



MULTI V™

SPLIT ROOFTOP UNIT INSTALLATION MANUAL



Models

ARNU363DDA4

ARNU363DDB4

ARNU483DDA4

ARNU483DDB4

ARNU603DDA4

ARNU603DDB4

ARNU723DDA4

ARNU723DDB4

36,000 to 72,000 Btu/h

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 **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 on page 4.

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

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SAFETY PRECAUTIONS

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

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.

 **Do not supply power to the unit until all wiring and piping are completed or reconnected and checked.**
There is risk of physical injury or death due to electric shock.

WARNING

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

For replacement of an installed unit, always contact an LG trained service provider.

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

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

 **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.

Replace all control box and panel covers.

If cover panels are not securely installed, dust, water, and animals will enter the outdoor unit, causing fire, electric shock, and physical injury or death.

Always check for system refrigerant leaks after the unit has been installed or serviced.

Exposure to high concentration levels of refrigerant gas will lead to illness or death.

Periodically check that the outdoor frame is not damaged.

There is a risk of explosion, physical injury, or death.

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 American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Standard 15. If the refrigerant leaks and safety limits are exceeded, it could result in personal injuries or death from oxygen depletion.

The heat recovery unit must be installed indoors;  do not install the heat recovery unit in a highly humid environment.
There is risk of physical injury or death due to electric shock.

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.

Install the unit considering the potential for strong winds or earthquakes.

Improper installation will cause the unit to fall over, resulting in physical injury or death.

Install the unit in a safe location where nobody can step, fall onto it, or place objects on it.  Do not install the unit on a defective stand.

It will result in an accident that causes physical injury or death.

SAFETY PRECAUTIONS

WARNING

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.

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 weights listed.
- Some products use polypropylene bands for packaging.  Do not use polypropylene bands to lift the unit.
- Suspend the outdoor unit from the base at specified positions (at a minimum of six [6] points) to avoid slippage from rigging apparatus.

Note:

LG Electronics U.S.A., Inc., is not responsible for any piping calculations, refrigerant leaks, degradation of performance, or any other potential problems or damages as a result of interconnecting piping, their joint connections, isolation valves, introduced debris inside the piping system, or other problems caused by the interconnecting piping system.

 **Do not install the product where it is exposed directly to ocean winds.**

Sea salt in the air will cause the product to corrode. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

When installing the outdoor unit in a low-lying area, or a location that is not level, use a raised concrete pad or concrete blocks to provide a solid, level foundation.

This prevents water damage and abnormal vibration.

Properly insulate all cold surfaces to prevent “sweating.”

Cold surfaces such as uninsulated piping can generate condensate that will drip and cause a slippery surface condition and / or water damage to walls.

Always check for system refrigerant leaks after the unit has been installed or serviced.

Low refrigerant levels will cause product failure.

 **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 damage will occur.

 **Do not store or use flammable gas / combustibles near the unit.**

There is a risk of product failure.

 **Do not use the product for mission critical or special purpose applications such as preserving foods, works of art, or other precision air conditioning applications. The equipment is designed to provide comfort cooling and heating.**

There is risk of property damage.

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

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.

The heat recovery box must be installed indoors;  do not install the heat recovery box in a highly humid environment.
There is risk of product failure and property damage.

When connecting refrigerant piping, remember to allow for pipe expansion.

Improper piping installation will cause system malfunction.

 **Do not install the outdoor unit or heat recovery unit in a noise-sensitive area.**

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 outdoor frame 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 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.

SAFETY PRECAUTIONS

WIRING

DANGER

High voltage electricity is required to operate this system. Adhere to the U.S. National Electric Codes (NEC) and these instructions when wiring.

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

Always ground the unit following local, state, and NEC codes.
There is risk of fire, electric shock, and physical injury or death.

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

Electrical 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.

 **Do not share the electrical circuit with other devices.**
There is risk of fire, electric shock, and physical injury or death due to heat generation.

 **Do not use damaged or loose power wiring.**  **Do not modify or extend the outdoor unit's power wiring. Ensure that the power wiring will not be pulled nor weight be placed on the power wiring during operation.**

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

WARNING

The information contained in this manual is intended for use by an industry-qualified, experienced, trained 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 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 NEC, 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.

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, and physical injury or death.

Secure all field wiring connections with appropriate wire strain relief.

Improperly securing wires will create undue stress on equipment power connections. Inadequate connections will generate heat, cause a fire, and 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.

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 is 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.

Note:

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

The system will malfunction.

The information contained in this manual is intended for use by an industry-qualified, experienced, licensed 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 and property damage.

SAFETY PRECAUTIONS

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 breaker 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.

Periodically verify the equipment mounts have not deteriorated.

If the base collapses, the unit could fall and cause physical injury or death.

Use inert (nitrogen) gas when performing leak tests or air purges. ⊘ Do not use compressed air, oxygen, or flammable gases.

Using these substances will cause fire, explosion, and physical injury or death.

If refrigerant 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 a fire, electric shock, explosion, physical injury or death.

⚠ WARNING

⊘ Do not allow water, dirt, or animals to enter the unit.

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

⊘ 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.

⊘ Do not touch the refrigerant piping during or after operation.

It can cause burns or frostbite.

⊘ Do not open the inlet during operation.

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

⚠ CAUTION

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

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

Note:

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

⊘ Do not use the product for mission critical or special purpose applications such as preserving food, works of art, or other precision air conditioning applications. The equipment is designed to provide comfort cooling and heating.

There is risk of property damage.

⊘ Do not allow water, dirt, or animals to enter the unit.

There is risk of unit failure.

⊘ Do not open the inlet during operation.

There is risk of unit failure.

⊘ Do not operate the unit with the panel(s) or protective cover(s) removed; keep fingers and clothing away from moving parts.

Non-secured covers can result in malfunction 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.

Use only a 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 cause its appearance to deteriorate.

Provide power to the outdoor unit to warm the compressor crankcase 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 turn off the main power switch after operation has been stopped.

Wait at least five (5) minutes before turning off the main power switch, otherwise it will result in product malfunction.

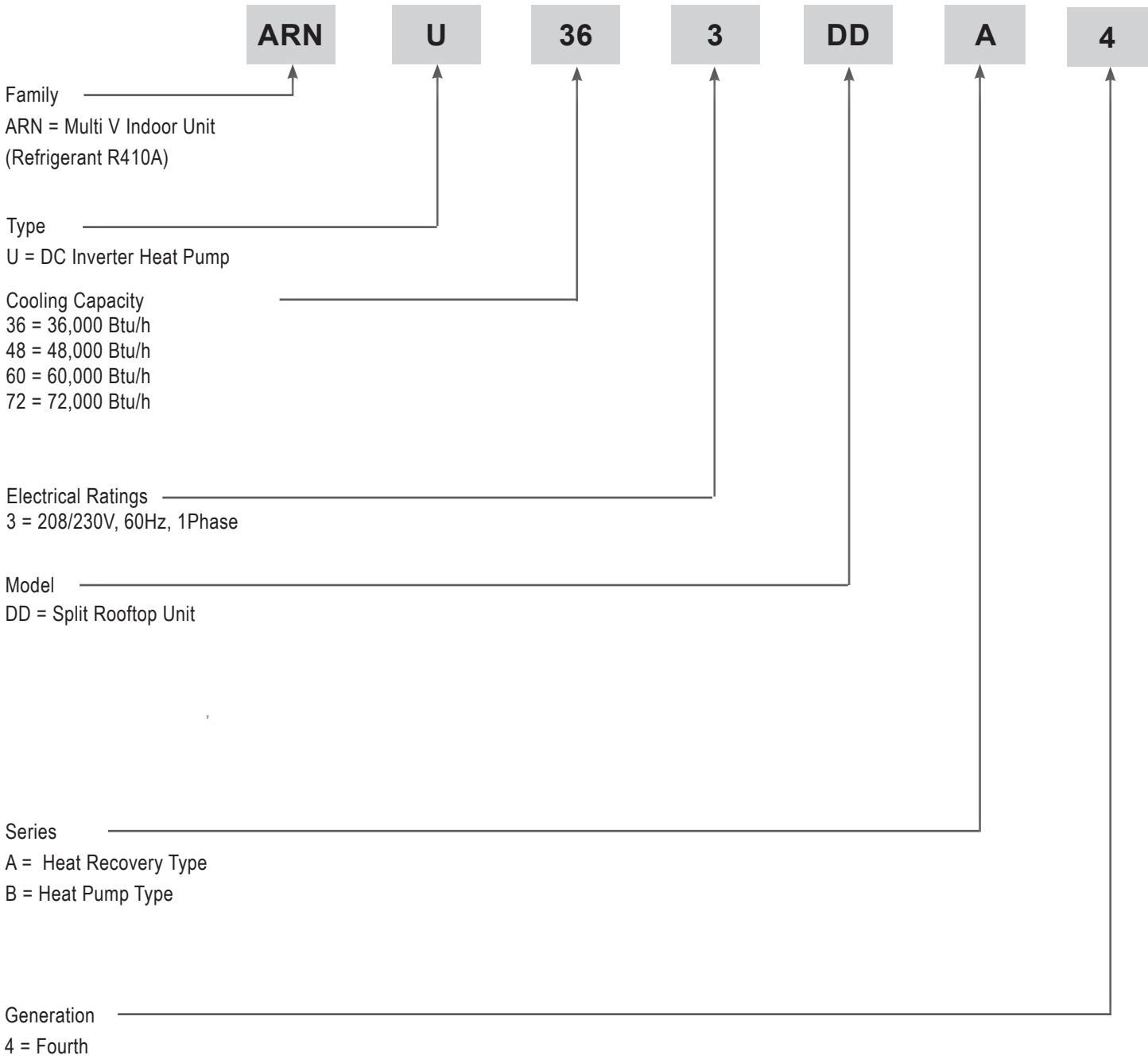
⊘ Do not block the inlet or outlet.

Unit will malfunction.

Auto-addressing must be performed after connecting the power of all Split Rooftop Unit and outdoor units.

Auto-addressing must also be performed after servicing a Split Rooftop Unit.

UNIT NOMENCLATURE



This manual describes how to install LG Split Rooftop Unit (RTU) for Multi V Variable Refrigerant Flow (VRF) heat pump and heat recovery systems. Refer to LG's Split Rooftop Unit Engineering Manual for complete detailed engineering data and selection procedures.

Figure 1: RTU.



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 firefighting assistance.

Installation Personnel

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

Applicable Codes

Personnel must be familiar with and follow the applicable national, state, and/or local codes.

⚠ 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, its components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation.

INTRODUCTION

Required Tools (field provided)

- Level
- JIS screwdriver
- Electrical lineman pliers
- Electric drill
- Holesaw
- Drill
- R410A flaring tool set
- Tubing cutter
- Tube/pipe reamer
- Refrigerant gas-leak detector
- Thermometer

Required Parts (field provided)

- Pipes - vapor line and liquid line, with insulation
- 3/8" or 1/2" nuts, flat washers, and lock/split washers
- 3/8" or 1/2" threaded hanger rods
- Insulated drain hose
- Additional drain hose
- Connecting cable (power and control)

PRODUCT OVERVIEW

General Data

Table 1: ARNU363~723DDA4 General Data.

Model No.	ARNU363DDA4	ARNU483DDA4	ARNU603DDA4	ARNU723DDA4
Cooling Mode Performance				
Capacity (Btu/h)	36,000	48,000	60,000	72,000
Max Power Input¹ (W)	640	700	760	770
L / M / H Power Input at Factory Default (W)	110 / 130 / 150	120 / 150 / 260	130 / 250 / 330	140 / 260 / 350
Heating Mode Performance				
Capacity (Btu/h)	38,000	52,000	71,000	80,000
Max Power Input¹ (W)	640	700	760	770
L / M / H Power Input at Factory Default (W)	110 / 130 / 150	120 / 150 / 260	130 / 250 / 330	140 / 260 / 350
Entering Mixed Air				
Cooling Max. (°F WB)	76	76	76	76
Heating Min. (°F DB)²	50	50	50	50
Unit Data				
Refrigerant Type³	R410A	R410A	R410A	R410A
Refrigerant Control	EEV	EEV	EEV	EEV
Sound Power⁴ dB(A) (H/M/L)	66 / 63 / 60	67 / 64 / 61	68 / 65 / 62	69 / 66 / 63
Net Unit Weight (lbs.)	472	472	472	472
Shipping Weight (lbs.)	494	494	494	494
Communication Cable⁵ (No. x AWG)	2 x 18			
Fan				
Type	3D Plug			
Motor	1	1	1	1
Motor / Drive	ECM (Electronically Commutated Motor) / Direct			
Airflow Rate H/M/L (CFM) Standard Mode	1200 / 1000 / 800	1400 / 1200 / 950	1700 / 1300 / 1000	1800 / 1400 / 1100
External Static Pressure (in. wg) Standard Mode	1.7	1.6	1.5	1.4
External Static Pressure (in. wg)	0.2 - 1.7	0.2 - 1.6	0.2 - 1.5	0.2 - 1.4
Piping				
Liquid Line (in., O.D.)	3/8 Brazed	3/8 Brazed	3/8 Brazed	3/8 Brazed
High Pressure Vapor Line (in, OD)	1/2 Brazed	1/2 Brazed	5/8 Brazed	5/8 Brazed
Low Pressure Vapor Line (in., O.D.)	5/8 Brazed	5/8 Brazed	3/4 Brazed	3/4 Brazed
Condensate Line (in., I.D.)	1, Plain			
Filtration				
Outdoor	2" Merv8 (16" x 20") x 4 each			

EEV: Electronic Expansion Valve

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

This unit comes with a dry nitrogen charge.

Rated capacity is certified under AHRI Standard 1230. Ratings are subject to change without notice. Current certified ratings are available at www.ahridirectory.org.

¹Max power input is rated at maximum setting value.

²Low ambient performance with LGRED° heat technology is included in Multi V 5 Air

Source Units produced after February 2019.

³Take appropriate actions at the end of HVAC equipment life to recover, recycle, reclaim or destroy R410A refrigerant according to applicable regulations (40 CFR Part 82, Subpart F) under section 608 of CAA.

⁴Sound Pressure levels are tested in an anechoic chamber under ISO Standard 3745.

⁵All communication cable to be minimum 18 AWG, 2-conductor, twisted, stranded, shielded and must comply with applicable local and national codes. Ensure the communication cable is properly grounded at the main outdoor unit only. ⚡ Do not ground the ODU-IDU communication cable at any other point.

PRODUCT OVERVIEW

General Data

Table 2: ARNU363~ 723DDB4 General Data.

Model No.	ARNU363DDB4	ARNU483DDB4	ARNU603DDB4	ARNU723DDB4
Cooling Mode Performance				
Capacity (Btu/h)	36,000	48,000	60,000	72,000
Maximum Power Input¹ (W)	640	700	760	770
L / M / H Power Input at Factory Default (W)	110 / 130 / 150	120 / 150 / 260	130 / 250 / 330	140 / 260 / 350
Heating Mode Performance				
Capacity (Btu/h)	38,000	52,000	71,000	80,000
Maximum Power Input¹ (W)	640	700	760	770
L / M / H Power Input at Factory Default (W)	110 / 130 / 150	120 / 150 / 260	130 / 250 / 330	140 / 260 / 350
Entering Mixed Air				
Cooling Maximum (°F WB)	76	76	76	76
Heating Minimum (°F DB)²	50	50	50	50
Unit Data				
Refrigerant Type³	R410A	R410A	R410A	R410A
Refrigerant Control	EEV	EEV	EEV	EEV
Sound Power⁴ dB(A) (H / M / L)	66 / 63 / 60	67 / 64 / 61	68 / 65 / 62	69 / 66 / 63
Net Unit Weight (lbs.)	461	461	461	461
Shipping Weight (lbs.)	483	483	483	483
Communication Cable⁵ (No. x AWG)	2 x 18			
Fan				
Type	3D Plug			
Motor	1	1	1	1
Motor / Drive	ECM (Electronically Commutated Motor) / Direct			
Airflow Rate H/M/L (CFM) Standard Mode	1200 / 1000 / 800	1400 / 1200 / 950	1700 / 1300 / 1000	1800 / 1400 / 1100
External Static Pressure (in. wg) Standard Mode	1.7	1.6	1.5	1.4
External Static Pressure (in. wg)	0.2 - 1.7	0.2 - 1.6	0.2 - 1.5	0.2 - 1.4
Piping				
Liquid Line (in., O.D.)	3/8 Brazed	3/8 Brazed	3/8 Brazed	3/8 Brazed
Vapor Line (in., O.D.)	5/8 Brazed	5/8 Brazed	3/4 Brazed	3/4 Brazed
Condensate Line (in., I.D.)	1, Plain			
Filtration				
Outdoor	2" Merv8 (16" x 20") x 4 each			

EEV: Electronic Expansion Valve

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

This unit comes with a dry nitrogen charge.

Rated capacity is certified under AHRI Standard 1230. Ratings are subject to change without notice. Current certified ratings are available at www.ahridirectory.org.

¹Max power input is rated at maximum setting value.

²Low ambient performance with LGRED[®] heat technology is included in Multi V 5 Air Source Units produced after February 2019.

³Take appropriate actions at the end of HVAC equipment life to recover, recycle, reclaim or destroy R410A refrigerant according to applicable regulations (40 CFR Part 82, Subpart F) under section 608 of CAA.

⁴Sound Pressure levels are tested in an anechoic chamber under ISO Standard 3745.

⁵All communication cable to be minimum 18 AWG, 2-conductor, twisted, stranded, shielded and must comply with applicable local and national codes. Ensure the communication cable is properly grounded at the main outdoor unit only. ⚡ Do not ground the ODU-IDU communication cable at any other point.

PRODUCT OVERVIEW

Electrical Data

Table 3: Split Rooftop Unit Electrical Data.

Capacity (RT)	Voltage Range	MCA	MOP	Rated Amps (A)	Power Supply			Power Input ¹ (W)		
					Hz	Volts	Phase	Max. Cooling	Max. Heating	L / M / H at Factory Default
6	208 / 230	8.4	15	6.7	60	208 / 230	1	770	770	140 / 260 / 350
5		8.4		6.7				760	760	130 / 250 / 330
4		8.4		6.7				700	700	120 / 150 / 260
3		8.4		6.7				640	640	110 / 130 / 150

MCA : Minimum Circuit Ampacity.

MOP : Maximum Overcurrent Protection.

Units are suitable for use on an electrical system where voltage supplied to unit terminals is within the listed range limits.

Select wire size based on the larger MCA value.

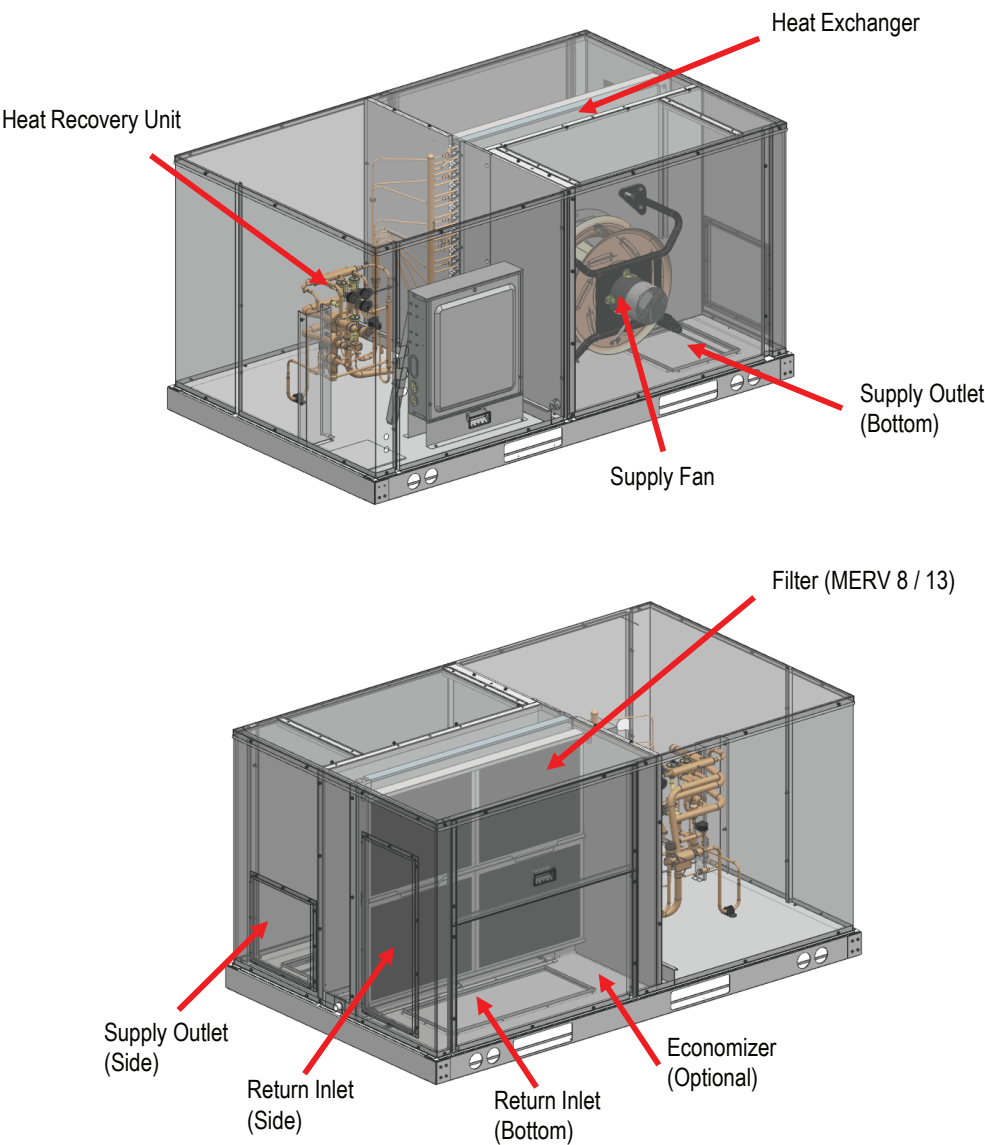
Instead of fuse, use the circuit breaker.

¹Max. power input is rated at maximum setting value.

PRODUCT OVERVIEW

Interior Components Heat Recovery Model

Figure 2: RTU Components Heat Recovery Model.

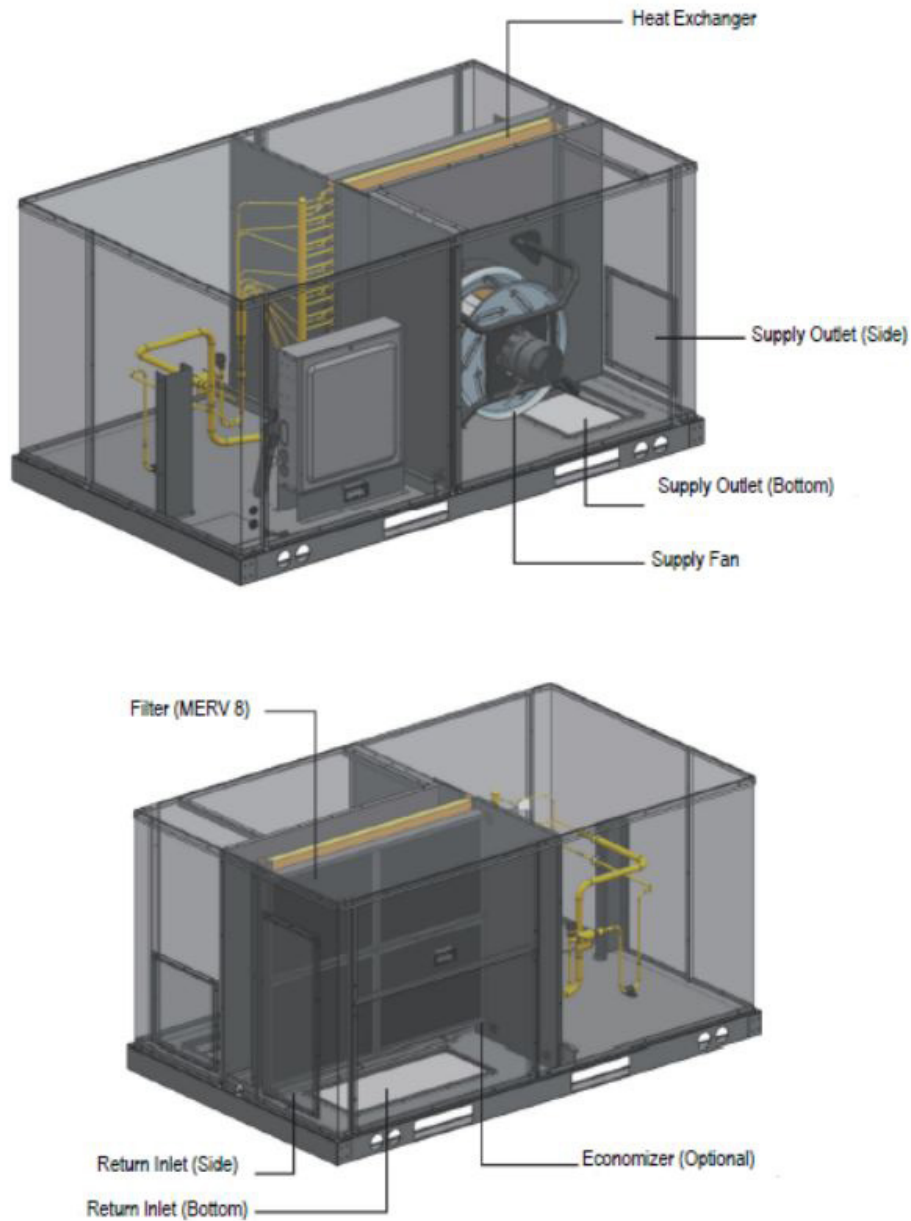


PRODUCT OVERVIEW

Interior Components

Heat Pump Model

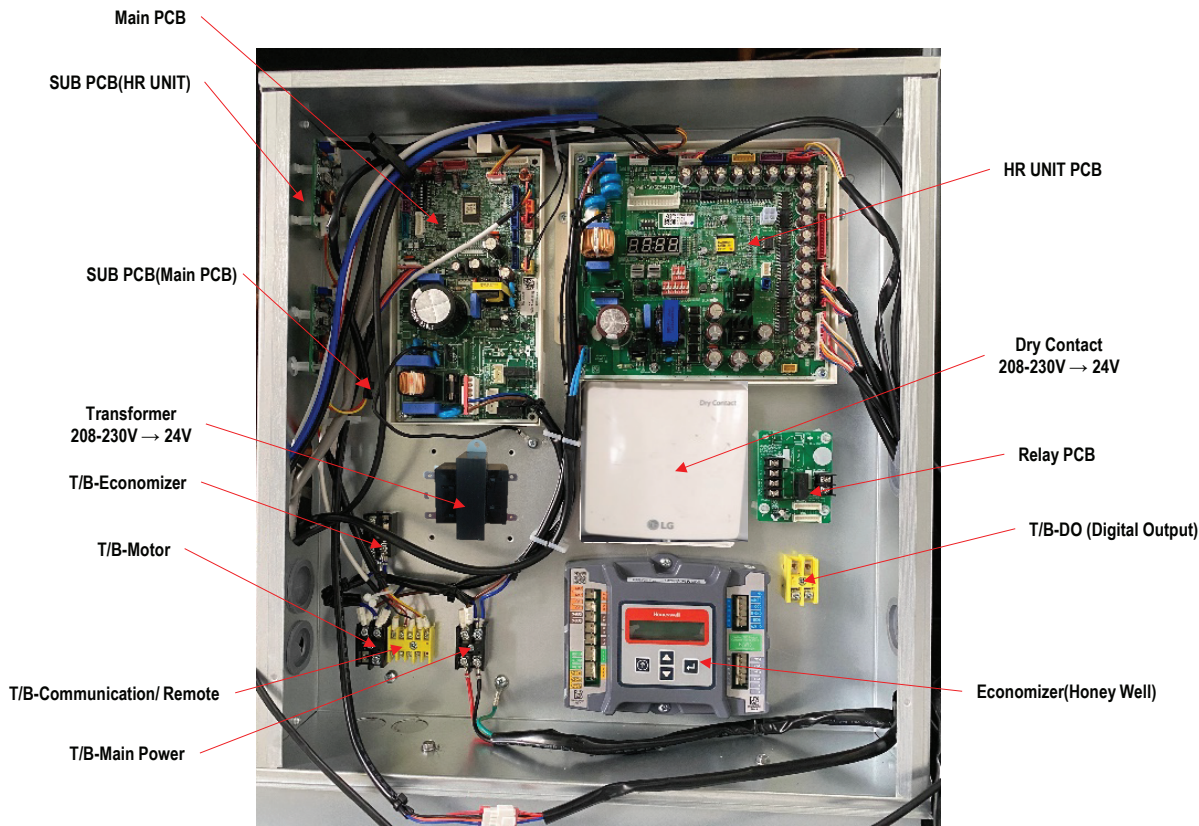
Figure 3: RTU Components Heat Pump Model.



PRODUCT OVERVIEW

Control Box Components

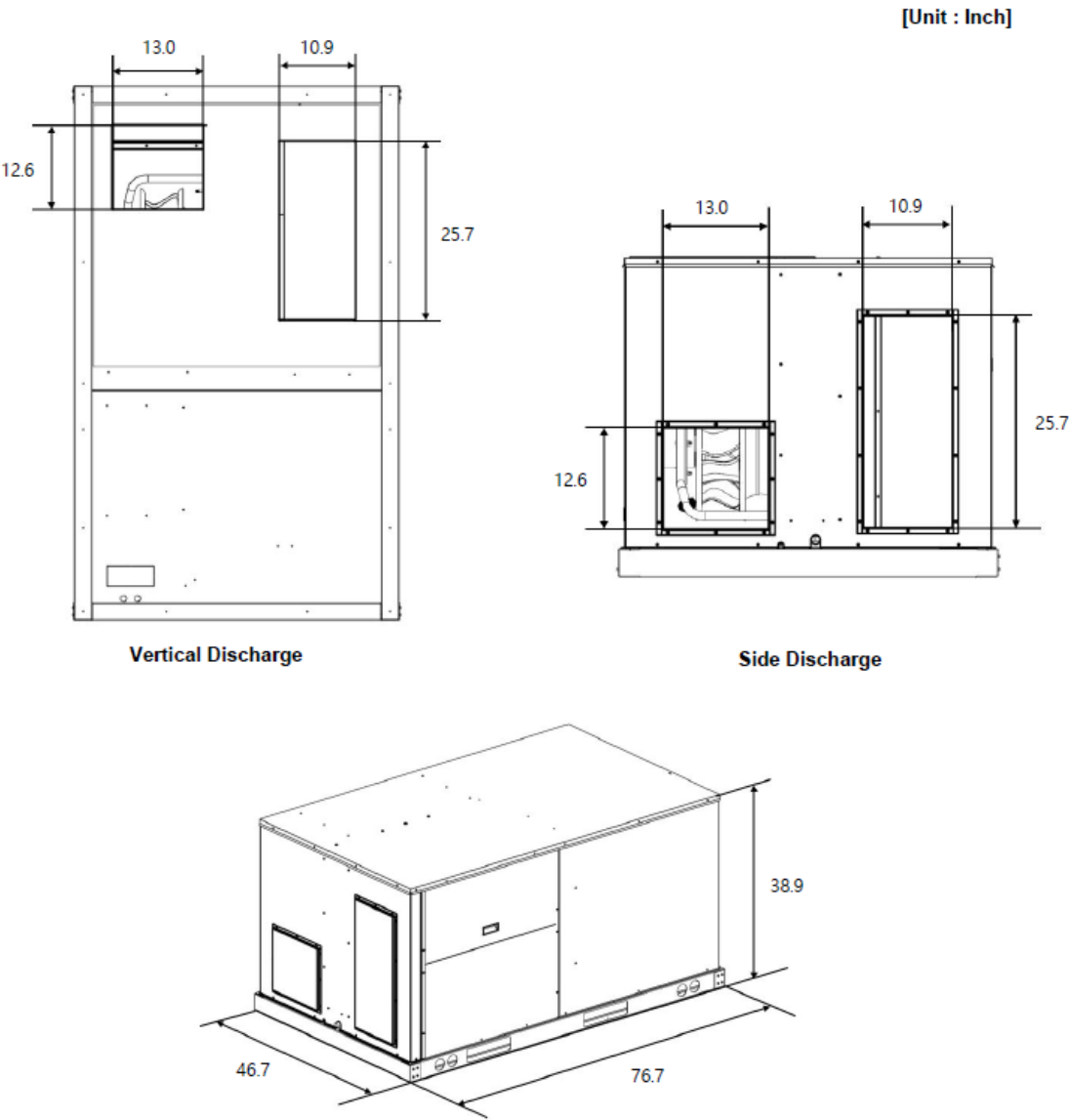
Figure 4: Control box in the Split Rooftop Unit.



PRODUCT OVERVIEW

External Dimensions

Figure 5: Split RTU Dimensions.



	Supply Air	Return Air
Horizontal	13.0 in. X 12.6 in.	10.9 in. X 25.7 in.
Vertical	13.0 in. X 12.6 in.	10.9 in. X 25.7 in.

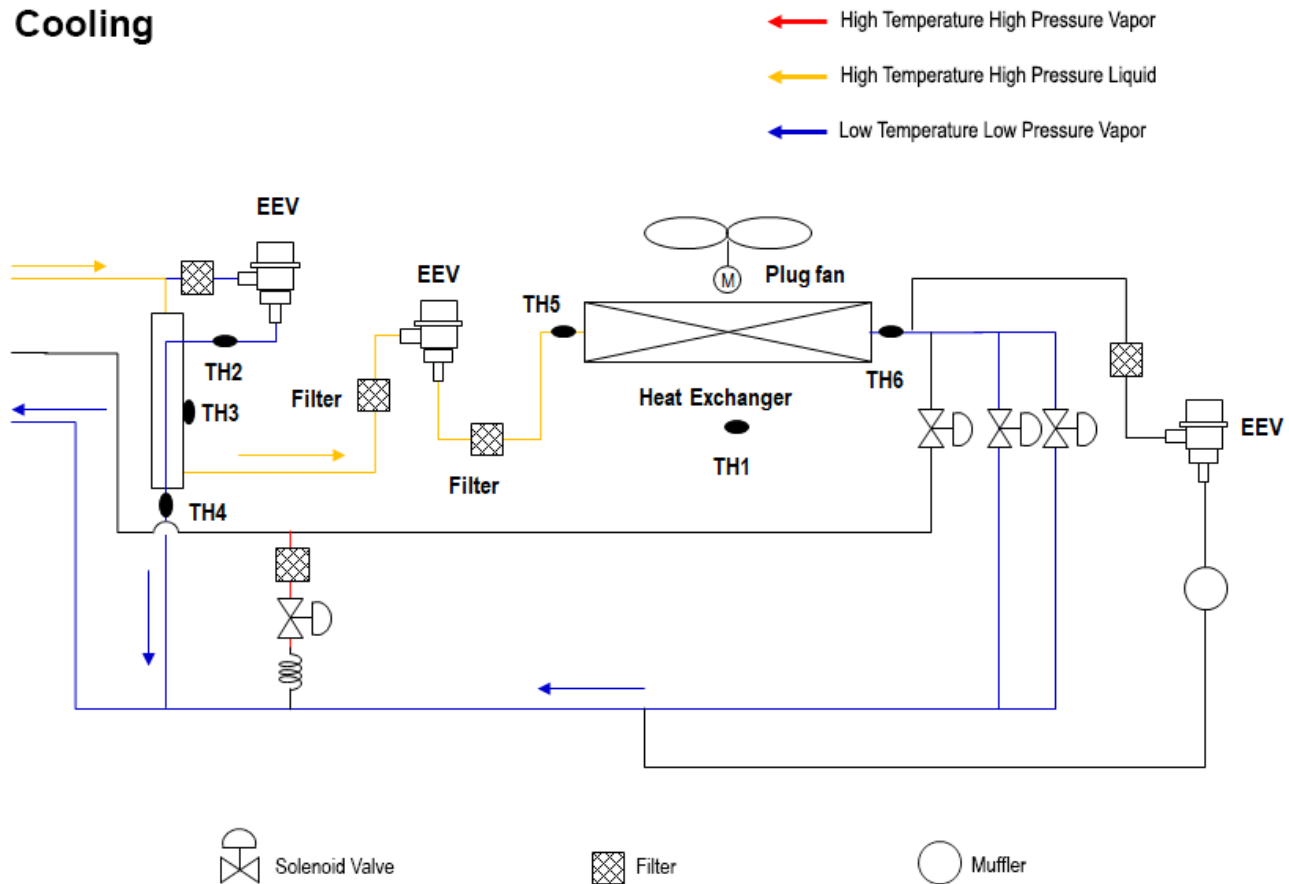
*RA Dimension is equal to carrier RTU

PRODUCT OVERVIEW

Refrigerant Flow Diagram

Figure 6: ARNU363~723DDA4 Refrigerant Flow Diagram.

Cooling



PRODUCT OVERVIEW

Refrigerant Flow Diagram

Figure 7: ARNU363~723DDA4 Refrigerant Flow Diagram.

Heating

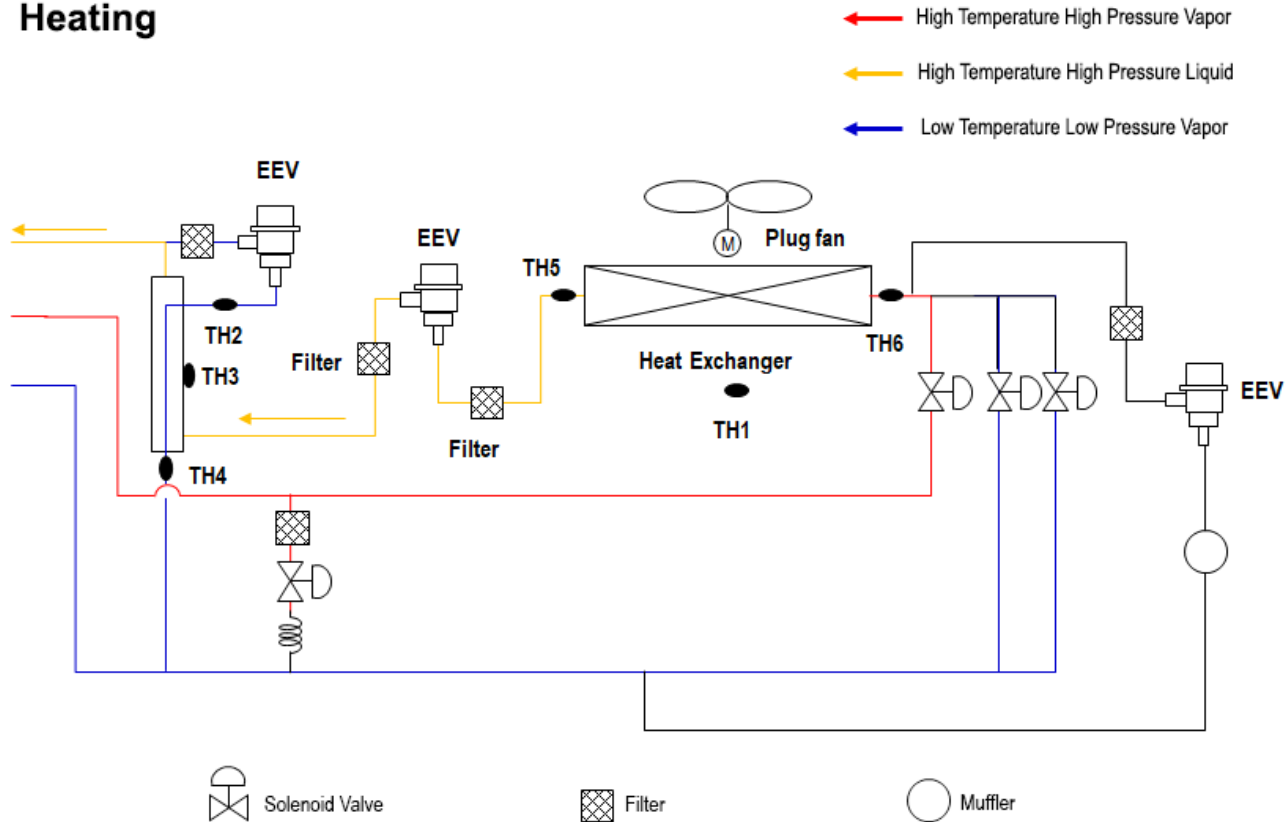


Table 4: ARNU363~723DDA4 Refrigerant Pipe Connection Port Diameters.

Model	Liquid (inch)	High Pressure Vapor (inch)	Low Pressure Vapor (inch)
ARNU723DDA4	3/8 Brazed	5/8 Brazed	3/4 Brazed
ARNU603DDA4			
ARNU483DDA4		1/2 Brazed	5/8 Brazed
ARNU363DDA4			

Table 5: ARNU363~723DDA4 Thermistors.

Thermistor	Description
TH1	Return air thermistor
TH2	HR Pipe out thermistor
TH3	HR Pipe in thermistor
TH4	HR liquid
TH5	Pipe in thermistor
TH6	Pipe out thermistor

PRODUCT OVERVIEW

Refrigerant Flow Diagram

Figure 8: ARNU363~723DDB4 Refrigerant Flow Diagram.

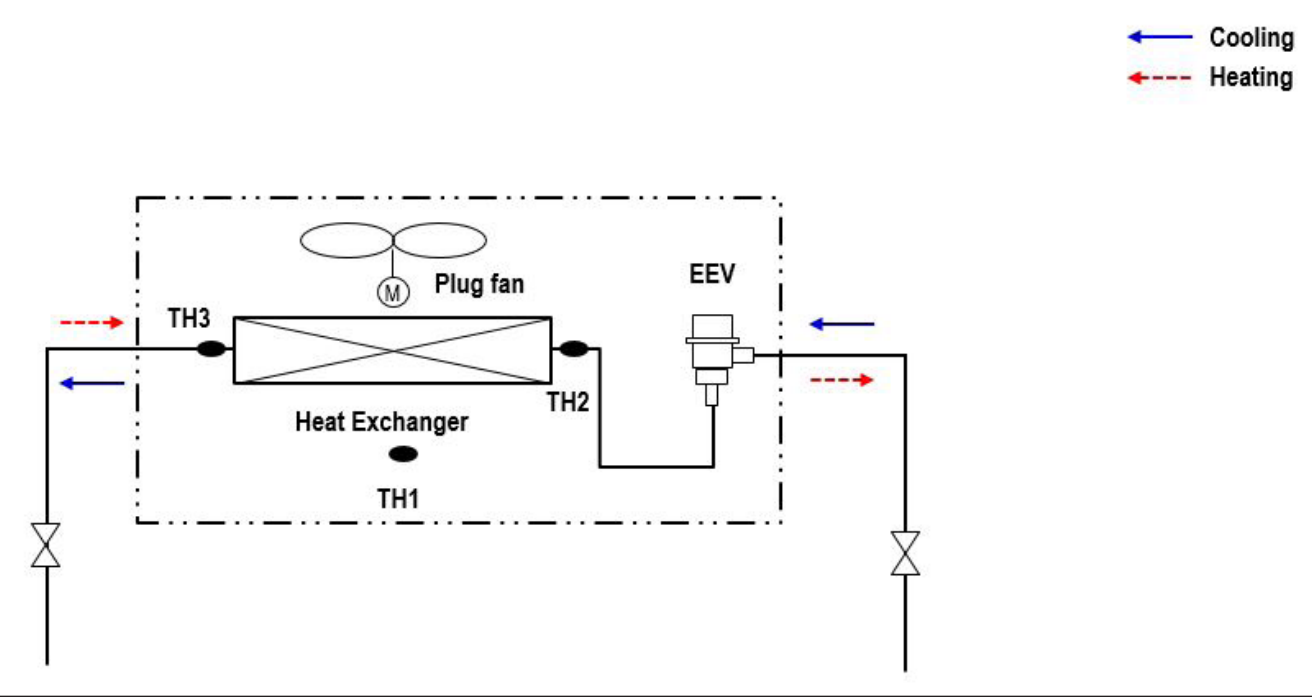


Table 6: ARNU363~723DDB4 Refrigerant Pipe Connection Port Diameters.

Model	Liquid (inch)	Refrigerant Vapor (inch)	Condensate Line (inch)
ARNU723DDB4	3/8 Brazed	3/4 Brazed	1, plain
ARNU603DDB4			
ARNU483DDB4		5/8 Brazed	
ARNU363DDB4			

Table 7: ARNU363~723DDB4 Thermistors.

Thermistor	Description
TH1	Return air thermistor
TH2	Pipe in thermistor
TH3	Pipe out thermistor

INSTALLATION GUIDELINES

Combination Ratio

Device Connection Limitations

When designing a system, the engineer must take into consideration the combination ratio.

Installation Options	Combination Ratio
MV Outdoor Unit (ODU) with only RTUs	The total capacity of all RTUs must be 50-110% of ODU capacity.
MV ODU with RTUs and other indoor units	• The total capacity of all indoor units (Indoor Unit + RTU) must be 50-100% of outdoor unit capacity. • The total capacity of RTUs must be less than 60% of the total capacity of all indoor units.

Note:

Failure to comply with the above connection conditions for installation can cause reduced heating/cooling performance.

Sample Layouts (Combination Ratio Examples)

Figure 9: RTU Correct Combination Ratio.

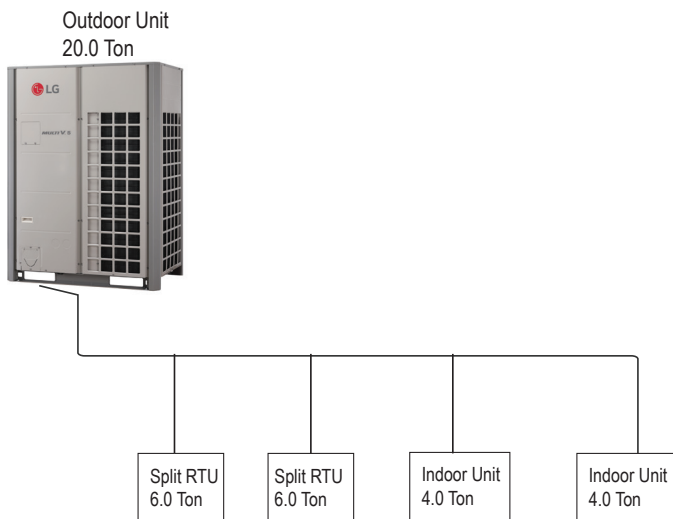
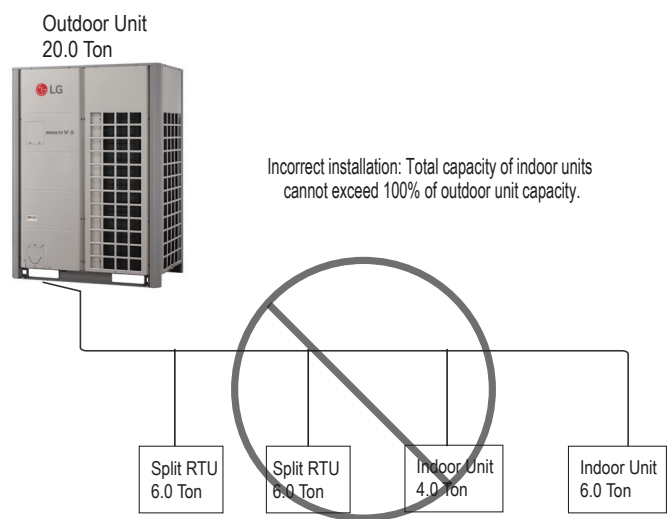


Figure 10: RTU Incorrect Combination Ratio.



Note:

Images are for illustrative purposes only and are not accurate representations. For specific details on piping limitations and other refrigerant system rules, review the information in the appropriate Engineering or Installation Manual, and follow the LATs diagram.

INSTALLATION GUIDELINES

Selecting the Best Location for the Split Rooftop Unit

DANGER

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

CAUTION

When deciding on a location to place the Split Rooftop Unit, be sure to choose an area where run-off from defrost will not accumulate and freeze on sidewalks or driveways, which will create unsafe conditions. Properly install and insulate any drain hoses to prevent the hose from freezing, cracking, leaking, and causing unsafe conditions from frozen condensate.

WARNING

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

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

- Where there is enough strength to bear the weight of the outdoor unit.
- A location that allows for optimum air flow and is easily accessible for inspection, maintenance, and service.
- Include space for drainage to ensure condensate flows properly out of the unit when it is in cooling mode. ⊘ Avoid placing the unit in a low-lying area where water could accumulate.
- Use a level indicator to ensure the unit is installed on a level plane.

Don'ts

- Where it will be subjected to direct thermal radiation from other heat sources, or an area that would expose the outdoor unit to heat or steam like discharge from boiler stacks, chimneys, steam relief ports, other air conditioning units, kitchen vents, plumbing vents, and other sources of extreme temperatures.
- Where high-frequency electrical noise / electromagnetic waves will affect operation.
- Where operating sound from the unit will disturb inhabitants of surrounding buildings.

Note:

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

- ⊘ 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 malfunction of the condensate drain. If this is a potential problem, install a ventilation fan large enough to vent out these materials
- ⊘ Do not install the unit where it will be subjected to direct thermal radiation from other heat sources.
- ⊘ Do not install the unit in an area where combustible gas may generate, flow, stagnate, or leak. There is the possibility of fire.
- ⊘ Do not install the unit in a location where acidic solution and spray (sulfur) are often used.
- ⊘ Do not use the unit in environments where oil, steam, sulfuric gas, or volatile organic compounds (VOC) are present.
- ⊘ Do not install additional ventilation products on the chassis of the unit.
- ⊘ Do not install the unit near high-frequency generator sources.

INSTALLATION GUIDELINES

Receiving

This product may have been subject to road salt during transit. If so, immediately wash off all visible white residue from all exterior surfaces. Upon receiving the product, check to ensure all line items are accounted for by referencing the delivery receipt or packing list.

Inspect each crate or carton for shipping damage before accepting delivery.

Alert the carrier if any damage is detected. ⚠ Do not refuse shipment. The customer must make notation of damage (or shortage of items) on the delivery receipt and all copies of the bill of lading which should be countersigned by the delivering carrier. If damaged, immediately contact your manufacturer's representative. Any physical damage to the unit after acceptance is not the responsibility of the manufacturer.

Access door handles are locked with the bracket when shipped from factory.

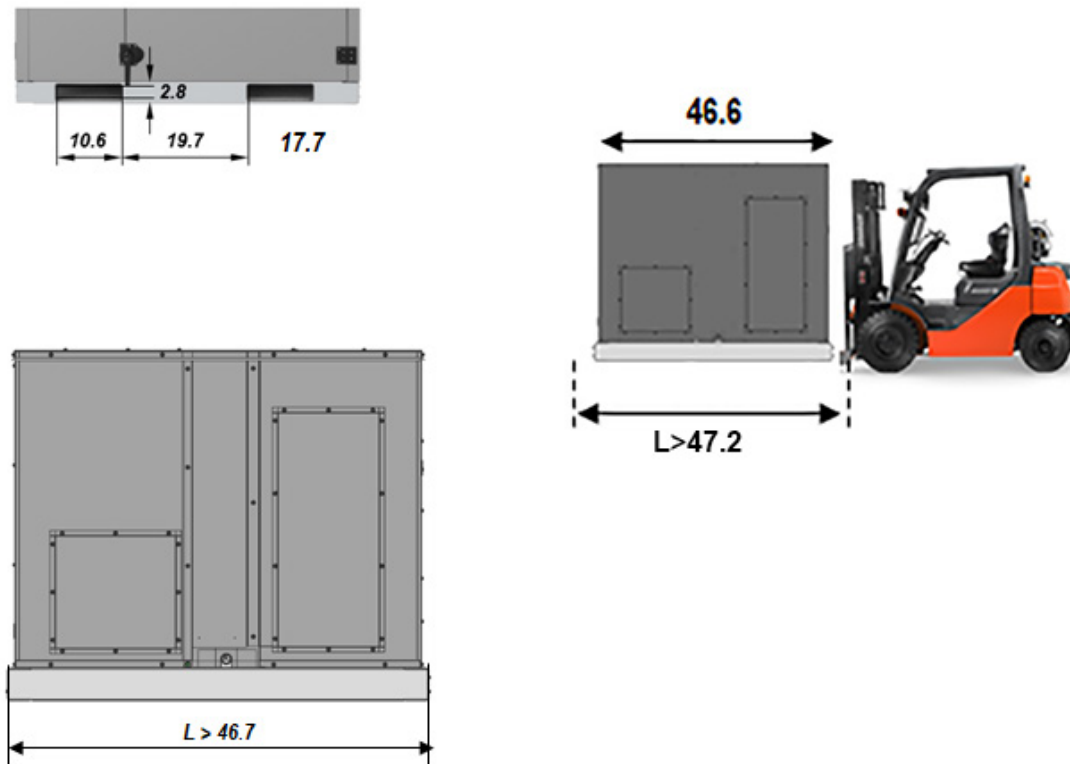
Handling

Units are to be rigged and moved by the lifting or by the skid when a forklift is used.

Note:

Handle the unit in such a manner as to keep from scratching or chipping the coating. Damaged finish may reduce ability of unit to resist corrosion.

Figure 11: Split Rooftop Unit Forklift Guide



INSTALLATION GUIDELINES

Unpacking

Verify that all required parts and the correct quantity of each item have been received. If any items are missing, report shortages to your local representative to arrange for obtaining missing parts. Confirmation of shipment(s) must be limited to only items on the bill of lading.

Storage

Units are protected against damage during shipment. If the unit cannot be installed and operated immediately, precautions need to be taken to prevent deterioration of the unit during storage.

Note:

The customer assumes responsibility of the unit and accessories while in storage. The manufacturer will not be responsible for damage during storage. These suggestions are provided solely as a convenience to the customer.

The ideal environment for the storage of units and accessories is indoors, above grade, in a low humidity atmosphere which is sealed to prevent the entry of blowing dust, rain, or snow. Units designed for outdoor applications may be stored outdoors.

Indoor

Maintain temperatures evenly to prevent condensation. Remove any accumulations of dirt, water, ice, or snow and wipe dry before moving to indoor storage. To avoid condensation, allow cold parts to reach room temperature. Leave coverings loose to permit air circulation and to allow for periodic inspection.

The unit must be stored at least 3½ in. (89 mm) off the floor. Clearance must be provided to permit air circulation and space for inspection.

Outdoor

The unit must be placed on a level surface to prevent water from leaking into the unit. The unit should be elevated so that it is above water and snow levels.

Ensure sufficient support to prevent unit from settling into soft ground. Locate parts far enough apart to permit air circulation, sunlight, and space for periodic inspection. To minimize water accumulation, place all unit parts on blocking supports so that rain water will run off.

⊘ Do not cover parts with plastic film or tarps as these cause condensation of moisture from the air passing through heating and cooling cycles.

Inspection and Maintenance

While in storage, inspect units once per month. Keep a record of inspection and maintenance performed.

If moisture or dirt accumulations are found on parts, the source should be located and eliminated. At each inspection. If paint deterioration begins, consideration should be given to touch-up or repainting.

Machined parts coated with rust preventive should be restored to good condition promptly if signs of rust occur. Immediately remove the original rust preventive coating with petroleum solvent and clean with lint-free cloths. Polish any remaining rust from surface with crocus cloth or fine emery paper and oil.

⊘ Do not destroy the continuity of the surfaces.

INSTALLATION GUIDELINES

Removing from Storage

As units are removed from storage to be installed in their final location, they should be protected and maintained in a similar fashion until the equipment goes into operation.

Prior to installing the unit and system components, inspect the unit assembly to make sure it is in working order.

1. Check all fasteners, set screws on the fan, wheel, bearings, drive, motor base, and accessories for tightness
2. Rotate the fan wheel(s) by hand and assure no parts are rubbing.

Assemblies

Blower - one plenum-type fans (LG 3D Plug). All units are equipped with a plenum fan for Supply Air

Coils - Evaporator coil

Filters - 2 inch thick pleated paper MERV 8(standard) or MERV 13 filters in the supply air stream

Split DX system - Unit ordered with either Multi V 5 outdoor unit or Multi V S outdoor unit.

Airflow Arrangement

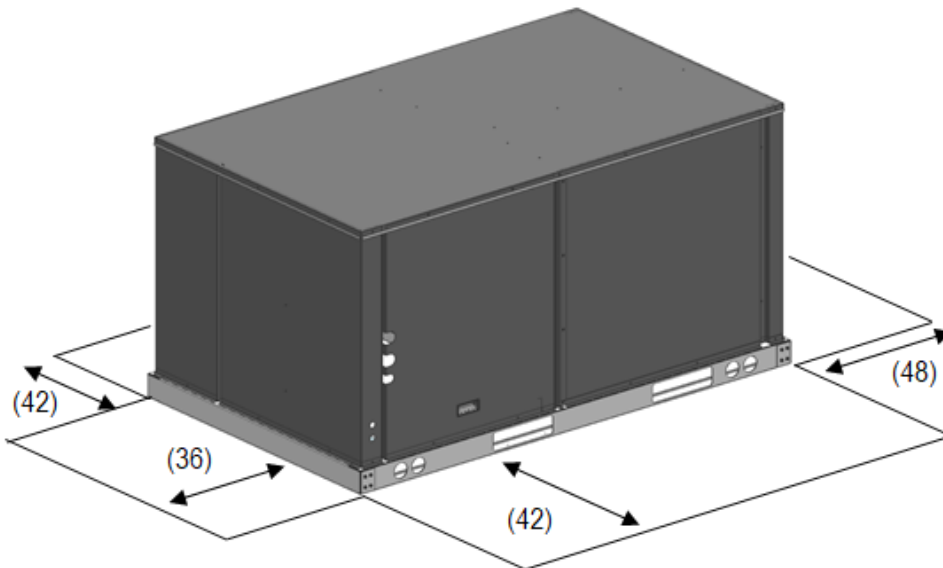
The unit is capable of Constant Air volume (CAV) with two different mode. One is "Air Volume (CFM) Control" which follow automatically the target CFM value. It can be used between 0.8 and maximum ESP. The other is "Constant Volume" control; this is manual set up of the Air volume with RPM setting. It can be used between 0.2 to 0.8 in.wg.

Service Clearance

Allow service clearances as indicated in Figure below. Also, it is recommended to provide a roof walkway to the RTU, as well as along each side of the unit in order to provide access to most controls and serviceable components.

Refer to NEC and local for minimum clearances around the unit and control panel.

Figure 12: Clearance Requirements for Split Rooftop Unit.



INSTALLATION GUIDELINES

Rigging

Rigging holes for shackles are integral on the unit base. Use four independent lines, securing one end of a line to a unit base lifting point and the other end of the line to an associated spreader bar lifting point. See Figure below.

Use spreader bars to prevent damage to the unit cabinet. Avoid twisting or uneven lifting of the unit. The cable length from the bracket to the hook should always be longer than the distance between the outer lifting points.

Lifting

⚠ WARNING

- Only trained and qualified personnel should be allowed to rig loads or operate load rated cranes and/or hoist assemblies. ⚠ Do not use a forklift to lift or maneuver the unit. Failure to use a load rated crane or hoist assembly to lift or maneuver the unit can cause severe personal injury and property damage.
- Use all lifting points. Improper lifting can cause property damage, severe personal injury, or death.

Note:

Lifting points may not be symmetrical to the center of gravity of the unit. Ballast or unequal cable lengths may be required.

- Before lifting, be sure that all shipping materials have been removed from unit.
- To assist in determining rigging requirements, see the General Data section of this manual.
- Spreader bars must span the unit to prevent damage to the cabinet by the lift cables
- Always test-lift the unit to check for proper balance and rigging before hoisting to desired location.
- ⚠ Do not lift unit by weatherhood.
- ⚠ Do not lift units in windy conditions.
- Preparation of curb and roof openings should be completed prior to lifting unit to the roof.
- Check to make sure that gasket (supplied by others) has been applied to the top of the curb prior to lifting the unit and setting on the curb.
- ⚠ Do not use fork lifts for handling unit.

Figure 13: Split Rooftop Unit Rigging

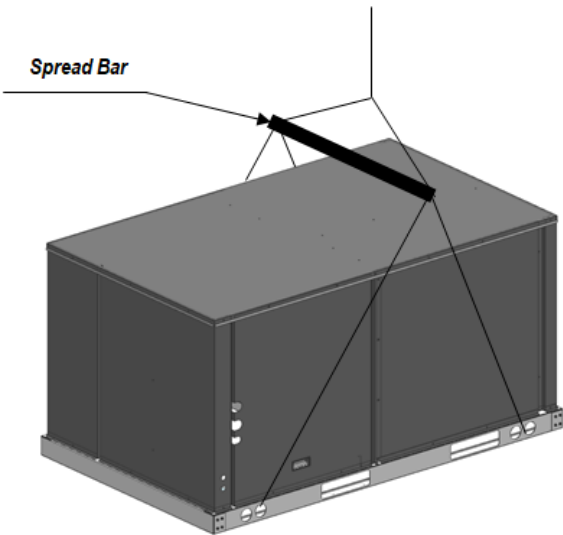


Table 8: Split Rooftop Unit Net Weights.

Model	ARNU363DDA4	ARNU483DDA4	ARNU603DDA4	ARNU723DDA4
Net Weight (lbs.)	472	472	472	472
Model	ARNU363DDB4	ARNU483DDB4	ARNU603DDB4	ARNU723DDB4
Net Weight (lbs.)	461	461	461	461

INSTALLATION GUIDELINES

Roof Curb Mounting

⚠ WARNING

- Ensure that the chosen location has enough strength to support the weight of the unit(s). If it does not have sufficient strength, the unit(s) will fall and cause physical injury or death.
- Install the Split Rooftop Unit to protect against extremely high winds and earthquakes. Any deficiency in installation will cause unit to fall, resulting in physical injury or death.

⚠ CAUTION

Mold can cause personal injury. Some materials such as gypsum wall board can promote mold growth when damp. Such materials must be protected from moisture that can enter units during maintenance or normal operation.

Note:

- If wind load restraints are needed, hire local engineer to design wind load restraints.
- The bottom of the unit must be field-insulated if outdoor air can contact the bottom of the unit.
- ☉ To avoid leakage, do not drill or punch holes in the floor of the unit
- Gasket material must be applied to all surfaces of the curb which contact the unit to create proper seal between the unit and the curb.

Locate the roof curb and unit on a portion of the roof that can support the weight of the unit. The unit must be supported to prevent bending or twisting of the machine.

If building construction allows sound and vibration into the occupied space, locate the unit over a non-critical area. It is the responsibility of the system designer to make adequate provisions for noise and vibration in the occupied space. Install the curb and unit level to allow the condensate drain to flow properly and allow service access doors to open and close without binding.

Roof curb details, including duct locations and dimensions are to be found in the roof curb assembly instructions. The recommended nominal curb height is at least 14 inches.

1. Install curb

Locate curb over roof opening and fasten in place. Check that the diagonal dimensions are within $\pm 1/8$ inch of each other and adjust as necessary. For proper coil drainage and unit operation, it is important that the installation be level. Shim the curb as required to level. Install gasket on top surface of curb (provided by others). Assembly of a roof curb is shown in figure below.

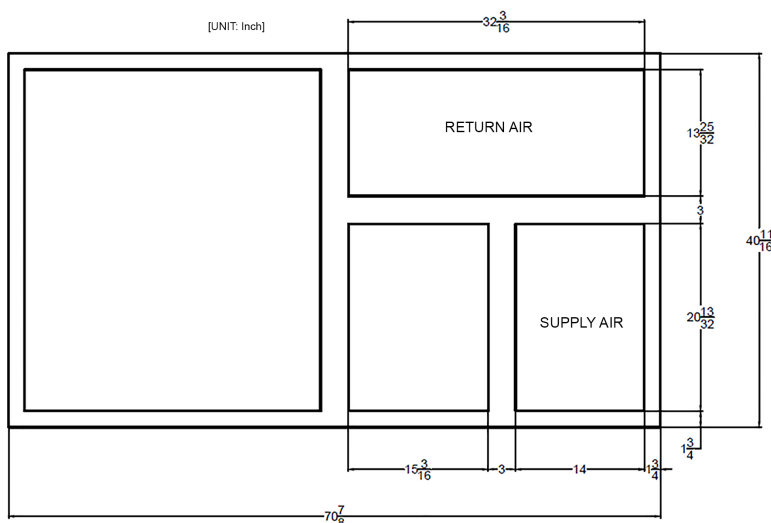
2. Install Duct Work

Installation of all ducts should be done in accordance with SMACNA and AMCA guidelines. Duct adapters are provided to support ducts prior to setting the unit.

3. Set the Unit

Lift unit to a point directly above the curb and duct openings. Guide unit while lowering to align with duct openings. Roof curbs fit inside the unit base. Make sure the unit is properly seated on the curb and level.

Figure 14: Split Rooftop Unit Roof Curb Drawing



INSTALLATION GUIDELINES

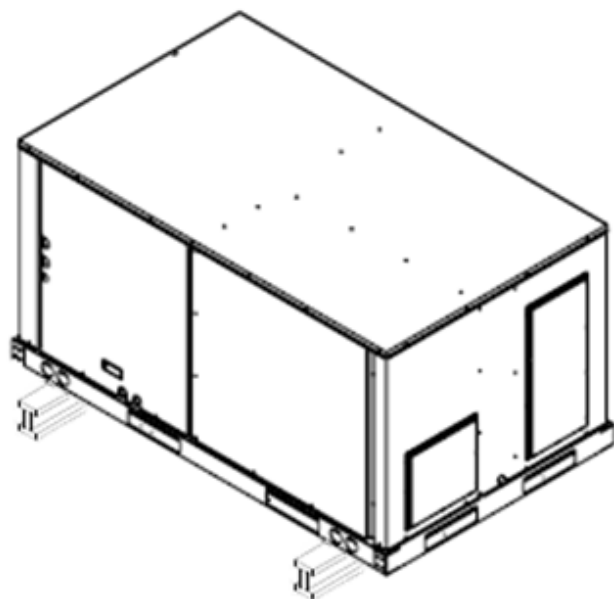
Rail Mounting

Split Rooftop Units can be installed on rails provided and installed by others. Ensure that rails are designed to handle the weight of the unit and provide proper load distribution on building supports.

- Make sure that rail positioning does not interfere with the openings on the unit.
- Rails should run the width of the unit and extend beyond the unit a minimum of 12 inches on each side.
- Set unit on rails.

See Figure below for example of a typical RTU installed on rails supplied by others.

Figure 15: RTU - Installed on Rails.



⚠ WARNING

- *Ensure that the rails are designed to handle the weight of the unit. If the rails don't have sufficient strength, the unit will fall and cause physical injury or death.*
- *Ensure that the chosen location has enough strength to support the weight of the unit(s). If it does not have sufficient strength, the unit(s) will fall and cause physical injury or death.*
- *Install the Split Rooftop Unit to protect against extremely high winds and earthquakes. Any deficiency in installation will cause unit to fall, resulting in physical injury or death.*

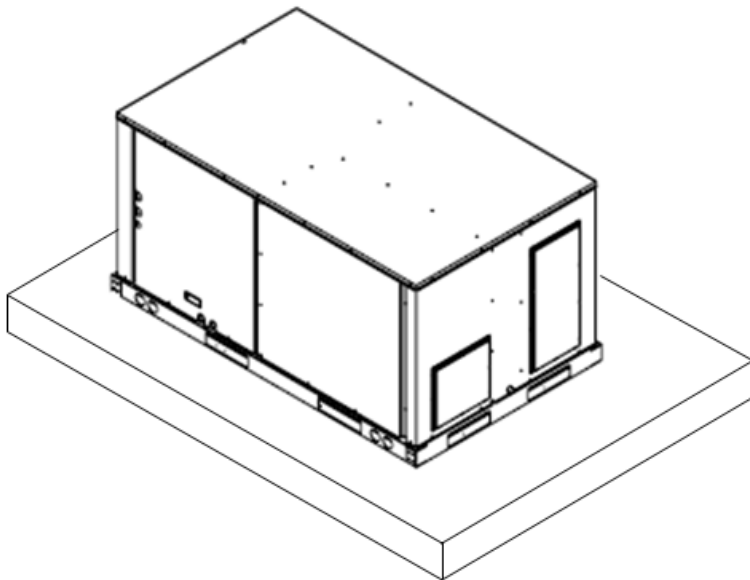
INSTALLATION GUIDELINES

PAD Mounting

A Split Rooftop Unit can be installed on a pad provided and installed by others.

Provide a level concrete slab that extends a minimum of 6 inches (150 mm) beyond unit cabinet.

Figure 16: RTU - Installed on Pad.



⚠ WARNING

- *Ensure that the pad is designed to handle the weight of the unit. If the pad doesn't have sufficient strength, the unit will fall and cause physical injury or death.*
- *Ensure that the chosen location has enough strength to support the weight of the unit(s). If it does not have sufficient strength, the unit(s) will fall and cause physical injury or death.*
- *Install the Split Rooftop Unit to protect against extremely high winds and earthquakes. Any deficiency in installation will cause unit to fall, resulting in physical injury or death.*

REFRIGERANT SAFETY

R410A Refrigerant

R410A refrigerant has a higher operating pressure in comparison to R22 refrigerant and, therefore, 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, so the ozone depletion potential (ODP) is 0.

WARNING

 Do not place the refrigerant cylinder in direct sunlight. Refrigerant cylinder may 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 may 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 may fail when pressurized.

Refrigerant Safety Standards

WARNING

Verify that the maximum refrigerant concentration in the space where the unit will be mounted meets the concentration limit allowed by ASHRAE Standards 15-2010 and 34-2010. There is danger of asphyxiation from oxygen displacement.

ASHRAE Standards 15-2010 and 34-2010 offer guidelines that address refrigerant safety and the maximum allowable concentration of refrigerant in an occupied space. Refrigerant will dissipate into the atmosphere, but a certain volume of air is required for this to occur safely. For R410A refrigerant, the maximum allowable concentration of refrigerant is twenty-six (26) lbs. per 1,000 cubic feet of an occupied space. Buildings with twenty-four (24) hour occupancy allow half of that concentration.¹

ASHRAE Standards 15 and 34 assume that if a system develops a leak, its entire refrigerant charge will dump into the area where the leak occurs. To meet ASHRAE Standards 15 and 34, calculate the refrigerant concentration that may occur in the smallest room volume on the system, and compare the results to the maximum allowable concentration number.¹ Also consult state and local codes in regards to refrigerant safety.

¹Information about ASHRAE Standard 15-2010 / 34-2010 and addenda current as of the date of this publication.

GENERAL REFRIGERANT PIPING SYSTEM

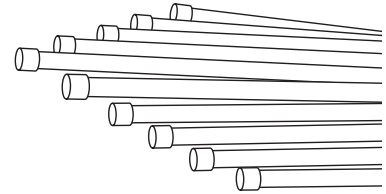
Piping Handling

Piping Handling

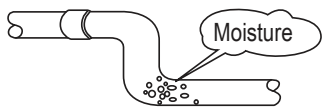
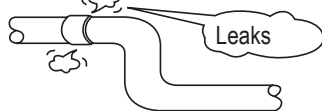
Pipes used for the refrigerant piping system must include the specified thickness, and the interior must be clean.

While handling and storing, do not bend or damage the pipes, and take care not to contaminate the interior with dust, moisture, etc.

Keep Pipes Capped While Storing.



Keep refrigerant pipe dry, clean, and airtight.

	Dry	Clean	Airtight
	No moisture should be inside the piping. 	No dust should be inside the piping. 	No leaks should occur. 
Possible Problems	- Significant hydrolysis of refrigerant oil. - Refrigerant oil degradation. - Poor insulation of the compressor. - System does not operate properly. - EEVs, capillary tubes are clogged.	- Refrigerant oil degradation. - Poor insulation of the compressor. - System does not operate properly. - EEVs and capillary tubes become clogged.	- Refrigerant gas leaks / shortages. - Refrigerant oil degradation. - Poor insulation of the compressor. - System does not operate properly.
Solutions	- Remove moisture from the piping. - Piping ends should remain capped until connections are complete. - Do not install piping on a rainy day. - Connect piping properly at the unit's side. - Remove caps only after the piping is cut, the burrs are removed, and after passing the piping through the walls. - Evacuate system to a minimum of 500 microns and insure the vacuum holds at that level for 24 hours	- Remove dust from the piping. - Piping ends should remain capped until connections are complete. - Connect piping properly at the side of the unit. - Remove caps only after the piping is cut and burrs are removed. - Retain the cap on the piping when passing it through walls, etc.	- Test system for air tightness. - Perform brazing procedures that comply with all applicable standards. - Perform flaring procedures that comply with all applicable standards. - Perform flanging procedures that comply with all applicable standards. - Ensure that refrigerant lines are pressure tested to 550 psig and hold for 24 hours.

GENERAL REFRIGERANT PIPING SYSTEM

Brazing Procedures

Brazing Procedure

⚠ WARNING

⊘ Do not braze in an enclosed location. ⊘ Do not allow the refrigerant to leak during brazing. Always test for gas leaks before and after brazing.

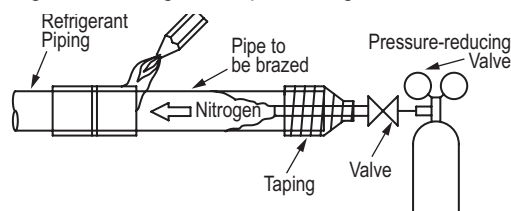
If the refrigerant combusts, it generates a toxic gas that will cause physical injury or death.

Note:

Braze the pipes to the service valve pipe stub of the outdoor unit.

1. All joints are brazed in the field. Multi V refrigeration system components contain very small capillary tubes, small orifices, electronic expansion valves, oil separators, and heat exchangers that can easily become blocked. Proper system operation depends on the installer using best practices and utmost care while assembling the piping system.
2. Store pipe stock in a dry place; keep stored pipe capped and clean.
3. Blow clean all pipe sections with dry nitrogen prior to assembly.
4. Use adapters to assemble different sizes of pipe.
5. Always use a non-oxidizing material for brazing. ⊘ Do not use flux, soft solder, or anti-oxidant agents. If the proper material is not used, oxidized film will accumulate and clog or damage the compressors. Flux can harm the copper piping or refrigerant oil.
6. Use a tubing cutter, ⊘ do not use a saw to cut pipe. De-bur and clean all cuts before assembly.
7. Brazing joints:
 - Use a dry nitrogen purge operating at a minimum pressure of three (3) psig and maintain a steady flow.
 - Use a 15% silver phosphorous copper brazing alloy to avoid overheating and produce good flow.
 - Protect isolation valves, electronic expansion valves, and other heat-sensitive control components from excessive heat with a wet rag or heat barrier spray.

Figure 17: Refrigerant Pipe Brazing.



Insulate Refrigerant Pipes

Sufficiently insulate all cold surfaces to prevent moisture forming. All pipes must be insulated and each pipe must be separately wrapped. Refer to Figure below. Use field-provided one-half (1/2) inch thick (or thicker) closed-cell insulation. The thickness may need to be increased based on ambient conditions and local codes.

Wrap all refrigerant piping including field-provided isolation ball valves and flexible pipe connection kits provided by LG. Glue all insulation joints with no air gaps between insulation segments, and between insulation segments and the unit case. Ensure insulation material fits snugly against the refrigeration pipe with no air space between the pipe surface and the surrounding insulation.

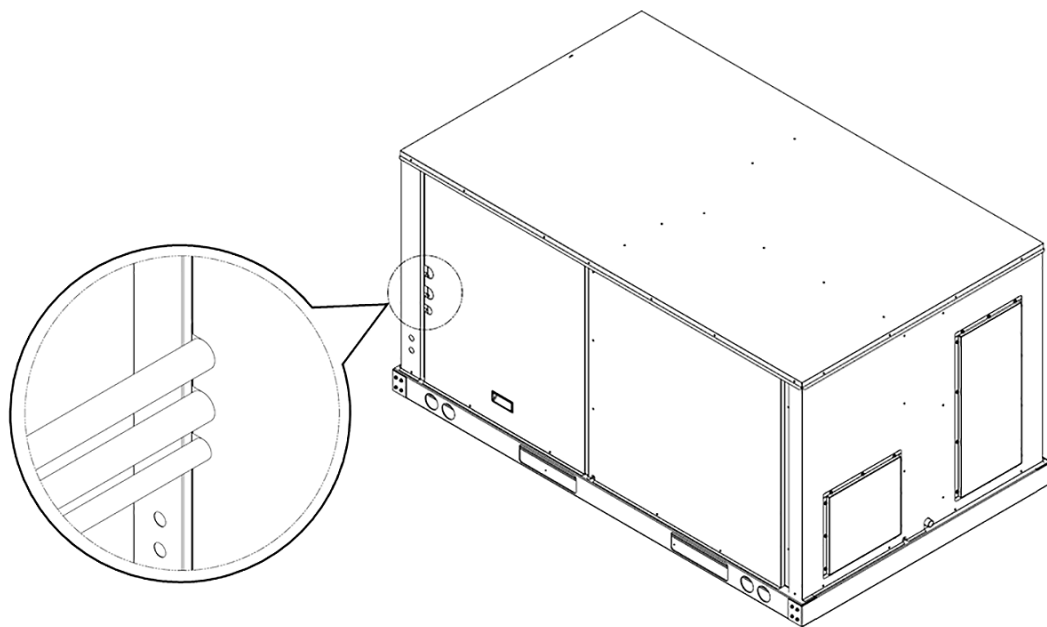
Protect insulation inside hangers and supports with a second insulation layer. Ensure insulation on all pipe passing through pipe hangers, inside conduit, and/or sleeves is not compressed.

This product is designed to work with refrigerant R410A.

Always follow these instructions to perform installation procedures.

- Be sure to use the specified refrigerant during refrigerant circulation and prevent air from contaminating the refrigerant.
- If the refrigerant leaks during the installation process, make sure to ventilate any enclosed space.

Figure 18: No Air Gap in Pipe Insulation in RTU Frame.



REFRIGERANT PIPING

Refrigerant Piping Installation

This product is designed to work with refrigerant R410A. Always follow proper instructions to perform installation procedures.

- Be sure to use the specified refrigerant during refrigerant circulation and prevent air from contaminating the refrigerant.

DANGER

If refrigerant 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 a fire, electric shock, explosion, physical injury or death.

WARNING

Always check for system refrigerant leaks after the unit has been installed or serviced.

Exposure to high concentration levels of refrigerant gas will lead to illness or death.

Note:

LG Electronics U.S.A., Inc., is not responsible for any piping calculations, refrigerant leaks, degradation of performance, or any other potential problems or damages as a result of interconnecting piping, their joint connections, isolation valves, introduced debris inside the piping system, or other problems caused by the interconnecting piping system.

Always check for system refrigerant leaks after the unit has been installed or serviced.

Low refrigerant levels will cause product failure.

- ⊗ **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 damage will occur.

Selecting Field-Supplied Copper Piping

Note:

Always follow local codes when selecting and installing copper pipe and piping system components.

Approved piping for use with Multi V products will be marked "R410 RATED" along the length of the pipe. Piping wall thickness must meet local code requirements and be approved for a maximum operating pressure of 551 psi. When bending piping, try to keep the number of bends to a minimum, and use the largest radii possible to reduce the equivalent length of installed piping; also, bending radii greater than ten (10) piping diameters can minimize pressure drop. Be sure no traps or sags are present.

LG prefers the use of hard drawn copper in pipe segments when connecting a Split Rooftop Unit product and an outdoor unit.

Note:

- Always reference the LATS HVAC software report.
- Use only the pipe size selected by the LATS HVAC design software. Using a different size will result in a system malfunction or system failure.
- Larger-capacity outdoor units must be the main in a multi-frame system.
- Main outdoor unit capacity must be greater than or equal to the sub 1 outdoor unit capacity, and, where applicable, sub 1 outdoor unit capacity must be greater than or equal to the sub 2 outdoor unit capacity.
- Connection piping from branch to branch cannot exceed the main pipe diameter (A) used by the outdoor unit.
- ⊗ Other indoor units cannot be connected with Split Rooftop Units.
- ⊗ Header branches cannot be installed with Split Rooftop Units.
- ⊗ Multi V DOAS units and Multi V indoor units cannot be combined in the same installation.

Refrigerant Pipe Length Limits

Proper system operation depends on the installer using utmost care while assembling the piping system. The following pages are an overview of best practices when installing the refrigerant piping system.

One of the most critical elements of a Multi V system is the refrigerant piping. The table below lists pipe length limits that must be followed in the design of a Multi V refrigerant pipe system:

Table 9: Multi V Refrigerant Piping System Limitations.

Pipe Length (ELF = Equivalent Length of pipe in Feet)	Longest total equivalent piping length	3,280 feet
	Longest distance from outdoor unit to RTU	656 feet (Actual) 738 feet (Equivalent)
	Distance between fittings and RTU	≥20 inches
	Distance between fittings and Y-branches	≥20 inches
	Distance between two Y-branches	≥20 inches
	Minimum distance between RTU to any Y-branch	3 feet from RTU to Y-branch
	Maximum distance between first Y-branch to farthest RTU	131 feet (295 feet for conditional applications)
Elevation (All Elevation Limitations are Measured in Actual Feet)	If outdoor unit is above or below RTU	164 feet
	Between RTUs	98 feet

Table 10: Equivalent Piping Length for Y-branches, Headers, and Other Piping Components.

Component	Size (Inches)														
Long Radius Elbow (ft.)	1/4	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2	1-5/8	1-3/4	2-1/8	
Y-branch (ft.) ¹	0.5	0.6	0.7	0.8	1.2	1.3	1.5	1.6	1.8	2.0	2.1	2.3	2.5	2.8	

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

Selection of Pipe Sizes

For piping work, follow the maximum tolerated length, difference in height, and length after a branch. Determine the proper size referring to following tables and reference figure (only for indication)

Table 11: Piping Outer Diameter (O.D.) size.

ODU Capacity Ton (kBtu/h)	Liquid pipe (O.D.)	Low Pressure pipe (O.D.)	High Pressure pipe (O.D.)
6 (72)	3/8 in	3/4 in	5/8 in
8 (96)		7/8 in	3/4 in
10 (119.7)	1/2 in	1-1/8 in	7/8 in
12 (144)			
14 (168)	5/8 in		1-3/8 in
16-18 (192-206)			
20 (233.1)	3/8 in	1-3/8 in	
22-28 (264-336)		1-3/8 in	
30-42 (360-504)			

REFRIGERANT PIPING

Figure 19: RTU Piping Sizing.

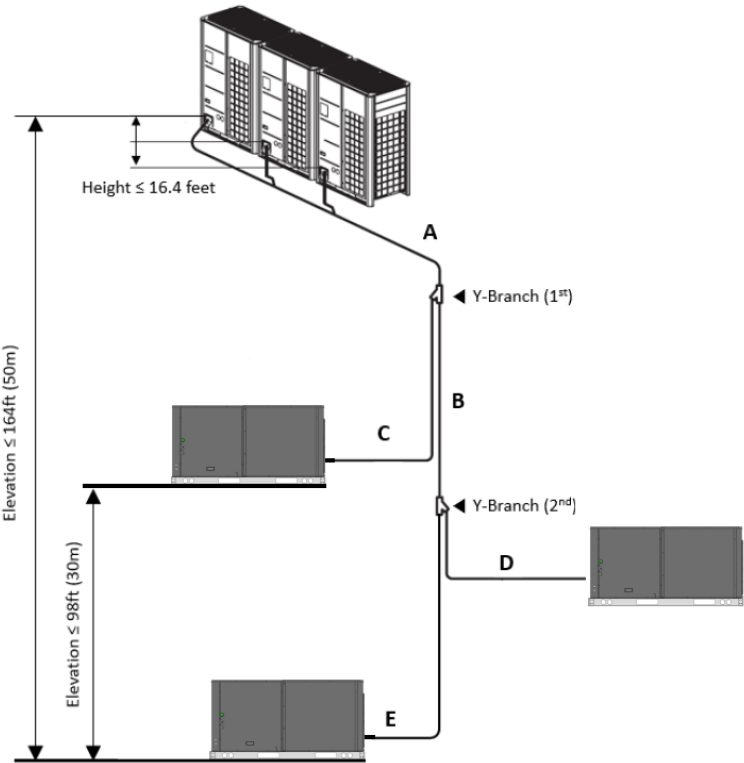


Table 12: Main Pipe (A) Diameters.

ODU Capacity Ton (kBtu/h)	Pipe diameter when pipe length is ≥295 feet (ODU ↔ RTU)		
	Liquid pipe (O.D.)	Low Pressure pipe (O.D.)	High Pressure pipe (O.D.)
10 (119.7)	1/2 in	No Increase	No Increase
12 (144)			
14 (168)	5/8 in		
16-18 (192-206)			
20 (233.1)			
22-28 (264-336)	7/8 in		
30-42 (360-504)			

Table 13: Pipe B/C/D/E between Y-branch and Y-branch / RTU Diameters.

Downstream RTU Capacity (kBtu/h)	Liquid pipe (O.D.)	Low Pressure pipe (O.D.)	High Pressure pipe (O.D.)
≤ 114,700	3/8 in	7/8 in	3/4 in
≤ 172,000	1/2 in	1-1/8 in	7/8 in
≤ 229,400	5/8 in		
≤ 248,500		1-3/8 in	1-1/8 in
≤ 344,000			
≤ 592,000	3/4 in	1-5/8 in	1-3/8 in

Duct Connections in Split Rooftop Units

The unit is shipped in vertical (bottom) duct configuration. To convert to horizontal ducted configuration, remove screws from the side duct opening covers and remove the covers. Using the same screws, install the covers on the vertical duct openings. Seals around duct openings must be tight.

General Guidelines

- To prevent air leaks, seal all ducts following local codes.
- Installation of all ducts must be done in accordance with SMACNA and AMCA guidelines.
- Duct adapters are provided along with the RTU to support ducts.

Figure 20: Split Rooftop Units - Horizontal and Vertical positions.

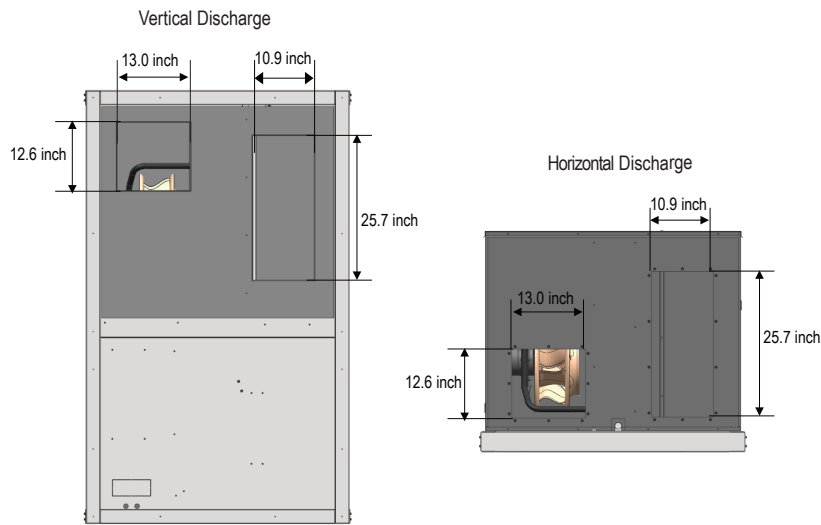
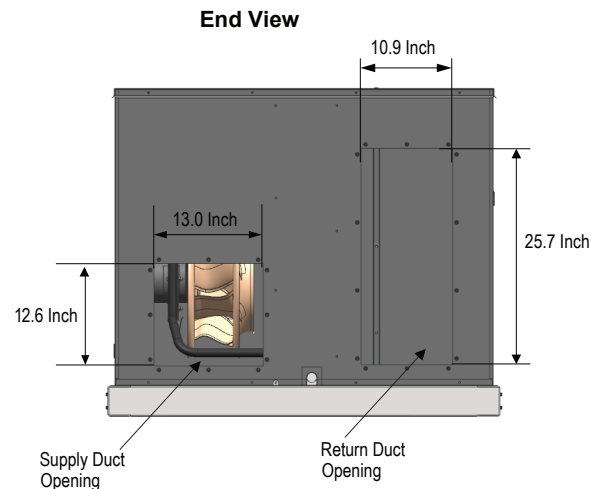
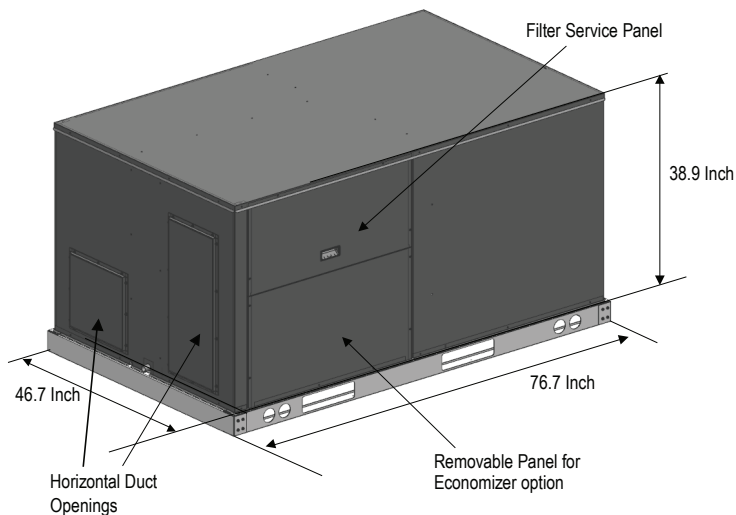
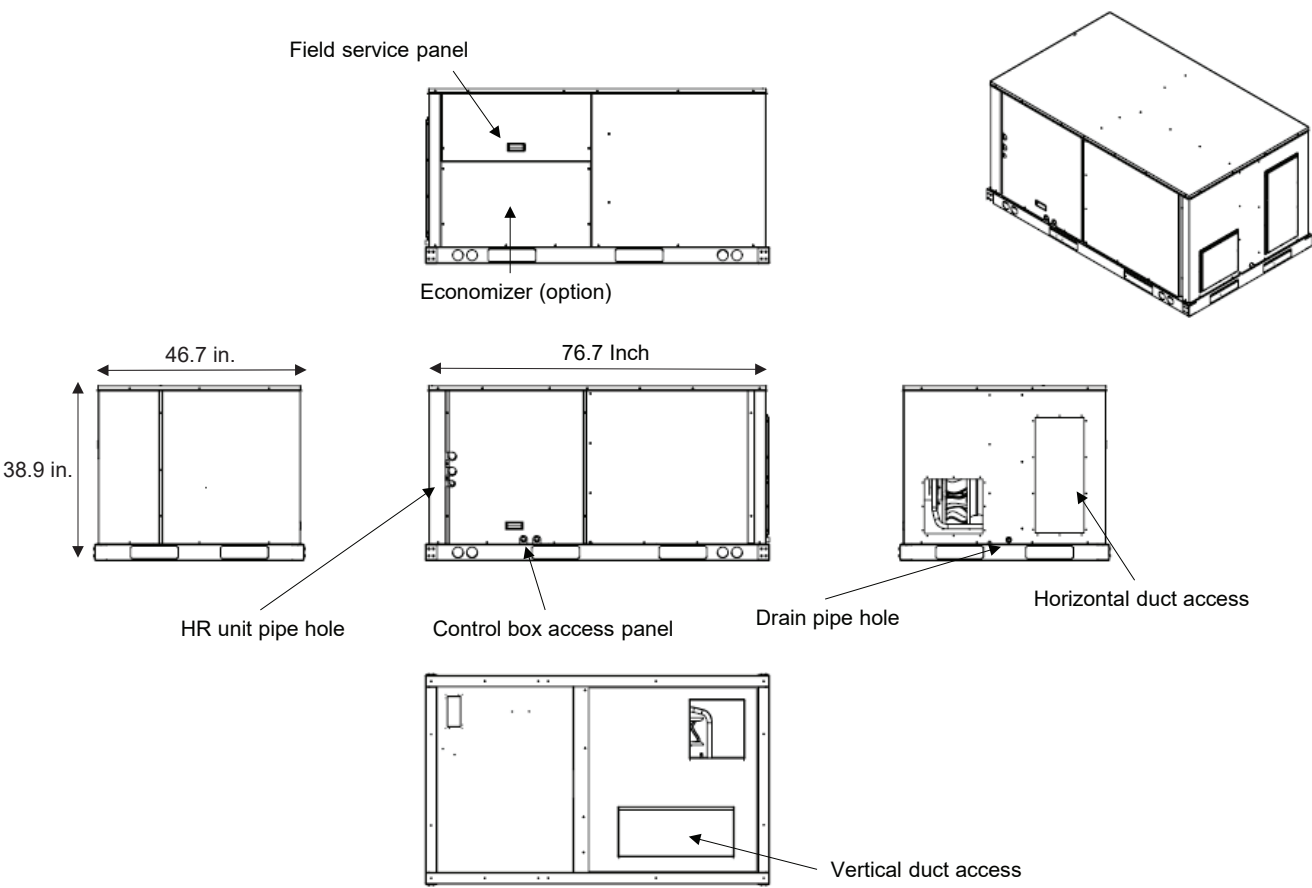


Figure 21: Split Rooftop Unit Duct Connections.



DUCT CONNECTIONS

Figure 22: Split Rooftop Unit Duct Connections.



ROOF DUCTWORK CONFIGURATION

Roof Ductwork Configuration

When the supply air discharge opening and/or the return air intake opening are located on the bottom of a unit, the ductwork must be connected to the curb directly. The actual opening sizes in the floor of the unit are not specified as they are slightly undersized from the duct dimensions shown on the following curb drawings.

The contractor is responsible for providing transitions to accommodate difference in sizing between the unit and the building ducts. Duct connections to collar-type openings can be made with S-cleats or overlapping joints. Apply caulk around each duct connection. Failure to seal duct connections can cause air leakage and system performance problems.

A straight duct for a distance of three (3) to six (6) duct diameters from the unit discharge should be used to develop a full dynamic head. Branching and turning closer to the discharge causes system effect losses.

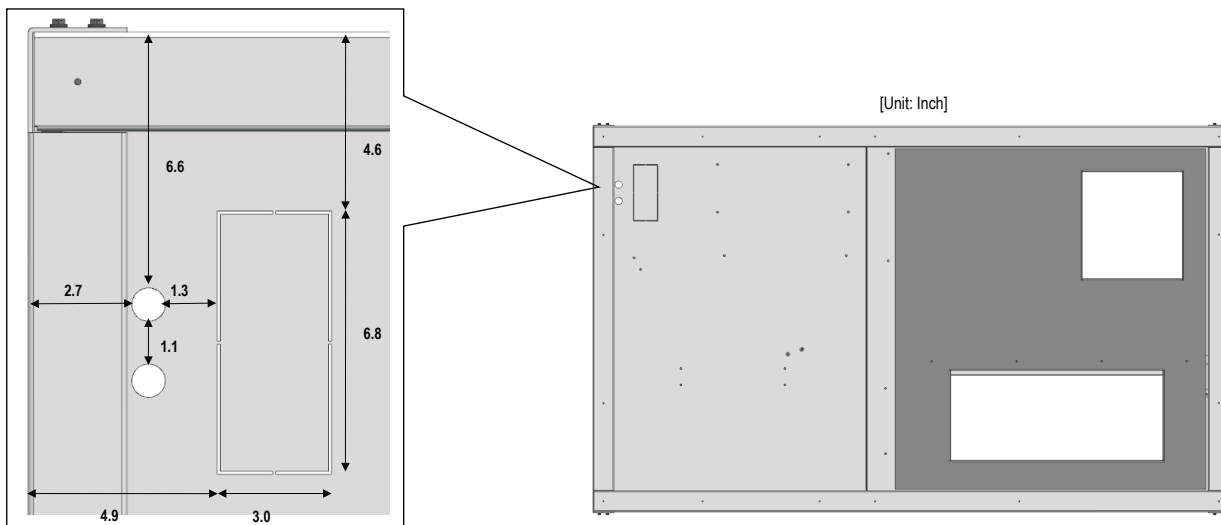
Note:

When an air duct which carries supply air or warm air passes through a combustible roof, a clearance of one inch must be maintained between the outside perimeter of ductwork and any combustible materials, per NFPA Standard 90A.

Access Holes (Bottom side)

A number of pre-punched holes / openings are provided on the cabinet for electrical and gas connections for each unit.

Figure 23: Split Rooftop Unit Access Holes



PIPING CONNECTIONS

Piping Connections

Figure 24: Split Rooftop Unit Piping Connection Dimensions.

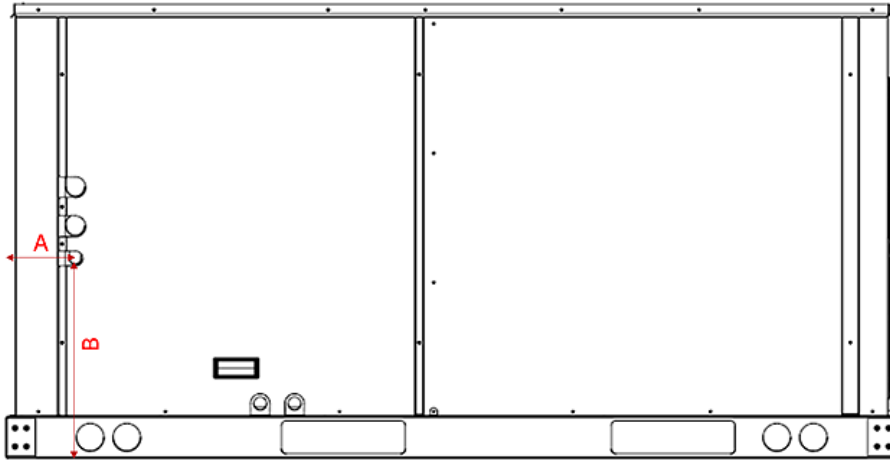


Table 14: Split Rooftop Unit Pipe Connections (Heat Recovery Model).

Nominal Tons	Model Name	Liquid Line				High Pressure Gas Line				Low Pressure Gas Line			
		Dia (in.)	Connection	A (in.)	B (in.)	Dia (in.)	Connection	A (in.)	B (in.)	Dia (in.)	Connection	A (in.)	B (in.)
6	ARUN723DDA4	3/8	Brazed	5-1/32	17-1/8	5/8	Brazed	5-1/32	19-7/8	3/4	Brazed	5-1/32	23-7/32
5	ARUN603DDA4	3/8	Brazed	5-1/32	17-1/8	5/8	Brazed	5-1/32	19-7/8	3/4	Brazed	5-1/32	23-7/32
4	ARUN483DDA4	3/8	Brazed	5-1/32	17-1/8	1/2	Brazed	5-1/32	19-7/8	3/4	Brazed	5-1/32	23-7/32
3	ARUN363DDA4	3/8	Brazed	5-1/32	17-1/8	1/2	Brazed	5-1/32	19-7/8	3/4	Brazed	5-1/32	23-7/32

Table 15: Split Rooftop Unit Pipe Connections (Heat Pump Model).

Nominal Tons	Model Name	Liquid Line				Gas Line			
		Dia (in.)	Connection	A (in.)	B (in.)	Dia (in.)	Connection	A (in.)	B (in.)
6	ARUN723DDB4	3/8	Brazed	5-1/32	17-1/8	5/8	Brazed	5-1/32	23-7/32
5	ARUN603DDB4	3/8	Brazed	5-1/32	17-1/8	5/8	Brazed	5-1/32	23-7/32
4	ARUN483DDB4	3/8	Brazed	5-1/32	17-1/8	1/2	Brazed	5-1/32	23-7/32
3	ARUN363DDB4	3/8	Brazed	5-1/32	17-1/8	1/2	Brazed	5-1/32	23-7/32

PIPING CONNECTIONS

Figure 25: Split Rooftop Unit Refrigerant Piping Connections (Heat Recovery Model).

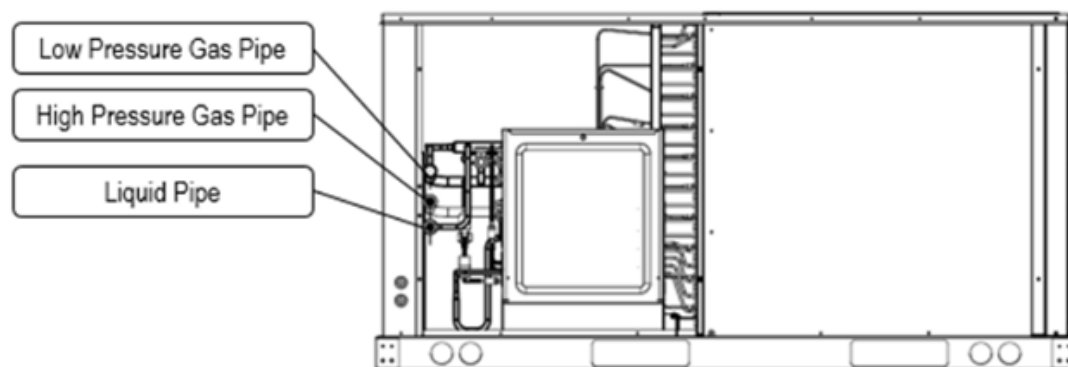
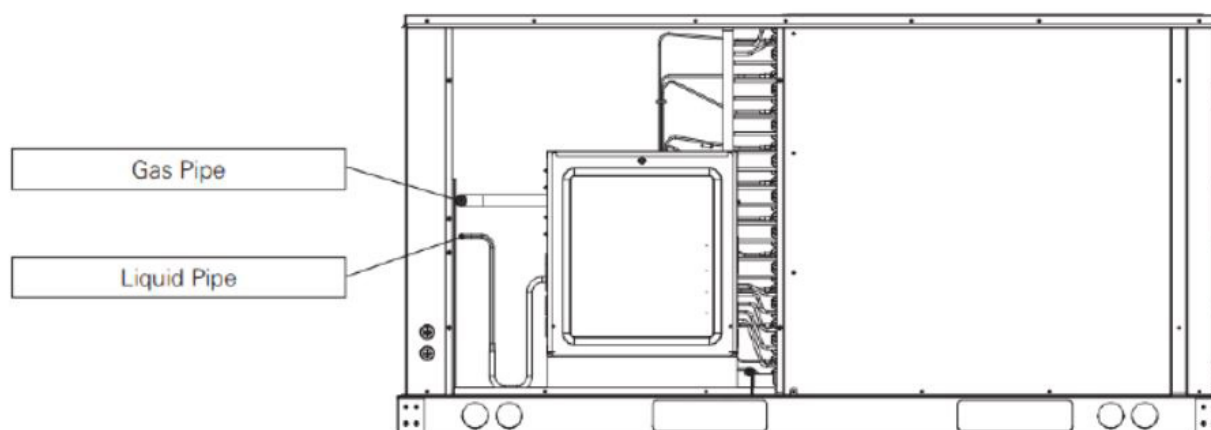


Figure 26: Split Rooftop Unit Refrigerant Piping Connections (Heat Pump Model).



CONDENSATE PIPING INFORMATION

Condensate Drain Connection

Condensate drain trapping and piping must conform to all applicable codes. A U-trap and drain line must be installed. The U-trap cannot exceed 6 inches from the drain connection. The lines need to be the same pipe size or larger than the drain connection. Include a U-trap, and pitch downward toward the drain. An air break should be used with long condensate line runs.

Note:

- Failure to install U-traps can result in an overflow of condensate water. This can lead to product damage or property damage. Draw-through cooling coils will have a negative static pressure in the drain pan area. This can cause an un-trapped drain to back up due to the air being pulled up through the condensate drain piping.
- The value of pressure in the drain pipe should be at least equal to the absolute value of the negative static pressure in the drain pan plus one inch.

The Split Rooftop Unit has one inch condensate drain connection on end of condensate pan. The piping for the condensate drain and external trap can be completed after the unit is in place. See Figure below.

All Split Rooftop Units must have an external trap for condensate drainage. Install a trap at least 4 inches (102mm) deep and protect against freeze-up. If drain line is installed downstream from external trap, pitch line away from the unit at 1 inch per 10 feet (25mm per 3m) of run.

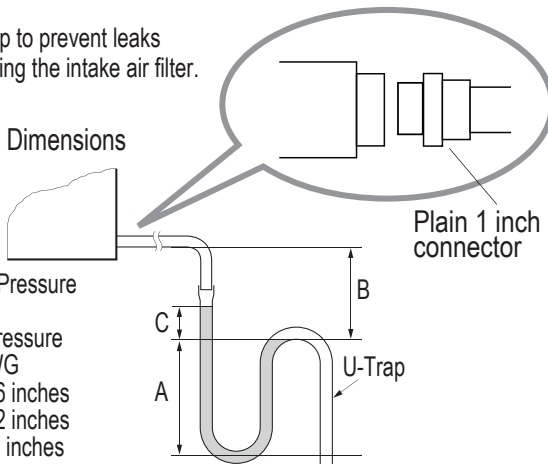
⚠ Do not use a pipe size smaller than the unit connection (1 inch).

Figure 27: U-Trap Specifications.

- Install the U-Trap to prevent leaks caused by blocking the intake air filter.

Applied U-Trap Dimensions

- A ≥ 4 inch
- B ≥ 2C
- C ≥ 2 x SP
- SP = External Pressure (in. WG)
- Ex) External Pressure = 0.4 in. WG
- A ≥ 2-9/16 inches
- B ≥ 1-7/12 inches
- C ≥ 13/16 inches



CONDENSATE PIPING INFORMATION

Condensate Drain Connection Location and Sizes

Figure 28: Split Rooftop Unit Condensate drain location.

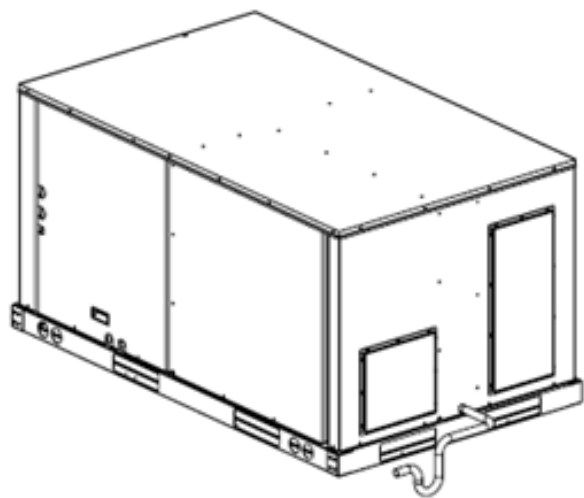


Figure 29: Split Rooftop Unit Condensate drain location and sizes.

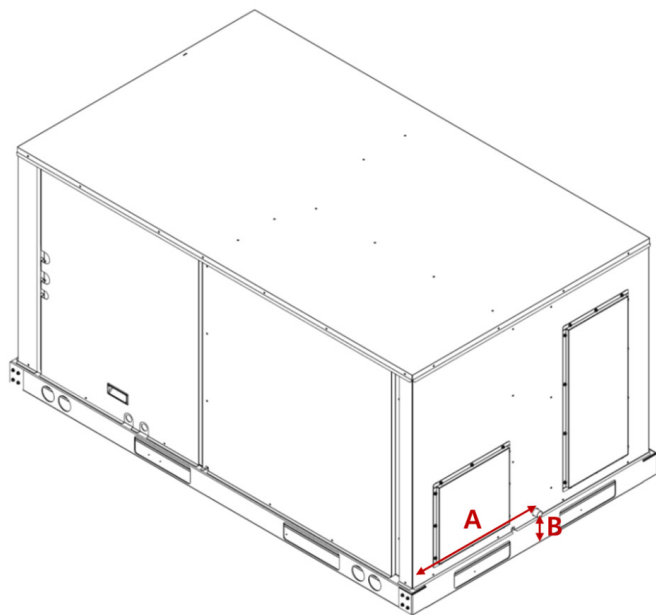


Table 16: Split RTU Condensate drain location and sizes.

Model Name	Gravity Drain			
	Drain Pipe Dia. (OD, in.)	Connection	A	B
ARUN363DDA4	1	Plain	24-1/4	4-19/32
ARUN483DDA4	1	Plain	24-1/4	4-19/32
ARUN603DDA4	1	Plain	24-1/4	4-19/32
ARUN723DDA4	1	Plain	24-1/4	4-19/32

ELECTRICAL

General Information

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) regulations related to electrical equipment and wiring, and following the instructions in this manual. Failure to do so will lead to electric shock and bodily injury or death.
- Be sure that main power to the unit is completely off before proceeding. Follow all safety and warning information outlined at the beginning of this manual. Failure to do so will cause electric shock and bodily injury.
- Familiarize yourself with the location of the circuit breaker. Be sure that a 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.
- Undersized wiring will lead to unacceptable voltage at the unit and will cause a fire, which will cause bodily injury or death.
- Properly ground all outdoor units and DOAS units. Ground wiring must always be installed by a qualified technician. Ground wiring is required to prevent accidental electrical shock during current leakage, which will cause bodily injury or death.
- The outdoor units are inverter driven. ⚡ Do not install a phase-leading capacitor; if installed, it will deteriorate the power factor improvement effect, cause the capacitor to generate an abnormal amount of heat, which will result in physical injury.
- 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 could include some amount of direct current. Using an oversized breaker or fuse will result in electric shock, physical injury or death.
- ⚡ Do not connect ground wire to refrigerant, gas, 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, physical injury or death.

Note:

- The information contained in this manual is intended for use by a trained electrician familiar with applicable local codes and the U.S. National Electric Code (NEC), and 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 or property damage.
- Consider ambient conditions (temperature, direct sunlight, inclement weather, etc.) when selecting, installing, and connecting the power wiring.
- Properly ground all outdoor units and Split Rooftop Units. Ground wiring must always be installed by a qualified technician. Improperly ground wire can cause communication problems from electrical noise, and motor current leakage.
- If there is a possibility of reversed phase, phase loss, momentary blackout, or the power goes on and off while the system is operating, install a field-supplied phase loss protection circuit. If the system operates in reversed phase, etc., it will damage the compressors and other components.
- 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.

Separating Power Wiring and Communication Cables

- ⊘ Avoid running the power wiring and communication cable alongside each other; there is a strong likelihood of operation malfunction due to electrostatic and electromagnetic interference. ⊘ Do not run both in the same conduit.
- If running the power wiring and communication cable alongside each other cannot be avoided, see the table below for minimum required distances.

Table 17: Power Wire and Communications Cable Minimum Required Separation Allowable Distances.

Capacity of Power Supply Wiring (current)	Required Minimum Distance ^{1,2}
100V or more	10A
	20 inches
	40 inches
	60 inches

¹The figures above are based on parallel lengths up to 328 feet long. For lengths in excess of 328 feet, the distances will have to be recalculated in direct proportion to the additional line lengths involved.

²If the power supply waveform continues to exhibit some distortion, the space between the power wiring and communication cable must be increased.

Note:

- ⊘ Do not secure the power wiring and communication cables together. It will result in equipment malfunction.
- ⊘ Do not run the power wiring and the communication cable in the same conduit. It will result in equipment malfunction.

ELECTRICAL

Power Wiring / Communication Cable Connections

Power Wiring / Communication Cable Connections

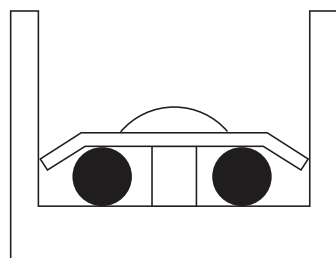
Best practice dictates using solderless ring or fork terminals at all power wiring and communication cable terminations. Use copper bearing ring or fork terminals; ⓧ do not use galvanized or nickel plate over steel. Use appropriate crimping tool to attach the ring or fork terminals at all power wiring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

- Firmly attach the wire; secure in a way to prevent external forces from being imparted to the terminal block.
- Use an appropriately sized screwdriver for tightening the terminals.
- ⓧ Do not overtighten the connections; overtightening will damage the terminals.

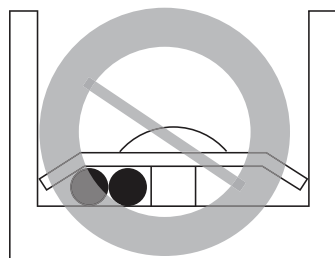
If ring terminals or fork terminals are not available, then:

- ⓧ 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.

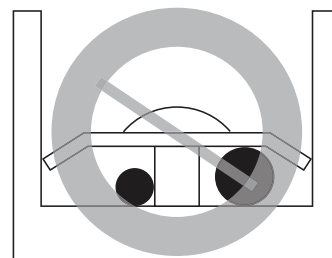
Figure 31: Proper and Improper Power Wiring Connections.



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.

● :Copper Wire

⚠ 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.

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 overtighten the connections — overtightening 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.

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 heat recovery units are wired in relation to the outdoor unit.
- ⓧ Do not include splices or wire nuts in the communication cable.

Figure 30: Close up of a Typical Ring Terminal.

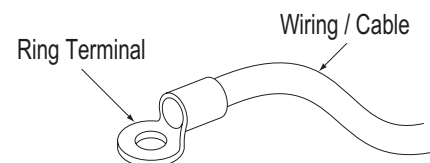
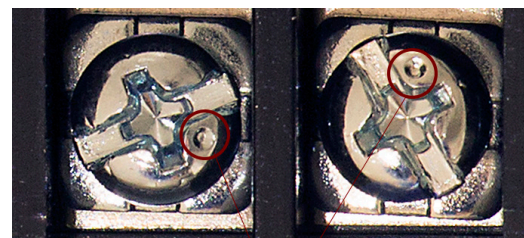


Figure 32: JIS Screws.



JIS DIMPLES

Power Supply / Power Wiring Specifications

Outdoor unit(s) and indoor units / heat recovery units must be provided power from separate breakers. For detailed information, see the Multi V Outdoor Unit Engineering and Installation Manuals on www.lghvac.com

Indoor Units / Heat Recovery Units

- Indoor units and heat recovery units require 1Ø, 208-230V, 60Hz power, but each unit draws minimal power.
- Where permitted by NEC and local codes, multiple indoor units and heat recovery units will be powered from a single breaker.
- Service switches typically must be installed for each indoor unit and heat recovery unit.
- Ground each indoor unit and heat recovery unit separately to a solid earth ground source per NEC and local code requirements.

⚠ WARNING

- *All power wiring installation must be performed by trained service providers working in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Failure to do so will lead to electric shock and bodily injury or death.*
- *Use specified wiring for connections, and ensure that external force is not imparted to terminal connections. If connections firmly attached, it will generate heat and / or cause a fire, resulting in physical injury or death.*
- *Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent will include some amount of direct current. Using an oversized breaker or fuse will result in electric shock, physical injury or death.*
- *Use the appropriate type of overcurrent protection. Generated overcurrent will include some amount of direct current, and if the appropriate type of overcurrent protection is not installed, there is a risk of fire, electric shock, and physical injury or death.*
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. Ⓢ Do not connect the ground line to the pipes. There is risk of fire, electric shock, explosion, physical injury or death.*
- *Install a main shutoff switch that interrupts all power sources simultaneously. There is risk of fire, electric shock, explosion, physical injury or death.*

Note:

- *Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent could 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 National Electrical Code-approved earth ground can result in property damage and equipment malfunction.*

ELECTRICAL

Communication Cable Specifications

Communication Cable Specifications From Outdoor Unit to RTU / Indoor Units / Heat Recovery Units

- Communication cable from Main Outdoor Unit to RTU / Indoor Units / Heat Recovery Units is to be LG supplied or field supplied 18 AWG, 2-conductor, twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the Main Outdoor Unit chassis only. Ⓢ Do not ground the Outdoor Unit to Indoor Units / Heat Recovery Units communication cable at any other point. Wiring must comply with all applicable local and national codes.
- Cable shields between the connected devices must be tied together and continuous from the Main outdoor unit to the last component connected and insulated to prevent grounding against the RTU/ IDU / HRU electrical enclosures.
- Start the communication cable at the main outdoor unit and route to the indoor units / heat recovery units in a daisy chain configuration.
Ⓢ Do not install in a starburst configuration.
- RTU / Indoor Unit / Heat Recovery Unit Communication Bus: The communication terminals are labeled differently among the indoor units, depending on type (currently for indoor units: A / B, 3[A] / 4[B], or 3 / 4; for heat recovery units: A / B). 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. Match IDU A and B terminals on outdoor unit to A (3) and B (4) terminals on indoor units / heat recovery units.
- Insulation as required by NEC and local codes.
- Rated for continuous exposure of temperatures up to 140°F.
- Maximum allowable communication cable length is 3,281 feet.
- Ⓢ *Never splice communication cable.*

⚠ WARNING

- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage.* Ⓢ *Do not connect the ground line to the pipes. There is risk of fire, electric shock, explosion, physical injury or death.*
- Ⓢ *Never ground the shield of the communications cable to the indoor unit frame or other grounded entities of the building. Inadequate connections will generate heat, cause a fire, and physical injury or death.*

Note:

- *Always verify the communication cable is connected to a communications terminal on the outdoor unit(s).* Ⓢ *Never apply line voltage power to the communication cable connection. If contact is made, the PCBs will be damaged.*
- Ⓢ *Never use a common multiple-core communications cable. Each communications bus must be provided a separate cable (i.e., between outdoor unit(s) and indoor units, outdoor units and central controller(s). If communications cables of separate systems are wired using a common multiple-core cable, it will result in a poor communications signal and unacceptable system operation.*

Communication Cable Connection

Note:

When connecting the communications bus between the outdoor unit, RTU(s), and heat recovery unit(s), it does not matter what physical path or route the wire takes. The installer may use discretion when choosing the order the components are connected to the communications bus, but must maintain the daisy chain and polarity configuration.

1. Access hole for the communications cable and the power cable are located at the bottom of the RTU. Remember that the communications cable and the power cable must enter the control box through different knockouts.
2. Field-install a plastic or rubber grommet in the knockout hole to prevent wire chaffing.
3. If using conduit, connect the conduit to the control box using field-provided fittings and industry best-practice procedures.
4. Provide at least three (3) to four (4) inches of slack cable at each RTU.
5. Secure the communications cable to the inside surface of the control box using a field provided nylon wire clamp.
6. Strip approximately quarter of an inch of insulation from each communications cable conductor. At each RTU, insert the conductors under the terminal screw.
7. Securely tighten the terminal screws to prevent the communications conductors from coming loose from the terminal block.
8. Secure the communications cable in appropriate locations outside the Split Rooftop Unit to prevent damage to the cable or injury to maintenance personnel.

Power Wiring and Communications Cable Location

Figure 33: Location of Power Wiring / Communications Cable Terminals in the Split Rooftop Units.

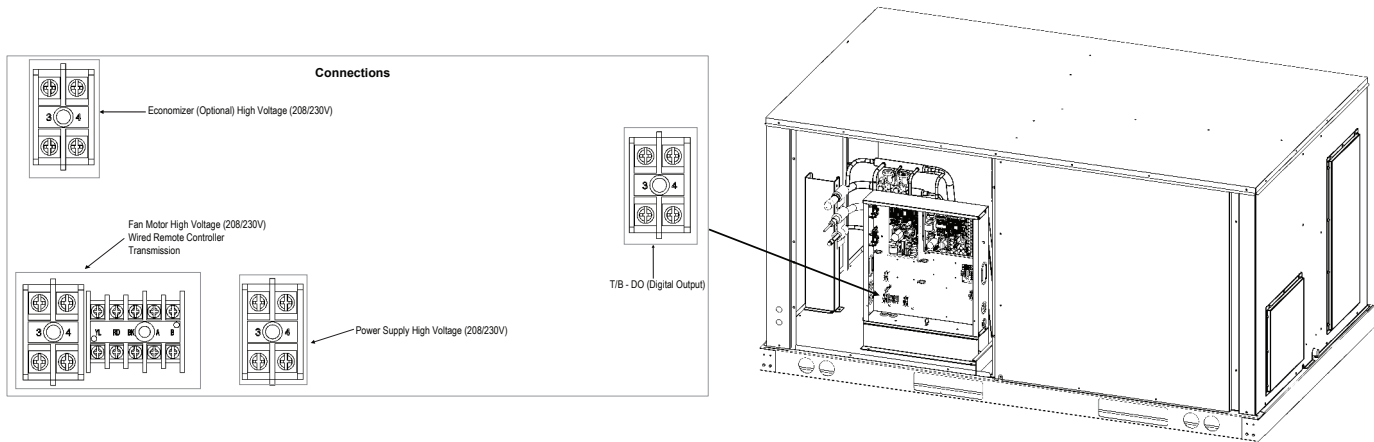
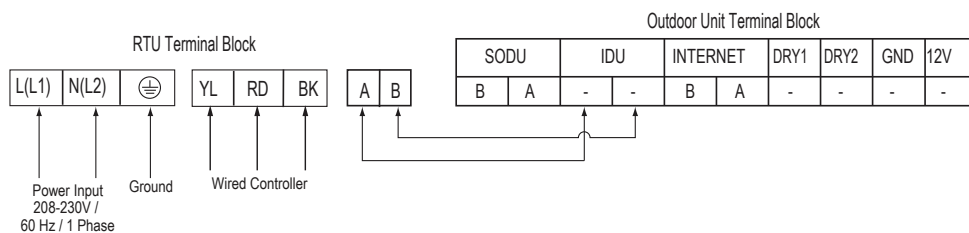


Figure 34: Terminal Block in the Split Rooftop Units.

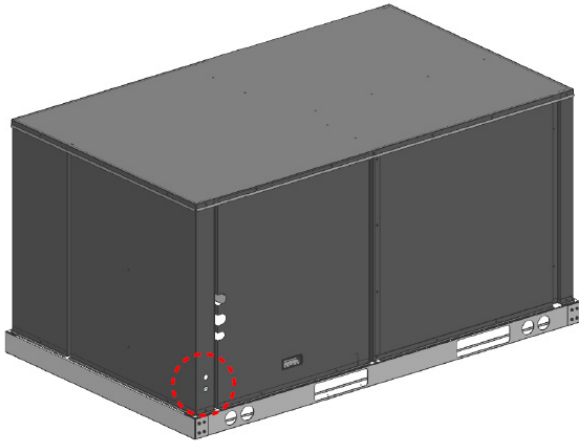


ELECTRICAL

Recommended Electrical Entry Location

It is recommended by the manufacturer that electrical service be brought into the unit through the end wall, as shown below. There are three penetrations into the cabinet that are required.

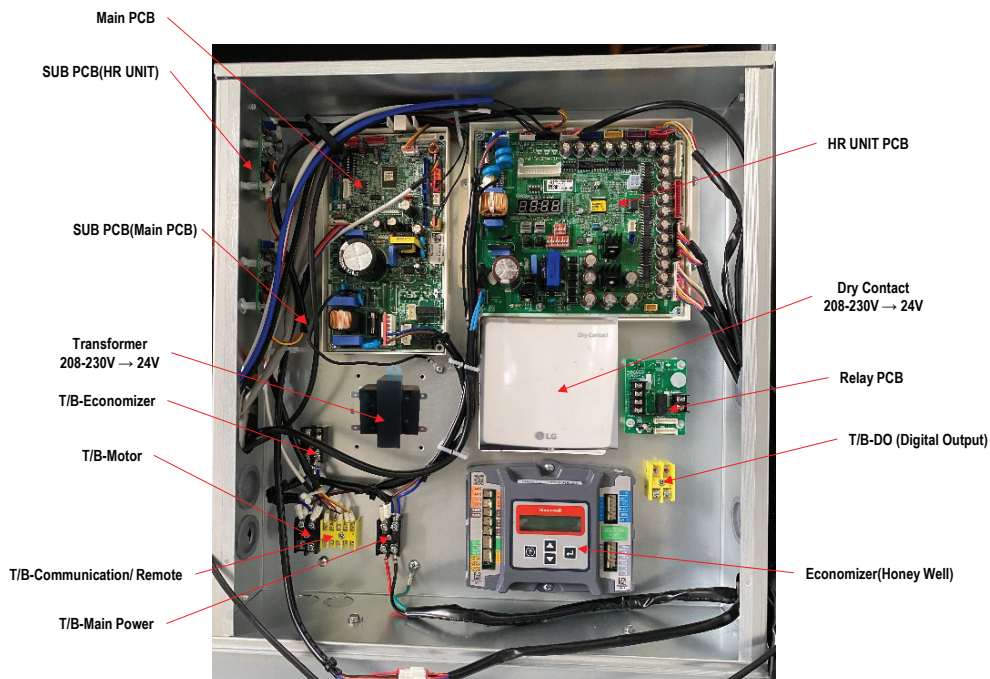
Figure 35: Electrical Entry in the Split Rooftop Units.



Control Box Wiring Connections

It is recommended by the Manufacturer that electrical service be brought into the unit through the end wall, as shown below. There are three penetrations into the cabinet that are required. See Figure below.

Figure 36: Control box in the Split Rooftop Unit.



Connecting the Power Wiring

⚠ DANGER

High voltage electricity is required to operate this system. Adhere to the National Electrical Codes and these instructions when wiring. Always ground the unit following local, state, and National Electrical Codes. Read the safety summary at the beginning of this manual.

- 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.

Note:

- Connect the RTU input power cable but Ⓢ do not apply power to the RTU until authorized to do so by the system commissioning agent. Inappropriate power connection can result in equipment damage and will void the LG limited liability warranty.
 - When connecting the communications bus between the outdoor unit and RTU(s), it does not matter what physical path or route the wire takes. The installer can use discretion when choosing the order the components are connected to the communications bus, but must maintain the daisy chain and polarity configuration.
 - Failure to follow any of these power and communications wiring guidelines or instructions will cause communications errors and unit malfunction.
- Ⓢ Never use wire caps and never splice communications cables.
 - Ⓢ Never connect zone controllers or other central controllers or LG building management system gateways to the RTU / outdoor unit communications cable.

Connection Procedure

RTU installation best practices are to connect control wiring (low voltage) and then connect power wiring (high voltage). Ⓢ Do not apply power to the RTU or any Multi V system component until authorized to do so by the system commissioning agent.

1. Ensure the input power is disconnected and there is no power on the power input cable.
2. Remove the knockout plugs from the control box. Remember the communications cable and the power cable must enter the control box through different knockouts.
3. Install a field provided plastic or rubber grommet in the knockout holes to prevent wire chaffing.
4. If using conduit, connect the conduit to the control box using field provided fittings and industry best-practice procedures.
5. Ensure the power wiring is routed separately from the communications cable to the RTU's terminal block (see figures on the preceeding pages). Ⓢ Do not route the communications cable near the power cable. Provide at least three (3) to four (4) inches of slack cable at each RTU.

Note:

Power wiring is field supplied. Wire size is selected based on the larger MCA value, and must comply with the applicable local and national codes.

6. Connect the power wiring to the terminal block connections. Ensure the screws securely connect the wire to the terminals and are not loose.

7. Polarity matters on the outdoor unit to RTU communications bus, and must be maintained throughout the entire system.

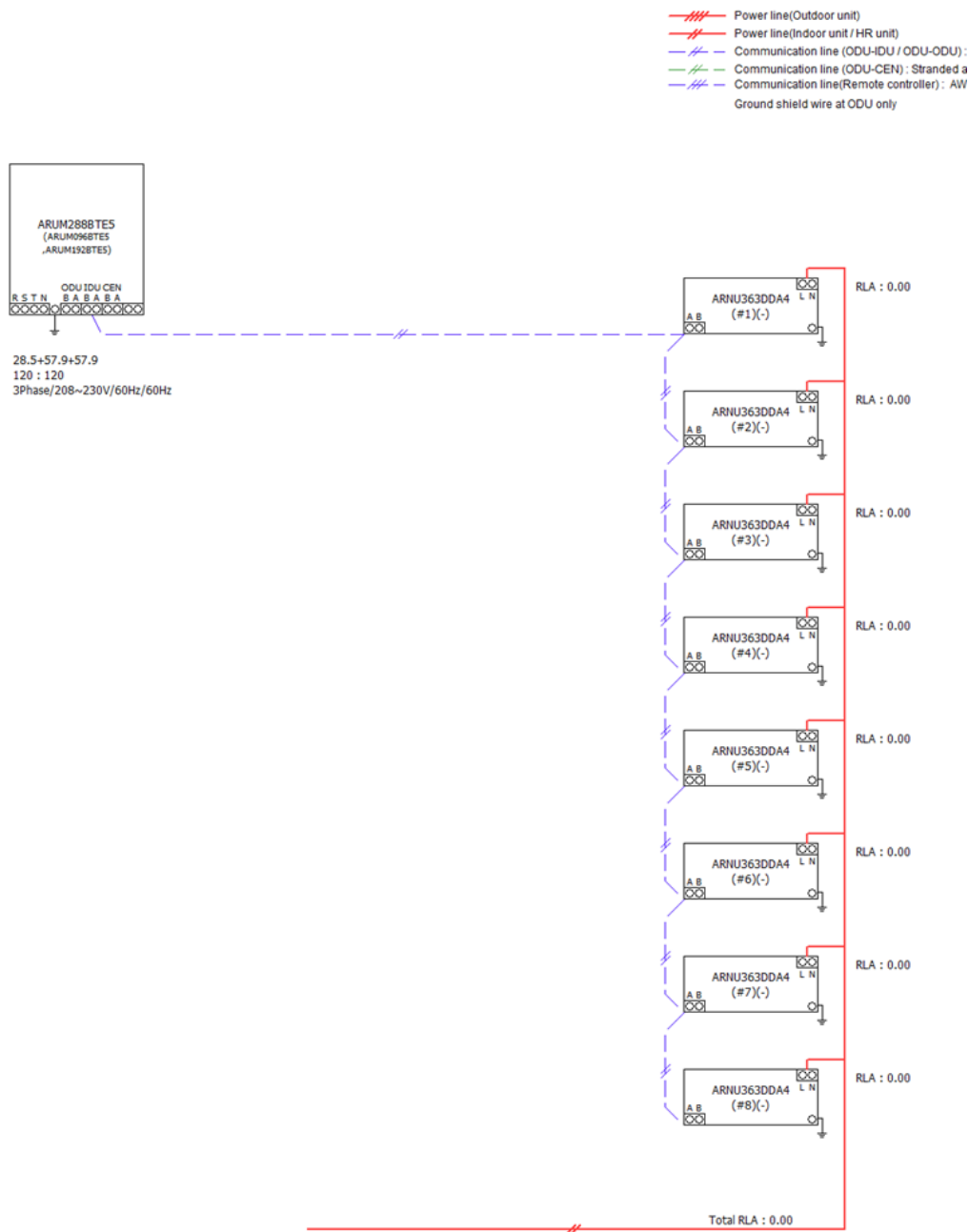
Be sure to connect

- IDU-A terminals (outdoor unit) to ODU(IDU)-A (RTU unit) terminals and connect IDU-B terminals (outdoor unit) terminals to ODU(IDU)-B (RTU unit) terminals.
- Central-A terminals (outdoor unit) to ODU(CEN)-A (RTU unit) terminals and connect Central-B terminals (outdoor unit) to ODU(CEN)-B (RTU unit) terminals.

ELECTRICAL

Typical Daisy Chain Configuration Example

Figure 37: Main Outdoor Unit to RTU Communication Wiring—Typical Daisy Chain Configuration Example.



Note :
Power wiring, breaker size, and disconnects should follow local code and NEC.
Multi-frame outdoor units require a separate power connection for each frame.
Refer to the most up-to-date submittal sheets for applicable electrical data.

ELECTRICAL

Communication Cable Specifications

Communications Cable Specifications from RTUs to Remote Controllers

- Communication cable from RTU 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 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.
- See diagrams below for two options: terminal block connections and Molex connections. Refer to the wiring diagram schematic found in the RTU itself, or to the wiring diagram in this Manual.
- ⚠ NEVER splice, cut, or extend cable length with field provided cable. Always include enough cable to cover distance between the RTU and the remote controller.
- Set the RTU operating parameters using DIP switches, or by setting up the remote controller. Refer to the remote controller installation manuals for more details.

Figure 38: One Example of RTU to Zone Controller Connection.

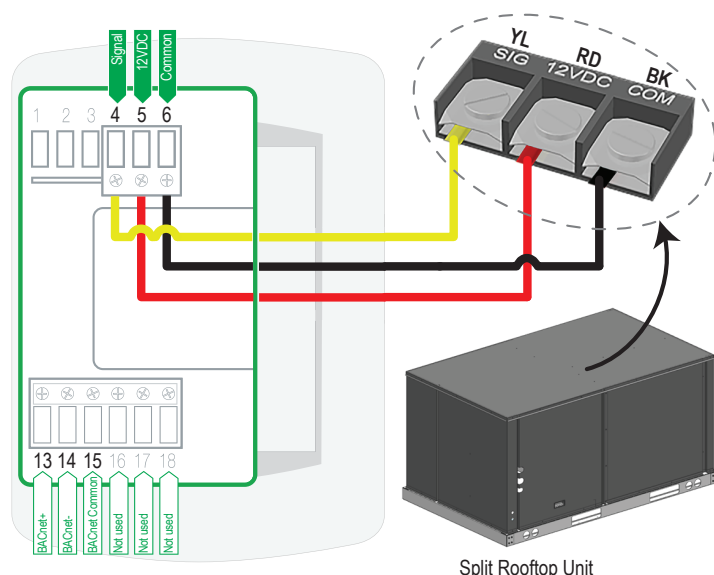
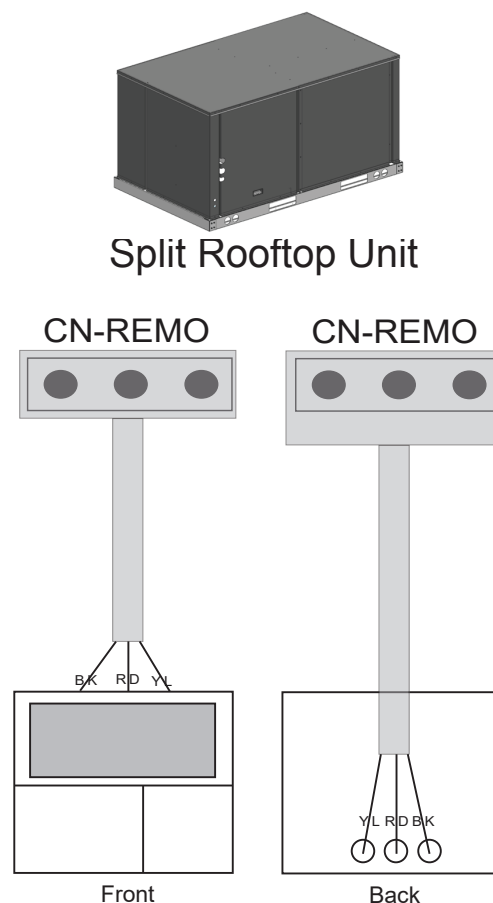


Figure 39: Another Example of RTU to Zone Controller Connection.



Note:

Cable connected to Zone Controller is the factory default connection.

ELECTRICAL

Communication Cable Specifications

Communications Cable Specifications Between Multiple RTUs Operating as a Group (Group Control)

If any RTUs were specified to operate in unison:

- Before running cable, decide which RTU will be the "Main." The other RTUs 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 RTU to identify the Main and Sub(s).
- Use a daisy chain configuration and connect all of the group's RTUs 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.
- Perform group control settings and connect the group control wiring after the system auto address and auto pipe procedures have been completed.

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

- From the controller to the main RTU, use 22 AWG, 3-conductor, twisted, stranded, unshielded. All wiring must comply with all applicable local and national codes.
- From the main RTU to the sub RTU(s), daisy chain using 22 AWG, 3-conductor, twisted, stranded, unshielded.
(⚠ Do not attach wire to 12VDC terminal to the sub RTUs). All wiring must comply with all applicable local and national codes.

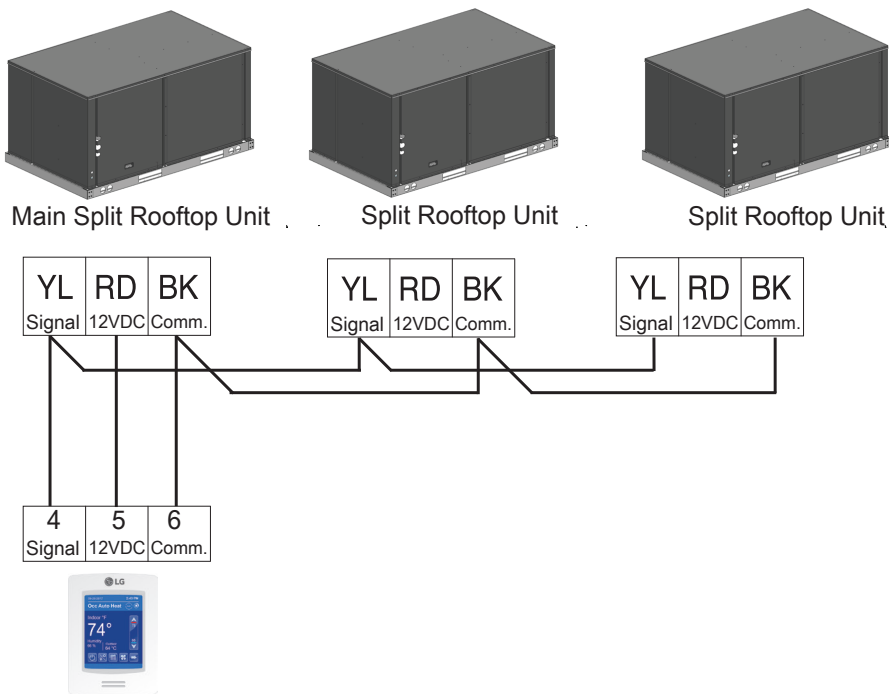
For RTUs with CN-REMO connections:

Use Group Control Kit (sold separately) containing extension and Y-splitter cables. Use one (1) group control cable kit for each RTU in the group except for the last RTU.

Note:

- Cable connected to zone controller is the factory default connection.

Figure 40: Example of RTU Group to Zone Controller Connections (Sig-12V-GND [Comm.] Terminal).



LGRED° Technology

LGRED technology is included in Multi V 5 air-source units produced after February 2019. The feature allows heat pump or heat recovery systems to operate in heating only mode (i.e., all indoor units in heating mode) down to -22°F outdoor ambient wet bulb by updating the main PCB software (v1.26) and replacing an air temperature sensor. Multi V 5 air-source units without these changes can only operate down to -13°F. For more information, contact your local LG sales representative.

PRHR*3 Heat Recovery Units

The PRHR*3A series of heat recovery units were released in June 2018, and are not automatically backwards compatible with all LG manufactured VRF air / water source units. The 3A heat recovery units will be compatible with many LG manufactured air source / water source units if its "Starting Production Date," the "Production Starting Serial No.," and / or the "Upgrade Software Service" dates fall after the dates shown below (see table).

LG VRF systems can operate with both old 2A heat recovery units and new 3A heat recovery units if the outdoor unit software has been upgraded. If a system includes a mix of both old and new heat recovery units, system design must follow 2A heat recovery unit series piping rules. For more information, contact your local LG sales representative.

Table 18: PRHR*3 Heat Recovery Unit to Air / Water Source Unit Compatibility.

	Model	Starting Production Date	Production Starting Serial No.	Upgrade Software Service
Multi V 5 with LGRED*	ARUM****TE5	February 1, 2019	1902xxx	N/A
Multi V 5	ARUM****TE5	February 1, 2018	1802xxx	September 28, 2018
Multi V S	ARUB060GSS4	October 1, 2018	1810xxx	September 28, 2018
Multi V S with LGRED	ARUM***GSS5	December 1, 2020	2012xxx	N/A

*Low ambient performance with LGRED° heat technology is included in Multi V 5 air source units produced after February 2019.

Generation 4 Indoor Units

LG's indoor units are designated Generation 4 (Gen 4). For Gen 4 indoor units to operate with Gen 4 indoor unit features, the air conditioning system must meet the following requirements:

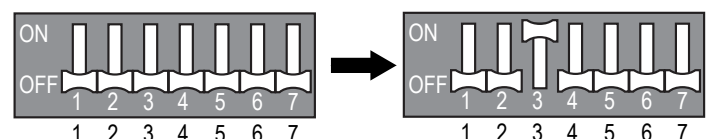
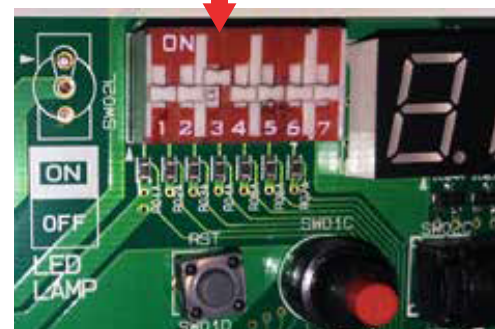
- All indoor units, heat recovery units, and air / water source units must be Gen 4 or higher. Gen 4 ODU and IDU model numbers end in "4." HRU model numbers end in "02A" or "03A."
- All air / water source units must have Gen 4 or higher software factory or field installed.
- Air / water source units DIP switch 3 must be set to ON (factory default setting is OFF).
- All controllers must support Gen 4 indoor unit features.

The figure at right shows the outdoor unit DIP switch. All air and water source units, indoor units, heat recovery units, and controllers in a system must be Gen 4 compatible or the system will not operate with Gen 4 indoor unit features.

If the ODU is powered On when dipswitch 3 is set to ON position, power must be cycled to the ODU or PCB reset for the setting to take effect.

Figure 41: Location and Setting of Outdoor Unit DIP Switch 3.

Air/Water Source Unit DIP Switch No. 3



ELECTRICAL

Wired Controller Placement

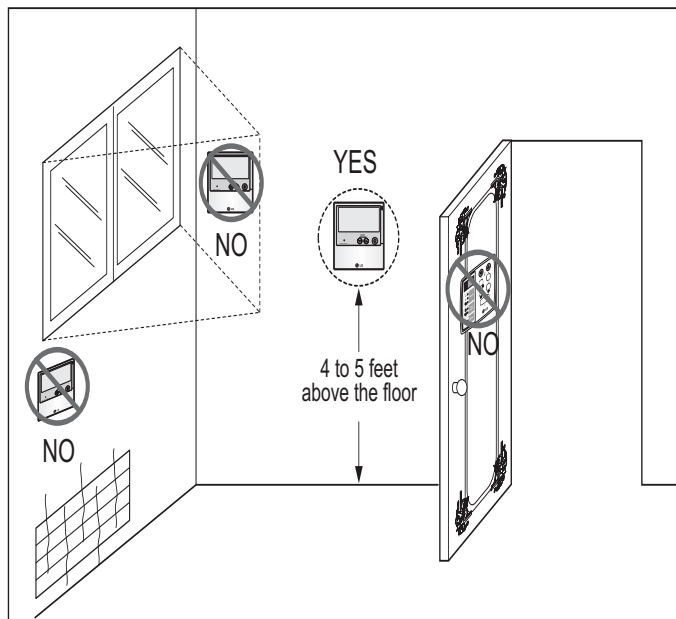
Wired controllers include a sensor to detect room temperature. To maintain comfort levels in the conditioned space, the wired controller must be installed in a location away from direct sunlight, high humidity, and where it could be directly exposed to cold air. Controller must be installed four (4)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



Do not install the wired controller near or in:

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

Figure 42: Proper Location for the Wired Controller.



Wall-Mounted Sensor Installation

Proper indoor unit operation depends on the location of the room sensor, if a room sensor is installed in addition to, or to use in place of a controller. A good location will protect the sensor from direct sunlight and external local sources of water vapor and air flow. If no mounting height was specified by the building designer, place the handy box approximately four (4) to five (5) feet above the finished floor.

- It may be necessary to use a handy box that is sized in metric units, depending on the sensor model. Check with your LG representative to verify which size of handy box is needed for the sensor in question.
- Maintain at least the minimum distance required between the communications cable and power wiring. The minimum required space between the two depends on the voltage of the power wiring.

Note:

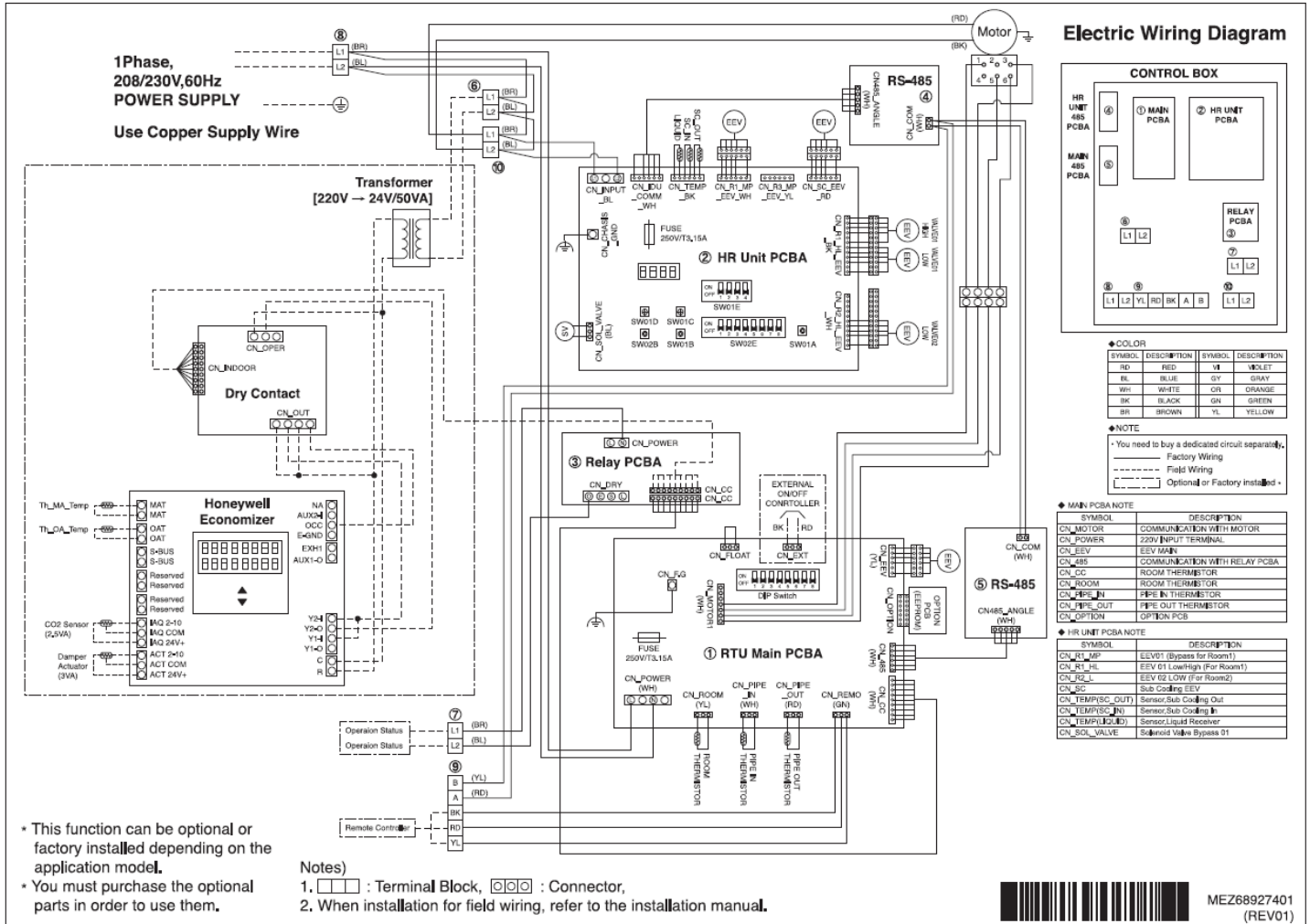
- Do not route power wiring and communications cables in the same conduit. Routing power wiring and communications cables together will cause communication errors and unit malfunction.
- Do not cut the quick-connect plugs off or adjust the length of the cable. Keep the communications cable away from high voltage wires and electromagnetic field (EMF) producing equipment. Performing these actions will cause communication errors and unit malfunction.

ELECTRICAL

Electrical Wiring Diagram

Electrical Wiring Diagram (when using Dry Contact PDRYCB400)

Figure 43: ARNU363~723DDA4 Wiring Diagram (Dry Contact PDRYCB400).

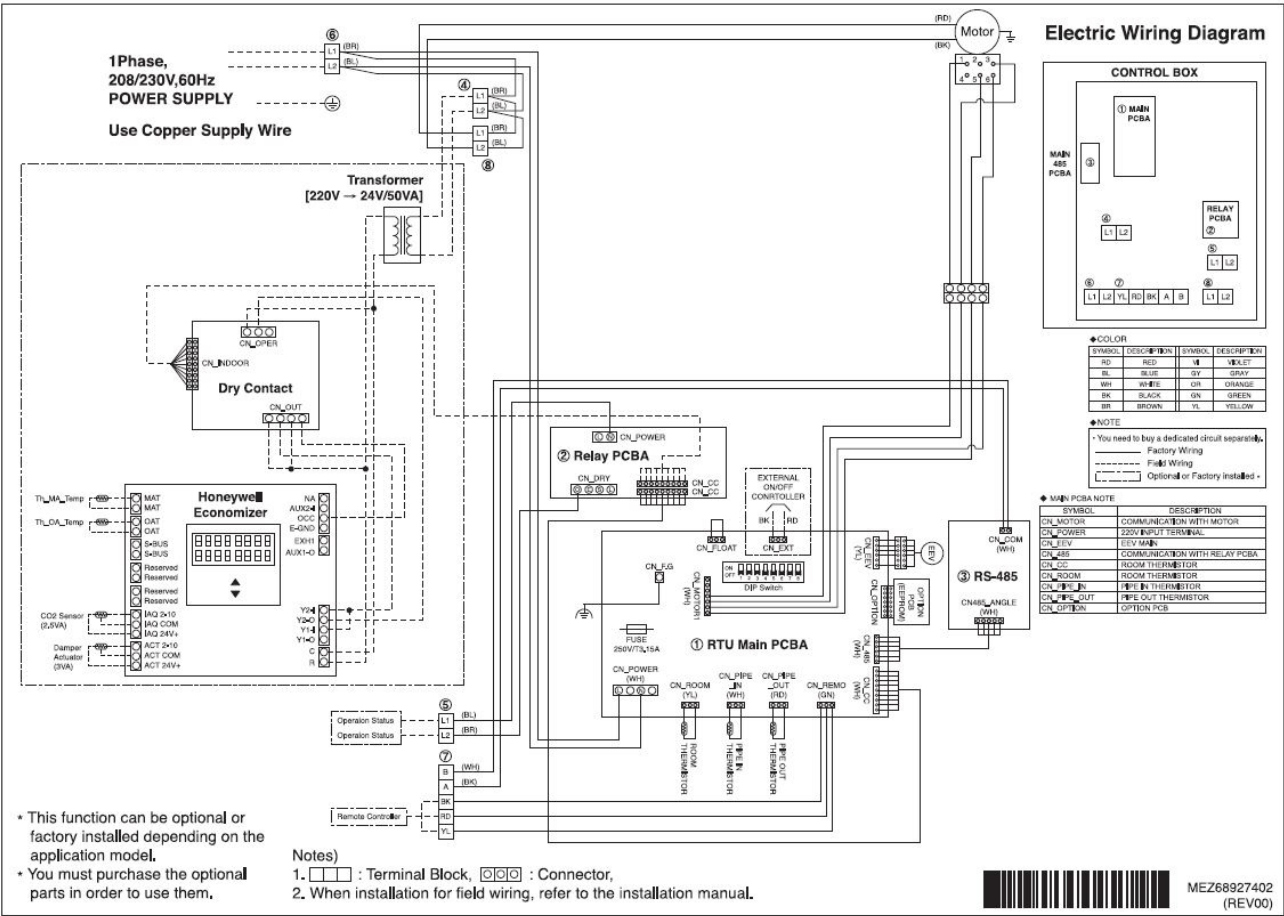


ELECTRICAL

Electrical Wiring Diagram

ARNU363~723DDB4 Wiring Diagram (when using Dry Contact PDRYCB400)

Figure 44: ARNU363~723DDB4 Wiring Diagram (Dry Contact PDRYCB400).

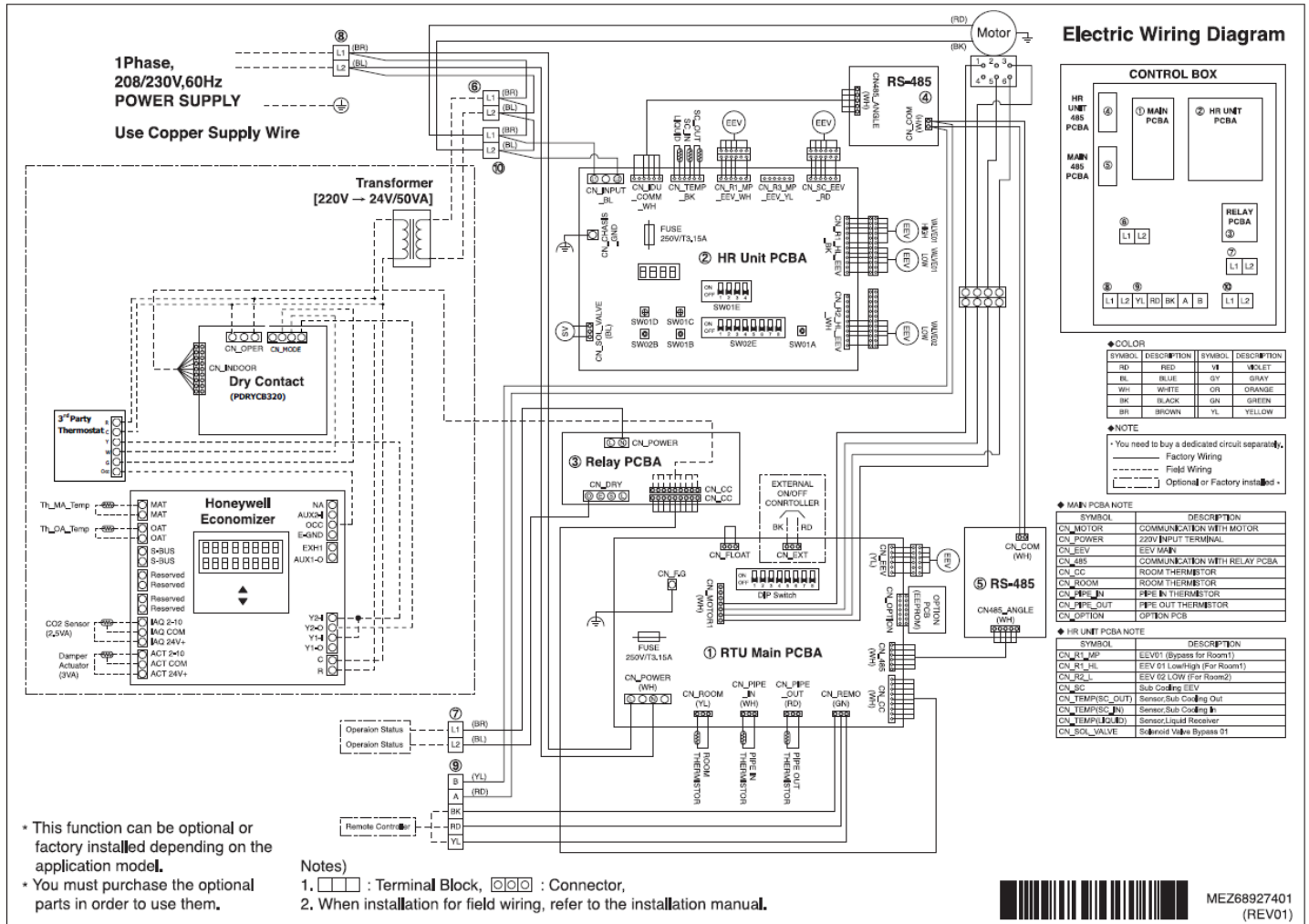


ELECTRICAL

Electrical Wiring Diagram

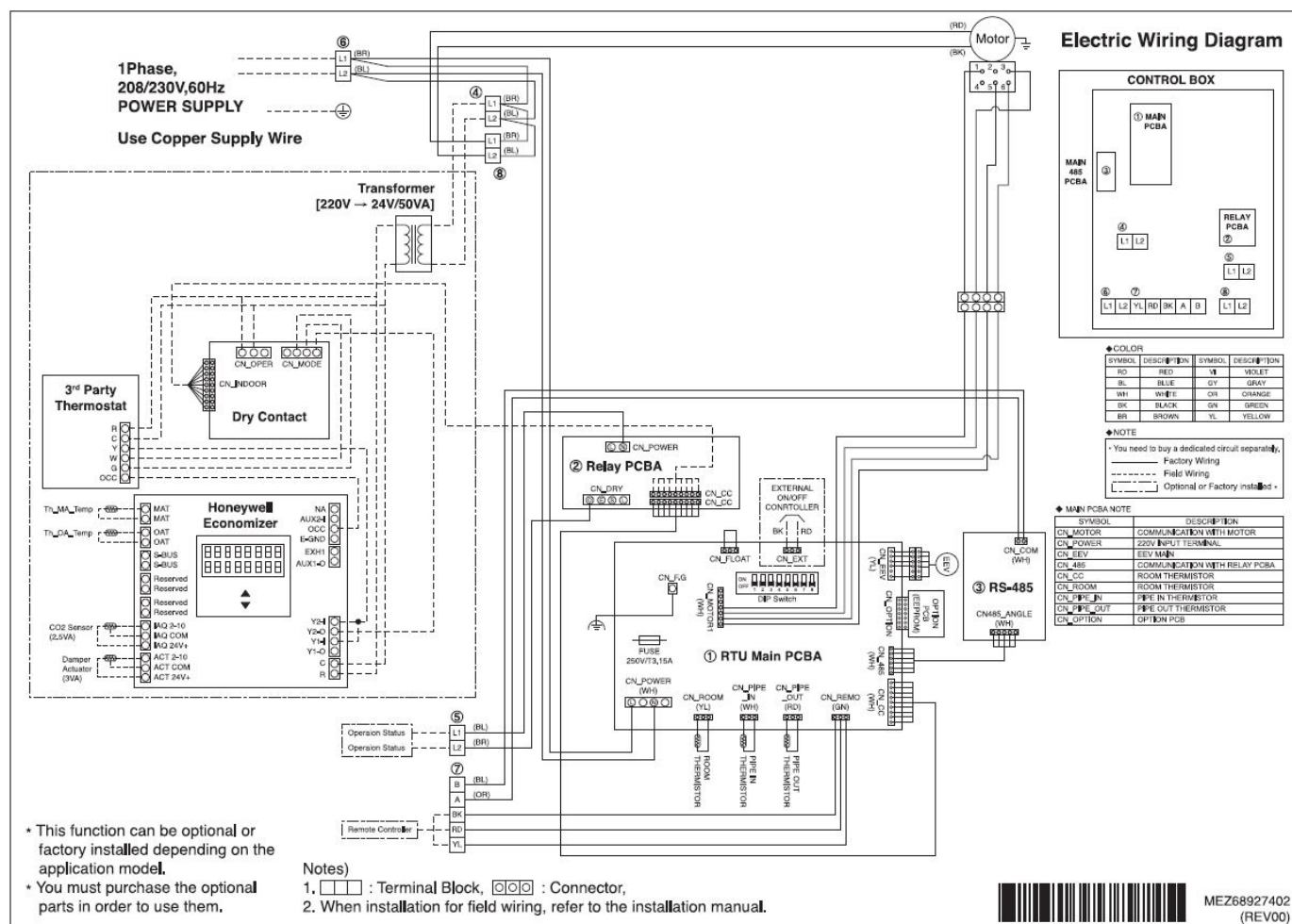
Electrical Wiring Diagram (when using Dry Contact PDRYCB320)

Figure 45: ARNU363-723DDA4 Wiring Diagram (Dry Contact PDRYCB320).



Electrical Wiring Diagram

Figure 46: ARNU363~723DDB4 Wiring Diagram (Dry Contact PDRYCB320).



ELECTRICAL

Electrical Wiring Diagram Legend

Table 19: ARNU363~723DDA4 Wiring Diagram Legend.

Terminal	Purpose	Function
CN-POWER	AC Power supply	AC Power line
CN-MOTOR3	Fan motor output	Motor output of BLDC
CN-VM	Sub PC power supply	N/A
CN_OUT	Heater	N/A
CN-DAMPER	N/A	N/A
CN-ZONE	Zone controller	N/A
CN-EXT	External ON / OFF controller	N/A
CN-EEV	EEV Output	EEV control output
CN-OPTION	Optional PCB EPROM	Option PCB connection
CN-DISPLAY	Display	N/A
CN-PTC	Auxiliary heater	N/A
CN-CC	Dry contact	Dry Contact connection
CN-LEAK	Refrigerant leak detector	N/A
CN-FLOAT	Float switch input	N/A
CN-PIPE-OUT	Discharge pipe sensor	Pipe out thermistor
CN-WF	Wi-Fi	N/A
CN-HUMID	N/A	N/A
CN-AIRC	N/A	N/A
CN-PIPE-IN	Suction pipe sensor	Pipe in thermistor
CN-ROOM	Room sensor	Room air thermistor
CN-REMO	Wired remote controller	Wired remote control connection
CN-D-PUMP	Drain pump output	N/A
CN-485	Communication	Connection between indoor and outdoor units

Table 20: ARNU363~723DDA4 DIP Switch Settings.

DIP Switch Setting		Off	On	Remarks
SW3	GROUP CONTROL	Main	Sub	Group control setting using 7-Day Programmable Controller; selects Main / Sub on each indoor unit
SW4	DRY CONTACT MODE	Variable	Auto	Sets operation mode for optional Dry Contact accessory 1. Variable: Auto or Manual Mode can be set through 7-Day Programmable Controller or Wireless Remote Controller (factory default setting is Auto if there is no setting) 2. Auto: For Dry Contact, it is always Auto mode
SW5	CONTINUOUS FAN	Off	On	Selects continuous fan for split rooftop units. 1. 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) 2. Off: Indoor unit fan speed can be changed by on / off

***For Gen 4 Multi V vertical air handler indoor units, DIP switches 1, 2, 7 and 8 must be set to OFF. These DIP switches are used for other models.**

****To enable Generation 4 features, outdoor unit DIP Switch No. 3 must be set to ON. Please refer to the Multi V IV, Multi V Water IV Engineering Manual for additional information.**

ELECTRICAL

Dry Contact Selection

Dry contact selection by using economizer and thermostat

Table 21: Dry Contact Selection.

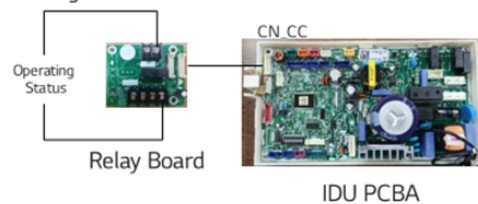
Dry contact option	Remote Controller	Economizer option
Dry Contact not used	LG Remote (Simple Remote Controller / CRC)	Economizer not used as an accessory
PDRYCB400		Economizer used as an accessory
PDRYCB320	Thermostat (3rd party)	Economizer used as an accessory
PDRYCB320		Economizer not used as an accessory

Figure 47: RTU Dry Contact Selection

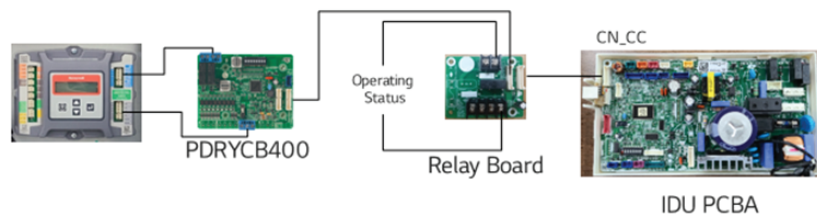
Split Rooftop Unit Relay Board



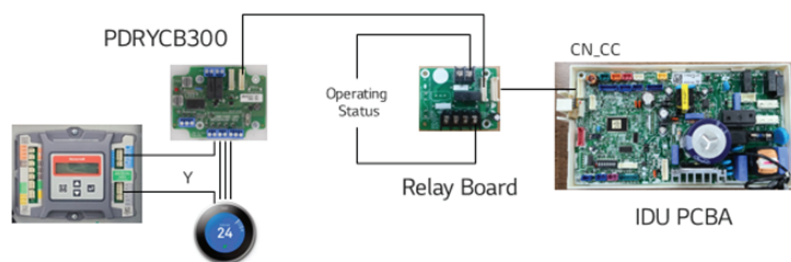
Scene #1 : No 3rd party device interlocking



Scene #2: Work with 3rd party Economizer



Scene #3: Work with 3rd party thermostat and Economizer



⚠ DANGER

- ⊘ When using operating status output on the relay board for local supply device, do not use high voltage more than DC 12V(0.5A), AC 24V (0.5A)
 There is risk of fire, electric shock, explosion, physical injury or death.

INSTALLATION CHECKLIST

PAGE 1



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

Checked by: _____ Date: _____ Signature: _____

Rough-In	N/A	Not Complete	Complete
Packing materials and literature removed from fan discharge.			
Airflow direction correct.			
Fan wheels spin without obstruction.			
Unit is properly supported – mounting bolts tight.			
Unit is level (condensate pump installations).			
Unit is canted toward gravity drain pan nipple (gravity drain installations only).			
Recommended minimum service clearances followed.			
Air filter is clean and properly installed.			
Does local code require a secondary drain pan under the indoor unit? Is a secondary drain line connected to the pan?			
Ductwork	N/A	Not Complete	Complete
All seams sealed – no air leaks.			
Mid and High-static models only – minimum external static pressure requirements met.			
Ductwork is properly sized considering the available external static pressure rating of the indoor unit fan.			
No kinks present in the flexible ductwork. Ductwork is properly supported.			
Ductwork balancing dampers have been installed and are correctly adjusted or open.			
Grilles and registers are properly sized and installed.			
Refrigerant Piping	N/A	Not Complete	Complete
A dry nitrogen purge rate of three (3) psig was maintained during all brazing activity.			
PVE refrigerant oil was used as a lubricant on flare fittings (POE type was NOT used).			
Field formed pipe flares are 45°.			
Refrigerant pipe is properly supported to keep lateral pressure off unit connections.			
Refrigerant shutoff valves are full port design with integral Schrader port rated for R410A (option).			
Shutoff valves have the same internal pipe diameter as the connected pipe (option).			
Two shutoff valves were installed; one (1) high pressure liquid, one (1) low pressure vapor (option).			
Shutoff valves installed with Schrader port between the indoor unit and the ball of the valve (option).			
Condensate System	N/A	Not Complete	Complete
Condensate pipe is properly sized and supported to keep lateral pressure off unit connections.			
Condensate pipe horizontal segments are sloped a minimum of 1/4"/100' of pipe away from the indoor unit.			
Condensate pipe and drain traps were sized using LG recommendations.			
Field-provided condensate line check valve was installed in the condensate pipe riser (option).			
Condensate traps were installed on gravity drain pipes (Mid and High-Static models only).			
Condensate pump power has been disconnected (Mid and High-Static indoor unit gravity-drain installations only).			
Condensate pump riser intersects the building main drain using an inverted trap with connection to the top half of the drain line with no more of a ±45° of vertical.			
If required by local code, is a secondary high level condensate shutoff switch present/wired properly (factory provided internal high level float switch will shut down cooling operation if high water level in the pan is detected)?			
Insulation	N/A	Not Complete	Complete
Additional housing, refrigerant and condensate pipe insulation has been supplemented to prevent sweating while operating if indoor unit installed in abnormal environmental conditions. (Optional - job condition specific.)			
All pipes are independently insulated. All insulation seams and joints are airtight. Insulation is not compressed. Double layer insulation is provided at pipe supports and wall penetrations.			

INSTALLATION CHECKLIST

PAGE 2



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

Checked by: _____ Date: _____ Signature: _____

Electrical	N/A	Not Complete	Complete
Power provided is single phase, $\pm 10\%$ of indoor unit nameplate specifications.			
Power wires properly sized and protected per NEC and local codes. Indoor unit is properly grounded.			
Power and communications conductors are separated by the recommended minimum distance.			
Terminal block screws are tight. Power wires are not in contact with terminals 3(A) and / or 4(B). Line voltage wires have spade connectors installed.			
Power wires are properly secured to the control box case to prevent wire tension at the terminal block.			
Wires are protected from chaffing at control box and conduit pipe penetrations.			
(Optional) Smoke detector is properly installed and wired. New batteries are installed (if applicable).			
Low voltage control cables are properly secured to the control panel case. Terminal block screws are tight and the cable is protected from sharp edges at control box case and conduit openings.			
Cables are installed at recommended distances from high voltage and EMF generating equipment.			
Outdoor unit / Indoor unit communications cable (terminals 3[A] and 4[B]).			
Field provided communications cable is 18-2, twisted, stranded and shielded. All terminations are made at the terminal block. No inline splices or wire caps are present.			
Communications cable is plenum rated.			
Communications cable shield is tied back and is grounded at only ONE end.			
Wall Mounted Zone Controller Communications	N/A	Not Complete	Complete
LG factory provided zone controller stranded, shielded (white jacket) cable was used between the zone controller(s) and indoor unit(s). If field wiring is used, it must be 22AWG, 3 conductor, twisted, stranded, unshielded.			
Zone controller cable has not been cut, spliced, or tied together with wire caps. Factory plugs are present.			
Cable is securely plugged into the socket on the zone controller or the three screw terminals (controller model specific); Yellow to "Y", Red to "R", and Black to "B".			
Zone controller DIP switches have been adjusted for the application's space temperature sensing strategy.			
Indoor Unit Control Panel	N/A	Not Complete	Complete
Zone controller cable is securely plugged into the CN-REMO socket on the indoor unit circuit board.			
If an optional remote temperature sensor was installed, the associated cable is plugged into socket CN-ROOM (the factory return air thermistor has been unplugged).			
Indoor unit DIP switches have been adjusted for application (group control-main/sub; continuous fan operation; dry contact).			
If a gravity drain primary condensate system is used (condensate pipe ONLY connected to the lowest nipple) the CN-D / Pump plugged has been removed from the socket on the control board (High-Static models only).			
All plugs are properly seated in the sockets on the control board.			
Power and communications cables are properly restrained and separated.			

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

162279



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www.lghvac.com

IM_MultiV_Split_Rooftop_Unit_09_23
Supersedes: IM_MultiV_Split_Rooftop_Unit_02_23
IM_MultiV_Split_Rooftop_Unit_11_21
IM_MultiV_Split_Rooftop_Unit_07_21
IM_MultiV_Split_Rooftop_Unit_06_21