The timing between defrost periods is determined by the system's ability to achieve a target head pressure value.

Capacity and AHRI ratings tables do not factor in capacity reduction when frost has accumulated on the condenser coil, nor during defrost operation.

Integrated heating capacity values can be obtained using the formula:

$$A = B \times C$$

Where:

A = Integrated Heating Capacity.

B = Value found in the Capacity Table.

C = Correction Factor for Frost Accumulation Factor (from Table 24).

Table 23: Outdoor Unit Frost Accumulation Factor (Heating)<sup>1</sup>.

Entering DB (°F)	19.4	23.0	26.6	32.0	37.4	41.0	44.6
Derate factor	0.98	0.95	0.93	0.86	0.93	0.96	1.0

<sup>1</sup>At 85% outdoor air relative humidity.

The frost accumulation factor does not account for effects of snow accumulation restricting airflow through the outdoor unit coil.

## Note:

There will be temporary reduction in capacity when frost / ice accumulates on the outside surface of the outdoor unit heat exchanger. The level of capacity reduction depends on a number of factors, for example, outdoor temperature (°F DB), relative humidity (RH), and the amount of frost present.

## Check the Indoor and Outdoor Unit Selection(s)

Compare the corrected cooling and heating capacities to the load calculations. Is each capacity sufficient for the zone it serves?

For each indoor unit, the corrected capacity must be at least equal to the total of the cooling design load (plus ventilation load, if applicable) for the space(s) served by the indoor unit. For each indoor unit, the corrected capacity also must be at least equal to the total of the heating design load (plus ventilation load, if applicable) for the space(s) and / or thermal zones served by the indoor unit.

The outdoor unit selected must be large enough to offset the total cooling load for all spaces it serves (account for ventilation air cooling load if the ventilation air has not been pretreated to room neutral conditions). The outdoor unit must also be large enough to offset the total heating load for all spaces it serves.

If the corrected heating capacity ratio exceeds 100%, reselect the equipment, or change the system design by moving some of the load to another system.

## System Sizing Check Formulas

### 1. Outdoor Unit Rated Capacity.

$Q_{odu(rated)}$  (From capacity tables).

### 2. Outdoor Unit Capacity at $T_i$ , $T_o$ Temperature.

$Q_{odu(T_i, T_o)}$  (From capacity tables).

### 3 Outdoor Unit Capacity Coefficient Factor.

$$F_{(T_i, T_o)} = Q_{odu(T_i, T_o)} / Q_{odu(rated)}$$

### 4. Piping Correction Factor (From Capacity Coefficient Factor Tables).

$F_{(length)}$  for each piping length

### 5. Individual Indoor Unit Combination Capacity.

$$Q_{idu( combi)} = Q_{odu(rated)} \times Q_{idu(rated)} / Q_{idu(rated-total)}$$

### 6. Individual Indoor Unit Actual Capacity.

$$Q_{idu( actual)} = Q_{odu( combi)} \times F_{(T_i, T_o)} \times F_{(length, altitude)}$$

## Conclusions and Recommendations

- Understand the design safety factors.
- Reference load calculations for actual cooling and heating capacities (applies in 99% of applications – consider total load when latent load is greater than 30%).
- Verify that the sensible load of the zone is satisfied.

- Use caution when sizing to meet listed capacity specifications for the scheduled manufacturer's equipment.

If further system design assistance is needed, or you have a unique application you would like to discuss, contact your LG sales rep.

# PLACEMENT CONSIDERATIONS

## Indoor Unit

### Selecting the Best Location for the Indoor Unit

#### Note:

Follow recommended best practices when choosing an indoor location for the single zone indoor unit.

#### Dos

- Place the unit where air circulation will not be blocked.
- Locate the indoor unit in a location that is level, and where it can be easily connected to the outdoor unit.
- Place the unit where drainage can be obtained easily. Condensation drain must be conveniently routed away from the unit.
- Include enough space around the indoor unit so that it is accessible for maintenance and service purposes.
- Where electrical noise / electromagnetic waves will not affect indoor unit operation. Maintain proper distances between the indoor units and electric wires, audio and visual appliances, breaker / circuit panels, etc. If the frequency signal of the appliance is unstable, then install the indoor unit a minimum of ten (10) feet away, and run the power and transmission cables through a conduit.
- An area that is level and with enough strength to bear the weight of the indoor unit(s).

#### ⊘ Dont's

- Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used. (These materials may generate condensate, cause a reduction in heat exchanger efficiency, or the drain to malfunction. If this is a potential problem, install a ventilation fan large enough to vent out these materials.)
- Ensure there are no obstacles to air circulation around the unit; keep proper distances from ceilings, doorways, floor, walls, etc.
- Avoid installing the unit near high-frequency generators or near any equipment that generates an electromagnetic field (minimum 3-1/3 feet away).

#### ⚠ WARNING

The unit must not be installed where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored. There is risk of fire, explosion, and physical injury or death.

**The unit may be damaged, may malfunction, and / or will not operate as designed if installed in any of the conditions listed.**

#### Note:

- ⊘ Indoor units (IDUs) must not be placed in an environment where the IDUs may be exposed to harmful volatile organic compounds (VOCs) or in environments where there is improper air make up or supply or inadequate ventilation. If there are concerns about VOCs in the environment where the IDUs are installed, proper air make up or supply and/ or adequate ventilation must be provided. Additionally, in buildings where IDUs will be exposed to VOCs consider a factory-applied epoxy coating to the fan coils for each IDU.
- If the unit is installed near a body of water, the installation parts are at risk of corroding. Appropriate anti-corrosion methods must be taken for the unit and all installation parts.

#### Installing in an Area Exposed to Unconditioned Air

In some installation applications, areas (floors, walls) in some rooms may be exposed to unconditioned air (room may be above or next to an unheated garage or storeroom). To countermeasure:

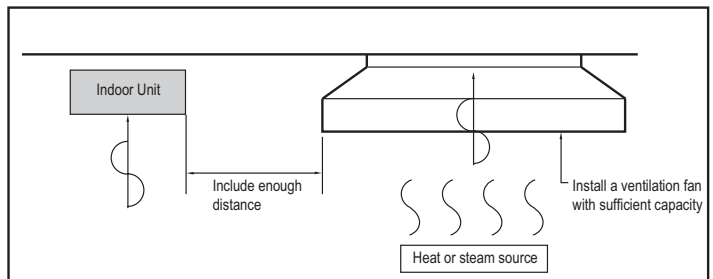
- Verify that carpet is or will be installed (carpet may increase the temperature by three [3] degrees).
- Add insulation between the floor joists.
- Install radiant heat or another type of heating system to the floor.

#### Installing in an Area with High Humidity Levels

If the environment is prone to humidity levels of 80% or more (near the ocean, lakes, etc.) or where steam could collect in the plenum:

- Install additional insulation to the indoor unit (glass wool insulation >13/32 inches thick).
- Install additional insulation to the refrigerant piping (insulation >13/16 inches thick).
- Seal all gaps between the indoor unit and the ceiling tiles (make the area air tight) so that humidity does not transfer from the plenum to the conditioned space. Also, add a ceiling grille for ventilation.

Figure 27: Installing Near a Heat or Steam Source.



# PLACEMENT CONSIDERATIONS

## Outdoor Unit

### Selecting the Best Location for the Outdoor Unit

#### **⚠ DANGER**

- ⊘ Do not install the unit in an area where combustible gas may generate, flow, stagnate, or leak. These conditions can cause a fire, resulting in bodily injury or death.
- ⊘ Do not install the unit in a location where acidic solution and spray (sulfur) are often used as it can cause bodily injury or death.
- ⊘ Do not use the unit in environments where oil, steam, or sulfuric gas are present as it can cause bodily injury or death.

#### **⚠ WARNING**

When deciding on a location to place the outdoor unit, be sure to choose an area where run-off from defrost will not accumulate and freeze on sidewalks or driveways, which may create unsafe conditions. Properly install and insulate any drain hoses to prevent the hose from freezing, cracking, leaking, and causing unsafe conditions from frozen condensate.

Install a fence to prevent vermin from crawling into the unit or unauthorized individuals from accessing it. Follow the placement guidelines set forth in "Clearance Requirements".

Select a location for installing the outdoor unit that will meet the following conditions:

- Where there is enough strength to bear the weight of the outdoor unit.
- A location that allows for optimum air flow and is easily accessible for inspection, maintenance, and service.
- Where piping between the outdoor unit and indoor unit(s) are within allowable limits.
- Include space for drainage to ensure condensate flows properly out of the unit when it is in heating mode. Avoid placing the outdoor unit in a low-lying area where water could accumulate.
- If the outdoor unit is installed in a highly humid environment (near an ocean, lake, etc.), ensure that the site is well-ventilated and has a lot of natural light (Example: Install on a rooftop).



#### **Don'ts**

- Where it will be subjected to direct thermal radiation from other heat sources, or an area that would expose the outdoor unit to heat or steam like discharge from boiler stacks, chimneys, steam relief ports, other air conditioning units, kitchen vents, plumbing vents, and other sources of extreme temperatures.
- Where high-frequency electrical noise / electromagnetic waves will not affect operation.
- Where operating sound from the unit will disturb inhabitants of surrounding buildings.
- Where the unit will be exposed to direct, strong winds.
- Where the discharge of one outdoor unit will blow into the inlet side of an adjacent unit (when installing multiple outdoor units).

#### **Note:**

The indoor unit may take longer to provide heat, or heating performance will be reduced in winter if the unit is installed:

1. In a narrow, shady location.
2. Near a location that has a lot of ground moisture.
3. In a highly humid environment.
4. In an area in which condensate does not drain properly.



# PLACEMENT CONSIDERATIONS

## Outdoor Unit

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### Outdoor Unit Condensate Drain Piping

Outdoor unit requires condensate drain piping. Condensate drain pipe is constructed with materials approved by local code. See Placement Considerations for information in reference to outdoor unit placement.

### Planning for Snow and Ice

To ensure the outdoor unit operates properly, certain measures are required in locations where there is a possibility of heavy snowfall or severe windchill or cold:

1. Prepare for severe winter wind chills and heavy snowfall, even in areas of the country where these are unusual phenomena.
2. Position the outdoor unit so that its airflow fans are not buried by direct, heavy snowfall. If snow piles up and blocks the airflow, the system may malfunction.
3. Remove any snow that has accumulated four (4) inches or more on the top of the outdoor unit.
4. In climates that may experience significant snow buildup, mount the outdoor unit on a raised, field-provided platform or stand. The raised support platform must be high enough to allow the unit to remain above possible snow drifts, and must be higher than the maximum anticipated snowfall for the location.
5. Design the mounting base to prevent snow accumulation on the platform in front or back of the unit frame.
6. Provide a field fabricated snow protection hood to keep snow and ice and/or drifting snow from accumulating on the coil surfaces.
7. Install a hail guard kit and air guide accessories (sold separately) to prevent snow or rain from accumulating on the fan inlet / outlet guards.
8. Consider tie-down requirements in case of high winds or where required by local codes.

#### **⚠ CAUTION**

*When deciding on a location to place the outdoor unit, be sure to choose an area where run-off from defrost will not accumulate and freeze on sidewalks or driveways, which may create unsafe conditions.*

#### **Note:**

*Choose an area where run-off from defrost mode will not accumulate and freeze on sidewalks or driveways. Properly install and insulate any drain hoses to prevent the hose from freezing, cracking, leaking, and damaging the outdoor unit.*

# PLACEMENT CONSIDERATIONS

## Outdoor Unit

### Underground Refrigerant Piping

Refrigerant pipe installed underground must be routed inside a vapor tight protective sleeve to prevent insulation deterioration and water infiltration. Refrigerant pipe installed inside underground casing must be continuous without any joints. Underground refrigerant pipe must be located at a level **below the frost line**.

Table 25: Utility Conduit Sizes (Inches).

Liquid Pipe <sup>1</sup>	Vapor Pipe <sup>1</sup>		
	3/8 (1-1/8 <sup>2,3</sup> )	1/2 (2.0 <sup>2,4</sup> )	5/8 (2-1/8 <sup>2,4</sup> )
1/4 (1.0) <sup>4</sup>	4	4	4
3/8 (1-1/8) <sup>4</sup>	4	4	4

<sup>1</sup>OD pipe diameter in inches; Values in parenthesis ( ) indicate OD of pipe with insulation jacket.

<sup>2</sup>Diameter of pipe with insulation. Thickness of pipe insulation is typical. Actual required thickness may vary based on surrounding ambient conditions and must be calculated and specified by the design engineer.

<sup>3</sup>Insulation thickness (value in parenthesis) = 3/8 inch.

<sup>4</sup>Insulation thickness (value in parenthesis) = 3/4 inch.

Figure 29: Typical Arrangement of Refrigerant Pipe and Cable(s) in a Utility Conduit.

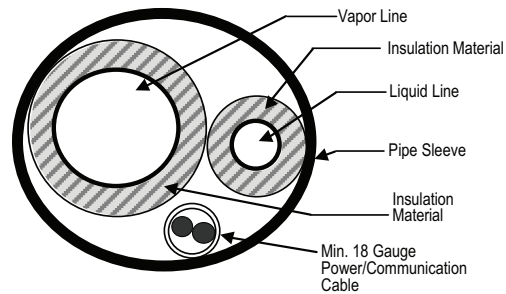


Table 26: Outdoor Unit Refrigerant Pipe Connections (All Brazed Type).

Model	Liquid Conn. (inches)	Vapor Conn. (inches)
LQ090HV, LQ120HV	1/4	3/8

### Tie-Downs, Wind Restraints, and Lightning Protection

#### Tie-Downs

- The strength of the roof must be checked before installing the outdoor units.
- If the installation site is prone to high winds or earthquakes, when installing on the wall or roof, securely anchor the mounting base using a field-provided tie-down configuration approved by a local professional engineer.
- The overall tie-down configuration must be approved by a local professional engineer. Always refer to local code when using a wind restraint system.

#### Note:

Always refer to local code when designing a wind restraint system.

#### Lightning Protection

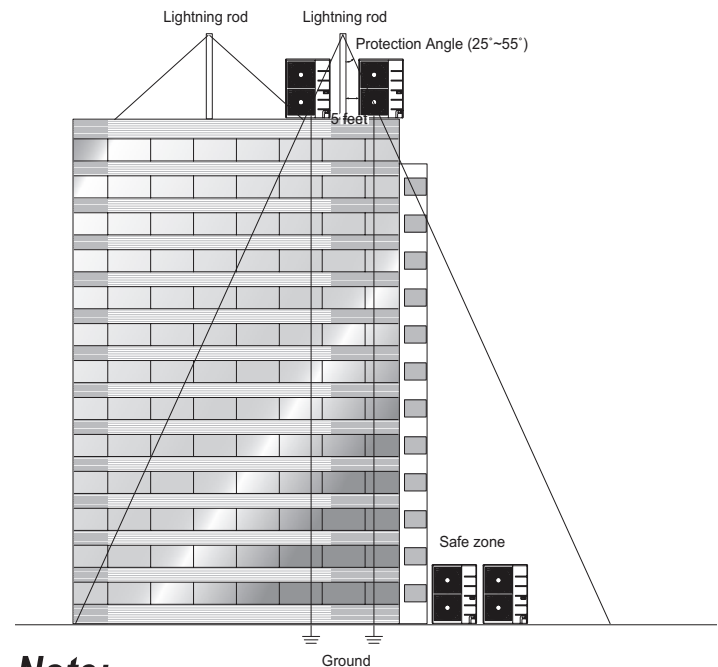
- To protect the outdoor unit from lightning, place the unit within the specified lightning safety zone.

Table 24: Safety Zone Specifications.

Building Height (feet)	66	98	148	197
Protection Angle (°)	55	45	35	25

- Power cable and communication cable must be installed five (5) feet away from lightning rod.
- A high-resistance ground system must be included to protect against induced lightning or indirect strike.

Figure 28: Lightning Protection Diagram.



#### Note:

If the building does not include lightning protection, the outdoor unit may be damaged from a lightning strike. Inform the customer of this possibility in advance.

# PLACEMENT CONSIDERATIONS

## Outdoor Unit

### Oceanside Applications

#### Wind Protection

If the outdoor unit is placed on a roof, position it with the compressor end (no coil surface) in the direction of the prevailing wind as shown in the figure at right. In cooler climates, it may be beneficial to position the unit in direct sunlight to assist with defrost operations.

If the outdoor unit is not placed on a roof, place it on the leeward side of the building or in a location where the unit will not be exposed to constant wind.

If placement exposes the unit to constant wind activity, construct a wind break in front of the unit. Follow the placement guidelines set forth in "Clearance Requirements".

#### Tie-Downs and Wind Restraints

The strength of the Vertical Air Handling Unit frames is adequate to be used with field-provided wind restraint tie-downs. The overall tie-down configuration must be approved by a local professional engineer. Always refer to local code when designing a wind restraint system.

#### Mounting Platform

The underlying structure or foundation must be designed to support the weight of the unit. Avoid placing the unit in a low lying area where water may accumulate.

#### Oceanside Installation Precautions

##### Note:

*Ocean winds may cause corrosion, particularly on the condenser and evaporator fins, which, in turn could cause product malfunction or inefficient performance.*

- Avoid installing the outdoor unit where it would be directly exposed to ocean winds.
- Install the outdoor unit on the side of the building opposite from direct ocean winds.
- Select a location with good drainage.
- Periodically clean dust or salt particles off of the heat exchanger with water.

If the outdoor unit must be placed in a location where it would be subjected to direct ocean winds, install a concrete windbreaker strong enough to block any winds. Windbreaker height and width must be more than 150% of the outdoor unit, and be installed at least 27-1/2 inches away from the outdoor unit to allow for airflow.

Figure 30: Prevailing Wind Direction.

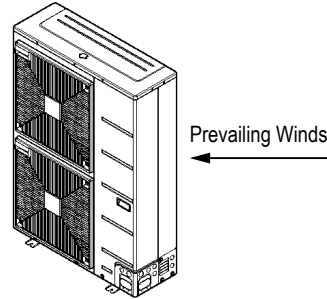


Figure 31: Leeward Side of the Building.



Figure 32: Wind Break.

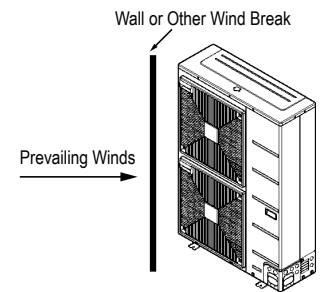
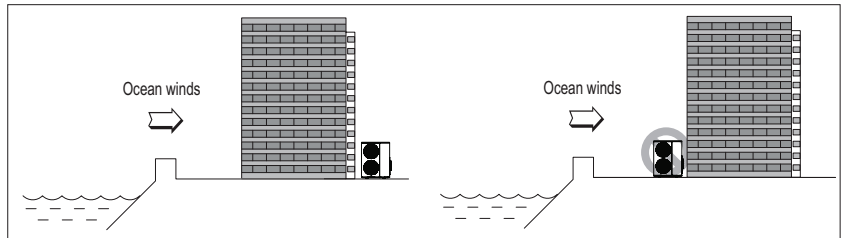
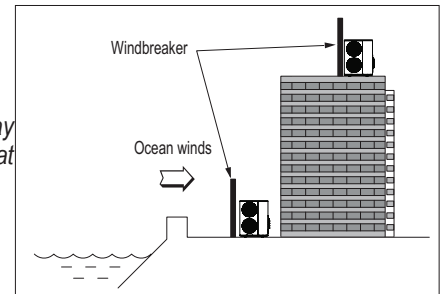


Figure 33: Oceanside Placement Using a Building as Shield, and Placement Using a Windbreaker.



##### Note:

*Additional anti-corrosion treatment may need to be applied to the outdoor unit at oceanside locations.*



# PLACEMENT CONSIDERATIONS

## Outdoor Unit

### General Mounting

Securely attach the outdoor unit to a condenser pad, base rails, or other mounting platform that is securely anchored to the ground or building structure. The underlying structure or foundation must be designed to support the weight of the unit, and avoid placing the outdoor unit in a low lying area where water may accumulate.

### Attaching the Outdoor Unit to the Bracket

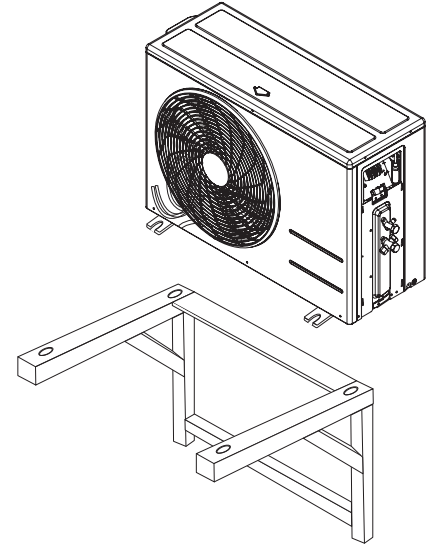
When installing the outdoor unit on a wall or roof top, anchor the mounting base securely using nails or wire with regard to wind and earthquake or vibration.

Refer to installation manual, and follow the applicable local code for clearance, mounting, anchor, and vibration attenuation requirements.

### Note:

- All referenced materials are to be field-supplied.
- Images are not to scale.

Figure 34: Bracket Mounting.



### Bolting the Outdoor Unit to the Platform

Figure 35: Bolting the LUU090HV and LUU120HV Outdoor Units to the Platform (Appearance May Vary).

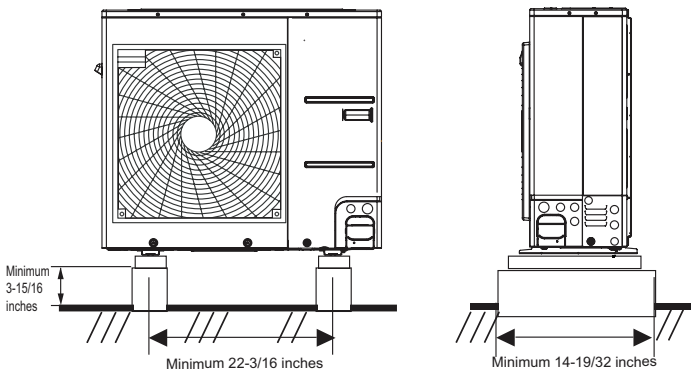


Table 27: Outdoor Unit Foundation Specifications.

Outdoor Unit	Bolt Type	Concrete Height	Bolt Depth
LUU090HV LUU120HV	M10-J	Minimum 3-15/16 inches	Minimum 2-3/8 inches

# PLACEMENT CONSIDERATIONS

## Outdoor Unit

### Bolting the Outdoor Unit to the Platform Procedure

When installing the outdoor unit onto a concrete or rigid mount, use a bolt and nut.

1. Ensure that the concrete platform will not degrade easily, and has enough strength to bear the weight of the unit.
2. Include an H-beam support. Firmly attach the corners, otherwise the support will bend.
3. Use a hexagon nut.
4. Use anti-vibration material.
5. Include enough space around the concrete foundation for condensate drainage.
6. Seal all wiring and piping access holes to prevent bugs from entering the unit.

### Concrete Platform Specifications

- Concrete foundations must be made of one part cement, two parts sand, and four parts gravel.
- The surface of the foundation must be finished with mortar with rounded edges, and weatherproofed.

### Note:

- All referenced materials are to be field-supplied.
- Images are not to scale.

Figure 36: Platform Mounting.

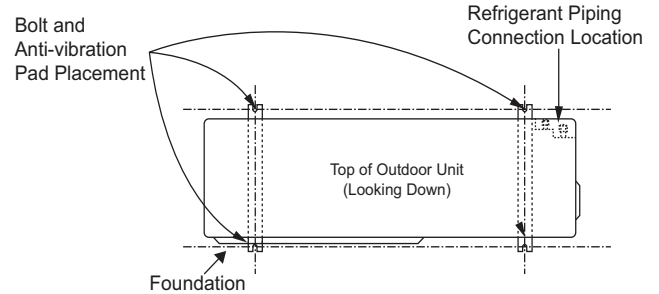
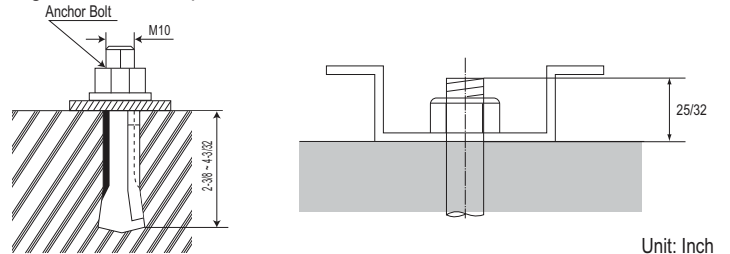


Figure 37: Close up of Bolt Attachment.




Unit: Inch

# CLEARANCES

## Outdoor Unit

### Minimum Allowable Clearance and Service Access Requirements

Proper clearance for the outdoor unit coil is critical for proper unit operation. When installing the outdoor unit, consider service, inlet and outlet and minimum allowable space requirements as illustrated in the diagrams on the following pages.

- Include enough space for airflow and for service access. If installing multiple outdoor units, avoid placing the units where the discharge of one unit will blow into the inlet side of an adjacent unit.
- If an awning is built over the unit to prevent direct sunlight or rain exposure, make sure that the discharge air of the outdoor unit isn't restricted.
-  No obstacles to air circulation around the unit; keep proper distances from ceilings, fences, floor, walls, etc. (Install a fence to prevent pests from damaging the unit or unauthorized individuals from accessing it.)

### Outdoor Unit (9,000 to 12,000 Capacity) Service Access and Allowable Clearances

Specific clearance requirements in the diagram below are for (9,000 to 12,000 Btu/h capacities). The figure below shows the overall minimum clearances that must be observed for safe operation and adequate airflow around the outdoor unit.

When placing the outdoor unit under an overhang, awning, sunroof or other "roof-like structure", observe the clearance requirements (as shown in Cases 1 and 2) for height in relation to the unit. To have successful service access to the outdoor unit, see the figure below for minimum spacing. When installing multiple outdoor units, see Cases 4 and 5 for correct spacing requirements.

Figure 38: 9,000 to 12,000 Capacity Outdoor Unit Service Access and Allowable Clearances Diagram.

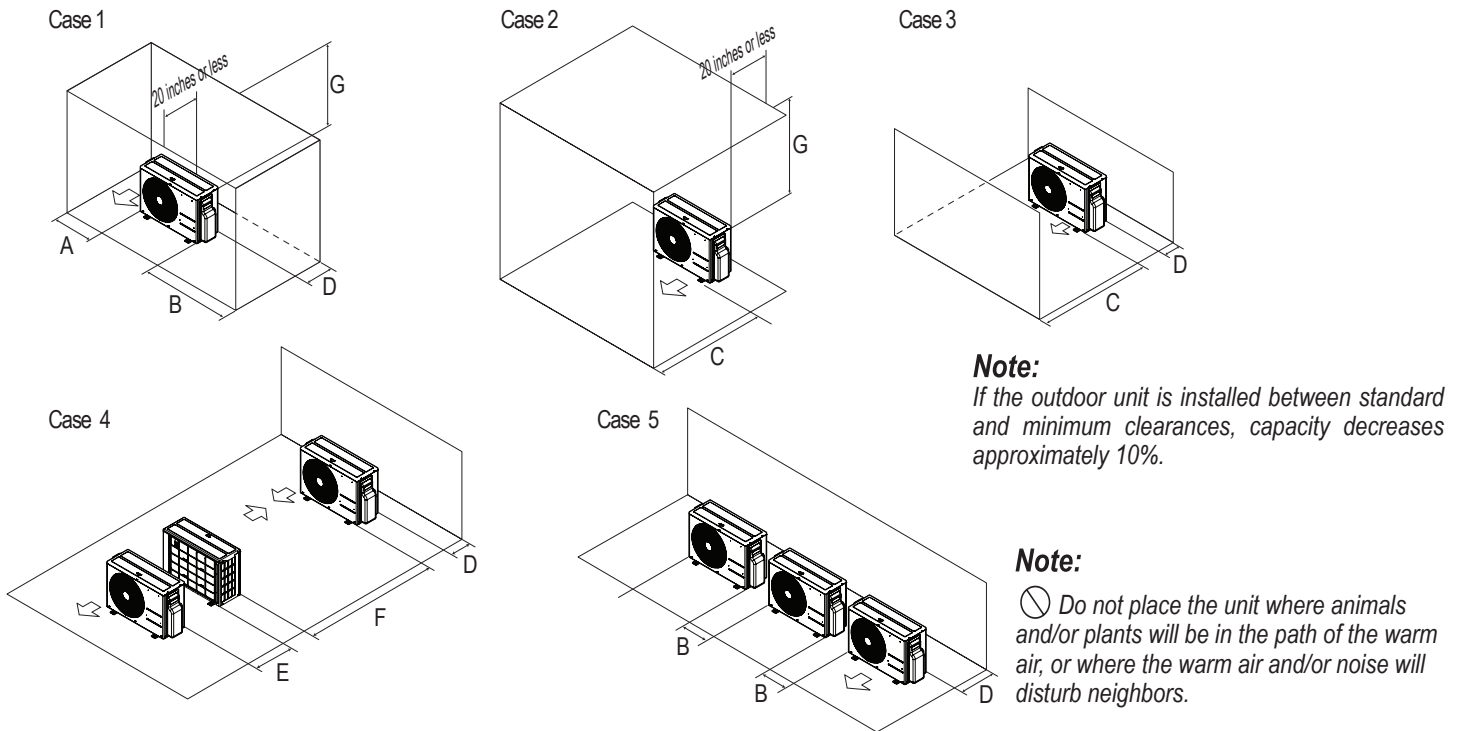


Table 28: 9,000 to 12,000 Outdoor Unit Service Access and Allowable Clearances Diagram Legend.

Unit: Inch		A	B	C	D	E	F	G
Case 1	Standard	12	24	-	12	-	-	-
	Minimum	4	10	-	4	-	-	40
Case 2	Standard	-	-	20	-	-	-	-
	Minimum	-	-	14	-	-	-	40
Case 3	Standard	-	-	20	12	-	-	-
	Minimum	-	-	14	4	-	-	-
Case 4	Standard	-	-	-	12	24	-	-
	Minimum	-	-	-	4	8	79	-
Case 5	Standard	-	24	-	12	-	-	-
	Minimum	-	10	-	4	-	-	-

# INSTALLING OUTDOOR UNITS INDOORS

## Installing Outdoor Units Indoors

LG outdoor units are engineered to be mounted outdoors and include technology designed to minimize the negative effects of winter weather's freezing rain, sleet, and snow. Some building projects, however, necessitate placing the HVAC outdoor units indoors:

- Lack of ground space.
- Lack of an appropriate outdoor location that meets system design requirements.
- When mounting on the roof is not an option due to a lack of roof space.
- Roof warranty will be voided if mechanical equipment is placed on the membrane.
- On retrofit projects, a former chiller / boiler / air handler equipment room, mechanical area, or penthouse already exists.
- Where a project has vertical, self-contained VAV air handlers on each floor (in lieu of a centralized mechanical room).
- To curtail the potential need for redundant zone heating devices such as wall-fin radiators or duct heaters.
- In extremely cold environments where there is a significant amount of run-time at temperatures well below freezing outside the outdoor unit ambient air temperature range published in this engineering manual.

## Benefits of Installing Outdoor Units Indoors

- Shelters the outdoor unit from direct exposure to prevailing winds that decrease the heating capability of the outdoor unit.
- Protects equipment from freezing precipitation and / or potential ice build-up that could hinder unit operation.
- Maintains coil heat transfer efficiency by reducing the number of and shortening the cycle time for defrost operation.
- Easier maintenance and servicing during inclement weather.
- When mounted in a fully enclosed space, limiting the ambient air temperature may allow the system designer to eliminate oversizing the outdoor unit to compensate for loss of capacity at low ambient temperatures.
- May also curtail the need to provide inefficient redundant zone heating devices such as wall-fin radiators and second-stage ancillary heating devices.

## Design Considerations Include:

- Enclosure types and elements such as louvers, rain hoods, dampers and controls, heating methods and sizing of heating devices
- Heating strategies
- Duct design
- Condensate handling

## General Guidelines

- Follow ASHRAE 62.1 design guidelines.
- Depending on the project / application, a roof over the outdoor units in combination with a wind break may be all that is necessary.
- Consider the potential for snow accumulation near louvers / roof openings. Outside air intakes and discharge ducts/louvers must be engineered to clear anticipated snow accumulation levels by at least one (1) foot.
- In situations where operation is anticipated at temperatures of -13°F and lower, ancillary heat must be provided to heat the outdoor unit coils to assure continuous compressor operation and heating.

It may be necessary to use an air guide accessory to prevent discharge air from short-cycling back to the coil inlet.

- Another option is to field manufacture ductwork and mount on top of the unit to encompass the outdoor unit fan discharge and connect to the exterior discharge grille on the building.
- Avoid using a single duct on multi-fan units to prevent short cycling. Provide a dedicated duct for each outdoor unit fan discharge.
- Consider the direction of prevailing winds and opening placement. If possible, locate inlet openings upwind of discharge openings and other exhaust outlets.
- When inlet and outlet openings are placed on the same wall, minimum distance between the two openings must be approximately three (3) feet (minimum distance varies significantly with variations in outlet opening face velocity).
- If roof-mounted ventilation openings are used, strategically locate the inlet ventilation opening(s) upwind of the outlet opening(s).
- Discharge and supply ductwork must be designed to avoid weather related long periods of water entrainment and the potential for microbial growth.

# INSTALLING OUTDOOR UNITS INDOORS


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Provide a means to drain the condensate generated during heating mode and defrost cycle in addition to rainwater that infiltrates the inlet louver enclosed area.

- Install a field-provided drain pan under the outdoor units and provide a path to a nearby floor drain.
- If the ambient air temperature is expected to drop below 32°F in the enclosure, heat the bottom surface of the pan, drain line, and floor drain so that the condensate does not freeze before reaching the drain.

Allow for ventilation intake and exhaust air based on maximum outdoor unit fan capacity.

- Select the size, type and orientation of architectural louvers with adequate "net free area" face velocity to ensure the total external static pressure from the outdoor unit fan does not exceed design limitations (see specification data tables).
-  No obstructions must be placed in front of the louver that could hamper the free flow (throw) of air.
- Roof top openings and / or discharge and supply louvers must be equipped with screens to prevent bird and insect infiltration.

As always, the best solution for each project balances acceptable heating performance (considering local weather conditions), capital costs, life cycle energy consumption, and limitations set forth by local building codes.



# REFRIGERANT PIPING DESIGN

## Design Guideline Summary

### Device Connection Limitations

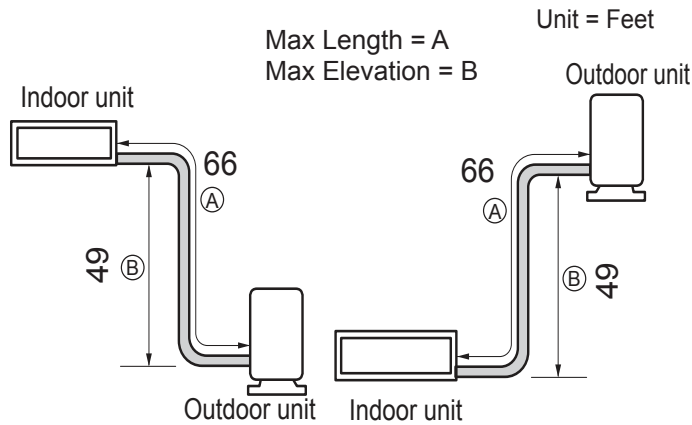
A single zone Low Wall Console system consists of one outdoor unit and one indoor unit. One of the most critical elements of a this system is the refrigerant piping. The table below lists pipe length limits that must be followed in the design of a single zone Low Wall Console refrigerant pipe system.

Table 29: Single Zone Console Refrigerant Piping System Limitations.

System Model Name		LQ090HV, LQ120HV
Pipe Length (ELF = Equivalent Length of Pipe)	Longest total equivalent piping length	66 feet
	Shortest total equivalent piping length	16.4
	Distance between fittings and indoor or outdoor units	≥20 inches
	No additional refrigerant	25 feet
Elevation (All Elevation Limitations are Measured in Actual Feet)	If outdoor unit is above indoor unit	49 feet
	If outdoor unit is below indoor unit	49 feet
Additional Refrigerant Needed (oz/ft)		0.22

### System Layout

Figure 39: Typical LQ090HV, LQ120HV System Layout.





*Inverter*

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EM\_SZ\_Console\_12\_22  
EM\_SZ\_Console\_03\_20