LG
Life's Good

MULTI F
MULTI F MAX

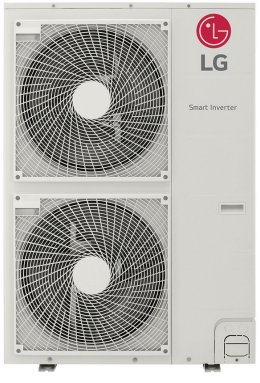
HEAT PUMP SYSTEM
ENGINEERING MANUAL

Multi-Zone Heat Pump Systems

1.5 to 5 Tons

Dual and Tri-Zone
Multi F

Quad-Zone
Multi F



Eight-Zone
Multi F MAX

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A summary list of safety precautions is on page 3.

To access additional technical documentation such as submittals, indoor unit engineering manuals, installation, service, product data performance, general best practice, and building ventilation manuals, as well as white papers, catalogs, LATS software programs, and more, log in to www.lghvac.com.

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TABLE OF SYMBOLS

⚠DANGER	*This symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.*
⚠WARNING	*This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.*
⚠CAUTION	*This symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.*
⚠NOTE	*This symbol indicates situations that may result in equipment or property damage accidents only.*
Note:	*This symbol indicates information related to the current procedure.*
	This symbol indicates an action that should not be performed.

UNIT NOMENCLATURE

Multi-Zone Systems — Outdoor Units and Indoor Units

L	M	U	30	3	HV

L = LG

Type: M = Multi-Zone

Component:
AN: Art Cool™ Wall-Mounted Indoor Unit
N: Standard Wall-Mounted Indoor Unit
CN: Four-Way Ceiling-Cassette Indoor Unit
DN: Ceiling-Concealed Duct (Low Static) Indoor Unit
HN: Ceiling-Concealed Duct (High Static) Indoor Unit
QN: Low-Wall Console Indoor Unit
VN: Vertical-Horizontal Air Handling Indoor Unit
U: Outdoor Unit

Nominal Capacity
(Nominal cooling capacity in Btu/h):

07 = 7,000	15 = 15,000	30 = 30,000	48 = 48,000
09 = 9,000	18 = 18,000	36 = 36,000	54 = 54,000
12 = 12,000	24 = 24,000	42 = 42,000	60 = 60,000

Generation

Features:
H = Heat Pump
V = Inverter
T = High Wall-Mounted Indoor Unit
P = Art Cool Gallery Indoor Unit

Branch Distribution Units

P	M	BD	36	2	0

P = Part (Accessory)

Type: M = Multi-Zone

BD: Branch Distribution Unit

Family

Number of Port Connections
(Maximum Number of Connectable Indoor Units): 2, 3, 4

Generation: 0, 1

Note:

- *Voltage for all equipment is 208-230V, 60 Hz, 1-phase.*
- *All indoor units are compatible with wired controllers.*
- *All outdoor units are LGAP control network compatible with PI-485 V-net Control Integration Board (PMNFP14A1, sold separately).*
- *Compatible single zone IDU nomenclature is listed in the Single Zone Engineering Manuals.*

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LG Air Conditioner Technical Solution (LATS) Software

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

Note:

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

Formats

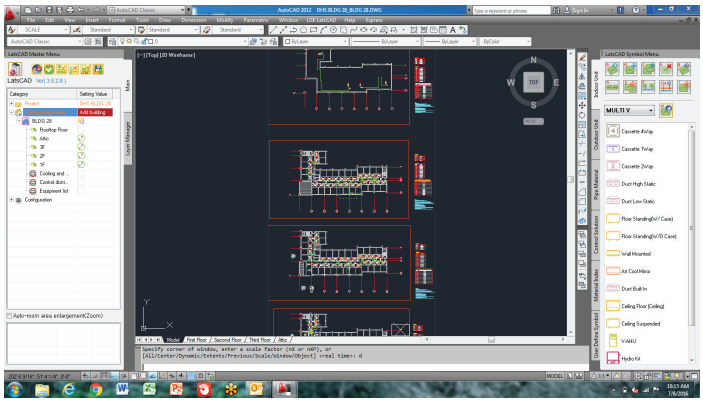
LATS is available to LG customers in three user interfaces: LATS HVAC, LATS CAD2, and LATS Revit. All three LATS formats are available through www.myLGHVAC.com, or contact an LG Sales Representative.

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

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

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

Figure 1: Example of LATS CAD2.



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

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

Features

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

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

The program can also:

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

Note:

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

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LG AIR CONDITIONER TECHNICAL SOLUTION (LATS)

MULTI F
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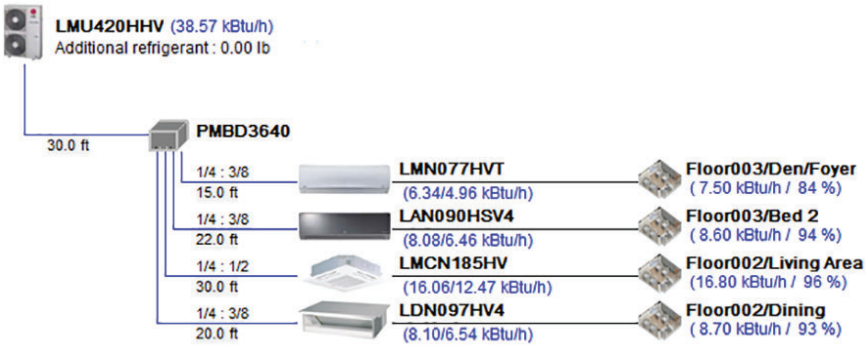
LATS Generates a Complete Project Report

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

Proper Design to Install Procedure

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

Figure 2: Example of a LATS Tree Diagram.



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

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

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

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

Note:

Contact your LG representative for the best software program for your application.

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MANUAL EQUIPMENT SELECTION PROCEDURE

To use the manual equipment selection procedure in choosing the multi-zone system that is the most appropriate for the space, as with traditional air-conditioning systems, follow similar protocols outlined in Manual J from the Air Conditioning Contractors of America (ACCA; see www.acca.org).

1. Obtain the design conditions, and calculate the maximum cool and heat loads for the structure.
2. Select the equipment (choosing the appropriate indoor units and outdoor unit):
   - Determine number of zones.
   - Determine total number of indoor units (refer to zone load calculations when choosing indoor units).
   - Determine number of indoor units allocated to each outdoor unit, considering allowable indoor unit connections, both indoor unit and outdoor unit capacities, and system piping capabilities.
3. Determine the corrected capacity for the indoor units and outdoor unit using LATS Multi F software (preferred method) or:
   - System Combination Tables.
   - Capacity Tables (it may be necessary to interpolate).
   - Capacity Coefficient Factors (such as refrigerant line length derates, design condition derates, defrost operation derate [heating mode], altitude derate [if applicable]).
4. Compare corrected capacities to load calculations.
5. Reselect equipment if necessary.

Obtain Design Conditions, Calculate Maximum Cool / Heat Loads

Obtain the winter outdoor / indoor temperature and summer and winter outdoor / indoor temperature design parameters for the location in which the system is installed. Determine if summer or winter design gains, relative humidity, and building features like skylights, orientation, number of occupants, etc., would change the total heat loss / gain and sensible / latent heat gain, and then calculate the maximum cool and heat loads for the space (using Manual J or energy modeling programs).

Select the Equipment

Determine the Number of Zones

Multi F heat pump systems can cool or heat, but not simultaneously. When designing larger-capacity Multi F heat pump systems or a Multi F MAX system, the designer may be able to combine spaces with similar load profiles located near or adjacent to each other into “thermal zones.” After combining like spaces into zones that will be served by a single (or grouped) indoor unit(s), calculate the peak cooling and heating loads for each zone.

Choosing the Appropriate Indoor Units

Determine the appropriate indoor unit capacity that satisfies the given zone load calculations, and choose how many (and which styles of) indoor units will be required. See Table 1 on page 8 for allowable indoor unit to outdoor unit connections, and the maximum number of connectable indoor units on each Multi F and Multi F MAX outdoor unit. When choosing indoor units, also consider the cooling and heating CFM, featured airflow specifications, and static pressure (if applicable) for each indoor unit.

Avoid oversizing indoor units in an attempt to increase the air exchange rate in the space. Multi F and Multi F MAX systems are designed for minimum airflow over the coil to maximize latent capacity while cooling, maintain a comfortable, consistent discharge air temperature while heating, and minimize fan motor power consumption. In extreme cases, oversizing the indoor units may affect outdoor unit size selection and compromise the outdoor unit’s ability to effectively match the space load(s).

For proper system operation:

1. At least two indoor units must be connected to the outdoor unit.
2. Total connected indoor unit nominal capacity must be at least the minimum connection capacity index specified for the outdoor unit (see Table 2 on page 9), and not exceed the maximum connection capacity index specified for the outdoor unit (see Table 2 on page 9).
3. To calculate the connected total indoor unit nominal capacity, simply sum up the nominal capacities of all indoor units.
   - For high static duct and vertical-horizontal air handling indoor units, a 1.3 multiplier must first be applied before adding to the sum of other indoor units (when connected to an outdoor unit other than the LMU601HV).
     - When high static duct and / or vertical-horizontal air handling indoor units are the only connected indoor units, the multiplier is 1.2.

Note:

For allocated capacity information, see the combination tables in the "Multi F / Multi F MAX Combination Data Manual" on www.lghvac.com. For performance data, see "Multi F / Multi F MAX Performance Data Manual" on www.lghvac.com.

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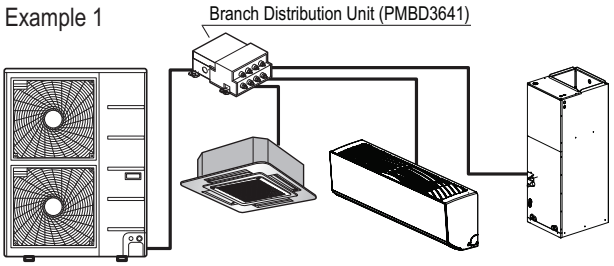
MANUAL EQUIPMENT SELECTION PROCEDURE

Examples

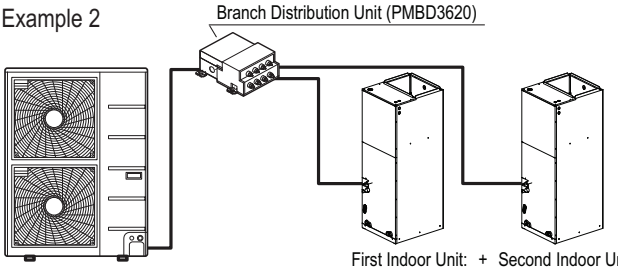
Example 1



Outdoor Unit: LMU541HV | First Indoor Unit: LMCN128HV | + | Second Indoor Unit: LSN090HSV5 | + | Third Indoor Unit: LMVN361HV

Total Capacity Index = 12 + 9 + 36 x 1.3 = 67.8 < 73 Acceptable Combination

Example 2



Outdoor Unit: LMU601HV | First Indoor Unit: LMVN241HV | + | Second Indoor Unit: LMVN241HV

Total Capacity Index = 24 + 24 = 48 < 73 Acceptable Combination

Table 1: Allowable Indoor Unit to Outdoor Unit Connections.

Indoor Units		Outdoor Units						
Model Type	Indoor Unit Nominal Capacity (Btu/h)	LMU183HV	LMU243HV	LMU303HV	LMU363HV	LMU481HV	LMU541HV	LMU601HV
		Maximum No. of Connectable Indoor Units						
		2	3	4	4	8	8	8
ART COOL Mirror	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	18,000	-	O	O	O	O	O	O
ART COOL Gallery	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
Standard Wall Mounted	7,000	O	O	O	O	O	O	O
	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	15,000	O	O	O	O	O	O	O
	18,000	-	O	O	O	O	O	O
	24,000	-	-	O	O	O	O	O
Ceiling Concealed Duct-Low Static	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	18,000	-	O	O	O	O	O	O
Ceiling Concealed Duct-High Static	24,000	-	-	O	O	O	O	O
	36,000	-	-	-	-	O	O	O
Four-Way Ceiling Cassette	7,000	O	O	O	O	O	O	O
	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	18,000	-	O	O	O	O	O	O
Low-Wall Console	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	15,000	O	O	O	O	O	O	O
Vertical-Horizontal Air Handler	24,000	-	-	O	O	O	O	O
	36,000	-	-	-	-	O	O	O

Choosing the Appropriate Outdoor Unit

After all indoor units are properly sized to offset the applicable loads in each zone, select the outdoor unit by choosing a size that meets both the load-cooling requirement, and offsets the sum of the heating load. Then, the system's combination ratio should be evaluated and confirmed it is within the allowable range (the combination ratio compares the nominal capacity of all connected indoor units to the nominal capacity of the outdoor unit serving them). The total nominal capacity of all indoor units should be smaller than the total nominal capacity of the outdoor unit. If the combination ratio is more than 100%, the designer is undersizing the outdoor unit relative to the combined nominal capacity of the connected indoor units. In some designs, oversized indoor units may be unavoidable in the case where the smallest size indoor unit available from LG is larger than what is necessary to satisfy the zone load. This scenario may also occur when an indoor unit selection one size down from the selected unit is slightly short of fulfilling the design load requirements, and the designer must choose the next largest size unit. Sometimes it is recommended to choose a larger capacity outdoor unit if the installation space is big enough. Also, it may be prudent to oversize the outdoor unit to address those times when the weather conditions may exceed the design conditions, to minimize the possibility of ventilation systems that causes the space temperature to drift outside design parameters, or when the indoor unit's entering air temperature falls outside the approved design temperature range.

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Table 2: Rated Outdoor Unit Capacity.

		Outdoor Units						
		LMU183HV	LMU243HV	LMU303HV	LMU363HV	LMU481HV	LMU541HV	LMU601HV
Rated Capacity (Btu/h)*	Cooling	18,000	24,000	30,000	32,800	48,000	52,500	60,000
	Heating	22,000	24,600	32,000	36,000	54,000	58,000	64,000
Connectable Indoor Units	Min. No. of IDUs	2	2	2	2	2	2	2
	Max. No. of IDUs	2	3	4	4	8	8	8
	Min. Capacity Index	14,000	14,000	14,000	14,000	18,000	18,000	18,000
	Max. Capacity Index	24,000	33,000	40,000	48,000	65,000	73,000	81,000

**Rated capacity shown is based on a non-ducted indoor unit combination. Refer to combination tables for rated capacity of other combinations.*

Determine the Corrected Capacity

The *corrected* cooling / heating capacity is different from the rated cooling / heating capacity. The corrected capacity includes changes in unit performance after considering design temperatures, available capacity that can be allocated from the outdoor unit, pressure drop due to refrigerant line length, defrost operation in heating mode, and (if applicable) altitude. Depending on the location of the building, additional capacity correction factors may need to be applied.

Using the Outdoor Unit Cooling and Heating Capacity Tables

Rated cooling capacity ratings are obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB). Rated heating capacity ratings are 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).

To evaluate the total outdoor unit capacity at design conditions, using LATS software (preferred method) or reference the Performance Data Capacity Tables found in the Multi F outdoor unit section in this manual. All design temperatures are not explicitly shown in the charts, therefore, interpolation may be necessary to calculate the capacity for specific design conditions. Based on the premise that capacity follows a linear curve, the following formula can be applied:

$$(y - y1) / (y2 - y1) = (x - x1) / (x2 - x1)$$

Where

y = Missing Capacity (Capacity at the Design Temperature).[1]
y1 = Capacity at Lower Temperature (Smaller value of the two nearest published TC datapoints).
y2 = Capacity at Higher Temperature (Higher value of the two nearest published TC datapoints).
x = Design Temperature (Temperature not shown in published capacity tables).[2]
x1 = (Smaller value of the two nearest published temperature datapoints).
x2 = (Larger value of the two nearest published temperature datapoints).

[1]Median between two published Total Capacity [TC] Btu/h datapoints in the capacity table.
[2]Median between two nearest published temperature datapoints.

Using the Indoor Unit Cooling and Heating Capacity Tables

The datapoints shown in the indoor unit cooling and heating capacity charts are based on (and convey) an indoor unit operating with maximum possible refrigerant flow from the outdoor unit and before any derates are applied. In other words, the capacities displayed reflect what the indoor unit would produce if it was the only indoor unit that required capacity, and the outdoor unit did not have to allocate any capacity to another indoor unit.

System operation with a combination of indoor units is not conveyed in these charts, however, the information can be used to calculate indoor unit allocated capacity (without using the system combination tables). Simply calculate by using the formula:

$$Qidu(combi) = Qodu(rated) \times \frac{Qidu(rated)}{\Sigma Qidu(rated)}$$

Where

Qidu(combi) = Individual Indoor Unit Combination Capacity.
Qodu(rated) = Outdoor Unit Rated Capacity.
Qidu(rated) = Individual Indoor Unit Rated Capacity.
ΣQidu(rated) = Total Connected Indoor Unit Rated Capacity.

Note:

- *The formula can be used to find individual indoor unit capacity for Multi F MAX systems.*
- *A more accurate method to determine expected capacity would be to apply the outdoor unit's corrected capacity instead of rated capacity.*

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Using the System Combination Tables

Multi F system combination tables illustrate how each indoor unit receives a percentage of total outdoor unit rated capacity. Allocation is based on:

- Combinations of Non-Ducted Indoor Units
- Combinations of Ducted Indoor Units
- Combinations of Mixed Non-Ducted and Ducted Indoor Units

Multi F MAX system combination tables only show the total connected indoor unit capacity, but individual indoor unit capacity can be calculated using the formula:

$$Qidu(combi) = Qodu(rated) \times \frac{Qidu(rated)}{\Sigma Qidu(rated)}$$

Note:

- *A more accurate method to determine expected capacity would be to apply the outdoor unit's corrected capacity instead of rated capacity.*
- *For allocated capacity information, see the combination tables in the "Multi F / Multi F MAX Combination Data Manual" on www.lghvac.com. For performance data, see "Multi F / Multi F MAX Performance Data Manual" on www.lghvac.com.*

Capacity Coefficient Factors

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 in the table below, and in the tables on the next page.

Table 3: Multi F Outdoor Unit (Multiple Piping) to Indoor Unit Refrigerant Line Length Derates.

Piping Length (feet)	Cooling Capacity (%)	Heating Capacity (%)
7,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	98.4	99.2
49.2	95.8	97.8
65.6	93.2	96.4
82.0	90.6	95.0
9,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	98.0	99.0
49.2	94.8	97.4
65.6	91.6	95.8
82.0	88.4	94.2
12,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	97.6	98.6
49.2	93.8	96.4
65.6	89.9	94.1
82.0	86.1	91.9
15,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	97.2	98.2
49.2	93.0	95.4
65.6	88.8	92.6
82.0	84.6	89.8
18,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	98.6	99.6
49.2	96.4	99.0
65.6	94.1	98.3
82.0	91.9	97.7
24,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	98.2	99.2
49.2	95.4	98.0
65.6	92.4	96.6
82.0	89.6	95.4

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Table 4: Multi F MAX Outdoor Unit to Branch Distribution Unit Refrigerant Line Length Derates.

Main Piping Length (feet)	16.4	32.8	49.2	65.6	82.0	98.4	114.8	131.2	147.6	164.0	180.4
Cooling Capacity (%)	100.0	98.8	97.3	95.8	94.3	92.8	91.3	89.8	88.3	86.8	85.3
Heating Capacity (%)	100.0	99.6	99.2	98.7	98.3	97.8	97.4	96.9	96.5	96.0	95.6

Figure 3: Multi F MAX Outdoor Unit to Branch Distribution Unit Refrigerant Line Length Derate Chart.

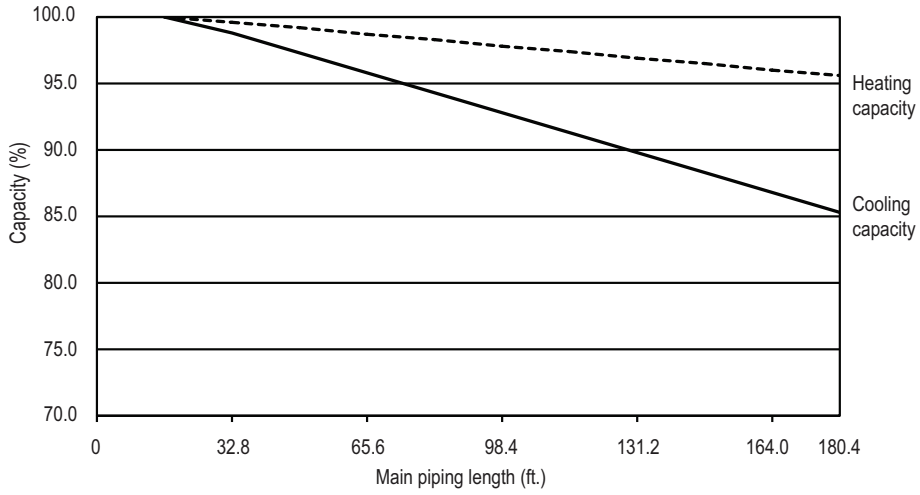

Table 5: Multi F MAX Branch Distribution Unit to Indoor Unit Refrigerant Line Length Derates.

Piping Length (feet)	Cooling Capacity (%)	Heating Capacity (%)
7,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	98.0	99.5
49.2	96.0	98.9
9,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.5	98.8
49.2	95.0	97.5
12,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.0	98.3
49.2	94.0	96.5
15,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.2	98.2
49.2	93.0	95.4
18,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	98.3	99.5
49.2	96.5	99.0
24,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.8	99.2
49.2	95.5	98.4
36,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.9	98.8
49.2	95.7	97.6

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MANUAL EQUIPMENT SELECTION PROCEDURE

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.

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 x C

Where:

A = Integrated Heating Capacity.
B = Value found in the Capacity Table.
C = Correction Factor for Frost Accumulation Factor (see right).

Table 6: 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

[1]At 85% outdoor air relative humidity.

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

Note:

There will be 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 must be within the minimum and maximum indoor unit connection capacity index, and be large enough to offset the total cooling load for all spaces it serves (account for ventilation air cooling load if the ventilation air has not been pretreated to room neutral conditions). The outdoor unit must also be large enough to offset the total heating load for all spaces it serves.

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

System Sizing Check Formulas

1. Outdoor Unit Rated Capacity.

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

2. Outdoor Unit Capacity at 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.

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

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.

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MULTI F
OUTDOOR UNIT DATA

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MULTI F OUTDOOR UNIT

Mechanical Specifications

MULTI F
MULTI F MAX

Multi F Heat Pump Condensing Units

General

A Multi F multi-zone system is comprised of one heat pump outdoor unit connected to two, three, or four indoor units using a shared refrigerant piping circuit between the outdoor unit and each indoor unit, and includes integrated controls supplied by LG. The outdoor unit is internally assembled, wired, and piped from the factory; all LG components are manufactured in a facility registered to ISO 9001 and ISO 14001, set by the International Organization for Standardization (ISO). The LG Multi F multi zone heat pump system components comply with Underwriters Laboratories (UL) 1995 Heating and Cooling Equipment Standard for Safety. The units are certified to AHRI 210 / 240.

Figure 4: Multi F LMU183HV and LMU243HV Outdoor Units.

Figure 5: Multi F LMU303HV and LMU363HV Outdoor Units.

Temperature Ranges

The heat pump outdoor units are capable of continuous operation in cooling mode from 14°F to +118°F ambient dry bulb (installing an optional Low Ambient Wind Baffle Kit will allow continuous operation down to -4°F in cooling mode for Multi F systems). The heat pump outdoor units are capable of continuous operation in heating mode from -4°F to +64°F ambient wet bulb without additional low ambient controls, and intermittent operation from -9°F to +64°F .

Frame

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

Refrigerant System

Multi F systems have a shared refrigerant circuit field piped to multiple (ducted, non-ducted or mixed) indoor units to effectively and efficiently control the heating or cooling operation of the multi zone system. All refrigerant lines from the outdoor unit to the indoor units are field-installed and must be insulated separately.

All Multi F systems use R410A refrigerant. The outdoor units are equipped with a refrigerant strainer, check valves, oil separator, accumulator, four-way reversing valve, electronic expansion valve(s) (EEV), high side and low side refrigerant charging ports, and a service port. Each outdoor unit also includes sensors for suction temperature, discharge temperature, high-pressure, low-pressure, heat exchanger temperature, and outdoor temperature conditions.

Refrigeration Oil Control

The outdoor units have an oil separator to separate oil mixed with the refrigerant gas during compression and return oil to the compressor. The outdoor units also have an oil injection mechanism to ensure a consistent film of oil on all moving compressor parts at low speed.

Compressor

Multi F condensing units are equipped with one hermetically sealed, digitally controlled, inverter driven twin-rotary compressor that includes Teflon™ coated bearings. The inverter motor is capable of providing a modulation range of 10Hz to 70Hz (cooling) and 10Hz to 99Hz (heating) (for LMU183-243HV models), and 10Hz to 80Hz (cooling) and 10Hz to 100Hz (heating) (for LMU303-363HV models) with control in 1Hz increments. The compressor is protected with phase-reversal protection, uses a factory-charge of Polyvinyl Ether (PVE) oil, and is mounted to avoid the transmission of vibration.

Fan and Motors

Each outdoor unit includes one direct drive variable speed propeller fan with Brushless Digitally Controlled (BLDC) motor with a horizontal air discharge. Fan blades are statically and dynamically balanced propeller fans made of durable Acrylonitrile Butadiene Styrene (ABS) plastic, and include a raised fan guard to limit contact with moving parts. The motors have inherent overload protection, permanently lubricated bearings, and a maximum speed up to 840 rpm (for LMU183-243HV models), or 750 rpm (for LMU303-363HV models). All Multi F outdoor units have a horizontal discharge airflow.

Outdoor Unit Coil

The outdoor unit coils are factory-built of aluminum fins mechanically bonded on copper tubing. Coils have a minimum of two rows, a minimum of 14 fins per inch, and have been factory pressure-tested. Coil fins also have a factory applied corrosion-resistant GoldFin™ material with hydrophilic coating that has been tested in accordance with ASTM B-117 salt spray test procedure for a minimum of 1,000 hours.

Electrical

All Multi F outdoor units have 208/230V, 1 phase, 60Hz electrical power capable of operating within ±10% of the rated voltage.

Controls

Factory installed microprocessor controls in the outdoor unit and indoor units perform functions to efficiently operate the multi- zone system. System wiring must be installed in a tree configuration from outdoor unit to indoor units through four conductor power/transmission cable. The system is capable of performing continuous operation, even when power is turned off to an individual indoor unit.

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MULTI F OUTDOOR UNIT

General Data

Table 7: Multi F Outdoor Unit Specifications.

Model Number	LMU183HV	LMU243HV	LMU303HV	LMU363HV
Cooling Capacity (Btu/h)[1] (Min.~Rated~ Max.)	8,400~18,000~21,600	8,400~24,000~25,000	8,400~30,000~36,000	8,400~32,800~38,400
Heating Capacity (Btu/h)[1] (Min.~Rated~ Max.)	10,080~22,000~25,000	10,080~24,600~29,000	10,080~32,000~38,400	10,080~36,000~41,600
Continuous Operating Range				
Cooling (°F DB)[7]	14 to 118	14 to 118	14 to 118	14 to 118
Heating (°F WB)	-4 to +64	-4 to +64	-4 to +64	-4 to +64
Operative Operating Range[8]				
Cooling (°F DB)[7]	14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)	-9 to +64	-9 to +64	-9 to +64	-9 to +64
Compressor				
Inverter Quantity	Twin Rotary x 1	Twin Rotary x 1	Twin Rotary x 1	Twin Rotary x 1
Oil/Type	FVC68D	FVC68D	FVC68D	FVC68D
Fan (Side Discharge)				
Type	Propeller	Propeller	Propeller	Propeller
Motor Output (W) x Qty.	85.4 x 1	85.4 x 1	124.2 x 1	124.2 x 1
Motor / Drive	Brushless Digitally Controlled / Direct			
Maximum Air Volume (CFM)	1,766	1,766	2,119	2,119
Unit Data				
Refrigerant Type	R410A	R410A	R410A	R410A
Refrigerant Control/Location	EEV / Outdoor Unit	EEV / Outdoor Unit	EEV/Outdoor Unit	EEV/Outdoor Unit
Min. ~ Max. Number Indoor Units/System[2]	2~2	2~3	2~4	2~4
Min. ~ Max. Allowable Total Indoor Unit Connected Capacity (Btu/h)	14,000~24,000	14,000~33,000	14,000~40,000	14,000~48,000
Sound Pressure (Cooling / Heating) dB(A)[3]	49 / 54	50 / 54	51 / 54	51 / 54
Dimensions (W x H x D [inch])	34-1/4 x 25-19/32 x 13		37-13/32 x 32-27/32 x 13	
Net / Shipping Unit Weight (lbs.)	101 / 109.8	101.4 / 110.2	138.9 / 154.3	138.9 / 154.3
Power Supply (V, Phase, Hz)	208 / 230V, 1, 60			
Power Wiring / Communications Cable (No. x AWG)[4,5]	4C x 14	4C x 14	4C x 14	4C x 14
Heat Exchanger				
Material and Fin Coating	Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic			
Rows / Columns/Fins per inch x Qty.	(2 x 28 x 14) x 1	(2 x 28 x 14) x 1	(2 x 38 x 14) x 1	(2 x 38 x 14) x 1
Piping				
Liquid Line Connection (in., OD) x Qty.	1/4 x 2	1/4 x 3	1/4 x 4	1/4 x 4
Vapor Line Connection (in., OD) x Qty.	3/8 x 2	3/8 x 3	3/8 x 4	3/8 x 4
Factory Charge lbs. of R410A	3.97	3.97	6.17	6.17
Piping Lengths				
Maximum Total Piping (ft.)[6]	164.0	230.0	246.1	246.1
Piping Length (No Additional Refrigerant [ft])	98.4	98.4	98.4	98.4
Min. / Max. Outdoor Unit to Indoor Unit Piping (ft)	9.8 / 82.0	9.8 / 82.0	9.8 / 82.0	9.8 / 82.0
Maximum Elevation between ODU and IDU (ft.)	49.2	49.2	49.2	49.2
Maximum Elevation between IDU and IDU (ft.)	24.6	24.6	24.6	24.6

[1]Capacity is rated with non-ducted indoor units, 0 ft. above sea level, with a 0 ft. level difference between outdoor and indoor units, and the following refrigerant pipe lengths:
LMU183HV: 16.4 ft. x 2 = 32.8 ft.
LMU243HV: 16.4 ft. x 3 = 49.2 ft.
LMU303HV: 16.4 ft. x 4 = 65.6 ft.
LMU363HV: 16.4 ft. x 4 = 65.6 ft.
All capacities are net with a combination ratio between 95 – 105%.

Rated cooling capacity 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).
Rated heating capacity 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).

[2]At least two indoor units must be connected. For allocated capacity information, see the combination tables in the "Multi F / Multi F MAX Combination Data Manual" on www.lghvac.com. For performance data, see "Multi F / Multi F MAX Performance Data Manual" on www.lghvac.com.

[3]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745 and are the same in both cooling and heating mode. These values can increase due to ambient conditions during operation.

[4]Power wiring to the outdoor unit is field supplied, solid or stranded, and must comply with the applicable local and national codes. For detailed information, please refer to electrical characteristics on page 17.

[5]All power wiring / communication cable to be minimum 14 AWG, 4-conductor from the outdoor unit to the indoor units, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes. For detailed electrical information, please refer to electric characteristics on page 17.

[6]Piping lengths are equivalent.

[7]Cooling operation range with Low Ambient Wind Baffle Kit (sold separately) is -4°F to +118°F.

[8]Operation outside of Continuous Operating Range is subject to safety interruption.

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MULTI F OUTDOOR UNIT

General Data

Table 8: LMU183HV Efficiency Ratings.[1,2]

System	Combined With	Rated Cooling Capacity (Btu/h)	EER2 (95°F)	SEER2	Rated Heating Capacity (Btu/h)	COP (47°F)	HSPF2	Low Heating Capacity (Btu/h)	COP (17°F)
LMU183HV	Non-Ducted Indoor Units	18,000	13.5	22.5	22,000	3.60	9.6	13,800	2.70
	Ducted Indoor Units	17,200	12.5	18.5	20,000	3.41	9.0	13,400	2.58
	Mixed Non-Ducted and Ducted Indoor Units	17,600	13.0	20.5	21,000	3.50	9.3	13,600	2.64

Table 9: LMU243HV Efficiency Ratings.[1,2]

System	Combined With	Rated Cooling Capacity (Btu/h)	EER2 (95°F)	SEER2	Rated Heating Capacity (Btu/h)	COP (47°F)	HSPF2	Low Heating Capacity (Btu/h)	COP (17°F)
LMU243HV	Non-Ducted Indoor Units	24,000	12.5	22.5	24,600	4.20	9.4	14,900	2.93
	Ducted Indoor Units	22,000	12.5	18.5	23,000	3.47	9.0	14,600	2.85
	Mixed Non-Ducted and Ducted Indoor Units	23,000	12.5	20.5	23,800	3.81	9.2	14,750	2.88

Table 10: LMU303HV Efficiency Ratings.[1,2]

System	Combined With	Rated Cooling Capacity (Btu/h)	EER2 (95°F)	SEER2	Rated Heating Capacity (Btu/h)	COP (47°F)	HSPF2	Low Heating Capacity (Btu/h)	COP (17°F)
LMU303HV	Non-Ducted Indoor Units	30,000	13.0	22.0	32,000	4.01	9.2	20,000	2.73
	Ducted Indoor Units	27,400	12.0	18.5	30,000	3.75	8.8	18,000	2.64
	Mixed Non-Ducted and Ducted Indoor Units	28,700	12.5	20.3	31,000	3.88	9.0	19,000	2.76

Table 11: LMU363HV Efficiency Ratings.[1,2]

System	Combined With	Rated Cooling Capacity (Btu/h)	EER2 (95°F)	SEER2	Rated Heating Capacity (Btu/h)	COP (47°F)	HSPF2	Low Heating Capacity (Btu/h)	COP (17°F)
LMU363HV	Non-Ducted Indoor Units	32,800	12.5	21.5	36,000	3.85	9.0	21,000	2.70
	Ducted Indoor Units	30,800	11.7	18.0	34,000	3.64	8.6	20,000	2.55
	Mixed Non-Ducted and Ducted Indoor Units	31,800	12.1	19.8	35,000	3.75	8.8	20,500	2.68

[1]Capacity is rated 0 ft. above sea level, with a 0 ft. level difference between outdoor and indoor units, and the following refrigerant pipe lengths:
LMU180HV: 16.4 ft. x 2 = 32.8 ft.
LMU240HV: 16.4 ft. x 3 = 49.2 ft.
LMU303HV: 16.4 ft. x 4 = 65.6 ft.
LMU363HV: 16.4 ft. x 4 = 65.6 ft.
All capacities are net with a combination ratio between 95 – 105%.
Rated cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Rated 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).
[2]Rated capacity is certified under AHRI Standard 210 / 240. EER2, SEER2, COP, and HSPF2 are subject to change. See www.ahrinet.org for the latest values.

Note:

At least two indoor units must be connected. For allocated capacity information, see the combination tables in the "Multi F / Multi F MAX Combination Data Manual" on www.lghvac.com. For performance data, see "Multi F / Multi F MAX Performance Data Manual" on www.lghvac.com.

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Electrical Data

Table 12: Electrical Data.

Nominal Tons	Unit Model No.	Hertz	Voltage	Voltage Range (Min. to Max.)	MCA	MOP	LRA	Compressor Quantity	Compressor Motor RLA	Outdoor Fan Motor		Indoor Fan Motor
										kW	FLA	FLA
1.5	LMU183HV	60	208 - 230	187 - 253	15.8	20	16.0	1	12.0	0.085	0.40	0.40
2	LMU243HV				16.0	20	16.0	1	12.0	0.085	0.40	0.60
2.5	LMU303HV				18.4	25	19.0	1	13.5	0.124	0.73	0.80
3	LMU363HV				18.4	25	19.0	1	13.5	0.124	0.73	0.80

Voltage tolerance is ±10%.
Maximum allowable voltage unbalance is 2%.
RLA = Rated Load Amps.
MCA = Minimum Circuit Ampacity.
LRA = (Locked Rotor Amps)

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.

Indoor Fan Motor (FLA; Full Load Amps [A]) is based on the following indoor unit combinations:.
- 18,000 ODU (LMU183HV): 9k Wall Mounted IDU x 2
- 24,000 ODU (LMU243HV): 7k Wall Mounted IDU x 2 + 9k Wall Mounted IDU x 1
- 30,000 ODU (LMU303HV): 9k Wall Mounted IDU x 4
- 36,000 ODU (LMU363HV): 9k Wall Mounted IDU x 4

*Wall Mounted IDU FLA is 0.2

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MULTI F OUTDOOR UNIT

Functions, Controls, Options, and Accessories

MULTI F
MULTI F MAX

Table 13: Functions, Controls, Options, and Accessories.

Functions		LMU183HV	LMU243HV	LMU303HV	LMU363HV
Reliability	Defrost / Deicing	√	√	√	√
	High Pressure Switch	X	X	X	X
	Low Pressure Switch	X	X	X	X
	Phase Protection	X	X	X	X
	Restart Delay (Three [3] Minutes)	√	√	√	√
	Self Diagnosis	√	√	√	√
	Soft Start	√	√	√	√
	Test Function	√	√	√	√
Convenience	Night Silent Operation	√	√	√	√
	Wiring Error Check	√	√	√	√
	Peak Control	√	√	√	√
	Mode Lock	√	√	√	√
	Forced Cooling Operation (Outdoor Unit)	√	√	√	√
Central Controllers	PI-485	PMNFP14A1	PMNFP14A1	PMNFP14A1	PMNFP14A1
Integration Solution	MultiSITE Communications Manager	PBACNBTR0A	PBACNBTR0A	PBACNBTR0A	PBACNBTR0A
Building Network Unit	AC Smart 5	PACS5A000	PACS5A000	PACS5A000	PACS5A000
	ACP 5	PACP5A000	PACP5A000	PACP5A000	PACP5A000
	Y-Branch	X	X	X	X
	Header Branch	X	X	X	X
	Air Guide	X	X	X	X
Other	Power Distribution Indication (PDI) Premium	PQNUD1S41	PQNUD1S41	PQNUD1S41	PQNUD1S41
	Dry Contact	X	X	X	X
	Low Ambient Wind Baffle Kit	ZLABGP03A (Logical Operation)	ZLABGP03A (Logical Operation)	ZLABGP04A (Logical Operation)	ZLABGP04A (Logical Operation)
	Drain Pan Heater	PQSH1203	PQSH1203	PQSH1200	PQSH1200
	Compatibility w / prior generation of Multi F	√	√	√	√
	Computer LG Monitoring View (LGMV)	PRCTIL0	PRCTIL0	PRCTIL0	PRCTIL0
	Mobile LGMV for Android Smartphones / Tablets	PLGMVW100	PLGMVW100	PLGMVW100	PLGMVW100
	Mobile LGMV for iOS Tablet	PLGMVW100	PLGMVW100	PLGMVW100	PLGMVW100

√ = Standard feature

o = Optional accessory (must be purchased separately)

X = Not available

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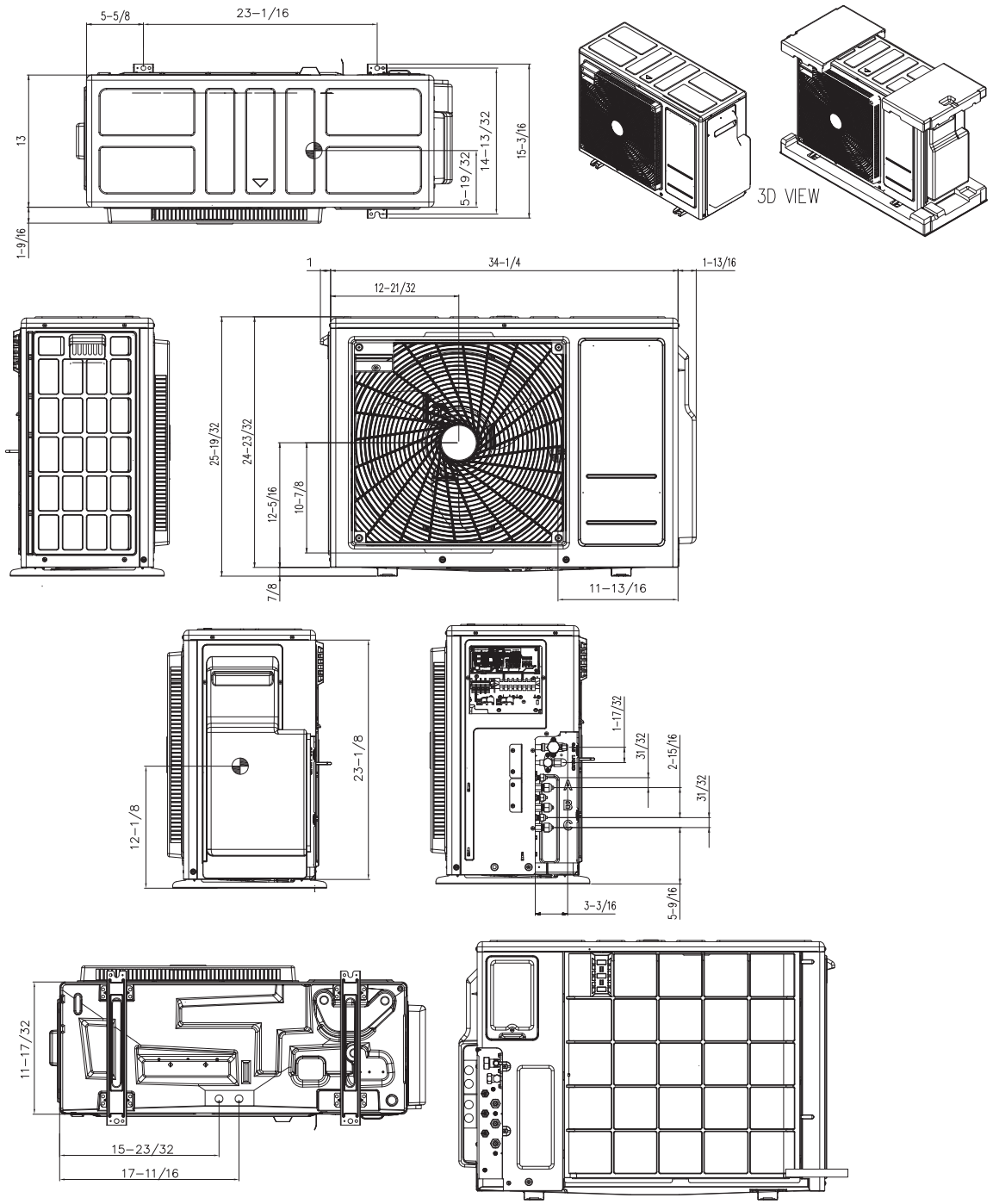
MULTI F OUTDOOR UNIT

Dimensions

Figure 6: LMU183HV and LMU243HV External Dimensions.

Unit: Inch
Gravity point



Notes:

1. Unit must be installed in compliance with the installation manual.
2. Unit must be grounded in accordance with the local or state regulations and applicable national codes.
3. All field-supplied electrical components and materials must comply with the local, state, and national codes.
4. Electrical characteristics must be considered for electrical work and design. The capacity of power cable and circuit breaker for the outdoor unit must follow local, state, national, and manufacturer requirements.
5. For LMU183HV Unit, ports A and B are available.
6. For LMU243HV Unit, ports A, B, and C are available.

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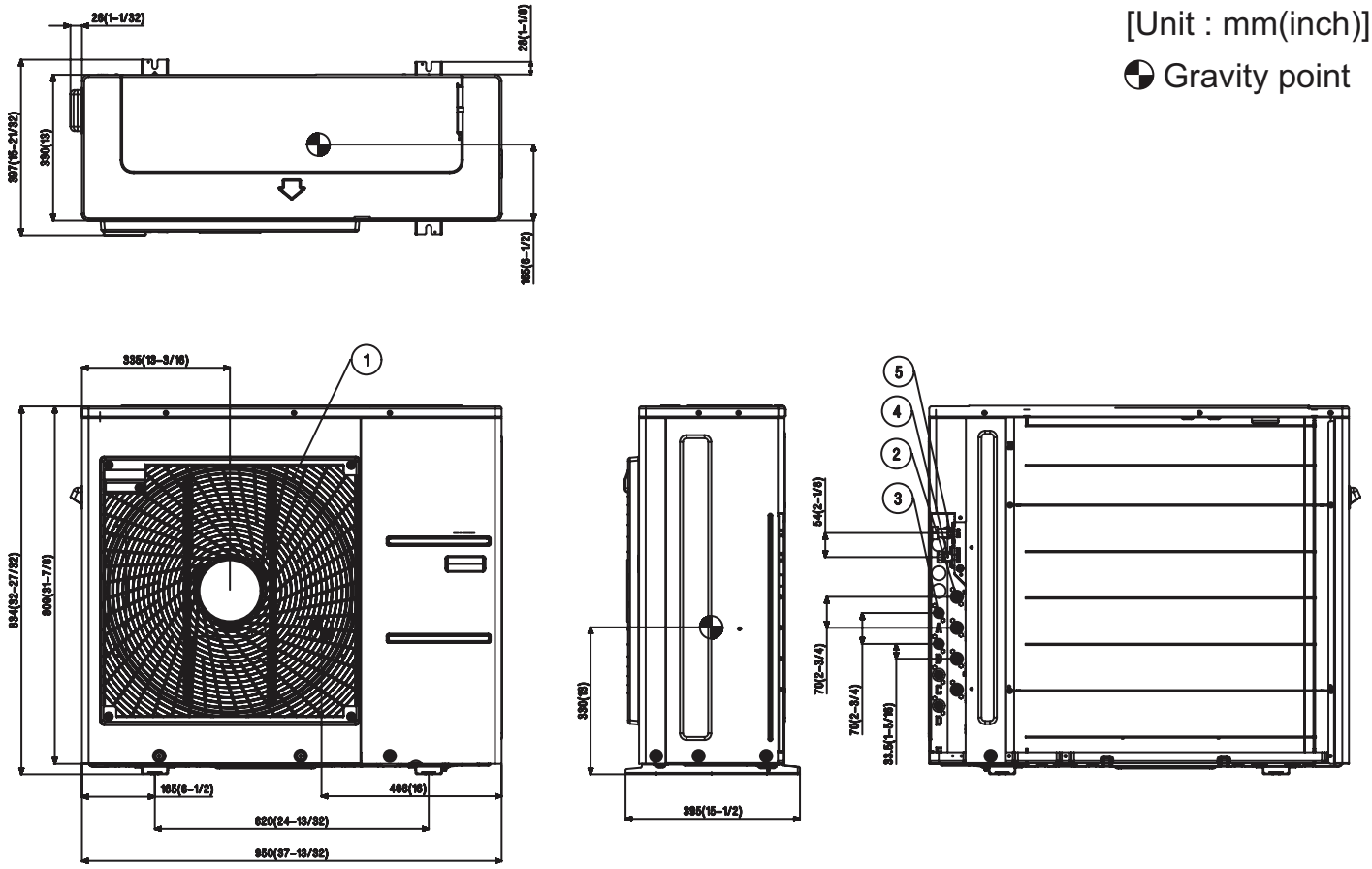
MULTI F OUTDOOR UNIT

Dimensions

Figure 7: LMU303HV and LMU363CHV External Dimensions.

[Unit : mm(inch)]

Gravity point



No.	Part Name
1	Air discharge grille
2	Vapor pipe connection
3	Liquid pipe connection
4	Main service valve (Liquid)
5	Main service valve (Vapor)

Notes:

1. Unit must be installed in compliance with the installation manual.
2. Unit must be grounded in accordance with the local or state regulations and applicable national codes.
3. All field-supplied electrical components and materials must comply with local, state, and national codes.
4. Electrical characteristics must be considered for electrical work and design. The capacity of power cable and circuit breaker for the outdoor unit must follow local, state, national, and manufacturer requirements.

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MULTI F OUTDOOR UNIT

Center of Gravity / Corner Weights

Figure 8: LMU183HV, LMU243HV, LMU303HV, and LMU363HV Center of Gravity and Corner Weight Diagram (LMU303HV and LMU363HV appearance will differ than what is depicted below)..

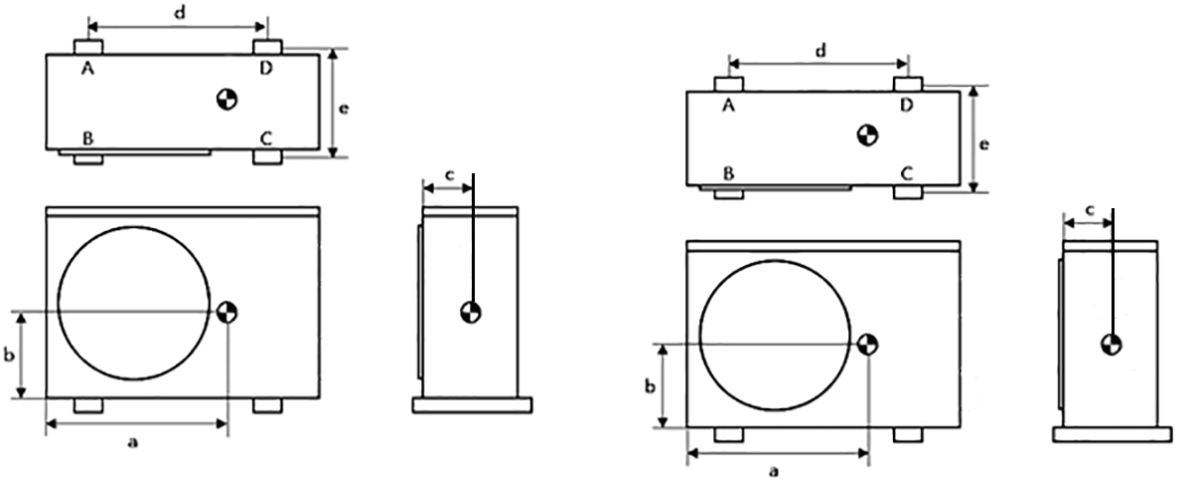

Table 14: LMU183HV, LMU243HV, LMU303HV, and LMU363HV Center of Gravity and Corner Weights.

Model No.	Weight (lb.)		Center of Gravity (in.)			Leg (in.)		Corner Weight (lb.)			
	Shipping	Net	a	b	c	d	e	A	B	C	D
LMU183HV	109.8	101.0	22-7/16	11-3/16	5-19/32	23-1/16	14-13/32	13.3	21.0	40.8	25.9
LMU243HV	110.2	101.4	22-7/16	11-3/16	5-19/32	23-1/16	14-13/32	13.4	21.1	41.0	26.0
LMU303HV	154.3	138.9	23-7/32	12-19/32	5-29/32	24-13/32	14-3/16	19.1	24.9	50.4	44.5
LMU363HV	154.3	138.9	23-7/32	12-19/32	5-29/32	24-13/32	14-3/16	19.1	24.9	50.4	44.5

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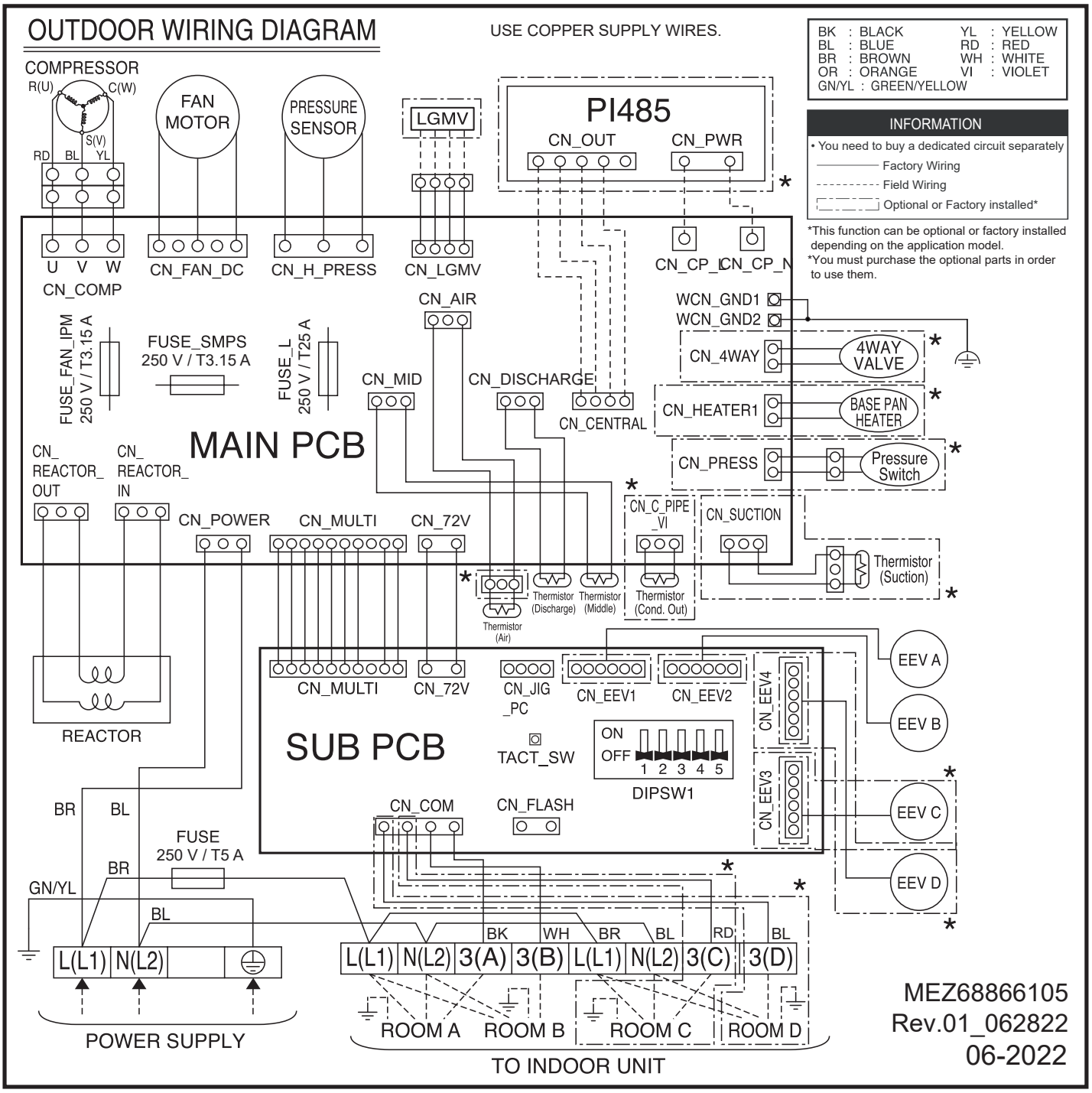
Figure 9: LMU183HV and LMU243HV Wiring Diagram.



Note:

LMU183HV can support no more than two indoor units; LMU243HV can support two or three indoor units. Ensure the communication cable / power wiring from the outdoor unit to the indoor units is installed correctly for the system and the chosen application.

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Figure 10: LMU303HV and LMU363HV Wiring Diagram.

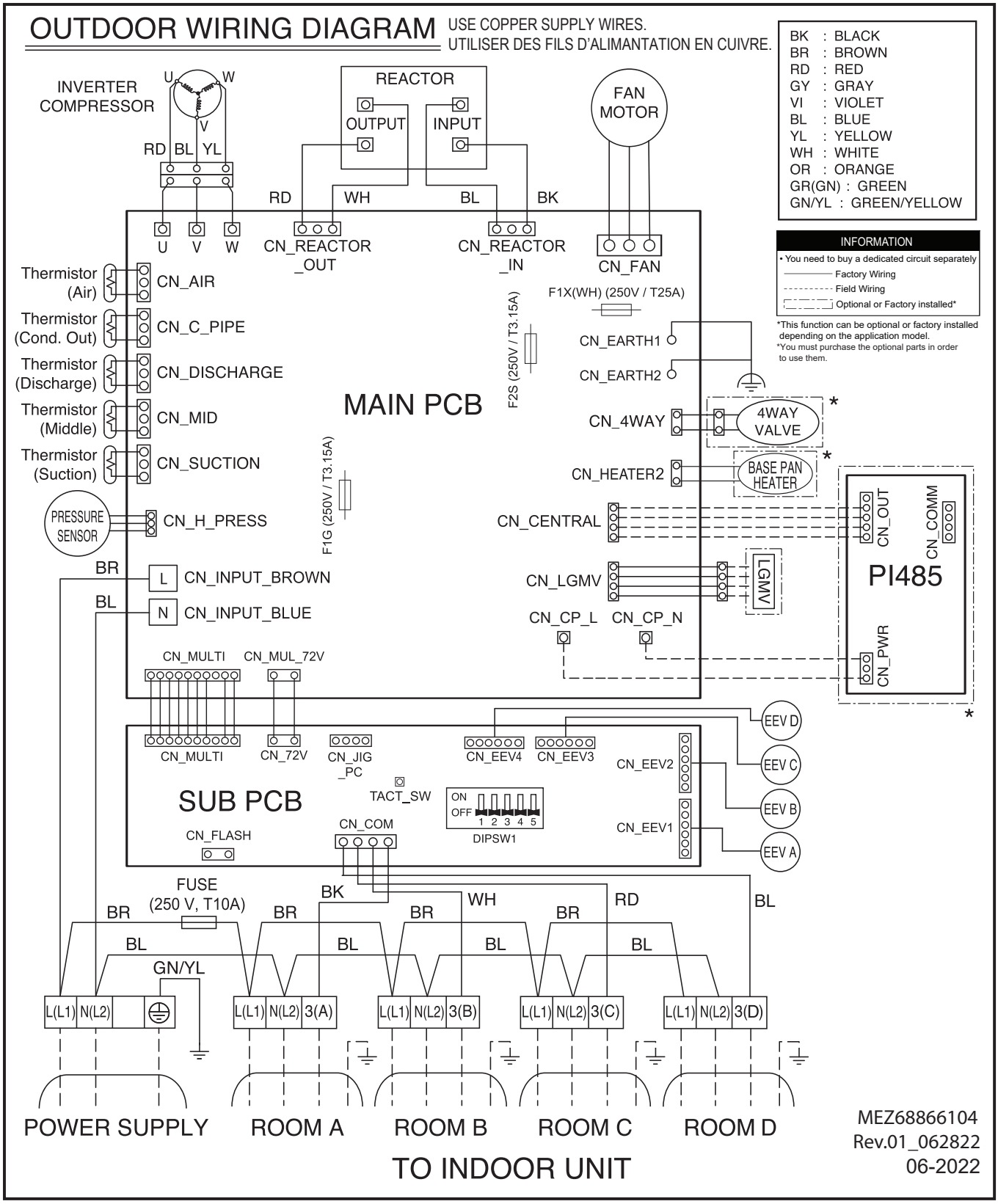

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Figure 11: LMU183HV Refrigerant Flow Diagram.

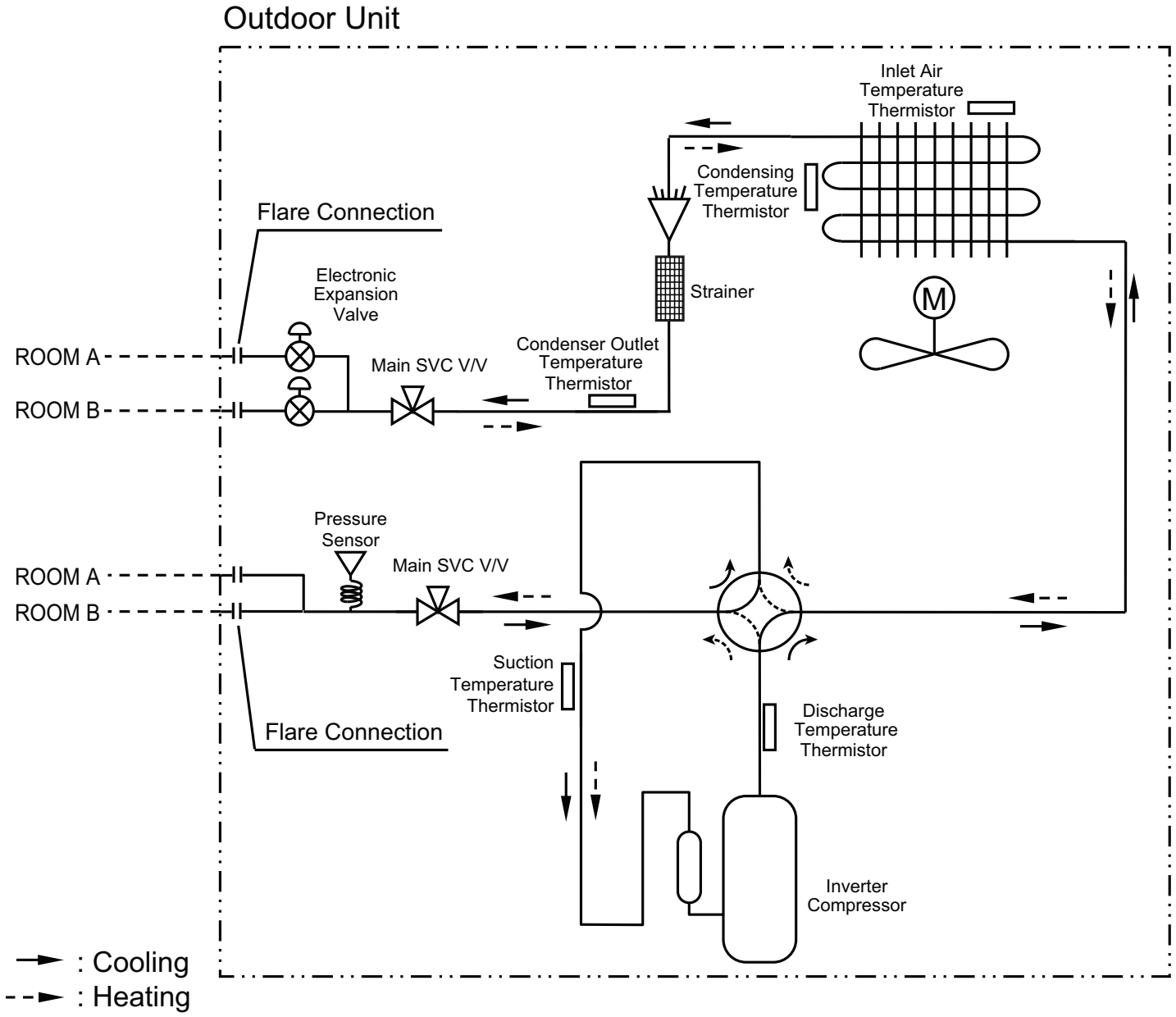

Table 15: LMU183HV Thermistor Details.

Description	PCB Connector
Condenser Outlet Temperature Thermistor	CN_C_PIPE
Condensing Temperature Thermistor	CN_MID
Inlet Air Temperature Thermistor	CN_AIR
Discharge Temperature Thermistor	CN_DISCHARGE
Suction Temperature Thermistor	CN_SUCTION
Pressure Sensor	CN_H_PRESS

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Figure 12: LMU243HV Refrigerant Flow Diagram.

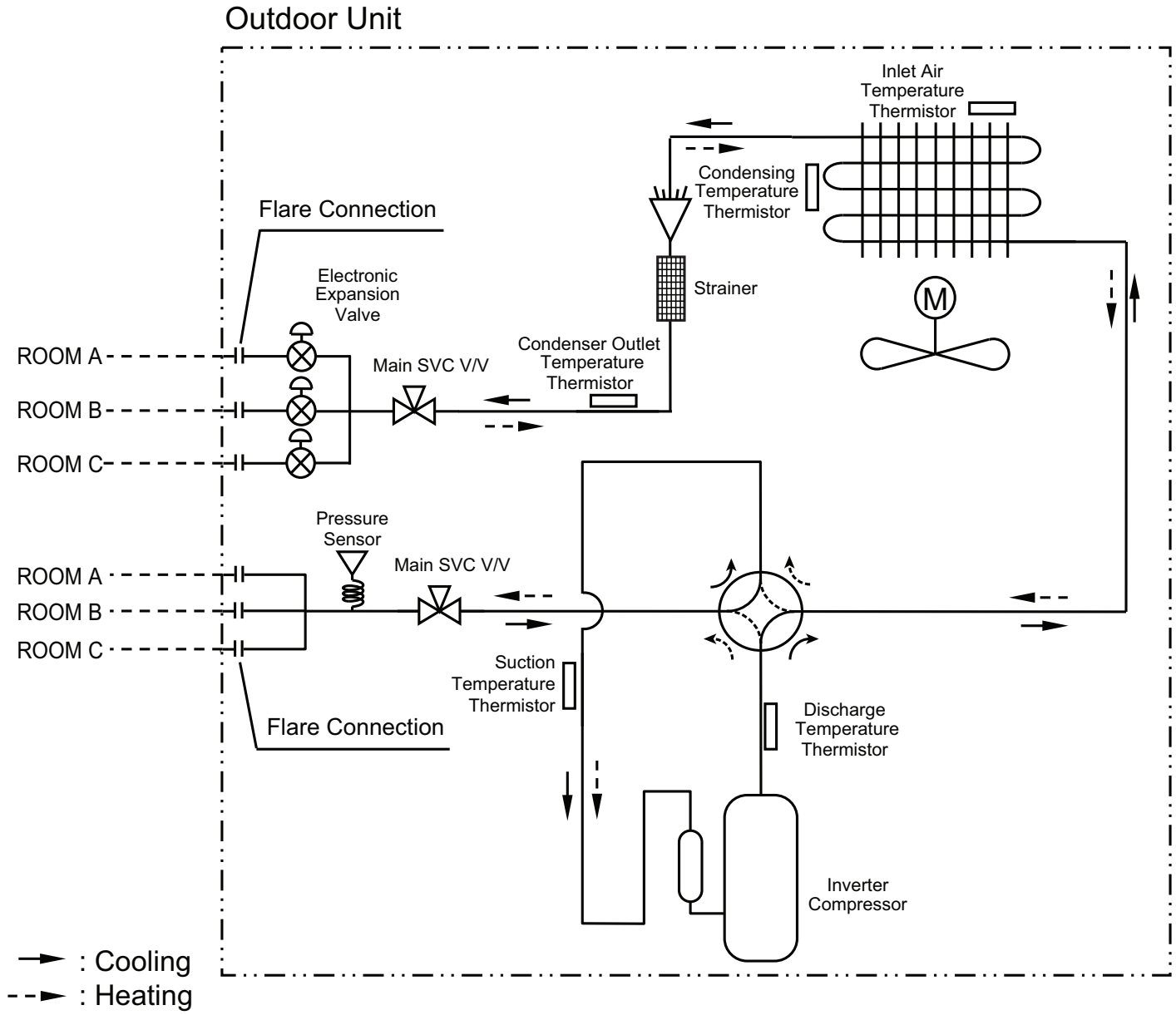

Table 16: LMU243HV Thermistor Details.

Description	PCB Connector
Condenser Outlet Temperature Thermistor	CN_C_PIPE
Condensing Temperature Thermistor	CN_MID
Inlet Air Temperature Thermistor	CN_AIR
Discharge Temperature Thermistor	CN_DISCHARGE
Suction Temperature Thermistor	CN_SUCTION
Pressure Sensor	CN_H_PRESS

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Figure 13: LMU303HV and LMU363HV Refrigerant Flow Diagram.

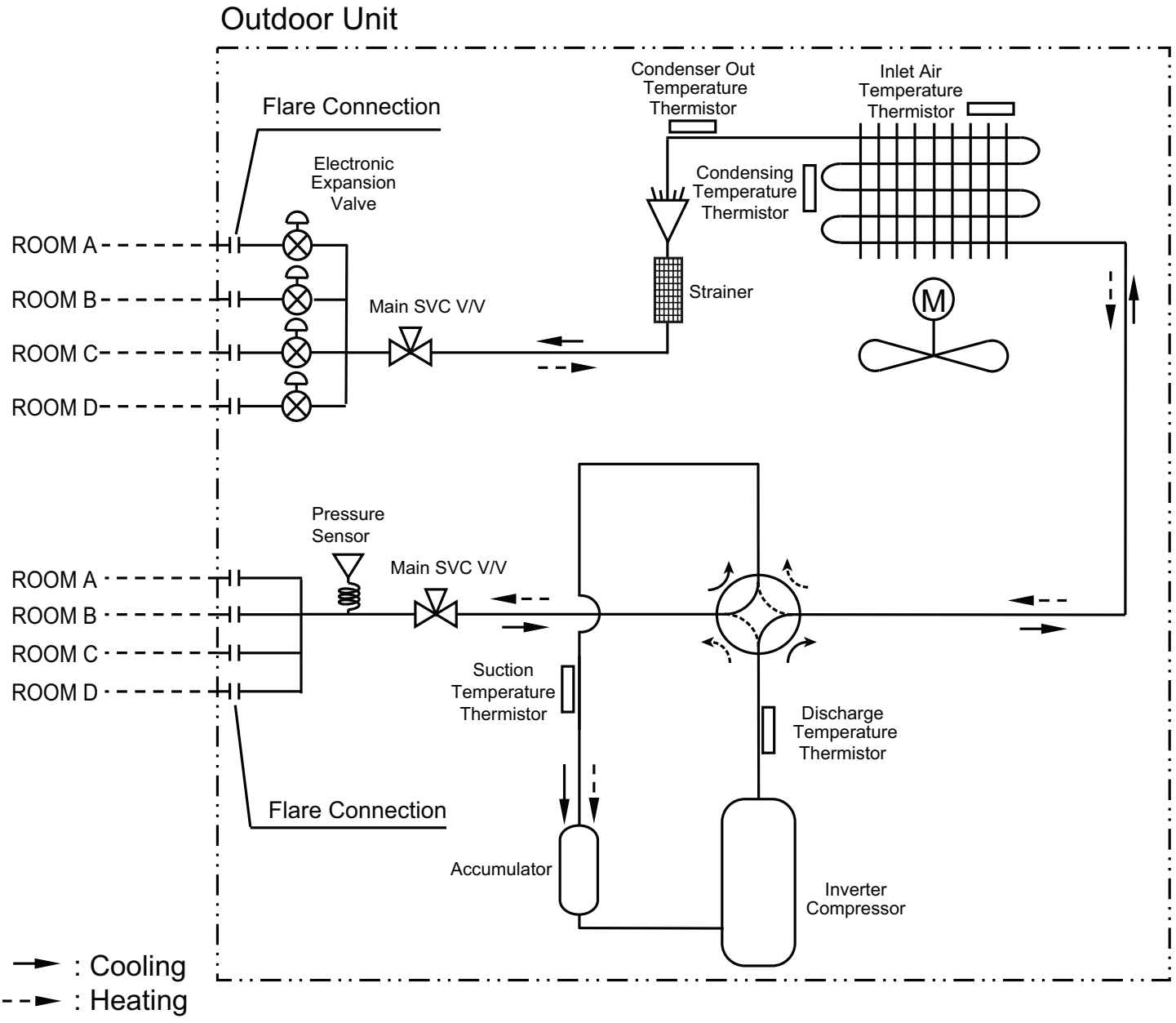

Table 17: LMU303HV and LMU363HV Thermistor Details.

Description	PCB Connector
Condensing Temperature Thermistor	CN_TH4
Condenser Outlet Temperature Thermistor	CN_TH2
Inlet Air Temperature Thermistor	
Discharge Temperature Thermistor	CN_TH3
Suction Temperature Thermistor	
Pressure Sensor	CN_TH1

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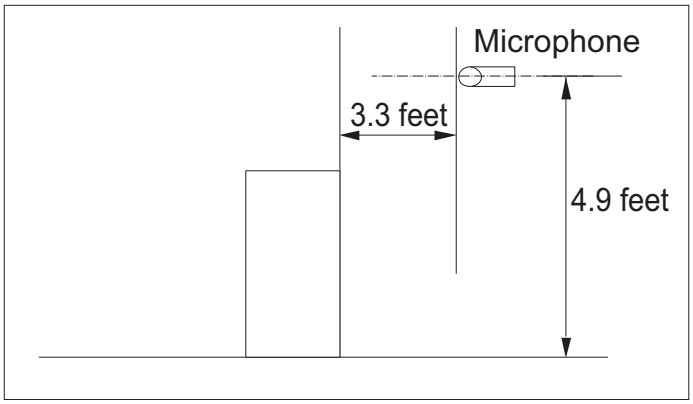
Sound Pressure Levels

Figure 14: Acoustic Measurement Location.



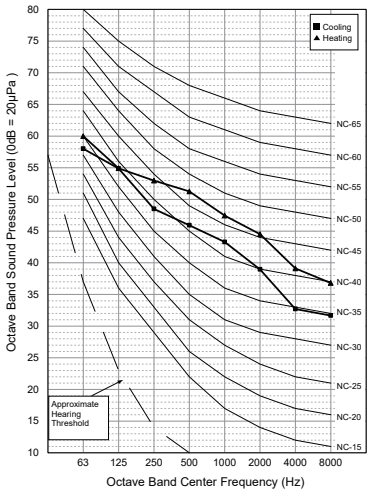
- Measurement taken 4.9' above finished floor, and at a distance of 3.3' from face of unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound level may be increased in static pressure mode or if air guide is used.
- Sound pressure levels are measured in dB(A)±1.
- Tested in anechoic chamber per ISO Standard 3745.

Table 18: Sound Pressure Levels (dB[A]).

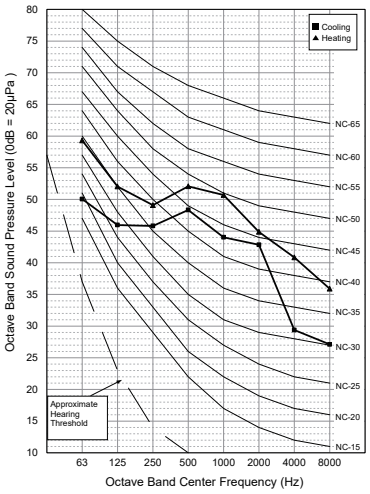
Model No.	Sound Pressure Level (dB[A])	
	Cooling	Heating
LMU183HV	49	54
LMU243HV	50	54
LMU303HV	51	54
LMU363HV	51	54

Figure 15: Sound Pressure Level Diagrams.

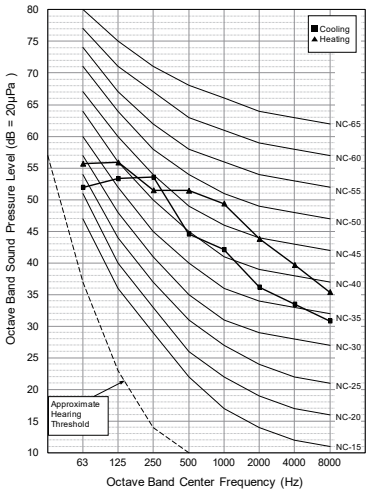
LMU183HV



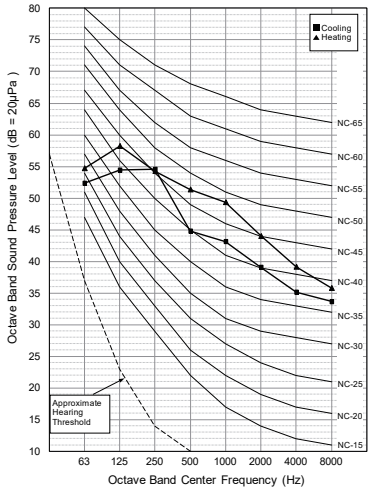
LMU243HV



LMU303HV



LMU363HV



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Sound Power Levels

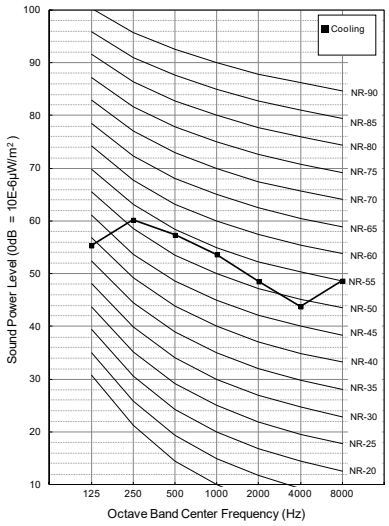
- Data is valid under diffuse field conditions.
- Data is valid under nominal operating conditions.
- Sound power level is measured using rated conditions, and tested in a reverberation room per ISO 3741 standards.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Reference acoustic intensity: 0dB = 10E-6μW/m^2

Table 19: Sound Power Levels (dB[A]).

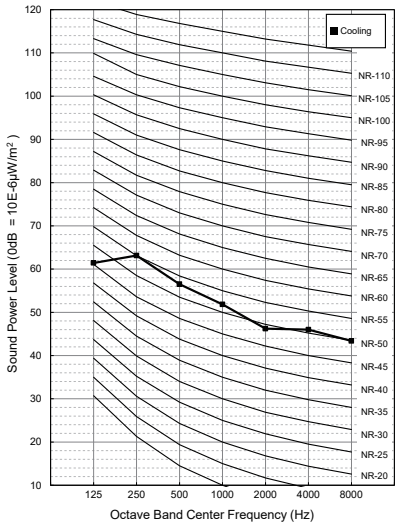
Model No.	Sound Power Level (dB[A])
	Cooling
LMU183HV	63
LMU243HV	64
LMU303HV	64
LMU363HV	64

Figure 16: Sound Power Level Diagrams.

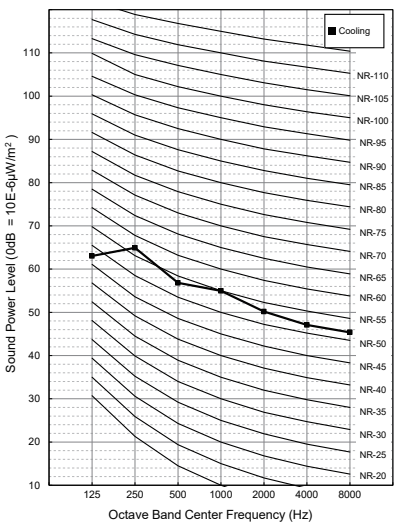
LMU183HV



LMU243HV



LMU303HV



LMU363HV

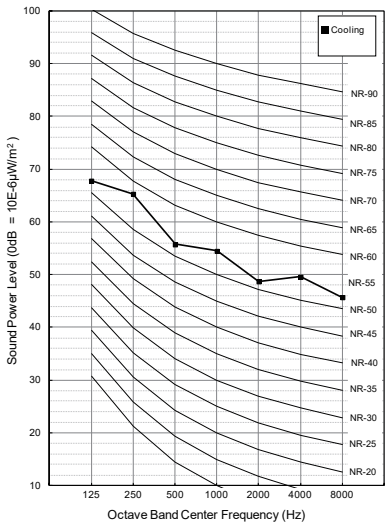


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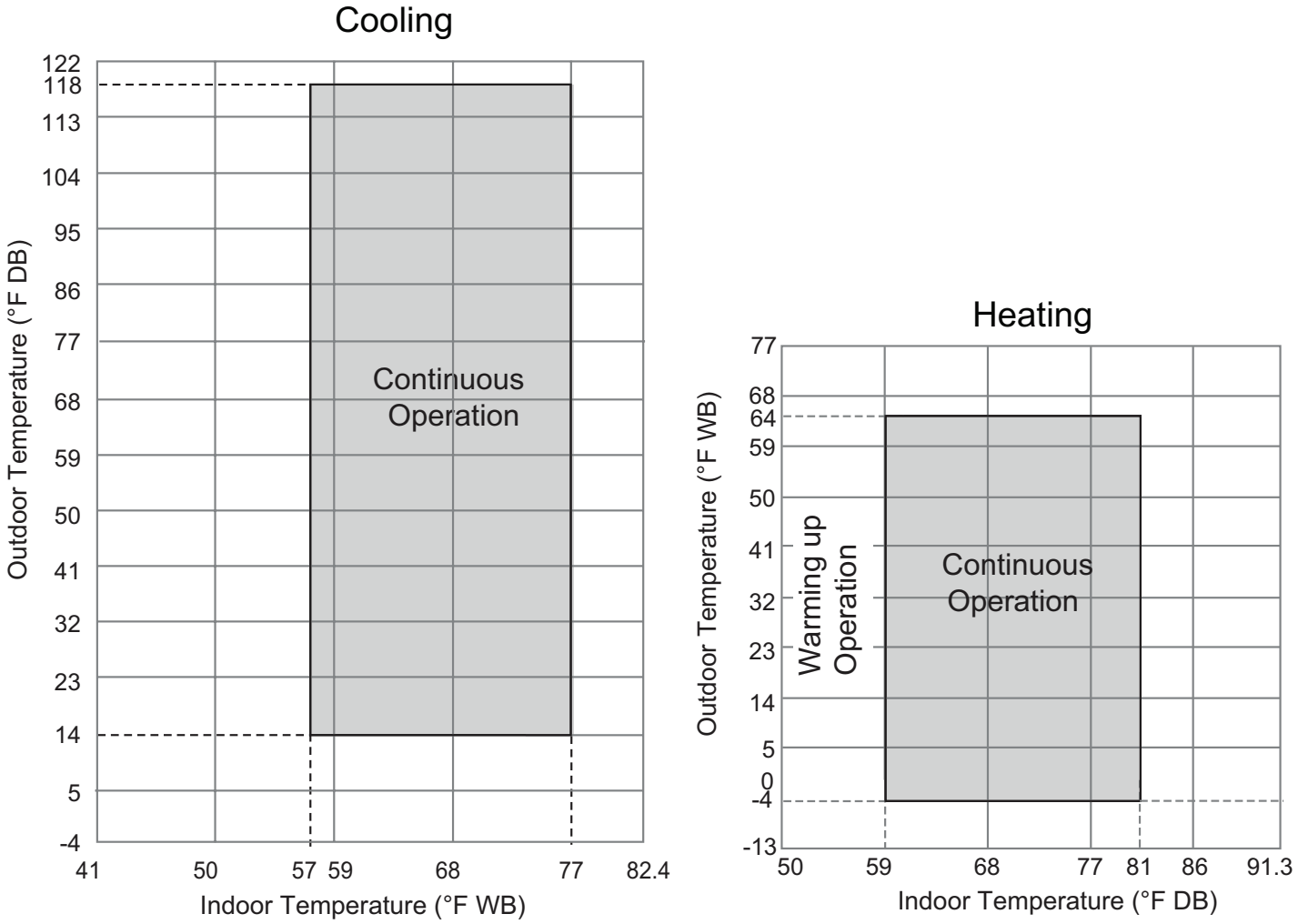
Figure 17: Cooling and Heating Operation Ranges.



Note:

Cooling operation range can extend down to -4 °F outdoor temperature if Low Ambient Kit is installed (sold separately).

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MULTI F MAX OUTDOOR UNIT DATA

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Functions, Controls, Options, and Accessories on page 34
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Center of Gravity / Corner Weight on page 37
Wiring Diagrams on page 39
Refrigerant Flow Diagrams on page 41
Acoustic Data on page 43
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MULTI F MAX OUTDOOR UNIT

Mechanical Specifications

Multi F MAX Heat Pump Condensing Units

General

A Multi F MAX multi-zone system is comprised of one heat pump outdoor unit connected up to eight indoor units through a branch distribution unit (BD) using a single refrigerant piping circuit, and includes integrated controls supplied by LG. Factory-designed and supplied Y-branches may be used as well.

The outdoor unit is internally assembled, wired, and piped from the factory; all LG components are manufactured in a facility registered to ISO 9001 and ISO 14001, set by the International Organization for Standardization (ISO). The LG Multi F MAX multi-zone heat pump system components comply with Underwriters Laboratories (UL) 1995 Heating and Cooling Equipment Standard for Safety. The units are certified to AHRI 210 / 240.

Temperature Ranges

The heat pump outdoor units are capable of operating in cooling mode from 14°F to 118°F ambient dry bulb (installing an optional Low Ambient Wind Baffle Kit will allow operation down to -4°F in cooling mode for Multi F MAX systems). The heat pump outdoor units are capable of operating in heating mode from -4°F to +64°F ambient wet bulb without additional low ambient controls.

Frame

Multi F MAX condensing unit case is constructed from pre-coated metal that has been tested in accordance with ASTM B-117 salt spray procedure for a minimum of 1,000 hours. Case has a removable front panel to allow access to major components and control devices, and legs to secure the unit during installation.

Refrigerant System

Multi F MAX systems have a single refrigerant circuit field piped with a manufacturer-supplied BD unit(s) and Y-branches (if applicable) to multiple (ducted, non-ducted or mixed) indoor units to effectively and efficiently control the heating or cooling operation of the multi zone system. All refrigerant lines from the outdoor unit to the BD unit(s) and from the BD unit(s) to indoor units are field-installed and must be insulated separately.

Multi F MAX systems use R410A refrigerant. The LMU481HV and LMU541HV outdoor units are equipped with a refrigerant strainer, check valves, oil separator, hot gas bypass valve, accumulator, four-way reversing valve, electronic expansion valve(s) (EEV), high side and low side refrigerant charging ports, and a service port. The outdoor unit also includes sensors for suction temperature, discharge temperature, high-pressure, low-pressure, heat exchanger temperature, and outdoor temperature conditions. The LMU601HV outdoor unit includes the components cited above (except hot gas bypass valve) in addition to a sub-cooled heat exchanger, vapor injection and vapor bypass circuit.

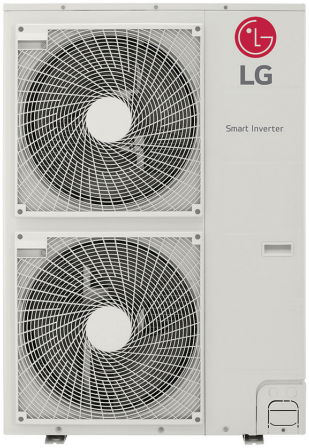
Refrigeration Oil Control

The outdoor unit has an oil separator to separate oil mixed with the refrigerant gas during compression and return oil to the compressor. The outdoor unit also has an oil injection mechanism to ensure a consistent film of oil on all moving compressor parts at low speed.

Compressor

Multi F MAX condensing units are equipped with one hermetically sealed, digitally controlled, inverter driven R1 scroll compressor that includes Teflon™ coated bearings. The inverter motor is capable of providing a modulation range of 10Hz to 130Hz for LMU481HV and LMU541HV, or 10Hz to 130Hz (cooling) and 10Hz to 150Hz (heating) for LMU601HV, with control in 1Hz increments. The compressor uses a factory-charge of Polyvinyl Ether (PVE) oil, and is mounted to avoid the transmission of vibration.

Figure 18: Multi F MAX LMU481HV and LMU541HV Outdoor Units.



Fan and Motors

The Multi F MAX outdoor unit includes two direct drive variable speed propeller fans with Brushless Digitally Controlled (BLDC) motor with a horizontal air discharge.

Fan blades are statically and dynamically balanced propeller fans made of durable Acrylonitrile Butadiene Styrene (ABS) plastic, and include a raised fan guard to limit contact with moving parts. The motors have inherent overload protection, permanently lubricated bearings, and a maximum speed up to 670 rpm for LMU481HV and LMU541HV, or 750 rpm for LMU601HV. Multi F MAX outdoor unit has a horizontal discharge airflow.

Outdoor Unit Coil

The outdoor unit coils are factory-built of aluminum fins mechanically bonded on copper tubing. Coils have a minimum of two rows for LMU481HV and LMU541HV, or three rows for LMU601HV, a minimum of 14 fins per inch, and have been factory pressure-tested.

Coil fins also have a factory applied corrosion-resistant GoldFin™ material with hydrophilic coating that has been tested in accordance with ASTM B-117 salt spray test procedure for a minimum of 1,000 hours.

Electrical

Multi F MAX outdoor unit have 208/230V, 1 phase, 60Hz electrical power capable of operating within ±10% of the rated voltage.

Controls

Factory installed microprocessor controls in the outdoor unit, BD unit(s), and indoor units perform functions to efficiently operate the multi-zone system. System wiring must be installed in a tree configuration from outdoor unit to BD unit(s) to indoor units through four conductor power/transmission cable. The system is capable of performing continuous operation, even when power is turned off to an individual indoor unit.

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MULTI F MAX OUTDOOR UNIT

General Data

MULTI F
MULTI F MAX

Table 20: Multi F MAX Outdoor Unit General Data.

Model Number		LMU481HV	LMU541HV	LMU601HV
Capacity				
Cooling (Btu/h) (Minimum ~ Rated ~ Maximum)[1]		10,800~48,000~58,000	10,800~50,500~63,200	10,800~60,000~65,000
Cooling Power Input (kW) (Min.~Rated~ Max.)		0.66~3.75~5.20	0.66~4.01~5.71	0.64~5.31~5.81
Cooling Running Current (A) (Min.~Rated~ Max.)		3.0~17.0~23.6	3.0~18.2~25.9	2.9~24.0~26.3
Heating (Btu/h) (Minimum ~ Rated ~ Maximum)[1]		12,420~54,000~59,000	12,420~58,000~64,000	12,420~64,000~68,000
Heating Power Input (kW) (Min.~Rated~ Max.)		0.75~4.52~5.28	0.75~5.07~5.83	0.71~5.44~5.87
Heating Running Current (A) (Min.~Rated~ Max.)		3.4~20.5~23.9	3.4~23.0~26.4	3.2~24.6~26.6
Operating Range				
Cooling (°F DB)		14[7] to 118		
Heating (°F WB)		-4 to +64		
Compressor				
Inverter Quantity		Scroll x 1		
Oil/Type		FVC68D		
Fan (Side Discharge)				
Type		Propeller		
Motor Output (W) x Qty.		124.2 x 2		
Motor / Drive		Brushless Digitally Controlled / Direct		
Maximum Air Volume (CFM)		1,942 x 2		2,119 x 2
Unit Data				
Refrigerant Type		R410A		
Refrigerant Control / Location		Electronic Expansion Valve / Outdoor Unit		
Min. ~ Max. Number Indoor Units/System[2]		2 ~ 8	2 ~ 8	2 ~8
Max. Number of Branch Distribution Units		2		
Min. ~ Max. Allowable Total Indoor Unit Connected Capacity (Btu/h)		18,000 ~ 65,000	18,000 ~ 73,000	18,000 ~ 81,000
Sound Pressure ±3 dB(A) (Cooling / Heating)[3]		53 / 55		56 / 58
Dimensions (W x H x D [inch])		37-13/32 x 54-11/32 x 13		
Net / Shipping Unit Weight (lbs.)		192 / 216		218 / 243
Power Supply (V, Phase, Hz)		208 / 230V, 1, 60		
Comm. / Conn. (Power) Cable from ODU & BDU / BDU & IDU (No. X AWG)[4,5]		4C x 14 / 4C x 14		
Heat Exchanger				
Material and Fin Coating		Copper Tube / Aluminum Fin and GoldFin™/Hydrophilic		
Rows / Columns / Fins per inch x Qty.		(2 x 32 x 14) x 2		(3 x 32 x 14) x 2
Piping				
Liquid Line Connection (in., OD) x Qty.		Ø3/8 x 1		
Vapor Line Connection (in., OD) x Qty.		Ø3/4 x 1		
Factory Charge oz. of R410A		148.2		183.4
Additional Charging Volume (oz. / ft.)	Main Pipe	0.54		
	Branch Pipe	0.22		
Piping Lengths				
Maximum Total System Piping (ft.)[6]		475.7		
Piping Length (No Additional Refrigerant [ft.] Main+Branch)		16.4+131.2	16.4+131.2	49.2 + 131.2
Maximum Main Pipe Length (ODU to BDU [ft.])		180.4		
Total Branch Piping (BDU to all IDUs [ft.])		295.3		
Maximum Branch Pipe Length (Length between each BDU and IDU [ft.])		49.2		
Maximum Outdoor Unit to Indoor Unit Pipe Length (ft.)		229.6		
Maximum Elevation between ODU and IDU (ft.)		98.4		
Maximum Elevation between IDU and IDU (ft.)		49.2		
Maximum Elevation between BDU and IDU (ft.)		32.8		
Maximum Elevation between BDU and BDU (ft.)		49.2		

[1]Capacity is rated with non-ducted IDUs, 0 ft. above sea level, with a 0 ft. level difference between ODU and IDUs, and the following refrigerant pipe lengths:
LMU481 / 541 / 601HV: 16.4 ft. Main + (16.4 ft. Branch x 8) = 147.6 ft.
All capacities are net with a combination ratio between 95 – 105%.

Rated cooling capacity obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Rated heating capacity 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).

[2]At least one Branch Distribution Unit is required for system operation; a maximum of two can be installed per outdoor unit with use of Y-branch accessory (PMBL5620). At least two indoor units must be connected. For allocated capacity information, see the combination tables in the "Multi F / Multi F MAX Combination Data Manual" on www.lghvac.com. For performance data, see "Multi F / Multi F MAX Performance Data Manual" on www.lghvac.com.

[3]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745. These values can increase due to ambient conditions during operation.

[4]Power wiring to the outdoor unit is field supplied, solid or stranded, and must comply with the applicable local and national codes. For detailed information, please refer to electrical characteristics on page 33.

[5]All power wiring / communication cable to be minimum 14 AWG, 4-conductor from the outdoor unit to the BD unit (Multi F MAX systems only), and 14 AWG, 4-conductor from the BD unit to the indoor unit, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes. For detailed electrical information, please refer to electric characteristics on page 33.

[6]Piping lengths are equivalent.

[7]Cooling operation range with Low Ambient Wind Baffle Kit (sold separately) is -4°F to +118°F.

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MULTI F MAX OUTDOOR UNIT

General Data / Electrical Data

Table 21: LMU481HV Efficiency Ratings.[1,2]

System	Combined With	Rated Cooling Capacity (Btu/h)	EER (95°F)	SEER	Rated Heating Capacity (Btu/h)	COP (47°F)	HSPF	Low Heating Capacity (Btu/h)	COP (17°F)
LMU481HV	Non-Ducted Indoor Units	48,000	12.8	20.8	54,000	4.87	10.5	33,800	2.50
	Ducted Indoor Units	48,000	12.6	19.0	54,000	4.51	10.5	33,800	2.45
	Mixed Non-Ducted and Ducted Indoor Units	48,000	12.7	19.9	54,000	4.68	10.5	33,800	2.47

Table 23: LMU541HV Efficiency Ratings.[1,2]

System	Combined With	Rated Cooling Capacity (Btu/h)	EER (95°F)	SEER	Rated Heating Capacity (Btu/h)	COP (47°F)	HSPF	Low Heating Capacity (Btu/h)	COP (17°F)
LMU541HV	Non-Ducted Indoor Units	50,500	12.6	20.6	58,000	3.35	10.0	37,200	2.47
	Ducted Indoor Units	50,500	12.5	18.5	58,000	3.27	10.0	37,200	2.42
	Mixed Non-Ducted and Ducted Indoor Units	50,500	12.6	19.6	58,000	3.31	10.0	37,200	2.44

Table 24: LMU601HV Efficiency Ratings.[1,2]

System	Combined With	Rated Cooling Capacity (Btu/h)	EER (95°F)	SEER	Rated Heating Capacity (Btu/h)	COP (47°F)	HSPF	Low Heating Capacity (Btu/h)	COP (17°F)
LMU601HV	Non-Ducted Indoor Units	60,000	11.3	20.5	64,000	3.45	11.0	42,000	2.55
	Ducted Indoor Units	60,000	11.0	18.5	64,000	3.33	10.5	42,000	2.50
	Mixed Non-Ducted and Ducted Indoor Units	60,000	11.2	19.5	64,000	3.39	10.8	42,000	2.52

[1]Capacity is rated 0 ft. above sea level, with a 0 ft. level difference between ODU and IDUs, and the following refrigerant pipe lengths:
LMU481 / 541 / 601HV: 16.4 ft. Main + (16.4 ft. Branch x 8) = 147.6 ft.
All capacities are net with a combination ratio between 95 – 105%.
Rated cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Rated 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).
[2]Rated capacity is certified under AHRI Standard 210 / 240. EER, SEER, COP, and HSPF are subject to change. See www.ahrinet.org for the latest values.

Note:

At least two indoor units must be connected. For allocated capacity information, see the combination tables in the "Multi F / Multi F MAX Combination Data Manual" on www.lghvac.com. For performance data, see "Multi F / Multi F MAX Performance Data Manual" on www.lghvac.com.

Electrical Data

Table 22: LMU481HV, LMU541HV, and LMU601HV Electrical Data.

Nominal Tons	Unit Model No.	Phase	Hertz	Voltage	Voltage Range (Min. to Max.)	MCA	MOP	Compressor Quantity	Compressor Motor RLA	Outdoor Unit Fan Motor(s)		Indoor Unit Fan Motor
										kW x Qty.	FLA x Qty.	FLA
4.0	LMU481HV	1	60	208 -230	187 - 253	32.7	40	1	22.0	2 x 0.12	1.60 x 2	4.0
4.5	LMU541HV					32.7	40	1	22.0	2 x 0.12	1.60 x 2	4.8
5.0	LMU601HV					32.7	40	1	22.0	2 x 0.12	1.60 x 2	5.2

Voltage tolerance is ±10%.
Maximum allowable voltage unbalance is 2%.
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.

RLA = Rated Load Amps.
FLA = Full Load Amps.
Indoor Fan Motor (FLA) is based on the max. combination of IDUs.

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MULTI F MAX OUTDOOR UNIT

Functions, Controls, Options, and Accessories

Table 25: Functions, Controls, Options, and Accessories.

Functions		LMU481HV	LMU541HV	LMU601HV
Reliability	Defrost / Deicing	√	√	√
	High Pressure Switch	X	X	X
	Low Pressure Switch	X	X	X
	Phase Protection	X	X	X
	Restart Delay (Three [3] Minutes)	√	√	√
	Self Diagnosis	√	√	√
	Soft Start	√	√	√
	Test Function	√	√	√
Convenience	Night Silent Operation	√	√	√
	Wiring Error Check	√	√	√
	Peak Control	√	√	√
	Mode Lock	√	√	√
	Forced Cooling Operation (Outdoor Unit)	√	√	√
Central Controllers	PI-485	PMNFP14A1	PMNFP14A1	PMNFP14A1
Integration Solution	MultiSITE Communications Manager	PBACNBTR0A	PBACNBTR0A	PBACNBTR0A
Building Network Unit	AC Smart 5	PACS5A000	PACS5A000	PACS5A000
	ACP 5	PACP5A000	PACP5A000	PACP5A000
Installation	Branch Distribution Units	PMBD3620, PMBD3630, PMBD3640, PMBD3641	PMBD3620, PMBD3630, PMBD3640, PMBD3641	PMBD3620, PMBD3630, PMBD3640, PMBD3641
	Y-Branch	PMBL5620	PMBL5620	PMBL5620
	Header Branch	X	X	X
	Air Guide	X	X	X
Other	Power Distribution Indication (PDI) Premium	PQNUD1S41	PQNUD1S41	PQNUD1S41
	Dry Contact	X	X	X
	Low Ambient Wind Baffle Kit	ZLABGP04A x 2 (Logical Operation)	ZLABGP04A x 2 (Logical Operation)	ZLABGP04A x 2 (Logical Operation)
	Drain Pan Heater	PQSH1200	PQSH1200	PQSH1200
	Compatibility w / prior generation of Multi F	√	√	√
	Computer LG Monitoring View (LGMV)	PRCTIL0	PRCTIL0	PRCTIL0
	Mobile LGMV for Android Smartphones / Tablets	PLGMVW100	PLGMVW100	PLGMVW100
	Mobile LGMV for iOS Tablet	PLGMVW100	PLGMVW100	PLGMVW100

√ = Standard feature

o = Optional accessory (must be purchased separately)

X = Not available

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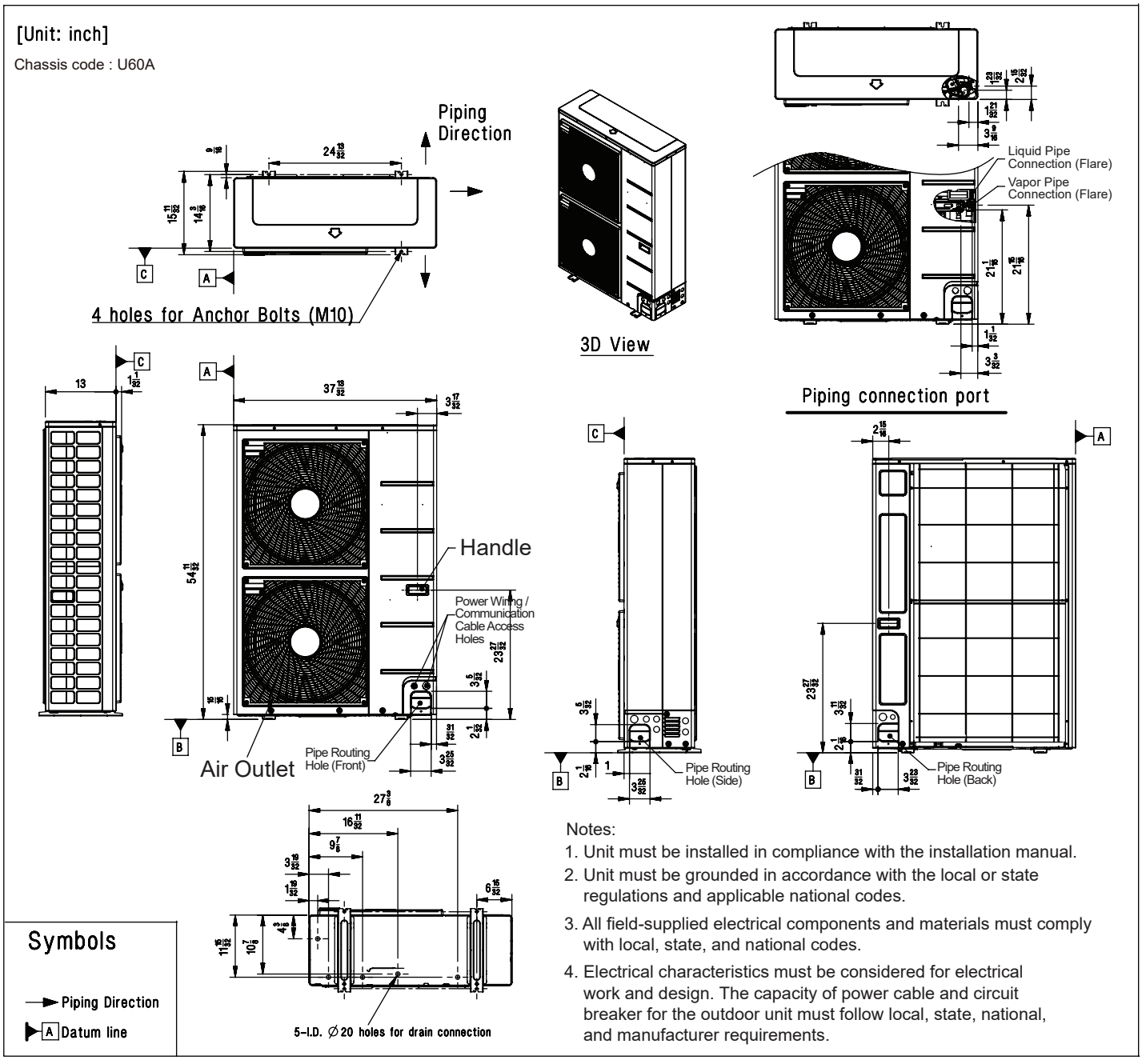
MULTI F MAX OUTDOOR UNIT

Dimensions

Figure 19: LMU481HV and LMU541HV External Dimensions.



Notes:

1. Unit must be installed in compliance with the installation manual.
2. Unit must be grounded in accordance with the local or state regulations and applicable national codes.
3. All field-supplied electrical components and materials must comply with local, state, and national codes.
4. Electrical characteristics must be considered for electrical work and design. The capacity of power cable and circuit breaker for the outdoor unit must follow local, state, national, and manufacturer requirements.

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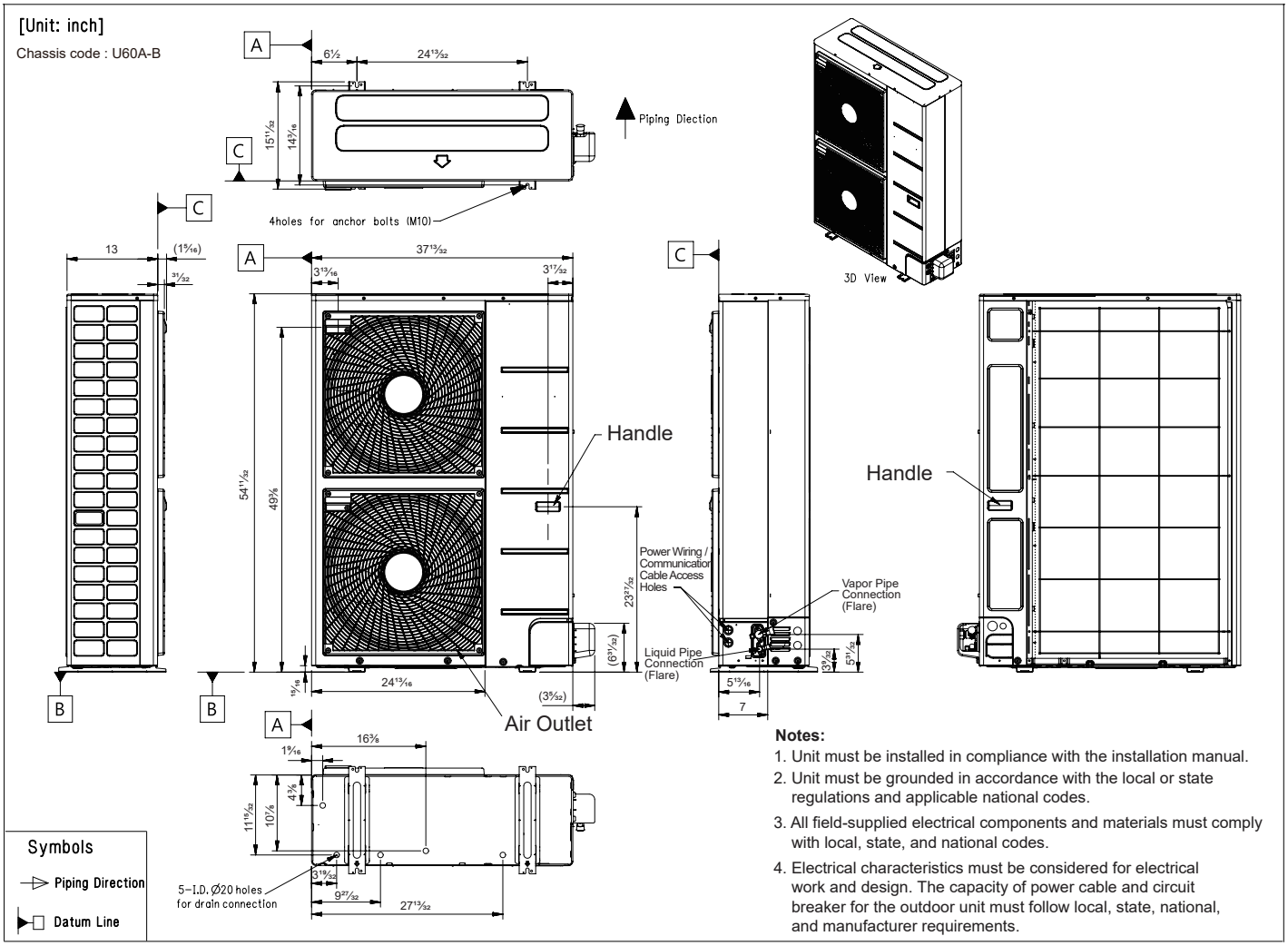
MULTI F MAX OUTDOOR UNIT

Dimensions

Figure 20: LMU601HV External Dimensions.



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MULTI F MAX OUTDOOR UNIT

Center of Gravity / Corner Weight

Figure 21: LMU481HV and LMU541HV Center of Gravity and Corner Weight Diagram.

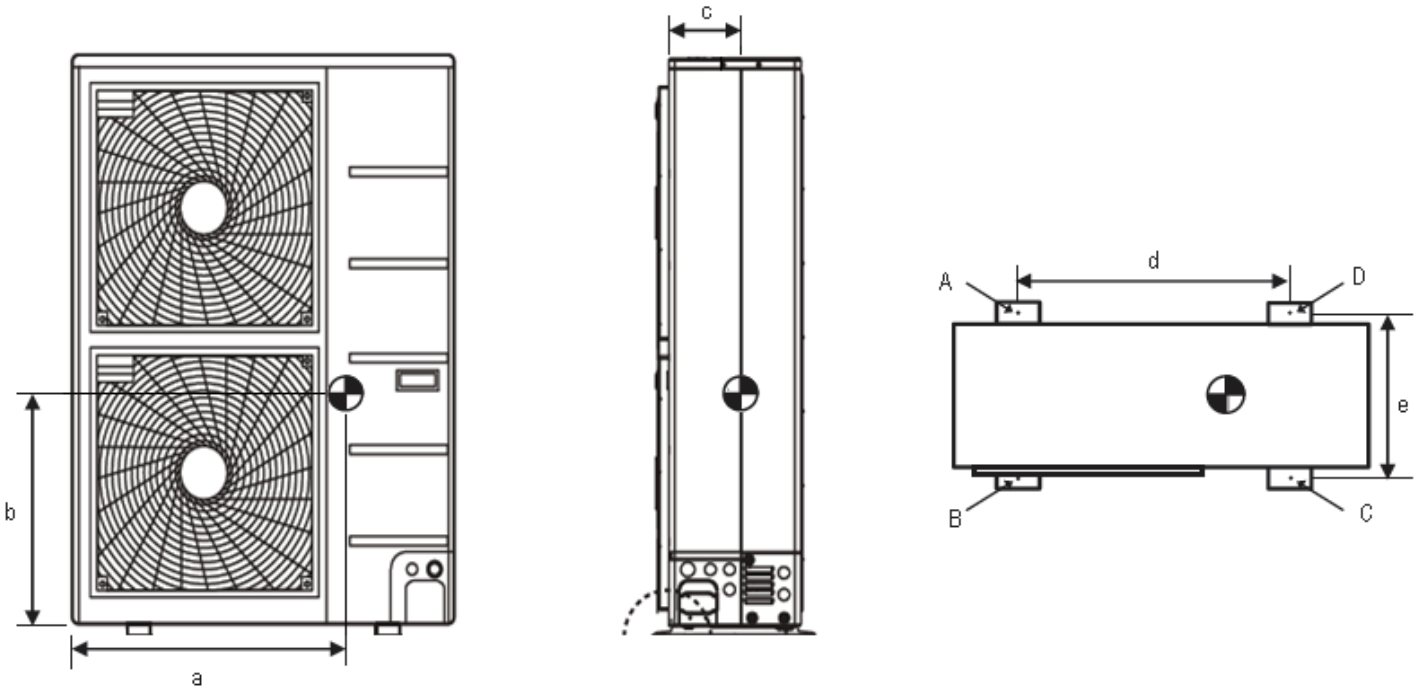

Table 26: LMU481HV and LMU541HV Center of Gravity and Corner Weight Dimensions.

Model No.	Frame	Weight (lb.)		Center of Gravity (in.)			Leg (in.)		Corner Weight (lb.)			
		Shipping	Net	a	b	c	d	e	A	B	C	D
LMU481HV	U60A	216.0	191.8	27-7/32	21-15/32	6-5/8	24-13/32	14-3/16	15.7	18.1	84.2	73.9
LMU541HV	U60A	216.0	191.8	27-7/32	21-15/32	6-5/8	24-13/32	14-3/16	15.7	18.1	84.2	73.9

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MULTI F MAX OUTDOOR UNIT

Center of Gravity / Corner Weight

Figure 22: LMU601HV Center of Gravity and Corner Weight Diagram.

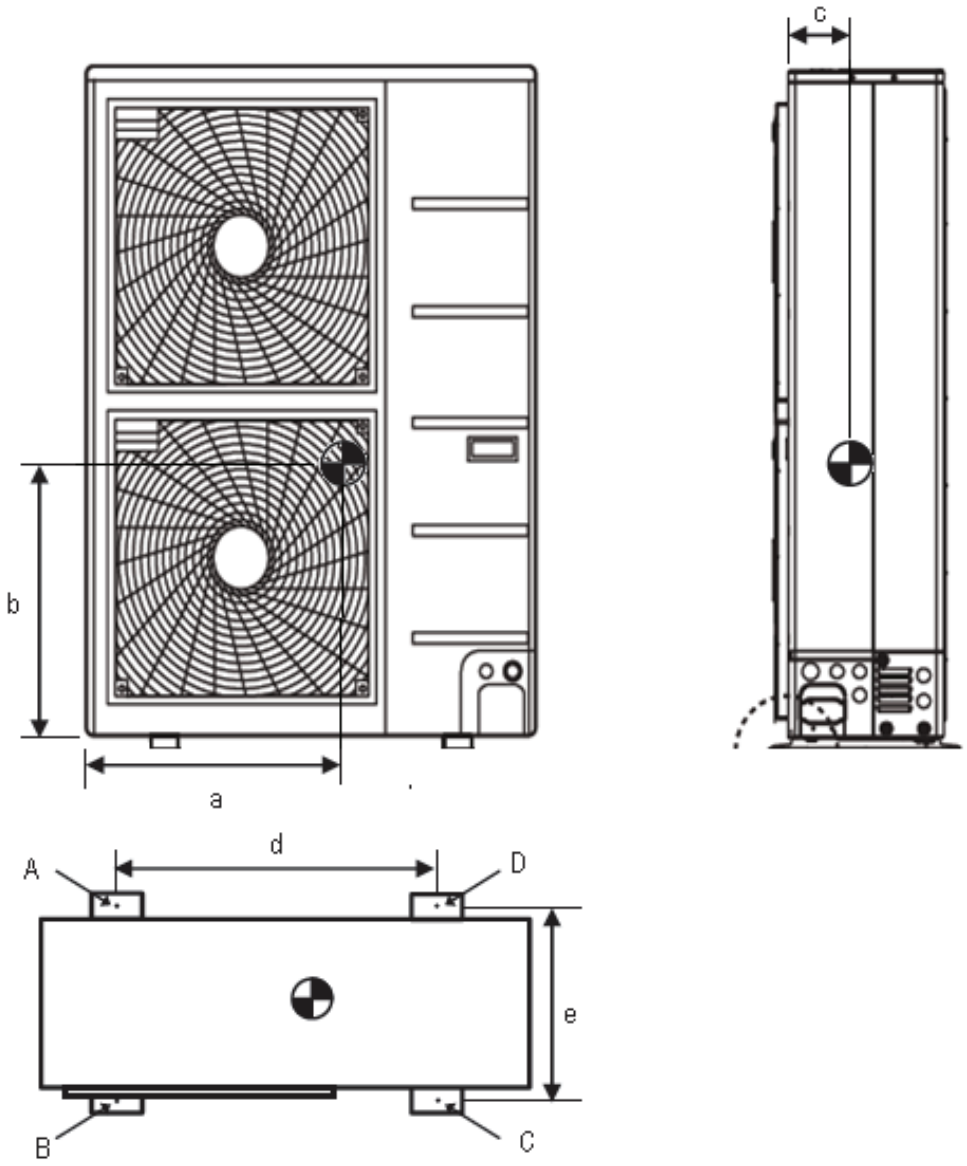

Table 27: LMU601HV Center of Gravity and Corner Weight Dimensions.

Model No.	Frame	Weight (lb.)		Center of Gravity (in.)			Leg (in.)		Corner Weight (lb.)			
		Shipping	Net	a	b	c	d	e	A	B	C	D
LMU601HV	U60A-B	242.5	218.3	27-7/32	21-15/32	6-5/8	24-13/32	14-3/16	17.9	20.4	96.0	84.0

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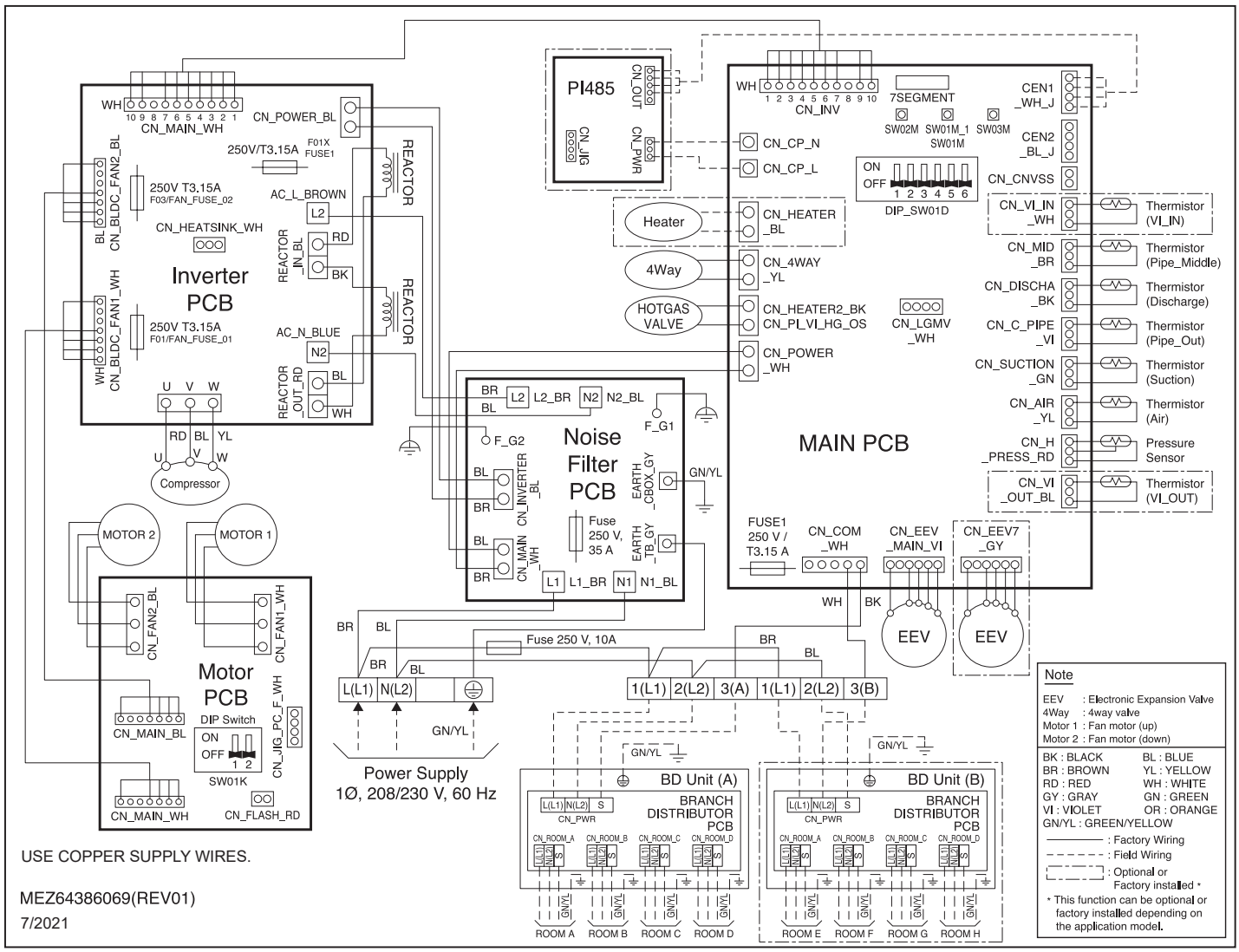
Figure 23: LMU481HV and LMU541HV Wiring Diagram.



USE COPPER SUPPLY WIRES.

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Figure 24: LMU601HV Wiring Diagram.

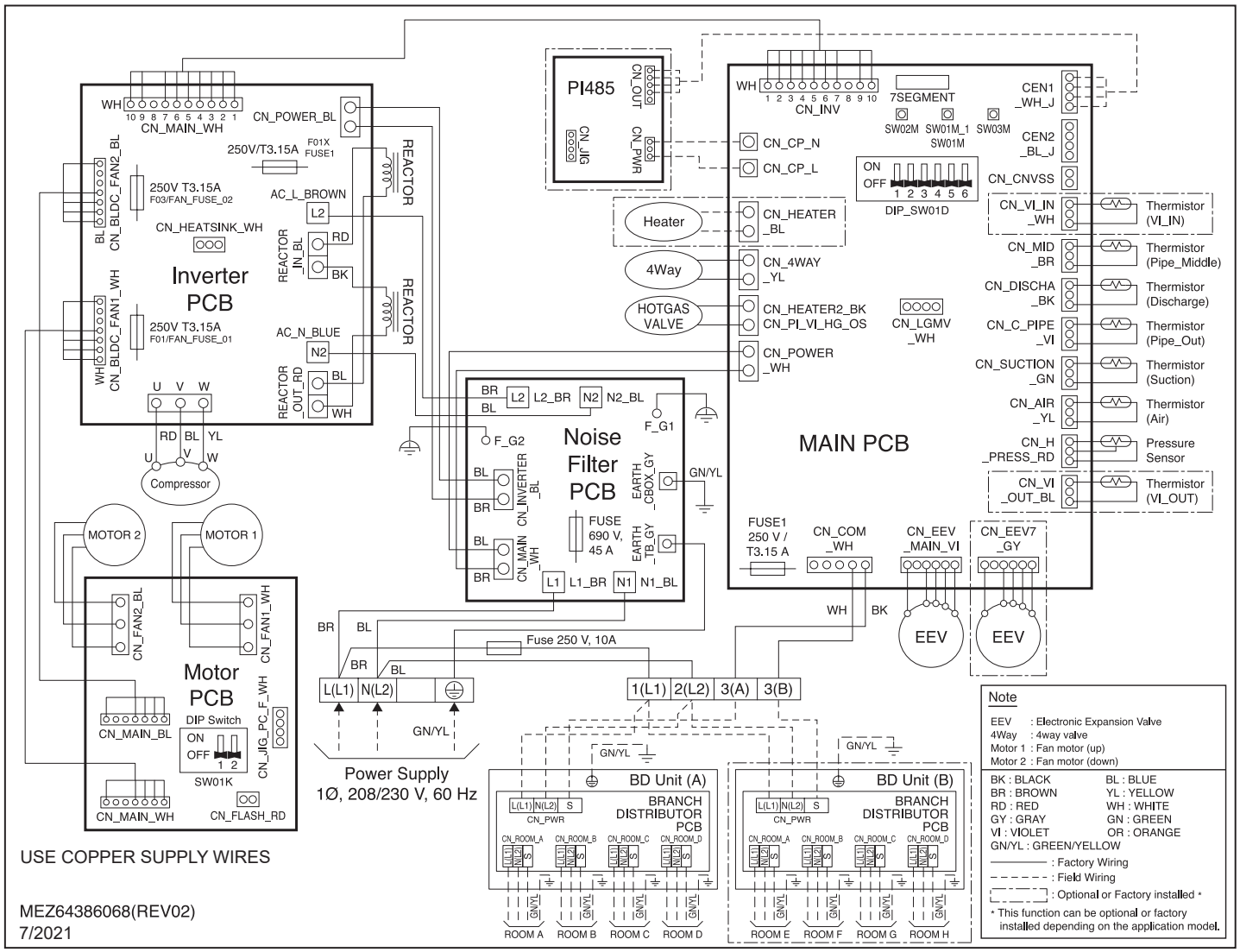

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Figure 25: LMU481HV and LMU541HV Refrigerant Flow Diagram.

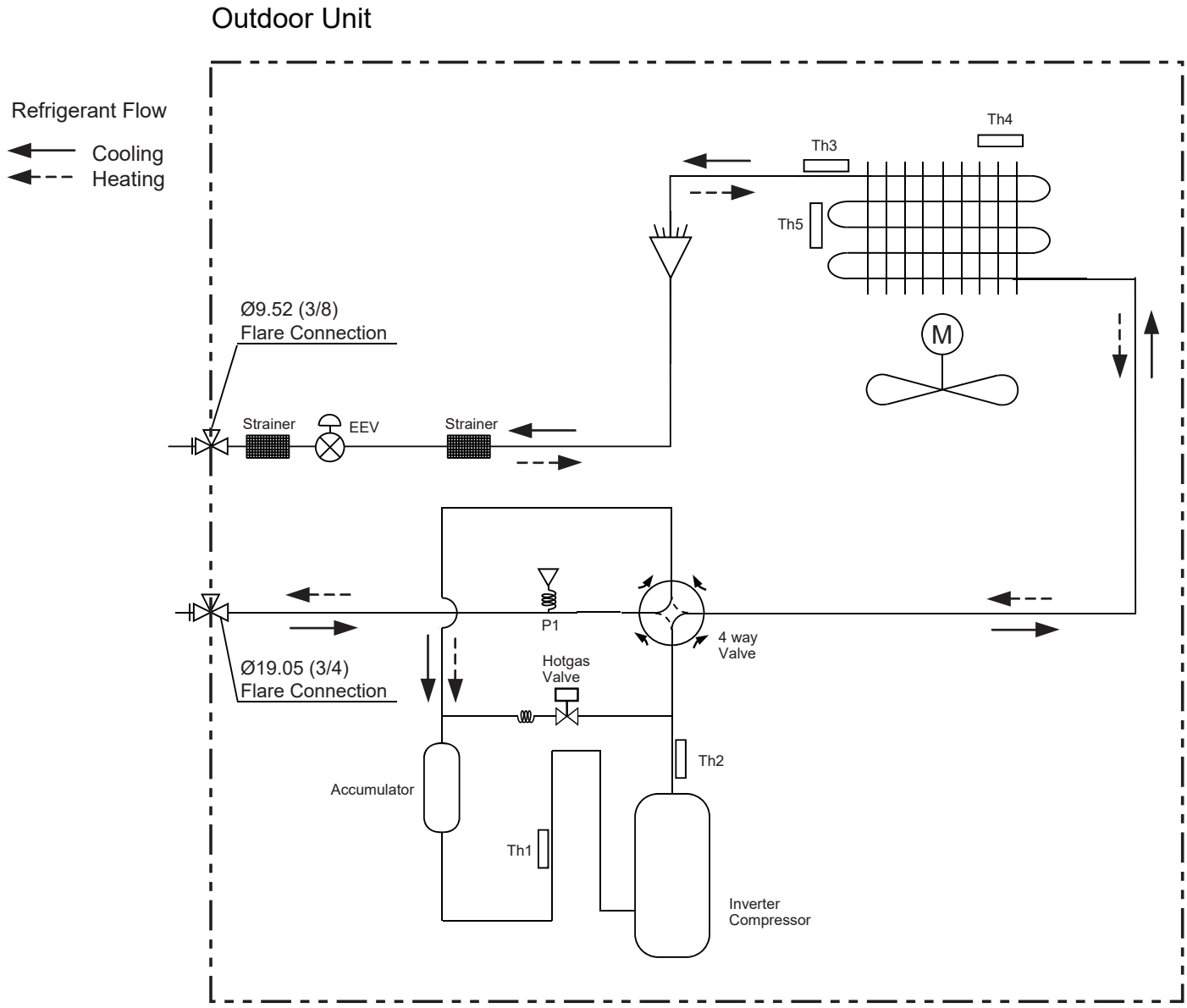

Table 28: LMU481HV and LMU541HV PCB Connection Details.

Location	Description	PCB Connection
EEV	Electronic Expansion Valve	CN_EEV_MAIN_VI
Th1	Suction Pipe Temperature Thermistor	CN_SUCTION(GR)
Th2	Discharge Pipe Temperature Thermistor	CN_DISCHA(BK)
Th3	Condenser Pipe Temperature Thermistor	CN_C_PIPE(VI)
Th4	Outdoor Air Temperature Thermistor	CN_AIR(YL)
Th5	Condenser Middle Pipe Temperature Thermistor	CN_MID(BR)
P1	Pressure Sensor	CN_H_PRESS_RD

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Figure 26: LMU601HV Refrigerant Flow Diagram.

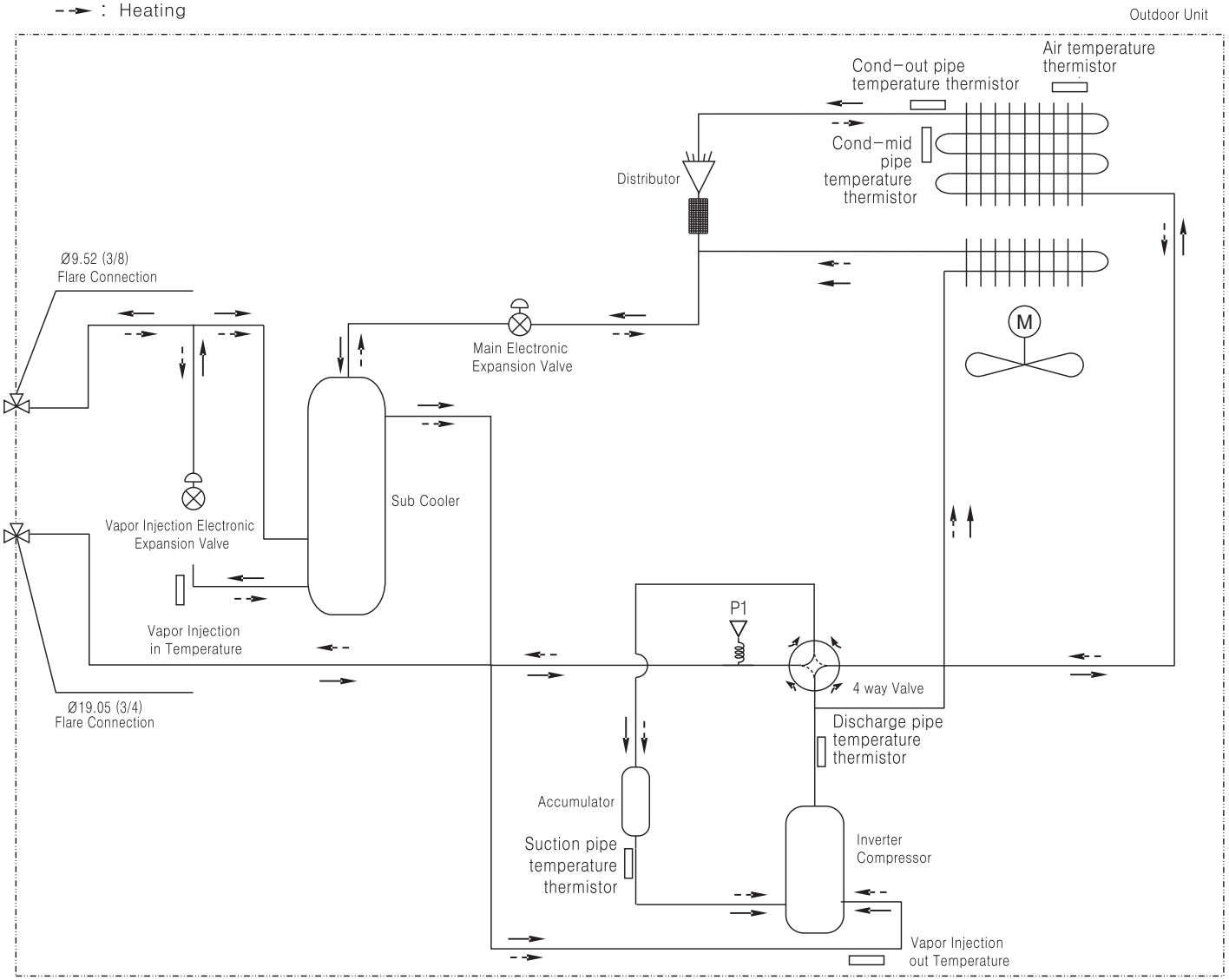

Table 29: LMU601HV PCB Connection Details.

Description	PCB Connection
Discharge Pipe Temperature Thermistor	CN_DISCHA_BK
Suction Pipe Temperature Thermistor	CN_SUCTION_GN
Condenser Outlet Pipe Temperature Thermistor	CN_C_PIPE_VI
Air Temperature Thermistor	CN_AIR_YL
Condenser Middle Pipe Temperature Thermistor	CN_MID_BR
Vapor Injection Inlet Temperature Thermistor	CN_VI_IN_WH
Vapor Injection Outlet Temperature Thermistor	CN_VI_OUT_BL
Pressure Sensor	CN_H_PRESS_RD

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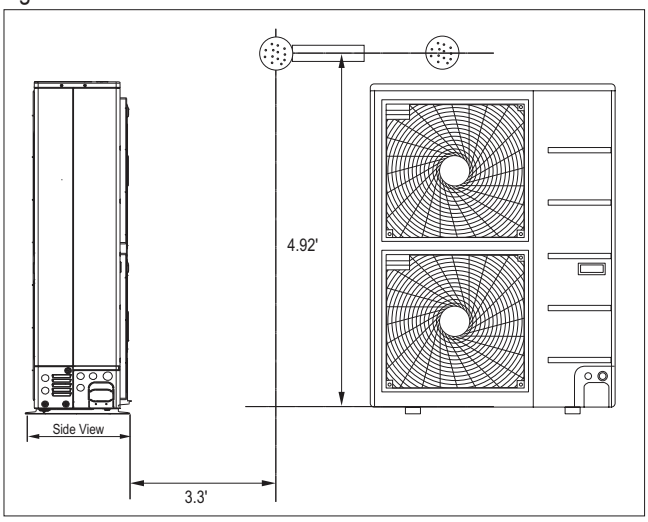
Acoustic Data

Figure 27: Sound Pressure Level Measurement Location.



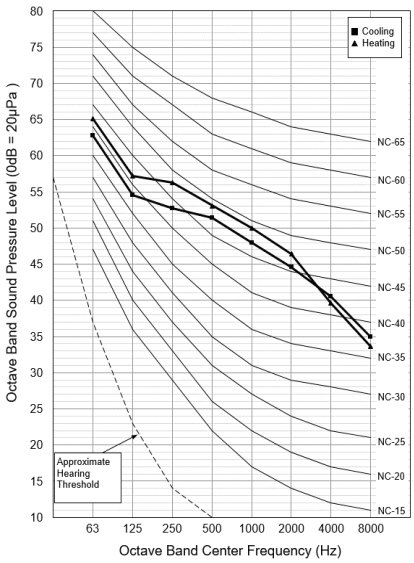
- Measurement taken 4.92' above finished floor, and at a distance of 3.3' from face of unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound pressure levels are measured in dB(A) ±3.
- Tested in anechoic chamber per ISO Standard 3745.

Table 30: Sound Pressure Levels (dB[A]).

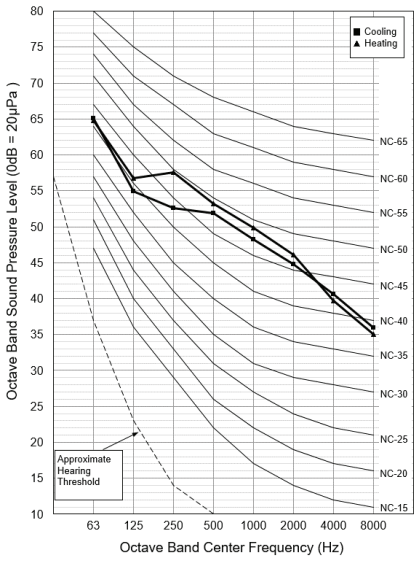
Model No.	Sound Pressure Levels (dB[A])	
	Cooling	Heating
LMU481HV	53	55
LMU541HV	53	55
LMU601HV	56	58

Figure 28: Sound Pressure Diagrams.

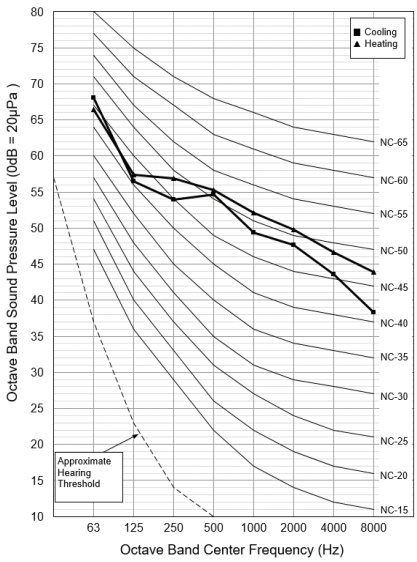
LMU481HV



LMU541HV



LMU601HV



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Sound Power Levels

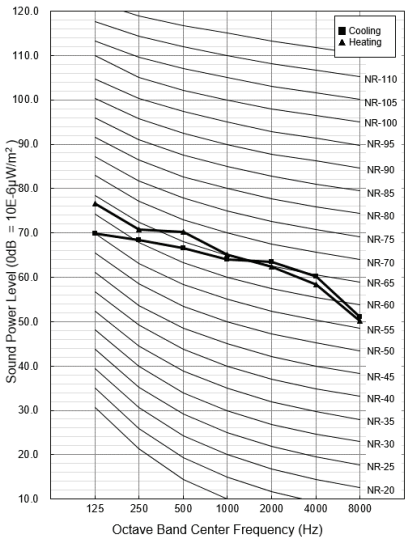
- Data is valid under diffuse field conditions.
- Data is valid under nominal operating conditions.
- Sound power level is measured using rated conditions, and tested in a reverberation room per ISO 3741 standards.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Reference acoustic intensity: 0dB = 10E-6μW/m^2

Table 31: Sound Power Levels (dB[A]).

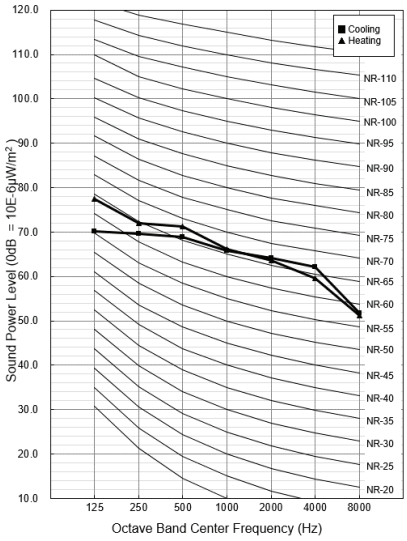
Model No.	Sound Power Levels (dB[A])	
	Cooling (High)	Heating (High)
LMU481HV	71	72
LMU541HV	72	73
LMU601HV	73	74

Figure 29: Sound Power Level Diagrams.

LMU481HV



LMU541HV



LMU601HV

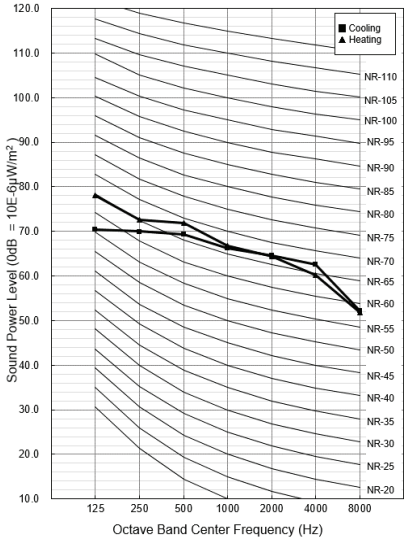


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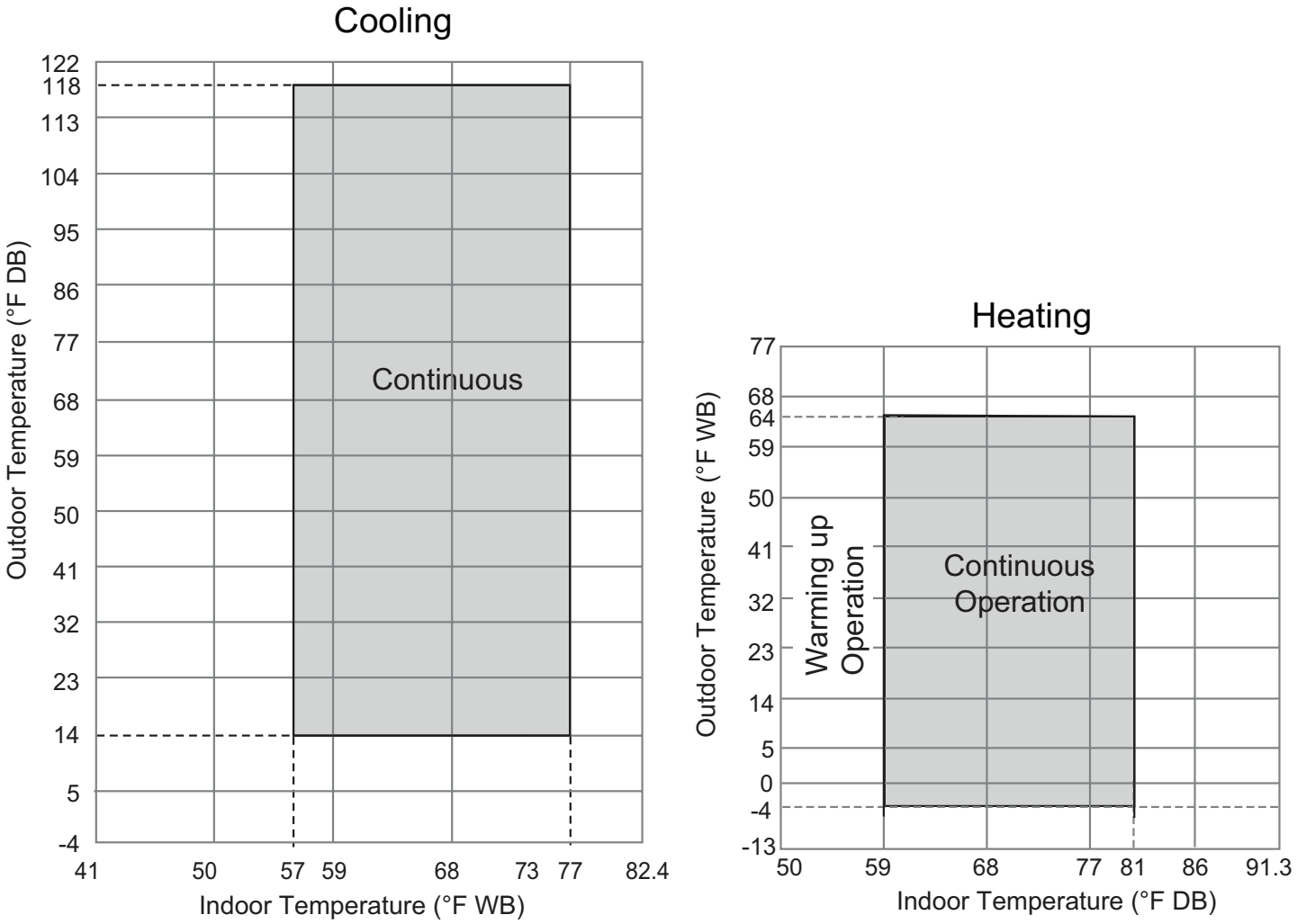
Figure 30: LMU481HV, LMU541HV, and LMU601HV Cooling and Heating Operation Ranges.



Note:

Cooling operation range can extend down to -4 °F outdoor temperature if Low Ambient Kit is installed (sold separately).

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MULTI F MAX BD UNIT DATA

Mechanical Specifications on page 47

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Dimensions on page 49

Wiring Diagram on page 50

Refrigerant Flow Diagram on page 51

Y-Branch Accessory on page 52

Branch Distribution Unit Orientation on page 53

MULTI F MAX BD UNIT

Mechanical Specifications

Branch Distribution Unit

General

Branch distribution units are designed for use with LG Multi F MAX (LMU481HV, LMU541HV, and LMU601HV) outdoor units, and are internally piped, wired, assembled and run-tested at the factory. The branch distribution unit is used as an intermediate refrigerant control device between the outdoor unit and the indoor units to effectively and efficiently control the heating or cooling operation of the system through the use of electronic expansion valves.

Refrigerant System

System is designed for use with R410A refrigerant. All refrigerant lines from the outdoor unit to the branch distribution unit, and from the branch distribution unit to the indoor units, must be field insulated. The units may be connected to optional field-supplied and field-installed isolation valves for servicing without evacuating the entire system.

Piping Capabilities

Maximum piping length from the branch distribution unit to the indoor unit is 49.2 equivalent feet. Maximum elevation difference between branch distribution unit and indoor unit is 32.8 feet. Maximum elevation difference between two parallel branch distribution units is 49.2 feet.

Electrical

Each branch distribution unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Figure 31: PMBD3620 Two-Port Branch Distribution Unit.

Figure 32: PMBD3630 Three-Port Branch Distribution Unit.

Figure 33: PMBD3640 and PMBD3641 Four-Port Branch Distribution Unit.

Casing

The casing is designed to mount fully concealed above a finished ceiling, is manufactured of galvanized steel plate, and is internally insulated. Branch distribution units do not require a condensate drain.

Port Assembly

Branch distribution units have a two-pipe system consisting of one vapor pipe and one liquid pipe. Units are available in a choice of two (PMBD3620), three (PMBD3630) or four ports (PMBD3640 and PMBD3641); branch distribution units include two, two-positioned solenoid valves per port. Each port for PMBD3620, PMBD3630, and PMBD3640 units connects to one indoor unit for a maximum nominal capacity of 24,000 Btu/h. For PMBD3641 units, ports A, B, C each connect to one indoor unit for a maximum nominal capacity of 24,000 Btu/h; port D connects to one indoor unit for a nominal capacity of either 24,000 Btu/h or 36,000 Btu/h. Maximum nominal capacity per branch distribution unit is 73,000 Btu/h. Two branch distribution units can be piped in parallel using accessory Y-branch kit PMBL5620.

Controls

The unit is provided with factory-installed control boards and an integral microprocessor to communicate with the main control board in the outdoor unit. All power wiring / communication cable to be minimum 14 AWG, 4-conductor from the outdoor unit to the BD unit, and 14 AWG, 4-conductor from the BD unit to the indoor unit, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes.

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MULTI F MAX BD UNIT

General Data

MULTI F
MULTI F MAX

Table 32: Multi F MAX BD Unit General Data.

Model Number		PMBD3620	PMBD3630	PMBD3640	PMBD3641
No. of Connectable Indoor Units[1]		1-2	1-3	1-4	1-4
Max. Nominal Capacity / Port (Btu/h)[2]		24,000	24,000	24,000	Ports A, B, C: 24,000; Port D: 36,000
Connected Indoor Unit Capacity (Btu/h)		7,000 ~ 24,000	7,000 ~ 24,000	7,000 ~ 24,000	Ports A, B, C: 7,000 ~ 24,000; Port D: 24,000 or 36,000
Max. Nominal Capacity / Branch Distribution Unit (Btu/h)		48,000	72,000	73,000	73,000
Operation Temperature Range (°F DB)		0 ~ 150	0 ~ 150	0 ~ 150	0 ~ 150
Maximum Humidity		80%	80%	80%	80%
Unit Data					
Refrigerant Type		R410A	R410A	R410A	R410A
Power Supply V, Ø, Hz		208-230, 1, 60	208-230, 1, 60	208-230, 1, 60	208-230, 1, 60
Power Input (W)		16	24	32	32
Rated Amps (A)		0.08	0.12	0.16	0.16
Dimensions W x H x D (in.)		17-3/32 x 6-13/32 x 10-23/32	17-3/32 x 6-13/32 x 10-23/32	17-3/32 x 6-13/32 x 10-23/32	17-3/32 x 6-13/32 x 10-23/32
Net Unit Weight (lbs.)		13	14.3	15.7	15.7
Shipping Weight (lbs.)		15	17	18	18
Communication / Connection (Power) Cables[3]					
From Outdoor Unit to Branch Distribution Unit (Qty. x AWG)[3]		4C x 14	4C x 14	4C x 14	4C x 14
From Branch Distribution Unit to Indoor Unit (Qty. x AWG)[3]		4C x 14	4C x 14	4C x 14	4C x 14
Piping Connections					
Outdoor Unit to Branch Distribution Unit	Liquid (in., OD)	Ø3/8	Ø3/8	Ø3/8	Ø3/8
	Vapor (in., OD)	Ø3/4	Ø3/4	Ø3/4	Ø3/4
Branch Distribution Unit to Indoor Units	Liquid (in., OD) x Qty.	Ø1/4 x 2	Ø1/4 x 3	Ø1/4 x 4	Ø1/4 x 4
	Vapor (in., OD) x Qty.	Ø3/8 x 2	Ø3/8 x 3	Ø3/8 x 4	Ø3/8 x 3; Ø1/2 x 1
Piping Lengths					
Maximum Total System Piping (ft.)[4]		475.7	475.7	475.7	475.7
Maximum Main Pipe Length (Outdoor Unit to Branch Distribution Units [ft.])		180.4	180.4	180.4	180.4
Total Branch Piping (Branch Distribution Units to Indoor Units [ft.])		295.3	295.3	295.3	295.3
Maximum Branch Pipe Length Between Branch Distribution Unit and Each Indoor Unit [ft.])		49.2	49.2	49.2	49.2
Maximum Outdoor Unit to Indoor Unit Pipe Length (ft.)		229.6	229.6	229.6	229.6
Piping Length (No Additional Refrigerant [ft.]; approx. 16.4 ft. or 49.2 ft. of Main Piping (depending on ODU model) + 131.2 ft. of Branch Piping)		147.6 or 180.4 (Depending on ODU Model)	147.6 or 180.4 (Depending on ODU Model)	147.6 or 180.4 (Depending on ODU Model)	147.6 or 180.4 (Depending on ODU Model)
Maximum Elevation between Branch Distribution Unit and Indoor Unit (ft.)		32.8	32.8	32.8	32.8
Maximum Elevation between Branch Distribution Unit and Branch Distribution Unit (ft.)		49.2	49.2	49.2	49.2

[1]At least one Branch Distribution Unit is required for system operation; a maximum of two can be installed per outdoor unit with use of Y-branch accessory (PMBL5620) To connect only one (1) indoor unit to a branch distribution unit, the system must include another branch distribution unit with at least one (1) connected indoor unit.

[2]Branch Distribution Unit can accommodate from one (1) indoor unit up to four (4) indoor units depending on the ports available on the Branch Distribution Unit.

[3]All power wiring / communication cable to be minimum 14 AWG, 4-conductor from the outdoor unit to the BD unit (Multi F MAX systems only), and 14 AWG, 4-conductor from the BD unit to the indoor unit, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes.

[4]Piping lengths are equivalent.

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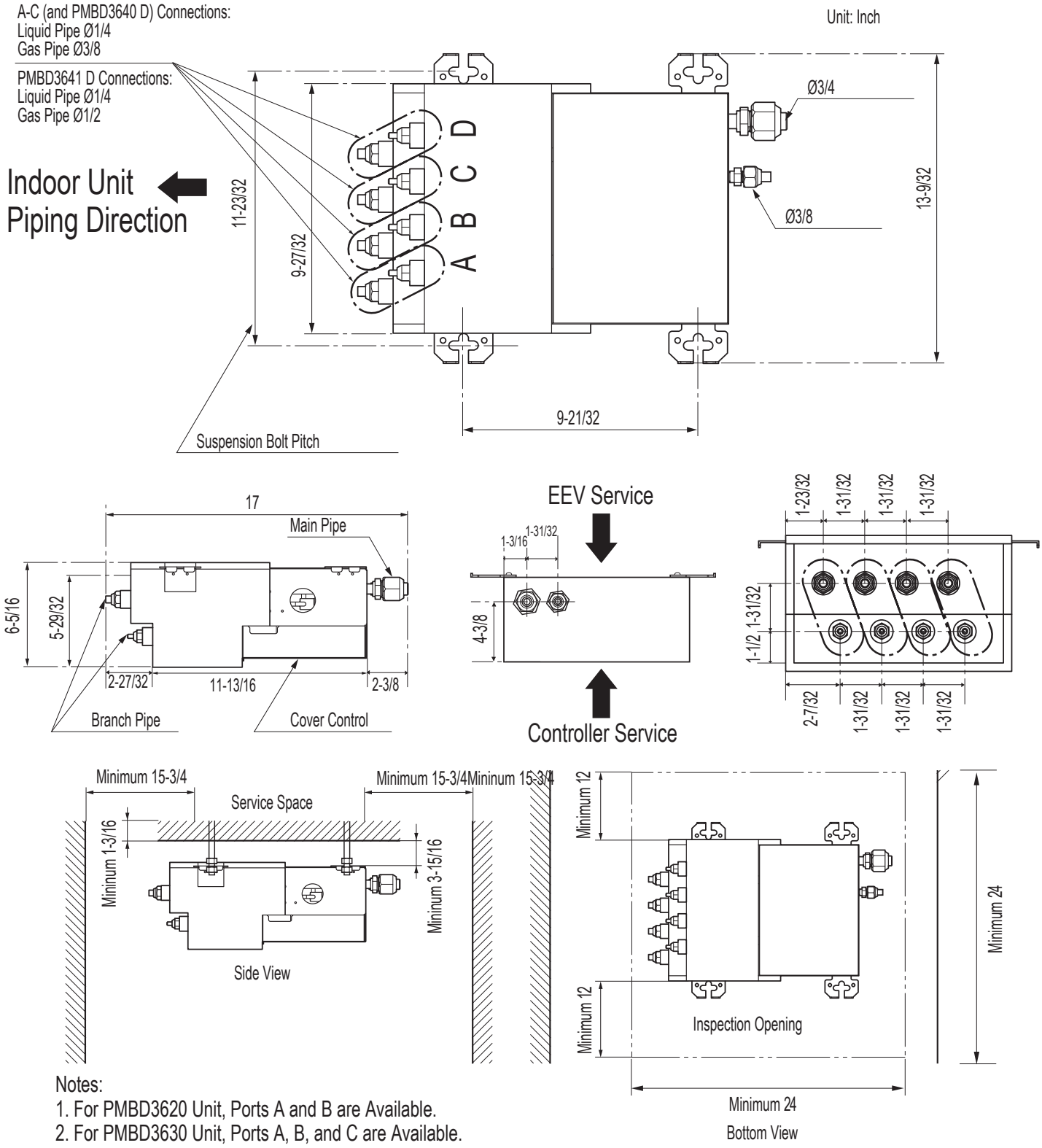
MULTI F MAX BD UNIT

Dimensions

Figure 34: PMBD3620, PMBD3630, PMBD3640, and PMBD3641 External Dimensions.



Notes:
1. For PMBD3620 Unit, Ports A and B are Available.
2. For PMBD3630 Unit, Ports A, B, and C are Available.
3. For PMBD3640 and PMBD3641 Units, Ports A, B, C, and D are Available.

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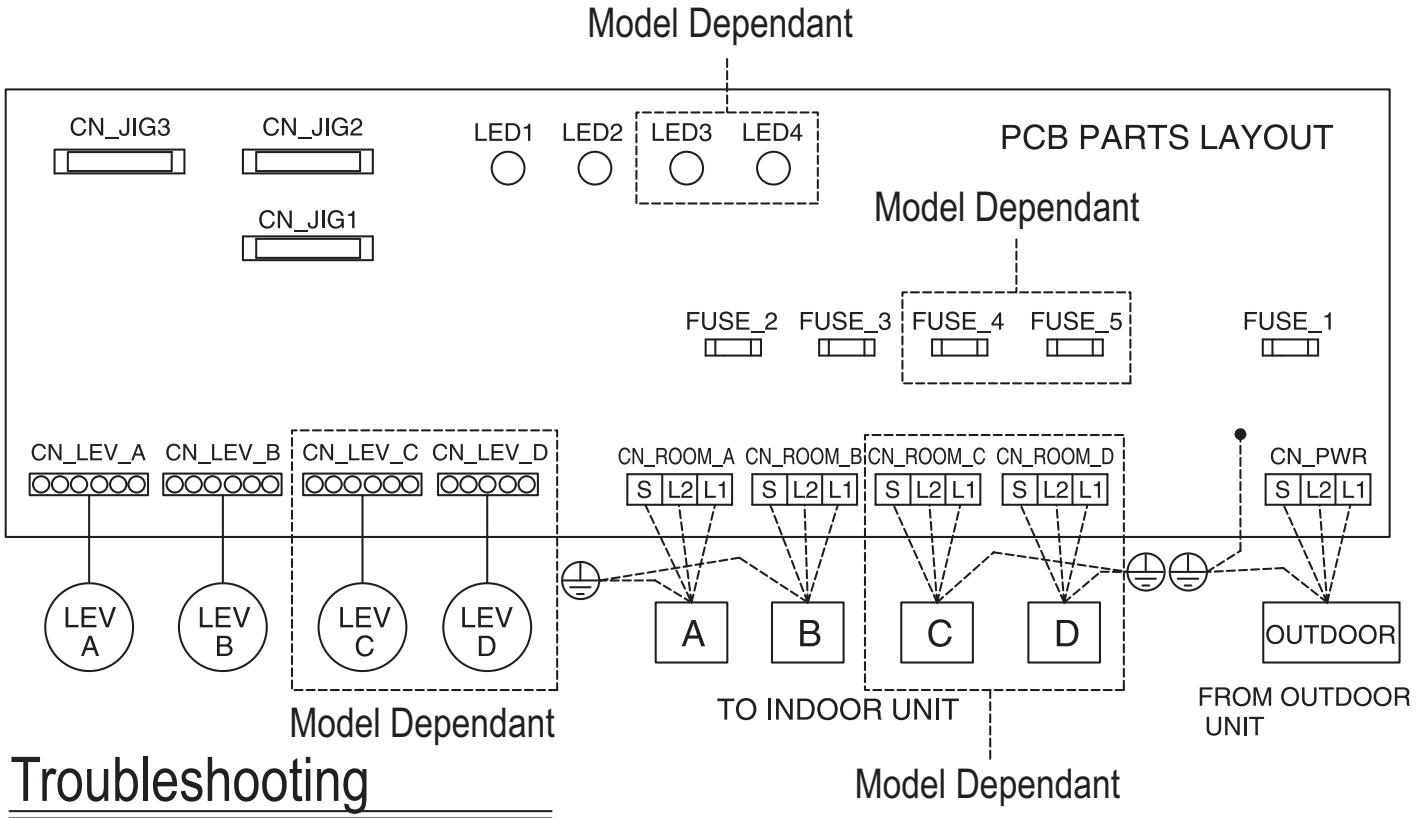
Figure 35: PMBD3620, PMBD3630, PMBD3640, PMBD3641 Wiring Diagram.



Troubleshooting

LED	DIAGNOSIS
	NORMAL
	ABNORMALITY -->CHECK BRANCH DISTRIBUTOR UNIT
	ABNORMALITY -->CHECK INDOOR OR OUTDOOR UNIT CHECK CONNECTING CABLE

Note:

PMBD3620 BD Unit supplied with "A, B".
PMBD3630 BD Unit supplied with "A, B, C".
PMBD3640 and PMBD3641 BD Units supplied with "A, B, C, D".

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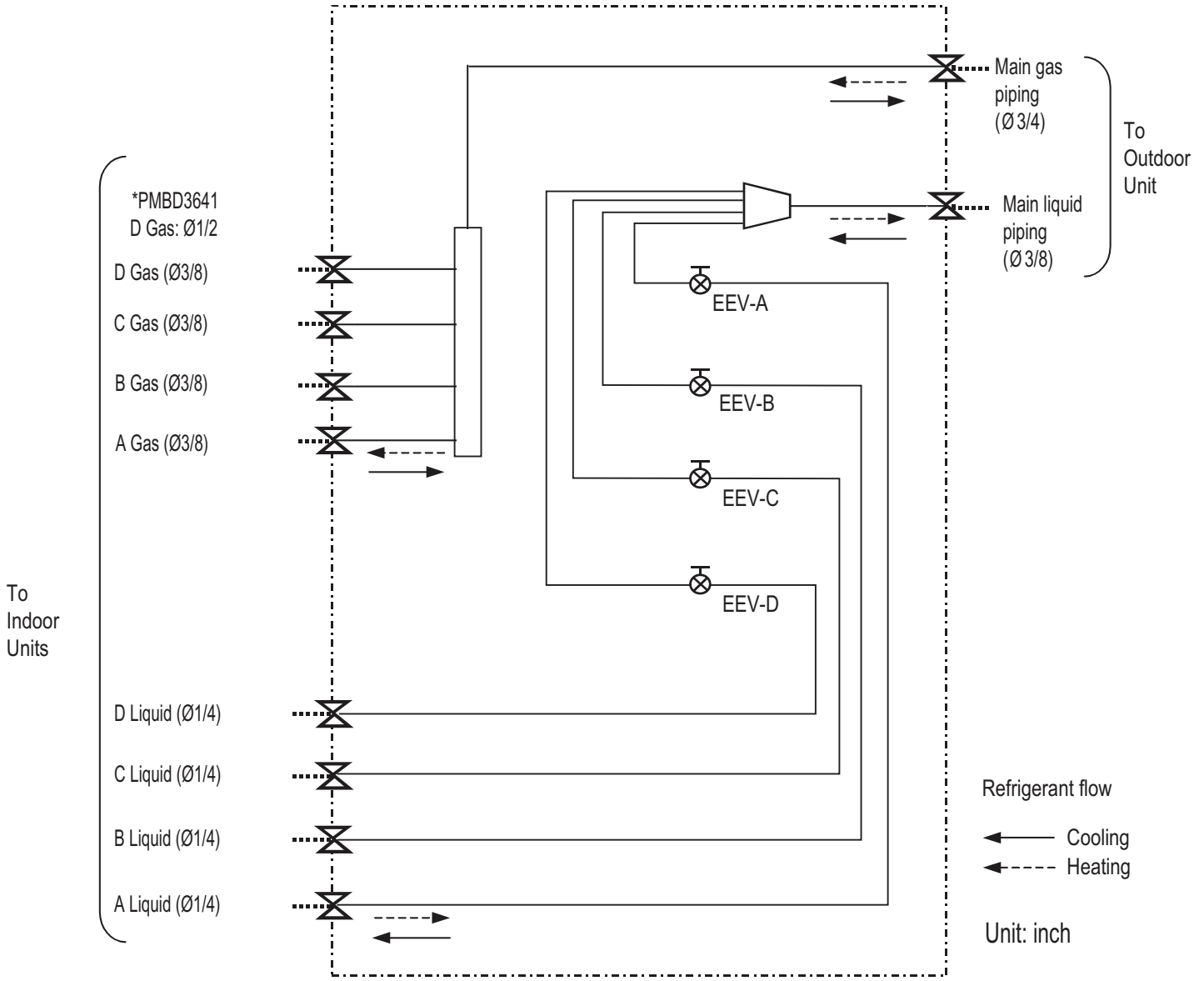
MULTI F MAX BD UNIT

Refrigerant Flow Diagram

Figure 36: PMBD3620, PMBD3630, PMBD3640, PMBD3641 Refrigerant Flow Diagram.



Note:

1. *Flare connections for field piping installation.*
2. *Match the BD ports to the indoor unit and outdoor unit piping sizes. Use an adapter if the piping size does not match the piping size of the connecting indoor unit.*
3. *EEV: Electronic Expansion Valve*
4. *PMBD3620 BD Unit supplied with "A, B".*
   PMBD3630 BD Unit supplied with "A, B, C".
   PMBD3640 and PMBD3641 BD Units supplied with "A, B, C, D".

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Multi F MAX Y-Branch Kit PMBL5620

The LG-supplied Y-Branch kit PMBL5620 MUST be used when installing two (2) branch distribution units in parallel on one (1) Multi F MAX system. ⃠ Field-supplied fittings are not permitted. Each Y-Branch kit includes two (2) Y-branches (one for the liquid line and one for the vapor line) and insulation covers.

Y-branches may be installed in horizontal or vertical configurations. When installed vertically, position the Y-branch so the straight through leg is ±3° of plumb. When installed horizontally, position the Y-branch so the take-off leg is level and shares the same horizontal plane as the straight-through leg ±5° rotation.

Y-branches must be properly installed following instructions in the applicable LG manual. Y-branches must always be installed with the single port facing the outdoor unit and the two-port end facing the branch distribution units. ⃠ Do not install Y-branches backwards as refrigerant flow cannot make U-turns. The Y-branch kit must be located at least three (3) feet from the outdoor unit. Provide a minimum of 20 inches between a Y-branch and the branch distribution unit.

It is recommended that when a Y-branch is located in a pipe chase or other concealed space, access doors must be provided for inspection access.

The equivalent pipe length of each Y-branch (1.6') must be added to the main pipe segment entered into LATS piping design software.

Note:

- *Design pressure is 551 psig.*
- *All dimensions in inches. Tolerance ±1/4 inch.*
- *Images are not to scale.*

Figure 37: Y-Branch Port Identifier Diagram.

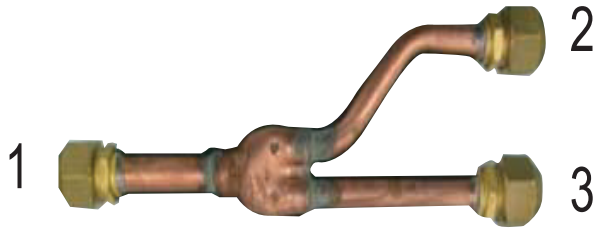
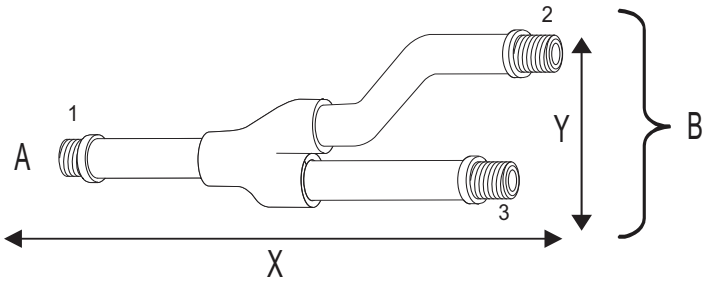


Figure 38: Y-Branch Dimensions Diagram.



A = To Outdoor Unit
B = To Branch Distribution Unit

Table 33: Multi F MAX Y-Branch Specifications.

Model	Y-Branch Type	Port Identifier (inch)		
		1	2	3
PMBL5620	Liquid	Ø3/8	Ø3/8	Ø3/8
	Vapor	Ø3/4	Ø3/4	Ø3/4
	Y-Branch Type	Dimensions (inch)		
		X	Y	
	Liquid	13.80	3.24	
	Vapor	12.48	3.02	

Figure 39: Horizontal Configuration End View.

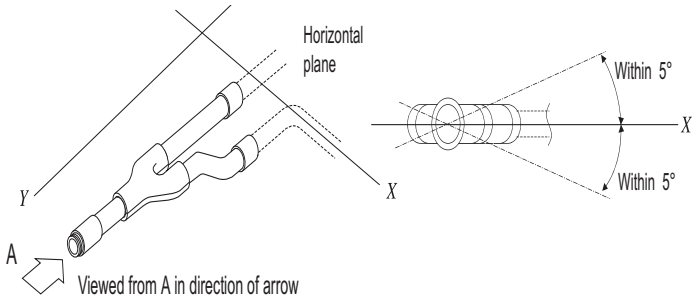
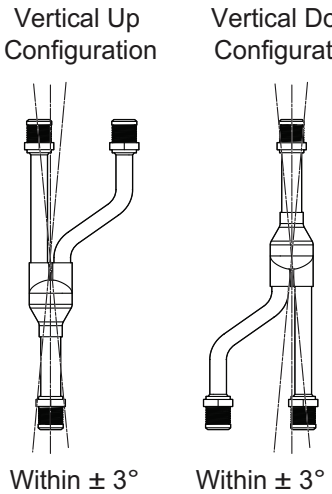


Figure 40: Y-branch Installation Alignment Specification.



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Branch Distribution Unit Orientation

Multi F MAX Branch Distribution (BD) Units can be installed in a multitude of options to fit various building configurations and job or application requirements. Multi F MAX BD Units include electronic expansion valves that properly seat only if the BD Unit is installed in an acceptable orientation. Installations with improper BD Unit orientation risk incomplete valve seating and system performance degradation from potential refrigerant leakage through the electronic expansion valve.

Note:
This material is for informational or educational purposes only. It is not intended to be a substitute for professional advice. Consult with your engineer or design professionals for specific applications to your system

Figure 41: Acceptable BD Unit Ceiling Mount Orientations.

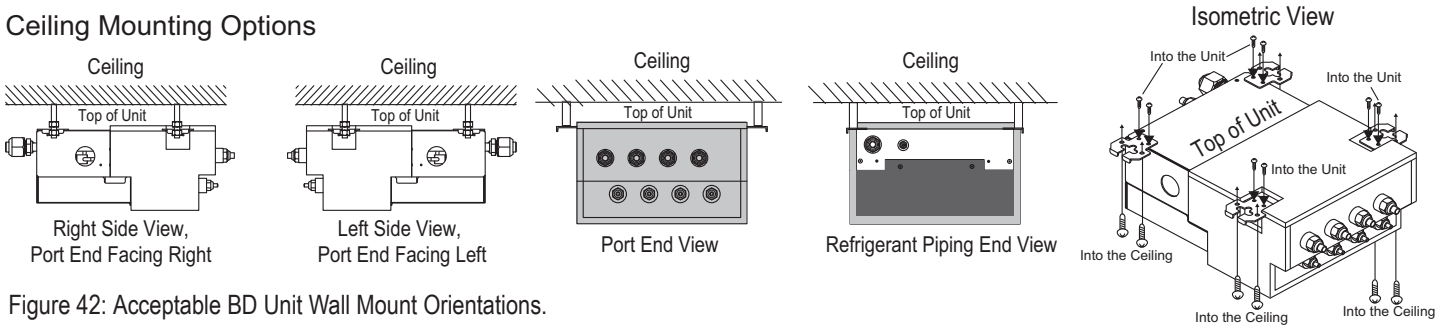


Figure 42: Acceptable BD Unit Wall Mount Orientations.

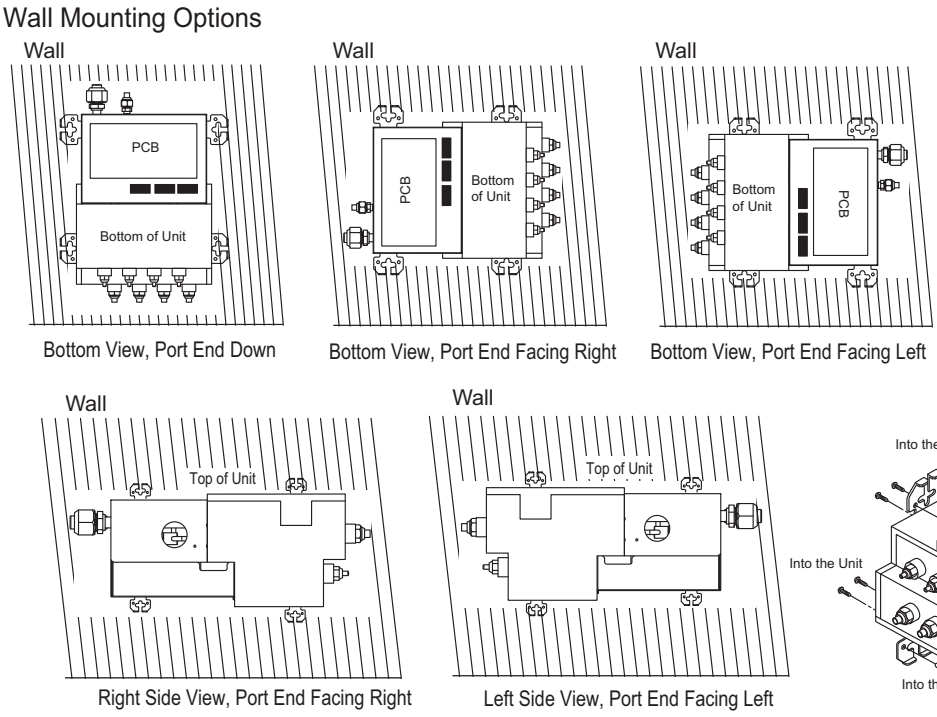
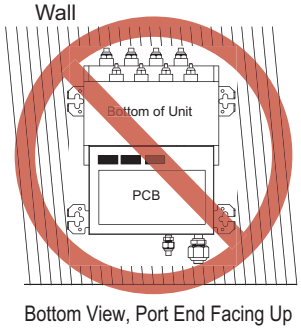


Figure 43: Unacceptable BD Unit Orientation.



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ELECTRICAL CONNECTIONS

General Information on page 55
Wiring Specifications on page 55
Systems for Multi F on page 57
Systems for Multi F MAX on page 60
Indoor Units / Controllers on page 62

ELECTRICAL CONNECTIONS

General Information

⚠WARNING

- *All power (line voltage) wiring and communication cable installation must be performed by trained service providers working in accordance with local, state, and National Electrical Code (NEC) / UL federal regulations related to electrical equipment and wiring, and following the manufacturer product diagrams, requirements, and instructions in this manual. Electric shock can cause physical injury or death.*
- *Be sure that main power to the unit is completely off before installing. Follow all safety and warning information. Failure to do so will cause electric shock, resulting in bodily injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously (circuit breaker must be resistant to electromagnetic currents). Be sure that the circuit breaker or some other emergency power cutoff device is in place before any power wiring is done to the system. Failure to do so will cause bodily injury or death.*
- ⃠ *Never touch any power lines or live cables before all power is cutoff to the system. To do so will cause bodily injury or death.*
- *Power wiring and communication cable sizes must comply with all applicable federal, state, and local codes. Undersized wiring will lead to unacceptable voltage at the unit and will cause a fire, which will cause bodily injury or death.*
- *Properly ground the outdoor unit, indoor units, and branch distribution units. Ground wiring must always be installed by a trained technician. Ground wiring is required to prevent accidental electrical shock during current leakage, which will cause bodily injury or death.*
- *Verify that the branch switch and circuit breaker are set to OFF before installing the wiring system. Electric shock can cause physical injury or death.*
- *Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent will include some amount of direct current. Using an oversized breaker or fuse will result in electric shock, causing physical injury or death.*
- ⃠ *Do not connect ground wire to refrigerant, gas, sewage, or water piping; to lightning rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide an NEC-approved earth ground can result in electric shock, fire, resulting in physical injury or death.*

Note:

- *Consider ambient conditions (temperature, direct sunlight, inclement weather, etc.) when selecting, installing, and connecting the power wiring.*
- *Properly ground the outdoor unit, indoor units, and branch distribution units. Ground wiring must always be installed by a trained technician. Improperly grounded wire can cause communication problems from electrical noise, and motor current leakage.*

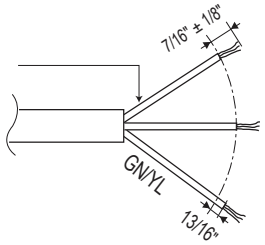
⚠NOTE

- *Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent will include some amount of direct current. Using an oversized breaker or fuse will result in equipment malfunction and property damage.*
- ⃠ *Do not connect ground wire to refrigerant, gas, or water piping; to lightning rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide a NEC-approved earth ground can result in property damage and equipment malfunction.*
- ⃠ *Do not operate the air conditioning system until the refrigerant piping installation is complete. Operating the system before refrigerant piping is finalized will damage the compressor.*

Power Supply / Power Wiring Specifications

- Multi F and Multi F MAX systems operate at 1Ø, 208-230V, 60Hz, and power is wired to the outdoor unit only. The outdoor unit will supply power to the indoor units and the branch distribution units (Multi F MAX systems only) through the communication / connection (power) cable.
- Power supply to the outdoor unit must be selected based on NEC and local codes. Maximum allowable voltage fluctuation ±10% or nameplate rated value.
- Power wiring to the outdoor unit(s) must be solid or stranded, and must comply with all local and national electrical codes.
- Properly ground the outdoor unit and indoor unit per NEC and local codes.
- Ground wire must be longer than the common power / communication wires.
- Connect the wiring firmly so the wires cannot be easily pulled out.
- Refer to the inside of the chassis cover or control cover for circuit and terminal block diagrams.
- Always match color codes of each wire and follow wiring diagram.
- ⃠ Do not install power wiring to the outdoor unit and the communication / connection (power) cable to the indoor unit in the same conduit. Use separate conduits.

Figure 44: Multi F / Multi F MAX Outdoor Unit Power Wiring.



⚠WARNING

Always have a trained service provider properly ground the outdoor unit. If the outdoor unit is not properly grounded, there is a risk of electric shock, physical injury, or death.

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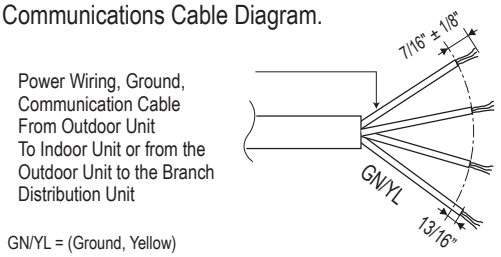
Communication / Connection (Power) Cable Specifications

- Insulation material as required by local code.
- Rated for continuous exposure of temperatures up to 140°F.
- Firmly attach the cable; provide slack but secure in a way to prevent external forces from being imparted on the terminal block.
- Wiring must be completed without splices.

Figure 47: Typical Multi F / Multi F MAX Outdoor and Indoor / Branch Distribution Unit Wiring and Communications Cable Diagram.



Multi F Systems:

- Communication / connection (power) cable from the outdoor unit to the indoor unit must use a minimum of 14 AWG, four (4) conductor, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes.
- Use of 14 AWG, four (4) conductor, stranded, shielded or unshielded wire is allowed for lengths up to the published maximum pipe length, plus recommended slack at both ends.

Multi F MAX Systems:

- All communication / connection (power) cable from the outdoor unit to the branch distribution unit(s) must be a minimum of 14 AWG, four (4) conductor, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes.
- Communication / connection (power) cable from the branch distribution unit(s) to the indoor units must use a minimum of 14 AWG, four (4) conductor, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes.
- Use of 14 AWG, four (4) conductor, stranded, shielded or unshielded wire is allowed for lengths up to the published maximum pipe length, plus recommended slack at both ends.

Note:

⃠ Never ground the shield of the communications cable to the indoor unit frame or other grounded entities of the building. Ground the communications cable shield only at the outdoor unit. Improperly grounding this cable can cause communications errors.

- *Use a conduit for the communications / connection (power) cable from the outdoor unit to the indoor units and branch distribution unit(s). Electrical interference my cause product malfunction.*
- *The communications / connection (power) cable from the outdoor unit to the indoor units / branch distribution unit(s) must be separated and isolated from power wiring to the outdoor unit, computers, radio and television broadcasting facilities, as well as medical imaging equipment. Electrical interference my cause product malfunction.*

Figure 45: Typical Multi F System General Power / Communications System Schematic.

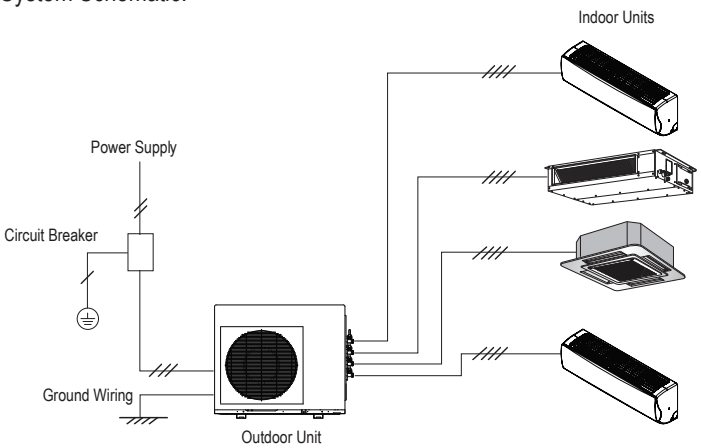
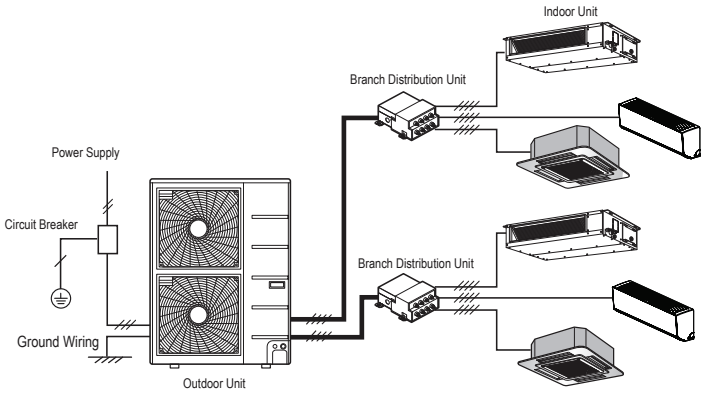


Figure 46: Typical Multi F MAX System General Power / Communications System Schematic.



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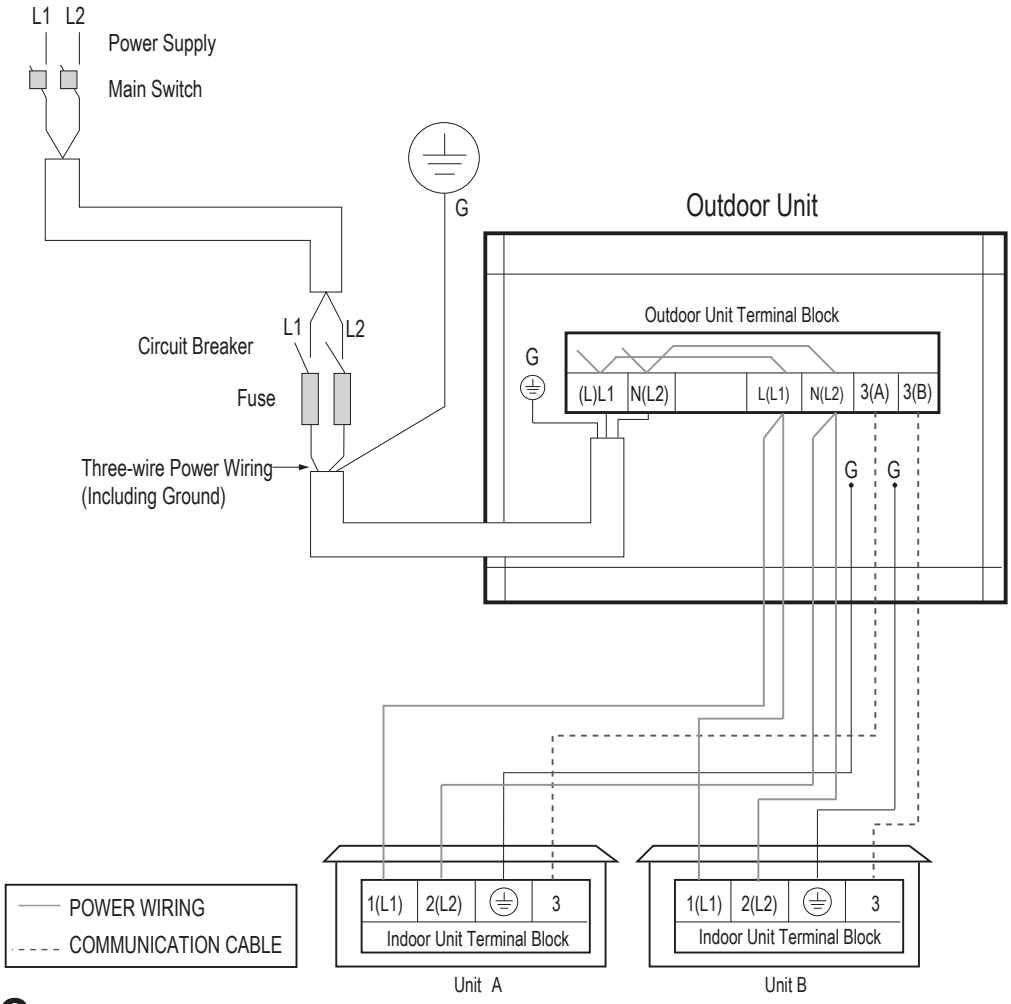
ELECTRICAL CONNECTIONS

Systems for Multi F

Figure 48: Multi F LMU183HV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, causing physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, resulting in physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, resulting in physical injury or death.*

Note:

- *Terminal block labels, appearances, and location will vary depending on outdoor unit model.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

⚠ NOTE

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*

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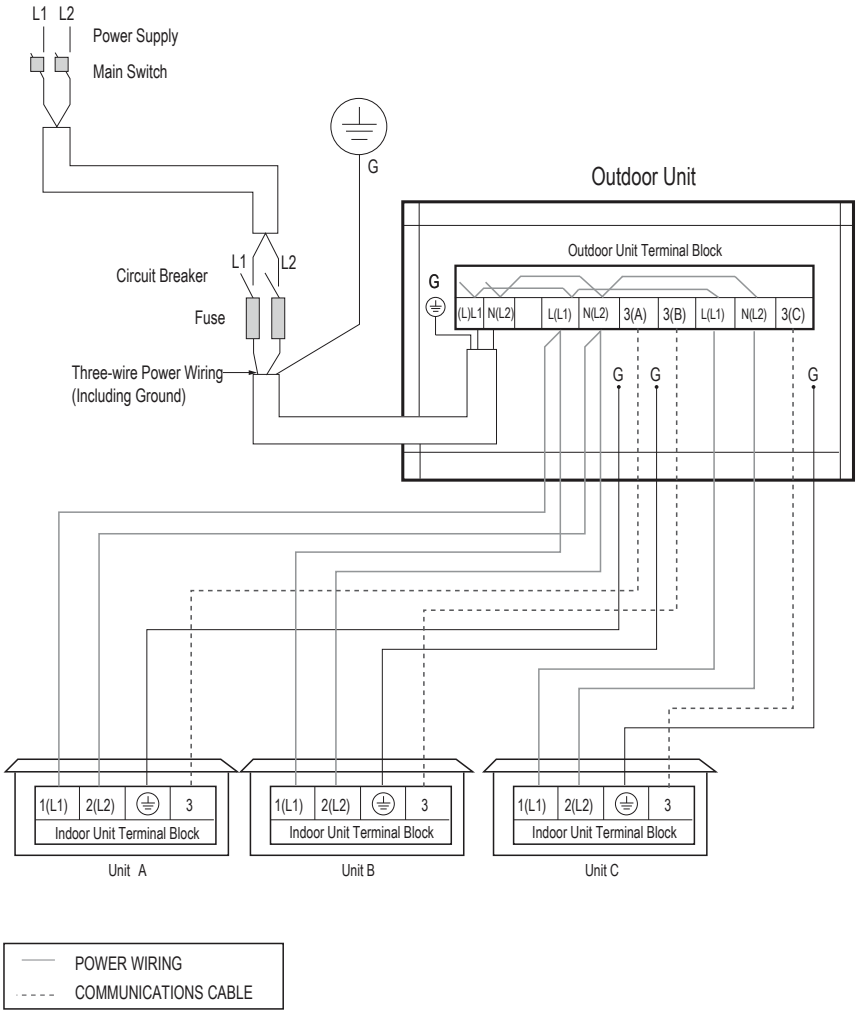
Figure 49: Multi F LMU243HV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, causing physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, resulting in physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, resulting in physical injury or death.*

Note:

- *Terminal block labels, appearances, and location will vary depending on outdoor unit model.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

⚠ NOTE

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*

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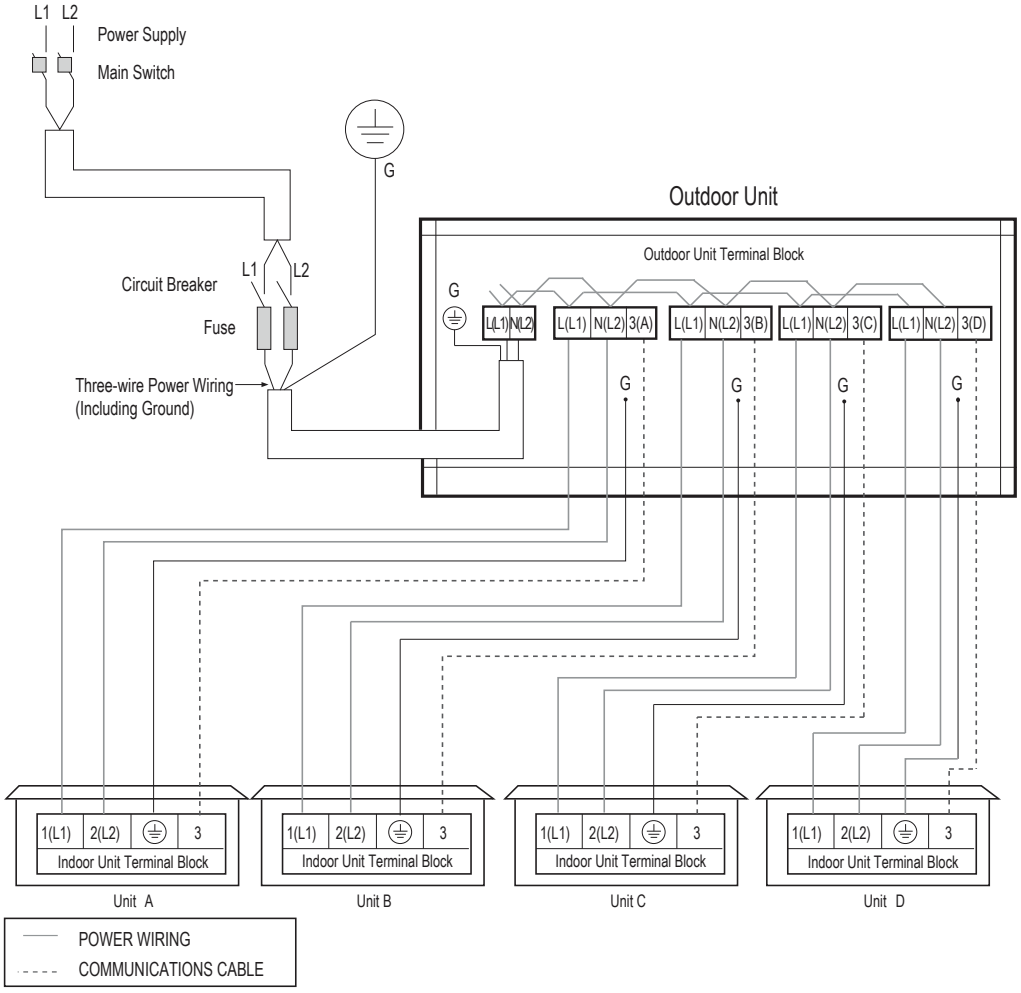
Figure 50: Multi F LMU303HV and LMU363HV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, causing physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, resulting in physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, resulting in physical injury or death.*

Note:

- *Terminal block labels, appearances, and location will vary depending on outdoor unit model.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

⚠ NOTE

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*

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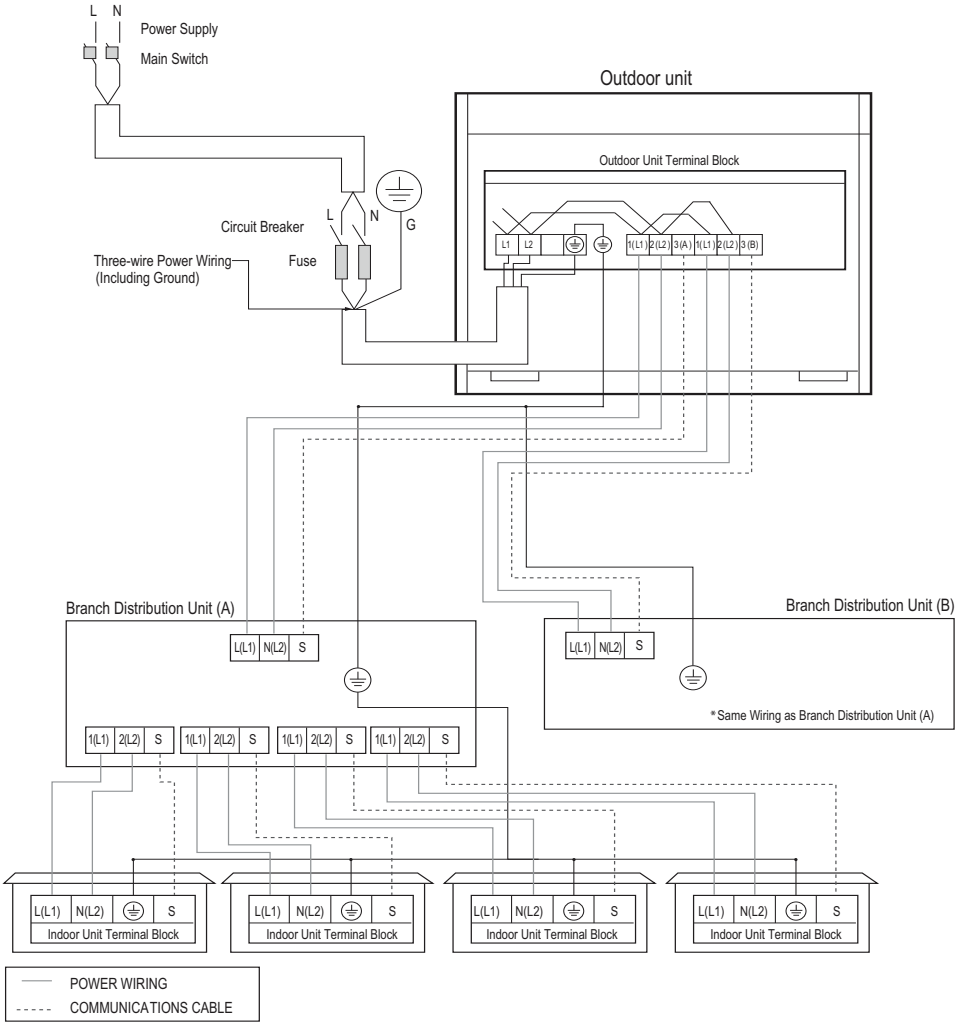
ELECTRICAL CONNECTIONS

Systems for Multi F MAX

Figure 51: Multi F MAX LMU481HV and LMU541HV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, causing physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, resulting in physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, resulting in physical injury or death.*

Note:

- *Terminal block labels, appearances, and location will vary depending on outdoor unit model.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

⚠ NOTE

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*

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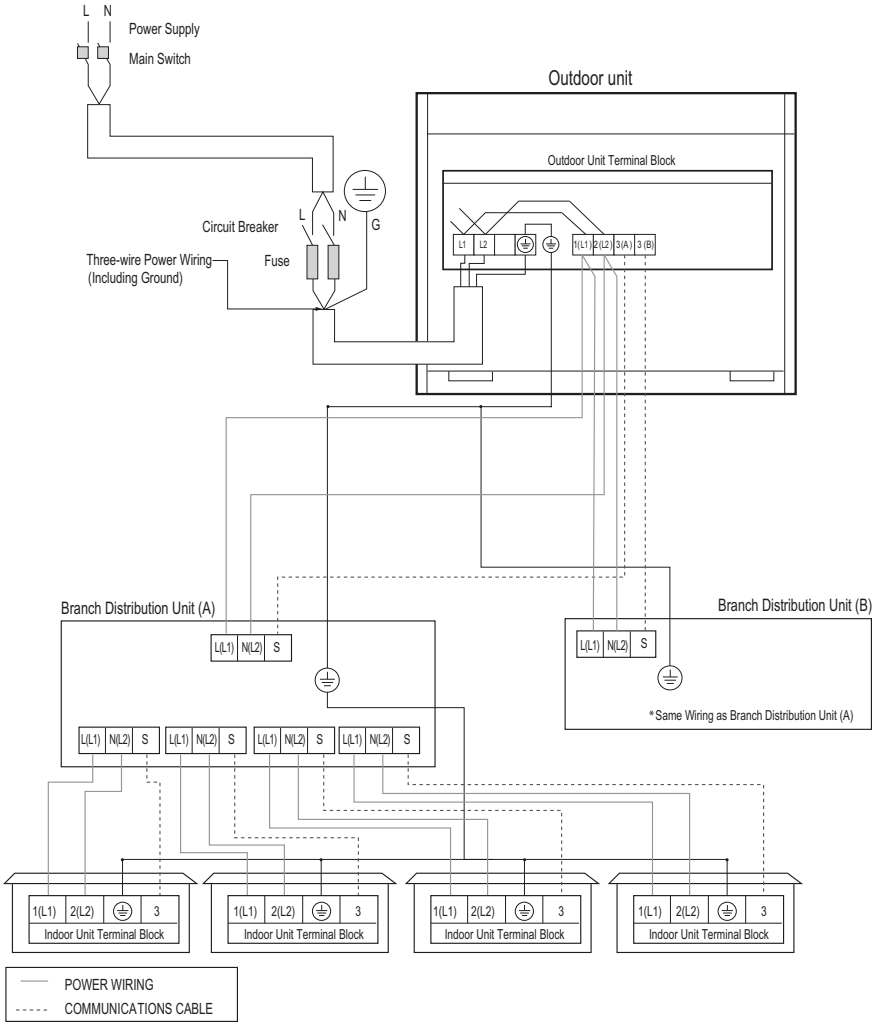
ELECTRICAL CONNECTIONS

Systems for Multi F MAX

Figure 52: Multi F MAX LMU601HV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, causing physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, resulting in physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, resulting in physical injury or death.*

Note:

- *Terminal block labels, appearances, and location will vary depending on outdoor unit model.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

⚠ NOTE

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*

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From Indoor Units to Remote Controllers

- Communication cable from indoor unit to remote controller(s) is to be 22 AWG, 3-conductor, twisted, stranded, unshielded. Wiring must comply with all applicable local and national codes.
- If using the LG Controller / Extension cable and the length needs to be extended, the LG Extension Kit (sold separately) must be used. A maximum of four (4) kits (up to 165 feet) can be used.
- Remote controllers have hardwired connections: SIG - 12V - GND (Comm.) terminals.
- Indoor unit controller connections depend on type of indoor unit being installed. Some indoor units use terminal block connections; other indoor units use Mollex connections. See diagrams below for the two options. Refer to the wiring diagram schematic found in the indoor unit itself, or to the indoor unit wiring diagrams in the Engineering Manuals for more information.
- ⃠ NEVER splice, cut, or extend cable length with field provided cable. Always include enough cable to cover distance between the indoor unit and the remote controller.
- Set the indoor unit operating parameters using DIP switches, or by setting up the remote controller. Refer to the indoor unit installation manuals for more details.

Figure 53: One Example of Indoor Unit to Zone Controller Connection.

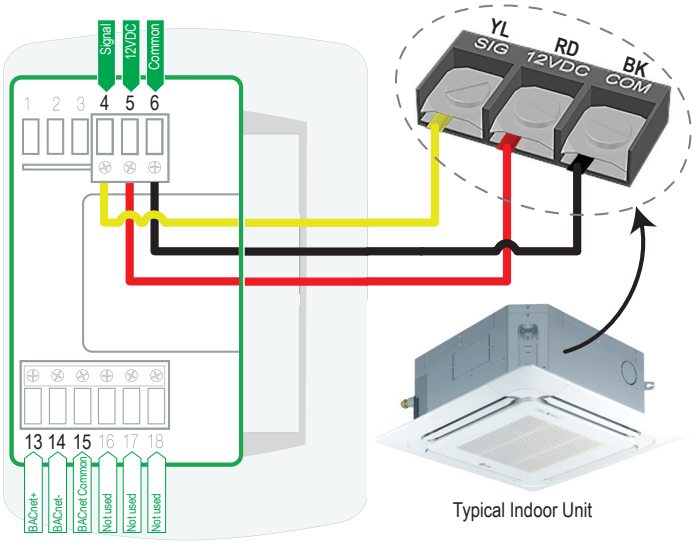
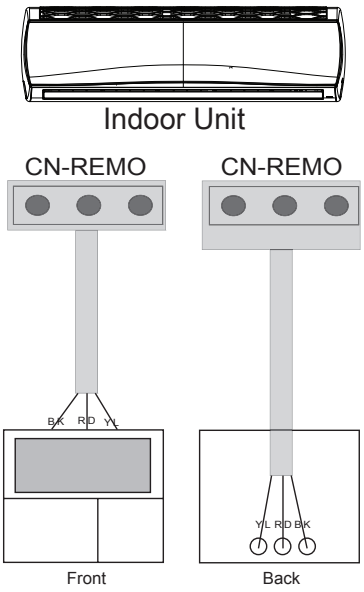


Figure 54: Another Example of Indoor Unit to Zone Controller Connection.



Note:

Cable connected to Zone Controller is the factory default connection.

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Between Multiple Indoor Units Operating as a Group (Group Control)

If any indoor units were specified to operate in unison:

- Before running cable, decide which indoor unit will be the "Main." The other indoor units in that group will be designated as "Sub(s)." The zone controller will be connected to the "Main."
- Set the pertinent DIP switch at each indoor unit to identify the Main and Sub(s). On wall mounted indoor unit models, set the assignment using the handheld remote controller.
- Use a daisy chain configuration and connect all of the group's indoor units together starting at the "Main" unit.
- ⃠ NEVER splice, cut, or extend cable length with field provided cable. Always include enough cable to cover distance between all components.

For indoor units with hardwired connections SIG - 12V - GND (Comm.) terminals:

- From the controller to the main indoor unit, use 22 AWG, 3-conductor, twisted, stranded, unshielded. All wiring must comply with all applicable local / national codes.
- From the main indoor unit to the sub indoor unit(s), daisy chain using 22 AWG, 3-conductor, twisted, stranded, unshielded. All wiring must comply with all applicable local / national codes.
- (⃠ Do not attach wire to 12VDC terminal to the sub indoor units). All wiring must comply with all applicable local and national codes.
- ⃠ NEVER splice, cut, or extend cable length; always include enough cable to cover distance between all components.

For indoor units with CN-REMO connections:

Use one (or multiple) Group Control Kit(s) (sold separately) containing extension and Y-splitter cables. Use one (1) group control cable kit for each indoor unit in the group except for the last indoor unit. ⃠ NEVER splice, cut, or extend cable length with field provided cable.

Figure 55: Example of Indoor Unit Group to Zone Controller Connections (Sig-12V-GND [Comm.] Terminal).

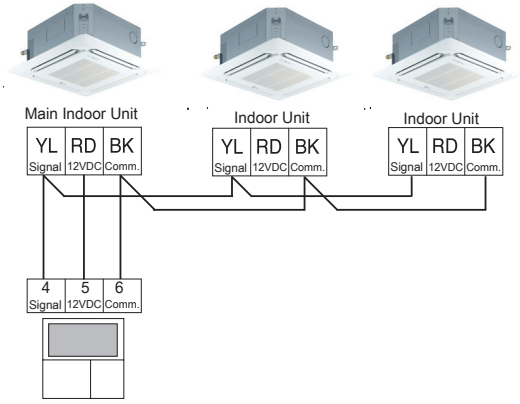
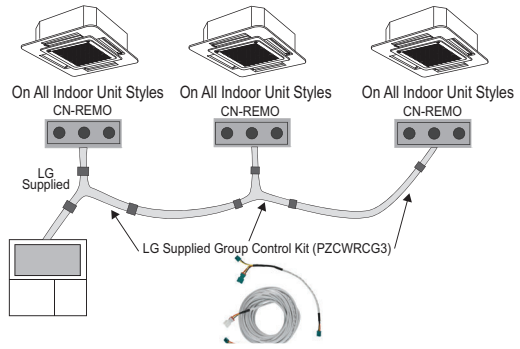


Figure 56: Example of Indoor Unit Group to Zone Controller Connections (CN-REMO).



Note:

- *Cable connected to zone controller is the factory default connection.*
- *Indoor unit connections depend on indoor unit type.*

General Specifications

- Wired remote controllers can be connected to all indoor unit types.
- Wireless controllers can be used in conjunction with wired remote controllers.
- A dry contact unit can be connected with a central controller simultaneously.
  - The main indoor unit is recognized by the dry contact unit and the central controller.
  - Group Control only available for indoor units manufactured after February 2009.
  - The central controller can control indoor units after setting the address of the main indoor unit only.
  - Sub indoor unit cannot be individually controlled by central controller.
  - Sub indoor unit will operate like main indoor unit.
- If an error occurs with the indoor unit, the error will be displayed on the wired remote controller.
- The following functions are available with group control:
- Selection of operation options (operation/mode/set temperature)
- Control of air flow rate (High/Medium/Low)

Table 34: Accessories for Some Group Control Applications.

Accessory	Model Number	Image
Wired Remote Group Control Cable Assembly - Required for connecting multiple indoor units to a control group	PZCWRCG3	
Wired Remote/Wired Remote Extension Cable - Required for extending the distance between indoor units or remote controllers in a control group	PZCWRC1	

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PIPING LIMITATIONS AND PLACEMENT CONSIDERATIONS

Piping Limitations on page 65

Selecting the Best Location for the Outdoor Unit on page 67

Outdoor Unit Clearance Requirements on page 69

Installing Outdoor Units Indoors on page 72

Selecting the Best Location for the Indoor Units / Branch Distribution Units on page 75

PIPING LIMITATIONS

Following pages present Multi F / MAX piping limitations and are for illustrative purposes only. Designers are highly encouraged to use LATS when designing Multi F / MAX systems.

Device Connection Limitations

- The minimum number of connected and operating indoor units to Multi F / Multi F MAX systems is two, taking into consideration the minimum combination ratio.
- The maximum number of indoor units for each Multi F / Multi F MAX heat pump systems is:

LMU183HV = 2 LMU243HV = 3 LMU303HV = 4 LMU363HV = 4 LMU481HV = 8 LMU541HV = 8 LMU601HV = 8

Note:

For allocated capacity information, see the combination tables in the "Multi F / Multi F MAX Combination Data Manual" on www.lghvac.com. For performance data, see "Multi F / Multi F MAX Performance Data Manual" on www.lghvac.com.

One of the most critical elements of multi-zone systems is the refrigerant piping. The following pages list pipe length limits that must be followed in the design of Multi F and Multi F MAX refrigerant pipe systems:

Using Refrigerant Components

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

Table 35: Equivalent Piping Length for Elbows, Y-branches, and Branch Distribution Units.

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
Y-Branch Kit (ft., Multi F MAX systems only)[1]	1.6				
Branch Distribution Unit (ft., Multi F MAX systems only)	8.2				

[1]Kit contains two Y-branches: one for liquid and one for vapor.

Example of a Multi F System

Example: LMU363HV outdoor unit with four (4) indoor units connected.

ODU: Outdoor Unit.

IDU: Indoor Unit.

A, B, C, D: Pipes from Outdoor Unit to Indoor Unit.

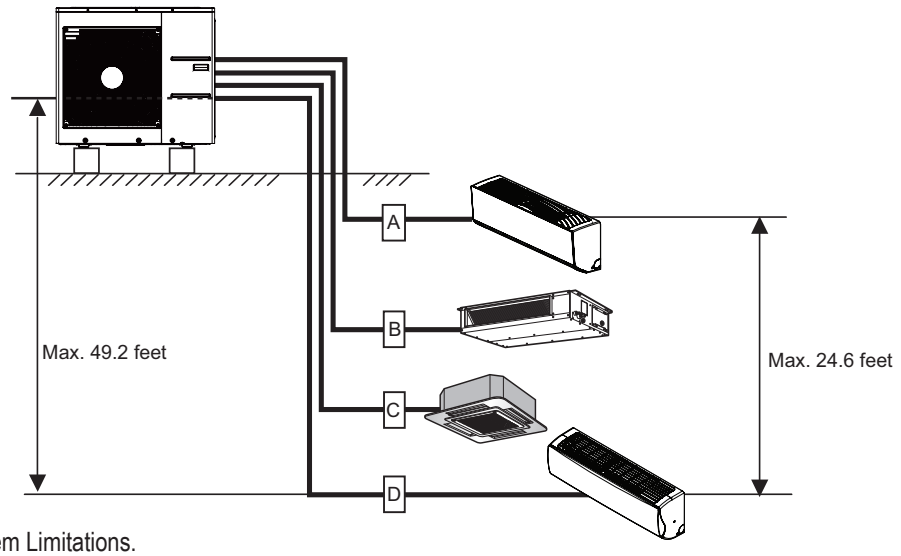

Table 36: Multi F Outdoor Unit Refrigerant Piping System Limitations.

Outdoor Unit	Minimum Length for Each Pipe (ft.)	Maximum Piping Length to Each Indoor Unit (ft.)				Maximum Total Piping Length for Each System (ft.)
		A	B	C	D	
LMU183HV	9.8	82	82	-	-	164.0
LMU243HV	9.8	82	82	-	-	230.0
LMU303HV	9.8	82	82	82	82	246.1
LMU363HV	9.8	82	82	82	82	246.1

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PIPING LIMITATIONS

Following pages present Multi F / MAX piping limitations and are for illustrative purposes only. Designers are highly encouraged to use LATS when designing Multi F / MAX systems.

Example of a Multi F MAX System with One Branch Distribution Unit

Example: LMU541HV outdoor unit with four (4) indoor units, and one (1) branch distribution unit connected.

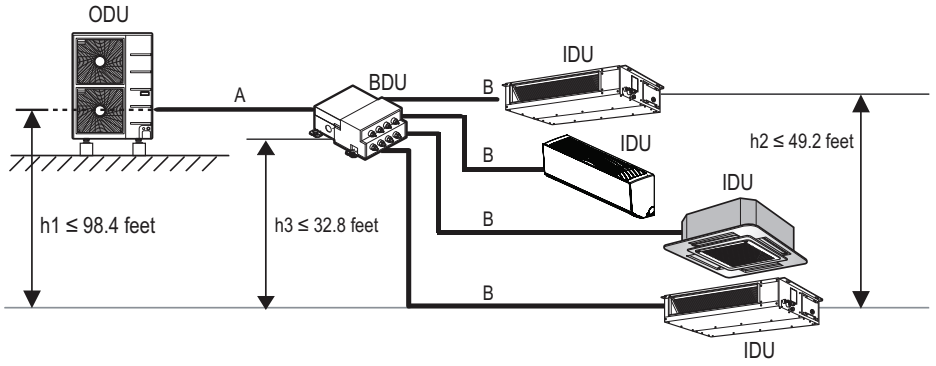
ODU: Outdoor Unit.

IDU: Indoor Unit.

BDU: Branch Distribution Unit.

A: Main Pipe.

B: Branch Pipe (Branch Distribution Unit to Indoor Unit[s]).



Example of a Multi F MAX System with Two Branch Distribution Units

Example: LMU541HV outdoor unit with seven (7) indoor units, and two (2) branch distribution units connected.

ODU: Outdoor Unit.

IDU: Indoor Unit.

BD: Branch Distribution Unit(s).

A: Main Pipe.

B: Branch Pipe (Branch Distribution Unit[s] to Indoor Unit[s]).

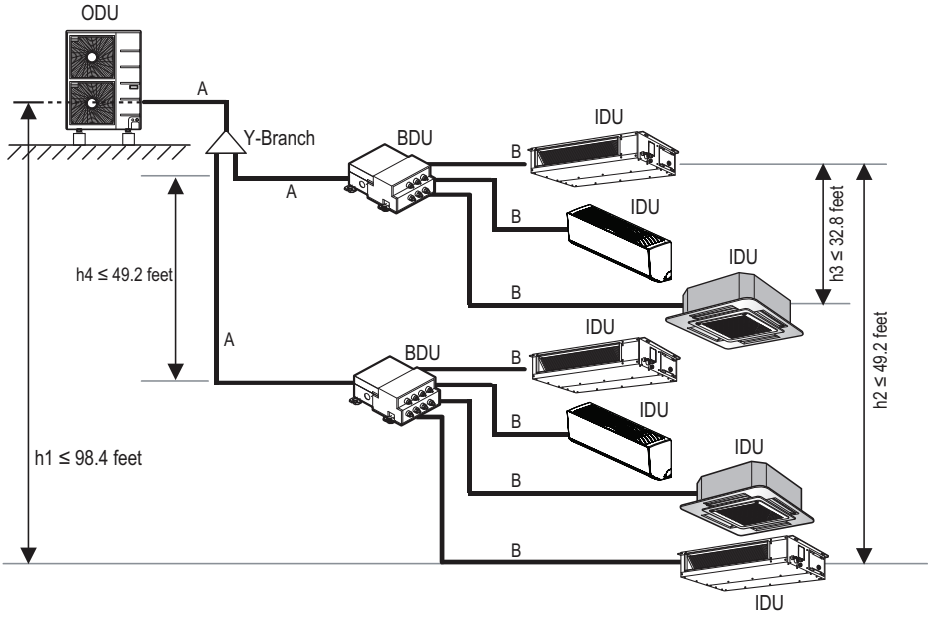


Table 37: Multi F MAX Outdoor Unit Refrigerant Piping System Limitations.

Pipe Length (ELF = Equivalent Length of pipe in Feet)	Total piping length (ΣA + ΣB)		≤475.7 feet
	Main pipe (Outdoor Unit to Branch Distribution Units: A)	Minimum for Each (A) Piping Segment	16.4 feet
		Maximum (ΣA)	≤180.4 feet
	Total branch piping length (ΣB)		≤295.3 feet
	Branch pipe (Branch Distribution Units to Indoor Units: B)	Minimum	16.4 feet
		Maximum	≤49.2 feet
Elevation Differential (All Elevation Limitations are Measured in Actual Feet)	If outdoor unit is above or below indoor unit (h1)		≤98.4 feet
	Between the farthest two indoor units (h2)		≤49.2 feet
	Between branch distribution unit and farthest connected indoor unit(s) (h3)		≤32.8 feet
	Between branch distribution units (h4)		≤49.2 feet

Table 38: Multi F MAX Piping Sizes.

Piping	Main Pipe A (inch)	Branch Pipe B
Liquid	Ø3/8	Depends on the size of the indoor unit piping
Gas	Ø3/4	

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PLACEMENT CONSIDERATIONS

Selecting the Best Location for the Outdoor Unit

Selecting the Best Location for the Outdoor Unit

⚠DANGER

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

⚠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 can create unsafe conditions. Properly install and insulate any drain hoses to prevent the hose from freezing, cracking, leaking, and causing unsafe conditions from frozen condensate.

⚠WARNING

Install a fence to prevent vermin from crawling into the unit or unauthorized individuals from accessing it. Vermin and unauthorized individuals will cause a fire, electric shock, physical injury or death. Follow the placement guidelines set forth in "Clearance Requirements".

Note:

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

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

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

⃠ Do Not's

- *Where it will be subjected to direct thermal radiation from other heat sources, or an area that would expose the outdoor unit to heat or steam like discharge from boiler stacks, chimneys, steam relief ports, other air conditioning units, kitchen vents, plumbing vents, and other sources of extreme temperatures.*
- *Where high-frequency electrical noise / electromagnetic waves will affect operation.*
- *Where operating sound from the unit will disturb inhabitants of surrounding buildings.*
- *Where the unit will be exposed to direct, strong winds.*
- *Where the discharge of one outdoor unit will blow into the inlet side of an adjacent unit (when installing multiple outdoor units).*

Outdoor Unit Condensate Drain Piping

Outdoor unit requires condensate drain piping. Condensate drain pipe is constructed with materials approved by local code. See pages 69 to 71 for information in reference to outdoor unit placement.

Planning for Snow and Ice

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

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

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PLACEMENT CONSIDERATIONS

Selecting the Best Location for the Outdoor Unit

Planning for Snow and Ice, continued.

⚠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 will create unsafe conditions. Properly install and insulate any drain hoses to prevent the hose from freezing, cracking, leaking, and causing unsafe conditions from frozen condensate.

Rooftop Installations

If the outdoor unit is installed on a roof structure, be sure to level the unit. Ensure the roof structure and anchoring method are adequate for the unit location. Consult local codes regarding rooftop mounting.

Oceanside Installation Precautions

- Install the outdoor unit on the side of the building opposite from direct ocean winds.
- Select a location with good drainage.
- Periodically clean dust or salt particles off of the heat exchanger with water.

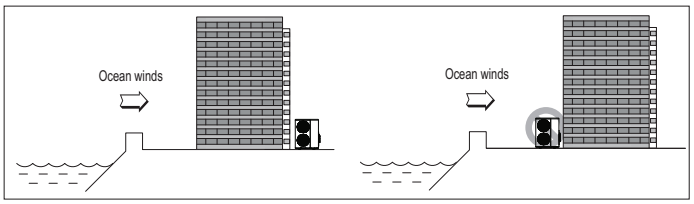
- Avoid installing the outdoor unit where it would be directly exposed to ocean winds.

Note:

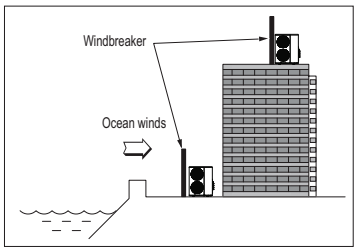
Additional anti-corrosion treatment may need to be applied to the outdoor unit at oceanside locations.

Note:

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



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



Tie-Downs and Lightning Protection

Tie-Downs

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

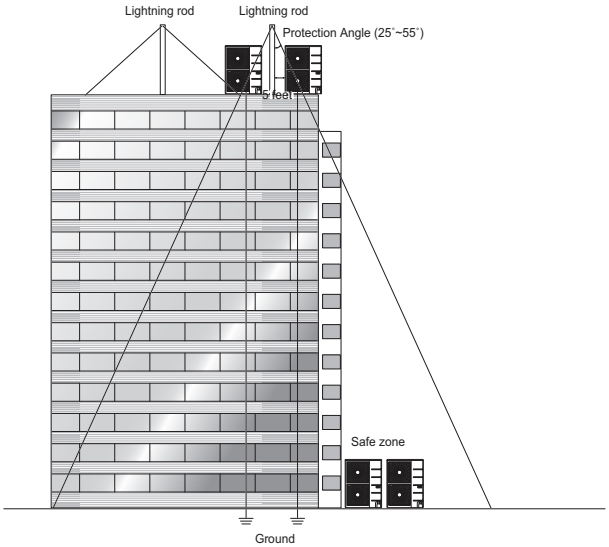
Lightning Protection

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

Table 39: Safety Zone Specifications.

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

Figure 57: Lightning Protection Diagram.



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

⚠NOTE

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

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PLACEMENT CONSIDERATIONS

Outdoor Unit Clearance Requirements

Minimum Allowable Clearance and Service Access Requirements

Proper clearance for the outdoor unit coil is critical for proper 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.)

Multi F Outdoor Unit (18,000, 24,000, 30,000, and 36,000 Btu/h Capacities) Service Access and Allowable Clearances

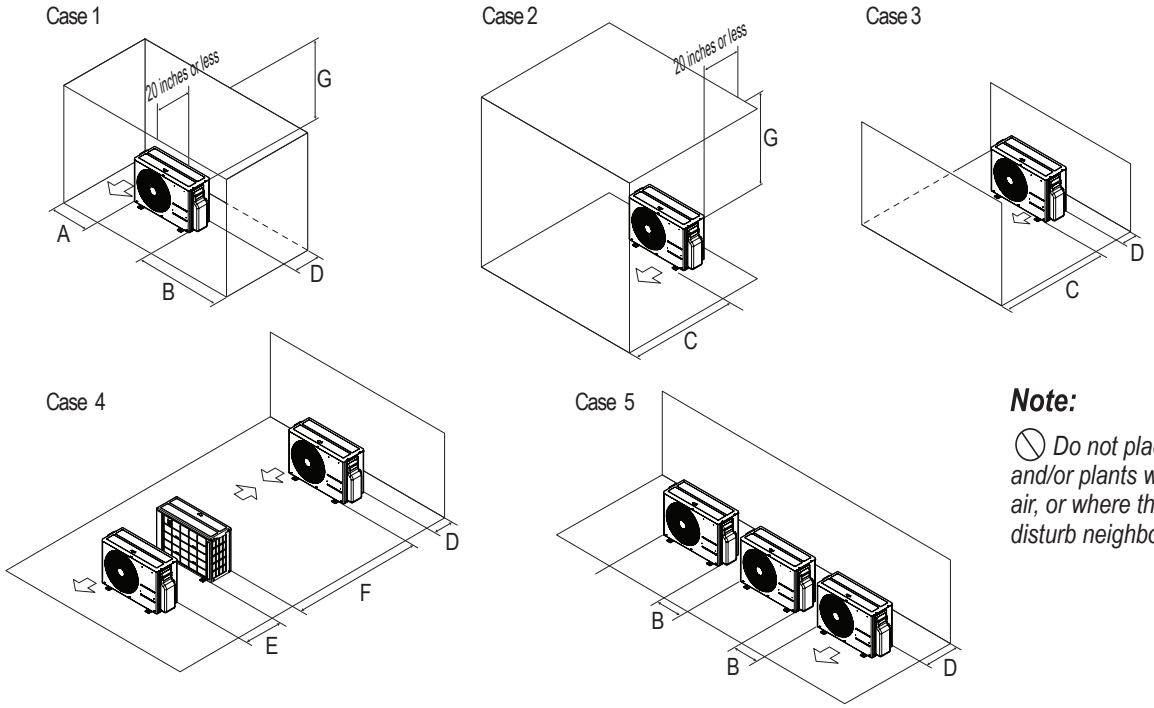
Specific clearance requirements in the diagram below are for 18,000, 24,000, 30,000, 36,000 Btu/h capacities. The figure below shows the overall minimum clearances that must be observed for safe operation and adequate airflow around the outdoor unit.

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

Note:

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

Figure 58: Multi F 18,000, 24,000, 30,000, and 36,000 Btu/h 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: Multi F 18,000, 24,000, 30,000, and 36,000 Btu/h 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	-	-	-

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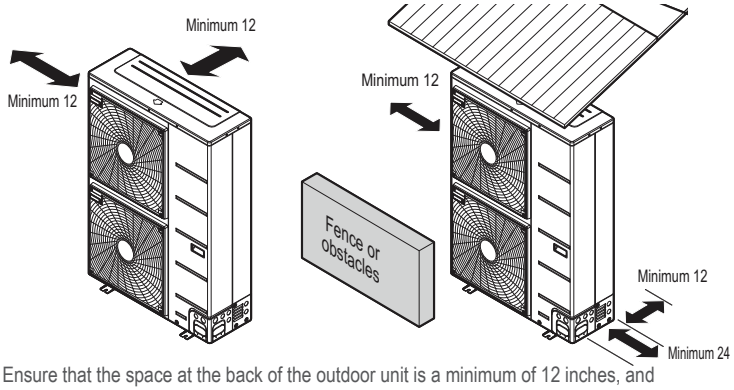
PLACEMENT CONSIDERATIONS

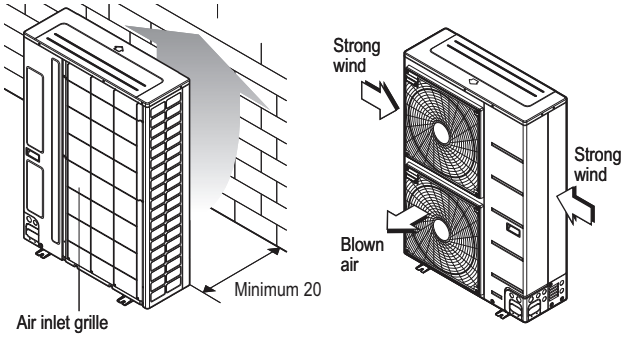
Outdoor Unit Clearance Requirements

Multi F MAX Outdoor Unit (48,000, 54,000 and 60,000 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 12 inches, and include a minimum of 24 inches at the right side of the unit for service.

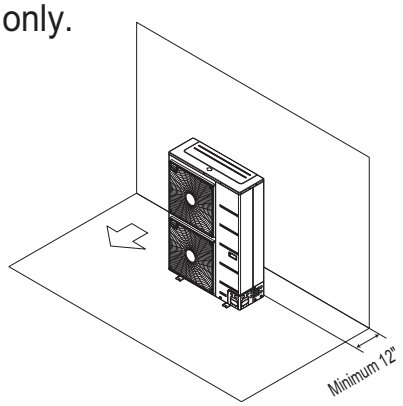


If the outdoor unit discharge side faces a wall, include a minimum of 20 inches between the outdoor unit and the wall. Install the outdoor unit so that the discharge port is set at a right angle to the wind direction.

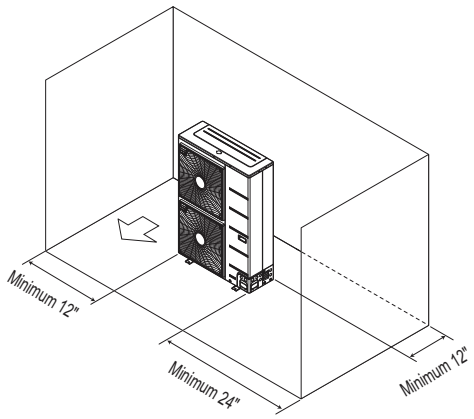
Unit: Inch

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

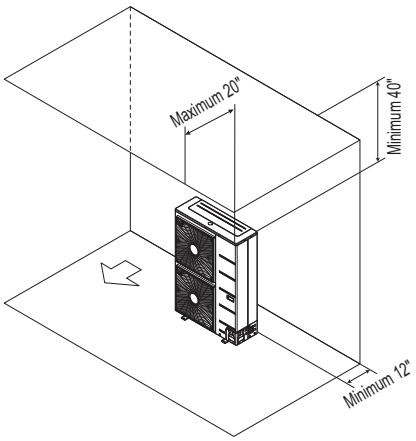
Obstacle on the suction side only.



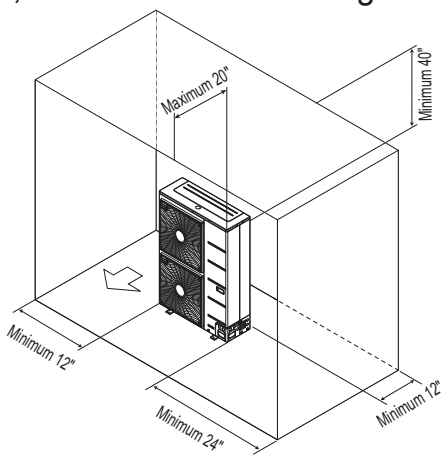
Obstacles on the suction side and on both left and right sides.



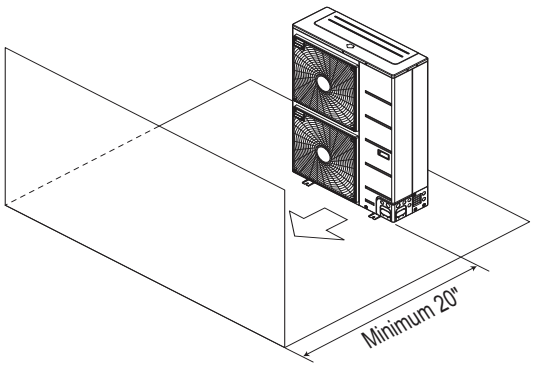
Obstacles above and on the air intake side.



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



Obstacle just on the air discharge side.



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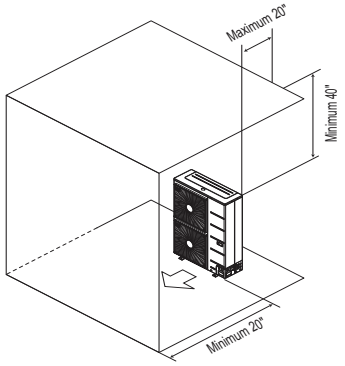
PLACEMENT CONSIDERATIONS

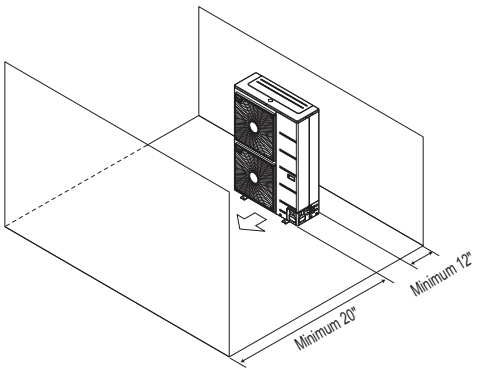
Outdoor Unit Clearance Requirements

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

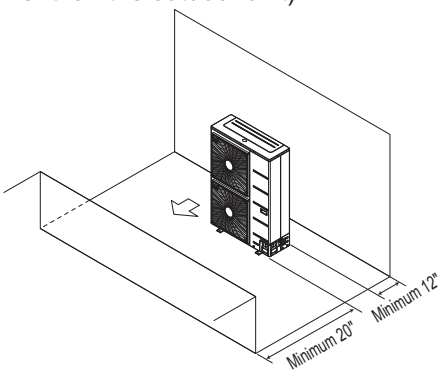
Obstacles above and on the air discharge side.



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



Where there are obstacles 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 higher than the outdoor unit).

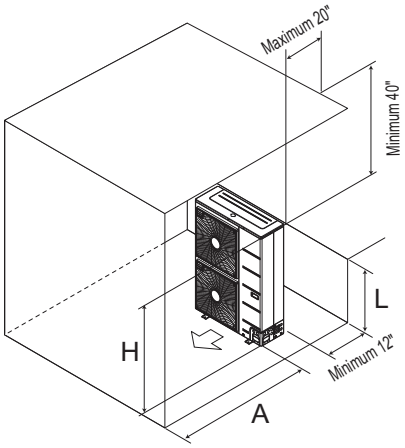


Table 41: Ratio among H, A, and L.

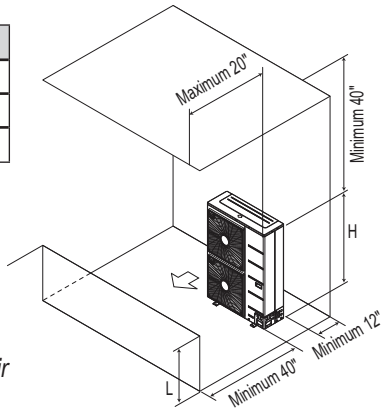
	L	A
L ≤ H	0 < L ≤ 1/2 H	30 inches
	1/2 H < L	40 inches
H < L	Set Stand as: L ≤ H	

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

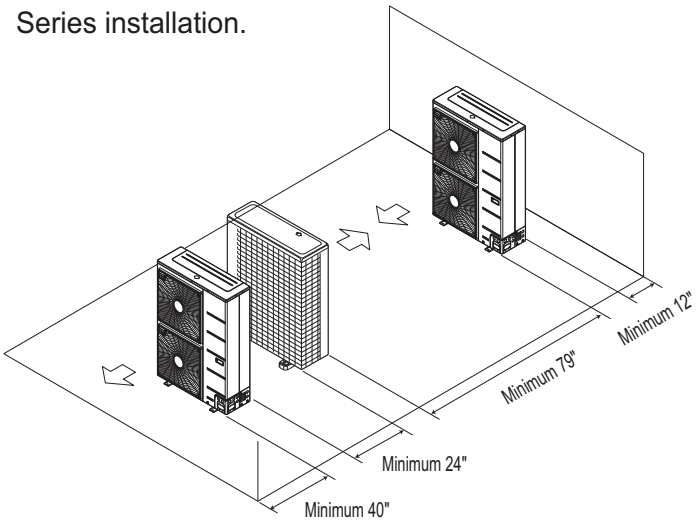
Note:

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

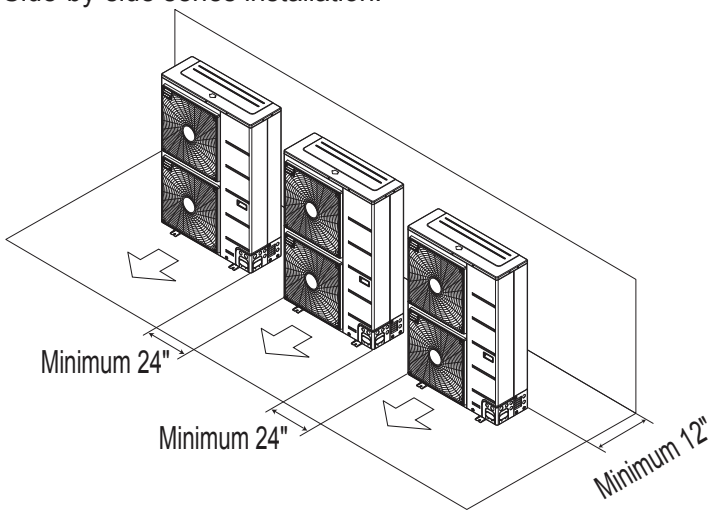
Where there are obstacles above, and on both suction and discharge sides (discharge side obstacle is lower than the outdoor unit).



Series installation.



Side-by-side series installation.



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PLACEMENT CONSIDERATIONS

Installing Outdoor Units Indoors

Installing Outdoor Units Indoors

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

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

Benefits of Installing Outdoor Units Indoors

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

Design Considerations Include:

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

General Guidelines

- Follow ASHRAE 62.1 design guidelines.
- Depending on the project / application, a roof over the outdoor units in combination with a wind break can be all that is necessary.
- Consider the potential for snow accumulation near louvers / roof openings. Outside air intakes and discharge ducts/louvers must be engineered to clear anticipated snow accumulation levels by at least one (1) foot.
- In situations where operation is anticipated at temperatures of -4°F and lower, ancillary heat must be provided to heat the outdoor unit coils to assure continuous compressor operation and heating.

- It can be necessary to use a field-fabricated air guide to prevent discharge air from short-cycling back to the coil inlet.
- Consider the direction of prevailing winds and opening placement. If possible, locate inlet openings upwind of discharge openings and other exhaust outlets.
- When inlet and outlet openings are placed on the same wall, minimum distance between the two openings must be approximately three (3) feet (minimum distance varies significantly with variations in outlet opening face velocity).
- If roof-mounted ventilation openings are used, strategically locate the inlet ventilation opening(s) upwind of the outlet opening(s).
- Discharge and supply ductwork must be designed to avoid weather related long periods of water entrainment and the potential for microbial growth.

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PLACEMENT CONSIDERATIONS

Installing Outdoor Units Indoors

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

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

⚠ 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 side-walks or driveways which can create unsafe conditions.

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

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

Note:

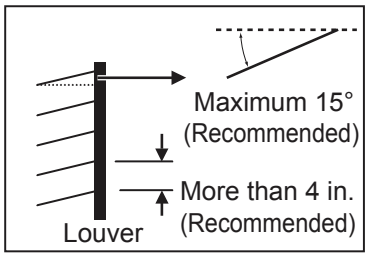
For louver recommendations, see below and on the next page.

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

Louver Recommendations for Outdoor Unit Enclosure

1. Outdoor Unit Enclosure: Manual Door Open Type.
2. Louver Angle: No More Than 15° Horizontally.
3. Space Between Louvers: More than 4 inches (Recommend).
4. Louver Shape: Wing or Plane Type.

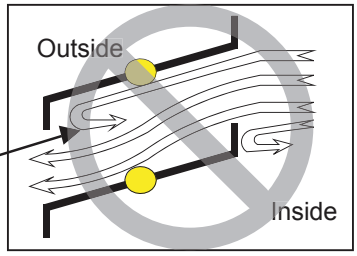
Figure 59: Louver Recommendations.



Note:

- *Open Rate and Inlet must be taken into consideration when designing the louvered outdoor unit enclosure.*
- ⃠ *Do not use "S" type louvers.*

Figure 60: Using "S" Type Louvers.



Note:

If the Louver Open Rate is Too Small

1. *Noise can occur because of the increased air velocity passing through thee louver blade.*
2. *Noise can occur from louver blade vibrations.*
3. *A drop in outdoor unit fan performance (excess static pressure can cause a drop in outdoor unit performance and heat exchanger efficiency).*
4. *If the louver open rate is too small or there is insufficient air flow exchange, the air conditioner might stop operating.*

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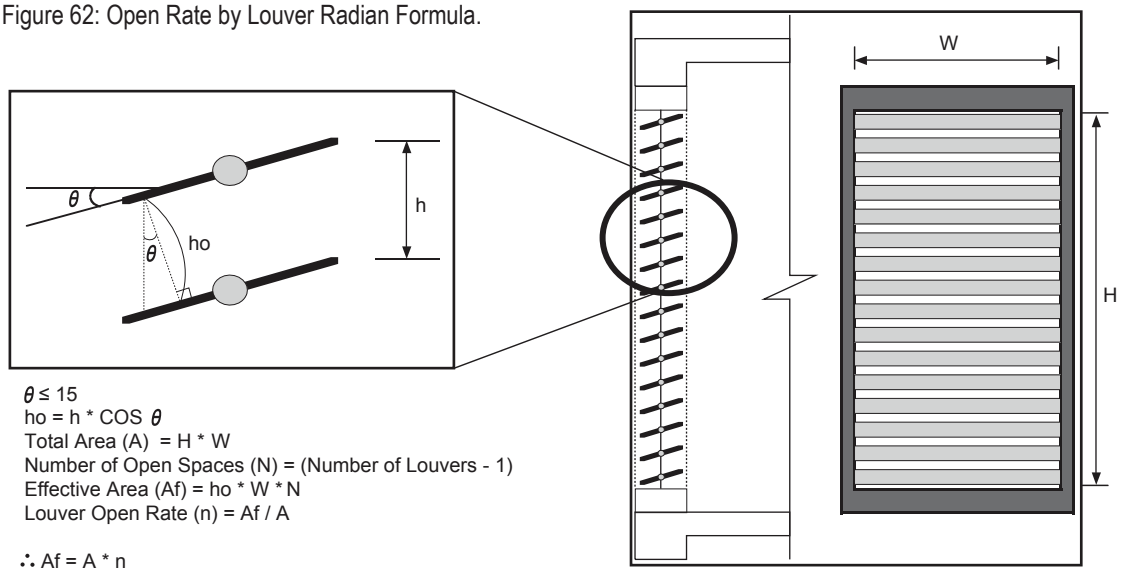
PLACEMENT CONSIDERATIONS

Installing Outdoor Units Indoors

Open Rate by Louver Radian

Figure 62: Open Rate by Louver Radian Formula.



$\theta \leq 15$
$ho = h * COS\ \theta$
Total Area (A) = H * W
Number of Open Spaces (N) = (Number of Louvers - 1)
Effective Area (Af) = ho * W * N
Louver Open Rate (n) = Af / A

$\therefore Af = A * n$

Effective Cross Section Area

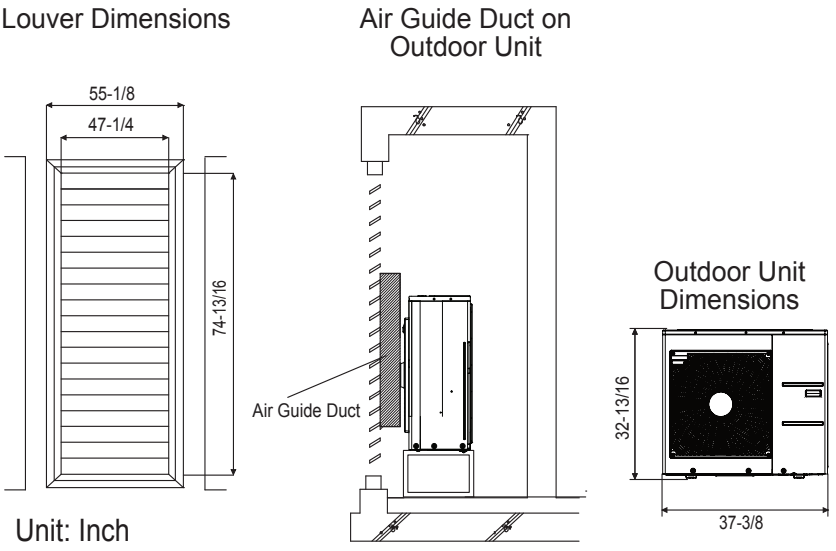
Confirming Air Flow Rate / Total Opening Rate

- Example: LMU363HV
- Airflow Rate: 2,119 ft.^{3}/min.
- Velocity of Outlet Air: 12.9 ft./s
- Velocity of Inlet Air: 6.5 ft./s
- Open Rate = 80% or More

$$\text{Open Rate} = \frac{\text{Effective Face Area (Af)}}{\text{Total Face Area (A)}}$$

- Discharge Air Guide must be installed.

Figure 61: Example of Installing Outdoor Unit Indoors.



Formula

- Total Louver Dimension (Excluding Frame) (A) = 3.9 feet x 6.2 feet = 24.2 ft.^{2}
- Louver Shield Dimension by Product (B) = 3.12 feet x 2.74 feet = 8.55 ft.^{2}
- Inlet Louver Dimension (A - B) = 15.7 ft.^{2}
- Equivalent Inlet Dimension (Open Rate 80%) = 15.7 ft^2 x 0.8 = 12.56 ft.^{2}
- Equivalent Inlet Air Volume = 12.56 ft.^{2} x 6.5 ft./s x 60 sec./min. = 4,898 ft.^{3}/min.
- Required Air Volume / Equivalent Volume = 4,898 ft.^{3}/min. / 2,119 ft.^{3}/min. = 231% (Within Allowable Limits)

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PLACEMENT CONSIDERATIONS

Selecting the Best Location for the Indoor Units / Branch Distribution Units

Selecting the Best Location for the Indoor Units

Note:

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

- Within allowable parameters for proper connection to the outdoor unit (or Branch Distribution unit, if a Multi F MAX system).
- So that condensation drainage can be conveniently routed away.
- Include enough space around the indoor unit so that it is accessible for maintenance and service purposes.
- Where electrical noise / electromagnetic waves will not affect indoor unit operation. Maintain proper distances between the indoor units and electric wires, audio and visual appliances, breaker / circuit panels, etc. If the frequency signal of the appliance is unstable, then install the indoor unit a minimum of ten (10) feet away, and run the power and transmission cables through a conduit.
- An area that is level and with enough strength to bear the weight of the indoor unit(s).

⃠ Do Not's

- Where there are no obstacles to air circulation around the unit; keep proper distances from ceilings, doorways, floor, walls, etc.
- An area where operation sound won't disturb occupants.
- An area that does not expose the indoor unit(s) to heat, water, steam, oil splattering or spray.

Note:

⃠ *Indoor units (IDUs) must not be placed in an environment where the IDUs will be exposed to harmful volatile organic compounds (VOCs) or in environments where there is improper air make up or supply or inadequate ventilation. If there are concerns about VOCs in the environment where the IDUs are installed, proper air make up or supply and/ or adequate ventilation must be provided. Additionally, in buildings where IDUs will be exposed to VOCs consider a factory-applied epoxy coating to the fan coils for each IDU.*

For detailed placement considerations and installation requirements for indoor units, refer to its Indoor Unit Engineering and / or Installation Manuals.

Selecting the Best Location for the Branch Distribution (BD) Unit

Note:

Branch Distribution (BD) units are used only with Multi F MAX systems to distribute the refrigerant from the outdoor unit to up to eight (8) indoor units. Select location indoors that will meet the following conditions:

- Within allowable parameters for proper connection to the Multi F MAX outdoor unit and indoor unit(s); refrigerant piping and wire lengths must not exceed amounts specified by LG Electronics, U.S.A., Inc.
- Condensate drain piping is not required.
- Ensure there is enough space in the installation area for service purposes (minimum 24 inches); install the refrigerant piping and electrical wiring system in an easily accessible location.
- Level where there is enough strength to bear the weight of the branch distribution unit.

⃠ Do Not's

- *Install the branch distribution unit in a location where it would be subjected to strong radiation heat from heat sources.*
- *Install in an installation environment where the branch distribution unit would be exposed to heat, water, steam, oil splattering or spray.*
- *Install the unit in a location where any sound it generates will disturb occupants in the surrounding rooms.*
- *No obstacles to air circulation around the unit; keep proper distances from ceilings, doorways, floor, walls, etc.*
- *Install in an area where high-frequency electrical noise / electromagnetic waves will affect operation. Maintain proper distances between the branch distribution unit(s) and electric wires, audio and visual appliances, breaker / circuit panels, etc.*

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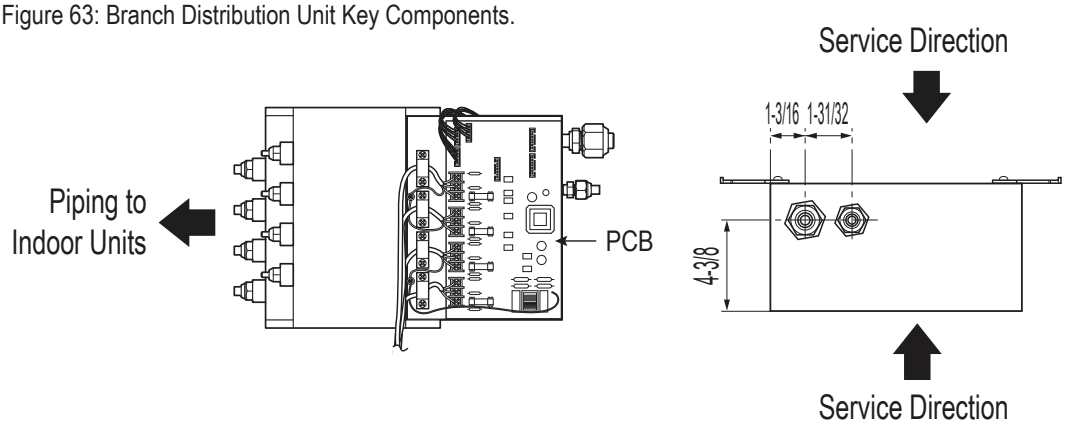
PLACEMENT CONSIDERATIONS

Selecting the Best Location for the Indoor Units / Branch Distribution Units

Figure 63: Branch Distribution Unit Key Components.



Branch Distribution Unit Orientation

Multi F MAX branch distribution units can be installed in a multitude of options to fit various building configurations and job or application requirements. The installation location of the PCB within the branch distribution unit can be changed for easier service access, depending on the branch distribution unit installation itself. Multi F MAX branch distribution units include electronic expansion valves that properly seat only if the branch distribution unit is installed in an acceptable orientation. Installations with improper branch distribution unit orientation risk incomplete valve seating and system performance degradation from potential refrigerant leakage through the electronic expansion valve. See the Branch Distribution Product Section for acceptable installation options.

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EM_MultiFODU_06_2020
EM_MultiFODU_04_2020
EM_MultiFODU_07_19
EM_MultiFODU_03_17
EM_MultiFODU_11_16
EM_MultiFODU_1_16
EM_MultiFODU_10_15

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MULTI F
MULTI F MAX

INDOOR UNIT ENGINEERING MANUAL

Vertical-Horizontal
Air Handling Units

Art Cool™ Mirror
Wall-Mounted

Art Cool™ Gallery
Wall-Mounted

Four-Way Ceiling Cassette

Ceiling-Concealed Duct

Indoor Units for Multi-Zone Heat Pump Systems
7,000 to 36,000 Btu/h

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TABLE OF SYMBOLS

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

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MULTI F
MULTI F MAX

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CONVERGENCE OF TECHNOLOGY, INNOVATION, FLEXIBILITY, & STYLE

About LG Electronics, Inc.

LG Electronics is a global leader and technology innovator in consumer electronics, mobile communications, and home appliances. LG Electronics comprises five business units—Home Entertainment, Mobile Communications, Air Conditioning, Business Solutions, and Home Appliance. LG is one of the world's leading producers of flat panel televisions, audio and video products, mobile handsets, air conditioners, and washing machines. LG's commercial air conditioning business unit was established in 1968 and has built its lineup of residential and commercial products to include VRF, Multi F, duct-free split systems, packaged terminal air conditioners (PTACs), and room air conditioners. In 2011, the air conditioning and energy solutions business unit grew to include LED lighting and solar products. For more information, visit www.lg.com.

Multi-Zone Systems

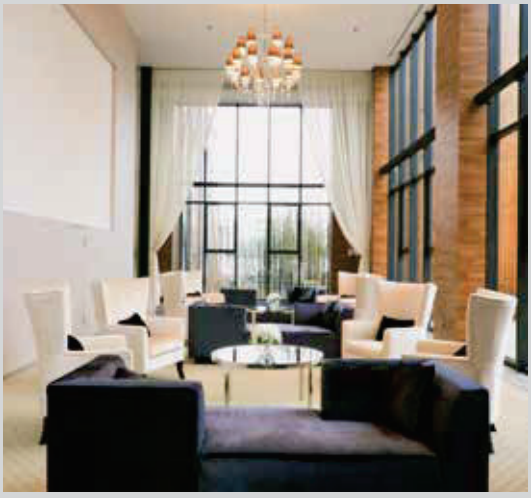
LG HVAC systems offer a range of solutions that are cost efficient, quiet and attractive. Multi-zone systems are "split" into indoor and outdoor units, and provide a smart alternative to both central HVAC and window-mounted air conditioners. These inverter heat pump systems are available in a variety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

Multi F Systems

LG's inverter heat pumps can support two, three, or four indoor units that are typically installed in separate rooms. Indoor units can be used with different controllers, allowing the customer to set the temperature individually. Indoor units are available in several different configurations: Art Cool™ Mirror-mounted, Art Cool Gallery wall-mounted, standard wall-mounted, four-way ceiling cassettes, ceiling-concealed duct (high and low static), and vertical-horizontal air handling models. Multi F MAX systems can operate up to eight indoor units through two-, three-, or four-port branch distribution units.

Benefits of Multi F Systems

- Individual zone control
- Long refrigerant piping lengths
- High refrigerant piping elevation differences
- Maximum flexibility
- Operating ranges of 14°F to 118°F (DB) in cooling and -4°F to 75°F (DB) in heating if connected to standard Multi F Outdoor Units or -13°F to 75°F (DB) in heating if connected to Multi F with LG RED° Outdoor Units.
- Quiet and comfortable environment
- Reduced ductwork



Adaptable and Flexible

Multi F outdoor units can be adapted to a wide range of building applications and sizes such as schools, hotels, hospitals, offices, and residences. The system components are lightweight and compact so they can be placed in buildings without expensive cranes, they easily fit into most service elevators, and they can be set in place with minimal structural reinforcements requirements.

Multi F technology allows you to pipe farther by reaching areas of the building that would require the installation of a second system when using traditional direct-expansion cooling and heating equipment. Multi F provides the designer with uncompromised pipe system engineering flexibility—long pipe runs and large elevation differences. Whether your building is a condominium, a hotel, a school, or an office complex, Multi F is best suited to reach the farthest corners and elevations.

Smaller Chases and Plenums

LG Multi F systems use refrigerant piping to move heat, resulting in smaller space requirements for piping as compared to chilled water or roof top systems. This helps reduce the overall construction and material cost of the building, and gives back leasable space. Flexible and logical placement of system components, reduced back-and-forth pipe lengths, and fewer joints lowers installation costs and minimizes potential leaking.

Quality Commitment

LG is committed to the success of duct-free projects. We provide technical support during installation and commissioning. LG offers a variety of classes designed for installers and servicers on Multi F installation. Classes are conducted at LG's training centers and in field locations at various times throughout the year and on special request.

MULTI F

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UNIT NOMENCLATURE

Multi-Zone Systems — Indoor Units and Outdoor Units

L = LG

Type: M = Multi-Zone

Component:
AN: Art Cool™ Wall-Mounted Indoor Unit
N: Standard Wall-Mounted Indoor Unit
CN: Four-Way Ceiling-Cassette Indoor Unit
DN: Ceiling-Concealed Duct (Low Static) Indoor Unit
HN: Ceiling-Concealed Duct (High Static) Indoor Unit
VN: Vertical-Horizontal Air Handling Indoor Unit
U: Outdoor Unit

Nominal Capacity
(Nominal cooling capacity in Btu/h):

07 = 7,000	15 = 15,000	30 = 30,000	48 = 48,000
09 = 9,000	18 = 18,000	36 = 36,000	54 = 54,000
12 = 12,000	24 = 24,000	42 = 42,000	60 = 60,000

Generation

Features:
H = Heat Pump
V = Inverter
T = High Wall-Mounted Indoor Unit
P = Art Cool Gallery Indoor Unit

Branch Distribution Units

P = Part (Accessory)

Type: M = Multi-Zone

BD: Branch Distribution Unit

Family

Number of Port Connections
(Maximum Number of Connectable Indoor Units): 2, 3, 4

Generation: 0, 1

Note:

- *Voltage for all equipment is 208-230V, 60 Hz, 1-phase.*
- *All indoor units are compatible with wired controllers.*
- *All outdoor units are LGAP control network compatible with PI-485 V-net Control Integration Board (PMNFP14A1, sold separately).*
- *Compatible single zone IDU nomenclature is listed in the Single Zone Wall-Mounted IDU Engineering Manual.*

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FUNCTIONS, CONTROLS AND OPTIONS OVERVIEW

MULTI F
MULTI F MAX

Table 1: Indoor Units—Functions, Controls and Options.

	Indoor Unit Type	ART COOL™ Mirror Wall Mounted	ART COOL™ Gallery	Standard Wall Mounted	Ceiling Concealed (Low Static) Ducted	Ceiling Concealed (High Static) Ducted	Four-Way Ceiling Cassette	Vertical-Horizontal Air Handling Unit
Airflow	Air supply outlets	1	3	1	1	2	4	1
	Airflow direction (left/right)	Auto	Auto	Auto				
	Airflow direction (up/down)	Auto	Auto	Auto			Auto	
	Auto swing (left/right)	√	√	√				
	Auto swing (up/down)	√	√	√			√	
	Airflow steps (fan/cool/heat)	6 / 6 / 6	5 / 5 / 4	6 / 6 / 6	3 / 3 / 3	3 / 3 / 3	4 / 5 / 4	3 / 3 / 3
	Comfort Air (random fan speed)	√	√	√			√	
	Jet-cool/Jet Heat (power wind)	√	√	√			√	
	Swirl wind						√	
Filter	Washable anti-fungal[1]	√	√	√	√	√	√	
	Plasma[2]						o[3]	
	3M Micro Dust Filter[2]	√		√				
	Ventilation						√[4]	
Operation	Drain pump				√	√	√	
	E.S.P. control				√	√		√
	Electric heater							o
	High ceiling[5]						√	
	Hot Start	√	√	√	√	√	√	√
	Self diagnostics	√	√	√	√	√	√	√
	Soft Dry (dehumidification)	√	√	√	√	√	√	√
	Auto operation	√	√	√	√	√	√	√
	Auto clean (coil dry)	√	√	√				
	Auto restart	√	√	√	√	√	√	
	Child lock	o	o	o	o	o	o	o
	Forced operation	√	√	√			√	
	Group control – Requires the use of one Group control Cable Kit (PZCWRCG3) for every additional indoor unit	o	o	o	o	o	o	o[5]
	Sleep mode	√	√	√	√	√	√	√
	Timer (on/off)	√	√	√	√	√	√	√
	Weekly schedule	o	o	o	√	√	o	√
	Two thermistor control	o	o	o	o	o	o	o
Controllers	7-Day programmable controller	o	o	o	o	o	o	o
	Simple wired remote controller	o	o	o	o	o	o	o
	Wireless LCD remote control	√	√	√	o[6]	o[6]	√	o[6]
	Dry contact	o	o	o	o	o	o	√[7]
	Dry contact (temperature setting)	o	o	o	o	o	o	o
	Central control (LGAP)	√	√	√	√	√	√	√
	Connector for Water Sensor	√	√	√				
Special Function	Wi-Fi[8]	√		√	o		o	o

[1]Primary washable filters.

[2]Secondary filter

[3]Branch location and static pressure requirements. Requires PTPKQ0 Plasma kit.

[4]Requires ventilation kit PTVK430 (Temperature, humidity, and volume limitations apply).

[5]Group control will affect available features

[6]Requires wired zone controller

[7]For use with 3rd party thermostat

[8]Embedded. Optional for LVNxxxHV4 4-way VAHU; LDN 9/12 MBH LSD are compatible as of June 2018 production. Not available for 2-way LMVNxxxHV VAHU.

√ = Standard feature

o = Unit option

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FUNCTIONS, CONTROLS AND OPTIONS OVERVIEW

Table 2: Indoor Unit Accessories Overview.

Model No.	Description
For Four-Way Ceiling-Cassette Indoor Units	
PT-QCHW0	Ceiling Grille
PT-UQC	Ceiling Grille
PTDCQ	Decorative Cover
PTPKQ0	Plasma Filter
PRARH0	Aux Heat Relay Kit
PWFMDD200	Wi-Fi Module
Wall-Mounted Indoor Units	
PCRCUDT3	Wi-Fi Module (compatible wall mount models)
AG-9300-LG	Condensate Sensor
PRARS1	Aux Heat Relay Kit
For Vertical-Horizontal Air Handing Units	
PNDFJ0	Downflow Conversion Kit (18/24MBH)
PNDFK0	Downflow Conversion Kit (36MBH)
ANEH033B1	3 kW Electric Heater (18-36MBH)
ANEH053B1	5 kW Electric Heater (18-36MBH)
ANEH083B2	8 kW Electric Heater (18-36MBH)
ANEH103B2	10 kW Electric Heater (18-36MBH)
ANEH153B2	15 kW Electric Heater (36MBH)
ANEH203B2	20 kW Electric Heater (36MBH)
PRARH0	Aux Heat Relay Kit
PWFMDD200	Wi-Fi Module
For Ceiling-Concealed Duct (Low Static) Indoor Units	
PWFMDD200	Wi-Fi Module
For Ceiling-Concealed Duct (High Static) Indoor Units	
ZFBXBG01A	High Efficiency Filter Box
ZFBXD201A	Dynamic V8 2VL Low Profile Air Cleaner
ZPLMV201A	Dynamic 2VL Air Cleaner Low Profile Return Air Plenum
ZFBXD402A	Dynamic V8 4VL Low Profile Air Cleaner
ZPLMV402A	Dynamic 4VL Air Cleaner Low Profile Return Air Plenum
ZFLT1301A	4-Pack Dynamic V8 VL Air Cleaner Replacement Filter Pads
ZFLT1302A	24-Pack Dynamic V8 VL Air Cleaner Replacement Filter Pads
ZGRLRA01A	Dynamic V8 Air Cleaner Louvered Return Air Grille (one per plenum)
ZGRLRA02A	Dynamic V8 Air Cleaner Egg Crate Return Air Grille (one per plenum)
PRARH0	Aux Heat Relay Kit
Controls Accessories	
PQWRHQ0FDB	Wireless Handheld Remote (Duct/VAHU)
PREMTA000A	Premium Controller
PREMTC00U	Simple Controller (Wall/Cassette)
PREMTBVC0	MultiSITE CRC1 Base Controller
PREMTBVC1	MultiSITE CRC1 Plus Controller
ZVRCZ****	MultiSITE CRC1 Wireless Accessories
PDRYCB100	Dry Contact (Simple)
PDRYCB300	Dry Contact (3rd party controller)
PDRYCB400	Dry Contact (Setback)
ZRTBS01	Remote Temp Sensor (Cassette/Duct/VAHU)
PZCWRCG3	Group Control Cable Kit
PZCWRC1	Controller Extension Cable

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ART COOL™ MIRROR INDOOR UNIT DATA

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“Factory Supplied Parts and Materials” on page 21
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ART COOL MIRROR INDOOR UNITS

Mechanical Specifications and Features

MULTI F
MULTI F MAX

ART COOL Mirror Wall-Mounted Indoor Units

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. ART COOL Mirror Wall-Mounted indoor units have a sound rating no higher than 44 dB(A) as tested per KSA0701 ISO Standard 3745.

Coil

Indoor unit coils are comprised of a minimum of two rows of aluminum fins mechanically bonded to copper tubing. The coils are pressure tested at the factory. Each unit is provided with a factory installed condensate drain pan below the coil.

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare. All refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

Units are designed to mount on a vertical surface, and are shipped with a separate back plate that secures the unit to the wall, protruding no more than nine (9) inches. Unit is designed so that refrigerant piping can be installed in one (1) of four (4) different directions.

Finish

The Art Cool Mirror unit has a flat, architectural panel with a smoked charcoal mirror finish. Unit casing has a dark grey finish and is manufactured of heavy-duty acrylonitrile butadiene styrene (ABS) and high impact polystyrene (HIPS) plastic.

Fan Assembly and Control

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

Figure 1: Multi F Art Cool Mirror Wall-Mounted Indoor Unit.

Air Filter

Return air inlet has a factory-supplied primary removable, washable filter. The unit is also equipped with a secondary 3M Micro Dust filter. Filters are accessed from the front of the unit without the use of tools.

Airflow Guide Vanes

A motorized guide vane is factory installed, and allows the ability to control the direction of airflow from side to side. A motorized louver provides an automatic change in airflow by directing the air up and down to provide uniform air distribution.

Microprocessor Control

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

Controls

The indoor unit casing has a factory-standard, integral infrared sensor designed to communicate with the supplied LG wireless handheld remote controller. An optional LG supplied wired controller is available as an additional accessory. Communication between the indoor units and the outdoor unit is accomplished through 18 AWG, four-core, stranded and shielded power/communication cable. The indoor unit has built-in wi-fi and can be controlled with LG's SmartThinQ app on a smart device. A field-supplied wi-fi network and smart device are required. The SmartThinQ app is free and is available for Android and iOS smart devices.

Condensate

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

Features

- Inverter (Variable speed fan)
- Comfort Air
- 3M filter
- Jet cool/Jet heat
- Group Control
- Self-cleaning indoor coil
- Auto operation
- Auto restart operation
- Built-in wi-fi
- Dehumidifying function
- Self diagnosis function
- Wireless LCD remote control included

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ART COOL MIRROR INDOOR UNITS

General Data / Specifications

Table 3: Multi F Art Cool Mirror Indoor Unit General Data.

Model Name	LAN090HSV5	LAN120HSV5	LAN180HSV5
Nominal Cooling Capacity (Btu/h)[1]	9,000	12,000	18,000
Nominal Heating Capacity (Btu/h)[1]	10,900	13,600	21,600
Operating Range			
Cooling (°F WB)	57-77		
Heating (°F DB)	59-81		
Fan			
Type	Cross Flow		
Motor Output (W) x Qty.	30 x 1		60.0 x 1
Motor/Drive	Brushless Digitally Controlled / Direct		
Airflow Rate CFM (H/M/L)	268 / 218 / 169	282 / 233 / 177	558 / 438 / 353
Unit Data			
Refrigerant Type[2]	R410A		
Refrigerant Control	EEV		
Power Supply V, Ø, Hz[3]	208-230, 1, 60		
Rated Amps (A)	0.4		
Sound Pressure Level dB(A) (H/M/L)[4]	36 / 32 / 27	38 / 34 / 29	44 / 38 / 34
Dimensions (W x H x D, in.)	32-15/16 x 12-1/8 x 7-9/16		39-9/32 x 13-19/32 x 8-11/32
Net Unit Weight (lbs.)	20.5		29.8
Shipping Weight (lbs.)	25.6		36.4
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 18		
Heat Exchanger (Row x Column x Fin / inch) x Number	(2 x 23 x 22) x 1		(2 x 16 x 20) x 1
Pipe Size			
Liquid (in.)	1/4		
Vapor (in.)	3/8		1/2
Connection Size			
Liquid (in.)	1/4		3/8
Vapor (in.)	3/8		5/8
Drain O.D. / I.D. (in.)	27/32, 5/8		

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs 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.

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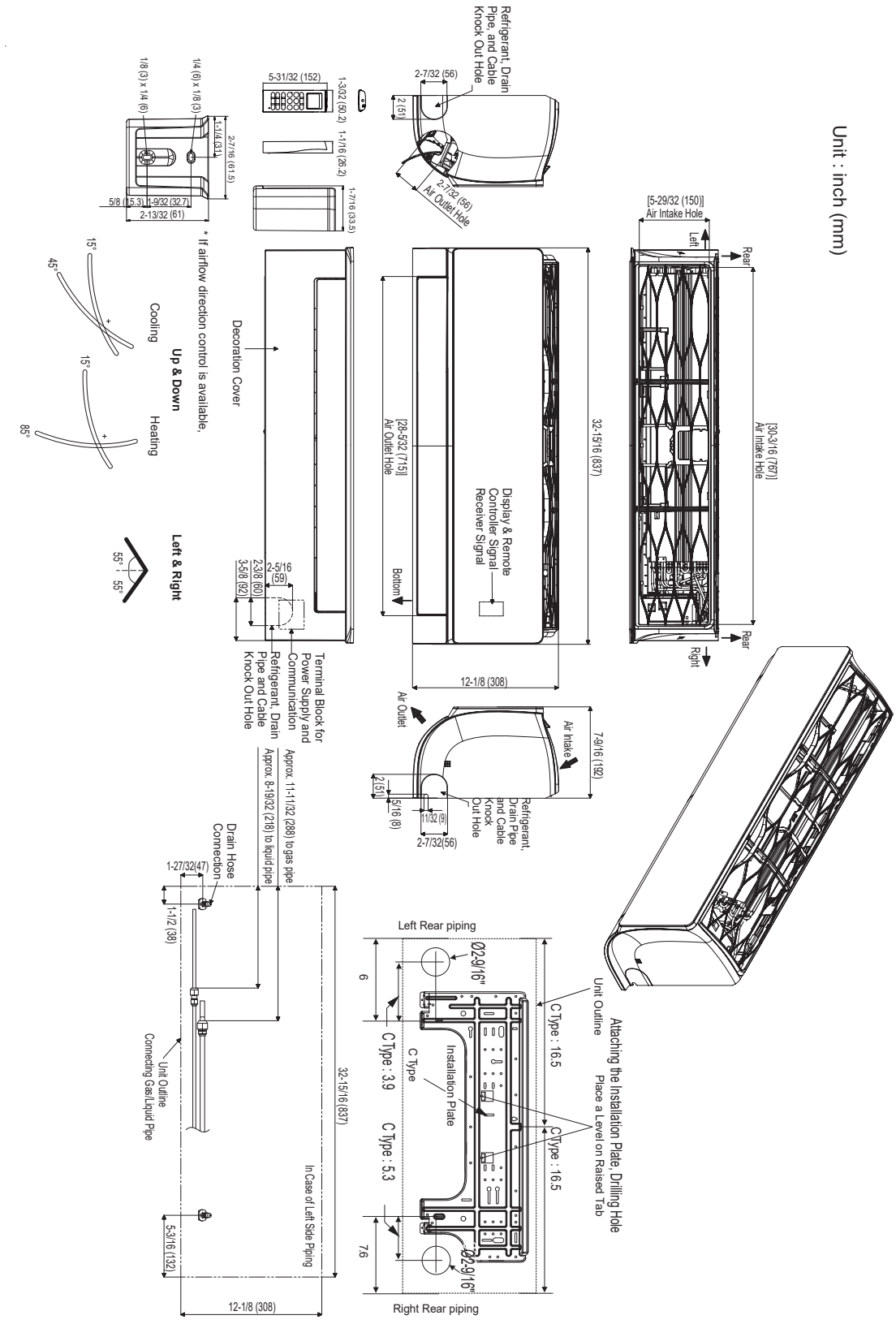
Figure 2: LAN090HSV5 and LAN120HSV5 Dimensions.



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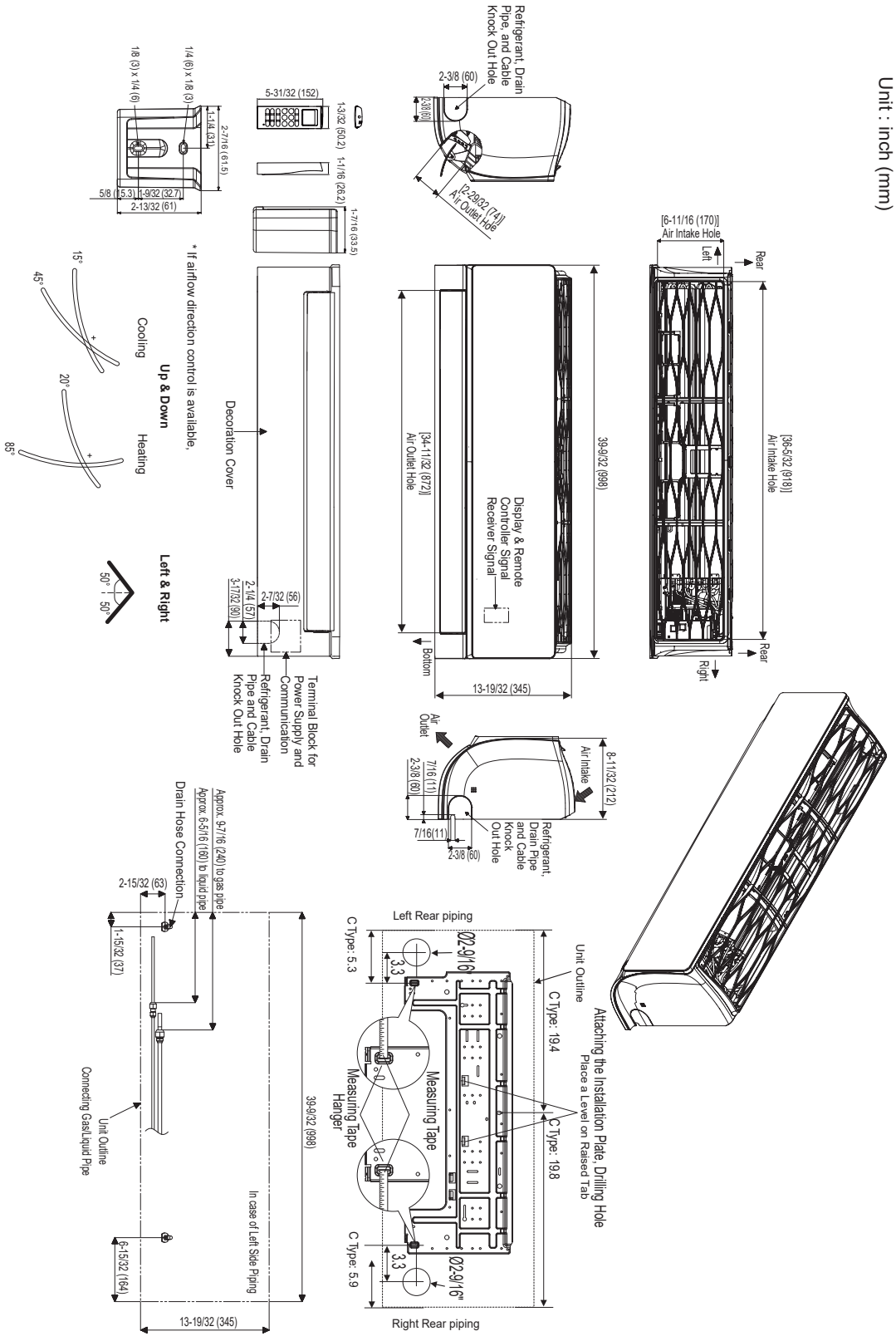
ART COOL MIRROR INDOOR UNITS

Dimensions

Figure 3: LAN180HSV5 Dimensions.



Art Cool Mirror™

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ART COOL MIRROR INDOOR UNITS

Cooling Capacity Table

MULTI F
MULTI F MAX

Table 4: Multi F Art Cool Mirror Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LAN090HSV5 9,000	14	8.82	6.04	9.37	6.38	9.92	6.18	10.31	6.31	11.01	6.36	11.56	6.48
	20	8.82	6.09	9.36	6.43	9.91	6.23	10.31	6.36	11.01	6.41	11.55	6.53
	25	8.81	6.13	9.36	6.48	9.90	6.27	10.30	6.41	11.00	6.46	11.54	6.58
	30	8.80	6.18	9.35	6.53	9.90	6.32	10.29	6.46	10.99	6.51	11.54	6.63
	35	8.80	6.23	9.34	6.58	9.89	6.37	10.28	6.50	10.98	6.56	11.53	6.68
	40	8.79	6.28	9.33	6.63	9.88	6.42	10.27	6.55	10.97	6.61	11.52	6.73
	45	8.78	6.32	9.33	6.68	9.87	6.47	10.27	6.60	10.96	6.66	11.51	6.78
	50	8.78	6.37	9.32	6.73	9.87	6.51	10.26	6.65	10.96	6.71	11.50	6.83
	55	8.77	6.42	9.31	6.78	9.86	6.56	10.25	6.70	10.95	6.76	11.49	6.88
	60	8.76	6.46	9.31	6.83	9.85	6.61	10.24	6.75	10.94	6.81	11.48	6.93
	65	8.76	6.51	9.30	6.88	9.84	6.66	10.24	6.80	10.93	6.85	11.47	6.98
	70	8.75	6.56	9.29	6.92	9.84	6.70	10.23	6.85	10.92	6.90	11.47	7.03
	75	8.54	6.45	9.08	6.82	9.62	6.61	10.01	6.75	10.71	6.82	11.25	6.96
	80	8.33	6.34	8.87	6.71	9.41	6.51	9.80	6.66	10.49	6.73	11.03	6.87
	85	8.12	6.22	8.66	6.60	9.20	6.41	9.59	6.56	10.28	6.64	10.82	6.79
	90	7.91	6.10	8.45	6.48	8.99	6.31	9.37	6.46	10.06	6.55	10.60	6.70
	95	7.68	6.04	8.22	6.43	8.75	6.26	**9.00**	**6.32**	9.83	6.52	10.36	6.67
	100	7.50	5.88	8.03	6.26	8.57	6.11	8.88	6.22	9.64	6.37	10.17	6.53
	105	7.31	5.72	7.84	6.10	8.38	5.96	8.77	6.12	9.45	6.23	9.99	6.39
	110	7.12	5.52	7.66	5.90	8.19	5.78	8.58	5.94	9.26	6.06	9.80	6.22
	115	6.94	5.36	7.47	5.74	8.01	5.63	8.39	5.79	9.08	5.91	9.61	6.08
	118	6.82	5.32	7.36	5.70	7.89	5.60	8.28	5.76	8.96	5.89	9.50	6.06
	122	6.79	5.30	7.32	5.69	7.86	5.59	8.24	5.76	8.93	5.89	9.46	6.06
LAN120HSV5 12,000	14	11.76	8.51	12.49	8.99	13.22	8.70	13.75	8.88	14.69	8.96	15.42	9.13
	20	11.75	8.57	12.48	9.06	13.21	8.77	13.74	8.95	14.67	9.03	15.40	9.20
	25	11.75	8.64	12.48	9.13	13.20	8.84	13.73	9.02	14.66	9.10	15.39	9.27
	30	11.74	8.71	12.47	9.20	13.19	8.90	13.72	9.09	14.65	9.17	15.38	9.34
	35	11.73	8.77	12.46	9.27	13.18	8.97	13.71	9.16	14.64	9.24	15.37	9.41
	40	11.72	8.84	12.45	9.34	13.17	9.04	13.70	9.23	14.63	9.31	15.36	9.48
	45	11.71	8.90	12.44	9.41	13.16	9.11	13.69	9.30	14.62	9.38	15.35	9.55
	50	11.70	8.97	12.43	9.47	13.15	9.17	13.68	9.37	14.61	9.45	15.33	9.62
	55	11.69	9.03	12.42	9.54	13.14	9.24	13.67	9.44	14.60	9.52	15.32	9.70
	60	11.68	9.10	12.41	9.61	13.13	9.31	13.66	9.50	14.59	9.58	15.31	9.77
	65	11.67	9.17	12.40	9.68	13.12	9.38	13.65	9.57	14.57	9.65	15.30	9.84
	70	11.66	9.23	12.39	9.75	13.11	9.44	13.64	9.64	14.56	9.72	15.29	9.91
	75	11.38	9.08	12.11	9.60	12.83	9.31	13.35	9.51	14.27	9.60	15.00	9.79
	80	11.10	8.92	11.82	9.45	12.55	9.17	13.07	9.38	13.99	9.48	14.71	9.68
	85	10.83	8.76	11.54	9.29	12.26	9.03	12.78	9.24	13.70	9.36	14.42	9.56
	90	10.55	8.60	11.26	9.13	11.98	8.88	12.50	9.10	13.42	9.22	14.13	9.43
	95	10.25	8.51	10.96	9.05	11.67	8.82	**12.00**	**8.90**	13.10	9.18	13.81	9.39
	100	10.00	8.28	10.71	8.82	11.42	8.61	11.84	8.76	12.85	8.98	13.56	9.20
	105	9.75	8.05	10.46	8.59	11.17	8.40	11.69	8.62	12.60	8.78	13.31	9.01
	110	9.50	7.77	10.21	8.31	10.92	8.14	11.44	8.37	12.35	8.53	13.07	8.76
	115	9.25	7.54	9.96	8.08	10.67	7.92	11.19	8.15	12.10	8.33	12.82	8.56
	118	9.10	7.49	9.81	8.03	10.52	7.88	11.04	8.12	11.95	8.30	12.67	8.54
	122	9.05	7.47	9.76	8.01	10.48	7.87	10.99	8.11	11.90	8.29	12.62	8.53

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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LG

ART COOL MIRROR INDOOR UNITS

Cooling Capacity Table

Table 5: Multi F Art Cool Mirror Indoor Units Cooling Capacity Table (continued).

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LAN180HSV5 18,000	14	17.65	12.33	18.74	13.02	19.84	12.61	20.63	12.88	22.03	12.98	23.12	13.23
	20	17.63	12.43	18.73	13.13	19.82	12.71	20.61	12.98	22.01	13.09	23.11	13.33
	25	17.62	12.52	18.71	13.23	19.81	12.81	20.60	13.08	22.00	13.19	23.09	13.44
	30	17.60	12.62	18.70	13.33	19.79	12.91	20.58	13.18	21.98	13.29	23.07	13.54
	35	17.59	12.71	18.68	13.43	19.78	13.00	20.57	13.28	21.96	13.39	23.05	13.64
	40	17.58	12.81	18.67	13.53	19.76	13.10	20.55	13.38	21.94	13.49	23.04	13.75
	45	17.56	12.90	18.66	13.63	19.75	13.20	20.53	13.48	21.93	13.59	23.02	13.85
	50	17.55	13.00	18.64	13.73	19.73	13.30	20.52	13.58	21.91	13.69	23.00	13.95
	55	17.54	13.10	18.63	13.83	19.72	13.39	20.50	13.68	21.89	13.79	22.98	14.05
	60	17.52	13.19	18.61	13.93	19.70	13.49	20.49	13.78	21.88	13.89	22.97	14.16
	65	17.51	13.29	18.60	14.03	19.69	13.59	20.47	13.87	21.86	13.99	22.95	14.26
	70	17.50	13.38	18.58	14.13	19.67	13.69	20.46	13.97	21.84	14.09	22.93	14.36
	75	17.08	13.16	18.16	13.92	19.24	13.49	20.03	13.79	21.41	13.92	22.50	14.20
	80	16.66	12.93	17.74	13.70	18.82	13.30	19.60	13.60	20.98	13.75	22.06	14.03
	85	16.24	12.70	17.32	13.47	18.40	13.09	19.17	13.40	20.55	13.56	21.63	13.85
	90	15.82	12.46	16.90	13.23	17.97	12.88	18.75	13.19	20.12	13.37	21.20	13.67
	95	15.37	12.33	16.44	13.12	17.51	12.78	**18.00**	**12.90**	19.65	13.30	20.72	13.61
	100	14.99	12.00	16.06	12.78	17.13	12.47	17.77	12.70	19.28	13.01	20.35	13.33
	105	14.62	11.67	15.69	12.45	16.76	12.17	17.53	12.50	18.90	12.73	19.97	13.05
	110	14.24	11.27	15.32	12.05	16.39	11.79	17.16	12.13	18.53	12.36	19.60	12.70
	115	13.87	10.93	14.94	11.71	16.01	11.48	16.79	11.82	18.15	12.07	19.22	12.41
	118	13.65	10.85	14.72	11.64	15.79	11.42	16.56	11.77	17.93	12.03	19.00	12.37
	122	13.57	10.83	14.64	11.62	15.71	11.40	16.49	11.75	17.85	12.01	18.92	12.36

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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ART COOL MIRROR INDOOR UNITS

Heating Capacity Table

MULTI F
MULTI F MAX

Table 6: Multi F Art Cool Mirror Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LAN090HSV5 10,900	0	-0.4	5.61	5.53	5.48	5.45	5.37	5.14
	5	4.5	6.32	6.24	6.18	6.16	6.08	5.85
	10	9	7.03	6.95	6.90	6.88	6.79	6.56
	17	15	7.98	7.90	7.85	**7.82**	7.75	7.48
	20	19	8.33	8.26	8.21	8.18	8.09	7.82
	25	23	8.93	8.85	8.79	8.77	8.69	8.37
	30	28	9.44	9.36	9.31	9.29	9.20	8.93
	35	32	9.96	9.87	9.82	9.79	9.72	9.47
	40	36	10.42	10.33	10.28	10.25	10.18	9.94
	45	41	10.87	10.80	10.74	10.71	10.64	10.40
	47	43	11.06	10.98	10.93	**10.90**	10.82	10.59
	50	46	11.24	11.15	11.10	11.08	10.99	10.73
	55	51	11.53	11.46	11.40	11.37	11.30	10.98
	60	56	11.53	11.46	11.40	11.37	11.30	11.03
	63	59	11.53	11.46	11.40	11.37	11.30	11.06
	68	64	11.53	11.46	11.40	11.37	11.30	11.11
LAN120HSV5 13,600	0	-0.4	7.00	6.90	6.83	6.80	6.70	6.50
	5	4.5	7.89	7.78	7.71	7.69	7.59	7.40
	10	9	8.78	8.67	8.60	8.58	8.48	8.31
	17	15	9.95	9.86	9.79	**9.76**	9.67	9.47
	20	19	10.40	10.30	10.23	10.20	10.10	9.90
	25	23	11.14	11.03	10.96	10.95	10.85	10.60
	30	28	11.78	11.67	11.60	11.59	11.49	11.30
	35	32	12.42	12.31	12.24	12.21	12.13	11.99
	40	36	13.00	12.89	12.82	12.79	12.70	12.58
	45	41	13.56	13.46	13.39	13.36	13.28	13.16
	47	43	13.80	13.70	13.63	**13.60**	13.50	13.40
	50	46	14.02	13.91	13.84	13.82	13.72	13.59
	55	51	14.39	14.29	14.22	14.19	14.10	13.90
	60	56	14.39	14.29	14.22	14.19	14.10	13.96
	63	59	14.39	14.29	14.22	14.19	14.10	14.00
	68	64	14.39	14.29	14.22	14.19	14.10	14.06
LAN180HSV5 21,600	0	-0.4	11.11	10.96	10.85	10.80	10.64	10.18
	5	4.5	12.52	12.37	12.26	12.21	12.06	11.58
	10	9	13.93	13.77	13.67	13.61	13.46	12.99
	17	15	15.81	15.65	15.55	**15.49**	15.34	14.84
	20	19	16.51	16.36	16.25	16.20	16.04	15.49
	25	23	17.69	17.53	17.43	17.37	17.22	16.59
	30	28	18.70	18.55	18.44	18.39	18.24	17.69
	35	32	19.72	19.56	19.46	19.41	19.25	18.79
	40	36	20.63	20.48	20.37	20.32	20.17	19.70
	45	41	21.55	21.39	21.29	21.24	21.08	20.61
	47	43	21.91	21.76	21.65	**21.60**	21.44	20.98
	50	46	22.26	22.11	22.01	21.95	21.80	21.27
	55	51	22.86	22.70	22.59	22.53	22.38	21.76
	60	56	22.86	22.70	22.59	22.53	22.38	21.85
	63	59	22.86	22.70	22.59	22.53	22.38	21.91
	68	64	22.86	22.70	22.59	22.53	22.38	22.02

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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).

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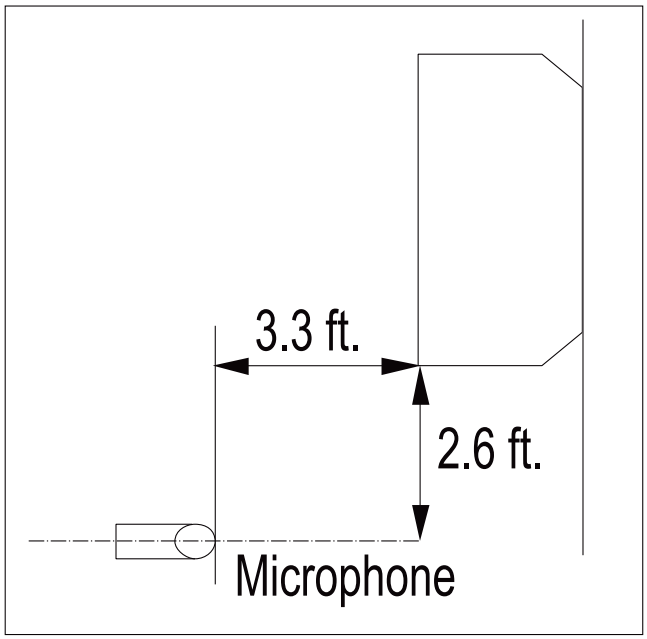
ART COOL MIRROR INDOOR UNITS

Acoustic Data

Figure 4: Sound Pressure Level Measurement Location.



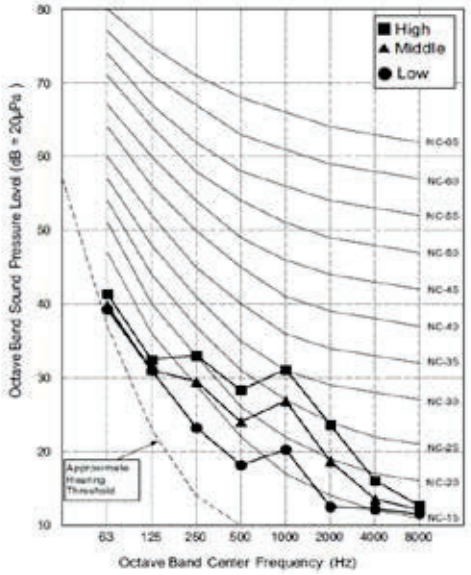
- Measurement taken 2.6' below the bottom of the unit and at a distance of 3.3' from face of unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient)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

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

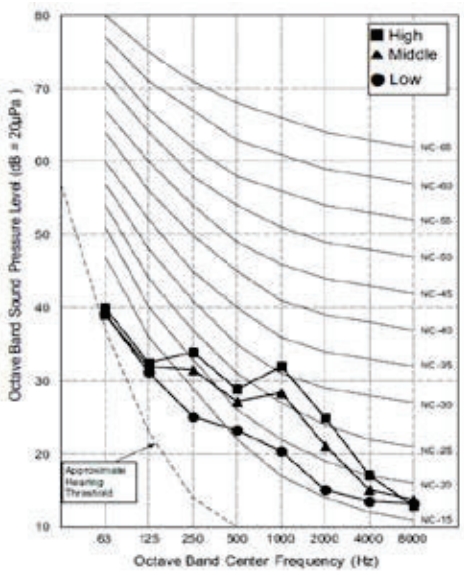
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LAN090HSV5	36	32	27
LAN120HSV5	38	34	29
LAN180HSV5	44	38	34

Figure 5: Sound Pressure Level Diagrams.

LAN090HSV5



LAN120HSV5



LAN180HSV5

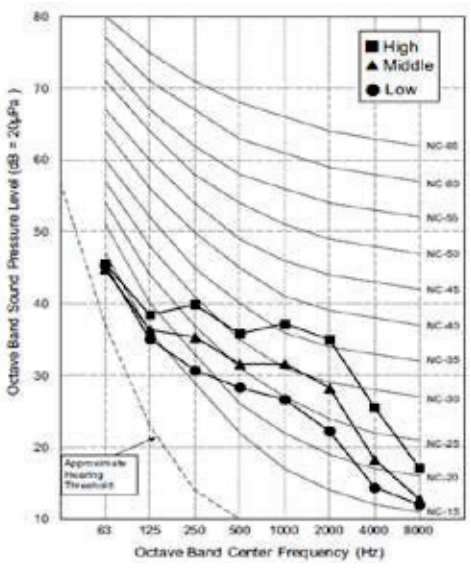


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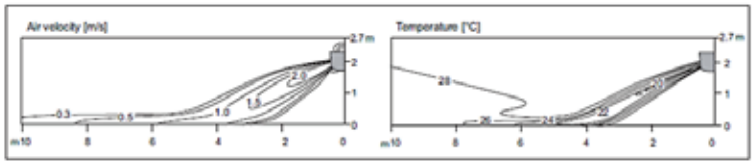
Figure 6: LAN090HSV5 and LAN120HSV5 Air Velocity and Temperature Distribution Charts.

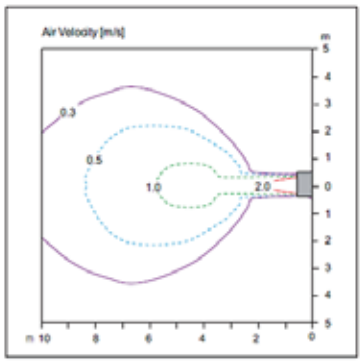
Cooling

Side View
Discharge angle: 35°

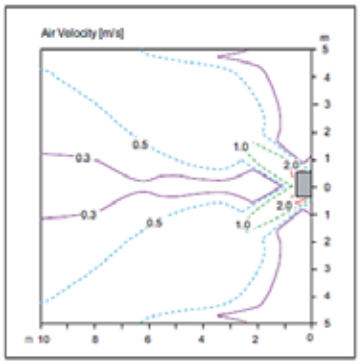


- Vertical Louver : Center
- Fan speed : Power

Top View
Discharge angle: 35°



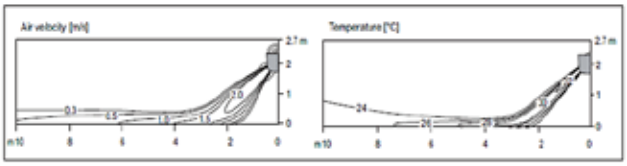
- Vertical Louver : Center
- Vertical Vane : 0°
- Fan speed : Power
- Air speed 0.3m/s Range : 11.0m



- Vertical Louver : Left & Right
- Vertical Vane : 55°
- Fan speed : Power

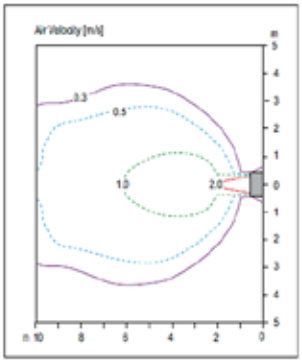
Heating

Side View
Discharge angle: 55°

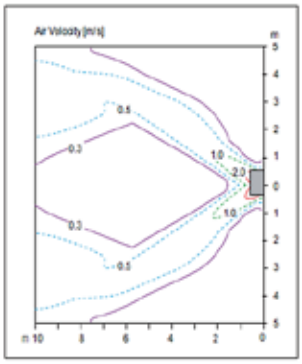


- Vertical Louver : Center
- Fan speed : Power

Top View
Discharge angle: 55°



- Vertical Louver : Center
- Vertical Vane : 0°
- Fan speed : Power
- Air speed 0.3m/s Range : 13.2m

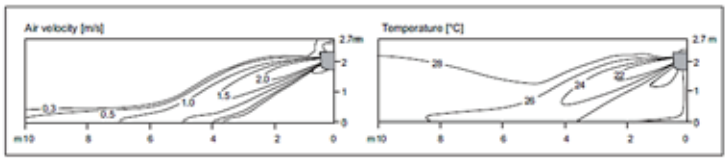


- Vertical Louver : Left & Right
- Vertical Vane : 55°
- Fan speed : Power

Figure 7: LAN180HSV5 Air Velocity and Temperature Distribution Charts.

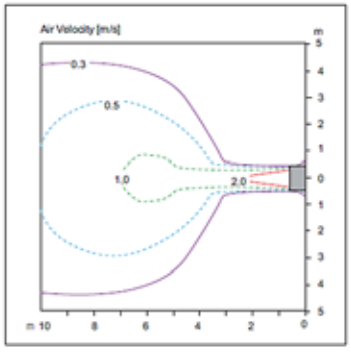
Cooling

Side View
Discharge angle: 25°

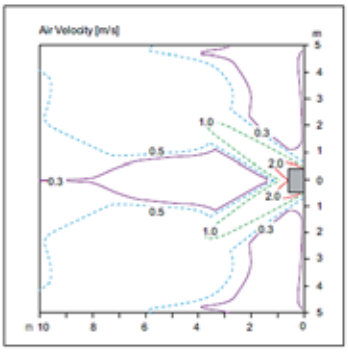


- Vertical Louver : Center
- Fan speed : Power

Top View
Discharge angle: 25°



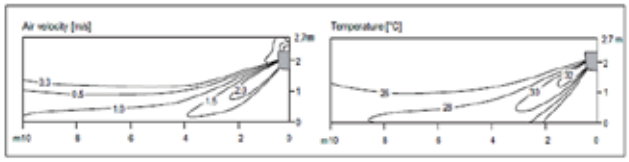
- Vertical Louver : Center
- Vertical Vane : 0°
- Fan speed : Power
- Air speed 0.3m/s Range : 12.9m



- Vertical Louver : Left & Right
- Vertical Vane : 50°
- Fan speed : Power

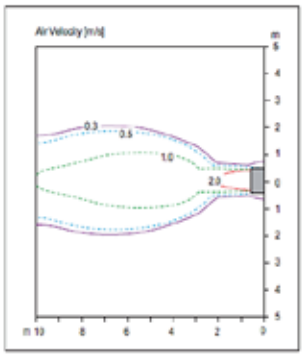
Heating

Side View
Discharge angle: 45°

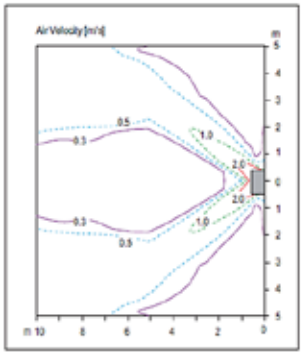


- Vertical Louver : Center
- Fan speed : Power

Top View
Discharge angle: 45°



- Vertical Louver : Center
- Vertical Vane : 0°
- Fan speed : Power
- Air speed 0.3m/s Range : 20.0m



- Vertical Louver : Left & Right
- Vertical Vane : 50°
- Fan speed : Power

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ART COOL MIRROR INDOOR UNITS

Refrigerant Flow Diagram

Figure 8: Art Cool Mirror Indoor Unit Refrigerant Flow Diagram.

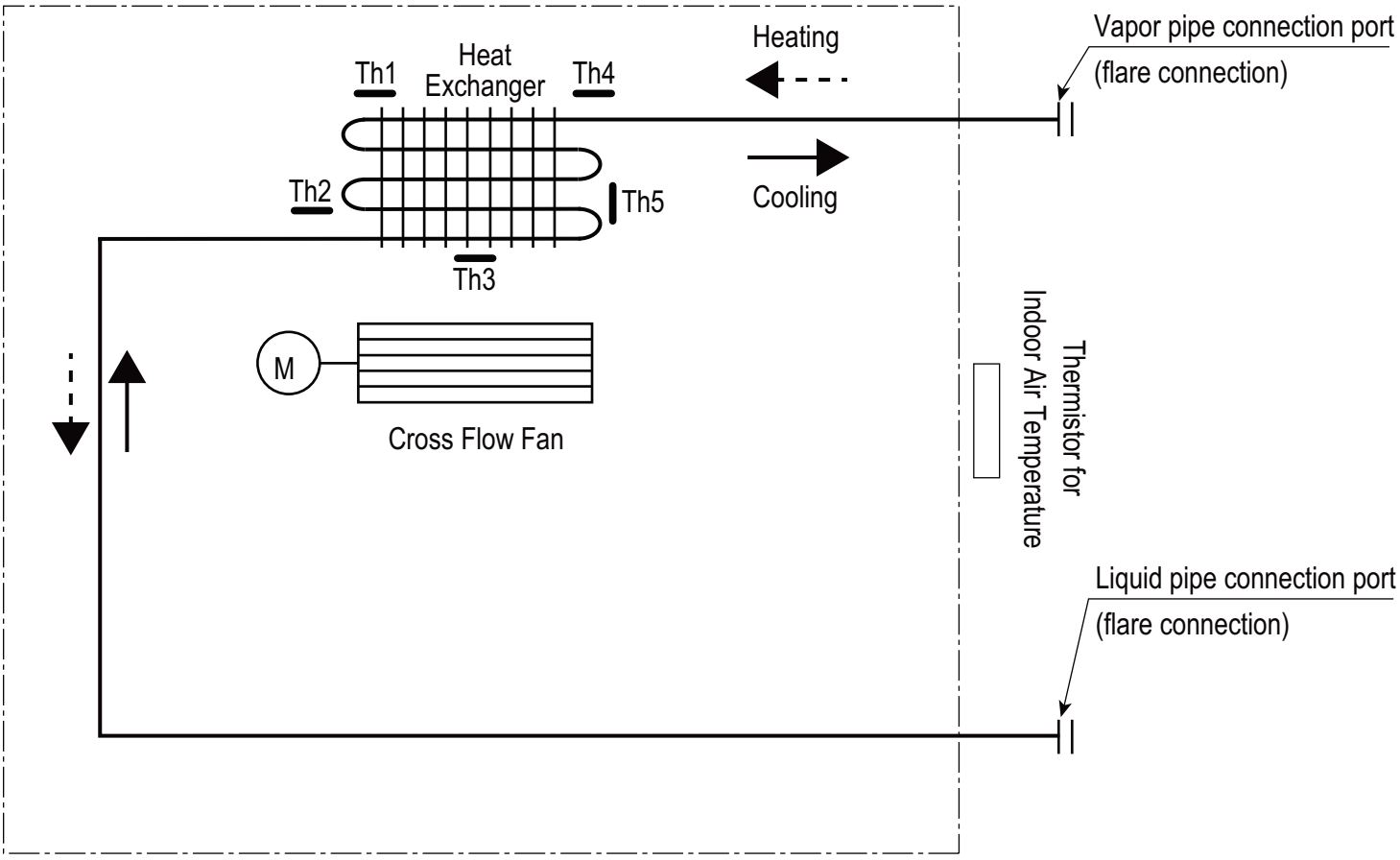

Table 8: Art Cool Mirror Indoor Unit Refrigerant Pipe Sizes.

Indoor Unit Capacity	Vapor Line Size (in., OD)	Liquid Line Size (in., OD)
9,000 Btu/h	Ø3/8	Ø1/4
12,000 Btu/h		
18,000 Btu/h	Ø1/2	

Table 9: Art Cool Mirror Indoor Unit Refrigerant Pipe Connections

Indoor Unit Capacity	Vapor Line Connection (in., OD)	Liquid Line Connection (in., OD)
9,000 Btu/h	Ø3/8	Ø1/4
12,000 Btu/h		
18,000 Btu/h	Ø5/8	Ø3/8

Table 10: Art Cool Mirror Indoor Unit Thermistor Details.

Location	Description (Based on Cooling Mode)	IDU PCB Connector
Th1	Indoor Air Temperature Thermistor	CN-TH1
Th2	Evaporator Inlet Temperature Thermistor	
Th3	Evaporator Middle Temperature Thermistor	CN-TH2
Th4	Evaporator Outlet Temperature Thermistor	
Th5	Water Level Sensor (Optional)	CN-TH3

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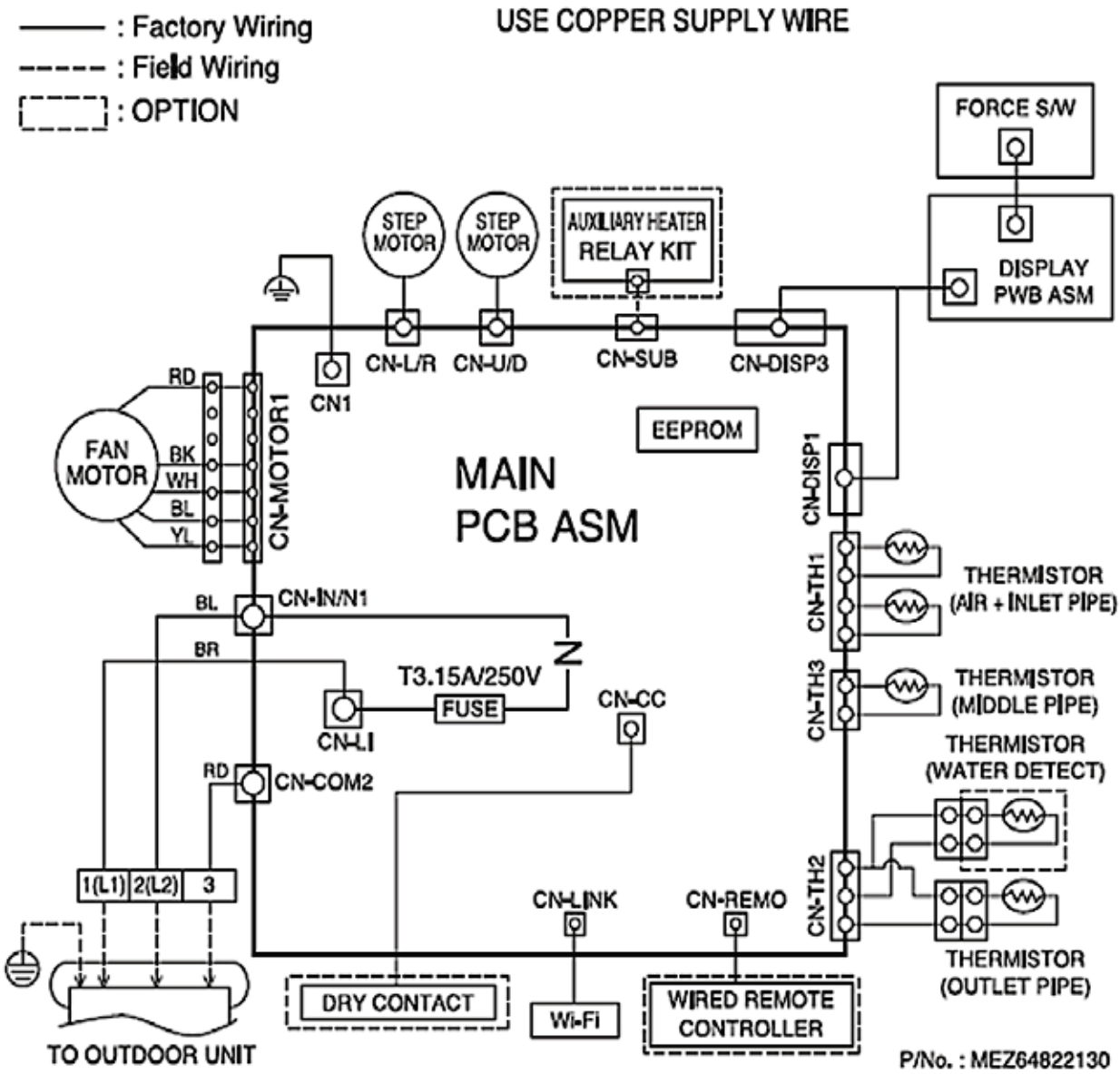
Figure 9: Multi F Art Cool Mirror LAN090HSV5, LAN120HSV5, and LAN180HSV5 Indoor Units Wiring Diagram.



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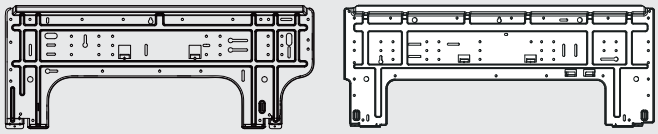
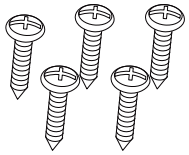
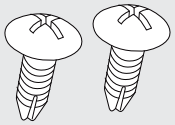
ART COOL MIRROR INDOOR UNITS

Factory Supplied Parts and Materials

Factory Supplied Parts

Table 11: Parts Table.

Part	Quantity	Image
Installation Plate	One (1)	 LAN090HSV5 and LAN120HSV5 LAN180HSV5
Type “A” Screws	Five (5)	
Type “B” Screws (M4 x 12L)	Two (2)	
Wireless Handheld Controller with Holder AKB74955602	One (1)	

Factory Supplied Materials

- Owner’s Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Spanner (Half union)
- Thermometer

⚠WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit’s components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

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ART COOL MIRROR INDOOR UNITS

Installation and Best Layout Practices

MULTI F
MULTI F MAX

⚠ DANGER

To avoid the possibility of fire, ⃠ do not install the unit in an area where combustible gas will generate, flow, stagnate, or leak. Failure to do so will cause serious bodily injury or death. Before beginning installation, read the safety summary at the beginning of this manual.

Select a location for installing the wall-mounted indoor unit (IDU) that meets the following conditions:

- Where there is enough structural strength to bear the weight of the unit
- Where air circulation will not be blocked
- Where noise prevention is taken into consideration
- Ensure there is sufficient space from the ceiling and floor
- Locate the indoor unit in a location where it can be easily connected to the outdoor unit/branch distribution unit
- Include space for drainage to ensure condensate flows properly out of the unit when it is in cooling mode
- Use a level indicator to ensure the unit is installed on a level plane

Note:

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

- ⃠ Do not install the unit where it will be subjected to direct thermal radiation from other heat sources.
- ⃠ Do not install the unit in an area where combustible gas will 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.
- ⃠ Do not install additional ventilation products on the chassis of the unit.
- ⃠ Do not install the unit near high-frequency generator sources.
- ⃠ Do not install the unit near a doorway.

Note:

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

Installing in an Area Exposed to Unconditioned Air

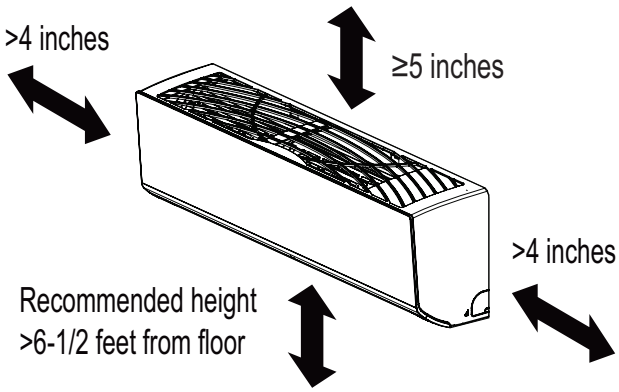
In some installation applications, areas (floors, walls) in some rooms will be exposed to unconditioned air (room will be above or next to an unheated garage or storeroom). To countermeasure:

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

Required Clearances

Figure 10 shows required clearance distances around a typical installed wall-mounted unit.

Figure 10: Minimum Clearance Requirements.



Mounting the Installation Plate

The mounting wall must be strong and solid enough to protect the unit from vibration.

- Mount the installation plate on the wall using the Type “A” screws. If mounting the unit on concrete, consider using anchor bolts.
- Always mount the installation plate horizontally. Measure the wall and mark the centerline using thread and a level.

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Figure 11: Installation Plate for LAN090HSV5 and LAN120HSV5 Units.

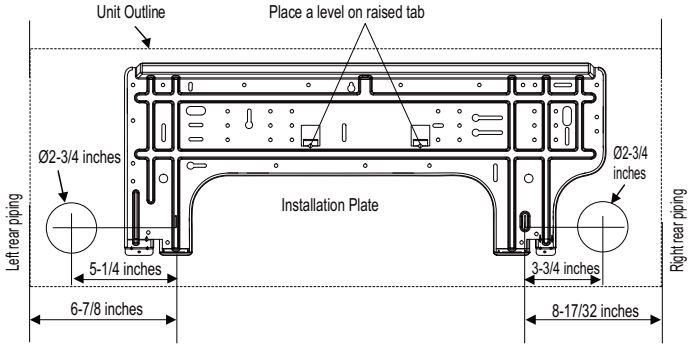
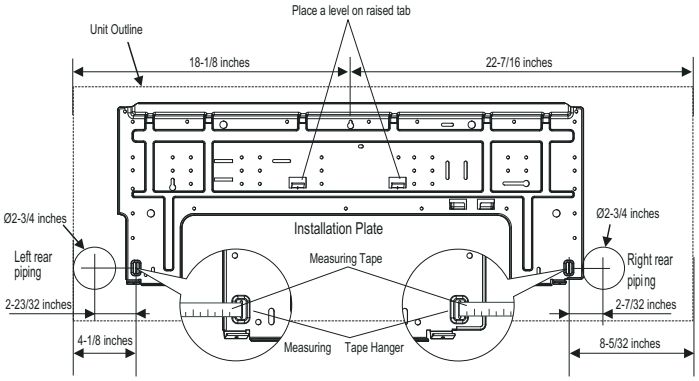


Figure 12: Installation Plate for LAN180HSV5 Units.



Drilling Piping Hole in the Wall

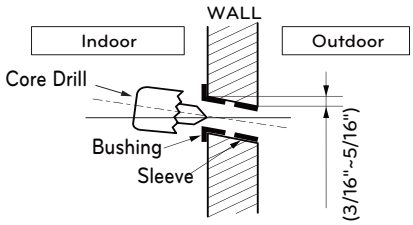
⚠WARNING

Use caution when drilling holes through walls. Drilling into power wiring in the wall can cause serious bodily injury or death.

Follow the left or right piping clearance recommendations.

1. Using a 2-5/8 (ø 65mm) inch hole core drill bit, drill a hole at either the right or left side of the wall mounting. The hole must slant 3/16" to 5/16" from level (upward on the indoor unit side and downward on the outdoor unit side).
2. Finish off the newly drilled hole as shown with bushing and sleeve covering. Sleeve and bushing prevents damage to the tubing/bundling of the piping.

Figure 19: Drilling Piping Hole



Hanging the Indoor Unit Chassis

1. Attach the three (3) hooks on the top of the indoor unit to the top edge of the installation plate. Verify the hooks are properly attached to the installation plate by gently shaking the indoor unit from side to side.
2. Unlock the tubing clamp from the indoor unit frame. For easier access between the bottom of the indoor unit and the wall, prop the clamp between the indoor unit frame and installation plate.
3. Remove the screw covers at the bottom of the indoor unit, unscrew the two (2) screws, remove the frame cover, remove the piping connection cover, and position the piping for installation (down, back, left, or right).

Figure 13: Locking the Indoor Unit onto the Installation Plate.

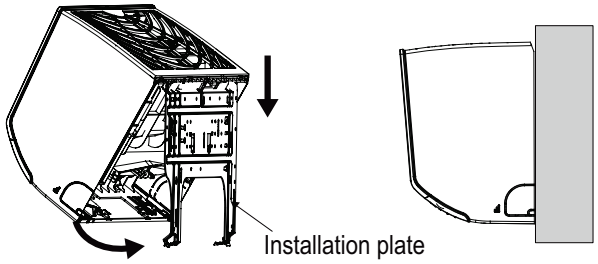


Figure 14: Accessing the Back of the Indoor Unit.

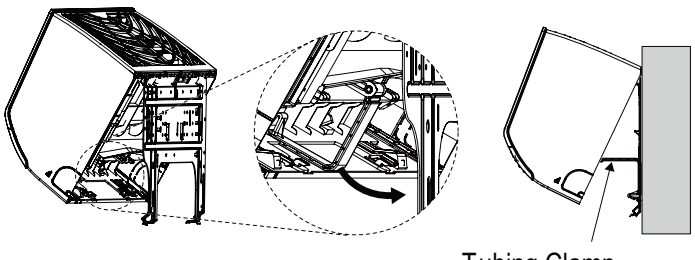


Figure 15: Removing the Frame Cover.

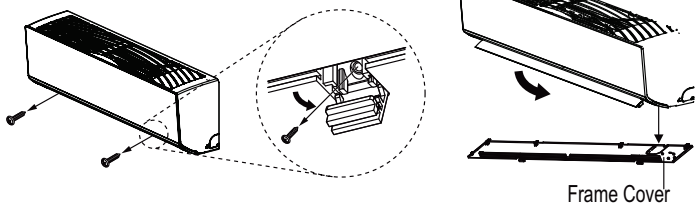


Figure 16: Exterior Back View of Indoor Unit.

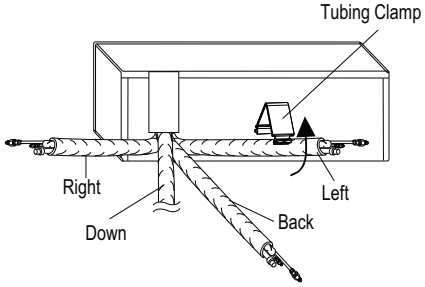


Figure 17: Piping Installed to the Left.

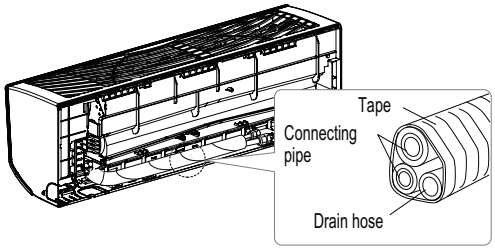
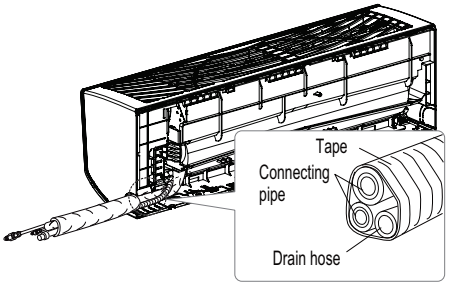


Figure 18: Piping Installed to the Right.



Art Cool Mirror™

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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

• Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

Connecting the Power Wiring and Communications Cable

1. Insert the power wiring/communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) through the bottom of the indoor unit.

2. Connect each wire to its appropriate terminal on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

3. Secure the power wiring/communications cable with the cable restraint.

Figure 20: Connecting the Power Wiring / Communications Cable.

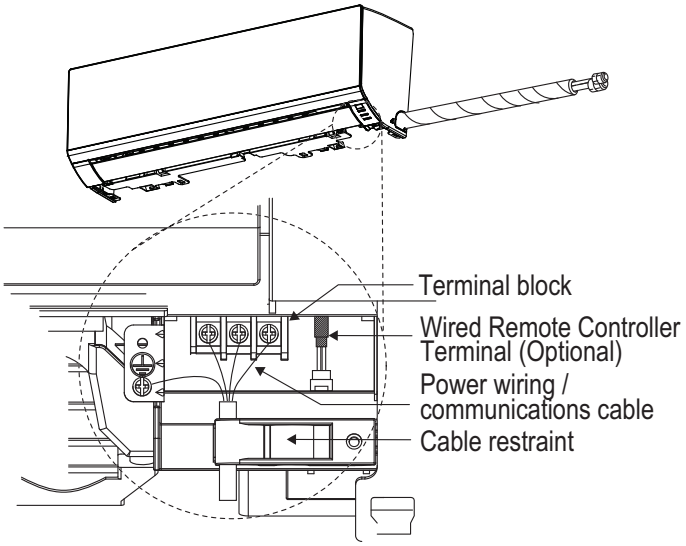


Figure 21: Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections—LAN090HSV5 and LAN120HSV5 models.

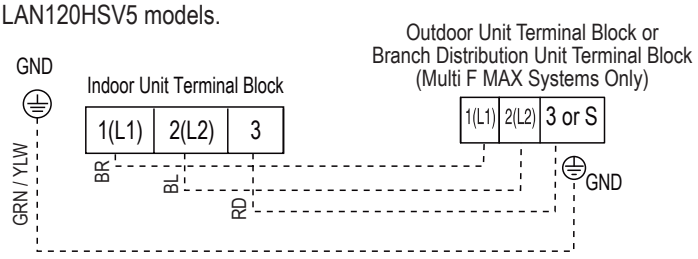
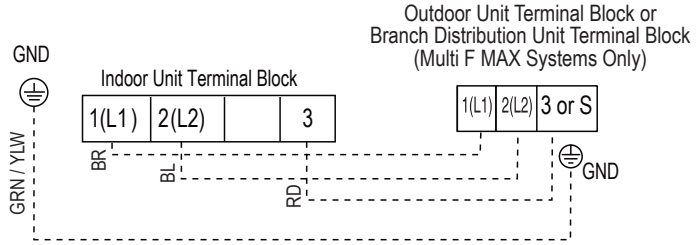


Figure 22: Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections—LAN180HSV5 models.



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ART COOL MIRROR INDOOR UNITS

Installation and Best Layout Practices

Wireless Handheld Controller

Figure 23: AKB74955602 Wireless Controller.

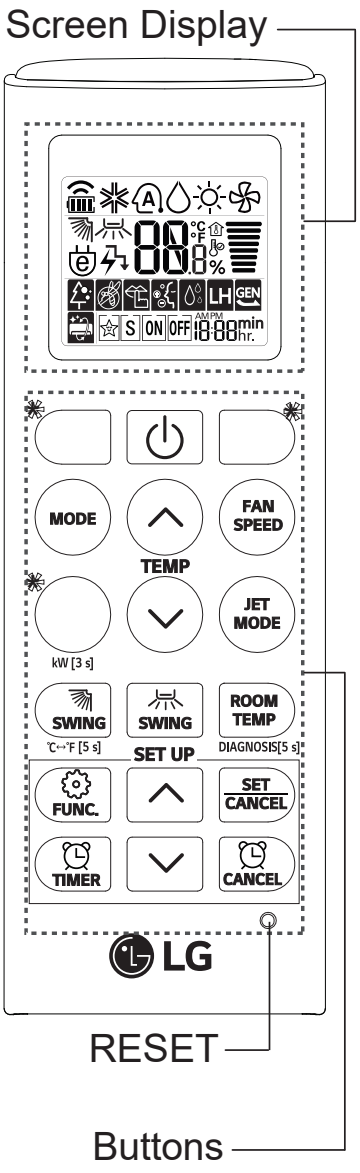

Table 12: AKB74955602 Wireless Controller Functions.

Button	Display Screen	Description
		To purify the air by removing particles that enters the indoor unit.
		To reduce noise from outdoor units.
		To keep your skin moisturized by generating ion clusters.
	Po	To lower indoor humidity quickly.
	LH	To maintain a minimum indoor temperature and prevent indoor objects from freezing.
		To fan away a mosquito.
		To remove moisture generated inside the indoor unit.
		To make the comfortable sleep environment.
RESET	-	To Initialize the remote control settings.

Button	Display Screen	Description
	-	To turn on/off the air conditioner.
		To adjust the desired room temperature in cooling, heating or auto changeover mode.
MODE		To select the cooling mode.
		To select the heating mode.
		To select the dehumidification mode.
		To select the fan mode.
		To select the auto changeover/auto operation mode.
JET MODE	Po	To change room temperature quickly.
FAN SPEED		To adjust the fan speed.
		To adjust the air flow direction vertically or horizontally.
	S ON OFF	To turn on/off air conditioner automatically at desired time.
SET/ CANCEL	-	To set/cancel the special functions and timer.
	-	To cancel the timer settings.
	-	To adjust time.
*LIGHT OFF	-	To set the brightness of the display on the indoor unit.
ROOM TEMP		To display the room temperature.
°C ↔ °F [5 s]	°C °F	To change unit between °C and °F.
*ENERGY SAVING		To minimize power consumption.
*COMFORT AIR		To adjust the air flow to deflect wind.
kW[3 s]	-	To set whether or not to display information regarding energy.
*ENERGY CTRL		To bring the effect of the power saving.
*COMFORT SLEEP		To make the comfortable sleep environment.
DIAGNOSIS [5 s]	-	To conveniently check maintenance information of a product.

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Wired Controller Connections

Figure 24: Wired Controller Connection on the Indoor Unit Terminal Block—LAN090HSV5 and LAN120HSV5 models.

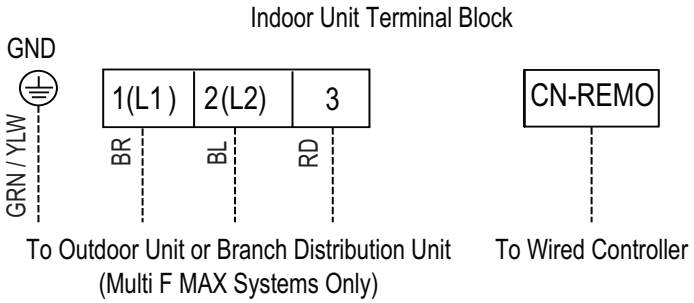
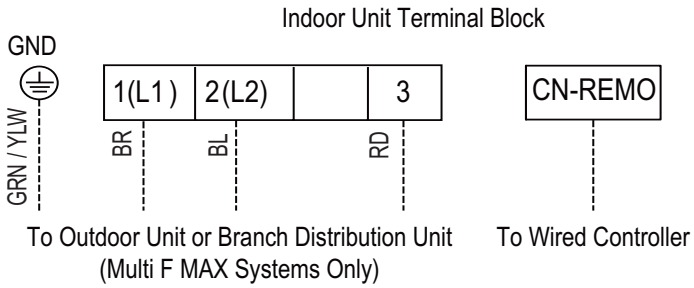


Figure 25: Wired Controller Connection on the Indoor Unit Terminal Block—LAN180HSV5 models.



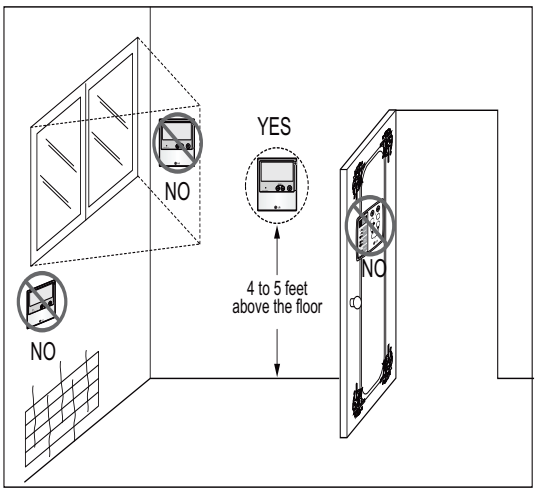
Wired Controller Placement

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

⃠ Do not install the wired controller near or in:

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

Figure 26: Proper Location for the Wired Controller.



Operation Mode Sequence

Cooling Mode
↓
Auto Operation
↓
Dehumidification Mode
↓
Heating Mode

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Hanging the Wired Controller

1. The controller wiring/cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring/cable on applicable side.

2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring/cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 27: Removing the Cable Guide Grooves.

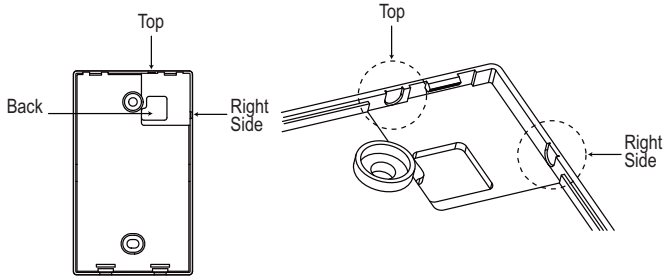


Figure 28: Attaching the Wall Plate.

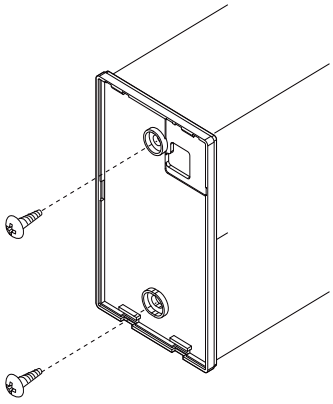
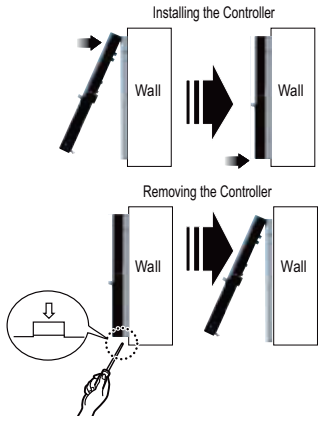


Figure 29: Installing/Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

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ART COOL™ GALLERY INDOOR UNIT DATA

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“Cooling Capacity Table” on page 32
“Heating Capacity Table” on page 33
“Acoustic Data” on page 34
“Air Velocity and Temperature Distribution” on page 35
“Refrigerant Flow Diagram” on page 36
“Wiring Diagram” on page 37
“Factory Supplied Parts and Materials” on page 38
“Installation and Best Layout Practices” on page 39

ART COOL GALLERY INDOOR UNITS

Mechanical Specifications and Features

ART COOL Gallery Indoor Units

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Art Cool Gallery indoor units have a sound rating no higher than 42 dB(A) as tested per KSA0701 ISO Standard 3745.

Coil

Indoor unit coils are comprised of a minimum of two rows of aluminum fins mechanically bonded to copper tubing. The coils are pressure tested at the factory. Each unit is provided with a factory installed condensate drain pan below the coil.

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare. All refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

Units are designed to mount on a vertical surface, and are shipped with a separate back plate that secures the unit to the wall, protruding no more than six (6) inches. Unit is designed so that refrigerant piping can be installed in one of four different directions.

Cases / Finishes

The Art Cool Gallery unit has a frame that can accommodate a 20" x 20" photograph, picture or artwork. Unit casing has a gray finish and is manufactured of heavy-duty acrylonitrile butadiene styrene (ABS) and high impact polystyrene (HIPS) plastic.

Fan Assembly and Control

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

Figure 30: Multi F Art Cool Gallery Indoor Unit.

Air Filter

Return air is filtered with a factory-supplied, removable, washable pre-filter. Filter access is from the front of the unit without the use of tools.

Airflow Guide Vanes

Motorized oscillating guide vanes are factory installed, and allows the ability to control the direction of airflow from side to side. A motorized air sweep louver provides an automatic change in airflow by directing the air up and down to provide uniform air distribution.

Microprocessor Control

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

Controls

The indoor unit casing has a factory-standard, integral infrared sensor designed to communicate with the supplied LG wireless handheld remote controller. An optional LG supplied wired controller is available as an additional accessory. Communication between the indoor units and the outdoor unit is accomplished through 18 AWG, four-core, stranded and shielded power / communication cable.

Condensate

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

Features

- Inverter (Variable speed fan)
- Chaos swing
- Jet cool
- Group control
- Self-cleaning indoor coil
- Auto operation / auto restart operation
- 24-Hour on/off timer
- Wireless LCD remote control included; wired thermostat available (sold separately)

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ART COOL GALLERY INDOOR UNITS

General Data / Specifications

MULTI F
MULTI F MAX

Table 13: Multi F Art Cool Gallery Indoor Unit General Data.

Model Name	LMAN097HVP	LMAN127HVP
Nominal Cooling Capacity (Btu/h)[1]	9,000	11,200
Nominal Heating Capacity (Btu/h)[1]	10,400	13,300
Operating Range		
Cooling (°F WB)	57-77	57-77
Heating (°F DB)	59-81	59-81
Fan		
Type	Turbo	Turbo
Motor Output (W) x Qty.	24 x 1	24 x 1
Motor/Drive	Brushless Digitally Controlled / Direct	Brushless Digitally Controlled / Direct
Airflow Rate CFM (H/M/L)	272 / 208 / 155	314 / 258 / 198
Unit Data		
Refrigerant Type[2]	R410A	R410A
Refrigerant Control	EEV	EEV
Power Supply V, Ø, Hz[3]	208-230, 1, 60	208-230, 1, 60
Rated Amps (A)	0.2	0.2
Sound Pressure Level dB(A) (H/M/L)[4]	39 / 35 / 31	42 / 38 / 34
Dimensions (W x H x D, in.)	23-5/8 x 23-5/8 x 5-25/32	23-5/8 x 23-5/8 x 5-25/32
Net Unit Weight (lbs.)	32	32
Shipping Weight (lbs.)	37	37
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 18	4 x 18
Heat Exchanger (Row x Column x Fin / inch) x Number	(2 x 20 x 21) x 1	(2 x 20 x 21) x 1
Piping		
Liquid (in.)	1/4	1/4
Vapor (in.)	3/8	3/8
Drain O.D. / I.D. (in.)	27/32, 5/8	27/32, 5/8

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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).
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).

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs 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.

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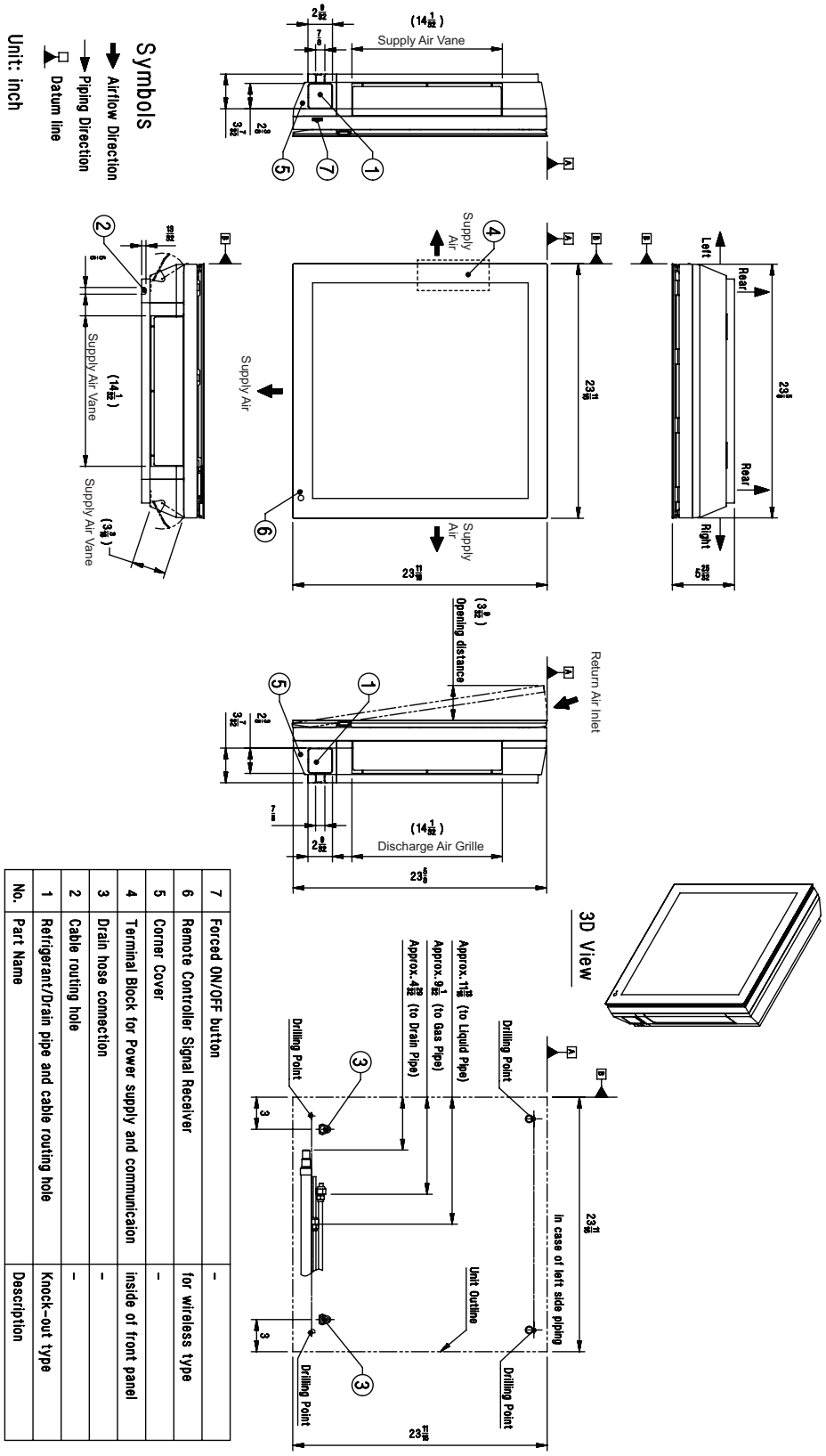
ART COOL GALLERY INDOOR UNITS

Dimensions

Figure 31: LMAN097HVP and LMAN127HVP Dimensions.



No.	Part Name	Description
1	Refrigerant/Drain pipe and cable routing hole	Knock-out type
2	Cable routing hole	-
3	Drain hose connection	-
4	Terminal Block for Power supply and communicaion	inside of front panel
5	Corner Cover	-
6	Remote Controller Signal Receiver	for wireless type
7	Forced ON/OFF button	-

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ART COOL GALLERY INDOOR UNITS

Cooling Capacity Table

MULTI F
MULTI F MAX

Table 14: Multi F Art Cool Gallery Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LMAN097HVP 9,000	14	8.82	5.68	9.37	6.00	9.92	5.81	10.31	5.93	11.01	5.98	11.56	6.09
	20	8.82	5.72	9.36	6.04	9.91	5.85	10.31	5.98	11.01	6.03	11.55	6.14
	25	8.81	5.77	9.36	6.09	9.90	5.90	10.30	6.02	11.00	6.07	11.54	6.19
	30	8.80	5.81	9.35	6.14	9.90	5.94	10.29	6.07	10.99	6.12	11.54	6.23
	35	8.80	5.85	9.34	6.18	9.89	5.99	10.28	6.11	10.98	6.17	11.53	6.28
	40	8.79	5.90	9.33	6.23	9.88	6.03	10.27	6.16	10.97	6.21	11.52	6.33
	45	8.78	5.94	9.33	6.28	9.87	6.08	10.27	6.21	10.96	6.26	11.51	6.38
	50	8.78	5.99	9.32	6.32	9.87	6.12	10.26	6.25	10.96	6.30	11.50	6.42
	55	8.77	6.03	9.31	6.37	9.86	6.17	10.25	6.30	10.95	6.35	11.49	6.47
	60	8.76	6.07	9.31	6.42	9.85	6.21	10.24	6.34	10.94	6.40	11.48	6.52
	65	8.76	6.12	9.30	6.46	9.84	6.26	10.24	6.39	10.93	6.44	11.47	6.56
	70	8.75	6.16	9.29	6.51	9.84	6.30	10.23	6.43	10.92	6.49	11.47	6.61
	75	8.54	6.06	9.08	6.41	9.62	6.21	10.01	6.35	10.71	6.41	11.25	6.54
	80	8.33	5.96	8.87	6.31	9.41	6.12	9.80	6.26	10.49	6.33	11.03	6.46
	85	8.12	5.85	8.66	6.20	9.20	6.03	9.59	6.17	10.28	6.24	10.82	6.38
	90	7.91	5.74	8.45	6.09	8.99	5.93	9.37	6.07	10.06	6.16	10.60	6.30
	95	7.68	5.68	8.22	6.04	8.75	5.88	**9.00**	**5.94**	9.83	6.12	10.36	6.27
	100	7.50	5.52	8.03	5.89	8.57	5.74	8.88	5.85	9.64	5.99	10.17	6.14
	105	7.31	5.37	7.84	5.73	8.38	5.60	8.77	5.76	9.45	5.86	9.99	6.01
	110	7.12	5.19	7.66	5.55	8.19	5.43	8.58	5.58	9.26	5.69	9.80	5.85
	115	6.94	5.03	7.47	5.39	8.01	5.29	8.39	5.44	9.08	5.56	9.61	5.71
	118	6.82	5.00	7.36	5.36	7.89	5.26	8.28	5.42	8.96	5.54	9.50	5.70
	122	6.79	4.98	7.32	5.35	7.86	5.25	8.24	5.41	8.93	5.53	9.46	5.69
LMAN127HVP 12,000	14	10.98	7.06	11.66	7.46	12.34	7.22	12.84	7.38	13.71	7.44	14.39	7.58
	20	10.97	7.12	11.65	7.52	12.33	7.28	12.83	7.43	13.70	7.50	14.38	7.64
	25	10.96	7.17	11.64	7.58	12.32	7.34	12.82	7.49	13.69	7.55	14.37	7.70
	30	10.95	7.23	11.63	7.64	12.31	7.39	12.81	7.55	13.68	7.61	14.36	7.76
	35	10.95	7.28	11.63	7.69	12.31	7.45	12.80	7.61	13.66	7.67	14.34	7.82
	40	10.94	7.34	11.62	7.75	12.30	7.51	12.79	7.66	13.65	7.73	14.33	7.87
	45	10.93	7.39	11.61	7.81	12.29	7.56	12.78	7.72	13.64	7.79	14.32	7.93
	50	10.92	7.45	11.60	7.87	12.28	7.62	12.77	7.78	13.63	7.84	14.31	7.99
	55	10.91	7.50	11.59	7.92	12.27	7.67	12.76	7.83	13.62	7.90	14.30	8.05
	60	10.90	7.56	11.58	7.98	12.26	7.73	12.75	7.89	13.61	7.96	14.29	8.11
	65	10.90	7.61	11.57	8.04	12.25	7.78	12.74	7.95	13.60	8.02	14.28	8.17
	70	10.89	7.67	11.56	8.10	12.24	7.84	12.73	8.01	13.59	8.07	14.27	8.23
	75	10.63	7.54	11.30	7.97	11.97	7.73	12.46	7.90	13.32	7.97	14.00	8.13
	80	10.36	7.41	11.04	7.85	11.71	7.62	12.19	7.79	13.05	7.87	13.73	8.04
	85	10.10	7.27	10.77	7.72	11.45	7.50	11.93	7.67	12.79	7.77	13.46	7.94
	90	9.84	7.14	10.51	7.58	11.18	7.38	11.67	7.56	12.52	7.66	13.19	7.83
	95	9.56	7.06	10.23	7.51	10.89	7.32	**11.20**	**7.39**	12.23	7.62	12.89	7.80
	100	9.33	6.87	10.00	7.32	10.66	7.15	11.05	7.28	11.99	7.45	12.66	7.64
	105	9.10	6.68	9.76	7.13	10.43	6.97	10.91	7.16	11.76	7.29	12.43	7.48
	110	8.86	6.46	9.53	6.90	10.20	6.76	10.68	6.95	11.53	7.08	12.19	7.27
	115	8.63	6.26	9.30	6.71	9.96	6.58	10.44	6.77	11.30	6.91	11.96	7.11
	118	8.49	6.22	9.16	6.67	9.82	6.54	10.30	6.74	11.16	6.89	11.82	7.09
	122	8.44	6.20	9.11	6.65	9.78	6.53	10.26	6.73	11.11	6.88	11.78	7.08

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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ART COOL GALLERY INDOOR UNITS

Heating Capacity Table

Table 15: Multi F Art Cool Gallery Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LMAN097HVP 9,000	0	-0.4	5.35	5.28	5.23	5.20	5.12	4.90
	5	4.5	6.03	5.95	5.90	5.88	5.80	5.58
	10	9	6.71	6.63	6.58	6.56	6.48	6.26
	17	15	7.61	7.54	7.49	**7.46**	7.39	7.14
	20	19	7.95	7.88	7.83	7.80	7.72	7.46
	25	23	8.52	8.44	8.39	8.37	8.29	7.99
	30	28	9.01	8.93	8.88	8.86	8.78	8.52
	35	32	9.50	9.42	9.37	9.34	9.27	9.04
	40	36	9.94	9.86	9.81	9.78	9.71	9.48
	45	41	10.37	10.30	10.25	10.22	10.15	9.92
	47	43	10.55	10.48	10.43	**10.40**	10.32	10.10
	50	46	10.72	10.64	10.59	10.57	10.49	10.24
	55	51	11.00	10.93	10.88	10.85	10.78	10.48
	60	56	11.00	10.93	10.88	10.85	10.78	10.52
	63	59	11.00	10.93	10.88	10.85	10.78	10.55
	68	64	11.00	10.93	10.88	10.85	10.78	10.60
LMAN127HVP 12,000	0	-0.4	6.84	6.75	6.68	6.65	6.55	6.26
	5	4.5	7.71	7.61	7.55	7.52	7.42	7.13
	10	9	8.58	8.48	8.42	8.38	8.29	8.00
	17	15	9.73	9.64	9.57	**9.54**	9.44	9.14
	20	19	10.17	10.07	10.01	9.98	9.88	9.54
	25	23	10.89	10.79	10.73	10.70	10.60	10.22
	30	28	11.52	11.42	11.36	11.32	11.23	10.89
	35	32	12.14	12.05	11.98	11.95	11.85	11.57
	40	36	12.71	12.61	12.55	12.51	12.42	12.13
	45	41	13.27	13.17	13.11	13.08	12.98	12.69
	47	43	13.49	13.40	13.33	**13.30**	13.20	12.91
	50	46	13.71	13.61	13.55	13.52	13.42	13.10
	55	51	14.07	13.97	13.91	13.88	13.78	13.40
	60	56	14.07	13.97	13.91	13.88	13.78	13.46
	63	59	14.07	13.97	13.91	13.88	13.78	13.49
	68	64	14.07	13.97	13.91	13.88	13.78	13.55

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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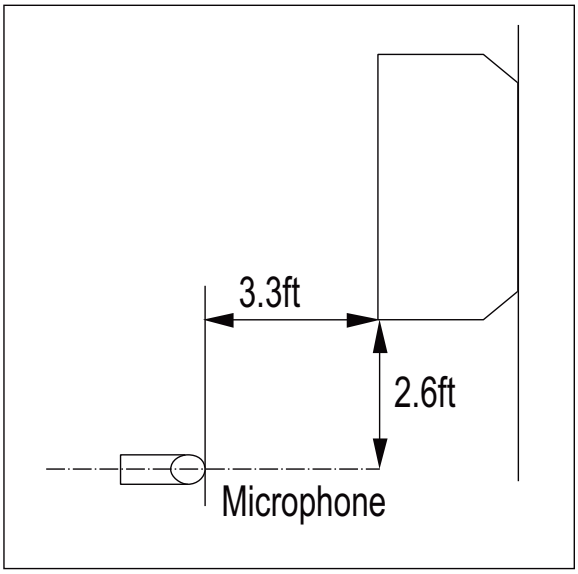
Figure 32: Sound Pressure Level Measurement Location.



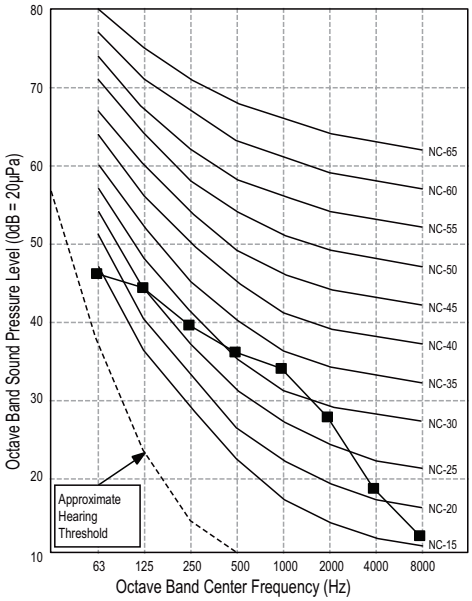
- Measurement taken 2.6' below the bottom of the unit and at a distance of 3.3' from face of unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient)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

Table 16: Sound Pressure Levels (dB[A]).

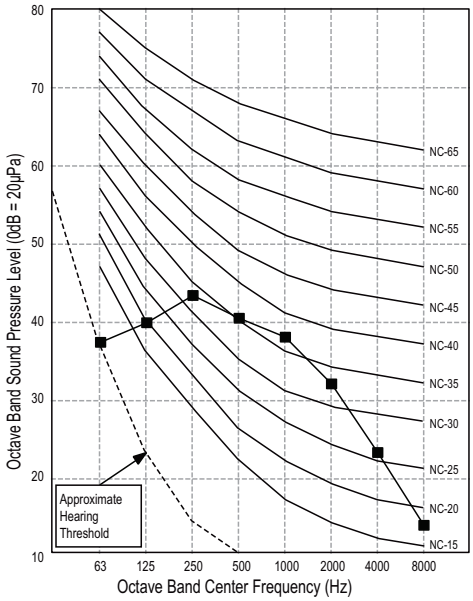
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LMAN097HVP	39	35	31
LMAN127HVP	42	38	34

Figure 33: Sound Pressure Level Diagrams.

LMAN097HVP



LMAN127HVP



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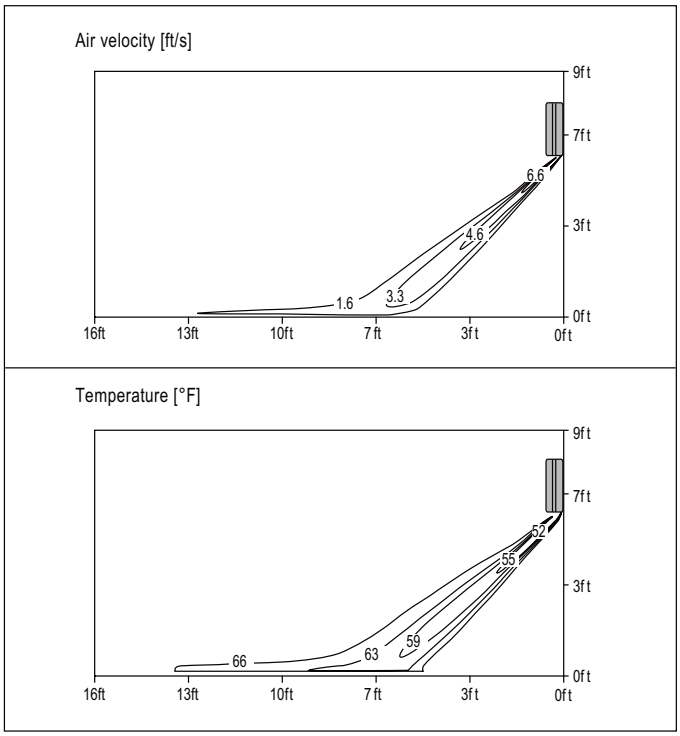
ART COOL GALLERY INDOOR UNITS

Air Velocity and Temperature Distribution

Figure 34: LMAN097HVP Air Velocity and Temperature Distribution Charts.

Cooling

Discharge angle: 40°



Heating

Discharge angle: 50°

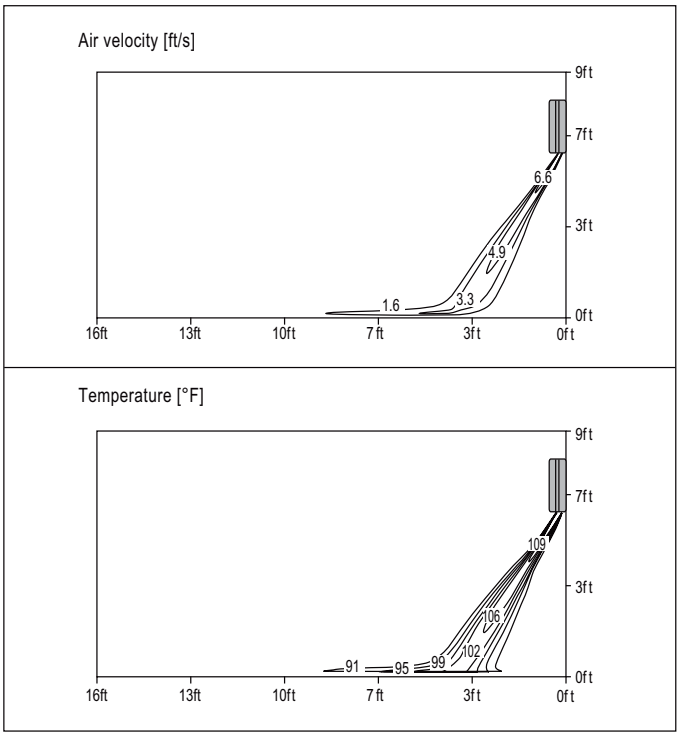
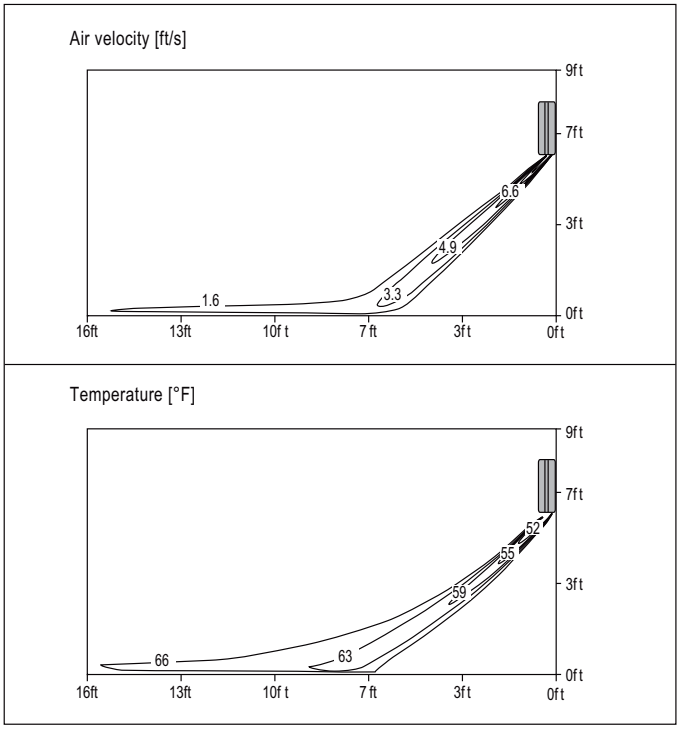


Figure 35: LMAN127HVP Air Velocity and Temperature Distribution Charts.

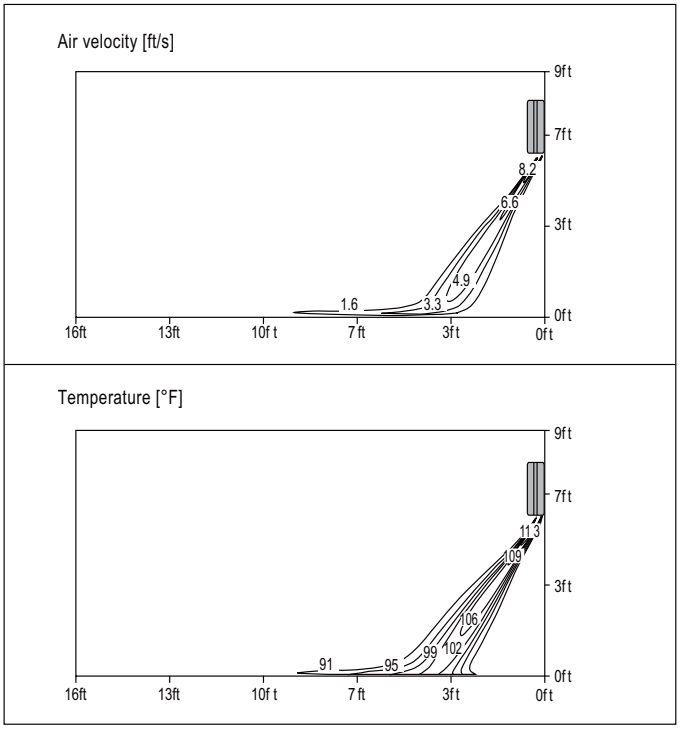
Cooling

Discharge angle : 40°



Heating

Discharge angle : 50°



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ART COOL GALLERY INDOOR UNITS

Refrigerant Flow Diagram

Figure 36: Art Cool Gallery Indoor Unit Refrigerant Flow Diagram.

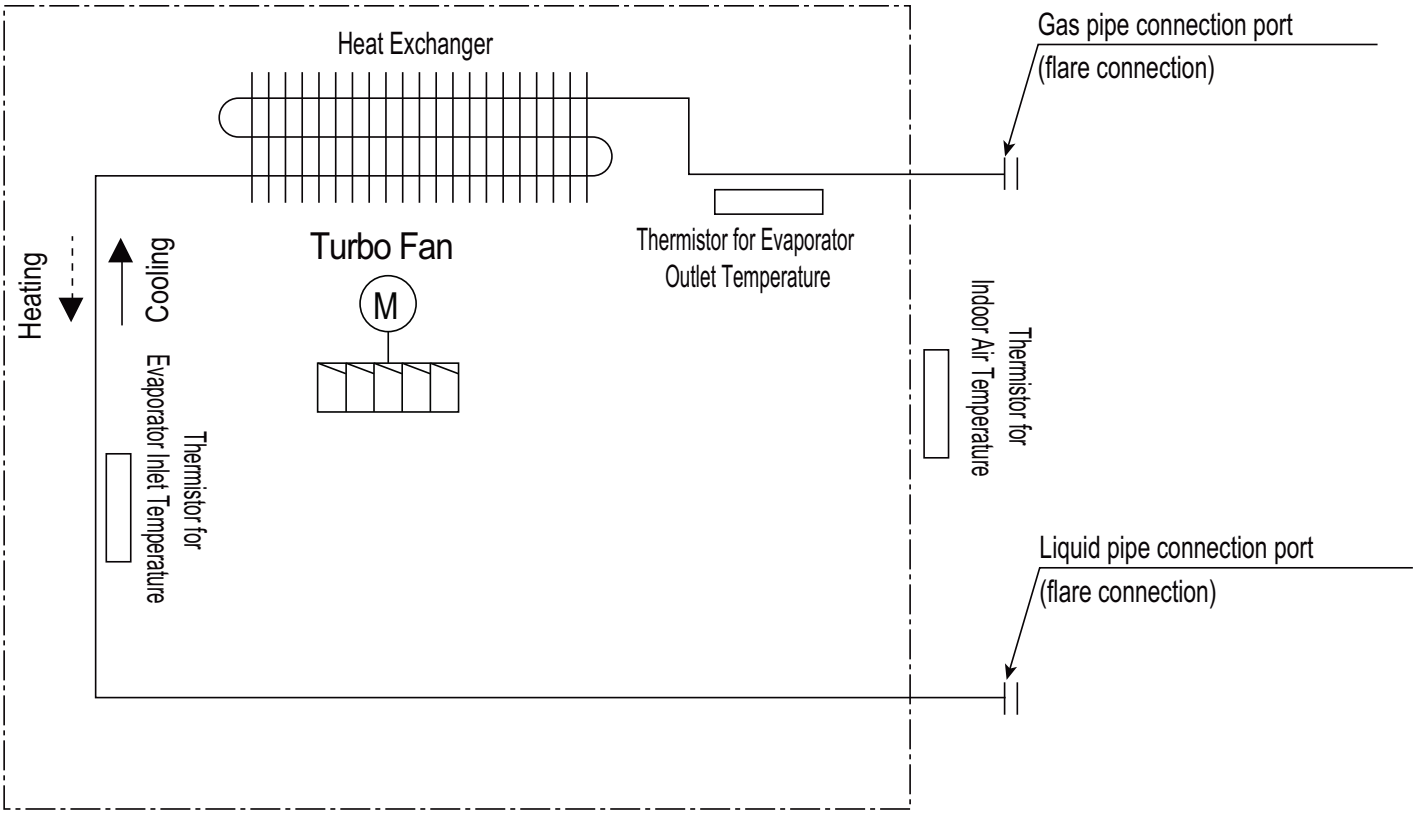

Table 17: Art Cool Gallery Indoor Unit Refrigerant Pipe Connection Port Diameters.

Model No.	Vapor (inch)	Liquid (inch)
LMAN097HVP	Ø3/8	Ø1/4
LMAN127HVP		

Table 18: Art Cool Gallery Indoor Unit Thermistor Details.

Description (Based on Cooling Mode)	PCB Connector
Indoor Air Temperature Thermistor	CN-TH1
Evaporator Inlet Temperature Thermistor	
Evaporator Outlet Temperature Thermistor	CN-TH2
Water Level Sensor (Optional)	CN-TH3

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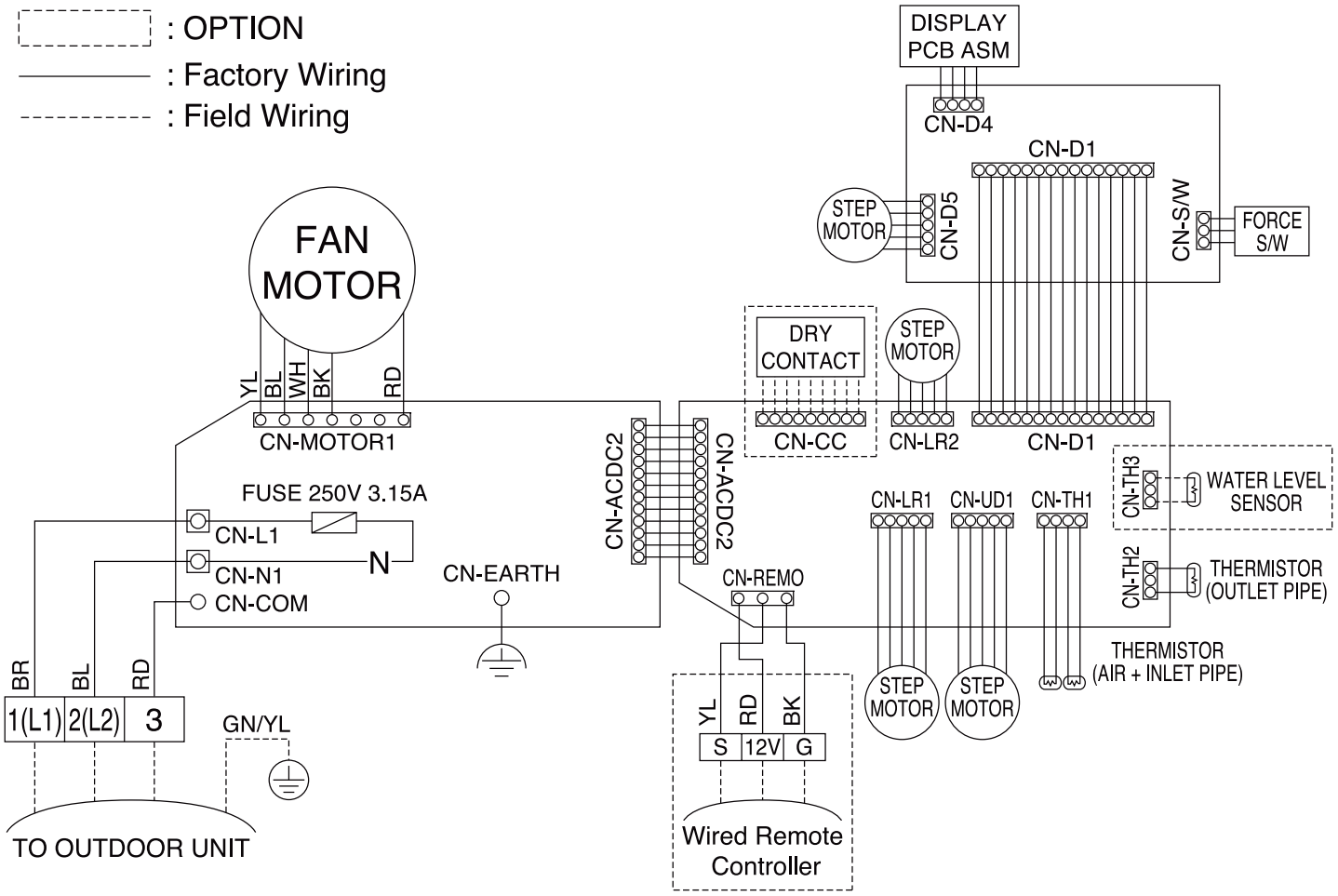
ART COOL GALLERY INDOOR UNITS

Wiring Diagram

Figure 37: Multi F Art Cool Gallery Indoor Units Wiring Diagram.



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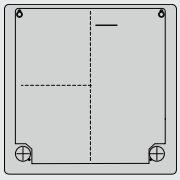
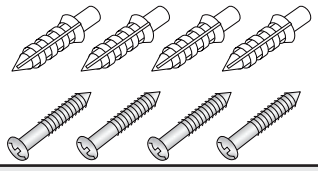
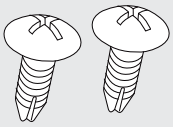
ART COOL GALLERY INDOOR UNITS

Factory Supplied Parts and Materials

Factory Supplied Parts

Table 19: Parts Table.

Part	Quantity	Image
Installation Guide	One (1)	
Type “A” Screws and Plastic Anchors	Four (4) Each	
Type “B” Screws (M4 x 12L)	Two (2)	
Wireless Handheld Controller with Holder (AKB73635607)	One (1)	

Factory Supplied Materials

- Owner’s Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Spanner (Half union)
- Thermometer

⚠ WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit’s components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

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ART COOL GALLERY INDOOR UNITS

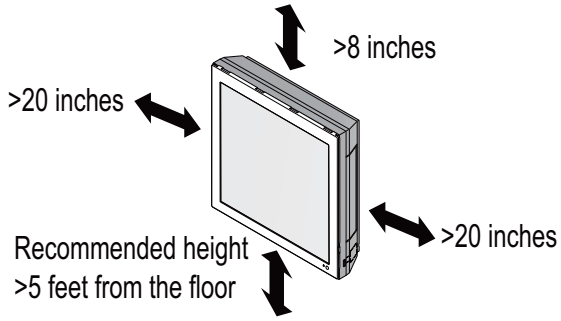
Installation and Best Layout Practices

Selecting the Best Location

Do's

- Place the unit where air circulation will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient space from the ceiling and floor.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit in a location where it can be easily connected to the outdoor unit/branch distribution unit.

Figure 38:Minimum Clearance Requirements.



⃠ Don'ts

- ⃠ *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- ⃠ *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- ⃠ *Do not install the unit near high-frequency generators.*
- ⃠ *Do not install the unit near a doorway.*

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

Note:

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

Installing in an Area Exposed to Unconditioned Air

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

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

Using the Installation Guide

1. Choose an appropriate location for the indoor unit. To hang the installation guide, verify that it is level and plumb, and then tape it to the wall.

2. Drill four (4) 1/4-inch diameter holes with a depth of 1-3/16 to 1-3/8 inches for the mounting screws. Drill one (1) two (2) inch-diameter hole for the field-installed refrigerant and drain piping.

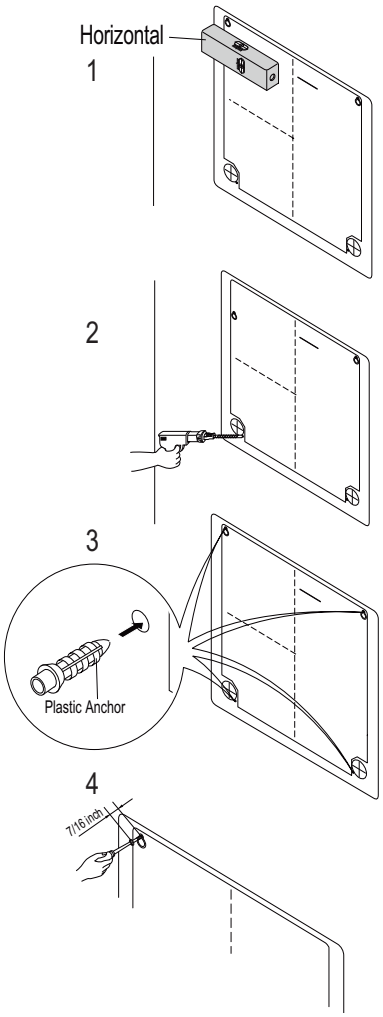
3. Insert a plastic anchor into each of the mounting holes.

4. Screw the top two (2) screws into the wall. ⃠ Do not flush them to the wall; leave a 7/16 inch space for hanging the indoor unit.

Note:

If the unit is installed near a body of water, certain components are at risk of being corroded. Appropriate anti-corrosion methods must be taken for the unit and all components.

Figure 39:Using the Installation Guide.



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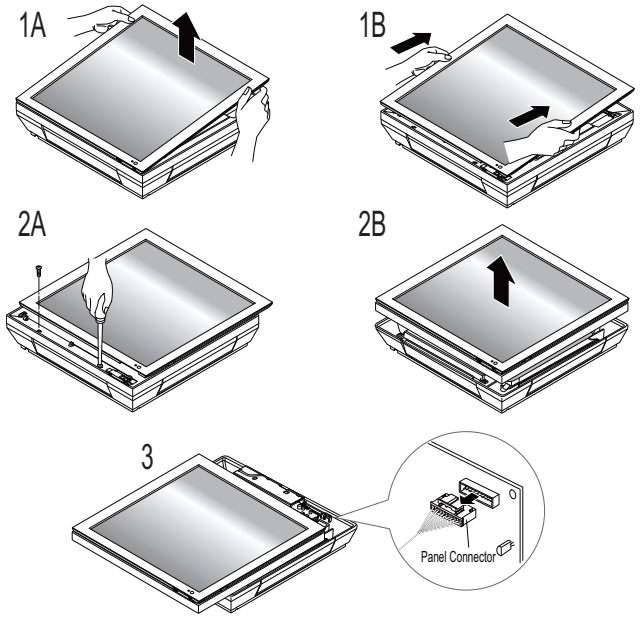
Preparing the Indoor Unit for Installation

Removing the Front Panel

1. First pull the top of the front panel up (1A) and then out (1B).
2. Remove the two (2) screws at the bottom (2A), then lift off the front panel (2B).
3. To completely detach the front panel, disconnect the panel connector found at the top of the indoor unit (3).

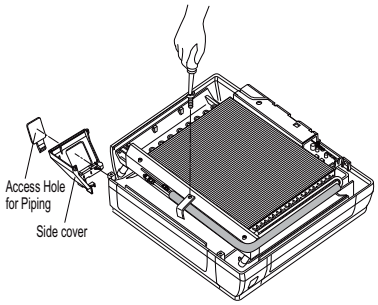
Figure 40:Preparing for Installation.



Removing the Piping and Side Covers

1. Unscrew the center cover.
2. Remove the cover from the side of the indoor unit chosen for the piping connections, and then knock out the piping access hole. If the refrigerant piping will be connected through the back of the unit, the access hole does not need to be knocked out.
3. Remove any burrs that will have been made.

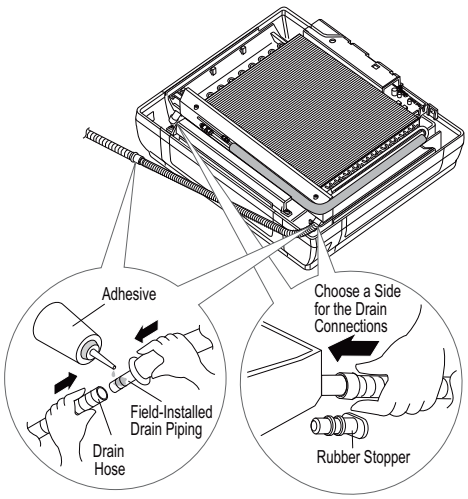
Figure 41:Removing the Piping and Side Covers.



Preparing the Drain Hose

1. Remove the rubber stopper from the chosen side of the indoor unit.
2. Insert the drain hose into the handle of the drain pan.
3. Connect the drain hose to the field-installed drain piping.

Figure 42:Preparing the Drain Hose.



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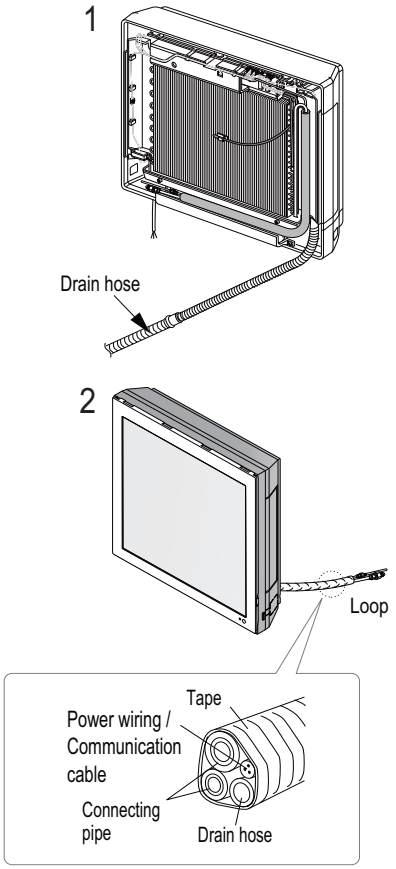
Preparing the Refrigerant and Drain Piping Connections

1. Depending on the installation requirements, route the indoor unit refrigerant piping and the drain hose to the left, right (see guidelines below), or rear of the frame.

2. Bundle the piping and drain hose with tape where they meet near the indoor unit frame. Position the drain hose at the bottom of the bundle (positioning the drain hose at the top of the bundle will cause the drain pan to overflow inside the indoor unit).

Figure 43:Preparing the Refrigerant / Drain Connections.

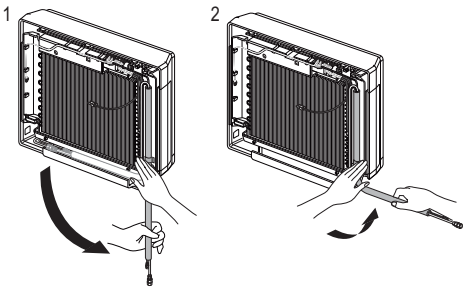


Installing Piping on the Right Side of the Indoor Unit Frame

1. Press on the top of the clamp, and then slowly guide the piping downward.

2. Bend the piping to the right side of the indoor unit frame.

Figure 44:Right Side Piping Access.



Note:

Do not bend the piping/drain hose from side to side; it will damage the components.

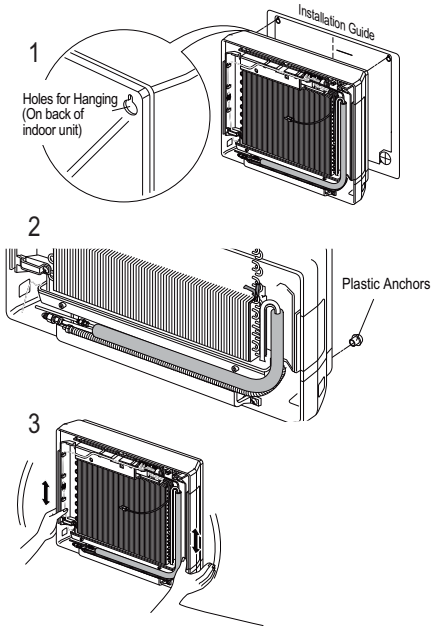
Hanging the Indoor Unit Frame

1. Remove the installation guide and hang the indoor unit on the top two (2) screws. Verify the indoor unit is hanging securely on the screws.

2. Align the holes at the bottom of the indoor unit to the mounting holes. Tighten first the top screws, then tighten the bottom screws.

3. Verify that the indoor unit is completely secured to the wall by gently shaking it up and down.

Figure 45:Hanging the Indoor Unit Frame.



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Connecting the Indoor Unit Piping to the Field-Installed Piping

1. Center align the indoor unit piping (refrigerant and drain) and the field-installed piping, then hand tighten the flare nut.
2. Tighten the flare nut with a torque wrench.
3. Attach the drain tube piping to the indoor unit drain hose as shown below.

Figure 46:Indoor Unit to Field-Installed Piping Connection.

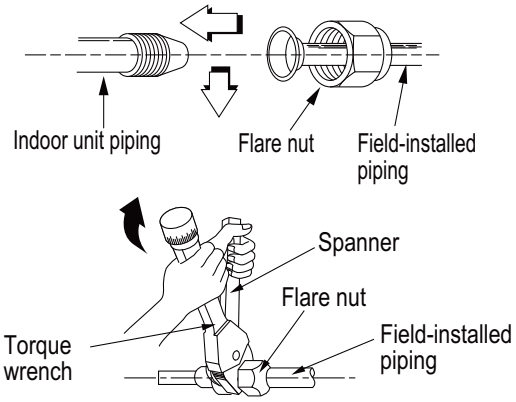
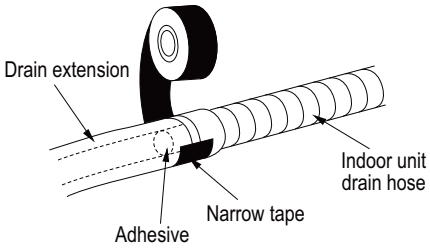


Figure 47:Extending the Drain Hose.



Note:

If the drain hose is routed inside a room, add insulation to prevent condensation from forming.

Insulating the Refrigerant and Drain Piping

⚠ WARNING

Ensure all piping is insulated. Exposed piping can cause burns if touched.

Refrigerant Piping Insulation

Field-installed vapor and liquid refrigerant piping lines must be properly and completely covered in insulation (up to the indoor unit piping connections). Any exposed piping will generate condensate or will cause burns if touched. Insulation for this field-installed refrigerant piping must have a minimum heat resistance of 248°F.

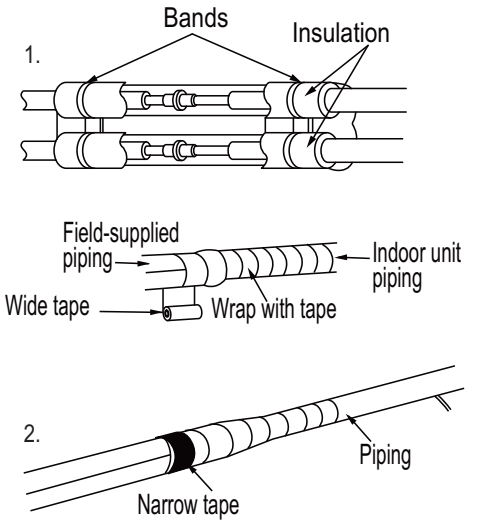
Drain Piping Insulation

Drain piping must have insulation a minimum of 7/32 inches thick.

Installing the Insulation

1. Overlap the insulation at the connection of the field-installed piping and the indoor unit piping. Tape together so there are no gaps.
2. Secure insulation to the rear piping housing section with vinyl tape.
3. Bundle the piping and drain hose with tape where they meet at the back of the indoor unit frame. Position the drain hose at the bottom of the bundle (positioning the drain hose at the top of the bundle will cause the drain pan to overflow inside the indoor unit).

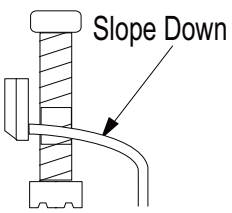
Figure 48:Insulating the Piping.



Drain Slope

Drain hose must point down so water can flow away easily.

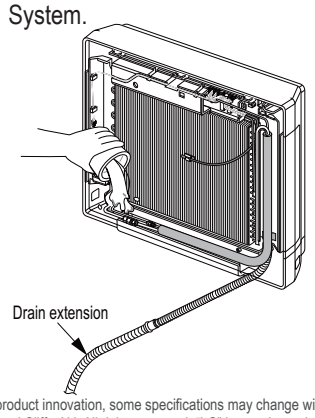
Figure 49:Drain Piping Slope.



Checking the Drainage System

1. Pour water on the indoor unit evaporator.
2. Ensure the water flows through and out of the hose and away from the indoor unit without leaking.

Figure 50:Checking the Drainage System.



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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

• Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

Connecting the Power Wiring and Communications Cable

1. Insert the power wiring/communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) through the access hole of the indoor unit (ground wire must be longer than the other wires/cables). Unscrew the control board cover.

2. Connect each wire to its appropriate terminal on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

3. Secure the power wiring/communications cable to the control board.

4. Reattach the control board cover.

Figure 51:Connecting the Power Wiring / Communications Cable.

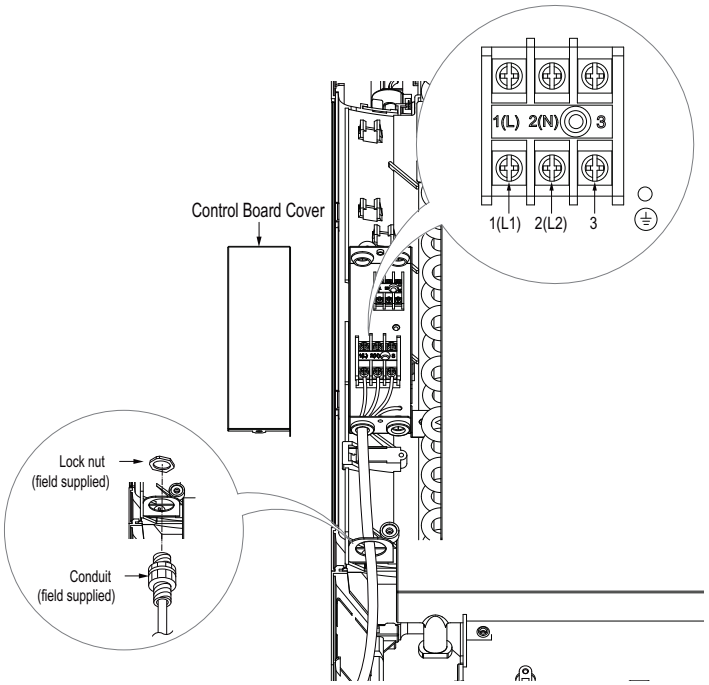
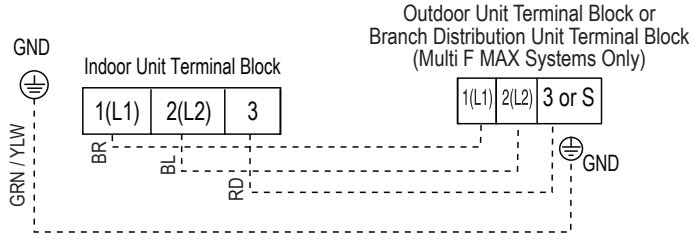


Figure 52:Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections—LMAN097HVP and LMAN127HVP models.



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Controller Options

Art Cool Gallery wall-mounted indoor units include a handheld controller (AKB73635607), but optional LG-supplied wired controllers are available.

Wireless Handheld Controller

Figure 53:AKB73635607 Wireless Controller.

Operation Mode Sequence

Cooling Mode
↓
Auto Operation
↓
Dehumidification Mode
↓
Heating Mode

Table 20: AKB73635607 Wireless Controller Functions.

Control Panel Button	Display Screen	Description
FAN		Air circulation button[1]: Circulates the room air without operating in cooling or heating mode.
SLEEP	1hr	Sleep Mode Auto Button[1]: Sets the sleep mode auto operation.
TEMP	88 °C	Temperature Adjustment Buttons: Raises or lowers temperature setpoint in cooling and heating operation.
ON OFF	-	On / Off Button: Turns the power on/off.
FAN SPEED		Indoor Fan Speed Button: Changes the fan speed.
MODE		Operation mode selection button[1]: Selects the operation mode. Cooling operation / Auto operation or auto changeover / Dehumidifying operation / Heating operation
JET	Po	Jet Cool / Jet Heat Button[1]: Warms up or cools down the indoor temperature within a short period.
SWING		Air Flow Direction Button: Adjusts the airflow direction.
ROOM TEMP		Temperature Display Button: Displays the room temperature. Press and hold button down for five (5) seconds to change from °C to °F.
ON OFF	AM 12:00	Timer button: Sets the current time and the start/end times.
A/CLEAN E/SAVING LIGHT		Navigation/Functions Button[1]: Adjusts the time and sets the special functions. Auto clean / Operates energy saving cooling / Adjusts the brightness of the indoor unit display
SET CLEAR	-	Set/Clear Button: Sets or cancels functions.
O	-	Reset Button: Resets the air conditioner settings.

[1]Depending on the indoor unit model, some functions will not be supported.

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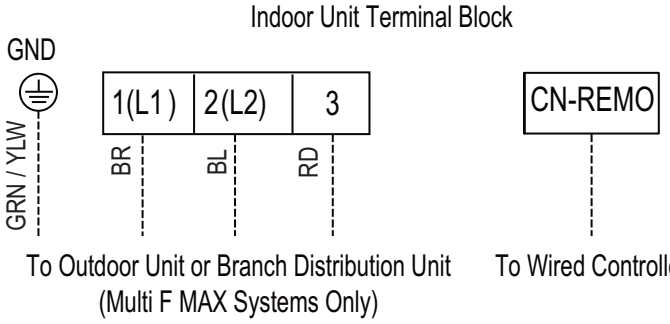
LG

Wired Controller Connections

Figure 54:Wired Controller Connection on the Indoor Unit Terminal Block.



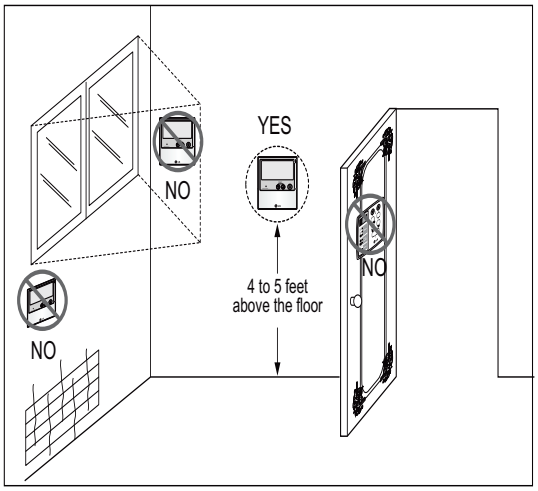
Wired Controller Placement

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

⃠ Do not install the wired controller near or in:

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

Figure 55:Proper Location for the Wired Controller.



Hanging the Wired Controller

1. The controller wiring/cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring/cable on applicable side.

2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring/cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 56:Removing the Cable Guide Grooves.

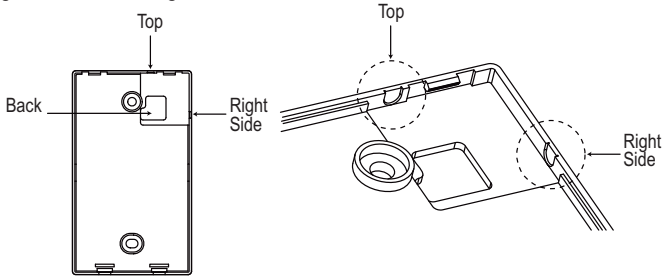


Figure 57:Attaching the Wall Plate.

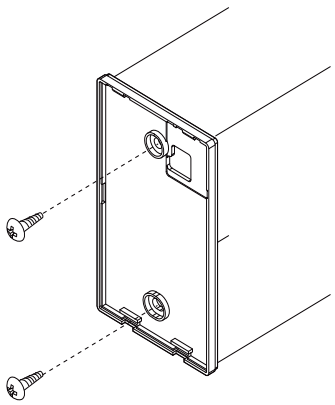
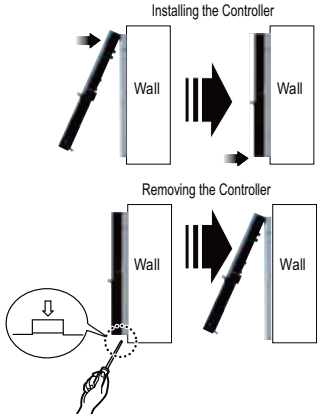


Figure 58:Installing/Removing the Controller.



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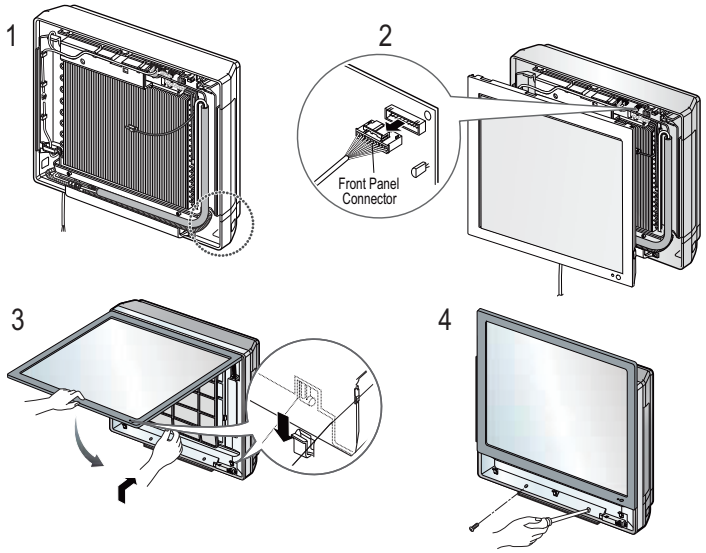
Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

Finalizing Indoor Unit Installation

1. Verify that the side covers are closed or opened, depending on installation requirements. Place the power wiring / communications cable in the bottom groove along the left side of the frame.
2. Reconnect the panel connector found at the top of the indoor unit.
3. Attach the top part of the front panel, then position its tabs in the grooves on the bottom part of the indoor unit frame.
4. To ensure the front panel tabs are securely positioned in the grooves, adjust the panel by loosening or tightening the screws at the bottom.

Figure 59:Final Installation Step—Reattaching the Front Panel.



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MULTI F
MULTI F MAX

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STANDARD WALL-MOUNTED INDOOR UNIT DATA

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“Heating Capacity Table” on page 56
“Acoustic Data” on page 58
“Air Velocity and Temperature Distribution” on page 60
“Refrigerant Flow Diagram” on page 62
“Wiring Diagram” on page 63
“Factory Supplied Parts and Materials” on page 65
“Installation and Best Layout Practices” on page 66

STANDARD WALL-MOUNTED INDOOR UNITS

Mechanical Specifications and Features

Standard Wall-Mounted Indoor Units

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Standard Wall-Mounted units have a sound rating no higher than 46 dB(A) as tested per KSA0701 ISO Standard 3745.

Coil

Indoor unit coils are comprised of a minimum of two rows of aluminum fins mechanically bonded to copper tubing. The coils are pressure tested at the factory. Each unit is provided with a factory installed condensate drain pan below the coil.

Refrigerant System

The system is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare. All refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

The indoor units require 208–230Vac/60Hz/1Φ power with voltage variance of no more than ±10%.

Casing

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

Finish

The Standard Wall-Mounted unit has a curved architectural panel with a pearl white finish. Unit casing has a pearl white or dark gray finish and is manufactured of heavy-duty acrylonitrile butadiene styrene (ABS) and high impact polystyrene (HIPS) plastic.

Fan Assembly and Control

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

Figure 60: Multi F Standard Wall-Mounted Indoor Unit.

Air Filter

The return air inlet has a factory-supplied primary removable, washable filter. The unit is also equipped with a secondary 3M Micro Dust filter. Filters are accessed from the front of the unit without the use of tools.

Airflow Guide Vanes

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

Microprocessor Control

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

Controls

The indoor unit casing has a factory-standard, integral infrared sensor to communicate with the supplied LG wireless handheld remote controller. An optional LG supplied wired controller is available as an additional accessory. Communication between the indoor units and the outdoor unit is accomplished through 18 AWG, four-core, stranded and shielded power / communication cable. The indoor unit has built-in wi-fi and can be controlled with LG's SmartThinQ app on a smart device. A field-supplied wi-fi network and smart device are required. The SmartThinQ app is free and is available for Android and iOS smart devices.

Condensate

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

Features

- Inverter (Variable speed fan)
- Comfort Air
- 3M filter
- Jet cool/Jet Heat
- Group control
- Self-cleaning indoor coil
- Auto operation
- Auto restart operation
- Built-in wi-fi
- Dehumidifying function
- Self-diagnostic function
- Wireless LCD remote control included

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STANDARD WALL-MOUNTED INDOOR UNITS

General Data / Specifications

MULTI F
MULTI F MAX

Table 21: Multi F Standard Wall-Mounted Indoor Unit General Data.

Model Name	LMN079HVT	LSN090HSV5	LSN120HSV5	LMN159HVT	LSN180HSV5	LMN249HVT
Nominal Cooling Capacity (Btu/h)[1]	7,000	9,000	12,000	14,300	18,000	24,000
Nominal Heating Capacity (Btu/h)[1]	8,100	10,900	13,600	15,600	21,600	25,600
Operating Range						
Cooling (°F WB)	57-77					
Heating (°F DB)	59-81					
Fan						
Type	Cross Flow					
Motor Output (W) x Qty.	30 x 1				60 x 1	
Motor/Drive	Brushless Digitally Controlled / Direct					
Airflow Rate CFM (H/M/L)	254 / 204 / 148	268 / 218 / 169	282 / 233 / 177	314 / 268 / 184	558 / 438 / 353	597 / 452 / 367
Unit Data						
Refrigerant Type[2]	R410A					
Refrigerant Control	EEV					
Power Supply V, Ø, Hz[3]	208-230, 1, 60					
Rated Amps (A)	0.4					
Sound Pressure Level dB(A) (H/M/L)[4]	35 / 31 / 26	36 / 32 / 27	38 / 34 / 29	42 / 38 / 32	44 / 38 / 34	46 / 41 / 36
Dimensions (W x H x D, in.)	32-15/16 x 12-1/8 x 7-7/16				39-9/32 x 13-19/32 x 8-9/32	
Net Unit Weight (lbs.)	18.3				25.6	
Shipping Weight (lbs.)	23.4				32.2	
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 18					
Heat Exchanger (Row x Column x Fin / inch) x Number	(2 x 23 x 22) x 1				(2 x 16 x 20) x 1	
Pipe Size						
Liquid (in.)	1/4					
Vapor (in.)	3/8				1/2	
Connection Size						
Liquid (in.)	1/4				3/8	1/4
Vapor (in.)	3/8				5/8	1/2
Drain O.D. / I.D. (in.)	27/32, 5/8					

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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).
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).

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs 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.

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STANDARD WALL-MOUNTED INDOOR UNITS

Dimensions

Figure 61: LMN079HVT, LSN090HSV5, LSN120HSV5, and LMN159HVT Dimensions.

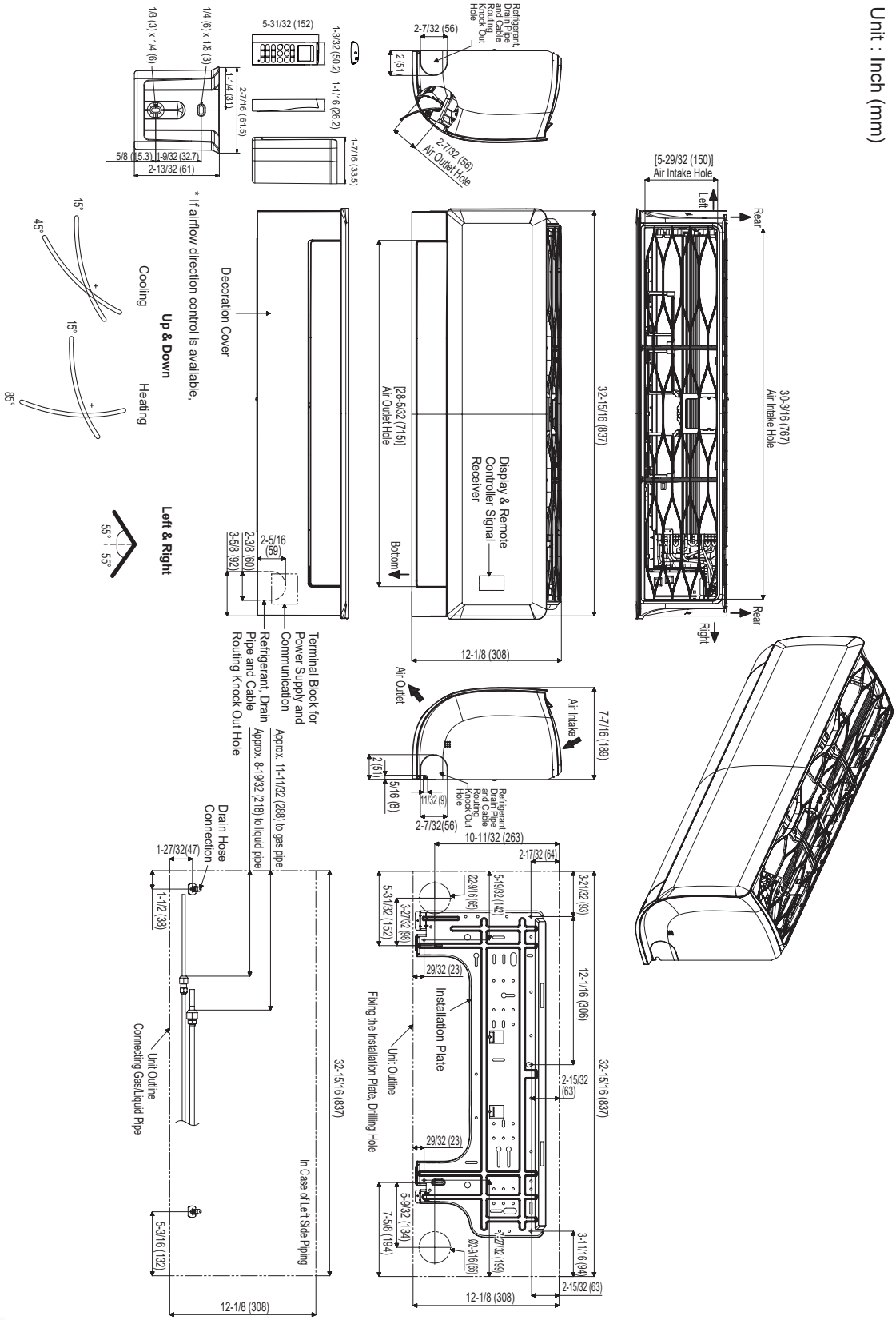

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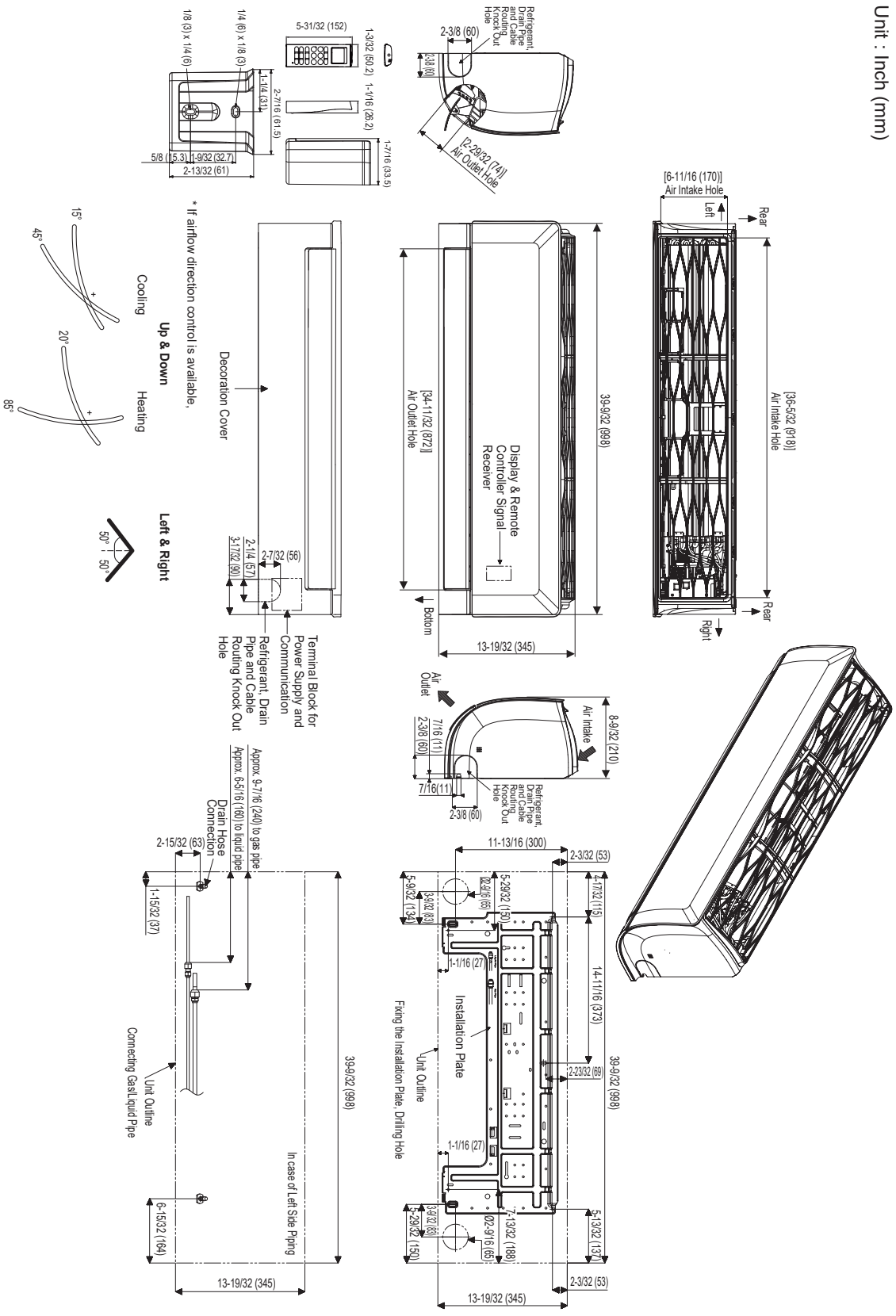
Figure 62: LSN180HSV5 and LMN249HVT Dimensions.



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STANDARD WALL-MOUNTED INDOOR UNITS

Cooling Capacity Table

Table 22: Multi F Standard Wall-Mounted Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LMN079HVT 7,000	14	6.86	4.68	7.29	4.95	7.71	4.79	8.02	4.89	8.57	4.93	8.99	5.03
	20	6.86	4.72	7.28	4.99	7.71	4.83	8.02	4.93	8.56	4.97	8.99	5.06
	25	6.85	4.76	7.28	5.02	7.70	4.86	8.01	4.97	8.55	5.01	8.98	5.10
	30	6.85	4.79	7.27	5.06	7.70	4.90	8.00	5.01	8.55	5.05	8.97	5.14
	35	6.84	4.83	7.27	5.10	7.69	4.94	8.00	5.04	8.54	5.09	8.97	5.18
	40	6.84	4.87	7.26	5.14	7.68	4.98	7.99	5.08	8.53	5.12	8.96	5.22
	45	6.83	4.90	7.25	5.18	7.68	5.01	7.99	5.12	8.53	5.16	8.95	5.26
	50	6.83	4.94	7.25	5.22	7.67	5.05	7.98	5.16	8.52	5.20	8.94	5.30
	55	6.82	4.97	7.24	5.25	7.67	5.09	7.97	5.19	8.51	5.24	8.94	5.34
	60	6.81	5.01	7.24	5.29	7.66	5.12	7.97	5.23	8.51	5.28	8.93	5.38
	65	6.81	5.05	7.23	5.33	7.66	5.16	7.96	5.27	8.50	5.31	8.92	5.42
	70	6.80	5.08	7.23	5.37	7.65	5.20	7.95	5.31	8.49	5.35	8.92	5.45
	75	6.64	5.00	7.06	5.29	7.48	5.13	7.79	5.24	8.33	5.29	8.75	5.39
	80	6.48	4.91	6.90	5.20	7.32	5.05	7.62	5.16	8.16	5.22	8.58	5.33
	85	6.31	4.82	6.73	5.12	7.15	4.97	7.46	5.09	7.99	5.15	8.41	5.26
	90	6.15	4.73	6.57	5.03	6.99	4.89	7.29	5.01	7.83	5.08	8.24	5.19
	95	5.98	4.68	6.39	4.98	6.81	4.85	**7.00**	**4.90**	7.64	5.05	8.06	5.17
	100	5.83	4.56	6.25	4.86	6.66	4.74	6.91	4.82	7.50	4.94	7.91	5.06
	105	5.69	4.43	6.10	4.73	6.52	4.62	6.82	4.75	7.35	4.83	7.77	4.96
	110	5.54	4.28	5.96	4.58	6.37	4.48	6.67	4.61	7.21	4.70	7.62	4.82
	115	5.39	4.15	5.81	4.45	6.23	4.36	6.53	4.49	7.06	4.58	7.48	4.71
	118	5.31	4.12	5.72	4.42	6.14	4.34	6.44	4.47	6.97	4.57	7.39	4.70
	122	5.28	4.11	5.69	4.41	6.11	4.33	6.41	4.46	6.94	4.56	7.36	4.70
LSN090HSV5 9,000	14	8.82	6.04	9.37	6.38	9.92	6.18	10.31	6.31	11.01	6.36	11.56	6.48
	20	8.82	6.09	9.36	6.43	9.91	6.23	10.31	6.36	11.01	6.41	11.55	6.53
	25	8.81	6.13	9.36	6.48	9.90	6.27	10.30	6.41	11.00	6.46	11.54	6.58
	30	8.80	6.18	9.35	6.53	9.90	6.32	10.29	6.46	10.99	6.51	11.54	6.63
	35	8.80	6.23	9.34	6.58	9.89	6.37	10.28	6.50	10.98	6.56	11.53	6.68
	40	8.79	6.28	9.33	6.63	9.88	6.42	10.27	6.55	10.97	6.61	11.52	6.73
	45	8.78	6.32	9.33	6.68	9.87	6.47	10.27	6.60	10.96	6.66	11.51	6.78
	50	8.78	6.37	9.32	6.73	9.87	6.51	10.26	6.65	10.96	6.71	11.50	6.83
	55	8.77	6.42	9.31	6.78	9.86	6.56	10.25	6.70	10.95	6.76	11.49	6.88
	60	8.76	6.46	9.31	6.83	9.85	6.61	10.24	6.75	10.94	6.81	11.48	6.93
	65	8.76	6.51	9.30	6.88	9.84	6.66	10.24	6.80	10.93	6.85	11.47	6.98
	70	8.75	6.56	9.29	6.92	9.84	6.70	10.23	6.85	10.92	6.90	11.47	7.03
	75	8.54	6.45	9.08	6.82	9.62	6.61	10.01	6.75	10.71	6.82	11.25	6.96
	80	8.33	6.34	8.87	6.71	9.41	6.51	9.80	6.66	10.49	6.73	11.03	6.87
	85	8.12	6.22	8.66	6.60	9.20	6.41	9.59	6.56	10.28	6.64	10.82	6.79
	90	7.91	6.10	8.45	6.48	8.99	6.31	9.37	6.46	10.06	6.55	10.60	6.70
	95	7.68	6.04	8.22	6.43	8.75	6.26	**9.00**	**6.32**	9.83	6.52	10.36	6.67
	100	7.50	5.88	8.03	6.26	8.57	6.11	8.88	6.22	9.64	6.37	10.17	6.53
	105	7.31	5.72	7.84	6.10	8.38	5.96	8.77	6.12	9.45	6.23	9.99	6.39
	110	7.12	5.52	7.66	5.90	8.19	5.78	8.58	5.94	9.26	6.06	9.80	6.22
	115	6.94	5.36	7.47	5.74	8.01	5.63	8.39	5.79	9.08	5.91	9.61	6.08
	118	6.82	5.32	7.36	5.70	7.89	5.60	8.28	5.76	8.96	5.89	9.50	6.06
	122	6.79	5.30	7.32	5.69	7.86	5.59	8.24	5.76	8.93	5.89	9.46	6.06

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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STANDARD WALL-MOUNTED INDOOR UNITS

Cooling Capacity Table

Table 23: Multi F Standard Wall-Mounted Indoor Units Cooling Capacity Table (continued).

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LSN120HSV5 12,000	14	11.76	8.51	12.49	8.99	13.22	8.70	13.75	8.88	14.69	8.96	15.42	9.13
	20	11.75	8.57	12.48	9.06	13.21	8.77	13.74	8.95	14.67	9.03	15.40	9.20
	25	11.75	8.64	12.48	9.13	13.20	8.84	13.73	9.02	14.66	9.10	15.39	9.27
	30	11.74	8.71	12.47	9.20	13.19	8.90	13.72	9.09	14.65	9.17	15.38	9.34
	35	11.73	8.77	12.46	9.27	13.18	8.97	13.71	9.16	14.64	9.24	15.37	9.41
	40	11.72	8.84	12.45	9.34	13.17	9.04	13.70	9.23	14.63	9.31	15.36	9.48
	45	11.71	8.90	12.44	9.41	13.16	9.11	13.69	9.30	14.62	9.38	15.35	9.55
	50	11.70	8.97	12.43	9.47	13.15	9.17	13.68	9.37	14.61	9.45	15.33	9.62
	55	11.69	9.03	12.42	9.54	13.14	9.24	13.67	9.44	14.60	9.52	15.32	9.70
	60	11.68	9.10	12.41	9.61	13.13	9.31	13.66	9.50	14.59	9.58	15.31	9.77
	65	11.67	9.17	12.40	9.68	13.12	9.38	13.65	9.57	14.57	9.65	15.30	9.84
	70	11.66	9.23	12.39	9.75	13.11	9.44	13.64	9.64	14.56	9.72	15.29	9.91
	75	11.38	9.08	12.11	9.60	12.83	9.31	13.35	9.51	14.27	9.60	15.00	9.79
	80	11.10	8.92	11.82	9.45	12.55	9.17	13.07	9.38	13.99	9.48	14.71	9.68
	85	10.83	8.76	11.54	9.29	12.26	9.03	12.78	9.24	13.70	9.36	14.42	9.56
	90	10.55	8.60	11.26	9.13	11.98	8.88	12.50	9.10	13.42	9.22	14.13	9.43
	95	10.25	8.51	10.96	9.05	11.67	8.82	**12.00**	**8.90**	13.10	9.18	13.81	9.39
	100	10.00	8.28	10.71	8.82	11.42	8.61	11.84	8.76	12.85	8.98	13.56	9.20
	105	9.75	8.05	10.46	8.59	11.17	8.40	11.69	8.62	12.60	8.78	13.31	9.01
	110	9.50	7.77	10.21	8.31	10.92	8.14	11.44	8.37	12.35	8.53	13.07	8.76
	115	9.25	7.54	9.96	8.08	10.67	7.92	11.19	8.15	12.10	8.33	12.82	8.56
	118	9.10	7.49	9.81	8.03	10.52	7.88	11.04	8.12	11.95	8.30	12.67	8.54
	122	9.05	7.47	9.76	8.01	10.48	7.87	10.99	8.11	11.90	8.29	12.62	8.53
LMN159HVT 14,300	14	14.02	10.23	14.89	10.80	15.76	10.46	16.39	10.68	17.50	10.77	18.37	10.97
	20	14.01	10.31	14.88	10.89	15.75	10.54	16.38	10.76	17.49	10.85	18.36	11.06
	25	14.00	10.39	14.87	10.97	15.74	10.62	16.36	10.85	17.47	10.94	18.34	11.15
	30	13.99	10.47	14.85	11.06	15.72	10.70	16.35	10.93	17.46	11.02	18.33	11.23
	35	13.98	10.55	14.84	11.14	15.71	10.79	16.34	11.01	17.45	11.11	18.32	11.32
	40	13.96	10.62	14.83	11.22	15.70	10.87	16.33	11.10	17.43	11.19	18.30	11.40
	45	13.95	10.70	14.82	11.31	15.69	10.95	16.31	11.18	17.42	11.27	18.29	11.49
	50	13.94	10.78	14.81	11.39	15.68	11.03	16.30	11.26	17.41	11.36	18.27	11.57
	55	13.93	10.86	14.80	11.47	15.66	11.11	16.29	11.34	17.39	11.44	18.26	11.66
	60	13.92	10.94	14.79	11.56	15.65	11.19	16.28	11.43	17.38	11.52	18.25	11.74
	65	13.91	11.02	14.78	11.64	15.64	11.27	16.26	11.51	17.37	11.61	18.23	11.83
	70	13.90	11.10	14.76	11.72	15.63	11.35	16.25	11.59	17.35	11.69	18.22	11.91
	75	13.57	10.92	14.43	11.55	15.29	11.19	15.91	11.44	17.01	11.55	17.87	11.78
	80	13.23	10.73	14.09	11.36	14.95	11.03	15.57	11.28	16.67	11.40	17.53	11.64
	85	12.90	10.53	13.76	11.17	14.61	10.86	15.23	11.11	16.33	11.25	17.18	11.49
	90	12.57	10.33	13.42	10.98	14.28	10.68	14.90	10.94	15.99	11.09	16.84	11.34
	95	12.21	10.23	13.06	10.88	13.91	10.60	**14.30**	**10.70**	15.61	11.03	16.46	11.29
	100	11.91	9.95	12.76	10.60	13.61	10.35	14.11	10.53	15.31	10.79	16.16	11.06
	105	11.61	9.68	12.46	10.33	13.32	10.09	13.93	10.37	15.02	10.56	15.87	10.83
	110	11.32	9.35	12.17	10.00	13.02	9.78	13.63	10.06	14.72	10.26	15.57	10.53
	115	11.02	9.07	11.87	9.71	12.72	9.52	13.33	9.80	14.42	10.01	15.27	10.29
	118	10.84	9.00	11.69	9.66	12.54	9.48	13.16	9.76	14.24	9.98	15.09	10.26
	122	10.78	8.98	11.63	9.64	12.48	9.46	13.10	9.74	14.18	9.97	15.03	10.25

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 columns and rows indicate reference data. When operating at this temperature, these values can be different if the system is not running consistently.

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STANDARD WALL-MOUNTED INDOOR UNITS

Cooling Capacity Table

Table 24: Multi F Standard Wall-Mounted Indoor Units Cooling Capacity Table (continued).

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LSN180HSV5 18,000	14	17.65	12.33	18.74	13.02	19.84	12.61	20.63	12.88	22.03	12.98	23.12	13.23
	20	17.63	12.43	18.73	13.13	19.82	12.71	20.61	12.98	22.01	13.09	23.11	13.33
	25	17.62	12.52	18.71	13.23	19.81	12.81	20.60	13.08	22.00	13.19	23.09	13.44
	30	17.60	12.62	18.70	13.33	19.79	12.91	20.58	13.18	21.98	13.29	23.07	13.54
	35	17.59	12.71	18.68	13.43	19.78	13.00	20.57	13.28	21.96	13.39	23.05	13.64
	40	17.58	12.81	18.67	13.53	19.76	13.10	20.55	13.38	21.94	13.49	23.04	13.75
	45	17.56	12.90	18.66	13.63	19.75	13.20	20.53	13.48	21.93	13.59	23.02	13.85
	50	17.55	13.00	18.64	13.73	19.73	13.30	20.52	13.58	21.91	13.69	23.00	13.95
	55	17.54	13.10	18.63	13.83	19.72	13.39	20.50	13.68	21.89	13.79	22.98	14.05
	60	17.52	13.19	18.61	13.93	19.70	13.49	20.49	13.78	21.88	13.89	22.97	14.16
	65	17.51	13.29	18.60	14.03	19.69	13.59	20.47	13.87	21.86	13.99	22.95	14.26
	70	17.50	13.38	18.58	14.13	19.67	13.69	20.46	13.97	21.84	14.09	22.93	14.36
	75	17.08	13.16	18.16	13.92	19.24	13.49	20.03	13.79	21.41	13.92	22.50	14.20
	80	16.66	12.93	17.74	13.70	18.82	13.30	19.60	13.60	20.98	13.75	22.06	14.03
	85	16.24	12.70	17.32	13.47	18.40	13.09	19.17	13.40	20.55	13.56	21.63	13.85
	90	15.82	12.46	16.90	13.23	17.97	12.88	18.75	13.19	20.12	13.37	21.20	13.67
	95	15.37	12.33	16.44	13.12	17.51	12.78	**18.00**	**12.90**	19.65	13.30	20.72	13.61
	100	14.99	12.00	16.06	12.78	17.13	12.47	17.77	12.70	19.28	13.01	20.35	13.33
	105	14.62	11.67	15.69	12.45	16.76	12.17	17.53	12.50	18.90	12.73	19.97	13.05
	110	14.24	11.27	15.32	12.05	16.39	11.79	17.16	12.13	18.53	12.36	19.60	12.70
	115	13.87	10.93	14.94	11.71	16.01	11.48	16.79	11.82	18.15	12.07	19.22	12.41
	118	13.65	10.85	14.72	11.64	15.79	11.42	16.56	11.77	17.93	12.03	19.00	12.37
	122	13.57	10.83	14.64	11.62	15.71	11.40	16.49	11.75	17.85	12.01	18.92	12.36
LMN249HVT 24,000	14	23.53	16.82	24.99	17.77	26.45	17.21	27.50	17.57	29.37	17.72	30.83	18.05
	20	23.51	16.95	24.97	17.91	26.43	17.34	27.48	17.70	29.35	17.85	30.81	18.19
	25	23.49	17.08	24.95	18.05	26.41	17.47	27.46	17.84	29.33	17.99	30.79	18.33
	30	23.47	17.21	24.93	18.19	26.39	17.61	27.44	17.98	29.30	18.13	30.76	18.47
	35	23.46	17.35	24.91	18.32	26.37	17.74	27.42	18.12	29.28	18.27	30.74	18.61
	40	23.44	17.48	24.89	18.46	26.35	17.88	27.40	18.25	29.26	18.41	30.72	18.75
	45	23.42	17.61	24.87	18.60	26.33	18.01	27.38	18.39	29.24	18.54	30.69	18.89
	50	23.40	17.74	24.85	18.74	26.31	18.14	27.36	18.52	29.21	18.68	30.67	19.03
	55	23.38	17.87	24.84	18.87	26.29	18.27	27.34	18.66	29.19	18.82	30.64	19.17
	60	23.37	18.00	24.82	19.01	26.27	18.41	27.32	18.79	29.17	18.95	30.62	19.31
	65	23.35	18.13	24.80	19.15	26.25	18.54	27.29	18.93	29.15	19.09	30.60	19.45
	70	23.33	18.26	24.78	19.28	26.23	18.67	27.27	19.07	29.13	19.23	30.57	19.59
	75	22.77	17.95	24.21	18.99	25.66	18.41	26.70	18.81	28.55	18.99	29.99	19.37
	80	22.21	17.65	23.65	18.69	25.09	18.14	26.13	18.55	27.97	18.75	29.42	19.14
	85	21.65	17.33	23.09	18.38	24.53	17.86	25.57	18.28	27.40	18.50	28.84	18.90
	90	21.09	17.00	22.53	18.06	23.96	17.57	25.00	18.00	26.83	18.24	28.27	18.65
	95	20.49	16.82	21.92	17.89	23.35	17.44	**24.00**	**17.60**	26.20	18.14	27.63	18.57
	100	19.99	16.37	21.42	17.44	22.85	17.02	23.69	17.33	25.70	17.75	27.13	18.19
	105	19.49	15.92	20.92	16.99	22.35	16.60	23.38	17.06	25.20	17.36	26.63	17.81
	110	18.99	15.38	20.42	16.44	21.85	16.09	22.88	16.55	24.70	16.87	26.13	17.32
	115	18.49	14.91	19.92	15.98	21.35	15.66	22.38	16.12	24.20	16.47	25.63	16.93
	118	18.19	14.81	19.62	15.88	21.05	15.59	22.08	16.05	23.90	16.41	25.33	16.88
	122	18.10	14.77	19.52	15.85	20.95	15.56	21.98	16.03	23.81	16.39	25.23	16.86

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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STANDARD WALL-MOUNTED INDOOR UNITS

Heating Capacity Table

Table 25: Multi F Standard Wall-Mounted Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LMN079HVT 8,100	0	-0.4	4.17	4.11	4.07	4.05	3.99	3.82
	5	4.5	4.70	4.64	4.60	4.58	4.52	4.34
	10	9	5.22	5.17	5.13	5.11	5.05	4.87
	17	15	5.93	5.87	5.83	**5.81**	5.75	5.56
	20	19	6.19	6.13	6.09	6.08	6.02	5.81
	25	23	6.63	6.57	6.53	6.52	6.46	6.22
	30	28	7.01	6.96	6.92	6.90	6.84	6.63
	35	32	7.40	7.34	7.30	7.28	7.22	7.04
	40	36	7.74	7.68	7.64	7.62	7.56	7.39
	45	41	8.08	8.02	7.98	7.96	7.90	7.73
	47	43	8.22	8.16	8.12	**8.10**	8.04	7.87
	50	46	8.35	8.29	8.25	8.23	8.17	7.98
	55	51	8.57	8.51	8.47	8.45	8.39	8.16
	60	56	8.57	8.51	8.47	8.45	8.39	8.20
	63	59	8.57	8.51	8.47	8.45	8.39	8.22
	68	64	8.57	8.51	8.47	8.45	8.39	8.25
LSN090HSV5 10,900	0	-0.4	5.61	5.53	5.48	5.45	5.37	5.14
	5	4.5	6.32	6.24	6.18	6.16	6.08	5.85
	10	9	7.03	6.95	6.90	6.88	6.79	6.56
	17	15	7.98	7.90	7.85	**7.82**	7.75	7.48
	20	19	8.33	8.26	8.21	8.18	8.09	7.82
	25	23	8.93	8.85	8.79	8.77	8.69	8.37
	30	28	9.44	9.36	9.31	9.29	9.20	8.93
	35	32	9.96	9.87	9.82	9.79	9.72	9.47
	40	36	10.42	10.33	10.28	10.25	10.18	9.94
	45	41	10.87	10.80	10.74	10.71	10.64	10.40
	47	43	11.06	10.98	10.93	**10.90**	10.82	10.59
	50	46	11.24	11.15	11.10	11.08	10.99	10.73
	55	51	11.53	11.46	11.40	11.37	11.30	10.98
	60	56	11.53	11.46	11.40	11.37	11.30	11.03
	63	59	11.53	11.46	11.40	11.37	11.30	11.06
	68	64	11.53	11.46	11.40	11.37	11.30	11.11
LSN120HSV5 13,600	0	-0.4	7.00	6.90	6.83	6.80	6.70	6.50
	5	4.5	7.89	7.78	7.71	7.69	7.59	7.40
	10	9	8.78	8.67	8.60	8.58	8.48	8.31
	17	15	9.95	9.86	9.79	**9.76**	9.67	9.47
	20	19	10.40	10.30	10.23	10.20	10.10	9.90
	25	23	11.14	11.03	10.96	10.95	10.85	10.60
	30	28	11.78	11.67	11.60	11.59	11.49	11.30
	35	32	12.42	12.31	12.24	12.21	12.13	11.99
	40	36	13.00	12.89	12.82	12.79	12.70	12.58
	45	41	13.56	13.46	13.39	13.36	13.28	13.16
	47	43	13.80	13.70	13.63	**13.60**	13.50	13.40
	50	46	14.02	13.91	13.84	13.82	13.72	13.59
	55	51	14.39	14.29	14.22	14.19	14.10	13.90
	60	56	14.39	14.29	14.22	14.19	14.10	13.96
	63	59	14.39	14.29	14.22	14.19	14.10	14.00
	68	64	14.39	14.29	14.22	14.19	14.10	14.06

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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STANDARD WALL-MOUNTED INDOOR UNITS

Heating Capacity Table

Table 26: Multi F Standard Wall-Mounted Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LMN159HVT 15,600	0	-0.4	8.03	7.91	7.84	7.80	7.69	7.35
	5	4.5	9.05	8.93	8.86	8.82	8.71	8.37
	10	9	10.06	9.95	9.87	9.83	9.72	9.38
	17	15	11.42	11.31	11.23	**11.19**	11.08	10.71
	20	19	10.03	11.81	11.73	11.70	11.59	11.19
	25	23	12.77	12.66	12.58	12.55	12.43	11.98
	30	28	13.51	13.40	13.32	13.28	13.17	12.77
	35	32	14.25	14.13	14.06	14.02	13.91	13.57
	40	36	14.90	14.79	14.71	14.67	14.56	14.23
	45	41	15.56	15.45	15.37	15.34	15.22	14.88
	47	43	15.83	15.71	15.64	**15.60**	15.49	15.15
	50	46	16.08	15.97	15.89	15.86	15.74	15.36
	55	51	16.51	16.39	16.32	16.28	16.17	15.71
	60	56	16.51	16.39	16.32	16.28	16.17	15.78
	63	59	16.51	16.39	16.32	16.28	16.17	15.83
	68	64	16.51	16.39	16.32	16.28	16.17	15.89
LSN180HSV5 21,600	0	-0.4	11.11	10.96	10.85	10.80	10.64	10.18
	5	4.5	12.52	12.37	12.26	12.21	12.06	11.58
	10	9	13.93	13.77	13.67	13.61	13.46	12.99
	17	15	15.81	15.65	15.55	**15.49**	15.34	14.84
	20	19	16.51	16.36	16.25	16.20	16.04	15.49
	25	23	17.69	17.53	17.43	17.37	17.22	16.59
	30	28	18.70	18.55	18.44	18.39	18.24	17.69
	35	32	19.72	19.56	19.46	19.41	19.25	18.79
	40	36	20.63	20.48	20.37	20.32	20.17	19.70
	45	41	21.55	21.39	21.29	21.24	21.08	20.61
	47	43	21.91	21.76	21.65	**21.60**	21.44	20.98
	50	46	22.26	22.11	22.01	21.95	21.80	21.27
	55	51	22.86	22.70	22.59	22.53	22.38	21.76
	60	56	22.86	22.70	22.59	22.53	22.38	21.85
	63	59	22.86	22.70	22.59	22.53	22.38	21.91
	68	64	22.86	22.70	22.59	22.53	22.38	22.02
LMN249HVT 25,600	0	-0.4	13.17	12.99	12.87	12.80	12.61	12.06
	5	4.5	14.84	14.66	14.54	14.47	14.29	13.73
	10	9	16.51	16.33	16.20	16.14	15.96	15.40
	17	15	18.74	18.56	18.42	**18.37**	18.18	17.59
	20	19	19.57	19.39	19.27	19.20	19.01	18.37
	25	23	20.96	20.77	20.65	20.59	20.40	19.66
	30	28	22.17	21.98	21.85	21.80	21.61	20.96
	35	32	23.37	23.19	23.07	23.00	22.82	22.26
	40	36	24.45	24.27	24.15	24.08	23.90	23.34
	45	41	25.53	25.35	25.23	25.16	24.98	24.42
	47	43	25.97	25.79	25.67	**25.60**	25.41	24.86
	50	46	26.39	26.21	26.08	26.02	25.83	25.20
	55	51	27.09	26.90	26.78	26.71	26.53	25.79
	60	56	27.09	26.90	26.78	26.71	26.53	25.90
	63	59	27.09	26.90	26.78	26.71	26.53	25.97
	68	64	27.09	26.90	26.78	26.71	26.53	26.08

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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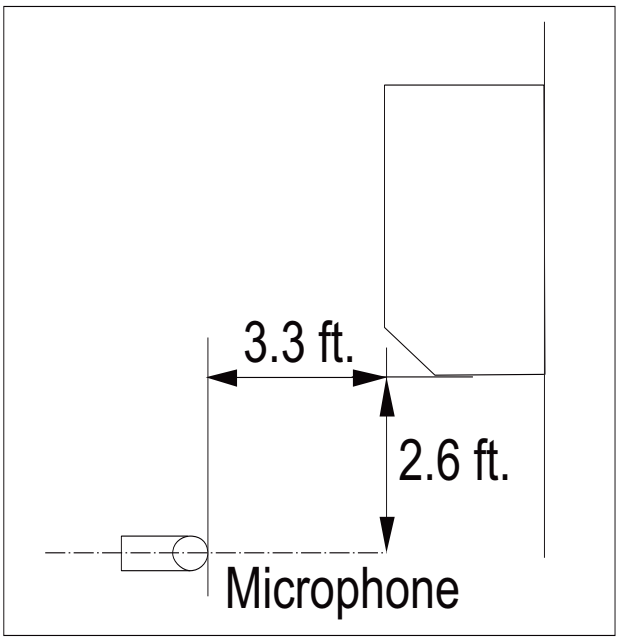
STANDARD WALL-MOUNTED INDOOR UNITS

Acoustic Data

Figure 63: Sound Pressure Level Measurement Location.



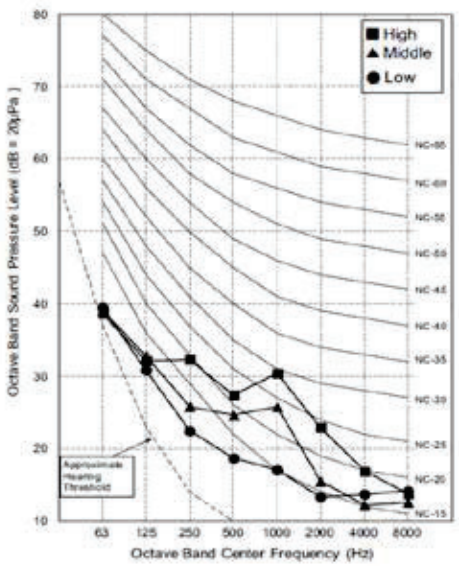
- Measurement taken 2.6' below the bottom of the unit and at a distance of 3.3' from face of unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient)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

Table 27: Sound Pressure Levels (dB[A]).

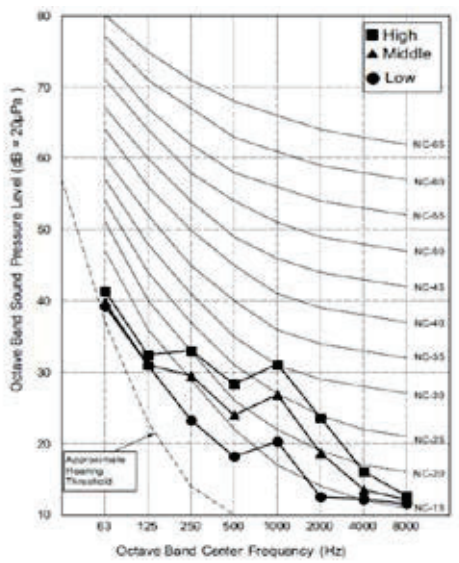
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LMN079HVT	35	31	26
LSN090HSV5	36	32	27
LSN120HSV5	38	34	29
LMN159HVT	42	38	32
LSN180HSV5	44	38	34
LMN249HVT	46	41	36

Figure 64: LMN079HVT, LSN090HSV5, and LSN120HSV5 Sound Pressure Level Diagrams.

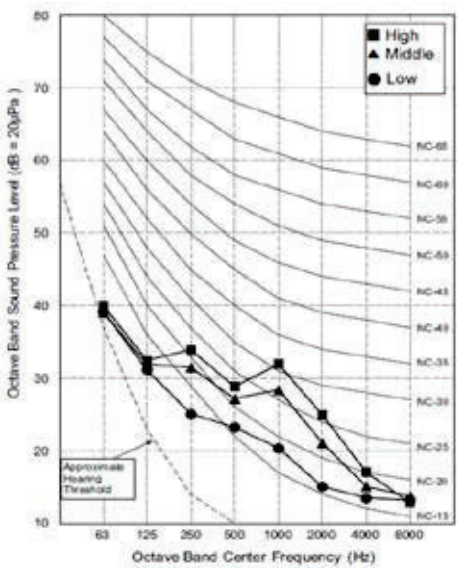
LMN079HVT



LSN090HSV5



LSN120HSV5



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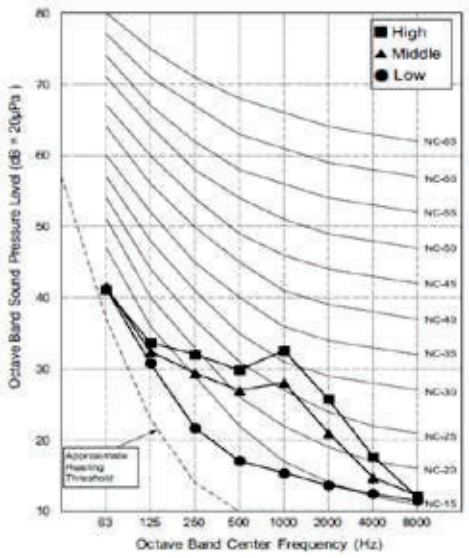
STANDARD WALL-MOUNTED INDOOR UNITS

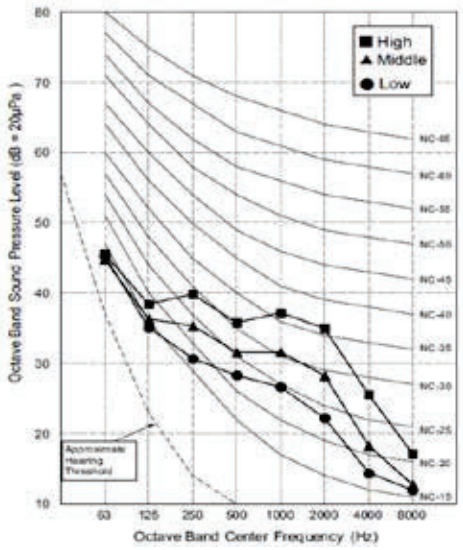
Acoustic Data

Figure 65: LMN159HVT, LSN180HSV5, and LMN249HVT Sound Pressure Level Diagrams.

LMN159HVT



LSN180HSV5



LMN249HVT

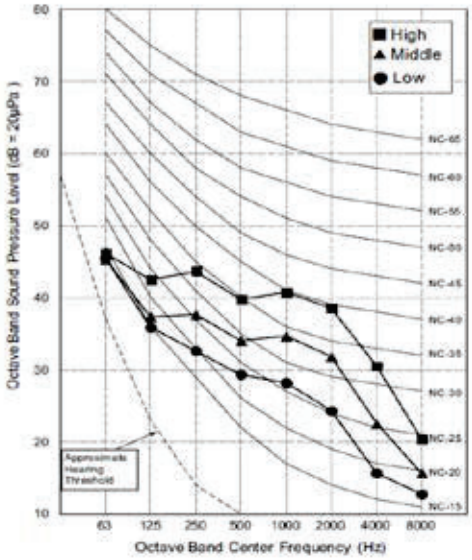


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Figure 66: LMN079HVT, LSN090HSV5, LSN120HSV5, LMN159HVT Air Velocity and Temperature Distribution Charts.

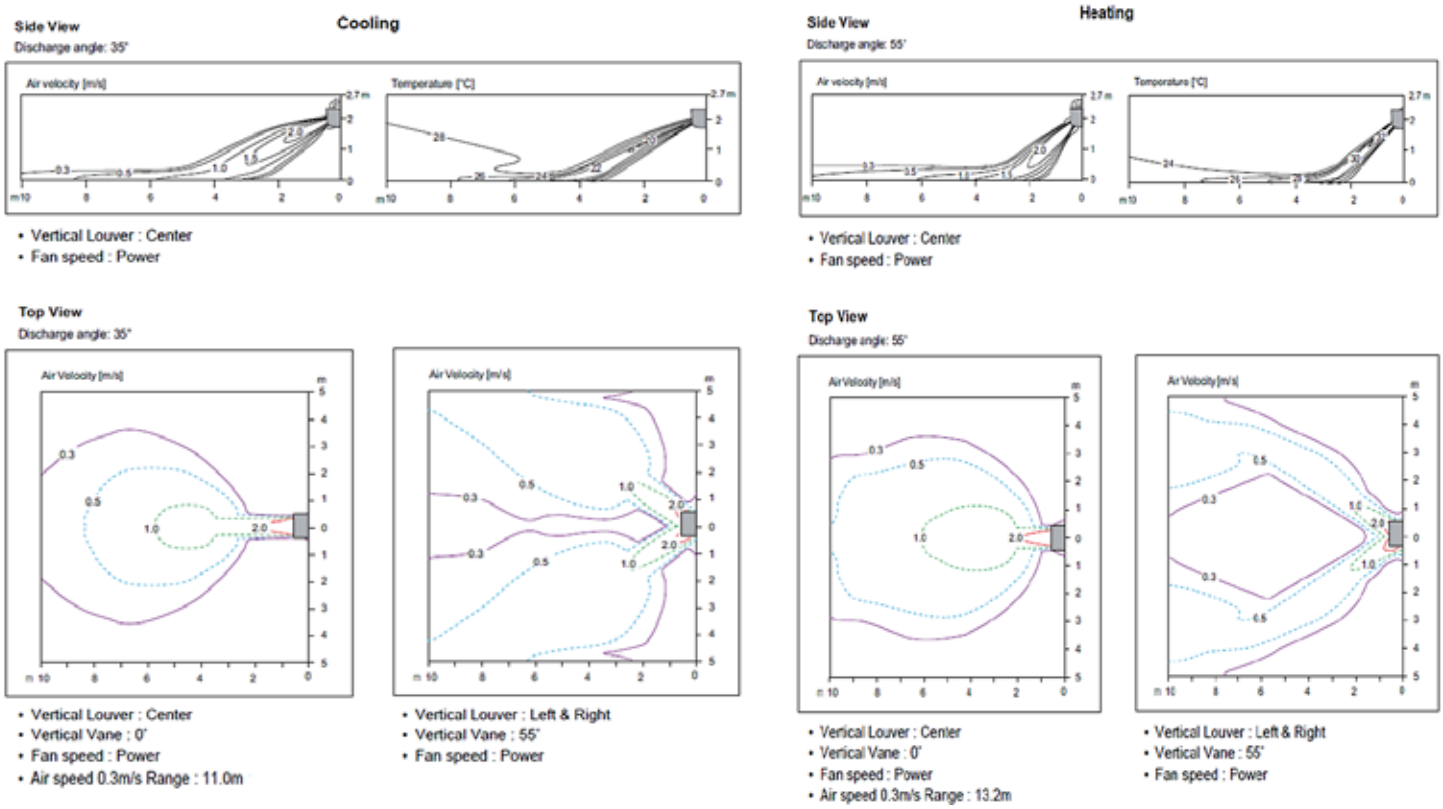
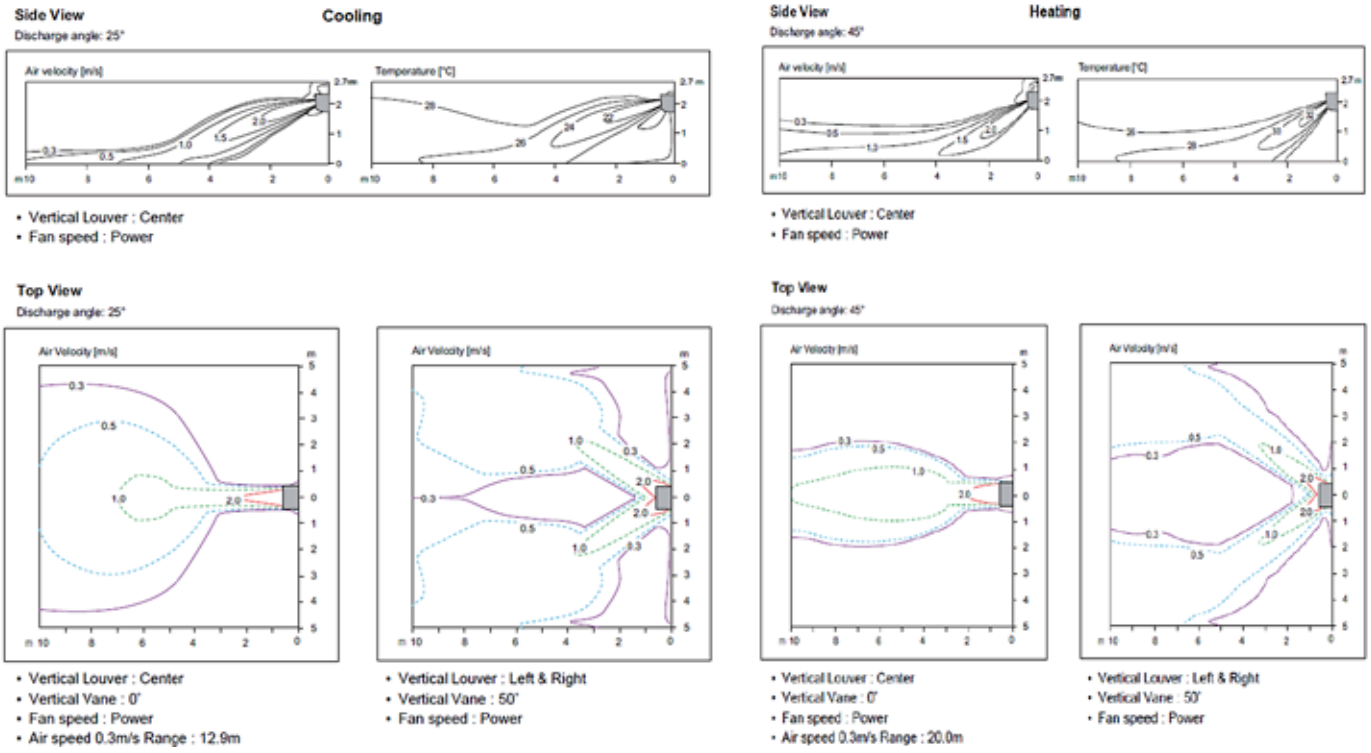


Figure 67: LSN180HSV5 Air Velocity and Temperature Distribution Charts.



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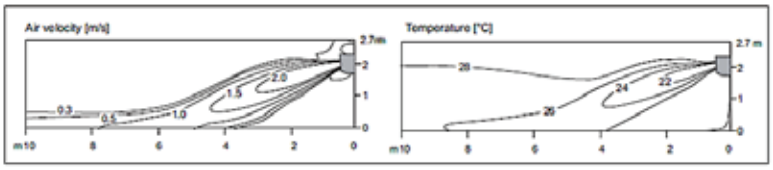
STANDARD WALL-MOUNTED INDOOR UNITS

Air Velocity and Temperature Distribution

Figure 68: LMN249HVT Air Velocity and Temperature Distribution Charts.

Cooling

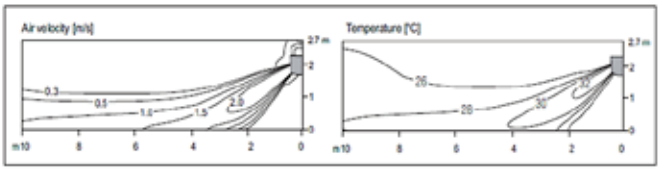
Side View
Discharge angle: 25°



- Vertical Louver : Center
- Fan speed : Power

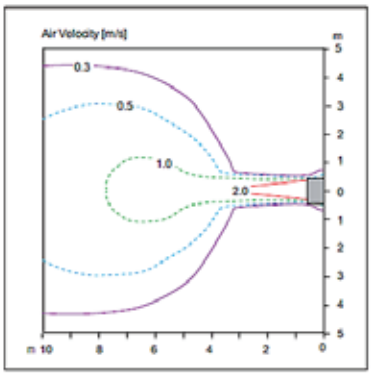
Heating

Side View
Discharge angle: 45°

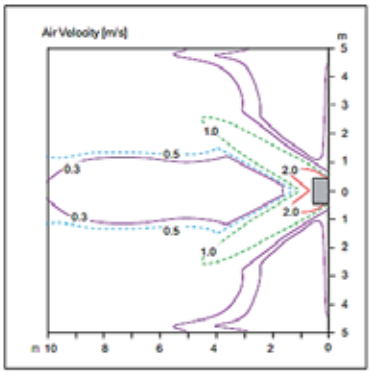


- Vertical Louver : Center
- Fan speed : Power

Top View
Discharge angle: 25°

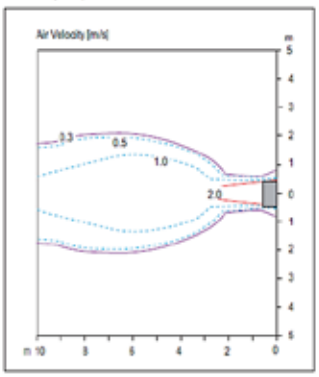


- Vertical Louver : Center
- Vertical Vane : 0°
- Fan speed : Power
- Air speed 0.3m/s Range : 15.0m

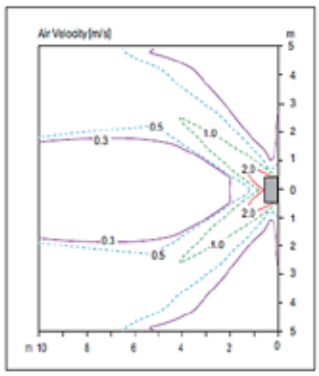


- Vertical Louver : Left & Right
- Vertical Vane : 50°
- Fan speed : Power

Top View
Discharge angle: 45°



- Vertical Louver : Center
- Vertical Vane : 0°
- Fan speed : Power
- Air speed 0.3m/s Range : 20.0m



- Vertical Louver : Left & Right
- Vertical Vane : 50°
- Fan speed : Power

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STANDARD WALL-MOUNTED INDOOR UNITS

Refrigerant Flow Diagram

Figure 69: Multi F Standard Wall-Mounted Indoor Unit Refrigerant Flow Diagram.

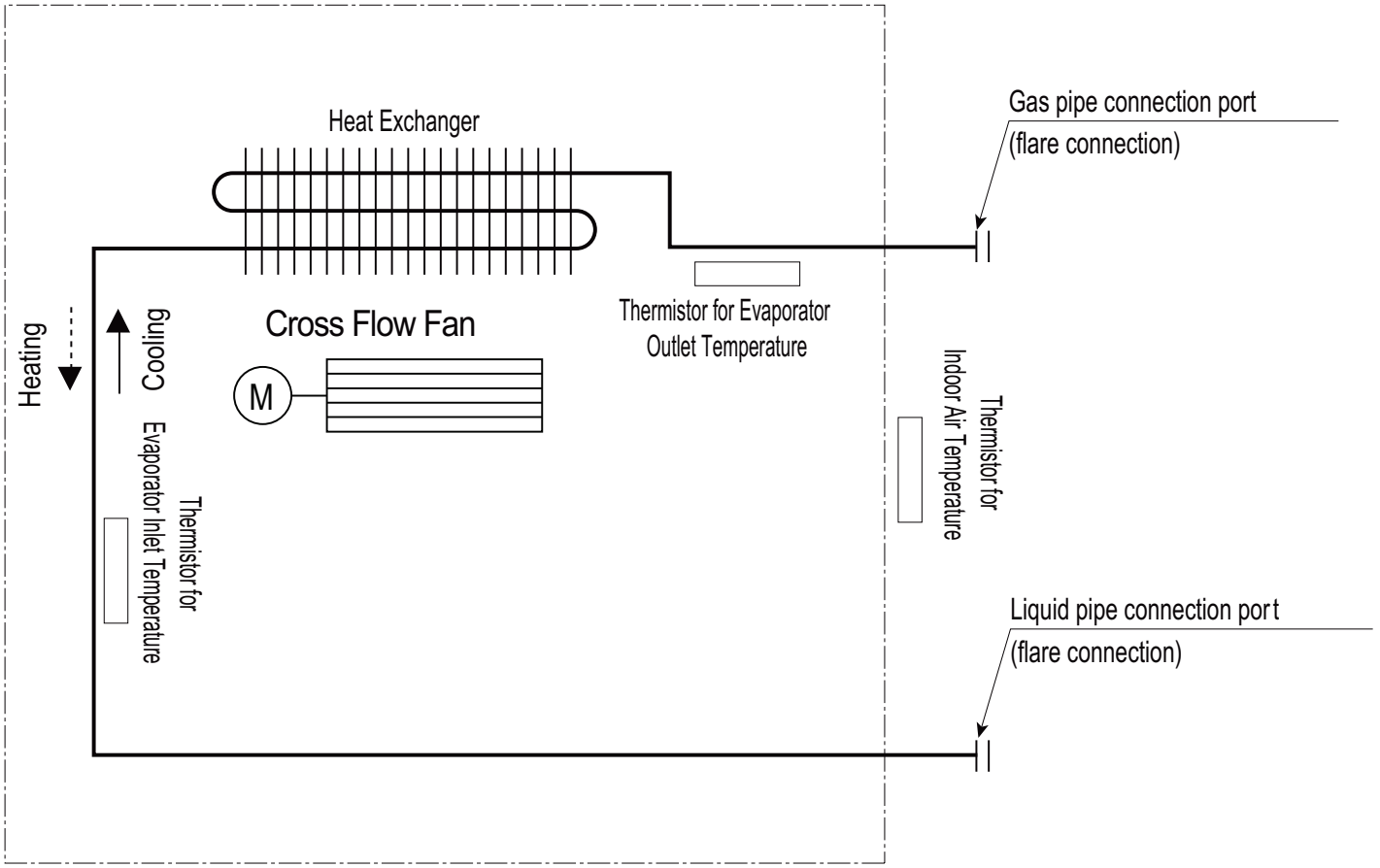

Table 28: Multi F Standard Wall-Mounted Indoor Unit Refrigerant Pipe Sizes.

Model No.	Vapor (inch)	Liquid (inch)
LMN079HVT	Ø3/8	Ø1/4
LSN090HSV5		
LSN120HSV5		
LMN159HVT		
LSN180HSV5	Ø1/2	
LMN249HVT		

Table 29: Multi F Standard Wall-Mounted Indoor Unit Refrigerant Pipe Connections.

Model No.	Vapor (inch)	Liquid (inch)
LMN079HVT	Ø3/8	Ø1/4
LSN090HSV5		
LSN120HSV5		
LMN159HVT		
LSN180HSV5	Ø5/8	Ø3/8
LMN249HVT	Ø1/2	Ø1/4

Table 30: Multi F LSNxxxHSV5 Standard Wall-Mounted Indoor Unit Thermistor Details.

Description (Based on Cooling Mode)	PCB Connector
Indoor Air Temperature Thermistor	CN-TH1
Evaporator Inlet Temperature Thermistor	
Evaporator Middle Temperature Thermistor	CN-TH2
Evaporator Outlet Temperature Thermistor	
Water Level Sensor (Optional)	CN-TH3

Table 31: Multi F LMNxxxHVT Standard Wall-Mounted Indoor Unit Thermistor Details.

Description (Based on Cooling Mode)	PCB Connector
Indoor Air Temperature Thermistor	CN-TH1
Evaporator Inlet Temperature Thermistor	
Evaporator Outlet Temperature Thermistor	CN-TH2
Water Level Sensor (Optional)	CN-TH3

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Figure 70: Multi F Standard Wall-Mounted LSN090HSV5, LSN120HSV5, LSN180HSV5 Indoor Units Wiring Diagram.

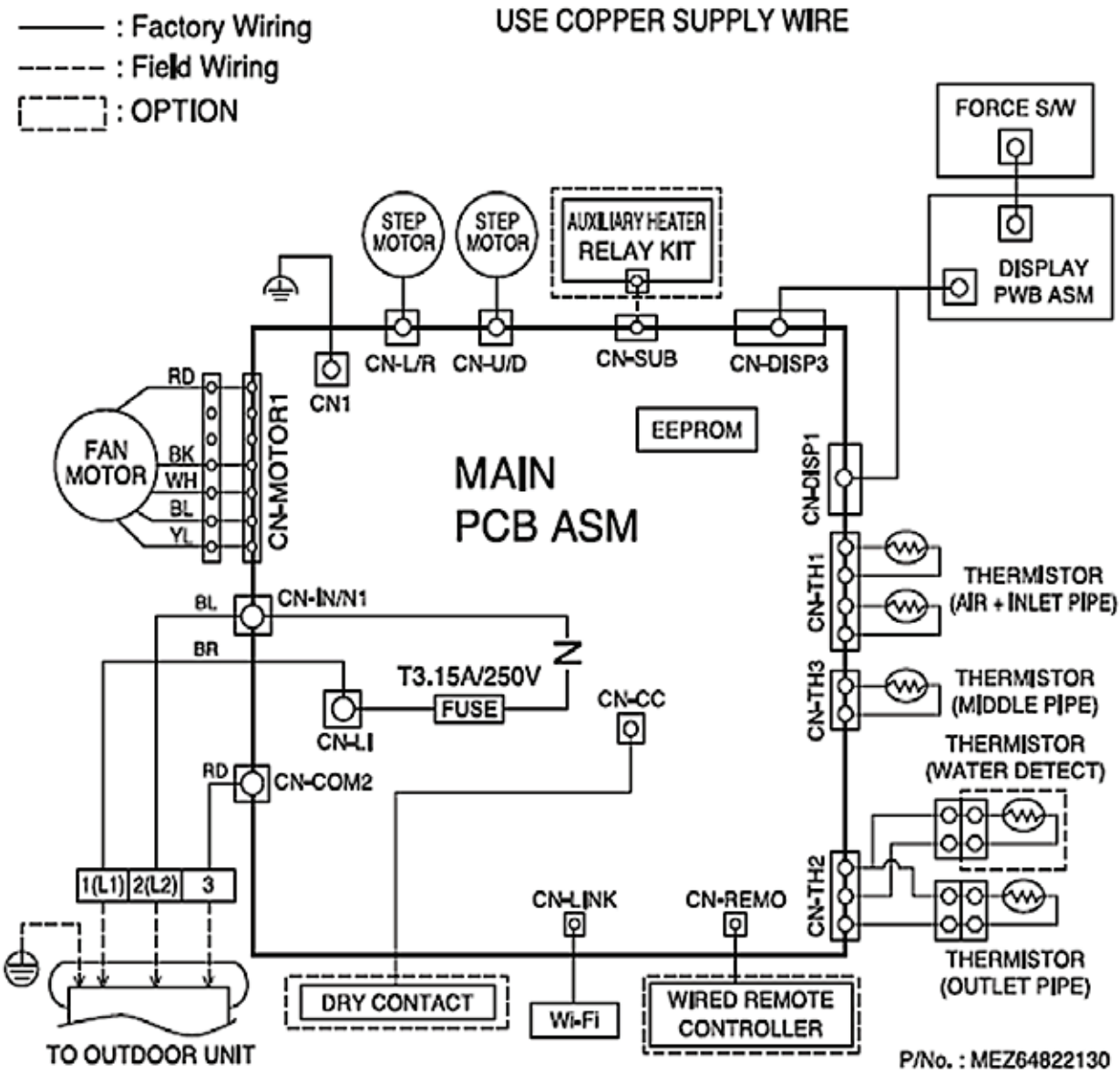

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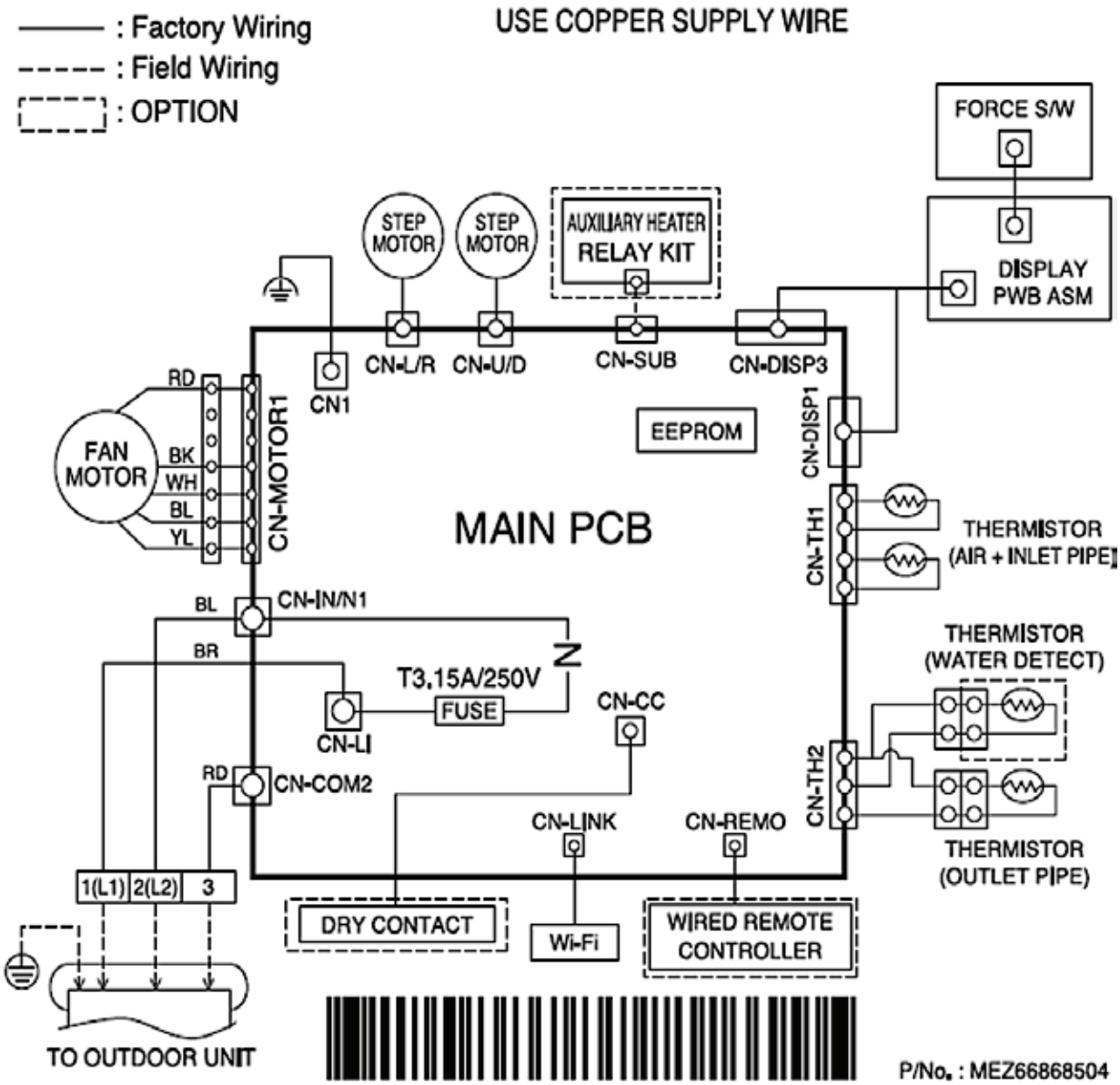
Figure 71: Multi F Standard Wall-Mounted LMN079HVT, LMN159HVT, LMN249HVT Indoor Unit Wiring Diagram.



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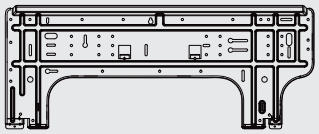
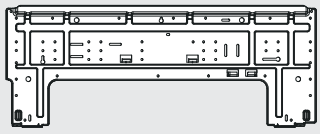
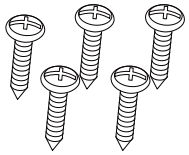
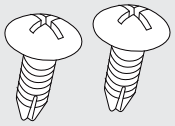
STANDARD WALL-MOUNTED INDOOR UNITS

Factory Supplied Parts and Materials

Factory Supplied Parts

Table 32: Parts Table.

Part	Quantity	Image
Installation Plate	One (1)	 7,000 ~ 15,000 Btu/h Indoor Units  18,000 and 24,000 Btu/h Indoor Units
Type “A” Screws	Five (5)	
Type “B” Screws (M4 x 12L)	Two (2)	
Wireless Controller with Holder AKB74955602	One (1)	

Factory Supplied Materials

- Owner’s Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Spanner (Half union)
- Thermometer

⚠ WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit’s components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

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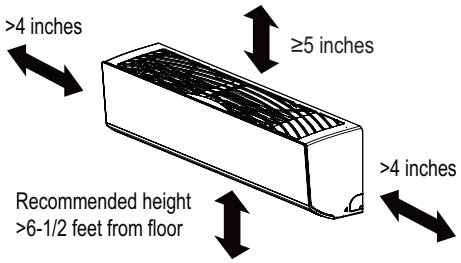
STANDARD WALL-MOUNTED INDOOR UNITS

Installation and Best Layout Practices

MULTI F
MULTI F MAX

Selecting the Best Location

Figure 72: Minimum Clearance Requirements.



Do's

- Place the unit where air circulation will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient space from the ceiling and floor.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit where it can be easily connected to the outdoor unit or branch distribution unit.

Don'ts

- *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- *Do not install the unit near high-frequency generators.*
- *Do not install the unit near a doorway.*

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

Note:

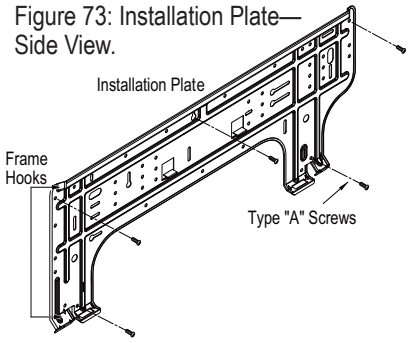
- *Indoor units (IDUs) must not be placed in an environment where the IDUs will be exposed to harmful volatile organic compounds (VOCs) or in environments where there is improper air make up or supply or inadequate ventilation. If there are concerns about VOCs in the environment where the IDUs are installed,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

Installing in an Area Exposed to Unconditioned Air

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

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

Figure 73: Installation Plate—Side View.



Mounting the Installation Plate

The mounting wall must be strong and solid enough to protect the unit from vibration.

- Mount the installation plate on the wall using the Type "A" screws. If mounting the unit on concrete, consider using anchor bolts.
- Always mount the installation plate horizontally. Measure the wall and mark the centerline using thread and a level.

Figure 74: Installation Plate for LMN079HVT, LSN090HSV5, LSN120HSV5, and LMN159HVT Units.

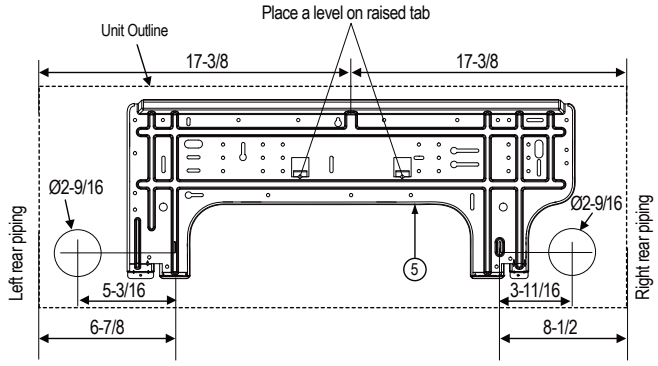
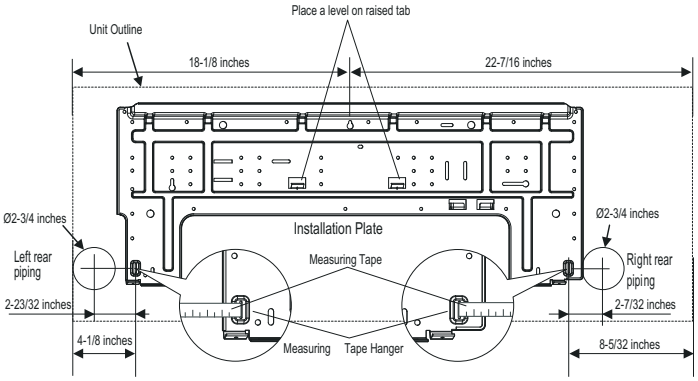


Figure 75: Installation Plate for LSN180HSV5 and LMN249HVT Units.



Note:

If the unit is installed near a body of water, certain components are at risk of being corroded. Appropriate anti-corrosion methods must be taken for the unit and all components.

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STANDARD WALL-MOUNTED INDOOR UNITS

Installation and Best Layout Practices

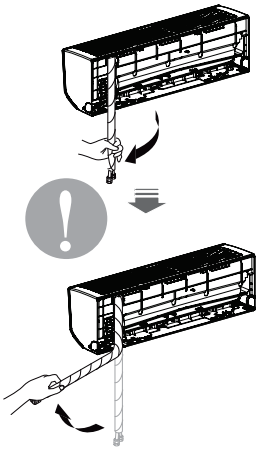
Preparing for Installation

Prepare the refrigerant piping and drain hose (indoor unit piping) for installation through the wall: press on the top of the tubing clamp and slowly guide the piping / hose down (depending on installation requirements, then to the left or right). Relock the tubing clamp after the piping / hose are released.

Note:

⃠ *Do not bend the piping / drain hose from side to side; it will damage the components.*

Figure 76: Preparing for Installation.



Hanging the Indoor Unit Frame

1. Attach the three (3) hooks on the top of the indoor unit to the top edge of the installation plate. Verify the hooks are properly attached to the installation plate by gently shaking the indoor unit from side to side.
2. Unlock the tubing clamp from the indoor unit frame. For easier access between the bottom of the indoor unit and the wall, prop the clamp between the indoor unit frame and installation plate.
3. Remove the screw covers at the bottom of the indoor unit, unscrew the two (2) screws, remove the frame cover, remove the piping connection cover, and position the piping for installation (down, back, left, or right).

Figure 77: Locking the Indoor Unit onto the Installation Plate.

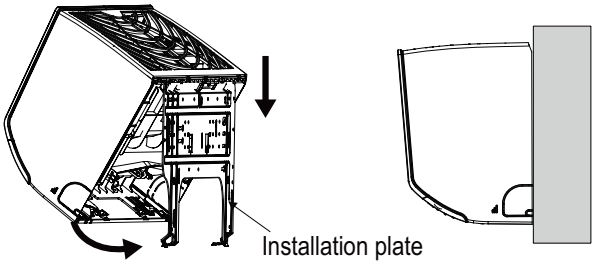


Figure 78: Accessing the Back of the Indoor Unit.

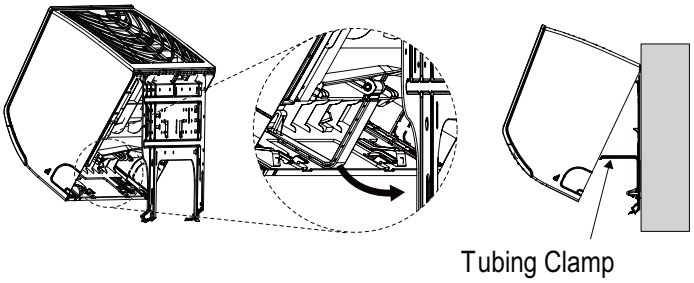


Figure 79: Removing the Frame Cover.

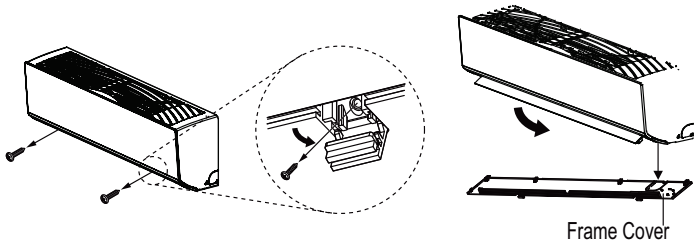


Figure 80: Exterior Back View of Indoor Unit.

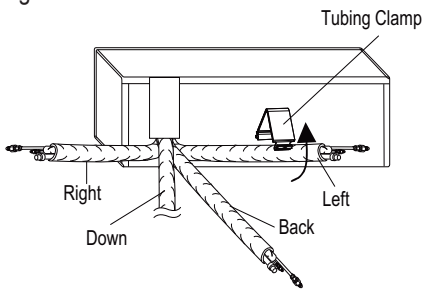


Figure 81: Piping Installed to the Left.

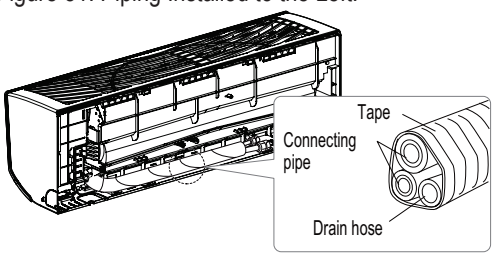
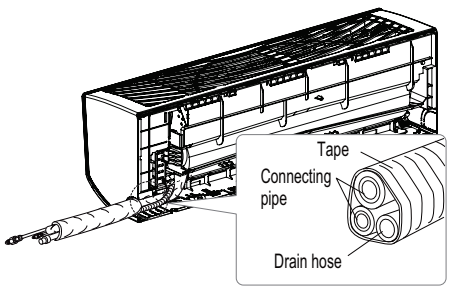


Figure 82: Piping Installed to the Right.



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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

- *Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.*

Note:

- *Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.*

A voltage drop will cause the following problems:

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

Connect Power Wiring and Communications Cable

1. Insert the power wiring / communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) through the bottom of the indoor unit.
2. Connect each wire to its appropriate terminal on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.
3. Secure power wiring/communications cable with cable restraint.

Figure 83: Connecting Power Wiring / Communications Cable.

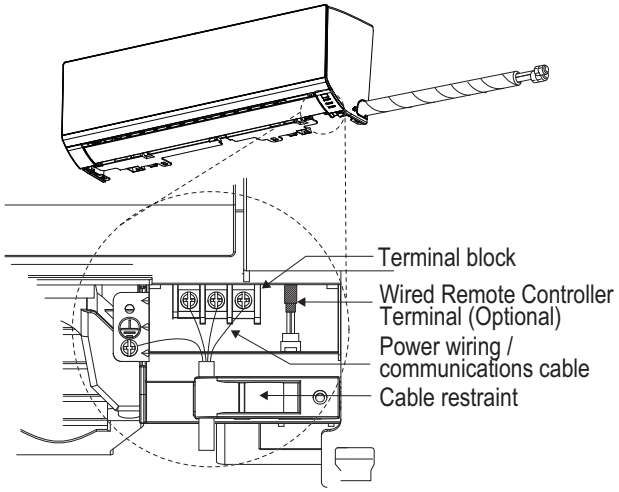


Figure 84: Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections—LMN079HVT, LSN090HSV5, LSN120HSV5 and LMN159HVT.

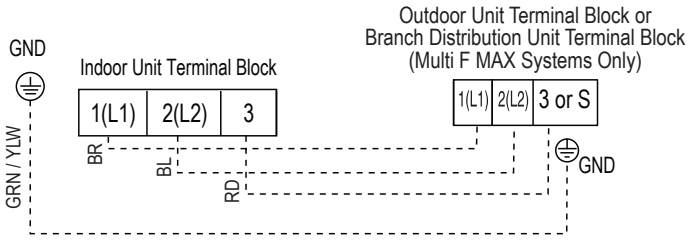
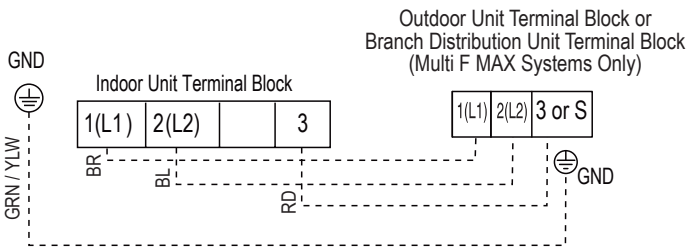


Figure 85: Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections— LSN180HSV5 and LMN249HVT.



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Controller Options

Standard wall-mounted indoor units include a wireless controller (AKB74955602), but optional LG-supplied wired controllers are available.

Wireless Controller

Figure 86: AKB74955602 Wireless Controller.

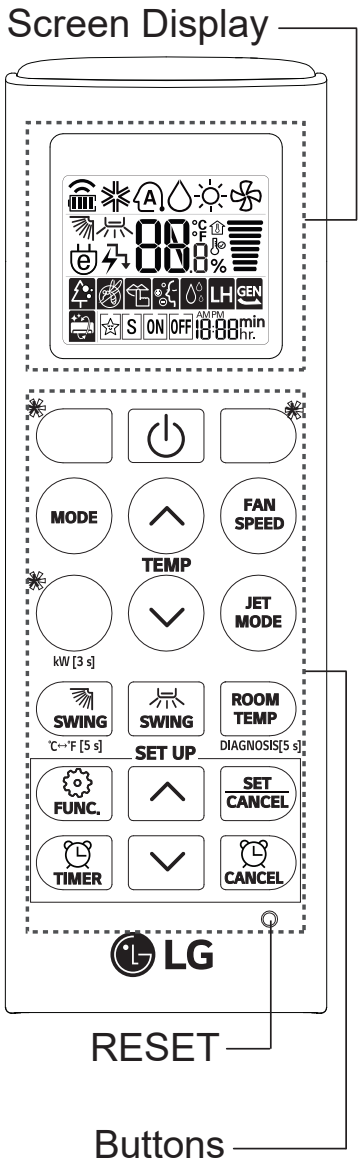

Table 33: AKB74955602 Wireless Controller Functions.

Button	Display Screen	Description
		To purify the air by removing particles that enters the indoor unit.
		To reduce noise from outdoor units.
		To keep your skin moisturized by generating ion clusters.
	Po	To lower indoor humidity quickly.
	LH	To maintain a minimum indoor temperature and prevent indoor objects from freezing.
		To fan away a mosquito.
		To remove moisture generated inside the indoor unit.
		To make the comfortable sleep environment.
RESET	-	To Initialize the remote control settings.

Button	Display Screen	Description
	-	To turn on/off the air conditioner.
		To adjust the desired room temperature in cooling, heating or auto changeover mode.
MODE		To select the cooling mode.
		To select the heating mode.
		To select the dehumidification mode.
		To select the fan mode.
		To select the auto changeover/auto operation mode.
JET MODE	Po	To change room temperature quickly.
FAN SPEED		To adjust the fan speed.
		To adjust the air flow direction vertically or horizontally.
	S ON OFF	To turn on/off air conditioner automatically at desired time.
SET/ CANCEL	-	To set/cancel the special functions and timer.
	-	To cancel the timer settings.
	-	To adjust time.
*LIGHT OFF	-	To set the brightness of the display on the indoor unit.
ROOM TEMP		To display the room temperature.
°C ↔ °F [5 s]	°C °F	To change unit between °C and °F.
*ENERGY SAVING		To minimize power consumption.
*COMFORT AIR		To adjust the air flow to deflect wind.
kW[3 s]	-	To set whether or not to display information regarding energy.
*ENERGY CTRL		To bring the effect of the power saving.
*COMFORT SLEEP		To make the comfortable sleep environment.
DIAGNOSIS [5 s]	-	To conveniently check maintenance information of a product.

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Wired Controller Connections

Figure 87: Wired Controller Connection on Indoor Unit Terminal Block—LMN079HVT, LSN090HSV5, LSN120HSV5, and LMN159HVT Models.

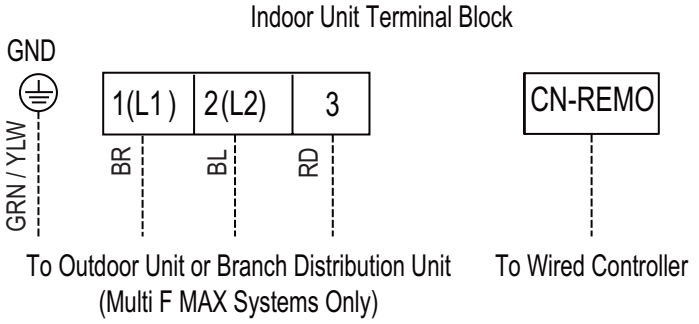
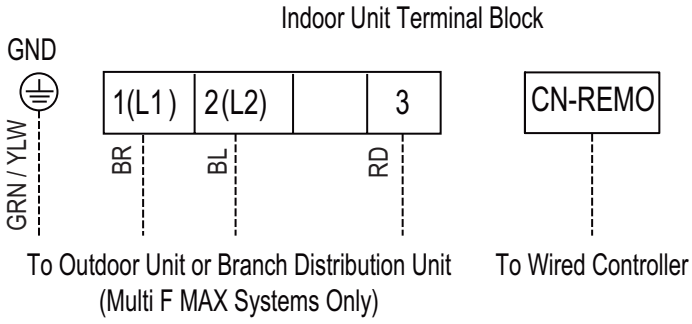


Figure 88: Wired Controller Connection on Indoor Unit Terminal Block—LSN180HSV5 and LMN249HVT Models.



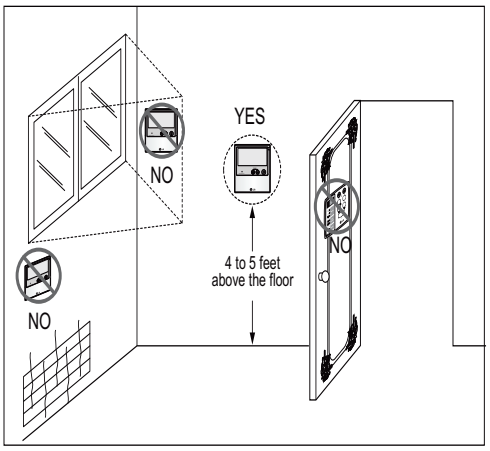
Wired Controller Placement

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

⃠ Do not install the wired controller near or in:

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

Figure 89: Proper Location for the Wired Controller.



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Hanging the Wired Controller

1. The controller wiring / cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring / cable on applicable side.

2. Choose and mark the area of installation. Use the provided parts and screw the wall plate into place. Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring / cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 91: Removing the Cable Guide Grooves.

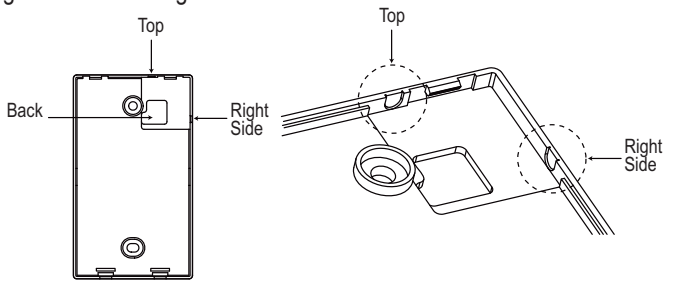


Figure 92: Attaching the Wall Plate.

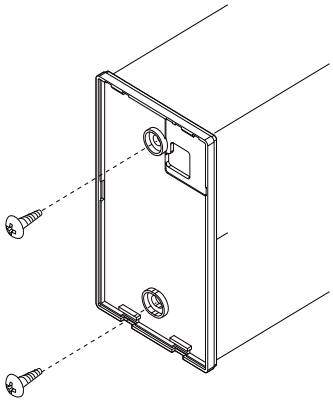
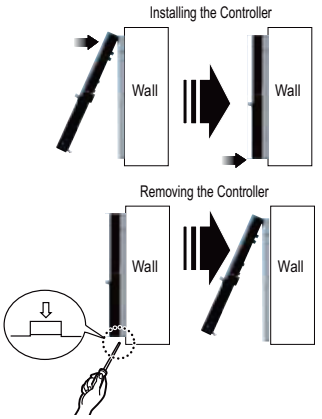


Figure 93: Installing / Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

Finalizing Indoor Unit Installation

1. Move the tubing clamp to its original position.

2. Ensure the three (3) hooks are properly attached to the installation plate by gently shaking the indoor unit from side to side.

3. Press the bottom left and right sides of the indoor unit against the installation plate until the hooks click firmly into their slots.

4. Using two (2) Type “C” screws, secure the bottom of the indoor unit to the installation plate.

5. Remove the two (2) tabs from the filter.

6. Replace the frame cover.

Figure 90: Attach Bottom of Indoor Unit to Installation Plate.

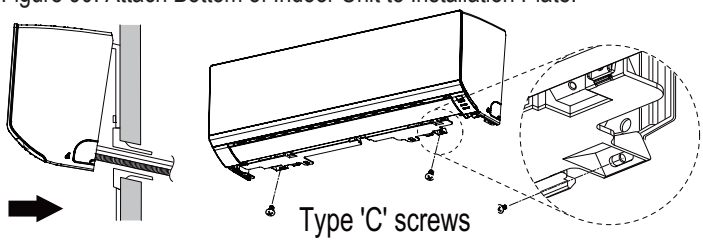
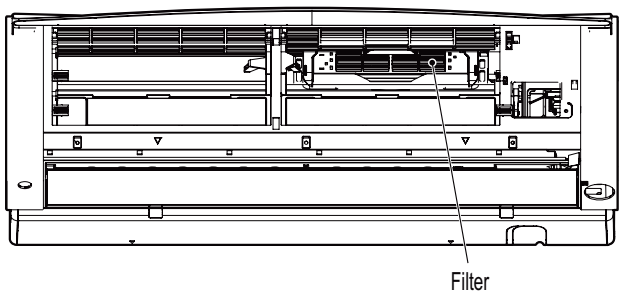


Figure 94: Removing the Filter Tabs.



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CEILING-CONCEALED DUCT (LOW STATIC) INDOOR UNIT DATA

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DUCT (LOW STATIC) INDOOR UNITS

Mechanical Specifications and Features

Ceiling-Concealed Duct (Low Static) Indoor Unit

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Ceiling-Concealed Duct (Low Static) units have a sound rating no higher than 36 dB(A) as tested per KSA0701 ISO Standard 3745, and are designed for low-static pressure up to 0.20"WG.

Coil

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

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare, and all refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

The case has a low profile design with a maximum height of 7.5 inches designed to mount fully concealed above a finished ceiling in as little as 8 inches vertical space. Casing is manufactured of galvanized steel plate, and provided with hanger brackets designed to support the weight on four corners. Unit has a front horizontal supply air discharge outlet, and one rear horizontal return air inlet; unit is also field-convertible for a rear bottom return.

Fan Assembly and Control

The units have at least two direct-drive, Sirocco fans made of high strength ABS HT-700 polymeric resin that are statically and dynamically balanced. The fans are mounted on a common brushless digitally controlled (BLDC) motor 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. The indoor fan has Low, Med, High, and Auto settings for Cooling mode; and has Low, Med, High, and Auto settings for Heating mode. Each of the settings can be field-adjusted from the factory setting (RPM / ESP). The Auto setting adjusts the fan speed based on the difference between the controller set-point and space temperature.

Figure 95: Ceiling-Concealed Duct (Low Static) Indoor Unit.

Air Filter

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

Microprocessor Control

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

The indoor units are Wi-Fi compatible with the addition of an LG Wi-Fi module accessory, and can be controlled by LG's Smart ThinQ™ app on a smart device. A field-supplied Wi-Fi network and smart device are required. The Smart ThinQ app is free, and is available for Android™ and iOS. (Android is a trademark of Google LLC.)

Controls

The indoor unit controller of choice must be ordered separately. Communication between the indoor units and the outdoor unit is accomplished through 18 AWG, four-core, stranded, shielded or unshielded power / communication cable.

Condensate Lift/Pump

The indoor unit is provided with a factory installed and wired condensate lift/pump capable of providing a minimum 27.5 inch 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.

Features

- Inverter (Variable speed fan)
- External mounted drain pump
- Control lock function
- Auto operation
- Auto restart operation
- Dehumidification function
- Two thermistor control
- External static pressure control
- Self-diagnostics function
- Group control
- Wired controller ordered separately
- Wi-Fi compatible

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DUCT (LOW STATIC) INDOOR UNITS

General Data / Specifications

MULTI F
MULTI F MAX

Table 34: Multi F Ceiling-Concealed Low-Static Ducted Indoor Unit General Data.

Model Name	LDN097HV4	LDN127HV4	LDN187HV4
Nominal Cooling Capacity (Btu/h)[1]	9,000	12,000	18,000
Nominal Heating Capacity (Btu/h)[1]	10,400	13,800	20,800
Operating Range			
Cooling (°F WB)	57-77		
Heating (°F DB)	59-81		
Fan			
Type	Sirocco		
Motor Output (W) x Qty.	19 x 1	5 x 1, 19 x 1	
Motor/Drive	Brushless Digitally Controlled / Direct		
Airflow Rate CFM (H/M/L)	318 / 247 / 194	353 / 300 / 247	530 / 441 / 353
Factory Set External Static Pressure (in. wg)	0.10		
Max. External Static Pressure (in. wg)	0.20		
Unit Data			
Refrigerant Type[2]	R410A		
Refrigerant Control	EEV		
Power Supply V, Ø, Hz[3]	208-230, 1, 60		
Rated Amps (A)	0.40	0.80	
Sound Pressure Level dB(A) (H/M/L)[4]	30 / 26 / 23	31 / 28 / 27	36 / 34 / 31
Dimensions (W x H x D, in.)	27-9/16 x 7-15/32 x 27-9/16	35-7/16 x 7-15/32 x 27-9/16	
Net Unit Weight (lbs.)	39	51	48.5
Shipping Weight (lbs.)	46	60	57.3
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 18		
Heat Exchanger (Row x Column x Fin / inch) x Number	(2 x 11 x 14) x 1	(2 x 11 x 18) x 1	
Pipe Size			
Liquid Line (in.)	1/4		
Vapor Line (in.)	3/8		1/2
Connection Size			
Liquid Line (in.)	1/4		
Vapor Line (in.)	3/8		1/2
Drain O.D. / I.D. (in.)	1-1/4, 1		

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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).
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).

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs 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.

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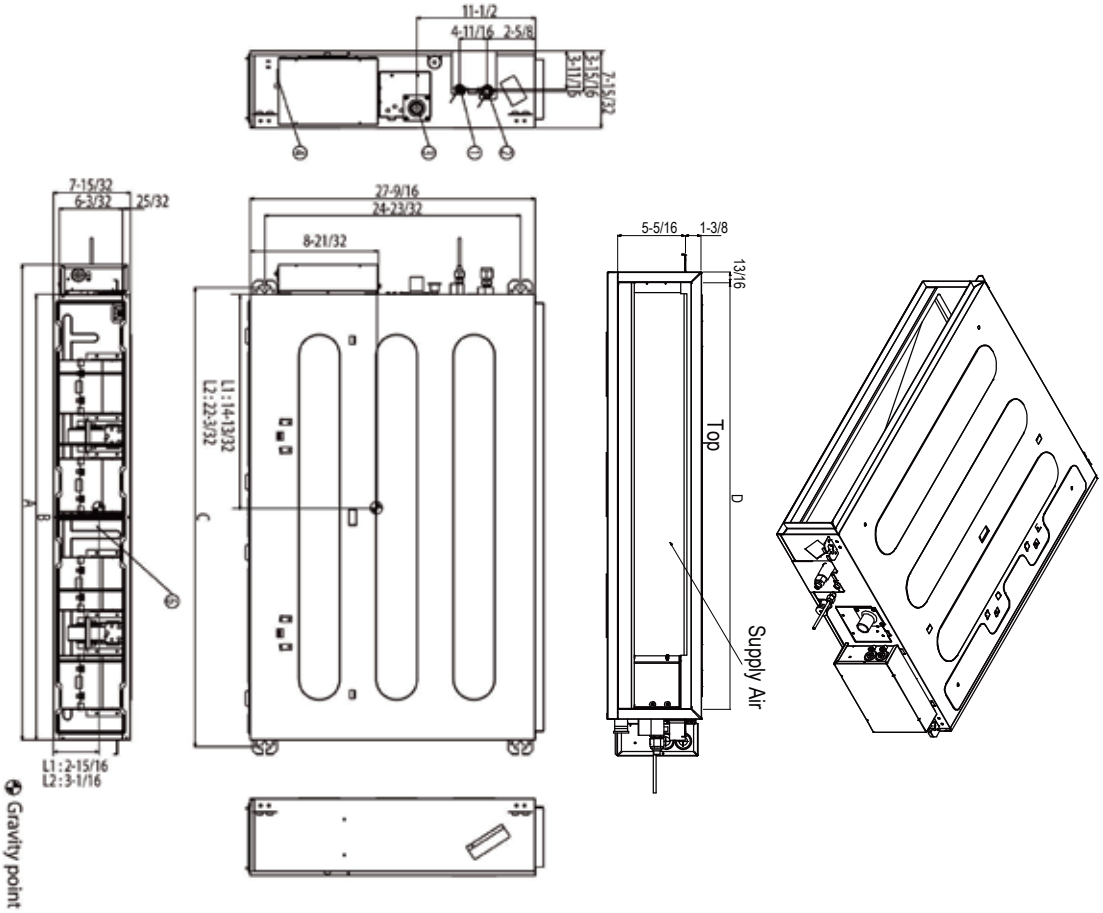
DUCT (LOW STATIC) INDOOR UNITS

Dimensions

Figure 96: LDN097HV4, LDN127HV4, and LDN187HV4 Dimensions.



Model Number	A	B	C	D
LDN097HV4	30-15/32	27-9/16	28-27/32	25-31/32
LDN127HV4 LDN187HV4	38-11/32	35-7/16	36-23/32	33-27/32

(unit: inch)

Number	Name	Description
1	Liquid pipe connection	
2	Gas pipe connection	
3	Drain pipe connection	
4	Power supply connection	
5	Air discharge	
6	Air suction	

(unit : inch)

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DUCT (LOW STATIC) INDOOR UNITS

Cooling Capacity Table

Table 35: Multi F Ceiling-Concealed Duct (Low Static) Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LDN097HV4 9,000	14	8.82	7.55	9.37	7.98	9.92	7.72	10.31	7.89	11.01	7.95	11.56	8.10
	20	8.82	7.61	9.36	8.04	9.91	7.78	10.31	7.95	11.01	8.01	11.55	8.17
	25	8.81	7.67	9.36	8.10	9.90	7.84	10.30	8.01	11.00	8.08	11.54	8.23
	30	8.80	7.73	9.35	8.16	9.90	7.90	10.29	8.07	10.99	8.14	11.54	8.29
	35	8.80	7.79	9.34	8.22	9.89	7.96	10.28	8.13	10.98	8.20	11.53	8.36
	40	8.79	7.84	9.33	8.29	9.88	8.02	10.27	8.19	10.97	8.26	11.52	8.42
	45	8.78	7.90	9.33	8.35	9.87	8.08	10.27	8.25	10.96	8.32	11.51	8.48
	50	8.78	7.96	9.32	8.41	9.87	8.14	10.26	8.31	10.96	8.38	11.50	8.54
	55	8.77	8.02	9.31	8.47	9.86	8.20	10.25	8.38	10.95	8.45	11.49	8.61
	60	8.76	8.08	9.31	8.53	9.85	8.26	10.24	8.44	10.94	8.51	11.48	8.67
	65	8.76	8.14	9.30	8.59	9.84	8.32	10.24	8.50	10.93	8.57	11.47	8.73
	70	8.75	8.19	9.29	8.66	9.84	8.38	10.23	8.56	10.92	8.63	11.47	8.79
	75	8.54	8.06	9.08	8.52	9.62	8.26	10.01	8.44	10.71	8.53	11.25	8.69
	80	8.33	7.92	8.87	8.39	9.41	8.14	9.80	8.33	10.49	8.42	11.03	8.59
	85	8.12	7.78	8.66	8.25	9.20	8.02	9.59	8.20	10.28	8.30	10.82	8.48
	90	7.91	7.63	8.45	8.10	8.99	7.89	9.37	8.08	10.06	8.19	10.60	8.37
	95	7.68	7.55	8.22	8.03	8.75	7.83	9.00	7.90	9.83	8.14	10.36	8.34
	100	7.50	7.35	8.03	7.83	8.57	7.64	8.88	7.78	9.64	7.97	10.17	8.16
	105	7.31	7.15	7.84	7.63	8.38	7.45	8.77	7.66	9.45	7.79	9.99	7.99
	110	7.12	6.90	7.66	7.38	8.19	7.22	8.58	7.43	9.26	7.57	9.80	7.77
	115	6.94	6.69	7.47	7.17	8.01	7.03	8.39	7.24	9.08	7.39	9.61	7.60
	118	6.82	6.65	7.36	7.13	7.89	7.00	8.28	7.21	8.96	7.37	9.50	7.58
	122	6.79	6.63	7.32	7.11	7.86	6.98	8.24	7.19	8.93	7.36	9.46	7.57
LDN127HV4 12,000	14	11.76	9.94	12.49	10.50	13.22	10.17	13.75	10.38	14.69	10.47	15.42	10.67
	20	11.75	10.02	12.48	10.58	13.21	10.25	13.74	10.46	14.67	10.55	15.40	10.75
	25	11.75	10.09	12.48	10.66	13.20	10.33	13.73	10.54	14.66	10.63	15.39	10.83
	30	11.74	10.17	12.47	10.75	13.19	10.40	13.72	10.62	14.65	10.71	15.38	10.92
	35	11.73	10.25	12.46	10.83	13.18	10.48	13.71	10.70	14.64	10.79	15.37	11.00
	40	11.72	10.33	12.45	10.91	13.17	10.56	13.70	10.79	14.63	10.88	15.36	11.08
	45	11.71	10.40	12.44	10.99	13.16	10.64	13.69	10.87	14.62	10.96	15.35	11.16
	50	11.70	10.48	12.43	11.07	13.15	10.72	13.68	10.95	14.61	11.04	15.33	11.25
	55	11.69	10.56	12.42	11.15	13.14	10.80	13.67	11.03	14.60	11.12	15.32	11.33
	60	11.68	10.63	12.41	11.23	13.13	10.88	13.66	11.11	14.59	11.20	15.31	11.41
	65	11.67	10.71	12.40	11.31	13.12	10.96	13.65	11.19	14.57	11.28	15.30	11.49
	70	11.66	10.79	12.39	11.40	13.11	11.03	13.64	11.27	14.56	11.36	15.29	11.58
	75	11.38	10.61	12.11	11.22	12.83	10.88	13.35	11.12	14.27	11.22	15.00	11.45
	80	11.10	10.43	11.82	11.05	12.55	10.72	13.07	10.96	13.99	11.08	14.71	11.31
	85	10.83	10.24	11.54	10.86	12.26	10.55	12.78	10.80	13.70	10.93	14.42	11.17
	90	10.55	10.04	11.26	10.67	11.98	10.38	12.50	10.63	13.42	10.78	14.13	11.02
	95	10.25	9.94	10.96	10.57	11.67	10.30	12.00	10.40	13.10	10.72	13.81	10.97
	100	10.00	9.67	10.71	10.31	11.42	10.06	11.84	10.24	12.85	10.49	13.56	10.75
	105	9.75	9.41	10.46	10.04	11.17	9.81	11.69	10.08	12.60	10.26	13.31	10.52
	110	9.50	9.09	10.21	9.72	10.92	9.51	11.44	9.78	12.35	9.97	13.07	10.24
	115	9.25	8.81	9.96	9.44	10.67	9.26	11.19	9.53	12.10	9.73	12.82	10.00
	118	9.10	8.75	9.81	9.39	10.52	9.21	11.04	9.49	11.95	9.70	12.67	9.98
	122	9.05	8.73	9.76	9.37	10.48	9.19	10.99	9.47	11.90	9.69	12.62	9.97

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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DUCT (LOW STATIC) INDOOR UNITS

Cooling Capacity Table

Table 36: Multi F Ceiling-Concealed Duct (Low Static) Indoor Units Cooling Capacity Table (continued).

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LDN187HV4 18,000	14	17.65	13.09	18.74	13.83	19.84	13.39	20.63	13.67	22.03	13.79	23.12	14.05
	20	17.63	13.20	18.73	13.94	19.82	13.50	20.61	13.78	22.01	13.90	23.11	14.16
	25	17.62	13.30	18.71	14.05	19.81	13.60	20.60	13.89	22.00	14.01	23.09	14.27
	30	17.60	13.40	18.70	14.16	19.79	13.71	20.58	13.99	21.98	14.11	23.07	14.38
	35	17.59	13.50	18.68	14.26	19.78	13.81	20.57	14.10	21.96	14.22	23.05	14.49
	40	17.58	13.60	18.67	14.37	19.76	13.91	20.55	14.21	21.94	14.33	23.04	14.60
	45	17.56	13.71	18.66	14.48	19.75	14.02	20.53	14.31	21.93	14.43	23.02	14.71
	50	17.55	13.81	18.64	14.58	19.73	14.12	20.52	14.42	21.91	14.54	23.00	14.82
	55	17.54	13.91	18.63	14.69	19.72	14.23	20.50	14.52	21.89	14.65	22.98	14.92
	60	17.52	14.01	18.61	14.80	19.70	14.33	20.49	14.63	21.88	14.75	22.97	15.03
	65	17.51	14.11	18.60	14.90	19.69	14.43	20.47	14.74	21.86	14.86	22.95	15.14
	70	17.50	14.21	18.58	15.01	19.67	14.53	20.46	14.84	21.84	14.97	22.93	15.25
	75	17.08	13.98	18.16	14.78	19.24	14.33	20.03	14.64	21.41	14.78	22.50	15.08
	80	16.66	13.74	17.74	14.55	18.82	14.12	19.60	14.44	20.98	14.60	22.06	14.90
	85	16.24	13.49	17.32	14.30	18.40	13.90	19.17	14.23	20.55	14.40	21.63	14.71
	90	15.82	13.23	16.90	14.06	17.97	13.68	18.75	14.01	20.12	14.20	21.20	14.52
	95	15.37	13.09	16.44	13.93	17.51	13.57	**18.00**	**13.70**	19.65	14.12	20.72	14.46
	100	14.99	12.74	16.06	13.58	17.13	13.25	17.77	13.49	19.28	13.82	20.35	14.16
	105	14.62	12.39	15.69	13.23	16.76	12.93	17.53	13.28	18.90	13.52	19.97	13.86
	110	14.24	11.97	15.32	12.80	16.39	12.53	17.16	12.88	18.53	13.13	19.60	13.48
	115	13.87	11.61	14.94	12.44	16.01	12.19	16.79	12.55	18.15	12.82	19.22	13.18
	118	13.65	11.53	14.72	12.36	15.79	12.13	16.56	12.50	17.93	12.77	19.00	13.14
	122	13.57	11.50	14.64	12.34	15.71	12.11	16.49	12.48	17.85	12.76	18.92	13.13

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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DUCT (LOW STATIC) INDOOR UNITS

Heating Capacity Table

Table 37: Multi F Ceiling-Concealed Duct (Low Static) Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LDN097HV4 9,000	0	-0.4	5.35	5.28	5.23	5.20	5.12	4.90
	5	4.5	6.03	5.95	5.90	5.88	5.80	5.58
	10	9	6.71	6.63	6.58	6.56	6.48	6.26
	17	15	7.61	7.54	7.49	7.46	7.39	7.14
	20	19	7.95	7.88	7.83	7.80	7.72	7.46
	25	23	8.52	8.44	8.39	8.37	8.29	7.99
	30	28	9.01	8.93	8.88	8.86	8.78	8.52
	35	32	9.50	9.42	9.37	9.34	9.27	9.04
	40	36	9.94	9.86	9.81	9.78	9.71	9.48
	45	41	10.37	10.30	10.25	10.22	10.15	9.92
	47	43	10.55	10.48	10.43	10.40	10.32	10.10
	50	46	10.72	10.64	10.59	10.57	10.49	10.24
	55	51	11.00	10.93	10.88	10.85	10.78	10.48
	60	56	11.00	10.93	10.88	10.85	10.78	10.52
	63	59	11.00	10.93	10.88	10.85	10.78	10.55
	68	64	11.00	10.93	10.88	10.85	10.78	10.60
LDN127HV4 12,000	0	-0.4	7.10	7.00	6.93	6.90	6.80	6.50
	5	4.5	8.00	7.90	7.83	7.80	7.70	7.40
	10	9	8.90	8.80	8.73	8.70	8.60	8.30
	17	15	10.10	10.00	9.93	9.90	9.80	9.48
	20	19	10.55	10.45	10.38	10.35	10.25	9.90
	25	23	11.30	11.20	11.13	11.10	11.00	10.60
	30	28	11.95	11.85	11.78	11.75	11.65	11.30
	35	32	12.60	12.50	12.43	12.40	12.30	12.00
	40	36	13.18	13.08	13.02	12.98	12.88	12.58
	45	41	13.77	13.67	13.60	13.57	13.47	13.17
	47	43	14.00	13.90	13.83	13.80	13.70	13.40
	50	46	14.23	14.13	14.06	14.03	13.93	13.59
	55	51	14.60	14.50	14.43	14.40	14.30	13.90
	60	56	14.60	14.50	14.43	14.40	14.30	13.96
	63	59	14.60	14.50	14.43	14.40	14.30	14.00
	68	64	14.60	14.50	14.43	14.40	14.30	14.06
LDN187HV4 18,000	0	-0.4	10.70	10.55	10.45	10.40	10.25	9.80
	5	4.5	12.06	11.91	11.81	11.76	11.61	11.15
	10	9	13.41	13.26	13.16	13.11	12.96	12.51
	17	15	15.22	15.07	14.97	**14.92**	14.77	14.29
	20	19	15.90	15.75	15.65	15.60	15.45	14.92
	25	23	17.03	16.88	16.78	16.73	16.58	15.98
	30	28	18.01	17.86	17.76	17.71	17.56	17.03
	35	32	18.99	18.84	18.74	18.69	18.54	18.09
	40	36	19.87	19.72	19.62	19.57	19.42	18.97
	45	41	20.75	20.60	20.50	20.45	20.30	19.85
	47	43	21.10	20.95	20.85	**20.80**	20.65	20.20
	50	46	21.44	21.29	21.19	21.14	20.99	20.48
	55	51	22.01	21.86	21.75	21.70	21.55	20.95
	60	56	22.01	21.86	21.75	21.70	21.55	21.04
	63	59	22.01	21.86	21.75	21.70	21.55	21.10
	68	64	22.01	21.86	21.75	21.70	21.55	21.20

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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DUCT (LOW STATIC) INDOOR UNITS

External Static Pressure

Table 38: Multi F Ceiling-Concealed Duct (Low Static) External Static Pressure Setting Values Table.

Static Pressure (in. wg)			0.0	0.04	0.08	0.12	0.16	0.20
Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Airflow Rate / CFM		Setting Value					
LDN097HV4 9,000	High	318	98	103	108	116	123	130
	Mid	247	82	88	94	102	110	118
	Low	194	69	76	83	91	99	109
LDN127HV4 12,000	High	353	95	99	104	109	116	124
	Mid	300	86	91	96	101	108	116
	Low	247	78	82	87	93	100	108
LDN187HV4 18,000	High	530	123	125	129	134	141	145
	Mid	441	109	112	117	123	129	136
	Low	353	95	99	104	109	116	124

Note:

- *To get the desired air flow and external static pressure combination, use the setting value from the table. Using a setting value other than that listed in the table will not provide the desired combination.*
- *Table data is based at 230V. Air flow rate varies according to voltage fluctuation.*

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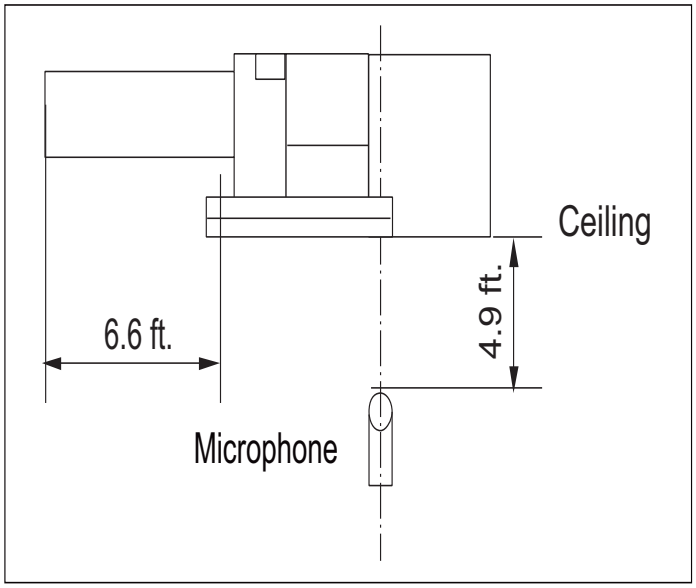
DUCT (LOW STATIC) INDOOR UNITS

Acoustic Data

Figure 97: Sound Pressure Level Measurement Location.



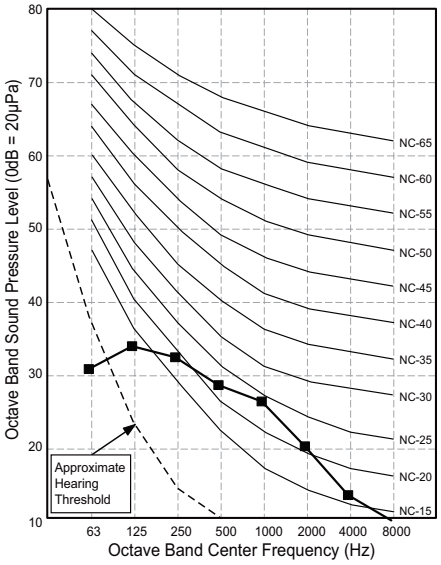
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound power levels are measured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

Table 39: Sound Pressure Levels (dB[A]).

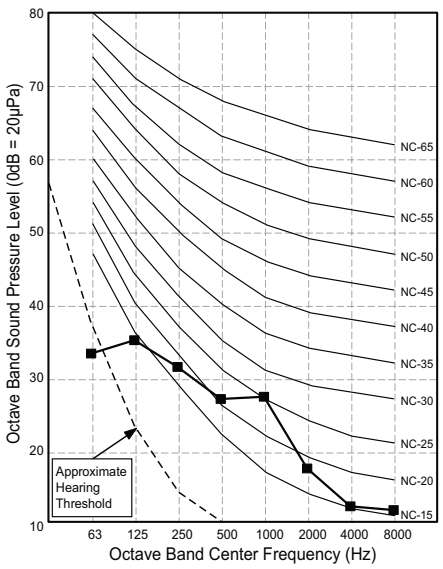
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LDN097HV4	30	26	23
LDN127HV4	31	28	27
LDN187HV4	36	34	31

Figure 98: Sound Pressure Level Diagrams.

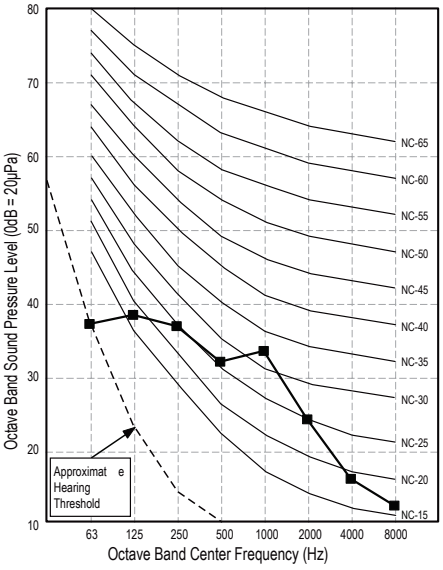
LDN097HV4



LDN127HV4



LDN187HV4



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DUCT (LOW STATIC) INDOOR UNITS

Refrigerant Flow Diagram

Figure 99: LDN097HV4 Refrigerant Flow Diagram.

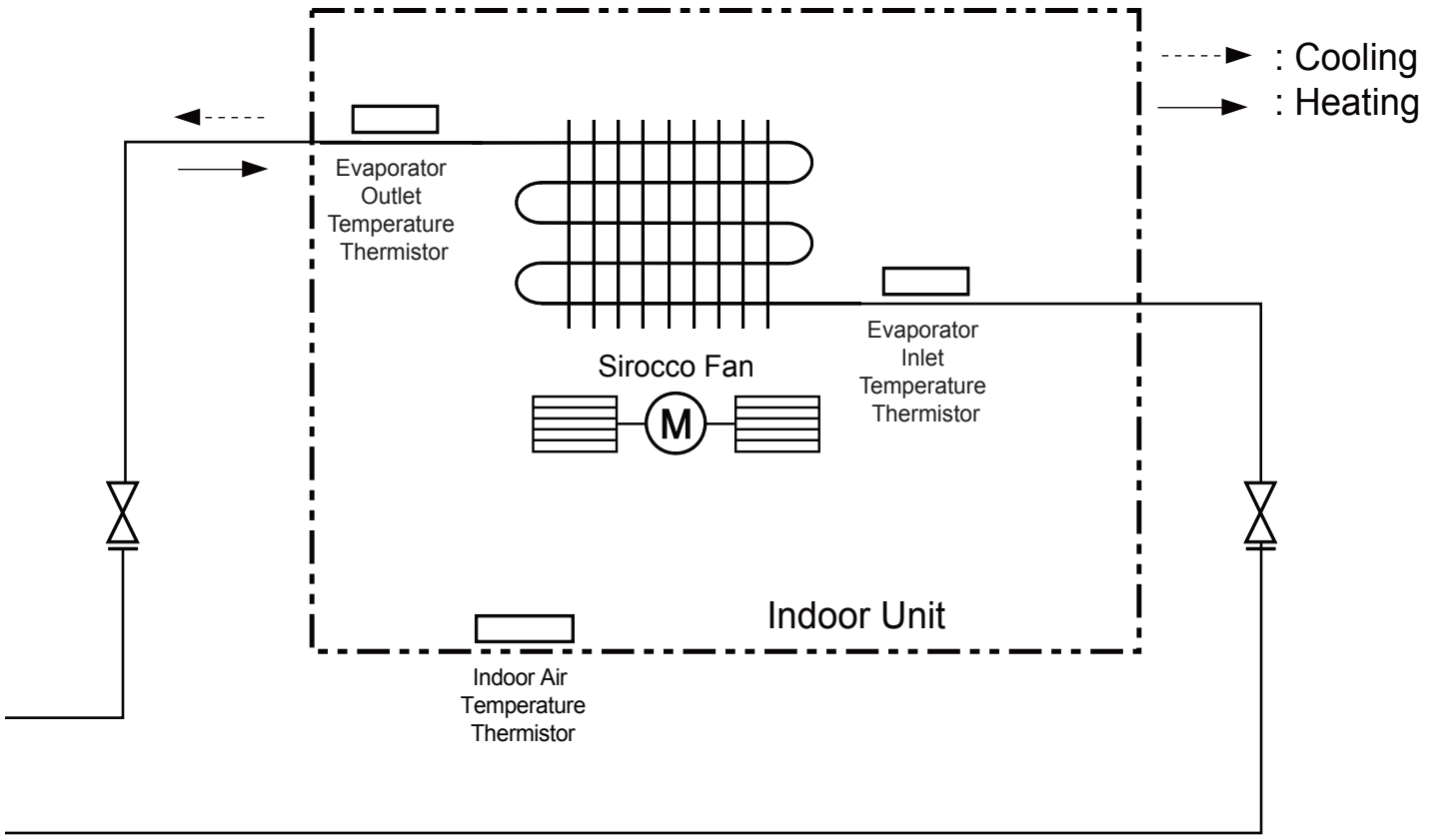

Table 40: Multi F Ceiling-Concealed Duct (Low Static) LDN097HV4 Indoor Unit Refrigerant Pipe Sizes.

Model No.	Vapor (inch)	Liquid (inch)
LDN097HV4	Ø3/8	Ø1/4

Table 41: Multi F Ceiling-Concealed Duct (Low Static) LDN097HV4 Refrigerant Pipe Connections.

Model No.	Vapor (inch)	Liquid (inch)
LDN097HV4	Ø3/8	Ø1/4

Table 42: Multi F Ceiling-Concealed Duct (Low Static) LDN097HV4 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

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DUCT (LOW STATIC) INDOOR UNITS

Refrigerant Flow Diagrams

Figure 100: LDN127HV4 and LDN187HV4 Refrigerant Flow Diagram.

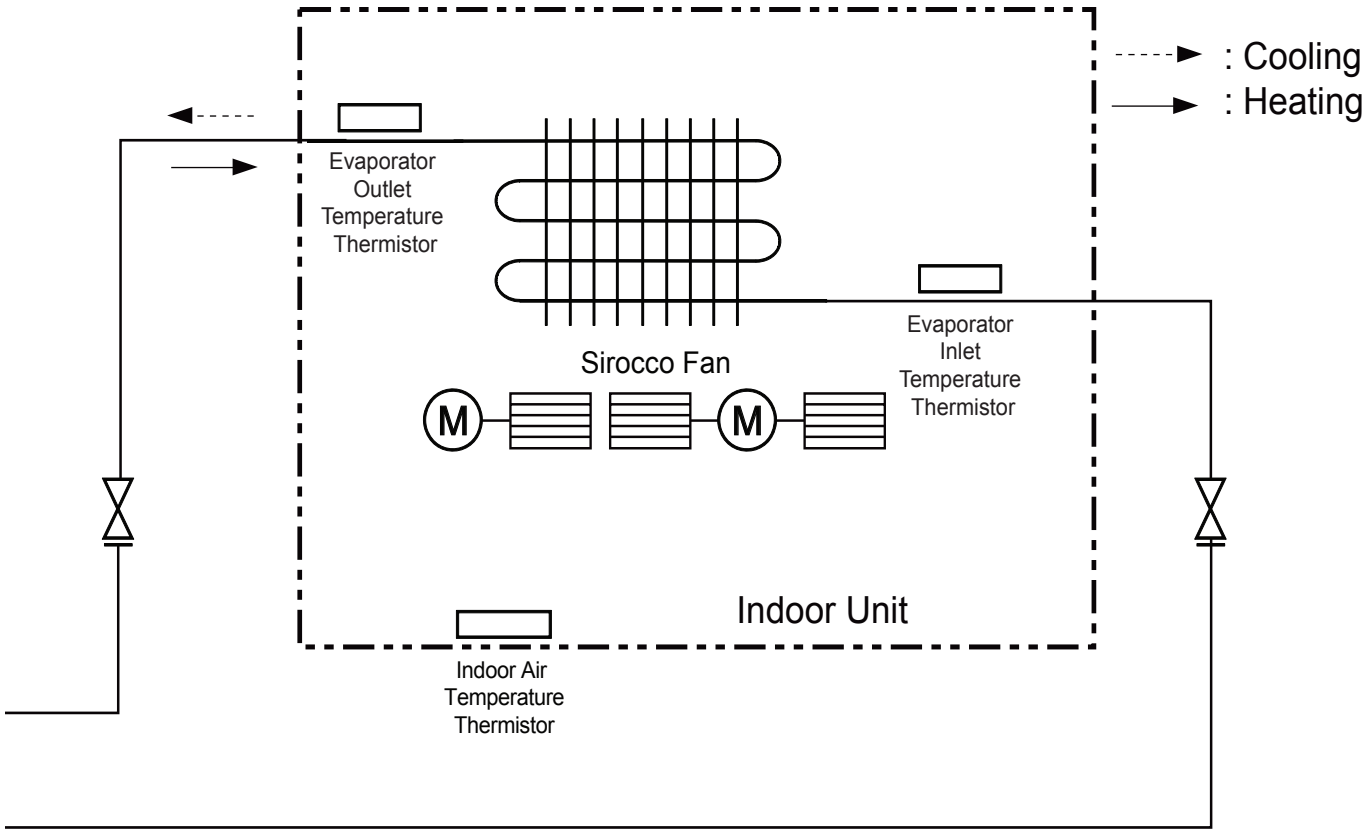

Table 43: Multi F Ceiling-Concealed Duct (Low Static) LDN127HV4 and LDN187HV4 Indoor Unit Refrigerant Pipe Sizes.

Model No.	Vapor (inch)	Liquid (inch)
LDN127HV4	Ø3/8	Ø1/4
LDN187HV4	Ø1/2	

Table 44: Multi F Ceiling-Concealed Duct (Low Static) LDN127HV4 and LDN187HV4 Indoor Unit Refrigerant Pipe Connections.

Model No.	Vapor (inch)	Liquid (inch)
LDN127HV4	Ø3/8	Ø1/4
LDN187HV4	Ø1/2	

Table 45: Multi F Ceiling-Concealed Duct (Low Static) LDN127HV4 and LDN187HV4 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

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DUCT (LOW STATIC) INDOOR UNITS

Wiring Diagram

Figure 101: Multi F Ceiling-Concealed Duct (Low Static) LDN097HV4 and LDN127HV4 Indoor Units Wiring Diagram.

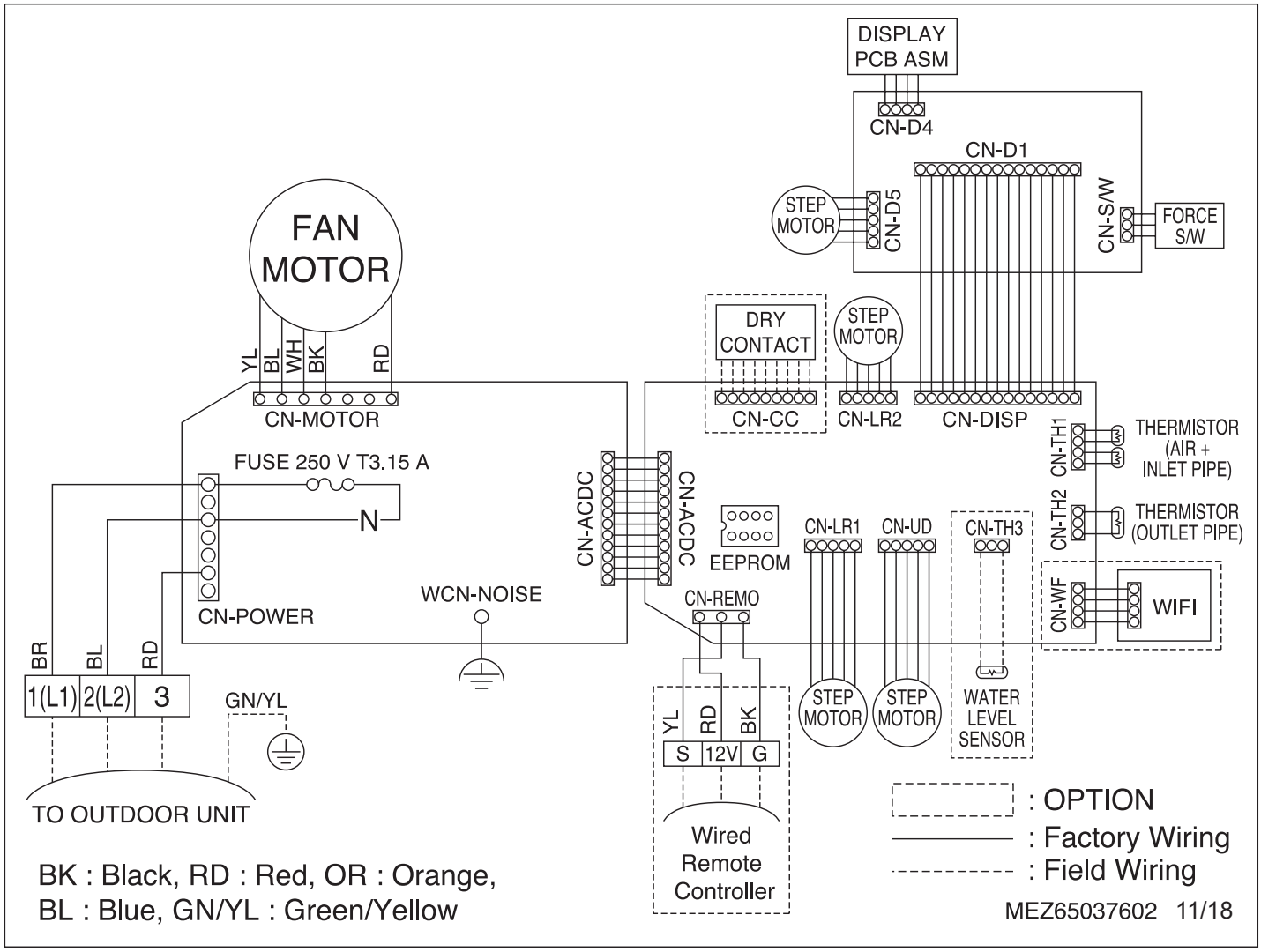

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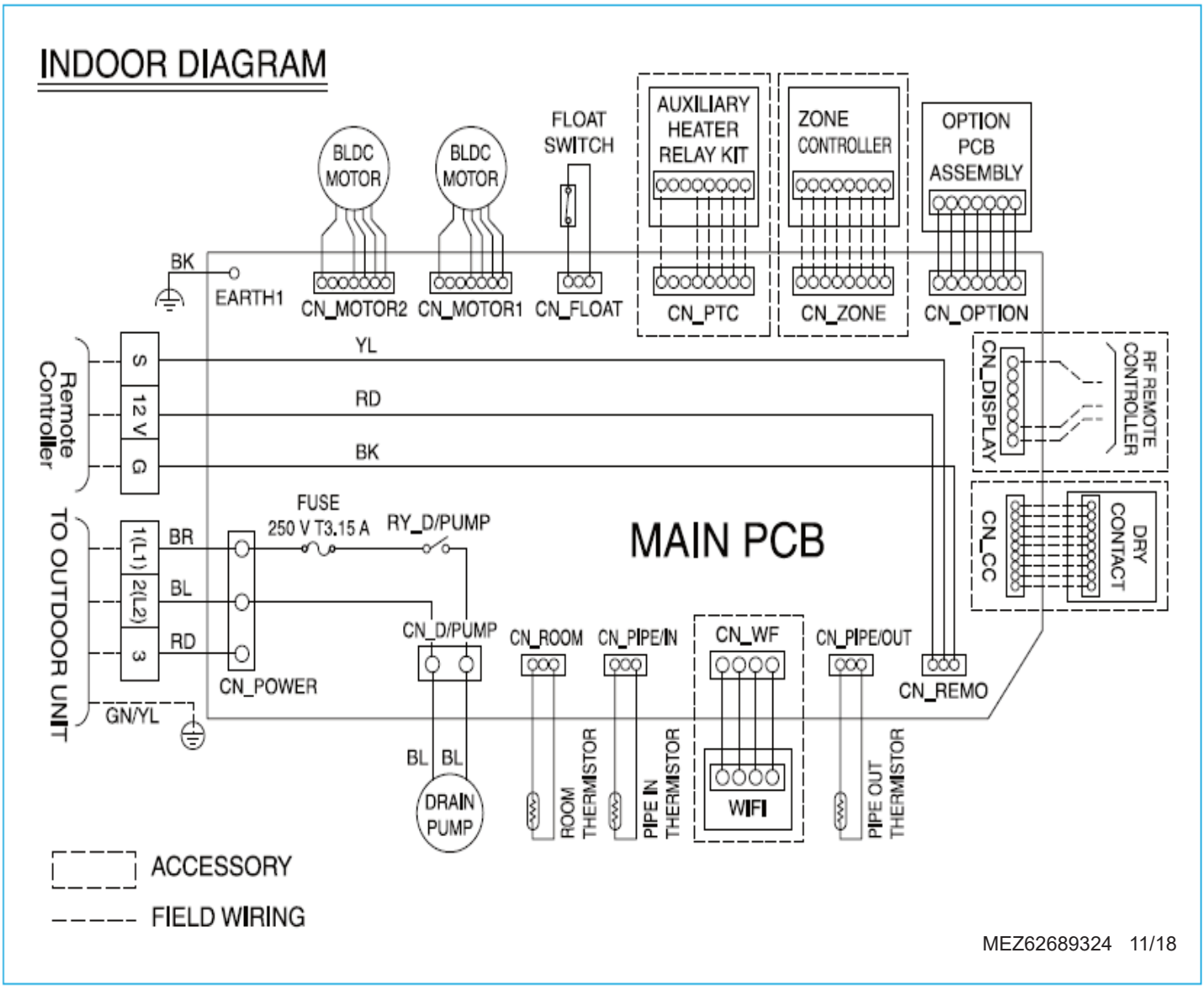
Figure 102: Multi F Ceiling-Concealed Duct (Low Static) LDN187HV4 Indoor Units Wiring Diagram.



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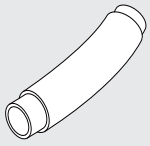
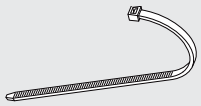
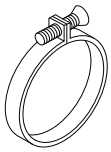
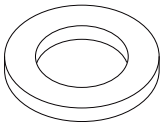
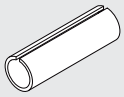
DUCT (LOW STATIC) INDOOR UNITS

Factory Supplied Parts and Materials

Factory Supplied Parts

Table 46: Parts Table.

Part	Quantity	Image	Part	Quantity	Image
Drain Hose	One (1)		Zip Ties	Four (4)	
Metal Clamp	Two (2)		Washers for Hanging Brackets	Eight (8)	
Insulation for Fittings	One (1) Set	 For Vapor Piping For Liquid Piping			

Factory Supplied Materials

- Owner's Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Torque wrenches
- Hexagonal wrench
- Gas-leak detector
- Thermometer

⚠ WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit's components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

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Selecting the Best Location

Do's

- Place the unit where air circulation will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient strength to bear the load of the indoor unit.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit in a location that is level, and where it can be easily connected to the outdoor unit / branch distribution unit.

⃠ Don'ts

- ⃠ *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- ⃠ *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- ⃠ *Do not install the unit near high-frequency generators.*
- ⃠ *Do not install the unit near a doorway.*

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

Installing in an Area Exposed to Unconditioned Air

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

- Verify that carpet is or will be installed (carpet will 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.

Note:

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

Figure 103: General Installation Guidelines.

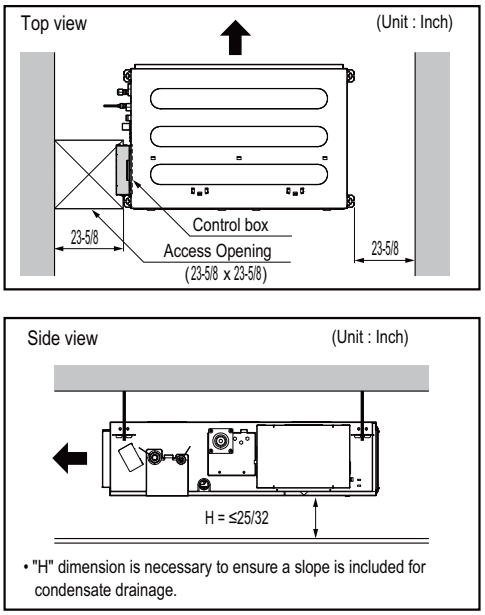

Figure 104: Service / Access Panel Dimensions.

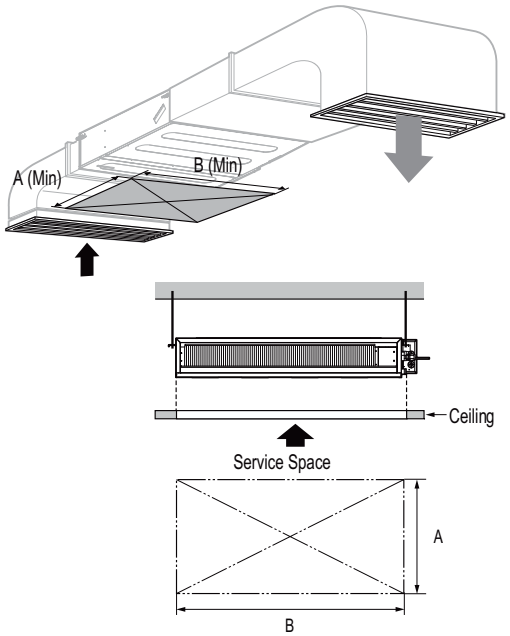

Table 47: General Access Panel Dimensions.

Model / Capacity (Btu/h)	Dimensions (in.)	
	A	B
LDN097HV4 / 9,000	31-1/2	31-1/2
LDN127HV4 / 12,000		39-3/8
LDN187HV4 / 18,000		

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DUCT (LOW STATIC) INDOOR UNITS

Installation and Best Layout Practices

Duct (Low Static) Indoor Units can be installed in two ways:

Figure 105: Air inlet from the back of the indoor unit.

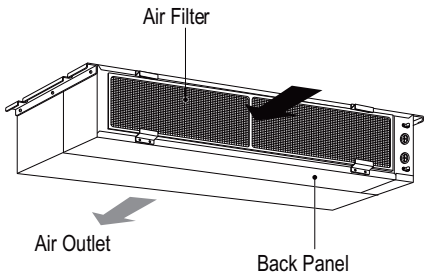


Figure 106: Air inlet from the bottom of the indoor unit.

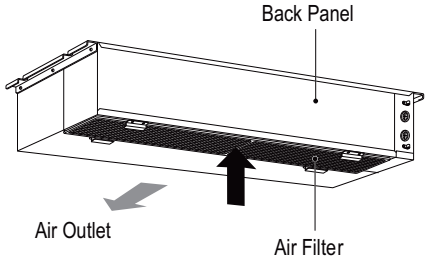


Table 49: Indoor Unit Bolt Locations.

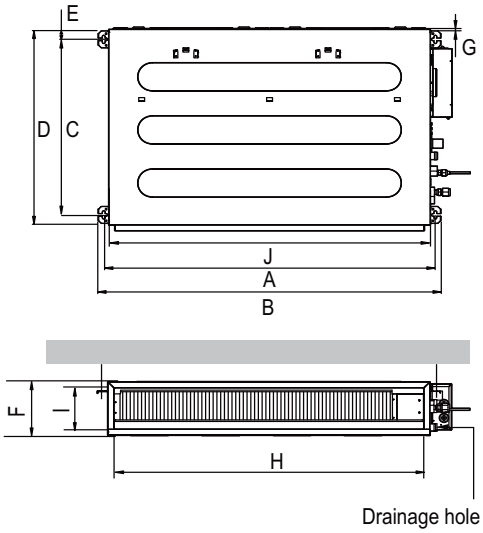


Table 48: Indoor Unit Bolt Location Dimensions.

Model / Capacity (Btu/h)	Dimensions (in.)									
	A	B	C	D	E	F	G	H	I	J
LDN097HV4 / 9,000	28-27/32	30-13/32	24-23/32	27-9/16	1-13/32	7-15/32	25/32	25-31/32	6-3/32	27-9/16
LDN127HV4 / 12,000	36-23/32	38-9/32						33-27/32		35-7/16
LDN187HV4 / 18,000										

Preparing the Installation Area and Hanging the Indoor Unit Frame

1. Select and mark the area for the suspension or console bolts (use embedded inserts or anchor bolts in new buildings, and hole-in-anchors in older buildings).
2. Drill the holes.
3. Add the set-anchor and the plate washer to the bolts (bolts must be at least 13/32 inches in diameter), and then insert the bolts into the installation area.
4. Add the plate washer, spring washer, and nut to secure the bolts into the installation area.
5. Position the indoor unit installation plates onto the bolts. Secure using nuts, plate washers, and spring washers. Adjust for level as necessary.

Figure 107: Preparing the Installation Area.

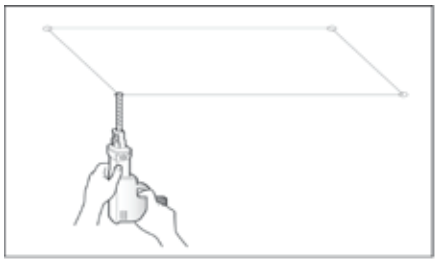


Figure 108: Console Bolt Options.

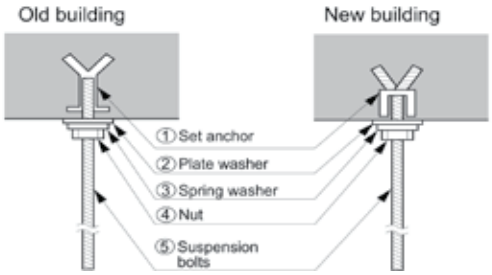
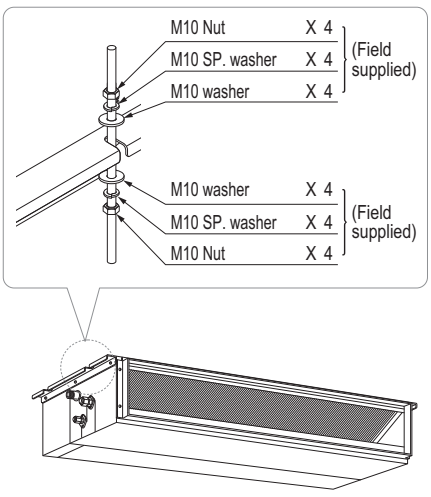


Figure 109: Hanging the Indoor Unit.



Note:

Install a canvas duct to the air outlet and air inlet so that vibration from the indoor unit does not carry to the duct or ceiling. Also, add insulation to the interior of the duct, and apply anti-vibration to the suspension bolts.

⚠ WARNING

- *Unit must be installed correctly.*
- *Tighten the nuts and bolts to prevent the unit from falling.*

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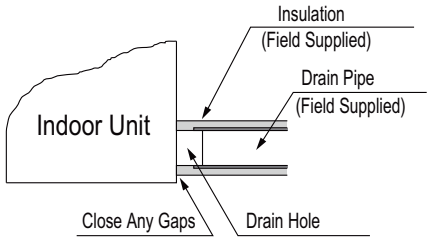
Installing the Drain System

- Drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must 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.

Figure 110: Drain Connection.

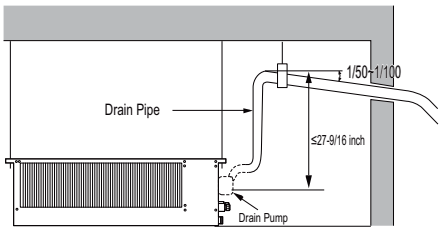


Ducted (low static) indoor units have two options for condensate drainage: Using the factory-installed drain pump, or using a gravity drain.

Using the Drain Pump

- Maximum drain lift is 27-9/16 inches, therefore, the drain piping must be placed below the maximum lift height.
- Field-installed drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must not be straight up and down.

Figure 111: Indoor Unit Using Drain Pump.

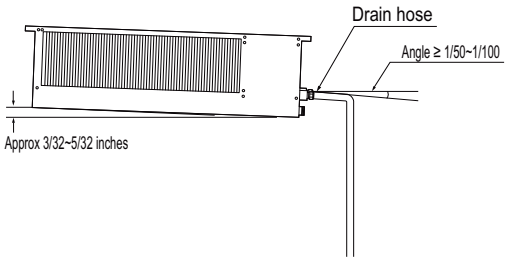


Pump location will be different on the indoor unit.

Using the Gravity Drain

Field-drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must not be straight up and down.

Figure 112: Indoor Unit Using Gravity Drain.

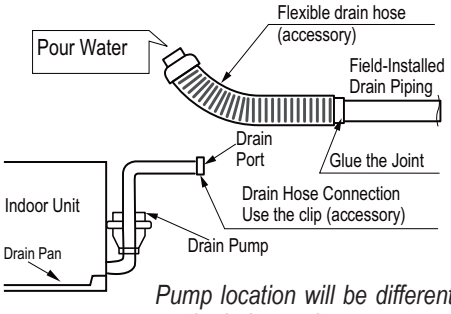


Checking the Drain Pump

The unit uses a drain pump to remove condensate. The pump must be tested before the system operates.

- Connect the flexible drain hose to the field-installed drain piping; leave it as is until the test is complete.
- Pour water into the flexible drain hose and check for leaks.
- After power wiring installation is complete, operate the drain pump to see if it sounds and functions properly.
- After the test is complete, connect the flexible drain hose to the indoor unit drain port.

Figure 113: Checking the Drain Pump.

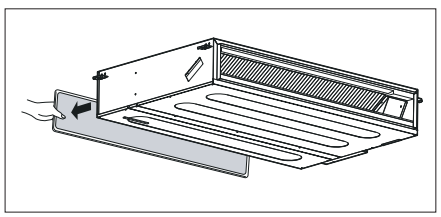


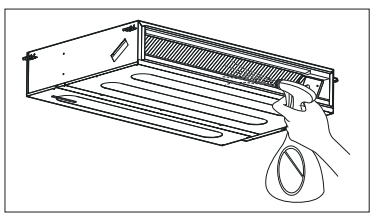
Pump location will be different on the indoor unit.

Checking the Drainage System

1. Remove the air filter.
2. Check the drainage.
   - Spray water on the evaporator.
   - Verify that water flows through the indoor unit drain hose without leaking.

Figure 114: Checking the Drainage System.





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Insulating the Refrigerant and Drain Piping

⚠ WARNING

Ensure all piping is insulated. Exposed piping can cause burns if touched.

Refrigerant Piping Insulation

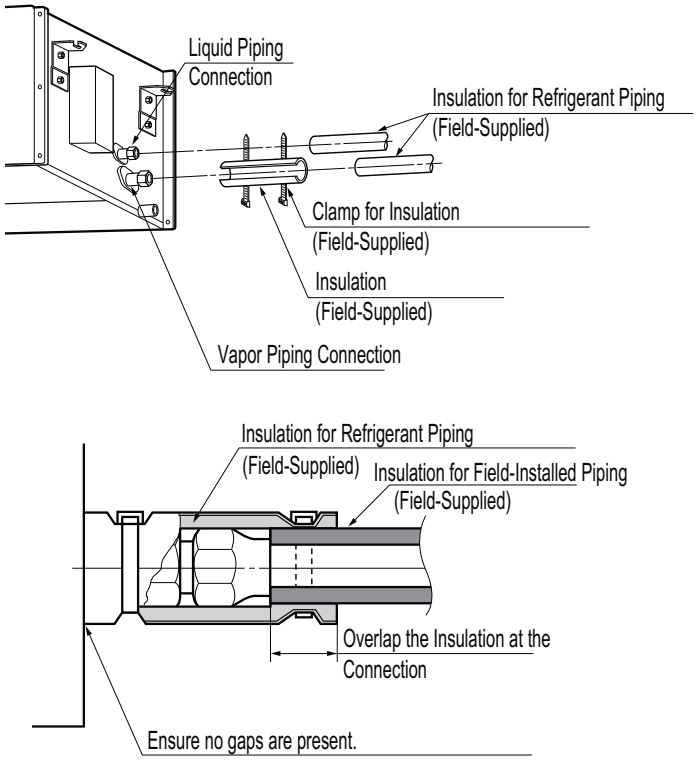
Field-installed vapor and liquid refrigerant piping lines must be properly and completely covered in insulation (up to the indoor unit piping connections). Any exposed piping will generate condensate or will cause burns if touched. Insulation for this field-installed refrigerant piping must have a minimum heat resistance of 248°F.

Duct (low static) indoor units have been tested under and meet the requirements of the "KS Conditions." If the indoor unit is installed and is operated at an extended period in a highly humid environment (dew point temperature >73°F), however, condensate will form. To prevent this phenomenon, install adiabatic glass wool insulation with a thickness or 13/32 to 13/16 inches thick. Also, install glass wool insulation on all indoor unit that are located in the ceiling plenum.

Drain Piping Insulation

Drain piping must have insulation a minimum of 7/32 inches thick.

Figure 115: Insulating the Piping.



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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

• Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

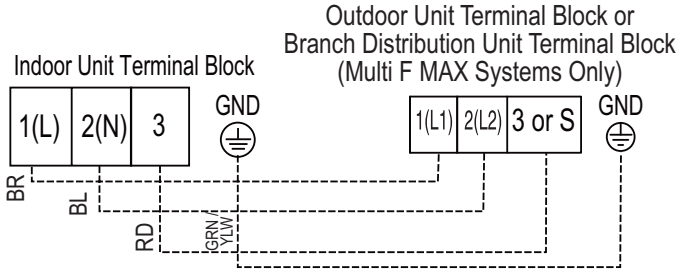
Connecting the Power Wiring and Communications Cable

1. Insert the power wiring / communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) through the side of the indoor unit. 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.

2. Connect each wire to its appropriate terminal on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

3. Secure the power wiring / communications cable with the cable restraint.

Figure 116: Indoor Unit to Outdoor Unit / Branch Distribution Unit (Multi F MAX systems only) Power Wiring / Communications Cable Connections.



4. Screw the steel clamp to the inside of the control panel.
   - Place the wiring / cables in the clamp and tighten the plastic clamp to an open surface of the control panel.
   - When clamping, ⃠ do not apply force to the wiring connections.
   - Neatly arrange the wiring, ⃠ do not catch the wiring in the electric box cover, and ensure the cover firmly closes.

5. Fill in any gaps around the wiring access hole with sealant to prevent foreign particles from entering the indoor unit.

Using a Conduit

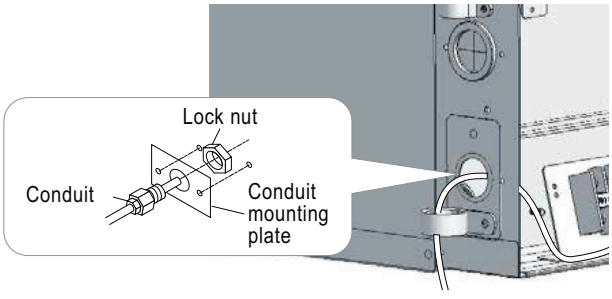
1. Remove the rubber stopper on the indoor unit. Pass the power wiring / communications cable through the conduit, the conduit mounting plate, and to the control panel of the indoor unit.

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 117: Exterior View of Conduit Installation.



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Controller Options

Ceiling-concealed duct (low static) indoor units can be used with many LG-supplied wired controllers (sold separately). The wireless hand-held controller (Model No. PQWRHQ0FDB) is also an optional accessory with use wired controllers.

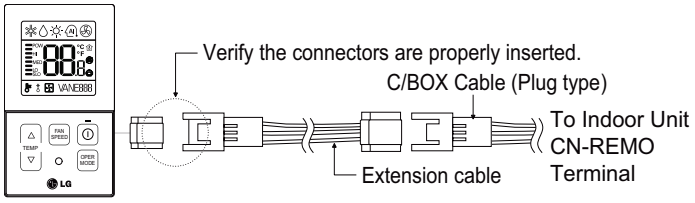
Wired Controller Connections

Controllers can connect to the indoor unit in one of two different ways.

1. LG Wired Remote Extension Cable with Molex plug (PZCWRC1; sold separately) that connects to the CN-REMO terminal on the indoor unit PCB.

2. Field-supplied controller cable that connects to the indoor unit terminal block (must be at least UL2547 or UL1007, 22 AWG, two-core, one-shield core, at least FT-6 rated if local electric and building codes require plenum cable usage).

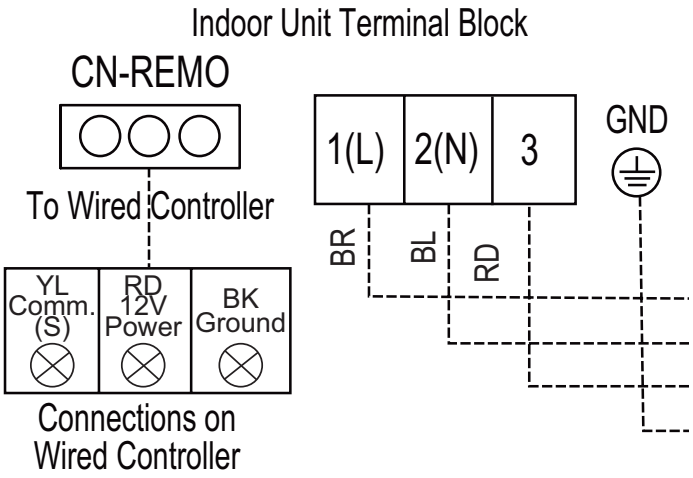
Figure 118: PZCWRC1 LG Wired Remote Extension Cable.



Note:

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

Figure 119: Wired Controller Connections on the Indoor Unit Terminal Block.



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Hanging the Wired Controller

1. The controller wiring / cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring / cable on applicable side.

2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring / cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 120: Removing the Cable Guide Grooves.

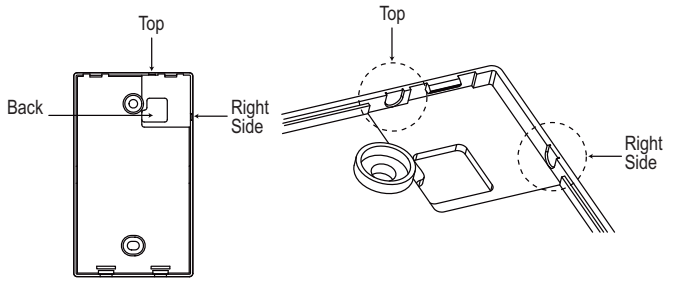


Figure 121: Attaching the Wall Plate.

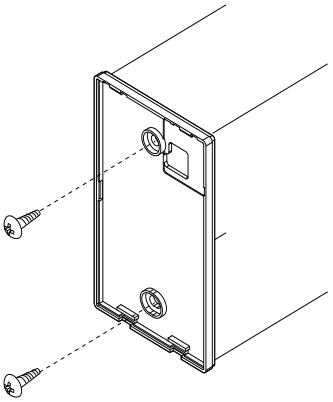
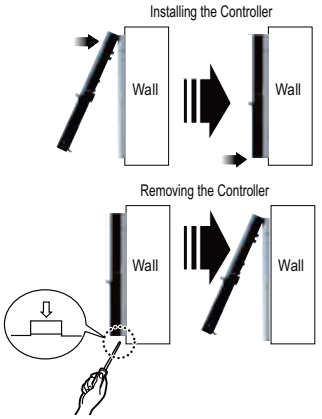


Figure 122: Installing / Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

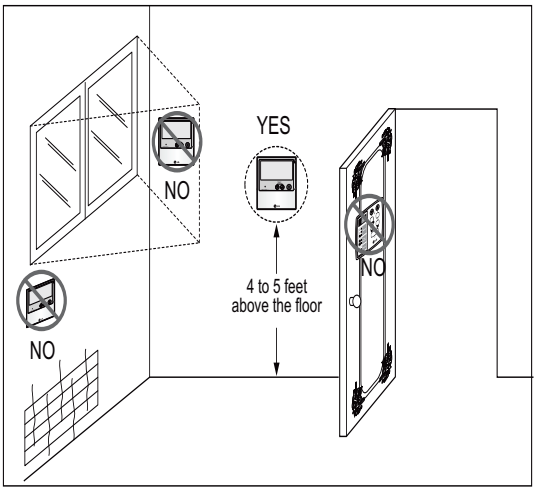
Wired Controller Placement

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

⃠ *Do not install the remote controller where it can be impacted by the following:*

- *Drafts or dead spots behind doors and in corners*
- *Hot or cold air from ducts*
- *Radiant heat from sun or appliances*
- *Concealed pipes and chimneys*
- *Uncontrolled areas such as an outside wall behind the remote controller*

Figure 123: Proper Location for the Wired Controller.



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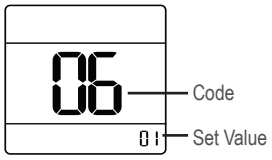
External Static Pressure Control

To provide a required air flow rate that accounts for the external static pressure change, follow the steps below.

1. To access system installer setting mode, press and hold the temperature increase and mode selection buttons simultaneously for approximately three (3) seconds. Choose setting code value “06” by pressing the mode selection button.

Figure 124: Select Code and Set Value.



2. Use the temperature increase and decrease buttons to select the desired setting value.

Setting Values

01 : V-H
02 : F-H
03 : V-L
04 : F-L

3. Press the on / off button to save the established settings.

4. To deactivate system installer setting mode after the settings have been established, press and hold the temperature increase and mode selection check buttons simultaneously for approximately three (3) seconds. If a button is not pressed for more than 25 seconds, the system installer setting mode will automatically deactivate.

Figure 125: Controller External Static Pressure Setting Display.

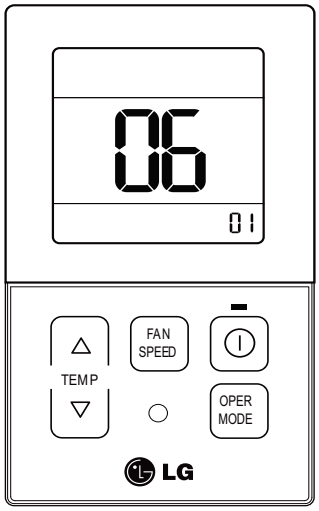


Table 50: Static Pressure Setting Table.

Pressure Selection		Function	
		Zone State	External Static Pressure Standard Value
01	V-H	Variable	High
02	F-H	Fixed	High
03	V-L	Variable	Low
04	F-L	Fixed	Low

Note:

- *Select the position after verifying duct work and the external static pressure of the indoor unit.*
- *Factory set to pressure selection F-H.*

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Assigning Air Flow

To assign an air flow for each fan speed, follow the steps below.

1. To access system installer setting mode, press and hold the temperature increase and mode selection buttons simultaneously for approximately three (3) seconds. Choose setting code value “03” by pressing the mode selection button.

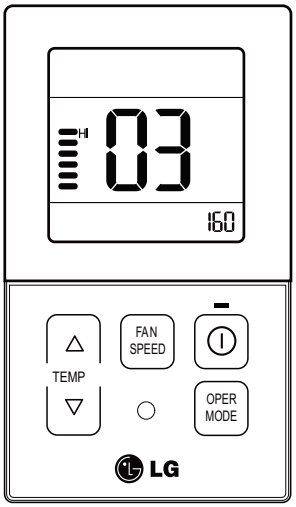
2. Use the fan speed button to select the desired fan speed. (Lo→Med→Hi will display on the LED).

3. Use the temperature increase and decrease buttons to select the desired external static pressure setting value (thereby assigning the respective airflow). External static pressure value range: 0~255; the value will display near the lower right corner of the LED.

4. Press the on / off button to save the established settings.

5. To deactivate system installer setting mode after the settings have been established, press and hold the temperature increase and mode selection check buttons simultaneously for approximately three (3) seconds. If a button is not pressed for more than 25 seconds, the system installer setting mode will automatically deactivate.

Figure 126: Controller External Static Pressure Setting Display.



Note:

- *A certified technician must set the external static pressure value(s). If the external static pressure is set incorrectly, the system will malfunction.*
- ⃠ *Do not alter the external static pressure value that corresponds to each air flow level.*
- *External static pressure value can vary depending on the indoor unit.*
- *If by pressing the fan speed button during external static pressure setup, the fan speed is raised to the next level, the air flow value of the previous fan speed will be maintained (external static pressure setting value is saved).*

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CEILING-CONCEALED DUCT (HIGH STATIC) INDOOR UNIT DATA

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“General Data / Specifications” on page 97
“Dimensions” on page 98
“Cooling Capacity Table” on page 99
“Heating Capacity Table” on page 100
“External Static Pressure” on page 101
“Acoustic Data” on page 100
“Refrigerant Flow Diagrams” on page 102
“Wiring Diagram” on page 103
“Factory Supplied Parts and Materials” on page 104
“Installation and Best Layout Practices” on page 105

DUCT (HIGH STATIC) INDOOR UNITS

Mechanical Specifications and Features

MULTI F
MULTI F MAX

Ceiling-Concealed Duct (High Static) Indoor Unit

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Ceiling-Concealed Duct (High Static) units are designed for high-speed air volume against an external static pressure up to 0.78"WG for the 24,000 Btu/h model; up to 0.55"WG for the 36,000 Btu/h model.

Coil

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

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare, and all refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

The casing is designed to mount fully concealed above a finished ceiling. Casing is manufactured of galvanized steel plate. Cold surfaces of the unit are covered internally with a coated polystyrene insulating material, and covered externally with sheet insulation made of ethylene propylene diene monomer (M-Class) (EPDM). External insulation is plenum rated and conforms to ASTM Standard D-1418. Hanger brackets are included on the casing to support the weight on four corners. Unit has a front horizontal supply air discharge outlet, and one dedicated rear horizontal return air inlet.

Fan Assembly and Control

The units have two direct-drive, Sirocco fans made of high strength ABS GP-2200 polymeric resin that are statically and dynamically balanced. The fans are mounted on a common brushless digitally controlled (BLDC) motor 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. The indoor fan has Low, Med, High, and Auto settings for Cooling mode; and has Low, Med, High, and Auto settings for Heating mode. Each of the settings can be field-adjusted from the factory setting (RPM / ESP). The Auto setting adjusts the fan speed based on the difference between the controller setpoint and space temperature.

Figure 127: Ceiling-Concealed Duct (High Static) Indoor Unit.

Air Filter

Return air is filtered with a factory-supplied, removable, washable filter accessible from the rear of the indoor unit. High efficiency air filter options include a return filter box and an LG / Dynamic supplied air cleaner (both sold separately).

Microprocessor Control

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

Controls

The indoor unit controller of choice must be ordered separately. Communication between the indoor units and the outdoor unit is accomplished through 18 AWG, four-core, stranded and shielded power / communication cable.

Condensate Lift/Pump

The indoor unit is provided with a factory installed and wired internal condensate lift/pump capable of providing a minimum 27.5 inch 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.

Features

- Inverter (Variable speed fan)
- Internal drain pump
- Control lock function
- Auto operation
- Auto restart operation
- Dehumidifying function
- Two thermistor control
- External static pressure control
- Group control
- Self-diagnostics function
- Wired controller ordered separately

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DUCT (HIGH STATIC) INDOOR UNITS

General Data / Specifications

Table 51: Multi F Ceiling-Concealed High-Static Ducted Indoor Unit General Data.

Model Name	LMHN240HV	LMHN360HV
Nominal Cooling Capacity (Btu/h)[1]	24,000	36,000
Nominal Heating Capacity (Btu/h)[1]	27,000	40,000
Operating Range		
Cooling (°F WB)	57-77	57-77
Heating (°F DB)	59-81	59-81
Fan		
Type	Sirocco	Sirocco
Motor Output (W) x Qty.	154 x 1	350 x 1
Motor/Drive	Brushless Digitally Controlled / Direct	Brushless Digitally Controlled / Direct
Factory Set Airflow Rate CFM (H/M/L)	688 / 618 / 530	1,130 / 953 / 706
Factory Set External Static Pressure (in. wg)	0.39	0.39
Maximum External Static Pressure (in. wg)	0.78	0.55
Unit Data		
Refrigerant Type[2]	R410A	R410A
Refrigerant Control	EEV	EEV
Power Supply V, Ø, Hz[3]	208-230, 1, 60	208-230, 1, 60
Rated Amps (A)	0.9	1.4
Sound Pressure Level (Standard Mode) dB(A) H/M/L)[4]	37 / 36 / 35	44 / 42 / 40
Dimensions (W x H x D, in.)	46-17/32 x 11-23/32 x 17-23/32	46-17/32 x 11-23/32 x 17-23/32
Net Unit Weight (lbs.)	80	91
Shipping Weight (lbs.)	91	101
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 18	4 x 18
Heat Exchanger (Row x Column x Fin / inch) x Number	(2 x 12 x 21) x 1	(3 x 12 x 21) x 1
Piping		
Liquid (in.)	1/4	3/8
Vapor (in.)	1/2	5/8
Drain O.D. / I.D. (in.)	1-1/4, 1	1-1/4, 1

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs 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.

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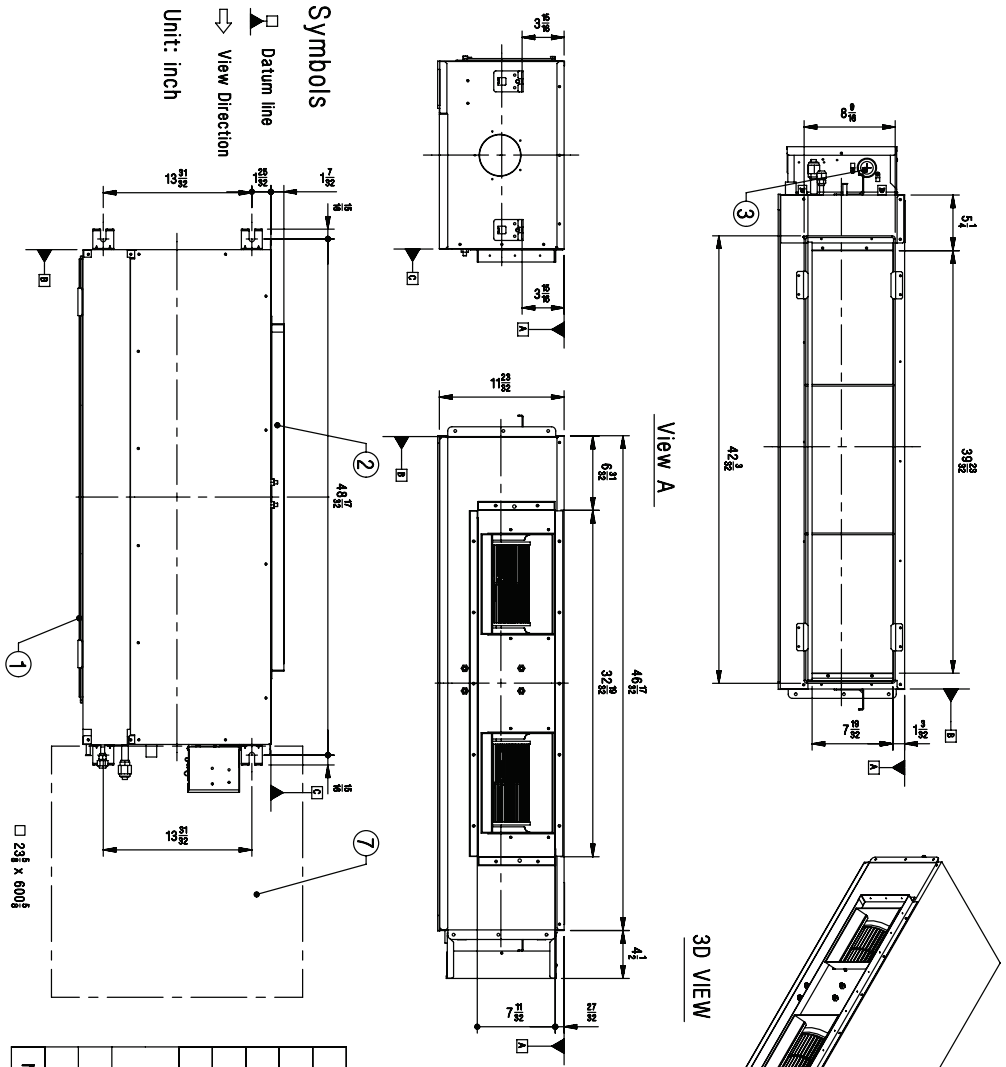
Figure 128: LMHN240HV and LMHN360HV Dimensions.



No.	Part Name	Description
1	Air Intake	-
2	Air Outlet	-
3	Power and Communication cable & Wired Remote Controller Wire Routing Hole	-
4	Drain Pipe Connection	-
5	Liquid Pipe Connection	-
6	Gas Pipe Connection	-
7	Inspection Hole	-
8	Drain Pump (accessory) Installation Hole	Knock out Type

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DUCT (HIGH STATIC) INDOOR UNITS

Cooling Capacity Table

Table 52:Multi F Ceiling-Concealed Duct (High Static) Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LMHN240HV 24,000	14	23.53	17.66	24.99	18.66	26.45	18.07	27.50	18.45	29.37	18.60	30.83	18.95
	20	23.51	17.80	24.97	18.80	26.43	18.21	27.48	18.59	29.35	18.75	30.81	19.10
	25	23.49	17.94	24.95	18.95	26.41	18.35	27.46	18.73	29.33	18.89	30.79	19.25
	30	23.47	18.08	24.93	19.09	26.39	18.49	27.44	18.88	29.30	19.04	30.76	19.40
	35	23.46	18.21	24.91	19.24	26.37	18.63	27.42	19.02	29.28	19.18	30.74	19.54
	40	23.44	18.35	24.89	19.38	26.35	18.77	27.40	19.16	29.26	19.33	30.72	19.69
	45	23.42	18.49	24.87	19.53	26.33	18.91	27.38	19.31	29.24	19.47	30.69	19.84
	50	23.40	18.62	24.85	19.67	26.31	19.05	27.36	19.45	29.21	19.61	30.67	19.99
	55	23.38	18.76	24.84	19.82	26.29	19.19	27.34	19.59	29.19	19.76	30.64	20.13
	60	23.37	18.90	24.82	19.96	26.27	19.33	27.32	19.73	29.17	19.90	30.62	20.28
	65	23.35	19.03	24.80	20.10	26.25	19.47	27.29	19.88	29.15	20.04	30.60	20.42
	70	23.33	19.17	24.78	20.25	26.23	19.61	27.27	20.02	29.13	20.19	30.57	20.57
	75	22.77	18.85	24.21	19.94	25.66	19.33	26.70	19.75	28.55	19.94	29.99	20.34
	80	22.21	18.53	23.65	19.63	25.09	19.05	26.13	19.48	27.97	19.69	29.42	20.10
	85	21.65	18.19	23.09	19.30	24.53	18.75	25.57	19.19	27.40	19.43	28.84	19.84
	90	21.09	17.85	22.53	18.96	23.96	18.45	25.00	18.90	26.83	19.15	28.27	19.59
	95	20.49	17.66	21.92	18.79	23.35	18.31	**24.00**	**18.48**	26.20	19.05	27.63	19.50
	100	19.99	17.19	21.42	18.31	22.85	17.87	23.69	18.19	25.70	18.64	27.13	19.10
	105	19.49	16.71	20.92	17.84	22.35	17.43	23.38	17.91	25.20	18.23	26.63	18.70
	110	18.99	16.14	20.42	17.26	21.85	16.90	22.88	17.37	24.70	17.71	26.13	18.19
	115	18.49	15.66	19.92	16.78	21.35	16.45	22.38	16.93	24.20	17.29	25.63	17.77
	118	18.19	15.55	19.62	16.68	21.05	16.36	22.08	16.86	23.90	17.23	25.33	17.72
	122	18.10	15.51	19.52	16.64	20.95	16.34	21.98	16.83	23.81	17.21	25.23	17.71
LMHN360HV 36,000	14	35.29	25.46	37.48	26.90	39.67	26.04	41.26	26.59	44.06	26.81	46.25	27.32
	20	35.26	25.66	37.45	27.11	39.64	26.25	41.23	26.80	44.02	27.02	46.21	27.54
	25	35.24	25.86	37.43	27.32	39.61	26.45	41.19	27.01	43.99	27.23	46.18	27.75
	30	35.21	26.06	37.40	27.53	39.58	26.65	41.16	27.21	43.96	27.44	46.14	27.96
	35	35.18	26.25	37.37	27.73	39.55	26.85	41.13	27.42	43.92	27.65	46.11	28.17
	40	35.16	26.45	37.34	27.94	39.52	27.06	41.10	27.63	43.89	27.86	46.07	28.39
	45	35.13	26.65	37.31	28.15	39.49	27.26	41.07	27.83	43.86	28.07	46.04	28.60
	50	35.10	26.85	37.28	28.36	39.46	27.46	41.04	28.04	43.82	28.27	46.00	28.81
	55	35.08	27.04	37.25	28.57	39.43	27.66	41.01	28.24	43.79	28.48	45.97	29.02
	60	35.05	27.24	37.23	28.78	39.40	27.86	40.97	28.45	43.76	28.69	45.93	29.23
	65	35.02	27.44	37.20	28.98	39.37	28.06	40.94	28.65	43.72	28.90	45.90	29.44
	70	34.99	27.63	37.17	29.19	39.34	28.26	40.91	28.86	43.69	29.10	45.86	29.65
	75	34.15	27.18	36.32	28.75	38.49	27.87	40.05	28.47	42.82	28.75	44.99	29.32
	80	33.31	26.71	35.47	28.29	37.64	27.46	39.20	28.08	41.96	28.39	44.12	28.97
	85	32.48	26.23	34.63	27.82	36.79	27.03	38.35	27.66	41.10	28.00	43.26	28.61
	90	31.64	25.73	33.79	27.33	35.94	26.59	37.50	27.24	40.25	27.61	42.40	28.23
	95	30.74	25.46	32.88	27.09	35.02	26.39	**36.00**	**26.64**	39.30	27.46	41.44	28.11
	100	29.99	24.78	32.13	26.40	34.27	25.76	35.53	26.23	38.55	26.87	40.69	27.53
	105	29.24	24.10	31.38	25.72	33.52	25.13	35.07	25.82	37.80	26.28	39.94	26.96
	110	28.49	23.27	30.63	24.89	32.77	24.36	34.32	25.04	37.05	25.54	39.20	26.22
	115	27.74	22.58	29.88	24.19	32.02	23.71	33.57	24.41	36.31	24.93	38.45	25.62
	118	27.29	22.41	29.43	24.04	31.57	23.59	33.12	24.30	35.86	24.84	38.00	25.55
	122	27.14	22.36	29.28	23.99	31.43	23.55	32.97	24.26	35.71	24.81	37.85	25.53

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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DUCT (HIGH STATIC) INDOOR UNITS

Heating Capacity Table

Table 53:Multi F Ceiling-Concealed Duct (High Static) Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LMHN240HV 24,000	0	-0.4	13.89	13.70	13.57	13.50	13.30	12.72
	5	4.5	15.65	15.46	15.33	15.26	15.07	14.48
	10	9	17.41	17.22	17.09	17.02	16.83	16.24
	17	15	19.76	19.57	19.43	**19.37**	19.17	18.55
	20	19	20.64	20.45	20.32	20.25	20.05	19.37
	25	23	22.11	21.91	21.78	21.72	21.52	20.74
	30	28	23.38	23.18	23.05	22.99	22.79	22.11
	35	32	24.65	24.46	24.33	24.26	24.07	23.48
	40	36	25.79	25.60	25.47	25.40	25.21	24.62
	45	41	26.93	26.74	26.61	26.54	26.35	25.76
	47	43	27.39	27.20	27.07	**27.00**	26.80	26.22
	50	46	27.83	27.64	27.51	27.44	27.24	26.58
	55	51	28.57	28.37	28.24	28.17	27.98	27.20
	60	56	28.57	28.37	28.24	28.17	27.98	27.32
	63	59	28.57	28.37	28.24	28.17	27.98	27.39
	68	64	28.57	28.37	28.24	28.17	27.98	27.51
LMHN360HV 36,000	0	-0.4	20.58	20.29	20.10	20.00	19.71	18.84
	5	4.5	23.19	22.90	22.71	22.61	22.32	21.45
	10	9	25.80	25.51	25.31	25.22	24.93	24.06
	17	15	29.28	28.99	28.79	**28.70**	28.41	27.48
	20	19	30.58	30.29	30.10	30.00	29.71	28.70
	25	23	32.75	32.46	32.27	32.17	31.88	30.72
	30	28	34.64	34.35	34.15	34.06	33.77	32.75
	35	32	36.52	36.23	36.04	35.94	35.65	34.78
	40	36	38.21	37.92	37.73	37.63	37.34	36.47
	45	41	39.90	39.61	39.42	39.32	39.03	38.16
	47	43	40.58	40.29	40.10	**40.00**	39.71	38.84
	50	46	41.23	40.94	40.75	40.65	40.36	39.38
	55	51	42.32	42.03	41.84	41.74	41.45	40.29
	60	56	42.32	42.03	41.84	41.74	41.45	40.47
	63	59	42.32	42.03	41.84	41.74	41.45	40.58
	68	64	42.32	42.03	41.84	41.74	41.45	40.76

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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DUCT (HIGH STATIC) INDOOR UNITS

External Static Pressure / Acoustic Data

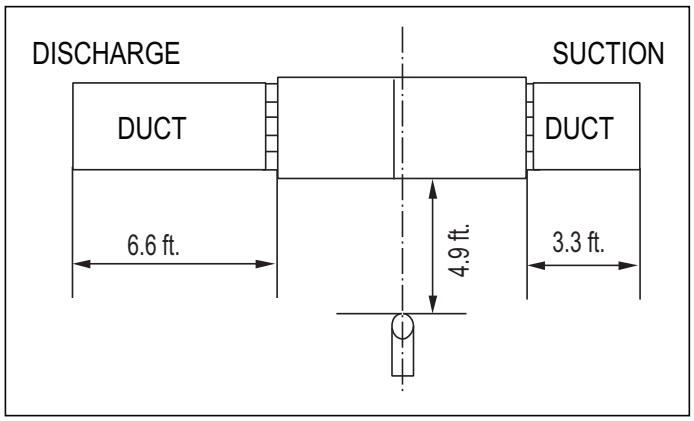
Table 54:Multi F Ceiling-Concealed Duct (High Static) External Static Pressure Setting Values Table.

Static Pressure (in. wg)			0.1	0.16	0.23	0.31	0.39	0.47	0.55	0.62	0.70	0.78
Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Airflow Rate / CFM		Setting Value (in. wg)									
LMHN240HV 24,000	High	688	82	92	103	113	122	131	140	147	154	160
	Mid	618	78	89	99	110	119	128	137	144	151	157
	Low	530	73	86	96	107	116	125	134	141	148	154
LMHN360HV 36,000	High	1,130	-	124	133	140	148	154	160	-	-	-
	Mid	953	-	112	122	130	137	145	152	-	-	-
	Low	706	-	97	107	117	125	133	141	-	-	-

Note:

- *To get the desired air flow and external static pressure combination, use the setting value from the table. Using a setting value other than that listed in the table will not provide the desired combination.*
- *Table data is based at 230V. Air flow rate varies according to voltage fluctuation.*

Figure 129: Sound Pressure Level Measurement Location.



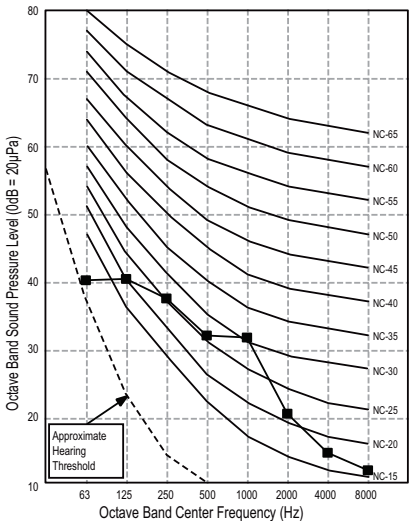
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound power levels are measured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

Table 55:Sound Pressure Levels (dB[A]).

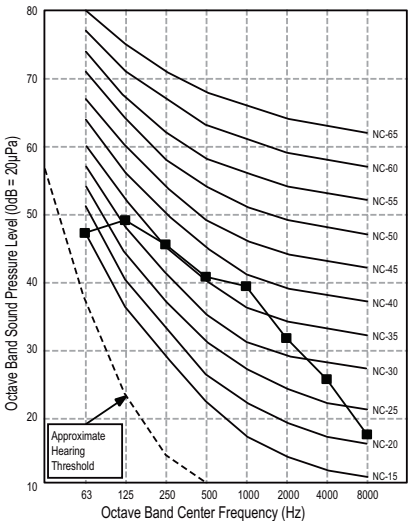
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LMHN240HV	37	36	35
LMHN360HV	44	42	40

Figure 130: Sound Pressure Level Diagrams.

LMHN240HV



LMHN360HV



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DUCT (HIGH STATIC) INDOOR UNITS

Refrigerant Flow Diagrams

Figure 131: LMHN240HV and LMHN360HV Refrigerant Flow Diagram.

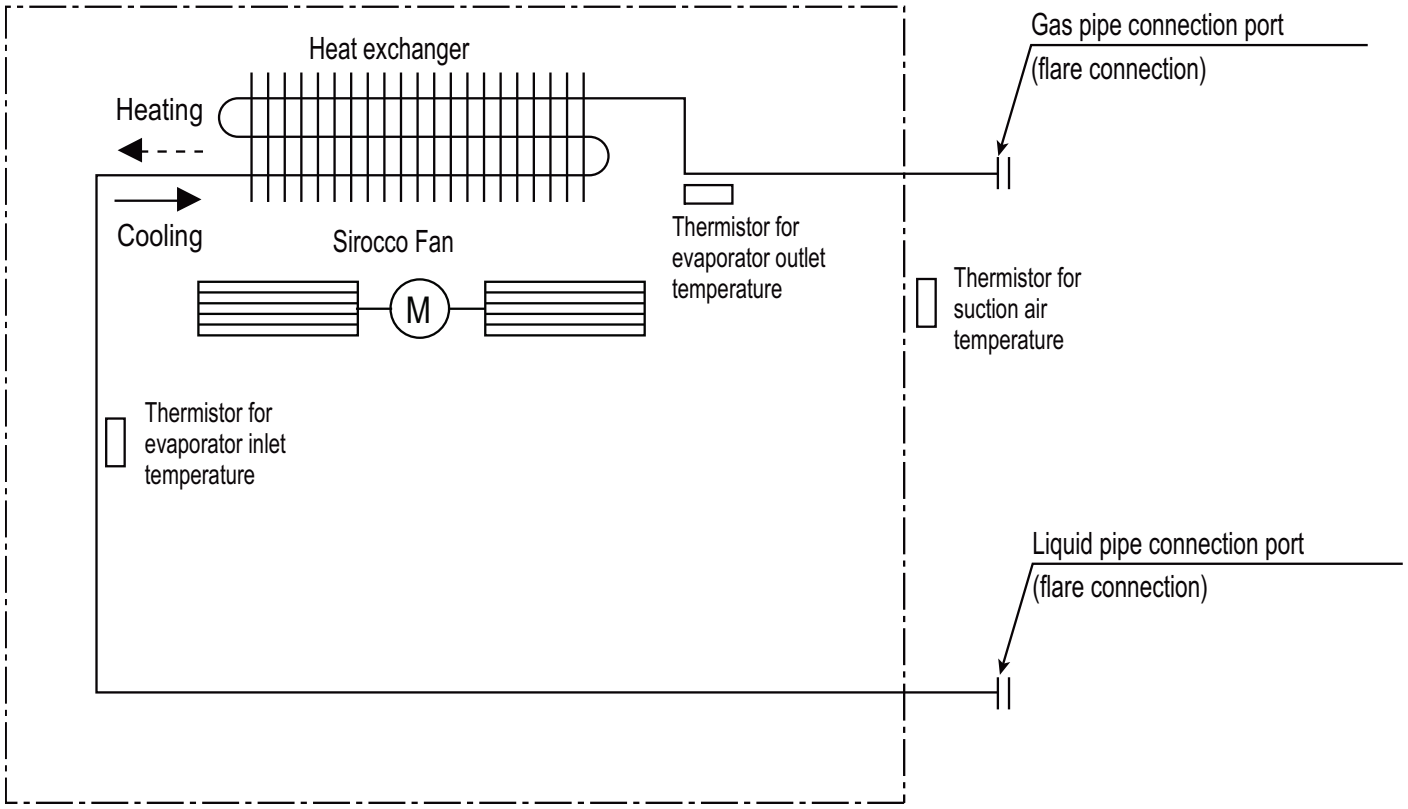

Table 56: Multi F Ceiling-Concealed Duct (High Static) Indoor Unit Refrigerant Pipe Connection Port Diameters.

Model No.	Vapor (inch)	Liquid (inch)
LMHN240HV	Ø1/2	Ø1/4
LMHN360HV	Ø5/8	Ø3/8

Table 57: Multi F Ceiling-Concealed Duct (High Static) 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

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Figure 132: Multi F Ceiling-Concealed Duct (High Static) LMHN240HV Indoor Units Wiring Diagram.

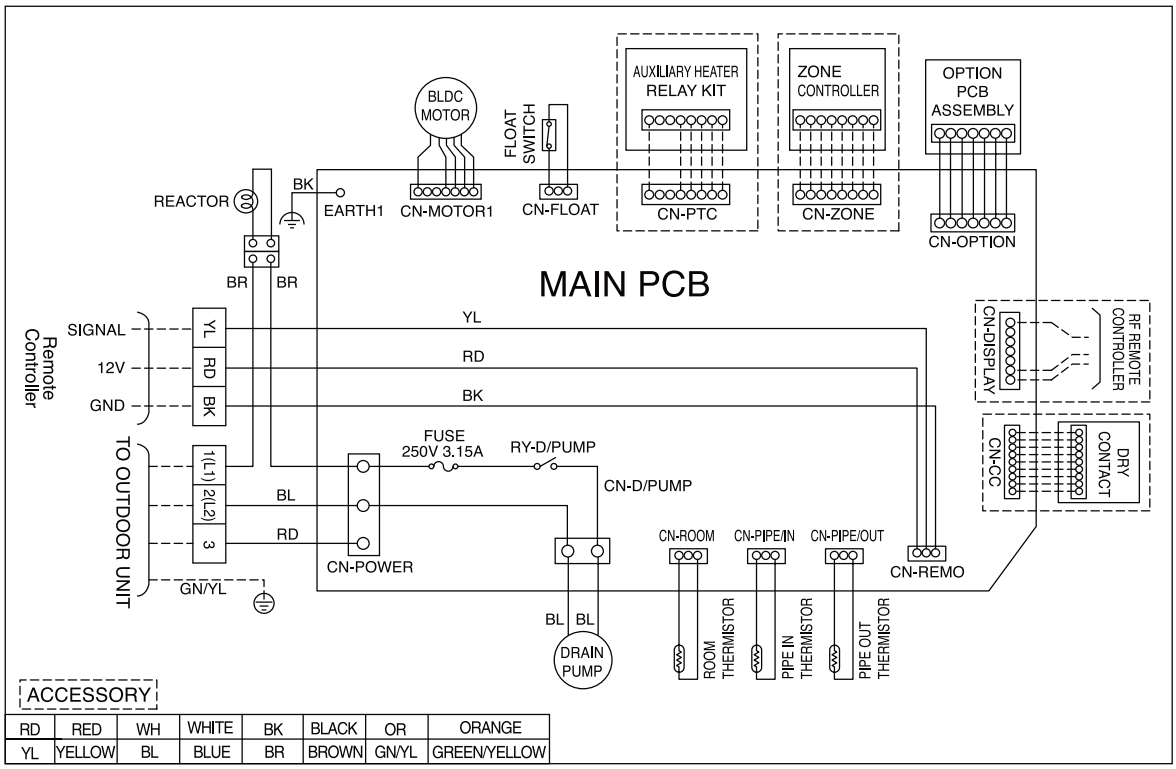
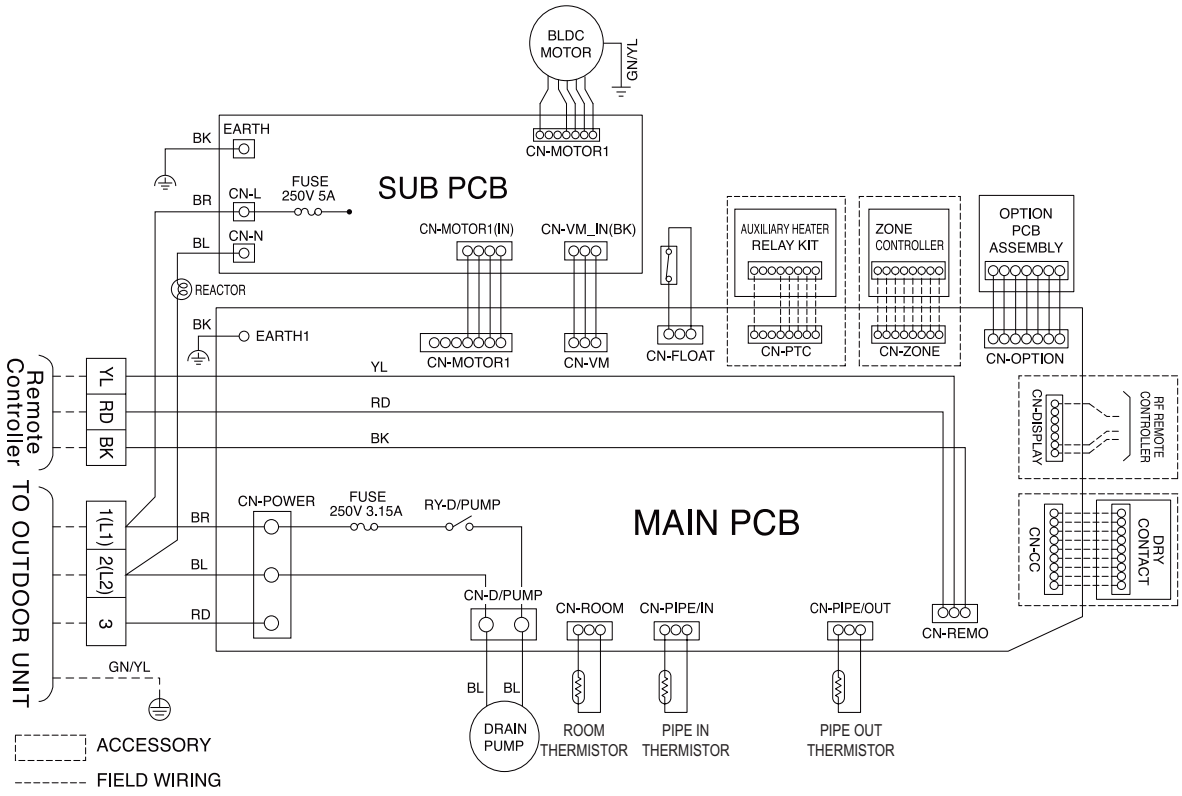


Figure 133: Multi F Ceiling-Concealed Duct (High Static) LMHN360HV Indoor Units Wiring Diagram.



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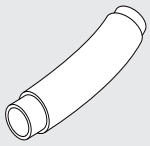
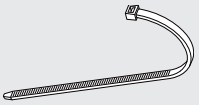
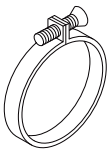
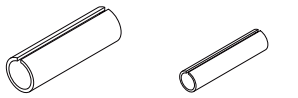
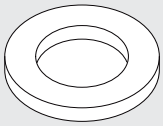
DUCT (HIGH STATIC) INDOOR UNITS

Factory Supplied Parts and Materials / Installation

Factory Supplied Parts

Table 58: Parts Table.

Part	Quantity	Image	Part	Quantity	Image
Drain Hose	One (1)		Zip Ties	Four (4)	
Metal Clamp	Two (2)		Insulation for Fittings	One (1) Set	 For Vapor Piping For Liquid Piping
Washers for Hanging Brackets	Eight (8)				

Factory Supplied Materials

- Owner's Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Torque wrenches
- Hexagonal wrench
- Gas-leak detector
- Thermometer

⚠WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit's components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

Selecting the Best Location

Do's

- Place the unit where air circulation will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient strength to bear the load of the indoor unit.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit in a location that is level, and where it can be easily connected to the outdoor unit / branch distribution unit.

⃠ Don'ts

- ⃠ *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- ⃠ *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- ⃠ *Do not install the unit near high-frequency generators.*
- ⃠ *Do not install the unit near a doorway.*

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

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DUCT (HIGH STATIC) INDOOR UNITS

Installation and Best Layout Practices

Note:

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

Installing in an Area Exposed to Unconditioned Air

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

- Verify that carpet is or will be installed (carpet will 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 134: Access Panel and General Service Space Required Dimensions.

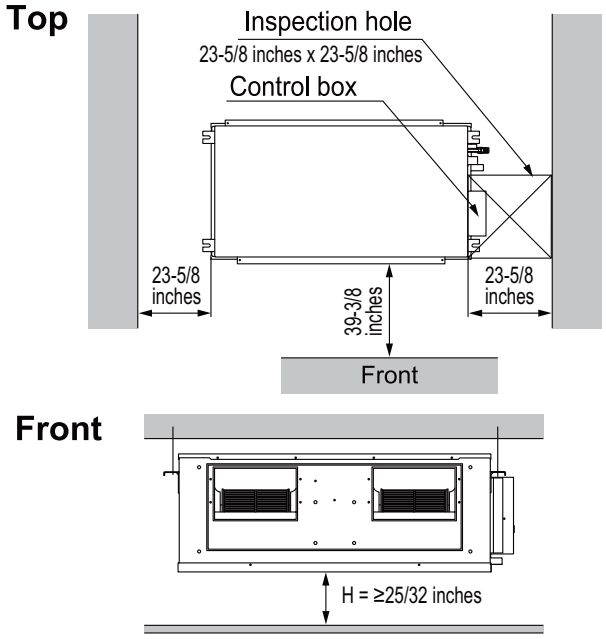

Figure 135: Indoor Unit Bolt Locations.

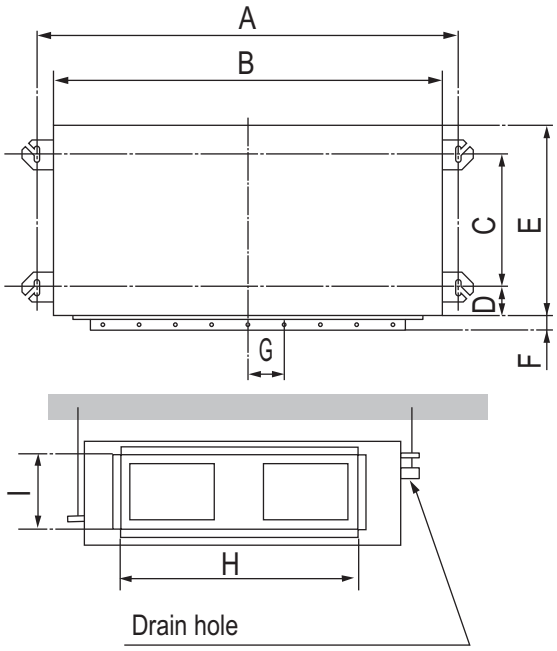

Table 59:Indoor Unit Bolt Location Dimensions.

Model / Capacity (Btu/h)	Dimensions (inches)								
	A	B	C	D	E	F	G	H	I
LMHN240HV / 24,000	48-17/32	46-17/32	13-31/32	1-25/32	17-23/32	1-7/32	3-5/8	32-19/32	7-11/32
LMHN360HV / 36,000									

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Preparing the Installation Area and Hanging the Indoor Unit Frame

1. Select and mark the area for the suspension or console bolts (use embedded inserts or anchor bolts in new buildings, and hole-in-anchors in older buildings).
2. Drill the holes.
3. Add the set-anchor and the plate washer to the bolts (bolts must be at least 13/32 inches in diameter), and then insert the bolts into the installation area.
4. Add the plate washer, spring washer, and nut to secure the bolts into the installation area.
5. Position the indoor unit installation plates onto the bolts. Secure using nuts, plate washers, and spring washers. Adjust for level as necessary.

Figure 136: Preparing the Installation Area.

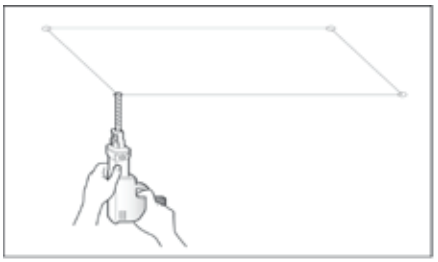


Figure 137: Suspension Bolt Options.

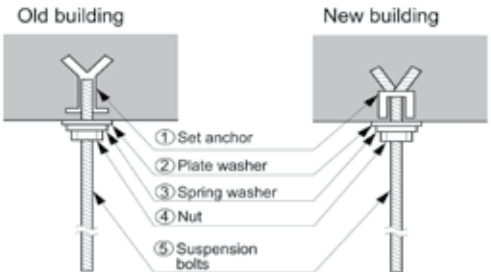
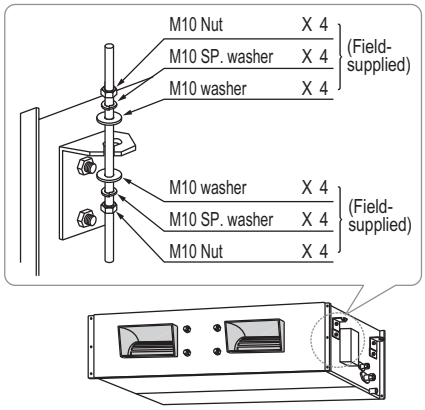


Figure 138: Hanging the Indoor Unit.



Note:

Install a canvas duct to the air outlet and air inlet so that vibration from the indoor unit does not carry to the duct or ceiling. Also, add insulation to the interior of the duct, and apply anti-vibration to the suspension bolts.

⚠ WARNING

- *Unit must be installed correctly. Tighten the nuts and bolts to prevent the unit from falling and causing severe injury or death.*

Installing the Drain System

- Drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must 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.

Figure 139:Indoor Unit Drain Piping.

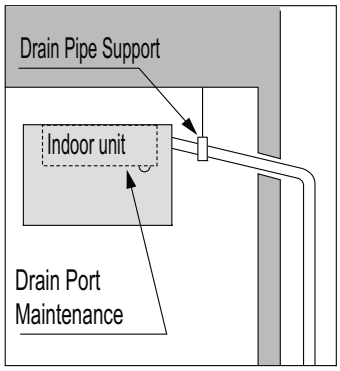
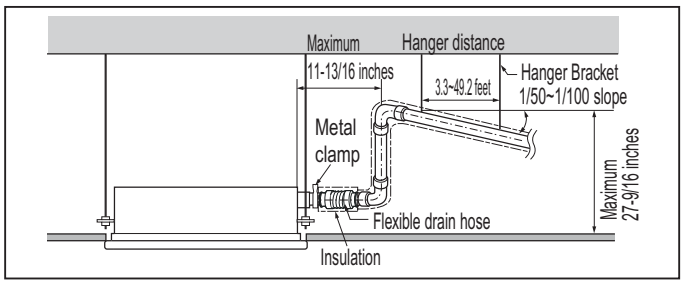
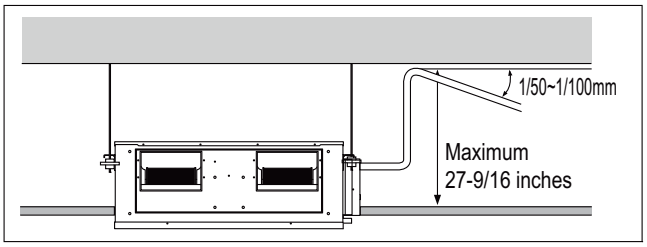


Figure 140:Drain Piping Installation Dimensions.





Note:

⃠ *Do not apply force or twist the drain hose: it will leak.*

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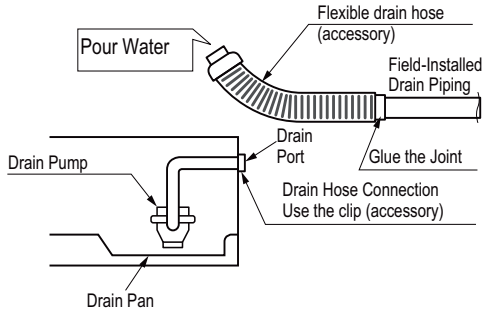
Checking the Drain Pump

The unit uses a drain pump to remove condensate. The pump must be tested before the system operates.

- Connect (field supplied) flexible drain hose to the field-installed drain piping; leave it as is until the test is complete.
- Pour water into the flexible drain hose and check for leaks.
- After power wiring installation is complete, operate the drain pump to see if it sounds and functions properly.
- After the test is complete, connect the flexible drain hose to the indoor unit drain port.

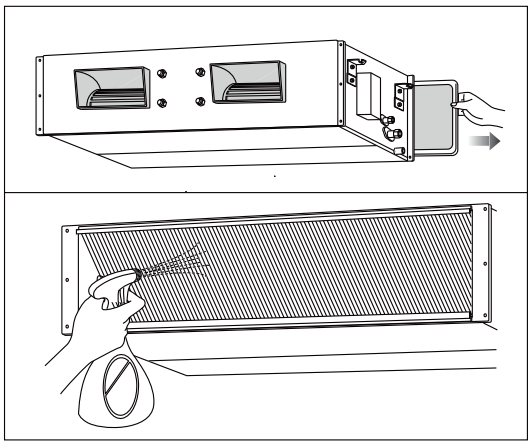
Figure 141:Checking the drain pump.



Checking the Drainage System

1. Remove the air filter.
2. Check the drainage.
   - Spray water on the evaporator.
   - Verify that water flows through the indoor unit drain hose without leaking.

Figure 142:Checking the Drainage System.



Insulating the Refrigerant and Drain Piping

⚠ WARNING

Ensure all piping is insulated. Exposed piping can cause burns if touched.

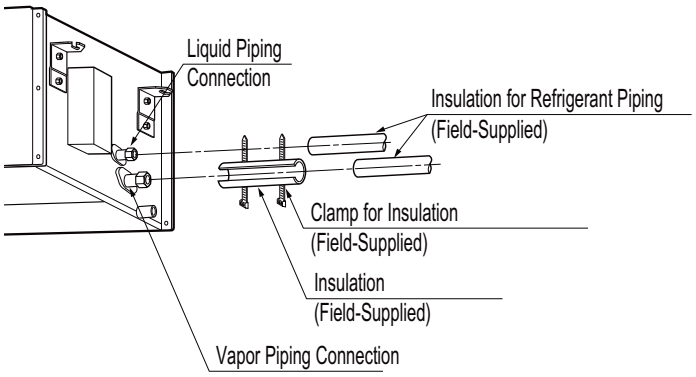
Refrigerant Piping Insulation

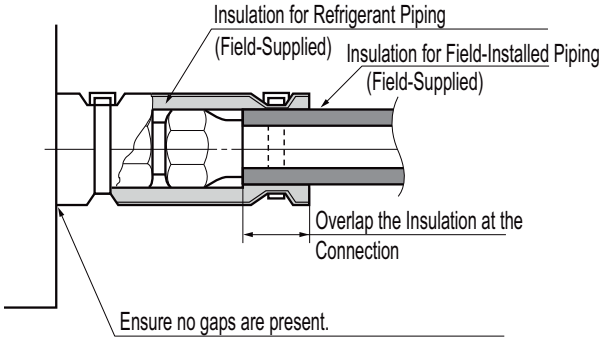
Field-installed vapor and liquid refrigerant piping lines must be properly and completely covered in insulation (up to the indoor unit piping connections). Any exposed piping will generate condensate or will cause burns if touched. Insulation for this field-installed refrigerant piping must have a minimum heat resistance of 248°F.

Drain Piping Insulation

Drain piping must have insulation a minimum of 7/32 inches thick.

Figure 143: Insulating the Piping.





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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

• Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

Connecting the Power Wiring and Communications Cable

1. To access the terminal block, first unscrew the cover from the control box.

2. Insert the power wiring / communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) 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.

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 or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

4. Secure the power wiring / communications cable with the cable restraint.

5. Screw the steel clamp to the inside of the control panel.
   - Place the wiring / cables in the clamp and tighten the plastic clamp to an open surface of the control panel.
   - When clamping, ⃠ do not apply force to the wiring connections.
   - Neatly arrange the wiring, ⃠ do not catch the wiring in the electric box cover, and ensure 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 144:Accessing the Indoor Unit Terminal Block.

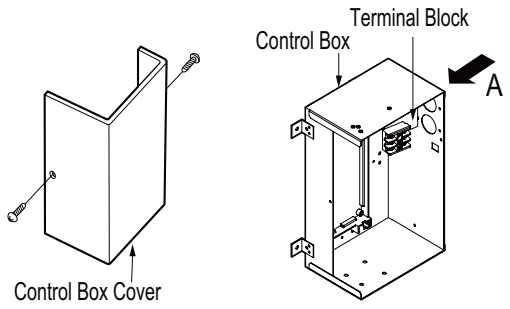
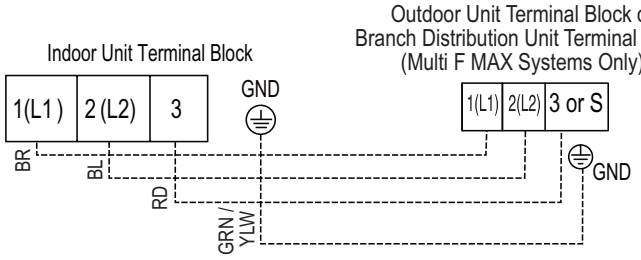


Figure 145:Indoor Unit to Outdoor Unit / Branch Distribution Unit (Multi F MAX systems only) Power Wiring / Communications Cable Connections.



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DUCT (HIGH STATIC) INDOOR UNITS

Installation and Best Layout Practices

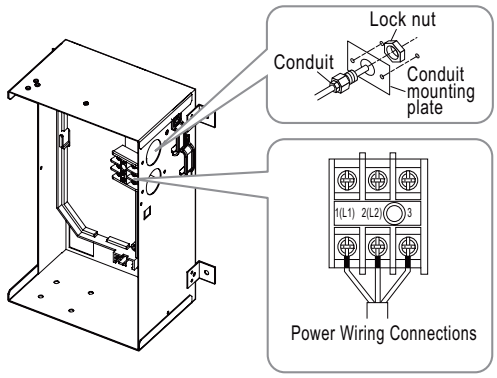
Using a Conduit

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.

Note:

If the distance between the outdoor unit and indoor unit is greater than 131 feet, connect the power wiring and communications cable separately (i.e., a conduit cannot be used).

Figure 146:Exterior View of Conduit Installation.



Controller Options

Ceiling-concealed duct (high static) indoor units can be used with many LG-supplied wired controllers (sold separately). The wireless hand-held controller (Model No. PQWRHQ0FDB) is also an optional accessory with use of the wired controller.

Wired Controller Connections

Controllers can connect to the indoor unit in one of two different ways.

1. LG Wired Remote Extension Cable with Molex plug (PZCWRC1; sold separately) that connects to the CN-REMO terminal on the indoor unit PCB.

2. Field-supplied controller cable that connects to the indoor unit terminal block (must be at least UL2547 or UL1007, 22 AWG, two-core, one-shield core, at least FT-6 rated if local electric and building codes require plenum cable usage).

Figure 147:PZCWRC1 LG Wired Remote Extension Cable.

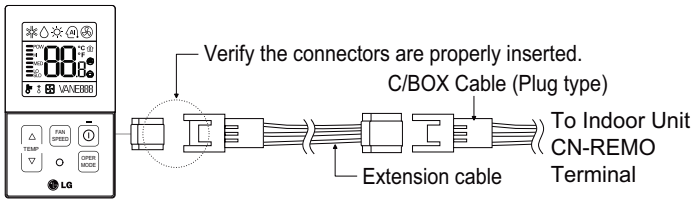
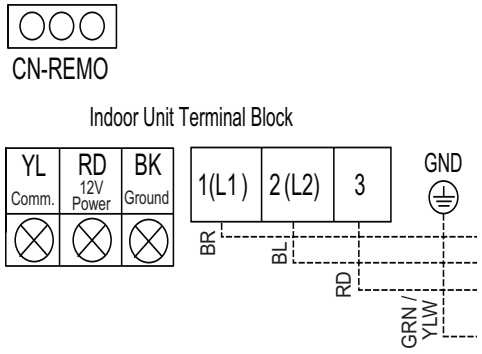


Figure 148:Wired Controller Connections on the Indoor Unit Terminal Block.



Note:

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

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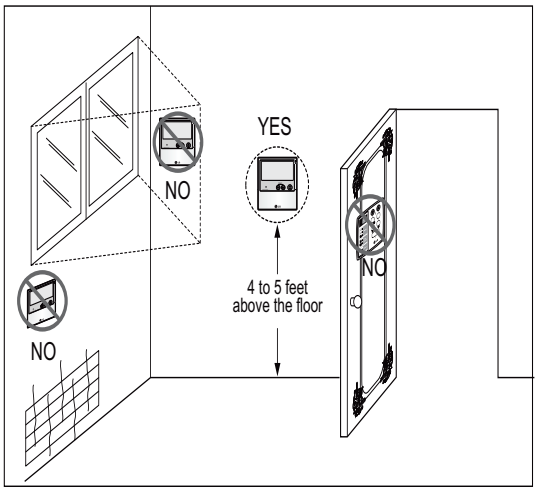
Wired Controller Placement

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

⃠ Do not install the wired controller near or in:

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

Figure 149:Proper Location for the Wired Controller.



Hanging the Wired Controller

1. The controller wiring / cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring / cable on applicable side.

2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring / cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 150:Removing the Cable Guide Grooves.

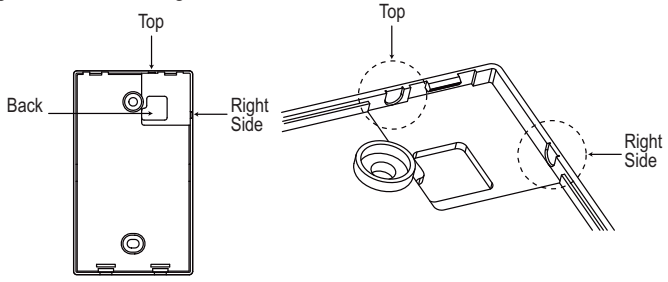


Figure 151:Attaching the Wall Plate.

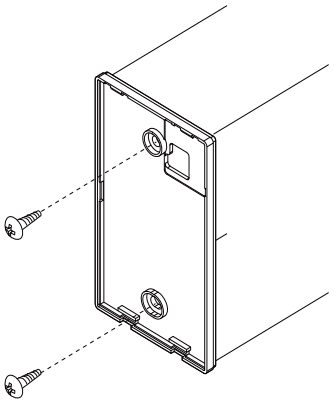
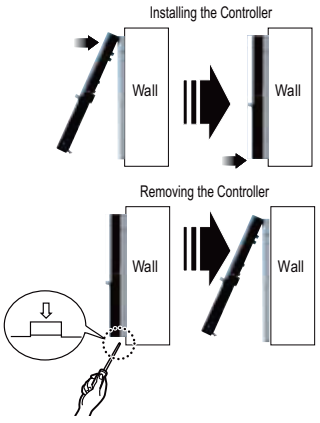


Figure 152:Installing / Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

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External Static Pressure Control

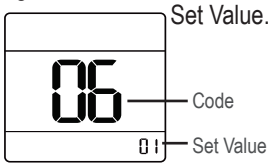
To provide a required air flow rate that accounts for the external static pressure change, follow the steps below.

1. To access system installer setting mode, press and hold the temperature increase and mode selection buttons simultaneously for approximately three (3) seconds. Choose setting code value “06” by pressing the mode selection button.

2. Use the temperature increase and decrease buttons to select the desired setting value.

   Setting Values
   01 : V-H
   02 : F-H
   03 : V-L
   04 : F-L

Figure 153:Select Code and Set Value.



3. Press the on / off button to save the established settings.

4. To deactivate system installer setting mode after the settings have been established, press and hold the temperature increase and mode selection check buttons simultaneously for approximately three (3) seconds. If a button is not pressed for more than 25 seconds, the system installer setting mode will automatically deactivate.

Figure 154:Controller External Static Pressure Setting Display.

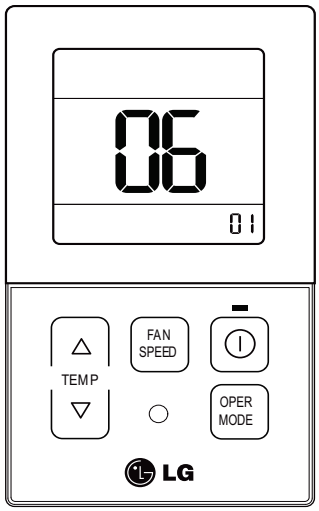


Table 66:Static Pressure Setting Table.

Pressure Selection		Function	
		Zone State	External Static Pressure Standard Value
01	V-H	Variable	High
02	F-H	Fixed	High
03	V-L	Variable	Low
04	F-L	Fixed	Low

Note:

- *Select the position after verifying duct work and the external static pressure of the indoor unit.*
- *Factory set to pressure selection F-H.*

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Assigning Air Flow

To assign an air flow for each fan speed, follow the steps below.

1. To access system installer setting mode, press and hold the temperature increase and mode selection buttons simultaneously for approximately three (3) seconds. Choose setting code value “03” by pressing the mode selection button.

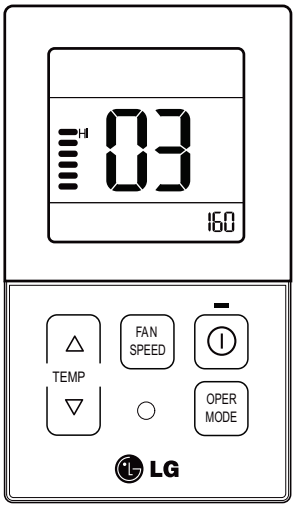
2. Use the fan speed button to select the desired fan speed. (Lo→Med→Hi will display on the LED).

3. Use the temperature increase and decrease buttons to select the desired external static pressure setting value (thereby assigning the respective airflow). External static pressure value range: 0~255; the value will display near the lower right corner of the LED.

4. Press the on / off button to save the established settings.

5. To deactivate system installer setting mode after the settings have been established, press and hold the temperature increase and mode selection check buttons simultaneously for approximately three (3) seconds. If a button is not pressed for more than 25 seconds, the system installer setting mode will automatically deactivate.

Figure 155:Controller External Static Pressure Setting Display.



Note:

- *A certified technician must set the external static pressure value(s). If the external static pressure is set incorrectly, the system will malfunction.*
- ⃠ *Do not alter the external static pressure value that corresponds to each air flow level.*
- *External static pressure value can vary depending on the indoor unit.*
- *If by pressing the fan speed button during external static pressure setup, the fan speed is raised to the next level, the air flow value of the previous fan speed will be maintained (external static pressure setting value is saved).*

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FOUR-WAY CEILING-CASSETTE INDOOR UNIT DATA

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“General Data / Specifications” on page 115
“Dimensions” on page 116
“Cooling Capacity Table” on page 118
“Heating Capacity Table” on page 120
“Acoustic Data” on page 122
“Air Velocity and Temperature Distribution” on page 124
“Refrigerant Flow Diagram” on page 126
“Wiring Diagram” on page 127
“Factory Supplied Parts and Materials” on page 128
“Installation and Best Layout Practices” on page 129

FOUR-WAY CEILING CASSETTE INDOOR UNITS

Mechanical Specifications and Features

MULTI F
MULTI F MAX

Four-Way Ceiling-Cassette Indoor Units

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Four-way ceiling-cassette units have a sound rating no higher than 38 dB(A) as tested per KSA0701 ISO Standard 3745.

Coil

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

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare, and all refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

The 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.

Ventilation Air

The case has a factory designated knockouts to connect a field-supplied, pressurized, and filtered outside air duct.

Fan Assembly and Control

All indoor units have a single, direct-drive turbo fan. Fans are manufactured of high-strength ABS HT-700 polymeric resin that is 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 setpoint and space temperature.

Air Filter

Return air is filtered with a factory-supplied, 14" x 14" x 1", removable, washable filter accessible from the bottom of the unit. A plasma filter is also available as an optional accessory.

Architectural Grille

An 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.

Figure 156: Multi F Four-Way Ceiling-Cassette Indoor Unit.

Airflow Guide Vanes

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.

Microprocessor Control

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

The indoor units are Wi-Fi compatible with the addition of an LG Wi-Fi module accessory, and can be controlled by LG's Smart ThinQ™ app on a smart device. A field-supplied Wi-Fi network and smart device are required. The Smart ThinQ app is free, and is available for Android™ and iOS. (Android is a trademark of Google LLC.)

Controls

The indoor unit casing has a factory-standard, integral infrared sensor designed to communicate with the supplied LG wireless handheld remote controller. An optional wired controller is available as an additional accessory. Communication between the indoor units and the outdoor unit is accomplished through 18 AWG, four-core, stranded and shielded power / communication cable.

Condensate Lift/Pump

The indoor unit is provided with a factory installed and wired internal condensate lift/pump capable of providing a minimum 27.5 inch 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.

Features

- Inverter (Variable speed fan)
- Internal drain pump
- Jet cool
- Control lock function
- Auto operation
- Auto restart operation
- 24-Hour on/off timer
- Two thermistor control
- Required accessory grille (PT-QCHW0 or PT-UQC) sold separately
- Group Control
- Plasma kit (PTPKQ0) sold separately
- Wireless LCD remote control included; wired thermostat available (sold separately)
- Wi-Fi compatible

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FOUR-WAY CEILING-CASSETTE INDOOR UNITS

General Data / Specifications

Table 67: Multi F Four-Way Ceiling-Cassette Indoor Unit General Data.

Model Name	LMCN078HV	LCN098HV4	LCN128HV4	LCN188HV4
Grille (Sold Separately)	PT-QCHW0 / PT-UQC	PT-QCHW0 / PT-UQC	PT-QCHW0 / PT-UQC	PT-QCHW0 / PT-UQC
Nominal Cooling Capacity (Btu/h)[1]	7,000	9,000	12,000	18,000
Nominal Heating Capacity (Btu/h)[1]	8,100	10,400	13,800	20,800
Operating Range				
Cooling (°F WB)	57-77			
Heating (°F DB)	59-81			
Fan				
Type	Turbo			
Motor Output (W) x Qty.	43 x 1			
Motor/Drive	Brushless Digitally Controlled / Direct			
Airflow Rate CFM (H/M/L)	265 / 212 / 177	300 / 265 / 230	335 / 283 / 247	459 / 424 / 388
Unit Data				
Refrigerant Type[2]	R410A			
Refrigerant Control	EEV			
Power Supply V, Ø, Hz[3]	208-230, 1, 60			
Rated Amps (A)	0.25			
Sound Pressure Level dB(A) (H/M/L)[4]	31 / 27 / 24	36 / 33 / 30	38 / 35 / 32	41 / 39 / 36
Body Dimensions (W x H x D, in.)	22-7/16 x 8-7/16 x 22-7/16			22-7/16 x 10-3/32 x 22-7/16
Grille (Sold separately) Dimensions (WxHxD, in.)	27-9/16 x 7/8 x 27-9/16			
Body Net Weight (lbs.)	26	29		32
Grille (Sold separately) Net Weight (lbs.)	7			
Body Shipping Weight (lbs.)	31	34		39
Grille (Sold separately) Shipping Weight (lbs.)	9			
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 18			
Heat Exchanger (Row x Column x Fin / inch) x Number	(1 X 8 X 18) X 1	(2 x 8 x 18) x 1		(2 x 10 x 18) x 1
Pipe Size				
Liquid (in.)	1/4			
Vapor (in.)	3/8			1/2
Connection Size				
Liquid (in.)	1/4			
Vapor (in.)	3/8			1/2
Drain O.D. / I.D. (in.)	1-1/4, 1			

[1]Nominal capacity is rated 0 ft. above sea level with a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs 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.

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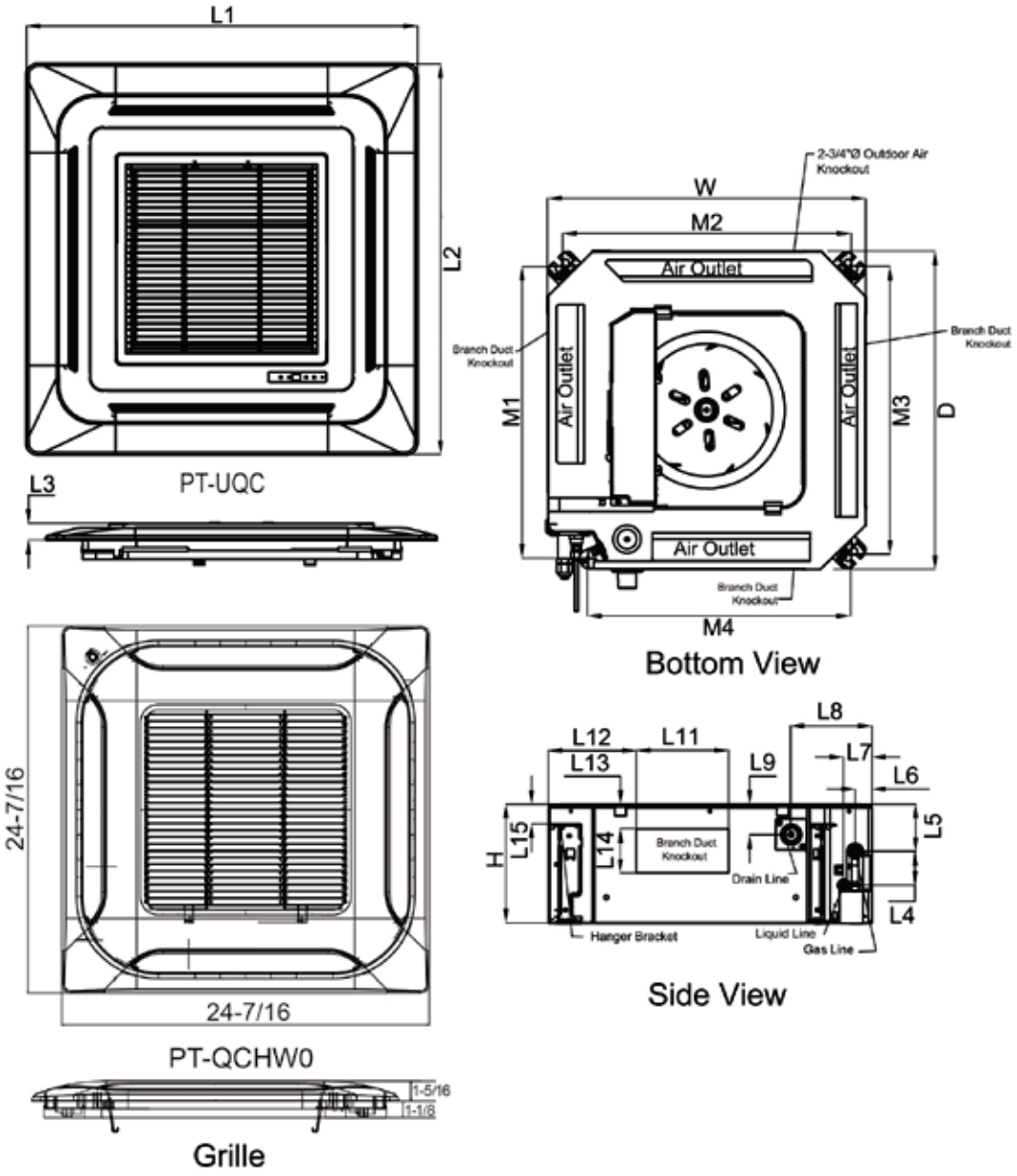
FOUR-WAY CEILING-CASSETTE INDOOR UNITS

Dimensions

Figure 157: LMCN078HV, LCN098HV4, and LCN128HV4 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"

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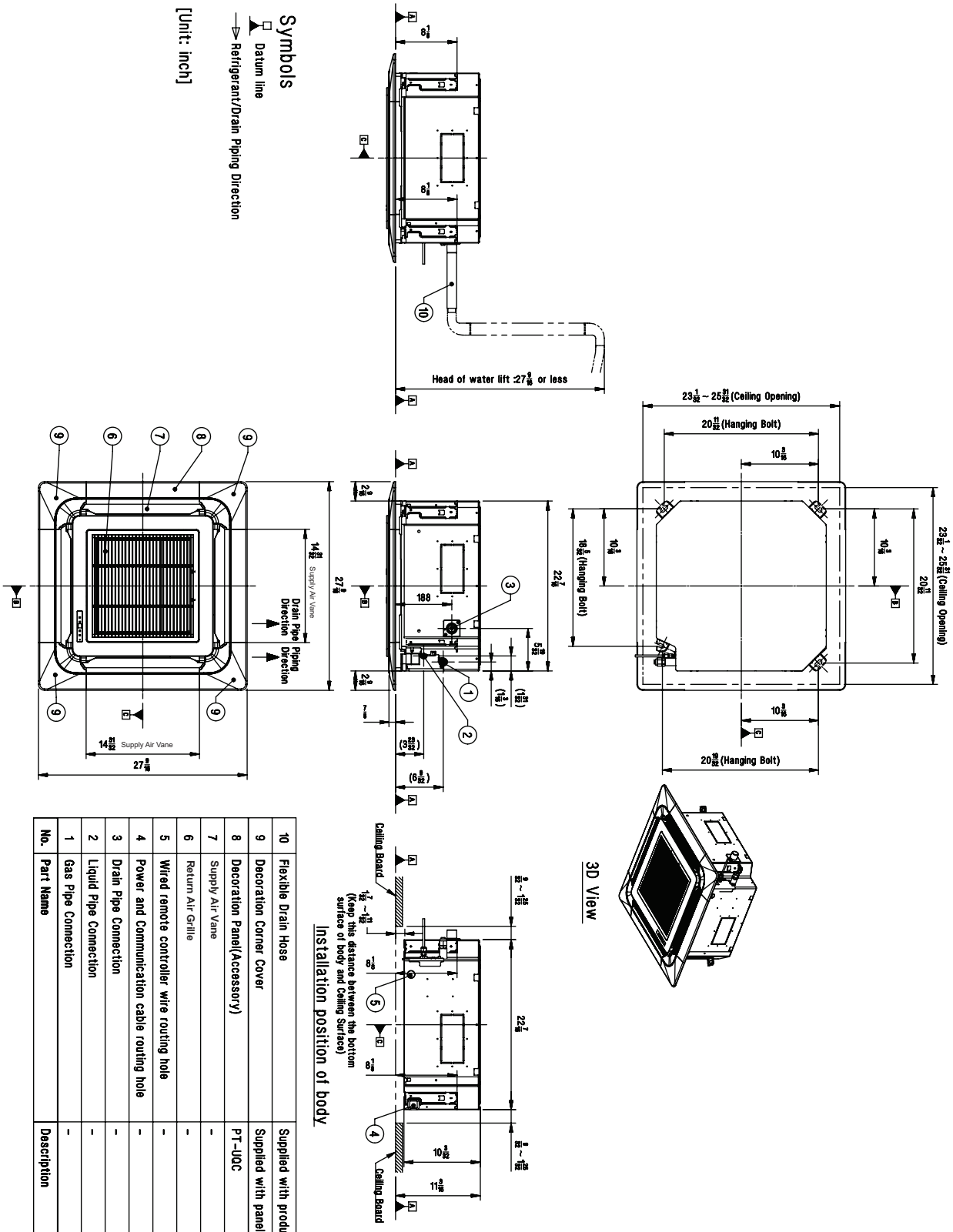
FOUR-WAY CEILING-CASSETTE INDOOR UNITS

Dimensions

Figure 158: LCN188HV4 Dimensions.



No.	Part Name	Description
1	Gas Pipe Connection	-
2	Liquid Pipe Connection	-
3	Drain Pipe Connection	-
4	Power and Communication cable routing hole	-
5	Wired remote controller wire routing hole	-
6	Return Air Grille	-
7	Supply Air Vane	-
8	Decoration Panel(Accessory)	PT-UQC
9	Decoration Corner Cover	Supplied with panel
10	Flexible Drain Hose	Supplied with product

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FOUR-WAY CEILING CASSETTE INDOOR UNITS

MULTI F
MULTI F MAX

Cooling Capacity Table

Table 68: Multi F Four-Way Ceiling-Cassette Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LMCN078HV 7,000	14	6.86	4.87	7.29	5.15	7.71	4.99	8.02	5.09	8.57	5.13	8.99	5.23
	20	6.86	4.91	7.28	5.19	7.71	5.02	8.02	5.13	8.56	5.17	8.99	5.27
	25	6.85	4.95	7.28	5.23	7.70	5.06	8.01	5.17	8.55	5.21	8.98	5.31
	30	6.85	4.99	7.27	5.27	7.70	5.10	8.00	5.21	8.55	5.25	8.97	5.35
	35	6.84	5.03	7.27	5.31	7.69	5.14	8.00	5.25	8.54	5.29	8.97	5.39
	40	6.84	5.06	7.26	5.35	7.68	5.18	7.99	5.29	8.53	5.33	8.96	5.43
	45	6.83	5.10	7.25	5.39	7.68	5.22	7.99	5.33	8.53	5.37	8.95	5.47
	50	6.83	5.14	7.25	5.43	7.67	5.26	7.98	5.37	8.52	5.41	8.94	5.52
	55	6.82	5.18	7.24	5.47	7.67	5.30	7.97	5.41	8.51	5.45	8.94	5.56
	60	6.81	5.21	7.24	5.51	7.66	5.33	7.97	5.45	8.51	5.49	8.93	5.60
	65	6.81	5.25	7.23	5.55	7.66	5.37	7.96	5.49	8.50	5.53	8.92	5.64
	70	6.80	5.29	7.23	5.59	7.65	5.41	7.95	5.52	8.49	5.57	8.92	5.68
	75	6.64	5.20	7.06	5.50	7.48	5.33	7.79	5.45	8.33	5.50	8.75	5.61
	80	6.48	5.11	6.90	5.42	7.32	5.26	7.62	5.38	8.16	5.43	8.58	5.55
	85	6.31	5.02	6.73	5.33	7.15	5.17	7.46	5.30	7.99	5.36	8.41	5.48
	90	6.15	4.93	6.57	5.23	6.99	5.09	7.29	5.21	7.83	5.29	8.24	5.40
	95	5.98	4.87	6.39	5.19	6.81	5.05	**7.00**	**5.10**	7.64	5.26	8.06	5.38
	100	5.83	4.74	6.25	5.05	6.66	4.93	6.91	5.02	7.50	5.14	7.91	5.27
	105	5.69	4.61	6.10	4.92	6.52	4.81	6.82	4.94	7.35	5.03	7.77	5.16
	110	5.54	4.46	5.96	4.76	6.37	4.66	6.67	4.79	7.21	4.89	7.62	5.02
	115	5.39	4.32	5.81	4.63	6.23	4.54	6.53	4.67	7.06	4.77	7.48	4.90
	118	5.31	4.29	5.72	4.60	6.14	4.52	6.44	4.65	6.97	4.76	7.39	4.89
	122	5.28	4.28	5.69	4.59	6.11	4.51	6.41	4.64	6.94	4.75	7.36	4.89
LCN098HV4 9,000	14	8.82	6.31	9.37	6.66	9.92	6.45	10.31	6.59	11.01	6.64	11.56	6.77
	20	8.82	6.36	9.36	6.72	9.91	6.50	10.31	6.64	11.01	6.70	11.55	6.82
	25	8.81	6.41	9.36	6.77	9.90	6.55	10.30	6.69	11.00	6.75	11.54	6.87
	30	8.80	6.46	9.35	6.82	9.90	6.60	10.29	6.74	10.99	6.80	11.54	6.93
	35	8.80	6.50	9.34	6.87	9.89	6.65	10.28	6.79	10.98	6.85	11.53	6.98
	40	8.79	6.55	9.33	6.92	9.88	6.70	10.27	6.84	10.97	6.90	11.52	7.03
	45	8.78	6.60	9.33	6.97	9.87	6.75	10.27	6.90	10.96	6.95	11.51	7.09
	50	8.78	6.65	9.32	7.03	9.87	6.80	10.26	6.95	10.96	7.00	11.50	7.14
	55	8.77	6.70	9.31	7.08	9.86	6.85	10.25	7.00	10.95	7.06	11.49	7.19
	60	8.76	6.75	9.31	7.13	9.85	6.90	10.24	7.05	10.94	7.11	11.48	7.24
	65	8.76	6.80	9.30	7.18	9.84	6.95	10.24	7.10	10.93	7.16	11.47	7.29
	70	8.75	6.85	9.29	7.23	9.84	7.00	10.23	7.15	10.92	7.21	11.47	7.35
	75	8.54	6.73	9.08	7.12	9.62	6.90	10.01	7.05	10.71	7.12	11.25	7.26
	80	8.33	6.62	8.87	7.01	9.41	6.80	9.80	6.96	10.49	7.03	11.03	7.18
	85	8.12	6.50	8.66	6.89	9.20	6.70	9.59	6.85	10.28	6.94	10.82	7.09
	90	7.91	6.37	8.45	6.77	8.99	6.59	9.37	6.75	10.06	6.84	10.60	6.99
	95	7.68	6.31	8.22	6.71	8.75	6.54	9.00	6.60	9.83	6.80	10.36	6.96
	100	7.50	6.14	8.03	6.54	8.57	6.38	8.88	6.50	9.64	6.66	10.17	6.82
	105	7.31	5.97	7.84	6.37	8.38	6.23	8.77	6.40	9.45	6.51	9.99	6.68
	110	7.12	5.77	7.66	6.17	8.19	6.03	8.58	6.20	9.26	6.33	9.80	6.50
	115	6.94	5.59	7.47	5.99	8.01	5.87	8.39	6.05	9.08	6.18	9.61	6.35
	118	6.82	5.55	7.36	5.96	7.89	5.84	8.28	6.02	8.96	6.15	9.50	6.33
	122	6.79	5.54	7.32	5.94	7.86	5.83	8.24	6.01	8.93	6.15	9.46	6.32

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 columns and rows indicate reference data. When operating at this temperature, these values can be different if the system is not running consistently.

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FOUR-WAY CEILING CASSETTE INDOOR UNITS

Cooling Capacity Table

Table 69: Multi F Four-Way Ceiling-Cassette Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LCN128HV4 12,000	14	11.76	8.51	12.49	8.99	13.22	8.70	13.75	8.88	14.69	8.96	15.42	9.13
	20	11.75	8.57	12.48	9.06	13.21	8.77	13.74	8.95	14.67	9.03	15.40	9.20
	25	11.75	8.64	12.48	9.13	13.20	8.84	13.73	9.02	14.66	9.10	15.39	9.27
	30	11.74	8.71	12.47	9.20	13.19	8.90	13.72	9.09	14.65	9.17	15.38	9.34
	35	11.73	8.77	12.46	9.27	13.18	8.97	13.71	9.16	14.64	9.24	15.37	9.41
	40	11.72	8.84	12.45	9.34	13.17	9.04	13.70	9.23	14.63	9.31	15.36	9.48
	45	11.71	8.90	12.44	9.41	13.16	9.11	13.69	9.30	14.62	9.38	15.35	9.55
	50	11.70	8.97	12.43	9.47	13.15	9.17	13.68	9.37	14.61	9.45	15.33	9.62
	55	11.69	9.03	12.42	9.54	13.14	9.24	13.67	9.44	14.60	9.52	15.32	9.70
	60	11.68	9.10	12.41	9.61	13.13	9.31	13.66	9.50	14.59	9.58	15.31	9.77
	65	11.67	9.17	12.40	9.68	13.12	9.38	13.65	9.57	14.57	9.65	15.30	9.84
	70	11.66	9.23	12.39	9.75	13.11	9.44	13.64	9.64	14.56	9.72	15.29	9.91
	75	11.38	9.08	12.11	9.60	12.83	9.31	13.35	9.51	14.27	9.60	15.00	9.79
	80	11.10	8.92	11.82	9.45	12.55	9.17	13.07	9.38	13.99	9.48	14.71	9.68
	85	10.83	8.76	11.54	9.29	12.26	9.03	12.78	9.24	13.70	9.36	14.42	9.56
	90	10.55	8.60	11.26	9.13	11.98	8.88	12.50	9.10	13.42	9.22	14.13	9.43
	95	10.25	8.51	10.96	9.05	11.67	8.82	12.00	8.90	13.10	9.18	13.81	9.39
	100	10.00	8.28	10.71	8.82	11.42	8.61	11.84	8.76	12.85	8.98	13.56	9.20
	105	9.75	8.05	10.46	8.59	11.17	8.40	11.69	8.62	12.60	8.78	13.31	9.01
	110	9.50	7.77	10.21	8.31	10.92	8.14	11.44	8.37	12.35	8.53	13.07	8.76
	115	9.25	7.54	9.96	8.08	10.67	7.92	11.19	8.15	12.10	8.33	12.82	8.56
	118	9.10	7.49	9.81	8.03	10.52	7.88	11.04	8.12	11.95	8.30	12.67	8.54
	122	9.05	7.47	9.76	8.01	10.48	7.87	10.99	8.11	11.90	8.29	12.62	8.53
LCN188HV4 18,000	14	17.65	12.33	18.74	13.02	19.84	12.61	20.63	12.88	22.03	12.98	23.12	13.23
	20	17.63	12.43	18.73	13.13	19.82	12.71	20.61	12.98	22.01	13.09	23.11	13.33
	25	17.62	12.52	18.71	13.23	19.81	12.81	20.60	13.08	22.00	13.19	23.09	13.44
	30	17.60	12.62	18.70	13.33	19.79	12.91	20.58	13.18	21.98	13.29	23.07	13.54
	35	17.59	12.71	18.68	13.43	19.78	13.00	20.57	13.28	21.96	13.39	23.05	13.64
	40	17.58	12.81	18.67	13.53	19.76	13.10	20.55	13.38	21.94	13.49	23.04	13.75
	45	17.56	12.90	18.66	13.63	19.75	13.20	20.53	13.48	21.93	13.59	23.02	13.85
	50	17.55	13.00	18.64	13.73	19.73	13.30	20.52	13.58	21.91	13.69	23.00	13.95
	55	17.54	13.10	18.63	13.83	19.72	13.39	20.50	13.68	21.89	13.79	22.98	14.05
	60	17.52	13.19	18.61	13.93	19.70	13.49	20.49	13.78	21.88	13.89	22.97	14.16
	65	17.51	13.29	18.60	14.03	19.69	13.59	20.47	13.87	21.86	13.99	22.95	14.26
	70	17.50	13.38	18.58	14.13	19.67	13.69	20.46	13.97	21.84	14.09	22.93	14.36
	75	17.08	13.16	18.16	13.92	19.24	13.49	20.03	13.79	21.41	13.92	22.50	14.20
	80	16.66	12.93	17.74	13.70	18.82	13.30	19.60	13.60	20.98	13.75	22.06	14.03
	85	16.24	12.70	17.32	13.47	18.40	13.09	19.17	13.40	20.55	13.56	21.63	13.85
	90	15.82	12.46	16.90	13.23	17.97	12.88	18.75	13.19	20.12	13.37	21.20	13.67
	95	15.37	12.33	16.44	13.12	17.51	12.78	**18.00**	**12.90**	19.65	13.30	20.72	13.61
	100	14.99	12.00	16.06	12.78	17.13	12.47	17.77	12.70	19.28	13.01	20.35	13.33
	105	14.62	11.67	15.69	12.45	16.76	12.17	17.53	12.50	18.90	12.73	19.97	13.05
	110	14.24	11.27	15.32	12.05	16.39	11.79	17.16	12.13	18.53	12.36	19.60	12.70
	115	13.87	10.93	14.94	11.71	16.01	11.48	16.79	11.82	18.15	12.07	19.22	12.41
	118	13.65	10.85	14.72	11.64	15.79	11.42	16.56	11.77	17.93	12.03	19.00	12.37
	122	13.57	10.83	14.64	11.62	15.71	11.40	16.49	11.75	17.85	12.01	18.92	12.36

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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FOUR-WAY CEILING-CASSETTE INDOOR UNITS

Heating Capacity Table

Table 70: Multi F Four-Way Ceiling-Cassette Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LMCN078HV 7,000	0	-0.4	4.17	4.11	4.07	4.05	3.99	3.82
	5	4.5	4.70	4.64	4.60	4.58	4.52	4.34
	10	9	5.22	5.17	5.13	5.11	5.05	4.87
	17	15	5.93	5.87	5.83	**5.81**	5.75	5.56
	20	19	6.19	6.13	6.09	6.08	6.02	5.81
	25	23	6.63	6.57	6.53	6.52	6.46	6.22
	30	28	7.01	6.96	6.92	6.90	6.84	6.63
	35	32	7.40	7.34	7.30	7.28	7.22	7.04
	40	36	7.74	7.68	7.64	7.62	7.56	7.39
	45	41	8.08	8.02	7.98	7.96	7.90	7.73
	47	43	8.22	8.16	8.12	**8.10**	8.04	7.87
	50	46	8.35	8.29	8.25	8.23	8.17	7.98
	55	51	8.57	8.51	8.47	8.45	8.39	8.16
	60	56	8.57	8.51	8.47	8.45	8.39	8.20
	63	59	8.57	8.51	8.47	8.45	8.39	8.22
	68	64	8.57	8.51	8.47	8.45	8.39	8.25
LCN098HV4 9,000	0	-0.4	5.35	5.28	5.23	5.20	5.12	4.90
	5	4.5	6.03	5.95	5.90	5.88	5.80	5.58
	10	9	6.71	6.63	6.58	6.56	6.48	6.26
	17	15	7.61	7.54	7.49	7.46	7.39	7.14
	20	19	7.95	7.88	7.83	7.80	7.72	7.46
	25	23	8.52	8.44	8.39	8.37	8.29	7.99
	30	28	9.01	8.93	8.88	8.86	8.78	8.52
	35	32	9.50	9.42	9.37	9.34	9.27	9.04
	40	36	9.94	9.86	9.81	9.78	9.71	9.48
	45	41	10.37	10.30	10.25	10.22	10.15	9.92
	47	43	10.55	10.48	10.43	10.40	10.32	10.10
	50	46	10.72	10.64	10.59	10.57	10.49	10.24
	55	51	11.00	10.93	10.88	10.85	10.78	10.48
	60	56	11.00	10.93	10.88	10.85	10.78	10.52
	63	59	11.00	10.93	10.88	10.85	10.78	10.55
	68	64	11.00	10.93	10.88	10.85	10.78	10.60

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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FOUR-WAY CEILING-CASSETTE INDOOR UNITS

Heating Capacity Table

Table 71: Multi F Four-Way Ceiling-Cassette Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LCN128HV4 12,000	0	-0.4	7.10	7.00	6.93	6.90	6.80	6.50
	5	4.5	8.00	7.90	7.83	7.80	7.70	7.40
	10	9	8.90	8.80	8.73	8.70	8.60	8.30
	17	15	10.10	10.00	9.93	9.90	9.80	9.48
	20	19	10.55	10.45	10.38	10.35	10.25	9.90
	25	23	11.30	11.20	11.13	11.10	11.00	10.60
	30	28	11.95	11.85	11.78	11.75	11.65	11.30
	35	32	12.60	12.50	12.43	12.40	12.30	12.00
	40	36	13.18	13.08	13.02	12.98	12.88	12.58
	45	41	13.77	13.67	13.60	13.57	13.47	13.17
	47	43	14.00	13.90	13.83	13.80	13.70	13.40
	50	46	14.23	14.13	14.06	14.03	13.93	13.59
	55	51	14.60	14.50	14.43	14.40	14.30	13.90
	60	56	14.60	14.50	14.43	14.40	14.30	13.96
	63	59	14.60	14.50	14.43	14.40	14.30	14.00
	68	64	14.60	14.50	14.43	14.40	14.30	14.06
LCN188HV4 18,000	0	-0.4	10.70	10.55	10.45	10.40	10.25	9.80
	5	4.5	12.06	11.91	11.81	11.76	11.61	11.15
	10	9	13.41	13.26	13.16	13.11	12.96	12.51
	17	15	15.22	15.07	14.97	**14.92**	14.77	14.29
	20	19	15.90	15.75	15.65	15.60	15.45	14.92
	25	23	17.03	16.88	16.78	16.73	16.58	15.98
	30	28	18.01	17.86	17.76	17.71	17.56	17.03
	35	32	18.99	18.84	18.74	18.69	18.54	18.09
	40	36	19.87	19.72	19.62	19.57	19.42	18.97
	45	41	20.75	20.60	20.50	20.45	20.30	19.85
	47	43	21.10	20.95	20.85	**20.80**	20.65	20.20
	50	46	21.44	21.29	21.19	21.14	20.99	20.48
	55	51	22.01	21.86	21.75	21.70	21.55	20.95
	60	56	22.01	21.86	21.75	21.70	21.55	21.04
	63	59	22.01	21.86	21.75	21.70	21.55	21.10
	68	64	22.01	21.86	21.75	21.70	21.55	21.20

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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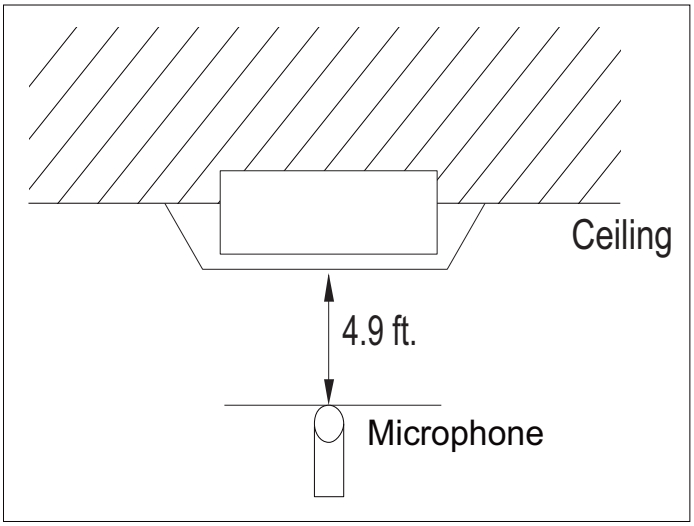
Figure 159: Sound Pressure Level Measurement Location.



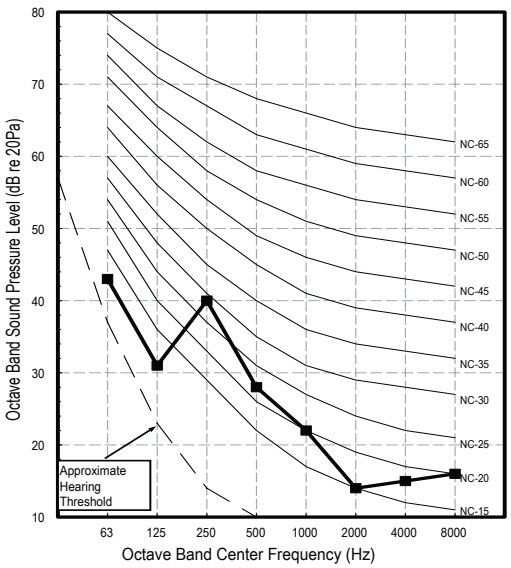
- Measurement taken 4.9' away from the unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound power levels are measured in dB(A).
- Tested in anechoic chamber per ISO Standard 3745.

Table 72: Sound Pressure Levels (dB[A]).

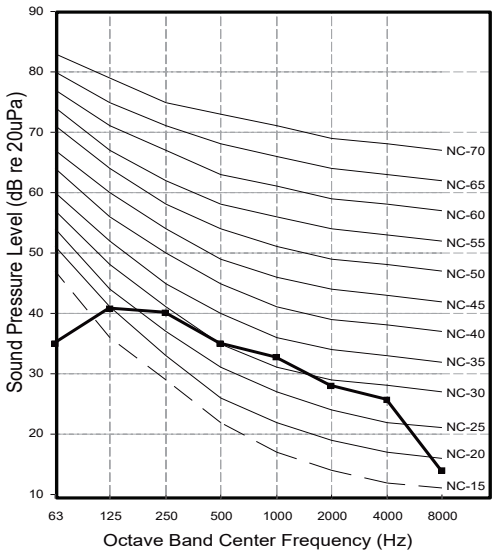
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LMCN078HV	31	27	24
LCN098HV4	36	33	30
LCN128HV4	38	35	32
LCN188HV4	41	39	36

Figure 160: LMCN078HV and LCN098HV4 Sound Pressure Level Diagrams.

LMCN078HV



LCN098HV4



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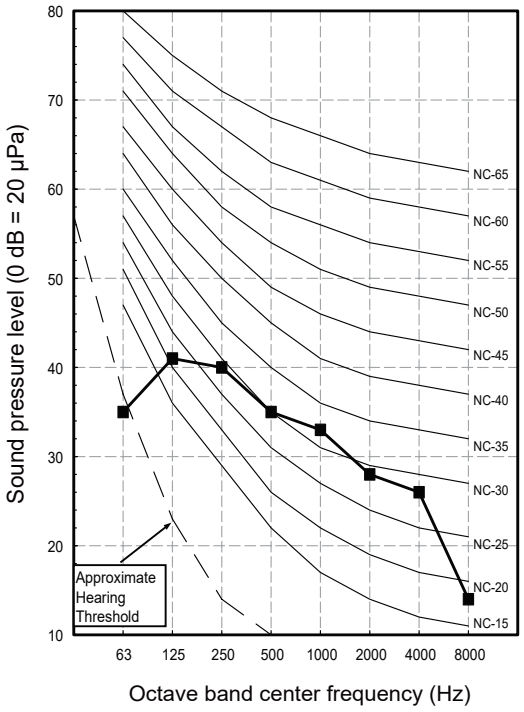
FOUR-WAY CEILING CASSETTE INDOOR UNITS

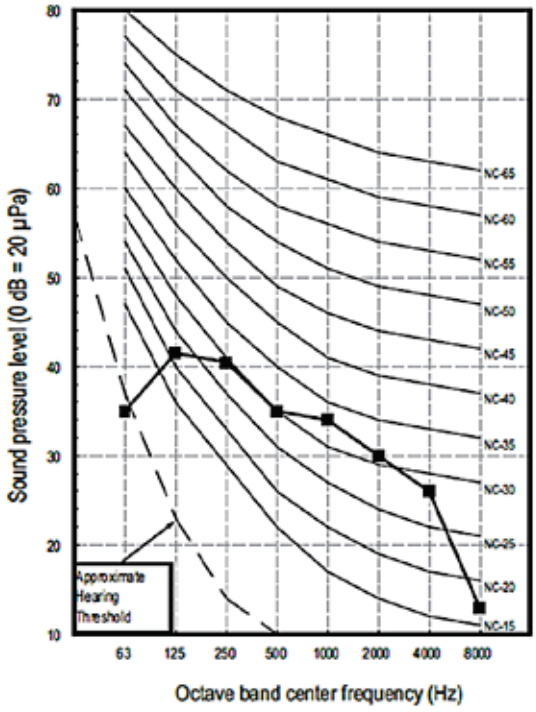
Acoustic Data

Figure 161: LCN128HV4 and LCN188HV4 Sound Pressure Level Diagrams.

LCN128HV4



LCN188HV4



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FOUR-WAY CEILING-CASSETTE INDOOR UNITS

Air Velocity and Temperature Distribution

Figure 162: LMCN078HV Air Velocity and Temperature Distribution Charts.

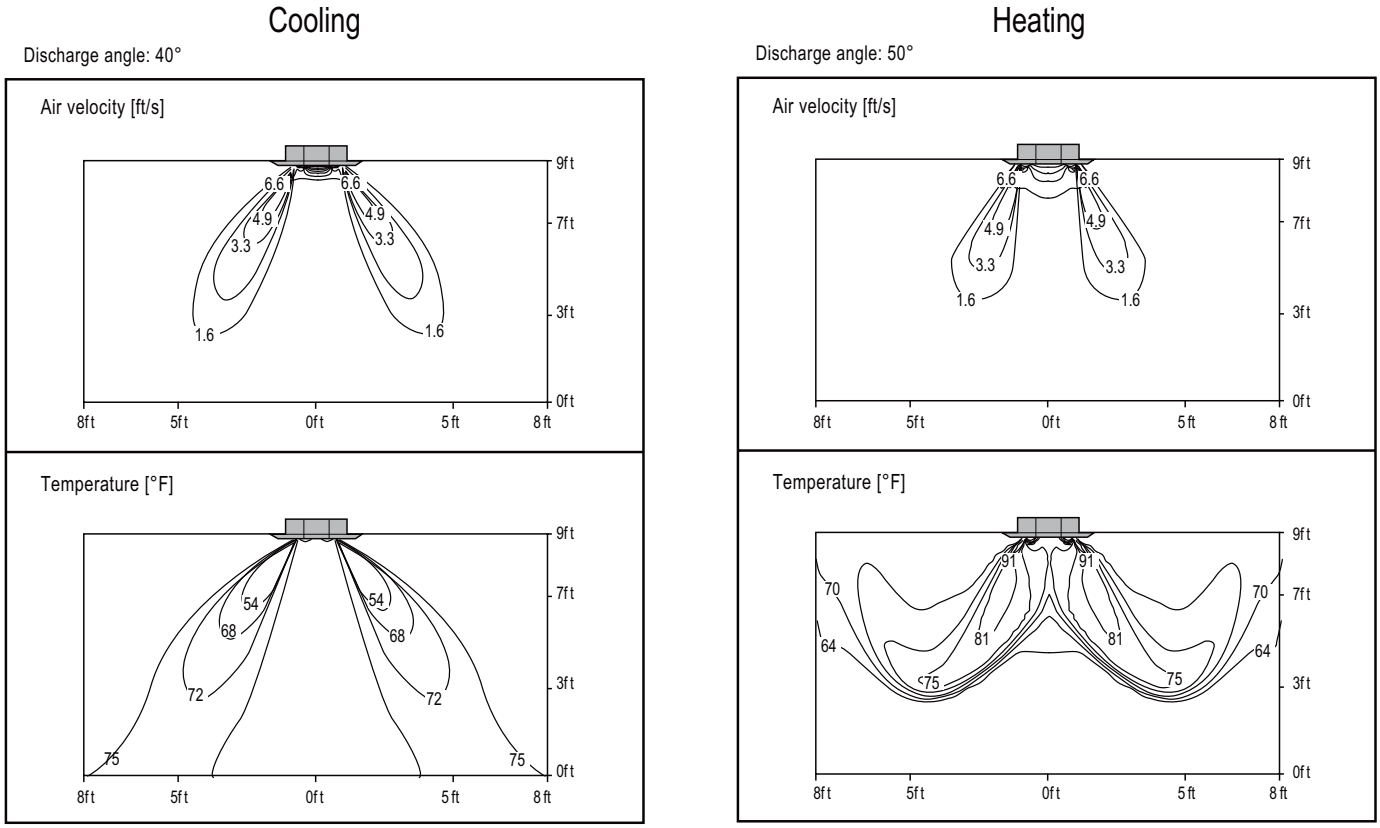
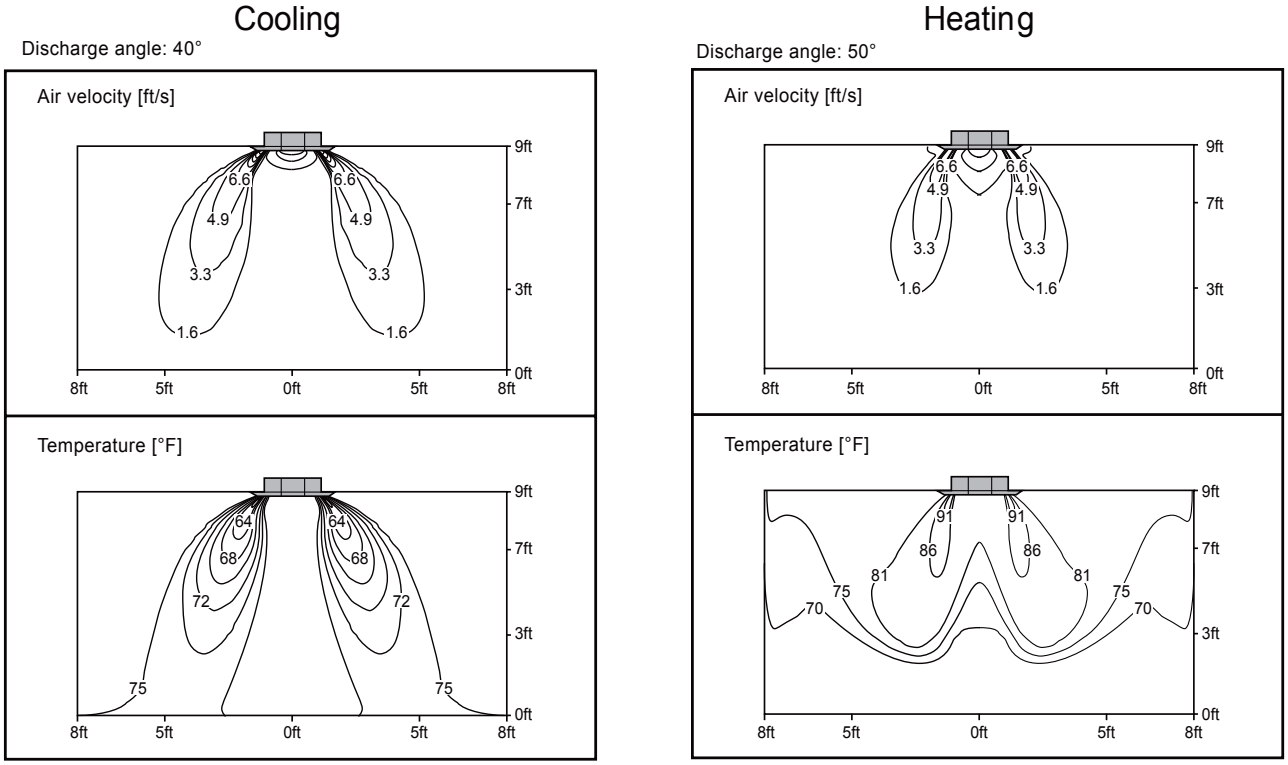


Figure 163: LCN098HV4 Air Velocity and Temperature Distribution Charts.



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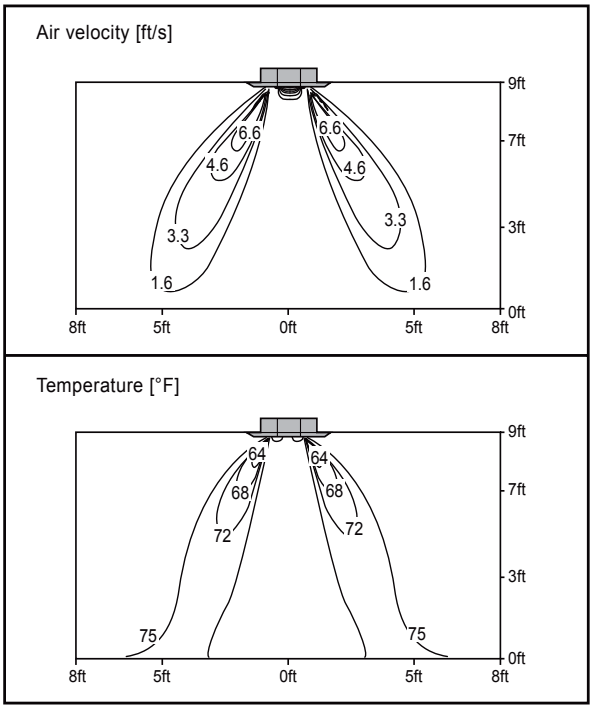
FOUR-WAY CEILING CASSETTE INDOOR UNITS

Air Velocity and Temperature Distribution

Figure 164: LCN128HV4 Air Velocity and Temperature Distribution Charts.

Cooling

Discharge angle: 40°



Heating

Discharge angle: 50°

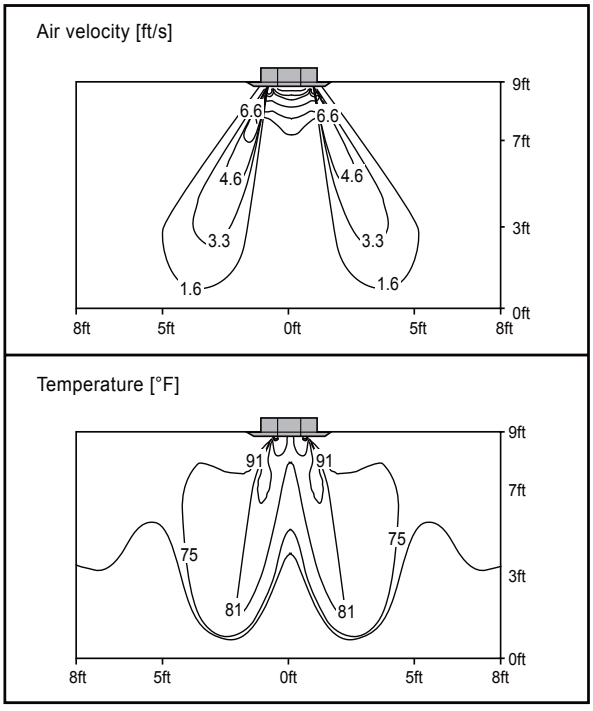
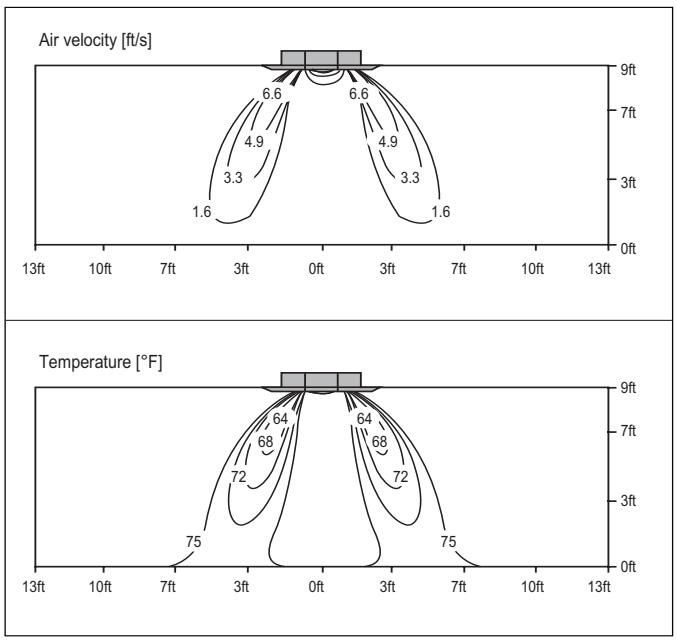


Figure 165: LCN188HV4 Air Velocity and Temperature Distribution Charts.

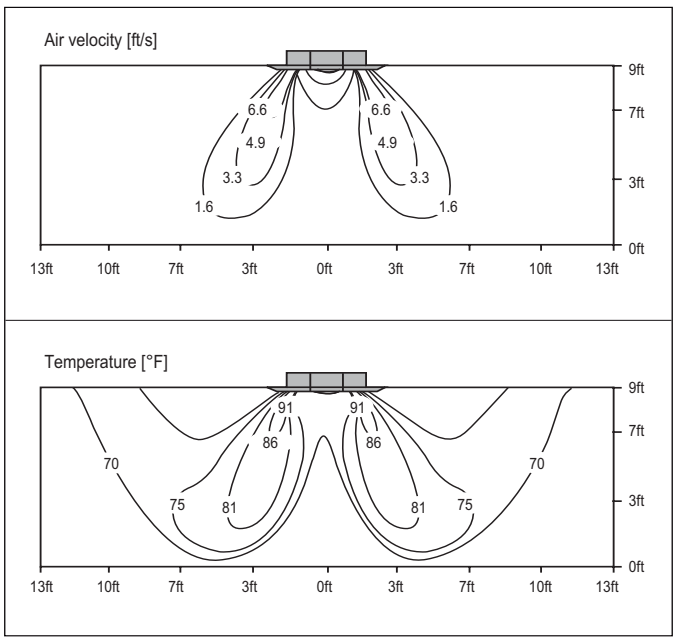
Cooling

Discharge angle : 40°



Heating

Discharge angle : 50°



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FOUR-WAY CEILING-CASSETTE INDOOR UNITS

Refrigerant Flow Diagram

Figure 166: Multi F Four-Way Ceiling-Cassette Indoor Unit Refrigerant Flow Diagram.

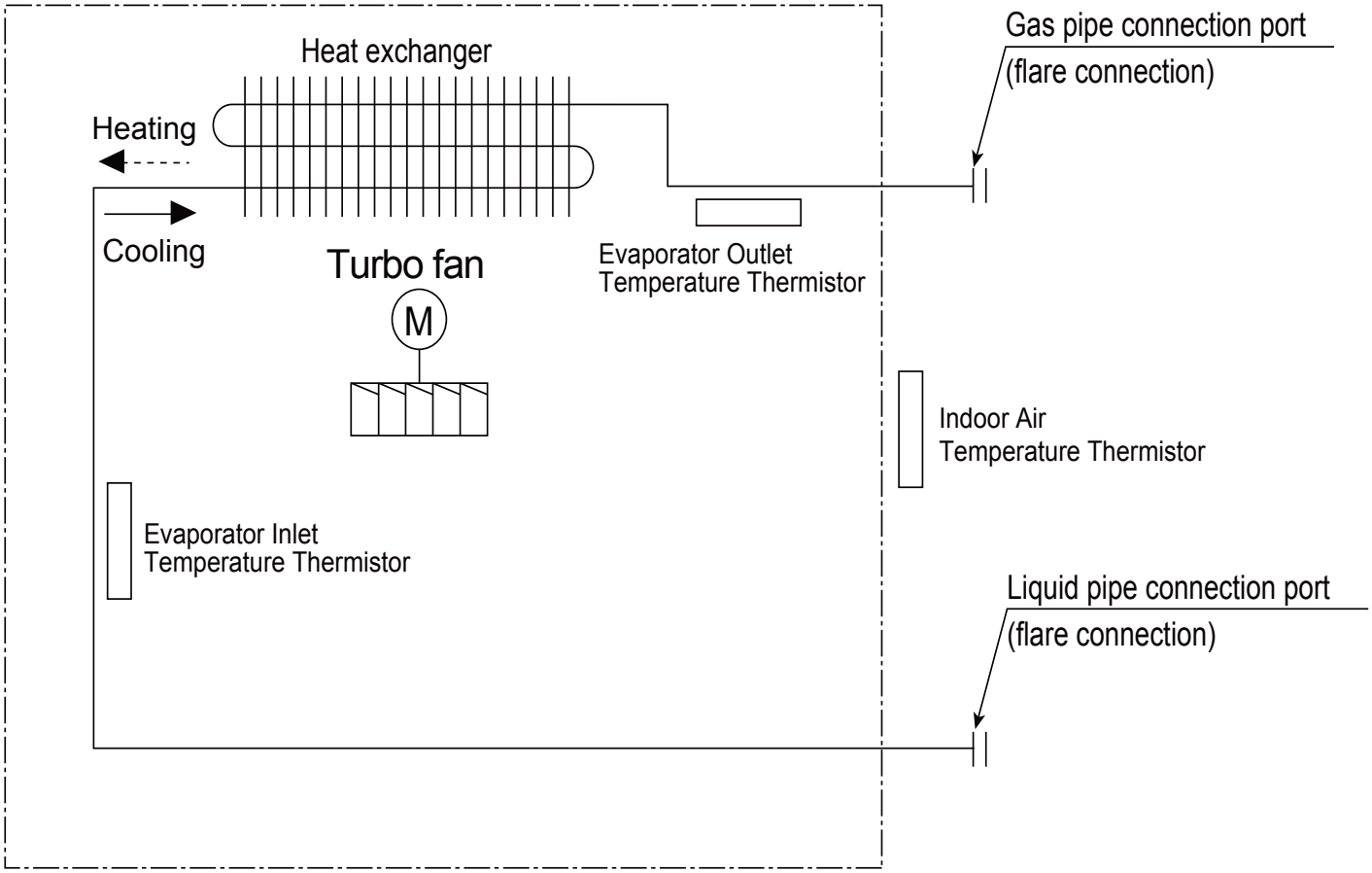

Table 73: Multi F Four-Way Ceiling-Cassette Indoor Unit Refrigerant Pipe Sizes.

Model No.	Vapor (inch)	Liquid (inch)
LMCN078HV	Ø3/8	Ø1/4
LCN098HV4		
LCN128HV4		
LCN188HV4	Ø1/2	

Table 74: Multi F Four-Way Ceiling-Cassette Indoor Unit Refrigerant Pipe Connections.

Model No.	Vapor (inch)	Liquid (inch)
LMCN078HV	Ø3/8	Ø1/4
LCN098HV4		
LCN128HV4		
LCN188HV4	Ø1/2	

Table 75: Multi F 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

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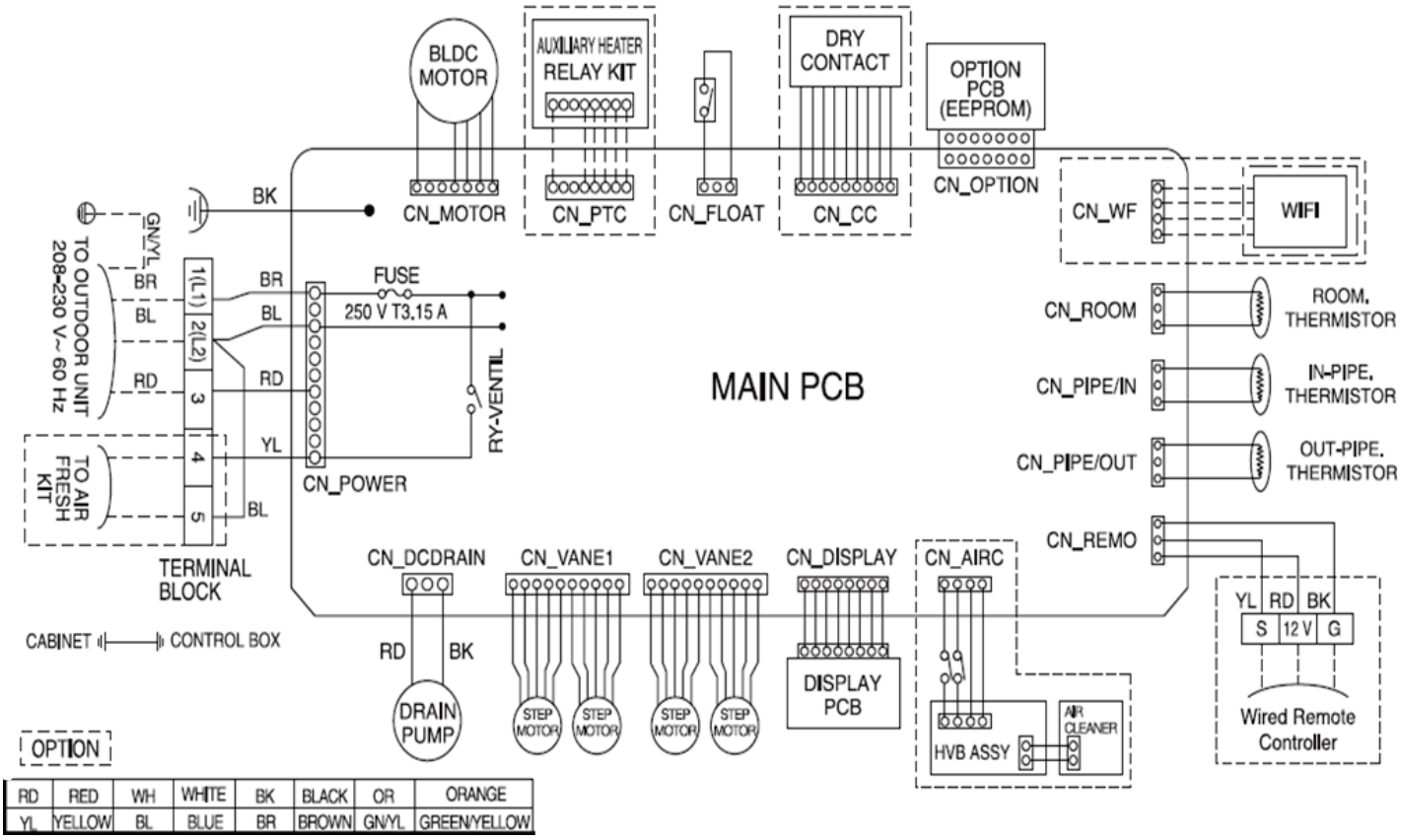
FOUR-WAY CEILING CASSETTE INDOOR UNITS

Wiring Diagram

Figure 167: Multi F Four-Way Ceiling-Cassette Indoor Unit Wiring Diagram.



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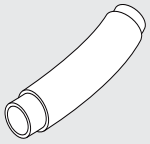
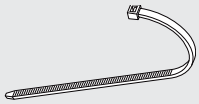
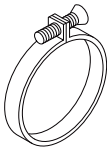
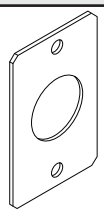
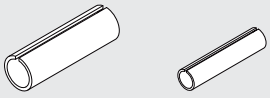
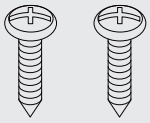
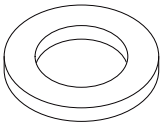
FOUR-WAY CEILING-CASSETTE INDOOR UNITS

MULTI F
MULTI F MAX

Factory Supplied Parts and Materials

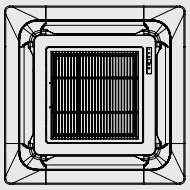
Factory Supplied Parts

Table 76: Parts Table.

Part	Quantity	Image	Part	Quantity	Image
Drain Hose	One (1)		Zip Ties	Four (4)	
Metal Clamp	Two (2)		Conduit Bracket	One (1)	
Insulation for Fittings	One (1) Set	 For Vapor Piping For Liquid Piping	M4 Screws	Two (2)	
Washer for Hanging Bracket	Eight (8)		Wireless Handheld Controller with Holder (AKB73757604)[1]	One (1)	

[1]Wireless Handheld Controller for the four-way ceiling cassette indoor units is also referenced by Model No. PQWRHQ0FDB.

Table 77: Required Accessory Table.

Part	Quantity	Image
Grille Kit (PT-QCHW0 or PT-UQC)	One (1)	

Factory Supplied Materials

- Installation Guide (template)
- Owner's Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Torque wrenches
- Hexagonal wrench
- Gas-leak detector
- Thermometer

⚠ WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit's components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

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FOUR-WAY CEILING CASSETTE INDOOR UNITS

Installation and Best Layout Practices

Selecting the Best Location

Do's

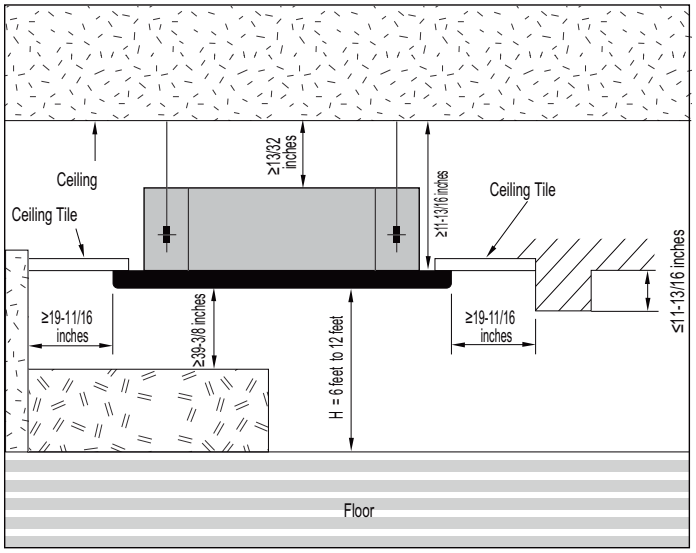
- Place the unit where air circulation will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient strength to bear the load of the indoor unit.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit in a location that is level, and where it can be easily connected to the outdoor unit / branch distribution unit.

⃠ Don'ts

- ⃠ *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- ⃠ *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- ⃠ *Do not install the unit near high-frequency generators.*
- ⃠ *Do not install the unit near a doorway.*

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

Figure 168: Indoor Unit Clearance Requirements.



Note:

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

Installing in a High or Dropped Ceiling

High or dropped ceilings, often found in commercial buildings and offices, will 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 78: Indoor Unit High Ceiling Mode Selection Options.

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

Installing in an Area Exposed to Unconditioned Air

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

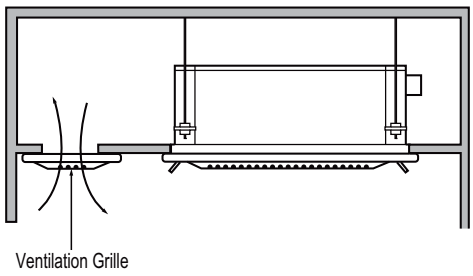
- Verify that carpet is or will be installed (carpet will increase the temperature by three (3) degrees).
- Add insulation between the floor joists.
- Install radiant heat or another type of heating system to the floor.

Installing in an Area with High Humidity Levels

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

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

Figure 169: Installing in a Highly Humid Location.



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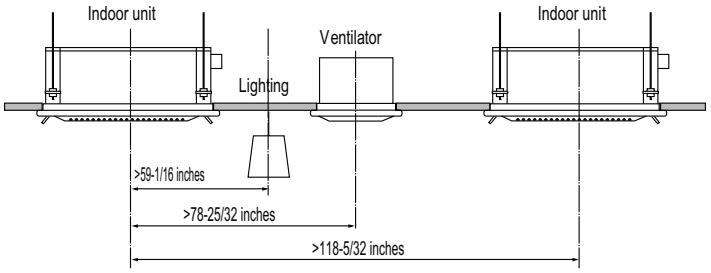
Installing Multiple Indoor Units in One Area

Ensure there is enough space between indoor units, lighting fixtures, and ventilation fans / systems.

Figure 170: Installing Multiple Indoor Units.



Preparing the Installation Area and Hanging the Indoor Unit Frame

Preparing the Installation Area

1. Installation guide (template) depicts the exact dimensions necessary for the ceiling opening.
2. Choose the location for the indoor unit, and then mark where the bolts, refrigerant piping, and drain hose must be. Suspension bolt angle must account for drain direction.
3. Drill holes for the bolts. Use either a W 3/8 inch or a M10 size bolt.

Note:

For easier installation, attach the accessories (except for the decoration panel) before hanging the indoor unit.

Figure 171: Ceiling Opening Dimensions and Bolt Locations.

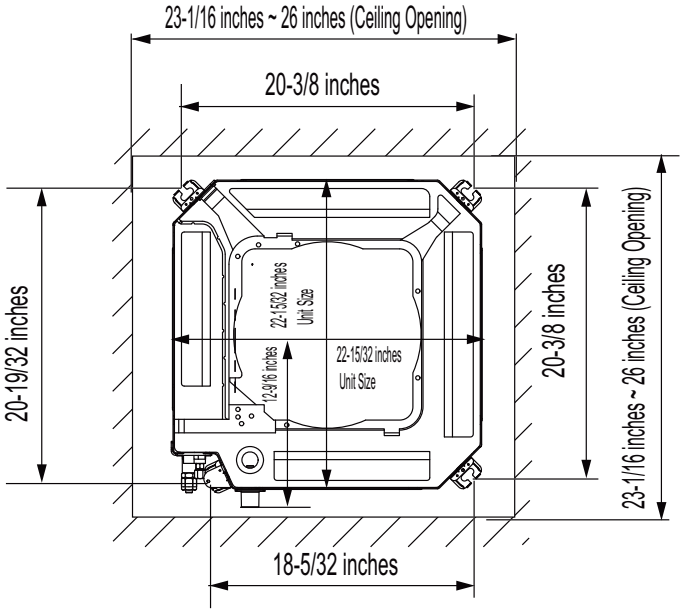


Figure 172: Installing the Hanging Bolt in the Ceiling.

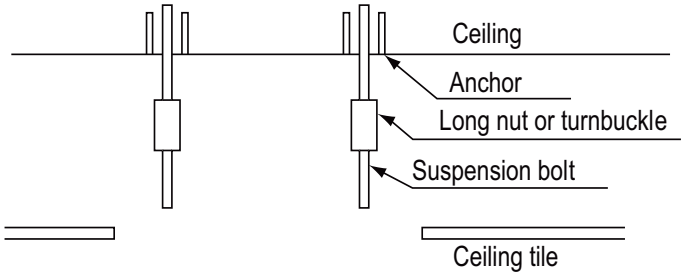
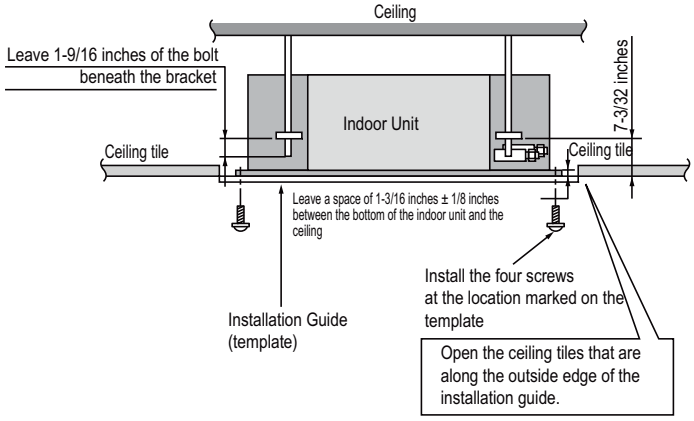


Figure 173: Installation Diagram.



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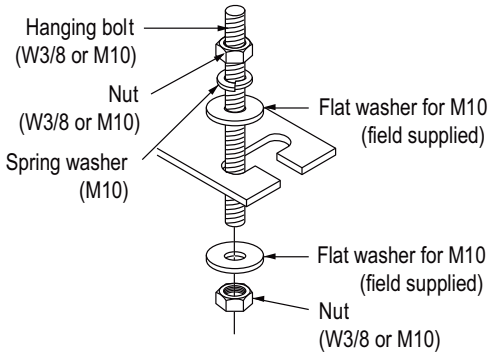
FOUR-WAY CEILING CASSETTE INDOOR UNITS

Installation and Best Layout Practices

For New Ceilings

1. Use a sunken insert, a sunken anchor, or any other field-supplied part to reinforce the ceiling so that it can bear the weight of the indoor unit. Use a temporary washer plate to more easily set up the unit suspension location.
2. Ceiling height is shown on the side of the installation guide (template). Adjust the height of the unit accordingly. Adjust the clearance before hanging the indoor unit.
3. Refer to the installation guide (template) for the dimensions to the ceiling opening. Match the center of the indoor unit (labeled) to the center indicated on the installation guide.
4. Align the installation guide (template) with the label attached to the unit (affixing the template to the unit if desired) to properly place the unit.
5. Remove the temporary washer plate and position the indoor unit hanger brackets on the bolts. Secure with nuts and washers on the top and bottom of the hanger brackets.

Figure 174: Hanging the Indoor Unit.



6. Ceiling-cassette indoor units are equipped with a built-in drain pump and float switch, therefore, the unit must be installed horizontally or condensate will drip out and cause product malfunction. Measure the unit at each corner to verify that it is level.
7. Remove the installation guide (template).

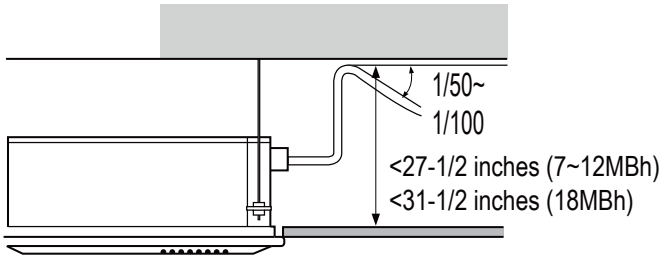
For Existing Ceilings

1. Use anchors when installing the indoor unit in an existing ceiling.
2. Ceiling height is shown on the side of the installation guide (template). Adjust the height of the unit accordingly. Adjust the clearance before hanging the indoor unit.
3. Remove the temporary washer plate and position the indoor unit hanger brackets on the bolts. Secure with nuts and washers on the top and bottom of the hanger brackets.
4. Ceiling-cassette indoor units are equipped with a built-in drain pump and float switch, therefore, the unit must be installed horizontally or condensate will drip out and cause product malfunction. Measure the unit at each corner to verify that it is level.
5. Remove the installation guide (template).

Installing the Drain System

- Drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must 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.

Figure 175: Indoor Unit Drain Piping.

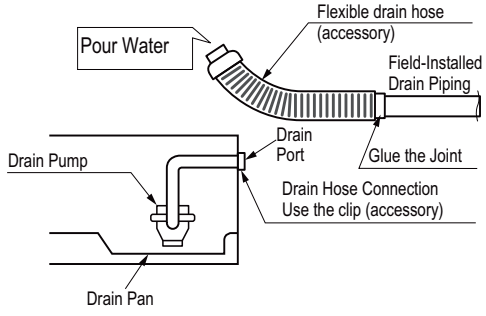


Checking the Drain Pump

The unit uses a drain pump to remove condensate. The pump must be tested before the system operates.

- Connect flexible drain hose to the field-installed drain piping; leave it as is until the test is complete.
- Pour water into the flexible drain hose and check for leaks.
- After power wiring installation is complete, operate the drain pump to see if it sounds and functions properly.
- After the test is complete, connect the flexible drain hose to the indoor unit drain port.

Figure 176: Checking the Drain Pump.



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Insulating the Refrigerant and Drain Piping

⚠ WARNING

Ensure all piping is insulated. Exposed piping can cause burns if touched.

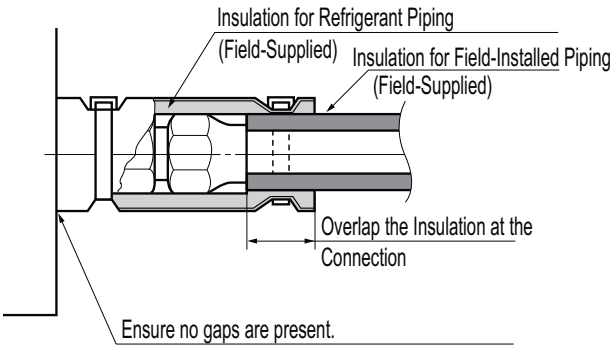
Refrigerant Piping Insulation

Field-installed vapor and liquid refrigerant piping lines must be properly and completely covered in insulation (up to the indoor unit piping connections). Any exposed piping will generate condensate or will cause burns if touched. Insulation for this field-installed refrigerant piping must have a minimum heat resistance of 248°F.

Drain Piping Insulation

Drain piping must have insulation a minimum of 7/32 inches thick.

Figure 177: Insulating the Piping.



Installing the Insulation

1. Overlap the insulation at the connection of the field-installed piping and the indoor unit piping. Tape together so that no gaps exist.
2. Secure insulation to the rear piping housing section with vinyl tape.
3. Bundle the piping and drain hose with tape where they meet at the back of the indoor unit frame. Position the drain hose at the bottom of the bundle (positioning the drain hose at the top of the bundle will cause the drain pan to overflow inside the indoor unit).

Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

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Connecting the Power Wiring and Communications Cable

1. To access the terminal block, open the control box cover.

2. Insert the power wiring / communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) 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.

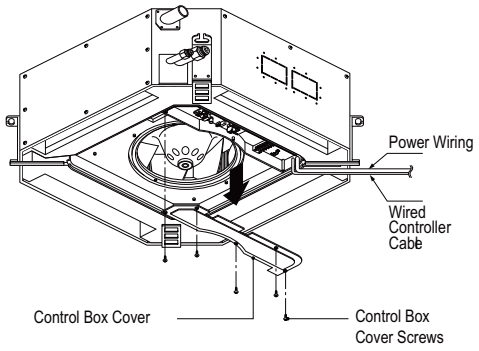
3. Connect each wire to its appropriate terminal on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

4. Neatly arrange power wiring / communications cable and secure with the appropriate cable restraint. ⃠ When clamping, ⃠ do not apply force to the wiring connections.

5. Firmly reattach the control box cover. ⃠ Do not catch the wiring in the electric box cover and 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 178: Power Wiring and Communications Cable Connection Access.



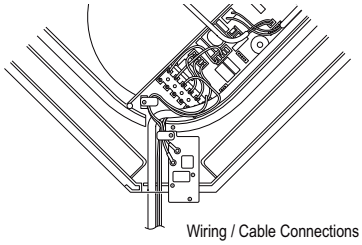
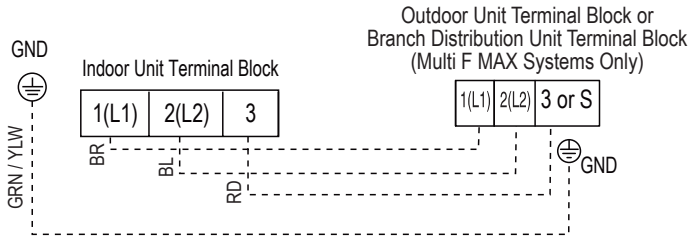


Figure 179: Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections.



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. Tighten the conduit and the conduit mounting plate together.

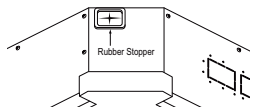
3. Connect the power wiring / communications cable to the indoor unit terminal block.

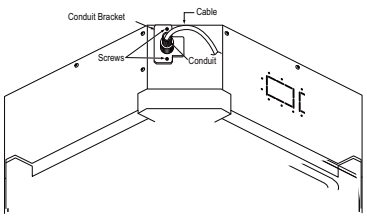
4. Screw the conduit mounting plate to the indoor unit.

Note:

If the distance between the outdoor unit and indoor unit is greater than 131 feet, connect the power wiring and communications cable separately (i.e., a conduit cannot be used).

Figure 180: Using a Conduit.





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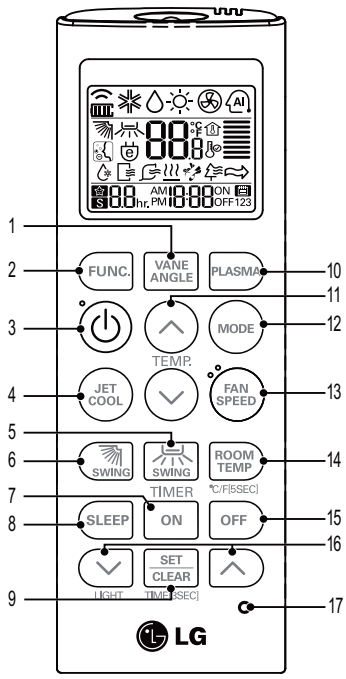
Controller Options

Four-way ceiling-concealed indoor units include a wireless handheld controller (AKB73757604)[1], but optional LG-supplied wired controllers are available.

Wireless Handheld Controller

Figure 181: AKB73757604 Wireless Handheld Controller.



Operation Mode Sequence

Cooling Mode
↓
Auto Mode/Changeover
↓
Dehumidification Mode
↓
Heating Mode
↓
Fan Mode

Table 79: AKB73757604[1] Wireless Handheld Controller Functions.[2]

Button Label	Description
1	Vane Angle Button: Sets the angle to each vane.
2	Function Setting Button: Sets or clears auto clean, smart clean, electric heater, or individual vane angle control functions.
3	On / Off Button: Turns the power on/off.
4	Jet Cool: Sets the unit to super high fan speed when in cooling mode.
5	Left / Right Air Flow Button (optional): Sets the desired left / right (horizontal) air flow direction.
6	Up / Down Air flow Button: Stops or starts louver movement, and sets the desired air flow direction to up or down.
7	On Time Button: Sets the time when the operation begins.
8	Sleep Timer Button: Sets the sleep mode operation.
9	Set / Clear Button: Sets or cancels the timer, also sets the current time.
10	Plasma Button: Starts or stops plasma-purification functions.
11	Room Temperature Setting Button: Raises or lowers temperature setpoint in cooling and heating operation.
12	Operation mode selection button: Selects the operation mode.
13	Indoor Fan Speed Button: Changes the fan speed to one of four choices: low, medium, high, and chaos.
14	Room Temperature Check Button: Displays / checks the room temperature.
15	Off Timer button: Sets the time when the operation ends.
16	Time Setting (Up / Down) / Light Button: Sets the timer and adjusts the brightness of the LED.
17	Reset Button: Resets the remote controller.

[1]Wireless Handheld Controller for the four-way ceiling cassette indoor units is also referenced by Model No. PQWRHQ0FDB.

[2]Depending on the indoor unit model, some functions will not be supported or displayed.

Wired Controller Connections

Controllers can connect to the indoor unit in one of two different ways.

1. LG Wired Remote Extension Cable with Molex plug (PZC-WRC1; sold separately) that connects to the CN-REMO terminal on the indoor unit PCB.

2. Field-supplied controller cable that connects to the indoor unit terminal block (must be at least UL2547 or UL1007, 22 AWG, two-core, one-shield core, at least FT-6 rated if local electric and building codes require plenum cable usage).

Note:

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

Figure 182: PZCWRC1 LG Wired Remote Extension Cable.

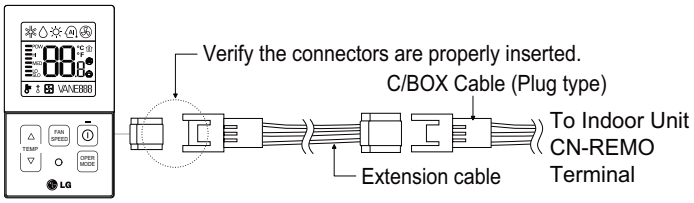
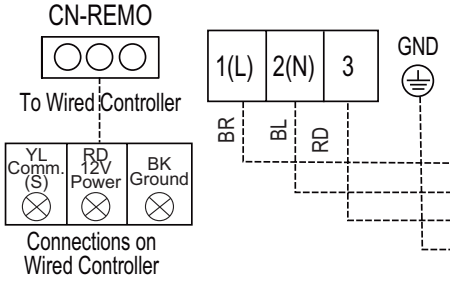


Figure 183: Wired Controller Connections on the Indoor Unit Terminal Block.



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FOUR-WAY CEILING CASSETTE INDOOR UNITS

Installation and Best Layout Practices

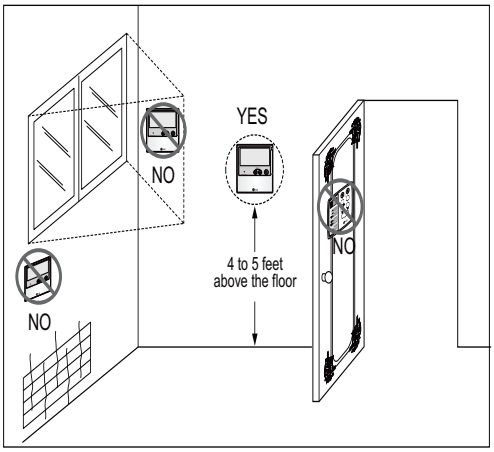
Wired Controller Placement

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

⃠ *Do not install the remote controller where it can be impacted by the following:*

- *Drafts or dead spots behind doors and in corners*
- *Hot or cold air from ducts*
- *Radiant heat from sun or appliances*
- *Concealed pipes and chimneys*
- *Uncontrolled areas such as an outside wall behind the remote controller*

Figure 184: Proper Location for the Wired Controller.



Hanging the Wired Controller

1. The controller wiring / cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring / cable on applicable side.

2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring / cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 185: Removing the Cable Guide Grooves.

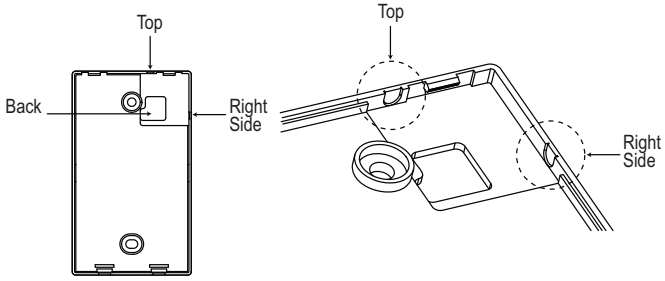


Figure 186: Attaching the Wall Plate.

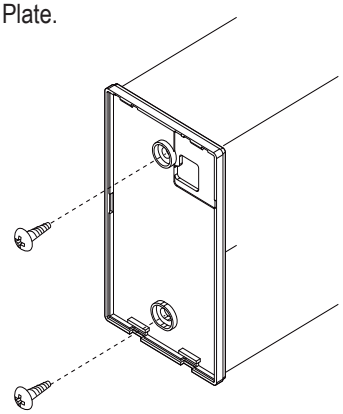
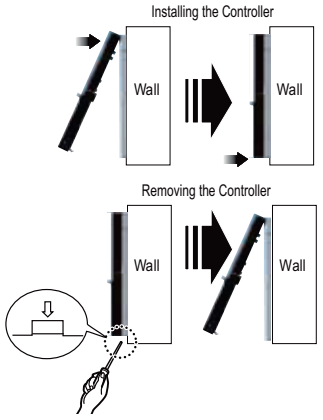


Figure 187: Installing / Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

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Finalizing Indoor Unit Installation— Installing the Decoration Panel

Note:

Decoration panel must be installed properly; cool air will leak from any gaps found between the indoor unit frame and the decoration panel, which will cause condensation to generate.

1. Remove the packaging, take out air inlet grille from the front panel (1A), and then remove the corner covers of the panel (1B).
2. Attach the panel to the indoor frame by inserting the hooks as shown (2).
3. Attach two screws on diagonal corners of each panel, but ⃠ do not tighten completely (3). Screws to attach the panel to the indoor unit frame are factory-provided and can be found in the shipping box.
4. Verify the panel is aligned with the ceiling. Adjust the height by using the hanging bolts as shown (4).
5. Attach the corner covers (5).
6. Unscrew the control panel cover (6).
7. Connect the one display connector (CN-DISPLAY) and the two vane control connectors (CN-VANE1, CN-VANE2) of the front panel to the indoor unit PCB (7).
8. Close the control box cover. Attach the link on the front panel as shown (8). The link is supplied in the front panel shipping package.
9. Attach the other side of the link on the filter guide of the air inlet grille, then install the filter and the air inlet grille on the front panel (9).

Figure 189: Ensure that no gaps are present between the indoor unit frame and the decoration panel.

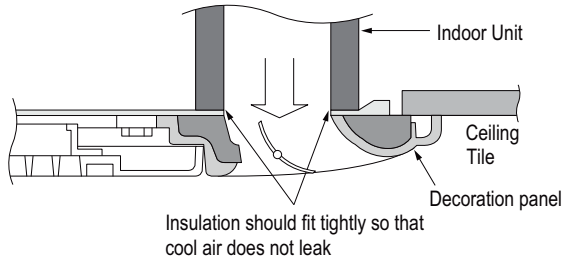
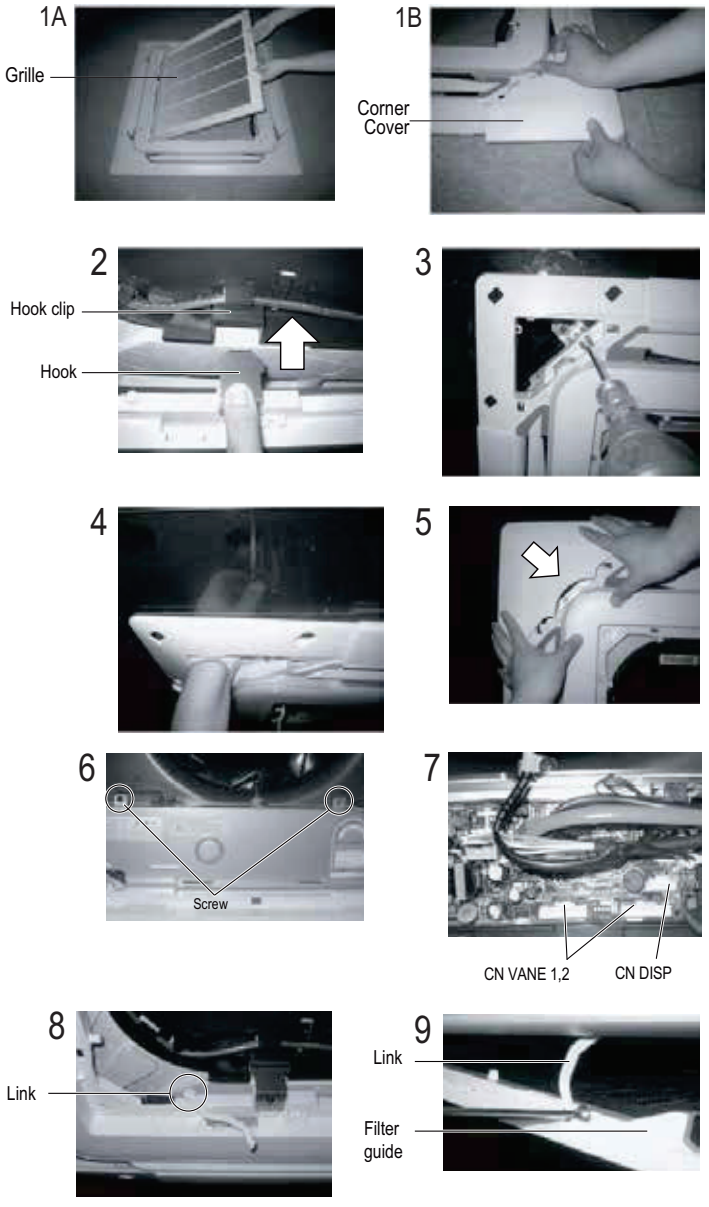


Figure 188: Installing the Decoration Panel.



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TWO-WAY VERTICAL-HORIZONTAL AIR HANDLING INDOOR UNIT DATA

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“General Data / Specifications” on page 139
“Dimensions” on page 140
“Cooling Capacity Table” on page 141
“Heating Capacity Table” on page 142
“External Static Pressure” on page 143
“Acoustic Data” on page 144
“Refrigerant Flow Diagram” on page 145
“Wiring Diagram” on page 146
“Factory Supplied Parts and Materials” on page 148
“Installation and Best Layout Practices” on page 149

TWO-WAY VAHU INDOOR UNITS

Mechanical Specifications and Features

Two-way Vertical-Horizontal Air Handing Indoor Unit

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Vertical-Horizontal Air Handling units are designed for high-speed air volume against an external static pressure up to 1.00"WG. Supply air opening is flanged to accept field-installed ductwork that cannot exceed the external static pressure limit of the unit.

Coil

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

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare, and all refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

The casing is designed to mount fully concealed behind a wall or above a finished ceiling. Casing is manufactured of 22-gauge precoated metal and finished with a high-gloss baked enamel finish. Cold surfaces of the unit are covered internally with 1/2-inch polystyrene fiber insulation; inside surface of the pan assembly door access panel is treated with 1/2-inch polystyrene fiber insulation, encapsulated on both sides. The access panel is sealed along the edges with reinforced foil-faced covering, all access panels also have gasket seals to minimize air leaks.

The two-way vertical-horizontal air handling unit can operate in one of two airflow configurations: the vertical (upflow) configuration or horizontal (left) end discharge. Supply air is drawn from the top, and there is a dedicated bottom vertical return. Unit is also designed to accept an internal, optional LG electrical strip heater.

Fan Assembly and Control

The units have an integral fan assembly consisting of galvanized steel housing and a forward curve fan wheel. The fan motor is a brushless digitally controlled (BLDC) motor 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. The indoor fan has Low, Med, High, and Auto settings for Cooling mode; and has Low, Med, High, and Auto settings for Heating mode. Each of the settings can be field-adjusted from the factory setting (RPM / ESP). The Auto setting adjusts the fan speed to most effectively achieve setpoint.

Figure 190: Multi F Vertical-Horizontal Air Handling Indoor Unit.

Filter Assembly

The unit includes a filter rack that can accept a field-supplied 16” x 20” x 1” filter cartridge. The filter rack has a guide to assist in centering the filters, and can be accessed from the front.

Microprocessor Control

The indoor unit is provided with an integrated control panel to communicate with the outdoor unit. All unit operation parameters are stored in non-volatile memory resident on the unit microprocessor. The microprocessor controls space temperature through using the value provided by temperature sensors within the indoor unit. A field-supplied communication cable must be installed to connect the indoor unit(s) to the outdoor unit.

Controls

The indoor unit controller of choice must be ordered separately. Communication between the indoor units and the outdoor unit is accomplished through 18 AWG, four-core, stranded and shielded power / communication cable.

Condensate

The unit is designed for gravity draining of condensate.

Features

- Inverter (Variable speed fan)
- Control lock function
- Auto operation
- Dehumidifying function
- Two thermistor control
- Group control
- External static pressure control
- Self-diagnostics function
- Wired controller ordered separately

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TWO-WAY VAHU INDOOR UNITS

General Data / Specifications

Table 80: Multi F Vertical-Horizontal Air Handling Indoor Unit General Data.

Model Name	LMVN240HV	LMVN360HV
Nominal Cooling Capacity (Btu/h)[1]	24,000	36,000
Nominal Heating Capacity (Btu/h)[1]	27,000	40,000
Operating Range		
Cooling (°F WB)	57-77	57-77
Heating (°F DB)	59-81	59-81
Fan		
Type	Sirocco	Sirocco
Motor Output (W) x Qty.	96 x 1	182 x 1
Motor/Drive	Brushless Digitally Controlled / Direct	Brushless Digitally Controlled / Direct
Airflow Rate CFM (H/M/L) at 0.5"WG ESP	710 / 640 / 480	990 / 880 / 800
Maximum External Static Pressure (in. WG)	1.00	1.00
Unit Data		
Refrigerant Type[2]	R410A	R410A
Refrigerant Control	EEV	EEV
Power Supply V, Ø, Hz[3]	208-230, 1, 60	208-230, 1, 60
Rated Amps (A)	0.59	1.12
Sound Pressure Level dB(A) (H/M/L)[4] at 0.3"WG ESP	43 / 42 / 41	45 / 44 / 43
Dimensions (W x H x D, in.)	18 x 48-21/32 x 21-1/4	18 x 48-21/32 x 21-1/4
Net Weight (lbs.)	117	121
Shipping Weight (lbs.)	130	135
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 18	4 x 18
Heat Exchanger (Row x Column x Fin / inch) x Number	(2 x 24 x 18) x 2	(3 x 24 x 18) x 2
Piping		
Liquid (in.)	1/4	3/8
Vapor (in.)	1/2	5/8
Primary Drain I.D. (in.)	3/4 FPT	3/4 FPT
Secondary Drain I.D. (in.)	3/4 FPT	3/4 FPT

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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).
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).

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs must 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.

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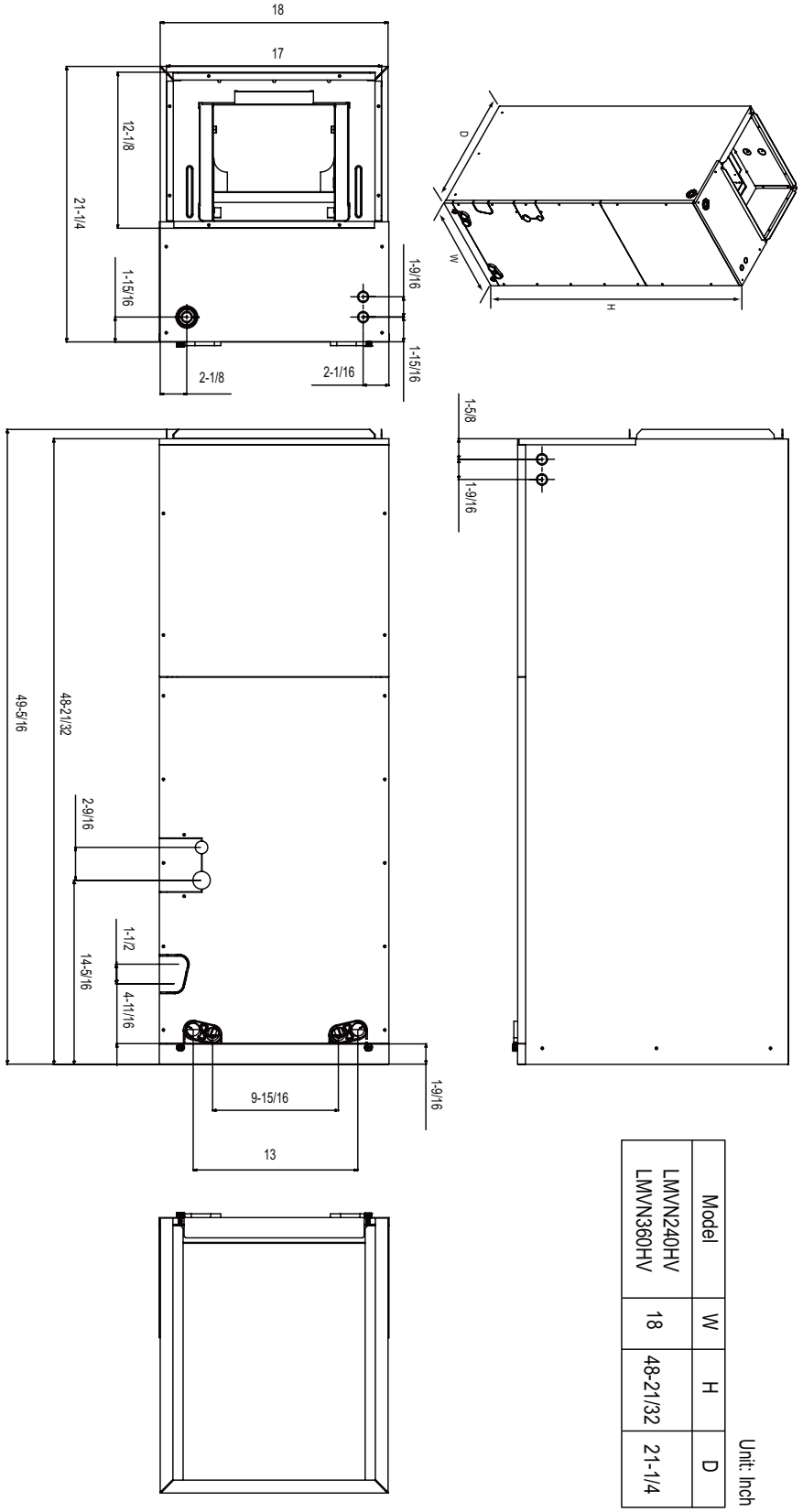
TWO-WAY VAHU INDOOR UNITS

Dimensions

Figure 191: LMVN240HV and LMVN360HV Dimensions.



Model	W	H	D
LMVN240HV LMVN360HV	18	48-21/32	21-1/4

Unit: Inch

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TWO-WAY VAHU INDOOR UNITS

Cooling Capacity Table

Table 81: Multi F Vertical-Horizontal Air Handling Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LMVN240HV 24,000	14	23.53	17.89	24.99	18.90	26.45	18.30	27.50	18.69	29.37	18.84	30.83	19.20
	20	23.51	18.03	24.97	19.05	26.43	18.44	27.48	18.83	29.35	18.99	30.81	19.35
	25	23.49	18.17	24.95	19.20	26.41	18.59	27.46	18.98	29.33	19.14	30.79	19.50
	30	23.47	18.31	24.93	19.34	26.39	18.73	27.44	19.12	29.30	19.28	30.76	19.65
	35	23.46	18.45	24.91	19.49	26.37	18.87	27.42	19.27	29.28	19.43	30.74	19.80
	40	23.44	18.59	24.89	19.64	26.35	19.01	27.40	19.41	29.26	19.58	30.72	19.95
	45	23.42	18.73	24.87	19.78	26.33	19.15	27.38	19.56	29.24	19.72	30.69	20.10
	50	23.40	18.87	24.85	19.93	26.31	19.30	27.36	19.70	29.21	19.87	30.67	20.24
	55	23.38	19.00	24.84	20.07	26.29	19.44	27.34	19.85	29.19	20.01	30.64	20.39
	60	23.37	19.14	24.82	20.22	26.27	19.58	27.32	19.99	29.17	20.16	30.62	20.54
	65	23.35	19.28	24.80	20.37	26.25	19.72	27.29	20.13	29.15	20.30	30.60	20.69
	70	23.33	19.42	24.78	20.51	26.23	19.86	27.27	20.28	29.13	20.45	30.57	20.84
	75	22.77	19.10	24.21	20.20	25.66	19.58	26.70	20.01	28.55	20.20	29.99	20.60
	80	22.21	18.77	23.65	19.88	25.09	19.30	26.13	19.73	27.97	19.95	29.42	20.36
	85	21.65	18.43	23.09	19.55	24.53	18.99	25.57	19.44	27.40	19.68	28.84	20.10
	90	21.09	18.08	22.53	19.21	23.96	18.69	25.00	19.14	26.83	19.40	28.27	19.84
	95	20.49	17.89	21.92	19.03	23.35	18.55	**24.00**	**18.72**	26.20	19.30	27.63	19.75
	100	19.99	17.41	21.42	18.55	22.85	18.10	23.69	18.43	25.70	18.88	27.13	19.35
	105	19.49	16.93	20.92	18.07	22.35	17.66	23.38	18.14	25.20	18.47	26.63	18.94
	110	18.99	16.35	20.42	17.49	21.85	17.12	22.88	17.60	24.70	17.94	26.13	18.42
	115	18.49	15.86	19.92	17.00	21.35	16.66	22.38	17.15	24.20	17.51	25.63	18.00
	118	18.19	15.75	19.62	16.89	21.05	16.58	22.08	17.07	23.90	17.46	25.33	17.96
	122	18.10	15.71	19.52	16.86	20.95	16.55	21.98	17.05	23.81	17.44	25.23	17.94
LMVN360HV 36,000	14	35.29	26.84	37.48	28.35	39.67	27.45	41.26	28.03	44.06	28.26	46.25	28.80
	20	35.26	27.05	37.45	28.57	39.64	27.66	41.23	28.25	44.02	28.49	46.21	29.02
	25	35.24	27.26	37.43	28.79	39.61	27.88	41.19	28.47	43.99	28.71	46.18	29.25
	30	35.21	27.47	37.40	29.01	39.58	28.09	41.16	28.68	43.96	28.93	46.14	29.47
	35	35.18	27.67	37.37	29.23	39.55	28.31	41.13	28.90	43.92	29.15	46.11	29.70
	40	35.16	27.88	37.34	29.45	39.52	28.52	41.10	29.12	43.89	29.37	46.07	29.92
	45	35.13	28.09	37.31	29.67	39.49	28.73	41.07	29.34	43.86	29.58	46.04	30.14
	50	35.10	28.30	37.28	29.89	39.46	28.94	41.04	29.55	43.82	29.80	46.00	30.37
	55	35.08	28.51	37.25	30.11	39.43	29.16	41.01	29.77	43.79	30.02	45.97	30.59
	60	35.05	28.71	37.23	30.33	39.40	29.37	40.97	29.99	43.76	30.24	45.93	30.81
	65	35.02	28.92	37.20	30.55	39.37	29.58	40.94	30.20	43.72	30.46	45.90	31.03
	70	34.99	29.13	37.17	30.77	39.34	29.79	40.91	30.42	43.69	30.67	45.86	31.26
	75	34.15	28.65	36.32	30.30	38.49	29.37	40.05	30.01	42.82	30.30	44.99	30.90
	80	33.31	28.16	35.47	29.82	37.64	28.94	39.20	29.60	41.96	29.92	44.12	30.54
	85	32.48	27.64	34.63	29.32	36.79	28.49	38.35	29.16	41.10	29.52	43.26	30.15
	90	31.64	27.12	33.79	28.81	35.94	28.03	37.50	28.71	40.25	29.10	42.40	29.76
	95	30.74	26.84	32.88	28.55	35.02	27.82	**36.00**	**28.08**	39.30	28.95	41.44	29.63
	100	29.99	26.12	32.13	27.83	34.27	27.15	35.53	27.65	38.55	28.32	40.69	29.02
	105	29.24	25.40	31.38	27.11	33.52	26.49	35.07	27.21	37.80	27.70	39.94	28.41
	110	28.49	24.53	30.63	26.23	32.77	25.67	34.32	26.40	37.05	26.92	39.20	27.64
	115	27.74	23.80	29.88	25.49	32.02	24.99	33.57	25.72	36.31	26.27	38.45	27.01
	118	27.29	23.62	29.43	25.34	31.57	24.87	33.12	25.61	35.86	26.18	38.00	26.93
	122	27.14	23.56	29.28	25.29	31.43	24.82	32.97	25.57	35.71	26.15	37.85	26.91

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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TWO-WAY VAHU INDOOR UNITS

Heating Capacity Table

Table 82: Multi F Vertical-Horizontal Air Handling Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LMVN240HV 24,000	0	-0.4	13.89	13.70	13.57	13.50	13.30	12.72
	5	4.5	15.65	15.46	15.33	15.26	15.07	14.48
	10	9	17.41	17.22	17.09	17.02	16.83	16.24
	17	15	19.76	19.57	19.43	**19.37**	19.17	18.55
	20	19	20.64	20.45	20.32	20.25	20.05	19.37
	25	23	22.11	21.91	21.78	21.72	21.52	20.74
	30	28	23.38	23.18	23.05	22.99	22.79	22.11
	35	32	24.65	24.46	24.33	24.26	24.07	23.48
	40	36	25.79	25.60	25.47	25.40	25.21	24.62
	45	41	26.93	26.74	26.61	26.54	26.35	25.76
	47	43	27.39	27.20	27.07	27.00	26.80	26.22
	50	46	27.83	27.64	27.51	27.44	27.24	26.58
	55	51	28.57	28.37	28.24	28.17	27.98	27.20
	60	56	28.57	28.37	28.24	28.17	27.98	27.32
	63	59	28.57	28.37	28.24	28.17	27.98	27.39
	68	64	28.57	28.37	28.24	28.17	27.98	27.51
LMVN360HV 36,000	0	-0.4	20.58	20.29	20.10	20.00	19.71	18.84
	5	4.5	23.19	22.90	22.71	22.61	22.32	21.45
	10	9	25.80	25.51	25.31	25.22	24.93	24.06
	17	15	29.28	28.99	28.79	**28.70**	28.41	27.48
	20	19	30.58	30.29	30.10	30.00	29.71	28.70
	25	23	32.75	32.46	32.27	32.17	31.88	30.72
	30	28	34.64	34.35	34.15	34.06	33.77	32.75
	35	32	36.52	36.23	36.04	35.94	35.65	34.78
	40	36	38.21	37.92	37.73	37.63	37.34	36.47
	45	41	39.90	39.61	39.42	39.32	39.03	38.16
	47	43	40.58	40.29	40.10	40.00	39.71	38.84
	50	46	41.23	40.94	40.75	40.65	40.36	39.38
	55	51	42.32	42.03	41.84	41.74	41.45	40.29
	60	56	42.32	42.03	41.84	41.74	41.45	40.47
	63	59	42.32	42.03	41.84	41.74	41.45	40.58
	68	64	42.32	42.03	41.84	41.74	41.45	40.76

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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TWO-WAY VAHU INDOOR UNITS

External Static Pressure

Table 83: Multi F Vertical-Horizontal Air Handling Unit External Static Pressure Setting Values Table.

Static Pressure (in. wg)			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Airflow Rate / CFM		Setting Value at (in. wg)[1]									
LMVN240HV 24,000	High	710	56	67	74	78	87	94	98	98[2]	98[2]	98[2]
	Mid	640	53	65	70	75	85	91	96	96[2]	96[2]	96[2]
	Low	480	53	55	64	70	79	84	92	92[2]	92[2]	92[2]
LMVN360HV 36,000	High	990	80	85	90	95	100	103	103[2]	103[2]	103[2]	103[2]
	Mid	880	65	72	80	85	92	98	103	103[2]	103[2]	103[2]
	Low	800	65	69	77	82	90	96	101	101[2]	101[2]	101[2]

[1]Unless otherwise noted, vertical-horizontal air handing units are UL listed up to 0.5 in. wg total static pressure, including coil, case, duct work pressure drop, air filter, and largest kW size heater. Internal static pressure includes coil and case only.

[2]Airflow rate (CFM) decreases by 3% per 0.1 in. wg.

[3]Maximum airflow rate is 400 CFM per ton. (For the 24,000 Btu/h unit, the maximum airflow rate is 2 x 400 = 800 CFM). If airflow is set at the maximum rate, the external static pressure value must be increased from high speed setting value to: From 24kBtu/h of capacity: 4; From 36kBtu/h of capacity: 5

[4]High static pressure is 0.5 in. wg (factory setting); low static pressure is 0.3 in. wg.

Note:

If external static pressure is not set correctly, the air conditioning system will not operate properly or will malfunction.

Table 84: Multi F Vertical-Horizontal Air Handling Unit Minimum Airflow by Heater Capacity.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Heater Capacity (kW)			
	5	10	15	20
LMVN240HV (24,000)	480 CFM	480 CFM	Not Available	Not Available
LMVN360HV (36,000)	780 CFM	780 CFM	Not Available	Not Available

⚠ WARNING

⃠ *Do not operate the air conditioning system using less than the minimum airflow. There is risk of fire and severe injury or death.*

Note:

⃠ *Do not operate the air conditioning system using less than the minimum airflow. There is risk of product damage.*

Table 85: Electric Heater Static Pressure Drop.

Heater Capacity (kW)	Static Pressure Drop (in. wg)
0	0
5	-0.01
10	-0.02

Note:

- *The external static pressure value must be reset if an electric heater is installed. For each 0.01 in. wg. increase in static pressure, the external static pressure must increase by 1.*
- *If the external static pressure is not set properly, the provided safety device will turn off the heater (according to airflow).*

Table 86: Field-Supplied Air Filter Static Pressure Drop Factors.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Airflow Rate / CFM		Static Pressure Drop (in. wg)
LMVN240HV (24,000)	High	710	-0.04
	Mid	640	-0.03
	Low	480	-0.03
LMVN360HV (36,000)	High	990	-0.07
	Mid	880	-0.05
	Low	800	-0.05

Note:

- *The external static pressure value must be reset if an air filter is installed. For each 0.01 in. wg. increase in static pressure, the external static pressure must increase by 1.*
- *Factory tested with MERV 4 filter media. Fan speed set value when the unit is used with field-supplied filter media.*

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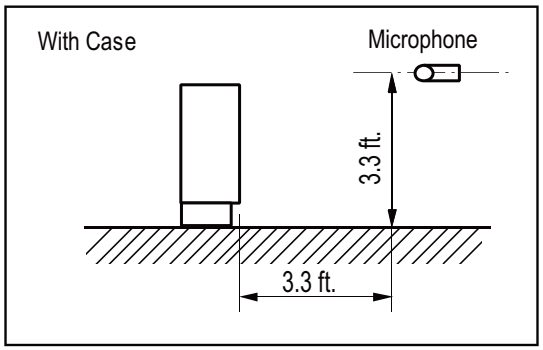
Figure 192: Sound Pressure Level Measurement Location.



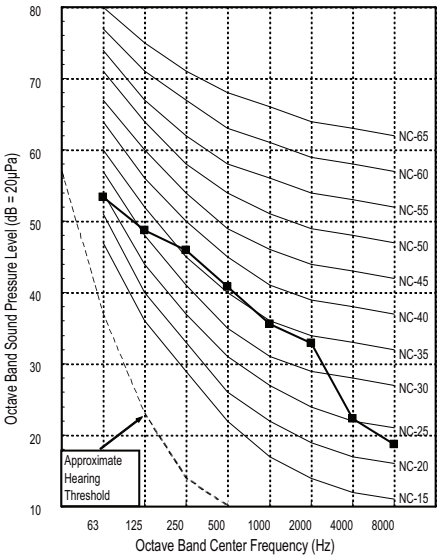
- Measurement taken 3.3' away from the unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is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

Table 87: Sound Pressure Levels (dB[A]).

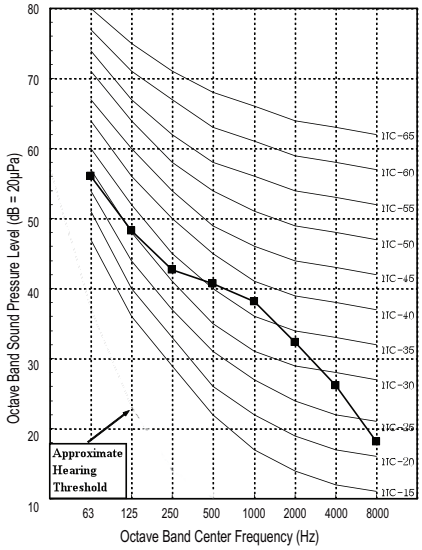
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LMVN240HV	43	42	41
LMVN360HV	45	44	43

Figure 193: Sound Pressure Level Diagrams.

LMVN240HV



LMVN360HV



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TWO-WAY VAHU INDOOR UNITS

Refrigerant Flow Diagram

Figure 194: Multi F Vertical-Horizontal Air Handling Indoor Unit Refrigerant Flow Diagram.

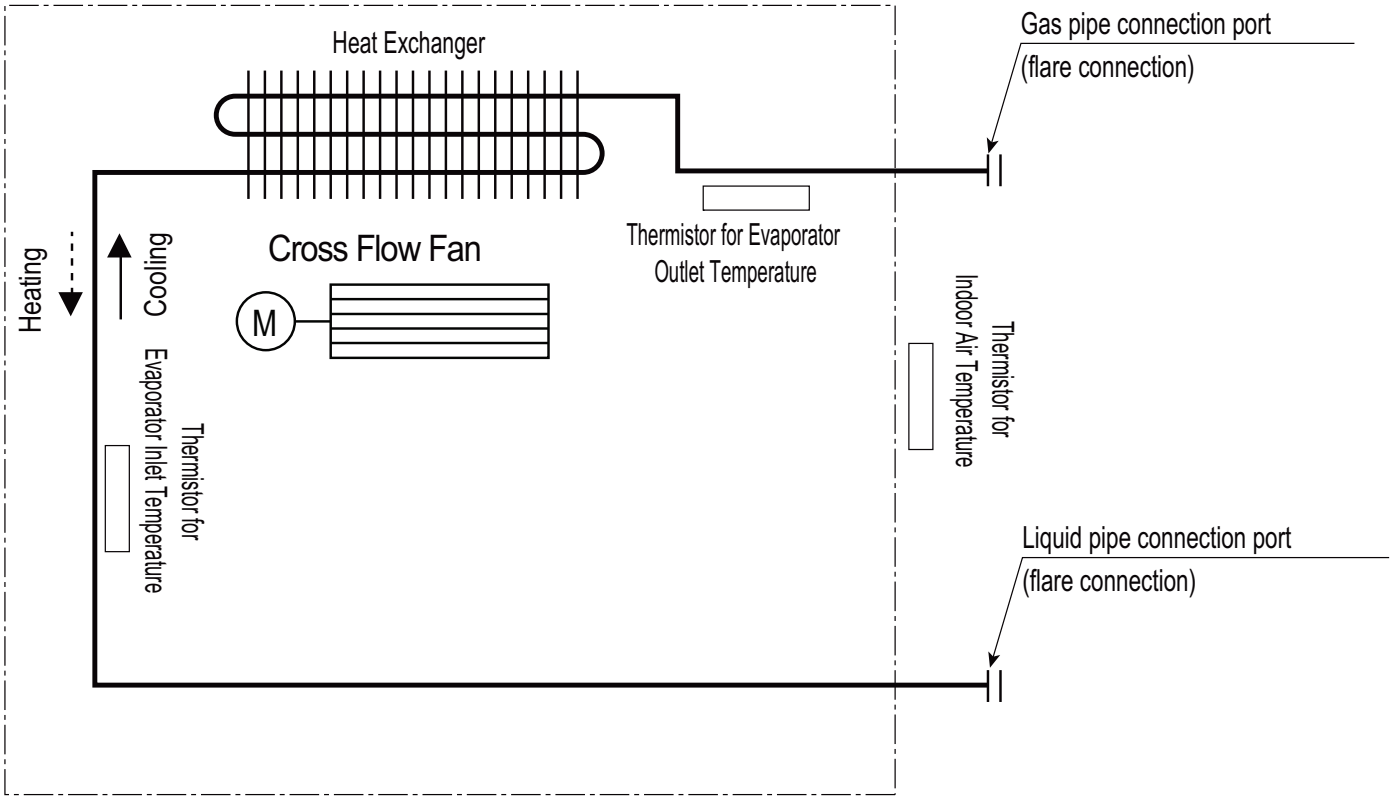

Table 88: Multi F Vertical-Horizontal Air Handling Indoor Unit Refrigerant Pipe Connection Port Diameters.

Model No.	Vapor (inch)	Liquid (inch)
LMVN240HV	1/2	1/4
LMVN360HV	5/8	3/8

Table 89: Multi F Vertical-Horizontal Air-Handling 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

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Figure 195: Multi F Vertical-Horizontal Air-Handling Indoor Unit Wiring Diagram.

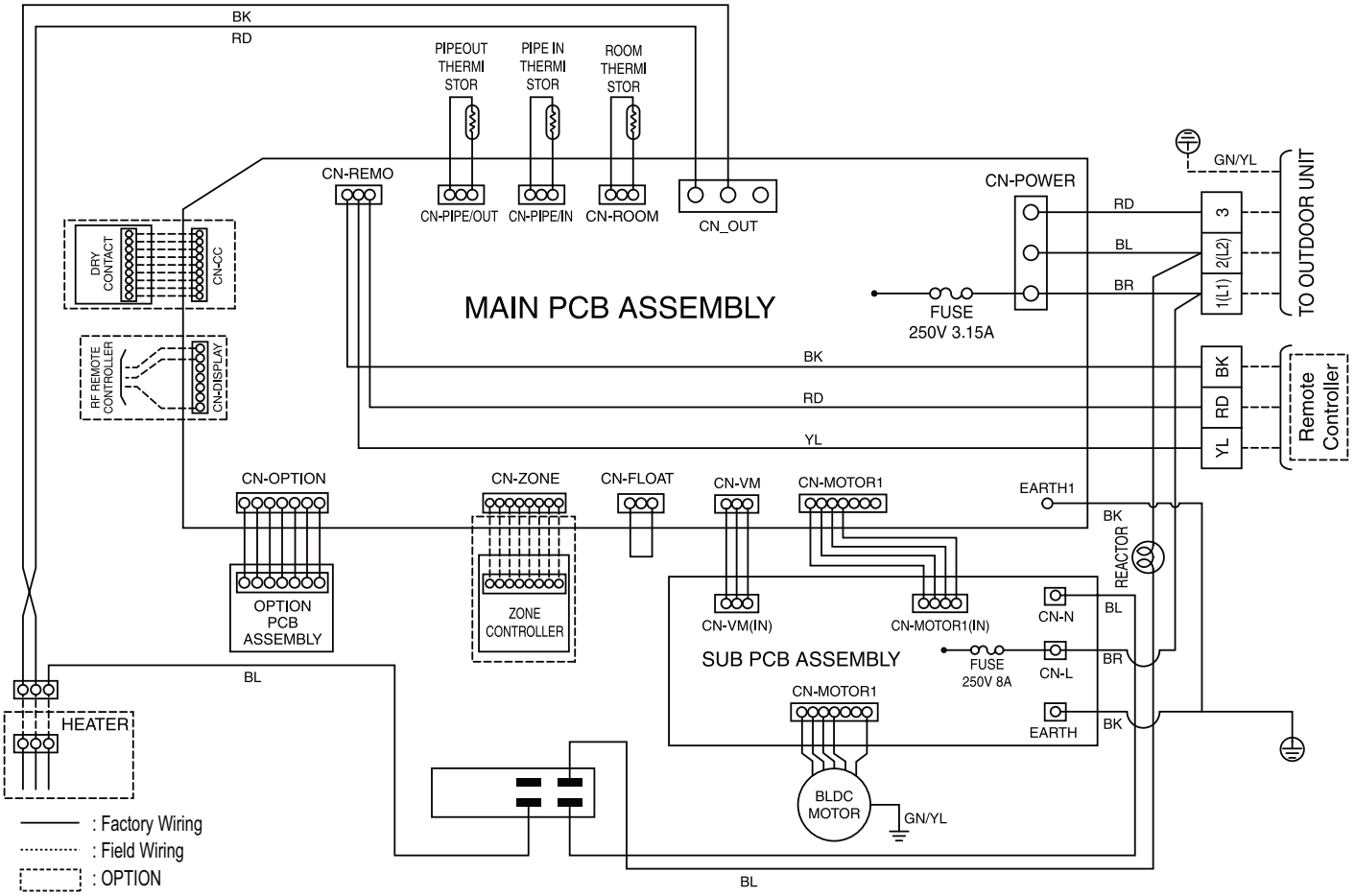

Table 90: Wiring Diagram Connections.

Connection Name	Location	Function
CN-POWER	AC power supply	AC Power line input for indoor controller
CN-MOTOR1	Fan motor output	Motor output of BLDC
CN-MOTOR2	Fan motor output	Motor output of BLDC
CN-FLOAT	Float switch input	Float switch sensing (water level sensor)
CN-PIPE/IN	Suction pipe sensor	Pipe in thermistor
CN-PIPE/OUT	Discharge pipe sensor	Pipe out thermistor
CN-ROOM	Room sensor	Room thermistor
CN-REMO	Remote controller	Remote control line
CN-OPTION	Option PCB	Communication between main and option
CN-ZONE	Zone controller	Zone control line
CN-DISPLAY	RF Remote controller	RF Remote control line
CN-CC	Dry contact	Dry contact line

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TWO-WAY VAHU INDOOR UNITS

Wiring Diagram

Table 91: DIP Switch Settings.

Dip Switch Settings		OFF	ON	Description
SW3	GROUP	Master	Slave	Group control setting using wired remote controller.
SW4	DRY CONTACT	Variable	Auto	Dry contact mode setting. 1. Variable: Auto/manual mode can be chosen using the wide wired remote controller or wireless remote controller (factory setting is the manual mode). 2. Auto: For dry contact, it is always auto mode.
SW5	EXTRA1	Off	On	• ON: Fan operates continuously. • OFF: Default (Fan does not operate continuously).
SW6	HEATER	Off	On	• ON: Automatic heater operation. • OFF: Default (manual heater operation).

1. Indoor unit without electric heater.
   - DIP switch 1, 2, 6, 8 must be set to OFF.

2. Indoor unit with electric heater, DIP switches 5 and 6 must be set to ON.
   - SW 5 ON: Fan operates continuously. (Can have uninterrupted heating during defrost or oil return modes using continuous heater and fan operation.)
   - SW5 OFF: Fan discontinuous operation. (There would be reduction in heating capacity while defrosting or oil return operation.)
   - SW6 ON: Automatic heater operation. (Heater operates automatically using the heater algorithm.)
   - SW6 OFF: Manual heater operation. (On / off operation is set manually. Heater operation follows the heater algorithm.)

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TWO-WAY VAHU INDOOR UNITS

Factory Supplied Parts and Materials

MULTI F
MULTI F MAX

Factory Supplied Materials

- Owner's Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Torque wrenches
- Hexagonal wrench
- Gas-leak detector
- Thermometer

⚠WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit's components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

Selecting the Best Location

Do's

- Place the unit where air circulation through the ducts will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient strength to bear the load of the indoor unit.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit in a location that is level, and where it can be easily connected to the outdoor unit / branch distribution unit.

⃠ Don'ts

- ⃠ *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- ⃠ *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- ⃠ *Do not install the unit near high-frequency generators.*
- ⃠ *Do not install the unit near a doorway.*

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

Note:

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

Installing in an Area Exposed to Unconditioned Air

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

- Verify that carpet is or will be installed (carpet will 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.

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LG

TWO-WAY VAHU INDOOR UNITS

Installation and Best Layout Practices

Figure 196:Clearance Requirements.

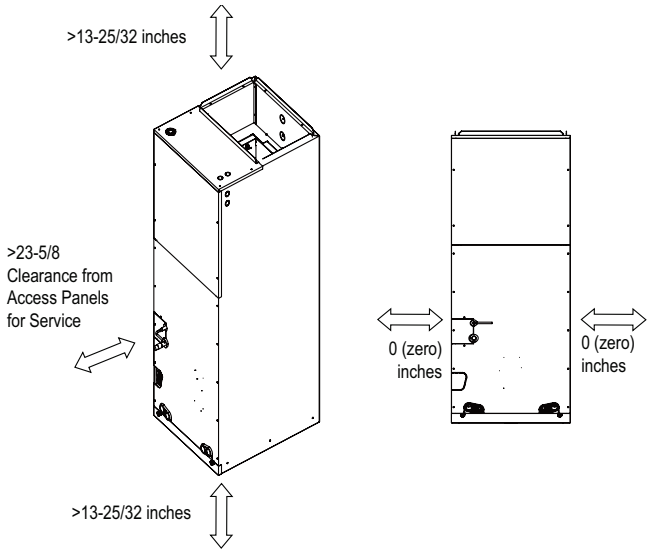

Figure 197:General and Duct Connection Dimensions.

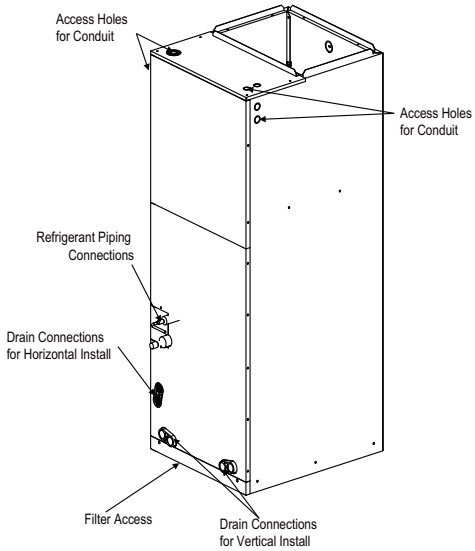

Figure 198:Location of Access Holes and Piping Connections.

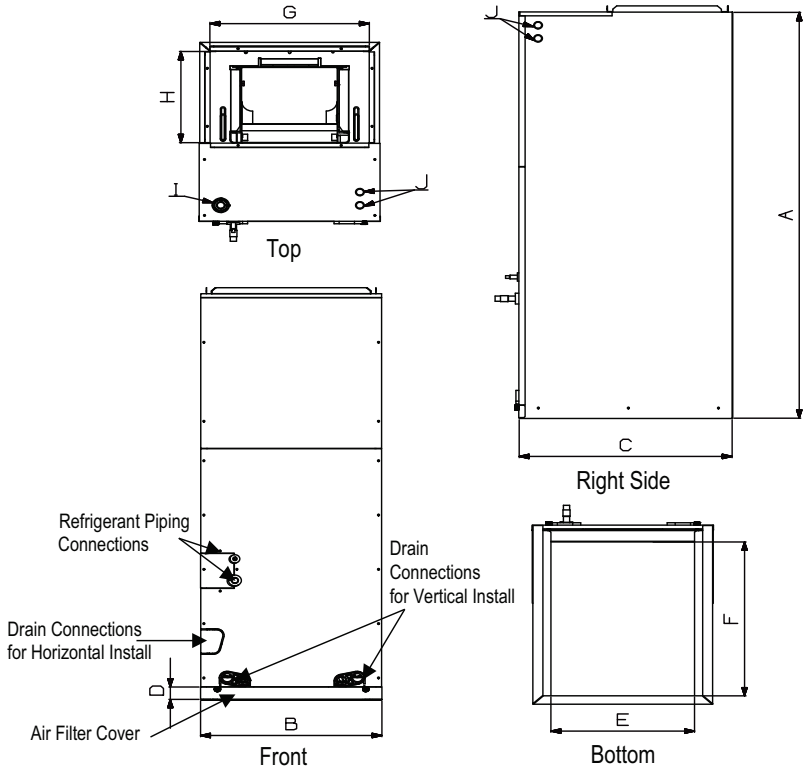

Table 92:General and Duct Connection Dimensions.

Capacity (Btu/h)	Dimensions (inches)								Access Hole for Wiring / Cable (inches)		Refrigerant Connection Sizes (inches)	
	A	B	C	D	E	F	G	H	I	J	Liquid	Vapor
	Height	Width	Depth						Power	Comm.		
24,000	48-21/32	18	21-1/4	1-9/16	17-1/2	20	17	12-1/8	1-11/16	7/8	1/4	1/2
36,000											3/8	5/8

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TWO-WAY VAHU INDOOR UNITS

Installation and Best Layout Practices

MULTI F
MULTI F MAX

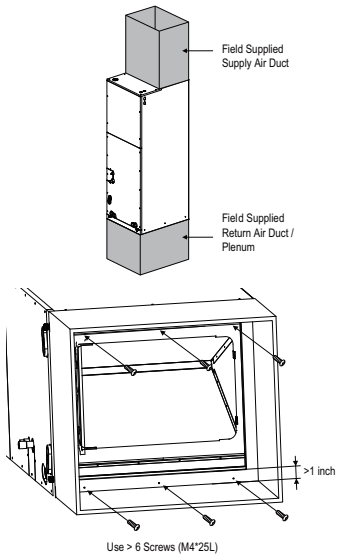
Note:

Vertical-Horizontal Air Handling Units can be installed in a choice of vertical (upflow) or horizontal (left side) configurations.

Vertical (Upflow) Installation

- Unit must be positioned properly for plenum / duct installation.
- To maintain proper air flow, minimum height clearance is 14 inches.
- Plenum must be strong and secure enough to support the installation of adapter collars to accommodate duct work.
- Air handler platform must be sturdy enough to support the frame, plus any accessories (e.g., filter box).
- To prevent air leaks, seal all duct work according to local codes, but make sure that filter access is still unobstructed.
- Vibration isolators (field supplied) must be installed between the unit frame and the platform. If necessary, provide the installing contractor with an illustration of where the vibration isolator must be added and how it must be positioned.

Figure 199:Vertical Installation / Attaching the Bottom Duct.



Note:

Do not install the screws on the front and back of the unit, doing so will block filter installation.

Horizontal Installation

- Units must be installed so that the access panels face to the side, not facing up or down.
- Installation must be in accordance with all relevant building codes, which will necessitate the installation of an external condensate pan (position the unit in or above the external condensate pan).
- If the units are going to be suspended, use angled steel support brackets with threaded rods to provide support from the bottom. The brackets / threaded rods must be comparatively bigger / longer than the unit, and each must be centered on the part of the frame it supports.
- If the unit will not be suspended, still use angled steel support brackets, but also add vibration isolators (field supplied) to avoid sound transmission. If necessary, provide the installing contractor with an illustration of where the vibration isolator must be added and how it must be positioned.
- Unit must be positioned properly for plenum / duct installation.
- Plenum must be strong and secure enough to support the installation of adapter collars to accommodate duct work.

Figure 200:Horizontal Installation.

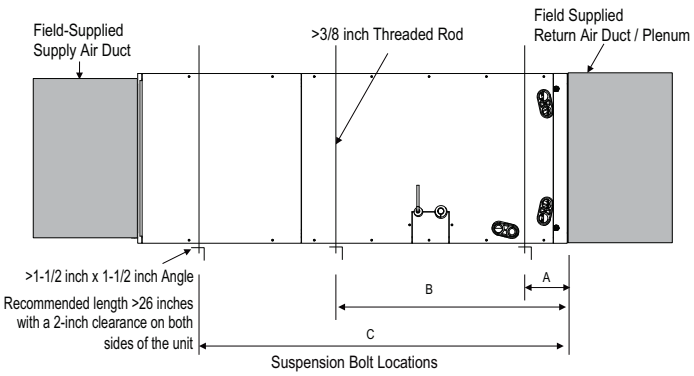


Table 93:Bracket / Bolt Position Dimensions.

Capacity (Btu/h)	Dimensions (inches)		
	A	B	C
24,000	4	23	41-11/32
36,000			

Note:

To ensure proper drainage for horizontal installations, unit must be installed within ±1/8 inches level of the unit's length and width.

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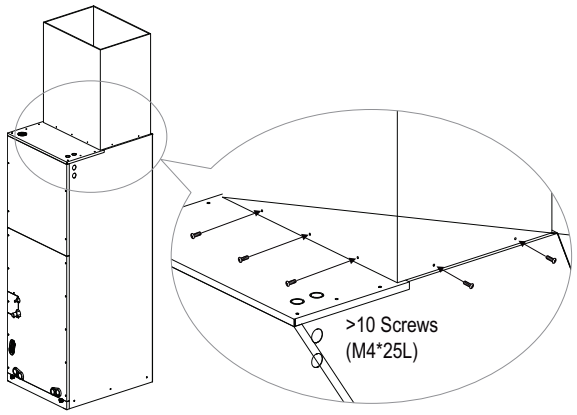
TWO-WAY VAHU INDOOR UNITS

Installation and Best Layout Practices

Installing the Ducts

- Use more than ten (10) screws to securely attach the supply ducts to the unit. To prevent air leaks, seal around the duct opening before the duct is secure.
- To prevent vibration transmission, install flexible connectors between ducts and the unit. The flexible connectors must be made of a heat-resistant material at the discharge connection if an electric heater is installed.
- Duct work must be insulated and covered with vapor barrier when routed through unconditioned spaces. Include enough insulation to prevent condensate from forming on the ducts.
- It will be necessary to add internal acoustical insulation lining for a metal duct system if it does not include a 90° elbow and ten (10) feet between the main duct and the first branch.

Figure 201:Securing the Ducts to the Unit.



- Fibrous glass ducts could be used as a substitute if built and installed in accordance with the most recent edition of the Sheet Metal and Air-Conditioning Contractors' National Associate (SMACNA) standard.
- Also, fibrous duct work and acoustical insulation lining must also follow National Fire Protection Standard 90A or B as tested by UL Standard 181 for Class 1 air ducts.

Installing the Drain System

General Specifications

- To prevent property damage, optimize drain system performance by installing both a primary and secondary drain line, and properly size the condensate traps.
- The primary and secondary drain line must be trapped to allow proper drainage of condensate water. If the secondary drain line is not used, it must be capped.
- ⃠ Do not block the filter access panel when installing the condensate drain piping. Prime the primary and secondary condensate traps after running both to the drain pan.
- If the unit is installed above an inhabited space, add a field-supplied external condensate pan that runs underneath the entire frame (to prevent damage from overflow). The additional external condensate line must run from the unit to the external condensate pan.
- Drain all generated condensate from the external condensate pan to an appropriate area. Install a trap in the condensate lines as near to the indoor unit coil as possible.
- All condensate must be drained from the external condensate pan to some noticeable area.
- To prevent overflow, the outlet of each trap must be positioned below its connection to the condensate pan.
- All traps must be primed, insulated, and leak tested if located above an inhabited space.
- Use a 3/4-inch PVC male pipe thread fitting at the condensate pan connection. Tighten gently.
- Point the drain hose down for easier flow.
- ⃠ Do not just use the pipe joint or PVC / CPVC piping on the indoor unit drain line connections. Use only Teflon tape.
- Design the drain system to plan for winter operation (condensate line will freeze up if condensate does not properly drain away).

Figure 202:Vertical Installation Drain System.

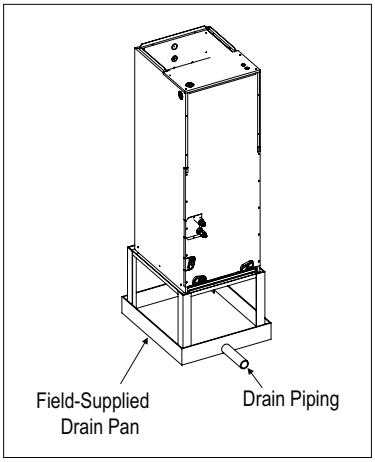
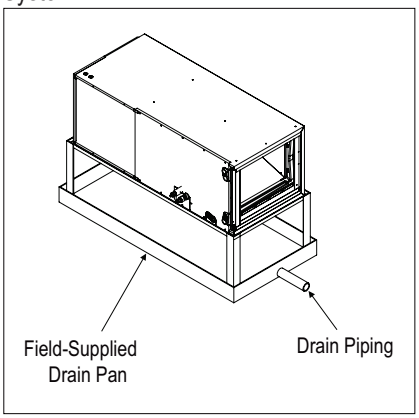


Figure 203:Horizontal Installation Drain System.



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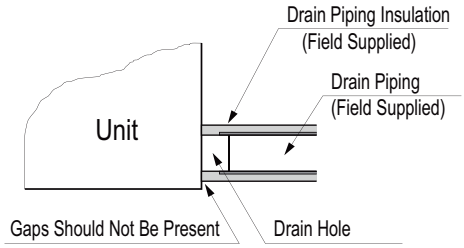
Drain Piping Specifications

- Drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must not be straight up and down.
- ⃠ Do not damage the drain port on the indoor unit when connecting the field-supplied drain piping.

Figure 204:Close up of Drain Piping Connection.



Field-Installed U-Trap Specifications

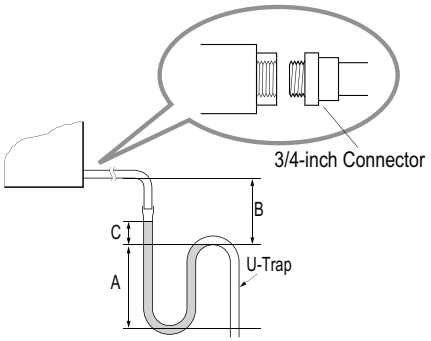
Note:

To prevent leaks cause by a block in the intake air filter, install a U-Trap.

A ≥ 2-9/16 inches
B ≥ 2C
C ≥ 2 x SP
SP = External Pressure in. WG

Example:
External Pressure= 0.4 in WG
A ≥ 2-9/16 inches
B ≥ 1-7/12 inches
C ≥ 19/24 inches

Figure 205:Installing the U-Trap.



Insulating the Refrigerant and Drain Piping

⚠WARNING

Ensure all piping is insulated. Exposed piping can cause burns if touched.

Refrigerant Piping Insulation

Field-installed vapor and liquid refrigerant piping lines must be properly and completely covered in insulation (up to the indoor unit piping connections) and must comply with federal, state, and local requirements. Any exposed piping will generate condensate or will cause burns if touched. Insulation for this field-installed refrigerant piping must have a minimum heat resistance of 248°F.

If the indoor unit is installed and is operated at an extended period in a highly humid environment (dew point temperature >73°F), however, condensate will form. To prevent this phenomenon, install adiabatic glass wool insulation with a thickness of 7/16 to 13/16 inches thick. Also, install glass wool insulation on all indoor units that are located in the ceiling plenum.

Drain Piping Insulation

Drain piping insulation must be 7/32 inches thick, minimum.

Figure 206:Vertical Primary and Secondary Drain Layout.

Figure 207:Horizontal Primary and Secondary Drain Layout.

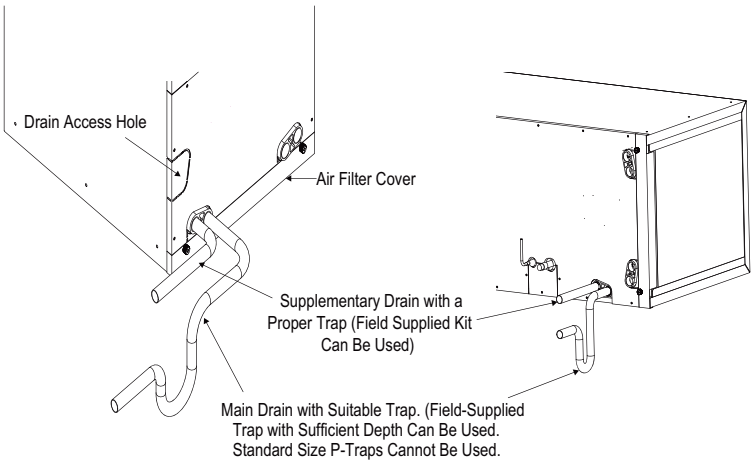


Figure 208:Close Up of Refrigerant Piping Connection Insulation.

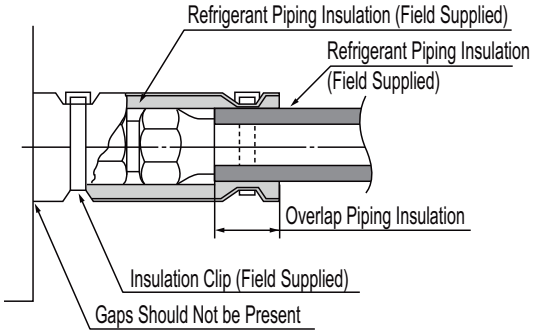
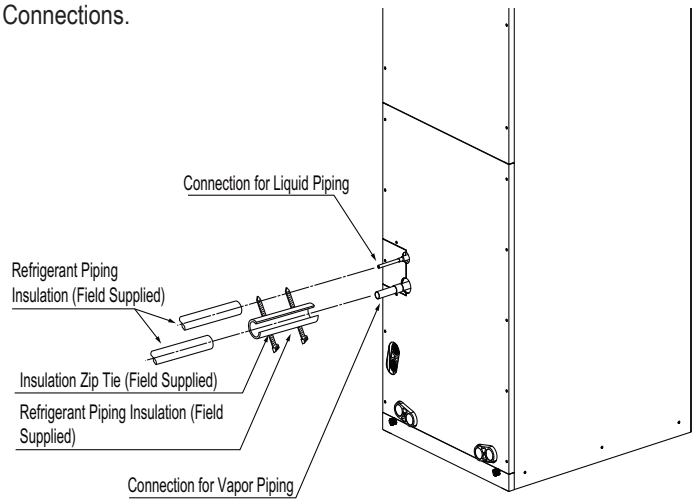


Figure 209:Insulating the Refrigerant Piping and Refrigerant Piping Connections.



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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

• Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

Connecting the Power Wiring and Communications Cable

1. To access the terminal block, first unscrew the top front panel, and then unscrew the cover from the control box.

2. Knockout the access holes for the wiring. Insert the power wiring/ communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) through the conduits, pass the conduits through the designated access holes, and then insert the conduits into the control box. To prevent electromagnetic interference and product malfunction, leave a space between the power wiring and communications cable outside of the indoor unit.

3. Connect the power wiring and communications cables to the appropriate terminals on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

4. Fill in any gaps around the conduit access holes with sealant to prevent foreign particles from entering the indoor unit.

Figure 210:Connecting the Power Wiring and Communications Cable.

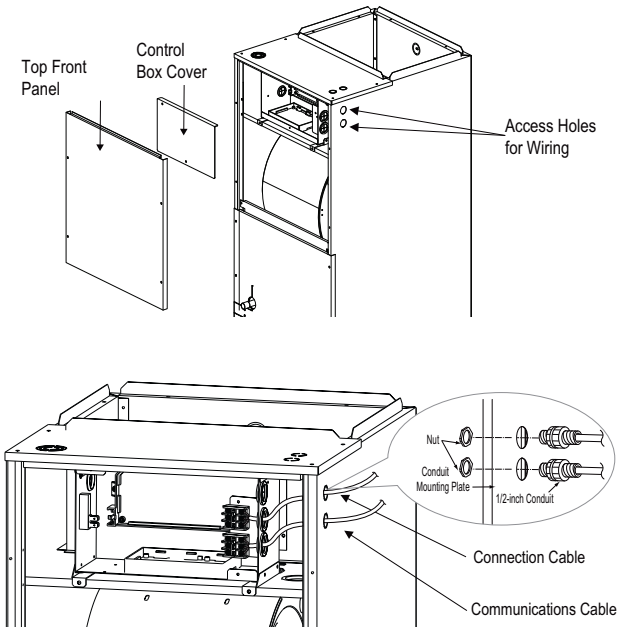
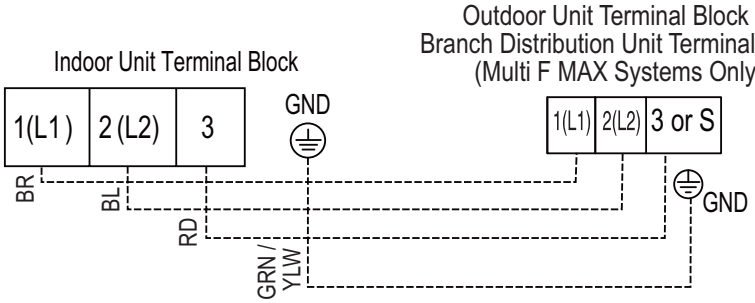


Figure 211:Indoor Unit to Outdoor Unit / Branch Distribution Unit (Multi F MAX systems only) Power Wiring / Communications Cable Connections.



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Controller Options

Vertical-Horizontal Air Handling indoor units can be used with many LG-supplied wired controllers (sold separately). The wireless handheld controller (Model No. PQWRHQ0FDB) is also an optional accessory with use of the wired controller.

Wired Controller Connections

Controllers can connect to the indoor unit in one of two different ways.

1. LG Wired Remote Extension Cable with Molex plug (PZCWRC1; sold separately) that connects to the CN-REMO terminal on the indoor unit PCB.

2. Field-supplied controller cable that connects to the indoor unit terminal block (must be at least UL2547 or UL1007, 22 AWG, two-core, one-shield core, at least FT-6 rated if local electric and building codes require plenum cable usage).

Figure 212:PZCWRC1 LG Wired Remote Extension Cable.

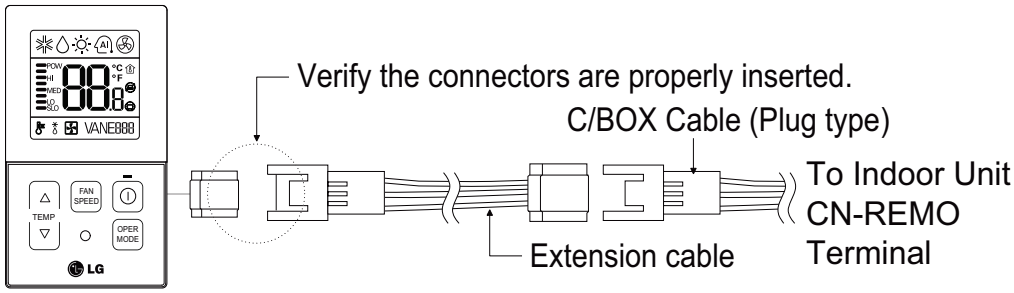
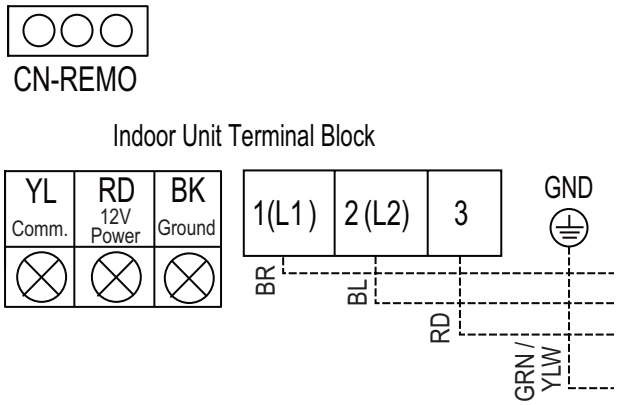


Figure 213:Wired Controller Connection on the Indoor Unit Terminal Block.



Note:

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

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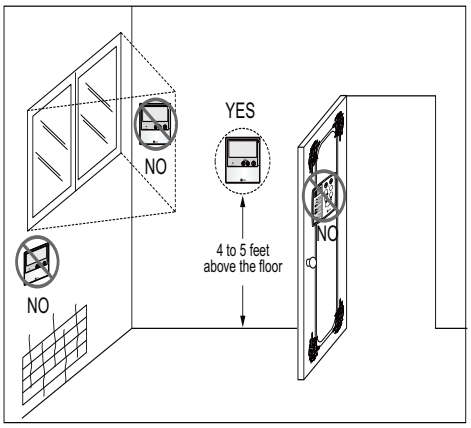
Wired Controller Placement

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

⃠ Do not install the wired controller near or in:

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

Figure 214:Proper Location for the Wired Controller.



Hanging the Wired Controller

1. The controller wiring / cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring / cable on applicable side.
2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.
3. Arrange wiring / cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.
4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 215:Removing the Cable Guide Grooves.

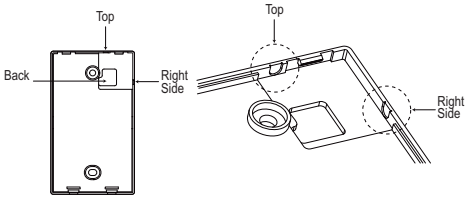


Figure 216:Attaching the Wall Plate.

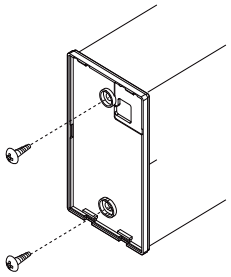
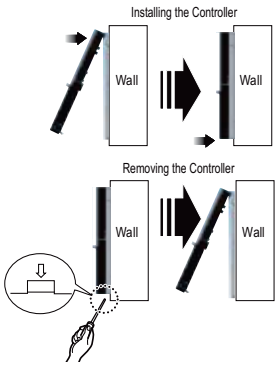


Figure 217:Installing / Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

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FOUR-WAY VERTICAL-HORIZONTAL AIR HANDLING INDOOR UNIT DATA

“Mechanical Specifications” on page 158
“General Data / Specifications” on page 159
“Dimensions” on page 160
“Cooling Capacity Table” on page 161
“Heating Capacity Table” on page 163
“External Static Pressure” on page 166
“Heater Capacities” on page 168
“Acoustic Data” on page 169
“Refrigerant Flow Diagram” on page 171
“Wiring Diagram” on page 172
“Factory Supplied Parts and Materials” on page 174
“Installation and Best Layout Practices” on page 175

FOUR-WAY VAHU INDOOR UNITS

Mechanical Specifications and Features

MULTI F
MULTI F MAX

Four-way Vertical-Horizontal Air Handing Indoor Unit

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Vertical-Horizontal Air Handling units are designed for high-speed air volume against an external static pressure up to 1.00"WG. Supply air opening is flanged to accept field-installed ductwork that cannot exceed the external static pressure limit of the unit.

Coil

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

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare, and all refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

The casing is designed to mount fully concealed behind a wall or above a finished ceiling. Casing is manufactured of 22-gauge precoated metal and finished with a high-gloss baked enamel finish. Cold surfaces of the unit are covered internally with 1/2-inch polystyrene fiber insulation; inside surface of the pan assembly door access panel is treated with 1/2-inch polystyrene fiber insulation, encapsulated on both sides. The access panel is sealed along the edges with reinforced foil-faced covering, all access panels also have gasket seals to minimize air leaks.

The vertical-horizontal air handling unit can operate in one of four airflow configurations: vertical upflow, vertical downflow, horizontal left discharge, or horizontal right discharge. Vertical downflow operation requires an optional conversion kit. In the vertical position, the unit has an opening for supply air from top (or bottom) with a dedicated bottom (or top) vertical return. In the horizontal position, supply air is from the left (or right) end with the return air from the right (or left) end. Unit can also accept an internal, optional LG electrical strip heater.

Fan Assembly and Control

The units have an integral fan assembly consisting of galvanized steel housing and a forward curve fan wheel. The fan motor is a brushless digitally controlled (BLDC) motor 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. The indoor fan has Low, Med, High, and Auto settings for Cooling mode; and has Low, Med, High, and Auto settings for Heating mode. Each of the settings can be field-adjusted from the factory setting (RPM / ESP). The Auto setting adjusts the fan speed to most effectively achieve setpoint.

Figure 218: Multi F Vertical-Horizontal Air Handling Indoor Unit.

Filter Assembly

The unit comes with a filter rack sized to hold a field-provided 16” x 20” x 1” (NJ frame) or 24” x 20” x 1” (NK frame) filter cartridge. The filter rack has a guide to assist in centering the filters, and can be accessed from the front.

Microprocessor Control

The indoor unit is provided with an integrated control panel to communicate with the outdoor unit. All unit operation parameters are stored in non-volatile memory resident on the unit microprocessor. The microprocessor controls space temperature through using the value provided by temperature sensors within the indoor unit. A field-supplied communication cable must be installed to connect the indoor unit(s) to the outdoor unit.

Controls

The indoor unit controller of choice must be ordered separately. Communication between the indoor units and the outdoor unit is accomplished through 18 AWG, four-core, stranded and shielded power / communication cable. The indoor unit has a built-in dry contact for a field supplied 3rd party thermostat. An optional Wi-Fi module is available as an additional accessory for use with LG’s SmartThinQ app on a smart device.

Condensate

The unit is designed for gravity draining of condensate.

Features

- Inverter (Variable speed fan)
- Control lock function
- Auto operation
- Dehumidifying function
- Two thermistor control
- Group control
- External static pressure control
- Self-diagnostics function
- Built-in dry contact for third party thermostat
- Wired controller ordered separately

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FOUR-WAY VAHU INDOOR UNITS

General Data / Specifications

Table 94: Multi F Vertical-Horizontal Air Handling Indoor Unit General Data.

Model Name	LVN180HV4	LVN240HV4	LVN360HV4
Nominal Cooling Capacity (Btu/h)[1]	18,000	24,000	36,000
Nominal Heating Capacity (Btu/h)[1]	20,000	27,000	40,000
Operating Range			
Cooling (°F WB)	57-77	57-77	57-77
Heating (°F DB)	59-81	59-81	59-81
Fan			
Type	Sirocco	Sirocco	Sirocco
Motor Output (W) x Qty.	198 x 1	198 x 1	400 x 1
Motor/Drive	Brushless Digitally Controlled / Direct	Brushless Digitally Controlled / Direct	Brushless Digitally Controlled / Direct
Airflow Rate CFM (H/M/L) at 0.5" WG ESP	640 / 580 / 480	710 / 640 / 480	1,100 / 1,000 / 900
Maximum External Static Pressure (in. WG)	0.7	0.7	1.00
Unit Data			
Refrigerant Type[2]	R410A	R410A	R410A
Refrigerant Control	EEV	EEV	EEV
Power Supply V, Ø, Hz[3]	208-230, 1, 60	208-230, 1, 60	208-230, 1, 60
Rated Amps (A)	1.1	1.1	2.2
Sound Pressure Level dB(A) (H/M/L)[4] at 0.3"WG ESP	42 / 42 / 41	43 / 42 / 41	45 / 44 / 43
Dimensions (W x H x D, in.)	18 x 48-11/16 x 21-1/4	18 x 48-11/16 x 21-1/4	25 x 55-3/16 x 21-1/4
Net Weight (lbs.)	129	129	165
Shipping Weight (lbs.)	140	140	188
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 18	4 x 18	4 x 18
Heat Exchanger (Row x Column x Fin / inch) x Number	(3x 24 x 18) x 2	(3x 24 x 18) x 2	(3x 30 x 18) x 2
Pipe Size			
Liquid (in.)	1/4	1/4	3/8
Vapor (in.)	1/2	1/2	5/8
Connection Size			
Liquid (in.)	3/8	3/8	3/8
Vapor (in.)	5/8	5/8	5/8
Primary Drain I.D. (in.)	3/4 FPT	3/4 FPT	3/4 FPT
Secondary Drain I.D. (in.)	3/4 FPT	3/4 FPT	3/4 FPT

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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).
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).

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs must 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.

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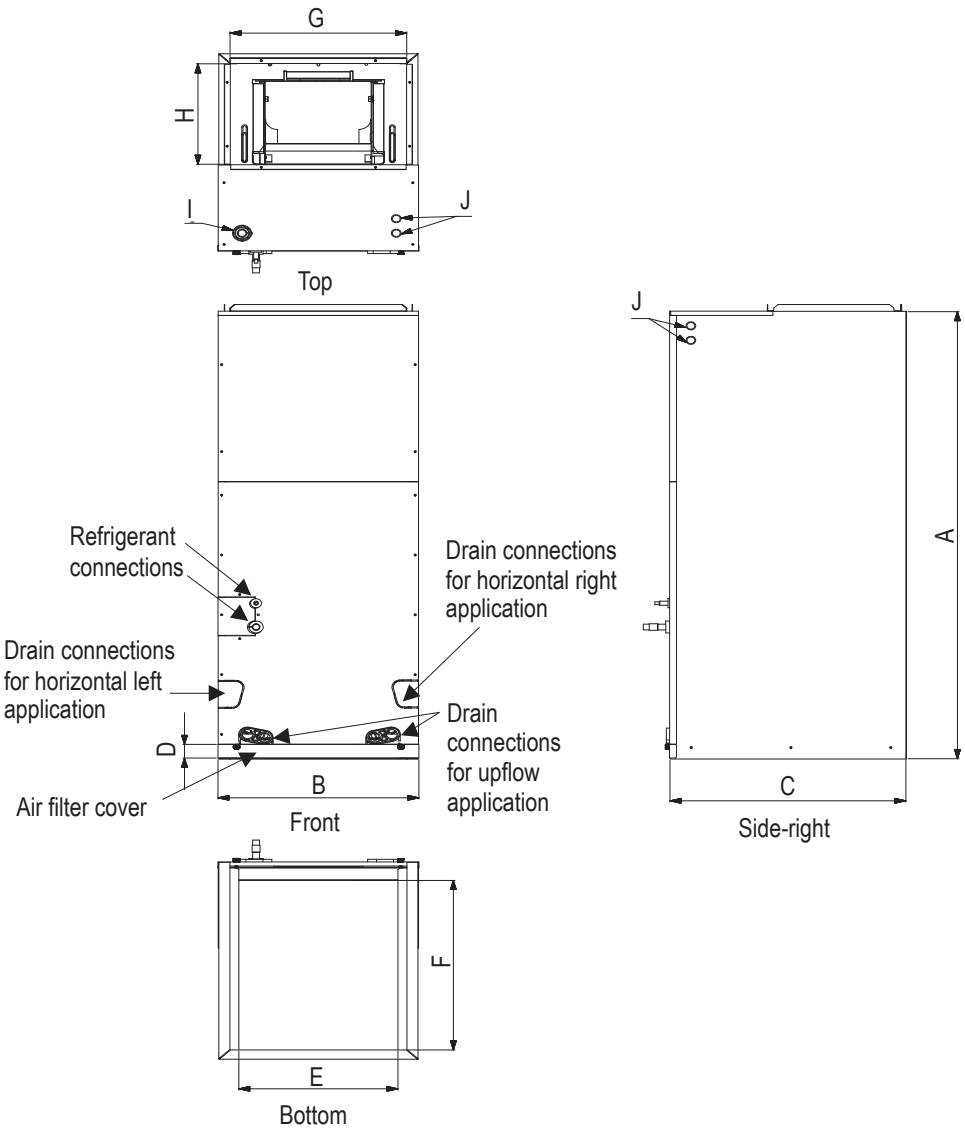
FOUR-WAY VAHU INDOOR UNITS

Dimensions

Figure 219: Four-way Vertical Air Handling Unit Dimensions.



Unit: inch

ODU	Capacity (kBtu/h)	Dimensions								Wiring Knock out		Refrigerant Pipe size		Refrigerant Pipe Connections	
		A	B	C	D	E	F	G	H	I	J				
		Height	Width	Depth						Power	Comm-unication	Liquid	Gas	Liquid	Gas
Multi Zone	18 24	48-5/8	18	21-3/8	1-9/16	17-1/2	20	17	12-1/8	1-11/16	7/8	1/4	1/2	3/8	5/8
	36	55-1/8	25	21-3/8	1-9/16	24-1/2	20	24	12-1/8	1-11/16	7/8	3/8	5/8	3/8	5/8

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FOUR-WAY VAHU INDOOR UNITS

Cooling Capacity Table

Table 95: Multi F Vertical-Horizontal Air Handling Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LVN180HV4 18,000	14	17.65	13.25	18.74	13.99	19.84	13.55	20.63	13.83	22.03	13.95	23.12	14.22
	20	17.63	13.35	18.73	14.10	19.82	13.65	20.61	13.94	22.01	14.06	23.11	14.33
	25	17.62	13.45	18.71	14.21	19.81	13.76	20.60	14.05	22.00	14.17	23.09	14.44
	30	17.60	13.56	18.70	14.32	19.79	13.87	20.58	14.16	21.98	14.28	23.07	14.55
	35	17.59	13.66	18.68	14.43	19.78	13.97	20.57	14.27	21.96	14.39	23.05	14.66
	40	17.58	13.76	18.67	14.54	19.76	14.08	20.55	14.37	21.94	14.49	23.04	14.77
	45	17.56	13.87	18.66	14.65	19.75	14.18	20.53	14.48	21.93	14.60	23.02	14.88
	50	17.55	13.97	18.64	14.75	19.73	14.29	20.52	14.59	21.91	14.71	23.00	14.99
	55	17.54	14.07	18.63	14.86	19.72	14.39	20.50	14.69	21.89	14.82	22.98	15.10
	60	17.52	14.17	18.61	14.97	19.70	14.50	20.49	14.80	21.88	14.93	22.97	15.21
	65	17.51	14.27	18.60	15.08	19.69	14.60	20.47	14.91	21.86	15.03	22.95	15.32
	70	17.50	14.38	18.58	15.19	19.67	14.70	20.46	15.01	21.84	15.14	22.93	15.43
	75	17.08	14.14	18.16	14.96	19.24	14.50	20.03	14.81	21.41	14.96	22.50	15.25
	80	16.66	13.90	17.74	14.72	18.82	14.29	19.60	14.61	20.98	14.77	22.06	15.07
	85	16.24	13.64	17.32	14.47	18.40	14.06	19.17	14.39	20.55	14.57	21.63	14.88
	90	15.82	13.39	16.90	14.22	17.97	13.84	18.75	14.17	20.12	14.36	21.20	14.69
	95	15.37	13.25	16.44	14.09	17.51	13.73	**18.00**	**13.86**	19.65	14.29	20.72	14.62
	100	14.99	12.89	16.06	13.74	17.13	13.40	17.77	13.65	19.28	13.98	20.35	14.32
	105	14.62	12.54	15.69	13.38	16.76	13.08	17.53	13.43	18.90	13.67	19.97	14.02
	110	14.24	12.11	15.32	12.95	16.39	12.67	17.16	13.03	18.53	13.29	19.60	13.64
	115	13.87	11.75	14.94	12.58	16.01	12.34	16.79	12.70	18.15	12.97	19.22	13.33
	118	13.65	11.66	14.72	12.51	15.79	12.27	16.56	12.64	17.93	12.92	19.00	13.29
	122	13.57	11.63	14.64	12.48	15.71	12.25	16.49	12.62	17.85	12.91	18.92	13.28
LVN240HV4 24,000	14	23.53	17.89	24.99	18.90	26.45	18.30	27.50	18.69	29.37	18.84	30.83	19.20
	20	23.51	18.03	24.97	19.05	26.43	18.44	27.48	18.83	29.35	18.99	30.81	19.35
	25	23.49	18.17	24.95	19.20	26.41	18.59	27.46	18.98	29.33	19.14	30.79	19.50
	30	23.47	18.31	24.93	19.34	26.39	18.73	27.44	19.12	29.30	19.28	30.76	19.65
	35	23.46	18.45	24.91	19.49	26.37	18.87	27.42	19.27	29.28	19.43	30.74	19.80
	40	23.44	18.59	24.89	19.64	26.35	19.01	27.40	19.41	29.26	19.58	30.72	19.95
	45	23.42	18.73	24.87	19.78	26.33	19.15	27.38	19.56	29.24	19.72	30.69	20.10
	50	23.40	18.87	24.85	19.93	26.31	19.30	27.36	19.70	29.21	19.87	30.67	20.24
	55	23.38	19.00	24.84	20.07	26.29	19.44	27.34	19.85	29.19	20.01	30.64	20.39
	60	23.37	19.14	24.82	20.22	26.27	19.58	27.32	19.99	29.17	20.16	30.62	20.54
	65	23.35	19.28	24.80	20.37	26.25	19.72	27.29	20.13	29.15	20.30	30.60	20.69
	70	23.33	19.42	24.78	20.51	26.23	19.86	27.27	20.28	29.13	20.45	30.57	20.84
	75	22.77	19.10	24.21	20.20	25.66	19.58	26.70	20.01	28.55	20.20	29.99	20.60
	80	22.21	18.77	23.65	19.88	25.09	19.30	26.13	19.73	27.97	19.95	29.42	20.36
	85	21.65	18.43	23.09	19.55	24.53	18.99	25.57	19.44	27.40	19.68	28.84	20.10
	90	21.09	18.08	22.53	19.21	23.96	18.69	25.00	19.14	26.83	19.40	28.27	19.84
	95	20.49	17.89	21.92	19.03	23.35	18.55	**24.00**	**18.72**	26.20	19.30	27.63	19.75
	100	19.99	17.41	21.42	18.55	22.85	18.10	23.69	18.43	25.70	18.88	27.13	19.35
	105	19.49	16.93	20.92	18.07	22.35	17.66	23.38	18.14	25.20	18.47	26.63	18.94
	110	18.99	16.35	20.42	17.49	21.85	17.12	22.88	17.60	24.70	17.94	26.13	18.42
	115	18.49	15.86	19.92	17.00	21.35	16.66	22.38	17.15	24.20	17.51	25.63	18.00
	118	18.19	15.75	19.62	16.89	21.05	16.58	22.08	17.07	23.90	17.46	25.33	17.96
	122	18.10	15.71	19.52	16.86	20.95	16.55	21.98	17.05	23.81	17.44	25.23	17.94

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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FOUR-WAY VAHU INDOOR UNITS

Cooling Capacity Table

Table 91: Multi F Vertical-Horizontal Air Handling Indoor Units Cooling Capacity Table - continued

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LVN360HV4 18,000	14	35.29	27.18	37.48	28.71	39.67	27.80	41.26	28.39	44.06	28.63	46.25	29.17
	20	35.26	27.39	37.45	28.94	39.64	28.02	41.23	28.61	44.02	28.85	46.21	29.40
	25	35.24	27.61	37.43	29.16	39.61	28.24	41.19	28.83	43.99	29.07	46.18	29.62
	30	35.21	27.82	37.40	29.39	39.58	28.45	41.16	29.05	43.96	29.30	46.14	29.85
	35	35.18	28.03	37.37	29.61	39.55	28.67	41.13	29.27	43.92	29.52	46.11	30.08
	40	35.16	28.24	37.34	29.83	39.52	28.88	41.10	29.49	43.89	29.74	46.07	30.30
	45	35.13	28.45	37.31	30.05	39.49	29.10	41.07	29.71	43.86	29.96	46.04	30.53
	50	35.10	28.66	37.28	30.28	39.46	29.32	41.04	29.93	43.82	30.19	46.00	30.76
	55	35.08	28.87	37.25	30.50	39.43	29.53	41.01	30.15	43.79	30.41	45.97	30.98
	60	35.05	29.08	37.23	30.72	39.40	29.74	40.97	30.37	43.76	30.63	45.93	31.21
	65	35.02	29.29	37.20	30.94	39.37	29.96	40.94	30.59	43.72	30.85	45.90	31.43
	70	34.99	29.50	37.17	31.16	39.34	30.17	40.91	30.81	43.69	31.07	45.86	31.66
	75	34.15	29.01	36.32	30.69	38.49	29.75	40.05	30.40	42.82	30.69	44.99	31.30
	80	33.31	28.52	35.47	30.20	37.64	29.31	39.20	29.98	41.96	30.30	44.12	30.93
	85	32.48	28.00	34.63	29.70	36.79	28.86	38.35	29.53	41.10	29.89	43.26	30.54
	90	31.64	27.47	33.79	29.18	35.94	28.39	37.50	29.08	40.25	29.48	42.40	30.14
	95	30.74	27.18	32.88	28.92	35.02	28.17	**36.00**	**28.44**	39.30	29.32	41.44	30.01
	100	29.99	26.45	32.13	28.19	34.27	27.50	35.53	28.00	38.55	28.69	40.69	29.39
	105	29.24	25.72	31.38	27.46	33.52	26.83	35.07	27.56	37.80	28.06	39.94	28.78
	110	28.49	24.84	30.63	26.57	32.77	26.00	34.32	26.74	37.05	27.26	39.20	27.99
	115	27.74	24.10	29.88	25.82	32.02	25.31	33.57	26.05	36.31	26.61	38.45	27.35
	118	27.29	23.93	29.43	25.66	31.57	25.19	33.12	25.94	35.86	26.52	38.00	27.28
	122	27.14	23.87	29.28	25.61	31.43	25.14	32.97	25.90	35.71	26.49	37.85	27.25

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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FOUR-WAY VAHU INDOOR UNITS

Heating Capacity Table

Table 96: Multi F Vertical-Horizontal Air Handling Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LVN180HV4 18,000	0	-0.4	10.29	10.14	10.05	10.00	9.86	9.42
	5	4.5	11.59	11.45	11.35	11.30	11.16	10.72
	10	9	12.90	12.75	12.66	12.61	12.46	12.03
	17	15	14.64	14.49	14.40	**14.35**	14.20	13.74
	20	19	15.29	15.14	15.05	15.00	14.86	14.35
	25	23	16.38	16.23	16.14	16.09	15.94	15.36
	30	28	17.32	17.17	17.08	17.03	16.88	16.38
	35	32	18.26	18.12	18.02	17.97	17.83	17.39
	40	36	19.11	18.96	18.86	18.82	18.67	18.24
	45	41	19.95	19.81	19.71	19.66	19.52	19.08
	47	43	20.29	20.14	20.05	**20.00**	19.86	19.42
	50	46	20.62	20.47	20.37	20.33	20.18	19.69
	55	51	21.16	21.01	20.92	20.87	20.72	20.14
	60	56	21.16	21.01	20.92	20.87	20.72	20.24
	63	59	21.16	21.01	20.92	20.87	20.72	20.29
	68	64	21.16	21.01	20.92	20.87	20.72	20.38
LVN240HV4 24,000	0	-0.4	13.89	13.70	13.57	13.50	13.30	12.72
	5	4.5	15.65	15.46	15.33	15.26	15.07	14.48
	10	9	17.41	17.22	17.09	17.02	16.83	16.24
	17	15	19.76	19.57	19.43	**19.37**	19.17	18.55
	20	19	20.64	20.45	20.32	20.25	20.05	19.37
	25	23	22.11	21.91	21.78	21.72	21.52	20.74
	30	28	23.38	23.18	23.05	22.99	22.79	22.11
	35	32	24.65	24.46	24.33	24.26	24.07	23.48
	40	36	25.79	25.60	25.47	25.40	25.21	24.62
	45	41	26.93	26.74	26.61	26.54	26.35	25.76
	47	43	27.39	27.20	27.07	**27.00**	26.80	26.22
	50	46	27.83	27.64	27.51	27.44	27.24	26.58
	55	51	28.57	28.37	28.24	28.17	27.98	27.20
	60	56	28.57	28.37	28.24	28.17	27.98	27.32
	63	59	28.57	28.37	28.24	28.17	27.98	27.39
	68	64	28.57	28.37	28.24	28.17	27.98	27.51

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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FOUR-WAY VAHU INDOOR UNITS

Heating Capacity Table

Table 92: Multi F Vertical-Horizontal Air Handling Indoor Units Heating Capacity Table - continued

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LVN360HV4 36,000	0	-0.4	20.58	20.29	20.10	20.00	19.71	18.84
	5	4.5	23.19	22.90	22.71	22.61	22.32	21.45
	10	9	25.80	25.51	25.31	25.22	24.93	24.06
	17	15	29.28	28.99	28.79	**28.70**	28.41	27.48
	20	19	30.58	30.29	30.10	30.00	29.71	28.70
	25	23	32.75	32.46	32.27	32.17	31.88	30.72
	30	28	34.64	34.35	34.15	34.06	33.77	32.75
	35	32	36.52	36.23	36.04	35.94	35.65	34.78
	40	36	38.21	37.92	37.73	37.63	37.34	36.47
	45	41	39.90	39.61	39.42	39.32	39.03	38.16
	47	43	40.58	40.29	40.10	**40.00**	39.71	38.84
	50	46	41.23	40.94	40.75	40.65	40.36	39.38
	55	51	42.32	42.03	41.84	41.74	41.45	40.29
	60	56	42.32	42.03	41.84	41.74	41.45	40.47
	63	59	42.32	42.03	41.84	41.74	41.45	40.58
	68	64	42.32	42.03	41.84	41.74	41.45	40.76

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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FOUR-WAY VAHU INDOOR UNITS

External Static Pressure and Airflow Ranges

Figure 220: ESP Setting Values – NJ Chassis, LVN180HV4, LVN240HV4

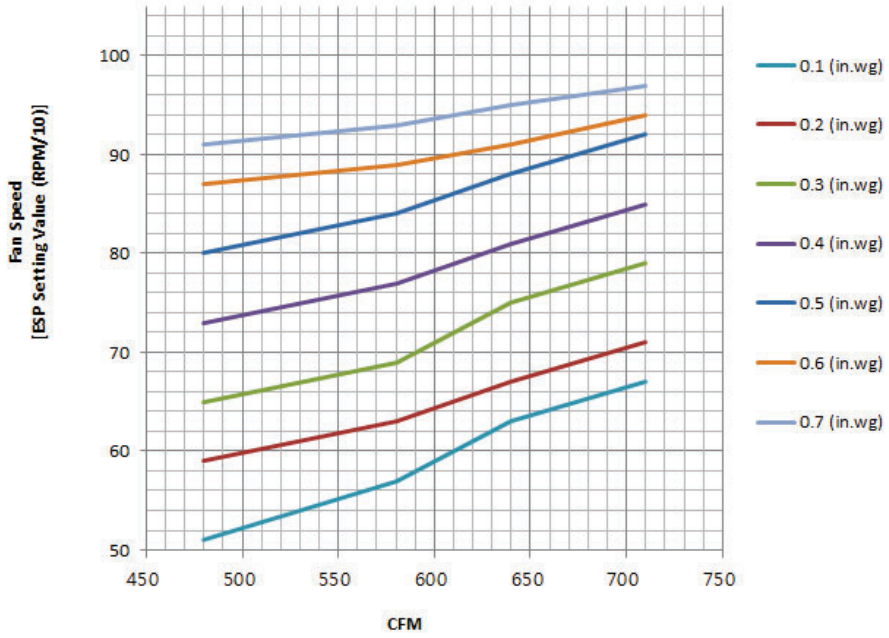
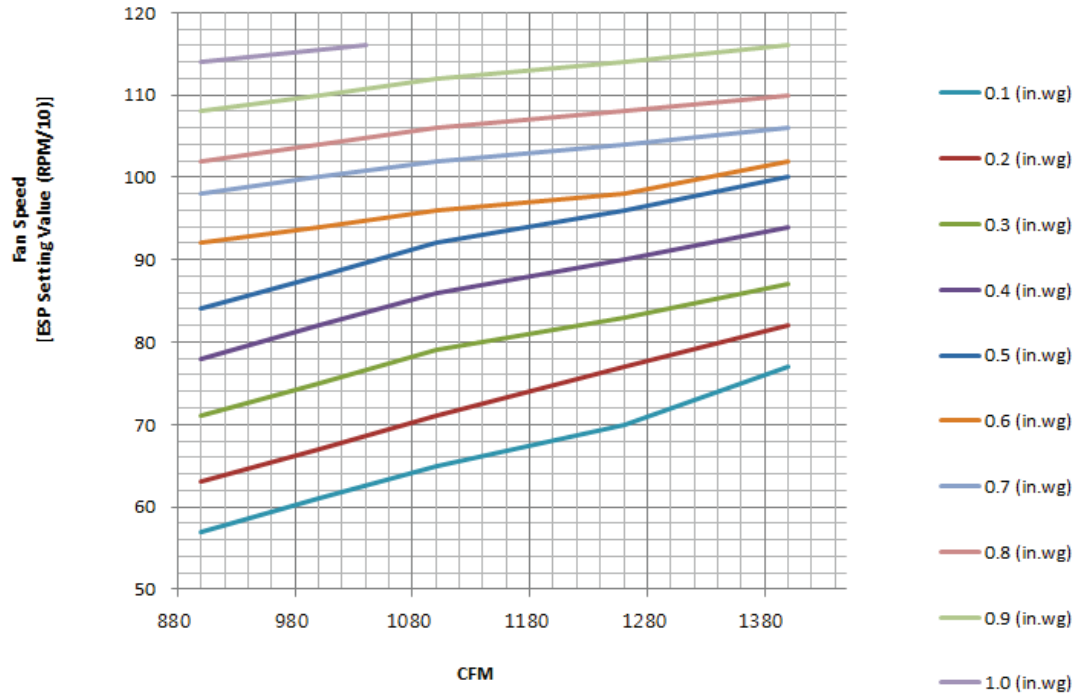


Figure 221: ESP Setting Values – NK Chassis, LVN360HV4.



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FOUR-WAY VAHU INDOOR UNITS

External Static Pressure

Table 97: Multi F Vertical-Horizontal Air Handling Unit External Static Pressure Setting Values Table.

Static Pressure (in. wg)			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Airflow Rate / CFM		Setting Value at (in. wg)[1]									
LVN180HV4 18,000	High	640	63	67	75	81	88	91	95	—	—	—
	Mid	580	57	63	69	77	84	89	93	—	—	—
	Low	480	51	59	65	73	80	87	91	—	—	—
LVN240HV4 24,000	High	710	67	71	79	85	92	94	97	—	—	—
	Mid	640	63	67	75	81	88	91	95	—	—	—
	Low	480	51	59	65	73	80	87	91	—	—	—
LVN360HV4 36,000	High	1,100	65	71	79	86	92	96	102	106	112	—
	Mid	1,000	61	67	75	82	88	94	100	104	110	116
	Low	900	57	63	71	78	84	92	98	102	108	114

[1]Unless otherwise noted, vertical-horizontal air handing units are UL listed up to 0.5 in. wg total static pressure, including coil, case, duct work pressure drop, air filter, and largest kW size heater. Internal static pressure includes coil and case only.

[2]Airflow rate (CFM) decreases by 3% per 0.1 in. wg.

[3]Factory default setting is 0.3 in wg

[4]Factory default setting is high static pressure

Note:

- *If the ESP is set incorrectly, the air conditioning will malfunction.*
- *To get the desired air flow and external static pressure combination, use the setting value from the table. Using a setting value other than the values listed in the table will not provide the desired combination.*

Table 98: Air Filter Static Pressure Drop Factors.

Capacity (kBtu/h [tons])	Flow Rate (CFM)	Static Pressure Drop (in wg)
18 (1.5)	High (640)	-0.04
	Middle(580)	-0.04
	Low (480)	-0.04
24 (2.0)	High (710)	-0.04
	Middle(640)	-0.04
	Low (480)	-0.04
36 (3.0)	High (1100)	-0.08
	Middle(1000)	-0.08
	Low (900)	-0.08

Table 99: Minimum Airflow (CFM) by Heater Capacity

Capacity (kBtu/h [tons])	Heater Capacity kW			
	3, 5	8, 10	15	20
18 (1.5)	480	480	Not Available	Not Available
24 (2.0)	480	480	Not Available	Not Available
36 (3.0)	900	900	900	900

⚠ WARNING

⃠ Do not operate with less than the minimum airflow. If an airflow is used below the minimum, there is a risk of fire, which will lead to physical injury or death

Note:

⃠ Do not operate with less than the minimum airflow. If an airflow is used below the minimum, there is a risk of damage to the product.

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FOUR-WAY VAHU INDOOR UNITS

External Static Pressure

Table 100: Electric Heater Static Pressure Drop Factors.

Heater Capacity	Static Pressure Drop (in. wg)
0	0
3, 5	-0.01
8, 10	-0.02
15	-0.03
20	-0.04

If the electric heater optional accessory is installed, adjust ESP value according to heater size
For every increase in static pressure by 0.01 in wg, the ESP value must be increased by 1
If the ESP setting value is inappropriate, the provided safety device will turn the heater off according to the airflow

Table 101: Down Flow (optional) Static Pressure Drop Factors.

Capacity (kBtu/h [tons])	Flow Rate (CFM)	Static Pressure Drop (in wg)
18 (1.5)	High (640)	-0.04
	Middle(580)	-0.04
	Low (480)	-0.04
24 (2.0)	High (710)	-0.04
	Middle(640)	-0.04
	Low (480)	-0.04
36 (3.0)	High (1100)	-0.09
	Middle(1000)	-0.09
	Low (900)	-0.09

If the optional down flow kit is installed, adjust ESP value as necessary
For every increase in static pressure by 0.01 in wg, the ESP value must be increased by 1

Table 102: Down Flow Air Filter Static Pressure Drop Factors

Capacity (kBtu/h [tons])	Flow Rate (CFM)	Static Pressure Drop (in wg)
18 (1.5)	High (640)	-0.04
	Middle(580)	-0.04
	Low (480)	-0.04
24 (2.0)	High (710)	-0.04
	Middle(640)	-0.04
	Low (480)	-0.04
36 (3.0)	High (1100)	-0.06
	Middle(1000)	-0.06
	Low (900)	-0.06

If the air filter is installed, adjust ESP value as necessary
For every increase in static pressure by 0.01 in wg, the ESP value must be increased by 1

Table 103: Down Flow Internal Electric Heater Static Pressure Drop.

Heater Capacity (kW)	Static Pressure Drop (in. wg)
0	0
3, 5	-0.01
8, 10	-0.01
15	-0.01
20	-0.01

If the electric heater optional accessory is installed, adjust ESP value according to heater size
For every increase in static pressure by 0.01 in wg, the ESP value must be increased by 1
If the ESP setting value is inappropriate, the provided safety device will turn the heater off according to the airflow

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FOUR-WAY VAHU INDOOR UNITS

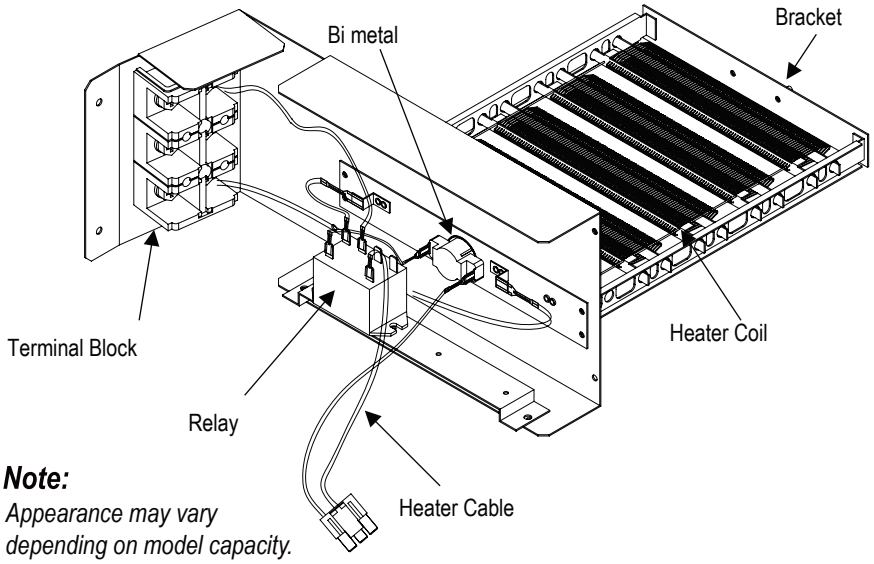
Heater Capacities

Table 104: Optional Electric Heater Capacities.

Heater Capacity (kW)	Static Pressure Drop (in. wg)
3	ANEH033B1
5	ANEH053B1
8	ANEH083B2
10	ANEH103B2
15	ANEH153B2
20	ANEH203B2

Figure 222: Typical Vertical Air Handling Unit Optional Electric Heater Accessory.

Example: 5kW Capacity Heater



Note:
Appearance may vary depending on model capacity.

Table 105: Electric Heater Compatibility

VAHU Model Number and Capacity (MBh)	Model Number / Heater Capacity kW					
	ANEH033B1 (3kW)	ANEH053B1 (5kW)	ANEH083B2 (8kW)	ANEH103B2 (10kW)	ANEH153B2 (15kW)	ANEH203B2 (20kW)
LVN180HV4 (18)	√	√	√	√	X	X
LVN240HV4 (24)	√	√	√	√	X	X
LVN360HV4 (36)	√	√	√	√	√	√

√ = Compatible X = Not Compatible

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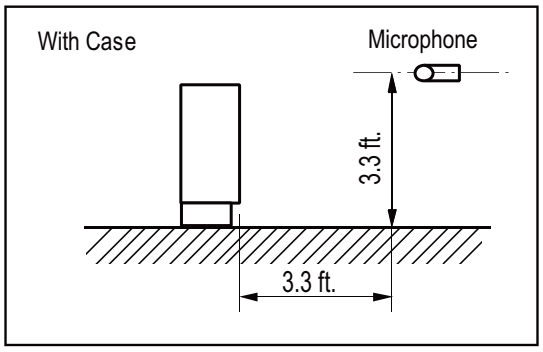
FOUR-WAY VAHU INDOOR UNITS

Acoustic Data

Figure 223: Sound Pressure Level Measurement Location.



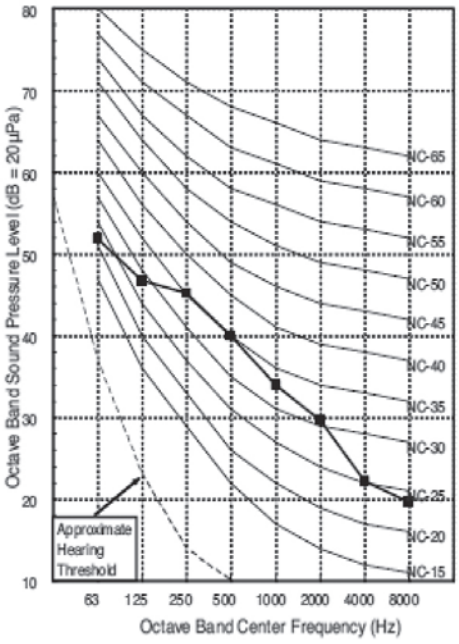
- Measurement taken 3.3' away from the unit.
- Sound pressure levels are measured in dB(A).
- Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.
- Operating Conditions:
  Power source: 220V/60 Hz.
- Sound level will vary depending on a range of factors including the construction (acoustic absorption coefficient) of a particular room in which the unit was installed.

Table 106: Vertical Air Handling Unit Sound Pressure Levels (dB[A]).

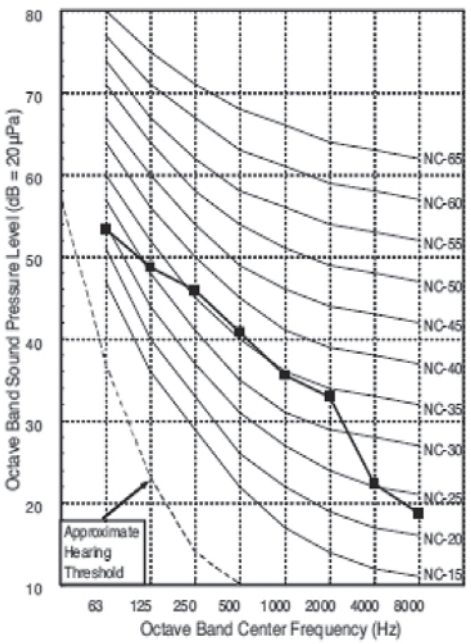
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LVN180HV4	42	42	41
LVN240HV4	43	42	41
LVN360HV4	45	44	43

Figure 224: Sound Pressure Level Diagrams.

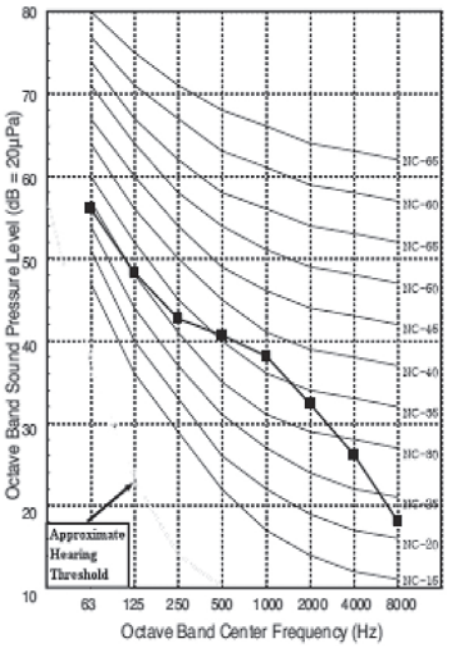
LVN180HV4



LVN240HV4



LVN360HV4



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FOUR-WAY VAHU INDOOR UNITS

Acoustic Data

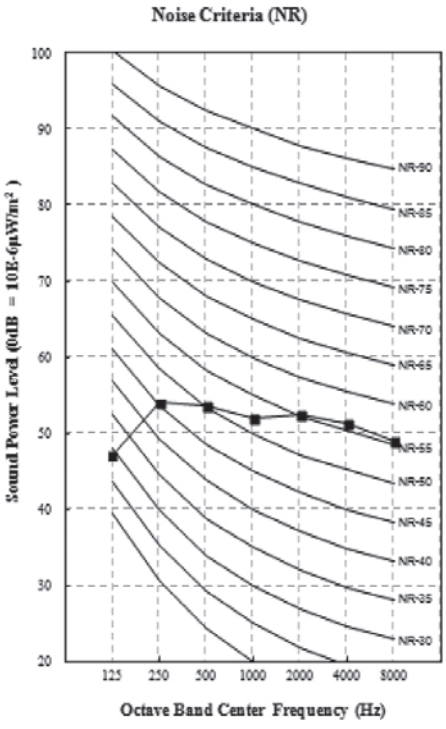
Table 107: Vertical Air Handling Unit Sound Power Levels (dB[A]).

Model No.	Sound Power Levels (dB[A])
	High Fan Speed
LVN180HV4	59
LVN240HV4	60
LVN360HV4	61

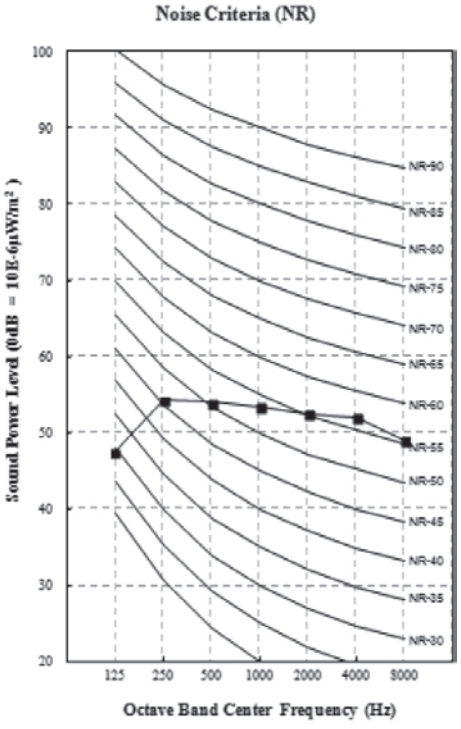
- Data is valid under diffuse field conditions.
- Data is valid under nominal operating conditions.
- Sound power level is measured using rated conditions, and tested in a reverberation room per ISO 3741 standards.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Reference acoustic intensity: 0dB = 10E-6μW/m2

Figure 225: Sound Power Level Diagrams.

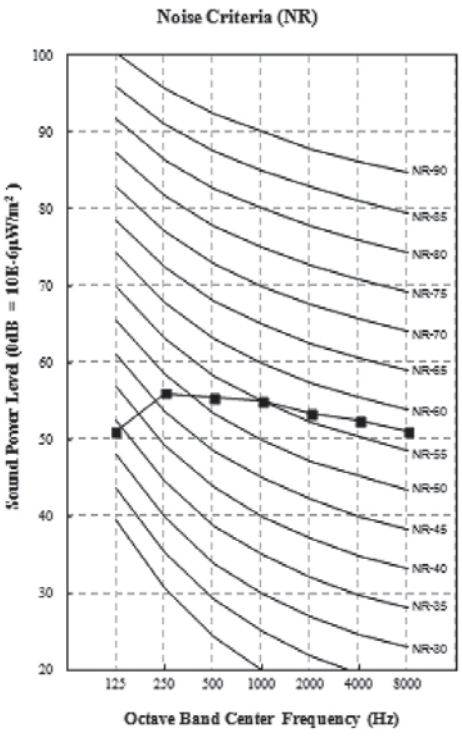
LVN180HV4



LVN240HV4



LVN360HV4



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FOUR-WAY VAHU INDOOR UNITS

Refrigerant Flow Diagram

Figure 226: Four-way Vertical-Horizontal Air Handling Indoor Unit Refrigerant Flow Diagram.

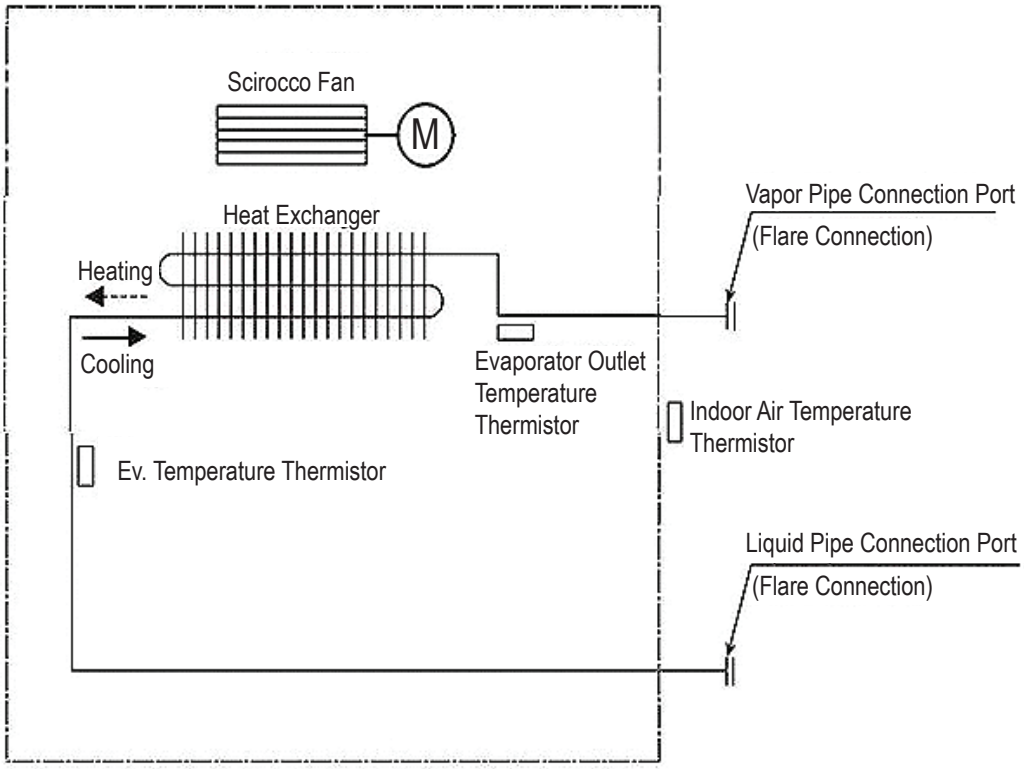

Table 108: Four-way Vertical-Horizontal Air Handling Indoor Unit Refrigerant Pipe Sizes and Connection Sizes.

Model No.	Piping Size		Connection Port Size	
	Liquid (inch)	Vapor (inch)	Liquid (inch)	Vapor (inch)
LVN180HV4	1/4	1/2	3/8	5/8
LVN240HV4	1/4	1/2	3/8	5/8
LVN360HV4	3/8	5/8	3/8	5/8

Table 109: Four-way Vertical-Horizontal Air-Handling 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

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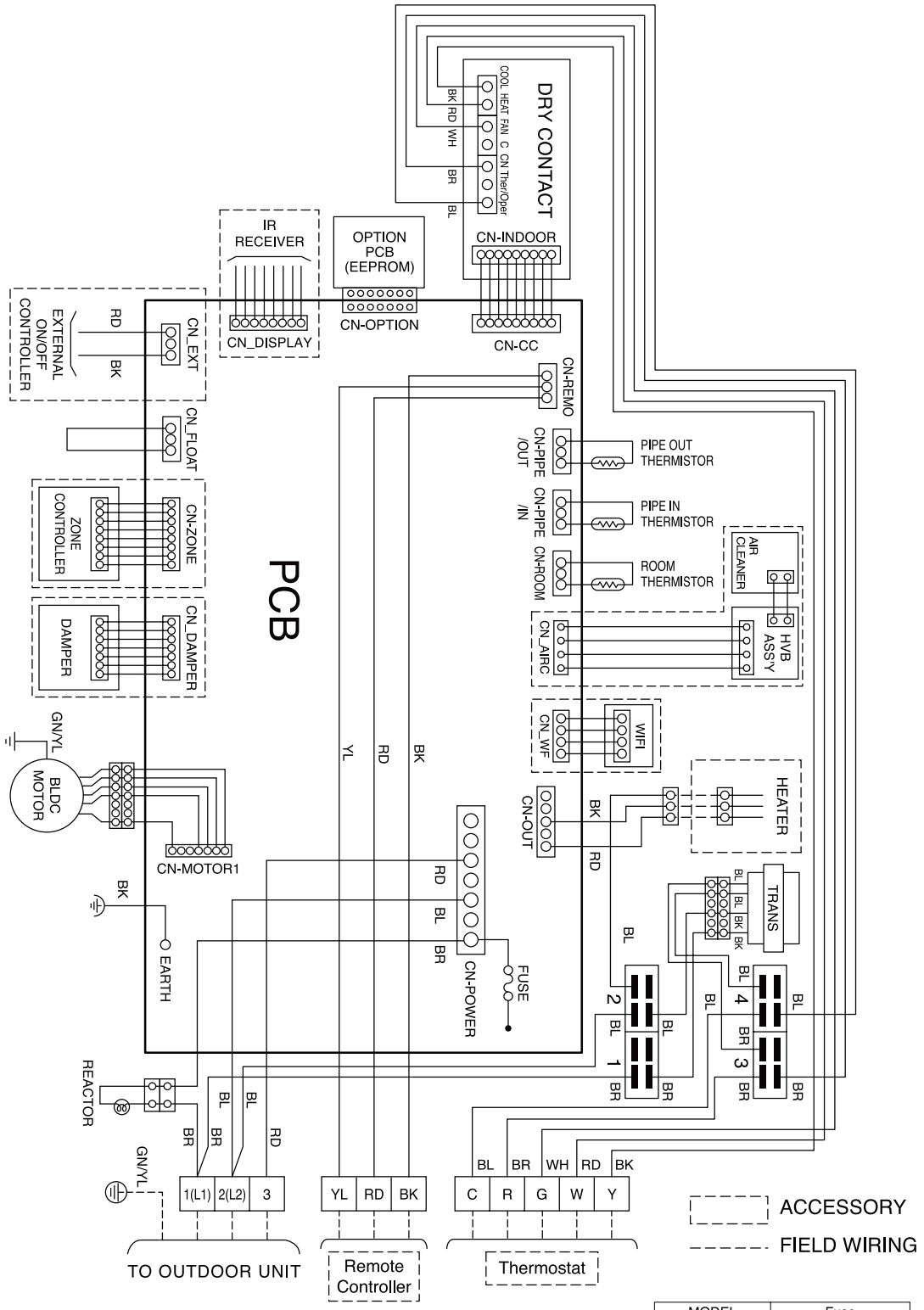
FOUR-WAY VAHU INDOOR UNITS

Wiring Diagram

Figure 227: Four-way Vertical-Horizontal Air-Handling Indoor Unit Wiring Diagram.



MODEL	Fuse
180 / 240	250 V / T 3.15 A
360	250 V / T 5 A

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FOUR-WAY VAHU INDOOR UNITS

Wiring Diagram

Table 110: Wiring Diagram Connections.

Connection Name	Location	Function
CN-POWER	AC power supply	AC Power line
CN-MOTOR1	Fan motor output	Motor output of BLDC
CN_OUT	Heater	Connection for heater
CN-D/PUMP	Drain pump output	AC output for drain pump
CN-FLOAT	Float switch input	Float switch sensing
CN-ZONE	Zone controller	Zone controller connection
CN-OPTION	Optional PCB EPROM	Option PCB connection
CN-EXT	External ON / OFF controller	External ON / OFF controller connection
CN-DISPLAY	Display	Display of indoor status
CN-CC	Dry contact	Dry Contact connection
CN-PIPE/OUT (RD)	Discharge pipe sensor	Pipe out thermistor
CN-LEAK (VI)	Refrigerant leak detector	Refrigerant leak detector connection
CN-PIPE/IN (WH)	Suction pipe sensor	Pipe in thermistor
CN-REMO (GN)	Wired remote controller	Wired remote control connection
CN-ROOM (YL)	Room sensor	Room air thermistor
CN-DAMPER	Damper Controller	Damper connection
CN-AIRC	Air Cleaner	Air Cleaner connection
CN-WF	Wifi	Wifi Module connection

Table 111: DIP Switch Settings.

Dip Switch Settings		OFF	ON	Description
SW1	Communication	Off (default)	—	—
SW2	CYCLE	Off (default)	—	—
SW3	GROUP	Master	Slave	Group control setting using wired remote controller.
SW4	DRY CONTACT	Variable	Auto	Dry contact mode setting. 1. Variable: Auto/manual mode can be chosen using the wide wired remote controller or wireless remote controller (factory setting is the manual mode). 2. Auto: For dry contact, it is always auto mode.
SW5	EXTRA1	Off	On	• ON: Fan operates continuously. • OFF: Default (Fan does not operate continuously).
SW6	HEATER	Off	On	• ON: Automatic heater operation. • OFF: Default (manual heater operation).
SW7	Off			
SW8	Off			

To operate the indoor unit without Internal Electric Heater , Dip switch 1, 2, 6, 8 must be set OFF .

To operate the indoor unit with Internal Electric heater , Dip switch 6 must be set ON.

- SW6 ON: Automatic Heater operation: Heater operates automatically.
- SW6 OFF: Manual Heater operation: Owner 's involvement is required for on/off operation.

If you operate the indoor unit with Internal Electric heater with Dip switch 5, note the following:

- SW5 ON: Fan operates continuously. During defrosting or oil return operation, uninterrupted heating can be attained, as a result of continuous heater and fan operation.
- SW5 OFF: Fan discontinuous operation. There would be a reduction in heating capacity while defrosting or oil return operation.

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FOUR-WAY VAHU INDOOR UNITS

Factory Supplied Parts and Materials

MULTI F
MULTI F MAX

Factory Supplied Materials

- Owner's Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Torque wrenches
- Hexagonal wrench
- Gas-leak detector
- Thermometer

⚠WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit's components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

Selecting the Best Location

Do's

- Place the unit where air circulation through the ducts will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient strength to bear the load of the indoor unit.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit in a location that is level, and where it can be easily connected to the outdoor unit / branch distribution unit.

⃠ Don'ts

- ⃠ *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- ⃠ *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- ⃠ *Do not install the unit near high-frequency generators.*
- ⃠ *Do not install the unit near a doorway.*

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

Note:

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

Installing in an Area Exposed to Unconditioned Air

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

- Verify that carpet is or will be installed (carpet will 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.

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FOUR-WAY VAHU INDOOR UNITS

Installation and Best Layout Practices

Figure 228:Clearance Requirements.

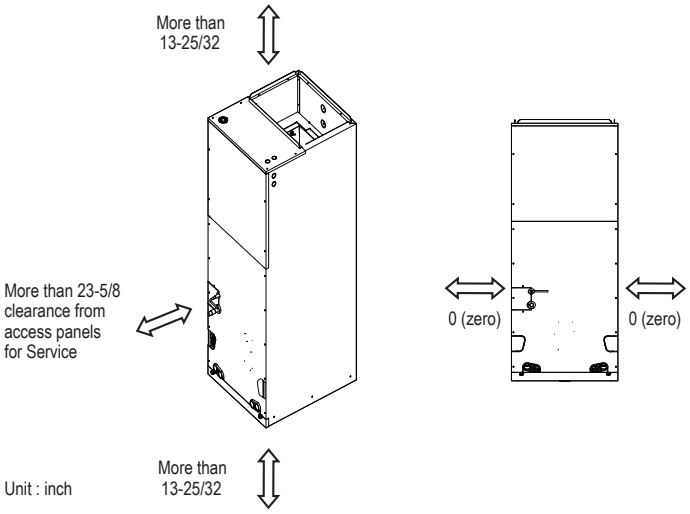


Figure 229:General and Duct Connection Dimensions.

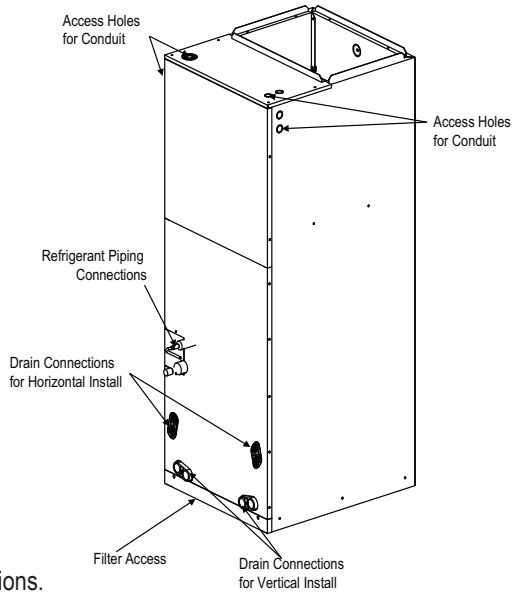
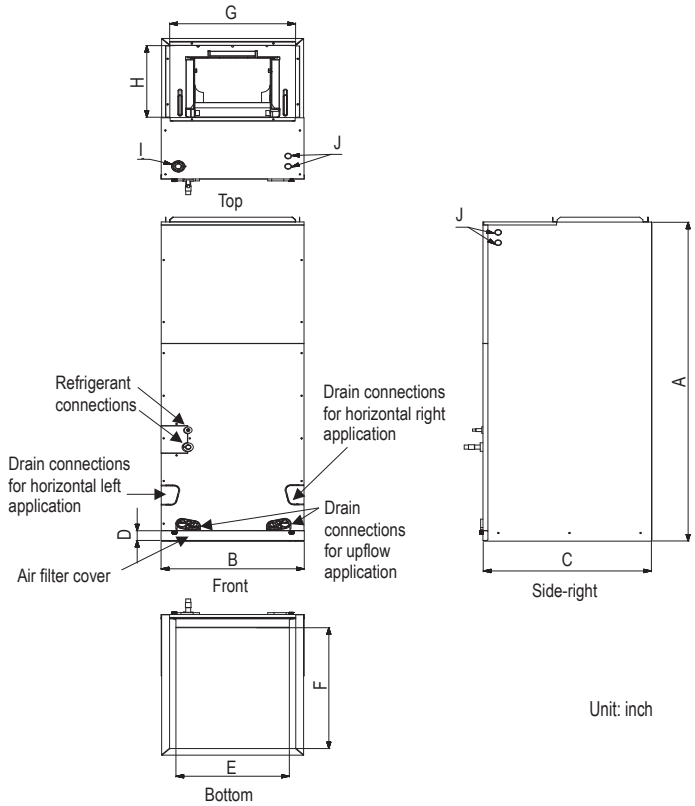


Figure 230:Location of Access Holes and Piping Connections.



ODU	VAHU Capacity (kBtu/h)	Dimensions								Wiring Knock out		Refrigerant Pipe size		Refrigerant Pipe Connections	
		A	B	C	D	E	F	G	H	I	J				
		Height	Width	Depth						Power	Comm-unication	Liquid	Gas	Liquid	Gas
Multi Zone	18 24	48-5/8	18	21-3/8	1-9/16	17-1/2	20	17	12-1/8	1-11/16	7/8	1/4	1/2	3/8	5/8
	36	55-1/8	25	21-3/8	1-9/16	24-1/2	20	24	12-1/8	1-11/16	7/8	3/8	5/8	3/8	5/8

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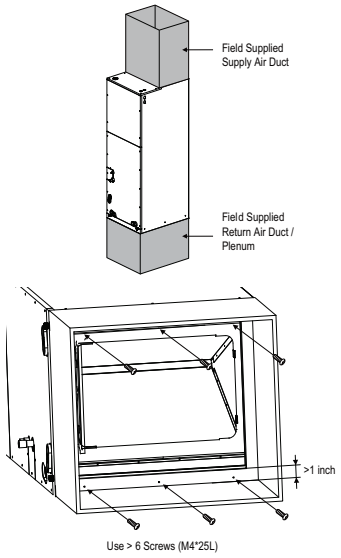
Note:

Vertical-Horizontal Air Handling Units can be installed in a choice of vertical upflow, vertical downflow (with optional downflow kit), or horizontal (left or right side) configurations.

Vertical (Upflow) Installation

- Unit must be positioned properly for plenum / duct installation.
- To maintain proper air flow, minimum height clearance is 14 inches.
- Plenum must be strong and secure enough to support the installation of adapter collars to accommodate duct work.
- Air handler platform must be sturdy enough to support the frame, plus any accessories (e.g., filter box).
- To prevent air leaks, seal all duct work according to local codes, but make sure that filter access is still unobstructed.
- Vibration isolators (field supplied) must be installed between the unit frame and the platform. If necessary, provide the installing contractor with an illustration of where the vibration isolator must be added and how it must be positioned.

Figure 231:Vertical Installation / Attaching the Bottom Duct.



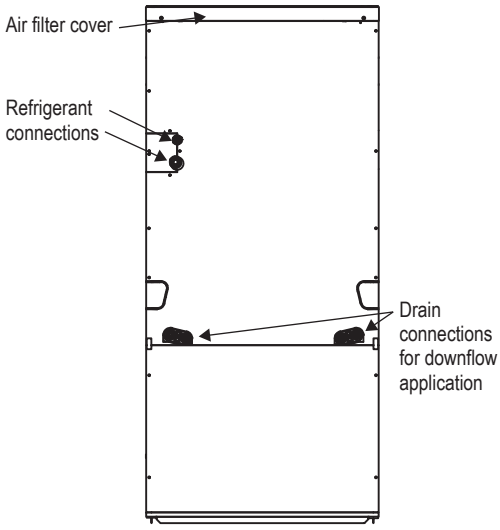
Note:

Do not install the screws on the front and back of the unit; doing so will block filter installation.

Vertical (Downflow) Installation

The Vertical-Horizontal Air Handling Unit can be field-converted to vertical downflow operation. The optional vertical downflow kit is required. Downflow kit PNDFJ0 is required for 18-24MBH NJ chassis units and downflow kit PNDFK0 is required for 36MBH NK chassis units. The coil must be removed and repositioned in the chassis with the brackets of the downflow kit. For installation details, refer to the instructions included with the kit.

Figure 232: Chassis after Downflow Field Conversion.



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FOUR-WAY VAHU INDOOR UNITS

Installation and Best Layout Practices

Horizontal Installation

- Units will be installed in horizontal left or horizontal right configuration. Horizontal left is the factory default configuration. For horizontal right, the unit must be field converted. The horizontal right conversion requires removing the internal drain pan from the left side of the unit and reinstalling on the right side. No conversion kit is required. Refer to the installation manual for details.
- Units must be installed so that the access panels face to the side, not facing up or down.
- Installation must be in accordance with all relevant building codes, which will necessitate the installation of an external condensate pan (position the unit in or above the external condensate pan).
- If the units are going to be suspended, use angled steel support brackets with threaded rods to provide support from the bottom. The brackets / threaded rods must be comparatively bigger / longer than the unit, and each must be centered on the part of the frame it supports.
- If the unit will not be suspended, use angled steel support brackets, but also add vibration isolators (field supplied) to avoid sound transmission. If necessary, provide the installing contractor with an illustration of where the vibration isolator must be added and how it must be positioned.
- Unit must be positioned properly for plenum / duct installation.
- Plenum must be strong and secure enough to support the installation of adapter collars to accommodate duct work.

Note:

To ensure proper drainage for horizontal installations, unit must be installed within ±1/8 inches level of the unit's length and width.

Figure 233: Typical Horizontal Left Installation.

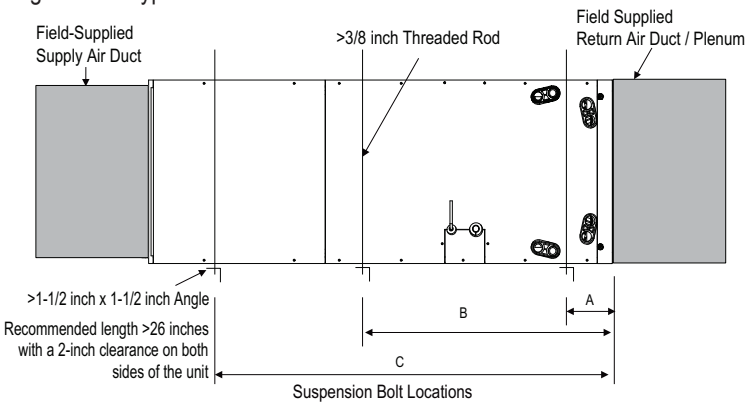

Figure 234: Typical Horizontal Right Installation.

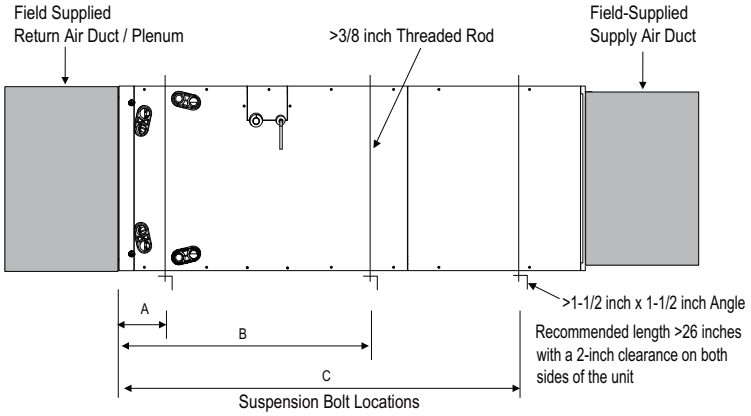

Table 112: Bracket / Bolt Position Dimensions for Horizontal Left and Horizontal Right Installation.

Capacity (Btu/h)	Dimensions (inches)		
	A	B	C
18,000	4	23	41-11/32
24,000	4	23	41-11/32
36,000	4	29	48

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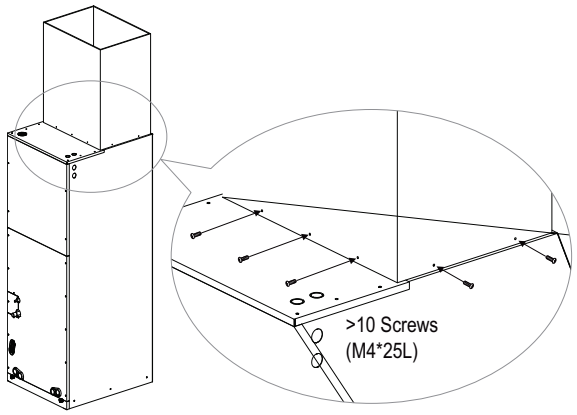
Installing the Ducts

- Use more than ten (10) screws to securely attach the supply ducts to the unit. To prevent air leaks, seal around the duct opening before the duct is secure.
- To prevent vibration transmission, install flexible connectors between ducts and the unit. The flexible connectors must be made of a heat-resistant material at the discharge connection if an electric heater is installed.
- Duct work must be insulated and covered with vapor barrier when routed through unconditioned spaces. Include enough insulation to prevent condensate from forming on the ducts.
- It will be necessary to add internal acoustical insulation lining for a metal duct system if it does not include a 90° elbow and ten (10) feet between the main duct and the first branch.

Figure 235:Securing the Ducts to the Unit.



- Fibrous glass ducts could be used as a substitute if built and installed in accordance with the most recent edition of the Sheet Metal and Air-Conditioning Contractors' National Associate (SMACNA) standard.
- Also, fibrous duct work and acoustical insulation lining must also follow National Fire Protection Standard 90A or B as tested by UL Standard 181 for Class 1 air ducts.

Installing the Drain System

General Specifications

- To prevent property damage, optimize drain system performance by installing both a primary and secondary drain line, and properly size the condensate traps.
- The primary and secondary drain line must be trapped to allow proper drainage of condensate water. If the secondary drain line is not used, it must be capped.
- ⃠ Do not block the filter access panel when installing the condensate drain piping. Prime the primary and secondary condensate traps after running both to the drain pan.
- If the unit is installed above an inhabited space, add a field-supplied external condensate pan that runs underneath the entire frame (to prevent damage from overflow). The additional external condensate line must run from the unit to the external condensate pan.
- Drain all generated condensate from the external condensate pan to an appropriate area. Install a trap in the condensate lines as near to the indoor unit coil as possible.
- For horizontal right operation, the drain pan must be removed from the interior left side of the unit and reinstalled on the right side.
- All condensate must be drained from the external condensate pan to some noticeable area.
- To prevent overflow, the outlet of each trap must be positioned below its connection to the condensate pan.
- All traps must be primed, insulated, and leak tested if located above an inhabited space.
- Use a 3/4-inch PVC male pipe thread fitting at the condensate pan connection. Tighten gently.
- Point the drain hose down for easier flow.
- ⃠ Do not just use the pipe joint or PVC / CPVC piping on the indoor unit drain line connections. Use only Teflon tape.
- Design the drain system to plan for winter operation (condensate line will freeze up if condensate does not properly drain away).

Figure 236: Typical Vertical Up/Down Installation Drain System.

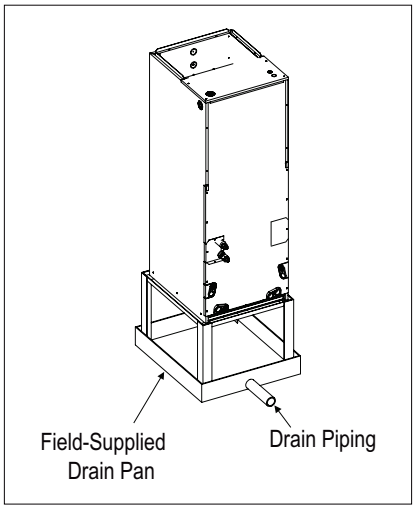
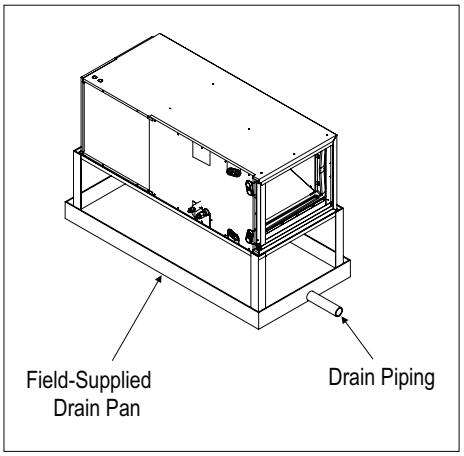


Figure 237: Typical Horizontal Left/Right Installation Drain System.



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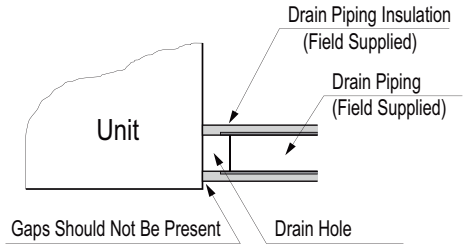
Drain Piping Specifications

- Drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must not be straight up and down.
- ⃠ Do not damage the drain port on the indoor unit when connecting the field-supplied drain piping.

Figure 238:Close up of Drain Piping Connection.



Field-Installed U-Trap Specifications

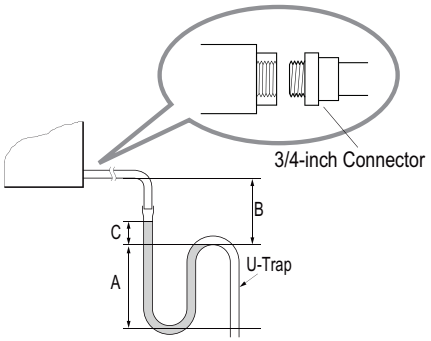
Note:

To prevent leaks cause by a block in the intake air filter, install a U-Trap.

A ≥ 2-9/16 inches
B ≥ 2C
C ≥ 2 x SP
SP = External Pressure in. WG

Example:
External Pressure= 0.4 in WG
A ≥ 2-9/16 inches
B ≥ 1-7/12 inches
C ≥ 19/24 inches

Figure 239:Installing the U-Trap.



Insulating the Refrigerant and Drain Piping

⚠WARNING

Ensure all piping is insulated. Exposed piping can cause burns if touched.

Refrigerant Piping Insulation

Field-installed vapor and liquid refrigerant piping lines must be properly and completely covered in insulation (up to the indoor unit piping connections) and must comply with federal, state, and local requirements. Any exposed piping will generate condensate or will cause burns if touched. Insulation for this field-installed refrigerant piping must have a minimum heat resistance of 248°F.

If the indoor unit is installed and is operated at an extended period in a highly humid environment (dew point temperature >73°F), however, condensate will form. To prevent this phenomenon, install adiabatic glass wool insulation with a thickness of 7/16 to 13/16 inches thick. Also, install glass wool insulation on all indoor units that are located in the ceiling plenum.

Drain Piping Insulation

Drain piping insulation must be 7/32 inches thick, minimum.

Figure 240: Vertical Primary and Secondary Drain Layout.

Figure 241: Horizontal Primary and Secondary Drain Layout.

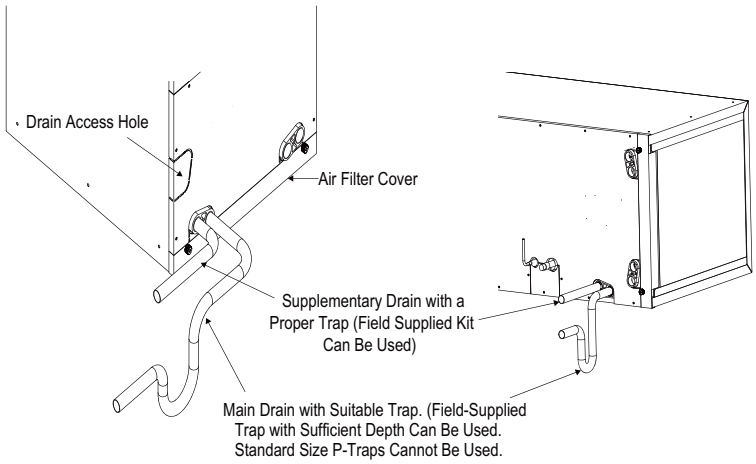


Figure 242:Close Up of Refrigerant Piping Connection Insulation.

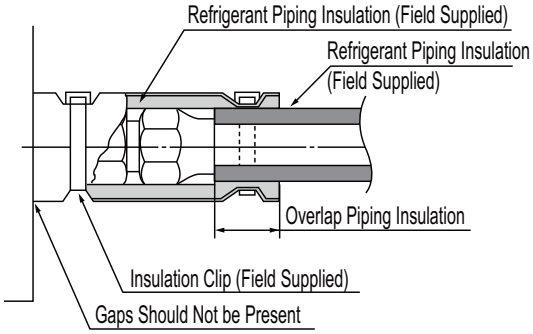
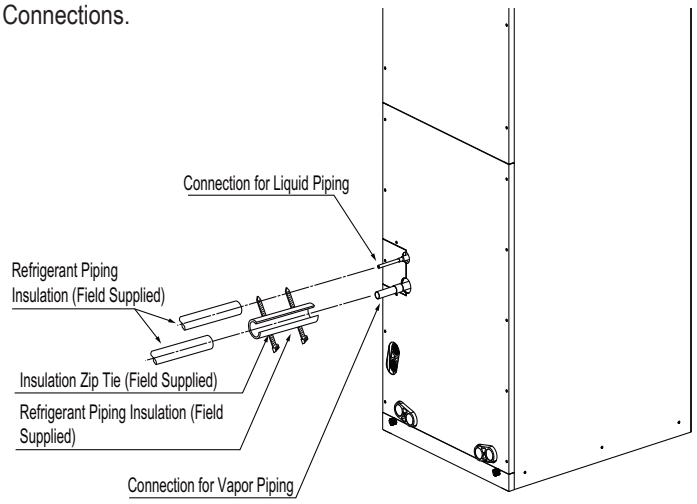


Figure 243: Insulating the Refrigerant Piping and Refrigerant Piping Connections.



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FOUR-WAY VAHU INDOOR UNITS

Installation and Best Layout Practices

Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

• Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

Connecting the Power Wiring and Communications Cable

1. To access the terminal block, first unscrew the top front panel, and then unscrew the cover from the control box.

2. Knockout the access holes for the wiring. Insert the power wiring/ communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) through the conduits, pass the conduits through the designated access holes, and then insert the conduits into the control box. To prevent electromagnetic interference and product malfunction, leave a space between the power wiring and communications cable outside of the indoor unit.

3. Connect the power wiring and communications cables to the appropriate terminals on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

4. Fill in any gaps around the conduit access holes with sealant to prevent foreign particles from entering the indoor unit.

Figure 244:Connecting the Power Wiring and Communications Cable.

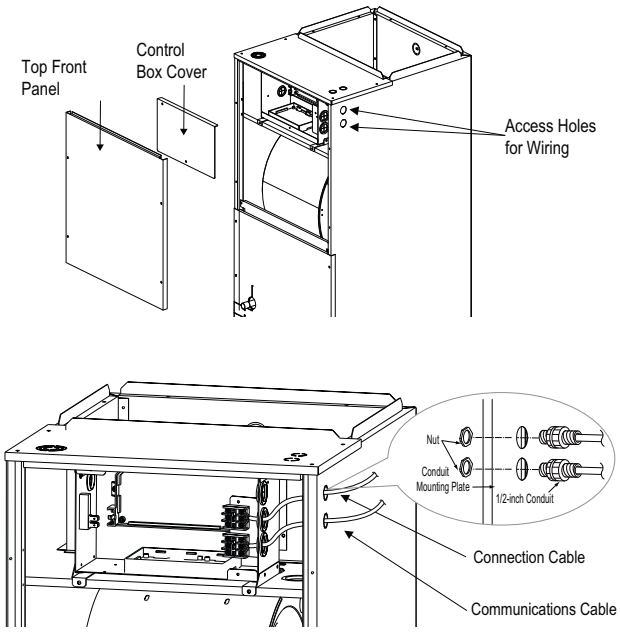
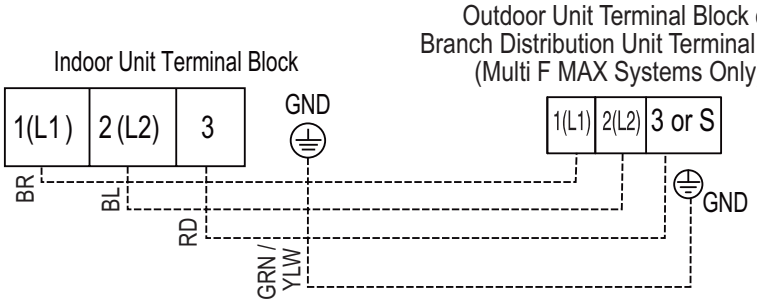


Figure 245:Indoor Unit to Outdoor Unit / Branch Distribution Unit (Multi F MAX systems only) Power Wiring / Communications Cable Connections.



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Controller Options

Vertical-Horizontal Air Handling indoor units can be used with many LG-supplied wired controllers (sold separately). The wireless handheld controller (Model No. PQWRHQ0FDB) is also an optional accessory with use of the wired controller.

Wired Controller Connections

Controllers can connect to the indoor unit in one of two different ways.

1. LG Wired Remote Extension Cable with Molex plug (PZCWRC1; sold separately) that connects to the CN-REMO terminal on the indoor unit PCB.

2. Field-supplied controller cable that connects to the indoor unit terminal block (must be at least UL2547 or UL1007, 22 AWG, two-core, one-shield core, at least FT-6 rated if local electric and building codes require plenum cable usage).

Figure 246:PZCWRC1 LG Wired Remote Extension Cable.

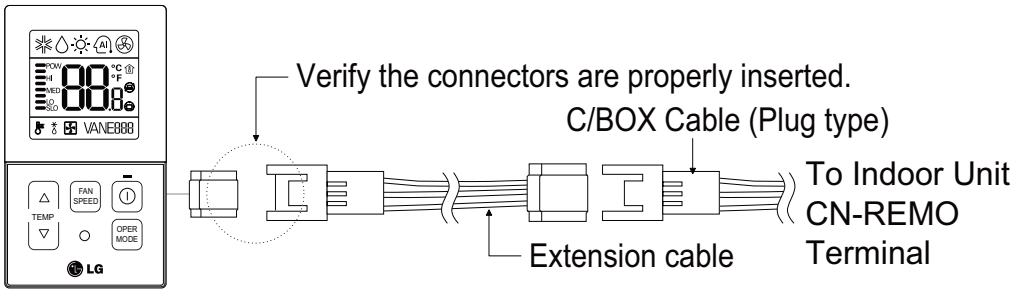
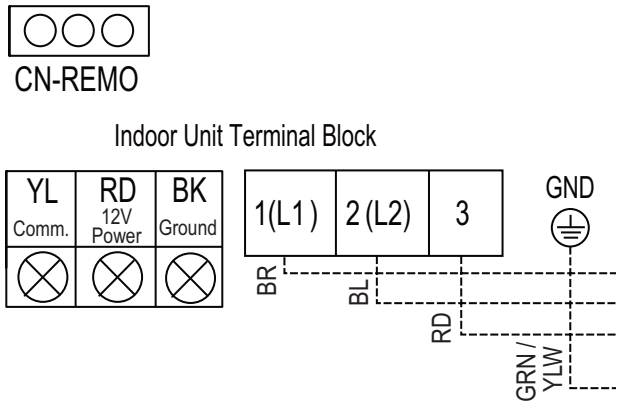


Figure 247:Wired Controller Connection on the Indoor Unit Terminal Block.



Note:

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

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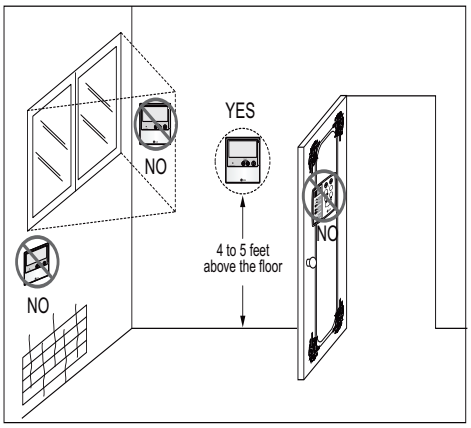
Wired Controller Placement

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

⃠ Do not install the wired controller near or in:

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

Figure 248:Proper Location for the Wired Controller.



Hanging the Wired Controller

1. The controller wiring / cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring / cable on applicable side.
2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.
3. Arrange wiring / cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.
4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 249:Removing the Cable Guide Grooves.

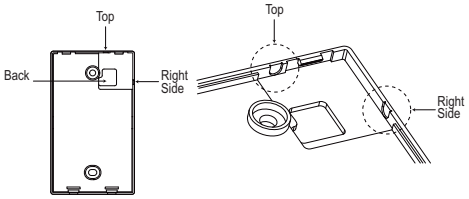


Figure 250:Attaching the Wall Plate.

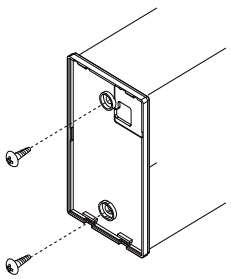
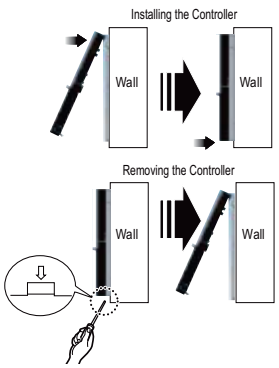


Figure 251:Installing / Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

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MULTI F
MULTI F MAX

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APPLICATION GUIDELINES

“Equipment Selection Procedure” on page 185
“Placement Considerations” on page 192

EQUIPMENT SELECTION PROCEDURE

To choose the multi-zone system that is the most appropriate for the space, as with traditional air-conditioning systems, follow similar protocols outlined in Manual J from the Air Conditioning Contractors of America (ACCA; see www.acca.org).

1. Obtain the design conditions, and calculate the maximum cool and heat loads for the structure.
2. Select the equipment (choosing the appropriate indoor units and outdoor unit):
   - Determine number of zones.
   - Determine total number of indoor units (refer to zone load calculations when choosing indoor units).
   - Determine number of indoor units allocated to each outdoor unit, considering allowable indoor unit connections, both indoor unit and outdoor unit capacities, and system piping capabilities.
3. Determine the corrected capacity for the indoor units and outdoor unit using LATS Multi F software (preferred method) or:
   - System Combination Tables.
   - Capacity Tables (it will be necessary to interpolate).
   - Capacity Coefficient Factors (such as refrigerant line length derates, design condition derates, defrost operation derate [heating mode], altitude derate [if applicable]).
4. Compare corrected capacities to load calculations.
5. Reselect equipment if necessary.

Obtain Design Conditions, Calculate Maximum Cool / Heat Loads

Obtain the winter outdoor / indoor temperature and summer and winter outdoor / indoor temperature design parameters for the location in which the system is installed. Determine if summer or winter design gains, relative humidity, and building features like skylights, orientation, number of occupants, etc., would change the total heat loss / gain and sensible / latent heat gain, and then calculate the maximum cool and heat loads for the space (using Manual J or energy modeling programs).

Select the Equipment

Determine the Number of Zones

Multi F and Multi F with LG RED heat pump systems can cool or heat, but not simultaneously. When designing larger-capacity Multi F heat pump systems or a Multi F MAX system, the designer will be able to combine spaces with similar load profiles located near or adjacent to each other into “thermal zones.” After combining like spaces into zones that will be served by a single (or grouped) indoor unit(s), calculate the peak cooling and heating loads for each zone.

Choosing the Appropriate Indoor Units

Determine the appropriate indoor unit capacity that satisfies the given zone load calculations, and choose how many (and which styles of) indoor units will be required. See the table on the next page for allowable indoor unit to outdoor unit connections, and the maximum number of connectable indoor units on each Multi F and Multi F MAX outdoor unit. When choosing indoor units, also consider the cooling and heating CFM, featured airflow specifications, and static pressure (if applicable) for each indoor unit.

⃠ Avoid oversizing indoor units in an attempt to increase the air exchange rate in the space. Multi F and Multi F MAX systems are designed for minimum airflow over the coil to maximize latent capacity while cooling, maintain a comfortable, consistent discharge air temperature while heating, and minimize fan motor power consumption. In extreme cases, oversizing the indoor units will affect outdoor unit size selection and compromise the outdoor unit’s ability to effectively match the space load(s).

For proper system operation:

1. At least two indoor units must be connected to the outdoor unit.

2. Total connected indoor unit nominal capacity must be a minimum 40% and a maximum of 133% of outdoor unit nominal capacity.

3. To calculate the connected total indoor unit nominal capacity, simply sum up the nominal capacities of all indoor units.
   - For high static duct and vertical-horizontal air handling indoor units, a 1.3 multiplier must first be applied before adding to the sum of other indoor units.
   - When high static duct and / or vertical-horizontal air handling indoor units are the only connected indoor units, the multiplier is 1.2.

Note:

For allocated capacity information, see the combination tables in the "Multi F / Multi F MAX Combination Data Manual" on www.lghvac.com. For performance data, see "Multi F / Multi F MAX Performance Data Manual" on www.lghvac.com. Also refer to the appropriate manuals on www.lghvac.com for combination and capacity data for Multi F with LG RED / Multi F MAX with LG RED units.

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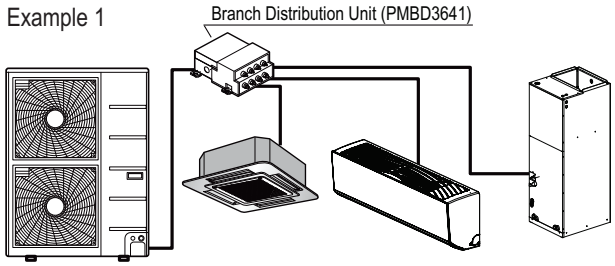
Multiplier Examples

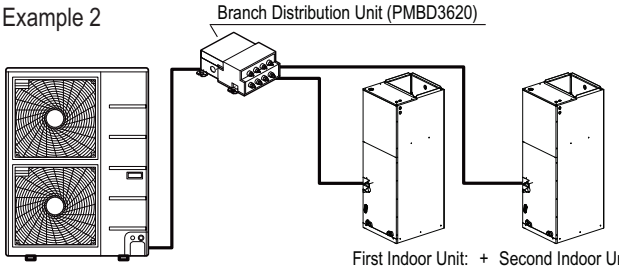
Example 1



Outdoor Unit: LMU540HV | First Indoor Unit: LMCN125HV | + | Second Indoor Unit: LSN090HSV4 | + | Third Indoor Unit: LVN360HV4

Total Capacity Index = 12 + 9 + 36 x 1.3 = 67.8 < 73 Acceptable Combination

Example 2



Outdoor Unit: LMU540HV | First Indoor Unit: LVN240HV4 | + | Second Indoor Unit: LVN240HV4

Total Capacity Index = 24 x 1.2 + 24 x 1.2 = 57.6 < 73 Acceptable Combination

Table 113: Allowable Indoor Unit to Multi F / Multi F MAX with LGRED Outdoor Unit Connections.

Indoor units		Outdoor units						
Model Type	Indoor Unit Nominal Capacity (Btu/h)	LMU18CHV	LMU24CHV	LMU30CHV	LMU36CHV	LMU480HV	LMU540HV	LMU600HV
		Maximum No. of Connectable Indoor Units						
		2	3	4	4	8	8	8
ART COOL Mirror	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	18,000	-	O	O	O	O	O	O
ART COOL Gallery	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
Standard Wall Mounted	7,000	O	O	O	O	O	O	O
	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	15,000	O	O	O	O	O	O	O
	18,000	-	O	O	O	O	O	O
	24,000	-	O	O	O	O	O	O
Ceiling Concealed Duct-Low Static	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	18,000	-	O	O	O	O	O	O
Ceiling Concealed Duct-High Static	24,000	-	-	O	O	O	O	O
	36,000	-	-	-	-	O	O	O
Four-Way Ceiling Cassette	7,000	O	O	O	O	O	O	O
	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	18,000	-	O	O	O	O	O	O
Vertical-Horizontal Air Handler	18,000	-	O	O	O	O	O	O
	24,000	-	-	O	O	O	O	O
	36,000	-	-	-	-	O	O	O

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EQUIPMENT SELECTION PROCEDURE

Table 115: Allowable Indoor Unit to Multi F / Multi F MAX with LGRED Outdoor Unit Connections.

Indoor units		Outdoor units				
Model Type	Indoor Unit Nominal Capacity (Btu/h)	LMU180HHV	LMU240HHV	LMU300HHV	LMU360HHV	LMU420HHV
		Maximum No. of Connectable Indoor Units				
		2	3	4	5	6
ART COOL Mirror	9,000	O	O	O	O	O
	12,000	O	O	O	O	O
	18,000	-	O	O	O	O
ART COOL Gallery	9,000	O	O	O	O	O
	12,000	O	O	O	O	O
Standard Wall Mounted	7,000	O	O	O	O	O
	9,000	O	O	O	O	O
	12,000	O	O	O	O	O
	15,000	O	O	O	O	O
	18,000	-	O	O	O	O
	24,000	-	O	O	O	O
Ceiling Concealed Duct-Low Static	9,000	O	O	O	O	O
	12,000	O	O	O	O	O
	18,000	-	O	O	O	O
Ceiling Concealed Duct-High Static	24,000	-	-	O	O	O
	36,000	-	-	-	-	O
Four-Way Ceiling Cassette	7,000	O	O	O	O	O
	9,000	O	O	O	O	O
	12,000	O	O	O	O	O
	18,000	-	O	O	O	O
Vertical-Horizontal Air Handler	18,000	-	O	O	O	O
	24,000	-	-	O	O	O
	36,000	-	-	-	-	O

Choosing the Appropriate Outdoor Unit

After all indoor units are properly sized to offset the applicable loads in each zone, select the outdoor unit by choosing a size that meets both the load-cooling requirement, and offsets the sum of the heating load. Then, the system's combination ratio must be evaluated and confirmed it is within the allowable range (the combination ratio compares the nominal capacity of all connected indoor units to the nominal capacity of the outdoor unit serving them). The total nominal capacity of all indoor units must be smaller than the total nominal capacity of the outdoor unit. If the combination ratio is more than 100%, the designer is undersizing the outdoor unit relative to the combined nominal capacity of the connected indoor units. In some designs, oversized indoor units will be unavoidable in the case where the smallest size indoor unit available from LG is larger than what is necessary to satisfy the zone load. This scenario will also occur when an indoor unit selection one size down from the selected unit is slightly short of fulfilling the design load requirements, and the designer must choose the next largest size unit. Sometimes it is required to choose a larger capacity outdoor unit if the installation space is big enough. Also, it will be prudent to oversize the outdoor unit to address those times when the weather conditions will exceed the design conditions, to minimize the possibility of ventilation systems that causes the space temperature to drift outside design parameters, or when the indoor unit's entering air temperature falls outside the approved design temperature range.

Table 114: Multi F / Multi F Max Rated Outdoor Unit Capacity.

		Outdoor Units						
		LMU18CHV	LMU24CHV	LMU30CHV	LMU36CHV	LMU480HV	LMU540HV	LMU600HV
Rated Capacity (Btu/h)*	Cooling	17,000	20,000	30,000	32,000	48,000	52,500	60,000
	Heating	22,000	24,000	32,000	36,000	54,000	58,000	64,000
Connectable Indoor Units	Minimum No. of Connectable IDUs	2	2	2	2	2	2	2
	Maximum No. of Connectable IDUs	2	3	4	4	8	8	8
	Maximum Capacity Index	24,000	33,000	40,000	48,000	65,000	73,000	81,000

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Table 116: Multi F / Multi F MAX with LGRED Rated Outdoor Unit Capacity.

		Outdoor Units				
		LMU180HHV	LMU240HHV	LMU300HHV	LMU360HHV	LMU420HHV
Rated Capacity (Btu/h)*	Cooling	18,000	24,000	28,400	36,000	42,000
	Heating	22,000	26,000	28,600	41,000	45,000
Connectable Indoor Units	Minimum No. of Connectable IDUs	2	2	2	2	2
	Maximum No. of Connectable IDUs	2	3	4	5	6
	Maximum Capacity Index	24,000	33,000	40,000	48,000	56,000

Determine the Corrected Capacity

The *corrected* cooling / heating capacity is different from the rated cooling / heating capacity. The corrected capacity includes changes in unit performance after considering design temperatures, available capacity that can be allocated from the outdoor unit, pressure drop due to refrigerant line length, defrost operation in heating mode, and (if applicable) altitude. Depending on the location of the building, additional capacity correction factors will need to be applied.

Using the Outdoor Unit Cooling and Heating Capacity Tables

Rated cooling capacity ratings are obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB). Rated heating capacity ratings are 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).

To evaluate the total outdoor unit capacity at design conditions perform a selection using LATS Multi F software (preferred method) or reference the Performance Data Capacity Tables. All design temperatures are not explicitly shown in the charts, therefore, interpolation will be necessary to calculate the capacity for specific design conditions. Based on the premise that capacity follows a linear curve, the following formula can be applied:

$$(y - y1) / (y2 - y1) = (x - x1) / (x2 - x1)$$

Where

y = Missing Capacity (Capacity at the Design Temperature).[1]
y1 = Capacity at Lower Temperature (Smaller value of the two nearest published TC datapoints).
y2 = Capacity at Higher Temperature (Higher value of the two nearest published TC datapoints).
x = Design Temperature (Temperature not shown in published capacity tables).[2]
x1 = (Smaller value of the two nearest published temperature datapoints).
x2 = (Larger value of the two nearest published temperature datapoints).

[1]Median between two published Total Capacity [TC] Btu/h datapoints in the capacity table.
[2]Median between two nearest published temperature datapoints.

Using the Indoor Unit Cooling and Heating Capacity Tables

The datapoints shown in the indoor unit cooling and heating capacity charts are based on (and convey) an indoor unit operating with maximum possible refrigerant flow from the outdoor unit and before any derates are applied. In other words, the capacities displayed reflect what the indoor unit would produce if it was the only indoor unit that required capacity, and the outdoor unit did not have to allocate any capacity to another indoor unit.

System operation with a combination of indoor units is not conveyed in these charts, however, the information can be used to calculate indoor unit allocated capacity (without using the system combination tables). Simply calculate by using the formula:

$$Qidu(combi) = Qodu(rated) \times \frac{Qidu(rated)}{\Sigma Qidu(rated)}$$

Where

Qidu(combi) = Individual Indoor Unit Combination Capacity.
Qodu(rated) = Outdoor Unit Rated Capacity.
Qidu(rated) = Individual Indoor Unit Rated Capacity.
ΣQidu(rated) = Total Connected Indoor Unit Rated Capacity.

Note:

- The formula can be used to find individual indoor unit capacity for Multi F MAX / Multi F MAX with LGRED systems.
- A more accurate method to determine expected capacity would be to apply the outdoor unit's corrected capacity instead of rated capacity.

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Using the System Combination Tables

Multi F system combination tables illustrate how each indoor unit receives a percentage of total outdoor unit rated capacity. Allocation is based on:

- Combinations of Non-Ducted Indoor Units
- Combinations of Ducted Indoor Units
- Combinations of Mixed Non-Ducted and Ducted Indoor Units

Multi F MAX system combination tables only show the total connected indoor unit capacity, but individual indoor unit capacity can be calculated using the formula:

$$Qidu(combi) = Qodu(rated) \times \frac{Qidu(rated)}{\Sigma Qidu(rated)}$$

Note:

A more accurate method to determine expected capacity would be to apply the outdoor unit's corrected capacity instead of rated capacity.

Capacity Coefficient Factors

Refrigerant Line Length Derates

For air-cooled systems, a capacity correction factor will 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 in the tables below and on the next page.

Table 117: Multi F / Multi F with LGRED Outdoor Unit (Multiple Piping) to Indoor Unit Refrigerant Line Length Derates.

Piping Length (feet)	Cooling Capacity (%)	Heating Capacity (%)
7,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	98.4	99.2
49.2	95.8	97.8
65.6	93.2	96.4
82.0	90.6	95.0
9,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	98.0	99.0
49.2	94.8	97.4
65.6	91.6	95.8
82.0	88.4	94.2
12,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	97.6	98.6
49.2	93.8	96.4
65.6	89.9	94.1
82.0	86.1	91.9
15,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	97.2	98.2
49.2	93.0	95.4
65.6	88.8	92.6
82.0	84.6	89.8
18,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	98.6	99.6
49.2	96.4	99.0
65.6	94.1	98.3
82.0	91.9	97.7
24,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	98.2	99.2
49.2	95.4	98.0
65.6	92.4	96.6
82.0	89.6	95.4

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Table 118: Multi F MAX / Multi F MAX with LGRED Outdoor Unit to Branch Distribution Unit Refrigerant Line Length Derates.

Main Piping Length (feet)	16.4	32.8	49.2	65.6	82.0	98.4	114.8	131.2	147.6	164.0	180.4
Cooling Capacity (%)	100.0	98.8	97.3	95.8	94.3	92.8	91.3	89.8	88.3	86.8	85.3
Heating Capacity (%)	100.0	99.6	99.2	98.7	98.3	97.8	97.4	96.9	96.5	96.0	95.6

Figure 252: Multi F MAX / Multi F MAX with LGRED Outdoor Unit to Branch Distribution Unit Refrigerant Line Length Derate Chart.

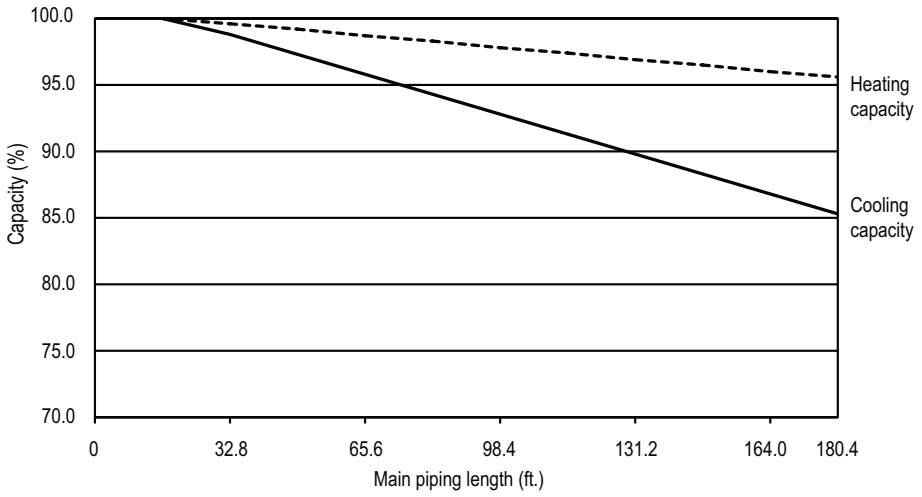

Table 119: Multi F MAX and Multi F MAX with LGRED Branch Distribution Unit to Indoor Unit Refrigerant Line Length Derates.

Piping Length (feet)	Cooling Capacity (%)	Heating Capacity (%)
7,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	98.0	99.5
49.2	96.0	98.9
9,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.5	98.8
49.2	95.0	97.5
12,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.0	98.3
49.2	94.0	96.5
15,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.2	98.2
49.2	93.0	95.4
18,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	98.3	99.5
49.2	96.5	99.0
24,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.8	99.2
49.2	95.5	98.4
36,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.9	98.8
49.2	95.7	97.6

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EQUIPMENT SELECTION PROCEDURE

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.

Defrost Correction Factor for Heating Operation

The outdoor unit heating capacity will need to be adjusted for frost accumulation on air-cooled systems. If design day conditions are below the dewpoint of the surrounding air, frost will not be a problem and no correction factor is needed. In certain weather conditions, however, frost will 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 x C

Where:

A = Integrated Heating Capacity.
B = Value found in the Capacity Table.
C = Correction Factor for Frost Accumulation Factor (from Table 101).

Table 120: 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

[1]At 85% outdoor air relative humidity.

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

Note:

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

Check the Indoor and Outdoor Unit Selection(s)

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

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

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

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

System Sizing Check Formulas

1. Outdoor Unit Rated Capacity.
$Q_{odu(rated)}$ (From capacity tables).

2. Outdoor Unit Capacity at 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.
$Q_{idu\ (combi)} = Q_{odu(rated)} \times Q_{idu(rated)} / Q_{idu(rated\text{-}total)}$

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.

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Selecting the Best Location for the Indoor Units

Note:

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

- Indoor Units (IDUs) must not be placed in an environment where the IDUs will be exposed to harmful volatile organic compounds (VOCs) or in environments where there is improper air make up or supply or inadequate ventilation. If there are concerns about VOCs in the environment where the IDUs are installed, proper air make up or supply and/ or adequate ventilation must be provided. Additionally, in buildings where IDUs will be exposed to VOCs consider a factory-applied epoxy coating to the fan coils for each IDU.
- Within allowable parameters for proper connection to the outdoor unit (or Branch Distribution unit, if a Multi F MAX system).
- So that condensation drainage can be conveniently routed away.
- Include enough space around the indoor unit so that it is accessible for maintenance and service purposes.
- Where electrical noise / electromagnetic waves will not affect indoor unit operation. Maintain proper distances between the indoor units and electric wires, audio and visual appliances, breaker / circuit panels, etc. If the frequency signal of the appliance is unstable, then install the indoor unit a minimum of ten (10) feet away, and run the power and transmission cables through a conduit.
- An area that is level and with enough strength to bear the weight of the indoor unit(s).
- No obstacles to air circulation around the unit; keep proper distances from ceilings, doorways, floor, walls, etc.
- An area where operation sound won't disturb occupants.
- An area that does not expose the indoor unit(s) to heat, water, steam, oil splattering or spray.

Selecting the Best Location for the Branch Distribution (BD) Unit

Note:

Branch Distribution (BD) units are used only with Multi F MAX / Multi F MAX with LGRED systems to distribute the refrigerant from the outdoor unit to up to eight indoor units. Select location indoors that will meet the following conditions:

- Within allowable parameters for proper connection to the Multi F MAX / Multi F MAX with LGRED outdoor unit and indoor unit(s); refrigerant piping and wire lengths must not exceed amounts specified by LG Electronics, U.S.A., Inc.
- Condensate drain piping is not required.
- Ensure there is enough space in the installation area for service purposes; install the refrigerant piping and electrical wiring system in an easily accessible location.
- Level where there is enough strength to bear the weight of the BD unit.
- ⃠ Do not install the BD unit in a location where it would be subjected to strong radiation heat from heat sources.
- ⃠ Avoid an installation environment where the BD unit would be exposed to heat, water, steam, oil splattering or spray.
- Install the unit in a location where any sound it generates will not disturb occupants in the surrounding rooms.
- No obstacles to air circulation around the unit; keep proper distances from ceilings, doorways, floor, walls, etc.
- Where high-frequency electrical noise / electromagnetic waves will not affect operation. Maintain proper distances between the BD unit(s) and electric wires, audio and visual appliances, breaker / circuit panels, etc.

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 will generate, flow, stagnate, or leak. Failure to do so will cause serious bodily injury or death.

⚠WARNING

⃠ Do not install the unit in a location where acidic solution and spray (sulfur) are often used as this will cause serious bodily injury or death. ⃠ Do not use the unit in environments where oil, steam, or sulfuric gas are present as this will cause serious bodily injury or death.

⚠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 will create unsafe conditions.

Note:

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

- A location strong enough to bear the weight of the outdoor unit.
- A location that allows for optimum air flow and is easily accessible for inspection, maintenance, and service.

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Selecting the Best Location for the Outdoor Unit, continued.

- Where piping between the outdoor unit, indoor unit(s), and BD units (Multi F MAX systems only) are within allowable limits.
- Include space for drainage to ensure condensate flows properly out of the unit when it is in heating mode. ⃠ Avoid placing the outdoor unit in a low-lying area where water could accumulate.

⃠

- Where it 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 high-frequency electrical noise / electromagnetic waves will not affect operation.
- Where operating sound from the unit will not disturb inhabitants of surrounding buildings.
- Where the unit will not be exposed to direct, strong winds.

Rooftop Installations

If the outdoor unit is installed on a roof structure, be sure to level the unit. Ensure the roof structure and anchoring method are adequate for the unit location. Consult local codes regarding rooftop mounting.

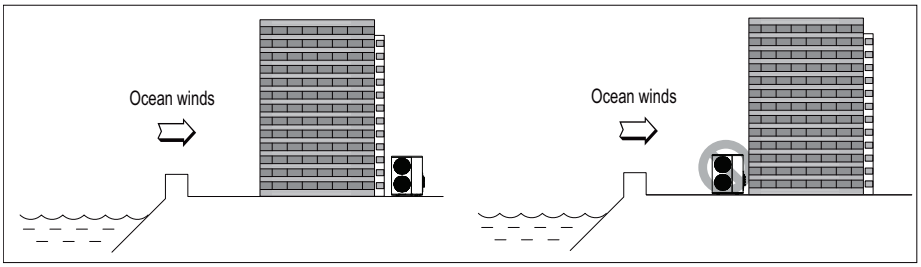
Oceanside Installation Precautions

- Install the outdoor unit on the side of the building opposite from direct ocean winds.
- Select a location with good drainage.
- Periodically clean dust or salt particles off of the heat exchanger with water.

- ⃠ Avoid installing the outdoor unit where it would be directly exposed to ocean winds.

Note:

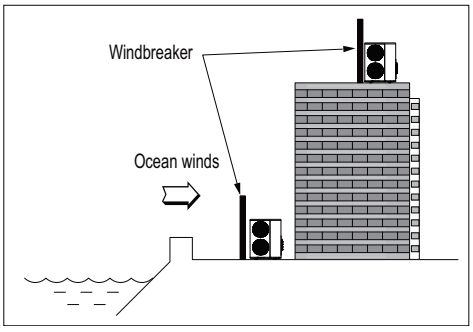
Ocean winds will cause corrosion, particularly on the condenser and evaporator fins, which, in turn could cause product malfunction or inefficient performance.



Note:

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

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



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.

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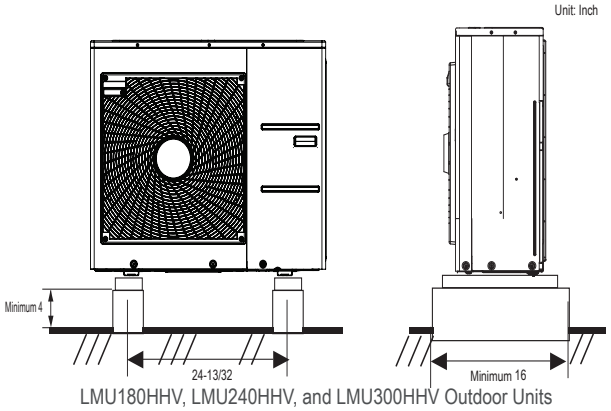
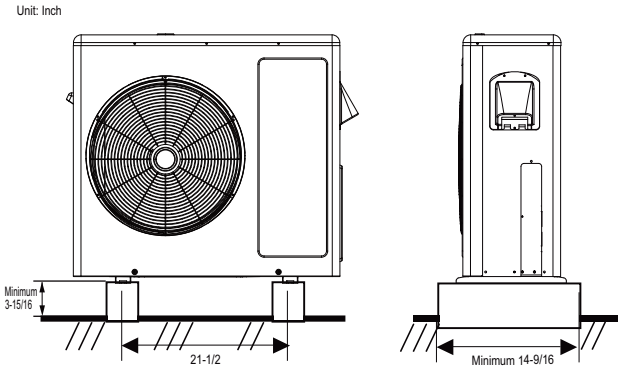
Outdoor Unit Platform Requirements

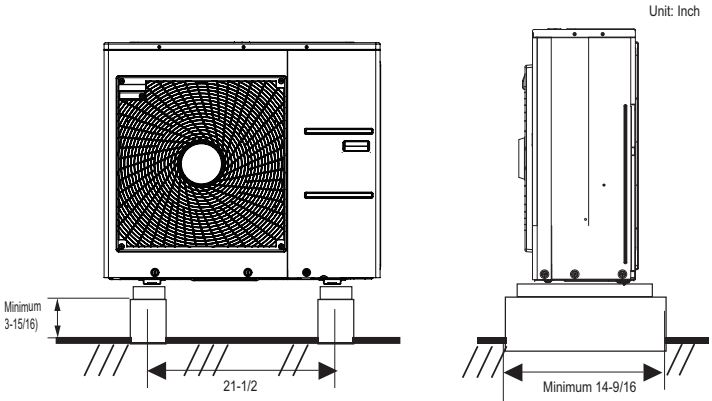
Figure 253: Outdoor Unit Foundation Requirements.



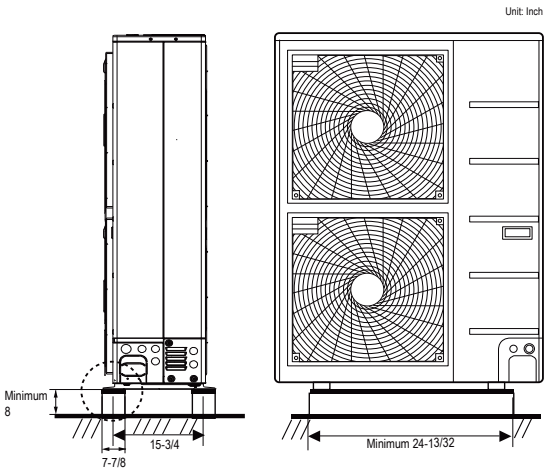
LMU180HHV, LMU240HHV, and LMU300HHV Outdoor Units



LMU18CHV and LMU24CHV Outdoor Units



LMU30CHV and LMU36CHV Outdoor Units



LMU360HHV, LMU420HHV, LMU480HV, LMU540HV, LMU600HV Outdoor Units

Table 121: Outdoor Unit Foundation Specifications.

Outdoor Unit Type	Bolt Type	Concrete Height	Bolt Depth
LMU180HHV, LMU240HHV, LMU300HHV, LMU18CHV, LMU24CHV, LMU30CHV, LMU36CHV	M10-J	Minimum Four (4) Inches	Minimum Three (3) Inches
LMU360HHV, LMU420HHV, LMU480HV, LMU540HV,LMU600HV	M10-J	Minimum Eight (8) Inches	Minimum Three (3) Inches

Bolting the Outdoor Unit to the Platform

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

Concrete Platform Specifications

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

Figure 254: Bolting the Outdoor Unit to the Platform.

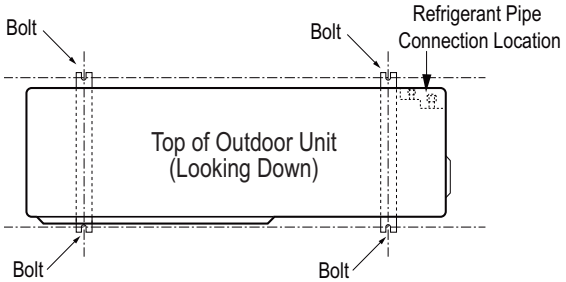
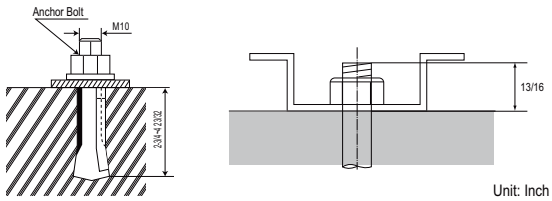


Figure 255: Close up of Bolt Attachment.



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PLACEMENT CONSIDERATIONS

Tie-Downs and Lightening Protection

Tie-Downs

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

Lightening Protection

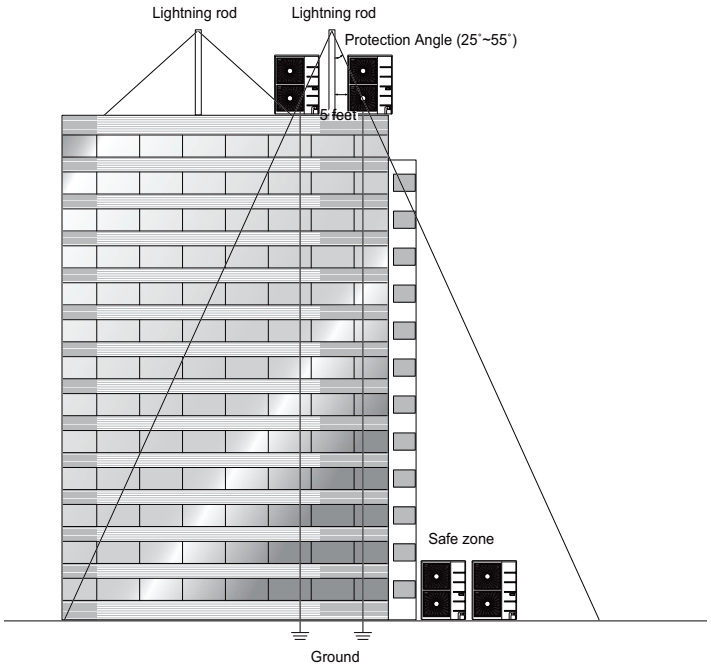
- To protect the outdoor unit from lightning, it must be placed within the specified lightning safety zone.

Table 122: Safety Zone Specifications.

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

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

Figure 256: Lightening Protection Diagram.



Note:

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

Outdoor Unit Service Access and Allowable Clearances

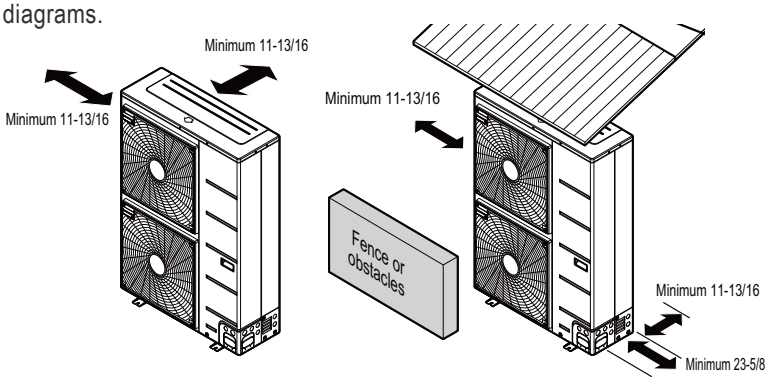
Appropriate airflow through the outdoor unit coil is critical for proper unit operation.

- 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.

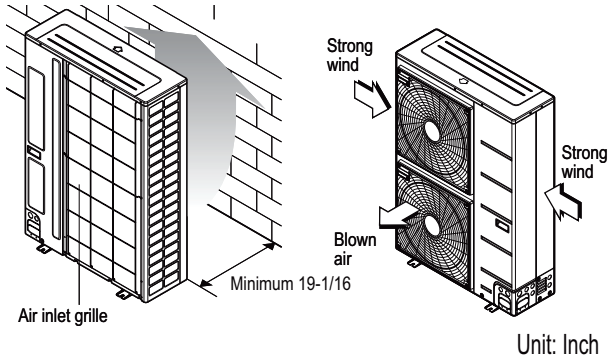
⃠

- 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.)

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.

Unit: Inch

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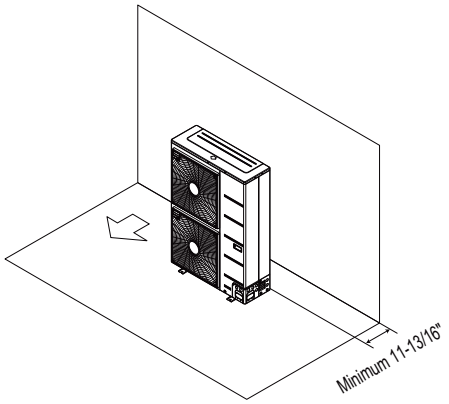
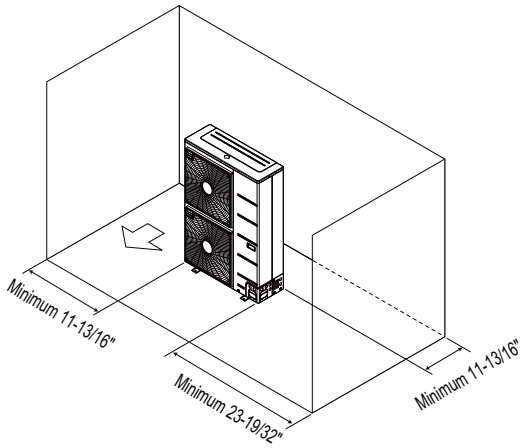
PLACEMENT CONSIDERATIONS

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

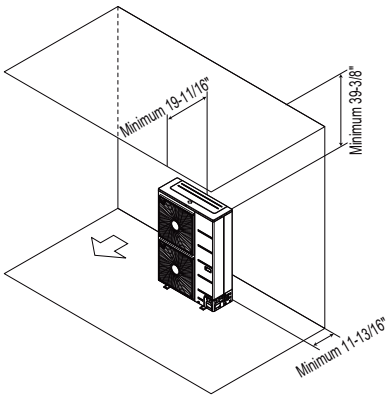
Obstacle on the suction side only.



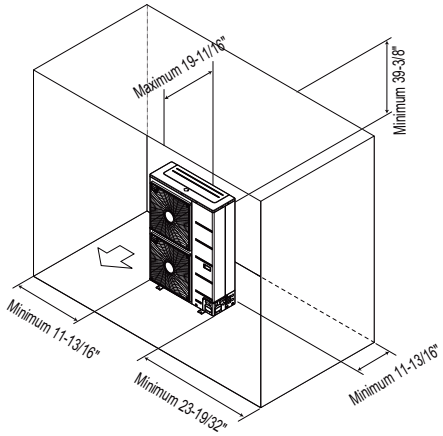
Obstacles on the suction side and on both left and right sides.



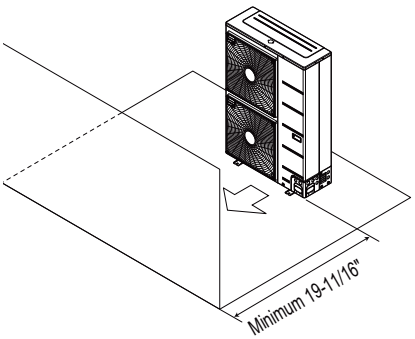
Obstacles above and on the air intake side.



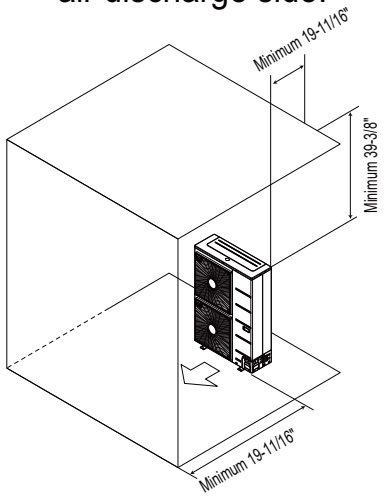
Obstacles above, on the air intake side, and on both left and right sides



Obstacle just on the air discharge side.



Obstacles above and on the air discharge side.



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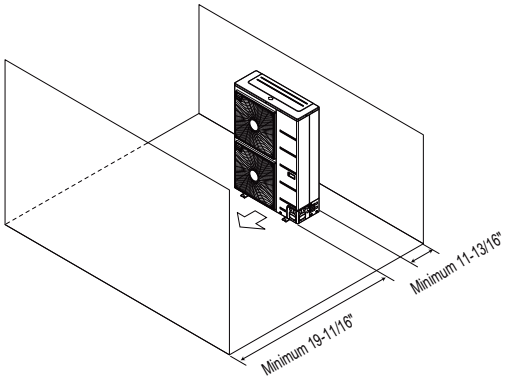
PLACEMENT CONSIDERATIONS

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

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).

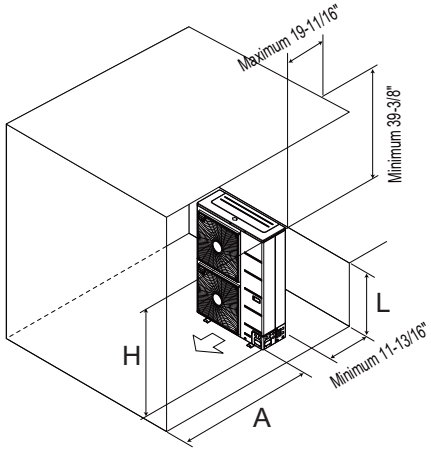
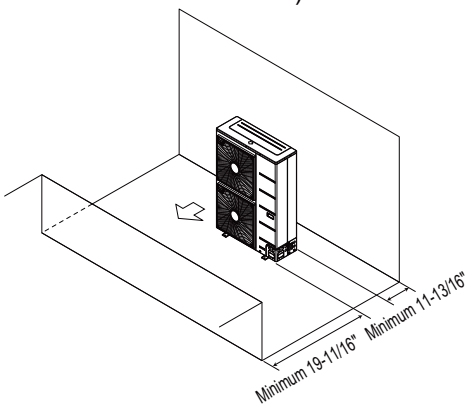


Table 123: Ratio among H, A, and L.

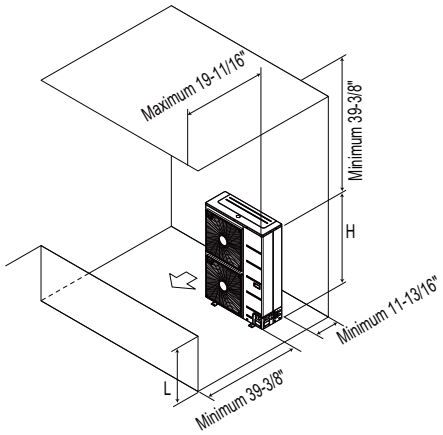
	L	A
L ≤ H	0 < L ≤ 1/2 H	29-1/32 inches
	1/2 H < L	39-3/8 inches
H < L	Set Stand as: L ≤ H	

If a stand is necessary, it must 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).



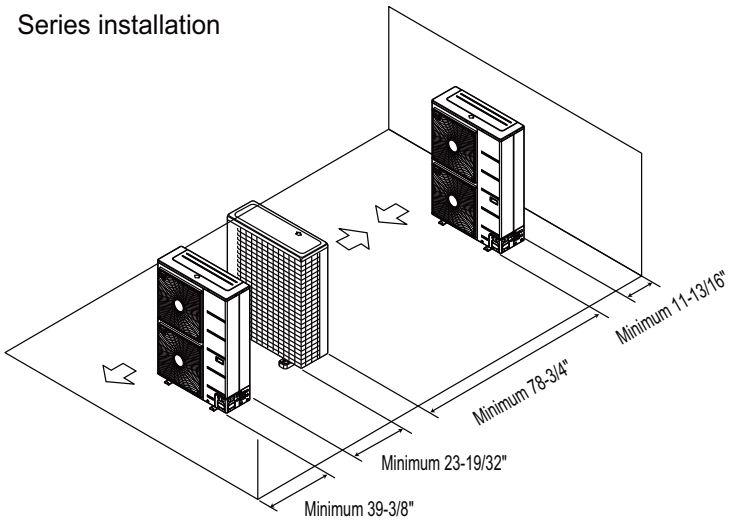
Where there are obstacles above, and on both suction and discharge sides (discharge side obstacle is lower than the outdoor unit).



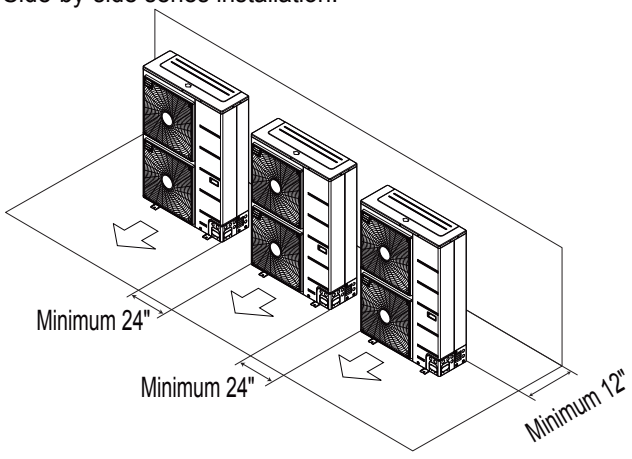
Note:

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

Series installation



Side-by-side series installation.



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REFRIGERANT PIPING DESIGN & LAYOUT BEST PRACTICES

“Design Guideline Summary” on page 199

“Creating a Balanced System” on page 203

“Condensate Drain Piping” on page 204

REFRIGERANT PIPING DESIGN

Design Guideline Summary

The following are examples of manual pipe size calculations. Designers are highly encouraged to use LATS for Multi F systems.

Device Connection Limitations

- The minimum number of connected and operating indoor units to Multi F / Multi F MAX systems is two, taking into consideration of the minimum combination ratio.
- The maximum number of indoor units for each Multi F / Multi F MAX heat pump systems is:

LMU18CHV = 2 LMU24CHV = 3 LMU30CHV = 4 LMU36CHV = 4 LMU480HV = 8 LMU540HV = 8 LMU600HV = 8

LMU180HHV = 2 LMU240HHV = 3 LMU300HHV = 4 LMU360HHV = 5 LMU420HHV = 6

One of the most critical elements of multi-zone systems is the refrigerant piping. The following pages list pipe length limits that must be followed in the design of Multi F and Multi F MAX refrigerant pipe systems:

Using Refrigerant Components

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

Table 124:Equivalent Piping Length for Elbows, Y-branches, and Branch Distribution Units.

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
Y-Branch Kit (ft., Multi F MAX systems only)[1]	1.6				
Branch Distribution Unit (ft., Multi F MAX systems only)	8.2				

[1]Kit contains two Y-branches: one for liquid and one for vapor.

Multi F System

Example: LMU36CHV outdoor unit with four (4) indoor units connected.
ODU: Outdoor Unit.
IDU: Indoor Unit.
A, B, C, D: Pipes from Outdoor Unit to Indoor Unit.

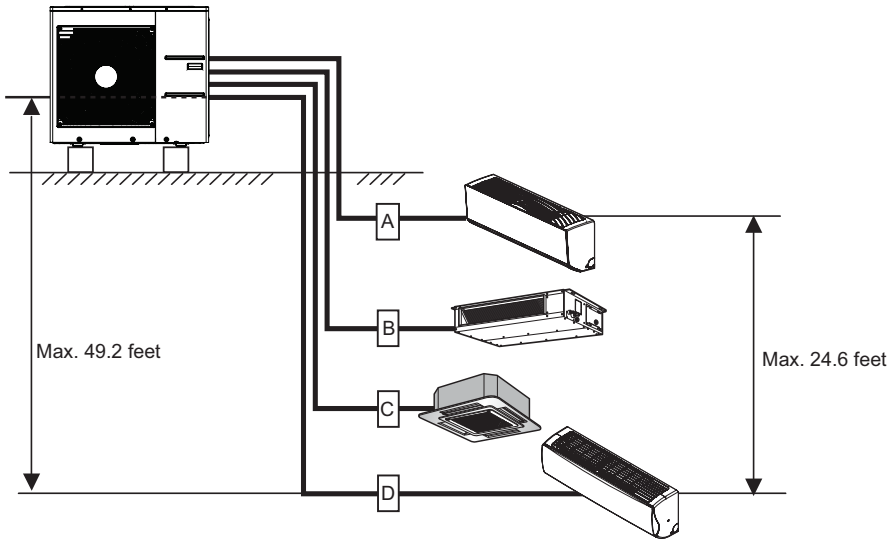

Table 125:Multi F Outdoor Unit Refrigerant Piping System Limitations.

Outdoor Unit	Minimum Length for Each Pipe (ft.)	Maximum Piping Length to Each Indoor Unit (ft.)				Maximum Total Piping Length for Each System (ft.)
		A	B	C	D	
LMU18CHV	10	82	82	-	-	164
LMU24CHV	10	82	82	82	-	246.1
LMU30CHV	10	82	82	82	82	246.1
LMU36CHV	10	82	82	82	82	246.1

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REFRIGERANT PIPING DESIGN

Design Guideline Summary

MULTI F
MULTI F MAX

The following are examples of manual pipe size calculations. Designers are highly encouraged to use LATS for Multi F systems.

Multi F MAX System with One Branch Distribution Unit

Example: LMU540HV outdoor unit with four (4) indoor units, and one (1) branch distribution unit connected.

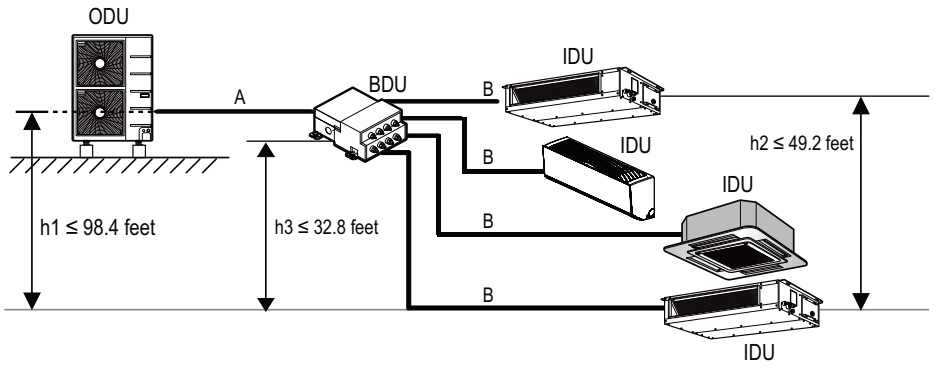
ODU: Outdoor Unit.

IDU: Indoor Unit.

BDU: Branch Distribution Unit.

A: Main Pipe.

B: Branch Pipe (Branch Distribution Unit to Indoor Unit[s]).



Multi F MAX System with Two Branch Distribution Units

Example: LMU540HV outdoor unit with seven (7) indoor units, and two (2) branch distribution units connected.

ODU: Outdoor Unit.

IDU: Indoor Unit.

BD: Branch Distribution Unit(s).

ΣA: Main Pipe.

ΣB: Branch Pipe (Branch Distribution Unit[s] to Indoor Unit[s]).

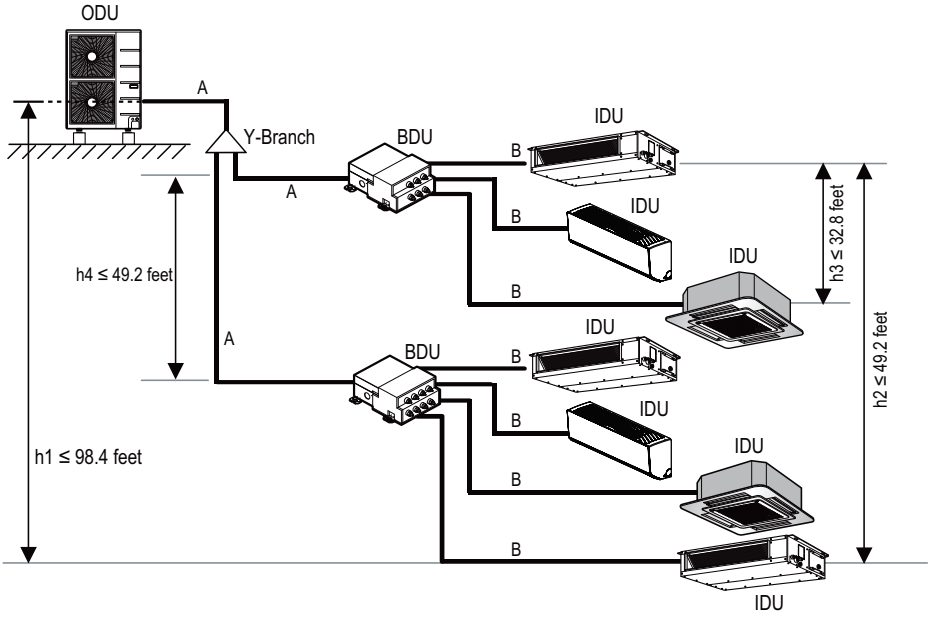


Table 126: Multi F MAX Outdoor Unit Refrigerant Piping System Limitations.

Pipe Length (ELF = Equivalent Length of pipe in Feet)	Total piping length (ΣA + ΣB)		≤475.7 feet
	Main pipe (Outdoor Unit to Branch Distribution Units: ΣA)	Minimum	10 feet
		Maximum	≤180.4 feet
	Total branch piping length (ΣB)		≤295.3 feet
	Branch pipe (Branch Distribution Units to Indoor Units: B)	Minimum	10 feet
		Maximum	≤49.2 feet
Elevation Differential (All Elevation Limitations are Measured in Actual Feet)	If outdoor unit is above or below indoor unit (h1)		≤98.4 feet
	Between the farthest two indoor units (h2)		≤49.2 feet
	Between branch distribution unit and farthest connected indoor unit(s) (h3)		≤32.8 feet
	Between branch distribution units (h4)		≤49.2 feet

Table 127: Multi F MAX Piping Sizes.

Piping	Main Pipe A (inch)	Branch Pipe B
Liquid	Ø3/8	Depends on the size of the indoor unit piping
Gas	Ø3/4	

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REFRIGERANT PIPING DESIGN

Design Guideline Summary

The following are examples of manual pipe size calculations. Designers are highly encouraged to use LATS for Multi F systems.

Multi F with LGRED System

Example: LMU300HHV outdoor unit with four (4) indoor units connected.

ODU: Outdoor Unit.

IDU: Indoor Unit.

A, B, C, D: Pipes from Outdoor Unit to Indoor Unit.

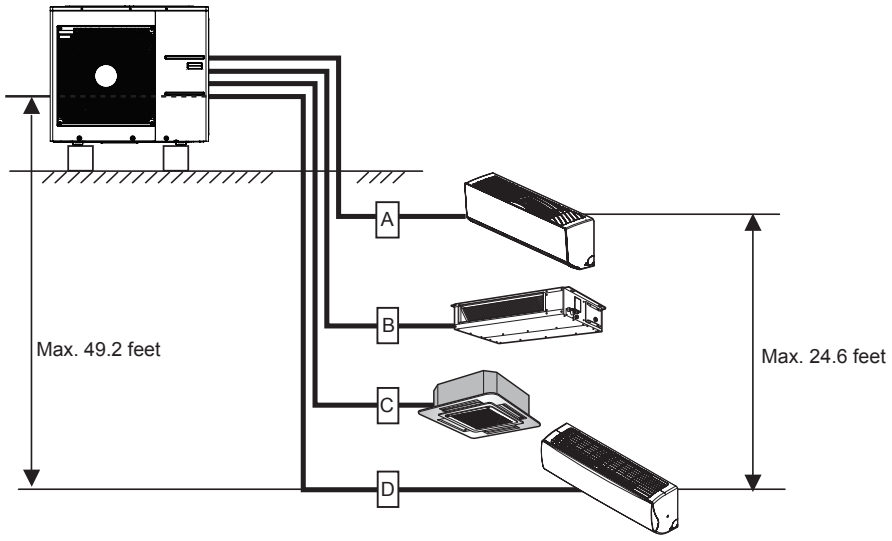


Table 128:Multi F with LGRED Outdoor Unit Refrigerant Piping System Limitations.

Outdoor Unit	Minimum Length for Each Pipe (ft.)	Maximum Piping Length to Each Indoor Unit (ft.)				Maximum Total Piping Length for Each System (ft.)	Maximum Height Difference (Max. [ft.]) Outdoor Unit ~ Indoor Unit	Maximum Height Difference (Max. [ft.]) Indoor Unit ~ Indoor Unit
		A	B	C	D			
LMU180HHV	10	82	82	-	-	164	49.2	24.6
LMU240HHV	10	82	82	82	-	246.1	49.2	24.6
LMU300HHV	10	82	82	82	82	246.1	49.2	24.6

Multi F MAX with LGRED System with One Branch Distribution Unit

Example: LMU360HHV outdoor unit with four (4) indoor units and one (1) branch distribution unit connected.

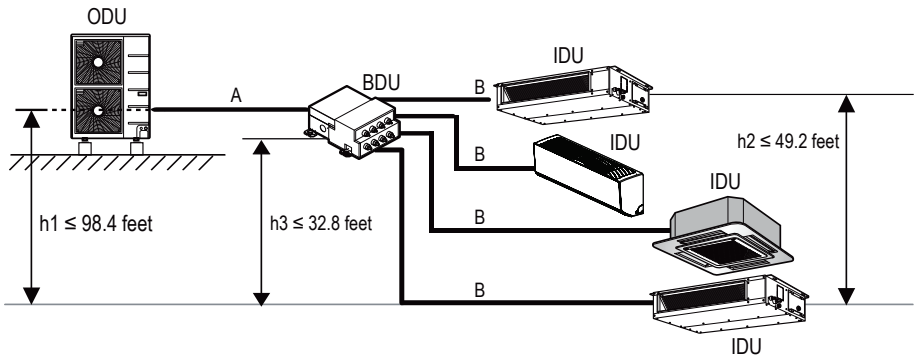
ODU: Outdoor Unit.

IDU: Indoor Unit.

BDU: Branch Distribution Unit.

A: Main Pipe.

B: Branch Pipe (Branch Distribution Unit to Indoor Unit[s]).



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REFRIGERANT PIPING DESIGN

Design Guideline Summary

MULTI F
MULTI F MAX

The following are examples of manual pipe size calculations. Designers are highly encouraged to use LATS for Multi F systems.

Multi F MAX with LGRED System with Two Branch Distribution Units

Example: LMU420HHV outdoor unit with six (6) indoor units and two (2) branch distribution units connected.

ODU: Outdoor Unit.

IDU: Indoor Unit.

BDU: Branch Distribution Unit(s).

ΣA: Main Pipe.

ΣB: Branch Pipe (Branch Distribution Unit[s] to Indoor Unit[s]).

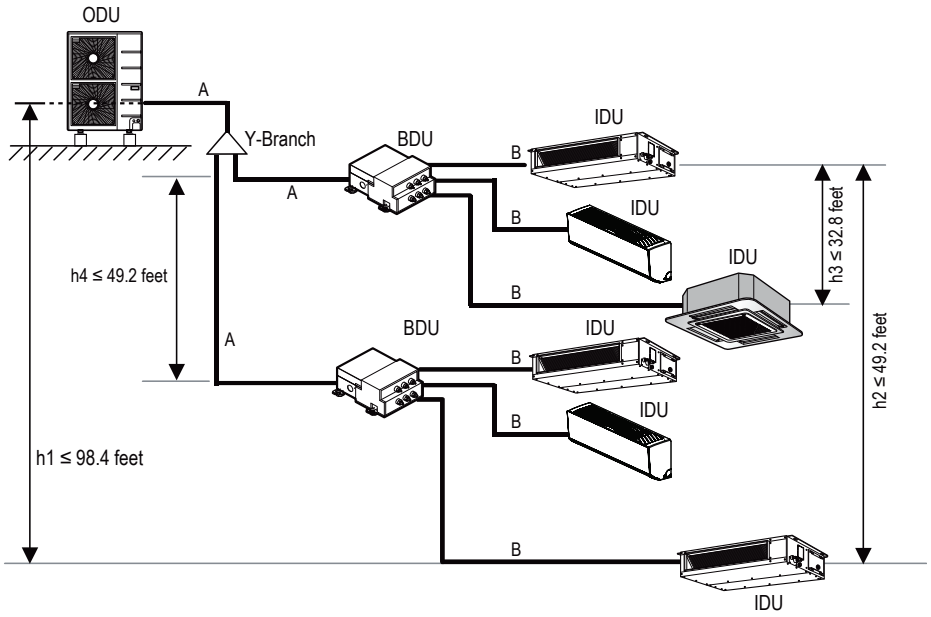

Table 129: Multi F MAX with LGRED Outdoor Unit Refrigerant Piping System Limitations.

Pipe Length (ELF = Equivalent Length of pipe in Feet)	Total piping length (ΣA + ΣB)		≤475.7 feet
	Main pipe (Outdoor Unit to Branch Distribution Units: ΣA)	Minimum	10 feet
		Maximum	≤180.4 feet
	Total branch piping length (ΣB)		≤295.3 feet
	Branch pipe (Branch Distribution Units to Indoor Units: B)	Minimum	10 feet
		Maximum	≤49.2 feet
Elevation Differential (All Elevation Limitations are Measured in Actual Feet)	If outdoor unit is above or below indoor unit (h1)		≤98.4 feet
	Between the farthest two indoor units (h2)		≤49.2 feet
	Between branch distribution unit and farthest connected indoor unit(s) (h3)		≤32.8 feet
	Between branch distribution units (h4)		≤49.2 feet

Table 130: Multi F MAX with LGRED Piping Sizes.

Piping	Main Pipe A (inch)	Branch Pipe B
Liquid	Ø3/8	Depends on the size of the indoor unit piping
Gas	Ø3/4	

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REFRIGERANT PIPING DESIGN

Creating a Balanced System / Manual Layout Procedure

Creating a Balanced / Quality Piping System

Unlike designing duct-work or chilled and hot water pipe systems where balancing dampers, ball valves, orifices, circuit setters, or other flow control devices can be installed to modify or balance the flow of cooling medium, these cannot be used in a Multi F system. Therefore, variable refrigerant flow systems have to be designed to be "self balanced." Balanced liquid refrigerant distribution is solely dependent on the designer using the correct pipe size for each segment. Pipe sizing considerations include pipe length, pipe segment pressure drop relative to other pipe segments in the system, type and quantity of elbows, bends present, fitting installation orientation, and end use device elevation differences.

Note:

⃠ The designer must avoid creating excessive pressure drop. When liquid refrigerant is subjected to excessive pressure drop, liquid refrigerant will change state and "flash" to vapor. Vapor present in a stream of liquid refrigerant before reaching the indoor unit coil (or branch distribution unit for Multi F MAX systems) results in a loss of system control and causes damage to the components. ⃠ The pipe system must be designed in a manner that avoids the creation of unwanted vapor.

Refrigerant Piping System Verification

To ensure that the refrigerant piping design is suitable for the system, a LATS refrigerant piping design software report must be provided with every Multi F order. Following the installation, if any changes or variations to the design were necessary, an "as-built" LATS piping design software report must be provided to LG prior to system commissioning. User must always check the LATS report actual pipe layout versus pipe limits.

Note:

Any field changes, such as re-routing, shortening or lengthening a pipe segment, adding or eliminating elbows and/or fittings, re-sizing, adding, or eliminating indoor units, changing the mounting height or moving the location of a device or fitting during installation must be done with caution and ALWAYS VERIFIED in LATS MULTI F SOFTWARE before supplies are purchased or installed. Doing so ensures profitable installation, eliminates rework, and ensures easier system commissioning.

Manual Layout Procedure

1. Choose the location of the indoor units on the building drawing.
2. Choose the location of all Y-branch and branch distribution units (if a Multi F MAX system) and note them on the building drawing. Verify that all fittings are positioned per the guideline limitations in "LG Engineered Multi F MAX Y-Branch Kit"
3. Plan the route for interconnecting piping. Draw a one-line depiction of the pipe route chosen on the building drawing.
4. Calculate the actual length of each pipe segment and note it on the building drawing.
5. Using the data obtained while selecting the system components, list the corrected cooling capacity next to each indoor unit on the drawing.
6. Starting at the indoor unit located farthest from the outdoor unit, sum the corrected cooling capacity of all indoor units served by the pipe segment for each branch and runout pipe (indoor units and branch distribution units [Multi F MAX systems only]). Record these values next to each segment.
7. Verify the size of the liquid and vapor lines.
8. If a Multi F MAX system, refer to the branch distribution unit information and the Y-branch kit information to verify the part number of each Y-branch and branch distribution unit based on the connected downstream nominal capacity served.
9. Calculate the equivalent pipe length in feet of each pipe segment. If a Multi F MAX system, Y-branch equivalent lengths must be totaled with the upstream segment only. Use equivalent pipe length data when it is provided with field-purchased fittings. If not available, use the data provided to estimate the equivalent length of field-provided pipe and fittings for each segment. Equivalent lengths must be totaled with the upstream segment only.
10. Verify the equivalent pipe length complies with product limitations. If the limitations are exceeded, either reroute the pipe or change the location of the indoor unit, Y-branch fittings and branch distribution units (if Multi F MAX systems), so the design conforms with all limitations.
11. If pipe length is adjusted as described in Step 10 above, verify again if the length of the design complies with the product limitations.
12. Use LATS Multi F software to verify the manually sized pipe design is acceptable. When entering the length of pipe segments in LATS Multi F software, enter the equivalent pipe length. Account for the additional pressure drop created by elbows, valves, and other fittings present in each segment by adding their respective equivalent pipe length to the actual pipe length.

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Condensate Drain Piping

Indoor Units

All indoor units generate water during cooling operation, therefore, how to properly handle this condensation must be considered. Some indoor units include factory-installed drain pumps; others apply the gravity drain method.

Table 131:Indoor Unit Drain Piping Specifications.

Indoor Unit	Drain Type	Drain Pipe Diameter (OD / ID, in.)	Drain Amount (gal. / min. at 0.033 ft. height)
Art Cool Wall-Mounted	Gravity	13/16 / 5/8	—
Art Cool Gallery	Gravity	13/16 / 5/8	—
Standard Wall-Mounted	Gravity	13/16 / 5/8	—
Ceiling-Concealed Ducted (Low Static and High Static)	27-1/2 in. Lift Drain Pump, Factory Installed	Ø1-1/4 / Ø1	0.105
Four-Way Ceiling Cassette	27-1/2 in. (9,12MBh) or 31-1/2 in (18MBh) Lift Drain Pump, Factory Installed	Ø1-1/4 / Ø1	0.105
Vertical-Horizontal Air Handling Unit	Gravity	Ø3/4 / —	—

Figure 257:Diagram of an Indoor Unit with a Gravity Drain.

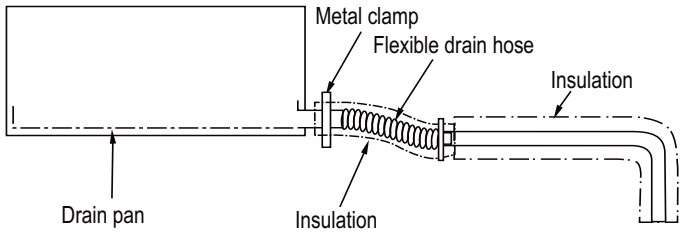
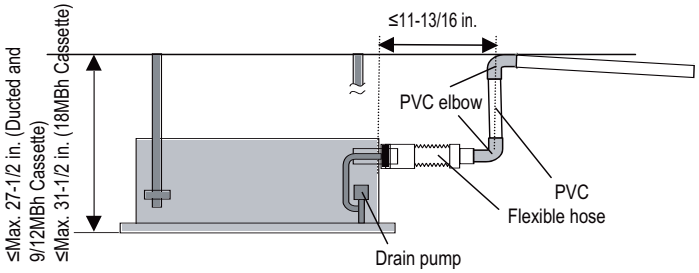


Figure 258:Diagram of an Indoor Unit with a Drain Pump.



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ELECTRICAL CONNECTIONS

“General Information” on page 206

“Power Wiring (208-230V) and Communications Cable Details” on page 209

“Remote Controller Connections” on page 219

“Indoor Unit Group Control” on page 220

ELECTRICAL CONNECTIONS

General Information

MULTI F
MULTI F MAX

⚠ WARNING

- *All power (line voltage) wiring and communication cable installation must be performed by trained service providers working in accordance with all local, state, and National Electrical Code (NEC) / UL / ETL federal regulations related to electrical equipment and wiring, and following the manufacturer product diagrams, requirements, and instructions in this manual. Electric shock can cause physical injury or death.*
- *Be sure that main power to the unit is completely off before proceeding. Follow all safety and warning information outlined at the beginning of this manual. Failure to do so will cause electric shock and bodily injury.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously (circuit breaker must be resistant to electromagnetic currents). Be sure that the circuit breaker or some other emergency power cutoff device is in place before any power wiring is done to the system. Failure to do so will cause bodily injury or death.*
- ⃠ *Never touch any power lines or live cables before all power is cutoff to the system. To do so will cause bodily injury or death.*
- *Power wiring and communication cable sizes must comply with all applicable federal, state, and local codes. Undersized wiring will lead to unacceptable voltage at the unit and will cause a fire, which will cause bodily injury or death.*
- *Properly ground the outdoor unit, indoor units, and branch distribution units. Ground wiring must always be installed by a trained technician. Ground wiring is required to prevent accidental electrical shock during current leakage, which will cause bodily injury or death.*
- *Verify that the branch switch and circuit breaker are set to OFF before installing the wiring system. Electric shock can cause physical injury or death.*
- *Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent will include some amount of direct current. Using an oversized breaker or fuse will result in electric shock, physical injury or death.*
- ⃠ *Do not connect ground wire to refrigerant, gas, sewage, or water piping; to lightning rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide a NEC-approved earth ground can result in electric shock, fire, physical injury or death.*

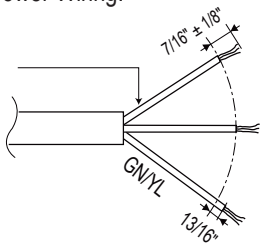
Note:

- *Consider ambient conditions (temperature, direct sunlight, inclement weather, etc.) when selecting, installing, and connecting the power wiring.*
- *Properly ground the outdoor unit, indoor units, and branch distribution units. Ground wiring must always be installed by a trained technician. Improperly grounded wire can cause communication problems from electrical noise, and motor current leakage.*
- *Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent will include some amount of direct current. Using an oversized breaker or fuse will result in equipment malfunction and property damage.*
- ⃠ *Do not connect ground wire to refrigerant, gas, or water piping; to lightning rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide a NEC-approved earth ground can result in property damage and equipment malfunction.*
- ⃠ *Do not operate the air conditioning system until the refrigerant piping installation is complete. Operating the system before refrigerant piping is finalized will damage the compressor.*

Power Supply / Power Wiring Specifications

- Multi F systems operate at 1Ø, 208-230V, 60Hz, and power is wired to the outdoor unit only. The outdoor unit will supply power to the indoor units and the branch distribution units (Multi F MAX systems only) through the communication / connection (power) cable.
- Power supply to the outdoor unit must be selected based on NEC and local codes. Maximum allowable voltage fluctuation ±10% or nameplate rated value.
- Power wiring to the outdoor unit(s) must be solid or stranded, and must comply with all local and national electrical codes.
- Properly ground the outdoor unit and indoor unit per NEC and local codes.
- Ground wire must be longer than the common power / communication wires.
- Connect the wiring firmly so the wires cannot be easily pulled out.
- Refer to the inside of the chassis cover or control cover for circuit and terminal block diagrams.
- Always match color codes of each wire and follow wiring diagram.
- ⃠ Do not install power wiring to the outdoor unit and the communication / connection (power) cable to the indoor unit in the same conduit. Use separate conduits.

Figure 259: Multi F / Multi F MAX Outdoor Unit Power Wiring.



⚠ WARNING

Always have a trained service provider properly ground the outdoor unit. If the outdoor unit is not properly grounded, there is a risk of electric shock, physical injury, or death.

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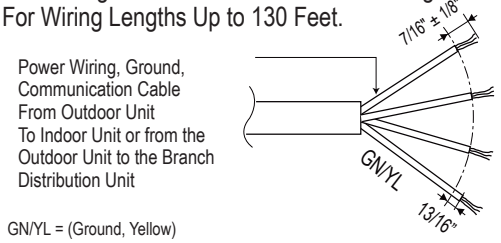
Communication / Connection (Power) Cable Specifications

Multi F Systems:

- Communication / connection (power) cable from the outdoor unit to the indoor unit for lengths up to 130 feet must use a minimum of 18 AWG, four (4) conductor, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes.
- When the communication / connection (power) wires between the indoor unit and outdoor unit is GREATER THAN 130 feet, use:
  - A two (2) conductor wire for power (for each indoor unit).
  - A two (2) conductor wire for communication / ground (for each indoor unit).
  - Separate the power AT LEAST two (2) inches away from the communication / ground wire (for each indoor unit).
  - All wiring is still minimum 18 gauge, stranded, shielded, or unshielded as cited above (for each indoor unit).

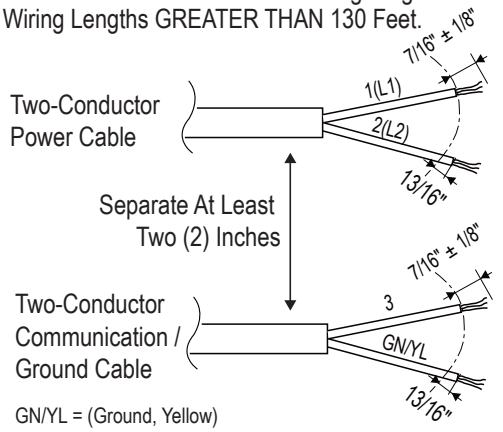
Figure 260:Typical Multi F / Multi F MAX with LGRED Outdoor and Indoor / Branch Distribution Unit Wiring and Communications Cable Diagram For Wiring Lengths Up to 130 Feet.



Multi F MAX Systems:

- All communication / connection (power) cable from the outdoor unit to the branch distribution unit(s) must be a minimum of 16 AWG, four (4) conductor, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes.
- Communication / connection (power) cable from the branch distribution unit(s) to the indoor units for lengths up to 130 feet must use a minimum of 18 AWG, four (4) conductor, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes.
- When the communication / connection (power) wires between the branch distribution unit and indoor unit is GREATER THAN 130 feet, use:
  - A two (2) conductor wire for power (for each indoor unit).
  - A two (2) conductor wire for communication / ground (for each indoor unit).
  - Separate the power AT LEAST two (2) inches away from the communication / ground wire (for each indoor unit).
  - All wiring is still minimum 18 gauge, stranded, shielded, or unshielded as cited above (for each indoor unit).

Figure 261:Multi F with LGRED Outdoor Unit to Indoor Unit, and Multi F MAX with LGRED Branch Distribution Unit to Indoor Unit Wiring Diagram for Wiring Lengths GREATER THAN 130 Feet.



- Insulation material as required by local code.
- Rated for continuous exposure of temperatures up to 140°F.
- Firmly attach the cable; provide slack but secure in a way to prevent external forces from being imparted on the terminal block.
- Wiring must be completed without splices.

Note:

- *Use a conduit for the communications / connection (power) cable from the outdoor unit to the indoor units and branch distribution unit(s). Electrical interference my cause product malfunction.*
- ⃠ *Never ground the shield of the communications cable to the indoor unit frame or other grounded entities of the building. Ground the communications cable shield only at the outdoor unit. Improperly grounding this cable can cause communications errors.*
- *The communications / connection (power) cable from the outdoor unit to the indoor units / branch distribution unit(s) must be separated and isolated from power wiring to the outdoor unit, computers, radio and television broadcasting facilities, as well as medical imaging equipment. Electrical interference my cause product malfunction.*

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ELECTRICAL CONNECTIONS

General Information

Figure 262:Typical Multi F System General Power / Communications System Schematic When Wiring is Less Than 130 Feet.

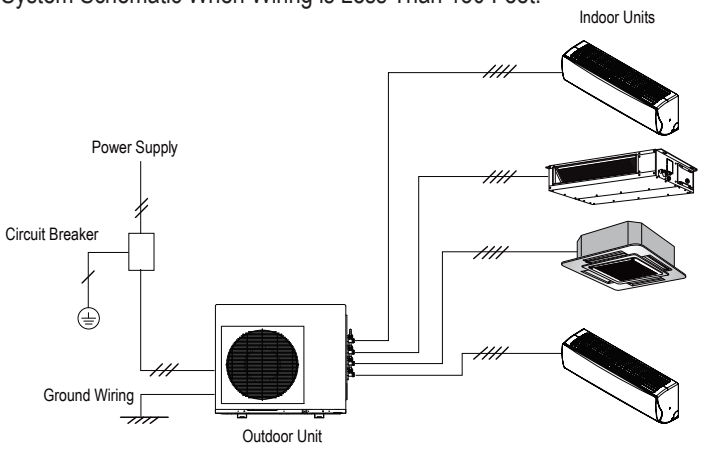


Figure 263:Typical Multi F MAX System General Power / Communications System Schematic When Wiring is Less Than 130 Feet.

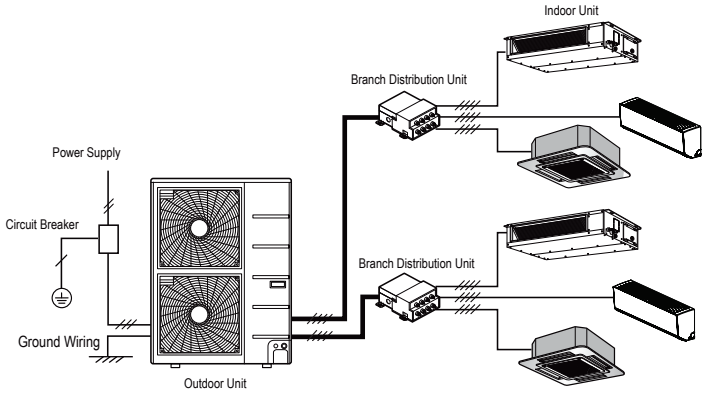
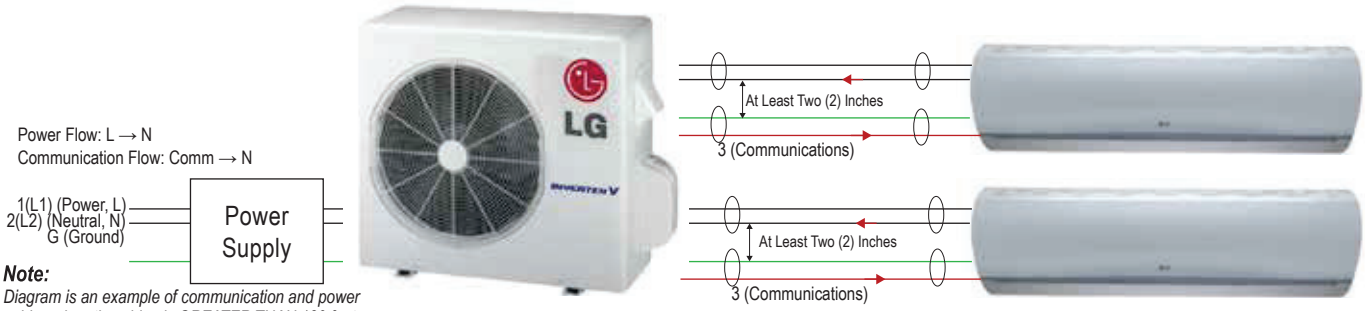


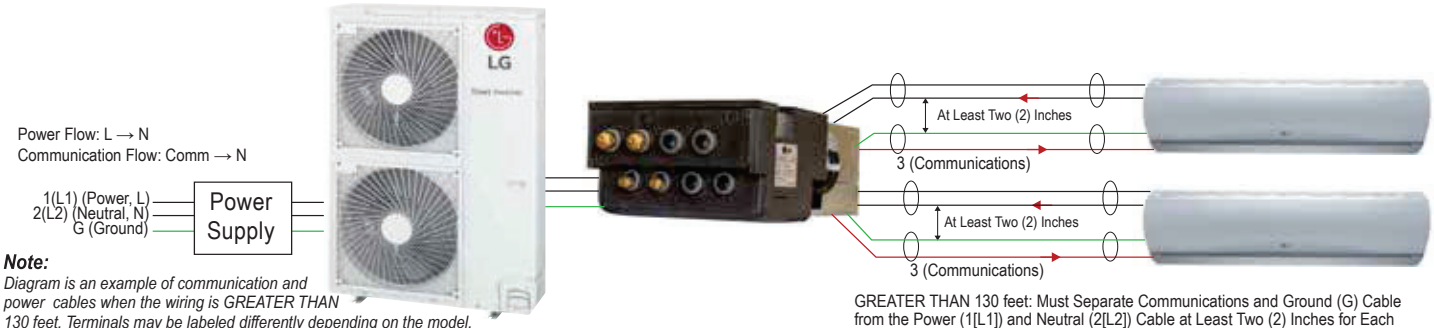
Figure 264:Schematic of a Multi F System When the Wiring is GREATER THAN 130 Feet.



Note:
Diagram is an example of communication and power cables when the wiring is GREATER THAN 130 feet. Terminals may be labeled differently depending on the model. Outdoor and Indoor Unit appearances may vary depending on the model.

GREATER THAN 130 feet: Must Separate Communications and Ground (G) Cable from the Power (1[L1]) and Neutral (2[L2]) Cable at Least Two (2) Inches for Each Indoor Unit

Figure 265:Schematic of a Multi F MAX with LGRED System When the Wiring is GREATER THAN 130 Feet.



Note:
Diagram is an example of communication and power cables when the wiring is GREATER THAN 130 feet. Terminals may be labeled differently depending on the model. Outdoor and Indoor Unit appearances may vary depending on the model.

GREATER THAN 130 feet: Must Separate Communications and Ground (G) Cable from the Power (1[L1]) and Neutral (2[L2]) Cable at Least Two (2) Inches for Each Indoor Unit.

Note:

- *Secure the separate wires in the control box panel using zip ties.*
- *Secure wiring with accessory clamps so that it does not touch piping.*
- *Use a conduit for the cable.*
- *Outside the unit, make sure the communications cable / power wiring are separately shielded, otherwise, the outdoor unit operation will be affected by electrical noise and will malfunction or fail.*
- *For details on the Multi F with LG RED and Multi F MAX with LG RED units, refer to the engineering manuals on www.lghvac.com.*

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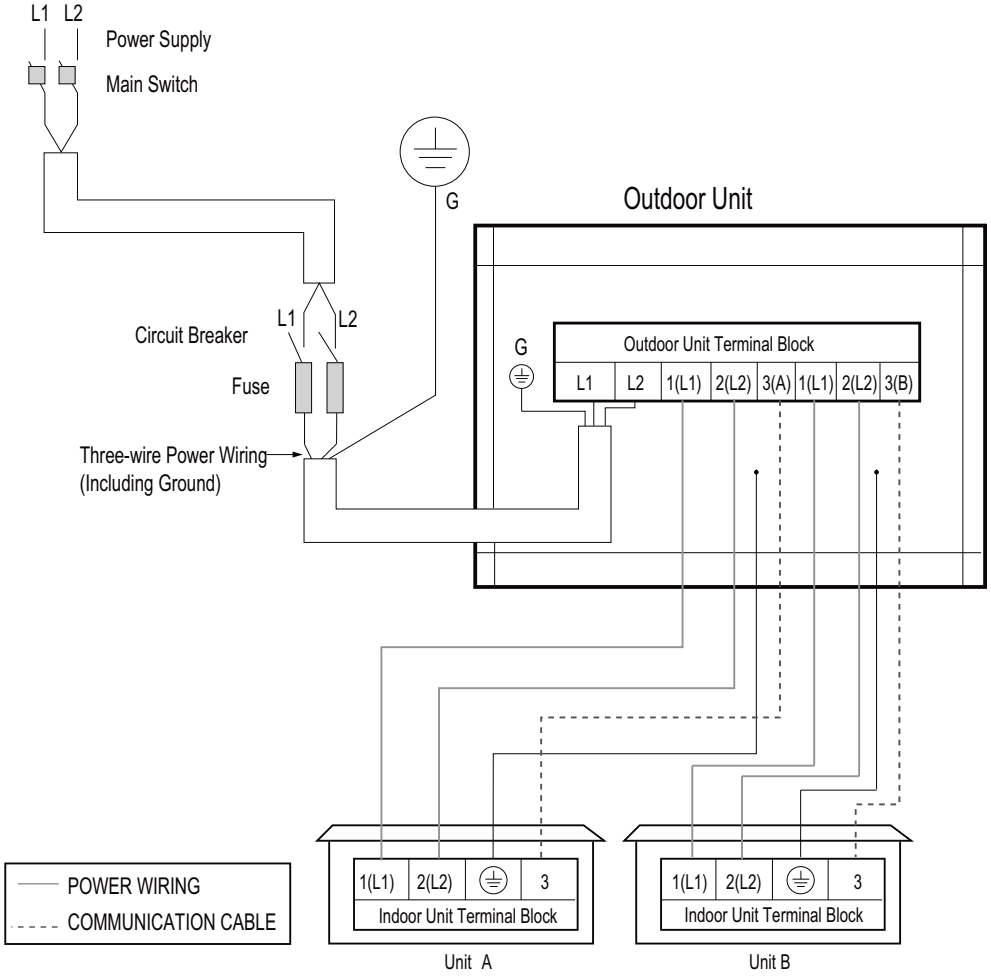
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 266: Multi F LMU18CHV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Electric shock can cause physical injury or death.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Electric shock can cause physical injury or death.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring will result in fire, electric shock, physical injury or death.*

Note:

- *For Multi F with LGRED, refer to Multi F & Multi F MAX with LGRED ODU engineering manual.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Failure to install proper wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components can result in property damage and equipment malfunction.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring can result in property damage and equipment malfunction.*

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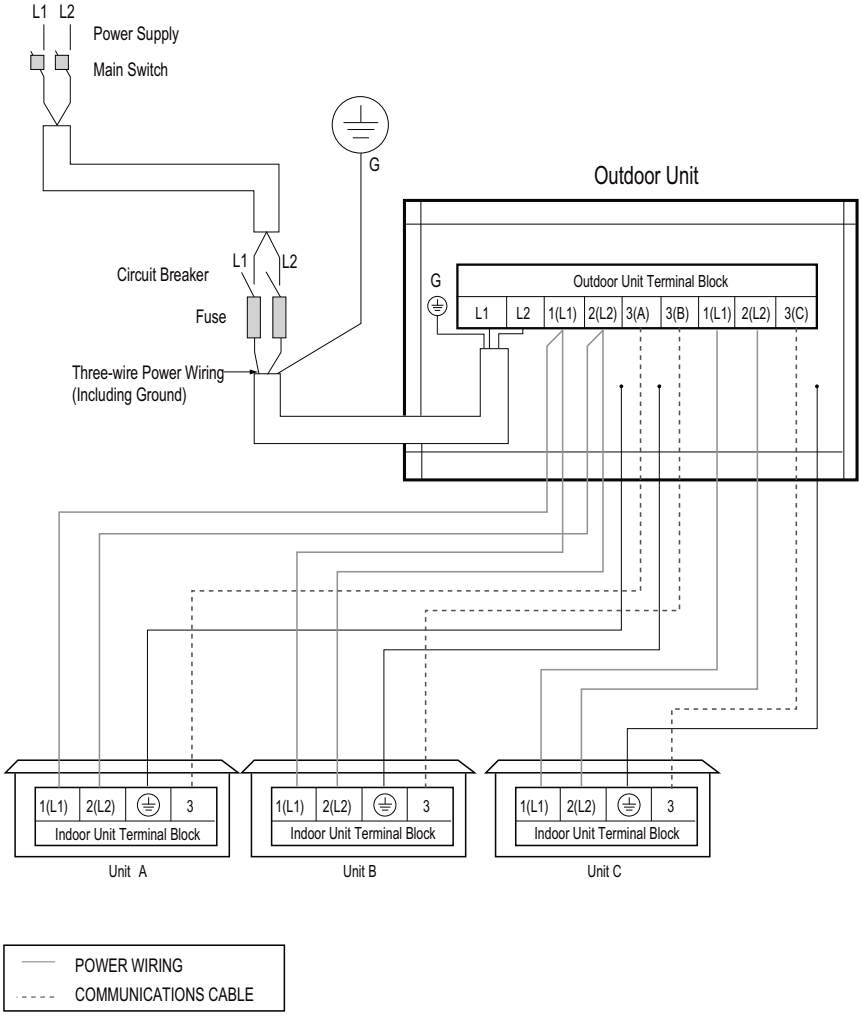
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 267:Multi F LMU24CHV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Electric shock can cause physical injury or death.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Electric shock can cause physical injury or death.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring will result in fire, electric shock, physical injury or death.*

Note:

- *For Multi F with LGRED, refer to Multi F & Multi F MAX with LGRED ODU engineering manual.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Failure to install proper wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components can result in property damage and equipment malfunction.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring can result in property damage and equipment malfunction.*

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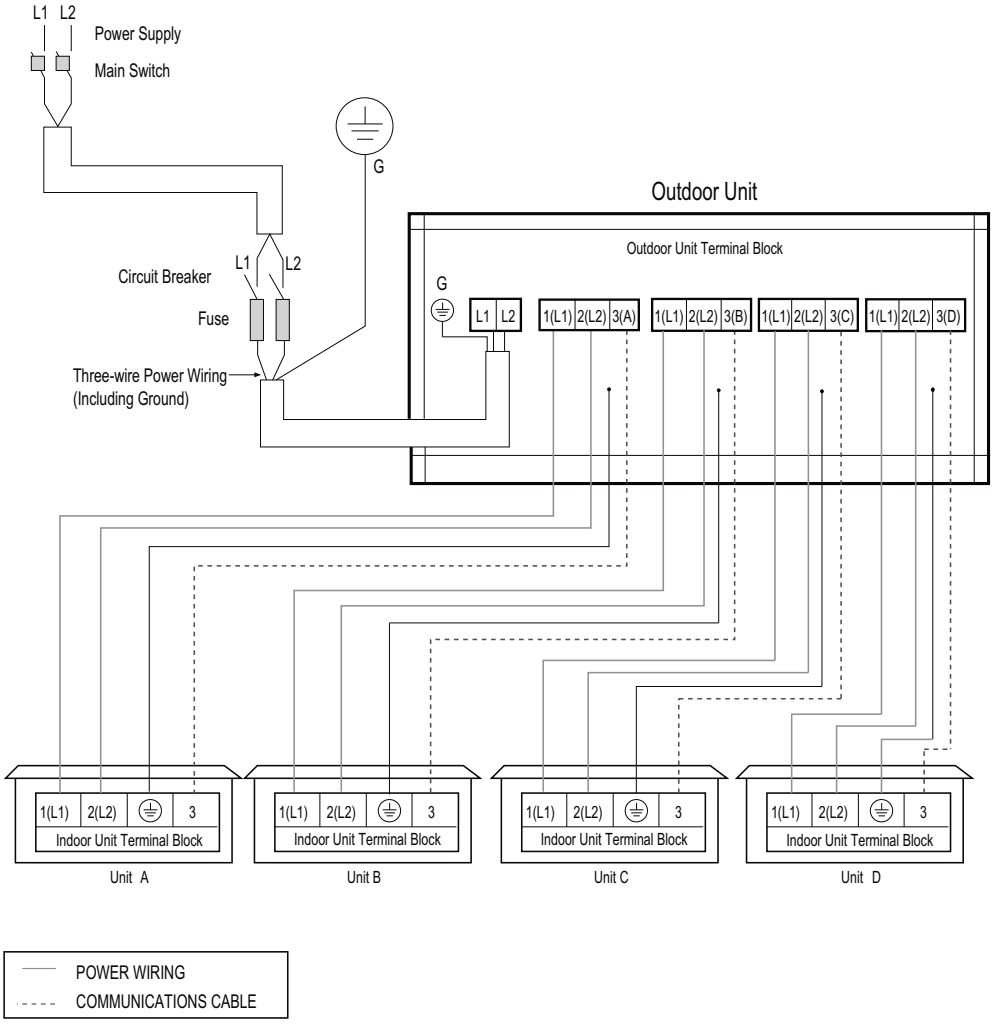
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 268:Multi F LMU30CHV and LMU36CHV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Electric shock can cause physical injury or death.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Electric shock can cause physical injury or death.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring will result in fire, electric shock, physical injury or death.*

Note:

- *For Multi F with LGRED, refer to Multi F & Multi F MAX with LGRED ODU engineering manual.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Failure to install proper wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components can result in property damage and equipment malfunction.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring can result in property damage and equipment malfunction.*

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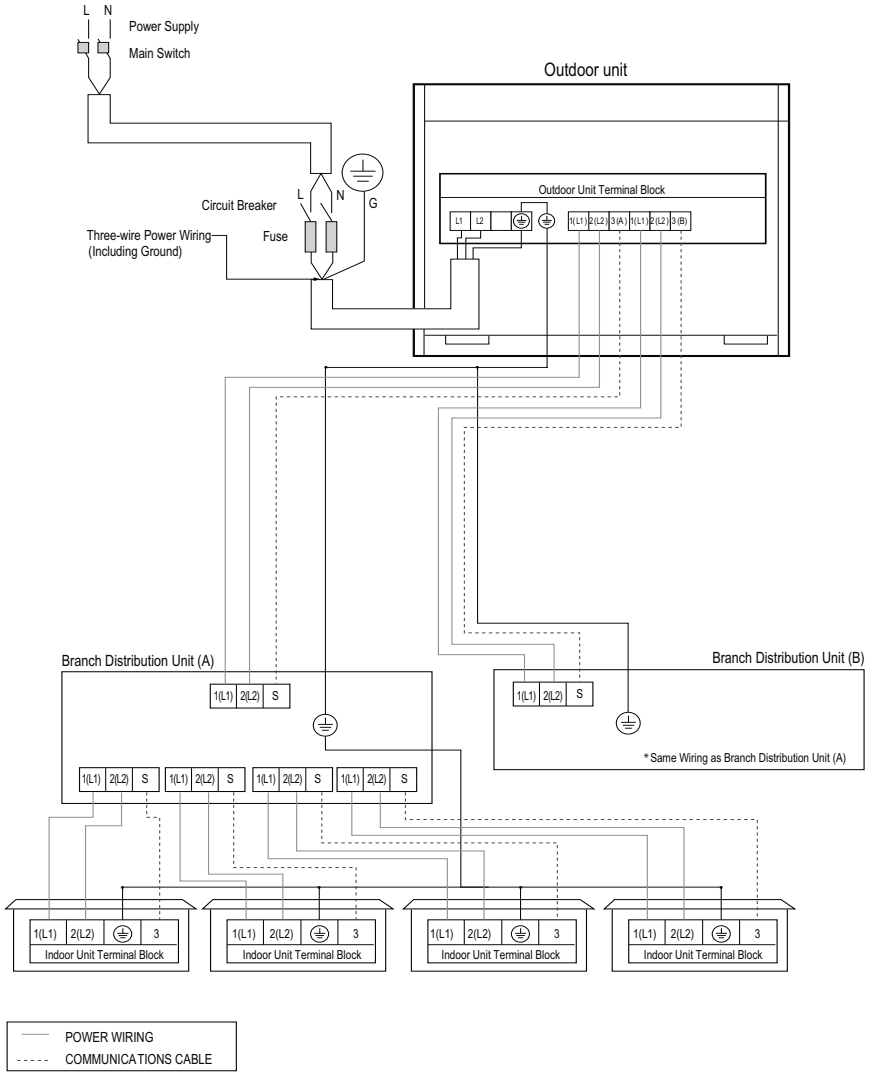
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 269:Multi F MAX LMU480HV and LMU540HV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Electric shock can cause physical injury or death.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Electric shock can cause physical injury or death.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring will result in fire, electric shock, physical injury or death.*

Note:

- *For Multi F MAX with LGRED, refer to Multi F & Multi F MAX with LGRED ODU engineering manual.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Failure to install proper wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components can result in property damage and equipment malfunction.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring can result in property damage and equipment malfunction.*

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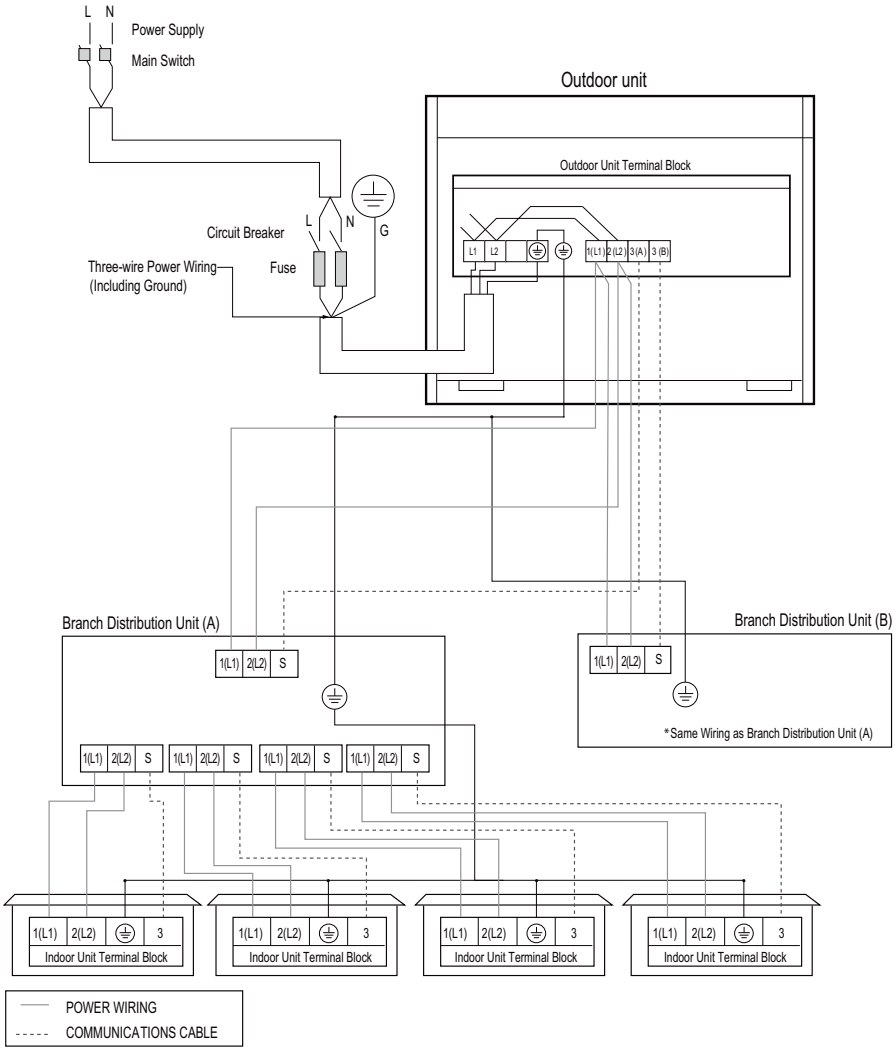
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 270:Multi F MAX LMU600HV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Electric shock can cause physical injury or death.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Electric shock can cause physical injury or death.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring will result in fire, electric shock, physical injury or death.*

Note:

- *For Multi F MAX with LGRED, refer to Multi F & Multi F MAX with LGRED ODU engineering manual.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Failure to install proper wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components can result in property damage and equipment malfunction.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring can result in property damage and equipment malfunction.*

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ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 271:Multi F with LGRED System General Power / Communications System Schematic.

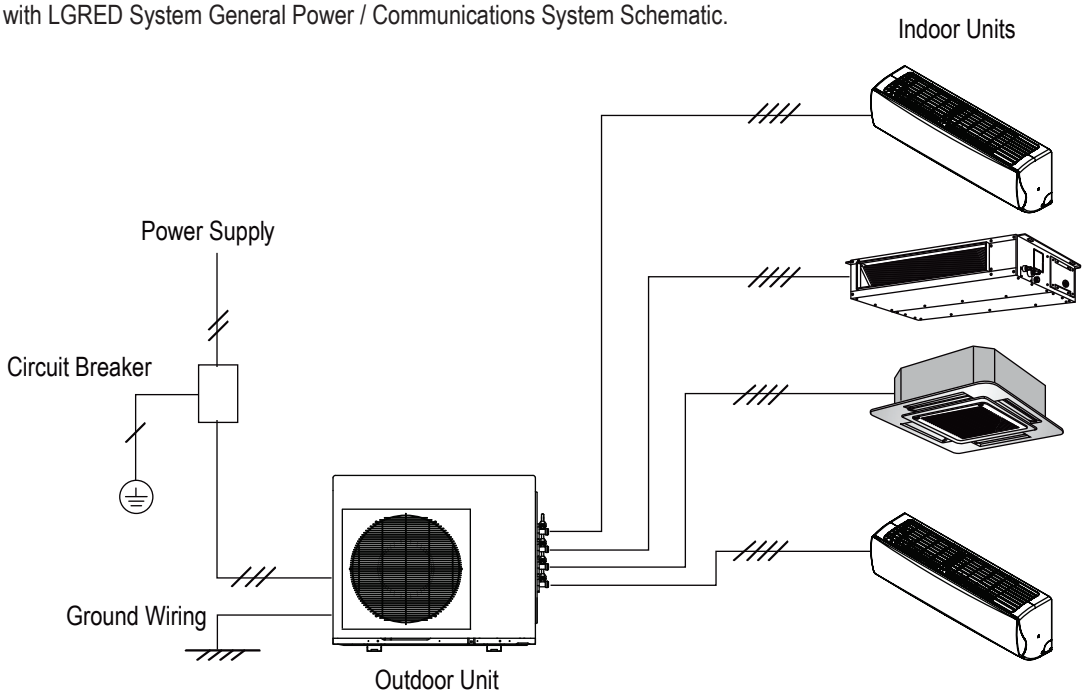
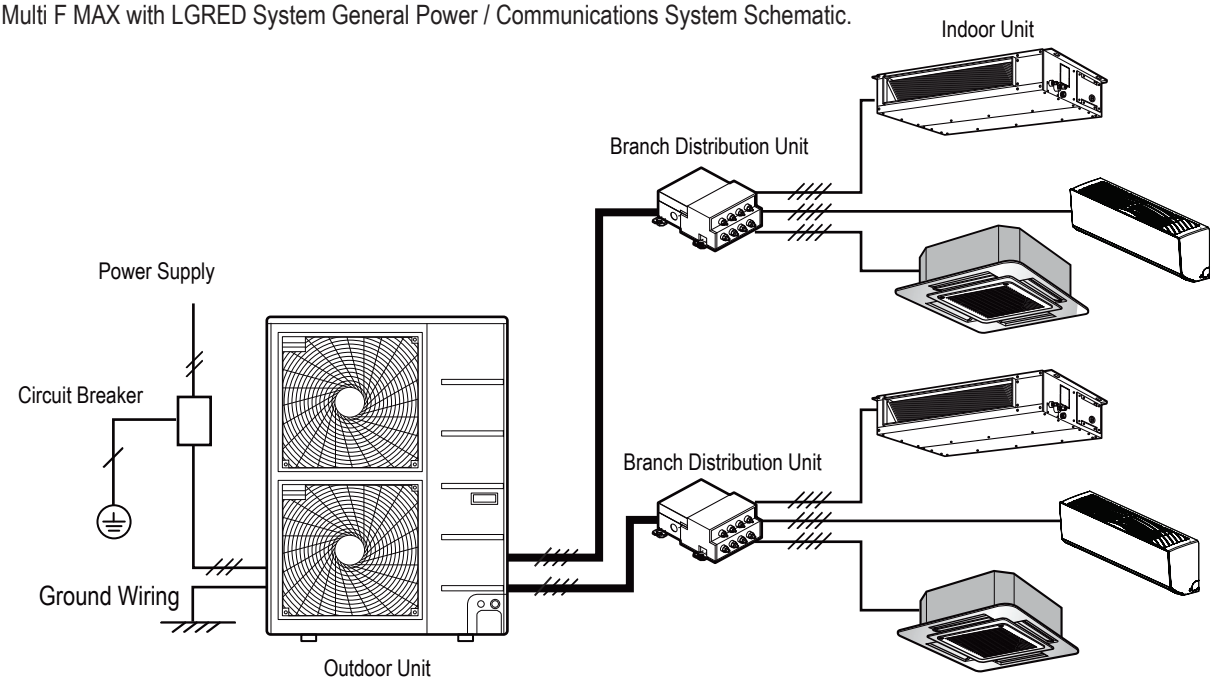


Figure 272:Multi F MAX with LGRED System General Power / Communications System Schematic.



Note:

- *Secure the separate wires in the control box panel using zip ties.*
- *Secure wiring with accessory clamps so that it does not touch the piping.*
- *Use a conduit for the communications cable / power wiring from the outdoor unit to the indoor / branch distribution units.*
- *Make sure the communications cable / power wiring from the outdoor units to the indoor / branch distribution units, and the power wiring to the outdoor unit are separate, otherwise, the outdoor unit operation will be affected by electrical noise and will malfunction or fail.*

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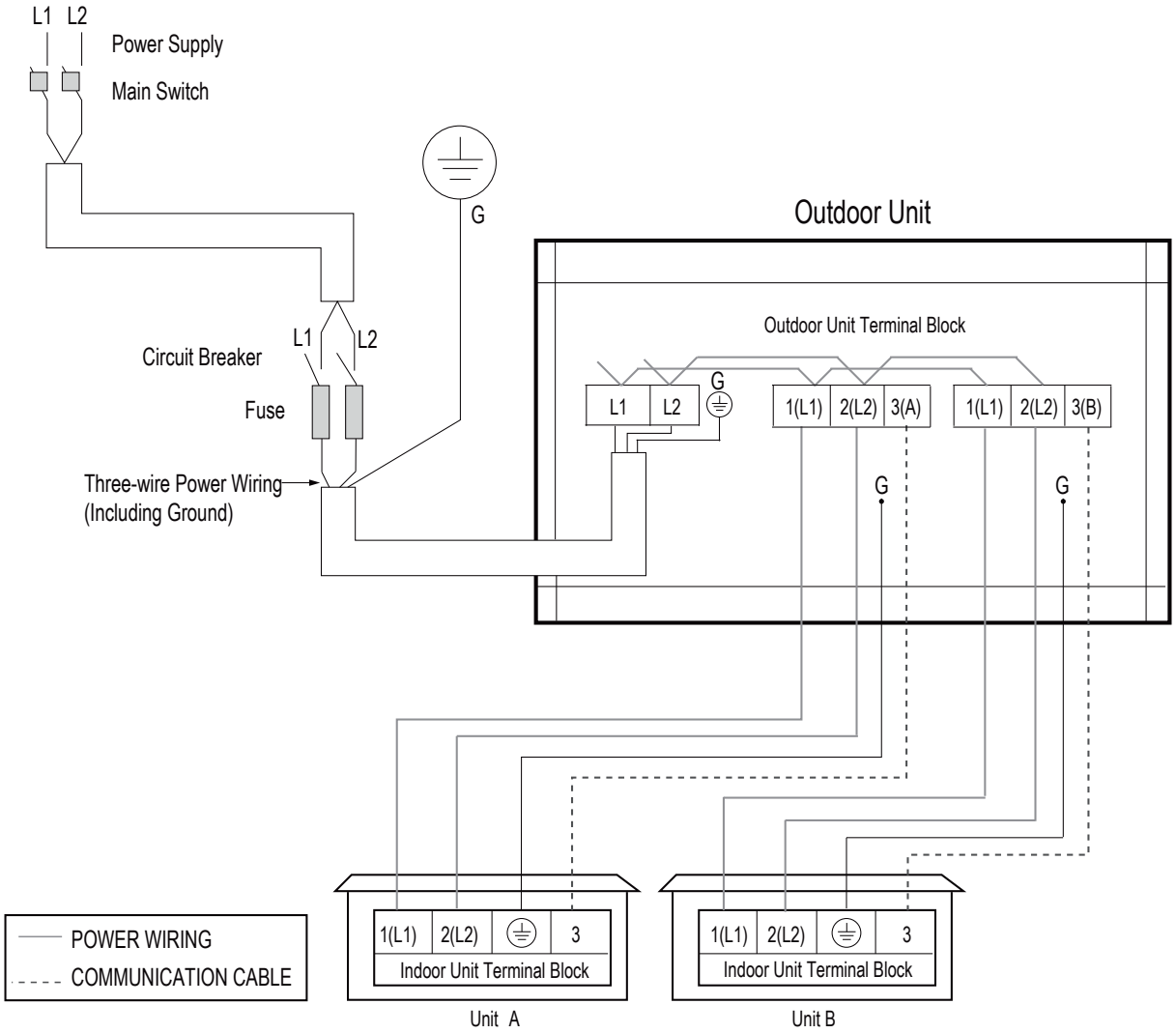
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 273:Multi F with LGRED LMU180HHV System Power Wiring and Communications Cable Connections.



⚠ WARNING

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, physical injury or death.*

Note:

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

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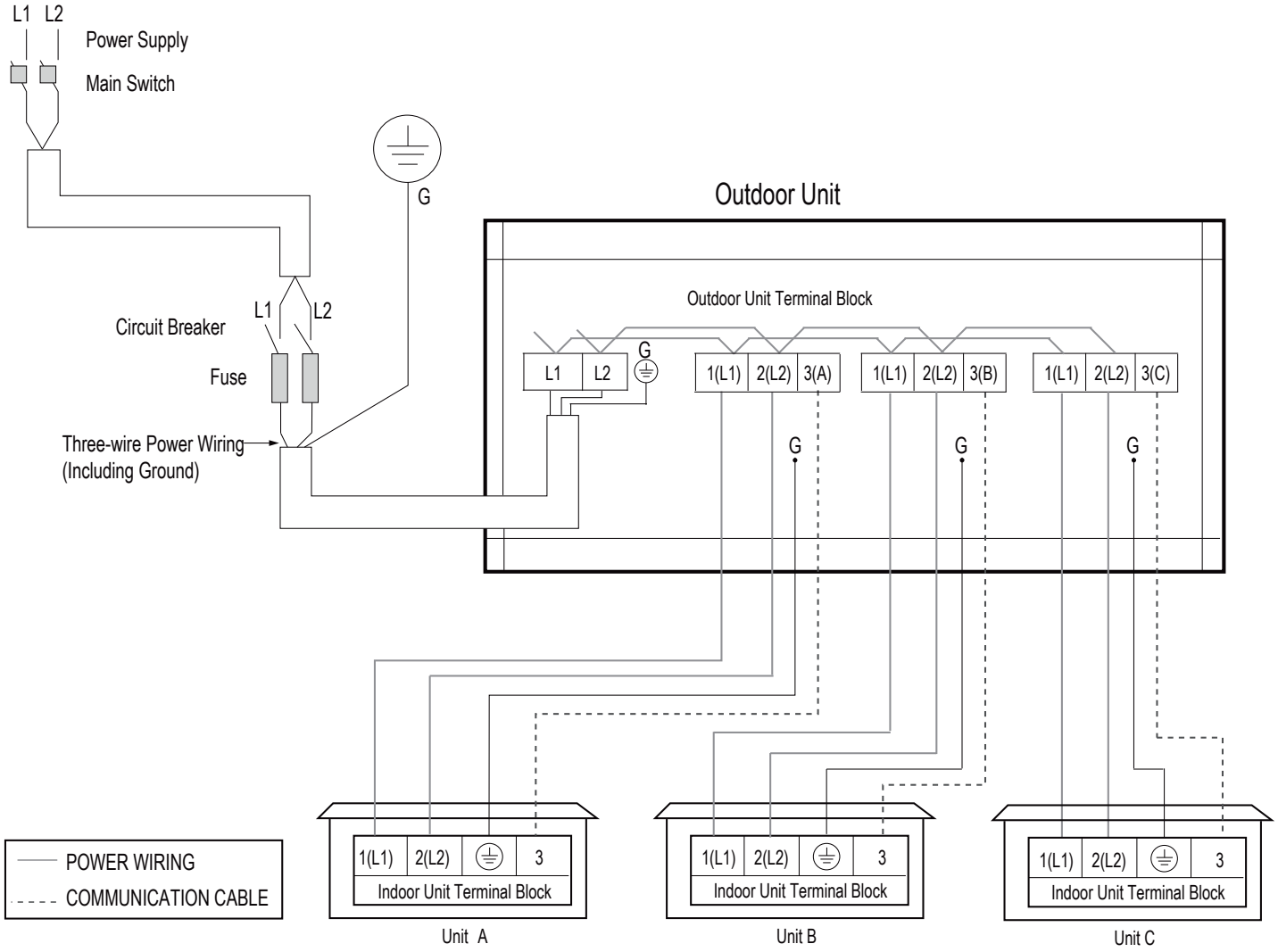
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 274:Multi F with LGRED LMU240HHV System Power Wiring and Communications Cable Connections.



⚠ WARNING

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, physical injury or death.*

Note:

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

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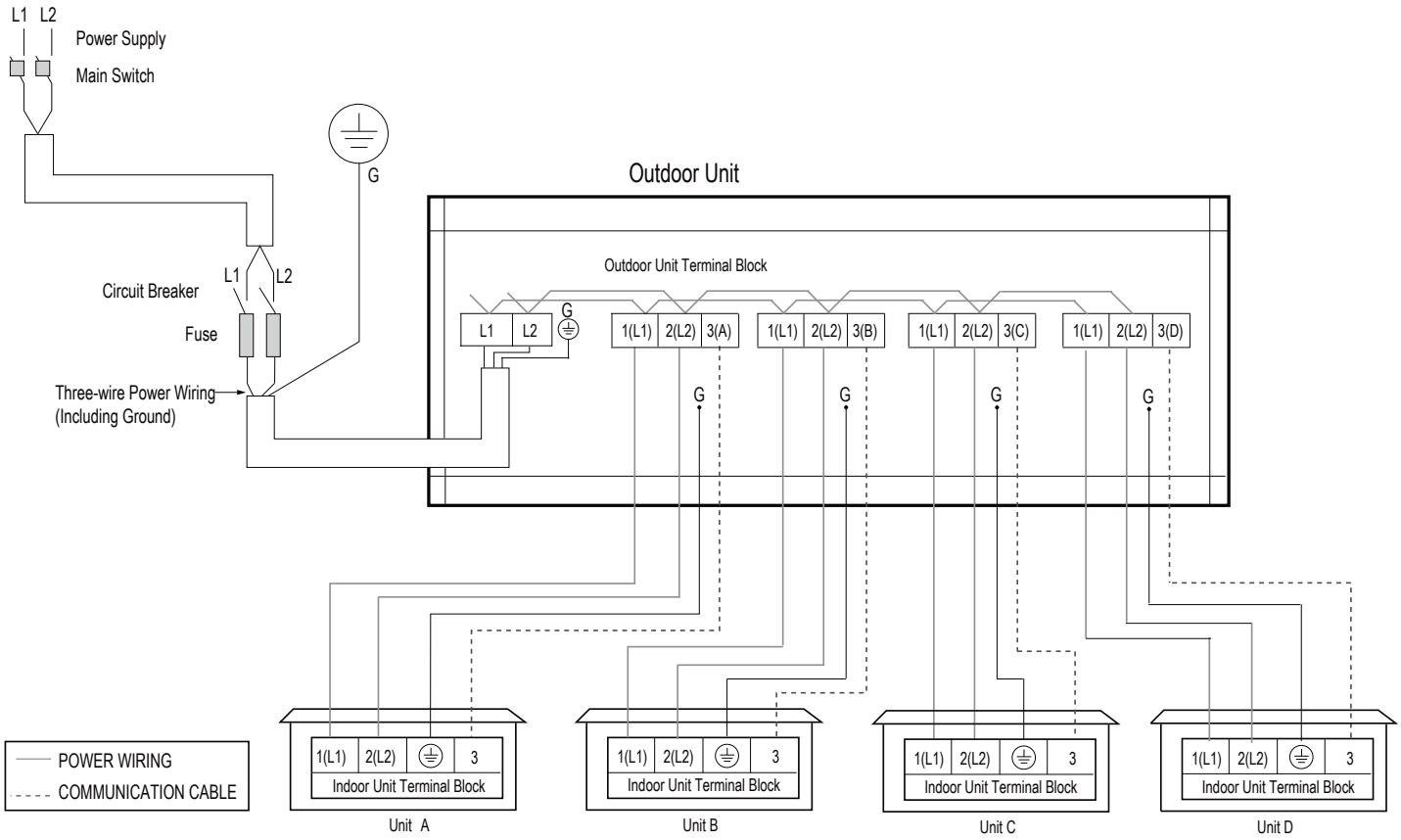
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 275:Multi F with LGRED LMU300HHV System Power Wiring and Communications Cable Connections.



⚠ WARNING

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, physical injury or death.*

Note:

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

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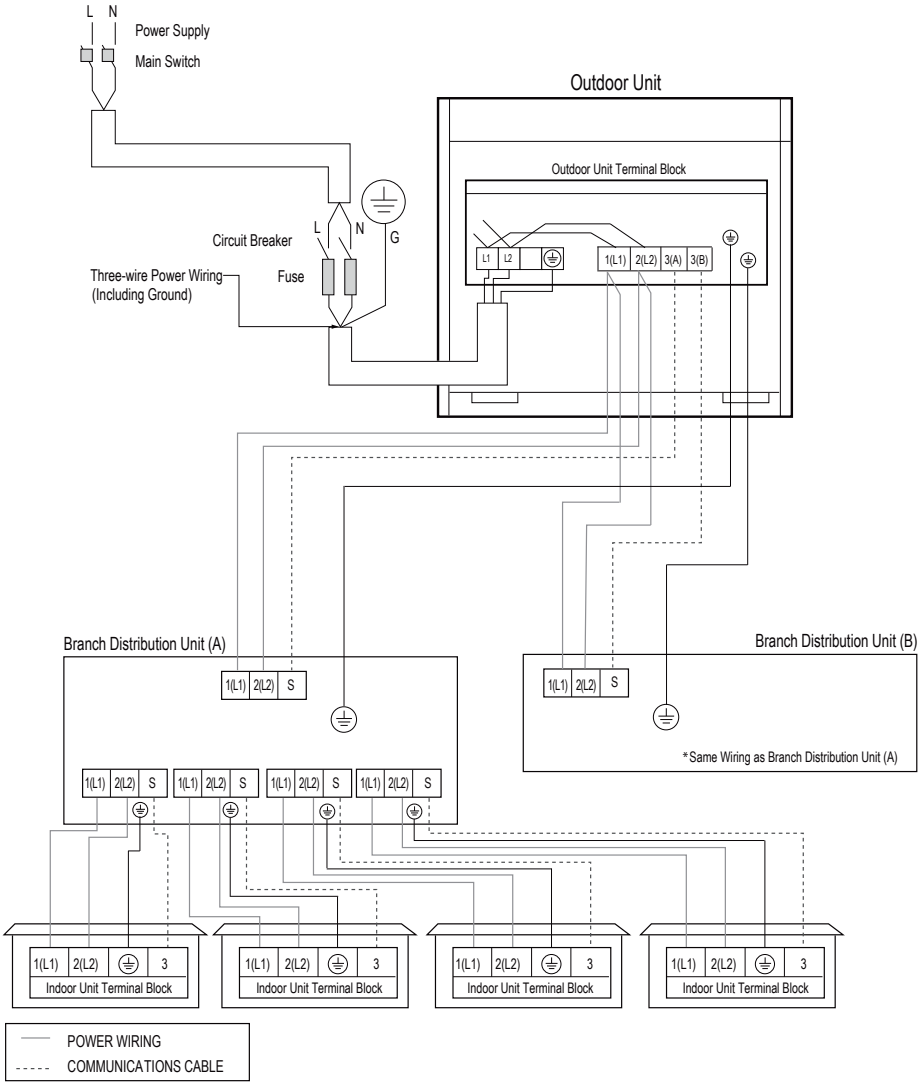
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 276:Multi F MAX with LGRED LMU360HHV and LMU420HHV System Power Wiring and Communications Cable Connections.



⚠ WARNING

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, physical injury or death.*

Note:

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

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ELECTRICAL CONNECTIONS

Remote Controller Connections

From Indoor Units to Remote Controllers

- Communication cable from indoor unit to remote controller(s) is to be 22 AWG, 3-conductor, twisted, stranded, unshielded. Wiring must comply with all applicable local and national codes.
- If using the LG Controller / Extension cable and the length needs to be further extended, the LG Extension Kit (sold separately) must be used. A maximum of four (4) kits (up to 165 feet) can be used.
- Remote controllers have hardwired connections: SIG - 12V - GND (Comm.) terminals.
- Indoor unit controller connections depend on type of indoor unit being installed. Some indoor units use terminal block connections; other indoor units use Molex connections. See diagrams below for the two options. Refer to the wiring diagram schematic found in the indoor unit itself, or to the indoor unit wiring diagrams in the Engineering Manuals for more information.
- ⃠ NEVER splice, cut, or extend cable length with field provided cable. Always include enough cable to cover distance between the indoor unit and the remote controller.
- Set the indoor unit operating parameters using DIP switches, or by setting up the remote controller. Refer to the indoor unit installation manuals for more details.

Figure 277:One Example of Indoor Unit to Zone Controller Connection.

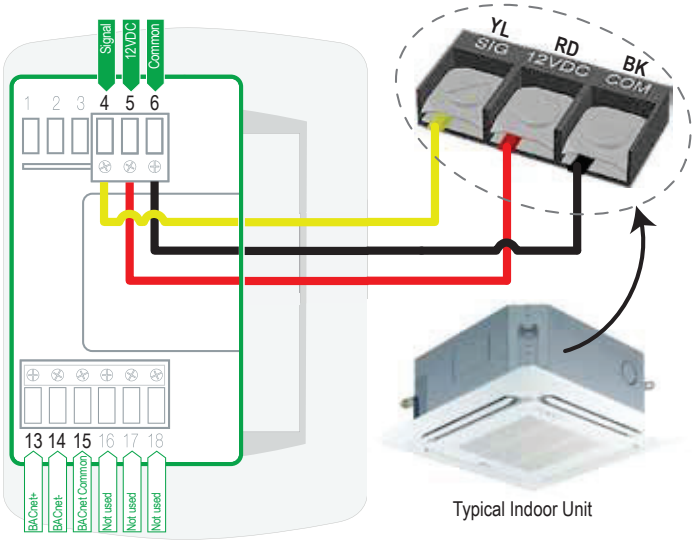
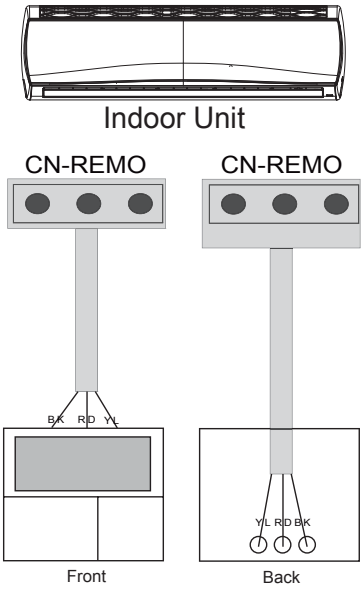


Figure 278:Another Example of Indoor Unit to Zone Controller Connection.



Note:

Cable connected to Zone Controller is the factory default connection.

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Between Multiple Indoor Units Operating as a Group (Group Control)

If any indoor units were specified to operate in unison:

- Before running cable, decide which indoor unit will be the "Master." The other indoor units in that group will be designated as "Slave(s)." The zone controller will be connected to the "Master."
- Set the pertinent DIP switch at each indoor unit to identify the Master and Slave(s). On wall mounted indoor unit models, set the assignment using the handheld remote controller.
- Use a daisy chain configuration and connect all of the group's indoor units together starting at the "Master" unit.
- ⃠ NEVER splice, cut, or extend cable length with field provided cable. Always include enough cable to cover distance between all components.

For indoor units with hardwired connections SIG - 12V - GND (Comm.) terminals:

- From the controller to the master indoor unit, use 22 AWG, 3-conductor, twisted, stranded, unshielded. All wiring must comply with all applicable local / national codes.
- From the master indoor unit to the slave indoor unit(s), daisy chain using 22 AWG, 3-conductor, twisted, stranded, unshielded. All wiring must comply with all applicable local / national codes.
- (⃠ Do not attach wire to 12VDC terminal to the slave indoor units). All wiring must comply with all applicable local and national codes.
- ⃠ NEVER splice, cut, or extend cable length; always include enough cable to cover distance between all components.

For indoor units with CN-REMO connections:

Use one (or multiple) Group Control Kit(s) (sold separately) containing extension and Y-splitter cables. Use one (1) group control cable kit for each indoor unit in the group except for the last indoor unit. ⃠ NEVER splice, cut, or extend cable length with field provided cable.

Figure 279:Example of Indoor Unit Group to Zone Controller Connections (Sig-12V-GND [Comm.] Terminal).

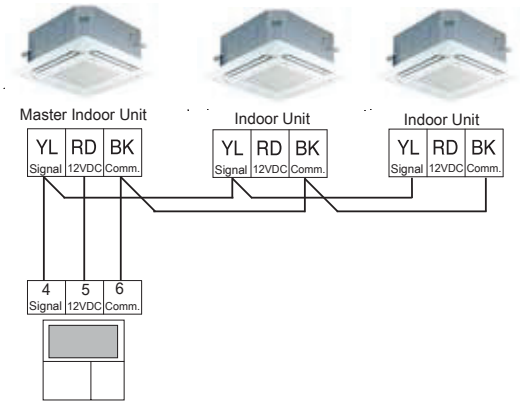
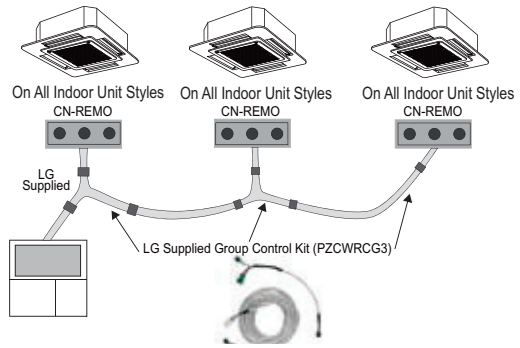


Figure 280:Example of Indoor Unit Group to Zone Controller Connections (CN-REMO).



Note:

- *Cable connected to zone controller is the factory default connection.*
- *Indoor unit connections depend on indoor unit type.*

General Specifications

- Wired remote controllers can be connected to all indoor unit types.
- Wireless controllers can be used in conjunction with wired remote controllers.
- A dry contact unit can be connected with a central controller simultaneously.
  - The master indoor unit is recognized by the dry contact unit and the central controller.
  - Group Control only available for indoor units manufactured after February 2009.
  - The central controller can control indoor units after setting the address of the master indoor unit only.
  - Slave indoor unit cannot be individually controlled by central controller.
  - Slave indoor unit will operate like master indoor unit.
- If an error occurs with the indoor unit, the error will be displayed on the wired remote controller.
- The following functions are available with group control:
- Selection of operation options (operation/mode/set temperature)
- Control of air flow rate (High/Medium/Low)

Table 132:Accessories for Some Group Control Applications.

Accessory	Model Number	Image
Wired Remote Group Control Cable Assembly - Required for connecting multiple indoor units to a control group	PZCWRCG3	
Wired Remote/Wired Remote Extension Cable - Required for extending the distance between indoor units or remote controllers in a control group	PZCWRC1	

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ACRONYMS

Table 133: Table of Acronyms.

ABS	Acrylonitrile Butadiene Styrene	IAQ	Indoor Air Quality
AC	Air Conditioner	IDU	Indoor Unit
ACP	Advanced Control Platform	IUCF	Indoor Unit Correction Factor
ARI	Air Conditioning and Refrigeration Institute	KTL	Korea Testing Laboratories
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning	LATS	LG Air Conditioning Technical Solution
AWG	American Wire Gauge	LGAP	LG Air Conditioner Protocol
BDU	Branch Distribution (Unit)	MAT	Mixed Air Temperature
Btu/h	British Thermal Units per hour	MBh	Thousands BTUs per hour
CCR	Corrected Capacity Ratio	MCA	Maximum Circuit Ampacity
CDOA	Coupled Dedicated Outdoor Air	MFS	Maximum Fuse Size
CFM	Cubic Feet per Minute	NEC	National Electrical Code
CR	Combination Ratio	OAT	Outdoor Air Temperature
DB	Dry Bulb	ODU	Outdoor Unit
dB(A)	Decibels with “A” frequency weighting	OUCF	Outdoor Unit Correction Factor
DDOAS	Decoupled Dedicated Outdoor Air	PDI	Power Distribution Indicator
DFS	Duct-Free Split	PI	Power Input
DI	Digital Input	PTAC	Packaged Terminal Air Conditioner
DO	Digital Output	PVE	Polyvinyl Ether
EEV	Electronic Expansion Valve	RAT	Return Air Temperature
ELF	Equivalent Length in Feet	RCL	Refrigerant Concentration Limit
EPDM	Ethylene Propylene Diene M-Class Rubber	SC	Sensible Capacity
ESP	External Static Pressure	TC	Total Capacity
ETL	Electronic Testing Laboratories	VAV	Variable Air Volume
HACR	Heating, Air Conditioning, and Refrigeration	VRF	Variable Refrigerant Flow
H/M/L	High / Medium / Low	VRP	Ventilation Rate Procedure

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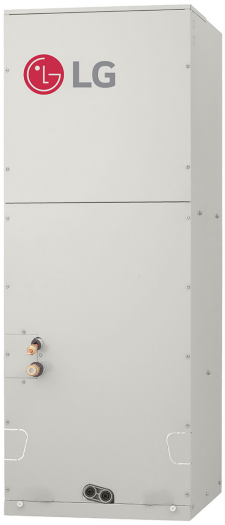
EM_MultiF_IDU_11_18
Supersedes: EM_MultiF_IDU_10_17
EM_MultiF_IDU_11_16
EM_MultiF_IDU_7_16
EM_MultiF_IDU_7_15
EM-MultiFIDU-01-15
EM-MultiFIDU-06-14

LG
Life's Good

MULTI F
MULTI F MAX

INDOOR UNIT ENGINEERING MANUAL



Vertical-Horizontal
Air Handling Units

Low Wall Console

Art Cool™ Mirror
Wall-Mounted

Art Cool™ Gallery
Wall-Mounted

Four-Way Ceiling Cassette

Ceiling-Concealed Duct

Indoor Units for Multi-Zone Heat Pump Systems

7,000 to 36,000 Btu/h

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TABLE OF SYMBOLS

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

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MULTI F
MULTI F MAX

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CONVERGENCE OF TECHNOLOGY, INNOVATION, FLEXIBILITY, & STYLE

About LG Electronics, Inc.

LG Electronics is a global leader and technology innovator in consumer electronics, mobile communications, and home appliances. LG Electronics comprises five business units—Home Entertainment, Mobile Communications, Air Conditioning, Business Solutions, and Home Appliance. LG is one of the world's leading producers of flat panel televisions, audio and video products, mobile handsets, air conditioners, and washing machines. LG's commercial air conditioning business unit was established in 1968 and has built its lineup of residential and commercial products to include VRF, Multi F, duct-free split systems, packaged terminal air conditioners (PTACs), and room air conditioners. In 2011, the air conditioning and energy solutions business unit grew to include LED lighting and solar products. For more information, visit www.lg.com.

Multi-Zone Systems

LG HVAC systems offer a range of solutions that are cost efficient, quiet and attractive. Multi-zone 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 trained HVAC contractor is safe and easy – little to no duct work or sheet metal is required.

Multi F Systems

LG's inverter heat pumps can support two, three, or four indoor units that are typically installed in separate rooms. Indoor units can be used with different controllers, allowing the customer to set the temperature individually. Indoor units are available in several different configurations: Art Cool™ Mirror-mounted, Art Cool Gallery wall-mounted, standard wall-mounted, low wall console, four-way ceiling cassettes, ceiling-concealed duct (high and low static), and vertical-horizontal air handling models. Multi F MAX systems can operate up to eight indoor units through two-, three-, or four-port branch distribution units.

Benefits of Multi F Systems

- Individual zone control
- Long refrigerant piping lengths
- High refrigerant piping elevation differences
- Maximum flexibility
- Operating ranges of 14°F to 118°F (DB) in cooling and -4°F to 75°F (DB) in heating if connected to standard Multi F Outdoor Units or -13°F to 75°F (DB) in heating if connected to Multi F with LG RED° Outdoor Units.
- Quiet and comfortable environment
- Reduced ductwork

Adaptable and Flexible

Multi F outdoor units can be adapted to a wide range of building applications and sizes such as schools, hotels, hospitals, offices, and residences. The system components are lightweight and compact so they can be placed in buildings without expensive cranes, they easily fit into most service elevators, and they can be set in place with minimal structural reinforcements requirements.

Multi F technology allows you to pipe farther by reaching areas of the building that would require the installation of a second system when using traditional direct-expansion cooling and heating equipment. Multi F provides the designer with uncompromised pipe system engineering flexibility—long pipe runs and large elevation differences. Whether your building is a condominium, a hotel, a school, or an office complex, Multi F is best suited to reach the farthest corners and elevations.

Smaller Chases and Plenums

LG Multi F systems use refrigerant piping to move heat, resulting in smaller space requirements for piping as compared to chilled water or roof top systems. This helps reduce the overall construction and material cost of the building, and gives back leasable space. Flexible and logical placement of system components, reduced back-and-forth pipe lengths, and fewer joints lowers installation costs and minimizes potential leaking.

Quality Commitment

LG is committed to the success of duct-free projects. We provide technical support during installation and commissioning. LG offers a variety of classes designed for installers and servicers on Multi F installation. Classes are conducted at LG's training centers and in field locations at various times throughout the year and on special request.

MULTI F

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UNIT NOMENCLATURE

Multi-Zone Systems — Indoor Units and Outdoor Units

L	M	CN	07	8	HV

L = LG
Type: M = Multi-Zone

Component:
AN: Art Cool™ Wall-Mounted Indoor Unit
N: Standard Wall-Mounted Indoor Unit
QN: Low Wall Console Indoor Unit
CN: Four-Way Ceiling-Cassette Indoor Unit
DN: Ceiling-Concealed Duct (Low Static) Indoor Unit
HN: Ceiling-Concealed Duct (High Static) Indoor Unit
VN: Vertical-Horizontal Air Handling Indoor Unit
U: Outdoor Unit

Nominal Capacity
(Nominal cooling capacity in Btu/h):

07 = 7,000	15 = 15,000	30 = 30,000	48 = 48,000
09 = 9,000	18 = 18,000	36 = 36,000	54 = 54,000
12 = 12,000	24 = 24,000	42 = 42,000	60 = 60,000

Generation

Features:
H = Heat Pump
V = Inverter
T = High Wall-Mounted Indoor Unit
P = Art Cool Gallery Indoor Unit

Branch Distribution Units

P	M	BD	36	2	0

P = Part (Accessory)
Type: M = Multi-Zone

BD: Branch Distribution Unit

Family

Number of Port Connections
(Maximum Number of Connectable Indoor Units): 2, 3, 4

Generation: 0, 1

Note:

- *Voltage for all equipment is 208-230V, 60 Hz, 1-phase.*
- *All indoor units are compatible with wired controllers.*
- *All outdoor units are LGAP control network compatible with PI-485 V-net Control Integration Board (PMNFP14A1, sold separately).*
- *Compatible single zone IDU nomenclature is listed in the Single Zone Wall-Mounted IDU Engineering Manual.*

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FUNCTIONS, CONTROLS AND OPTIONS OVERVIEW

MULTI F
MULTI F MAX

Table 1: Indoor Units—Functions, Controls and Options.

	Indoor Unit Type	ART COOL™ Mirror Wall Mounted	ART COOL™ Gallery	Standard Wall Mounted	Low Wall Console	Ceiling Concealed (Low Static) Ducted	Ceiling Concealed (High Static) Ducted	Four-Way Ceiling Cassette	Vertical-Horizontal Air Handling Unit
Airflow	Air supply outlets	1	3	1	2	1	1	4	1
	Airflow direction (left/right)	Auto	Auto	Auto	Manual				
	Airflow direction (up/down)	Auto	Auto	Auto	Auto			Auto	
	Auto swing (left/right)	√	√	√					
	Auto swing (up/down)	√	√	√	√			√	
	Airflow steps (fan/cool/heat)	6 / 6 / 6	5 / 5 / 4	6 / 6 / 6	5 / 5 / 5	3 / 3 / 3	3 / 3 / 3	4 / 5 / 4	3 / 3 / 3
	Comfort Air (random fan speed)	√	√	√	√			√	
	Jet-cool/Jet Heat (power wind)	√	√	√	√			√	
	Swirl wind							√	
Filter	Washable anti-fungal[1]	√	√	√	√	√	√	√	
	3M Micro Dust Filter[2]	√		√					
	Ventilation							√[4]	
Operation	Drain pump					√	√	√	
	E.S.P. control					√	√		
	Electric heater								o
	High ceiling[5]							√	
	Hot Start	√	√	√	√	√	√	√	√
	Self diagnostics	√	√	√	√	√	√	√	√
	Soft Dry (dehumidification)	√	√	√		√	√	√	√
	Auto operation	√	√	√	√	√	√	√	√
	Auto clean (coil dry)	√	√	√					
	Auto restart	√	√	√	√	√	√	√	
	Child lock	o	o	o	√[6]	o	o	o	o
	Forced operation	√	√	√	√			√	
	Group control	o	o	o	√[6]	o	o	o	o[5]
	Sleep mode	√	√	√	√	√	√	√	√
	Timer (on/off)	√	√	√	√	√	√	√	√
	Weekly schedule	o	o	o	√	√	√	o	√
	Two thermistor control	o	o	o	√	o	o	o	o
Controllers	7-Day programmable controller	o	o	o	o	o	o	o	o
	Simple wired remote controller	o	o	o	o	o	o	o	o
	Wireless LCD remote control	√	√	√	√	o[6]	o[6]	√	o[6]
	Dry contact	o	o	o	o	o	o	o	√[7]
	Dry contact (temperature setting)	o	o	o	o	o	o	o	o
	Central control (LGAP)	√	√	√	√	√	√	√	√
	Connector for Water Sensor	√	√	√	√				
Special Function	Wi-Fi[8]	√	o	√	o	o	o	o	o

[1]Primary washable filters.

[2]Secondary filter

[3]Branch location and static pressure requirements. Requires PTPKQ0 Plasma kit.

[4]Requires ventilation kit PTVK430 (Temperature, humidity, and volume limitations apply).

[5]Group control will affect available features

[6]Requires wired zone controller

[7]For use with 3rd party thermostat

[8]Embedded. Optional for HSD, LVNxxxHV4 4-way VAHU; LDN 9/12 MBH LSD are compatible as of June 2018 production. Not available for 2-way LMVNxxxHV VAHU. LMANxxxHVP Art Cool Gallery compatible as of January 2019 production.

√ = Standard feature

o = Unit option

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FUNCTIONS, CONTROLS AND OPTIONS OVERVIEW

Table 2: Indoor Unit Accessories Overview.

Model No.	Description
For Four-Way Ceiling-Cassette Indoor Units	
PT-QCHW0	Ceiling Grille
PTDCQ	Decorative Cover
PRARH1	Aux Heat Relay Kit
PWFMDD200	Wi-Fi Module
For Wall-Mounted Indoor Units	
PWFMDD200	Wi-Fi Module
AG-9300-LG	Condensate Sensor
PRARS1	Aux Heat Relay Kit
For Low Wall Console Units	
PWFMDD200	Wi-Fi Module
AG-9300-LG	Condensate Sensor
PRARH1	Aux Heat Relay Kit
For Vertical-Horizontal Air Handing Units	
PNDFJ0	Downflow Conversion Kit (18/24/36MBH)
ANEH033B1	3 kW Electric Heater (18-36MBH)
ANEH053B1	5 kW Electric Heater (18-36MBH)
ANEH083B2	8 kW Electric Heater (18-36MBH)
ANEH103B2	10 kW Electric Heater (18-36MBH)
PRARH1	Aux Heat Relay Kit
PWFMDD200	Wi-Fi Module
For Ceiling-Concealed Duct (Low Static) Indoor Units	
PWFMDD200	Wi-Fi Module
For Ceiling-Concealed Duct (High Static) Indoor Units	
ZFBXM101A	High Efficiency Filter Box for LHN248HV
ZFBXM201A	High Efficiency Filter Box for LHN368HV
ZFBXD201A	Dynamic V8 2VL Low Profile Air Cleaner
ZPLMV201A	Dynamic 2VL Air Cleaner Low Profile Return Air Plenum
ZFBXD402A	Dynamic V8 4VL Low Profile Air Cleaner
ZPLMV402A	Dynamic 4VL Air Cleaner Low Profile Return Air Plenum
ZFLT1301A	4-Pack Dynamic V8 VL Air Cleaner Replacement Filter Pads
ZFLT1302A	24-Pack Dynamic V8 VL Air Cleaner Replacement Filter Pads
ZGRLRA01A	Dynamic V8 Air Cleaner Louvered Return Air Grille (one per plenum)
ZGRLRA02A	Dynamic V8 Air Cleaner Egg Crate Return Air Grille (one per plenum)
PRARH1	Aux Heat Relay Kit
PWFMDD200	Wi-Fi Module
Controls Accessories	
PQWRHQ0FDB	Wireless Handheld Remote (Duct/VAHU)
PREMTA000A	Premium Controller
PREMTC00U	Simple Controller
PREMTBVC0	MultiSITE CRC1 Base Controller
PREMTBVC1	MultiSITE CRC1 Plus Controller
ZVRCZ****	MultiSITE CRC1 Wireless Accessories
PDRYCB100	Dry Contact (Simple)
PDRYCB320	Dry Contact (3rd party controller)
PDRYCB400	Dry Contact (Setback)
ZRTBS01	Remote Temp Sensor (Cassette/Console/Duct/VAHU)
PZCWRCG3	Group Control Cable Kit
PZCWRC1	Controller Extension Cable

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ART COOL™ MIRROR INDOOR UNIT DATA

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ART COOL MIRROR INDOOR UNITS

Mechanical Specifications and Features

MULTI F
MULTI F MAX

ART COOL Mirror Wall-Mounted Indoor Units

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. ART COOL Mirror Wall-Mounted indoor units have a sound rating no higher than 44 dB(A) as tested per KSA0701 ISO Standard 3745.

Coil

Indoor unit coils are comprised of a minimum of two rows of aluminum fins mechanically bonded to copper tubing. The coils are pressure tested at the factory. Each unit is provided with a factory installed condensate drain pan below the coil.

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare. All refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

Units are designed to mount on a vertical surface, and are shipped with a separate back plate that secures the unit to the wall, protruding no more than nine (9) inches. Unit is designed so that refrigerant piping can be installed in one (1) of four (4) different directions.

Finish

The Art Cool Mirror unit has a flat, architectural panel with a smoked charcoal mirror finish. Unit casing has a dark grey finish and is manufactured of heavy-duty acrylonitrile butadiene styrene (ABS) and high impact polystyrene (HIPS) plastic.

Fan Assembly and Control

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

Figure 1: Multi F Art Cool Mirror Wall-Mounted Indoor Unit.

Air Filter

Return air inlet has a factory-supplied primary removable, washable filter. The unit is also equipped with a secondary 3M Micro Dust filter. Filters are accessed from the front of the unit without the use of tools.

Airflow Guide Vanes

A motorized guide vane is factory installed, and allows the ability to control the direction of airflow from side to side. A motorized louver provides an automatic change in airflow by directing the air up and down to provide uniform air distribution.

Microprocessor Control

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

Controls

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

Condensate

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

Features

- Inverter (Variable speed fan)
- Comfort Air
- 3M filter
- Jet cool/Jet heat
- Group Control
- Self-cleaning indoor coil
- Auto operation
- Auto restart operation
- Built-in wi-fi
- Dehumidifying function
- Self diagnosis function
- Wireless LCD remote control included

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ART COOL MIRROR INDOOR UNITS

General Data / Specifications

Table 3: Multi F Art Cool Mirror Indoor Unit General Data.

Model Name	LAN090HSV5	LAN120HSV5	LAN180HSV5
Nominal Cooling Capacity (Btu/h)[1]	9,000	12,000	18,000
Nominal Heating Capacity (Btu/h)[1]	10,900	13,600	21,600
Operating Range			
Cooling (°F WB)	57-77		
Heating (°F DB)	59-81		
Fan			
Type	Cross Flow		
Motor Output (W) x Qty.	30 x 1		60.0 x 1
Motor/Drive	Brushless Digitally Controlled / Direct		
Airflow Rate CFM (H/M/L)	268 / 218 / 169	282 / 233 / 177	558 / 438 / 353
Unit Data			
Refrigerant Type[2]	R410A		
Refrigerant Control	EEV		
Power Supply V, Ø, Hz[3]	208-230, 1, 60		
Rated Amps (A)	0.4		
Sound Pressure Level dB(A) (H/M/L)[4]	36 / 32 / 27	38 / 34 / 29	44 / 38 / 34
Dimensions (W x H x D, in.)	32-15/16 x 12-1/8 x 7-9/16		39-9/32 x 13-19/32 x 8-11/32
Net Unit Weight (lbs.)	20.5		29.8
Shipping Weight (lbs.)	25.6		36.4
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 14		
Heat Exchanger (Row x Column x Fin / inch) x Number	(2 x 23 x 22) x 1		(2 x 16 x 20) x 1
Pipe Size			
Liquid (in.)	1/4		
Vapor (in.)	3/8		1/2
Connection Size			
Liquid (in.)	1/4		3/8
Vapor (in.)	3/8		5/8
Drain O.D. / I.D. (in.)	27/32, 5/8		

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs be minimum 14 AWG, 4-conductor, stranded, shielded or unshielded (if shielded, must be grounded to chassis at ODU only) and must comply with applicable local and national codes.

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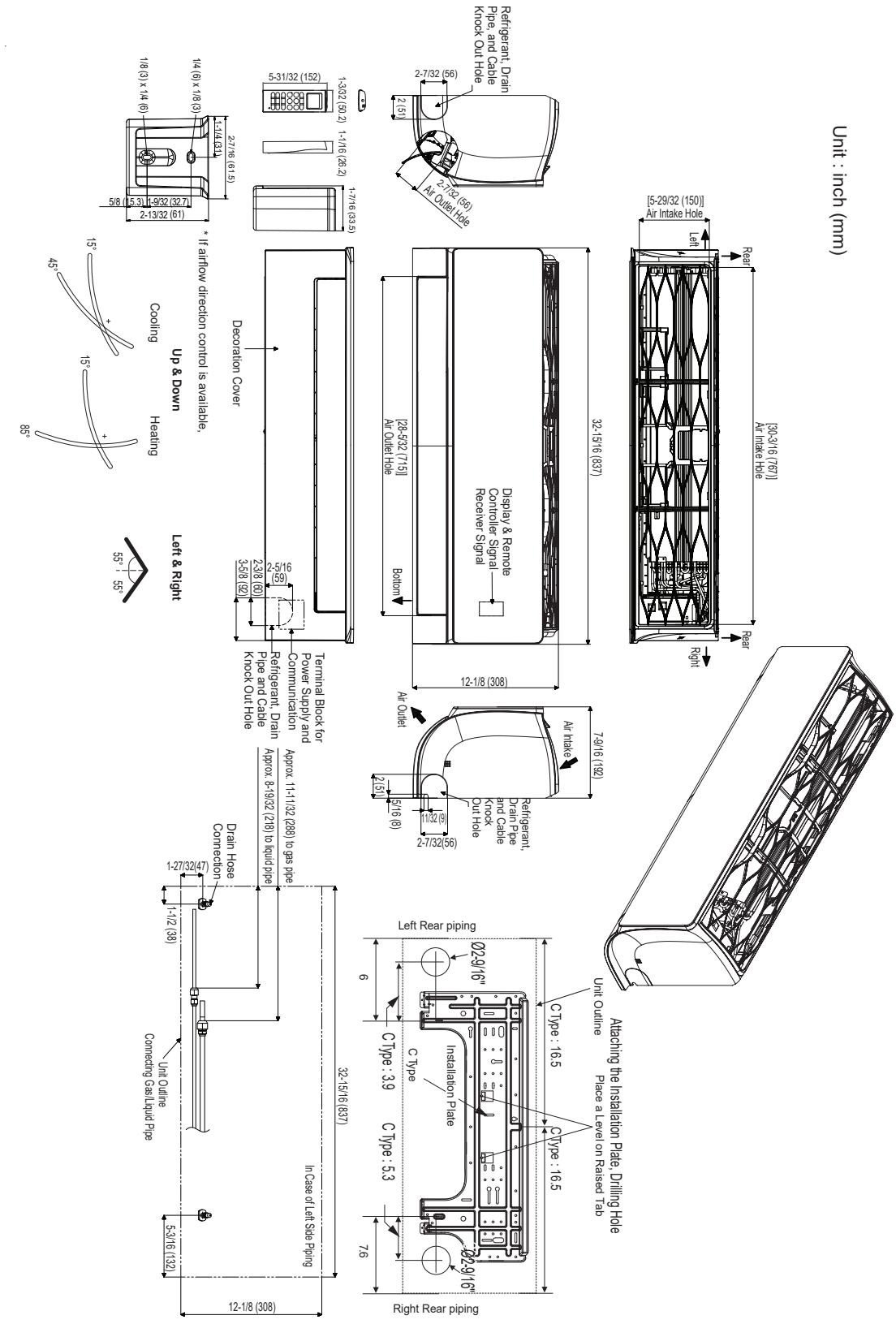
Figure 2: LAN090HSV5 and LAN120HSV5 Dimensions.



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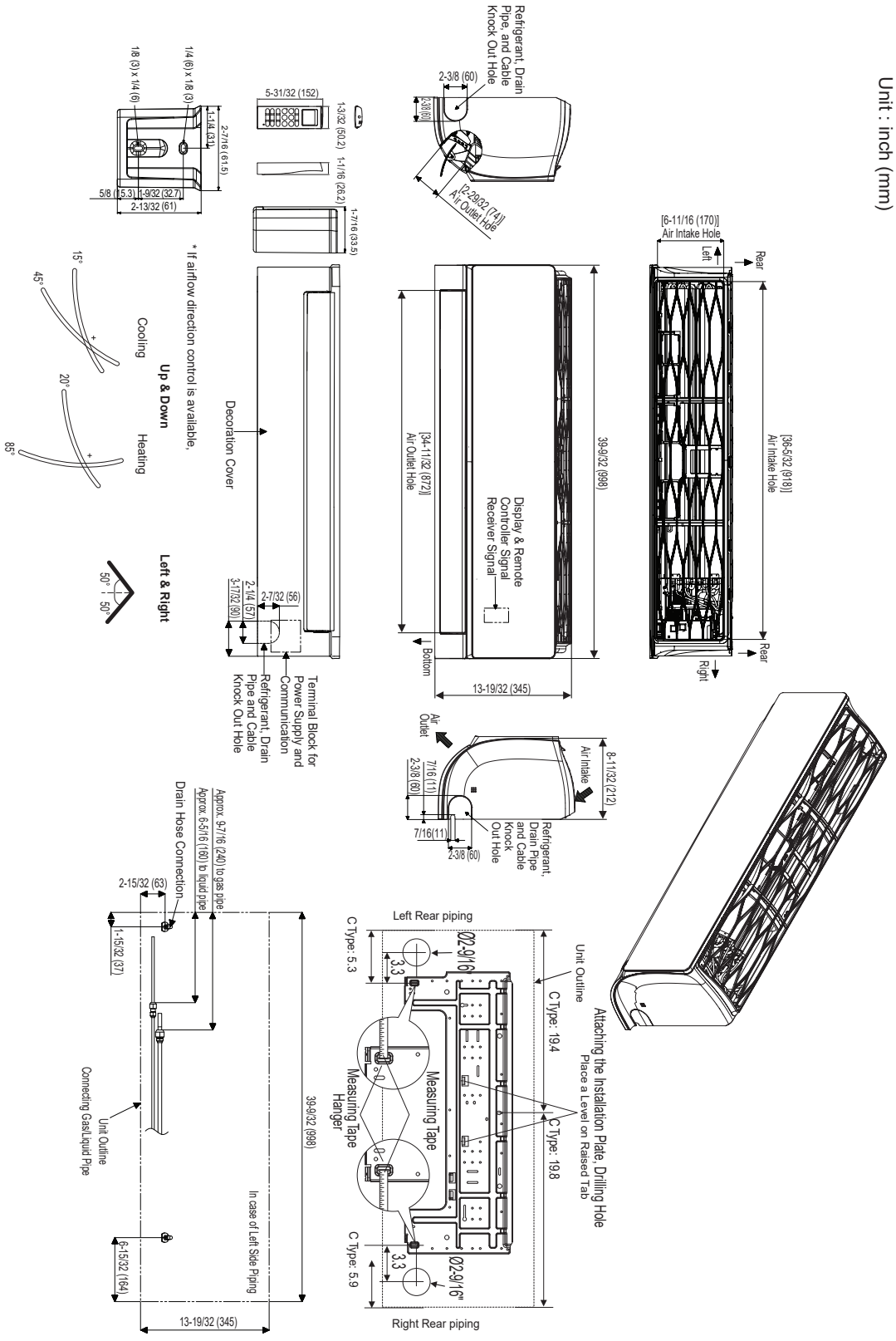
ART COOL MIRROR INDOOR UNITS

Dimensions

Figure 3: LAN180HSV5 Dimensions.



Art Cool Mirror™

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ART COOL MIRROR INDOOR UNITS

Cooling Capacity Table

MULTI F
MULTI F MAX

Table 4: Multi F Art Cool Mirror Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LAN090HSV5 9,000	14	8.82	6.04	9.37	6.38	9.92	6.18	10.31	6.31	11.01	6.36	11.56	6.48
	20	8.82	6.09	9.36	6.43	9.91	6.23	10.31	6.36	11.01	6.41	11.55	6.53
	25	8.81	6.13	9.36	6.48	9.90	6.27	10.30	6.41	11.00	6.46	11.54	6.58
	30	8.80	6.18	9.35	6.53	9.90	6.32	10.29	6.46	10.99	6.51	11.54	6.63
	35	8.80	6.23	9.34	6.58	9.89	6.37	10.28	6.50	10.98	6.56	11.53	6.68
	40	8.79	6.28	9.33	6.63	9.88	6.42	10.27	6.55	10.97	6.61	11.52	6.73
	45	8.78	6.32	9.33	6.68	9.87	6.47	10.27	6.60	10.96	6.66	11.51	6.78
	50	8.78	6.37	9.32	6.73	9.87	6.51	10.26	6.65	10.96	6.71	11.50	6.83
	55	8.77	6.42	9.31	6.78	9.86	6.56	10.25	6.70	10.95	6.76	11.49	6.88
	60	8.76	6.46	9.31	6.83	9.85	6.61	10.24	6.75	10.94	6.81	11.48	6.93
	65	8.76	6.51	9.30	6.88	9.84	6.66	10.24	6.80	10.93	6.85	11.47	6.98
	70	8.75	6.56	9.29	6.92	9.84	6.70	10.23	6.85	10.92	6.90	11.47	7.03
	75	8.54	6.45	9.08	6.82	9.62	6.61	10.01	6.75	10.71	6.82	11.25	6.96
	80	8.33	6.34	8.87	6.71	9.41	6.51	9.80	6.66	10.49	6.73	11.03	6.87
	85	8.12	6.22	8.66	6.60	9.20	6.41	9.59	6.56	10.28	6.64	10.82	6.79
	90	7.91	6.10	8.45	6.48	8.99	6.31	9.37	6.46	10.06	6.55	10.60	6.70
	95	7.68	6.04	8.22	6.43	8.75	6.26	**9.00**	**6.32**	9.83	6.52	10.36	6.67
	100	7.50	5.88	8.03	6.26	8.57	6.11	8.88	6.22	9.64	6.37	10.17	6.53
	105	7.31	5.72	7.84	6.10	8.38	5.96	8.77	6.12	9.45	6.23	9.99	6.39
	110	7.12	5.52	7.66	5.90	8.19	5.78	8.58	5.94	9.26	6.06	9.80	6.22
	115	6.94	5.36	7.47	5.74	8.01	5.63	8.39	5.79	9.08	5.91	9.61	6.08
	118	6.82	5.32	7.36	5.70	7.89	5.60	8.28	5.76	8.96	5.89	9.50	6.06
	122	6.79	5.30	7.32	5.69	7.86	5.59	8.24	5.76	8.93	5.89	9.46	6.06
LAN120HSV5 12,000	14	11.76	8.51	12.49	8.99	13.22	8.70	13.75	8.88	14.69	8.96	15.42	9.13
	20	11.75	8.57	12.48	9.06	13.21	8.77	13.74	8.95	14.67	9.03	15.40	9.20
	25	11.75	8.64	12.48	9.13	13.20	8.84	13.73	9.02	14.66	9.10	15.39	9.27
	30	11.74	8.71	12.47	9.20	13.19	8.90	13.72	9.09	14.65	9.17	15.38	9.34
	35	11.73	8.77	12.46	9.27	13.18	8.97	13.71	9.16	14.64	9.24	15.37	9.41
	40	11.72	8.84	12.45	9.34	13.17	9.04	13.70	9.23	14.63	9.31	15.36	9.48
	45	11.71	8.90	12.44	9.41	13.16	9.11	13.69	9.30	14.62	9.38	15.35	9.55
	50	11.70	8.97	12.43	9.47	13.15	9.17	13.68	9.37	14.61	9.45	15.33	9.62
	55	11.69	9.03	12.42	9.54	13.14	9.24	13.67	9.44	14.60	9.52	15.32	9.70
	60	11.68	9.10	12.41	9.61	13.13	9.31	13.66	9.50	14.59	9.58	15.31	9.77
	65	11.67	9.17	12.40	9.68	13.12	9.38	13.65	9.57	14.57	9.65	15.30	9.84
	70	11.66	9.23	12.39	9.75	13.11	9.44	13.64	9.64	14.56	9.72	15.29	9.91
	75	11.38	9.08	12.11	9.60	12.83	9.31	13.35	9.51	14.27	9.60	15.00	9.79
	80	11.10	8.92	11.82	9.45	12.55	9.17	13.07	9.38	13.99	9.48	14.71	9.68
	85	10.83	8.76	11.54	9.29	12.26	9.03	12.78	9.24	13.70	9.36	14.42	9.56
	90	10.55	8.60	11.26	9.13	11.98	8.88	12.50	9.10	13.42	9.22	14.13	9.43
	95	10.25	8.51	10.96	9.05	11.67	8.82	**12.00**	**8.90**	13.10	9.18	13.81	9.39
	100	10.00	8.28	10.71	8.82	11.42	8.61	11.84	8.76	12.85	8.98	13.56	9.20
	105	9.75	8.05	10.46	8.59	11.17	8.40	11.69	8.62	12.60	8.78	13.31	9.01
	110	9.50	7.77	10.21	8.31	10.92	8.14	11.44	8.37	12.35	8.53	13.07	8.76
	115	9.25	7.54	9.96	8.08	10.67	7.92	11.19	8.15	12.10	8.33	12.82	8.56
	118	9.10	7.49	9.81	8.03	10.52	7.88	11.04	8.12	11.95	8.30	12.67	8.54
	122	9.05	7.47	9.76	8.01	10.48	7.87	10.99	8.11	11.90	8.29	12.62	8.53

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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ART COOL MIRROR INDOOR UNITS

Cooling Capacity Table

Table 5: Multi F Art Cool Mirror Indoor Units Cooling Capacity Table (continued).

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LAN180HSV5 18,000	14	17.65	12.33	18.74	13.02	19.84	12.61	20.63	12.88	22.03	12.98	23.12	13.23
	20	17.63	12.43	18.73	13.13	19.82	12.71	20.61	12.98	22.01	13.09	23.11	13.33
	25	17.62	12.52	18.71	13.23	19.81	12.81	20.60	13.08	22.00	13.19	23.09	13.44
	30	17.60	12.62	18.70	13.33	19.79	12.91	20.58	13.18	21.98	13.29	23.07	13.54
	35	17.59	12.71	18.68	13.43	19.78	13.00	20.57	13.28	21.96	13.39	23.05	13.64
	40	17.58	12.81	18.67	13.53	19.76	13.10	20.55	13.38	21.94	13.49	23.04	13.75
	45	17.56	12.90	18.66	13.63	19.75	13.20	20.53	13.48	21.93	13.59	23.02	13.85
	50	17.55	13.00	18.64	13.73	19.73	13.30	20.52	13.58	21.91	13.69	23.00	13.95
	55	17.54	13.10	18.63	13.83	19.72	13.39	20.50	13.68	21.89	13.79	22.98	14.05
	60	17.52	13.19	18.61	13.93	19.70	13.49	20.49	13.78	21.88	13.89	22.97	14.16
	65	17.51	13.29	18.60	14.03	19.69	13.59	20.47	13.87	21.86	13.99	22.95	14.26
	70	17.50	13.38	18.58	14.13	19.67	13.69	20.46	13.97	21.84	14.09	22.93	14.36
	75	17.08	13.16	18.16	13.92	19.24	13.49	20.03	13.79	21.41	13.92	22.50	14.20
	80	16.66	12.93	17.74	13.70	18.82	13.30	19.60	13.60	20.98	13.75	22.06	14.03
	85	16.24	12.70	17.32	13.47	18.40	13.09	19.17	13.40	20.55	13.56	21.63	13.85
	90	15.82	12.46	16.90	13.23	17.97	12.88	18.75	13.19	20.12	13.37	21.20	13.67
	95	15.37	12.33	16.44	13.12	17.51	12.78	**18.00**	**12.90**	19.65	13.30	20.72	13.61
	100	14.99	12.00	16.06	12.78	17.13	12.47	17.77	12.70	19.28	13.01	20.35	13.33
	105	14.62	11.67	15.69	12.45	16.76	12.17	17.53	12.50	18.90	12.73	19.97	13.05
	110	14.24	11.27	15.32	12.05	16.39	11.79	17.16	12.13	18.53	12.36	19.60	12.70
	115	13.87	10.93	14.94	11.71	16.01	11.48	16.79	11.82	18.15	12.07	19.22	12.41
	118	13.65	10.85	14.72	11.64	15.79	11.42	16.56	11.77	17.93	12.03	19.00	12.37
	122	13.57	10.83	14.64	11.62	15.71	11.40	16.49	11.75	17.85	12.01	18.92	12.36

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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ART COOL MIRROR INDOOR UNITS

Heating Capacity Table

MULTI F
MULTI F MAX

Table 6: Multi F Art Cool Mirror Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LAN090HSV5 10,900	0	-0.4	5.61	5.53	5.48	5.45	5.37	5.14
	5	4.5	6.32	6.24	6.18	6.16	6.08	5.85
	10	9	7.03	6.95	6.90	6.88	6.79	6.56
	17	15	7.98	7.90	7.85	**7.82**	7.75	7.48
	20	19	8.33	8.26	8.21	8.18	8.09	7.82
	25	23	8.93	8.85	8.79	8.77	8.69	8.37
	30	28	9.44	9.36	9.31	9.29	9.20	8.93
	35	32	9.96	9.87	9.82	9.79	9.72	9.47
	40	36	10.42	10.33	10.28	10.25	10.18	9.94
	45	41	10.87	10.80	10.74	10.71	10.64	10.40
	47	43	11.06	10.98	10.93	**10.90**	10.82	10.59
	50	46	11.24	11.15	11.10	11.08	10.99	10.73
	55	51	11.53	11.46	11.40	11.37	11.30	10.98
	60	56	11.53	11.46	11.40	11.37	11.30	11.03
	63	59	11.53	11.46	11.40	11.37	11.30	11.06
	68	64	11.53	11.46	11.40	11.37	11.30	11.11
LAN120HSV5 13,600	0	-0.4	7.00	6.90	6.83	6.80	6.70	6.50
	5	4.5	7.89	7.78	7.71	7.69	7.59	7.40
	10	9	8.78	8.67	8.60	8.58	8.48	8.31
	17	15	9.95	9.86	9.79	**9.76**	9.67	9.47
	20	19	10.40	10.30	10.23	10.20	10.10	9.90
	25	23	11.14	11.03	10.96	10.95	10.85	10.60
	30	28	11.78	11.67	11.60	11.59	11.49	11.30
	35	32	12.42	12.31	12.24	12.21	12.13	11.99
	40	36	13.00	12.89	12.82	12.79	12.70	12.58
	45	41	13.56	13.46	13.39	13.36	13.28	13.16
	47	43	13.80	13.70	13.63	**13.60**	13.50	13.40
	50	46	14.02	13.91	13.84	13.82	13.72	13.59
	55	51	14.39	14.29	14.22	14.19	14.10	13.90
	60	56	14.39	14.29	14.22	14.19	14.10	13.96
	63	59	14.39	14.29	14.22	14.19	14.10	14.00
	68	64	14.39	14.29	14.22	14.19	14.10	14.06
LAN180HSV5 21,600	0	-0.4	11.11	10.96	10.85	10.80	10.64	10.18
	5	4.5	12.52	12.37	12.26	12.21	12.06	11.58
	10	9	13.93	13.77	13.67	13.61	13.46	12.99
	17	15	15.81	15.65	15.55	**15.49**	15.34	14.84
	20	19	16.51	16.36	16.25	16.20	16.04	15.49
	25	23	17.69	17.53	17.43	17.37	17.22	16.59
	30	28	18.70	18.55	18.44	18.39	18.24	17.69
	35	32	19.72	19.56	19.46	19.41	19.25	18.79
	40	36	20.63	20.48	20.37	20.32	20.17	19.70
	45	41	21.55	21.39	21.29	21.24	21.08	20.61
	47	43	21.91	21.76	21.65	**21.60**	21.44	20.98
	50	46	22.26	22.11	22.01	21.95	21.80	21.27
	55	51	22.86	22.70	22.59	22.53	22.38	21.76
	60	56	22.86	22.70	22.59	22.53	22.38	21.85
	63	59	22.86	22.70	22.59	22.53	22.38	21.91
	68	64	22.86	22.70	22.59	22.53	22.38	22.02

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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).

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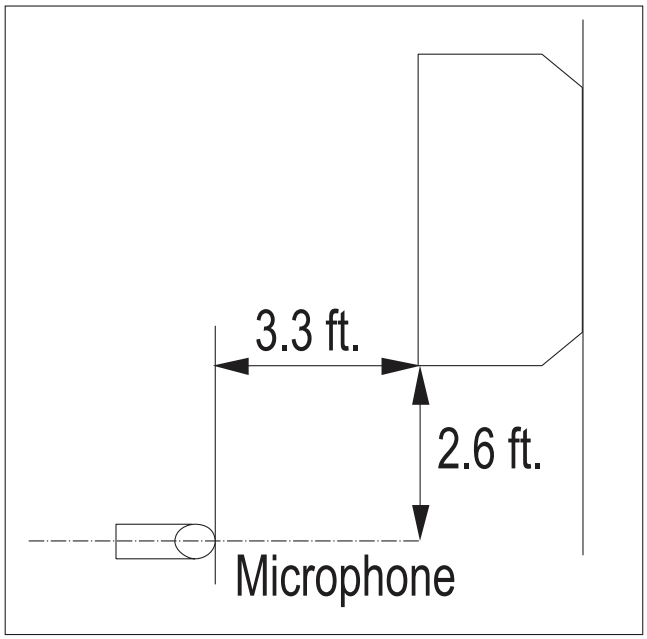
ART COOL MIRROR INDOOR UNITS

Acoustic Data

Figure 4: Sound Pressure Level Measurement Location.



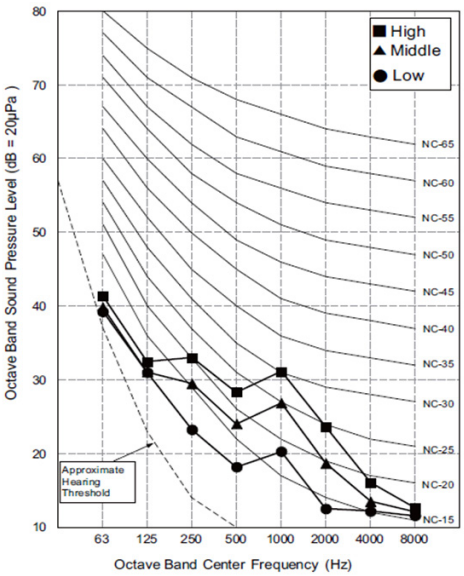
- Measurement taken 2.6' below the bottom of the unit and at a distance of 3.3' from face of unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient)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

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

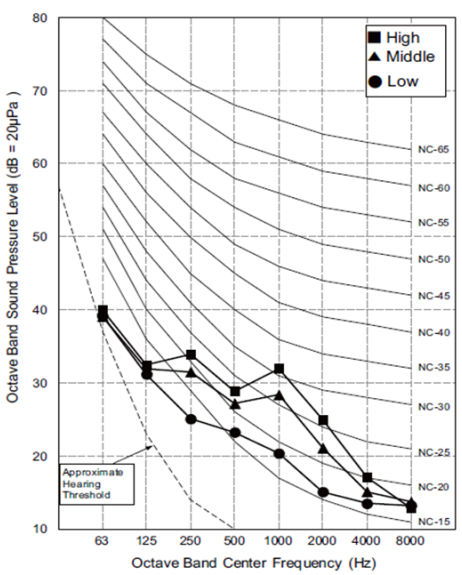
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LAN090HSV5	36	32	27
LAN120HSV5	38	34	29
LAN180HSV5	44	38	34

Figure 5: Sound Pressure Level Diagrams.

LAN090HSV5



LAN120HSV5



LAN180HSV5

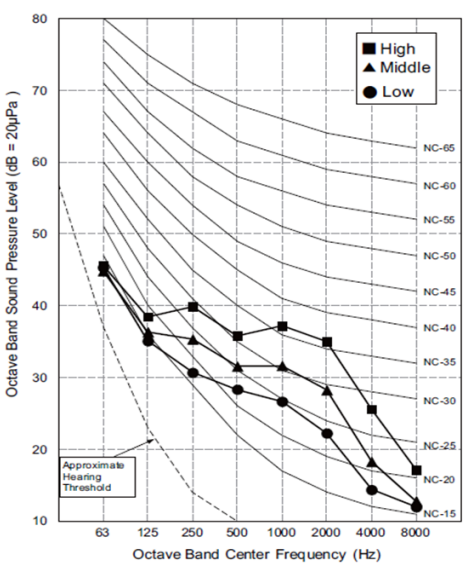


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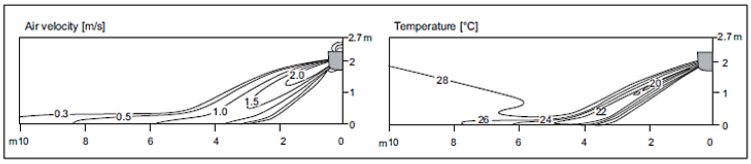
Figure 6: LAN090HSV5 and LAN120HSV5 Air Velocity and Temperature Distribution Charts.

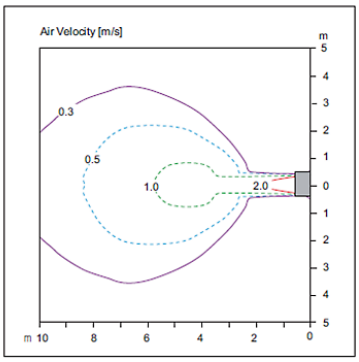
Cooling

Side View
Discharge angle: 35°

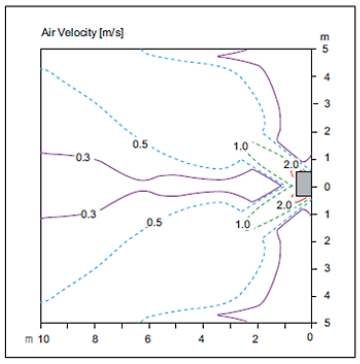


- Vertical Louver : Center
- Fan speed : Power

Top View
Discharge angle: 35°



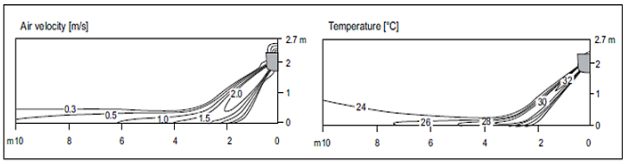
- Vertical Louver : Center
- Vertical Vane : 0°
- Fan speed : Power
- Air speed 0.3m/s Range : 11.0m



- Vertical Louver : Left & Right
- Vertical Vane : 55°
- Fan speed : Power

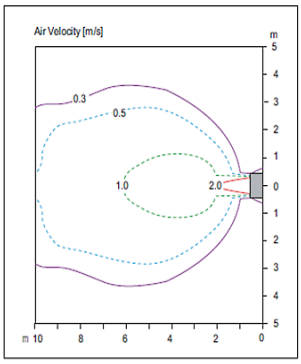
Heating

Side View
Discharge angle: 55°

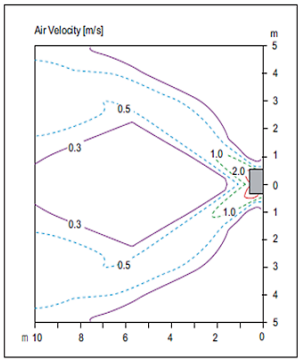


- Vertical Louver : Center
- Fan speed : Power

Top View
Discharge angle: 55°



- Vertical Louver : Center
- Vertical Vane : 0°
- Fan speed : Power
- Air speed 0.3m/s Range : 13.2m

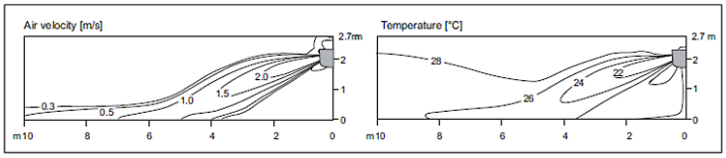


- Vertical Louver : Left & Right
- Vertical Vane : 55°
- Fan speed : Power

Figure 7: LAN180HSV5 Air Velocity and Temperature Distribution Charts.

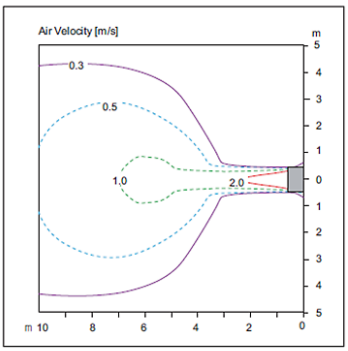
Cooling

Side View
Discharge angle: 25°

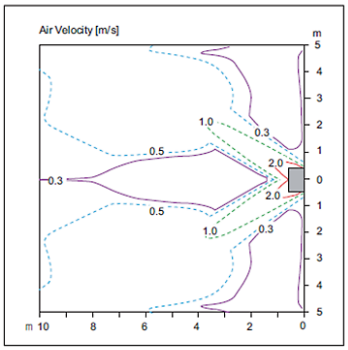


- Vertical Louver : Center
- Fan speed : Power

Top View
Discharge angle: 25°



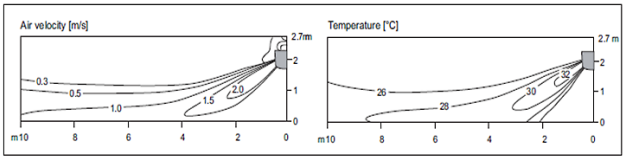
- Vertical Louver : Center
- Vertical Vane : 0°
- Fan speed : Power
- Air speed 0.3m/s Range : 12.9m



- Vertical Louver : Left & Right
- Vertical Vane : 50°
- Fan speed : Power

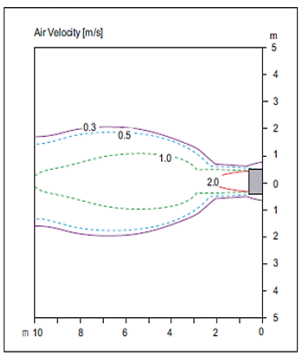
Heating

Side View
Discharge angle: 45°

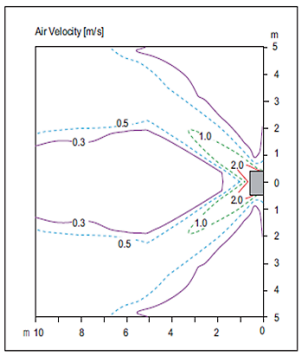


- Vertical Louver : Center
- Fan speed : Power

Top View
Discharge angle: 45°



- Vertical Louver : Center
- Vertical Vane : 0°
- Fan speed : Power
- Air speed 0.3m/s Range : 20.0m



- Vertical Louver : Left & Right
- Vertical Vane : 50°
- Fan speed : Power

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ART COOL MIRROR INDOOR UNITS

Refrigerant Flow Diagram

Figure 8: Art Cool Mirror Indoor Unit Refrigerant Flow Diagram.

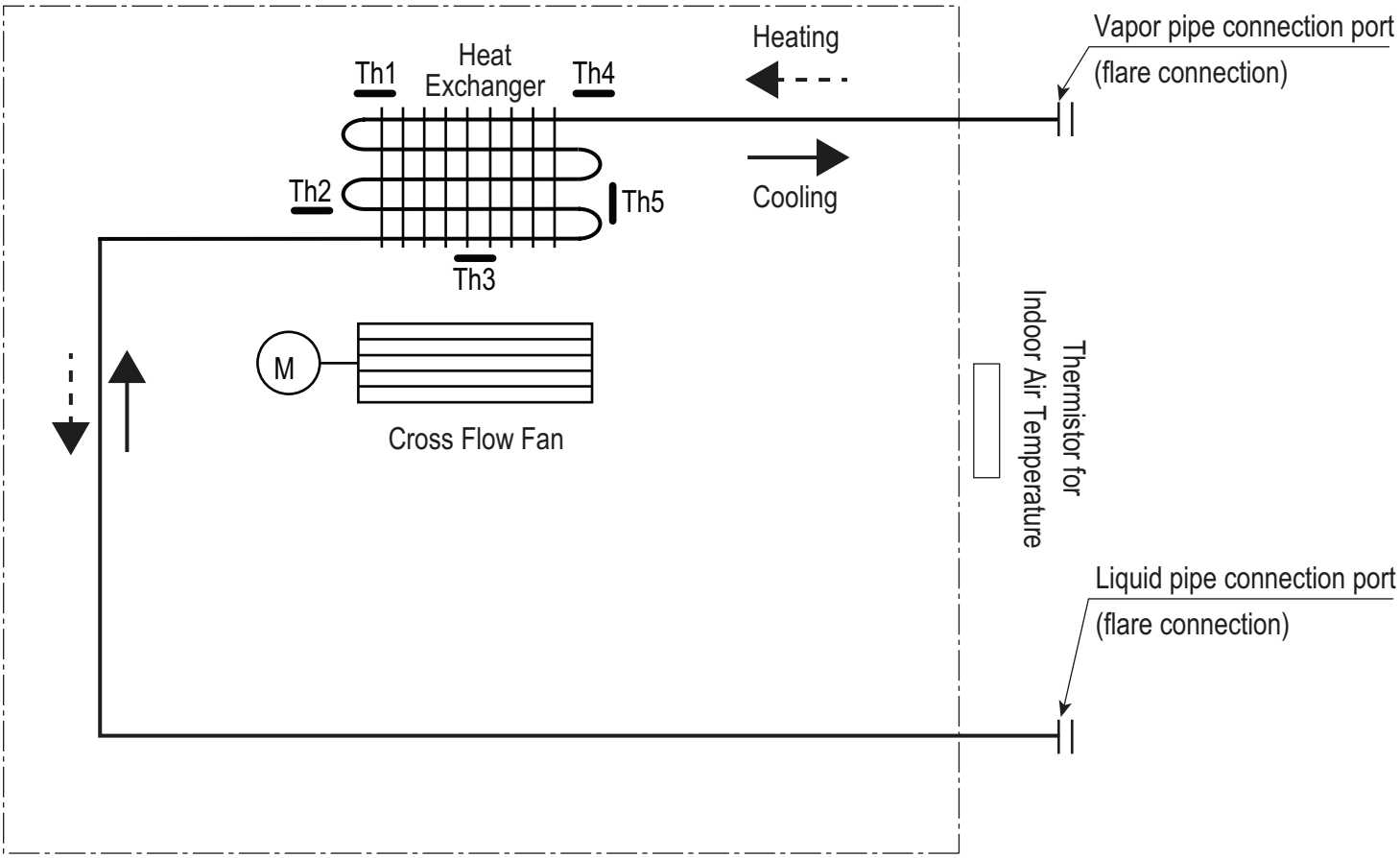

Table 8: Art Cool Mirror Indoor Unit Refrigerant Pipe Sizes.

Indoor Unit Capacity	Vapor Line Size (in., OD)	Liquid Line Size (in., OD)
9,000 Btu/h	Ø3/8	Ø1/4
12,000 Btu/h		
18,000 Btu/h	Ø1/2	

Table 9: Art Cool Mirror Indoor Unit Refrigerant Pipe Connections

Indoor Unit Capacity	Vapor Line Connection (in., OD)	Liquid Line Connection (in., OD)
9,000 Btu/h	Ø3/8	Ø1/4
12,000 Btu/h		
18,000 Btu/h	Ø5/8	Ø3/8

Table 10: Art Cool Mirror Indoor Unit Thermistor Details.

Location	Description (Based on Cooling Mode)	IDU PCB Connector
Th1	Indoor Air Temperature Thermistor	CN-TH1
Th2	Evaporator Inlet Temperature Thermistor	
Th3	Evaporator Middle Temperature Thermistor	CN-TH2
Th4	Evaporator Outlet Temperature Thermistor	
Th5	Water Level Sensor (Optional)	CN-TH3

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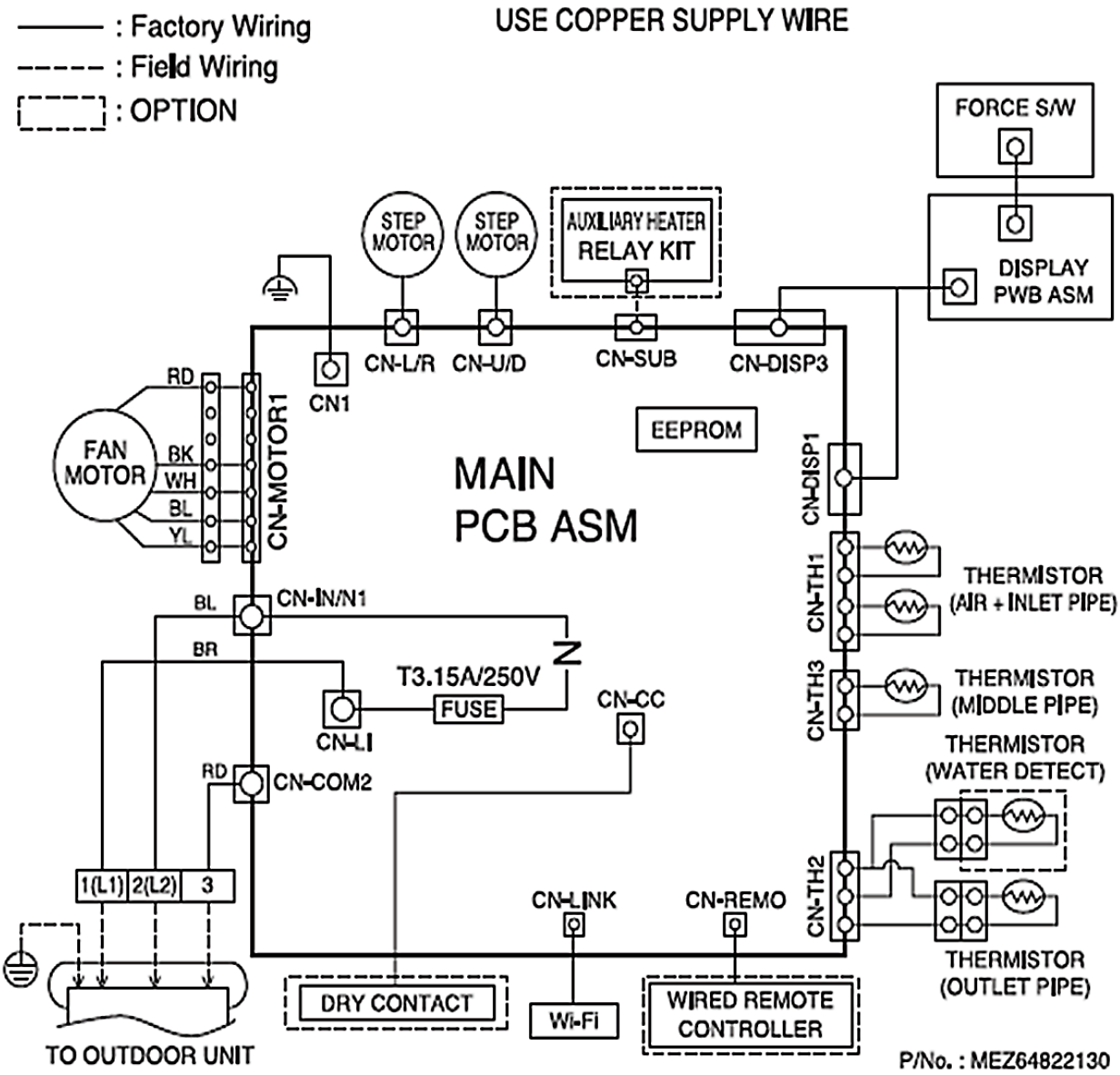
ART COOL MIRROR INDOOR UNITS

Wiring Diagram

Figure 9: Multi F Art Cool Mirror LAN090HSV5, LAN120HSV5, and LAN180HSV5 Indoor Units Wiring Diagram.



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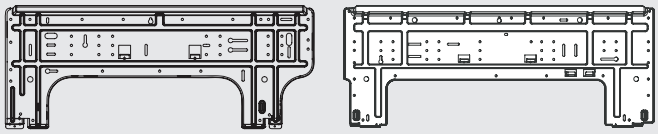
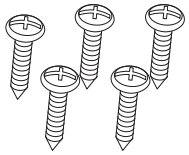
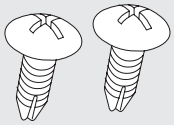
ART COOL MIRROR INDOOR UNITS

Factory Supplied Parts and Materials

Factory Supplied Parts

Table 11: Parts Table.

Part	Quantity	Image
Installation Plate	One (1)	 LAN090HSV5 and LAN120HSV5 LAN180HSV5
Type “A” Screws	Five (5)	
Type “B” Screws (M4 x 12L)	Two (2)	
Wireless Handheld Controller with Holder AKB74955602	One (1)	

Factory Supplied Materials

- Owner’s Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Spanner (Half union)
- Thermometer

⚠WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit’s components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

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ART COOL MIRROR INDOOR UNITS

Installation and Best Layout Practices

MULTI F
MULTI F MAX

⚠ DANGER

To avoid the possibility of fire, ⃠ do not install the unit in an area where combustible gas will generate, flow, stagnate, or leak. Failure to do so will cause serious bodily injury or death. Before beginning installation, read the safety summary at the beginning of this manual.

Select a location for installing the wall-mounted indoor unit (IDU) that meets the following conditions:

- Where there is enough structural strength to bear the weight of the unit
- Where air circulation will not be blocked
- Where noise prevention is taken into consideration
- Ensure there is sufficient space from the ceiling and floor
- Locate the indoor unit in a location where it can be easily connected to the outdoor unit/branch distribution unit
- Include space for drainage to ensure condensate flows properly out of the unit when it is in cooling mode
- Use a level indicator to ensure the unit is installed on a level plane

Note:

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

- ⃠ Do not install the unit where it will be subjected to direct thermal radiation from other heat sources.
- ⃠ Do not install the unit in an area where combustible gas will 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.
- ⃠ Do not install additional ventilation products on the chassis of the unit.
- ⃠ Do not install the unit near high-frequency generator sources.
- ⃠ Do not install the unit near a doorway.

Note:

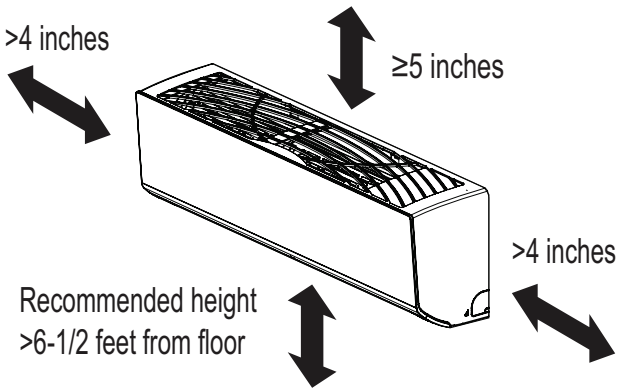
- ⃠ *Indoor units (IDUs) must not be placed in an environment where the IDUs will be exposed to harmful volatile organic compounds (VOCs) or in environments where there is improper air make up or supply or inadequate ventilation. If there are concerns about VOCs in the environment where the IDUs are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

Installing in an Area Exposed to Unconditioned Air

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

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

Figure 10:Minimum Clearance Requirements.



Required Clearances

Figure 10 shows required clearance distances around a typical installed wall-mounted unit.

Mounting the Installation Plate

The mounting wall must be strong and solid enough to protect the unit from vibration.

- Mount the installation plate on the wall using the Type “A” screws. If mounting the unit on concrete, consider using anchor bolts.
- Always mount the installation plate horizontally. Measure the wall and mark the centerline using thread and a level.

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ART COOL MIRROR INDOOR UNITS

Installation and Best Layout Practices

Figure 11:Installation Plate for LAN090HSV5 and LAN120HSV5 Units.

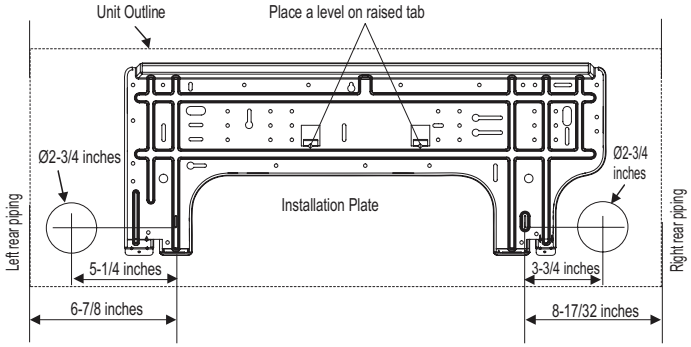
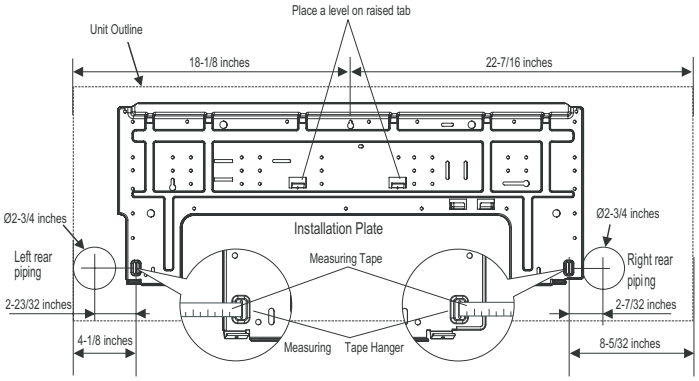


Figure 12:Installation Plate for LAN180HSV5 Units.



Drilling Piping Hole in the Wall

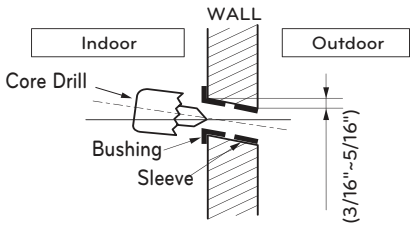
⚠WARNING

Use caution when drilling holes through walls. Drilling into power wiring in the wall can cause serious bodily injury or death.

Follow the left or right piping clearance recommendations.

1. Using a 2-5/8 (ø 65mm) inch hole core drill bit, drill a hole at either the right or left side of the wall mounting. The hole must slant 3/16" to 5/16" from level (upward on the indoor unit side and downward on the outdoor unit side).
2. Finish off the newly drilled hole as shown with bushing and sleeve covering. Sleeve and bushing prevents damage to the tubing/bundling of the piping.

Figure 19:Drilling Piping Hole



Hanging the Indoor Unit Chassis

1. Attach the three (3) hooks on the top of the indoor unit to the top edge of the installation plate. Verify the hooks are properly attached to the installation plate by gently shaking the indoor unit from side to side.
2. Unlock the tubing clamp from the indoor unit frame. For easier access between the bottom of the indoor unit and the wall, prop the clamp between the indoor unit frame and installation plate.
3. Remove the screw covers at the bottom of the indoor unit, unscrew the two (2) screws, remove the frame cover, remove the piping connection cover, and position the piping for installation (down, back, left, or right).

Figure 13:Locking the Indoor Unit onto the Installation Plate.

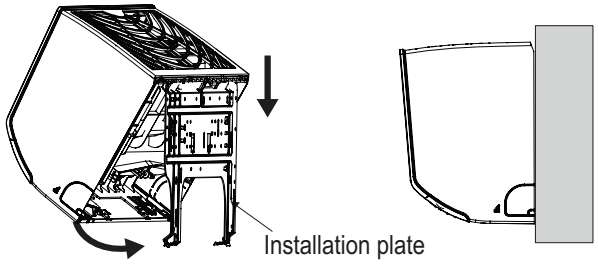


Figure 14:Accessing the Back of the Indoor Unit.

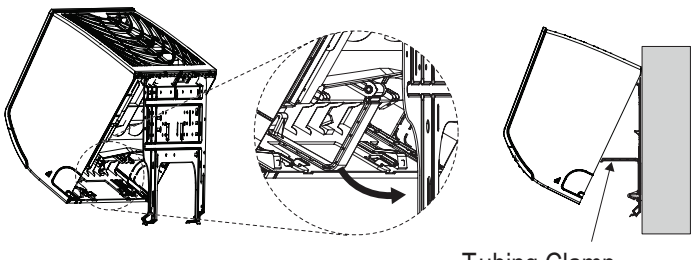


Figure 15:Removing the Frame Cover.

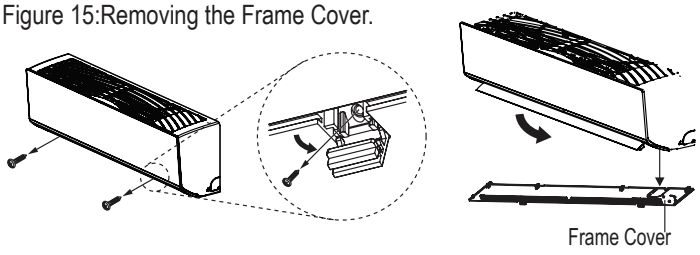


Figure 16:Exterior Back View of Indoor Unit.

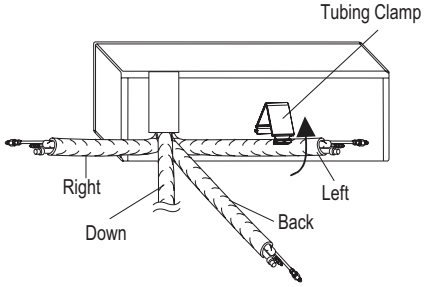


Figure 17:Piping Installed to the Left.

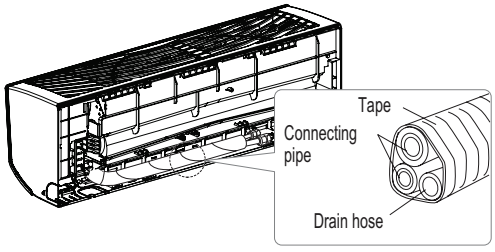
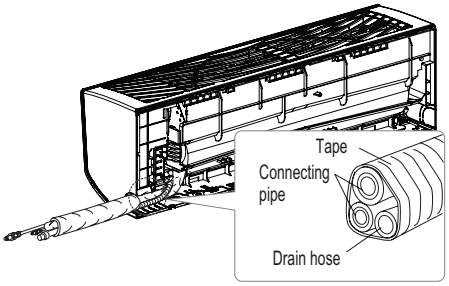


Figure 18:Piping Installed to the Right.



Art Cool Mirror™

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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

• Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

Connecting the Power Wiring and Communications Cable

1. Insert the power wiring/communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) through the bottom of the indoor unit.

2. Connect each wire to its appropriate terminal on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

3. Secure the power wiring/communications cable with the cable restraint.

Figure 20:Connecting the Power Wiring / Communications Cable.

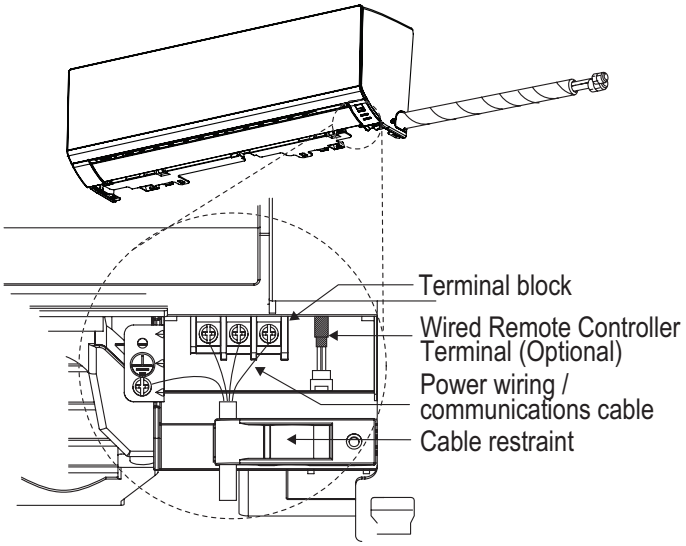


Figure 21:Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections—LAN090HSV5 and LAN120HSV5 models.

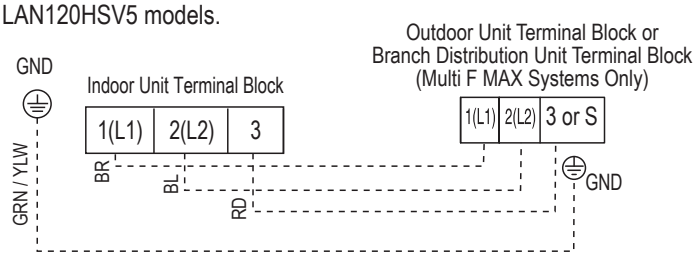
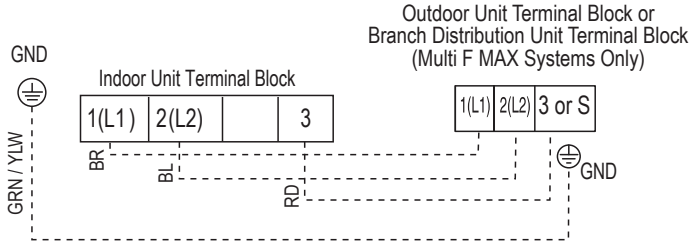


Figure 22:Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections—LAN180HSV5 models.



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ART COOL MIRROR INDOOR UNITS

Installation and Best Layout Practices

Wireless Handheld Controller

Figure 23:AKB74955602 Wireless Controller.

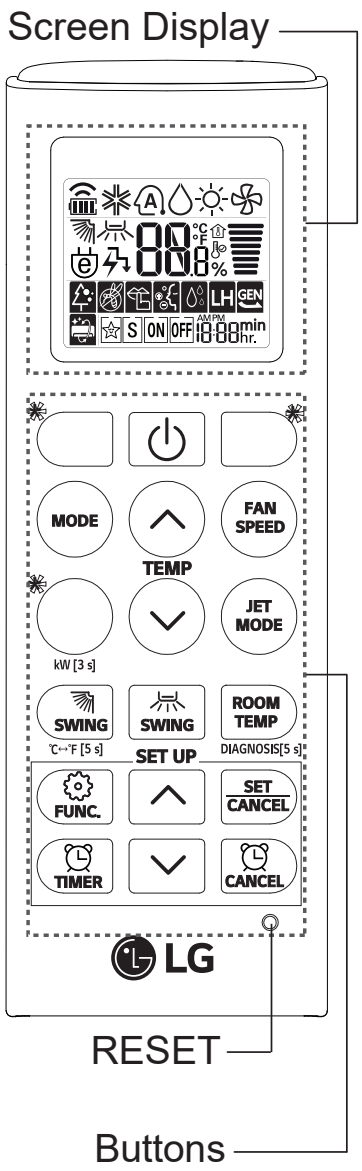

Table 12: AKB74955602 Wireless Controller Functions.

Button	Display Screen	Description
		To purify the air by removing particles that enters the indoor unit.
		To reduce noise from outdoor units.
		To keep your skin moisturized by generating ion clusters.
	Po	To lower indoor humidity quickly.
	LH	To maintain a minimum indoor temperature and prevent indoor objects from freezing.
		To fan away a mosquito.
		To remove moisture generated inside the indoor unit.
	SL	To make the comfortable sleep environment.
RESET	-	To Initialize the remote control settings.

Button	Display Screen	Description
	-	To turn on/off the air conditioner.
		To adjust the desired room temperature in cooling, heating or auto changeover mode.
MODE		To select the cooling mode.
		To select the heating mode.
		To select the dehumidification mode.
		To select the fan mode.
		To select the auto changeover/auto operation mode.
JET MODE	Po	To change room temperature quickly.
FAN SPEED		To adjust the fan speed.
		To adjust the air flow direction vertically or horizontally.
	S ON OFF	To turn on/off air conditioner automatically at desired time.
SET/ CANCEL	-	To set/cancel the special functions and timer.
	-	To cancel the timer settings.
	-	To adjust time.
*LIGHT OFF	-	To set the brightness of the display on the indoor unit.
ROOM TEMP		To display the room temperature.
°C ↔ °F [5 s]	°C °F	To change unit between °C and °F.
*ENERGY SAVING		To minimize power consumption.
*COMFORT AIR		To adjust the air flow to deflect wind.
kW[3 s]	-	To set whether or not to display information regarding energy.
*ENERGY CTRL		To bring the effect of the power saving.
*COMFORT SLEEP		To make the comfortable sleep environment.
DIAGNOSIS [5 s]	-	To conveniently check maintenance information of a product.

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Wired Controller Connections

Figure 24:Wired Controller Connection on the Indoor Unit Terminal Block—LAN090HSV5 and LAN120HSV5 models.

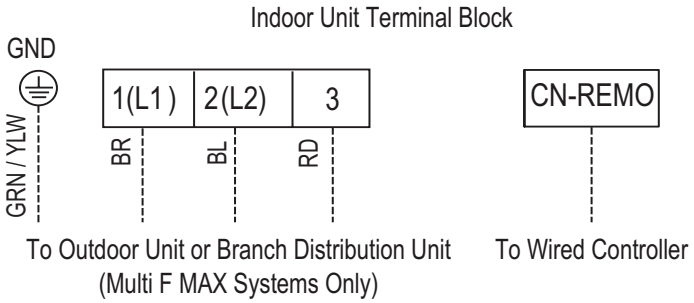
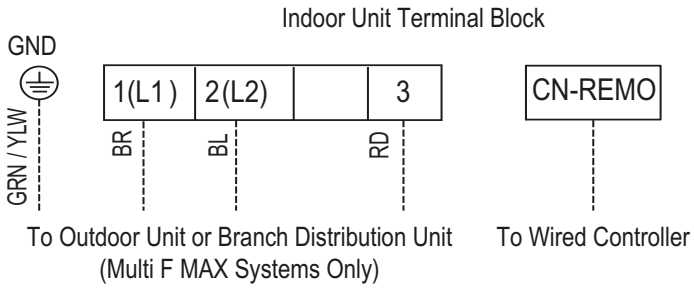


Figure 25:Wired Controller Connection on the Indoor Unit Terminal Block—LAN180HSV5 models.



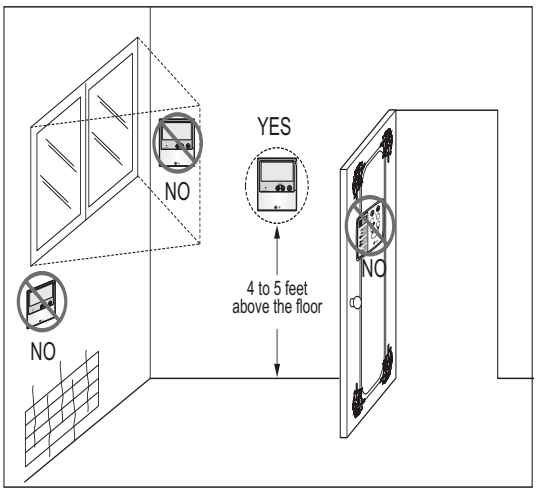
Wired Controller Placement

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

⃠ Do not install the wired controller near or in:

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

Figure 26:Proper Location for the Wired Controller.



Operation Mode Sequence

Cooling Mode
↓
Auto Operation
↓
Dehumidification Mode
↓
Heating Mode

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Hanging the Wired Controller

1. The controller wiring/cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring/cable on applicable side.

2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring/cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 27:Removing the Cable Guide Grooves.

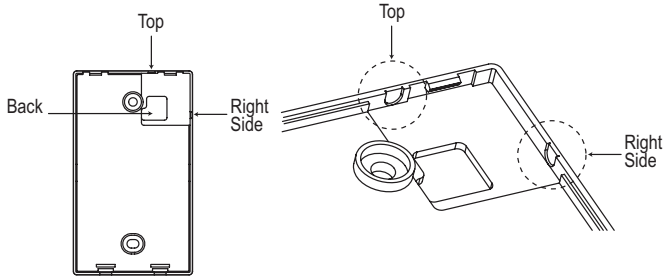


Figure 28:Attaching the Wall Plate.

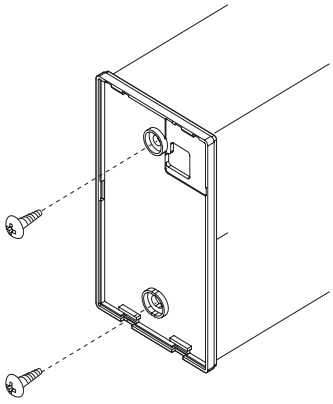
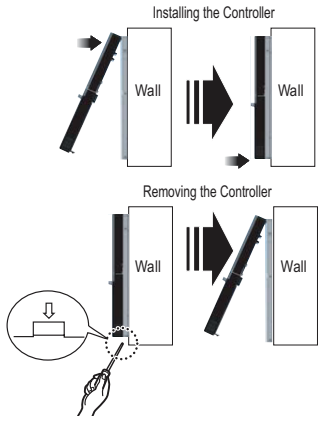


Figure 29:Installing/Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

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ART COOL™ GALLERY INDOOR UNIT DATA

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“General Data / Specifications” on page 30
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“Heating Capacity Table” on page 33
“Acoustic Data” on page 34
“Air Velocity and Temperature Distribution” on page 35
“Refrigerant Flow Diagram” on page 36
“Wiring Diagram” on page 37
“Factory Supplied Parts and Materials” on page 38
“Installation and Best Layout Practices” on page 39

ART COOL GALLERY INDOOR UNITS

Mechanical Specifications and Features

ART COOL Gallery Indoor Units

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Art Cool Gallery indoor units have a sound rating no higher than 42 dB(A) as tested per KSA0701 ISO Standard 3745.

Coil

Indoor unit coils are comprised of a minimum of two rows of aluminum fins mechanically bonded to copper tubing. The coils are pressure tested at the factory. Each unit is provided with a factory installed condensate drain pan below the coil.

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare. All refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

Units are designed to mount on a vertical surface, and are shipped with a separate back plate that secures the unit to the wall, protruding no more than six (6) inches. Unit is designed so that refrigerant piping can be installed in one of four different directions.

Cases / Finishes

The Art Cool Gallery unit has a frame that can accommodate a 20" x 20" photograph, picture or artwork. Unit casing has a gray finish and is manufactured of heavy-duty acrylonitrile butadiene styrene (ABS) and high impact polystyrene (HIPS) plastic.

Fan Assembly and Control

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

Figure 30: Multi F Art Cool Gallery Indoor Unit.

Air Filter

Return air is filtered with a factory-supplied, removable, washable pre-filter. Filter access is from the front of the unit without the use of tools.

Airflow Guide Vanes

Motorized oscillating guide vanes are factory installed, and allows the ability to control the direction of airflow from side to side. A motorized air sweep louver provides an automatic change in airflow by directing the air up and down to provide uniform air distribution.

Microprocessor Control

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

Controls

The indoor unit casing has a factory-standard, integral infrared sensor designed to communicate with the supplied LG wireless handheld remote controller. An optional LG supplied wired controller is available as an additional accessory. Communication between the indoor units and the outdoor unit is accomplished through 14 AWG, four-core, stranded and shielded power / communication cable.

Condensate

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

Features

- Inverter (Variable speed fan)
- Chaos swing
- Jet cool
- Group control
- Self-cleaning indoor coil
- Auto operation / auto restart operation
- 24-Hour on/off timer
- Wireless LCD remote control included; wired thermostat available (sold separately)

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ART COOL GALLERY INDOOR UNITS

General Data / Specifications

MULTI F
MULTI F MAX

Table 13: Multi F Art Cool Gallery Indoor Unit General Data.

Model Name	LMAN097HVP	LMAN127HVP
Nominal Cooling Capacity (Btu/h)[1]	9,000	11,200
Nominal Heating Capacity (Btu/h)[1]	10,400	13,300
Operating Range		
Cooling (°F WB)	57-77	57-77
Heating (°F DB)	59-81	59-81
Fan		
Type	Turbo	Turbo
Motor Output (W) x Qty.	24 x 1	24 x 1
Motor/Drive	Brushless Digitally Controlled / Direct	Brushless Digitally Controlled / Direct
Airflow Rate CFM (H/M/L)	272 / 208 / 155	314 / 258 / 198
Unit Data		
Refrigerant Type[2]	R410A	R410A
Refrigerant Control	EEV	EEV
Power Supply V, Ø, Hz[3]	208-230, 1, 60	208-230, 1, 60
Rated Amps (A)	0.2	0.2
Sound Pressure Level dB(A) (H/M/L)[4]	39 / 35 / 31	42 / 38 / 34
Dimensions (W x H x D, in.)	23-5/8 x 23-5/8 x 5-25/32	23-5/8 x 23-5/8 x 5-25/32
Net Unit Weight (lbs.)	32	32
Shipping Weight (lbs.)	37	37
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 14	4 x 14
Heat Exchanger (Row x Column x Fin / inch) x Number	(2 x 20 x 21) x 1	(2 x 20 x 21) x 1
Piping		
Liquid (in.)	1/4	1/4
Vapor (in.)	3/8	3/8
Drain O.D. / I.D. (in.)	27/32, 5/8	27/32, 5/8

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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).
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).

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs be minimum 14 AWG, 4-conductor, stranded, shielded or unshielded (if shielded, must be grounded to chassis at ODU only) and must comply with applicable local and national codes.

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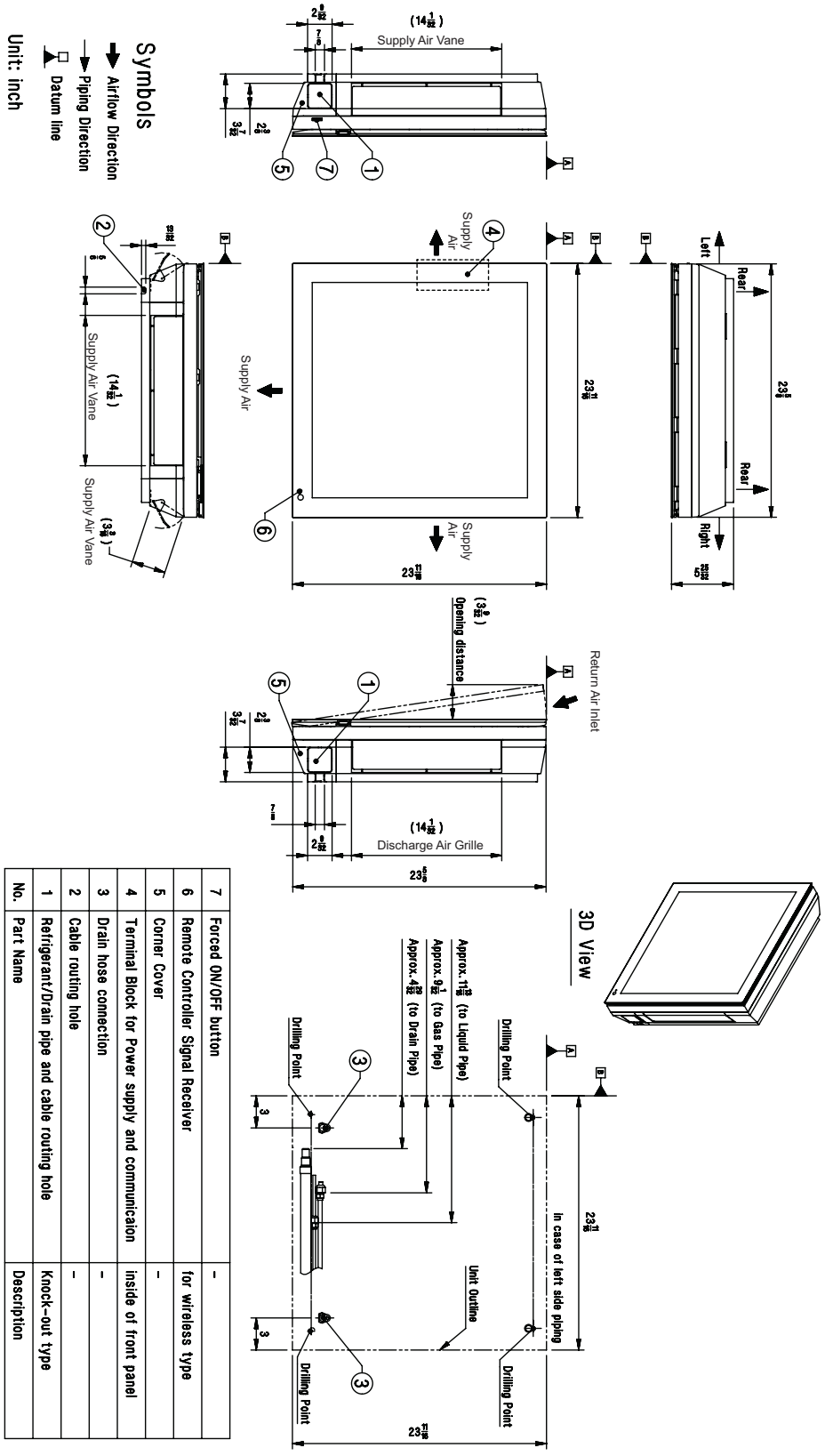
LG

ART COOL GALLERY INDOOR UNITS

Dimensions

Figure 31: LMAN097HVP and LMAN127HVP Dimensions.



No.	Part Name	Description
1	Refrigerant/Drain pipe and cable routing hole	Knock-out type
2	Cable routing hole	-
3	Drain hose connection	-
4	Terminal Block for Power supply and communicaion	inside of front panel
5	Corner Cover	-
6	Remote Controller Signal Receiver	for wireless type
7	Forced ON/OFF button	-

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ART COOL GALLERY INDOOR UNITS

Cooling Capacity Table

MULTI F
MULTI F MAX

Table 14: Multi F Art Cool Gallery Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LMAN097HVP 9,000	14	8.82	5.68	9.37	6.00	9.92	5.81	10.31	5.93	11.01	5.98	11.56	6.09
	20	8.82	5.72	9.36	6.04	9.91	5.85	10.31	5.98	11.01	6.03	11.55	6.14
	25	8.81	5.77	9.36	6.09	9.90	5.90	10.30	6.02	11.00	6.07	11.54	6.19
	30	8.80	5.81	9.35	6.14	9.90	5.94	10.29	6.07	10.99	6.12	11.54	6.23
	35	8.80	5.85	9.34	6.18	9.89	5.99	10.28	6.11	10.98	6.17	11.53	6.28
	40	8.79	5.90	9.33	6.23	9.88	6.03	10.27	6.16	10.97	6.21	11.52	6.33
	45	8.78	5.94	9.33	6.28	9.87	6.08	10.27	6.21	10.96	6.26	11.51	6.38
	50	8.78	5.99	9.32	6.32	9.87	6.12	10.26	6.25	10.96	6.30	11.50	6.42
	55	8.77	6.03	9.31	6.37	9.86	6.17	10.25	6.30	10.95	6.35	11.49	6.47
	60	8.76	6.07	9.31	6.42	9.85	6.21	10.24	6.34	10.94	6.40	11.48	6.52
	65	8.76	6.12	9.30	6.46	9.84	6.26	10.24	6.39	10.93	6.44	11.47	6.56
	70	8.75	6.16	9.29	6.51	9.84	6.30	10.23	6.43	10.92	6.49	11.47	6.61
	75	8.54	6.06	9.08	6.41	9.62	6.21	10.01	6.35	10.71	6.41	11.25	6.54
	80	8.33	5.96	8.87	6.31	9.41	6.12	9.80	6.26	10.49	6.33	11.03	6.46
	85	8.12	5.85	8.66	6.20	9.20	6.03	9.59	6.17	10.28	6.24	10.82	6.38
	90	7.91	5.74	8.45	6.09	8.99	5.93	9.37	6.07	10.06	6.16	10.60	6.30
	95	7.68	5.68	8.22	6.04	8.75	5.88	**9.00**	**5.94**	9.83	6.12	10.36	6.27
	100	7.50	5.52	8.03	5.89	8.57	5.74	8.88	5.85	9.64	5.99	10.17	6.14
	105	7.31	5.37	7.84	5.73	8.38	5.60	8.77	5.76	9.45	5.86	9.99	6.01
	110	7.12	5.19	7.66	5.55	8.19	5.43	8.58	5.58	9.26	5.69	9.80	5.85
	115	6.94	5.03	7.47	5.39	8.01	5.29	8.39	5.44	9.08	5.56	9.61	5.71
	118	6.82	5.00	7.36	5.36	7.89	5.26	8.28	5.42	8.96	5.54	9.50	5.70
	122	6.79	4.98	7.32	5.35	7.86	5.25	8.24	5.41	8.93	5.53	9.46	5.69
LMAN127HVP 12,000	14	10.98	7.06	11.66	7.46	12.34	7.22	12.84	7.38	13.71	7.44	14.39	7.58
	20	10.97	7.12	11.65	7.52	12.33	7.28	12.83	7.43	13.70	7.50	14.38	7.64
	25	10.96	7.17	11.64	7.58	12.32	7.34	12.82	7.49	13.69	7.55	14.37	7.70
	30	10.95	7.23	11.63	7.64	12.31	7.39	12.81	7.55	13.68	7.61	14.36	7.76
	35	10.95	7.28	11.63	7.69	12.31	7.45	12.80	7.61	13.66	7.67	14.34	7.82
	40	10.94	7.34	11.62	7.75	12.30	7.51	12.79	7.66	13.65	7.73	14.33	7.87
	45	10.93	7.39	11.61	7.81	12.29	7.56	12.78	7.72	13.64	7.79	14.32	7.93
	50	10.92	7.45	11.60	7.87	12.28	7.62	12.77	7.78	13.63	7.84	14.31	7.99
	55	10.91	7.50	11.59	7.92	12.27	7.67	12.76	7.83	13.62	7.90	14.30	8.05
	60	10.90	7.56	11.58	7.98	12.26	7.73	12.75	7.89	13.61	7.96	14.29	8.11
	65	10.90	7.61	11.57	8.04	12.25	7.78	12.74	7.95	13.60	8.02	14.28	8.17
	70	10.89	7.67	11.56	8.10	12.24	7.84	12.73	8.01	13.59	8.07	14.27	8.23
	75	10.63	7.54	11.30	7.97	11.97	7.73	12.46	7.90	13.32	7.97	14.00	8.13
	80	10.36	7.41	11.04	7.85	11.71	7.62	12.19	7.79	13.05	7.87	13.73	8.04
	85	10.10	7.27	10.77	7.72	11.45	7.50	11.93	7.67	12.79	7.77	13.46	7.94
	90	9.84	7.14	10.51	7.58	11.18	7.38	11.67	7.56	12.52	7.66	13.19	7.83
	95	9.56	7.06	10.23	7.51	10.89	7.32	**11.20**	**7.39**	12.23	7.62	12.89	7.80
	100	9.33	6.87	10.00	7.32	10.66	7.15	11.05	7.28	11.99	7.45	12.66	7.64
	105	9.10	6.68	9.76	7.13	10.43	6.97	10.91	7.16	11.76	7.29	12.43	7.48
	110	8.86	6.46	9.53	6.90	10.20	6.76	10.68	6.95	11.53	7.08	12.19	7.27
	115	8.63	6.26	9.30	6.71	9.96	6.58	10.44	6.77	11.30	6.91	11.96	7.11
	118	8.49	6.22	9.16	6.67	9.82	6.54	10.30	6.74	11.16	6.89	11.82	7.09
	122	8.44	6.20	9.11	6.65	9.78	6.53	10.26	6.73	11.11	6.88	11.78	7.08

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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ART COOL GALLERY INDOOR UNITS

Heating Capacity Table

Table 15: Multi F Art Cool Gallery Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LMAN097HVP 9,000	0	-0.4	5.35	5.28	5.23	5.20	5.12	4.90
	5	4.5	6.03	5.95	5.90	5.88	5.80	5.58
	10	9	6.71	6.63	6.58	6.56	6.48	6.26
	17	15	7.61	7.54	7.49	**7.46**	7.39	7.14
	20	19	7.95	7.88	7.83	7.80	7.72	7.46
	25	23	8.52	8.44	8.39	8.37	8.29	7.99
	30	28	9.01	8.93	8.88	8.86	8.78	8.52
	35	32	9.50	9.42	9.37	9.34	9.27	9.04
	40	36	9.94	9.86	9.81	9.78	9.71	9.48
	45	41	10.37	10.30	10.25	10.22	10.15	9.92
	47	43	10.55	10.48	10.43	**10.40**	10.32	10.10
	50	46	10.72	10.64	10.59	10.57	10.49	10.24
	55	51	11.00	10.93	10.88	10.85	10.78	10.48
	60	56	11.00	10.93	10.88	10.85	10.78	10.52
	63	59	11.00	10.93	10.88	10.85	10.78	10.55
	68	64	11.00	10.93	10.88	10.85	10.78	10.60
LMAN127HVP 12,000	0	-0.4	6.84	6.75	6.68	6.65	6.55	6.26
	5	4.5	7.71	7.61	7.55	7.52	7.42	7.13
	10	9	8.58	8.48	8.42	8.38	8.29	8.00
	17	15	9.73	9.64	9.57	**9.54**	9.44	9.14
	20	19	10.17	10.07	10.01	9.98	9.88	9.54
	25	23	10.89	10.79	10.73	10.70	10.60	10.22
	30	28	11.52	11.42	11.36	11.32	11.23	10.89
	35	32	12.14	12.05	11.98	11.95	11.85	11.57
	40	36	12.71	12.61	12.55	12.51	12.42	12.13
	45	41	13.27	13.17	13.11	13.08	12.98	12.69
	47	43	13.49	13.40	13.33	**13.30**	13.20	12.91
	50	46	13.71	13.61	13.55	13.52	13.42	13.10
	55	51	14.07	13.97	13.91	13.88	13.78	13.40
	60	56	14.07	13.97	13.91	13.88	13.78	13.46
	63	59	14.07	13.97	13.91	13.88	13.78	13.49
	68	64	14.07	13.97	13.91	13.88	13.78	13.55

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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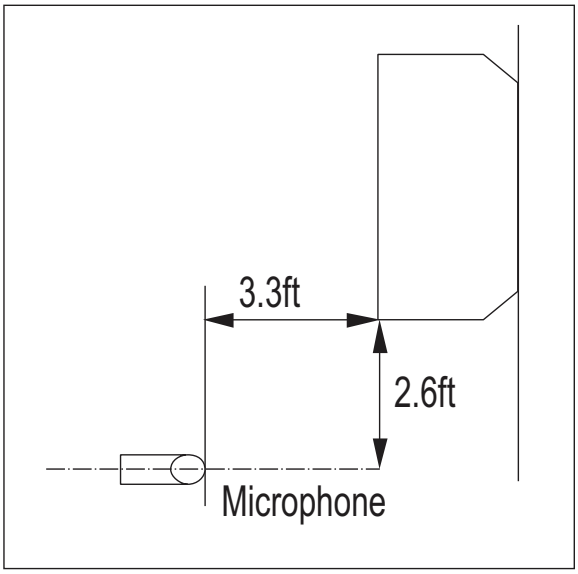
Figure 32: Sound Pressure Level Measurement Location.



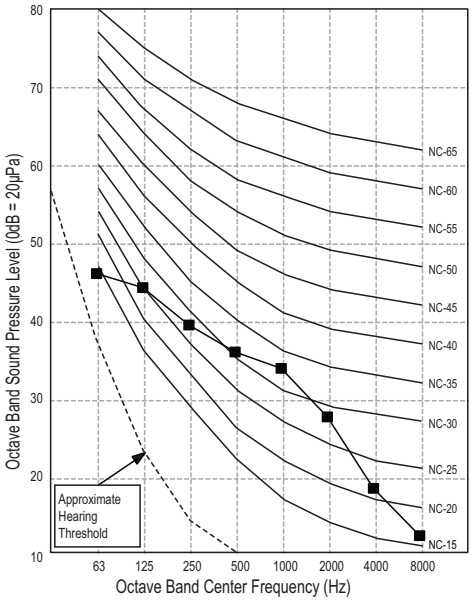
- Measurement taken 2.6' below the bottom of the unit and at a distance of 3.3' from face of unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient)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

Table 16: Sound Pressure Levels (dB[A]).

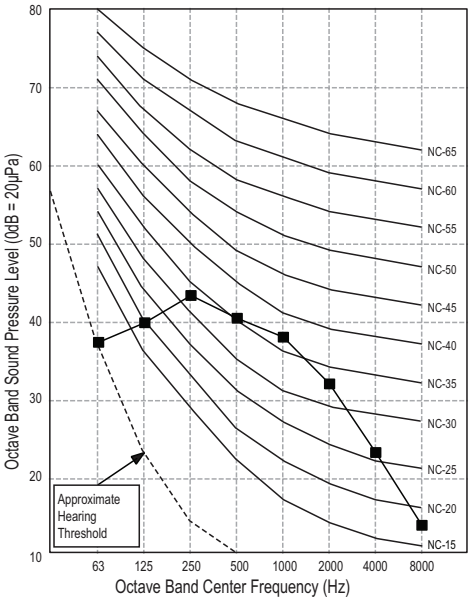
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LMAN097HVP	39	35	31
LMAN127HVP	42	38	34

Figure 33: Sound Pressure Level Diagrams.

LMAN097HVP



LMAN127HVP



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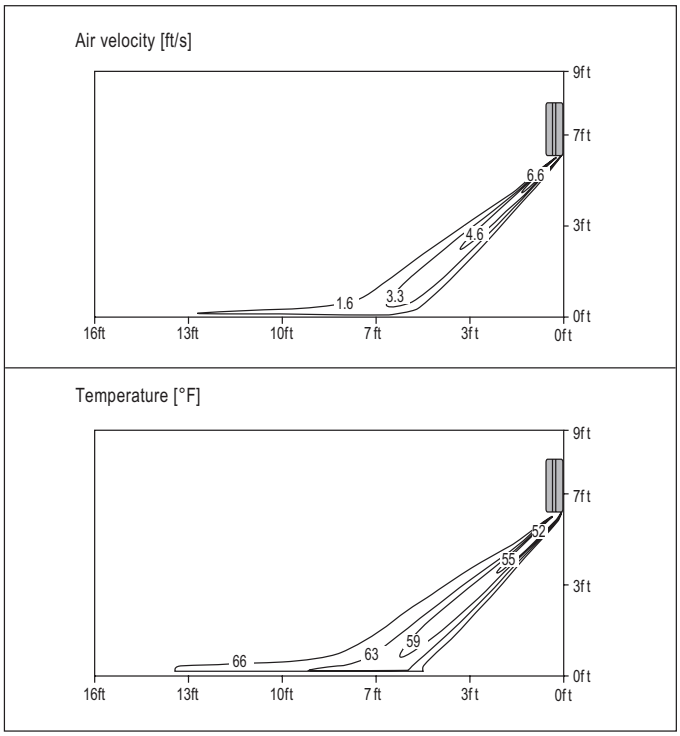
ART COOL GALLERY INDOOR UNITS

Air Velocity and Temperature Distribution

Figure 34: LMAN097HVP Air Velocity and Temperature Distribution Charts.

Cooling

Discharge angle: 40°



Heating

Discharge angle: 50°

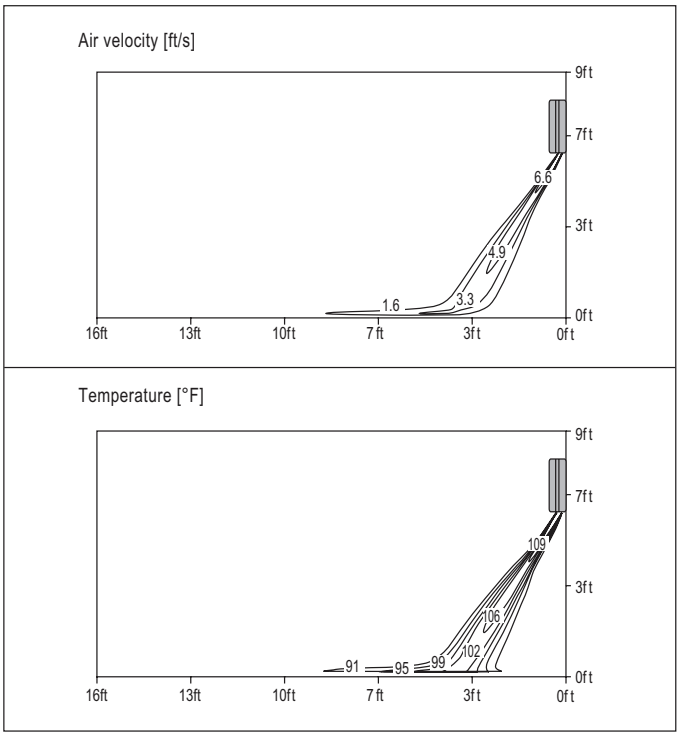
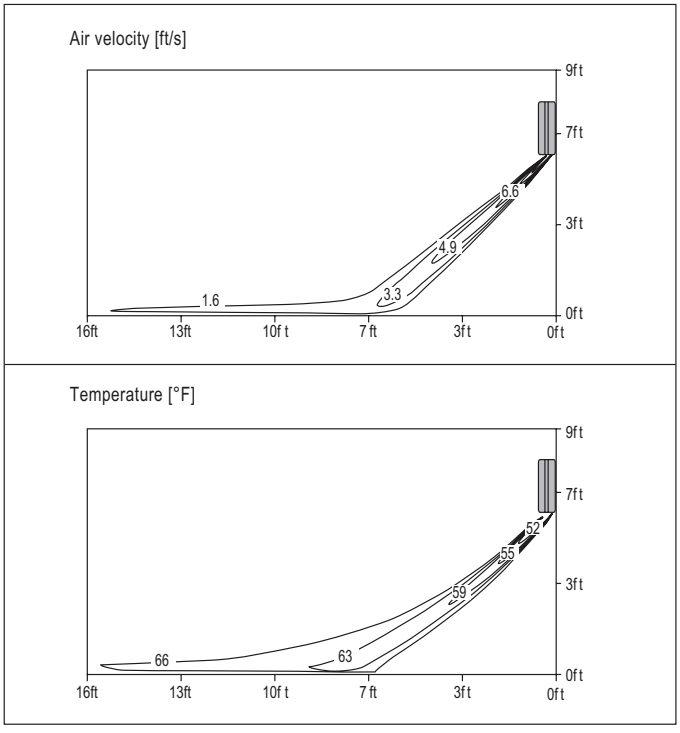


Figure 35: LMAN127HVP Air Velocity and Temperature Distribution Charts.

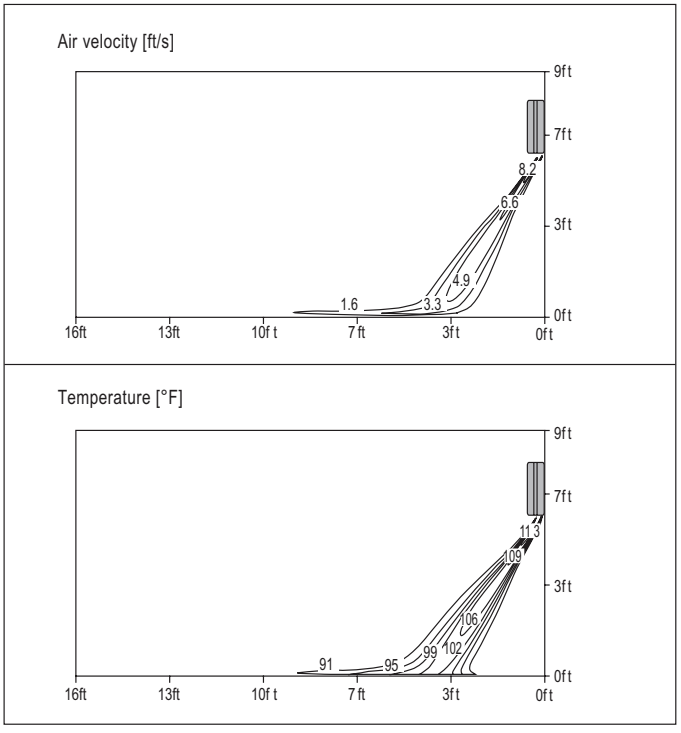
Cooling

Discharge angle : 40°



Heating

Discharge angle : 50°



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ART COOL GALLERY INDOOR UNITS

Refrigerant Flow Diagram

Figure 36: Art Cool Gallery Indoor Unit Refrigerant Flow Diagram.

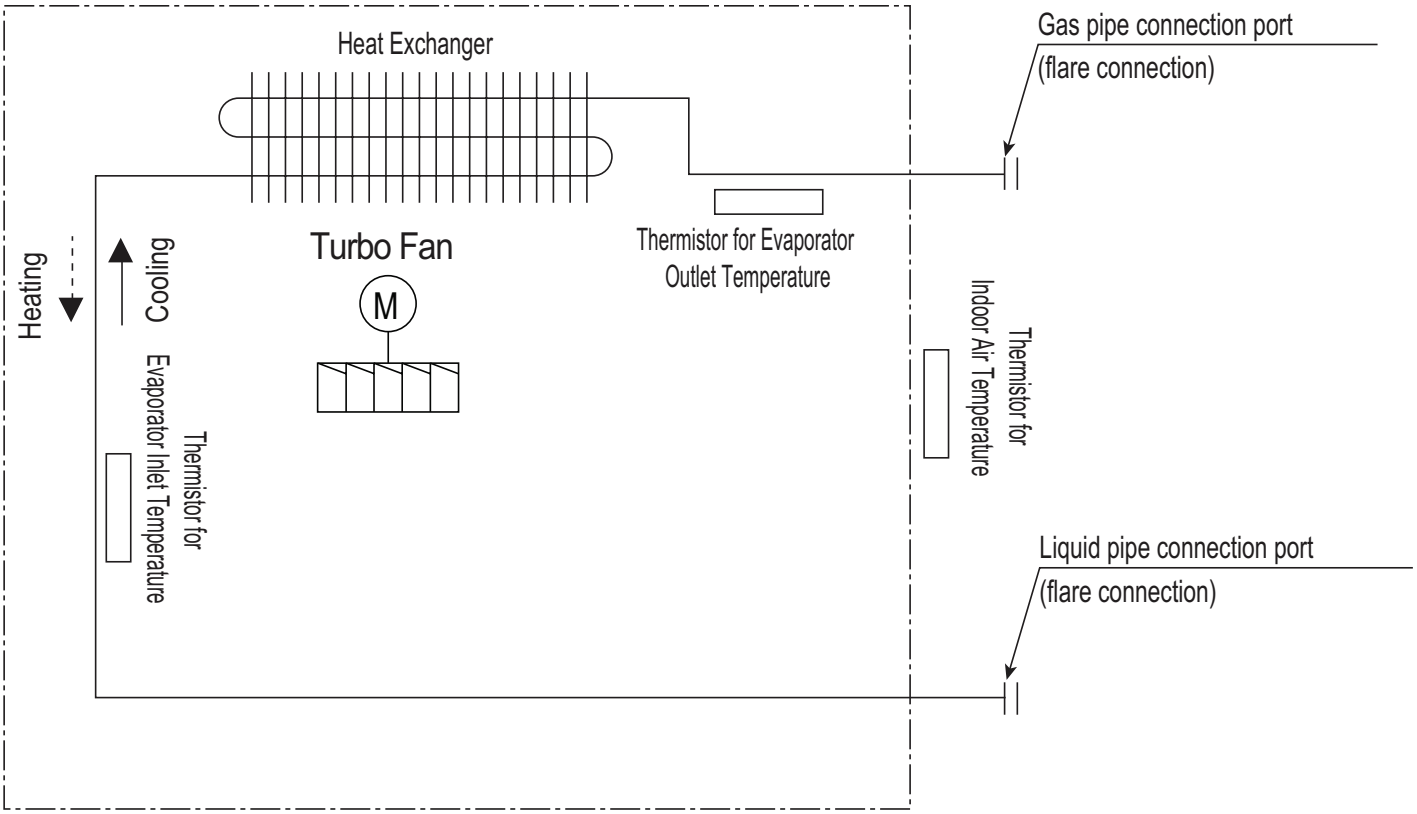

Table 17: Art Cool Gallery Indoor Unit Refrigerant Pipe Connection Port Diameters.

Model No.	Vapor (inch)	Liquid (inch)
LMAN097HVP	Ø3/8	Ø1/4
LMAN127HVP		

Table 18: Art Cool Gallery Indoor Unit Thermistor Details.

Description (Based on Cooling Mode)	PCB Connector
Indoor Air Temperature Thermistor	CN-TH1
Evaporator Inlet Temperature Thermistor	
Evaporator Outlet Temperature Thermistor	CN-TH2
Water Level Sensor (Optional)	CN-TH3

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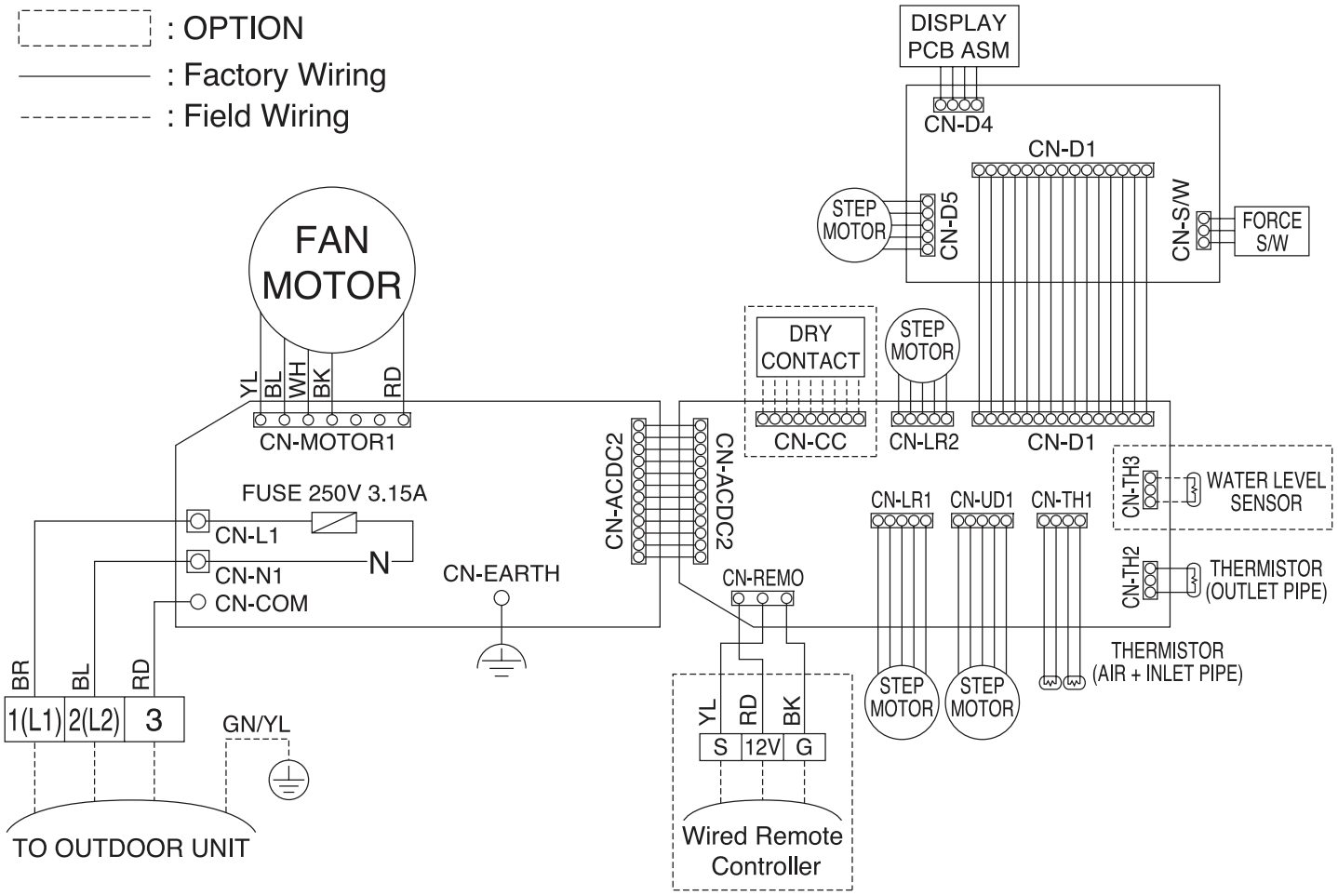
ART COOL GALLERY INDOOR UNITS

Wiring Diagram

Figure 37: Multi F Art Cool Gallery Indoor Units Wiring Diagram.



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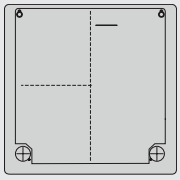
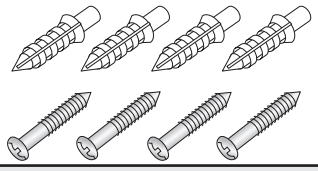
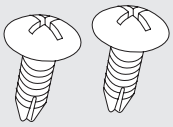
Factory Supplied Parts

Table 19: Parts Table.

Part	Quantity	Image
Installation Guide	One (1)	
Type “A” Screws and Plastic Anchors	Four (4) Each	
Type “B” Screws (M4 x 12L)	Two (2)	
Wireless Handheld Controller with Holder (AKB73635607)	One (1)	

Factory Supplied Materials

- Owner’s Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Spanner (Half union)
- Thermometer

⚠ WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit’s components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

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ART COOL GALLERY INDOOR UNITS

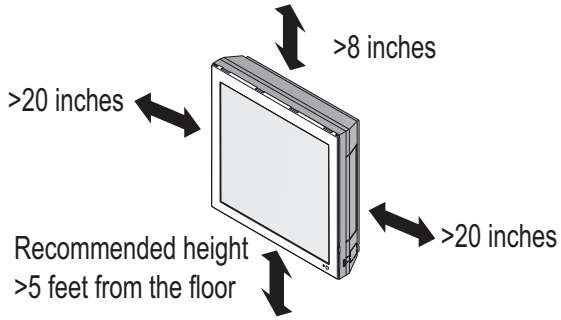
Installation and Best Layout Practices

Selecting the Best Location

Do's

- Place the unit where air circulation will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient space from the ceiling and floor.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit in a location where it can be easily connected to the outdoor unit/branch distribution unit.

Figure 38:Minimum Clearance Requirements.



⃠ Don'ts

- ⃠ *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- ⃠ *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- ⃠ *Do not install the unit near high-frequency generators.*
- ⃠ *Do not install the unit near a doorway.*

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

Note:

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

Installing in an Area Exposed to Unconditioned Air

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

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

Using the Installation Guide

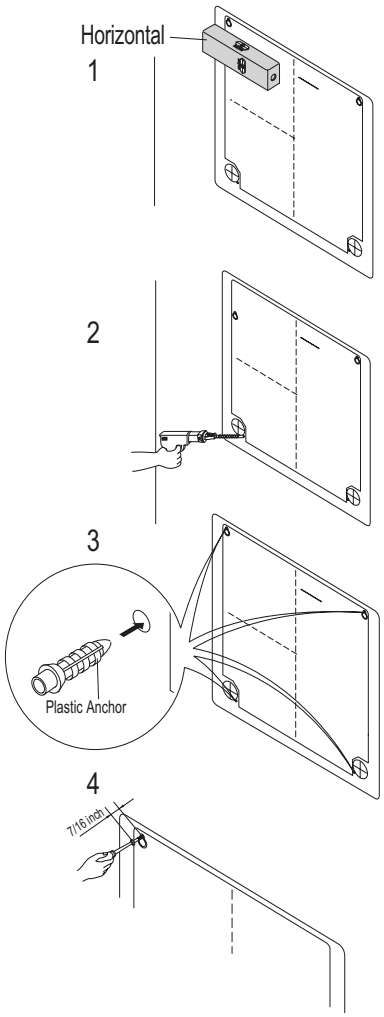
1. Choose an appropriate location for the indoor unit. To hang the installation guide, verify that it is level and plumb, and then tape it to the wall.

2. Drill four (4) 1/4-inch diameter holes with a depth of 1-3/16 to 1-3/8 inches for the mounting screws. Drill one (1) two (2) inch-diameter hole for the field-installed refrigerant and drain piping.

3. Insert a plastic anchor into each of the mounting holes.

4. Screw the top two (2) screws into the wall. ⃠ Do not flush them to the wall; leave a 7/16 inch space for hanging the indoor unit.

Figure 39:Using the Installation Guide.



Note:

If the unit is installed near a body of water, certain components are at risk of being corroded. Appropriate anti-corrosion methods must be taken for the unit and all components.

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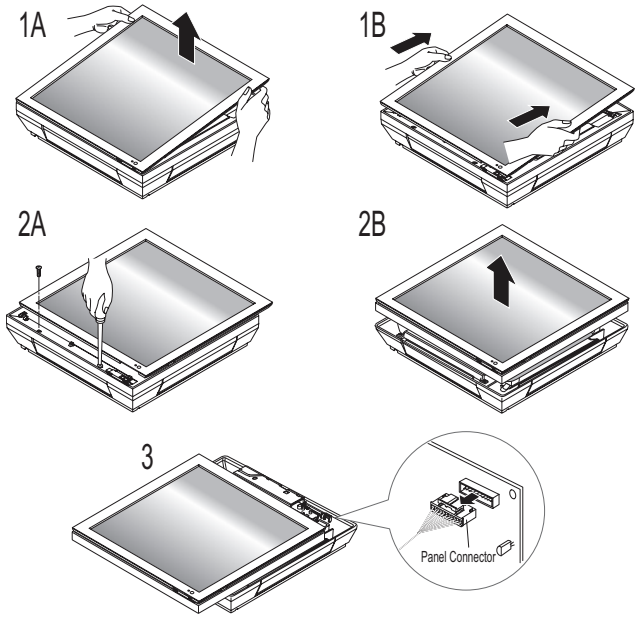
Preparing the Indoor Unit for Installation

Removing the Front Panel

1. First pull the top of the front panel up (1A) and then out (1B).
2. Remove the two (2) screws at the bottom (2A), then lift off the front panel (2B).
3. To completely detach the front panel, disconnect the panel connector found at the top of the indoor unit (3).

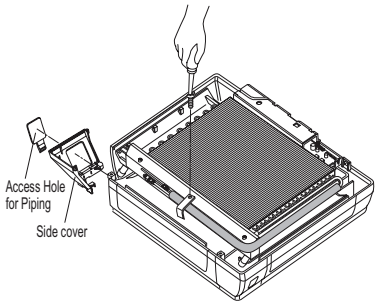
Figure 40:Preparing for Installation.



Removing the Piping and Side Covers

1. Unscrew the center cover.
2. Remove the cover from the side of the indoor unit chosen for the piping connections, and then knock out the piping access hole. If the refrigerant piping will be connected through the back of the unit, the access hole does not need to be knocked out.
3. Remove any burrs that will have been made.

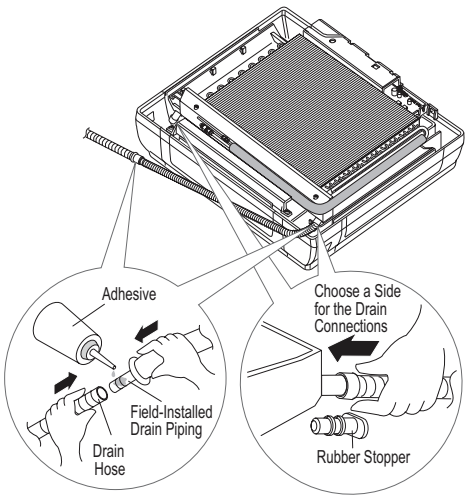
Figure 41:Removing the Piping and Side Covers.



Preparing the Drain Hose

1. Remove the rubber stopper from the chosen side of the indoor unit.
2. Insert the drain hose into the handle of the drain pan.
3. Connect the drain hose to the field-installed drain piping.

Figure 42:Preparing the Drain Hose.



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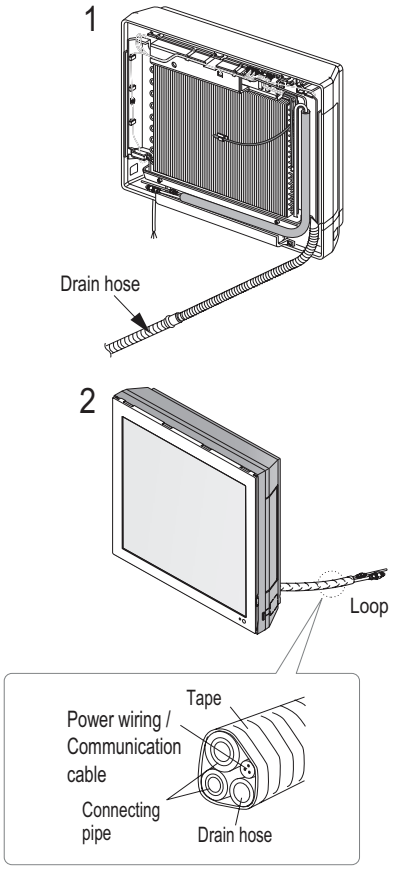
Preparing the Refrigerant and Drain Piping Connections

1. Depending on the installation requirements, route the indoor unit refrigerant piping and the drain hose to the left, right (see guidelines below), or rear of the frame.

2. Bundle the piping and drain hose with tape where they meet near the indoor unit frame. Position the drain hose at the bottom of the bundle (positioning the drain hose at the top of the bundle will cause the drain pan to overflow inside the indoor unit).

Figure 43:Preparing the Refrigerant / Drain Connections.

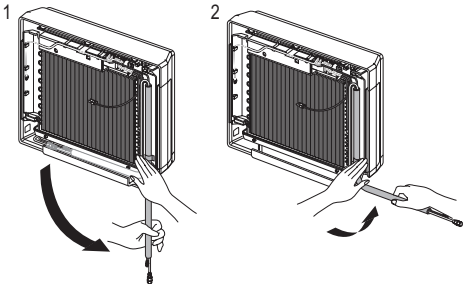


Installing Piping on the Right Side of the Indoor Unit Frame

1. Press on the top of the clamp, and then slowly guide the piping downward.

2. Bend the piping to the right side of the indoor unit frame.

Figure 44:Right Side Piping Access.



Note:

Do not bend the piping/drain hose from side to side; it will damage the components.

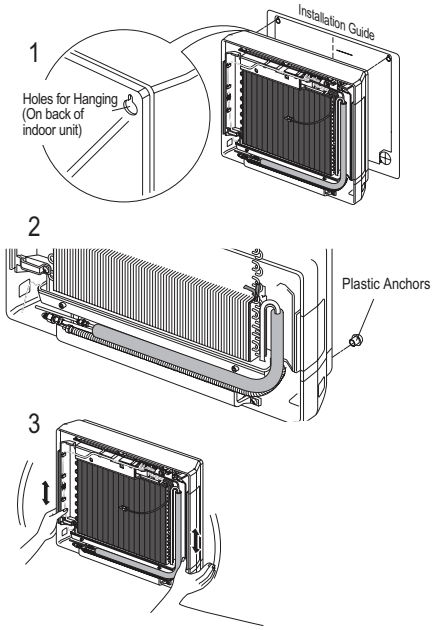
Hanging the Indoor Unit Frame

1. Remove the installation guide and hang the indoor unit on the top two (2) screws. Verify the indoor unit is hanging securely on the screws.

2. Align the holes at the bottom of the indoor unit to the mounting holes. Tighten first the top screws, then tighten the bottom screws.

3. Verify that the indoor unit is completely secured to the wall by gently shaking it up and down.

Figure 45:Hanging the Indoor Unit Frame.



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Connecting the Indoor Unit Piping to the Field-Installed Piping

1. Center align the indoor unit piping (refrigerant and drain) and the field-installed piping, then hand tighten the flare nut.
2. Tighten the flare nut with a torque wrench.
3. Attach the drain tube piping to the indoor unit drain hose as shown below.

Figure 46:Indoor Unit to Field-Installed Piping Connection.

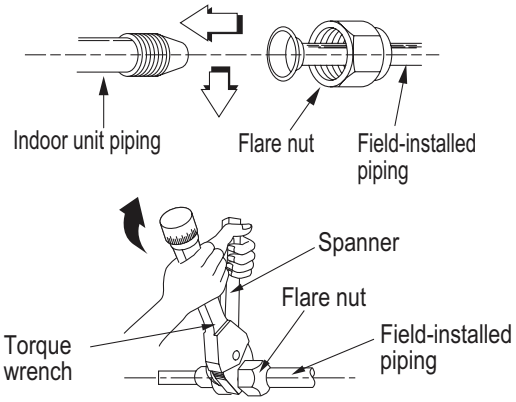
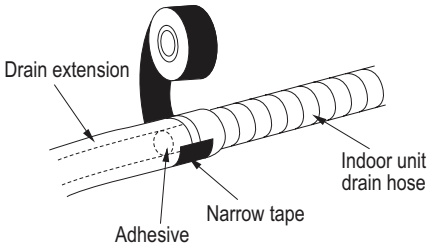


Figure 47:Extending the Drain Hose.



Note:

If the drain hose is routed inside a room, add insulation to prevent condensation from forming.

Insulating the Refrigerant and Drain Piping

⚠ WARNING

Ensure all piping is insulated. Exposed piping can cause burns if touched.

Refrigerant Piping Insulation

Field-installed vapor and liquid refrigerant piping lines must be properly and completely covered in insulation (up to the indoor unit piping connections). Any exposed piping will generate condensate or will cause burns if touched. Insulation for this field-installed refrigerant piping must have a minimum heat resistance of 248°F.

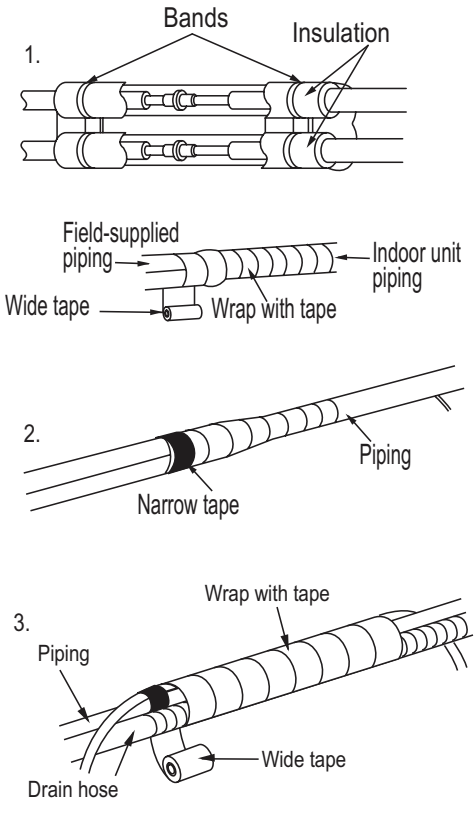
Drain Piping Insulation

Drain piping must have insulation a minimum of 7/32 inches thick.

Installing the Insulation

1. Overlap the insulation at the connection of the field-installed piping and the indoor unit piping. Tape together so there are no gaps.
2. Secure insulation to the rear piping housing section with vinyl tape.
3. Bundle the piping and drain hose with tape where they meet at the back of the indoor unit frame. Position the drain hose at the bottom of the bundle (positioning the drain hose at the top of the bundle will cause the drain pan to overflow inside the indoor unit).

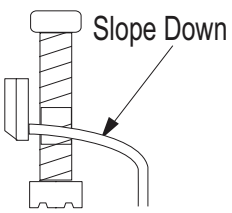
Figure 48:Insulating the Piping.



Drain Slope

Drain hose must point down so water can flow away easily.

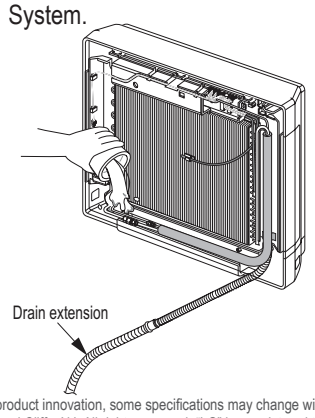
Figure 49:Drain Piping Slope.



Checking the Drainage System

1. Pour water on the indoor unit evaporator.
2. Ensure the water flows through and out of the hose and away from the indoor unit without leaking.

Figure 50:Checking the Drainage System.



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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

• Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

Connecting the Power Wiring and Communications Cable

1. Insert the power wiring/communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) through the access hole of the indoor unit (ground wire must be longer than the other wires/cables). Unscrew the control board cover.

2. Connect each wire to its appropriate terminal on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

3. Secure the power wiring/communications cable to the control board.

4. Reattach the control board cover.

Figure 51:Connecting the Power Wiring / Communications Cable.

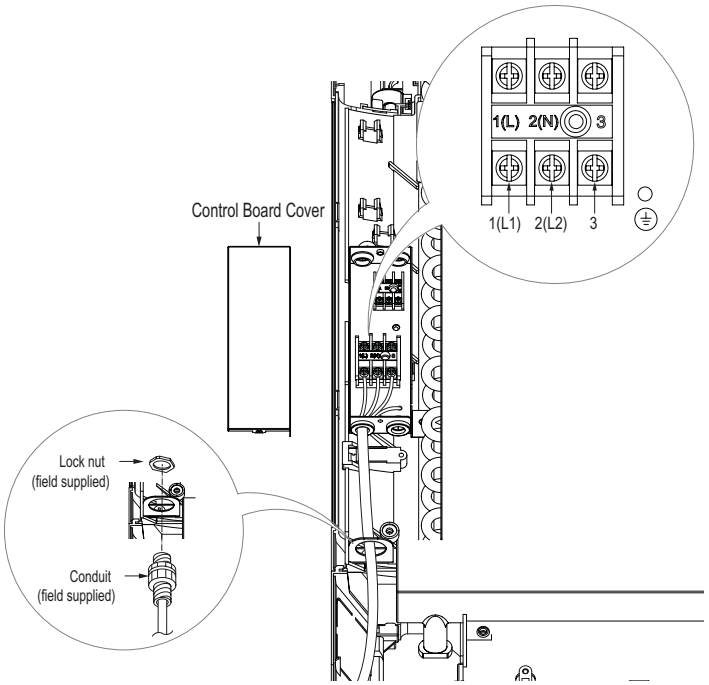
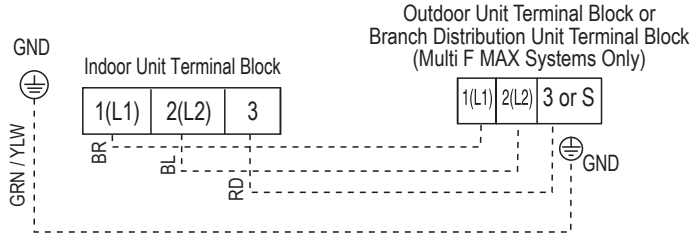


Figure 52:Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections—LMAN097HVP and LMAN127HVP models.



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Controller Options

Art Cool Gallery wall-mounted indoor units include a handheld controller (AKB73635607), but optional LG-supplied wired controllers are available.

Wireless Handheld Controller

Figure 53:AKB73635607 Wireless Controller.

Operation Mode Sequence

Cooling Mode
↓
Auto Operation
↓
Dehumidification Mode
↓
Heating Mode

Table 20: AKB73635607 Wireless Controller Functions.

Control Panel Button	Display Screen	Description
FAN		Air circulation button[1]: Circulates the room air without operating in cooling or heating mode.
SLEEP	1hr	Sleep Mode Auto Button[1]: Sets the sleep mode auto operation.
TEMP	88 °C	Temperature Adjustment Buttons: Raises or lowers temperature setpoint in cooling and heating operation.
ON OFF	-	On / Off Button: Turns the power on/off.
FAN SPEED		Indoor Fan Speed Button: Changes the fan speed.
MODE		Operation mode selection button[1]: Selects the operation mode. Cooling operation / Auto operation or auto changeover / Dehumidifying operation / Heating operation
JET	Po	Jet Cool / Jet Heat Button[1]: Warms up or cools down the indoor temperature within a short period.
SWING		Air Flow Direction Button: Adjusts the airflow direction.
ROOM TEMP		Temperature Display Button: Displays the room temperature. Press and hold button down for five (5) seconds to change from °C to °F.
ON OFF	AM 12:00	Timer button: Sets the current time and the start/end times.
A/CLEAN E/SAVING LIGHT		Navigation/Functions Button[1]: Adjusts the time and sets the special functions. Auto clean / Operates energy saving cooling / Adjusts the brightness of the indoor unit display
SET CLEAR	-	Set/Clear Button: Sets or cancels functions.
O	-	Reset Button: Resets the air conditioner settings.

[1]Depending on the indoor unit model, some functions will not be supported.

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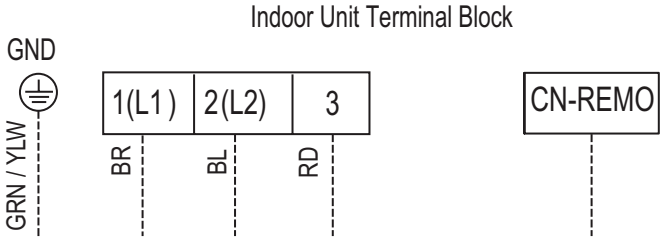
Wired Controller Connections

Figure 54:Wired Controller Connection on the Indoor Unit Terminal Block.



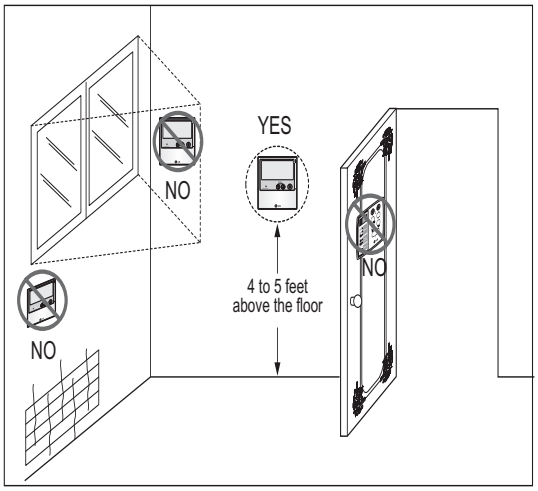
Wired Controller Placement

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

⃠ Do not install the wired controller near or in:

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

Figure 55:Proper Location for the Wired Controller.



Hanging the Wired Controller

1. The controller wiring/cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring/cable on applicable side.

2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring/cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 56:Removing the Cable Guide Grooves.

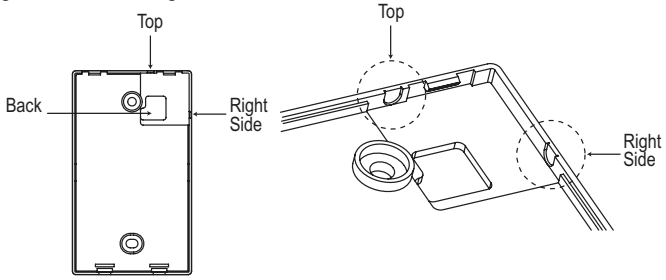


Figure 57:Attaching the Wall Plate.

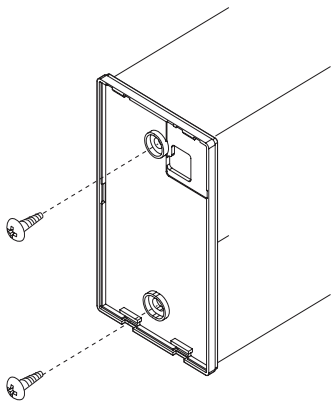
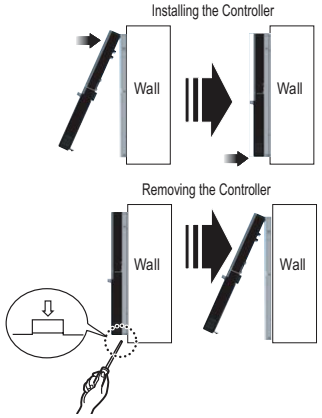


Figure 58:Installing/Removing the Controller.



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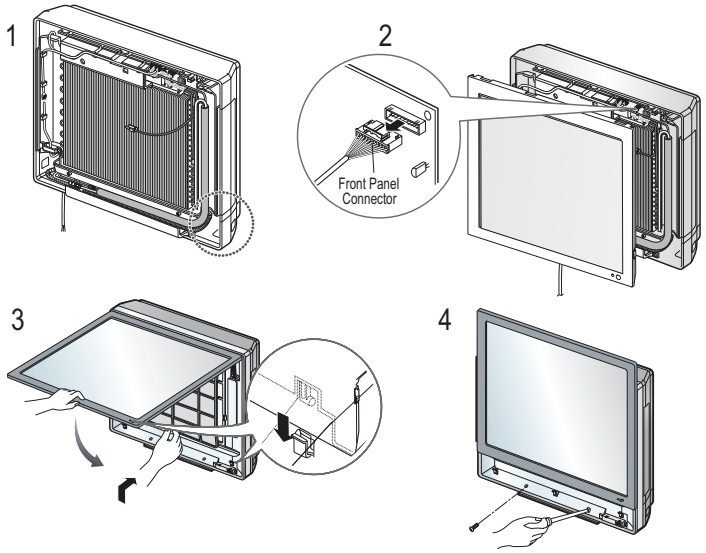
Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

Finalizing Indoor Unit Installation

1. Verify that the side covers are closed or opened, depending on installation requirements. Place the power wiring / communications cable in the bottom groove along the left side of the frame.
2. Reconnect the panel connector found at the top of the indoor unit.
3. Attach the top part of the front panel, then position its tabs in the grooves on the bottom part of the indoor unit frame.
4. To ensure the front panel tabs are securely positioned in the grooves, adjust the panel by loosening or tightening the screws at the bottom.

Figure 59:Final Installation Step—Reattaching the Front Panel.



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MULTI F
MULTI F MAX

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STANDARD WALL-MOUNTED INDOOR UNIT DATA

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“Heating Capacity Table” on page 56
“Acoustic Data” on page 58
“Air Velocity and Temperature Distribution” on page 60
“Refrigerant Flow Diagram” on page 62
“Wiring Diagram” on page 63
“Factory Supplied Parts and Materials” on page 65
“Installation and Best Layout Practices” on page 66

STANDARD WALL-MOUNTED INDOOR UNITS

Mechanical Specifications and Features

Standard Wall-Mounted Indoor Units

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Standard Wall-Mounted units have a sound rating no higher than 46 dB(A) as tested per KSA0701 ISO Standard 3745.

Coil

Indoor unit coils are comprised of a minimum of two rows of aluminum fins mechanically bonded to copper tubing. The coils are pressure tested at the factory. Each unit is provided with a factory installed condensate drain pan below the coil.

Refrigerant System

The system is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare. All refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

The indoor units require 208–230Vac/60Hz/1Φ power with voltage variance of no more than ±10%.

Casing

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

Finish

The Standard Wall-Mounted unit has a curved architectural panel with a pearl white finish. Unit casing has a pearl white or dark gray finish and is manufactured of heavy-duty acrylonitrile butadiene styrene (ABS) and high impact polystyrene (HIPS) plastic.

Fan Assembly and Control

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

Figure 60: Multi F Standard Wall-Mounted Indoor Unit.

Air Filter

The return air inlet has a factory-supplied primary removable, washable filter. The unit is also equipped with a secondary 3M Micro Dust filter. Filters are accessed from the front of the unit without the use of tools.

Airflow Guide Vanes

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

Microprocessor Control

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

Controls

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

Condensate

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

Features

- Inverter (Variable speed fan)
- Comfort Air
- 3M filter
- Jet cool/Jet Heat
- Group control
- Self-cleaning indoor coil
- Auto operation
- Auto restart operation
- Built-in wi-fi
- Dehumidifying function
- Self-diagnostic function
- Wireless LCD remote control included

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STANDARD WALL-MOUNTED INDOOR UNITS

General Data / Specifications

MULTI F
MULTI F MAX

Table 21: Multi F Standard Wall-Mounted Indoor Unit General Data.

Model Name	LMN079HVT	LSN090HSV5	LSN120HSV5	LMN159HVT	LSN180HSV5	LMN249HVT
Nominal Cooling Capacity (Btu/h)[1]	7,000	9,000	12,000	14,300	18,000	24,000
Nominal Heating Capacity (Btu/h)[1]	8,100	10,900	13,600	15,600	21,600	25,600
Operating Range						
Cooling (°F WB)	57-77					
Heating (°F DB)	59-81					
Fan						
Type	Cross Flow					
Motor Output (W) x Qty.	30 x 1				60 x 1	
Motor/Drive	Brushless Digitally Controlled / Direct					
Airflow Rate CFM (H/M/L)	254 / 204 / 148	268 / 218 / 169	282 / 233 / 177	314 / 268 / 184	558 / 438 / 353	597 / 452 / 367
Unit Data						
Refrigerant Type[2]	R410A					
Refrigerant Control	EEV					
Power Supply V, Ø, Hz[3]	208-230, 1, 60					
Rated Amps (A)	0.4					
Sound Pressure Level dB(A) (H/M/L)[4]	35 / 31 / 26	36 / 32 / 27	38 / 34 / 29	42 / 38 / 32	44 / 38 / 34	46 / 41 / 36
Dimensions (W x H x D, in.)	32-15/16 x 12-1/8 x 7-7/16				39-9/32 x 13-19/32 x 8-9/32	
Net Unit Weight (lbs.)	18.3				25.6	
Shipping Weight (lbs.)	23.4				32.2	
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 14					
Heat Exchanger (Row x Column x Fin / inch) x Number	(2 x 23 x 22) x 1				(2 x 16 x 20) x 1	
Pipe Size						
Liquid (in.)	1/4					
Vapor (in.)	3/8				1/2	
Connection Size						
Liquid (in.)	1/4				3/8	1/4
Vapor (in.)	3/8				5/8	1/2
Drain O.D. / I.D. (in.)	27/32, 5/8					

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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).
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).

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs be minimum 14 AWG, 4-conductor, stranded, shielded or unshielded (if shielded, must be grounded to chassis at ODU only) and must comply with applicable local and national codes.

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STANDARD WALL-MOUNTED INDOOR UNITS

Dimensions

Figure 61: LMN079HVT, LSN090HSV5, LSN120HSV5, and LMN159HVT Dimensions.

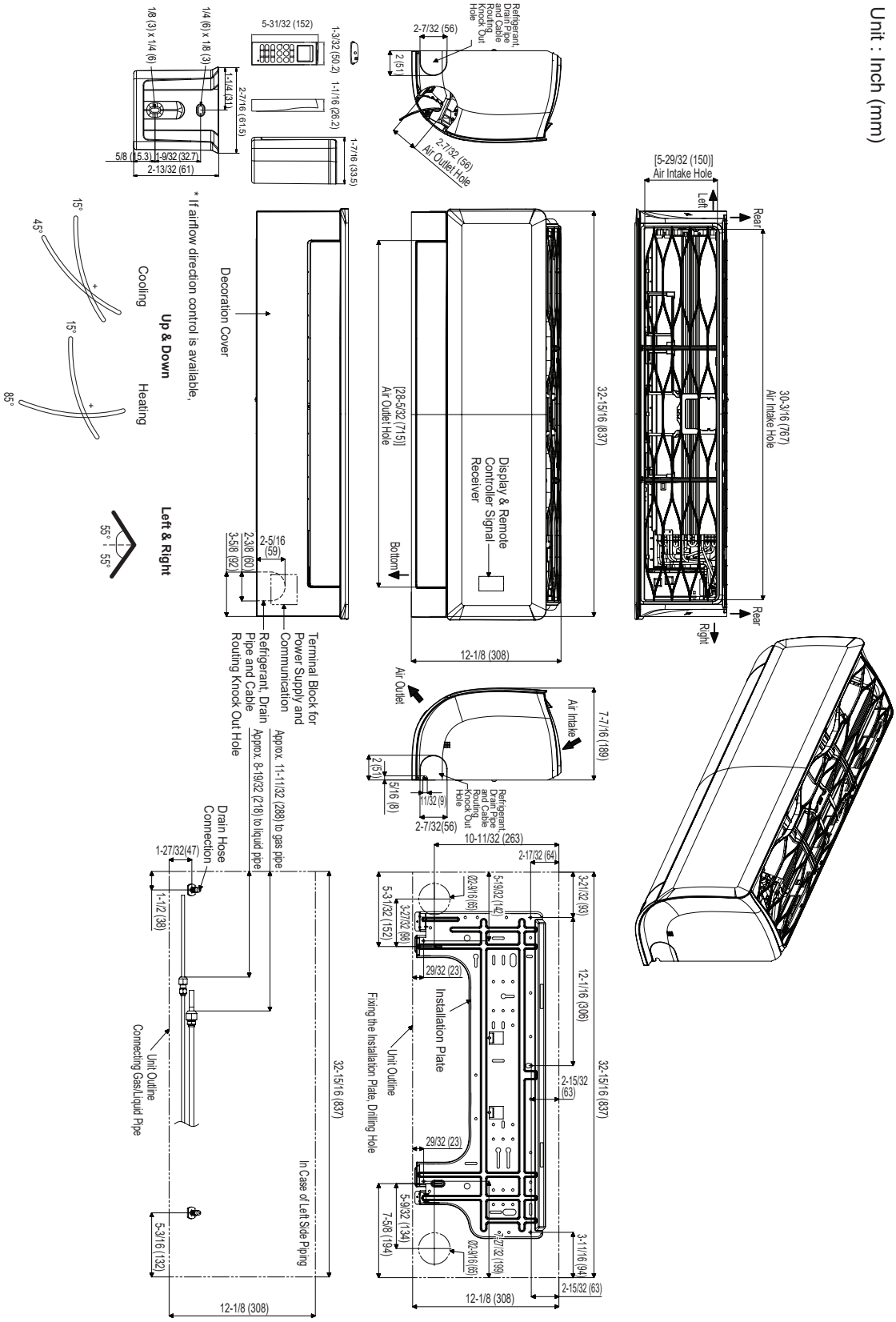

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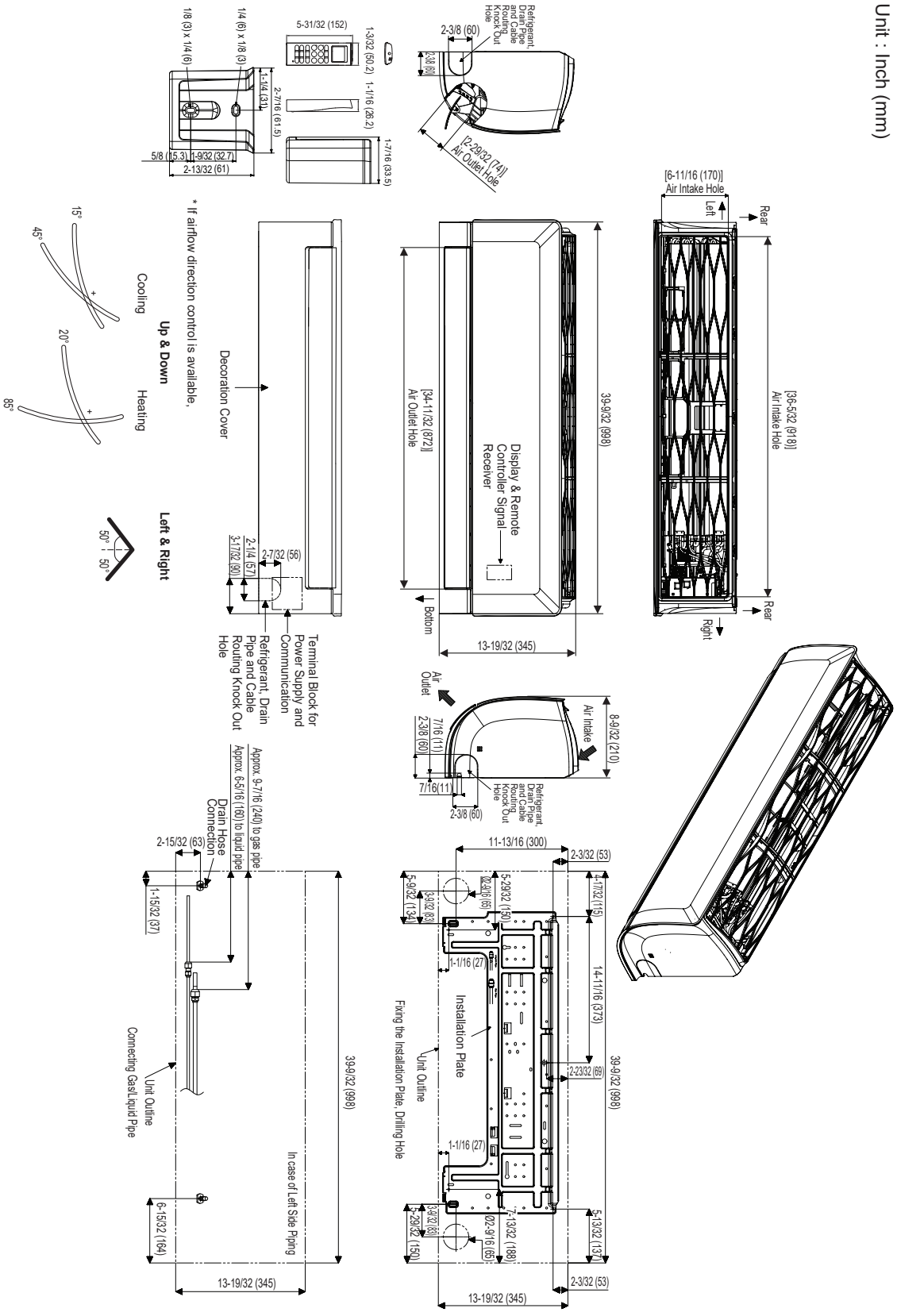
Figure 62: LSN180HSV5 and LMN249HVT Dimensions.



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STANDARD WALL-MOUNTED INDOOR UNITS

Cooling Capacity Table

Table 22: Multi F Standard Wall-Mounted Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LMN079HVT 7,000	14	6.86	4.68	7.29	4.95	7.71	4.79	8.02	4.89	8.57	4.93	8.99	5.03
	20	6.86	4.72	7.28	4.99	7.71	4.83	8.02	4.93	8.56	4.97	8.99	5.06
	25	6.85	4.76	7.28	5.02	7.70	4.86	8.01	4.97	8.55	5.01	8.98	5.10
	30	6.85	4.79	7.27	5.06	7.70	4.90	8.00	5.01	8.55	5.05	8.97	5.14
	35	6.84	4.83	7.27	5.10	7.69	4.94	8.00	5.04	8.54	5.09	8.97	5.18
	40	6.84	4.87	7.26	5.14	7.68	4.98	7.99	5.08	8.53	5.12	8.96	5.22
	45	6.83	4.90	7.25	5.18	7.68	5.01	7.99	5.12	8.53	5.16	8.95	5.26
	50	6.83	4.94	7.25	5.22	7.67	5.05	7.98	5.16	8.52	5.20	8.94	5.30
	55	6.82	4.97	7.24	5.25	7.67	5.09	7.97	5.19	8.51	5.24	8.94	5.34
	60	6.81	5.01	7.24	5.29	7.66	5.12	7.97	5.23	8.51	5.28	8.93	5.38
	65	6.81	5.05	7.23	5.33	7.66	5.16	7.96	5.27	8.50	5.31	8.92	5.42
	70	6.80	5.08	7.23	5.37	7.65	5.20	7.95	5.31	8.49	5.35	8.92	5.45
	75	6.64	5.00	7.06	5.29	7.48	5.13	7.79	5.24	8.33	5.29	8.75	5.39
	80	6.48	4.91	6.90	5.20	7.32	5.05	7.62	5.16	8.16	5.22	8.58	5.33
	85	6.31	4.82	6.73	5.12	7.15	4.97	7.46	5.09	7.99	5.15	8.41	5.26
	90	6.15	4.73	6.57	5.03	6.99	4.89	7.29	5.01	7.83	5.08	8.24	5.19
	95	5.98	4.68	6.39	4.98	6.81	4.85	**7.00**	**4.90**	7.64	5.05	8.06	5.17
	100	5.83	4.56	6.25	4.86	6.66	4.74	6.91	4.82	7.50	4.94	7.91	5.06
	105	5.69	4.43	6.10	4.73	6.52	4.62	6.82	4.75	7.35	4.83	7.77	4.96
	110	5.54	4.28	5.96	4.58	6.37	4.48	6.67	4.61	7.21	4.70	7.62	4.82
	115	5.39	4.15	5.81	4.45	6.23	4.36	6.53	4.49	7.06	4.58	7.48	4.71
	118	5.31	4.12	5.72	4.42	6.14	4.34	6.44	4.47	6.97	4.57	7.39	4.70
	122	5.28	4.11	5.69	4.41	6.11	4.33	6.41	4.46	6.94	4.56	7.36	4.70
LSN090HSV5 9,000	14	8.82	6.04	9.37	6.38	9.92	6.18	10.31	6.31	11.01	6.36	11.56	6.48
	20	8.82	6.09	9.36	6.43	9.91	6.23	10.31	6.36	11.01	6.41	11.55	6.53
	25	8.81	6.13	9.36	6.48	9.90	6.27	10.30	6.41	11.00	6.46	11.54	6.58
	30	8.80	6.18	9.35	6.53	9.90	6.32	10.29	6.46	10.99	6.51	11.54	6.63
	35	8.80	6.23	9.34	6.58	9.89	6.37	10.28	6.50	10.98	6.56	11.53	6.68
	40	8.79	6.28	9.33	6.63	9.88	6.42	10.27	6.55	10.97	6.61	11.52	6.73
	45	8.78	6.32	9.33	6.68	9.87	6.47	10.27	6.60	10.96	6.66	11.51	6.78
	50	8.78	6.37	9.32	6.73	9.87	6.51	10.26	6.65	10.96	6.71	11.50	6.83
	55	8.77	6.42	9.31	6.78	9.86	6.56	10.25	6.70	10.95	6.76	11.49	6.88
	60	8.76	6.46	9.31	6.83	9.85	6.61	10.24	6.75	10.94	6.81	11.48	6.93
	65	8.76	6.51	9.30	6.88	9.84	6.66	10.24	6.80	10.93	6.85	11.47	6.98
	70	8.75	6.56	9.29	6.92	9.84	6.70	10.23	6.85	10.92	6.90	11.47	7.03
	75	8.54	6.45	9.08	6.82	9.62	6.61	10.01	6.75	10.71	6.82	11.25	6.96
	80	8.33	6.34	8.87	6.71	9.41	6.51	9.80	6.66	10.49	6.73	11.03	6.87
	85	8.12	6.22	8.66	6.60	9.20	6.41	9.59	6.56	10.28	6.64	10.82	6.79
	90	7.91	6.10	8.45	6.48	8.99	6.31	9.37	6.46	10.06	6.55	10.60	6.70
	95	7.68	6.04	8.22	6.43	8.75	6.26	**9.00**	**6.32**	9.83	6.52	10.36	6.67
	100	7.50	5.88	8.03	6.26	8.57	6.11	8.88	6.22	9.64	6.37	10.17	6.53
	105	7.31	5.72	7.84	6.10	8.38	5.96	8.77	6.12	9.45	6.23	9.99	6.39
	110	7.12	5.52	7.66	5.90	8.19	5.78	8.58	5.94	9.26	6.06	9.80	6.22
	115	6.94	5.36	7.47	5.74	8.01	5.63	8.39	5.79	9.08	5.91	9.61	6.08
	118	6.82	5.32	7.36	5.70	7.89	5.60	8.28	5.76	8.96	5.89	9.50	6.06
	122	6.79	5.30	7.32	5.69	7.86	5.59	8.24	5.76	8.93	5.89	9.46	6.06

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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STANDARD WALL-MOUNTED INDOOR UNITS

Cooling Capacity Table

Table 23: Multi F Standard Wall-Mounted Indoor Units Cooling Capacity Table (continued).

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LSN120HSV5 12,000	14	11.76	8.51	12.49	8.99	13.22	8.70	13.75	8.88	14.69	8.96	15.42	9.13
	20	11.75	8.57	12.48	9.06	13.21	8.77	13.74	8.95	14.67	9.03	15.40	9.20
	25	11.75	8.64	12.48	9.13	13.20	8.84	13.73	9.02	14.66	9.10	15.39	9.27
	30	11.74	8.71	12.47	9.20	13.19	8.90	13.72	9.09	14.65	9.17	15.38	9.34
	35	11.73	8.77	12.46	9.27	13.18	8.97	13.71	9.16	14.64	9.24	15.37	9.41
	40	11.72	8.84	12.45	9.34	13.17	9.04	13.70	9.23	14.63	9.31	15.36	9.48
	45	11.71	8.90	12.44	9.41	13.16	9.11	13.69	9.30	14.62	9.38	15.35	9.55
	50	11.70	8.97	12.43	9.47	13.15	9.17	13.68	9.37	14.61	9.45	15.33	9.62
	55	11.69	9.03	12.42	9.54	13.14	9.24	13.67	9.44	14.60	9.52	15.32	9.70
	60	11.68	9.10	12.41	9.61	13.13	9.31	13.66	9.50	14.59	9.58	15.31	9.77
	65	11.67	9.17	12.40	9.68	13.12	9.38	13.65	9.57	14.57	9.65	15.30	9.84
	70	11.66	9.23	12.39	9.75	13.11	9.44	13.64	9.64	14.56	9.72	15.29	9.91
	75	11.38	9.08	12.11	9.60	12.83	9.31	13.35	9.51	14.27	9.60	15.00	9.79
	80	11.10	8.92	11.82	9.45	12.55	9.17	13.07	9.38	13.99	9.48	14.71	9.68
	85	10.83	8.76	11.54	9.29	12.26	9.03	12.78	9.24	13.70	9.36	14.42	9.56
	90	10.55	8.60	11.26	9.13	11.98	8.88	12.50	9.10	13.42	9.22	14.13	9.43
	95	10.25	8.51	10.96	9.05	11.67	8.82	**12.00**	**8.90**	13.10	9.18	13.81	9.39
	100	10.00	8.28	10.71	8.82	11.42	8.61	11.84	8.76	12.85	8.98	13.56	9.20
	105	9.75	8.05	10.46	8.59	11.17	8.40	11.69	8.62	12.60	8.78	13.31	9.01
	110	9.50	7.77	10.21	8.31	10.92	8.14	11.44	8.37	12.35	8.53	13.07	8.76
	115	9.25	7.54	9.96	8.08	10.67	7.92	11.19	8.15	12.10	8.33	12.82	8.56
	118	9.10	7.49	9.81	8.03	10.52	7.88	11.04	8.12	11.95	8.30	12.67	8.54
	122	9.05	7.47	9.76	8.01	10.48	7.87	10.99	8.11	11.90	8.29	12.62	8.53
LMN159HVT 14,300	14	14.02	10.23	14.89	10.80	15.76	10.46	16.39	10.68	17.50	10.77	18.37	10.97
	20	14.01	10.31	14.88	10.89	15.75	10.54	16.38	10.76	17.49	10.85	18.36	11.06
	25	14.00	10.39	14.87	10.97	15.74	10.62	16.36	10.85	17.47	10.94	18.34	11.15
	30	13.99	10.47	14.85	11.06	15.72	10.70	16.35	10.93	17.46	11.02	18.33	11.23
	35	13.98	10.55	14.84	11.14	15.71	10.79	16.34	11.01	17.45	11.11	18.32	11.32
	40	13.96	10.62	14.83	11.22	15.70	10.87	16.33	11.10	17.43	11.19	18.30	11.40
	45	13.95	10.70	14.82	11.31	15.69	10.95	16.31	11.18	17.42	11.27	18.29	11.49
	50	13.94	10.78	14.81	11.39	15.68	11.03	16.30	11.26	17.41	11.36	18.27	11.57
	55	13.93	10.86	14.80	11.47	15.66	11.11	16.29	11.34	17.39	11.44	18.26	11.66
	60	13.92	10.94	14.79	11.56	15.65	11.19	16.28	11.43	17.38	11.52	18.25	11.74
	65	13.91	11.02	14.78	11.64	15.64	11.27	16.26	11.51	17.37	11.61	18.23	11.83
	70	13.90	11.10	14.76	11.72	15.63	11.35	16.25	11.59	17.35	11.69	18.22	11.91
	75	13.57	10.92	14.43	11.55	15.29	11.19	15.91	11.44	17.01	11.55	17.87	11.78
	80	13.23	10.73	14.09	11.36	14.95	11.03	15.57	11.28	16.67	11.40	17.53	11.64
	85	12.90	10.53	13.76	11.17	14.61	10.86	15.23	11.11	16.33	11.25	17.18	11.49
	90	12.57	10.33	13.42	10.98	14.28	10.68	14.90	10.94	15.99	11.09	16.84	11.34
	95	12.21	10.23	13.06	10.88	13.91	10.60	**14.30**	**10.70**	15.61	11.03	16.46	11.29
	100	11.91	9.95	12.76	10.60	13.61	10.35	14.11	10.53	15.31	10.79	16.16	11.06
	105	11.61	9.68	12.46	10.33	13.32	10.09	13.93	10.37	15.02	10.56	15.87	10.83
	110	11.32	9.35	12.17	10.00	13.02	9.78	13.63	10.06	14.72	10.26	15.57	10.53
	115	11.02	9.07	11.87	9.71	12.72	9.52	13.33	9.80	14.42	10.01	15.27	10.29
	118	10.84	9.00	11.69	9.66	12.54	9.48	13.16	9.76	14.24	9.98	15.09	10.26
	122	10.78	8.98	11.63	9.64	12.48	9.46	13.10	9.74	14.18	9.97	15.03	10.25

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 columns and rows indicate reference data. When operating at this temperature, these values can be different if the system is not running consistently.

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STANDARD WALL-MOUNTED INDOOR UNITS

Cooling Capacity Table

Table 24: Multi F Standard Wall-Mounted Indoor Units Cooling Capacity Table (continued).

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LSN180HSV5 18,000	14	17.65	12.33	18.74	13.02	19.84	12.61	20.63	12.88	22.03	12.98	23.12	13.23
	20	17.63	12.43	18.73	13.13	19.82	12.71	20.61	12.98	22.01	13.09	23.11	13.33
	25	17.62	12.52	18.71	13.23	19.81	12.81	20.60	13.08	22.00	13.19	23.09	13.44
	30	17.60	12.62	18.70	13.33	19.79	12.91	20.58	13.18	21.98	13.29	23.07	13.54
	35	17.59	12.71	18.68	13.43	19.78	13.00	20.57	13.28	21.96	13.39	23.05	13.64
	40	17.58	12.81	18.67	13.53	19.76	13.10	20.55	13.38	21.94	13.49	23.04	13.75
	45	17.56	12.90	18.66	13.63	19.75	13.20	20.53	13.48	21.93	13.59	23.02	13.85
	50	17.55	13.00	18.64	13.73	19.73	13.30	20.52	13.58	21.91	13.69	23.00	13.95
	55	17.54	13.10	18.63	13.83	19.72	13.39	20.50	13.68	21.89	13.79	22.98	14.05
	60	17.52	13.19	18.61	13.93	19.70	13.49	20.49	13.78	21.88	13.89	22.97	14.16
	65	17.51	13.29	18.60	14.03	19.69	13.59	20.47	13.87	21.86	13.99	22.95	14.26
	70	17.50	13.38	18.58	14.13	19.67	13.69	20.46	13.97	21.84	14.09	22.93	14.36
	75	17.08	13.16	18.16	13.92	19.24	13.49	20.03	13.79	21.41	13.92	22.50	14.20
	80	16.66	12.93	17.74	13.70	18.82	13.30	19.60	13.60	20.98	13.75	22.06	14.03
	85	16.24	12.70	17.32	13.47	18.40	13.09	19.17	13.40	20.55	13.56	21.63	13.85
	90	15.82	12.46	16.90	13.23	17.97	12.88	18.75	13.19	20.12	13.37	21.20	13.67
	95	15.37	12.33	16.44	13.12	17.51	12.78	**18.00**	**12.90**	19.65	13.30	20.72	13.61
	100	14.99	12.00	16.06	12.78	17.13	12.47	17.77	12.70	19.28	13.01	20.35	13.33
	105	14.62	11.67	15.69	12.45	16.76	12.17	17.53	12.50	18.90	12.73	19.97	13.05
	110	14.24	11.27	15.32	12.05	16.39	11.79	17.16	12.13	18.53	12.36	19.60	12.70
	115	13.87	10.93	14.94	11.71	16.01	11.48	16.79	11.82	18.15	12.07	19.22	12.41
	118	13.65	10.85	14.72	11.64	15.79	11.42	16.56	11.77	17.93	12.03	19.00	12.37
	122	13.57	10.83	14.64	11.62	15.71	11.40	16.49	11.75	17.85	12.01	18.92	12.36
LMN249HVT 24,000	14	23.53	16.82	24.99	17.77	26.45	17.21	27.50	17.57	29.37	17.72	30.83	18.05
	20	23.51	16.95	24.97	17.91	26.43	17.34	27.48	17.70	29.35	17.85	30.81	18.19
	25	23.49	17.08	24.95	18.05	26.41	17.47	27.46	17.84	29.33	17.99	30.79	18.33
	30	23.47	17.21	24.93	18.19	26.39	17.61	27.44	17.98	29.30	18.13	30.76	18.47
	35	23.46	17.35	24.91	18.32	26.37	17.74	27.42	18.12	29.28	18.27	30.74	18.61
	40	23.44	17.48	24.89	18.46	26.35	17.88	27.40	18.25	29.26	18.41	30.72	18.75
	45	23.42	17.61	24.87	18.60	26.33	18.01	27.38	18.39	29.24	18.54	30.69	18.89
	50	23.40	17.74	24.85	18.74	26.31	18.14	27.36	18.52	29.21	18.68	30.67	19.03
	55	23.38	17.87	24.84	18.87	26.29	18.27	27.34	18.66	29.19	18.82	30.64	19.17
	60	23.37	18.00	24.82	19.01	26.27	18.41	27.32	18.79	29.17	18.95	30.62	19.31
	65	23.35	18.13	24.80	19.15	26.25	18.54	27.29	18.93	29.15	19.09	30.60	19.45
	70	23.33	18.26	24.78	19.28	26.23	18.67	27.27	19.07	29.13	19.23	30.57	19.59
	75	22.77	17.95	24.21	18.99	25.66	18.41	26.70	18.81	28.55	18.99	29.99	19.37
	80	22.21	17.65	23.65	18.69	25.09	18.14	26.13	18.55	27.97	18.75	29.42	19.14
	85	21.65	17.33	23.09	18.38	24.53	17.86	25.57	18.28	27.40	18.50	28.84	18.90
	90	21.09	17.00	22.53	18.06	23.96	17.57	25.00	18.00	26.83	18.24	28.27	18.65
	95	20.49	16.82	21.92	17.89	23.35	17.44	**24.00**	**17.60**	26.20	18.14	27.63	18.57
	100	19.99	16.37	21.42	17.44	22.85	17.02	23.69	17.33	25.70	17.75	27.13	18.19
	105	19.49	15.92	20.92	16.99	22.35	16.60	23.38	17.06	25.20	17.36	26.63	17.81
	110	18.99	15.38	20.42	16.44	21.85	16.09	22.88	16.55	24.70	16.87	26.13	17.32
	115	18.49	14.91	19.92	15.98	21.35	15.66	22.38	16.12	24.20	16.47	25.63	16.93
	118	18.19	14.81	19.62	15.88	21.05	15.59	22.08	16.05	23.90	16.41	25.33	16.88
	122	18.10	14.77	19.52	15.85	20.95	15.56	21.98	16.03	23.81	16.39	25.23	16.86

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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STANDARD WALL-MOUNTED INDOOR UNITS

MULTI F
MULTI F MAX

Heating Capacity Table

Table 25: Multi F Standard Wall-Mounted Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LMN079HVT 8,100	0	-0.4	4.17	4.11	4.07	4.05	3.99	3.82
	5	4.5	4.70	4.64	4.60	4.58	4.52	4.34
	10	9	5.22	5.17	5.13	5.11	5.05	4.87
	17	15	5.93	5.87	5.83	**5.81**	5.75	5.56
	20	19	6.19	6.13	6.09	6.08	6.02	5.81
	25	23	6.63	6.57	6.53	6.52	6.46	6.22
	30	28	7.01	6.96	6.92	6.90	6.84	6.63
	35	32	7.40	7.34	7.30	7.28	7.22	7.04
	40	36	7.74	7.68	7.64	7.62	7.56	7.39
	45	41	8.08	8.02	7.98	7.96	7.90	7.73
	47	43	8.22	8.16	8.12	**8.10**	8.04	7.87
	50	46	8.35	8.29	8.25	8.23	8.17	7.98
	55	51	8.57	8.51	8.47	8.45	8.39	8.16
	60	56	8.57	8.51	8.47	8.45	8.39	8.20
	63	59	8.57	8.51	8.47	8.45	8.39	8.22
	68	64	8.57	8.51	8.47	8.45	8.39	8.25
LSN090HSV5 10,900	0	-0.4	5.61	5.53	5.48	5.45	5.37	5.14
	5	4.5	6.32	6.24	6.18	6.16	6.08	5.85
	10	9	7.03	6.95	6.90	6.88	6.79	6.56
	17	15	7.98	7.90	7.85	**7.82**	7.75	7.48
	20	19	8.33	8.26	8.21	8.18	8.09	7.82
	25	23	8.93	8.85	8.79	8.77	8.69	8.37
	30	28	9.44	9.36	9.31	9.29	9.20	8.93
	35	32	9.96	9.87	9.82	9.79	9.72	9.47
	40	36	10.42	10.33	10.28	10.25	10.18	9.94
	45	41	10.87	10.80	10.74	10.71	10.64	10.40
	47	43	11.06	10.98	10.93	**10.90**	10.82	10.59
	50	46	11.24	11.15	11.10	11.08	10.99	10.73
	55	51	11.53	11.46	11.40	11.37	11.30	10.98
	60	56	11.53	11.46	11.40	11.37	11.30	11.03
	63	59	11.53	11.46	11.40	11.37	11.30	11.06
	68	64	11.53	11.46	11.40	11.37	11.30	11.11
LSN120HSV5 13,600	0	-0.4	7.00	6.90	6.83	6.80	6.70	6.50
	5	4.5	7.89	7.78	7.71	7.69	7.59	7.40
	10	9	8.78	8.67	8.60	8.58	8.48	8.31
	17	15	9.95	9.86	9.79	**9.76**	9.67	9.47
	20	19	10.40	10.30	10.23	10.20	10.10	9.90
	25	23	11.14	11.03	10.96	10.95	10.85	10.60
	30	28	11.78	11.67	11.60	11.59	11.49	11.30
	35	32	12.42	12.31	12.24	12.21	12.13	11.99
	40	36	13.00	12.89	12.82	12.79	12.70	12.58
	45	41	13.56	13.46	13.39	13.36	13.28	13.16
	47	43	13.80	13.70	13.63	**13.60**	13.50	13.40
	50	46	14.02	13.91	13.84	13.82	13.72	13.59
	55	51	14.39	14.29	14.22	14.19	14.10	13.90
	60	56	14.39	14.29	14.22	14.19	14.10	13.96
	63	59	14.39	14.29	14.22	14.19	14.10	14.00
	68	64	14.39	14.29	14.22	14.19	14.10	14.06

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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STANDARD WALL-MOUNTED INDOOR UNITS

Heating Capacity Table

Table 26: Multi F Standard Wall-Mounted Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LMN159HVT 15,600	0	-0.4	8.03	7.91	7.84	7.80	7.69	7.35
	5	4.5	9.05	8.93	8.86	8.82	8.71	8.37
	10	9	10.06	9.95	9.87	9.83	9.72	9.38
	17	15	11.42	11.31	11.23	**11.19**	11.08	10.71
	20	19	10.03	11.81	11.73	11.70	11.59	11.19
	25	23	12.77	12.66	12.58	12.55	12.43	11.98
	30	28	13.51	13.40	13.32	13.28	13.17	12.77
	35	32	14.25	14.13	14.06	14.02	13.91	13.57
	40	36	14.90	14.79	14.71	14.67	14.56	14.23
	45	41	15.56	15.45	15.37	15.34	15.22	14.88
	47	43	15.83	15.71	15.64	**15.60**	15.49	15.15
	50	46	16.08	15.97	15.89	15.86	15.74	15.36
	55	51	16.51	16.39	16.32	16.28	16.17	15.71
	60	56	16.51	16.39	16.32	16.28	16.17	15.78
	63	59	16.51	16.39	16.32	16.28	16.17	15.83
	68	64	16.51	16.39	16.32	16.28	16.17	15.89
LSN180HSV5 21,600	0	-0.4	11.11	10.96	10.85	10.80	10.64	10.18
	5	4.5	12.52	12.37	12.26	12.21	12.06	11.58
	10	9	13.93	13.77	13.67	13.61	13.46	12.99
	17	15	15.81	15.65	15.55	**15.49**	15.34	14.84
	20	19	16.51	16.36	16.25	16.20	16.04	15.49
	25	23	17.69	17.53	17.43	17.37	17.22	16.59
	30	28	18.70	18.55	18.44	18.39	18.24	17.69
	35	32	19.72	19.56	19.46	19.41	19.25	18.79
	40	36	20.63	20.48	20.37	20.32	20.17	19.70
	45	41	21.55	21.39	21.29	21.24	21.08	20.61
	47	43	21.91	21.76	21.65	**21.60**	21.44	20.98
	50	46	22.26	22.11	22.01	21.95	21.80	21.27
	55	51	22.86	22.70	22.59	22.53	22.38	21.76
	60	56	22.86	22.70	22.59	22.53	22.38	21.85
	63	59	22.86	22.70	22.59	22.53	22.38	21.91
	68	64	22.86	22.70	22.59	22.53	22.38	22.02
LMN249HVT 25,600	0	-0.4	13.17	12.99	12.87	12.80	12.61	12.06
	5	4.5	14.84	14.66	14.54	14.47	14.29	13.73
	10	9	16.51	16.33	16.20	16.14	15.96	15.40
	17	15	18.74	18.56	18.42	**18.37**	18.18	17.59
	20	19	19.57	19.39	19.27	19.20	19.01	18.37
	25	23	20.96	20.77	20.65	20.59	20.40	19.66
	30	28	22.17	21.98	21.85	21.80	21.61	20.96
	35	32	23.37	23.19	23.07	23.00	22.82	22.26
	40	36	24.45	24.27	24.15	24.08	23.90	23.34
	45	41	25.53	25.35	25.23	25.16	24.98	24.42
	47	43	25.97	25.79	25.67	**25.60**	25.41	24.86
	50	46	26.39	26.21	26.08	26.02	25.83	25.20
	55	51	27.09	26.90	26.78	26.71	26.53	25.79
	60	56	27.09	26.90	26.78	26.71	26.53	25.90
	63	59	27.09	26.90	26.78	26.71	26.53	25.97
	68	64	27.09	26.90	26.78	26.71	26.53	26.08

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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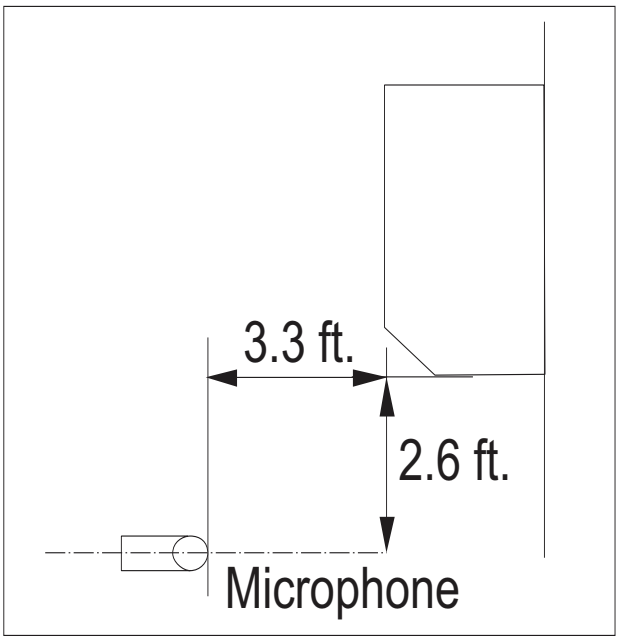
STANDARD WALL-MOUNTED INDOOR UNITS

Acoustic Data

Figure 63: Sound Pressure Level Measurement Location.

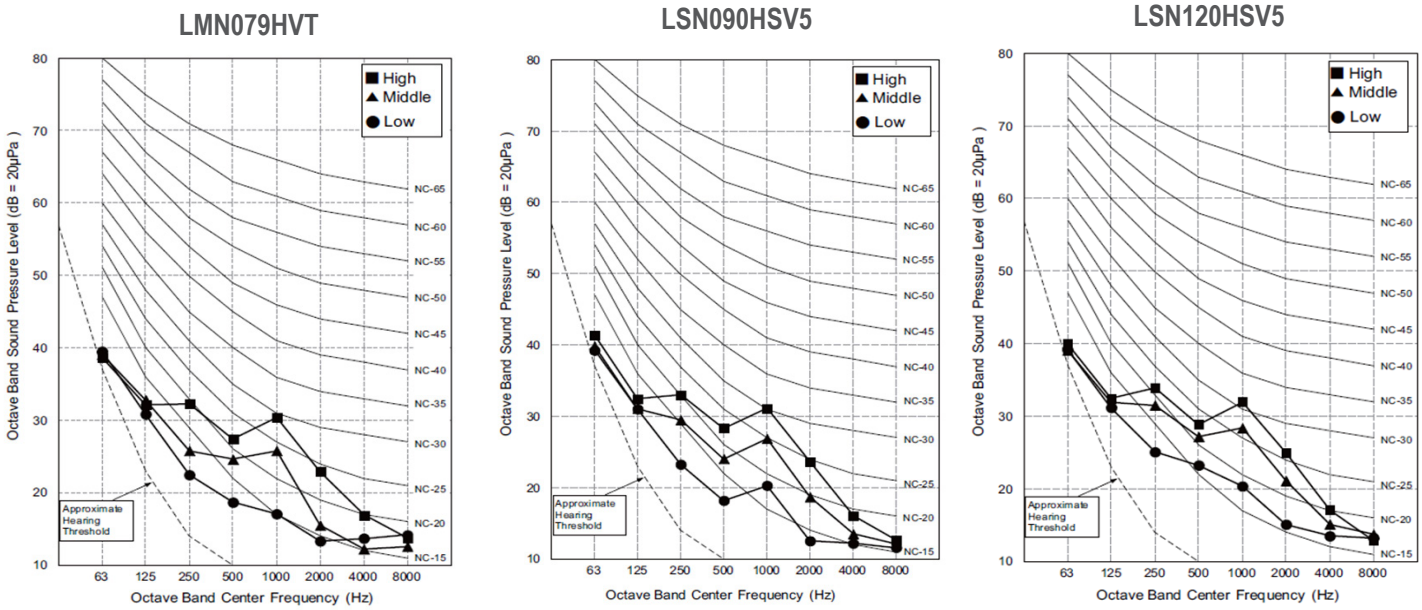


- Measurement taken 2.6' below the bottom of the unit and at a distance of 3.3' from face of unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient)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

Table 27: Sound Pressure Levels (dB[A]).

Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LMN079HVT	35	31	26
LSN090HSV5	36	32	27
LSN120HSV5	38	34	29
LMN159HVT	42	38	32
LSN180HSV5	44	38	34
LMN249HVT	46	41	36

Figure 64:LMN079HVT, LSN090HSV5, and LSN120HSV5 Sound Pressure Level Diagrams.



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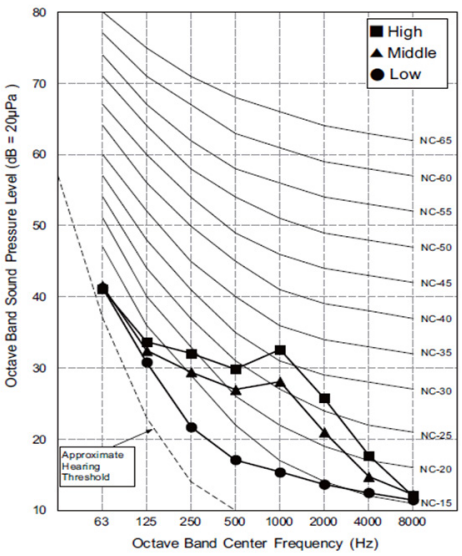
STANDARD WALL-MOUNTED INDOOR UNITS

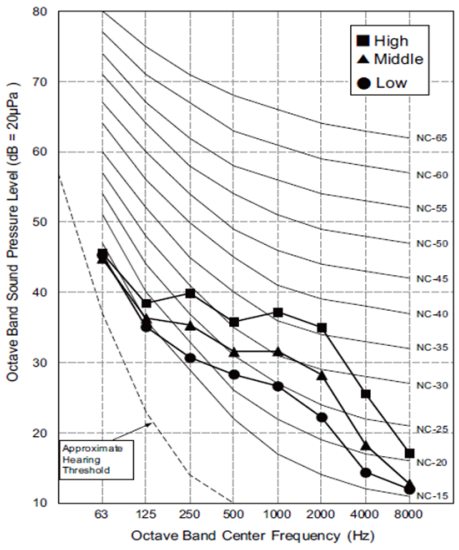
Acoustic Data

Figure 65:LMN159HVT, LSN180HSV5, and LMN249HVT Sound Pressure Level Diagrams.

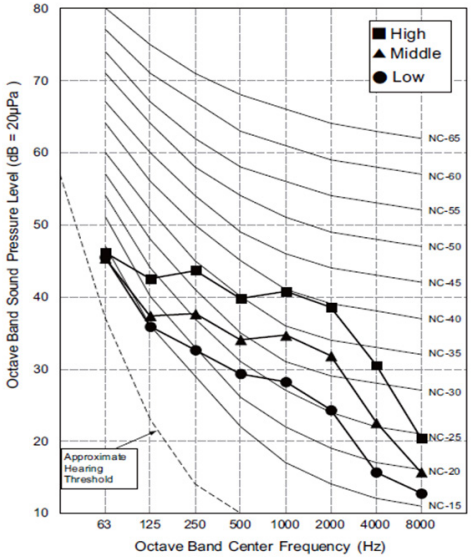
LMN159HVT



LSN180HSV5



LMN249HVT



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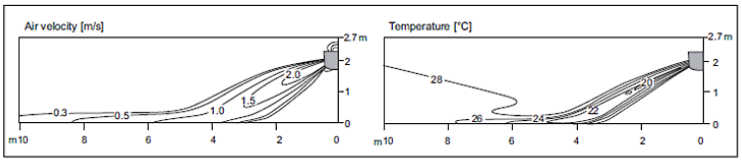
STANDARD WALL-MOUNTED INDOOR UNITS

Air Velocity and Temperature Distribution

Figure 66:LMN079HVT, LSN090HSV5, LSN120HSV5, LMN159HVT Air Velocity and Temperature Distribution Charts.

Cooling

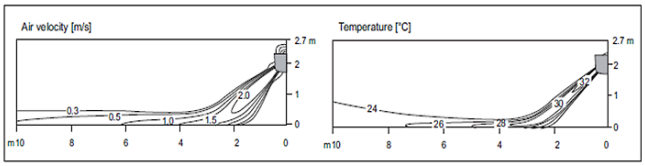
Side View
Discharge angle: 35°



- Vertical Louver : Center
- Fan speed : Power

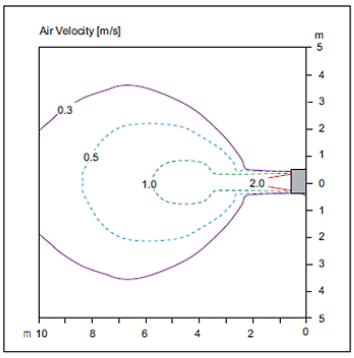
Heating

Side View
Discharge angle: 55°

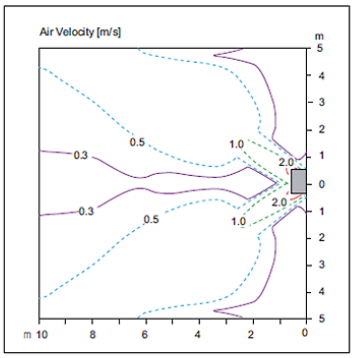


- Vertical Louver : Center
- Fan speed : Power

Top View
Discharge angle: 35°

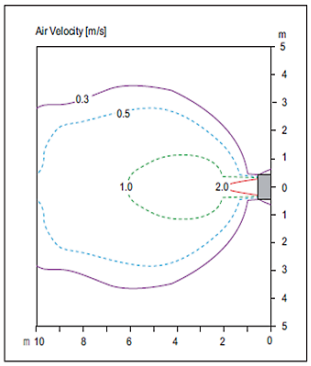


- Vertical Louver : Center
- Vertical Vane : 0˚
- Fan speed : Power
- Air speed 0.3m/s Range : 11.0m

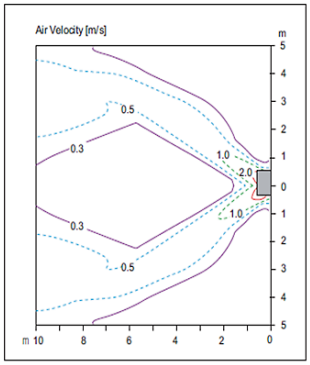


- Vertical Louver : Left & Right
- Vertical Vane : 55˚
- Fan speed : Power

Top View
Discharge angle: 55°



- Vertical Louver : Center
- Vertical Vane : 0˚
- Fan speed : Power
- Air speed 0.3m/s Range : 13.2m

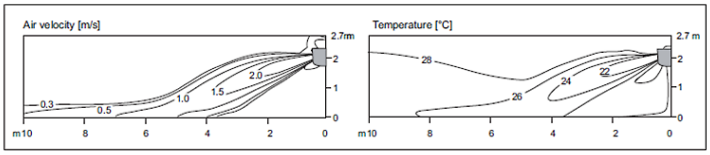


- Vertical Louver : Left & Right
- Vertical Vane : 55˚
- Fan speed : Power

Figure 67:LSN180HSV5 Air Velocity and Temperature Distribution Charts.

Cooling

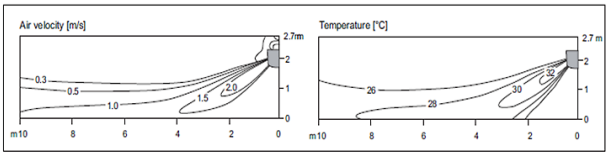
Side View
Discharge angle: 25°



- Vertical Louver : Center
- Fan speed : Power

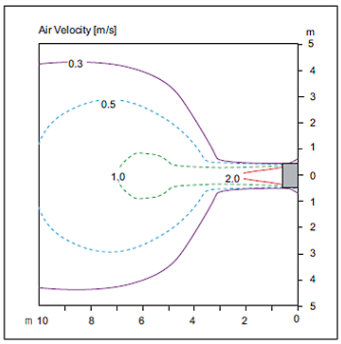
Heating

Side View
Discharge angle: 45°

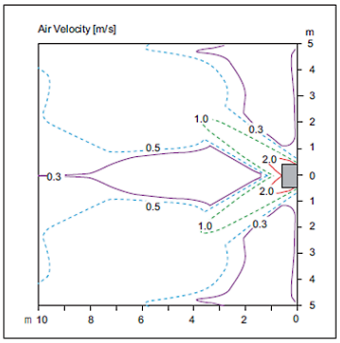


- Vertical Louver : Center
- Fan speed : Power

Top View
Discharge angle: 25°

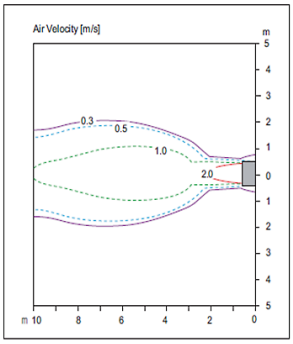


- Vertical Louver : Center
- Vertical Vane : 0˚
- Fan speed : Power
- Air speed 0.3m/s Range : 12.9m

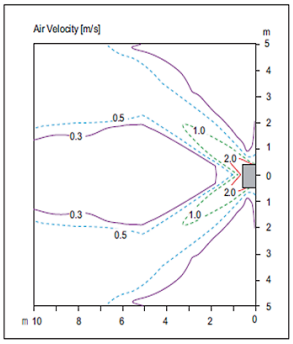


- Vertical Louver : Left & Right
- Vertical Vane : 50˚
- Fan speed : Power

Top View
Discharge angle: 45°



- Vertical Louver : Center
- Vertical Vane : 0˚
- Fan speed : Power
- Air speed 0.3m/s Range : 20.0m



- Vertical Louver : Left & Right
- Vertical Vane : 50˚
- Fan speed : Power

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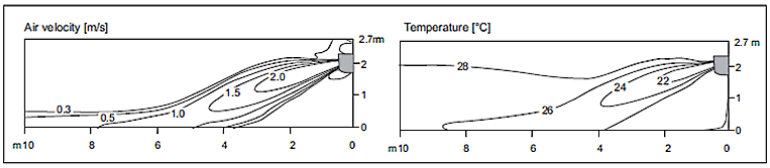
STANDARD WALL-MOUNTED INDOOR UNITS

Air Velocity and Temperature Distribution

Figure 68:LMN249HVT Air Velocity and Temperature Distribution Charts.

Cooling

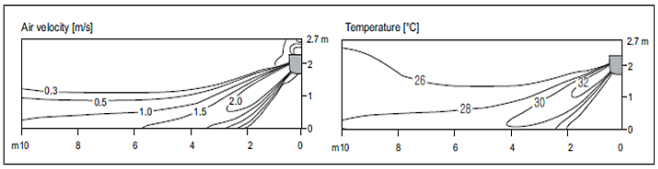
Side View
Discharge angle: 25°



- Vertical Louver : Center
- Fan speed : Power

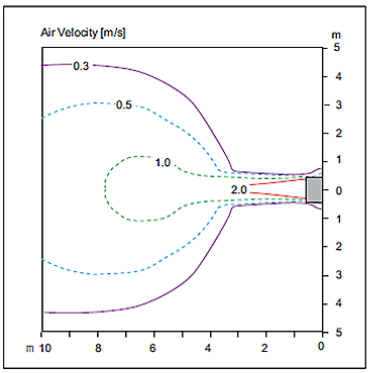
Heating

Side View
Discharge angle: 45°

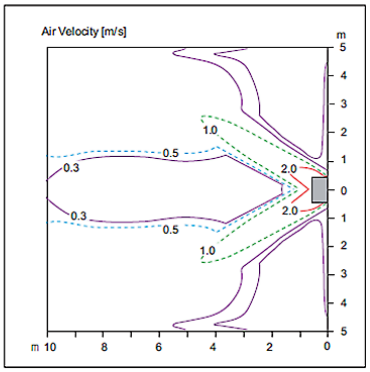


- Vertical Louver : Center
- Fan speed : Power

Top View
Discharge angle: 25°

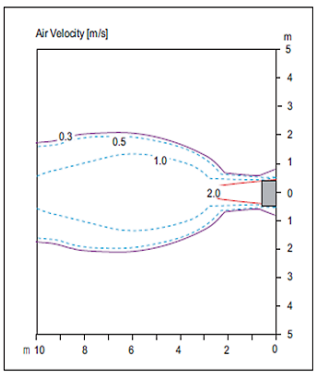


- Vertical Louver : Center
- Vertical Vane : 0°
- Fan speed : Power
- Air speed 0.3m/s Range : 15.0m

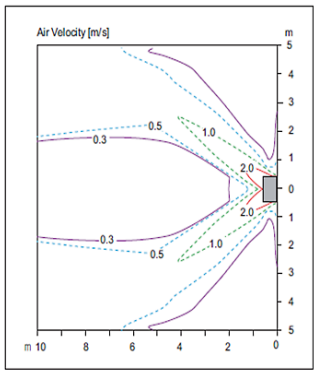


- Vertical Louver : Left & Right
- Vertical Vane : 50°
- Fan speed : Power

Top View
Discharge angle: 45°



- Vertical Louver : Center
- Vertical Vane : 0°
- Fan speed : Power
- Air speed 0.3m/s Range : 20.0m



- Vertical Louver : Left & Right
- Vertical Vane : 50°
- Fan speed : Power

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STANDARD WALL-MOUNTED INDOOR UNITS

Refrigerant Flow Diagram

Figure 69:Multi F Standard Wall-Mounted Indoor Unit Refrigerant Flow Diagram.

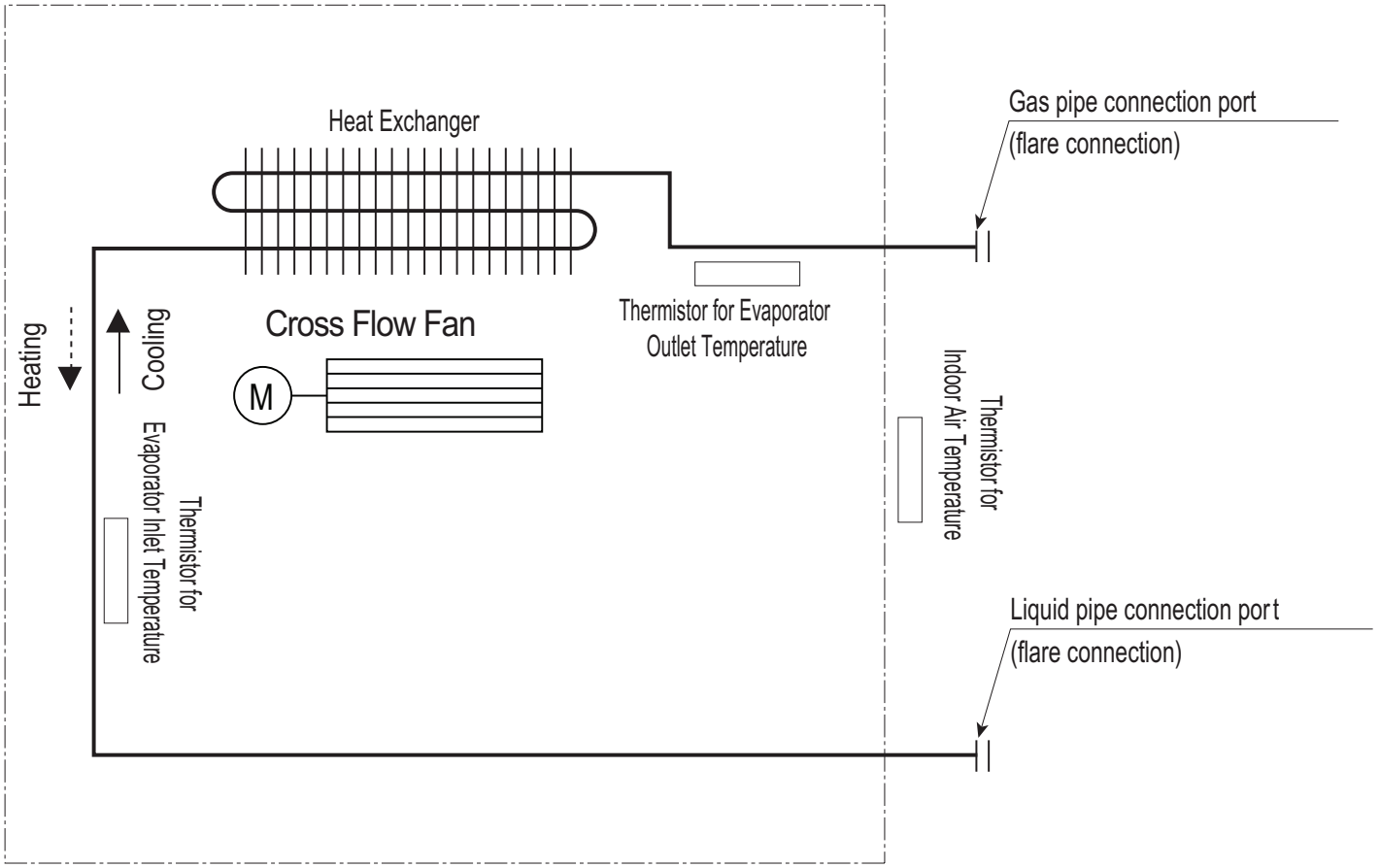

Table 28: Multi F Standard Wall-Mounted Indoor Unit Refrigerant Pipe Sizes.

Model No.	Vapor (inch)	Liquid (inch)
LMN079HVT	Ø3/8	Ø1/4
LSN090HSV5		
LSN120HSV5		
LMN159HVT		
LSN180HSV5	Ø1/2	
LMN249HVT		

Table 29: Multi F Standard Wall-Mounted Indoor Unit Refrigerant Pipe Connections.

Model No.	Vapor (inch)	Liquid (inch)
LMN079HVT	Ø3/8	Ø1/4
LSN090HSV5		
LSN120HSV5		
LMN159HVT		
LSN180HSV5	Ø5/8	Ø3/8
LMN249HVT	Ø1/2	Ø1/4

Table 30: Multi F LSNxxxHSV5 Standard Wall-Mounted Indoor Unit Thermistor Details.

Description (Based on Cooling Mode)	PCB Connector
Indoor Air Temperature Thermistor	CN-TH1
Evaporator Inlet Temperature Thermistor	
Evaporator Middle Temperature Thermistor	CN-TH2
Evaporator Outlet Temperature Thermistor	
Water Level Sensor (Optional)	CN-TH3

Table 31: Multi F LMNxxxHVT Standard Wall-Mounted Indoor Unit Thermistor Details.

Description (Based on Cooling Mode)	PCB Connector
Indoor Air Temperature Thermistor	CN-TH1
Evaporator Inlet Temperature Thermistor	
Evaporator Outlet Temperature Thermistor	CN-TH2
Water Level Sensor (Optional)	CN-TH3

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STANDARD WALL-MOUNTED INDOOR UNITS

Wiring Diagram

Figure 70:Multi F Standard Wall-Mounted LSN090HSV5, LSN120HSV5, LSN180HSV5 Indoor Units Wiring Diagram.

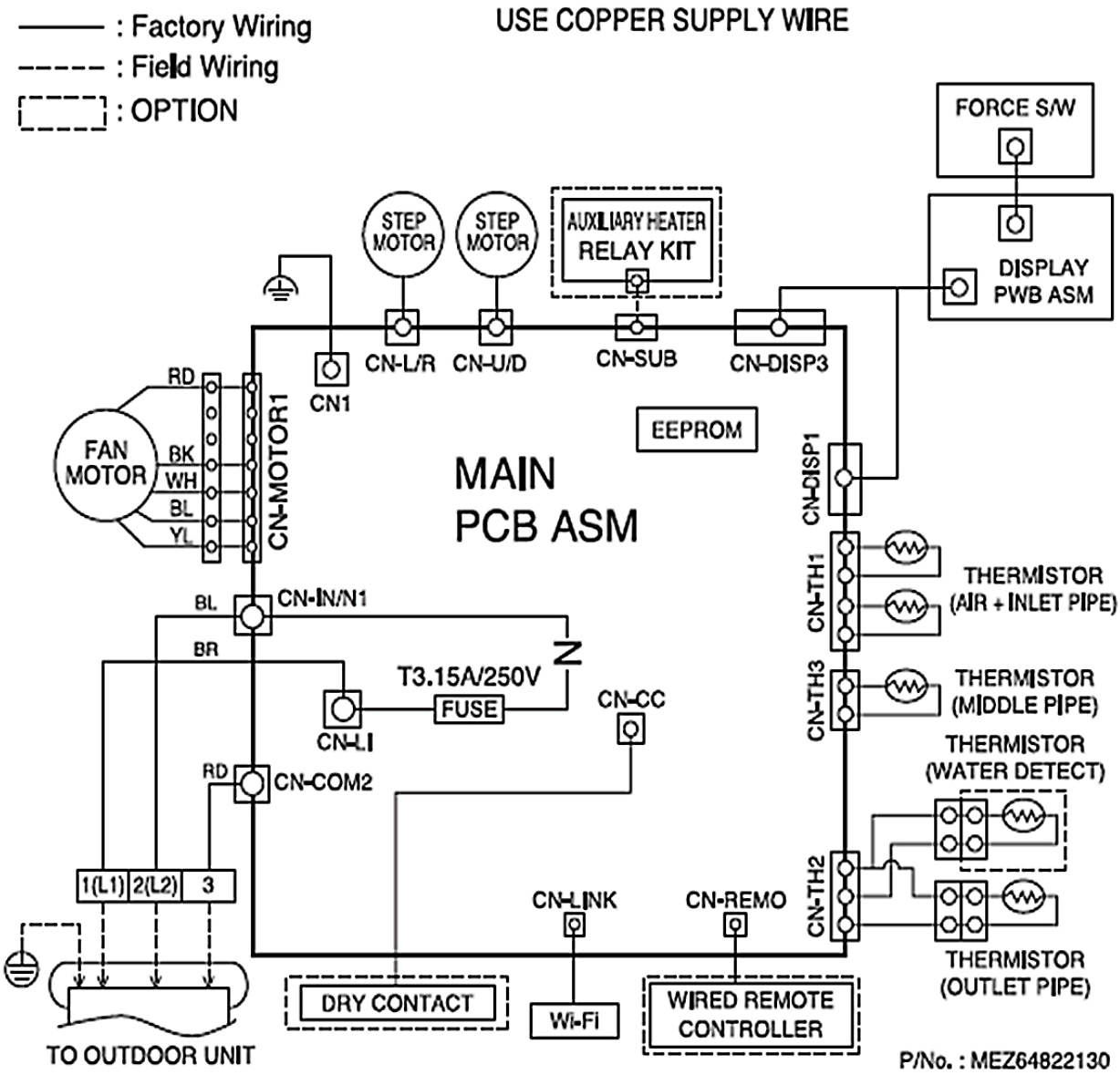

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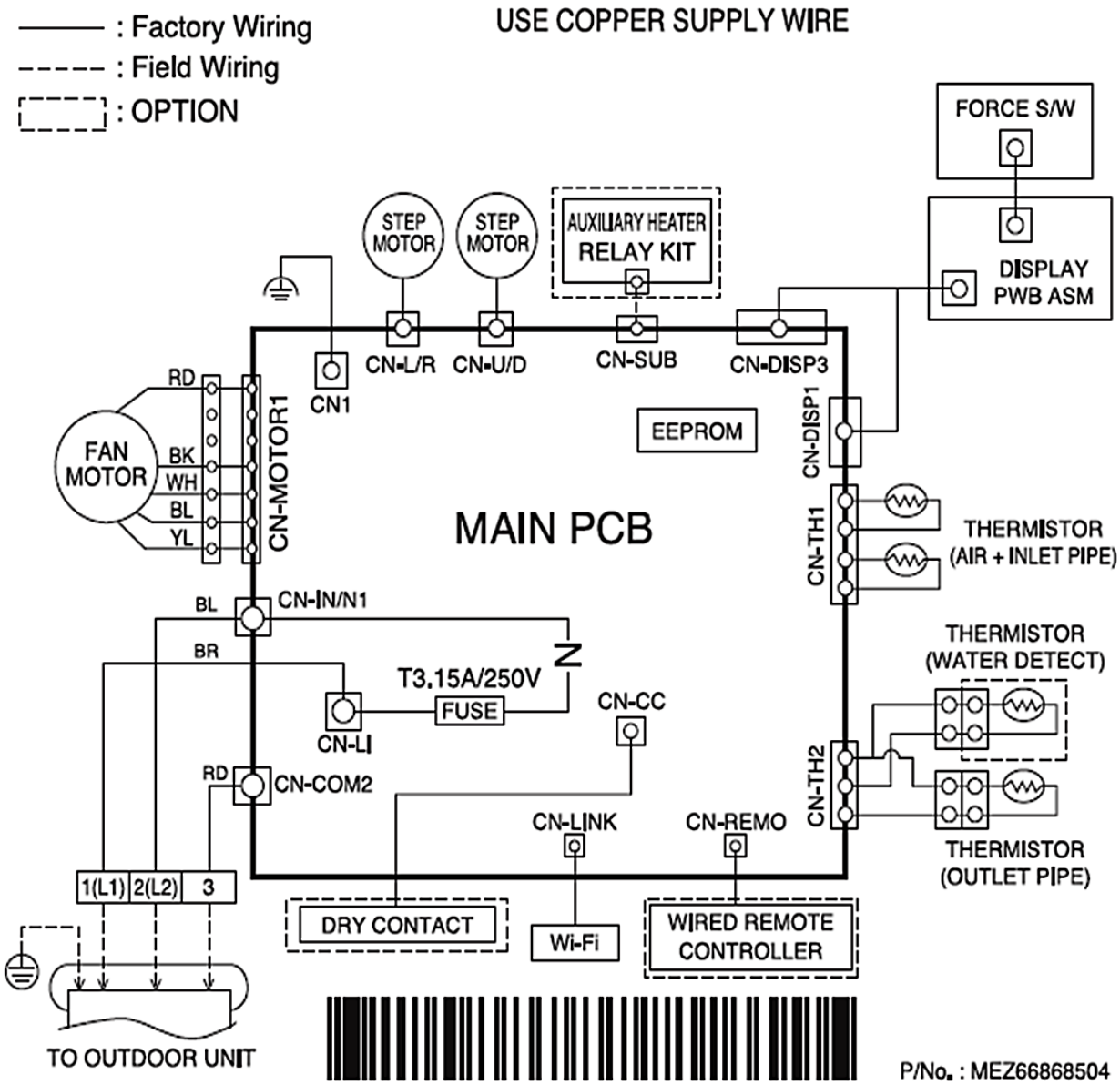
Figure 71: Multi F Standard Wall-Mounted LMN079HVT, LMN159HVT, LMN249HVT Indoor Unit Wiring Diagram.



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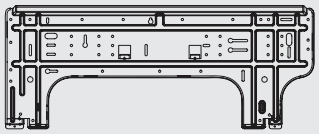
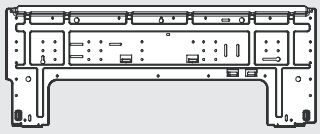
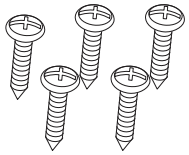
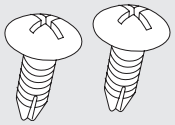
STANDARD WALL-MOUNTED INDOOR UNITS

Factory Supplied Parts and Materials

Factory Supplied Parts

Table 32: Parts Table.

Part	Quantity	Image
Installation Plate	One (1)	 7,000 ~ 15,000 Btu/h Indoor Units  18,000 and 24,000 Btu/h Indoor Units
Type “A” Screws	Five (5)	
Type “B” Screws (M4 x 12L)	Two (2)	
Wireless Controller with Holder AKB74955602	One (1)	

Factory Supplied Materials

- Owner’s Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Spanner (Half union)
- Thermometer

⚠ WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit’s components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

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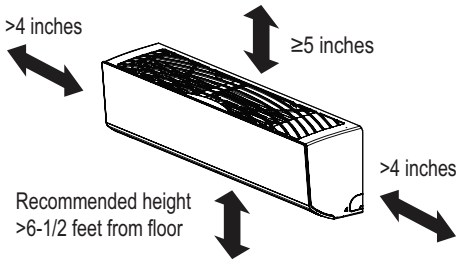
STANDARD WALL-MOUNTED INDOOR UNITS

Installation and Best Layout Practices

MULTI F
MULTI F MAX

Selecting the Best Location

Figure 72:Minimum Clearance Requirements.



Do's

- Place the unit where air circulation will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient space from the ceiling and floor.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit where it can be easily connected to the outdoor unit or branch distribution unit.

Don'ts

- *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- *Do not install the unit near high-frequency generators.*
- *Do not install the unit near a doorway.*

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

Note:

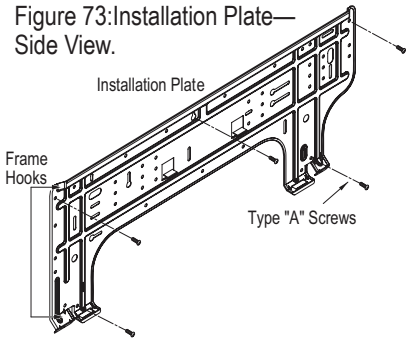
- *Indoor units (IDUs) must not be placed in an environment where the IDUs will be exposed to harmful volatile organic compounds (VOCs) or in environments where there is improper air make up or supply or inadequate ventilation. If there are concerns about VOCs in the environment where the IDUs are installed,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

Installing in an Area Exposed to Unconditioned Air

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

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

Figure 73:Installation Plate—Side View.



Mounting the Installation Plate

The mounting wall must be strong and solid enough to protect the unit from vibration.

- Mount the installation plate on the wall using the Type "A" screws. If mounting the unit on concrete, consider using anchor bolts.
- Always mount the installation plate horizontally. Measure the wall and mark the centerline using thread and a level.

Figure 74:Installation Plate for LMN079HVT, LSN090HSV5, LSN120HSV5, and LMN159HVT Units.

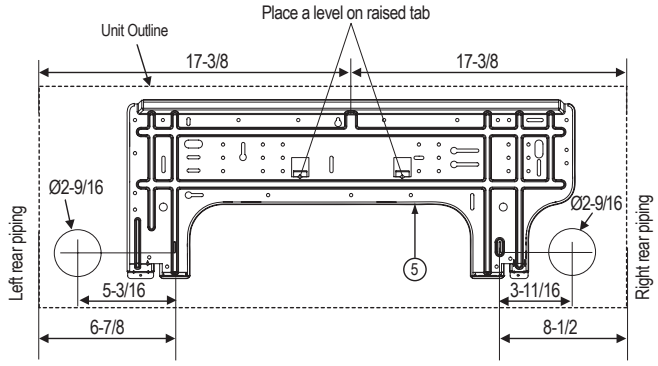
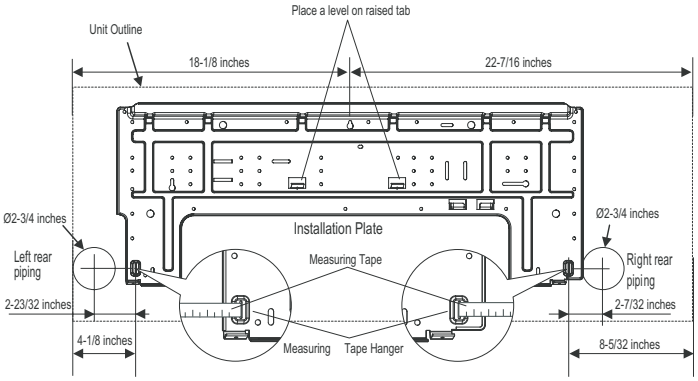


Figure 75:Installation Plate for LSN180HSV5 and LMN249HVT Units.



Note:

If the unit is installed near a body of water, certain components are at risk of being corroded. Appropriate anti-corrosion methods must be taken for the unit and all components.

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STANDARD WALL-MOUNTED INDOOR UNITS

Installation and Best Layout Practices

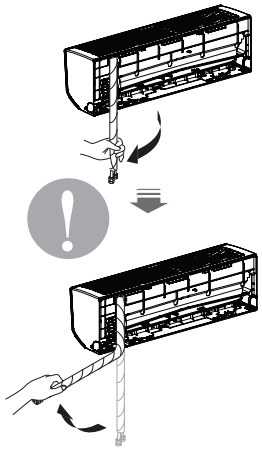
Preparing for Installation

Prepare the refrigerant piping and drain hose (indoor unit piping) for installation through the wall: press on the top of the tubing clamp and slowly guide the piping / hose down (depending on installation requirements, then to the left or right). Relock the tubing clamp after the piping / hose are released.

Note:

⃠ *Do not bend the piping / drain hose from side to side; it will damage the components.*

Figure 76:Preparing for Installation.



Hanging the Indoor Unit Frame

1. Attach the three (3) hooks on the top of the indoor unit to the top edge of the installation plate. Verify the hooks are properly attached to the installation plate by gently shaking the indoor unit from side to side.
2. Unlock the tubing clamp from the indoor unit frame. For easier access between the bottom of the indoor unit and the wall, prop the clamp between the indoor unit frame and installation plate.
3. Remove the screw covers at the bottom of the indoor unit, unscrew the two (2) screws, remove the frame cover, remove the piping connection cover, and position the piping for installation (down, back, left, or right).

Figure 77:Locking the Indoor Unit onto the Installation Plate.

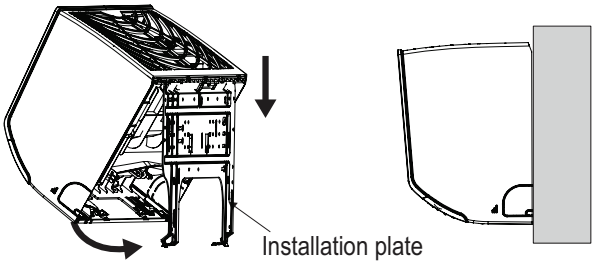


Figure 78:Accessing the Back of the Indoor Unit.

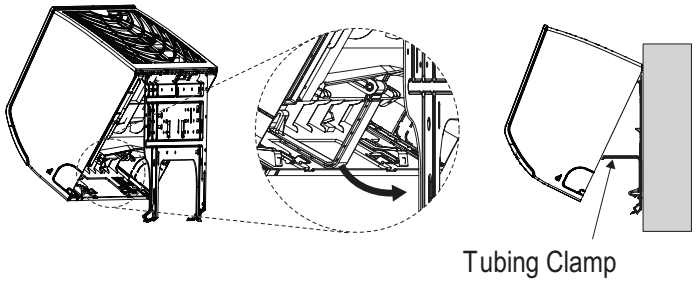


Figure 79:Removing the Frame Cover.

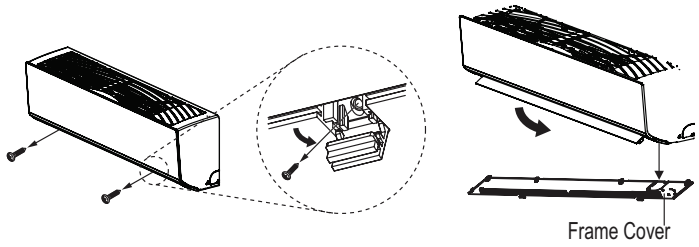


Figure 80:Exterior Back View of Indoor Unit.

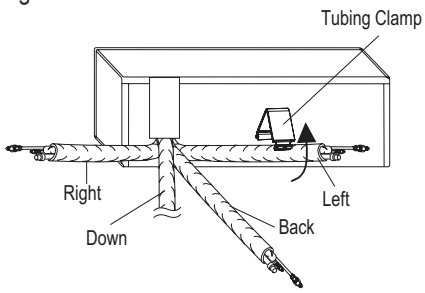


Figure 81:Piping Installed to the Left.

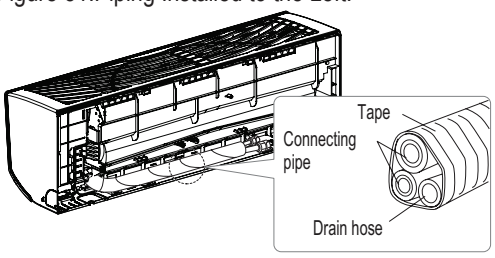
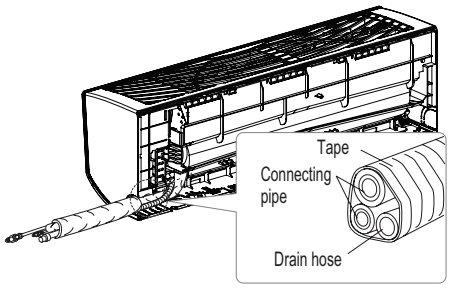


Figure 82:Piping Installed to the Right.



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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

- *Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.*

Note:

- *Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.*

A voltage drop will cause the following problems:

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

Connect Power Wiring and Communications Cable

1. Insert the power wiring / communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) through the bottom of the indoor unit.
2. Connect each wire to its appropriate terminal on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.
3. Secure power wiring/communications cable with cable restraint.

Figure 83: Connecting Power Wiring / Communications Cable.

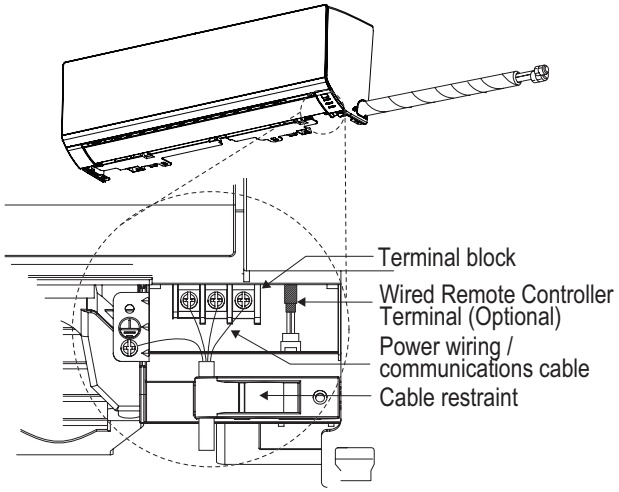


Figure 84:Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections—LMN079HVT, LSN090HSV5, LSN120HSV5 and LMN159HVT.

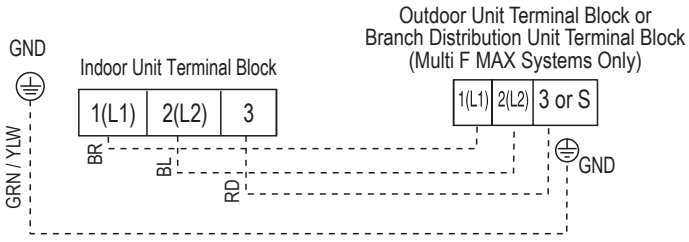
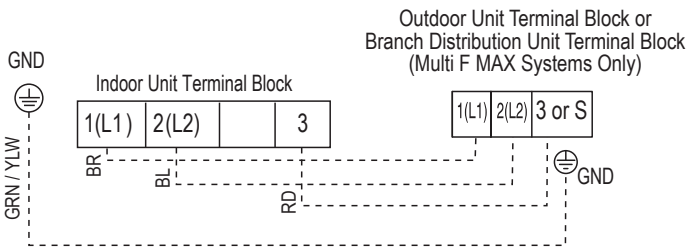


Figure 85:Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections— LSN180HSV5 and LMN249HVT.



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Controller Options

Standard wall-mounted indoor units include a wireless controller (AKB74955602), but optional LG-supplied wired controllers are available.

Wireless Controller

Figure 86:AKB74955602 Wireless Controller.

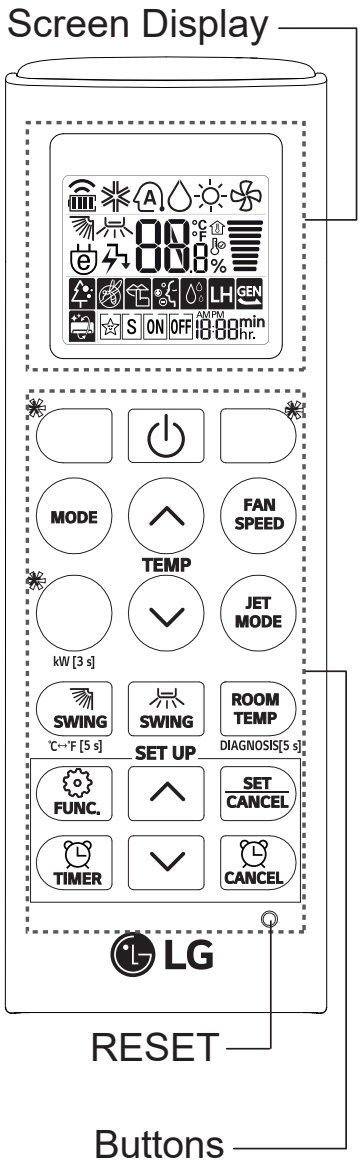

Table 33: AKB74955602 Wireless Controller Functions.

Button	Display Screen	Description
		To purify the air by removing particles that enters the indoor unit.
		To reduce noise from outdoor units.
		To keep your skin moisturized by generating ion clusters.
	Po	To lower indoor humidity quickly.
	LH	To maintain a minimum indoor temperature and prevent indoor objects from freezing.
		To fan away a mosquito.
		To remove moisture generated inside the indoor unit.
		To make the comfortable sleep environment.
RESET	-	To Initialize the remote control settings.

Button	Display Screen	Description
	-	To turn on/off the air conditioner.
		To adjust the desired room temperature in cooling, heating or auto changeover mode.
MODE		To select the cooling mode.
		To select the heating mode.
		To select the dehumidification mode.
		To select the fan mode.
		To select the auto changeover/auto operation mode.
JET MODE	Po	To change room temperature quickly.
FAN SPEED		To adjust the fan speed.
		To adjust the air flow direction vertically or horizontally.
	S ON OFF	To turn on/off air conditioner automatically at desired time.
SET/ CANCEL	-	To set/cancel the special functions and timer.
	-	To cancel the timer settings.
	-	To adjust time.
*LIGHT OFF	-	To set the brightness of the display on the indoor unit.
ROOM TEMP		To display the room temperature.
°C ↔°F [5 s]	°C °F	To change unit between °C and °F.
*ENERGY SAVING		To minimize power consumption.
*COMFORT AIR		To adjust the air flow to deflect wind.
kW[3 s]	-	To set whether or not to display information regarding energy.
*ENERGY CTRL		To bring the effect of the power saving.
*COMFORT SLEEP		To make the comfortable sleep environment.
DIAGNOSIS [5 s]	-	To conveniently check maintenance information of a product.

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Wired Controller Connections

Figure 87:Wired Controller Connection on Indoor Unit Terminal Block—LMN079HVT, LSN090HSV5, LSN120HSV5, and LMN159HVT Models.

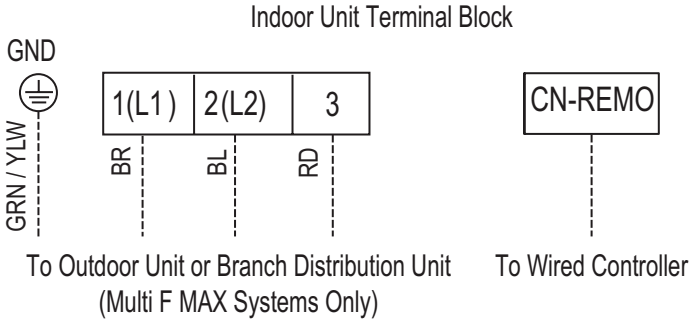
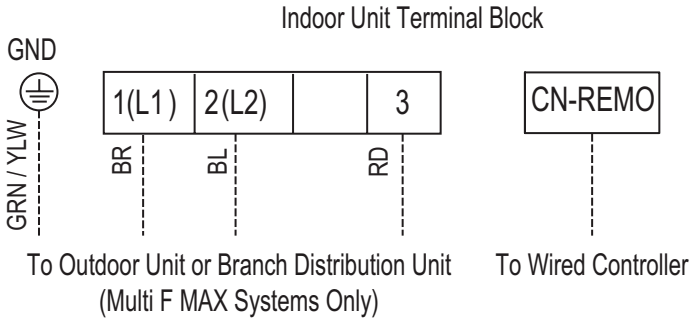


Figure 88:Wired Controller Connection on Indoor Unit Terminal Block—LSN180HSV5 and LMN249HVT Models.



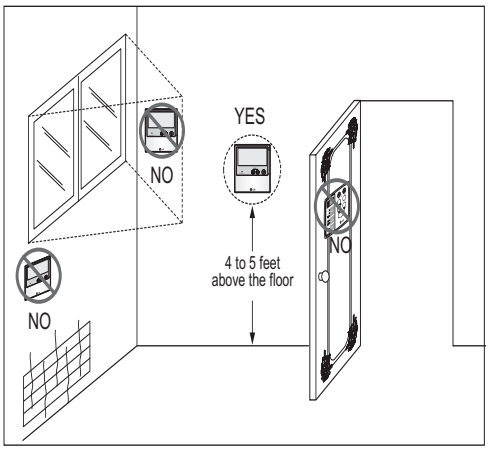
Wired Controller Placement

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

⃠ Do not install the wired controller near or in:

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

Figure 89:Proper Location for the Wired Controller.



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Hanging the Wired Controller

1. The controller wiring / cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring / cable on applicable side.

2. Choose and mark the area of installation. Use the provided parts and screw the wall plate into place. Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring / cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 91:Removing the Cable Guide Grooves.

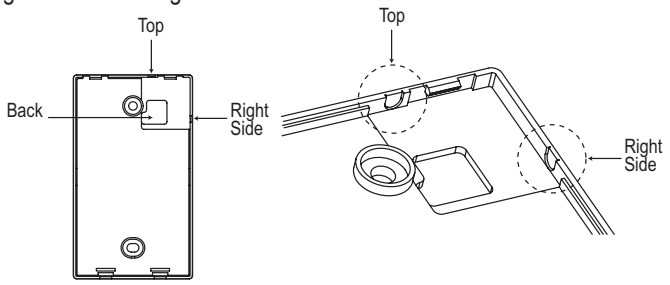


Figure 92:Attaching the Wall Plate.

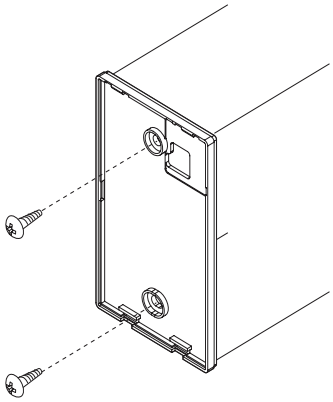
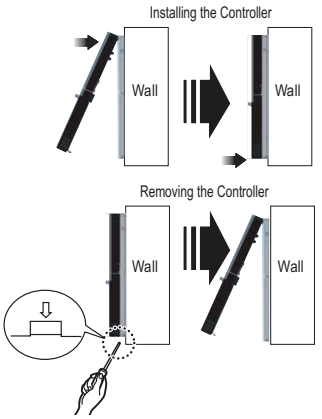


Figure 93:Installing / Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

Finalizing Indoor Unit Installation

1. Move the tubing clamp to its original position.

2. Ensure the three (3) hooks are properly attached to the installation plate by gently shaking the indoor unit from side to side.

3. Press the bottom left and right sides of the indoor unit against the installation plate until the hooks click firmly into their slots.

4. Using two (2) Type “C” screws, secure the bottom of the indoor unit to the installation plate.

5. Remove the two (2) tabs from the filter.

6. Replace the frame cover.

Figure 90:Attach Bottom of Indoor Unit to Installation Plate.

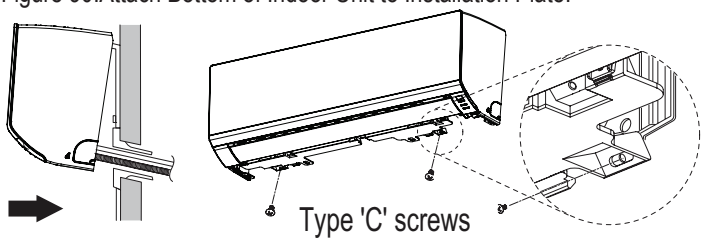
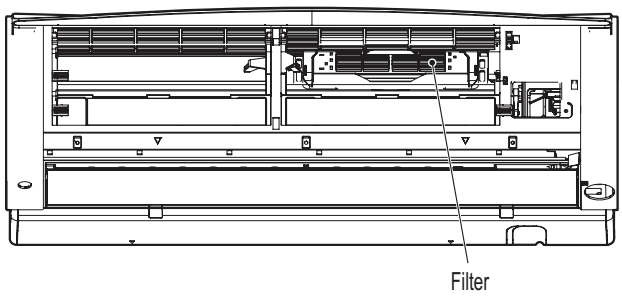


Figure 94:Removing the Filter Tabs.



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LOW WALL CONSOLE INDOOR UNIT DATA

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“Acoustic Data” on page 79
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“Refrigerant Flow Diagram” on page 82
“Wiring Diagram” on page 83
“Factory Supplied Parts and Materials” on page 84
“Installation and Best Layout Practices” on page 85

LOW WALL CONSOLE INDOOR UNITS

Mechanical Specifications and Features

Low Wall Console Indoor Units

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Low Wall Console units have a sound rating no higher than 44 dB(A) as tested per KSA0701 ISO Low 3745.

Coil

Indoor unit coils are comprised of a minimum of two rows of aluminum fins mechanically bonded to copper tubing. The coils are pressure tested at the factory. Each unit is provided with a factory installed condensate drain pan below the coil.

Refrigerant System

The system is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare. All refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

The indoor units require 208–230Vac/60Hz/1Φ power with voltage variance of no more than ±10%.

Casing

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

Finish

The Low Wall Console unit has a case with a beige-white panel. It is manufactured of heavy-duty acrylonitrile butadiene styrene (ABS) and high impact polystyrene (HIPS) plastic.

Fan Assembly and Control

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

Air Filter

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

Figure 95: Multi F Low Wall Console Indoor Unit.

Airflow Guide Vanes

A factory-installed motorized guide vane controls the direction of airflow up and down for uniform air distribution. Side to side control is manual.

Microprocessor Control

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

Controls

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

Condensate

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

Features

- Inverter (Variable speed fan)
- Comfort Air
- Jet cool/Jet Heat
- Group control
- Auto operation
- Auto restart operation
- Optional wi-fi
- Self-diagnostic function
- Wireless LCD remote control included

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LOW WALL CONSOLE INDOOR UNITS

General Data / Specifications

MULTI F
MULTI F MAX

Table 34: Multi F Low Wall Console Indoor Unit General Data.

Model Name	LQN090HV4	LQN120HV4	LMQN150HV
Nominal Cooling Capacity (Btu/h)[1]	9,000	12,000	15,710
Nominal Heating Capacity (Btu/h)[1]	10,500	13,650	17,070
Operating Range			
Cooling (°F WB)	57-77		
Heating (°F DB)	59-81		
Fan			
Type	Turbo		
Motor Output (W) x Qty.	48 x 1		
Motor/Drive	Brushless Digitally Controlled / Direct		
Airflow Rate CFM (Max/H/M/L)	304 / 300 / 237 / 177	346 / 318 / 244 / 184	388 / 357 / 304 / 254
Unit Data			
Refrigerant Type[2]	R410A		
Refrigerant Control	EEV		
Power Supply V, Ø, Hz[3]	208-230, 1, 60		
Rated Amps (A)	0.7		
Sound Pressure Level dB(A) (H/M/L)[4]	38/32/27	39/32/27	44/39/35
Dimensions (W x H x D, in.)	27-9/16 x 23-5/8 x 8-9/32		
Net Unit Weight (lbs.)	35.7		
Shipping Weight (lbs.)	41.7		
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 14		
Heat Exchanger (Row x Column x FPI) x Qty.	(2 x 19 x 19) x 1		
Pipe Size			
Liquid (in.)	1/4	1/4	1/4
Vapor (in.)	3/8	3/8	1/2
Connection Size			
Liquid (in.)	1/4	1/4	1/4
Vapor (in.)	3/8	3/8	1/2
Drain O.D. / I.D. (in.)	27/32, 5/8		

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with low length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

[4]Sound pressure levels are tested in an anechoic chamber under ISO Low 3745 and are the same in both cooling and heating mode. These values can increase due to ambient conditions during operation.

[5]All power wiring / communications cable to the IDUs be minimum 14 AWG, 4-conductor, stranded, shielded or unshielded (if shielded, must be grounded to chassis at ODU only) and must comply with applicable local and national codes.

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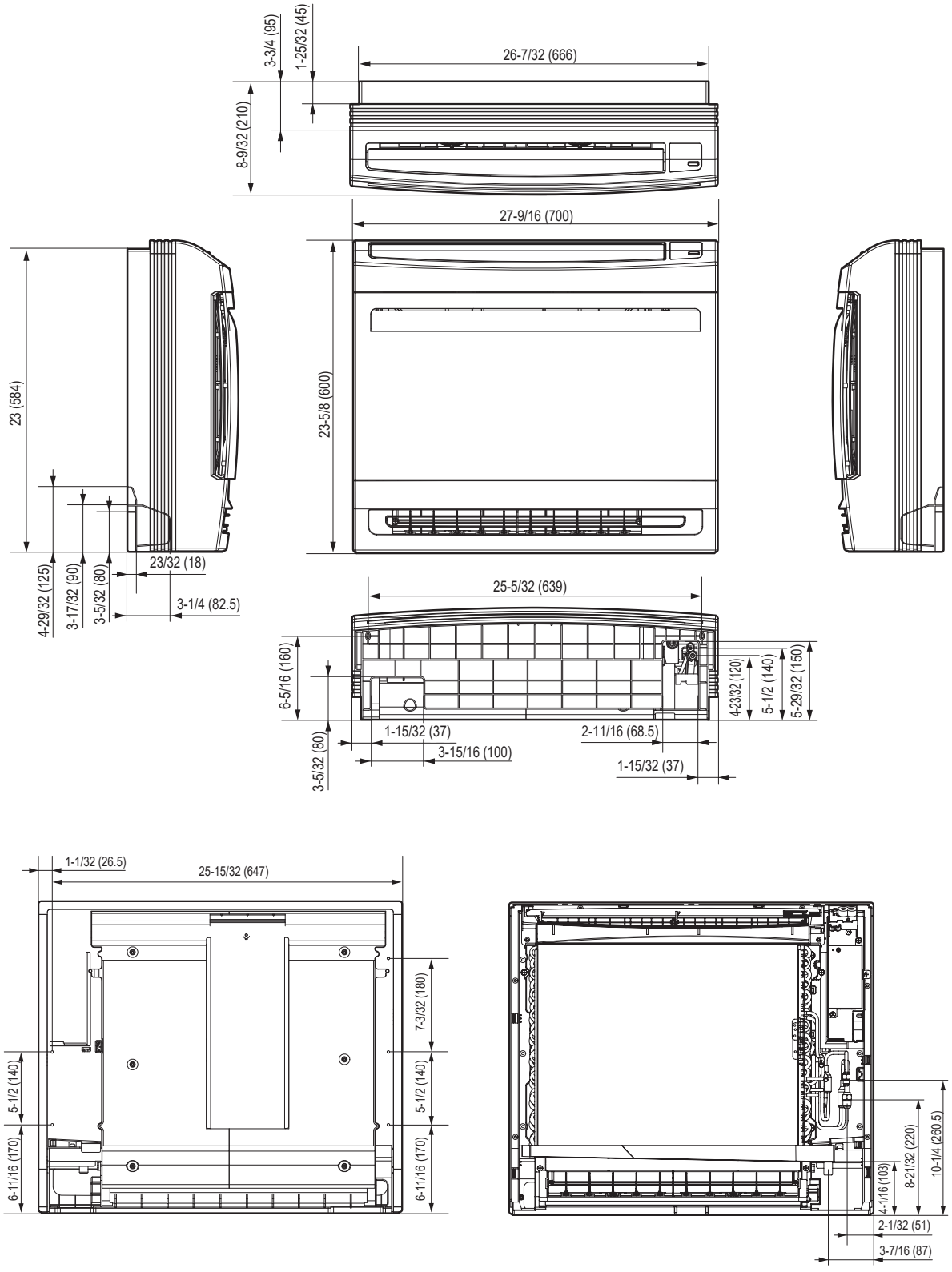
LG

LOW WALL CONSOLE INDOOR UNITS

Dimensions

Figure 96: LQN090HV4, LQN120HV4, and LMQN150HV Dimensions.



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LOW WALL CONSOLE INDOOR UNITS

Cooling Capacity Table

Table 35: Multi F Low Wall Console Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LQN090HV4 9,000	14	8.82	6.19	9.37	6.54	9.92	6.33	10.31	6.47	11.01	6.52	11.56	6.65
	20	8.82	6.24	9.36	6.59	9.91	6.38	10.31	6.52	11.01	6.57	11.55	6.70
	25	8.81	6.29	9.36	6.64	9.90	6.43	10.30	6.57	11.00	6.62	11.54	6.75
	30	8.80	6.34	9.35	6.70	9.90	6.48	10.29	6.62	10.99	6.68	11.54	6.80
	35	8.80	6.39	9.34	6.75	9.89	6.53	10.28	6.67	10.98	6.73	11.53	6.85
	40	8.79	6.43	9.33	6.80	9.88	6.58	10.27	6.72	10.97	6.78	11.52	6.90
	45	8.78	6.48	9.33	6.85	9.87	6.63	10.27	6.77	10.96	6.83	11.51	6.96
	50	8.78	6.53	9.32	6.90	9.87	6.68	10.26	6.82	10.96	6.88	11.50	7.01
	55	8.77	6.58	9.31	6.95	9.86	6.73	10.25	6.87	10.95	6.93	11.49	7.06
	60	8.76	6.63	9.31	7.00	9.85	6.78	10.24	6.92	10.94	6.98	11.48	7.11
	65	8.76	6.67	9.30	7.05	9.84	6.83	10.24	6.97	10.93	7.03	11.47	7.16
	70	8.75	6.72	9.29	7.10	9.84	6.87	10.23	7.02	10.92	7.08	11.47	7.21
	75	8.54	6.61	9.08	6.99	9.62	6.78	10.01	6.93	10.71	6.99	11.25	7.13
	80	8.33	6.50	8.87	6.88	9.41	6.68	9.80	6.83	10.49	6.90	11.03	7.05
	85	8.12	6.38	8.66	6.77	9.20	6.58	9.59	6.73	10.28	6.81	10.82	6.96
	90	7.91	6.26	8.45	6.65	8.99	6.47	9.37	6.63	10.06	6.72	10.60	6.87
	95	7.68	6.19	8.22	6.59	8.75	6.42	**9.00**	**6.48**	9.83	6.68	10.36	6.84
	100	7.50	6.03	8.03	6.42	8.57	6.27	8.88	6.38	9.64	6.54	10.17	6.70
	105	7.31	5.86	7.84	6.26	8.38	6.11	8.77	6.28	9.45	6.39	9.99	6.56
	110	7.12	5.66	7.66	6.05	8.19	5.92	8.58	6.09	9.26	6.21	9.80	6.38
	115	6.94	5.49	7.47	5.88	8.01	5.77	8.39	5.94	9.08	6.06	9.61	6.23
	118	6.82	5.45	7.36	5.85	7.89	5.74	8.28	5.91	8.96	6.04	9.50	6.22
	122	6.79	5.44	7.32	5.84	7.86	5.73	8.24	5.90	8.93	6.04	9.46	6.21
LQN120HV4 12,000	14	11.76	8.37	12.49	8.84	13.22	8.56	13.75	8.74	14.69	8.82	15.42	8.98
	20	11.75	8.44	12.48	8.91	13.21	8.63	13.74	8.81	14.67	8.89	15.40	9.05
	25	11.75	8.50	12.48	8.98	13.20	8.70	13.73	8.88	14.66	8.96	15.39	9.12
	30	11.74	8.57	12.47	9.05	13.19	8.76	13.72	8.95	14.65	9.02	15.38	9.19
	35	11.73	8.63	12.46	9.12	13.18	8.83	13.71	9.02	14.64	9.09	15.37	9.26
	40	11.72	8.70	12.45	9.19	13.17	8.90	13.70	9.08	14.63	9.16	15.36	9.33
	45	11.71	8.76	12.44	9.26	13.16	8.96	13.69	9.15	14.62	9.23	15.35	9.40
	50	11.70	8.83	12.43	9.33	13.15	9.03	13.68	9.22	14.61	9.30	15.33	9.47
	55	11.69	8.89	12.42	9.39	13.14	9.10	13.67	9.29	14.60	9.37	15.32	9.54
	60	11.68	8.96	12.41	9.46	13.13	9.16	13.66	9.35	14.59	9.43	15.31	9.61
	65	11.67	9.02	12.40	9.53	13.12	9.23	13.65	9.42	14.57	9.50	15.30	9.68
	70	11.66	9.09	12.39	9.60	13.11	9.29	13.64	9.49	14.56	9.57	15.29	9.75
	75	11.38	8.94	12.11	9.45	12.83	9.16	13.35	9.36	14.27	9.45	15.00	9.64
	80	11.10	8.78	11.82	9.30	12.55	9.03	13.07	9.23	13.99	9.33	14.71	9.53
	85	10.83	8.62	11.54	9.15	12.26	8.89	12.78	9.10	13.70	9.21	14.42	9.41
	90	10.55	8.46	11.26	8.99	11.98	8.74	12.50	8.96	13.42	9.08	14.13	9.28
	95	10.25	8.37	10.96	8.91	11.67	8.68	**12.00**	**8.76**	13.10	9.03	13.81	9.24
	100	10.00	8.15	10.71	8.68	11.42	8.47	11.84	8.62	12.85	8.84	13.56	9.05
	105	9.75	7.92	10.46	8.46	11.17	8.26	11.69	8.49	12.60	8.64	13.31	8.86
	110	9.50	7.65	10.21	8.18	10.92	8.01	11.44	8.24	12.35	8.40	13.07	8.62
	115	9.25	7.42	9.96	7.95	10.67	7.80	11.19	8.03	12.10	8.20	12.82	8.42
	118	9.10	7.37	9.81	7.91	10.52	7.76	11.04	7.99	11.95	8.17	12.67	8.40
	122	9.05	7.35	9.76	7.89	10.48	7.74	10.99	7.98	11.90	8.16	12.62	8.39

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

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

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

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

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LOW WALL CONSOLE INDOOR UNITS

Cooling Capacity Table

Table 36: Multi F Low Wall Console Indoor Units Cooling Capacity Table (continued).

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LMQN150HV 15,710	14	15.40	11.41	16.36	12.05	17.31	11.67	18.00	11.92	19.23	12.02	20.18	12.25
	20	15.39	11.50	16.34	12.15	17.30	11.76	17.99	12.01	19.21	12.11	20.17	12.34
	25	15.38	11.59	16.33	12.24	17.29	11.85	17.98	12.10	19.20	12.21	20.15	12.44
	30	15.37	11.68	16.32	12.34	17.27	11.94	17.96	12.20	19.18	12.30	20.14	12.53
	35	15.35	11.77	16.31	12.43	17.26	12.04	17.95	12.29	19.17	12.39	20.12	12.63
	40	15.34	11.86	16.29	12.52	17.25	12.13	17.94	12.38	19.15	12.49	20.11	12.72
	45	15.33	11.94	16.28	12.62	17.23	12.22	17.92	12.47	19.14	12.58	20.09	12.82
	50	15.32	12.03	16.27	12.71	17.22	12.31	17.91	12.57	19.12	12.67	20.07	12.91
	55	15.31	12.12	16.26	12.80	17.21	12.40	17.89	12.66	19.11	12.77	20.06	13.01
	60	15.29	12.21	16.24	12.90	17.19	12.49	17.88	12.75	19.09	12.86	20.04	13.10
	65	15.28	12.30	16.23	12.99	17.18	12.58	17.87	12.84	19.08	12.95	20.03	13.20
	70	15.27	12.38	16.22	13.08	17.17	12.67	17.85	12.93	19.06	13.04	20.01	13.29
	75	14.90	12.18	15.85	12.88	16.80	12.49	17.48	12.76	18.69	12.88	19.63	13.14
	80	14.54	11.97	15.48	12.68	16.42	12.31	17.11	12.59	18.31	12.72	19.25	12.99
	85	14.17	11.75	15.11	12.47	16.05	12.11	16.73	12.40	17.94	12.55	18.88	12.82
	90	13.81	11.53	14.75	12.25	15.69	11.92	16.36	12.21	17.56	12.37	18.50	12.65
	95	13.41	11.41	14.35	12.14	15.28	11.83	**15.71**	**11.94**	17.15	12.31	18.08	12.60
	100	13.09	11.10	14.02	11.83	14.95	11.55	15.51	11.75	16.82	12.04	17.76	12.34
	105	12.76	10.80	13.69	11.53	14.63	11.26	15.30	11.57	16.50	11.78	17.43	12.08
	110	12.43	10.43	13.37	11.15	14.30	10.92	14.98	11.22	16.17	11.44	17.10	11.75
	115	12.11	10.12	13.04	10.84	13.97	10.63	14.65	10.94	15.84	11.17	16.78	11.48
	118	11.91	10.04	12.84	10.77	13.78	10.57	14.45	10.89	15.65	11.13	16.58	11.45
	122	11.84	10.02	12.78	10.75	13.71	10.55	14.39	10.87	15.58	11.12	16.52	11.44

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

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

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

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

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LOW WALL CONSOLE INDOOR UNITS

Heating Capacity Table

MULTI F
MULTI F MAX

Table 37: Multi F Low Wall Console Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LQN090HV4 9,000	0	-0.4	5.40	5.33	5.28	5.25	5.17	4.95
	5	4.5	6.09	6.01	5.96	5.93	5.86	5.63
	10	9	6.77	6.70	6.64	6.62	6.54	6.32
	17	15	7.68	7.61	7.56	**7.53**	7.46	7.21
	20	19	8.03	7.95	7.90	7.88	7.80	7.53
	25	23	8.60	8.52	8.47	8.45	8.37	8.07
	30	28	9.09	9.02	8.97	8.94	8.86	8.60
	35	32	9.59	9.51	9.46	9.43	9.36	9.13
	40	36	10.03	9.95	9.90	9.88	9.80	9.57
	45	41	10.47	10.40	10.35	10.32	10.25	10.02
	47	43	10.65	10.58	10.53	**10.50**	10.42	10.20
	50	46	10.82	10.75	10.70	10.67	10.60	10.34
	55	51	11.11	11.03	10.98	10.96	10.88	10.58
	60	56	11.11	11.03	10.98	10.96	10.88	10.62
	63	59	11.11	11.03	10.98	10.96	10.88	10.65
	68	64	11.11	11.03	10.98	10.96	10.88	10.70
LQN120HV4 12,000	0	-0.4	7.02	6.92	6.86	6.83	6.73	6.43
	5	4.5	7.91	7.81	7.75	7.72	7.62	7.32
	10	9	8.80	8.70	8.64	8.61	8.51	8.21
	17	15	9.99	9.89	9.83	**9.79**	9.69	9.38
	20	19	10.44	10.34	10.27	10.24	10.14	9.79
	25	23	11.18	11.08	11.01	10.98	10.88	10.48
	30	28	11.82	11.72	11.66	11.62	11.52	11.18
	35	32	12.46	12.36	12.30	12.27	12.17	11.87
	40	36	13.04	12.94	12.88	12.84	12.74	12.45
	45	41	13.62	13.52	13.45	13.42	13.32	13.02
	47	43	13.85	13.75	13.68	**13.65**	13.55	13.25
	50	46	14.07	13.97	13.91	13.87	13.77	13.44
	55	51	14.44	14.34	14.28	14.24	14.14	13.75
	60	56	14.44	14.34	14.28	14.24	14.14	13.81
	63	59	14.44	14.34	14.28	14.24	14.14	13.85
	68	64	14.44	14.34	14.28	14.24	14.14	13.91
LMQN150HV 15,710	0	-0.4	8.78	8.66	8.58	8.54	8.41	8.04
	5	4.5	9.90	9.77	9.69	9.65	9.52	9.15
	10	9	11.01	10.89	10.80	10.76	10.64	10.27
	17	15	12.49	12.37	12.29	**12.25**	12.12	11.73
	20	19	13.05	12.93	12.84	12.80	12.68	12.25
	25	23	13.98	13.85	13.77	13.73	13.61	13.11
	30	28	14.78	14.66	14.58	14.53	14.41	13.98
	35	32	15.59	15.46	15.38	15.34	15.21	14.84
	40	36	16.31	16.18	16.10	16.06	15.94	15.57
	45	41	17.03	16.91	16.82	16.78	16.66	16.29
	47	43	17.32	17.19	17.11	**17.07**	16.95	16.58
	50	46	17.60	17.47	17.39	17.35	17.22	16.81
	55	51	18.06	17.94	17.85	17.81	17.69	17.19
	60	56	18.06	17.94	17.85	17.81	17.69	17.27
	63	59	18.06	17.94	17.85	17.81	17.69	17.32
	68	64	18.06	17.94	17.85	17.81	17.69	17.39

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. Corresponding refrigerant piping length is accordance with low length of each outdoor unit. Nominal 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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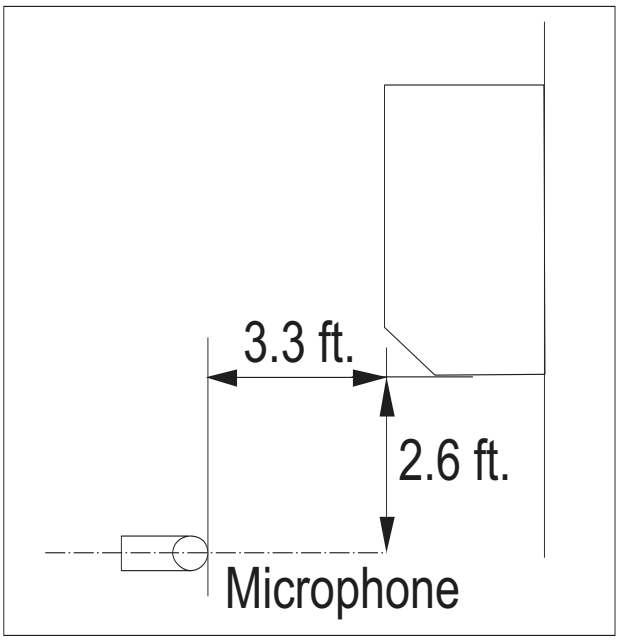
LOW WALL CONSOLE INDOOR UNITS

Acoustic Data

Figure 97: Sound Pressure Level Measurement Location.



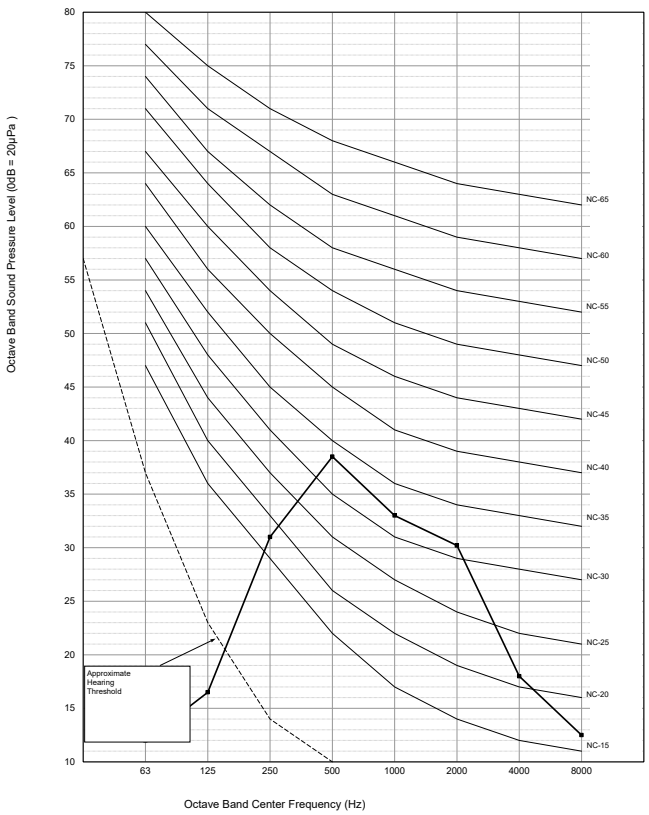
- Measurement taken 2.6' below the bottom of the unit and at a distance of 3.3' from face of unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient)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

Table 38: Sound Pressure Levels (dB[A]).

Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LQN090HV4	38	32	27
LQN120HV4	39	32	27
LMQN150HV	44	39	35

Figure 98:LQN090HV4 and LQN120HV4 Sound Pressure Level Diagrams.

LQN090HV4



LQN120HV4

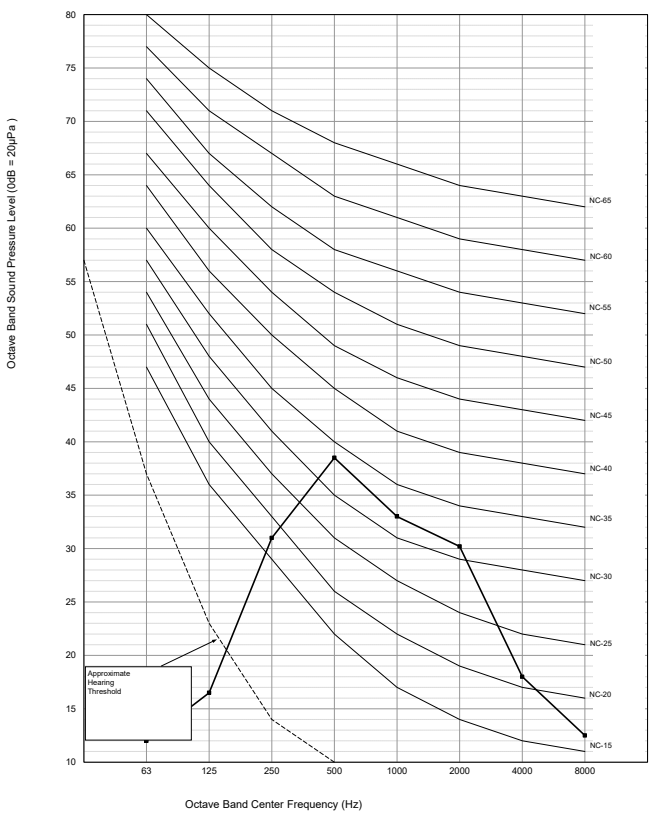


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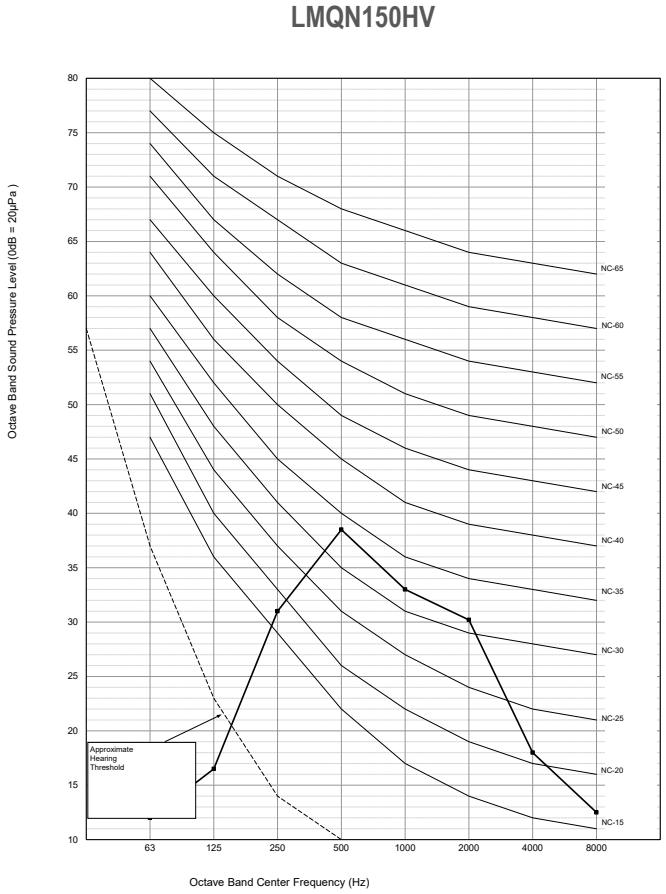
Figure 99:LMQN150HV Sound Pressure Level Diagram.



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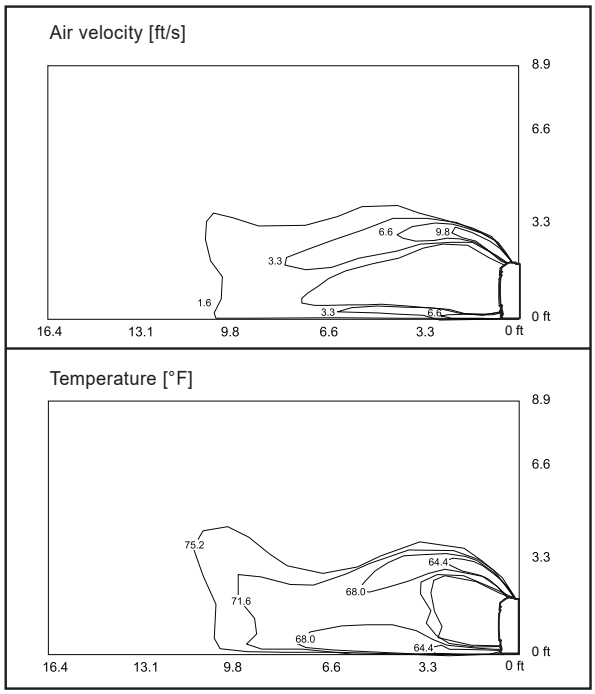
LOW WALL CONSOLE INDOOR UNITS

Air Velocity and Temperature Distribution

Figure 100:LQN090HV4 and LQN120HV4 Air Velocity and Temperature Distribution Charts.

Cooling

Discharge angle: 40°



Heating

Discharge angle: 50°

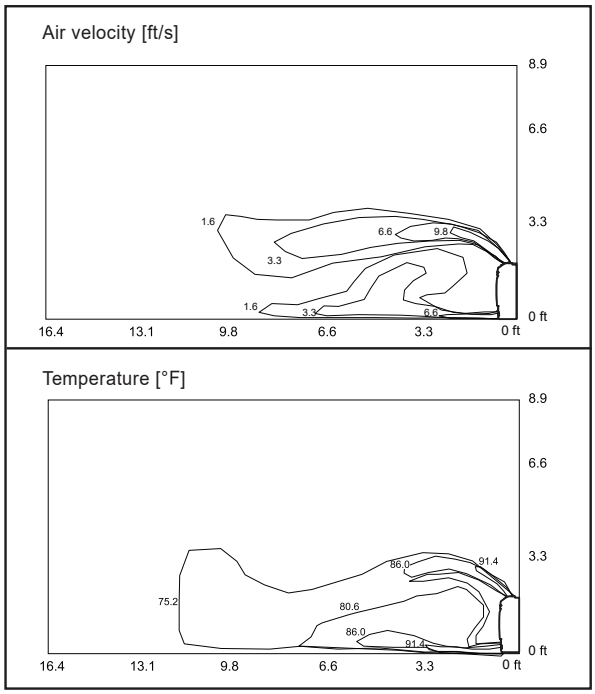
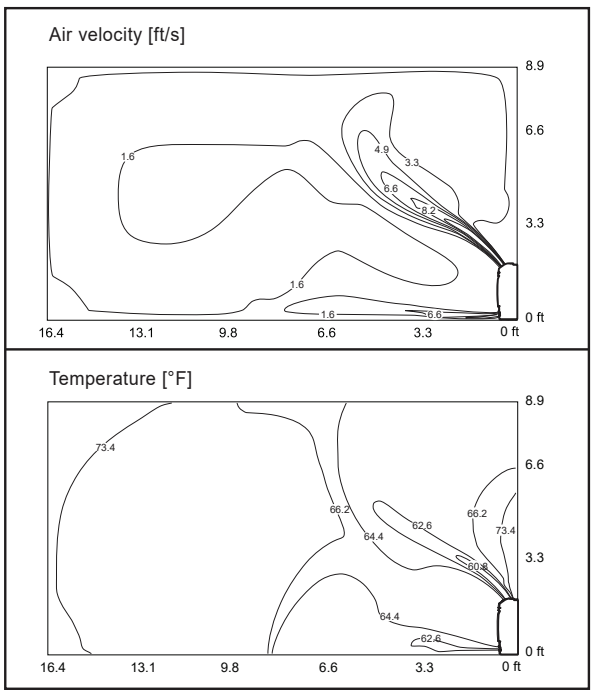


Figure 101:LMQN150HV Air Velocity and Temperature Distribution Charts.

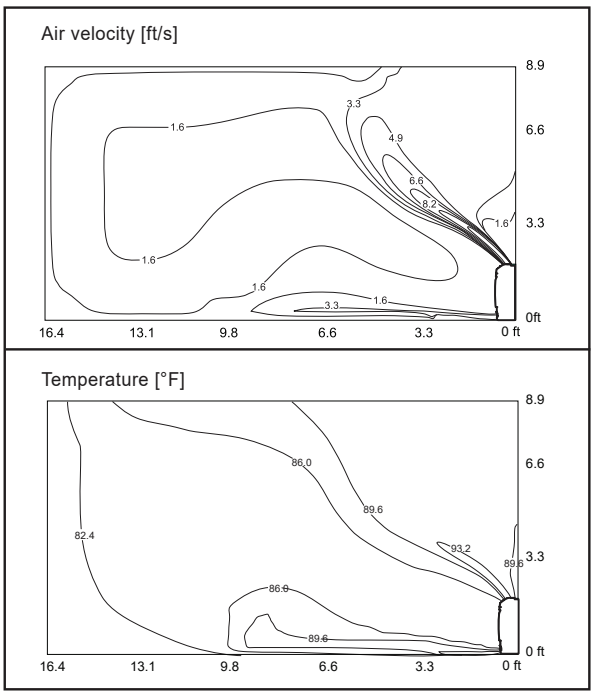
Cooling

Discharge angle: 40°



Heating

Discharge angle: 50°



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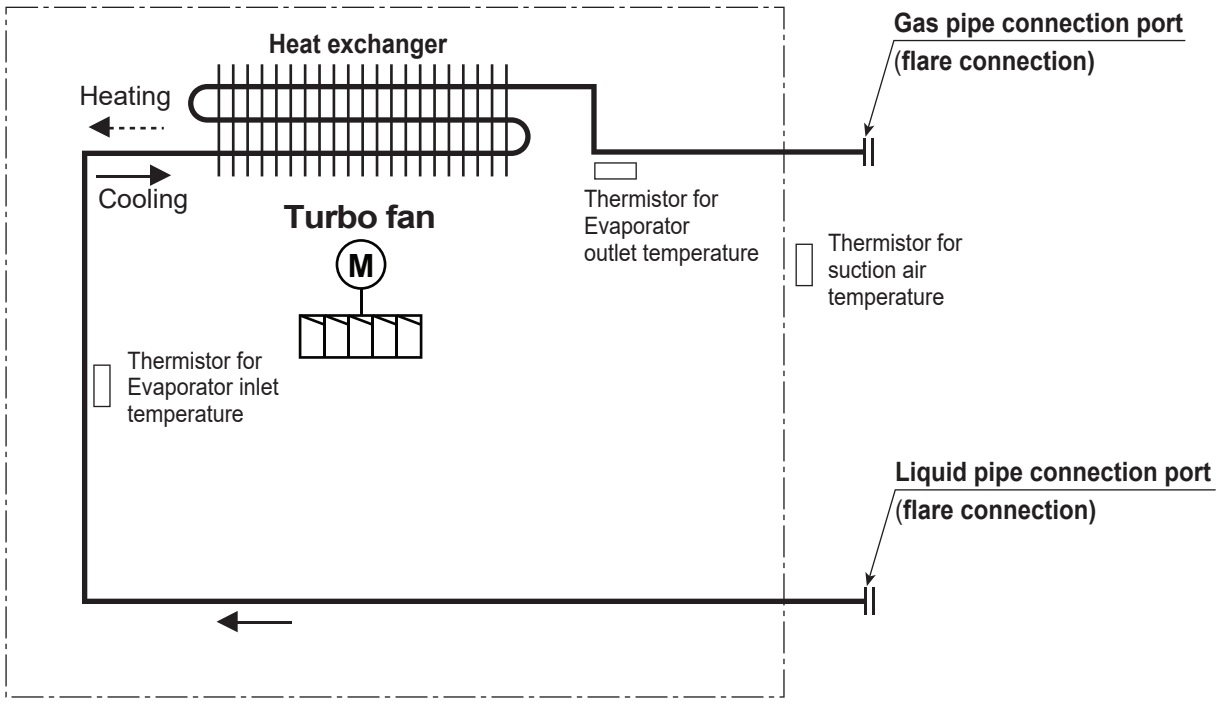
LOW WALL CONSOLE INDOOR UNITS

Refrigerant Flow Diagram

Figure 102:Multi F Low Wall Console Indoor Unit Refrigerant Flow Diagram.



Description	PCB Connector
Thermistor for suction air temperature	CN-ROOM
Thermistor for evaporator inlet temperature	CN-PIPE / IN
Thermistor for evaporator outlet temperature	CN-PIPE / OUT

Refrigerant pipe connection port diameters

Model	Vapor (inch)	Liquid (inch)
LQN090HV4	Ø3/8	Ø1/4
LQN120HV4		
LMQN150HV	Ø1/2	Ø1/4

Refrigerant pipe connection pipe sizes

Model	Vapor (inch)	Liquid (inch)
LQN090HV4	Ø3/8	Ø1/4
LQN120HV4		
LMQN150HV	Ø1/2	Ø1/4

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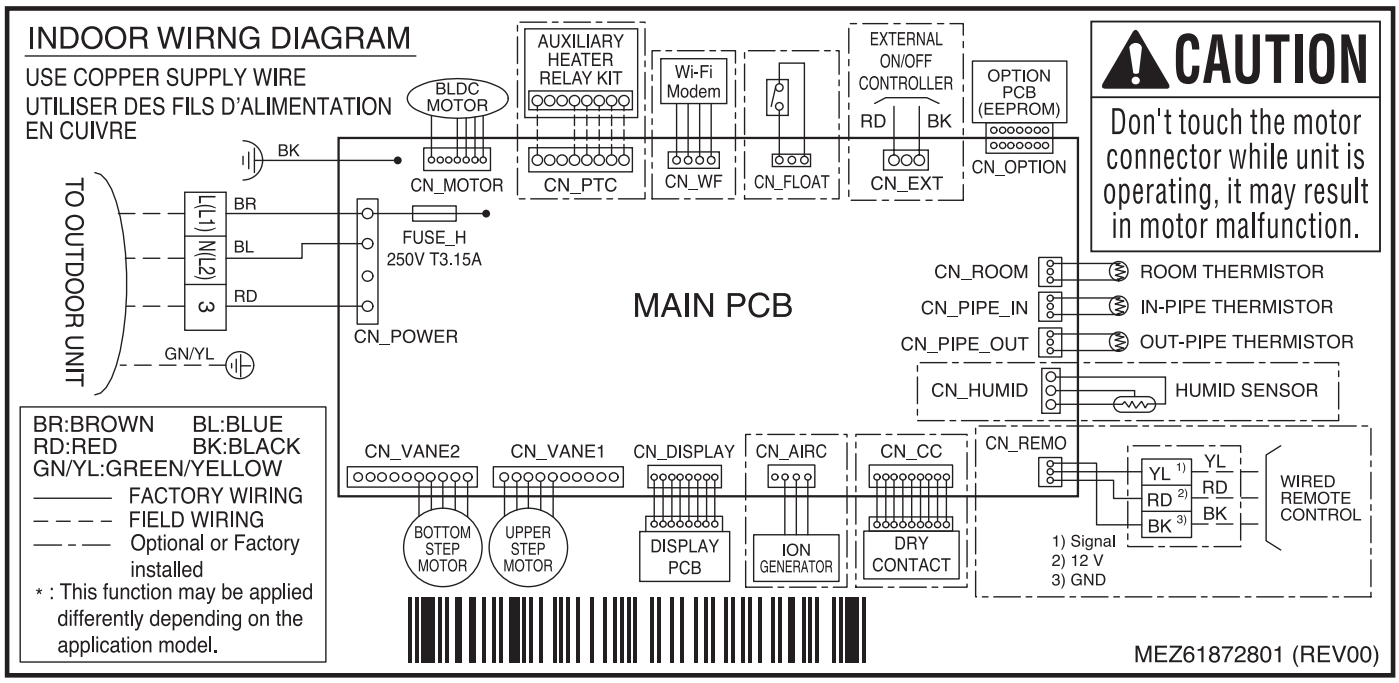
LOW WALL CONSOLE INDOOR UNITS

Wiring Diagram

Figure 103:Multi F Low Wall Console LQN090HV4, LQN120HV4, and LMQN150HV Indoor Units Wiring Diagram.



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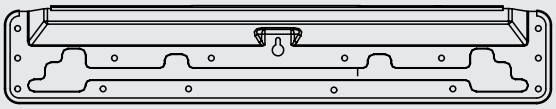
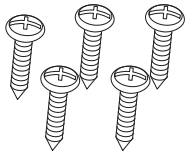
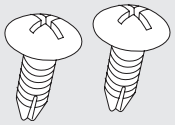
LOW WALL CONSOLE INDOOR UNITS

Factory Supplied Parts and Materials

Factory Supplied Parts

Table 39: Parts Table.

Part	Quantity	Image
Installation Plate	One (1)	
Type “A” Screws	Five (5)	
Type “B” Screws (M4 x 12L)	Two (2)	
Wireless Controller with Holder AKB75735410	One (1)	

Factory Supplied Materials

- Owner’s Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Spanner (Half union)
- Thermometer

⚠ WARNING

Installation work must be performed by trained personnel and in accordance with national wiring lows and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit’s components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

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LOW WALL CONSOLE INDOOR UNITS

Installation and Best Layout Practices

Selecting the Best Location

Do's

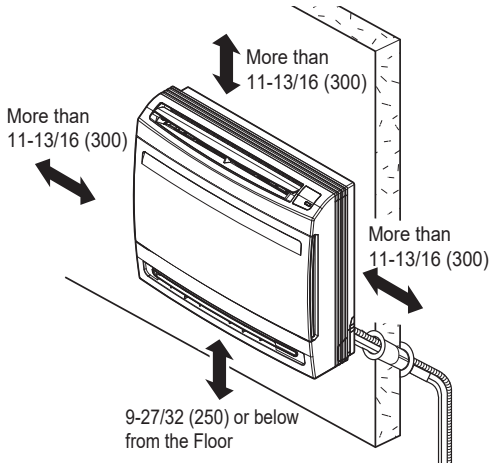
- Place the unit where air circulation will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient space from the ceiling and floor.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit where it can be easily connected to the outdoor unit or branch distribution unit.

⃠ Don'ts

- ⃠ *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- ⃠ *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- ⃠ *Do not install the unit near high-frequency generators.*
- ⃠ *Do not install the unit near a doorway.*

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

Figure 104:Minimum Clearance Requirements.



[Unit : inch (mm)]

Note:

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

Installing in an Area Exposed to Unconditioned Air

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

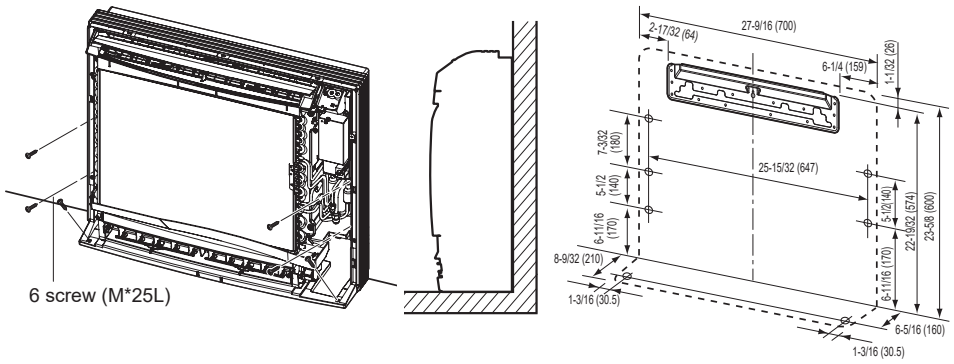
- Verify that carpet is or will be installed (carpet will increase the temperature by three degrees).
- Add insulation between the floor joists.
- Install radiant heat or another type of heating system to the floor.

Selecting Installation Method

The unit can be installed in one of three configurations:

- On the floor.
- Mounted on the wall above floor molding.
- Half concealed (recessed) in an opening in the wall.

Figure 105:Floor Installation



[Unit : inch (mm)]

Note:

If the unit is installed near a body of water, certain components are at risk of being corroded. Appropriate anti-corrosion methods must be taken for the unit and all components.

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Figure 106:Wall Installation.

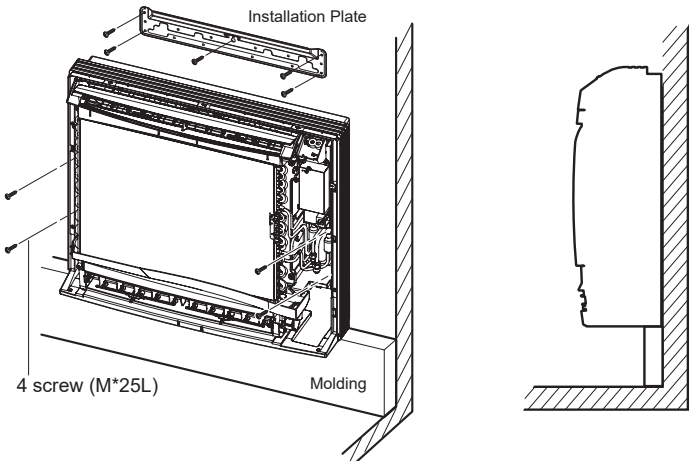
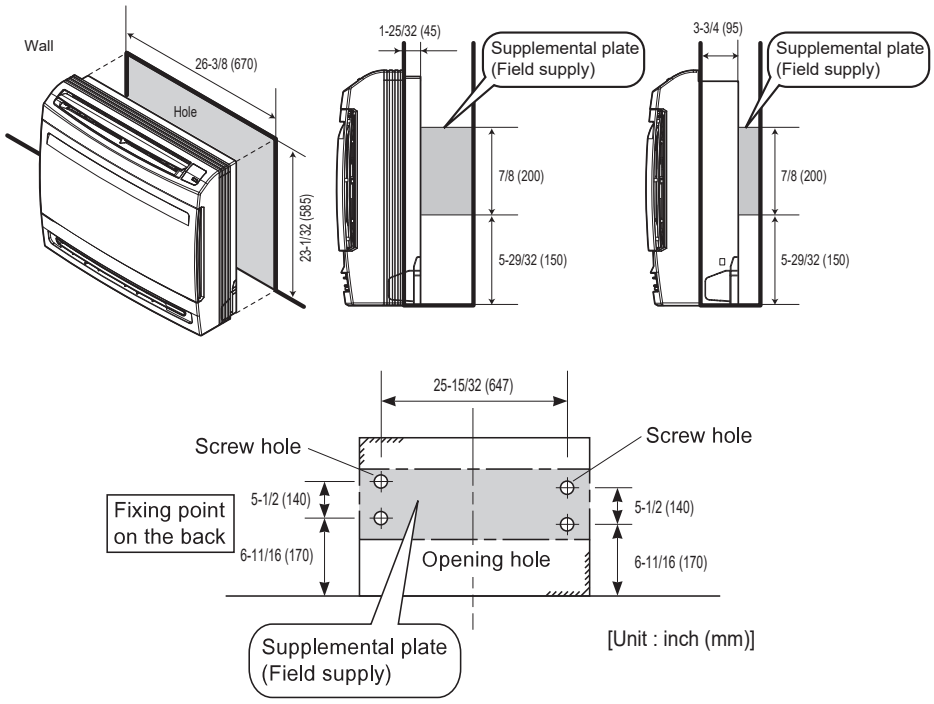


Figure 107:Recessed Installation.



Mounting the Installation Plate

The mounting wall must be strong and solid enough to protect the unit from vibration.

- Mount the installation plate on the wall using the Type “A” screws. If mounting the unit on concrete, consider using anchor bolts.
- Always mount the installation plate horizontally. Measure the wall and mark the centerline using thread and a level.

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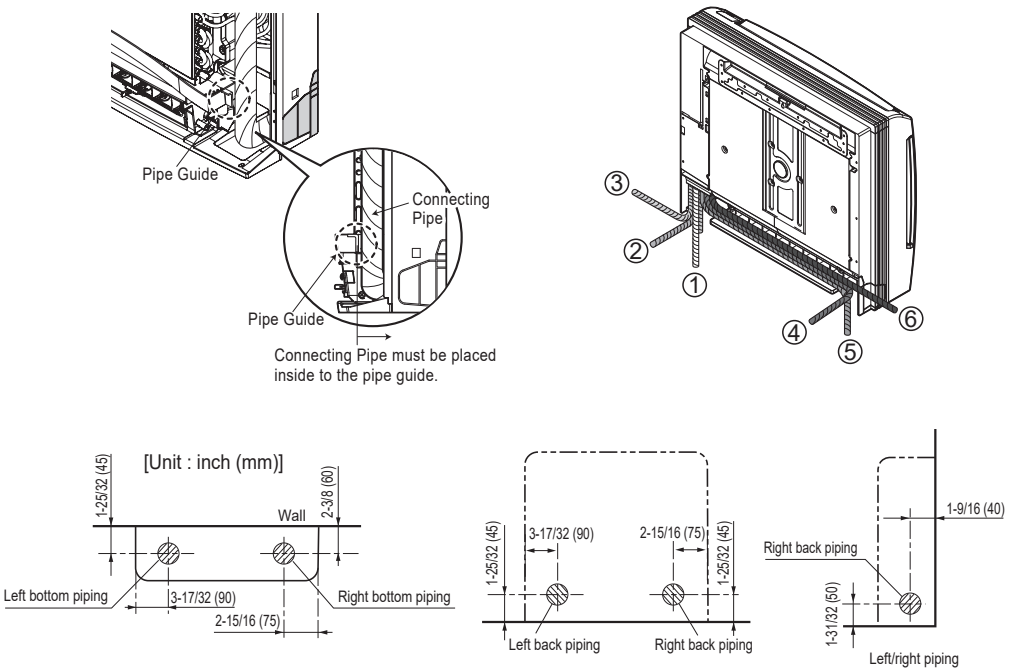
Selecting Pipe Routing

The pipe can be routed in one of six directions as shown in Figure 108.

Figure 108:Pipe Holes and Routing.

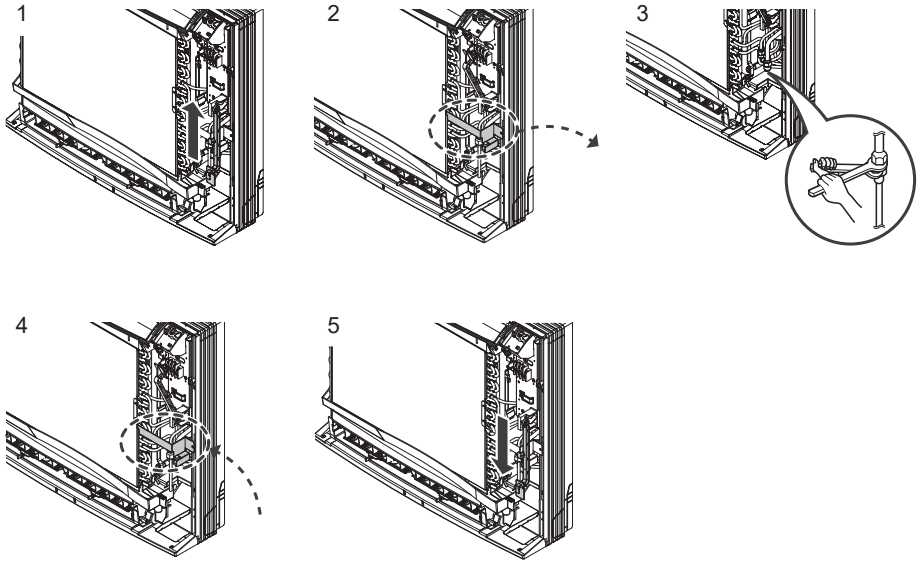


Pipe Connection

Connect the pipes as shown in Figure 109

1. Hold up the Sensor Link.
2. Separate the Pipe Bracket (2 screws)
3. Connect the refrigerant pipe. (Refer to next page)
4. Assemble the Pipe Bracket (2 screws)
5. Put down the Sensor Link.

Figure 109:Pipe Connection.



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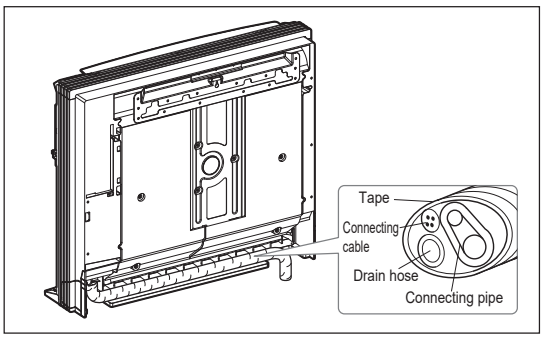
Pipe Routing and Insulation

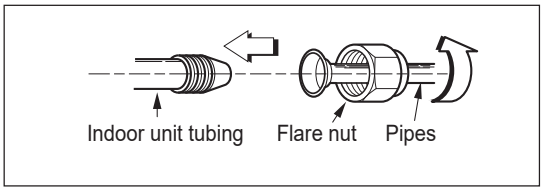
If the drain hose is routed inside the room insulate the hose with an insulation material* so that dripping from sweating (condensation) will not damage furniture or floors.

* Foamed polyethylene or equivalent is recommended.

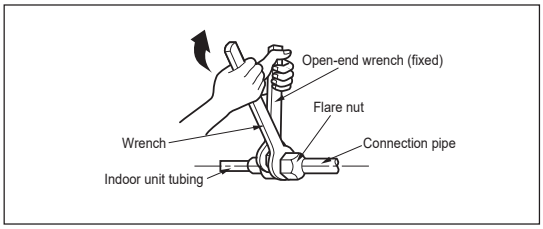


Connecting the installation pipe and drain hose to the indoor unit.

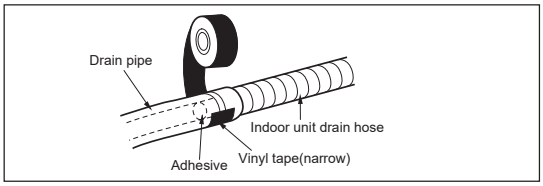
1. Align the center of the pipes and sufficiently tighten the flare nut by hand.
2. Tighten the flare nut with a wrench.



Outside diameter		Torque
mm	inch	kgf·m
Ø6.35	1/4	1.8~2.5
Ø9.52	3/8	3.4~4.2
Ø12.7	1/2	5.5~6.5
Ø15.88	5/8	6.3~8.2
Ø19.05	3/4	9.9~12.1

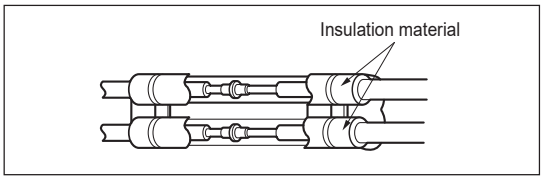


3. When needed to extend the drain hose of indoor unit, assemble the drain pipe as shown on the drawing



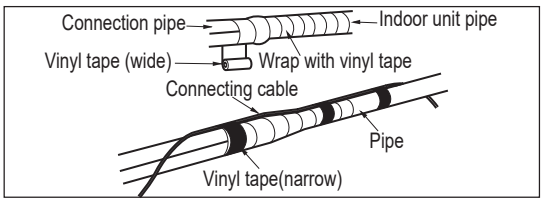
Wrap the insulation material around the connecting portion.

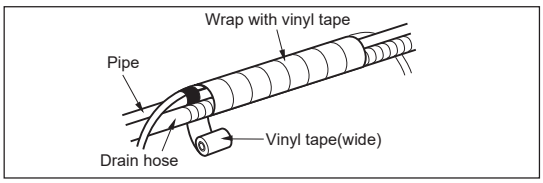
1. Overlap the connection pipe insulation material and the indoor unit pipe insulation material. Bind them together with vinyl tape so that there may be no gap.



2. Wrap the area which accommodates the rear piping housing section with vinyl tape.

3. Bundle the piping and drain hose together by wrapping them with vinyl tape sufficient enough to cover where they fit into the rear piping housing section.





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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

- *Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.*

Note:

- *Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.*

A voltage drop will cause the following problems:

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

Connect Power Wiring and Communications Cable

1. Insert the power wiring / communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only).
2. Remove screws 1 and 2 and remove control box cover.
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 or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.
4. Secure power wiring/communications cable with cable restraint.

Figure 110: Connecting Power Wiring / Communications Cable.

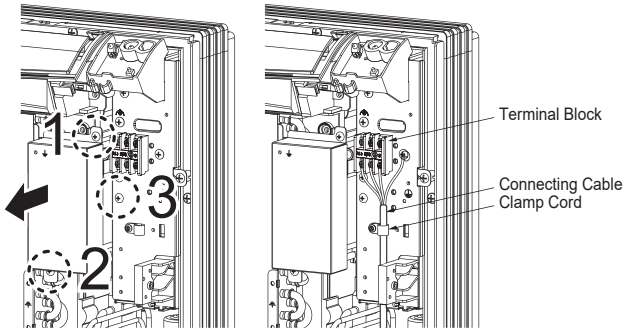


Figure 111:Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections

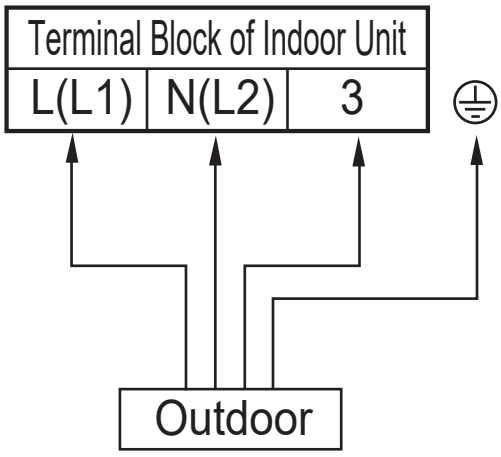
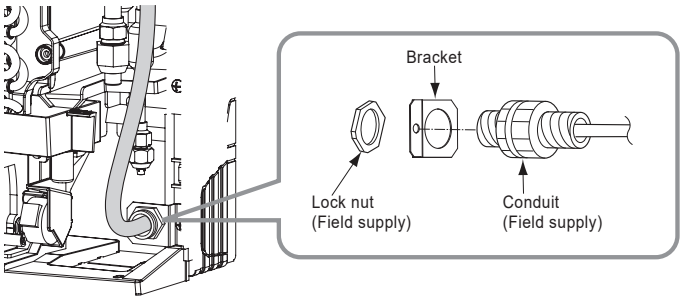


Figure 112:Securing Wiring to Unit.



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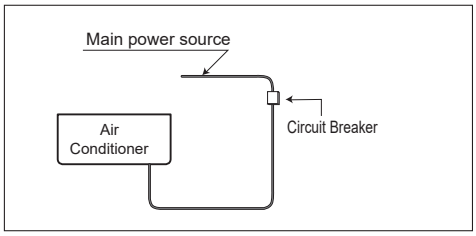
Power Connection

1. All wiring must comply with applicable code.
2. Select a power source that is capable of supplying the current required by the air conditioner.
3. Feed the power source to the unit via a distribution switch board designed for this purpose.
4. The terminal screws inside the control box may be loose due to vibration during transport. Check the screws for loose connection. (Running the air conditioner with loose connection can overload and damage electrical components.)
5. Always ground the air conditioner with a grounding wire and connector to meet applicable code.

Figure 113:Power Wiring.



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LOW WALL CONSOLE INDOOR UNITS

Installation and Best Layout Practices

Wired Controller Connections

Figure 114:Wired Controller Connection on Indoor Unit Terminal Block— .

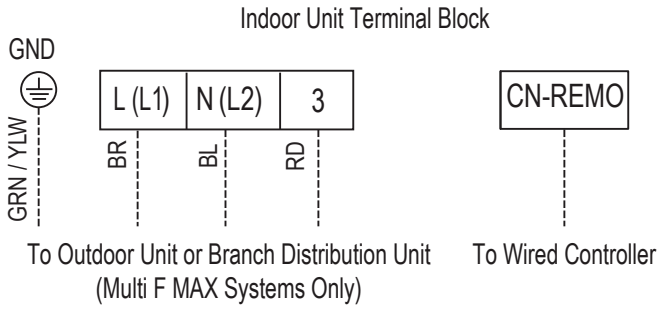
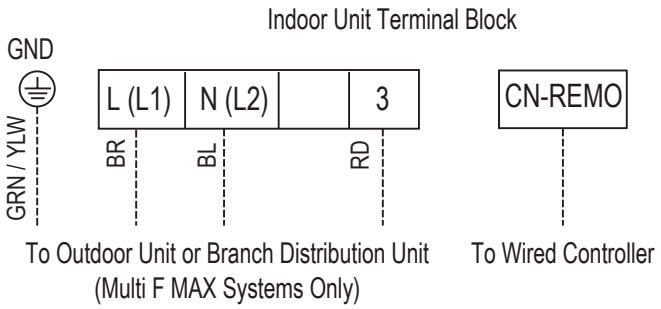


Figure 115:Wired Controller Connection on Indoor Unit Terminal Block—



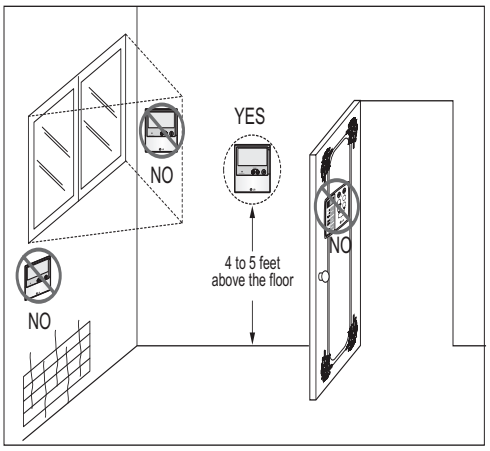
Wired Controller Placement

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

⃠ Do not install the wired controller near or in:

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

Figure 116:Proper Location for the Wired Controller.



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Hanging the Wired Controller

1. The controller wiring / cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring / cable on applicable side.

2. Choose and mark the area of installation. Use the provided parts and screw the wall plate into place. Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring / cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 117:Removing the Cable Guide Grooves.

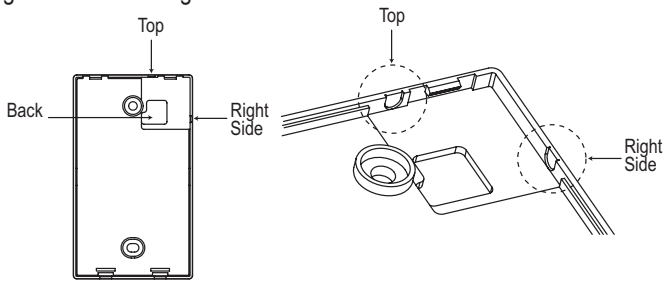


Figure 118:Attaching the Wall Plate.

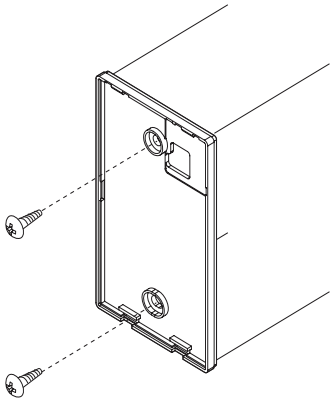
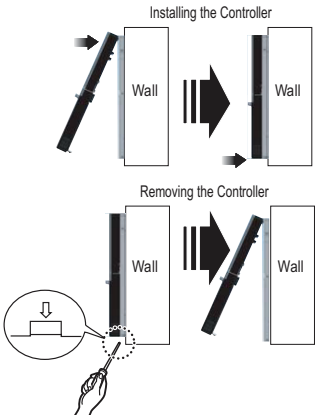


Figure 119:Installing / Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

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CEILING-CONCEALED DUCT (LOW STATIC) INDOOR UNIT DATA

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“General Data / Specifications” on page 95
“Dimensions” on page 96
“Cooling Capacity Table” on page 97
“Heating Capacity Table” on page 99
“External Static Pressure” on page 100
“Acoustic Data” on page 101
“Refrigerant Flow Diagrams” on page 102
“Wiring Diagram” on page 104
“Factory Supplied Parts and Materials” on page 106
“Installation and Best Layout Practices” on page 107

DUCT (LOW STATIC) INDOOR UNITS

Mechanical Specifications and Features

MULTI F
MULTI F MAX

Ceiling-Concealed Duct (Low Static) Indoor Unit

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Ceiling-Concealed Duct (Low Static) units have a sound rating no higher than 36 dB(A) as tested per KSA0701 ISO Standard 3745, and are designed for low-static pressure up to 0.20"WG.

Coil

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

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare, and all refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

The case has a low profile design with a maximum height of 7.5 inches designed to mount fully concealed above a finished ceiling in as little as 8 inches vertical space. Casing is manufactured of galvanized steel plate, and provided with hanger brackets designed to support the weight on four corners. Unit has a front horizontal supply air discharge outlet, and one rear horizontal return air inlet; unit is also field-convertible for a rear bottom return.

Fan Assembly and Control

The units have at least two direct-drive, Sirocco fans made of high strength ABS HT-700 polymeric resin that are statically and dynamically balanced. The fans are mounted on a common brushless digitally controlled (BLDC) motor 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. The indoor fan has Low, Med, High, and Auto settings for Cooling mode; and has Low, Med, High, and Auto settings for Heating mode. Each of the settings can be field-adjusted from the factory setting (RPM / ESP). The Auto setting adjusts the fan speed based on the difference between the controller set-point and space temperature.

Figure 120: Ceiling-Concealed Duct (Low Static) Indoor Unit.

Air Filter

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

Microprocessor Control

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

The indoor units are Wi-Fi compatible with the addition of an LG Wi-Fi module accessory, and can be controlled by LG's Smart ThinQ™ app on a smart device. A field-supplied Wi-Fi network and smart device are required. The Smart ThinQ app is free, and is available for Android™ and iOS. (Android is a trademark of Google LLC.)

Controls

The indoor unit controller of choice must be ordered separately. Communication between the indoor units and the outdoor unit is accomplished through 14 AWG, four-core, stranded, shielded or unshielded power / communication cable.

Condensate Lift/Pump

The indoor unit is provided with a factory installed and wired condensate lift/pump capable of providing a minimum 27.5 inch 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.

Features

- Inverter (Variable speed fan)
- External mounted drain pump
- Control lock function
- Auto operation
- Auto restart operation
- Dehumidification function
- Two thermistor control
- External static pressure control
- Self-diagnostics function
- Group control
- Wired controller ordered separately
- Wi-Fi compatible

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DUCT (LOW STATIC) INDOOR UNITS

General Data / Specifications

Table 40: Multi F Ceiling-Concealed Low-Static Ducted Indoor Unit General Data.

Model Name	LDN097HV4	LDN127HV4	LDN187HV4
Nominal Cooling Capacity (Btu/h)[1]	9,000	12,000	18,000
Nominal Heating Capacity (Btu/h)[1]	10,400	13,800	20,800
Operating Range			
Cooling (°F WB)	57-77		
Heating (°F DB)	59-81		
Fan			
Type	Sirocco		
Motor Output (W) x Qty.	19 x 1	5 x 1, 19 x 1	
Motor/Drive	Brushless Digitally Controlled / Direct		
Airflow Rate CFM (H/M/L)	318 / 247 / 194	353 / 300 / 247	530 / 441 / 353
Factory Set External Static Pressure (in. wg)	0.10		
Max. External Static Pressure (in. wg)	0.20		
Unit Data			
Refrigerant Type[2]	R410A		
Refrigerant Control	EEV		
Power Supply V, Ø, Hz[3]	208-230, 1, 60		
Rated Amps (A)	0.40	0.80	
Sound Pressure Level dB(A) (H/M/L)[4]	30 / 26 / 23	31 / 28 / 27	36 / 34 / 31
Dimensions (W x H x D, in.)	27-9/16 x 7-15/32 x 27-9/16	35-7/16 x 7-15/32 x 27-9/16	
Net Unit Weight (lbs.)	39	51	48.5
Shipping Weight (lbs.)	46	60	57.3
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 14		
Heat Exchanger (Row x Column x Fin / inch) x Number	(2 x 11 x 14) x 1	(2 x 11 x 18) x 1	
Pipe Size			
Liquid Line (in.)	1/4		
Vapor Line (in.)	3/8		1/2
Connection Size			
Liquid Line (in.)	1/4		
Vapor Line (in.)	3/8		1/2
Drain O.D. / I.D. (in.)	1-1/4, 1		

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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).
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).

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs be minimum 14 AWG, 4-conductor, stranded, shielded or unshielded (if shielded, must be grounded to chassis at ODU only) and must comply with applicable local and national codes.

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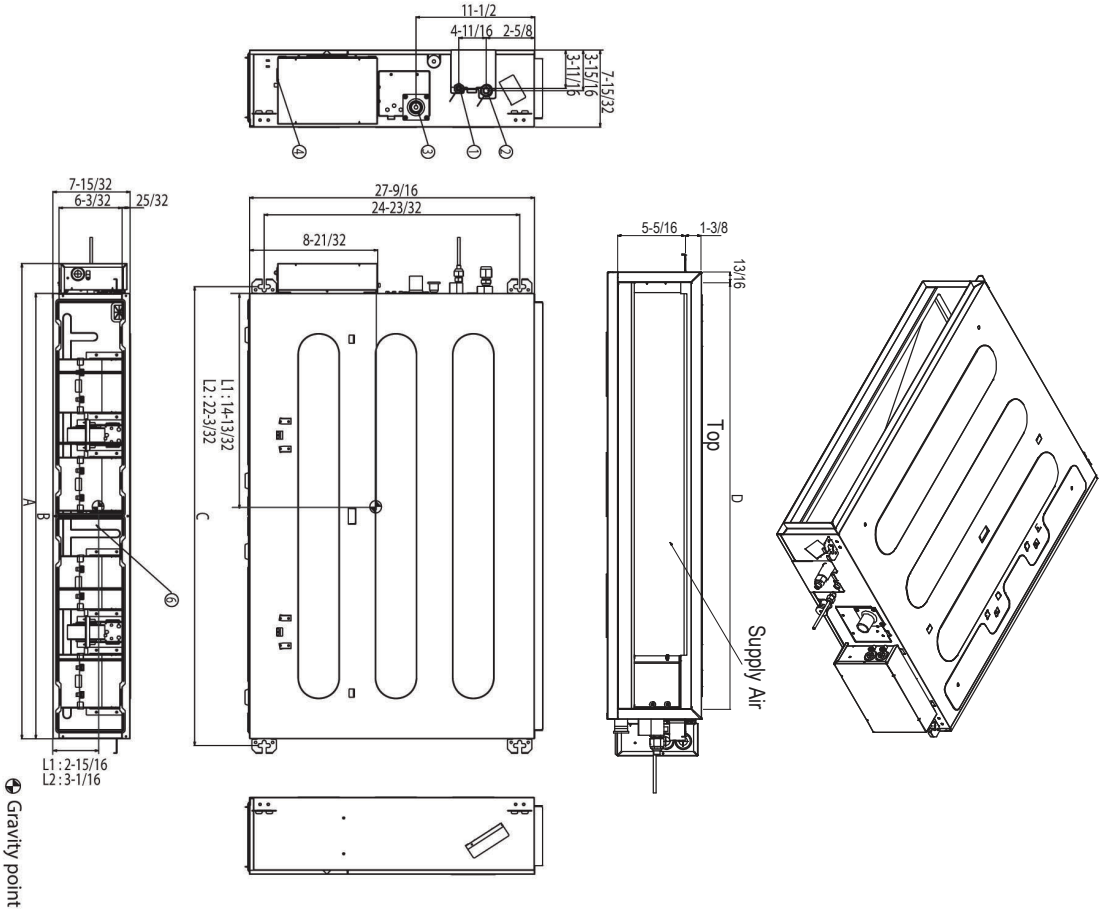
DUCT (LOW STATIC) INDOOR UNITS

Dimensions

Figure 121:LDN097HV4, LDN127HV4, and LDN187HV4 Dimensions.



Model Number	A	B	C	D
LDN097HV4	30-15/32	27-9/16	28-27/32	25-31/32
LDN127HV4 LDN187HV4	38- 11/32	35-7/16	36-23/32	33-27/32

(unit: inch)

Number	Name	Description
1	Liquid pipe connection	
2	Gas pipe connection	
3	Drain pipe connection	
4	Power supply connection	
5	Air discharge	
6	Air suction	

(unit: inch)

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DUCT (LOW STATIC) INDOOR UNITS

Cooling Capacity Table

Table 41: Multi F Ceiling-Concealed Duct (Low Static) Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LDN097HV4 9,000	14	8.82	7.55	9.37	7.98	9.92	7.72	10.31	7.89	11.01	7.95	11.56	8.10
	20	8.82	7.61	9.36	8.04	9.91	7.78	10.31	7.95	11.01	8.01	11.55	8.17
	25	8.81	7.67	9.36	8.10	9.90	7.84	10.30	8.01	11.00	8.08	11.54	8.23
	30	8.80	7.73	9.35	8.16	9.90	7.90	10.29	8.07	10.99	8.14	11.54	8.29
	35	8.80	7.79	9.34	8.22	9.89	7.96	10.28	8.13	10.98	8.20	11.53	8.36
	40	8.79	7.84	9.33	8.29	9.88	8.02	10.27	8.19	10.97	8.26	11.52	8.42
	45	8.78	7.90	9.33	8.35	9.87	8.08	10.27	8.25	10.96	8.32	11.51	8.48
	50	8.78	7.96	9.32	8.41	9.87	8.14	10.26	8.31	10.96	8.38	11.50	8.54
	55	8.77	8.02	9.31	8.47	9.86	8.20	10.25	8.38	10.95	8.45	11.49	8.61
	60	8.76	8.08	9.31	8.53	9.85	8.26	10.24	8.44	10.94	8.51	11.48	8.67
	65	8.76	8.14	9.30	8.59	9.84	8.32	10.24	8.50	10.93	8.57	11.47	8.73
	70	8.75	8.19	9.29	8.66	9.84	8.38	10.23	8.56	10.92	8.63	11.47	8.79
	75	8.54	8.06	9.08	8.52	9.62	8.26	10.01	8.44	10.71	8.53	11.25	8.69
	80	8.33	7.92	8.87	8.39	9.41	8.14	9.80	8.33	10.49	8.42	11.03	8.59
	85	8.12	7.78	8.66	8.25	9.20	8.02	9.59	8.20	10.28	8.30	10.82	8.48
	90	7.91	7.63	8.45	8.10	8.99	7.89	9.37	8.08	10.06	8.19	10.60	8.37
	95	7.68	7.55	8.22	8.03	8.75	7.83	9.00	7.90	9.83	8.14	10.36	8.34
	100	7.50	7.35	8.03	7.83	8.57	7.64	8.88	7.78	9.64	7.97	10.17	8.16
	105	7.31	7.15	7.84	7.63	8.38	7.45	8.77	7.66	9.45	7.79	9.99	7.99
	110	7.12	6.90	7.66	7.38	8.19	7.22	8.58	7.43	9.26	7.57	9.80	7.77
	115	6.94	6.69	7.47	7.17	8.01	7.03	8.39	7.24	9.08	7.39	9.61	7.60
	118	6.82	6.65	7.36	7.13	7.89	7.00	8.28	7.21	8.96	7.37	9.50	7.58
	122	6.79	6.63	7.32	7.11	7.86	6.98	8.24	7.19	8.93	7.36	9.46	7.57
LDN127HV4 12,000	14	11.76	9.94	12.49	10.50	13.22	10.17	13.75	10.38	14.69	10.47	15.42	10.67
	20	11.75	10.02	12.48	10.58	13.21	10.25	13.74	10.46	14.67	10.55	15.40	10.75
	25	11.75	10.09	12.48	10.66	13.20	10.33	13.73	10.54	14.66	10.63	15.39	10.83
	30	11.74	10.17	12.47	10.75	13.19	10.40	13.72	10.62	14.65	10.71	15.38	10.92
	35	11.73	10.25	12.46	10.83	13.18	10.48	13.71	10.70	14.64	10.79	15.37	11.00
	40	11.72	10.33	12.45	10.91	13.17	10.56	13.70	10.79	14.63	10.88	15.36	11.08
	45	11.71	10.40	12.44	10.99	13.16	10.64	13.69	10.87	14.62	10.96	15.35	11.16
	50	11.70	10.48	12.43	11.07	13.15	10.72	13.68	10.95	14.61	11.04	15.33	11.25
	55	11.69	10.56	12.42	11.15	13.14	10.80	13.67	11.03	14.60	11.12	15.32	11.33
	60	11.68	10.63	12.41	11.23	13.13	10.88	13.66	11.11	14.59	11.20	15.31	11.41
	65	11.67	10.71	12.40	11.31	13.12	10.96	13.65	11.19	14.57	11.28	15.30	11.49
	70	11.66	10.79	12.39	11.40	13.11	11.03	13.64	11.27	14.56	11.36	15.29	11.58
	75	11.38	10.61	12.11	11.22	12.83	10.88	13.35	11.12	14.27	11.22	15.00	11.45
	80	11.10	10.43	11.82	11.05	12.55	10.72	13.07	10.96	13.99	11.08	14.71	11.31
	85	10.83	10.24	11.54	10.86	12.26	10.55	12.78	10.80	13.70	10.93	14.42	11.17
	90	10.55	10.04	11.26	10.67	11.98	10.38	12.50	10.63	13.42	10.78	14.13	11.02
	95	10.25	9.94	10.96	10.57	11.67	10.30	12.00	10.40	13.10	10.72	13.81	10.97
	100	10.00	9.67	10.71	10.31	11.42	10.06	11.84	10.24	12.85	10.49	13.56	10.75
	105	9.75	9.41	10.46	10.04	11.17	9.81	11.69	10.08	12.60	10.26	13.31	10.52
	110	9.50	9.09	10.21	9.72	10.92	9.51	11.44	9.78	12.35	9.97	13.07	10.24
	115	9.25	8.81	9.96	9.44	10.67	9.26	11.19	9.53	12.10	9.73	12.82	10.00
	118	9.10	8.75	9.81	9.39	10.52	9.21	11.04	9.49	11.95	9.70	12.67	9.98
	122	9.05	8.73	9.76	9.37	10.48	9.19	10.99	9.47	11.90	9.69	12.62	9.97

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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DUCT (LOW STATIC) INDOOR UNITS

Cooling Capacity Table

Table 42: Multi F Ceiling-Concealed Duct (Low Static) Indoor Units Cooling Capacity Table (continued).

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LDN187HV4 18,000	14	17.65	13.09	18.74	13.83	19.84	13.39	20.63	13.67	22.03	13.79	23.12	14.05
	20	17.63	13.20	18.73	13.94	19.82	13.50	20.61	13.78	22.01	13.90	23.11	14.16
	25	17.62	13.30	18.71	14.05	19.81	13.60	20.60	13.89	22.00	14.01	23.09	14.27
	30	17.60	13.40	18.70	14.16	19.79	13.71	20.58	13.99	21.98	14.11	23.07	14.38
	35	17.59	13.50	18.68	14.26	19.78	13.81	20.57	14.10	21.96	14.22	23.05	14.49
	40	17.58	13.60	18.67	14.37	19.76	13.91	20.55	14.21	21.94	14.33	23.04	14.60
	45	17.56	13.71	18.66	14.48	19.75	14.02	20.53	14.31	21.93	14.43	23.02	14.71
	50	17.55	13.81	18.64	14.58	19.73	14.12	20.52	14.42	21.91	14.54	23.00	14.82
	55	17.54	13.91	18.63	14.69	19.72	14.23	20.50	14.52	21.89	14.65	22.98	14.92
	60	17.52	14.01	18.61	14.80	19.70	14.33	20.49	14.63	21.88	14.75	22.97	15.03
	65	17.51	14.11	18.60	14.90	19.69	14.43	20.47	14.74	21.86	14.86	22.95	15.14
	70	17.50	14.21	18.58	15.01	19.67	14.53	20.46	14.84	21.84	14.97	22.93	15.25
	75	17.08	13.98	18.16	14.78	19.24	14.33	20.03	14.64	21.41	14.78	22.50	15.08
	80	16.66	13.74	17.74	14.55	18.82	14.12	19.60	14.44	20.98	14.60	22.06	14.90
	85	16.24	13.49	17.32	14.30	18.40	13.90	19.17	14.23	20.55	14.40	21.63	14.71
	90	15.82	13.23	16.90	14.06	17.97	13.68	18.75	14.01	20.12	14.20	21.20	14.52
	95	15.37	13.09	16.44	13.93	17.51	13.57	**18.00**	**13.70**	19.65	14.12	20.72	14.46
	100	14.99	12.74	16.06	13.58	17.13	13.25	17.77	13.49	19.28	13.82	20.35	14.16
	105	14.62	12.39	15.69	13.23	16.76	12.93	17.53	13.28	18.90	13.52	19.97	13.86
	110	14.24	11.97	15.32	12.80	16.39	12.53	17.16	12.88	18.53	13.13	19.60	13.48
	115	13.87	11.61	14.94	12.44	16.01	12.19	16.79	12.55	18.15	12.82	19.22	13.18
	118	13.65	11.53	14.72	12.36	15.79	12.13	16.56	12.50	17.93	12.77	19.00	13.14
	122	13.57	11.50	14.64	12.34	15.71	12.11	16.49	12.48	17.85	12.76	18.92	13.13

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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DUCT (LOW STATIC) INDOOR UNITS

Heating Capacity Table

Table 43: Multi F Ceiling-Concealed Duct (Low Static) Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LDN097HV4 9,000	0	-0.4	5.35	5.28	5.23	5.20	5.12	4.90
	5	4.5	6.03	5.95	5.90	5.88	5.80	5.58
	10	9	6.71	6.63	6.58	6.56	6.48	6.26
	17	15	7.61	7.54	7.49	7.46	7.39	7.14
	20	19	7.95	7.88	7.83	7.80	7.72	7.46
	25	23	8.52	8.44	8.39	8.37	8.29	7.99
	30	28	9.01	8.93	8.88	8.86	8.78	8.52
	35	32	9.50	9.42	9.37	9.34	9.27	9.04
	40	36	9.94	9.86	9.81	9.78	9.71	9.48
	45	41	10.37	10.30	10.25	10.22	10.15	9.92
	47	43	10.55	10.48	10.43	10.40	10.32	10.10
	50	46	10.72	10.64	10.59	10.57	10.49	10.24
	55	51	11.00	10.93	10.88	10.85	10.78	10.48
	60	56	11.00	10.93	10.88	10.85	10.78	10.52
	63	59	11.00	10.93	10.88	10.85	10.78	10.55
	68	64	11.00	10.93	10.88	10.85	10.78	10.60
LDN127HV4 12,000	0	-0.4	7.10	7.00	6.93	6.90	6.80	6.50
	5	4.5	8.00	7.90	7.83	7.80	7.70	7.40
	10	9	8.90	8.80	8.73	8.70	8.60	8.30
	17	15	10.10	10.00	9.93	9.90	9.80	9.48
	20	19	10.55	10.45	10.38	10.35	10.25	9.90
	25	23	11.30	11.20	11.13	11.10	11.00	10.60
	30	28	11.95	11.85	11.78	11.75	11.65	11.30
	35	32	12.60	12.50	12.43	12.40	12.30	12.00
	40	36	13.18	13.08	13.02	12.98	12.88	12.58
	45	41	13.77	13.67	13.60	13.57	13.47	13.17
	47	43	14.00	13.90	13.83	13.80	13.70	13.40
	50	46	14.23	14.13	14.06	14.03	13.93	13.59
	55	51	14.60	14.50	14.43	14.40	14.30	13.90
	60	56	14.60	14.50	14.43	14.40	14.30	13.96
	63	59	14.60	14.50	14.43	14.40	14.30	14.00
	68	64	14.60	14.50	14.43	14.40	14.30	14.06
LDN187HV4 18,000	0	-0.4	10.70	10.55	10.45	10.40	10.25	9.80
	5	4.5	12.06	11.91	11.81	11.76	11.61	11.15
	10	9	13.41	13.26	13.16	13.11	12.96	12.51
	17	15	15.22	15.07	14.97	**14.92**	14.77	14.29
	20	19	15.90	15.75	15.65	15.60	15.45	14.92
	25	23	17.03	16.88	16.78	16.73	16.58	15.98
	30	28	18.01	17.86	17.76	17.71	17.56	17.03
	35	32	18.99	18.84	18.74	18.69	18.54	18.09
	40	36	19.87	19.72	19.62	19.57	19.42	18.97
	45	41	20.75	20.60	20.50	20.45	20.30	19.85
	47	43	21.10	20.95	20.85	**20.80**	20.65	20.20
	50	46	21.44	21.29	21.19	21.14	20.99	20.48
	55	51	22.01	21.86	21.75	21.70	21.55	20.95
	60	56	22.01	21.86	21.75	21.70	21.55	21.04
	63	59	22.01	21.86	21.75	21.70	21.55	21.10
	68	64	22.01	21.86	21.75	21.70	21.55	21.20

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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DUCT (LOW STATIC) INDOOR UNITS

External Static Pressure

Table 44: Multi F Ceiling-Concealed Duct (Low Static) External Static Pressure Setting Values Table.

Static Pressure (in. wg)			0.0	0.04	0.08	0.12	0.16	0.20
Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Airflow Rate / CFM		Setting Value					
LDN097HV4 9,000	High	318	98	103	108	116	123	130
	Mid	247	82	88	94	102	110	118
	Low	194	69	76	83	91	99	109
LDN127HV4 12,000	High	353	95	99	104	109	116	124
	Mid	300	86	91	96	101	108	116
	Low	247	78	82	87	93	100	108
LDN187HV4 18,000	High	530	123	125	129	134	141	145
	Mid	441	109	112	117	123	129	136
	Low	353	95	99	104	109	116	124

Note:

- *To get the desired air flow and external static pressure combination, use the setting value from the table. Using a setting value other than that listed in the table will not provide the desired combination.*
- *Table data is based at 230V. Air flow rate varies according to voltage fluctuation.*

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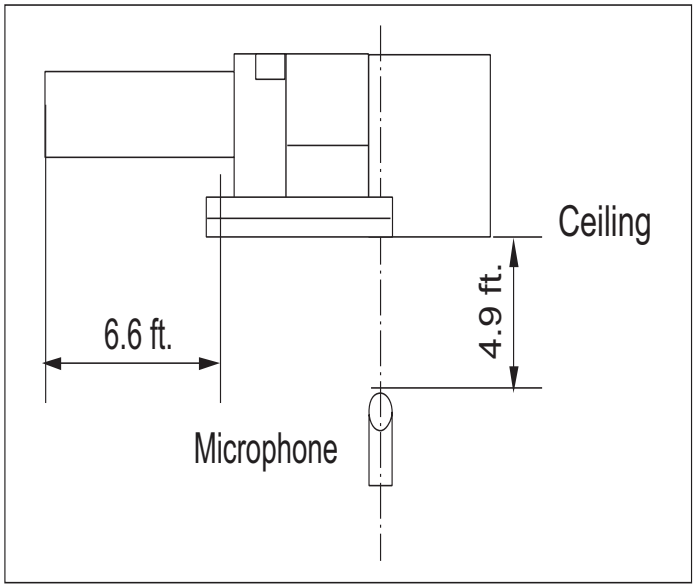
DUCT (LOW STATIC) INDOOR UNITS

Acoustic Data

Figure 122:Sound Pressure Level Measurement Location.



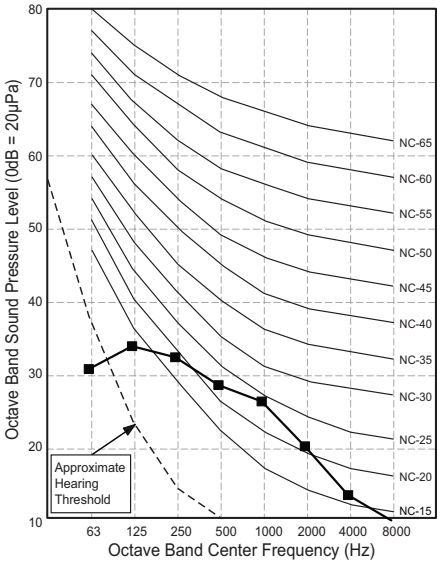
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound power levels are measured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

Table 45:Sound Pressure Levels (dB[A]).

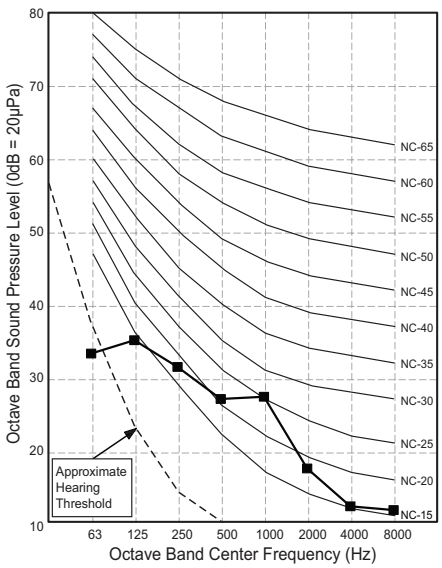
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LDN097HV4	30	26	23
LDN127HV4	31	28	27
LDN187HV4	36	34	31

Figure 123:Sound Pressure Level Diagrams.

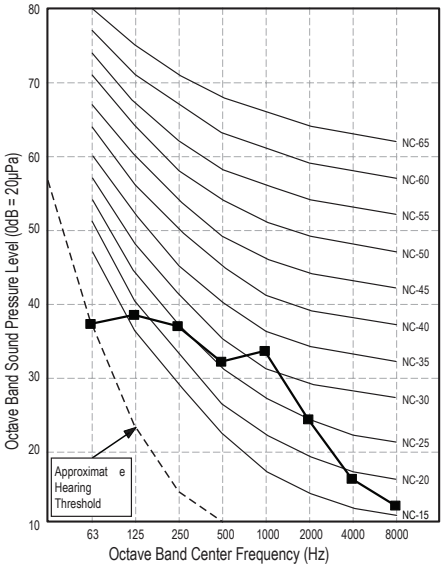
LDN097HV4



LDN127HV4



LDN187HV4



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DUCT (LOW STATIC) INDOOR UNITS

Refrigerant Flow Diagram

Figure 124:LDN097HV4 Refrigerant Flow Diagram.

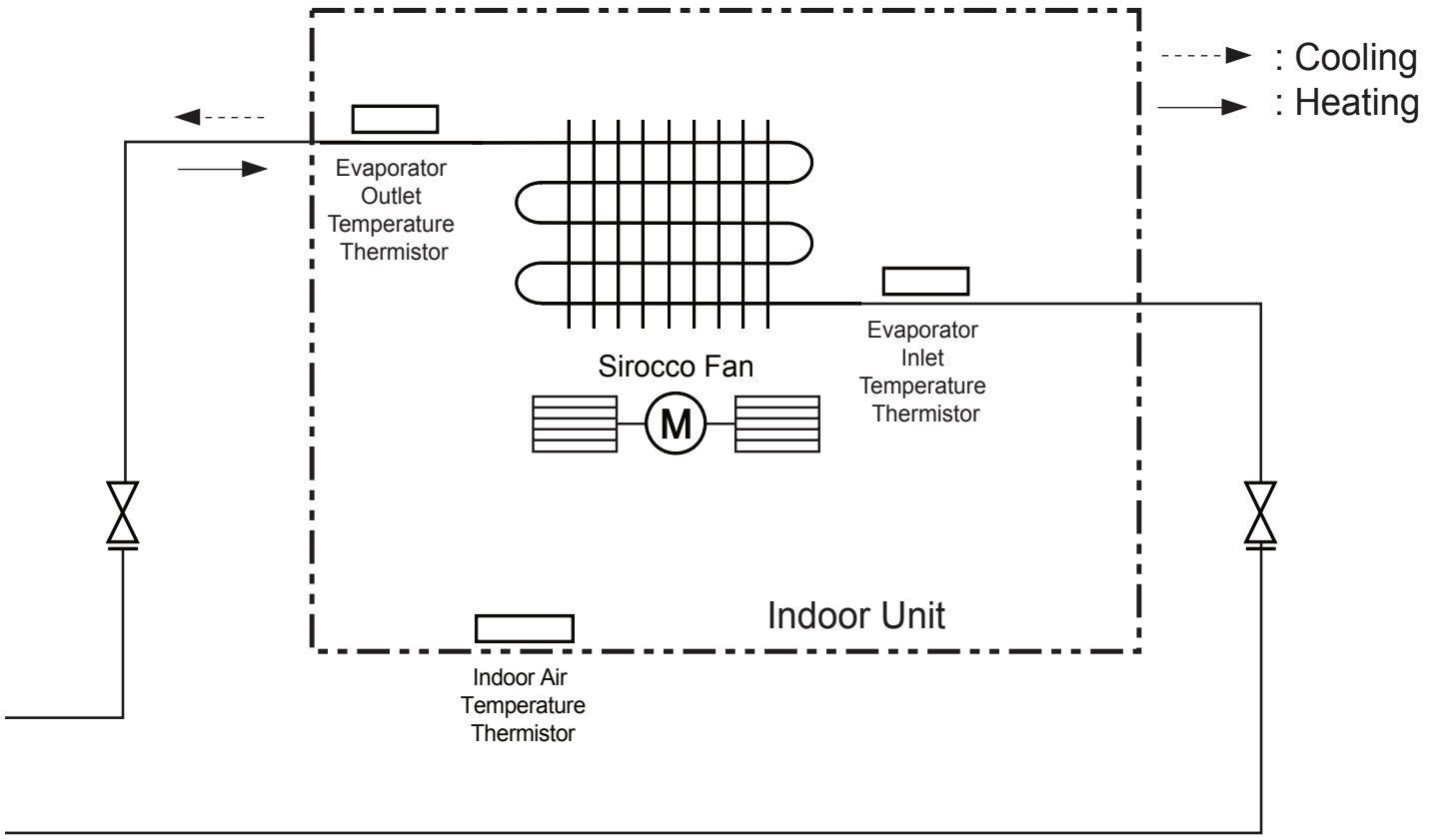

Table 46:Multi F Ceiling-Concealed Duct (Low Static) LDN097HV4 Indoor Unit Refrigerant Pipe Sizes.

Model No.	Vapor (inch)	Liquid (inch)
LDN097HV4	Ø3/8	Ø1/4

Table 47:Multi F Ceiling-Concealed Duct (Low Static) LDN097HV4 Refrigerant Pipe Connections.

Model No.	Vapor (inch)	Liquid (inch)
LDN097HV4	Ø3/8	Ø1/4

Table 48:Multi F Ceiling-Concealed Duct (Low Static) LDN097HV4 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

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DUCT (LOW STATIC) INDOOR UNITS

Refrigerant Flow Diagrams

Figure 125:LDN127HV4 and LDN187HV4 Refrigerant Flow Diagram.

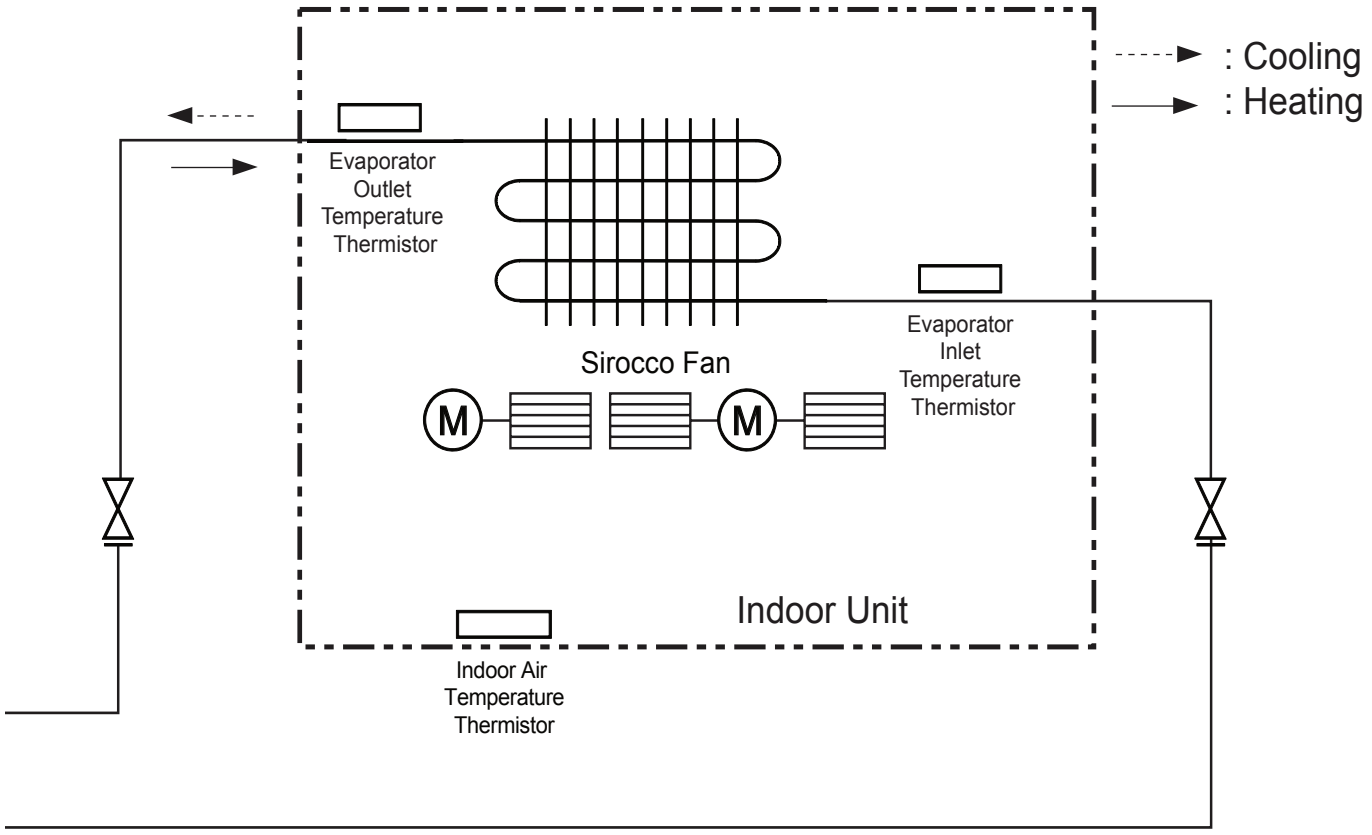

Table 49: Multi F Ceiling-Concealed Duct (Low Static) LDN127HV4 and LDN187HV4 Indoor Unit Refrigerant Pipe Sizes.

Model No.	Vapor (inch)	Liquid (inch)
LDN127HV4	Ø3/8	Ø1/4
LDN187HV4	Ø1/2	

Table 50: Multi F Ceiling-Concealed Duct (Low Static) LDN127HV4 and LDN187HV4 Indoor Unit Refrigerant Pipe Connections.

Model No.	Vapor (inch)	Liquid (inch)
LDN127HV4	Ø3/8	Ø1/4
LDN187HV4	Ø1/2	

Table 51: Multi F Ceiling-Concealed Duct (Low Static) LDN127HV4 and LDN187HV4 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

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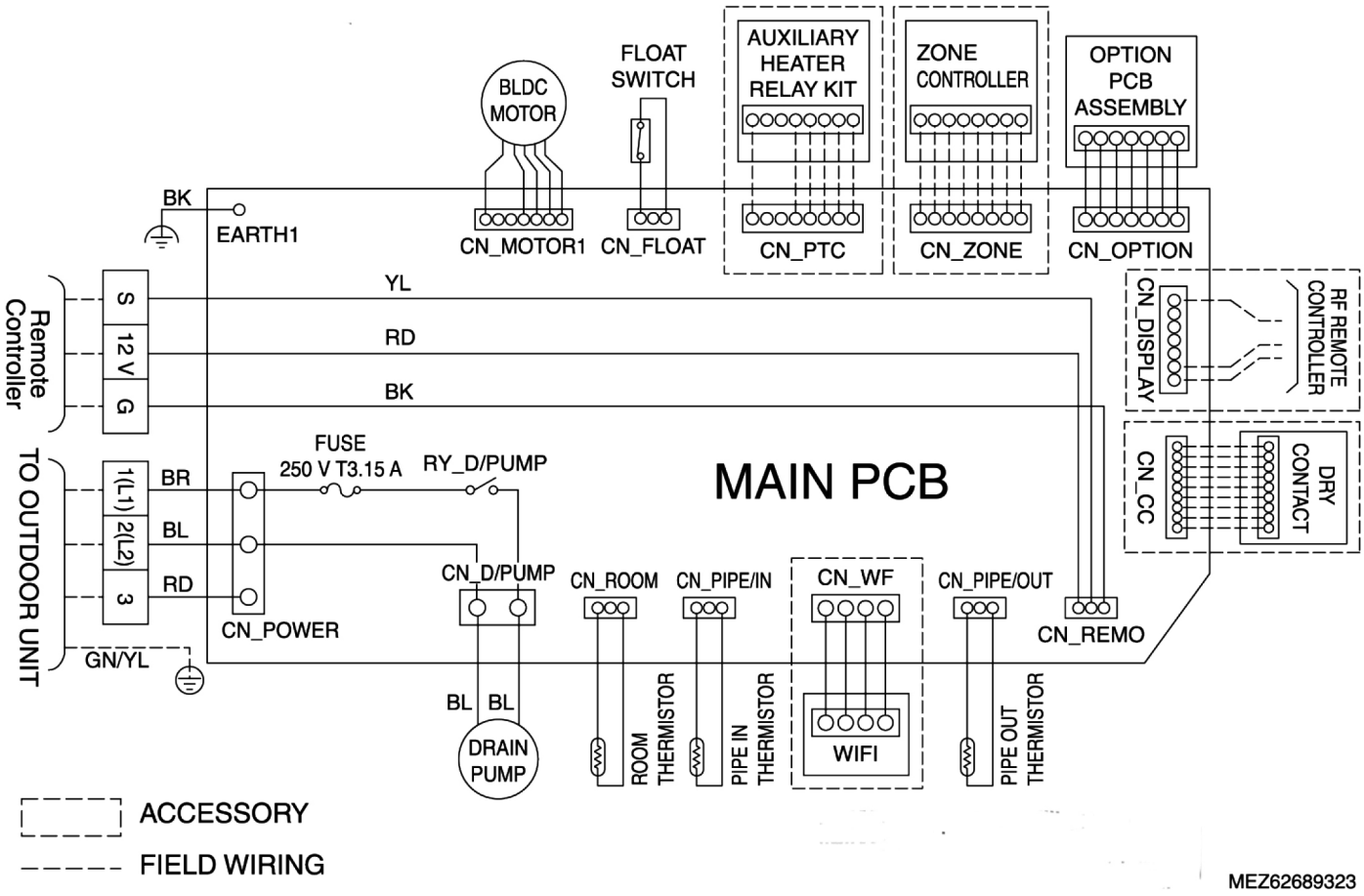
DUCT (LOW STATIC) INDOOR UNITS

Wiring Diagram

Figure 126:Multi F Ceiling-Concealed Duct (Low Static) LDN097HV4 Indoor Units Wiring Diagram.



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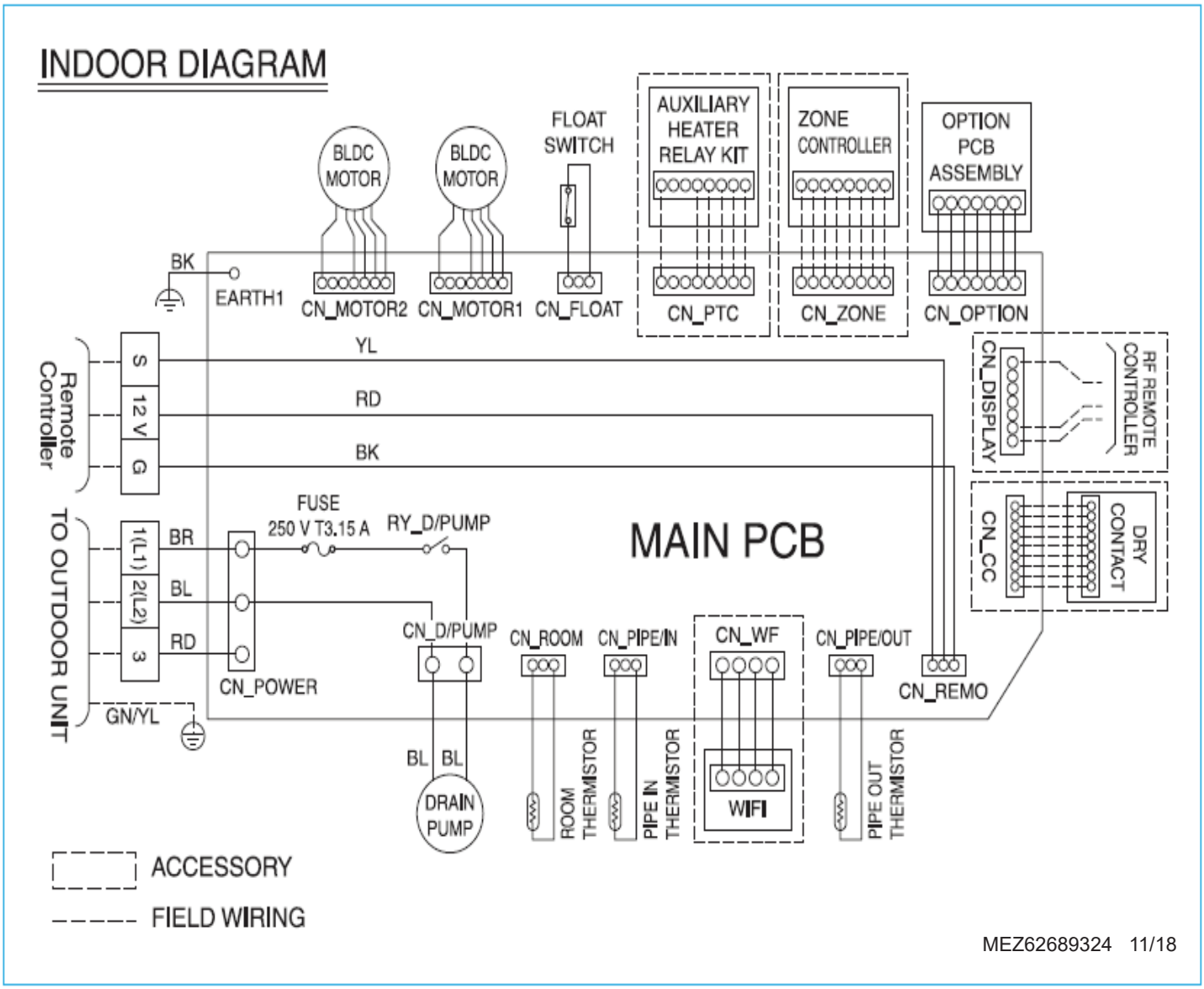
DUCT (LOW STATIC) INDOOR UNITS

Wiring Diagram

Figure 127:Multi F Ceiling-Concealed Duct (Low Static) LDN127HV4 and LDN187HV4 Indoor Units Wiring Diagram.



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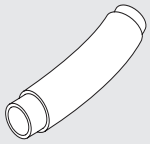
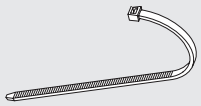
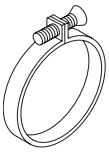
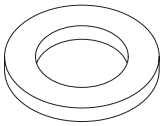
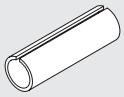
DUCT (LOW STATIC) INDOOR UNITS

Factory Supplied Parts and Materials

Factory Supplied Parts

Table 52: Parts Table.

Part	Quantity	Image	Part	Quantity	Image
Drain Hose	One (1)		Zip Ties	Four (4)	
Metal Clamp	Two (2)		Washers for Hanging Brackets	Eight (8)	
Insulation for Fittings	One (1) Set	 For Vapor Piping For Liquid Piping			

Factory Supplied Materials

- Owner's Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Torque wrenches
- Hexagonal wrench
- Gas-leak detector
- Thermometer

⚠WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit's components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

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DUCT (LOW STATIC) INDOOR UNITS

Installation and Best Layout Practices

Selecting the Best Location

Do's

- Place the unit where air circulation will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient strength to bear the load of the indoor unit.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit in a location that is level, and where it can be easily connected to the outdoor unit / branch distribution unit.

⃠ Don'ts

- ⃠ *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- ⃠ *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- ⃠ *Do not install the unit near high-frequency generators.*
- ⃠ *Do not install the unit near a doorway.*

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

Installing in an Area Exposed to Unconditioned Air

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

- Verify that carpet is or will be installed (carpet will 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.

Note:

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

Figure 128:General Installation Guidelines.

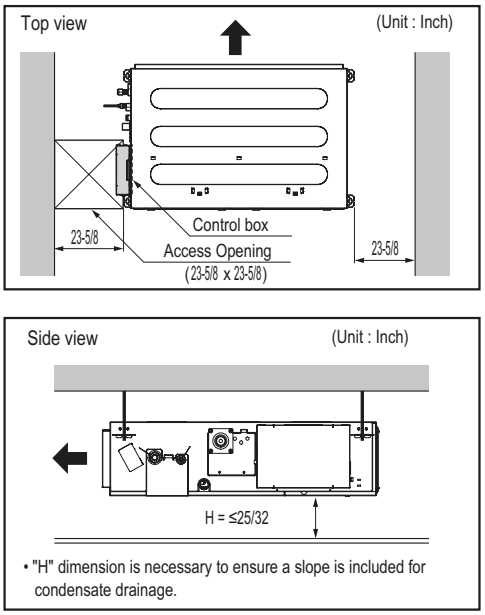

Figure 129:Service / Access Panel Dimensions.

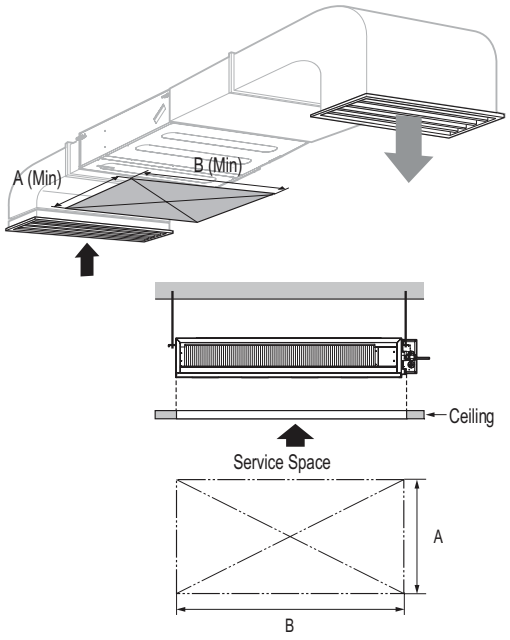

Table 53:General Access Panel Dimensions.

Model / Capacity (Btu/h)	Dimensions (in.)	
	A	B
LDN097HV4 / 9,000	31-1/2	31-1/2
LDN127HV4 / 12,000		39-3/8
LDN187HV4 / 18,000		

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DUCT (LOW STATIC) INDOOR UNITS

Installation and Best Layout Practices

Duct (Low Static) Indoor Units can be installed in two ways:

Figure 130:Air inlet from the back of the indoor unit.

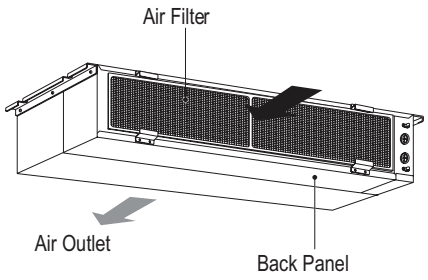


Figure 131:Air inlet from the bottom of the indoor unit.

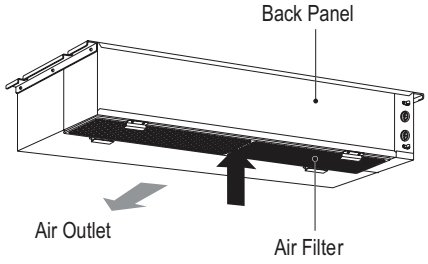


Table 55:Indoor Unit Bolt Locations.

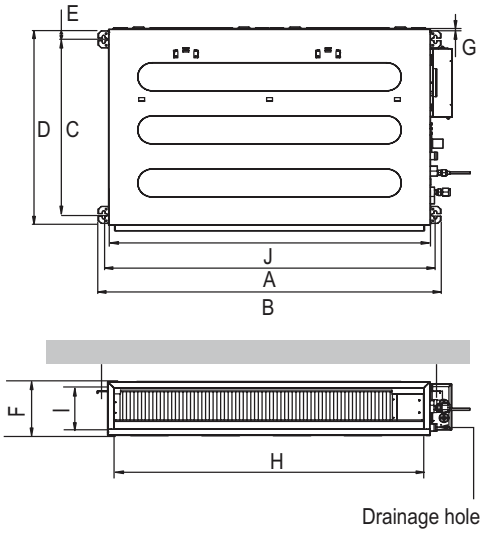


Table 54:Indoor Unit Bolt Location Dimensions.

Model / Capacity (Btu/h)	Dimensions (in.)									
	A	B	C	D	E	F	G	H	I	J
LDN097HV4 / 9,000	28-27/32	30-13/32	24-23/32	27-9/16	1-13/32	7-15/32	25/32	25-31/32	6-3/32	27-9/16
LDN127HV4 / 12,000	36-23/32	38-9/32						33-27/32		35-7/16
LDN187HV4 / 18,000										

Preparing the Installation Area and Hanging the Indoor Unit Frame

1. Select and mark the area for the suspension or console bolts (use embedded inserts or anchor bolts in new buildings, and hole-in-anchors in older buildings).
2. Drill the holes.
3. Add the set-anchor and the plate washer to the bolts (bolts must be at least 13/32 inches in diameter), and then insert the bolts into the installation area.
4. Add the plate washer, spring washer, and nut to secure the bolts into the installation area.
5. Position the indoor unit installation plates onto the bolts. Secure using nuts, plate washers, and spring washers. Adjust for level as necessary.

Figure 132:Preparing the Installation Area.

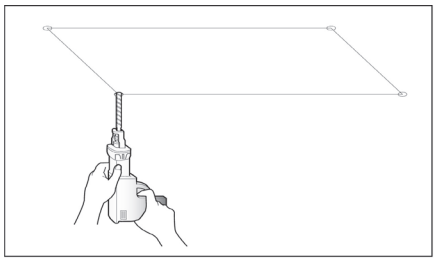


Figure 133:Console Bolt Options.

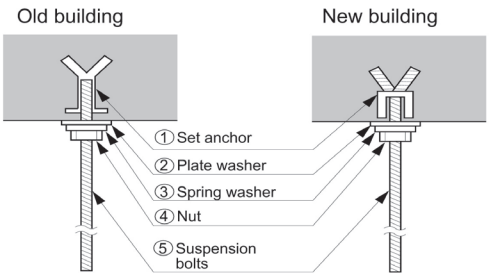
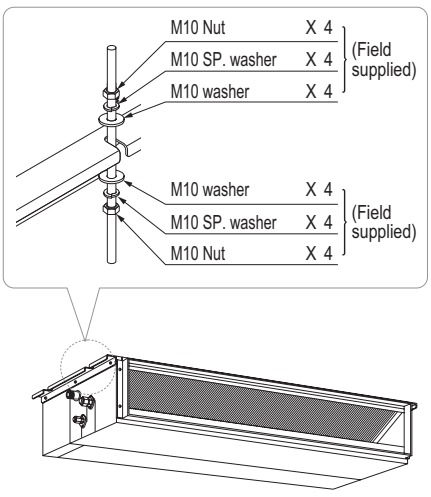


Figure 134:Hanging the Indoor Unit.



Note:

Install a canvas duct to the air outlet and air inlet so that vibration from the indoor unit does not carry to the duct or ceiling. Also, add insulation to the interior of the duct, and apply anti-vibration to the suspension bolts.

⚠ WARNING

- *Unit must be installed correctly.*
- *Tighten the nuts and bolts to prevent the unit from falling.*

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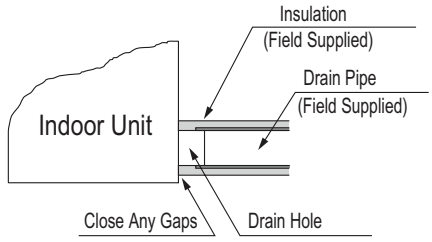
DUCT (LOW STATIC) INDOOR UNITS

Installation and Best Layout Practices

Installing the Drain System

- Drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must 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.

Figure 135:Drain Connection.

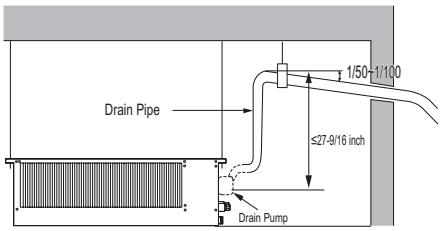


Ducted (low static) indoor units have two options for condensate drainage: Using the factory-installed drain pump, or using a gravity drain.

Using the Drain Pump

- Maximum drain lift is 27-9/16 inches, therefore, the drain piping must be placed below the maximum lift height.
- Field-installed drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must not be straight up and down.

Figure 136:Indoor Unit Using Drain Pump.

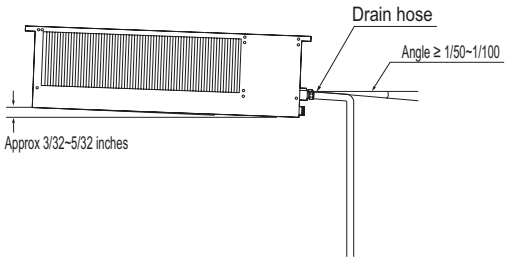


Pump location will be different on the indoor unit.

Using the Gravity Drain

Field-drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must not be straight up and down.

Figure 137:Indoor Unit Using Gravity Drain.

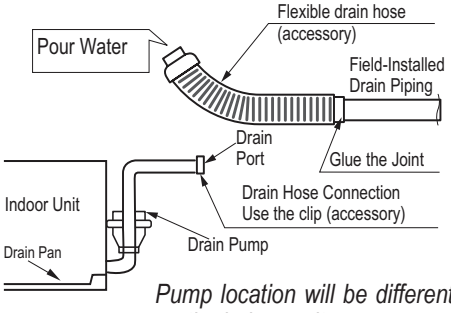


Checking the Drain Pump

The unit uses a drain pump to remove condensate. The pump must be tested before the system operates.

- Connect the flexible drain hose to the field-installed drain piping; leave it as is until the test is complete.
- Pour water into the flexible drain hose and check for leaks.
- After power wiring installation is complete, operate the drain pump to see if it sounds and functions properly.
- After the test is complete, connect the flexible drain hose to the indoor unit drain port.

Figure 138:Checking the Drain Pump.

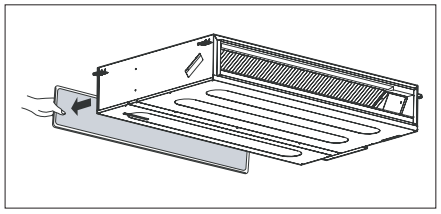


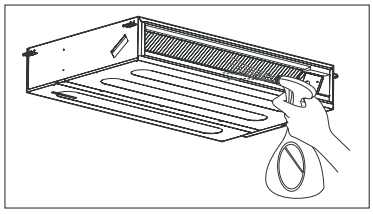
Pump location will be different on the indoor unit.

Checking the Drainage System

1. Remove the air filter.
2. Check the drainage.
   - Spray water on the evaporator.
   - Verify that water flows through the indoor unit drain hose without leaking.

Figure 139:Checking the Drainage System.





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Insulating the Refrigerant and Drain Piping

⚠ WARNING

Ensure all piping is insulated. Exposed piping can cause burns if touched.

Refrigerant Piping Insulation

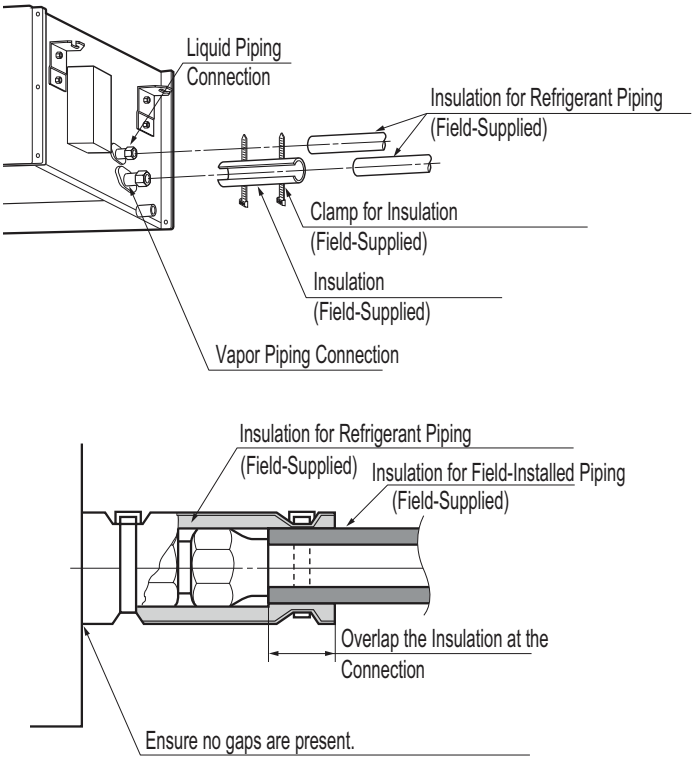
Field-installed vapor and liquid refrigerant piping lines must be properly and completely covered in insulation (up to the indoor unit piping connections). Any exposed piping will generate condensate or will cause burns if touched. Insulation for this field-installed refrigerant piping must have a minimum heat resistance of 248°F.

Duct (low static) indoor units have been tested under and meet the requirements of the "KS Conditions." If the indoor unit is installed and is operated at an extended period in a highly humid environment (dew point temperature >73°F), however, condensate will form. To prevent this phenomenon, install adiabatic glass wool insulation with a thickness or 13/32 to 13/16 inches thick. Also, install glass wool insulation on all indoor unit that are located in the ceiling plenum.

Drain Piping Insulation

Drain piping must have insulation a minimum of 7/32 inches thick.

Figure 140:Insulating the Piping.



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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

• Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

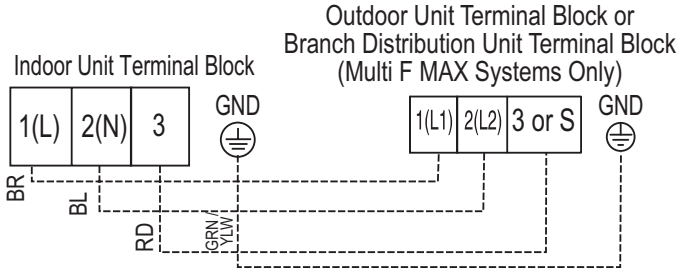
Connecting the Power Wiring and Communications Cable

1. Insert the power wiring / communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) through the side of the indoor unit. 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.

2. Connect each wire to its appropriate terminal on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

3. Secure the power wiring / communications cable with the cable restraint.

Figure 141:Indoor Unit to Outdoor Unit / Branch Distribution Unit (Multi F MAX systems only) Power Wiring / Communications Cable Connections.



4. Screw the steel clamp to the inside of the control panel.
   - Place the wiring / cables in the clamp and tighten the plastic clamp to an open surface of the control panel.
   - When clamping, ⃠ do not apply force to the wiring connections.
   - Neatly arrange the wiring, ⃠ do not catch the wiring in the electric box cover, and ensure the cover firmly closes.

5. Fill in any gaps around the wiring access hole with sealant to prevent foreign particles from entering the indoor unit.

Using a Conduit

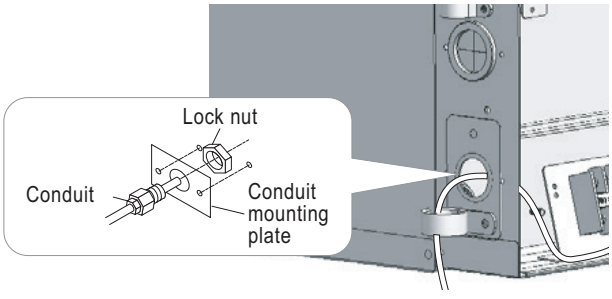
1. Remove the rubber stopper on the indoor unit. Pass the power wiring / communications cable through the conduit, the conduit mounting plate, and to the control panel of the indoor unit.

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 142:Exterior View of Conduit Installation.



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Controller Options

Ceiling-concealed duct (low static) indoor units can be used with many LG-supplied wired controllers (sold separately). The wireless hand-held controller (Model No. PQWRHQ0FDB) is also an optional accessory with use wired controllers.

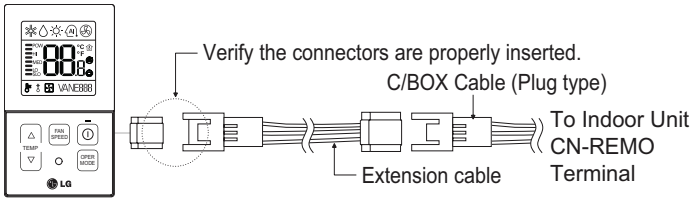
Wired Controller Connections

Controllers can connect to the indoor unit in one of two different ways.

1. LG Wired Remote Extension Cable with Molex plug (PZCWRC1; sold separately) that connects to the CN-REMO terminal on the indoor unit PCB.

2. Field-supplied controller cable that connects to the indoor unit terminal block (must be at least UL2547 or UL1007, 22 AWG, two-core, one-shield core, at least FT-6 rated if local electric and building codes require plenum cable usage).

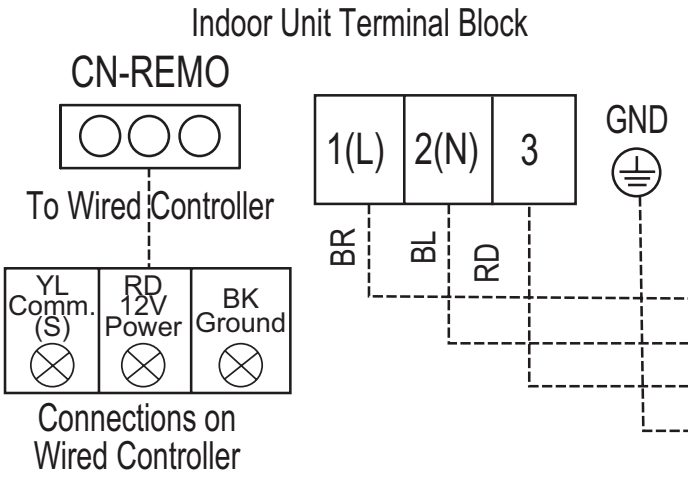
Figure 143:PZCWRC1 LG Wired Remote Extension Cable.



Note:

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

Figure 144:Wired Controller Connections on the Indoor Unit Terminal Block.



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DUCT (LOW STATIC) INDOOR UNITS

Installation and Best Layout Practices

Hanging the Wired Controller

1. The controller wiring / cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring / cable on applicable side.

2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring / cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 145:Removing the Cable Guide Grooves.

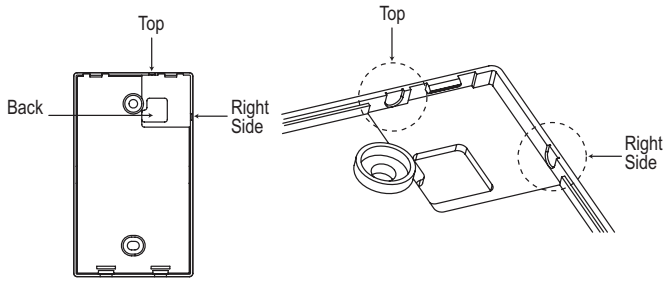


Figure 146:Attaching the Wall Plate.

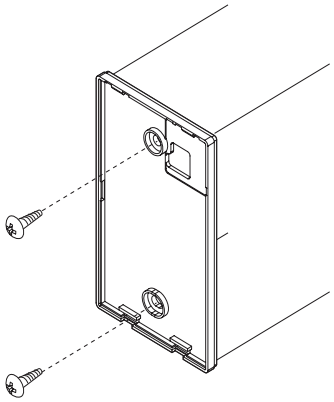
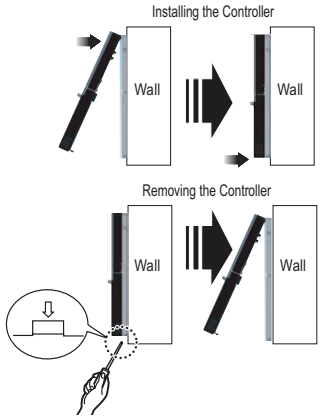


Figure 147: Installing / Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

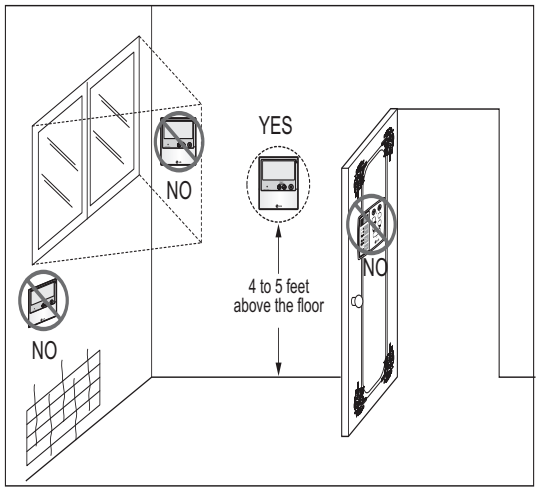
Wired Controller Placement

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

⃠ *Do not install the remote controller where it can be impacted by the following:*

- *Drafts or dead spots behind doors and in corners*
- *Hot or cold air from ducts*
- *Radiant heat from sun or appliances*
- *Concealed pipes and chimneys*
- *Uncontrolled areas such as an outside wall behind the remote controller*

Figure 148:Proper Location for the Wired Controller.



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External Static Pressure Control

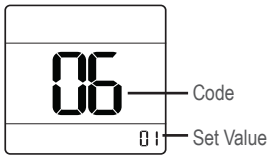
To provide a required air flow rate that accounts for the external static pressure change, follow the steps below.

1. To access system installer setting mode, press and hold the temperature increase and mode selection buttons simultaneously for approximately three (3) seconds. Choose setting code value “06” by pressing the mode selection button.

2. Use the temperature increase and decrease buttons to select the desired setting value.

   Setting Values
   01 : V-H
   02 : F-H
   03 : V-L
   04 : F-L

Figure 149:Select Code and Set Value.



3. Press the on / off button to save the established settings.

4. To deactivate system installer setting mode after the settings have been established, press and hold the temperature increase and mode selection check buttons simultaneously for approximately three (3) seconds. If a button is not pressed for more than 25 seconds, the system installer setting mode will automatically deactivate.

Figure 150:Controller External Static Pressure Setting Display.

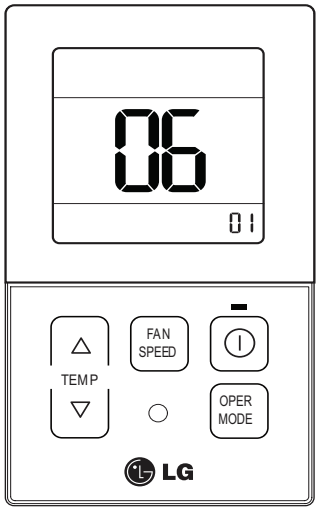


Table 56:Static Pressure Setting Table.

Pressure Selection		Function	
		Zone State	External Static Pressure Standard Value
01	V-H	Variable	High
02	F-H	Fixed	High
03	V-L	Variable	Low
04	F-L	Fixed	Low

Note:

- *Select the position after verifying duct work and the external static pressure of the indoor unit.*
- *Factory set to pressure selection F-H.*

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Assigning Air Flow

To assign an air flow for each fan speed, follow the steps below.

1. To access system installer setting mode, press and hold the temperature increase and mode selection buttons simultaneously for approximately three (3) seconds. Choose setting code value “03” by pressing the mode selection button.

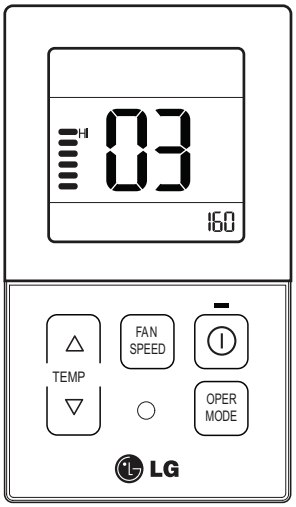
2. Use the fan speed button to select the desired fan speed. (Lo→Med→Hi will display on the LED).

3. Use the temperature increase and decrease buttons to select the desired external static pressure setting value (thereby assigning the respective airflow). External static pressure value range: 0~255; the value will display near the lower right corner of the LED.

4. Press the on / off button to save the established settings.

5. To deactivate system installer setting mode after the settings have been established, press and hold the temperature increase and mode selection check buttons simultaneously for approximately three (3) seconds. If a button is not pressed for more than 25 seconds, the system installer setting mode will automatically deactivate.

Figure 151:Controller External Static Pressure Setting Display.



Note:

- *A certified technician must set the external static pressure value(s). If the external static pressure is set incorrectly, the system will malfunction.*
- ⃠ *Do not alter the external static pressure value that corresponds to each air flow level.*
- *External static pressure value can vary depending on the indoor unit.*
- *If by pressing the fan speed button during external static pressure setup, the fan speed is raised to the next level, the air flow value of the previous fan speed will be maintained (external static pressure setting value is saved).*

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CEILING-CONCEALED DUCT (HIGH STATIC) INDOOR UNIT DATA

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“Factory Supplied Parts and Materials” on page 126
“Installation and Best Layout Practices” on page 127

DUCT (HIGH STATIC) INDOOR UNITS

Mechanical Specifications and Features

Ceiling-Concealed Duct (High Static) Indoor Unit

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Ceiling-Concealed Duct (High Static) units are designed for high-speed air volume against an external static pressure up to 0.78"WG for the 24,000 Btu/h model; up to 0.55"WG for the 36,000 Btu/h model.

Coil

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

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare, and all refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

The casing is designed to mount fully concealed above a finished ceiling. Casing is manufactured of galvanized steel plate. Cold surfaces of the unit are covered internally with a coated polystyrene insulating material, and covered externally with sheet insulation made of ethylene propylene diene monomer (M-Class) (EPDM). External insulation is plenum rated and conforms to ASTM Standard D-1418. Hanger brackets are included on the casing to support the weight on four corners. Unit has a front horizontal supply air discharge outlet, and one dedicated rear horizontal return air inlet.

Fan Assembly and Control

The 24MBH (LHN248HV) indoor unit has one direct-drive Sirocco fan, while the 36MBH (LHN368HV) indoor unit has two direct-drive Sirocco fans. The fans are made of high strength ABS GP-2200 polymeric resin that are statically and dynamically balanced. The fans are mounted on a common brushless digitally controlled (BLDC) motor 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. The indoor fan has Low, Med, High, and Auto settings for Cooling mode; and has Low, Med, High, and Auto settings for Heating mode. Each of the settings can be field-adjusted from the factory setting (RPM / ESP). The Auto setting adjusts the fan speed based on the difference between the controller setpoint and space temperature.

Figure 152: Ceiling-Concealed Duct (High Static) Indoor Unit.

Air Filter

Return air is filtered with a factory-supplied, removable, washable filter accessible from the rear of the indoor unit. High efficiency air filter options include a return filter box and an LG / Dynamic supplied air cleaner (both sold separately).

Microprocessor Control

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

Controls

The indoor unit controller of choice must be ordered separately. Communication between the indoor units and the outdoor unit is accomplished through 14 AWG, four-core, stranded and shielded power / communication cable.

Condensate Lift/Pump

The indoor unit is provided with a factory installed and wired internal condensate lift/pump capable of providing a minimum 27.5 inch 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.

Features

- Inverter (Variable speed fan)
- Internal drain pump
- Control lock function
- Auto operation
- Auto restart operation
- Dehumidifying function
- Two thermistor control
- External static pressure control
- Group control
- Self-diagnostics function
- Wired controller ordered separately
- Wi-Fi compatible

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DUCT (HIGH STATIC) INDOOR UNITS

General Data / Specifications

Table 57: Multi F Ceiling-Concealed High-Static Ducted Indoor Unit General Data.

Model Name	LHN248HV	LHN368HV
Nominal Cooling Capacity (Btu/h)[1]	24,000	36,000
Nominal Heating Capacity (Btu/h)[1]	27,000	40,000
Operating Range		
Cooling (°F WB)	57-77	57-77
Heating (°F DB)	59-81	59-81
Fan		
Type	Sirocco	Sirocco
Motor Output (W) x Qty.	136.5 x 1	259 x 1
Motor/Drive	Brushless Digitally Controlled / Direct	Brushless Digitally Controlled / Direct
Factory Set Airflow Rate CFM (H/M/L)	777 / 706 / 636	1,130 / 989 / 848
Factory Set External Static Pressure (in. wg)	0.24	0.24
Maximum External Static Pressure (in. wg)	0.59	0.59
Unit Data		
Refrigerant Type[2]	R410A	R410A
Refrigerant Control	EEV	EEV
Power Supply V, Ø, Hz[3]	208-230, 1, 60	208-230, 1, 60
Rated Amps (A)	1.6	2.3
Sound Pressure Level (Standard Mode) dB(A) H/M/L)[4]	37 / 35 / 34	44 / 42 / 40
Dimensions (W x H x D, in.)	35-7/16 x 10-5/8 x 27-9/16	49-3/16 x 10-5/8 x 27-9/16
Net Unit Weight (lbs.)	58.6	85.3
Shipping Weight (lbs.)	71.9	99.4
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 14	4 x 14
Heat Exchanger (Row x Column x Fin / inch) x Number	(3 x 13 x 18) x 1	(3 x 13 x 18) x 1
Pipe Size		
Liquid (in.)	1/4	3/8
Vapor (in.)	1/2	5/8
Connection Size		
Liquid (in.)	3/8	3/8
Vapor (in.)	5/8	5/8
Drain O.D. / I.D. (in.)	1-1/4, 1	1-1/4, 1

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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). 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).

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs be minimum 14 AWG, 4-conductor, stranded, shielded or unshielded (if shielded, must be grounded to chassis at ODU only) and must comply with applicable local and national codes.

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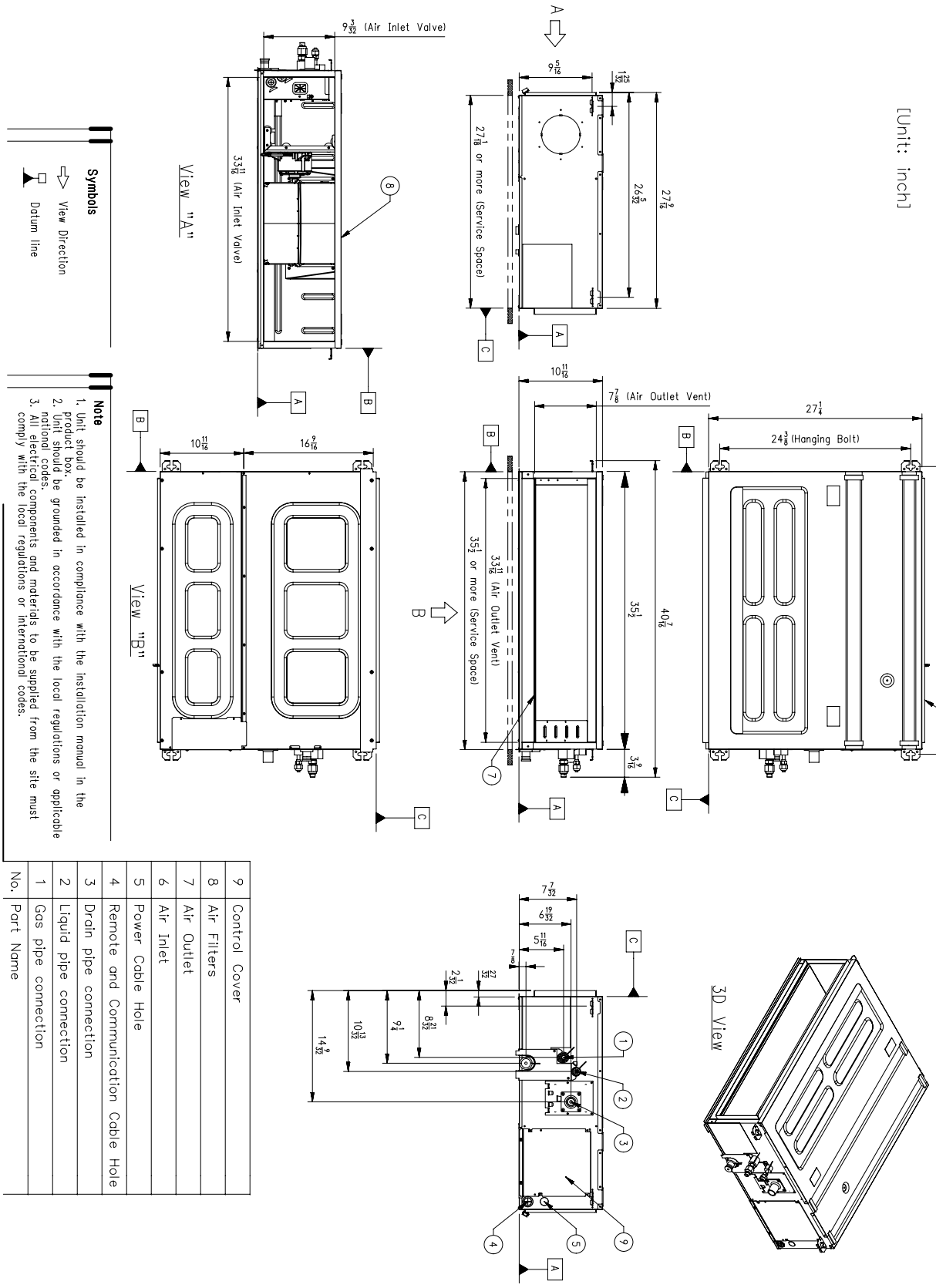
DUCT (HIGH STATIC) INDOOR UNITS

Dimensions

Figure 153: LHN248HV Dimensions.



No.	Part Name
1	Gas pipe connection
2	Liquid pipe connection
3	Drain pipe connection
4	Remote and Communication Cable Hole
5	Power Cable Hole
6	Air Inlet
7	Air Outlet
8	Air Filters
9	Control Cover

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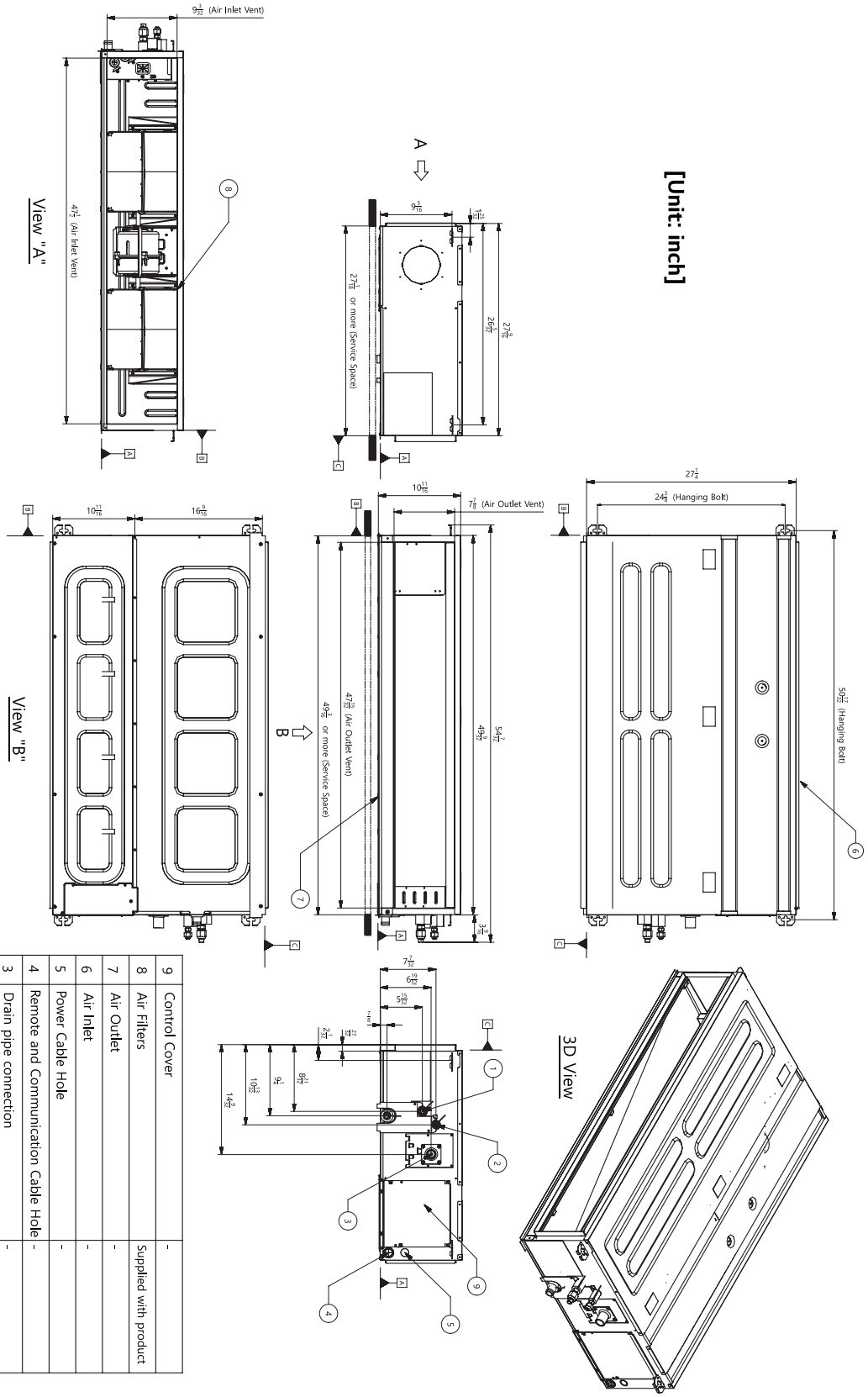
Figure 154: LHN368HV Dimensions.



No.	Part Name	Description
1	Gas pipe connection	-
2	Liquid pipe connection	-
3	Drain pipe connection	-
4	Remote and Communication Cable Hole	-
5	Power Cable Hole	-
6	Air Inlet	-
7	Air Outlet	-
8	Air Filters	Supplied with product
9	Control Cover	-

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DUCT (HIGH STATIC) INDOOR UNITS

Cooling Capacity Table

Table 58:Multi F Ceiling-Concealed Duct (High Static) Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LHN248HV 24,000	14	23.53	17.66	24.99	18.66	26.45	18.07	27.50	18.45	29.37	18.60	30.83	18.95
	20	23.51	17.80	24.97	18.80	26.43	18.21	27.48	18.59	29.35	18.75	30.81	19.10
	25	23.49	17.94	24.95	18.95	26.41	18.35	27.46	18.73	29.33	18.89	30.79	19.25
	30	23.47	18.08	24.93	19.09	26.39	18.49	27.44	18.88	29.30	19.04	30.76	19.40
	35	23.46	18.21	24.91	19.24	26.37	18.63	27.42	19.02	29.28	19.18	30.74	19.54
	40	23.44	18.35	24.89	19.38	26.35	18.77	27.40	19.16	29.26	19.33	30.72	19.69
	45	23.42	18.49	24.87	19.53	26.33	18.91	27.38	19.31	29.24	19.47	30.69	19.84
	50	23.40	18.62	24.85	19.67	26.31	19.05	27.36	19.45	29.21	19.61	30.67	19.99
	55	23.38	18.76	24.84	19.82	26.29	19.19	27.34	19.59	29.19	19.76	30.64	20.13
	60	23.37	18.90	24.82	19.96	26.27	19.33	27.32	19.73	29.17	19.90	30.62	20.28
	65	23.35	19.03	24.80	20.10	26.25	19.47	27.29	19.88	29.15	20.04	30.60	20.42
	70	23.33	19.17	24.78	20.25	26.23	19.61	27.27	20.02	29.13	20.19	30.57	20.57
	75	22.77	18.85	24.21	19.94	25.66	19.33	26.70	19.75	28.55	19.94	29.99	20.34
	80	22.21	18.53	23.65	19.63	25.09	19.05	26.13	19.48	27.97	19.69	29.42	20.10
	85	21.65	18.19	23.09	19.30	24.53	18.75	25.57	19.19	27.40	19.43	28.84	19.84
	90	21.09	17.85	22.53	18.96	23.96	18.45	25.00	18.90	26.83	19.15	28.27	19.59
	95	20.49	17.66	21.92	18.79	23.35	18.31	**24.00**	**18.48**	26.20	19.05	27.63	19.50
	100	19.99	17.19	21.42	18.31	22.85	17.87	23.69	18.19	25.70	18.64	27.13	19.10
	105	19.49	16.71	20.92	17.84	22.35	17.43	23.38	17.91	25.20	18.23	26.63	18.70
	110	18.99	16.14	20.42	17.26	21.85	16.90	22.88	17.37	24.70	17.71	26.13	18.19
	115	18.49	15.66	19.92	16.78	21.35	16.45	22.38	16.93	24.20	17.29	25.63	17.77
	118	18.19	15.55	19.62	16.68	21.05	16.36	22.08	16.86	23.90	17.23	25.33	17.72
	122	18.10	15.51	19.52	16.64	20.95	16.34	21.98	16.83	23.81	17.21	25.23	17.71
LHN368HV 36,000	14	35.29	25.46	37.48	26.90	39.67	26.04	41.26	26.59	44.06	26.81	46.25	27.32
	20	35.26	25.66	37.45	27.11	39.64	26.25	41.23	26.80	44.02	27.02	46.21	27.54
	25	35.24	25.86	37.43	27.32	39.61	26.45	41.19	27.01	43.99	27.23	46.18	27.75
	30	35.21	26.06	37.40	27.53	39.58	26.65	41.16	27.21	43.96	27.44	46.14	27.96
	35	35.18	26.25	37.37	27.73	39.55	26.85	41.13	27.42	43.92	27.65	46.11	28.17
	40	35.16	26.45	37.34	27.94	39.52	27.06	41.10	27.63	43.89	27.86	46.07	28.39
	45	35.13	26.65	37.31	28.15	39.49	27.26	41.07	27.83	43.86	28.07	46.04	28.60
	50	35.10	26.85	37.28	28.36	39.46	27.46	41.04	28.04	43.82	28.27	46.00	28.81
	55	35.08	27.04	37.25	28.57	39.43	27.66	41.01	28.24	43.79	28.48	45.97	29.02
	60	35.05	27.24	37.23	28.78	39.40	27.86	40.97	28.45	43.76	28.69	45.93	29.23
	65	35.02	27.44	37.20	28.98	39.37	28.06	40.94	28.65	43.72	28.90	45.90	29.44
	70	34.99	27.63	37.17	29.19	39.34	28.26	40.91	28.86	43.69	29.10	45.86	29.65
	75	34.15	27.18	36.32	28.75	38.49	27.87	40.05	28.47	42.82	28.75	44.99	29.32
	80	33.31	26.71	35.47	28.29	37.64	27.46	39.20	28.08	41.96	28.39	44.12	28.97
	85	32.48	26.23	34.63	27.82	36.79	27.03	38.35	27.66	41.10	28.00	43.26	28.61
	90	31.64	25.73	33.79	27.33	35.94	26.59	37.50	27.24	40.25	27.61	42.40	28.23
	95	30.74	25.46	32.88	27.09	35.02	26.39	**36.00**	**26.64**	39.30	27.46	41.44	28.11
	100	29.99	24.78	32.13	26.40	34.27	25.76	35.53	26.23	38.55	26.87	40.69	27.53
	105	29.24	24.10	31.38	25.72	33.52	25.13	35.07	25.82	37.80	26.28	39.94	26.96
	110	28.49	23.27	30.63	24.89	32.77	24.36	34.32	25.04	37.05	25.54	39.20	26.22
	115	27.74	22.58	29.88	24.19	32.02	23.71	33.57	24.41	36.31	24.93	38.45	25.62
	118	27.29	22.41	29.43	24.04	31.57	23.59	33.12	24.30	35.86	24.84	38.00	25.55
	122	27.14	22.36	29.28	23.99	31.43	23.55	32.97	24.26	35.71	24.81	37.85	25.53

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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DUCT (HIGH STATIC) INDOOR UNITS

Heating Capacity Table

MULTI F
MULTI F MAX

Table 59:Multi F Ceiling-Concealed Duct (High Static) Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LHN248HV 24,000	0	-0.4	13.89	13.70	13.57	13.50	13.30	12.72
	5	4.5	15.65	15.46	15.33	15.26	15.07	14.48
	10	9	17.41	17.22	17.09	17.02	16.83	16.24
	17	15	19.76	19.57	19.43	**19.37**	19.17	18.55
	20	19	20.64	20.45	20.32	20.25	20.05	19.37
	25	23	22.11	21.91	21.78	21.72	21.52	20.74
	30	28	23.38	23.18	23.05	22.99	22.79	22.11
	35	32	24.65	24.46	24.33	24.26	24.07	23.48
	40	36	25.79	25.60	25.47	25.40	25.21	24.62
	45	41	26.93	26.74	26.61	26.54	26.35	25.76
	47	43	27.39	27.20	27.07	**27.00**	26.80	26.22
	50	46	27.83	27.64	27.51	27.44	27.24	26.58
	55	51	28.57	28.37	28.24	28.17	27.98	27.20
	60	56	28.57	28.37	28.24	28.17	27.98	27.32
	63	59	28.57	28.37	28.24	28.17	27.98	27.39
	68	64	28.57	28.37	28.24	28.17	27.98	27.51
LHN368HV 36,000	0	-0.4	20.58	20.29	20.10	20.00	19.71	18.84
	5	4.5	23.19	22.90	22.71	22.61	22.32	21.45
	10	9	25.80	25.51	25.31	25.22	24.93	24.06
	17	15	29.28	28.99	28.79	**28.70**	28.41	27.48
	20	19	30.58	30.29	30.10	30.00	29.71	28.70
	25	23	32.75	32.46	32.27	32.17	31.88	30.72
	30	28	34.64	34.35	34.15	34.06	33.77	32.75
	35	32	36.52	36.23	36.04	35.94	35.65	34.78
	40	36	38.21	37.92	37.73	37.63	37.34	36.47
	45	41	39.90	39.61	39.42	39.32	39.03	38.16
	47	43	40.58	40.29	40.10	**40.00**	39.71	38.84
	50	46	41.23	40.94	40.75	40.65	40.36	39.38
	55	51	42.32	42.03	41.84	41.74	41.45	40.29
	60	56	42.32	42.03	41.84	41.74	41.45	40.47
	63	59	42.32	42.03	41.84	41.74	41.45	40.58
	68	64	42.32	42.03	41.84	41.74	41.45	40.76

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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DUCT (HIGH STATIC) INDOOR UNITS

External Static Pressure / Acoustic Data

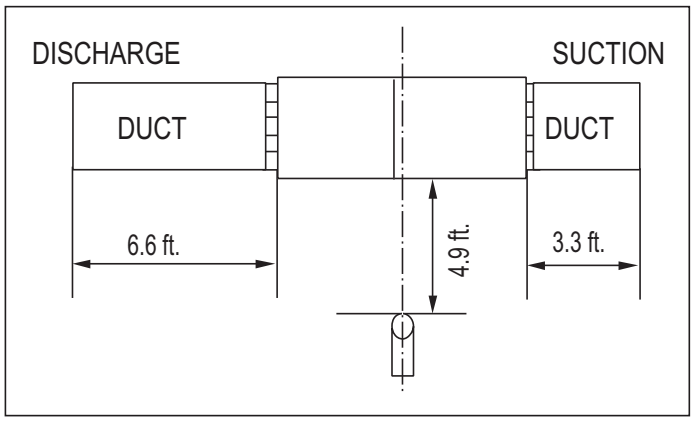
Table 60:Multi F Ceiling-Concealed Duct (High Static) External Static Pressure Setting Values Table.

Static Pressure (in. wg)			0.1	0.16	0.2	0.24	0.28	0.31	0.35	0.39	0.43	0.47	0.51	0.59
Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Airflow Rate / CFM		Setting Value (in. wg)											
LHN248HV 24,000	High	777	110	117	121	124	127	130	133	136	137	-	138	140
	Mid	706	102	110	114	118	120	125	127	130	133	-	134	136
	Low	636	96	102	107	110	114	118	122	125	127	-	130	132
LHN368HV 36,000	High	1,130	-	109	112	115	119	122	126	128	131	134	137	144
	Mid	989	-	101	105	108	112	115	119	123	127	130	133	138
	Low	848	-	92	97	101	105	109	113	117	121	124	127	134

Note:

- *To get the desired air flow and external static pressure combination, use the setting value from the table. Using a setting value other than that listed in the table will not provide the desired combination.*
- *Table data is based at 230V. Air flow rate varies according to voltage fluctuation.*

Figure 155: Sound Pressure Level Measurement Location.



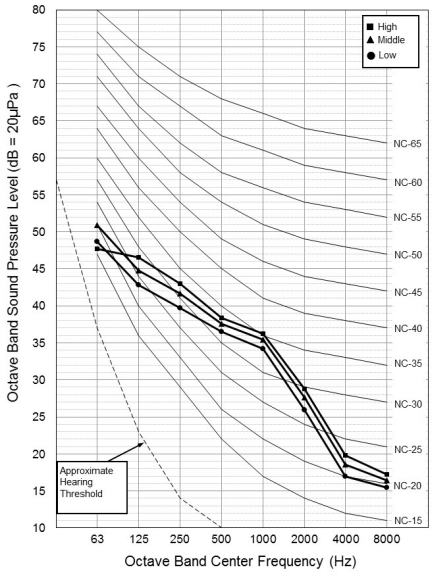
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound power levels are measured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

Table 61:Sound Pressure Levels (dB[A]).

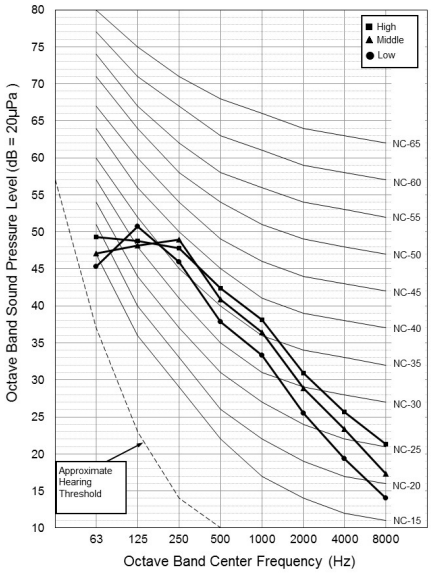
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LHN248HV	37	35	34
LHN368HV	44	42	40

Figure 156: Sound Pressure Level Diagrams.

LHN248HV



LHN368HV



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DUCT (HIGH STATIC) INDOOR UNITS

Refrigerant Flow Diagrams

Figure 157: LHN248HV and LHN368HV Refrigerant Flow Diagram.

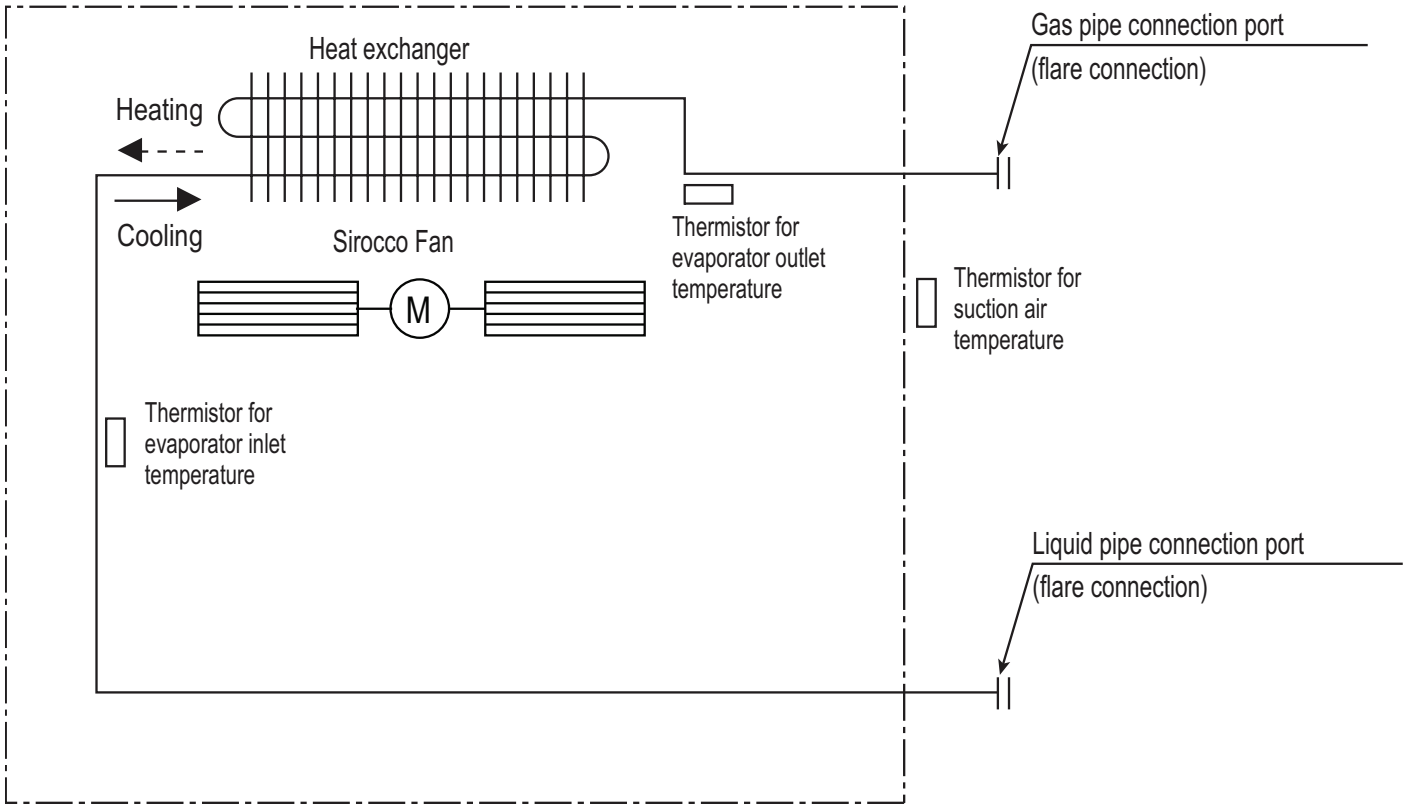

Table 62: Multi F Ceiling-Concealed Duct (High Static) IDU Refrigerant Piping and Connection Sizes.

Model No.	Piping Size		Connection Port Size	
	Liquid (inch)	Vapor (inch)	Liquid (inch)	Vapor (inch)
LHN248HV	1/4	1/2	3/8	5/8
LHN368HV	3/8	5/8	3/8	5/8

Table 63: Multi F Ceiling-Concealed Duct (High Static) 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

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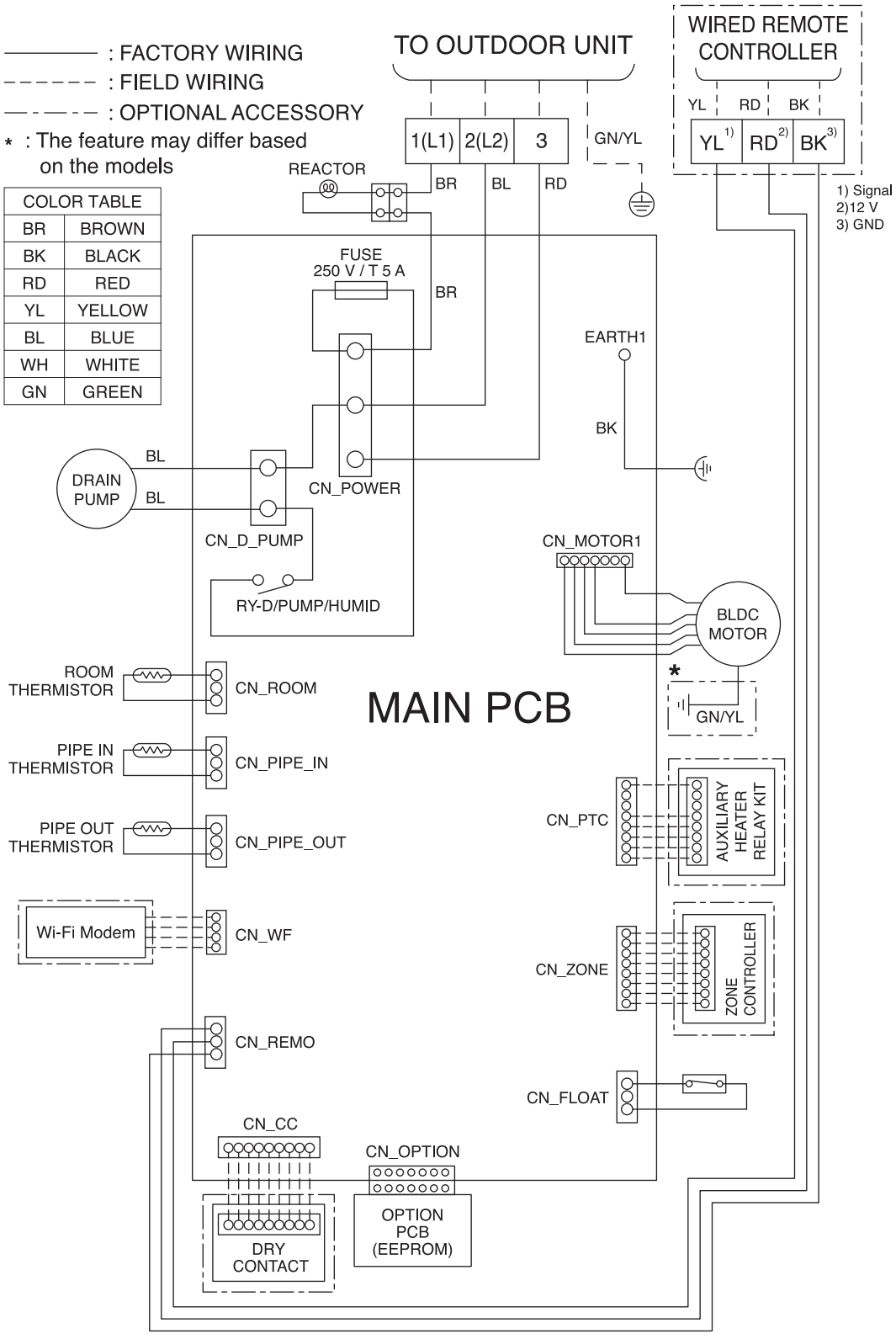
DUCT (HIGH STATIC) INDOOR UNITS

Wiring Diagrams

Figure 158: Multi F Ceiling-Concealed Duct (High Static) LHN248HV and LHN368HV Indoor Units Wiring Diagram.



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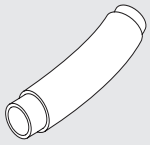
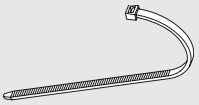
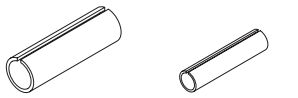
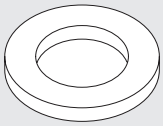
DUCT (HIGH STATIC) INDOOR UNITS

Factory Supplied Parts and Materials / Installation

Factory Supplied Parts

Table 64: Parts Table.

Part	Quantity	Image	Part	Quantity	Image
Drain Hose	One (1)		Zip Ties	Four (4)	
Metal Clamp	Two (2)		Insulation for Fittings	One (1) Set	 For Vapor Piping For Liquid Piping
Washers for Hanging Brackets	Eight (8)				

Factory Supplied Materials

- Owner's Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Torque wrenches
- Hexagonal wrench
- Gas-leak detector
- Thermometer

⚠WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit's components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

Selecting the Best Location

Do's

- Place the unit where air circulation will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient strength to bear the load of the indoor unit.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit in a location that is level, and where it can be easily connected to the outdoor unit / branch distribution unit.

⃠ Don'ts

- ⃠ *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- ⃠ *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- ⃠ *Do not install the unit near high-frequency generators.*
- ⃠ *Do not install the unit near a doorway.*

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

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DUCT (HIGH STATIC) INDOOR UNITS

Installation and Best Layout Practices

Note:

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

Installing in an Area Exposed to Unconditioned Air

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

- Verify that carpet is or will be installed (carpet will 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 159: Access Panel and General Service Space Required Dimensions.

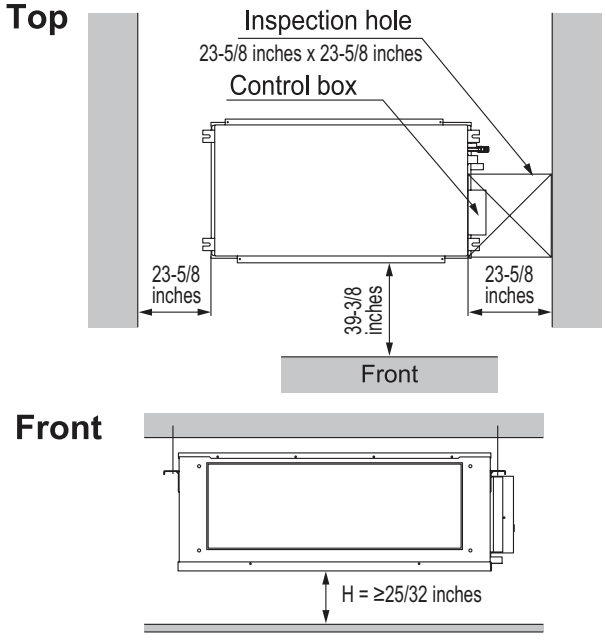

Figure 160: Indoor Unit Bolt Locations.

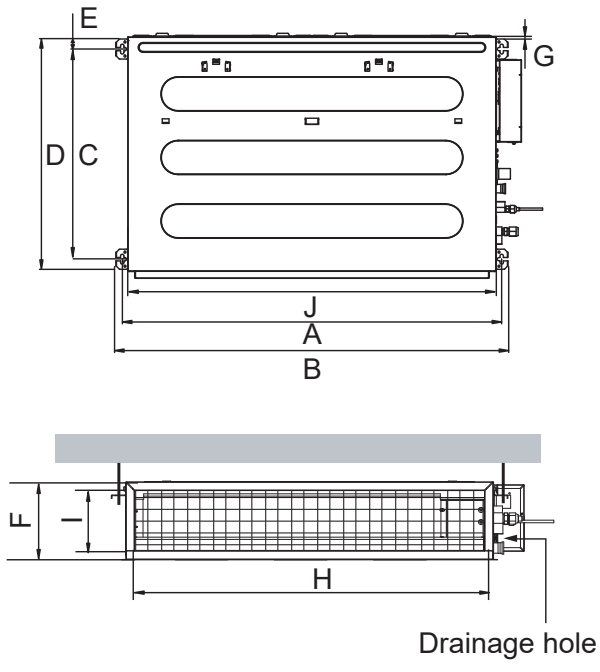

Table 65:Indoor Unit Bolt Location Dimensions.

Model / Capacity (Btu/h)	Dimensions (inches)									
	A	B	C	D	E	F	G	H	I	J
LHN248HV / 24,000	36-3/4	38-1/4	24-3/8	27-9/16	1-3/16	10-5/8	19/32	33-25/32	7-15/16	35-7/16
LHN368HV / 36,000	50-17/32	52-1/32	24-3/8	27-9/16	1-3/16	10-5/8	19/32	47-9/16	7-15/16	49-7/32

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Preparing the Installation Area and Hanging the Indoor Unit Frame

1. Select and mark the area for the suspension or console bolts (use embedded inserts or anchor bolts in new buildings, and hole-in-anchors in older buildings).
2. Drill the holes.
3. Add the set-anchor and the plate washer to the bolts (bolts must be at least 13/32 inches in diameter), and then insert the bolts into the installation area.
4. Add the plate washer, spring washer, and nut to secure the bolts into the installation area.
5. Position the indoor unit installation plates onto the bolts. Secure using nuts, plate washers, and spring washers. Adjust for level as necessary.

Figure 161: Preparing the Installation Area.

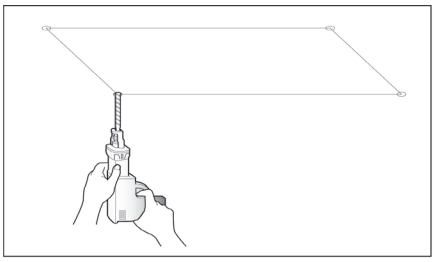


Figure 162: Suspension Bolt Options.

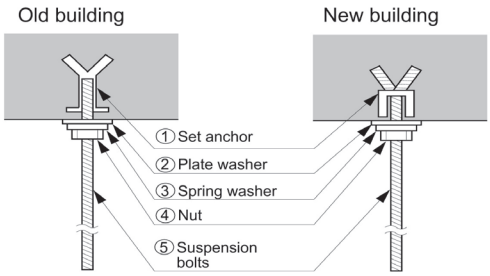
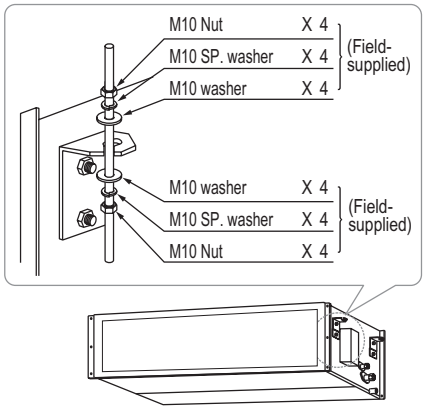


Figure 163: Hanging the Indoor Unit.



Note:

Install a canvas duct to the air outlet and air inlet so that vibration from the indoor unit does not carry to the duct or ceiling. Also, add insulation to the interior of the duct, and apply anti-vibration to the suspension bolts.

⚠ WARNING

- *Unit must be installed correctly. Tighten the nuts and bolts to prevent the unit from falling and causing severe injury or death.*

Installing the Drain System

- Drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must 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.

Figure 164:Indoor Unit Drain Piping.

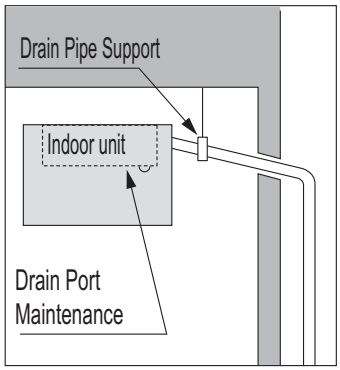
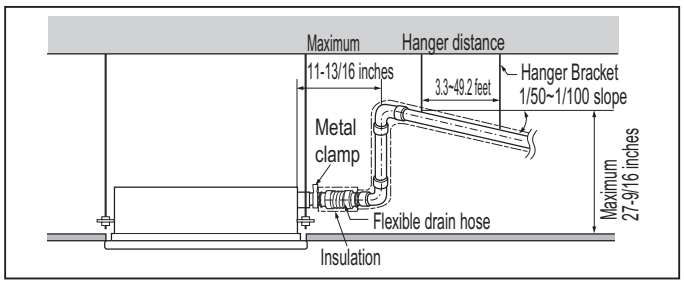
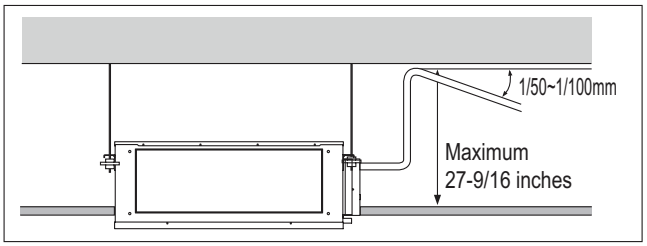


Figure 165:Drain Piping Installation Dimensions.





Note:

⃠ *Do not apply force or twist the drain hose: it will leak.*

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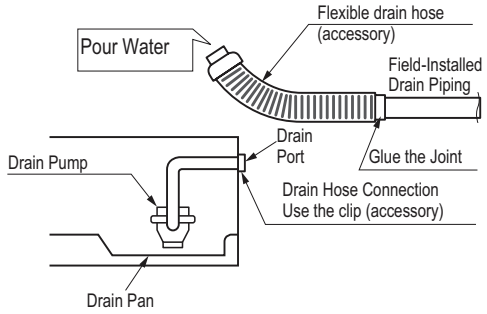
Checking the Drain Pump

The unit uses a drain pump to remove condensate. The pump must be tested before the system operates.

- Connect (field supplied) flexible drain hose to the field-installed drain piping; leave it as is until the test is complete.
- Pour water into the flexible drain hose and check for leaks.
- After power wiring installation is complete, operate the drain pump to see if it sounds and functions properly.
- After the test is complete, connect the flexible drain hose to the indoor unit drain port.

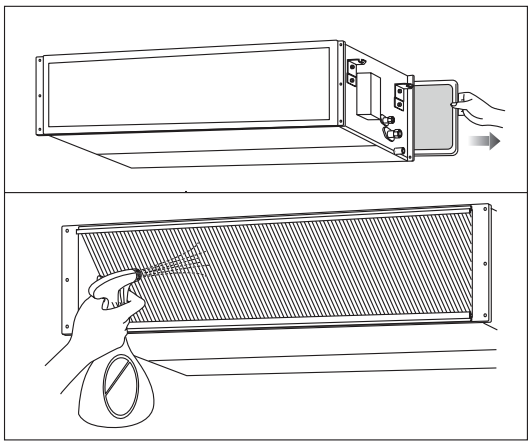
Figure 166:Checking the drain pump.



Checking the Drainage System

1. Remove the air filter.
2. Check the drainage.
   - Spray water on the evaporator.
   - Verify that water flows through the indoor unit drain hose without leaking.

Figure 167:Checking the Drainage System.



Insulating the Refrigerant and Drain Piping

⚠ WARNING

Ensure all piping is insulated. Exposed piping can cause burns if touched.

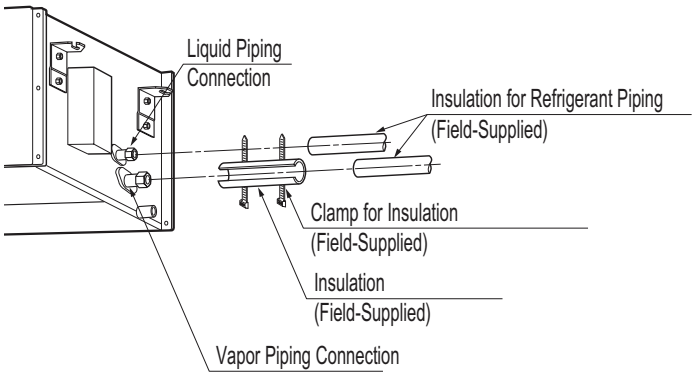
Refrigerant Piping Insulation

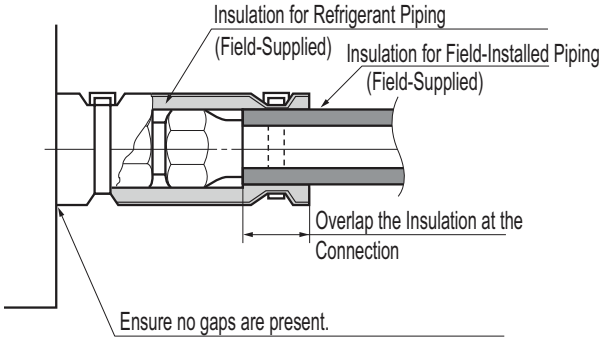
Field-installed vapor and liquid refrigerant piping lines must be properly and completely covered in insulation (up to the indoor unit piping connections). Any exposed piping will generate condensate or will cause burns if touched. Insulation for this field-installed refrigerant piping must have a minimum heat resistance of 248°F.

Drain Piping Insulation

Drain piping must have insulation a minimum of 7/32 inches thick.

Figure 168: Insulating the Piping.





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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

• Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

Connecting the Power Wiring and Communications Cable

1. To access the terminal block, first unscrew the cover from the control box.

2. Insert the power wiring / communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) 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.

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 or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

4. Secure the power wiring / communications cable with the cable restraint.

5. Screw the steel clamp to the inside of the control panel.
   - Place the wiring / cables in the clamp and tighten the plastic clamp to an open surface of the control panel.
   - When clamping, ⃠ do not apply force to the wiring connections.
   - Neatly arrange the wiring, ⃠ do not catch the wiring in the electric box cover, and ensure 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 169:Accessing the Indoor Unit Terminal Block.

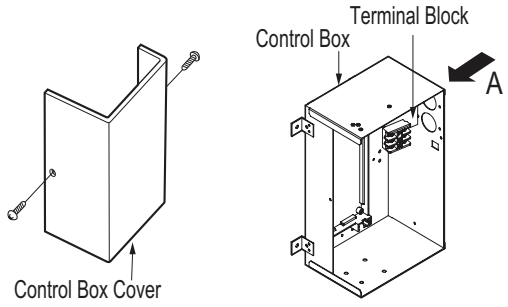
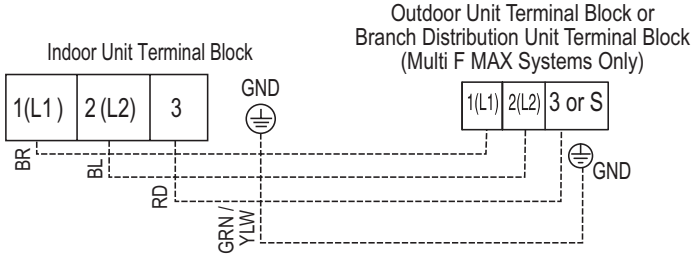


Figure 170:Indoor Unit to Outdoor Unit / Branch Distribution Unit (Multi F MAX systems only) Power Wiring / Communications Cable Connections.



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DUCT (HIGH STATIC) INDOOR UNITS

Installation and Best Layout Practices

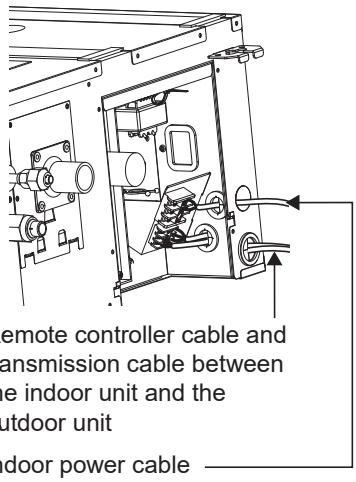
Using a Conduit

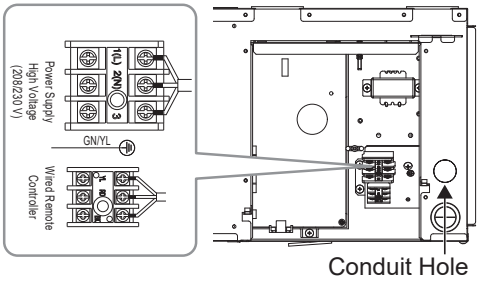
1. Remove the rubber stopper on the indoor unit. Pass the power wiring / communications cable through the conduit, the conduit mounting plate, and to / through the control panel of the indoor unit.
2. Connect the power wiring / communications cable to the indoor unit terminal block.
3. Screw the conduit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

Note:

If the distance between the outdoor unit and indoor unit is greater than 131 feet, connect the power wiring and communications cable separately (i.e., a conduit cannot be used).

Figure 171:Exterior View of Conduit Installation.





Controller Options

Ceiling-concealed duct (high static) indoor units can be used with many LG-supplied wired controllers (sold separately). The wireless hand-held controller (Model No. PQWRHQ0FDB) is also an optional accessory with use of the wired controller.

Wired Controller Connections

Controllers can connect to the indoor unit in one of two different ways.

1. LG Wired Remote Extension Cable with Molex plug (PZCWRC1; sold separately) that connects to the CN-REMO terminal on the indoor unit PCB.

2. Field-supplied controller cable that connects to the indoor unit terminal block (must be at least UL2547 or UL1007, 22 AWG, two-core, one-shield core, at least FT-6 rated if local electric and building codes require plenum cable usage).

Figure 172:PZCWRC1 LG Wired Remote Extension Cable.

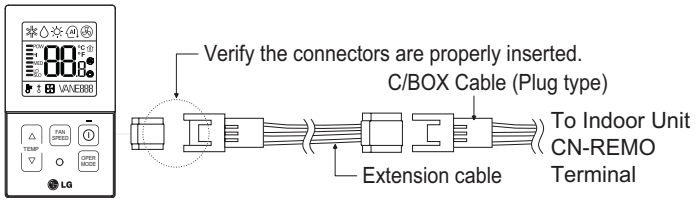
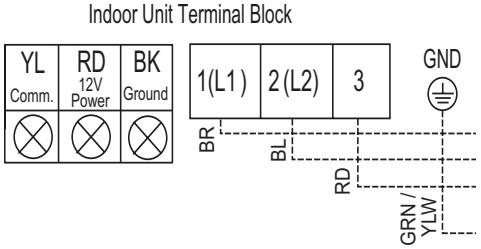


Figure 173:Wired Controller Connections on the Indoor Unit Terminal Block.



Note:

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

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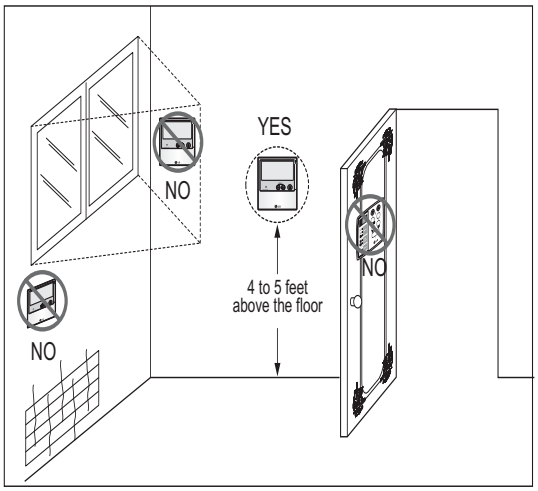
Wired Controller Placement

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

⃠ Do not install the wired controller near or in:

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

Figure 174:Proper Location for the Wired Controller.



Hanging the Wired Controller

1. The controller wiring / cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring / cable on applicable side.

2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring / cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 175:Removing the Cable Guide Grooves.

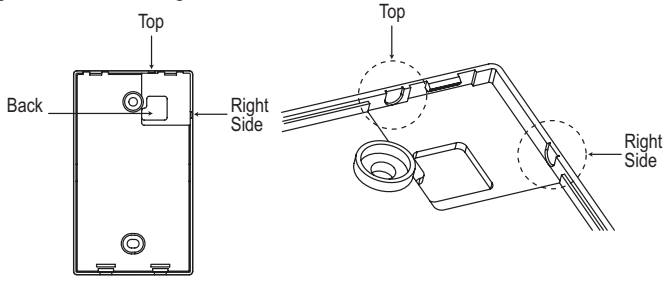


Figure 176:Attaching the Wall Plate.

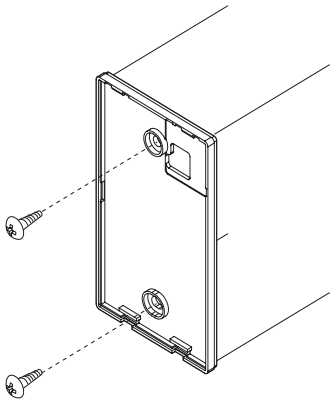
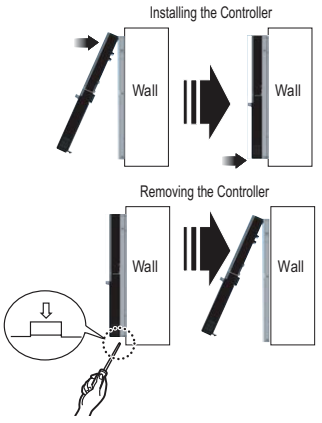


Figure 177:Installing / Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

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External Static Pressure Control

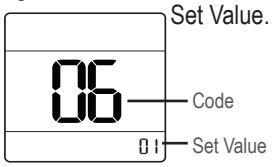
To provide a required air flow rate that accounts for the external static pressure change, follow the steps below.

1. To access system installer setting mode, press and hold the temperature increase and mode selection buttons simultaneously for approximately three (3) seconds. Choose setting code value “06” by pressing the mode selection button.

2. Use the temperature increase and decrease buttons to select the desired setting value.

   Setting Values
   01 : V-H
   02 : F-H
   03 : V-L
   04 : F-L

Figure 178:Select Code and Set Value.



3. Press the on / off button to save the established settings.

4. To deactivate system installer setting mode after the settings have been established, press and hold the temperature increase and mode selection check buttons simultaneously for approximately three (3) seconds. If a button is not pressed for more than 25 seconds, the system installer setting mode will automatically deactivate.

Figure 179:Controller External Static Pressure Setting Display.

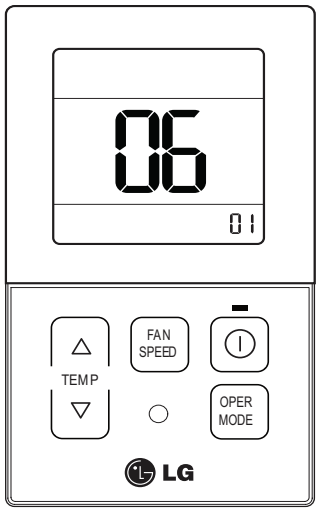


Table 66:Static Pressure Setting Table.

Pressure Selection		Function	
		Zone State	External Static Pressure Standard Value
01	V-H	Variable	High
02	F-H	Fixed	High
03	V-L	Variable	Low
04	F-L	Fixed	Low

Note:

- *Select the position after verifying duct work and the external static pressure of the indoor unit.*
- *Factory set to pressure selection F-H.*

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Assigning Air Flow

To assign an air flow for each fan speed, follow the steps below.

1. To access system installer setting mode, press and hold the temperature increase and mode selection buttons simultaneously for approximately three (3) seconds. Choose setting code value “03” by pressing the mode selection button.

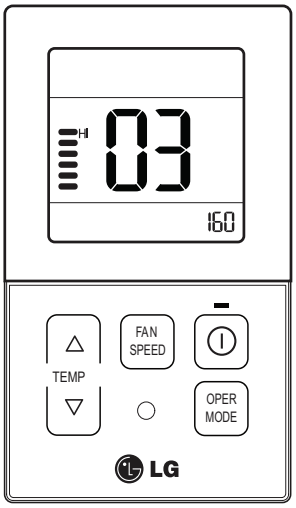
2. Use the fan speed button to select the desired fan speed. (Lo→Med→Hi will display on the LED).

3. Use the temperature increase and decrease buttons to select the desired external static pressure setting value (thereby assigning the respective airflow). External static pressure value range: 0~255; the value will display near the lower right corner of the LED.

4. Press the on / off button to save the established settings.

5. To deactivate system installer setting mode after the settings have been established, press and hold the temperature increase and mode selection check buttons simultaneously for approximately three (3) seconds. If a button is not pressed for more than 25 seconds, the system installer setting mode will automatically deactivate.

Figure 180:Controller External Static Pressure Setting Display.



Note:

- *A certified technician must set the external static pressure value(s). If the external static pressure is set incorrectly, the system will malfunction.*
- *⃠ Do not alter the external static pressure value that corresponds to each air flow level.*
- *External static pressure value can vary depending on the indoor unit.*
- *If by pressing the fan speed button during external static pressure setup, the fan speed is raised to the next level, the air flow value of the previous fan speed will be maintained (external static pressure setting value is saved).*

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FOUR-WAY CEILING-CASSETTE INDOOR UNIT DATA

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“General Data / Specifications” on page 137
“Dimensions” on page 138
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“Acoustic Data” on page 144
“Air Velocity and Temperature Distribution” on page 146
“Refrigerant Flow Diagram” on page 148
“Wiring Diagram” on page 149
“Factory Supplied Parts and Materials” on page 150
“Installation and Best Layout Practices” on page 151

FOUR-WAY CEILING CASSETTE INDOOR UNITS

Mechanical Specifications and Features

MULTI F
MULTI F MAX

Four-Way Ceiling-Cassette Indoor Units

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, fan, and motor. Four-way ceiling-cassette units have a sound rating no higher than 38 dB(A) as tested per KSA0701 ISO Standard 3745.

Coil

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

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare, and all refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

The 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.

Ventilation Air

The case has a factory designated knockouts to connect a field-supplied, pressurized, and filtered outside air duct.

Fan Assembly and Control

All indoor units have a single, direct-drive turbo fan. Fans are manufactured of high-strength ABS HT-700 polymeric resin that is 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 setpoint and space temperature.

Air Filter

Return air is filtered with a factory-supplied, 14" x 14" x 1", removable, washable filter accessible from the bottom of the unit.

Architectural Grille

An 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.

Figure 181:Multi F Four-Way Ceiling-Cassette Indoor Unit.

Airflow Guide Vanes

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.

Microprocessor Control

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

The indoor units are Wi-Fi compatible with the addition of an LG Wi-Fi module accessory, and can be controlled by LG's Smart ThinQ™ app on a smart device. A field-supplied Wi-Fi network and smart device are required. The Smart ThinQ app is free, and is available for Android™ and iOS. (Android is a trademark of Google LLC.)

Controls

The indoor unit casing has a factory-standard, integral infrared sensor designed to communicate with the supplied LG wireless handheld remote controller. An optional wired controller is available as an additional accessory. Communication between the indoor units and the outdoor unit is accomplished through 14 AWG, four-core, stranded and shielded power / communication cable.

Condensate Lift/Pump

The indoor unit is provided with a factory installed and wired internal condensate lift/pump capable of providing a minimum 27.5 inch 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.

Features

- Inverter (Variable speed fan)
- Internal drain pump
- Jet cool
- Control lock function
- Auto operation
- Auto restart operation
- 24-Hour on/off timer
- Two thermistor control
- Required accessory grille (PT-QCHW0) sold separately
- Group Control
- Wireless LCD remote control included; wired thermostat available (sold separately)
- Wi-Fi compatible

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FOUR-WAY CEILING-CASSETTE INDOOR UNITS

General Data / Specifications

Table 73:Multi F Four-Way Ceiling-Cassette Indoor Unit General Data.

Model Name	LMCN078HV	LCN098HV4	LCN128HV4	LCN188HV4
Grille (Sold Separately)	PT-QCHW0	PT-QCHW0	PT-QCHW0	PT-QCHW0
Nominal Cooling Capacity (Btu/h)[1]	7,000	9,000	12,000	18,000
Nominal Heating Capacity (Btu/h)[1]	8,100	10,400	13,800	20,800
Operating Range				
Cooling (°F WB)	57-77			
Heating (°F DB)	59-81			
Fan				
Type	Turbo			
Motor Output (W) x Qty.	43 x 1			
Motor/Drive	Brushless Digitally Controlled / Direct			
Airflow Rate CFM (H/M/L)	265 / 212 / 177	300 / 265 / 230	335 / 283 / 247	459 / 424 / 388
Unit Data				
Refrigerant Type[2]	R410A			
Refrigerant Control	EEV			
Power Supply V, Ø, Hz[3]	208-230, 1, 60			
Rated Amps (A)	0.25			
Sound Pressure Level dB(A) (H/M/L)[4]	31 / 27 / 24	36 / 33 / 30	38 / 35 / 32	41 / 39 / 36
Body Dimensions (W x H x D, in.)	22-7/16 x 8-7/16 x 22-7/16			22-7/16 x 10-3/32 x 22-7/16
Grille (Sold separately) Dimensions (WxHxD, in.)	27-9/16 x 7/8 x 27-9/16			
Body Net Weight (lbs.)	26	29		32
Grille (Sold separately) Net Weight (lbs.)	7			
Body Shipping Weight (lbs.)	31	34		39
Grille (Sold separately) Shipping Weight (lbs.)	9			
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 14			
Heat Exchanger (Row x Column x Fin / inch) x Number	(1 X 8 X 18) X 1	(2 x 8 x 18) x 1		(2 x 10 x 18) x 1
Pipe Size				
Liquid (in.)	1/4			
Vapor (in.)	3/8			1/2
Connection Size				
Liquid (in.)	1/4			
Vapor (in.)	3/8			1/2
Drain O.D. / I.D. (in.)	1-1/4, 1			

[1]Nominal capacity is rated 0 ft. above sea level with a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs be minimum 14 AWG, 4-conductor, stranded, shielded or unshielded (if shielded, must be grounded to chassis at ODU only) and must comply with applicable local and national codes.

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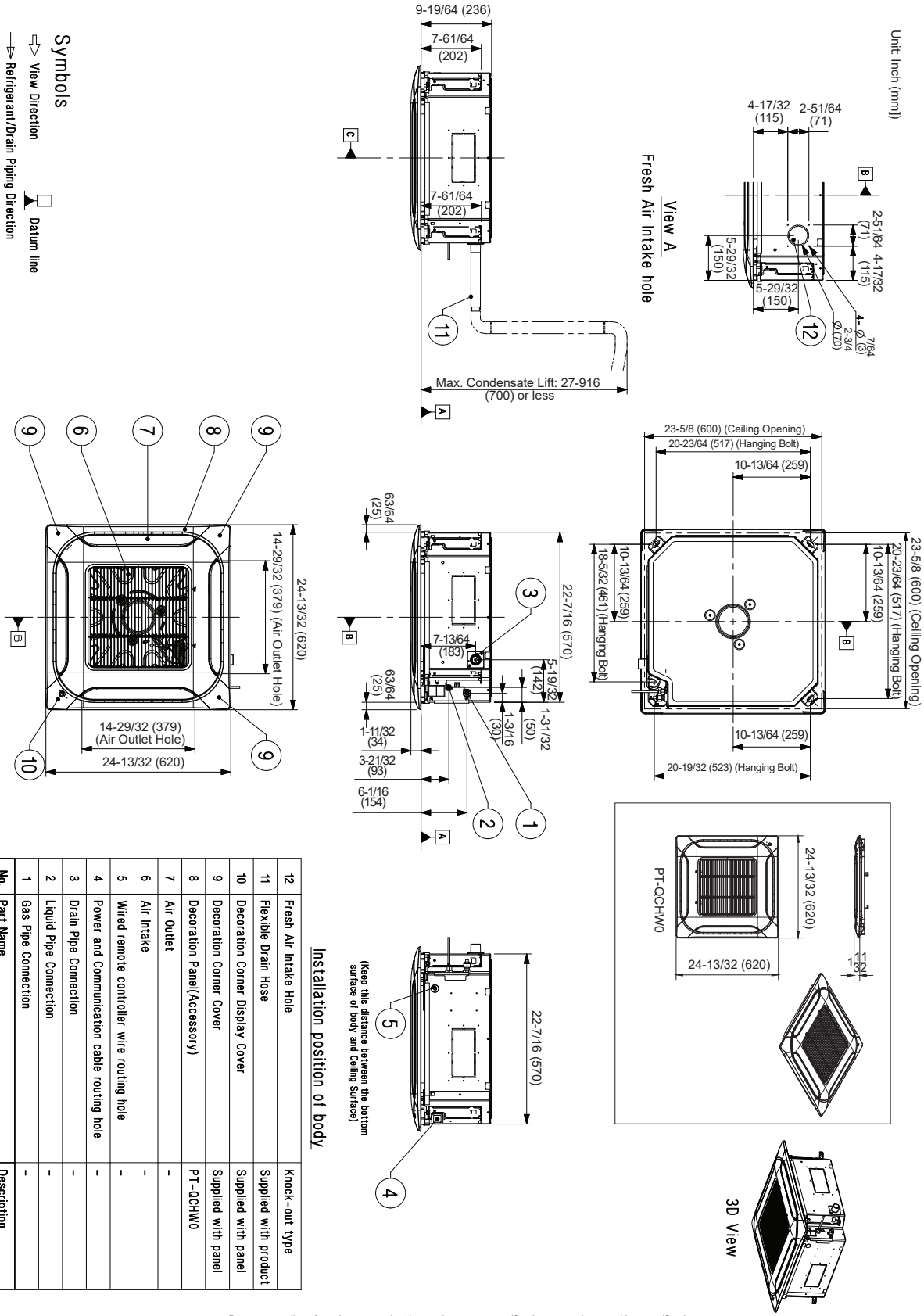
FOUR-WAY CEILING-CASSETTE INDOOR UNITS

MULTI F
MULTI F MAX

Dimensions

Figure 182:LMCN078HV, LCN098HV4, and LCN128HV4 Dimensions.



Installation position of body

No.	Part Name	Description
1	Gas Pipe Connection	-
2	Liquid Pipe Connection	-
3	Drain Pipe Connection	-
4	Power and Communication cable routing hole	-
5	Wired remote controller wire routing hole	-
6	Air Intake	-
7	Air Outlet	-
8	Decoration Panel(Accessory)	PT-QCHW0
9	Decoration Corner Cover	Supplied with panel
10	Decoration Corner Display Cover	Supplied with panel
11	Flexible Drain Hose	Supplied with product
12	Fresh Air Intake Hole	Knock-out type

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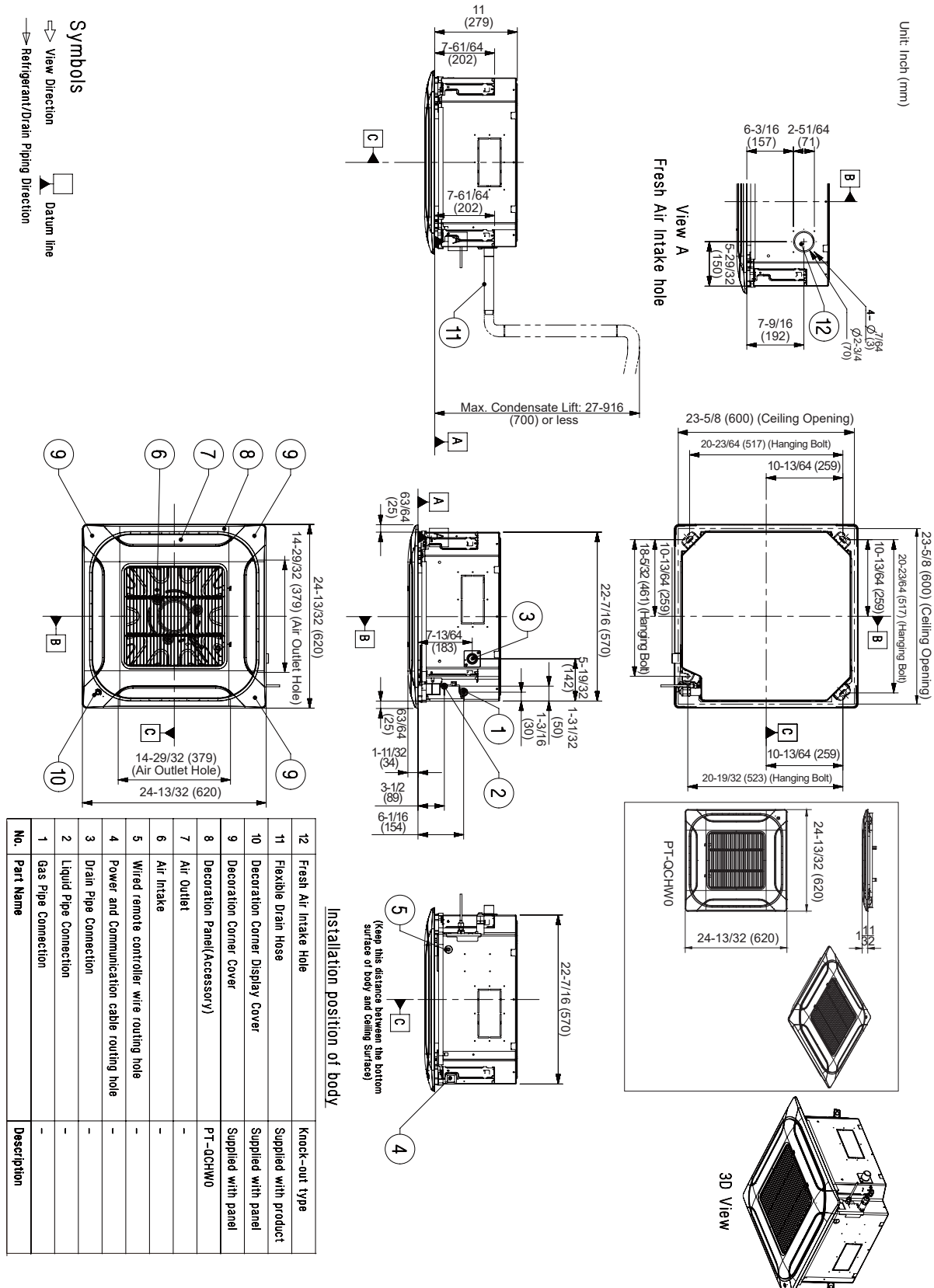
FOUR-WAY CEILING-CASSETTE INDOOR UNITS

Dimensions

Figure 183:LCN188HV4 Dimensions.



Installation position of body

No.	Part Name	Description
1	Gas Pipe Connection	-
2	Liquid Pipe Connection	-
3	Drain Pipe Connection	-
4	Power and Communication cable routing hole	-
5	Wired remote controller wire routing hole	-
6	Air Intake	-
7	Air Outlet	-
8	Decoration Panel(Accessory)	PT-QCHW0
9	Decoration Corner Cover	Supplied with panel
10	Decoration Corner Display Cover	Supplied with panel
11	Flexible Drain Hose	Supplied with product
12	Fresh Air Intake Hole	Knock-out type

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FOUR-WAY CEILING CASSETTE INDOOR UNITS

MULTI F
MULTI F MAX

Cooling Capacity Table

Table 74:Multi F Four-Way Ceiling-Cassette Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LMCN078HV 7,000	14	6.86	4.87	7.29	5.15	7.71	4.99	8.02	5.09	8.57	5.13	8.99	5.23
	20	6.86	4.91	7.28	5.19	7.71	5.02	8.02	5.13	8.56	5.17	8.99	5.27
	25	6.85	4.95	7.28	5.23	7.70	5.06	8.01	5.17	8.55	5.21	8.98	5.31
	30	6.85	4.99	7.27	5.27	7.70	5.10	8.00	5.21	8.55	5.25	8.97	5.35
	35	6.84	5.03	7.27	5.31	7.69	5.14	8.00	5.25	8.54	5.29	8.97	5.39
	40	6.84	5.06	7.26	5.35	7.68	5.18	7.99	5.29	8.53	5.33	8.96	5.43
	45	6.83	5.10	7.25	5.39	7.68	5.22	7.99	5.33	8.53	5.37	8.95	5.47
	50	6.83	5.14	7.25	5.43	7.67	5.26	7.98	5.37	8.52	5.41	8.94	5.52
	55	6.82	5.18	7.24	5.47	7.67	5.30	7.97	5.41	8.51	5.45	8.94	5.56
	60	6.81	5.21	7.24	5.51	7.66	5.33	7.97	5.45	8.51	5.49	8.93	5.60
	65	6.81	5.25	7.23	5.55	7.66	5.37	7.96	5.49	8.50	5.53	8.92	5.64
	70	6.80	5.29	7.23	5.59	7.65	5.41	7.95	5.52	8.49	5.57	8.92	5.68
	75	6.64	5.20	7.06	5.50	7.48	5.33	7.79	5.45	8.33	5.50	8.75	5.61
	80	6.48	5.11	6.90	5.42	7.32	5.26	7.62	5.38	8.16	5.43	8.58	5.55
	85	6.31	5.02	6.73	5.33	7.15	5.17	7.46	5.30	7.99	5.36	8.41	5.48
	90	6.15	4.93	6.57	5.23	6.99	5.09	7.29	5.21	7.83	5.29	8.24	5.40
	95	5.98	4.87	6.39	5.19	6.81	5.05	**7.00**	**5.10**	7.64	5.26	8.06	5.38
	100	5.83	4.74	6.25	5.05	6.66	4.93	6.91	5.02	7.50	5.14	7.91	5.27
	105	5.69	4.61	6.10	4.92	6.52	4.81	6.82	4.94	7.35	5.03	7.77	5.16
	110	5.54	4.46	5.96	4.76	6.37	4.66	6.67	4.79	7.21	4.89	7.62	5.02
	115	5.39	4.32	5.81	4.63	6.23	4.54	6.53	4.67	7.06	4.77	7.48	4.90
	118	5.31	4.29	5.72	4.60	6.14	4.52	6.44	4.65	6.97	4.76	7.39	4.89
	122	5.28	4.28	5.69	4.59	6.11	4.51	6.41	4.64	6.94	4.75	7.36	4.89
LCN098HV4 9,000	14	8.82	6.31	9.37	6.66	9.92	6.45	10.31	6.59	11.01	6.64	11.56	6.77
	20	8.82	6.36	9.36	6.72	9.91	6.50	10.31	6.64	11.01	6.70	11.55	6.82
	25	8.81	6.41	9.36	6.77	9.90	6.55	10.30	6.69	11.00	6.75	11.54	6.87
	30	8.80	6.46	9.35	6.82	9.90	6.60	10.29	6.74	10.99	6.80	11.54	6.93
	35	8.80	6.50	9.34	6.87	9.89	6.65	10.28	6.79	10.98	6.85	11.53	6.98
	40	8.79	6.55	9.33	6.92	9.88	6.70	10.27	6.84	10.97	6.90	11.52	7.03
	45	8.78	6.60	9.33	6.97	9.87	6.75	10.27	6.90	10.96	6.95	11.51	7.09
	50	8.78	6.65	9.32	7.03	9.87	6.80	10.26	6.95	10.96	7.00	11.50	7.14
	55	8.77	6.70	9.31	7.08	9.86	6.85	10.25	7.00	10.95	7.06	11.49	7.19
	60	8.76	6.75	9.31	7.13	9.85	6.90	10.24	7.05	10.94	7.11	11.48	7.24
	65	8.76	6.80	9.30	7.18	9.84	6.95	10.24	7.10	10.93	7.16	11.47	7.29
	70	8.75	6.85	9.29	7.23	9.84	7.00	10.23	7.15	10.92	7.21	11.47	7.35
	75	8.54	6.73	9.08	7.12	9.62	6.90	10.01	7.05	10.71	7.12	11.25	7.26
	80	8.33	6.62	8.87	7.01	9.41	6.80	9.80	6.96	10.49	7.03	11.03	7.18
	85	8.12	6.50	8.66	6.89	9.20	6.70	9.59	6.85	10.28	6.94	10.82	7.09
	90	7.91	6.37	8.45	6.77	8.99	6.59	9.37	6.75	10.06	6.84	10.60	6.99
	95	7.68	6.31	8.22	6.71	8.75	6.54	9.00	6.60	9.83	6.80	10.36	6.96
	100	7.50	6.14	8.03	6.54	8.57	6.38	8.88	6.50	9.64	6.66	10.17	6.82
	105	7.31	5.97	7.84	6.37	8.38	6.23	8.77	6.40	9.45	6.51	9.99	6.68
	110	7.12	5.77	7.66	6.17	8.19	6.03	8.58	6.20	9.26	6.33	9.80	6.50
	115	6.94	5.59	7.47	5.99	8.01	5.87	8.39	6.05	9.08	6.18	9.61	6.35
	118	6.82	5.55	7.36	5.96	7.89	5.84	8.28	6.02	8.96	6.15	9.50	6.33
	122	6.79	5.54	7.32	5.94	7.86	5.83	8.24	6.01	8.93	6.15	9.46	6.32

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 columns and rows indicate reference data. When operating at this temperature, these values can be different if the system is not running consistently.

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FOUR-WAY CEILING CASSETTE INDOOR UNITS

Cooling Capacity Table

Table 75:Multi F Four-Way Ceiling-Cassette Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LCN128HV4 12,000	14	11.76	8.51	12.49	8.99	13.22	8.70	13.75	8.88	14.69	8.96	15.42	9.13
	20	11.75	8.57	12.48	9.06	13.21	8.77	13.74	8.95	14.67	9.03	15.40	9.20
	25	11.75	8.64	12.48	9.13	13.20	8.84	13.73	9.02	14.66	9.10	15.39	9.27
	30	11.74	8.71	12.47	9.20	13.19	8.90	13.72	9.09	14.65	9.17	15.38	9.34
	35	11.73	8.77	12.46	9.27	13.18	8.97	13.71	9.16	14.64	9.24	15.37	9.41
	40	11.72	8.84	12.45	9.34	13.17	9.04	13.70	9.23	14.63	9.31	15.36	9.48
	45	11.71	8.90	12.44	9.41	13.16	9.11	13.69	9.30	14.62	9.38	15.35	9.55
	50	11.70	8.97	12.43	9.47	13.15	9.17	13.68	9.37	14.61	9.45	15.33	9.62
	55	11.69	9.03	12.42	9.54	13.14	9.24	13.67	9.44	14.60	9.52	15.32	9.70
	60	11.68	9.10	12.41	9.61	13.13	9.31	13.66	9.50	14.59	9.58	15.31	9.77
	65	11.67	9.17	12.40	9.68	13.12	9.38	13.65	9.57	14.57	9.65	15.30	9.84
	70	11.66	9.23	12.39	9.75	13.11	9.44	13.64	9.64	14.56	9.72	15.29	9.91
	75	11.38	9.08	12.11	9.60	12.83	9.31	13.35	9.51	14.27	9.60	15.00	9.79
	80	11.10	8.92	11.82	9.45	12.55	9.17	13.07	9.38	13.99	9.48	14.71	9.68
	85	10.83	8.76	11.54	9.29	12.26	9.03	12.78	9.24	13.70	9.36	14.42	9.56
	90	10.55	8.60	11.26	9.13	11.98	8.88	12.50	9.10	13.42	9.22	14.13	9.43
	95	10.25	8.51	10.96	9.05	11.67	8.82	12.00	8.90	13.10	9.18	13.81	9.39
	100	10.00	8.28	10.71	8.82	11.42	8.61	11.84	8.76	12.85	8.98	13.56	9.20
	105	9.75	8.05	10.46	8.59	11.17	8.40	11.69	8.62	12.60	8.78	13.31	9.01
	110	9.50	7.77	10.21	8.31	10.92	8.14	11.44	8.37	12.35	8.53	13.07	8.76
	115	9.25	7.54	9.96	8.08	10.67	7.92	11.19	8.15	12.10	8.33	12.82	8.56
	118	9.10	7.49	9.81	8.03	10.52	7.88	11.04	8.12	11.95	8.30	12.67	8.54
	122	9.05	7.47	9.76	8.01	10.48	7.87	10.99	8.11	11.90	8.29	12.62	8.53
LCN188HV4 18,000	14	17.65	12.33	18.74	13.02	19.84	12.61	20.63	12.88	22.03	12.98	23.12	13.23
	20	17.63	12.43	18.73	13.13	19.82	12.71	20.61	12.98	22.01	13.09	23.11	13.33
	25	17.62	12.52	18.71	13.23	19.81	12.81	20.60	13.08	22.00	13.19	23.09	13.44
	30	17.60	12.62	18.70	13.33	19.79	12.91	20.58	13.18	21.98	13.29	23.07	13.54
	35	17.59	12.71	18.68	13.43	19.78	13.00	20.57	13.28	21.96	13.39	23.05	13.64
	40	17.58	12.81	18.67	13.53	19.76	13.10	20.55	13.38	21.94	13.49	23.04	13.75
	45	17.56	12.90	18.66	13.63	19.75	13.20	20.53	13.48	21.93	13.59	23.02	13.85
	50	17.55	13.00	18.64	13.73	19.73	13.30	20.52	13.58	21.91	13.69	23.00	13.95
	55	17.54	13.10	18.63	13.83	19.72	13.39	20.50	13.68	21.89	13.79	22.98	14.05
	60	17.52	13.19	18.61	13.93	19.70	13.49	20.49	13.78	21.88	13.89	22.97	14.16
	65	17.51	13.29	18.60	14.03	19.69	13.59	20.47	13.87	21.86	13.99	22.95	14.26
	70	17.50	13.38	18.58	14.13	19.67	13.69	20.46	13.97	21.84	14.09	22.93	14.36
	75	17.08	13.16	18.16	13.92	19.24	13.49	20.03	13.79	21.41	13.92	22.50	14.20
	80	16.66	12.93	17.74	13.70	18.82	13.30	19.60	13.60	20.98	13.75	22.06	14.03
	85	16.24	12.70	17.32	13.47	18.40	13.09	19.17	13.40	20.55	13.56	21.63	13.85
	90	15.82	12.46	16.90	13.23	17.97	12.88	18.75	13.19	20.12	13.37	21.20	13.67
	95	15.37	12.33	16.44	13.12	17.51	12.78	**18.00**	**12.90**	19.65	13.30	20.72	13.61
	100	14.99	12.00	16.06	12.78	17.13	12.47	17.77	12.70	19.28	13.01	20.35	13.33
	105	14.62	11.67	15.69	12.45	16.76	12.17	17.53	12.50	18.90	12.73	19.97	13.05
	110	14.24	11.27	15.32	12.05	16.39	11.79	17.16	12.13	18.53	12.36	19.60	12.70
	115	13.87	10.93	14.94	11.71	16.01	11.48	16.79	11.82	18.15	12.07	19.22	12.41
	118	13.65	10.85	14.72	11.64	15.79	11.42	16.56	11.77	17.93	12.03	19.00	12.37
	122	13.57	10.83	14.64	11.62	15.71	11.40	16.49	11.75	17.85	12.01	18.92	12.36

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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FOUR-WAY CEILING-CASSETTE INDOOR UNITS

Heating Capacity Table

Table 76:Multi F Four-Way Ceiling-Cassette Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LMCN078HV 7,000	0	-0.4	4.17	4.11	4.07	4.05	3.99	3.82
	5	4.5	4.70	4.64	4.60	4.58	4.52	4.34
	10	9	5.22	5.17	5.13	5.11	5.05	4.87
	17	15	5.93	5.87	5.83	**5.81**	5.75	5.56
	20	19	6.19	6.13	6.09	6.08	6.02	5.81
	25	23	6.63	6.57	6.53	6.52	6.46	6.22
	30	28	7.01	6.96	6.92	6.90	6.84	6.63
	35	32	7.40	7.34	7.30	7.28	7.22	7.04
	40	36	7.74	7.68	7.64	7.62	7.56	7.39
	45	41	8.08	8.02	7.98	7.96	7.90	7.73
	47	43	8.22	8.16	8.12	**8.10**	8.04	7.87
	50	46	8.35	8.29	8.25	8.23	8.17	7.98
	55	51	8.57	8.51	8.47	8.45	8.39	8.16
	60	56	8.57	8.51	8.47	8.45	8.39	8.20
	63	59	8.57	8.51	8.47	8.45	8.39	8.22
	68	64	8.57	8.51	8.47	8.45	8.39	8.25
LCN098HV4 9,000	0	-0.4	5.35	5.28	5.23	5.20	5.12	4.90
	5	4.5	6.03	5.95	5.90	5.88	5.80	5.58
	10	9	6.71	6.63	6.58	6.56	6.48	6.26
	17	15	7.61	7.54	7.49	7.46	7.39	7.14
	20	19	7.95	7.88	7.83	7.80	7.72	7.46
	25	23	8.52	8.44	8.39	8.37	8.29	7.99
	30	28	9.01	8.93	8.88	8.86	8.78	8.52
	35	32	9.50	9.42	9.37	9.34	9.27	9.04
	40	36	9.94	9.86	9.81	9.78	9.71	9.48
	45	41	10.37	10.30	10.25	10.22	10.15	9.92
	47	43	10.55	10.48	10.43	10.40	10.32	10.10
	50	46	10.72	10.64	10.59	10.57	10.49	10.24
	55	51	11.00	10.93	10.88	10.85	10.78	10.48
	60	56	11.00	10.93	10.88	10.85	10.78	10.52
	63	59	11.00	10.93	10.88	10.85	10.78	10.55
	68	64	11.00	10.93	10.88	10.85	10.78	10.60

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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FOUR-WAY CEILING-CASSETTE INDOOR UNITS

Heating Capacity Table

Table 77:Multi F Four-Way Ceiling-Cassette Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LCN128HV4 12,000	0	-0.4	7.10	7.00	6.93	6.90	6.80	6.50
	5	4.5	8.00	7.90	7.83	7.80	7.70	7.40
	10	9	8.90	8.80	8.73	8.70	8.60	8.30
	17	15	10.10	10.00	9.93	9.90	9.80	9.48
	20	19	10.55	10.45	10.38	10.35	10.25	9.90
	25	23	11.30	11.20	11.13	11.10	11.00	10.60
	30	28	11.95	11.85	11.78	11.75	11.65	11.30
	35	32	12.60	12.50	12.43	12.40	12.30	12.00
	40	36	13.18	13.08	13.02	12.98	12.88	12.58
	45	41	13.77	13.67	13.60	13.57	13.47	13.17
	47	43	14.00	13.90	13.83	13.80	13.70	13.40
	50	46	14.23	14.13	14.06	14.03	13.93	13.59
	55	51	14.60	14.50	14.43	14.40	14.30	13.90
	60	56	14.60	14.50	14.43	14.40	14.30	13.96
	63	59	14.60	14.50	14.43	14.40	14.30	14.00
	68	64	14.60	14.50	14.43	14.40	14.30	14.06
LCN188HV4 18,000	0	-0.4	10.70	10.55	10.45	10.40	10.25	9.80
	5	4.5	12.06	11.91	11.81	11.76	11.61	11.15
	10	9	13.41	13.26	13.16	13.11	12.96	12.51
	17	15	15.22	15.07	14.97	**14.92**	14.77	14.29
	20	19	15.90	15.75	15.65	15.60	15.45	14.92
	25	23	17.03	16.88	16.78	16.73	16.58	15.98
	30	28	18.01	17.86	17.76	17.71	17.56	17.03
	35	32	18.99	18.84	18.74	18.69	18.54	18.09
	40	36	19.87	19.72	19.62	19.57	19.42	18.97
	45	41	20.75	20.60	20.50	20.45	20.30	19.85
	47	43	21.10	20.95	20.85	**20.80**	20.65	20.20
	50	46	21.44	21.29	21.19	21.14	20.99	20.48
	55	51	22.01	21.86	21.75	21.70	21.55	20.95
	60	56	22.01	21.86	21.75	21.70	21.55	21.04
	63	59	22.01	21.86	21.75	21.70	21.55	21.10
	68	64	22.01	21.86	21.75	21.70	21.55	21.20

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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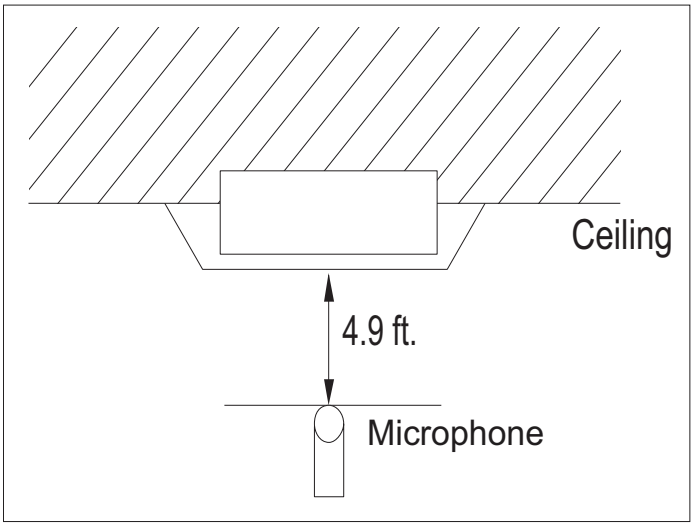
FOUR-WAY CEILING-CASSETTE INDOOR UNITS

MULTI F
MULTI F MAX

Acoustic Data

Figure 184:Sound Pressure Level Measurement Location.



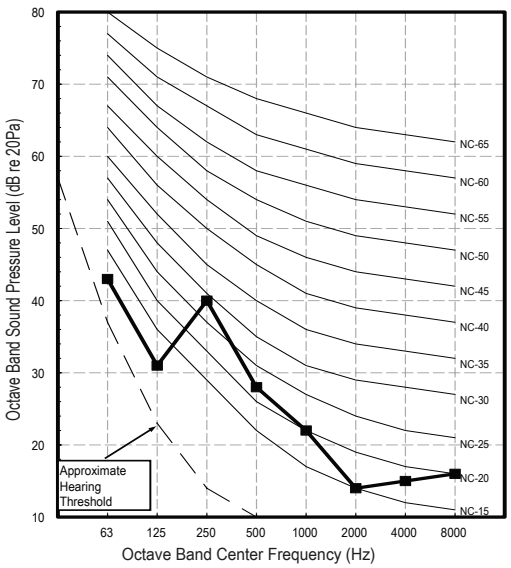
- Measurement taken 4.9' away from the unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound power levels are measured in dB(A).
- Tested in anechoic chamber per ISO Standard 3745.

Table 78:Sound Pressure Levels (dB[A]).

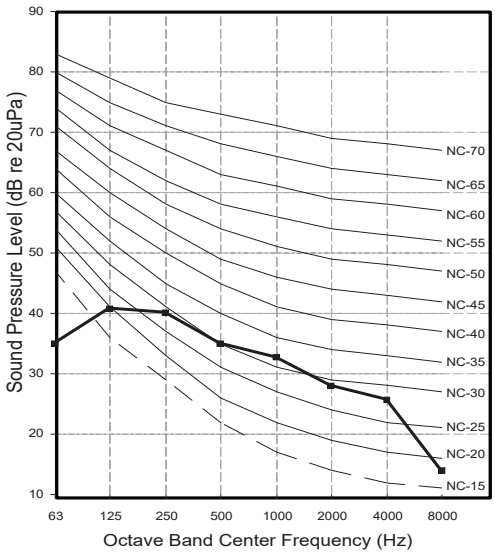
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LMCN078HV	31	27	24
LCN098HV4	36	33	30
LCN128HV4	38	35	32
LCN188HV4	41	39	36

Figure 185:LMCN078HV and LCN098HV4 Sound Pressure Level Diagrams.

LMCN078HV



LCN098HV4



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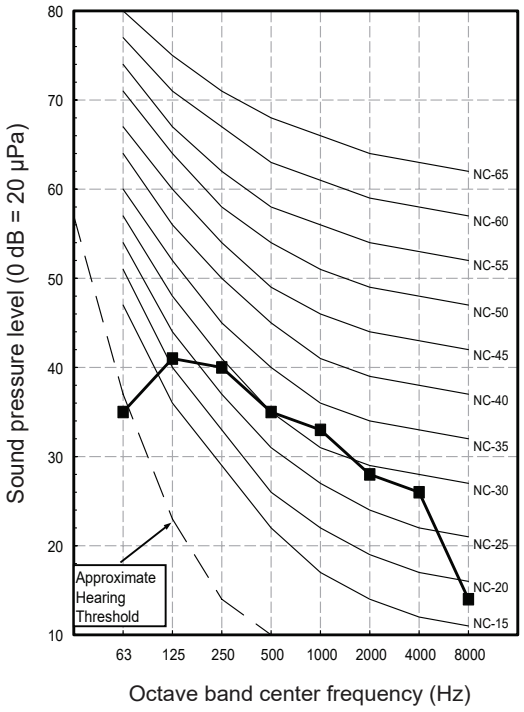
FOUR-WAY CEILING CASSETTE INDOOR UNITS

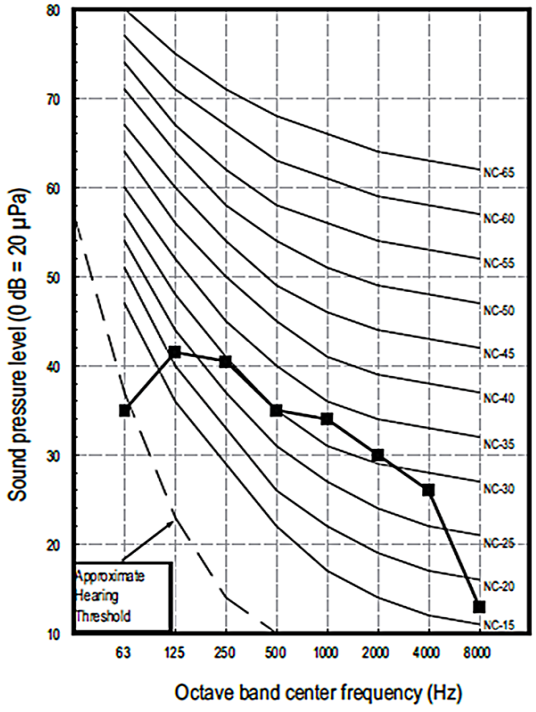
Acoustic Data

Figure 186:LCN128HV4 and LCN188HV4 Sound Pressure Level Diagrams.

LCN128HV4



LCN188HV4



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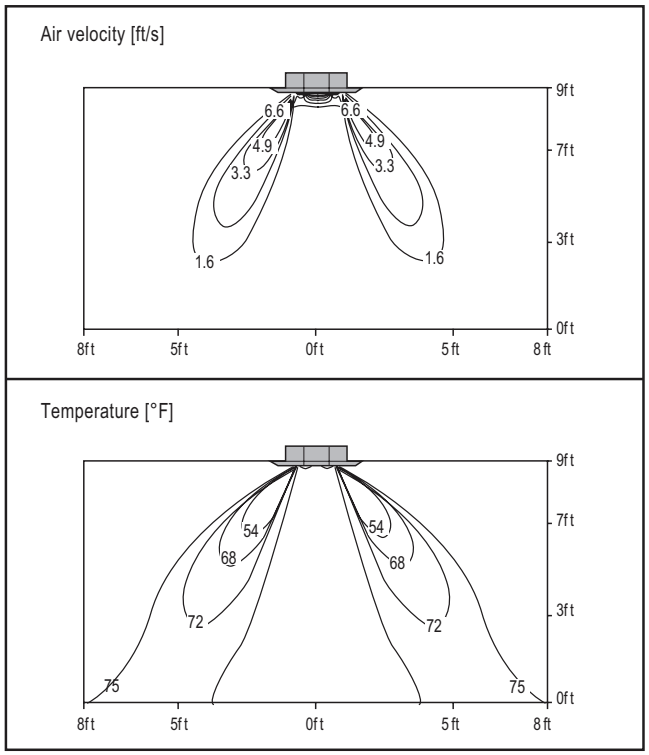
FOUR-WAY CEILING-CASSETTE INDOOR UNITS

Air Velocity and Temperature Distribution

Figure 187:LMCN078HV Air Velocity and Temperature Distribution Charts.

Cooling

Discharge angle: 40°



Heating

Discharge angle: 50°

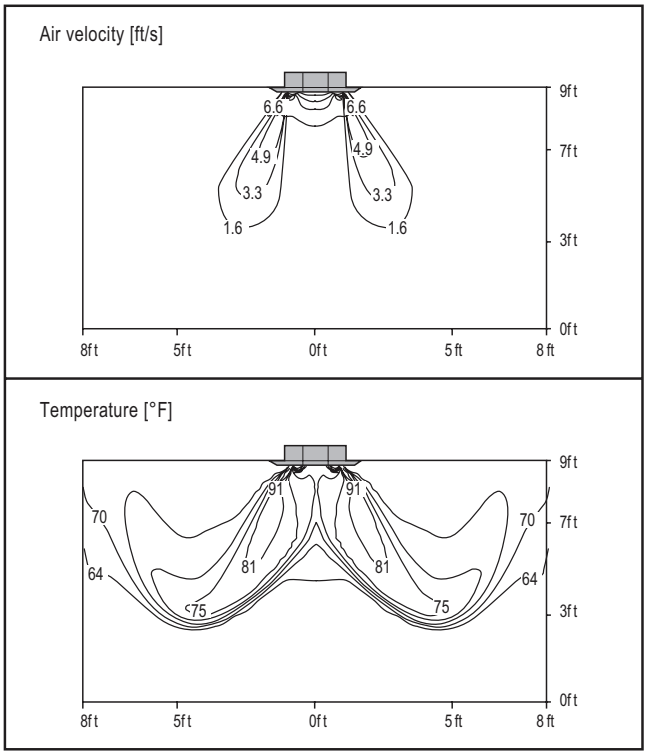
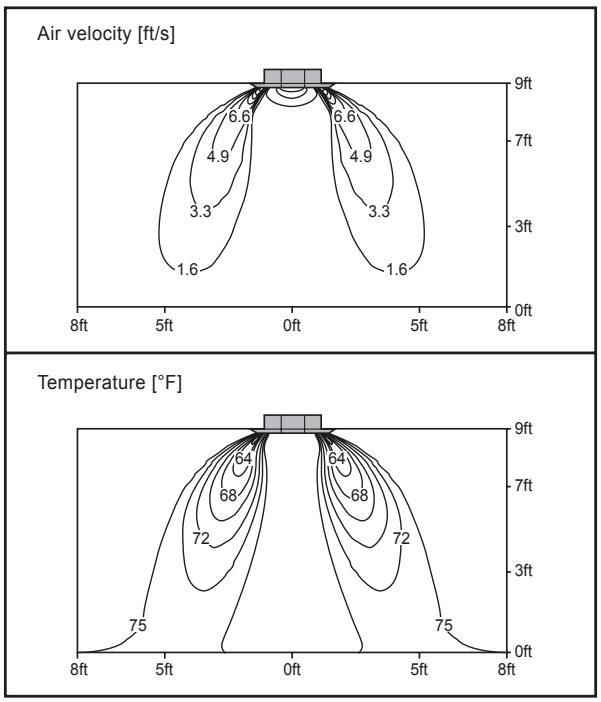


Figure 188:LCN098HV4 Air Velocity and Temperature Distribution Charts.

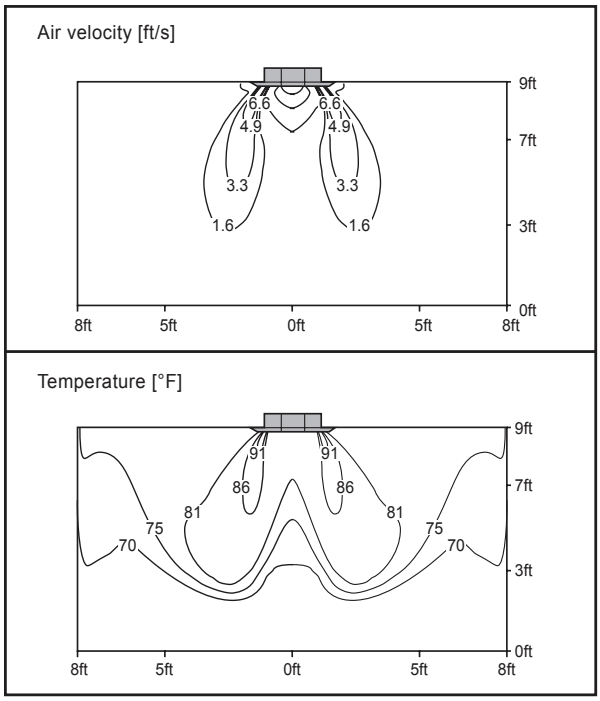
Cooling

Discharge angle: 40°



Heating

Discharge angle: 50°



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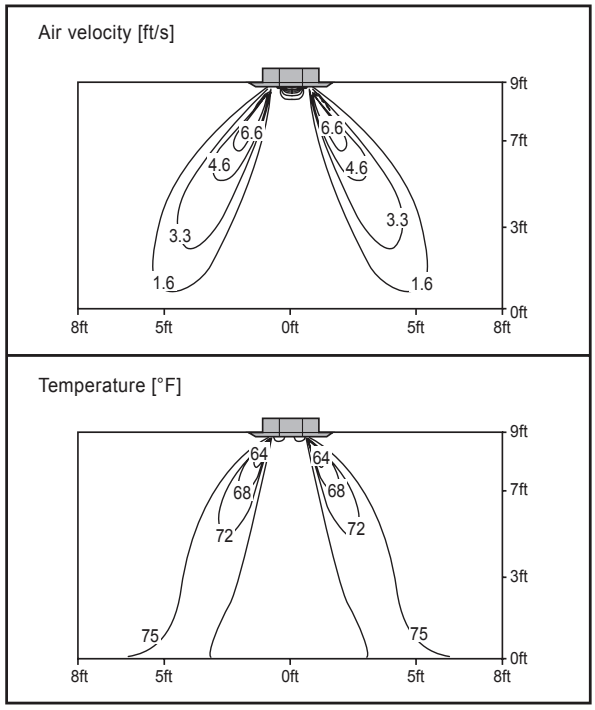
FOUR-WAY CEILING CASSETTE INDOOR UNITS

Air Velocity and Temperature Distribution

Figure 189:LCN128HV4 Air Velocity and Temperature Distribution Charts.

Cooling

Discharge angle: 40°



Heating

Discharge angle: 50°

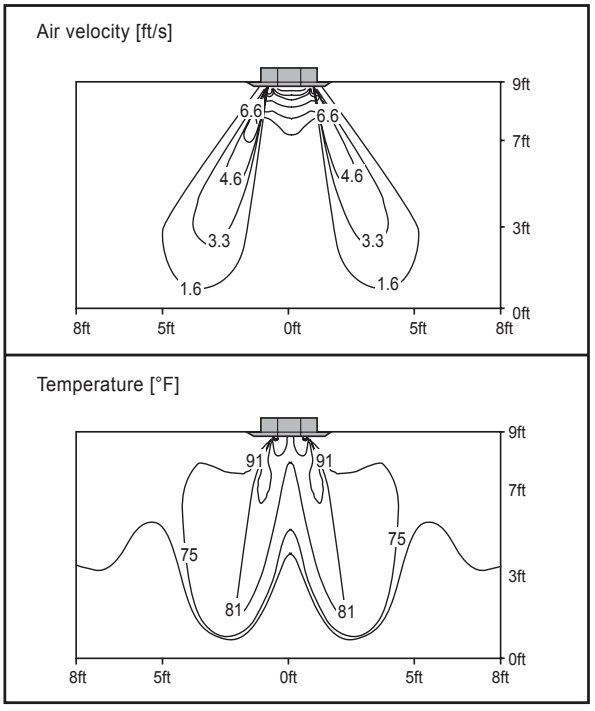
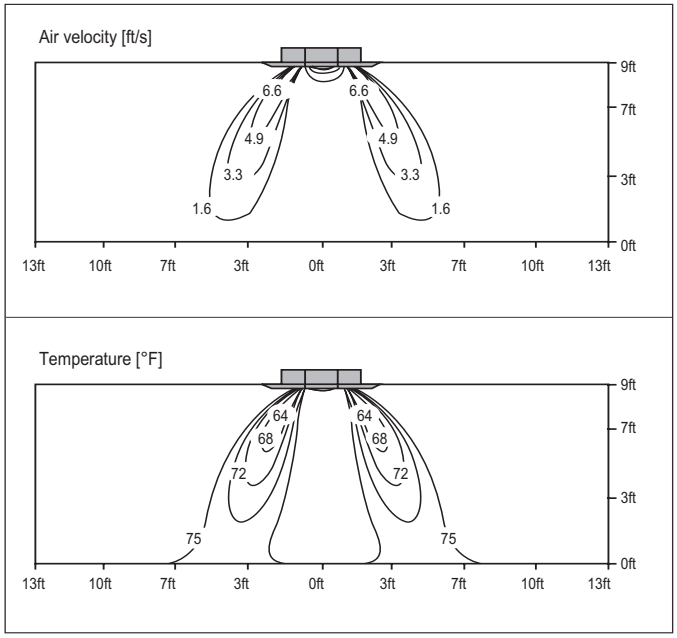


Figure 190:LCN188HV4 Air Velocity and Temperature Distribution Charts.

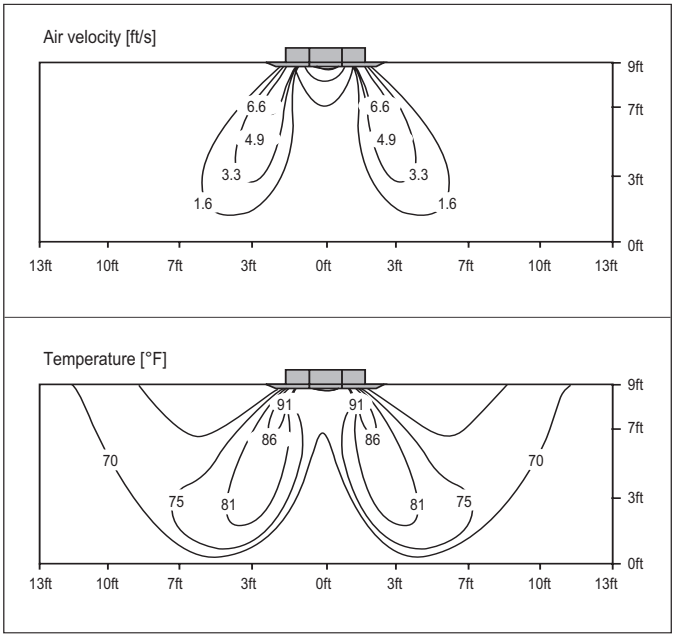
Cooling

Discharge angle : 40°



Heating

Discharge angle : 50°



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FOUR-WAY CEILING-CASSETTE INDOOR UNITS

Refrigerant Flow Diagram

Figure 191:Multi F Four-Way Ceiling-Cassette Indoor Unit Refrigerant Flow Diagram.

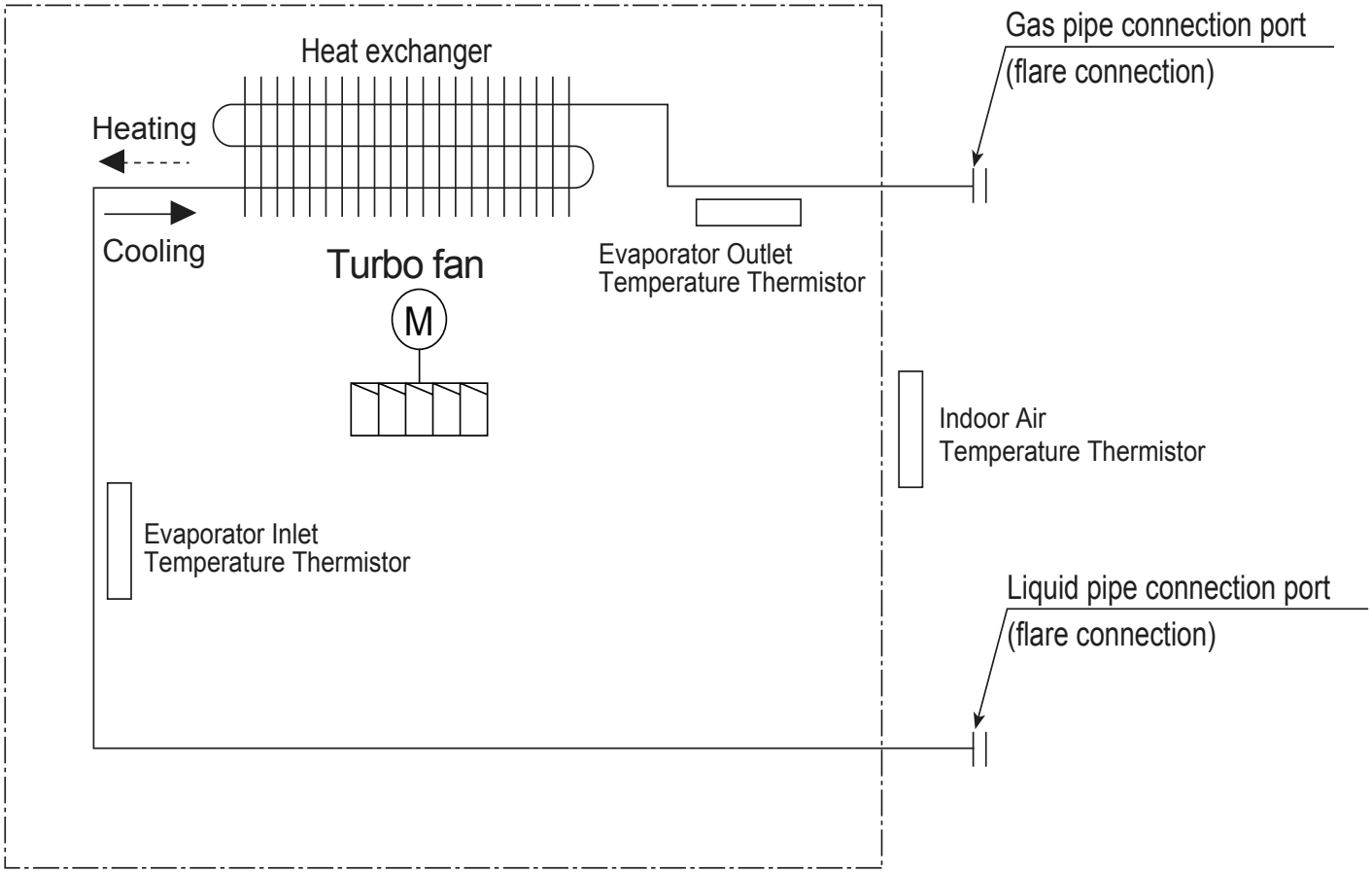

Table 79:Multi F Four-Way Ceiling-Cassette Indoor Unit Refrigerant Pipe Sizes.

Model No.	Vapor (inch)	Liquid (inch)
LMCN078HV	Ø3/8	Ø1/4
LCN098HV4		
LCN128HV4		
LCN188HV4	Ø1/2	

Table 80:Multi F Four-Way Ceiling-Cassette Indoor Unit Refrigerant Pipe Connections.

Model No.	Vapor (inch)	Liquid (inch)
LMCN078HV	Ø3/8	Ø1/4
LCN098HV4		
LCN128HV4		
LCN188HV4	Ø1/2	

Table 81:Multi F 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

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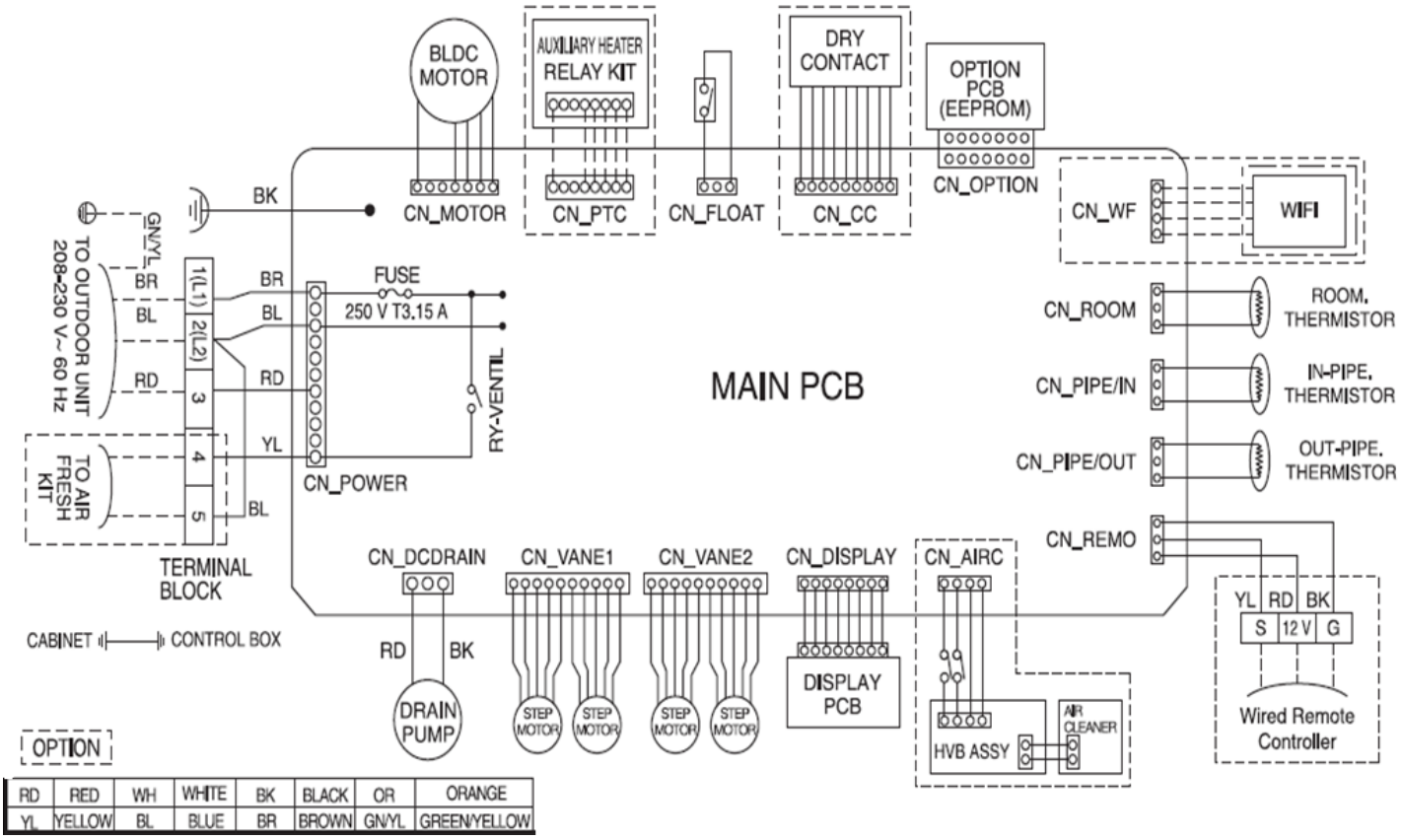
FOUR-WAY CEILING CASSETTE INDOOR UNITS

Wiring Diagram

Figure 192:Multi F Four-Way Ceiling-Cassette Indoor Unit Wiring Diagram.



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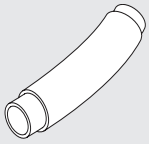
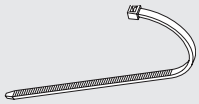
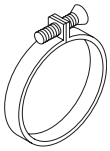
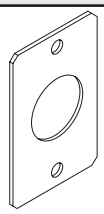
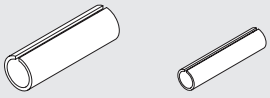
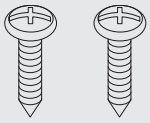
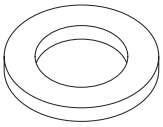
FOUR-WAY CEILING-CASSETTE INDOOR UNITS

MULTI F
MULTI F MAX

Factory Supplied Parts and Materials

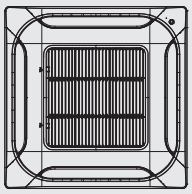
Factory Supplied Parts

Table 82: Parts Table.

Part	Quantity	Image	Part	Quantity	Image
Drain Hose	One (1)		Zip Ties	Four (4)	
Metal Clamp	Two (2)		Conduit Bracket	One (1)	
Insulation for Fittings	One (1) Set	 For Vapor Piping For Liquid Piping	M4 Screws	Two (2)	
Washer for Hanging Bracket	Eight (8)		Wireless Handheld Controller with Holder (AKB73757604)[1]	One (1)	

[1]Wireless Handheld Controller for the four-way ceiling cassette indoor units is also referenced by Model No. PQWRHQ0FDB.

Table 83:Required Accessory Table.

Part	Quantity	Image
Grille Kit (PT-QCHW0)	One (1)	

Factory Supplied Materials

- Installation Guide (template)
- Owner's Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Torque wrenches
- Hexagonal wrench
- Gas-leak detector
- Thermometer

⚠ WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit's components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

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FOUR-WAY CEILING CASSETTE INDOOR UNITS

Installation and Best Layout Practices

Selecting the Best Location

Do's

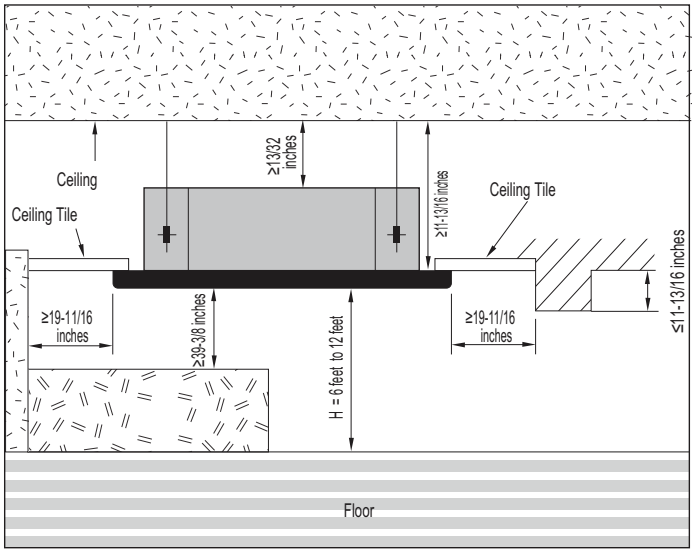
- Place the unit where air circulation will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient strength to bear the load of the indoor unit.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit in a location that is level, and where it can be easily connected to the outdoor unit / branch distribution unit.

⃠ Don'ts

- ⃠ *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- ⃠ *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- ⃠ *Do not install the unit near high-frequency generators.*
- ⃠ *Do not install the unit near a doorway.*

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

Figure 193:Indoor Unit Clearance Requirements.



Note:

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

Installing in a High or Dropped Ceiling

High or dropped ceilings, often found in commercial buildings and offices, will 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 84:Indoor Unit High Ceiling Mode Selection Options.

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

Installing in an Area Exposed to Unconditioned Air

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

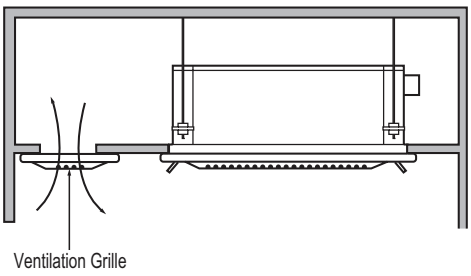
- Verify that carpet is or will be installed (carpet will increase the temperature by three (3) degrees).
- Add insulation between the floor joists.
- Install radiant heat or another type of heating system to the floor.

Installing in an Area with High Humidity Levels

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

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

Figure 194:Installing in a Highly Humid Location.



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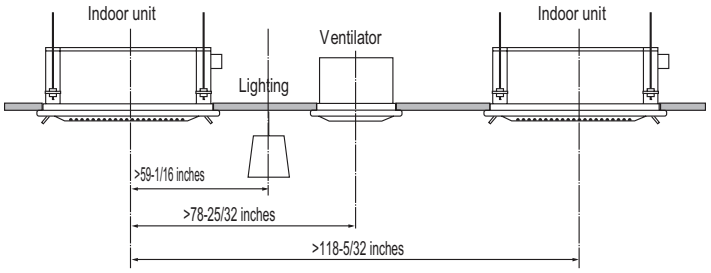
Installing Multiple Indoor Units in One Area

Ensure there is enough space between indoor units, lighting fixtures, and ventilation fans / systems.

Figure 195:Installing Multiple Indoor Units.



Preparing the Installation Area and Hanging the Indoor Unit Frame

Preparing the Installation Area

1. Installation guide (template) depicts the exact dimensions necessary for the ceiling opening.
2. Choose the location for the indoor unit, and then mark where the bolts, refrigerant piping, and drain hose must be. Suspension bolt angle must account for drain direction.
3. Drill holes for the bolts. Use either a W 3/8 inch or a M10 size bolt.

Note:

For easier installation, attach the accessories (except for the decoration panel) before hanging the indoor unit.

Figure 196:Ceiling Opening Dimensions and Bolt Locations.

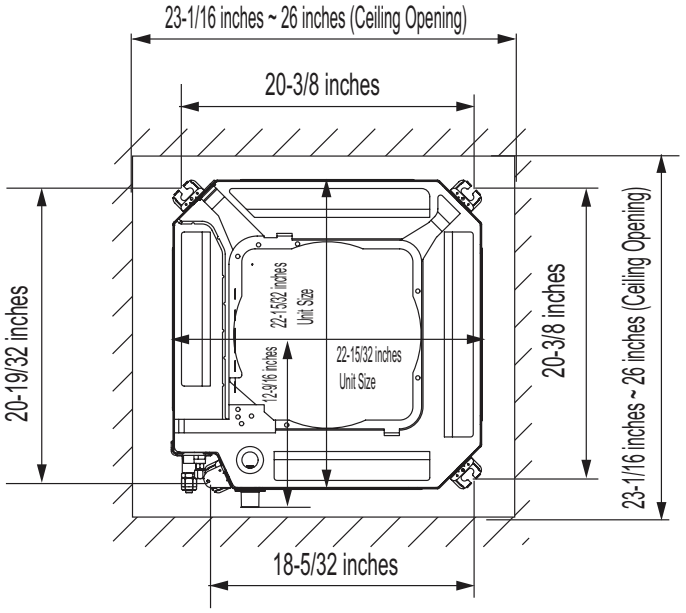


Figure 197:Installing the Hanging Bolt in the Ceiling.

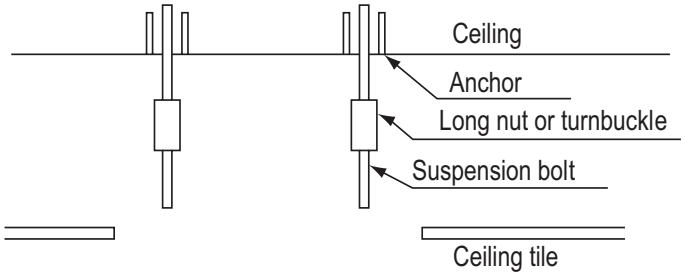
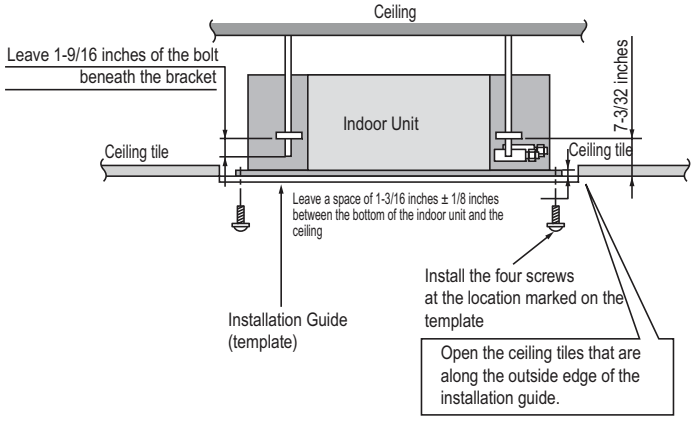


Figure 198:Installation Diagram.



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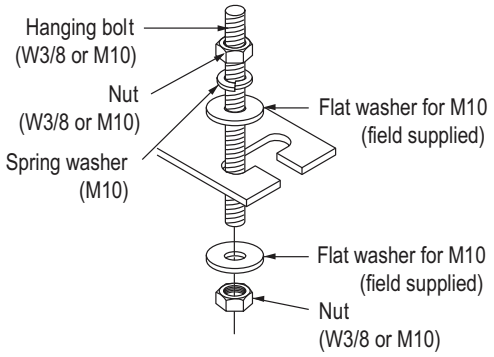
FOUR-WAY CEILING CASSETTE INDOOR UNITS

Installation and Best Layout Practices

For New Ceilings

1. Use a sunken insert, a sunken anchor, or any other field-supplied part to reinforce the ceiling so that it can bear the weight of the indoor unit. Use a temporary washer plate to more easily set up the unit suspension location.
2. Ceiling height is shown on the side of the installation guide (template). Adjust the height of the unit accordingly. Adjust the clearance before hanging the indoor unit.
3. Refer to the installation guide (template) for the dimensions to the ceiling opening. Match the center of the indoor unit (labeled) to the center indicated on the installation guide.
4. Align the installation guide (template) with the label attached to the unit (affixing the template to the unit if desired) to properly place the unit.
5. Remove the temporary washer plate and position the indoor unit hanger brackets on the bolts. Secure with nuts and washers on the top and bottom of the hanger brackets.

Figure 199:Hanging the Indoor Unit.



6. Ceiling-cassette indoor units are equipped with a built-in drain pump and float switch, therefore, the unit must be installed horizontally or condensate will drip out and cause product malfunction. Measure the unit at each corner to verify that it is level.
7. Remove the installation guide (template).

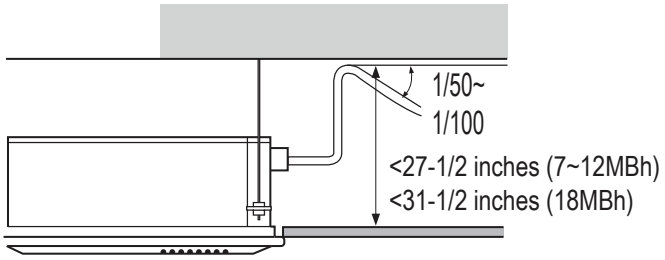
For Existing Ceilings

1. Use anchors when installing the indoor unit in an existing ceiling.
2. Ceiling height is shown on the side of the installation guide (template). Adjust the height of the unit accordingly. Adjust the clearance before hanging the indoor unit.
3. Remove the temporary washer plate and position the indoor unit hanger brackets on the bolts. Secure with nuts and washers on the top and bottom of the hanger brackets.
4. Ceiling-cassette indoor units are equipped with a built-in drain pump and float switch, therefore, the unit must be installed horizontally or condensate will drip out and cause product malfunction. Measure the unit at each corner to verify that it is level.
5. Remove the installation guide (template).

Installing the Drain System

- Drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must 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.

Figure 200:Indoor Unit Drain Piping.

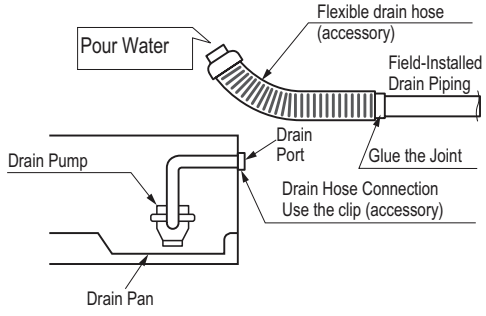


Checking the Drain Pump

The unit uses a drain pump to remove condensate. The pump must be tested before the system operates.

- Connect flexible drain hose to the field-installed drain piping; leave it as is until the test is complete.
- Pour water into the flexible drain hose and check for leaks.
- After power wiring installation is complete, operate the drain pump to see if it sounds and functions properly.
- After the test is complete, connect the flexible drain hose to the indoor unit drain port.

Figure 201:Checking the Drain Pump.



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Insulating the Refrigerant and Drain Piping

⚠ WARNING

Ensure all piping is insulated. Exposed piping can cause burns if touched.

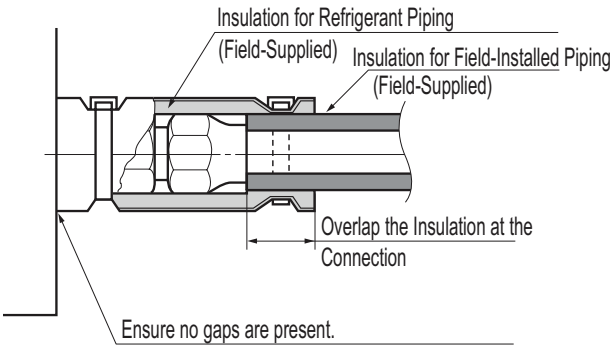
Refrigerant Piping Insulation

Field-installed vapor and liquid refrigerant piping lines must be properly and completely covered in insulation (up to the indoor unit piping connections). Any exposed piping will generate condensate or will cause burns if touched. Insulation for this field-installed refrigerant piping must have a minimum heat resistance of 248°F.

Drain Piping Insulation

Drain piping must have insulation a minimum of 7/32 inches thick.

Figure 202:Insulating the Piping.



Installing the Insulation

1. Overlap the insulation at the connection of the field-installed piping and the indoor unit piping. Tape together so that no gaps exist.
2. Secure insulation to the rear piping housing section with vinyl tape.
3. Bundle the piping and drain hose with tape where they meet at the back of the indoor unit frame. Position the drain hose at the bottom of the bundle (positioning the drain hose at the top of the bundle will cause the drain pan to overflow inside the indoor unit).

Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

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Connecting the Power Wiring and Communications Cable

1. To access the terminal block, open the control box cover.

2. Insert the power wiring / communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) 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.

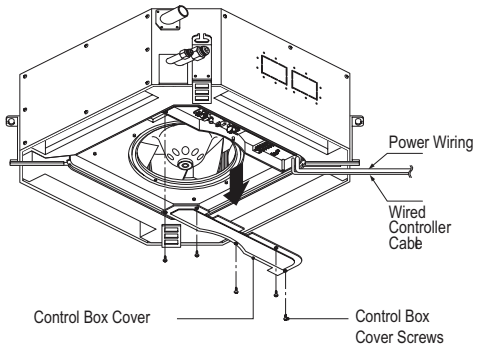
3. Connect each wire to its appropriate terminal on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

4. Neatly arrange power wiring / communications cable and secure with the appropriate cable restraint. ⃠ When clamping, ⃠ do not apply force to the wiring connections.

5. Firmly reattach the control box cover. ⃠ Do not catch the wiring in the electric box cover and 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 203:Power Wiring and Communications Cable Connection Access.



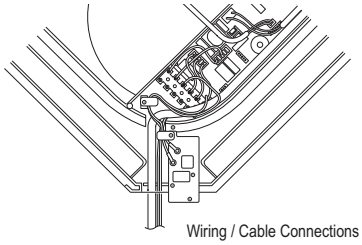
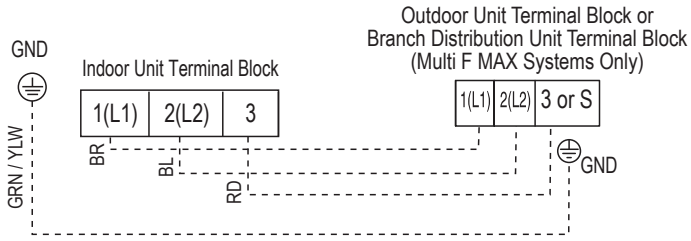


Figure 204:Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections.



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. Tighten the conduit and the conduit mounting plate together.

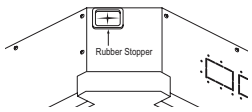
3. Connect the power wiring / communications cable to the indoor unit terminal block.

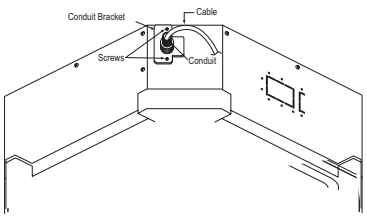
4. Screw the conduit mounting plate to the indoor unit.

Note:

If the distance between the outdoor unit and indoor unit is greater than 131 feet, connect the power wiring and communications cable separately (i.e., a conduit cannot be used).

Figure 205:Using a Conduit.





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FOUR-WAY CEILING-CASSETTE INDOOR UNITS

Installation and Best Layout Practices

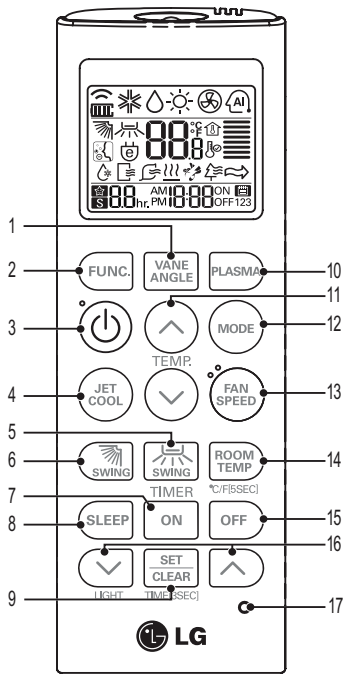
MULTI F
MULTI F MAX

Controller Options

Four-way ceiling-concealed indoor units include a wireless handheld controller (AKB73757604)[1], but optional LG-supplied wired controllers are available.

Wireless Handheld Controller

Figure 206:AKB73757604 Wireless Handheld Controller.



Operation Mode Sequence

Cooling Mode
↓
Auto Mode/Changeover
↓
Dehumidification Mode
↓
Heating Mode
↓
Fan Mode

Table 85:AKB73757604[1] Wireless Handheld Controller Functions.[2]

Button Label	Description
1	Vane Angle Button: Sets the angle to each vane.
2	Function Setting Button: Sets or clears auto clean, smart clean, electric heater, or individual vane angle control functions.
3	On / Off Button: Turns the power on/off.
4	Jet Cool: Sets the unit to super high fan speed when in cooling mode.
5	Left / Right Air Flow Button (optional): Sets the desired left / right (horizontal) air flow direction.
6	Up / Down Air flow Button: Stops or starts louver movement, and sets the desired air flow direction to up or down.
7	On Time Button: Sets the time when the operation begins.
8	Sleep Timer Button: Sets the sleep mode operation.
9	Set / Clear Button: Sets or cancels the timer, also sets the current time.
10	Plasma Button: Starts or stops plasma-purification functions.
11	Room Temperature Setting Button: Raises or lowers temperature setpoint in cooling and heating operation.
12	Operation mode selection button: Selects the operation mode.
13	Indoor Fan Speed Button: Changes the fan speed to one of four choices: low, medium, high, and chaos.
14	Room Temperature Check Button: Displays / checks the room temperature.
15	Off Timer button: Sets the time when the operation ends.
16	Time Setting (Up / Down) / Light Button: Sets the timer and adjusts the brightness of the LED.
17	Reset Button: Resets the remote controller.

[1]Wireless Handheld Controller for the four-way ceiling cassette indoor units is also referenced by Model No. PQWRHQ0FDB.

[2]Depending on the indoor unit model, some functions will not be supported or displayed.

Wired Controller Connections

Controllers can connect to the indoor unit in one of two different ways.

1. LG Wired Remote Extension Cable with Molex plug (PZC-WRC1; sold separately) that connects to the CN-REMO terminal on the indoor unit PCB.

2. Field-supplied controller cable that connects to the indoor unit terminal block (must be at least UL2547 or UL1007, 22 AWG, two-core, one-shield core, at least FT-6 rated if local electric and building codes require plenum cable usage).

Note:

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

Figure 207:PZCWRC1 LG Wired Remote Extension Cable.

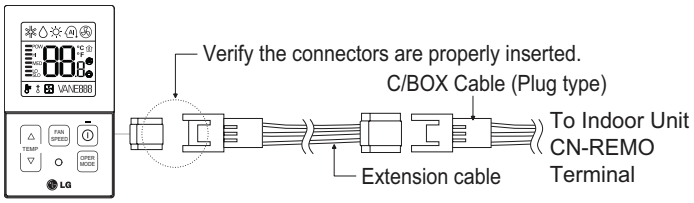
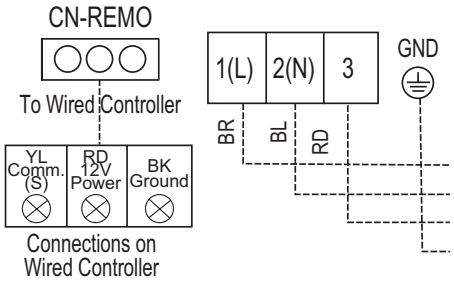


Figure 208:Wired Controller Connections on the Indoor Unit Terminal Block.



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FOUR-WAY CEILING CASSETTE INDOOR UNITS

Installation and Best Layout Practices

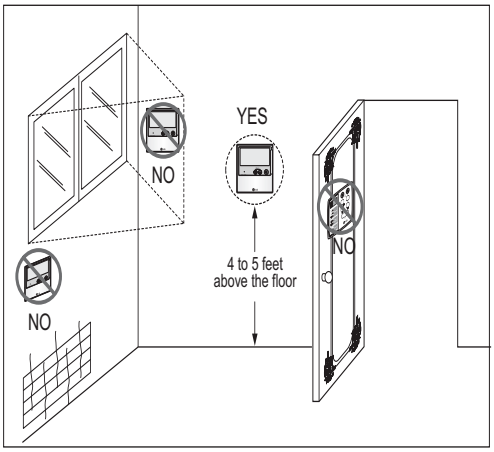
Wired Controller Placement

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

⃠ *Do not install the remote controller where it can be impacted by the following:*

- *Drafts or dead spots behind doors and in corners*
- *Hot or cold air from ducts*
- *Radiant heat from sun or appliances*
- *Concealed pipes and chimneys*
- *Uncontrolled areas such as an outside wall behind the remote controller*

Figure 209:Proper Location for the Wired Controller.



Hanging the Wired Controller

1. The controller wiring / cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring / cable on applicable side.

2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.

3. Arrange wiring / cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.

4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 210:Removing the Cable Guide Grooves.

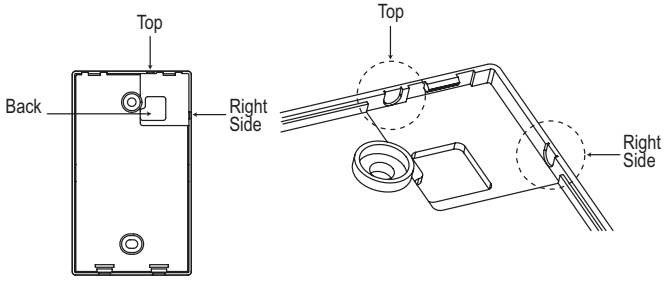


Figure 211:Attaching the Wall Plate.

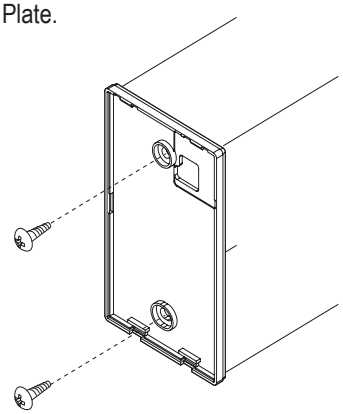
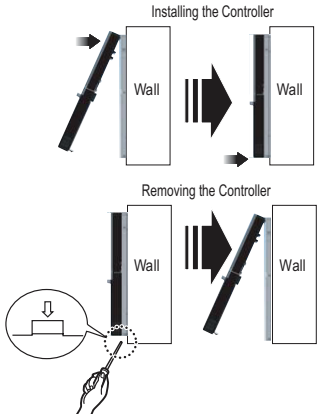


Figure 212:Installing / Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

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Finalizing Indoor Unit Installation— Installing the Decoration Panel

Note:

Decoration panel must be installed properly; cool air will leak from any gaps found between the indoor unit frame and the decoration panel, which will cause condensation to generate.

1. Remove the packaging, take out air inlet grille from the front panel (1A), and then remove the corner covers of the panel (1B).
2. Attach the panel to the indoor frame by inserting the hooks as shown (2).
3. Attach two screws on diagonal corners of each panel, but ⃠ do not tighten completely (3). Screws to attach the panel to the indoor unit frame are factory-provided and can be found in the shipping box.
4. Verify the panel is aligned with the ceiling. Adjust the height by using the hanging bolts as shown (4).
5. Attach the corner covers (5).
6. Unscrew the control panel cover (6).
7. Connect the one display connector (CN-DISPLAY) and the two vane control connectors (CN-VANE1, CN-VANE2) of the front panel to the indoor unit PCB (7).
8. Close the control box cover. Attach the link on the front panel as shown (8). The link is supplied in the front panel shipping package.
9. Attach the other side of the link on the filter guide of the air inlet grille, then install the filter and the air inlet grille on the front panel (9).

Figure 214:Ensure that no gaps are present between the indoor unit frame and the decoration panel.

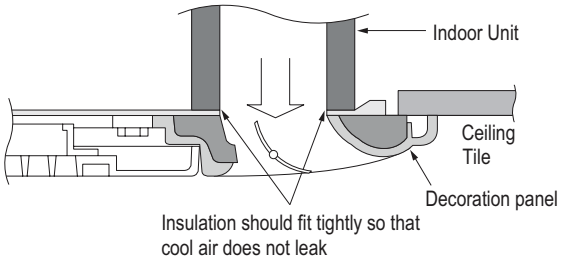
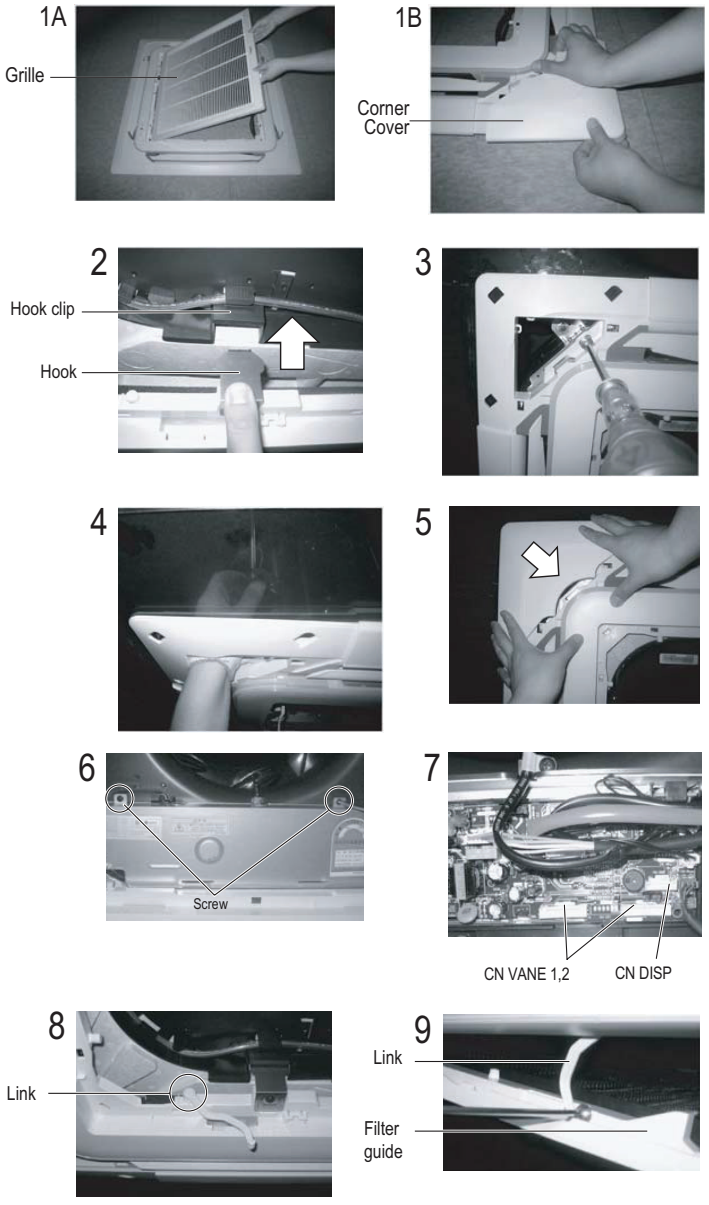


Figure 213:Installing the Decoration Panel.



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FOUR-WAY VERTICAL-HORIZONTAL AIR HANDLING INDOOR UNIT DATA

“Mechanical Specifications” on page 160
“General Data / Specifications” on page 161
“Dimensions” on page 162
“Cooling Capacity Table” on page 163
“Heating Capacity Table” on page 165
“External Static Pressure” on page 167
“Heater Capacities” on page 169
“Acoustic Data” on page 170
“Refrigerant Flow Diagram” on page 172
“Wiring Diagram” on page 173
“Factory Supplied Parts and Materials” on page 175
“Installation and Best Layout Practices” on page 176

FOUR-WAY VAHU INDOOR UNITS

Mechanical Specifications and Features

MULTI F
MULTI F MAX

Four-way Vertical-Horizontal Air Handing Indoor Unit

General

All LG indoor units are factory assembled, wired, piped, and provided with a control circuit board, and constant CFM ECM fan. Vertical-Horizontal Air Handling units are designed for high-speed air volume against an external static pressure up to 0.7"WG. Supply air opening is flanged to accept field-installed ductwork that cannot exceed the external static pressure limit of the unit.

Coil

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

Refrigerant System

System is designed for use with R410A refrigerant. The refrigeration circuit is pressure-tested at the factory and shipped with a holding charge of helium gas. Refrigerant pipe connections are 45° flare, and all refrigerant lines from the outdoor unit to the indoor units must be field insulated.

Electrical

Each indoor unit is designed to operate using 208–230/60/1 power with voltage variances of ±10%.

Casing

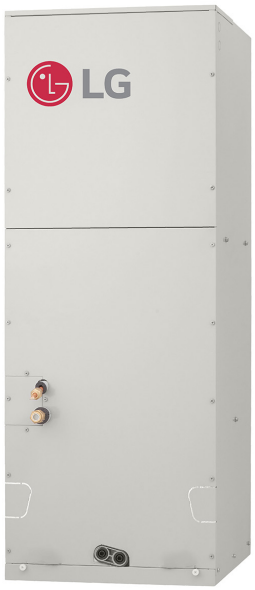
The casing is designed to mount fully concealed behind a wall or above a finished ceiling. Casing is manufactured of 22-gauge metal and finished with a high-gloss baked enamel finish. Cold surfaces of the unit are covered internally with 1/2-inch polystyrene fiber insulation; inside surface of the pan assembly door access panel is treated with 1/2-inch polystyrene fiber insulation, encapsulated on both sides. The access panel is sealed along the edges with reinforced foil-faced covering, all access panels also have gasket seals to minimize air leaks.

The vertical-horizontal air handling unit can operate in one of four airflow configurations: vertical upflow, vertical downflow, horizontal left discharge, or horizontal right discharge. Vertical downflow operation requires an optional conversion kit. In the vertical position, the unit has an opening for supply air from top (or bottom) with a dedicated bottom (or top) vertical return. In the horizontal position, supply air is from the left (or right) end with the return air from the right (or left) end. Unit can also accept an internal, optional LG electrical strip heater.

Fan Assembly and Control

The units have an integral fan assembly consisting of galvanized steel housing and a forward curve fan wheel. The ECM (electronically commutated motor) fan is programmed to deliver constant CFM regardless of permitted ESP (external static pressure), and has 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. The indoor fan has Low, Med, High, and Auto settings for Cooling mode; and has Low, Med, High, and Auto settings for Heating mode. Low, Med and High fan speeds maintain published airflow as the ECM motor adjusts to ESP. The Auto setting adjusts the fan speed to most effectively achieve setpoint.

Figure 215: Multi F Vertical-Horizontal Air Handling Indoor Unit.



Filter Assembly

The unit comes with a filter rack sized to hold a field-provided 16” x 20” x 1” filter cartridge. The filter rack has a guide to assist in centering the filters, and can be accessed from the front.

Microprocessor Control

The indoor unit is provided with an integrated control board to communicate with the outdoor unit. All unit operation parameters are stored in non-volatile memory resident on the unit microprocessor. The microprocessor controls space temperature through using the value provided by temperature sensors within the indoor unit. A field-supplied communication cable must be installed to connect the indoor unit(s) to the outdoor unit.

Controls

The indoor unit controller of choice must be ordered separately. Communication between the indoor units and the outdoor unit is accomplished through 14 AWG, four-core, stranded and shielded power / communication cable. The indoor unit has a built-in dry contact for a field supplied 3rd party thermostat. An optional Wi-Fi module is available as an additional accessory for use with LG’s SmartThinQ app on a smart device.

Condensate

The unit is designed for gravity draining of condensate.

Features

- Inverter (Variable speed fan)
- Control lock function
- Auto operation
- Dehumidifying function
- Two thermistor control
- Group control
- Optional accessory electric heater
- Self-diagnostics function
- Built-in dry contact for third party thermostat
- Wired controller ordered separately
- Constant CFM ECM fan

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LG

FOUR-WAY VAHU INDOOR UNITS

General Data / Specifications

Table 86: Multi F Vertical-Horizontal Air Handling Indoor Unit General Data.

Model Name	LVN181HV4	LVN241HV4	LVN361HV4
Nominal Cooling Capacity (Btu/h)[1]	18,000	24,000	36,000
Nominal Heating Capacity (Btu/h)[1]	20,000	27,000	40,000
Operating Range			
Cooling (°F WB)	57-77	57-77	57-77
Heating (°F DB)	59-81	59-81	59-81
Fan			
Type	Sirocco	Sirocco	Sirocco
Motor Output (W) x Qty.	250 x 1	250 x 1	250 x 1
Motor/Drive	ECM (Electronically Commutated Motor) / Direct	ECM (Electronically Commutated Motor) / Direct	ECM (Electronically Commutated Motor) / Direct
Airflow Rate CFM (H/M/L)	640 / 580 / 480	710 / 640 / 480	990 / 880 / 800
Maximum External Static Pressure (in. WG)	0.7	0.7	0.7
Unit Data			
Refrigerant Type[2]	R410A	R410A	R410A
Refrigerant Control	EEV	EEV	EEV
Power Supply V, Ø, Hz[3]	208-230, 1, 60	208-230, 1, 60	208-230, 1, 60
Rated Amps (A)	1.1	1.1	1.1
Sound Pressure Level dB(A) (H/M/L)[4] at 0.3"WG ESP	35 / 33 / 30	36 / 34 / 30	44 / 41 / 39
Dimensions (W x H x D, in.)	18 x 48-11/16 x 21-1/4	18 x 48-11/16 x 21-1/4	18 x 48-11/16 x 21-1/4
Net Weight (lbs.)	123.5	123.5	129
Shipping Weight (lbs.)	135.1	135.1	140
Power Wiring / Communications Cable (No. x AWG)[5]	4 x 14	4 x 14	4 x 14
Heat Exchanger (Row x Column x Fin / inch) x Number	(2x24x18)x2	(2x24x18)x2	(3x24x18)x2
Pipe Size			
Liquid (in.)	1/4	1/4	3/8
Vapor (in.)	1/2	1/2	5/8
Connection Size			
Liquid (in.)	3/8	3/8	3/8
Vapor (in.)	5/8	5/8	5/8
Primary Drain I.D. (in.)	3/4 FPT	3/4 FPT	3/4 FPT
Secondary Drain I.D. (in.)	3/4 FPT	3/4 FPT	3/4 FPT

[1]Nominal capacity is rated 0 ft. above sea level with corresponding refrigerant piping length in accordance with standard length of each outdoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a combination ratio between 95 – 105%.

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

[2]This unit comes with a dry helium charge.

[3]Acceptable operating voltage: 187V-253V.

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

[5]All power wiring / communications cable to the IDUs must be minimum 14 AWG, 4-conductor, stranded, shielded or unshielded (if shielded, must be grounded to chassis at ODU only) and must comply with applicable local and national codes.

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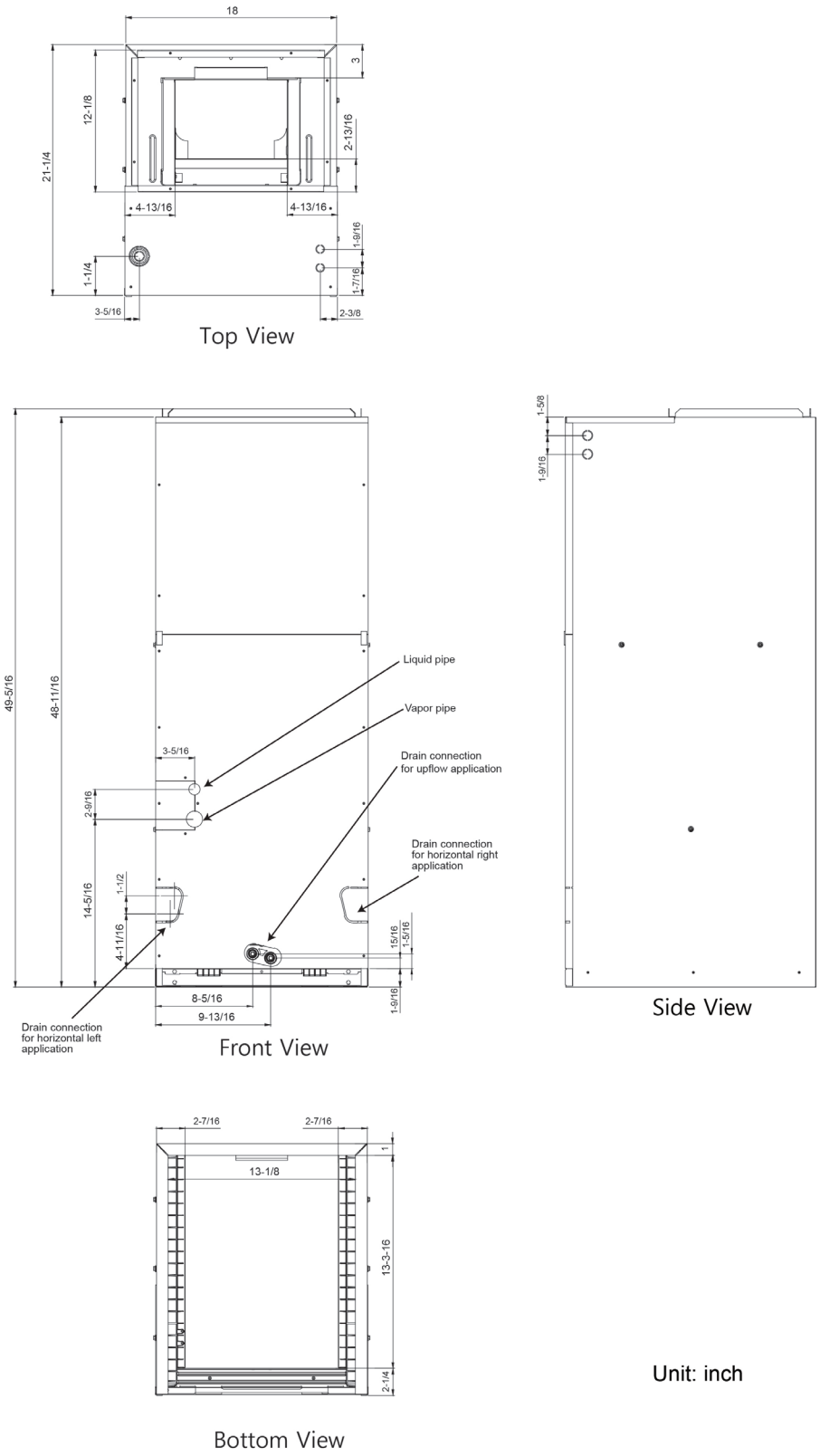
FOUR-WAY VAHU INDOOR UNITS

Dimensions

Figure 216: Four-way Vertical Air Handling Unit Dimensions.



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FOUR-WAY VAHU INDOOR UNITS

Cooling Capacity Table

Table 87: Multi F Vertical-Horizontal Air Handling Indoor Units Cooling Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LVN181HV4 18,000	14	17.65	13.25	18.74	13.99	19.84	13.55	20.63	13.83	22.03	13.95	23.12	14.22
	20	17.63	13.35	18.73	14.10	19.82	13.65	20.61	13.94	22.01	14.06	23.11	14.33
	25	17.62	13.45	18.71	14.21	19.81	13.76	20.60	14.05	22.00	14.17	23.09	14.44
	30	17.60	13.56	18.70	14.32	19.79	13.87	20.58	14.16	21.98	14.28	23.07	14.55
	35	17.59	13.66	18.68	14.43	19.78	13.97	20.57	14.27	21.96	14.39	23.05	14.66
	40	17.58	13.76	18.67	14.54	19.76	14.08	20.55	14.37	21.94	14.49	23.04	14.77
	45	17.56	13.87	18.66	14.65	19.75	14.18	20.53	14.48	21.93	14.60	23.02	14.88
	50	17.55	13.97	18.64	14.75	19.73	14.29	20.52	14.59	21.91	14.71	23.00	14.99
	55	17.54	14.07	18.63	14.86	19.72	14.39	20.50	14.69	21.89	14.82	22.98	15.10
	60	17.52	14.17	18.61	14.97	19.70	14.50	20.49	14.80	21.88	14.93	22.97	15.21
	65	17.51	14.27	18.60	15.08	19.69	14.60	20.47	14.91	21.86	15.03	22.95	15.32
	70	17.50	14.38	18.58	15.19	19.67	14.70	20.46	15.01	21.84	15.14	22.93	15.43
	75	17.08	14.14	18.16	14.96	19.24	14.50	20.03	14.81	21.41	14.96	22.50	15.25
	80	16.66	13.90	17.74	14.72	18.82	14.29	19.60	14.61	20.98	14.77	22.06	15.07
	85	16.24	13.64	17.32	14.47	18.40	14.06	19.17	14.39	20.55	14.57	21.63	14.88
	90	15.82	13.39	16.90	14.22	17.97	13.84	18.75	14.17	20.12	14.36	21.20	14.69
	95	15.37	13.25	16.44	14.09	17.51	13.73	**18.00**	**13.86**	19.65	14.29	20.72	14.62
	100	14.99	12.89	16.06	13.74	17.13	13.40	17.77	13.65	19.28	13.98	20.35	14.32
	105	14.62	12.54	15.69	13.38	16.76	13.08	17.53	13.43	18.90	13.67	19.97	14.02
	110	14.24	12.11	15.32	12.95	16.39	12.67	17.16	13.03	18.53	13.29	19.60	13.64
	115	13.87	11.75	14.94	12.58	16.01	12.34	16.79	12.70	18.15	12.97	19.22	13.33
	118	13.65	11.66	14.72	12.51	15.79	12.27	16.56	12.64	17.93	12.92	19.00	13.29
	122	13.57	11.63	14.64	12.48	15.71	12.25	16.49	12.62	17.85	12.91	18.92	13.28
LVN241HV4 24,000	14	23.53	17.89	24.99	18.90	26.45	18.30	27.50	18.69	29.37	18.84	30.83	19.20
	20	23.51	18.03	24.97	19.05	26.43	18.44	27.48	18.83	29.35	18.99	30.81	19.35
	25	23.49	18.17	24.95	19.20	26.41	18.59	27.46	18.98	29.33	19.14	30.79	19.50
	30	23.47	18.31	24.93	19.34	26.39	18.73	27.44	19.12	29.30	19.28	30.76	19.65
	35	23.46	18.45	24.91	19.49	26.37	18.87	27.42	19.27	29.28	19.43	30.74	19.80
	40	23.44	18.59	24.89	19.64	26.35	19.01	27.40	19.41	29.26	19.58	30.72	19.95
	45	23.42	18.73	24.87	19.78	26.33	19.15	27.38	19.56	29.24	19.72	30.69	20.10
	50	23.40	18.87	24.85	19.93	26.31	19.30	27.36	19.70	29.21	19.87	30.67	20.24
	55	23.38	19.00	24.84	20.07	26.29	19.44	27.34	19.85	29.19	20.01	30.64	20.39
	60	23.37	19.14	24.82	20.22	26.27	19.58	27.32	19.99	29.17	20.16	30.62	20.54
	65	23.35	19.28	24.80	20.37	26.25	19.72	27.29	20.13	29.15	20.30	30.60	20.69
	70	23.33	19.42	24.78	20.51	26.23	19.86	27.27	20.28	29.13	20.45	30.57	20.84
	75	22.77	19.10	24.21	20.20	25.66	19.58	26.70	20.01	28.55	20.20	29.99	20.60
	80	22.21	18.77	23.65	19.88	25.09	19.30	26.13	19.73	27.97	19.95	29.42	20.36
	85	21.65	18.43	23.09	19.55	24.53	18.99	25.57	19.44	27.40	19.68	28.84	20.10
	90	21.09	18.08	22.53	19.21	23.96	18.69	25.00	19.14	26.83	19.40	28.27	19.84
	95	20.49	17.89	21.92	19.03	23.35	18.55	**24.00**	**18.72**	26.20	19.30	27.63	19.75
	100	19.99	17.41	21.42	18.55	22.85	18.10	23.69	18.43	25.70	18.88	27.13	19.35
	105	19.49	16.93	20.92	18.07	22.35	17.66	23.38	18.14	25.20	18.47	26.63	18.94
	110	18.99	16.35	20.42	17.49	21.85	17.12	22.88	17.60	24.70	17.94	26.13	18.42
	115	18.49	15.86	19.92	17.00	21.35	16.66	22.38	17.15	24.20	17.51	25.63	18.00
	118	18.19	15.75	19.62	16.89	21.05	16.58	22.08	17.07	23.90	17.46	25.33	17.96
	122	18.10	15.71	19.52	16.86	20.95	16.55	21.98	17.05	23.81	17.44	25.23	17.94

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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FOUR-WAY VAHU INDOOR UNITS

Cooling Capacity Table

Table 95: Multi F Vertical-Horizontal Air Handling Indoor Units Cooling Capacity Table - continued

Model No. / Nominal Capacity of Indoor Unit (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	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
LVN361HV4 18,000	14	35.29	27.18	37.48	28.71	39.67	27.80	41.26	28.39	44.06	28.63	46.25	29.17
	20	35.26	27.39	37.45	28.94	39.64	28.02	41.23	28.61	44.02	28.85	46.21	29.40
	25	35.24	27.61	37.43	29.16	39.61	28.24	41.19	28.83	43.99	29.07	46.18	29.62
	30	35.21	27.82	37.40	29.39	39.58	28.45	41.16	29.05	43.96	29.30	46.14	29.85
	35	35.18	28.03	37.37	29.61	39.55	28.67	41.13	29.27	43.92	29.52	46.11	30.08
	40	35.16	28.24	37.34	29.83	39.52	28.88	41.10	29.49	43.89	29.74	46.07	30.30
	45	35.13	28.45	37.31	30.05	39.49	29.10	41.07	29.71	43.86	29.96	46.04	30.53
	50	35.10	28.66	37.28	30.28	39.46	29.32	41.04	29.93	43.82	30.19	46.00	30.76
	55	35.08	28.87	37.25	30.50	39.43	29.53	41.01	30.15	43.79	30.41	45.97	30.98
	60	35.05	29.08	37.23	30.72	39.40	29.74	40.97	30.37	43.76	30.63	45.93	31.21
	65	35.02	29.29	37.20	30.94	39.37	29.96	40.94	30.59	43.72	30.85	45.90	31.43
	70	34.99	29.50	37.17	31.16	39.34	30.17	40.91	30.81	43.69	31.07	45.86	31.66
	75	34.15	29.01	36.32	30.69	38.49	29.75	40.05	30.40	42.82	30.69	44.99	31.30
	80	33.31	28.52	35.47	30.20	37.64	29.31	39.20	29.98	41.96	30.30	44.12	30.93
	85	32.48	28.00	34.63	29.70	36.79	28.86	38.35	29.53	41.10	29.89	43.26	30.54
	90	31.64	27.47	33.79	29.18	35.94	28.39	37.50	29.08	40.25	29.48	42.40	30.14
	95	30.74	27.18	32.88	28.92	35.02	28.17	**36.00**	**28.44**	39.30	29.32	41.44	30.01
	100	29.99	26.45	32.13	28.19	34.27	27.50	35.53	28.00	38.55	28.69	40.69	29.39
	105	29.24	25.72	31.38	27.46	33.52	26.83	35.07	27.56	37.80	28.06	39.94	28.78
	110	28.49	24.84	30.63	26.57	32.77	26.00	34.32	26.74	37.05	27.26	39.20	27.99
	115	27.74	24.10	29.88	25.82	32.02	25.31	33.57	26.05	36.31	26.61	38.45	27.35
	118	27.29	23.93	29.43	25.66	31.57	25.19	33.12	25.94	35.86	26.52	38.00	27.28
	122	27.14	23.87	29.28	25.61	31.43	25.14	32.97	25.90	35.71	26.49	37.85	27.25

TC = Total Capacity (kBtu/h).

SHC: Sensible Heat Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

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

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FOUR-WAY VAHU INDOOR UNITS

Heating Capacity Table

Table 88: Multi F Vertical-Horizontal Air Handling Indoor Units Heating Capacity Table.

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LVN181HV4 18,000	0	-0.4	10.29	10.14	10.05	10.00	9.86	9.42
	5	4.5	11.59	11.45	11.35	11.30	11.16	10.72
	10	9	12.90	12.75	12.66	12.61	12.46	12.03
	17	15	14.64	14.49	14.40	**14.35**	14.20	13.74
	20	19	15.29	15.14	15.05	15.00	14.86	14.35
	25	23	16.38	16.23	16.14	16.09	15.94	15.36
	30	28	17.32	17.17	17.08	17.03	16.88	16.38
	35	32	18.26	18.12	18.02	17.97	17.83	17.39
	40	36	19.11	18.96	18.86	18.82	18.67	18.24
	45	41	19.95	19.81	19.71	19.66	19.52	19.08
	47	43	20.29	20.14	20.05	**20.00**	19.86	19.42
	50	46	20.62	20.47	20.37	20.33	20.18	19.69
	55	51	21.16	21.01	20.92	20.87	20.72	20.14
	60	56	21.16	21.01	20.92	20.87	20.72	20.24
	63	59	21.16	21.01	20.92	20.87	20.72	20.29
	68	64	21.16	21.01	20.92	20.87	20.72	20.38
LVN241HV4 24,000	0	-0.4	13.89	13.70	13.57	13.50	13.30	12.72
	5	4.5	15.65	15.46	15.33	15.26	15.07	14.48
	10	9	17.41	17.22	17.09	17.02	16.83	16.24
	17	15	19.76	19.57	19.43	**19.37**	19.17	18.55
	20	19	20.64	20.45	20.32	20.25	20.05	19.37
	25	23	22.11	21.91	21.78	21.72	21.52	20.74
	30	28	23.38	23.18	23.05	22.99	22.79	22.11
	35	32	24.65	24.46	24.33	24.26	24.07	23.48
	40	36	25.79	25.60	25.47	25.40	25.21	24.62
	45	41	26.93	26.74	26.61	26.54	26.35	25.76
	47	43	27.39	27.20	27.07	**27.00**	26.80	26.22
	50	46	27.83	27.64	27.51	27.44	27.24	26.58
	55	51	28.57	28.37	28.24	28.17	27.98	27.20
	60	56	28.57	28.37	28.24	28.17	27.98	27.32
	63	59	28.57	28.37	28.24	28.17	27.98	27.39
	68	64	28.57	28.37	28.24	28.17	27.98	27.51

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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FOUR-WAY VAHU INDOOR UNITS

Heating Capacity Table

Table 96: Multi F Vertical-Horizontal Air Handling Indoor Units Heating Capacity Table - continued

Model No. / Nominal Capacity of Indoor Unit (Btu/h)	Outdoor Air Temp.		Indoor Air Temp. °F DB					
	°F DB	°F WB	61	64	68	70	72	75
			TC	TC	TC	TC	TC	TC
LVN361HV4 36,000	0	-0.4	20.58	20.29	20.10	20.00	19.71	18.84
	5	4.5	23.19	22.90	22.71	22.61	22.32	21.45
	10	9	25.80	25.51	25.31	25.22	24.93	24.06
	17	15	29.28	28.99	28.79	**28.70**	28.41	27.48
	20	19	30.58	30.29	30.10	30.00	29.71	28.70
	25	23	32.75	32.46	32.27	32.17	31.88	30.72
	30	28	34.64	34.35	34.15	34.06	33.77	32.75
	35	32	36.52	36.23	36.04	35.94	35.65	34.78
	40	36	38.21	37.92	37.73	37.63	37.34	36.47
	45	41	39.90	39.61	39.42	39.32	39.03	38.16
	47	43	40.58	40.29	40.10	**40.00**	39.71	38.84
	50	46	41.23	40.94	40.75	40.65	40.36	39.38
	55	51	42.32	42.03	41.84	41.74	41.45	40.29
	60	56	42.32	42.03	41.84	41.74	41.45	40.47
	63	59	42.32	42.03	41.84	41.74	41.45	40.58
	68	64	42.32	42.03	41.84	41.74	41.45	40.76

TC = Total Capacity (kBtu/h).

Nominal capacity as rated 0 ft. above sea level and a 0 ft. level difference between outdoor and indoor units. 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 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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FOUR-WAY VAHU INDOOR UNITS

External Static Pressure

Table 89: Air Filter Static Pressure Drop Factors.

Capacity (kBtu/h [tons])	Flow Rate (CFM)	Static Pressure Drop (in wg)
18 (1.5)	High (640)	-0.04
	Middle(580)	-0.04
	Low (480)	-0.04
24 (2.0)	High (710)	-0.04
	Middle(640)	-0.04
	Low (480)	-0.04
36 (3.0)	High (990)	-0.04
	Middle(880)	-0.04
	Low (800)	-0.04

Table 90: Minimum Airflow (CFM) by Heater Capacity

Capacity (kBtu/h [tons])	Heater Capacity kW			
	3, 5	8, 10	15	20
18 (1.5)	480	480	Not Available	Not Available
24 (2.0)	480	480	Not Available	Not Available
36 (3.0)	900	900	Not Available	Not Available

⚠ WARNING

⃠ Do not operate with less than the minimum airflow. If an airflow is used below the minimum, there is a risk of fire, which will lead to physical injury or death

Note:

⃠ Do not operate with less than the minimum airflow. If an airflow is used below the minimum, there is a risk of damage to the product.

These VAHUs are constant air volume (CAV) units and do not require any field adjustment to change ESP settings.

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Table 91: Electric Heater Static Pressure Drop Factors.

Heater Capacity	Static Pressure Drop (in. wg)
0	0
3, 5	-0.01
8, 10	-0.02

Table 92: Down Flow (optional) Static Pressure Drop Factors.

Capacity (kBtu/h [tons])	Flow Rate (CFM)	Static Pressure Drop (in wg)
18 (1.5)	High (640)	-0.04
	Middle(580)	-0.04
	Low (480)	-0.04
24 (2.0)	High (710)	-0.04
	Middle(640)	-0.04
	Low (480)	-0.04
36 (3.0)	High (990)	-0.04
	Middle(880)	-0.04
	Low (800)	-0.04

Table 93: Down Flow Air Filter Static Pressure Drop Factors

Capacity (kBtu/h [tons])	Flow Rate (CFM)	Static Pressure Drop (in wg)
18 (1.5)	High (640)	-0.04
	Middle(580)	-0.04
	Low (480)	-0.04
24 (2.0)	High (710)	-0.04
	Middle(640)	-0.04
	Low (480)	-0.04
36 (3.0)	High (990)	-0.04
	Middle(880)	-0.04
	Low (800)	-0.04

Table 94: Down Flow Internal Electric Heater Static Pressure Drop.

Heater Capacity (kW)	Static Pressure Drop (in. wg)
0	0
3, 5	-0.01
8, 10	-0.01

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FOUR-WAY VAHU INDOOR UNITS

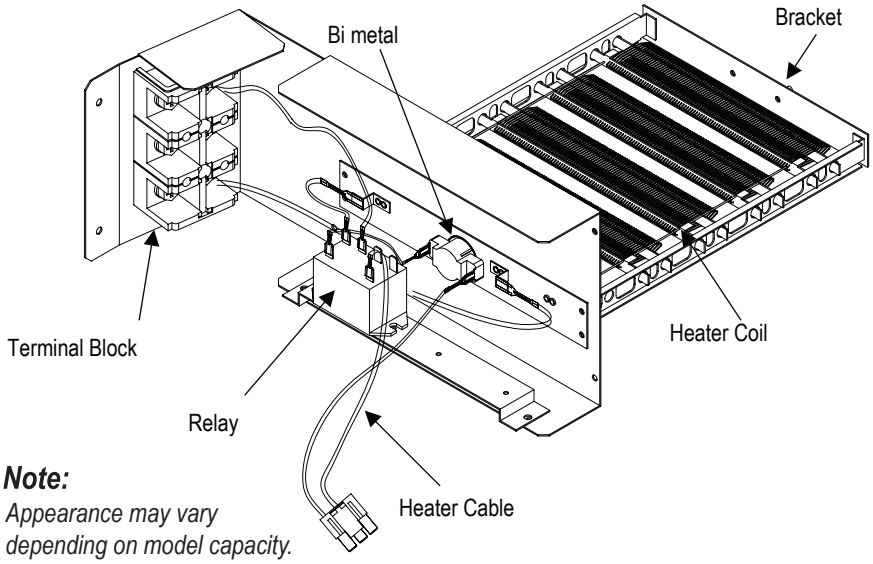
Heater Capacities

Table 95: Optional Electric Heater Capacities.

Heater Capacity (kW)	Model Number
3	ANEH033B1
5	ANEH053B1
8	ANEH083B2
10	ANEH103B2

Figure 217: Typical Vertical Air Handling Unit Optional Electric Heater Accessory.

Example: 5kW Capacity Heater



Note:
Appearance may vary depending on model capacity.

Table 96: Electric Heater Compatibility

VAHU Model Number and Capacity (MBh)	Model Number / Heater Capacity kW					
	ANEH033B1 (3kW)	ANEH053B1 (5kW)	ANEH083B2 (8kW)	ANEH103B2 (10kW)	ANEH153B2 (15kW)	ANEH203B2 (20kW)
LVN181HV4 (18)	√	√	√	√	X	X
LVN241HV4 (24)	√	√	√	√	X	X
LVN361HV4 (36)	√	√	√	√	X	X

√ = Compatible X = Not Compatible

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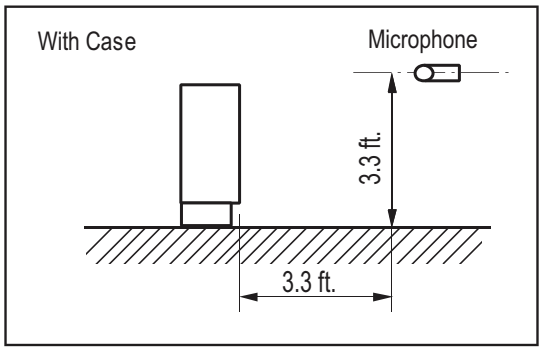
Figure 218: Sound Pressure Level Measurement Location.



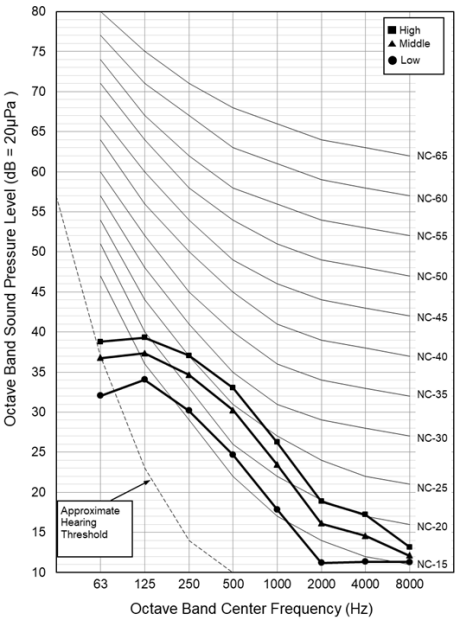
- Measurement taken 3.3' away from the unit.
- Sound pressure levels are measured in dB(A).
- Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.
- Operating Conditions:
  Power source: 220V/60 Hz.
- Sound level will vary depending on a range of factors including the construction (acoustic absorption coefficient) of a particular room in which the unit was installed.

Table 97: Vertical Air Handling Unit Sound Pressure Levels (dB[A]).

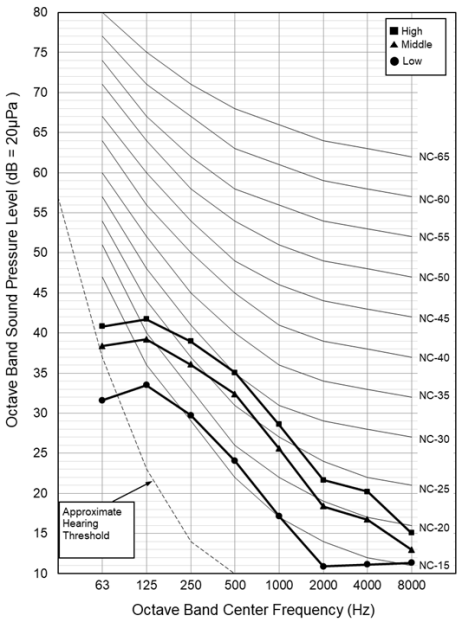
Model No.	Sound Pressure Levels (dB[A]) (Cooling and Heating)		
	High Fan Speed	Medium Fan Speed	Low Fan Speed
LVN181HV4	35	33	30
LVN241HV4	36	34	30
LVN361HV4	44	41	39

Figure 219: Sound Pressure Level Diagrams.

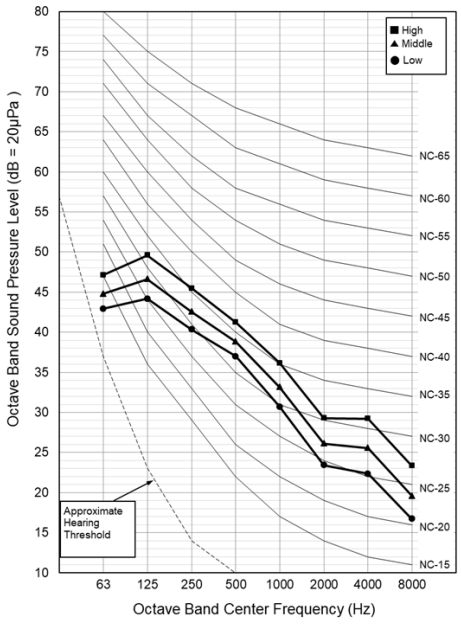
LVN181HV4



LVN241HV4



LVN361HV4



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FOUR-WAY VAHU INDOOR UNITS

Acoustic Data

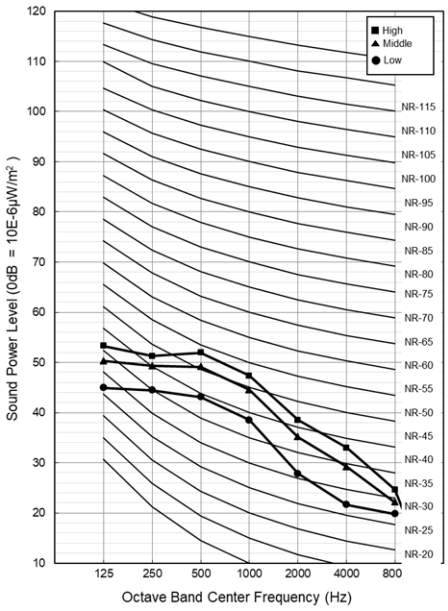
Table 98: Vertical Air Handling Unit Sound Power Levels (dB[A]).

Model No.	Sound Power Levels (dB[A])
	High Fan Speed
LVN181HV4	54
LVN241HV4	55
LVN361HV4	63

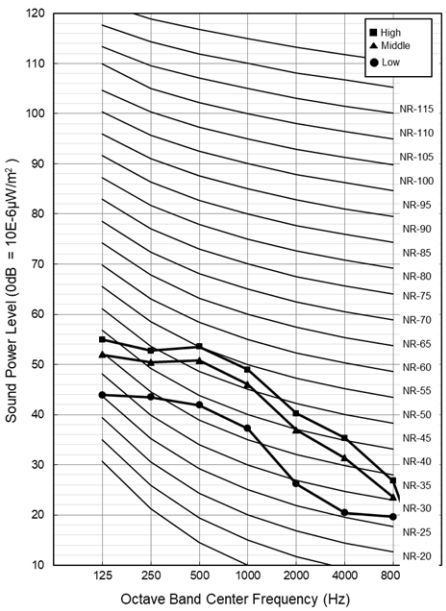
- Data is valid under diffuse field conditions.
- Data is valid under nominal operating conditions.
- Sound power level is measured using rated conditions, and tested in a reverberation room per ISO 3741 standards.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Reference acoustic intensity: 0dB = 10E-6μW/m2

Figure 220: Sound Power Level Diagrams.

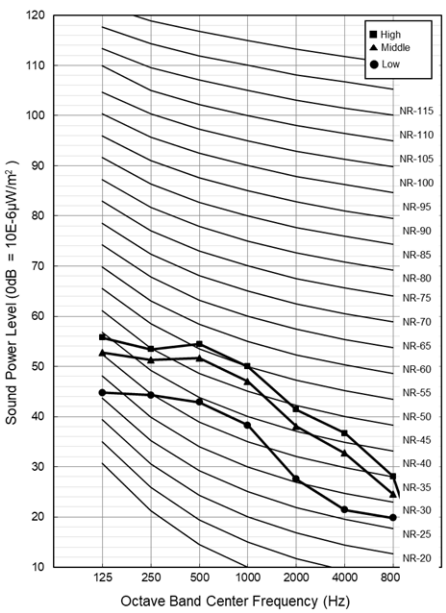
LVN181HV4



LVN241HV4



LVN361HV4



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FOUR-WAY VAHU INDOOR UNITS

Refrigerant Flow Diagram

Figure 221: Four-way Vertical-Horizontal Air Handling Indoor Unit Refrigerant Flow Diagram.

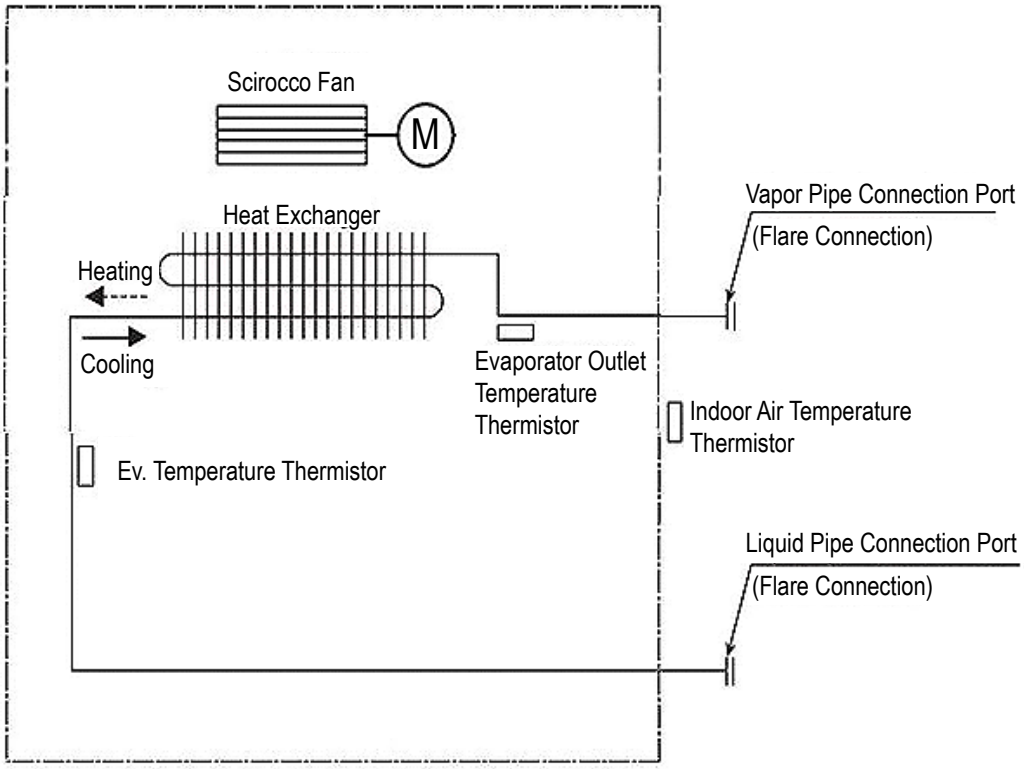

Table 99: Four-way Vertical-Horizontal Air Handling Indoor Unit Refrigerant Pipe Sizes and Connection Sizes.

Model No.	Piping Size		Connection Port Size	
	Liquid (inch)	Vapor (inch)	Liquid (inch)	Vapor (inch)
LVN181HV4	1/4	1/2	3/8	5/8
LVN241HV4	1/4	1/2	3/8	5/8
LVN361HV4	3/8	5/8	3/8	5/8

Table 100: Four-way Vertical-Horizontal Air-Handling 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

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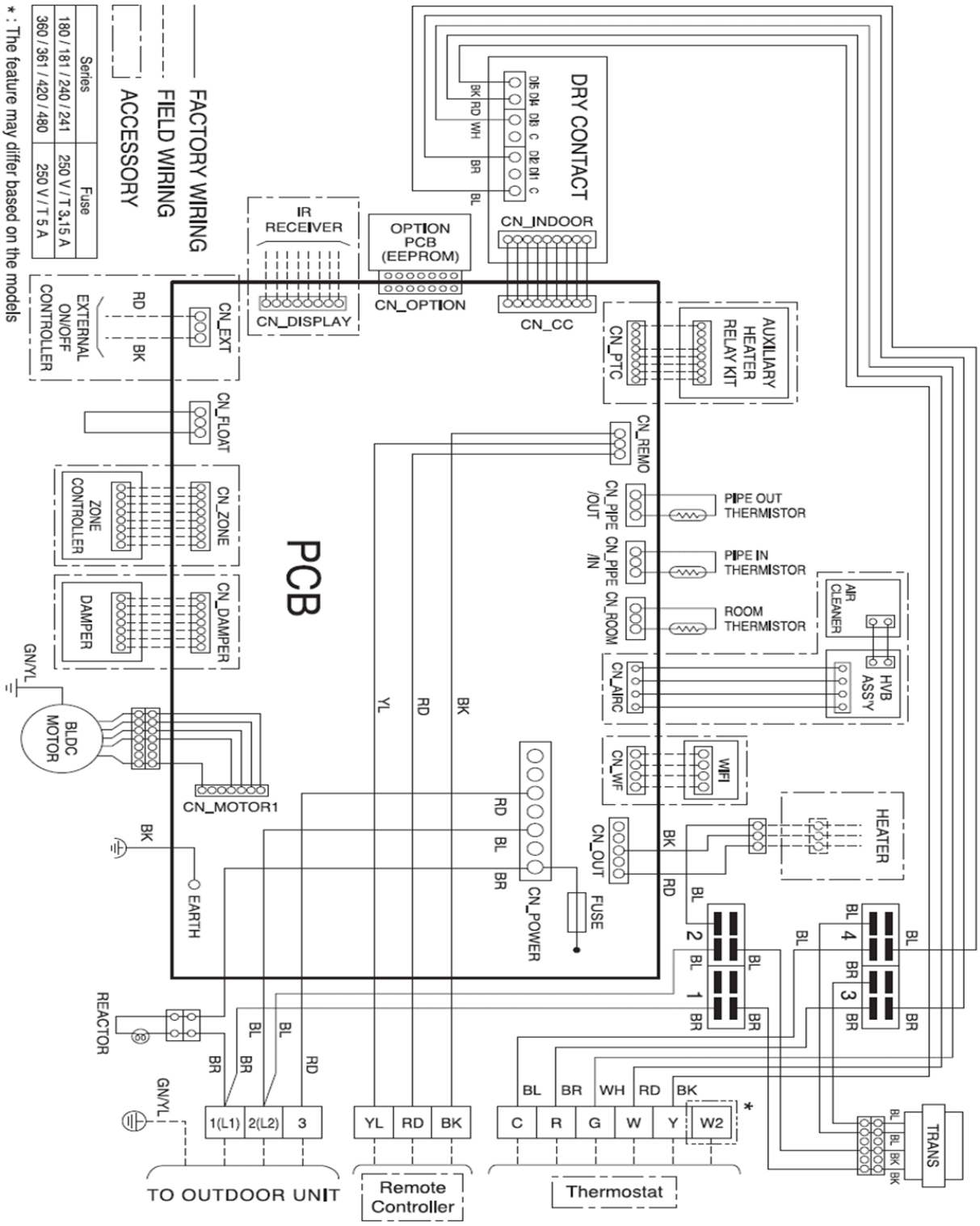
FOUR-WAY VAHU INDOOR UNITS

Wiring Diagram

Figure 222: Four-way Vertical-Horizontal Air-Handling Indoor Unit Wiring Diagram.



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FOUR-WAY VAHU INDOOR UNITS

Wiring Diagram

Table 101: Wiring Diagram Connections.

Connection Name	Location	Function
CN-POWER	AC power supply	AC Power line
CN-MOTOR1	Fan motor output	Motor output of BLDC
CN_OUT	Heater	Connection for heater
CN-D/PUMP	Drain pump output	AC output for drain pump
CN-FLOAT	Float switch input	Float switch sensing
CN-ZONE	Zone controller	Zone controller connection
CN-OPTION	Optional PCB EPROM	Option PCB connection
CN-EXT	External ON / OFF controller	External ON / OFF controller connection
CN-DISPLAY	Display	Display of indoor status
CN-CC	Dry contact	Dry Contact connection
CN-PIPE/OUT (RD)	Discharge pipe sensor	Pipe out thermistor
CN-LEAK (VI)	Refrigerant leak detector	Refrigerant leak detector connection
CN-PIPE/IN (WH)	Suction pipe sensor	Pipe in thermistor
CN-REMO (GN)	Wired remote controller	Wired remote control connection
CN-ROOM (YL)	Room sensor	Room air thermistor
CN-DAMPER	Damper Controller	Damper connection
CN-AIRC	Air Cleaner	Air Cleaner connection
CN-WF	Wifi	Wifi Module connection
CN-PTC	Auxiliary Heater	Auxiliary Heater

Table 102: DIP Switch Settings.

DIP Switch Settings		OFF	ON	Description
SW1	Communication	Off (default)	—	—
SW2	CYCLE	Off (default)	—	—
SW3	GROUP	Master	Slave	Group control setting using wired remote controller.
SW4	DRY CONTACT	Variable	Auto	Dry contact mode setting. 1. Variable: Auto/manual mode can be chosen using the wide wired remote controller or wireless remote controller (factory setting is the manual mode). 2. Auto: For dry contact, it is always auto mode.
SW5	EXTRA1	Off	On	• ON: Fan operates continuously. • OFF: Default (Fan does not operate continuously).
SW6	HEATER	Off	On	• ON: Automatic heater operation. • OFF: Default (manual heater operation).
SW7	Off			
SW8	Off			

To operate the indoor unit without Internal Electric Heater , Dip switch 1, 2, 6, 8 must be set OFF .

To operate the indoor unit with Internal Electric heater , Dip switch 6 must be set ON.

- SW6 ON: Automatic Heater operation: Heater operates automatically.
- SW6 OFF: Manual Heater operation: Owner 's involvement is required for on/off operation.

If you operate the indoor unit with Internal Electric heater with Dip switch 5, note the following:

- SW5 ON: Fan operates continuously. During defrosting or oil return operation, uninterrupted heating can be attained, as a result of continuous heater and fan operation.
- SW5 OFF: Fan discontinuous operation. There would be a reduction in heating capacity while defrosting or oil return operation.

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FOUR-WAY VAHU INDOOR UNITS

Factory Supplied Parts and Materials

Factory Supplied Materials

- Owner's Manual
- Installation Manual

Required Tools

- Level
- Screwdriver
- Electric drill
- Hole core drill
- Flaring tool set
- Torque wrenches
- Hexagonal wrench
- Gas-leak detector
- Thermometer

⚠ WARNING

Installation work must be performed by trained personnel and in accordance with national wiring standards and all local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.

Note:

Read all instructions before installing this product. Become familiar with the unit's components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

Selecting the Best Location

Do's

- Place the unit where air circulation through the ducts will not be blocked.
- Place the unit where drainage can be obtained easily.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient strength to bear the load of the indoor unit.
- Ensure there is sufficient maintenance space.
- Locate the indoor unit in a location that is level, and where it can be easily connected to the outdoor unit / branch distribution unit.

⃠ Don'ts

- ⃠ *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used.*
- ⃠ *Do not install the unit where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored.*
- ⃠ *Do not install the unit near high-frequency generators.*
- ⃠ *Do not install the unit near a doorway.*

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

Note:

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

Installing in an Area Exposed to Unconditioned Air

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

- Verify that carpet is or will be installed (carpet will 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.

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FOUR-WAY VAHU INDOOR UNITS

Installation and Best Layout Practices

Figure 223:Clearance Requirements.

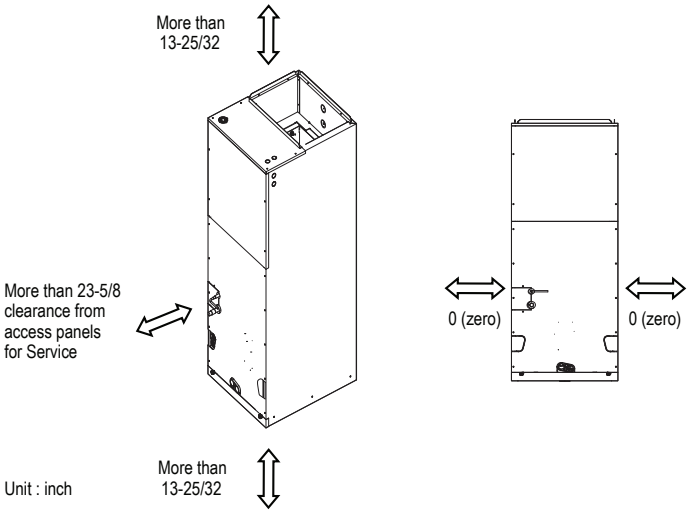


Figure 224:General and Duct Connection Dimensions.

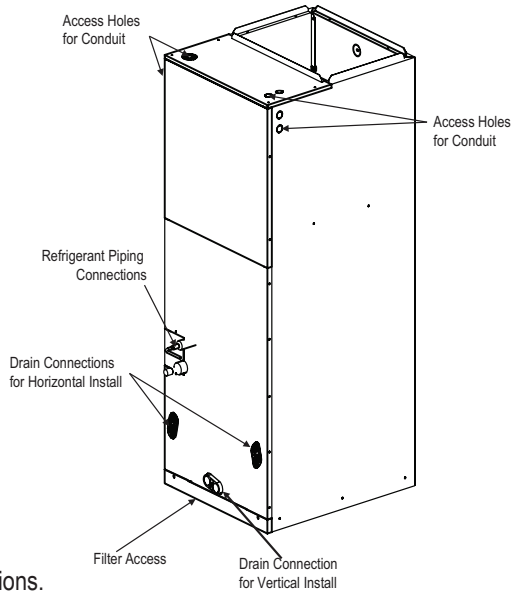
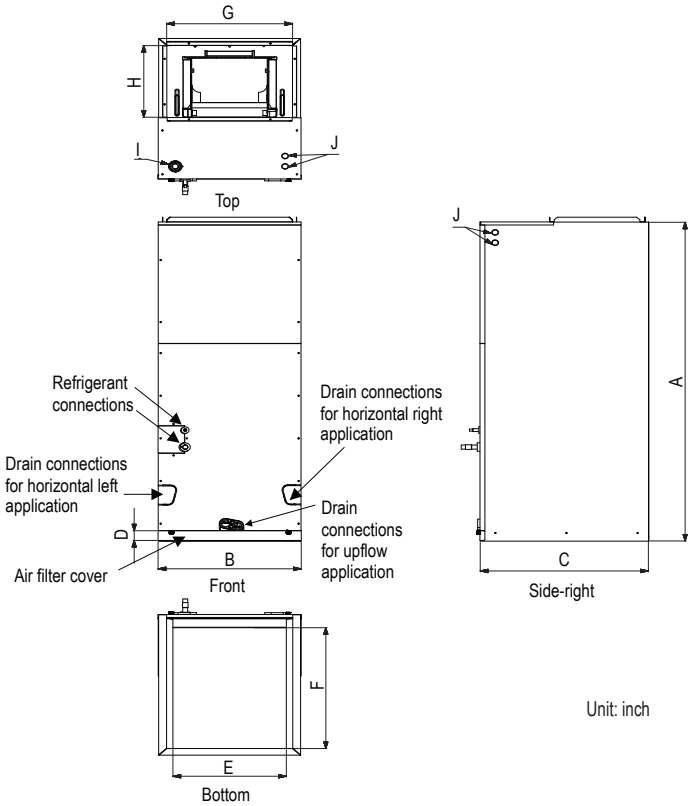


Figure 225:Location of Access Holes and Piping Connections.



ODU	VAHU Capacity (kBtu/h)	Dimensions								Wiring Knock out		Refrigerant Pipe size		Refrigerant Pipe Connections	
		A	B	C	D	E	F	G	H	I	J				
		Height	Width	Depth						Power	Comm-unication	Liquid	Gas	Liquid	Gas
Multi Zone	18 24	48-11/16	18	21-1/4	1-9/16	17-1/2	20	17	12-1/8	1-11/16	7/8	1/4	1/2	3/8	5/8
	36	48-11/16	18	21-1/4	1-9/16	17-1/2	20	17	12-1/8	1-11/16	7/8	3/8	5/8	3/8	5/8

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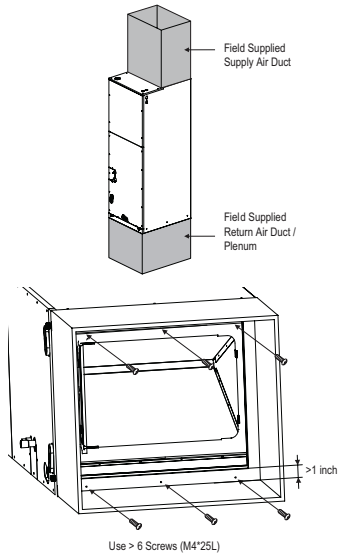
Note:

Vertical-Horizontal Air Handling Units can be installed in a choice of vertical upflow, vertical downflow (with optional downflow kit), or horizontal (left or right side) configurations.

Vertical (Upflow) Installation

- Unit must be positioned properly for plenum / duct installation.
- To maintain proper air flow, minimum height clearance is 14 inches.
- Plenum must be strong and secure enough to support the installation of adapter collars to accommodate duct work.
- Air handler platform must be sturdy enough to support the frame, plus any accessories (e.g., filter box).
- To prevent air leaks, seal all duct work according to local codes, but make sure that filter access is still unobstructed.
- Vibration isolators (field supplied) must be installed between the unit frame and the platform. If necessary, provide the installing contractor with an illustration of where the vibration isolator must be added and how it must be positioned.

Figure 226:Vertical Installation / Attaching the Bottom Duct.



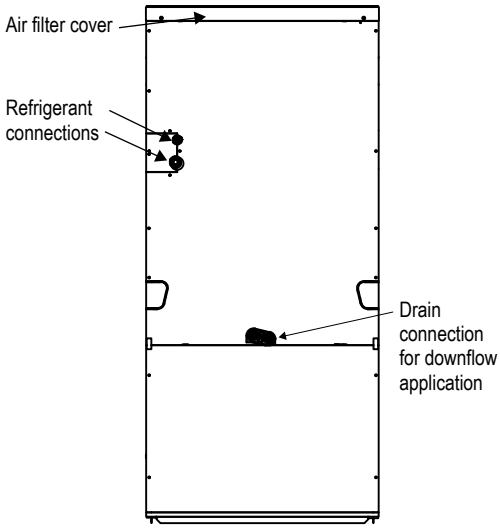
Note:

Do not install the screws on the front and back of the unit; doing so will block filter installation.

Vertical (Downflow) Installation

The Vertical-Horizontal Air Handling Unit can be field-converted to vertical downflow operation. The optional vertical downflow kit is required. Downflow kit PNDFJ0 is required for 18-36MBH NJ chassis units. The coil must be removed and repositioned in the chassis with the brackets of the downflow kit. For installation details, refer to the instructions included with the kit.

Figure 227: Chassis after Downflow Field Conversion.



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Horizontal Installation

- Units will be installed in horizontal left or horizontal right configuration. Horizontal left is the factory default configuration. For horizontal right, the unit must be field converted. The horizontal right conversion requires removing the internal drain pan from the left side of the unit and reinstalling on the right side. No conversion kit is required. Refer to the installation manual for details.
- Units must be installed so that the access panels face to the side, not facing up or down.
- Installation must be in accordance with all relevant building codes, which will necessitate the installation of an external condensate pan (position the unit in or above the external condensate pan).
- If the units are going to be suspended, use angled steel support brackets with threaded rods to provide support from the bottom. The brackets / threaded rods must be comparatively bigger / longer than the unit, and each must be centered on the part of the frame it supports.
- If the unit will not be suspended, use angled steel support brackets, but also add vibration isolators (field supplied) to avoid sound transmission. If necessary, provide the installing contractor with an illustration of where the vibration isolator must be added and how it must be positioned.
- Unit must be positioned properly for plenum / duct installation.
- Plenum must be strong and secure enough to support the installation of adapter collars to accommodate duct work.

Note:

To ensure proper drainage for horizontal installations, unit must be installed within ±1/8 inches level of the unit's length and width.

Figure 228: Typical Horizontal Left Installation.

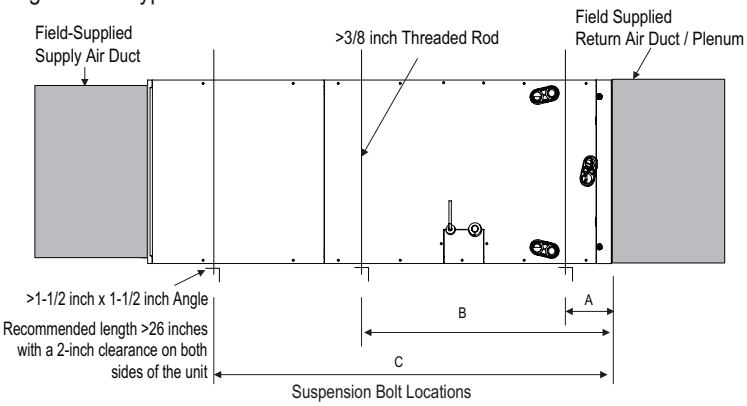

Figure 229: Typical Horizontal Right Installation.

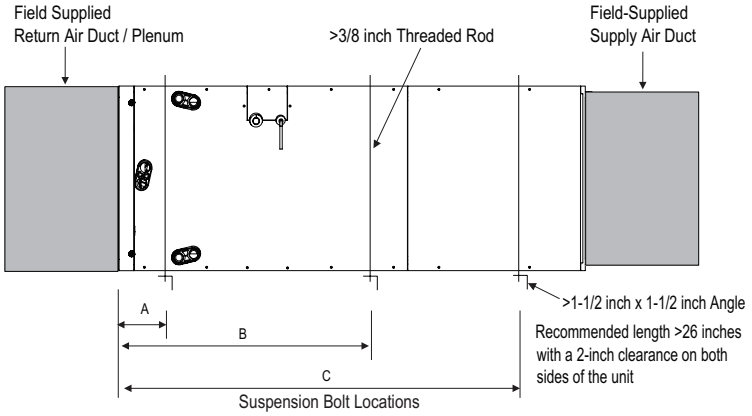

Table 103: Bracket / Bolt Position Dimensions for Horizontal Left and Horizontal Right Installation.

Capacity (Btu/h)	Dimensions (inches)		
	A	B	C
18,000	4	23	41-11/32
24,000	4	23	41-11/32
36,000	4	23	41-11/32

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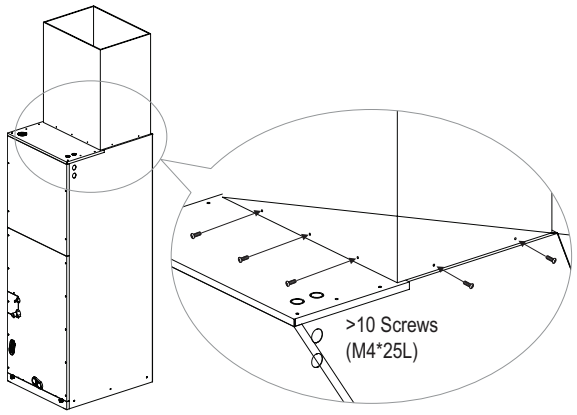
Installing the Ducts

- Use more than ten (10) screws to securely attach the supply ducts to the unit. To prevent air leaks, seal around the duct opening before the duct is secure.
- To prevent vibration transmission, install flexible connectors between ducts and the unit. The flexible connectors must be made of a heat-resistant material at the discharge connection if an electric heater is installed.
- Duct work must be insulated and covered with vapor barrier when routed through unconditioned spaces. Include enough insulation to prevent condensate from forming on the ducts.
- It will be necessary to add internal acoustical insulation lining for a metal duct system if it does not include a 90° elbow and ten (10) feet between the main duct and the first branch.

Figure 230:Securing the Ducts to the Unit.



- Fibrous glass ducts could be used as a substitute if built and installed in accordance with the most recent edition of the Sheet Metal and Air-Conditioning Contractors' National Associate (SMACNA) standard.
- Also, fibrous duct work and acoustical insulation lining must also follow National Fire Protection Standard 90A or B as tested by UL Standard 181 for Class 1 air ducts.

Installing the Drain System

General Specifications

- To prevent property damage, optimize drain system performance by installing both a primary and secondary drain line, and properly size the condensate traps.
- The primary and secondary drain line must be trapped to allow proper drainage of condensate water. If the secondary drain line is not used, it must be capped.
- ⃠ Do not block the filter access panel when installing the condensate drain piping. Prime the primary and secondary condensate traps after running both to the drain pan.
- If the unit is installed above an inhabited space, add a field-supplied external condensate pan that runs underneath the entire frame (to prevent damage from overflow). The additional external condensate line must run from the unit to the external condensate pan.
- Drain all generated condensate from the external condensate pan to an appropriate area. Install a trap in the condensate lines as near to the indoor unit coil as possible.
- For horizontal right operation, the drain pan must be removed from the interior left side of the unit and reinstalled on the right side.
- All condensate must be drained from the external condensate pan to some noticeable area.
- To prevent overflow, the outlet of each trap must be positioned below its connection to the condensate pan.
- All traps must be primed, insulated, and leak tested if located above an inhabited space.
- Use a 3/4-inch PVC male pipe thread fitting at the condensate pan connection. Tighten gently.
- Point the drain hose down for easier flow.
- ⃠ Do not just use the pipe joint or PVC / CPVC piping on the indoor unit drain line connections. Use only Teflon tape.
- Design the drain system to plan for winter operation (condensate line will freeze up if condensate does not properly drain away).

Figure 231: Typical Vertical Up/Down Installation Drain System.

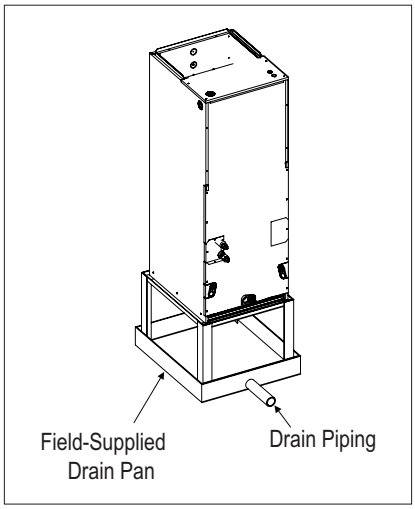
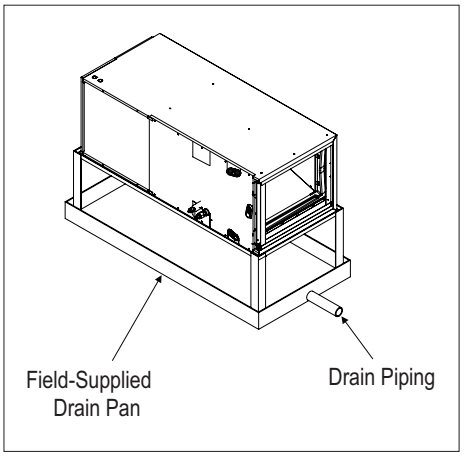


Figure 232: Typical Horizontal Left/Right Installation Drain System.



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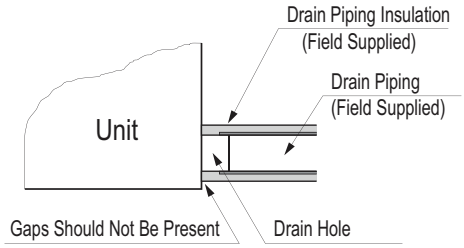
Drain Piping Specifications

- Drain piping must have downward gradient of at least 1/50 to 1/100; to prevent reverse flow, slope must not be straight up and down.
- ⃠ Do not damage the drain port on the indoor unit when connecting the field-supplied drain piping.

Figure 233:Close up of Drain Piping Connection.



Field-Installed U-Trap Specifications

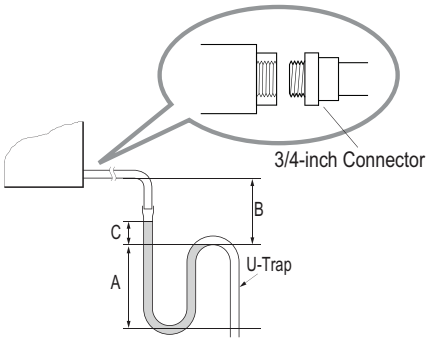
Note:

To prevent leaks cause by a block in the intake air filter, install a U-Trap.

A ≥ 2-9/16 inches
B ≥ 2C
C ≥ 2 x SP
SP = External Pressure in. WG

Example:
External Pressure= 0.4 in WG
A ≥ 2-9/16 inches
B ≥ 1-7/12 inches
C ≥ 19/24 inches

Figure 234:Installing the U-Trap.



Insulating the Refrigerant and Drain Piping

⚠WARNING

Ensure all piping is insulated. Exposed piping can cause burns if touched.

Refrigerant Piping Insulation

Field-installed vapor and liquid refrigerant piping lines must be properly and completely covered in insulation (up to the indoor unit piping connections) and must comply with federal, state, and local requirements. Any exposed piping will generate condensate or will cause burns if touched. Insulation for this field-installed refrigerant piping must have a minimum heat resistance of 248°F.

If the indoor unit is installed and is operated at an extended period in a highly humid environment (dew point temperature >73°F), however, condensate will form. To prevent this phenomenon, install adiabatic glass wool insulation with a thickness of 7/16 to 13/16 inches thick. Also, install glass wool insulation on all indoor units that are located in the ceiling plenum.

Drain Piping Insulation

Drain piping insulation must be 7/32 inches thick, minimum.

Figure 235: Vertical Primary and Secondary Drain Layout.

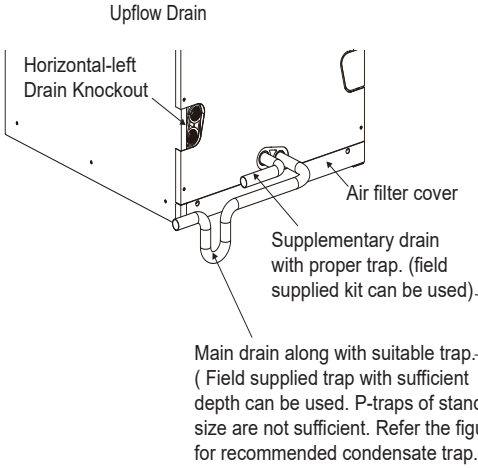


Figure 236: Horizontal Primary and Secondary Drain Layout.

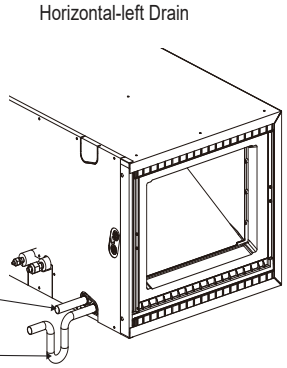


Figure 237:Close Up of Refrigerant Piping Connection Insulation.

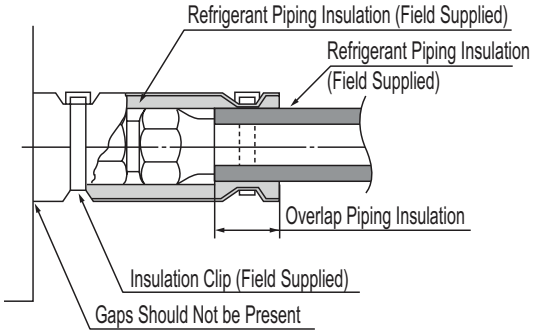
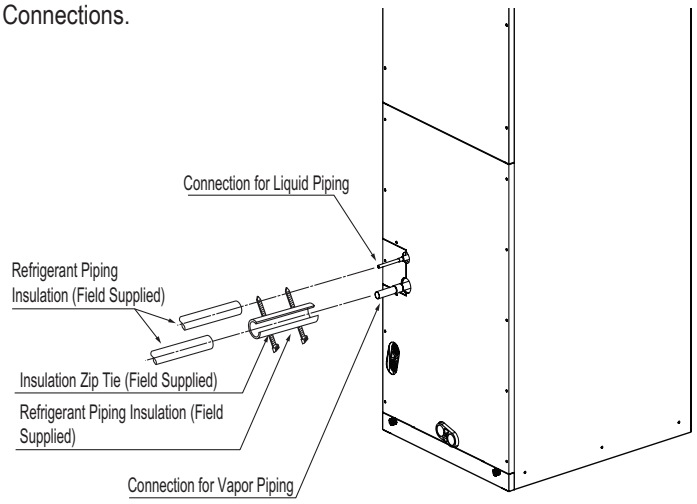


Figure 238: Insulating the Refrigerant Piping and Refrigerant Piping Connections.



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Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams in the technical manuals.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the outdoor unit name plate.
- Confirm cable thickness specifications.
- It is required that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.

⚠ WARNING

• Loose wiring will cause unit to malfunction, overheat, and catch fire, resulting in severe injury or death.

Note:

• Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.
A voltage drop will cause the following problems:
• Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
• Compressor will not receive the proper starting current.

Connecting the Power Wiring and Communications Cable

1. To access the terminal block, first unscrew the top front panel, and then unscrew the cover from the control box.

2. Knockout the access holes for the wiring. Insert the power wiring/ communications cable from the outdoor unit or branch distribution unit (Multi F MAX systems only) through the conduits, pass the conduits through the designated access holes, and then insert the conduits into the control box. To prevent electromagnetic interference and product malfunction, leave a space between the power wiring and communications cable outside of the indoor unit.

3. Connect the power wiring and communications cables to the appropriate terminals on the indoor unit control board. Verify that the color and terminal numbers from the outdoor unit or branch distribution unit (Multi F MAX systems only) wiring match the color and terminal numbers on the indoor unit.

4. Fill in any gaps around the conduit access holes with sealant to prevent foreign particles from entering the indoor unit.

Figure 239:Connecting the Power Wiring and Communications Cable.

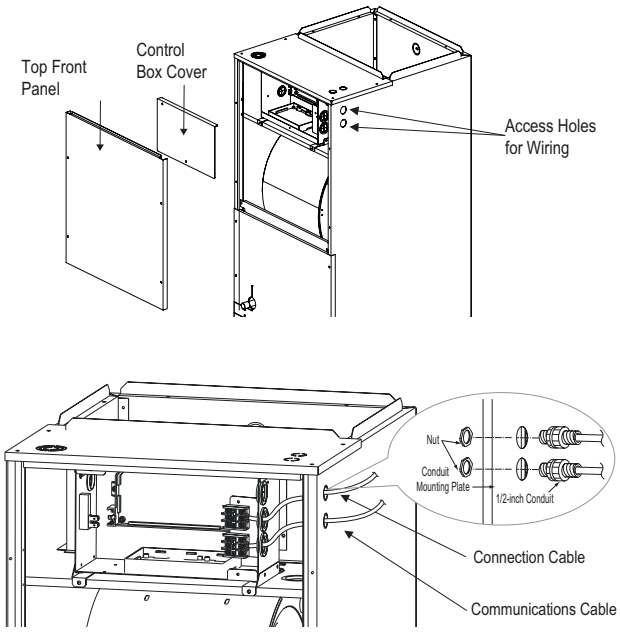
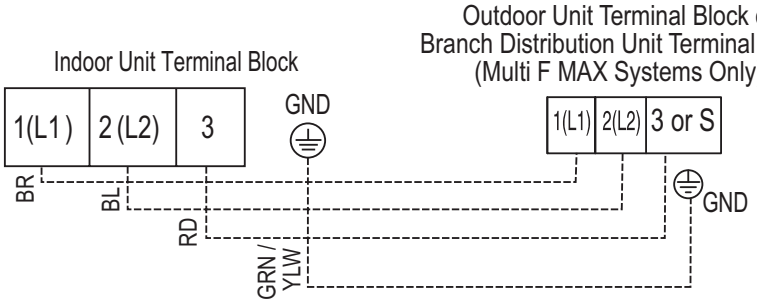


Figure 240:Indoor Unit to Outdoor Unit / Branch Distribution Unit (Multi F MAX systems only) Power Wiring / Communications Cable Connections.



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Controller Options

Vertical-Horizontal Air Handling indoor units can be used with many LG-supplied wired controllers (sold separately). The wireless handheld controller (Model No. PQWRHQ0FDB) is also an optional accessory with use of the wired controller.

Wired Controller Connections

Controllers can connect to the indoor unit in one of two different ways.

1. LG Wired Remote Extension Cable with Molex plug (PZCWRC1; sold separately) that connects to the CN-REMO terminal on the indoor unit PCB.

2. Field-supplied controller cable that connects to the indoor unit terminal block (must be at least UL2547 or UL1007, 22 AWG, two-core, one-shield core, at least FT-6 rated if local electric and building codes require plenum cable usage).

Figure 241:PZCWRC1 LG Wired Remote Extension Cable.

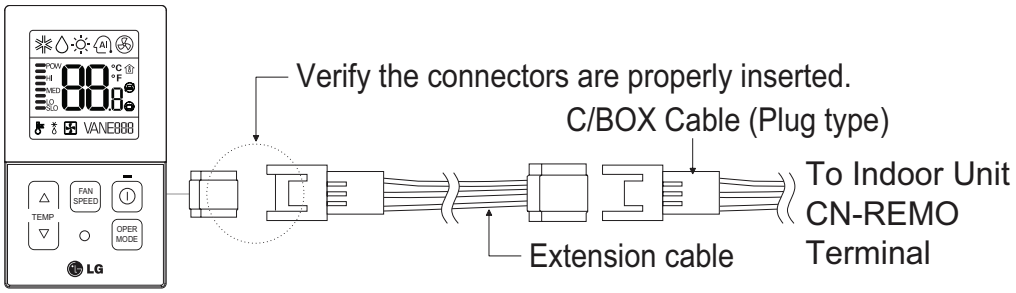
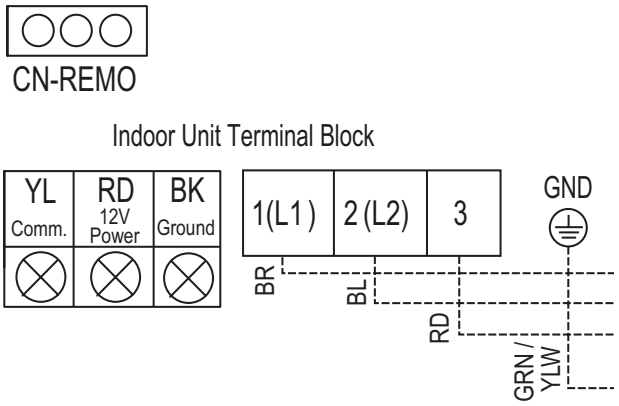


Figure 242:Wired Controller Connection on the Indoor Unit Terminal Block.



Note:

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

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FOUR-WAY VAHU INDOOR UNITS

Installation and Best Layout Practices

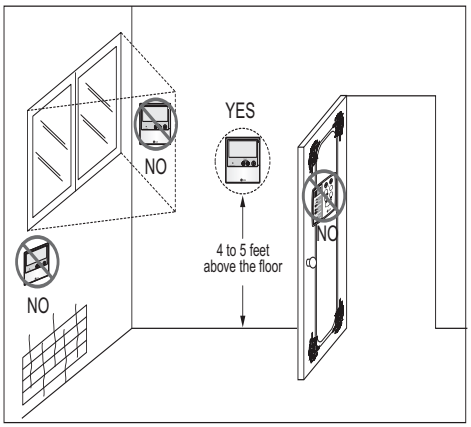
Wired Controller Placement

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

⃠ Do not install the wired controller near or in:

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

Figure 243:Proper Location for the Wired Controller.



Hanging the Wired Controller

1. These steps are typical. Refer to the installation instructions with your controller. The controller wiring / cable can be installed in one of three directions: top, back, or on the right side. If top or right side installation is desired, remove cable guide grooves on the controller, and then position wiring / cable on applicable side.
2. Choose and mark the area of installation, and then screw the wall plate into place (using the provided parts). Install the controller wall plate to fit the electrical box if one is present. Ensure that no gaps exist between the wall plate and the wall itself.
3. Arrange wiring / cables so as not to interfere with the controller circuitry. Position the wired controller on the wall plate. Snap into place by pressing the bottom part of the wired controller onto the wall plate. Make sure that no gaps exist between the wired controller and the wall plate on all sides.
4. To remove wired controller from the wall plate, insert a screwdriver into the two holes at the bottom. Twist screwdriver to release controller. ⃠ Do not damage the controller components when removing.

Figure 244:Removing the Cable Guide Grooves.

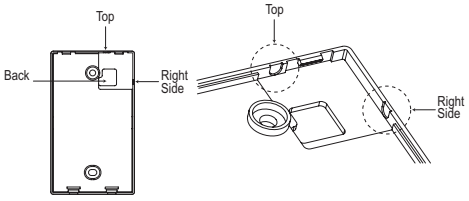


Figure 245:Attaching the Wall Plate.

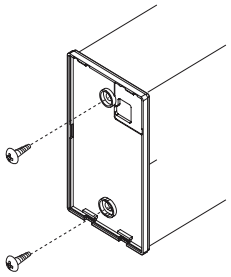
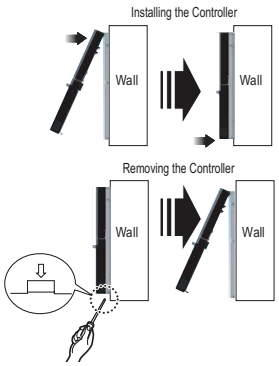


Figure 246:Installing / Removing the Controller.



Assigning the Thermistor for Temperature Detection

Each indoor unit includes a return air thermistor assigned to sense the temperature. If a wired controller is installed, there is a choice of sensing temperature with either the indoor unit return air thermistor or the thermistor in the wired controller. It is also an option to set both thermistors to sense temperature so that indoor unit bases its operation on the first thermistor to reach the designated temperature differential. For applicable indoor units, an optional Remote Temperature Sensor can be used in lieu of the return air thermistor—either alone or in conjunction with a wired controller thermistor as previously described.

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APPLICATION GUIDELINES

“Equipment Selection Procedure” on page 186
“Placement Considerations” on page 193

EQUIPMENT SELECTION PROCEDURE

To choose the multi-zone system that is the most appropriate for the space, as with traditional air-conditioning systems, follow similar protocols outlined in Manual J from the Air Conditioning Contractors of America (ACCA; see www.acca.org).

1. Obtain the design conditions, and calculate the maximum cool and heat loads for the structure.
2. Select the equipment (choosing the appropriate indoor units and outdoor unit):
   - Determine number of zones.
   - Determine total number of indoor units (refer to zone load calculations when choosing indoor units).
   - Determine number of indoor units allocated to each outdoor unit, considering allowable indoor unit connections, both indoor unit and outdoor unit capacities, and system piping capabilities.
3. Determine the corrected capacity for the indoor units and outdoor unit using LATS HVAC software (preferred method) or:
   - System Combination Tables.
   - Capacity Tables (it will be necessary to interpolate).
   - Capacity Coefficient Factors (such as refrigerant line length derates, design condition derates, defrost operation derate [heating mode], altitude derate [if applicable]).
4. Compare corrected capacities to load calculations.
5. Reselect equipment if necessary.

Obtain Design Conditions, Calculate Maximum Cool / Heat Loads

Obtain the winter outdoor / indoor temperature and summer and winter outdoor / indoor temperature design parameters for the location in which the system is installed. Determine if summer or winter design gains, relative humidity, and building features like skylights, orientation, number of occupants, etc., would change the total heat loss / gain and sensible / latent heat gain, and then calculate the maximum cool and heat loads for the space (using Manual J or energy modeling programs).

Select the Equipment

Determine the Number of Zones

Multi F and Multi F with LG RED heat pump systems can cool or heat, but not simultaneously. When designing larger-capacity Multi F heat pump systems or a Multi F MAX system, the designer will be able to combine spaces with similar load profiles located near or adjacent to each other into “thermal zones.” After combining like spaces into zones that will be served by a single (or grouped) indoor unit(s), calculate the peak cooling and heating loads for each zone.

Choosing the Appropriate Indoor Units

Determine the appropriate indoor unit capacity that satisfies the given zone load calculations, and choose how many (and which styles of) indoor units will be required. See the table on the next page for allowable indoor unit to outdoor unit connections, and the maximum number of connectable indoor units on each Multi F and Multi F MAX outdoor unit. When choosing indoor units, also consider the cooling and heating CFM, featured airflow specifications, and static pressure (if applicable) for each indoor unit.

⃠ Avoid oversizing indoor units in an attempt to increase the air exchange rate in the space. Multi F and Multi F MAX systems are designed for minimum airflow over the coil to maximize latent capacity while cooling, maintain a comfortable, consistent discharge air temperature while heating, and minimize fan motor power consumption. In extreme cases, oversizing the indoor units will affect outdoor unit size selection and compromise the outdoor unit’s ability to effectively match the space load(s).

For proper system operation:

1. At least two indoor units must be connected to the outdoor unit.

2. Total connected indoor unit nominal capacity must be a minimum 40% and a maximum of 133% of outdoor unit nominal capacity.

3. To calculate the connected total indoor unit nominal capacity, simply sum up the nominal capacities of all indoor units.
   - For high static duct and vertical-horizontal air handling indoor units, a 1.3 multiplier must first be applied before adding to the sum of other indoor units (when connected to an ODU **other** than the LMU600HV).
     - When high static duct and / or vertical-horizontal air handling indoor units are the **only** connected indoor units, the multiplier is 1.2.

Note:

For allocated capacity information, see the combination tables in the "Multi F / Multi F MAX Combination Data Manual" on www.lghvac.com. For performance data, see "Multi F / Multi F MAX Performance Data Manual" on www.lghvac.com. Also refer to the appropriate manuals on www.lghvac.com for combination and capacity data for Multi F with LG RED / Multi F MAX with LG RED units.

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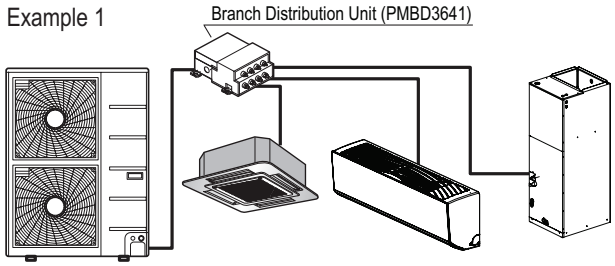
EQUIPMENT SELECTION PROCEDURE

Multiplier Examples

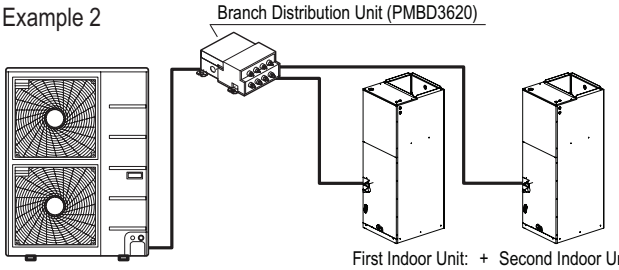
Example 1



Outdoor Unit: LMU540HV | First Indoor Unit: LMCN125HV | + | Second Indoor Unit: LSN090HSV4 | + | Third Indoor Unit: LVN361HV4

Total Capacity Index = 12 + 9 + 36 x 1.3 = 67.8 < 73 Acceptable Combination

Example 2



Outdoor Unit: LMU540HV | First Indoor Unit: LVN241HV4 | + | Second Indoor Unit: LVN241HV4

Total Capacity Index = 24 x 1.2 + 24 x 1.2 = 57.6 < 73 Acceptable Combination

Table 104: Allowable Indoor Unit to Multi F / Multi F MAX with LGRED Outdoor Unit Connections.

Indoor units		Outdoor units						
Model Type	Indoor Unit Nominal Capacity (Btu/h)	LMU18CHV	LMU24CHV	LMU30CHV	LMU36CHV	LMU480HV	LMU540HV	LMU600HV
		Maximum No. of Connectable Indoor Units						
		2	3	4	4	8	8	8
ART COOL Mirror	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	18,000	-	O	O	O	O	O	O
ART COOL Gallery	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
Standard Wall Mounted	7,000	O	O	O	O	O	O	O
	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	15,000	O	O	O	O	O	O	O
	18,000	-	O	O	O	O	O	O
	24,000	-	O	O	O	O	O	O
Low Wall Console	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	15,000	O	O	O	O	O	O	O
Ceiling Concealed Duct-Low Static	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	18,000	-	O	O	O	O	O	O
Ceiling Concealed Duct-High Static	24,000	-	-	O	O	O	O	O
	36,000	-	-	-	-	O	O	O
Four-Way Ceiling Cassette	7,000	O	O	O	O	O	O	O
	9,000	O	O	O	O	O	O	O
	12,000	O	O	O	O	O	O	O
	18,000	-	O	O	O	O	O	O
Vertical-Horizontal Air Handler	18,000	-	O	O	O	O	O	O
	24,000	-	-	O	O	O	O	O
	36,000	-	-	-	-	O	O	O

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Table 106: Allowable Indoor Unit to Multi F / Multi F MAX with LGRED Outdoor Unit Connections.

Indoor units		Outdoor units				
Model Type	Indoor Unit Nominal Capacity (Btu/h)	LMU180HHV	LMU240HHV	LMU300HHV	LMU360HHV	LMU420HHV
		Maximum No. of Connectable Indoor Units				
		2	3	4	5	6
ART COOL Mirror	9,000	O	O	O	O	O
	12,000	O	O	O	O	O
	18,000	-	O	O	O	O
ART COOL Gallery	9,000	O	O	O	O	O
	12,000	O	O	O	O	O
Standard Wall Mounted	7,000	O	O	O	O	O
	9,000	O	O	O	O	O
	12,000	O	O	O	O	O
	15,000	O	O	O	O	O
	18,000	-	O	O	O	O
	24,000	-	O	O	O	O
Low Wall Console	9,000	O	O	O	O	O
	12,000	O	O	O	O	O
	15,000	O	O	O	O	O
Ceiling Concealed Duct-Low Static	9,000	O	O	O	O	O
	12,000	O	O	O	O	O
	18,000	-	O	O	O	O
Ceiling Concealed Duct-High Static	24,000	-	-	O	O	O
	36,000	-	-	-	-	O
Four-Way Ceiling Cassette	7,000	O	O	O	O	O
	9,000	O	O	O	O	O
	12,000	O	O	O	O	O
	18,000	-	O	O	O	O
Vertical-Horizontal Air Handler	18,000	-	O	O	O	O
	24,000	-	-	O	O	O
	36,000	-	-	-	-	O

Choosing the Appropriate Outdoor Unit

After all indoor units are properly sized to offset the applicable loads in each zone, select the outdoor unit by choosing a size that meets both the load-cooling requirement, and offsets the sum of the heating load. Then, the system's combination ratio must be evaluated and confirmed it is within the allowable range (the combination ratio compares the nominal capacity of all connected indoor units to the nominal capacity of the outdoor unit serving them). The total nominal capacity of all indoor units must be smaller than the total nominal capacity of the outdoor unit. If the combination ratio is more than 100%, the designer is undersizing the outdoor unit relative to the combined nominal capacity of the connected indoor units. In some designs, oversized indoor units will be unavoidable in the case where the smallest size indoor unit available from LG is larger than what is necessary to satisfy the zone load. This scenario will also occur when an indoor unit selection one size down from the selected unit is slightly short of fulfilling the design load requirements, and the designer must choose the next largest size unit. Sometimes it is required to choose a larger capacity outdoor unit if the installation space is big enough. Also, it will be prudent to oversize the outdoor unit to address those times when the weather conditions will exceed the design conditions, to minimize the possibility of ventilation systems that causes the space temperature to drift outside design parameters, or when the indoor unit's entering air temperature falls outside the approved design temperature range.

Table 105: Multi F / Multi F Max Rated Outdoor Unit Capacity.

		Outdoor Units						
		LMU18CHV	LMU24CHV	LMU30CHV	LMU36CHV	LMU480HV	LMU540HV	LMU600HV
Rated Capacity (Btu/h)*	Cooling	17,000	20,000	30,000	32,000	48,000	52,500	60,000
	Heating	22,000	24,000	32,000	36,000	54,000	58,000	64,000
Connectable Indoor Units	Minimum No. of Connectable IDUs	2	2	2	2	2	2	2
	Maximum No. of Connectable IDUs	2	3	4	4	8	8	8
	Maximum Capacity Index	24,000	33,000	40,000	48,000	65,000	73,000	81,000

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EQUIPMENT SELECTION PROCEDURE

Table 107: Multi F / Multi F MAX with LGRED Rated Outdoor Unit Capacity.

		Outdoor Units				
		LMU180HHV	LMU240HHV	LMU300HHV	LMU360HHV	LMU420HHV
Rated Capacity (Btu/h)*	Cooling	18,000	24,000	28,400	36,000	42,000
	Heating	22,000	26,000	28,600	41,000	45,000
Connectable Indoor Units	Minimum No. of Connectable IDUs	2	2	2	2	2
	Maximum No. of Connectable IDUs	2	3	4	5	6
	Maximum Capacity Index	24,000	33,000	40,000	48,000	56,000

Determine the Corrected Capacity

The *corrected* cooling / heating capacity is different from the rated cooling / heating capacity. The corrected capacity includes changes in unit performance after considering design temperatures, available capacity that can be allocated from the outdoor unit, pressure drop due to refrigerant line length, defrost operation in heating mode, and (if applicable) altitude. Depending on the location of the building, additional capacity correction factors will need to be applied.

Using the Outdoor Unit Cooling and Heating Capacity Tables

Rated cooling capacity ratings are obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB), and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB). Rated heating capacity ratings are 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).

To evaluate the total outdoor unit capacity at design conditions perform a selection using LATS HVAC software (preferred method) or reference the Performance Data Capacity Tables. All design temperatures are not explicitly shown in the charts, therefore, interpolation will be necessary to calculate the capacity for specific design conditions. Based on the premise that capacity follows a linear curve, the following formula can be applied:

$$(y - y1) / (y2 - y1) = (x - x1) / (x2 - x1)$$

Where

y = Missing Capacity (Capacity at the Design Temperature).[1]
y1 = Capacity at Lower Temperature (Smaller value of the two nearest published TC datapoints).
y2 = Capacity at Higher Temperature (Higher value of the two nearest published TC datapoints).
x = Design Temperature (Temperature not shown in published capacity tables).[2]
x1 = (Smaller value of the two nearest published temperature datapoints).
x2 = (Larger value of the two nearest published temperature datapoints).

[1]Median between two published Total Capacity [TC] Btu/h datapoints in the capacity table.
[2]Median between two nearest published temperature datapoints.

Using the Indoor Unit Cooling and Heating Capacity Tables

The datapoints shown in the indoor unit cooling and heating capacity charts are based on (and convey) an indoor unit operating with maximum possible refrigerant flow from the outdoor unit and before any derates are applied. In other words, the capacities displayed reflect what the indoor unit would produce if it was the only indoor unit that required capacity, and the outdoor unit did not have to allocate any capacity to another indoor unit.

System operation with a combination of indoor units is not conveyed in these charts, however, the information can be used to calculate indoor unit allocated capacity (without using the system combination tables). Simply calculate by using the formula:

$$Qidu(combi) = Qodu(rated) \times \frac{Qidu(rated)}{\Sigma Qidu(rated)}$$

Where

Qidu(combi) = Individual Indoor Unit Combination Capacity.
Qodu(rated) = Outdoor Unit Rated Capacity.
Qidu(rated) = Individual Indoor Unit Rated Capacity.
ΣQidu(rated) = Total Connected Indoor Unit Rated Capacity.

Note:

- The formula can be used to find individual indoor unit capacity for Multi F MAX / Multi F MAX with LGRED systems.
- A more accurate method to determine expected capacity would be to apply the outdoor unit's corrected capacity instead of rated capacity.

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Using the System Combination Tables

Multi F system combination tables illustrate how each indoor unit receives a percentage of total outdoor unit rated capacity. Allocation is based on:

- Combinations of Non-Ducted Indoor Units
- Combinations of Ducted Indoor Units
- Combinations of Mixed Non-Ducted and Ducted Indoor Units

Multi F MAX system combination tables only show the total connected indoor unit capacity, but individual indoor unit capacity can be calculated using the formula:

$$Qidu(combi) = Qodu(rated) \times \frac{Qidu(rated)}{\Sigma Qidu(rated)}$$

Note:

A more accurate method to determine expected capacity would be to apply the outdoor unit's corrected capacity instead of rated capacity.

Capacity Coefficient Factors

Refrigerant Line Length Derates

For air-cooled systems, a capacity correction factor will 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 in the tables below and on the next page.

Table 108: Multi F / Multi F with LGRED Outdoor Unit (Multiple Piping) to Indoor Unit Refrigerant Line Length Derates.

Piping Length (feet)	Cooling Capacity (%)	Heating Capacity (%)
7,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	98.4	99.2
49.2	95.8	97.8
65.6	93.2	96.4
82.0	90.6	95.0
9,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	98.0	99.0
49.2	94.8	97.4
65.6	91.6	95.8
82.0	88.4	94.2
12,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	97.6	98.6
49.2	93.8	96.4
65.6	89.9	94.1
82.0	86.1	91.9
15,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	97.2	98.2
49.2	93.0	95.4
65.6	88.8	92.6
82.0	84.6	89.8
18,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	98.6	99.6
49.2	96.4	99.0
65.6	94.1	98.3
82.0	91.9	97.7
24,000 Btu/h Indoor Unit Models		
25.0	100.0	100.0
32.8	98.2	99.2
49.2	95.4	98.0
65.6	92.4	96.6
82.0	89.6	95.4

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EQUIPMENT SELECTION PROCEDURE

Table 109: Multi F MAX / Multi F MAX with LGRED Outdoor Unit to Branch Distribution Unit Refrigerant Line Length Derates.

Main Piping Length (feet)	16.4	32.8	49.2	65.6	82.0	98.4	114.8	131.2	147.6	164.0	180.4
Cooling Capacity (%)	100.0	98.8	97.3	95.8	94.3	92.8	91.3	89.8	88.3	86.8	85.3
Heating Capacity (%)	100.0	99.6	99.2	98.7	98.3	97.8	97.4	96.9	96.5	96.0	95.6

Figure 247: Multi F MAX / Multi F MAX with LGRED Outdoor Unit to Branch Distribution Unit Refrigerant Line Length Derate Chart.

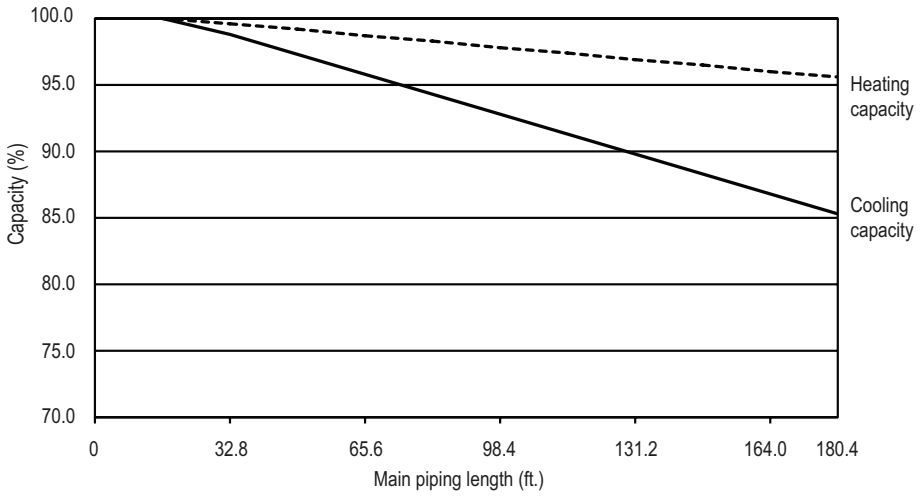

Table 110: Multi F MAX and Multi F MAX with LGRED Branch Distribution Unit to Indoor Unit Refrigerant Line Length Derates.

Piping Length (feet)	Cooling Capacity (%)	Heating Capacity (%)
7,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	98.0	99.5
49.2	96.0	98.9
9,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.5	98.8
49.2	95.0	97.5
12,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.0	98.3
49.2	94.0	96.5
15,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.2	98.2
49.2	93.0	95.4
18,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	98.3	99.5
49.2	96.5	99.0
24,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.8	99.2
49.2	95.5	98.4
36,000 Btu/h Indoor Unit Models		
16.4	100.0	100.0
32.8	97.9	98.8
49.2	95.7	97.6

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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.

Defrost Correction Factor for Heating Operation

The outdoor unit heating capacity will need to be adjusted for frost accumulation on air-cooled systems. If design day conditions are below the dewpoint of the surrounding air, frost will not be a problem and no correction factor is needed. In certain weather conditions, however, frost will 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 x C

Where:

A = Integrated Heating Capacity.
B = Value found in the Capacity Table.
C = Correction Factor for Frost Accumulation Factor (from Table 101).

Table 111: 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

[1]At 85% outdoor air relative humidity.

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

Note:

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

Check the Indoor and Outdoor Unit Selection(s)

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

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

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

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

System Sizing Check Formulas

1. Outdoor Unit Rated Capacity.

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

2. Outdoor Unit Capacity at 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.

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

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.

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PLACEMENT CONSIDERATIONS

Selecting the Best Location for the Indoor Units

Note:

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

- Indoor Units (IDUs) must not be placed in an environment where the IDUs will be exposed to harmful volatile organic compounds (VOCs) or in environments where there is improper air make up or supply or inadequate ventilation. If there are concerns about VOCs in the environment where the IDUs are installed, proper air make up or supply and/ or adequate ventilation must be provided. Additionally, in buildings where IDUs will be exposed to VOCs consider a factory-applied epoxy coating to the fan coils for each IDU.
- Within allowable parameters for proper connection to the outdoor unit (or Branch Distribution unit, if a Multi F MAX system).
- So that condensation drainage can be conveniently routed away.
- Include enough space around the indoor unit so that it is accessible for maintenance and service purposes.
- Where electrical noise / electromagnetic waves will not affect indoor unit operation. Maintain proper distances between the indoor units and electric wires, audio and visual appliances, breaker / circuit panels, etc. If the frequency signal of the appliance is unstable, then install the indoor unit a minimum of ten (10) feet away, and run the power and transmission cables through a conduit.
- An area that is level and with enough strength to bear the weight of the indoor unit(s).
- No obstacles to air circulation around the unit; keep proper distances from ceilings, doorways, floor, walls, etc.
- An area where operation sound won't disturb occupants.
- An area that does not expose the indoor unit(s) to heat, water, steam, oil splattering or spray.

Selecting the Best Location for the Branch Distribution (BD) Unit

Note:

Branch Distribution (BD) units are used only with Multi F MAX / Multi F MAX with LGRED systems to distribute the refrigerant from the outdoor unit to up to eight indoor units. Select location indoors that will meet the following conditions:

- Within allowable parameters for proper connection to the Multi F MAX / Multi F MAX with LGRED outdoor unit and indoor unit(s); refrigerant piping and wire lengths must not exceed amounts specified by LG Electronics, U.S.A., Inc.
- Condensate drain piping is not required.
- Ensure there is enough space in the installation area for service purposes; install the refrigerant piping and electrical wiring system in an easily accessible location.
- Level where there is enough strength to bear the weight of the BD unit.
- ⃠ Do not install the BD unit in a location where it would be subjected to strong radiation heat from heat sources.
- ⃠ Avoid an installation environment where the BD unit would be exposed to heat, water, steam, oil splattering or spray.
- Install the unit in a location where any sound it generates will not disturb occupants in the surrounding rooms.
- No obstacles to air circulation around the unit; keep proper distances from ceilings, doorways, floor, walls, etc.
- Where high-frequency electrical noise / electromagnetic waves will not affect operation. Maintain proper distances between the BD unit(s) and electric wires, audio and visual appliances, breaker / circuit panels, etc.

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 will generate, flow, stagnate, or leak. Failure to do so will cause serious bodily injury or death.

⚠WARNING

⃠ Do not install the unit in a location where acidic solution and spray (sulfur) are often used as this will cause serious bodily injury or death. ⃠ Do not use the unit in environments where oil, steam, or sulfuric gas are present as this will cause serious bodily injury or death.

⚠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 will create unsafe conditions.

Note:

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

- A location strong enough to bear the weight of the outdoor unit.
- A location that allows for optimum air flow and is easily accessible for inspection, maintenance, and service.

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Selecting the Best Location for the Outdoor Unit, continued.

- Where piping between the outdoor unit, indoor unit(s), and BD units (Multi F MAX systems only) are within allowable limits.
- Include space for drainage to ensure condensate flows properly out of the unit when it is in heating mode. ⃠ Avoid placing the outdoor unit in a low-lying area where water could accumulate.

⃠

- Where it 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 high-frequency electrical noise / electromagnetic waves will not affect operation.
- Where operating sound from the unit will not disturb inhabitants of surrounding buildings.
- Where the unit will not be exposed to direct, strong winds.

Rooftop Installations

If the outdoor unit is installed on a roof structure, be sure to level the unit. Ensure the roof structure and anchoring method are adequate for the unit location. Consult local codes regarding rooftop mounting.

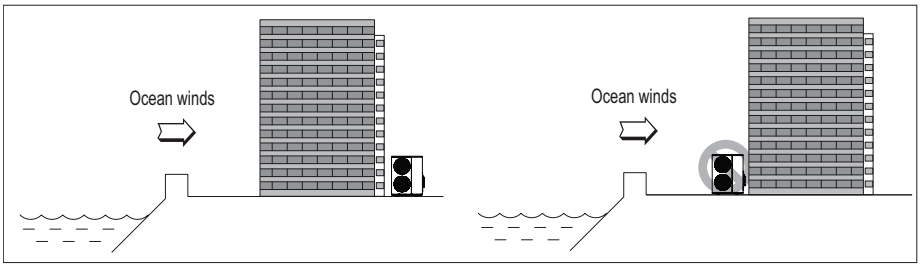
Oceanside Installation Precautions

- Install the outdoor unit on the side of the building opposite from direct ocean winds.
- Select a location with good drainage.
- Periodically clean dust or salt particles off of the heat exchanger with water.

- ⃠ Avoid installing the outdoor unit where it would be directly exposed to ocean winds.

Note:

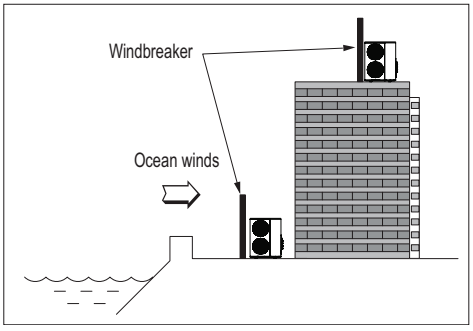
Ocean winds will cause corrosion, particularly on the condenser and evaporator fins, which, in turn could cause product malfunction or inefficient performance.



Note:

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

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



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.

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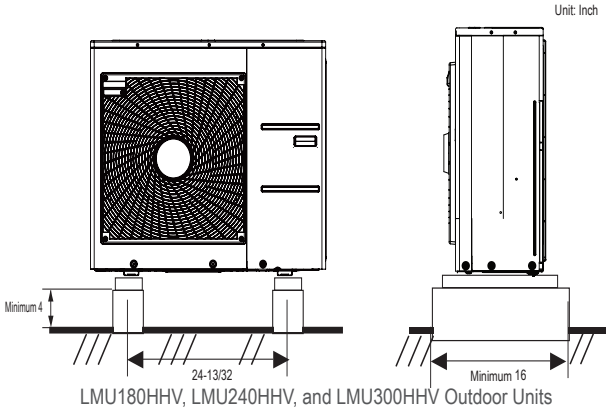
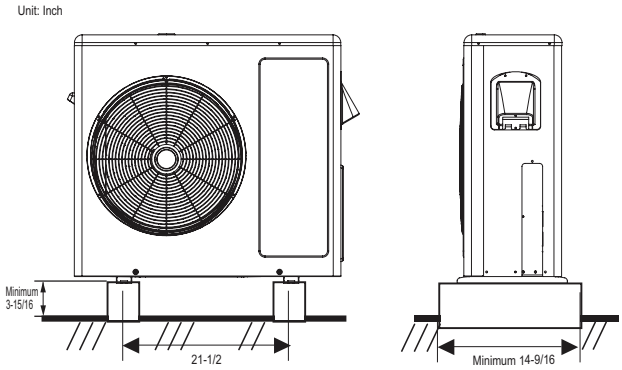
PLACEMENT CONSIDERATIONS

Outdoor Unit Platform Requirements

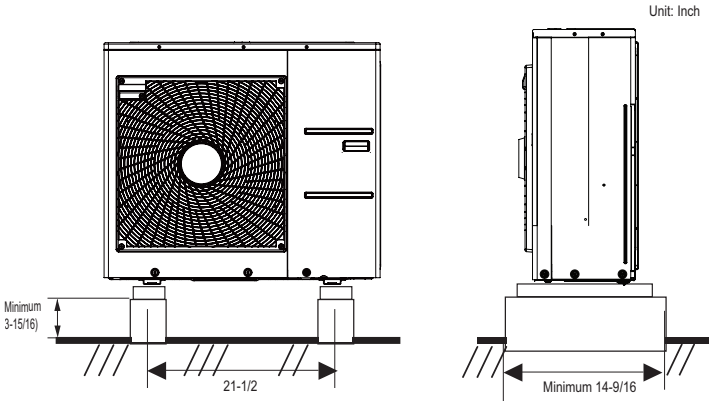
Figure 248: Outdoor Unit Foundation Requirements.



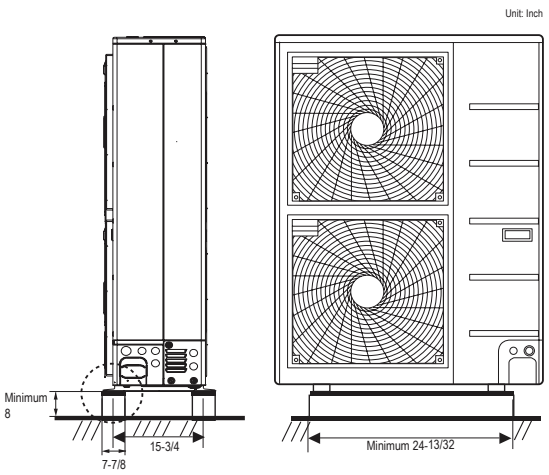
LMU180HHV, LMU240HHV, and LMU300HHV Outdoor Units



LMU18CHV and LMU24CHV Outdoor Units



LMU30CHV and LMU36CHV Outdoor Units



LMU360HHV, LMU420HHV, LMU480HV, LMU540HV, LMU600HV Outdoor Units

Table 112: Outdoor Unit Foundation Specifications.

Outdoor Unit Type	Bolt Type	Concrete Height	Bolt Depth
LMU180HHV, LMU240HHV, LMU300HHV, LMU18CHV, LMU24CHV, LMU30CHV, LMU36CHV	M10-J	Minimum Four (4) Inches	Minimum Three (3) Inches
LMU360HHV, LMU420HHV, LMU480HV, LMU540HV,LMU600HV	M10-J	Minimum Eight (8) Inches	Minimum Three (3) Inches

Bolting the Outdoor Unit to the Platform

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

Concrete Platform Specifications

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

Figure 249: Bolting the Outdoor Unit to the Platform.

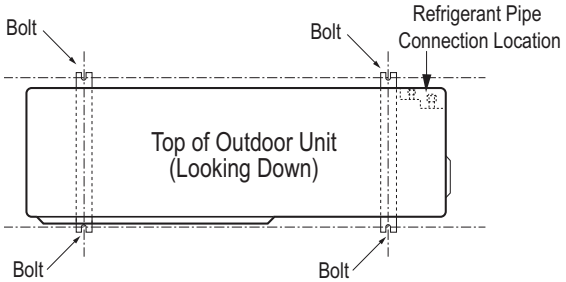
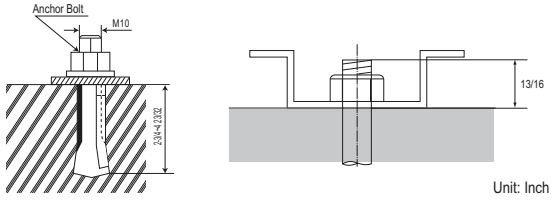


Figure 250: Close up of Bolt Attachment.



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Tie-Downs and Lightening Protection

Tie-Downs

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

Lightening Protection

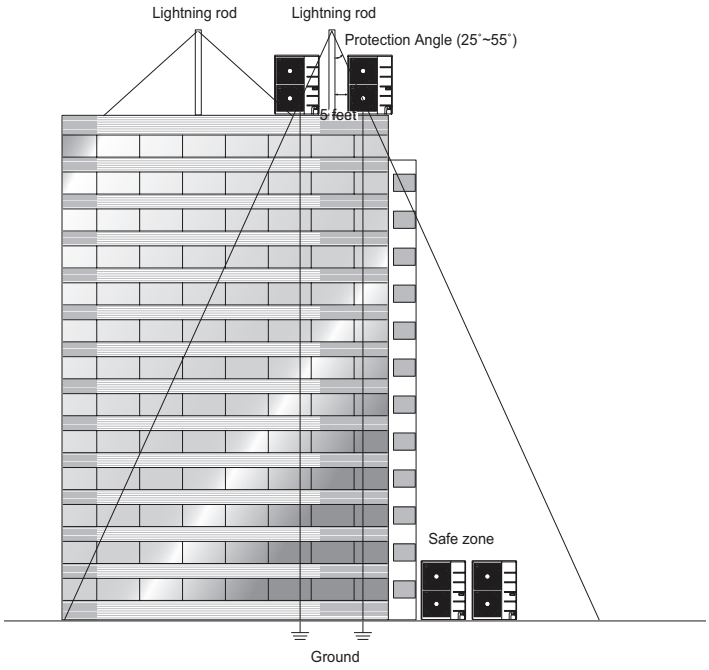
- To protect the outdoor unit from lightning, it must be placed within the specified lightning safety zone.

Table 113: Safety Zone Specifications.

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

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

Figure 251: Lightening Protection Diagram.



Note:

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

Outdoor Unit Service Access and Allowable Clearances

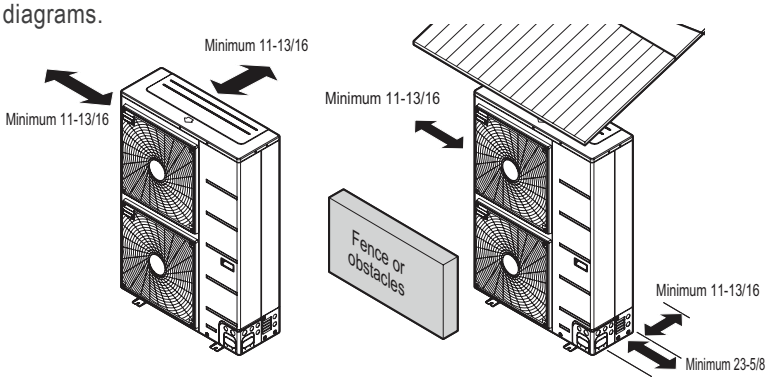
Appropriate airflow through the outdoor unit coil is critical for proper unit operation.

- 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.

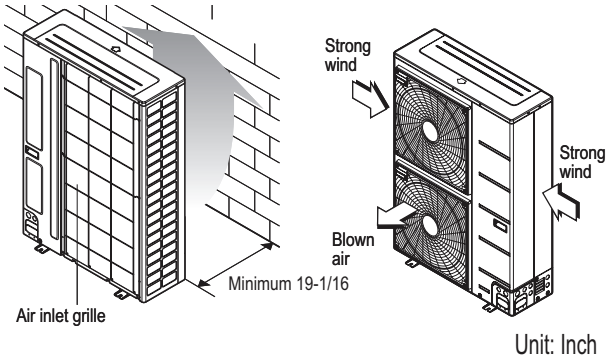
⃠

- 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.)

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.

Unit: Inch

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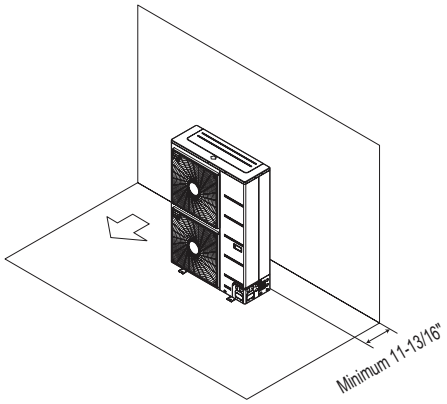
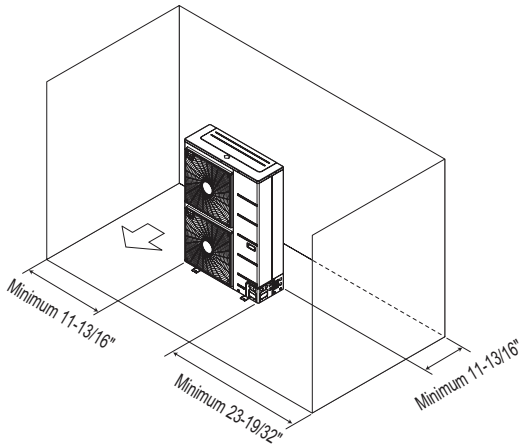
PLACEMENT CONSIDERATIONS

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

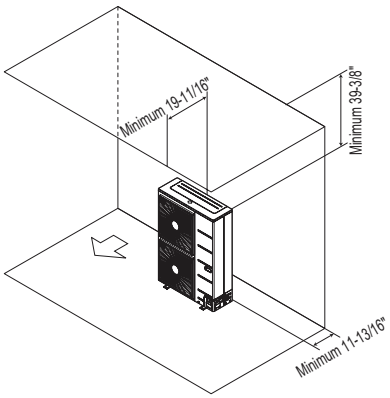
Obstacle on the suction side only.



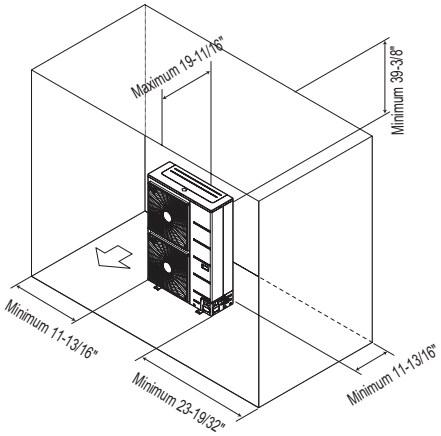
Obstacles on the suction side and on both left and right sides.



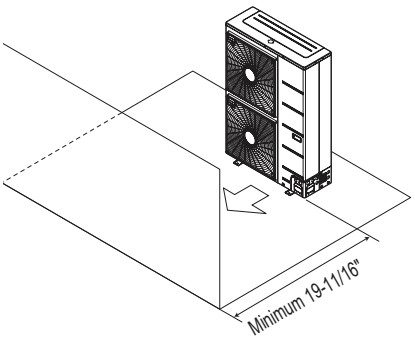
Obstacles above and on the air intake side.



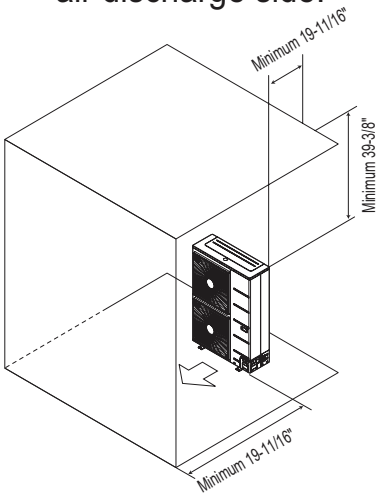
Obstacles above, on the air intake side, and on both left and right sides



Obstacle just on the air discharge side.



Obstacles above and on the air discharge side.



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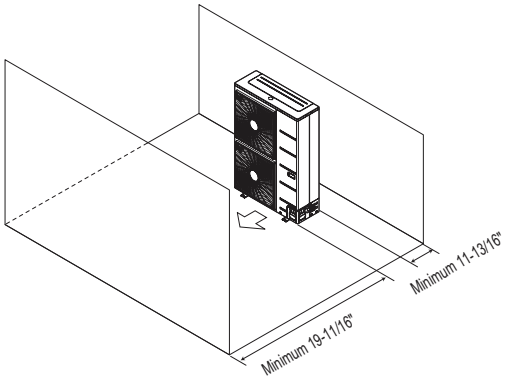
PLACEMENT CONSIDERATIONS

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

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).

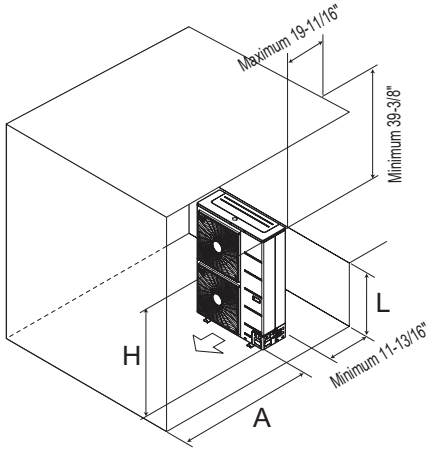
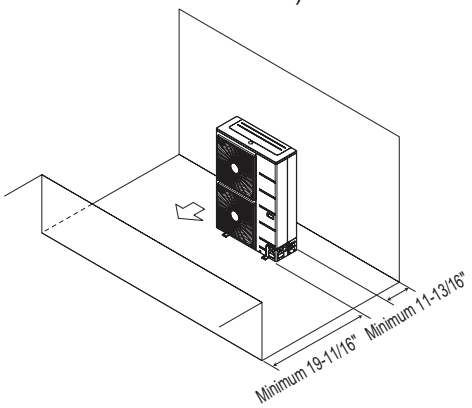


Table 114: Ratio among H, A, and L.

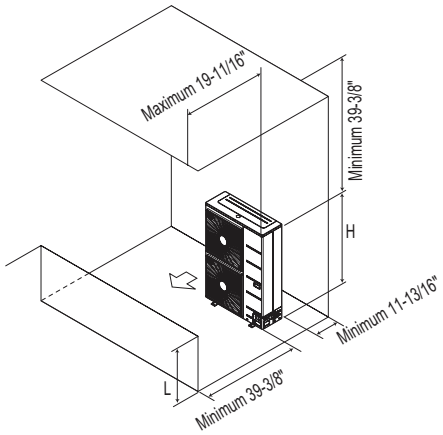
	L	A
L ≤ H	0 < L ≤ 1/2 H	29-1/32 inches
	1/2 H < L	39-3/8 inches
H < L	Set Stand as: L ≤ H	

If a stand is necessary, it must 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).



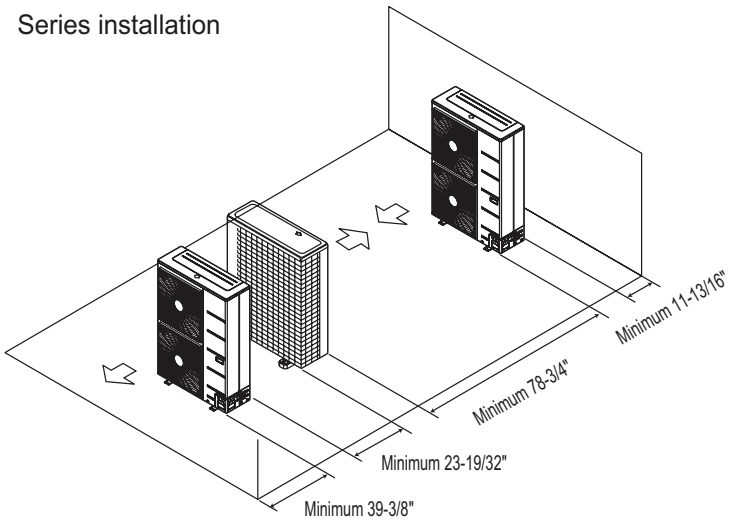
Where there are obstacles above, and on both suction and discharge sides (discharge side obstacle is lower than the outdoor unit).



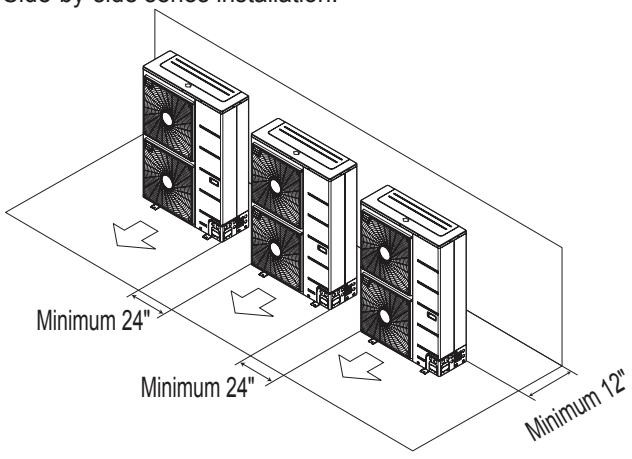
Note:

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

Series installation



Side-by-side series installation.



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REFRIGERANT PIPING DESIGN & LAYOUT BEST PRACTICES

“Design Guideline Summary” on page 200

“Creating a Balanced System” on page 204

“Condensate Drain Piping” on page 205

REFRIGERANT PIPING DESIGN

MULTI F
MULTI F MAX

Design Guideline Summary

The following are examples of manual pipe size calculations. Designers are highly encouraged to use LATS for Multi F systems.

Device Connection Limitations

- The minimum number of connected and operating indoor units to Multi F / Multi F MAX systems is two, taking into consideration of the minimum combination ratio.
- The maximum number of indoor units for each Multi F / Multi F MAX heat pump systems is:

LMU18CHV = 2 LMU24CHV = 3 LMU30CHV = 4 LMU36CHV = 4 LMU480HV = 8 LMU540HV = 8 LMU600HV = 8

LMU180HHV = 2 LMU240HHV = 3 LMU300HHV = 4 LMU360HHV = 5 LMU420HHV = 6

One of the most critical elements of multi-zone systems is the refrigerant piping. The following pages list pipe length limits that must be followed in the design of Multi F and Multi F MAX refrigerant pipe systems:

Using Refrigerant Components

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

Table 115:Equivalent Piping Length for Elbows, Y-branches, and Branch Distribution Units.

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
Y-Branch Kit (ft., Multi F MAX systems only)[1]	1.6				
Branch Distribution Unit (ft., Multi F MAX systems only)	8.2				

[1]Kit contains two Y-branches: one for liquid and one for vapor.

Multi F System

Example: LMU36CHV outdoor unit with four (4) indoor units connected.
ODU: Outdoor Unit.
IDU: Indoor Unit.
A, B, C, D: Pipes from Outdoor Unit to Indoor Unit.

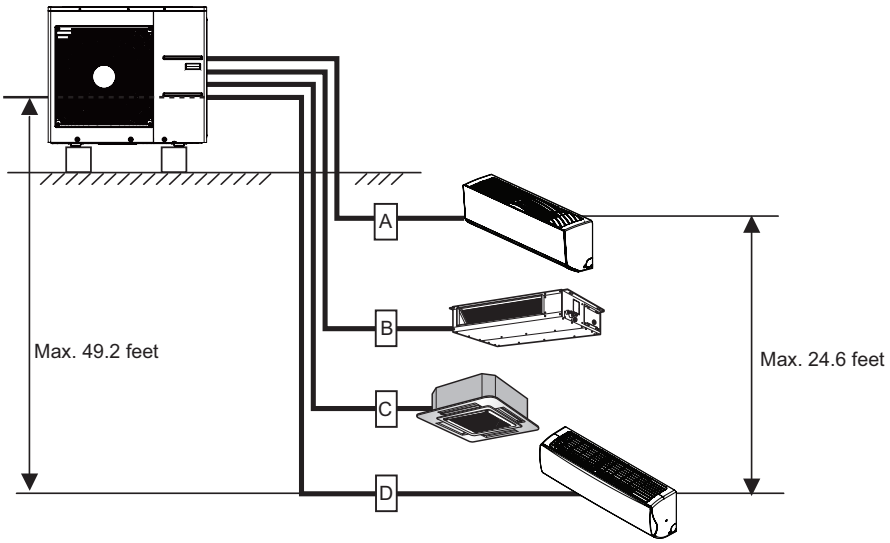

Table 116:Multi F Outdoor Unit Refrigerant Piping System Limitations.

Outdoor Unit	Minimum Length for Each Pipe (ft.)	Maximum Piping Length to Each Indoor Unit (ft.)				Maximum Total Piping Length for Each System (ft.)
		A	B	C	D	
LMU18CHV	10	82	82	-	-	164
LMU24CHV	10	82	82	82	-	246.1
LMU30CHV	10	82	82	82	82	246.1
LMU36CHV	10	82	82	82	82	246.1

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REFRIGERANT PIPING DESIGN

Design Guideline Summary

The following are examples of manual pipe size calculations. Designers are highly encouraged to use LATS for Multi F systems.

Multi F MAX System with One Branch Distribution Unit

Example: LMU540HV outdoor unit with four (4) indoor units, and one (1) branch distribution unit connected.

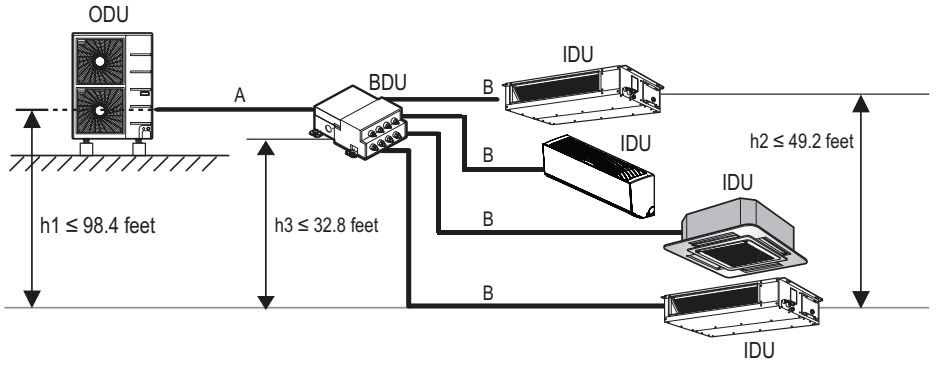
ODU: Outdoor Unit.

IDU: Indoor Unit.

BDU: Branch Distribution Unit.

A: Main Pipe.

B: Branch Pipe (Branch Distribution Unit to Indoor Unit[s]).



Multi F MAX System with Two Branch Distribution Units

Example: LMU540HV outdoor unit with seven (7) indoor units, and two (2) branch distribution units connected.

ODU: Outdoor Unit.

IDU: Indoor Unit.

BD: Branch Distribution Unit(s).

ΣA: Main Pipe.

ΣB: Branch Pipe (Branch Distribution Unit[s] to Indoor Unit[s]).

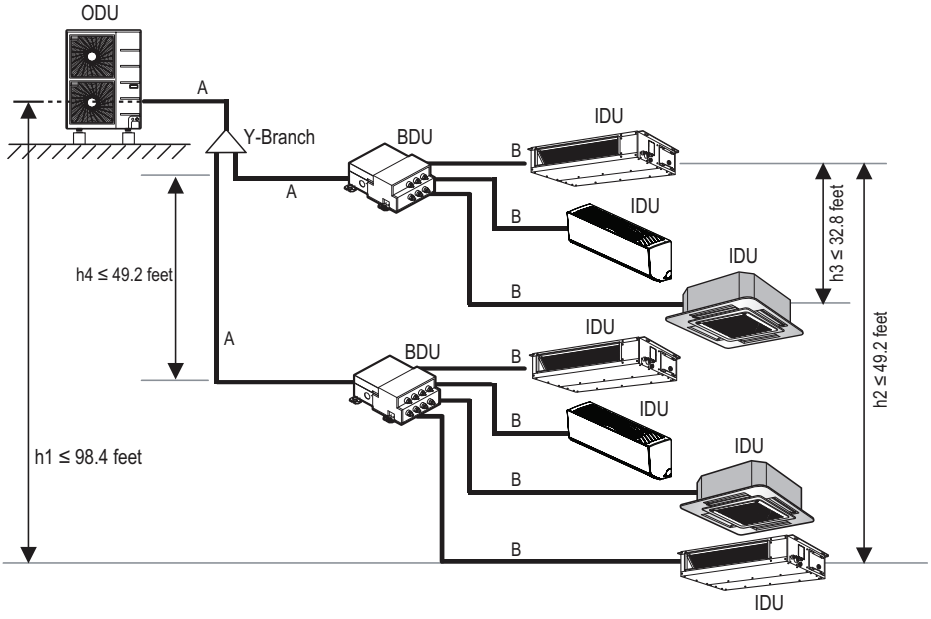


Table 117: Multi F MAX Outdoor Unit Refrigerant Piping System Limitations.

Pipe Length (ELF = Equivalent Length of pipe in Feet)	Total piping length (ΣA + ΣB)		≤475.7 feet
	Main pipe (Outdoor Unit to Branch Distribution Units: ΣA)	Minimum	10 feet
		Maximum	≤180.4 feet
	Total branch piping length (ΣB)		≤295.3 feet
	Branch pipe (Branch Distribution Units to Indoor Units: B)	Minimum	10 feet
		Maximum	≤49.2 feet
Elevation Differential (All Elevation Limitations are Measured in Actual Feet)	If outdoor unit is above or below indoor unit (h1)		≤98.4 feet
	Between the farthest two indoor units (h2)		≤49.2 feet
	Between branch distribution unit and farthest connected indoor unit(s) (h3)		≤32.8 feet
	Between branch distribution units (h4)		≤49.2 feet

Table 118: Multi F MAX Piping Sizes.

Piping	Main Pipe A (inch)	Branch Pipe B
Liquid	Ø3/8	Depends on the size of the indoor unit piping
Gas	Ø3/4	

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REFRIGERANT PIPING DESIGN

Design Guideline Summary

The following are examples of manual pipe size calculations. Designers are highly encouraged to use LATS for Multi F systems.

Multi F with LGRED System

Example: LMU300HHV outdoor unit with four (4) indoor units connected.

ODU: Outdoor Unit.

IDU: Indoor Unit.

A, B, C, D: Pipes from Outdoor Unit to Indoor Unit.

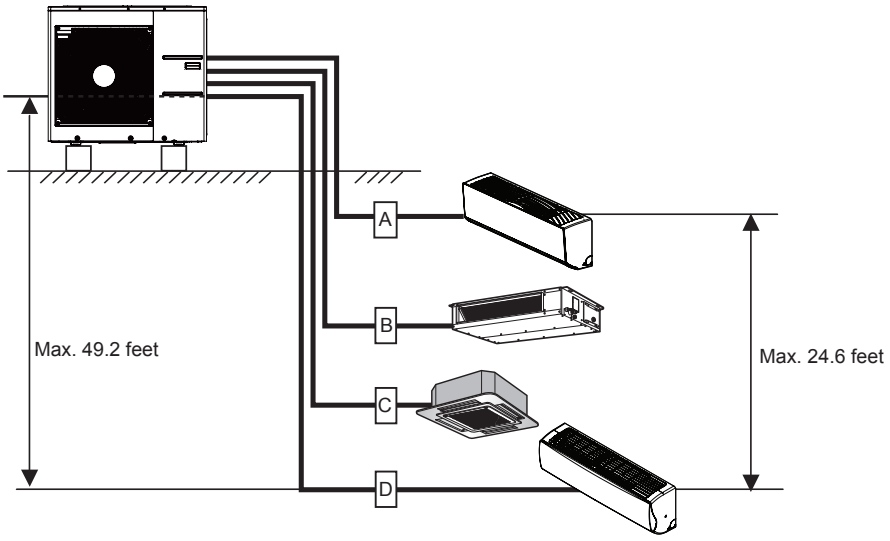


Table 119:Multi F with LGRED Outdoor Unit Refrigerant Piping System Limitations.

Outdoor Unit	Minimum Length for Each Pipe (ft.)	Maximum Piping Length to Each Indoor Unit (ft.)				Maximum Total Piping Length for Each System (ft.)	Maximum Height Difference (Max. [ft.]) Outdoor Unit ~ Indoor Unit	Maximum Height Difference (Max. [ft.]) Indoor Unit ~ Indoor Unit
		A	B	C	D			
LMU180HHV	10	82	82	-	-	164	49.2	24.6
LMU240HHV	10	82	82	82	-	246.1	49.2	24.6
LMU300HHV	10	82	82	82	82	246.1	49.2	24.6

Multi F MAX with LGRED System with One Branch Distribution Unit

Example: LMU360HHV outdoor unit with four (4) indoor units and one (1) branch distribution unit connected.

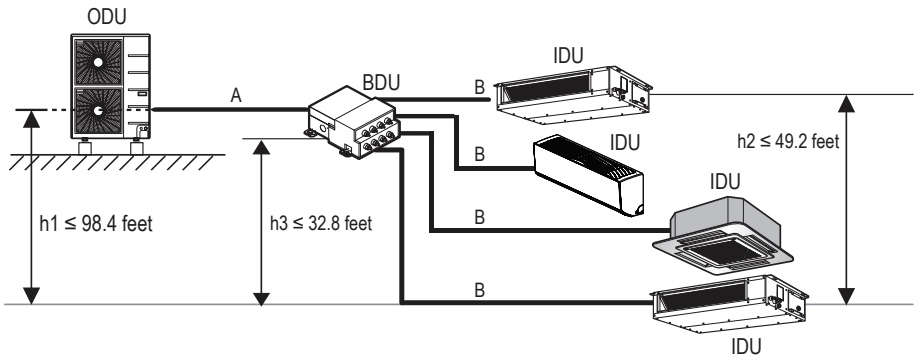
ODU: Outdoor Unit.

IDU: Indoor Unit.

BDU: Branch Distribution Unit.

A: Main Pipe.

B: Branch Pipe (Branch Distribution Unit to Indoor Unit[s]).



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REFRIGERANT PIPING DESIGN

Design Guideline Summary

The following are examples of manual pipe size calculations. Designers are highly encouraged to use LATS for Multi F systems.

Multi F MAX with LGRED System with Two Branch Distribution Units

Example: LMU420HHV outdoor unit with six (6) indoor units and two (2) branch distribution units connected.

ODU: Outdoor Unit.

IDU: Indoor Unit.

BDU: Branch Distribution Unit(s).

ΣA: Main Pipe.

ΣB: Branch Pipe (Branch Distribution Unit[s] to Indoor Unit[s]).

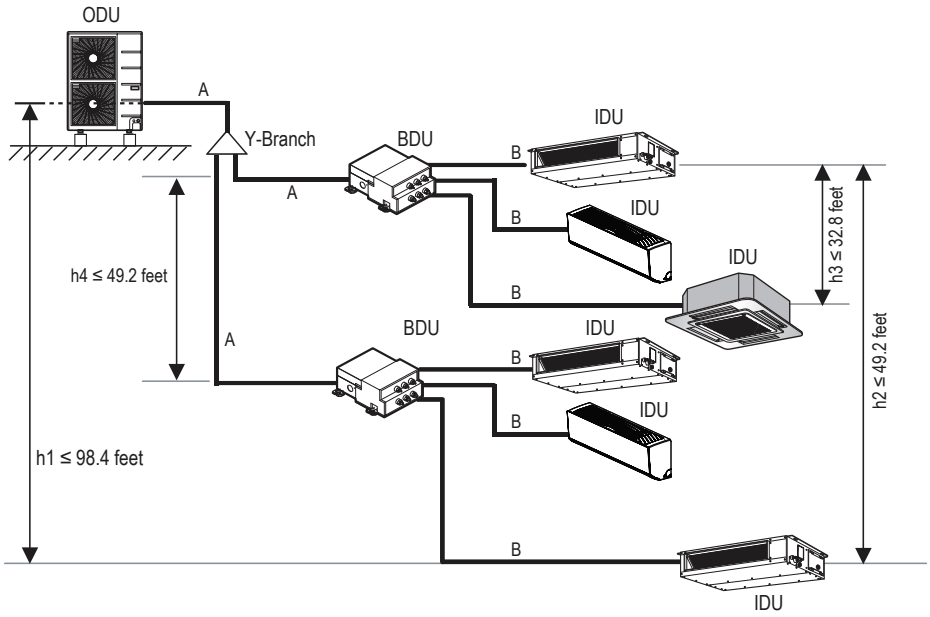

Table 120: Multi F MAX with LGRED Outdoor Unit Refrigerant Piping System Limitations.

Pipe Length (ELF = Equivalent Length of pipe in Feet)	Total piping length (ΣA + ΣB)		≤475.7 feet
	Main pipe (Outdoor Unit to Branch Distribution Units: ΣA)	Minimum	10 feet
		Maximum	≤180.4 feet
	Total branch piping length (ΣB)		≤295.3 feet
	Branch pipe (Branch Distribution Units to Indoor Units: B)	Minimum	10 feet
		Maximum	≤49.2 feet
Elevation Differential (All Elevation Limitations are Measured in Actual Feet)	If outdoor unit is above or below indoor unit (h1)		≤98.4 feet
	Between the farthest two indoor units (h2)		≤49.2 feet
	Between branch distribution unit and farthest connected indoor unit(s) (h3)		≤32.8 feet
	Between branch distribution units (h4)		≤49.2 feet

Table 121: Multi F MAX with LGRED Piping Sizes.

Piping	Main Pipe A (inch)	Branch Pipe B
Liquid	Ø3/8	Depends on the size of the indoor unit piping
Gas	Ø3/4	

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REFRIGERANT PIPING DESIGN

Creating a Balanced System / Manual Layout Procedure

MULTI F
MULTI F MAX

Creating a Balanced / Quality Piping System

Unlike designing duct-work or chilled and hot water pipe systems where balancing dampers, ball valves, orifices, circuit setters, or other flow control devices can be installed to modify or balance the flow of cooling medium, these cannot be used in a Multi F system. Therefore, variable refrigerant flow systems have to be designed to be "self balanced." Balanced liquid refrigerant distribution is solely dependent on the designer using the correct pipe size for each segment. Pipe sizing considerations include pipe length, pipe segment pressure drop relative to other pipe segments in the system, type and quantity of elbows, bends present, fitting installation orientation, and end use device elevation differences.

Note:

⃠ The designer must avoid creating excessive pressure drop. When liquid refrigerant is subjected to excessive pressure drop, liquid refrigerant will change state and "flash" to vapor. Vapor present in a stream of liquid refrigerant before reaching the indoor unit coil (or branch distribution unit for Multi F MAX systems) results in a loss of system control and causes damage to the components. ⃠ The pipe system must be designed in a manner that avoids the creation of unwanted vapor.

Refrigerant Piping System Verification

To ensure that the refrigerant piping design is suitable for the system, a LATS refrigerant piping design software report must be provided with every Multi F order. Following the installation, if any changes or variations to the design were necessary, an "as-built" LATS piping design software report must be provided to LG prior to system commissioning. User must always check the LATS report actual pipe layout versus pipe limits.

Note:

Any field changes, such as re-routing, shortening or lengthening a pipe segment, adding or eliminating elbows and/or fittings, re-sizing, adding, or eliminating indoor units, changing the mounting height or moving the location of a device or fitting during installation must be done with caution and ALWAYS VERIFIED in LATS HVAC SOFTWARE before supplies are purchased or installed. Doing so ensures profitable installation, eliminates rework, and ensures easier system commissioning.

Manual Layout Procedure

1. Choose the location of the indoor units on the building drawing.
2. Choose the location of all Y-branch and branch distribution units (if a Multi F MAX system) and note them on the building drawing. Verify that all fittings are positioned per the guideline limitations in "LG Engineered Multi F MAX Y-Branch Kit"
3. Plan the route for interconnecting piping. Draw a one-line depiction of the pipe route chosen on the building drawing.
4. Calculate the actual length of each pipe segment and note it on the building drawing.
5. Using the data obtained while selecting the system components, list the corrected cooling capacity next to each indoor unit on the drawing.
6. Starting at the indoor unit located farthest from the outdoor unit, sum the corrected cooling capacity of all indoor units served by the pipe segment for each branch and runout pipe (indoor units and branch distribution units [Multi F MAX systems only]). Record these values next to each segment.
7. Verify the size of the liquid and vapor lines.
8. If a Multi F MAX system, refer to the branch distribution unit information and the Y-branch kit information to verify the part number of each Y-branch and branch distribution unit based on the connected downstream nominal capacity served.
9. Calculate the equivalent pipe length in feet of each pipe segment. If a Multi F MAX system, Y-branch equivalent lengths must be totaled with the upstream segment only. Use equivalent pipe length data when it is provided with field-purchased fittings. If not available, use the data provided to estimate the equivalent length of field-provided pipe and fittings for each segment. Equivalent lengths must be totaled with the upstream segment only.
10. Verify the equivalent pipe length complies with product limitations. If the limitations are exceeded, either reroute the pipe or change the location of the indoor unit, Y-branch fittings and branch distribution units (if Multi F MAX systems), so the design conforms with all limitations.
11. If pipe length is adjusted as described in Step 10 above, verify again if the length of the design complies with the product limitations.
12. Use LATS HVAC software to verify the manually sized pipe design is acceptable. When entering the length of pipe segments in LATS HVAC software, enter the equivalent pipe length. Account for the additional pressure drop created by elbows, valves, and other fittings present in each segment by adding their respective equivalent pipe length to the actual pipe length.

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Condensate Drain Piping

Indoor Units

All indoor units generate water during cooling operation, therefore, how to properly handle this condensation must be considered. Some indoor units include factory-installed drain pumps; others apply the gravity drain method.

Table 122:Indoor Unit Drain Piping Specifications.

Indoor Unit	Drain Type	Drain Pipe Diameter (OD / ID, in.)	Drain Amount (gal. / min. at 0.033 ft. height)
Art Cool Wall-Mounted	Gravity	13/16 / 5/8	—
Art Cool Gallery	Gravity	13/16 / 5/8	—
Standard Wall-Mounted	Gravity	13/16 / 5/8	—
Low Wall Console	Gravity	13/16 / 5/8	—
Ceiling-Concealed Ducted (Low Static and High Static)	27-1/2 in. Lift Drain Pump, Factory Installed	Ø1-1/4 / Ø1	0.105
Four-Way Ceiling Cassette	27-1/2 in. (9,12MBh) or 31-1/2 in (18MBh) Lift Drain Pump, Factory Installed	Ø1-1/4 / Ø1	0.105
Vertical-Horizontal Air Handling Unit	Gravity	Ø3/4 / —	—

Figure 252:Diagram of an Indoor Unit with a Gravity Drain.

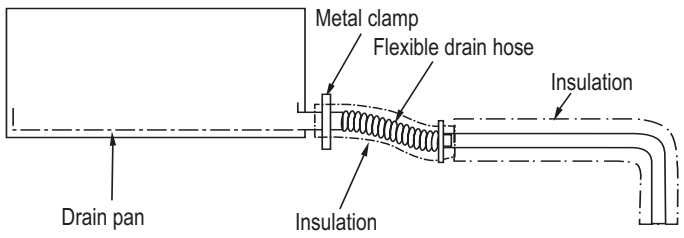
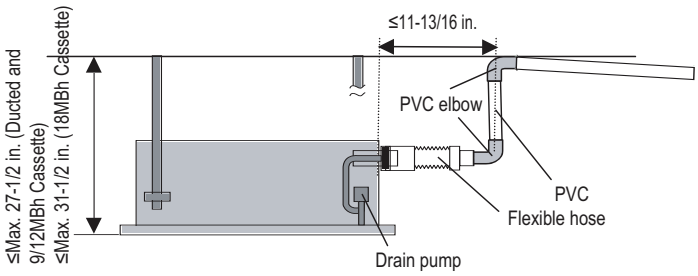


Figure 253:Diagram of an Indoor Unit with a Drain Pump.



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ELECTRICAL CONNECTIONS

“General Information” on page 207

“Power Wiring (208-230V) and Communications Cable Details” on page 210

“Remote Controller Connections” on page 220

“Indoor Unit Group Control” on page 221

ELECTRICAL CONNECTIONS

General Information

⚠ WARNING

- *All power (line voltage) wiring and communication cable installation must be performed by trained service providers working in accordance with all local, state, and National Electrical Code (NEC) / UL / ETL federal regulations related to electrical equipment and wiring, and following the manufacturer product diagrams, requirements, and instructions in this manual. Electric shock can cause physical injury or death.*
- *Be sure that main power to the unit is completely off before proceeding. Follow all safety and warning information outlined at the beginning of this manual. Failure to do so will cause electric shock and bodily injury.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously (circuit breaker must be resistant to electro-magnetic currents). Be sure that the circuit breaker or some other emergency power cutoff device is in place before any power wiring is done to the system. Failure to do so will cause bodily injury or death.*
- ⃠ *Never touch any power lines or live cables before all power is cutoff to the system. To do so will cause bodily injury or death.*
- *Power wiring and communication cable sizes must comply with all applicable federal, state, and local codes. Undersized wiring will lead to unacceptable voltage at the unit and will cause a fire, which will cause bodily injury or death.*
- *Properly ground the outdoor unit, indoor units, and branch distribution units. Ground wiring must always be installed by a trained technician. Ground wiring is required to prevent accidental electrical shock during current leakage, which will cause bodily injury or death.*
- *Verify that the branch switch and circuit breaker are set to OFF before installing the wiring system. Electric shock can cause physical injury or death.*
- *Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent will include some amount of direct current. Using an oversized breaker or fuse will result in electric shock, physical injury or death.*
- ⃠ *Do not connect ground wire to refrigerant, gas, sewage, or water piping; to lightning rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide a NEC-approved earth ground can result in electric shock, fire, physical injury or death.*

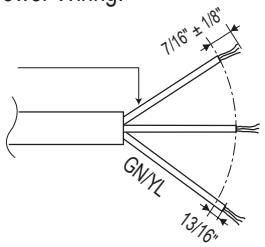
Note:

- *Consider ambient conditions (temperature, direct sunlight, inclement weather, etc.) when selecting, installing, and connecting the power wiring.*
- *Properly ground the outdoor unit, indoor units, and branch distribution units. Ground wiring must always be installed by a trained technician. Improperly grounded wire can cause communication problems from electrical noise, and motor current leakage.*
- *Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent will include some amount of direct current. Using an oversized breaker or fuse will result in equipment malfunction and property damage.*
- ⃠ *Do not connect ground wire to refrigerant, gas, or water piping; to lightning rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide a NEC-approved earth ground can result in property damage and equipment malfunction.*
- ⃠ *Do not operate the air conditioning system until the refrigerant piping installation is complete. Operating the system before refrigerant piping is finalized will damage the compressor.*

Power Supply / Power Wiring Specifications

- Multi F systems operate at 1Ø, 208-230V, 60Hz, and power is wired to the outdoor unit only. The outdoor unit will supply power to the indoor units and the branch distribution units (Multi F MAX systems only) through the communication / connection (power) cable.
- Power supply to the outdoor unit must be selected based on NEC and local codes. Maximum allowable voltage fluctuation ±10% or nameplate rated value.
- Power wiring to the outdoor unit(s) must be solid or stranded, and must comply with all local and national electrical codes.
- Properly ground the outdoor unit and indoor unit per NEC and local codes.
- Ground wire must be longer than the common power / communication wires.
- Connect the wiring firmly so the wires cannot be easily pulled out.
- Refer to the inside of the chassis cover or control cover for circuit and terminal block diagrams.
- Always match color codes of each wire and follow wiring diagram.
- ⃠ Do not install power wiring to the outdoor unit and the communication / connection (power) cable to the indoor unit in the same conduit. Use separate conduits.

Figure 254: Multi F / Multi F MAX Outdoor Unit Power Wiring.



⚠ WARNING

Always have a trained service provider properly ground the outdoor unit. If the outdoor unit is not properly grounded, there is a risk of electric shock, physical injury, or death.

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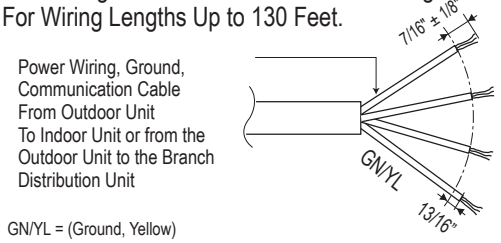
Communication / Connection (Power) Cable Specifications

Multi F Systems:

- Communication / connection (power) cable from the outdoor unit to the indoor unit for lengths up to 130 feet must use a minimum of 14 AWG, four (4) conductor, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes.
- When the communication / connection (power) wires between the indoor unit and outdoor unit is GREATER THAN 130 feet, use:
  - A two (2) conductor wire for power (for each indoor unit).
  - A two (2) conductor wire for communication / ground (for each indoor unit).
  - Separate the power AT LEAST two (2) inches away from the communication / ground wire (for each indoor unit).
  - All wiring is still minimum 14 gauge, stranded, shielded, or unshielded as cited above (for each indoor unit).

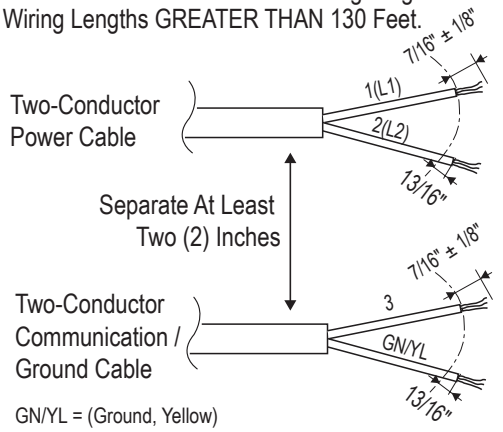
Figure 255:Typical Multi F / Multi F MAX with LGRED Outdoor and Indoor / Branch Distribution Unit Wiring and Communications Cable Diagram For Wiring Lengths Up to 130 Feet.



Multi F MAX Systems:

- All communication / connection (power) cable from the outdoor unit to the branch distribution unit(s) must be a minimum of 14 AWG, four (4) conductor, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes.
- Communication / connection (power) cable from the branch distribution unit(s) to the indoor units for lengths up to 130 feet must use a minimum of 14 AWG, four (4) conductor, stranded, shielded or unshielded (if shielded, it must be grounded to the chassis of the outdoor unit only), and must comply with applicable local and national codes.
- When the communication / connection (power) wires between the branch distribution unit and indoor unit is GREATER THAN 130 feet, use:
  - A two (2) conductor wire for power (for each indoor unit).
  - A two (2) conductor wire for communication / ground (for each indoor unit).
  - Separate the power AT LEAST two (2) inches away from the communication / ground wire (for each indoor unit).
  - All wiring is still minimum 14 gauge, stranded, shielded, or unshielded as cited above (for each indoor unit).

Figure 256:Multi F with LGRED Outdoor Unit to Indoor Unit, and Multi F MAX with LGRED Branch Distribution Unit to Indoor Unit Wiring Diagram for Wiring Lengths GREATER THAN 130 Feet.



- Insulation material as required by local code.
- Rated for continuous exposure of temperatures up to 140°F.
- Firmly attach the cable; provide slack but secure in a way to prevent external forces from being imparted on the terminal block.
- Wiring must be completed without splices.

Note:

- *Use a conduit for the communications / connection (power) cable from the outdoor unit to the indoor units and branch distribution unit(s). Electrical interference my cause product malfunction.*
- ⃠ *Never ground the shield of the communications cable to the indoor unit frame or other grounded entities of the building. Ground the communications cable shield only at the outdoor unit. Improperly grounding this cable can cause communications errors.*
- *The communications / connection (power) cable from the outdoor unit to the indoor units / branch distribution unit(s) must be separated and isolated from power wiring to the outdoor unit, computers, radio and television broadcasting facilities, as well as medical imaging equipment. Electrical interference my cause product malfunction.*

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ELECTRICAL CONNECTIONS

General Information

Figure 257:Typical Multi F System General Power / Communications System Schematic When Wiring is Less Than 130 Feet.

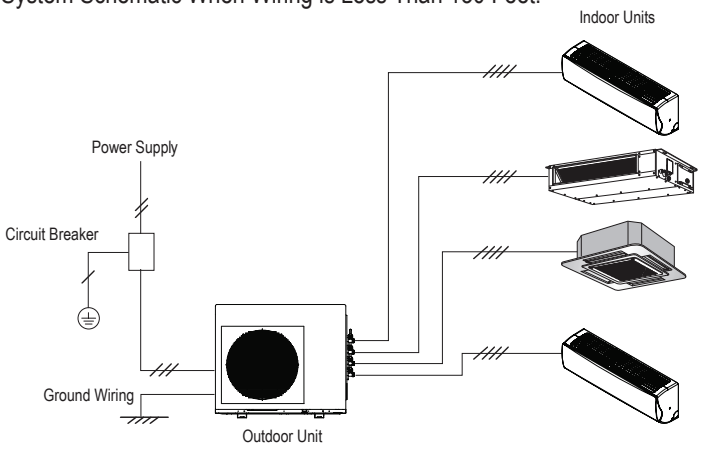


Figure 258:Typical Multi F MAX System General Power / Communications System Schematic When Wiring is Less Than 130 Feet.

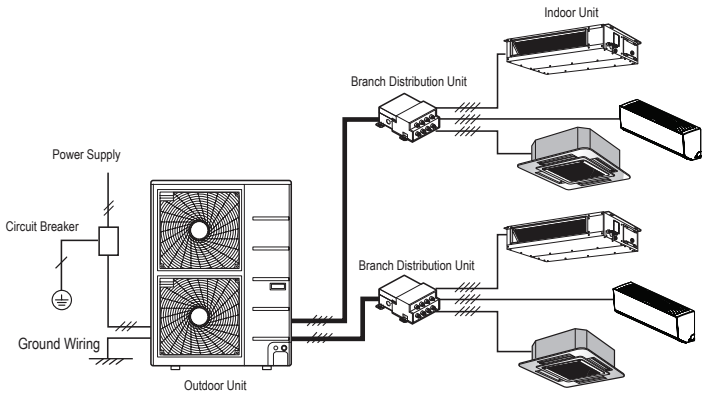
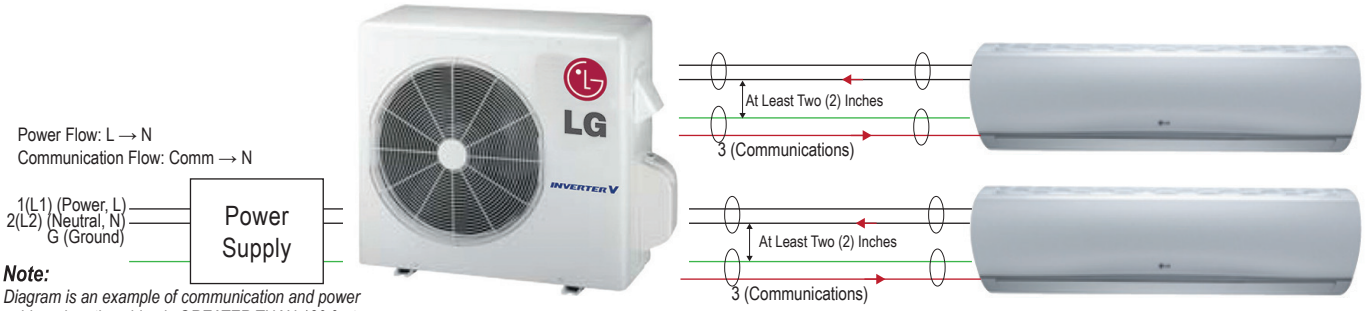


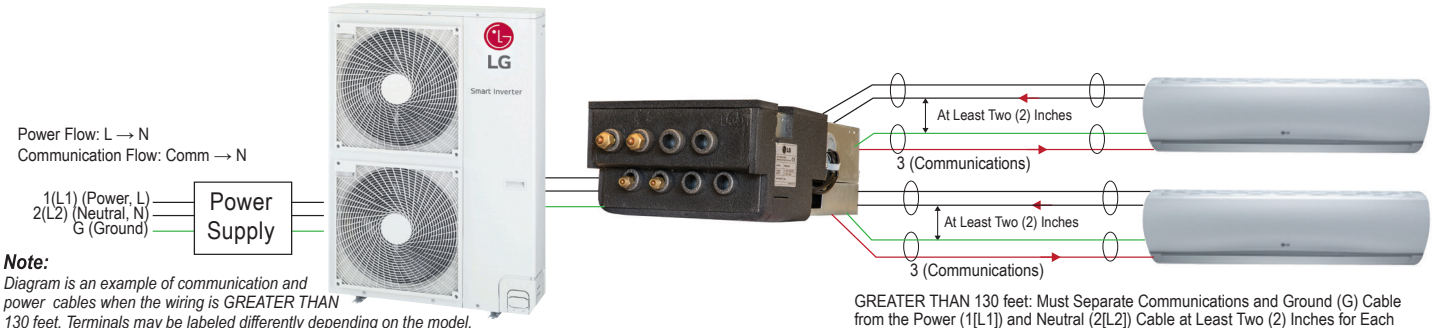
Figure 259:Schematic of a Multi F System When the Wiring is GREATER THAN 130 Feet.



Note:
Diagram is an example of communication and power cables when the wiring is GREATER THAN 130 feet. Terminals may be labeled differently depending on the model. Outdoor and Indoor Unit appearances may vary depending on the model.

GREATER THAN 130 feet: Must Separate Communications and Ground (G) Cable from the Power (1[L1]) and Neutral (2[L2]) Cable at Least Two (2) Inches for Each Indoor Unit

Figure 260:Schematic of a Multi F MAX with LGRED System When the Wiring is GREATER THAN 130 Feet.



Note:
Diagram is an example of communication and power cables when the wiring is GREATER THAN 130 feet. Terminals may be labeled differently depending on the model. Outdoor and Indoor Unit appearances may vary depending on the model.

GREATER THAN 130 feet: Must Separate Communications and Ground (G) Cable from the Power (1[L1]) and Neutral (2[L2]) Cable at Least Two (2) Inches for Each Indoor Unit.

Note:

- *Secure the separate wires in the control box panel using zip ties.*
- *Secure wiring with accessory clamps so that it does not touch piping.*
- *Use a conduit for the cable.*
- *Outside the unit, make sure the communications cable / power wiring are separately shielded, otherwise, the outdoor unit operation will be affected by electrical noise and will malfunction or fail.*
- *For details on the Multi F with LG RED and Multi F MAX with LG RED units, refer to the engineering manuals on www.lghvac.com.*

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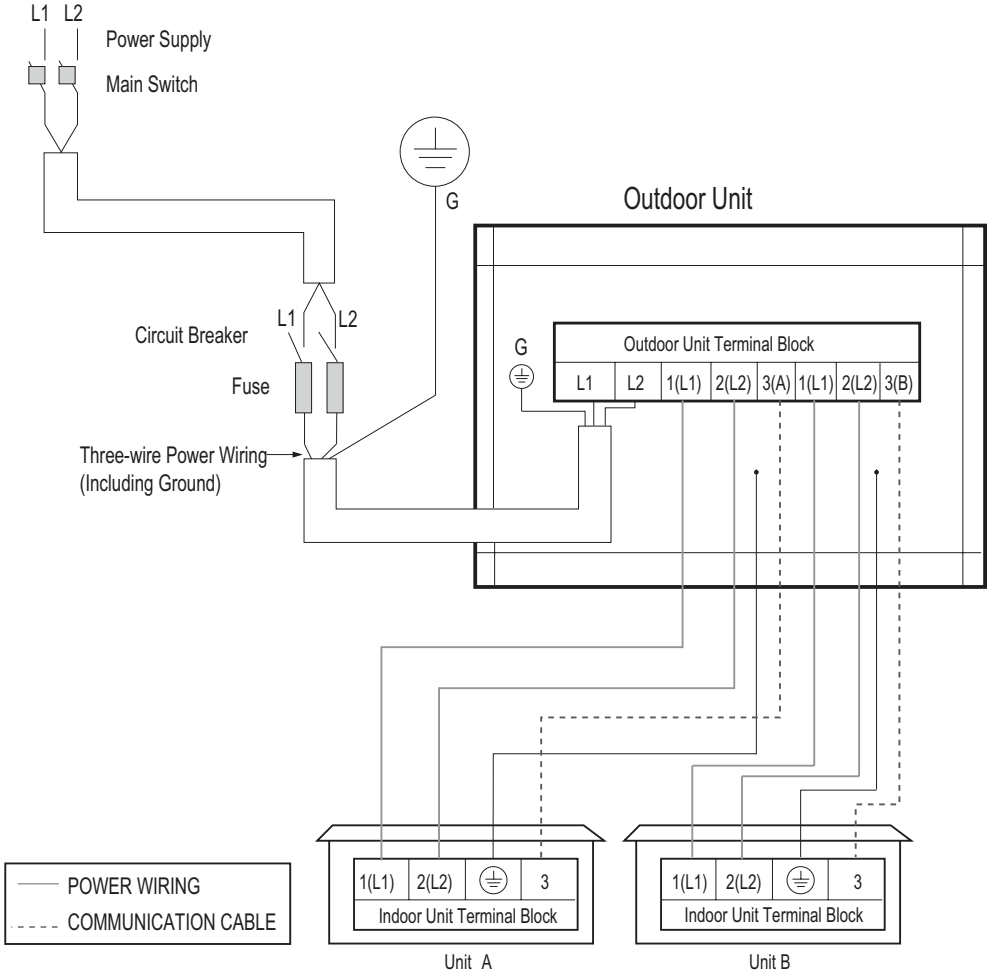
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 261: Multi F LMU18CHV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Electric shock can cause physical injury or death.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Electric shock can cause physical injury or death.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring will result in fire, electric shock, physical injury or death.*

Note:

- *For Multi F with LGRED, refer to Multi F & Multi F MAX with LGRED ODU engineering manual.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Failure to install proper wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components can result in property damage and equipment malfunction.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring can result in property damage and equipment malfunction.*

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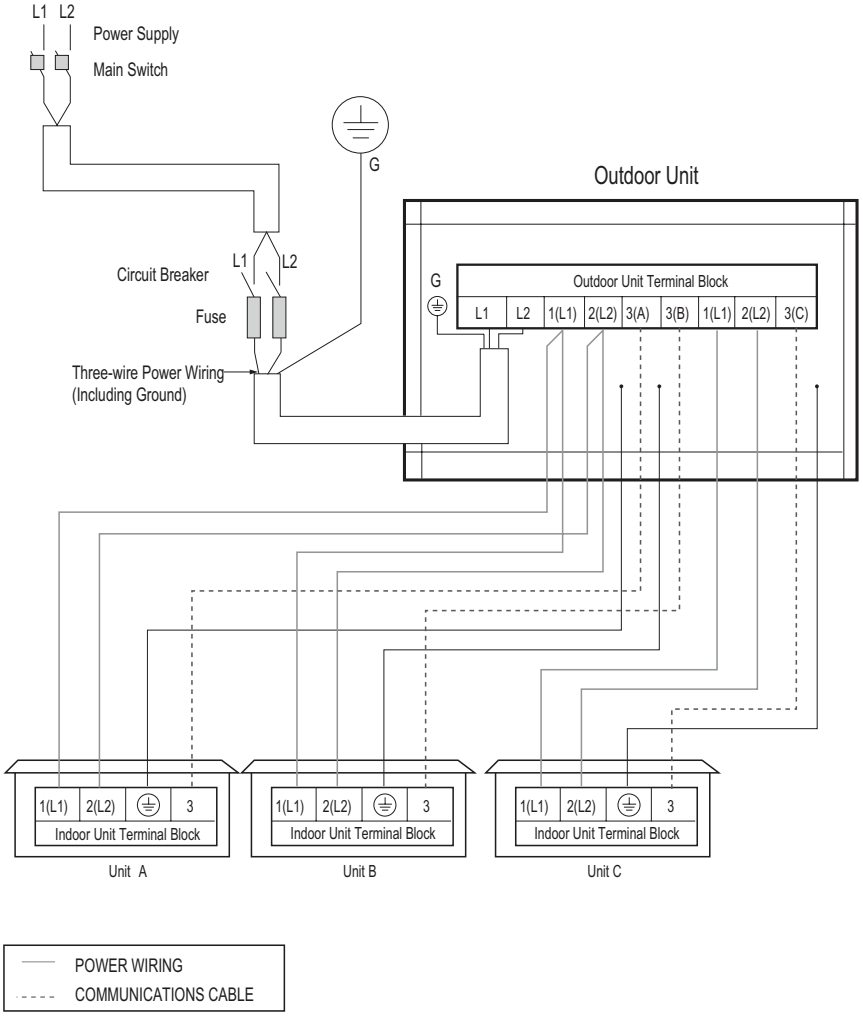
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 262:Multi F LMU24CHV System Power Wiring and Communications Cable.



WARNING

- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Electric shock can cause physical injury or death.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Electric shock can cause physical injury or death.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring will result in fire, electric shock, physical injury or death.*

Note:

- *For Multi F with LGRED, refer to Multi F & Multi F MAX with LGRED ODU engineering manual.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Failure to install proper wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components can result in property damage and equipment malfunction.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring can result in property damage and equipment malfunction.*

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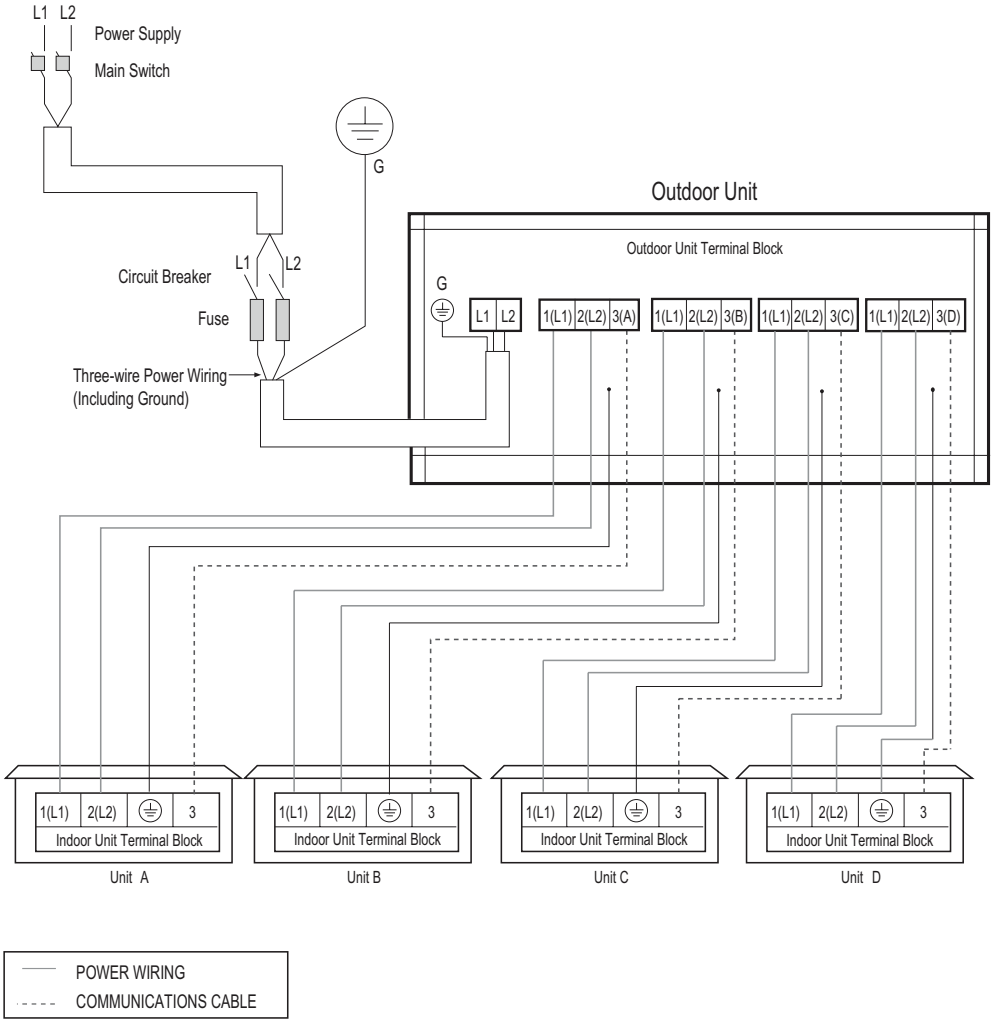
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 263:Multi F LMU30CHV and LMU36CHV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Electric shock can cause physical injury or death.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Electric shock can cause physical injury or death.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring will result in fire, electric shock, physical injury or death.*

Note:

- *For Multi F with LGRED, refer to Multi F & Multi F MAX with LGRED ODU engineering manual.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Failure to install proper wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components can result in property damage and equipment malfunction.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring can result in property damage and equipment malfunction.*

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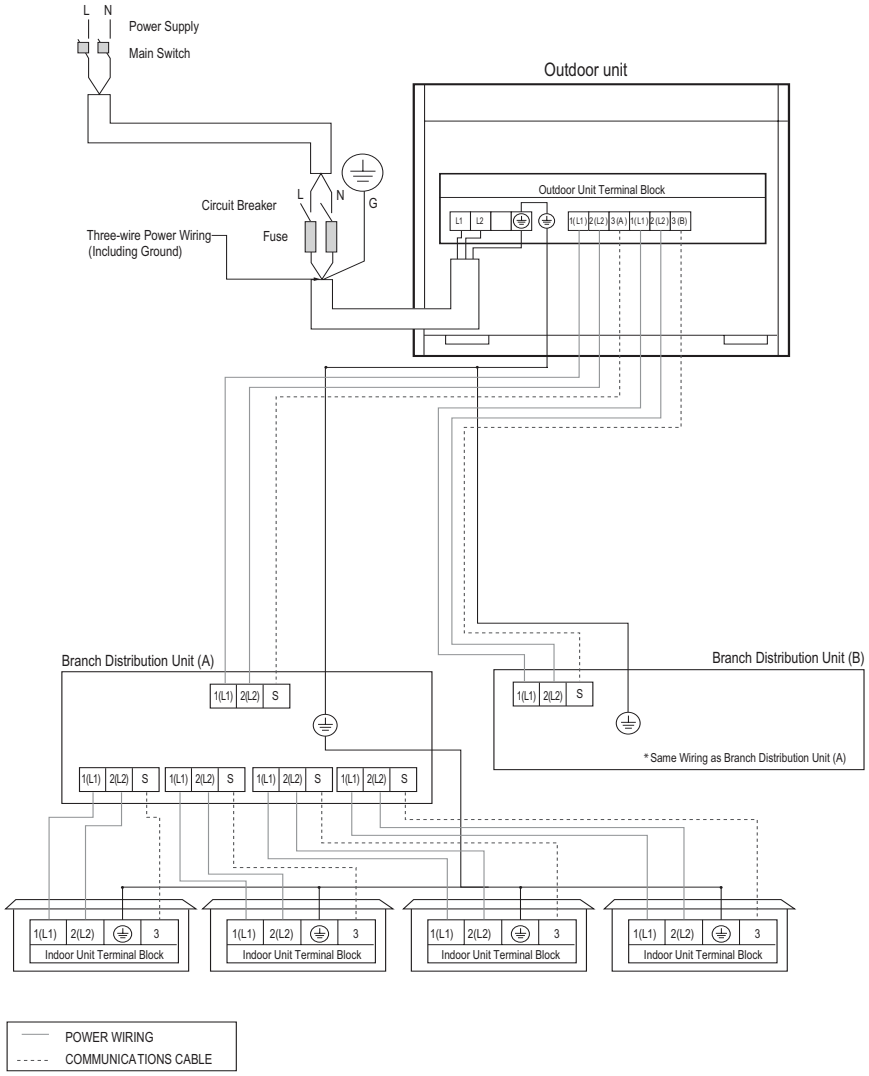
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 264:Multi F MAX LMU480HV and LMU540HV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Electric shock can cause physical injury or death.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Electric shock can cause physical injury or death.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring will result in fire, electric shock, physical injury or death.*

Note:

- *For Multi F MAX with LGRED, refer to Multi F & Multi F MAX with LGRED ODU engineering manual.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Failure to install proper wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components can result in property damage and equipment malfunction.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring can result in property damage and equipment malfunction.*

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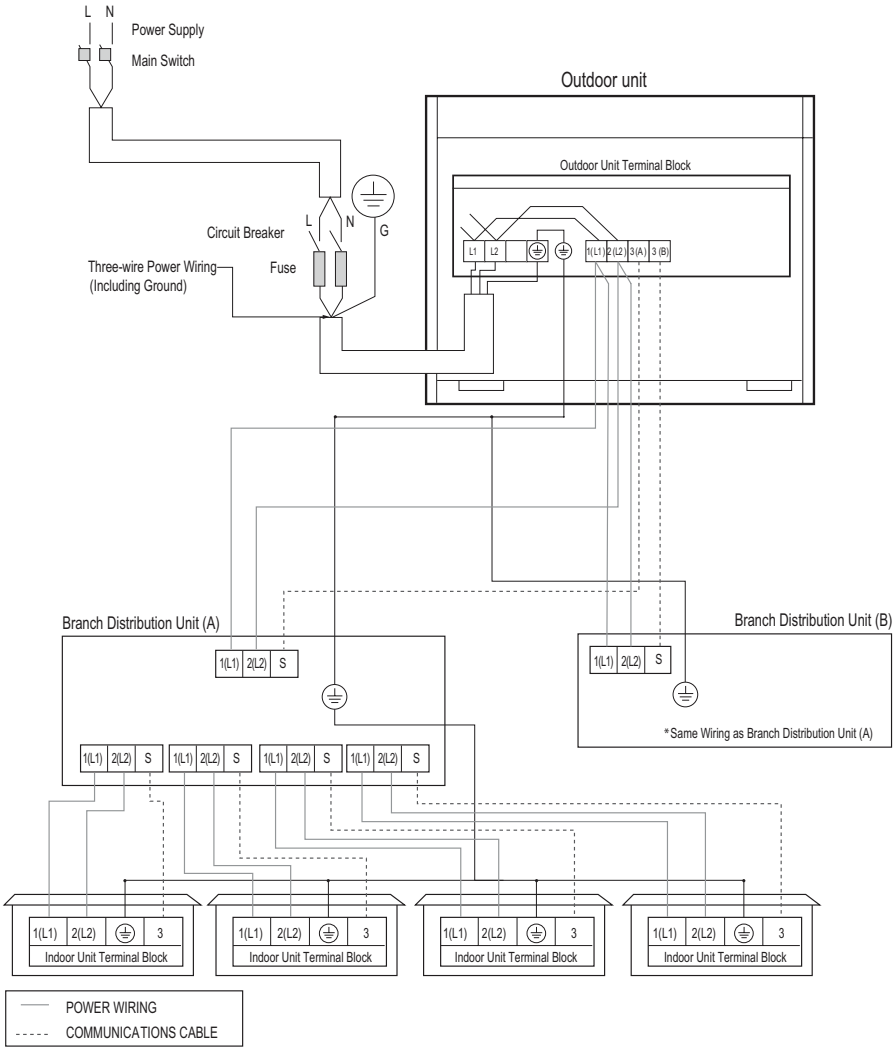
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 265:Multi F MAX LMU600HV System Power Wiring and Communications Cable.



⚠ WARNING

- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Electric shock can cause physical injury or death.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Electric shock can cause physical injury or death.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring will result in fire, electric shock, physical injury or death.*

Note:

- *For Multi F MAX with LGRED, refer to Multi F & Multi F MAX with LGRED ODU engineering manual.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *All field-supplied wiring, components, and materials must follow national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Use only stranded, shielded or unshielded copper communications / power wiring from the outdoor unit to the indoor units. If shielded, wiring must be grounded to the chassis at the outdoor unit only. Failure to install proper wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components can result in property damage and equipment malfunction.*
- *Wiring cable size must comply with applicable national, state, and local codes. Improper wiring can result in property damage and equipment malfunction.*

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ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 266:Multi F with LGRED System General Power / Communications System Schematic.

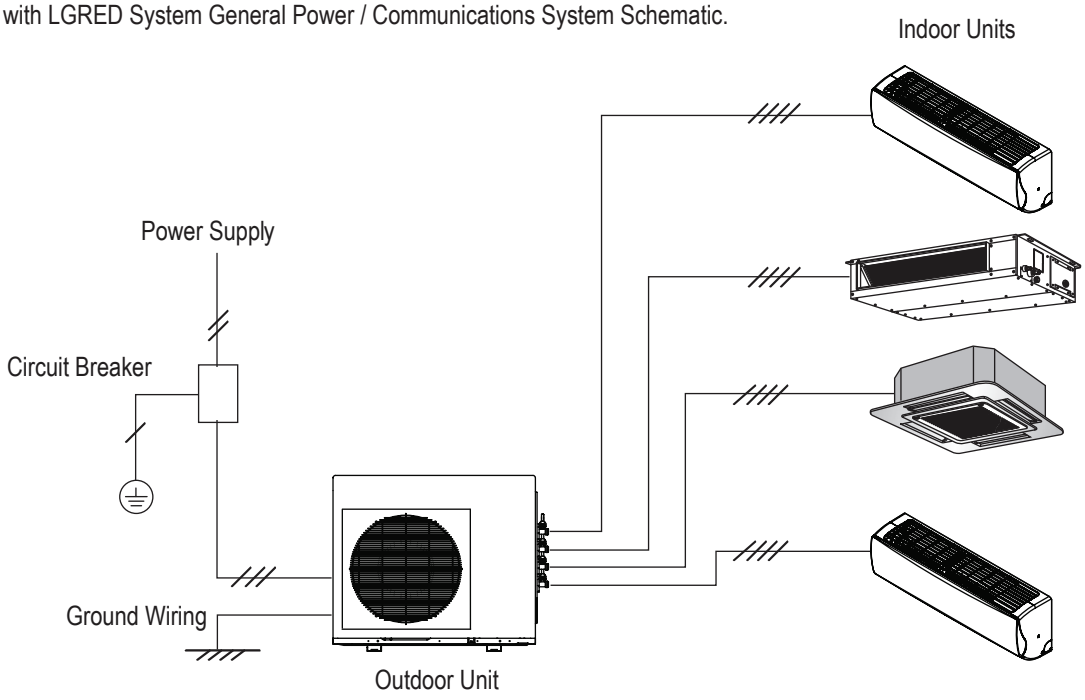
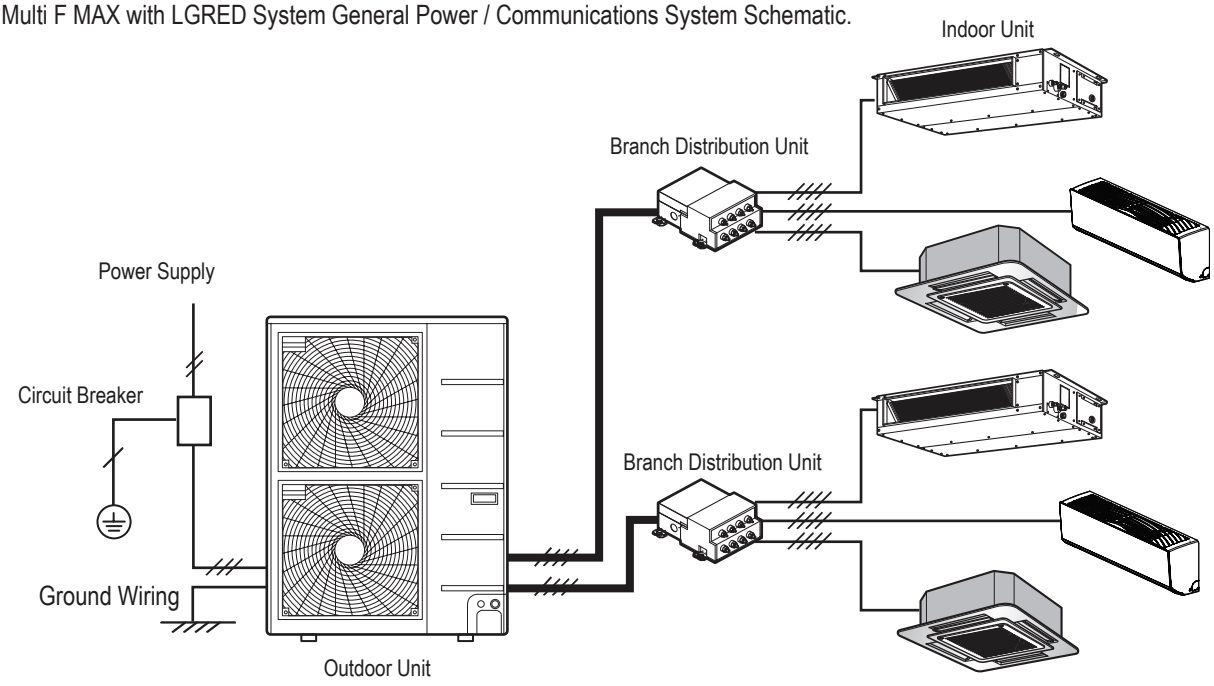


Figure 267:Multi F MAX with LGRED System General Power / Communications System Schematic.



Note:

- *Secure the separate wires in the control box panel using zip ties.*
- *Secure wiring with accessory clamps so that it does not touch the piping.*
- *Use a conduit for the communications cable / power wiring from the outdoor unit to the indoor / branch distribution units.*
- *Make sure the communications cable / power wiring from the outdoor units to the indoor / branch distribution units, and the power wiring to the outdoor unit are separate, otherwise, the outdoor unit operation will be affected by electrical noise and will malfunction or fail.*

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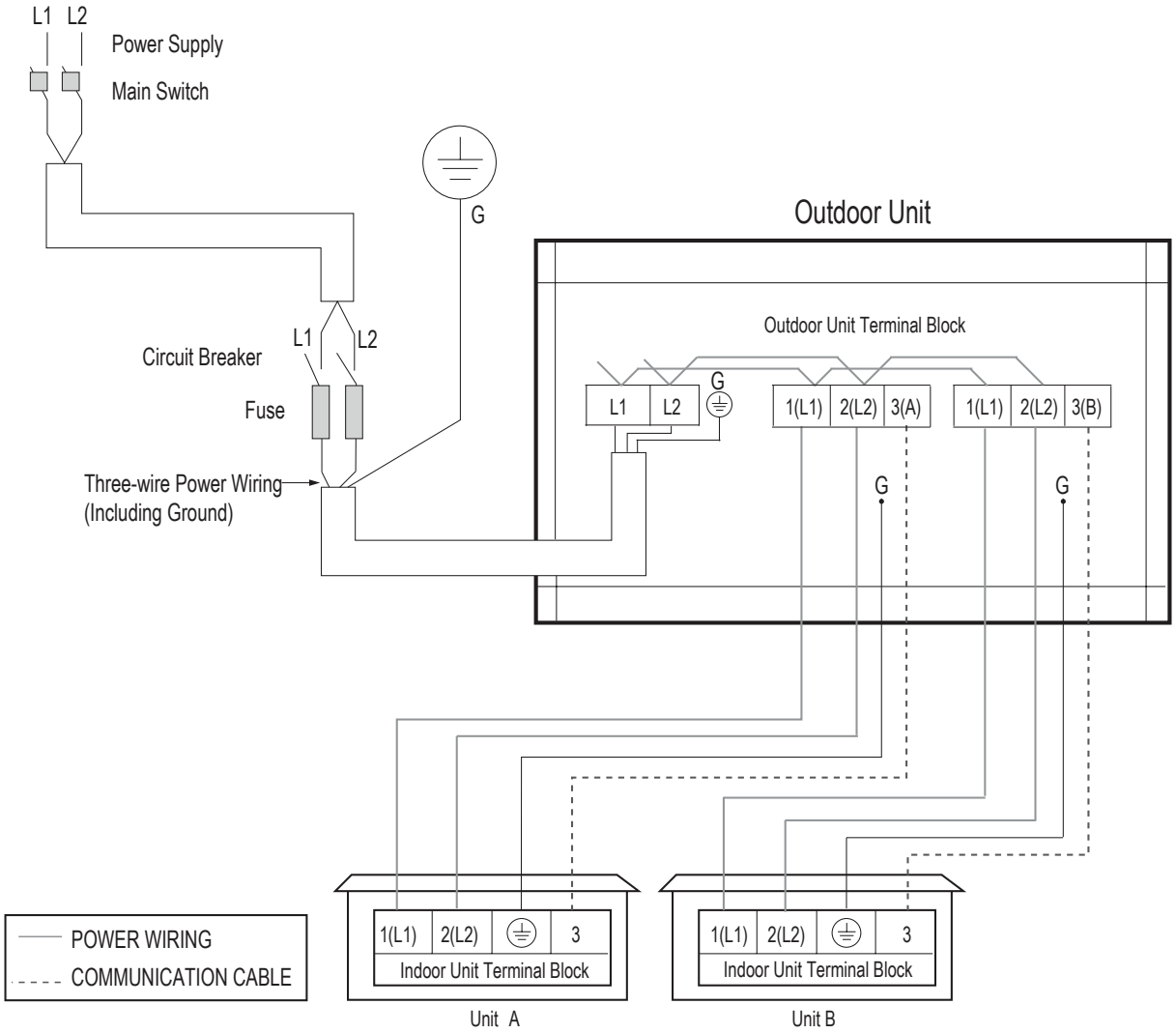
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 268:Multi F with LGRED LMU180HHV System Power Wiring and Communications Cable Connections.



⚠ WARNING

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, physical injury or death.*

Note:

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

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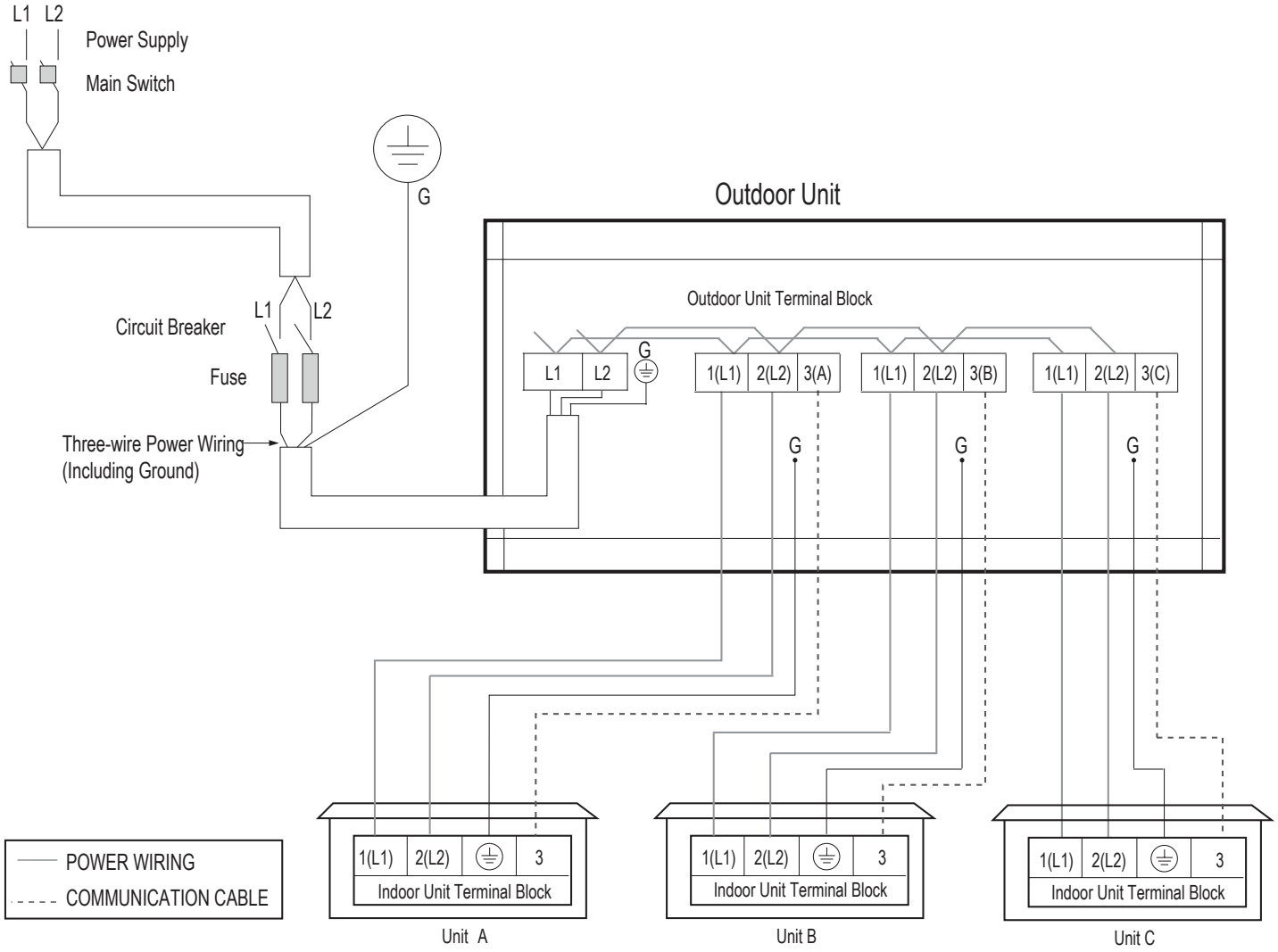
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 269:Multi F with LGRED LMU240HHV System Power Wiring and Communications Cable Connections.



⚠ WARNING

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, physical injury or death.*

Note:

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

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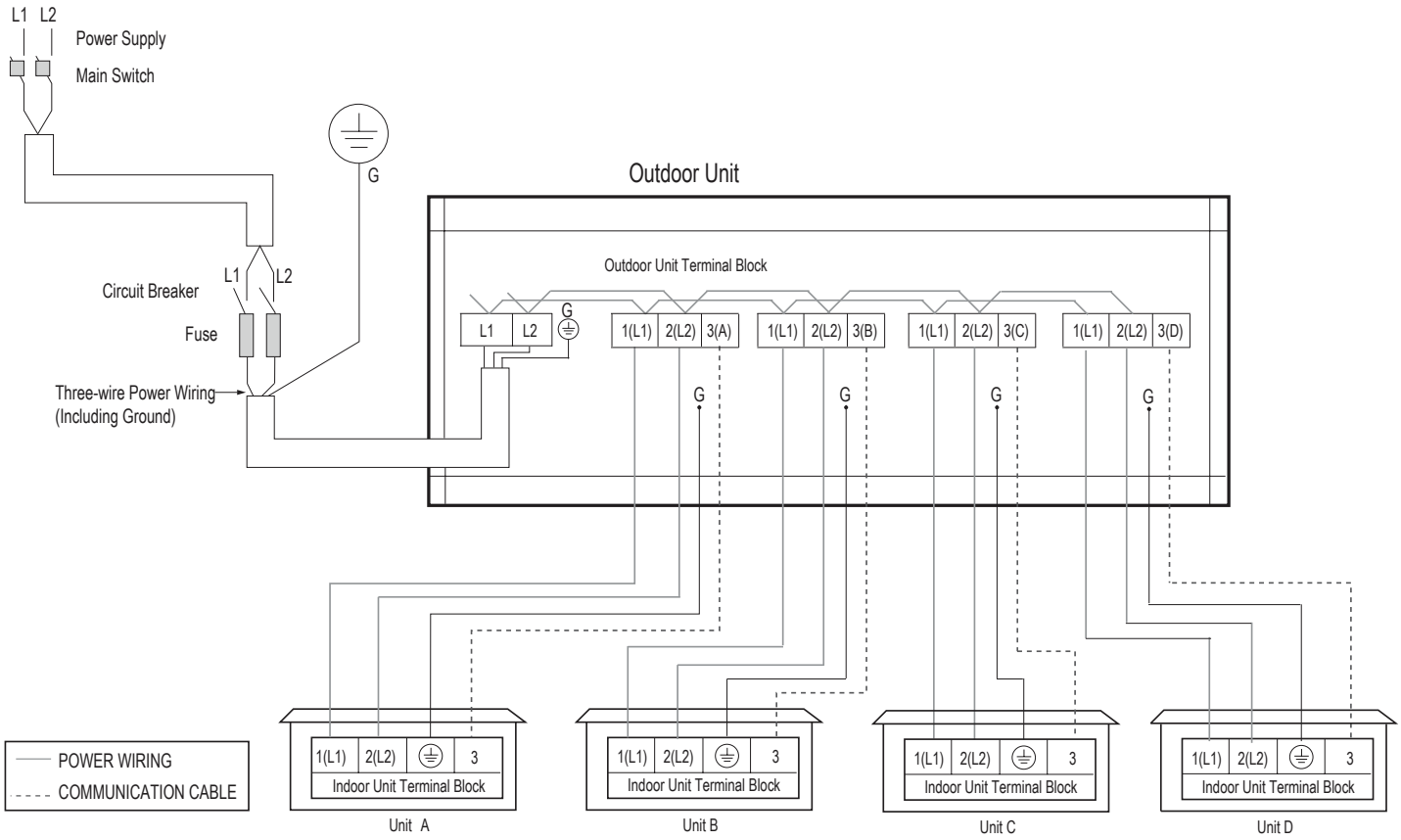
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 270:Multi F with LGRED LMU300HHV System Power Wiring and Communications Cable Connections.



⚠ WARNING

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, physical injury or death.*

Note:

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

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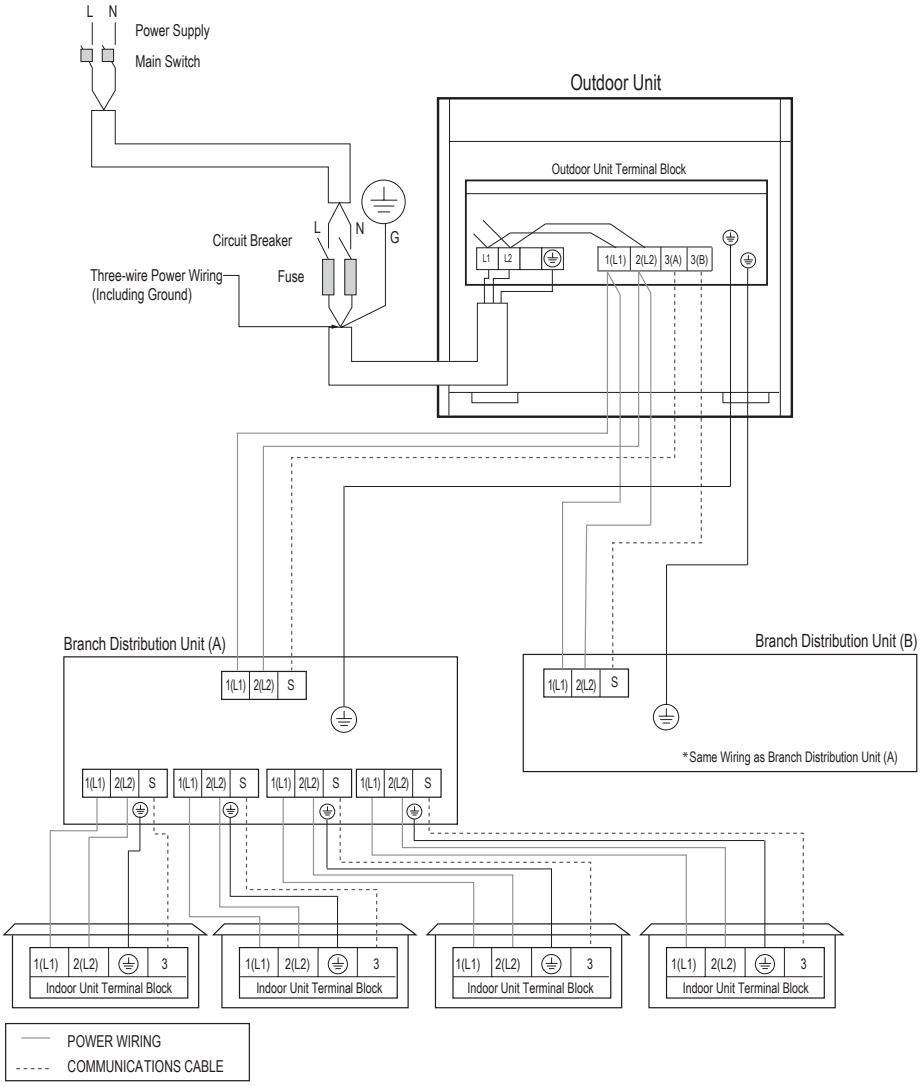
ELECTRICAL CONNECTIONS

Power Wiring (208-230V) and Communications Cable Details

Figure 271:Multi F MAX with LGRED LMU360HHV and LMU420HHV System Power Wiring and Communications Cable Connections.



⚠ WARNING

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Improper wiring will result in fire, electric shock, physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is a risk of fire, electric shock, explosion, physical injury or death.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. There is a risk of fire, electric shock, explosion, physical injury or death.*

Note:

- *All field-supplied wiring, components, sizes, and materials must comply with all applicable national, state, and local codes and requirements. Failure to install proper electrical components can result in property damage and equipment malfunction.*
- *Ground wiring is required to prevent communication problems from electrical noise, and motor current leakage. Failure to provide proper ground wiring can result in property damage and equipment malfunction.*
- *Install a main shutoff switch or circuit breaker that interrupts all power sources simultaneously. Failure to install proper electric components will result in property damage and equipment malfunction.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*

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ELECTRICAL CONNECTIONS

Remote Controller Connections

From Indoor Units to Remote Controllers

- Communication cable from indoor unit to remote controller(s) is to be field provided or LG provided 22 AWG, 3-conductor, twisted, stranded, unshielded. Wiring must comply with all applicable local and national codes.
- If using the LG Controller / Extension cable and the length needs to be further extended, the LG Extension Kit (sold separately) must be used. A maximum of four (4) kits (up to 165 feet) can be used.
- Remote controllers have hardwired connections: SIG - 12V - GND (Comm.) terminals.
- Indoor unit controller connections depend on type of indoor unit being installed. Some indoor units use terminal block connections; other indoor units use Molex connections. See diagrams below for the two options. Refer to the wiring diagram schematic found in the indoor unit itself, or to the indoor unit wiring diagrams in the Engineering Manuals for more information.
- ⃠ NEVER splice, cut, or extend LG provided cable with field provided cable. Always include enough cable to cover distance between the indoor unit and the remote controller.
- Set the indoor unit operating parameters using DIP switches, or by setting up the remote controller. Refer to the indoor unit installation manuals for more details.

Figure 272:One Example of Indoor Unit to Zone Controller Connection.

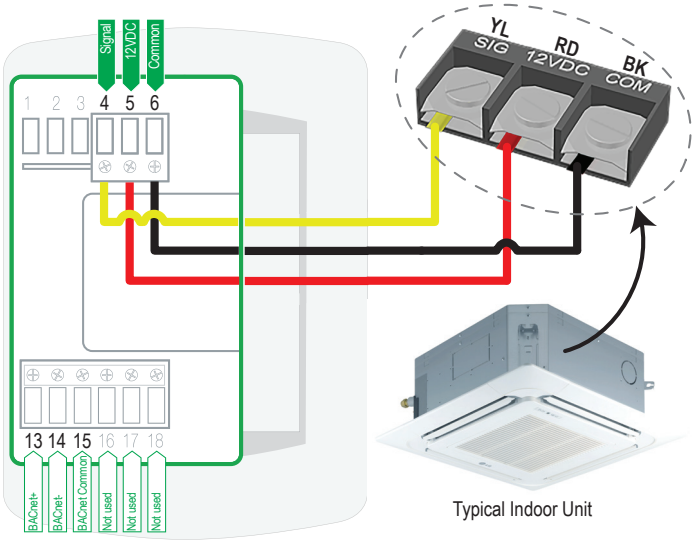
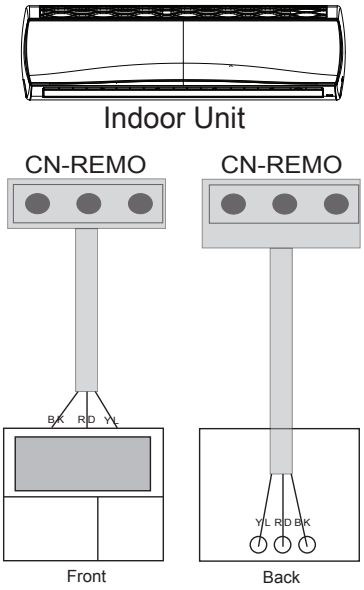


Figure 273:Another Example of Indoor Unit to Zone Controller Connection.



Note:

Cable connected to Zone Controller is the factory default connection.

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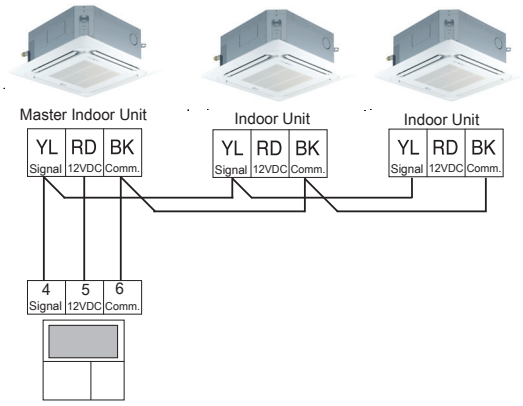
Between Multiple Indoor Units Operating as a Group (Group Control)

If any indoor units were specified to operate in unison:

- Before running the field provided or LG provided cable, decide which indoor unit will be the "Master." The other indoor units in that group will be designated as "Slave(s)." The zone controller will be connected to the "Master."
- Set the pertinent DIP switch at each indoor unit to identify the Master and Slave(s). On wall mounted indoor unit models, set the assignment using the handheld remote controller.
- Use a daisy chain configuration and connect all of the group's indoor units together starting at the "Master" unit.
- ⃠ NEVER splice, cut, or extend LG provided cable with field provided cable. Always include enough cable to cover distance between all components.

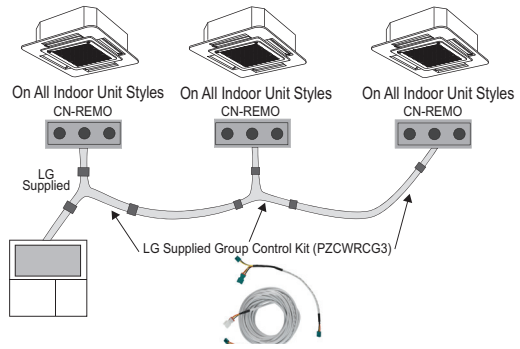
Figure 274:Example of Indoor Unit Group to Zone Controller Connections (Sig-12V-GND [Comm.] Terminal).



For indoor units with hardwired connections SIG - 12V - GND (Comm.) terminals:

- From the controller to the master indoor unit, use field provided or LG provided 22 AWG, 3-conductor, twisted, stranded, unshielded. All wiring must comply with all applicable local / national codes.
- From the master indoor unit to the slave indoor unit(s), daisy chain using field provided or LG provided 22 AWG, 3-conductor, twisted, stranded, unshielded. All wiring must comply with all applicable local / national codes.
- ⃠ Do not attach wire to 12VDC terminal to the slave indoor units. All wiring must comply with all applicable local and national codes.
- ⃠ NEVER splice, cut, or extend LG provided cable with field provided cable. Always include enough cable to cover distance between all components.

Figure 275:Example of Indoor Unit Group to Zone Controller Connections (CN-REMO).



For indoor units with CN-REMO connections:

Use one (or multiple) Group Control Kit(s) (sold separately) containing extension and Y-splitter cables. Use one (1) group control cable kit for each indoor unit in the group except for the last indoor unit. ⃠ NEVER splice, cut, or extend cable length with field provided cable.

Table 123:Accessories for Some Group Control Applications.

Accessory	Model Number	Image
Wired Remote Group Control Cable Assembly - For connecting multiple indoor units to a control group	PZCWRCG3	
Wired Remote/Wired Remote Extension Cable - For extending the distance between indoor units or remote controllers in a control group	PZCWRC1	

Note:

- *Cable connected to zone controller is the factory default connection.*
- *Indoor unit connections depend on indoor unit type.*

General Specifications

- Wired remote controllers can be connected to all indoor unit types.
- Wireless controllers can be used in conjunction with wired remote controllers.
- A dry contact unit can be connected with a central controller simultaneously.
  - The master indoor unit is recognized by the dry contact unit and the central controller.
  - Group Control only available for indoor units manufactured after February 2009.
  - The central controller can control indoor units after setting the address of the master indoor unit only.
  - Slave indoor unit cannot be individually controlled by central controller.
  - Slave indoor unit will operate like master indoor unit.
- If an error occurs with the indoor unit, the error will be displayed on the wired remote controller.
- The following functions are available with group control:
- Selection of operation options (operation/mode/set temperature)
- Control of air flow rate (High/Medium/Low)

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ACRONYMS

Table 124: Table of Acronyms.

ABS	Acrylonitrile Butadiene Styrene	IAQ	Indoor Air Quality
AC	Air Conditioner	IDU	Indoor Unit
ACP	Advanced Control Platform	IUCF	Indoor Unit Correction Factor
ARI	Air Conditioning and Refrigeration Institute	KTL	Korea Testing Laboratories
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning	LATS	LG Air Conditioning Technical Solution
AWG	American Wire Gauge	LGAP	LG Air Conditioner Protocol
BDU	Branch Distribution (Unit)	MAT	Mixed Air Temperature
Btu/h	British Thermal Units per hour	MBh	Thousands BTUs per hour
CAV	Constant Air Volume	MCA	Maximum Circuit Ampacity
CCR	Corrected Capacity Ratio	MFS	Maximum Fuse Size
CDOA	Coupled Dedicated Outdoor Air	NEC	National Electrical Code
CFM	Cubic Feet per Minute	OAT	Outdoor Air Temperature
CR	Combination Ratio	ODU	Outdoor Unit
DB	Dry Bulb	OUCF	Outdoor Unit Correction Factor
dB(A)	Decibels with “A” frequency weighting	PDI	Power Distribution Indicator
DDOAS	Decoupled Dedicated Outdoor Air	PI	Power Input
DFS	Duct-Free Split	PTAC	Packaged Terminal Air Conditioner
DI	Digital Input	PVE	Polyvinyl Ether
DO	Digital Output	RAT	Return Air Temperature
ECM	Electronically Commutated Motor	RCL	Refrigerant Concentration Limit
EEV	Electronic Expansion Valve	SC	Sensible Capacity
ELF	Equivalent Length in Feet	TC	Total Capacity
EPDM	Ethylene Propylene Diene M-Class Rubber	VAV	Variable Air Volume
ESP	External Static Pressure	VRF	Variable Refrigerant Flow
ETL	Electronic Testing Laboratories	VRP	Ventilation Rate Procedure
HACR	Heating, Air Conditioning, and Refrigeration		
H/M/L	High / Medium / Low		

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EM_MultiF_IDU_02_21
Supersedes: EM_MultiF_IDU_04_20
EM_MultiF_IDU_09_19
EM_MultiF_IDU_08_19
EM_MultiF_IDU_11_18
EM_MultiF_IDU_10_17
EM_MultiF_IDU_11_16
EM_MultiF_IDU_7_16
EM_MultiF_IDU_7_15
EM-MultiFIDU-01-15
EM-MultiFIDU-06-14