BUILDING VENTILATION GUIDE FOR LG HVAC SYSTEM INSTALLATION

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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 is 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 by the summary list of safety precautions 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.*
⃠	*This symbol indicates an action that should not be performed.*

For more technical materials such as submittals, catalogs, engineering, owner's, best practices, and service manuals, visit www.lghvac.com.

Note:

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

Introduction

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

Note:

Disclaimer

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

- *For a complete copy of Standard 62.1 and 62.2, refer to the American Standard of Heating and Air Conditioning Engineers (ASHRAE) website at www.ashrae.org.*
- *For more information on how to properly size a ventilation air pretreatment system, refer to the article, "Selecting DOAS Equipment with Reserve Capacity" by John Murphy, published in the ASHRAE Journal, April 2010.*

Method 1: Decoupled Dedicated Outdoor Air System (DDOAS)

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

Advantages

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

Disadvantages

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

Note:

- *LG recommends using the DDOAS method in all installations.*
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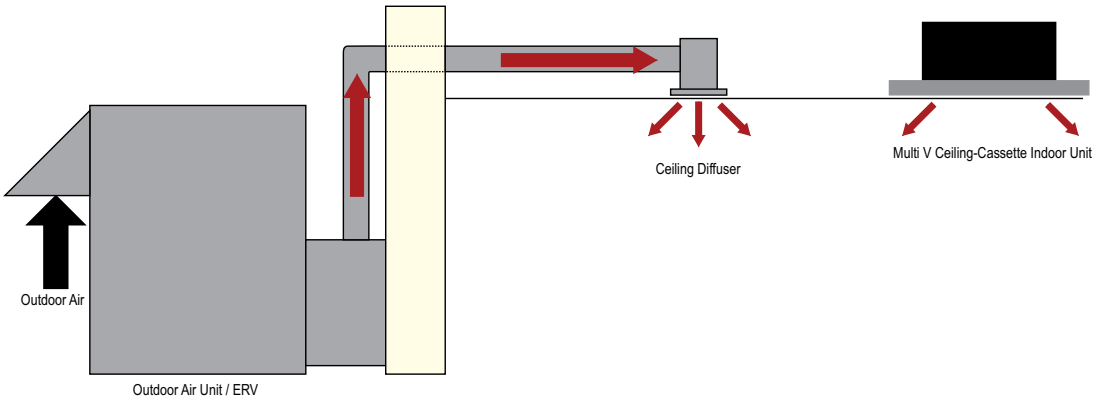

METHOD 2

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

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

Advantages

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

Disadvantages

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

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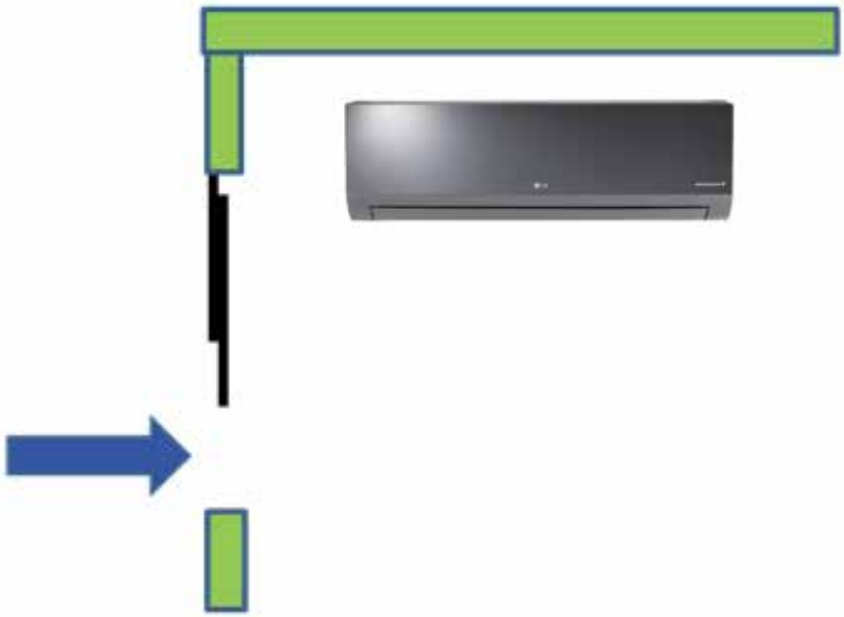

Method 3: Unconditioned Outdoor Air Ducted to Indoor Units

Untreated outdoor air is channeled through a duct system that is piped to the return air duct on LG HVAC ducted indoor units, or to the frame of LG HVAC one-way and four-way cassettes.

Note:

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

Advantages

- May require less ductwork if indoor units are placed near outdoor walls or a roof deck.
- Controls must be interlocked to shut off the outdoor air supply fan when the space is unoccupied.
- Third-party demand-control ventilation controls may be installed to regulate outdoor intake based on the CO_2 levels of the occupied space.

Disadvantages

- Fan(s) will be required to push outdoor air to the indoor unit. Indoor units are engineered for low sound levels and are not designed to overcome the added static pressure caused by the outdoor air source ductwork.
- Ventilation air must be pre-filtered before mixing with the return air stream. LG indoor cassette models are configured to introduce the ventilation air downstream of the return air filter media.
- Ducted, one-way, and four-way cassette models are the only indoor units that accept the connection of an outdoor air duct to the unit case.
- Mixed air conditions must be between a minimum of 59°F DB while operating in heating and a maximum of 76°F WB while operating in cooling. Depending on the ventilation air volume requirement, the location choices are limited where untreated outside air may be introduced to the building using this method.
- Larger indoor units may be required to satisfy for additional outdoor air.
- Motorized dampers may be required to prevent outdoor air flow through the indoor unit when the indoor unit is not operating.
- An LG Dry Contact adapter may be necessary to interlock the motorized damper with the indoor unit fan operation. Other relay devices and central control may also be options.
- While operating in heating, the untreated outdoor air may delay the start of the indoor unit fan impacting building comfort.
- In most cases, in lieu of using the factory mounted return-air thermistor on indoor units, a remote wall temperature sensor or zone controller will be needed for each indoor unit to provide an accurate reading of the conditioned area temperature.

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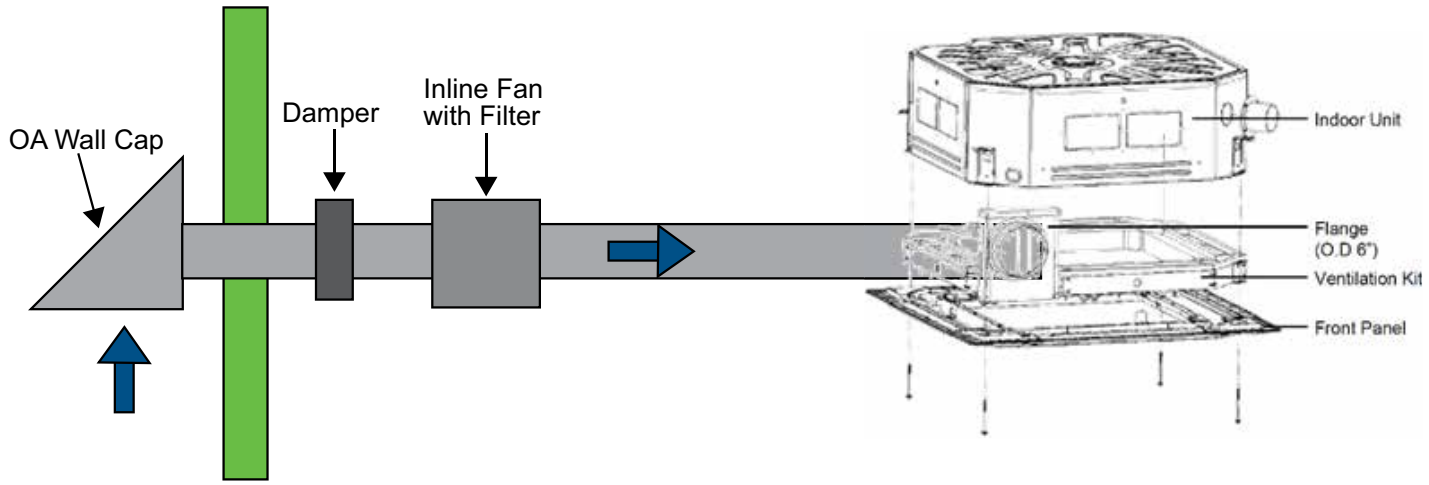


METHOD 4

Method 4: Unconditioned Outdoor Air (Non-Ducted, Fan Assisted Ventilation)

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

Note:

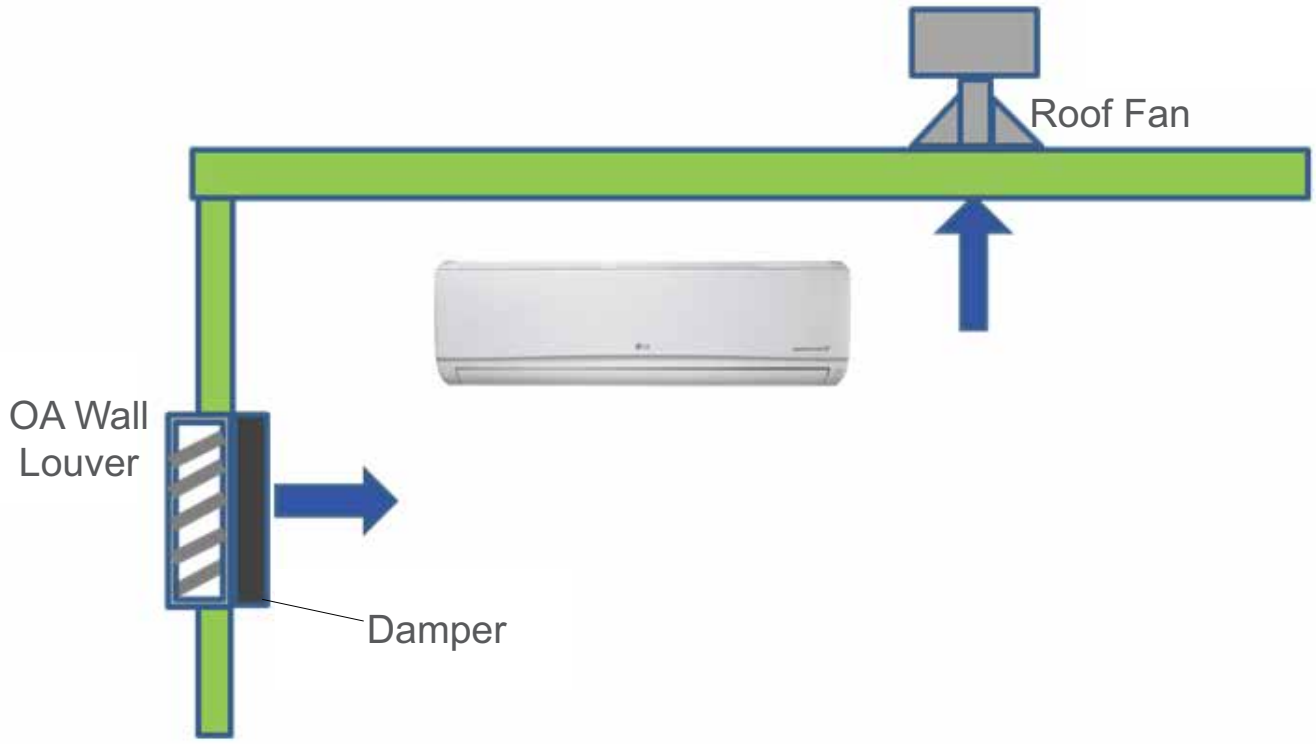
This may result in loss of building pressurization control, increasing infiltration loads with adverse effects.

Advantages

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

Disadvantages

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



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Method 5: Coupled Dedicated Outdoor Air (CDOA)

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

Note:

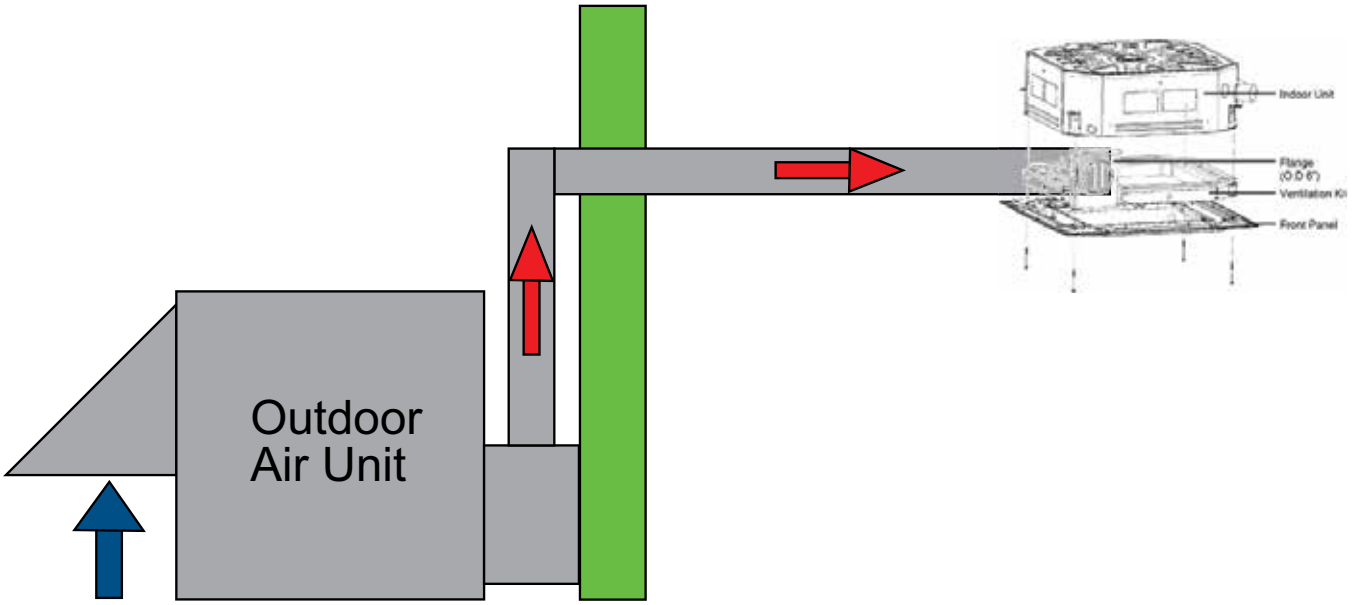
Outside air may flow backward through the return air-filter grille when the indoor unit fan speed is reduced or stops when the space load is satisfied. This may result in captured particulate on the filter media being blown back into the conditioned space.

Advantages

- Separate ceiling registers or grilles for introduction of the outside air to the conditioned space may be avoided.
- Indoor unit capacity may not need to be increased because of outdoor air.
- Fan and filter system is centralized to the main outdoor air unit.

Disadvantages

- Ducted, one-way, and four-way cassette indoor units are the only models designed for direct connection of an outside air duct.
- The building occupant may not notice the outdoor air pretreatment system has malfunctioned until the unconditioned outdoor air exceeds the indoor unit mixed air limits of 59°F DB for heating and 76°F WB for cooling.
- Ceiling space is required for ductwork.
- If the coil entering air condition limitation is exceeded, the indoor unit may malfunction and cease to operate.
- If the outdoor air unit cooling or heating system fails, the malfunction may be masked by the indoor unit ramping up operating parameters to compensate for the failure.
- Motorized dampers may be required to prevent outdoor air from entering the indoor unit while the indoor unit has cycled off.
- An LG Dry Contact adapter may be necessary to interlock the motorized damper with the indoor unit fan operation. Other relay devices and central control may also be options.
- In lieu of using the factory mounted return-air thermistor, a remote wall temperature sensor or zone controller may be required to provide an accurate conditioned space temperature reading.



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