



SINGLE-ZONE FOUR-WAY CEILING-CASSETTE SYSTEM ENGINEERING MANUAL

Single-Zone Four-Way
Ceiling Cassette
Heat Pump Systems
3/4 to 3-1/2 Tons



LC098HV4 (9,000 Btu/h)
LC128HV4 (12,000 Btu/h)



LC187HV (18,000 Btu/h)
LC188HV4 (18,000 Btu/h)
LC247HV (24,000 Btu/h)



LC367HV (36,000 Btu/h)
LC427HV (42,000 Btu/h)

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Duct-Free Split Systems

LG HVAC systems offer a range of solutions that are cost efficient, quiet and attractive. Duct-Free Split systems are “split” into indoor and outdoor units, and provide a smart alternative to both central HVAC and window-mounted air conditioners. These inverter heat pump systems are available in a variety of configurations to suit different cooling and heating situations. Installation by a qualified HVAC contractor is safe and easy – little to no duct work or sheet metal is required.

Inverter Systems

LG Single Zone Four-Way Ceiling Cassette air-source systems offer the opportunity to minimize ductwork in the same configuration. The system offers zoning without the need for zone damper systems. The LG Single Zone Four-Way Ceiling Cassette system's advanced controls provide exceptional building dehumidification and temperature control, and can rapidly adapt system operating parameters to the ever changing building load. The LG Single Zone Four-Way Ceiling Cassette system is easy to design, install, and maintain. The modular design allows occupants to control their environmental condition, providing individualized control of the setpoint temperature and allowing occupants to condition only the occupied zones.

Quality Commitment

LG is committed to the success of Duct-Free Split projects. We provide industry leading technical support during installation and commissioning. LG offers a variety of classes designed for installers and servicers to ensure that every system installation is completed successfully.





Classes are conducted at LG's training centers and in field locations at various times throughout the year and upon special request.



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TABLE OF SYMBOLS

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

INTRODUCTION

ARCHITECTURAL APPEAL

Convergence of Technological Innovation with Flexibility and Style

Single-Zone Four-Way Ceiling-Cassette Systems

A four-way ceiling-cassette system provides a system designer an edge to engineer a system with many user-adjustable settings. Four-way ceiling cassette systems features a ceiling-recessed indoor unit case and an off-white architectural grille (required; sold separately) that is flush mounted, providing a clean look to the room. These systems are 208-230V/60Hz/1PH systems, available in nominal capacities of 3/4, 1, 1-1/2, 2, 3, and 3-1/2 tons, and are best suited in light commercial applications or large, open spaces. The ceiling cassette indoor unit is a useful alternative when wall space is limited.

Benefits of Four-Way Ceiling Cassette Systems

- Inverter technology
- Available in 9,000, 12,000, 18,000, 24,000, 36,000, 42,000 Btu/h capacities
- All-season use—heat pump models for both cooling and heating capabilities
- Operating ranges for 9,000 and 12,000 Btu/h outdoor units of 0°F to +118°F (DB) for cooling (Cooling range can be extended from 0°F down to -4°F using the Low Ambient Wind Baffle Kit [sold separately]); -4°F to +64°F (WB) for heating
- Operating ranges for 9,000 and 12,000 Btu/h indoor units of 57°F to 77°F (WB) for cooling; 59°F to 81°F (DB) for heating
- Indoor unit temperature setting range for 9,000 and 12,000 Btu/h of 65°F to 86°F (DB) for cooling; 61°F to 86°F (WB) for heating
- Operating ranges for 18,000, 24,000, 36,000, 42,000 Btu/h outdoor units of 5°F to +118°F (DB) for cooling; 0°F to +64°F (WB) for heating
- Operating ranges for 18,000, 24,000, 36,000, 42,000 Btu/h indoor units of 57°F to 77°F (WB) for cooling; 59°F to 81°F (DB) for heating
- Indoor unit temperature setting range for 18,000, 24,000, 36,000, and 42,000 Btu/h of 65°F to 86°F (DB) for cooling; 61°F to 86°F (WB) for heating
- Quiet operation inside and outside



Inverter Technology

Inverter variable-speed compressors are also measurably quieter and consume less energy than those in conventional air conditioners. The Inverter compressor ramps up or down to match the required room capacity and maintain the comfort level. When the selected temperature is reached, the inverter compressor operates at low speed to maintain that comfort level, thereby using less energy.

Adaptable and Flexible

Four-way ceiling-cassette systems allow cooling or heating for a single room without the need for extensive remodeling. Long refrigerant piping lengths allow for extra design flexibility in indoor unit installation. These units may be used for a number of residential or commercial environments such as:

- Older homes
- New home construction
- Office buildings
- Restaurants
- Hospitals / Medical facilities
- Schools
- Nursing homes
- Retail establishments
- Houses of worship



Figure 1: Four-Way Ceiling Cassette System.

PRODUCT DATA

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“Unit Nomenclature” on page 9

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“Electrical Data” on page 13

“Dimensions” on page 14

“Acoustic Data” on page 21

“Air Velocity and Temperature Distribution” on page 23

“Refrigerant Flow Diagrams” on page 27

“Wiring Diagrams” on page 31

“Accessories” on page 37

PRODUCT FEATURES AND BENEFITS

Four-Way Ceiling Cassette Systems

Single zone four-way ceiling cassette systems are equipped with inverter components that offer superior load matching and long piping installation. The product works for optimizing power consumption in residential and small office buildings. Using a four-way ceiling cassette indoor unit with custom temperature controls allow for precise temperature settings in each zone of the building. Four-way ceiling cassette indoor units allow flexibility in interior design and complement any decor.

Lower Sound Levels

When outdoor units operate fully loaded, they have one of the quietest sound levels in the industry, operating as low as 47 dB(A). To promote a quiet, comfortable environment, four-way ceiling cassette indoor units operate as low as 30 dB(A) at low speed. LG customers often ask if the outdoor unit is running after commissioning is complete. All rotating components are soft-started using digitally controlled inverters, which reduce undesirable noise caused by fans and compressors cycling on and off.

Comfort Control at its Best

Tight temperature control through precise load matching. Unlike traditional air conditioning control systems, which use thermostatic controls to maintain room temperatures, LG inverters continuously vary the indoor unit fan speed and refrigerant flow, indirectly providing lower and more consistent humidity levels in the conditioned space.

The longer the indoor coil temperature is below the dewpoint of the room in conjunction with air movement across the coil, the space humidity level will vary little, compared to technologies that cycle fans and compressors on and off multiple times per hour. The outdoor unit responds by varying the compressor speed and fan motors as needed to maintain system operating pressure. As a result, four-way ceiling cassette systems deliver precise space temperature control.

Inverter Driven

The compressor is optimized to maximize compressor efficiency, which reduces power consumption and monthly utility bills. This inverter technology allows the LG four-way ceiling cassette outdoor unit to vary the compressor motor shaft speed and deliver an appropriate amount of cooling to the indoor unit. Occupants remain comfortable while utility costs are reduced.

Simplified Installation

The LG four-way ceiling cassette system simplifies and reduces mechanical and control system design time. The designer no longer has to be concerned with interconnecting chilled and condenser water piping, complicated air distribution duct systems, matching and selecting chillers, towers, pumps, coils, fans, air handlers, or Variable Air Volume (VAV) boxes.

Operating Range

Four-way ceiling cassette systems are available in 9,000, 12,000, 18,000, 24,000, 36,000, and 42,000 Btu/h capacities.

9,000 and 12,000 Btu/h Operating Ranges

- Operating ranges for outdoor units of 0°F to +118°F (DB) for cooling (Cooling range can be extended from 0°F down to -4°F using the Low Ambient Wind Baffle Kit [sold separately]); -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.

18,000, 24,000, 36,000, and 42,000 Operating Ranges

- Operating ranges for outdoor units of 5°F to +118°F (DB) for cooling; 0°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.

Clean Finish

The four-way ceiling cassette indoor unit case is recessed, while the off-white architectural grille (required, sold separately) is flush mounted, providing a clean look to the room.

Heat Transfer Efficiency

Fin Design with GoldFin™ Coating

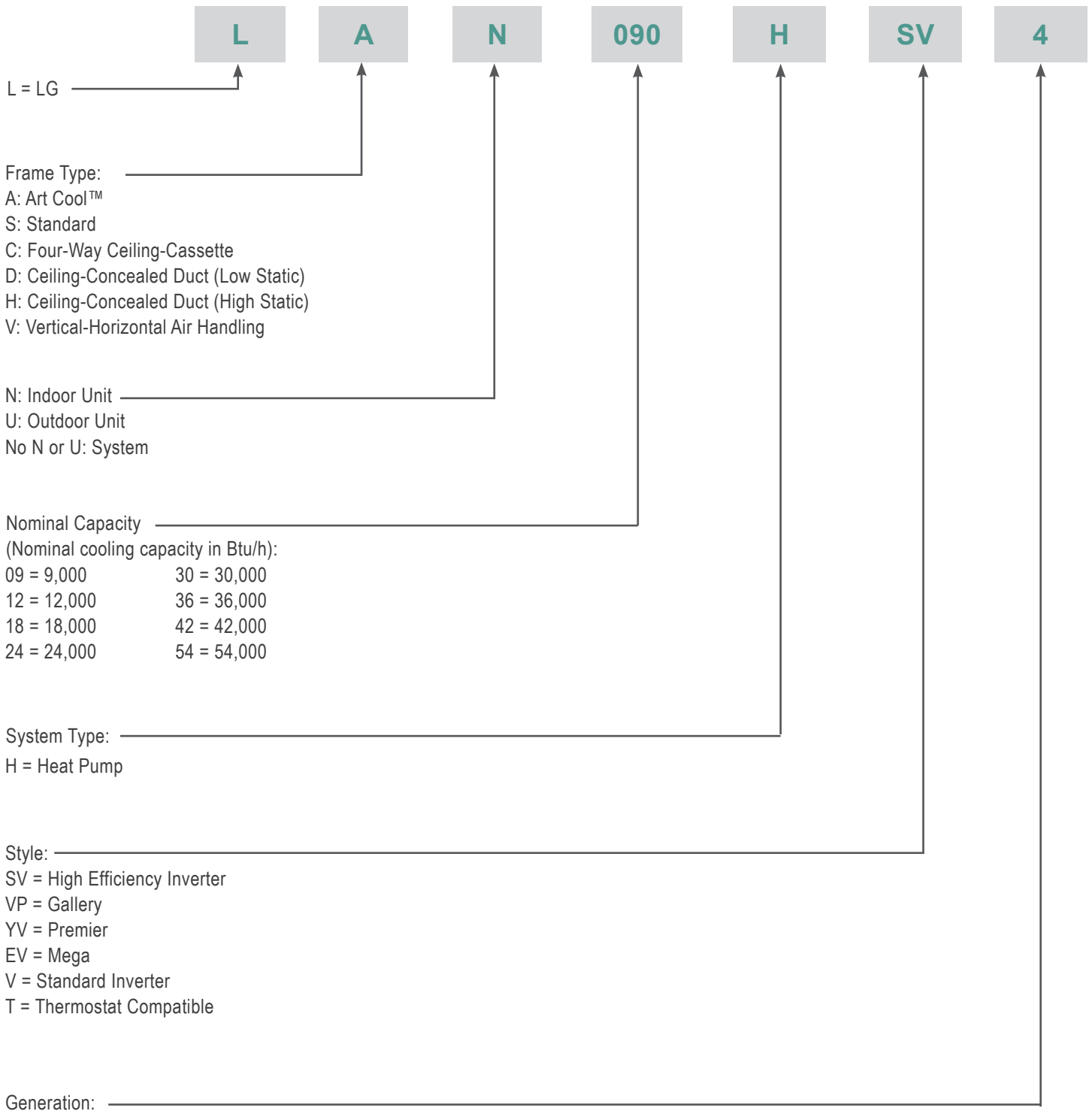
All four-way ceiling cassette outdoor units are provided with large surface coils made of copper tubes with louvered aluminum fins designed to maximize unit operating efficiency over a wide range of ambient conditions. Standard from the factory, the LG outdoor coil fin surface is coated with LG's exclusive GoldFin™ anti-corrosive coating designed to prevent natural surface corrosion of the aluminum fins. This maintains heat transfer properties of the coil for an extended time. A hydrophilic coating is applied to the outdoor unit coil fin surface over the GoldFin coating. This coating enhances the development of heavier water droplets gathering on the fin surface. As a result, the droplets roll off the fin surfaces, delaying the point when frost forms on the coil surface during heating operation. This coating also makes it possible to easily clean the outdoor unit coil using a mild soap.

Other Features

- Inverter (Variable Speed) Compressor
- Five fan speeds
- Auto restart
- Auto changeover
- Swirl Wind
- Internal condensate pump included
- Precision Load Matching
- Follows AHRI 210/240
- Optional Wi-Fi control



UNIT NOMENCLATURE












Product Data

GENERAL DATA

Four-Way Ceiling Cassette Pairing Table

The following table shows the available outdoor and indoor unit, along with the factory provided controller.

Table 1: Four-Way Ceiling Cassette System Pairing Table

Outdoor Unit Model	Indoor Unit Model	Controller
LUU097HV LUU127HV 	LCN098HV4 LCN128HV4 	PQWRHQ0FDB 
LUU187HV LUU189HV LUU247HV 	LCN187HV LCN189HV4 LCN247HV 	PQWRHQ0FDB 
LUU367HV LUU427HV 	LCN367HV LCN427HV 	PQWRHQ0FDB 

GENERAL DATA / SPECIFICATIONS

Table 2: Four-Way Ceiling Cassette System General Data.

Type	Single Zone Four-Way Ceiling Cassette		
System (Model) (Indoor Unit / Outdoor Unit)	LC098HV4 (LCN098HV4 / LUU097HV)	LC128HV4 (LCN128HV4 / LUU127HV)	LC188HV4 (LCN188HV4 / LUU189HV)
Ceiling Grille Model Number (Sold Separately)	PT-QCHW0 / PT-UQC	PT-QCHW0 / PT-UQC	PT-QCHW0 / PT-UQC
Cooling Capacity (Min/Rated/Max) (Btu/h)	3,600 ~ 9,000 ~ 9,900	3,400 ~ 11,100 ~ 12,400	7,700 ~ 18,000 ~ 24,800
Cooling Power Input ¹ (kW)	0.19 ~ 0.66 ~ 0.83	0.25 ~ 0.88 ~ 1.1	0.54 ~ 1.44 ~ 2.60
EER (OD 95°F)	13.65	12.6	12.5
SEER	20.2	19.4	20.5
Heating Capacity (Min/Rated/Max) (Btu/h)	4,400 ~ 11,000 ~ 12,100	2,800 ~ 14,000 ~ 15,500	6,500 ~ 18,500 ~ 23,400
Heating Power Input ¹ (kW)	0.15 ~ 0.83 ~ 1.05	0.22 ~ 1.19 ~ 1.5	0.50 ~ 1.95 ~ 2.60
COP (OD 47°F)	3.88	3.44	2.78
HSPF	10.5	10.4	10
Rated Low Heating Capacity (Btu/h)			
Outdoor 17°F (WB)/Indoor 70°F (DB)	7,000	9,100	12,700
Low COP (OD 17°F)	2.92	2.7	2.38
Maximum Heating Capacity (Btu/h)			
Outdoor 17°F (WB)/Indoor 70°F (DB)	9,350	11,900	17,000
Outdoor 5°F (WB)/Indoor 70°F (DB)	8,250	10,500	15,000
Outdoor -4°F (WB)/Indoor 70°F (DB)	7,040	8,960	13,000
Power Supply V, Ø, Hz ²	208-230 / 1 / 60		
Outdoor Unit Operating Range			
Cooling (°F DB)	0 to +118 ⁶	0 to +118 ⁶	5 to +118 ⁶
Heating (°F WB)	-4 to +64	-4 to +64	-4 to +64
Indoor Unit Operating Range			
Cooling (°F WB)	57 to 77	57 to 77	57 to 77
Heating (°F DB)	59 to 81	59 to 81	59 to 81
Indoor Temperature Setting Range			
Cooling (°F DB)	65 to 86	65 to 86	65 to 86
Heating (°F WB)	61 to 86	61 to 86	61 to 86
Unit Data			
Refrigerant Type ³	R410A		
Refrigerant Control	EEV		
Indoor Unit Sound Pressure Level dB(A) (H/M/L) ⁴	36 / 33 / 30	38 / 35 / 32	41 / 39 / 36
Outdoor Unit Sound Pressure Level dB(A) (Cool/Heat) ⁴	47 / 51	49 / 52	48 / 52
Indoor Unit Net / Shipping Weight (lbs.)	31 / 37	31 / 37	31.5 / 40.0
Outdoor Unit Net / Shipping Weight (lbs.)	82 / 89	82 / 89	127.8 / 140.0
Grille Net / Shipping Weight (lbs.)	7 / 9	7 / 9	7 / 9
Power Wiring / Communications Cable (No. x AWG) ²	4 x 18	4 x 18	4 x 18
Compressor (Type x Qty.)	Twin Rotary x 1	Twin Rotary x 1	Twin Rotary x 1
Dehumidification Rate (pts./hr.)	1.6	2.47	3.3
Fan			
Indoor Unit Type x Qty.	Turbo x 1		
Outdoor Unit Type x Qty.	Axial x 1		
Motor / Drive	Brushless Digitally Controlled / Direct		
Airflow Rate			
Indoor Unit (H / M / L [CFM])	300 / 265 / 230	335 / 283 / 247	460 / 424 / 388
Outdoor Unit (CFM)	988	988	2,048
Piping			
Liquid (in.) (Connection Size / Pipe Size)	1/4 / 1/4		1/4 / 3/8
Vapor (in.) (Connection Size / Pipe Size)	3/8 / 3/8		1/2 / 5/8
Indoor Unit Condensate Drain O.D. / I.D. (in.)	1-1/4 / 1		1-1/4 / 1
Additional Refrigerant Charge (oz./ft.)	0.22		0.43
Maximum Pipe Length (ft.)	66		164
Piping Length ⁵ (no additional refrigerant, ft.)	25		24.6
Maximum Elevation Difference (ft.)	49		98.4

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).
¹Power Input is rated at high speed.

²All power wiring/communication cables from ODU to IDU are field supplied and are to be minimum 18



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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.
³Take 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.
⁴Sound 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.
⁵Piping lengths are equivalent.
⁶Cooling range can be extended from 0°F down to -4°F using the Low Ambient Wind Baffle Kit (sold separately).

GENERAL DATA / SPECIFICATIONS

Table 3: Four-Way Ceiling Cassette System General Data, continued.

Type	Single Zone Four-Way Ceiling Cassette			
	LC187HV (LCN187HV / LUU187HV)	LC247HV (LCN247HV / LUU247HV)	LC367HV (LCN367HV / LUU367HV)	LC427HV (LCN427HV / LUU427HV)
System (Model) (Indoor Unit / Outdoor Unit)	PT-UMC1B / PT-UMC1	PT-UMC1B / PT-UMC1	PT-UMC1B / PT-UMC1	PT-UMC1B / PT-UMC1
Ceiling Grille Model Number (Sold Separately)	PT-UMC1B / PT-UMC1	PT-UMC1B / PT-UMC1	PT-UMC1B / PT-UMC1	PT-UMC1B / PT-UMC1
Cooling Capacity (Min/Rated/Max) (Btu/h)	9,500~18,000~19,800	9,700~24,000~26,700	14,000~36,000~42,000	17,100~42,000~47,100
Cooling Power Input ¹ (kW)	1.26	1.91	2.97	4.07
EER (OD 95°F)	15	12.6	13.5	10.3
SEER	20.0	17.0	19.0	17.0
Heating Capacity (Min/Rated/Max) (Btu/h)	9,300~20,000~22,000	10,900~27,000~30,000	14,500~40,000~45,000	17,100~47,000~52,600
Heating Power Input ¹ (kW)	1.5	2.60	3.20	4.05
COP (OD 47°F)	-	-	-	-
HSPF	10.1	9.7	9.5	8.6
Power Supply V, Ø, Hz ²	208-230 / 1 / 60			
<i>Outdoor Unit Operating Range</i>				
Cooling (°F DB)	5-118			
Heating (°F WB)	0-64			
<i>Indoor Unit Operating Range</i>				
Cooling (°F WB)	57-77			
Heating (°F DB)	59-81			
<i>Indoor Temperature Setting Range</i>				
Cooling (°F DB)	65-86			
Heating (°F WB)	61-86			
<i>Unit Data</i>				
Refrigerant Type ³	R410A			
Refrigerant Control	EEV			
Indoor Unit Sound Pressure Level ±3 dB(A) (H/M/L) ⁴	38 / 36 / 34		46 / 44 / 43	
Outdoor Unit Sound Pressure Level ±3 dB(A) (Cool/Heat) ⁴	48 / 52		52 / 54	
Indoor Unit Net / Shipping Weight (lbs.)	46 / 55		55 / 65	
Outdoor Unit Net / Shipping Weight (lbs.)	133 / 148		203 / 227	
Grille Net / Shipping Weight (lbs.)	11 / 20			
Power Wiring / Communications Cable (No. x AWG) ²	4 x 18			
Compressor (Type x Qty.)	Twin Rotary x 1			
Dehumidification Rate (pts./hr.)	5.1		7.7	
<i>Fan</i>				
Indoor Unit Type x Qty.	Turbo x 1			
Outdoor Unit Type x Qty.	Propeller x 1		Propeller x 2	
Motor / Drive	Brushless Digitally Controlled / Direct			
<i>Airflow Rate</i>				
Indoor Unit (Max. / H / M / L [CFM])	565/494/424	600/530/459	1,060/989/918	1,060/989/918
Outdoor Unit (CFM)	2,048	2,048	1,942 x 2	1,942 x 2
<i>Piping</i>				
Liquid (in.) (Connection Size / Pipe Size)	3/8 / 3/8			
Vapor (in.) (Connection Size / Pipe Size)	5/8 / 5/8			
Indoor Unit Condensate Drain O.D. / I.D. (in.)	1-1/4 / 1			
Additional Refrigerant Charge (oz./ft.)	0.43			
Maximum Pipe Length (ft.)	164		246	
Piping Length ⁵ (no additional refrigerant, ft.)	25			
Maximum Elevation Difference (ft.)	98			

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).

¹Power Input is rated at high speed.

²All power wiring/communication cables from ODU to IDU are field supplied and are to be minimum 18

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.

³Take 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.

⁴Sound 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.

⁵Piping lengths are equivalent.

ELECTRICAL DATA

Electrical Data

Table 4: 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	LUU097HV	60	208 - 230	187 - 253	11.9	15	1	9.0	1	0.25
1	LUU127HV				12.3					
1-1/2	LUU187HV				18.1	30		13.5		
1-1/2	LUU189HV				20	30				
2	LUU247HV				18.1	30		13.5		
3	LUU367HV				24.5	40		18.0		
3-1/2	LUU427HV									

Voltage tolerance is $\pm 10\%$.

Maximum allowable voltage unbalance is 2%.

RLA = Rated Load Amps.

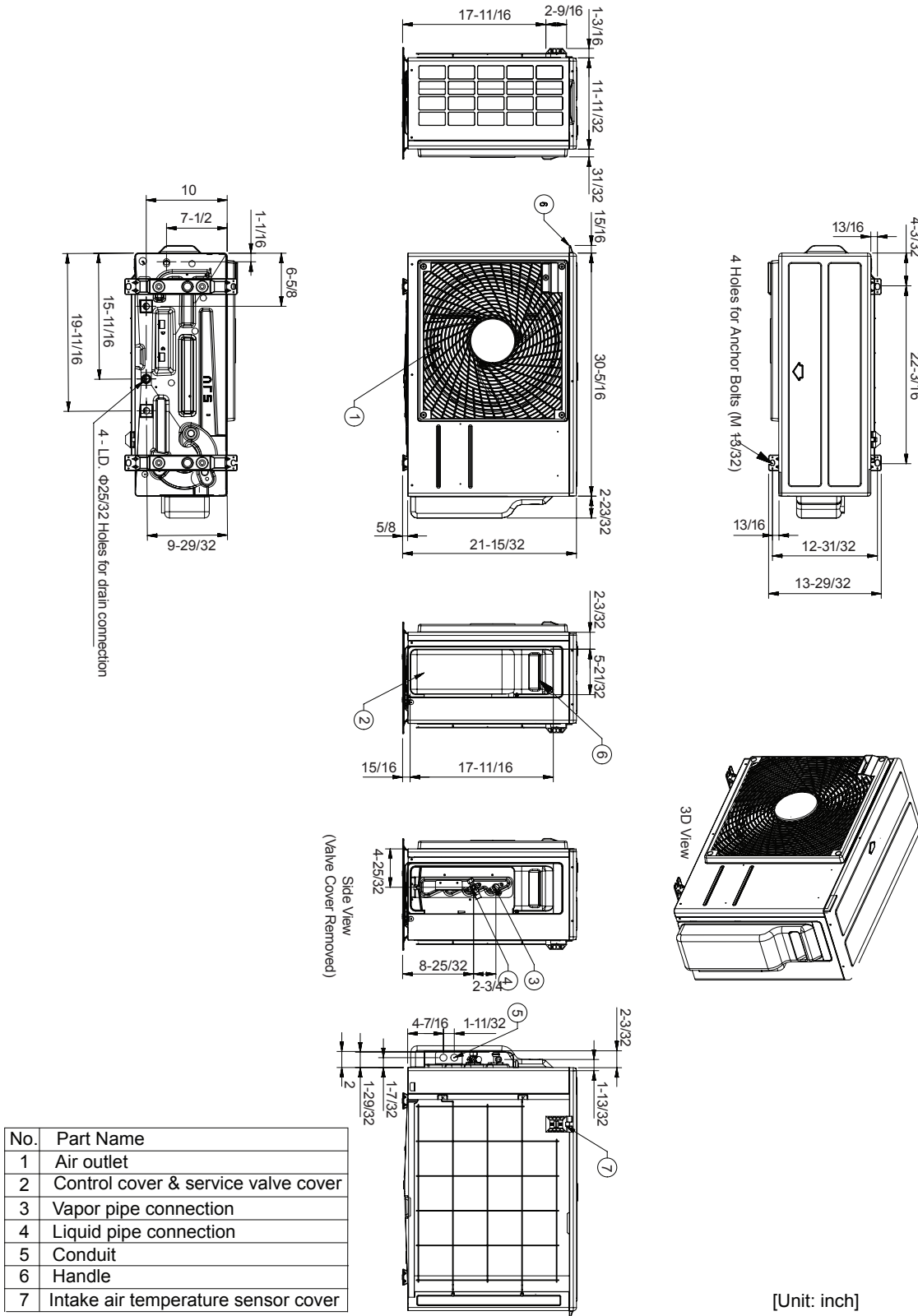
MCA = Minimum Circuit Ampacity.

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.

OUTDOOR UNIT DIMENSIONS

LUU097HV, LUU127HV

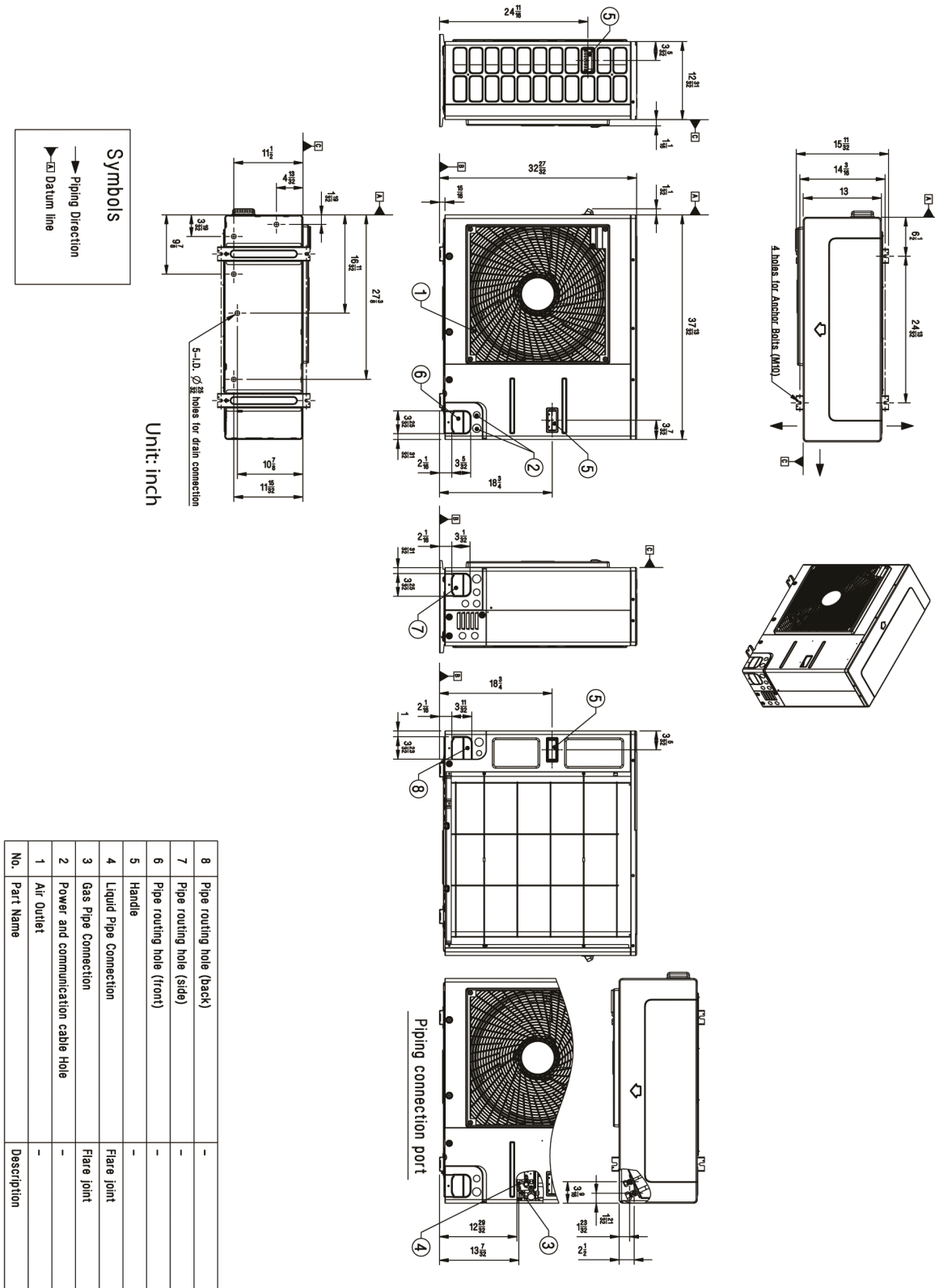
Figure 2: LUU097HV, LUU127HV Outdoor Unit Dimensions.



OUTDOOR UNIT DIMENSIONS

LUU187HV, LUU189HV, LUU247HV

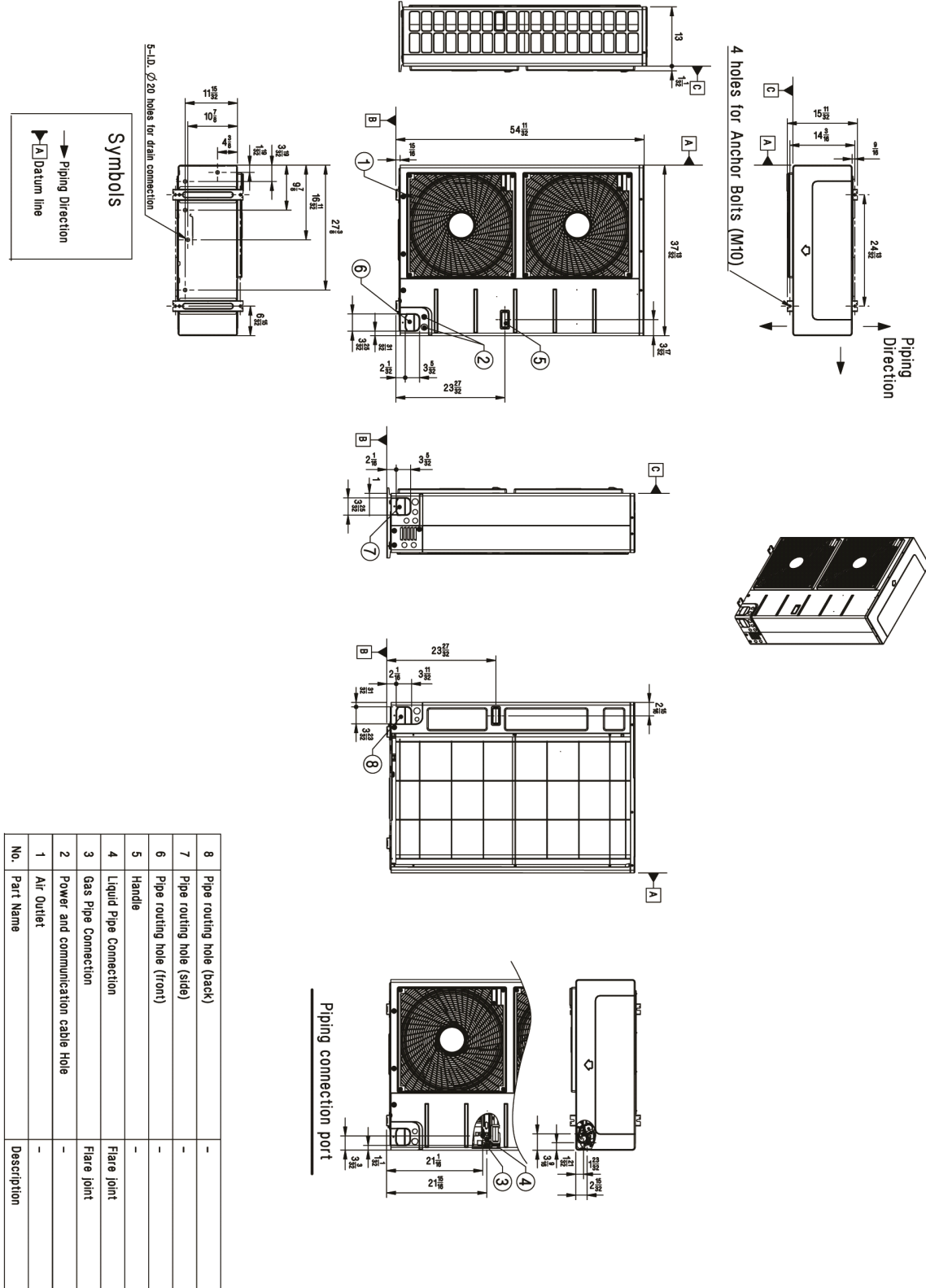
Figure 3: LUU187HV, LUU189HV, LUU247HV Outdoor Unit Dimensions.



OUTDOOR UNIT DIMENSIONS

LUU367HV, LUU427HV

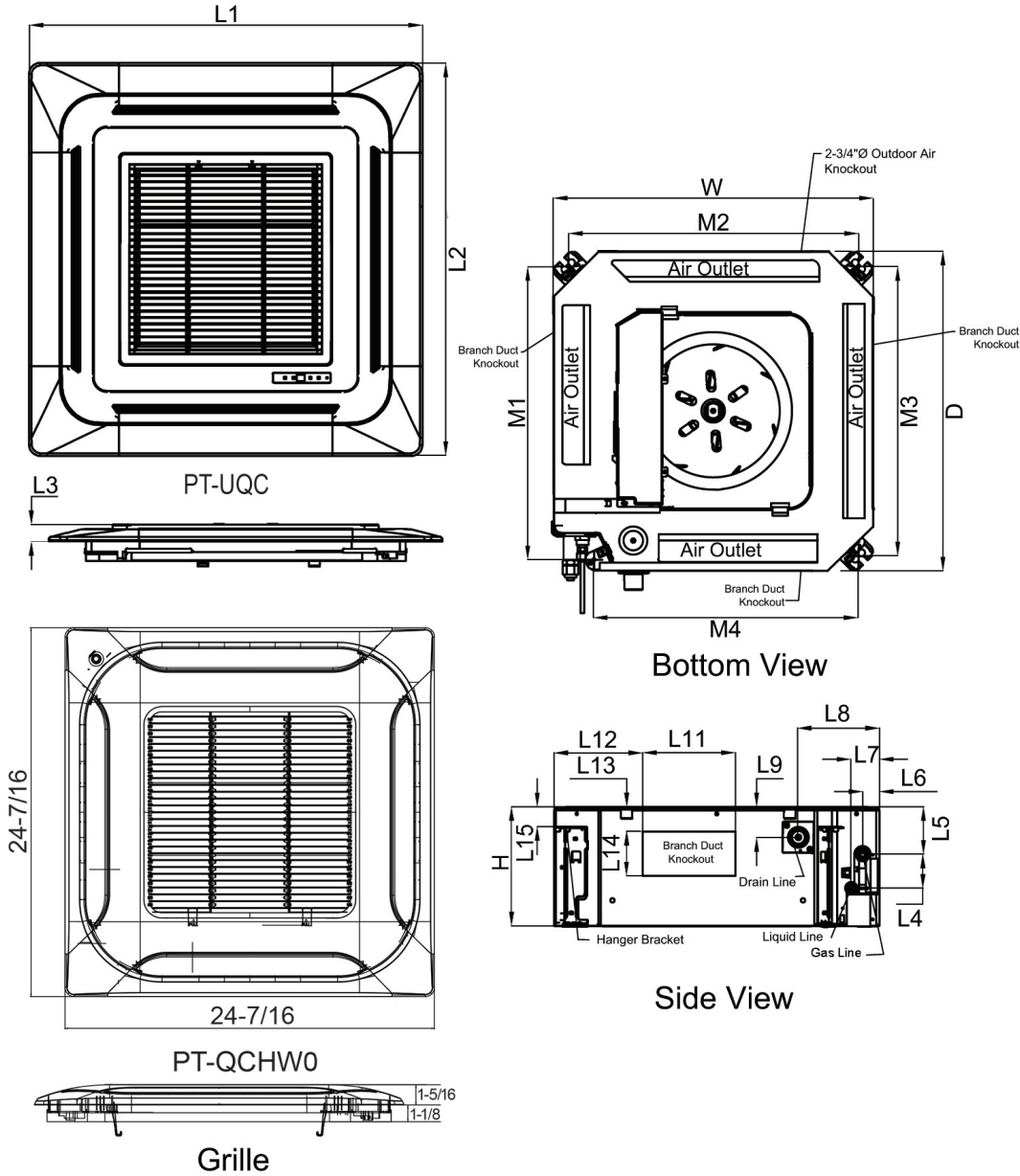
Figure 4: LUU367HV, LUU427HV Outdoor Unit Dimensions.



INDOOR UNIT DIMENSIONS

LCN098HV4, LCN128HV4

Figure 5: LCN098HV4, LCN128HV4 Indoor Unit Dimensions.



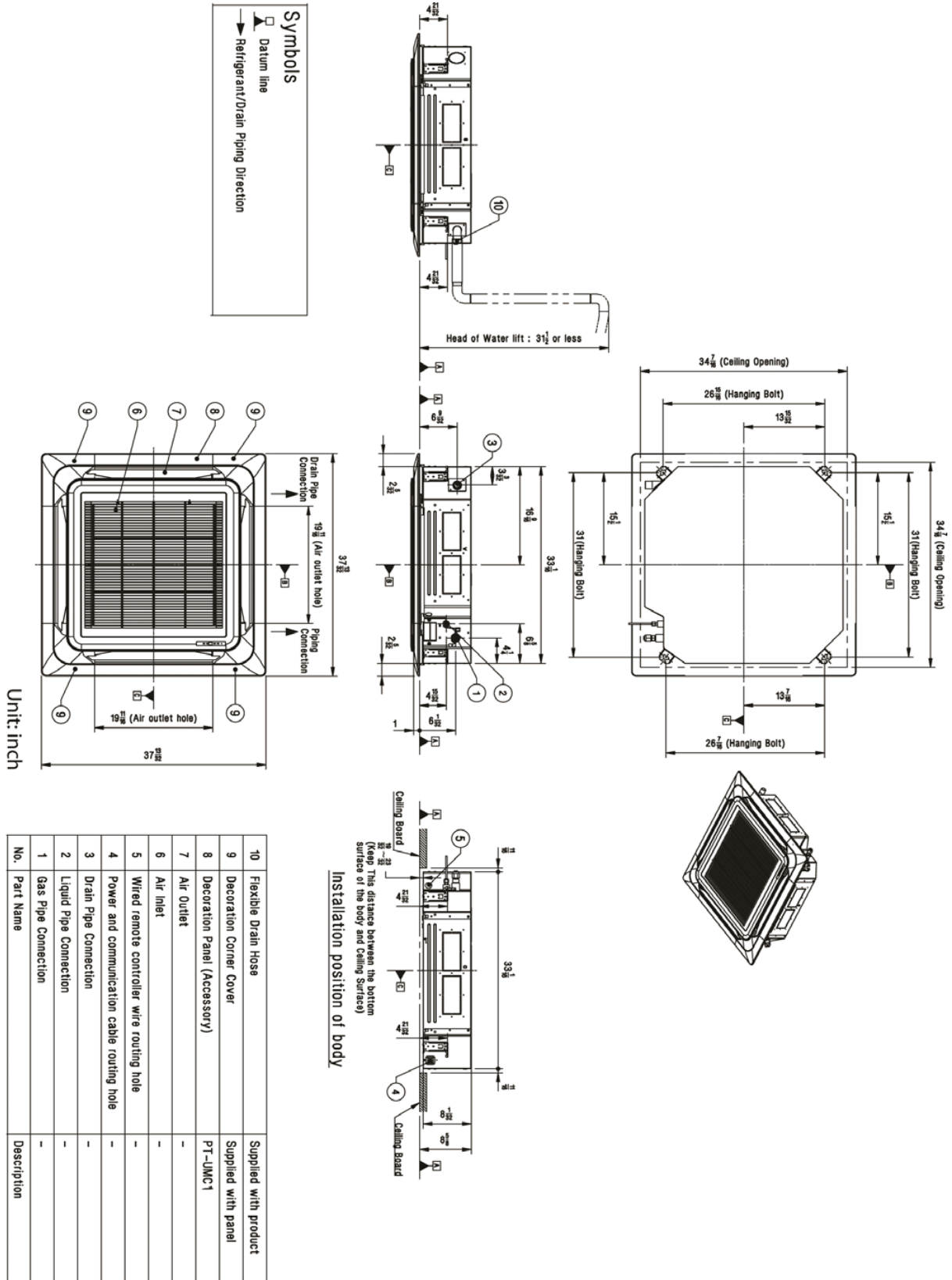
W	22-7/16"
H	8-7/16"
D	22-7/16"
L1	27-9/16"
L2	27-9/16"
L3	7/8"
L4	2-13/32"
L5	3-7/8"
L6	1-3/16"
L7	1-15/16"
L8	5-5/8"
L9	1-1/32"
L10	1-11/32"
L11	6-1/2"
L12	5-13/16"
L13	3-3/16"
L14	3-1/8"
L15	1-11/32"
M1	20-19/32"
M2	20-3/8"
M3	20-3/8"
M4	18-5/32"

Product Data

INDOOR UNIT DIMENSIONS

LCN187HV, LCN247HV

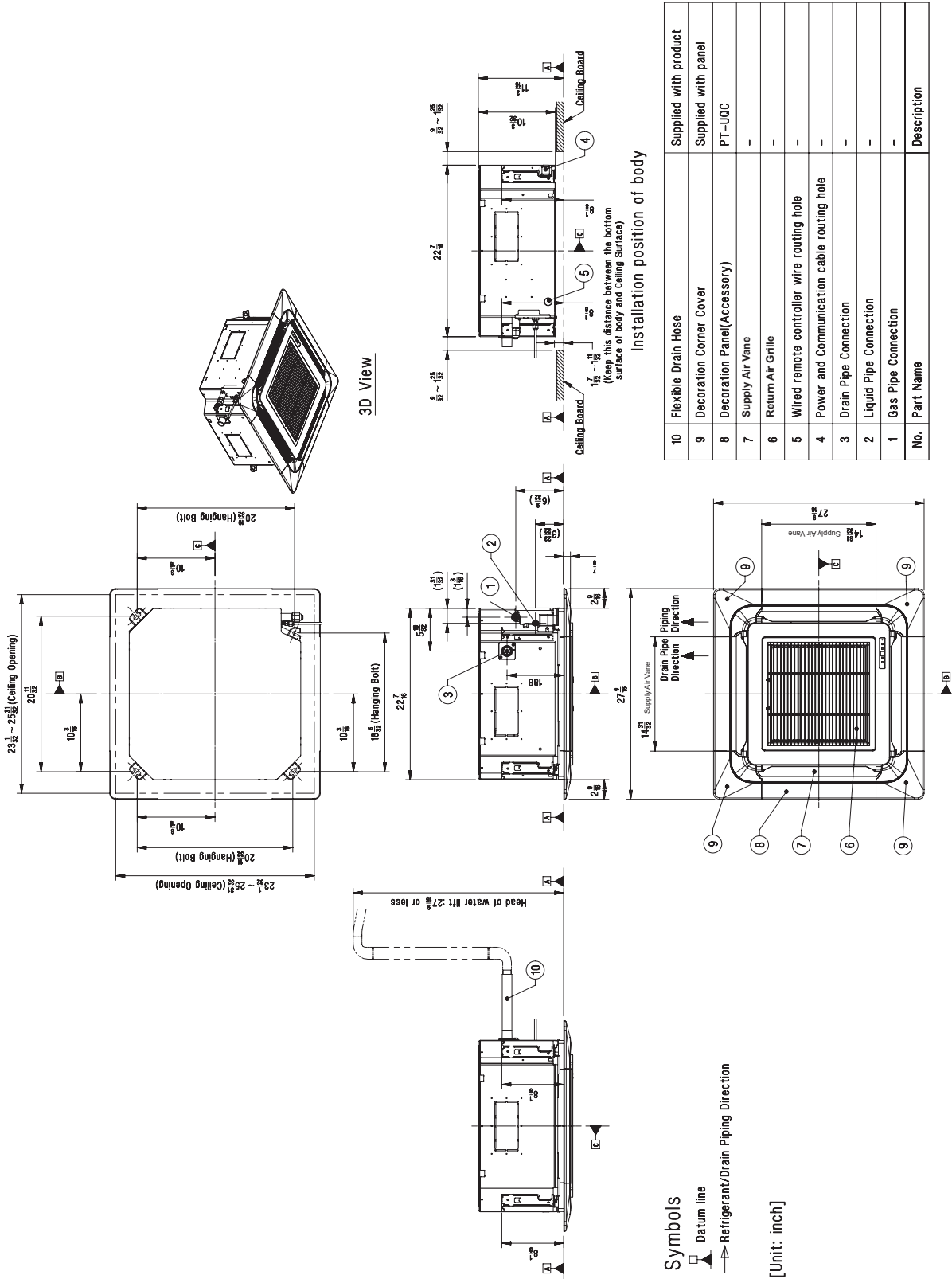
Figure 6: LCN187HV, LCN247HV Indoor Unit Dimensions.



INDOOR UNIT DIMENSIONS

LCN188HV4

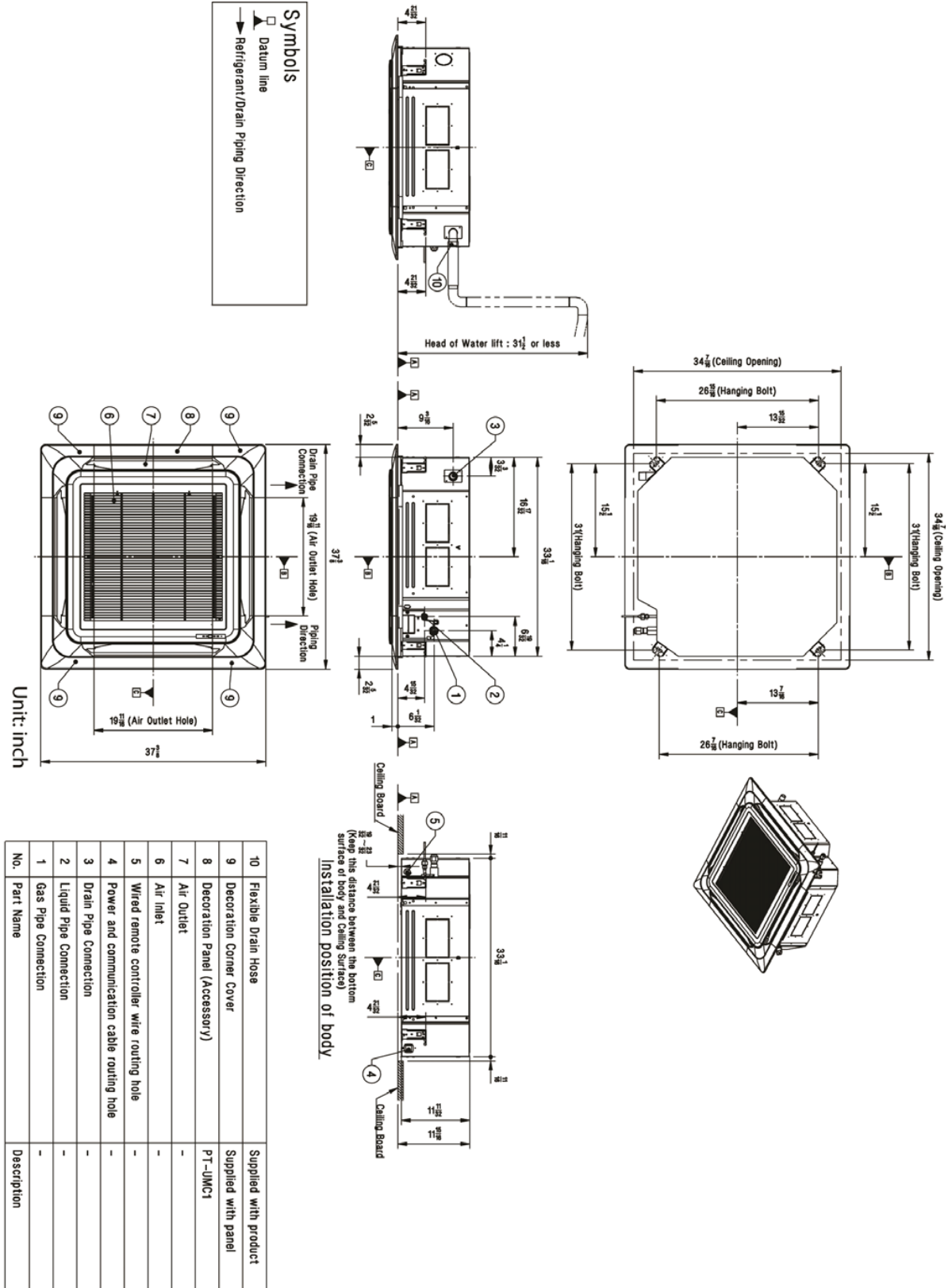
Figure 7: LCN188HV4 Indoor Unit Dimensions.



INDOOR UNIT DIMENSIONS

LCN367HV, LCN427HV

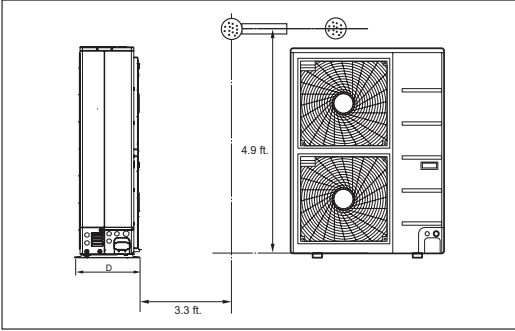
Figure 8: LCN367HV, LCN427HV Indoor Unit Dimensions.



ACOUSTIC DATA

Outdoor Units

Figure 9: Four-Way Ceiling Cassette Outdoor Unit Sound Pressure Level Measurement Location.

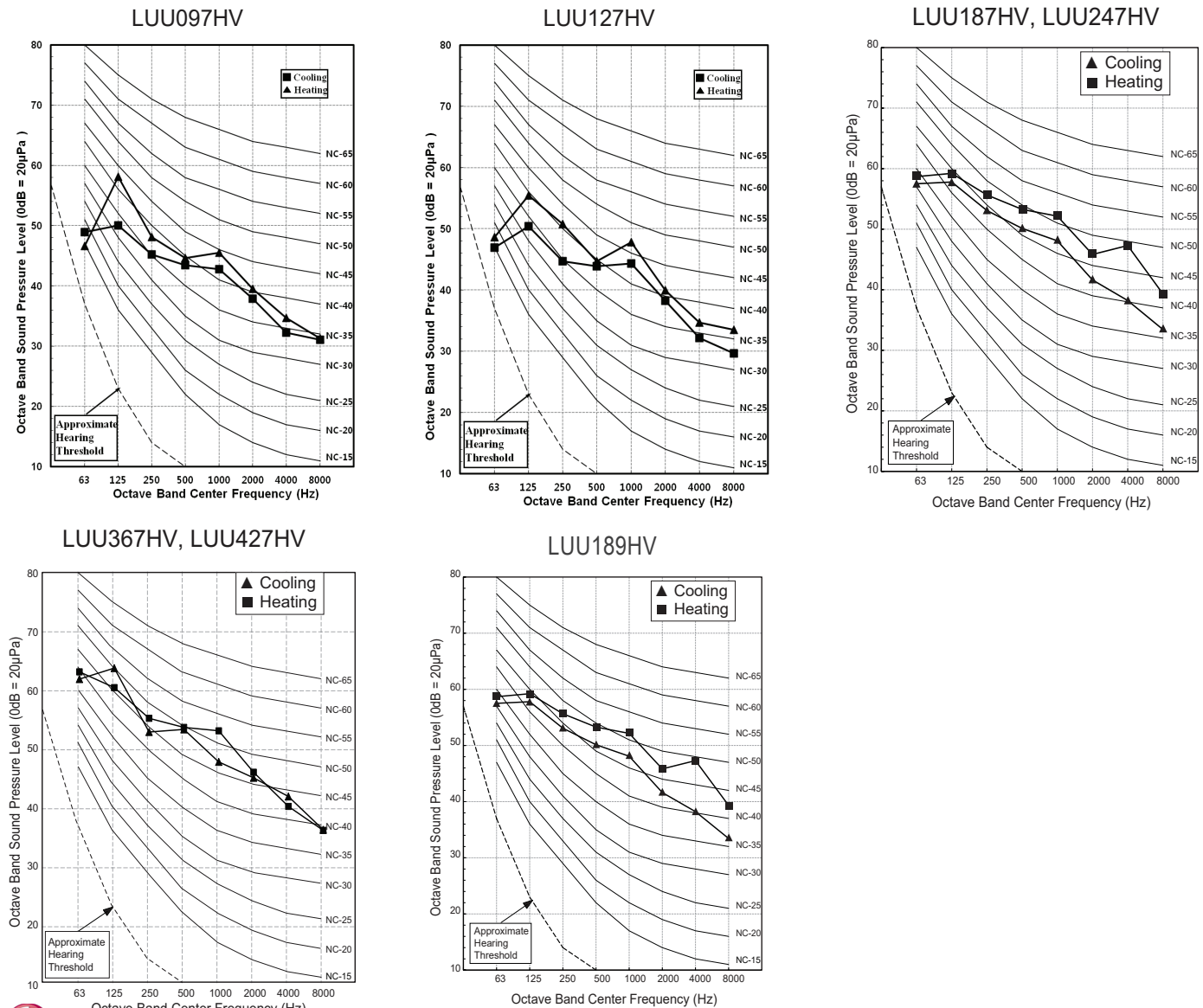


- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound power levels are measured in dB(A)±3.
- Tested in anechoic chamber per ISO Standard 3745.

Table 5: Four-Way Ceiling Cassette Outdoor Unit Sound Pressure Levels (dB[A]).

Model	Sound Pressure Levels (dB[A])	
	Cooling	Heating
LUU097HV	47	51
LUU127HV	49	52
LUU187HV	48	52
LUU189HV	48	52
LUU247HV	48	52
LUU367HV	52	54
LUU427HV	52	54

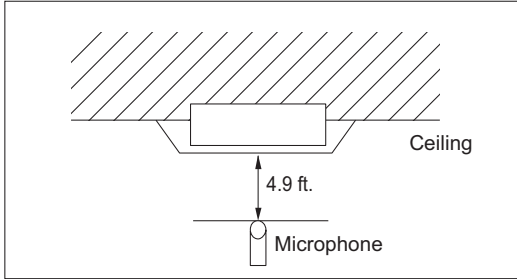
Figure 10: Four-Way Ceiling Cassette Outdoor Unit Sound Pressure Level Diagrams.



ACOUSTIC DATA

Indoor Units

Figure 11: Indoor Unit Sound Pressure Level Measurement Location.

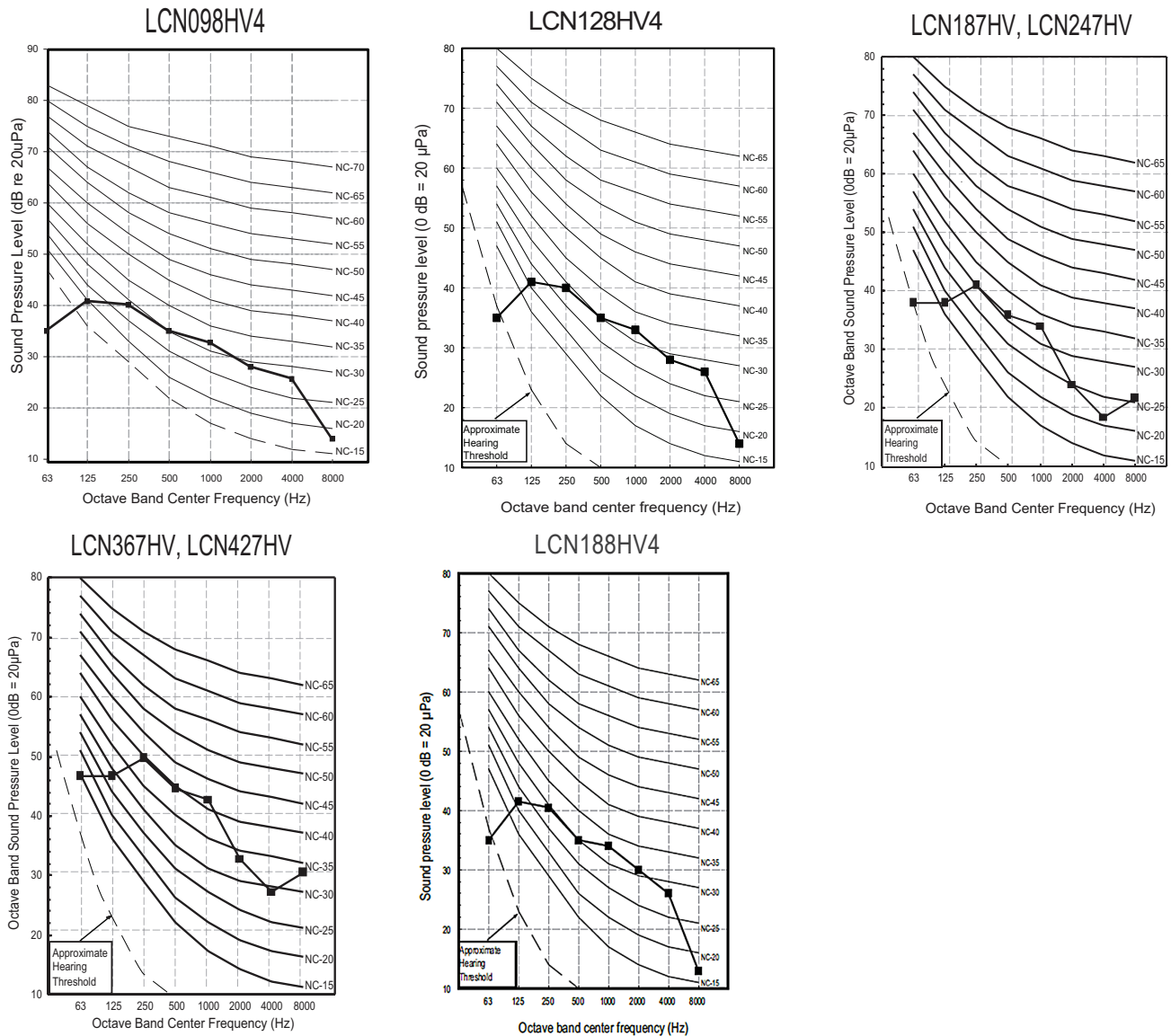


- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound power levels are measured in dB(A)±3.
- Tested in anechoic chamber per ISO Standard 3745.

Table 6: Four-Way Ceiling Cassette Indoor Unit Sound Pressure Levels (dB[A]).

Model	Sound Pressure Levels (dB[A])		
	H	M	L
LCN098HV4	36	33	30
LCN128HV4	38	35	32
LCN187HV	38	36	34
LCN188HV4	41	39	36
LCN247HV	38	36	34
LCN367HV	46	44	43
LCN427HV	46	44	43

Figure 12: Four-Way Ceiling Cassette Indoor Unit Sound Pressure Level Diagrams.



AIR VELOCITY AND TEMPERATURE DISTRIBUTION

Figure 13: LCN098HV4 Air Velocity and Temperature Distribution Charts.

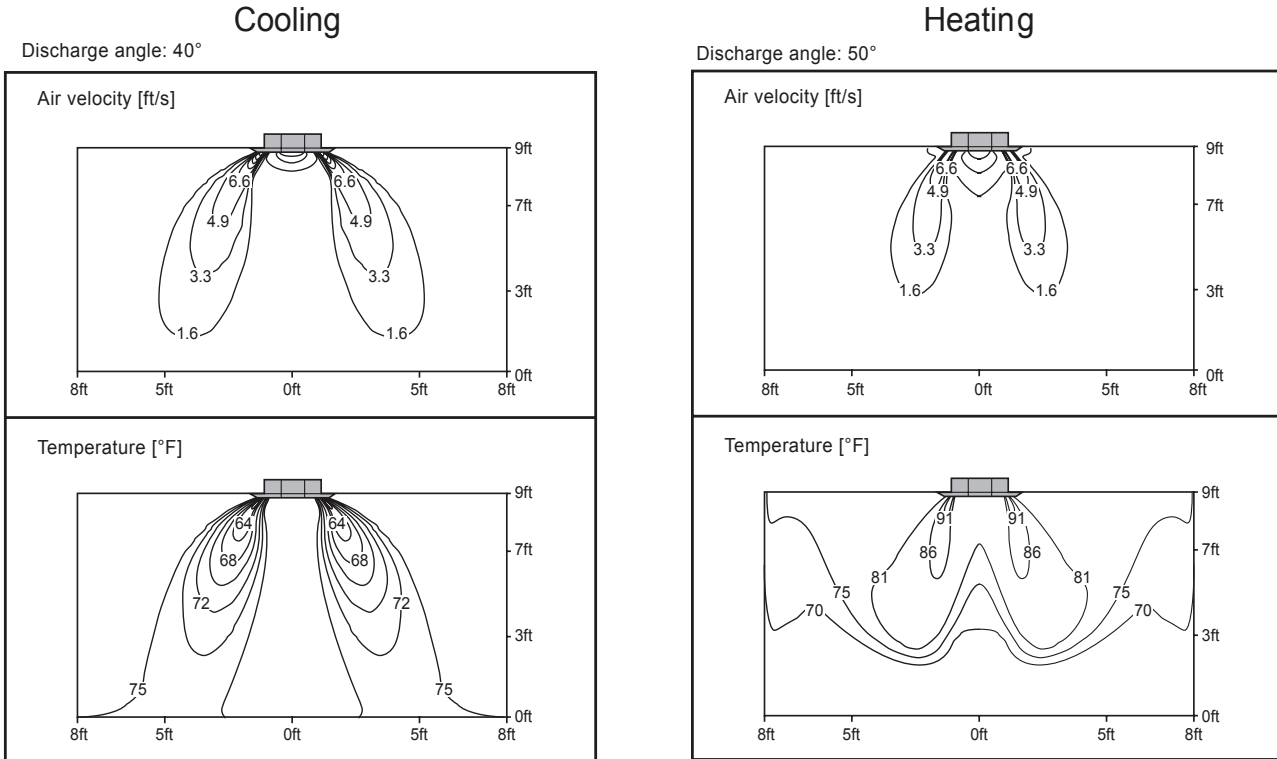
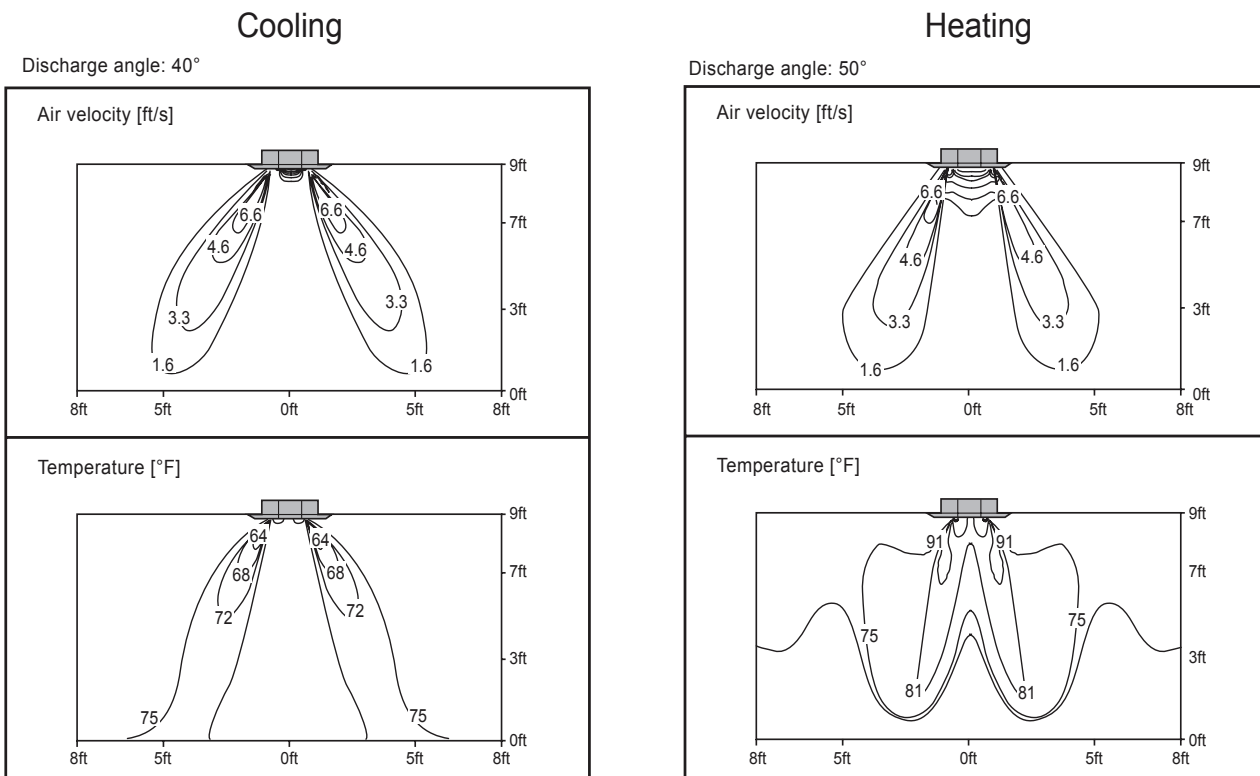


Figure 14: LCN128HV4 Air Velocity and Temperature Distribution Charts.



AIR VELOCITY AND TEMPERATURE DISTRIBUTION

Figure 15: LCN187HV Air Velocity and Temperature Distribution Charts.

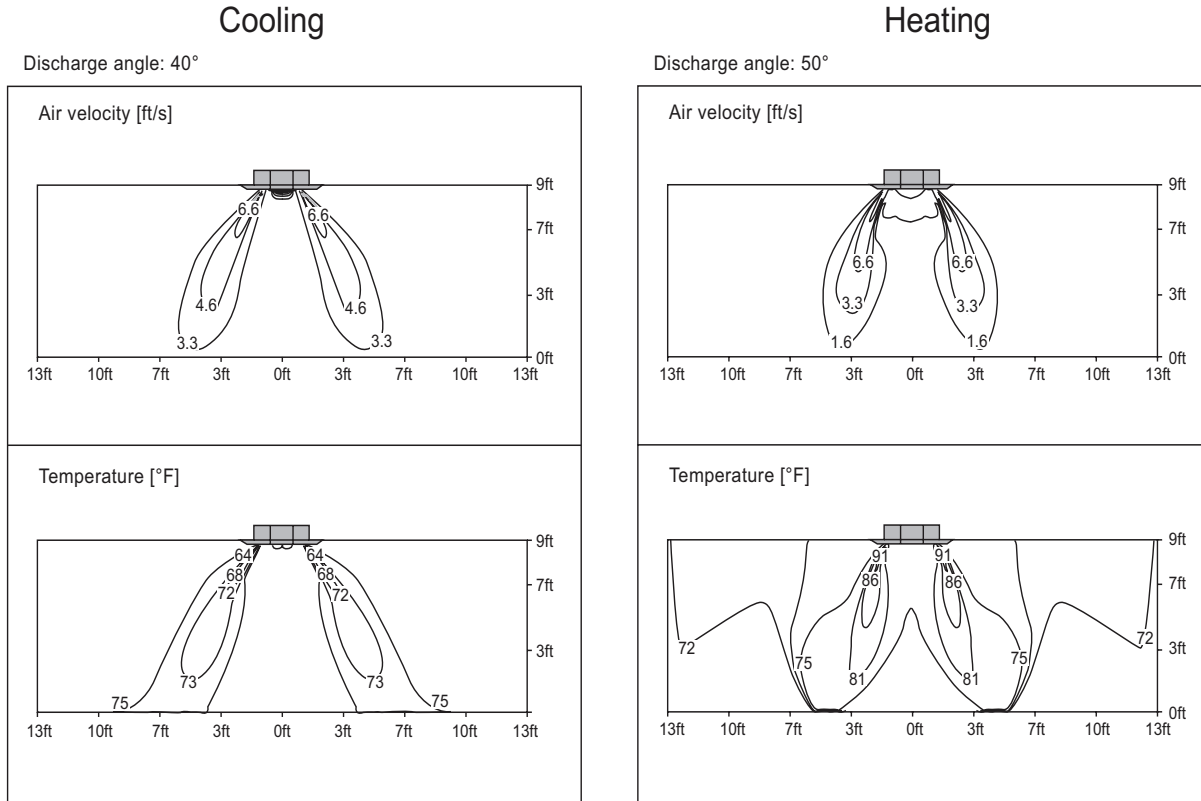
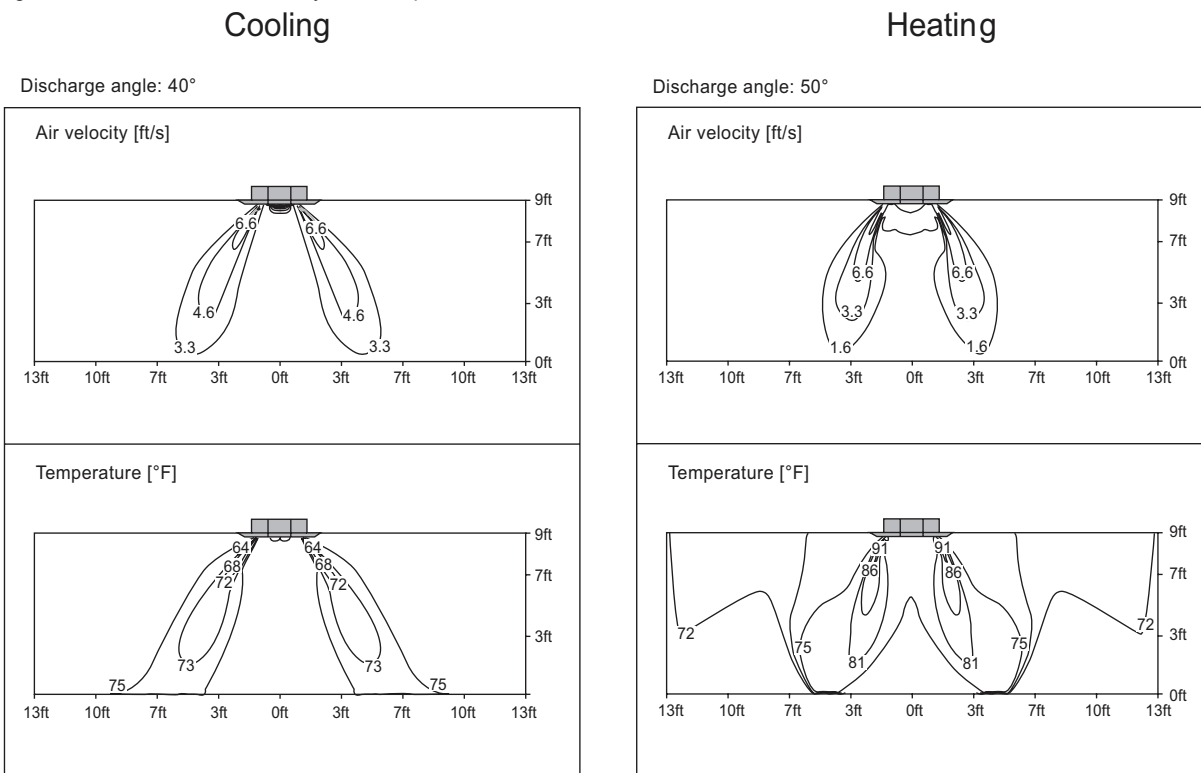
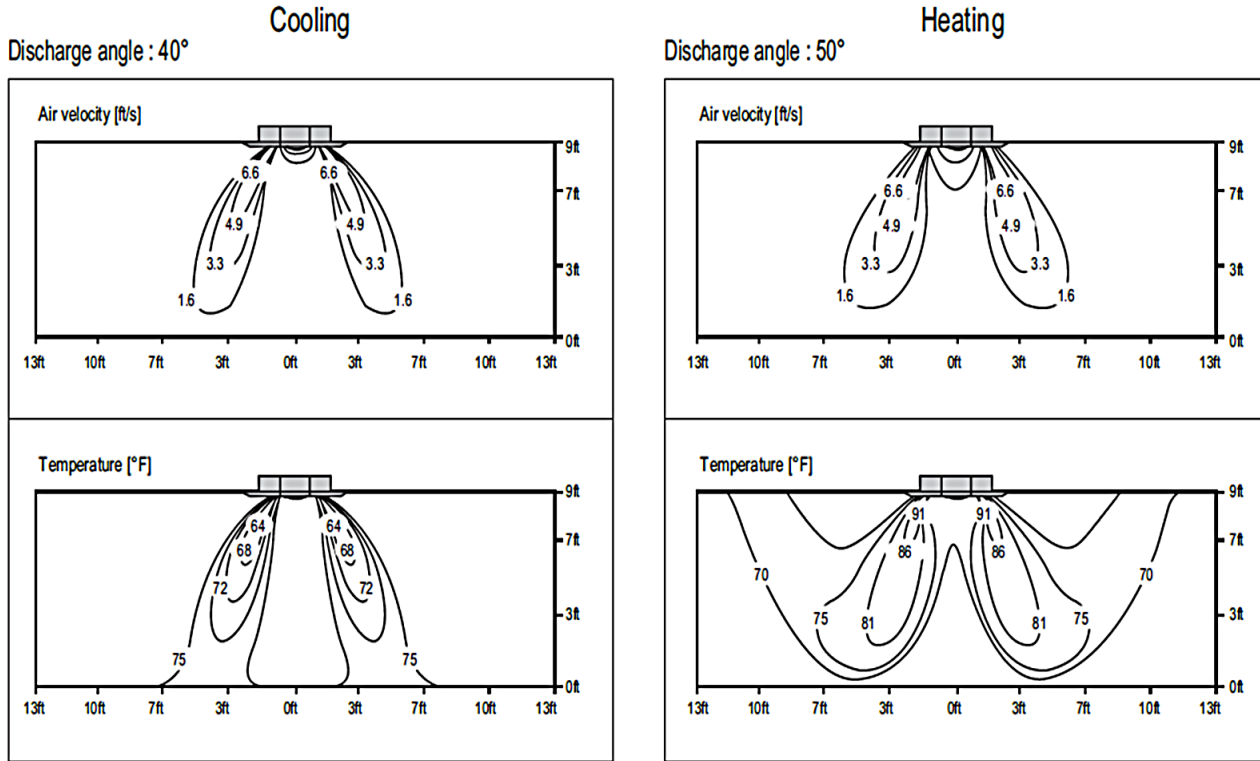


Figure 16: LCN247HV Air Velocity and Temperature Distribution Charts.



AIR VELOCITY AND TEMPERATURE DISTRIBUTION

Figure 17: LCN188HV4 Air Velocity and Temperature Distribution Charts.



Product Data

AIR VELOCITY AND TEMPERATURE DISTRIBUTION

Figure 18: LCN367HV Air Velocity and Temperature Distribution Charts.

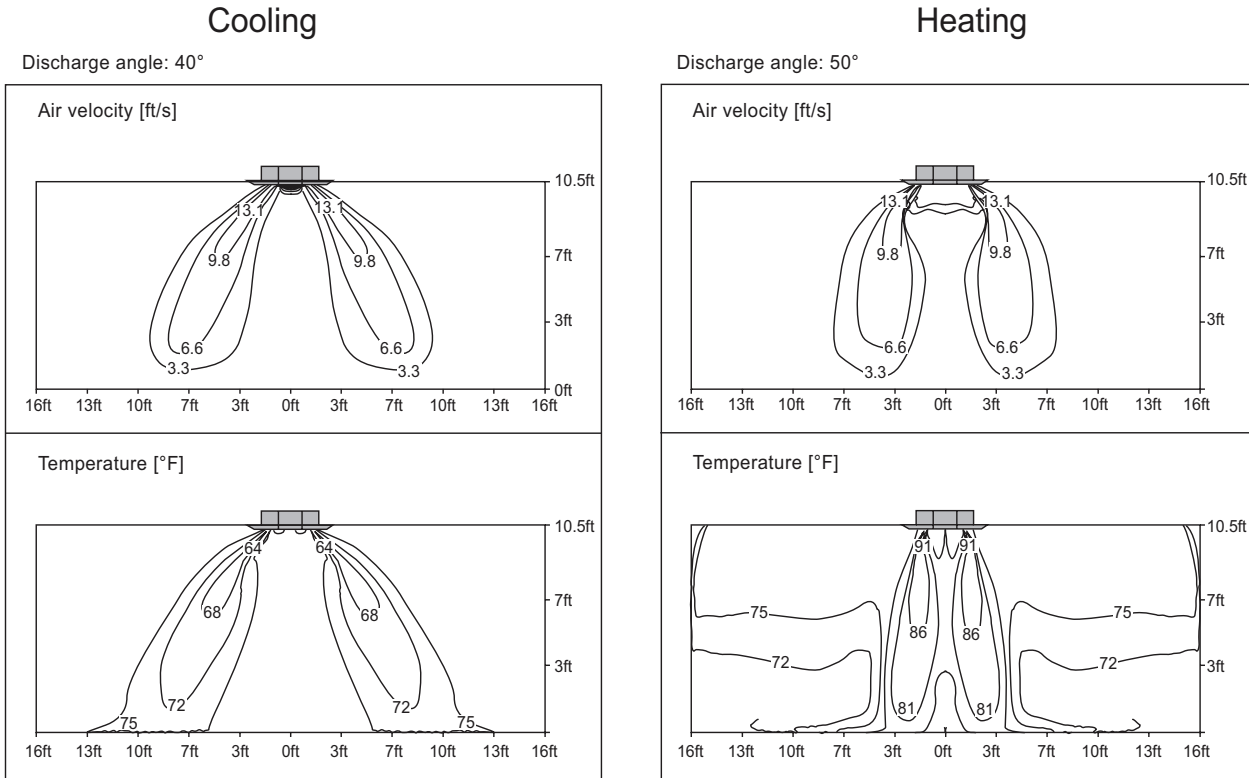
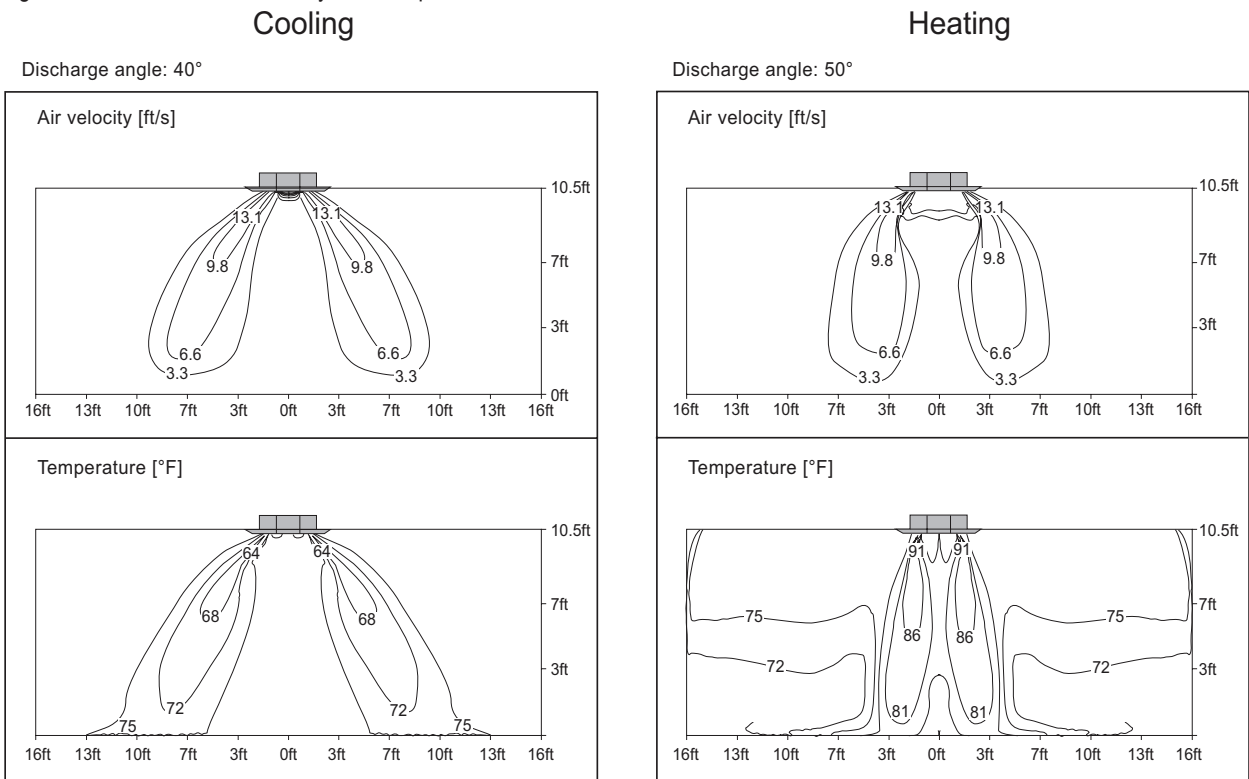


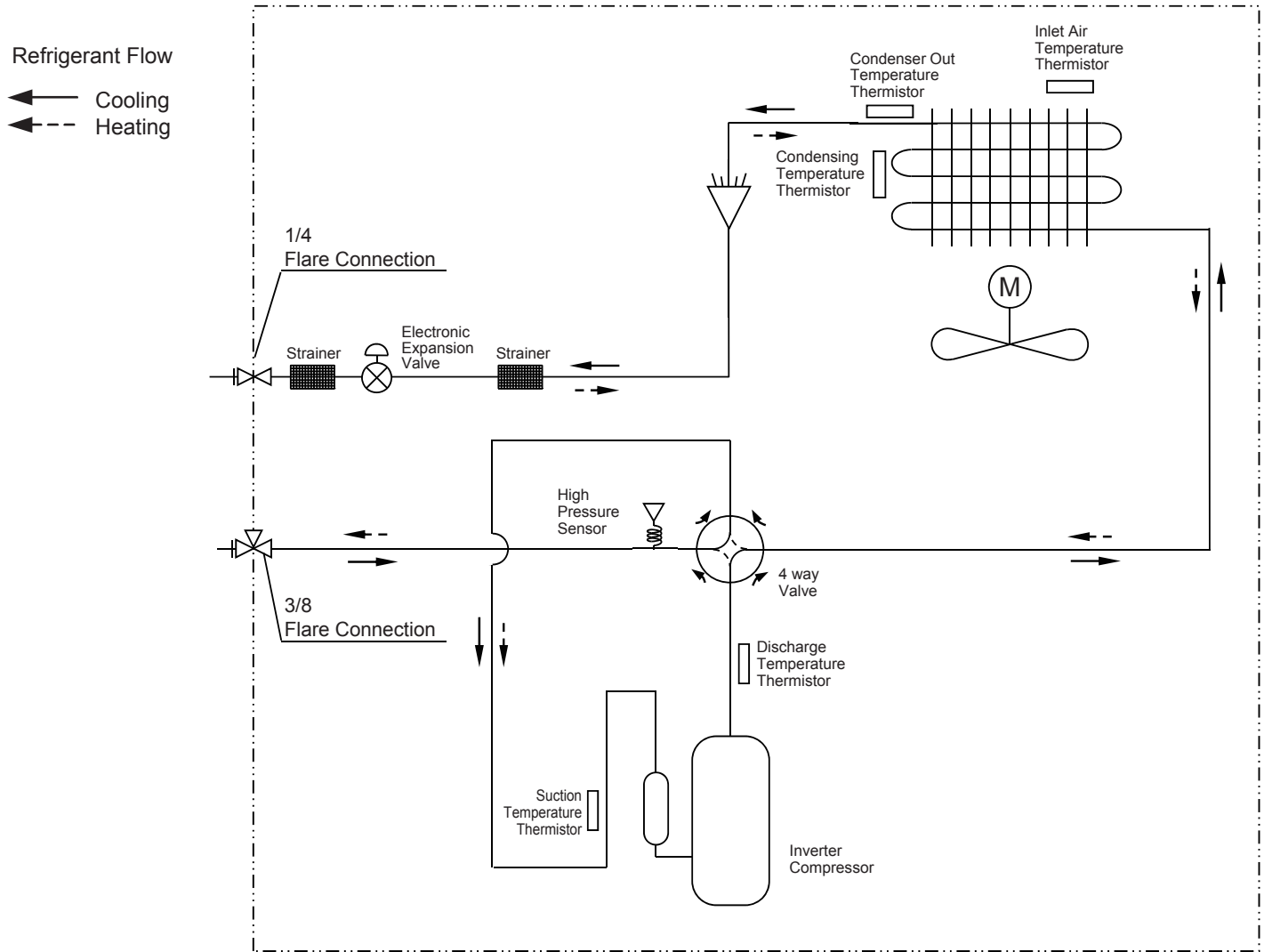
Figure 19: LCN427HV Air Velocity and Temperature Distribution Charts.



OUTDOOR UNIT REFRIGERANT FLOW DIAGRAM

LUU097, 127HV

Figure 20: LUU097, 127HV Refrigerant Flow Diagram.



Product Data

Table 7: LUU097-127HV Four-Way Ceiling Concealed Outdoor Unit Thermistor Details.

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

INDOOR UNIT REFRIGERANT FLOW DIAGRAM

LCN098, 128HV4

Figure 21: LCN098, 128HV4 Refrigerant Flow Diagram.

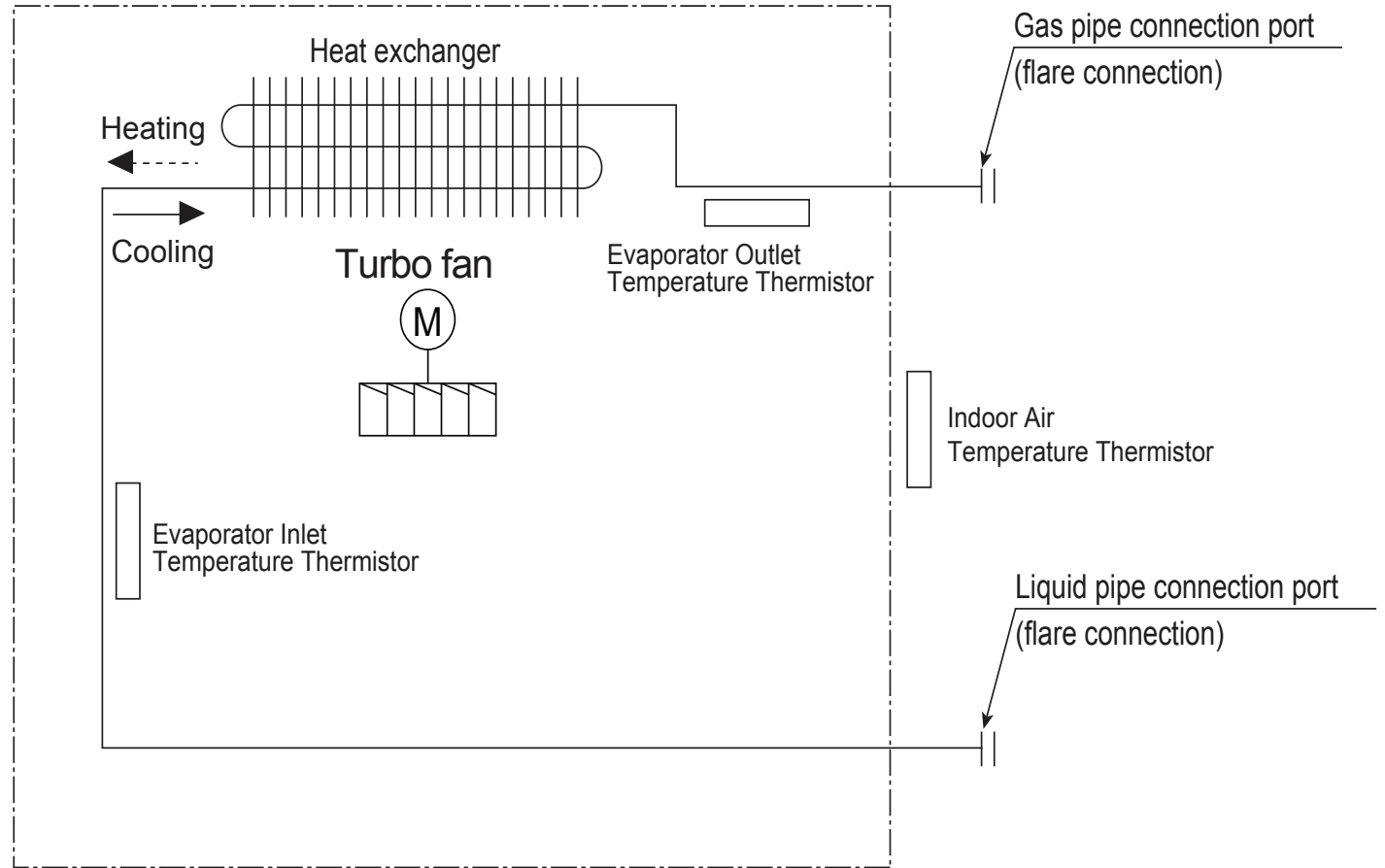


Table 8: Four-Way Ceiling Cassette Indoor Unit Thermistor Details.

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 9: LCN098, 128HV4 4-Way Ceiling Cassette Indoor Unit Refrigerant Pipe Connections

Model No.	Vapor (inch)	Liquid (inch)
LCN098HV4, LCN128HV4	3/8	1/4

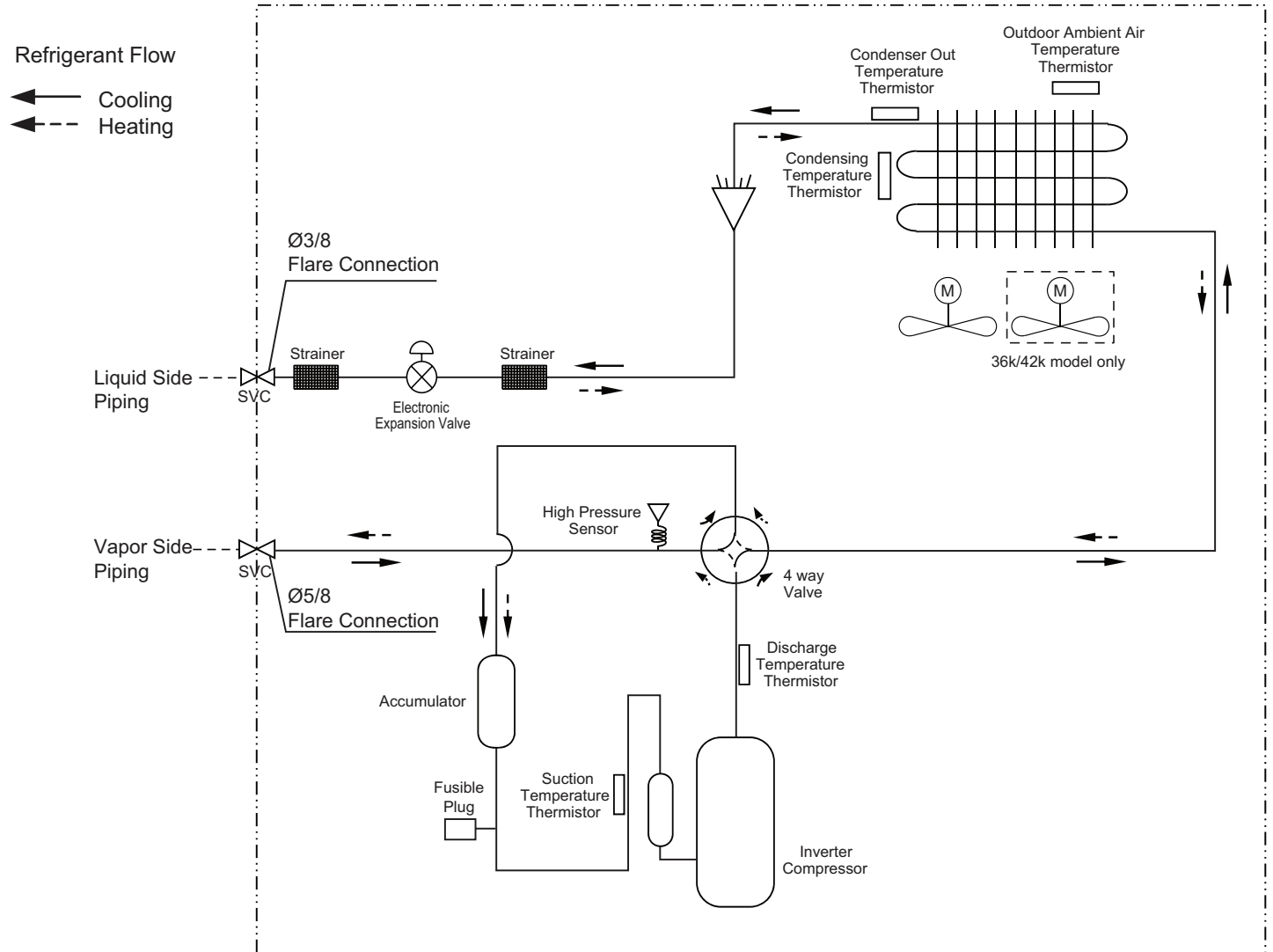
Table 10: LCN098, 128HV4 4-Way Ceiling Cassette Indoor Unit Refrigerant Pipe Sizes.

Model No.	Vapor (inch)	Liquid (inch)
LCN098HV4, LCN128HV4	3/8	1/4

OUTDOOR UNIT REFRIGERANT FLOW DIAGRAM

LUU187, 189, 247, 367, 427HV

Figure 22: LUU187, 189, 247, 367, 427HV Refrigerant Flow Diagram.



Product Data

Table 11: LUU187~427 Four-Way Ceiling Concealed Outdoor Unit Thermistor Details.

Description (Based on Cooling Mode)	PCB Connector	
	LUU247HV	LUU367HV
Suction Temperature Thermistor	CN-TH3	CN-TH3
Discharge Temperature Thermistor	CN-TH2	CN-TH2
Condenser Outlet Temperature Thermistor	CN-TH4	CN-TH4
Outdoor Ambient Air Temperature Thermistor	CN-TH1	P-SENSOR(H)

INDOOR UNIT REFRIGERANT FLOW DIAGRAM

LCN187HV, 188HV4, 247HV, 367HV, 427HV

Figure 23: LCN187, 188HV4, 247HV, 367HV, 427HV Refrigerant Flow Diagram.

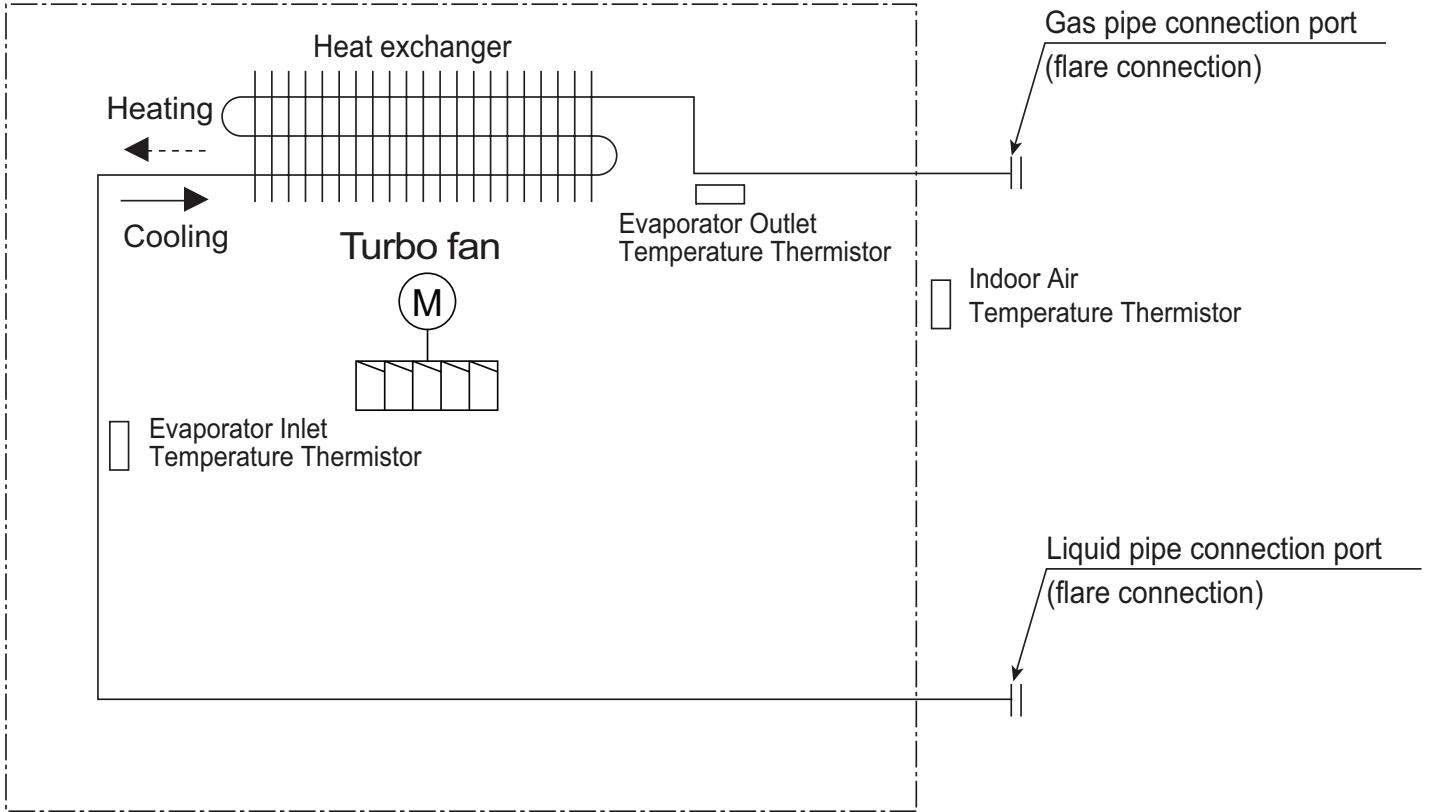


Table 12: LCN187, 188HV4~427HV 4-Way Ceiling Cassette IDU Thermistor Details.

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 13: LCN187, 188HV4~427HV 4-Way Cassette IDU Refrigerant Pipe Connections.

Model No.	Vapor (inch)	Liquid (inch)
LCN187HV, LC247HV, LCN367HV, LC427HV	5/8	3/8
LCN188HV4	1/2	1/4

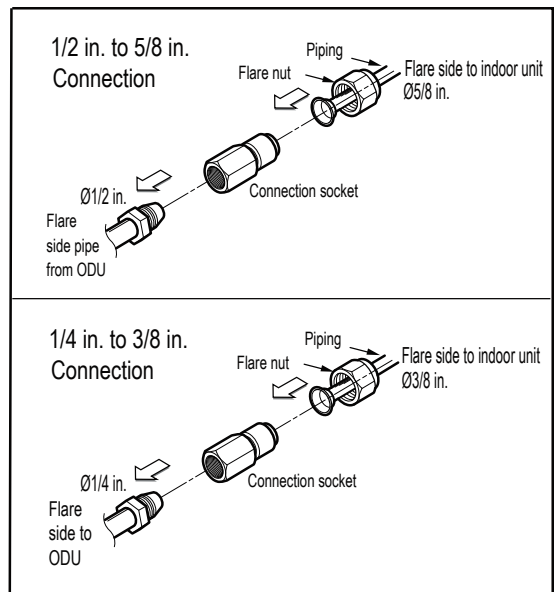
Table 14: LCN187, 188HV4~427HV 4-Way Cassette IDU Refrigerant Pipe Sizes.

Model No.	Vapor (inch)	Liquid (inch)
LCN187HV, LC247HV, LCN367HV, LC427HV	5/8	3/8
LCN188HV4	5/8	3/8

Table 15: LCN188HV4 Connection Socket Dimensions.

Model No.	Vapor (inch)	Liquid (inch)
LCN188HV4	Ø1/2 – Ø5/8	Ø1/4 – Ø3/8

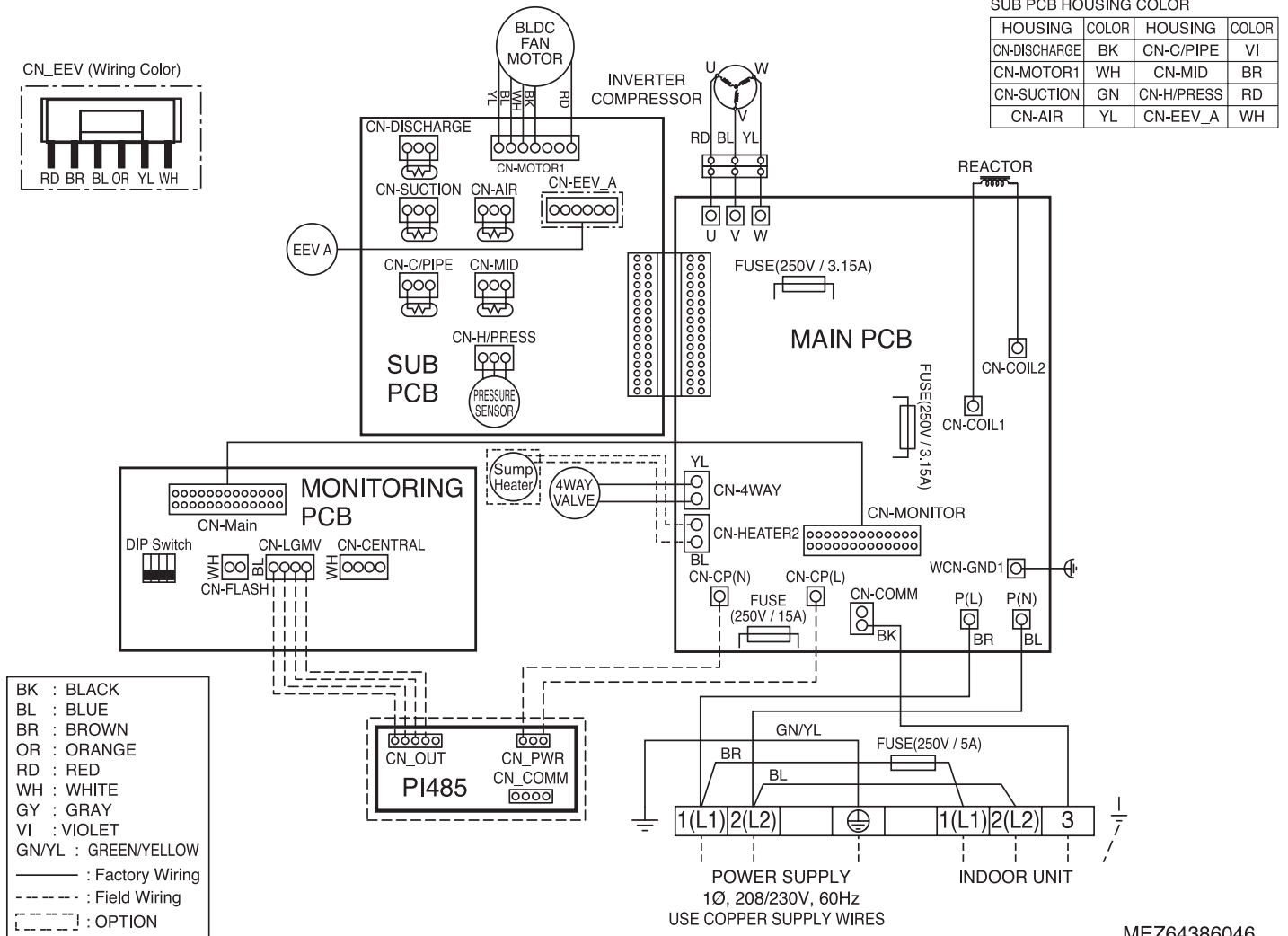
Figure 24: LCN188HV4 Refrigerant Pipe Connections



OUTDOOR UNIT WIRING DIAGRAM

LUU097HV and LUU127HV

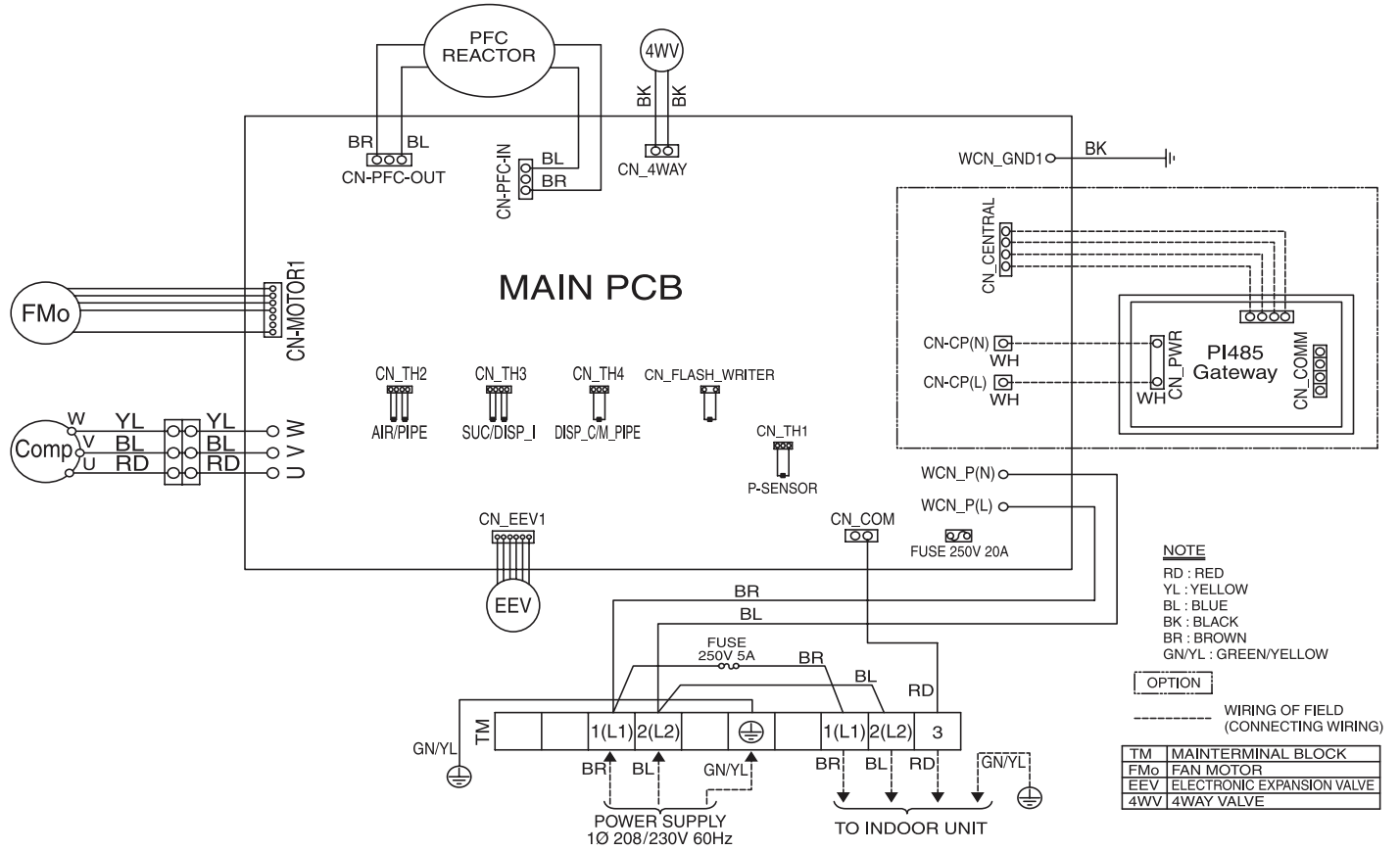
Figure 25: Four-Way Ceiling Cassette LUU097HV and LUU127HV Outdoor Unit Wiring Diagram.



OUTDOOR UNIT WIRING DIAGRAM

LUU187HV and LUU247HV

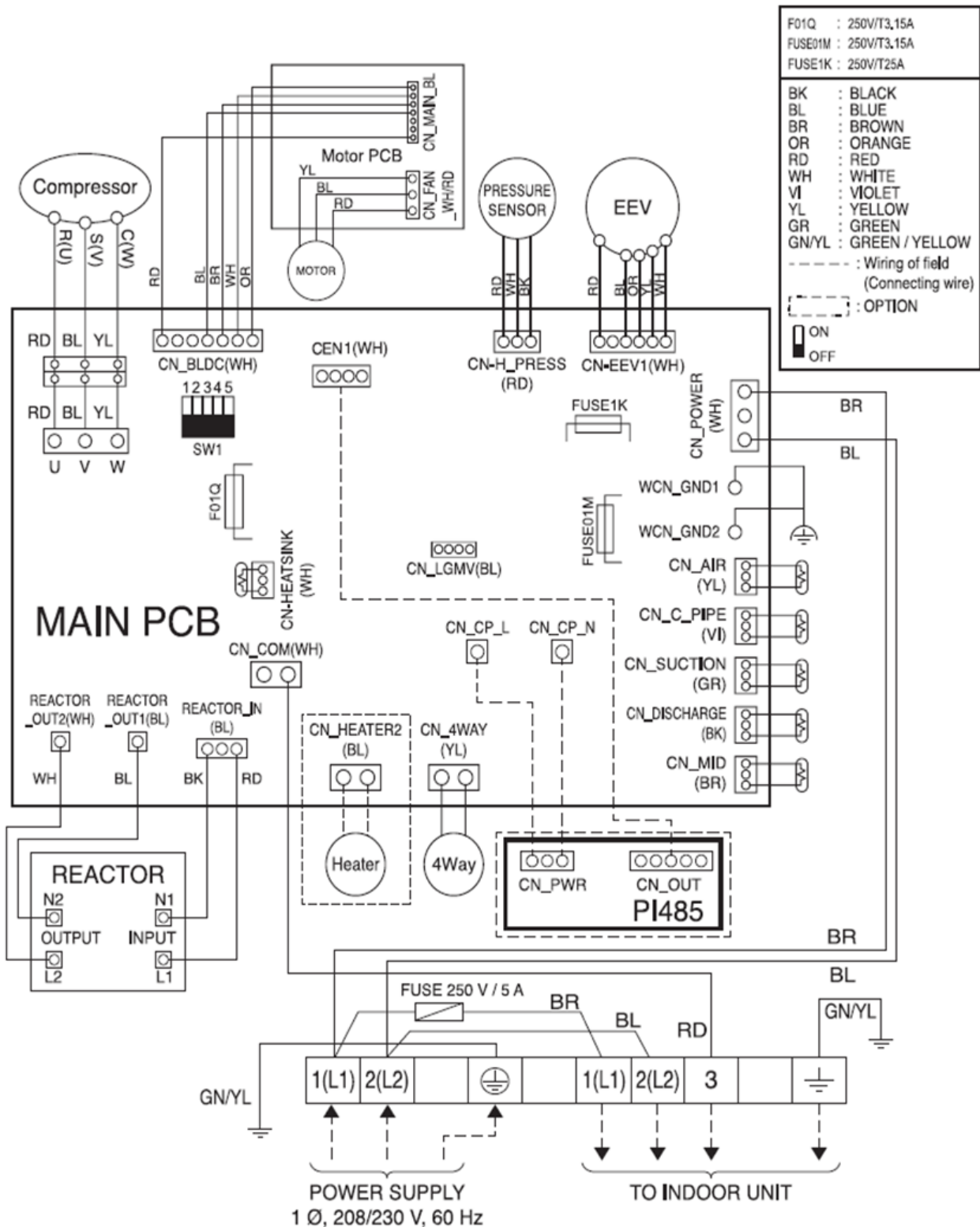
Figure 26: Four-Way Ceiling Cassette LUU187HV and LUU247HV Outdoor Unit Wiring Diagram.



OUTDOOR UNIT WIRING DIAGRAM

LUU189HV

Figure 27: Four-Way Ceiling Cassette LUU189HV Outdoor Unit Wiring Diagram.

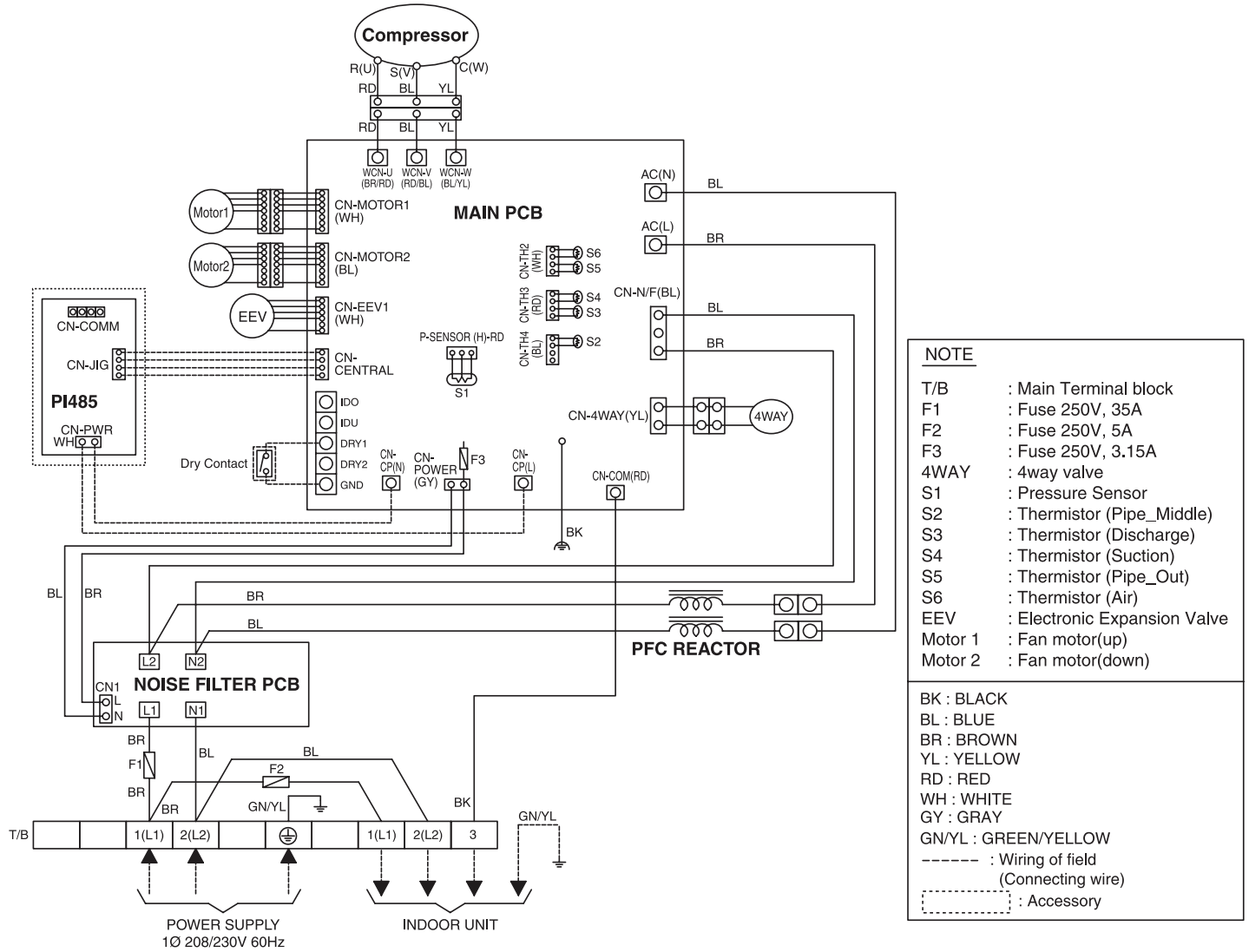


Product Data

OUTDOOR UNIT WIRING DIAGRAM

LUU367HV and LUU427HV

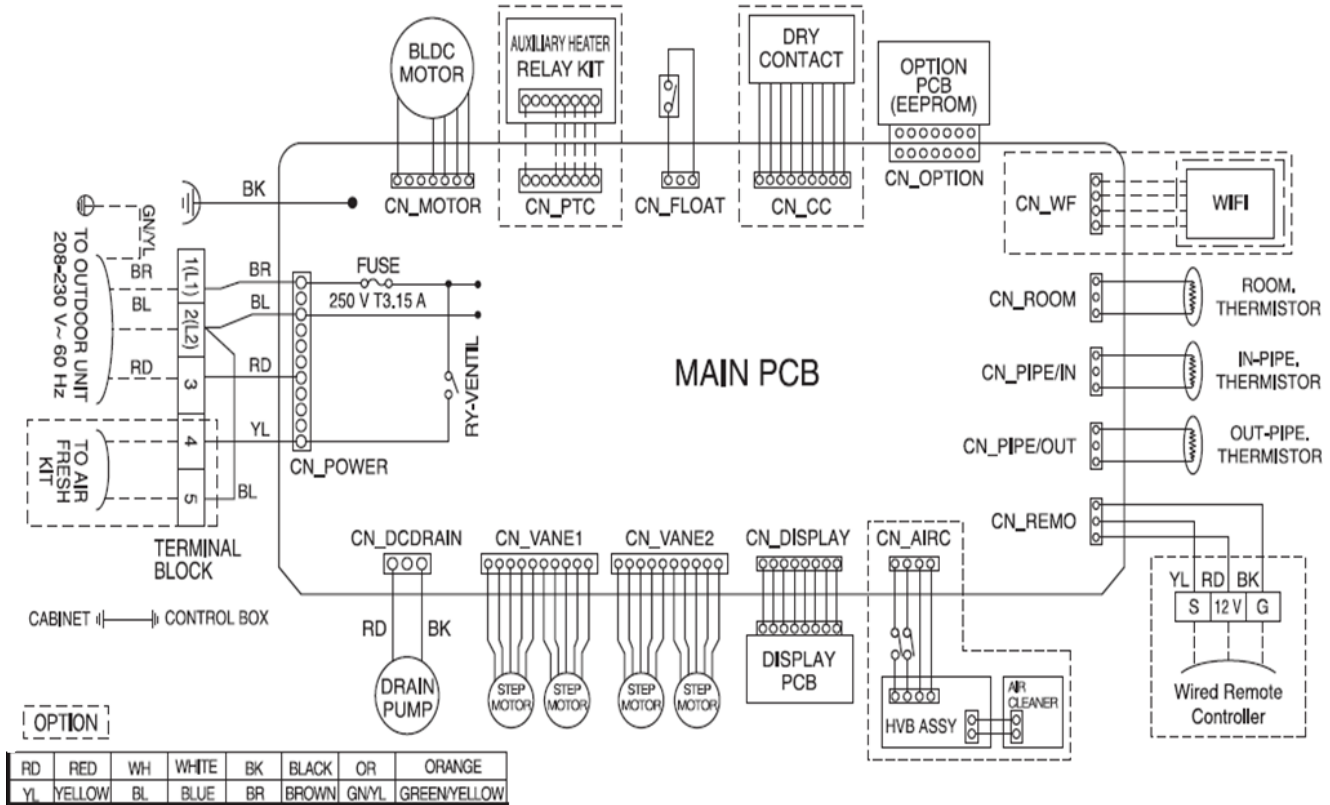
Figure 28: Four-Way Ceiling Cassette LUU367HV and LUU427HV Outdoor Unit Wiring Diagram.



INDOOR UNIT WIRING DIAGRAM

LCN098,128, 188HV4

Figure 29: Four-Way Ceiling Cassette LCN098, 128, 188HV4 Indoor Unit Wiring Diagram.

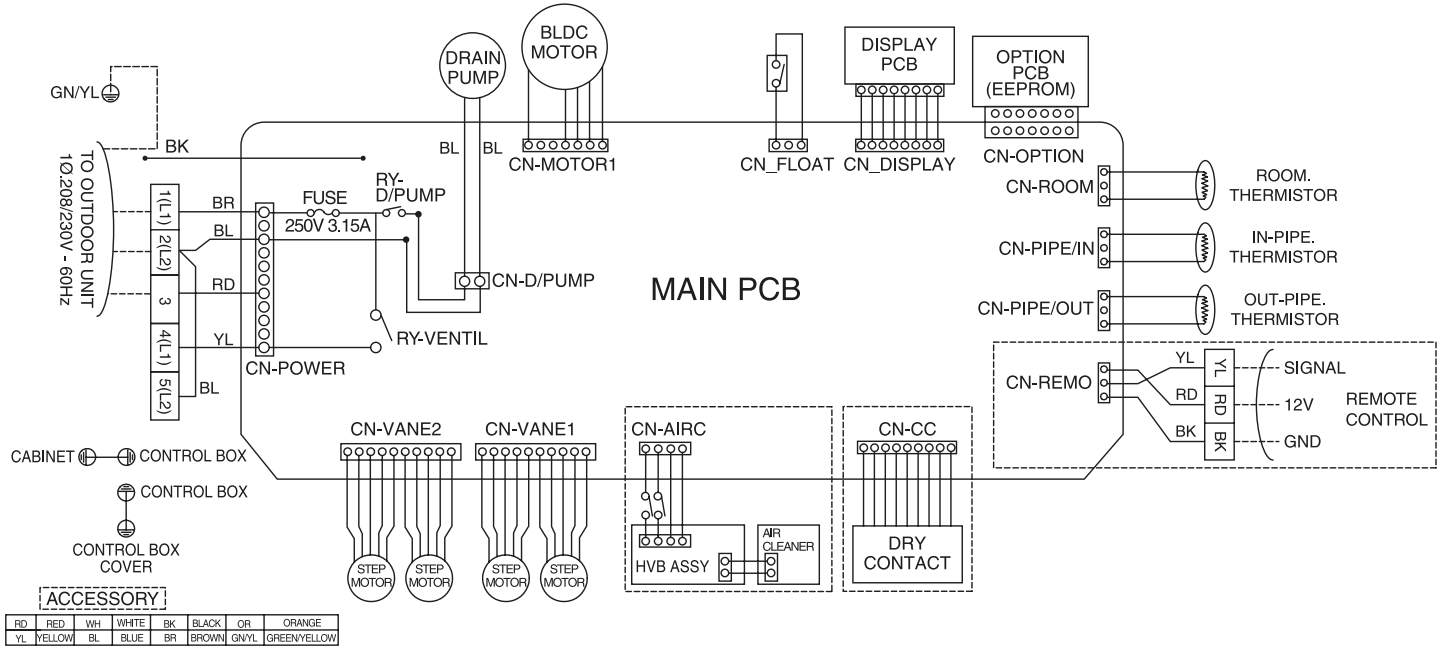


Product Data

INDOOR UNIT WIRING DIAGRAM

LCN187, 247, 367, 427HV

Figure 30: Four-Way Ceiling Cassette LCN187, 247, 367, 427 HV Indoor Unit Wiring Diagram.



ACCESSORIES

Functions, Controls, and Options

Table 16: Indoor Units—Functions, Controls and Options.

Indoor Unit Type		Four-Way Ceiling-Cassette
Airflow	Air supply outlets	4
	Airflow direction control (up & down)	Auto
	Auto swing (up and down)	√
	Airflow steps (fan/cool/heat)	4 / 5 / 4
	Comfort Air (random fan speed)	√
	Jet cool/heat	√ / -
	Swirl wind	√
Filters	Plasma air purifier	o ¹
	Washable anti-fungal ²	√
Operation	Drain pump	√
	E.S.P. control ³	o
	High ceiling operation ^{3,4}	o
	Auto Elevation Grille ³	o
	Hot Start	√
	Self diagnostics	√
	Soft Dry (dehumidification)	√
	Auto changeover	√
	Auto operation	√
	Auto restart	√
	Child lock	√
	Forced operation	√
	Group control – Requires the use of one Group Control Cable Kit (PZCWRCG3) for every additional indoor unit	o
	Sleep mode	√
	Timer (on/off)	√
	Weekly schedule	√
	Two thermistor control	√
Controllers	7-Day programmable controller	o ³
	Simple wired remote controller	o ³
	Wireless LCD remote control	√
	Dry contact	o ³
	Dry contact (temperature setting)	o ³
	Central control (LGAP)	√
Special Function	Wi-Fi ⁵	o ⁵

√ = Standard feature
o = Unit option

¹Branch location and static filter requirements. Requires PTPKQ0 plasma kit.
²Primary washable filter. 14"x14"x1" for 2x2 units; 20.5"x20.5"x1" for 3x3 units
³Requires wired zone controller.

⁴Group control may affect available features.
⁵Requires Wi-Fi module PWFMD200.

Table 17: Four-Way Ceiling-Cassette Indoor Unit Accessories Overview.

Model No.	Description
ZLABGP01A	Low Ambient Wind Baffle for for 9 and 12k Capacities
PT-QCHW0	Ceiling Grilles for 2' x 2' indoor units
PT-UQC	
PT-UMC1B	Ceiling Grilles for 3' x 3' indoor units
PT-UMC1	
PTVK410+PTVK420	Ventilation Kit + Flange for All Capacities (Must comply with applicable codes for fire isolation dampers.)
PTVK430	Flange for All Capacities
PTEGM0	Auto Elevation Kit for 3' x 3' indoor units
PWFMD200	Wi-Fi Module



ACCESSORIES

LGMV Diagnostic Software

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
- Inverter compressor current value
- Outdoor air temperature
- Actual high pressure/saturation temperature
- Actual low pressure/saturation temperature
- Suction temperature
- Inverter compressor discharge temperature
- Outdoor coil pipe temperature
- Liquid line 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
- Total number of connected indoor units (for multi zone systems)
- Communication indicator lights
- Unit error code



- Indoor unit capacity
- Indoor unit operating mode
- Indoor unit fan speed
- Indoor unit room temperature
- Indoor unit inlet pipe temperature
- Indoor unit outlet pipe temperature

Additional information that can be gathered from the main screen:

1. Graph: Graphic shows the following:
 - Compressors showing actual speeds
 - EEVs
 - IDUs
 - Low and high pressures
 - Temperature sensors
 - Four-way reversing valve
 - Outdoor fans showing status and speeds
2. Setting: Converts metric values to imperial values.
3. Making Data: Recording of real time data to a separate file created to be stored on the user's computer.
4. Loading Data: Recorded data from a saved ".CSV" file can be loaded to create an LGMV session.
5. Electrical Data: The lower half of main screen is changed to show the following:
 - Inverter compressor
 - Power Hz
 - Amps
 - Volts
 - Inverter control board fan Hz

The software is available in a high version with all of the features listed above. The low version has all features as the high version without Target High Pressure and Target Low Pressure values shown on main screen.

In lieu of connecting to the ODU, user has the option to connect to IDU with the use of a USB to RS-485 connector kit. When connected through IDU, 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

PERFORMANCE DATA

“Cooling Capacity Data” on page 40

“Heating Capacity Data” on page 47

PERFORMANCE DATA

Cooling Capacity Tables

Table 18: LC098HV4 System Cooling Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB																	
		68 / 57			73 / 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
LC098HV4 / 9,000	-4	8.85	6.84	0.39	9.40	7.23	0.40	9.95	7.00	0.42	10.34	7.15	0.42	11.05	7.21	0.43	11.60	7.34	0.44
	0	8.84	6.88	0.39	9.39	7.27	0.41	9.94	7.04	0.42	10.34	7.19	0.43	11.04	7.25	0.44	11.59	7.39	0.45
	5	8.84	6.94	0.40	9.38	7.33	0.42	9.93	7.10	0.43	10.33	7.25	0.44	11.03	7.31	0.44	11.58	7.45	0.45
	10	8.83	7.00	0.41	9.38	7.39	0.42	9.93	7.16	0.44	10.32	7.31	0.44	11.02	7.37	0.45	11.57	7.51	0.46
	15	8.82	7.05	0.41	9.37	7.45	0.43	9.92	7.21	0.44	10.31	7.37	0.45	11.01	7.43	0.46	11.56	7.57	0.47
	20	8.82	7.11	0.42	9.36	7.51	0.43	9.91	7.27	0.45	10.31	7.42	0.46	11.01	7.49	0.46	11.55	7.63	0.47
	25	8.81	7.16	0.42	9.36	7.57	0.44	9.90	7.33	0.46	10.30	7.48	0.46	11.00	7.54	0.47	11.54	7.69	0.48
	30	8.80	7.22	0.43	9.35	7.63	0.45	9.90	7.38	0.46	10.29	7.54	0.47	10.99	7.60	0.48	11.54	7.75	0.49
	35	8.80	7.27	0.44	9.34	7.68	0.45	9.89	7.44	0.47	10.28	7.60	0.47	10.98	7.66	0.48	11.53	7.81	0.49
	40	8.79	7.33	0.44	9.33	7.74	0.46	9.88	7.50	0.48	10.27	7.65	0.48	10.97	7.72	0.49	11.52	7.86	0.50
	45	8.78	7.38	0.45	9.33	7.80	0.47	9.87	7.55	0.48	10.27	7.71	0.49	10.96	7.78	0.50	11.51	7.92	0.51
	50	8.78	7.44	0.45	9.32	7.86	0.47	9.87	7.61	0.49	10.26	7.77	0.49	10.96	7.83	0.50	11.50	7.98	0.51
	55	8.77	7.49	0.46	9.31	7.91	0.48	9.86	7.66	0.49	10.25	7.82	0.50	10.95	7.89	0.51	11.49	8.04	0.52
	60	8.76	7.55	0.47	9.31	7.97	0.48	9.85	7.72	0.50	10.24	7.88	0.51	10.94	7.95	0.52	11.48	8.10	0.53
	65	8.76	7.60	0.47	9.30	8.03	0.49	9.84	7.77	0.51	10.24	7.94	0.51	10.93	8.00	0.52	11.47	8.16	0.53
	70	8.75	7.65	0.48	9.29	8.09	0.50	9.84	7.83	0.51	10.23	7.99	0.52	10.92	8.06	0.53	11.47	8.21	0.54
	75	8.54	7.53	0.50	9.08	7.96	0.52	9.62	7.72	0.54	10.01	7.89	0.55	10.71	7.96	0.56	11.25	8.12	0.57
	80	8.33	7.40	0.53	8.87	7.84	0.55	9.41	7.61	0.57	9.80	7.78	0.58	10.49	7.86	0.59	11.03	8.03	0.60
	85	8.12	7.27	0.56	8.66	7.71	0.58	9.20	7.49	0.60	9.59	7.66	0.60	10.28	7.76	0.62	10.82	7.92	0.63
	90	7.91	7.13	0.58	8.45	7.57	0.60	8.99	7.37	0.62	9.37	7.55	0.63	10.06	7.65	0.64	10.60	7.82	0.66
95	7.68	7.05	0.61	8.22	7.50	0.63	8.75	7.31	0.65	9.00	7.38	0.66	9.83	7.61	0.67	10.36	7.79	0.69	
100	7.50	6.86	0.63	8.03	7.31	0.66	8.57	7.14	0.68	8.88	7.27	0.69	9.64	7.44	0.70	10.17	7.63	0.72	
105	7.31	6.68	0.66	7.84	7.13	0.68	8.38	6.96	0.71	8.77	7.15	0.72	9.45	7.28	0.73	9.99	7.47	0.74	
110	7.12	6.45	0.68	7.66	6.89	0.71	8.19	6.75	0.74	8.58	6.94	0.74	9.26	7.07	0.76	9.80	7.26	0.77	
115	6.94	6.25	0.71	7.47	6.70	0.74	8.01	6.57	0.76	8.39	6.76	0.77	9.08	6.90	0.79	9.61	7.10	0.80	
118	6.82	6.21	0.73	7.36	6.66	0.75	7.89	6.54	0.78	8.28	6.73	0.79	8.96	6.88	0.80	9.50	7.08	0.82	
122	6.79	6.19	0.75	7.32	6.65	0.77	7.86	6.52	0.80	8.24	6.72	0.81	8.93	6.87	0.83	9.46	7.07	0.84	

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).

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

PERFORMANCE DATA

Cooling Capacity Tables

Table 19: LC128HV4 System Cooling Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB																	
		68 / 57			73 / 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
LC128HV4 / 12,000	-4	10.91	7.83	0.52	11.59	8.27	0.54	12.27	8.00	0.56	12.76	8.17	0.57	13.62	8.24	0.58	14.30	8.40	0.59
	0	10.91	7.87	0.53	11.58	8.32	0.55	12.26	8.05	0.57	12.75	8.22	0.57	13.62	8.29	0.58	14.29	8.45	0.59
	5	10.90	7.94	0.53	11.57	8.38	0.55	12.25	8.12	0.57	12.74	8.29	0.58	13.61	8.36	0.59	14.28	8.52	0.60
	10	10.89	8.00	0.54	11.57	8.45	0.56	12.24	8.18	0.58	12.73	8.35	0.59	13.59	8.42	0.60	14.27	8.58	0.61
	15	10.88	8.06	0.55	11.56	8.52	0.57	12.23	8.25	0.59	12.72	8.42	0.60	13.58	8.49	0.61	14.26	8.65	0.62
	20	10.87	8.13	0.56	11.55	8.58	0.58	12.22	8.31	0.60	12.71	8.49	0.61	13.57	8.56	0.62	14.25	8.72	0.63
	25	10.86	8.19	0.57	11.54	8.65	0.59	12.21	8.38	0.61	12.70	8.55	0.62	13.56	8.62	0.63	14.24	8.79	0.64
	30	10.86	8.25	0.57	11.53	8.72	0.60	12.20	8.44	0.62	12.69	8.62	0.62	13.55	8.69	0.64	14.23	8.85	0.65
	35	10.85	8.31	0.58	11.52	8.78	0.60	12.20	8.50	0.63	12.68	8.68	0.63	13.54	8.76	0.64	14.22	8.92	0.66
	40	10.84	8.38	0.59	11.51	8.85	0.61	12.19	8.57	0.63	12.67	8.75	0.64	13.53	8.82	0.65	14.21	8.99	0.67
	45	10.83	8.44	0.60	11.50	8.91	0.62	12.18	8.63	0.64	12.66	8.81	0.65	13.52	8.89	0.66	14.19	9.06	0.68
	50	10.82	8.50	0.61	11.50	8.98	0.63	12.17	8.70	0.65	12.65	8.88	0.66	13.51	8.95	0.67	14.18	9.12	0.68
	55	10.81	8.56	0.61	11.49	9.05	0.64	12.16	8.76	0.66	12.64	8.94	0.67	13.50	9.02	0.68	14.17	9.19	0.69
	60	10.81	8.63	0.62	11.48	9.11	0.64	12.15	8.82	0.67	12.63	9.01	0.68	13.49	9.08	0.69	14.16	9.26	0.70
	65	10.80	8.69	0.63	11.47	9.18	0.65	12.14	8.89	0.68	12.62	9.07	0.68	13.48	9.15	0.70	14.15	9.32	0.71
	70	10.79	8.75	0.64	11.46	9.24	0.66	12.13	8.95	0.69	12.61	9.14	0.69	13.47	9.22	0.71	14.14	9.39	0.72
	75	10.53	8.61	0.67	11.20	9.10	0.70	11.87	8.82	0.72	12.35	9.02	0.73	13.20	9.10	0.74	13.87	9.28	0.76
	80	10.27	8.46	0.71	10.94	8.96	0.73	11.60	8.70	0.76	12.09	8.89	0.77	12.94	8.99	0.78	13.60	9.17	0.80
	85	10.01	8.30	0.74	10.68	8.81	0.77	11.34	8.56	0.80	11.82	8.76	0.81	12.67	8.87	0.82	13.34	9.06	0.84
	90	9.76	8.15	0.78	10.42	8.65	0.80	11.08	8.42	0.83	11.56	8.63	0.84	12.41	8.74	0.86	13.07	8.94	0.88
95	9.48	8.06	0.81	10.14	8.58	0.84	10.80	8.36	0.87	11.10	8.44	0.88	12.12	8.70	0.90	12.78	8.90	0.91	
100	9.25	7.85	0.84	9.91	8.36	0.87	10.57	8.16	0.91	10.96	8.31	0.92	11.89	8.51	0.93	12.55	8.72	0.95	
105	9.02	7.63	0.88	9.68	8.14	0.91	10.34	7.96	0.94	10.81	8.18	0.95	11.66	8.32	0.97	12.32	8.54	0.99	
110	8.78	7.37	0.91	9.44	7.88	0.95	10.10	7.71	0.98	10.58	7.93	0.99	11.43	8.09	1.01	12.09	8.30	1.03	
115	8.55	7.15	0.95	9.21	7.66	0.98	9.87	7.51	1.02	10.35	7.73	1.03	11.19	7.89	1.05	11.85	8.11	1.07	
118	8.42	7.10	0.97	9.08	7.61	1.00	9.74	7.47	1.04	10.21	7.69	1.05	11.06	7.87	1.07	11.72	8.09	1.09	
122	8.37	7.08	1.00	9.03	7.60	1.03	9.69	7.46	1.07	10.17	7.68	1.08	11.01	7.86	1.10	11.67	8.08	1.12	

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).

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

PERFORMANCE DATA

Cooling Capacity Tables

Table 20: LC187HV System Cooling Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB																	
		68 / 57			73 / 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
LC187HV / 18,000	5	17.83	14.43	0.50	18.94	15.24	0.68	20.04	15.69	0.74	20.84	15.07	0.75	22.26	15.19	0.75	23.37	15.48	0.75
	10	17.80	14.53	0.52	18.91	15.35	0.70	20.02	15.80	0.76	20.81	15.18	0.77	22.23	15.30	0.77	23.33	15.59	0.77
	15	17.78	14.64	0.53	18.88	15.46	0.72	19.99	15.92	0.78	20.78	15.29	0.79	22.20	15.42	0.79	23.30	15.71	0.79
	20	17.75	14.74	0.54	18.86	15.57	0.74	19.96	16.03	0.80	20.75	15.40	0.81	22.16	15.53	0.81	23.27	15.82	0.81
	25	17.73	14.85	0.56	18.83	15.68	0.76	19.93	16.14	0.82	20.72	15.50	0.83	22.13	15.63	0.83	23.23	15.93	0.83
	30	17.70	14.95	0.57	18.80	15.79	0.78	19.90	16.26	0.84	20.69	15.61	0.85	22.10	15.74	0.85	23.20	16.04	0.85
	35	17.68	15.05	0.59	18.77	15.90	0.80	19.87	16.37	0.86	20.66	15.72	0.87	22.07	15.85	0.88	23.17	16.15	0.87
	40	17.65	15.16	0.60	18.75	16.01	0.81	19.84	16.48	0.88	20.63	15.83	0.90	22.04	15.96	0.90	23.13	16.26	0.89
	45	17.63	15.26	0.61	18.72	16.12	0.83	19.81	16.59	0.90	20.60	15.94	0.92	22.00	16.07	0.92	23.10	16.37	0.92
	50	17.60	15.36	0.63	18.69	16.23	0.85	19.79	16.70	0.92	20.57	16.04	0.94	21.97	16.18	0.94	23.06	16.48	0.94
	55	17.57	15.46	0.64	18.67	16.33	0.87	19.76	16.81	0.94	20.55	16.15	0.96	21.94	16.28	0.96	23.03	16.59	0.96
	60	17.55	15.56	0.66	18.64	16.44	0.89	19.73	16.92	0.96	20.52	16.25	0.98	21.91	16.39	0.98	23.00	16.70	0.98
	65	17.52	15.66	0.67	18.61	16.55	0.91	19.70	17.03	0.98	20.49	16.36	1.00	21.88	16.50	1.00	22.96	16.81	1.00
	70	17.50	15.77	0.69	18.58	16.65	0.93	19.67	17.14	1.01	20.46	16.47	1.02	21.84	16.60	1.02	22.93	16.92	1.02
	75	17.08	15.51	0.73	18.16	16.40	0.96	19.24	16.90	1.03	20.03	16.25	1.05	21.41	16.40	1.06	22.50	16.73	1.07
	80	16.66	15.24	0.77	17.74	16.14	0.99	18.82	16.66	1.06	19.60	16.02	1.08	20.98	16.20	1.10	22.06	16.53	1.11
	85	16.24	14.96	0.88	17.32	15.87	1.07	18.40	16.40	1.14	19.17	15.78	1.16	20.55	15.98	1.18	21.63	16.32	1.20
	90	15.82	14.68	0.99	16.90	15.59	1.16	17.97	16.13	1.21	18.75	15.54	1.23	20.12	15.75	1.26	21.20	16.11	1.28
	95	15.37	14.53	1.09	16.44	15.45	1.24	17.51	16.01	1.28	18.00	15.20	1.26	19.65	15.67	1.32	20.72	16.04	1.35
	100	14.99	14.14	1.14	16.06	15.06	1.26	17.13	15.63	1.29	17.77	14.96	1.28	19.28	15.33	1.32	20.35	15.71	1.35
105	14.62	13.75	1.20	15.69	14.68	1.28	16.76	15.25	1.30	17.53	14.73	1.30	18.90	15.00	1.32	19.97	15.38	1.35	
110	14.24	13.28	1.16	15.32	14.20	1.21	16.39	14.77	1.21	17.16	14.29	1.21	18.53	14.57	1.22	19.60	14.96	1.24	
115	13.87	12.88	1.05	14.94	13.80	1.06	16.01	14.38	1.03	16.79	13.93	1.02	18.15	14.22	1.02	19.22	14.62	1.04	
118	13.10	12.28	0.93	14.13	13.17	0.91	15.16	13.74	0.87	15.90	13.31	0.85	17.21	13.61	0.85	18.24	14.00	0.87	
122	12.84	12.07	0.89	13.86	12.95	0.86	14.87	13.52	0.82	15.60	13.10	0.80	16.90	13.40	0.79	17.91	13.79	0.81	

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).

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

PERFORMANCE DATA

Cooling Capacity Tables

Table 21: LC188HV4 System Cooling Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB																	
		68 / 57			73 / 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
LC188HV4 / 18,000	-4	17.70	11.95	0.85	18.80	12.62	0.88	19.89	12.22	0.92	20.69	12.48	0.93	22.09	12.59	0.94	23.19	12.82	0.96
	0	17.69	12.02	0.86	18.79	12.70	0.89	19.88	12.29	0.93	20.68	12.55	0.94	22.08	12.66	0.95	23.18	12.90	0.97
	5	17.67	12.12	0.88	18.77	12.81	0.91	19.87	12.40	0.94	20.66	12.66	0.95	22.06	12.77	0.97	23.16	13.01	0.99
	10	17.66	12.22	0.89	18.76	12.91	0.92	19.85	12.50	0.95	20.64	12.76	0.97	22.05	12.87	0.98	23.14	13.11	1.00
	15	17.65	12.32	0.90	18.74	13.01	0.93	19.84	12.60	0.97	20.63	12.86	0.98	22.03	12.97	1.00	23.12	13.22	1.02
	20	17.63	12.41	0.91	18.73	13.11	0.95	19.82	12.70	0.98	20.61	12.96	0.99	22.01	13.07	1.01	23.11	13.32	1.03
	25	17.62	12.51	0.93	18.71	13.22	0.96	19.81	12.80	1.00	20.60	13.06	1.01	22.00	13.18	1.03	23.09	13.42	1.05
	30	17.60	12.61	0.94	18.70	13.32	0.97	19.79	12.89	1.01	20.58	13.17	1.02	21.98	13.28	1.04	23.07	13.53	1.06
	35	17.59	12.70	0.95	18.68	13.42	0.99	19.78	12.99	1.02	20.57	13.27	1.04	21.96	13.38	1.05	23.05	13.63	1.08
	40	17.58	12.80	0.97	18.67	13.52	1.00	19.76	13.09	1.04	20.55	13.37	1.05	21.94	13.48	1.07	23.04	13.73	1.09
	45	17.56	12.89	0.98	18.66	13.62	1.01	19.75	13.19	1.05	20.53	13.46	1.06	21.93	13.58	1.08	23.02	13.84	1.11
	50	17.55	12.99	0.99	18.64	13.72	1.03	19.73	13.28	1.07	20.52	13.56	1.08	21.91	13.68	1.10	23.00	13.94	1.12
	55	17.54	13.08	1.00	18.63	13.82	1.04	19.72	13.38	1.08	20.50	13.66	1.09	21.89	13.78	1.11	22.98	14.04	1.13
	60	17.52	13.18	1.02	18.61	13.92	1.05	19.70	13.48	1.09	20.49	13.76	1.11	21.88	13.88	1.13	22.97	14.14	1.15
	65	17.51	13.27	1.03	18.60	14.02	1.07	19.69	13.58	1.11	20.47	13.86	1.12	21.86	13.98	1.14	22.95	14.24	1.16
	70	17.50	13.37	1.04	18.58	14.12	1.08	19.67	13.67	1.12	20.46	13.96	1.13	21.84	14.08	1.16	22.93	14.35	1.18
	75	17.08	13.15	1.10	18.16	13.91	1.14	19.24	13.48	1.18	20.03	13.78	1.20	21.41	13.91	1.22	22.50	14.18	1.24
	80	16.66	12.92	1.16	17.74	13.69	1.20	18.82	13.28	1.24	19.60	13.58	1.26	20.98	13.73	1.28	22.06	14.02	1.31
	85	16.24	12.69	1.21	17.32	13.46	1.26	18.40	13.08	1.30	19.17	13.38	1.32	20.55	13.55	1.34	21.63	13.84	1.37
	90	15.82	12.45	1.27	16.90	13.22	1.32	17.97	12.87	1.36	18.75	13.18	1.38	20.12	13.36	1.40	21.20	13.66	1.43
95	15.37	12.32	1.33	16.44	13.10	1.37	17.51	12.77	1.42	18.00	12.89	1.44	19.65	13.29	1.47	20.72	13.60	1.50	
100	14.99	11.99	1.38	16.06	12.77	1.43	17.13	12.46	1.48	17.77	12.69	1.50	19.28	13.00	1.53	20.35	13.32	1.56	
105	14.62	11.66	1.44	15.69	12.44	1.49	16.76	12.16	1.54	17.53	12.49	1.56	18.90	12.71	1.59	19.97	13.04	1.62	
110	14.24	11.26	1.49	15.32	12.04	1.55	16.39	11.78	1.61	17.16	12.12	1.62	18.53	12.35	1.65	19.60	12.68	1.69	
115	13.87	10.92	1.55	14.94	11.70	1.61	16.01	11.47	1.67	16.79	11.81	1.68	18.15	12.06	1.72	19.22	12.39	1.75	
118	13.65	10.84	1.58	14.72	11.63	1.64	15.79	11.41	1.70	16.56	11.75	1.72	17.93	12.02	1.75	19.00	12.36	1.79	
122	13.57	10.82	1.63	14.64	11.61	1.69	15.71	11.39	1.75	16.49	11.74	1.77	17.85	12.00	1.80	18.92	12.35	1.84	

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).

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

PERFORMANCE DATA

Cooling Capacity Tables

Table 22: LC247HV System Cooling Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB																	
		68 / 57			73 / 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
LC247HV / 24,000	5	23.77	17.54	0.76	25.25	18.53	1.03	26.73	19.07	1.12	27.79	18.32	1.13	29.68	18.47	1.14	31.15	18.82	1.13
	10	23.74	17.67	0.78	25.21	18.66	1.06	26.69	19.21	1.15	27.75	18.45	1.17	29.64	18.61	1.17	31.11	18.96	1.17
	15	23.70	17.80	0.80	25.18	18.80	1.09	26.65	19.35	1.18	27.71	18.58	1.20	29.59	18.74	1.20	31.07	19.10	1.20
	20	23.67	17.92	0.83	25.14	18.93	1.12	26.61	19.49	1.21	27.67	18.72	1.23	29.55	18.88	1.23	31.02	19.23	1.23
	25	23.64	18.05	0.85	25.10	19.07	1.15	26.57	19.63	1.24	27.63	18.85	1.26	29.51	19.01	1.26	30.98	19.37	1.26
	30	23.60	18.17	0.87	25.07	19.20	1.18	26.53	19.76	1.27	27.59	18.98	1.29	29.47	19.14	1.30	30.93	19.50	1.29
	35	23.57	18.30	0.89	25.03	19.33	1.21	26.50	19.90	1.31	27.55	19.11	1.33	29.42	19.27	1.33	30.89	19.64	1.32
	40	23.53	18.43	0.91	25.00	19.46	1.23	26.46	20.04	1.34	27.51	19.24	1.36	29.38	19.41	1.36	30.84	19.77	1.36
	45	23.50	18.55	0.93	24.96	19.60	1.26	26.42	20.17	1.37	27.47	19.37	1.39	29.34	19.54	1.39	30.80	19.91	1.39
	50	23.47	18.67	0.95	24.92	19.73	1.29	26.38	20.31	1.40	27.43	19.50	1.42	29.30	19.67	1.42	30.75	20.04	1.42
	55	23.43	18.80	0.97	24.89	19.86	1.32	26.34	20.44	1.43	27.39	19.63	1.45	29.25	19.80	1.45	30.71	20.17	1.45
	60	23.40	18.92	1.00	24.85	19.99	1.35	26.30	20.58	1.46	27.35	19.76	1.48	29.21	19.93	1.49	30.66	20.31	1.48
	65	23.36	19.05	1.02	24.81	20.12	1.38	26.27	20.71	1.49	27.31	19.89	1.52	29.17	20.06	1.52	30.62	20.44	1.52
	70	23.33	19.17	1.04	24.78	20.25	1.41	26.23	20.84	1.52	27.27	20.02	1.55	29.13	20.19	1.55	30.57	20.57	1.55
	75	22.77	18.85	1.11	24.21	19.94	1.45	25.66	20.55	1.57	26.70	19.75	1.59	28.55	19.94	1.61	29.99	20.34	1.62
	80	22.21	18.53	1.17	23.65	19.63	1.50	25.09	20.25	1.61	26.13	19.48	1.64	27.97	19.69	1.66	29.42	20.10	1.68
	85	21.65	18.19	1.33	23.09	19.30	1.63	24.53	19.93	1.72	25.57	19.19	1.75	27.40	19.43	1.78	28.84	19.84	1.81
	90	21.09	17.85	1.49	22.53	18.96	1.76	23.96	19.61	1.84	25.00	18.90	1.87	26.83	19.15	1.91	28.27	19.59	1.94
	95	20.49	17.66	1.65	21.92	18.79	1.87	23.35	19.46	1.94	24.00	18.48	1.91	26.20	19.05	2.00	27.63	19.50	2.04
	100	19.99	17.19	1.73	21.42	18.31	1.91	22.85	19.00	1.96	23.69	18.19	1.94	25.70	18.64	2.00	27.13	19.10	2.04
105	19.49	16.71	1.82	20.92	17.84	1.95	22.35	18.54	1.97	23.38	17.91	1.97	25.20	18.23	2.00	26.63	18.70	2.04	
110	18.99	16.14	1.76	20.42	17.26	1.84	21.85	17.96	1.83	22.88	17.37	1.83	24.70	17.71	1.85	26.13	18.19	1.89	
115	18.49	15.66	1.58	19.92	16.78	1.60	21.35	17.49	1.56	22.38	16.93	1.54	24.20	17.29	1.55	25.63	17.77	1.58	
118	17.47	14.93	1.40	18.84	16.01	1.38	20.21	16.70	1.32	21.20	16.18	1.29	22.95	16.54	1.29	24.32	17.02	1.32	
122	17.12	14.68	1.34	18.48	15.75	1.31	19.83	16.44	1.24	20.80	15.93	1.21	22.53	16.29	1.20	23.88	16.76	1.23	

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).

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

PERFORMANCE DATA

Cooling Capacity Tables

Table 23: LC367HV System Cooling Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB																	
		68 / 57			73 / 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
LC367HV / 36,000	5	35.66	25.73	1.18	37.87	27.18	1.60	40.09	27.98	1.74	41.69	26.87	1.76	44.52	27.10	1.77	46.73	27.61	1.76
	10	35.61	25.92	1.22	37.82	27.38	1.65	40.03	28.18	1.79	41.63	27.07	1.81	44.45	27.30	1.82	46.67	27.81	1.81
	15	35.56	26.11	1.25	37.77	27.58	1.69	39.97	28.39	1.83	41.57	27.26	1.86	44.39	27.49	1.87	46.60	28.01	1.86
	20	35.51	26.29	1.28	37.71	27.77	1.74	39.92	28.59	1.88	41.51	27.46	1.91	44.33	27.69	1.92	46.53	28.21	1.91
	25	35.45	26.48	1.32	37.66	27.97	1.78	39.86	28.79	1.93	41.45	27.65	1.96	44.26	27.89	1.97	46.46	28.41	1.96
	30	35.40	26.66	1.35	37.60	28.17	1.83	39.80	28.99	1.98	41.39	27.85	2.01	44.20	28.08	2.01	46.40	28.61	2.01
	35	35.35	26.85	1.38	37.55	28.36	1.87	39.74	29.19	2.03	41.33	28.04	2.06	44.13	28.27	2.06	46.33	28.81	2.06
	40	35.30	27.03	1.42	37.49	28.55	1.92	39.69	29.39	2.08	41.27	28.23	2.11	44.07	28.47	2.11	46.26	29.01	2.11
	45	35.25	27.21	1.45	37.44	28.75	1.96	39.63	29.59	2.13	41.21	28.42	2.16	44.01	28.66	2.16	46.20	29.20	2.16
	50	35.20	27.40	1.48	37.39	28.94	2.01	39.57	29.79	2.18	41.15	28.61	2.21	43.94	28.85	2.21	46.13	29.40	2.21
	55	35.15	27.58	1.52	37.33	29.13	2.05	39.51	29.99	2.22	41.09	28.80	2.26	43.88	29.04	2.26	46.06	29.59	2.26
	60	35.10	27.76	1.55	37.28	29.32	2.10	39.46	30.18	2.27	41.03	28.99	2.31	43.82	29.24	2.31	46.00	29.79	2.31
	65	35.05	27.94	1.58	37.22	29.51	2.14	39.40	30.38	2.32	40.97	29.18	2.36	43.75	29.43	2.36	45.93	29.98	2.36
	70	34.99	28.12	1.61	37.17	29.70	2.19	39.34	30.58	2.37	40.91	29.37	2.41	43.69	29.61	2.41	45.86	30.18	2.41
	75	34.15	27.66	1.72	36.32	29.25	2.26	38.49	30.15	2.43	40.05	28.98	2.48	42.82	29.26	2.50	44.99	29.83	2.51
	80	33.31	27.18	1.82	35.47	28.79	2.33	37.64	29.71	2.50	39.20	28.58	2.55	41.96	28.89	2.59	44.12	29.48	2.62
	85	32.48	26.69	2.07	34.63	28.31	2.53	36.79	29.24	2.68	38.35	28.15	2.73	41.10	28.50	2.77	43.26	29.11	2.82
	90	31.64	26.18	2.32	33.79	27.81	2.73	35.94	28.77	2.86	37.50	27.72	2.91	40.25	28.10	2.96	42.40	28.73	3.02
	95	30.74	25.91	2.57	32.88	27.56	2.91	35.02	28.55	3.02	36.00	27.11	2.97	39.30	27.95	3.11	41.44	28.61	3.18
	100	29.99	25.21	2.70	32.13	26.87	2.97	34.27	27.87	3.04	35.53	26.69	3.02	38.55	27.35	3.11	40.69	28.02	3.18
105	29.24	24.52	2.82	31.38	26.17	3.03	33.52	27.19	3.06	35.07	26.27	3.07	37.80	26.75	3.11	39.94	27.43	3.18	
110	28.49	23.68	2.74	30.63	25.33	2.86	32.77	26.35	2.85	34.32	25.49	2.84	37.05	25.99	2.87	39.20	26.68	2.93	
115	27.74	22.97	2.46	29.88	24.61	2.49	32.02	25.65	2.43	33.57	24.84	2.40	36.31	25.36	2.40	38.45	26.07	2.46	
118	26.20	21.90	2.18	28.26	23.49	2.15	30.31	24.50	2.05	31.80	23.74	2.01	34.42	24.27	2.00	36.48	24.96	2.05	
122	25.69	21.53	2.09	27.71	23.10	2.04	29.74	24.11	1.93	31.21	23.37	1.88	33.80	23.90	1.87	35.82	24.59	1.92	

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).

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

PERFORMANCE DATA

Cooling Capacity Tables

Table 24: LC427HV System Cooling Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB																	
		68 / 57			73 / 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
LC427HV / 42,000	5	41.60	30.30	1.62	44.19	32.00	2.20	46.77	32.94	2.38	48.64	31.64	2.42	51.94	31.91	2.42	54.52	32.51	2.42
	10	41.54	30.52	1.67	44.12	32.24	2.26	46.70	33.18	2.45	48.57	31.87	2.49	51.86	32.14	2.49	54.44	32.75	2.48
	15	41.48	30.74	1.71	44.06	32.47	2.32	46.64	33.42	2.51	48.50	32.10	2.55	51.79	32.37	2.56	54.36	32.98	2.55
	20	41.42	30.96	1.76	44.00	32.70	2.38	46.57	33.66	2.58	48.43	32.33	2.62	51.71	32.60	2.63	54.29	33.22	2.62
	25	41.36	31.18	1.80	43.93	32.93	2.45	46.50	33.90	2.65	48.36	32.56	2.69	51.64	32.83	2.69	54.21	33.45	2.69
	30	41.30	31.39	1.85	43.87	33.16	2.51	46.43	34.14	2.71	48.29	32.79	2.76	51.57	33.06	2.76	54.13	33.69	2.75
	35	41.24	31.61	1.89	43.81	33.39	2.57	46.37	34.37	2.78	48.22	33.01	2.82	51.49	33.29	2.83	54.05	33.92	2.82
	40	41.18	31.83	1.94	43.74	33.62	2.63	46.30	34.61	2.85	48.15	33.24	2.89	51.42	33.52	2.90	53.97	34.15	2.89
	45	41.13	32.04	1.99	43.68	33.85	2.69	46.23	34.84	2.91	48.08	33.46	2.96	51.34	33.75	2.96	53.90	34.38	2.96
	50	41.07	32.26	2.03	43.62	34.07	2.75	46.17	35.08	2.98	48.01	33.69	3.03	51.27	33.97	3.03	53.82	34.62	3.03
	55	41.01	32.47	2.08	43.55	34.30	2.82	46.10	35.31	3.05	47.94	33.91	3.10	51.19	34.20	3.10	53.74	34.85	3.09
	60	40.95	32.68	2.12	43.49	34.53	2.88	46.03	35.54	3.11	47.87	34.13	3.16	51.12	34.42	3.17	53.66	35.07	3.16
	65	40.89	32.90	2.17	43.43	34.75	2.94	45.97	35.77	3.18	47.80	34.36	3.23	51.04	34.65	3.24	53.58	35.30	3.23
	70	40.83	33.11	2.21	43.36	34.97	3.00	45.90	36.00	3.25	47.73	34.58	3.30	50.97	34.87	3.30	53.50	35.53	3.30
	75	39.84	32.56	2.36	42.37	34.44	3.10	44.90	35.50	3.34	46.73	34.12	3.39	49.96	34.45	3.42	52.49	35.13	3.44
	80	38.86	32.01	2.50	41.39	33.90	3.19	43.91	34.98	3.42	45.73	33.65	3.49	48.95	34.01	3.54	51.48	34.72	3.59
	85	37.89	31.42	2.84	40.41	33.33	3.47	42.92	34.43	3.67	44.74	33.15	3.74	47.96	33.55	3.80	50.47	34.28	3.86
	90	36.91	30.83	3.18	39.43	32.75	3.74	41.94	33.88	3.92	43.75	32.64	3.98	46.96	33.08	4.06	49.47	33.83	4.14
	95	35.86	30.51	3.52	38.36	32.45	3.99	40.85	33.62	4.14	42.00	31.92	4.07	45.85	32.91	4.27	48.35	33.68	4.35
	100	34.98	29.69	3.69	37.48	31.63	4.07	39.98	32.81	4.17	41.46	31.43	4.14	44.98	32.20	4.27	47.47	32.99	4.35
105	34.11	28.87	3.87	36.61	30.82	4.15	39.11	32.02	4.19	40.91	30.93	4.21	44.10	31.49	4.26	46.60	32.30	4.36	
110	33.24	27.88	3.76	35.74	29.82	3.92	38.23	31.03	3.91	40.04	30.01	3.89	43.23	30.60	3.93	45.73	31.41	4.02	
115	32.37	27.05	3.38	34.86	28.98	3.41	37.36	30.20	3.33	39.17	29.24	3.29	42.36	29.87	3.30	44.86	30.70	3.37	
118	30.57	25.78	2.99	32.97	27.65	2.94	35.36	28.85	2.81	37.10	27.95	2.75	40.16	28.57	2.74	42.56	29.39	2.81	
122	29.97	25.35	2.86	32.33	27.20	2.79	34.70	28.39	2.64	36.41	27.51	2.57	39.43	28.14	2.56	41.79	28.95	2.63	

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).

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

PERFORMANCE DATA

Heating Capacity Tables

Table 25: LC098HV4 System Heating Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB											
	°F DB	°F WB	61		64		68		70		72		75	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
LC098HV4 / 9,000	-4	-4.4	4.38	0.61	4.06	0.63	4.03	0.64	3.99	0.64	3.95	0.65	3.77	0.67
	0	-0.4	5.22	0.62	4.91	0.64	4.84	0.65	4.77	0.65	4.71	0.66	4.51	0.68
	5	4.5	6.22	0.63	5.93	0.65	5.79	0.66	5.70	0.67	5.62	0.68	5.39	0.70
	10	9	6.89	0.63	6.61	0.66	6.43	0.67	6.32	0.68	6.23	0.69	5.98	0.71
	17	15	7.63	0.65	7.36	0.67	7.13	0.69	7.00	0.70	6.90	0.71	6.63	0.73
	20	19	8.07	0.66	7.82	0.68	7.55	0.70	7.41	0.71	7.30	0.72	7.02	0.74
	25	23	8.82	0.67	8.56	0.69	8.26	0.72	8.10	0.73	7.98	0.74	7.68	0.76
	30	28	9.57	0.69	9.28	0.71	8.96	0.73	8.79	0.75	8.66	0.76	8.34	0.78
	35	32	10.33	0.71	10.00	0.73	9.66	0.75	9.48	0.77	9.35	0.78	9.01	0.80
	40	36	10.85	0.73	10.55	0.75	10.21	0.78	10.04	0.79	9.89	0.81	9.54	0.83
	45	41	11.51	0.75	11.24	0.78	10.91	0.80	10.72	0.82	10.58	0.83	10.20	0.86
	47	43	11.77	0.77	11.51	0.79	11.18	0.82	11.00	0.83	10.85	0.84	10.46	0.87
	50	46	11.81	0.76	11.57	0.78	11.28	0.81	11.12	0.82	10.99	0.83	10.62	0.85
	55	51	11.87	0.75	11.67	0.77	11.45	0.79	11.32	0.80	11.22	0.81	10.89	0.82
	60	56	11.92	0.74	11.77	0.76	11.62	0.77	11.53	0.78	11.45	0.78	11.15	0.80
	63	59	11.96	0.74	11.83	0.75	11.73	0.76	11.65	0.77	11.58	0.77	11.31	0.78
68	64	11.99	0.73	11.89	0.74	11.83	0.75	11.77	0.75	11.72	0.76	11.48	0.76	

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.

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).

Table 26: LC128HV System Heating Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB											
	°F DB	°F WB	61		64		68		70		72		75	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
LC128HV4 / 12,000	-4	-4.4	6.04	0.83	5.61	0.86	5.56	0.87	5.50	0.88	5.44	0.88	5.20	0.92
	0	-0.4	7.04	0.85	6.63	0.88	6.52	0.89	6.43	0.90	6.36	0.91	6.09	0.94
	5	4.5	8.24	0.87	7.85	0.90	7.66	0.92	7.54	0.93	7.44	0.93	7.14	0.97
	10	9	9.03	0.88	8.67	0.91	8.43	0.94	8.28	0.95	8.17	0.96	7.85	0.99
	17	15	9.91	0.91	9.57	0.94	9.27	0.96	9.10	0.98	8.97	0.99	8.62	1.02
	20	19	10.45	0.92	10.11	0.95	9.78	0.98	9.60	1.00	9.45	1.02	9.09	1.04
	25	23	11.34	0.95	11.00	0.98	10.62	1.01	10.42	1.04	10.26	1.05	9.87	1.08
	30	28	12.24	0.98	11.86	1.02	11.46	1.05	11.25	1.07	11.08	1.09	10.67	1.12
	35	32	13.14	1.02	12.73	1.05	12.29	1.08	12.07	1.10	11.89	1.12	11.46	1.15
	40	36	13.81	1.05	13.43	1.08	13.00	1.11	12.77	1.14	12.59	1.15	12.14	1.18
	45	41	14.65	1.08	14.30	1.12	13.88	1.15	13.65	1.17	13.46	1.19	12.98	1.23
	47	43	14.99	1.10	14.65	1.13	14.23	1.17	14.00	1.19	13.81	1.21	13.31	1.24
	50	46	15.03	1.09	14.73	1.12	14.36	1.16	14.15	1.17	13.99	1.19	13.52	1.22
	55	51	15.10	1.08	14.85	1.11	14.58	1.13	14.41	1.14	14.28	1.15	13.85	1.18
	60	56	15.18	1.07	14.98	1.09	14.80	1.11	14.67	1.12	14.57	1.12	14.19	1.14
	63	59	15.22	1.06	15.05	1.08	14.92	1.09	14.82	1.10	14.74	1.10	14.40	1.12
68	64	15.26	1.05	15.13	1.07	15.06	1.08	14.98	1.08	14.92	1.08	14.61	1.09	

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.

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

Table 27: LC187HV System Heating Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB											
	°F DB	°F WB	61		64		68		70		72		75	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
LC187HV / 18,000	0	-0.4	8.96	1.12	8.42	1.16	8.43	1.18	8.24	1.19	8.08	1.20	7.74	1.24
	5	4.5	10.89	1.14	10.37	1.18	10.23	1.20	10.01	1.22	9.84	1.23	9.44	1.27
	10	9	12.18	1.15	11.69	1.19	11.43	1.22	11.20	1.24	11.01	1.25	10.58	1.29
	17	15	13.60	1.17	13.13	1.21	12.75	1.25	12.50	1.27	12.30	1.29	11.83	1.32
	20	19	14.46	1.19	14.00	1.22	13.55	1.27	13.29	1.29	13.08	1.31	12.59	1.35
	25	23	15.90	1.22	15.43	1.25	14.89	1.30	14.61	1.32	14.38	1.35	13.84	1.38
	30	28	17.34	1.25	16.80	1.29	16.22	1.33	15.93	1.36	15.69	1.38	15.11	1.42
	35	32	18.78	1.28	18.18	1.33	17.56	1.36	17.24	1.39	16.99	1.42	16.38	1.45
	40	36	19.73	1.32	19.18	1.36	18.57	1.40	18.25	1.43	17.99	1.45	17.34	1.49
	45	41	20.93	1.36	20.43	1.41	19.83	1.45	19.50	1.48	19.24	1.50	18.54	1.55
	47	43	21.41	1.38	20.93	1.43	20.33	1.47	20.00	1.50	19.73	1.52	19.02	1.57
	50	46	21.47	1.37	21.04	1.42	20.52	1.46	20.22	1.48	19.98	1.50	19.31	1.54
	55	51	21.58	1.36	21.22	1.39	20.83	1.43	20.59	1.44	20.40	1.46	19.79	1.49
	60	56	21.68	1.35	21.40	1.37	21.14	1.40	20.95	1.41	20.81	1.42	20.28	1.44
	63	59	21.74	1.34	21.51	1.36	21.32	1.38	21.18	1.39	21.06	1.39	20.57	1.41
	68	64	21.81	1.33	21.62	1.34	21.51	1.36	21.40	1.36	21.31	1.37	20.86	1.38

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.

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).

Table 28: LC188HV4 System Heating Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB											
	°F DB	°F WB	61		64		68		70		72		75	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
LC188HV4 / 18,000	-4	-4.4	9.61	6.86	8.97	7.08	8.87	7.30	8.76	7.42	8.67	7.51	8.29	7.73
	0	-0.4	10.70	6.43	10.10	6.64	9.92	6.84	9.78	6.96	9.66	7.05	9.26	7.25
	5	4.5	12.01	5.91	11.46	6.10	11.18	6.29	10.99	6.39	10.85	6.47	10.41	6.66
	10	9	12.88	5.43	12.36	5.60	12.01	5.78	11.81	5.87	11.64	5.95	11.18	6.12
	17	15	13.84	4.79	13.36	4.94	12.93	5.10	12.70	5.18	12.51	5.25	12.03	5.40
	20	19	14.42	4.36	13.96	4.50	13.49	4.64	13.24	4.72	13.04	4.78	12.55	4.92
	25	23	15.39	3.93	14.94	4.06	14.42	4.19	14.15	4.26	13.93	4.31	13.40	4.44
	30	28	16.38	3.40	15.87	3.51	15.33	3.62	15.05	3.68	14.82	3.73	14.28	3.84
	35	32	17.37	2.97	16.82	3.07	16.24	3.17	15.95	3.22	15.72	3.26	15.15	3.36
	40	36	18.25	2.55	17.74	2.63	17.18	2.71	16.88	2.76	16.64	2.79	16.04	2.88
	45	41	19.36	2.01	18.90	2.08	18.34	2.14	18.04	2.18	17.79	2.21	17.15	2.28
	47	43	19.80	1.80	19.36	1.86	18.81	1.92	18.50	1.95	18.25	1.98	17.59	2.04
	50	46	19.86	1.79	19.46	1.84	18.98	1.89	18.70	1.92	18.48	1.94	17.86	2.00
	55	51	19.96	1.77	19.63	1.81	19.26	1.85	19.04	1.88	18.87	1.89	18.31	1.93
	60	56	20.06	1.75	19.79	1.78	19.55	1.82	19.38	1.83	19.25	1.84	18.76	1.87
	63	59	20.11	1.74	19.89	1.77	19.72	1.79	19.59	1.80	19.48	1.81	19.03	1.83
68	64	20.17	1.73	19.99	1.75	19.90	1.77	19.79	1.77	19.71	1.78	19.30	1.79	

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.

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

Table 29: LC247HV System Heating Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB											
	°F DB	°F WB	61		64		68		70		72		75	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
LC247HV / 24,000	0	-0.4	15.76	1.74	14.88	1.81	14.61	1.83	14.40	1.85	14.22	1.86	13.63	1.93
	5	4.5	17.63	1.80	16.82	1.86	16.41	1.90	16.14	1.92	15.93	1.94	15.29	2.00
	10	9	18.88	1.85	18.13	1.91	17.62	1.96	17.31	1.98	17.07	2.01	16.40	2.07
	17	15	20.26	1.91	19.56	1.97	18.94	2.04	18.60	2.07	18.33	2.10	17.62	2.16
	20	19	21.10	1.96	20.43	2.02	19.75	2.09	19.38	2.13	19.09	2.16	18.36	2.22
	25	23	22.51	2.04	21.84	2.10	21.08	2.18	20.68	2.22	20.36	2.26	19.59	2.32
	30	28	23.93	2.13	23.19	2.20	22.39	2.27	21.98	2.32	21.65	2.36	20.86	2.42
	35	32	25.35	2.22	24.54	2.30	23.71	2.36	23.28	2.41	22.94	2.46	22.11	2.52
	40	36	26.64	2.28	25.89	2.36	25.07	2.43	24.63	2.48	24.29	2.52	23.41	2.59
	45	41	28.26	2.37	27.58	2.44	26.77	2.52	26.32	2.57	25.97	2.60	25.02	2.68
	47	43	28.90	2.40	28.26	2.48	27.45	2.56	27.00	2.60	26.64	2.64	25.67	2.71
	50	46	28.99	2.38	28.40	2.45	27.70	2.52	27.30	2.56	26.98	2.59	26.07	2.66
	55	51	29.13	2.36	28.65	2.42	28.12	2.47	27.79	2.50	27.54	2.52	26.72	2.58
	60	56	29.27	2.33	28.89	2.38	28.53	2.42	28.29	2.44	28.09	2.45	27.38	2.49
	63	59	29.35	2.32	29.03	2.35	28.78	2.39	28.59	2.40	28.43	2.41	27.77	2.44
68	64	29.44	2.30	29.18	2.33	29.04	2.36	28.89	2.36	28.77	2.37	28.17	2.39	

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.

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).

Table 30: LC367HV System Heating Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB											
	°F DB	°F WB	61		64		68		70		72		75	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
LC367HV / 36,000	0	-0.4	19.98	2.41	18.81	2.50	18.80	2.54	18.37	2.56	18.03	2.58	17.27	2.67
	5	4.5	23.43	2.44	22.34	2.53	22.01	2.58	21.54	2.61	21.17	2.63	20.32	2.72
	10	9	25.75	2.47	24.71	2.56	24.16	2.62	23.67	2.66	23.27	2.69	22.36	2.77
	17	15	28.29	2.51	27.31	2.60	26.52	2.68	26.00	2.72	25.58	2.76	24.60	2.84
	20	19	29.83	2.54	28.88	2.62	27.95	2.71	27.41	2.76	26.99	2.80	25.96	2.88
	25	23	32.40	2.60	31.44	2.67	30.35	2.77	29.77	2.83	29.31	2.88	28.21	2.95
	30	28	34.98	2.67	33.90	2.75	32.73	2.84	32.13	2.90	31.65	2.95	30.49	3.02
	35	32	37.55	2.73	36.36	2.83	35.12	2.90	34.49	2.97	33.98	3.02	32.76	3.10
	40	36	39.47	2.81	38.36	2.91	37.14	2.99	36.49	3.05	35.98	3.10	34.68	3.19
	45	41	41.86	2.91	40.86	3.01	39.66	3.10	39.00	3.16	38.47	3.20	37.07	3.30
	47	43	42.82	2.95	41.86	3.05	40.66	3.15	40.00	3.20	39.47	3.24	38.03	3.34
	50	46	42.94	2.93	42.08	3.02	41.04	3.11	40.44	3.15	39.97	3.19	38.62	3.28
	55	51	43.15	2.90	42.44	2.97	41.65	3.04	41.18	3.08	40.79	3.11	39.59	3.17
	60	56	43.36	2.87	42.80	2.93	42.27	2.98	41.91	3.00	41.62	3.02	40.56	3.07
	63	59	43.49	2.85	43.01	2.90	42.64	2.94	42.35	2.96	42.12	2.97	41.14	3.00
68	64	43.61	2.83	43.23	2.87	43.02	2.90	42.80	2.91	42.62	2.92	41.73	2.94	

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.

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).

Product Data

PERFORMANCE DATA

Heating Capacity Tables

Table 31: LC427HV System Heating Capacity Table.

Model No. / Nominal Capacity (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB											
	°F DB	°F WB	61		64		68		70		72		75	
			TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
LC427HV / 42,000	0	-0.4	21.92	2.60	20.62	2.70	20.64	2.74	20.17	2.76	19.79	2.78	18.95	2.88
	5	4.5	26.29	2.70	25.06	2.79	24.69	2.85	24.17	2.88	23.75	2.91	22.79	3.01
	10	9	29.21	2.79	28.03	2.89	27.41	2.96	26.85	3.00	26.40	3.03	25.36	3.13
	17	15	32.42	2.91	31.30	3.01	30.40	3.10	29.80	3.15	29.32	3.19	28.20	3.28
	20	19	34.37	2.99	33.28	3.09	32.21	3.19	31.59	3.25	31.09	3.30	29.91	3.39
	25	23	37.62	3.14	36.50	3.23	35.23	3.35	34.57	3.42	34.03	3.47	32.75	3.57
	30	28	40.87	3.30	39.61	3.41	38.25	3.51	37.55	3.59	36.98	3.65	35.63	3.74
	35	32	44.13	3.46	42.72	3.58	41.27	3.67	40.53	3.76	39.93	3.83	38.49	3.92
	40	36	46.38	3.56	45.07	3.68	43.64	3.79	42.88	3.86	42.28	3.93	40.74	4.03
	45	41	49.19	3.68	48.01	3.81	46.60	3.93	45.82	4.00	45.20	4.05	43.56	4.17
	47	43	50.31	3.73	49.19	3.86	47.78	3.98	47.00	4.05	46.38	4.10	44.69	4.23
	50	46	50.46	3.71	49.44	3.82	48.22	3.93	47.52	3.99	46.96	4.04	45.37	4.15
	55	51	50.70	3.67	49.86	3.76	48.94	3.85	48.38	3.90	47.93	3.93	46.51	4.01
	60	56	50.95	3.63	50.29	3.70	49.67	3.77	49.24	3.80	48.90	3.82	47.65	3.88
	63	59	51.10	3.61	50.54	3.67	50.10	3.72	49.76	3.74	49.49	3.76	48.34	3.80
	68	64	51.25	3.59	50.80	3.63	50.54	3.67	50.29	3.68	50.08	3.69	49.03	3.72

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.

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).

APPLICATION GUIDELINES

“Equipment Selection Procedure” on page 52

“Building Ventilation Design Guide” on page 54

“Placement Considerations” on page 59

EQUIPMENT SELECTION PROCEDURE

Cooling / Heating Correction Factors

For Four-Way Ceiling Cassette 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 32: 9,000 and 12,000 Btu/h Capacity Cassette System Cooling and Heating Capacity Coefficient Factors.

Piping Length (ft.)		24.6	32.8	49.2	65.6	98.4	131.2	164.0	196.9	229.7	246.0
Cooling Capacity Coefficient Factor											
Rate of Capacity Change (%)	LC098HV4 (9,000 Btu/h)	100	99.7	99.2	98.7	-	-	-	-	-	-
	LC128HV4 (12,000 Btu/h)	100	99.7	99.2	98.7	-	-	-	-	-	-
Heating Capacity Coefficient Factor											
Rate of Capacity Change (%)	LC098HV4 (9,000 Btu/h)	100	99.7	99.2	98.7	-	-	-	-	-	-
	LC128HV4 (12,000 Btu/h)	100	99.7	99.2	98.7	-	-	-	-	-	-

Table 33: 18,000 to 42,000 Btu/h Capacity Cassette System Cooling and Heating Capacity Coefficient Factors.

Piping Length (ft.)		16.4	32.8	49.2	65.6	98.4	131.2	164.0	196.9	229.7	246.0
Cooling Capacity Coefficient Factor											
Rate of Capacity Change (%)	LC187HV (18,000 Btu/h)	100	99.3	97.9	96.6	93.8	91.1	88.4	-	-	-
	LC188HV4 (18,000 Btu/h)	100	99.3	97.9	96.6	93.8	91.1	88.4	-	-	-
	LC247HV (24,000 Btu/h)	100	99.3	97.9	96.6	93.8	91.1	88.4	-	-	-
	LC367HV (36,000 Btu/h)	100	99.3	97.9	96.6	93.8	91.1	88.4	85.6	82.9	81.5
	LC427HV (42,000 Btu/h)	100	99.3	97.9	96.6	93.8	91.1	88.4	85.6	82.9	81.5
Heating Capacity Coefficient Factor											
Rate of Capacity Change (%)	LC187HV (18,000 Btu/h)	100	99.7	99.2	98.7	97.7	96.6	95.6	-	-	-
	LC188HV4 (18,000 Btu/h)	100	99.7	99.2	98.7	97.7	96.6	95.6	-	-	-
	LC247HV (24,000 Btu/h)	100	99.7	99.2	98.7	97.7	96.6	95.6	-	-	-
	LC367HV (36,000 Btu/h)	100	99.7	99.2	98.7	97.7	96.6	95.6	94.6	93.5	93.0
	LC427HV (42,000 Btu/h)	100	99.7	99.2	98.7	97.7	96.6	95.6	94.6	93.5	93.0

Equivalent Piping Length for Piping Components

Table 34: 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 30).

Table 35: Outdoor Unit Frost Accumulation Factor (Heating)¹.

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

¹At 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 a 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 should 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 should 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 Ti, To Temperature.

$Q_{odu(Ti, To)}$ (From capacity tables).

3 Outdoor Unit Capacity Coefficient Factor.

$F_{(Ti, To)} = Q_{odu(Ti, To)} / Q_{odu(rated)}$

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.

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

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.



BUILDING VENTILATION DESIGN GUIDE

Note:

Indoor units (IDUs) should 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 should 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.

ASHRAE Standards 62.1 and 62.2 (depending on if the building is residential or commercial), and local codes specify the minimum volume of airflow that must be provided to an occupied space. Outdoor air is required to minimize adverse health effects, and it provides acceptable indoor air quality for building occupants. Indoor units located within the zone typically require less airflow to condition the space. During the design phase, refer to the airflow capabilities listed in the specification tables for each product. Choose the best method for the application out of the five (5) ventilation options available.

Note:

Disclaimer

Although we believe that these building ventilation methods have been portrayed accurately, none of the methods have been tested, verified, or evaluated by LG Electronics, U.S.A., Inc.. In all cases, the designer, installer, and contractor should understand if the suggested method is used, it is used at their own risk. LG Electronics U.S.A., Inc., takes no responsibility and offers no warranty express, implied, or statutory and the implied warranties of merchantability and fitness for a particular purpose are excluded should the building ventilation methods fail to perform as stated or intended.

• For a complete copy of ASHRAE Standard 62.1 and 62.2, refer to the American Standard of Heating and Air Conditioning Engineers (ASHRAE) website at www.ashrae.org.

Method 1: Natural Ventilation (Non-Ducted, Unconditioned Outdoor Air)

Natural ventilation devices, such as operable windows or louvers may be used to ventilate the building when local code permits. The open area of a window or the free area of a louver must meet the minimum percentage of the net occupied floor area.

Advantages

- Occupants control the volume of the ventilation air manually.
- Useful for historic buildings that have no ceiling space available for outdoor air ductwork.
- May be used with the full lineup of Duct-Free Split system indoor units.

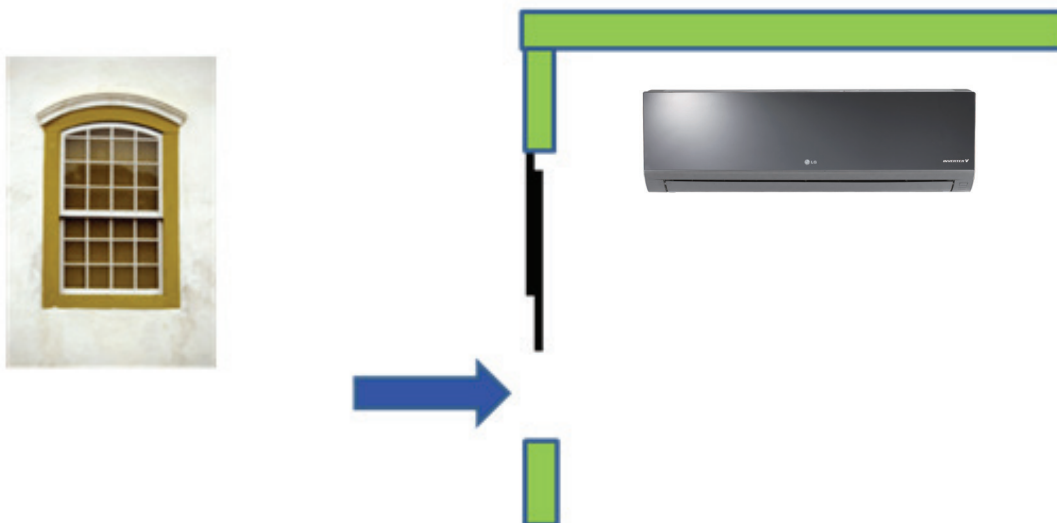
Note:

Methodology illustrations are for examples only and do not depict actual indoor units for the specific outdoor unit pairing. These are generic illustrations to show ventilation design only.

Disadvantages

- In some locations, it may be difficult to control humidity levels when windows are open.
- Thermal comfort levels may be substandard when windows are open.
- Indoor units may have to be oversized to account for the added heating and cooling loads when windows are open.
- Provides outdoor air to perimeter spaces only. Additional mechanical ventilation system may be required to satisfy requirements for interior spaces.
- Outdoor air loads may be difficult to calculate since the quantity of outdoor air is not regulated.
- May affect indoor unit proper operation when open.

Figure 31: Natural Ventilation (Non-Ducted, Unconditioned Outdoor Air).



BUILDING VENTILATION DESIGN GUIDE

Method 2: Unconditioned Outdoor Air (Non-Ducted, Fan Assisted Ventilation)

When approved by local codes, the fan assisted ventilation method uses exhaust fans to remove air from the building, and outdoor air is drawn into occupied spaces through a wall louver or gravity roof intake hood. Supply fans can also be used to push the outdoor air into the space and building positive pressure will vent the exhaust air through louvers or roof-mounted exhaust hoods. Outdoor air is neither cooled nor heated before entering the building.

Note:

This may result in loss of building pressurization control, increasing infiltration loads with adverse effects.

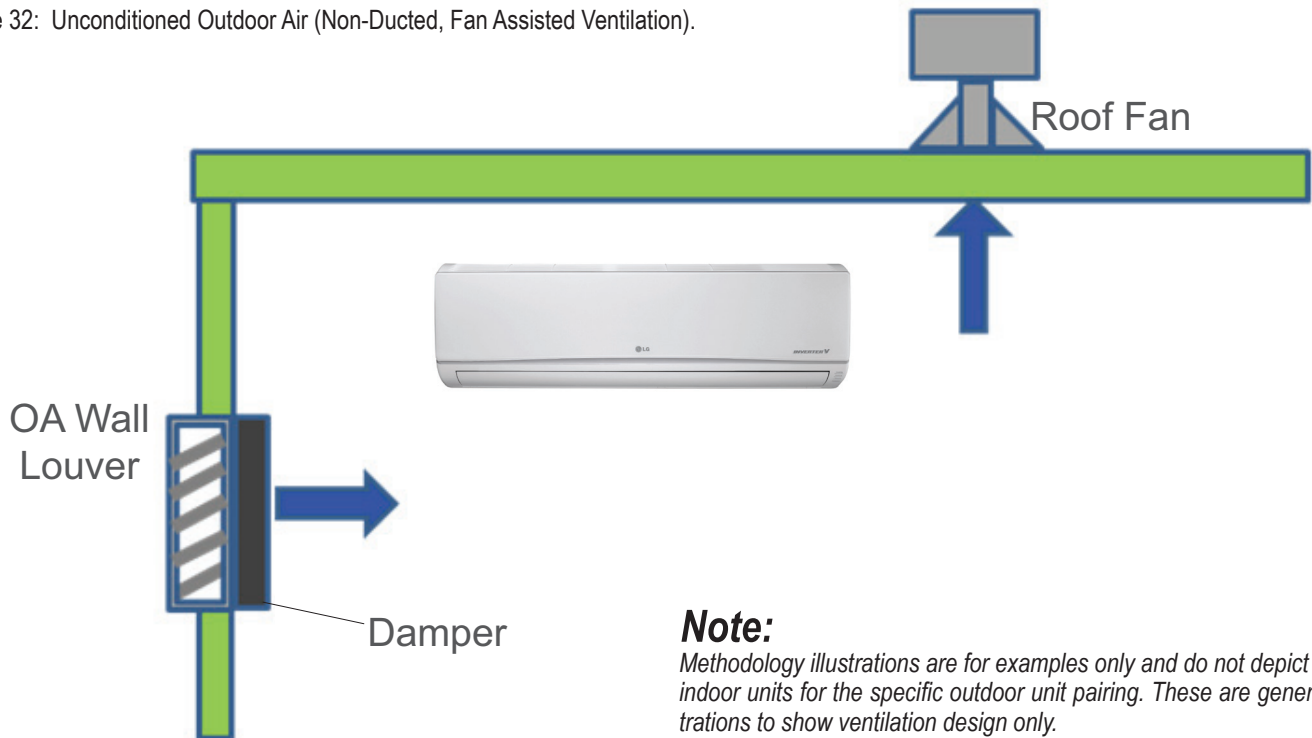
Advantages

- Outdoor air may be manually controlled by the occupant or automatic controls may be installed to open/close outdoor air dampers or to turn on/off ventilation fans.
- Useful for large open spaces like warehouses, garages, and workshops.
- Outdoor air volume is a known quantity. Air loads may be easier to calculate since fans will regulate the amount of outdoor air.
- May be used with the full lineup of Duct-Free Split system indoor units.

Disadvantages

- In some locations of the country, it may be difficult to control humidity levels while outdoor air louvers/hoods are opened.
- Thermal comfort levels may be substandard when louvers/hoods are opened.
- Indoor units may have to be oversized to account for the added heating/cooling loads when louvers/hoods are open.
- Hot, cold, and/or humid areas may be present if the outdoor air is not evenly distributed to the different spaces.

Figure 32: Unconditioned Outdoor Air (Non-Ducted, Fan Assisted Ventilation).



Note:

Methodology illustrations are for examples only and do not depict actual indoor units for the specific outdoor unit pairing. These are generic illustrations to show ventilation design only.

BUILDING VENTILATION DESIGN GUIDE

Method 3: Unconditioned Outdoor Air Ducted to Indoor Units

Untreated outdoor air is channeled through a duct system that is piped to the return air duct on Duct-Free Split system ducted indoor units or to the frame of Duct-Free Split system four-way cassettes.

Note:

Outside air may flow backward through the return air-filter grille when the indoor unit fan speed slows or stops in response to changes in the space load. This may result in captured particulate on the filter media being blown back into the conditioned space.

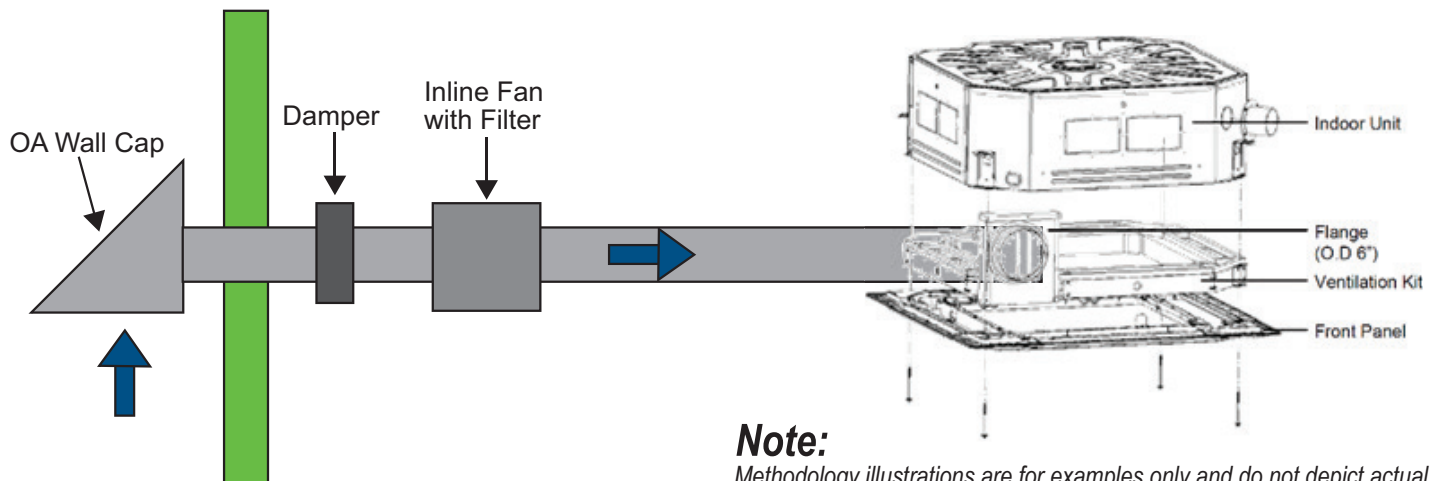
Advantages

- May require less ductwork if indoor units are placed near outdoor walls or a roof deck.
- Controls must be interlocked to shut off the outdoor air supply fan when the space is unoccupied.
- Third-party demand-control ventilation controls may be installed to regulate outdoor intake based on the CO₂ levels of the occupied space.

Disadvantages

- Fan(s) will be required to push outdoor air to the indoor unit to overcome the additional static pressure.
- Filter required to be added to the outdoor air duct.
- Ducted and four-way cassette models are the only indoor units that accept the connection of an outdoor air duct to the unit case.
- In most cases, in lieu of using the factory mounted return-air thermistor on indoor units, a remote wall temperature sensor or zone controller will be needed to provide an accurate reading of the conditioned area temperature.
- Unconditioned outdoor air may affect indoor unit performance, which may necessitate oversizing the indoor unit.

Figure 33: Unconditioned Outdoor Air Ducted to Indoor Units.



Note:

Methodology illustrations are for examples only and do not depict actual indoor units for the specific outdoor unit pairing. These are generic illustrations to show ventilation design only.

BUILDING VENTILATION DESIGN GUIDE

Method 4: Coupled Dedicated Outdoor Air (CDOA)

A separate, dedicated outdoor air system delivers air directly to a Duct-Free Split system indoor unit or to the return air duct system. After mixing with the return air stream, ventilation air passes through the indoor unit and into the conditioned space. The pretreatment system is capable of filtering, conditioning, and dehumidifying outdoor air to room neutral conditions.

Note:

Outside air may flow backward through the return air-filter grille when the indoor unit fan speed is reduced or stops when the space load is satisfied. This may result in captured particulate on the filter media being blown back into the conditioned space.

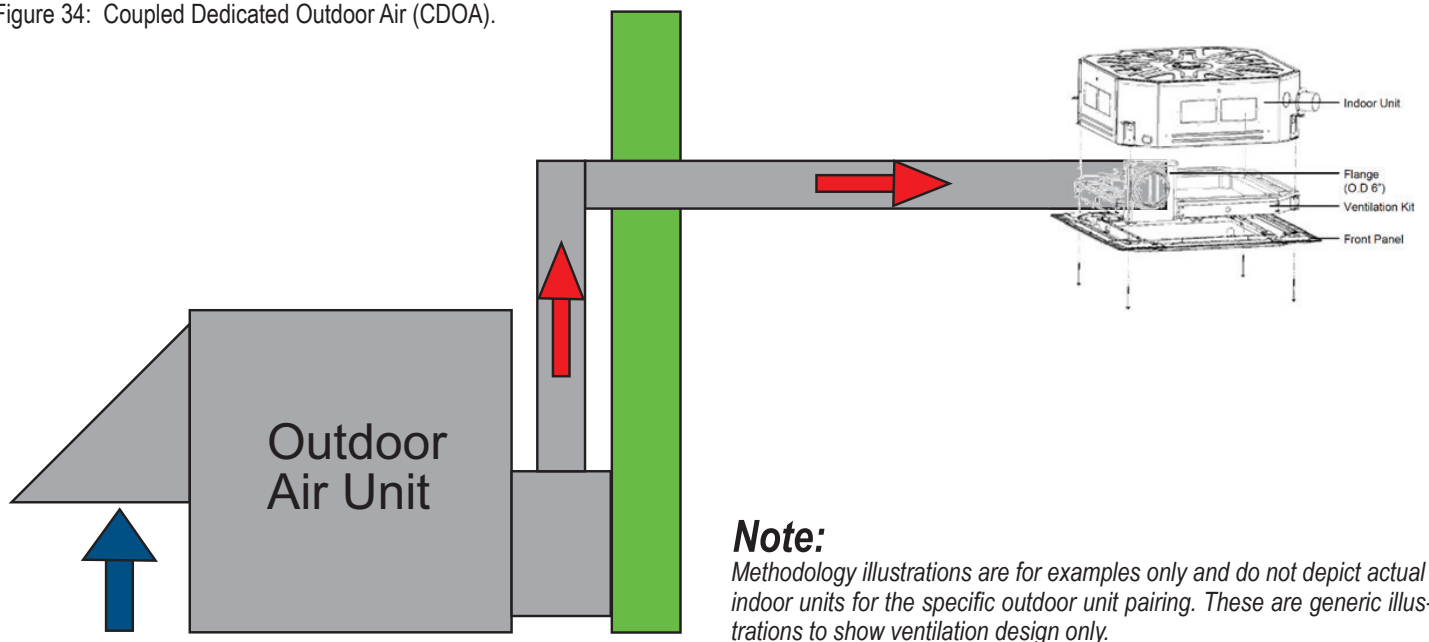
Advantages

- Indoor unit capacity may not need to be increased because of outdoor air.
- Fan and filter system is centralized to the main outdoor air unit.

Disadvantages

- Ducted and four-way cassette indoor units are the only models designed for direct connection of an outside air duct.
- Ceiling space is required for ductwork.
- Failure of outdoor air may impact indoor unit operation.
- In lieu of using the factory mounted return-air thermistor, a remote wall temperature sensor or zone controller may be required to provide an accurate conditioned space temperature reading.

Figure 34: Coupled Dedicated Outdoor Air (CDOA).



Note:

Methodology illustrations are for examples only and do not depict actual indoor units for the specific outdoor unit pairing. These are generic illustrations to show ventilation design only.

BUILDING VENTILATION DESIGN GUIDE

Method 5: Decoupled Dedicated Outdoor Air System (DDOAS)

Provide a separate, dedicated outdoor-air system designed to filter, condition, and dehumidify ventilation air and deliver it directly to the conditioned space through a separate register or grille. This approach requires a separate independent ventilation duct system not associated with the Duct-Free Split system.

Note:

LG recommends using the DDOAS method in all installations.

Advantages

- May be used with the full lineup of Duct-Free Split system indoor units.
- The outdoor air unit may supply “neutral” air to the occupant space even when the Duct-Free Split system indoor unit fan changes speed or cycles on and off. DDOAS controls do not have to be interlocked with the Duct-Free Split system.
- In lieu of installing localized smaller outside air treatment equipment throughout the building, this method centralizes the ventilation air source making service and filter changes easier and less disruptive for the building occupants.
- Third-party demand control ventilation controls are more readily accommodated.

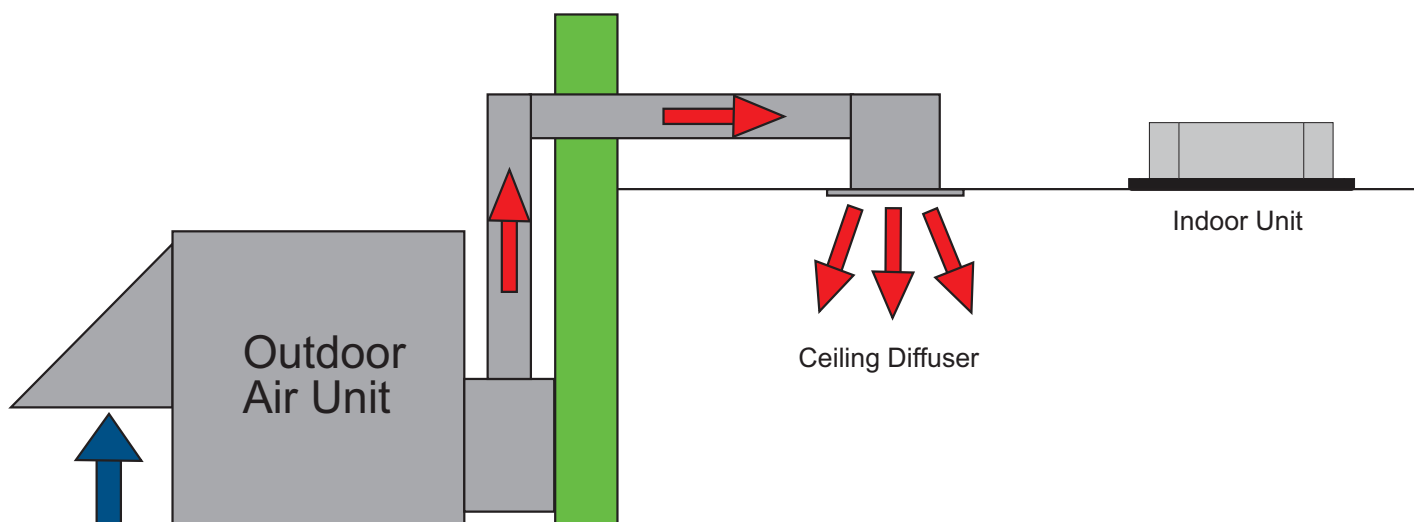
Disadvantages

- Ceiling space is required to accommodate ductwork between the outdoor air unit and ceiling diffusers.

Note:

Methodology illustrations are for examples only and do not depict actual indoor units for the specific outdoor unit pairing. These are generic illustrations to show ventilation design only.

Figure 35: Decoupled Dedicated Outdoor Air System (DDOAS).



PLACEMENT CONSIDERATIONS

Indoor Unit

Selecting the Best Location for the Indoor Unit

⚠ WARNING

The unit should 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.

Note:

Select a location for installing the indoor units that will meet the following conditions:

- 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 in a location where condensation drainage can be conveniently routed away.
- Include enough space around the indoor unit so that it is accessible for maintenance and service purposes.
- Place the unit in a location where electrical noise / electromagnetic waves will not affect 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.
- Place in an area that is level and with enough strength to bear the weight of the indoor unit(s).

⊘ Don'ts

- No obstacles to air circulation around the unit; keep proper distances from ceilings, doorways, floor, walls, etc.
- The unit should not be installed near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.
- The unit should not be installed where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.
- Avoid installing the unit near high-frequency generators or near any equipment that generates an electromagnetic field (minimum 3-1/3 feet away).

Note:

- Indoor units (IDUs) should 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 should 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, certain components are at risk of being corroded. Appropriate anti-corrosion methods should be taken for the unit and all components.

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

Installing in a High or Dropped Ceiling

High or dropped ceilings, often found in commercial buildings and offices, may cause a wide temperature differentiation. To countermeasure:

- Change the indoor unit mode selection to allow for higher ceilings (see table).
- Install an air circulator.
- Set the air discharge outlet so that heated air flows in a downward direction.
- Use a dual door system to protect the building gate or exit.

Table 36: Indoor Unit High Ceiling Mode Selection Options (LCN098HV4, LCN128HV4, LCN187HV, LCN188HV4, LCN247HV).

Ceiling Height	Mode Selection
≤7-1/2 feet	Low Ceiling
7-1/2 feet to 8-7/8 feet	Standard
8-7/8 feet to 10-3/16 feet	High Ceiling
10-3/16 feet to 11-13/16 feet	Very High Ceiling

Table 37: Indoor Unit High Ceiling Mode Selection Options (LCN367, LCN427HV).

Ceiling Height	Mode Selection
≤8-7/8 feet	Low Ceiling
8-7/8 feet to 10-1/2 feet	Standard
10-1/2 feet to 11-13/16 feet	High Ceiling
11-13/16 feet to 13-13/16 feet	Very High Ceiling

PLACEMENT CONSIDERATIONS

Indoor Unit

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 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 36: Indoor Unit Clearance Requirements.

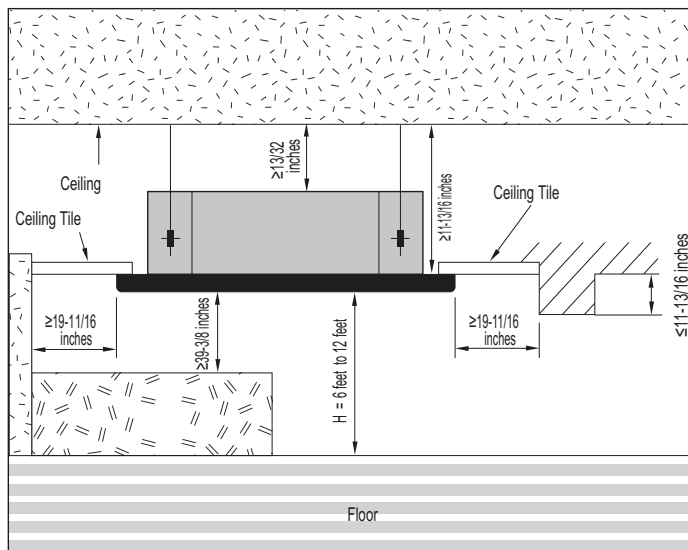


Figure 37: Ceiling Opening Dimensions and Bolt Locations.

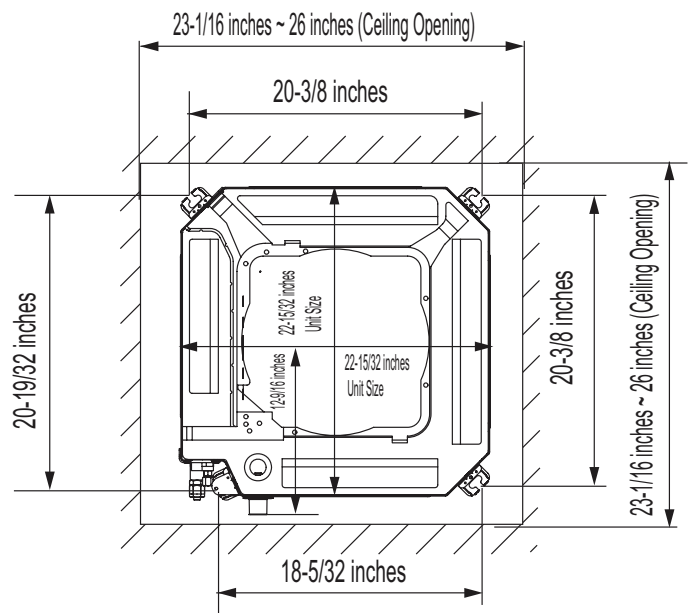
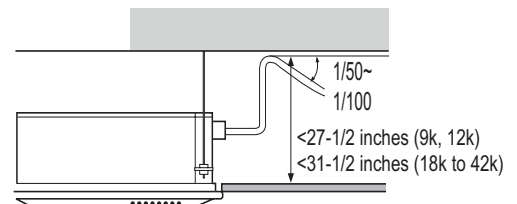


Figure 38: Indoor Unit Drain Piping.



Installing the Drain System

- Drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope should not be straight up and down.
- Do not damage the drain port on the indoor unit when connecting the field-supplied drain piping.
- Drain piping specifications:
 - Indoor Unit Drain Connection: 1-1/4 inch outside diameter.
 - Field-Supplied Drain Piping: Polyvinyl chloride piping with 1-inch inside diameter and pipe fittings.

PLACEMENT CONSIDERATIONS

Outdoor Unit

Selecting the Best Location for the Outdoor Unit

⚠ DANGER

To avoid the possibility of fire, Ⓣ do not install the unit in an area where combustible gas may generate, flow, stagnate, or leak. Failure to do so will cause serious bodily injury or death.

⚠ WARNING

Install a fence to prevent vermin from crawling into the unit or unauthorized individuals from accessing it. Ⓣ Do not install the unit in a location where acidic solution and spray (sulfur) are often used as this may cause serious bodily injury or death. Ⓣ Do not use the unit in environments where oil, steam, or sulfuric gas are present as this may cause serious bodily injury or death.

Note:

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

- Where the unit will not be subjected to direct thermal radiation from other heat sources, nor an area that would not 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 operating sound from the unit will not disturb inhabitants of surrounding buildings.
- Where the unit will not be exposed to direct, strong winds.
- Where there is enough strength to bear the weight of the unit.
- 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.
- 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 are within allowable limits.
- Where high-frequency electrical noise / electromagnetic waves will not affect operation.

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.

⚠ 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.

Planning for Snow and Ice

In climates that experience snow buildup, place the unit on a raised platform to ensure proper condenser airflow. The raised support platform must be high enough to allow the unit to remain above possible snow drifts. Mount the unit on a field-provided stand that is higher than the maximum anticipated snowfall for the location. Design the mounting base to prevent snow accumulation on the platform in front or back of the unit case. If necessary, provide a field fabricated hood to keep snow and ice and/or drifting snow from accumulating on the coil surfaces. Use inlet and discharge duct or hoods to prevent snow or rain from accumulating on the fan inlet and outlet guards. Best practice prevents snow from accumulating on top of the unit. Consider tie-down requirements in case of high winds or where required by local codes.

PLACEMENT CONSIDERATIONS

Outdoor Unit

Tie-Downs / Wind Restraints and Lightning Protection

The strength of the Four-Way Ceiling Cassette system outdoor unit frame is adequate to be used with field-provided wind restraint tie-downs.

Tie-Downs / Wind Restraints

- 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.

Lightening Protection

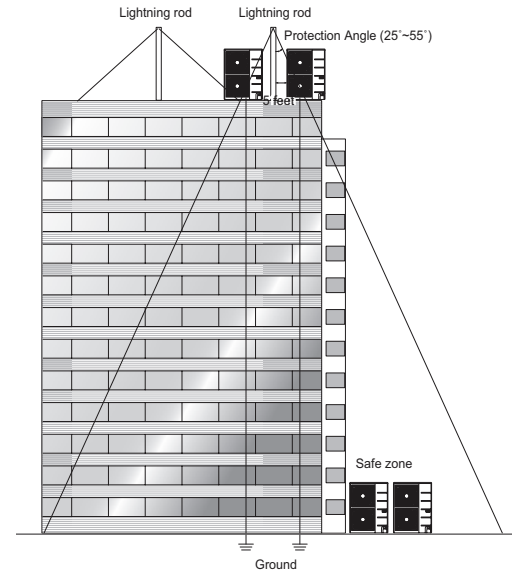
- To protect the outdoor unit from lightning, it should be placed within the specified lightning safety zone.

Table 38: Safety Zone Specifications.

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

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

Figure 39: 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.

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

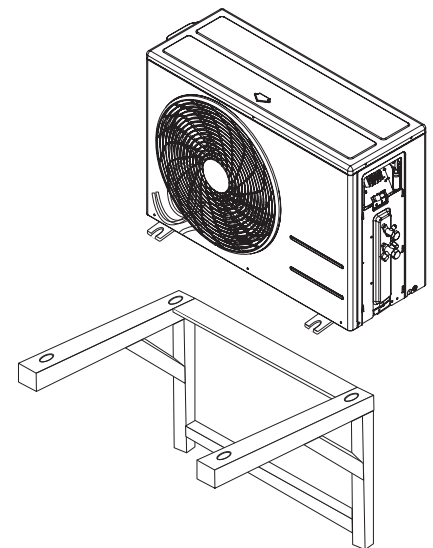
When installing the outdoor unit on a wall or roof top, anchor the mounting base securely using nails or wire with regard to wind and earthquake or vibration.

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 40: Bracket Mounting.



PLACEMENT CONSIDERATIONS

Outdoor Unit

Bolting the Outdoor Unit to the Platform

Figure 41: Bolting the LUU097HV and LUU127HV Outdoor Units to the Platform (Appearance May Vary).

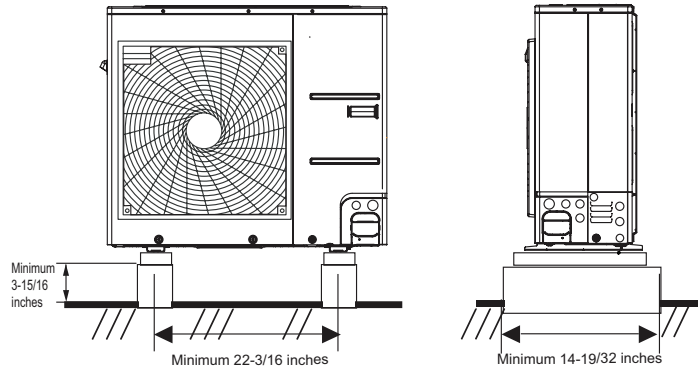


Table 39: Outdoor Unit Foundation Specifications.

Outdoor Unit	Bolt Type	Concrete Height	Bolt Depth
LUU097HV LUU127HV	M10-J	Minimum 3-15/16 inches	Minimum 2-3/8 inches
LUU187HV LUU189HV LUU247HV	M10-J	Minimum 7-7/8 inches	
LUU367HV LUU427HV	M10-J		

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

Note:

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

Figure 42: Bolting the LUU187HV, LUU189HV, and LUU247HV Outdoor Unit to the Platform.

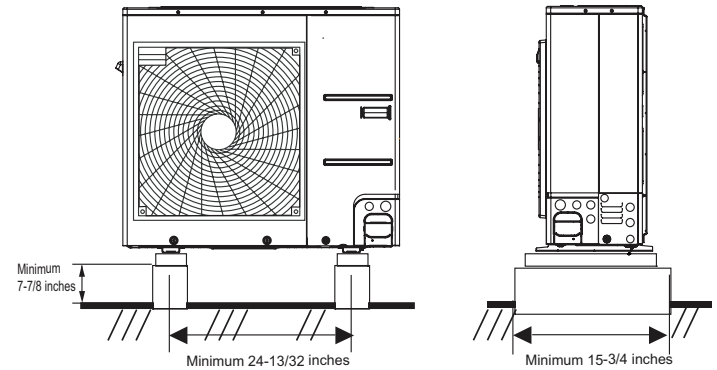


Figure 43: Bolting the LUU367HV and LUU427HV Outdoor Unit to the Platform.

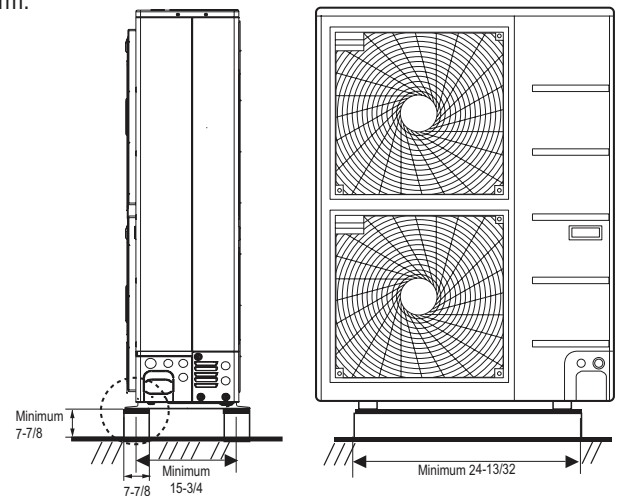


Figure 44: Platform Mounting.

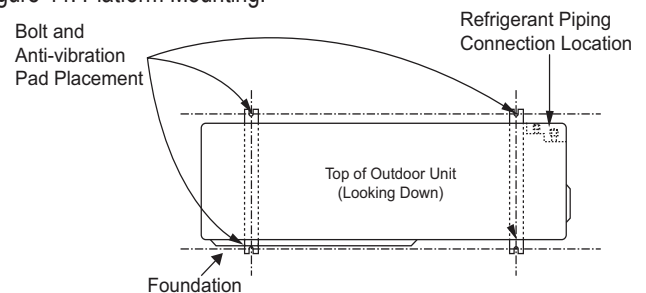
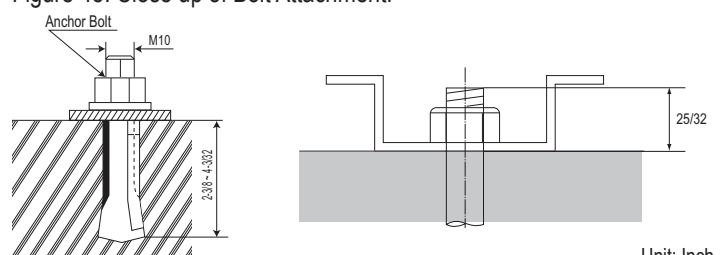


Figure 45: Close up of Bolt Attachment.




Unit: Inch

PLACEMENT CONSIDERATIONS

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 24,000 Capacity) Service Access and Allowable Clearances

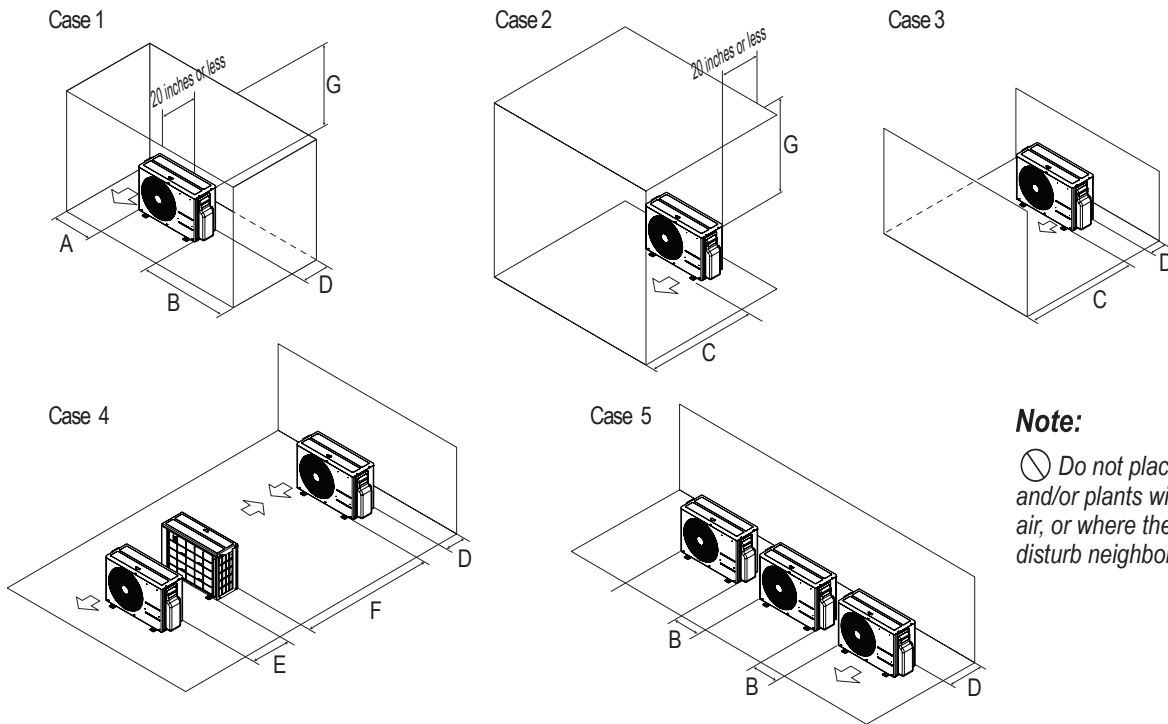
Specific clearance requirements in the diagram below are for (9,000 to 24,000 Btu/h capacities). Figure 43 shows the overall minimum clearances that must be observed for safe operation and adequate airflow around the outdoor unit.

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 Figure 43 for minimum spacing. When installing multiple outdoor units, see Cases 4 and 5 for correct spacing requirements.

Note:

If the outdoor unit is installed between standard and minimum clearances, capacity decreases approximately 10%.

Figure 46: 9,000 to 24,000 Capacity Outdoor Unit Service Access and Allowable Clearances Diagram.



Note:


 Do not place the unit where animals and/or plants will be in the path of the warm air, or where the warm air and/or noise will disturb neighbors.

Table 40: 9,000 to 24,000 Outdoor Unit Service Access and Allowable Clearances Diagram Legend.

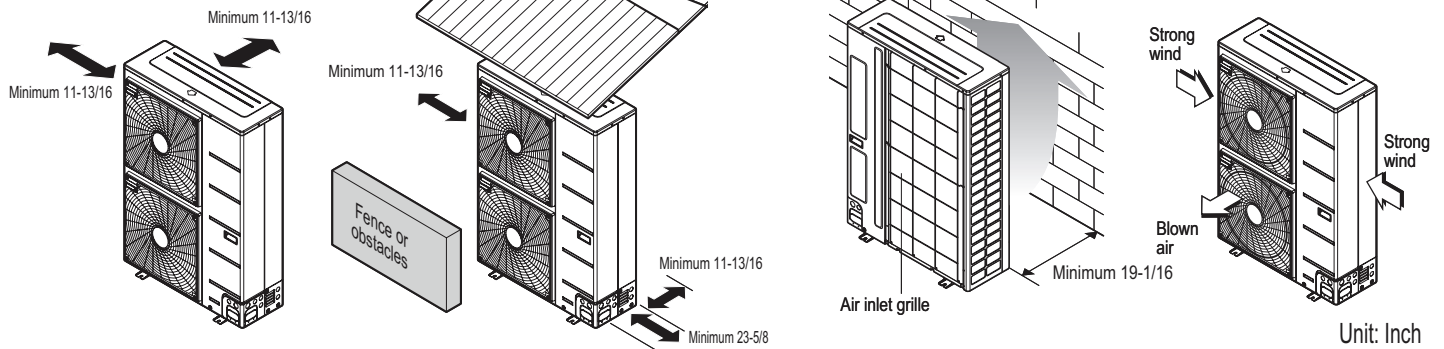
Unit: Inch		A	B	C	D	E	F	G
Case 1	Standard	12	24	-	12	-	-	-
	Minimum	4	10	-	4	-	-	40
Case 2	Standard	-	-	20	-	-	-	-
	Minimum	-	-	14	-	-	-	40
Case 3	Standard	-	-	20	12	-	-	-
	Minimum	-	-	14	4	-	-	-
Case 4	Standard	-	-	-	12	24	-	-
	Minimum	-	-	-	4	8	79	-
Case 5	Standard	-	24	-	12	-	-	-
	Minimum	-	10	-	4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

PLACEMENT CONSIDERATIONS

Outdoor Unit

Outdoor Unit (36,000 and 42,000 Btu/h Capacity) Service Access and Allowable Clearances

When installing the outdoor unit, consider service, inlet, and outlet, and minimum allowable space requirements as illustrated in the following diagrams.



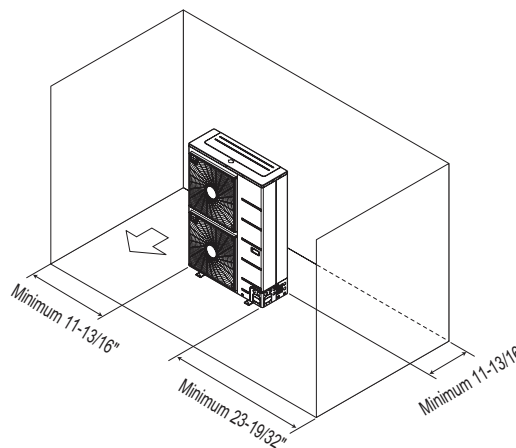
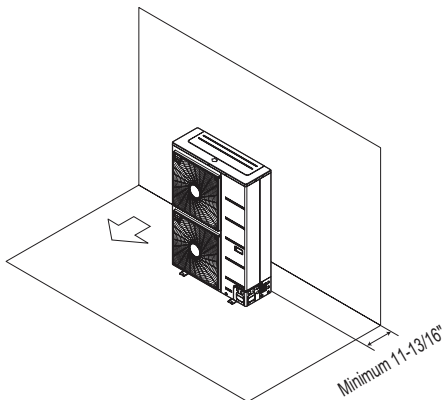
Ensure that the space at the back of the outdoor unit is a minimum of 11-13/16 inches, and include a minimum of 23-5/8 inches at the right side of the unit for service.

If the outdoor unit discharge side faces a wall, include a minimum of 19-11/16 inches between the outdoor unit and the wall. Install the outdoor unit so that the discharge port is set at a right angle to the wind direction.

Clearance Requirements when Different Obstacles are Present (Unit: Inch).

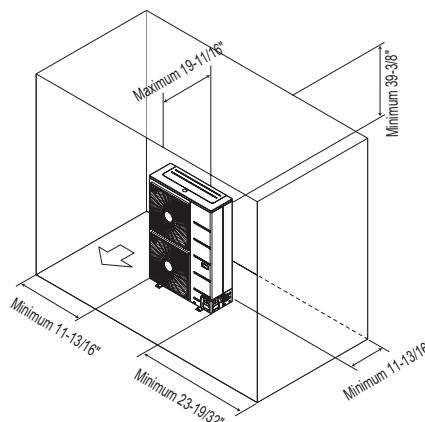
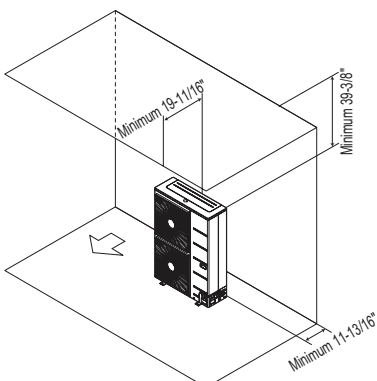
Obstacle on the suction side only.

Obstacles on the suction side and on both left and right sides.



Obstacles above and on the air intake side.

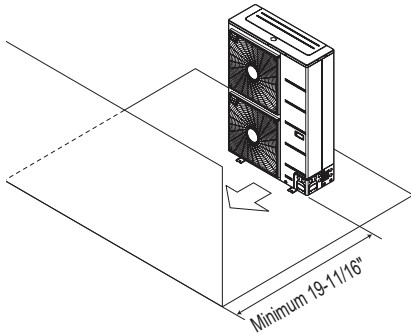
Obstacles above, on the air intake side, and on both left and right sides



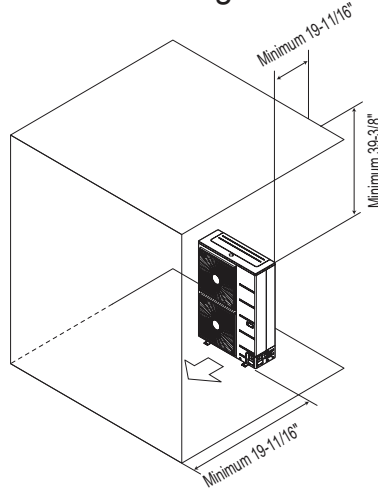
PLACEMENT CONSIDERATIONS

Outdoor Unit

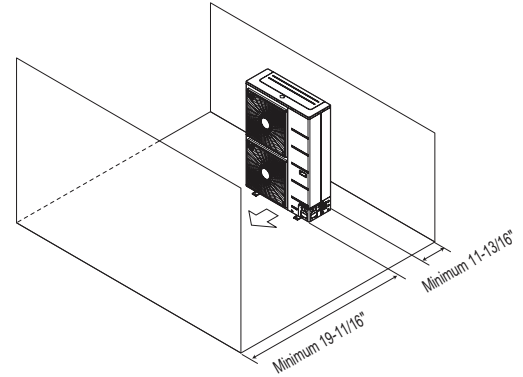
Obstacle just on the air discharge side.



Obstacles above and on the air discharge side.



Where there are obstacles on both suction and discharge sides (discharge side obstacle is higher than the outdoor unit).



Where there are obstacles above, and on both suction and discharge sides (discharge side obstacle is higher than the outdoor unit).

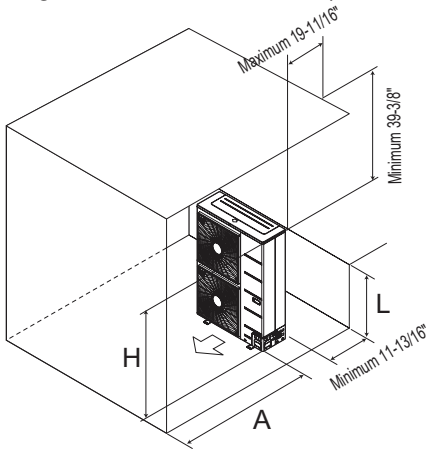
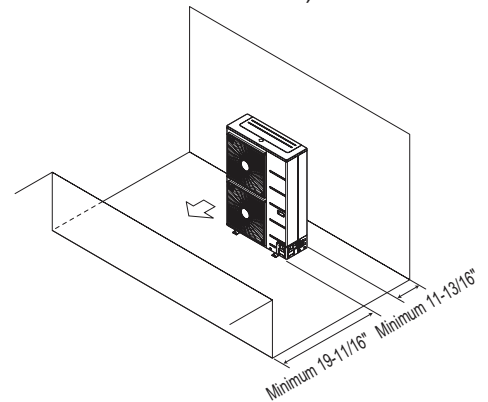


Table 41: Ratio among H, A, and L.

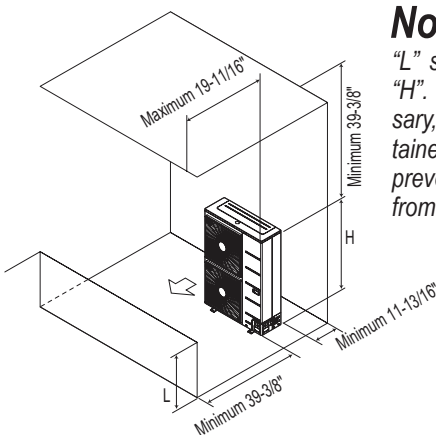
	L	A
$L \leq H$	$0 < L \leq 1/2 H$	29-1/32 inches
	$1/2 H < L$	39-3/8 inches
$H < L$	Set Stand as: $L \leq H$	

If a stand is necessary, it should be contained (not open frame) to prevent the discharge air from short cycling.

Where there are obstacles on both suction and discharge sides (discharge side obstacle is lower than the outdoor unit).



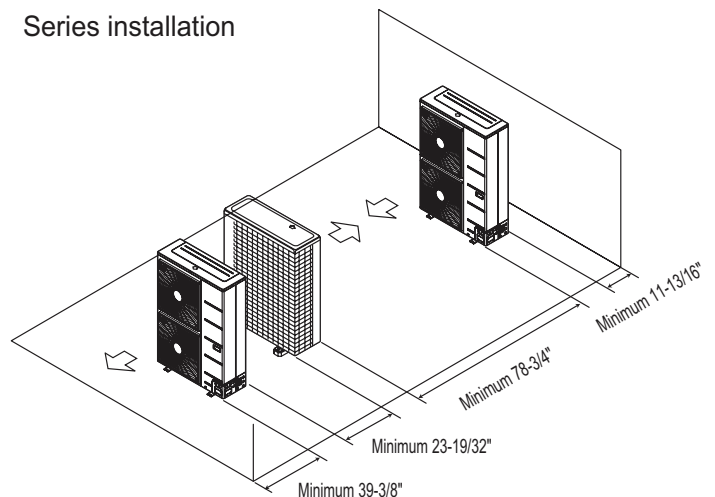
Where there are obstacles above, and on both suction and discharge sides (discharge side obstacle is lower than the outdoor unit).



Note:

"L" should be lower than "H". If a stand is necessary, it should be contained (not open frame) to prevent the discharge air from short cycling.

Series installation



REFRIGERANT PIPING DESIGN & LAYOUT BEST PRACTICES

"Refrigerant Piping Design" on page 68

"Selecting Field-Supplied Copper Tubing" on page 69

"Refrigerant Piping System Layout" on page 70

"Electrical Connections" on page 77

REFRIGERANT PIPING DESIGN

Design Guideline Summary

Device Connection Limitations

A single-zone four-way ceiling cassette system consists of one outdoor unit and one indoor unit. One of the most critical elements of a single-zone four-way ceiling cassette system is the refrigerant piping. The table below lists pipe length limits that must be followed in the design of a single-zone four-way ceiling cassette refrigerant pipe system.

Table 42: Single-Zone Four-Way Ceiling Cassette Refrigerant Piping System Limitations.

System Model Name		LC098HV4, LC128HV4	LC187HV, LC188HV4, LC247HV	LC367HV, LC427HV
Pipe Length (ELF = Equivalent Length of Pipe)	Longest total equivalent piping length	66 feet	164 feet	246 feet
	Shortest total equivalent piping length	6.6	6.6	6.6
	Distance between fittings and indoor or outdoor units	≥20 inches	≥20 inches	≥20 inches
	No additional refrigerant	24.6 feet	24.6 feet	24.6 feet
Elevation (All Elevation Limitations are Measured in Actual Feet)	If outdoor unit is above indoor unit	49 feet	98 feet	98 feet
	If outdoor unit is below indoor unit	49 feet	98 feet	98 feet
Additional Refrigerant Needed (oz/ft)		0.22	0.43	0.43

DFS System Layout

Figure 47: Typical LC098HV4 and LC128HV4 System Layout.

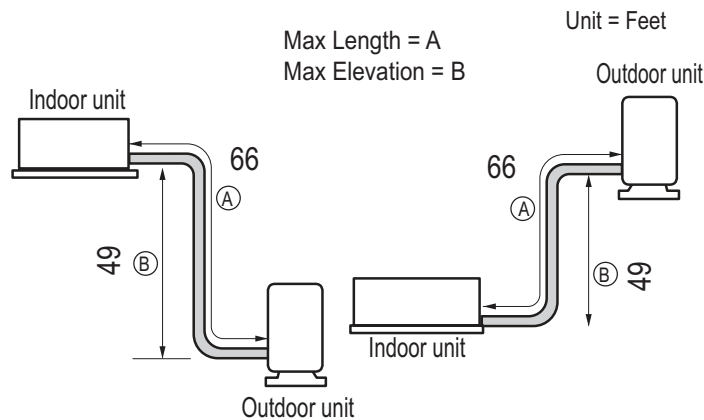


Figure 48: Typical LC187HV, LC188HV4, and LC247HV System Layout.

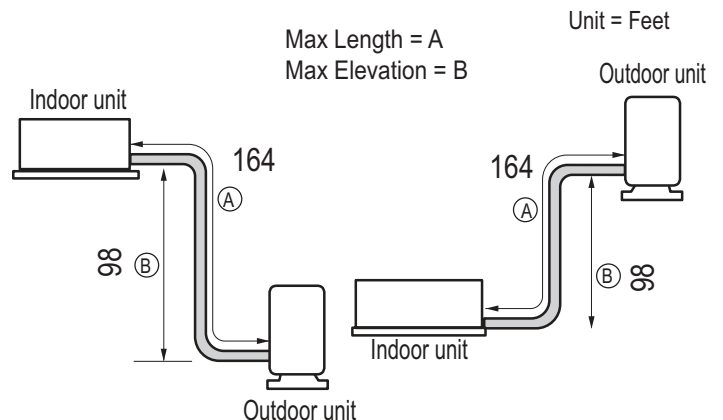
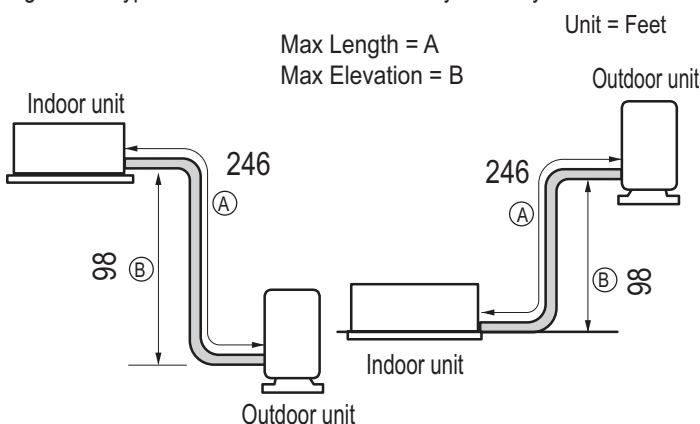


Figure 49: Typical LC347HV and LC427HV System Layout.



REFRIGERANT PIPING DESIGN

Selecting Field-Supplied Copper Tubing

Figure 50: Coiled Expansion Loops and Offsets.

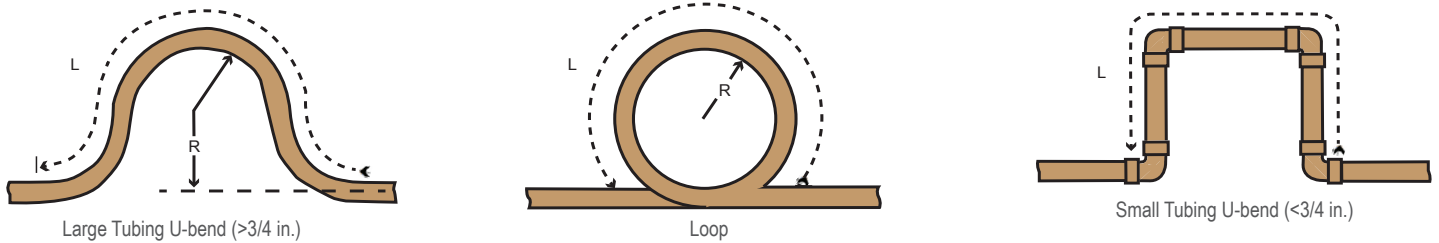


Table 44: Radii of Coiled Expansion Loops and Developed Lengths of Expansion Offsets.

Anticipated Linear Expansion (LE) (inches)		Nominal Tube Size (OD) inches			
		1/4	3/8	1/2	3/4
1/2	R ¹	6	7	8	9
	L ²	38	44	50	59
1	R ¹	9	10	11	13
	L ²	54	63	70	83
1-1/2	R ¹	11	12	14	16
	L ²	66	77	86	101
2	R ¹	12	14	16	19
	L ²	77	89	99	117
2-1/2	R ¹	14	16	18	21
	L ²	86	99	111	131
3	R ¹	15	17	19	23
	L ²	94	109	122	143
3-1/2	R ¹	16	19	21	25
	L ²	102	117	131	155
4	R ¹	17	20	22	26
	L ²	109	126	140	166

¹R = Centerline Length of Pipe.

²L = Centerline Minimum Radius (inches).

Table 43: Linear Thermal Expansion of Copper Tubing in Inches.

Pipe Length ¹	Fluid Temperature °F																			
	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	100°	105°	110°	115°	120°	125°	130°
10	0.04	0.04	0.05	0.06	0.06	0.07	0.08	0.08	0.09	0.09	0.10	0.10	0.11	0.11	0.11	0.12	0.13	0.14	0.15	0.15
20	0.08	0.08	0.10	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.22	0.23	0.26	0.28	0.29	0.30
30	0.12	0.12	0.15	0.18	0.20	0.21	0.23	0.24	0.26	0.27	0.29	0.30	0.32	0.33	0.32	0.35	0.39	0.42	0.44	0.45
40	0.16	0.16	0.20	0.24	0.26	0.28	0.30	0.32	0.34	0.36	0.38	0.40	0.42	0.44	0.43	0.46	0.52	0.56	0.58	0.60
50	0.20	0.20	0.25	0.30	0.33	0.35	0.38	0.40	0.43	0.45	0.48	0.50	0.53	0.55	0.54	0.58	0.65	0.70	0.73	0.75
60	0.24	0.24	0.30	0.36	0.39	0.42	0.45	0.48	0.51	0.54	0.57	0.60	0.63	0.66	0.65	0.69	0.78	0.84	0.87	0.90
70	0.28	0.28	0.35	0.42	0.46	0.49	0.53	0.56	0.60	0.63	0.67	0.70	0.74	0.77	0.76	0.81	0.91	0.98	1.02	1.05
80	0.32	0.32	0.40	0.48	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.86	0.92	1.04	1.12	1.16	1.20
90	0.36	0.36	0.45	0.54	0.59	0.63	0.68	0.72	0.77	0.81	0.86	0.90	0.95	0.99	0.97	1.04	1.17	1.26	1.31	1.35
100	0.40	0.40	0.50	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.08	1.15	1.30	1.40	1.45	1.50
120	0.48	0.48	0.60	0.72	0.78	0.84	0.90	0.96	1.02	1.08	1.14	1.20	1.26	1.32	1.30	1.38	1.56	1.68	1.74	1.80
140	0.56	0.56	0.70	0.84	0.91	0.98	1.05	1.12	1.19	1.26	1.33	1.40	1.47	1.54	1.51	1.61	1.82	1.96	2.03	2.10
160	0.64	0.64	0.80	0.96	1.04	1.12	1.20	1.28	1.36	1.44	1.52	1.60	1.68	1.76	1.73	1.84	2.08	2.24	2.32	2.40
180	0.72	0.72	0.90	1.08	1.17	1.26	1.35	1.44	1.53	1.62	1.71	1.80	1.89	1.98	1.94	2.07	2.34	2.52	2.61	2.70
200	0.80	0.80	1.00	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.16	2.30	2.60	2.80	2.90	3.00
220	0.88	0.88	1.10	1.32	1.43	1.54	1.65	1.76	1.87	1.98	2.09	2.20	2.31	2.42	2.38	2.53	2.86	3.08	3.19	3.30
240	0.96	0.96	1.20	1.44	1.56	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.59	2.76	3.12	3.36	3.48	3.60
260	1.04	1.04	1.30	1.56	1.69	1.82	1.95	2.08	2.21	2.34	2.47	2.60	2.73	2.86	2.81	2.99	3.38	3.64	3.77	3.90
280	1.12	1.12	1.40	1.68	1.82	1.96	2.10	2.24	2.38	2.52	2.66	2.80	2.94	3.08	3.02	3.22	3.64	3.92	4.06	4.20

¹Pipe length baseline temperature = 0°F. "Expansion of Carbon, Copper and Stainless Steel Pipe," *The Engineers' Toolbox*, www.engineeringtoolbox.com.

REFRIGERANT PIPING DESIGN

Selecting Field-Supplied Copper Tubing / Refrigerant Piping System Layout

Definitions

Physical Pipe Length: Actual length of straight segment(s) of pipe.

Equivalent Pipe Length: Actual length of pipe plus equivalent lengths of long radius elbows, Y-branches, and valves.

Layout Procedure

1. Draft a one-line diagram of the proposed piping system connecting outdoor unit to indoor units. Follow the pipe limitations listed on page 64.
2. Calculate the physical length of each pipe segment and note it on the drawing.
3. Calculate the equivalent pipe length of each pipe segment.

Using Elbows

Field-supplied elbows are allowed as long as they are long radius and designed for use with R410A refrigerant. The designer should be cautious with the quantity and size of fittings used, and must account for the additional pressure losses in equivalent pipe length calculation. The equivalent pipe length of each elbow must be added to each pipe segment. See Table 40 for equivalent lengths.

Table 45: Equivalent Piping Length for Piping Components.

Component	Size (Inches)				
	1/4	3/8	1/2	5/8	3/4
Long Radius Elbow (ft.)	0.5	0.6	0.7	0.8	1.2

Field-Provided Isolation Ball Valves

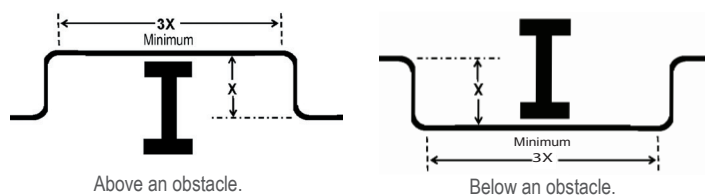
It is acceptable to install field-supplied ball valves with Schrader ports at the indoor unit. Full-port isolation ball valves with Schrader ports (positioned between valve and indoor unit) rated for use with R410A refrigerant should be used on both the liquid and vapor lines.

If valves are not installed and the indoor unit needs to be removed or repaired, the entire system must be shut down and evacuated. Position valves with a minimum distance of three (3) to six (6) inches of pipe on either side of the valve. Valves must be easily accessible for service. If necessary, install drywall access doors or removable ceiling panels, and position the valves to face the access door or ceiling panel opening. Mount valves with adequate space between them to allow for placement of adequate pipe insulation around the valves. Recommended best practice is to clearly label and document locations of all service valves. The equivalent pipe length of each ball valve must be added to each pipe segment.

Obstacles

When an obstacle, such as an I-beam or concrete T, is in the path of the planned refrigerant pipe run, it is best practice to route the pipe over the obstacle. If adequate space is not available to route the insulated pipe over the obstacle, then route the pipe under the obstacle. In either case, it is imperative the horizontal section of pipe above or below the obstacle be a minimum of three (3) times greater than the longest vertical rise (or fall) distance.

Figure 51: Installing Piping Above and Below an Obstacle.



In-line Refrigeration Components

Components such as oil traps, solenoid valves, filter-dryers, sight glasses, tee fittings, and other after-market accessories are not permitted on the refrigerant piping system between the outdoor unit and the indoor unit. Single Zone air-source systems are provided with redundant systems that assure oil is properly returned to the compressor. Sight-glasses and solenoid valves may cause vapor to form in the liquid stream. Over time, dryers may deteriorate and introduce debris into the system. The designer and installer verify the refrigerant piping system is free of traps, sagging pipes, sight glasses, filter dryers, etc.

INSTALLATION & LAYOUT BEST PRACTICES

Refrigerant Piping System Layout

No Pipe Size Substitutions

Using a different size is prohibited and may result in a system malfunction or failure to work at all.

Inserts and Pipe Supports

Inserts

An insert can be installed into a floor or beam before the concrete sets so that fittings such as ducts, pipes, or suspension bolts can be added at a later time. Decide where the inserts should be placed before support installation.

Note:

A properly installed pipe system should be adequately supported to avoid pipe sagging. Sagging pipes become oil traps that lead to equipment malfunction.

Pipe Supports

Pipe supports should never touch the pipe wall; supports shall be installed outside (around) the primary pipe insulation jacket (see Figure 50). Insulate the pipe first because pipe supports shall be installed outside (around) the primary pipe insulation jacket. Clevis hangers should be used with shields between the hangers and insulation.

Field provided pipe supports should be designed to meet local codes. If allowed by code, use fiber straps or split-ring hangers suspended from the ceiling on all-thread rods (fiber straps or split ring hangers can be used as long as they do not compress the pipe insulation). Place a second layer of insulation over the pipe insulation jacket to prevent chafing and compression of the primary insulation within the confines of the support pipe clamp.

A properly installed pipe system will have sufficient supports to avoid pipes from sagging during the life of the system. As necessary, place supports closer for segments where potential sagging could occur. Maximum spacing of pipe supports must meet local codes. If local codes do not specify pipe support spacing, pipe must be supported: Maximum of five feet (5') on center for straight segments of pipe up to 3/4" outside diameter size.

Wherever the pipe changes direction, place a hanger within twelve (12) inches on one side and within twelve to nineteen (12 to 19) inches of the bend on the other side as shown in Figure 51.

Figure 54: Typical Pipe Support Location—Change in Pipe Direction.

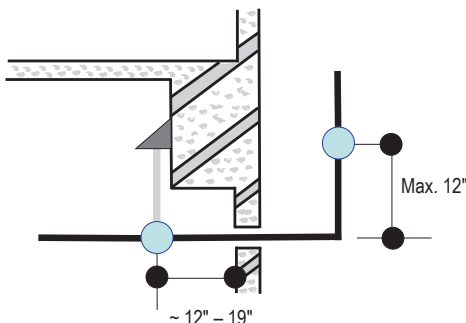


Figure 52: Installing an Insert Into a Concrete Beam.

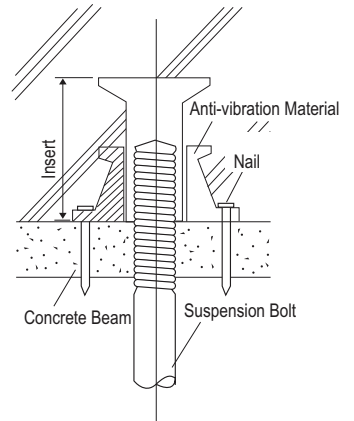


Figure 53: Pipe Hanger Details.

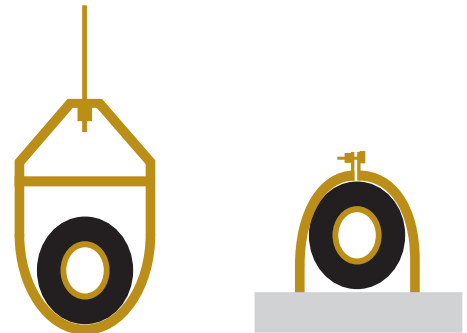
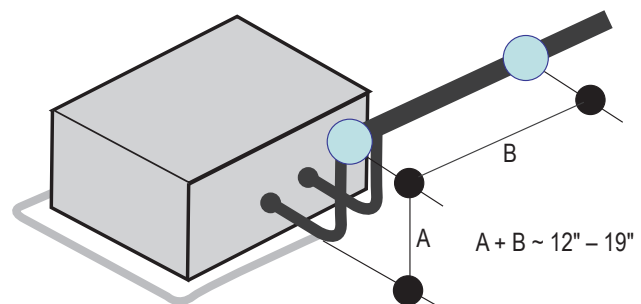


Figure 55: Pipe Support at Indoor Unit.



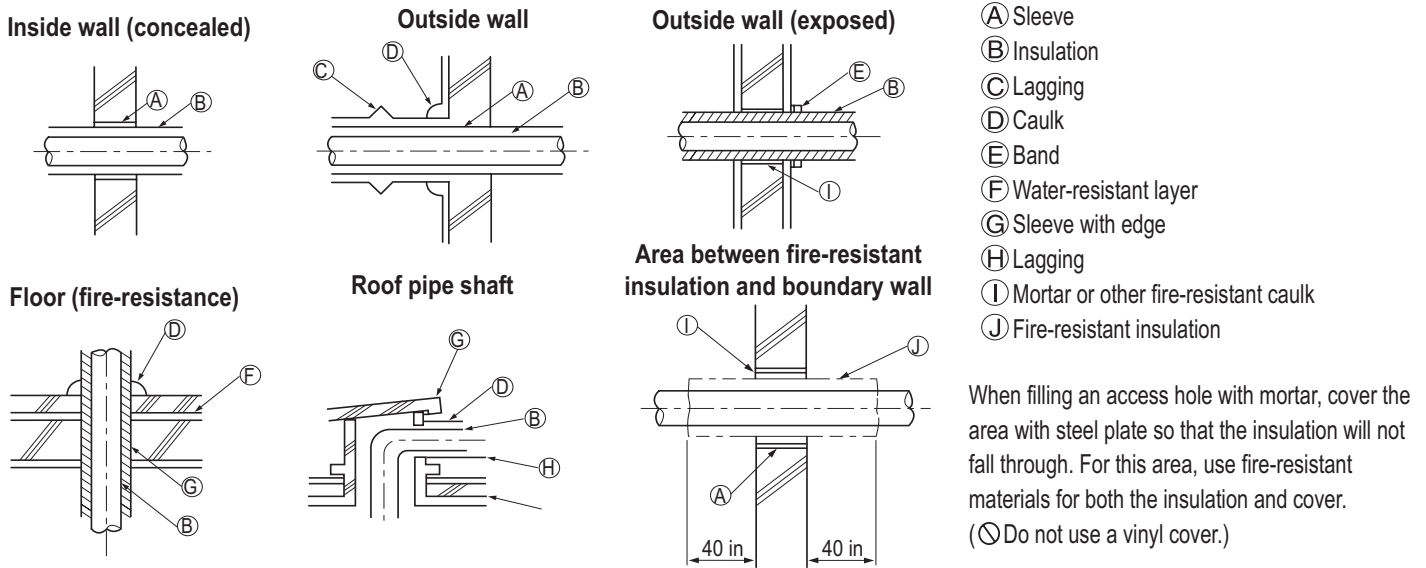
INSTALLATION & LAYOUT BEST PRACTICES

Refrigerant Piping System Layout

Pipe Sleeves at Penetrations

LG requires that all pipe penetrations through walls, floors, and pipes buried underground be properly insulated and routed through an appropriate wall sleeve of sufficient size to prevent compression of refrigerant pipe insulation and free movement of the pipe within the sleeve. Underground refrigerant pipe shall be routed inside a protective sleeve to prevent insulation deterioration.

Figure 56: Pipe Sleeve Options.



Note:

Diameter of penetrations shall be determined by pipe diameter plus the thickness of the insulation.

Underground Refrigerant Piping

Refrigerant pipe installed underground should 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 46: Utility Conduit Sizes.

Liquid Pipe ¹	Vapor Pipe ¹		
	1/2 (2.0 ^{2,5})	5/8 (2-1/8 ^{2,5})	3/4 (2-1/4 ^{2,5})
1/4 (1.0) ³	4	4	4
3/8 (1-1/8) ³	4	4	5
1/2 (1-1/2) ⁴	5	5	5
5/8 (1-5/8) ⁴	5	5	5
3/4 (1-3/4) ⁴	5	5	5

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

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

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

⁴Insulation thickness (value in parenthesis) = 1 inch.

⁵Insulation thickness (value in parenthesis) = 3/4 inch.

Figure 57: Typical Arrangement of Refrigerant Pipe and Cable(s) in a Utility Conduit.

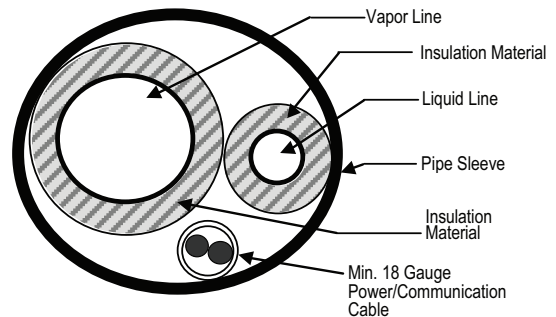


Table 47: Outdoor Unit Refrigerant Pipe Connections.

System Model No.	Liquid Conn. (inches)	Vapor Conn. (inches)
LC098HV4, LC128HV4	1/4	3/8
LC187HV, LC247HV, LC367HV, LC427HV	3/8	5/8
LC188HV4	1/4	1/2

INSTALLATION & LAYOUT BEST PRACTICES

Refrigerant Piping System Layout

Single Zone Cassette Outdoor Unit Connections

1. Remove the connection cover from the unit by loosening the screws.
2. Align the center of the refrigerant pipe and corresponding connection.
3. Place a couple of drops of refrigerant oil on the opening rim of the flare before assembling. Ensure you do not add any contaminants. Tighten the flare nut initially by hand.
4. Finish tightening the flare nut with a torque wrench until the wrench clicks. See page 70 for torque information.

Note:

When tightening the flare nut with a torque wrench, ensure the direction for tightening follows the arrow on the wrench.

Figure 58: Removing the Refrigerant Piping Connection Cover (LUU097HV, LUU127HV).

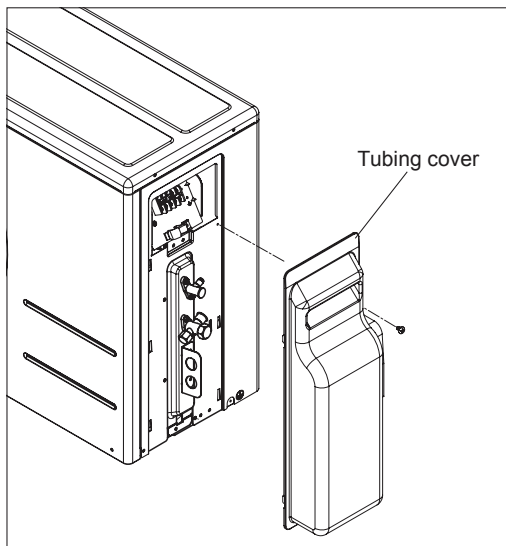


Figure 60: LUU097HV, LUU127HV, LUU187HV, LUU189HV, LUU247HV Refrigerant Piping Connections.

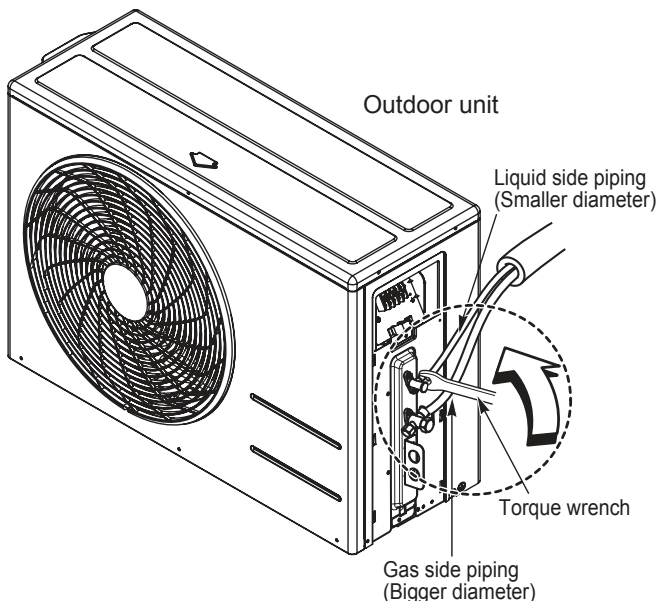


Figure 59: Removing the Refrigerant Piping Connection Cover (LUU187HV, LUU189HV, LUU247HV).

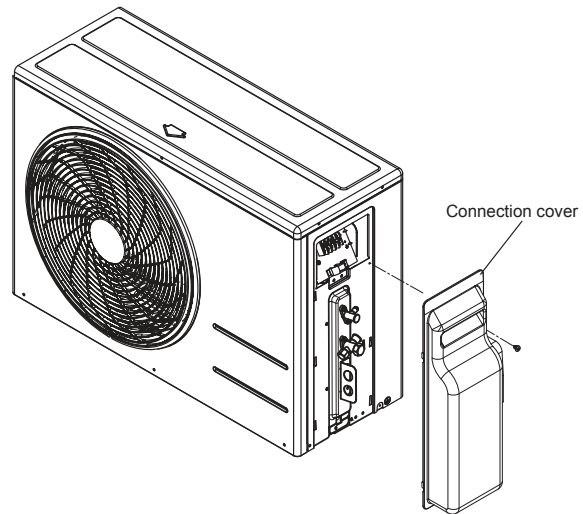
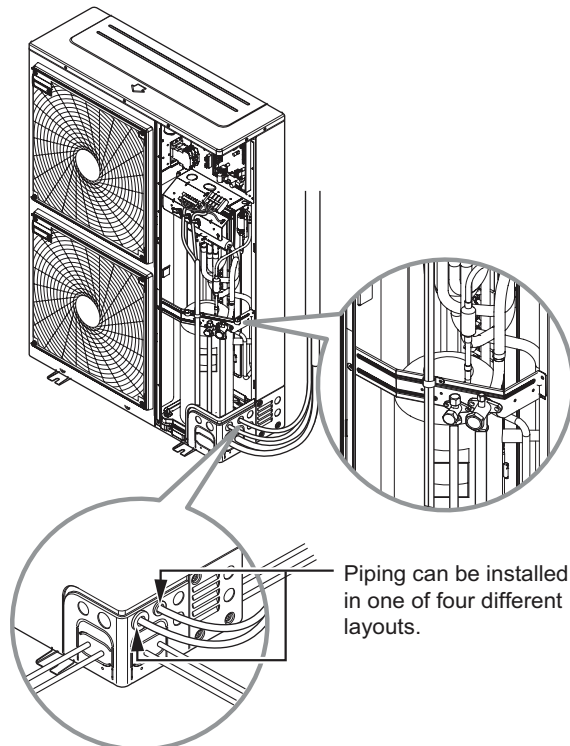


Figure 61: LUU367HV, LUU427HV Refrigerant Piping Connections.



INSTALLATION & LAYOUT BEST PRACTICES

Refrigerant Piping System Layout

Brazing Practices

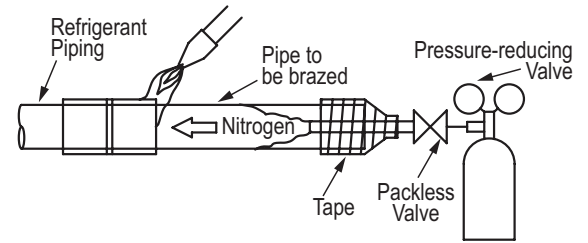
Note:

It is imperative to keep the piping system free of contaminants and debris such as copper burrs, slag, or carbon dust during installation.

All joints are brazed in the field. Single Zone Cassette refrigeration system components contain very small capillary tubes, small orifices, electronic expansion valves, oil separators, and heat exchangers that can easily become blocked. Proper system operation depends on the installer using best practices and utmost care while assembling the piping system.

- While brazing, use a dry nitrogen purge operating at a minimum pressure of three (3) psig and maintain a steady flow.
- Blow clean all pipe sections with dry nitrogen prior to assembly.
- Do not use a saw to cut pipe; use a tubing cutter. De-burr and clean all cuts before assembly.
- Store pipe stock in a dry place. Keep pipe capped and clean.
- Use adapters to assemble different sizes of pipe.
- Do not use flux, soft solder, or anti-oxidant agents.
- Use a 15% silver phosphorous copper brazing alloy to avoid overheating and produce good flow.
- Protect isolation valves, electronic expansion valves, and other heat-sensitive control components from excessive heat with a wet rag or a heat barrier spray product.

Figure 62: Refrigerant Pipe Brazing.



Flare Connection Practices

1. When connecting the flare nuts, coat the flare (outside only) with polyvinyl ether (PVE) refrigeration oil only.

Note:

- Do not use polyolyster (POE) or any other type of mineral oil as a thread lubricant. These lubricants are not compatible with PVE oil used in this system and create oil sludge leading to equipment damage and system malfunction.
- Improperly installed flare connections can lead to refrigerant leaks.
- When tightening the flare unit with a torque wrench, ensure the direction for tightening follows the arrow on the wrench.

2. Initially hand tighten the flare nuts using three (3) or four (4) turns.
3. To finish tightening the flare nuts, use both a torque wrench and a backup wrench.
4. After all the piping has been connected and the caps have been tightened, check for refrigerant leaks.

Loosening the Flare Nuts

Always use two (2) wrenches to loosen the flare nuts.

Figure 63: Flare Connection, Isometric View.

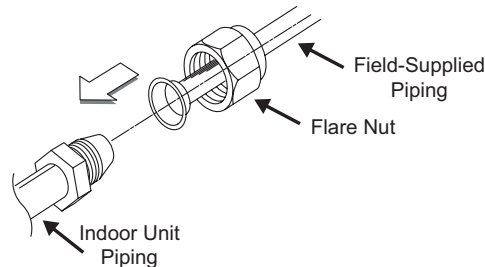


Figure 64: Flare Connection, Side View.

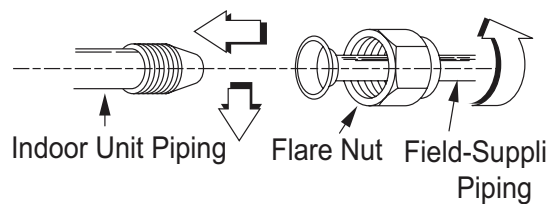


Table 48: Tightening Torque for Flare Nuts.

Pipe Size (Inches O.D.)	Outside Diameter (mm)	Tightening Torque (ft-lbs)
1/4	6.35	13.0 ~ 18.0
3/8	9.52	24.6 ~ 30.4
1/2	12.7	39.8 ~ 47.7
5/8	15.88	45.6 ~ 59.3
3/4	19.05	71.6 ~ 87.5

INSTALLATION & LAYOUT BEST PRACTICES

Refrigerant Piping System Layout

Refrigerant Piping System Insulation

All refrigerant piping including connections, field-provided isolation ball valves, service valves, and elbows shall be completely insulated using closed cell pipe insulation.

To prevent heat loss/heat gain through the refrigerant piping, all refrigerant piping including liquid lines and vapor lines shall be insulated separately. Insulation shall be a minimum 1/2" thick, and thickness may need to be increased based on ambient conditions and local codes.

All insulation joints shall be glued with no air gaps. Insulation material shall fit snugly against the refrigeration pipe with no air space between it and the pipe. Insulation passing through pipe hangers, inside conduit, and/or sleeves must not be compressed. Protect insulation inside hangers and supports with a second layer. All pipe insulation exposed to the sun and outdoor elements shall be properly protected with PVC, aluminum vapor barrier, or alternatively placed in a weather-resistant enclosure such as a pipe rack with a top cover; and meet local codes. Pay special attention to insulating the pipes installed in the ceiling plenum.

The design engineer should perform calculations to determine if the factory-supplied insulation jackets are sufficient to meet local codes and avoid sweating. Maximum refrigerant piping temperature is +227°F; minimum refrigerant piping temperature is -4°F. Add additional insulation if necessary. Check the fit of the insulation jacket after the header fitting and all run-out pipes are installed. Mark all pipes at the point where the insulation jacket ends. Remove the jacket. Install field provided insulation on the run-out and main trunk pipes first. Install the LG-provided insulation plugs on the ends of all unused header ports. Peel the adhesive glue protector slip from the insulation jacket and install the clam-shell jacket over the fitting.

Charging

Each outdoor unit is factory charged (nameplate charge) for the evaporator as well as a standard 25 ft line. Any time a line set is used longer than the standard 25 ft line set length, the refrigerant charge has to be adjusted.

You must adjust the charge based on how many feet of piping are added based on 0.22 oz. of R410A per foot. The factory charge accommodates pipe lengths up to the standard length without requiring refrigerant removal.

Note:

If you are uncertain of the unit charge, reclaim, evacuate and weigh in the correct charge using the unit nameplate (capacity) charge adjusting for line sets longer than 24.6 or 41 ft. This will prevent any interruptions to the functioning of the unit and possible damage.

Example: A 50 ft line set is used --

9 additional feet x 0.22 oz per ft = Add 1.98 oz of R410A

Table 49: Charging Capacity.

Capacity (Btu/h)/Model	Pipe Size		Standard Length (ft)	Max. Elevation (ft)	Max. Length (ft)	Min. Length (ft)	Additional Refrigerant (oz/ft)
	Vapor	Liquid					
9k LC098HV4, 12k LC128HV4	3/8	1/4	24.6	49	66	6.6	0.22
18k LC187HV, 24k LC247HV	5/8	3/8	24.6	98.4	164	6.6	0.43
18k LC188HV4	1/2	1/4	24.6	98.4	164	6.6	0.43
36k LC367HV, 42k LC427HV	5/8	3/8	24.6	98.4	246	6.6	0.43

CONDENSATE DRAIN PIPING

Condensate Drain Piping

Condensate drain piping should be constructed out of materials approved by local codes (generally PVC). Drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope should not be straight up and down, and support hangers should be used at 3-5/16 to 5 foot intervals to keep the condensate drainage system stable.

The inside temperature of the drain piping can rise to about 50°F. When high temperature and humidity air touch the outside surface of the drain pipe, condensation may form. To prevent condensation from forming, install polyethylene insulation 1/4 to 7/16 inches thick. Drain piping must be properly insulated to prevent damage to the indoor unit and the ceiling.

Test the condensate drain piping system for leaks 24 hours after installation is complete. Use only water to test the drain piping.

Outdoor Units

See pages 57 to 62 for information in reference to outdoor unit placement and condensate drainage.

Indoor Units

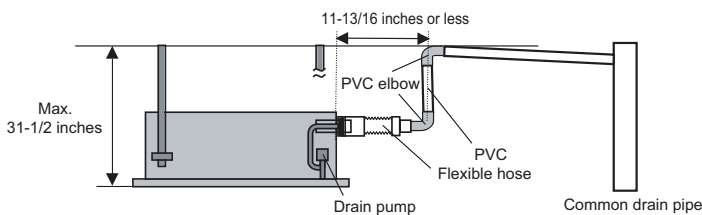
The Four-Way Ceiling Cassette indoor units include a factory-installed drain pump. Depending on the location of the indoor unit, condensation can be drained directly to the outside of the building, or tied into a drainage piping system.

Table 50: Drain Piping Specifications.

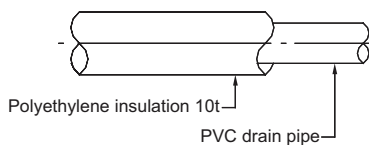
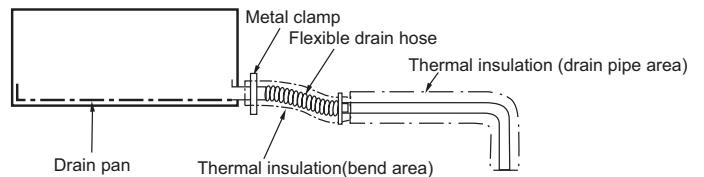
Indoor Unit	Drain Pipe Dia. (inches) (External / Internal)	Drain Pump	Drain Lift Height (inches)	Amount of Drainage (gpm) (at 0.4 inches high)
9k to 12k Ceiling Cassette	1-1/4 / 1	Standard	27-1/2	0.106
18k to 42k Ceiling Cassette	1-1/4 / 1	Standard	31-1/2	0.106

Figure 65: Condensate Drain Piping Trap.

Models with drain pump



Models without drain pump

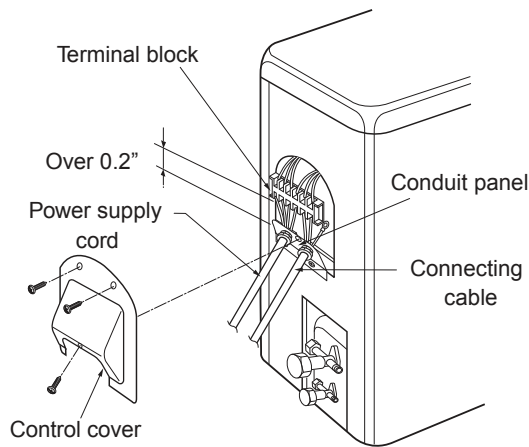


Outdoor Unit Power Wiring / Communications Cable Connections

LUU097HV, LUU127HV, LUU187HV, LUU189HV, LUU247HV Outdoor Unit Connections

1. Remove the 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 67: LUU187, 247HV Outdoor Unit Terminal Block Location.



LUU367HV, LUU427HV Outdoor Unit Connections

1. Remove the side panel.
2. Use the clamp to attach the wiring / cable.

Figure 66: LUU098, 128HV Outdoor Unit Terminal Block Location.

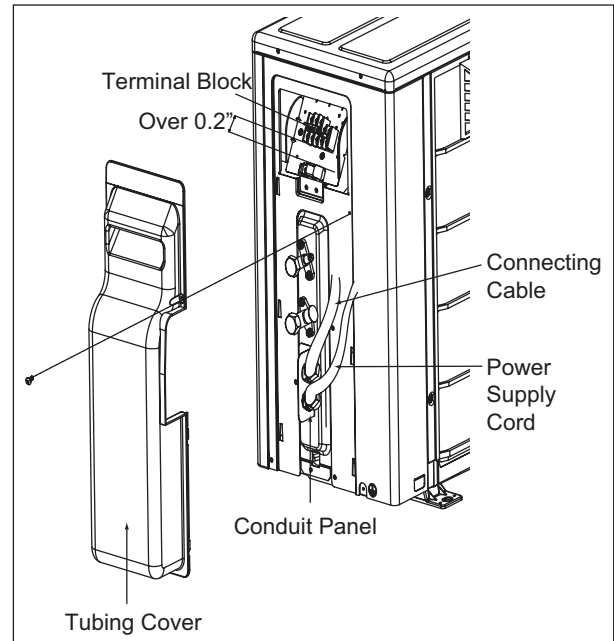
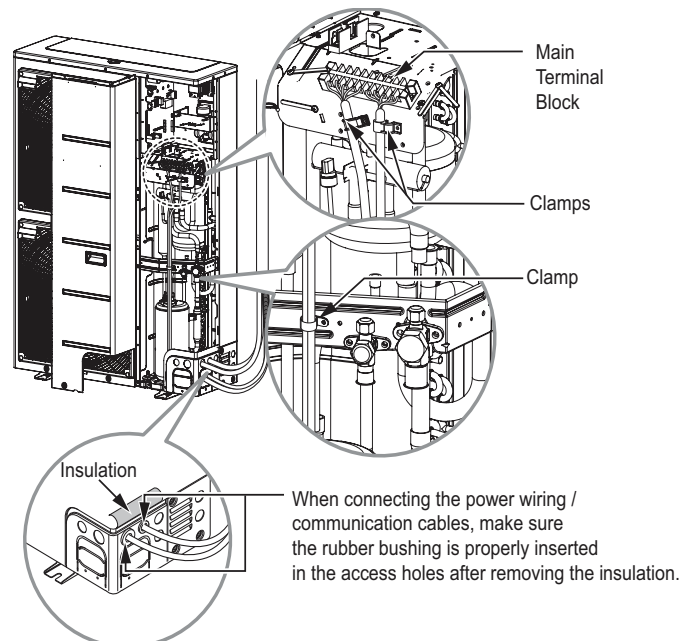


Figure 68: LUU367, 427HV Outdoor Unit Terminal Block Location.

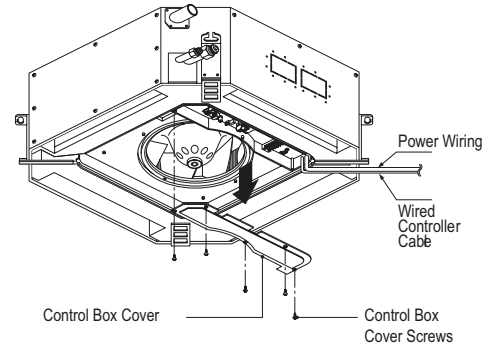


ELECTRICAL CONNECTIONS

Cassette Indoor Unit Power Wiring / Communications Cable Connections

1. To access the terminal block, open the control box cover.
2. Insert the power wiring / communications cable from the outdoor unit through the sides of the indoor unit and control box. Pass the wiring through the designated access holes to prevent damage. To prevent electromagnetic interference and product malfunction, leave a space between the power wiring and communications cable outside of the indoor unit. (For power wiring / communications cable between the single zone outdoor unit and the indoor unit, use a four-conductor, stranded, shielded or unshielded wire. If shielded, the wire must be grounded to the chassis at the outdoor unit only.)
3. Connect each wire to its appropriate terminal on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit wiring match the color and terminal numbers on the indoor unit.
4. Neatly arrange power wiring / communications cable and secure with the appropriate cable restraint. ⚠ Do not apply force to the wiring connections when clamping.
5. Firmly reattach the control box cover. ⚠ Do not catch the wiring in the electric box cover. Make sure the cover firmly closes.
6. Fill in any gaps around the wiring access holes with sealant to prevent foreign particles from entering the indoor unit.

Figure 70: Power Wiring and Communications Cable Connection Access.



Using a Conduit

1. Remove the rubber stopper on the indoor unit. Pass the power wiring / communications cable through the conduit, the conduit mounting plate, and to / through the control panel of the indoor unit.
2. Connect the power wiring / communications cable to the indoor unit terminal block.
3. Screw the conduit mounting plate to the indoor unit.
4. Tighten the conduit and the conduit mounting plate together.

Figure 71: Cassette Indoor Unit Terminal Block Location / Using a Conduit.

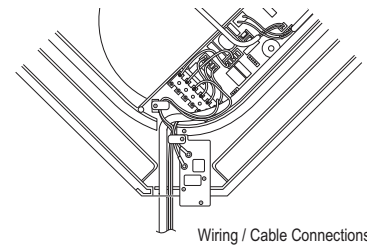
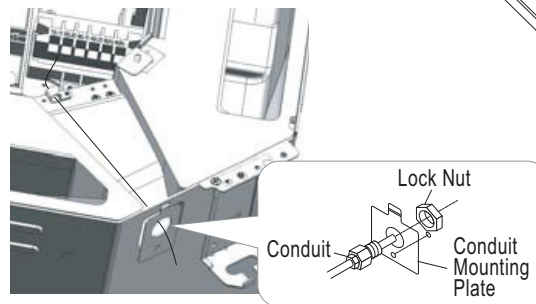


Figure 69: Circuit Breaker/Time Delay Fuse Connection.

Note:

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

⚠ WARNING

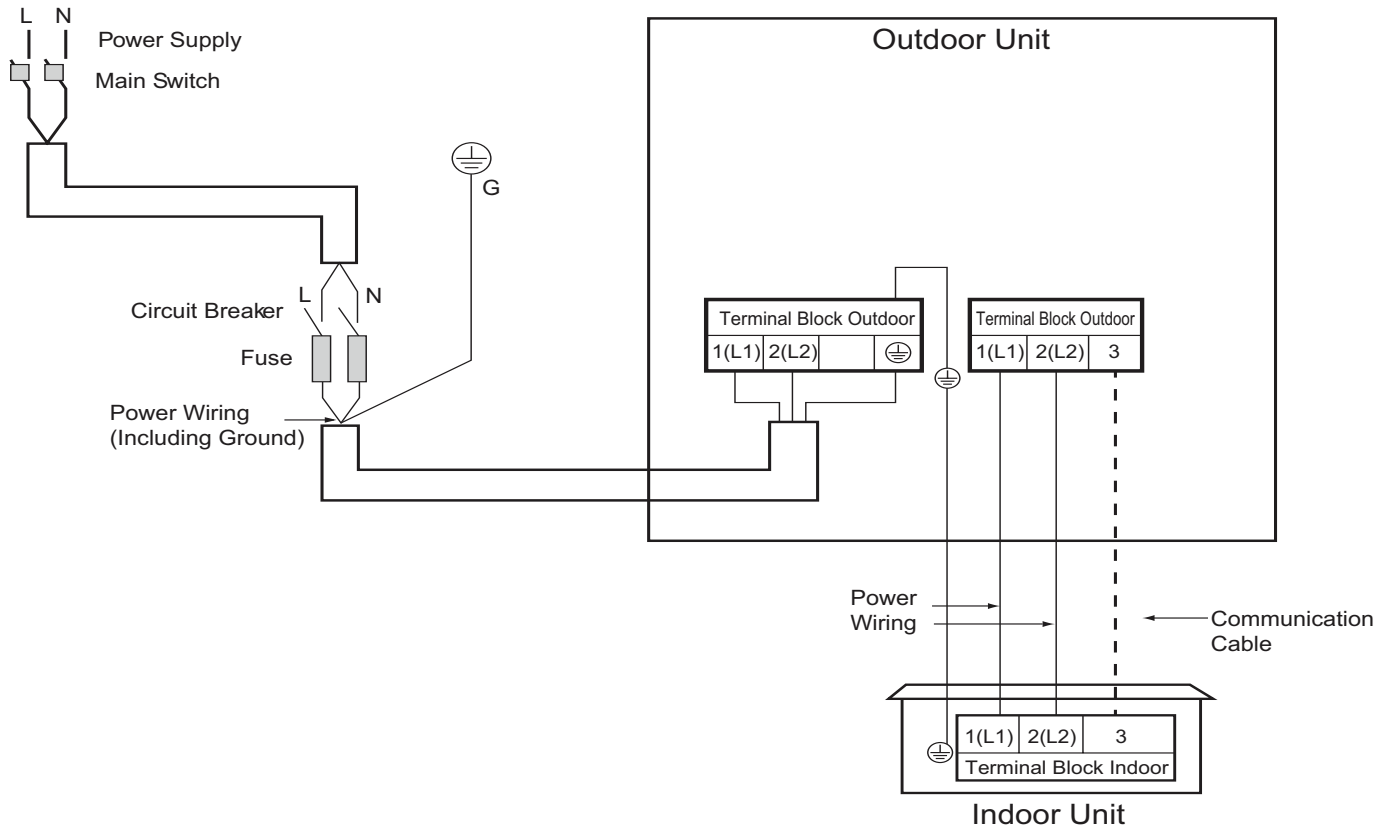
- Separately wire the high and low voltage lines. There is a risk of electric shock, physical injury, or death.
- Use heat-proof electrical wire capable of withstanding temperatures up to 167°F to avoid wiring malfunction and electrical shock, which may cause physical injury or death.
- Ensure you connect 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 piping, the compressor or any moving parts since it can lead to mechanical failure.

ELECTRICAL CONNECTIONS

Figure 72: 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 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 as it can lead to mechanical failure.

TECHNICAL DATA

“Mechanical Specifications” on page 81

“Acronyms” on page 83

MECHANICAL SPECIFICATIONS

Four-Way Ceiling Cassette System

General

System

LG single zone four-way ceiling cassette system comprises of a single frame outdoor unit connected to a single indoor unit with a single refrigerant circuit. An LG single zone four-way ceiling cassette is a DFS system that 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 Electrical Testing Laboratories (ETL) label. Wiring in these units are in accordance with the national Electrical Code (NEC). LG single zone four-way ceiling cassette 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 units have sound levels not exceeding 54 dB(A) tested in an anechoic chamber under ISO Standard 3745.

Indoor Unit

The indoor units have sound ratings no higher than 46 dB(A) as tested per ISO Standard 3745.

Temperature Ranges

9,000 and 12,000 Btu/h Ceiling Cassette Operating Ranges

- Operating ranges for outdoor units of 0°F to +118°F (DB) for cooling (Cooling range can be extended from 0°F down to -4°F using the Low Ambient Wind Baffle Kit [sold separately]); -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.

18,000, 24,000, 36,000, and 42,000 Btu/h Ceiling Cassette Operating Ranges

- Operating ranges for outdoor units of 5°F to +118°F (DB) for cooling; 0°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 indoor unit case is constructed of a galvanized steel plate designed to recess in the ceiling, and has a surface mounted concentric grille on the bottom of the unit. Unit has four supply air outlets and one return air inlet. The supply air outlet has four-directional slot diffusers, each equipped with an independent oscillating motorized guide vane to change airflow direction. A guide vane algorithm sequentially changes the predominant discharge airflow direction in counterclockwise pattern, or can be used to lock each guide vane independently in a field-adjusted fixed position. The four vanes can be individually adjusted from the wired remote controller to customize the airflow pattern for the conditioned space. A setting in the cooling and heating modes can cycle the vanes up and down for uniform / random air distribution.

A required architectural grille is sold as a separate required accessory. The four-way grille is off-white acrylonitrile butadiene styrene (ABS) polymeric resin with a tapered trim edge.

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 outdoor unit is equipped with one hermetically sealed, digitally controlled, inverter-driven twin rotary compressor to modulate capacity (variable from 20 to 100 Hz, modulate in 1 Hz increments). Teflon coated bearings, overcurrent protection and vibration isolation are integrated with the compressor.

Figure 73: Four-Way Ceiling Cassette System (LC097HV, LC127HV, LC187HV, LC188HV4, and LC247HV Models).



MECHANICAL SPECIFICATIONS

Four-Way Ceiling Cassette 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 (LUU097HV), 12,000 Btu/h (LUU127HV), 18,000 Btu/h (LUU187HV), 18,000 Btu/h (LUU189HV), and 24,000 Btu/h (LUU247HV) outdoor units include one direct drive, variable speed axial / propeller type fan with a horizontal air discharge; the 36,000 Btu/h (LUU367HV) and 42,000 Btu/h (LUU427HV) include two fans. 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

All of the indoor units have a single, direct-drive, turbo fan manufactured of high-strength ABS HT-700 polymeric resin; the fans are statically and dynamically balanced. 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 digital control algorithm that provides pre-programmed, field-selectable fixed or auto fan speeds in the Heating and Cooling modes.

The indoor fan has Low, Med, High, Power Cool and Auto settings for Cooling mode; and has Low, Med, High, and Auto settings for Heating mode. Auto setting adjusts the fan speed based on the difference between the controller set-point and space temperature.

Air Filter - Indoor Unit

Return air is filtered with a factory-supplied, removable, washable filter accessible from the bottom of the unit.

For 2' x 2' cassettes the removable washable filter size is 14" x 14" x 1."

For 3' x 3' cassettes the removable washable filter size is 20.5" x 20.5" x 1."

Electrical

The system was 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.

Controls

Indoor and outdoor units are factory wired with necessary electrical control components, printed circuit boards, thermistors, sensors, terminal blocks, and lugs for power wiring. Factory installed microprocessor controls in the outdoor unit and indoor unit shall perform functions to efficiently operate the single zone system, communicating via an 18 AWG four stranded and shielded conductor power/transmission cable. Microprocessor-based algorithms provide component protection, soft-start capability, refrigeration system pressure, temperature, defrost, and ambient control. System can be operated through a handheld wireless controller supplied with the four-way ceiling cassette indoor unit.

Condensate Lift/Pump

The indoor unit is provided with a factory installed and wired condensate lift/pump capable of providing a minimum 27-1/2 inch (9k and 12k indoor units) or minimum 31-1/2 inch (18k to 42k indoor units) lift from the bottom surface of the unit. Drain pump has a safety switch to shut off the indoor unit if the condensate rises too high in the drain pan.

Figure 74: Four-Way Ceiling Cassette System (LC367HV, LC427HV Models).



Table 51: Table of Acronyms.

ABS	Acrylonitrile Butadiene Styrene	kW	Kilo Watts
AC	Air Conditioner	LED	Light Emitting Diode
ACP	Advanced Control Platform	LEED	Leadership in Energy and Environmental Design
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers	MBh	Thousands BTUs per hour
AWG	American Wire Gauge	MCA	Maximum Circuit Ampacity
BLDC	Brushless Digitally Controlled	MOP	Maximum overcurrent Protection
Btu/h	British Thermal Units per hour	MSC	Maximum Starting Current
BUS	Binary Unit System	NC	Noise Criterion (regarding Sound Pressure Levels)
CFM	Cubic Feet per Minute		New Construction (LEED Related)
DB	Dry Bulb		Normally Closed
dB(A)	Decibels with "A" frequency weighting	NEC	National Electrical Code
DDOAS	Decoupled Dedicated Outdoor Air System	No.	Number
DI	Digital Input	ODU	Outdoor Unit
DFS	Duct Free Split	PCB	Printed Circuit Board
DO	Digital output	PCM	Pre-Coated Metal
DPST	Double-Pole Single-Throw (switch)	PDI	Power Distribution Indicator
EEV	Electronic Expansion Valve	PI	Power Input
ELF	Equivalent Length in Feet	PR	Prerequisite (LEED Related)
ETL	Electronic Testing Laboratories	PVC	Polyvinyl Chloride
H/M/L	High/Medium/Low	SW or S/W	Switch
HIPS	High Impact Polystyrene	USB	Universal Serial BUS
HVAC	Heating, Ventilation and Air Conditioning	VAC	Voltage Alternating Current
ID	Innovations in Design (LEED Related)	VRF	Variable Refrigerant Flow
IDU	Indoor Unit	WB	Wet Bulb
ISO	International organization for Standardization		

Inverter



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