SINGLE ZONE MEGA INVERTER WALL MOUNTED

ENGINEERING MANUAL

Single Zone Mega Inverter Wall Mounted
3/4 Ton, 1 Ton, 1 1/2 Ton, and 2 Ton

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Duct-Free Split (DFS) Systems

LG HVAC systems offer a range of solutions that are cost efficient, quiet and attractive. Duct-Free Split (DFS) 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 Mega Inverter Wall Mounted 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 Mega Inverter Wall Mount 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 Mega Inverter Wall Mounted system is easy to design, install, and maintain. The modular design allows occupants to control their environmental condition, providing individualized control of the set-point temperature and allowing occupants to condition only the occupied zones.

Quality Commitment

LG is committed to the success of DFS 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 DFS 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.

TABLE OF CONTENTS

TABLE OF SYMBOLS

⚠ **WARNING**	*This symbol indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.*
Note	*This symbol indicates additional helpful information such as an explanation, a comment, or a clarification about the subject.*
✓	*This symbol indicates a recommendation or tip. Recommendations instruct the user to apply the suggested practice to ensure the best operating results in order to achieve the maximum benefit of the product. Tips contain practical information that may help the user solve a problem or describe actions that may save time.*

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INTRODUCTION

“Architectural Appeal” on page 6

ARCHITECTURAL APPEAL

Convergence of Technological Innovation with Flexibility and Style

Benefits of Single Zone Mega Inverter Wall Mounted

- Inverter technology
- Available in 9,000, 12,000, 18,000 and 24,000 Btu/h capacities
- All-season use - heat pump models for both cooling and heating capabilities
- Operating ranges for Outdoor units of 64°F (DB) to 118°F for cooling; 23°F to 75°F (WB) for heating
- Operating ranges for Indoor Units of 64°F to 90°F for cooling; 60°F to 86°F for heating
- Quiet operation inside and outside
- Duct-Free Split system

Single Zone Mega Inverter Wall Mounted

The Single Zone Mega Inverter Wall Mounted Duct Free Split (DFS) System is among the industry's best entry level air-conditioning units. Choosing an LG Single Zone Mega Inverter Wall Mounted product provides a system designer an edge to engineer a system with individual control, and design flexibility at an attractive price point. The Single Zone Mega Inverter Wall Mounted Outdoor and Indoor units are available in a nominal capacity range of 3/4 to 2 tons. These are best suited for applications with zones that require heating or cooling, such as residential, and small business office buildings.

Single Zone Mega Inverter Wall Mounted Outdoor and Indoor units are available in 208–230V/60Hz/1Ph.

Adaptable and Flexible

The Single Zone Mega Inverter Wall Mounted DFS System allows cooling or heating for the entire residence or just a single room without the need for evasive ductwork. There is no tearing down of walls or altering the homes appearance.

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
- House of worship

LSU090HEV, LSU120HEV

LSU180HEV

LSU240HEV

LSN090HEV ~ LSN240HEV

Inverter Technology

Inverter variable-speed DFS Systems are measurably quieter and consume less energy than 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.

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LG

PRODUCT DATA

PRODUCT FEATURES AND BENEFITS

Single Zone Mega Inverter Wall Mounted

Single Zone Mega Inverter Wall Mounted units 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. Utilizing multiple indoor wall mounted units each with custom temperature controls allow for precise temperature settings in each zone of the building. Single Zone Mega Inverter Wall Mounted allows flexibility in interior design and complements any decor.

Low Sound Levels

When outdoor units operate fully loaded, they have one of the quietest sound levels in the industry. Sound is almost undetectable during off-peak operation. To promote a quiet, comfortable environment, the LG Single Zone Mega Inverter Wall Mounted indoor units operate at sound levels as low as 25 dB(A) indoor and outdoor units as low as 47 dB(A) at full load. LG customers often ask if the outdoor unit is running after commissioning is complete.

All rotating components are soft-started by the controller 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 maximizes the time that the indoor units remove moisture.

Unlike traditional air conditioning control systems, which use thermostatic controls to maintain room temperatures, LG Single Zone Mega Inverter controls 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 dew-point 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 outdoor fan motors as needed to maintain system operating pressure. As a result, the Single Zone Mega Inverter Wall Mount system delivers precise space temperature control.

Inverter Driven

The rotary (9k/12k Btu/h systems) and twin-rotary (18k.24k Btu/h systems) compressor is optimized to maximize compressor efficiency, which reduces power consumption and monthly utility bills. This latest inverter technology allows the LG Single Zone Mega Inverter Wall Mounted outdoor unit to vary the compressor motor shaft speed to deliver an appropriate amount of cooling to the indoor unit. Precise refrigerant volume delivery translates into long periods with coil surface temperatures below dew point and minimizes compressor and fan component run time. Occupants remain comfortable while utility costs are reduced.

Simplified Installation

Cooling and heating systems that use the LG Single Zone Mega Inverter Wall Mounted product simplify and reduce the mechanical and control system design time. The designer no longer has to be concerned with interconnecting chilled and condenser water piping, air-distribution duct systems, matching and selecting chillers, towers, pumps, coils, fans, air handlers, or Variable Air Volume (VAV) boxes.

Operating Range

The Single Zone Mega Inverter Wall Mounted product has a nominal capacity range of 3/4 to 2 tons (depending on outdoor/indoor units). Operating ranges include:

Mega Outdoor Units

Cooling: 64°F DB to 118°F DB
Heating: 23°F WB to 75°F WB

Compact Size

Single Zone Mega Inverter Wall Mounted outdoor units have the following footprints:

LSU090HEV, LSU120HEV
(WxHxD (in.)): 28 1/4 x 19 1/32 x 9 1/16

LSU180HEV
(WxHxD (in.)): 30 5/16 x 21 1/2 x 11 5/16

LSU240HEV
(WxHxD (in.)): 34 1/4 x 25 13/16 x 12 19/32

Heat Transfer Efficiency

Fin Design with GoldFin™ Coating

All Single Zone Mega Inverter Wall Mounted 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, every LG Single Zone Mega Inverter Wall Mounted 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
- Jet Cool
- Dehumidifying Mode
- Chaos Wind
- Auto restart
- Auto operation
- Self-cleaning indoor coil
- Smaller Footprint
- Precision Load Matching
- Meets AHRI 210/240

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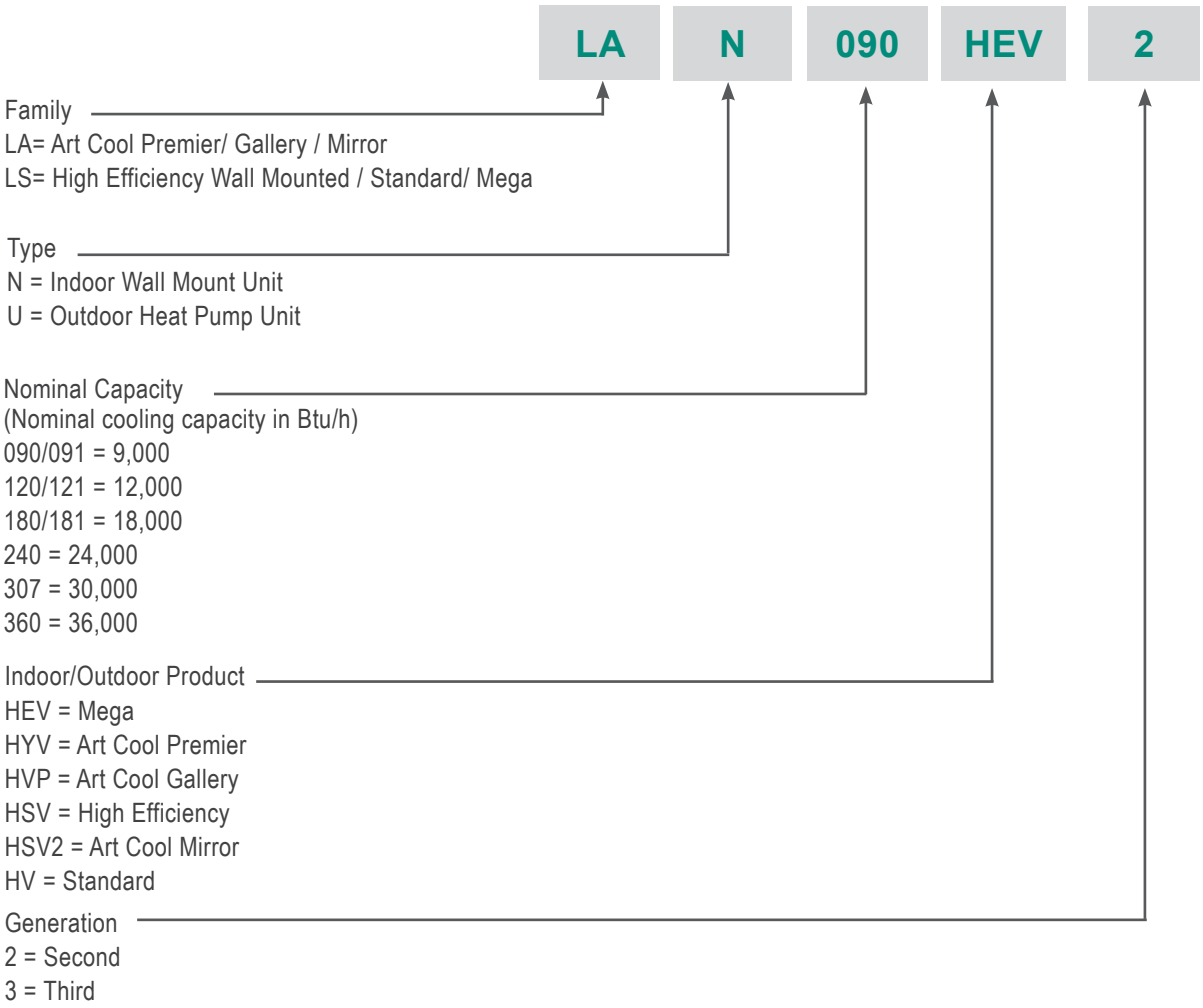
UNIT NOMENCLATURE

Single Zone Wall Mounted Indoor and Outdoor Units



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GENERAL DATA

Single Zone Mega Inverter Pairing Table

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

Table 1: Single Zone Mega Inverter Pairing Table

Outdoor Unit Model/ Btu/h	Indoor Unit Model/ Btu/h	Controller
LSU090HEV / 9,000 LSU120HEV / 12,000 	LSN090HEV / 9,000 LSN120HEV / 12,000 	AKB73835305 
LSU180HEV / 18,000 	LSN180HEV / 18,000 	AKB73835305 
LSU240HEV / 24,000 	LSN240HEV / 24,000 	AKB73835305 

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GENERAL DATA

Single Zone Mega Inverter Specifications

Table 1: Unit General Data

Type	Single Zone Mega Inverter	
System (Model)	LS090HEV (LSN090HEV/LSU090HEV)	LS120HEV (LSN120HEV/LSU120HEV)
Nominal Cooling Capacity (Btu/h)	8,500	12,000
Cooling Power Input[1] (kW)	0.78	1.17
Nominal Heating Capacity (Btu/h)	9,000	12,000
Heating Power Input[1] (kW)	0.78	0.98
Cooling COP	3.19	3.00
EER	10.90	10.26
SEER	16.3	
HSPF	8.3	8.5
Power Supply (V / Hz / Ø)	208-230/60/1	
ODU Operating Range		
Cooling (°F DB)	64-118	
Heating (°F WB)	23-75	
IDU Operating Range		
Cooling (°F WB)	64-90	
Heating (°F DB)	60-86	
Indoor Temperature Setting Range		
Cooling (°F)	65-86	
Heating (°F)	61-86	
Unit Data		
Refrigerant Type[2]	R410A	
Refrigerant Control	Capillary Tube	
IDU Sound Pressure[3] dB(A) (H/M/L)	39/33/25	
ODU Sound Pressure dB(A)	47	
Unit Weight (lbs)		
Indoor Unit (Net/Shipping)	16/21	20/25
Outdoor Unit (Net/Shipping)	52/56	49/53
Power/Communication Cable[4] (No. x AWG)	4 x 18	
Fan		
Indoor Type (Qty)	Cross Flow (1)	
Outdoor Type (Qty)	Propeller (1)	
Motor/Drive	Brushless Digitally Controlled/Direct	
Airflow Rate		
Indoor - Max/H/M/L (CFM)	318/276/226/177	424/353/272/212
Outdoor - Max (CFM)	953	

GENERAL DATA

Single Zone Mega Inverter Specifications

Table 1: Unit General Data (Continued)

Type	Single Zone Mega Inverter	
System (Model)	LS090HEV (LSN090HEV/LSU090HEV)	LS120HEV (LSN120HEV/LSU120HEV)
Piping		
Liquid Line (in, OD)	1/4	
Vapor Line (in, OD)	3/8	
Condensation Line (OD | ID)	27/32 | 5/8	
Additional Refrigerant Charge (oz/ft)	0.22	
Max Pipe Length (ft)[5]	49.2	
Piping Length (no add'l refrigerant, ft)[5]	24.6	
Max Elevation Difference (ft)	22.9	

EEV: Electronic Expansion Valve

Power wiring is field supplied and must comply with the applicable local and national codes.

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. All capacities are net with a combination ratio between 95-105%.

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

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

[1]Power Input is rated at high speed.

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

[3]Sound Pressure levels are tested in an anechoic chamber under ISO Standard 1996.

[4]All communication cable to be minimum 18 AWG, 4-conductor, stranded, shielded and must comply with applicable and national code.

[5]Piping lengths are equivalent.

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Table 2: Unit General Data

Type	Single Zone Mega Inverter	
System (Model)	LS180HEV (LSN180HEV/LSU180HEV)	LS240HEV (LSN240HEV/LSU240HEV)
Nominal Cooling Capacity (Btu/h)	17,000	22,000
Cooling Power Input[1] (kW)	1.55	2.04
Nominal Heating Capacity (Btu/h)	19,000	22,000
Heating Power Input[1] (kW)	1.59	1.93
Cooling COP	3.21	3.15
EER	10.95	10.75
SEER	17.0	
HSPF	8.7	8.5
Power Supply (V / Hz / Ø)	208-230/60/1	
ODU Operating Range		
Cooling (°F DB)	64-118	
Heating (°F WB)	23-75	
IDU Operating Range		
Cooling (°F WB)	64-90	
Heating (°F DB)	60-86	
Indoor Temperature Setting Range		
Cooling (°F)	65-86	
Heating (°F)	61-86	
Unit Data		
Refrigerant Type[2]	R410A	
Refrigerant Control	Capillary Tube	
IDU Sound Pressure[3] dB(A) (H/M/L)	42/40/35	45/40/35
ODU Sound Pressure dB(A)	51	53
Unit Weight (lbs)		
Indoor Unit (Net/Shipping)	28/30	28/34
Outdoor Unit (Net/Shipping)	72/77	92/104
Power/Communication Cable[4] (No. x AWG)	4 x 18	
Fan		
Indoor Type (Qty)	Cross Flow (1)	
Outdoor Type (Qty)	Propeller (1)	
Motor/Drive	Brushless Digitally Controlled/Direct	
Airflow Rate		
Indoor - Max/H/M/L (CFM)	629/512/441/353	689/600/494/388
Outdoor - Max (CFM)	1,342	1,766

GENERAL DATA

Single Zone Mega Inverter Specifications

Table 2: Unit General Data (Continued)

Type	Single Zone Mega Inverter	
System (Model)	LS180HEV (LSN180HEV/LSU180HEV)	LS240HEV (LSN240HEV/LSU240HEV)
Piping		
Liquid Line (in, OD)	1/4	
Vapor Line (in, OD)	1/2	5/8
Condensation Line (OD | ID)	27/32 | 5/8	
Additional Refrigerant Charge (oz/ft)	0.33	
Max Pipe Length (ft)[5]	65.6	
Piping Length (no add'l refrigerant, ft)[5]	24.6	
Max Elevation Difference (ft)	32.8	

EEV: Electronic Expansion Valve

Power wiring is field supplied and must comply with the applicable local and national codes.

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. All capacities are net with a combination ratio between 95-105%.

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

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

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[5]Piping lengths are equivalent.

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ELECTRICAL DATA

Single Zone Mega Inverter Outdoor Units

Table 3: 208-230V, 60Hz, 1-Phase Single Zone Mega Inverter Outdoor Units

Unit Model Nos.	Nom. Tons	Compressor Qty	Compressor(A) Cool/Heat	Fan Qty	ODU Fan(A)	MCA(A)	MOP(A)
LSU090HEV	3/4	1	6.8/6.8	1	0.5	9	15
LSU120HEV	1	1	6.8/6.8	1	0.5	9	15
LSU180HEV	1 1/2	1	8.68/9.28	1	0.4	12	20
LSU240HEV	2	1	10.8/9.6	1	0.48	14	20

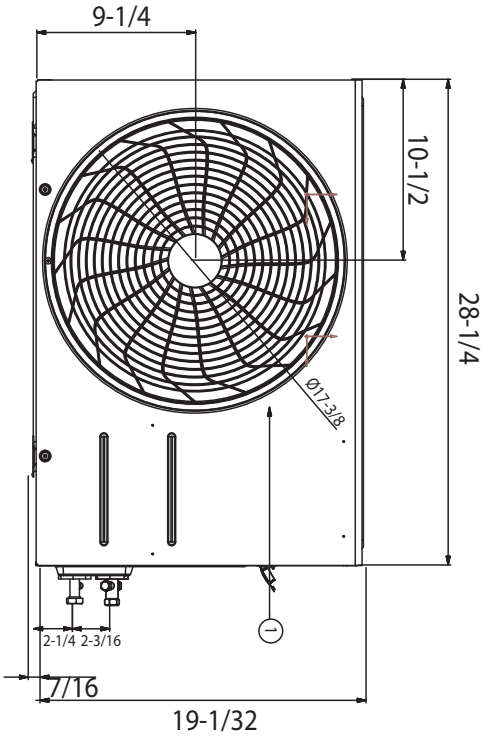
For component model nos. see the specification table on page 15
Voltage tolerance is ±10%.
Maximum allowable voltage unbalance is 2%.

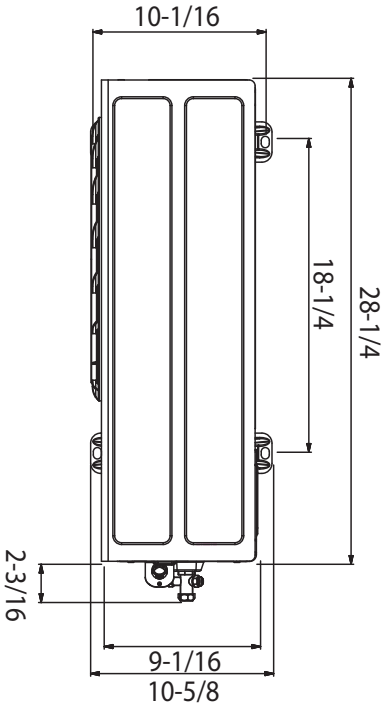
MSC = Maximum Starting Current.
MCA = Minimum Circuit Ampacity.

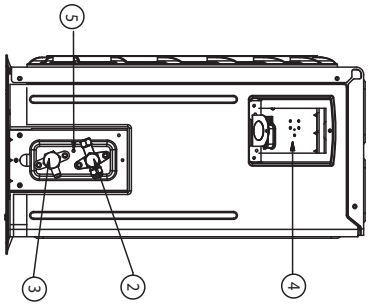
Maximum Overcurrent Protectin (MOP) is calculated as follows: (Largest motor FLA x 2.25) + (Sum of other motor FLA) rounded down to the nearest standard fuse size.

OUTDOOR UNIT DIMENSIONS

LSU090HEV, LSU120HEV







Unit: inch

Item No.	Part Name	Remarks
1	**Return Air Grille**	
2	Gas Pipe Connection Port	
3	Liquid Pipe Connection Port	
4	Control Box	
5	Earth Screw	

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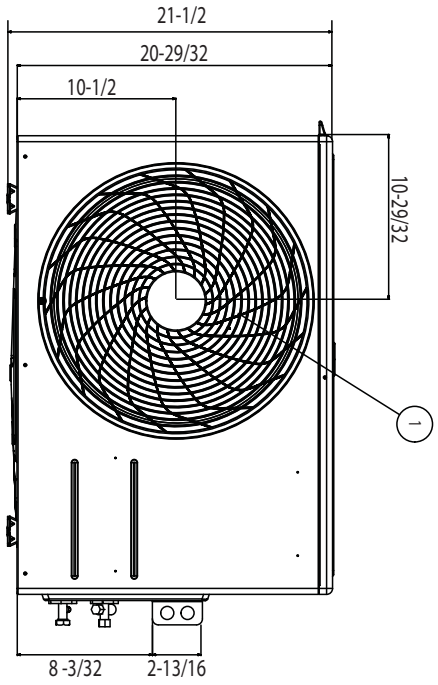
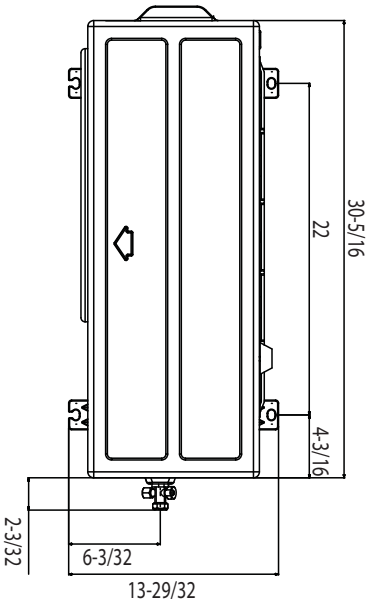
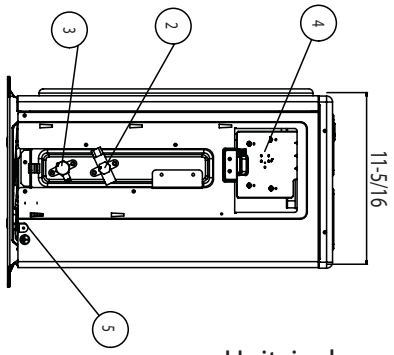
OUTDOOR UNIT DIMENSIONS

LSU180HEV





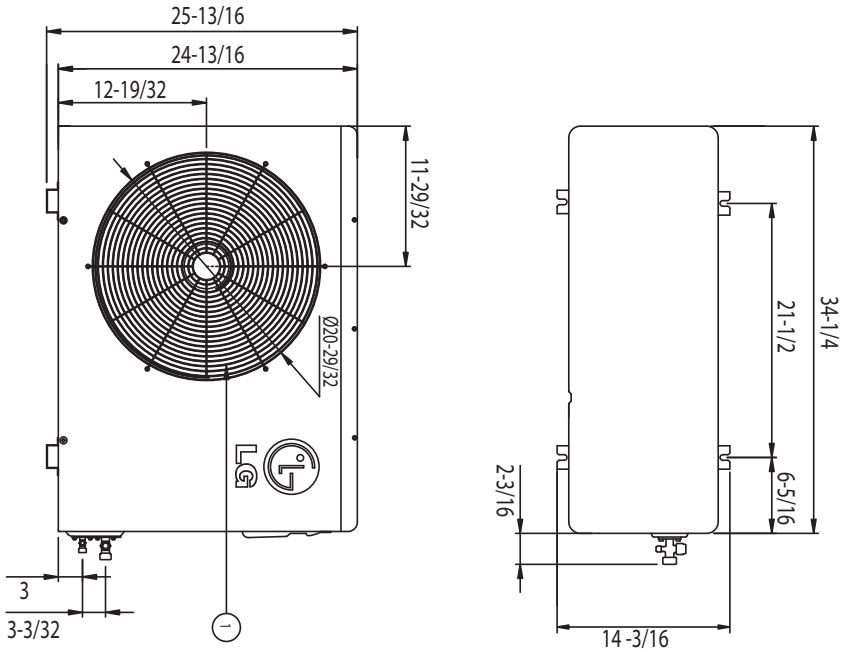


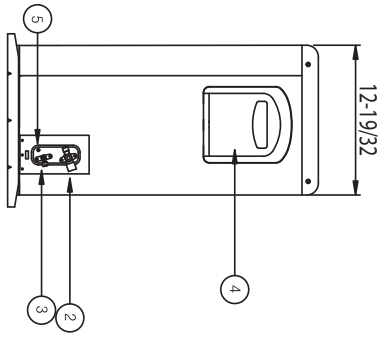
Unit: inch

Item No.	Part Name	Remarks
1	**Return Air Grille**	
2	Gas Pipe Connection Port	
3	Liquid Pipe Connection Port	
4	Control Box	
5	Earth Screw	

OUTDOOR UNIT DIMENSIONS

LSU240HEV





Unit: inch

Item No.	Part Name	Remarks
1	**Return Air Grille**	
2	Gas Pipe Connection Port	
3	Liquid Pipe Connection Port	
4	Control Box	
5	Earth Screw	

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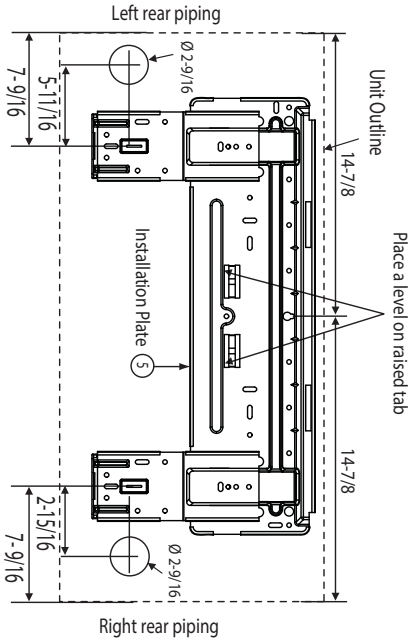
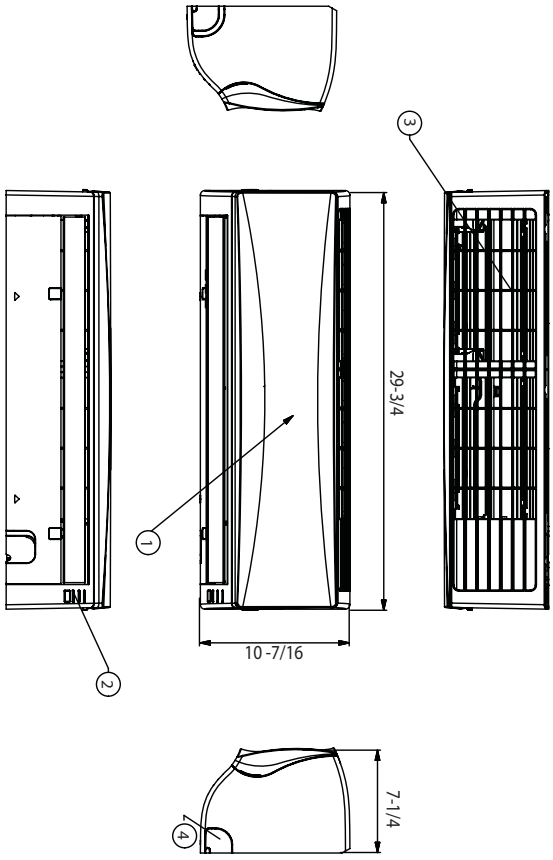
INDOOR UNIT DIMENSIONS

LSN090HEV



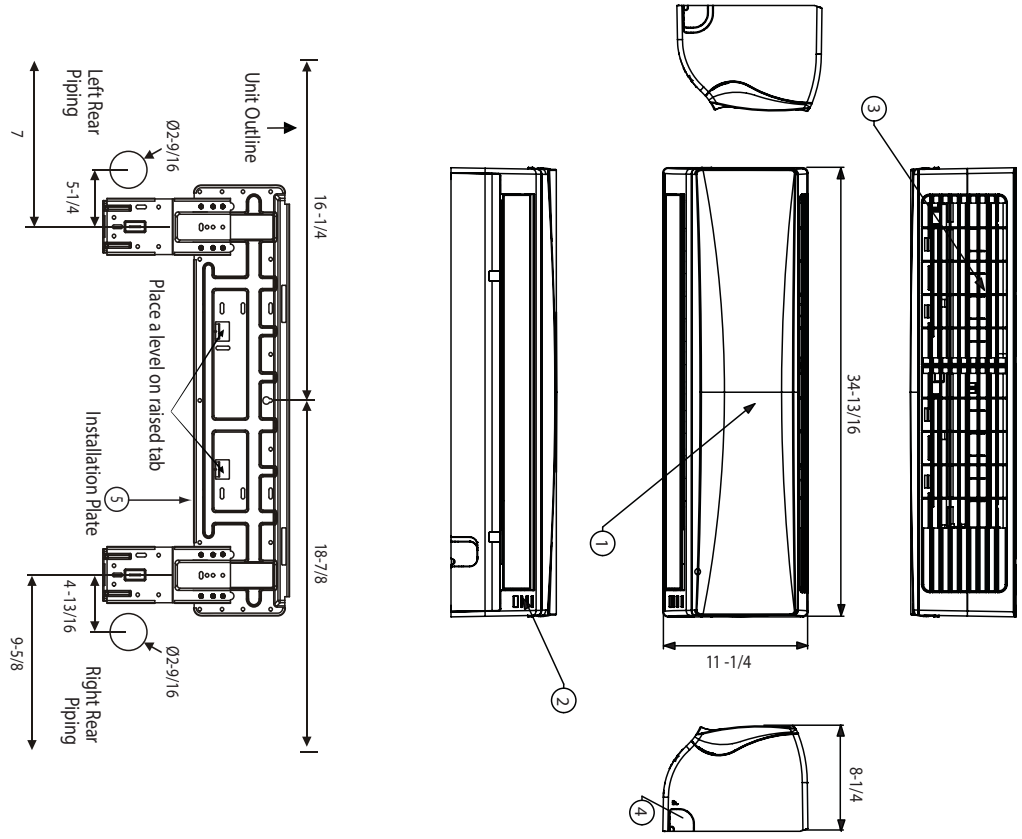


Unit: inch

Item No.	Part Name	Remarks
1	Front Panel	
2	Display & Signal Receiver	
3	Air Suction Grille	
4	Knockout hole	For pipe and cable
5	Installation Plate	

INDOOR UNIT DIMENSIONS

LSN120HEV



Unit: inch

Item No.	Part Name	Remarks
1	Front Panel	
2	Display & Signal Receiver	
3	Air Suction Grille	
4	Knockout hole	For pipe and cable
5	Installation Plate	

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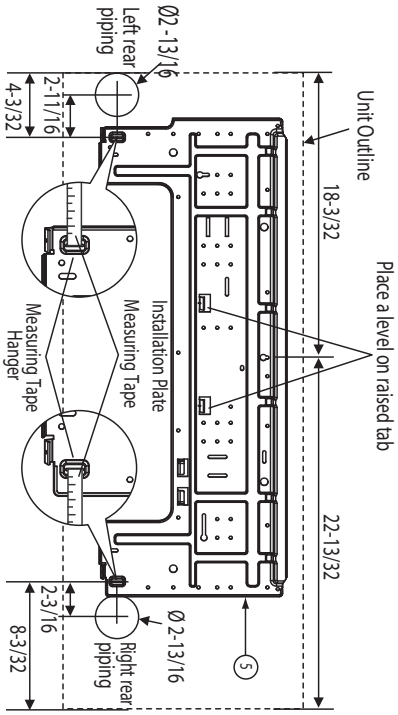
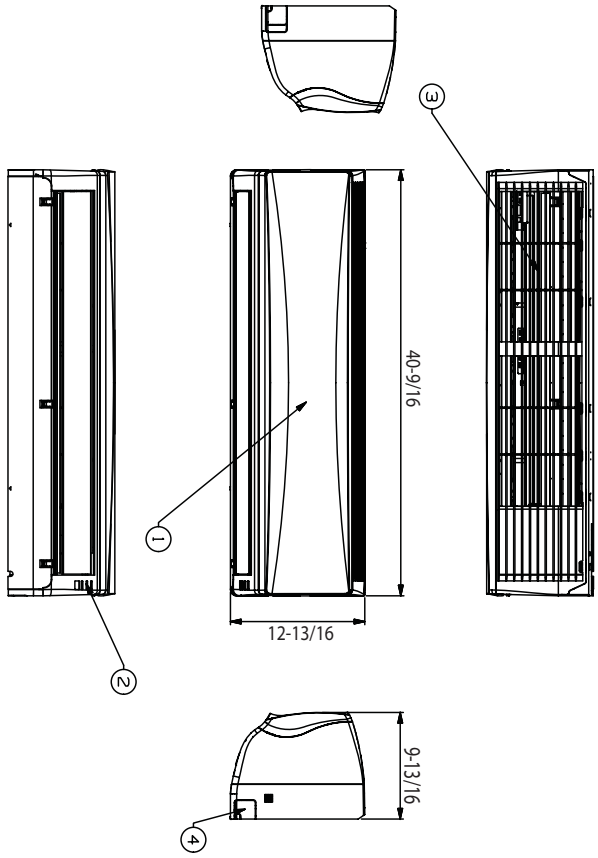
INDOOR UNIT DIMENSIONS

LSN180HEV, LSN240HEV





Unit: inch

Item No.	Part Name	Remarks
1	Front Panel	
2	Display & Signal Receiver	
3	Air Suction Grille	
4	Knockout hole	For pipe and cable
5	Installation Plate	

ACOUSTIC DATA

Single Zone Mega Inverter Outdoor Units

Sound Pressure Levels

Figure 1: LSU090HEV

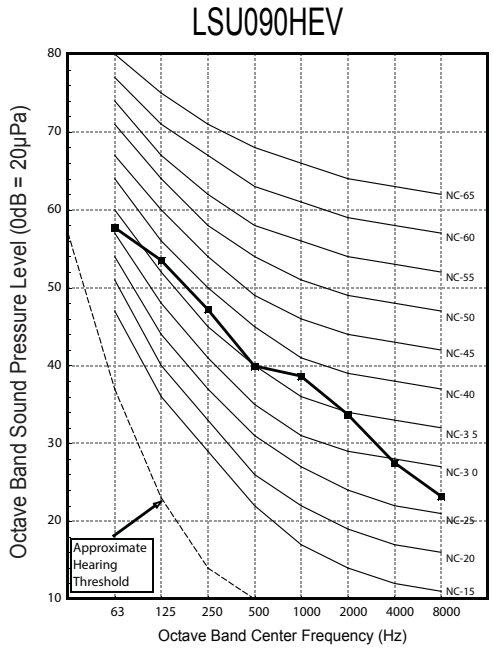


Figure 2: LSU120HEV

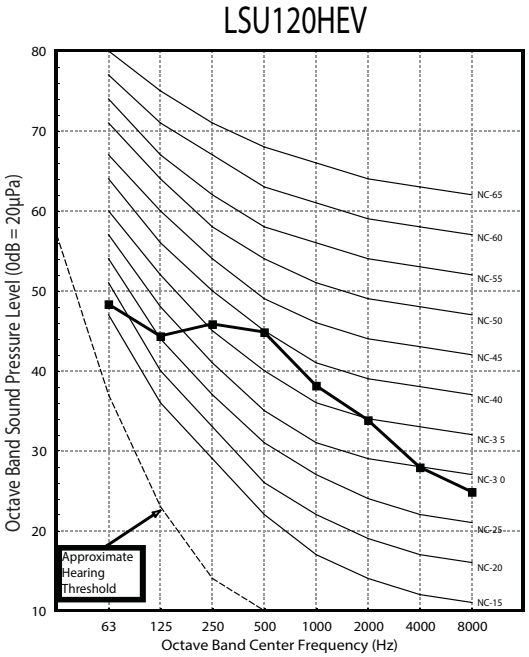


Figure 3: LSU180HEV

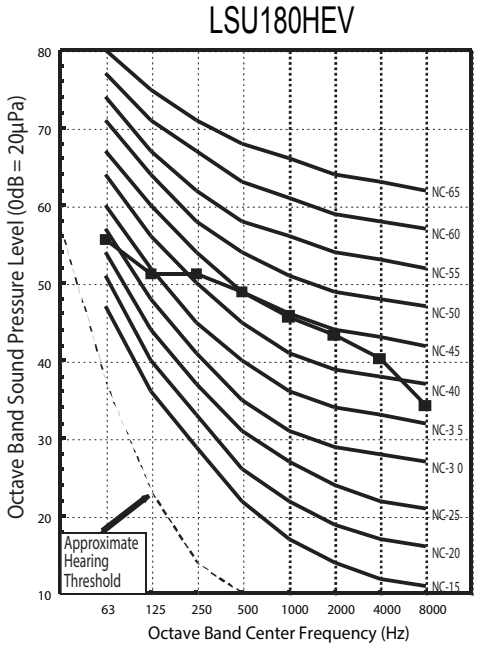
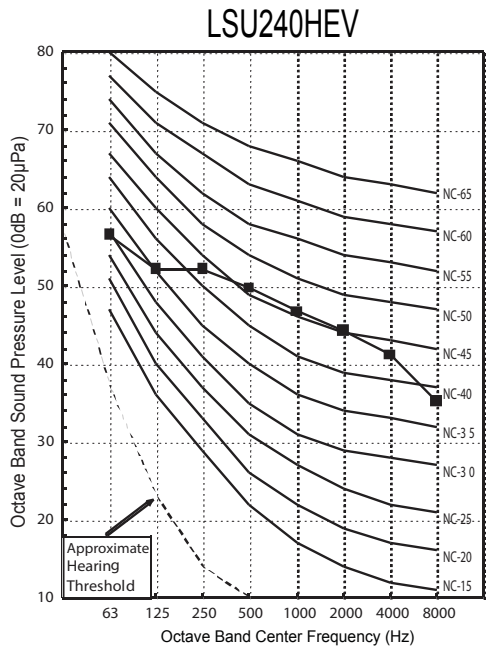


Figure 4: LSU240HEV



Due to our policy of continuous product innovation, some specifications may change without notification.

Figure 5: LSN090HEV, LSN120HEV

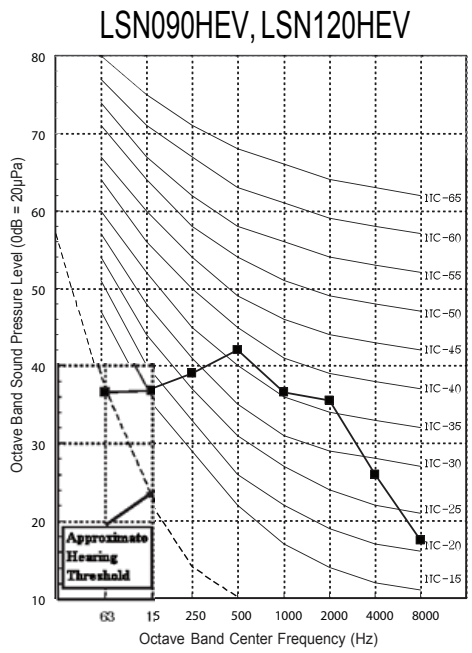


Figure 6: LSN180HEV

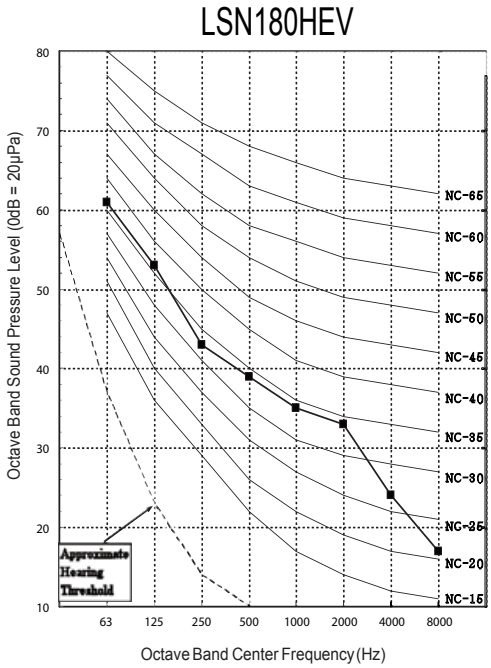
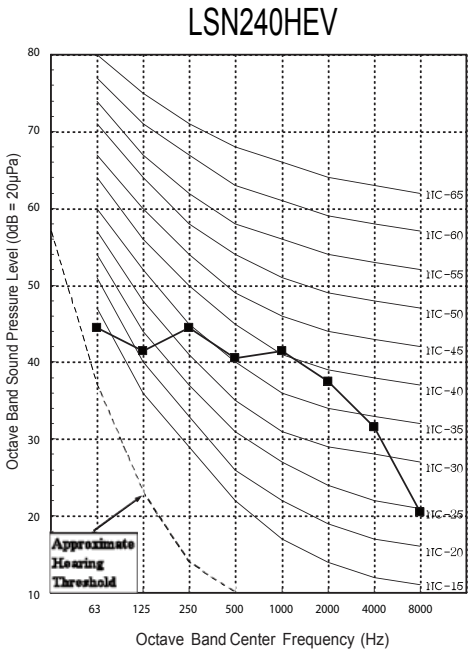


Figure 7: LSN2400HEV

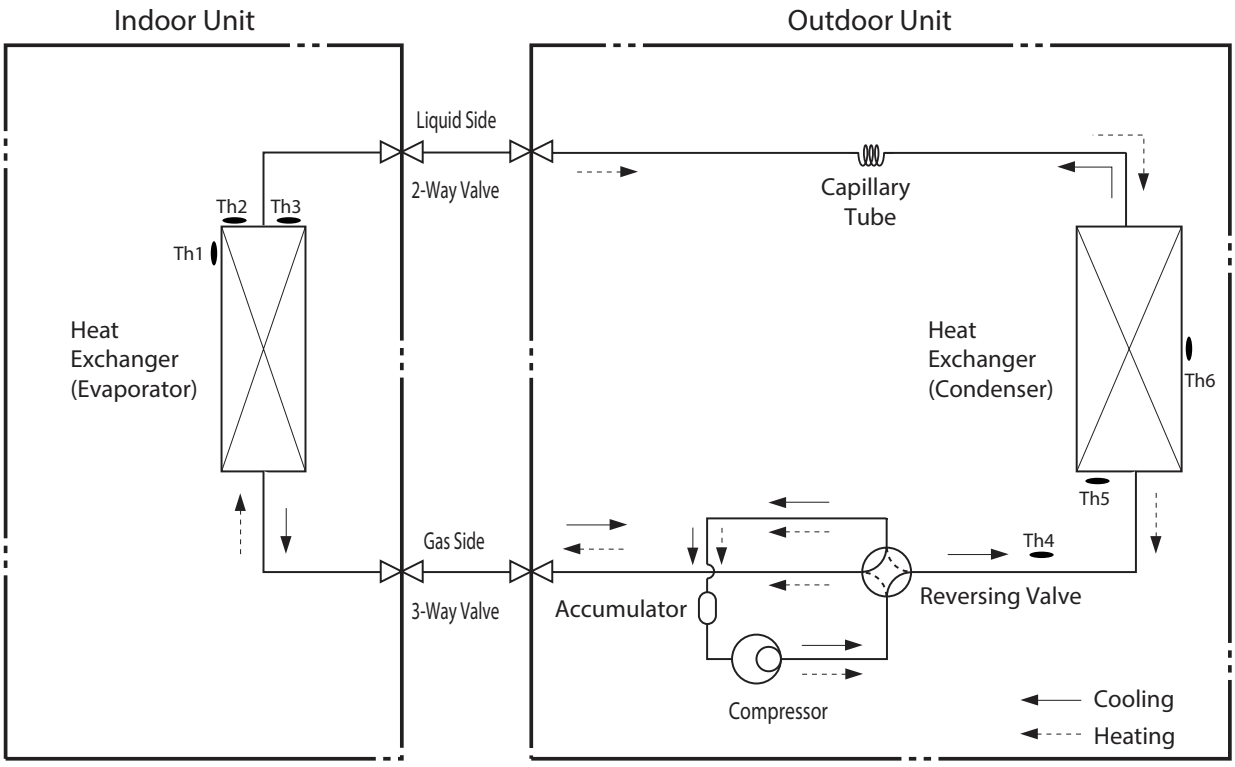


Product Data

REFRIGERANT FLOW DIAGRAMS

LSN090HEV/LSU090HEV

LSN120HEV/LSU120HEV

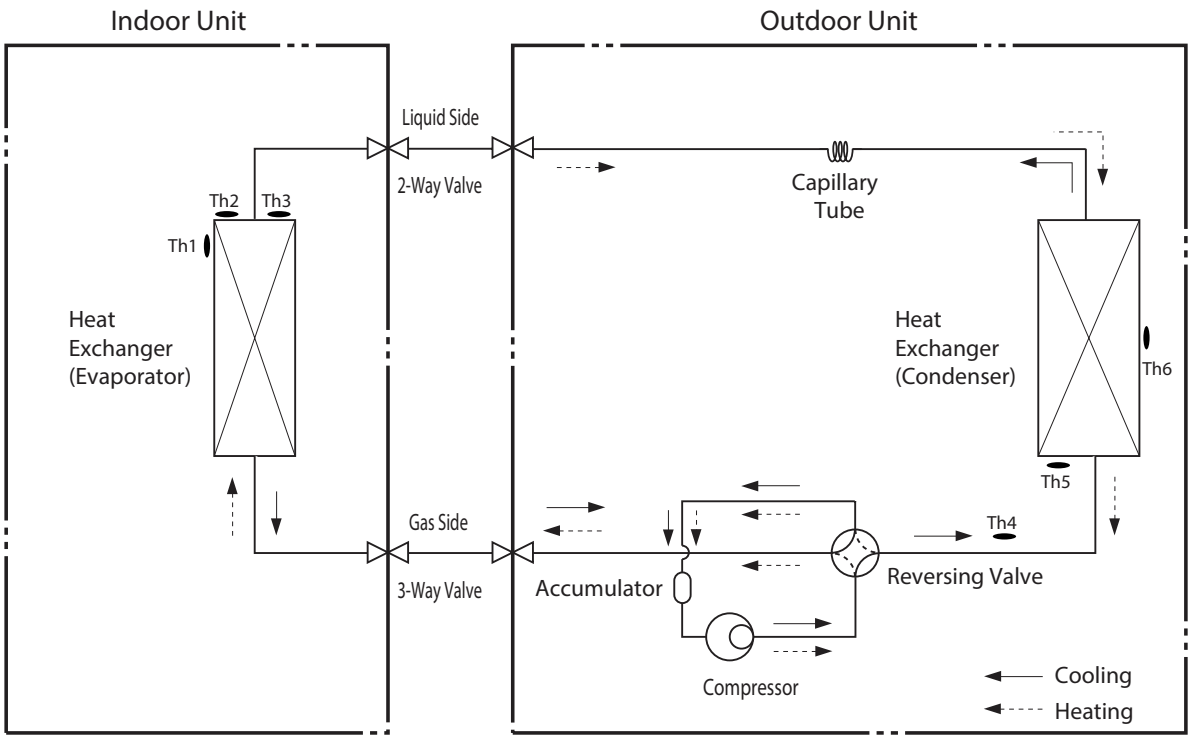


LOC	Description	PCB Connector
Th1	Indoor air temperature thermistor	CH-TH1(Indoor)
Th2	W ater level sensor (Option)	CH-TH2 (Indoor)
Th3	Evaporating middle temperature thermistor	CH-TH3 (Indoor)
Th4	Discharge pipe temperature thermistor	CN-TH2 (Outdoor)
Th5	Heat exchanger temperature thermistor	CN-TH1 (Outdoor)
Th6	Outdoor air temperature thermistor	CN-TH1 (Outdoor)

Due to our policy of continuous product innovation, some specifications may change without notification.

REFRIGERANT FLOW DIAGRAMS

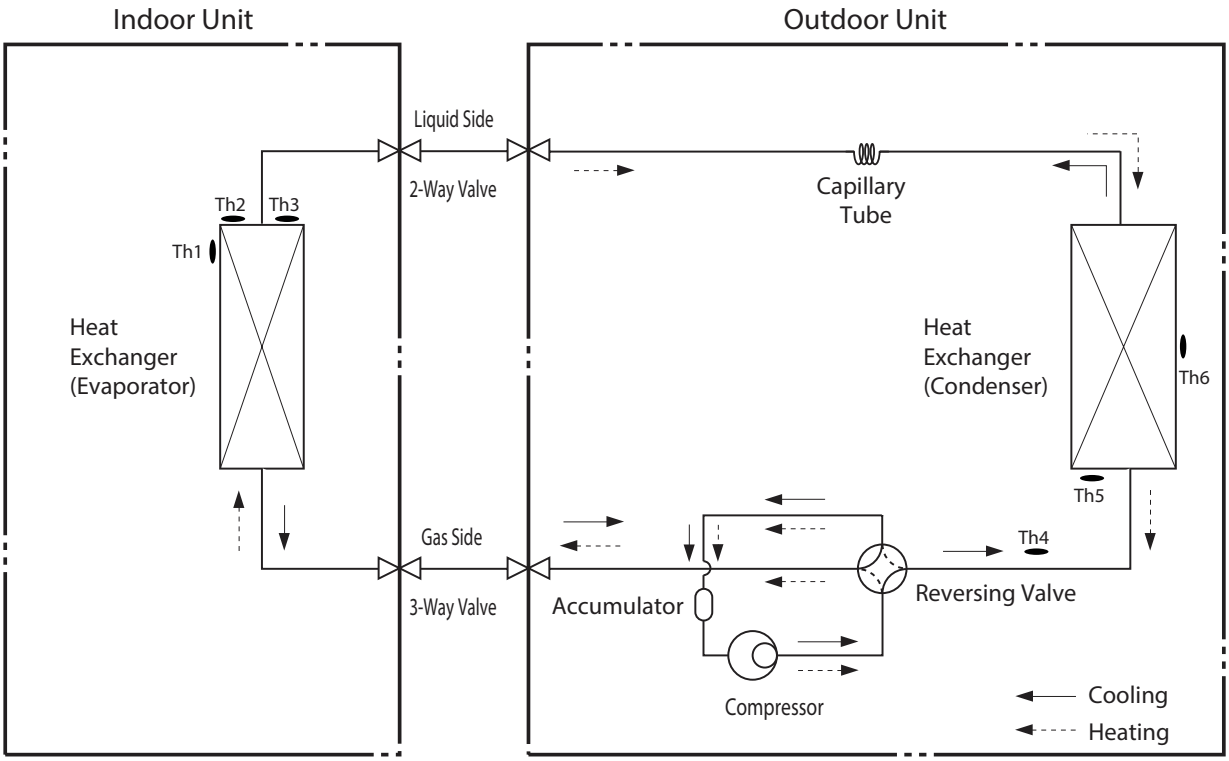
LSN180HEV/LSU180HEV



LOC	Description	PCB Connector
Th 1	Indoor air temperature thermistor	CH-TH1(Indoor)
Th 2	W ater level sensor (Option)	CH-TH2 (Indoor)
Th 3	Evaporating middle temperature thermistor	CH-TH3 (Indoor)
Th 4	Discharge pipe temperature thermistor	CN-TH2 (Outdoor)
Th 5	Heat exchanger temperature thermistor	CN-TH1 (Outdoor)
Th 6	Outdoor air temperature thermistor	CN-TH1 (Outdoor)

REFRIGERANT FLOW DIAGRAMS

LSN240HEV/LSU240HEV



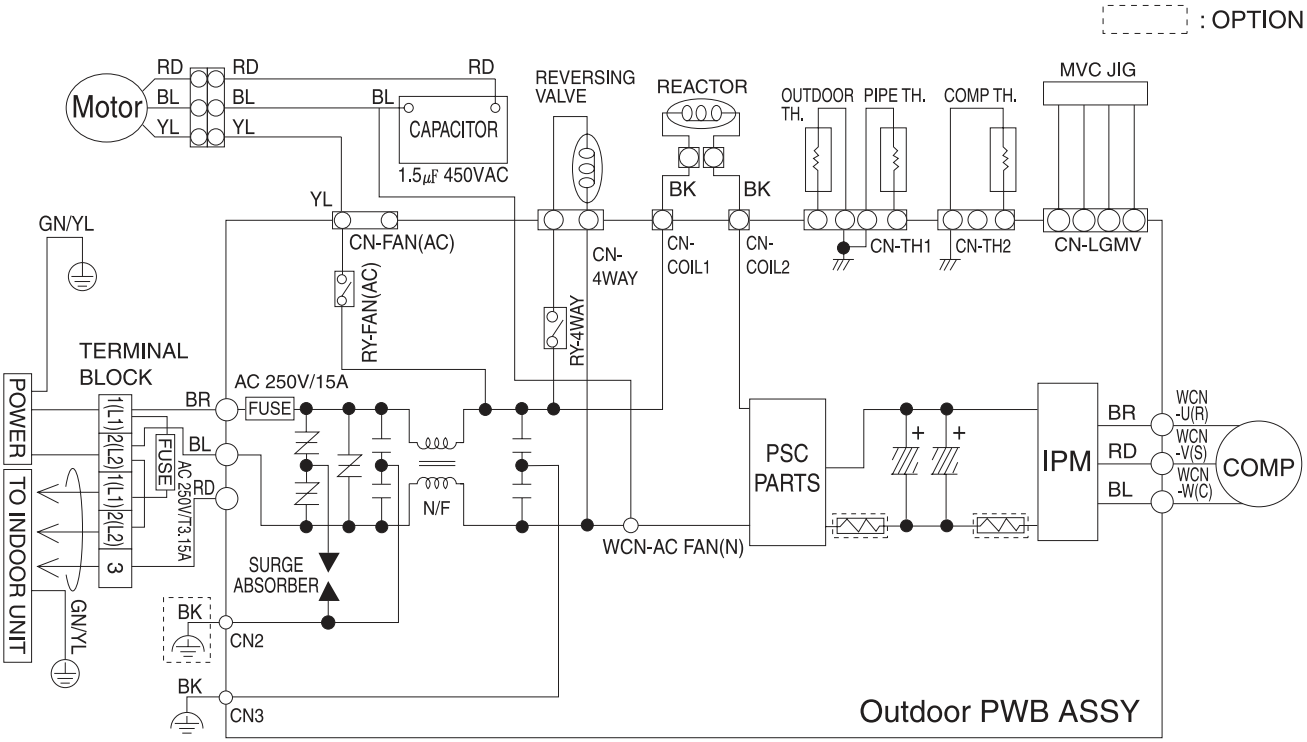
LOC	Description	PCB Connector
Th 1	Indoor air temperature thermistor	CH-TH1 (Indoor)
Th 2	W ater level sensor (Option)	CH-TH2 (Indoor)
Th 3	Evaporating middle temperature thermistor	CH-TH3 (Indoor)
Th 4	Discharge pipe temperature thermistor	CN-TH2 (Outdoor)
Th 5	Heat exchanger temperature thermistor	CN-TH1(Outdoor)
Th 6	Outdoor air temperature thermistor	CN-TH1(Outdoor)

Due to our policy of continuous product innovation, some specifications may change without notification.

WIRING DIAGRAM

LSU090HEV, LSU120HEV

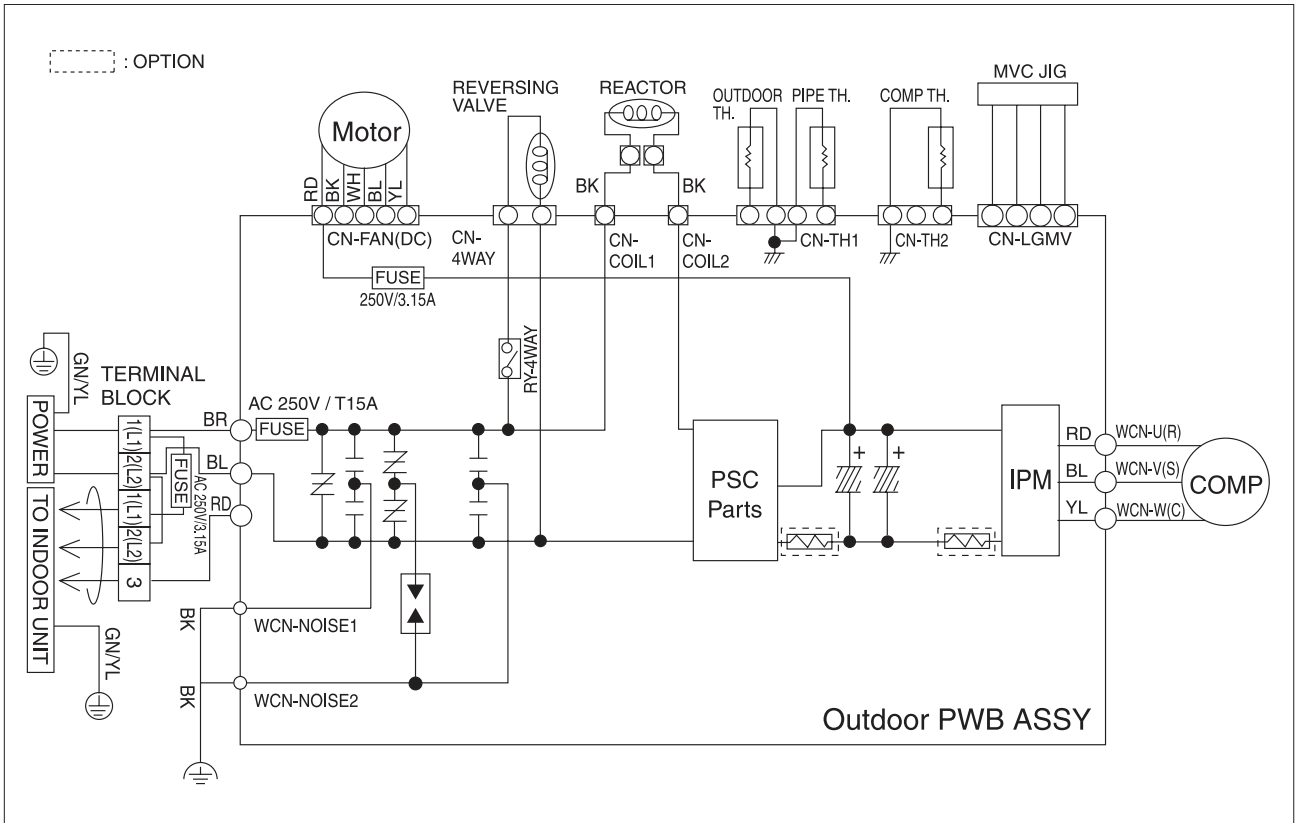
Single Zone Mega Inverter



Product Data

WIRING DIAGRAM

Single Zone Mega Inverter LSU180HEV

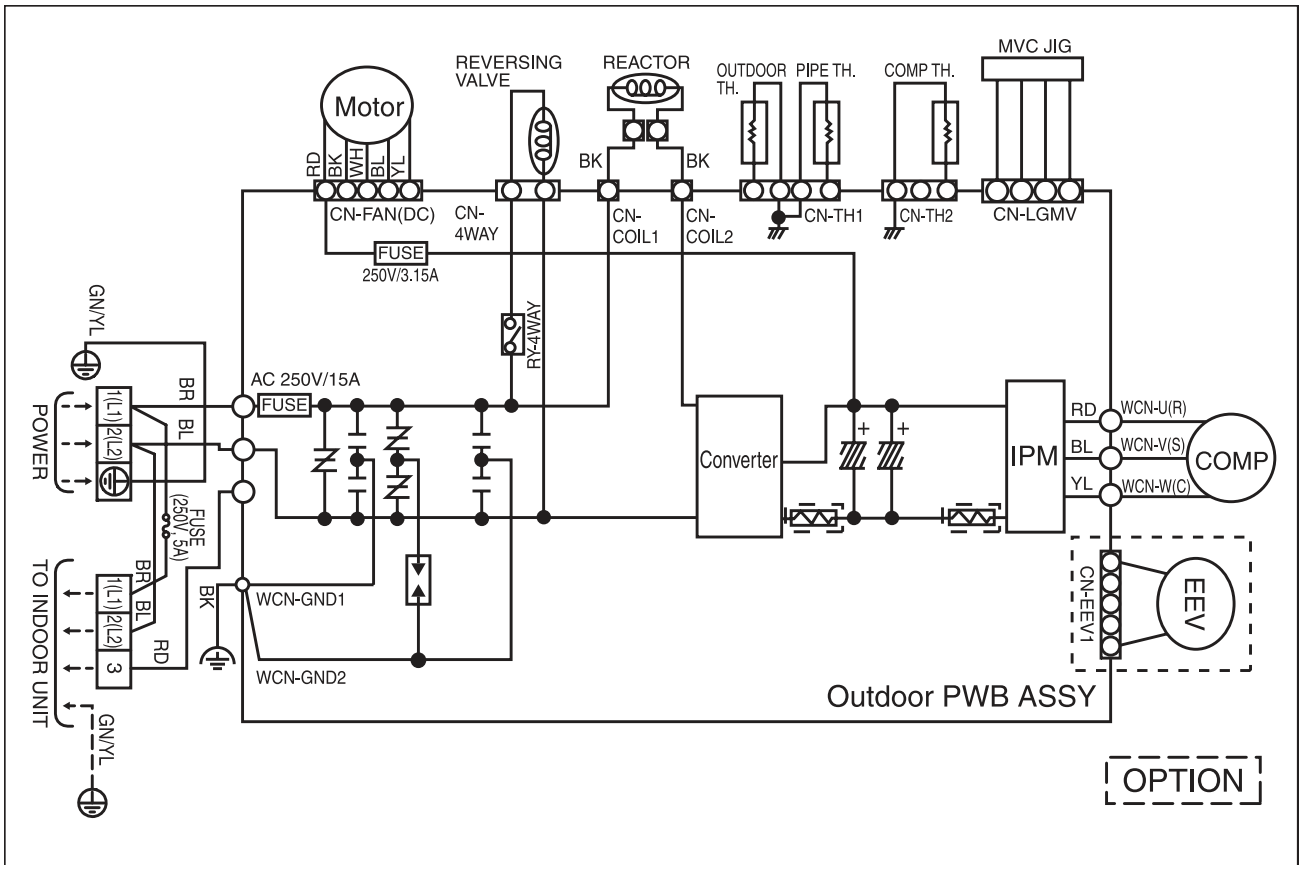


Due to our policy of continuous product innovation, some specifications may change without notification.

WIRING DIAGRAM

LSU240HEV

Single Zone Mega Inverter

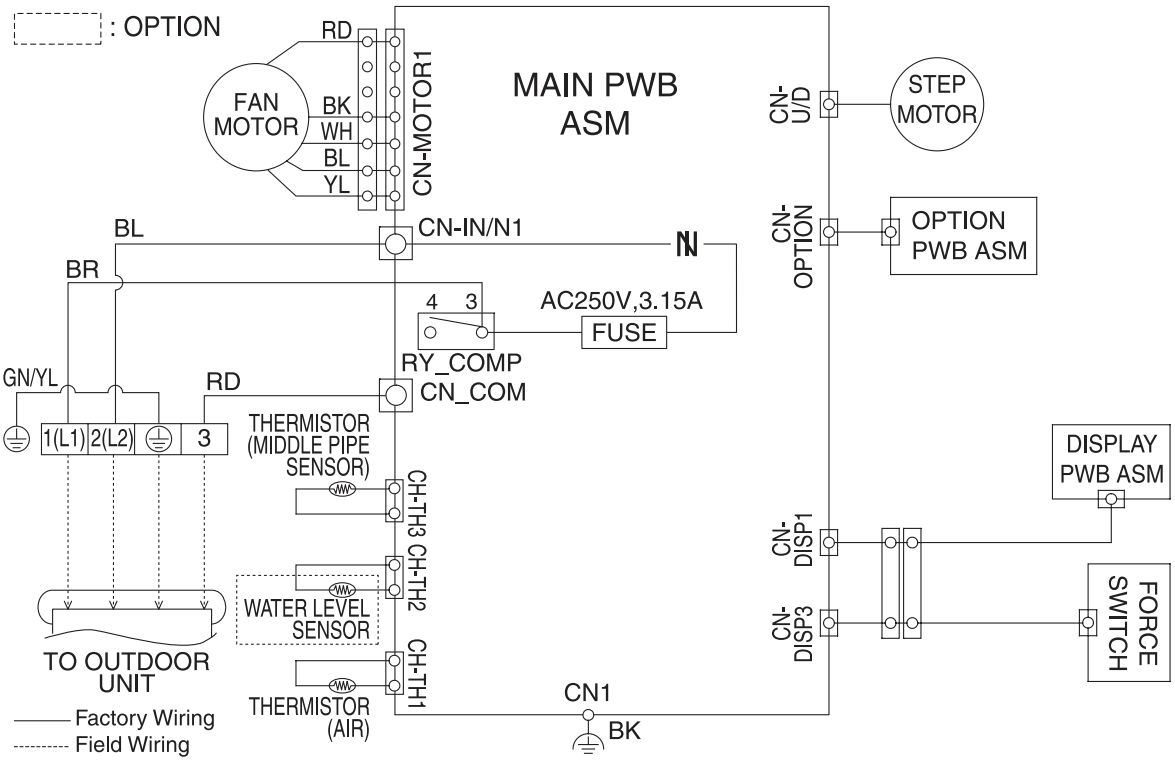


Product Data

WIRING DIAGRAM

Single Zone Mega Inverter

LSN090HEV, LSN120HEV
LSN180HEV, LSN240HEV



Due to our policy of continuous product innovation, some specifications may change without notification.

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
   - 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
     - Amps
     - Volts
     - Power Hz
     - Inverter control board fan Hz

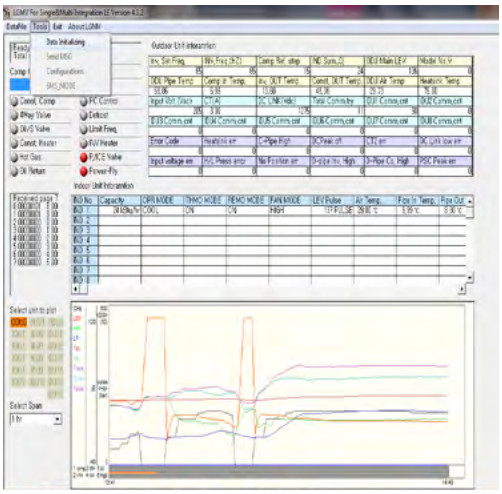


Figure 8: MV Diagnostic Screen

ACCESSORIES

LG Monitoring View (LGMV) Diagnostic Software and Cable - Continued

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

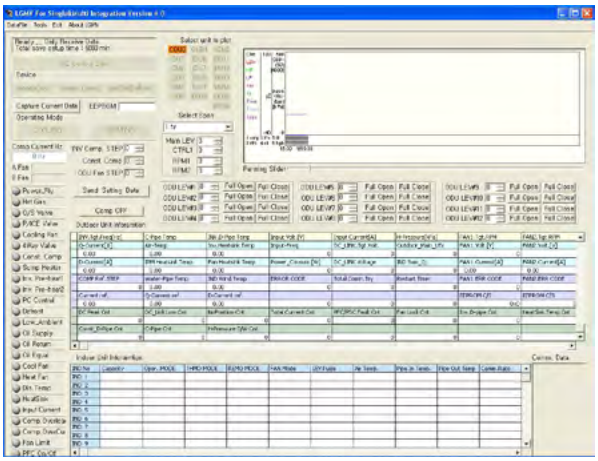


Figure 9: MV Diagnostic Screen - High Version

Due to our policy of continuous product innovation, some specifications may change without notification.

PERFORMANCE DATA

PERFORMANCE DATA

Cooling Capacity

LSN090HEV/LSU090HEV

Outdoor air temp. (°F DB)	Indoor Air Temp. °F DB/°F WB																				
	64/53			68/57			72/61			77/64			80/67			86/72			90/75		
	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI
14	5.20	4.56	0.33	5.59	4.90	0.34	5.98	5.25	0.35	6.37	5.59	0.36	6.55	5.74	0.37	7.15	6.27	0.39	7.54	6.61	0.40
23	5.59	4.73	0.33	6.00	5.08	0.34	6.42	5.43	0.35	6.84	5.79	0.36	7.03	5.95	0.37	7.68	6.50	0.39	8.10	6.85	0.40
59	6.70	5.08	0.38	7.21	5.46	0.39	7.71	5.84	0.40	8.21	6.22	0.42	8.44	6.39	0.43	9.21	6.98	0.45	9.72	7.36	0.46
70	7.65	6.23	0.56	8.16	6.64	0.58	8.67	7.06	0.59	9.01	7.34	0.61	9.27	7.54	0.63	9.95	8.10	0.66	10.63	8.65	0.68
75	7.55	6.25	0.58	8.06	6.68	0.59	8.58	7.10	0.61	8.93	7.39	0.63	9.18	7.60	0.65	9.82	8.13	0.68	10.54	8.73	0.70
80	7.35	6.20	0.60	7.86	6.63	0.62	8.38	7.06	0.64	8.76	7.38	0.66	9.10	7.66	0.68	9.69	8.16	0.71	10.37	8.74	0.73
85	7.16	6.22	0.64	7.67	6.66	0.66	8.18	7.11	0.68	8.59	7.46	0.70	8.93	7.76	0.73	9.56	8.31	0.75	10.21	8.88	0.78
90	6.96	6.26	0.67	7.47	6.72	0.69	7.98	7.18	0.71	8.42	7.57	0.73	8.76	7.87	0.76	9.44	8.49	0.79	10.01	9.00	0.81
95	6.75	6.29	0.69	7.26	6.76	0.71	7.76	7.23	0.73	8.27	7.70	0.76	**8.50**	**7.91**	**0.78**	9.28	8.64	0.81	9.78	9.11	0.84
100	6.57	6.19	0.70	7.08	6.66	0.72	7.59	7.14	0.75	8.09	7.61	0.77	8.39	7.89	0.79	9.10	8.56	0.82	9.61	9.04	0.85
105	6.40	6.08	0.71	6.90	6.57	0.74	7.41	7.05	0.76	7.91	7.53	0.78	8.28	7.87	0.81	8.93	8.49	0.84	9.43	8.97	0.86
110	6.22	6.03	0.72	6.73	6.52	0.74	7.23	7.01	0.77	7.74	7.50	0.79	8.10	7.85	0.82	8.75	8.48	0.85	9.25	8.97	0.87
115	6.04	5.91	0.73	6.55	6.41	0.75	7.06	6.90	0.77	7.56	7.40	0.80	7.93	7.76	0.82	8.57	8.39	0.86	9.08	8.88	0.88
118	5.87	5.78	0.74	6.38	6.28	0.76	6.80	6.70	0.78	7.31	7.20	0.81	7.65	7.54	0.83	8.29	8.17	0.86	8.76	8.63	0.89
122	5.59	5.52	0.74	6.07	5.99	0.76	6.54	6.47	0.79	7.02	6.94	0.81	7.37	7.28	0.83	7.98	7.88	0.87	8.46	8.36	0.89

DB = Dry Bulb Temperature (°F)

WB = Wet Bulb Temperature (°F)

TC = Total Capacity (kBtu/h).

SC = Sensible Capacity (kBtu/h)

PI = Power Input (kW) (includes compressor, indoor fan motor and outdoor fan motor).

NOTES

1. All capacities are net, evaporator fan motor heat is deducted.
2. Grey shading Indicates reference data. When operating at this temperature, these values can be different by discontinuous operation.
3. Direct interpolation is permissible. Do not extrapolate
4. Capacities are based on the following conditions:
   - Interconnecting Piping Length 24.6 ft
   - Level Difference of Zero.
   - Indoor Air Temperature
     :80°F (26.7°C) DB / 67°F (19.4°C) WB
   - Outdoor Air Temperature
     :95°F (35.0°C) DB / 75°F (23.9°C) WB

LSN120HEV/LSU120HEV

Outdoor air temp. (°F DB)	Indoor Air Temp. °F DB/°F WB																				
	64/53			68/57			72/61			77/64			80/67			86/72			90/75		
	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI
14	7.35	6.44	0.50	7.90	6.92	0.51	8.45	7.41	0.53	9.00	7.89	0.54	9.25	8.11	0.56	10.10	8.85	0.58	10.65	9.34	0.60
23	7.89	6.67	0.49	8.48	7.17	0.51	9.07	7.67	0.53	9.66	8.17	0.54	9.93	8.40	0.56	10.84	9.17	0.58	11.43	9.67	0.60
59	9.46	7.17	0.57	10.17	7.70	0.59	10.88	8.24	0.61	11.59	8.78	0.62	11.91	9.02	0.64	13.01	9.85	0.67	13.72	10.39	0.69
70	10.80	8.79	0.84	11.52	9.38	0.87	12.24	9.97	0.89	12.72	10.36	0.92	13.08	10.65	0.95	14.04	11.43	0.99	15.00	12.21	1.02
75	10.66	8.83	0.86	11.38	9.43	0.89	12.11	10.03	0.92	12.60	10.44	0.95	12.96	10.73	0.98	13.86	11.48	1.01	14.88	12.32	1.04
80	10.38	8.75	0.90	11.10	9.35	0.93	11.82	9.96	0.96	12.36	10.41	0.99	12.84	10.82	1.02	13.68	11.52	1.06	14.64	12.33	1.09
85	10.11	8.78	0.96	10.83	9.41	0.99	11.54	10.03	1.02	12.12	10.53	1.06	12.60	10.95	1.09	13.50	11.73	1.13	14.42	12.53	1.17
90	9.83	8.84	1.00	10.55	9.49	1.04	11.26	10.13	1.07	11.88	10.69	1.10	12.36	11.12	1.13	13.32	11.98	1.18	14.13	12.71	1.22
95	9.53	8.87	1.04	10.25	9.54	1.07	10.96	10.20	1.10	11.67	10.87	1.13	**12.00**	**11.17**	**1.17**	13.10	12.20	1.22	13.81	12.86	1.25
100	9.28	8.73	1.05	10.00	9.40	1.09	10.71	10.08	1.12	11.42	10.75	1.15	11.84	11.14	1.19	12.85	12.09	1.24	13.56	12.76	1.27
105	9.03	8.59	1.07	9.75	9.27	1.10	10.46	9.95	1.14	11.17	10.63	1.17	11.69	11.12	1.21	12.60	11.98	1.26	13.31	12.66	1.30
110	8.78	8.51	1.08	9.50	9.20	1.12	10.21	9.89	1.15	10.92	10.58	1.19	11.44	11.08	1.22	12.35	11.97	1.27	13.07	12.66	1.31
115	8.53	8.35	1.09	9.25	9.05	1.13	9.96	9.75	1.16	10.67	10.45	1.20	11.19	10.95	1.23	12.10	11.84	1.28	12.82	12.54	1.32
118	8.28	8.16	1.10	9.00	8.87	1.14	9.60	9.46	1.17	10.32	10.17	1.21	10.80	10.64	1.25	11.70	11.53	1.30	12.36	12.18	1.33
122	7.89	7.79	1.11	8.56	8.46	1.14	9.24	9.13	1.18	9.91	9.80	1.21	10.40	10.28	1.25	11.27	11.13	1.30	11.94	11.80	1.34

DB = Dry Bulb Temperature (°F)

WB = Wet Bulb Temperature (°F)

TC = Total Capacity (kBtu/h).

SC = Sensible Capacity (kBtu/h)

PI = Power Input (kW) (includes compressor, indoor fan motor and outdoor fan motor).

NOTES

1. All capacities are net, evaporator fan motor heat is deducted.
2. Grey shading Indicates reference data. When operating at this temperature, these values can be different by discontinuous operation.
3. Direct interpolation is permissible. Do not extrapolate
4. Capacities are based on the following conditions:
   - Interconnecting Piping Length 24.6 ft
   - Level Difference of Zero.
   - Indoor Air Temperature
     :80°F (26.7°C) DB / 67°F (19.4°C) WB
   - Outdoor Air Temperature
     :95°F (35.0°C) DB / 75°F (23.9°C) WB

Due to our policy of continuous product innovation, some specifications may change without notification.

LG

LSN180HEV/LSU180HEV

Outdoor air temp. (°F DB)	Indoor Air Temp. °F DB/°F WB																				
	64/53			68/57			72/61			77/64			80/67			86/72			90/75		
	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI
14	10.41	9.13	0.66	11.19	9.81	0.68	11.97	10.49	0.70	12.75	11.18	0.72	13.10	11.49	0.74	14.30	12.54	0.77	15.08	13.23	0.80
23	11.17	9.45	0.66	12.01	10.16	0.68	12.85	10.87	0.70	13.68	11.58	0.72	14.07	11.90	0.74	15.36	12.99	0.77	16.19	13.70	0.79
59	13.41	10.15	0.75	14.41	10.91	0.78	15.41	11.67	0.80	16.42	12.43	0.83	16.88	12.78	0.85	18.43	13.95	0.89	19.43	14.71	0.91
70	15.30	12.46	1.11	16.32	13.29	1.15	17.34	14.12	1.18	18.02	14.67	1.22	18.53	15.09	1.26	19.89	16.20	1.31	21.25	17.30	1.35
75	15.10	12.51	1.14	16.13	13.36	1.18	17.15	14.20	1.22	17.85	14.78	1.25	18.36	15.21	1.29	19.64	16.26	1.34	21.08	17.46	1.38
80	14.71	12.39	1.19	15.73	13.25	1.23	16.75	14.11	1.27	17.51	14.75	1.31	18.19	15.32	1.35	19.38	16.33	1.40	20.74	17.47	1.44
85	14.32	12.44	1.28	15.34	13.33	1.32	16.35	14.21	1.36	17.17	14.92	1.40	17.85	15.51	1.44	19.13	16.62	1.50	20.43	17.75	1.54
90	13.93	12.53	1.33	14.94	13.44	1.37	15.96	14.35	1.41	16.83	15.14	1.46	17.51	15.75	1.50	18.87	16.97	1.56	20.02	18.01	1.61
95	13.50	12.57	1.37	14.51	13.51	1.41	15.52	14.46	1.46	16.54	15.40	1.50	**17.00**	**15.83**	**1.55**	18.56	17.28	1.61	19.57	18.22	1.66
100	13.15	12.37	1.40	14.16	13.32	1.44	15.17	14.28	1.48	16.18	15.23	1.53	16.78	15.79	1.58	18.20	17.13	1.64	19.22	18.08	1.69
105	12.80	12.17	1.42	13.81	13.13	1.46	14.82	14.09	1.51	15.83	15.05	1.55	16.56	15.75	1.60	17.85	16.98	1.67	18.86	17.94	1.72
110	12.44	12.06	1.43	13.45	13.04	1.48	14.46	14.02	1.52	15.48	14.99	1.57	16.21	15.70	1.62	17.50	16.95	1.68	18.51	17.93	1.74
115	12.09	11.83	1.45	13.10	12.82	1.49	14.11	13.81	1.54	15.12	14.80	1.59	15.85	15.51	1.64	17.14	16.78	1.70	18.16	17.77	1.75
118	11.73	11.56	1.46	12.75	12.57	1.51	13.60	13.40	1.55	14.62	14.41	1.60	15.30	15.08	1.65	16.58	16.34	1.72	17.51	17.26	1.77
122	11.17	11.04	1.47	12.13	11.99	1.51	13.09	12.93	1.56	14.04	13.88	1.61	14.74	14.56	1.66	15.96	15.77	1.72	16.92	16.71	1.78

DB = Dry Bulb Temperature (°F)

WB = Wet Bulb Temperature (°F)

TC = Total Capacity (kBtu/h).

SC = Sensible Capacity (kBtu/h)

PI = Power Input (kW) (includes compressor, indoor fan motor and outdoor fan motor).

NOTES

1. All capacities are net, evaporator fan motor heat is deducted.
2. Grey shading Indicates reference data. When operating at this temperature, these values can be different by discontinuous operation.
3. Direct interpolation is permissible. Do not extrapolate
4. Capacities are based on the following conditions:
   - Interconnecting Piping Length 24.6 ft
   - Level Difference of Zero.
   - Indoor Air Temperature
     :80°F (26.7°C) DB / 67°F (19.4°C) WB
   - Outdoor Air Temperature
     :95°F (35.0°C) DB / 75°F (23.9°C) WB

LSN240HEV/LSU240HEV

Outdoor air temp. (°F DB)	Indoor Air Temp. °F DB/°F WB																				
	64/53			68/57			72/61			77/64			80/67			86/72			90/75		
	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI	TC	SC	PI
14	13.47	11.81	0.87	14.48	12.69	0.90	15.49	13.58	0.92	16.49	14.46	0.95	16.96	14.87	0.98	18.51	16.23	1.02	19.52	17.12	1.05
23	14.46	12.23	0.87	15.54	13.15	0.89	16.62	14.06	0.92	17.71	14.98	0.95	18.20	15.40	0.98	19.87	16.81	1.02	20.96	17.73	1.05
59	17.35	13.14	1.00	18.65	14.12	1.03	19.95	15.11	1.06	21.25	16.09	1.09	21.84	16.54	1.13	23.85	18.06	1.17	25.14	19.04	1.21
70	19.80	16.12	1.47	21.12	17.20	1.52	22.44	18.27	1.56	23.32	18.99	1.61	23.98	19.53	1.66	25.74	20.96	1.73	27.50	22.39	1.78
75	19.55	16.19	1.51	20.87	17.29	1.56	22.20	18.38	1.61	23.10	19.13	1.66	23.76	19.68	1.71	25.41	21.04	1.78	27.28	22.59	1.83
80	19.03	16.04	1.58	20.36	17.15	1.63	21.68	18.26	1.68	22.66	19.09	1.73	23.54	19.83	1.78	25.08	21.13	1.85	26.84	22.61	1.91
85	18.53	16.10	1.69	19.85	17.25	1.74	21.16	18.39	1.79	22.22	19.31	1.85	23.10	20.07	1.91	24.75	21.51	1.98	26.44	22.98	2.04
90	18.02	16.21	1.76	19.34	17.39	1.81	20.65	18.58	1.87	21.78	19.59	1.93	22.66	20.38	1.99	24.42	21.97	2.07	25.91	23.31	2.13
95	17.47	16.27	1.81	18.78	17.49	1.87	20.09	18.71	1.93	21.40	19.93	1.99	**22.00**	**20.48**	**2.05**	24.02	22.36	2.13	25.33	23.58	2.20
100	17.02	16.01	1.85	18.33	17.24	1.90	19.63	18.47	1.96	20.94	19.70	2.02	21.71	20.43	2.08	23.56	22.17	2.17	24.87	23.40	2.23
105	16.56	15.75	1.88	17.87	16.99	1.93	19.18	18.24	1.99	20.48	19.48	2.06	21.43	20.38	2.12	23.10	21.97	2.20	24.41	23.21	2.27
110	16.10	15.60	1.90	17.41	16.87	1.96	18.72	18.14	2.02	20.03	19.40	2.08	20.97	20.32	2.14	22.64	21.94	2.23	23.95	23.21	2.29
115	15.64	15.31	1.91	16.95	16.59	1.97	18.26	17.87	2.03	19.57	19.15	2.10	20.52	20.07	2.16	22.19	21.71	2.25	23.50	22.99	2.32
118	15.18	14.96	1.93	16.50	16.26	1.99	17.60	17.35	2.05	18.92	18.65	2.12	19.80	19.52	2.18	21.45	21.14	2.27	22.66	22.33	2.34
122	14.46	14.29	1.94	15.70	15.51	2.00	16.94	16.73	2.06	18.18	17.96	2.13	19.07	18.84	2.19	20.65	20.41	2.28	21.89	21.63	2.35

DB = Dry Bulb Temperature (°F)

WB = Wet Bulb Temperature (°F)

TC = Total Capacity (kBtu/h).

SC = Sensible Capacity (kBtu/h)

PI = Power Input (kW) (includes compressor, indoor fan motor and outdoor fan motor).

NOTES

1. All capacities are net, evaporator fan motor heat is deducted.
2. Grey shading Indicates reference data. When operating at this temperature, these values can be different by discontinuous operation.
3. Direct interpolation is permissible. Do not extrapolate
4. Capacities are based on the following conditions:
   - Interconnecting Piping Length 24.6 ft
   - Level Difference of Zero.
   - Indoor Air Temperature
     :80°F (26.7°C) DB / 67°F (19.4°C) WB
   - Outdoor Air Temperature
     :95°F (35.0°C) DB / 75°F (23.9°C) WB

PERFORMANCE DATA

Heating Capacity

LSN090HEV/LSU090HEV

Outdoor Air Temperature		Indoor Air Temp. °F DB													
		60		64		68		70		72		75		86	
(°F DB)	(°F WB)	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
24	23	6.27	0.76	6.07	0.75	6.01	0.75	5.95	0.75	5.91	0.75	5.79	0.74	5.65	0.74
32	30	7.58	0.78	7.35	0.77	7.27	0.77	7.20	0.76	7.14	0.76	7.00	0.75	6.84	0.75
41	38	8.74	0.79	8.48	0.78	8.39	0.78	8.31	0.77	8.24	0.77	8.08	0.76	7.89	0.76
43	40	9.03	0.79	8.76	0.78	8.67	0.78	8.58	0.78	8.52	0.78	8.35	0.77	8.15	0.77
47	43	9.47	0.80	9.18	0.79	9.09	0.79	9.00	0.78	8.93	0.78	8.75	0.77	8.54	0.77
53	50	9.57	0.80	9.27	0.80	9.18	0.80	9.09	0.79	9.02	0.79	8.84	0.78	8.63	0.78
59	55	9.78	0.81	9.49	0.80	9.39	0.80	9.30	0.80	9.23	0.80	9.04	0.79	8.83	0.79
64	60	9.99	0.83	9.69	0.82	9.59	0.82	9.50	0.81	9.42	0.81	9.23	0.80	9.01	0.80
70	66	10.18	0.84	9.87	0.83	9.77	0.83	9.68	0.82	9.60	0.82	9.41	0.81	9.18	0.81
75	71	10.32	0.85	10.01	0.84	9.91	0.84	9.81	0.83	9.74	0.83	9.54	0.83	9.31	0.83
78	75	10.42	0.86	10.10	0.85	10.00	0.85	9.90	0.84	9.82	0.84	9.63	0.83	9.40	0.83

DB = Dry Bulb Temperature (°F)

WB = Wet Bulb Temperature (°F)

TC = Total Capacity (kBtu/h).

PI = Power Input (kW) (includes compressor, indoor fan motor and outdoor fan motor).

NOTES

1. All capacities are net, evaporator fan motor heat is deducted.
2. Direct interpolation is permissible. Do not extrapolate
3. Capacities are based on the following conditions:
   - Interconnecting Piping Length 24.6 ft
   - Level Difference of Zero.
   - Indoor Air Temperature
     :70°F(21.1°C) DB / 60°F(15.6°C) WB
   - Outdoor Air Temperature
     : 47°F(8.3°C) DB / 43°F(6.1°C) WB

LSN120HEV/LSU120HEV

Outdoor Air Temperature		Indoor Air Temp. °F DB													
		60		64		68		70		72		75		86	
(°F DB)	(°F WB)	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
24	23	8.26	0.96	8.01	0.95	7.93	0.95	7.85	0.94	7.79	0.94	7.64	0.93	7.46	0.93
32	30	10.05	0.97	9.74	0.97	9.65	0.97	9.55	0.96	9.48	0.96	9.29	0.95	9.07	0.95
41	38	11.64	0.99	11.28	0.98	11.17	0.98	11.06	0.97	10.97	0.97	10.75	0.96	10.50	0.96
43	40	12.03	0.99	11.67	0.98	11.55	0.98	11.43	0.97	11.35	0.97	11.12	0.96	10.86	0.96
47	43	12.63	1.00	12.24	0.99	12.12	0.99	12.00	0.98	11.91	0.98	11.67	0.97	11.39	0.97
53	50	12.75	1.01	12.37	1.00	12.24	1.00	12.12	0.99	12.03	0.99	11.79	0.98	11.51	0.98
59	55	13.04	1.02	12.65	1.01	12.52	1.01	12.40	1.00	12.30	1.00	12.05	0.99	11.77	0.99
64	60	13.32	1.04	12.92	1.03	12.79	1.03	12.66	1.02	12.56	1.02	12.31	1.01	12.02	1.01
70	66	13.57	1.05	13.16	1.04	13.03	1.04	12.90	1.03	12.80	1.03	12.54	1.02	12.25	1.02
75	71	13.76	1.07	13.35	1.06	13.21	1.06	13.08	1.05	12.98	1.05	12.72	1.04	12.42	1.04
78	75	13.89	1.08	13.47	1.07	13.33	1.07	13.20	1.06	13.10	1.06	12.84	1.05	12.53	1.05

DB = Dry Bulb Temperature (°F)

WB = Wet Bulb Temperature (°F)

TC = Total Capacity (kBtu/h).

PI = Power Input (kW) (includes compressor, indoor fan motor and outdoor fan motor).

NOTES

1. All capacities are net, evaporator fan motor heat is deducted.
2. Direct interpolation is permissible. Do not extrapolate
3. Capacities are based on the following conditions:
   - Interconnecting Piping Length 24.6 ft
   - Level Difference of Zero.
   - Indoor Air Temperature
     :70°F(21.1°C) DB / 60°F(15.6°C) WB
   - Outdoor Air Temperature
     : 47°F(8.3°C) DB / 43°F(6.1°C) WB

Due to our policy of continuous product innovation, some specifications may change without notification.

LSN180HEV/LSU180HEV

Outdoor Air Temperature		Indoor Air Temp. °F DB													
		60		64		68		70		72		75		86	
(°F DB)	(°F WB)	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
24	23	12.87	1.55	12.48	1.54	12.35	1.54	12.23	1.52	12.14	1.52	11.89	1.51	11.61	1.51
32	30	15.78	1.58	15.31	1.57	15.15	1.57	15.00	1.55	14.89	1.55	14.59	1.53	14.24	1.53
41	38	18.37	1.61	17.82	1.59	17.64	1.59	17.46	1.57	17.33	1.57	16.98	1.56	16.58	1.56
43	40	19.02	1.61	18.44	1.60	18.26	1.60	18.08	1.58	17.94	1.58	17.58	1.57	17.16	1.57
47	43	19.99	1.62	19.39	1.61	19.19	1.61	19.00	1.59	18.85	1.59	18.48	1.57	18.04	1.57
53	50	20.19	1.64	19.58	1.62	19.38	1.62	19.19	1.61	19.04	1.61	18.66	1.59	18.22	1.59
59	55	20.65	1.65	20.03	1.64	19.82	1.64	19.63	1.62	19.48	1.62	19.09	1.61	18.63	1.61
64	60	21.09	1.69	20.45	1.67	20.25	1.67	20.05	1.65	19.89	1.65	19.49	1.64	19.03	1.64
70	66	21.49	1.71	20.84	1.69	20.63	1.69	20.43	1.68	20.27	1.68	19.86	1.66	19.39	1.66
75	71	21.79	1.74	21.13	1.72	20.92	1.72	20.71	1.70	20.55	1.70	20.14	1.68	19.66	1.68
78	75	21.99	1.75	21.33	1.73	21.11	1.73	20.90	1.72	20.74	1.72	20.32	1.70	19.84	1.70

DB = Dry Bulb Temperature (°F)

WB = Wet Bulb Temperature (°F)

TC = Total Capacity (kBtu/h).

PI = Power Input (kW) (includes compressor, indoor fan motor and outdoor fan motor).

NOTES

1. All capacities are net, evaporator fan motor heat is deducted.
2. Direct interpolation is permissible. Do not extrapolate
3. Capacities are based on the following conditions:
   - Interconnecting Piping Length 24.6 ft
   - Level Difference of Zero.
   - Indoor Air Temperature
     :70°F(21.1°C) DB / 60°F(15.6°C) WB
   - Outdoor Air Temperature
     : 47°F(8.3°C) DB / 43°F(6.1°C) WB

LSN240HEV/LSU240HEV

Outdoor Air Temperature		Indoor Air Temp. °F DB													
		60		64		68		70		72		75		86	
(°F DB)	(°F WB)	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
24	23	15.14	1.89	14.68	1.87	14.53	1.87	14.38	1.85	14.27	1.85	13.99	1.83	13.66	1.83
32	30	18.41	1.92	17.86	1.91	17.68	1.91	17.50	1.89	17.37	1.89	17.02	1.87	16.61	1.87
41	38	21.33	1.95	20.68	1.94	20.47	1.94	20.27	1.92	20.11	1.92	19.71	1.90	19.24	1.90
43	40	22.06	1.96	21.39	1.94	21.17	1.94	20.96	1.92	20.80	1.92	20.38	1.90	19.90	1.90
47	43	23.15	1.97	22.45	1.95	22.22	1.95	22.00	1.94	21.83	1.94	21.39	1.92	20.88	1.92
53	50	23.38	1.99	22.67	1.97	22.44	1.97	22.22	1.95	22.05	1.95	21.61	1.93	21.09	1.93
59	55	23.91	2.01	23.19	1.99	22.95	1.99	22.73	1.97	22.55	1.97	22.10	1.95	21.57	1.95
64	60	24.42	2.05	23.68	2.03	23.44	2.03	23.21	2.01	23.03	2.01	22.57	1.99	22.03	1.99
70	66	24.89	2.08	24.13	2.06	23.89	2.06	23.65	2.04	23.47	2.04	23.00	2.02	22.45	2.02
75	71	25.23	2.11	24.47	2.09	24.22	2.09	23.98	2.07	23.80	2.07	23.32	2.05	22.76	2.05
78	75	25.46	2.13	24.69	2.11	24.44	2.11	24.20	2.09	24.02	2.09	23.53	2.07	22.97	2.07

DB = Dry Bulb Temperature (°F)

WB = Wet Bulb Temperature (°F)

TC = Total Capacity (kBtu/h).

PI = Power Input (kW) (includes compressor, indoor fan motor and outdoor fan motor).

NOTES

1. All capacities are net, evaporator fan motor heat is deducted.
2. Direct interpolation is permissible. Do not extrapolate
3. Capacities are based on the following conditions:
   - Interconnecting Piping Length 24.6 ft
   - Level Difference of Zero.
   - Indoor Air Temperature
     :70°F(21.1°C) DB / 60°F(15.6°C) WB
   - Outdoor Air Temperature
     : 47°F(8.3°C) DB / 43°F(6.1°C) WB

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Due to our policy of continuous product innovation, some specifications may change without notification.

APPLICATION GUIDELINES

Cooling / Heating Correction Factors

For the Single Zone Mega Wall Mounted system, 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 in Figure 10 and Figure 11. Multiply the correction factors by the cooling or heating capacity obtained from the capacity tables using design conditions. The resultant is the NET cooling or heating capacity.

Capacity Coefficient Factors

Figure 10: Cooling Capacity Coefficient Factor

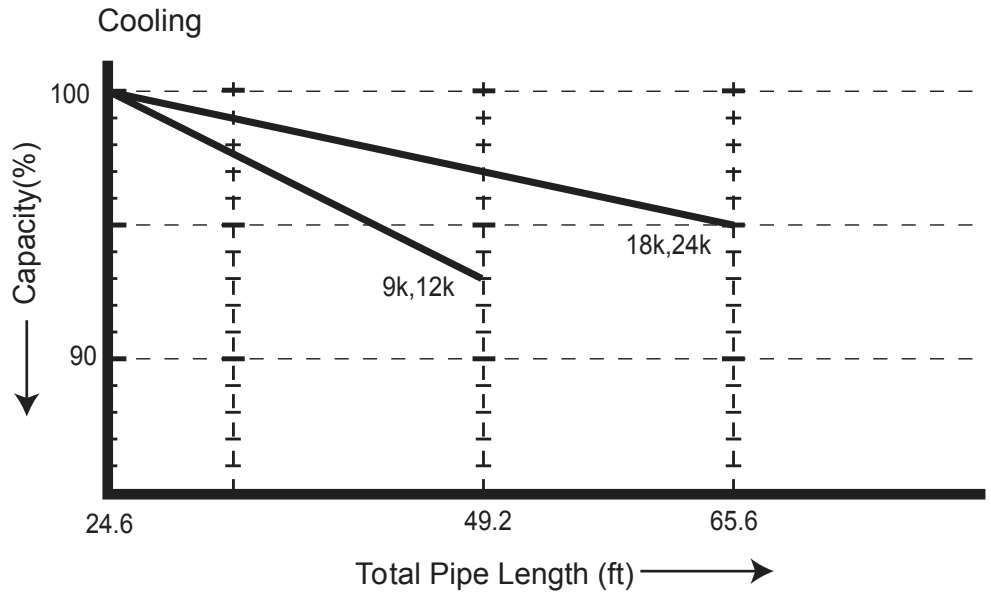
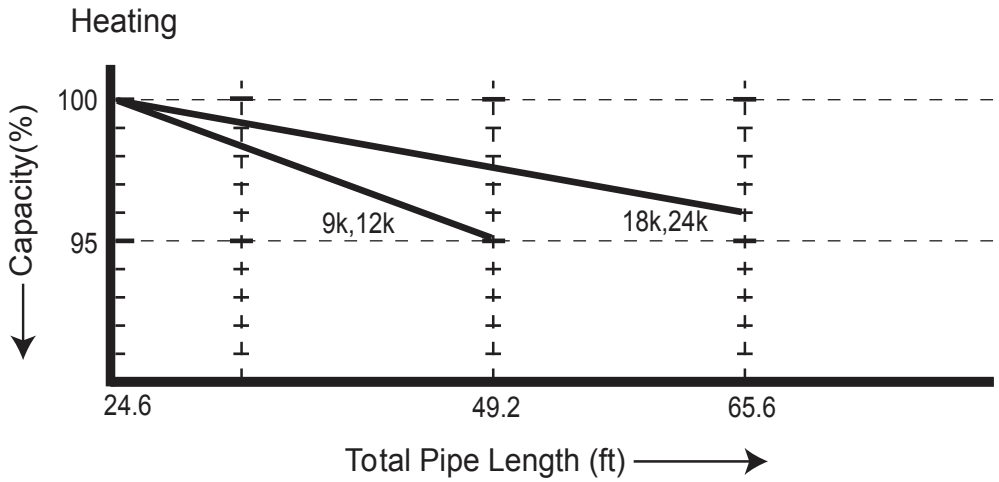


Figure 11: Heating Capacity Coefficient Factor



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Building Ventilation Design Guide

ASHRAE 62.1 and local codes specify the minimum volume of outdoor air 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. The three methods of accomplishing this with LG Single Zone Mega Inverter Wall Mounted systems are summarized here.

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, expressed or implied, of merchantability or fitness of purpose if this method fails to perform as stated or intended.

- *For a complete copy of Standard 62.1-2010, refer to the American Standard of Heating and Air Conditioning Engineers (ASHRAE) website at www.ashrae.org.*
- *For more information on how to properly size a ventilation air pretreatment system, refer to the article, "Selecting DOAS Equipment with Reserve Capacity" by John Murphy, published in the ASHRAE Journal, April 2010.*

Method 1: 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 Single Zone Mega Inverter Wall Mounted system (Figure 12).

Note:

LG recommends using the DDOAS method in all installations.

Advantages

- Does not add additional heating or cooling loads to indoor units.
- May be used with all single zone systems.
- If the outdoor air unit fails, the resulting untreated air will be readily noticed by the occupants.
- The outdoor air unit may supply “neutral” air to the occupant space even when the Single Zone Mega Inverter Wall Mounted indoor unit fan changes speed or cycles on and off. DDOAS controls do not have to be interlocked with the Single Zone Mega Inverter Wall Mounted 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.
- Indoor unit operation and performance will not be affected by the condition of outdoor air.
- Third-party demand control ventilation controls are more readily accommodated.

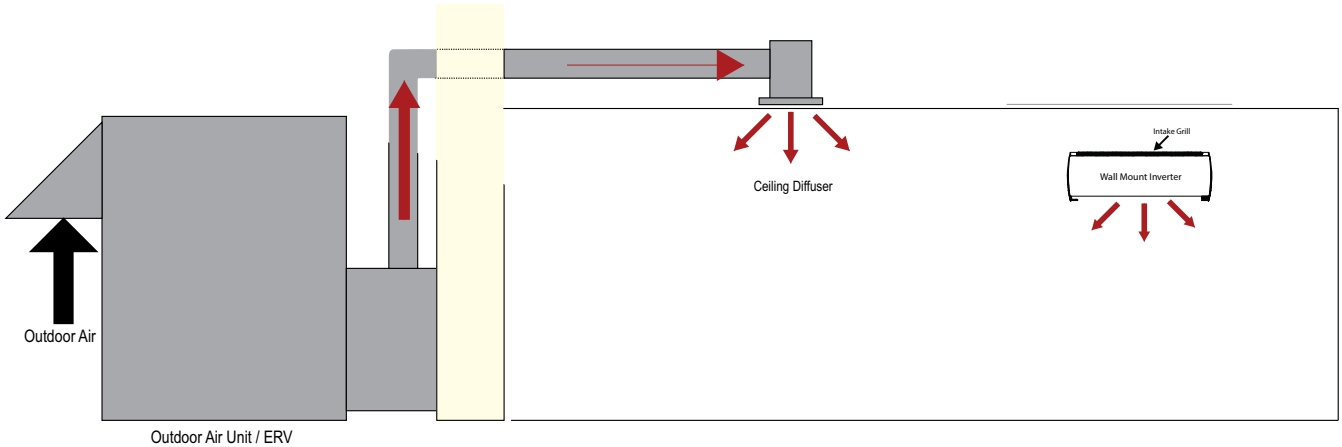
Disadvantages

- Ceiling space is required to accommodate ductwork between the centralized 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 12: Decoupled Dedicated Outdoor System Diagram



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

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 (Figure 13).

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 all single zone systems..

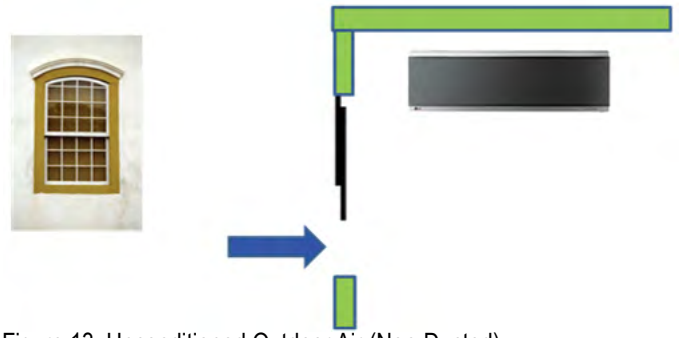


Figure 13: Unconditioned Outdoor Air (Non-Ducted)

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.

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!

Method 3: 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 (Figure 14).

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 all single zone systems..

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 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.

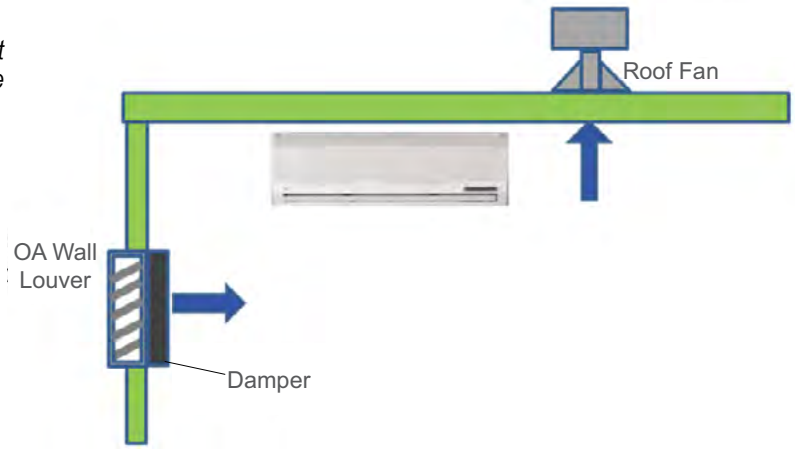


Figure 14: Unconditioned Outdoor Air (Non-Ducted)

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PLACEMENT CONSIDERATIONS

Single Zone Mega Inverter Wall Mounted

Selecting the Best Location

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.
- 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.
- Include enough space for air flow and for service access.
- To avoid the possibility of fire, do not install the unit in an area where combustible gas may generate, flow, stagnate, or leak.
- Do not install the unit in a location where acidic solution and spray (sulfur) are often used.
- Do not use the unit in environments where oil, steam, or sulfuric gas are present.
- Install a fence to prevent vermin from crawling into the unit or unauthorized individuals from accessing it.

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

1. Prepare for severe winter wind chills and heavy snowfall, even in areas of the country where these are unusual phenomena.
2. Position the outdoor unit so that its airflow fans are not buried by direct, heavy snowfall. If snow piles up and blocks the airflow, the system may malfunction.
3. Remove any snow that has accumulated 3-15/16 inches or more on the top of the outdoor unit.
4. Place the outdoor unit on a raised platform at least 19-11/16 inches higher than the average annual snowfall for the area. In environments where there is a possibility of heavy snow, the frame height must be more than two (2) times the amount of average annual snowfall, and should not exceed the width of the outdoor unit. If the frame width is wider than the outdoor unit, snow may accumulate.
5. Install a snow protection hood.
6. To prevent snow and heavy rain from entering the outdoor unit, install the suction and discharge ducts facing away from direct winds.

Additionally, the following conditions should be taken into considerations when the unit operates in defrost mode:

- If the outdoor unit is installed in a highly humid environment (near an ocean, lake, etc.), ensure that the site is well-ventilated and has a lot of natural light. (Example: Install on a rooftop.)
- Sidewalks or parking lots near the outdoor unit may accumulate moisture after unit operates in defrost mode that can turn to ice.

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

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

PLACEMENT CONSIDERATIONS

Outdoor Installation

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. Attach the ODU with a bolt and nut onto a concrete or rigid mount (Figure 15). 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.

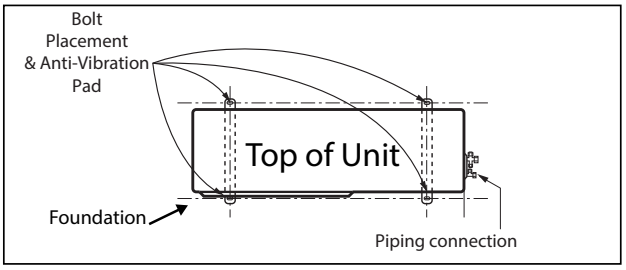
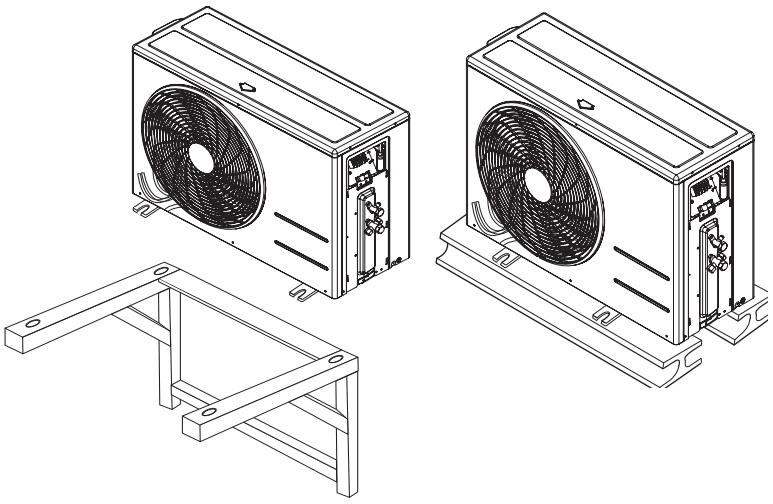


Figure 15: Single Zone Mega Inverter Outdoor Unit—Mounting Methods



Mounting Platform

The underlying structure or foundation must be designed to support the weight of the unit. Avoid placing the unit in a low lying area where water may accumulate. When installing ODU on the wall, or roof top, anchor the mounting base securely using nails or wire with regard to wind and earthquake or vibration.

Tie-Downs and Wind Restraints

The strength of the Single Zone Mega Inverter frame is adequate to be used with field-provided wind restraint tie-downs. The overall tie-down configuration must be approved by a local professional engineer. Always refer to local code when designing a wind restraint system.

Snow and Ice Conditions

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 snow stand at a minimum height that is equal to the average annual snowfall, plus 20 inches. 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.

Note:
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.

Ambient Air Conditions

Avoid exposing the outdoor unit to steam, combustible gases, or other corrosive elements. Avoid exposing the unit to discharge from boiler stacks, chimneys, steam relief ports, other air conditioning units, kitchen vents, plumbing vents, and other sources of extreme temperature, gases, or substances that may degrade performance or cause damage to the unit.

When installing multiple outdoor units, avoid placing the units where discharge of one outdoor unit will blow into the inlet side of an adjacent unit.

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Single Zone Mega Inverter Wall Mounted Outdoor Unit Clearance

Proper airflow through 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 below. All unit clearance measurements are in inches.

Figure 16: Single Zone Mega Inverter Outdoor Unit Clearance

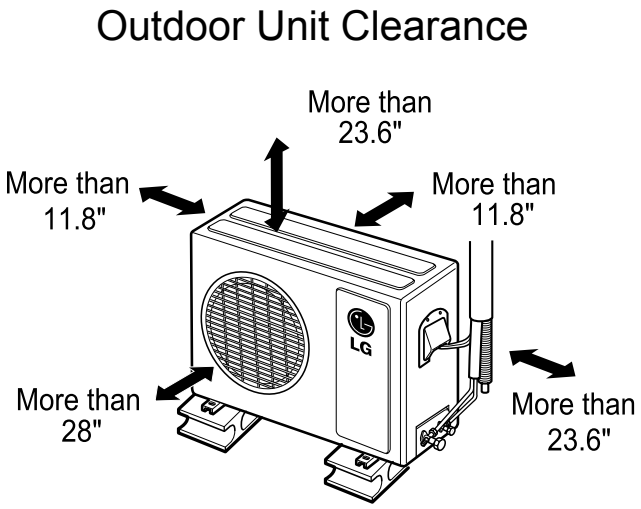
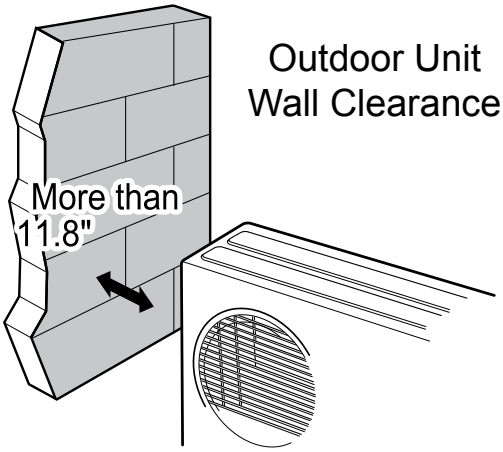


Figure 17: Single Zone Mega Inverter Outdoor Unit Next to Wall - Clearance



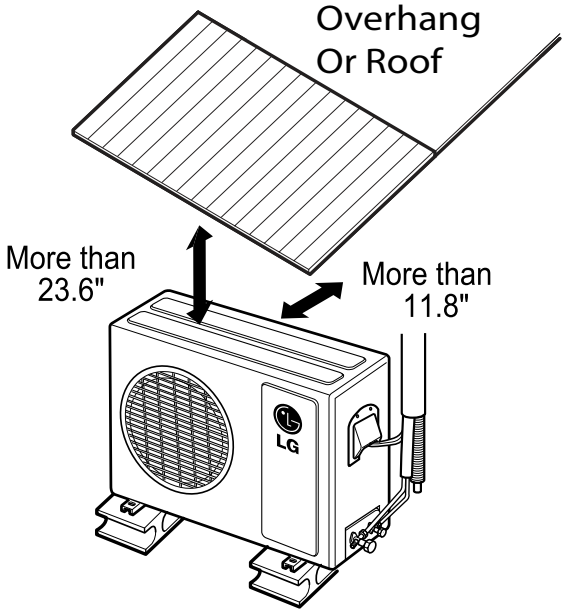
When placing the outdoor unit near a fence, wall or other large obstacle, observe the clearance requirements as shown in Figure 17. This clearance ensures that heat radiation from the condenser is not restricted around the unit.

Adhere to all clearance requirements if installing the unit on a roof. Be sure to level the unit and ensure that unit is adequately anchored. Consult local codes regarding rooftop mounting.

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.

Figure 18: Single Zone Mega Inverter Outdoor Unit Under Roof/Overhang



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REFRIGERANT PIPING DESIGN & LAYOUT BEST PRACTICES

REFRIGERANT PIPING DESIGN

Design Guideline Summary

Device Connection Limitations

A Single Zone Mega Inverter Wall Mounted system consists of one outdoor unit and one indoor unit.

One of the most critical elements of a Single Zone Mega Inverter Wall Mounted system is the refrigerant piping. Table 4 below lists pipe length limits that must be followed in the design of a Single Zone Wall Mount refrigerant pipe system. Refer to Figure 19 for system layout.

Table 4: Single Zone Mega Inverter Wall Mount Refrigerant Piping System Limitations

		LSU090HEV/ LSU120HEV	LSU180HEV/ LSU240HEV
Pipe Length (ELF = Equivalent Length of pipe in Feet)	Longest total equivalent piping length	49.2 feet	65.6 feet
	Distance between fittings and indoor or outdoor units	≥ 20 inches	≥ 20 inches
Elevation (All Elevation Limitations are Measured in Actual Feet)	If outdoor unit is above indoor unit	22.9 feet	32.8 feet
	If outdoor unit is below indoor unit	22.9 feet	32.8 feet

DFS System Layout

Figure 19: Typical DFS System Layout

Max Length = A
Max Elevation = B

Unit = Feet

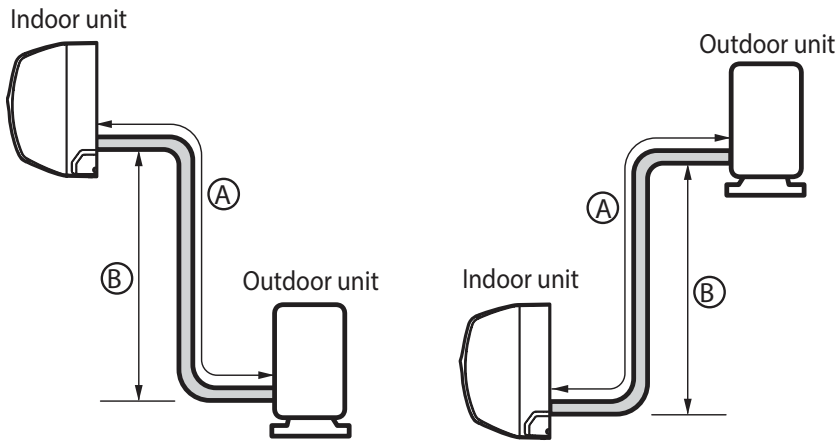

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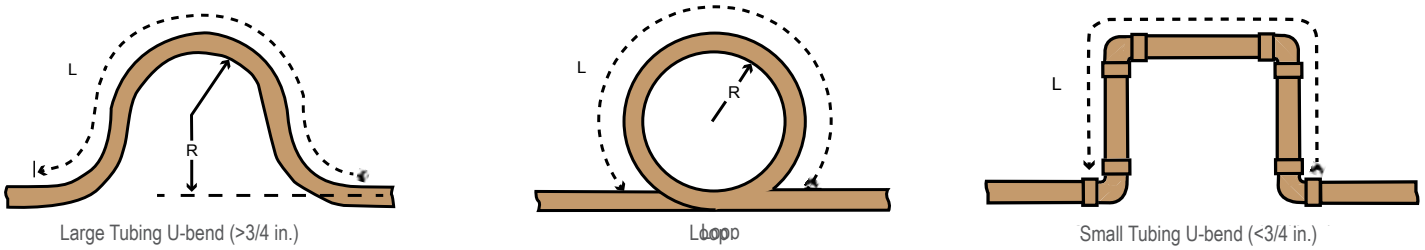
Table 5: Linear Thermal Expansion of Copper Tubing in Inches

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

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

Figure 20: Coiled Expansion Loops and Offsets.



Large Tubing U-bend (>3/4 in.) Loop Small Tubing U-bend (<3/4 in.)

Table 6: 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

[1]R = Centerline Length of Pipe.

[2]L = Centerline Minimum Radius (inches).

INSTALLATION & LAYOUT BEST PRACTICES

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 elbows and valves.

Layout Procedure

1. Draft a one-line diagram of the proposed piping system connecting outdoor unit to indoor unit. Follow the pipe limitations listed.
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 designed for use with R410A refrigerant. The designer, however, 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 7 for equivalent lengths.

Table 7: Equivalent Piping Length for Piping Components

Component	Size (Inches)				
	1/4	3/8	1/2	5/8	3/4
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 the indoor unit) rated for use with R410A refrigerant should be used on both the liquid and vapor lines.

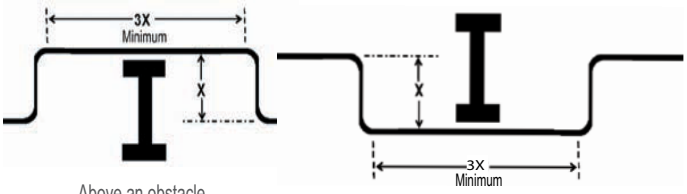
If valves are not installed and the indoor unit needs to be removed or repaired, the entire system must be shut down and evacuated.

Position valves with a minimum distance of three (3) to six (6) inches of pipe on either side of the valve. Valves shall 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 21).

Figure 21: Installing Piping Above and Below an Obstacle



Above an obstacle. Below an obstacle.

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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 Mega Inverter Wall Mounted 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 should verify the refrigerant piping system is free of traps, sagging pipes, sight glasses, filter dryers, etc.

No Pipe Size Substitutions

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

Pipe Supports

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 should never touch the pipe wall; supports shall be installed outside (around) the primary pipe insulation jacket (see Figure 22). 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 shall meet local codes. If local codes do not specify pipe support spacing, pipe shall be supported as follows:

- 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 23.

Figure 22: Pipe Hanger Details

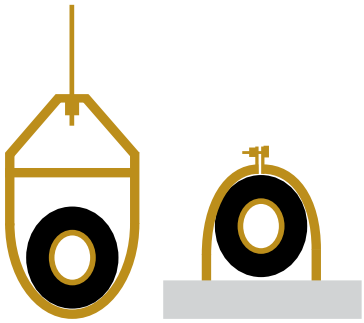


Figure 23: Typical Pipe Support Location—Change in Pipe Direction

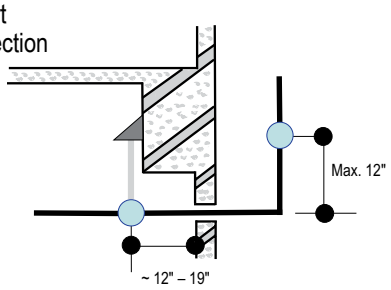
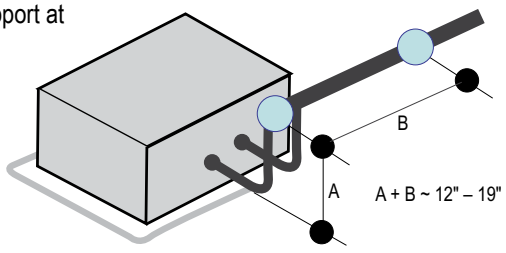


Figure 24: Pipe Support at Indoor Unit



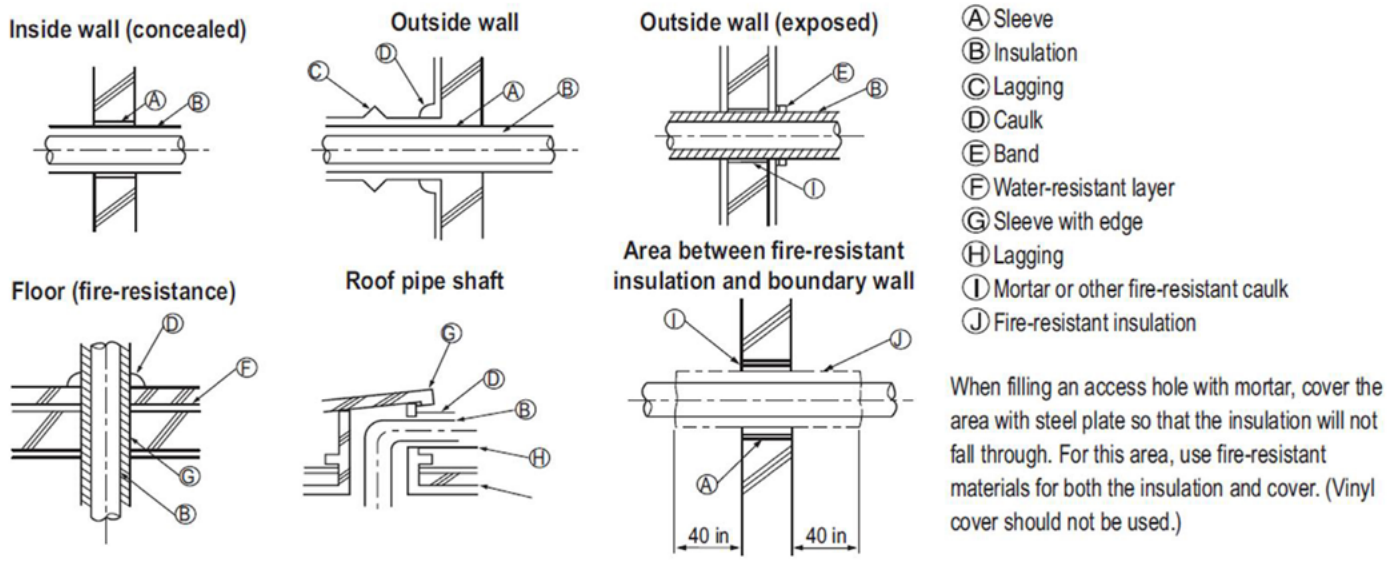
INSTALLATION & LAYOUT BEST PRACTICES

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 25: 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 8: Utility Conduit Sizes (Inches)

Liquid Pipe[1]	Vapor Pipe[1]		
	3/8 (1-1/8[2,3])	1/2 (2.0[2,4])	5/8 (2-1/8[2,4])
1/4 (1.0)[4]	4	4	4
3/8 (1-1/8)[4]	4	4	4

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

[2]Diameter 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.

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

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

Figure 26: Typical Arrangement of Refrigerant Pipe and Cable(s) in a Utility Conduit.

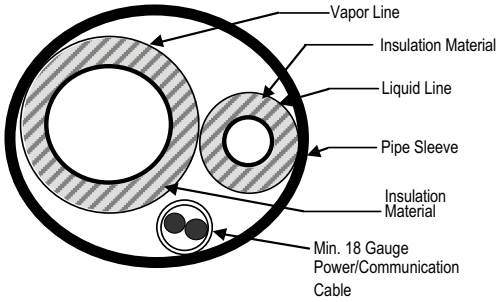


Table 9: Heat Pump Unit Refrigerant Pipe Connections (All Brazed Type)

Model	Liquid Conn. (inches)	Vapor Conn. (inches)
LSU090HEV, LSU120HEV	1/4	3/8
LSU180HEV	1/4	1/2
LSU240HEV	1/4	5/8

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Single Zone Mega Inverter Connections

Pipe Connection for a Single Zone Inverter System

1. Remove the tubing cover from the unit by loosening the fastening screws (Figure 27).
2. Align the center of the refrigerant pipe and corresponding connection as shown in Figure 28 and tighten the flare nut initially by hand.
3. Finish tightening the flare nut with a torque wrench until the wrench clicks. Follow the guidelines as outlined in Table 10 for the amount of torque to use.

Note:

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

Figure 27: Outdoor Unit Connection Cover Removal

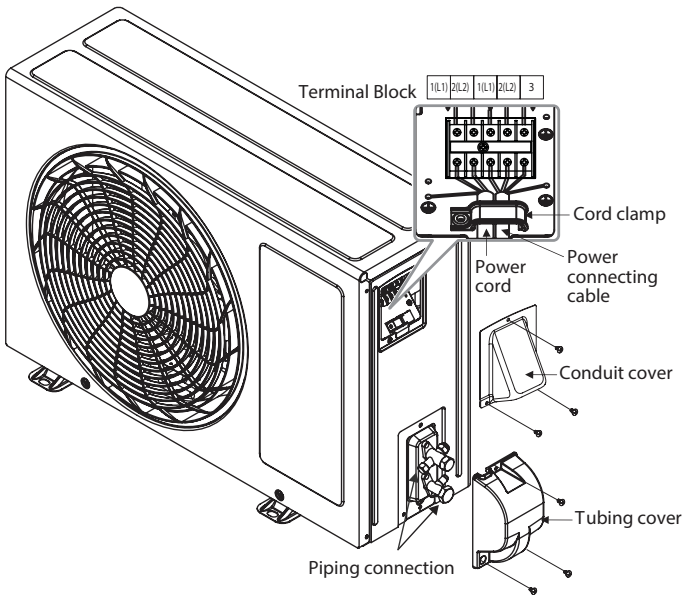
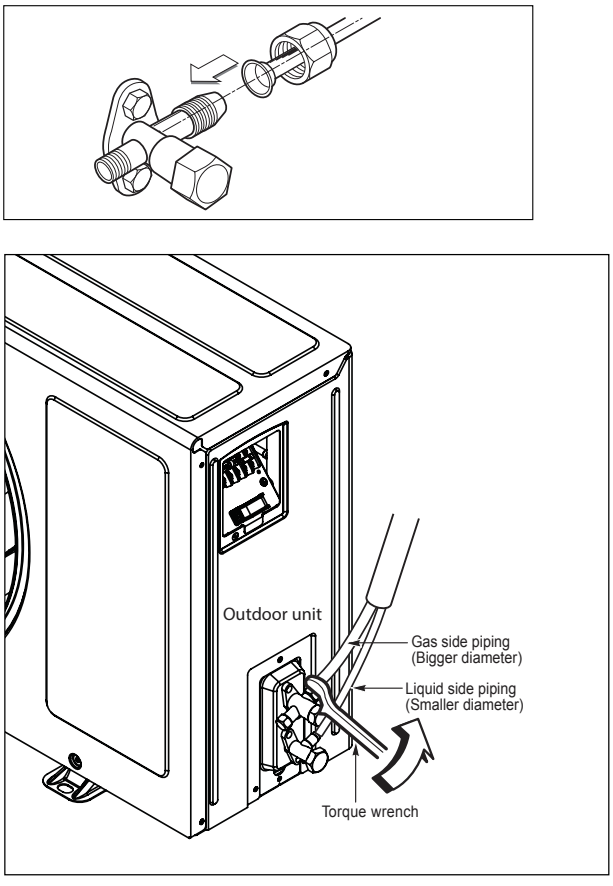


Table 10: Torque Wrench Tightening

Outside Diameter (Inches)	Torque (Lbs.-ft)
1/4	13-18
3/8	24.6-30.4
1/2	39.8-47.7
5/8	45.6-59.3
3/4	71.6-87.5

Figure 28: Heat Pump Outdoor Unit Piping Connection



INSTALLATION & LAYOUT BEST PRACTICES

Refrigerant Piping System Layout

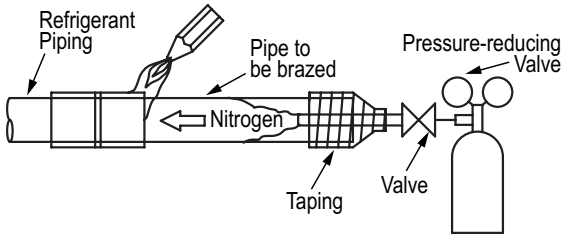
Installation of Refrigerant Piping / Brazing Practices

Note:

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 Mega Inverter Wall Mounted 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 (See Figure 23).

Figure 29: Refrigerant Pipe Brazing.



- 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.
- Use a tubing cutter, do not use a saw to cut pipe. 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

Refrigerant Piping System Insulation

All refrigerant piping, field-provided isolation ball valves, service valves, and elbows shall be completely insulated using closed cell pipe insulation. The liquid and vapor lines must be insulated separately.

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 needs to be increased based on ambient conditions and local codes.

All insulation joints are to be glued with no air gaps. Insulation material must 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.

The design engineer performs calculations to determine if the factory-supplied insulation jackets are sufficient to meet local codes and avoid sweating. Add additional insulation if necessary. 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. Peel the adhesive glue protector slip from the insulation jacket and install the clam-shell jacket over the fitting.

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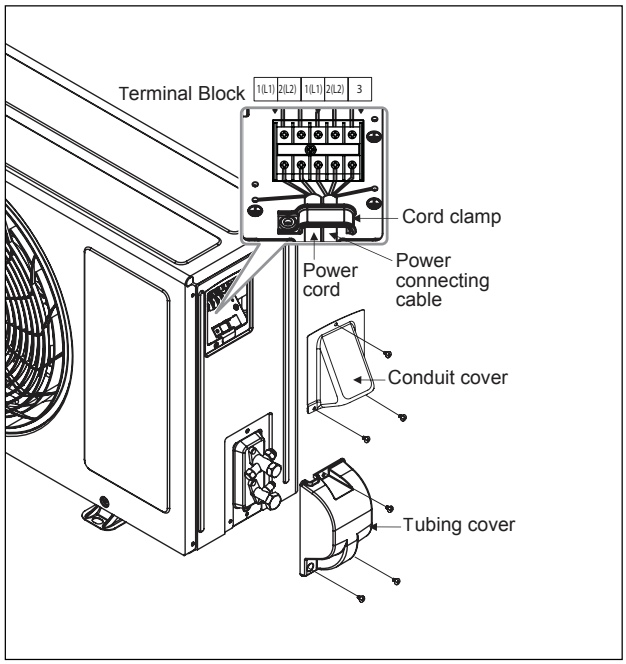
Outdoor Electrical Connection

Procedure

1. Remove the conduit cover from the unit by loosening the fastening screws (Figure 30).
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. Refix the control cover to the original position with the fastening screw.

Figure 30: Electrical Connection to Outdoor Unit

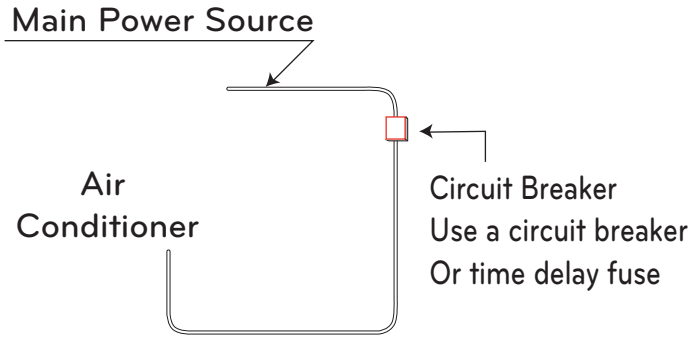


Note:
Always use a circuit breaker or time delay fuse when connecting electrical wiring to the unit (Figure 31).

⚠ WARNING

- *Comply with local codes while running wire from the indoor unit to the outdoor unit.*
- *Be sure to connect wire firmly.*
- *Separately wire the high and low voltage lines.*
- *Use heat-proof electrical wiring capable of withstanding temperatures up to 167°F.*
- *Use outdoor and waterproof connection cable rated up to 300V for the connection between indoor and outdoor unit.*
- *Do not allow wire to touch refrigerant tubing, the compressor or any moving parts.*

Figure 31: Circuit Breaker/Time Delay Fuse Connection



MECHANICAL SPECIFICATIONS

Single Zone Mega Inverter

General

LG Single Zone Mega Inverter Wall Mounted system comprises of a single outdoor unit connected to a single indoor unit with a single refrigerant circuit.

An LG Single Zone Mega Inverter Wall Mounted system is a DFS system that can operate in either cooling or heating mode. The system shall be 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 units are listed by Intertek Electrical Testing Laboratories (ETL) and bear the ETL label. Wiring in these units are in accordance with the National Electrical Code (NEC).

Temperature Ranges

Outdoor Unit

Operating ranges for Outdoor units of 64°F to 118°F for cooling; 23°F to 75°F for heating

Operating ranges for Indoor Units of 64°F to 90°F for cooling; 60°F to 86°F for heating

Casing / Frame

Outdoor unit is constructed with pre-coated metal (PCM).

Indoor unit is constructed of heavy duty Acrylonitrile Butadiene Styrene (ABS) and High Impact Polystyrene (HIPS) plastic."

Refrigerant System

The refrigeration system consists of a single refrigeration circuit and uses R410A refrigerant. The outdoor unit is provided with factory installed components, including a refrigerant strainer, check valves, oil separator, accumulator, four-way reversing valve, capillary tube, high and low side charging ports, service valves, and interconnecting piping.

Refrigeration Oil Control

Heat Pump outdoor units have a centrifugal oil separator and controls to ensure sufficient oil supply is maintained, and that oil does not travel with the refrigerant.

Compressors

The outdoor unit is equipped with one hermetic digitally controlled inverter driven rotary (9k/12k Btu/h systems) or twin-rotary (18k.24k Btu/h systems) compressor to modulate capacity (modulation in 1 Hz increments).

Frequency ranges for the outdoor units are:

9k Btu/h = 20 to 80 Hz

12k Btu/h = 20 to 90 Hz

18/24k Btu/h = 15 to 100 Hz

Over-current protection and vibration isolation are integrated with the compressor.

Outdoor Unit Coil

Heat Pump outdoor unit coils are of a nonferrous construction with louvered fins on copper tubing, and are protected with an integral coil guard. Coil fins have a factory applied corrosion resistant GoldFin™ material with hydrophilic coating.

Fans and Motors

The outdoor unit includes one direct drive, variable speed propeller type fan.

The Brushless Digitally Controlled (BLDC) fan motor shall have 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.

The outdoor unit has horizontal discharge airflow.

Electrical

The unit is available in 208-230V 60 Hz, 1-phase power supply. The unit is capable of operating within voltage limits of ±10% rated voltage, and include overcurrent protection.

Controls

The unit is factory wired with necessary electrical control components, integral microprocessors, printed circuit boards, thermistors, sensors, terminal blocks, and lugs for power wiring.

Microprocessor-based algorithms provide component protection, soft-start capability, refrigeration system pressure, temperature, defrost, and ambient control.

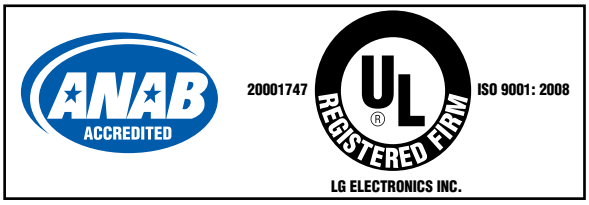
Due to our policy of continuous product innovation, some specifications may change without notification.

ACRONYMS

Table 11: Table of Acronyms

ABS	Acrylonitrile Butadiene Styrene
AC	Air Conditioner
ACP	Advanced Control Platform
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning
AWG	American Wire Gauge
BLDC	Brushless Digitally Controlled
Btu/h	British Thermal Units per hour
BUS	Binary Unit System
CFM	Cubic Feet per Minute
DB	Dry Bulb
dB(A)	Decibels with “A” frequency weighting
DDOAS	Decoupled Dedicated Outdoor Air System
DI	Digital Input
DFS	Duct Free Split
DO	Digital Output
DPST	Double-Pole Single-Throw (switch)
EEV	Electronic Expansion Valve
ELF	Equivalent Length in Feet
ETL	Electronic Testing Laboratories
H/M/L	High/Medium/Low
HIPS	High Impact Polystyrene
HVAC	Heating,Ventilation and Air Conditioning
ID	Innovations in Design (LEED Related)
IDU	Indoor Unit
ISO	International Organization for Standardization

kW	Kilo Watts
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
MBh	Thousands BTUs per hour
MCA	Maximum Circuit Ampacity
MOP	Maximum Overcurrent Protection
MSC	Maximum Starting Current
NC	Noice Criterion (regarding Sound Pressure Levels)
	New Construction (LEED Related)
	Normally Closed
NEC	National Electrical Code
NO	Number
ODU	Outdoor Unit
PCB	Printed Circuit Board
PCM	Pre-Coated Metal
PDI	Power Distribution Indicator
PI	Power Input
PR	Prerequisite (LEED Related)
PVC	Polyvinyl Chloride
SW or S/W	Switch
USB	Universal Serial BUS
VAC	Voltage Alternating Current
VRF	Variable Refrigerant Flow
WB	Wet Bulb



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