# MULTI F
# MULTI F MAX

## CONVERTIBLE MID-STATIC DUCTED INDOOR UNIT INSTALLATION MANUAL

- LHN098HV1 9 kBtu
- LHN128HV1 12 kBtu
- LHN188HV1 18 kBtu
- LHN248HV1 24 kBtu

# PROPRIETARY DATA NOTICE

**This document, as well as all reports, illustrations, data, information, and other materials are the property of LG Electronics U.S.A., Inc., and are disclosed by LG Electronics U.S.A., Inc., only in confidence. This document is for design purposes only.**

## ⃠ Do not throw away, destroy, or lose this manual.

Please read carefully and store in a safe place for future reference.
Content familiarity required for proper installation.

The instructions included in this manual must be followed to prevent product malfunction, property damage, injury, or death to the user or other people. Incorrect operation due to ignoring any instructions will cause harm or damage. The level of seriousness is classified by the symbols described below.

A summary list of safety precautions begins on page 3.

## For more technical materials such as submittals, engineering databooks, and catalogs, visit www.lghvac.com.

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

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IMPORTANT - This product has been designed and manufactured to meet ENERGY STAR criteria for energy efficiency when matched with appropriate coil components. However, proper refrigerant charge and proper air flow are critical to achieve rated capacity and efficiency. Installation of this product should follow the manufacturer's refrigerant charging and air flow instructions. **Failure to confirm proper charge and airflow may reduce energy efficiency and shorten equipment life.**

For continual product development, LG Electronics U.S.A., Inc., reserves the right to change specifications without notice.

# SAFETY INSTRUCTIONS

The instructions below must be followed to prevent product malfunction, property damage, injury or death to the user or other people. Incorrect operation due to ignoring any instructions will cause harm or damage. The level of seriousness is classified by the symbols described below.

## 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.* |

## INSTALLATION

**⚠DANGER**

**⃠ Don't store or use flammable gas / combustibles near the unit.**
*There is risk of fire, explosion, and physical injury or death.*

**Use only an appropriately sized vacuum pump and / or inert (nitrogen) gas when performing leak tests or purging air. ⃠ Do not use compressed compress air, oxygen, or flammable gases.**
*There is risk of fire, explosion, and physical injury or death.*

**⚠WARNING**

**⃠ Do not install or remove the unit by yourself (end-user). Ask the dealer or a trained technician to install the unit.**
*Improper installation by the user will result in water leakage, fire, explosion, electric shock, physical injury or death.*

**For replacement of an installed unit, always contact an LG trained service provider. ⃠ Do not randomly disassemble or repair the units.**
*There is risk of fire, electric shock, explosion, and physical injury or death.*

**The outdoor unit is shipped with refrigerant and the service valves closed. ⃠ Do not open service valves on the unit until all non-condensibles have been removed from the piping system and authorization has been obtained from the commissioning agent.**
*There is a risk of physical injury or death.*

**⃠ Do not run the compressor with the service valves closed.**
*There is risk of explosion, physical injury, or death.*

**Periodically check that the unit is not damaged.**
*There is risk of explosion, physical injury, or death.*

**Replace all control box and panel covers.**
*If cover panels are not installed securely, dust, water and animals will enter the unit, causing fire, electric shock, and physical injury or death.*

**Wear protective gloves when handling equipment. Sharp edges will cause personal injury.**

**Wear protective gloves when handling equipment. Sharp edges will cause personal injury.**

**Always check for system refrigerant leaks during installation and after the unit has been installed or serviced.**
*Exposure to high concentration levels of refrigerant gas will lead to illness or death.*

**Dispose of the packing materials safely.**
- *Packing materials, such as nails and other metal or wooden parts will cause puncture wounds or other injuries.*
- *Tear apart and throw away plastic packaging bags so that children will not play with them and risk suffocation and death.*

**⃠ Do not install the unit using defective hanging, attaching, or mounting hardware.**
*There is risk of physical injury or death.*

**⃠ Do not install the unit in any location exposed to open flame or extreme heat. ⃠ Do not touch the unit with wet hands.**
*There is risk of fire, electric shock, explosion, and physical injury or death.*

**Install the unit considering the potential for strong winds or earthquakes.**
*Improper installation will cause the unit to fall, resulting in physical injury or death.*

**⃠ Do not change the settings of the protection devices.**
*If the pressure switch, thermal switch, or other protection device shorted and forced to operate improperly, or parts other than those specified by LG are used, there is risk of fire, electric shock, explosion, and physical injury or death.*

## INSTALLATION - CONTINUED

**⚠WARNING**

**If the air conditioner is installed in a small space, take measures to prevent the refrigerant concentration from exceeding safety limits in the event of a refrigerant leak.**
*Consult the latest edition of ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) Standard 15. If the refrigerant leaks and safety limits are exceeded, it could result in personal injuries or death from oxygen depletion.*

**Properly insulate all cold surfaces to prevent "sweating."**
*Cold surfaces such as un-insulated piping can generate condensate that could drip, causing a slippery surface that creates a risk of slipping, falling, and personal injury.*

**When installing thei mid-static ducted indoor unit vertically, the vertical drain pan (in the conversion kit) must be installed.**
*If the conversion kit / vertical drain pan is not used, water will leak, causing a slippery surface that creates a risk of slipping, falling, and injury.*

**⚠CAUTION**

**Be very careful when transporting the product. Failure to follow these directions will result in minor or moderate physical injury.**

- ⃠ *Do not attempt to carry the product without assistance.*
- *Some products use polypropylene bands for packaging.* ⃠ *Do not use polypropylene bands to lift the unit.*
- *Suspend the unit from the base at specified positions.*
- *Support the unit a minimum of four points to avoid slippage from rigging apparatus.*

## *Note:*

**Properly insulate all cold surfaces to prevent "sweating."**
*Cold surfaces such as un-insulated piping can generate condensate that will drip and cause a slippery surface condition and/or water damage to walls.*

**When installing the unit in a hospital, mechanical room, or similar electromagnetic field (EMF) sensitive environment, provide sufficient protection against electrical noise.**
*Inverter equipment, power generators, high-frequency medical equipment, or radio communication equipment will cause the air conditioner to operate improperly. The unit will also affect such equipment by creating electrical noise that disturbs medical treatment or image broadcasting.*

⃠ **Do not use the product for special purposes such as preserving foods, works of art, wine coolers, or other precision air conditioning applications. This equipment is designed to provide comfort cooling and heating.**
*There is risk of property damage.*

⃠ **Do not make refrigerant substitutions. Use R410A only.**
*If a different refrigerant is used, or air mixes with original refrigerant, the unit will malfunction and become damaged.*

⃠ **Do not install the unit in a noise sensitive area.**

**When connecting refrigerant tubing, remember to allow for pipe expansion.**
*Improper piping will cause refrigerant leaks and system malfunction.*

**When installing thei mid-static ducted indoor unit vertically, the vertical drain pan (in the conversion kit) must be installed.**
*If the conversion kit / vertical drain pan is not used, water will leak and cause a slippery surface condition and/or water damage to walls.*

⃠ **Do not run the compressor with the service valves closed.**
*There is a risk of equipment damage.*

⃠ **Don't store or use flammable gas / combustibles near the unit.**
*There is risk of product failure.*

**Take appropriate actions at the end of HVAC equipment life to recover, recycle, reclaim or destroy R410A refrigerant according to applicable U.S. Environmental Protection Agency (EPA) rules.**

**Periodically check that the unit is not damaged.**
*There is a risk of equipment damage.*

**Install the unit in a safe location where no one can step on or fall onto it.** ⃠ **Do not install the unit with defective hanging, attaching, or mounting hardware.**
*There is risk of unit and property damage.*

**Install the drain hose to ensure adequate drainage.**
*There is a risk of water leakage and property damage.*

**Always check for system refrigerant leaks after the unit has been installed or serviced.**
*Low refrigerant levels will cause product failure.*

**The unit is shipped with refrigerant and the service valves closed.** ⃠ **Do not open service valves on the unit until all non-condensibles have been removed from the piping system and authorization to do so has been obtained from the commissioning agent.**
*There is a risk of refrigerant contamination, refrigerant loss and equipment damage.*

**Ensure the ductwork and its material follow local, state, and federal codes for supplying / circulating air.**
*There is risk of product failure and / or damage.*

## WIRING

**⚠DANGER**

**High voltage electricity is required to operate this system. Adhere to the National Electrical Codes and these instructions when wiring.**

*Improper connections and inadequate grounding can cause accidental injury or death.*

**Always ground the unit following local, state, and National Electrical Codes.**

**Turn the power off at the nearest disconnect before servicing the equipment.**

*Electric shock can cause physical injury or death.*

**Properly size all circuit breakers or fuses.**

*There is risk of fire, electric shock, explosion, physical injury or death.*

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**⚠WARNING**

**The information contained in this manual is intended for use by an industry-qualified, experienced, trained electrician familiar with the U.S. National Electric Code (NEC) who is equipped with the proper tools and test instruments.**

*Failure to carefully read and follow all instructions in this manual can result in equipment malfunction, property damage, personal injury or death.*

**All electric work must be performed by a licensed electrician and conform to local building codes or, in the absence of local codes, with the National Electrical Code, and the instructions given in this manual.**

*If the power source capacity is inadequate or the electric work is not performed properly, it will result in fire, electric shock, physical injury or death.*

**Ensure the system is connected to a dedicated power source that provides adequate power.**

*If the power source capacity is inadequate or the electric work is not performed properly, it will result in fire, electric shock, physical injury or death.*

**Refer to local, state, and federal codes, and use power wires of sufficient current capacity and rating.**

*Wires that are too small will generate heat and cause a fire.*

**Secure all field wiring connections with appropriate wire strain relief.**

*Improperly securing wires will create undue stress on equipment power lugs. Inadequate connections will generate heat, cause a fire and physical injury or death.*

**Properly tighten all power connections.**

*Loose wiring will overheat at connection points, causing a fire, physical injury or death.*

⃠ **Do not change the settings of the protection devices.**

*If the protection devices have been bypassed or are forced to operate improperly, or parts other than those specified by LG are used, there is risk of fire, electric shock, explosion, and physical injury or death.*

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## *Note:*

**The information contained in this manual is intended for use by an industry-qualified, experienced, certified electrician familiar with the U.S. National Electric Code (NEC) who is equipped with the proper tools and test instruments.**

*Failure to carefully read and follow all instructions in this manual can result in equipment malfunction and property damage.*

⃠ **Do not cut, lengthen or shorten the communications and power cable between any dry contact unit and its connected indoor unit.** ⃠ **Do not install the unit in a location where the communications and power cable cannot be safely and easily connected between the two units.** ⃠ **Do not allow strain on this cable.**

*Poor cable connections can cause equipment malfunction.*

## OPERATION

**⚠DANGER**

**⃠ Do not provide power to or operate the unit if it is flooded or submerged.**
*There is risk of fire, electric shock, physical injury or death.*

**Use a dedicated power source for this product.**
*There is risk of fire, electric shock, physical injury or death.*

**⃠ Do not operate the disconnect switch with wet hands.**
*There is risk of fire, electric shock, physical injury or death.*

**⚠WARNING**

**⃠ Do not allow water, dirt, or animals to enter the unit.**
*There is risk of unit failure, fire, electric shock, physical injury or death.*

**⃠ Avoid excessive cooling and periodically perform ventilation to the unit.**
*Inadequate ventilation is a health hazard.*

**⃠ Do not touch refrigerant piping during or after operation.**
*It can cause burns or frostbite.*

**⃠ Do not operate the unit with the panel(s) or protective cover(s) removed; keep fingers and clothing away from moving parts.**
*The rotating, hot, cold, and high-voltage parts of the unit can cause physical injury or death.*

**Periodically verify the equipment mounts have not deteriorated.**
*If the base collapses, the unit could fall and cause physical injury or death.*

**Periodically verify that the hardware securing the unit has not deteriorated.**
*If the unit falls from its installed location, it can cause physical injury or death.*

**If refrigerant gas leaks out, ventilate the area before operating the unit.**
*If the unit is mounted in an enclosed, low-lying, or poorly ventilated area and the system develops a refrigerant leak, it will cause fire, electric shock, explosion, physical injury or death.*

**Periodically check power cable and connection for damage.**
*Cable must be replaced by the manufacturer, its service agent, or similar qualified persons in order to avoid physical injury and/or electric shock.*

**Securely attach the electrical cover to the unit.**
*Non-secured electrical covers can result in burns or electric shock due to dust or water in the service panel.*

**⃠ Do not open the inlet grille of the unit during operation. ⃠ Do not operate the unit with the panels or guards removed. ⃠ Do not insert hands or other objects through the inlet or outlet when the unit is powered. ⃠ Do not touch the electrostatic filter, if the unit includes one.**
*The unit contains sharp, rotating, hot, and high voltage parts that can cause personal injury and/or electric shock.*

**Ensure no power is connected to the unit other than as directed in this manual. Remove power from the unit before removing or servicing the unit.**
*There is risk of unit failure, fire, electric shock, physical injury or death.*

**⚠CAUTION**

**⃠ To avoid physical injury, use caution when cleaning or servicing the air conditioner.**

## *Note:*

**Clean up the site after installation is finished, and check that no metal scraps, screws, or bits of wiring have been left inside or surrounding the unit.**

**⃠ Do not use this equipment in mission critical or special-purpose applications such as preserving foods, works of art, wine coolers or refrigeration. This equipment is designed to provide comfort cooling and heating.**

**Provide power to the compressor crankcase heaters at least six (6) hours before operation begins.**
*Starting operation with a cold compressor sump(s) will result in severe bearing damage to the compressor(s). Keep the power switch on during the operational season.*

**⃠ Do not block the inlet or outlet.**
*Unit will malfunction.*

**Securely attach the electrical cover to the indoor unit.**
*Non-secured covers can result in fire due to dust or water in the service panel.*

**Periodically verify the equipment mounts have not deteriorated.**
*If the base collapses, the unit could fall and cause property damage or product failure.*

**⃠ Do not allow water, dirt, or animals to enter the unit.**
*There is risk of unit failure.*

**Oil, steam, sulfuric smoke, etc., can significantly reduce the performance of the unit, or damage its parts.**

**Use a only soft cloth to clean the air conditioner. ⃠ Do not use wax, thinner, or strong detergents.**
*Strong cleaning products will damage the surface of the air conditioner, or will cause its appearance to deteriorate.*

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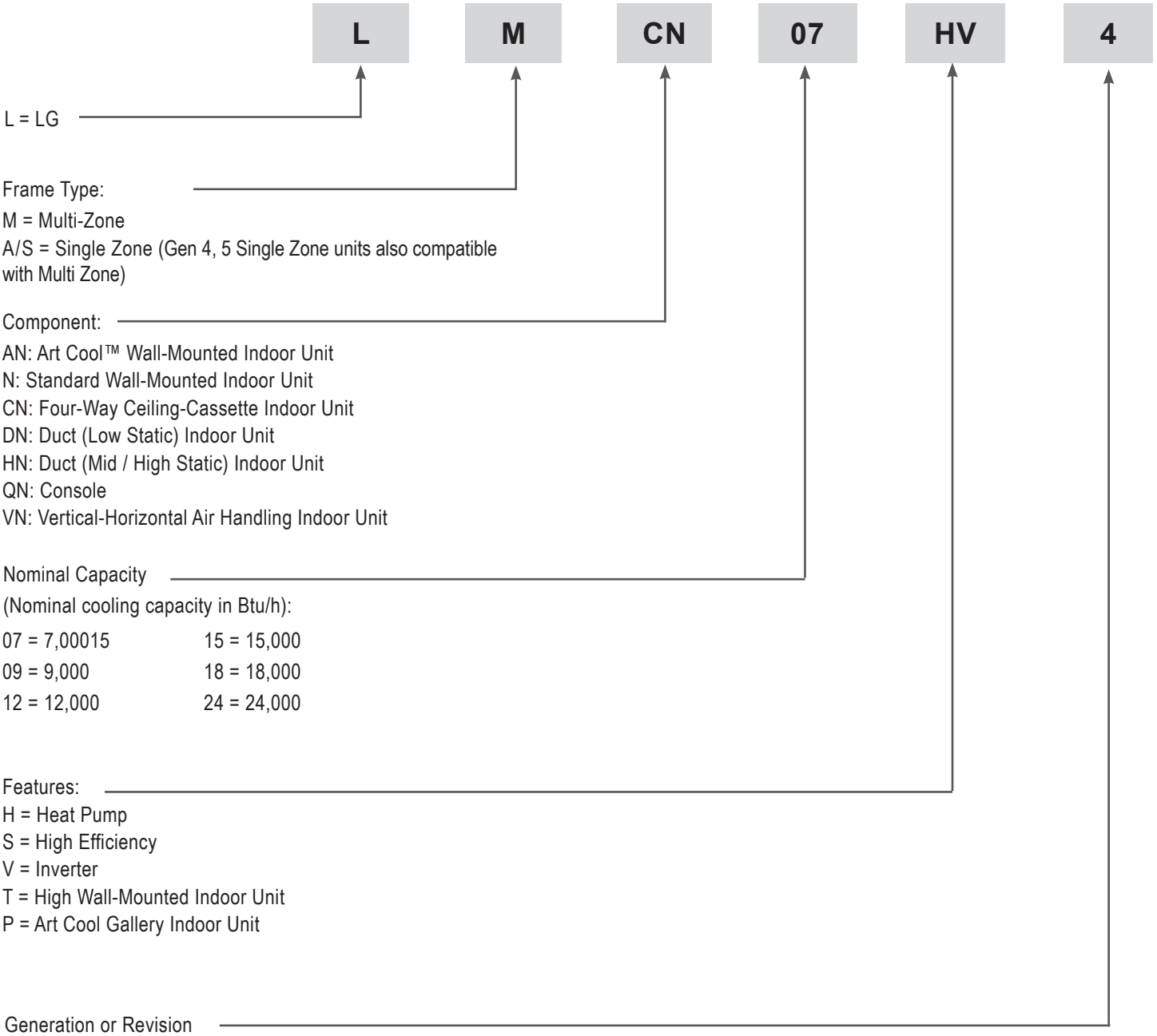
# UNIT NOMENCLATURE

## Multi F Multi-Zone Systems — Indoor Units




L = LG

Frame Type:
M = Multi-Zone
A/S = Single Zone (Gen 4, 5 Single Zone units also compatible with Multi Zone)

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

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

| | |
|---|---|
| 07 = 7,00015 | 15 = 15,000 |
| 09 = 9,000 | 18 = 18,000 |
| 12 = 12,000 | 24 = 24,000 |

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

Generation or Revision
1 = First
2 = Second
3 = Third
4 = Fourth or Multi-compatible

- *Voltage for all equipment is 208-230V, 60 Hz, 1-phase.*
- *All indoor units are compatible with wired controllers*

## Multi F and Multi F MAX Convertible Mid-Static Ducted Units

This manual describes how to install the LG Multi F and Multi F MAX (Multi Zone) Convertible Mid-Static Indoor Units (IDU) for Multi F heat pump systems. The table below lists the available models. Refer to LG's Multi F Indoor Unit Engineering Manual for complete detailed engineering data and selection procedures.

Figure 1: Multi F LHN098~248HV1 Convertible Mid-Static Ducted Indoor Unit.

## Safety

Safety of personnel is the primary concern during all procedures. Read and understand the safety summary at the front of this manual. Read and understand this installation procedure before beginning installation. Use the appropriate tools and accessories during installation. Plan your work and ⃠ do not work alone, if possible. Know how to obtain emergency medical and fire fighting assistance.

### Installation Personnel

This equipment is intended for installation by personnel trained in the required construction, mechanical, electrical, and/or other disciplines.

**⚠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:*

*Please 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.*

## Required Parts (field provided)

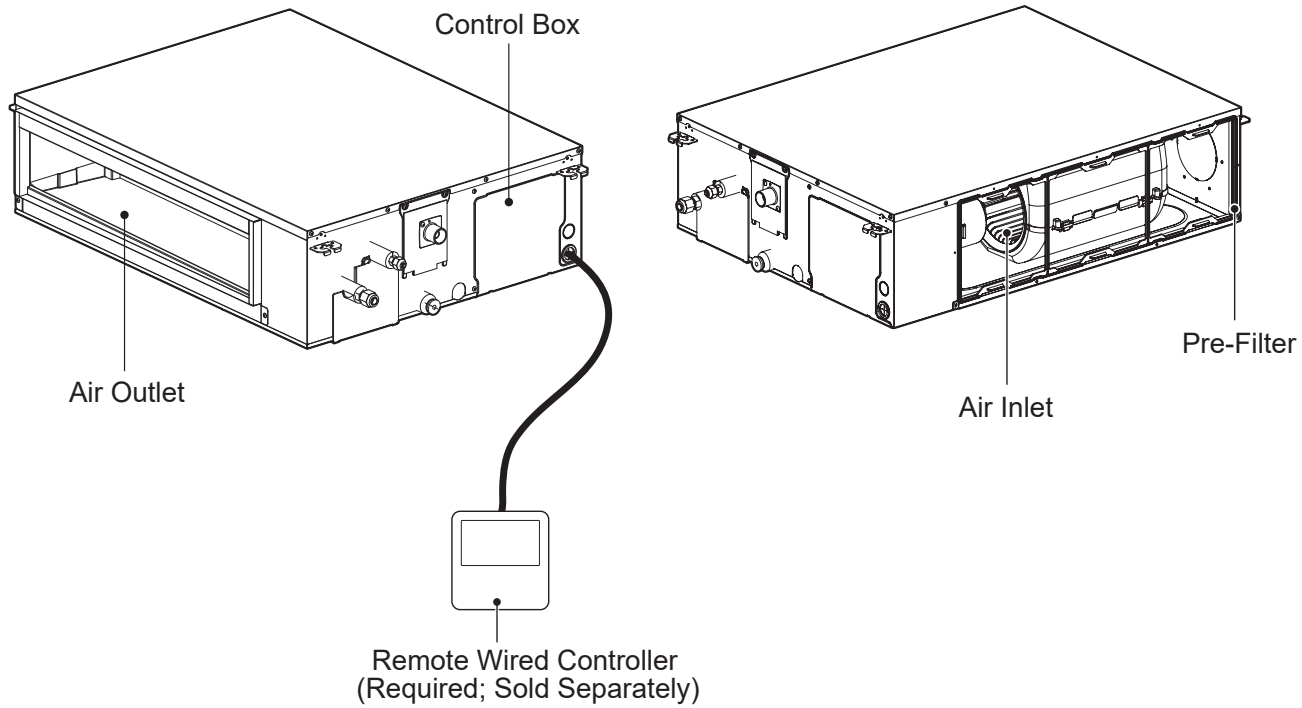
- Connecting cable (power and control)
- Pipes - vapor line and liquid line, with insulation
- 3/8" or 1/2" Threaded hanger rods
- 3/8" or 1/2" nuts, flat washers, and lock / split washers
- Secondary (optional) drain hose
- Insulation for secondary (optional) drain hose

Table 1: Multi F Convertible Mid-Static Ducted Indoor Units.

| Typical Unit | Model Number | Nominal Capacity | |
|---|---|---|---|
| | | Cooling (Btu) | Heating (Btu) |
|  | LHN098HV1 | 9,000 | 12,000 |
| | LHN128HV1 | 12,000 | 15,000 |
| | LHN188HV1 | 18,000 | 20,000 |
| | LHN248HV1 | 24,000 | 27,000 |

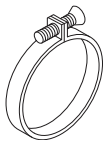
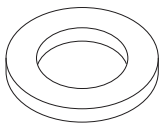
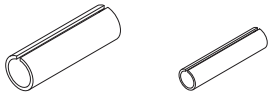
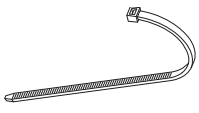
## Convertible Mid-Static Ducted Indoor Unit

Figure 2: Convertible Mid-Static Ducted Indoor Unit Front and Back Views.




## Included Parts

Table 2: Included Items.

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

## Optional Accessory

### Mid-Static Ducted Vertical Installation Conversion Kit

The Mid-Static Ducted Vertical Installation Cen-version Kit MUST be purchased (sold separately) and applied to install the mid-static ducted indoor unit vertically.

Figure 3: Mid-Static Ducted Vertical Installation Options.

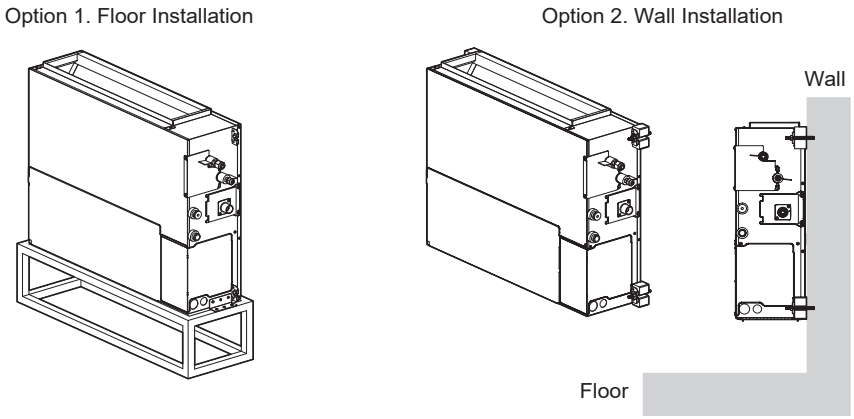
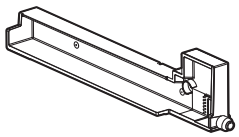
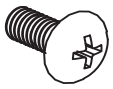
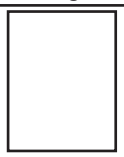
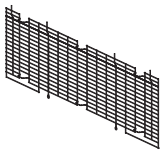
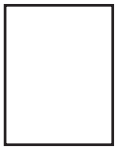
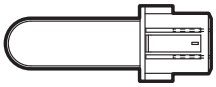
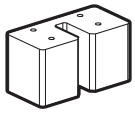
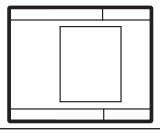
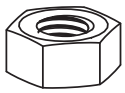



Table 3: Optional Accessory Table.

| Model Number | Description | Quantity |
|---|---|---|
| ABDAMA0 | Mid-Static Ducted Vertical Installation Conversion Kit | One (1) |

Table 4: Optional Accessory Parts (Included with the conversion kit).

| Part | Quantity | Image | Part | Quantity | Image | Part | Quantity | Image |
|---|---|---|---|---|---|---|---|---|
| Vertical Drain Pan Assembly | One (1) |  | D4 / L10 Screws | Five (5) |  | Vertical Installation Manual | One (1) |  |
| Metal Mesh | One (1) |  | Washers | Four (4) |  | Caution Label | Two (2) |  |
| CN_FLOAT Molex Connector | One (1) |  | Bushings | Four (4) |  | | | |
| CN_D_PUMP Molex Connector | One (1) |  | M10 Nuts | Four (4) |  | | | |

**⚠WARNING**

*When installing the mid-static ducted indoor unit vertically, the mesh steel provided MUST be installed to avoid injury from moving parts.*

## *Note:*

*Parts required will be different depending if the installation is on the floor or the wall.*

## R410A Refrigerant

R410A refrigerant has a higher operating pressure in comparison to R22 refrigerant. All piping system materials installed must have a higher resisting pressure than the materials traditionally used in R22 systems.

R410A refrigerant is an azeotrope of R32 and R125, mixed at 50:50. The ozone depletion potential (ODP) is 0.

**⚠WARNING**

- ⃠ *Do not place refrigerant cylinder in direct sunlight. Refrigerant cylinder will explode causing severe injury or death.*

## *Note:*

- *Because R410A is a combination of R32 and R125, the required additional refrigerant must be charged in its liquid state. If the refrigerant is charged in its gaseous state, its composition changes and the system will not work properly.*
- ⃠ *Do not heat piping more than necessary during installation. Piping will become soft and fail when pressurized.*
- ⃠ *Do not use any piping that has not been approved for use in high-pressure refrigerant systems. Piping wall thickness must comply with the applicable local, state, and federal codes for the 551 psi design pressure of R410A. Inadequate piping will fail when pressurized.*

Table 5: Multi F Convertible Mid-Static Ducted Indoor Unit Specifications.

| Model Name | LHN098HV1 | LHN128HV1 | LHN188HV1 | LHN248HV1 |
|---|---|---|---|---|
| **Nominal Cooling Capacity (Btu/h)[1]** | 9,000 | 12,000 | 18,000 | 24,000 |
| **Nominal Heating Capacity (Btu/h)[1]** | 12,000 | 15,000 | 20,000 | 27,000 |
| ***Operating Range*** | | | | |
| **Cooling (°F WB)** | 57-77 | 57-77 | 57-77 | 57-77 |
| **Heating (°F DB)** | 59-81 | 59-81 | 59-81 | 59-81 |
| ***Fan*** | | | | |
| **Type** | Sirocco | Sirocco | Sirocco | Sirocco |
| **Motor Output (W) x Qty.** | 165 x 1 | 165 x 1 | 165 x 1 | 165 x 1 |
| **Motor/Drive** | Brushless Digitally Controlled / Direct | Brushless Digitally Controlled / Direct | Brushless Digitally Controlled / Direct | Brushless Digitally Controlled / Direct |
| **Factory Set Airflow Rate CFM (H/M/L)** | 353 / 318 / 283 | 494 / 424 / 353 | 635 / 530 / 424 | 706 / 547 / 459 |
| **Factory Set External Static Pressure (in. wg)** | 0.24 | 0.24 | 0.24 | 0.24 |
| **Maximum External Static Pressure (in. wg)** | 0.59 | 0.59 | 0.59 | 0.59 |
| ***Unit Data*** | | | | |
| **Refrigerant Type[2]** | R410A | R410A | R410A | R410A |
| **Refrigerant Control** | EEV | EEV | EEV | EEV |
| **Power Supply V, Ø, Hz[3]** | 208-230, 1, 60 | 208-230, 1, 60 | 208-230, 1, 60 | 208-230, 1, 60 |
| **Rated Amps (A)** | 1.7 | 1.7 | 1.7 | 1.7 |
| **Sound Pressure Level (Standard Mode) dB(A) H/M/L)[4]** | 28 / 27 / 26 | 31 / 29 / 28 | 36 / 32 / 29 | 38 / 33 / 30 |
| **Sound Power dB(A)** | 44 | 47 | 54 | 57 |
| **Dimensions (W x H x D, in.)** | 35-7/16 x 9-21/32 x 27-9/16 | 35-7/16 x 9-21/32 x 27-9/16 | 35-7/16 x 9-21/32 x 27-9/16 | 35-7/16 x 9-21/32 x 27-9/16 |
| **Indoor Unit Net / Shipping Weight (lbs.)** | 61.5 / 71.7 | 61.5 / 71.7 | 61.5 / 71.7 | 64.2 / 74.3 |
| Vertical Install Kit Net / Ship Weight (lbs.) | 4.41 / 5.51 | 4.41 / 5.51 | 4.41 / 5.51 | 4.41 / 5.51 |
| **Power Wiring / Communications Cable (No. x AWG)[5]** | 4 x 14 | 4 x 14 | 4 x 14 | 4 x 14 |
| **Heat Exchanger (Row x Column x Fin / inch) x No.** | (2 x 13 x 18) x 1 | (2 x 13 x 18) x 1 | (2 x 13 x 18) x 1 | (3 x 13 x 18) x 1 |
| Dehumidification Rate (pts./hr) | 0.85 | 1.44 | 2.75 | 4.23 |
| ***Pipe Size*** | | | | |
| **Liquid (in.)** | 1/4 | 1/4 | 1/4 | 1/4 |
| **Vapor (in.)** | 3/8 | 3/8 | 1/2 | 1/2 |
| ***Connection Size*** | | | | |
| **Liquid (in.)** | 1/4 | 1/4 | 1/4 | 3/8 |
| **Vapor (in.)** | 3/8 | 3/8 | 1/2 | 5/8 |
| **Drain O.D. / I.D. (in.)** | 1-1/4, 31/32 | 1-1/4, 31/32 | 1-1/4, 31/32 | 1-1/4, 31/32 |

[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.

Figure 4: LHN098HV1, LHN128HV1, LCN188HV1, LHN248HV1 Dimensions.

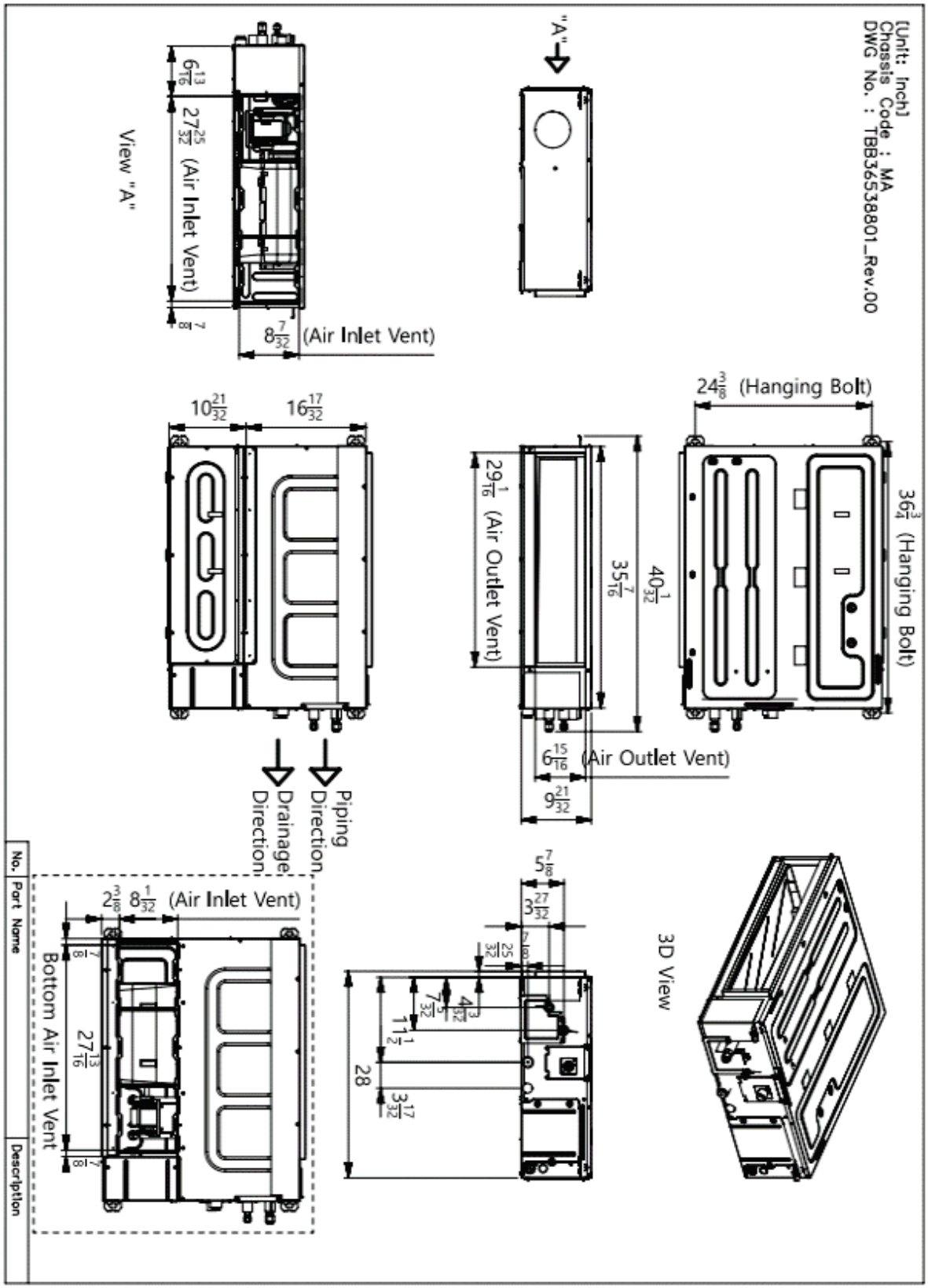


Figure 5: Multi F Mid-Static Ducted Indoor Unit Refrigerant Flow Diagram.

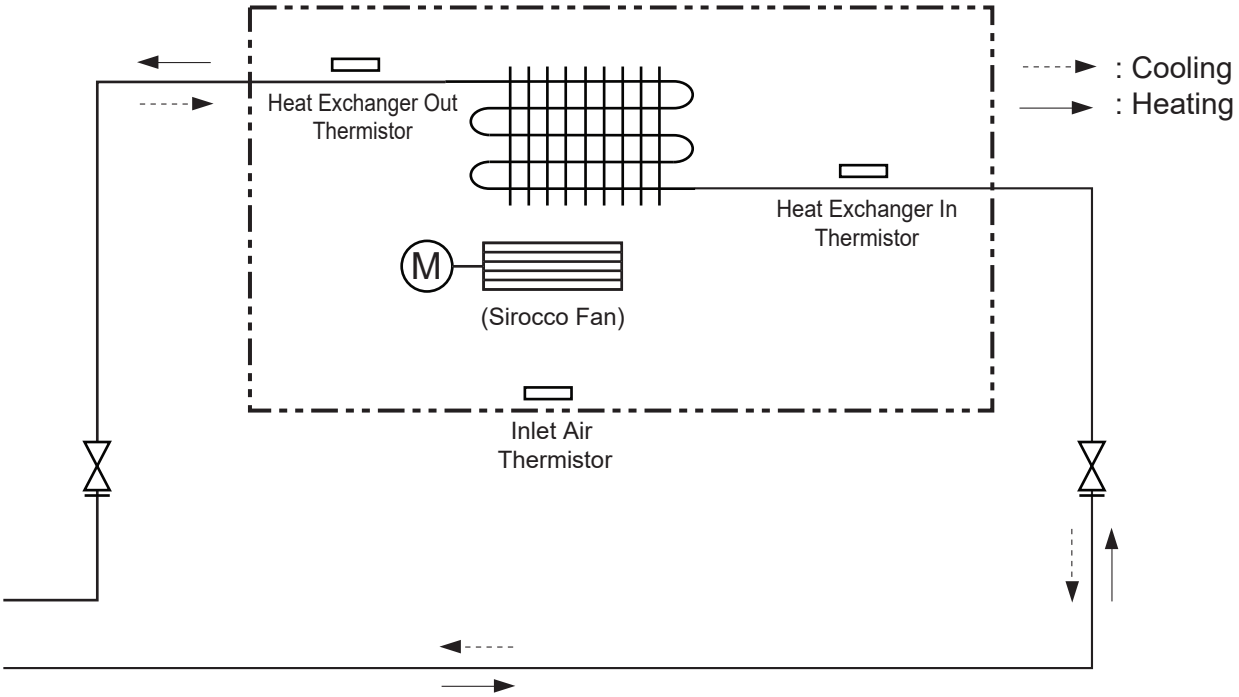



Table 6: Multi F Mid-Static Ducted Indoor Unit Thermistor Details.

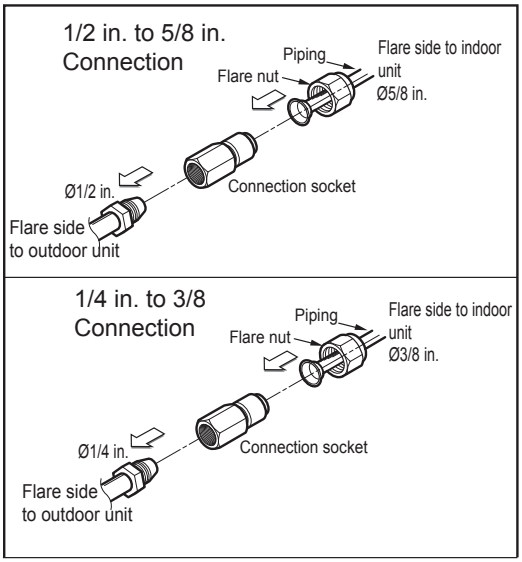
| Description (Based on Cooling Mode) | PCB Connector |
|---|---|
| Inlet Air Temperature Thermistor | CN-ROOM |
| Heat Exchanger Inlet Temperature Thermistor | CN-PIPE / IN |
| Heat Exchanger Outlet Temperature Thermistor | CN-PIPE / OUT |

Table 7: Multi F Mid-Static Ducted Indoor Unit Refrigerant Piping and Connection Sizes.

| Model No. | Piping Size | | Connection Port Size | |
|---|---|---|---|---|
| | Liquid (inch) | Vapor (inch) | Liquid (inch) | Vapor (inch) |
| LHN098HV1 | 1/4 | 3/8 | 1/4 | 3/8 |
| LHN128HV1 | 1/4 | 3/8 | 1/4 | 3/8 |
| LHN188HV1* | 1/4 | 1/2 | 1/4 | 1/2 |
| LHN248HV1 | 1/4 | 1/2 | 3/8 | 5/8 |

**Refer to Table 12 for LHN248HV1 socket connections.*

Table 8: LHN248HV1 Mid Static Duct Indoor Unit Refrigerant Pipe Connections.



## Unpack and Inspect for Freight Damage

**⚠CAUTION**

*Shipping and net weights of the indoor units are listed in the specifications table. To help avoid injury to personnel, use two people when carrying a unit by hand.*

***Note:***

- *Shipping and net weights of the indoor units are listed in the specification tables in the beginning of this manual. To help avoid damage to the unit, use at least two people when carrying a unit by hand.*
- *Before opening the shipping container, check the container labeling to verify the unit received is the correct unit. Verify the unit capacity, type, and voltage. Refer to the "Unit Nomenclature" chart in the beginning of this manual.*
- *After opening, if the unit is damaged, repack the unit as it was shipped to you. RETAIN ALL PACKING MATERIALS. In general, freight damage claims will be denied if the original packing materials are not retained for the claims adjustor to inspect. Contact your supervisor on how to proceed with filing a freight claim and to order a replacement unit.*
- *To avoid damaging the indoor unit, ⃠ do not unpack the unit and remove the protective materials until it is ready to install. Before unpacking, carefully move the packaged unit to a work area near the installation location.*

### Unpack and Inspect for Freight Damage

1. Before opening the shipping container, verify the correct unit is included as described in the note above.
2. Place the box on a solid surface right side up.
3. Cut the white reinforced nylon straps.
4. Open the box and fold back all four flaps.
5. Remove any protective cardboard / Styrofoam® top sheets and place to the side.
6. The walls and top panels are not attached to the bottom of the box. Lift the cardboard carton by the flaps and remove the box walls and top and place it to the side.
7. Remove the moisture barrier plastic bonnet.
8. Check the unit nameplate data and model number. Verify the unit voltage, and capacities are correct before proceeding.
9. Locate and retain all included parts and accessories in the box.
10. Using two people, carefully lift the unit and inspect for freight damage. ⃠ DO NOT lift by the refrigerant piping or drain pipe stub. Lift by the frame only. If damage is found, repack the unit as it was received in the original container.

## Selecting the Best Location for the Indoor 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. Before beginning installation, read the safety summary at the beginning of this manual.*

***Note:***

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

### Dos

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

- *Place the unit where air circulation will not be blocked.*
- *Locate the indoor unit in a location that is level, with enough strength to bear the weight of the indoor unit(s), and where it can be easily connected to the outdoor unit.*
- Place the unit where drainage can be obtained easily and to minimize the length of the condensate drain piping; include space for drainage to ensure condensate flows properly out of the unit when it is in cooling mode.
- *Include enough space around the indoor unit so that it is accessible for maintenance and service purposes. Include enough space to be able to clean the filter.*
- *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.*
- *Place the unit where operating sound from the unit will not disturb occupants.*
- *Confirm that there is enough space for and between the indoor unit and the suspension bolts.*

### ⃠ Dont's

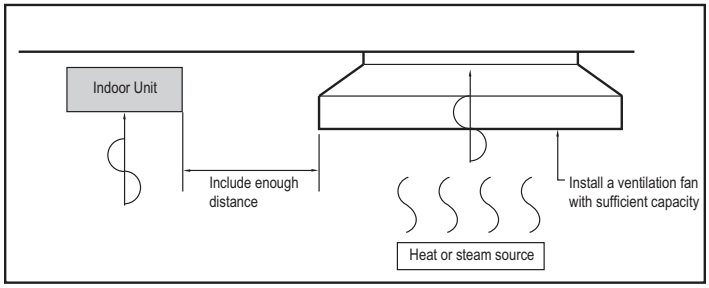
- *Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used. (These materials may generate condensate, cause a reduction in heat exchanger efficiency, or the drain to malfunction. If this is a potential problem, install a ventilation fan large enough to vent out these materials.)*
- *The unit should not be installed in an area where sulfuric acid and flammable or corrosive gases are generated, flowed, vented into, stagnate, leak, or stored.*
- *The unit should not be installed in a location where acidic solution and spray (sulfur) are often used.*
- *Ensure there are no obstacles to air circulation around the unit; keep proper distances from ceilings, doorways, floor, walls, etc.*
- *Avoid installing the unit near high-frequency generators or near any equipment that generates an electromagnetic field (minimum 3-1/3 feet away).*

**⚠WARNING**

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

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

Figure 6: Installing Near a Heat or Steam Source.




**⚠NOTE**

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

## ⚠NOTE

**Ensure the ductwork and its material follows local, state, and federal codes for supplying / circulating air.**

*There is risk of product failure and / or damage.*

### Installing in an Area Exposed to Unconditioned Air

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

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

### Installing in an Area with High Humidity Levels

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

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

## Mid-Static Ducted IDU Bolt Locations

Figure 7: Mid-Static Ducted Indoor Unit Bolt Locations.

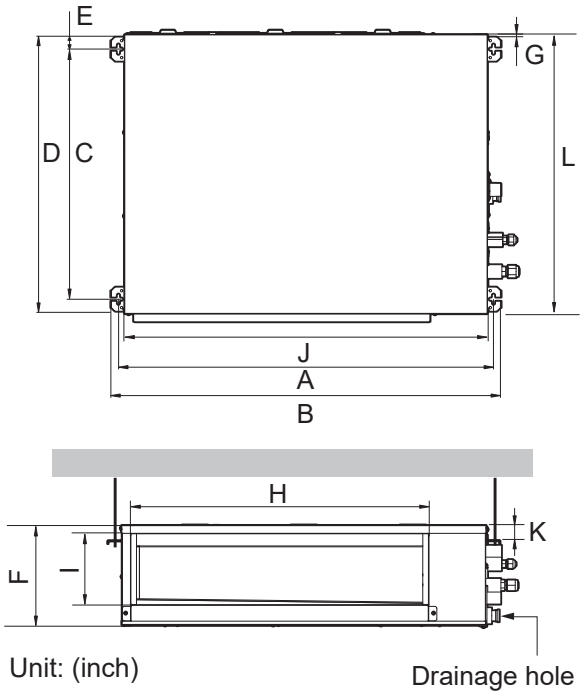
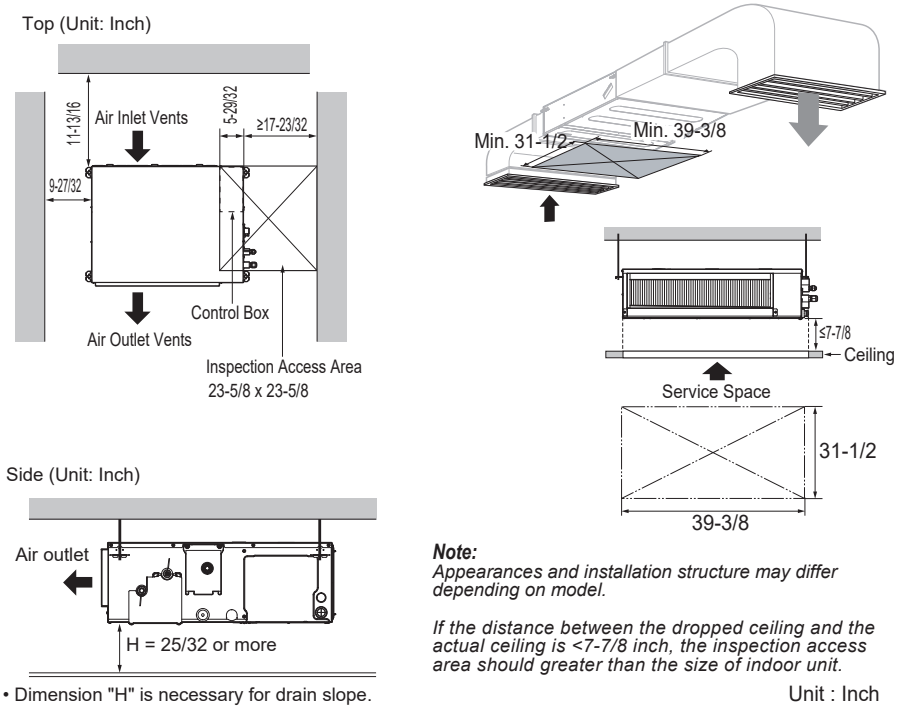



Table 9: Mid-Static Ducted Indoor Unit Bolt Location Dimensions.

| Model / Capacity (Btu/h) | Dimensions (inches) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | J | K | L |
| **LHN098HV1 / 9,000** | 36-3/4 | 38-9/32 | 24-3/8 | 26-3/4 | 1-3/16 | 9-21/32 | 7/32 | 29-1/16 | 6-15/16 | 35-7/16 | 1-15/32 | 27-9/16 |
| **LHN128HV1 / 12,000** | 36-3/4 | 38-9/32 | 24-3/8 | 26-3/4 | 1-3/16 | 9-21/32 | 7/32 | 29-1/16 | 6-15/16 | 35-7/16 | 1-15/32 | 27-9/16 |
| **LHN188HV1 / 18,000** | 36-3/4 | 38-9/32 | 24-3/8 | 26-3/4 | 1-3/16 | 9-21/32 | 7/32 | 29-1/16 | 6-15/16 | 35-7/16 | 1-15/32 | 27-9/16 |
| **LHN248HV1 / 24,000** | 36-3/4 | 38-9/32 | 24-3/8 | 26-3/4 | 1-3/16 | 9-21/32 | 7/32 | 29-1/16 | 6-15/16 | 35-7/16 | 1-15/32 | 27-9/16 |

## Mid-Static Ducted IDU Service Space Required Dimensions

Figure 9: Minimum Mid-Static Ducted Indoor Unit Clearance Requirements.




***Note:***
*Appearances and installation structure may differ depending on model.*

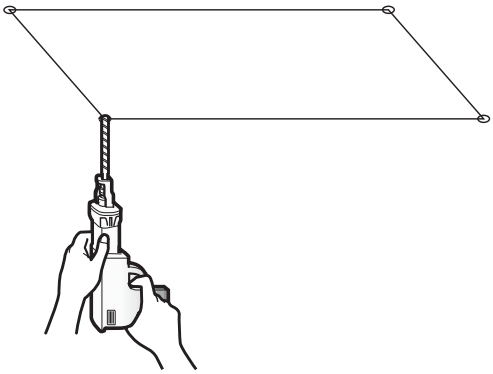
*If the distance between the dropped ceiling and the actual ceiling is <7-7/8 inch, the inspection access area should greater than the size of indoor unit.*

Unit : Inch

## Preparing the Installation Area

1. Choose the location for the indoor unit. Mark where the four (4) hanging / suspension bolts, refrigerant piping, and drain should be. Hanging / suspension bolt angle must account for drain direction.
2. Drill holes for the four (4) hanging / suspension bolts.
3. Apply a joint-canvas between the indoor unit and duct to absorb vibration.
4. Install a filter accessory at the air return.

Figure 8: Drilling the Holes.



### ⚠WARNING

- *The threaded rod hangars (bolts) and hardware must be securely installed to prevent the frame falling from its location. There is risk of injury from falling equipment.*
- *Installation work must be performed by trained personnel and in accordance with all local or other applicable codes. There is risk of personnel injury from incorrect installation.*
- *During installation, ⃠ do not damage the cable / wiring. There is a risk of electrical shock, fire, physical injury and / or death.*

### ⚠NOTE

- *The threaded rod hangers (bolts) and hardware must be securely installed to prevent the frame falling from its location. There is risk of property damage from falling equipment.*
- *Ensure the unit is properly installed. Incorrectly installed units can result in degraded performance or an inoperative unit/system.*
- *Ensure the frame is installed on a level plane. Incorrectly installed units can result in degraded performance or an inoperative unit/system.*

## Hanging the Indoor Unit

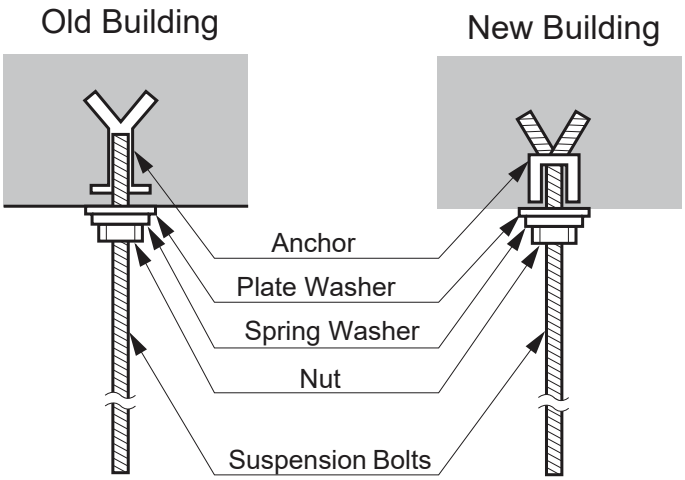
The following parts are field supplied:

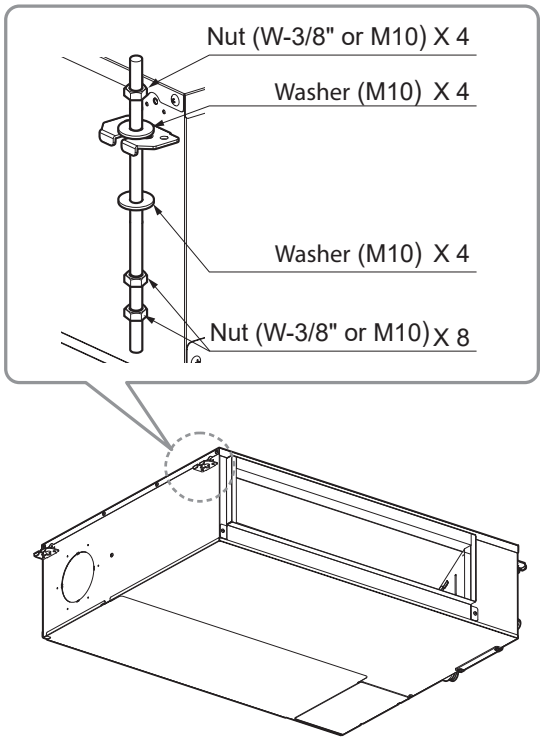
- Anchor
- Hanging bolt - W-3/8” or M10
- Nut - W-3/8” or M10
- Spring washer - M10

The following parts are included with the indoor unit:

- Flat washer - M10

Figure 10: Installing the Hanging Bolt in the Ceiling.




### For New Ceilings

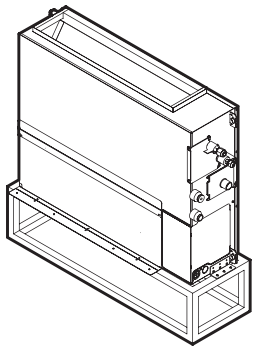
1. Use a sunken insert, a sunken anchor, or any other field-supplied part to reinforce the ceiling so that it can bear the weight of the indoor unit. Use a temporary washer plate to more easily set up the unit suspension location.
2. Adjust the height of the indoor unit accordingly. Adjust the clearance before hanging the indoor unit.
3. Refer to the indoor unit for the dimensions to the ceiling opening.
4. 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.
5. Mid-static indoor units are equipped with a drain, therefore, the unit must be installed properly or condensate will drip out and cause product malfunction and / or property damage.

### For Existing Ceilings

1. Use anchors when installing the indoor unit in an existing ceiling.
2. Adjust the height of the indoor 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. Mid-static indoor units are equipped with a drain, therefore, the unit must be installed properly or condensate will drip out and cause product malfunction and / or property damage.

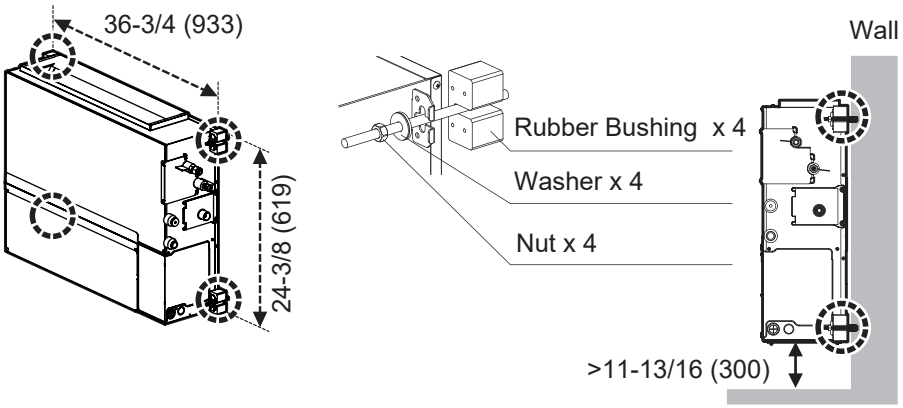
## Vertical Indoor Unit Installation

Option 1. Floor Installation



Platform (Field Supplied)

Option 2. Wall Installation




Unit: Inch (mm)

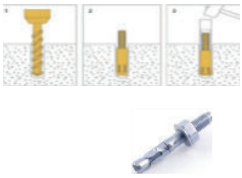
***Note:***

**See also the Vertical Conversion Kit Installation, Vertical Installation Conversion Kit Wiring, and Vertical Condensate Piping pages later in this section.**

For Wood Walls

Wood Insert Nuts
Bolts (M10 / L100 Four [4] Each)
(Field Supplied)

For Concrete Walls



Anchor Bolts
(M10 / L100, Four [4] Each)

## Installing for Condensate Drainage

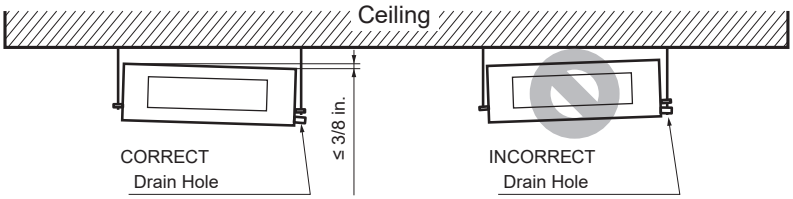
### *Note:*

- *It is very important to include a slope for indoor unit installation to ensure proper condensate drainage*

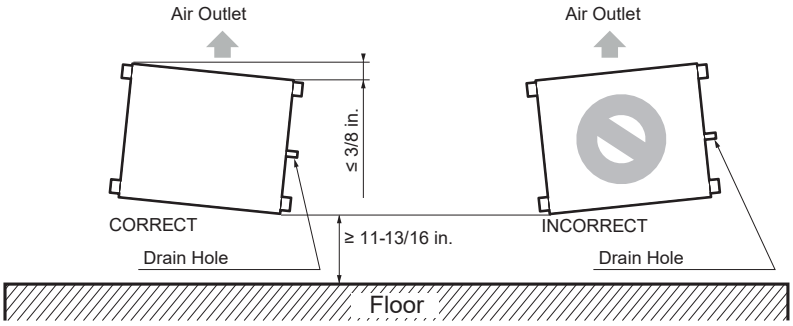
Figure 11: Include Slope for Indoor Unit Installation.

Front (Horizontal Installation)

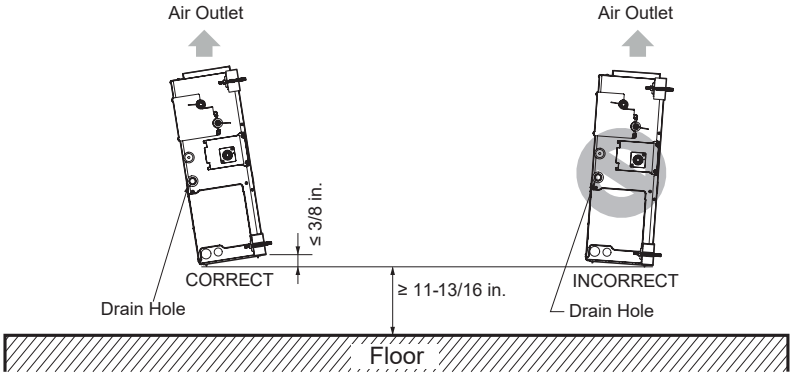
The indoor unit must slope tin the direction of the drain hole / piping




Front (Vertical Installation)




Side (Vertical Installation)




## Drilling the Piping Hole

Follow all piping clearance recommendations.

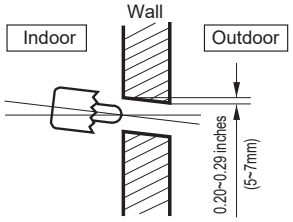
1. Using a 2-5/8 inch hole core drill bit, drill a hole following installation guidelines and application needs. Avoid obstructions in the wall such as electrical wires or conduits and water or gas pipes.

- The slant of the hole must be 3/16 inches to 5/16 inches from level with the slant being 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 to prevent damage to the insulation and piping.

- Sleeve and bushing prevents piping / bundling damage.

Figure 12: Drilling the Piping Hole.




Drill the piping access hole slightly tilted to the outdoor side using a Ø2-5/8 inch hole-core drill.

### *Note:*

- *See Refrigerant Piping Connections for Indoor Unit for information on piping installation.*
- *See the Refrigerant Piping Connections section of this manual for information on indoor unit piping connection installation.*
- *See the Electrical Connections section of this manual for information on conduit / electrical wiring to the indoor unit.*

## Vertical Conversion Kit Installation

The conversion kit is required in vertical mid-static ducted indoor unit applications (see below). Additional electrical work is also required. See the “Electrical System Installation Section” for the conversion kit electrical procedure.

**Step 1.**

Remove back / bottom panel, control box cover, pipe panel, and front panel.

**Step 2.**

Remove corner packing material and knock-out hole.

**Step 3.**

Replace corner packing material with vertical drain pan assembly (factory provided with the conversion kit).

**Step 4.**

Change the wiring connections for the drain pump (See Mid-Static Ducted Vertical Installation Conversion Kit Wiring).

**Step 5.**

Install the metal mesh for safety. Remove pre-filter (if present). Attach the metal mesh using four (4) screws and four (4) hooks (Step 5A) (included). Attach pre-filter after metal mesh is secured (Step 5B).

**Step 6.**

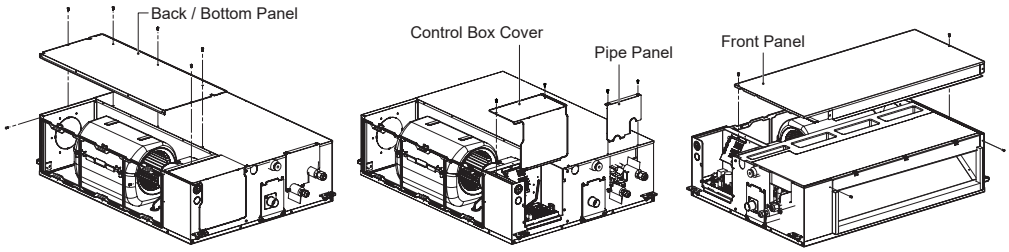
Reassemble in reverse order: reattach the front panel, the pipe panel, the control box cover, and then the back / bottom panel.

**Step 7.**

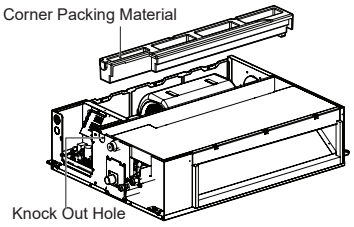
Install the mid-static ducted indoor unit in the pre-determined location.

Figure 13: Vertical Conversion Kit Installation Procedure..

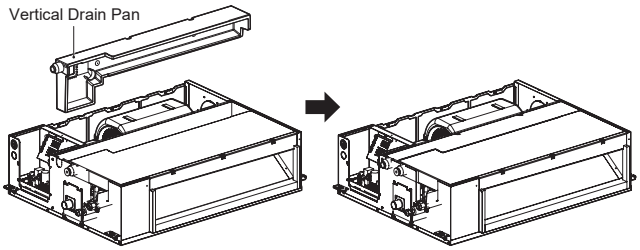
Step 1.

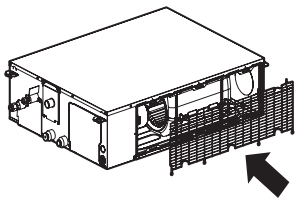



Step 2.

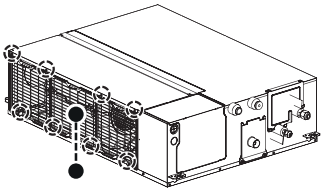



Step 3.



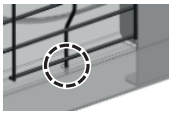



Step 5A.

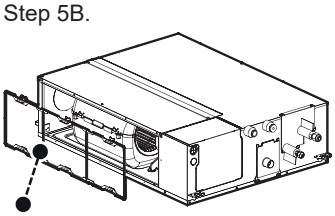


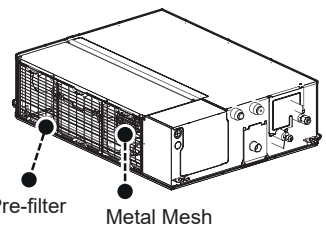

Screws (Four [4] Each)

Hooks (Four [4] Each)



Step 5B.



## Mid-Static Ducted Vertical Installation Conversion Kit Wiring

**⚠DANGER**

*When installing / replacing / servicing, wear anti-static gloves to prevent static electricity. Fire and electrical shock can cause physical injury or death.*

If the vertical installation conversion kit has been installed on the mid-static ducted indoor unit, additional electrical work is required. See the previous page.

**Step 1.**

Open the control box cover. Disconnect the wires on CN_D_PUMP and CN_FLOAT on the mid-static ducted indoor unit PCB.

**Step 2.**

Connect terminals for CN_D_PUMP (white) and CN_FLOAT (blue) (factory-provided accessories included with the conversion kit) as shown in the image at right.

**Step 3.**

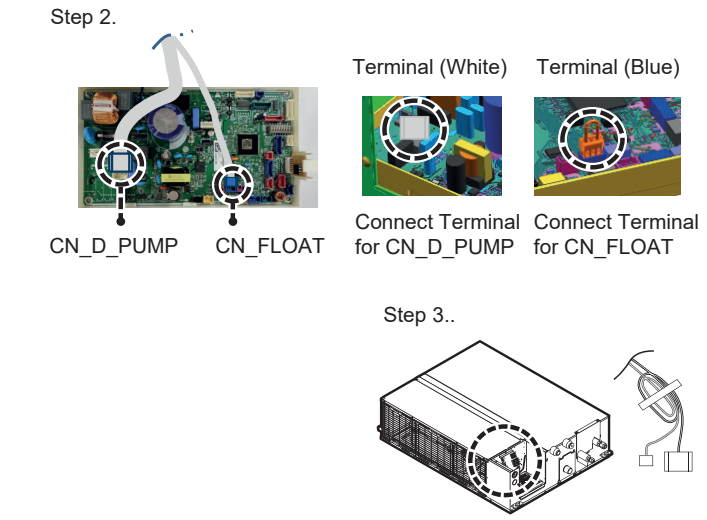
Coil up and tie any extra wiring and close control box cover.

**⚠DANGER**

*When installing / replacing / servicing, wear anti-static gloves to prevent static electricity. Fire and electrical shock can cause physical injury or death.*

Figure 14: Vertical Installation Conversion Kit PCB Connections.


Figure 15: Vertical Installation Conversion Kit Wiring Connection Procedures.



## Changing Inlet from Back to Bottom of Indoor Unit

***Note:***

*Apply based on duct configuration. Example: Change the inlet from back to bottom in applications where the indoor unit is installed in a recessed ceiling, the return grille is under the indoor unit for a bottom return, and the discharge is horizontal into the room.*

**Step 1.**

The mid-static ducted indoor unit is originally configured with the air inlet at the back.

**Step 2.**

Detach the screws holding the back / bottom panel, and remove the panel. Remove the pre-filter. Place the panel, the screws, and the pre-filter to the side.

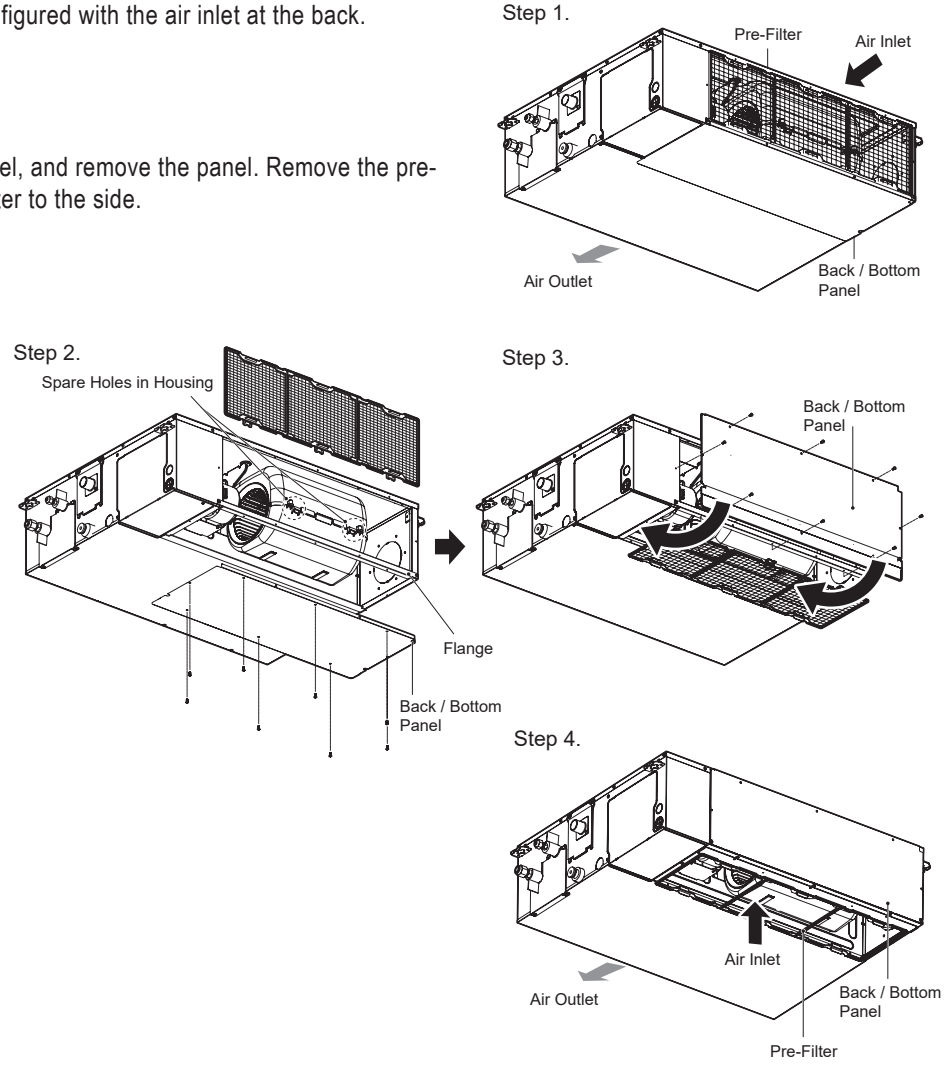
**Step 3.**

Flex the panel: Push in the center to squeeze in back of the indoor unit, and slip the edges in / over the flange. Attach the panel to the flange with the screws. If the hooks on the housing are damaged, use two (2) field-supplied screws to attach the panel using the spare holes (see figure at right).

**Step 4.**

Re-attach the pre-filter at the flange on the bottom of the indoor unit. The inlet is now reconfigured to the bottom of the mid-static ducted indoor unit.

Figure 16: Changing the Inlet Position.



## Preparing For / Connecting Indoor Unit Wiring

**⚠WARNING**

- *Verify that main power to the unit is completely off before proceeding with these steps as there is a risk of electrical shock, bodily injury, and / or death.*
- *Each wire must be tightly attached to the terminal block. Loose wiring connections cause the terminal to overheat, resulting in fire, electrical shock, bodily injury, and / or death.*
- *Follow all safety and warning information outlined at the beginning and throughout this manual. Failure to do so will cause electrical shock, bodily injury, and / or death.*

## *Note:*

- *Follow all safety and warning information outlined at the beginning and throughout this manual. Failure to do so will cause unit failure.*
- *Connect the communication / connection (power) cable to the indoor unit by matching the terminals on the outdoor unit control board. Verify the color of the wires at the outdoor unit, along with the terminal numbers, match those for the indoor unit.*
- *Images are representative; actual appearance will vary.*
- *Refer to the circuit diagram on the indoor unit.*

1. Using a Phillips head screwdriver, remove the metal control box cover (one panel) by unscrewing the two (2) screws that hold it in place. Set aside the metal control box cover and screws for reattachment.
2. Insert the communication / connection (power) cable (from the outdoor unit to the indoor unit) through the designated access hole in the side of the ducted frame (see images). If using a conduit, attach it to the conduit hole, and secure with a lock nut.
3. Attach the communication / connection (power) cable to the inside of the frame with the clamp.
4. Using a JIS screwdriver, connect the cable terminals to the terminal block. Ensure wire color and terminal number of the indoor unit matches those of the outdoor unit. Refer to the wiring diagram on the indoor unit.
5. When installing the wired remote controller (sold separately), insert the controller wiring through its designated access hole below the communication / connection (power) cable. Refer to the wiring diagram on the indoor unit. Using a JIS screwdriver, attached that cable to the appropriate terminal block connection.
6. Reinstall the metal control box by reattaching it with its two (2) screws.

Figure 17: Removing the Control Box.

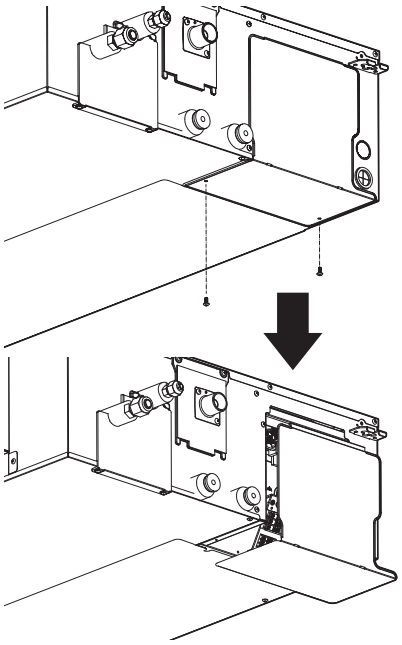


Figure 18: Location of the Access Holes.

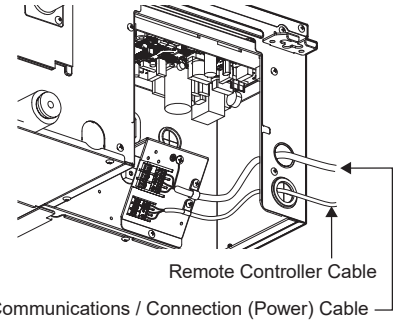
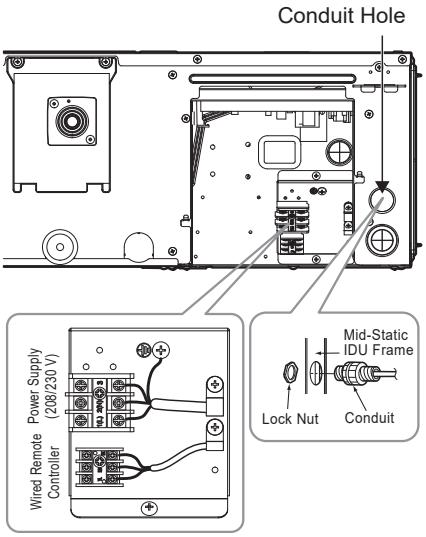



Figure 19: Using a Conduit.




## *Note:*

- *Each wire must be securely attached to the terminal block.*
- *Ground cable must be longer than the other wires.*
- *Secure the cable onto the control board using a cable tie.*
- *Use a conduit to protect the cable / refrigerant piping from the indoor unit to the outdoor unit. For more information on conduits, see the next page.*
- *See the Electrical section for more information.*

## Using a Conduit for Indoor Unit Wiring / Cable Installation

### *Note:*

*Use a liquidtight 3/4 inch elbow connector for flexible conduit to protect the communication / connection (power) cable.*

1. Assemble the conduit with a grommet and washer (field-supplied separately or included with the elbow connector).
2. Guide the power wiring / communication cable into the conduit assembly..
3. Attach the conduit assembly to the indoor unit with a lock nut.

Figure 20: Liquidtight 3/4 Inch Elbow Connector Attached to Flexible Conduit.

### *Note:*

*Check local, state, and federal codes when choosing a conduit size.*

4. To protect the piping, condensate drain, and conduit from the elements, add a lineset cover from the indoor access hole to the outdoor unit.

### *Note:*

*If a conduit is not used, see below for bundling information.*

## Bundling

If a conduit or piping set cover is not used on the connection from the outdoor unit to the interior, bundle both separately insulated refrigerant pipes, the drain hose, and outdoor unit to indoor unit communication / connection (power) cable together with wide vinyl tape.

1. Both piping must be fully and separately encased in insulation material: Overlap the field installation piping insulation material and the indoor unit piping insulation material.
2. Bind together the two pipes, using vinyl tape. Make sure there are no gaps during the binding. Verify that any insulation material cutting lines are placed upward.
3. Bind together the two pipes, using narrow vinyl tape. Make sure there are no gaps during the binding.
4. Continue to wrap the indoor unit pipe as connected to the outdoor connection pipe.
5. Using a wider vinyl tape, bundle the piping and drain hose together.
   - Tape must be sufficient to cover the piping in order to fit into the rear piping housing area at the back of the indoor units.

Figure 21: Bundling the Connection Components (From Outdoor Unit to Indoor Unit).

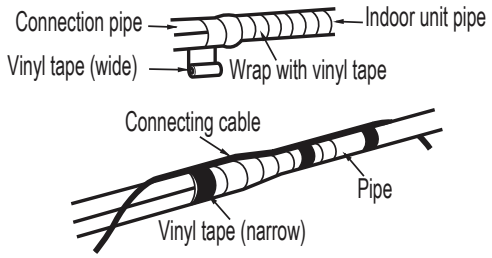
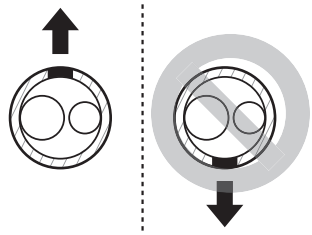


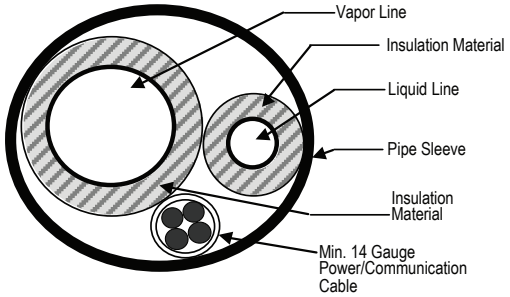

Figure 22: Cut Line Position.




### *Note:*

- *Always include insulation on all refrigerant and drain hose to ensure condensate does not form and cause damage to walls, floors, etc.*
- *Positioning the drain hose at the top of the bundle can cause condensate to overflow from the drain pan in the inside of the indoor unit.*

Figure 23: Cutaway of Proper Pipe and Cable Bundling.



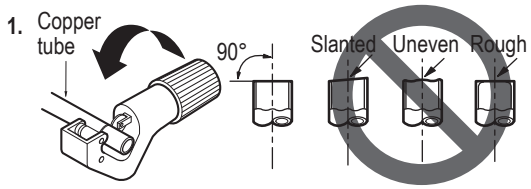
## Flaring Procedure

One of the main causes of refrigerant leaks is a defective connection. For LG HVAC systems, the installer needs to know how perform flared connections successfully.

***Note:***

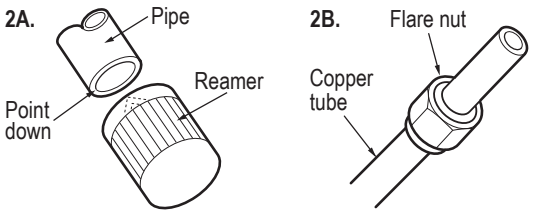
- *During installation, it is imperative to keep the piping system free of contaminants and debris such as copper burrs, slag, or carbon dust.*
- ⃠ *Do not use kinked pipe caused by excessive bending in one specific area on its length.*
- *When selecting flare fittings, always use a 45° fitting rated for use with high pressure refrigerant R410A. Selected fittings must also comply with local, state, or federal standards.*

1. Cut the pipe to length.
   - Measure the distance between the indoor unit and the outdoor unit.
   - Cut the pipes a little longer than measured distance.

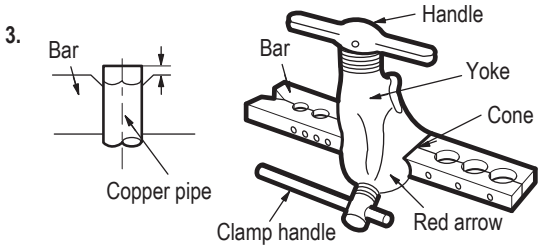



2A. Remove the burrs.
   - Completely remove all burrs from pipe ends.
   - When removing burrs, point the end of the copper pipe down to avoid introducing foreign materials in the pipe.

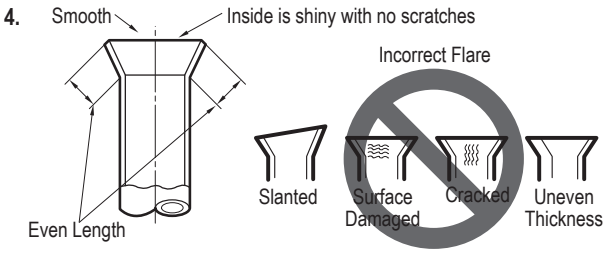
2B. Slide the flare nut onto the copper tube.



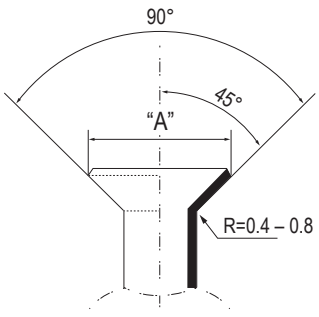

3. Flaring the pipe end.
   - Use the proper size flaring tool to finish flared connections as shown.
   - ALWAYS create a 45° flare when working with R410A.




4. Carefully inspect the flared pipe end.
   - Compare the geometry with the figure to the right
   - If the flare is defective, cut it off and re-do procedure.
   - If flare looks good, blow the pipe clean with dry nitrogen.




Dimensions of the Flare.




Flared Connection Dimensions / Tightening Torque.

| Pipe Size (in. O.D.) | Outside Diameter (mm) | "A" Dimension (mm [in.]) |
|---|---|---|
| 1/4 | 6.35 | ~ 9.1 (11/32 - 23/64) |
| 3/8 | 9.52 | ~ 13.2 (1/2 - 33/64) |
| 1/2 | 12.7 | ~ 16.6 (41/64 - 21/32) |
| 5/8 | 15.88 | ~ 19.7 (49/64 - 25/32) |
| 3/4 | 19.05 | - |

### Tightening the Flare Nuts

Tightening Torque for Flare Nuts.

| Pipe Size (in. O.D.) | Outside Diameter (mm) | Tightening Torque (ft-lbs.) |
|---|---|---|
| 1/4 | 6.35 | 13.0 - 18.0 |
| 3/8 | 9.52 | 24.6 - 30.4 |
| 1/2 | 12.7 | 39.8 - 47.7 |
| 5/8 | 15.88 | 45.4 - 59.3 |
| 3/4 | 19.05 | 71.5 - 87.5 |

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

## *Note:*

⃠ *Do not use polyolyester (POE) or any other type of mineral oil as a thread lubricant. These lubricants are not compatible with the PVE oil used in this system and create oil sludge leading to equipment damage and system malfunction.*

⃠ *Do not add any contaminants inside the refrigerant piping.*

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

### Loosening the Flare Nuts

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

## Multi F (Standard or LGRED) Outdoor Unit to Indoor Unit Piping Connections

### *Note:*

**⃠ Avoid Pipe Damage**

- *When routing field-provided piping, ⃠ avoid damaging the outdoor unit from excessive vibration.*
- *Properly insulate the liquid and gas lines separately up to the point of connection at the unit frame.*
- *See table below for outdoor unit connection types.*

*⃠ Correctly route the piping so it does not make contact with mounting bolts. Allow room for field installation.*

Figure 24: Outdoor Unit (24K) Refrigerant Pipe Connections.

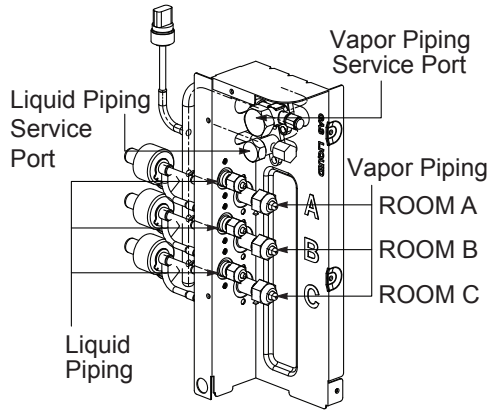



Table 10: Multi F (Standard or LGRED) Outdoor Unit Piping Connections.

| Outdoor Unit Piping Connections | LMU183HV<br>LMU180HHV | LMU243HV<br>LMU240HHV | LMU303HV<br>LMU363HV<br>LMU300HHV |
|---|---|---|---|
| Liquid Line Connection (in., OD) x Qty. | Ø1/4 x 2 | Ø1/4 x 3 | Ø1/4 x 4 |
| Vapor Line Connection (in., OD) x Qty. | Ø3/8 x 2 | Ø3/8 x 3 | Ø3/8 x 4 |

Table 11: Indoor Unit Pipe Sizes.

| Indoor Unit Capacity | Vapor Line Piping Size (in., OD) | Liquid Line Piping Size (in., OD) |
|---|---|---|
| 7,000 Btu/h | Ø3/8 | Ø1/4 |
| 9,000 Btu/h | | |
| 12,000 Btu/h | | |
| 15,000 Btu/h | | |
| 15,000 Bth: Console; 18,000 Btu/h | Ø1/2 | |
| 24,000 Btu/h | | |

Table 13: Indoor Unit Piping Connections.

| Indoor Unit Capacity | Vapor Line Conn. (in., OD) | Liquid Line Conn. (in., OD) |
|---|---|---|
| 7,000 Btu/h | Ø3/8 | Ø1/4 |
| 9,000 Btu/h | | |
| 12,000 Btu/h | | |
| 15,000 Btu/h | | |
| 15,000 Btu/h Console; 18,000 Btu/h Ducted and Four-Way Cassette | Ø1/2 | Ø1/4 |
| 24,000 Btu/h Wall Mounted | Ø1/2 | Ø1/4 |
| 18,000 Btu/h Wall-Mounted; 24,000 Btu/h Ducted; all VAHU | Ø5/8 | Ø3/8 |

### *Note:*

*Connection sockets (included as a factory-supplied accessory with the indoor units) will need to be used when piping the indoor units to the outdoor unit. See tables above and below for indoor unit piping connection and connection socket dimensions. See the following page for the connection socket installation procedure.*

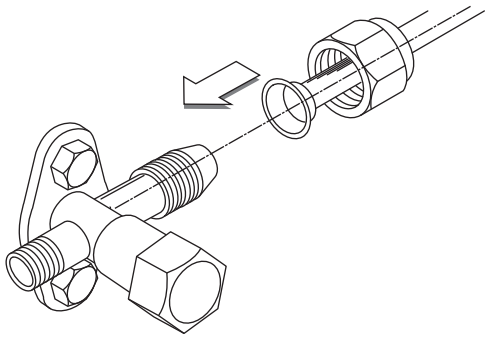
Table 12: Connection Socket Dimensions.

| Indoor Unit Capacity | Vapor (in., OD) | | Liquid (in., OD) | |
|---|---|---|---|---|
| | A | B | A | B |
| 18,000 Btu/h Wall-Mounted and VAHU; 24,000 Btu/h Ducted and VAHU | Ø3/8 → Ø1/2, Ø1/2 → Ø5/8 | | Ø1/4 → Ø3/8 | |
| 15,000 Btu/h Console; 18,000 Btu/h Ducted and Four-Way Cassette | Ø3/8 → Ø1/2 | | N/A | |
| 24,000 Btu/h Wall-Mounted | Ø3/8 → Ø1/2 | | N/A | |

### Installing Field Piping to the Outdoor Unit Piping Connections

1. Verify the outdoor unit service ports are closed.
2. Remove the caps on the outdoor unit piping connections.
3. Connect the gas piping first to ROOM A, then to ROOM B, then to ROOM C, in that order. Number of connections will differ depending on outdoor unit.
4. Tighten each gas piping connection individually following the “Tightening the Flare Nuts” procedure earlier in this section.
5. Connect the liquid piping first to ROOM A, then to ROOM B, then to ROOM C, in that order. Number of connections will differ depending on outdoor unit.
6. Tighten each liquid piping connection individually following the “Tightening the Flare Nuts” procedure earlier in this section.

Figure 26: Close Up of the Field Piping to the Outdoor Unit Piping Connection.



### Using the Connection Socket

Some indoor units require the use of a connection socket when piping the indoor units to the outdoor unit. (See previous page for information.) The connection sockets are included as a factory-supplied accessory with the indoor units. To install:

1. Align the center of the piping sections as seen in the diagrams at right and below.
2. Follow the “Tightening the Flare Nuts”procedure earlier in this section.
3. When all piping installation has been completed, perform the triple leak / pressure and evacuation tests (see the Final Installation Procedures Section in the Multi F / Multi F MAX with LGRED Outdoor Unit Installation Manual), verify that the system does not have any leaks, and then fully insulate all joints / connections.

Figure 25: Connection Socket Installation.

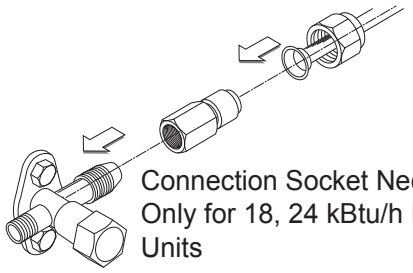
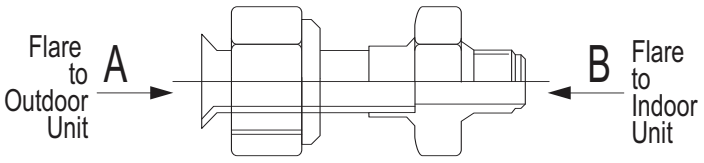



Figure 27: Connection Socket Diagram, External View.


Figure 28: Connection Socket Diagram, Internal View.




***Note:***

*For connections to regular Multi F and Multi F MAX outdoor unit systems, see the Multi F / Multi F MAX Installation Manual.*

## Multi F MAX (Standard or LGRED) Outdoor Unit System Piping Connections

### *Note:*

**⃠ Avoid Pipe Damage**

- *When routing field-provided piping, ⃠ avoid damaging the outdoor unit from excessive vibration.*
- *Properly insulate the liquid and gas lines separately up to the point of connection at the unit frame.*
- *See table below for Multi F MAX (Standard or LGRED) outdoor unit connection types.*

*⃠ Correctly route the piping so it does not make contact with mounting bolts. Allow room for field installation.*

Figure 29: Multi F MAX Outdoor Unit Refrigerant Pipe Connections.

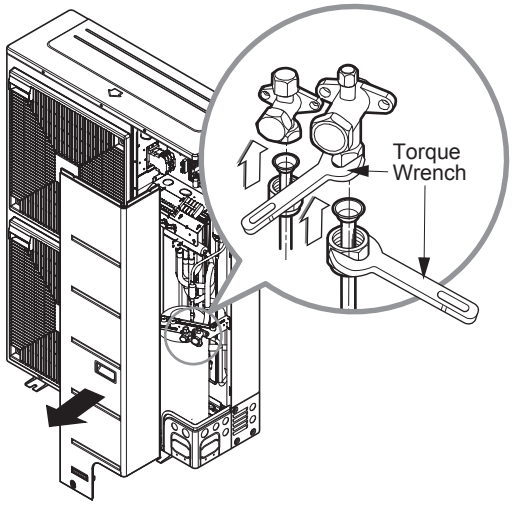



Table 14: Multi F MAX (Standard or LGRED) Outdoor Unit Piping Connections.

| Outdoor Unit Piping Connections | LMU483HV, LMU543HV, LMU601HV LMU360HHV, LMU420HHV, LMU480HHV |
|---|---|
| Liquid Line Connection (in., OD) x Qty. | Ø3/8 x 1 |
| Vapor Line Connection (in., OD) x Qty. | Ø3/4 x 1 |

### Branch Distribution to Indoor Unit Piping Connections

- Install indoor unit liquid and vapor refrigerant pipes (and connection wiring) to the appropriate branch distribution ports.
- Clearly note on the indoor unit's refrigerant piping (liquid, vapor) which branch distribution port it is connected to (A, B, C, D).

Table 15: Branch Distribution Unit Piping Connections.

| Branch Distribution Unit | Refrigerant Connections Pipe Size (in.) | | Connectable Indoor Unit Capacity (Btu/h) |
|---|---|---|---|
| | Liquid | Vapor | |
| PMBD3620 | Ø1/4 x 2 | Ø3/8 x 2 | 7,000, 9,000, 12,000, 15,000, 18,000, 24,000 |
| PMBD3630 | Ø1/4 x 3 | Ø3/8 x 3 | 7,000, 9,000, 12,000, 15,000, 18,000, 24,000 |
| PMBD3640 | Ø1/4 x 4 | Ø3/8 x 4 | 7,000, 9,000, 12,000, 15,000, 18,000, 24,000 |
| PMBD3641 | Ø1/4 x 4 | Ø3/8 x 3 | 7,000, 9,000, 12,000, 15,000, 18,000, 24,000 (A, B, C) |
| | | Ø1/2 x 1 | 24,000*, 36,000 (D) |

**24,000 Btu/h only applicable to Vertical Air-Handling Unit. 24,000 Btu/h Wall Mounted and 24,000 Ducted cannot be connected to Port D.*

Figure 30: Branch Distribution Ports to Indoor Units -- Side View.

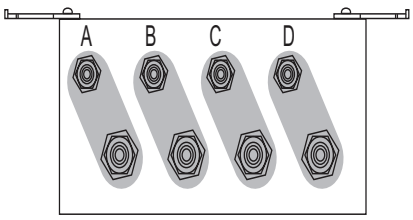
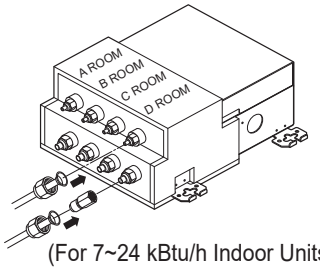


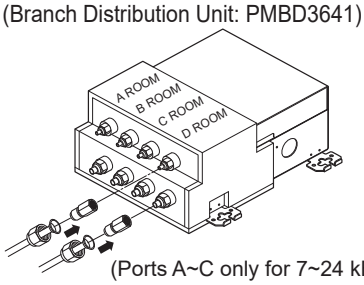

Figure 31: Branch Distribution Piping Connections.

(Branch Distribution Unit: PMBD3640)




(For 7~24 kBtu/h Indoor Units)

(Branch Distribution Unit: PMBD3641)




(Ports A~C only for 7~24 kBtu/h Indoor Units;
(Port D only for 36 kBtu/h Indoor Units and 24 kBtu/h Vertical Air-Handling Indoor Units. N/A for 24 KBtu/h Wall-Mounted and Ducted Indoor Units)

Table 16: Indoor Unit Pipe Sizes.

| Indoor Unit Capacity | Vapor Line Piping Size (in., OD) | Liquid Line Piping Size (in., OD) |
|---|---|---|
| 7,000 Btu/h | Ø3/8 | Ø1/4 |
| 9,000 Btu/h | | |
| 12,000 Btu/h | | |
| 15,000 Btu/h | | |
| 15,000 Btu/h: Console; 18,000 Btu/h | Ø1/2 | |
| 24,000 Btu/h | | |
| 36,000 Btu/h | Ø5/8 | Ø3/8 |

## *Note:*

*Connection sockets (included as a factory-supplied accessory with the indoor units) will need to be used when piping the indoor units to the branch distribution unit. The connection sockets for 36k indoor units are factory supplied with the branch distribution units. See tables above and below for indoor unit piping connection and connection socket dimensions. See the following page for the connection socket installation procedure.*

Table 17: Indoor Unit Piping Connections.

| Indoor Unit Capacity | Vapor Line Conn. (in., OD) | Liquid Line Conn. (in., OD) |
|---|---|---|
| 7,000 Btu/h | Ø3/8 | Ø1/4 |
| 9,000 Btu/h | | |
| 12,000 Btu/h | | |
| 15,000 Btu/h | | |
| 15,000 Btu/h Console; 18,000 Btu/h Ducted and Four-Way Cassette | Ø1/2 | Ø1/4 |
| 24,000 Btu/h Wall Mounted | Ø1/2 | Ø1/4 |
| 18,000 Btu/h Wall-Mounted, 24,000 Btu/h Ducted, all VAHU | Ø5/8 | Ø3/8 |

Table 18: Connection Socket Dimensions.

| Indoor Unit Capacity | Vapor (in., OD) | | Liquid (in., OD) | |
|---|---|---|---|---|
| | A | B | A | B |
| 18,000 Btu/h Wall-Mounted and VAHU; 24,000 Btu/h Ducted and VAHU | Ø3/8 → Ø1/2, Ø1/2 → Ø5/8 | | Ø1/4 → Ø3/8 | |
| 15,000 Btu/h Console; 18,000 Btu/h Ducted and Four-Way Cassette, | Ø3/8 → Ø1/2 | | N/A | |
| 24,000 Btu/h Wall-Mounted | Ø3/8 → Ø1/2 | | N/A | |
| 36,000 Btu/h | Ø1/2 → Ø5/8 | | Ø1/4 → Ø3/8 | |



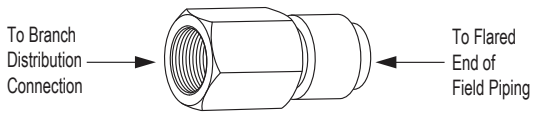
### Installing Field Piping to the Branch Distribution Unit Piping Connections

1. Remove any caps, etc., that will be on the branch distribution unit.
2. Tighten each piping connection individually following the “Tightening the Flare Nuts” procedure earlier in this section.
3. When all piping installation has been completed, perform the triple leak / pressure and evacuation tests (see the Final Installation Procedures Section in the Multi F / Multi F MAX or Multi F / Multi F MAX LGRED Outdoor Unit Installation Manual), verify that the system does not have any leaks, and then fully insulate all joints / connections.

### Using the Connection Socket

Some indoor units require the use of a connection socket when piping the indoor units to the branch distribution unit. (See previous page and below for information.) The connection sockets are included as a factory-supplied accessory with the indoor units, or in the case of the 36k indoor unit, it is factory supplied with the branch distribution units. To install:

Figure 32: Connection Socket Diagram, External View.

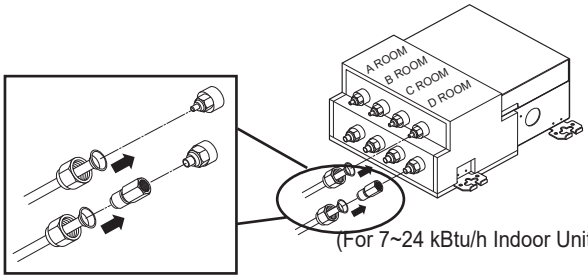



Connection Socket

1. Remove any caps, etc., that will be on the branch distribution unit.
2. Align the center of the piping sections as seen in the diagram at right.
3. Tighten each piping connection individually following the “Tightening the Flare Nuts” procedure earlier in this section.
4. When all piping installation has been completed, perform the triple leak / pressure and evacuation tests (see the Final Installation Procedures Section in the Multi F / Multi F MAX or Multi F / Multi F MAX LGRED Outdoor Unit Installation Manual), verify that the system does not have any leaks, and then fully insulate all joints / connections.

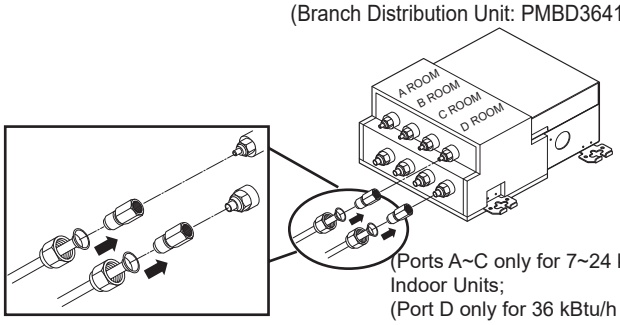
Figure 33: Close Up of Branch Distribution to Indoor Unit Piping Connections.

(Branch Distribution Unit: PMBD3640)




(For 7~24 kBtu/h Indoor Units)

(Branch Distribution Unit: PMBD3641)




(Ports A~C only for 7~24 kBtu/h Indoor Units;
(Port D only for 36 kBtu/h Indoor Units and 24 kBtu/h Vertical Air-Handling Indoor Units. N/A for 24 KBtu/h Wall-Mounted and Ducted Indoor Units)

Figure 34: Socket Connection.

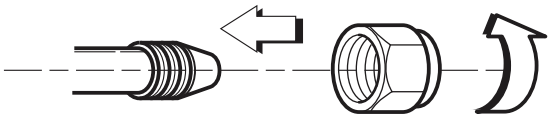
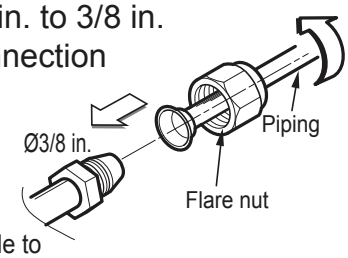
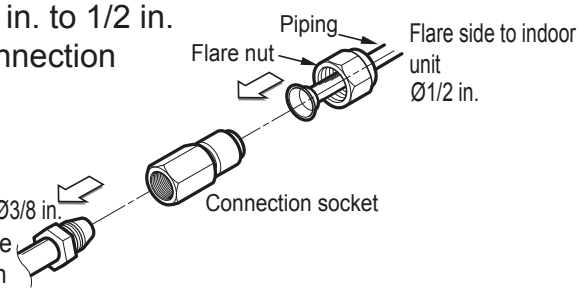


Figure 35: Possible Outdoor Unit or Branch Distribution Unit to Indoor Unit Connections.

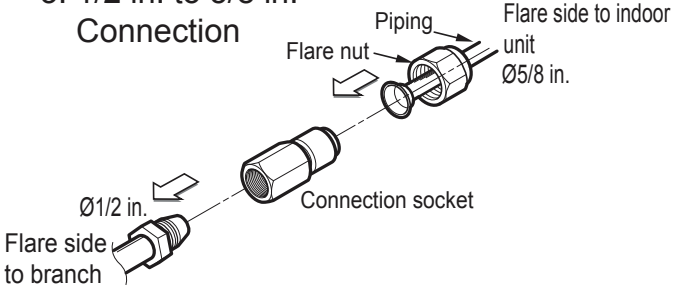
1. 3/8 in. to 3/8 in. Connection



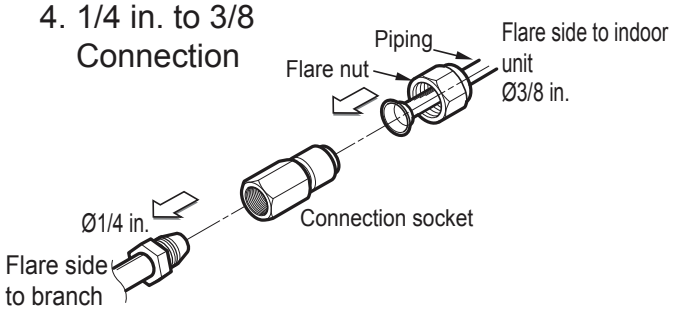

2. 3/8 in. to 1/2 in. Connection




3. 1/2 in. to 5/8 in. Connection



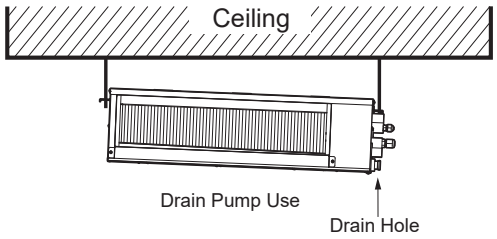

4. 1/4 in. to 3/8 Connection



## Condensate Piping Installation

Mid-static ducted indoor units include a flexible drain hose and two clamps. The hose can be used to connect the condensate pipe to the condensate pump connection. On mid-static units, there is the option to directly connect a 3/4 inch FPT fitting to the drain pan's gravity drain connection (see next page for gravity drain information).

Figure 36: Indoor Unit Slight Incline Installation.

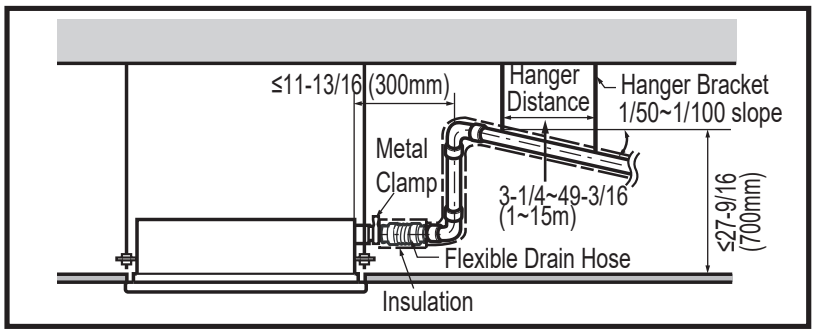



- Ensure that the mid-static ducted indoor unit is installed with a slight incline in the direction to the drain hose connection. See the "Installation" section for details.

- Any holes through the ceilings, walls etc., must be large enough to accommodate the drain piping and insulation. (See the Insulation section for more information. See also local, state, and federal codes.)

- The drain pump has a height of up to 27-9/16 inches to remove condensate. To ensure proper drainage, the factory-supplied flexible drain hose and any field-supplied drain piping must be installed below the maximum height.

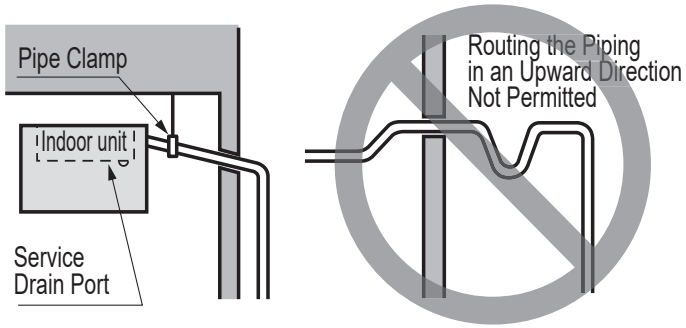
Figure 37: Drain Piping Installation Specifications.




- Install any drain lift piping at a right angle to the indoor unit, and no more than 11-13/16 inches (300mm) from the unit.

- Field-supplied drain piping must have downward gradient away from the unit of at least 1/50 to 1/100. To prevent reverse flow, ⃠ do not vertically slope the drain piping.

Figure 38: ⃠ Do Not Route the Piping Upward.




- Route the flexible drain pipe to the indoor unit, connect the flexible drain pipe to the indoor unit drain port, and then connect the flexible drain pipe to the field-supplied drain piping.

- When connecting the flexible drain hose or field-supplied drain piping, ⃠ do not damage the drain port on the indoor unit.

- Dimensions on the indoor unit drain connection is 1-1/4 inches (32mm) outside diameter.

- Use polyvinyl chloride VP25 pipe and pipe fittings for the condensate piping.

- After drain hose is installed and tested, insulate with polyethylene foam more than 0.3 inches (8mm) thick (check local, state, and federal codes). Position snugly against the indoor unit frame.

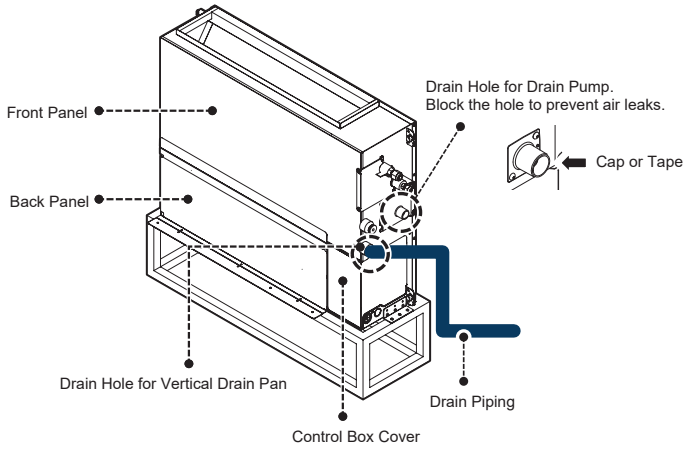
### ⚠NOTE

⃠ *Do NOT install the supplied flexible drain hose with a sharp curve or twist. A curved or twisted flexible hose will become damaged due to vibration and / or leak.*

## Vertical Condensate Piping Connections

- Connect the drain piping to drain hole of vertical drain pan.
- Block the drain hole of drain pump to prevent air leaks.

Figure 39: Vertical Condensate Piping Connections.




## Common Drain System Information

### *Note:*

*Condensate can be drained either directly outside or to a common drain system. For more information regarding the common drain system, see below or the Multi F / Multi F MAX with LGRED Outdoor Unit Engineering Manual or the regular Multi F / Multi F MAX Outdoor Unit Engineering Manual.*

If the field drain piping and / or the common drain system is long, install clamp hangers for support.

Table 19: Required Drain Piping Support Intervals.

| Piping Dia. (Inch) | Ø3/4" ~ 1-1/2" | Ø1-1/2" ~ 2" | Ø2-1/2" ~ 5" |
|---|---|---|---|
| Maximum Interval (feet) | <3.3 | <3.9 | <4.9 |

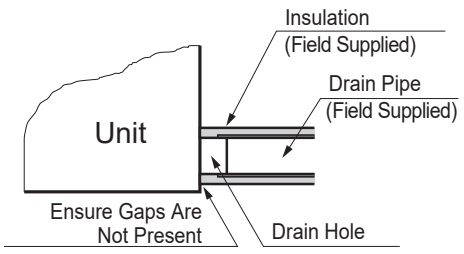
### Ducted Unit Common Drain System Information

If the bottom surface of the ducted indoor unit is at an elevation below a receiving building drain line connection, install an inverted trap at the top of the condensate pump discharge riser before connection to the building drain pipe.

If the receiving drain line is mounted horizontally, connect the inverted trap to the top half of the pipe. The connection point of the inverted trap to the building drain pipe should always be to the top half of the pipe and should never be over 45° either side of the upper most point of the horizontal building drain line.

If connecting to a vertical drain line or plumbing system vent line, connect the IDU condensate pump discharge line using a Y-45 fitting with the double end of the Y-45 fitting facing up. When connecting to a vertical drain line include an inverted trap at the top of the IDU condensate pump discharge riser before connection to the Y-45 fitting.

Figure 40: Close Up of Drain Hole.



## Gravity Condensate Pipe Connection

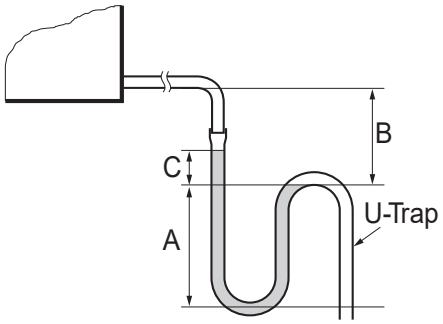
Mid-static indoor units have an auxiliary gravity condensate drain connection This connection may be used instead of using the condensate pump. If the gravity drain is used, disconnect the indoor unit condensate pump connector on the indoor unit PCB.

- Verify the unit is installed with a slight incline toward the gravity drain connection.
- Remove the rubber plug before connecting the condensate line to the indoor unit, if present.
- The gravity condensate for mid-static indoor units can be equipped with a condensate trap for proper condensate flow. See Figure at right for trap details.
- Horizontal segments of condensate pipe should be sloped a minimum of 1/4 inch per foot away from the indoor unit.

***Note:***

*Install a U-Trap / P-Trap to prevent water leaks caused by suction air blockage.*

Figure 43: U-Trap Dimensions.




Applied U-Trap Dimensions

A ≥ 2-3/4 inches

B ≥ 2C

C ≥ 2 x SP

SP = External Pressure (in. Aq.)

Example: External Pressure = 0.39 in. Aq.

A ≥ 2-3/4 inches.

B ≥ 1-9/16 inches.

C ≥ 25/32 inches.

## Checking the Indoor Unit and Drain Piping for Leaks

**To test the flexible drain hose and field-supplied drain piping:**

- Connect the flexible drain hose to the field-supplied drain piping (that drains to the outside).
- Pour water into the flexible drain hose and check for leaks.
- Repair any leaks if necessary.

**To test the evaporator:**

- Remove air filter, if present.
- Connect the flexible drain hose to the indoor unit drain port.
- Spray one (1) or two (2) glasses of water on the evaporator. Verify the water flows out of the drain hose without leaks.
- Repair any leaks if necessary.
- After power wiring installation is complete, operate the drain pump to see if it sounds and functions properly.

Figure 41: Checking the Drain Piping.

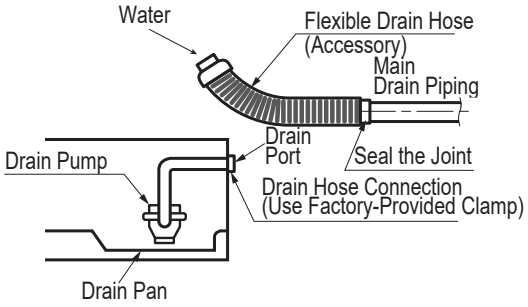
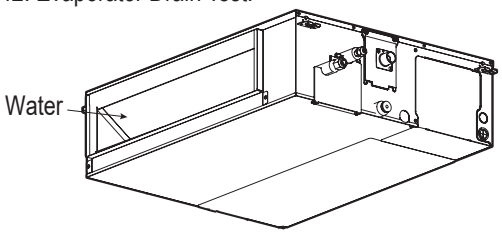



Figure 42: Evaporator Drain Test.



## Refrigerant Piping System Insulation

***Note:***

*For information regarding insulation for underground or penetration situations, see the "General Refrigerant Piping System Information" section.*

All refrigerant piping from the outdoor unit to the indoor units must be insulated correctly for safety and usage. Refrigerant piping, field-provided isolation ball valves (if present), service valves, and elbows must be properly and completely insulated using closed cell pipe insulation (up to the indoor unit piping connections). To prevent heat loss / heat gain through the refrigerant piping, all refrigerant piping including liquid lines and vapor lines must be insulated separately. Insulation must be a minimum 1/2 inches thick, and thickness will need to be increased based on ambient conditions and local codes. Table on next page lists minimum wall thickness requirements for Ethylene Propylene Diene Methylene (EPDM) insulation.

Inside the outdoor unit, maximum pipe temperature is 248°F and minimum pipe temperature is -40°F. For field insulation of refrigerant piping between outdoor units and indoor units, consider the following pipe temperature ranges for an operating heat pump system:

- Heating mode refrigerant temperature ranges: Liquid = 75-118°F; High Pressure Vapor = 95-220°F
- Cooling mode refrigerant temperature ranges: Liquid = 75-118°F; Low Pressure Vapor = 40-90°F

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

Figure 44: Typical Insulation at the Mid-Static Ducted Indoor Unit.

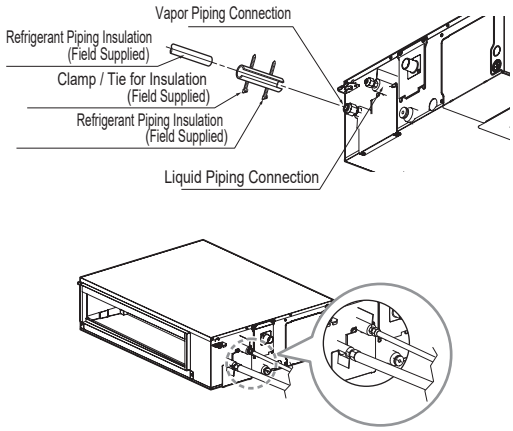



Figure 45: Typical Insulation Butt-Joint at Indoor Unit Casing.

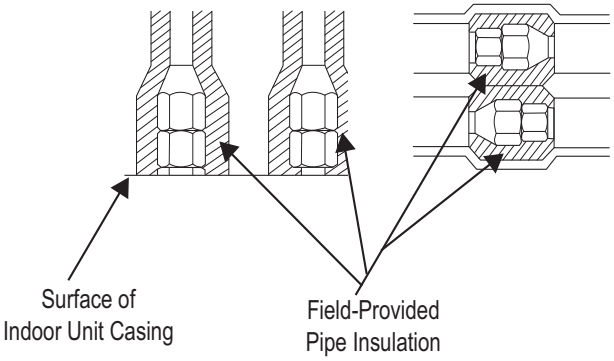



Figure 46: Typical Refrigerant Flare Fitting Insulation Detail.



Figure 47: Close Up of Typical Insulation at the Indoor Unit.

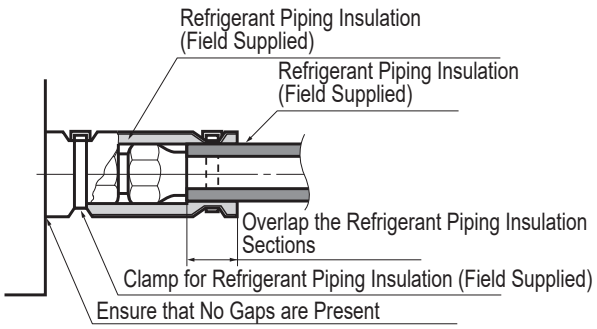
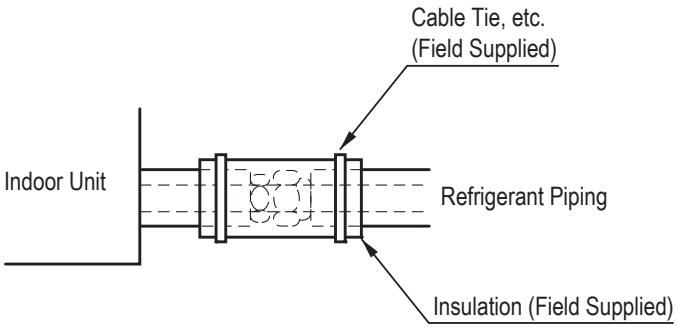



Figure 48: Insulating the Shut Off / Insulation Ball Valve (If Present).




**⚠NOTE**

*Always include plenty of insulation on all refrigerant and drain piping to ensure condensate does not form and cause damage to walls, floors, etc.*

# GENERAL INSTALLATION GUIDELINES

## Insulating Refrigerant Piping

### Minimum Refrigerant Pipe Ethylene Propylene Diene Methylene (EPDM) Insulation Wall Thickness Requirements

***Note:***

- ⃠ *Do not insulate gas and liquid pipes together as this can result in pipe leakage and malfunction due to extreme temperature fluctuations.*
- *Always properly insulate the piping. Insufficient insulation will result in condensation, reduced heating/cooling performance, etc. Also, if the pipes aren't insulated properly, condensation could potentially cause damage to building finishes. Pay special attention to insulating the pipes installed in the ceiling plenum.*
- *Fully insulate the piping connections.*
- *Follow local codes and the designer's instructions when selecting ethylene propylene diene methylene (EPDM) insulation wall thickness.*

Table 20: Insulation Guidelines for Typical and Special Circumstances.

<table>
<tr><th colspan="2" rowspan="2">Classification / Piping O.D.</th><th colspan="2">Air-conditioned location</th><th colspan="2">Non-air conditioned location</th></tr>
<tr><th>1. Typical Conditioned Location</th><th>2. Special Conditioned Location</th><th>3. Typical Unconditioned Location</th><th>4. Special Unconditioned Location</th></tr>
<tr><td rowspan="2">Liquid pipe</td><td>ø1/4 inch<br>ø3/8 inch</td><td>>1/2 inches</td><td>>1/2 inches</td><td>>1/2 inches</td><td>>1/2 inches</td></tr>
<tr><td>≥ø1/2 inch</td><td>>1/2 inches</td><td>>1/2 inches</td><td>>1/2 inches</td><td>>1/2 inches</td></tr>
<tr><td rowspan="12">Vapor pipe</td><td>ø3/8 inch<br>ø1/2 inch<br>ø5/8 inch<br>ø3/4 inch<br>ø7/8 inch<br>ø1 inch</td><td rowspan="6">>1/2 inches</td><td rowspan="7">>3/4 inches</td><td rowspan="7">>3/4 inches</td><td rowspan="12">>1 inch</td></tr>
<tr><td>ø1-1/8 inches<br>ø1-1/4 inches<br>ø1-3/8 inches<br>ø1-1/2 inches<br>ø1-3/4 inches</td><td rowspan="5">>3/4 inches</td></tr>
<tr><td colspan="2">>1 inch</td><td>>1 inch</td></tr>
</table>

*[1]The thickness of the above insulation material is based on heat conductivity of 0.61 Btu/in/h/ft²/°F.*

### 1. Typical Air-Conditioned Location

A building plenum or space that contains conditioned air that does not exceed 80°F DB. When piping passes through an indoor area where the indoor unit operates, such as an apartment, classroom, office, mall, hospital, etc.

### 2. Special Air-Conditioned Location

1. When the location is air conditioned, but there is severe temperature/humidity difference due to high ceilings.

• Church, auditorium, theater, lobby, etc.

2. When the location is air conditioned, but internal temperature/humidity are high.

• Bathroom, swimming pool, locker room, etc.

### 3. Typical Unconditioned Location

When piping passes through an indoor area where the indoor unit does not operate, such as a hallway, dormitory, or school, etc. An unconditioned space inside a building.

### 4. Special Unconditioned Location: If conditions 1 and 2 below are present.

1. An unconditioned space or plenum of a building.
2. An area where there is an elevated humidity level.

### 5. Additional Insulation for Indoor Units Will be Required in Humid Environments.

The air conditioner factory insulation has been tested according to "ISO Conditions with Mist," and it satisfies the requirements. If the system has been operating for a long time in a high humidity environment (dew point temperature: more than 73°F), condensate is likely to form. If this happens, install 3/8 inch thick EPDM insulation that is plenum-rated with a heat-resistance factor of more than 248°F.

**⚠WARNING**

- *All power wiring and communication cable installation must be performed by authorized service providers working in accordance with local, state, and National Electrical Code (NEC) federal regulations related to electrical equipment and wiring, and following the manufacturer product diagrams, requirements, and instructions in this manual. Failure to do so will lead to electric shock which can cause physical injury or death.*
- *Verify 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 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, indoor, and branch distribution units (Multi F MAX Standard or LGRED systems only). Ground wiring is required to prevent accidental electrical shock during current leakage.*
- *Verify that the circuit breaker is 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. Using an oversized breaker or fuse will result in fire, electric shock, physical injury or death.*
- ⃠ *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 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, indoor, and branch distribution units (Multi F MAX Standard or LGRED systems only). Improperly connected ground wire can cause communication problems from electrical noise and motor current leakage. Ground wiring must always be installed by a qualified technician.*
- *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 Wiring / Communication Cable Connections

Best practice dictates using solderless ring or fork terminals at all power wiring and communication cable terminations. Use copper bearing ring or fork terminals; ⃠ do not use galvanized or nickel plate over steel. Use appropriate crimping tool to attach the ring or fork terminals at all power wiring and control cable terminations.

### To Install a Ring or Fork Terminal:

1. Trim the wiring with wire cutters or pliers, then strip the insulation to expose the strand wiring to about 3/8 inches.
2. Using a ring terminal fastener or pliers, securely clamp a ring terminal to each stripped wire end.

### To Connect the Wiring to the Terminals:

1. Remove the JIS terminal screws from the (outdoor unit, branch distribution unit, or indoor unit) terminal plate with a JIS screwdriver. (See information about LG terminal connections on the next page.)
2. Position the ring terminal around the terminal, place the terminal screw in the ring, and tighten to the terminal plate using a JIS screwdriver.
   - Firmly attach the wire; secure in a way to prevent external forces from being imparted to the terminal block.
   - Use an appropriately sized JIS screwdriver for tightening the terminals.
   - ⃠ Do not over tighten the connections; over tightening will damage the terminals.

If ring terminals or fork terminals are not available, then:

- ⃠ Do not terminate different gauge wires to the power terminal block. (Slack in the wiring will generate heat.)
- When terminating wires of the same thickness, follow the instructions demonstrated in the figures below.

Figure 50: Close up of a Typical Ring Terminal.

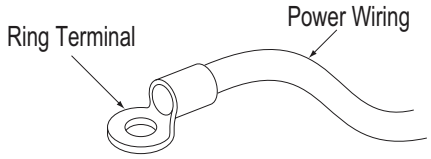



Figure 51: Adding a Ring Terminal to the Wiring.

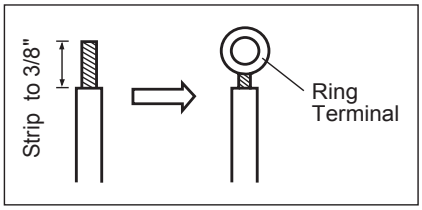



Figure 49: Tightening the Ring Terminal to the Terminal Plate.

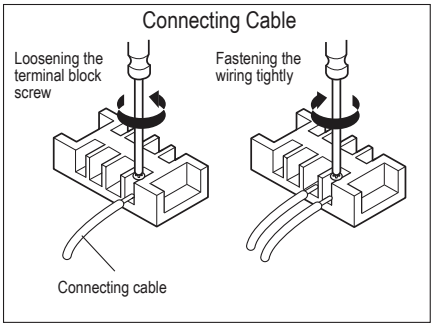
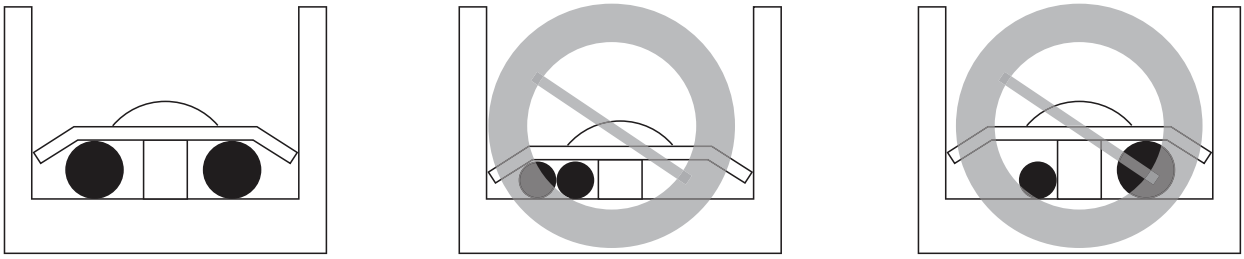



Figure 52: Proper and Improper Power Wiring Connections.

● :Copper Wire



Terminate multiple power wires of the same gauge to both sides.

Do not terminate two wires on one side.

Do not terminate different gauge wires to a terminal block.

### ⚠ WARNING

*If power wires are not properly terminated and firmly attached, there is risk of fire, electric shock, and physical injury or death.*

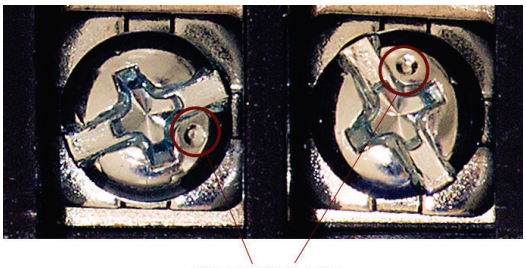
### ⚠ NOTE

- ⃠ *Never apply line voltage power to the communications cable terminal block. If contact is made, the PCBs will be damaged.*
- *Always include some allowance in the wiring length when terminating. Firmly attach the wiring or cable, but provide some slack to facilitate removing the electrical panels while servicing, and to prevent external forces from damaging the terminal block.*
- ⃠ *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.*

## LG Terminal Connections

LG uses a "JIS" type of screw for all terminals; use a JIS screwdriver to tighten and loosen these screws and avoid damaging the terminal. ⃠ Do not over tighten the connections — over tightening will damage the terminals — but firmly and securely attach the wiring in a way to prevent external forces from being imparted to the terminal block.

Figure 53: JIS Screws.




### *Note:*

- *The terminals labeled "GND" are NOT ground terminals. The terminals labeled ⏚ ARE ground terminals.*
- *Polarity matters. Always connect "A" to "A" and "B" to "B."*
- *Always create a wiring diagram that contains the exact sequence in which all the indoor units and branch distribution units (Multi F MAX systems Standard or LGRED only) are wired in relation to the outdoor unit.*
- ⃠ *Do not include splices or wire nuts in the communication cable.*

## Power Supply / Power Wiring Specifications

- Multi F and Multi F MAX (Standard or LGRED) 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 [Standard or LGRED] systems only) through the communication / connection (power) cable (indoor units and branch distribution units draw minimum power). See the Multi F / Multi F MAX Outdoor Unit Installation Manual or the Multi F / Multi F MAX with LGRED for information.
- Select power supply wire type and size based on NEC and local codes. Maximum voltage fluctuation ±10% of the nameplate rated value.
- Properly ground the outdoor unit / indoor units / branch distribution units 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 54: Power Wiring Conduit.

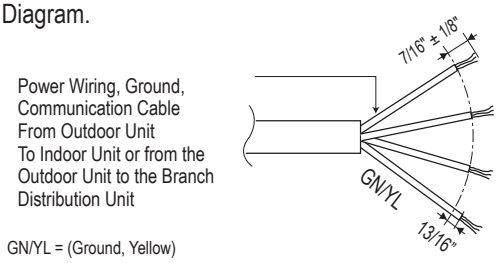
### ⚠WARNING

- *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.*
- *Provide a circuit breaker between the power source and the outdoor unit. Failure to do so will cause bodily injury or death.*

## 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 55: Typical Multi F / Multi F MAX (Standard or LGRED) Outdoor and Indoor / Branch Distribution Unit Wiring and Communications Cable Diagram.




### Multi F Systems (Standard or LGRED):

- 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 (Standard or LGRED):

- 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:*

- *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.*

Figure 56: Typical Multi F (Standard or LGRED) System General Power / Communications System Schematic.

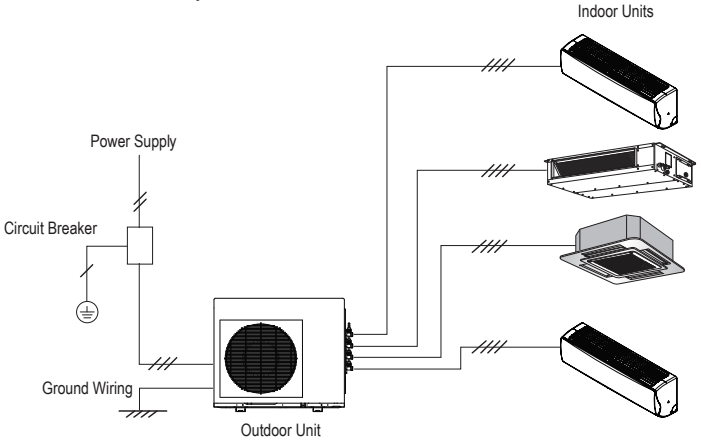
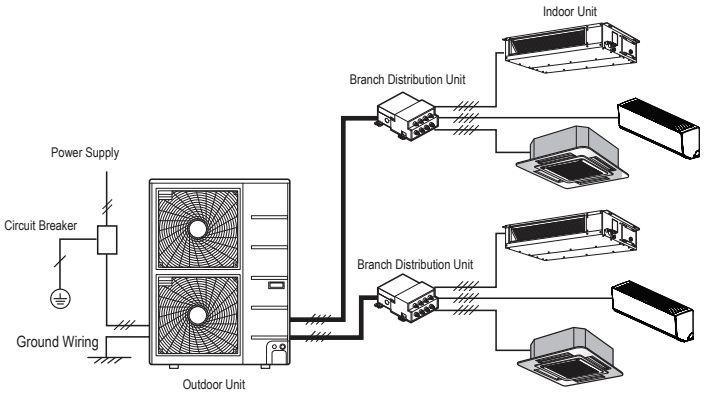



Figure 57: Typical Multi F MAX (Standard or LGRED) System General Power / Communications System Schematic.



## Communication Cables From Indoor Units to Remote Controllers

- Communication cable from indoor unit to remote controller(s) is to be LG supplied or field supplied 22 AWG, 3-conductor, twisted, stranded, unshielded. Wiring must comply with all applicable local and national codes.
- If using the LG supplied 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 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 supplied 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 58: One Example of Indoor Unit to Zone Controller Connection.

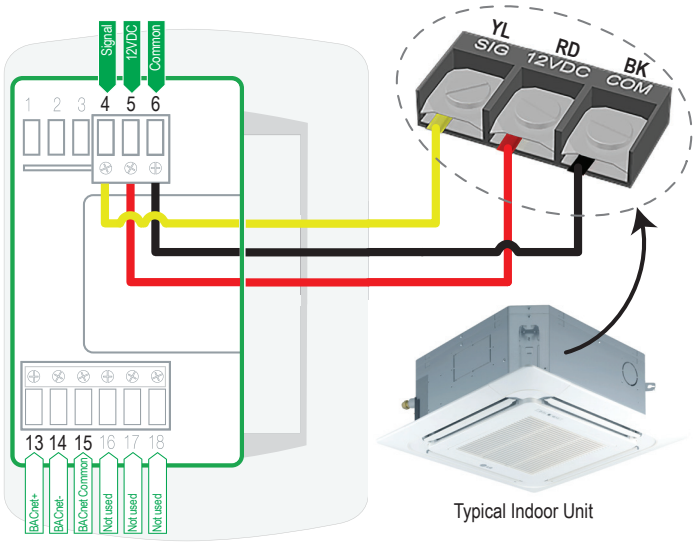
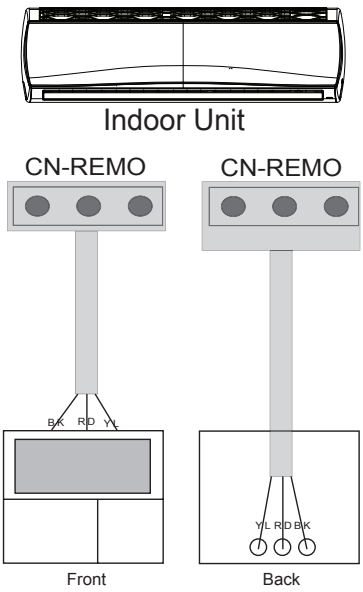



Figure 59: Another Example of Indoor Unit to Zone Controller Connection.




***Note:***

*Cable connected to Zone Controller is the factory default connection.*

## Communication Cables 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 60: Example of Indoor Unit Group to Zone Controller Connections (Sig-12V-GND [Comm.] Terminal).

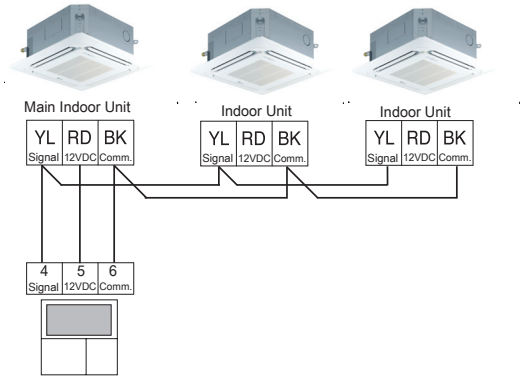



Figure 61: Example of Indoor Unit Group to Zone Controller Connections (CN-REMO).

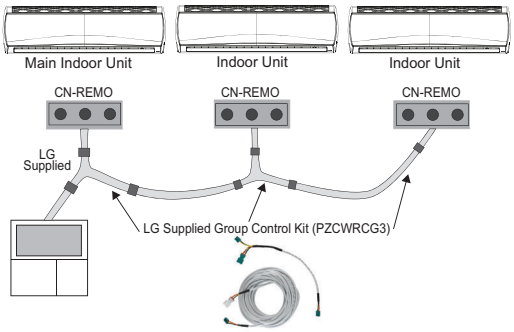



Table 21: Accessories for Some Group Control Applications.

| 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 |  |

## *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)

## Wired Controller

Optional controllers (sold separately; see “Functions, Controls, Options” in the engineering manual, or contact an LG representative for more information) can connect to the Mid-Static Ducted indoor unit in one of two different ways.

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

### *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.*
- *Use extension cable if the distance between wired remote controller and the indoor unit is >32 feet (9.75 m).*

Figure 63: Wired Controller Connection.

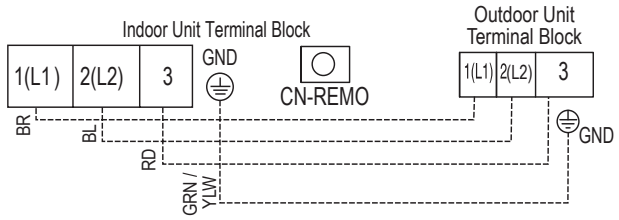
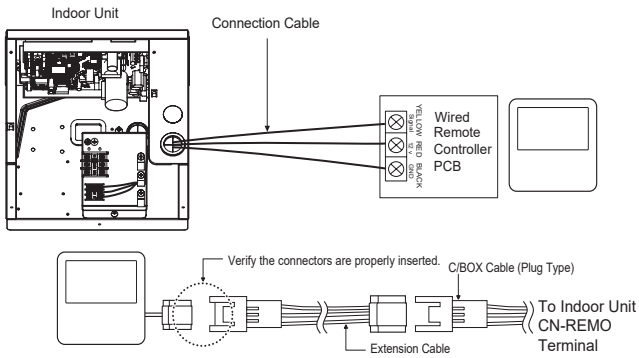



Figure 62: PZCWRC1 LG Wired Remote Extension Cable.




## Wired Controller Installation Location

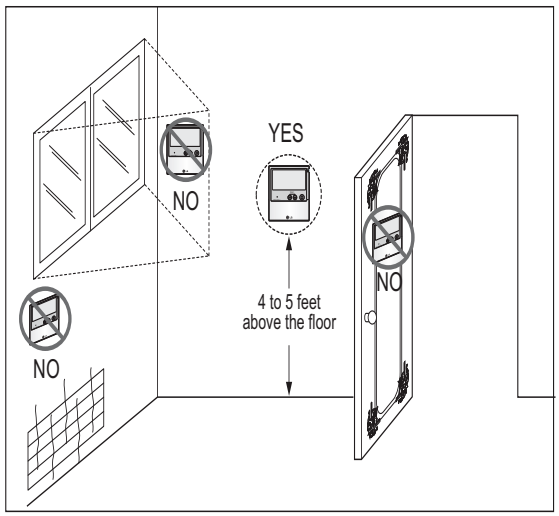
Mid-static ducted indoor units can be used with various wired controllers (optional; sold separately). Wired controllers include a sensor to detect room temperature. To maintain comfort levels in the conditioned space, the wired controller must be installed in a location away from direct sunlight, high 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.

### *Note:*

⃠ *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 64: Wired Controller Installation Location.




1. Pull communications cable between the controller handy box (if used) and the indoor unit (field supplied; see submittals for communication cable specifications).
2. Store a minimal amount of cable in the handy box. Any additional cable must be coiled and stored near the indoor unit control panel.
3. If the cable between a zone controller and the indoor unit is too long, ⃠ do not cut. Coil any spare communications cable, tie-wrap it, and leave it next to the indoor unit location.

## 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.

## Wired Controller Installation

**⚠WARNING**

- *Always have power off before installing the controller.*
- ⃠ *Never operate the indoor unit or outdoor unit outside of the operational parameters as outlined in this manual and the product specifications.*
- ⃠ *Never touch wiring or install accessories with wet hands.*
- *When drilling holes for the communication cable and the screws, take care not to damage wiring that is routed through the wall. There is risk of fire, electric shock, explosion, and physical injury or death.*

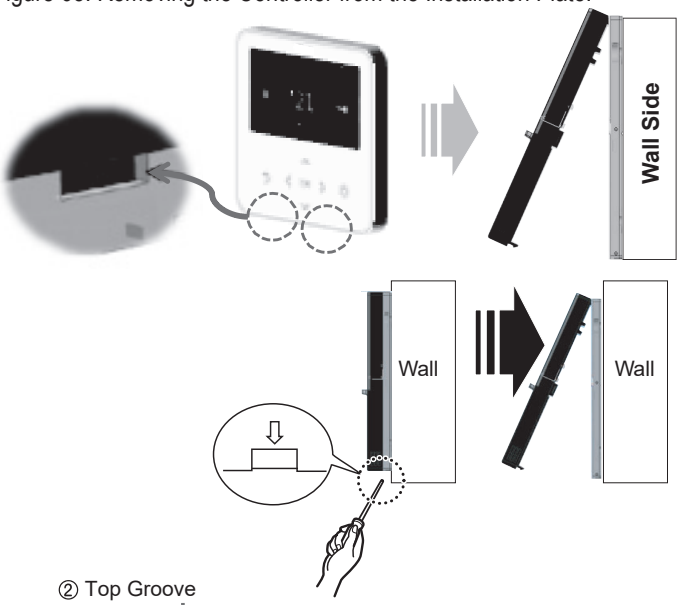
### *Note:*

*The controller is designed to be surface mounted. Recessing the controller will damage the temperature sensor, and cause it to misread the zone temperature.*

1. If not already done, separate the controller from its installation plate.

- To separate, insert a small screwdriver into one of the two holes at the bottom of the installation plate. Gently turn clockwise.
- Repeat for the remaining hole, and then gently pull outward on the bottom of the controller body.

Figure 65: Removing the Controller from the Installation Plate.

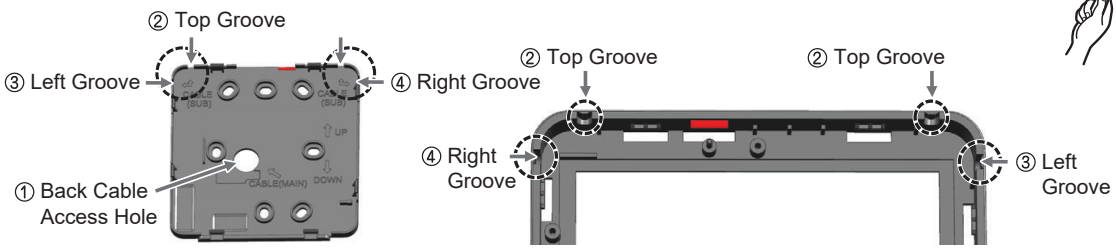



**⚠WARNING**

⃠ *Do not damage the controller components when separating. There is risk of fire, electric shock, and physical injury or death if the electrical components are damaged.*

2. Determine how the communications cable (female end) will be routed to the controller. Choose either through the back, using the top groove, using the left groove, or using right groove.

Figure 66: Routing the Communications Cable.

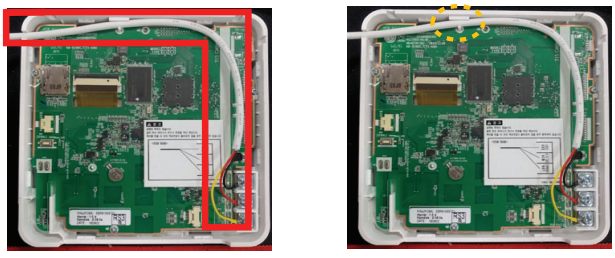



- If using the top, left, or right groove, use needle nose pliers to carefully break off the guide tab. Trim area neatly.
- If using the left groove:
  - Bend the cable to an “L” shape as shown.
  - Insert the cable into the top of the controller. Attach at center.
  - After wiring is complete, carefully tighten the controller to installation plate to avoid damaging components.

### *Note:*

*If the cable is not bent and inserted properly, it may not fit the installation plate / inside the controller.*

Figure 67: Left Groove Installation, Preparing and Inserting the Cable Properly.



Example Proper Shape of the Bent Cable

Location at Top for Attaching the Cable

**Wired Controller Installation, continued.**

• If using the back, route the communications cable through the handy box or wall, and through the large hole in the installation plate.

## *Note:*

*• If the distance between the controller and the indoor unit is more than 32 feet (9.75 m), use an LG Extension Cable (sold separately).*

*• ⃠ Do not install a cable longer than 164 feet (50 m). Communication errors will occur.*

*• Ensure the cable connections are male to female. If the communications cable is not routed properly with the connections facing the right direction, connections cannot be made.*

*• Install a totally enclosed, noncombustible conduit if local, state, or federal building codes require it for plenum cable use.*

3. Attach the controller installation plate to the wall or handy box using the factory-provided screws. Ensure the plate is level and securely attached to the wall.

## *Note:*

*• ⃠ Do not overtighten the screws and bend the installation plate. It damages the controller PCB.*

*• Ensure the installation plate fits into the handy box, if applicable.*

4. Seal all gaps or holes behind the installation plate before mounting. If mounting the controller over a handy box, seal the holes in the handy box using spray foam or similar insulation material approved by all applicable codes.

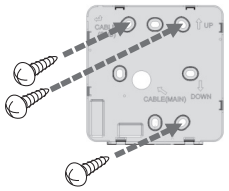
5. Attach the top of the controller to the top of the installation plate. Verify that the controller is level and secure, and there are no gaps.

6. Plug the male connection on the controller into the female end of the communications cable.

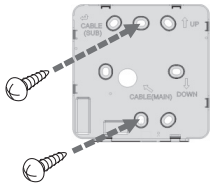
7. Connect the controller cable to terminal CN-REMO on the indoor unit PCB.

8. Guide the bottom of the controller to the bottom of the installation plate. Gently push on the controller along the bottom edge until it snaps onto the plate. Verify that it is properly seated with no gaps between the controller and the installation plate.

Figure 68: Location of the Controller Installation Plate Screws When Using a Handy Box.



Four-Socket Handy Box Installation



Two-Socket Handy Box Installation

Figure 69: Attaching the Top of the Controller to the Installation Plate.

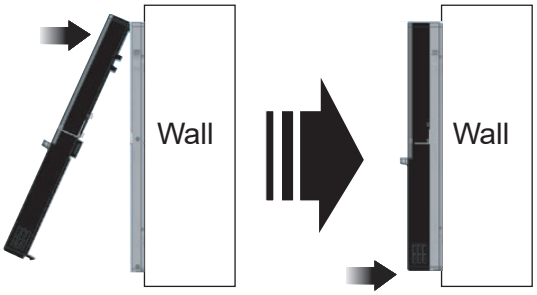
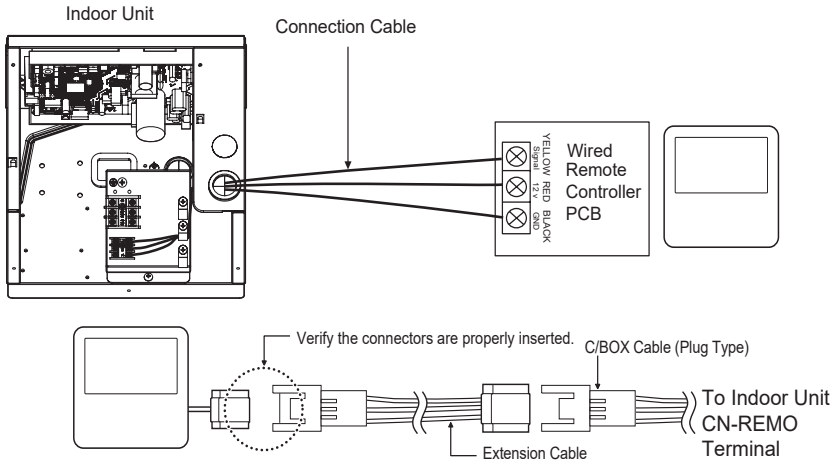



Figure 70: Controller Communication Cable Termination.



## Connecting Power Wiring / Communication Cable

The general guidelines for connecting electrical and communication cables are similar for all mid-static ducted indoor units. The electrical connections procedure includes a wiring diagram for the mid-static ducted indoor unit.

**⚠WARNING**

- *Verify that main power to the unit is completely off before proceeding with these steps as there is a risk of electrical shock, bodily injury, and / or death.*
- *Each wire must be tightly attached to the terminal block. Loose wiring connections cause the terminal to overheat, resulting in fire, electrical shock, bodily injury, and / or death.*
- *Follow all safety and warning information outlined at the beginning and throughout this manual. Failure to do so will cause electrical shock, bodily injury, and / or death.*

### *Note:*

- *Follow all safety and warning information outlined at the beginning and throughout this manual. Failure to do so will cause unit failure.*
- *Connect the communication / connection (power) cable to the indoor unit by matching the terminals on the outdoor unit control board. Verify the color of the wires at the outdoor unit, along with the terminal numbers, match those for the indoor unit.*
- *Images are representative; actual appearance will vary.*
- *Refer to the circuit diagram on the indoor unit.*
- *Terminal screws will become loose during transport. Properly tighten the terminal connections during installation.*

1. Using a Phillips head screwdriver, remove the metal control box cover (one panel) by unscrewing the two (2) screws that hold it in place. Set aside the metal control box cover and screws for reattachment.

2. Insert the communication / connection (power) cable (from the outdoor unit to the indoor unit) through the designated access hole in the side of the ducted frame (see images). If using a conduit, attach it to the conduit hole, and secure with a lock nut.

3. Attach the communication / connection (power) cable to the inside of the frame with the clamp.

4. Using a JIS screwdriver, connect the cable terminals to the terminal block. Ensure wire color and terminal number of the indoor unit matches those of the outdoor unit. Refer to the wiring diagram on the indoor unit.

5. When installing the wired remote controller (sold separately), insert the controller wiring through its designated access hole below the communication / connection (power) cable. Refer to the wiring diagram on the indoor unit. Using a JIS screwdriver, attached that cable to the appropriate terminal block connection.

6. Reinstall the metal control box by reattaching it with its two (2) screws.

Figure 71: Removing the Control Box.

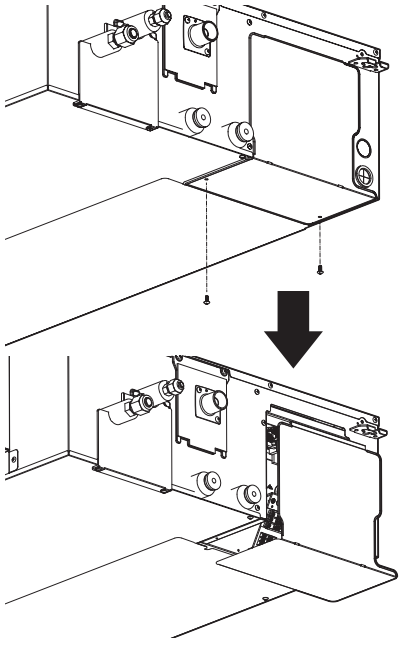


Figure 72: Location of the Access Holes.

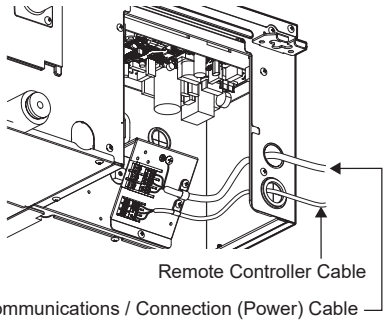
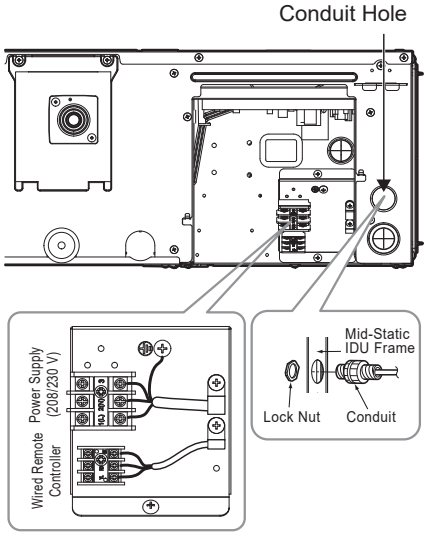



Figure 73: Using a Conduit.



## *Note:*

- *Each wire must be securely attached to the terminal block.*
- *Secure the cable onto the control board using a cable tie.*
- *Use a conduit to protect the cable / refrigerant piping from the indoor unit to the outdoor unit.For more information on conduits or the bundling method, see the Installation section.*

Figure 74: Multi F Mid-Static Ducted Indoor Unit Wiring Diagram.

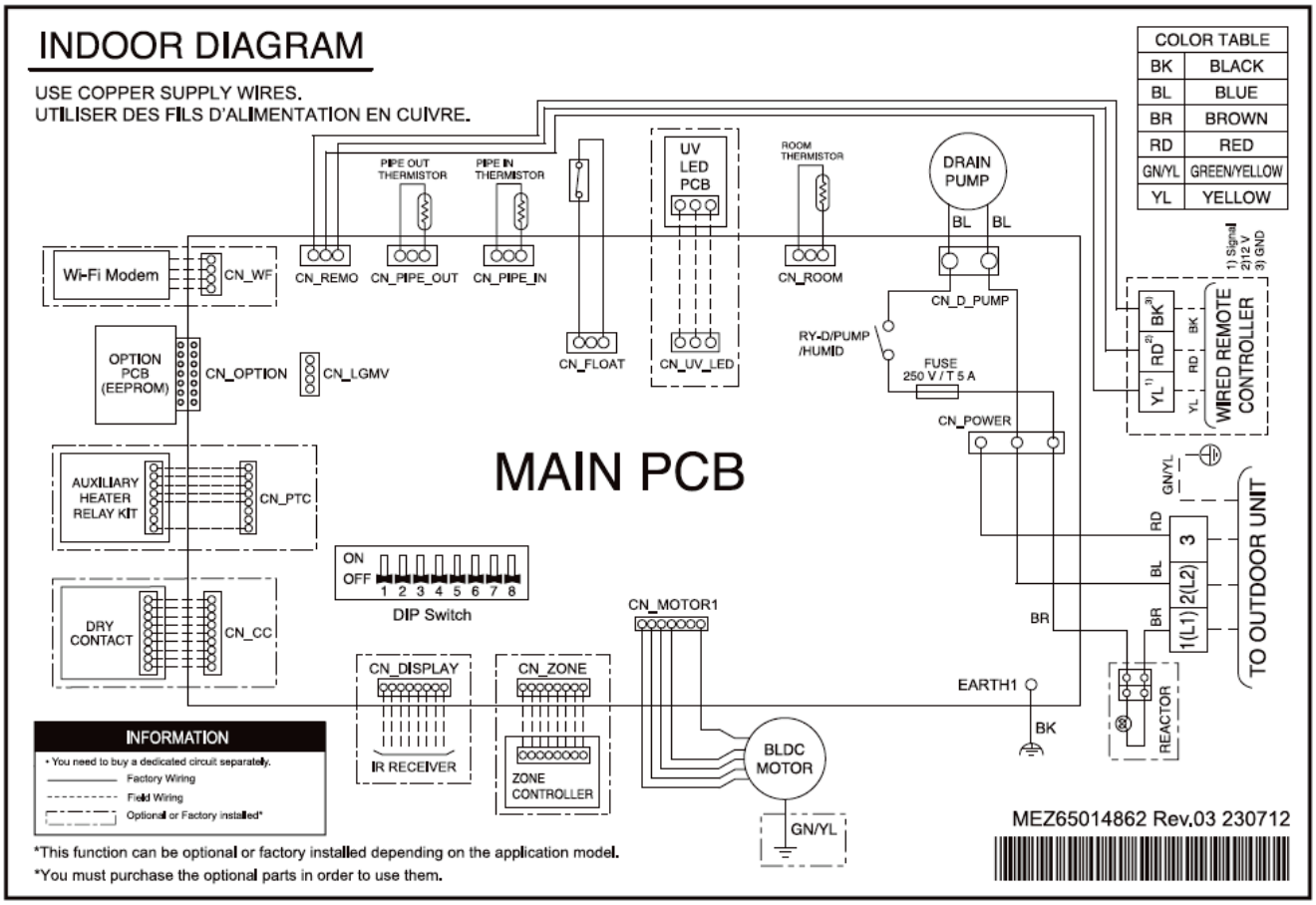



Figure 76: Simplified View of Indoor Unit to Outdoor Unit / Branch Distribution Unit Terminal Connections.

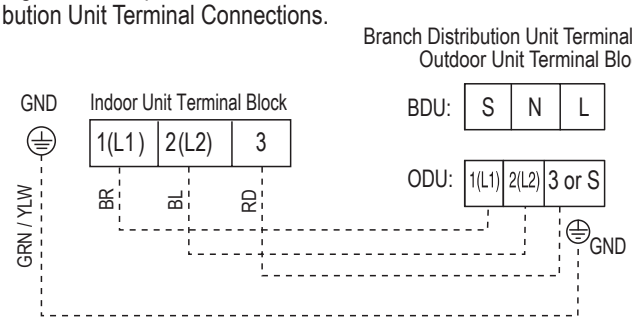
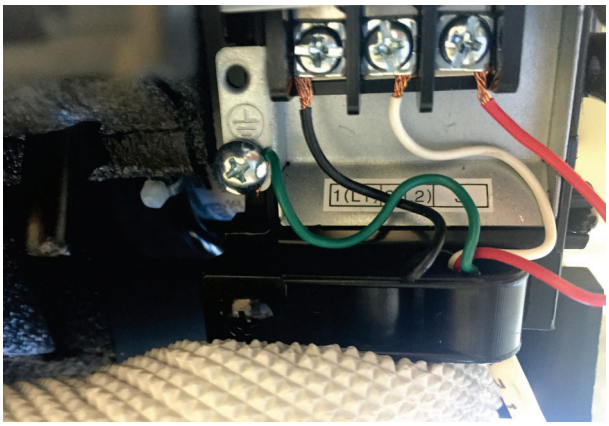



Figure 75: Typical Indoor Unit Terminal Block with Grounding Cable (Actual Appearance Will Vary).



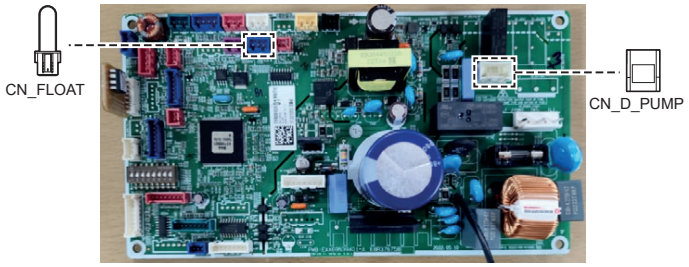
## Mid-Static Ducted Vertical Installation Conversion Kit Wiring

**⚠DANGER**

*When installing / replacing / servicing, wear anti-static gloves to prevent static electricity. Fire and electrical shock can cause physical injury or death.*

If the vertical installation conversion kit has been installed on the mid-static ducted indoor unit, additional electrical work is required. See the previous page.

Figure 78: Vertical Installation Conversion Kit PCB Connections.



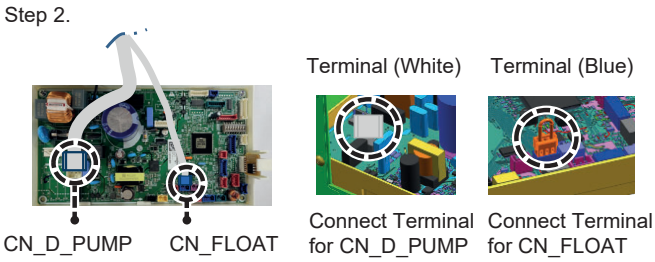

**Step 1.**

Open the control box cover. Disconnect the wires on CN_D_PUMP and CN_FLOAT on the mid-static ducted indoor unit PCB.

**Step 2.**

Connect terminals for CN_D_PUMP (white) and CN_FLOAT (blue) (factory-provided accessories included with the conversion kit) as shown in the image at right.

Figure 79: Vertical Installation Conversion Kit Wiring Connection Procedures.

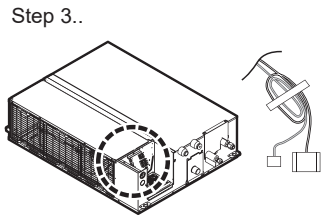



**Step 3.**

Coil up and tie any extra wiring and close control box cover.

**⚠DANGER**

*When installing / replacing / servicing, wear anti-static gloves to prevent static electricity. Fire and electrical shock can cause physical injury or death.*




## Using a Conduit for Indoor Unit Wiring / Cable Installation

### *Note:*

*Use a liquidtight 3/4 inch elbow connector for flexible conduit to protect the communication / connection (power) cable.*

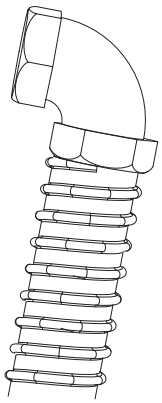
1. Assemble the conduit with a grommet and washer (field-supplied separately or included with the elbow connector).
2. Guide the power wiring / communication cable into the conduit assembly..
3. Attach the conduit assembly to the indoor unit with a lock nut.

### *Note:*

*Check local, state, and federal codes when choosing a conduit size.*

4. To protect the piping, condensate drain, and conduit from the elements, add a lineset cover from the indoor access hole to the outdoor unit.

Figure 77: Liquidtight 3/4 Inch Elbow Connector Attached to Flexible Conduit.



### *Note:*

*If a conduit is not used, see pages in the "Refrigerant Piping Connections" for refrigerant piping, condensate drain, power wiring / communication cable bundling information.*

## Installer Setting Mode

Installer Setting Mode sets system functions. Only trained and licensed HVAC technicians should access / use the Installer Setting Mode. If any installation procedure or system change is performed by someone other than a trained and licensed HVAC technician, LG is not responsible for the results, and it will void the warranty.

**⚠WARNING**

*If the Installer Setting Mode(s) is (are) not set correctly, a system malfunction could cause fire, electrical shock, physical injury and / or death. See the Wired Controller and Central Controller Installation manuals for instructions on entering Installer Mode.*

**⚠NOTE**

*If the Installer Setting Mode(s) is (are) not set correctly, a system malfunction could cause product and / or property damage. See the Wired Controller and Central Controller Installation manuals for instructions on entering Installer Mode.*

## Installer Setting Modes

### Mode Override

Use Mode Override only with non-autochangeover heat pump models.

### Group Control

Use for group control. ⃠ Do not use this function if the system is not set up for group control.

***Note:***

*After setting Group Control, turn the power OFF, wait for one (1) minute, and then turn the power back on.*

### Auxiliary Heater

This function is only applicable to systems that have the auxiliary heater installed / activated.

## Setting the External Static Pressure (ESP)

### ⚠NOTE

- *The ESP must be set by a trained service provider.*
- *If the ESP is not set correctly, the system will malfunction.*

Use the external static pressure setting to determine air flow.

**Step 1.**

To enter the Installer Setting Mode, press the Up ▲ and Operation Mode (OPER MODE) buttons simultaneously for at least three (3) seconds.

**Step 2.**

Access the ESP setting mode by pressing the Operation mode (OPER MODE) button and choosing “03”.

**Step 3.**

Select the desired air flow rate by pressing the FAN SPEED button. SLo→Lo→Med→Hi→Po levels will appear. Change to different levels by pressing the FAN SPEED button.

**Step 4.**

Select the desired air flow rate value using the Temperature Up ( ▲ ) and Down (▼ ) buttons.

- ESP Range: 0 ~ 255
- The ESP value will appear at the upper right hand corner of the display.

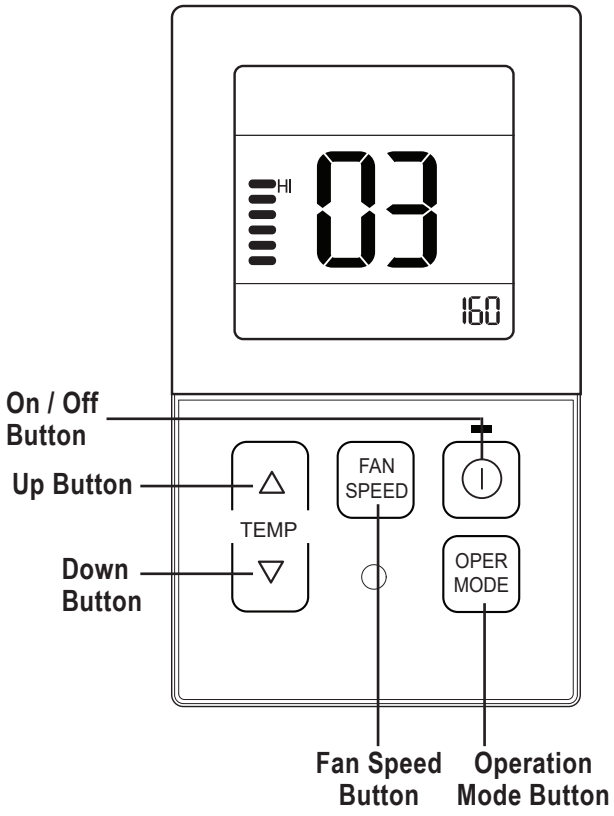
**Step 5.**

Press the On / Off button to save the ESP value for the chosen fan speed.

**Step 6.**

To release the Installer Setting Mode after all settings are complete, press the Up ▲ and Operation Mode (OPER MODE) buttons simultaneously for at least three (3) seconds. If input isn’t performed for more than 25 seconds, the Installer Setting Mode will be released automatically.

Figure 80: Using the Buttons on the Controller to Set ESP..




### *Note:*

*Consider the final pressure drop if a filter box is installed on the indoor unit. Adjust the air flow rate to compensate for the filter pressure drop.*

### *Note:*

- *External static pressure values vary according to the model.*
- *⃠ Do not alter the external static pressure value that corresponds to each airflow level.*
- *When the airflow rate is increased to a higher value, during the external static value setup, the previous airflow value will be stored in the system memory. (External static pressure values are saved to system memory before the changes are implemented).*

Table 22: Mid Static Ducted Indoor Unit 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 | 0.51 | 0.59 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model No. / Nominal Capacity of System (Btu/h) | Airflow Rate / CFM | | Setting Value (in. wg) | | | | | | | | | | |
| LHN098HV1 9,000 | High | 353.1 | 76 | 88 | 96 | 99 | 104 | 110 | 115 | 121 | 126 | 135 | 143 |
| | Mid | 317.8 | 72 | 82 | 92 | 95 | 100 | 106 | 111 | 117 | 121 | 131 | 139 |
| | Low | 282.5 | 68 | 78 | 88 | 91 | 96 | 102 | 107 | 113 | 117 | 127 | 135 |
| LHN128HV1 12,000 | High | 494.4 | 91 | 98 | 105 | 108 | 113 | 118 | 122 | 130 | 134 | 143 | 151 |
| | Mid | 423.8 | 82 | 92 | 100 | 103 | 108 | 114 | 118 | 126 | 130 | 139 | 147 |
| | Low | 353.1 | 76 | 88 | 96 | 99 | 104 | 110 | 114 | 121 | 126 | 135 | 143 |
| LHN188HV1 18,000 | High | 635.7 | 106 | 113 | 117 | 121 | 126 | 128 | 133 | 137 | 139 | 149 | 156 |
| | Mid | 529.7 | 94 | 102 | 108 | 109 | 115 | 119 | 122 | 130 | 134 | 145 | 152 |
| | Low | 423.8 | 82 | 92 | 100 | 103 | 108 | 114 | 118 | 126 | 130 | 139 | 147 |
| LHN248HV1 24,000 | High | 706.3 | 122 | 128 | 131 | 132 | 136 | 143 | 146 | 148 | 152 | 158 | 164 |
| | Mid | 547.4 | 103 | 110 | 114 | 117 | 121 | 127 | 130 | 135 | 138 | 145 | 154 |
| | Low | 459.1 | 93 | 100 | 105 | 109 | 114 | 118 | 122 | 128 | 131 | 139 | 146 |

## *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.*

## FC-15 (Thermo On / Off Differential)

Allows installer setting (field adjustment) of temperature targets. Use FC-15 in applications to overcome the height difference with indoor units installed high on the wall or in the ceiling.

Wired (FC-15) controllers can access the thermo on / off differential. Indoor unit logic must include the function to see the setting codes. If the function is visible, all sub-settings will display, even if the indoor unit logic is limited.

Table 23: Wired Controller Settings FC-15 Set Codes and Displays.

| Function | Code | Setting | | Step | Display |
|---|---|---|---|---|---|
| | | TH On | TH Off | | |
| Optional Heating Thermo On / Off | FC-15 | Default | | 0 | 15:00 |
| | | 7°F | 11°F | 1 | 15:01 |
| | | 4°F | 7°F | 2 | 15:02 |
| | | -2°F | 2°F | 3 | 15:03 |
| | | -1°F | 1°F | 4 | 15:04 |

### *Note:*

- *Indoor unit logic limits may prevent all sub-settings from being assignable.*
- *A sub-setting that isn't recognized by the indoor unit will revert to the default setting.*
- *The controller will display all sub-settings if the function is available for the indoor unit. Contact an LG Representative for details.*

## FC-35 (Thermo Off - Indoor Unit Fan Off)

Turns off the indoor unit fan during Thermo Off. Requires an LG wired controller to configure / set the installer code.

Table 24: Wired Controller Settings FC-35 Set Codes and Displays.

| Function | Code | Setting | Step | Display |
|---|---|---|---|---|
| Indoor Unit Fan Off During Thermo Off | FC-35 | Indoor Unit Default Airflow (Logic) | 0 | 35:00 |
| | | Indoor Unit Fan OFF | 1 | 35:01 |
| | | Setting Airflow | 2 | 35:02 |

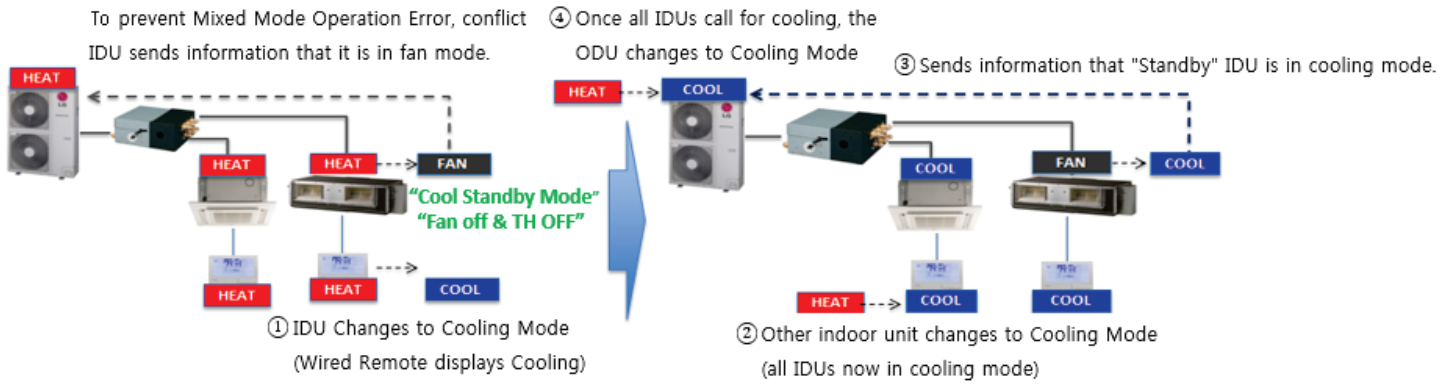
## FC-56 (Indoor Unit Standby Mode)

Multi F indoor units can be set to “Standby Mode” (installer setting) that adjusts the indoor unit mode to prevent a “mixed mode” error. During mixed operation, operation mode > standby function.

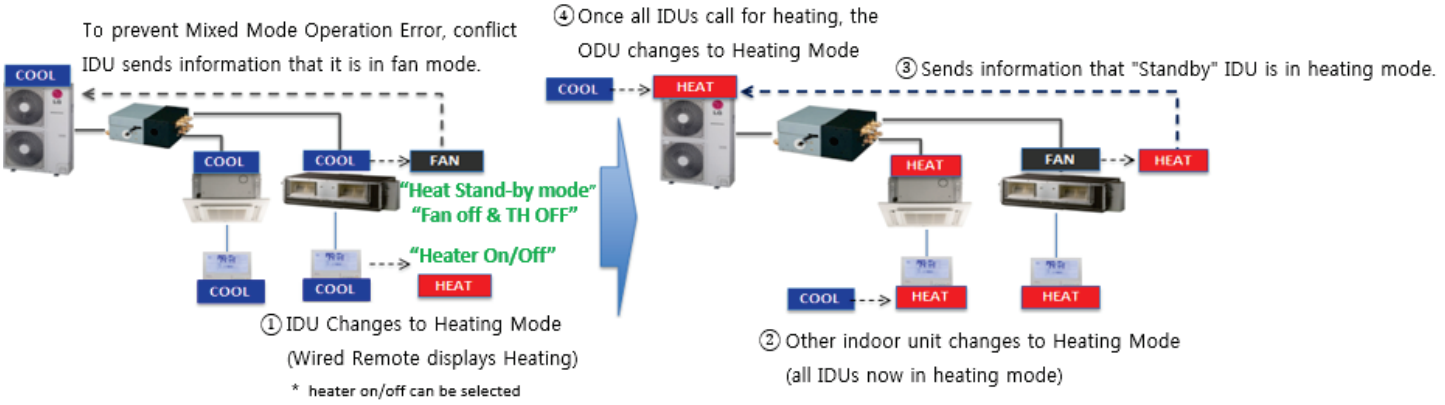
Table 25: Wired Controller Settings FC-56 Set Codes and Displays.

| Function | Code | Setting | Step | Display |
|---|---|---|---|---|
| Indoor Unit Standby Mode | FC-56 | Default (Off); Must assign installer setting | 0 | 56:00 |
| | | Function On | 1 | 56:01 |

1) During Heating operation




2) During Cooling operation



## LHN098-248HV1 Indoor Unit DIP Switch Settings

Indoor units feature optional modes that the service provider sets during installation by using the DIP switches.

Figure 81: Location of DIP Switch Bank on the Indoor Unit PCB.

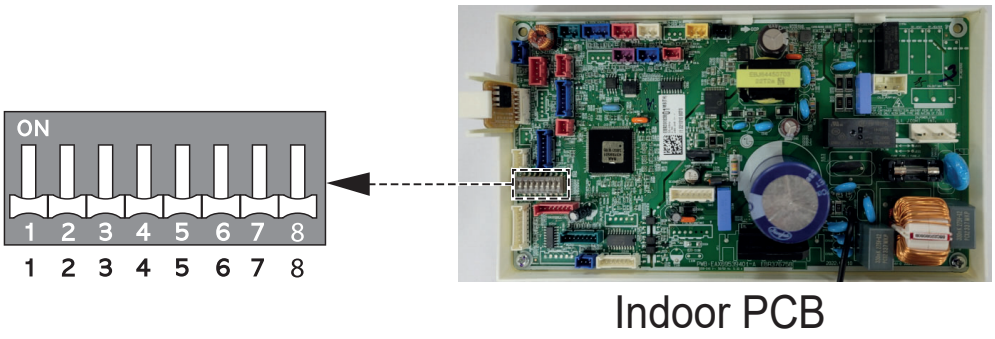



Figure 82: Mid-Static Ducted DIP Switch Settings.

| DIP Switch Setting | | Off | On | Description |
|---|---|---|---|---|
| SW3 | Group Control | Main | Sub | Group control setting using 7-Day Programmable Controller. Use to select Main / Sub for each indoor unit. |
| SW4 | Dry Contact Mode | Variable | Auto | Sets operation mode for optional Dry Contact accessory<br>1. Variable: Auto or Manual Mode can be set through 7-Day Programmable Controller or Wireless Remote Controller.<br>2. Auto: Factory default setting. |
| SW5 | Continuous Fan | Off | On | Selects continuous fan for ducted indoor units.<br>1. Off: Indoor unit fan speed can turn off and on.<br>2. On: Indoor unit fan will always operate at a set fan speed, except when the system is off, or the outdoor unit is in defrost mode. When the outdoor unit is in defrost mode, the fan will operate at super low fan speed. |

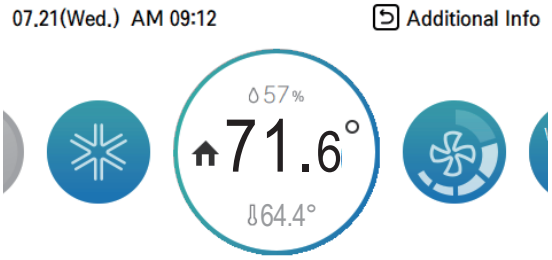
## Troubleshooting Using Error Codes

Refer to the tables below and on the next page for information on the error codes that are generated from the indoor and outdoor units. These codes are the most common that will manifest through these units. The system installed might generate additional codes not listed here. Contact an LG trained service provider if these types of errors are seen, and a simple power down and boot up has not corrected the issue. The end user should not attempt to fix the system.

### Error Codes

- Error codes indicate different types of unit failures, assist in self-diagnosis and to track the frequency of occurrence.
- Error codes are shown on the LEDs of indoor units, wired remote controller, the outdoor unit control board, and LG Monitoring View (LGMV) Diagnostic Software, depending on the system installed.
- If two or more errors occur simultaneously, the error code with the larger issue is displayed first.
- To resume system operation after an error code is resolved, cycle the power off, then back on.
- After error is resolved, the error code does not display.

Figure 83: Wired Remote Controller Display.




### Decoding the Error Display

The first and second number on the LED indicates error number. Example: 21 = LED1 2x blink, LED2 1x blink.

### Error Code Nomenclature Definitions

- MICOM: Non-volatile memory chip where unit setup information is stored.
- EEPROM: Non-volatile memory chip where device identification, size, and factory defined default component operating parameters are stored.

**⚠WARNING**

*If incorrect voltage is supplied, the protection circuit will turn the system off to prevent fire and / or electric shock, which will cause physical injury or death.*

## *Note:*

*If incorrect voltage is supplied, the protection circuit will turn the system off to prevent fire and / or electric shock. The system will automatically restart after three (3) minutes.*

Table 26: Mid-Static Ducted Indoor Unit Error Codes.

| Error Code | Description | Details | Indoor Unit Operation Status |
|---|---|---|---|
| 01 | Indoor Unit Room Air Temperature Room Sensor Error | Indoor unit air temperature sensor is disconnected, shorted, or opened. | Off |
| 02 | Indoor Unit Inlet Pipe Sensor Error | Indoor unit inlet pipe temperature sensor is disconnected, shorted, or opened. | Off |
| 03 | Remote Controller Error | Indoor unit PCB is not receiving a signal from the wired remote controller (if installed). | Off |
| 04 | Drain Pump Error | Drain pump malfunction. | Off |
| 05 | Communication Error Between Indoor Unit and Outdoor Unit | Indoor unit PCB is not receiving signal from outdoor unit. | Off |
| 06 | Indoor Unit Outlet Pipe Sensor Error | Indoor unit outlet pipe temperature sensor is disconnected, shorted, or opened. | Off |
| 09 | Indoor Unit EEPROM Error | Indoor unit EEPROM serial number marked on is 0 or FFFFFF. | Off |
| 10 | Indoor Unit BLDC Motor Fan Lock | Indoor unit fan motor connection is disconnected. Indoor unit fan motor lock has failed. | Off |

## Troubleshooting Using Error Codes - Continued

Table 27: Multi F / Multi F MAX (Standard or LGRED) Outdoor Unit Error Codes.

| Error Code | Description | No. of Times Outdoor Unit LEDs Blink | | Outdoor Operation Status |
|---|---|---|---|---|
| | | LED01 (Red) | LED02 (Green) | |
| 21 | DC Peak (IPM Fault); Compressor DC voltage was too high | 2X | 1X | OFF |
| 22 | Current Transformer2 (CT2) error; Alternating current (AC) input too high | 2X | 2X | OFF |
| 23 | DC Link Low Voltage (DC Link Voltage is <140VDC) | 2X | 3X | OFF |
| | DC Link High Voltage (DC Link Voltage is >420VDC) | | | |
| 25 | AC Low / High Voltage | 2X | 5X | OFF |
| 26 | DC Compressor Position Error (Compressor failed to start properly) | 2X | 6X | OFF |
| 27 | PSC / PFC Fault; Input current to inverter compressor PCB is too high | 2X | 7X | OFF |
| 29 | Current to inverter compressor is too high | 2X | 9X | OFF |
| 32 | Inverter compressor discharge pipe (D-Pipe) temperature is too high | 3X | 2X | OFF |
| 35 | Low Pressure Error; Pressure dropped below recommended limits | 3X | 5X | OFF |
| 39 | Communication Error between PFC MICOM and Inverter MICOM | 3X | 9X | OFF |
| 40 | CT Sensor Error; Thermistor is disconnected or has shorted out | 4X | - | OFF |
| 41 | Inverter compressor discharge pipe (D-Pipe) sensor is disconnected or has shorted out | 4X | 1X | OFF |
| 43 | High pressure sensor is disconnected or has shorted out | 4X | 3X | OFF |
| 44 | Outdoor air sensor is disconnected or has shorted out | 4X | 4X | OFF |
| 45 | Mid-pipe thermistor of outdoor unit condenser is disconnected or has shorted out | 4X | 5X | OFF |
| 46 | Outdoor unit suction piping thermistor is disconnected or has shorted out | 4X | 6X | OFF |
| 48 | Outlet piping (liquid) of condenser is disconnected or has shorted out | 4X | 8X | OFF |
| 51 | Combination ratio (capacity) is out of range; Total nominal indoor unit capacity is<50% or >130% of the outdoor unit capacity | 5X | 1X | OFF |
| 53 | Communication failure between outdoor unit and indoor unit(s) | 5X | 3X | OFF |
| 54 | Outdoor unit is not wired properly (ex: reversed phase) | 5X | 4X | OFF |
| 60 | Outdoor unit printed circuit board (PCB) EEPROM check sum error | 6X | - | OFF |
| 61 | Condenser coil thermistor temperature is too high | 6X | 1X | OFF |
| 62 | Outdoor unit inverter compressor PCB heat sink temperature is too high | 6X | 2X | OFF |
| 65 | Heat sink thermistor is disconnected or has shorted out | 6X | 5X | OFF |
| 67 | Outdoor unit brushless direct current (BLDC) fan motor lock error | 6X | 7X | OFF |
| 73 | Outdoor unit PFC overcurrent (peak) error | 7X | 3X | OFF |

**Refer to Service Manuals posted on www.lghvac.com for a full description of all error codes and workarounds.**

# INSTALLATION CHECKLIST

MULTI F
MULTI F MAX



System ID No.: _____ Indoor Unit ID.: _____

Checked by: _____ Date:_____ Signature:_____



### Major Component Rough-In

| Description | Check |
|---|---|
| The unit was connected properly per local code and the product installation procedures. | |
| All literature and bagged accessories have been removed from the fan discharge (ducted and cassette model indoor units). | |
| All indoor units and branch distribution unit(s) (Multi F MAX only, Standard or LGRED) are installed, properly supported, and located indoors in a non-corrosive environment. | |

### Piping Material, Components, and Insulation

| Description | Check |
|---|---|
| Multi-zone duct-free split systems: ACR copper piping rated at the system working pressure was used. | |
| LG Y-branch fitting was used per manufacturer's recommendations. | |
| All refrigerant pipes and valves were insulated separately. Insulation is positioned up against the walls of the indoor units and branch distribution units (Multi F MAX only, Standard or LGRED). No gaps shown. Insulation was not compressed at clamps and hangers. | |

### Brazing Practices

| Description | Check |
|---|---|
| Use medical grade dry nitrogen for purging during brazing (constant 3 psig while brazing). | |
| 15% silver brazing material only. | |

### Refrigerant Piping

| Description | Check |
|---|---|
| You must have in your possession a copy of the "As-Designed" LATS piping tree diagram. BEFORE ANY FIELD PIPE SIZE OR LENGTH CHANGES ARE MADE, PROPOSED CHANGES MUST BE FORWARDED TO THE DESIGN ENGINEER SO THAT THEY CAN INPUT THE CHANGES INTO LATS and RE-ISSUE A NEW LATS MULTI F PIPING TREE DIAGRAM. Installer must receive change authorization from the design engineer, because any change made requires the review of the entire tree diagram and verification that the change did not impact the size of piping segments in other parts of the system. | |
| All pipe materials were properly stored, capped, and clean. All burrs were removed after cutting and pipe ends were reamed before brazing. | |
| During refrigerant pipe installation, for each segment of pipe, a record was made of the pipe length (including expansion loops, offsets, double-back sections), and sizes, as well as the quantity and type of elbows used. | |
| Expansion loops, coils or other acceptable measures are provided where necessary to absorb temperature-change based pipe movement. | |
| A torque wrench and backup wrench were used to tighten all flare connections. | |
| The back side of all flares were lubricated with a small drop of PVE refrigeration oil before tightening flare fittings. | |
| Ensure all field made flares are 45°. Use factory-supplied flare nuts only. | |
| Pipe segments and Y-branch fittings are secured to the structure using a combination of fixed and floating clamps, and all wall penetrations were sleeved. | |
| Pipe insulation was not compressed at any point. | |
| Y-branch fittings were properly INSTALLED per details provided in the Multi F / Multi F MAX (Standard or LGRED) Outdoor Unit Installation Manual. | |
| Y-branch fittings were properly SUPPORTED per details provided in the Multi F / Multi F MAX (Standard or LGRED) Outdoor Unit Installation Manual. | |
| No oil traps, solenoid valves, sight glasses, filter driers, or any other unauthorized refrigerant specialties were present. | |
| (Optional) R410A rated full port ball valves were used at all indoor units and wherever appropriate in the refrigerant piping network. | |





LG

# INSTALLATION CHECKLIST



System ID No.: _____ Indoor Unit ID.: _____

Checked by: _____ Date:_____ Signature:_____

## Condensate Pump / Drain Installation

| Description | Check |
|---|---|
| Condensate piping installed correctly on indoor units. Material used is acceptable under local code. Insulated as necessary to prevent condensation. | |
| All condensate vertical risers are equal to or less than 27-9/16" from the bottom of the indoor unit. | |
| Indoor units with condensate pumps were level. Units with gravity drains were level or slightly canted toward the drain connection and are supported properly. Pumped condensate drain lines were properly connected (no traps, and connect to the top surface of the main drain line). | |
| Multi F / Multi F MAX (Standard or LGRED) outdoor unit gravity condensate drain line was connected and routed where it properly drains away or, if installed in a mechanical room, was connected and properly routed to a drain terminal. | |
| All condensate lines were properly insulated to prevent condensation. | |

## Power Wire and Communications Cables

| Description | Check |
|---|---|
| Ground wire was installed and properly terminated at the unit. | |
| Power wiring was connected to a single phase 208-230V source. | |
| Ground wire was installed and properly terminated at the unit. | |
| The power supplied was clean with voltage fluctuations within specifications. (±10% of nameplate). | |
| Power wiring to the Multi F / Multi F MAX (Standard or LGRED) outdoor unit was field supplied, solid or stranded, and installed per all local, state, and NEC requirements. | |
| For Multi F Systems (Standard or LGRED)<br>• Communication / connection (power) wiring from the outdoor unit to the indoor unit is minimum 14 gauge, four-conductor, stranded, shielded or unshielded. If shielded, must be grounded to chassis at the outdoor unit only.<br>• 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. | |
| For Multi F MAX (Standard or LGRED) Systems<br>All power wiring / communication cable to be minimum 14 AWG from the Multi F MAX outdoor unit to the BD 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.<br>• Communication / connection (power) wiring from the BD unit to the indoor unit is minimum 14 gauge, four-conductor, stranded, shielded or unshielded. If shielded, must be grounded to chassis at the BD unit only.<br>• 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. | |
| Power wiring to the outdoor unit and communication / connection (power) cable from the outdoor unit to the indoor units or branch distribution units (Multi F MAX only, Standard or LGRED) were separated per manufacturer's guidelines. These cannot be run in the same conduit. | |
| Communications / connection (power) cable were run in the same conduit (outdoor unit to indoor unit or branch distribution unit [Multi F MAX only, Standard or LGRED) as provided in the product installation manual. | |
| Proper communications cable was used between each indoor unit and its zone controller where applicable. No cables were spliced and no wire nuts are present. | |
| Communication type RS-485–BUS type. | |
| Used appropriate crimping tool to attach ring or fork terminals at all power wiring and control cable terminations. | |
| Only LG-supplied Y-cables were used between grouped indoor units, if applicable. | |

For further technical materials such as submittals, engineering manuals, service manuals, and catalogs, visit www.lghvac.com.

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