LG
Life's Good

MULTI V™

HEAT RECOVERY UNIT
PRHR*3A
ENGINEERING MANUAL

Three-Port
Heat Recovery Units

Six-Port
Heat Recovery Units

Eight-Port
Heat Recovery Units

PROPRIETARY DATA NOTICE

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A summary list of safety precautions is on page 3.

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

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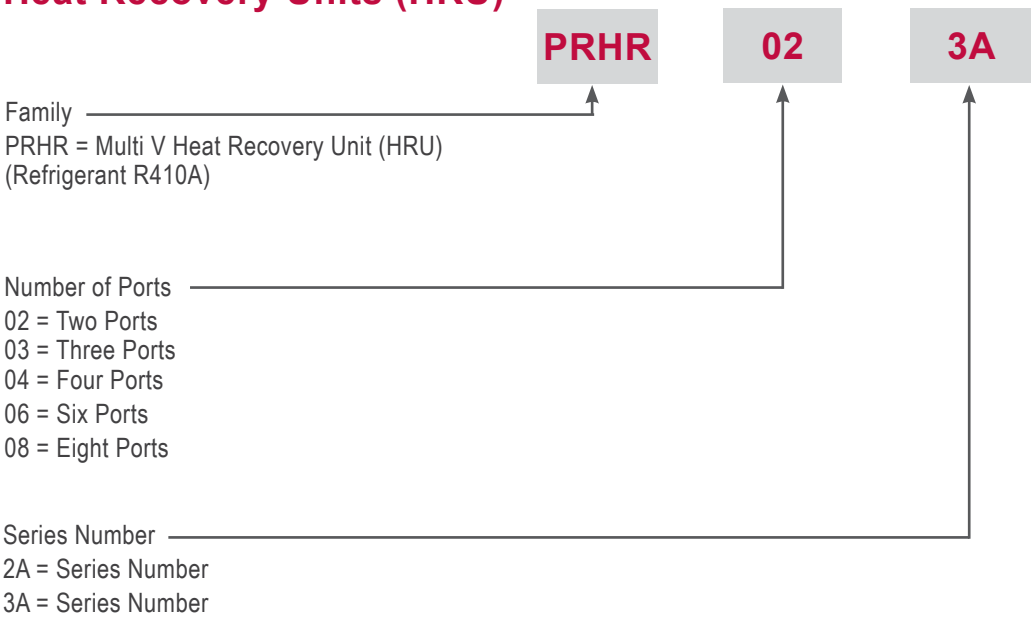
TABLE OF SYMBOLS

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

UNIT NOMENCLATURE

Heat Recovery Units (HRU)



LG AIR CONDITIONER TECHNICAL SOLUTION (LATS)

LG Air Conditioner Technical Solution (LATS) Software

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

Note:

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

Formats

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

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

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

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

Figure 1: Example of LATS CAD2.

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

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

Features

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

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

The program can also:

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

Note:

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

LG AIR CONDITIONER TECHNICAL SOLUTION (LATS)

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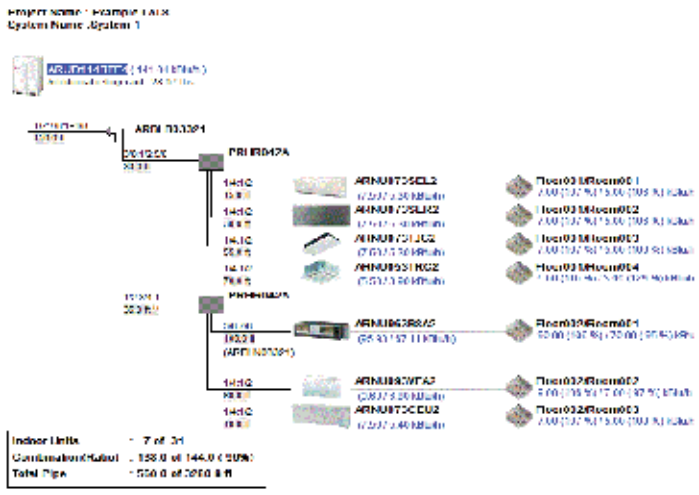
LATS Generates a Complete Project Report

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

Proper Design to Install Procedure

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

Figure 2: Example of a LATS Tree Diagram.



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

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

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

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

Note:

For refrigerant charge worksheets, see the respective air-source unit / water-source unit engineering and installation manuals.

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REFRIGERANT CHARGE WORKSHEET

Multi V 5 System R410A Refrigerant Charge Calculator (lbs.)

System Tag or ID:	Job Name: _____ Project Manager: _____ Date: _____

Line #	Description			Chassis I.D.	Size	Quantity	CF (Ref.)[1]	Total (lbs.)
1	Linear feet of 1/4" liquid line tubing[2]			—	—		0.015	
2	Linear feet of 3/8" liquid line tubing[2]			—	—		0.041	
3	Linear feet of 1/2" liquid line tubing[2]			—	—		0.079	
4	Linear feet of 5/8" liquid line tubing[2]			—	—		0.116	
5	Linear feet of 3/4" liquid line tubing[2]			—	—		0.179	
6	Linear feet of 7/8" liquid line tubing[2]			—	—		0.238	
7	Linear feet of 1" liquid line tubing[2]			—	—		0.323	
8	Standard + Art Cool Mirror			SJ, SK	5k to 15k		0.53	
9	Standard + Art Cool Mirror			SJ, SK	18k to 24k		0.62	
10	Standard			SV	30k to 36k		1.01	
11	Art Cool Gallery			SF	9k to 12k		0.22	
12	1-Way Cassette			TU	7k to 12k		0.44	
13	1-Way Cassette			TT	18k to 24k		0.64	
14	2-Way Cassette			TS	18k to 24k		0.75	
15	4-Way 2' x 2' Cassette			TR	5k to 7k		0.40	
16	4-Way 2' x 2' Cassette			TR	9k to 12k		0.55	
17	4-Way 2' x 2' Cassette			TQ	15k to 18k		0.71	
18	4-Way 3' x 3' Cassette			TN	7k to 24k		0.88	
19	4-Way 3' x 3' Cassette			TM	28k to 36k		1.08	
20	4-Way 3' x 3' Cassette			TM	42k to 48k		1.41	
21	High Static Ducted			BH	7k to 24k		0.57	
22	High Static Ducted			M2	7k to 24k		0.77	
23	High Static Ducted			M2	28k to 42k		1.15	
24	High Static Ducted			M3	28k to 54k		1.35	
25	High Static Ducted			B8	36k to 96k		2.20	
26	Low Static Ducted, Low Static Ducted Bottom Return			L1	5k to 9k		0.31	
27	Low Static Ducted, Low Static Ducted Bottom Return			L2	12k to 18k		0.42	
28	Low Static Ducted, Low Static Ducted Bottom Return			L3	21k to 24k		0.55	
29	Vertical / Horizontal Air Handling Unit			NJ	12k to 30k		1.04	
30	Vertical / Horizontal Air Handling Unit			NJ	36k		1.57	
31	Vertical / Horizontal Air Handling Unit			NK	42k to 54k		2.00	
32	Floor Standing			CE (U)	7k to 15k		0.37	
33	Floor Standing			CF (U)	18k to 24k		0.82	
34	HRU: PRHR022A/023A, 032A/033A, 042A/043A, 063A, 083A			—	—		1.1	
35	**ADDITIONAL Refrigerant Charge Required** (Sum of lines 1 – 34)							
36	Outdoor Unit Factory Refrigerant Charge	36A	ARUM072*TE5		72k		14.3	
		36B	ARUM096*TE5		96k		23.2	
		36C	ARUM121*TE5		121k		23.2	
		36D	ARUM144*TE5		144k		26.5	
		36E	ARUM168*TE5		168k		26.5	
		36F	ARUM192*TE5		192k		30.9	
		36G	ARUM216*TE5		216k		37.5	
		36H	ARUM241*TE5		241k		37.5	
37	**Total ODU FACTORY Refrigerant Charge** (Sum of factory refrigerant charges for all ODUs in the system, lines 36A -36H)							
38	**TOTAL SYSTEM CHARGE** Sum of Additional Refrigerant Charge Required (line 35) and Total ODU Factory Refrigerant Charge (line 37)							

[1]CF (Ref.) = Correction Factor for Refrigerant Charge. [2]For refrigerant charge purposes, consider only the liquid line; ignore the vapor line(s).

REFRIGERANT CHARGE WORKSHEET

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Water IV System R410A Refrigerant Charge Calculator (lbs.)

System Tag or ID:	Job Name: _____ Project Manager: _____ Date: _____

Line #	Description	Chassis I.D.	Size	Quantity	CF (Ref.)[1]	Total (lbs.)
1	Linear feet of 1/4" liquid line tubing[2]	—	—		0.015	
2	Linear feet of 3/8" liquid line tubing[2]	—	—		0.041	
3	Linear feet of 1/2" liquid line tubing[2]	—	—		0.079	
4	Linear feet of 5/8" liquid line tubing[2]	—	—		0.116	
5	Linear feet of 3/4" liquid line tubing[2]	—	—		0.179	
6	Linear feet of 7/8" liquid line tubing[2]	—	—		0.238	
7	Linear feet of 1" liquid line tubing[2]	—	—		0.323	
8	Standard + Art Cool Mirror	SJ, SK	5k to 15k		0.53	
9	Standard + Art Cool Mirror	SJ, SK	18k to 24k		0.62	
10	Standard	SV	30k to 36k		1.01	
11	Art Cool Gallery	SF	9k to 12k		0.22	
12	1-Way Cassette	TU	7k to 12k		0.44	
13	1-Way Cassette	TT	18k to 24k		0.64	
14	2-Way Cassette	TS	18k to 24k		0.75	
15	4-Way 2' x 2' Cassette	TR	5k to 7k		0.40	
16	4-Way 2' x 2' Cassette	TR	9k to 12k		0.55	
17	4-Way 2' x 2' Cassette	TQ	15k to 18k		0.71	
18	4-Way 3' x 3' Cassette	TN	7k to 24k		0.88	
19	4-Way 3' x 3' Cassette	TM	28k to 36k		1.08	
20	4-Way 3' x 3' Cassette	TM	42k to 48k		1.41	
21	High Static Ducted	BH	7k to 24k		0.57	
22	High Static Ducted	M2	7k to 24k		0.77	
23	High Static Ducted	M2	28k to 42k		1.15	
24	High Static Ducted	M3	28k to 54k		1.35	
25	High Static Ducted	B8	36k to 96k		2.20	
26	Low Static Ducted, Low Static Ducted Bottom Return	L1	5k to 9k		0.31	
27	Low Static Ducted, Low Static Ducted Bottom Return	L2	12k to 18k		0.42	
28	Low Static Ducted, Low Static Ducted Bottom Return	L3	21k to 24k		0.55	
29	Vertical / Horizontal Air Handling Unit	NJ	12k to 30k		1.04	
30	Vertical / Horizontal Air Handling Unit	NJ	36k		1.57	
31	Vertical / Horizontal Air Handling Unit	NK	42k to 54k		2.00	
32	Floor Standing	CE (U)	7k to 15k		0.37	
33	Floor Standing	CF (U)	18k to 24k		0.82	
34	HRU: PRHR022A/023A, 032A/033A, 042A/043A, 063A, 083A	—	—		1.1	
35	**ADDITIONAL Refrigerant Charge Required** (Sum of lines 1 – 34)					
36	Water-Source Unit Factory Refrigerant Charge	ARW*072BAS4, ARW*096BAS4, ARW*121BAS4, ARW*144BAS4			10.42	
		ARW*072DAS4, ARW*096DAS4, ARW*121DAS4			10.42	
		ARW*144DAS4, ARW*192DAS4			11.66	
37	**Total WSU FACTORY Refrigerant Charge** (Sum of factory refrigerant charges for all WSUs in the system)					
38	**TOTAL SYSTEM CHARGE** Sum of Additional Refrigerant Charge Required (line 35) and Total WSU Factory Refrigerant Charge (line 37)					

[1]CF (Ref.) = Correction Factor for Refrigerant Charge. [2]For refrigerant charge purposes, consider only the liquid line; ignore the vapor line(s).

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REFRIGERANT CHARGE WORKSHEET

Multi V S System R410A Refrigerant Charge Calculator (lbs.)

System Tag or ID:	Job Name: _____ Project Manager: _____ Date: _____

Line #	Description			Chassis I.D.	Size	Quantity	CF (Ref.)[1]	Total (lbs.)
1	Linear feet of 1/4" liquid line tubing[2]			—	—		0.015	
2	Linear feet of 3/8" liquid line tubing[2]			—	—		0.041	
3	Linear feet of 1/2" liquid line tubing[2]			—	—		0.079	
4	Linear feet of 5/8" liquid line tubing[2]			—	—		0.116	
5	Linear feet of 3/4" liquid line tubing[2]			—	—		0.179	
6	Linear feet of 7/8" liquid line tubing[2]			—	—		0.238	
7	Linear feet of 1" liquid line tubing[2]			—	—		0.323	
8	Standard + Art Cool Mirror			SJ, SK	5k to 15k		0.53	
9	Standard + Art Cool Mirror			SJ, SK	18k to 24k		0.62	
10	Standard			SV	30k to 36k		1.01	
11	Art Cool Gallery			SF	9k to 12k		0.22	
12	1-Way Cassette			TU	7k to 12k		0.44	
13	1-Way Cassette			TT	18k to 24k		0.64	
14	2-Way Cassette			TS	18k to 24k		0.75	
15	4-Way 2' x 2' Cassette			TR	5k to 7k		0.40	
16	4-Way 2' x 2' Cassette			TR	9k to 12k		0.55	
17	4-Way 2' x 2' Cassette			TQ	15k to 18k		0.71	
18	4-Way 3' x 3' Cassette			TN	7k to 24k		0.88	
19	4-Way 3' x 3' Cassette			TM	28k to 36k		1.08	
20	4-Way 3' x 3' Cassette			TM	42k to 48k		1.41	
21	High Static Ducted			BH	7k to 24k		0.57	
22	High Static Ducted			M2	7k to 24k		0.77	
23	High Static Ducted			M2	28k to 42k		1.15	
24	High Static Ducted			M3	28k to 54k		1.35	
25	High Static Ducted			B8	36k to 96k		2.20	
26	Low Static Ducted, Low Static Ducted Bottom Return			L1	5k to 9k		0.31	
27	Low Static Ducted, Low Static Ducted Bottom Return			L2	12k to 18k		0.42	
28	Low Static Ducted, Low Static Ducted Bottom Return			L3	21k to 24k		0.55	
29	Vertical / Horizontal Air Handling Unit			NJ	12k to 30k		1.04	
30	Vertical / Horizontal Air Handling Unit			NJ	36k		1.57	
31	Vertical / Horizontal Air Handling Unit			NK	42k to 54k		2.00	
32	Floor Standing			CE (U)	7k to 15k		0.37	
33	Floor Standing			CF (U)	18k to 24k		0.82	
34	HRU: PRHR022A/023A, 032A/ 033A, 042A/ 043A, 063A, 083A			—	—		1.1	
35	**ADDITIONAL Refrigerant Charge Required** (Sum of lines 1 – 34)							
36	Total ODU FACTORY Refrigerant Charge (Choose One)	36A	ARUN024GSS4				0	
		36B	ARUN038GSS4				0	
		36C	ARUN048GSS4				0	
		36D	ARUN053GSS4				0	
		36F	ARUN060GSS4				0	
		36G	ARUB060GSS4				0	
37	**TOTAL SYSTEM CHARGE** Sum of Additional Refrigerant Charge Required (line 35) and Total ODU Factory Refrigerant Charge (from lines 36A through 36G)							

[1]CF (Ref.) = Correction Factor for Refrigerant Charge. [2]For refrigerant charge purposes, consider only the liquid line; ignore the vapor line(s).

PRODUCT DATA

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Multi V Heat Recovery Units

Four-port Heat Recovery Unit.

General

Multi V heat recovery units are for use with Multi V 5, Water IV, and S heat recovery outdoor units to permit simultaneous heating and cooling operation (see page 44 for compatibility details).

Heat recovery units have two (2), three (3), four (4), six (6), or eight (8) ports for connections to indoor units. Each port is capable of connecting from one (1) indoor unit up to eight (8) indoor units up to a maximum nominal capacity of ≤60 MBh. When multiple indoor units are connected to one port, all indoor units on that port must operate in the same mode (cooling or heating). Individual indoor units ≥60 MBh nominal capacity must use two (2) neighboring heat recovery unit ports twinned together using a reverse Y-branch kit. Connect largest indoor unit to first port of the heat recovery unit. Each heat recovery unit can support a maximum capacity (sum of ports) of up to 230 MBh.

Heat recovery ports can operate in heating or cooling mode independently, regardless of the mode of any other port on the unit or in the system except where heat recovery unit ports are twinned. Heat recovery units contain one double spiral subcooling heat exchanger per port, are internally insulated, and do not require a condensate drain.

Casing and Construction

Heat recovery units are completely factory assembled, internally piped, wired, and are designed for indoor installation. Casing is constructed of galvanized steel, and houses piping, valves and controls to divert refrigerant controlling each port to operate in either heating or cooling mode. Heat recovery units contain one double spiral subcooling heat exchanger per port, are internally insulated, and do not require a condensate drain.

Refrigerant Valves

Each heat recovery port is circuited with two two-position motorized valves to control R410A refrigerant flow path to allow indoor units to operate in heating or cooling mode.

Refrigerant Piping

Units can be piped in series and / or parallel to optimize cost between material and labor. Up to 16 heat recovery units can be piped in series, parallel, or a combination of series and parallel to optimize cost between material and labor. Any series string of heat recovery ports/units can connect up to 230 MBh of indoor unit nominal capacity (series string is defined a heat recovery units piped in series).

Heat recovery unit piping limitations also depend on the allowable piping parameters of the outdoor unit installed.

- Indoor units up to 131 equivalent feet of piping length from the heat recovery unit to which it is connected.
- Indoor units up to 295 equivalent feet of piping length from the first branch.
- Difference between highest and lowest elevation indoor units piped to separate parallel heat recovery units (HRUs) up to 131 feet in elevation.
- Difference between highest and lowest heat recovery units piped in parallel up to 98 feet in elevation.
- Difference between highest and lowest elevation heat recovery units piped in series up to 16 feet in elevation.
- Elevation difference of series connected heat recovery units cannot exceed 16 feet.

All refrigerant lines from the outdoor unit to the heat recovery units, and from the heat recovery units to the indoor units must be field insulated separately.

Electrical

Heat recovery units require 208-230V, 1-phase, 60 Hz electrical power, and are capable of operation within ±10% of nominal voltage.

Controls

Heat recovery units include factory-installed control boards with integral microprocessors. Heat recovery unit control boards communicate with the main control board in the outdoor unit and interface with the VRF equipment controls system. The control circuit between the indoor units, heat recovery units and the outdoor unit is RS-485 daisy chain communication over two-conductor, twisted, stranded, shielded, 18 AWG cable.

PRODUCT DATA

General Data

Figure 3: Two-Port Heat Recovery Unit.

Figure 4: Three-Port Heat Recovery Unit.

Figure 5: Four-Port Heat Recovery Unit.

Note:

Heat recovery units can only be used with LG systems piped for heat recovery operation.

Table 1: Heat Recovery Unit Specifications.

Model			PRHR023A	PRHR033A	PRHR043A
Number of Ports			2	3	4
Max. Connectible No. of Indoor Units			16	24	32
Max. Connectible No. of Indoor Units on each port			8	8	8
Max. Port Capacity (each port)		Btu/h	60,000	60,000	60,000
Max. Unit Capacity (sum of ports)		Btu/h	120,000	180,000	230,000
Net Weight		lbs.	33	37	40
Shipping Weight		lbs.	46	50	53
Dimensions (W x H x D)		Inches	19-1/8 x 8-5/8 x 18-15/16		
Casing			Galvanized Steel Plate		
Connecting Pipes	To Indoor Units	Liquid Pipe (inches)	3/8	3/8	3/8
		Vapor Pipe (inches)	5/8	5/8	5/8
	To Outdoor Units	Liquid (inches)	3/8	1/2	5/8
		Low-pressure Vapor (inches)	7/8	1-1/8	1-1/8
		High-pressure Vapor (inches)	3/4	7/8	7/8
Insulation Material			Polyethylene Foam		

Figure 6: Six-Port Heat Recovery Unit.

Figure 7: Eight-Port Heat Recovery Unit.

Note:

Heat recovery units can only be used with LG systems piped for heat recovery operation.

Table 2: Heat Recovery Unit Specifications, continued.

Model			PRHR063A	PRHR083A
Number of Ports			6	8
Max. Connectible No. of Indoor Units			48	64
Max. Connectible No. of Indoor Units on each port			8	8
Max. Port Capacity (each port)		Btu/h	60,000	60,000
Max. Unit Capacity (sum of ports)		Btu/h	230,000	230,000
Net Weight		lbs.	60	68
Shipping Weight		lbs.	75	82
Dimensions (W x H x D)		Inches	31-1/4 x 8-5/8 x 18-15/16	
Casing			Galvanized Steel Plate	
Connecting Pipes	To Indoor Units	Liquid Pipe (inches)	3/8	3/8
		Vapor Pipe (inches)	5/8	5/8
	To Outdoor Units	Liquid (inches)	5/8	5/8
		Low-pressure Vapor (inches)	1-1/8	1-1/8
		High-pressure Vapor (inches)	7/8	7/8
Insulation Material			Polyethylene Foam	

Electrical Data

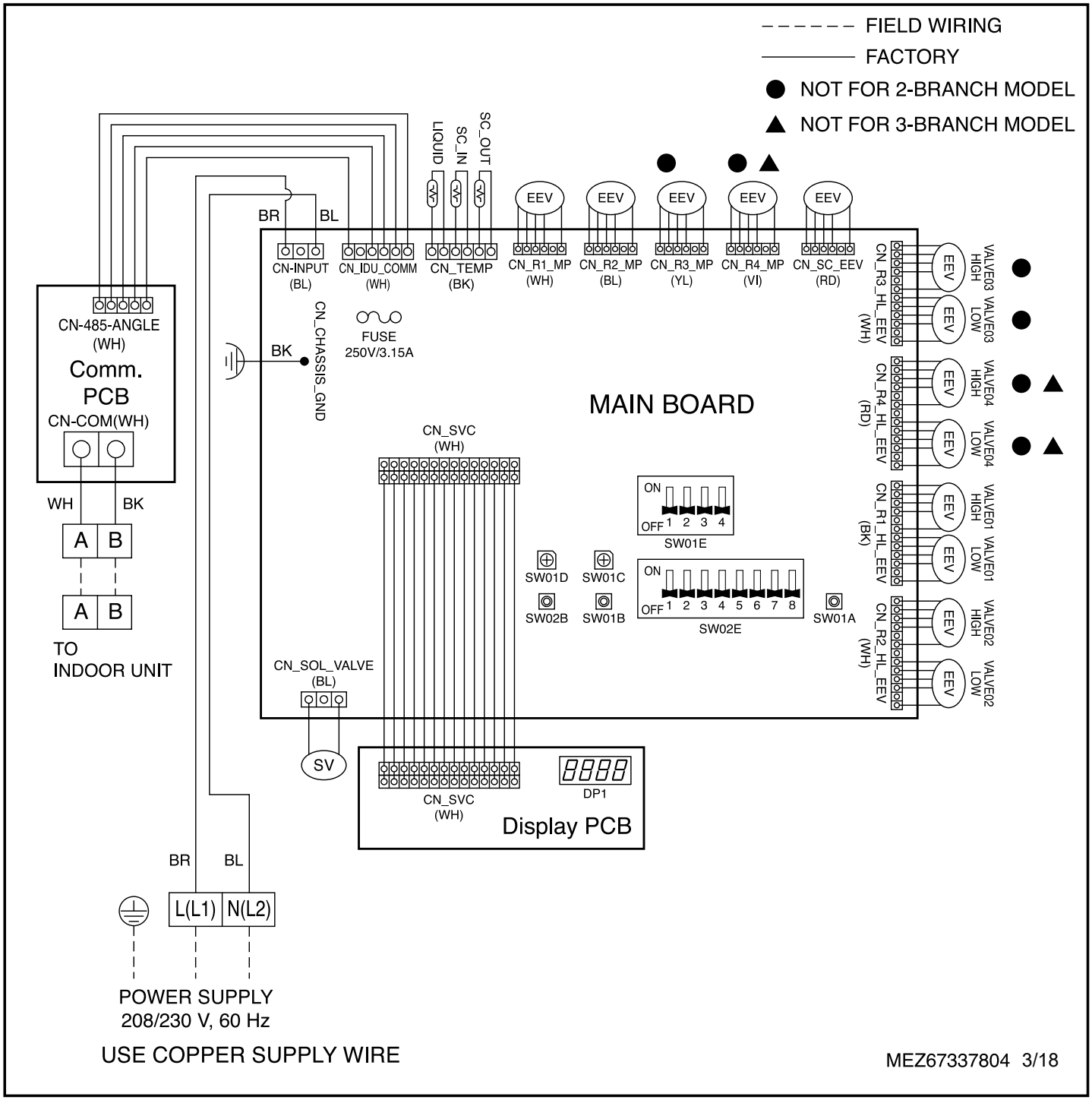
Table 3: Heat Recovery Unit Electrical Data.

Unit Model No.	Voltage Range	Rated Amps	MCA	MFA	Power Supply			Power Input (W)	
					Hz	Volts	Phase	Cooling	Heating
PRHR023A	187-253	0.06	0.17	15	60	208-230	1	39.8	37.2
PRHR033A									
PRHR043A									
PRHR063A		0.09	0.27					75.9	72.1
PRHR083A									

MCA : Minimum Circuit Ampacity.
MFA : Maximum Fuse Amps.

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 a fuse, use the circuit breaker.

Figure 8: PRHR023A, PRHR033A, and PRHR043A Wiring Diagram.



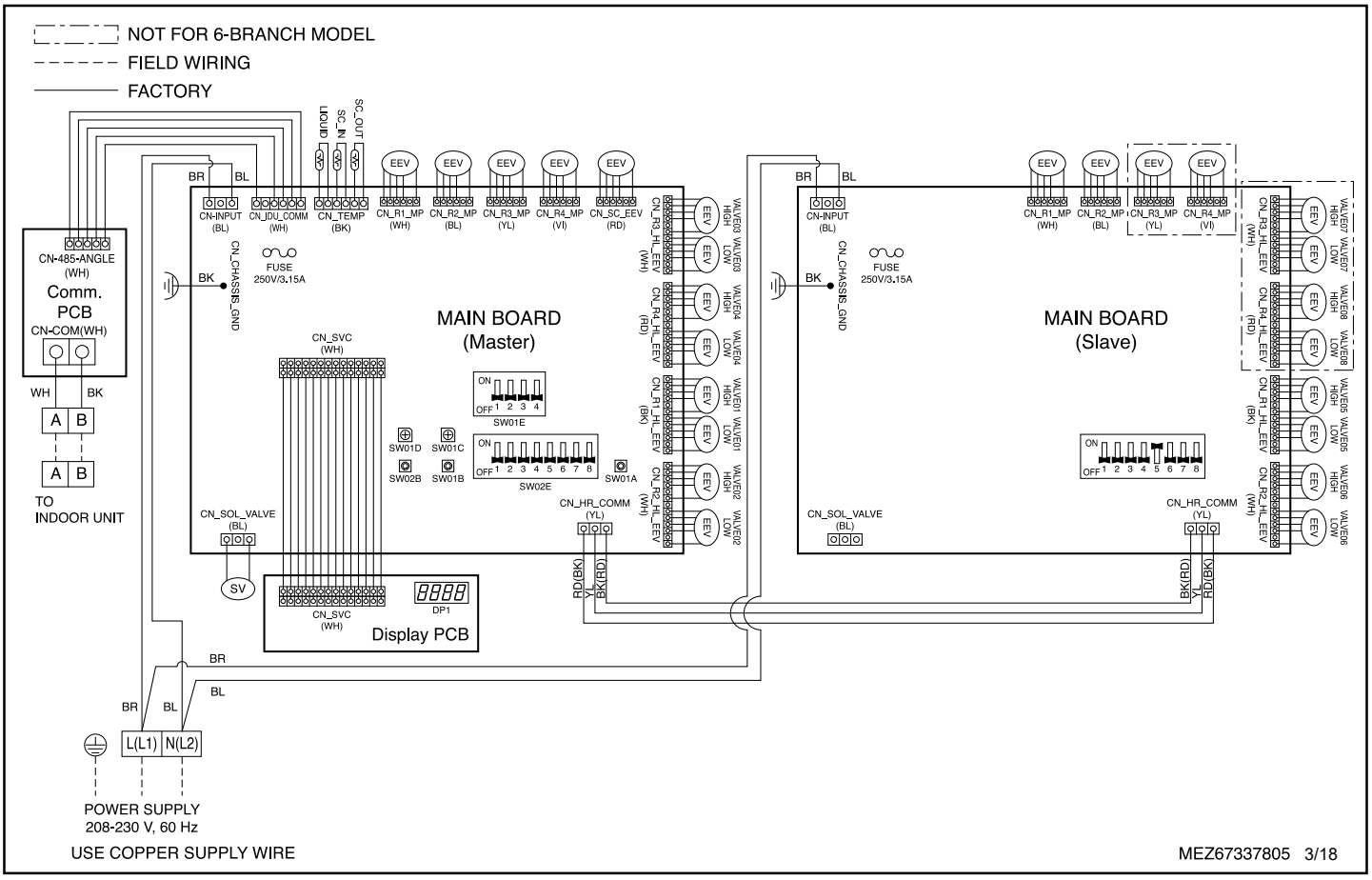
Wiring Diagram

PRHR023A, PRHR033A, PRHR043A

Table 4: PRHR023A, PRHR033A, and PRHR043A Wiring Diagram Legend.

Description	Purpose	Function
Terminals		
CN-INPUT (BL)	Power Input	Power Supply Input
CN_IDU_COMM (WH)	Communication	Communication Connection Between Indoor Units and Heat Recovery Units
CN_TEMP (LIQUID) (BK)	Liquid Temperature Receiver Sensor	Liquid Temperature Sensor
CN_TEMP (SC_IN) (BK)	Subcooling Inlet Sensor	Subcooling Inlet Sensor
CN_TEMP (SC_OUT) (BK)	Subcooling Outlet Sensor	Subcooling Outlet Sensor
CN_R1_MP (WH)	EEV 01	EEV 01 (Bypass for Room or Zone 1)
CN_R2_MP (BL)	EEV 02	EEV 02 (Bypass for Room or Zone 2)
CN_R3_MP (YL)	EEV 03	EEV 03 (Bypass for Room or Zone 3)
CN_R4_MP (VI)	EEV 04	EEV 04 (Bypass for Room or Zone 4)
CN_SC_EEV (RD)	Subcooling EEV	Subcooling EEV
CN_R3_HL_EEV (WH)	Low / High EEV 03	Low / High EEV 03 for Room or Zone 3
CN_R4_HL_EEV (RD)	Low / High EEV 04	Low / High EEV 04 for Room or Zone 4
CN_R1_HL_EEV (BK)	Low / High EEV 01	Low / High EEV 01 for Room or Zone 1
CN_R2_HL_EEV (WH)	Low / High EEV 02	Low / High EEV 02 for Room or Zone 2
CN_SVC (WH)	Display	For Display PCB
CN_SOL_VALVE (BL)	Solenoid Valve Bypass 01	Solenoid Valve Bypass 01
CN_CHASSIS_GND (BK)	Ground Terminal	Ground Terminal for Heat Recovery Unit Chassis
DIP Switch Banks		
SW01E	EEV or Zone Address Setting	Sets EEV Number When Using Manual Addressing; Sets Time of Zoning Address When Using Automatic Addressing
SW02E (No. 1)	Address Method	Selects Automatic or Manual Addressing Procedure
SW02E (Nos. 2 through 4)	Setting for Number of Indoor Units	Setting for Total Number of Indoor Units Connected
SW02E (No. 5)	Slave PCB Setting	Sets Slave PCB
SW02E (No. 6)	EEPROM Reset	Resets EEPROM to Save Settings
SW02E (Nos. 7 and 8)	Mode Setting (Zoning, etc.)	Sets the Mode (Zoning, etc.)
Rotary Dials and Tact Switches		
SW01B	Indoor Address Setting (Increase by One)	Increases the Indoor Address by One When Using the Manual Addressing Procedure
SW01C	Heat Recovery Unit Number Setting; EEV Zoning Number Setting	Sets the Heat Recovery Unit Number; Sets the EEV Zoning Number When Using the Manual Addressing Procedure
SW01D	EEV Group Setting	Sets the EEV Group
SW02B	Indoor Address Setting (Increase by Ten)	Increases the Indoor Address by Ten When Using the Manual Addressing Procedure

Figure 9: PRHR063A and PRHR083A Wiring Diagram.



Wiring Diagram

PRHR063A, PRHR083A

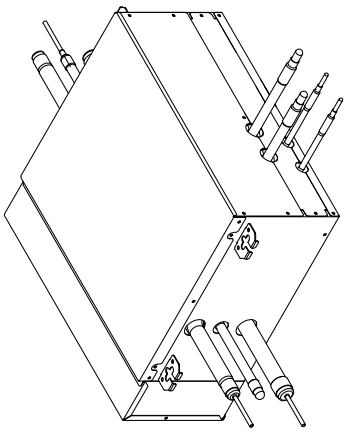
Table 5: PRHR063A and PRHR083A Wiring Diagram Legend.

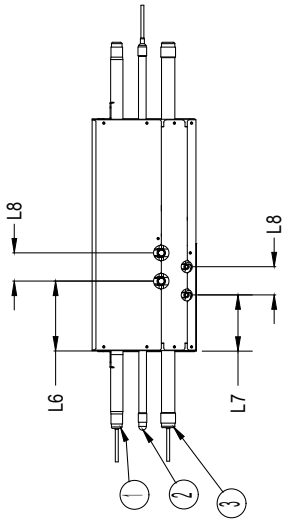
Description	Purpose	Function
Main PCB Terminals		
CN-INPUT (BL)	Power Input	Power Supply Input
CN_IDU_COMM (WH)	Communication	Communication Connection Between Indoor Units and Heat Recovery Units
CN_TEMP (LIQUID) (BK)	Liquid Temperature Receiver Sensor	Liquid Temperature Sensor
CN_TEMP (SC_IN) (BK)	Subcooling Inlet Sensor	Subcooling Inlet Sensor
CN_TEMP (SC_OUT) (BK)	Subcooling Outlet Sensor	Subcooling Outlet Sensor
CN_R1_MP (WH)	EEV 01	EEV 01 (Bypass for Room or Zone 1)
CN_R2_MP (BL)	EEV 02	EEV 02 (Bypass for Room or Zone 2)
CN_R3_MP (YL)	EEV 03	EEV 03 (Bypass for Room or Zone 3)
CN_R4_MP (VI)	EEV 04	EEV 04 (Bypass for Room or Zone 4)
CN_SC_EEV (RD)	Subcooling EEV	Subcooling EEV
CN_R3_HL_EEV (WH)	Low / High EEV 03	Low / High EEV 03 for Room or Zone 3
CN_R4_HL_EEV (RD)	Low / High EEV 04	Low / High EEV 04 for Room or Zone 4
CN_R1_HL_EEV (BK)	Low / High EEV 01	Low / High EEV 01 for Room or Zone 1
CN_R2_HL_EEV (WH)	Low / High EEV 02	Low / High EEV 02 for Room or Zone 2
CN_HR_COMM (YL)	Master and Slave PCB Communication	Communication Connection Between Heat Recovery Unit Master and Slave PCBs
CN_SVC (WH)	Display	For Display PCB
CN_SOL_VALVE (BL)	Solenoid Valve Bypass 01	Solenoid Valve Bypass 01
CN_CHASSIS_GND (BK)	Ground Terminal	Ground Terminal for Heat Recovery Unit Chassis
Slave PCB Terminals		
CN-INPUT (BL)	Power Input	Power Supply Input
CN_R1_MP (WH)	EEV 05	EEV 05 (Bypass for Room or Zone 5)
CN_R2_MP (BL)	EEV 06	EEV 06 (Bypass for Room or Zone 6)
CN_R3_MP (YL)	EEV 07	EEV 07 (Bypass for Room or Zone 7)
CN_R4_MP (VI)	EEV 08	EEV 08 (Bypass for Room or Zone 8)
CN_R3_HL_EEV (WH)	Low / High EEV 07	Low / High EEV 07 for Room or Zone 7
CN_R4_HL_EEV (RD)	Low / High EEV 08	Low / High EEV 04 for Room or Zone 8
CN_R1_HL_EEV (BK)	Low / High EEV 05	Low / High EEV 05 for Room or Zone 5
CN_R2_HL_EEV (WH)	Low / High EEV 06	Low / High EEV 02 for Room or Zone 6
CN_HR_COMM (YL)	Master and Slave PCB Communication	Communication Connection Between Heat Recovery Unit Master and Slave PCBs
CN_SOL_VALVE (BL)	N/A	N/A
CN_CHASSIS_GND (BK)	Ground Terminal	Ground Terminal for Heat Recovery Unit Chassis
Main PCB DIP Switch Banks		
SW01E	EEV or Zone Address Setting	Sets EEV Number When Using Manual Addressing; Sets Time of Zoning Address When Using Automatic Addressing
SW02E (No. 1)	Address Method	Selects Automatic or Manual Addressing Procedure
SW02E (Nos. 2 through 4)	Setting for Number of Indoor Units	Setting for Total Number of Indoor Units Connected
SW02E (No. 5)	Slave PCB Setting	Sets Slave PCB
SW02E (No. 6)	EEPROM Reset	Resets EEPROM to Save Settings
SW02E (Nos. 7 and 8)	Mode Setting (Zoning, etc.)	Sets the Mode (Zoning, etc.)
Main PCB Buttons		
SW01B	Indoor Address Setting (Increase by One)	Increases the Indoor Address by One When Using the Manual Addressing Procedure
SW01C	Heat Recovery Unit Number Setting; EEV Zoning Number Setting	Sets the Heat Recovery Unit Number; Sets the EEV Zoning Number When Using the Manual Addressing Procedure
SW01D	EEV Group Setting	Sets the EEV Group
SW02B	Indoor Address Setting (Increase by Ten)	Increases the Indoor Address by Ten When Using the Manual Addressing Procedure

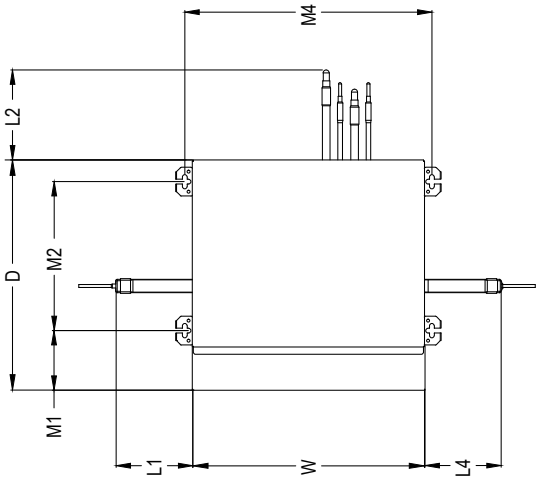
[Unit: inch]

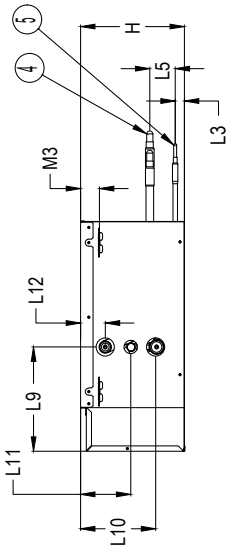
W	19-1/8″
H	8-5/8″
D	18-15/16″
L1	5-15/16″
L2	6-15/16″
L3	3/4″
L4	5-15/16″
L5	2-3/16″
L6	5-3/4″
L7	4-9/16″
L8	2-5/16″
L9	8-9/16″
L10	6-3/16″
L11	3-9/16″
L12	2″
M1	4-15/16″
M2	12-1/4″
M3	1-1/2″
M4	20-3/8″

No.	Part Name
6	Control box
5	Liquid pipe to Indoor unit
4	Gas pipe to Indoor unit
3	Low pressure gas pipe
2	Liquid pipe to Outdoor unit
1	High pressure gas pipe









Note:

1. Unit should be installed in compliance with the appropriate LG installation manual.
2. Unit should be grounded in accordance with the local regulations or applicable national codes.
3. All electrical components and materials supplied from the site must comply with the local regulations or national codes.

PRODUCT DATA

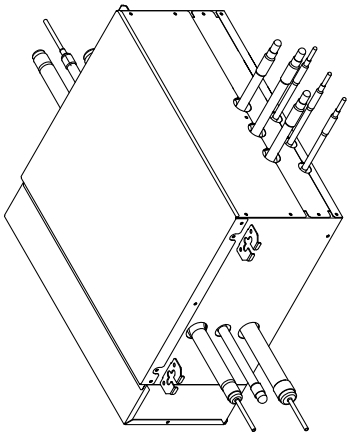
External Dimensions

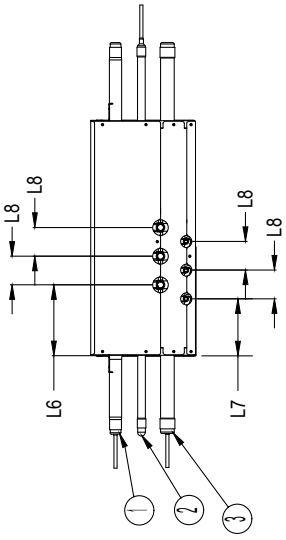
PRHR033A

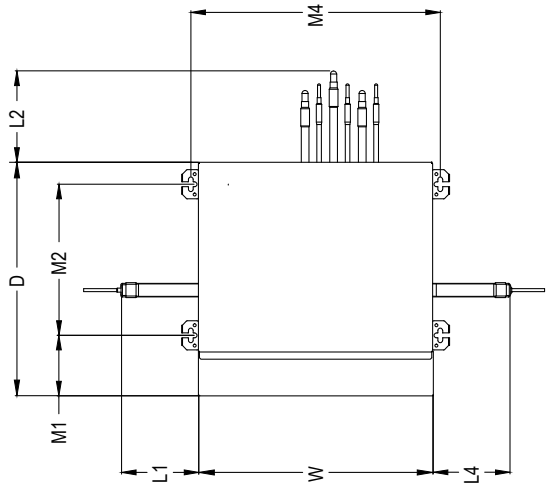
W	19-1/8″
H	8-5/8″
D	18-15/16″
L1	5-15/16″
L2	6-15/16″
L3	3/4″
L4	5-15/16″
L5	2-3/16″
L6	5-3/4″
L7	4-9/16″
L8	2-5/16″
L9	8-9/16″
L10	6-3/16″
L11	3-9/16″
L12	2″
M1	4-15/16″
M2	12-1/4″
M3	1-1/2″
M4	20-3/8″

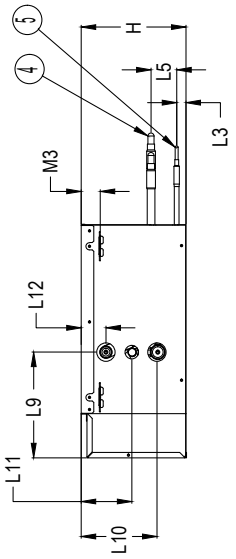
[Unit: inch]

No.	Part Name
1	High pressure gas pipe
2	Liquid pipe to Outdoor unit
3	Low pressure gas pipe
4	Gas pipe to Indoor unit
5	Liquid pipe to Indoor unit
6	Control box









Note:

1. Unit should be installed in compliance with the appropriate LG installation manual.
2. Unit should be grounded in accordance with the local regulations or applicable national codes.
3. All electrical components and materials supplied from the site must comply with the local regulations or national codes.

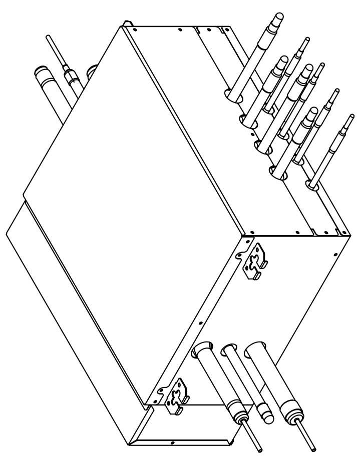
External Dimensions

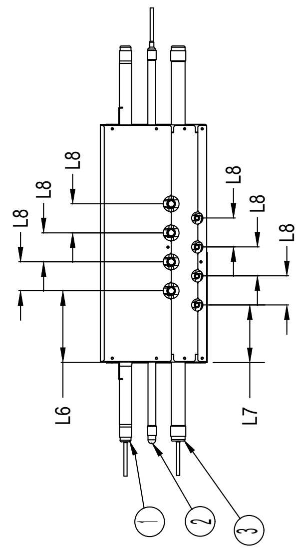
PRHR043A

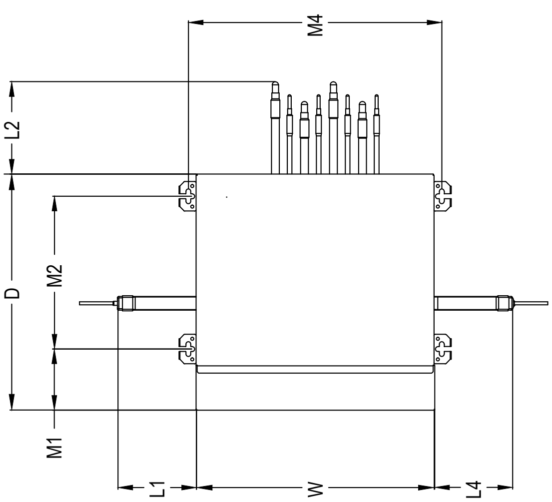
W	19-1/8"
H	8-5/8"
D	18-15/16"
L1	5-15/16"
L2	6-15/16"
L3	3/4"
L4	5-15/16"
L5	2-3/16"
L6	5-3/4"
L7	4-9/16"
L8	2-5/16"
L9	8-9/16"
L10	6-3/16"
L11	3-9/16"
L12	2"
M1	4-15/16"
M2	12-1/4"
M3	1-1/2"
M4	20-3/8"

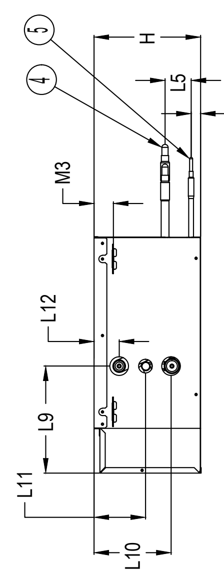
[Unit: inch]

No.	Part Name
1	High pressure gas pipe
2	Liquid pipe to Outdoor unit
3	Low pressure gas pipe
4	Gas pipe to Indoor unit
5	Liquid pipe to Indoor unit
6	Control box









Note:

1. Unit should be installed in compliance with the appropriate LG installation manual.
2. Unit should be grounded in accordance with the local regulations or applicable national codes.
3. All electrical components and materials supplied from the site must comply with the local regulations or national codes.

PRODUCT DATA

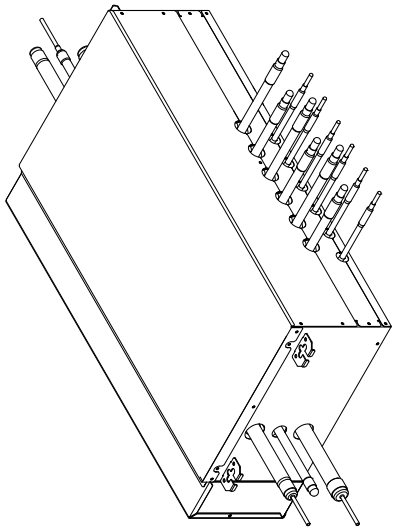
External Dimensions

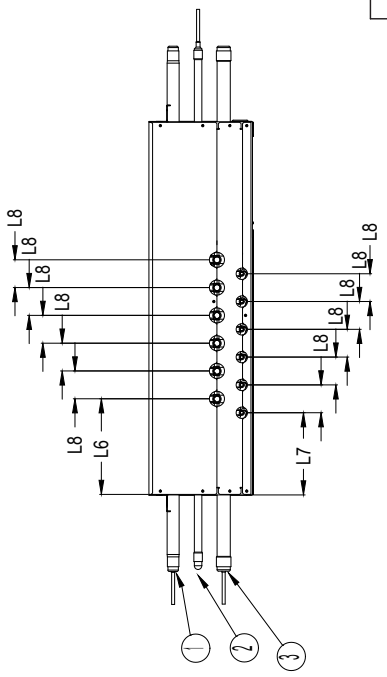
PRHR063A

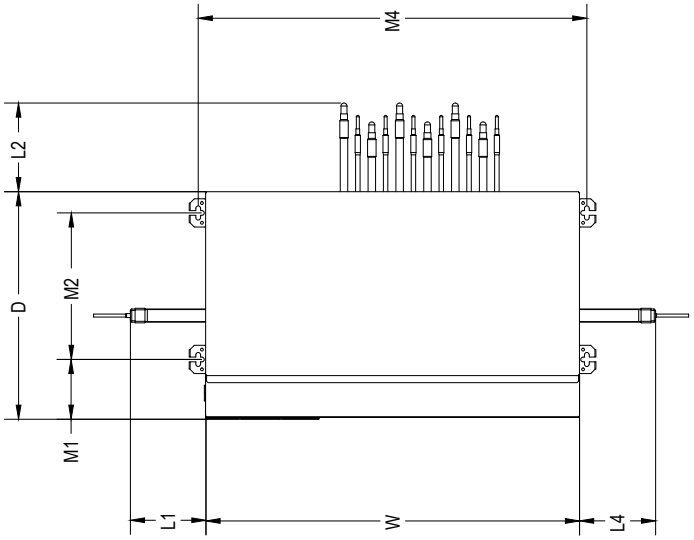
W	31-1/4″
H	8-5/8″
D	18-15/16″
L1	6-5/16″
L2	6-15/16″
L3	3/4″
L4	6-5/16″
L5	2-3/16″
L6	8-1/16″
L7	6-7/8″
L8	2-5/16″
L9	8-9/16″
L10	6-3/16″
L11	3-9/16″
L12	2″
M1	4-15/16″
M2	12-1/4″
M3	1-1/2″
M4	32-1/2″

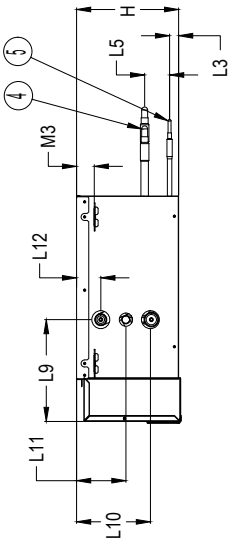
[Unit: inch]

No.	Part Name
6	Control box
5	Liquid pipe to Indoor unit
4	Gas pipe to Indoor unit
3	Low pressure gas pipe
2	Liquid pipe to Outdoor unit
1	High pressure gas pipe









Note:

1. Unit should be installed in compliance with the appropriate LG installation manual.
2. Unit should be grounded in accordance with the local regulations or applicable national codes.
3. All electrical components and materials supplied from the site must comply with the local regulations or national codes.

PRODUCT DATA

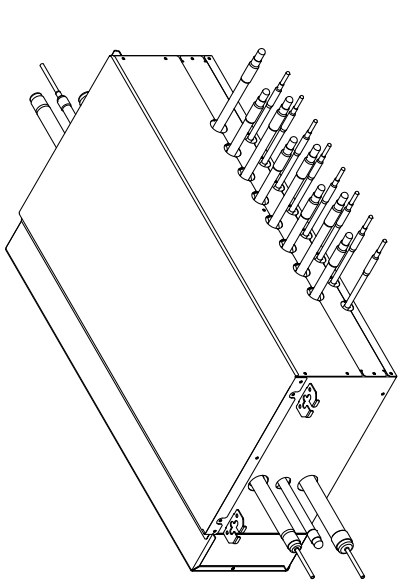
External Dimensions

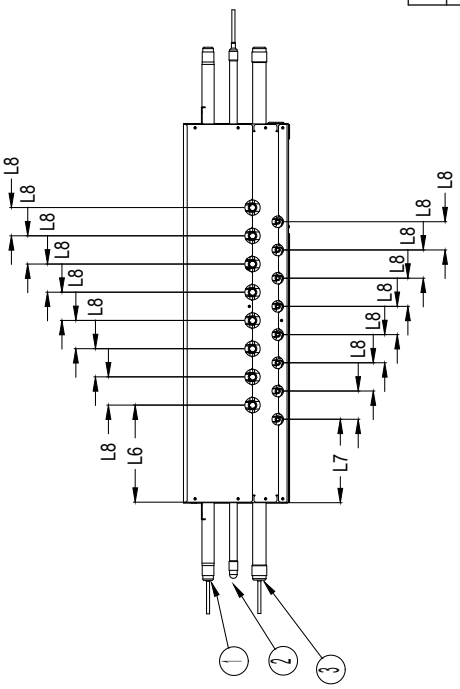
PRHR083A

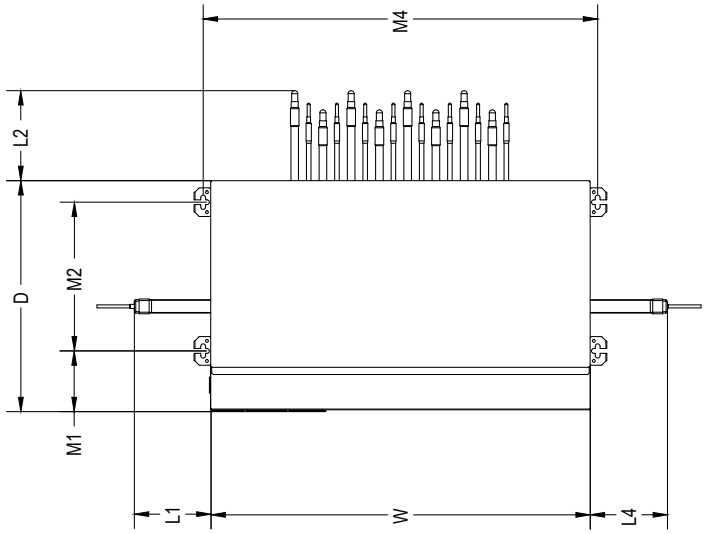
[Unit: inch]

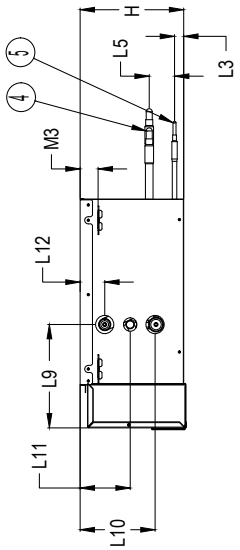
W	31-1/4″
H	8-5/8″
D	18-15/16″
L1	6-5/16″
L2	6-15/16″
L3	3/4″
L4	6-5/16″
L5	2-3/16″
L6	8-1/16″
L7	6-7/8″
L8	2-5/16″
L9	8-9/16″
L10	6-3/16″
L11	3-9/16″
L12	2″
M1	4-15/16″
M2	12-1/4″
M3	1-1/2″
M4	32-1/2″

No.	Part Name
6	Control box
5	Liquid pipe to Indoor unit
4	Gas pipe to Indoor unit
3	Low pressure gas pipe
2	Liquid pipe to Outdoor unit
1	High pressure gas pipe









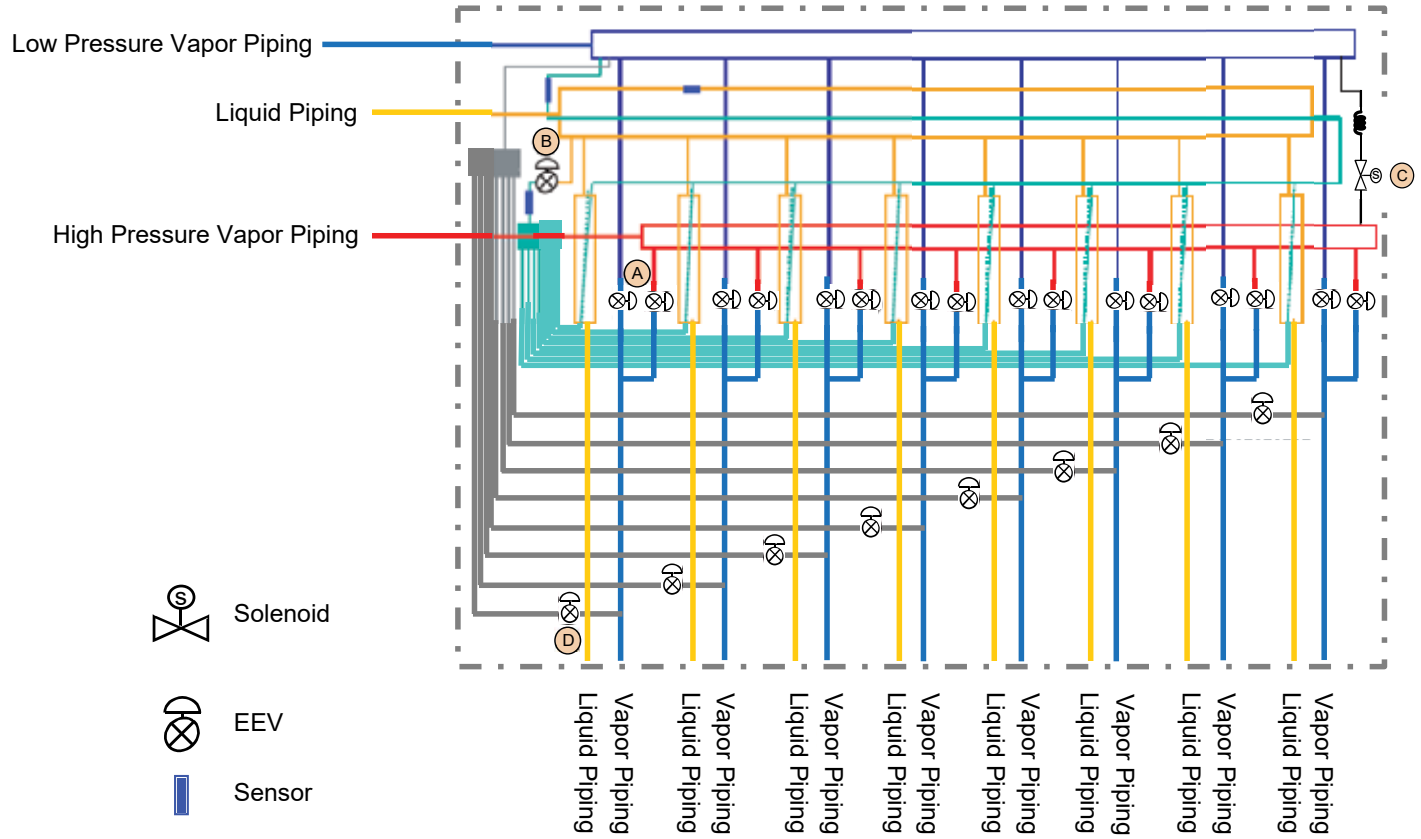
Note:

1. Unit should be installed in compliance with the appropriate LG installation manual.
2. Unit should be grounded in accordance with the local regulations or applicable national codes.
3. All electrical components and materials supplied from the site must comply with the local regulations or national codes.

Product Data

PRODUCT DATA

Refrigerant Flow Diagram



A : Switch operation between cooling and heating by two (2) valves.

B : Decreases noise following subcooling operation between inlet of one indoor unit and outlet of another indoor unit during simultaneous operation.

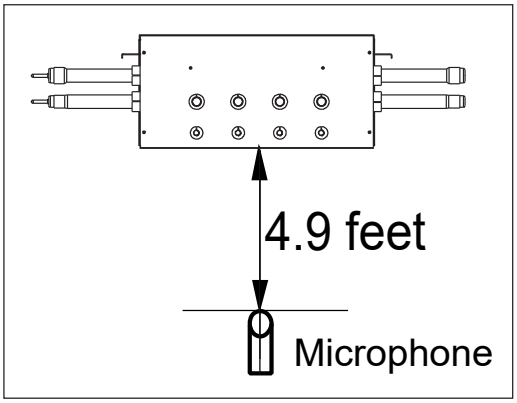
C : Prevents liquid from entering high pressure vapor valve and heat recovery unit during cooling mode.

D : Controls pressure between the high and low pressure vapor piping when operation mode switches.

Note:

Refrigerant diagram above represents the PRHR083A model. Appearances may differ depending on model.

Figure 11: Sound Pressure Measurement Location.



- Measurements are taken 4.9 ft. away from the center of the unit.
- Sound level will vary depending on a range of factors including the construction (acoustic absorption coefficient) of a particular room in which the unit was installed.
- Sound pressure levels are measured in dB(A) with a tolerance of ±3.
- Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

Operating Conditions:

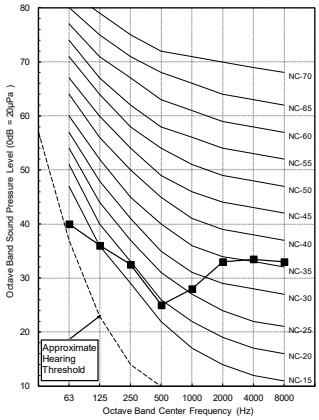
- Power source: 220V 60Hz
- Reference acoustic pressure: 0dB = 20μPa.
- Cooling: Indoor Temperature 80.6°F D.B., 66.2°F W.B., Outdoor Temperature 95°F D.B., 75.2°F W.B.
- Heating: Indoor Temperature 68°F D.B., 59°F W.B., Outdoor Temperature 44.6°F D.B., 42.8°F W.B.

Table 6: PRHR**3A Sound Pressure Levels.

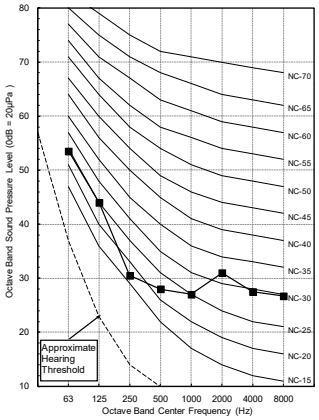
Operation Mode	Sound Pressure Levels dB(A)
Cooling	31
Heating	31
Simultaneous	38
Changeover From Cooling to Heating	33
Changeover From Heating to Cooling	38

Figure 10: PRHR**3A Sound Pressure Level Diagrams.

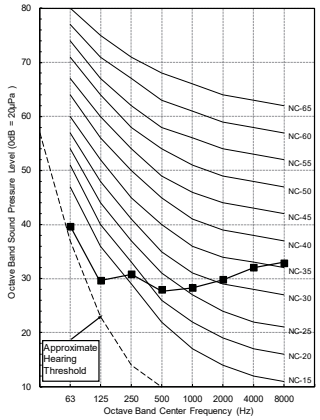
Cooling



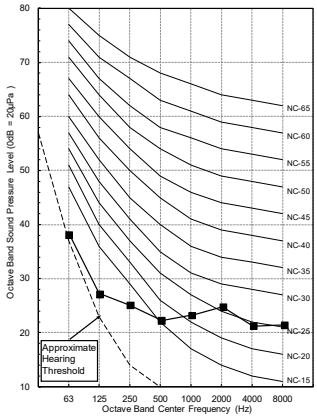
Heating



Changeover from Cooling to Heating



Changeover from Heating to Cooling

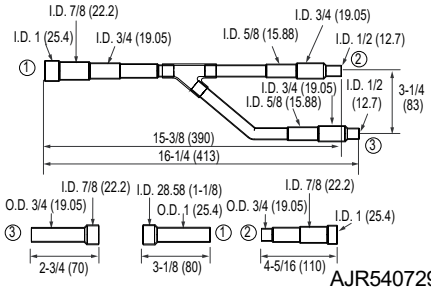
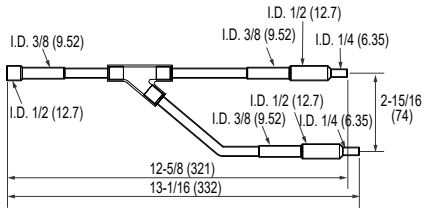


Combining Heat Recovery Ports for Large Indoor Units

It is necessary to combine two ports on a system designed for heat recovery operation when installing a single indoor unit with a capacity exceeding 60,000 Btu/h. Two neighboring heat recovery ports are combined using a reverse Y-branch that is then connected to the one large indoor unit (Kit sold separately).

Table 7: Y-Branch for Twinning Large Indoor Units.

Unit: Inch

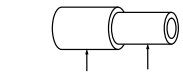
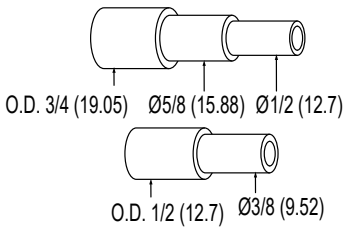
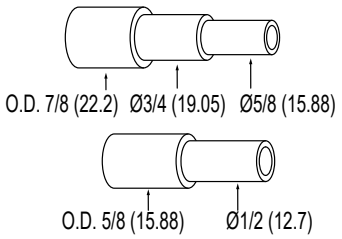
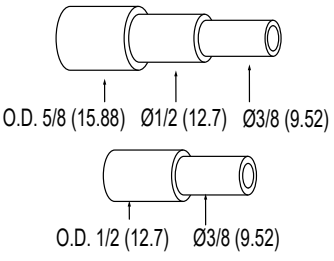
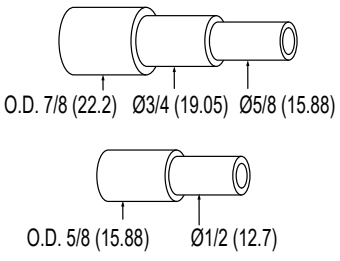
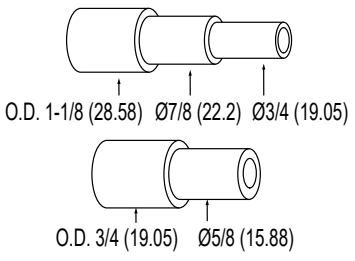
Kit Model No.	Vapor Pipe Dimensions	Liquid Pipe Dimensions
ARBLN03321		

Reducers

It may be necessary to install a reducer if the indoor unit piping or outdoor unit piping is too large or too small for the heat recovery unit connections.

Table 8: Reducers for Heat Recovery Units.

Unit: Inches (mm)

Model		Liquid Piping	Vapor Piping	
			High Pressure	Low Pressure
Heat Recovery Unit Reducer	PRHR023A			
	PRHR033A PRHR043A PRHR063A PRHR083A			

APPLICATION GUIDELINES

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Selecting the Best Location / Clearance Requirements on page 36

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APPLICATION GUIDELINES

Piping Limitations For Systems Designed for Heat Recovery Operation — MV 5

Following pages present Multi V 5 piping limitations and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Figure 12: Typical Heat Recovery System Building Layout with Piping Limitations.

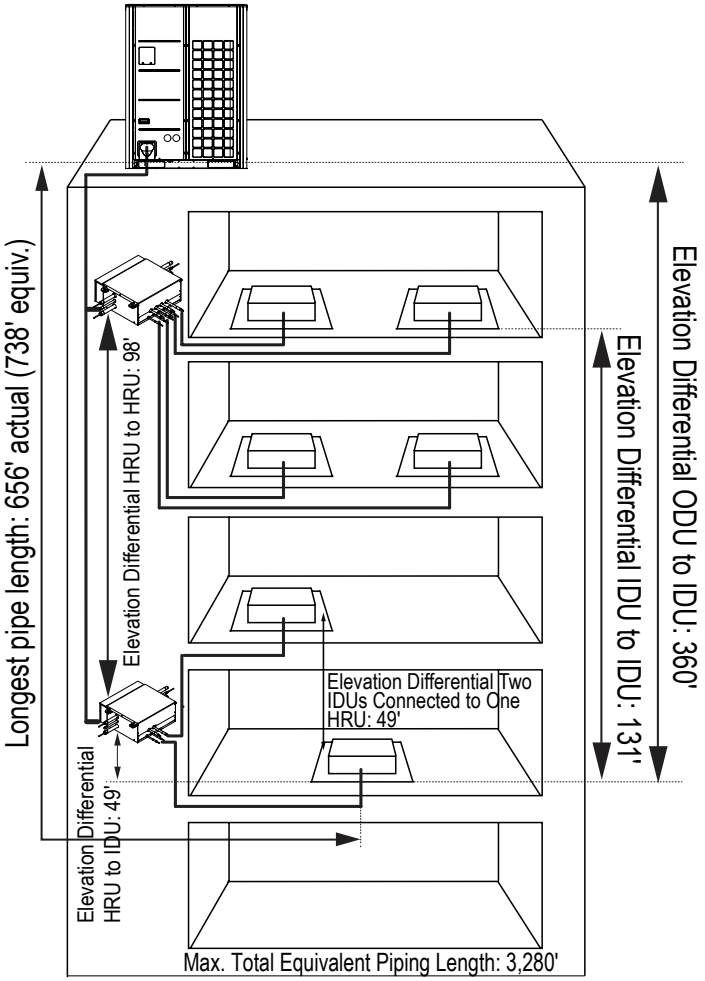


Table 9: Piping Limitations for Heat Recovery Operation (See next page).

Length	Total pipe length	Longest actual pipe length	Equivalent pipe length[1]
	A + ΣB + ΣC ≤ 3,280 feet	≤492 feet (656 feet conditional application)	≤574 feet (738 feet conditional application)
ℓ	Longest pipe length after first branch		
	≤131 feet (295 feet conditional application)		
Elevation1	Elevation differential (Outdoor Unit ↔ Indoor Unit)		
	Height ≤360 feet		
Elevation2	Elevation differential (Indoor Unit ↔ Indoor Unit)		
	height ≤131 feet		
Elevation3	Elevation differential (Indoor Unit ↔ Heat Recovery Unit) [single heat recovery unit or series heat recovery units]		
	49 feet		
Elevation4	Elevation differential (Indoor Unit ↔ Indoor Unit [connected to same Heat Recovery Unit])		
	49 feet		
height1	Elevation differential (Outdoor Unit ↔ Outdoor Unit)		
	≤16.4 feet		
Distance between Outdoor Unit to Outdoor Unit		≤33 feet (Max. 43 feet for Outdoor Unit ≥12 tons)	
Distance between fittings and Indoor Unit		≥20 inches	
Distance between fittings and Y-branches / Headers		≥20 inches	
Distance between two Y-branches / Headers		≥20 inches	
Height differential between two Heat Recovery Units if installed with a Y-branch		≤98 feet	
Height differential between two series-piped Heat Recovery Units		≤16 feet	

[1]Assume equivalent pipe length of Y-branch is 1.6 feet, and equivalent pipe length of header is 3.3 feet.

Piping Limitations For Systems Designed for Heat Recovery Operation — MV 5

Following pages present Multi V 5 piping limitations and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Example of Pipe Sizing When Installing a Heat Recovery System

Example: Triple-frame system, four (4) heat recovery units, one (1) header, and twelve (12) indoor units connected.

ODU: Outdoor Units.

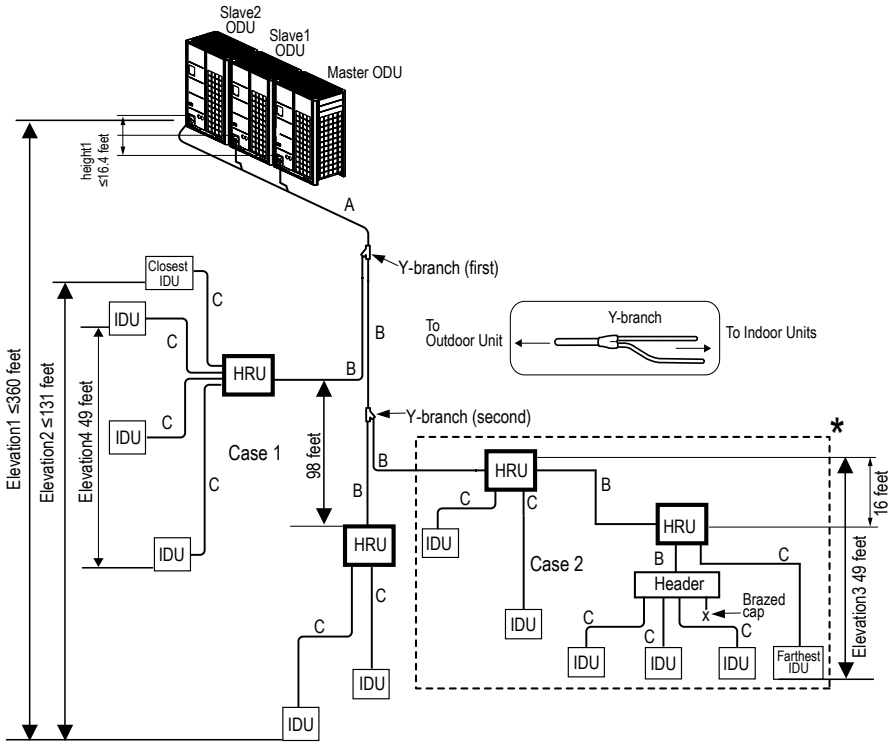
HRU: Heat Recovery Units.

IDU: Indoor units.

A: Main Pipe from Outdoor Unit to First Y-branch.

B: Heat Recovery Unit to Heat Recovery Unit, Y-branch to Heat Recovery Unit, Heat Recovery Unit to Header, or Y-branch to Y-branch.

C: Heat Recovery Unit / Header to Indoor Unit.



Case 1: Maximum height is 131 feet if installed with a Y-branch.
Case 2: Maximum height is 16 feet in heat recovery control unit series connection.

Note:

- *Always reference the LATS HVAC software report (latest version).*
- *Larger-capacity outdoor units must be the master in a multi-frame system.*
- *Master outdoor unit capacity must be greater than or equal to the slave1 outdoor unit capacity, and, where applicable, slave1 outdoor unit capacity must be greater than or equal to the slave2 outdoor unit capacity.*
- *Connection piping from branch to branch cannot exceed the main pipe diameter (A) used by the outdoor unit.*
- *Install the header branches or heat recovery units so that the pipe distances between the between the connected indoor units are minimized. Large differences in pipe distances can cause indoor unit performances to fluctuate.*
- ⃠ *Y-branches and other header branches cannot be installed downstream of the initial header branch.*
- *Total capacity of indoor units in series connection of heat recovery units ≤230,000 Btu/h.*
- *If large capacity indoor units (>60,000 Btu/h with piping sizes >5/8Ø / 3/8Ø) are installed, the valve group setting must be used. (Refer to the PCB of the heat recovery unit for the valve group control setting.)*

Table 10: Main Pipe (A) Diameters from Outdoor Unit to First Y-branch.

ODU Capacity (ton)	Standard Pipe Diameter			Pipe diameter when pipe length is ≥295 feet or when height differential (ODU ↔ IDU) is >164 feet		
	Liquid Pipe (inches OD)	Low Pressure Vapor Pipe (inches OD)	High Pressure Vapor Pipe (inches OD)	Liquid Pipe (inches OD)	Low Pressure Vapor Pipe (inches OD)	High Pressure Vapor Pipe (inches OD)
6	3/8Ø	3/4Ø	5/8Ø	1/2Ø	No Increase	No Increase
8	3/8Ø	7/8Ø	3/4Ø	1/2Ø	No Increase	No Increase
10	1/2Ø	1-1/8Ø	3/4Ø	5/8Ø	No Increase	No Increase
12	1/2Ø	1-1/8Ø	7/8Ø	5/8Ø	No Increase	No Increase
14	5/8Ø	1-1/8Ø	7/8Ø	3/4Ø	No Increase	No Increase
16-18	5/8Ø	1-1/8Ø	1-1/8Ø	3/4Ø	No Increase	No Increase
20	5/8Ø	1-3/8Ø	1-1/8Ø	3/4Ø	No Increase	No Increase
22-28	3/4Ø	1-3/8Ø	1-1/8Ø	7/8Ø	No Increase	No Increase
30-42	3/4Ø	1-5/8Ø	1-1/8Ø	7/8Ø	No Increase	No Increase

APPLICATION GUIDELINES

Piping Limitations For Systems Designed for Heat Recovery Operation — MV 5

Following pages present Multi V 5 piping limitations and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Table 11: Refrigerant Pipe (B) Diameters between Y-branches and Y-branches / Heat Recovery Unit / Headers.

Downstream IDU total capacity (Btu/h)	Liquid pipe (inches OD)	Vapor pipe (inches OD)	
		Low pressure	High pressure
≤19,100	1/4Ø	1/2Ø	3/8Ø
<54,600	3/8Ø	5/8Ø	1/2Ø
<76,400	3/8Ø	3/4Ø	5/8Ø
<114,700	3/8Ø	7/8Ø	3/4Ø
<172,000	1/2Ø	1-1/8Ø	7/8Ø
<229,400	5/8Ø	1-1/8Ø	7/8Ø
<248.500	5/8Ø	1-3/8Ø	1-1/8Ø
<344,000	3/4Ø	1-3/8Ø	1-1/8Ø
<592,500	3/4Ø	1-5/8Ø	1-3/8Ø

Table 12: Indoor Unit Connecting Pipe from Branch (C).

Indoor Unit Capacity[1]	Liquid pipe (inches OD)	Vapor pipe (inches OD)
≤19,100	1/4Ø	1/2Ø
≤54,600	3/8Ø	5/8Ø
≤76,400	3/8Ø	3/4Ø
≤95,900	3/8Ø	7/8Ø

[1]9,600-24,200 Btu/h 4-way 3 feet x 3 feet Cassette and 15,400-24,200 Btu/h High Static Ducted IDUs have 3/8Ø (liquid) and 5/8Ø (vapor).

Conditional Applications

Conditional applications are computed in LATS. See below for an explanation of when pipes are upsized.

If the equivalent length between the first Y-branch to the farthest indoor unit is >131 feet (maximum 295 feet):

- Pipe segment diameters between the first branch and the last branch must be sized up by one. This applies to both liquid and low / high vapor pipes. If the next size up is not available, or if the pipe segment diameters are the same as main pipe (A) diameters, sizing up is not possible.
- While calculating total refrigerant piping length, pipe (B) segment lengths between the first Y-branch and second Y-branch, and between the second Y-branch and the heat recovery unit must be calculated by two.
- Length of pipe (C) from each indoor unit to the closest Y-branch, header, or heat recovery unit ≤49 feet.
- [Length of pipe from outdoor unit to farthest indoor unit (A+B+C)] - [Length of pipe from outdoor unit to closest indoor unit (A+B+C)] ≤131 feet.

Piping Limitations For Systems Designed for Heat Recovery Operation — MV IV Water

Following pages present Multi V IV Water piping limitations and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Figure 13: Typical Heat Recovery System Building Layout with Piping Limitations.

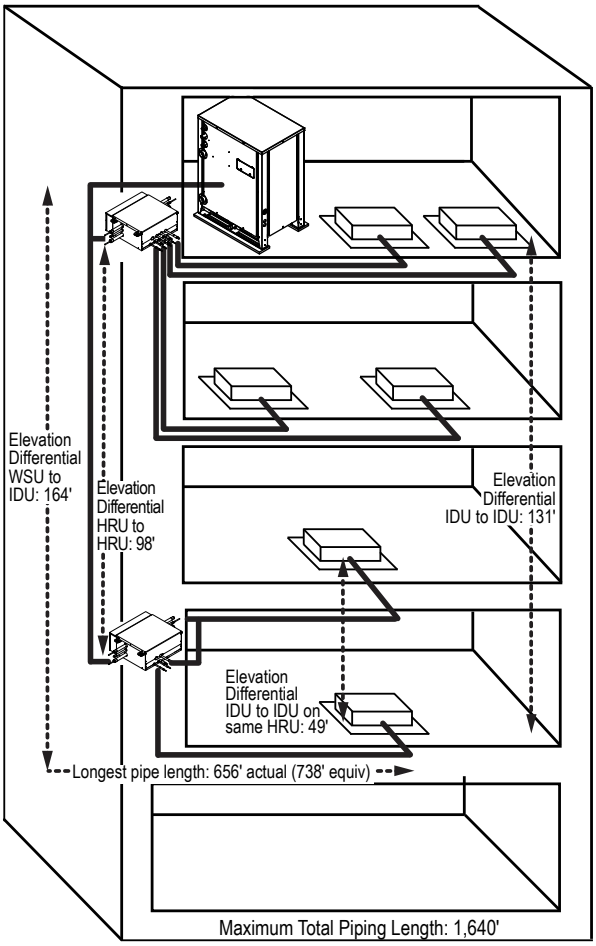


Table 13: Piping Limitations for Heat Recovery Operation.

Length	Total pipe length A + ΣB + ΣC ≤ 1,640 feet	Longest actual pipe length ≤656 feet	Equivalent pipe length1 ≤738 feet
ℓ	Longest pipe length after first branch ≤131 feet (295 feet conditional application)		
Elevation 1	Elevation differential (Water Source Unit ↔ Indoor Unit) Height ≤164 feet		
Elevation 2	Elevation differential (Indoor Unit ↔ Indoor Unit) [IDUs connected to separate HRUs which are parallel (Y-branch) connected.] Height ≤131 feet		
Elevation 3	Elevation differential (Indoor Unit ↔ Connected HRU or Series Connected HRU] Height ≤49 feet		
Elevation 4	Elevation differential (Indoor Unit ↔ Indoor Unit [connected to same Heat Recovery Unit]) Height ≤49 feet		
Elevation 5	Elevation differential (Highest WSU ↔ Lowest WSU unit) Height ≤16 feet		
Distance between WSU to WSU			≤33 feet
Distance between fittings and Indoor Unit			≥20 inches
Distance between fittings and Y-branches / Headers			≥20 inches
Distance between two Y-branches / Headers			≥20 inches
Height differential between two Heat Recovery Units if installed with a Y-branch			≤98 feet
Height differential between two series-piped Heat Recovery Units			≤16 feet

[1]Assume equivalent pipe length of Y-branch is 1.6 feet, and equivalent pipe length of header is 3.3 feet.

APPLICATION GUIDELINES

Piping Limitations For Systems Designed for Heat Recovery Operation — MV IV Water

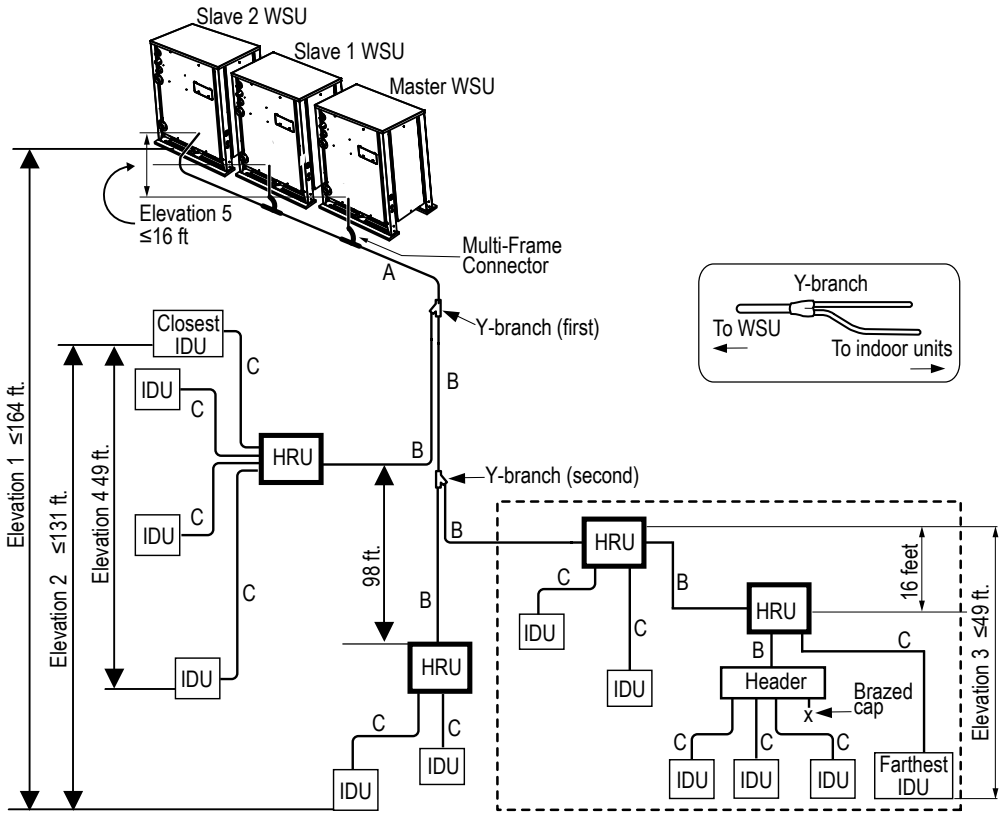
Following pages present Multi V IV Water piping limitations and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Example of Pipe Sizing When Installing a Heat Recovery System

Example: Triple-frame system, four (4) heat recovery units, one (1) header, and twelve (12) indoor units connected

WSU: Water Source Unit
HRU: Heat Recovery Unit
IDU: Indoor Unit
A: Main Pipe from Water Source Unit to First Y-branch.
B: HRU to HRU, Y-branch to HRU, HRU to Header, or Y-branch to Y-branch.
C: Heat Recovery Unit / Header to Indoor Unit.

Figure 14: Heat Recovery Triple-Frame Connections.



Note:

- *Always reference the LATS HVAC software report.*
- *Largest capacity WSU must be the master in a multi-frame system.*
- *Master WSU capacity must be greater than or equal to the slave1 WSU capacity, and, where applicable, slave1 WSU capacity must be greater than or equal to the slave2 WSU capacity.*
- *Connection piping from branch to branch cannot exceed the main pipe diameter (A) used by the water source unit.*
- *Install the header branches or heat recovery units so that the pipe distances between the between the connected indoor units are minimized. Large differences in pipe distances can cause indoor unit performances to fluctuate.*
- ⃠ *Y-branches and other header branches cannot be installed downstream of the initial header branch.*
- *Total capacity of indoor units in series connection of heat recovery units ≤230,000 Btu/h.*
- *If large capacity indoor units (>60,000 Btu/h with piping sizes >5/8Ø / 3/8Ø) are installed, the valve group setting must be used. (Refer to the PCB of the heat recovery unit for the valve group control setting.)*

APPLICATION GUIDELINES

Piping Limitations For Systems Designed for Heat Recovery Operation — MV IV Water

Following pages present Multi V IV Water piping limitations and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Table 14: Main Pipe (A) Diameter from Water Source Unit to First Y-branch.

WSU Capacity (ton)	Pipe diameter when equivalent pipe length from WSU to farthest IDU is <295 ft.			Pipe diameter when equivalent pipe length from WSU to farthest IDU is >295 ft.		
	Liquid Pipe (inches OD)	Low Pressure Vapor Pipe (inches OD)	High Pressure Vapor Pipe (inches OD)	Liquid Pipe (inches OD)	Low Pressure Vapor Pipe (inches OD)	High Pressure Vapor Pipe (inches OD)
6	3/8	7/8	3/4	1/2	7/8	3/4
8	3/8	7/8	3/4	1/2	1-1/8	3/4
10	1/2	1-1/8	3/4	5/8	1-1/8	3/4
12	1/2	1-1/8	3/4	5/8	1-1/8	3/4
14	1/2	1-1/8	3/4	5/8	1-1/8	3/4
16	1/2	1-1/8	3/4	5/8	1-1/8	3/4
18	3/4	1-3/8	1-1/8	7/8	1-3/8	1-1/8
20	3/4	1-3/8	1-1/8	7/8	1-3/8	1-1/8
24	3/4	1-3/8	1-1/8	7/8	1-3/8	1-1/8
28	3/4	1-3/8	1-1/8	7/8	1-3/8	1-1/8
30	3/4	1-5/8	1-3/8	7/8	1-5/8	1-3/8
32	3/4	1-5/8	1-3/8	7/8	1-5/8	1-3/8
36	3/4	1-5/8	1-3/8	7/8	1-5/8	1-3/8
40	3/4	1-5/8	1-3/8	7/8	1-5/8	1-3/8
48	3/4	1-5/8	1-3/8	7/8	1-5/8	1-3/8

Table 15: Refrigerant Pipe (B) Diameter between Y-branches and Y-branches / Heat Recovery Unit / Headers.

Downstream IDU total capacity (Btu/h)	Liquid pipe (inches OD)	Vapor pipe (inches OD)	
		Low pressure	High pressure
≤19,100	1/4	1/2	3/8
<54,600	3/8	5/8	1/2
<76,400	3/8	3/4	5/8
<112,600	3/8	7/8	3/4
<160,400	1/2	1-1/8	7/8
<242,300	5/8	1-1/8	1-1/8
<354,900	3/4	1-3/8	1-1/8
≥354,900	3/4	1-5/8	1-3/8

Table 16: Indoor Unit Connecting Pipe from Branch (C).

Indoor Unit Capacity[1]	Liquid pipe (inches OD)	Vapor pipe (inches OD)
≤19,100	1/4	1/2
≤54,600	3/8	5/8
≤76,400	3/8	3/4

[1]9,600-24,200 Btu/h 4-way 3 feet x 3 feet Cassette and 15,400-24,200 Btu/h High Static Ducted IDUs have 3/8Ø (liquid) and 5/8Ø (vapor).

Conditional Applications

Conditional applications are computed in LATS. See below for an explanation of when pipes are upsized.

If the equivalent length between the first Y-branch to the farthest indoor unit is >131 feet (maximum 295 feet):

- Pipe segment diameters between the first branch and the last branch must be sized up by one. This applies to both liquid and low / high vapor pipes. If the next size up is not available, or if the pipe segment diameters are the same as main pipe (A) diameters, sizing up is not possible.
- While calculating total refrigerant piping length, pipe (B) segment lengths between the first Y-branch and second Y-branch, and between the second Y-branch and the heat recovery unit must be calculated by two.
- Length of pipe (C) from each indoor unit to the closest Y-branch, header, or heat recovery unit ≤131 feet.
- [Length of pipe from water source unit to farthest indoor unit (A+B+C)] - [Length of pipe from water source unit to closest indoor unit (A+B+C)] ≤131 feet.

APPLICATION GUIDELINES

Piping Limitations For Systems Designed for Heat Recovery Operation — MV S

Following pages present Multi V S piping limitations and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Figure 15: Typical Multi V S Heat Recovery ARUB060GSS4 System Building Layout Listing the Piping Limitations — When the Outdoor Unit is Above the Indoor Units.

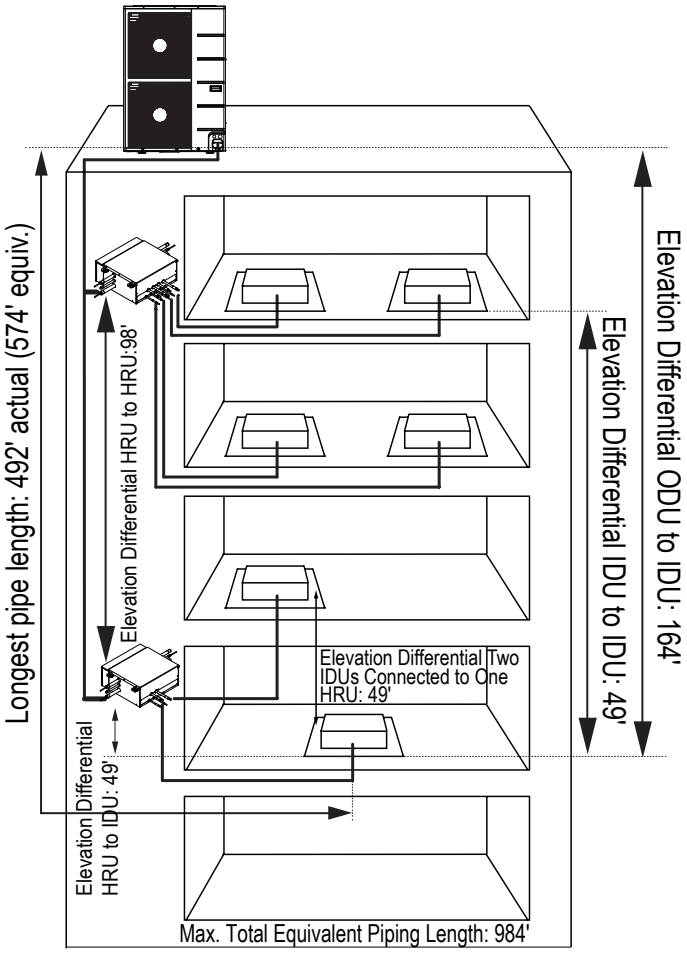


Figure 16: Typical Multi V S Heat Recovery ARUB060GSS4 System Building Layout Listing the Piping Limitations — When the Outdoor Unit is Below the Indoor Units.

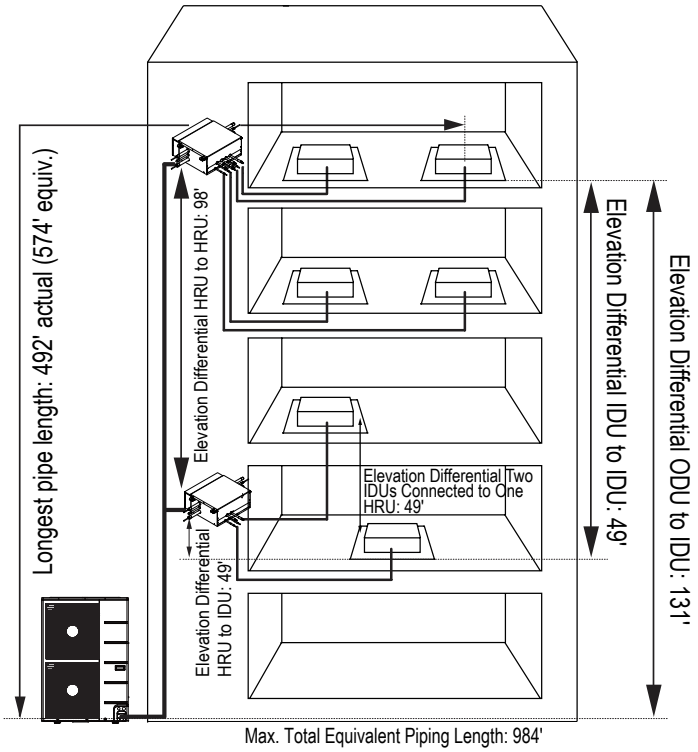


Table 17: Piping Limitations for ARUB060GSS4 Heat Recovery Systems (See next page).

Length	Total pipe length	Longest actual pipe length	Equivalent pipe length
	A + ΣB + ΣC ≤984 feet	≤492 feet	≤574 feet
ℓ	Longest pipe length after first branch		
	≤131 feet		
Elevation1	Elevation differential (Outdoor Unit ↔ Indoor Unit)		
	Height ≤164 feet (Outdoor Unit Above Indoor Unit); Height ≤131 feet (Outdoor Unit Below Indoor Unit)		
Elevation2	Elevation differential (Indoor Unit ↔ Indoor Unit)		
	height ≤49 feet		
Elevation3	Elevation differential (Indoor Unit ↔ Heat Recovery Unit)		
	49 feet		
Elevation4	Elevation differential (Indoor Unit ↔ Indoor Unit [connected to same Heat Recovery Unit])		
	49 feet		
Distance between fittings and Indoor Unit		≥20 inches	
Distance between fittings and Y-branches / Headers		≥20 inches	
Distance between two Y-branches / Headers		≥20 inches	
Height differential between two Heat Recovery Units if installed with a Y-branch		≤98 feet	
Height differential between two series-piped Heat Recovery Units		≤16 feet	

Piping Limitations For Systems Designed for Heat Recovery Operation — MV S

Following pages present Multi V S piping limitations and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Example of Pipe Sizing When Installing a Heat Recovery System

Example: Heat recovery system with four (4) heat recovery units, one (1) header, and twelve (12) indoor units connected

ODU: Outdoor Units.

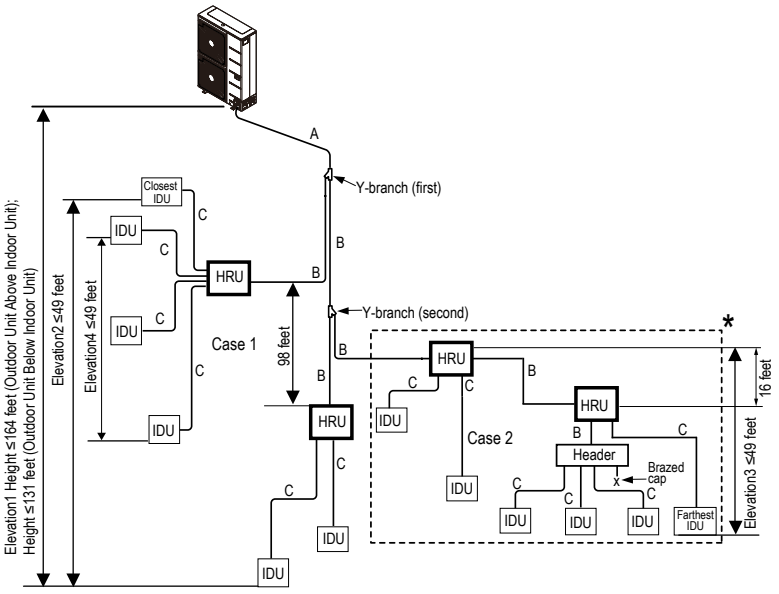
HRU: Heat Recovery Units.

IDU: Indoor units.

A: Main Pipe from Outdoor Unit to First Y-branch.

B: Heat Recovery Unit to Heat Recovery Unit, Y-branch to Heat Recovery Unit, Heat Recovery Unit to Header, or Y-branch to Y-branch.

C: Heat Recovery Unit / Header to Indoor Unit.



Case 1: Maximum height is 131 feet if installed with a Y-branch.
Case 2: Maximum height is 16 feet in heat recovery control unit series connection.

Note:

- *Always reference the LATS Multi V software report.*
- *Connection piping from branch to branch cannot exceed the main pipe diameter (A) used by the outdoor unit.*
- *Install the header branches or heat recovery units so that the pipe distances between the connected indoor units are minimized. Large differences in pipe distances can cause indoor unit performances to fluctuate.*
- ⃠ *Y-branches and other header branches cannot be installed downstream of the initial header branch.*
- *If large capacity indoor units (>60,000 Btu/h with piping sizes >5/8Ø / 3/8Ø) are installed, the valve group setting must be used. (Refer to the PCB of the heat recovery unit for the valve group control setting.)*

Table 18: Main Pipe (A) Diameters from ARUB060GSS4 Heat Recovery Outdoor Unit to First Y-branch.

Pipe Diameter when pipe length is ≤295 feet			Pipe diameter when pipe length is ≥295 feet		
Liquid Pipe (inches OD)	Low Pressure Vapor Pipe (inches OD)	High Pressure Vapor Pipe (inches OD)	Liquid Pipe (inches OD)	Low Pressure Vapor Pipe (inches OD)	High Pressure Vapor Pipe (inches OD)
3/8Ø	3/4Ø	5/8Ø	1/2Ø	7/8Ø	3/4Ø

Table 19: Refrigerant Pipe (B) Diameters between Y-branches and Y-branches / Heat Recovery Unit / Headers.

Downstream IDU total capacity (Btu/h)	Liquid pipe (inches OD)	Vapor pipe (inches OD)
≤19,100	1/4Ø	1/2Ø
<54,600	3/8Ø	5/8Ø
<76,400	3/8Ø	3/4Ø

Table 20: Indoor Unit Connecting Pipe from Branch (C).

Indoor Unit Capacity[1]	Liquid pipe (inches OD)	Vapor pipe (inches OD)
≤19,100	1/4Ø	1/2Ø
≤54,600	3/8Ø	5/8Ø
≤76,400	3/8Ø	3/4Ø

[1]9,600-24,200 Btu/h 4-way 3 feet x 3 feet Cassette and 15,400-24,200 Btu/h High Static Ducted IDUs have 3/8Ø (liquid) and 5/8Ø (vapor).

Conditional Applications

Conditional application are computed in LATS. See below for an explanation of when pipes are upsized.

When one or both conditions listed below are present, the diameter of main pipe (A) must be increased.

- If equivalent length between the outdoor unit and the farthest indoor unit is ≥295 feet, the diameters of the liquid, high pressure vapor, and low pressure vapor pipes must be sized up.
- If elevation differential between the outdoor unit and the farthest indoor unit is ≥164 feet, the diameter of only the liquid pipe must be sized up.

Selecting the Best Location / Clearance Requirements

Note:

Heat recovery units are for use with systems designed for heat recovery operation only.

Select an installation space for the heat recovery unit that meets the following conditions:

- Install the heat recovery unit indoors in a level and upright position.
- Ensure there is enough space in the installation area for service access.
- Install the heat recovery unit in a location where any sound it may generate will not disturb occupants in the surrounding rooms.
- Install the refrigerant piping and electrical wiring system in an easily accessible location.

Dont's

- *Refrigerant pipes must not exceed lengths specified by LG Electronics.*
- *Do not install the heat recovery unit in a location where it would be subjected to strong radiation heat from heat sources.*
- *Avoid an installation environment where oil splattering or vapor spray may occur.*
- *Avoid an installation environment where high-frequency electric noise could occur.*
- *Condensate drain piping is not required.*

Figure 17: PRHR023A to 043A Clearance Requirements.

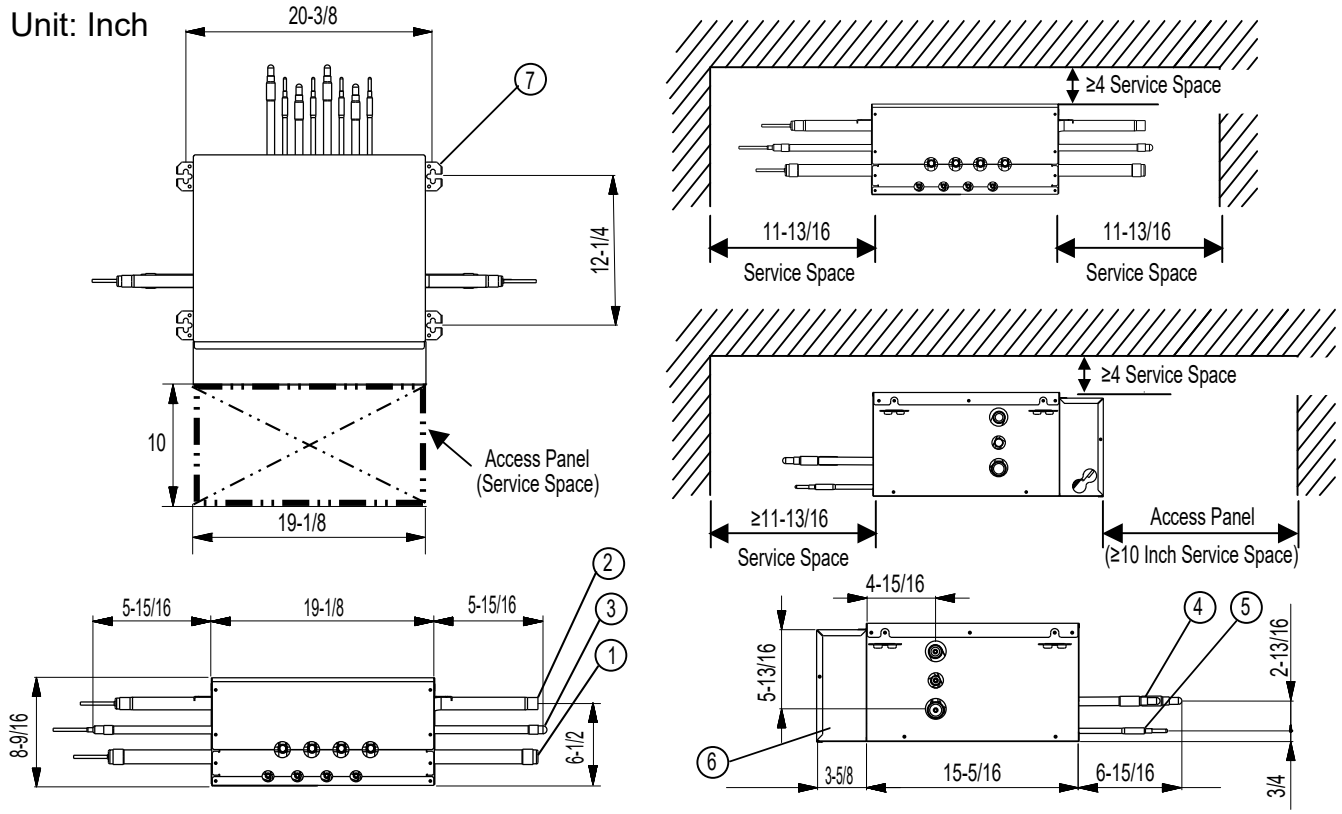


Table 21: PRHR023A to 043A Heat Recovery Unit Components.

No.	Component Name	Connection Size (in.) / Type		
		PRHR023A	PRHR033A	PRHR043A
1	Low Pressure Vapor Pipe Connection Port	7/8 Braze	1-1/8 Braze	1-1/8 Braze
2	High Pressure Vapor Pipe Connection Port	3/4 Braze	7/8 Braze	7/8 Braze
3	Liquid Pipe Connection Port	3/8 Braze	1/2 Braze	5/8 Braze
4	Indoor Unit Vapor Pipe Connection Port	5/8 Braze	5/8 Braze	5/8 Braze
5	Indoor Unit Liquid Pipe Connection Port	3/8 Braze	3/8 Braze	3/8 Braze
6	Control Box	–	–	–
7	Metal Hanger Bracket (Field-Supplied Suspension Bolt)	5/16 or 7/16	5/16 or 7/16	5/16 or 7/16

Selecting the Best Location / Clearance Requirements, Continued.

Figure 18: PRHR063A and PRHR083A Clearance Requirements.

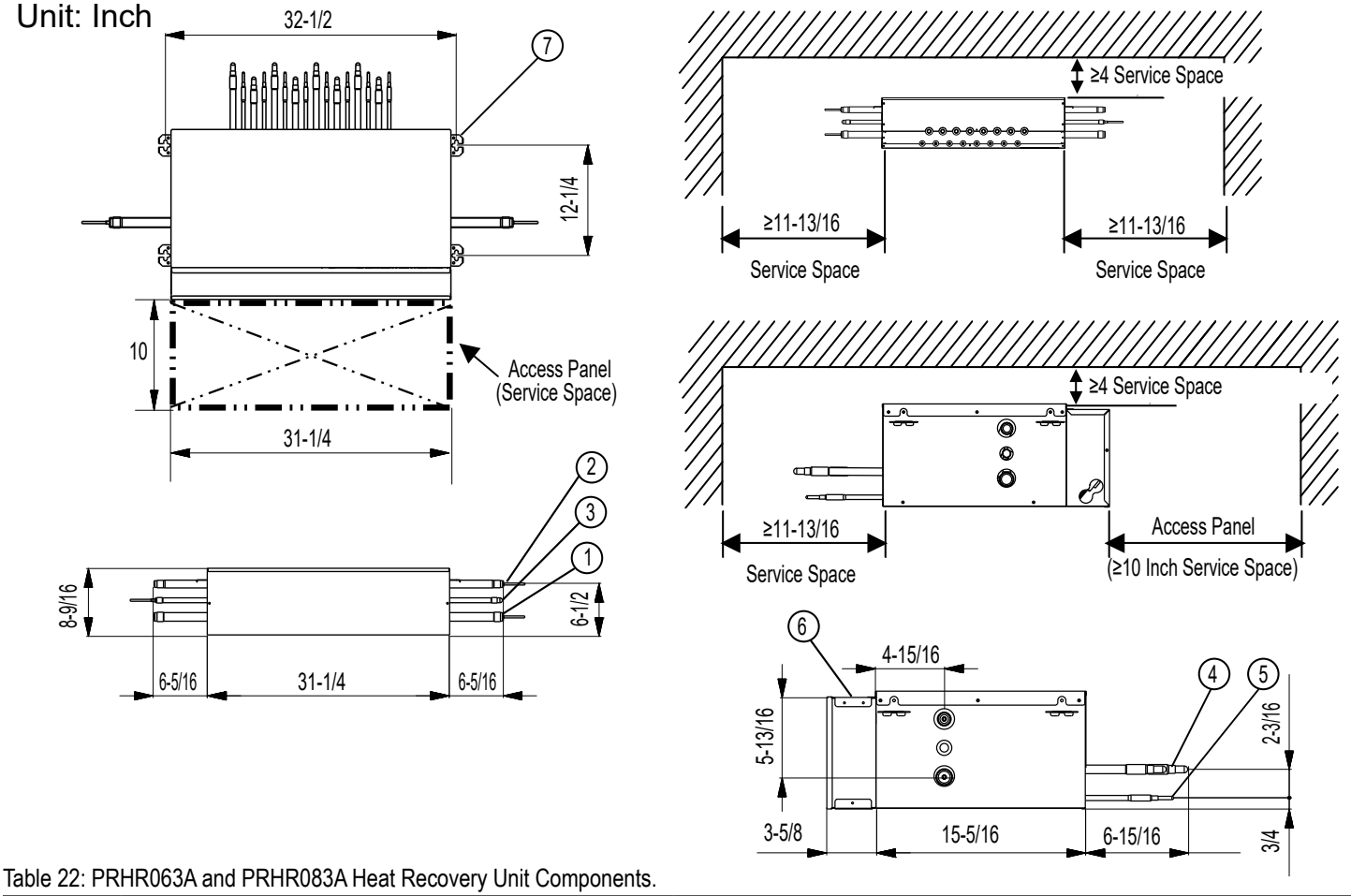


Table 22: PRHR063A and PRHR083A Heat Recovery Unit Components.

No.	Component Name	Connection Size (in.)/ Type	
		PRHR063A	PRHR083A
1	Low Pressure Vapor Pipe Connection Port	1-1/8 Braze	1-1/8 Braze
2	High Pressure Vapor Pipe Connection Port	7/8 Braze	7/8 Braze
3	Liquid Pipe Connection Port	5/8 Braze	5/8 Braze
4	Indoor Unit Vapor Pipe Connection Port	5/8 Braze	5/8 Braze
5	Indoor Unit Liquid Pipe Connection Port	3/8 Braze	3/8 Braze
6	Control Box	–	–
7	Metal Hanger Bracket (Field-Supplied Suspension Bolt)	5/16 or 7/16	5/16 or 7/16

Note:

- *Include an access panel at the side of the heat recovery unit where the control box is located.*
- *If reducers are used, service space must be increased equal to the dimensions of the reducer.*

General Mounting Procedure

1. Select and mark the area where the anchors / suspension bolts are to be placed on the ceiling.
2. Drill the holes for the anchors / suspension bolts as indicated.
3. Install the heat recovery unit horizontally on the metal hanger brackets with its top facing up. Use a level—the unit must be within ±5° from front to back and from left to right. Tighten all anchors, nuts, and bolts.

Figure 19: Drilling the Holes for the Anchors / Suspension Bolts.

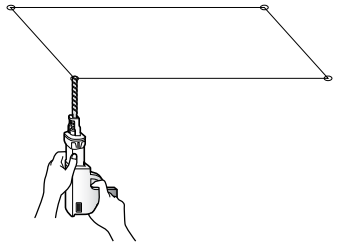
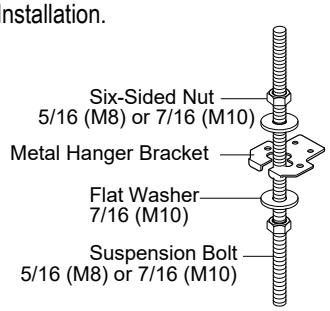


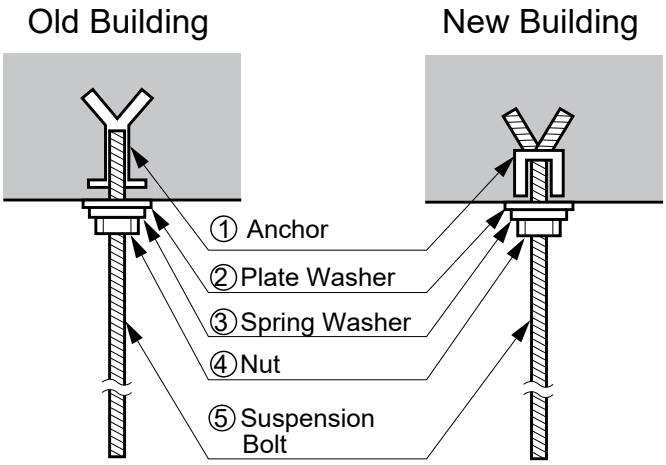
Figure 20: Suspension Bolts Installation.



The following parts are field supplied:

- Six-Sided Nuts: 5/16" (M8) or 7/16" (M10)
- Flat Washers: 7/16" (M10)
- Suspension Bolts: 5/16" (M8) or 7/16" (M10)

Figure 21: Old Versus New Building Suspension Bolt Installation.



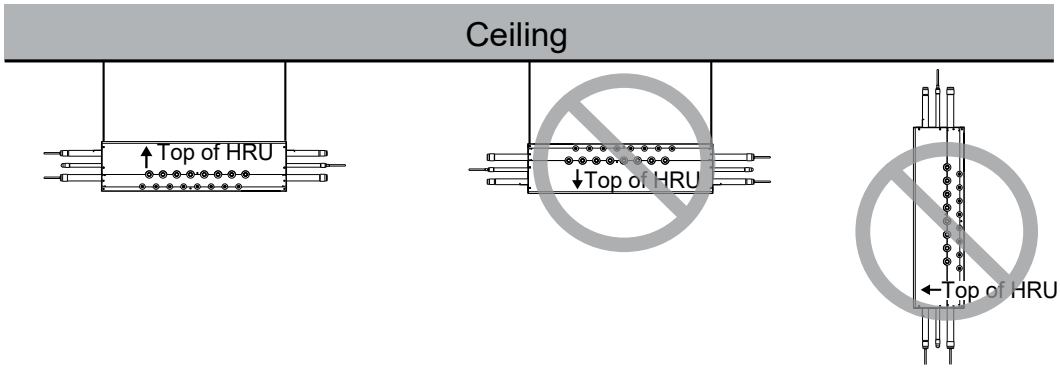
⚠ WARNING

- *The threaded suspension bolts and other hardware must be securely tightened to prevent the unit from falling from its installation location. There is a risk of personal injury from falling equipment.*
- *⃠ Do not damage power wiring during installation. There is risk of electric shock, which may result in physical injury or death.*

Note:

- *The threaded suspension bolts and other hardware must be securely tightened to prevent the unit from falling from its installation location. There is a risk of equipment damage.*
- *⃠ Do not damage power wiring during installation. There is a risk of equipment malfunction, which may result in property damage.*
- *The heat recovery unit MUST be installed so that its top faces up. If not, the incorrect installation may cause unit failure.*

Figure 22: Installing the Heat Recovery Unit Top Side Up.



General Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams displayed on the inside of the control box cover.
- Have a separate power supply for the heat recovery units / indoor units.
- Provide a circuit breaker switch between the power source and the heat recovery unit.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ±10 percent of the rated current marked on the name plate.
- Confirm wiring / cable thickness specifications:
  - 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.
  - Communication cable between Master ODU to IDUs / HRUs to be 18 AWG, 2-conductor, twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the Master ODU chassis only. ⃠ Do not ground the ODU to IDUs / HRUs communication cable at any other point. Wiring must comply with all applicable local and national codes.
- It is recommended that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system, add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.
- Any openings where the field wiring enters the cabinet must be completely sealed.

⚠ WARNING

- *Terminal screws may loosen during transport. Properly tighten the terminal connections during installation or risk electric shock, physical injury or death.*
- *Loose wiring may cause the wires to burnout or the terminal to overheat and catch fire. There is a risk of electric shock, physical injury or death.*

Note:

- *Terminal screws may loosen during transport. Properly tighten the terminal connections during installation or risk equipment malfunction or property damage.*
- *Loose wiring may cause unit malfunction, the wires to burnout or the terminal to overheat and catch fire. There is a risk of equipment malfunction or property damage.*
- Confirm that the electrical capacity is sufficient. *A voltage drop may cause magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.*

Power Wiring and Communications Cable Connections

1. Open (disassemble) the heat recovery unit control box cover from the bottom.
2. Insert the power wiring / communications cable from the outdoor unit using the designated path in the heat recovery unit.
3. Connect each wire to its appropriate terminal on the heat recovery unit control board. Verify that the color and terminal numbers from the outdoor unit wiring match the color and terminal numbers on the heat recovery unit.
4. Secure the power wiring / communications cable.

Figure 23: Opening the Heat Recovery Control Unit Control Box Cover.

Figure 24: Heat Recovery Unit Control Box With the Cover Removed.

Power Wiring and Communications Cable Connections, Continued.

Figure 26: Location / Path of Power Wiring / Communications Cable Terminals in Heat Recovery Units.

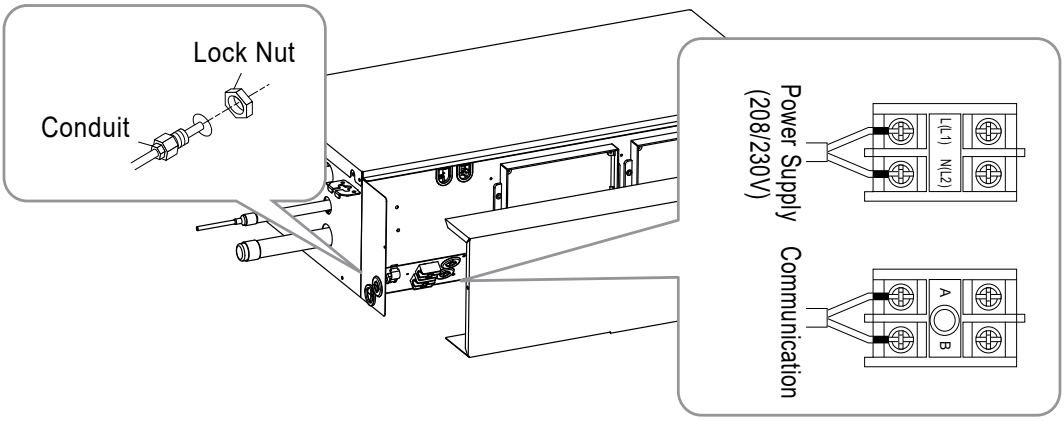


Figure 25: Close Up of Heat Recovery Unit Terminal Block.

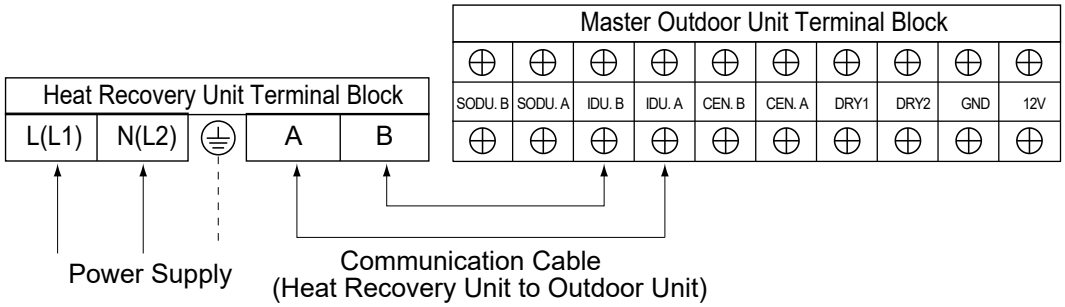
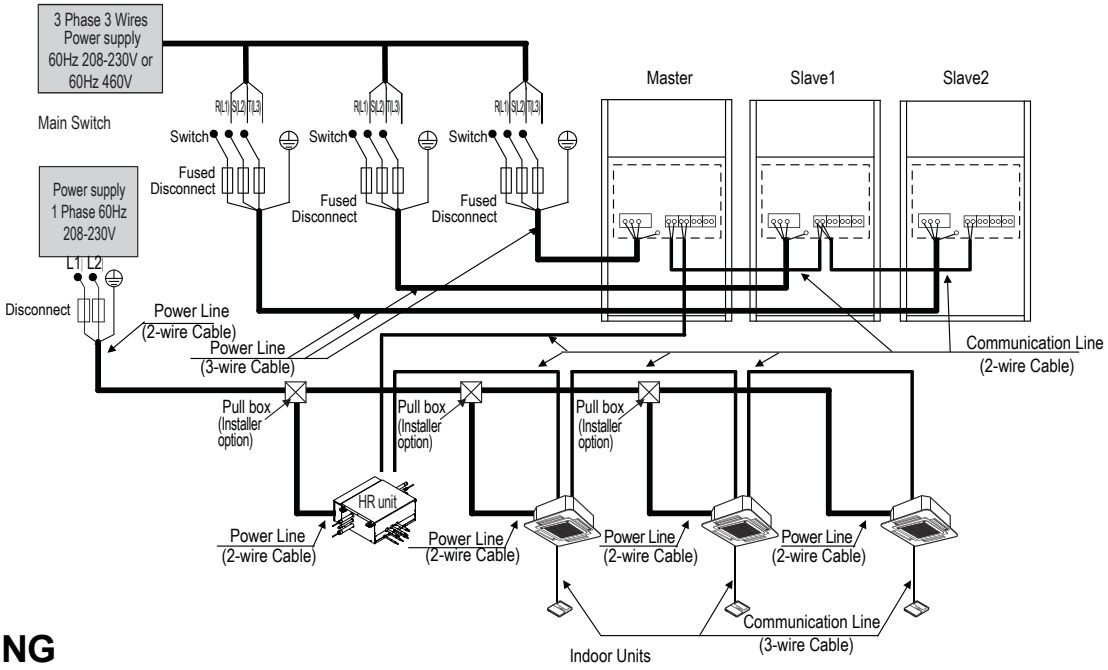


Figure 27: Example of a Typical Multi V 5 Heat Recovery System Power Wiring and Communications Cable Schematic.



⚠ WARNING

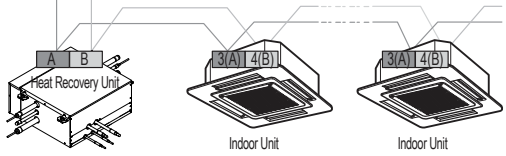
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is risk of fire, electric shock, explosion, physical injury or death.*
- *Install a main shutoff switch that interrupts all power sources simultaneously. There is risk of fire, electric shock, explosion, physical injury or death.*
- *Communication cable between Master ODU to Slave ODU(s), and Master ODU to IDUs / HRUs to be 18 AWG, 2-conductor, twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the Master ODU chassis only. ⃠ Do not ground the ODU to IDUs / HRUs communication cable at any other point. Wiring must comply with all applicable local and national codes. Inadequate connections may generate heat, cause a fire, and physical injury or death.*
- *The GND terminal at the main PCB is a negative terminal for dry contact, not a ground. Inadequate connections may generate heat, cause a fire, and physical injury or death.*

Heat Recovery Operation

Communications Cable Between Master Outdoor Unit and Heat Recovery Units / Indoor Units

Master Outdoor Unit Communication Terminal Block

ODU		IDU		CENTRAL		DRY1	DRY2	GND	12 V
B	A	B	A	B	A				



Communications Cable Between Master Outdoor Unit and Slave Outdoor Unit(s)

Master Outdoor Unit Communication Terminal Block

ODU		IDU		CENTRAL		DRY1	DRY2	GND	12 V
B	A	B	A	B	A				

Slave 1 Outdoor Unit Communication Terminal Block

ODU		IDU		CENTRAL		DRY1	DRY2	GND	12 V
B	A	B	A	B	A				

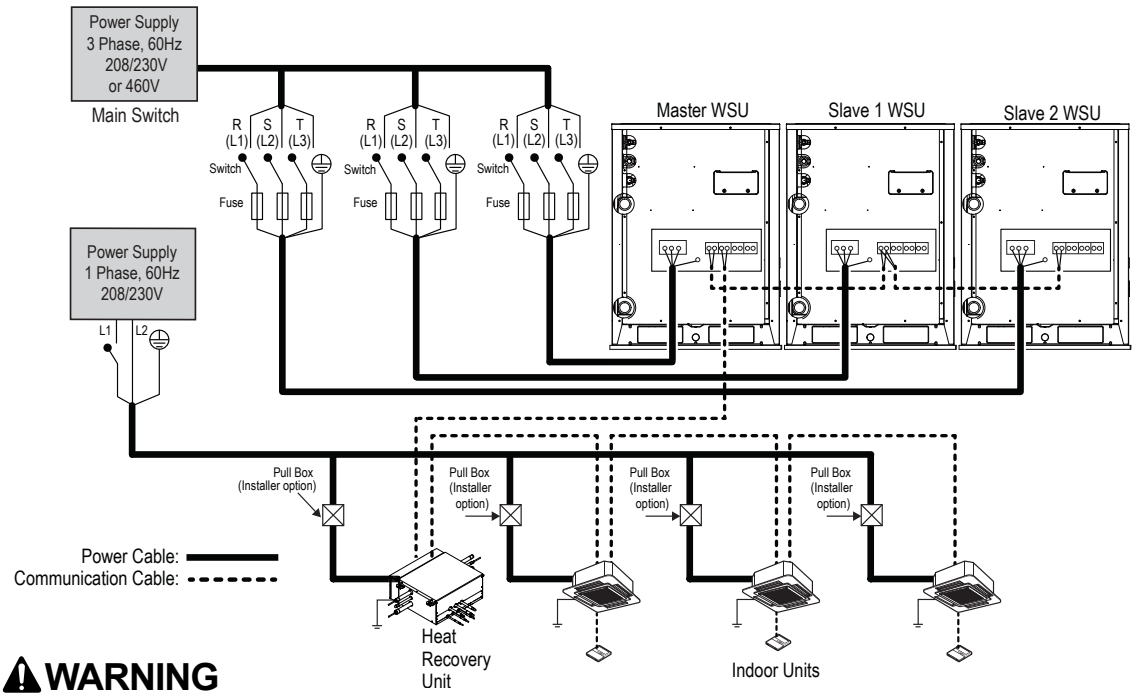
Slave 2 Outdoor Unit Communication Terminal Block

ODU		IDU		CENTRAL		DRY1	DRY2	GND	12 V
B	A	B	A	B	A				

Note:

- *Make sure that the terminal numbers of master outdoor unit and slave outdoor unit(s) match (A to A, B to B). The system will malfunction if not properly wired.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*
- *If the system operates in reversed phase, it may break the compressors and other components.*
- *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. Operating the system in reverse phase may break the compressor and other unit components.*

Figure 28: Example of a Typical Multi V IV Water Heat Recovery Operation Power Wiring and Communications Cable Schematic.



⚠WARNING

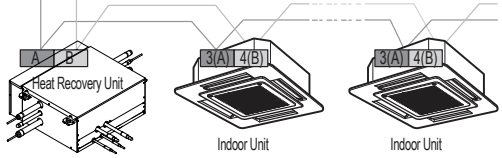
- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⃠ Do not connect the ground line to the pipes. There is risk of fire, electric shock, explosion, physical injury or death.*
- *Install a main shutoff switch that interrupts all power sources simultaneously. There is risk of fire, electric shock, explosion, physical injury or death.*
- *Communication cable between Master ODU to Slave ODU(s), and Master ODU to IDUs / HRUs to be 18 AWG, 2-conductor, twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the Master ODU chassis only. ⃠ Do not ground the ODU to IDUs / HRUs communication cable at any other point. Wiring must comply with all applicable local and national codes. Inadequate connections may generate heat, cause a fire, and physical injury or death.*
- *The GND terminal at the main PCB is a negative terminal for dry contact, not a ground. Inadequate connections may generate heat, cause a fire, and physical injury or death.*

Heat Recovery Operation

Communications Cable Between Master Outdoor Unit and Heat Recovery Units / Indoor Units

Master Outdoor Unit Communication Terminal Block

ODU		IDU		CENTRAL		DRY1	DRY2	GND	12 V
B	A	B	A	B	A				



Communications Cable Between Master Outdoor Unit and Slave Outdoor Unit(s)

Master Outdoor Unit Communication Terminal Block

ODU		IDU		CENTRAL		DRY1	DRY2	GND	12 V
B	A	B	A	B	A				

Slave 1 Outdoor Unit Communication Terminal Block

ODU		IDU		CENTRAL		DRY1	DRY2	GND	12 V
B	A	B	A	B	A				

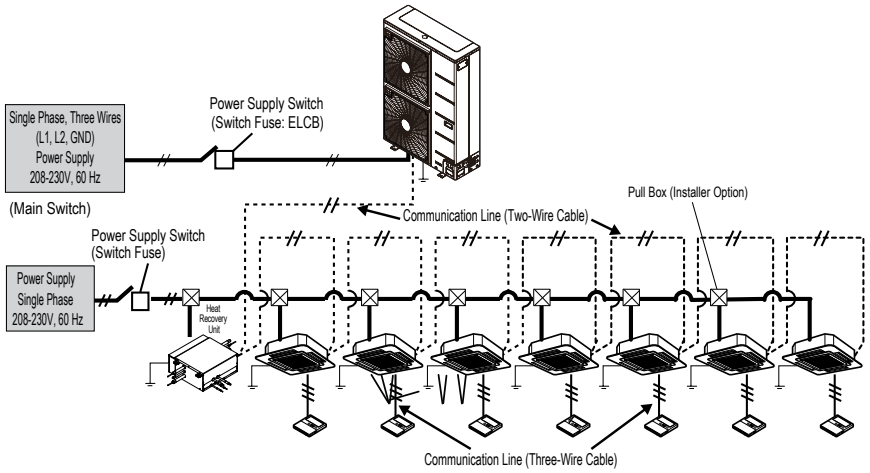
Slave 2 Outdoor Unit Communication Terminal Block

ODU		IDU		CENTRAL		DRY1	DRY2	GND	12 V
B	A	B	A	B	A				

Note:

- *Make sure that the terminal numbers of master water source unit and slave water source unit(s) match (A to A, B to B). The system will malfunction if not properly wired.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*
- *If the system operates in reversed phase, it may break the compressors and other components.*
- *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. Operating the system in reverse phase may break the compressor and other unit components.*

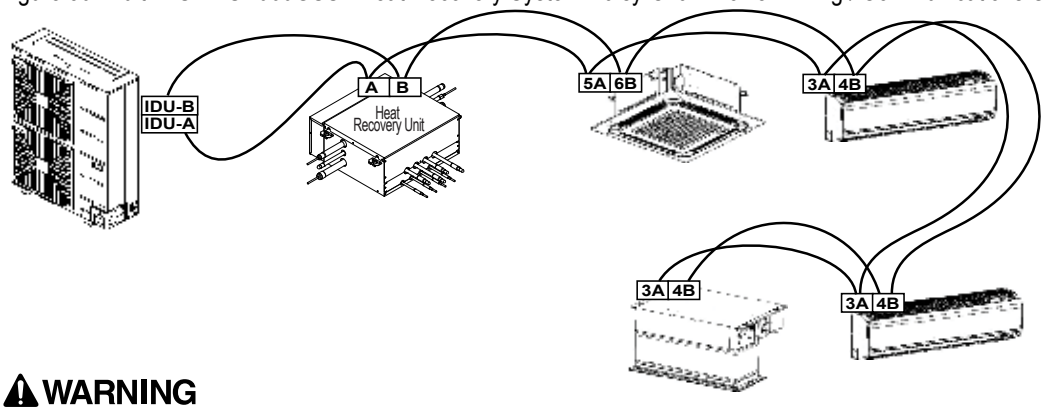
Figure 29: Multi V S ARUB060GSS4 Heat Recovery System Power Wiring / Communications Cable Connections.



⚠ DANGER

Refer to electrical data table for full load ampere ratings. Properly size all circuit breakers / fuses, wiring and field provided components per local codes. There is risk of fire, electric shock, explosion, physical injury or death.

Figure 30: Multi V S ARUB060GSS4 Heat Recovery System Daisy-Chain Power Wiring / Communications Cable Example.



⚠ WARNING

- *Ground wiring is required to prevent accidental electrical shock during 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.*
- *Communication cable between ODU to IDUs/Heat Recovery Units must be 18 AWG, 2-conductor, twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the ODU chassis only. ⃠ Do not ground the ODU to IDUs/Heat Recovery Units communication cable at any other point. Wiring must comply with all applicable local and national codes. Inadequate connections will generate heat, cause a fire, and physical injury or death.*
- *The GND terminal at the main PCB is a negative terminal for dry contact, not a ground. Inadequate connections will generate heat, cause a fire, and physical injury or death.*

Note:

- *Ground wiring is required to prevent communication problems from electrical noise and motor current leakage.*
- *Make sure that the terminal numbers of master outdoor unit and slave outdoor unit(s) match (A to A, B to B). The system will malfunction if not properly wired.*
- *Maintain polarity throughout the communication network. The system will malfunction if not properly wired.*
- *If the system operates in reversed phase, it will break the compressors and other components.*
- *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. Operating the system in reverse phase will break the compressor and other unit components.*

LGRED°, HRU COMPATIBILITY, AND GEN 4 DIP SWITCH SETTINGS

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 the 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 23: 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 Water IV	ARWB****AS4	October 1, 2018	1810xxx	September 28, 2018
Multi V IV	ARUB****TE4	N/A	N/A	October 31, 2018
Multi V II and III	ARUB****TE2, ARUB****TE3	N/A	N/A	N/A
Multi V Water II	ARWB****A2	N/A	N/A	N/A

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

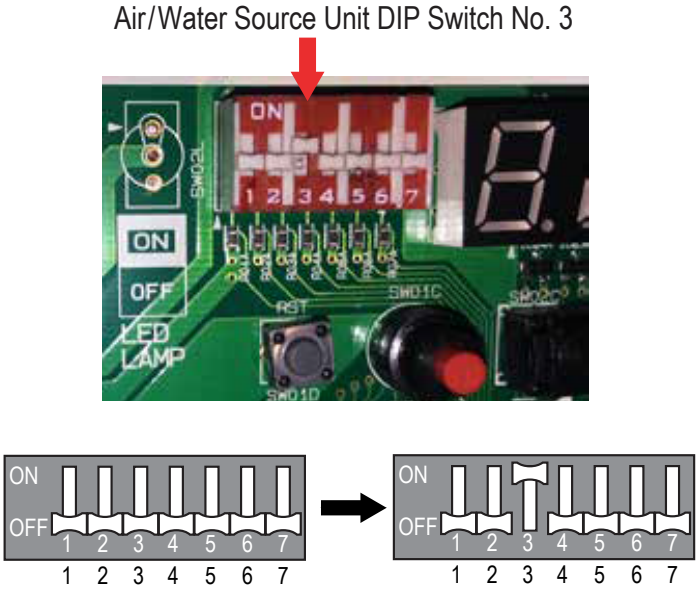
Generation 4 Indoor Units

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.
- 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.

Figure 31: Location and Setting of Outdoor Unit DIP Switch 3.

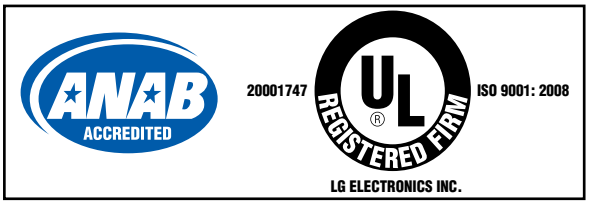


ACRONYMS

Table 24: Acronym Table.

ABS	Acrylonitrile Butadiene Styrene	IDU	Indoor Unit
AC	Air Conditioner/Alternate Current	kW	Kilowatts
ACP	Advanced Control Platform	in Aq	inches water
AHU	Air Handling Unit	ISO	International Standards Organization
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning	LATS	LG Air Conditioning Technical Solution software
ASTM	American Society for Testing and Materials	LED	Light Emitting Diode
AWG	American Wire Gauge	LEED	Leadership in Energy and Environmental Design
AWHP	Air-to-Air Water Heat Pump	MBh	Thousands BTUs per hour
BLDC	Brushless Digitally-Controlled	MCA	Minimum Circuit Ampacity
BTL	BACnet® Testing Laboratories	mm	Millimeter
Btu/h	British Thermal Unit per Hour	MOP	Maximum Overcurrent Protection
CAA	Clean Air Act	OD	Outside Diameter
CFM	Cubic Feet per Minute	ODU	Outdoor Unit
CFR	Code of Federal Regulations	PI	Power Input
DB	Dry Bulb	PTAC	Packaged Terminal Air Conditioner
dB(A)	Decibels with “A” frequency weighting	SHC	Sensible Heat Capacity
DPST	Double-Pole Single Throw	SMACNA	Sheet Metal & Air Conditioning Contractors’ National Association
DX	Direct expansion	RPM	Revolutions per Minute
EEV	Electric Expansion valve	TC	Total Capacity
EPDM	Ethylene Propylene Diene M-Class Rubber	USD	United States Dollar
EMF	Electromagnetic Field	UL	Underwriters Laboratories
ESP	External Static Pressure	V	Voltage
ETL	Electric Testing Laboratories	VAV	Variable Air Volume
GND	Ground	VRF	Variable Refrigerant Flow
H/M/L	High/Medium/Low	W	Watts
HVAC	Heating, Ventilating and Air Conditioning	WB	Wet Bulb
Hz	Hertz	wg	Water Gauge
ID	Inside Diameter		

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



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EM_MultiV_HeatRecoveryUnits_PRHR3A_04_19
Supersedes: EM_MultiV_HeatRecoveryUnits_PRHR3A_03_19
EM_MultiV_HeatRecoveryUnits_PRHR3A_06_18