



## Single Zone Outdoor Unit System Install Tips

The following pages present an overview of single zone air-source system installation concepts, and is intended to supplement the technical and installation information provided with each product and through [www.lghvac.com](http://www.lghvac.com). The review of basic operation and maintenance skills must reinforce industry established practices and provide helpful tips to make equipment operation successful.

### Note:

⊘ *The installation guide is NOT intended to be a replacement for LG installation manuals, nor is it intended to cover ALL the logistics of operating and maintenance of LG systems. For detailed information on the procedures mentioned here, refer to the installation manual specific to your product. Always comply with applicable local, state, and federal codes.*

### Safety Instructions - Installation

#### ⚠ DANGER

⊘ Do not store or use flammable gas or combustibles near the unit.  
*There is risk of fire, explosion, and physical injury or death.*

#### ⚠ WARNING

An authorized, trained technician licensed locally and at the state level must install the unit.  
*Improper installation by the user may result in fire, explosion, electric shock, physical injury or death.*

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

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

### Note:

⊘ Do not install the product where it is exposed directly to ocean winds.  
*Sea salt in the air may cause the product to corrode. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.*

Properly insulate all cold surfaces to prevent "sweating."  
*Cold surfaces such as uninsulated piping can generate condensate that may drip and cause a slippery surface condition and / or water damage to interior surfaces.*

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

#### ⚠ CAUTION

Be very careful when transporting the product. There is a risk of the product falling and causing physical injury.  
*Use appropriate moving equipment to transport each frame; ensure the equipment is capable of supporting the weight of the equipment.*

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

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

⊘ Do not make refrigerant substitutions. Use R-410A only.  
*If a different refrigerant is used, or air mixes with original refrigerant, the unit will malfunction and be damaged.*

Keep the unit upright during installation to avoid vibration or water leakage.

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

⊘ Do not install the outdoor unit in a noise-sensitive area. Periodically check that the outdoor frame is not damaged.  
*There is a risk of equipment damage.*

Install the unit in a safe location where nobody can step on or fall onto it. ⊘ Do not install the unit on a defective stand.  
*It may result in an accident that causes physical injury or death.*

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

Install the unit in a safe location where nobody can step on or fall onto it. ⊘ Do not install the unit on a defective stand.  
*There is a risk of unit and property damage.*

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

⊘ Do not store or use flammable gas / combustibles near the unit.  
*There is a risk of product failure.*

### Safety Instructions - Wiring

#### ⚠ DANGER

High voltage electricity is required to operate this system. Adhere to the U.S. National Electric Code (NEC) and these instructions when wiring.  
*Improper connections and inadequate grounding can cause accidental injury or death.*

#### ⚠ WARNING

The information contained in this manual is intended for use by an industry-qualified, experienced, certified electrician familiar with the 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.*

Refer to local, state, and federal codes, and use power wires of sufficient current capacity and rating.  
*Wires that are too small may generate heat and cause a fire.*

### Note:

⊘ Do not supply power to the unit until all electrical wiring, controls wiring, piping, installation, and refrigerant system evacuation are completed.

Always ground the unit following local, state, and NEC codes.  
*There is risk of fire, electric shock, and physical 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 NEC, and the instructions given in this manual.  
*If the power source capacity is inadequate or the electric work is not performed properly, it may result in fire, electric shock, physical injury or death.*

Secure all field wiring connections with appropriate wire strain relief.  
*Improperly securing wires will create undue stress on equipment power lugs. Inadequate connections may generate heat, cause a fire and physical injury or death.*

Properly size all circuit breakers or fuses.  
*There is risk of fire, electric shock, explosion, physical injury or death.*

Properly tighten all power lugs.  
*Loose wiring may overheat at connection points, causing a fire, physical injury or death.*

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

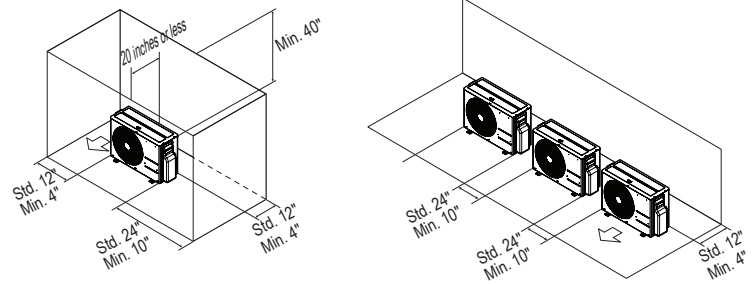
## Clearances

LG Single Zone air-source units are engineered to be installed outdoors. These outdoor units require sufficient space to ensure proper airflow, operation, and maintenance / service access. When installing outdoor units, allowable service, inlet, outlet, and space requirements **MUST** be considered. If the installation space is too tight around the outdoor units, then the system will not operate properly and it will be difficult to service. Figures below illustrate clearance requirements for various installation scenarios for single and dual fan outdoor units.

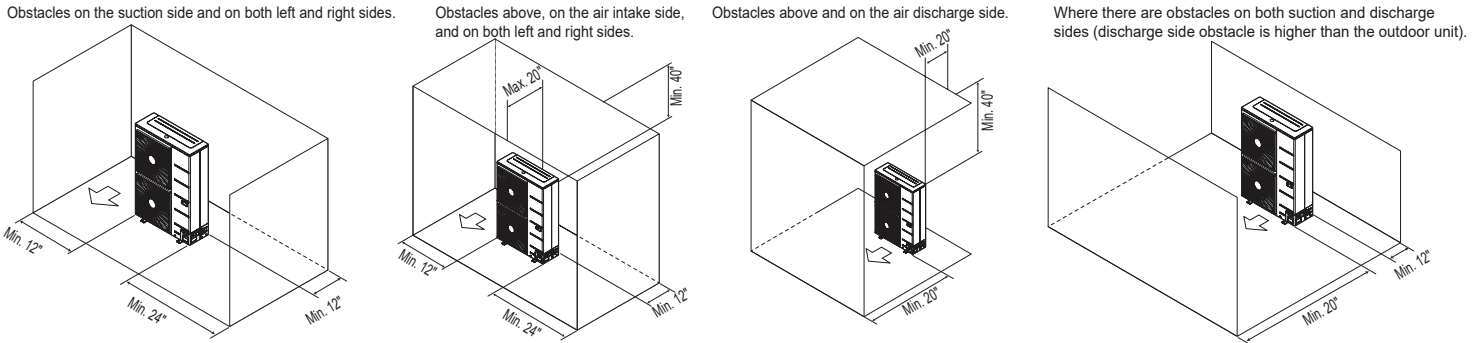
### Other Outdoor Unit Placement Considerations:

- Noise (Operational and Electrical)
- Site Occupants
- Good Drainage for Condensate, etc.
- Account for Snow Fall Levels
- Prevailing Winds
- Oceanside Applications (Install the outdoor unit on the side of the building opposite from direct ocean winds. If such an installation is not possible, then install a concrete windbreaker.)

### Single Fan Outdoor Unit Service Access and Allowable Clearances.

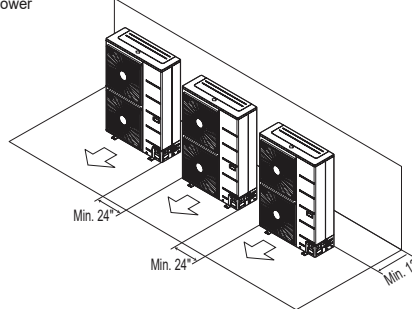


### Dual Fan Outdoor Unit Service Access and Allowable Clearances.

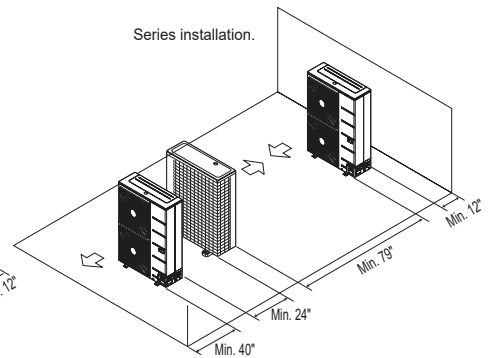


Where there are obstacles above, and on both suction and discharge sides (discharge side obstacle is lower than the outdoor unit).

### Side-by-side series installation.

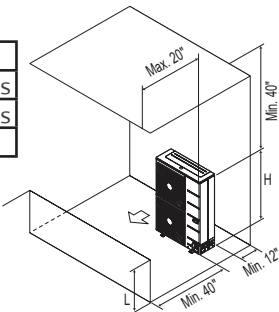


### Series installation.



### Ratio among H, A, and L.

	L	A
$L \leq H$	$0 < L \leq 1/2 H$	30 inches
	$1/2 H < L$	40 inches
$H < L$	Set Stand as: $L \leq H$	



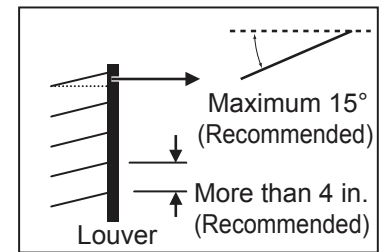
**Note:**  
**"L" must be lower than "H". If a stand is necessary, it must be contained (not open frame) to prevent the discharge air from short cycling.**

If placement options are limited because of a lack of ground space, roof space, a location that meets design requirements, on retrofit projects where an equipment / mechanical room already exists, then the outdoor unit **MAY** be installed in an interior space **ONLY IF** specific conditions are fulfilled. For example, if the single zone outdoor unit is to be installed in an enclosure, it must have certain design specifications:

### Louver Recommendations for Outdoor Unit Enclosures

- Enclosure is a Manual Door Open Type.
- Louver Angle: No More Than 15° Horizontally.
- Space Between Louvers : More than 4 inches (Recommend).
- Louver Shape: Wing or Plane Type. ⊙ Do not use "S" type louvers.
- Open Rate, Inlet, Outlet, Air Flow Rate, and Total Opening Rate must be taken into consideration.

### Louver Recommendations.



### Note:

- **If the rules for installing single zone outdoor units (either outside or inside) are not followed correctly, a drop in outdoor unit fan performance and / or noise can occur, or if there is insufficient air flow exchange, the system could stop operating.**
- **All dimensions are minimum clearances considering airflow only. Increase as necessary for NEC or other code compliance.**
- **If the installation scenario varies in any way from the samples provided here or in the complete installation manual, contact an LG representative for guidance.**

## Mounting Options

After an installation area for the outdoor unit(s) is chosen, verify:

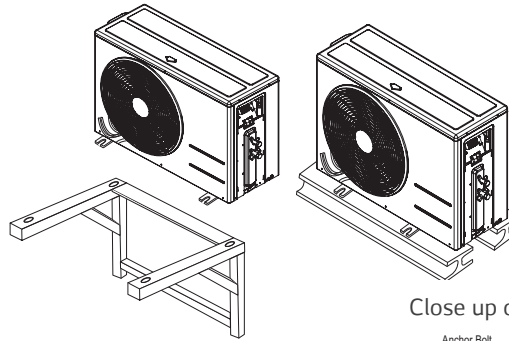
- The floor surface / chosen location has enough strength to support the weight of the unit(s) and base.
- There is enough space for piping and wiring.
- The area has sufficient slope for drainage around the foundation to ensure condensate thoroughly flows away from the outdoor unit condensate drain connection(s) to a drain (if present).
- Run-off from defrost mode will not accumulate and freeze on sidewalks or driveways.
- ⊙ Avoid placing the unit(s) in a low-lying area where water may accumulate.
- If installing the outdoor unit on a roof, check the strength of the roof.
- When installing on a wall (with field-supplied brackets), roof, or rooftop, securely anchor the mounting platform with nails and / or wiring, taking into consideration the possibility of strong winds or earthquakes.

## Mounting Options - continued

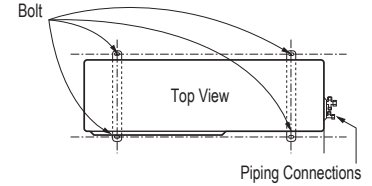
### Outdoor Unit Raised Platform

- Securely attach the outdoor unit to a condenser pad, base rails, or a mounting platform that is solidly anchored to the ground or building structure.
- When installing the outdoor unit on the wall or roof top, securely anchor the mounting base to account for wind, earthquakes, or vibration.
- When installing on a wall (with field-supplied brackets), roof, or rooftop, securely anchor the mounting platform with nails, taking into consideration the possibility of strong winds or earthquakes.
- If there is a possibility of vibration from the outdoor unit transmitting to the building, add an anti-vibration material.

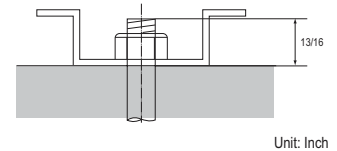
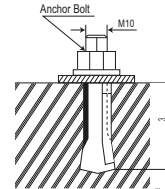
Wall Mounting Example.



Bolting the Outdoor Unit to the Platform (Piping Location May Differ Depending on Outdoor Unit Model).



Close up of a Bolt Attachment.



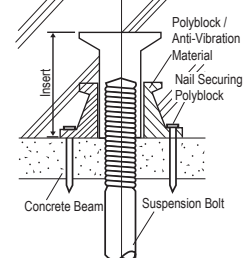
### Outdoor Unit Platform Concrete Specifications

- Concrete foundations must be made of one part cement, two parts sand, and four parts gravel.
- The surface of the foundation must be finished with mortar with rounded edges, and weatherproofed.
- Ensure that the concrete platform will not degrade easily, and has enough strength to bear the weight of the unit.
- Concrete height must be a minimum of four (4) to eight (8) inches high, depending on the outdoor unit.

### Bolting the Outdoor Unit

- All four corners of the outdoor unit must be supported properly, and securely fastened.
- Include an H-beam support. Attach the corners firmly, otherwise the support will bend.
- If not otherwise directed by a structural engineer or local codes, use a M10J bolt inserted at least three (3) inches deep into the supports. Tightly anchor the outdoor unit with the bolt and a hexagon nut.
- If there is a possibility of vibration from the outdoor unit transmitting to the building, add an anti-vibration material to the platform.
- Seal all wiring and piping access holes with field-supplied sealing material to prevent animals and insects from entering the unit.

Example of Using an Insert for a Hole in a Reinforced Concrete Beam.



## Tools

Verify the tools listed below are available for use at the installation site:

- |   |   |   |   |
|---|---|---|---|
| <ul style="list-style-type: none"> <li>Screw Drivers (JIS for terminal screws, Flat, Phillips)</li> <li>Pliers</li> <li>Wire Strippers, Cutters, and Crimpers</li> <li>Hammer</li> <li>Adjustable Wrenches</li> <li>Drill and Bits</li> <li>Hole Saw</li> </ul> | <ul style="list-style-type: none"> <li>Utility Knife</li> <li>Drop Cloth</li> <li>Pipe Cutter / Reamer</li> <li>Acetylene Brazing Outfit</li> <li>Brazing Material —15% silver only</li> <li>Digital Multimeter and Amp Clamp</li> <li>R-410A Flaring Tool</li> </ul> | <ul style="list-style-type: none"> <li>Torque Wrench Set</li> <li>Dedicated R-410A Refrigerant Manifold Gauge</li> <li>Dedicated 5/16" Premium Hoses</li> <li>Nitrogen regulator (for 550# test)</li> <li>1/4" to 5/16" Hose Adapters (if needed)</li> <li>Nitrogen Tank</li> </ul> | <ul style="list-style-type: none"> <li>Electronic Leak Detector</li> <li>5/16" Schrader Core Removal Tool</li> <li>Vacuum Micron Gauge</li> <li>Good Quality Digital Charging Scale</li> <li>Vacuum Pump and Fresh Oil</li> <li>Refrigerant Recovery Unit and Tank</li> </ul> |
|---|---|---|---|

## Piping

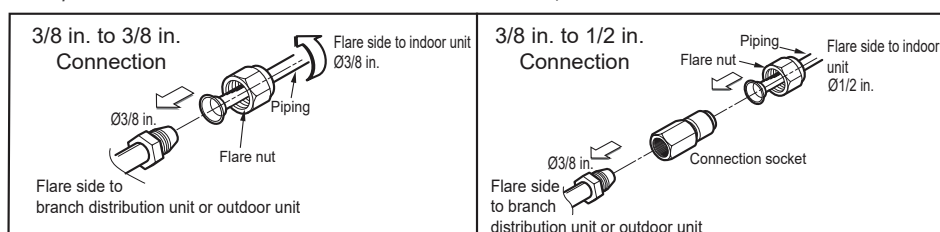
### Single Zone System Piping

Single zone outdoor units have two (one vapor and one liquid) flare-type piping connections. Field-installed piping directly links the outdoor unit connections to one indoor unit.

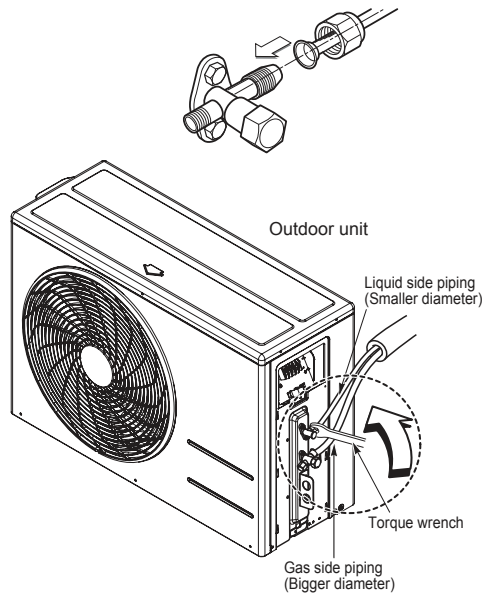
Depending on the indoor unit piping size, connection sockets (included as factory-supplied accessories with the indoor units) may need to be used.

Field piping for dual fan outdoor units can be installed in one of four directions: front, rear, right, and bottom. Whatever direction is chosen, plug the access holes with field-provided putty or insulation to fill all gaps. If the piping is installed in the bottom direction, the access hole of the base pan must be knocked out before piping work begins.

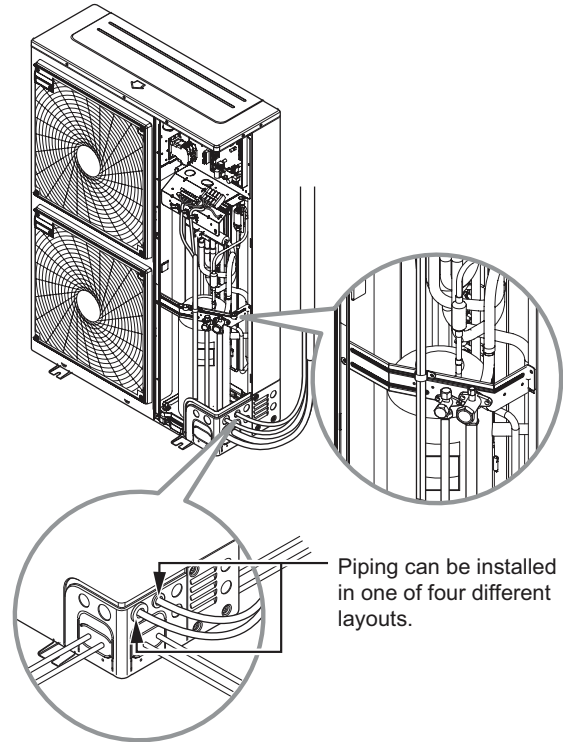
Example of Outdoor Unit to Indoor Unit Connections (With and Without Connection Socket).



Typical Single Fan ODU Piping Connections



Typical Dual Fan ODU Piping Connections



### Piping Selection

ACR-rated, seamless phosphorous deoxidized copper (UNS C12200 DHP class) rated at the system working pressure is the only approved refrigerant pipe material for LG single zone products. Approved piping will be marked "R-410A rated" along the length of the tube.

### Note:

• **Wall thickness must meet local code requirements and be approved for a maximum operating pressure of 551 psi.**

• **LG recommends soft copper use to be limited to 1/2 inches. Use hard drawn for larger sizes to avoid sags and kinks that lead to oil trapping.**

### Handling the Piping

To avoid operation failure, the single zone system CANNOT have contaminants or moisture in the piping network. Piping must be kept clean, dry, and air tight. Commercially available piping, however, often contains dust and other materials. Clean it with a dry inert gas, and keep it capped until ready for installation. While installing, prevent dust, water, or other contaminants from entering the piping. When cutting the piping, hold it so copper shavings do not fall into it, and properly remove all burrs with a de-burring tool. Ream all piping to its full inside diameter; correctly reamed piping will provide an excellent surface for a tight seal.

When bending piping, try to keep the number of bends to a minimum, and use the largest radius possible to reduce the equivalent length of installed pipe. If an obstacle is in the path of the planned refrigerant pipe run, it is preferable to route the pipe over the obstacle, with the length of the horizontal section of pipe above or below the obstacle be a minimum of three (3) times the longest vertical rise (or fall) at either end of the segment.

### Piping Expansion

Under normal operating conditions, the vapor pipe temperature of a single zone system can vary as much as 180°F. With this large variance in pipe temperature, the designer must consider pipe expansion and contraction to avoid pipe and fitting fatigue failures. When a segment of pipe is mounted between two fixed points, provisions must be provided to allow pipe expansion to naturally occur, generally by expansion Loops or U-bends.

### Flaring the Piping

When flaring the piping, use a dedicated R-410A flaring tool; use only synthetic oil between the nut and the flare (not inside the piping) to achieve correct torque and prevent leaks. Flares must be deeper to handle the higher pressures of R-410A. When brazing the piping, always use 15% silver braze and a nitrogen purge. Similar to piping medical gas, flow the nitrogen through the piping at 1 to 3 psig to prevent oxidation.

Proper R-410A Flare.



### Piping Supports

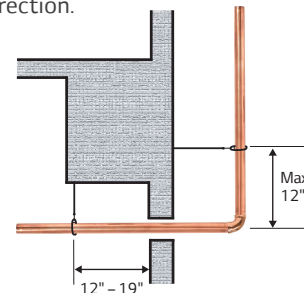
A properly installed piping system is adequately supported to avoid piping sags (sagging pipes become oil traps that lead to equipment malfunction). Field-provided piping supports must be designed to meet local codes. As necessary, place supports closer for segments where sagging could potentially occur. Maximum spacing of pipe supports must meet local codes, but if there are no specifications in the local codes, then the piping must be supported:

- Minimum of 20 inches recommended between long radius 90 degree elbows, and between the Y-branch and the branch distribution unit.
- Maximum 5 feet on center for straight segments of pipe up to 3/4 inches outside dia. size.
- Maximum of 6 feet on center for pipe up to 1 inch outside diameter size.
- Wherever the pipe changes direction, place a hanger within 12 inches on one side and within 12 to 19 inches of the bend on the other side.

Examples of Piping Supports.



Rule for Changes in Piping Direction.



### Piping Insulation

ALL piping and piping connections in a single zone system must be insulated; a minimum 1/2 inch wall, closed cell with vapor barrier insulation is recommended (follow all local, state, and national requirements). Insulate all piping separately. If improperly insulated, condensate may form on the outside of the piping and water damage within building may occur, the single zone system will lose capacity, or heat may move from the single zone system to the surrounding air.

## Wiring

### ⚠ WARNING

- **All power wiring and communication cable installation must be performed by authorized service providers working in accordance with local, state, and NEC regulations.**
- **Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations. Using inappropriately sized electrical components may result in electric shock, physical injury, or death.**
- **Properly ground the outdoor units.** Ⓣ 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 an NEC approved earth ground can result in electric shock, physical injury or death.
- **Properly terminate all wiring. If wires are not properly terminated and attached, there is risk of fire, electric shock, and physical injury or death.**

### Power Wiring and Communication / Connection (Power) Cable Specifications

Single zone outdoor units operate at 1Ø, 208-230V, 60Hz, and power is wired to the outdoor unit only. The outdoor unit supplies power to the indoor unit through the communication / power cable.

Power supply to the outdoor unit must be selected based on NEC and local codes. Maximum allowable voltage fluctuation  $\pm 10\%$  of nameplate rated value. Wiring must be solid or stranded, and must comply with all local and national electrical codes. Properly ground the outdoor unit per NEC and local codes.

The communication / power cable from the outdoor unit to the indoor unit must be a minimum of 18 AWG, four (4) conductor, stranded, shielded or unshielded.

If the communication / power cable from the outdoor unit to the indoor unit is longer than 130 feet, use two separate two conductor cables, one for communication and one for power. These cables must be separated by at least two inches all along their run.

### Note:

- **Ensure the power wiring / communication cable shield (if shielded) from the outdoor unit to the indoor unit is properly grounded to the outdoor unit chassis only.** Ⓣ Do not ground at any other point. Wiring must comply with all applicable local and national codes.
- **Use a conduit for the communications / connection (power) cable from the outdoor unit to the indoor unit. Electrical interference may cause product malfunction.**
- **The communications / power cable from the outdoor unit to the indoor unit 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 may cause product malfunction.**

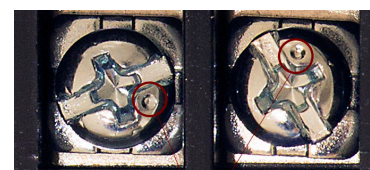
### Wiring Connections

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. Use a solderless ring or fork connection when possible. Ⓣ Do not over tighten the connections — over tightening may damage the terminals — but firmly and securely attach the wiring in a way to prevent external forces from being imparted on the terminal block.

### 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."**
- Ⓣ Do not include splices or wire nuts in the communication cable.

JIS Screws.



JIS DIMPLES

**Perform Triple Leak / Pressure Check**

After the refrigerant piping installation is complete, perform a triple leak / pressure test to check for leaks at any joints or connections within the piping system. Perform the Triple / Leak Pressure Check with only the piping system and indoor unit. Use medical grade dry nitrogen.

**Triple Leak / Pressure Procedure**

- Step 1: Perform the leak / pressure check at 150 psig for fifteen (15) minutes (standing pressure check).
- Step 2: Perform the leak / pressure check at 300 psig for thirty (30) minutes (standing pressure check).
- Step 3: Perform the leak / pressure check at 550 psig for one (1) hour to make sure the piping system is leak-free. After the gauge reading reaches 550 psig, isolate the system by first closing the gauge manifold, then close the nitrogen cylinder valve. Check the flared (and any

brazed connections) for leaks by applying a bubble solution to all joints. Step 4: If the pressure does NOT drop for one (1) hour, the system passes the test.

Step 5: If the pressure drops, there is a leak and it must be found. Remove the bubble solution with a clean cloth, repair the leak(s), and perform the leak / pressure check again.

**Perform Deep Evacuation**

After the leak / pressure check is complete, the deep evacuation procedure must be performed.

**Deep Evacuation Procedure**

- Step 1: Evacuate to static micron level  $\leq 500$  for at least one (1) hour.
- Step 2: Micron level must remain  $\leq 500$  for two (2) hours. If the vacuum gauge rises and stops, the system may contain moisture; therefore, it will be necessary to repeat the steps of vacuum break and drying.
- Step 3: After maintaining the system in vacuum for two (2) hours,

check if the vacuum gauge rises or not. If it doesn't rise, then the system is properly evacuated.

**Triple Evacuation Procedure**

After the leak / pressure check is complete, the triple evacuation procedure must be performed. Ⓞ Do not perform just the deep evacuation procedure. The deep evacuation procedure is insufficient to fully evacuate the piping system.

**Triple Evacuation Procedure Steps**

- Step 1: Operate the vacuum pump and evacuate the system to the 2,000 micron level. Isolate the pump, and then watch the micron level.
  - If the micron level DOES NOT stop rising, there is a leak.
  - If the micron level DOES rise above 2,000 micron, re-open the manifold gauges and the vacuum pump valve and continue evacuation back down to 2,000 micron level.
  - If the micron level holds at 2,000 micron, continue to the next step.
- Step 2: Break vacuum with 50 psig nitrogen purge for an appropriate amount of time (this is to "sweep" moisture from piping).
- Step 3: Purge nitrogen from the system until the pressure drops down to 1 to 3 psig.
- Step 4: Evacuate to 1,000 micron level. Isolate the pump and then watch the micron level.
  - If the micron level DOES NOT stop rising, there is a leak.

- If the micron level DOES rise above 1,000 micron, re-open the manifold gauges and the vacuum pump valve, and continue evacuation back down to 1,000 micron level.
- If the micron level holds at 1,000 micron, continue to the next step.

Step 5: Break vacuum with 50 psig nitrogen purge for an appropriate amount of time.

Step 6: Purge nitrogen from the system until the pressure drops down to 1 to 3 psig.

Step 7: Evacuate to static micron level  $\leq 500$  for at least one (1) hour. Step 8: Micron level must remain  $\leq 500$  for two (2) hours. If the vacuum gauge rises and stops, the system may contain moisture; therefore, it will be necessary to repeat the steps of vacuum break and drying.

**Test Run**

After the triple leak / pressure and evacuation procedures are complete, perform a test run.

**Before the Test Run**

1. Check that all condensate tubing, refrigerant piping and power wiring, and communication / connection (power) cables are properly connected.
2. Make sure that the gas and liquid service valves are fully open.

**Test Run Procedure**

3. Operate the system in cooling mode for 15 to 20 minutes.
4. Evaluate performance as the system runs, verifying the outdoor unit and indoor unit are working properly. Make notes as needed to address any issues that might be found.
  - Check the system refrigerant charge:
    - Measure the pressure from the gas side service valve.
    - Measure the indoor unit inlet and outlet air temperatures. Verify the difference between the intake temperature and the discharge is more than 15°F.
    - See table below for the optimum condition of the gas side pressure (again, system is in cooling mode).

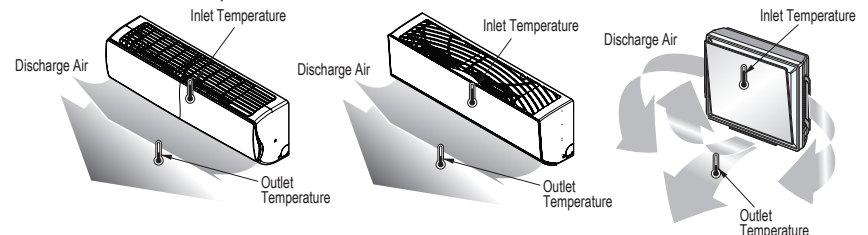
Optimum Conditions of the Gas Side Pressure.

Refrigerant Type	Outside Ambient Temperature	Gas Side Service Valve Pressure
R410A	95°F	120~135 psig

**Note:**

*If the pressure is > 135 psig, the system is most likely overcharged, and refrigerant must be removed. If the pressure is < 120 psig, the system is most likely undercharged and refrigerant must be added.*

Inlet and Outlet Temperature Locations on Various Indoor Units.



**Refrigerant Charge**

Single zone outdoor units ship from the factory with a charge of R410A refrigerant. A trim charge may need to be added to take into account additional piping length. To find the R410A factory charge of the outdoor unit, see the unit's nameplate.

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

**Installing the Remote Controller Batteries**

As part of the test run, two (2) AAA (1.5V) batteries need to be inserted into the optional remote controller, and the remote controller may need to be powered on to operate the indoor unit (depending on the indoor unit included in the system). For information on using the optional remote controller, refer to its owner's manual.

**Optional Modes**

The outdoor units include optional functions such as mode locks for cooling and heating, night quiet modes, and others. The modes are set by powering off the system, setting the applicable DIP switches on the PCB of the outdoor unit, and then turning the power back on. These modes must only be set by an authorized, trained and licensed technician during the installation process. For a complete list of optional modes that are available for specific outdoor units, and the detailed procedures necessary to properly set the modes, see the complete Installation Manual for the unit.

**⚠ WARNING**

*The circuit breaker must be turned off or the power source of the product must be shut off before setting the DIP switch. There is risk of physical injury or death due to electric shock.*

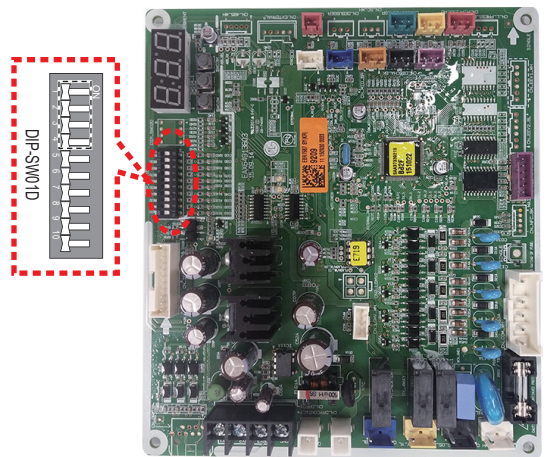
**Note:**

- *Unless the applicable DIP switch is set properly, the system may not work.*
- *If a specific function is desired, request that the installer set the appropriate DIP switch during installation.*

**Note:**

*LGMV monitoring software is encouraged for use in future diagnostic and maintenance related checks.*

Location of the Outdoor Unit DIP Switch Example. (Appearances May Differ Depending on Model).



## Installation Checklist

### Major Component Rough-In

Description	Check
Single zone outdoor 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).	
Indoor unit is installed, properly supported, and located indoors in a non-corrosive environment.	
Duct work installation completed (ducted indoor units only).	

### Piping Material, Components, and Insulation

Description	Check
ACR copper piping rated at the system working pressure was used.	
All refrigerant pipes and valves were insulated separately. Insulation is positioned up against the walls of the indoor unit. 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 Design and System

Description	Check
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 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.	
No oil traps, solenoid valves, sight glasses, filter driers, or any other unauthorized refrigerant specialties were present.	
(Optional) High quality R-410A rated full port ball valves (Schrader between the valve body and the indoor units) used at the indoor unit.	
Best practice includes a minimum of 20 inches of straight pipe was installed between long radius 90 degree elbows.	

### Condensate Pump / Drain Installation

Description	Check
Condensate piping installed correctly on indoor unit. Material used is acceptable under local code. Insulated as necessary to prevent condensation.	
All condensate vertical risers are equal to or less than 27-1/2 inches 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 (do not have traps, and connect to the top surface of the main drain line).	
All condensate lines were properly insulated to prevent condensation.	
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.	



**Installation Checklist, continued**

**Power Wire and Communications Cables**

Description	Check
Ground wire was installed and properly terminated at the outdoor unit.	
Power wiring was connected to a single phase 208-230V source.	
The power supplied was clean with voltage fluctuations within specifications ( $\pm 10\%$ of nameplate).	
Power wiring to the outdoor unit was field supplied, solid or stranded, and installed per all local, state, and NEC requirements.	
All communications / power cable from the outdoor unit to the indoor unit is minimum four conductor, 18 AWG 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.	
Power wiring to the outdoor unit and communication / power cable from the outdoor unit to the indoor unit were separated per manufacturer's guidelines. These cannot be run in the same conduit.	
If communication / power cable from the outdoor unit to the indoor unit is over 130 feet, use two cables; one two-conductor cable for communication and one two conductor cable for power. Separate these cables by at least two inches over the course of the run.	
Communications / power cable was run in conduit (outdoor unit to indoor unit) 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.	
Used appropriate crimping tool to attach ring or fork terminals at all power wiring and control cable terminations.	

**To access single zone installation manuals, visit:**  
[www.lghvac.com/resources](http://www.lghvac.com/resources)

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