R32

MULTI V™ WATER 5

ENGINEERING MANUAL



Variable Refrigerant Flow Water Source Units

6.0 to 48.0 Tons

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A summary list of safety precautions is on page 4.

To access additional technical documentation such as submittals, indoor unit engineering manuals, installation, service, product data performance, owner's, service, manuals, as well as catalogs, visit www.lghvac.com.

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TABLE OF SYMBOLS

	*Indicates that this appliance uses a flammable refrigerant. If the refrigerant leaks and is exposed to an external ignition source, there is a risk of fire.*
⚠ DANGER	*Indicates a hazardous situation that, if not avoided, WILL RESULT IN DEATH OR SERIOUS INJURY.[1]*
⚠ WARNING	*Indicates a hazardous situation that, if not avoided, COULD RESULT IN DEATH OR SERIOUS INJURY.[1]*
⚠ CAUTION	*Indicates a hazardous situation that, if not avoided, COULD RESULT IN MINOR OR MODERATE INJURY.[1]*
NOTICE	*Indicates information considered important, but not hazard-related; indicates situations that may result in equipment or property damage accidents.[1]*
	*This symbol indicates an action that should not be performed.*

[1]Signal words, symbols, and definitions taken from American National Standards Institute (ANSI) Z535.6. See https://www.ansi.org/ for more information.



R32 Refrigerant

LG Electronic split system heating and air conditioning (HVAC) products now contain R32 refrigerant. While R32 refrigerant is slightly flammable, it has a higher efficiency, a lower Global Warming Potential (GWP) value, and is more environmentally friendly than R410A.
R32 Ozone Depletion Potential (ODP) Value: 0.
R32 Global Warming Potential (GWP) Value: 675.

The amount of refrigerant depends on outdoor unit to indoor unit configuration. All refrigerant piping system components (copper piping, joints, and other fittings) must be selected and installed to conform with Refrigeration Safety Regulation standards. Use LG Air Conditioner Technical Solution (LATS) Software to verify the refrigerant amount needed for each installation.

⚠ WARNING

- *This HVAC system contains fluorinated greenhouse gases in the form of R32 refrigerant. ⃠ Do not leak refrigerant gas into the atmosphere.*
- *Only use R32 as the refrigerant in these HVAC systems. If other substances are added, it may cause an explosion.*
- *R32 refrigerant is slightly flammable. When handled properly, it does not leak. If the refrigerant leaks in the installation area and comes in contact with a flame, it may generate a fire and / or harmful gas.*
- *If a leak occurs, immediately turn off any combustion devices, ventilate the installation area, and contact the dealer / contractor where the HVAC unit was purchased. ⃠ Do not operate the unit until the refrigerant leaked is repaired.*

⚠ CAUTION

- *Piping wall thickness must comply with all applicable local, state, and federal regulations for the design pressures listed by the manufacturer. ⃠ Unapproved piping must not be used.*
- *To prevent piping from softening, ⃠ do not heat the piping more than necessary.*

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UNIT NOMENCLATURE
Water Source Units

R32 Multi V Water 5 Units

ZRW	M	072	B	A	S	5

Family
ZRW = R32 Multi V Water Source Unit (Refrigerant R32)

Type
M = Inverter Heat Pump and Heat Recovery

Capacity (Mbh)

072 = 72	191 = 192	288 = 288	576 = 576
096 = 96	192 = 192	360 = 360	
121 = 120	216 = 216	432 = 432	
144 = 144	240 = 240	480 = 480	
168 = 168	264 = 264	504 = 504	

Electrical Ratings
B = 208–230V/60Hz/3Phase (for 208–230V systems, acceptable voltage range is 187–253V)
D = 460V/60Hz/3Phase (for 460V systems, acceptable voltage range is 414–528V)

Airflow Configuration
T = Top Discharge

System Efficiency
S = Standard Efficiency

Generation
5 = Fifth

Heat Recovery Units (HRU)

PRHR	02	4	C

Family
Multi V Heat Recovery Unit (HRU)

Number of Ports
02 = Two Ports
03 = Three Ports
04 = Four Ports
06 = Six Port
08 = Eight Ports

Series Number:
4, 5

Type
1Ø, 208/230V, 60Hz
R32 Refrigerant
C = Includes Shutoff Valve

Shutoff Valve Units (SVU)

PRHPZ	02	0	A

Family
Multi V R32 Shutoff Valve Unit (SVU)

Number of Ports
01 = One Port
02 = Two Ports
03 = Three Ports
04 = Four Ports

Series Number

Type
1Ø, 208/230V, 60Hz

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LG AIR CONDITIONER TECHNICAL SOLUTION (LATS)

LG Air Conditioner Technical Solution (LATS) Software

A properly designed and installed refrigerant piping system 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. Contact your LG Rep for the best software program for your application.

NOTICE

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.

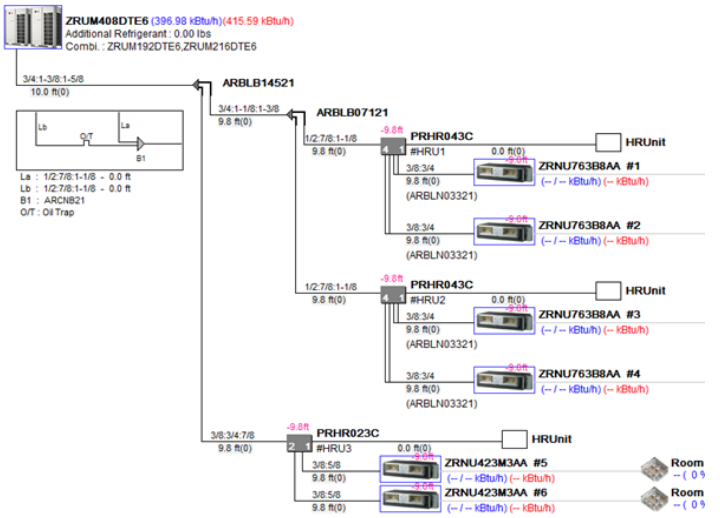
Formats

LATS is available to LG customers in two user interfaces: LATS HVAC and LATS Revit. Both 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, DOAS, and Energy Recovery Ventilator (ERV) systems.

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

Figure 1: LATS Example (Tree Diagram; Illustrative Purposes Only. is System will Vary Depending On Modell).



LATS Revit integrates the LG LATS program with Revit® software**. It permits engineers to layout and validate LG VRF, Multi F / Multi F MAX, Single-Zone, and DOAS directly into Revit drawings.

***Revit® is a registered mark 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.

NOTICE

Features depend on which LATS program is being used, and the type of system being designed. Contact your LG representative for the best software program for your application.

NOTICE

Any field changes, such as re-routing, shortening or lengthening a pipe segment, adding or eliminating elbows and/or fittings, re-sizing, adding, or eliminating indoor units, changing the mounting height, or moving the location of a device or fitting during installation must be done with caution and ALWAYS VERIFIED in LATS SOFTWARE BEFORE supplies are purchased or installed. Doing so will lead to a more profitable installation, reduce the potential for rework, and will reduce the potential for multiple visits to the job site to complete the system set up.

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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 be 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:

- 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 if Y-Branches will also need to be changed.
- Changes to outdoor unit and indoor unit capacities. Capacities changes will 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.

NOTICE

Features depend on which LATS program is being used, and the type of system being designed. Contact your LG representative for the best software program for your application.

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REFRIGERANT CHARGE WORKSHEET

R32 Multi V Water 5 Refrigerant Charge Calculator (lbs.)

MULTI V™ WATER 5

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]	—	—		0.013	
2	Linear feet of 3/8" liquid line tubing[2]	—	—		0.036	
3	Linear feet of 1/2" liquid line tubing[2]	—	—		0.069	
4	Linear feet of 5/8" liquid line tubing[2]	—	—		0.103	
5	Linear feet of 3/4" liquid line tubing[2]	—	—		0.158	
6	Linear feet of 7/8" liquid line tubing[2]	—	—		0.210	
7	Linear feet of 1" liquid line tubing[2]	—	—		0.284	
8	Standard + Art Cool Mirror	SJ, SK	5k to 15k		0.44	
9	Standard + Art Cool Mirror	SJ, SK	18k to 24k		0.51	
10	Standard	SR	30k to 36k		1.08	
11	1-Way Cassette	TC	7k to 18k		0.42	
12	2-Way Cassette	TS	18k to 24k		0.62	
13	4-Way 2' x 2' Cassette	TR	5k to 7k		0.33	
14	4-Way 2' x 2' Cassette	TR	9k to 12k		0.46	
15	4-Way 2' x 2' Cassette	TQ	15k to 18k		0.57	
16	4-Way 3' x 3' Cassette	TA	7k to 48k		1.23	
17	4-Way 3' x 3' Cassette	TB	7k to 15k		0.57	
18	High Static Ducted	M2	7k to 24k		0.64	
19	High Static Ducted	M3	28k		1.10	
20	High Static Ducted	B8	36k to 96k		1.83	
21	Mid Static Ducted	M2	36k to 42k		0.95	
22	Mid Static Ducted	M3	48k		1.10	
23	Low Static Ducted, Low Static Ducted Bottom Return	L1	7k to 9k		0.26	
24	Low Static Ducted, Low Static Ducted Bottom Return	L2	12k to 18k		0.37	
25	Low Static Ducted, Low Static Ducted Bottom Return	L3	24k		0.49	
26	Multi-Position Air Handling Unit	NA	12k to 24k		0.86	
27	Multi-Position Air Handling Unit	NB	30k to 48k		1.68	
28	Multi-Position Air Handling Unit	NC	54k to 60k		1.68	
29	Floor Standing	CE (U)	7k to 15k		0.31	
30	Floor Standing	CF (U)	18k to 24k		0.68	
31	Ceiling Suspended	VM1	18k to 24k		0.44	
32	Ceiling Suspended	VM2	36k to 48k		0.66	
33	Heat Recovery Units (HRU): PRHR024C, 034C, 044C	—	—		1.0	
34	Heat Recovery Units (HRU): PRHR065C, 085C	—	—		2.0	
35	**ADDITIONAL Refrigerant Charge Required (Sum of lines 1 – 34)**					
36	R32 Multi V Water 5 Unit Factory Refrigerant Charge	ZRWM072BAS5, ZRWM096BAS5, ZRWM121BAS5, ZRWM144BAS5			7.7	
		ZRWM072DAS5, ZRWM096DAS5, ZRWM121DAS5, ZRWM144DAS5			7.7	
		ZRWM168DAS5, ZRWM192DAS5			9.9	
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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R32 MULTI V WATER 5 UNIT PRODUCT DATA

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General

LG R32 Multi V Water 5 Variable refrigerant flow (VRF) Water Source Unit (WSU) operates as either a heat pump or a heat recovery system. The WSU consists of a single, dual or triple frame system connected to indoor units (IDU) (and heat recovery units for heat recovery systems) with a single refrigerant piping system connected using factory designed and supplied Y-branches and headers, and having integrated controls. The WSU has integrated controls and can be operated with its control system or with a building management system.

R32 Multi V Water 5 heat pump and heat recovery system is a VRF system that can operate in either heat pump mode (cooling or heating) or heat recovery mode (with indoor units in cooling or heating modes simultaneously).

The heat recovery unit is capable of being designed for minimum piping and maximum design flexibility. Individual indoor units or zones can change modes (cooling to heating or heating to cooling) within a maximum time of three (3) minutes to ensure indoor temperature can be properly maintained.

HRUs allow minimum piping and maximum design flexibility. Every indoor unit or zone of a heat recovery system is independently capable of operating in either heating or cooling mode regardless of the mode of other indoor units. The system ensures properly maintained indoor temperature by changing the mode of individual indoor units or zones (cooling to heating or heating to cooling) within a maximum time of three (3) minutes.

LG components are manufactured in a facility meeting International Organization for Standardization (ISO) 9001 and ISO 14001 standards. ISO 9001 defines quality management and ISO 14001 defines environmental management. The units are listed by Intertek Electrical Testing Laboratories (ETL) and bear the CSA Group (CSA) label. Wiring in these units are in accordance with the National Electrical Code (NEC).

Figure 2: Single Frame R32 Multi V Water 5 Unit.



Temperature Ranges

Heat Pump or Heat Recovery Systems

Water Source Units can operate in cooling mode with entering water temperatures (EWT) of 50°F to 113°F. Water Source Units can operate in heating or synchronous mode with entering water temperatures of 23°F to 113°F.

Casing / Frame

Water Source Units are constructed with galvanized steel, bonderized and finished with powder coat baked enamel paint. Each frame has a removable inspection panel to allow access to service tool connection, DIP switches, auto addressing, and error code display without removing the entire front panel. The entire front panel of the WSU is removable for maintenance.

WSU frames are completely factory assembled, piped and wired. Dual and triple frame WSUs must be field piped with factory designed and supplied Y-branch kits to manifold them together into a single refrigerant circuit.

Refrigerant System

The refrigeration system is a single refrigeration circuit using R32 refrigerant. The WSU is provided with factory-installed components including refrigerant sensors, check valves, oil separator, accumulator, hot gas bypass valve, four-way reversing valve, electronic controlled expansion valve (EEV), high and low side charging ports, high pressure safety switch, service valves, and interconnecting piping. Also included is an integral subcooler assembly consisting of a double spiral tube-type subcooling heat exchanger and EEV providing refrigerant subcooling modulation up to 25ºF.

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Refrigeration Oil Control

The oil return system uses the following technologies:

High Pressure Oil Return (HiPOR)

Oil is captured from compressor discharge by the centrifugal oil separator and then returned to the compressor through a separator oil injection pipe, preventing mixing of oil and refrigerant on the suction side of the compressor.

Smart Oil Control

Smart oil control monitors the oil level inside the compressor and initiates an oil return cycle to flush oil in the pipe system back to the compressor only when the oil level is too low. Timed oil return cycles are not necessary and the compressor is protected from operating at oil levels that are too low.

Figure 3: Dual Frame R32 Multi V Water 5 Unit.



Compressors

Each WSU frame is equipped with one hermetic, digitally-controlled, inverter-driven scroll compressor to modulate capacity (variable from 15 to 150Hz. The compressor has a built-in oil level sensor to provide real-time oil control.

Heat Exchanger

The water heat exchanger is a stainless steel, type SUS316, refrigerant / water plate heat exchanger. The heat exchanger requires a field-provided 50 mesh strainer and water treatment to prevent scaling inside the heat exchanger. Closed loop condenser water systems are required to protect the factory-mounted heat exchanger.

Electrical

Both heat pump and heat recovery WSUs are available with a choice of 208-230V, 60 Hz, 3-phase or 460V, 60 Hz, 3-phase input power supply. All WSUs are capable of operating within voltage limits of ±10% rated voltage, and include overcurrent protection.

Controls

Heat pump and heat recovery WSUs are factory wired with the necessary electrical control components, integral microprocessors, printed circuit boards, thermistors, sensors, terminal blocks, and power lugs.

The control circuit between the indoor units, heat recovery units (R32 Multi V Water 5 systems) and the WSU is an RS-485 daisy chain communication bus. The cable is two conductor, stranded and shielded, 18 AWG.

Microprocessor-based algorithms provide component protection, soft-start capability, refrigeration system pressure and temperature control. The variable water flow control kit allows condenser water temperatures below 59°F. This accessory also works with condenser water pumps equipped with variable frequency drive to save pumping energy.

Variable Water Flow Control Kit

The variable water flow control kit (PWFCKN000) is required for applications with entering water temperatures below 59ºF (one kit per frame). Minimum flow rate must be 40% of the nominal flow rate, 2-10V signal with a linear flow response valve.

Compressor

R32 Multi V Water 5 unit, equipped with an inverter compressor, offers superior load matching and long piping installation. The product optimizes power consumption in high-rise buildings. Add on features make it easy to upgrade the existing capacity at any time. Sophisticated electronic control and unique refrigerant flow gives these systems the capability to perform in extreme/unusual working conditions.

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MECHANICAL SPECIFICATIONS

R32 Multi V Water 5 Units

Product Compatibility

- All water source units, indoor units, heat recovery units (HRUs), and shutoff valve units (SVUs) are compatible.
- Water source units DIP switch 3 must be set to ON to enable the latest indoor unit features (factory default setting is OFF).

Low Sound Levels

When R32 Multi V Water 5 units operate fully loaded, they have one of the quietest sound levels in the industry. Sound is almost undetectable during off-peak operation. To promote a quiet, comfortable environment, LG R32 Multi V Water 5 Source Units operate at sound levels as low as 48 dB(A) in cooling and heating mode at rated AHRI operating conditions.

All rotating components are soft-started by the controller using digitally controlled inverters, which reduces undesirable noise caused by compressors cycling on and off.

Comfort Control

Tight temperature control through precise load matching maximizes the time that the indoor units remove moisture. This ensures maximum comfort and provides optimum indoor humidity levels.

Precision Load Matching

Unlike traditional air conditioning control systems, which use thermostatic controls to maintain room temperatures, in R32 Multi V Water 5 units, controls continuously vary the indoor unit fan speed and refrigerant flow, thereby indirectly providing lower and more consistent humidity levels in the conditioned space. The longer the indoor coil temperature is below the dew-point of the room with air moving across the coil, the less the space humidity level varies, compared to technologies that cycle fans and compressors on and off multiple times per hour.

The water source unit varies the compressor speed as needed to maintain system operating pressure. As a result, the R32 Multi V Water 5 system delivers precise space temperature control.

Advanced Compressor Technology

Oil Management

Oil migration is no longer a concern when choosing R32 Multi V Water 5. An oil management system ensures a safe level of oil in the compressor sump.

1. Smart oil system monitors oil sump levels to know when to inject oil into the compressor, eliminating the need for oil return cycles.
2. HiPOR™ oil return system minimizes oil mixing with refrigerant by separating oil at compressor discharge with an oil separator and injecting oil back to the lower section of the compressor shell. Energy is saved by compressing the refrigerant without the oil mixed at the compression chamber.
3. Oil injection system provides a consistent film of oil to moving parts, even at low speeds, ensuring compressor operation down to 15 Hz.

Inverter Driven

The scroll compressor is optimized to maximize compressor efficiency, which reduces power consumption and monthly utility bills. This latest inverter technology allows the R32 Multi V Water 5 unit to vary the compressor motor shaft speed to deliver an appropriate amount of cooling to all indoor units. Precise refrigerant volume delivery translates into long periods with coil surface temperatures below dew point and minimizes compressor component run time. Occupants remain comfortable while utility costs are reduced.

Simplified Installation

Cooling and heating systems that use R32 Multi V Water 5 simplify and reduce the mechanical and control system design time. The designer no longer has to be concerned with interconnecting chilled and condenser water piping, air-distribution duct systems, matching and selecting chillers, towers, pumps, coils, fans, air handlers, or Variable Air Volume (VAV) boxes.

System integration with existing building management systems has never been easier. Because all of the R32 Multi V Water 5 system components are engineered and provided by LG, the system components and controls come pre-engineered and do not need custom programming from third-party contractors.

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Operating Range

R32 Multi V Water 5 product line includes capacities from six (6.0) to forty-eight (48.0) tons, and features a connected indoor unit combination ratio of 50% to 130%. Operating ranges include:

Entering Water Temperatures

- 50 – 113°F for cooling mode
- 23 – 113°F for heating mode
- 23 – 113°F for synchronous mode (heat recovery systems only)

Compact Size

All R32 Multi V Water 5 source unit frames have the same physical footprint: 30-13/32" wide x 44-3/32" tall x 21-17/32" deep. Systems can be designed with one, two, or a maximum of three water source unit frames.

Other Features

- Inverter Scroll Compressors
- Elevation Advantage
- Smaller Footprint
- Precision Load Matching
- AHRI 1230 Certification

Refrigerant Leak Detection

The indoor unit contains an R32 refrigerant leak sensor. The sensor is designed to control optional refrigerant piping shut-off valves if a leak is detected. Shut-off valve units are available as separate LG accessories or included as components in LG Heat Recovery Unit accessories. The sensor can enable four individual controller displayed error codes for leak detection (CH230), sensor fault (CH228), 6 months life remaining (CH236) and end of life (CH229).

Table 1: Refrigerant Leak Sensor Specifications.

Item	Specification
Refrigerant	R32
Detection Concentration	5,000 ppm
Power Supply	DC 5V
Operating Temperature	-25°F to +140°F
Lifetime	10 years

Figure 4: Triple Frame R32 Multi V Water 5 Unit.



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GENERAL DATA

Single Frame 208-230V Water Source Unit Specifications

Table 2: Single-Frame 208-230V Units.

Combination Unit Model Number	6.0 Ton ZRWM072BAS5	8.0 Ton ZRWM096BAS5	10.0 Ton ZRWM121BAS5	12.0 ZRWM144BAS5
Individual Component Model Numbers	–	–	–	–
Cooling Performance				
Nominal Cooling Capacity (Btu/h)[1]	72,000	96,000	119,700	144,000
Heating Performance				
Nominal Heating Capacity (Btu/h)[1]	81,000	108,000	135,000	162,000
Operating Range (Entering Water Temperature)[2]				
Cooling (°F)	50 – 113	50 – 113	50 – 113	50 – 113
Heating (°F)[3]	23 – 113	23 – 113	23 – 113	23 – 113
Synchronous Operation (°F)[3]	23 – 113	23 – 113	23 – 113	23 – 113
Compressor				
Inverter Quantity	HSS DC Scroll x 1			
Oil / Type	PVE / FVC68D			
Unit Data				
Refrigerant Type / Control / Location	R32 / EEV / Indoor Unit			
R32 Refrigerant Factory Charge (lbs)	7.7	7.7	7.7	7.7
Max. Number Indoor Units / System	13	16	20	23
Sound Pressure dB(A)[4]	48 (62)	50 (62)	56 (62)	56 (62)
Net Unit Weight (lbs.)	322	322	322	322
Shipping Weight (lbs.)	340	340	340	340
Communication Cables[6,7]	2 x 18 AWG			
Heat Exchanger (Stainless Steel Plate)				
Maximum Pressure Resistance (psi)	640	640	640	640
Flow at Rated Condition (GPM)	20.3	25.4	30.4	35.5
Total Heat of Rejection (Btu/h)	94,100	125,900	157,900	190,100
Total Heat of Absorption (Btu/h)	74,200	98,600	122,700	146,800
Pressure Drop (ft-wg)	3.47	5.20	7.23	9.63
Δt[5] (°F)	9.3	9.9	10.4	10.7
Piping[8]				
Liquid Line (in.,OD)	3/8 Braze	3/8 Braze	1/2 Braze	1/2 Braze
Low Pressure Vapor Line (in.,OD)	3/4 Braze	3/4 Braze	7/8 Braze	7/8 Braze
High Pressure Vapor Line (in.,OD)	5/8 Braze	5/8 Braze	3/4 Braze	3/4 Braze
Water Inlet / Outlet Connection (in.,ID)	1-1/2 FPT	1-1/2 FPT	1-1/2 FPT	1-1/2 FPT
Condensate Pipe Diameter (in.,ID)	3/4 MPT	3/4 MPT	3/4 MPT	3/4 MPT

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

[2] Variable water flow control kit PWFCKN000 is required for applications with entering water temperatures below 59ºF (one kit per frame). Minimum flow rate must be 40% of the nominal flow rate, 2-10V signal with a linear flow response valve.

[3] For heating and synchronous operation applications with entering water temperatures lower than 50°F, refer to the Water Loop Circuit Design Guide document.

[4] Sound pressure levels are tested in an anechoic chamber under ISO 3745 standard at rated AHRI operating conditions.Sound pressure level may increase during heating operation at maximum compressor frequency. Value in parenthesis is the maximum sound pressure at those conditions.

[5] Value is calculated as follows: Δt = Total Heat of Rejection ÷ (Rated Flow Rate x 500). Data is for pure water.

[6] Communication cable between WSU, IDU(s) / HRU(s), and Central Controller must be a minimum of 2-conductor, 18 AWG, twisted, stranded, and shielded. Ensure the communication cable shield is properly grounded to the WSU chassis only. ⃠ Do not ground the communication cable at any other point. Wiring must comply with all applicable local and national codes.

[7] Power wiring is field provided, solid or stranded, and must comply with the applicable local and national codes.

[8] LG requires that LATS software be used on all projects to ensure correct line sizing. Designer must verify the shop drawing design against the as built design using LATS. Contractor must also use LG manufactured Y-Branch and Header Kits only.

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Table 3: Single Frame 460V Units.

Combination Unit Model Number	6.0 Ton ZRWM072DAS5	8.0 Ton ZRWM096DAS5	10.0 Ton ZRWM121DAS5	12.0 ZRWM144DAS5
Individual Component Model Numbers	–	–	–	–
Cooling Performance				
Nominal Cooling Capacity (Btu/h)[1]	72,000	96,000	119,700	144,000
Heating Performance				
Nominal Heating Capacity (Btu/h)[1]	81,000	108,000	135,000	162,000
Operating Range (Entering Water Temperature)[2]				
Cooling (°F)	50 – 113	50 – 113	50 – 113	50 – 113
Heating (°F)[3]	23 – 113	23 – 113	23 – 113	23 – 113
Synchronous Operation (°F)[3]	23 – 113	23 – 113	23 – 113	23 – 113
Compressor				
Inverter Quantity	HSS DC Scroll x 1			
Oil / Type	PVE / FVC68D			
Unit Data				
Refrigerant Type / Control / Location	R32 / EEV / Indoor Unit			
R32 Refrigerant Factory Charge (lbs)	7.7	7.7	7.7	7.7
Max. Number Indoor Units / System	13	16	20	23
Sound Pressure dB(A)[4]	48 (62)	50 (62)	56 (62)	56 (62)
Net Unit Weight (lbs.)	328	328	328	328
Shipping Weight (lbs.)	346	346	346	346
Communication Cables[6,7]	2 x 18 AWG			
Heat Exchanger (Stainless Steel Plate)				
Maximum Pressure Resistance (psi)	640	640	640	640
Flow at Rated Condition (GPM)	20.3	25.4	30.4	35.5
Total Heat of Rejection (Btu/h)	94,100	125,900	157,900	190,100
Total Heat of Absorption (Btu/h)	74,200	98,600	122,700	146,800
Pressure Drop (ft-wg)	3.47	5.20	7.23	9.63
Δt[5] (°F)	9.3	9.9	10.4	10.7
Piping[8]				
Liquid Line (in.,OD)	3/8 Braze	3/8 Braze	1/2 Braze	1/2 Braze
Low Pressure Vapor Line (in.,OD)	3/4 Braze	3/4 Braze	7/8 Braze	7/8 Braze
High Pressure Vapor Line (in.,OD)	5/8 Braze	5/8 Braze	3/4 Braze	3/4 Braze
Water Inlet / Outlet Connection (in.,ID)	1-1/2 FPT	1-1/2 FPT	1-1/2 FPT	1-1/2 FPT
Condensate Pipe Diameter (in.,ID)	3/4 MPT	3/4 MPT	3/4 MPT	3/4 MPT

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

[2] Variable water flow control kit PWFCKN000 is required for applications with entering water temperatures below 59ºF (one kit per frame). Minimum flow rate must be 40% of the nominal flow rate, 2-10V signal with a linear flow response valve.

[3] For heating and synchronous operation applications with entering water temperatures lower than 50°F, refer to the Water Loop Circuit Design Guide document.

[4] Sound pressure levels are tested in an anechoic chamber under ISO 3745 standard at rated AHRI operating conditions. Sound pressure level may increase during heating operation at maximum compressor frequency. Value in parenthesis is the maximum sound pressure at those conditions.

[5] Value is calculated as follows: Δt = Total Heat of Rejection ÷ (Rated Flow Rate x 500). Data is for pure water.

[6] Communication cable between WSU, IDU(s) / HRU(s), and Central Controller must be a minimum of 2-conductor, 18 AWG, twisted, stranded, and shielded. Ensure the communication cable shield is properly grounded to the WSU chassis only. ⃠ Do not ground the communication cable at any other point. Wiring must comply with all applicable local and national codes.

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Table 4: Single Frame 460V Units.

Combination Unit Model Number	14.0 Ton ZRWM168DAS5	16.0 Ton ZRWM192DAS5
Individual Component Model Numbers	–	–
Cooling Performance		
Nominal Cooling Capacity (Btu/h)[1]	168,000	192,000
Heating Performance		
Nominal Heating Capacity (Btu/h)[1]	189,000	216,000
Operating Range (Entering Water Temperature)[2]		
Cooling (°F)	50 – 113	50 – 113
Heating (°F)[3]	23 – 113	23 – 113
Synchronous Operation (°F)[3]	23 – 113	23 – 113
Compressor		
Inverter Quantity	HSS DC Scroll x 1	
Oil/Type	PVE/FVC68D	
Unit Data		
Refrigerant Type / Control / Location	R32 / EEV / Indoor Unit	
R32 Refrigerant Factory Charge (lbs)	9.9	9.9
Max. Number Indoor Units / System	29	32
Sound Pressure dB(A)[4]	58 (62)	60 (62)
Net Unit Weight (lbs.)	348	348
Shipping Weight (lbs.)	366	366
Communication Cables[6,7]	2 x 18 AWG	
Heat Exchanger (Stainless Steel Plate)		
Maximum Pressure Resistance (psi)	640	640
Flow at Rated Condition (GPM)	45.7	50.7
Total Heat of Rejection (Btu/h)	220,000	253,500
Total Heat of Absorption (Btu/h)	172,800	193,600
Pressure Drop (ft-wg)	8.32	10.08
Δt[5] (°F)	9.6	10.0
Piping[8]		
Liquid Line (in.,OD)	1/2 Braze	1/2 Braze
Low Pressure Vapor Line (in.,OD)	7/8 Braze	1-1/8 Braze
High Pressure Vapor Line (in.,OD)	3/4 Braze	7/8 Braze
Water Inlet / Outlet Connection (in.,ID)	1-1/2 FPT	1-1/2 FPT
Condensate Pipe Diameter (in.,ID)	3/4 MPT	3/4 MPT

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

[2] Variable water flow control kit PWFCKN000 is required for applications with entering water temperatures below 59ºF (one kit per frame). Minimum flow rate must be 40% of the nominal flow rate, 2-10V signal with a linear flow response valve.

[3] For heating and synchronous operation applications with entering water temperatures lower than 50°F, refer to the Water Loop Circuit Design Guide document.

[4] Sound pressure levels are tested in an anechoic chamber under ISO 3745 standard at rated AHRI operating conditions. Sound pressure level may increase during heating operation at maximum compressor frequency. Value in parenthesis is the maximum sound pressure at those conditions.

[5] Value is calculated as follows: Δt = Total Heat of Rejection ÷ (Rated Flow Rate x 500). Data is for pure water.

[6] Communication cable between WSU, IDU(s) / HRU(s), and Central Controller must be a minimum of 2-conductor, 18 AWG, twisted, stranded, and shielded. Ensure the communication cable shield is properly grounded to the WSU chassis only. ⃠ Do not ground the communication cable at any other point. Wiring must comply with all applicable local and national codes.

[7] Power wiring is field provided, solid or stranded, and must comply with the applicable local and national codes.

[8] LG requires that LATS software be used on all projects to ensure correct line sizing. Designer must verify the shop drawing design against the as built design using LATS. Contractor must also use LG manufactured Y-Branch and Header Kits only.

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Table 5: Dual Frame 208-230V Units.

Combination Unit Model Number	14.0 Ton ZRWM168BAS5	16.0 Ton ZRWM192BAS5	18.0 Ton ZRWM216BAS5
Individual Component Model Numbers	**ZRWM072BAS5 x 1 + ZRWM096BAS5 x 1**	**ZRWM096BAS5 x 2**	**ZRWM096BAS5 x 1 + ZRWM121BAS5 x 1**
Cooling Performance			
Nominal Cooling Capacity (Btu/h)[1]	168,000	192,000	216,000
Heating Performance			
Nominal Heating Capacity (Btu/h)[1]	189,000	216,000	243,000
Operating Range (Entering Water Temperature)[2]			
Cooling (°F)	50 - 113	50 - 113	50 - 113
Heating (°F))[3]	23 – 113	23 – 113	23 – 113
Synchronous Operation (°F))[3]	23 – 113	23 – 113	23 – 113
Compressor			
Inverter Quantity	HSS DC Scroll x 2		
Oil / Type	PVE / FVC68D		
Unit Data			
Refrigerant Type / Control / Location	R32 / EEV / Indoor Unit		
R32 Refrigerant Factory Charge (lbs)	7.7 + 7.7	7.7 + 7.7	7.7 + 7.7
Max. Number Indoor Units / System	29	32	35
Sound Pressure dB(A)[4]	52 (65)	53 (65)	57 (65)
Net Unit Weight (lbs.)	322 + 322	322 + 322	322 + 322
Shipping Weight (lbs.)	340 + 340	340 + 340	340 + 340
Communication Cables[6,7]	2 x 18 AWG		
Heat Exchanger (Stainless Steel Plate)			
Maximum Pressure Resistance (psi)	640	640	640
Flow at Rated Condition (GPM)	20.3 + 25.4	25.4 + 25.4	25.4 + 30.4
Total Heat of Rejection (Btu/h)	220,000	251,800	283,800
Total Heat of Absorption (Btu/h)	172,800	197,200	221,300
Pressure Drop (ft-wg)	3.47 / 5.20	5.20 / 5.20	5.20 / 7.23
Δt^5 (°F)	9.6	9.9	10.2
Piping[8]			
Liquid Line (in.,OD)	1/2 Braze	1/2 Braze	1/2 Braze
Low Pressure Vapor Line (in.,OD)	7/8 Braze	1-1/8 Braze	1-1/8 Braze
High Pressure Vapor Line (in.,OD)	3/4 Braze	7/8 Braze	7/8 Braze
Water Inlet / Outlet Connection (in.,ID)	1-1/2 + 1-1/2 FPT	1-1/2 + 1-1/2 FPT	1-1/2 + 1-1/2 FPT
Condensate Pipe Diameter (in.,ID)	3/4 + 3/4 MPT	3/4 + 3/4 MPT	3/4 + 3/4 MPT

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

[2] Variable water flow control kit PWFCKN000 is required for applications with entering water temperatures below 59ºF (one kit per frame). Minimum flow rate must be 40% of the nominal flow rate, 2-10V signal with a linear flow response valve.

[3] For heating and synchronous operation applications with entering water temperatures lower than 50°F, refer to the Water Loop Circuit Design Guide document.

[4] Sound pressure levels are tested in an anechoic chamber under ISO 3745 standard at rated AHRI operating conditions. Sound pressure level may increase during heating operation at maximum compressor frequency. Value in parenthesis is the maximum sound pressure at those conditions.

[5] Value is calculated as follows: Δt = Total Heat of Rejection ÷ (Rated Flow Rate x 500). Data is for pure water.

[6] Communication cable between WSU, IDU(s) / HRU(s), and Central Controller must be a minimum of 2-conductor, 18 AWG, twisted, stranded, and shielded. Ensure the communication cable shield is properly grounded to the WSU chassis only. ⃠ Do not ground the communication cable at any other point. Wiring must comply with all applicable local and national codes.

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GENERAL DATA
Dual Frame 208-230V Water Source Unit Specifications

Table 6: Dual Frame 208-230V Units.

Combination Unit Model Number	20.0 Ton ZRWM240BAS5	22.0 Ton ZRWM264BAS5	24.0 Ton ZRWM288BAS5
Individual Component Model Numbers	**ZRWM121BAS5 x 2**	**ZRWM121BAS5 x 1 + ZRWM144BAS5 x 1**	**ZRWM144BAS5 x 2**
Cooling Performance			
Nominal Cooling Capacity (Btu/h)[1]	239,400	264,000	287,700
Heating Performance			
Nominal Heating Capacity (Btu/h)[1]	269,000	297,000	324,000
Operating Range (Entering Water Temperature)[2]			
Cooling (°F	50 - 113	50 - 113	50 - 113
Heating (°F))[3]	23 – 113	23 – 113	23 – 113
Synchronous Operation (°F))[3]	23 – 113	23 – 113	23 – 113
Compressor			
Inverter Quantity	HSS DC Scroll x 2		
Oil / Type	PVE / FVC68D		
Unit Data			
Refrigerant Type / Control / Location	R32 / EEV / Indoor Unit		
R32 Refrigerant Factory Charge (lbs)	7.7 + 7.7	7.7 + 7.7	7.7 + 7.7
Max. Number Indoor Units / System	39	42	45
Sound Pressure dB(A)[4]	59 (65)	59 (65)	59 (65)
Net Unit Weight (lbs.)	322 + 322	322 + 322	322 + 322
Shipping Weight (lbs.)	340 + 340	340 + 340	340 + 340
Communication Cables[6,7]	2 x 18 AWG		
Heat Exchanger (Stainless Steel Plate)			
Maximum Pressure Resistance (psi)	640	640	640
Flow at Rated Condition (GPM)	30.4 + 30.4	30.4 + 35.5	35.5 + 35.5
Total Heat of Rejection (Btu/h)	315,800	348,000	380,200
Total Heat of Absorption (Btu/h)	245,400	269,500	293,600
Pressure Drop (ft-wg)	7.23 / 7.23	7.23 / 9.63	9.63 / 9.63
Δt[5] (°F)	10.4	10.6	10.7
Piping[8]			
Liquid Line (in.,OD)	1/2 Braze	5/8 Braze	5/8 Braze
Low Pressure Vapor Line (in.,OD)	1-1/8 Braze	1-1/8 Braze	1-3/8 Braze
High Pressure Vapor Line (in.,OD)	7/8 Braze	7/8 Braze	1-1/8 Braze
Water Inlet / Outlet Connection (in.,ID)	1-1/2 + 1-1/2 FPT	1-1/2 + 1-1/2 FPT	1-1/2 + 1-1/2 FPT
Condensate Pipe Diameter (in.,ID)	3/4 + 3/4 MPT	3/4 + 3/4 MPT	3/4 + 3/4 MPT

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

[2] Variable water flow control kit PWFCKN000 is required for applications with entering water temperatures below 59ºF (one kit per frame). Minimum flow rate must be 40% of the nominal flow rate, 2-10V signal with a linear flow response valve.

[3] For heating and synchronous operation applications with entering water temperatures lower than 50°F, refer to the Water Loop Circuit Design Guide document.

[4] Sound pressure levels are tested in an anechoic chamber under ISO 3745 standard at rated AHRI operating conditions. Sound pressure level may increase during heating operation at maximum compressor frequency. Value in parenthesis is the maximum sound pressure at those conditions.

[5] Value is calculated as follows: Δt = Total Heat of Rejection ÷ (Rated Flow Rate x 500). Data is for pure water.

[6] Communication cable between WSU, IDU(s) / HRU(s), and Central Controller must be a minimum of 2-conductor, 18 AWG, twisted, stranded, and shielded. Ensure the communication cable shield is properly grounded to the WSU chassis only. ⃠ Do not ground the communication cable at any other point. Wiring must comply with all applicable local and national codes.

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Table 7: Dual Frame 460V Units

Combination Unit Model Number	16.0 Ton ZRWM191DAS5	18.0 Ton ZRWM216DAS5	20.0 Ton ZRWM240DAS5
Individual Component Model Numbers	**ZRWM096DAS5 x 2**	**ZRWM096DAS5 x 1 + ZRWM121DAS5 x 1**	**ZRWM121DAS5 x 2**
Cooling Performance			
Nominal Cooling Capacity (Btu/h)[1]	192,000	216,000	239,400
Heating Performance			
Nominal Heating Capacity (Btu/h)[1]	216,000	243,000	269,000
Operating Range (Entering Water Temperature)[2]			
Cooling (°F)	50 - 113	50 - 113	50 - 113
Heating (°F))[3]	23 – 113	23 – 113	23 – 113
Synchronous Operation (°F))[3]	23 – 113	23 – 113	23 – 113
Compressor			
Inverter Quantity	HSS DC Scroll x 2		
Oil / Type	PVE / FVC68D		
Unit Data			
Refrigerant Type / Control / Location	R32 / EEV / Indoor Unit		
R32 Refrigerant Factory Charge (lbs)	7.7 + 7.7	7.7 + 7.7	7.7 + 7.7
Max. Number Indoor Units / System	32	35	39
Sound Pressure dB(A)[4]	53 (65)	57 (65)	59 (65)
Net Unit Weight (lbs.)	328 + 328	328+ 328	328 + 328
Shipping Weight (lbs.)	346 + 346	346 + 346	346 + 346
Communication Cables[6,7]	2 x 18 AWG		
Heat Exchanger (Stainless Steel Plate)			
Maximum Pressure Resistance (psi)	640	640	640
Flow at Rated Condition (GPM)	25.4 + 25.4	25.4 + 30.4	30.4 + 30.4
Total Heat of Rejection (Btu/h)	253,500	283,800	315,800
Total Heat of Absorption (Btu/h)	193,600	221,300	245,400
Pressure Drop (ft-wg)	5.20 / 5.20	5.20 / 7.23	7.23 / 7.23
Δt[5] (°F)	10.0	10.2	10.4
Piping[8]			
Liquid Line (in.,OD)	1/2 Braze	1/2 Braze	1/2 Braze
Low Pressure Vapor Line (in.,OD)	1-1/8 Braze	1-1/8 Braze	1-1/8 Braze
High Pressure Vapor Line (in.,OD)	7/8 Braze	7/8 Braze	7/8 Braze
Water Inlet / Outlet Connection (in.,ID)	1-1/2 + 1-1/2 FPT	1-1/2 + 1-1/2 FPT	1-1/2 + 1-1/2 FPT
Condensate Pipe Diameter (in.,ID)	3/4 + 3/4 MPT	3/4 + 3/4 MPT	3/4 + 3/4 MPT

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

[2] Variable water flow control kit PWFCKN000 is required for applications with entering water temperatures below 59ºF (one kit per frame). Minimum flow rate must be 40% of the nominal flow rate, 2-10V signal with a linear flow response valve.

[3] For heating and synchronous operation applications with entering water temperatures lower than 50°F, refer to the Water Loop Circuit Design Guide document.

[4] Sound pressure levels are tested in an anechoic chamber under ISO 3745 standard at rated AHRI operating conditions. Sound pressure level may increase during heating operation at maximum compressor frequency. Value in parenthesis is the maximum sound pressure at those conditions.

[5] Value is calculated as follows: Δt = Total Heat of Rejection ÷ (Rated Flow Rate x 500). Data is for pure water.

[6] Communication cable between WSU, IDU(s) / HRU(s), and Central Controller must be a minimum of 2-conductor, 18 AWG, twisted, stranded, and shielded. Ensure the communication cable shield is properly grounded to the WSU chassis only. ⃠ Do not ground the communication cable at any other point. Wiring must comply with all applicable local and national codes.

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GENERAL DATA
Dual Frame 460V Water Source Unit Specifications

Table 8: Dual Frame 460V Units.

Combination Unit Model Number	22.0 Ton ZRWM264DAS5	24.0 Ton ZRWM288DAS5	30.0 Ton ZRWM360DAS5
Individual Component Model Numbers	**ZRWM121DAS5 x 1 + ZRWM144DAS5 x 1**	**ZRWM144DAS5 x 2**	**ZRWM168DAS5 x 1 + ZRWM192DAS5 x 1**
Cooling Performance			
Nominal Cooling Capacity (Btu/h)[1]	264,000	287,700	360,000
Heating Performance			
Nominal Heating Capacity (Btu/h)[1]	297,000	324,000	405,000
Operating Range (Entering Water Temperature)[2]			
Cooling (°F)	50 - 113	50 - 113	50 - 113
Heating (°F))[3]	23 – 113	23 – 113	23 – 113
Synchronous Operation (°F))[3]	23 – 113	23 – 113	23 – 113
Compressor			
Inverter Quantity	HSS DC Scroll x 2		
Oil / Type	PVE / FVC68D		
Unit Data			
Refrigerant Type / Control / Location	R32 / EEV / Indoor Unit		
R32 Refrigerant Factory Charge (lbs)	7.7 + 7.7	7.7 + 7.7	9.9 + 9.9
Max. Number Indoor Units / System	42	45	58
Sound Pressure dB(A)[4]	59 (65)	59 (65)	62 (65)
Net Unit Weight (lbs.)	328 + 328	328 + 328	348 + 348
Shipping Weight (lbs.)	346 + 346	346 + 346	366 + 366
Communication Cables[6,7]	2 x 18 AWG		
Heat Exchanger (Stainless Steel Plate)			
Maximum Pressure Resistance (psi)	640	640	640
Flow at Rated Condition (GPM)	30.4 + 35.5	35.5 + 35.5	45.7 + 50.7
Total Heat of Rejection (Btu/h)	348,000	380,200	473,500
Total Heat of Absorption (Btu/h)	269,500	293,600	366,400
Pressure Drop (ft-wg)	7.23 / 9.63	9.63 / 9.63	8.32 / 10.08
Δt[5] (°F)	10.6	10.7	9.8
Piping[8]			
Liquid Line (in.,OD)	5/8 Braze	5/8 Braze	5/8 Braze
Low Pressure Vapor Line (in.,OD)	1-1/8 Braze	1-3/8 Braze	1-3/8 Braze
High Pressure Vapor Line (in.,OD)	7/8 Braze	1-1/8 Braze	1-1/8 Braze
Water Inlet / Outlet Connection (in.,ID)	1-1/2 + 1-1/2 FPT	1-1/2 + 1-1/2 FPT	1-1/2 + 1-1/2 FPT
Condensate Pipe Diameter (in.,ID)	3/4 + 3/4 MPT	3/4 + 3/4 MPT	3/4 + 3/4 MPT

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

[2] Variable water flow control kit PWFCKN000 is required for applications with entering water temperatures below 59ºF (one kit per frame). Minimum flow rate must be 40% of the nominal flow rate, 2-10V signal with a linear flow response valve.

[3] For heating and synchronous operation applications with entering water temperatures lower than 50°F, refer to the Water Loop Circuit Design Guide document.

[4] Sound pressure levels are tested in an anechoic chamber under ISO 3745 standard at rated AHRI operating conditions. Sound pressure level may increase during heating operation at maximum compressor frequency. Value in parenthesis is the maximum sound pressure at those conditions.

[5] Value is calculated as follows: Δt = Total Heat of Rejection ÷ (Rated Flow Rate x 500). Data is for pure water.

[6] Communication cable between WSU, IDU(s) / HRU(s), and Central Controller must be a minimum of 2-conductor, 18 AWG, twisted, stranded, and shielded. Ensure the communication cable shield is properly grounded to the WSU chassis only. ⃠ Do not ground the communication cable at any other point. Wiring must comply with all applicable local and national codes.

[7] Power wiring is field provided, solid or stranded, and must comply with the applicable local and national codes.

[8] LG requires that LATS software be used on all projects to ensure correct line sizing. Designer must verify the shop drawing design against the as built design using LATS. Contractor must also use LG manufactured Y-Branch and Header Kits only.

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Table 9: Triple Frame 208-230V Units.

Combination Unit Model Number	30.0 Ton ZRWM360BAS5	36.0 Ton ZRWM432BAS5
Individual Component Model Numbers	**ZRWM121BAS5 x 3**	**ZRWM144BAS5 x 3**
Cooling Performance		
Nominal Cooling Capacity (Btu/h)[1]	360,000	430,500
Heating Performance		
Nominal Heating Capacity (Btu/h)[1]	405,000	486,000
Operating Range (Entering Water Temperature)[2]		
Cooling (°F)	50 - 113	50 - 113
Heating (°F))[3]	23 – 113	23 – 113
Synchronous Operation (°F))[3]	23 – 113	23 – 113
Compressor		
Inverter Quantity	HSS DC Scroll x 3	
Oil / Type	PVE / FVC68D	
Unit Data		
Refrigerant Type / Control / Location	R32 / EEV / Indoor Unit	
R32 Refrigerant Factory Charge (lbs)	7.7 + 7.7 + 7.7	7.7 + 7.7 + 7.7
Max. Number Indoor Units / System	58	64
Sound Pressure dB(A)[4]	61 (67)	61 (67)
Net Unit Weight (lbs.)	322 + 322 + 322	322 + 322 + 322
Shipping Weight (lbs.)	340 + 340 + 340	340 + 340 + 340
Communication Cables[6,7]	2 x 18 AWG	
Heat Exchanger (Stainless Steel Plate)		
Maximum Pressure Resistance (psi)	640	640
Flow at Rated Condition (GPM)	30.4 + 30.4 + 30.4	35.5 + 35.5 + 35.5
Total Heat of Rejection (Btu/h)	473,700	570,300
Total Heat of Absorption (Btu/h)	368,100	440,400
Pressure Drop (ft-wg)	7.23 / 7.23 / 7.23	9.63 / 9.63 / 9.63
Δt[5] (°F)	10.4	10.7
Piping[8]		
Liquid Line (in.,OD)	5/8 Braze	3/4 Braze
Low Pressure Vapor Line (in.,OD)	1-3/8 Braze	1-5/8 Braze
High Pressure Vapor Line (in.,OD)	1-1/8 Braze	1-3/8 Braze
Water Inlet / Outlet Connection (in.,ID)	1-1/2 + 1-1/2 + 1-1/2 FPT	1-1/2 + 1-1/2 + 1-1/2 FPT
Condensate Pipe Diameter (in.,ID)	3/4 + 3/4 + 3/4 MPT	3/4 + 3/4 + 3/4 MPT

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

[2] Variable water flow control kit PWFCKN000 is required for applications with entering water temperatures below 59°F (one kit per frame). Minimum flow rate must be 40% of the nominal flow rate, 2-10V signal with a linear flow response valve.

[3] For heating and synchronous operation applications with entering water temperatures lower than 50°F, refer to the Water Loop Circuit Design Guide document.

[4] Sound pressure levels are tested in an anechoic chamber under ISO 3745 standard at rated AHRI operating conditions. Sound pressure level may increase during heating operation at maximum compressor frequency. Value in parenthesis is the maximum sound pressure at those conditions.

[5] Value is calculated as follows: Δt = Total Heat of Rejection ÷ (Rated Flow Rate x 500). Data is for pure water.

[6] Communication cable between WSU, IDU(s) / HRU(s), and Central Controller must be a minimum of 2-conductor, 18 AWG, twisted, stranded, and shielded. Ensure the communication cable shield is properly grounded to the WSU chassis only. ⃠ Do not ground the communication cable at any other point. Wiring must comply with all applicable local and national codes.

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GENERAL DATA

Triple Frame 460V Water Source Unit Specifications

MULTI V WATER 5

Table 10: Triple-Frame 460V Units

Combination Unit Model Number	36.0 Ton ZRWM432DAS5	42.0 Ton ZRWM504DAS5	48.0 Ton ZRWM576DAS5
Individual Component Model Numbers	**ZRWM144BAS5 x 3**	**ZRWM144DAS5 x 1 + ZRWM168DAS5 x 1 + ZRWM192DAS5 x 1**	**ZRWM192DAS5 x 3**
Cooling Performance			
Nominal Cooling Capacity (Btu/h)[1]	430,500	504,000	571,200
Heating Performance			
Nominal Heating Capacity (Btu/h)[1]	486,000	567,000	648,000
Operating Range (Entering Water Temperature)[2]			
Cooling (°F)	50 - 113	50 - 113	50 - 113
Heating (°F))[3]	23 – 113	23 – 113	23 – 113
Synchronous Operation (°F))[3]	23 – 113	23 – 113	23 – 113
Compressor			
Inverter Quantity / Oil / Type	HSS DC Scroll x 3 / PVE / FVC68D		
Unit Data			
Refrigerant Type / Control / Location	R32 / EEV / Indoor Unit		
R32 Refrigerant Factory Charge (lbs)	7.7 + 7.7 + 7.7	7.7 + 9.9 + 9.9	9.9 + 9.9 + 9.9
Max. Number Indoor Units / System	64	64	64
Sound Pressure dB(A)[4]	61 (67)	63 (67)	65 (67)
Net Unit Weight (lbs.)	328 + 328 + 328	328 + 348 + 348	348 + 348 + 348
Shipping Weight (lbs.)	346 + 346 + 346	346 + 366 + 366	366 + 366 + 366
Communication Cables[6,7]	2 x 18 AWG		
Heat Exchanger (Stainless Steel Plate)			
Maximum Pressure Resistance (psi)	640	640	640
Flow at Rated Condition (GPM)	35.5 + 35.5 + 35.5	35.5 + 45.7 + 50.7	50.7 + 50.7 + 50.7
Total Heat of Rejection (Btu/h)	570,300	663,600	760,500
Total Heat of Absorption (Btu/h)	440,400	513,200	580,800
Pressure Drop (ft-wg)	9.63 / 9.63 / 9.63	9.63 / 8.32 / 10.08	10.08 / 10.08 / 10.08
Δt[5] (°F)	10.7	10.1	10.0
Piping[8]			
Liquid Line (in.,OD)	3/4 Braze	3/4 Braze	3/4 Braze
Low Pressure Vapor Line (in.,OD)	1-5/8 Braze	1-5/8 Braze	1-5/8 Braze
High Pressure Vapor Line (in.,OD)	1-3/8 Braze	1-3/8 Braze	1-3/8 Braze
Water Inlet / Outlet Connection (in.,ID)	1-1/2 + 1-1/2 + 1-1/2 FPT	1-1/2 + 1-1/2 + 1-1/2 FPT	1-1/2 + 1-1/2 + 1-1/2 FPT
Condensate Pipe Diameter (in.,ID)	3/4 + 3/4 + 3/4 MPT	3/4 + 3/4 + 3/4 MPT	3/4 + 3/4 + 3/4 MPT

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

[2] Variable water flow control kit PWFCKN000 is required for applications with entering water temperatures below 59ºF (one kit per frame). Minimum flow rate must be 40% of the nominal flow rate, 2-10V signal with a linear flow response valve.

[3] For heating and synchronous operation applications with entering water temperatures lower than 50°F, refer to the Water Loop Circuit Design and Installation section in the Installation Manual.

[4] Sound pressure levels are tested in an anechoic chamber under ISO 3745 standard at rated AHRI operating conditions. Sound pressure level may increase during heating operation at maximum compressor frequency. Value in parenthesis is the maximum sound pressure at those conditions.

[5] Value is calculated as follows: Δt = Total Heat of Rejection ÷ (Rated Flow Rate x 500). Data is for pure water.

[6] Communication cable between WSU, IDU(s) / HRU(s), and Central Controller must be a minimum of 2-conductor, 18 AWG, twisted, stranded, and shielded. Ensure the communication cable shield is properly grounded to the WSU chassis only. ⃠ Do not ground the communication cable at any other point. Wiring must comply with all applicable local and national codes.

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Electrical data for 208–230V Models

Table 11: 208-230V, 60Hz, 3-Phase Systems

Nom. Tons	System Model No.	Compressor				MCA			MOCP		
		Comp. Qty.	Motor RLA			Frame 1	Frame 2	Frame 3	Frame 1	Frame 2	Frame 3
			Frame 1	Frame 2	Frame 3						
6	ZRWM072BAS5	1	11.1	-	-	13.8	-	-	20	-	-
8	ZRWM096BAS5	1	15.5	-	-	19.4	-	-	30	-	-
10	ZRWM121BAS5	1	22.2	-	-	27.7	-	-	45	-	-
12	ZRWM144BAS5	1	26.2	-	-	32.7	-	-	50	-	-
14	ZRWM168BAS5	2	15.5	11.1	-	19.4	13.8	-	30	20	-
16	ZRWM192BAS5	2	15.5	15.5	-	19.4	19.4	-	30	30	-
18	ZRWM216BAS5	2	22.2	15.5	-	27.7	19.4	-	45	30	-
20	ZRWM240BAS5	2	22.2	22.2	-	27.7	27.7	-	45	45	-
22	ZRWM264BAS5	2	26.2	22.2	-	32.7	27.7	-	50	45	-
24	ZRWM288BAS5	2	26.2	26.2	-	32.7	32.7	-	50	50	-
30	ZRWM360BAS5	3	22.2	22.2	22.2	27.7	27.7	27.7	45	45	45
36	ZRWM432BAS5	3	26.2	26.2	26.2	32.7	32.7	32.7	50	50	50

Electrical data for 460V Models

Table 12: 460V, 60Hz, 3-Phase Systems

Nom. Tons	System Model No.	Compressor				MCA			MOCP		
		Comp. Qty.	Motor RLA			Frame 1	Frame 2	Frame 3	Frame 1	Frame 2	Frame 3
			Frame 1	Frame 2	Frame 3						
6	ZRWM072DAS5	1	7.8	-	-	9.8	-	-	15	-	-
8	ZRWM096DAS5	1	8.8	-	-	11.1	-	-	15	-	-
10	ZRWM121DAS5	1	11.1	-	-	13.8	-	-	20	-	-
12	ZRWM144DAS5	1	13.3	-	-	16.6	-	-	25	-	-
14	ZRWM168DAS5	1	15.5	-	-	19.4	-	-	30	-	-
16	ZRWM192DAS5	1	20.0	-	-	24.9	-	-	40	-	-
16	ZRWM191DAS5	2	8.8	8.8	-	11.1	11.1	-	15	15	-
18	ZRWM216DAS5	2	11.1	8.8	-	13.8	11.1	-	20	15	-
20	ZRWM240DAS5	2	11.1	11.1	-	13.8	13.8	-	20	20	-
22	ZRWM264DAS5	2	13.3	11.1	-	16.6	13.8	-	25	20	-
24	ZRWM288DAS5	2	13.3	13.3	-	16.6	16.6	-	25	25	-
30	ZRWM360DAS5	2	20.0	15.5	-	24.9	19.4	-	40	30	-
36	ZRWM432DAS5	3	13.3	13.3	13.3	16.6	16.6	16.6	25	25	25
42	ZRWM504DAS5	3	20.0	15.5	13.3	24.9	19.4	16.6	40	30	25
48	ZRWM576DAS5	3	20.0	20.0	20.0	24.9	24.9	24.9	40	40	40

For component model numbers, see the specification tables.

For 208−230V systems, acceptable voltage range is 187−253V.

For 460V systems, acceptable voltage range is 414−528V.

Maximum allowable voltage imbalance is 2%.

MCA = Minimum Circuit Ampacity.

Maximum Overcurrent Protection (MOCP) is calculated as follows: (Largest motor RLA x 2.25) + (Sum of other motor RLA) rounded down to the nearest standard fuse size.

SCCR rating: 56 kA RMS symmetrical 208V maximum / 62 kA RMS symmetrical 230V maximum

SCCR rating: 65 kA RMS symmetrical 460V maximum

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CONNECTION LIMITATIONS

Water Source Units

MULTI V WATER 5

Table 13: Water Source Unit / Indoor Unit Matching Limitations.

Heat Pump / Heat Recovery Models	Nominal Cooling (Btu/h)	Indoor Units		
		Max. Qty.	Sum of Indoor Unit Nominal Cooling Capacities (Btu/h)	
			Min. Capacity (Btu/h) (50%)[1]	Max. Capacity (Btu/h) (130%)[2]
ZRWM072BAS5 / ZRWM072DAS5	72,000 / 72,000	13/13	36,000 / 36,000	93,600 / 93,600
ZRWM096BAS5 / ZRWM096DAS5	96,000 / 96,000	16/16	48,000 / 48,000	124,800 / 124,800
ZRWM121BAS5 / ZRWM121DAS5	119,700 / 119,700	20/20	60,000 / 60,000	156,000 / 156,000
ZRWM144BAS5 / ZRWM144DAS5	144,000 / 144,000	23/23	72,000 / 72,000	187,200 / 187,200
ZRWM168BAS5 / ZRWM168DAS5	168,000 / 168,000	29/29	84,000 / 84,000	218,400 / 218,400
ZRWM192DAS5	192,000	32	96,000	249,600
ZRWM192BAS5 / ZRWM192DAS5	192,000 / 192,000	32/32	96,000 / 96,000	249,600 / 249,600
ZRWM216BAS5 / ZRWM216DAS5	216,000 / 216,000	35/35	108,000 / 108,000	280,800 / 280,000
ZRWM240BAS5 / ZRWM240DAS5	239,400 / 239,400	39/39	120,000 / 120,000	312,000 / 312,000
ZRWM264BAS5 / ZRWM264DAS5	264,000/ 264,000	42/42	132,000 / 132,000	343,200 / 343,200
ZRWM288BAS5 / ZRWM288DAS5	287,700 / 287,700	45/45	144,000 / 144,000	374,400 / 374,400
ZRWM360BAS5 / ZRWM360DAS5	360,000 / 360,000	58/58	180,000 / 180,000	468,000 / 468,000
ZRWM432BAS5 / ZRWM432DAS5	430,500 / 430,500	64/64	216,000 / 216,000	561,600 / 561,600
ZRWM504DAS5	504,000	64	252,000	655,200
ZRWM576DAS5	571,200	64	288,000	748,800

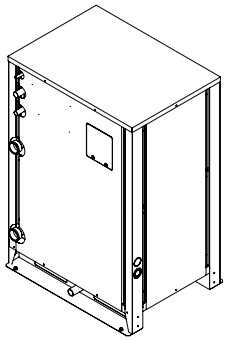
[1] 50% = Minimum Combination Ratio.
[2] 130% = Maximum Combination Ratio.

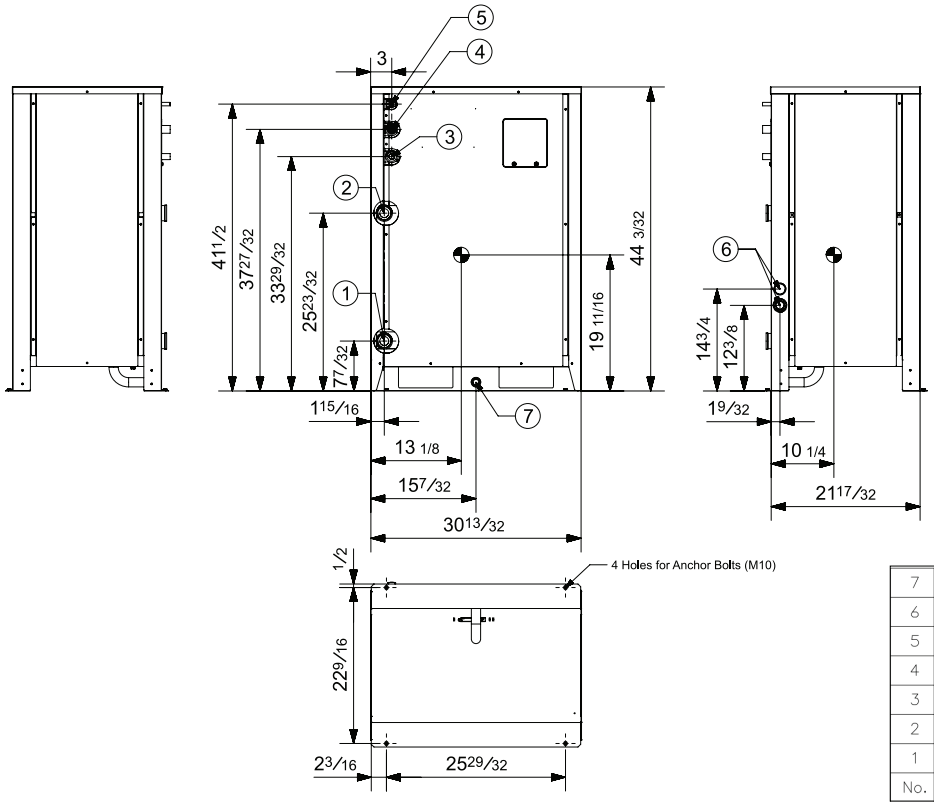
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DIMENSIONS

Single Frame





Note – All dimensions have a Tolerance of ± 0.25 in.

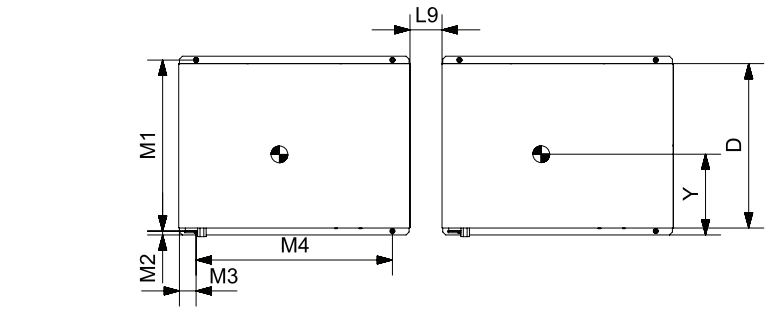
= Center of Gravity

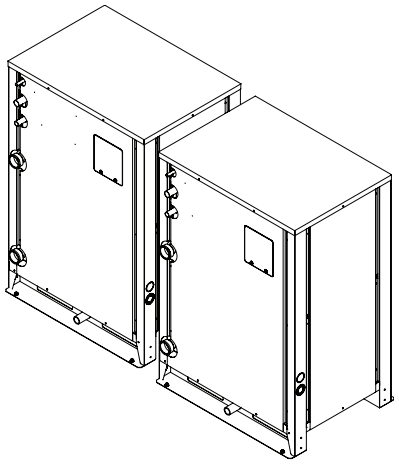
No.	Part Name	Description
7	Condensate drain pipe connection	PT 3/4 Female
6	Power and comm. cable hole	–
5	Liquid pipe connection	–
4	Low pressure pipe connection	–
3	High pressure pipe connection	–
2	Water outlet connection	PT 1-1/2 Female
1	Water inlet connection	PT 1-1/2 Female

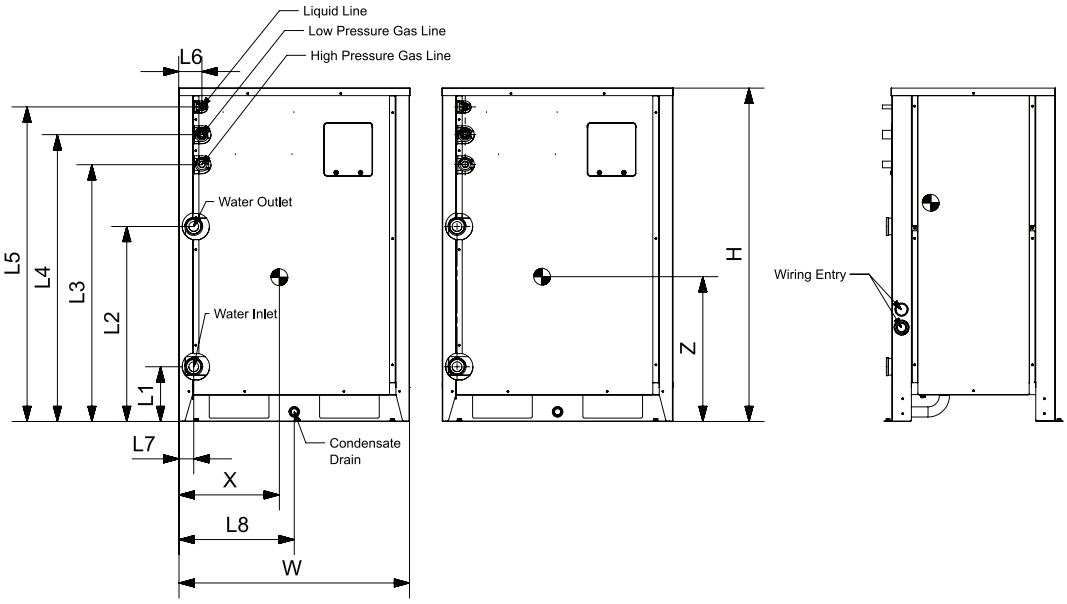
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DIMENSIONS

Dual Frame

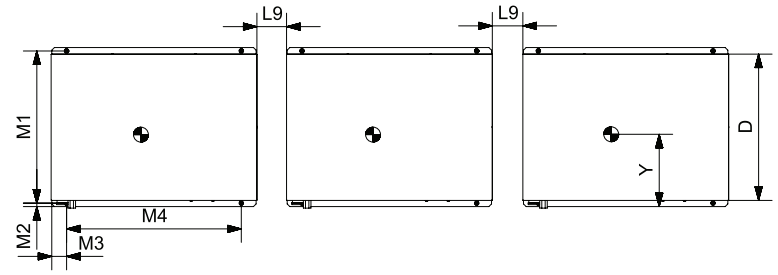


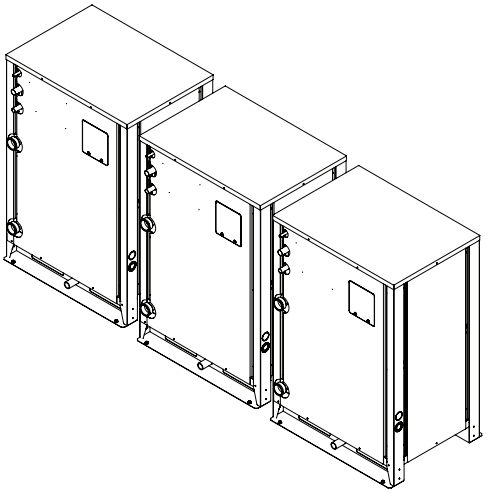


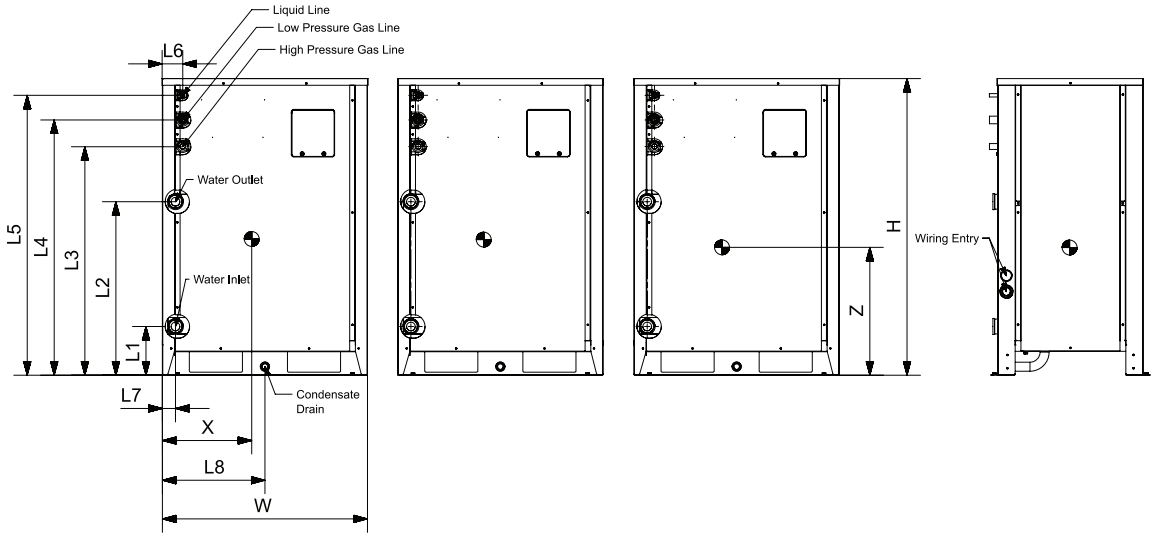


X	13–1/16"
Y	11–1/4"
Z	19–11/16"
W	30–13/32"
D	21–17/32"
H	44–3/32"
L1	7–3/16"
L2	25–3/4"
L3	33–7/8"
L4	37–7/8"
L5	41–1/2"
L6	3"
L7	1–15/16"
L8	15–3/16"
L9	4"
M1	22–9/16"
M2	1/2"
M3	2–3/16"
M4	25–7/8"

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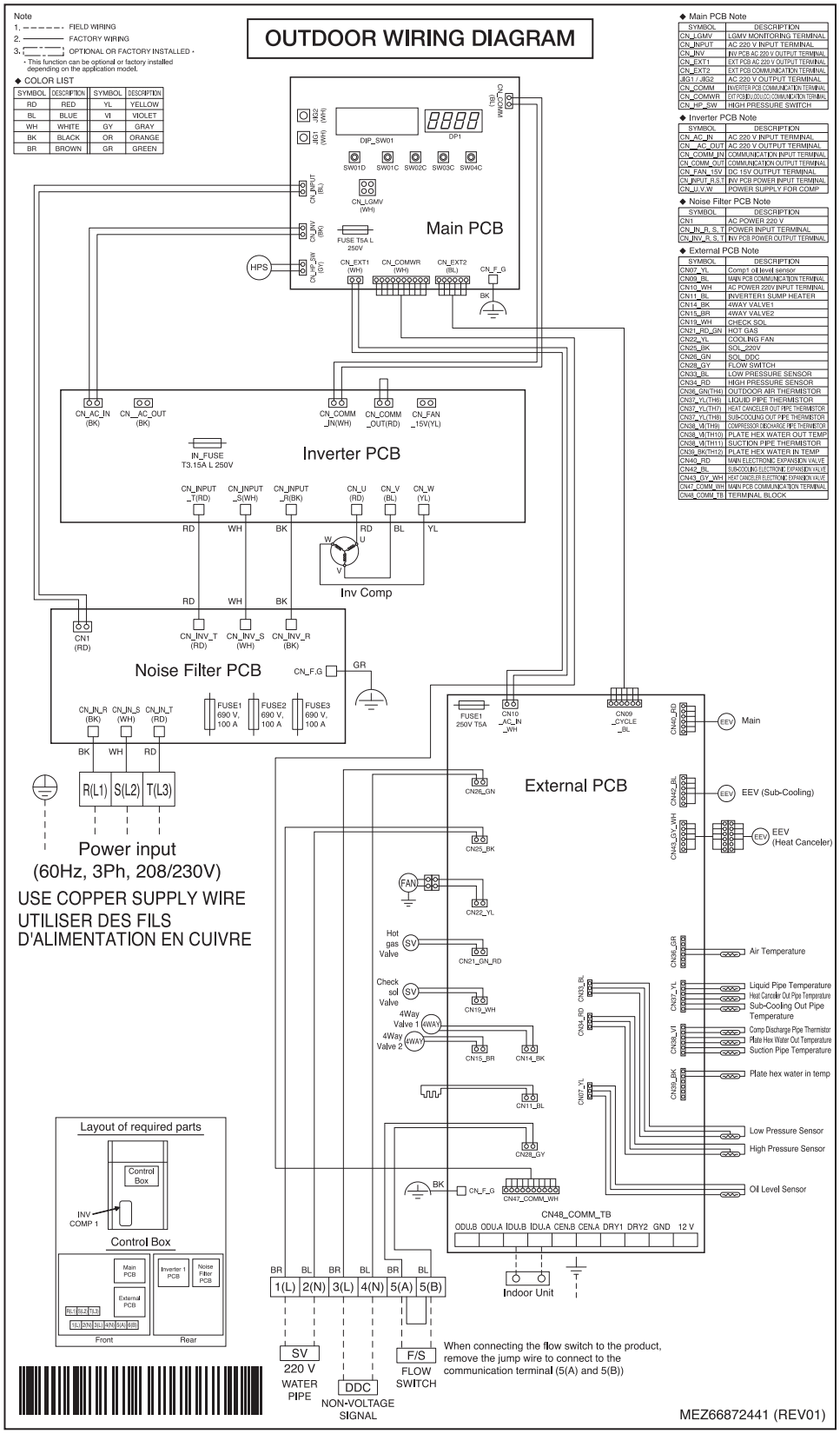




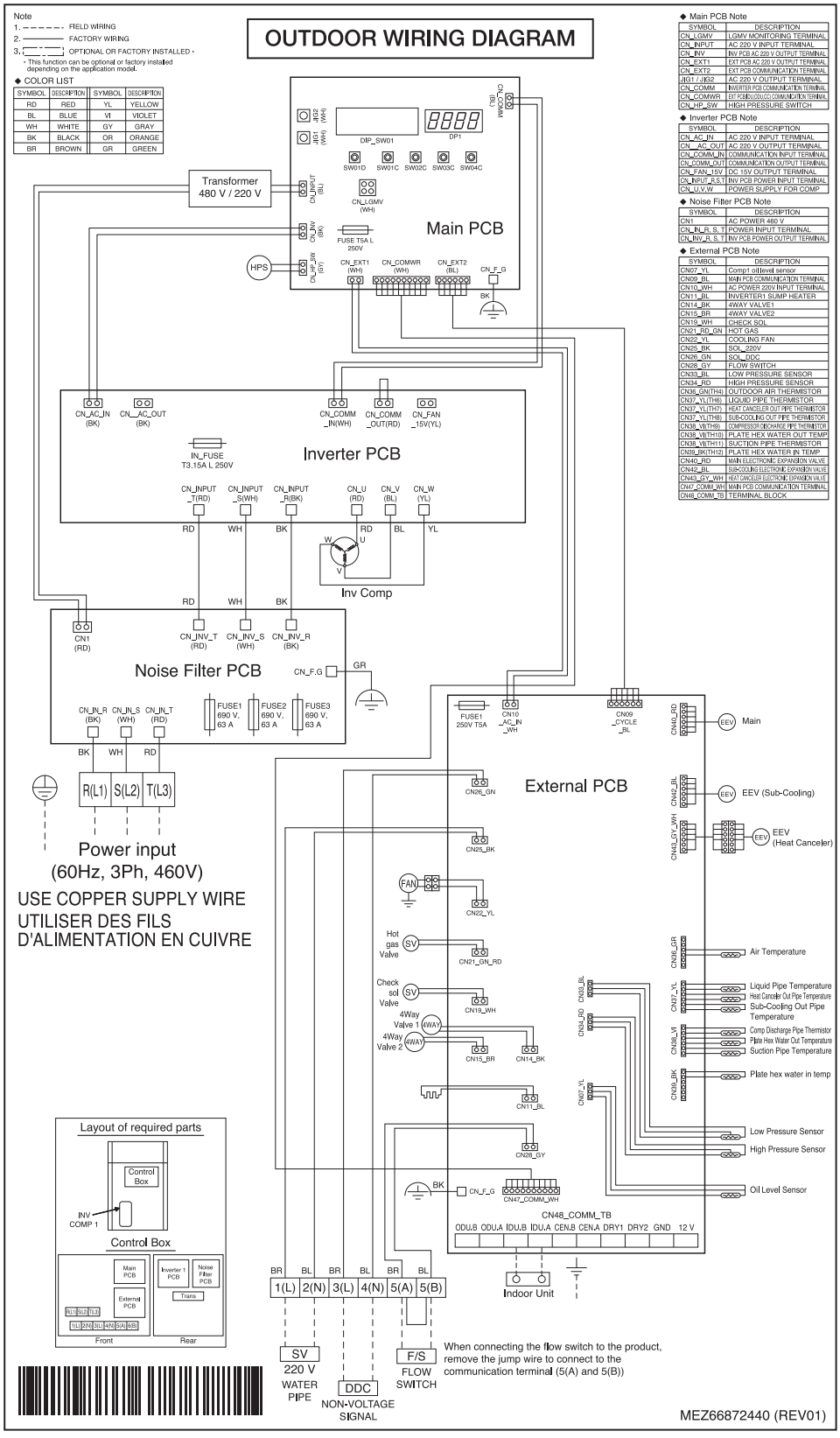


X	13–1/16"
Y	11–1/4"
Z	19–11/16"
W	30–13/32"
D	21–17/32"
H	44–3/32"
L1	7–3/16"
L2	25–3/4"
L3	33–7/8"
L4	37–7/8"
L5	41–1/2"
L6	3"
L7	1–15/16"
L8	15–3/16"
L9	4"
M1	22–9/16"
M2	1/2"
M3	2–3/16"
M4	25–7/8"

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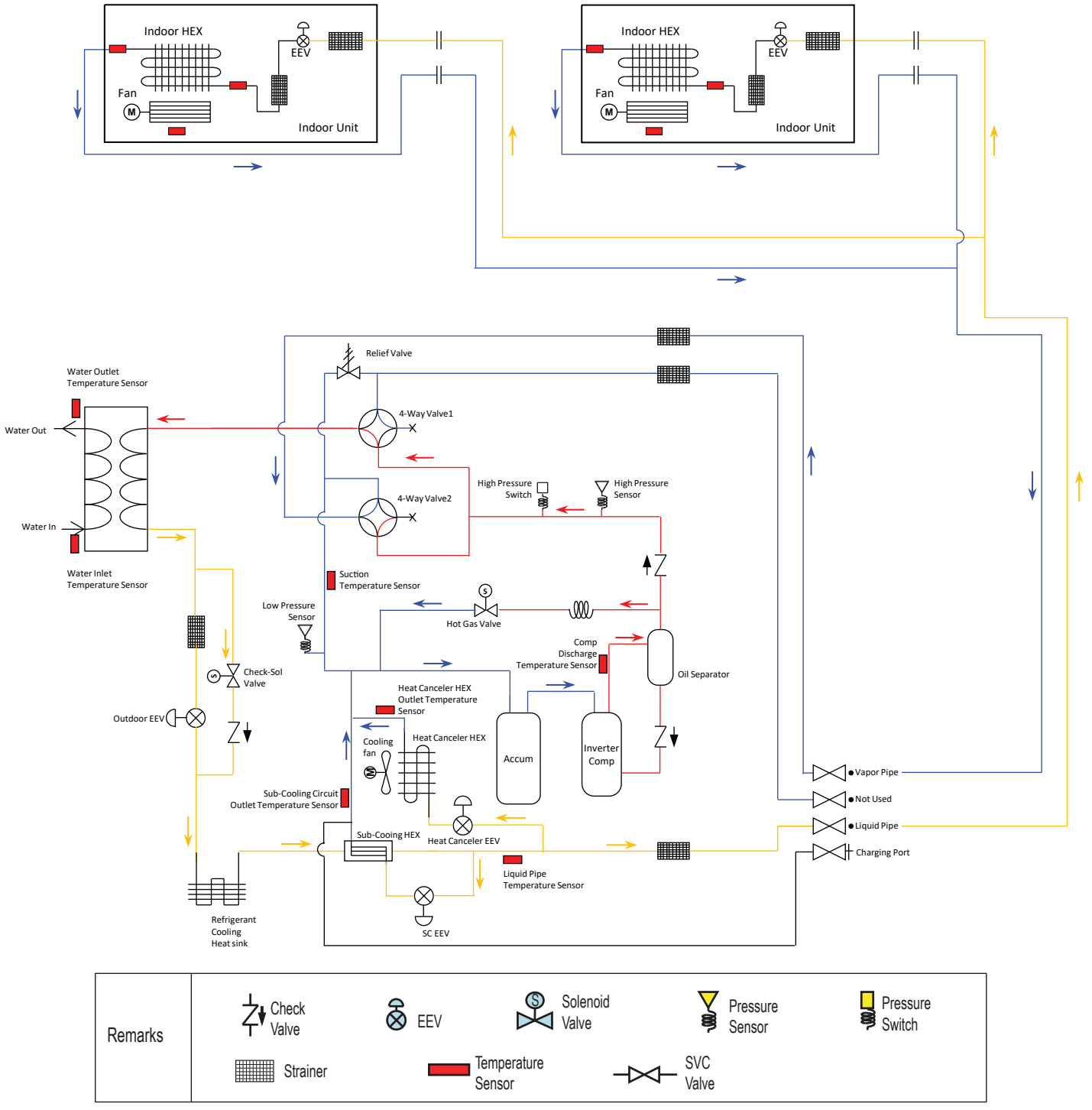
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REFRIGERANT FLOW DIAGRAMS

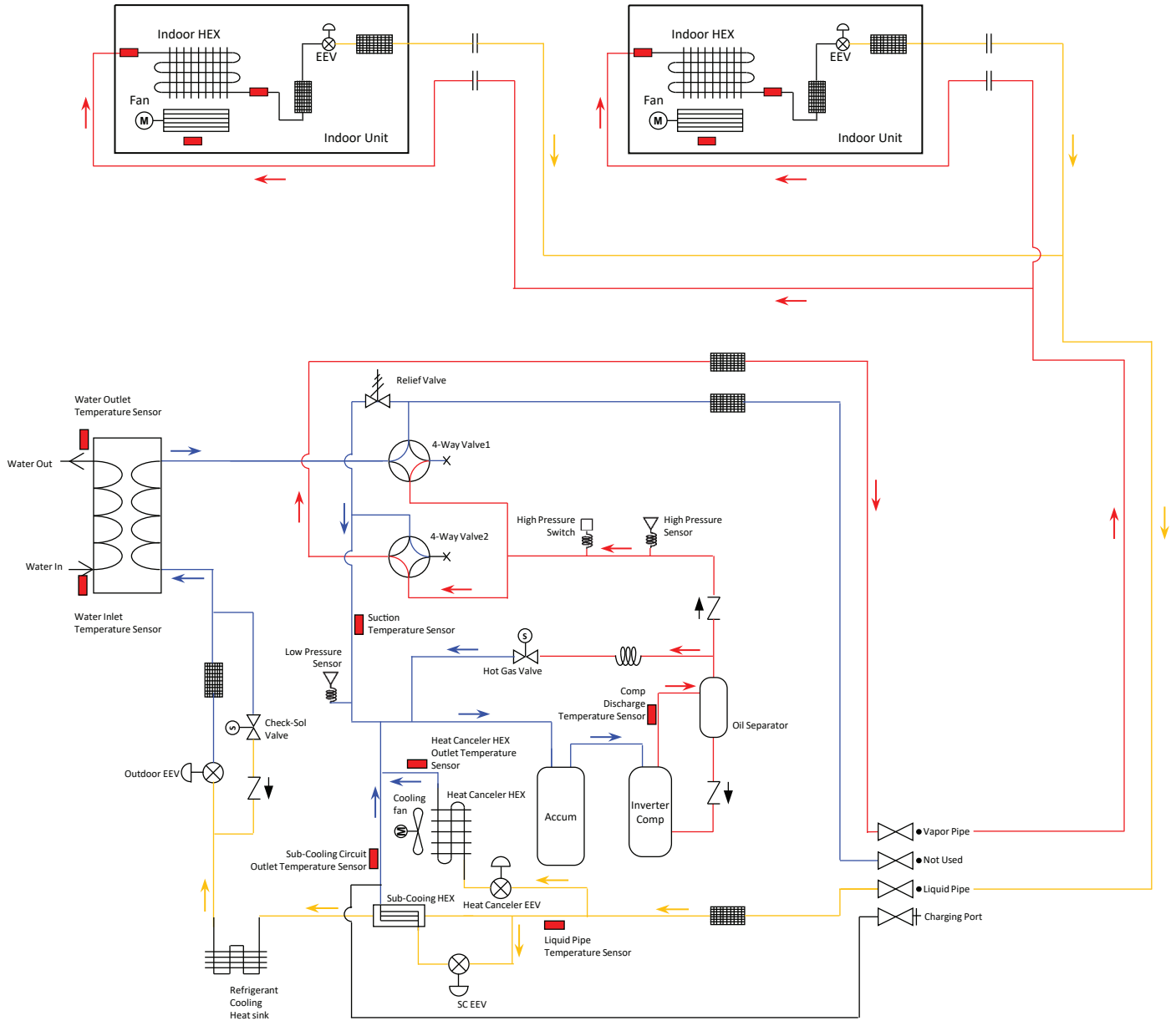
Heat Pump — Cooling Mode



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REFRIGERANT FLOW DIAGRAMS

Heat Pump — Heating Mode

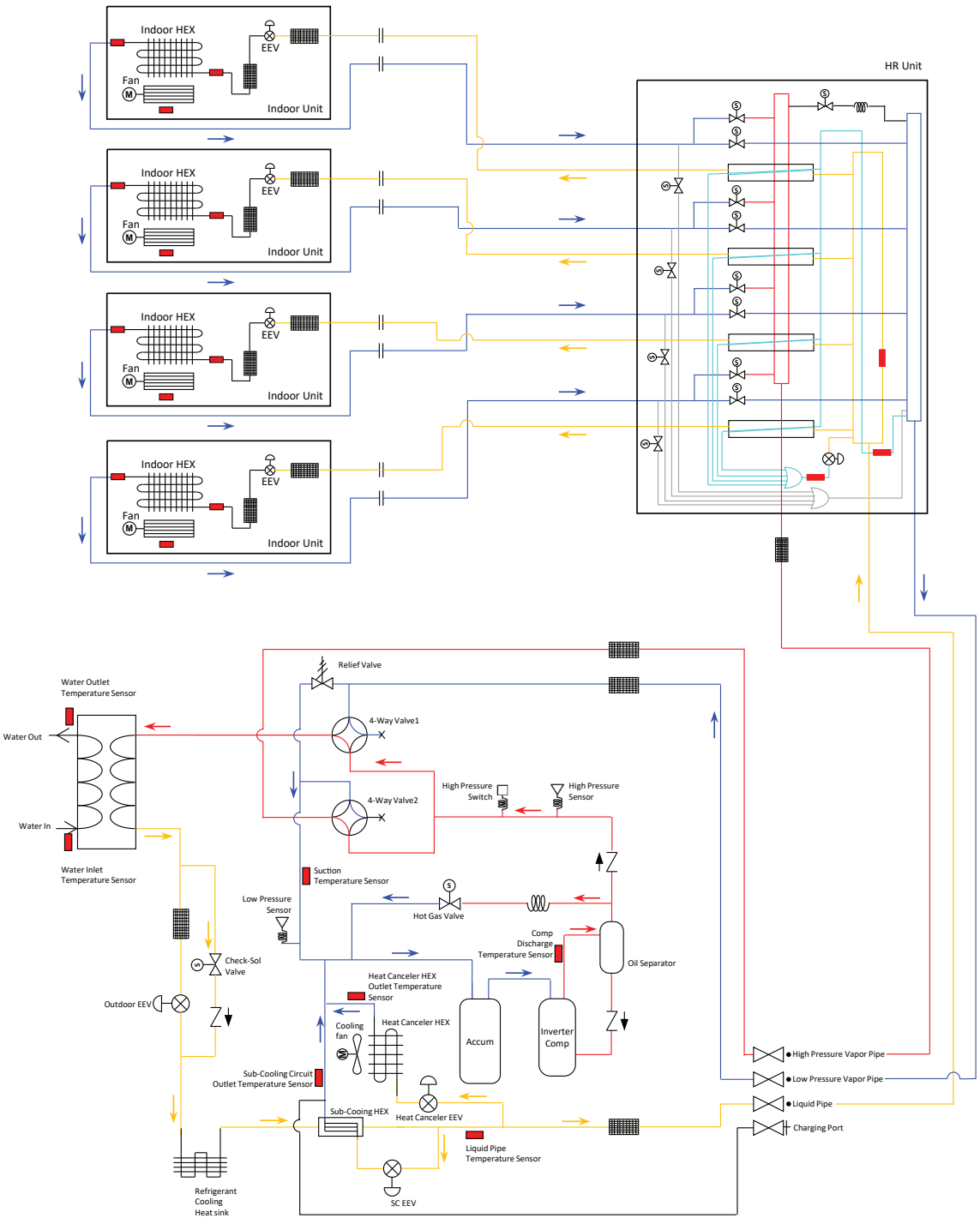


Remarks					
	Check Valve	EEV	Solenoid Valve	Pressure Sensor	Pressure Switch
	Strainer	Temperature Sensor	SVC Valve		

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REFRIGERANT FLOW DIAGRAMS

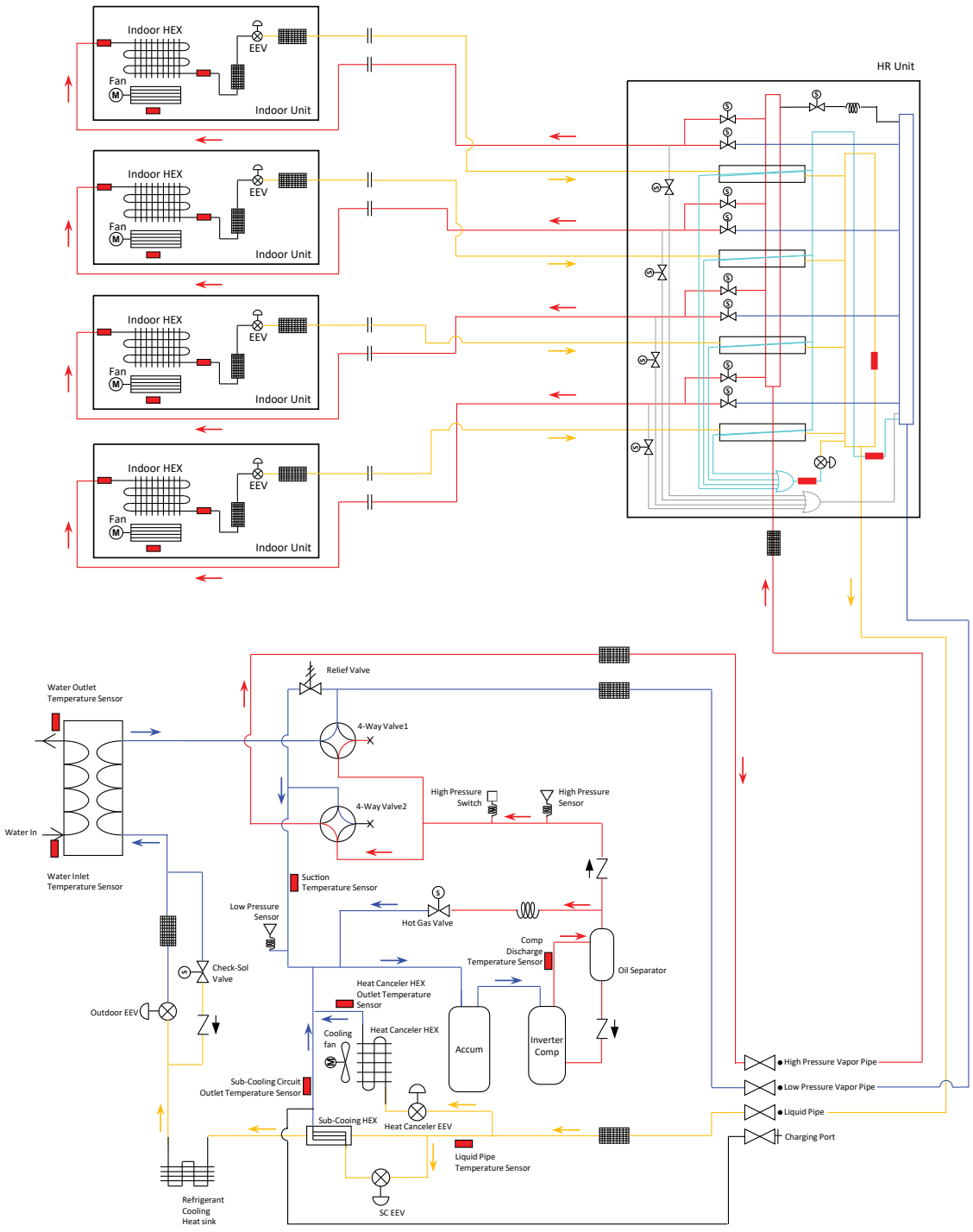
Heat Recovery — Cooling Mode



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REFRIGERANT FLOW DIAGRAMS

Heat Recovery — Heating Mode

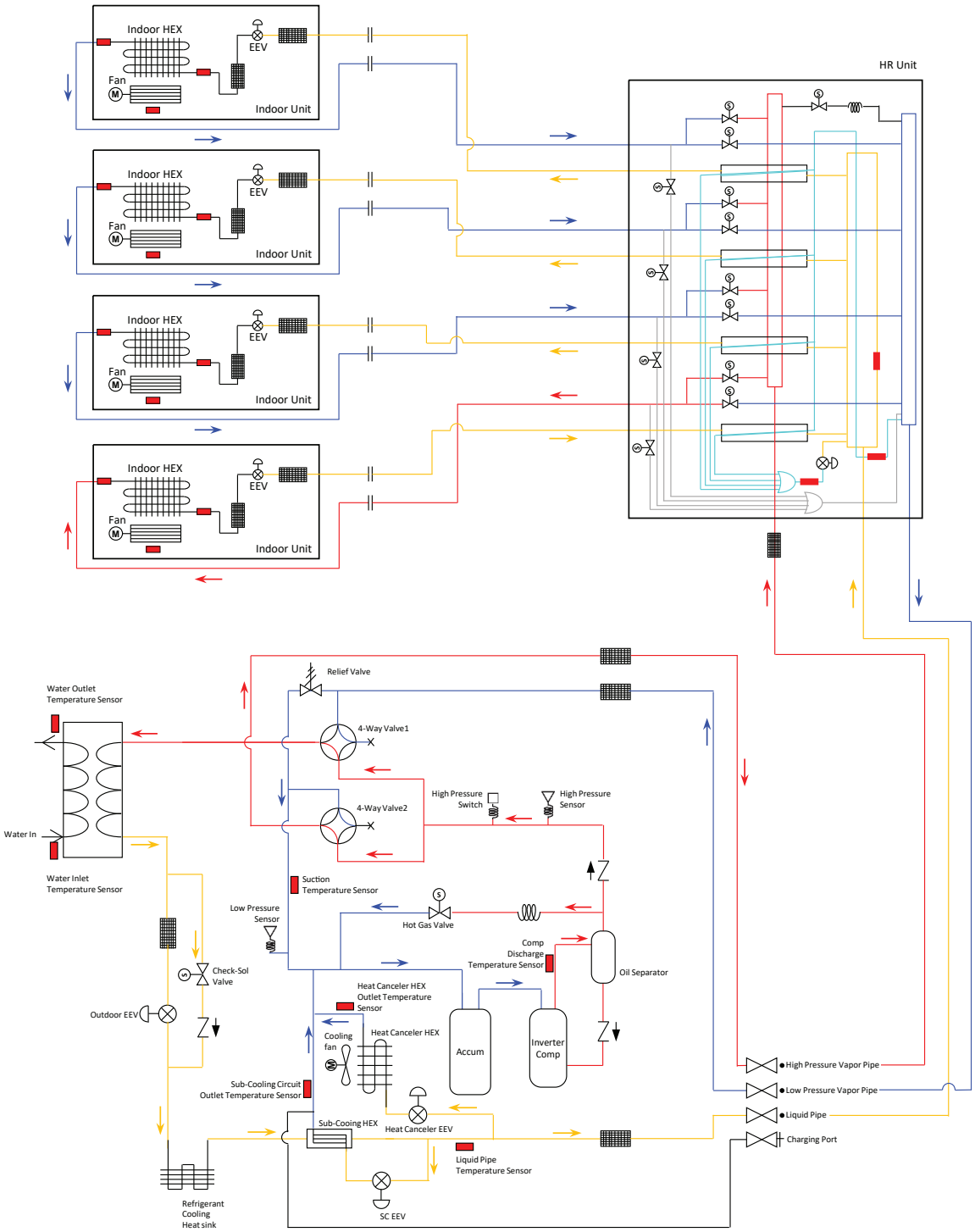


Remarks					
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	Strainer	Temperature Sensor	SVC Valve		

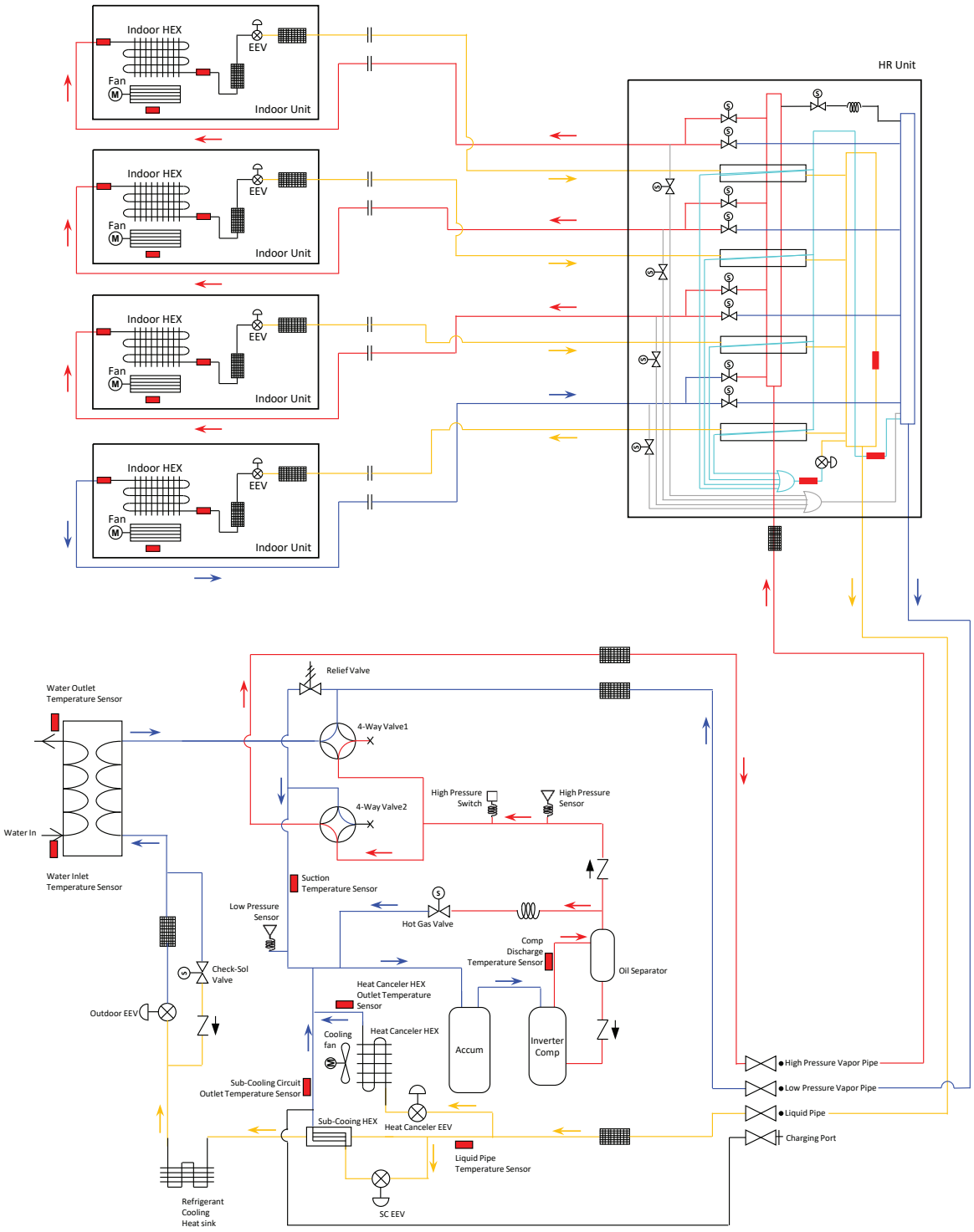
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REFRIGERANT FLOW DIAGRAMS

Heat Recovery — Cooling based Simultaneous Operation Mode



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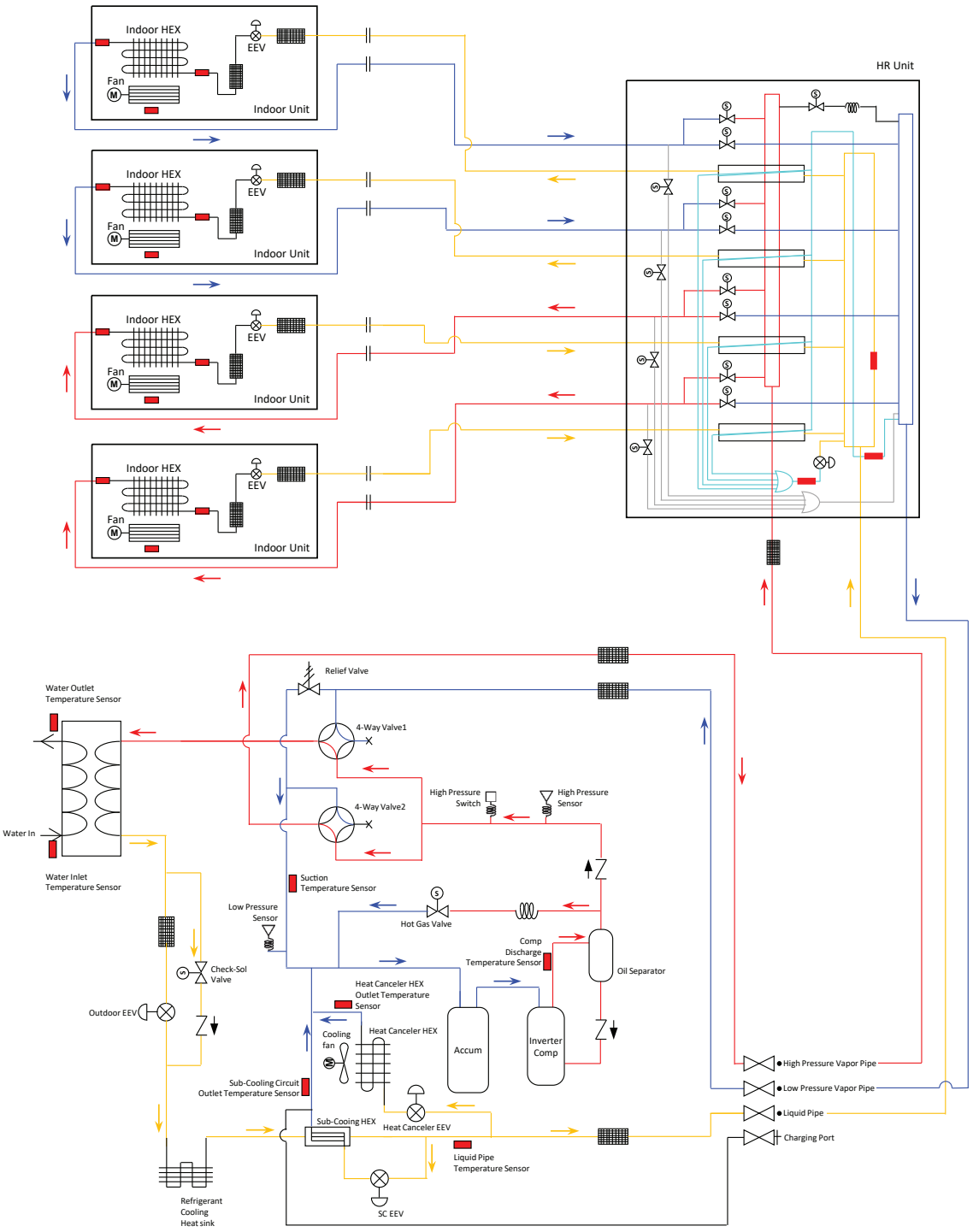


Remarks					
	Check Valve	EEV	Solenoid Valve	Pressure Sensor	Pressure Switch
	Strainer	Temperature Sensor	SVC Valve		

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REFRIGERANT FLOW DIAGRAMS

Heat Recovery — Balanced Simultaneous Operation Mode

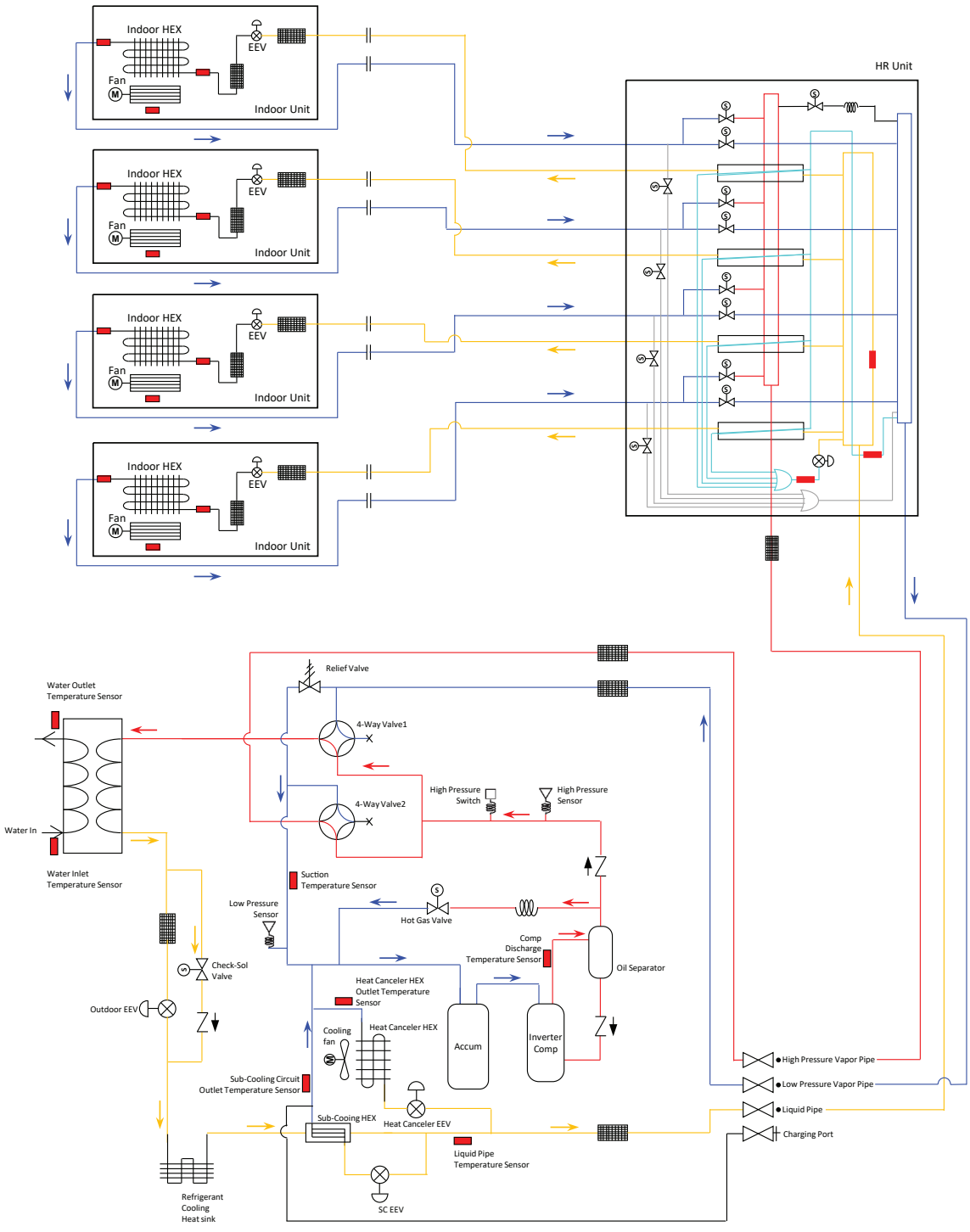


Remarks					
	Check Valve	EEV	Solenoid Valve	Pressure Sensor	Pressure Switch
	Strainer	Temperature Sensor	SVC Valve		

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REFRIGERANT FLOW DIAGRAMS

Heat Recovery — Oil Return Operation Mode



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Acoustic Data for WSU Models

- Measurement taken 3.3' above finished floor, and at a distance of 3.3' from face of unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound power levels are measured in dB(A)±3.
- Tested in anechoic chamber per ISO Standard 3745 at rated AHRI operating conditions.

Figure 5: Sound Pressure Measurement Location.

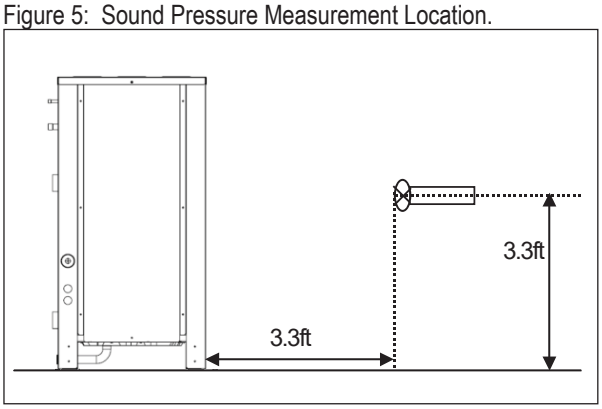


Table 14: Sound Pressure and Sound Power for 208-230V Models

Ton	Model	Sound Pressure*	Sound Power
6	ZRWM072BAS5	48 (62)	60
8	ZRWM096BAS5	50 (62)	62
10	ZRWM121BAS5	56 (62)	68
12	ZRWM144BAS5	56 (62)	68
14	ZRWM168BAS5	52 (65)	65
16	ZRWM192BAS5	53 (65)	66
18	ZRWM216BAS5	57 (65)	70
20	ZRWM240BAS5	59 (65)	72
22	ZRWM264BAS5	59 (65)	72
24	ZRWM288BAS5	59 (65)	72
30	ZRWM360BAS5	61 (67)	75
36	ZRWM432BAS5	61 (67)	75

Table 15: Sound Pressure and Sound Power for 460V Models.

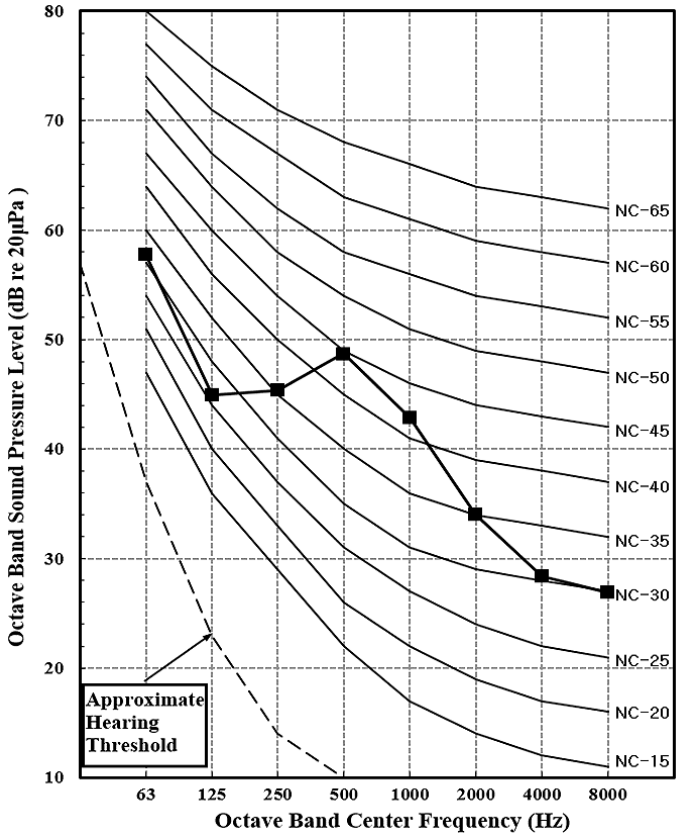
Ton	Model	Sound Pressure*	Sound Power
6	ZRWM072DAS5	48 (62)	60
8	ZRWM096DAS5	50 (62)	62
10	ZRWM121DAS5	56 (62)	68
12	ZRWM144DAS5	56 (62)	68
14	ZRWM168DAS5	58 (62)	70
16	ZRWM192DAS5	60 (62)	72
16	ZRWM191DAS5	53 (65)	66
18	ZRWM216DAS5	57 (65)	70
20	ZRWM240DAS5	59 (65)	72
22	ZRWM264DAS5	59 (65)	72
24	ZRWM288DAS5	59 (65)	72
30	ZRWM360DAS5	62 (65)	75
36	ZRWM432DAS5	61 (67)	75
42	ZRWM504DAS5	63 (67)	77
48	ZRWM576DAS5	65 (67)	79

* Sound pressure level may increase during heating operation at maximum compressor frequency. Value in parenthesis is the maximum sound pressure at those conditions.

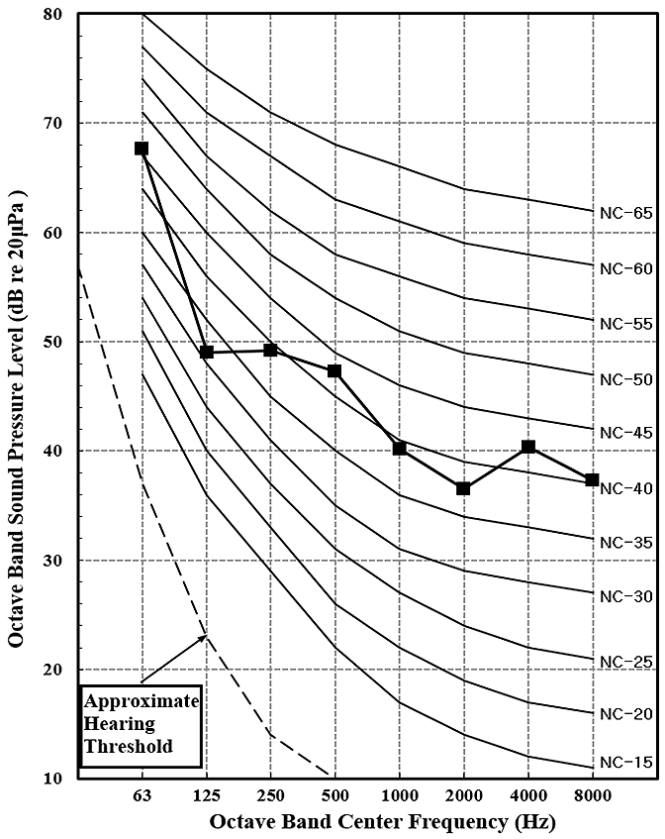
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Sound Pressure for 208-230V Models

ZRWM072BAS5



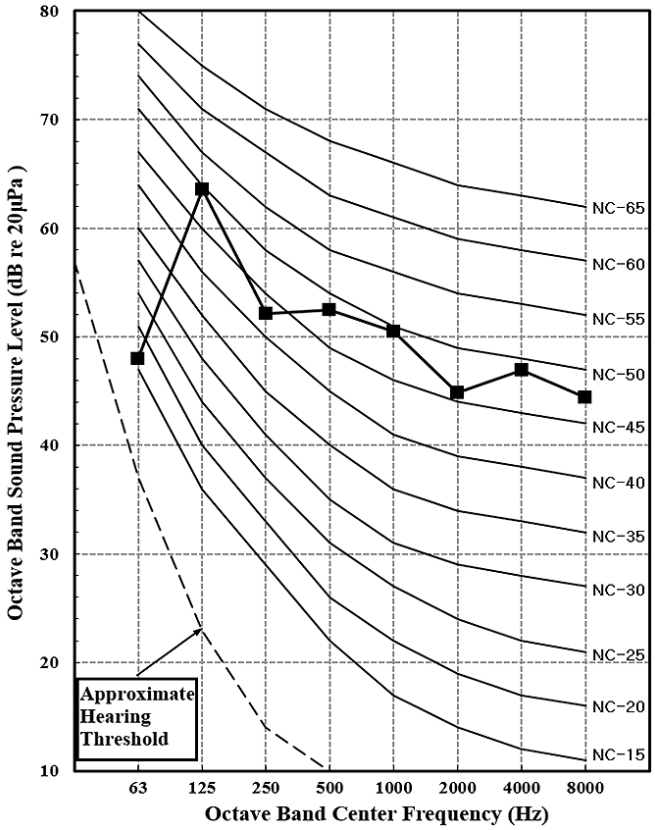
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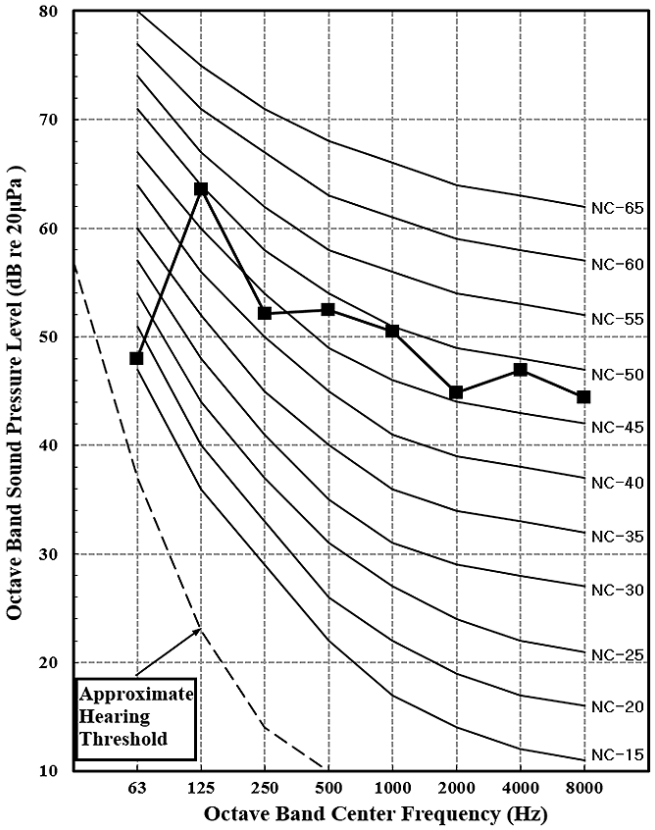
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Sound Pressure for 208-230V Models, continued.

ZRWM121BAS5



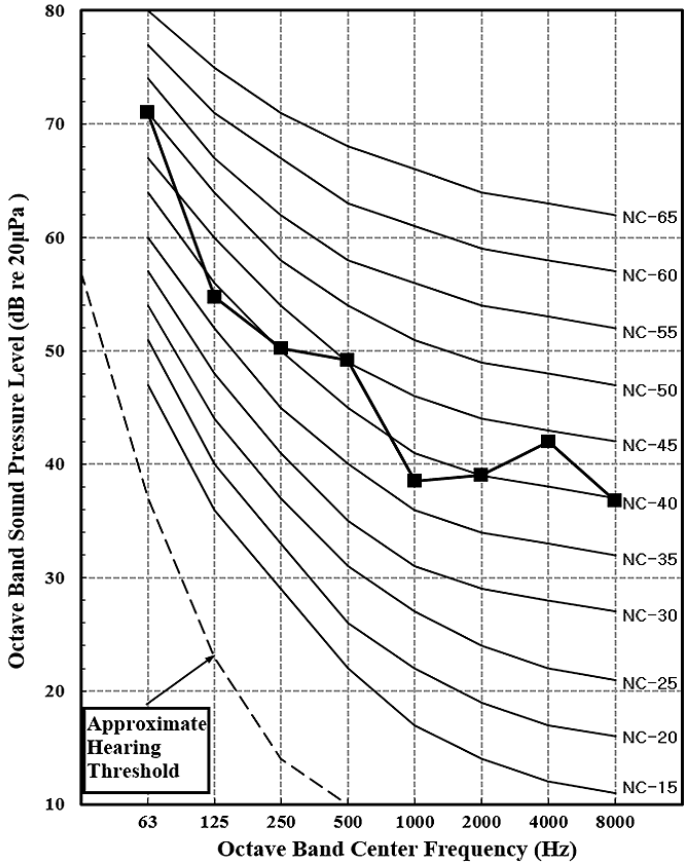
ZRWM144BAS5



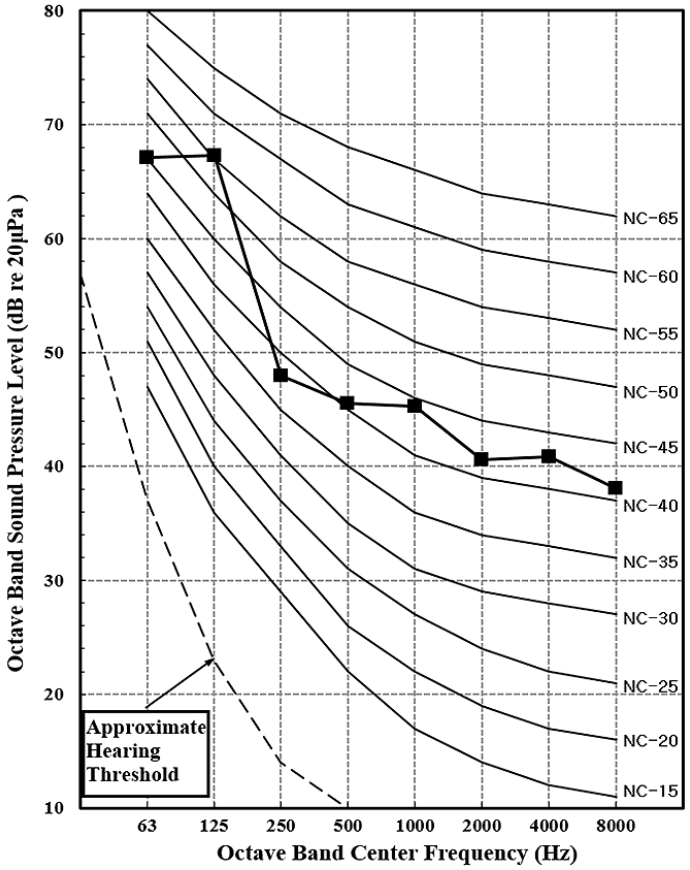
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Sound Pressure for 208-230V Models, continued.

ZRWM168BAS5



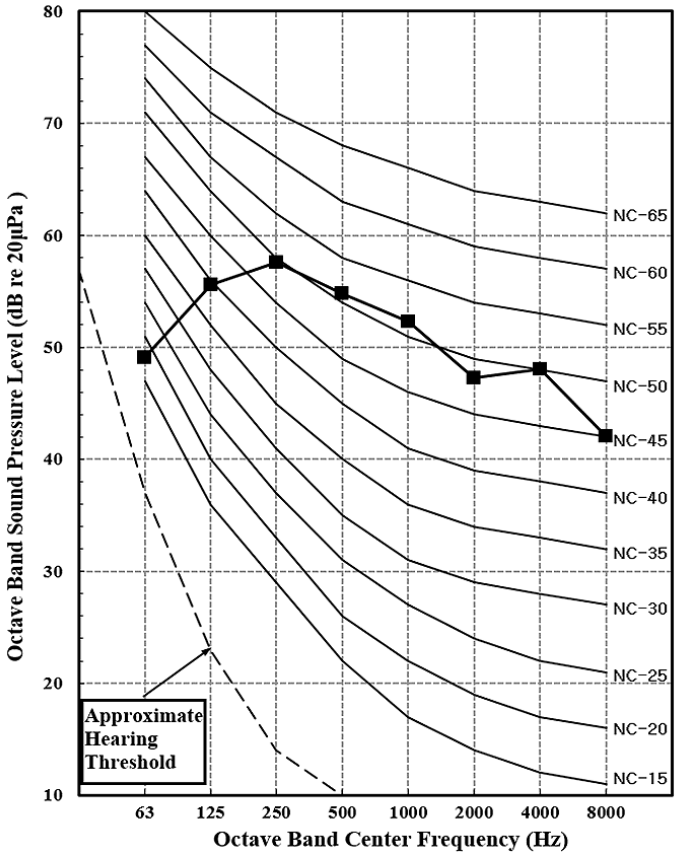
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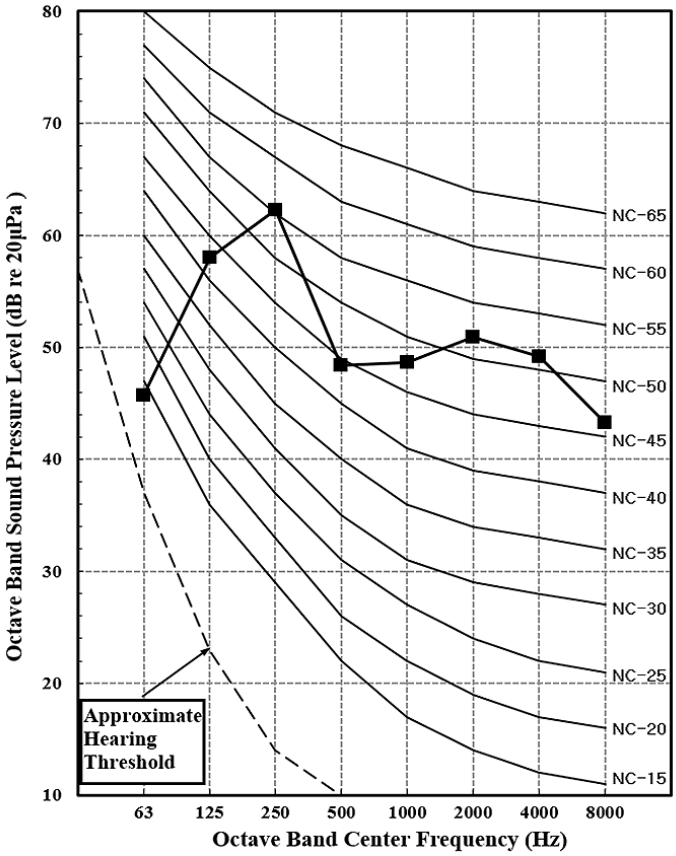
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Sound Pressure for 208-230V Models, continued.

ZRWM216BAS5



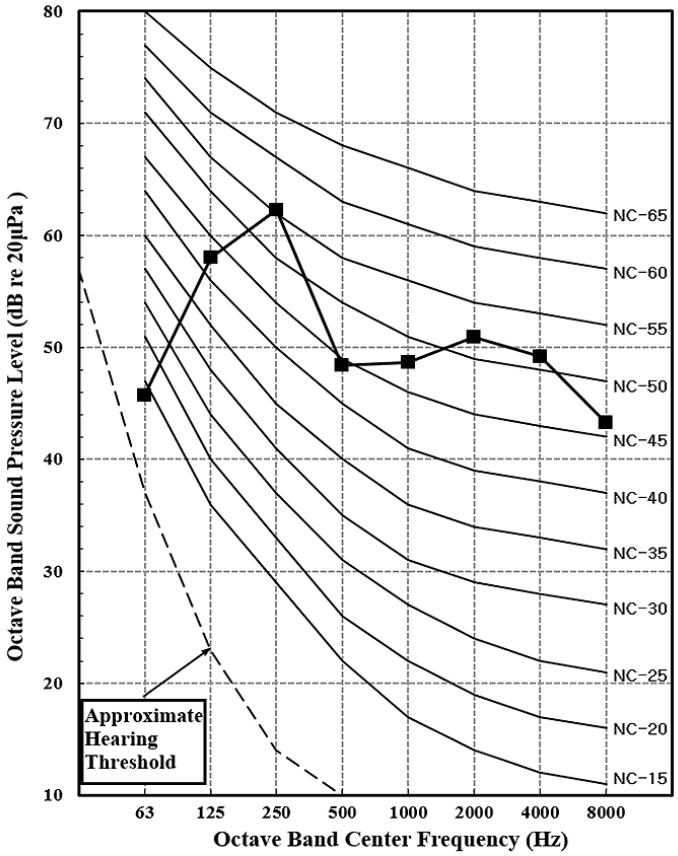
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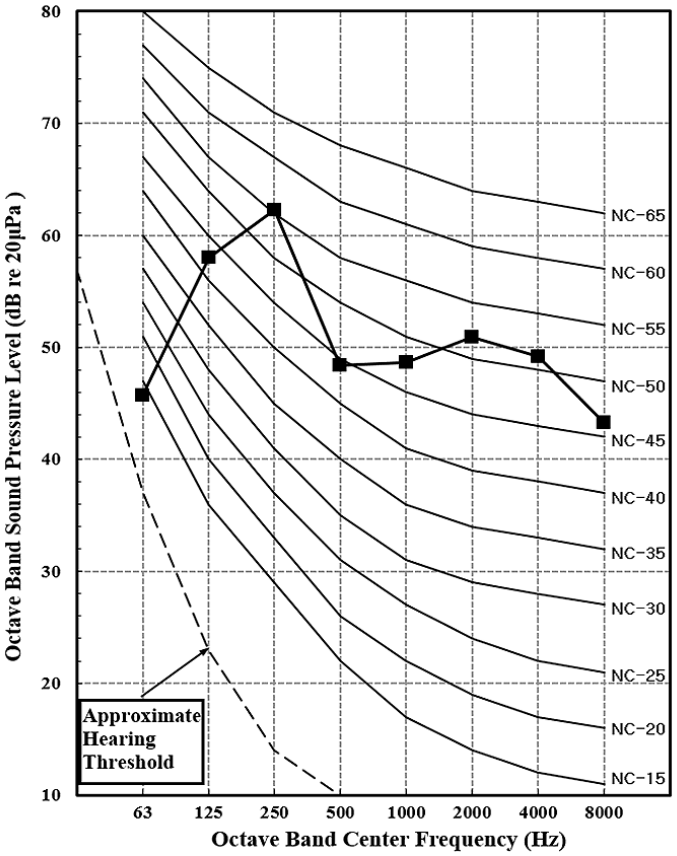
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Sound Pressure for 208-230V Models, continued.

ZRWM264BAS5



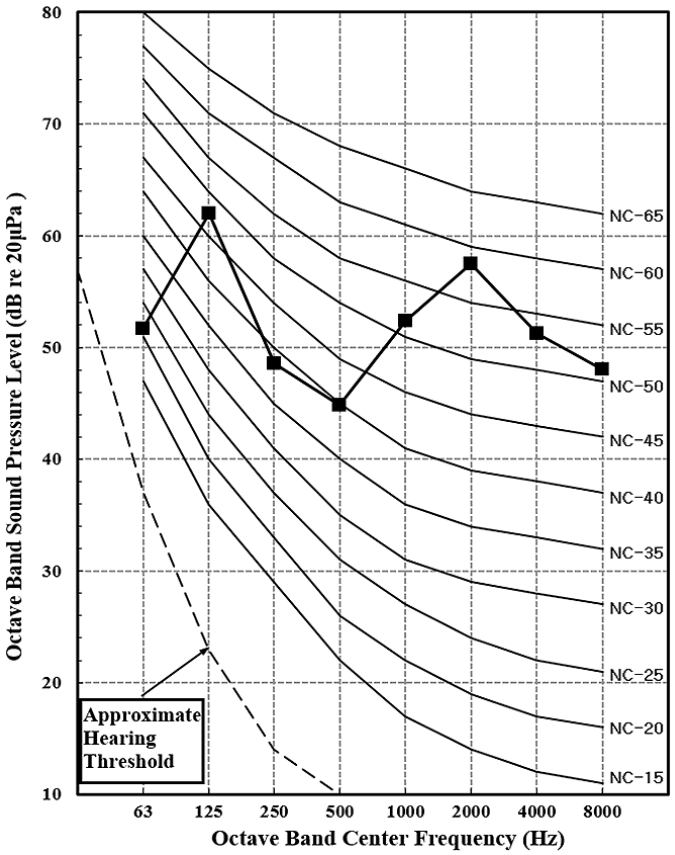
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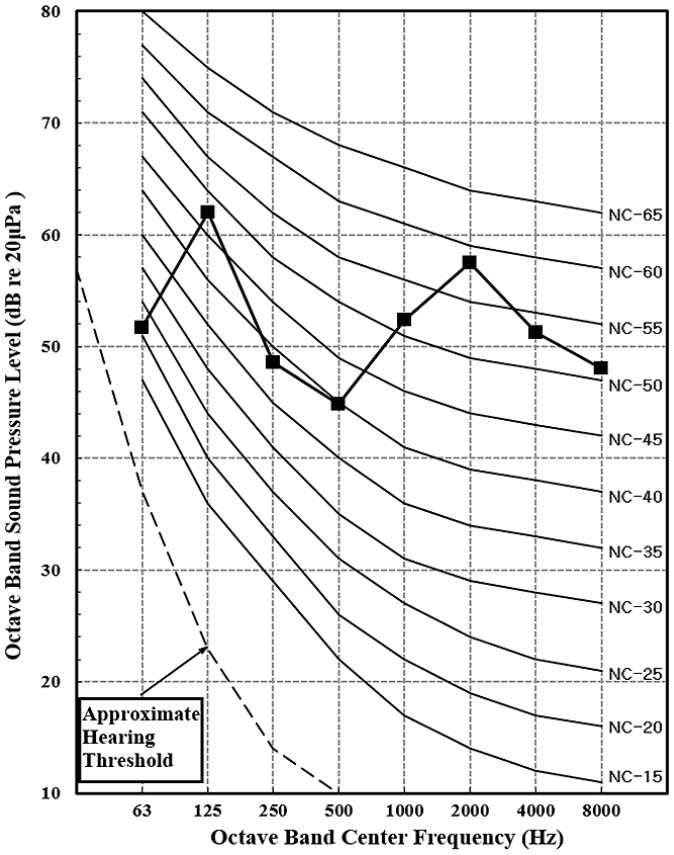
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Sound Pressure for 208-230V Models, continued.

ZRWM360BAS5



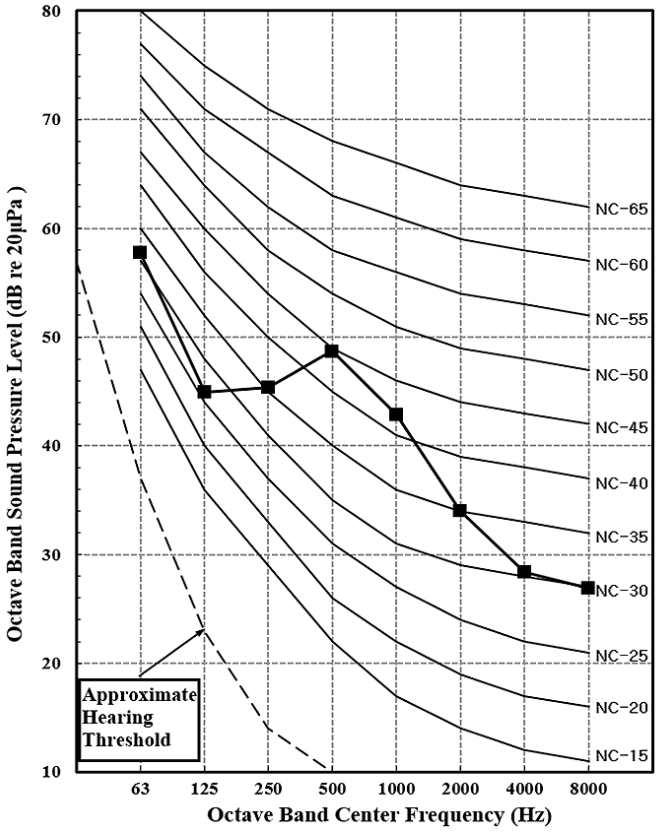
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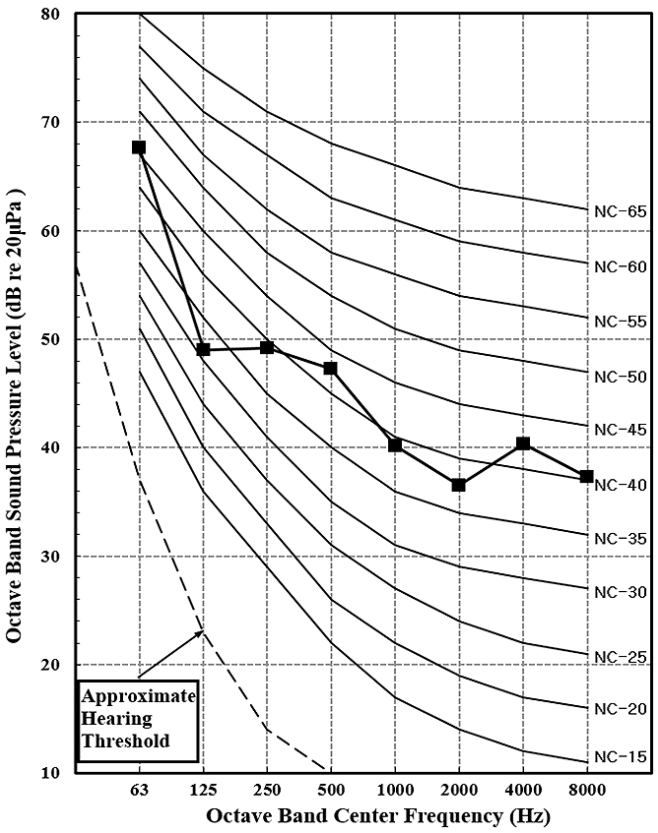
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Sound Pressure for 460V Models

ZRWM072DAS5



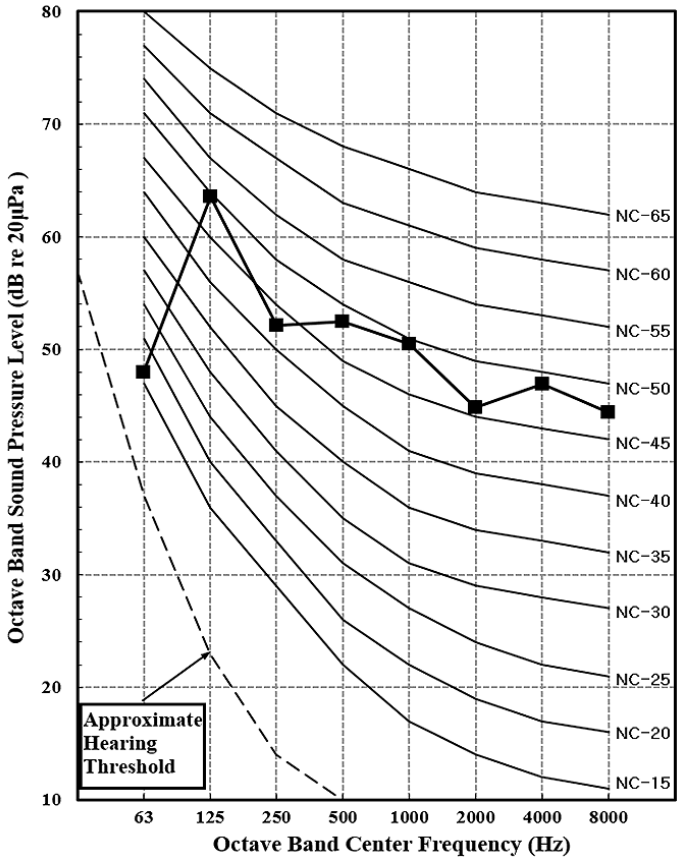
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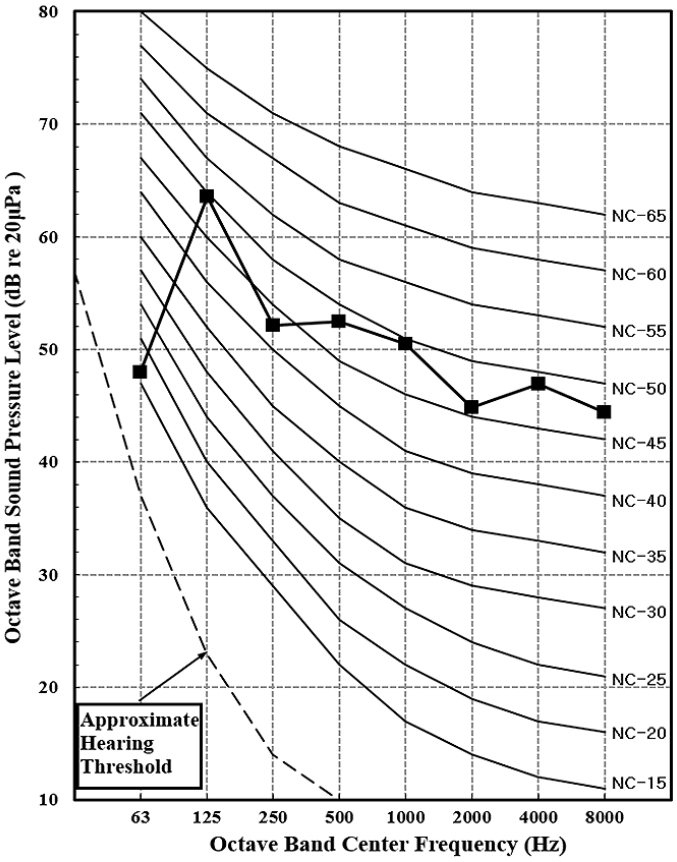
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Sound Pressure for 460V Models, continued.

ZRWM121DAS5



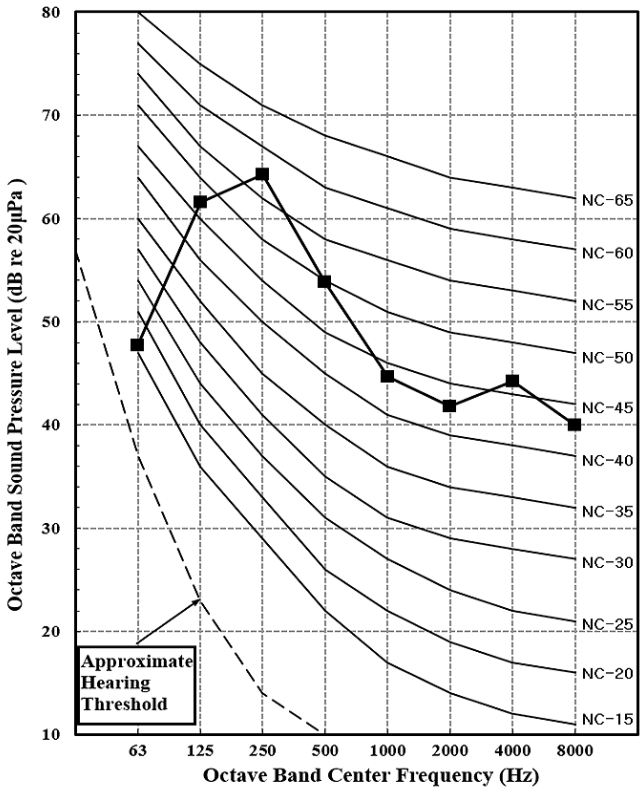
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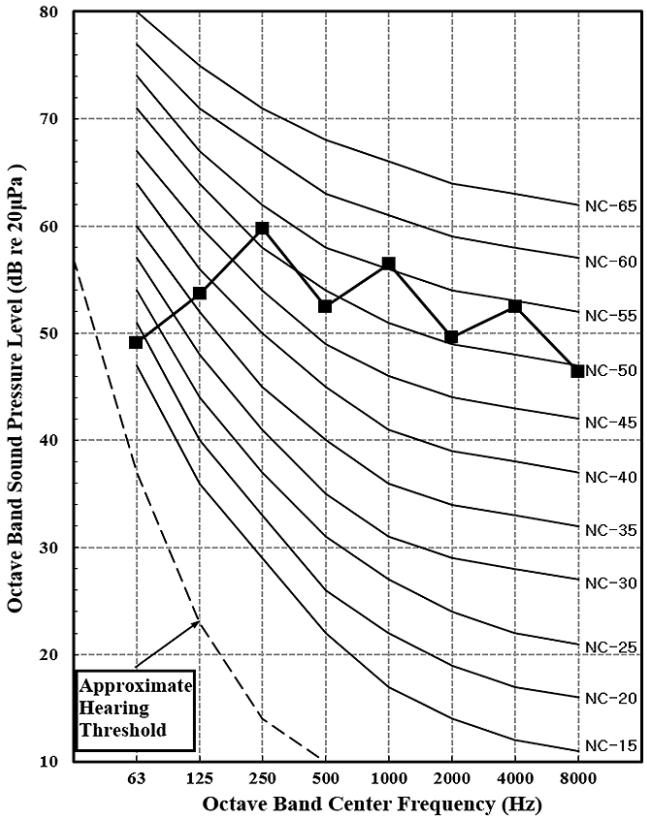
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Sound Pressure for 460V Models, continued.

ZRWM168DAS5



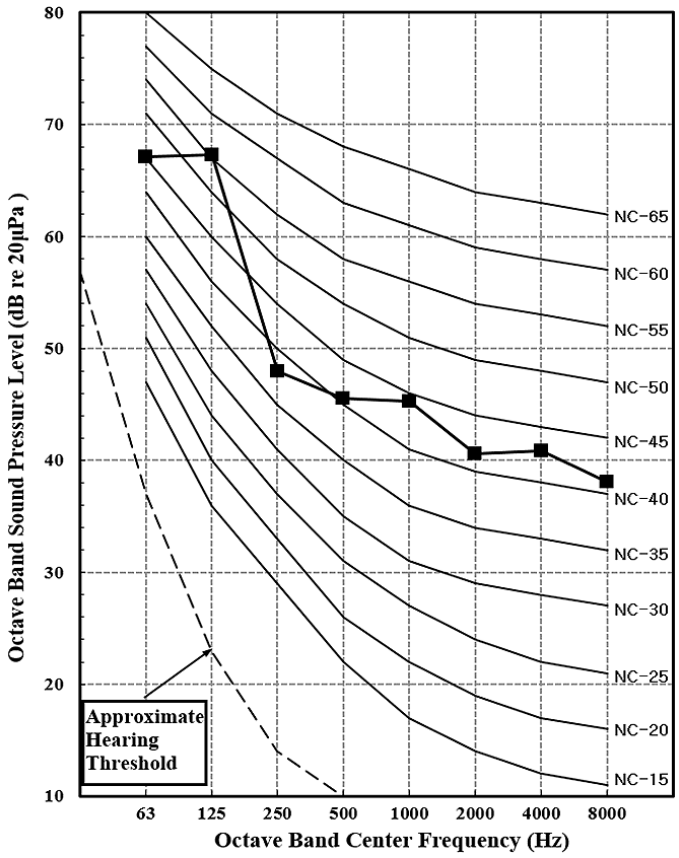
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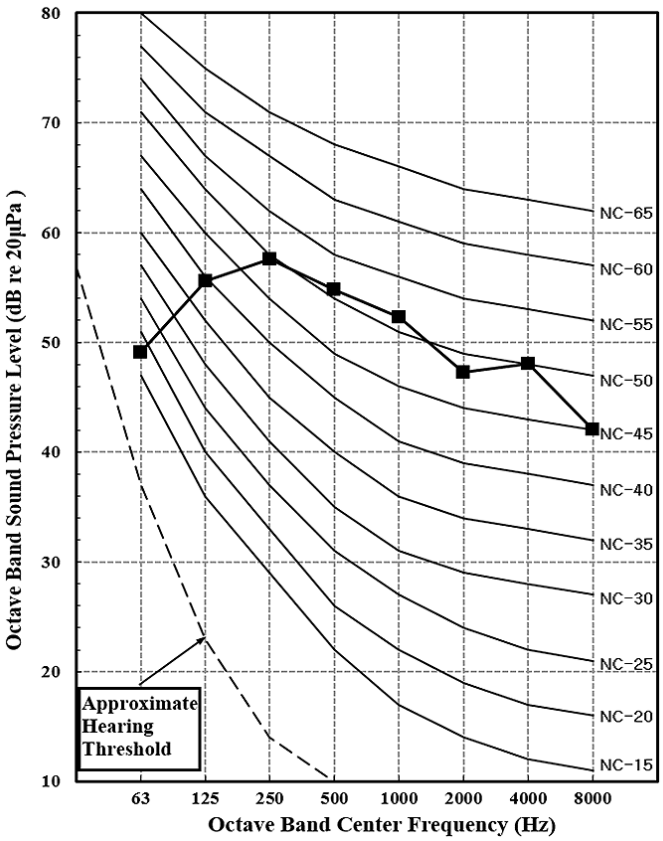
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Sound Pressure for 460V Models, continued.

ZRWM191DAS5



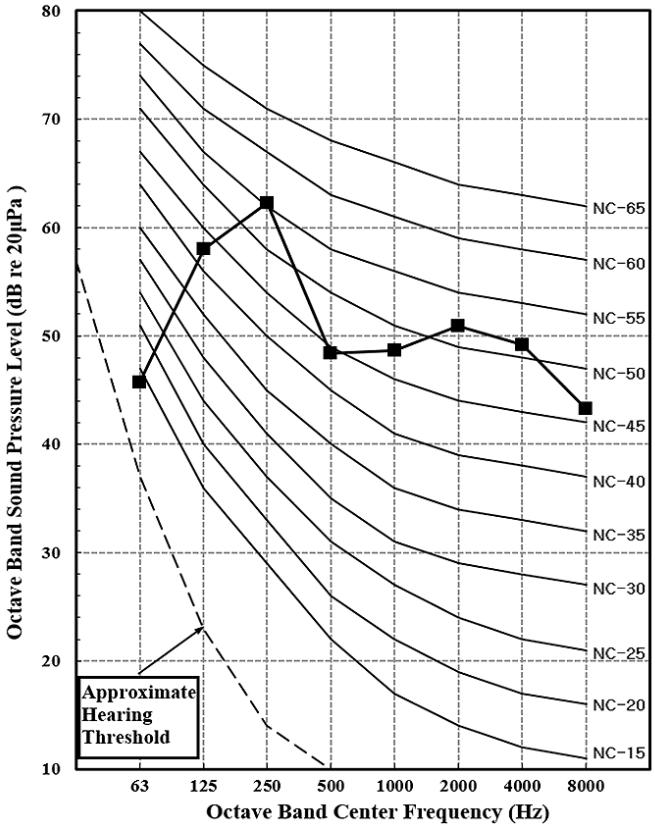
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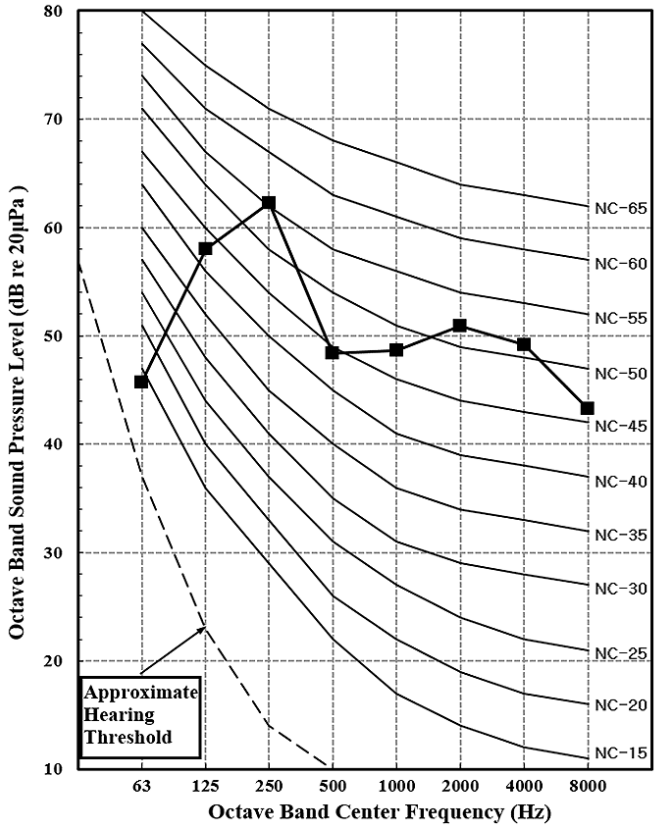
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Sound Pressure for 460V Models, continued.

ZRWM240DAS5



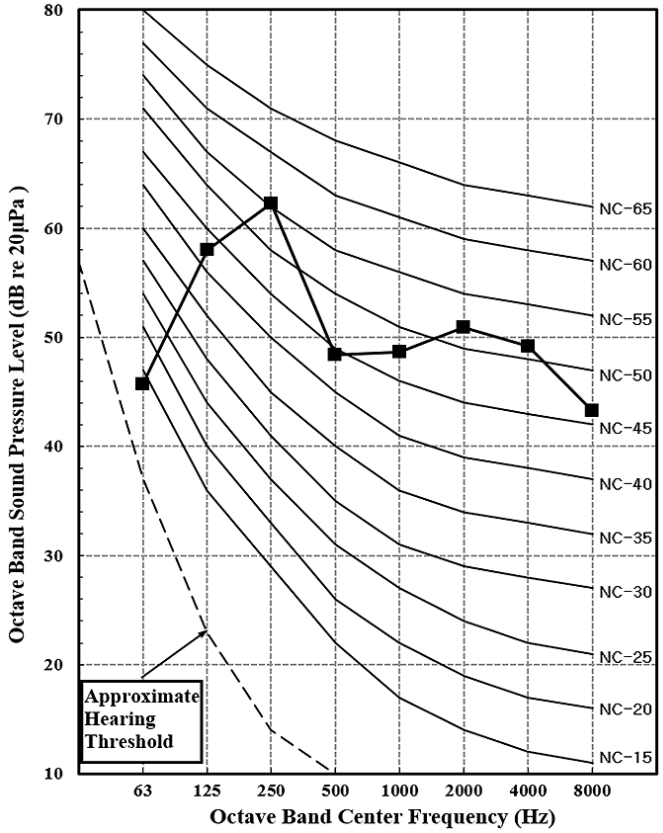
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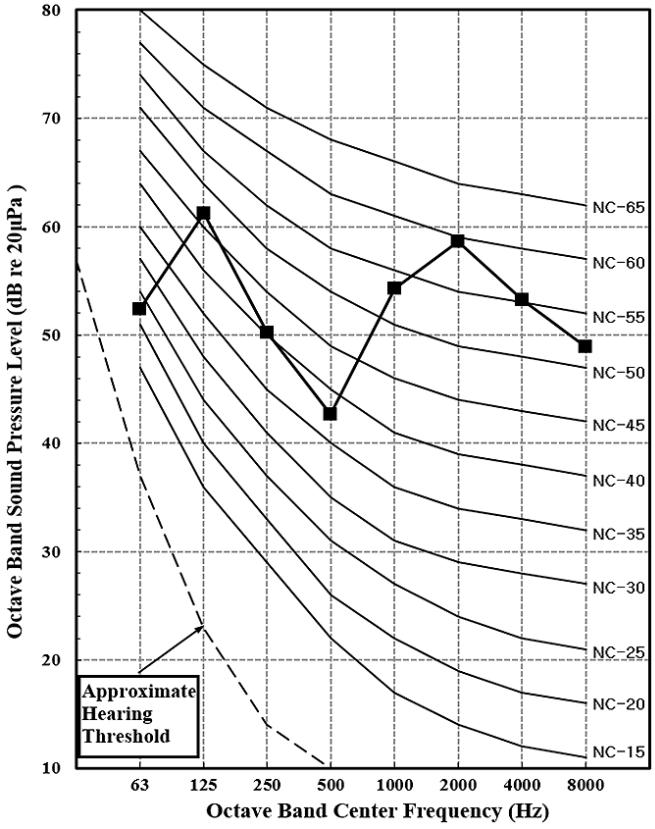
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Sound Pressure for 460V Models, continued.

ZRWM288DAS5



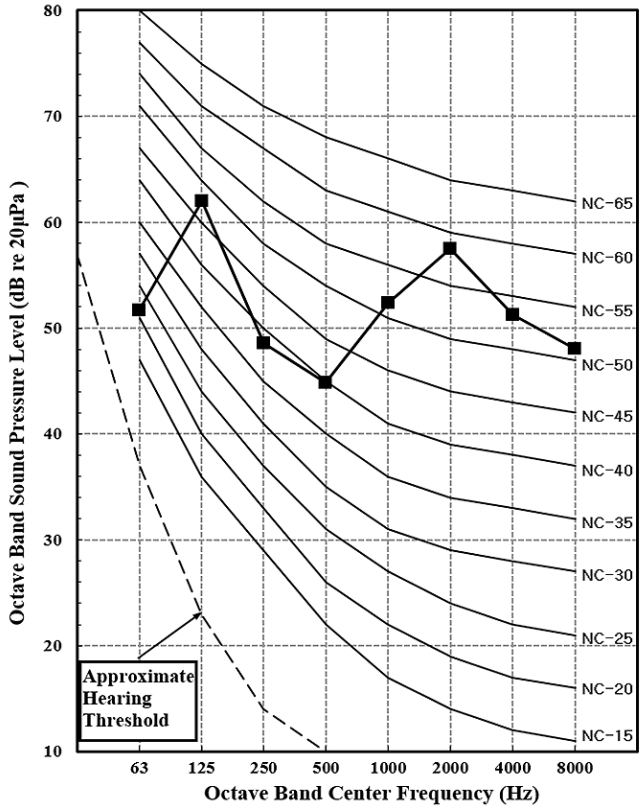
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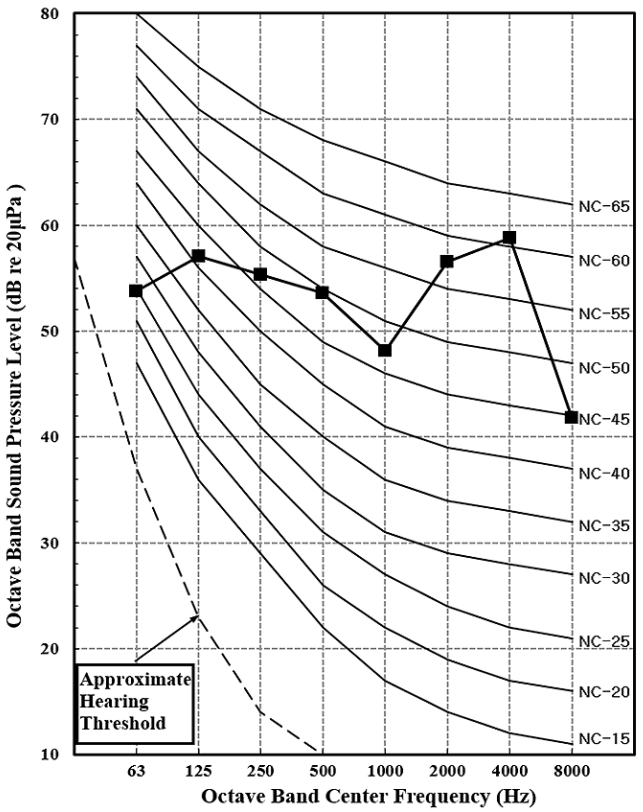
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Sound Pressure for 460V Models, continued.

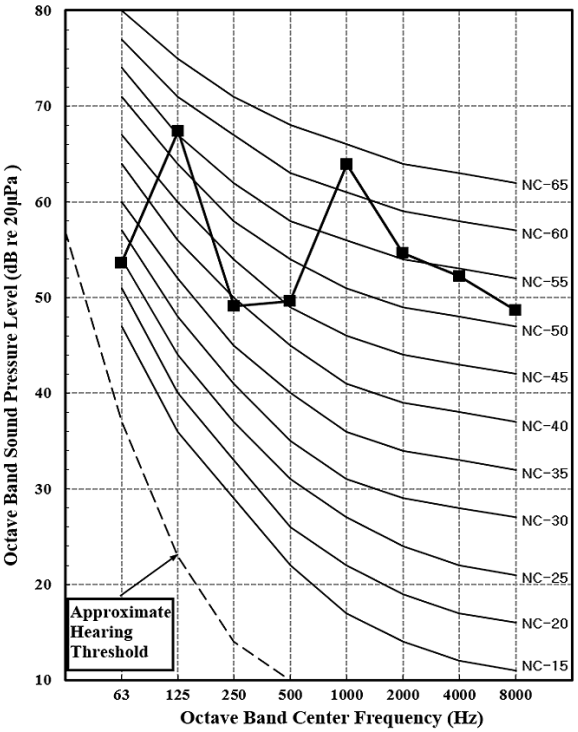
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ZRWM504DAS5



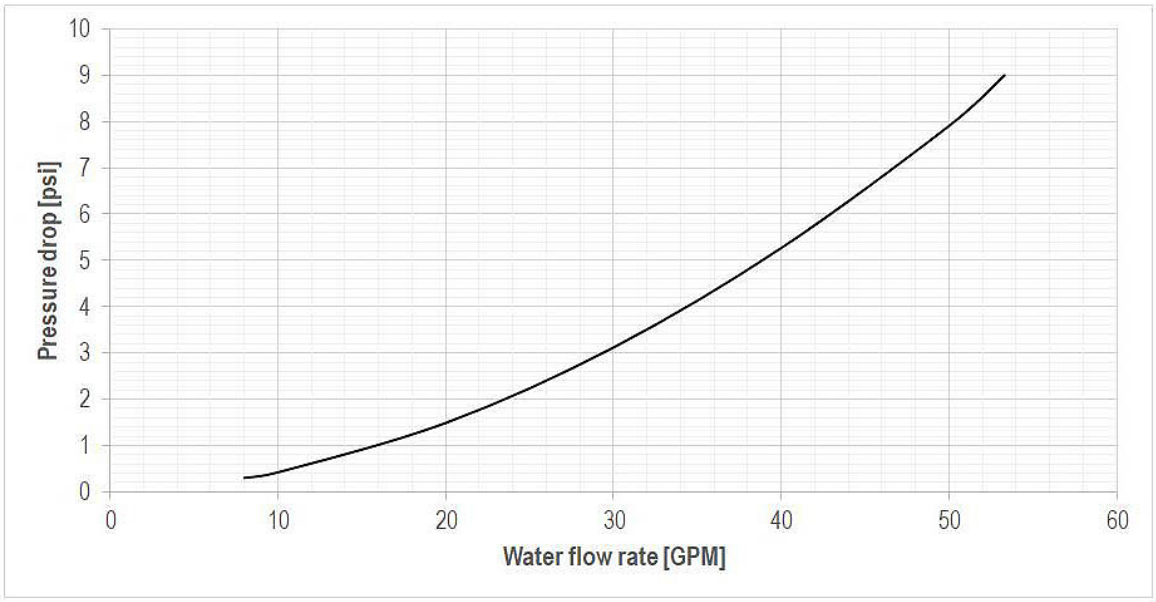
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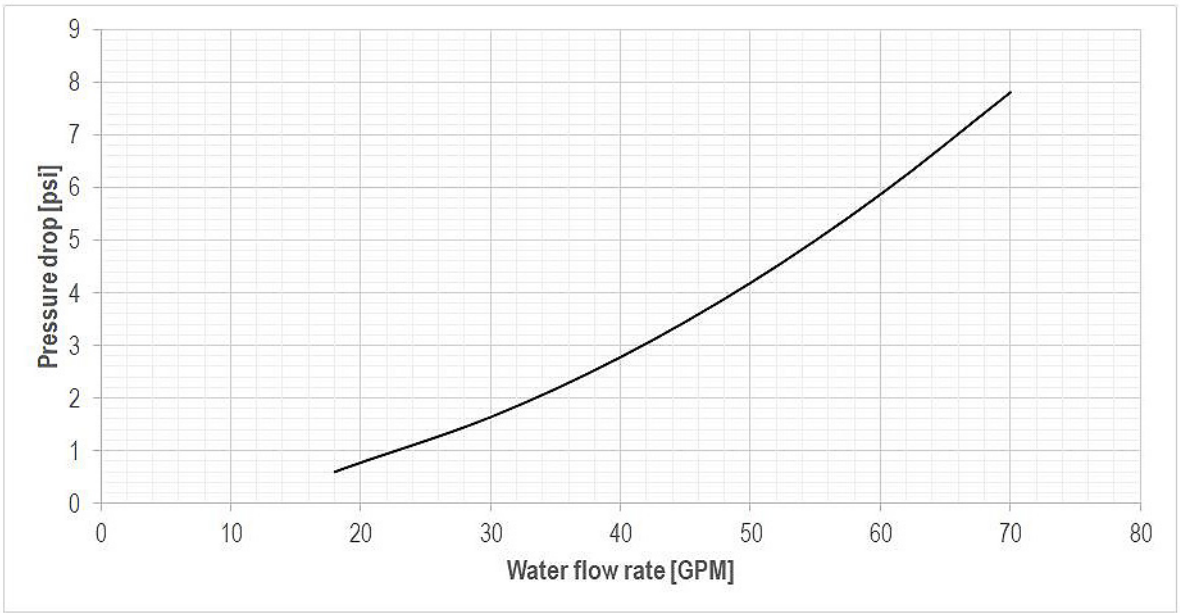
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PRESSURE DROP CURVES

ZRWM072BAS5, ZRWM096BAS5, ZRWM121BAS5, ZRWM144BAS5, ZRWM072DAS5, ZRWM096DAS5, ZRWM121DAS5, ZRWM144DAS5



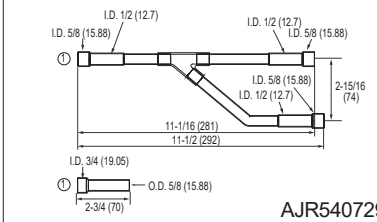
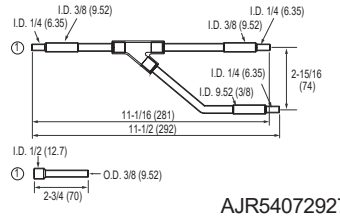
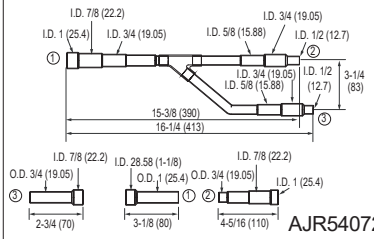
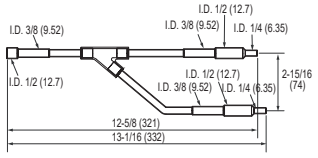
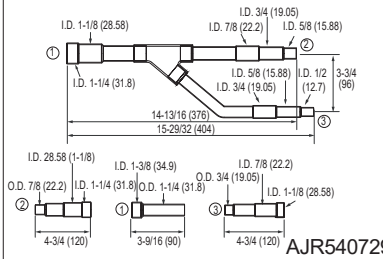
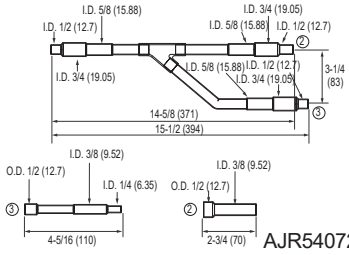
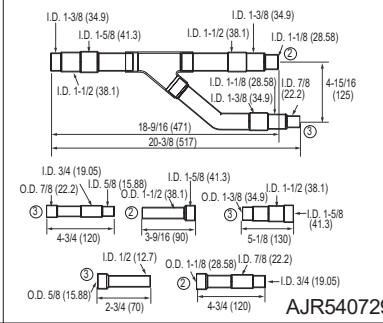
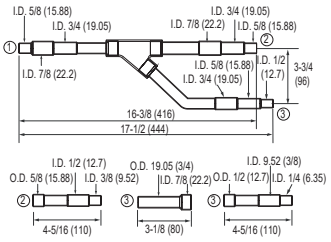
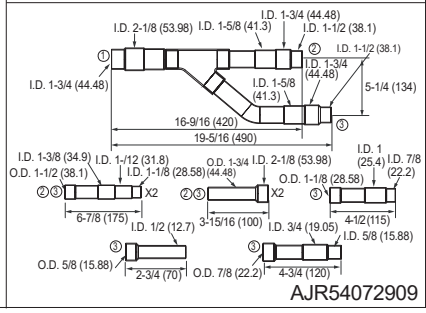
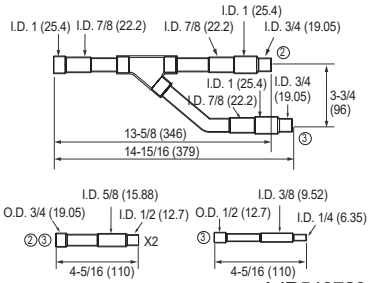
ZRWM168DAS5, ZRWM192DAS5



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Indoor Unit Y-Branches for Heat Pump Operation

(Unit: Inch [mm])

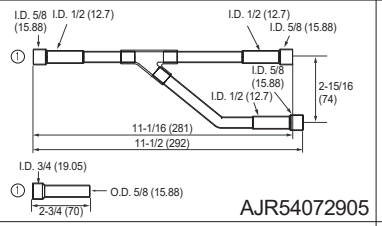
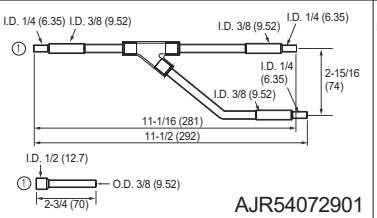
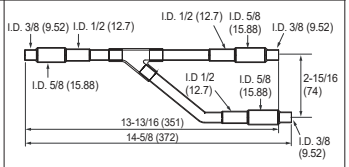
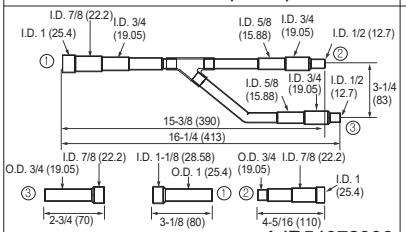
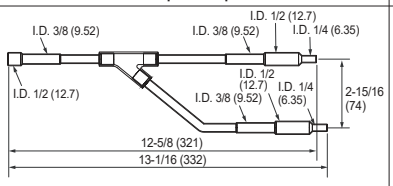
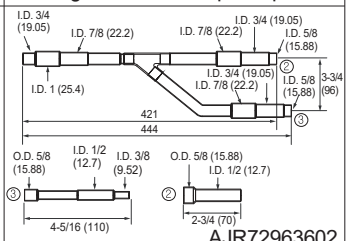
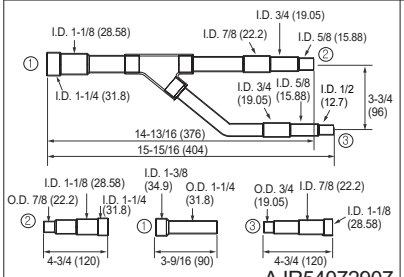
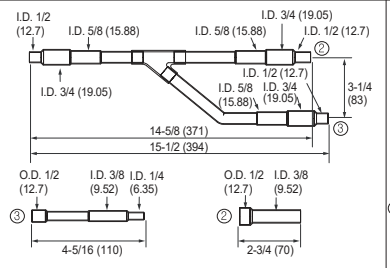
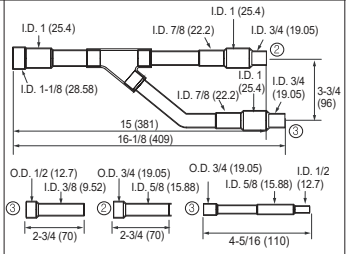
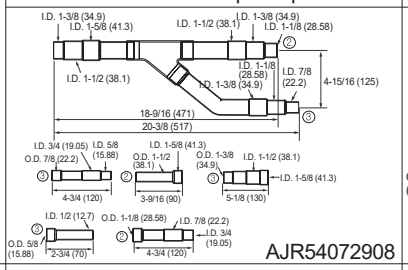
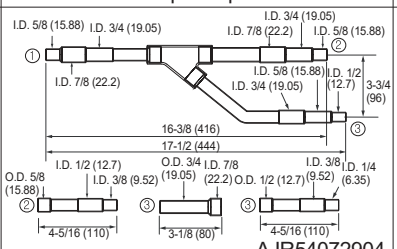
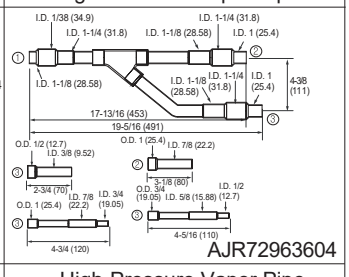
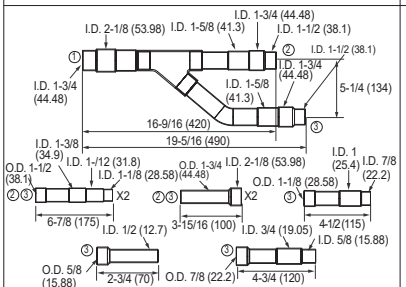
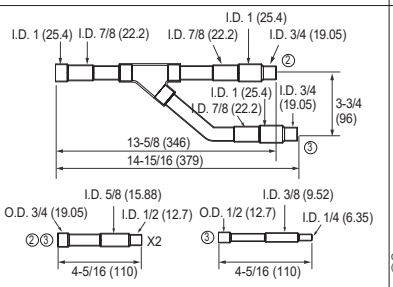
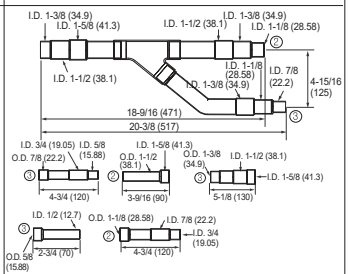
Models	Pipe	
	Vapor Pipe	Liquid Pipe
ARBLN01621	 AJR54072929	 AJR54072927
ARBLN03321	 AJR54072930	 AJR54072928
ARBLN07121	 AJR54072933	 AJR54072931
ARBLN14521	 AJR54072908	 AJR54072932
ARBLN23220	 AJR54072909	 AJR54072910

Water Source Unit Product Data

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Indoor Unit Y-branches for Heat Recovery Operation

(Unit: Inch [mm])

Models	Pipe		
	Low-Pressure Vapor Pipe	Liquid Pipe	High-Pressure Vapor Pipe
ARBLB01621	 AJR54072905	 AJR54072901	 AJR72963601
ARBLB03321	 AJR54072906	 AJR54072902	 AJR72963602
ARBLB07121	 AJR54072907	 AJR54072903	 AJR72963603
ARBLB14521	 AJR54072908	 AJR54072904	 AJR72963604
ARBLB23220	 AJR54072909	 AJR54072910	 AJR54072908

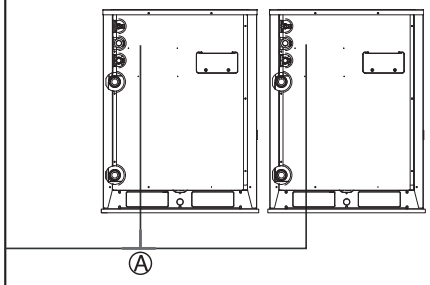
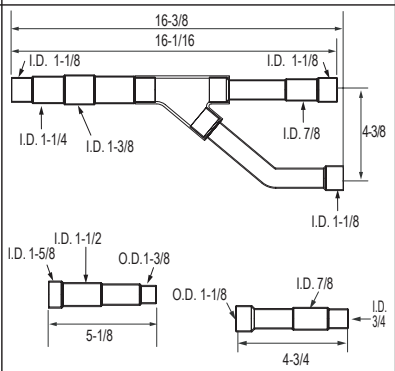
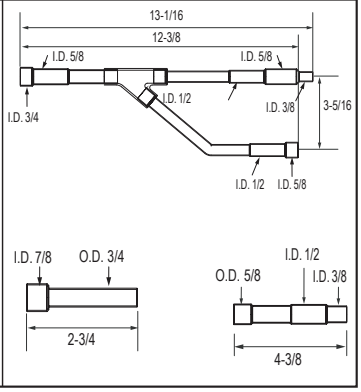
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Outdoor Unit Y-branches for Heat Pump Systems

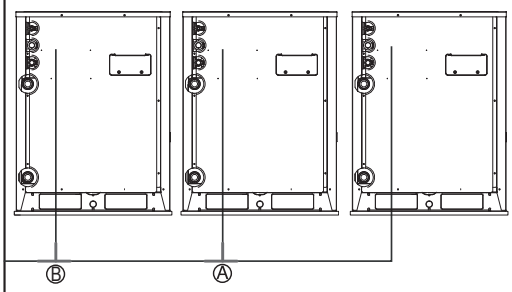
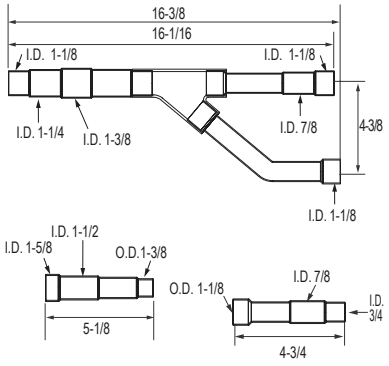
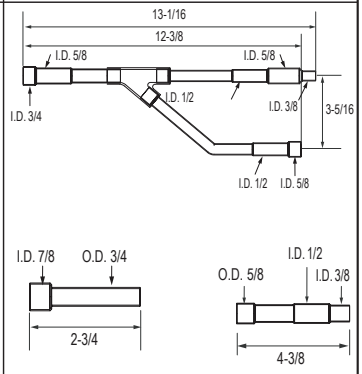
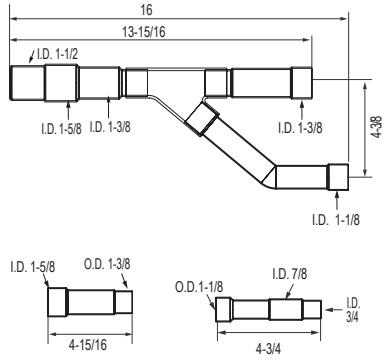
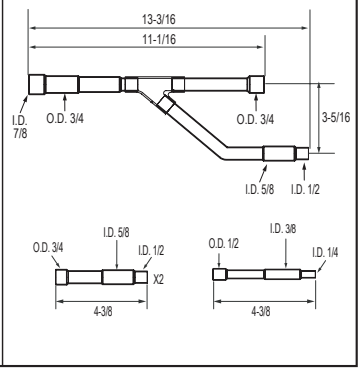
For Dual Frame Systems

Unit: inch

Combination	Multi-frame Connector	Vapor pipe	Liquid pipe
	Ⓐ ARCNN21		

For Triple Frame Systems

Unit: inch

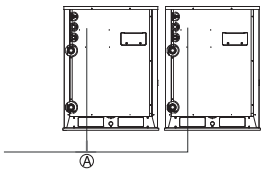
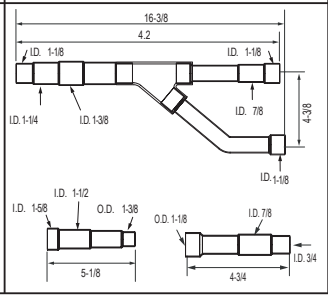
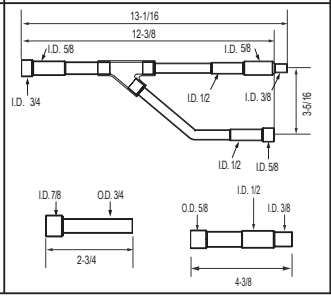
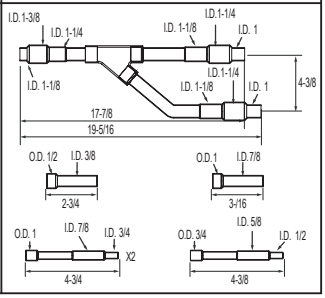
Combination specification	Multi-frame Connector	Vapor pipe	Liquid pipe
	Ⓐ ARCNN21		
	Ⓑ ARCNN31		

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Outdoor Unit Y-branches for Heat Recovery Systems

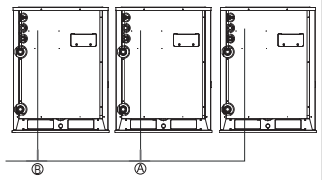
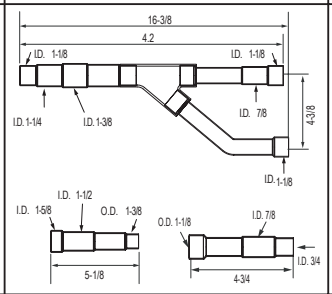
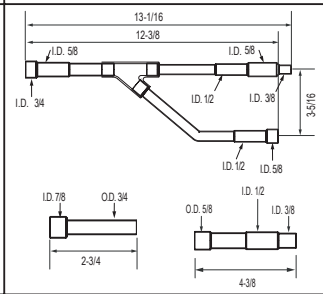
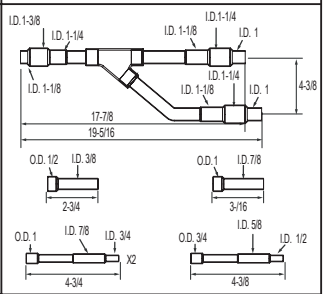
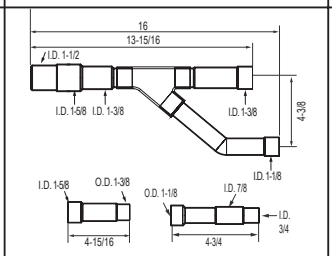
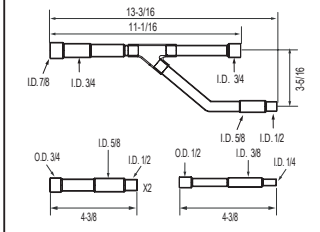
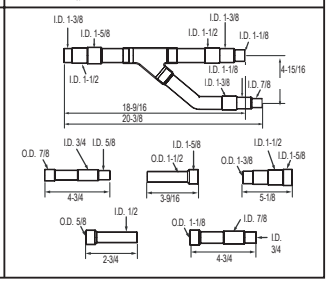
For Dual Frame Systems

Unit: inch

Combination specification	Multi-frame Connector	Low-pressure Vapor Pipe	Liquid Pipe	High-pressure Vapor Pipe
	Ⓐ ARCNB21			

For Triple Frame Systems

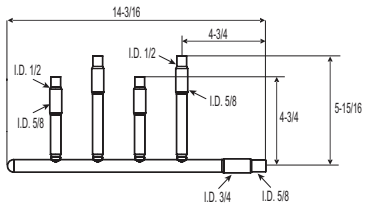
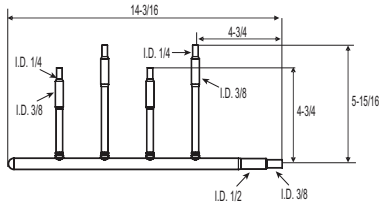
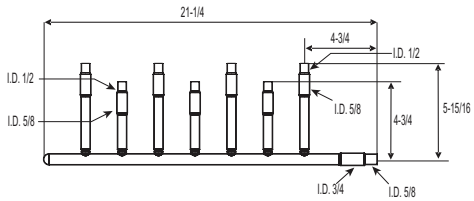
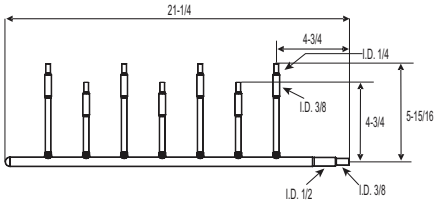
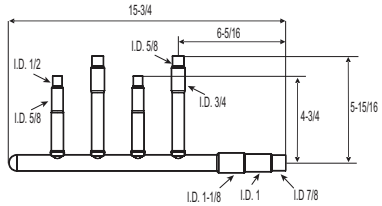
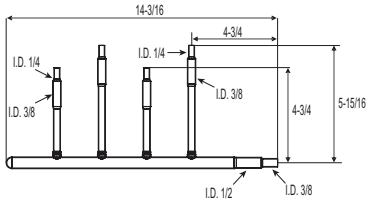
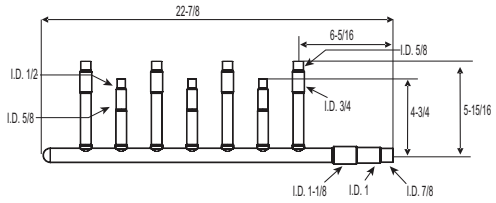
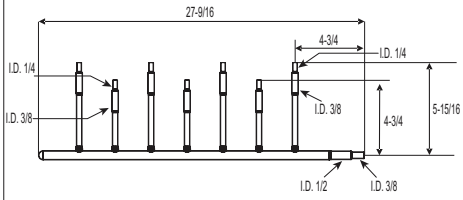
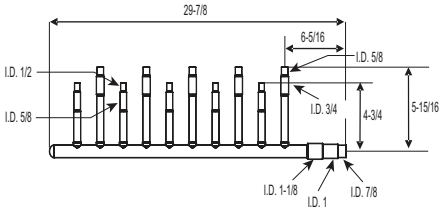
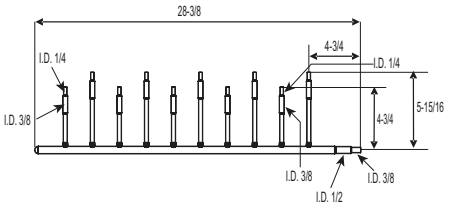
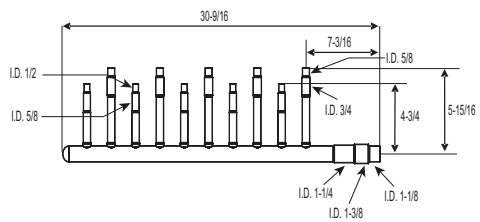
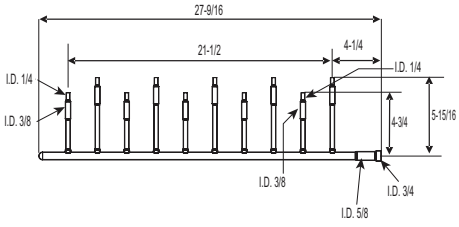
Unit: inch

Combination specification	Multi-frame Connector	Low-pressure Vapor Pipe	Liquid Pipe	High-pressure Vapor Pipe
	Ⓐ ARCNB21			
	Ⓑ ARCNB31			

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Headers for Heat Pump and Heat Recovery Operation

Unit: Inch

Models	Vapor pipe	Liquid pipe
4 branch ARBL054		
7 branch ARBL057		
4 branch ARBL104		
7 branch ARBL107		
10 branch ARBL1010		
10 branch ARBL2010		

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- LG headers serve as central connections for multiple runout pipe segments terminating at indoor units.
- Headers must be used with LG systems and be properly installed following the instructions in the applicable LG manual. Field-supplied headers are not permitted.
- Kit components must be kept free of debris and dry before installation.
- All Header Kits include:
  - Insulation jacket (one each for vapor and liquid pipes)
  - Plugging tubes / Insulation for plugging tubes (see Table 17).

Figure 6: Header.

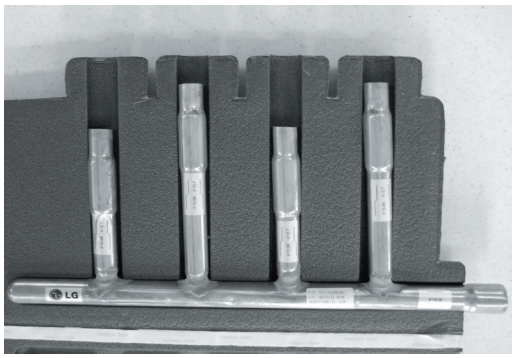


Table 16: Nominal Capacity Range.

Model	Fitting Capacity	Port Capacity
ARBL054 (4 branch)	≤72,000 connected capacity	≤54,300 per port
ARBL057 (7 branch)	≤75,100 connected capacity	≤54,300 per port
ARBL1010 (10 branch)	≤172,200 connected capacity	≤76,300 per port
ARBL104 (4 branch)	≤305,200 connected capacity	≤76,300 per port
ARBL107 (7 branch)	≤534,000 connected capacity	≤76,300 per port
ARBL2010 (10 branch)	≤560,000 connected capacity	≤76,300 per port

Table 17: Plugging Tubes and Plugging Tube Insulation Amounts.

Header Kits	Plugging Tubes (in OD)			Insulation for Plugging Tubes
	1/4	1/2	5/8	
ARBL054 (4 port)	—	—	—	—
ARBL057 (7 port)	2	2	—	4
ARBL1010 (10 port)	2	2	2	6
ARBL104 (4 port)	—	—	—	—
ARBL107 (7 port)	2	2	2	6
ARBL2010 (10 port)	2	2	2	6

Table 18: Insulation Jacket Properties.

Material	Polyolefin Foam
UL94 Flame Classification	HF-1
Density	1.84 lbs./ft.^{3}
Thermal Conductivity	.0208 Btu/h/ft. ºF
Thickness	1/2 inch

Table 19: Fitting Properties.

Material	Copper
Design Pressure	550 psig

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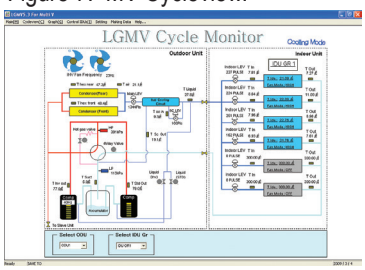
LG Monitoring View (LGMV) Diagnostic Software and Cable

LG Monitoring View (LGMV) is a maintenance and troubleshooting tool for Multi V™ air conditioning systems. LGMV formats are available for computer or mobile phone use.

The main screen for LGMV allows the user to view the following real time data:

- Actual inverter compressor speed
- Target inverter compressor speed
- Actual outdoor fan speed
- Target outdoor unit fan speed
- Actual superheat
- Target superheat
- Actual subcooler circuit superheat
- Target subcooler circuit superheat
- Main EEV position
- Subcooling EEV position
- Inverter compressor current transducer value
- Outdoor air temperature
- Actual high pressure/saturation temperature
- Actual low pressure/saturation temperature
- Suction temperature
- Inverter compressor discharge temperature
- Constant speed compressor discharge temperature
- Front outdoor coil pipe temperature
- Back outdoor coil pipe temperature
- Liquid line pipe temperature
- Subcooler inlet temperature
- Subcooler outlet temperature
- Average indoor unit (IDU) pipe temperature
- Inverter compressor operation indicator light
- Four-way reversing valve operation indicator light
- Pressure graph showing actual low pressure and actual high pressure levels
- Error code display
- Operating mode indicator
- Target high pressure
- Target low pressure
- PCB (printed circuit board) version
- Software version
- Installer name
- Model no. of outdoor units
- Site name
- Total number of connected indoor units
- Communication indicator lights
- Indoor unit capacity
- Indoor unit operating mode
- Indoor unit fan speed
- Indoor unit EEV position
- Indoor unit room temperature
- Indoor unit inlet pipe temperature
- Indoor unit outlet pipe temperature
- Indoor unit error code

Figure 7: MV Cycleview.



Additional screens can be accessed by tabs on the main screen:

1. Cycleview: Graphic of internal components including:
   - Compressors showing actual speeds
   - EEVs
   - Indoor Units
   - Liquid injection valves
   - Temperature and pressure sensors
   - Four-way reversing valve
   - Outdoor fans showing status and speeds
2. Graph: Full screen graph of actual high and low pressures and high and low pressure limits. A sliding bar enables user to go back in time and view data.
3. Control IDU: Enables user to turn on all IDU's default setpoints of 86°F in heat mode or 64°F in cool mode.
4. Setting: Converts metric values to imperial values.
5. Making Data: Recording of real time data to a separate file created to be stored on the user's computer.
6. Loading Data: Recorded data from a saved ".CSV" file can be loaded to create an LGMV session.
7. Electrical Data: The lower half of main screen is changed to show the following:
   - Inverter compressor
     - Amps
     - Volts
     - Power Hz
     - Inverter control board fan Hz
   - Constant compressor
     - Current transducer value
     - Phase

In lieu of connecting to the outdoor unit, user has the option to connect to the indoor unit with a connector kit. When connected through the indoor unit, user will not be able to record data.

This software can be used to both pre-set-up new systems and troubleshoot existing systems. LGMV data can be recorded to a ".CSV" file and emailed to an LG representative to assist with diagnostic evaluations.

LGMV is available in different formats, including Mobile LGMV, which is an app for use on wireless devices. Contact your LG Sales Representative for more information.

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ThinQ

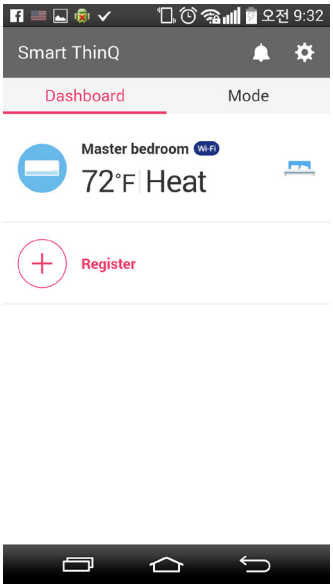
LG ThinQ is a built-in Wi-Fi module, along with a free smart phone app that provides monitoring and remote control capabilities for certain LG single zone systems. The app has the following features and benefits:

- Sign in to the app using LG credentials, or using Google® or Facebook® login credentials. Users only have to log in to the app once; the app remembers login details for subsequent logins.
- View current temperature settings of the air conditioning unit and change temperature, fan speed, and air flow direction from anywhere in the house or at a remote location (through the use of wireless connection). Multiple users can control the household air conditioning unit remotely.
- Monitor filter usage of the unit.
- Set up weekly schedules to start and stop air conditioner activity.
- Set up the unit to run in different Modes, depending on the user's schedule. Set up specific temperatures for when the user is home, away on vacation, or sleeping.
- Troubleshoot problems, and view tips on general maintenance of the system using the Smart Diagnosis function.

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Contact your LG Sales Representative or visit www.lghvac.com for system requirements, how to download the app, a user's manual, or other information.

Figure 8: Example of LG Smart ThinQ Screen (appearances my differ depending on version of software).



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HEAT RECOVERY UNIT PRODUCT DATA

Mechanical Specifications on page 62
General Data on page 63
Electrical Data on page 65
Dimensions on page 66
Wiring Diagram on page 68
Refrigerant Flow Diagram on page 72
Fan Curve Values on page 74
Acoustic Data on page 75
Accessories on page 76

Multi V Heat Recovery Units

Figure 9: Four-Port Heat Recovery Unit.



General

Multi V heat recovery units are for use with R32 Multi V i, Multi V Water 5 and Multi V S heat recovery outdoor units to permit simultaneous heating and cooling operation. 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.

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 and are internally insulated. Main and secondary condensate connections are provided.

Refrigerant Valves

Each heat recovery port is circuited with two two-position motorized valves to control R32 refrigerant flow path to allow indoor units to operate in heating or cooling mode. Six and eight-port heat recovery units use EEVs for refrigerant flow control. R32 heat recovery units include built-in shutoff valves.

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.

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Figure 10: Two-Port Heat Recovery Unit.



Figure 11: Three-Port Heat Recovery Unit.



Figure 12: Four-Port Heat Recovery Unit.

NOTICE

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

Table 20: Two-, Three-, and Four-Port Heat Recovery Unit Specifications.

Model			PRHR024C	PRHR034C	PRHR044C
Number of Ports			2	3	4
Max. Connectable No. of Indoor Units			16	24	32
Max. Connectable 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.	55.1	61.5	68.1
Shipping Weight		lbs.	71.7	79.4	86.0
Dimensions (W x H x D)		Inches	19-1/4 x 9-1/2 x 31-3/32		
Refrigerant Type			R32		
Refrigerant Control			Motorized Valve		
Casing			Galvanized Steel Plate		
Connecting Pipes	To Indoor Units	Liquid Pipe (inches)	Ø3/8 – Ø1/4		
		Vapor Pipe (inches)	Ø5/8 – Ø1/2		
	To Outdoor Units	Liquid (inches)	Ø3/8	Ø1/2	Ø5/8
		Low Pressure Vapor (inches)	Ø7/8	Ø1-1/8	Ø1-1/8
		High Pressure Vapor (inches)	Ø3/4	Ø7/8	Ø7/8

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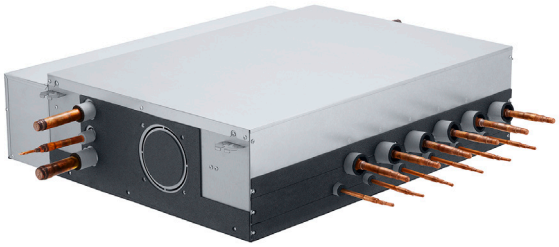


Figure 13: Six-Port Heat Recovery Unit.



Figure 14: Eight-Port Heat Recovery Unit.

NOTICE

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

Table 21: Six- and Eight-Port Heat Recovery Unit Specifications.

Model			PRHR065C	PRHR085C
Number of Ports			6	8
Max. Connectable No. of Indoor Units			48	64
Max. Connectable 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.	100.8	113.5
Shipping Weight		lbs.	126.3	140.0
Dimensions (W x H x D)		Inches	35-7/16 x 9-7/32 x 30-14/32	
Rerfrigerant Type			R32	
Refrigerant Control			EEV	
Casing			Galvanized Steel Plate	
Connecting Pipes	To Indoor Units	Liquid Pipe (inches)	Ø3/8 – Ø1/4	
		Vapor Pipe (inches)	Ø5/8 – Ø1/2	
	To Outdoor Units	Liquid (inches)	Ø1/2	Ø5/8
		Low Pressure Vapor (inches)	Ø7/8	Ø1-1/8
		High Pressure Vapor (inches)	Ø3/4	Ø7/8

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Table 22: Heat Recovery Unit Electrical Data.

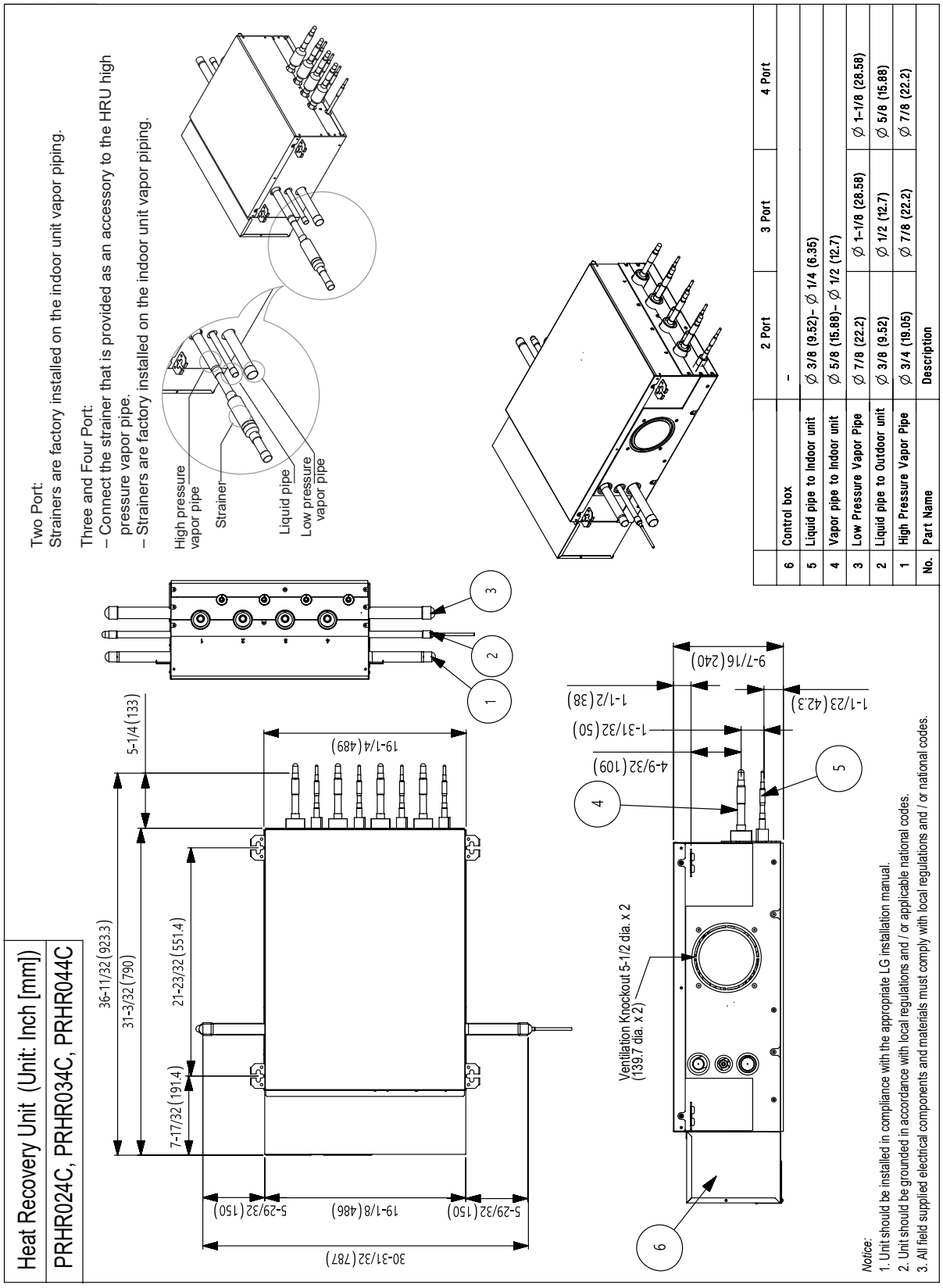
Unit Model No.	Voltage Range	Rated Amps	MCA	MFA	Power Supply			Power Input (W)	
					Hz	Volts	Phase	Cooling	Heating
PRHR024C	187-253	0.38	0.875	15	60	208-230	1	54.2	51.6
PRHR034C									
PRHR044C									
PRHR065C		0.43						98.7	94
PRHR085C									

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.

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Figure 15: PRHR024C, PRHR034C and PRHR044C Dimensions.

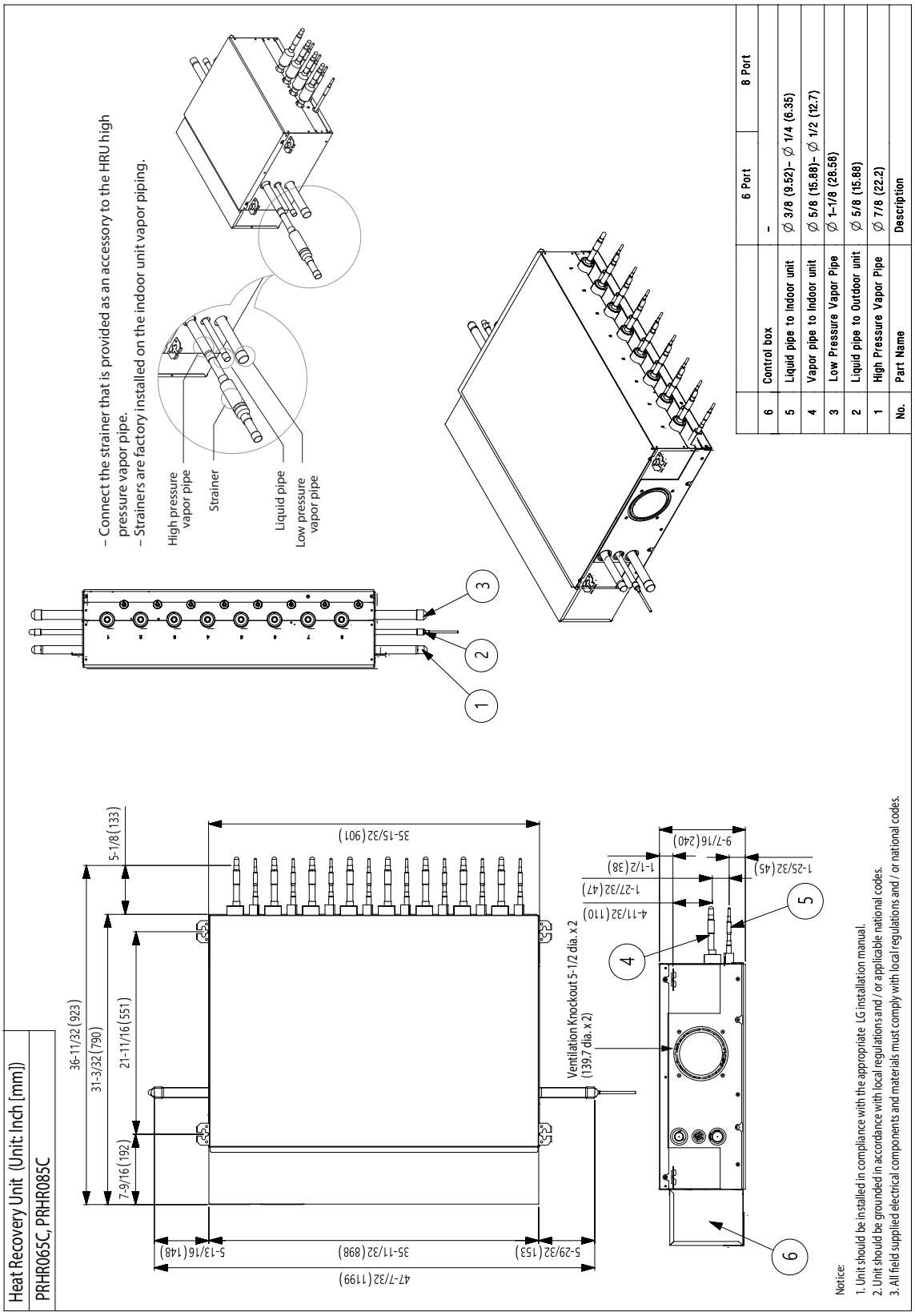


No.	Part Name	2 Port	3 Port	4 Port
6	Control box	-		
5	Liquid pipe to Indoor unit	Ø 3/8 (9.52)– Ø 1/4 (6.35)		
4	Vapor pipe to Indoor unit	Ø 5/8 (15.88)– Ø 1/2 (12.7)		
3	Low Pressure Vapor Pipe	Ø 7/8 (22.2)	Ø 1-1/8 (28.58)	Ø 1-1/8 (28.58)
2	Liquid pipe to Outdoor unit	Ø 3/8 (9.52)	Ø 1/2 (12.7)	Ø 5/8 (15.88)
1	High Pressure Vapor Pipe	Ø 3/4 (19.05)	Ø 7/8 (22.2)	Ø 7/8 (22.2)

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

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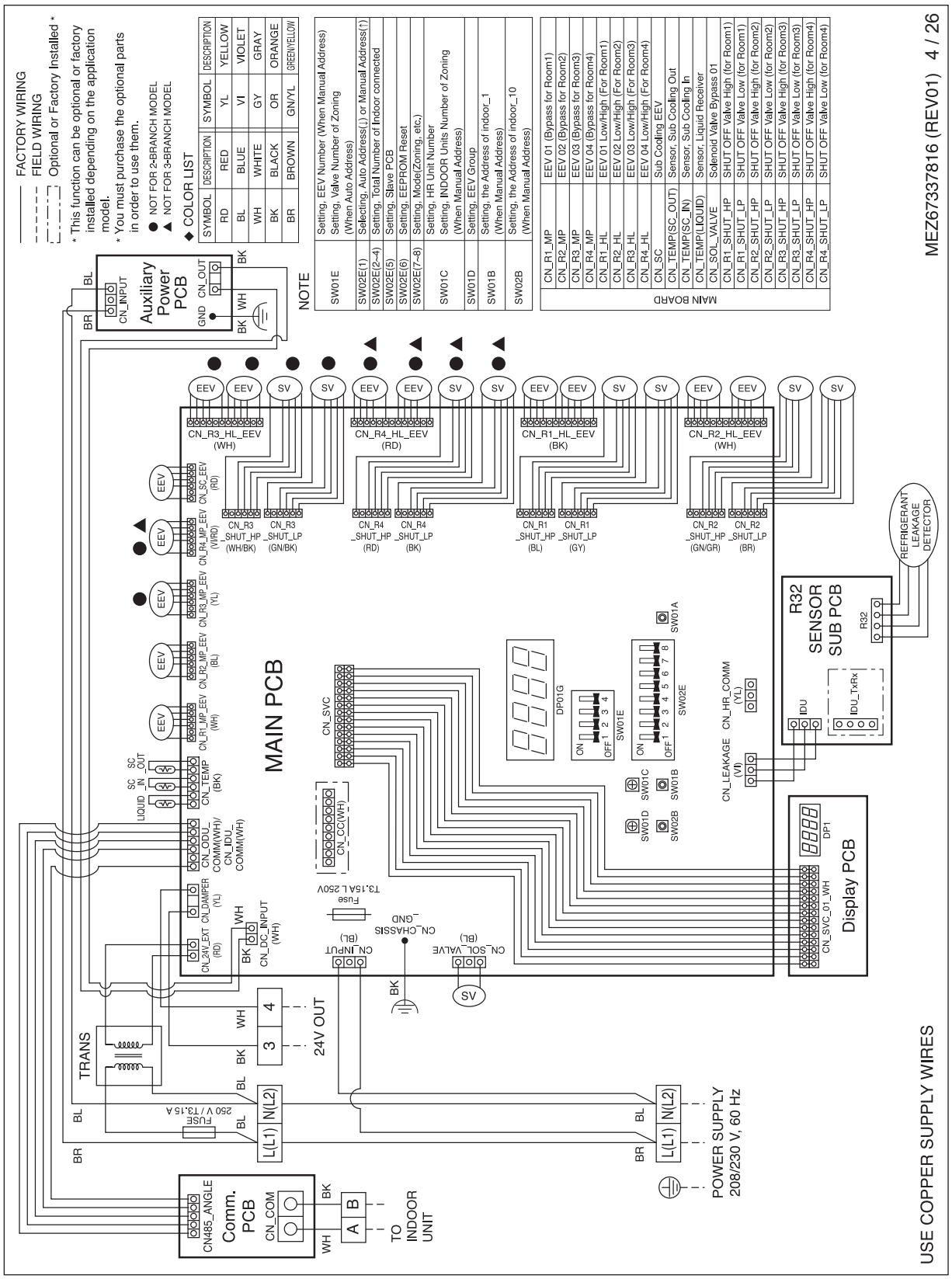
Figure 16: PRHR065C and PRHR085C Dimensions.



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WIRING DIAGRAM

Figure 17: PRHR024C, PRHR034C, and PRHR044C Wiring Diagram.



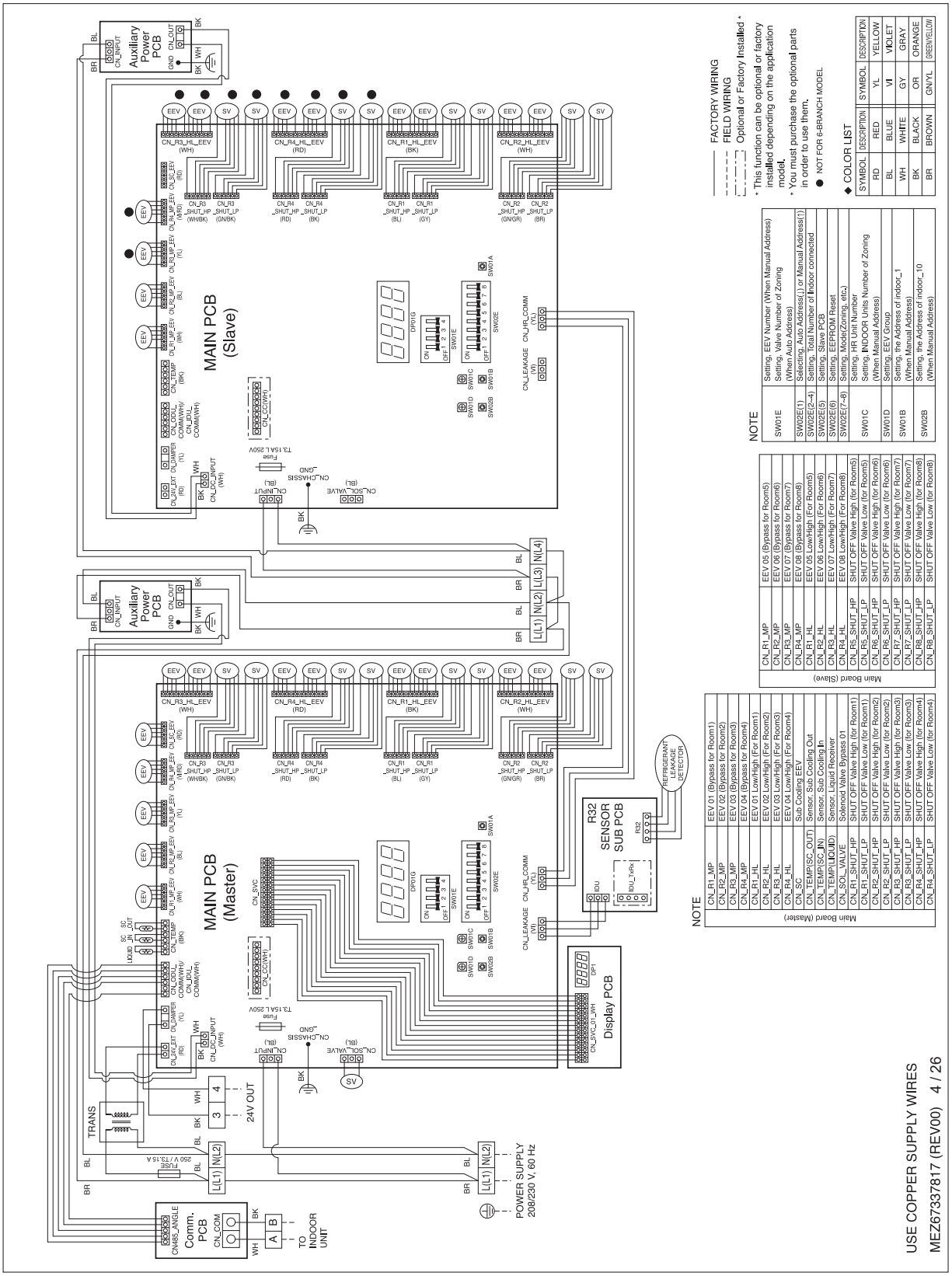
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Table 23: PRHR024C, PRHR034C, and PRHR044C Wiring Diagram Legend

Terminal	Description
Main PCB	
CN_24V-EXT(RD)	24V In (From Transformer)
CN_DAMPER(YL)	24V Out (For Relay)
CN_ODU_COMM(WH)/CN_IDU_COMM(WH)	Communication PCB (RS-485)
CN_TEMP(BK)	Thermistor (SC / In / Out / Liquid Pipe)
CN_R1_MP_EEV(WH)	EEV 01 (Bypass for Room 1)
CN_R2_MP_EEV(BL)	EEV 02 (Bypass for Room 2)
CN_R3_MP_EEV(YL)	EEV 03 (Bypass for Room 3)
CN_R4_MP_EEV(VI/RD)	EEV 04 (Bypass for Room 4)
CN_SC_EEV(RD)	Sub Cooling EEV
CN_R3_HL_EEV(WH)	EEV 03 Low / High (For Room 3)
CN_R3_SHUT_HP(WH/BK)	Shut Off Valve High (for Room 3)
CN_R3_SHUT_LP(GN/BK)	Shut Off Valve Low (for Room 3)
CN_R4_HL_EEV(RD)	EEV 04 Low / High (For Room 4)
CN_R4_SHUT_HP(RD)	Shut Off Valve High (for Room 4)
CN_R4_SHUT_LP(BK)	Shut Off Valve Low (for Room 4)
CN_R1_HL_EEV(BK)	EEV 01 Low / High (For Room 1)
CN_R1_SHUT_HP(BL)	Shut Off Valve High (for Room 1)
CN_R1_SHUT_LP(GY)	Shut Off Valve Low (for Room 1)
CN_R2_HL_EEV(WH)	EEV 02 Low / High (For Room 2)
CN_R2_SHUT_HP(GN/GR)	Shut Off Valve High (for Room 2)
CN_R2_SHUT_LP(BR)	Shut Off Valve Low (for Room 2)
CN_HR_COMM(YL)	Connection Sub PCB
CN_LEAKAGE(VI)	Leak Detector
CN_SVC	Display PCB
CN_SOL_VALVE(BL)	Liquid Bypass Valve
CN_CHASSIS_GND	PCB Functional Ground
CN_INPUT(BL)	Main Power
CN_CC(WH)	Dry Contact
CN_DC_INPUT(WH)	Auxiliary Power PCB
DIP Switch Settings	
SW01E	Setting, EEV Number (Manual Addressing)
	Setting, Valve Zone Number (Auto Addressing)
SW02E(1)	Selecting Auto Address (↓) or Manual Address (↑)
SW02E(2~4)	Setting, Total Number of Indoor Units Connected
SW02E(5)	Setting, Sub PCB
SW02E(6)	Setting, EEPROM Reset
SW02E(7~8)	Setting, Mode (Zoning, etc.)
SW01A	Reset
SW01D	Setting, EEV Group
SW01C	Setting, HR Unit Number
	Setting, Indoor Units Zone Number (Manual Addressing)
SW02B	Setting, the Address of indoor_10 (Manual Addressing)
SW01B	Setting, the Address of indoor_1 (Manual Addressing)

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Figure 18: PRHR065C and PRHR085C Wiring Diagram.



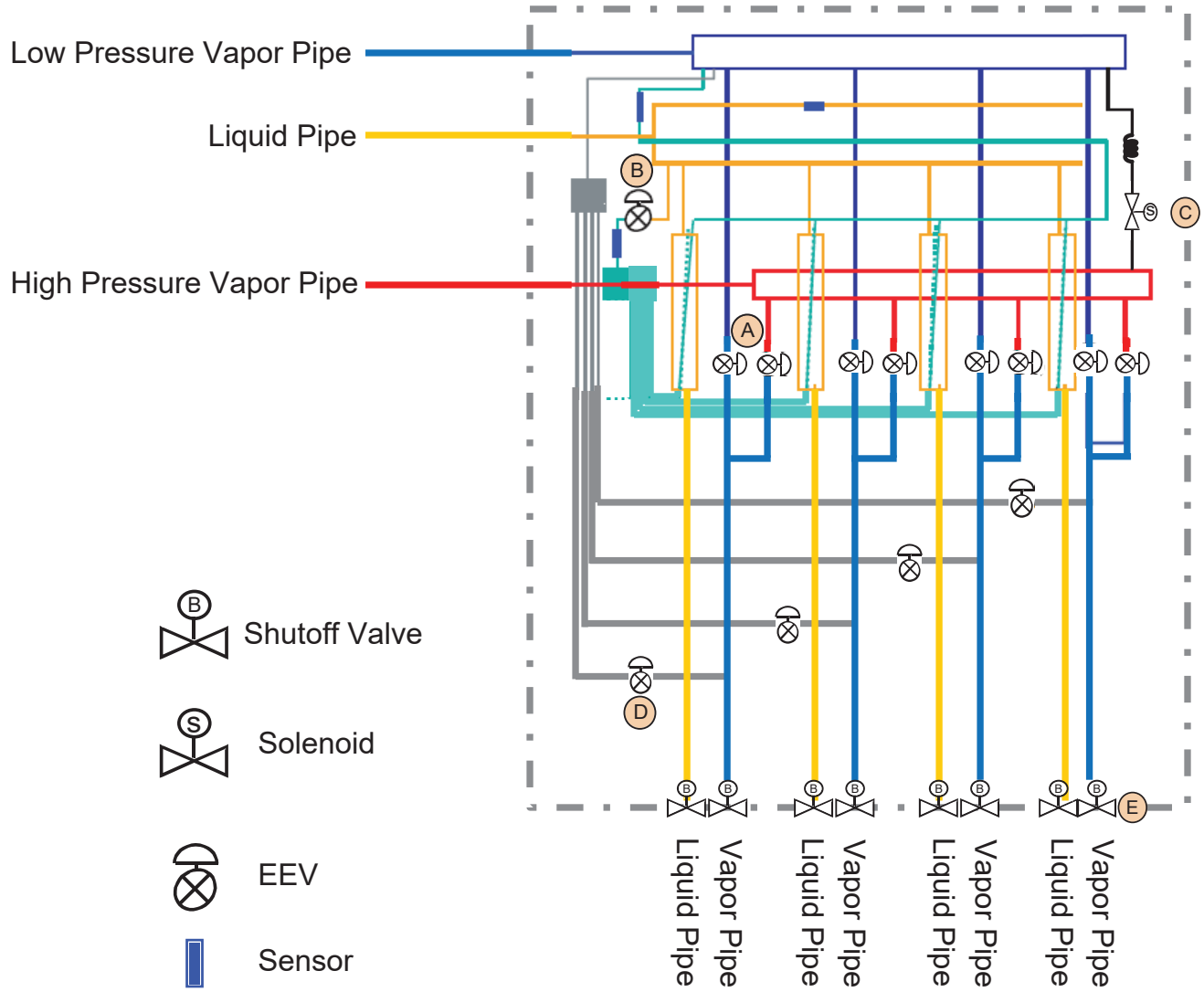
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Table 24: PRHR065C and PRHR085C Wiring Diagram Legend

Terminal	Description
Main PCB	
CN_24V-EXT(RD)	24V In (From Transformer)
CN_DAMPER(YL)	24V Out (For Relay)
CN_ODU_COMM(WH)/CN_IDU_COMM(WH)	Communication PCB (RS-485)
CN_TEMP(BK)	Thermistor (SC / In / Out / Liquid Pipe)
CN_R1_MP_EEV(WH)	EEV 01 (Bypass for Room 1)
CN_R2_MP_EEV(BL)	EEV 02 (Bypass for Room 2)
CN_R3_MP_EEV(YL)	EEV 03 (Bypass for Room 3)
CN_R4_MP_EEV(VI/RD)	EEV 04 (Bypass for Room 4)
CN_SC_EEV(RD)	Sub Cooling EEV
CN_R3_HL_EEV(WH)	EEV 03 Low / High (For Room 3)
CN_R3_SHUT_HP(WH/BK)	Shut Off Valve High (for Room 3)
CN_R3_SHUT_LP(GN/BK)	Shut Off Valve Low (for Room 3)
CN_R4_HL_EEV(RD)	EEV 04 Low / High (For Room 4)
CN_R4_SHUT_HP(RD)	Shut Off Valve High (for Room 4)
CN_R4_SHUT_LP(BK)	Shut Off Valve Low (for Room 4)
CN_R1_HL_EEV(BK)	EEV 01 Low / High (For Room 1)
CN_R1_SHUT_HP(BL)	Shut Off Valve High (for Room 1)
CN_R1_SHUT_LP(GY)	Shut Off Valve Low (for Room 1)
CN_R2_HL_EEV(WH)	EEV 02 Low / High (For Room 2)
CN_R2_SHUT_HP(GN/GR)	Shut Off Valve High (for Room 2)
CN_R2_SHUT_LP(BR)	Shut Off Valve Low (for Room 2)
CN_HR_COMM(YL)	Connection Sub PCB
CN_LEAKAGE(VI)	Leak Detector
CN_SVC	Display PCB
CN_SOL_VALVE(BL)	Liquid Bypass Valve
CN_CHASSIS_GND	PCB Functional Ground
CN_INPUT(BL)	Main Power
CN_CC(WH)	Dry Contact
CN_DC_INPUT(WH)	Auxiliary Power PCB
DIP Switch Settings	
SW01E	Setting, EEV Number (Manual Addressing)
	Setting, Valve Zone Number (Auto Addressing)
SW02E(1)	Selecting Auto Address (↓) or Manual Address (↑)
SW02E(2~4)	Setting, Total Number of Indoor Units Connected
SW02E(5)	Setting, Sub PCB
SW02E(6)	Setting, EEPROM Reset
SW02E(7~8)	Setting, Mode (Zoning, etc.)
SW01A	Reset
SW01D	Setting, EEV Group
SW01C	Setting, HR Unit Number
	Setting, Indoor Units Zone Number (Manual Addressing)
SW02B	Setting, the Address of indoor_10 (Manual Addressing)
SW01B	Setting, the Address of indoor_1 (Manual Addressing)

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Figure 19: PRHR024C, PRHR034C, and PRHR044C Refrigerant Flow Diagram.



Ⓐ: Switches operation between cooling and heating using the two valves.

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

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

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

Ⓔ: Blocks refrigerant flow if leak is detected.

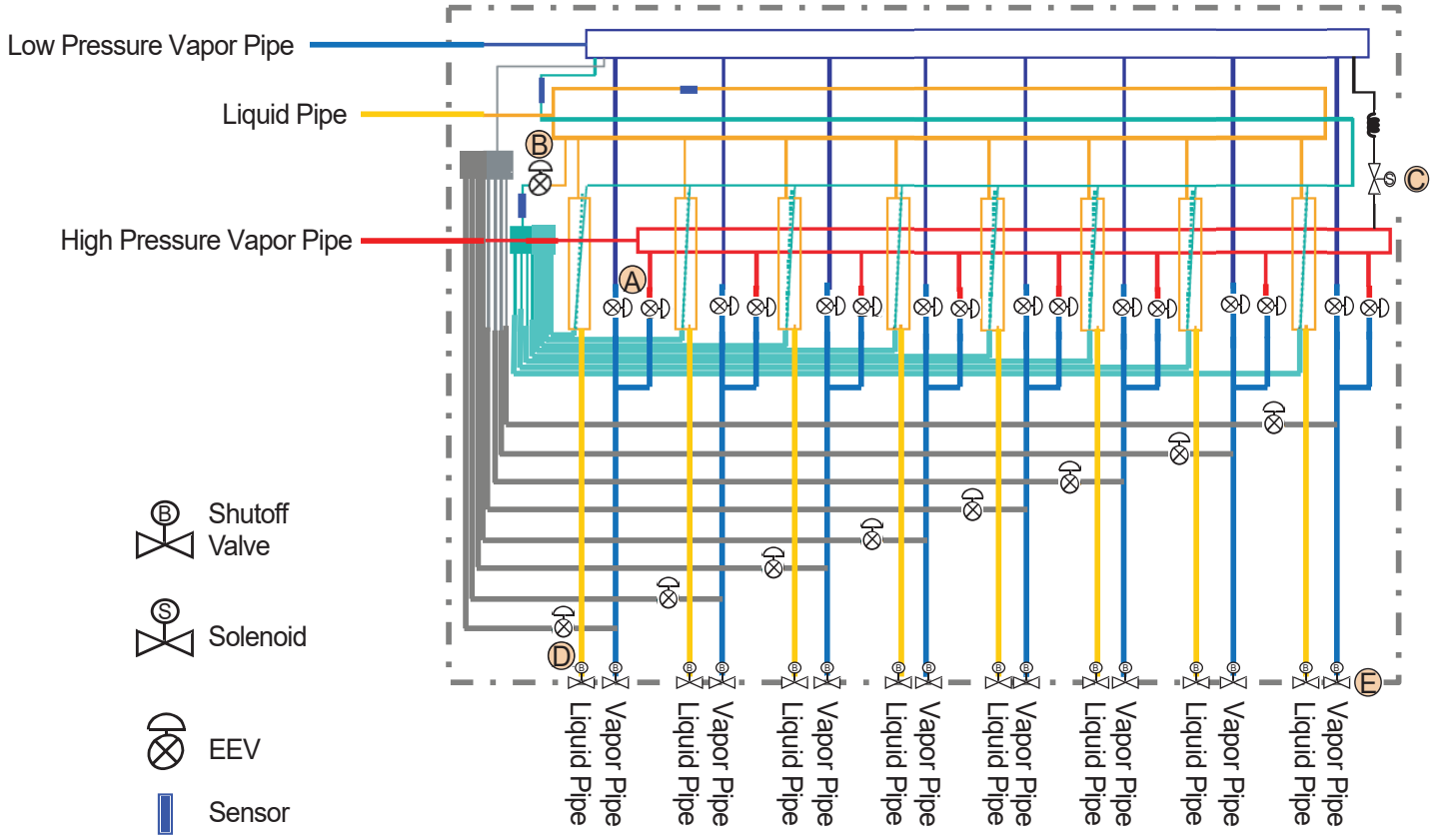
NOTICE

Refrigerant diagram above represents the PRHR044C model. Appearances will differ depending on model.

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REFRIGERANT FLOW DIAGRAM

Figure 20: PRHR065C and PRHR085C Refrigerant Flow Diagram.



Ⓐ: Switches operation between cooling and heating using the two valves.

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

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

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

Ⓔ: Blocks refrigerant flow if leak is detected.

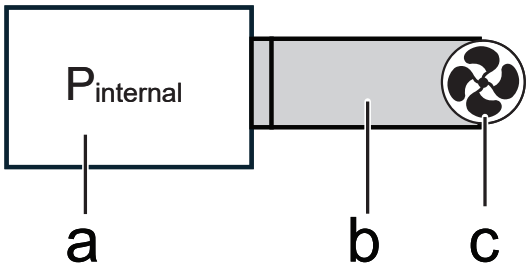
NOTICE

Refrigerant diagram above represents the PRHR085C model. Appearances will differ depending on model.

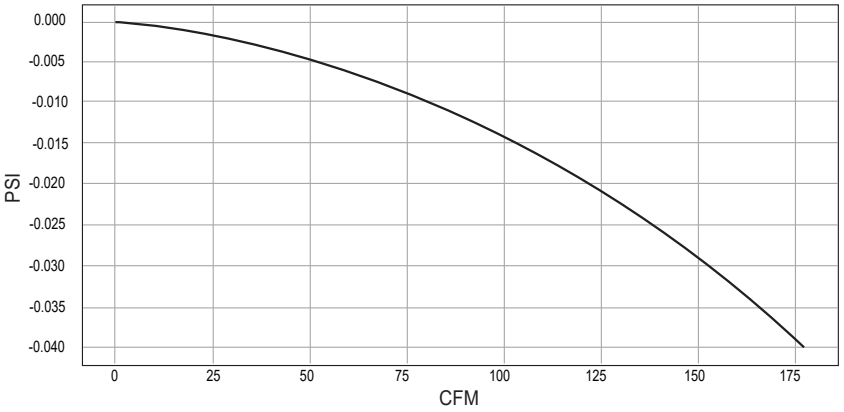
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Enclosure Ventilation (UL 60335-2-40: 2022 Edition 4)

- The ventilation airflow must be set higher than 11.11 CFM (18.87m³/h), and the internal negative pressure must be set higher than 0.08 in. w.g. (20 Pa).
- The internal pressure of the Heat Recovery Unit must not drop more than 1.4 in. w.g. (350 Pa) below the surrounding ambient pressure.

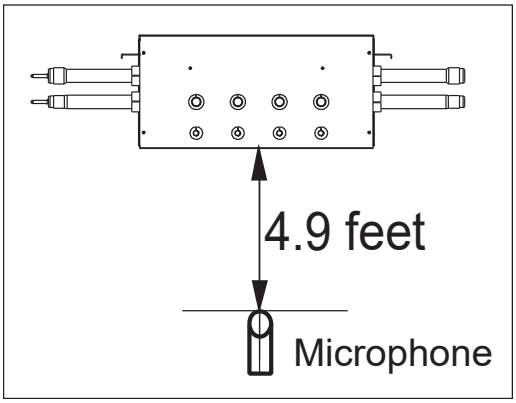


a	Heat Recovery Unit
b	Ductwork
c	Extraction Fan



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Figure 22: 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:

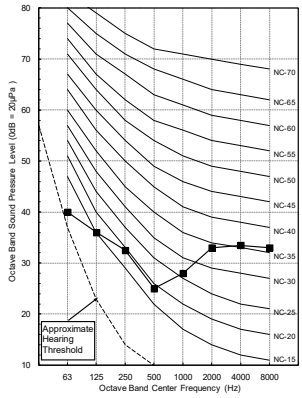
- Power source: 220V 60Hz
- Reference acoustic pressure: 0dB = 20μPa.
- Cooling: Indoor Temperature 80.6°F D.B., 66.2°F W.B., Outdoor Temperature 95°F D.B., 75.2°F W.B.
- Heating: Indoor Temperature 68°F D.B., 59°F W.B., Outdoor Temperature 44.6°F D.B., 42.8°F W.B.

Table 25: PRHR**4C Sound Pressure Levels.

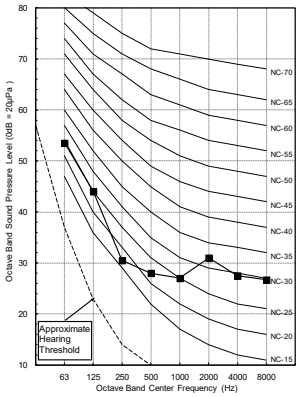
Operation Mode	Sound Pressure Levels dB(A)
Cooling	31
Heating	31
Simultaneous	38
Changeover From Cooling to Heating	33
Changeover From Heating to Cooling	38

Figure 21: PRHR**4C Sound Pressure Level Diagrams.

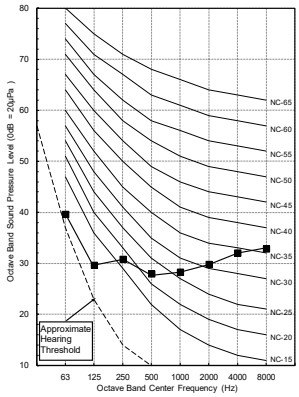
Cooling



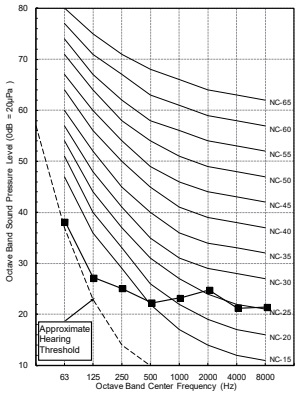
Heating



Changeover from Cooling to Heating



Changeover from Heating to Cooling

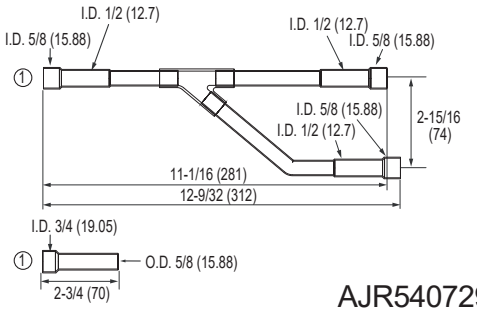


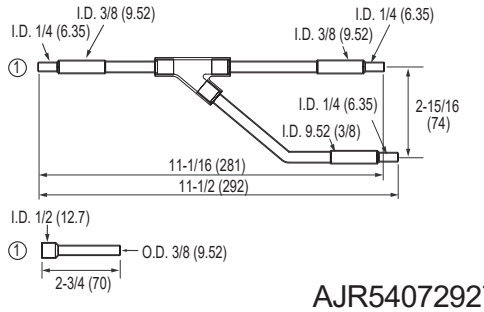
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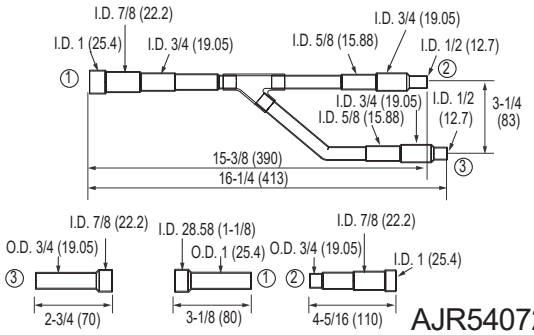
Combining Heat Recovery Ports for Large Indoor Units

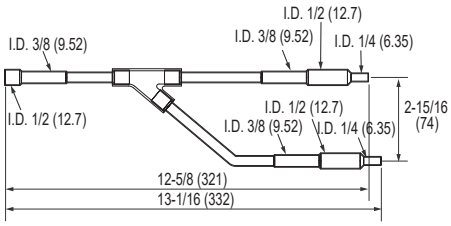
It is necessary to combine two ports on a system designed for heat recovery operation when installing a single indoor unit with a capacity exceeding 54,000 Btu/h. Two neighboring heat recovery ports are combined using a reverse Y-branch that is then connected to the one large indoor unit.

(Unit: Inch [mm])

<table>
<tr><th>Models</th><th colspan="2">Pipe</th></tr>
<tr><td rowspan="2">ARBLN01621</td><td>Vapor Pipe</td><td>Liquid Pipe</td></tr>
<tr><td>

AJR54072929


AJR54072927</td></tr>
<tr><td rowspan="2">ARBLN03321</td><td>Vapor Pipe</td><td>Liquid Pipe</td></tr>
<tr><td>

AJR54072930


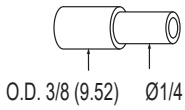
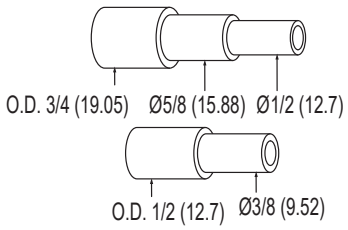
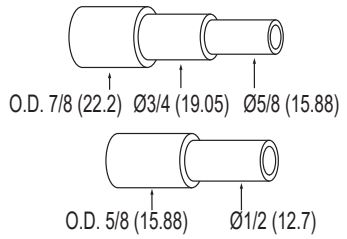
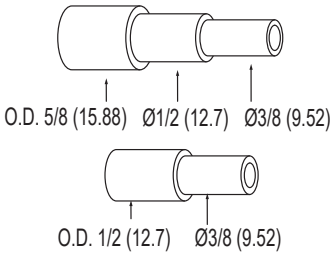
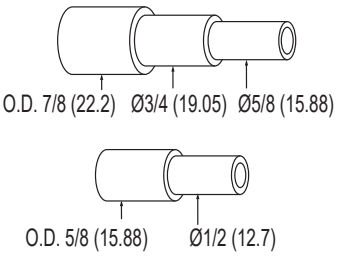
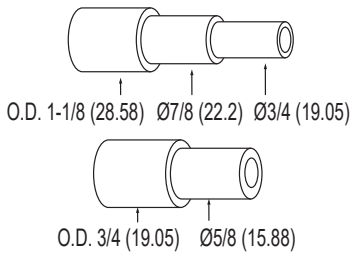
AJR54072928</td></tr>
</table>

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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.

Unit: Inches (mm)

Model		Liquid Piping	Vapor Piping	
			High Pressure	Low Pressure
Heat Recovery Unit Reducer	PRHR024C			
	PRHR034C PRHR044C PRHR065C PRHR085C			

Strainers

Strainers are provided as an accessory to three (3), four (4), six (6), and eight (8) port heat recovery units, and are to be installed on the high pressure vapor pipe to the indoor unit.

Models		High Pressure Vapor Pipe
Strainer	For Three-, Four-, Six-, and Eight-Port Heat Recovery Units	

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SHUTOFF VALVE UNIT PRODUCT DATA

General Data on page 79
Electrical Data on page 80
Dimensions on page 81
Wiring Diagrams on page 82
Refrigerant Flow Diagrams on page 87
Fan Curve Values on page 89
Accessories on page 90



Figure 23: One-Port Shutoff Valve Unit.



Figure 24: Two-Port Shutoff Valve Unit.



Figure 25: Three-Port Shutoff Valve Unit.



Figure 26: Four-Port Shutoff Valve Unit.

Table 26: Shutoff Valve Unit Specifications.

Model			PRHPZ010A	PRHPZ020A	PRHPZ030A	PRHPZ040A
Number of Ports			1	2	3	4
Max. Connectable No. of Indoor Units			8	16	24	32
Max. Connectable No. of Indoor Units on each port			8	8	8	8
Max. Port Capacity (each port)		Btu/h	60,000?	60,000	60,000	60,000
Max. Unit Capacity (sum of ports)		Btu/h	60,000	120,000	180,000	230,000
Net Weight		lbs.	14.9	42.1	45.4	48.1
Shipping Weight		lbs.	19.4	56.0	59.7	62.4
Net Dimensions (W x H x D)		Inches	13 x 8-25/32 x 11-27/64	37-1/2 x 10-5/8 x 24-5/8		
Shipping Dimensions (W x H x D)		Inches	26-17/32 x 11-15/16 x 14-1/32	42-13/32 x 13-45/64 x 29-7/8		
Refrigerant Type			R32	R32	R32	R32
Refrigerant Control			Motorized Valve			
Casing			Galvanized Steel Plate			
Connecting Pipes	To Indoor Units	Liquid Pipe (inches)	Ø3/8 – Ø1/4 Braze			
		Vapor Pipe (inches)	Ø5/8 – Ø1/2 Braze			
	To Outdoor Units	Liquid Pipe (inches)	N / A	Ø3/8 Braze	Ø1/2 Braze	Ø5/8 Braze
		Vapor Pipe (inches)	N / A	Ø7/8 Braze	Ø1-1/8 Braze	Ø1-1/8 Braze

NOTICE

The two-, three-, and 4-port shutoff valve units include refrigerant leak sensors and knockouts for enclosure ventilation applications. The single port units do not.

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Table 27: Shutoff Valve Unit Electrical Data.

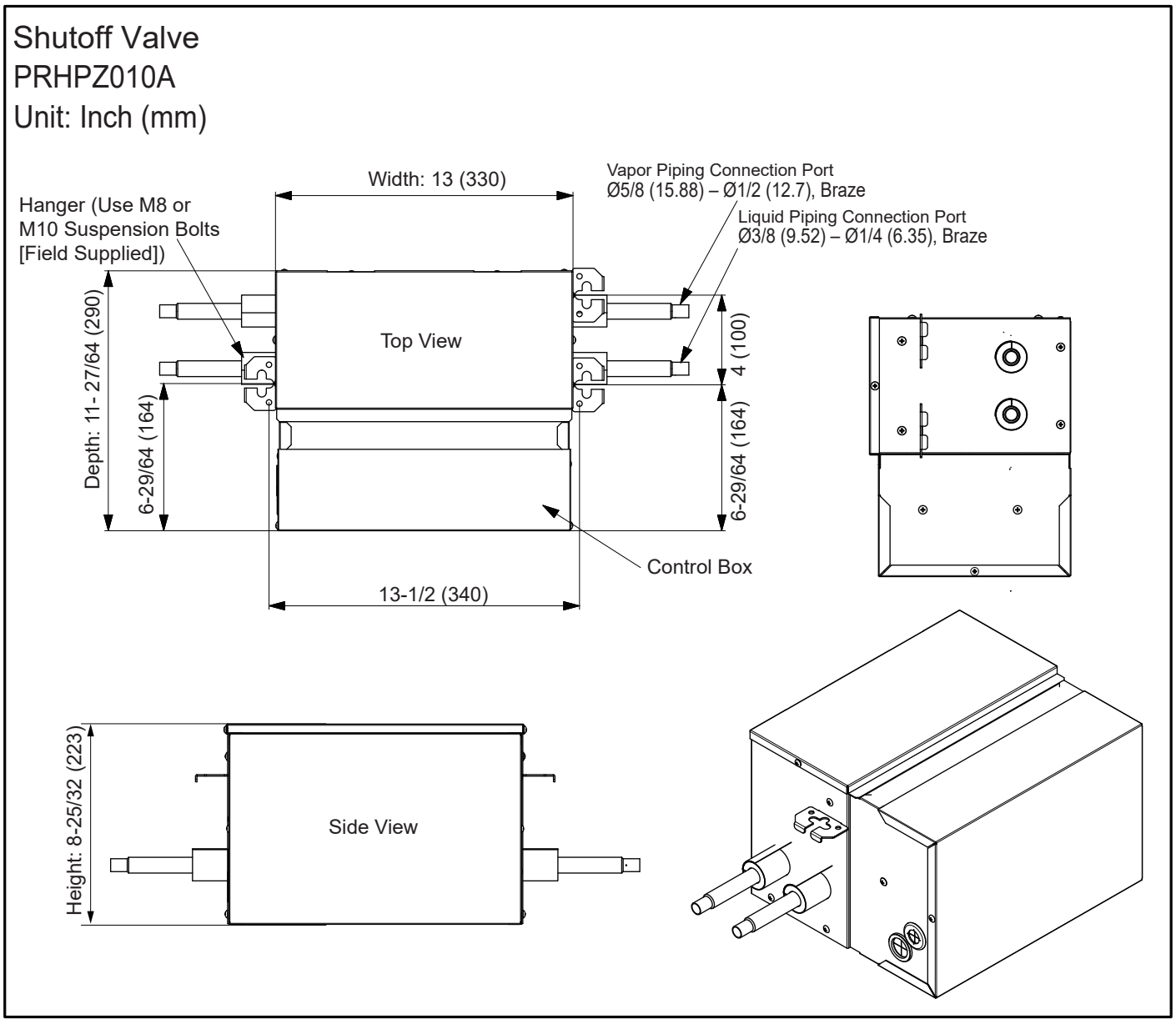
Unit Model No.	Voltage Range	Rated Amps	MCA	MFA	Power Supply			Power Input (W)	
					Hz	Volts	Phase	Cooling	Heating
PRHPZ010A	187-253	0.10	0.5	15	60	208-230	1	30	30
PRHPZ020A		0.28	0.875	15				49.2	46.6
PRHPZ030A		0.28	0.875	15				49.2	46.6
PRHPZ040A		0.28	0.875	15				49.2	46.6

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.

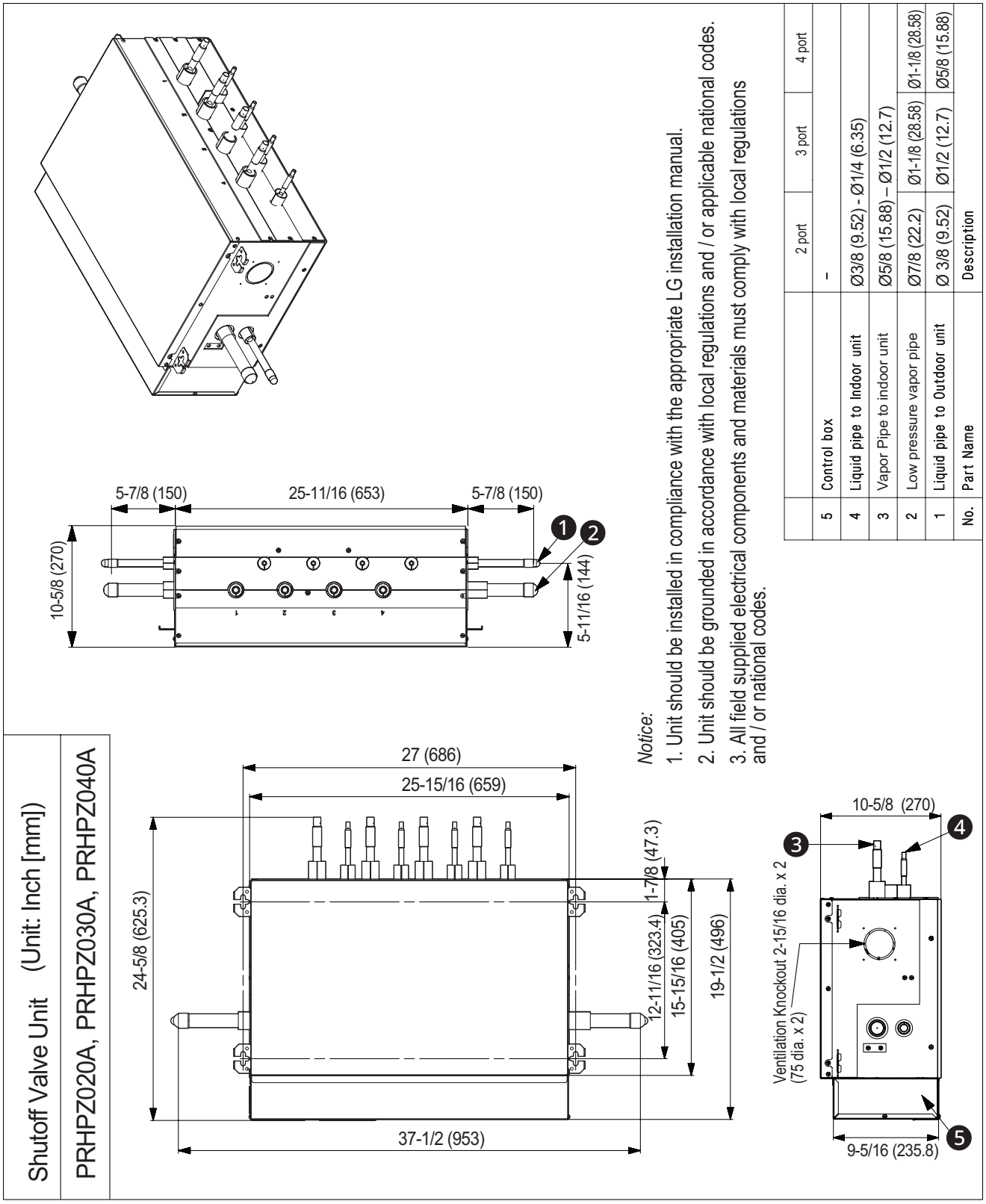
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Figure 27: PRHPZ010A Dimensions.



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Figure 28: PRHPZ020A, PRHPZ030A, and PRHPZ040A Dimensions.

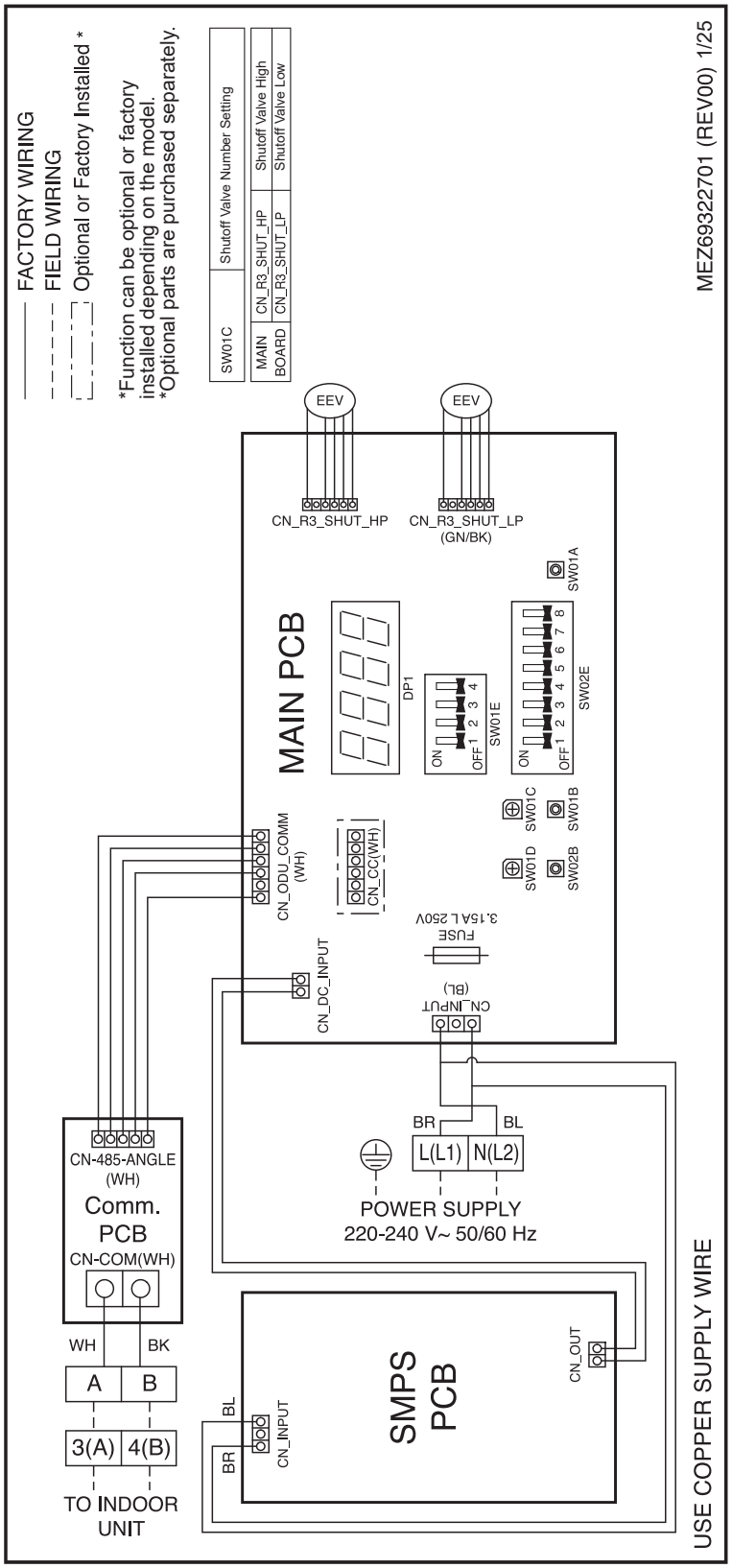


No.	Part Name	Description		
		2 port	3 port	4 port
5	Control box	–		
4	Liquid pipe to Indoor unit	Ø3/8 (9.52)	Ø1/4 (6.35)	
3	Vapor Pipe to indoor unit	Ø5/8 (15.88)	Ø1/2 (12.7)	
2	Low pressure vapor pipe	Ø7/8 (22.2)	Ø1-1/8 (28.58)	Ø1-1/8 (28.58)
1	Liquid pipe to Outdoor unit	Ø 3/8 (9.52)	Ø1/2 (12.7)	Ø5/8 (15.88)

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Figure 29: PRHPZ010A Wiring Diagram.



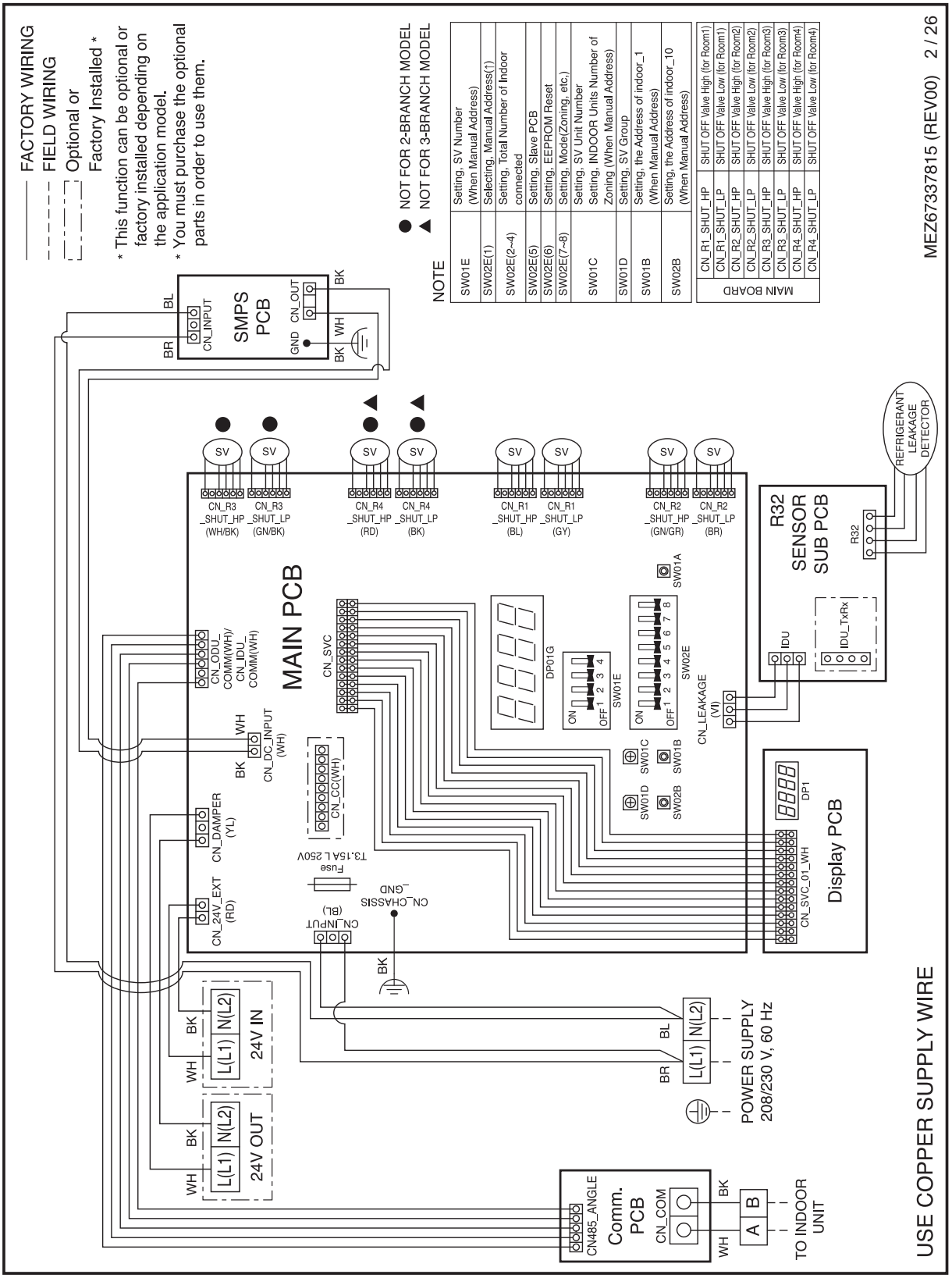
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Table 28: PRHPZ010A Wiring Diagram Legend

Terminal	Description
Main PCB	
CN_INPUT (BL)	Main Power
CN_DC_INPUT	Auxiliary Power PCB
CN_ODU_COMM (WH)	Communication PCB (RS-485)
CN_CC (WH)	Dry Contact
CN_R3_SHUT_HP(WH/BK)	Shutoff Valve High
CN_R3_SHUT_LP (GN/BK)	Shutoff Valve Low
DIP Switch Settings	
SW01E	Setting, Shutoff Valve Number (Manual Addressing)
SW02E(1)	Selecting Manual Address (↑)
SW02E(2~4)	Setting, Total Number of Indoor Units Connected
SW02E(5)	Setting, Sub PCB
SW02E(6)	Setting, EEPROM Reset
SW02E(7~8)	Setting, Mode (Zoning, etc.)
SW01A	Reset
SW01D	Setting, Shutoff Valve Group
SW01C	Setting, Shutoff Valve Unit Number
SW02B	Setting, the Address of indoor_10 (Manual Addressing)
SW01B	Setting, the Address of indoor_1 (Manual Addressing)

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Figure 30: PRHPZ020A, PRHPZ030A, and PRHPZ040A Wiring Diagram.



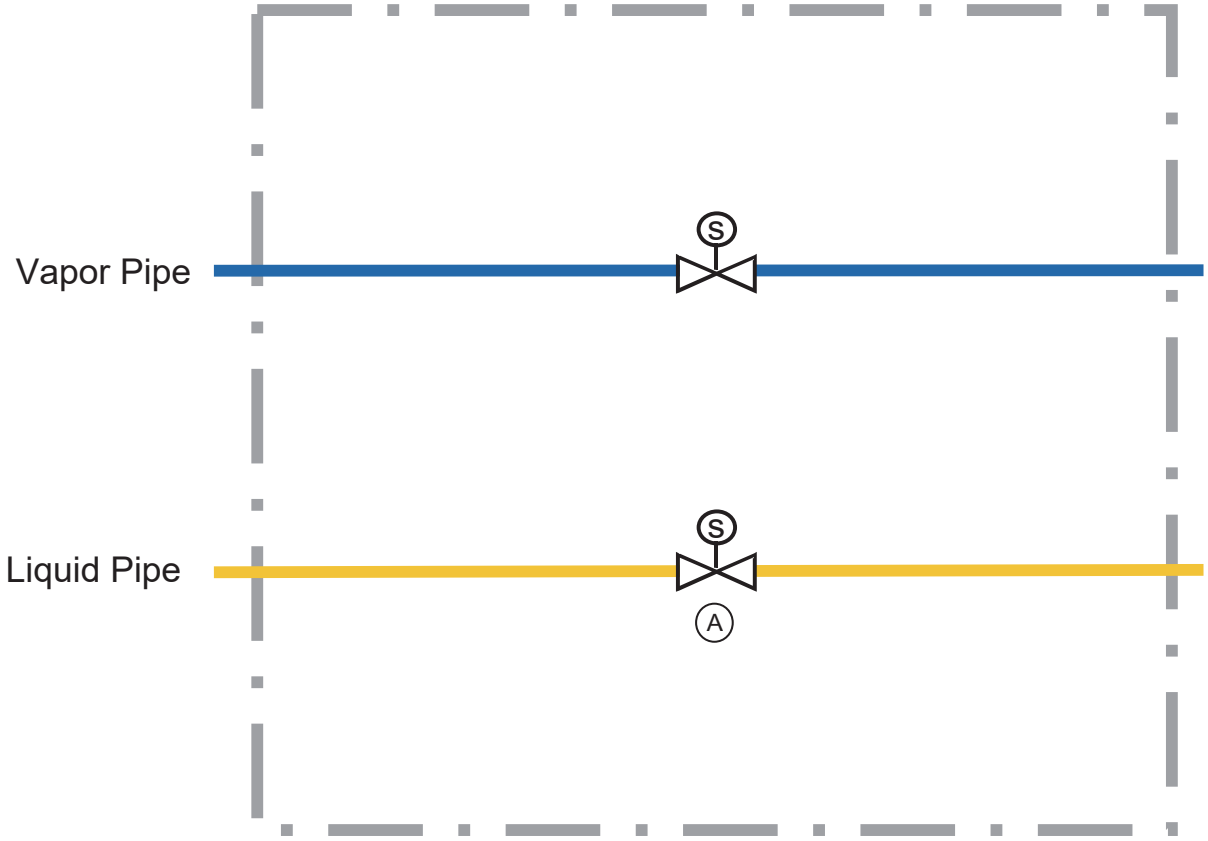
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Table 29: PRHPZ020A, PRHPZ030A, and PRHPZ040A Wiring Diagram Legend.

Terminal	Description
Main PCB	
CN_24V_EXT(RD)	24V In (Field Supply)
CN_DAMPER(YL)	24V Out (For Relay)
CN_DC_INPUT(WH)	Auxiliary Power PCB
CN_ODU_COMM(WH) / CN_IDU_COMM(WH)	Communication PCB (RS-485)
CN_R3_SHUT_HP(WH/BK)	Shutoff Valve High (for Room 3)
CN_R3_SHUT_LP (GN/BK)	ShutoffValve Low (for Room 3)
CN_R4_SHUT_HP(RD)	Shutoff Valve High (for Room 4)
CN_R4_SHUT_LP(BK)	Shutoff Valve Low (for Room 4)
CN_R1_SHUT_HP(BL)	Shutoff Valve High (for Room 1)
CN_R1_SHUT_LP(GY)	Shutoff Valve Low (for Room 1)
CN_R2_SHUT_HP(GN/GR)	Shutoff Valve High (for Room 2)
CN_R2_SHUT_LP(BR)	Shutoff Valve Low (for Room 2)
CN_LEAKAGE(VI)	Leak Detector
CN_SVC	Display PCB
CN_CC(WH)	Dry Contact
CN_CHASSIS_GND	PCB Functional Ground
CN_INPUT(BL)	Main Power
DIP Switch Settings	
SW01E	Setting, Shutoff Valve Number (Manual Addressing)
SW02E(1)	Selecting Manual Address (↑)
SW02E(2~4)	Setting, Total Number of Indoor Units Connected
SW02E(5)	Setting, Sub PCB
SW02E(6)	Setting, EEPROM Reset
SW02E(7~8)	Setting, Mode (Zoning, etc.)
SW01A	Reset
SW01D	Setting, Shutoff Valve Group
SW01C	Setting, Shutoff Valve Unit Number
	Setting, Indoor Units Zone Number (Manual Addressing)
SW02B	Setting, Address of Indoor_10 (Manual Addressing)
SW01B	Setting, Address of Indoor_1 (Manual Addressing)

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Figure 31: PRHPZ010A Refrigerant Flow Diagram.

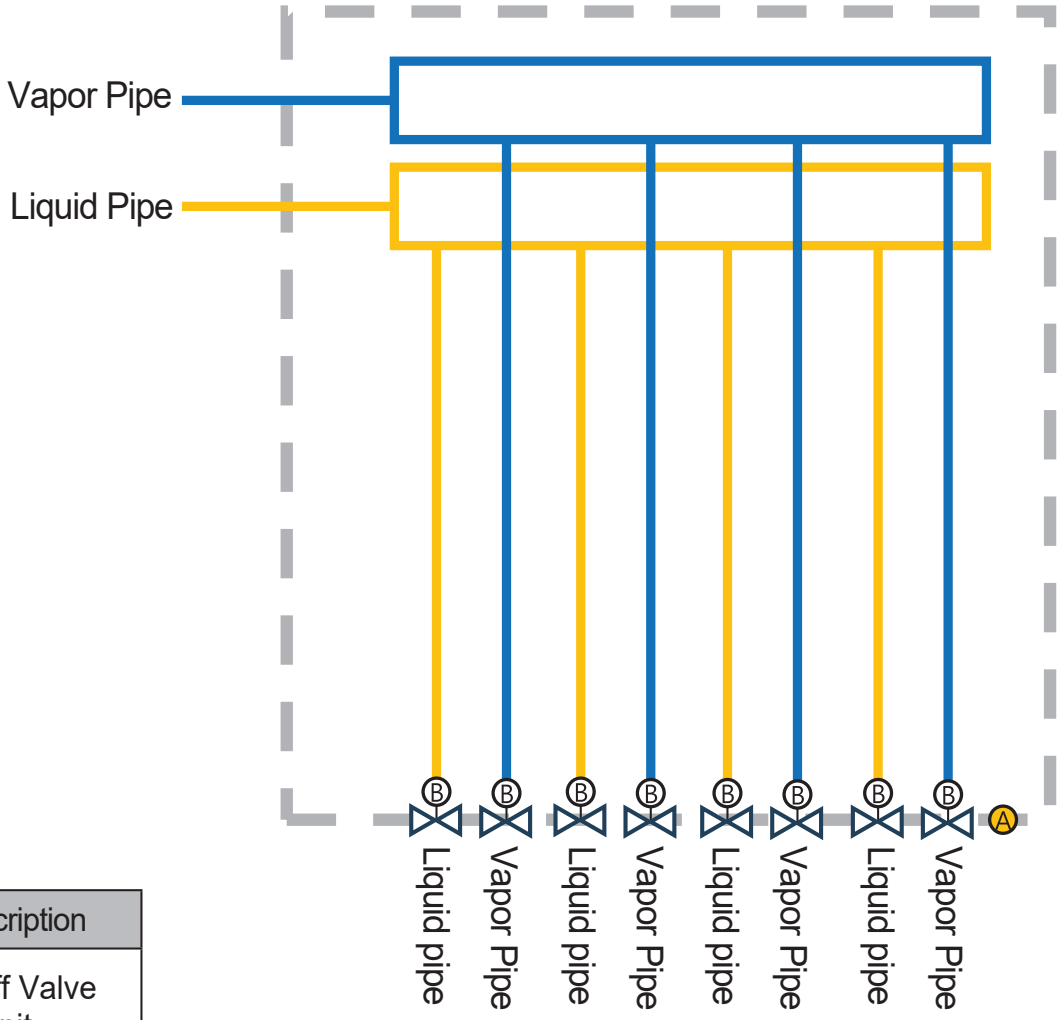


S Solenoid

Ⓐ: Closes to block refrigerant flow when a leak is detected.

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Figure 32: PRHPZ020A, PRHPZ030A, and PRHPZ040A Refrigerant Flow Diagram.



Symbol	Description
Ⓑ	Shutoff Valve Unit

Ⓐ :Closes to block refrigerant flow when a leak is detected.

NOTICE

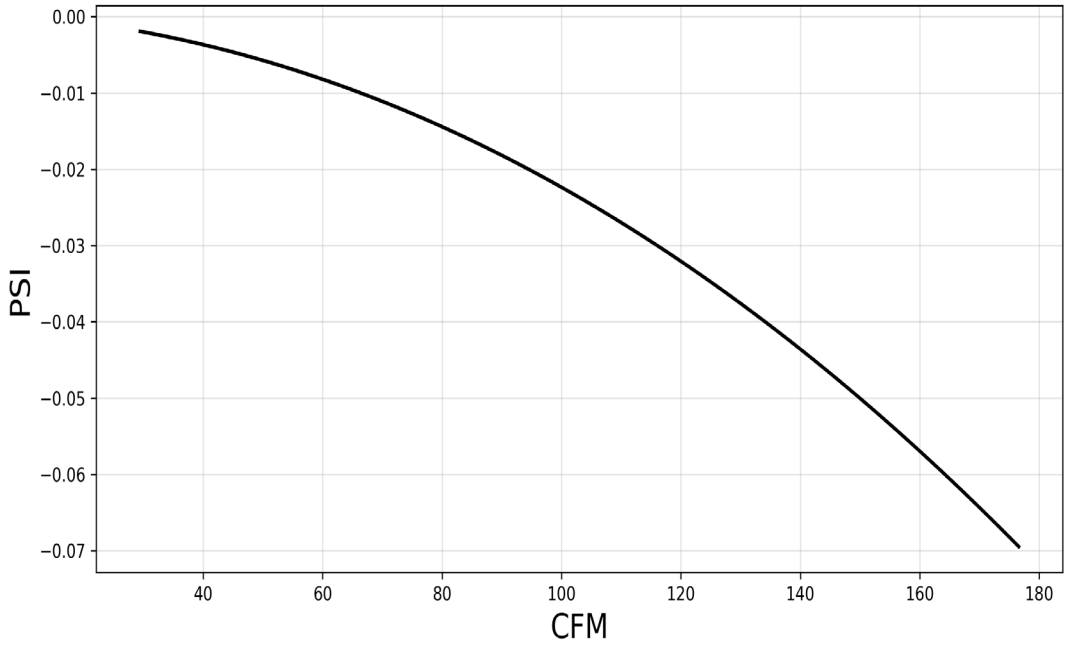
Refrigerant diagram above represents the PRHPZ040A model. Appearances will differ depending on model.

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Enclosure Ventilation (UL 60335-2-40: 2022 Edition 4)

- The ventilation airflow must be set higher than 11.11 CFM (18.87m³/h), and the internal negative pressure must be set higher than 0.08 in. w.g. (20 Pa).
- The internal pressure of the Shutoff Valve Unit must not drop more than 1.4 in. w.g (350 Pa) below the surrounding ambient pressure.

CFM / PSI Performance Curve



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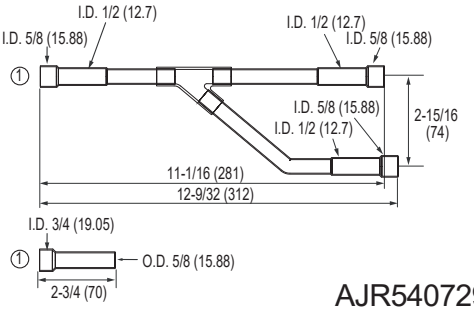
Table 30: Ventilation Accessories Overview (Sold Separately).

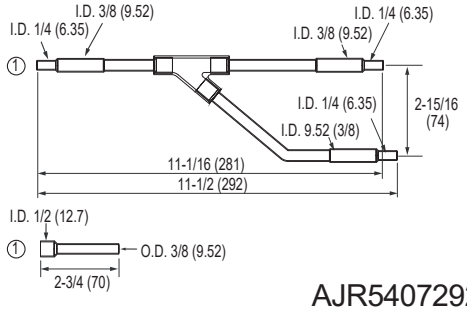
Accessory	Model Number
Ventilation Flange only for 2-3-4 ports	PTVK430
Simple Dry Contact (1 contact, 24 VAC external power) only for 2-3-4-ports	PDRYCB100

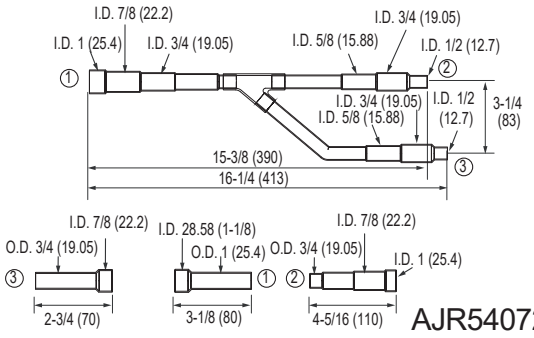
Combining Shutoff Valve Unit Ports for Large Indoor Units

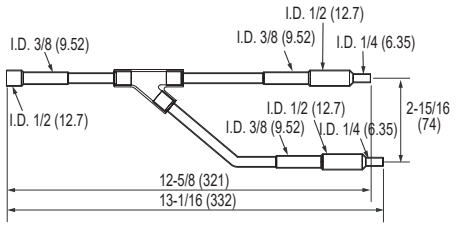
It is necessary to combine two ports when installing a single indoor unit with a capacity exceeding 54,000 Btu/h. Two neighboring shutoff valve ports are combined using a reverse Y-branch that is then connected to the one large indoor unit.

(Unit: Inch [mm])

<table>
<tr><th>Models</th><th colspan="2">Pipe</th></tr>
<tr><td rowspan="2">ARBLN01621</td><td>Vapor Pipe</td><td>Liquid Pipe</td></tr>
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AJR54072929


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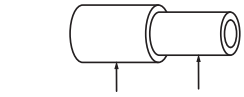
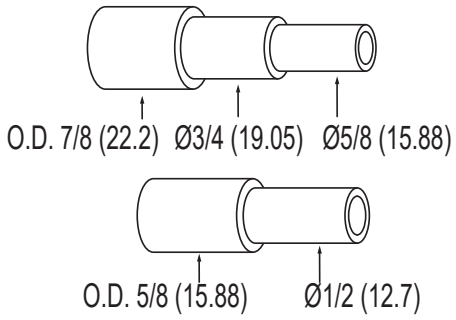
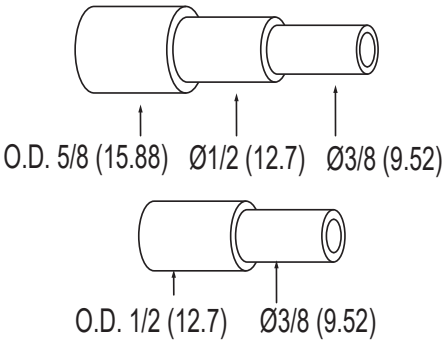
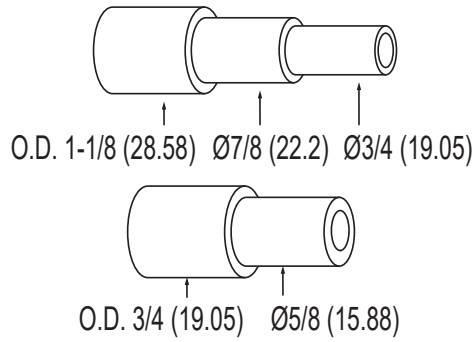
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Reducers

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 shutoff valve unit connections.

Unit: Inches (mm)

Model		Liquid Piping	Vapor Piping
Shutoff Valve Unit Reducer	PRHPZ020A		
	PRHPZ030A PRHPZ040A		

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ELECTRICAL CONNECTIONS

General Guidelines on page 93
System for Heat Pump Operation on page 94
System for Heat Recovery Operation on page 95
Heat Recovery Unit Wiring Connections on page 96
Shutoff Valve Unit Wiring Connections on page 97

GENERAL POWER WIRING / COMMUNICATION CABLE GUIDELINES

General Power Wiring / Communications Cable Guidelines

- Follow all applicable local, state, and federal wiring and installation codes.
- Follow manufacturer's circuit diagrams displayed on the inside of the control box covers.
- Have a separate power supply for each outdoor unit in dual and triple frame systems,
- Have a separate power supply for the heat recovery units / indoor units.
- Provide a circuit breaker switch between each power source and the outdoor unit(s).
- 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 the main outdoor unit to the indoor units / heat recovery units to be 18 AWG, 2-conductor, twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the main outdoor unit frame only. ⃠ Do not ground the outdoor unit to indoor unit(s) / heat recovery units 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 during transport. Properly tighten the terminal connections during installation or risk electric shock, physical injury, or death.*
- *Loose wiring may cause unit malfunction, the wires to burnout or the terminal to overheat and catch fire. There is a risk of electric shock, physical injury or death.*

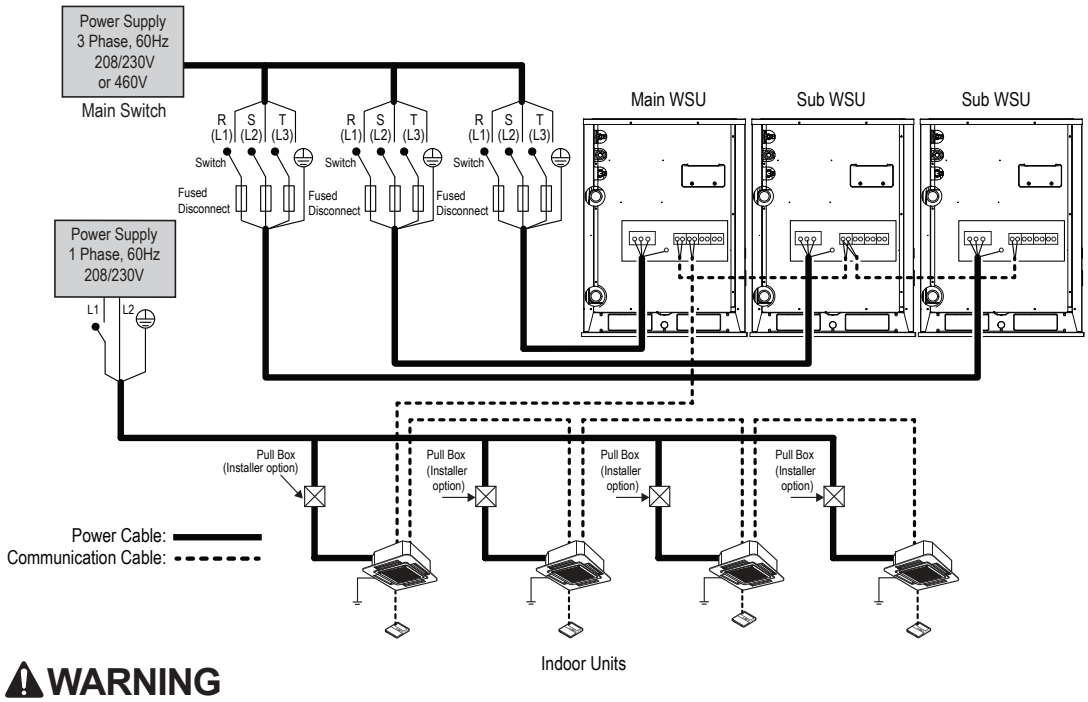
NOTICE

- *Terminal screws may loosen during 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.*

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SYSTEM FOR HEAT PUMP OPERATION, 208-230V AND 460V

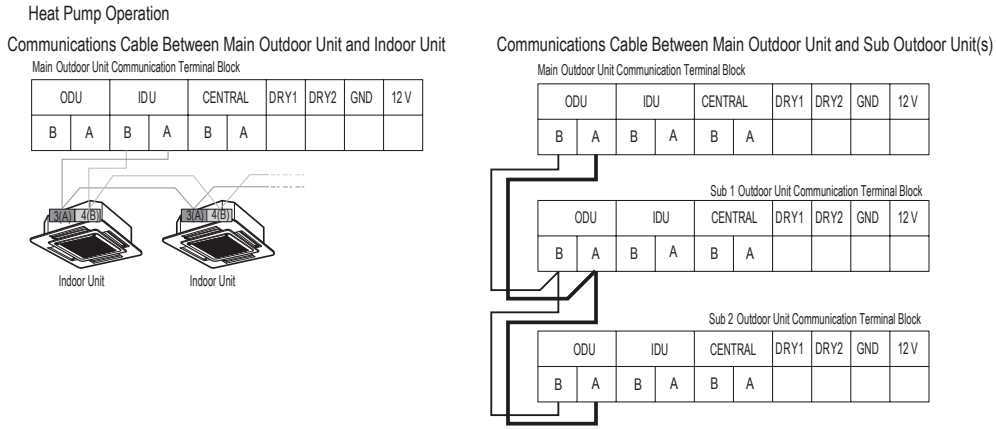
Figure 33: Example of a Typical Heat Pump Operation Power Wiring and Communications Cable Schematic.



⚠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 Main ODU to Sub ODU(s), and Main ODU to IDUs to be 18 AWG, 2-conductor, twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the Main ODU chassis only. ⃠ Do not ground the ODU to IDUs 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.*

Figure 34: Close-up of Heat Pump Operation Communications Cable Schematic.

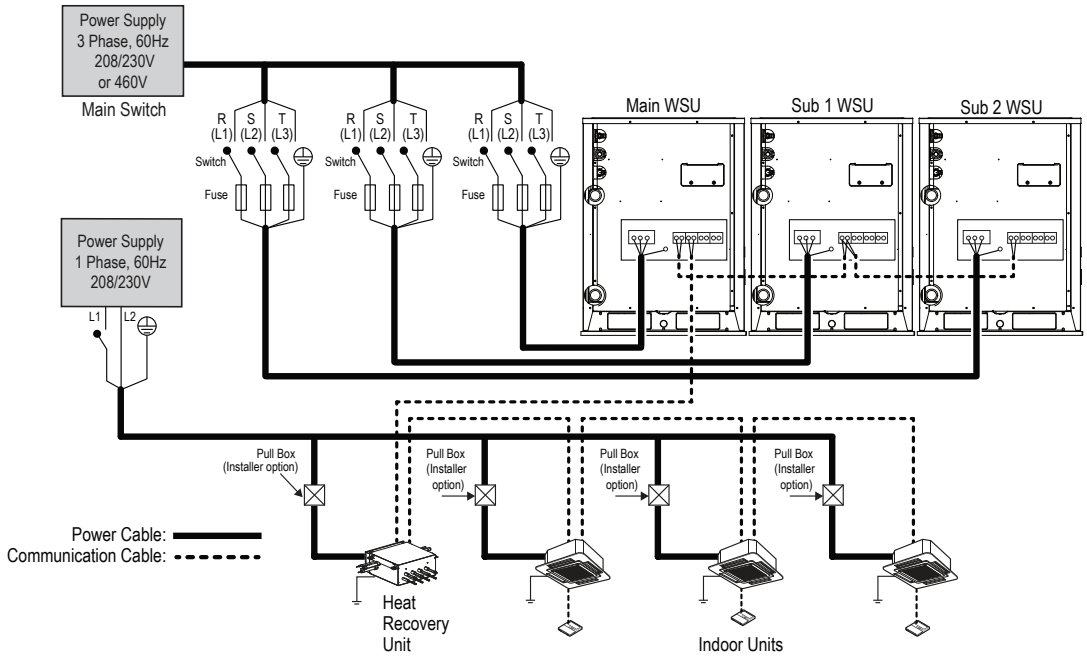


NOTICE

- *Make sure that the terminal numbers of main water source unit and sub 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.*

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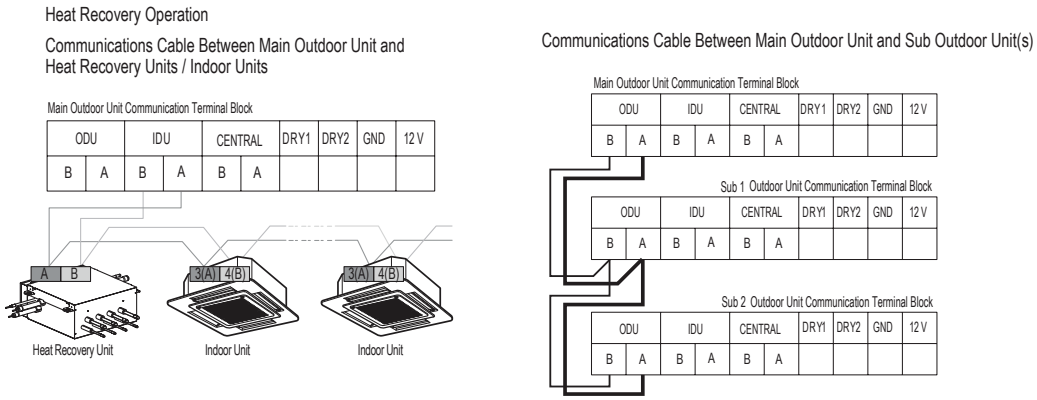
Figure 35: Example of a Typical Heat Recovery Operation Power Wiring and Communications Cable Schematic.



⚠ 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 Main ODU to Sub ODU(s), and Main ODU to IDUs / HRUs to be 18 AWG, 2-conductor, twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the Main 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.*

Figure 36: Close-up of Heat Recovery Operation Communications Cable Schematic.



NOTICE

- *Make sure that the terminal numbers of main water source unit and sub 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.*

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HEAT RECOVERY UNIT WIRING CONNECTIONS

Heat Recovery Unit Power Wiring and Communications Cable Connections

1. Open the heat recovery unit control box cover (see image below).
2. Insert the power wiring / communications cable from the outdoor unit using the access holes.
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.

NOTICE

All communication and power wiring must be connected to the terminals using connectors certified or recognized according to UL and CSA standards.

Figure 37: Accessing the Heat Recovery Control Unit Control Box.

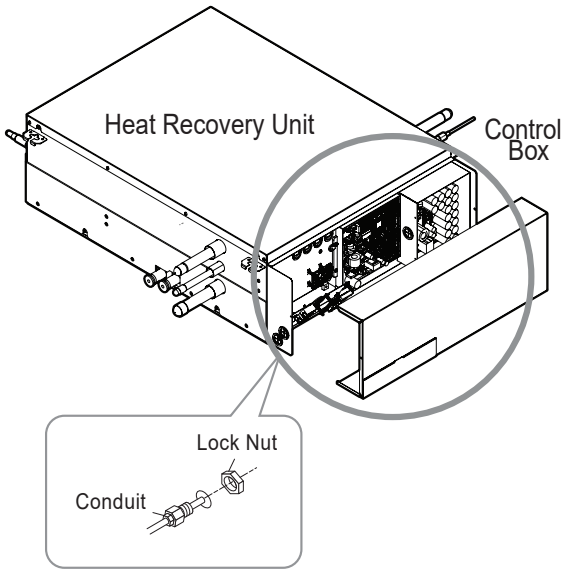


Figure 38: Control Box Connections.

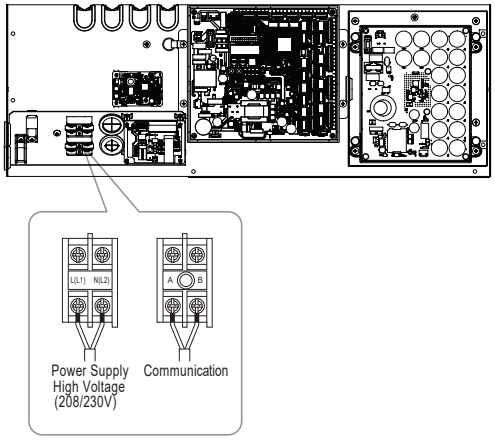


Figure 39: Close Up of Heat Recovery Unit to Outdoor Unit Terminal Block Connections.

Heat Recovery Unit Terminal Block				Main Outdoor Unit Terminal Block									
Power Supply			Communication	SODU		IDU		INTERNET		DRY1	DRY2	GND	12 V
L(L1)	N(L2)	⏚	A	B	B	A	B	A	B	A	-	-	-	-

Heat Recovery Unit Power Supply

Communication Cable (Heat Recovery Unit – Outdoor Unit)

⚠ WARNING

Ensure that all wiring is tightly connected and that the terminal screws are not loose. Loose wiring can cause the terminal to overheat, resulting in fire, physical injury, or death.

NOTICE

Ensure that all wiring is tightly connected and that the terminal screws are not loose. Loose wiring can cause the terminal malfunction.

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Shutoff Valve Unit Power Wiring and Communications Cable Connections

1. Open the shutoff valve unit control box cover (see image below).
2. Insert the power wiring / communications cable from the outdoor unit using the access holes.
3. Connect each wire to its appropriate terminal on the shutoff valve unit control board. Verify that the color and terminal numbers from the outdoor unit wiring match the color and terminal numbers on the shutoff valve unit.
4. Secure the power wiring / communications cable.

NOTICE

All communication and power wiring must be connected to the terminals using connectors certified or recognized according to UL and CSA standards.

Figure 40: Accessing the One-Port Shutoff Valve Unit Control Box.

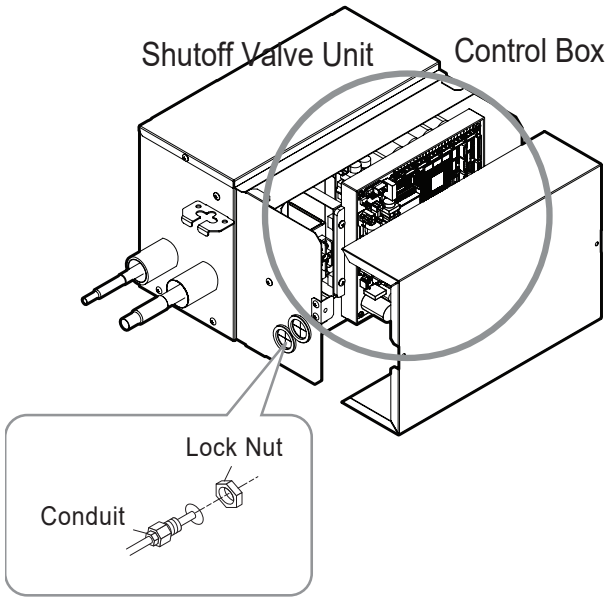


Figure 41: One-Port Shutoff Valve Control Box Connections.

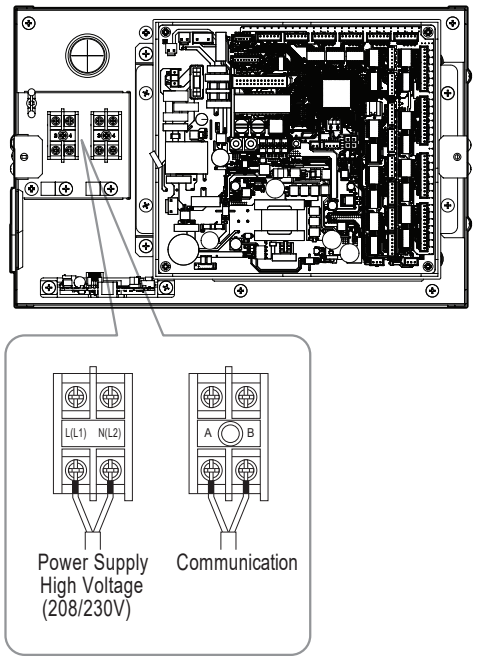


Figure 42: Close Up of the One-Port Shutoff Valve Unit to Outdoor Unit Terminal Block Connections.

Shutoff Valve Unit				(Main) Outdoor Unit									
Terminal Block			Terminal Block	SODU		IDU		INTERNET		DRY1	DRY2	GND	12 V
L(L1)	N(L2)	⏚	A	B	B	A	B	A	B	A	-	-	-	-

Power Supply

Communication Cable
(Shutoff Valve Unit to Outdoor Unit)

⚠ WARNING

Ensure that all wiring is tightly connected and that the terminal screws are not loose. Loose wiring can cause the terminal to overheat, resulting in fire, physical injury, or death.

NOTICE

Ensure that all wiring is tightly connected and that the terminal screws are not loose. Loose wiring can cause the terminal malfunction.

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SHUTOFF VALVE UNIT WIRING CONNECTIONS

Figure 43: Accessing the Two-, Three-, and Four-Port Shutoff Valve Unit Control Box.

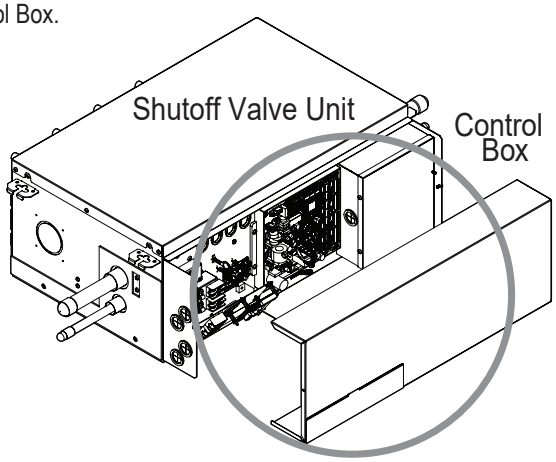
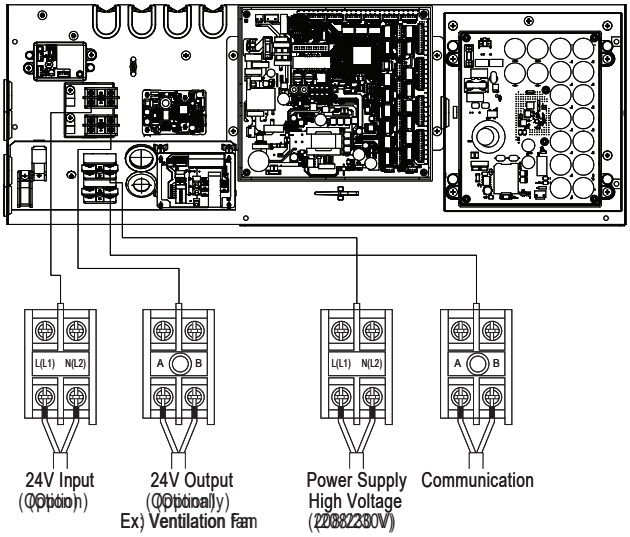


Figure 44: Two-, Three-, and Four-Port Shutoff Valve Control Box Connections.



⚠ WARNING

Ensure that all wiring is tightly connected and that the terminal screws are not loose. Loose wiring can cause the terminal to overheat, resulting in fire, physical injury, or death.

NOTICE

Ensure that all wiring is tightly connected and that the terminal screws are not loose. Loose wiring can cause the terminal malfunction.

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PIPING LIMITATIONS AND PLACEMENT CONSIDERATIONS

Piping Limitations for Heat Pump systems on page 100
Piping Limitations for Heat Recovery systems designed on page 110
WSU Capacity Correction Factors on page 121
Refrigerant Piping for Separated Water Source Units on page 125
Placement Considerations on page 127
Transporting/Lifting on page 128
Installation Considerations on page 129
Corner Weights on page 131
Selecting the Best Location for the Heat Recovery Unit(s) on page 132
Selecting the Best Location for the Shutoff Valve Unit(s) on page 133

PIPING LIMITATIONS

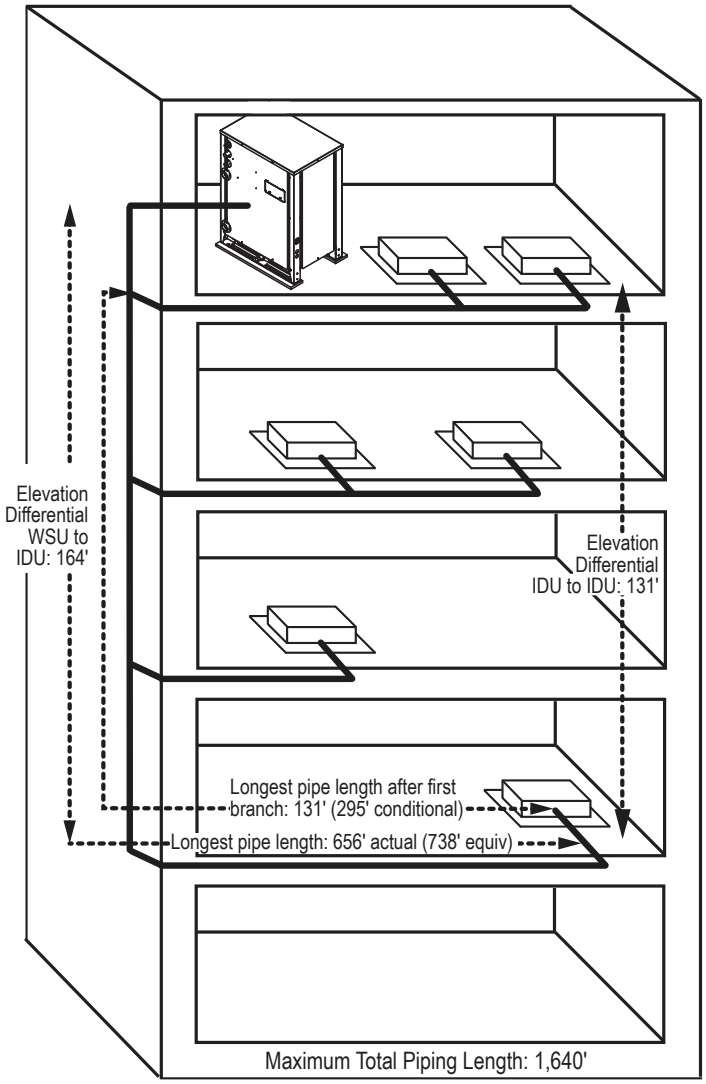
For Systems Designed for Heat Pump Operation

Following pages present R32 Multi V Water 5 Water piping limitations, and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

NOTICE

Various tools are available to assist in properly designing LG R32 systems. Refer to the "R32 Application Guide"; the "Simple Calculator for Capacity, Refrigerant Charge and ESP"; the "LG Air Conditioner Technical Solutions" (LATS) software program; and the local LG Sales Representative.

Figure 45: Typical Heat Pump System Building Layout with Piping Limitations.



*See next page for table.

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PIPING LIMITATIONS

For Systems Designed for Heat Pump Operation

Following pages present R32 Multi V Water 5 Water piping limitations, and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Table 31: Piping Limitations for Heat Pump Operation.

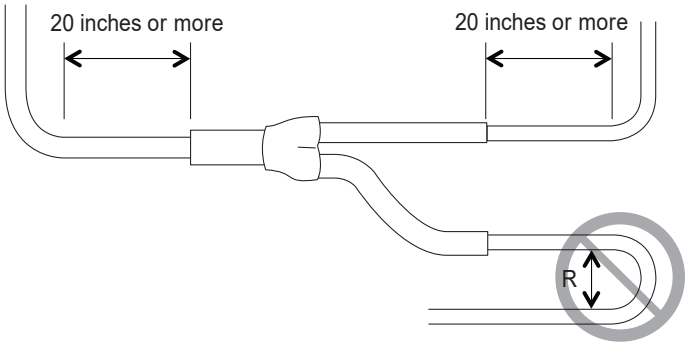
Installation Method			Y-Branch	Combo Y-branch and Header	Header[1]
Maximum Pipe Length	ODU ↔ IDU	Longest Actual Pipe Length (Standard Application)	≤492 feet	≤492 feet	≤656 feet
		Longest Actual Pipe Length (Conditional Application)	≤656 feet	≤656 feet	N / A
		Equivalent Pipe Length (Standard Application)	≤574 feet	≤574 feet	≤738 feet
		Equivalent Pipe Length (Conditional Application)	≤738 feet	≤738 feet	N / A
		Total Pipe Length (A + ΣB + ΣC)	≤1,640 feet	≤1,640 feet	≤1,640 feet
Maximum Elevation Differential	ODU ↔ IDU	Elevation Differential (Elevation1)	≤164 feet	≤164 feet	≤164 feet
	IDU ↔ IDU	Elevation Differential (Elevation2)	≤131 feet	≤131 feet	≤131 feet
Longest Pipe Length After First Branch		Pipe Length ℓ (Standard Application)	≤131 feet	≤131 feet	≤131 feet
		Pipe Length ℓ (Conditional Application)	≤295 feet	≤295 feet	N / A
height[1]		Elevation Differential Outdoor Unit to Outdoor Unit	16.4 feet	16.4 feet	16.4 feet
Distance between Outdoor Unit to Outdoor Unit			≤33 feet (Equivalent pipe length: ≤43 feet)		
Distance between Fittings and Indoor Units[1,2]			≥20 inches		
Distance between Fittings and Y-branches, and between Fittings and Headers[1,2]			≥20 inches		
Distance between two Y-branches or two Headers[1,2]			≥20 inches		
Distance between series-piped Shutoff Valve Units[2]			≥20 inches		
Height Differential between two Shutoff Valve Units if installed with a Y-branch			≤98 feet		
Height Differential between two series-piped Shutoff Valve Units			≤16 feet		

[1]Assume equivalent pipe length of a Y-branch is 1.6 feet, and equivalent pipe length of a header is 3.3 feet. Fittings refers to long radius 90° and 45° elbows.

[2]Must be at least 20 inches of straight pipe before and/or after Indoor Units, Y-branches, and Headers. Failure to provide 20 inches of straight pipe for these system components may affect performance or result in noise.

NOTICE

- *Bending radius should be at least twice the diameter of the pipe.*
- *Bend pipe after 20 inches or more from Y-branch or header.*
  If possible ⃠ do not use a U-type bend as it may affect performance or result in noise.
  If a U-type bend is necessary, the radius should be more than 8 inches.



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PIPING LIMITATIONS

For Systems Designed for Heat Pump Operation

Following pages present R32 Multi V Water 5 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 Pump System

Example: Five (5) indoor Units Connected

WSU: Water Source Unit

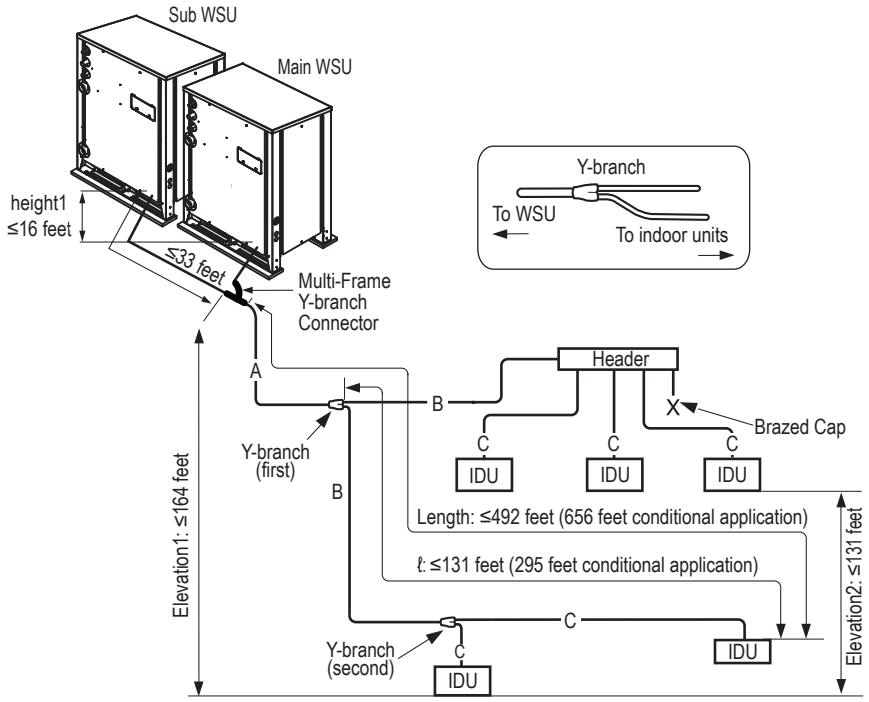
IDU: Indoor Unit

A: Main Pipe from Water Source Unit to First Y-branch

B: Y-branch to Y-branch / Header

C: Y-branch / Header to Indoor Unit

Figure 46: Sample pipe sizing for Heat Pump System.



NOTICE

- *Always reference the LATS Multi V software report.*
- *The largest capacity unit must be the main unit in a multi-frame system.*
- *Main water source unit capacity must be greater than or equal to the sub water source unit capacity.*
- *Connection piping from branch to branch cannot exceed the main pipe diameter (A) used by the water source unit.*
- *Install the header branches 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.*

Table 32: Main Pipe (A) Diameter from Water Source Unit to First Y-branch / Header Branch.

WSU Capacity (tons)	Equivalent pipe length from WSU to farthest IDU is <295 ft.		Equivalent pipe length from WSU to farthest IDU is ≥295 ft.	
	Liquid pipe (in.OD)	Vapor pipe (in.OD)	Liquid pipe (in.OD)	Vapor pipe (in.OD)
6	3/8	5/8	1/2	3/4
8	3/8	3/4	1/2	7/8
10	1/2	3/4	5/8	7/8
12	1/2	7/8	5/8	1-1/8
14	5/8	7/8	3/4	1-1/8
16	5/8	1-1/8	3/4	1-3/8
18	5/8	1-1/8	3/4	1-3/8
20	5/8	1-1/8	3/4	1-3/8
22	3/4	1-1/8	7/8	1-3/8
24	3/4	1-1/8	7/8	1-3/8
30	3/4	1-1/8	7/8	1-3/8
36	3/4	1-1/8	7/8	1-3/8
42	3/4	1-1/8	7/8	1-3/8
48	3/4	1-3/8	7/8	1-5/8

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PIPING LIMITATIONS

For Systems Designed for Heat Pump Operation

Following pages present R32 Multi V Water 5 Water piping limitations, and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Table 33: Refrigerant Pipe Diameter (B) from Y-branch to Y-branch / Header.

Downstream Total Capacity of IDUs (Btu/h)[1]	Liquid pipe (in. OD)	Vapor pipe (in. OD)
≤19,100	1/4	1/2
≤54,600	3/8	5/8
≤76,400	3/8	3/4
≤112,600	3/8	7/8
≤160,400	1/2	1-1/8
≤242,300	5/8	1-1/8
≤354,900	3/4	1-3/8
>354,900	3/4	1-5/8

[1]For the first branch pipe, use the branch pipe that matches main pipe A diameter.

Table 34: 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 indoor units have 3/8 in (liquid) and 5/8 in (vapor).

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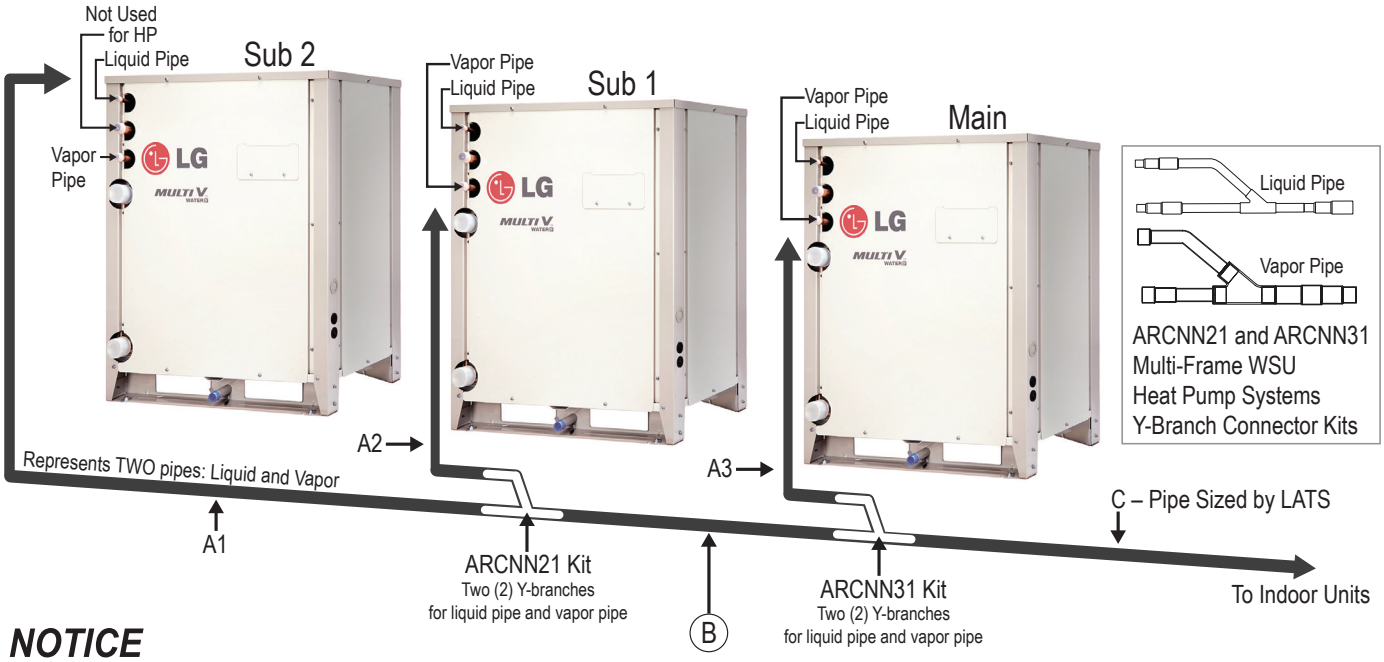
PIPING LIMITATIONS

For Systems Designed for Heat Pump Operation

Following pages present R32 Multi V Water 5 piping limitations, and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Triple-Frame Heat Pump Water Source Unit Connections

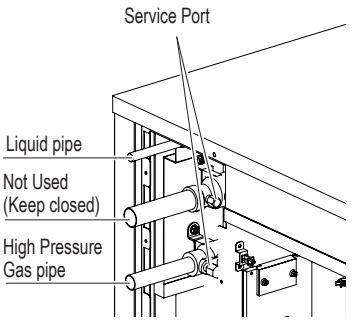
Figure 47: Heat Pump Triple-Frame Connections.



NOTICE

- *A1, A2, and A3 diameters match the water source unit connection diameters. Main pipe C diameters are sized by LATS.*
- *For single and dual-frame systems, the pipe size is the same size as the frame connections.*
- *Always reference the LATS Multi V software report.*
- *The largest capacity water source unit must be the main unit in a multi-frame system.*
- *Main water source unit capacity must be greater than or equal to the sub1 water source unit capacity, and, where applicable, sub1 water source unit capacity must be greater than or equal to the sub2 water source unit capacity.*
- *Connection piping from branch to branch cannot exceed the main pipe diameter (A) used by the water source unit.*
- *Install the header branches 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.*
- *Outdoor unit Y-branches can only be installed in a horizontal or vertical UP configuration. The vertical DOWN configuration is not permitted.*

Figure 48: Heat Pump Pipes and Service Ports.



Heat Pump Triple-Frame Connection Pipe Sizes

Table 35: Triple-Frame Connection Pipe Sizes.

Size (tons)	Water Source Unit (WSU)	Voltage	Main Unit	Sub Unit 1	Sub Unit 2	B			
						Equivalent pipe length from WSU to farthest IDU is <295'		Equivalent pipe length from WSU to farthest IDU is ≥295'	
						Liquid	Vapor	Liquid	Vapor
30	ZRWM360BAS5	208-230V	ZRWM121BAS5	ZRWM121BAS5	ZRWM121BAS5	3/4"	1-3/8"	7/8"	1-5/8"
36	ZRWM432BAS5	208-230V	ZRWM144BAS5	ZRWM144BAS5	ZRWM144BAS5	3/4"	1-3/8"	7/8"	1-5/8"
36	ZRWM432DAS5	460V	ZRWM144DAS5	ZRWM144DAS5	ZRWM144DAS5	3/4"	1-3/8"	7/8"	1-5/8"
42	ZRWM504DAS5	460V	ZRWM192DAS5	ZRWM168DAS5	ZRWM144DAS5	3/4"	1-3/8"	7/8"	1-5/8"
48	ZRWM576DAS5	460V	ZRWM192DAS5	ZRWM192DAS5	ZRWM192DAS5	3/4"	1-3/8"	7/8"	1-5/8"

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NOTICE

Various tools are available to assist in properly designing LG R32 systems. Refer to the "R32 Application Guide"; the "Simple Calculator for Capacity, Refrigerant Charge and ESP"; the "LG Air Conditioner Technical Solutions" (LATS) software program; and the local LG Sales Representative.

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 (up to 295 feet maximum):

- Pipe segment diameters between the first Y-branch and the second Y-branch must be sized up by one. This applies to both liquid and low pressure vapor pipes. If the next size up is not available, or if the piping segment diameters are the same as main pipe (A) diameters, sizing up is not possible.
- While calculating the entire refrigerant pipe length, pipe lengths for ΣB should be multiplied by two: A+(ΣBx2)+ΣC ≤3,280 feet.
- Length of pipe (C) from each indoor unit to the closest Y-branch or header ≤ 131 ft.
- [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.
- When an indoor unit is directly connected after the 1st branch. When installing the pipe of an Indoor unit directly connected after the 1st branch that is between 131 ft and 295 ft.,
  - Pipe diameter must be sized up by one.
  - This pipe length must be multiplied by two: A+(ΣBx2)+C(1)+ΣC ≤3,280 feet.

If the pipe (B) diameters after the first branch are bigger than the main pipe (A) diameters, pipe (B) should be changed to match main pipe (A) sizes. If one (or both) of the conditions below are met, the main pipe must be upsized.

- The equivalent length between outdoor unit and the farthest indoor unit is 295 ft. or more (liquid and gas pipes are upsized).
- The elevation distance between outdoor unit and indoor unit is 164 ft. or more (only the liquid pipe is upsized).

Refer to Table 21: Main Pipe (A) Diameter from Water Source Unit to First Y-branch / Header Branch".

Example: When an indoor unit combination ratio of 120% is connected to a 22-ton water source unit:
Water source unit main pipe (A) diameters: 1-3/8Ø inches (vapor) and 5/8Ø inches (liquid).

1. Pipe (B) diameters: 1-3/8Ø (vapor) and 3/4Ø (liquid) (after the first branch, when indoor unit combination ratio is 120% [26 tons]).
2. After the first branch, pipe (B) diameters must be changed to 1-3/8Ø inches (vapor) and 5/8Ø inches (liquid) to match main pipe (A) sizes.

Instead of using the total indoor unit capacity to choose main pipe (A) diameters, use water source unit capacity to choose downstream main pipe (A) diameters. Do not permit connection pipes (B) from branch to branch to exceed main pipe (A) diameters as indicated by water source unit. capacity. Example: When an indoor unit combination ratio of 120% is connected to a 20-ton water source unit (24 tons), and indoor unit with a 7,000 Btu/h capacity is located at the first branch:

1. Main pipe (A) diameters on a 20-ton water source unit: 1-1/8Ø inches (vapor) and 5/8Ø inches (liquid).
2. Pipe diameters between first and second branches, however, are: 1-3/8Ø (vapor) and 3/4Ø (liquid) (connected downstream indoor unit capacity is 20 tons).
3. If main pipe (A) diameters of a 20-ton water source unit are 1-1/8Ø (vapor) and 5/8Ø (liquid), then the pipe diameters between the first and second branches should be changed to match.

Note that the pipe diameters computed in LATS may not be standard ACR copper tube sizes that are commonly available. In these instances, refer to the table below and use the next commonly available pipe size. Please refer to the Copper Development Association Inc. Publication A4015-14/19: Copper Tube handbook for additional information.

Table 36: LATS Conditional Piping Upsizing.

LATS Conditional Applications Upsized Pipe Diameters	Standard Size Commonly Available ACR Pipe Diameters
1" →	1-1/8"
1-1/4" →	1-3/8"
1-1/2" →	1-5/8"

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PIPING LIMITATIONS

Systems Designed for Heat Pump Operation

The following pages present R32 Multi V Water 5 piping limitations and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

NOTICE

Various tools are available to assist in properly designing LG R32 systems. Refer to the "R32 Application Guide"; the "Simple Calculator for Capacity, Refrigerant Charge and ESP"; the "LG Air Conditioner Technical Solutions" (LATS) software program; and the local LG Sales Representative.

Connective Capacity Limit

1. The maximum total capacity of each shutoff valve unit branch is 60,000 Btu/h.
2. The maximum total capacity of indoor units is 230,000 Btu/h.
3. If an indoor unit capacity is larger than 60,000 Btu/h (large capacity 76,000 and 96,000 Btu/h indoor units), two pipes next to each other on one shutoff valve unit must be connected by a Y-branch unit and then connected to one indoor unit.
4. Serial Connection of Shutoff Valves
   - Maximum total sum of indoor units must be ≤230,00 Btu/h.
   - Maximum number of indoor units per a branch is eight (8).

Shutoff Valve Unit Piping

- Pipe installation is from outdoor units to shutoff valve units, and from shutoff valve units to indoor units.
- Two pipes: Vapor Pipe, Liquid Pipe.

Figure 49: Shutoff Valve Unit Piping System.

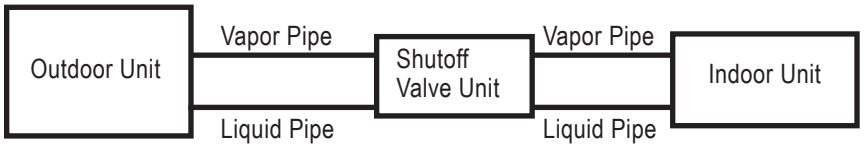
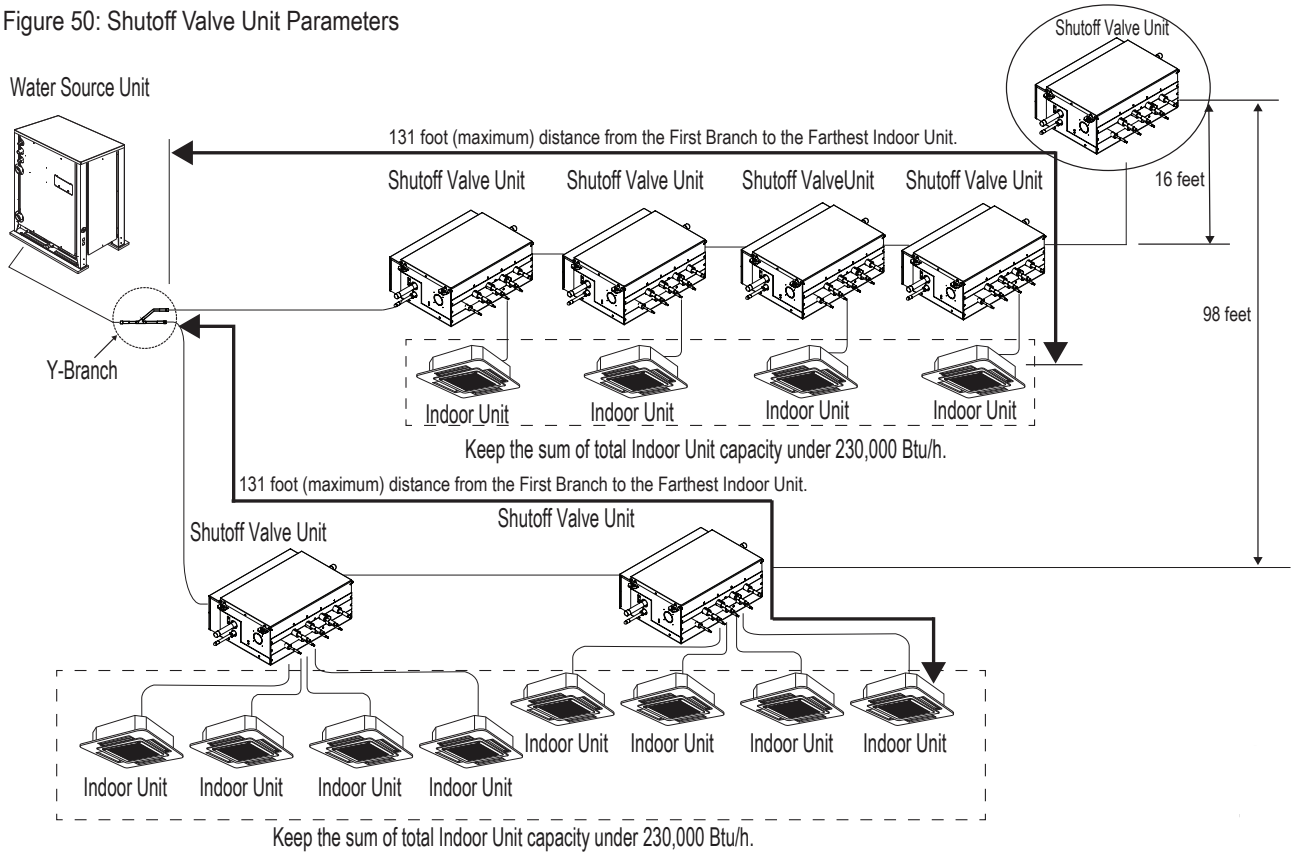


Figure 50: Shutoff Valve Unit Parameters



NOTICE

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PIPING LIMITATIONS

Systems Designed for Heat Pump Operation

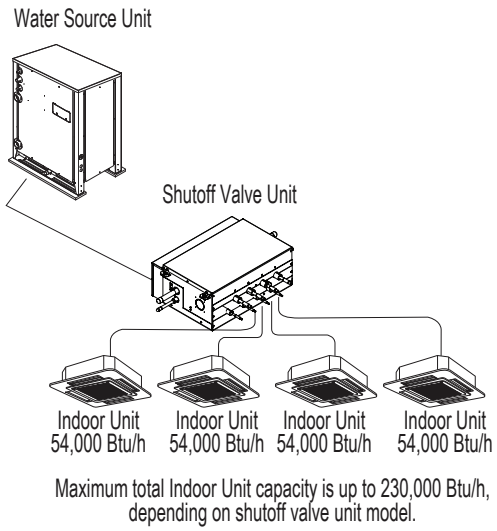
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NOTICE

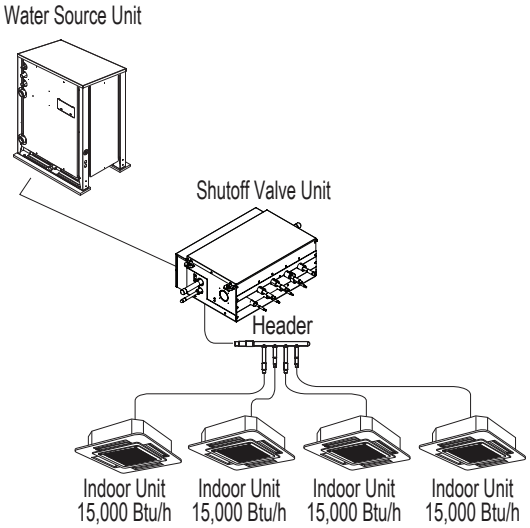
Various tools are available to assist in properly designing LG R32 systems. Refer to the "R32 Application Guide"; the "Simple Calculator for Capacity, Refrigerant Charge and ESP"; the "LG Air Conditioner Technical Solutions" (LATS) software program; and the local LG Sales Representative.

Sample Layouts

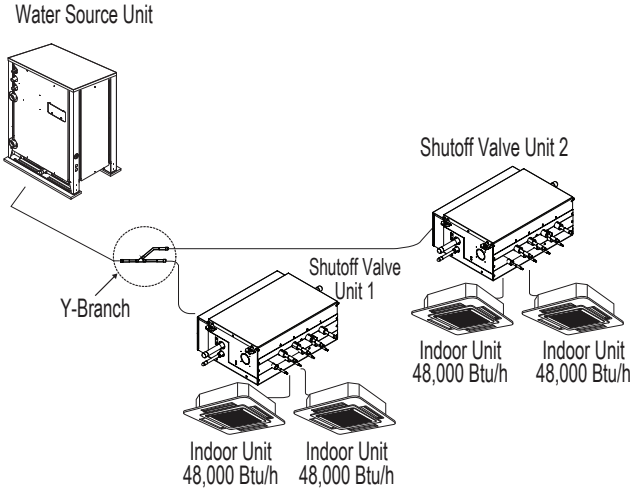
Systems designed for heat pump operation can be designed with a variety of Y-branches / Headers / Shutoff Valve Units combinations.

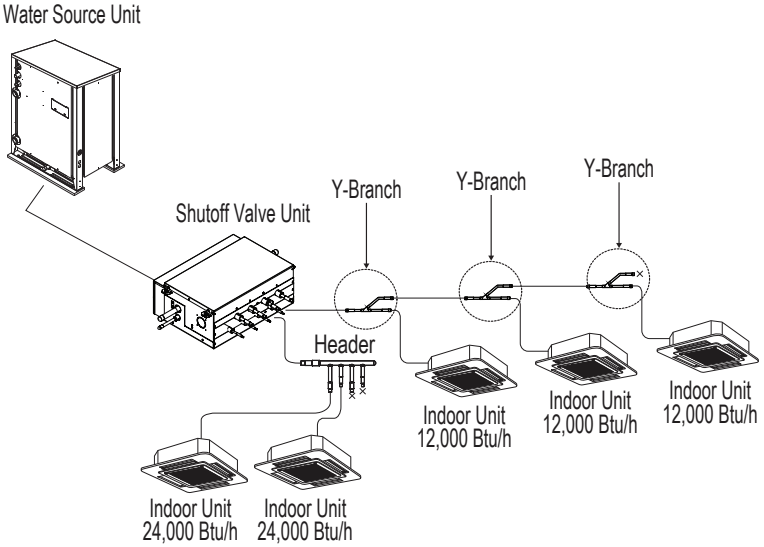


Maximum total Indoor Unit capacity is up to 230,000 Btu/h, depending on shutoff valve unit model.



Maximum total Indoor Unit capacity per Shutoff Valve Unit branch pipe is 60,000 Btu/h.





NOTICE

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PIPING LIMITATIONS

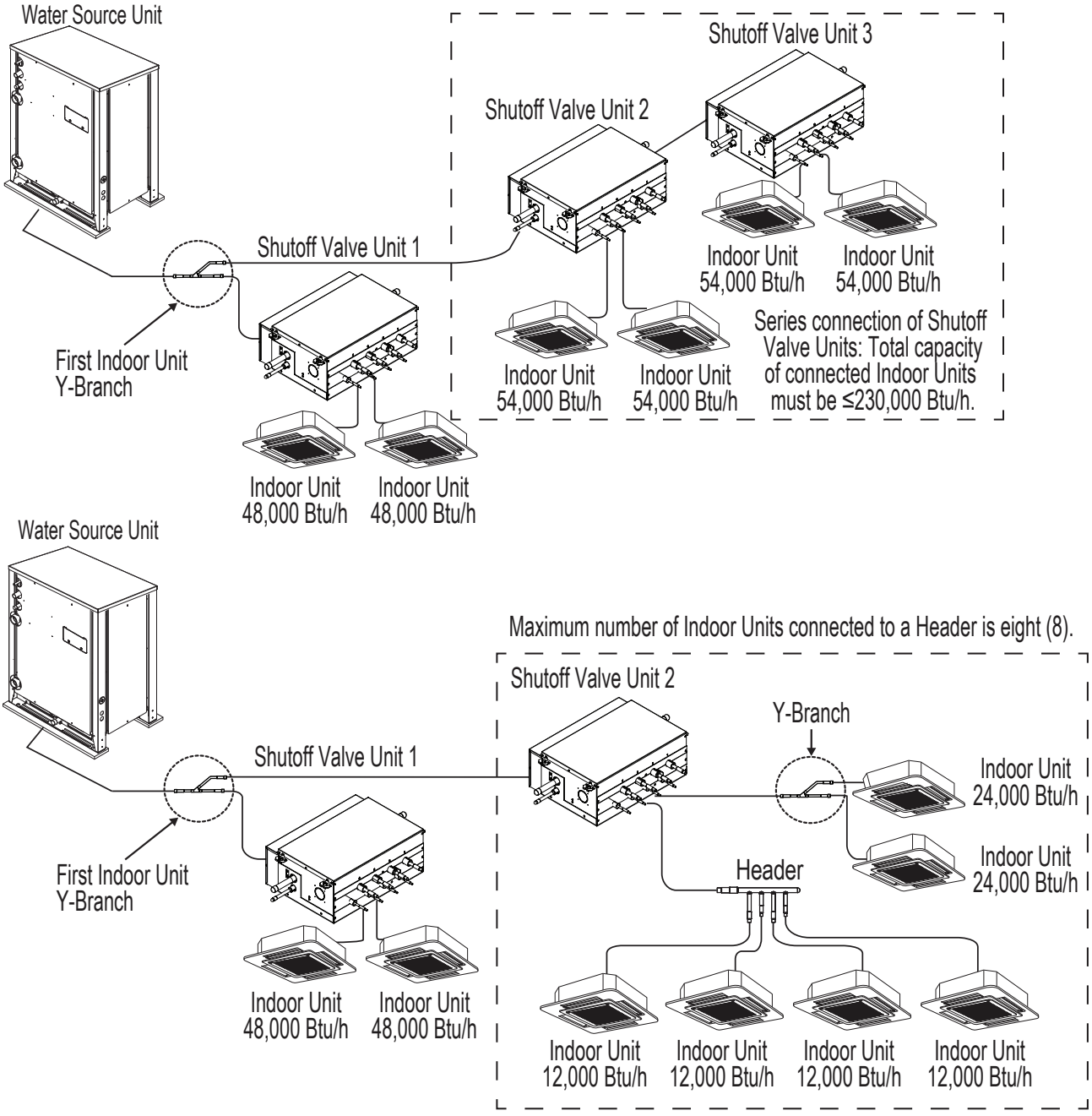
Systems Designed for Heat Pump Operation

The following pages present R32 Multi V Water 5 piping limitations and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

NOTICE

Various tools are available to assist in properly designing LG R32 systems. Refer to the "R32 Application Guide"; the "Simple Calculator for Capacity, Refrigerant Charge and ESP"; the "LG Air Conditioner Technical Solutions" (LATS) software program; and the local LG Sales Representative.

Sample Layouts, Continued.



NOTICE

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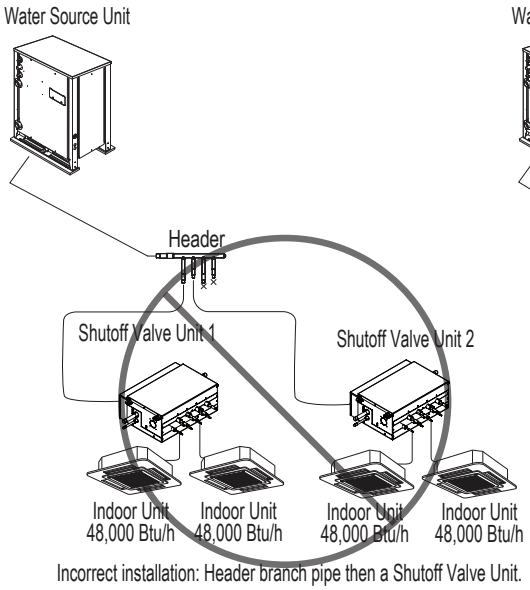
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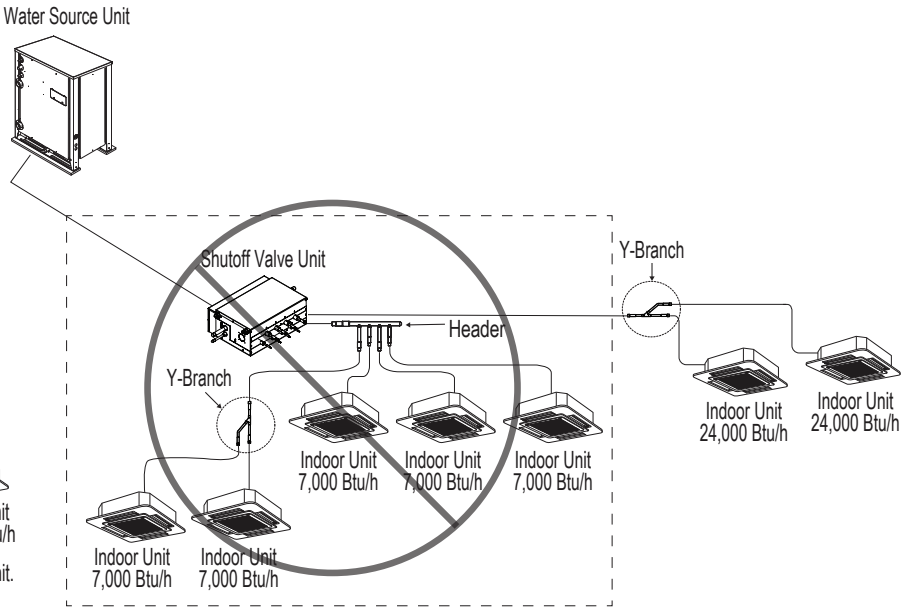
NOTICE

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Incorrect Layouts



Incorrect installation: Header branch pipe then a Shutoff Valve Unit.



Incorrect installation: Shutoff Valve Unit, then a Header branch pipe, then a Y-Branch and Header Branch pipe.

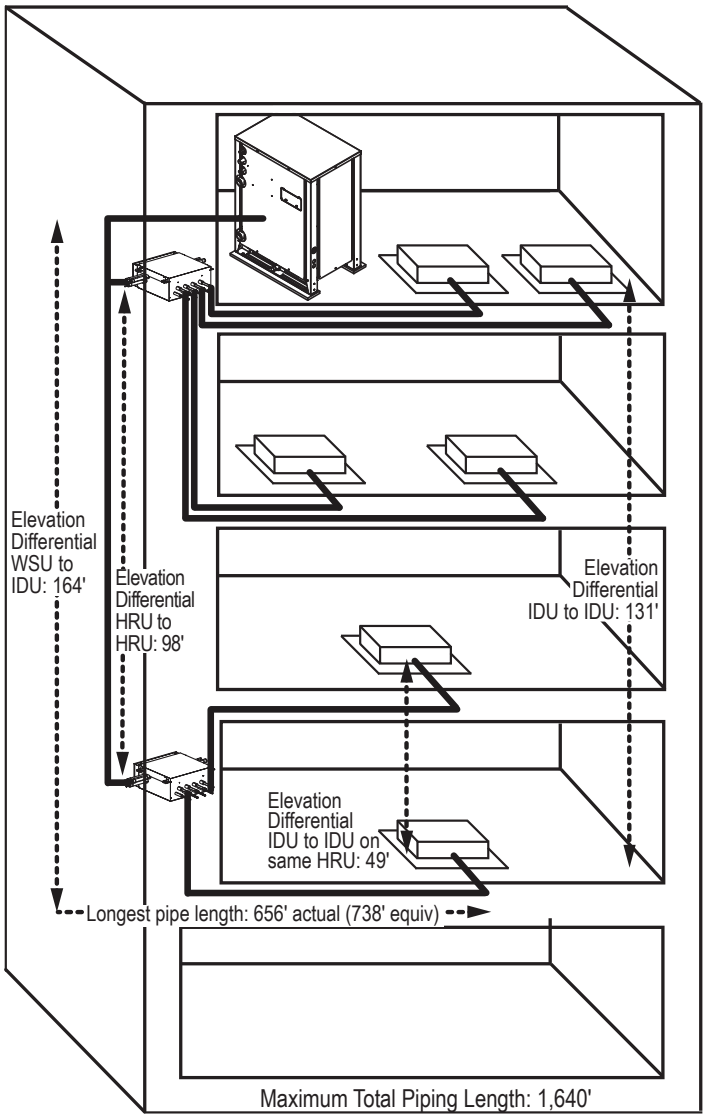
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PIPING LIMITATIONS

For Systems Designed for Heat Recovery Operation

Following pages present R32 Multi V Water 5 piping limitations and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Figure 51: Typical Heat Recovery System Building Layout with Piping Limitations.



**See next page for table.*

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PIPING LIMITATIONS

For Systems Designed for Heat Recovery Operation

Following pages present R32 Multi V Water 5 piping limitations, and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Table 37: Piping Limitations for Heat Recovery Operation.

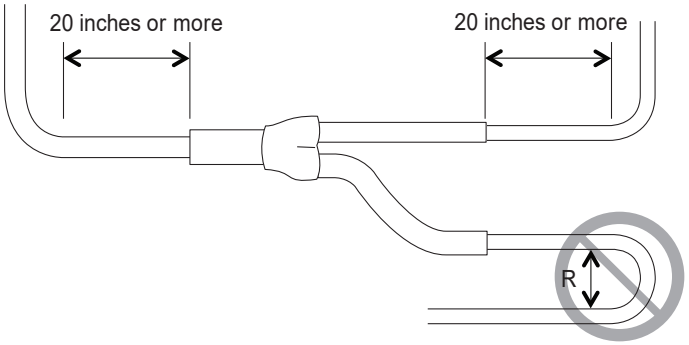
Length	Total pipe length	Longest actual pipe length	Equivalent pipe length[1]
	A + ΣB + ΣC ≤1,640 feet	≤492 feet (656 feet conditional application)	≤574 feet (738 feet conditional application)
ℓ	Longest pipe length after first branch		
	≤131 feet (295 feet conditional application)		
Elevation1	Elevation differential (Outdoor Unit ↔ Indoor Unit)		
	Height ≤164 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		
height[1]	Elevation differential (Outdoor Unit ↔ Outdoor Unit)		
	≤16.4 feet		
Distance between Outdoor Unit to Outdoor Unit		≤33 feet (Equivalent pipe length: ≤43 feet)	
Distance between Fittings and Indoor Units[1,2]		≥20 inches	
Distance between Fittings and Y-branches, and between Fittings and Headers[1,2]		≥20 inches	
Distance between two Y-branches or two Headers[1,2]		≥20 inches	
Distance between series-piped Heat Recovery Units[2]		≥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 a Y-branch is 1.6 feet, and equivalent pipe length of a header is 3.3 feet. Fittings refers to long radius 90° and 45° elbows.

[2]Must be at least 20 inches of straight pipe before and/or after Indoor Units, Heat Recovery Units, Y-branches and Headers. Failure to provide 20 inches of straight pipe for these system components may affect performance or result in noise.

NOTICE

- *Bending radius should be at least twice the diameter of the pipe.*
- *Bend pipe after 20 inches or more from Y-branch or header.*
  If possible ⃠ do not use a U-type bend as it may affect performance or result in noise.
  If a U-type bend is necessary, the radius should be more than 8 inches.



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PIPING LIMITATIONS

For Systems Designed for Heat Recovery Operation

Following pages present R32 Multi V Water 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

WSU: Water Source Unit

HRU: Heat Recovery Unit

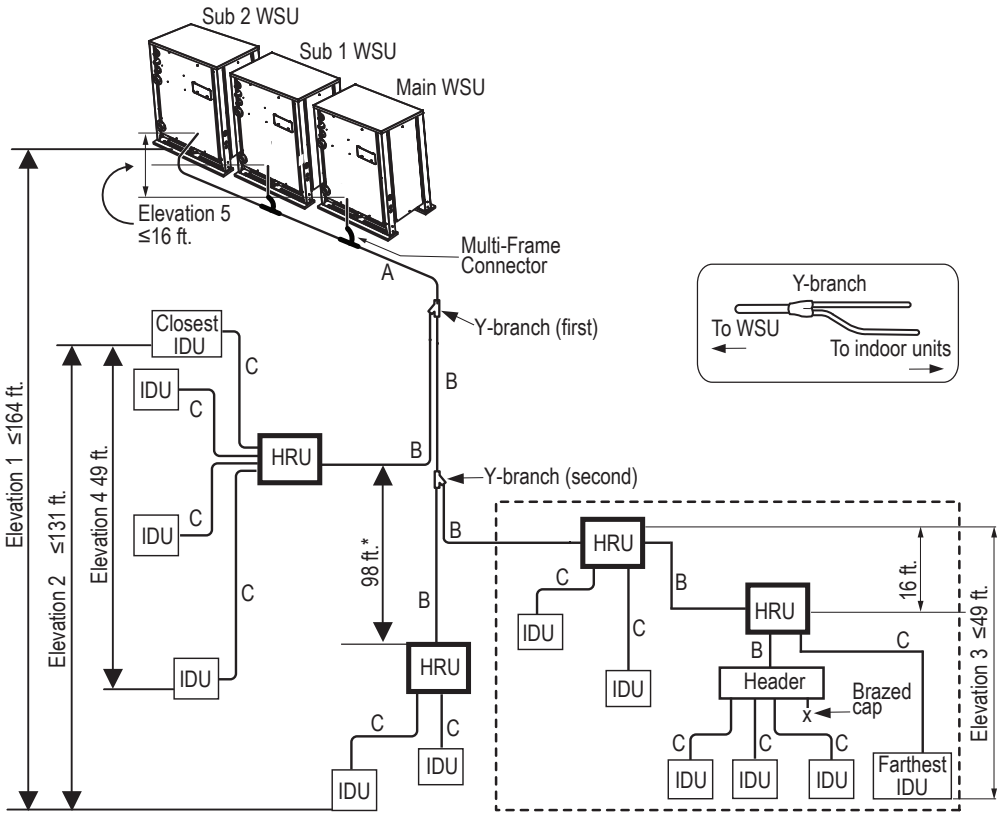
IDU: Indoor Unit

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 52: Heat Recovery Triple-Frame Connections.



* Up to 131 ft. may be possible with certain applications. Contact LG Engineering for additional information.

NOTICE

- *Always reference the LATS Multi V software report.*
- *The largest capacity WSU must be the main unit in a multi-frame system.*
- *Main WSU capacity must be greater than or equal to the sub1 WSU capacity, and, where applicable, sub1 WSU capacity must be greater than or equal to the sub2 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 ≤192,400 Btu/h.*
- *If large capacity indoor units (>12,000 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.)*

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PIPING LIMITATIONS

For Systems Designed for Heat Recovery Operation

Following pages present R32 Multi V Water 5 Water piping limitations, and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Table 38: 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 (in.OD)	High Pressure Vapor Pipe (in.OD)	Liquid Pipe (in.OD)	Low Pressure Vapor Pipe (in.OD)	High Pressure Vapor Pipe (in.OD)
6	3/8	3/4	5/8	1/2	7/8	3/4
8	3/8	7/8	3/4	1/2	1-1/8	7/8
10	1/2	1-1/8	3/4	5/8	1-3/8	7/8
12	1/2	1-1/8	7/8	5/8	1-3/8	1-1/8
14	5/8	1-1/8	7/8	3/4	1-3/8	1-1/8
16	5/8	1-1/8	1-1/8	3/4	1-3/8	1-3/8
18	5/8	1-1/8	1-1/8	3/4	1-3/8	1-3/8
20	5/8	1-3/8	1-1/8	3/4	1-5/8	1-3/8
22	3/4	1-3/8	1-1/8	7/8	1-5/8	1-3/8
24	3/4	1-3/8	1-1/8	7/8	1-5/8	1-3/8
30	3/4	1-5/8	1-1/8	7/8	1-5/8	1-3/8
36	3/4	1-5/8	1-1/8	7/8	1-5/8	1-3/8
42	3/4	1-5/8	1-1/8	7/8	1-5/8	1-3/8
48	3/4	1-5/8	1-3/8	7/8	1-5/8	1-5/8

Table 39: Refrigerant Pipe (B) Diameter between Y-branches and Y-branches / Heat Recovery Unit / Headers.

Downstream IDU total capacity (Btu/h)	Liquid pipe (in.OD)	Vapor pipe (in.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 40: 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

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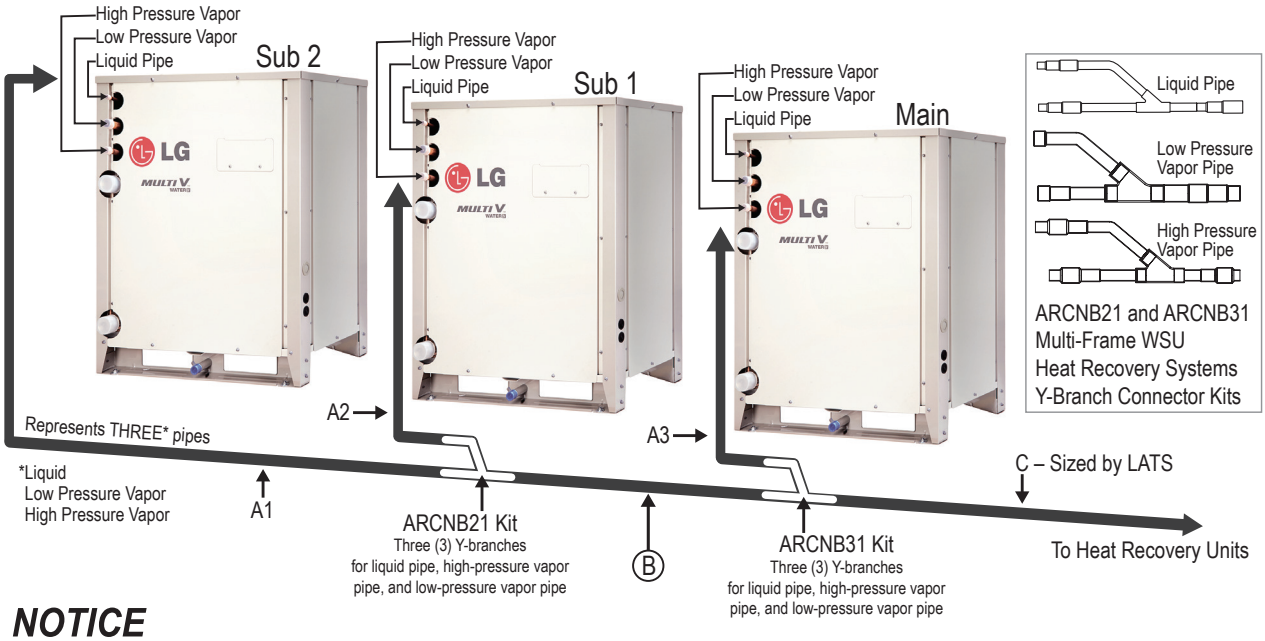
PIPING LIMITATIONS

For Systems Designed for Heat Recovery Operation

Following pages present R32 Multi V Water 5 piping limitations, and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Triple-Frame Heat Recovery Water Source Unit Connections

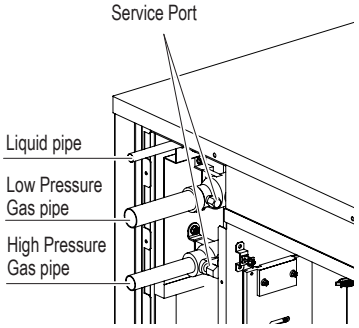
Figure 53: Heat Recovery Triple-Frame Connections.



NOTICE

- *A1, A2, and A3 diameters match the water source unit connection diameters. Main pipe C diameters are sized by LATS.*
- *For single and dual frame systems, the pipe size is the same size as the frame connections.*
- *Always reference the LATS Multi V software report.*
- *The largest capacity water source unit must be the main unit in a multi-frame system.*
- *Main water source unit capacity must be greater than or equal to the sub1 water source unit capacity, and, where applicable, sub1 water source unit capacity must be greater than or equal to the sub2 water source unit capacity.*
- *Connection piping from branch to branch cannot exceed the main pipe diameter (A) used by the water source unit.*
- *Install the header branches 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.*
- *Outdoor unit Y-branches can only be installed in a horizontal or vertical UP configuration. The vertical DOWN configuration is not permitted.*

Figure 54: Heat Recovery Pipes and Service Ports.



Heat Recovery Triple-Frame Connection Pipe Sizes

Table 41: Triple-Frame Connection Pipe Sizes.

Size (tons)	Water Source Unit	Voltage	Main unit	Sub unit 1	Sub unit 2	B Pipe					
						Equivalent pipe length from WSU to farthest IDU is <295'			Equivalent pipe length from WSU to farthest IDU is ≥295'		
						Liquid (in)	Low Pressure Vapor	High Pressure Vapor	Liquid	Low Pressure Vapor	High Pressure Vapor
30	ZRWM360BAS5	208-230V	ZRWM121BAS5	ZRWM121BAS5	ZRWM121BAS5	3/4"	1-3/8"	1-1/8"	7/8"	1-5/8"	1-1/8"
36	ZRWM432BAS5	208-230V	ZRWM144BAS5	ZRWM144BAS5	ZRWM144BAS5	3/4"	1-3/8"	1-1/8"	7/8"	1-5/8"	1-1/8"
36	ZRWM432DAS5	460V	ZRWM144DAS5	ZRWM144DAS5	ZRWM144DAS5	3/4"	1-3/8"	1-1/8"	7/8"	1-5/8"	1-1/8"
40	ZRWM504DAS5	460V	ZRWM192DAS5	ZRWM168DAS5	ZRWM144DAS5	3/4"	1-3/8"	1-1/8"	7/8"	1-5/8"	1-1/8"
48	ZRWM576DAS5	460V	ZRWM192DAS5	ZRWM192DAS5	ZRWM192DAS5	3/4"	1-3/8	1-1/8	7/8	1-5/8	1-1/8

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Following pages present R32 Multi V Water 5 piping limitations, and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

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 pressure 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: A+(ΣBx2)+C(1)+ΣC ≤ 3,280 feet.
- 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.

If one (or both) of the conditions below are met, the main pipe must be upsized.

- The equivalent length between outdoor unit and the farthest indoor unit is 295 ft. or more (liquid and gas pipes are upsized).
- The elevation distance between outdoor unit and indoor unit is 164 ft. or more (only the liquid pipe is upsized).

Refer to Table 27: Main pipe (A) diameter from the outdoor unit to the first Y-branch/header branch.

If the pipe (B) diameters after the first branch are bigger than the main pipe (A) diameters, pipe (B) must be changed to match main pipe (A) sizes.
Example: When an indoor unit combination ratio of 120% is connected to a 24-ton water source unit:
Water source unit main pipe (A) diameters: 1-3/8 inches (vapor) and 5/8 inches (liquid).

1. Pipe (B) diameters: 1-3/8 (vapor) and 3/4 (liquid) (after the first branch, when indoor unit combination ratio is 120% [26 tons]).
2. After the first branch, pipe (B) diameters must be changed to 1-3/8 inches (vapor) and 5/8 inches (liquid) to match main pipe (A) sizes.

Instead of using the total indoor unit capacity to choose main pipe (A) diameters, use water source unit capacity to choose downstream main pipe (A) diameters. ⃠ Do not permit connection pipes (B) from branch to branch to exceed main pipe (A) diameters as indicated by water source unit. capacity. Example: When an indoor unit combination ratio of 120% is connected to a 20-ton water source unit (24 tons), and indoor unit with a 7,000 Btu/h capacity is located at the first branch:

1. Main pipe (A) diameters on a 20-ton water source unit: 1-1/8 inches (vapor) and 5/8 inches (liquid).
2. Pipe diameters between first and second branches, however, are: 1-3/8 (vapor) and 3/4 (liquid) (connected downstream indoor unit capacity is 20 tons).
3. If main pipe (A) diameters of a 20-ton water source unit are 1-1/8 (vapor) and 5/8 (liquid), then the pipe diameters between the first and second branches must be changed to match.

Note that the pipe diameters computed in LATS may not be standard ACR copper tube sizes that are commonly available. In these instances, refer to the table below and use the next commonly available pipe size. Please refer to the Copper Development Association Inc. Publication A4015-14/19: Copper Tube handbook for additional information.

Table 42: LATS Conditional Piping Upsizing.

LATS Conditional Applications Upsized Pipe Diameters		Standard Size Commonly Available ACR Pipe Diameters
1"	→	1-1/8"
1-1/4"	→	1-3/8"
1-1/2"	→	1-5/8"

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PIPING LIMITATIONS

MULTI V WATER 5

Systems Designed for Heat Recovery Operation

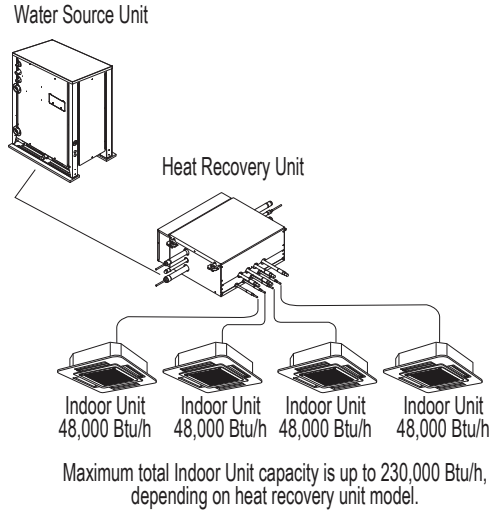
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NOTICE

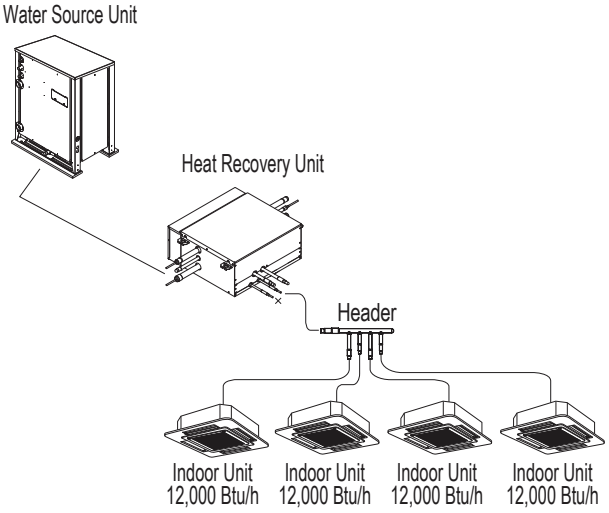
Various tools are available to assist in properly designing LG R32 systems. Refer to the "R32 Application Guide"; the "Simple Calculator for Capacity, Refrigerant Charge and ESP"; the "LG Air Conditioner Technical Solutions" (LATS) software program; and the local LG Sales Representative.

Sample Layouts

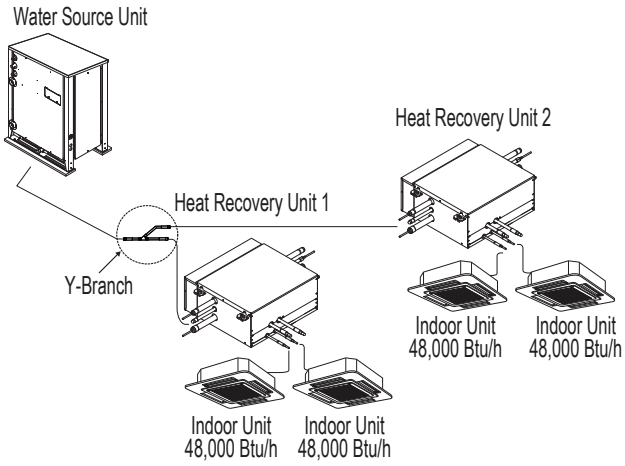
Systems designed for heat recovery operation can be designed with a variety of Y-branches / Headers / Heat Recovery Units combinations.

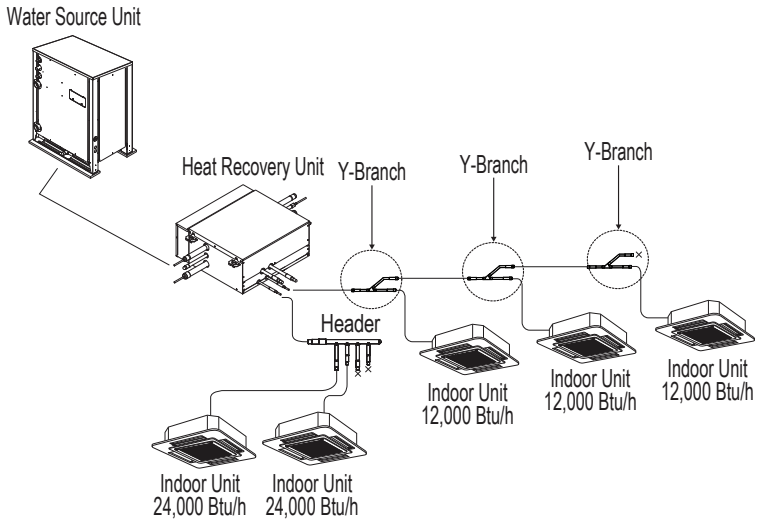


Maximum total Indoor Unit capacity is up to 230,000 Btu/h, depending on heat recovery unit model.



Maximum total Indoor Unit capacity per Heat Recovery Unit branch pipe is 60,000 Btu/h.





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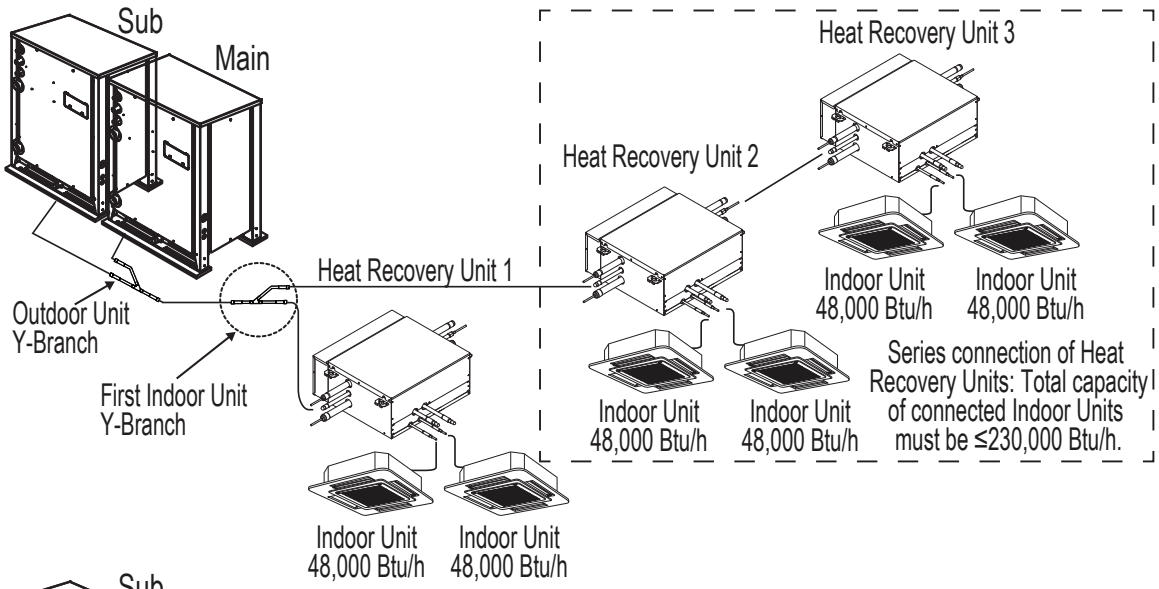
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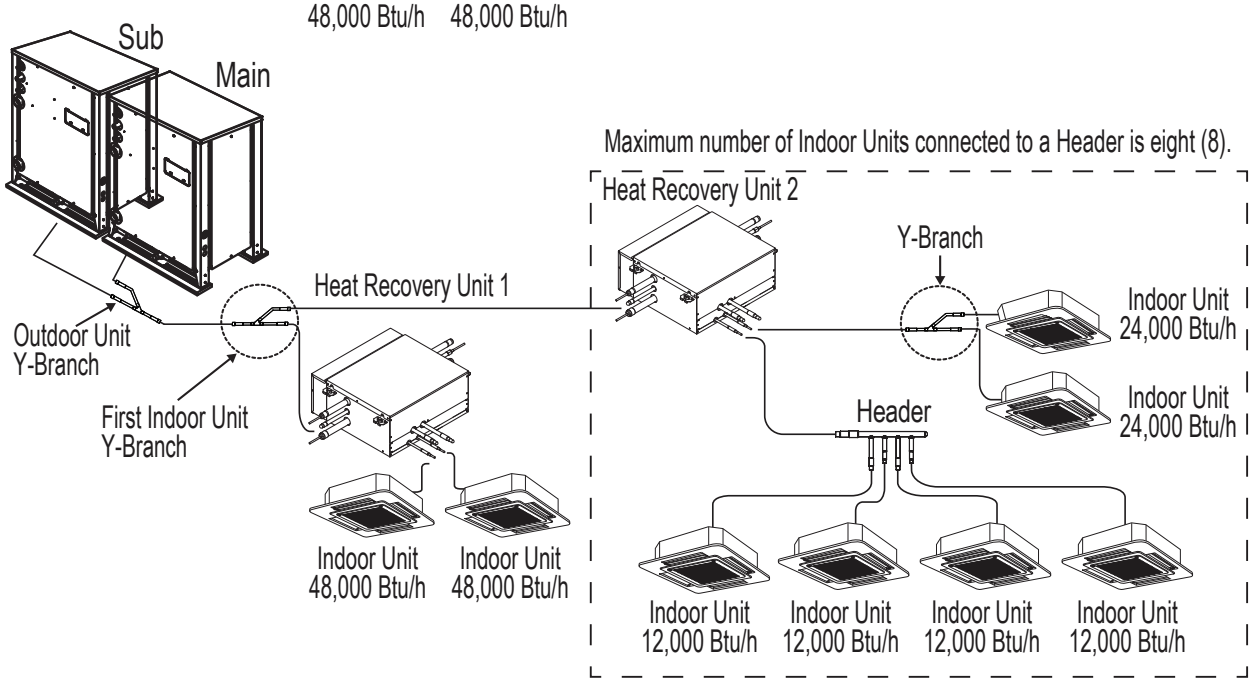
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Sample Layouts, Continued.





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PIPING LIMITATIONS

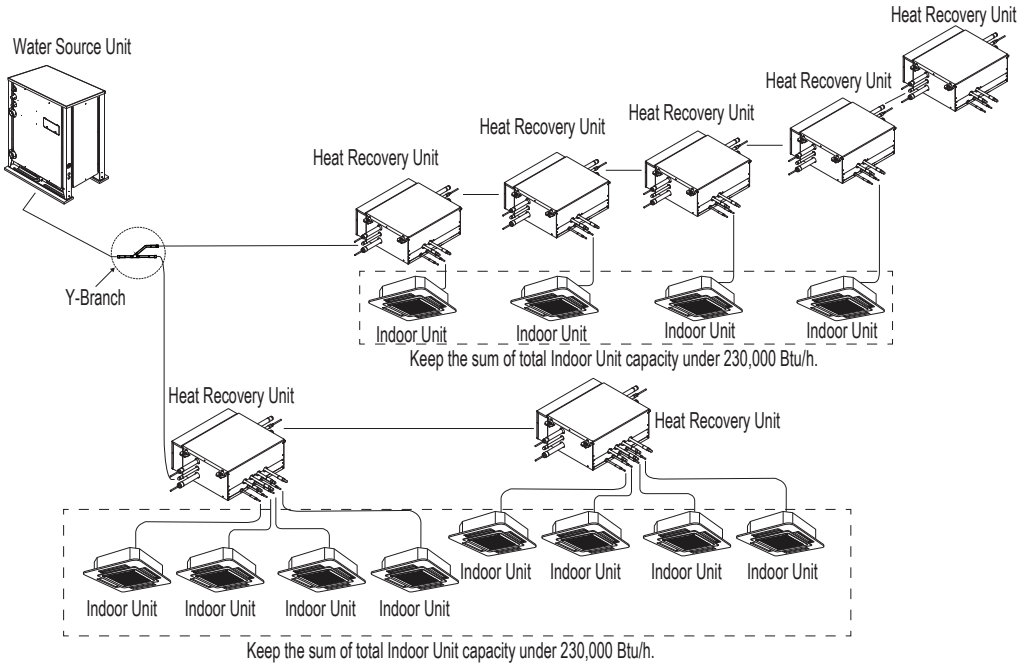
Systems Designed for Heat Recovery Operation

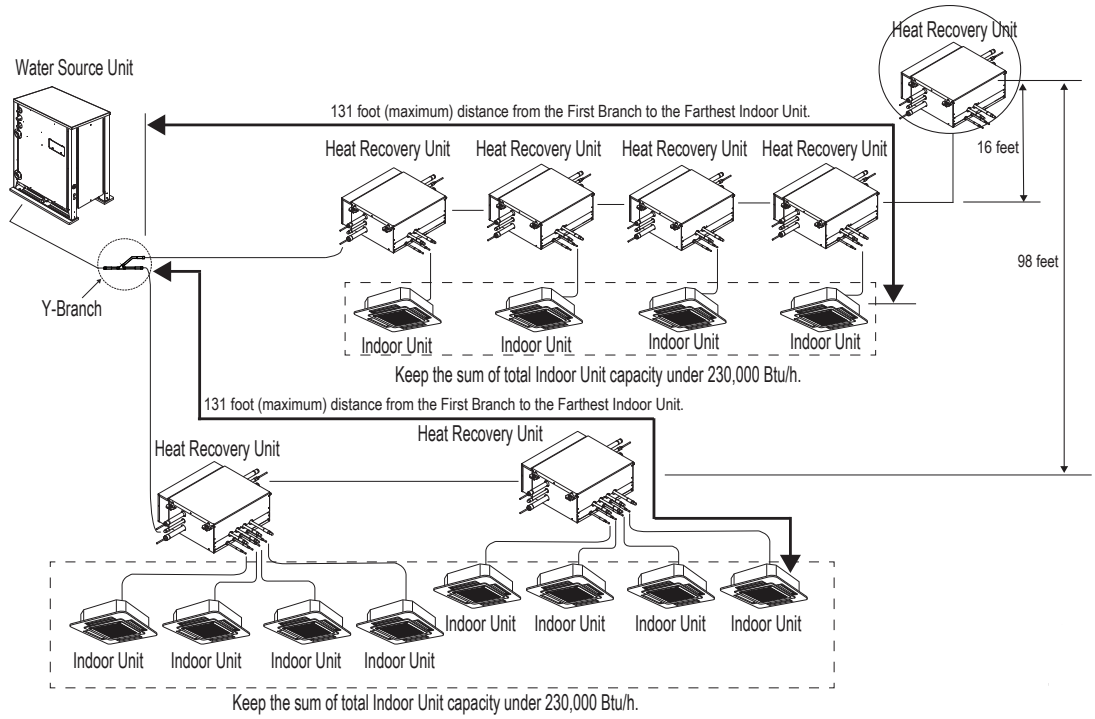
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NOTICE

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Sample Layouts, Continued.





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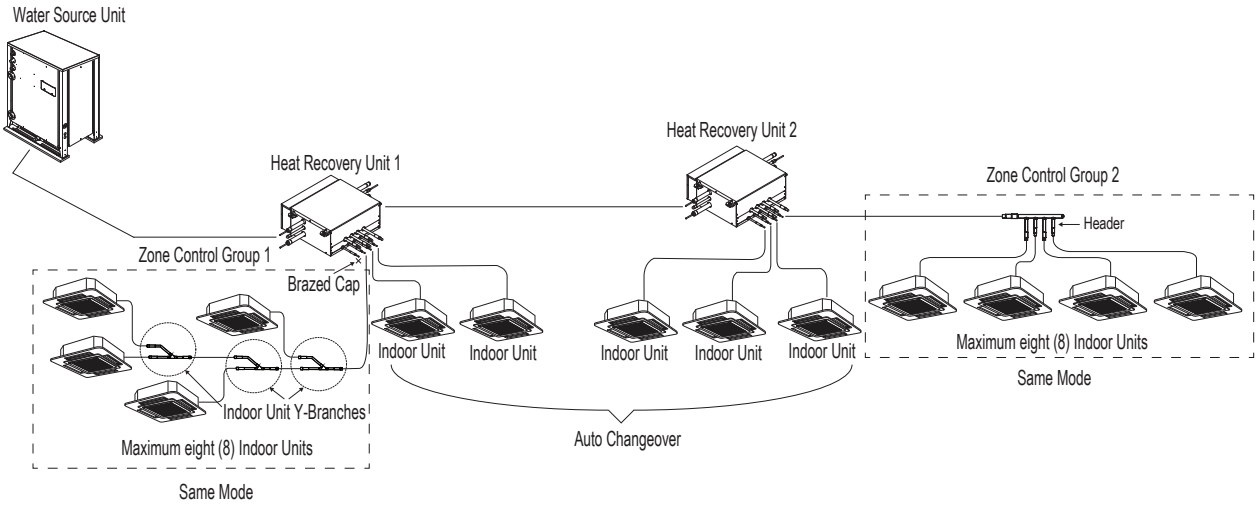
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Sample Layouts, Continued.

Zone Control

For zone control, up to eight (8) indoor units with a maximum capacity of 60,000 Btu/h can be connected to one port on the heat recovery unit. Y-Branches or Headers can be used, depending on what is best for the application.



- One heat recovery unit branch pipe can support a maximum of 60,000 Btu/h total indoor unit cooling capacity.
- PRHR044C heat recovery unit can support a maximum of 230,000 Btu/h total capacity and up to 32 connected indoor units (maximum indoor units per heat recovery unit branch pipe is 8).
- Zone control groups cannot operate in "Auto changeover" or "Mode override" functions.
- In the zone control group, if some indoor units are operating in cooling or heating mode, the other indoor units cannot change over to / operate in the opposite mode.

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PIPING LIMITATIONS

Systems Designed for Heat Recovery Operation

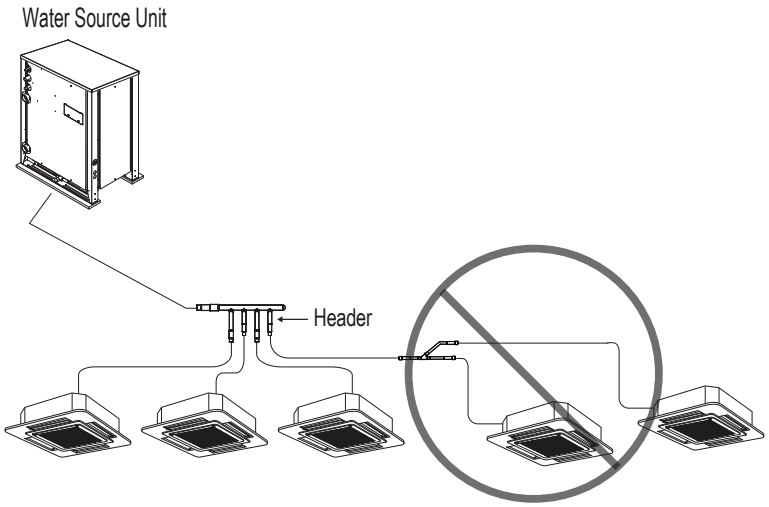
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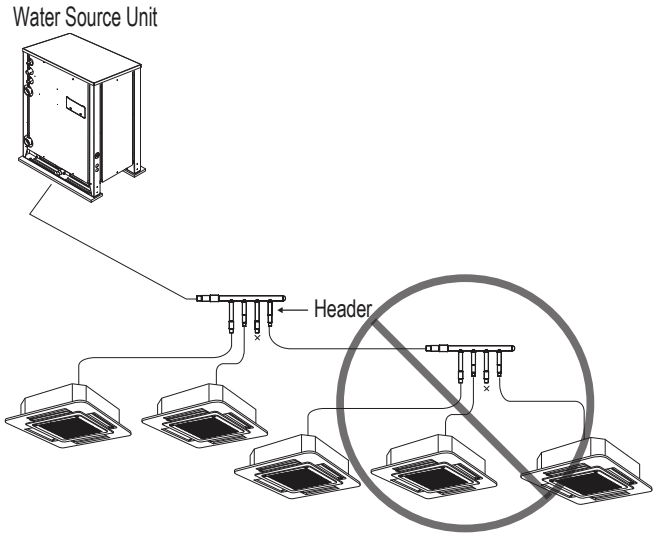
NOTICE

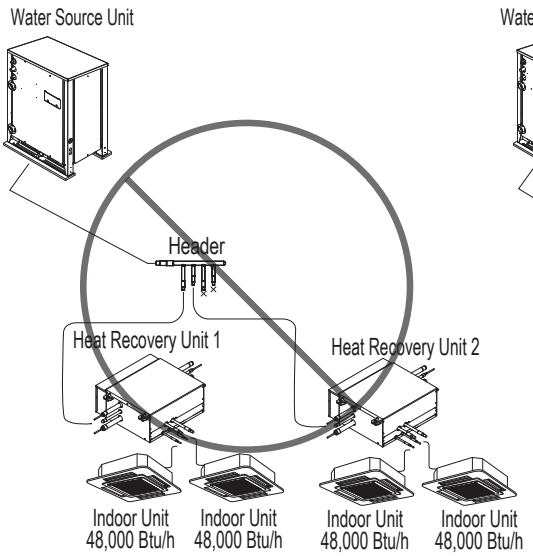
Various tools are available to assist in properly designing LG R32 systems. Refer to the "R32 Application Guide"; the "Simple Calculator for Capacity, Refrigerant Charge and ESP"; the "LG Air Conditioner Technical Solutions" (LATS) software program; and the local LG Sales Representative.

Incorrect Layouts

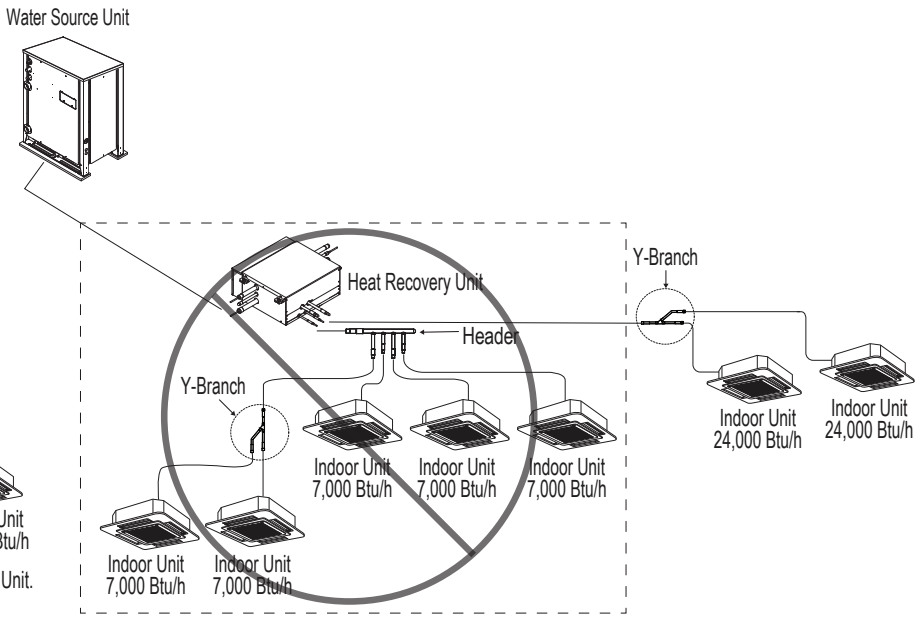
A second branch cannot be made after a Header.







Incorrect installation: Header branch pipe then a Heat Recovery Unit.



Incorrect installation: Heat Recovery Unit, then a Header branch pipe, then a Y-Branch and Header Branch pipe.

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Following pages present R32 Multi V Water 5 piping limitations, and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Water Source Unit Capacity Correction Factors

NOTICE

The LATS software program calculates these correction factors. Use this procedure only when performing manual calculations.

The nominal heating and/or cooling capacities of WSU(s) can be reduced by the design of the refrigerant piping system. Parameters that can reduce nominal capacity are the following:

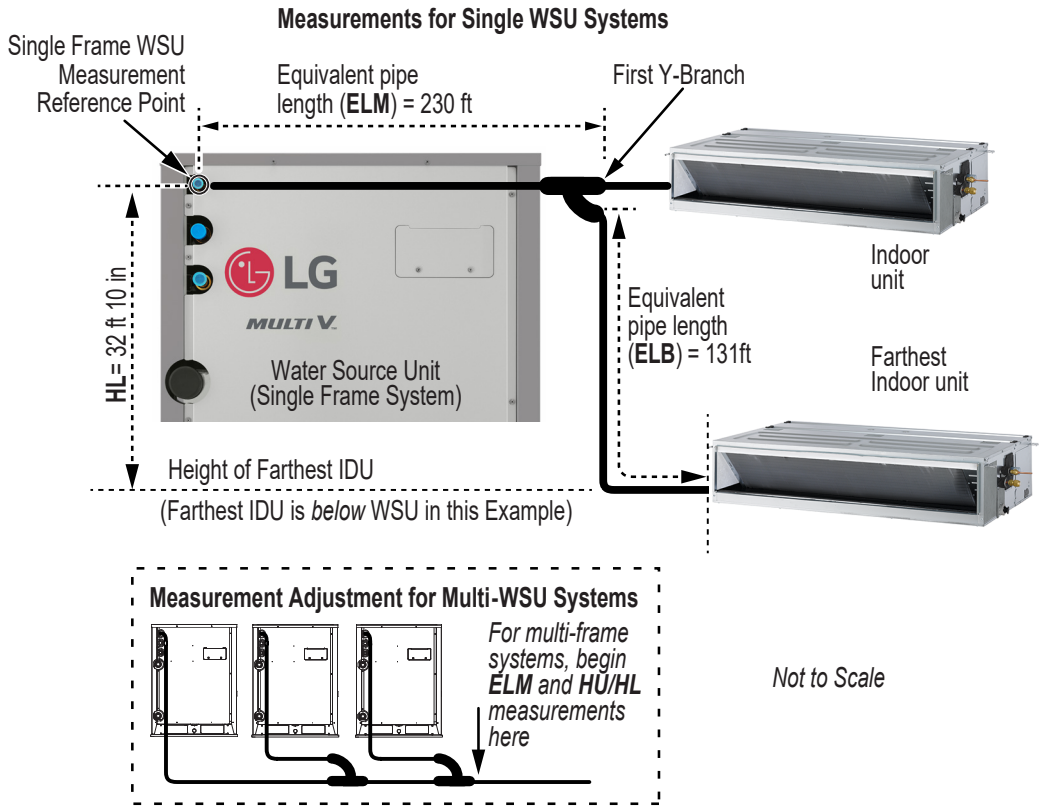
- Length of the liquid refrigerant pipe run to the farthest IDU (vapor pipes do not affect this calculation)
- Number and type of components in this liquid pipe run (elbows, Y-branches, etc.)
- Distance above or below the WSU(s) of the farthest IDU

To determine WSU capacity in your system design, multiply the WSU cooling and heating nominal capacities by the correction factors calculated in this procedure. The correction factor could be 1.0, resulting in no capacity loss, or could be less than 1.0, resulting in a certain amount of capacity loss. If the cooling or heating correction factor causes reduced capacity, the system designer must determine if the reduced capacity is acceptable or if redesign is required.

Two parameters determine WSU cooling and heating correction factors:

1. Height in feet above (HU) or below (HL) the WSU of the IDU farthest away from the WSU. Follow the procedure in the “HU/HL Measurement” below to find this parameter.
2. Total equivalent length (TEL) in feet of the liquid refrigerant pipe between the WSU and the IDU farthest away from the WSU. Equivalent length considers the effect of pressure drop due to components such as elbows and Y-branches. Equivalent feet will be a larger number than the measured physical distance in feet. Follow the procedure in the "Liquid Pipe Total Equivalent Length Calculation" section to find this parameter.
3. After determining the HU/HL and TEL parameters, follow the procedure in the "WSU Cooling/ Heating Capacity Correction Factor Calculation" section to determine if the proposed refrigerant pipe design and WSU/ IDU locations will reduce WSU capacity.

Figure 55: Equivalent Pipe Length Measurements Example.



HU/HL Measurement

Follow this procedure to determine the value of HU (farthest IDU above WSU) or HL (farthest IDU below WSU). Refer to the figure above .

1. Based on your system's refrigerant pipe design, determine which IDU is the farthest from the WSU.
2. Determine the vertical distance in feet between the WSU and the farthest IDU. For a single WSU system, measure from the WSU liquid pipe connection. For a dual or triple WSU system, measure from the end of the last multi-frame connector. At the IDU end, measure to the IDU's liquid pipe connection.
3. Record the vertical distance measurement in feet, and note if the IDU is above the WSU (HU) or below the WSU (HL).
4. Proceed to the total equivalent pipe length calculation.

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REFRIGERANT PIPING INSTALLATION

Following pages present R32 Multi V Water 5 piping limitations, and are for illustrative purposes only. Designers MUST use LATS when designing LG VRF systems.

Liquid Pipe Total Equivalent Length Calculation

A Multi V system may have many liquid refrigerant pipe runs, each composed of multiple segments, elbows, and other components, but the single pipe run that determines TEL is the run from the WSU(s) through the first Y-branch, to the farthest IDU. The TEL of this pipe run is its physical length plus an amount of "length" added to represent the effect of pressure drop due to elbows, Y-branches, headers, and other pipe system components.

Use this formula to calculate TEL:

TEL = (ELM x CF) + ELB, where:

TEL = total equivalent length of the liquid refrigerant pipe
ELM = equivalent length of the liquid refrigerant pipe to end of first Y-branch
CF = pipe length correction factor
ELB = equivalent length of the liquid refrigerant pipe from end of first Y-branch to farthest IDU

The ELM and ELB parameters will vary according to the system design. CF is a constant and is listed in the table on the next page**.** Determine ELM and ELB and then use the TEL formula to calculate total equivalent length.

Follow these steps to calculate ELM. Refer to the "Equivalent Pipe Length Measurements Example" Figure on previous page.

1. Determine the beginning measurement reference point at the WSU end of the liquid refrigerant pipe.
   - For a single WSU system, begin the measurement at the WSU's liquid refrigerant pipe connection (smallest diameter pipe, closest to top of unit).
   - For a dual or triple WSU system, begin the measurement at the end of the last multi-frame connector.
2. Locate the first Y-branch in the liquid pipe.
3. Measure the length in feet of this liquid pipe run. Measure along the length of the pipe, following any changes in direction. Record this value.
4. Count the number of elbow connectors in the pipe measured in step 3. Determine the outside diameter (OD) of the elbow connectors. All elbows in this segment should have the same OD.
5. Refer to the table below and find the equivalent length for this size of elbow connector. Multiply the number of elbows by the equivalent length in feet. Record this value.
6. Add the physical measurement found in step 3, the elbow connector value found in step 5, and 1.6 ft. for the first Y-branch. The result is the equivalent length in feet of this section of pipe, and is the **ELM** parameter of the total equivalent length equation.

Follow these steps to calculate ELB. Refer to the "Equivalent Pipe Length Measurements Example" Figure on previous page.

1. Measure the distance in feet from the end of the first liquid pipe Y-branch to the liquid pipe connection of the farthest IDU. Measure along the length of the pipe, following any changes in direction. Record this value.
2. Count the number of elbow connectors in the liquid pipe run measured in step 1. If there is more than one size of elbow connector, count the number of each size. Determine the outside diameter (OD) of each size of elbow connector.
3. Refer to the table below and find the equivalent length for each size of elbow connector. Multiply the number of each size of elbow by its equivalent length. Add these equivalent length values to determine a total equivalent length for elbow connectors. Record this value.
4. Count the number of Y-branches in the liquid pipe run measured in step 1. Multiply the number of Y-branches by 1.6 to determine their equivalent length in feet. Record this value. If there are no Y-branches, the value is zero.

Table 43: Equivalent Piping Length for Elbow Pipe Connectors.

Equivalent Lengths of Elbow Pipe Connectors															
Elbow (90° or 45°)	**Size, inches OD**	**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**
	Equivalent Length (ft.)	**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**
Y-branch (ft.)		1.6													
Header (ft.)		3.3													
Heat Recovery Unit (ft.) (For ARWB Heat Recovery Units only)		8.2													

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Steps to calculate ELB, continued.

5. Count the number of headers in the liquid pipe run measured in step 1. Multiply the number of headers by 3.3 to determine their equivalent length in feet. Record this value. If there are no headers, the value is zero.

6. Count the number of heat recovery units in the liquid pipe run measured in step 1. Multiply the number of heat recovery units by 8.2 to determine their equivalent length in feet. Record this value. If there are no heat recovery units, the value is zero.

7. Add the physical measurement found in step 1, the elbow connector value found in step 3, the Y-branch value found in step 4, the header value found in step 5 and the heat recovery unit value found in step 6. The result is the equivalent length in feet of this liquid pipe run, and is the **ELB** parameter of the total equivalent length equation.

Follow these steps to calculate TEL.

1. Multiply ELM by in feet to ELB in feet. This value is the equivalent length in feet of this section of refrigerant pipe.
2. Refer to the table below to find the equivalent length correction factor (**CF**) for cooling or heading mode.
3. Use the equation below with the HU/HL, ELB, and CF parameters to calculate total equivalent pipe length. Record this value.

Total Equivalent Length (TEL) in feet = [(ELM in feet) x (CF from Table below)] + (ELB in feet)

Table 44: Equivalent Pipe Length Correction Factors.

If Equivalent Pipe Length (ELM + ELB) is:	
Less than 295 ft, Correction Factor (CF) is:	**295 ft or More Correction Factor (CF) is:**
1.0 for Cooling	0.5 for Cooling
1.0 for Heating	0.2 for Heating

WSU Cooling/Heating Capacity Correction Factor Calculation

Follow this procedure to determine the system's WSU corrected capacity. You must have the results of the HU/HL Measurement procedure and the Total Equivalent Pipe Length Calculation procedure to accurately calculate the correction factors. If the cooling or heating correction factor causes reduced capacity, the system designer must determine if the reduced capacity is acceptable or if redesign is required.

1. Locate the recorded results of the HU/HL Measurement and the Total Equivalent Pipe Length Calculation.
2. Refer to the Cooling Capacity Correction Factors table. Refer to the HU or HL section of the table, as appropriate for your system.
3. Use the HU/HL measurement and the calculated TEL length to find the cooling correction factor. Record this value.
4. Multiply the nominal WSU cooling capacity by the correction factor found in step 3 to determine the corrected cooling capacity.
5. Refer to the Heating Capacity Correction Factors table. Refer to the HU or HL section of the table, as appropriate for your system.
6. Use the HU/HL measurement and the calculated TEL length to find the heating correction factor. Record this value.
7. Multiply the nominal WSU cooling capacity by the correction factor found in step 6 to determine the corrected heating capacity.
8. If either the cooling or heating corrected capacity is less than the nominal capacity, determine if the corrected capacity is acceptable or if system parameters must change to achieve an acceptable corrected capacity.

WSU Cooling/Heating Capacity Correction Factor Calculation Examples

Examples below use the data in the “Equivalent Pipe Length Measurements” in Figure 21 to determine cooling and heating capacity correction factors.

In Figure 21, ELM = 230 ft; ELB = 131 ft; HL = 33 ft

- For the cooling calculation:
  TEL = (230 ft x 0.5) + 131 ft
  TEL = 246 ft.
  Cooling capacity correction factor when TEL is 246 ft and HL is 33 ft is approximately 0.88
  Multiplying the WSU nominal cooling capacity by 0.88 gives the corrected cooling capacity
- For the heating calculation,
  TEL = (230 ft x 0.2) + 131 ft
  TEL = 177 ft.
  Heating capacity correction factor when TEL is 177 ft and HL is 33 ft is approximately 1.0
  Multiplying the WSU nominal heating capacity by 1.0 gives the corrected heating capacity

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Cooling and Heating Correction Factor Tables

These tables show the change in capacity of a standard indoor unit system at maximum load under standard conditions. If pipe insulation is insufficient, heat loss will become larger and capacity will decrease.

NOTICE

The LATS software program calculates these correction factors. To reduce the risk of designing an improper applied system or one that will not operate correctly, designers MUST use LATS when designing LG VRF systems.

Table 45: WSU Capacity Cooling Correction Factors.

Elevation Difference (ft.) Above WSU (HU)	Total Equivalent Length (TEL) in Feet												
	25	33	66	98	131	164	197	230	263	295	328	361	394
	Correction Factor												
0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95	0.86	0.85	0.84
25	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95	0.86	0.85	0.84
33	–	1.0	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95	0.86	0.85	0.84
66	–	–	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95	0.86	0.84	0.83
98	–	–	–	1.0	1.0	1.0	1.0	0.98	0.96	0.95	0.85	0.84	0.83
131	–	–	–	–	1.0	1.0	1.0	0.98	0.96	0.95	0.85	0.84	0.83
164	–	–	–	–	–	1.0	1.0	0.98	0.96	0.95	0.85	0.84	0.83
Elevation Difference (ft.) Below WSU (HL)	**Total Equivalent Length (TEL) in Feet**												
	25	33	66	98	131	164	197	230	263	295	328	361	394
	Correction Factor												
0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95	0.86	0.85	0.84
25	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95	0.86	0.85	0.84
33	–	1.0	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95	0.86	0.85	0.84
66	–	–	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95	0.86	0.85	0.84
98	–	–	–	1.0	1.0	1.0	1.0	0.98	0.96	0.95	0.86	0.85	0.84
131	–	–	–	–	1.0	1.0	1.0	0.98	0.96	0.95	0.86	0.85	0.84
164	–	–	–	–	–	1.0	1.0	0.98	0.96	0.95	0.86	0.85	0.84

Table 46: WSU Capacity Heating Correction Factors.

Elevation Difference (ft.) Above WSU (HU)	Total Equivalent Length (TEL) in Feet									
	25	33	66	98	131	164	197	230	263	295
	Correction Factor									
0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95
25	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95
33	–	1.0	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95
66	–	–	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95
98	–	–	–	1.0	1.0	1.0	1.0	0.98	0.96	0.95
131	–	–	–	–	1.0	1.0	1.0	0.98	0.96	0.95
164	–	–	–	–	–	1.0	1.0	0.98	0.96	0.95
Elevation Difference (ft.) Below WSU (HL)	**Total Equivalent Length (TEL) in Feet**									
	25	33	66	98	131	164	197	230	263	295
	Correction Factor									
0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95
25	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95
33	–	1.0	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95
66	–	–	1.0	1.0	1.0	1.0	1.0	0.98	0.96	0.95
98	–	–	–	1.0	1.0	1.0	1.0	0.98	0.96	0.95
131	–	–	–	–	1.0	1.0	1.0	0.98	0.96	0.95
164	–	–	–	–	–	1.0	1.0	0.98	0.96	0.95

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REFRIGERANT PIPING FOR SEPARATED WATER SOURCE UNITS

NOTICE

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Dual-frame and triple-frame systems must be installed with all water source units located next to each other. In conditions where the dual-frame or triple-frame water source units need to be separated, the following rules must be followed.

⃠ These rules do not apply to single-frame Water Source Units.

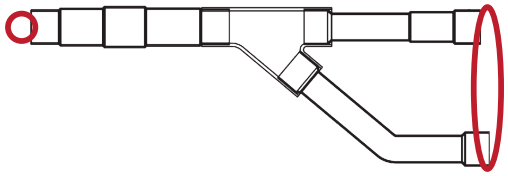
1. Measurements

All measurements must be made from the union center of the water source unit Y-branch.

2. Maximum Pipe Length from first water source unit Y-branch to farthest water source unit

Total pipe length from the first outdoor unit Y-branch to the piping connection at the farthest outdoor unit must not exceed thirty-three (33) feet.

Figure 56: Y-branch Measurement Location.



3. Elevation Difference between water source units

The elevation difference between the highest and lowest elevation water source unit must not exceed sixteen (16) feet.

Figure 57: Maximum Pipe Length from First WSU Y-branch to Farthest WSU.

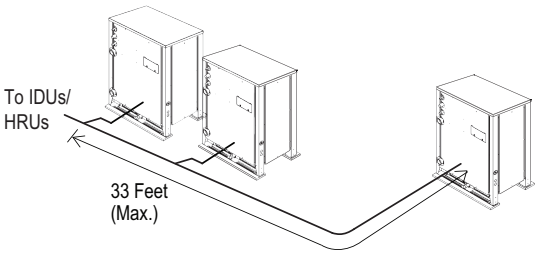
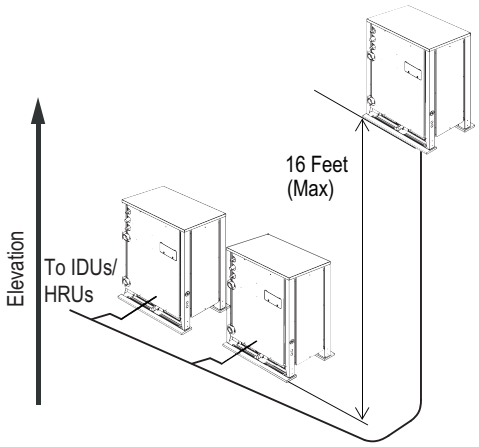


Figure 60: Elevation Difference Between WSUs.



Trapping

1. When required, all traps must be inverted type traps ≥8" in the vapor line(s).

a. Heat pump water source units would be trapped in the suction vapor line, and heat recovery water source units would be trapped in the high AND low pressure vapor lines.

b. Inverted traps are defined as any piping that is ≥8" in a vertical direction up the horizontal pipe it elevates from.

Figure 58: Traps for Heat Pump and Heat Recovery Units.

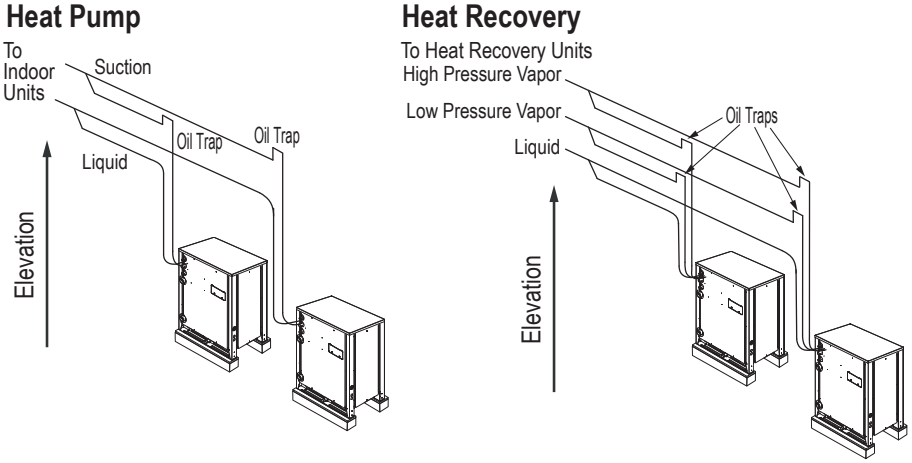
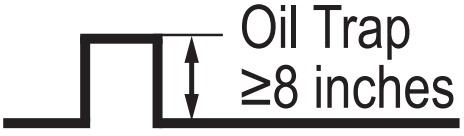


Figure 59: Close Up of An Inverted Oil Trap.



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REFRIGERANT PIPING FOR SEPARATED WATER SOURCE UNITS

1. Inverted traps are required when:
   a. Piping in a horizontal direction from the outdoor Y-branch towards an outdoor unit or another outdoor unit Y-branch is greater than 6.6'.
      The inverted trap must be installed close to the outdoor unit Y-branch (no more than 6.6' away, 20" is optimum).
   b. Anytime piping turns downward leaving an outdoor unit Y-branch toward an outdoor unit or another outdoor unit Y-branch.
      The inverted trap must be installed close to the outdoor unit Y-branch (no more than 6.6' away, 20" is optimum), and before the pipe toward the outdoor unit turns downward.
      A trap is required for piping within 8" below the unit connection(s) but not required for piping 8" or more below the unit connection(s).

Figure 62: Inverted Trap Applications.

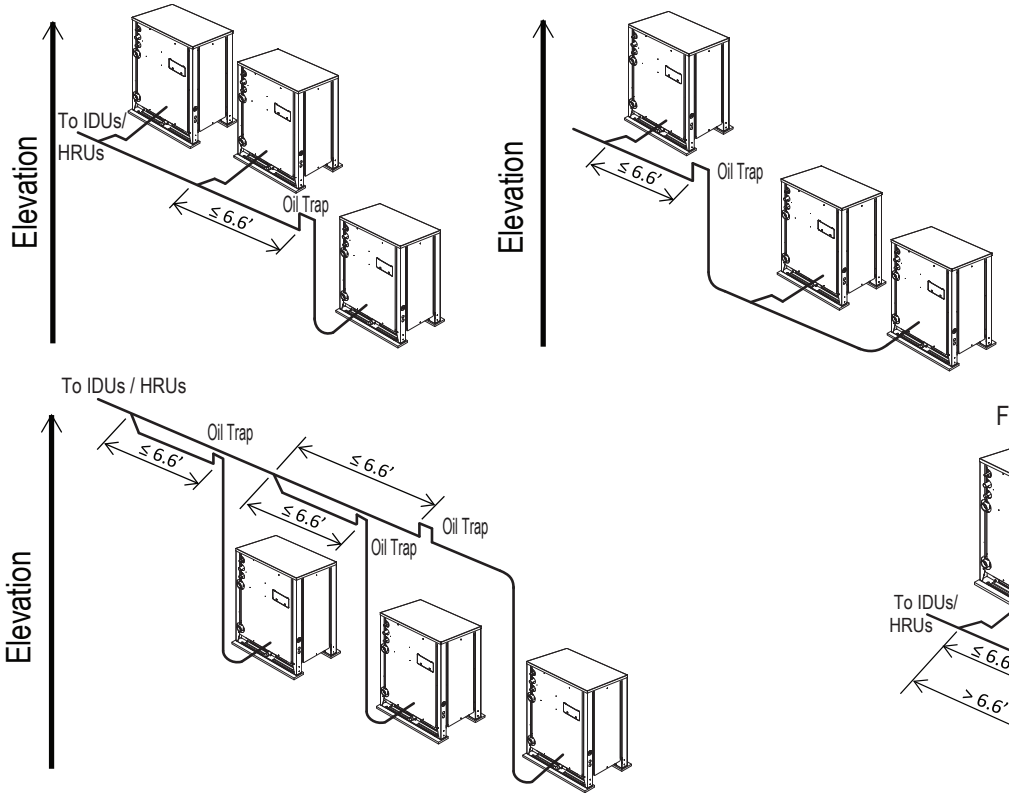
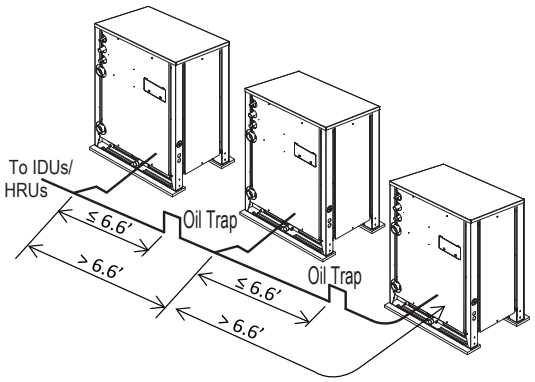


Figure 61: Examples of Inverted Traps.

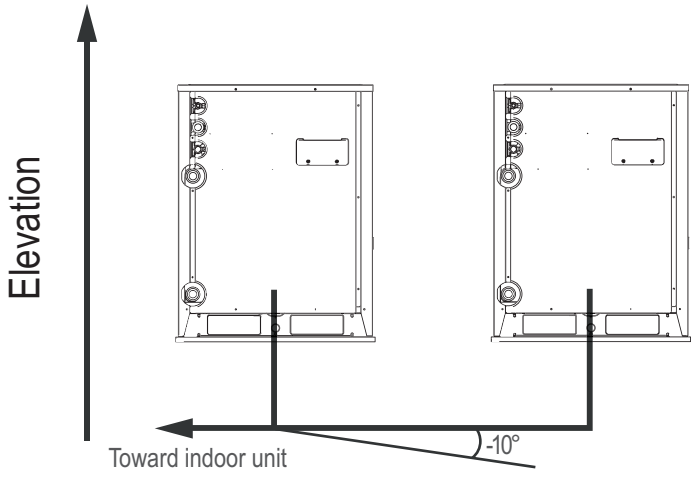


Pipe Slope

Horizontal pipe slope must be level or slightly away from the water source units, otherwise refrigerant and oil will migrate toward the water source units and accumulate in the pipe segment serving the frame that is not running or at the lowest elevation.

⃠ Piping must never slope more than -10° (see figure) without installing an inverted trap within 6.6' of the water source unit Y-branch and before the pipe slopes downward toward the water source unit.

Figure 63: Allowable Pipe Slope.



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Selecting the Best Location for the Water Source Unit(s)

⚠ DANGER

- ⃠ *Do not install the unit in an area where combustible gas may 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.*

- *Water source units are not weatherproof. Always install water source units indoors. Failure to follow this installation guideline can create an electrical hazard that can result in bodily injury or death.*

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

- Where the floor is waterproof and can bear the weight of the unit(s). The floor must contain a liquid drainage system and must have a slight slope to aid in liquid drainage.
- Where there is enough strength to bear the weight of the water source unit.
- A location that allows for optimum air flow and is easily accessible for inspection, maintenance, and service.
- Where piping between the water source unit and indoor unit(s) / heat recovery units are within allowable limits.
- Install the unit(s) in a separate machine room not exposed to external air.
- Install the unit(s) in a space where the ambient temperature is within 32 to 104°F.
- Have an anti-freeze plan for the water supply if the unit(s) is stopped during cold weather.

⃠ Don'ts

- *Where it will be subjected to direct thermal radiation from other heat sources, or an area that would expose the water source 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 not affect operation.*
- *Where operating sound from the unit will disturb inhabitants of the building.*
- *Where there is carbon fiber or combustible dust.*

NOTICE

For detailed placement considerations and installation requirements for indoor units, refer to the applicable Indoor Unit Engineering and / or Installation Manuals.

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Transporting / Lifting Water Source Unit(s)

When lifting the unit, use lifting straps and place around the unit as shown.

- Always lift the unit using properly sized lifting straps rated to carry the unit weight.
- Ensure the straps are long enough to maintain a maximum of a 40° angle as shown.

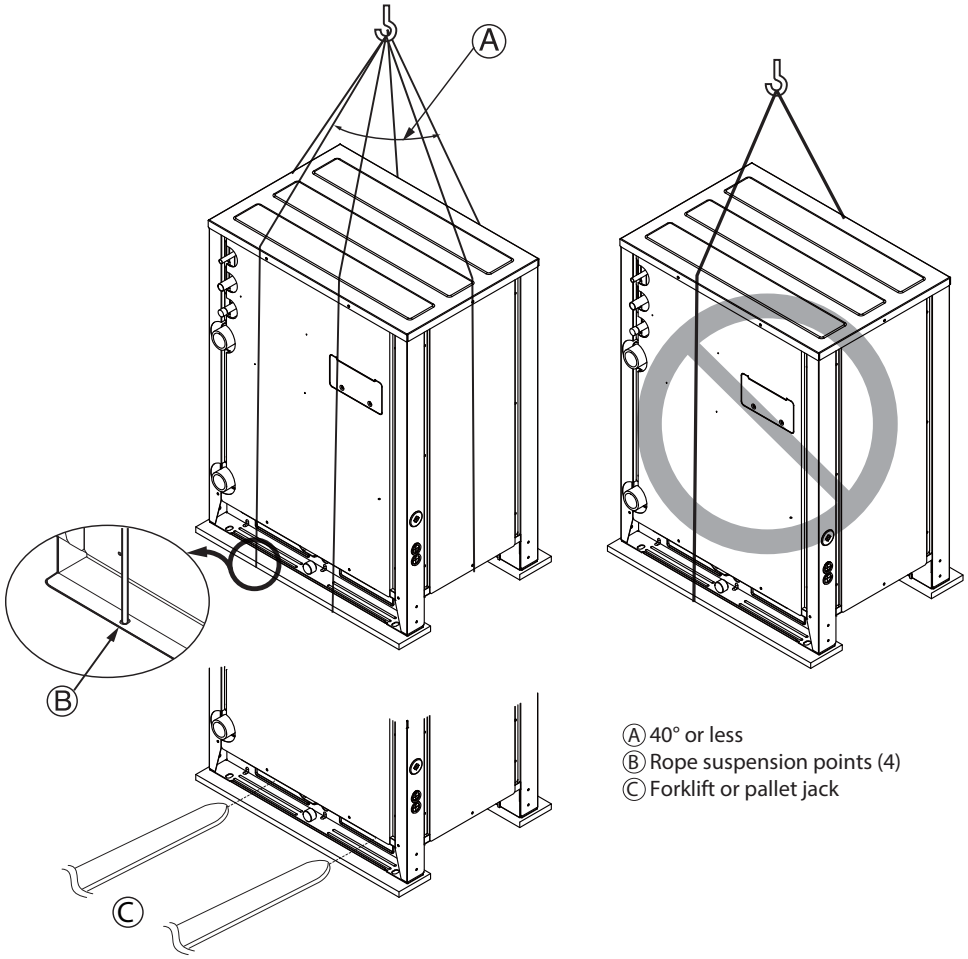
⚠ WARNING

- *Use appropriate moving equipment to transport each frame; ensure the equipment is capable of supporting the weights listed above. If the equipment is not properly secured, it may result in an accident that causes physical injury or death.*
- *Wear protective gloves when handling equipment. Sharp edges may cause personal injury.*
- *Some products include polypropylene bands around the unit for packaging. ⃠ Do not use polypropylene bands to lift the unit. There is a risk of the product falling and causing physical injury.*
- *Tear apart and throw away plastic packaging bags so that children may not play with them and risk suffocation and death.*
- *Consider the unit's center of gravity before lifting. Hoist the unit with the center of gravity centered among the lifting straps. There is a risk of the product falling and causing physical injury.*
- *Lift the water source unit from the base at specified locations. Support the unit at a minimum of six (6) points to avoid slippage from the rigging apparatus, and use a minimum of three (3) lifting straps. There is a risk of the product falling and causing physical injury.*
- *Use caution when using a forklift to transport an unpackaged unit. ⃠ Do not drop the unit when carrying it with a forklift. There is a risk of the product falling and causing physical injury.*

NOTICE

Place a protective cloth or other soft material at the locations where the casing comes in contact with the lifting straps to prevent damage to painted surfaces.

Figure 64: Moving requirements for water source units.



Ⓐ 40° or less
Ⓑ Rope suspension points (4)
Ⓒ Forklift or pallet jack

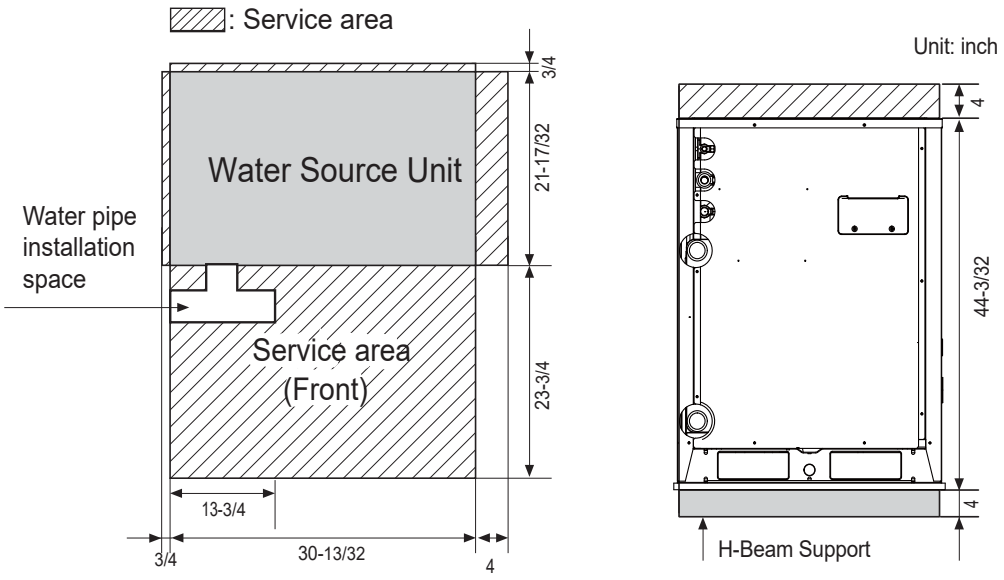
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LG

Single Frame Installation

Install single frame water source units as shown. Anchor bolt locations for installing water source units are shown on the next page.

Figure 65: Single Frame Installation.



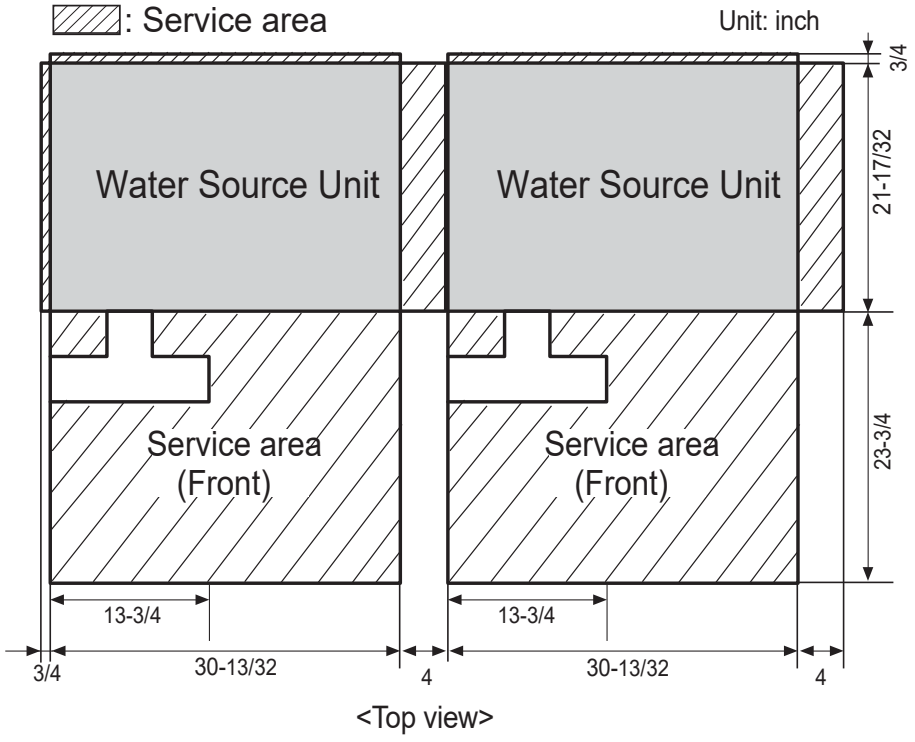
NOTICE

- *Consult with LG Electronics, U.S.A., Inc. if the available space is less than the space shown in these figures.*
- *If water piping passes along the side of a frame, ensure the indicated space is available after considering the space taken by the piping.*

Dual Frame Installation

Install dual frame water source units as shown. Anchor bolt locations for installing water source units are shown on the next page.

Figure 66: Dual Frame Installation.



⚠ WARNING

- *Ensure that the floor / chosen location has enough strength to support the weight of the unit(s). If it does not have sufficient strength, the unit(s) may fall and cause physical injury or death.*
- *Water source units are not weatherproof. Always install water source units indoors. Failure to follow this installation guideline can create an electrical hazard that can result in bodily injury or death.*

NOTICE

- *Ensure that the floor / chosen location has enough strength to support the weight of the unit(s). Failure to follow this guideline could cause product malfunction or inefficient performance.*
- *Ensure that the floor / chosen location is waterproof. It must contain a liquid drainage system with a slight slope to aid in liquid drainage. Failure to follow this guideline could cause product malfunction or inefficient performance.*

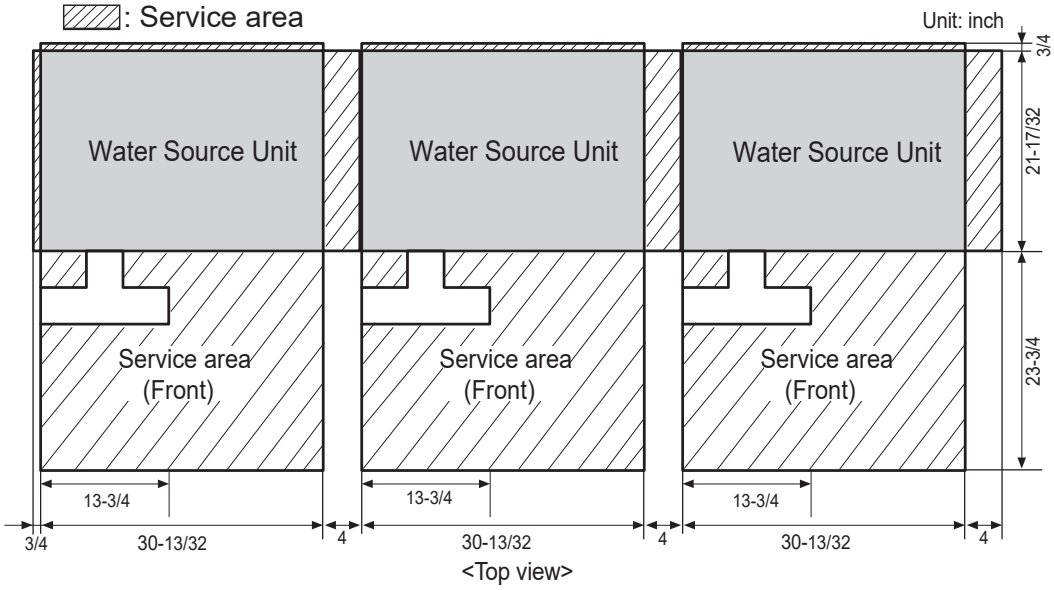
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INSTALLATION CONSIDERATIONS

Triple Frame and Stacked Frame Installation

Triple Frame Installation

Install triple frame water source units as shown. Anchor bolt locations for installing water source units are shown below.
Figure 67: Triple Frame Installation.



<Top view>

NOTICE

- *Consult with LG Electronics, U.S.A., Inc. if the available space is less than the space shown in these figures.*
- *If water piping passes along the side of a frame, ensure the indicated space is available after considering the space taken by the piping.*

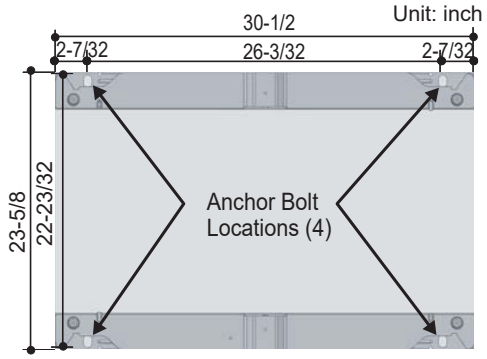
Stacked Frame Installation

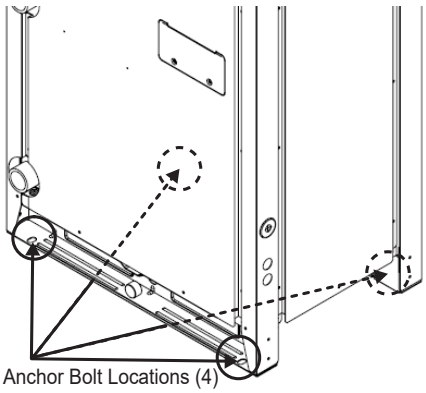
Install stacked single frame water source units as shown on right. Dual frame systems cannot be stacked.

Anchor Bolt Locations

Anchor bolt locations for installing water source units are shown below.

Figure 68: Anchor Bolt Locations.





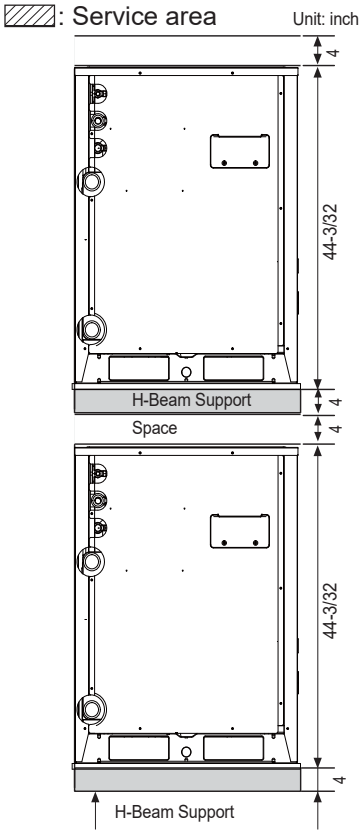
⚠WARNING

- *Ensure that the floor / chosen location has enough strength to support the weight of the unit(s). If it does not have sufficient strength, the unit(s) may fall and cause physical injury or death.*
- *Water source units are not weatherproof. Always install water source units indoors. Failure to follow this installation guideline can create an electrical hazard that can result in bodily injury or death.*

NOTICE

- *Ensure that the floor / chosen location has enough strength to support the weight of the unit(s). Failure to follow this guideline could cause product malfunction or inefficient performance.*
- *Ensure that the floor / chosen location is waterproof. It must contain a liquid drainage system with a slight slope to aid in liquid drainage. Failure to follow this guideline could cause product malfunction or inefficient performance.*

Figure 69: Stacked Frame Installation.



Front View

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CORNER WEIGHTS FOR WATER SOURCE UNITS

Figure 70: Corner weights.

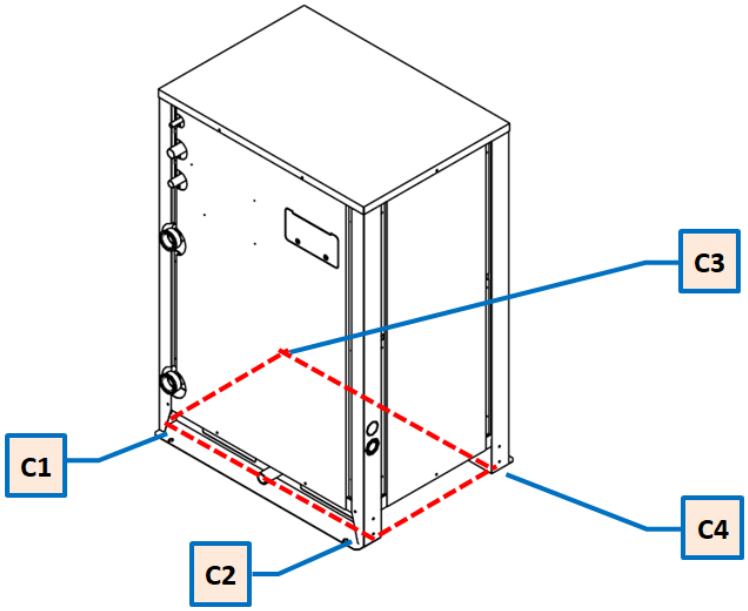


Table 47: Corner Weights.

WSU Model	Frame (Main)	Net Weight (lbs.)	Corner Weight (lbs.)				Frame (B)	Net Weight (lbs.)	Corner Weight (lbs.)				Frame (C)	Net Weight (lbs.)	Corner Weight (lbs.)			
			C1	C2	C3	C4			C1	C2	C3	C4			C1	C2	C3	C4
ZRWM072BAS5		322	121	55	106	40												
ZRWM096BAS5		322	121	55	106	40												
ZRWM121BAS5		322	121	55	106	40												
ZRWM144BAS5		322	121	55	106	40												
ZRWM072DAS5		328	121	55	106	40												
ZRWM096DAS5		328	121	55	106	40												
ZRWM121DAS5		328	121	55	106	40												
ZRWM144DAS5		328	121	55	106	40												
ZRWM168DAS5		348	131	60	114	43												
ZRWM192DAS5		348	131	60	114	43												
ZRWM191DAS5	ZRWM096DAS5	322	121	55	106	40	ZRWM096DAS5	322	121	55	106	40						
ZRWM192BAS5	ZRWM96BAS5	322	121	55	106	40	ZRWM96BAS5	322	121	55	106	40						
ZRWM168BAS5	ZRWM096BAS5	322	121	55	106	40	ZRWM072BAS5	322	121	55	106	40						
ZRWM216*AS5	ZRWM121*AS5	322	121	55	106	40	ZRWM096*AS5	322	121	55	106	40						
ZRWN240*AS5	ZRWM121*AS5	322	121	55	106	40	ZRWM121*AS5	322	121	55	106	40						
ZRUM264*AS5	ZRWM144*AS5	322	121	55	106	40	ZRWM121*AS5	322	121	55	106	40						
ZRWN288*AS5	ZRWM144*AS5	322	121	55	106	40	ZRWM144*AS5	322	121	55	106	40						
ZRWN360DAS5	ZRWM192DAS5	348	131	60	114	43	ZRWM168DAS5	348	131	60	114	43						
ZRWN360BAS5	ZRWM121BAS5	322	121	55	106	40	ZRWM121BAS5	322	121	55	106	40	ZRWM121BAS5	322	121	55	106	40
ZRWN432*AS5	ZRWM144*AS5	322	121	55	106	40	ZRWM144*AS5	322	121	55	106	40	ZRWM144*AS5	322	121	55	106	40
ZRWN504DAS5	ZRWM192DAS5	348	131	60	114	43	ZRWM168DAS5	348	131	60	114	43	ZRWM144DAS5	322	121	55	106	40
ZRWN576DAS5	ZRWM192DAS5	348	131	60	114	43	ZRWM192DAS5	348	131	60	114	43	ZRWM192DAS5	348	131	60	114	43

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PLACEMENT CONSIDERATIONS

Selecting the Best Location / Clearance Requirements for the Heat Recovery Unit(s)

NOTICE

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 generates will not disturb occupants in the surrounding rooms.
- Install so that the refrigerant piping, drainage piping, and electrical wiring system are easily accessible.

Dont's

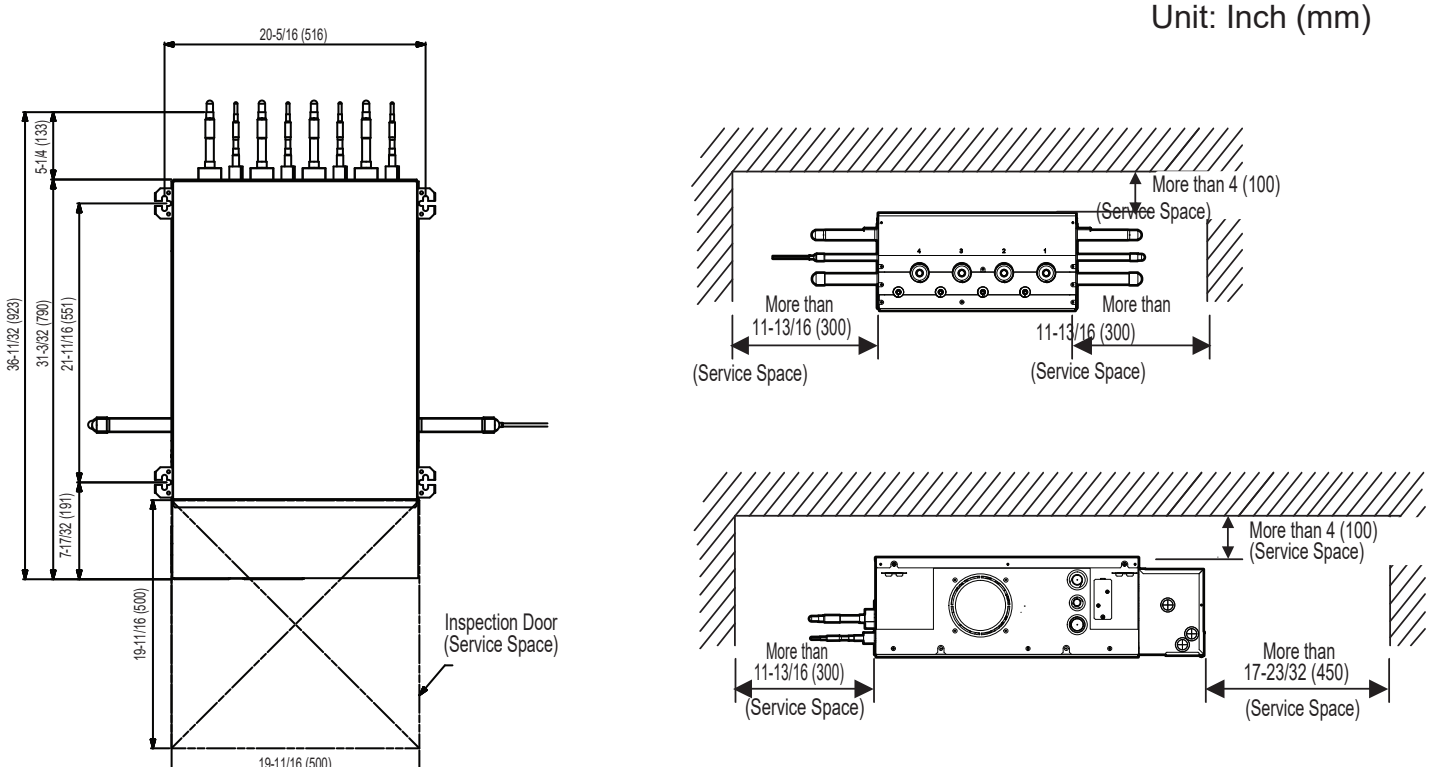
- *Refrigerant pipes must not exceed lengths specified by LG Electronics.*
- *Do not install the heat recovery unit in a location where rain may enter.*
- *Do not install the heat recovery unit in a location where it would be subjected to strong radiant heat from heat sources.*
- *Avoid an installation environment where more than 80% high humidity, or where oil splattering and / or vapor spray will occur.*
- *Avoid an installation environment where high-frequency electric noise could occur.*

Figure 71: PRHR024C, PRHR034C, PRHR044C, PRHR065C, and PRHR085C Clearance Requirements.

Two-, Three-, Four-, Six-, and Eight-Port Heat Recovery Unit

When NOT connecting the strainer directly to the heat recovery unit.

Unit: Inch (mm)



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Figure 72: PRHR034C, PRHR044C, PRHR065C, and PRHR085C Clearance Requirements, continued.

When connecting the strainer directly to the heat recovery unit (Except PRHR024C).

Unit: Inch (mm)

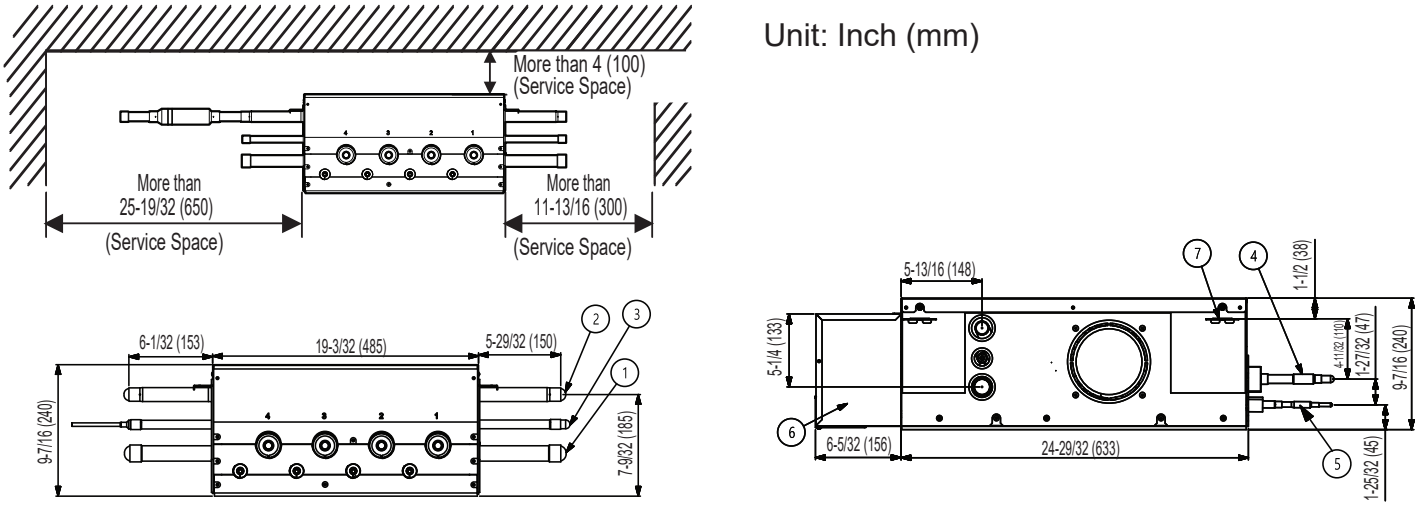
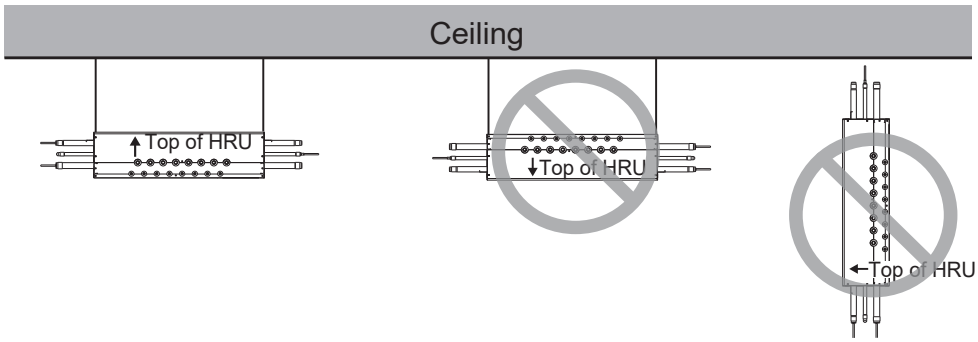


Table 48: PRHR024C, PRHR034C, PRHR044C, PRHR065C, and PRHR085C Heat Recovery Unit Components and Legend.

Part No.	Part Name	Connection Size (in.) / Type				
		PRHR024C	PRHR034C	PRHR044C	PRHR065C	PRHR085C
1	Low Pressure Vapor Pipe Connection Port	Ø7/8 Braze	Ø1-1/8 Braze	Ø1-1/8 Braze	Ø1-1/8 Braze	Ø1-1/8 Braze
2	High Pressure Vapor Pipe Connection Port	Ø3/4 Braze	Ø7/8 Braze	Ø7/8 Braze	Ø7/8 Braze	Ø7/8 Braze
3	Liquid Pipe Connection Port	Ø3/8 Braze	Ø1/2 Braze	Ø5/8 Braze	Ø1/2 Braze	Ø5/8 Braze
4	Indoor Unit Vapor Pipe Connection Port	Ø5/8 Braze – Ø1/2 Braze				
5	Indoor Unit Liquid Pipe Connection Port	Ø3/8 Braze – Ø1/4 Braze				
6	Control Box	–	–	–	-	-
7	Hanger Bracket	M8 or M10 Suspension Bolt				
8	Drain Hole	Connect the drain hose (field supplied), and tighten with a metal clamp (included).				

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

Figure 73: Install the Heat Recovery Unit Top Side Up.



NOTICE

Heat Recovery Unit must be installed so that the top side faces up. If the heat recovery unit is installed incorrectly, it may fail.

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PLACEMENT CONSIDERATIONS

Selecting the Best Location / Clearance Requirements for the Shutoff Valve Unit(s)

Select an installation space for the shutoff valve unit that meets the following conditions:

- Install the shutoff valve unit indoors in a level and upright position.
- Ensure there is enough space in the installation area for service access.
- Install the shutoff valve unit in a location where any sound it generates will not disturb occupants in the surrounding rooms.
- Install so that the refrigerant piping and electrical wiring system are easily accessible.

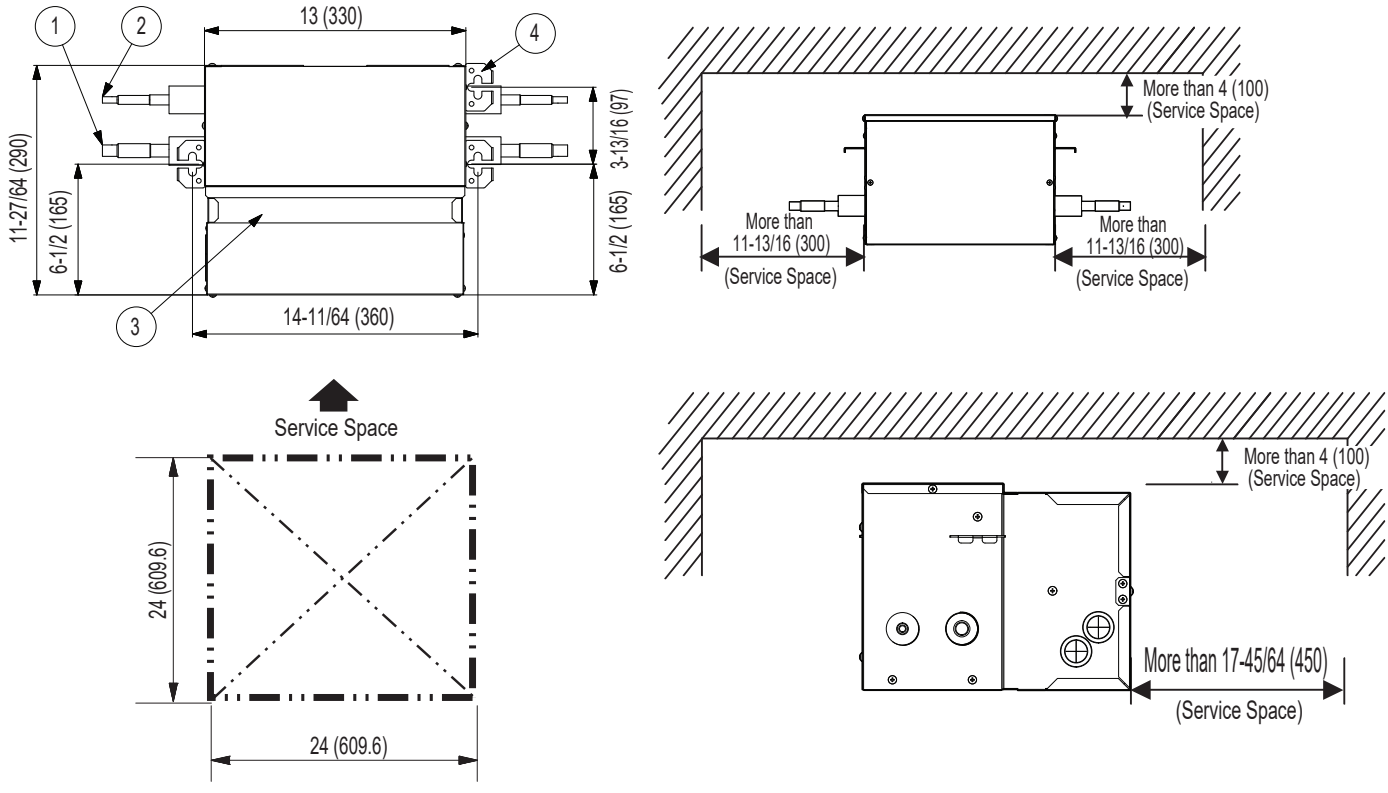
Dont's

- *Refrigerant pipes must not exceed lengths specified by LG Electronics.*
- *Do not install the shutoff valve unit in a location where rain may enter.*
- *Do not install the shutoff valve unit in a location where it would be subjected to strong radiant heat from heat sources.*
- *Avoid an installation environment with no more than 80% high humidity, or where oil splattering and / or vapor spray will occur.*
- *Avoid an installation environment where high-frequency electric noise could occur.*

Figure 74: PRHPZ010A Clearance Requirements.

One-Port Shutoff Valve Units

Unit: Inch (mm)



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Figure 75: PRHPZ010A Clearance Requirements, Continued.

One-Port Shutoff Valve Units

Unit: Inch (mm)

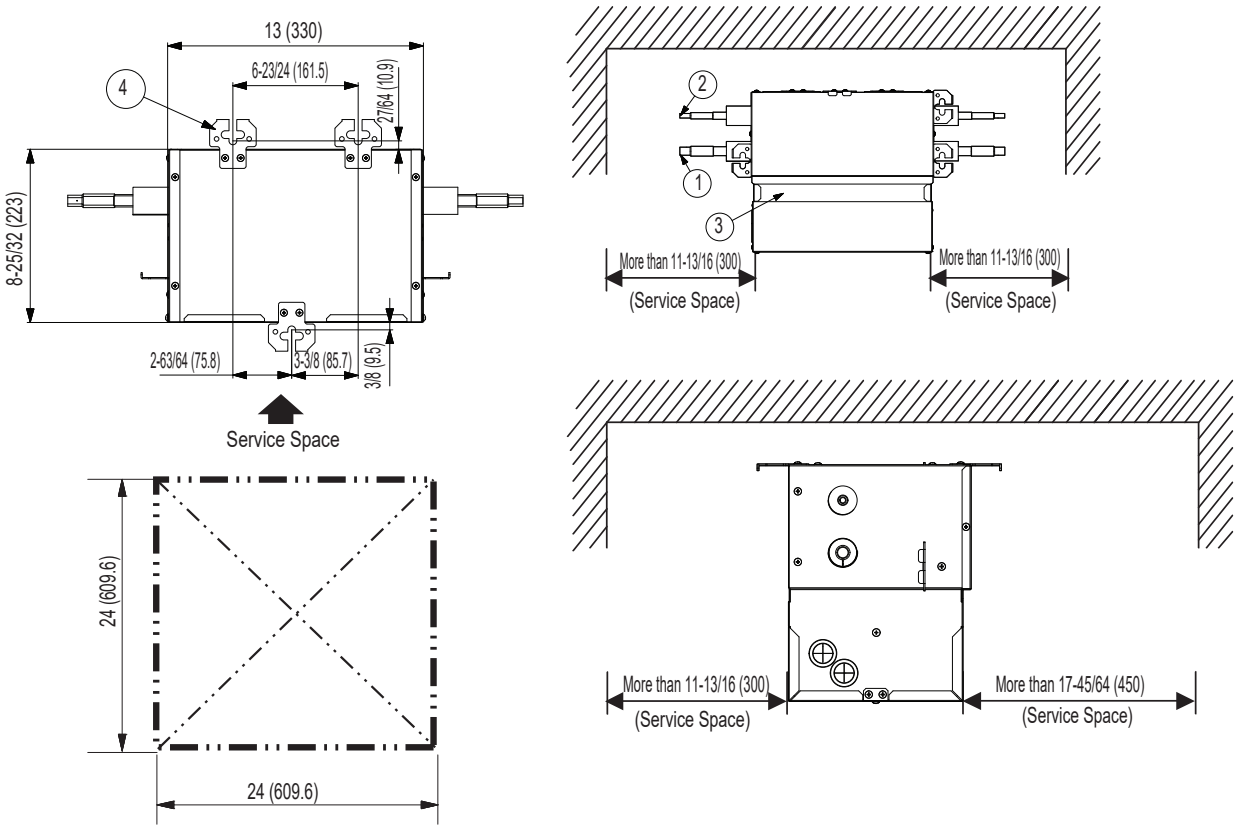


Table 49: PRHPZ010A Shutoff Valve Unit Components and Legend.

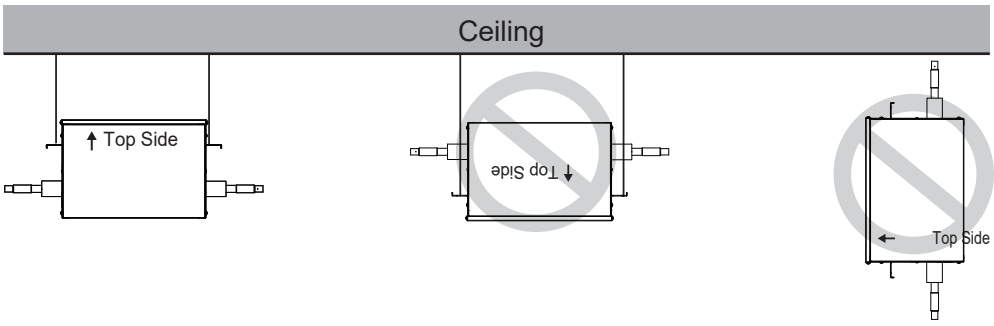
Part No.	Part Name	Connection Size (in.) / Type
		PRHPZ010A
1	Vapor Pipe Connection Port	Ø5/8 Braze – Ø1/2 Braze
2	Liquid Pipe Connection Port	Ø3/8 Braze – Ø1/4 Braze
3	Control Box	–
4	Hanger Bracket	M8 or M10 Suspension Bolt

[1]*Include an access panel at the side of the shutoff valve unit where the control box is located.*

NOTICE

Use the hanger accessories (included) when rotating the Shutoff Valve Units 90° in certain installations.

Figure 76: Install the One-Shutoff Valve Unit Top Side Up or Towards the Front.



NOTICE

The one-port shutoff valve unit must be installed so that the top side faces up. If the shutoff valve unit is installed incorrectly, it may fail.

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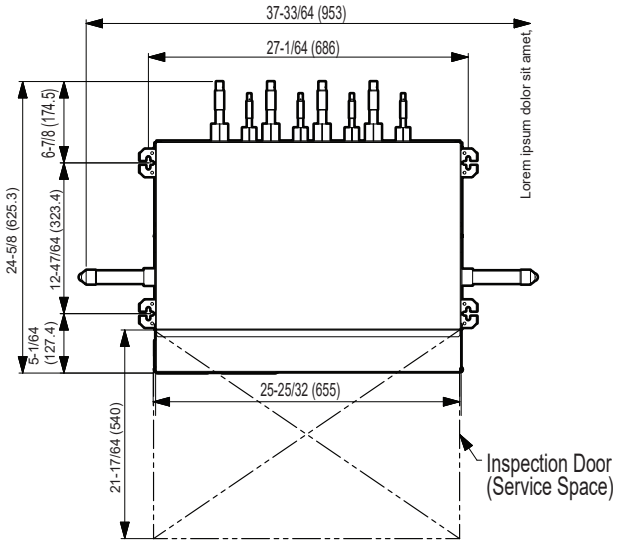
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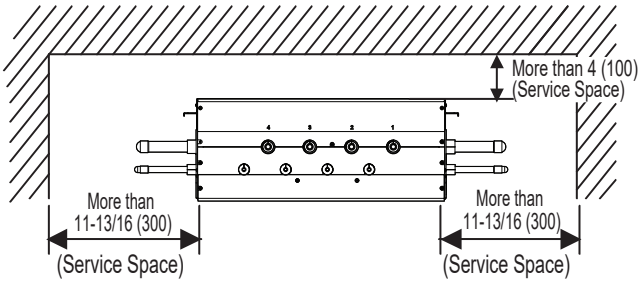
Selecting the Best Location / Clearance Requirements for the Shutoff Valve Unit(s)

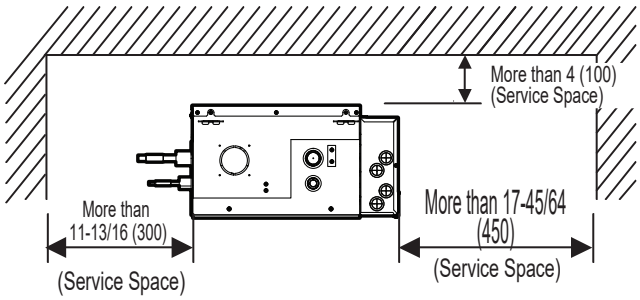
Figure 77: PRHPZ020A, PRHPZ030A, and PRHPZ040A Clearance Requirements.

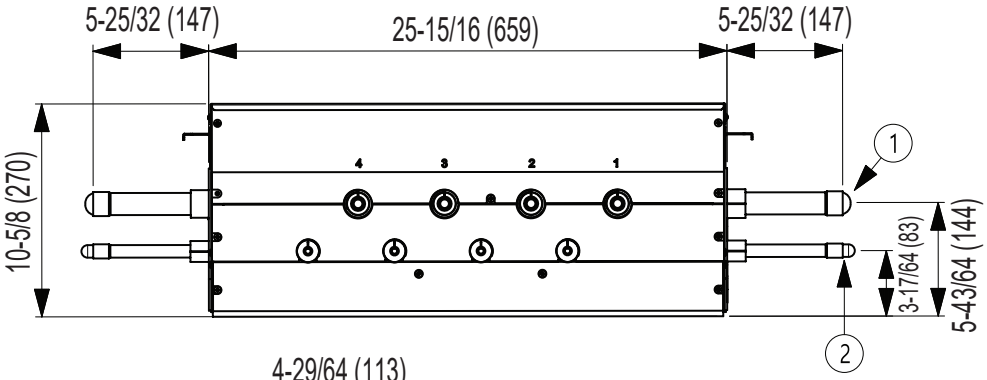
Two-, Three-, and Four-Port Shutoff Valve Units

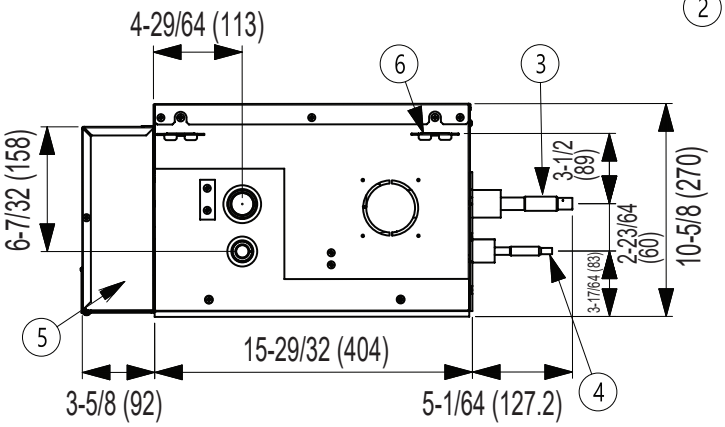
Unit: Inch (mm)











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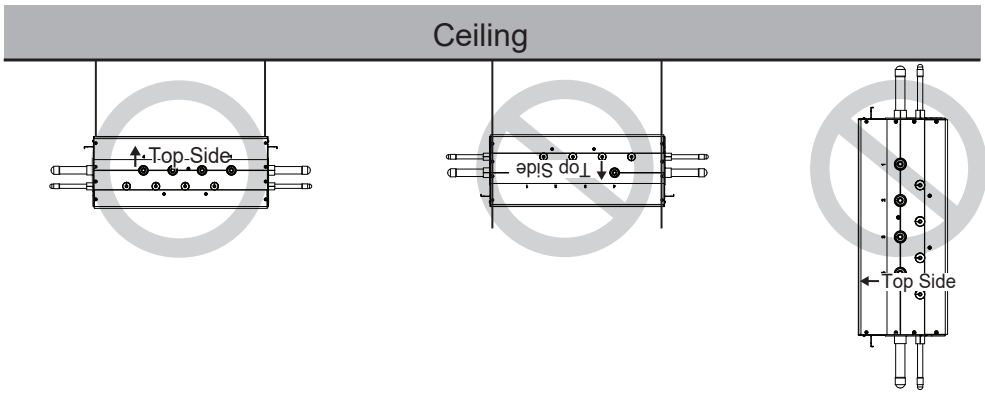
Selecting the Best Location / Clearance Requirements for the Shutoff Valve Unit(s)

Table 50: PRHPZ020A, PRHPZ030A, and PRHPZ040A Shutoff Valve Unit Components and Legend.

Part No.	Part Name	Connection Size (in.) / Type		
		PRHPZ020A	PRHPZ030A	PRHPZ040A
1	Outdoor Unit Vapor Pipe Connection Port	Ø7/8 Braze	Ø1-1/8 Braze	Ø1-1/8 Braze
2	Outdoor Unit Liquid Pipe Connection Port	Ø3/8 Braze	Ø1/2 Braze	Ø5/8 Braze
3	Indoor Unit Vapor Pipe Connection Port	Ø5/8 Braze – Ø1/2 Braze		
4	Indoor Unit Liquid Pipe Connection Port	Ø3/8 Braze – Ø1/4 Braze		
5	Control Box	–	–	–
6	Hanger Bracket	M8 or M10 Suspension Bolt		

[1]Include an access panel at the side of the shutoff valve unit where the control box is located.
[2]If reducers are used, service space must be increased equal to the dimensions of the reducer.

Figure 78: Install the Shutoff Valve Unit Top Side Up.



NOTICE

The two-, three- and four-port shutoff valve units must be installed so that the top side faces up. If these shutoff valve unit is installed incorrectly, they may fail.

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LIMITED WARRANTY (USA)

“The product’s full Limited Warranty terms and conditions and arbitration requirements are available at https://www.lghvac.com."

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LG Electronics, U.S.A., Inc.
Air Conditioning Technologies
4300 North Point Parkway
Alpharetta, Georgia 30022
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