LG
Life's Good

MULTI V™ IV

Heat Pump and Heat Recovery
Outdoor VRF Condensing Units

Installation Manual

Variable Refrigerant Flow Outdoor Units
6.0 to 36.0 Tons

Heat Pump 208 / 230V, 60Hz, 3-phase and 460V, 60Hz, 3-phase	Heat Recovery 208 / 230V, 60Hz, 3-phase and 460V, 60Hz, 3-phase
ARUN072BTE4 / ARUN072DTE4	ARUB072BTE4 / ARUB072DTE4
ARUN096BTE4 / ARUN096DTE4	ARUB096BTE4 / ARUB096DTE4
ARUN121BTE4 / ARUN121DTE4	ARUB121BTE4 / ARUB121DTE4
ARUN144BTE4 / ARUN144DTE4	ARUB144BTE4 / ARUB144DTE4
ARUN168BTE4 / ARUN168DTE4	ARUB168BTE4 / ARUB168DTE4
ARUN192BTE4 / ARUN192DTE4	ARUB192BTE4 / ARUB192DTE4
ARUN216BTE4 / ARUN216DTE4	ARUB216BTE4 / ARUB216DTE4
ARUN240BTE4 / ARUN240DTE4	ARUB240BTE4 / ARUB240DTE4
ARUN264BTE4 / ARUN264DTE4	ARUB264BTE4 / ARUB264DTE4
ARUN288BTE4/ ARUN288DTE4	ARUB288BTE4 / ARUB288DTE4
ARUN313BTE4 / ARUN313DTE4	ARUB313BTE4 / ARUB313DTE4
ARUN337BTE4 / ARUN337DTE4	ARUB337BTE4 / ARUB337DTE4
ARUN312BTE4 / ARUN312DTE4	ARUB312BTE4 / ARUB312DTE4
ARUN336BTE4 / ARUN336DTE4	ARUB336BTE4 / ARUB336DTE4
ARUN360BTE4 / ARUN360DTE4	ARUB360BTE4 / ARUB360DTE4
ARUN384BTE4 / ARUN384DTE4	ARUB384BTE4 / ARUB384DTE4
ARUN408BTE4 / ARUN408DTE4	ARUB408BTE4 / ARUB408DTE4
ARUN432BTE4 / ARUN432DTE4	ARUB432BTE4 / ARUB432DTE4
ARUN456BTE4 / ARUN456DTE4	ARUB456BTE4 / ARUB456DTE4
ARUN480BTE4 / ARUN480DTE4	ARUB480BTE4 / ARUB480DTE4
ARUN504BTE4 / ARUN504DTE4	ARUB504BTE4 / ARUB504DTE4

PROPRIETARY DATA NOTICE

Do not throw away, destroy, or lose this manual.
Please read carefully and store in a safe place for future reference.
Content familiarity required for proper installation.

The instructions included in this manual must be followed to prevent product malfunction, property damage, injury, or death to the user or other people. Incorrect operation due to ignoring any instructions will cause harm or damage. The level of seriousness is classified by the symbols described by the summary list of safety precautions on page 4.

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

MULTI V IV

TABLE OF CONTENTS

The instructions below must be followed to prevent product malfunction, property damage, injury or death to the user or other people. Incorrect operation due to ignoring any instructions will cause harm or damage. The level of seriousness is classified by the symbols described below.

TABLE OF SYMBOLS

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

INSTALLATION

⚠DANGER

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

⚠WARNING

Do not install, remove, or re-install the unit by yourself (end user). Ask the dealer or an authorized technician to install the unit.
Improper installation by the user may result in fire, explosion, electric shock, physical injury or death.

For replacement of an installed unit, always contact an LG trained service provider.
There is risk of fire, electric shock, explosion, and physical injury or death.

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

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

Replace all control box and panel covers.
If cover panels are not installed securely, dust, water and animals may enter the outdoor unit, causing fire, electric shock, and physical injury or death.

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

If the air conditioner is installed in a small space, take measures to prevent the refrigerant concentration from exceeding safety limits in the event of a refrigerant leak.
Consult the latest edition of ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) Standard 15. If the refrigerant leaks and safety limits are exceeded, it could result in personal injuries or death from oxygen depletion.

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

Periodically check that the outdoor frame is not damaged.
There is a risk of explosion, physical injury, or death.

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

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

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

LG

INSTALLATION, CONTINUED

⚠ CAUTION

Be very careful when transporting the product. There is a risk of the product falling and causing physical injury.

- *Use appropriate moving equipment to transport each frame; ensure the equipment is capable of supporting the weights listed above.*
- *Some products use polypropylene bands for packaging. Do not use polypropylene bands to lift the unit.*
- *Suspend the outdoor unit from the base at specified positions. Support the outdoor unit a minimum of four points to avoid slippage from rigging apparatus.*

⚠ WARNING

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

Note

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

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

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

When installing the unit in a hospital, mechanical room, or similar electromagnetic field (EMF) sensitive environment, provide sufficient protection against electrical noise.
Inverter equipment, power generators, high-frequency medical equipment or radio communication equipment may cause the air conditioner to operate improperly. The unit may also affect such equipment by creating electrical noise that disturbs medical treatment or image broadcasting.

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

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

Do not make refrigerant substitutions. Use R410A only.
If a different refrigerant is used, or air mixes with original refrigerant, the unit will malfunction and be damaged.

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

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

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

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

Take appropriate actions at the end of HVAC equipment life to recover, recycle, reclaim or destroy R410A refrigerant according to applicable U.S. Environmental Protection Agency (EPA) rules.

Periodically check that the outdoor frame is not damaged.
There is a risk of equipment damage.

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

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

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

WIRING

⚠DANGER

High voltage electricity is required to operate this system. Adhere to the NEC code and these instructions when wiring.
Improper connections and inadequate grounding can cause accidental injury or death.

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

Turn the power off at the nearest disconnect before servicing the equipment.
Electrical shock can cause physical injury or death.

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

⚠WARNING

The information contained in this manual is intended for use by an industry-qualified, experienced, certified electrician familiar with the U.S. National Electric Code (NEC) who is equipped with the proper tools and test instruments.
Failure to carefully read and follow all instructions in this manual can result in equipment malfunction, property damage, personal injury or death.

All electric work must be performed by a licensed electrician and conform to local building codes or, in the absence of local codes, with the National Electrical Code, and the instructions given in this manual.
If the power source capacity is inadequate or the electric work is not performed properly, it may result in fire, electric shock, physical injury or death.

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

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

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

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

Note

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

LG

OPERATION

⚠DANGER

Do not provide power to or operate the unit if it is flooded or submerged.
There is risk of fire, electric shock, physical injury or death.

Use a dedicated breaker for this product.
There is risk of fire, electric shock, physical injury or death.

Do not operate the disconnect switch with wet hands.
There is risk of fire, electric shock, physical injury or death.

Periodically verify the equipment mounts have not deteriorated.
If the base collapses, the unit could fall and cause physical injury or death.

Use inert (nitrogen) gas when performing leak tests or air purges. Do not use compressed air, oxygen, or flammable gases.
Using these substances may cause fire, explosion, and physical injury or death.

If refrigerant leaks out, ventilate the area before operating the unit.
If the unit is mounted in an ecnlosed, low-lying, or poorly ventilated area, and the the system develops a refrigerant leak, it may cause a fire, electric shock, explosion, physical injury or death.

⚠WARNING

Do not allow water, dirt, or animals to enter the unit.
There is risk of fire, electric shock, physical injury or death.

Do not touch the refrigerant piping during or after operation.
It can cause burns or frostbite.

Do not operate the unit with the panel(s) or protective cover(s) removed; keep fingers and clothing away from moving parts.
The rotating, hot, cold, and high-voltage parts of the unit can cause physical injury or death.

⚠CAUTION

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

Note

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

Do not use the product for mission critical or special purpose applications such as preserving foods, works of art, or other precision air conditioning applications. The equipment is designed to provide comfort cooling and heating.
Oil, steam, sulfuric smoke, etc., can significantly reduce the performance of the unit, or damage its parts.

Turn on the power at least six (6) hours before operation begins.
Starting operation immediately after turning on the main power switch can result in severe damage to the compressor(s). Keep the power switch on during the operational season.

Do not turn off the main power switch after operation has been stopped.
Wait at least five (5) minutes before turning off the main power switch, otherwise it may result in product malfunction.

Do not block the inlet or outlet.
Unit may malfunction.

Auto-addressing should be performed after connecting the power of all indoor and outdoor units.
Auto-addressing should also be performed after servicing an indoor unit.

Do not allow water, dirt, or animals to enter the unit.
There is risk of unit failure.

Do not operate the unit with the panel(s) or protective cover(s) removed; keep fingers and clothing away from moving parts.
Non-secured covers can result in malfunction due to dust or water in the service panel.

Periodically verify the equipment mounts have not deteriorated.
If the base collapses, the unit could fall and cause property damage or product failure.

UNIT NOMENCLATURE

Outdoor and Heat Recovery Control Units

Outdoor Units (ODU)

ARU	N	072	B	T	E	4

Family

ARU = Multi V Outdoor Unit (Refrigerant R410A)

Type

N = Inverter Heat Pump
B = Inverter Heat Recovery

Nominal Capacity
(Nominal cooling capacity in Btu/h)

072 = 72,000	192 = 192,000	312/313 = 312,000	432 = 432,000
096 = 96,000	216 = 216,000	336/337 = 336,000	456 = 456,000
121 = 121,000	240 = 240,000	360 = 360,000	480 = 480,000
144 = 144,000	264 = 264,000	384 = 384,000	504 = 504,000
168 = 168,000	288 = 288,000	408 = 408,000	

Electrical Ratings

B = 208–230V/60Hz/3Ph
D = 460V/60Hz/3Ph

Airflow Configuration

T = Top Discharge

Efficiency

E = High Efficiency

Generation

4 = Fourth

Heat Recovery Units (HRU)

PRHR	02	2A

Family

PRHR = Multi V Heat Recovery (HR) unit (Refrigerant R410A)

Number of Ports

02 = Two Ports
03 = Three Ports
04 = Four Ports

Series Number

2A = Series Number

HEAT PUMP SPECIFICATIONS

Single-Frame 208-230V

Table 1: Single-Frame 208-230V Heat Pump Units.

Combination Unit Model Number		6.0 Ton ARUN072BTE4	8.0 Ton ARUN096BTE4	10.0 Ton ARUN121BTE4	12.0 ARUN144BTE4	14.0 ARUN168BTE4
Individual Component Model Numbers		-	-	-	-	-
Cooling Performance						
Nominal Cooling Capacity (Btu/h)[1]		72,000	96,000	120,000	144,000	168,000
Rated Cooling Capacity (Btu/h)[2]		69,000	92,000	114,000	138,000	160,000
Heating Performance						
Nominal Heating Capacity (Btu/h)[1]		81,000	108,000	135,000	162,000	189,000
Rated Heating Capacity (Btu/h)[2]		77,000	103,000	129,000	154,000	180,000
Operating Range						
Cooling (°F DB)[3]		14 to 122	14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61	-13 to +61
Compressor						
Inverter Quantity		HSS DC Scroll x 1	HSS DC Scroll x 1	HSS DC Scroll x 1	HSS DC Scroll x 2	HSS DC Scroll x 2
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)						
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.75 x 1	0.60 x 2	0.60 x 2	0.60 x 2	0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct				
Operating Range (RPM)	Cooling	0 - 850	0 - 1,050	0 - 1,050	0 - 1,100	0 - 1,100
	Heating	80 - 850	80 - 1,050	80 - 1,050	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		7,400	9,850	9,850	10,200	10,200
Unit Data						
Refrigerant Type		R410A	R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/ System[4]		1 - 13	1 - 16	1 - 20	1- 24	1 - 29
Sound Pressure dB(A)[5]		58.5	59.0	59.0	59.5	59.5
Net Unit Weight (lbs.)		430	540	540	628	628
Shipping Weight (lbs.)		452	573	573	661	661
Communication Cables[6,7]		2 x 18	2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger						
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic				
Rows/Fins per inch		3/14	3/14	3/14	3/14	3/14
Piping[8]						
Liquid Line Connection (in., OD)		3/8 Braze	3/8 Braze	1/2 Braze	1/2 Braze	5/8 Braze
Vapor Line Connection (in., OD)		3/4 Braze	7/8 Braze	1-1/8 Braze	1-1/8 Braze	1-1/8 Braze
Factory Charge lbs. of R410A		16.9	23.6	23.6	23.6	23.6

[1]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[2]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[3]Cooling range with Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F.

[4]The System Combination Ratio must be between 50–130%.

[5]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[7]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 19 for detailed electrical data.

[8]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

HEAT PUMP SPECIFICATIONS

MULTI V IV

Dual-Frame 208-230V

Table 2: Dual-Frame 208-230V Heat Pump Units.

Combination Unit Model Number		16.0 Ton ARUN192BTE4	18.0 Ton ARUN216BTE4	20.0 Ton ARUN240BTE4	22.0 Ton ARUN264BTE4
Individual Component Model Numbers		ARUN072BTE4 + ARUN121BTE4	ARUN072BTE4 + ARUN144BTE4	ARUN096TE4 + ARUN144BTE4	ARUN121BTE4 + ARUN144BTE4
Cooling Performance					
Nominal Cooling Cap. (Btu/h)[1]		192,000	216,000	240,000	264,000
Rated Cooling Cap. (Btu/h)[2]		184,000	206,000	228,000	250,000
Heating Performance					
Nominal Heating Cap. (Btu/h)[1]		216,000	243,000	270,000	297,000
Rated Heating Cap. (Btu/h)[2]		206,000	230,000	256,000	282,000
Operating Range					
Cooling (°F DB)[3]		14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61
Compressor					
Inverter Quantity		HSS DC Scroll x 2	HSS DC Scroll x 3	HSS DC Scroll x 3	HSS DC Scroll x 3
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)					
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.75 + 0.60 x 2	0.75 + 0.60 x 2	0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct			
Oper. Range (RPM)	Cooling	0 - 1,050	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,050	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		17,250	17,600	20,050	20,050
Unit Data					
Refrigerant Type		R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/ System[4]		1 - 32	1 - 35	1 - 39	1 - 42
Sound Pressure dB(A)[5]		61.8	62.0	62.3	62.3
Net Unit Weight (lbs.)		430 + 540	430 + 628	540 + 628	540 + 628
Shipping Weight (lbs.)		452 + 573	452 + 661	573 + 661	573 + 661
Communication Cables[6,7]		2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger					
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic			
Rows/Fins per inch		3/14	3/14	3/14	3/14
Piping[8]					
Liquid Line Conn. (in., OD)		3/8 + 1/2 Braze	3/8 + 1/2 Braze	3/8 + 1/2 Braze	1/2 + 1/2 Braze
Vapor Line Conn. (in., OD)		3/4 + 1-1/8 Braze	3/4 + 1-1/8 Braze	7/8 + 1-1/8 Braze	1-1/8 + 1-1/8 Braze
Factory Charge lbs. of R410A		16.9 + 23.6	16.9 + 23.6	23.6 + 23.6	23.6 + 23.6

[1]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).

Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[2]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[3]Cooling range with Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F.

[4]The System Combination Ratio must be between 50–130%.

[5]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[7]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 19 for detailed electrical data.

[8]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

LG

Table 3: Dual-Frame 208-230V Heat Pump Units, continued.

Combination Unit Model Number		24.0 Ton ARUN288BTE4	26.0 Ton ARUN313BTE4	28.0 Ton ARUN337BTE4
Individual Component Model Numbers		ARUN144BTE4 + ARUN144BTE4	ARUN144BTE4 + ARUN168BTE4	ARUN168BTE4 + ARUN168BTE4
Cooling Performance				
Nominal Cooling Cap. (Btu/h)[1]		288,000	312,000	336,000
Rated Cooling Cap. (Btu/h)[2]		274,000	296,000	320,000
Heating Performance				
Nominal Heating Cap. (Btu/h)[1]		324,000	351,000	378,000
Rated Heating Cap. (Btu/h)[2]		308,000	334,000	361,000
Operating Range				
Cooling (°F DB)[3]		14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61
Compressor				
Inverter Quantity		HSS DC Scroll x 4	HSS DC Scroll x 4	HSS DC Scroll x 4
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)				
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct		
Operation Range (RPM)	Cooling	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		20,400	20,400	20,400
Unit Data				
Refrigerant Type		R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/System[4]		1 - 45	1 - 52	1 - 55
Sound Pressure dB(A)[5]		62.5	62.5	62.5
Net Unit Weight (lbs.)		628 + 628	628 + 628	628 + 628
Shipping Weight (lbs.)		661 + 661	661 + 661	661 + 661
Communication Cables[6,7]		2 x 18	2 x 18	2 x 18
Heat Exchanger				
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic		
Rows/Fins per inch		3/14	3/14	3/14
Piping[8]				
Liquid Line Conn. (in., OD)		1/2 + 1/2 Braze	1/2 + 5/8 Braze	5/8 + 5/8 Braze
Vapor Line Conn. (in., OD)		1-1/8 + 1-1/8 Braze	1-1/8 + 1-1/8 Braze	1-1/8 + 1-1/8 Braze
Factory Charge lbs. of R410A		23.6 + 23.6	23.6 + 23.6	23.6 + 23.6

[1]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[2]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[3]Cooling range with Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F.

[4]The System Combination Ratio must be between 50–130%.

[5]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[7]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 19 for detailed electrical data.

[8]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

HEAT PUMP SPECIFICATIONS

MULTI V IV

Triple-Frame 208-230V

Table 4: Triple-Frame 208-230V Heat Pump Units.

Combination Unit Model Number		26.0 Ton ARUN312BTE4	28.0 Ton ARUN336BTE4	30.0 Ton ARUN360BTE4	32.0 Ton ARUN384BTE4	34.0 Ton ARUN408BTE4
Individual Component Model Numbers[1]		ARUN072BTE4 + ARUN096BTE4 + ARUN144BTE4	ARUN096BTE4 + ARUN096BTE4 + ARUN144BTE4	ARUN096BTE4 + ARUN121BTE4 + ARUN144BTE4	ARUN096BTE4 + ARUN145BTE4 + ARUN145BTE4	ARUN121BTE4 + ARUN145BTE4 + ARUN145BTE4
Cooling Performance						
Nominal Cooling Cap. (Btu/h)[2]		312,000	336,000	360,000	384,000	408,000
Rated Cooling Cap. (Btu/h)[3]		296,000	320,000	342,000	366,000	390,000
Heating Performance						
Nominal Heating Cap. (Btu/h)[2]		351,000	378,000	405,000	432,000	459,000
Rated Heating Cap. (Btu/h)[3]		334,000	361,000	387,000	412,000	437,000
Operating Range						
Cooling (°F DB)[4]		14 to 122	14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61	-13 to +61
Compressor						
Inverter Quantity		HSS DC Scroll x 4	HSS DC Scroll x 4	HSS DC Scroll x 4	HSS DC Scroll x 5	HSS DC Scroll x 5
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)						
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.75 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct				
Operating Range (RPM)	Cooling	0 - 1,100	0 - 1,100	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,100	80 - 1,100	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		27,450	29,900	29,900	30,250	30,250
Unit Data						
Refrigerant Type		R410A	R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/ System[5]		1 - 52	1 - 55	1 - 58	1 - 61	1 - 64
Sound Pressure dB(A)[6]		63.8	63.9	63.9	64.1	64.1
Net Unit Weight (lbs.)		430 + 540 + 628	540 + 540 + 628	540 + 540 + 628	540 + 672 + 672	540 + 672 + 672
Shipping Weight (lbs.)		452 + 573 + 661	573 + 573 + 661	573 + 573 + 661	573 + 705 + 705	573 + 705 + 705
Communication Cables[7,8]		2 x 18	2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger						
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic				
Rows/Fins per inch		3/14	3/14	3/14	3/14	3/14
Piping[9]						
Liquid Line Conn. (in., OD)		3/8+3/8+1/2 Braze	3/8+3/8+1/2 Braze	3/8+1/2+1/2 Braze	3/8+5/8+5/8 Braze	1/2+5/8+5/8 Braze
Vapor Line Conn (in., OD)		3/4+7/8+1-1/8 Braze	7/8+7/8+1-1/8 Braze	7/8+1-1/8+1-1/8 Braze	7/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze
Factory Charge lbs. of R410A		16.9 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6

[1]ARUN145BTE4/ARUN145DTE4, ARUN169BTE4/ARUN169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN121BTE4/ARUN121DTE4, ARUN144BTE4/ARUN144DTE4, ARUN168BTE4/ ARUN168DTE4 single frame models.

[2]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[3]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[4]Cooling range with Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F.

[5]The System Combination Ratio must be between 50–130%.

[6]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[8]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 19 for detailed electrical data.

[9]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

LG

Table 5: Triple-Frame 208-230V Heat Pump Units, continued.

Combination Unit Model Number		36.0 Ton ARUN432BTE4	38.0 Ton ARUN456BTE4	40.0 Ton ARUN480BTE4	42.0 Ton ARUN504BTE4
Individual Component Model Numbers[1]		ARUN145BTE4 + ARUN145BTE4 + ARUN145BTE4	ARUN145BTE4 + ARUN145BTE4 + ARUN169BTE4	ARUN145BTE4 + ARUN169BTE4 + ARUN169BTE4	ARUN169BTE4 + ARUN169BTE4 + ARUN169BTE4
Cooling Performance					
Nominal Cooling Cap. (Btu/h)[2]		432,000	456,000	480,000	504,000
Rated Cooling Cap. (Btu/h)[3]		414,000	436,000	458,000	479,000
Heating Performance					
Nominal Heating Cap. (Btu/h)[2]		486,000	513,000	540,000	567,000
Rated Heating Cap. (Btu/h)[3]		462,000	488,000	514,000	539,000
Operating Range					
Cooling (°F DB)[4]		14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61
Compressor					
Inverter Quantity		HSS DC Scroll x 6	HSS DC Scroll x 6	HSS DC Scroll x 6	HSS DC Scroll x 6
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)					
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.60x2 + 0.60x2 + 0.60x2	0.60x2 + 0.60x2 + 0.60x2	0.60x2 + 0.60x2 + 0.60x2	0.60x2 + 0.60x2 + 0.60x2
Motor/Drive		Brushless Digitally Controlled/Direct			
Operating Range (RPM)	Cooling	0 - 1,100	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,100	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		30,600	30,600	30,600	30,600
Unit Data					
Refrigerant Type		R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/ System[5]		1 - 64	1 - 64	1 - 64	1 - 64
Sound Pressure dB(A)[6]		64.3	64.3	64.3	64.3
Net Unit Weight (lbs.)		672 + 672 + 672	672 + 672 + 672	672 + 672 + 672	672 + 672 + 672
Shipping Weight (lbs.)		705 + 705 + 705	705 + 705 + 705	705 + 705 + 705	705 + 705 + 705
Communication Cables[7,8]		2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger					
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic			
Rows/Fins per inch		3/14	3/14	3/14	3/14
Piping[9]					
Liquid Line Conn. (in., OD)		5/8+5/8+5/8 Braze	5/8+5/8+5/8 Braze	5/8+5/8+5/8 Braze	5/8+5/8+5/8 Braze
Vapor Line Conn (in., OD)		1-1/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze
Factory Charge lbs. of R410A		23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6

[1]ARUN145BTE4/ARUN145DTE4, ARUN169BTE4/ARUN169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN121BTE4/ARUN121DTE4, ARUN144BTE4/ARUN144DTE4, ARUN168BTE4/ ARUN168DTE4 single frame models.

[2]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[3]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[4]Cooling range with Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F.

[5]The System Combination Ratio must be between 50–130%.

[6]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[8]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 19 for detailed electrical data.

[9]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

HEAT PUMP SPECIFICATIONS

MULTI V IV

Single-Frame 460V

Table 6: Single-Frame 460V Heat Pump Units.

Combination Unit Model Number		6.0 Ton ARUN072DTE4	8.0 Ton ARUN096DTE4	10.0 Ton ARUN121DTE4	12.0 ARUN144DTE4	14.0 ARUN168DTE4
Individual Component Model Numbers		-	-	-	-	-
Cooling Performance						
Nominal Cooling Capacity (Btu/h)[1]		72,000	96,000	120,000	144,000	168,000
Rated Cooling Capacity (Btu/h)[2]		69,000	92,000	114,000	138,000	160,000
Heating Performance						
Nominal Heating Capacity (Btu/h)[1]		81,000	108,000	135,000	162,000	189,000
Rated Heating Capacity (Btu/h)[2]		77,000	103,000	129,000	154,000	180,000
Operating Range						
Cooling (°F DB)[3]		14 to 122	14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61	-13 to +61
Compressor						
Inverter Quantity		HSS DC Scroll x 1	HSS DC Scroll x 1	HSS DC Scroll x 1	HSS DC Scroll x 2	HSS DC Scroll x 2
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)						
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.75 x 1	0.60 x 2	0.60 x 2	0.60 x 2	0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct				
Operating Range (RPM)	Cooling	0 - 850	0 - 1,050	0 - 1,050	0 - 1,100	0 - 1,100
	Heating	80 - 850	80 - 1,050	80 - 1,050	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		7,400	9,850	9,850	10,200	10,200
Unit Data						
Refrigerant Type		R410A	R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. Number Indoor Units/ System[4]		1 - 13	1 - 16	1 - 20	1 - 24	1 - 29
Sound Pressure dB(A)[5]		58.5	59.0	59.0	59.5	59.5
Net Unit Weight (lbs.)		430	540	540	628	628
Shipping Weight (lbs.)		452	573	573	661	661
Communication Cables[6,7]		2 x 18	2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger						
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic				
Rows/Fins per inch		3/14	3/14	3/14	3/14	3/14
Piping[8]						
Liquid Line Connection (in., OD)		3/8 Braze	3/8 Braze	1/2 Braze	1/2 Braze	5/8 Braze
Vapor Line Connection (in., OD)		3/4 Braze	7/8 Braze	1-1/8 Braze	1-1/8 Braze	1-1/8 Braze
Factory Charge lbs. of R410A		16.9	23.6	23.6	23.6	23.6

[1]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[2]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[3]Cooling range with Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F.

[4]The System Combination Ratio must be between 50–130%.

[5]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[7]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 20 for detailed electrical data.

[8]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

LG

HEAT PUMP SPECIFICATIONS

Dual-Frame 460V

Table 7: Dual-Frame 460V Heat Pump Units.

Combination Unit Model Number		16.0 Ton ARUN192DTE4	18.0 Ton ARUN216DTE4	20.0 Ton ARUN240DTE4	22.0 Ton ARUN264DTE4
Individual Component Model Numbers		ARUN072DTE4 + ARUN121DTE4	ARUN072DTE4 + ARUN144DTE4	ARUN096DTE4+ ARUN144DTE4	ARUN121DTE4 + ARUN144DTE4
Cooling Performance					
Nominal Cooling Cap. (Btu/h)[1]		192,000	216,000	240,000	264,000
Rated Cooling Cap. (Btu/h)[2]		184,000	206,000	228,000	250,000
Heating Performance					
Nominal Heating Cap. (Btu/h)[1]		216,000	243,000	270,000	297,000
Rated Heating Cap. (Btu/h)[2]		206,000	230,000	256,000	282,000
Operating Range					
Cooling (°F DB)[3]		14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61
Compressor					
Inverter Quantity		HSS DC Scroll x 2	HSS DC Scroll x 3	HSS DC Scroll x 3	HSS DC Scroll x 3
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)					
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.75 + 0.60 x 2	0.75 + 0.60 x 2	0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct			
Oper. Range (RPM)	Cooling	0 - 1,050	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,050	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		17,250	17,600	20,050	20,050
Unit Data					
Refrigerant Type		R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/ System[4]		1 - 32	1 - 35	1 - 39	1 - 42
Sound Pressure dB(A)[5]		61.8	62.0	62.3	62.3
Net Unit Weight (lbs.)		430 + 540	430 + 628	540 + 628	540 + 628
Shipping Weight (lbs.)		452 + 573	452 + 661	573 + 661	573 + 661
Communication Cables[6,7]		2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger					
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic			
Rows/Fins per inch		3/14	3/14	3/14	3/14
Piping[8]					
Liquid Line Conn. (in., OD)		3/8 + 1/2 Braze	3/8 + 1/2 Braze	3/8 + 1/2 Braze	1/2 + 1/2 Braze
Vapor Line Conn. (in., OD)		3/4 + 1-1/8 Braze	3/4 + 1-1/8 Braze	7/8 + 1-1/8 Braze	1/2 + 1-1/8 Braze
Factory Charge lbs. of R410A		16.9 + 23.6	16.9 + 23.6	23.6 + 23.6	23.6 + 23.6

[1]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[2]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[3]Cooling range with Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F.

[4]The System Combination Ratio must be between 50–130%.

[5]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[7]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 20 for detailed electrical data.

[8]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

HEAT PUMP SPECIFICATIONS

MULTI V IV

Dual-Frame 460V

Table 8: Dual-Frame 460V Heat Pump Units, continued.

Combination Unit Model Number		24.0 Ton ARUN288DTE4	26.0 Ton ARUN313DTE4	28.0 Ton ARUN337DTE4
Individual Component Model Numbers		ARUN144DTE4 + ARUN144DTE4	ARUN144DTE4 + ARUN168DTE4	ARUN168DTE4 + ARUN168DTE4
Cooling Performance				
Nominal Cooling Cap. (Btu/h)[1]		288,000	312,000	336,000
Rated Cooling Cap. (Btu/h)[2]		274,000	296,000	320,000
Heating Performance				
Nominal Heating Cap. (Btu/h)[1]		324,000	351,000	378,000
Rated Heating Cap. (Btu/h)[2]		308,000	334,000	361,000
Operating Range				
Cooling (°F DB)[3]		14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61
Compressor				
Inverter Quantity		HSS DC Scroll x 4	HSS DC Scroll x 4	HSS DC Scroll x 4
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)				
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct		
Operation Range (RPM)	Cooling	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		20,400	20,400	20,400
Unit Data				
Refrigerant Type		R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/System[4]		1 - 45	1 - 52	1 - 55
Sound Pressure dB(A)[5]		62.5	62.5	62.5
Net Unit Weight (lbs.)		628 + 628	628 + 628	628 + 628
Shipping Weight (lbs.)		661 + 661	661 + 661	661 + 661
Communication Cables[6,7]		2 x 18	2 x 18	2 x 18
Heat Exchanger				
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic		
Rows/Fins per inch		3/14	3/14	3/14
Piping[8]				
Liquid Line Conn. (in., OD)		1/2 + 1/2 Braze	1/2 + 5/8 Braze	5/8 + 5/8 Braze
Vapor Line Conn. (in., OD)		1-1/8 + 1-1/8 Braze	1-1/8 + 1-1/8 Braze	1-1/8 + 1-1/8 Braze
Factory Charge lbs. of R410A		23.6 + 23.6	23.6 + 23.6	23.6 + 23.6

[1]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[2]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[3]Cooling range with Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F.

[4]The System Combination Ratio must be between 50–130%.

[5]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[7]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 20 for detailed electrical data.

[8]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

LG

Table 9: Triple-Frame 460V Heat Pump Units.

Combination Unit Model Number		26.0 Ton ARUN312DTE4	28.0 Ton ARUN336DTE4	30.0 Ton ARUN360DTE4	32.0 Ton ARUN384DTE4	34.0 Ton ARUN408DTE4
Individual Component Model Numbers[1]		ARUN072DTE4 + ARUN096DTE4 + ARUN144DTE4	ARUN096DTE4 + ARUN096DTE4 + ARUN144DTE4	ARUN096DTE4 + ARUN121DTE4 + ARUN144DTE4	ARUN096DTE4 + ARUN145DTE4 + ARUN145DTE4	ARUN121DTE4 + ARUN145DTE4 + ARUN145DTE4
Cooling Performance						
Nominal Cooling Cap. (Btu/h)[2]		312,000	336,000	360,000	384,000	408,000
Rated Cooling Cap. (Btu/h)[3]		296,000	320,000	342,000	366,000	390,000
Heating Performance						
Nominal Heating Cap. (Btu/h)[2]		351,000	351,000	405,000	432,000	459,000
Rated Heating Cap. (Btu/h)[3]		334,000	334,000	387,000	412,000	437,000
Operating Range						
Cooling (°F DB)[4]		14 to 122	14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61	-13 to +61
Compressor						
Inverter Quantity		HSS DC Scroll x 4	HSS DC Scroll x 4	HSS DC Scroll x 4	HSS DC Scroll x 5	HSS DC Scroll x 5
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)						
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.75 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct				
Operating Range (RPM)	Cooling	0 - 1,100	0 - 1,100	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,100	80 - 1,100	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		27,450	29,900	29,900	30,250	30,250
Unit Data						
Refrigerant Type		R410A	R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/ System[5]		1 - 52	1 - 55	1 - 58	1 - 61	1 - 64
Sound Pressure dB(A)[6]		63.8	63.9	63.9	64.1	64.1
Net Unit Weight (lbs.)		430 + 540 + 628	540 + 540 + 628	540 + 540 + 628	540 + 672 + 672	540 + 672 + 672
Shipping Weight (lbs.)		452 + 573 + 661	573 + 573 + 661	573 + 573 + 661	573 + 705 + 705	573 + 705 + 705
Communication Cables[7,8]		2 x 18	2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger						
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic				
Rows/Fins per inch		3/14	3/14	3/14	3/14	3/14
Piping[9]						
Liquid Line Conn. (in., OD)		3/8 + 3/8 + 1/2 Braze	3/8 + 3/8 + 1/2 Braze	3/8 + 1/2 + 1/2 Braze	3/8 + 5/8 + 5/8 Braze	1/2 + 5/8 + 5/8 Braze
Vapor Line Conn (in., OD)		3/4+7/8+1-1/8 Braze	7/8+7/8+1-1/8 Braze	7/8+1-1/8+1-1/8 Braze	7/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze
Factory Charge lbs. of R410A		16.9 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6

[1]ARUN145BTE4/ARUN145DTE4, ARUN169BTE4/ARUN169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/ARUN144DTE4, ARUN168BTE4/ARUN168DTE4 single frame models.

[2]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft.
of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[3]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[4]Cooling range with Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F.

[5]The System Combination Ratio must be between 50–130%.

[6]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[8]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 20 for detailed electrical data.

[9]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

HEAT PUMP SPECIFICATIONS

MULTI V IV

Triple-Frame 460V

Table 10: Triple-Frame 460V Heat Pump Units, continued.

Combination Unit Model Number		36.0 Ton ARUN432DTE4	38.0 Ton ARUN456DTE4	40.0 Ton ARUN480DTE4	42.0 Ton ARUN504DTE4
Individual Component Model Numbers[1]		ARUN145DTE4 + ARUN145DTE4 + ARUN145DTE4	ARUN145DTE4 + ARUN145DTE4 + ARUN169DTE4	ARUN145DTE4 + ARUN169DTE4 + ARUN169DTE4	ARUN169DTE4 + ARUN169DTE4 + ARUN169DTE4
Cooling Performance					
Nominal Cooling Cap. (Btu/h)[2]		432,000	456,000	480,000	504,000
Rated Cooling Cap. (Btu/h)[3]		414,000	436,000	458,000	479,000
Heating Performance					
Nominal Heating Cap. (Btu/h)[2]		486,000	513,000	540,000	567,000
Rated Heating Cap. (Btu/h)[3]		462,000	488,000	514,000	539,000
Operating Range					
Cooling (°F DB)[4]		14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61
Compressor					
Inverter Quantity		HSS DC Scroll x 6	HSS DC Scroll x 6	HSS DC Scroll x 6	HSS DC Scroll x 6
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)					
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct			
Operating Range (RPM)	Cooling	0 - 1,100	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,100	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		30,600	30,600	30,600	30,600
Unit Data					
Refrigerant Type		R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/ System[5]		1 - 64	1 - 64	1 - 64	1 - 64
Sound Pressure dB(A)[6]		64.3	64.3	64.3	64.3
Net Unit Weight (lbs.)		672 + 672 + 672	672 + 672 + 672	672 + 672 + 672	672 + 672 + 672
Shipping Weight (lbs.)		705 + 705 + 705	705 + 705 + 705	705 + 705 + 705	705 + 705 + 705
Communication Cables[7,8]		2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger					
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic			
Rows/Fins per inch		3/14	3/14	3/14	3/14
Piping[9]					
Liquid Line Conn. (in., OD)		5/8 + 5/8 + 5/8 Braze	5/8 + 5/8 + 5/8 Braze	5/8 + 5/8 + 5/8 Braze	5/8 + 5/8 + 5/8 Braze
Vapor Line Conn (in., OD)		1-1/8 + 1-1/8 + 1-1/8 Braze	1-1/8 + 1-1/8 + 1-1/8 Braze	1-1/8 + 1-1/8 + 1-1/8 Braze	1-1/8 + 1-1/8 + 1-1/8 Braze
Factory Charge lbs. of R410A		23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6

[1]ARUN145BTE4/ARUN145DTE4, ARUN169BTE4/ARUN169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/ARUN144DTE4, ARUN168BTE4/ARUN168DTE4 single frame models.

[2]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[3]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[4]Cooling range with Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F.

[5]The System Combination Ratio must be between 50–130%.

[6]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[8]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 20 for detailed electrical data.

[9]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

LG

Table 11: 208-230V, 60Hz, 3-Phase Heat Pump Units.

Nom. Tons	Unit Model Nos.	Compressor (Comp.)								Condenser Fan Motor(s)				MCA			MOCP			RFA		
		Comp. Qty.	Motor Amps						Fan Qty.	Amps				Frame			Frame			Frame		
			Motor RLA (Ea.)							FLA (Ea.)												
			Frame																			
			1		2		3			Frame												
			Comp. A	Comp. B	Comp. A	Comp. B	Comp. A	Comp. B		1	2	3		1	2	3	1	2	3	1	2	3
6.0	ARUN072BTE4	1	17.0	-	-	-	-	-	1	4.0	-	-		25.3	-	-	40	-	-	35	-	-
8.0	ARUN096BTE4	1	27.3	-	-	-	-	-	2	6.0	-	-		40.1	-	-	60	-	-	50	-	-
10.0	ARUN121BTE4	1	27.4	-	-	-	-	-	2	6.0	-	-		40.3	-	-	60	-	-	50	-	-
12.0	ARUN144BTE4	2	19.0	19.0	-	-	-	-	2	6.0	-	-		48.8	-	-	60	-	-	60	-	-
14.0	ARUN168BTE4	2	20.7	20.7	-	-	-	-	2	6.0	-	-		52.5	-	-	70	-	-	70	-	-
16.0	ARUN192BTE4	2	17.0	-	27.4	-	-	-	3	4.0	6.0	-		25.3	40.3	-	40	60	-	35	50	-
18.0	ARUN216BTE4	3	17.0	-	19.0	19.0	-	-	3	4.0	6.0	-		25.3	48.8	-	40	60	-	35	60	-
20.0	ARUN240BTE4	3	27.3	-	19.0	19.0	-	-	4	6.0	6.0	-		40.1	48.8	-	60	60	-	50	60	-
22.0	ARUN264BTE4	3	27.4	-	19.0	19.0	-	-	4	6.0	6.0	-		40.3	48.8	-	60	60	-	50	60	-
24.0	ARUN288BTE4	4	19.0	19.0	19.0	19.0	-	-	4	6.0	6.0	-		48.8	48.8	-	60	60	-	60	60	-
26.0	ARUN313BTE4	4	20.7	20.7	19.0	19.0	-	-	4	6.0	-	-		48.8	52.5	-	67.8	73.1	-	60	70	-
28.0	ARUN337BTE4	4	20.7	20.7	20.7	20.7	-	-	4	6.0	6.0	-		52.5	52.5	-	73.1	73.1	-	70	70	-
26.0	ARUN312BTE4	4	17.0	-	27.3	-	19.0	19.0	5	4.0	6.0	6.0		25.3	40.1	48.8	40	60	60	35	50	60
28.0	ARUN336BTE4	4	27.3	-	27.3	-	19.0	19.0	6	6.0	6.0	6.0		40.1	40.1	48.8	60	60	60	50	50	60
30.0	ARUN360BTE4	4	27.3	-	27.4	-	19.0	19.0	6	6.0	6.0	6.0		40.1	40.3	48.8	60	60	60	50	50	60
32.0	ARUN384BTE4	5	27.3	-	27.2	17.0	27.2	17.0	6	6.0	6.0	6.0		40.1	57.0	57.0	60	80*	80*	50	80	80
34.0	ARUN408BTE4	5	27.4	-	27.2	17.0	27.2	17.0	6	6.0	6.0	6.0		40.3	57.0	57.0	60	80*	80*	50	80	80
36.0	ARUN432BTE4	6	27.2	17.0	27.2	17.0	27.2	17.0	6	6.0	6.0	6.0		57.0	57.0	57.0	80*	80*	80*	80	80	80
38.0	ARUN456BTE4	6	27.2	17.0	27.2	17.0	27.2	17.0	6	6.0	6.0	6.0		57.0	57.0	57.0	80*	80*	80*	80	80	80
40.0	ARUN480BTE4	6	27.2	17.0	27.2	17.0	27.2	17.0	6	6.0	6.0	6.0		57.0	57.0	57.0	80*	80*	80*	80	80	80
42.0	ARUN504BTE4	6	27.2	17.0	27.2	17.0	27.2	17.0	6	6.0	6.0	6.0		57.0	57.0	57.0	80*	80*	80*	80	80	80

For component model nos. see the specification tables on p. 9-13.

Voltage tolerance is ±10%.

Maximum allowable voltage unbalance is 2%.

MCA = Minimum Circuit Ampacity.

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

RFA: Recommended Fuse Amps.

*SCCR rating: 5kA RMS Symmetrical.

HEAT PUMP ELECTRICAL DATA

Table 12: 460V, 60Hz, 3-Phase Heat Pump Units.

Nom. Tons	Unit Model Nos.	Compressor (Comp.)								Condenser Fan Motor(s)				MCA			MOCP					
		Comp. Qty.	Motor Amps						Fan Qty.	Amps				Frame			Frame			Frame		
			Motor RLA (Ea.)							FLA (Ea.)												
			Frame							Frame												
			1		2		3						1	2	3	1	2	3	1	2	3			
			Comp. A	Comp. B	Comp. A	Comp. B	Comp. A	Comp. B		1	2	3												
6.0	ARUN072DTE4	1	11.7	-	-	-	-	-	1	2.1	-	-	16.7	-	-	25	-	-	25	-	-			
8.0	ARUN096DTE4	1	16.5	-	-	-	-	-	2	2.6	-	-	23.2	-	-	35	-	-	30	-	-			
10.0	ARUN121DTE4	1	17.1	-	-	-	-	-	2	2.6	-	-	24.0	-	-	40	-	-	30	-	-			
12.0	ARUN144DTE4	2	12.9	12.9	-	-	-	-	2	2.6	-	-	31.6	-	-	40	-	-	40	-	-			
14.0	ARUN168DTE4	2	13.9	13.9	-	-	-	-	2	2.6	-	-	33.9	-	-	45	-	-	45	-	-			
16.0	ARUN192DTE4	2	11.7	-	17.1	-	-	-	3	2.1	2.6	-	16.7	24.0	-	25	40	-	25	30	-			
18.0	ARUN216DTE4	3	11.7	-	12.9	12.9	-	-	3	2.1	2.6	-	16.7	31.6	-	25	40	-	25	40	-			
20.0	ARUN240DTE4	3	16.5	-	12.9	12.9	-	-	4	2.6	2.6	-	23.2	31.6	-	35	40	-	30	40	-			
22.0	ARUN264DTE4	3	17.1	-	12.9	12.9	-	-	4	2.6	2.6	-	24.0	31.6	-	40	40	-	30	40	-			
24.0	ARUN288DTE4	4	12.9	12.9	12.9	12.9	-	-	4	2.6	2.6	-	31.6	31.6	-	40	40	-	40	40	-			
26.0	ARUN313DTE4	4	13.9	13.9	12.9	12.9	-	-	4	2.6	2.6	-	31.6	33.9	-	44.5	47.8	-	50	50	-			
28.0	ARUN337DTE4	4	13.9	13.9	13.9	13.9	-	-	4	2.6	2.6	-	33.9	33.9	-	47.8	47.8	-	50	50	-			
26.0	ARUN312DTE4	4	11.7	-	16.5	-	12.9	12.9	5	2.1	2.6	2.6	16.7	23.2	31.6	25	35	40	25	30	40			
28.0	ARUN336DTE4	4	16.5	-	16.5	-	12.9	12.9	6	2.6	2.6	2.6	23.2	23.2	31.6	35	35	40	30	30	40			
30.0	ARUN360DTE4	4	16.5	-	17.1	-	12.9	12.9	6	2.6	2.6	2.6	23.2	24.0	31.6	35	40	40	30	30	40			
32.0	ARUN384DTE4	5	16.5	-	16.2	12.9	16.2	12.9	6	2.6	2.6	2.6	23.2	35.8	35.8	35	50	50	30	50	50			
34.0	ARUN408DTE4	5	17.1	-	16.2	12.9	16.2	12.9	6	2.6	2.6	2.6	24.0	35.8	35.8	40	50	50	30	50	50			
36.0	ARUN432DTE4	6	16.2	12.9	16.2	12.9	16.2	12.9	6	2.6	2.6	2.6	35.8	35.8	35.8	50	50	50	50	50	50			
38.0	ARUN456DTE4	6	16.2	12.9	16.2	12.9	16.2	12.9	6	2.6	2.6	2.6	35.8	35.8	35.8	50	50	50	50	50	50			
40.0	ARUN480DTE4	6	16.2	12.9	16.2	12.9	16.2	12.9	6	2.6	2.6	2.6	35.8	35.8	35.8	50	50	50	50	50	50			
42.0	ARUN504DTE4	6	16.2	12.9	16.2	12.9	16.2	12.9	6	2.6	2.6	2.6	35.8	35.8	35.8	50	50	50	50	50	50			

For component model nos. see the specification tables on p. 14-18

Voltage tolerance is 414-528V.

Maximum allowable voltage unbalance is 2%.

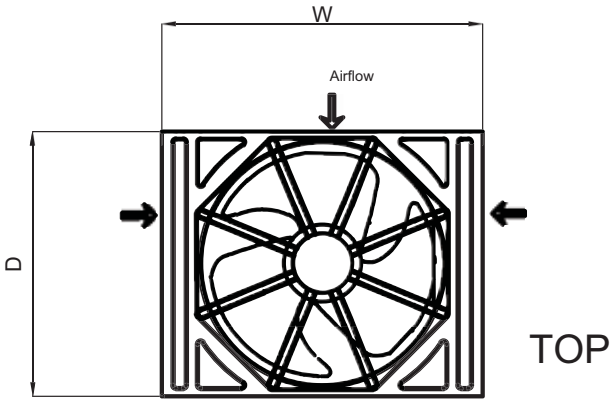
MCA = Minimum Circuit Ampacity.

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

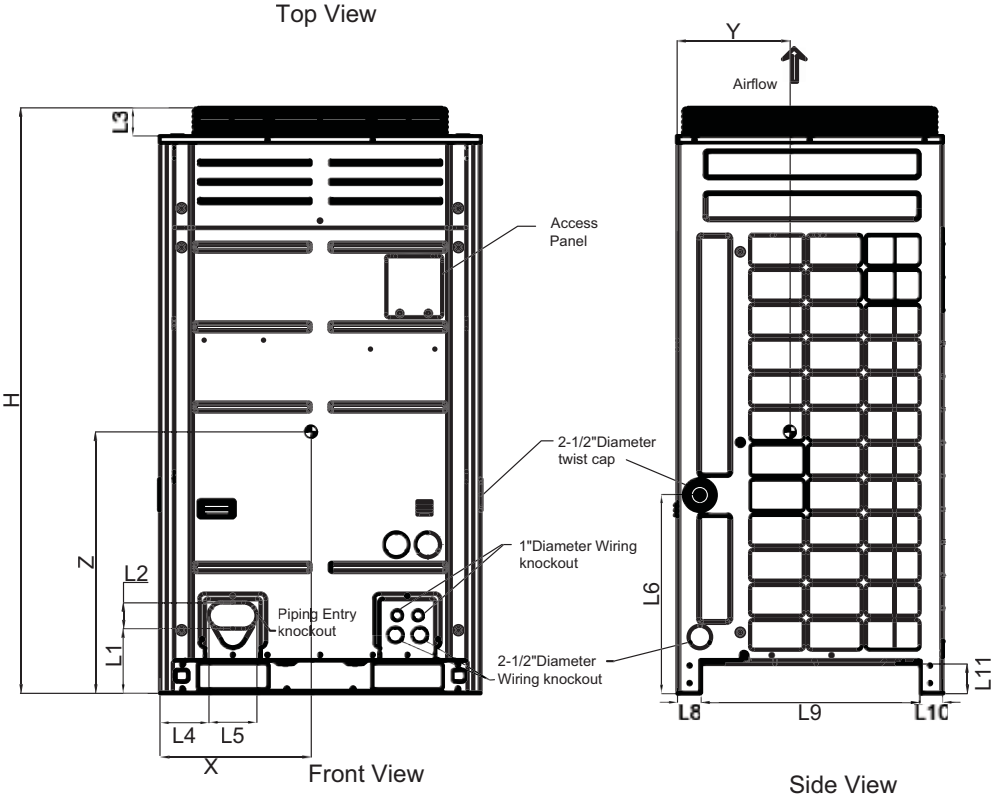
RFA: Recommended Fuse Amps.

HEAT PUMP DIMENSIONS

ARUN072BTE4 / ARUN072DTE4

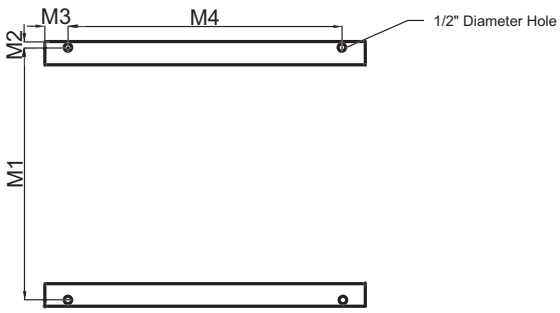


Top View



Front View

Side View



Bottom Mounting Holes

W	36-1/4"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	22-7/16"
L7	2-9/16"
L8	2-9/16"
L9	24-3/16"
L10	2-9/16"
L11	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	31-3/16"

Center of Gravity

X	17-5/8"
Y	13-1/2"
Z	29-5/8"

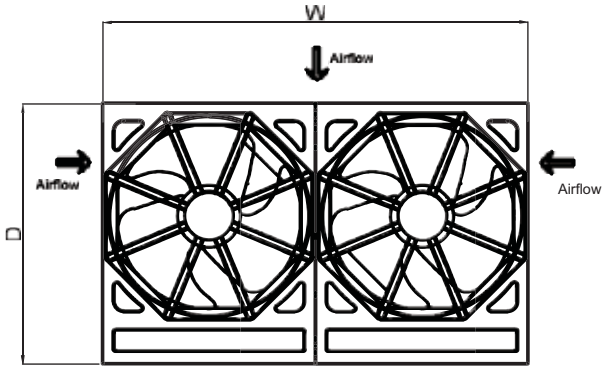
Note - All dimensions have a tolerance of ± 0.25 in.

= Center of Gravity

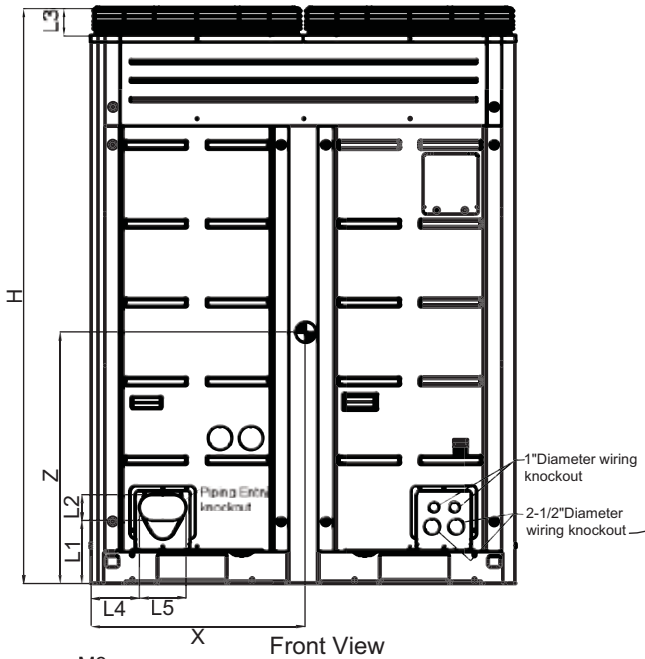
HEAT PUMP DIMENSIONS

MULTI V IV

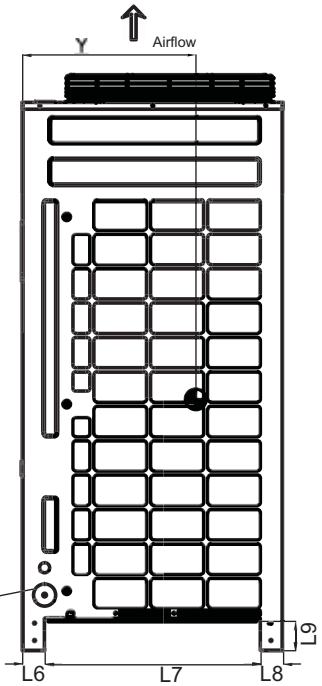
ARUN096BTE4 / 096DTE4, ARUN121BTE4 / 121DTE4, ARUN144BTE4 / 144DTE4, ARUN145BTE4 / 145DTE4, ARUN168BTE4 / 168DTE4, ARUN169BTE4 / 169DTE4



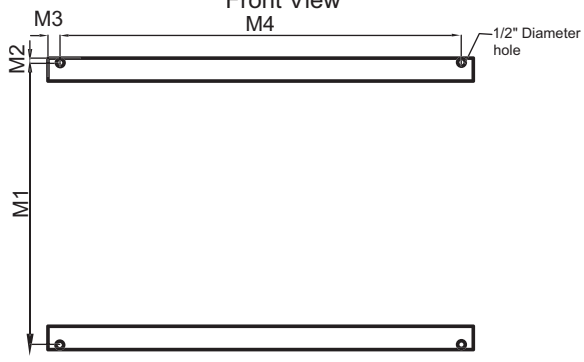
Top View



Front View



Side View



Bottom Mounting Holes

W	48-13/16"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	2-9/16
L7	24-3/16"
L8	2-9/16"
L9	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	43-3/8"

Center of Gravity

X	17-5/8"
Y	13-1/2"
Z	29-5/8"

Note - All dimensions have a tolerance of ± 0.25 in.

= Center of Gravity

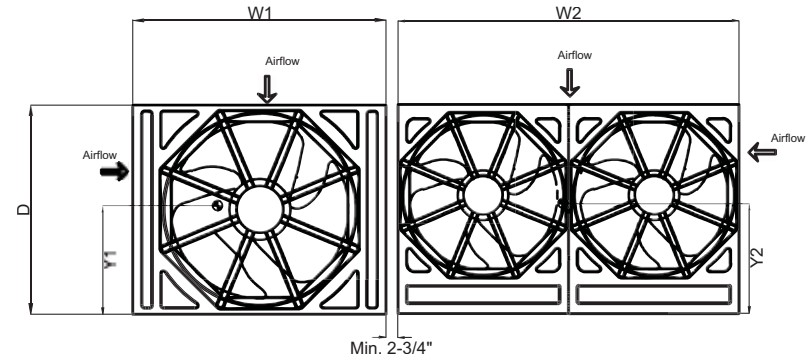
Note:

ARUN145BTE4/ARUN145DTE4 and ARUN169BTE4/ARUN169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/ ARUN144DTE4 and ARUN168BTE4/ARUN168DTE4 single frame models.

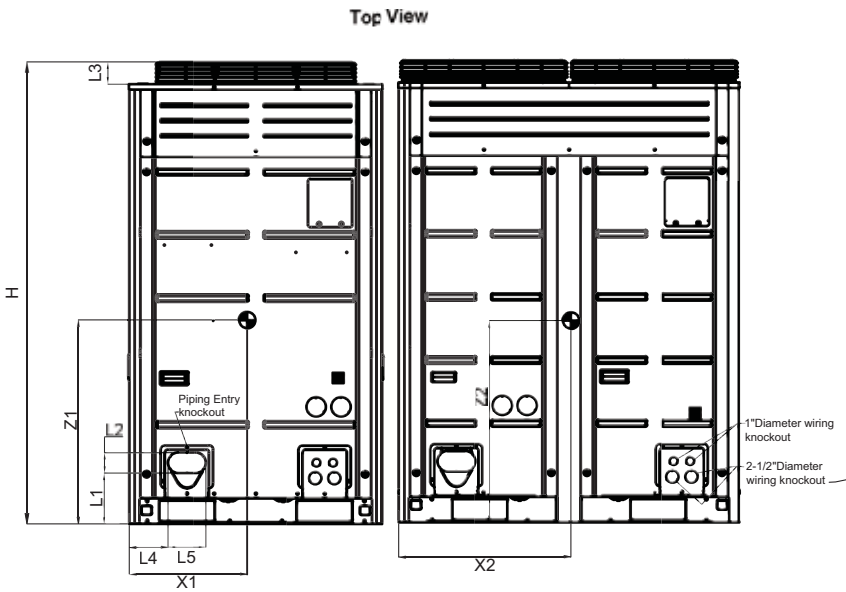
LG

HEAT PUMP DIMENSIONS

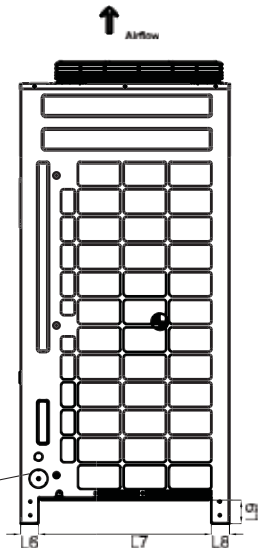
ARUN192BTE4 / 192DTE4, ARUN216BTE4 / 216DTE4



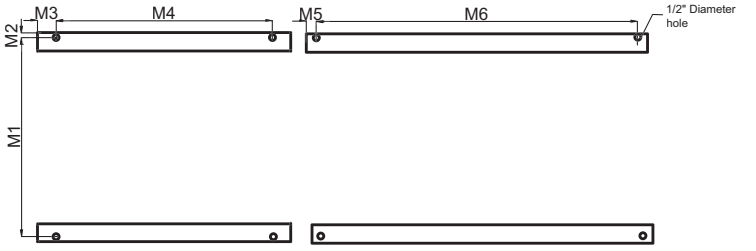
Top View



Front View



Side View



Bottom Mounting Holes

W1	36-1/4"
W2	48-13/16"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	2-9/16
L7	24-3/16"
L8	2-9/16"
L9	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	31-3/16"
M5	2-5/8"
M6	43-3/8"

Center of Gravity

X1	17-5/8"
X2	24-3/4"
Y1	13-1/2"
Y2	21-9/16"
Z1	29-5/8"
Z2	29-7/8"

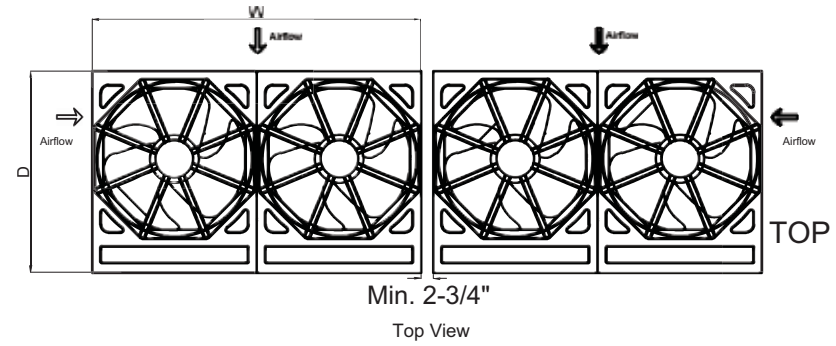
Note - All dimensions have a tolerance of ± 0.25 in.

= Center of Gravity

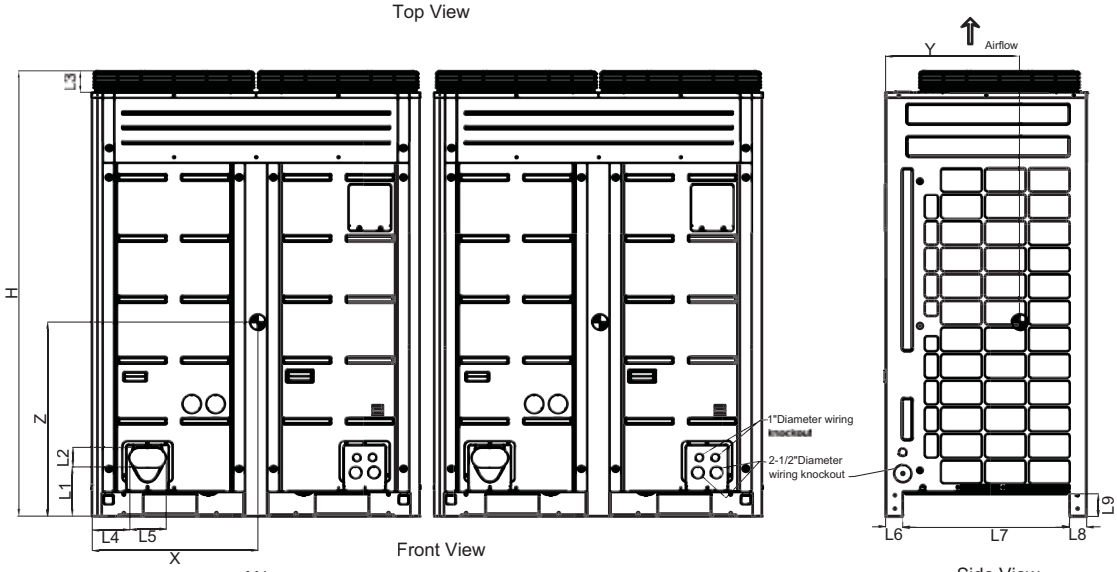
HEAT PUMP DIMENSIONS

MULTI V IV

ARUN240BTE4 / 240DTE4, ARUN264BTE4 / 264DTE4, ARUN288BTE4 / 288DTE4, ARUN313BTE4 / 313DTE4, ARUN337BTE4 / 337DTE4

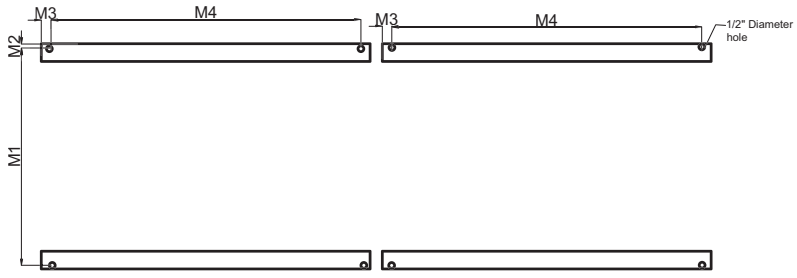


Top View



Front View

Side View



Bottom Mounting Holes

W	48-13/16"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	2-9/16
L7	24-3/16"
L8	2-9/16"
L9	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	43-3/8"

Center of Gravity

X	24-3/4"
Y	21-9/16"
Z	29-7/8"

Note - All dimensions have a tolerance of ± 0.25 in.

= Center of Gravity

LG

HEAT PUMP DIMENSIONS

ARUN312BTE4 / 312DTE4

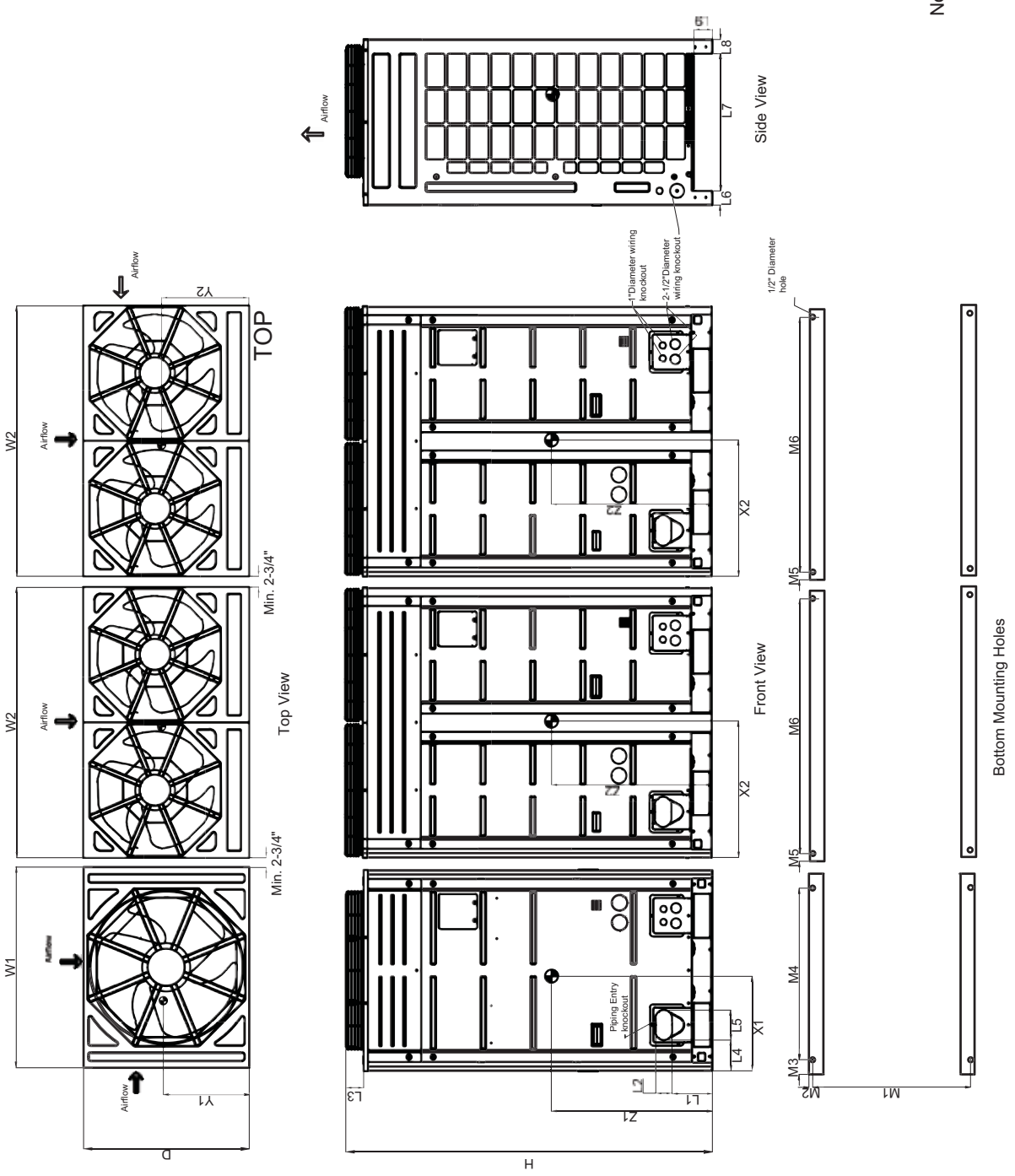
W1	36-1/4"
W2	48-13/16"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	2-9/16
L7	24-3/16"
L8	2-9/16"
L9	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	31-3/16"
M5	2-5/8"
M6	43-3/8"

Center of Gravity

X1	17-5/8"
X2	24-3/4"
Y1	13-1/2"
Y2	21-9/16"
Z1	29-5/8"
Z2	29-7/8"

Note - All dimensions have a tolerance of ± 0.25 in.

⊕ = Center of Gravity



HEAT PUMP DIMENSIONS

ARUN336-360-384-408-432-456-480-504BTE4 / DTE4

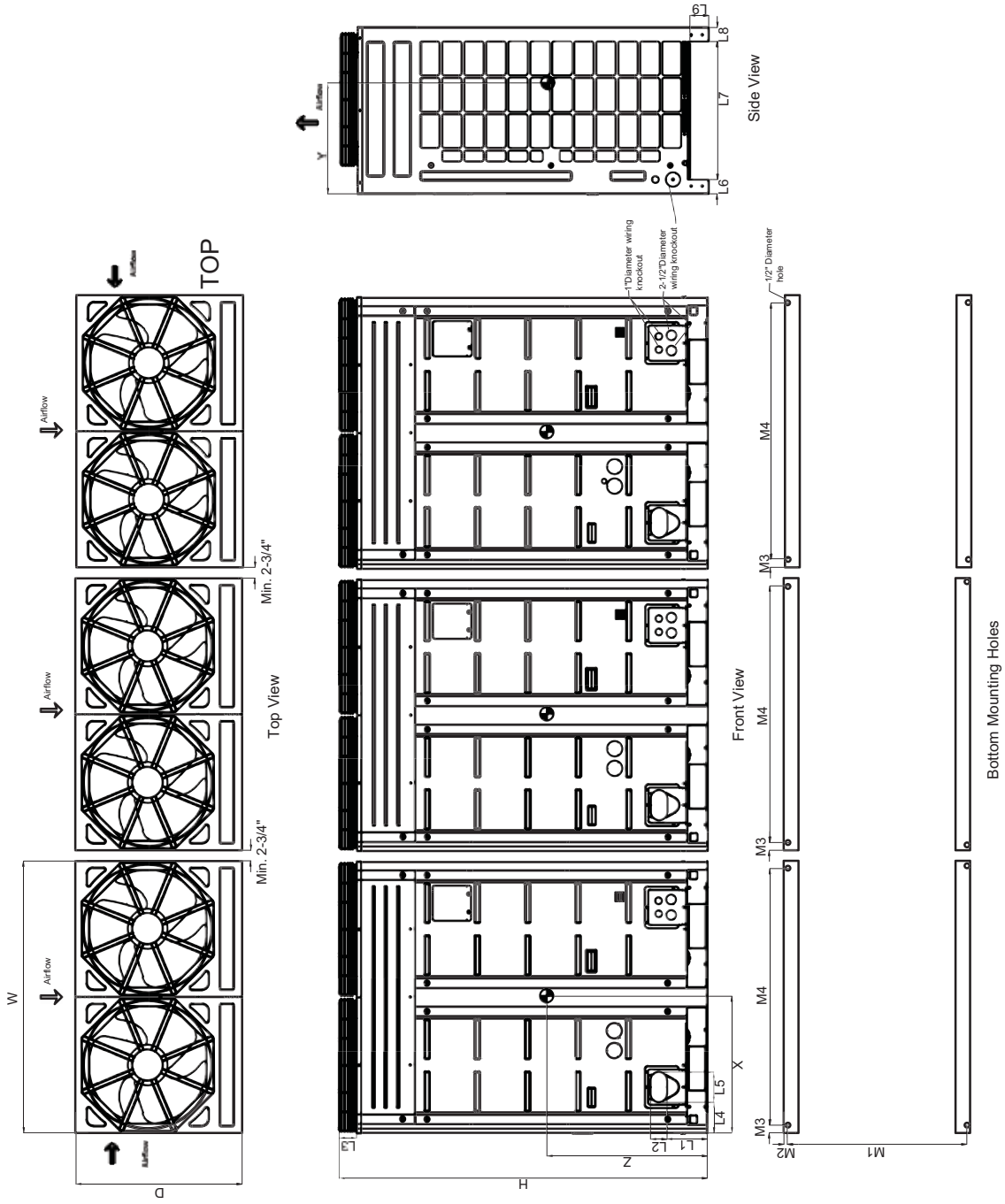
W	48-13/16"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	2-9/16
L7	24-3/16"
L8	2-9/16"
L9	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	43-3/8"

Center of Gravity

X	24-3/4"
Y	21-9/16"
Z	29-7/8"

Note - All dimensions have a tolerance of ± 0.25 in.

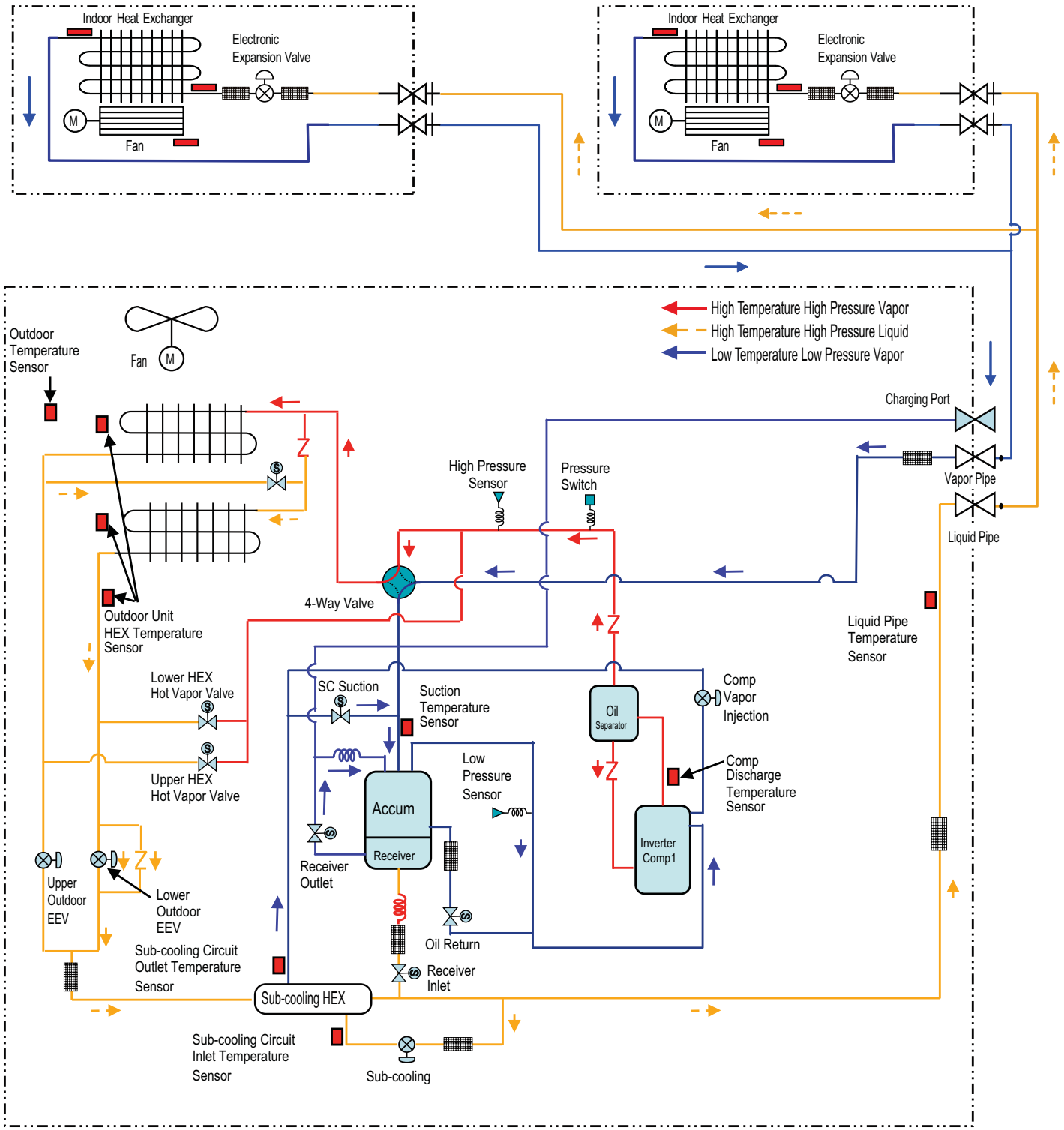
= Center of Gravity



HEAT PUMP REFRIG. FLOW DIAGRAMS

ARUN072BTE4 / 072DTE4, ARUN096BTE4 / 096DTE4,
ARUN121BTE4 / 121DTE4

Cooling Mode



*8 ton and 10 ton units have 2 fans.

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

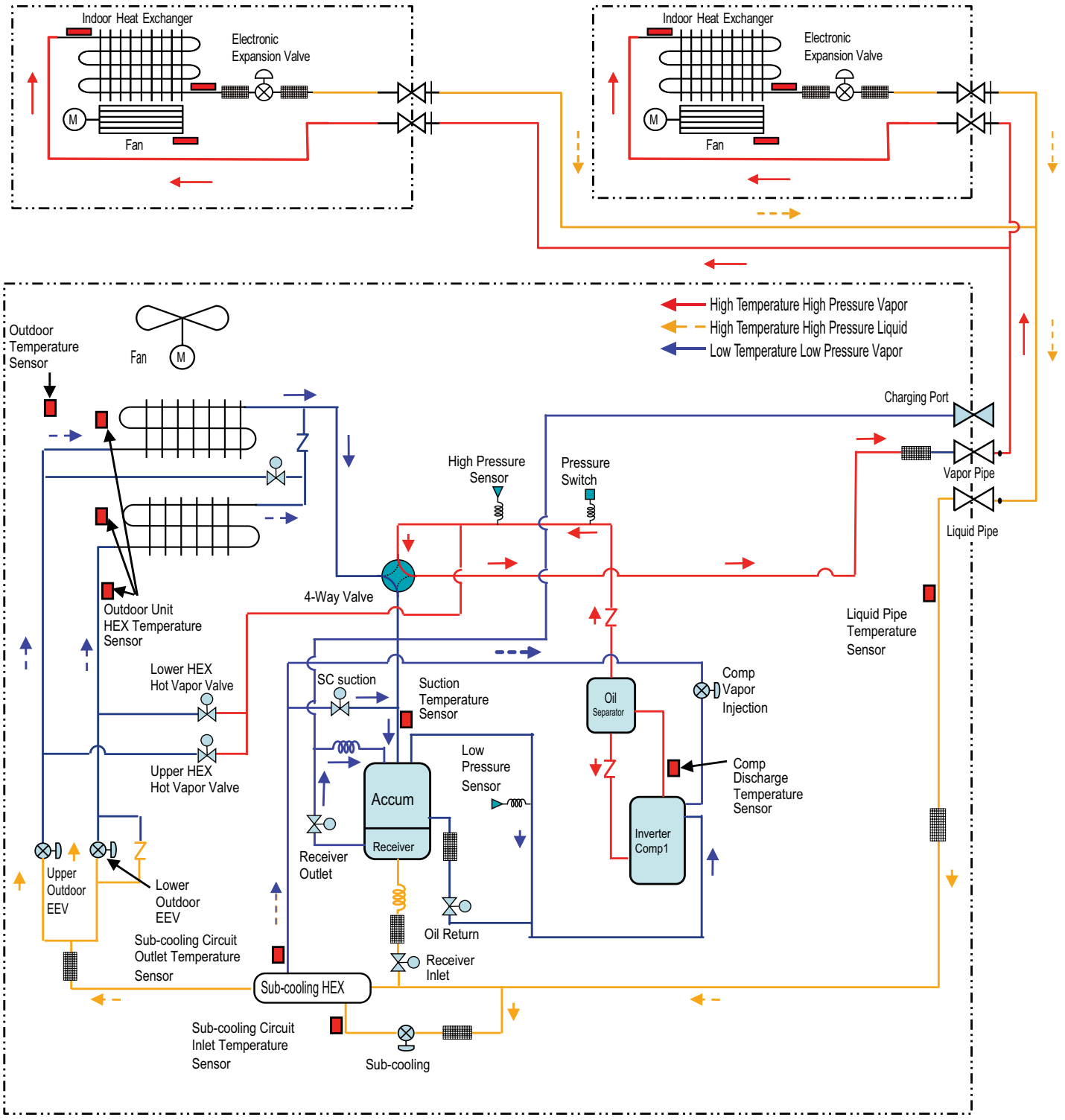
Product Data

HEAT PUMP REFRIG. FLOW DIAGRAMS

MULTI V IV

Heating Mode

ARUN072BTE4 / 072DTE4, ARUN096BTE4 / 096DTE4,
ARUN121BTE4 / 121DTE4



*8 ton and 10 ton units have 2 fans.

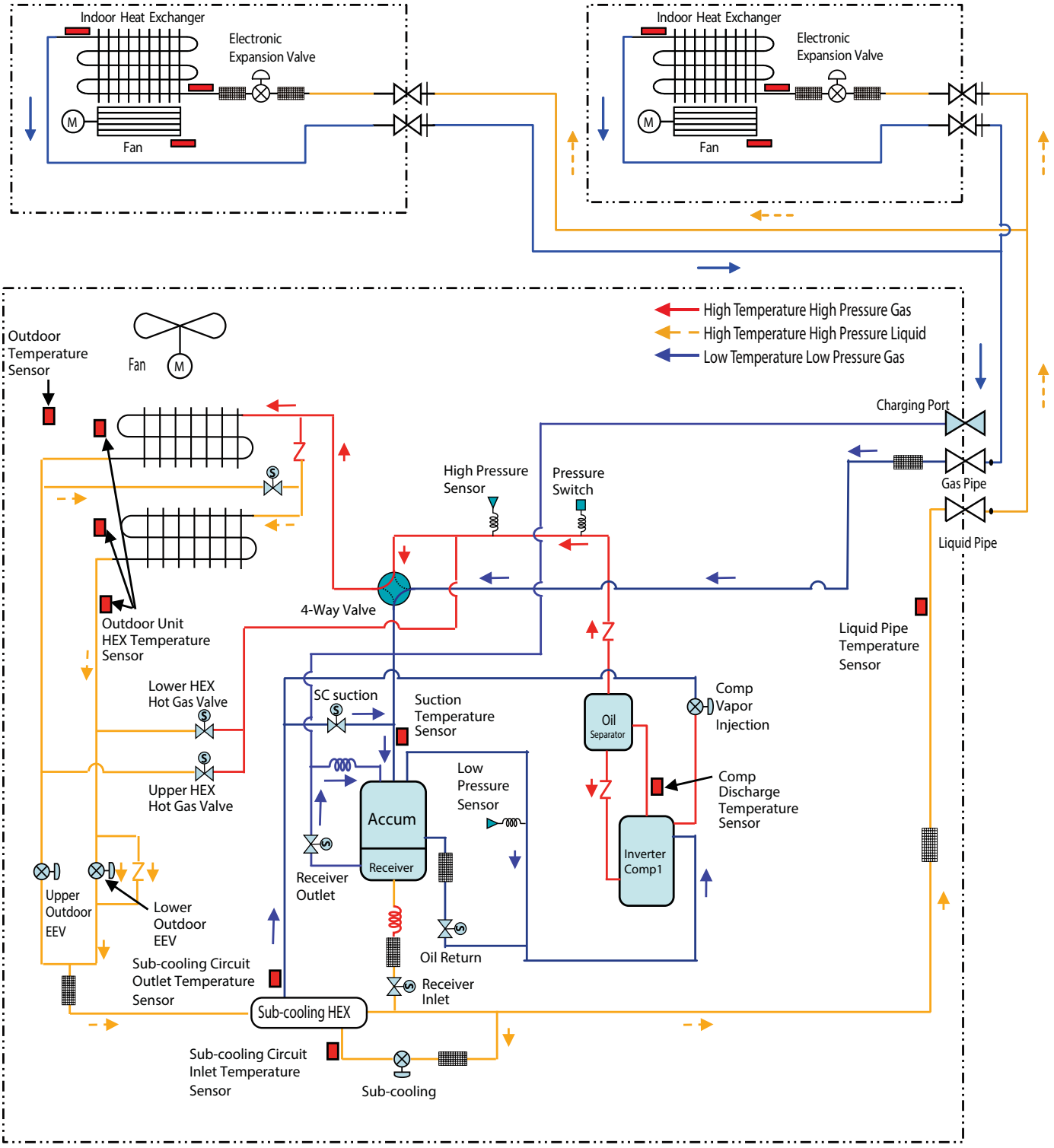
Remarks				
	Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
	Pressure Switch	SVC Valve	EEV	Strainer

LG

HEAT PUMP REFRIG. FLOW DIAGRAMS

ARUN072BTE4 / 072DTE4, ARUN096BTE4 / 096DTE4,
ARUN121BTE4 / 121DTE4

Oil Return and
Defrost Operation



*8 ton and 10 ton units have 2 fans

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

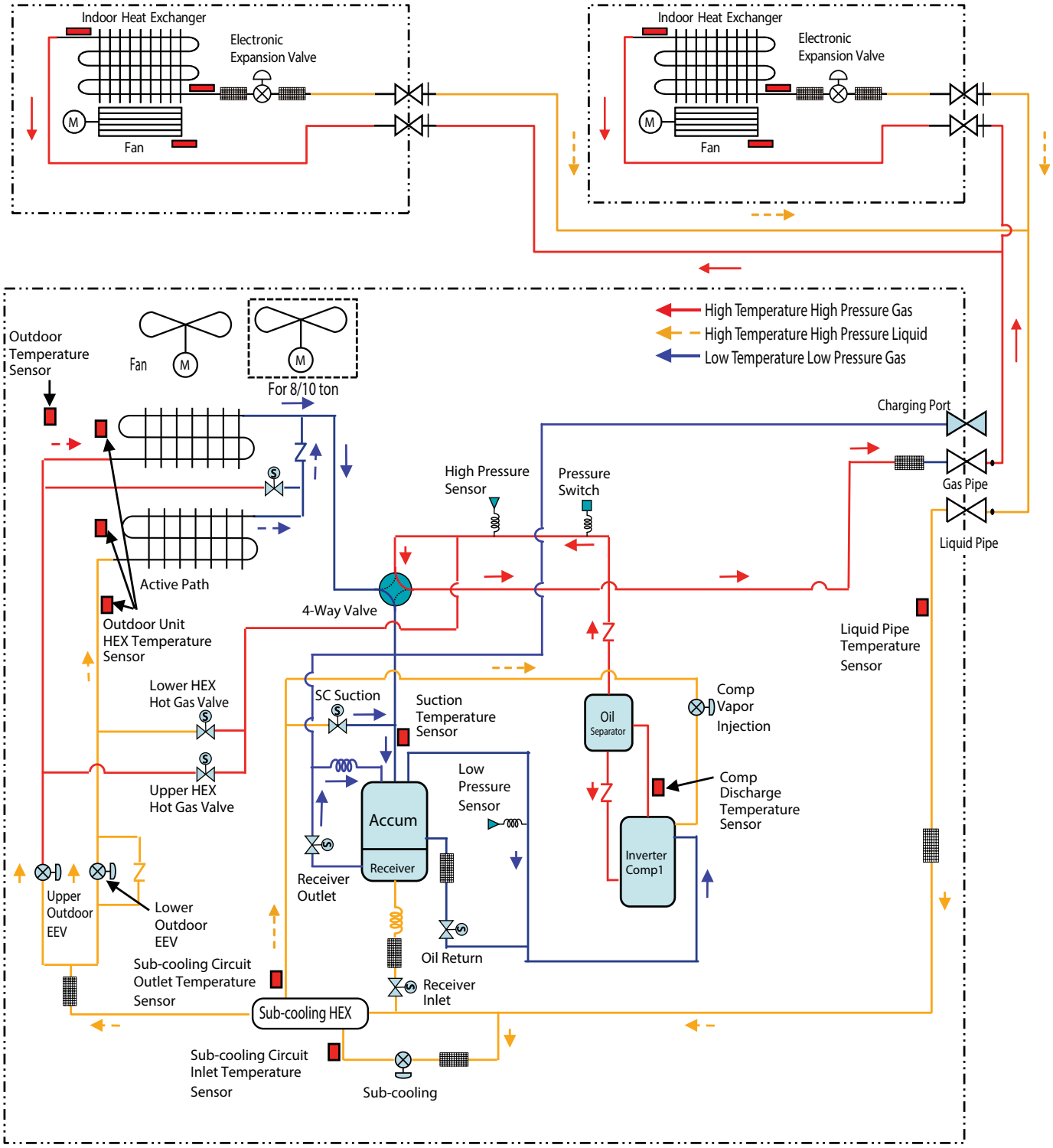
Product Data

HEAT PUMP REFRIG. FLOW DIAGRAMS

MULTI V IV

Upper HEX
Defrost Operation

ARUN072BTE4 / 072DTE4, ARUN096BTE4 / 096DTE4,
ARUN121BTE4 / 121DTE4



*8 ton and 10 ton units have 2 fans
**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

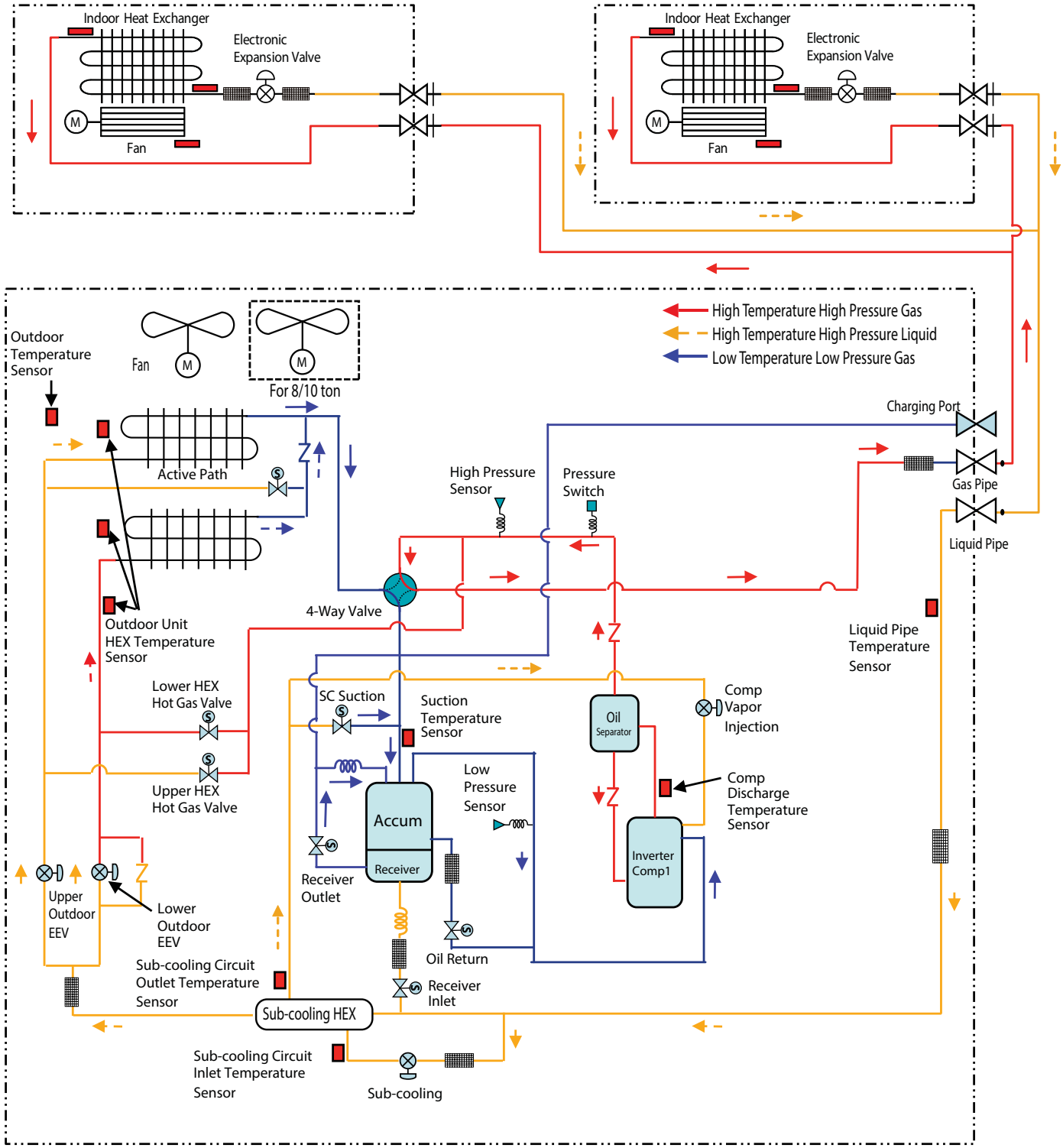
Remarks				
	Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
	Pressure Switch	SVC Valve	EEV	Strainer

LG

HEAT PUMP REFRIG. FLOW DIAGRAMS

ARUN072BTE4 / 072DTE4, ARUN096BTE4 / 096DTE4,
ARUN121BTE4 / 121DTE4

Lower HEX
Defrost Operation



*8 ton and 10 ton units have 2 fans
**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

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

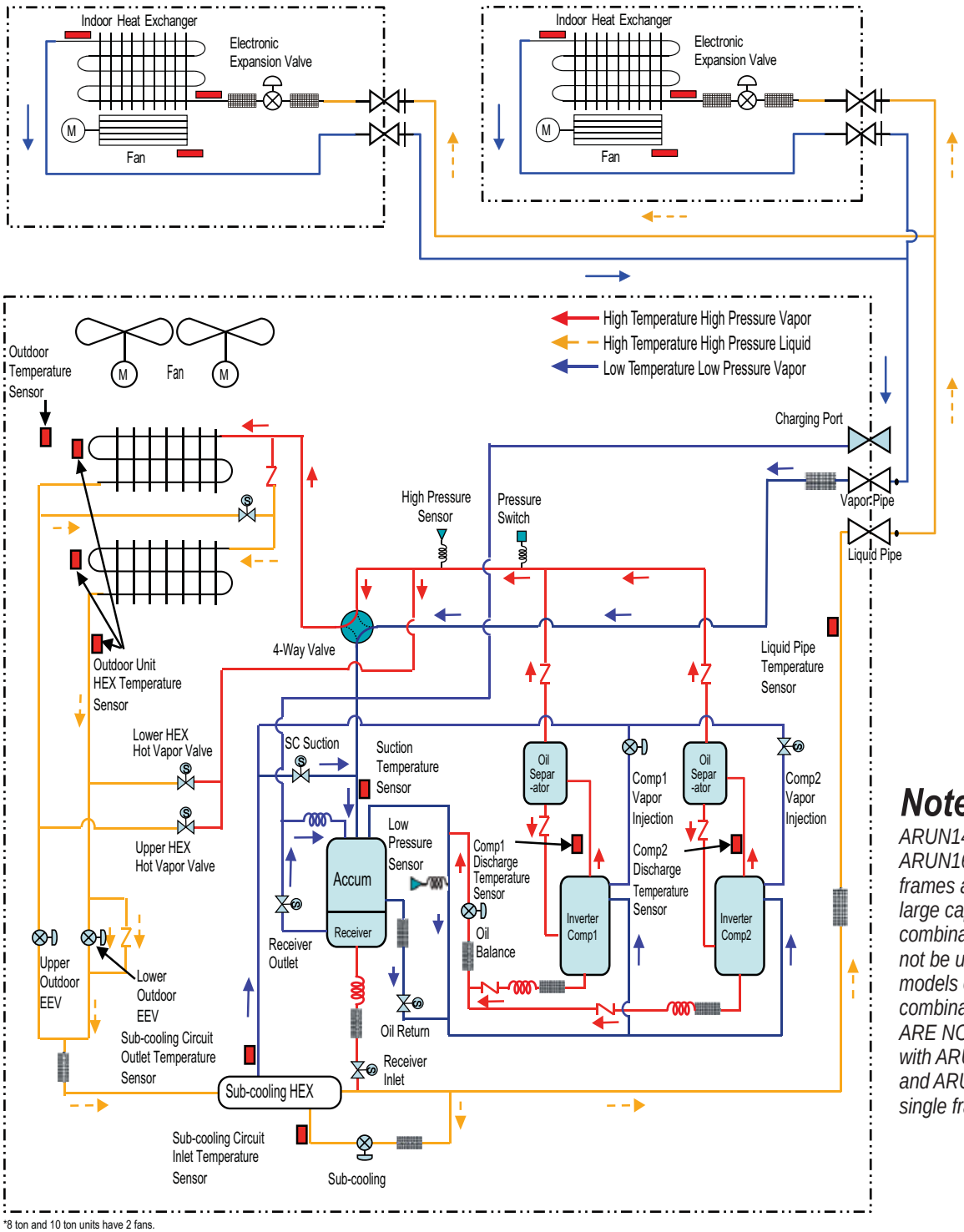
Product Data

HEAT PUMP REFRIG. FLOW DIAGRAMS

MULTI V IV

Cooling Mode

ARUN144BTE4 / 144DTE4, ARUN145BTE4 / 145DTE4,
ARUN168BTE4 / 168DTE4, ARUN169BTE4 / 169DTE4



*8 ton and 10 ton units have 2 fans.

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

Note:

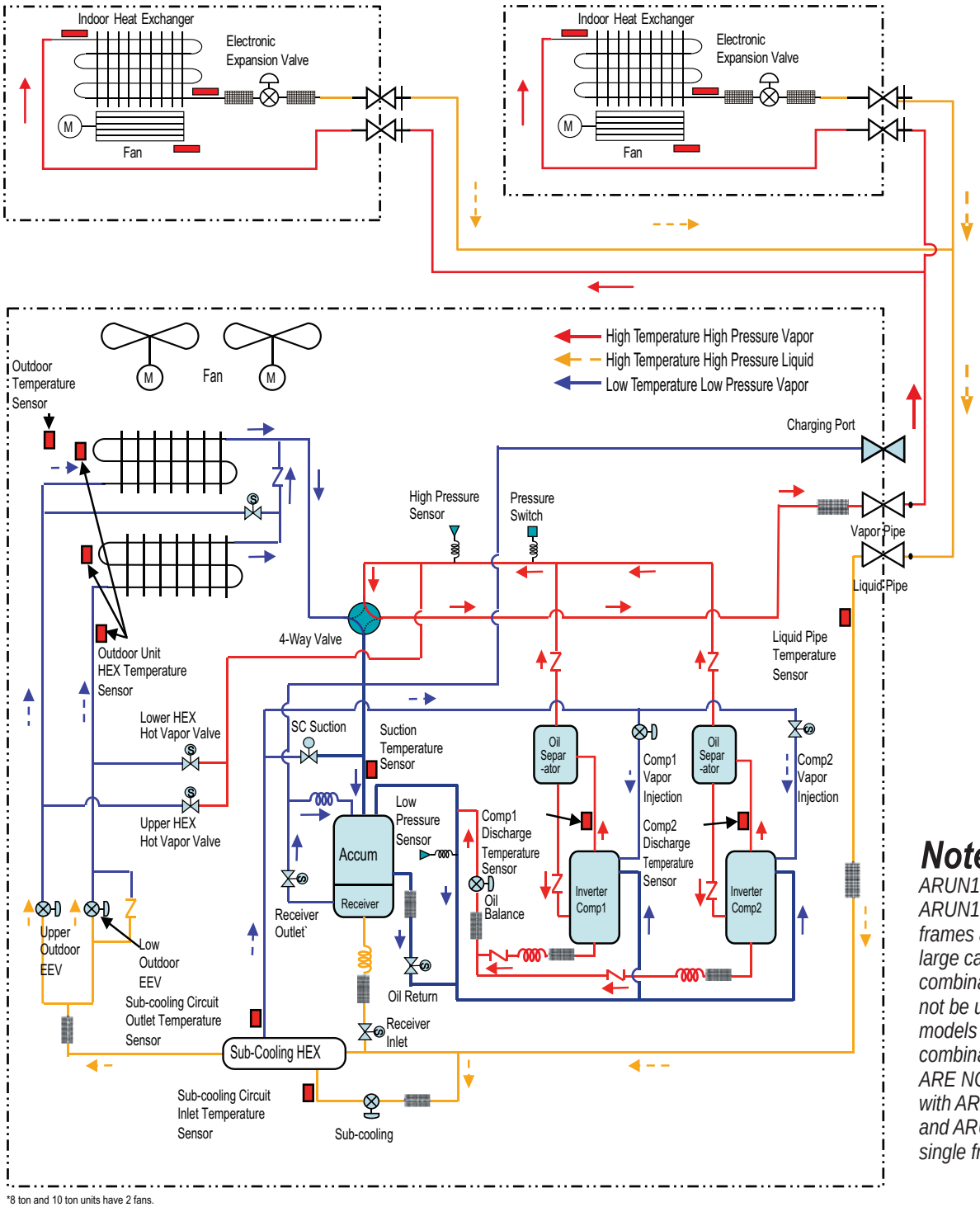
ARUN145BTE4/145DTE4 and ARUN169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/144DTE4 and ARUN168BTE4/168DTE4 single frame models.

LG

HEAT PUMP REFRIG. FLOW DIAGRAMS

ARUN144BTE4 / 144DTE4, ARUN145BTE4 / 145DTE4,
ARUN168BTE4 / 168DTE4, ARUN169BTE4 / 169DTE4

Heating Mode



*8 ton and 10 ton units have 2 fans.

Note:

ARUN145BTE4/145DTE4 and ARUN169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/144DTE4 and ARUN168BTE4/168DTE4 single frame models.

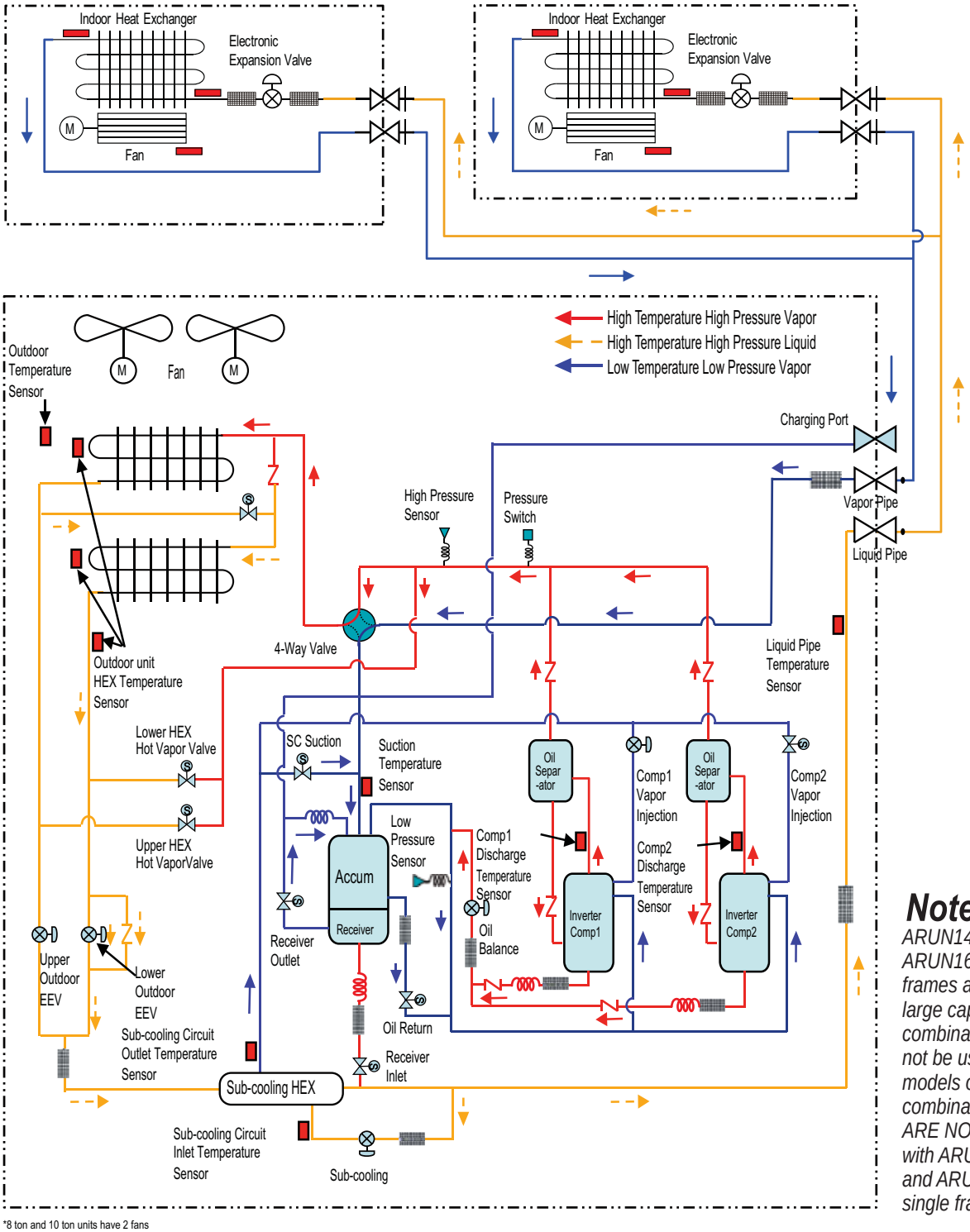
Remarks				
	Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
	Pressure Switch	SVC Valve	EEV	Strainer

HEAT PUMP REFRIG. FLOW DIAGRAMS

MULTI V IV

Oil Return and Defrost Operation

ARUN144BTE4 / 144DTE4, ARUN145BTE4 / 145DTE4,
ARUN168BTE4 / 168DTE4, ARUN169BTE4 / 169DTE4



*8 ton and 10 ton units have 2 fans

Note:

ARUN145BTE4/145DTE4 and ARUN169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/144DTE4 and ARUN168BTE4/168DTE4 single frame models.

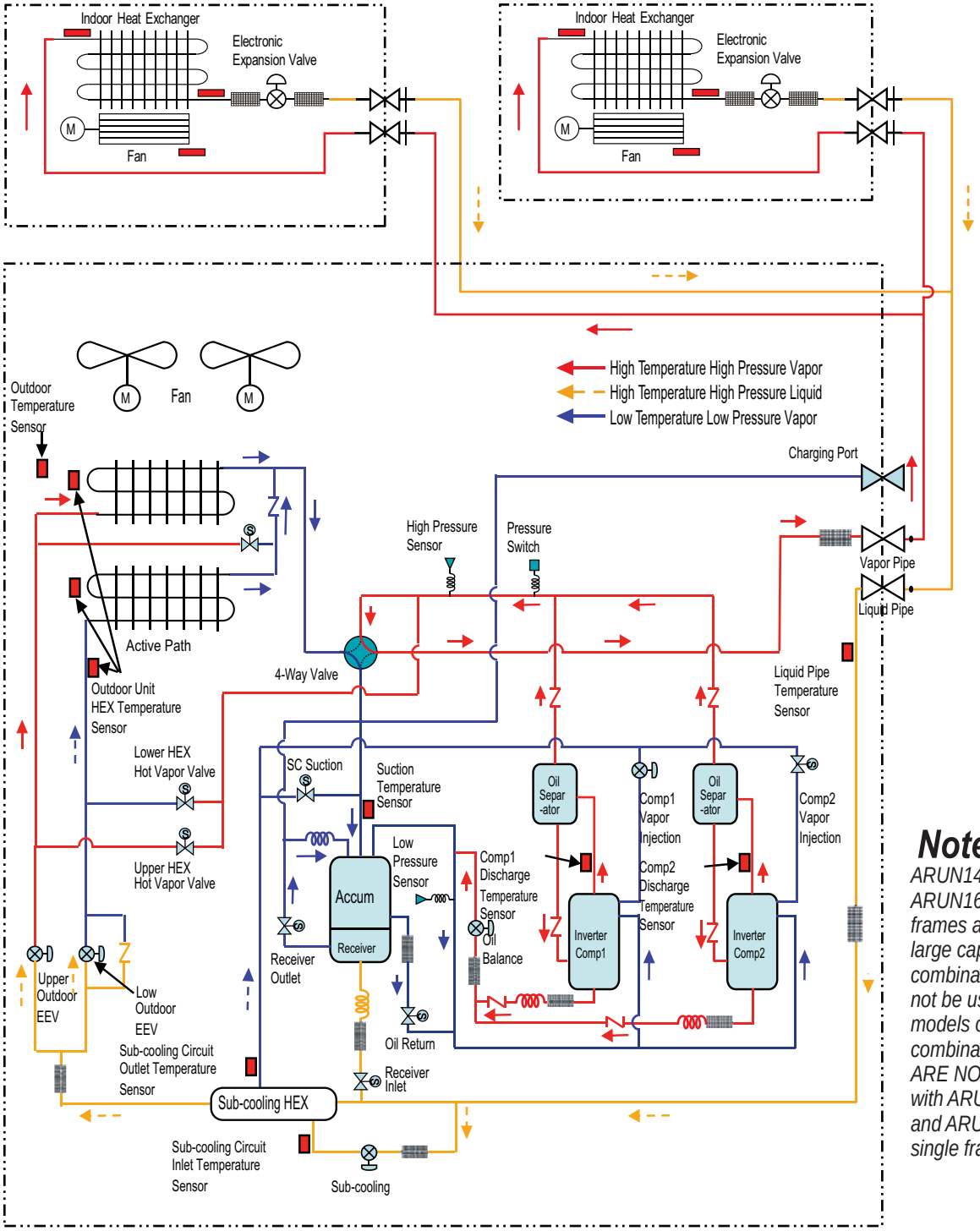
Remarks				
	Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
	Pressure Switch	SVC Valve	EEV	Strainer

LG

HEAT PUMP REFRIG. FLOW DIAGRAMS

ARUN144BTE4 / 144DTE4, ARUN145BTE4 / 145DTE4,
ARUN168BTE4 / 168DTE4, ARUN169BTE4 / 169DTE4

Upper HEX
Defrost Operation



*8 ton and 10 ton units have 2 fans.
**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

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

Note:

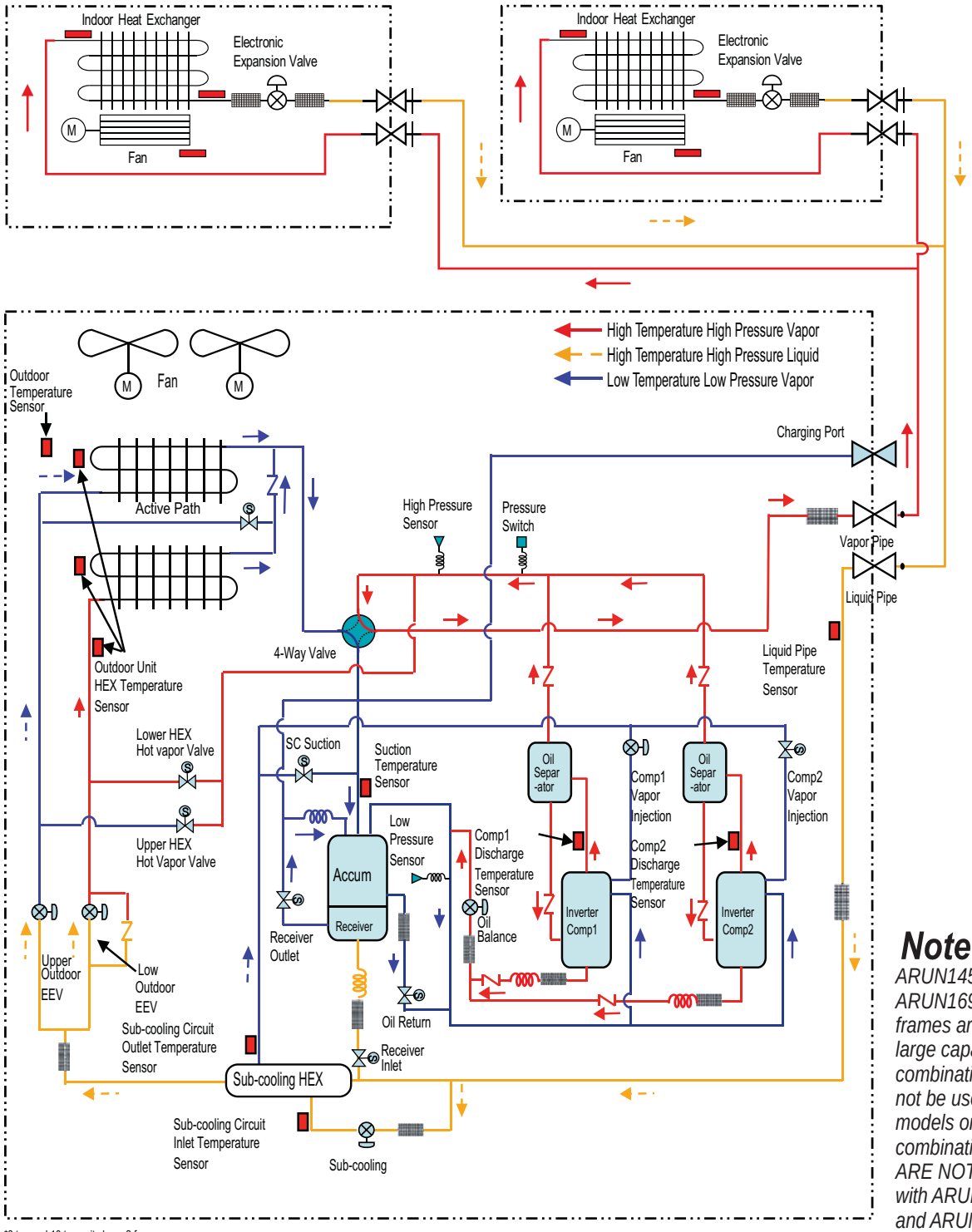
ARUN145BTE4/145DTE4 and ARUN169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/144DTE4 and ARUN168BTE4/168DTE4 single frame models.

HEAT PUMP REFRIG. FLOW DIAGRAMS

MULTI V IV

Lower HEX
Defrost Operation

ARUN144BTE4 / 144DTE4, ARUN145BTE4 / 145DTE4,
ARUN168BTE4 / 168DTE4, ARUN169BTE4 / 169DTE4



*8 ton and 10 ton units have 2 fans.
**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

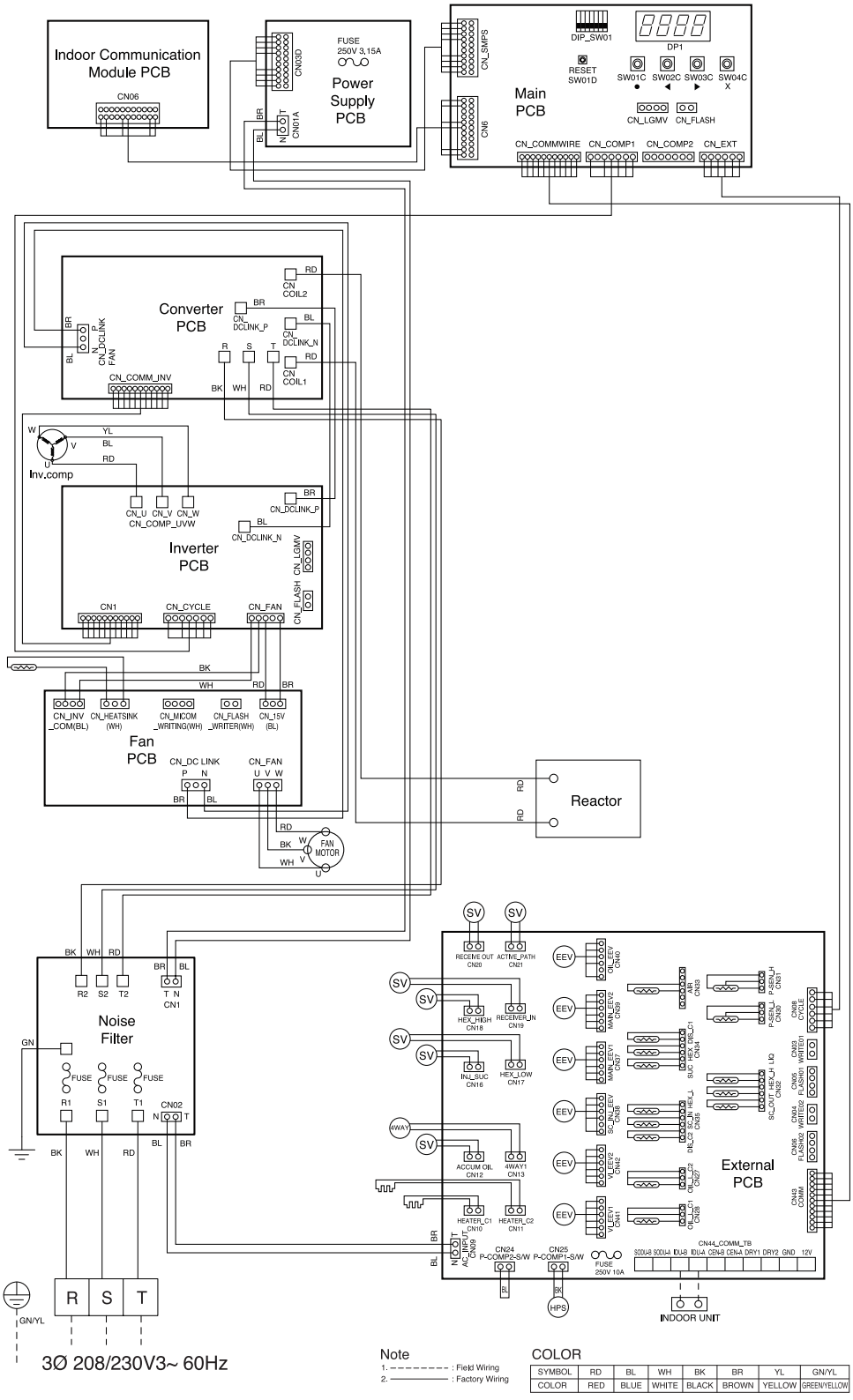
Note:

ARUN145BTE4/145DTE4 and ARUN169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/144DTE4 and ARUN168BTE4/168DTE4 single frame models.

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

LG

OUTDOOR WIRING DIAGRAM



Note
1. ---------- : Field Wiring
2. ———— : Factory Wiring

COLOR							
SYMBOL	RD	BL	WH	BK	BR	YL	GN/YL
COLOR	RED	BLUE	WHITE	BLACK	BROWN	YELLOW	GREEN/YELLOW

◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THEMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTRONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTRONIC EXPANSION VALVE
CN39	MAIN ELECTRONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTRONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

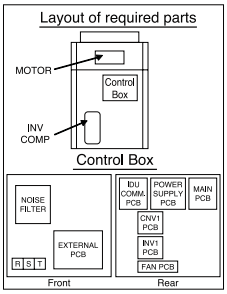
◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

SYMBOL	DESCRIPTION
CN1	AC POWER 220V
CN_DCLINK	AC POWER 220V FOR EXTERNAL PCB

Layout of required parts



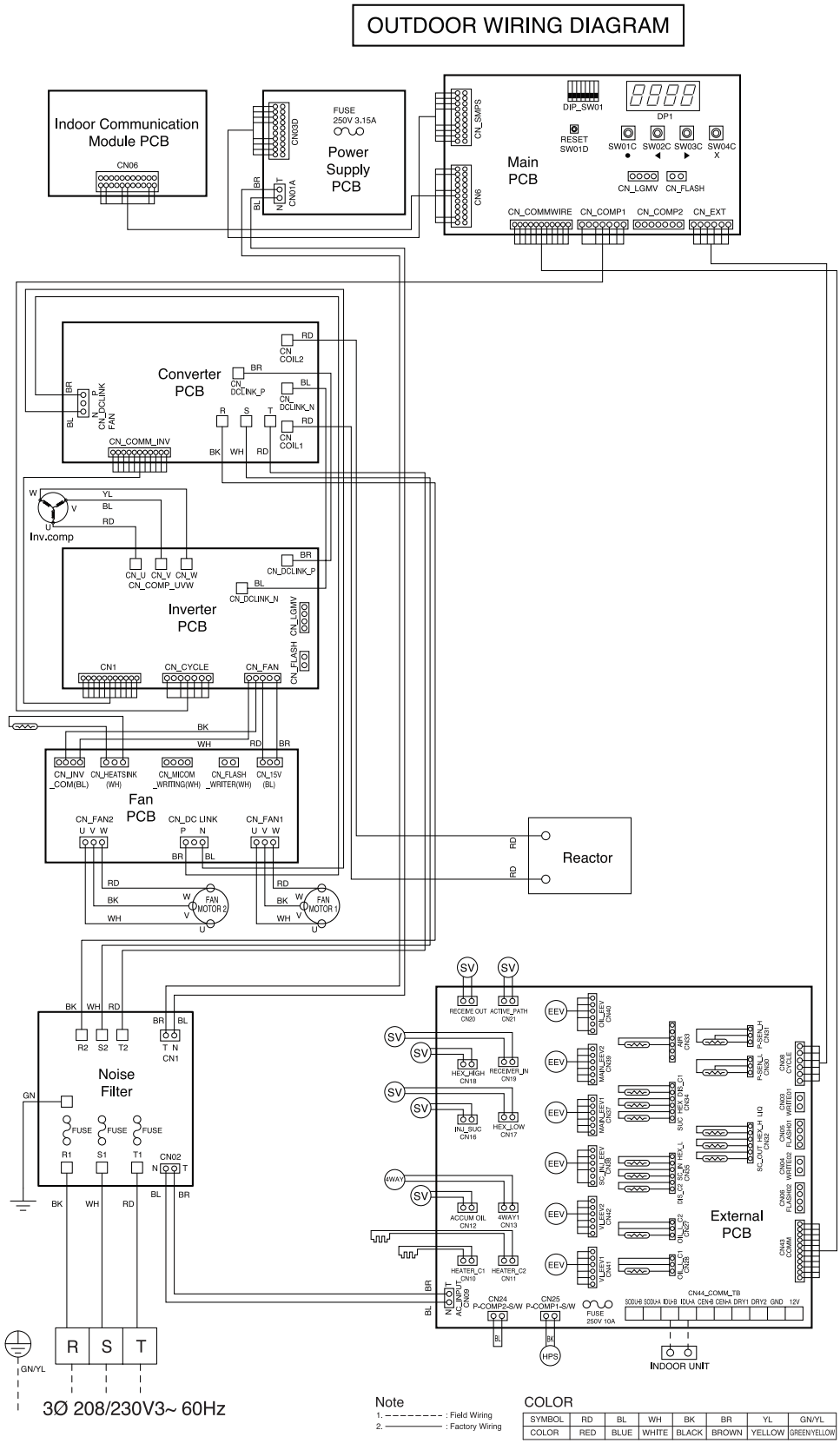
Product Data

HEAT PUMP WIRING DIAGRAMS

MULTI V IV

ARUN096BTE4, ARUN121BTE4 208-230V

OUTDOOR WIRING DIAGRAM



Note
1. ---------- : Field Wiring
2. ———— : Factory Wiring

COLOR

SYMBOL	RD	BL	WH	BK	BR	YL	GN/YL
COLOR	RED	BLUE	WHITE	BLACK	BROWN	YELLOW	GREEN/YELLOW

◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THERMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTRONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTRONIC EXPANSION VALVE
CN39	MAIN ELECTRONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTRONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

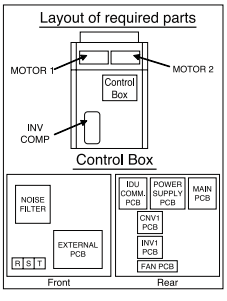
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U.V.W PHASE

◆Fan PCB Note

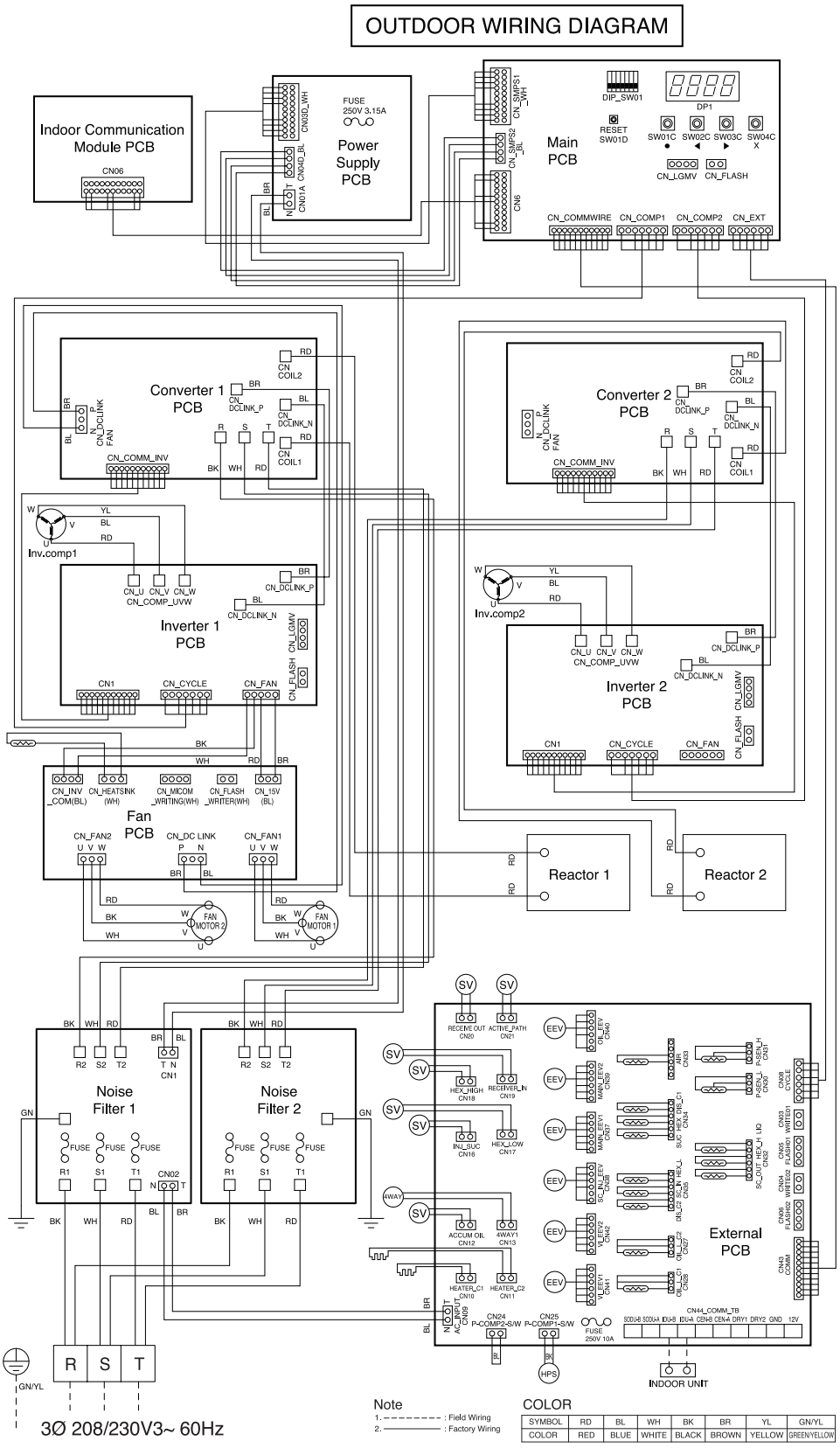
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

SYMBOL	DESCRIPTION
CN1	AC POWER 220V
CN_DCLINK	AC POWER 220V FOR EXTERNAL PCB



LG



◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THERMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTRONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTRONIC EXPANSION VALVE
CN39	MAIN ELECTRONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTRONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS1 _WH	POWER MODULE PCB COMMUNICATION TERMINAL
CN_SMPS2 _BL	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

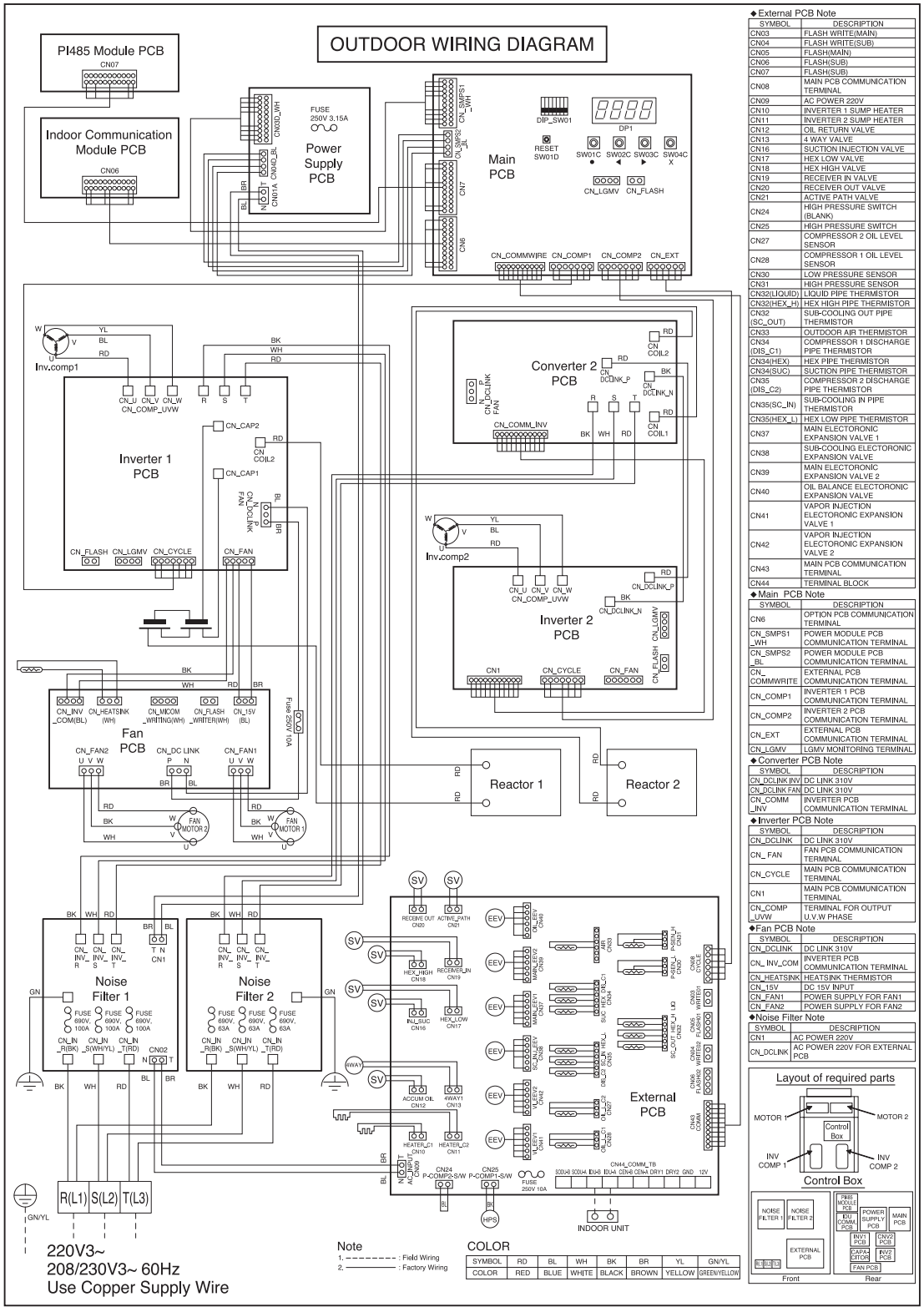
◆Noise PCB Note

SYMBOL	DESCRIPTION
CN1	AC POWER 220V
CN_DCLINK	AC POWER 220V FOR EXTERNAL PCB

HEAT PUMP WIRING DIAGRAMS

MULTI V IV

ARUN145BTE4, ARUN169BTE4 208-230V



◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN07	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THERMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTORONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTORONIC EXPANSION VALVE
CN39	MAIN ELECTORONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTORONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTORONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTORONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS1 _WH	POWER MODULE PCB COMMUNICATION TERMINAL
CN_SMPS2 _BL	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

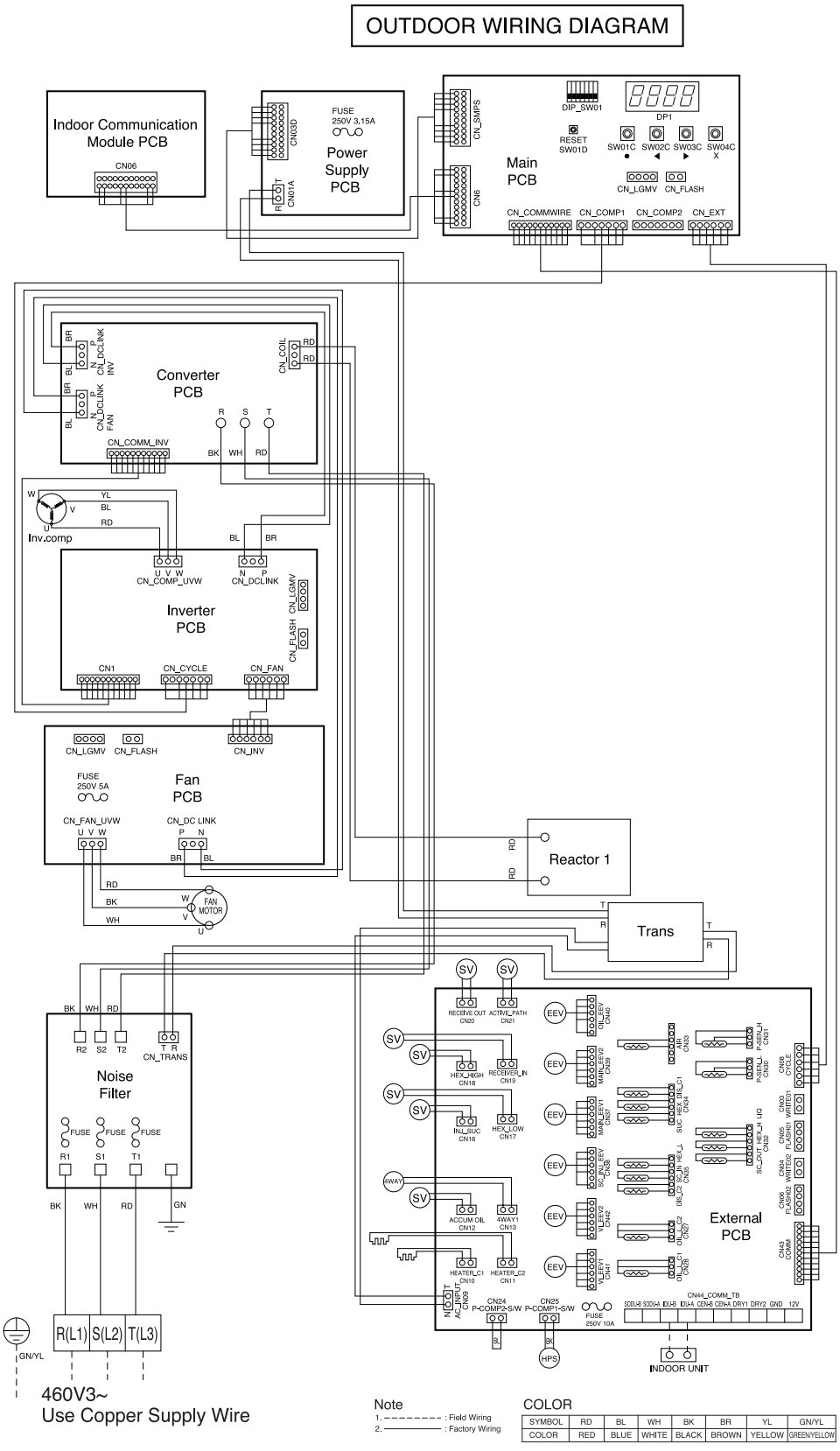
◆Noise Filter Note

SYMBOL	DESCRIPTION
CN1	AC POWER 220V
CN_DCLINK	AC POWER 220V FOR EXTERNAL PCB

Note:

ARUN145BTE4/ARUN145DTE4 and ARUN169BTE4/ARUN169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/ ARUN144DTE4 and ARUN168BTE4/ARUN168DTE4 single frame models.

OUTDOOR WIRING DIAGRAM



Note
1. ---------- : Field Wiring
2. ———— : Factory Wiring

COLOR

SYMBOL	RD	BL	WH	BK	BR	YL	GN/YL
COLOR	RED	BLUE	WHITE	BLACK	BROWN	YELLOW	GREEN/YELLOW

◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THERMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTRONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTRONIC EXPANSION VALVE
CN39	MAIN ELECTRONIC EXPANSION VALVE 2
CN40	OIL BALANCING ELECTRONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

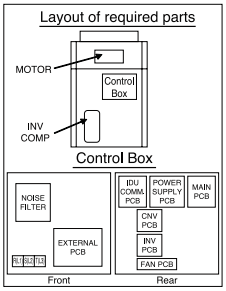
◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

SYMBOL	DESCRIPTION
CN_TRANS	AC POWER 460V

Layout of required parts

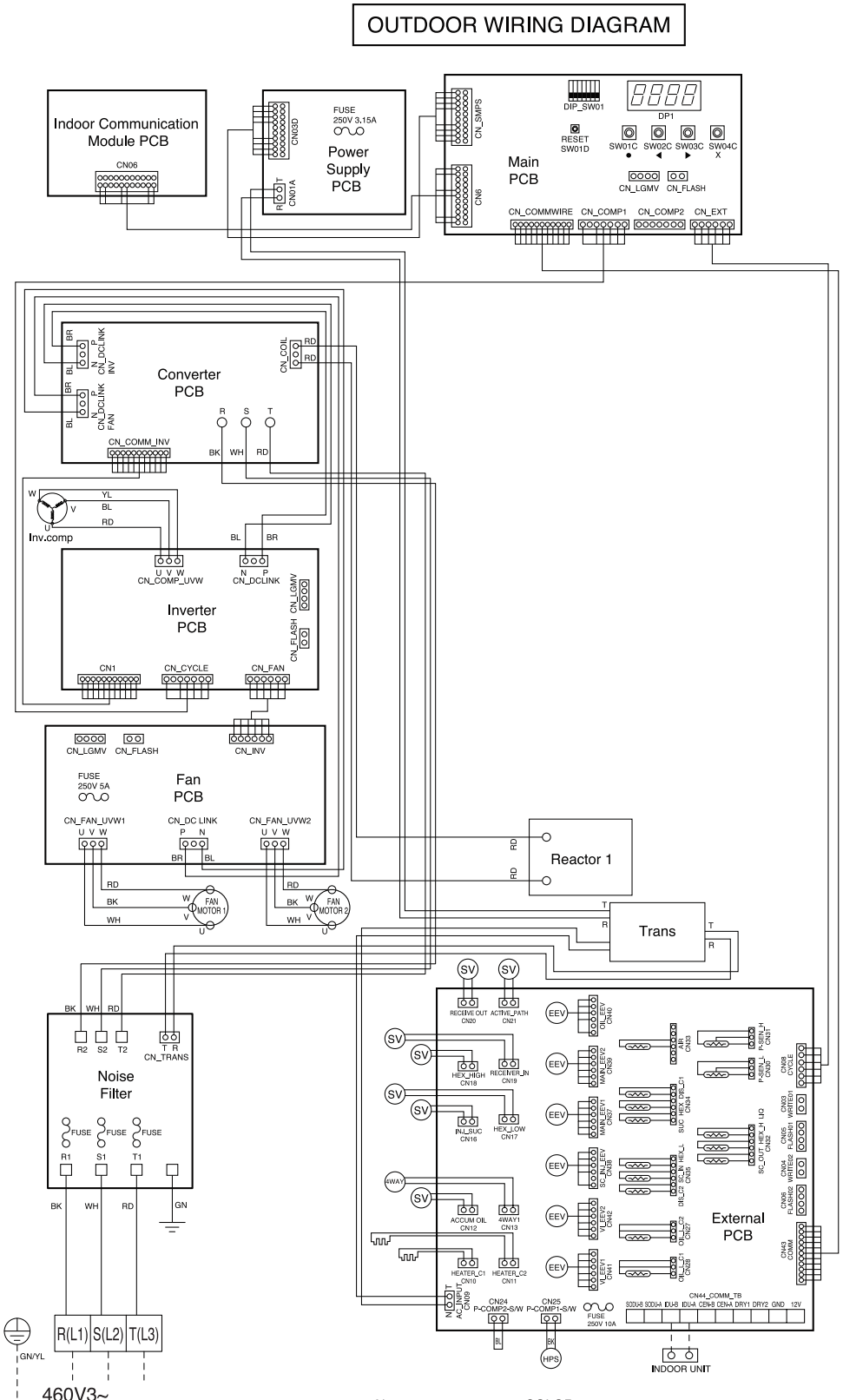


Product Data

HEAT PUMP WIRING DIAGRAMS

MULTI V IV

ARUN096DTE4, ARUN121DTE4 460V



◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THEMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTRONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTRONIC EXPANSION VALVE
CN39	MAIN ELECTRONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTRONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

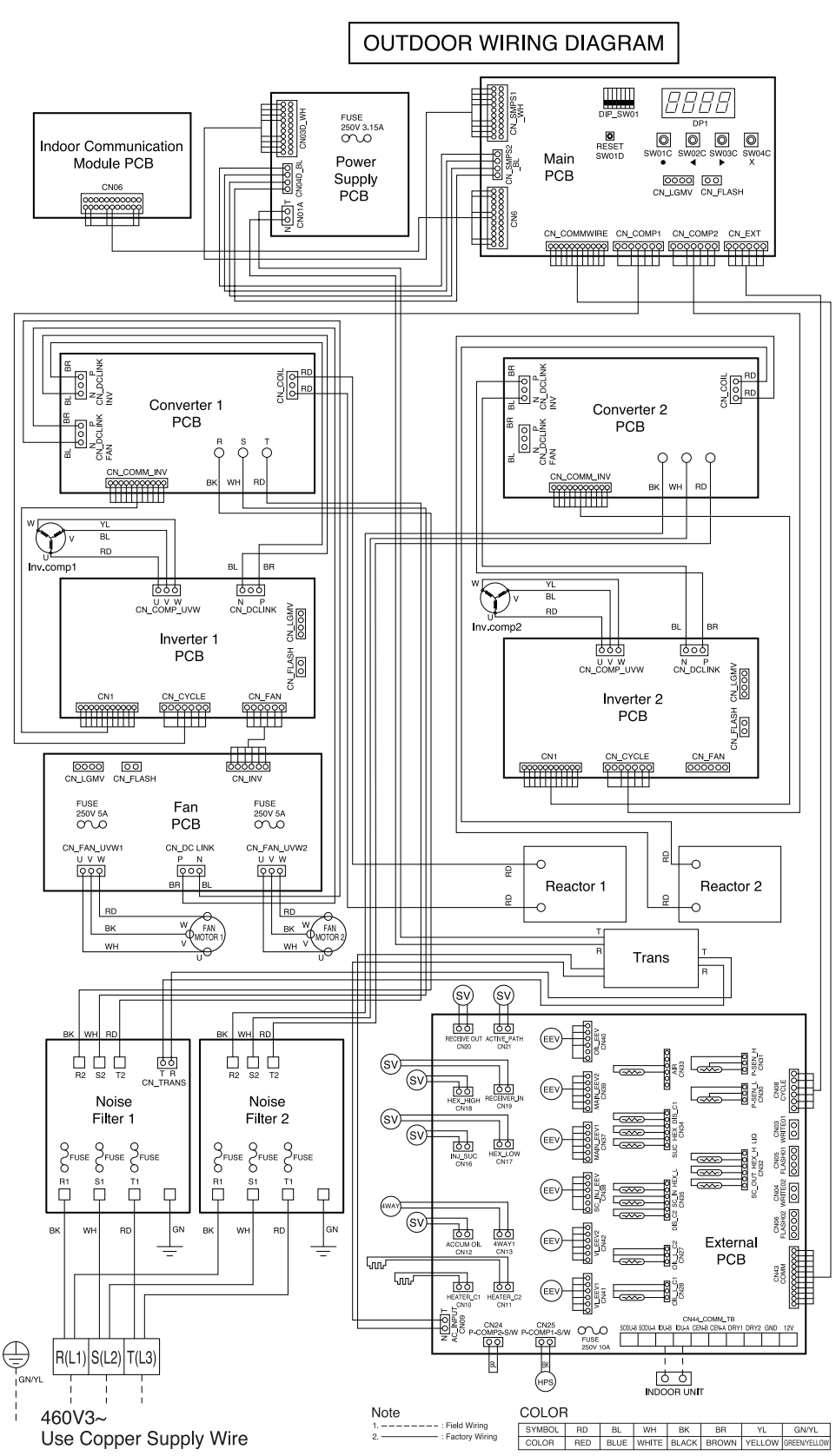
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

SYMBOL	DESCRIPTION
CN_TRANS	AC POWER 460V



Note
1. – – – – – – – – : Field Wiring
2. ———— : Factory Wiring

COLOR

SYMBOL	RD	BL	WH	BK	BR	YL	GN/YL
COLOR	RED	BLUE	WHITE	BLACK	BROWN	YELLOW	GREEN/YELLOW

◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THERMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTRONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTRONIC EXPANSION VALVE
CN39	MAIN ELECTRONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTRONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS1 _WH	POWER MODULE PCB COMMUNICATION TERMINAL
CN_SMPS2 _BL	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

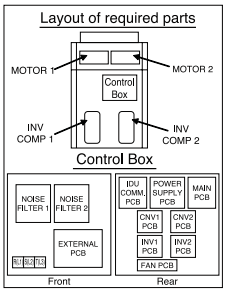
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

SYMBOL	DESCRIPTION
CN_TRANS	AC POWER 460V

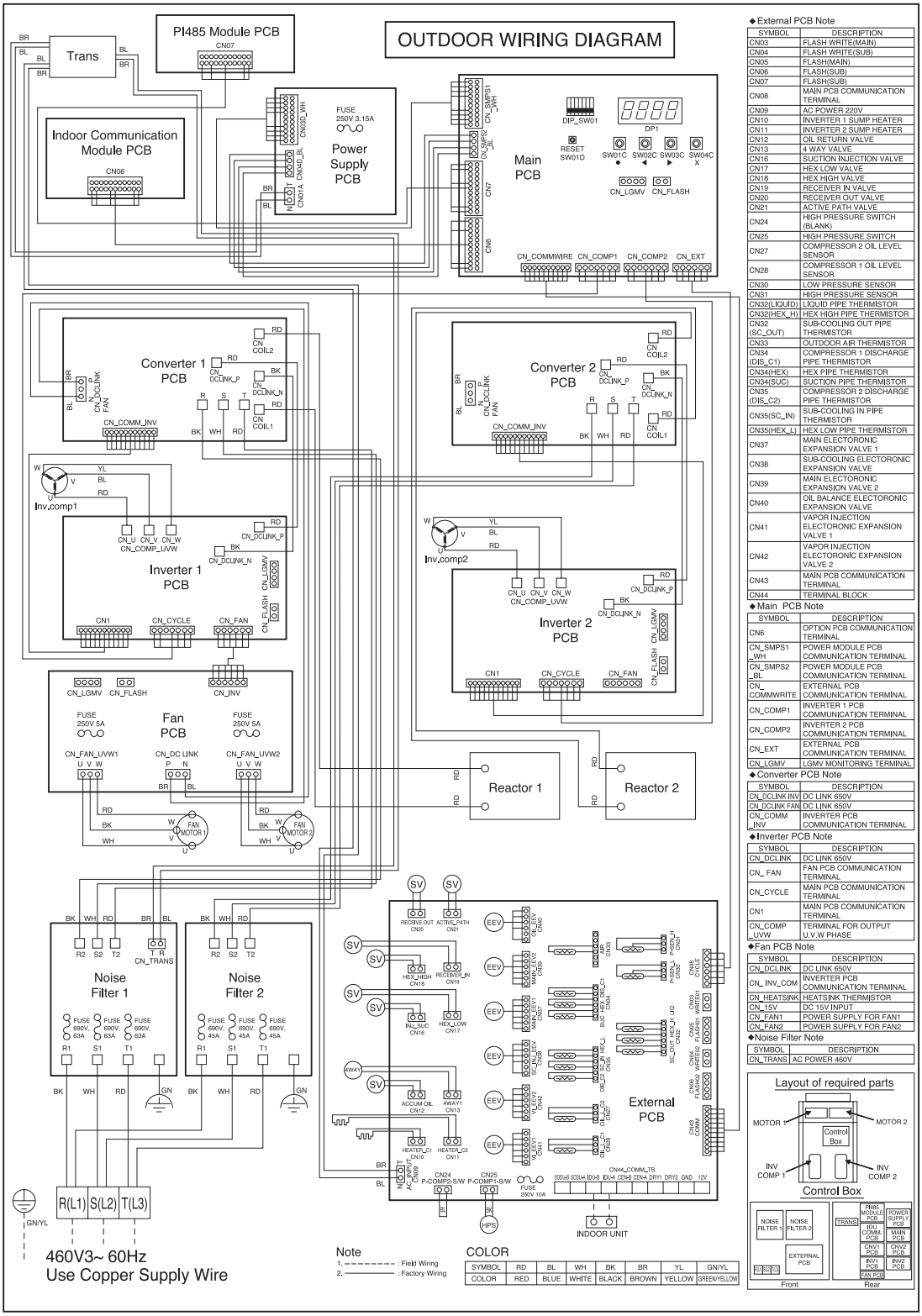


Product Data

HEAT PUMP WIRING DIAGRAMS

MULTI V IV

ARUN145DTE4, ARUN169DTE4 460V



◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN07	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THERMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTORONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTORONIC EXPANSION VALVE
CN39	MAIN ELECTORONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTORONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTORONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTORONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS1 _WH	POWER MODULE PCB COMMUNICATION TERMINAL
CN_SMPS2 _BL	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 650V
CN_DCLINK FAN	DC LINK 650V
CN_COMM _INV	INVERTER PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 650V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U.V.W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 650V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise Filter Note

SYMBOL	DESCRIPTION
CN_TRANS	AC POWER 460V

Note:

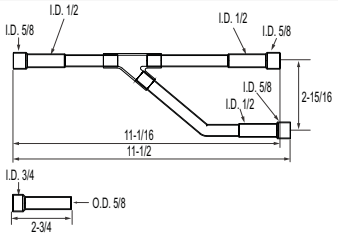
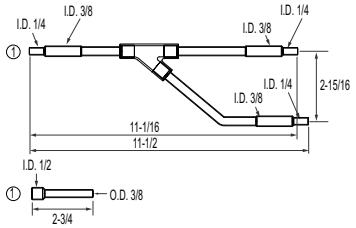
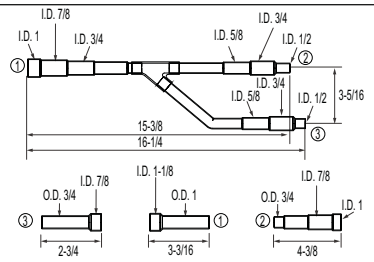
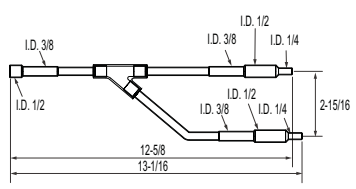
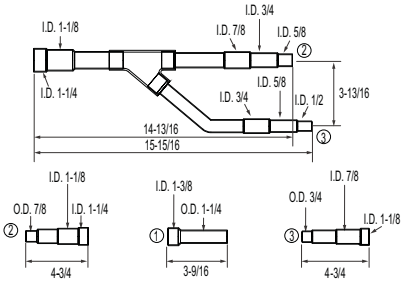
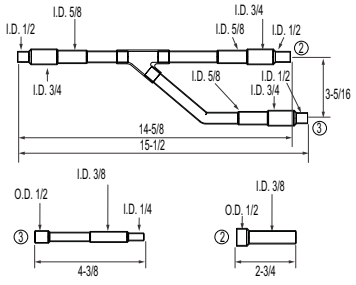
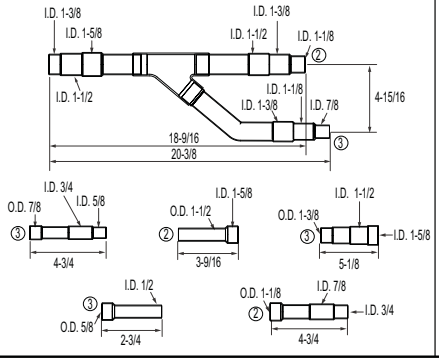
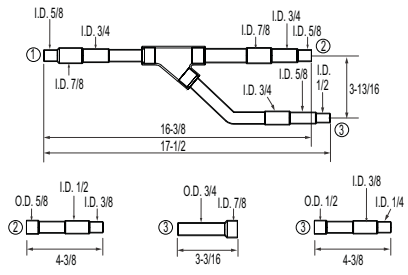
ARUN145BTE4/ARUN145DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/ARUN144DTE4 single frame models.

Table 13: Heat Pump Accessories.

Required Accessories	Model No.		
Y-branches (for indoor unit connection)	ARBLN01621		ARBLN07121
	ARBLN03321		ARBLN14521
Headers (for indoor unit connection)	Four (4) branch	Seven (7) branch	Ten (10) branch
	ARBL054	ARBL057	ARBL1010
	ARBL104	ARBL107	ARBL2010
Multi-frame Connectors (for outdoor unit connection)	Use to Combine Two Frame		Use to Combine Three Frames
	ARCNN21		ARCNN21
			ARCNN31

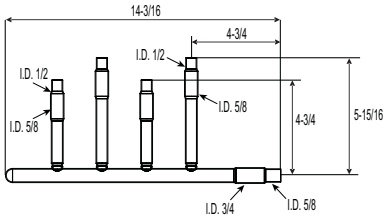
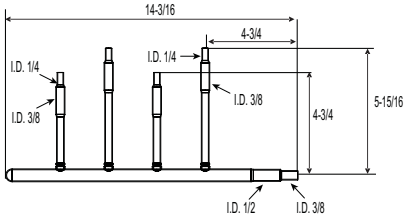
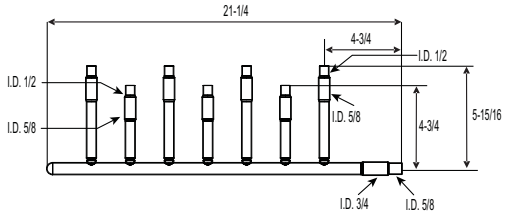
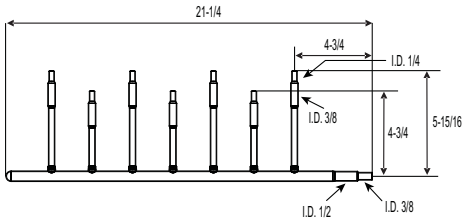
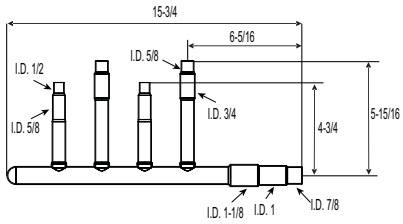
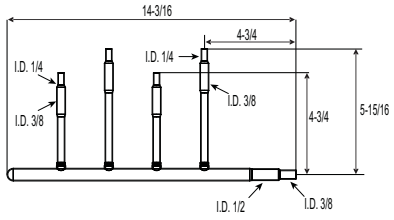
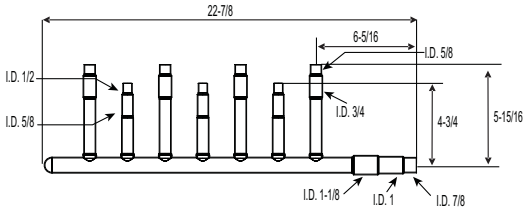
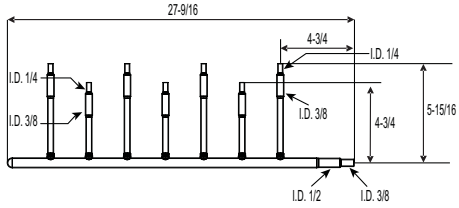
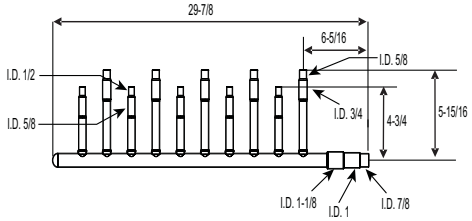
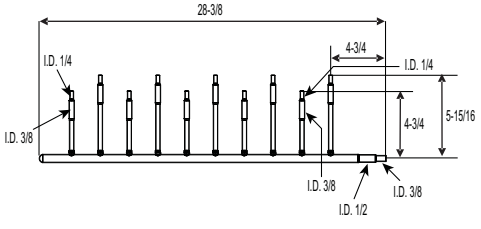
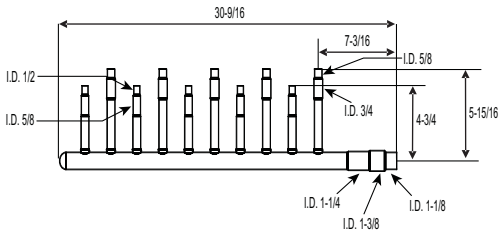
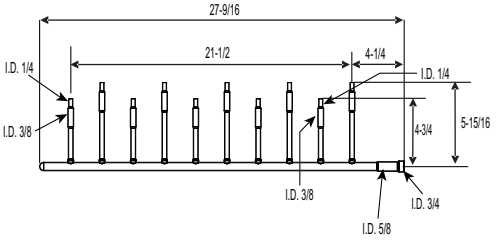
Y-branches (for indoor unit connection)

Unit: Inch

Kit Model No.	Vapor Pipe Dimensions	Vapor Pipe Model No.	Liquid Pipe Dimensions	Liquid Pipe Model No.
ARBLN01621		AJR54072905		AJR54072901
ARBLN03321		AJR54072906		AJR54072902
ARBLN07121		AJR54072907		AJR54072903
ARBLN14521		AJR54072908		AJR54072904

Headers (for indoor unit connection)

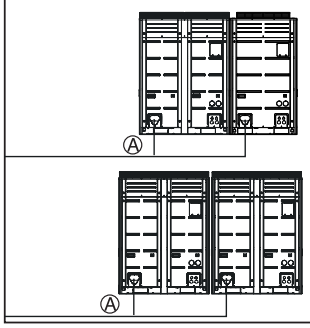
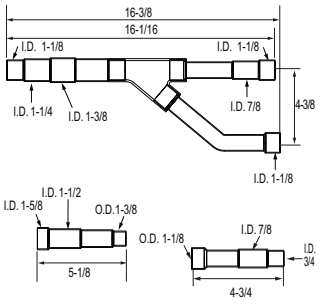
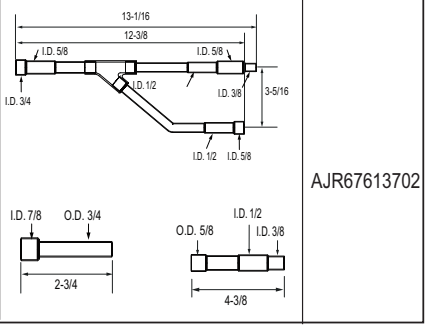
Unit: inch

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

Multi-frame Connectors (for heat pump outdoor unit connection)

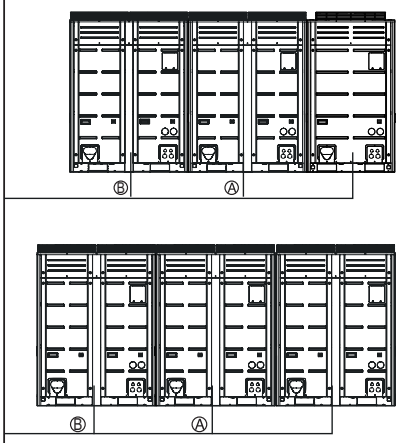
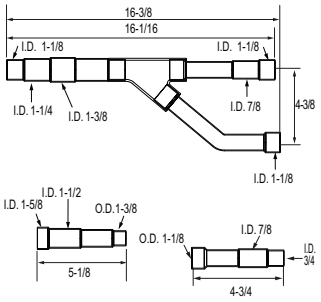
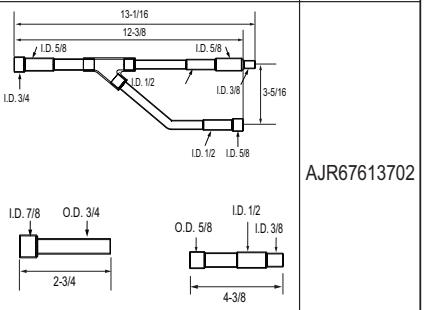
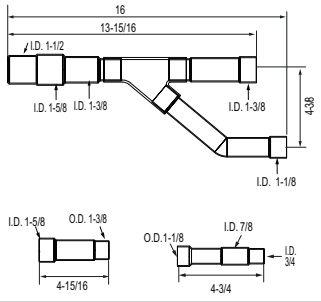
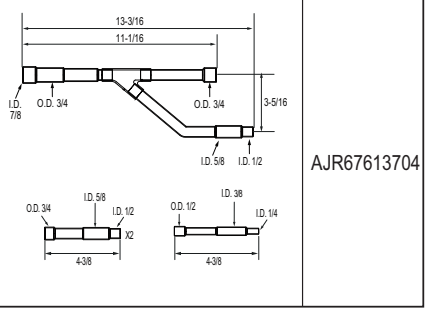
Two outdoor units

Unit: inch

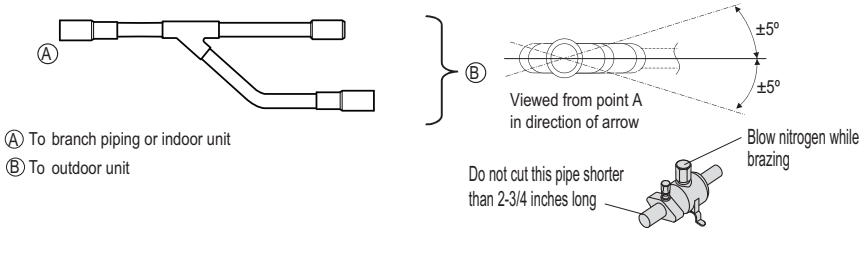
Combination	Multi-Frame Connector Kit Model No.	Vapor Pipe Dimensions	Vapor Pipe Model No.	Liquid Pipe Dimensions	Liquid Pipe Model No.
	Ⓐ ARCNN21		AJR67613701		AJR67613702

Three outdoor units

Unit: inch

Combination specification	Multi-Frame Connector	Vapor Pipe Dimensions	Vapor Pipe Model No.	Liquid Pipe Dimensions	Liquid Pipe Model No.
	Ⓐ ARCNN21		AJR67613701		AJR67613702
	Ⓑ ARCNN31		AJR67613703		AJR67613704

Install the branch pipe between the outdoor units so that the outlet pipe is parallel with the surface.



Ⓐ To branch piping or indoor unit

Ⓑ To outdoor unit

Facing up

Product Data

HEAT RECOVERY SPECIFICATIONS

MULTI V IV

Single-Frame 208-230V

Table 14: Single-Frame 208-230V Heat Recovery Units.

Combination Unit Model Number		6.0 Ton ARUB072BTE4	8.0 Ton ARUB096BTE4	10.0 Ton ARUB121BTE4	12.0 ARUB144BTE4	14.0 ARUB168BTE4
Individual Component Model Numbers		-	-	-	-	-
Cooling Performance						
Nominal Cooling Capacity (Btu/h)[1]		72,000	96,000	120,000	144,000	168,000
Rated Cooling Capacity (Btu/h)[2]		69,000	92,000	114,000	138,000	160,000
Heating Performance						
Nominal Heating Capacity (Btu/h)[1]		81,000	108,000	135,000	162,000	189,000
Rated Heating Capacity (Btu/h)[2]		77,000	103,000	129,000	154,000	180,000
Operating Range						
Cooling (°F DB)[3]		14 to 122	14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61	-13 to +61
Synchronous — Cooling Based (°F DB)		14 to 81	14 to 81	14 to 81	14 to 81	14 to 81
Synchronous — Heating Based (°F DB)		14 to 61	14 to 61	14 to 61	14 to 61	14 to 61
Compressor						
Inverter Quantity		HSS DC Scroll x 1	HSS DC Scroll x 1	HSS DC Scroll x 1	HSS DC Scroll x 2	HSS DC Scroll x 2
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)						
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.75 x 1	0.60 x 2	0.60 x 2	0.60 x 2	0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct				
Operating Range (RPM)	Cooling	0 - 850	0 - 1,050	0 - 1,050	0 - 1,100	0 - 1,100
	Heating	80 - 850	80 - 1,050	80 - 1,050	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		7,400	9,850	9,850	10,200	10,200
Unit Data						
Refrigerant Type		R410A	R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. Number Indoor Units/ System[4]		1 - 13	1 - 16	1 - 20	1 - 24	1 - 29
Sound Pressure dB(A)[5]		58.5	59.0	59.0	59.5	59.5
Net Unit Weight (lbs.)		430	540	540	628	628
Shipping Weight (lbs.)		452	573	573	661	661
Communication Cables[6,7]		2 x 18	2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger						
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic				
Rows/Fins per inch		3/14	3/14	3/14	3/14	3/14
Piping[8]						
Liquid Line Connection (in., OD)		3/8 Braze	3/8 Braze	1/2 Braze	1/2 Braze	5/8 Braze
Low Pressure Vapor Line Conn (in., OD)		3/4 Braze	7/8 Braze	1-1/8 Braze	1-1/8 Braze	1-1/8 Braze
High Pressure Vapor Line Conn (in, OD)		5/8 Braze	3/4 Braze	3/4 Braze	7/8 Braze	7/8 Braze
Factory Charge lbs. of R410A		16.9	23.6	23.6	23.6	23.6

[1]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[2]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[3]Cooling range with the Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F and is achieved only when all indoor units are operating in cooling mode. Does not impact synchronous operating range.

[4]The System Combination Ratio must be between 50–130%.

[5]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[7]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 58 for detailed electrical data.

[8]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

LG

HEAT RECOVERY SPECIFICATIONS

Dual-Frame 208-230V

Table 15: Dual-Frame 208-230V Heat Recovery Units.

Combination Unit Model Number		16.0 Ton ARUB192BTE4	18.0 Ton ARUB216BTE4	20.0 Ton ARUB240BTE4	22.0 Ton ARUB264BTE4
Individual Component Model Numbers		ARUB072BTE4 + ARUB121BTE4	ARUB072BTE4 + ARUB144BTE4	ARUB096TE4 + ARUB144BTE4	ARUB121BTE4 + ARUB144BTE4
Cooling Performance					
Nominal Cooling Cap. (Btu/h)[1]		192,000	216,000	240,000	264,000
Rated Cooling Cap. (Btu/h)[2]		184,000	206,000	228,000	250,000
Heating Performance					
Nominal Heating Cap. (Btu/h)[1]		216,000	243,000	270,000	297,000
Rated Heating Cap. (Btu/h)[2]		206,000	230,000	256,000	282,000
Operating Range					
Cooling (°F DB)[3]		14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61
Synchronous—Cooling Based (°F DB)		14 to 81	14 to 81	14 to 81	14 to 81
Synchronous—Heating Based (°F DB)		14 to 61	14 to 61	14 to 61	14 to 61
Compressor					
Inverter Quantity		HSS DC Scroll x 2	HSS DC Scroll x 3	HSS DC Scroll x 3	HSS DC Scroll x 3
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)					
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.75 + 0.60 x 2	0.75 + 0.60 x 2.	0.75 + 0.60 x 2	0.75 + 0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct			
Oper. Range (RPM)	Cooling	0 - 1,050	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,050	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		17,250	17,600	20,050	20,050
Unit Data					
Refrigerant Type		R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/System[4]		1 - 32	1 - 35	1 - 39	1 - 42
Sound Pressure dB(A)[5]		61.8	62.0	62.3	62.3
Net Unit Weight (lbs.)		430 + 540	430 + 628	540 + 628	540 + 628
Shipping Weight (lbs.)		452 + 573	452 + 661	573 + 661	573 + 661
Communication Cables[6,7]		2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger					
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic			
Rows/Fins per inch		3/14	3/14	3/14	3/14
Piping[8]					
Liquid Line Conn. (in., OD)		3/8 + 1/2 Braze	3/8 + 1/2 Braze	3/8 + 1/2 Braze	1/2 + 1/2 Braze
Low Press. Vapor Line Conn. (in., OD)		3/4 + 1-1/8 Braze	3/4 + 1-1/8 Braze	7/8 + 1-1/8 Braze	1-1/8 + 1-1/8 Braze
High Press. Vapor Line Conn (in, OD)		5/8 + 3/4 Braze	5/8 + 7/8 Braze	3/4 + 7/8 Braze	3/4 + 7/8 Braze
Factory Charge lbs. of R410A		16.9 + 23.6	16.9 + 23.6	23.6 + 23.6	23.6 + 23.6

[1]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[2]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[3]Cooling range with the Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F and is achieved only when all indoor units are operating in cooling mode. Does not impact synchronous operating range.

[4]The System Combination Ratio must be between 50–130%.

[5]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[7]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 58 for detailed electrical data.

[8]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

HEAT RECOVERY SPECIFICATIONS

MULTI V IV

Dual-Frame 208-230V

Table 16: Dual-Frame 208-230V Heat Recovery Units, continued.

Combination Unit Model Number		24.0 Ton ARUB288BTE4	26.0 Ton ARUB313BTE4	28.0 Ton ARUB337BTE4
Individual Component Model Numbers		ARUB144BTE4 + ARUB144BTE4	ARUB144BTE4 + ARUB168BTE4	ARUB168BTE4 + ARUB168BTE4
Cooling Performance				
Nominal Cooling Cap. (Btu/h)[1]		288,000	312,000	336,000
Rated Cooling Cap. (Btu/h)[2]		274,000	296,000	320,000
Heating Performance				
Nominal Heating Cap. (Btu/h)[1]		324,000	351,000	378,000
Rated Heating Cap. (Btu/h)[2]		308,000	334,000	361,000
Operating Range				
Cooling (°F DB)[3]		14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61
Synchronous—Cooling Based (°F DB)		14 to 81	14 to 81	14 to 81
Synchronous—Heating Based (°F DB)		14 to 61	14 to 61	14 to 61
Compressor				
Inverter Quantity		HSS DC Scroll x 4	HSS DC Scroll x 4	HSS DC Scroll x 4
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)				
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct		
Operation. Range (RPM)	Cooling	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		20,400	20,400	20,400
Unit Data				
Refrigerant Type		R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/System[4]		1 - 45	1 - 52	1 - 55
Sound Pressure dB(A)[5]		62.5	62.5	62.5
Net Unit Weight (lbs.)		628 + 628	628 + 628	628 + 628
Shipping Weight (lbs.)		661 + 661	661 + 661	661 + 661
Communication Cables[6,7]		2 x 18	2 x 18	2 x 18
Heat Exchanger				
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic		
Rows/Fins per inch		3/14	3/14	3/14
Piping[8]				
Liquid Line Conn. (in., OD)		1/2 + 1/2 Braze	1/2 + 5/8 Braze	5/8 + 5/8 Braze
Low Press. Vapor Line Conn. (in., OD)		1-1/8 + 1-1/8 Braze	1-1/8 + 1-1/8 Braze	1-1/8 + 1-1/8 Braze
High Press. Vapor Line Conn (in, OD)		7/8 + 7/8 Braze	7/8 + 7/8 Braze	7/8 + 7/8 Braze
Factory Charge lbs. of R410A		23.6 + 23.6	23.6 + 23.6	23.6 + 23.6

[1]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[2]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[3]Cooling range with the Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F and is achieved only when all indoor units are operating in cooling mode. Does not impact synchronous operating range.

[4]The System Combination Ratio must be between 50–130%.

[5]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[7]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 58 for detailed electrical data.

[8]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

LG

Table 17: Triple-Frame 208-230V Heat Recovery Units.

Combination Unit Model Number	26.0 Ton ARUB312BTE4	28.0 Ton ARUB336BTE4	30.0 Ton ARUB360BTE4	32.0 Ton ARUB384BTE4	34.0 Ton ARUB408BTE4
Individual Component Model Numbers[1]	ARUB072BTE4 + ARUB096BTE4 + ARUB144BTE4	ARUB096BTE4 + ARUB096BTE4 + ARUB144BTE4	ARUB096BTE4 + ARUB121BTE4 + ARUB144BTE4	ARUB096BTE4 + ARUB145BTE4 + ARUB145BTE4	ARUB121BTE4 + ARUB145BTE4 + ARUB145BTE4
Cooling Performance					
Nominal Cooling Cap. (Btu/h)[2]	312,000	336,000	360,000	384,000	408,000
Rated Cooling Cap. (Btu/h)[3]	296,000	320,000	342,000	366,000	390,000
Heating Performance					
Nominal Heating Cap. (Btu/h)[2]	351,000	378,000	405,000	432,000	459,000
Rated Heating Cap. (Btu/h)[3]	334,000	361,000	387,000	412,000	437,000
Operating Range					
Cooling (°F DB)[4]	14 to 122	14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)	-13 to +61	-13 to +61	-13 to +61	-13 to +61	-13 to +61
Synchronous—Cooling Based (°F DB)	14 to 81	14 to 81	14 to 81	14 to 81	14 to 81
Synchronous—Heating Based (°F DB)	14 to 61	14 to 61	14 to 61	14 to 61	14 to 61
Compressor					
Inverter Quantity	HSS DC Scroll x 4	HSS DC Scroll x 4	HSS DC Scroll x 4	HSS DC Scroll x 5	HSS DC Scroll x 5
Oil/Type	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)					
Type	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.	0.75 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2
Motor/Drive	Brushless Digitally Controlled/Direct				
Operating Range (RPM) Cooling	0 - 1,100	0 - 1,100	0 - 1,100	0 - 1,100	0 - 1,100
Operating Range (RPM) Heating	80 - 1,100	80 - 1,100	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)	27,450	29,900	29,900	30,250	30,250
Unit Data					
Refrigerant Type	R410A	R410A	R410A	R410A	R410A
Refrigerant Control/Location	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/System[5]	1 - 52	1 - 55	1 - 58	1 - 61	1 - 64
Sound Pressure dB(A)[6]	63.8	63.9	63.9	64.1	64.1
Net Unit Weight (lbs.)	430 + 540 + 628	540 + 540 + 628	540 + 540 + 628	540 + 672 + 672	540 + 672 + 672
Shipping Weight (lbs.)	452 + 573 + 661	573 + 573 + 661	573 + 573 + 661	573 + 705 + 705	573 + 705 + 705
Communication Cables[7,8]	2 x 18	2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger					
Material and Fin Coating	Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic				
Rows/Fins per inch	3/14	3/14	3/14	3/14	3/14
Piping[9]					
Liquid Line Connection (in., OD)	3/8+3/8+1/2 Braze	3/8+3/8+1/2 Braze	3/8+1/2+1/2 Braze	3/8+5/8+5/8 Braze	1/2+5/8+5/8 Braze
Low Pressure Vapor Line Conn (in., OD)	3/4+7/8+1-1/8 Braze	7/8+7/8+1-1/8 Braze	7/8+1-1/8+1-1/8 Braze	7/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze
High Pressure Vapor Line Conn (in, OD)	5/8+3/4+7/8 Braze	3/4+3/4+7/8 Braze	3/4+3/4+7/8 Braze	3/4+7/8+7/8 Braze	3/4+7/8+7/8 Braze
Factory Charge lbs. of R410A	16.9 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6

[1]ARUB145BTE4/ARUB145DTE4, ARUB169BTE4/ARUB169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/ARUB144DTE4, ARUB168BTE4/ARUB168DTE4 single frame models.

[2]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft.
of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[3]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[4]Cooling range with the Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F and is achieved only when all indoor units are operating in cooling mode. Does not impact synchronous operating range.

[5]The System Combination Ratio must be between 50–130%.

[6]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[8]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 58 for detailed electrical data.

[9]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

HEAT RECOVERY SPECIFICATIONS

MULTI V IV

Triple-Frame 208-230V

Table 18: Triple-Frame 208-230V Heat Recovery Units, continued.

Combination Unit Model Number	36.0 Ton ARUB432BTE4	38.0 Ton ARUB456BTE4	40.0 Ton ARUB480BTE4	42.0 Ton ARUB504BTE4
Individual Component Model Numbers[1]	ARUB145BTE4 + ARUB145BTE4 + ARUB145BTE4	ARUB145BTE4 + ARUB145BTE4 + ARUB169BTE4	ARUB145BTE4 + ARUB169BTE4 + ARUB169BTE4	ARUB169BTE4 + ARUB169BTE4 + ARUB169BTE4
Cooling Performance				
Nominal Cooling Cap. (Btu/h)[2]	432,000	456,000	480,000	504,000
Rated Cooling Cap. (Btu/h)[3]	414,000	436,000	458,000	479,000
Heating Performance				
Nominal Heating Cap. (Btu/h)[2]	486,000	513,000	540,000	567,000
Rated Heating Cap. (Btu/h)[3]	462,000	488,000	514,000	539,000
Operating Range				
Cooling (°F DB)[4]	14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)	-13 to +61	-13 to +61	-13 to +61	-13 to +61
Synchronous — Cooling Based (°F DB)	14 to 81	14 to 81	14 to 81	14 to 81
Synchronous — Heating Based (°F DB)	14 to 61	14 to 61	14 to 61	14 to 61
Compressor				
Inverter Quantity	HSS DC Scroll x 6	HSS DC Scroll x 6	HSS DC Scroll x 6	HSS DC Scroll x 6
Oil/Type	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)				
Type	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2
Motor/Drive	Brushless Digitally Controlled/Direct			
Operating Range (RPM) Cooling	0 - 1,100	0 - 1,100	0 - 1,100	0 - 1,100
Operating Range (RPM) Heating	80 - 1,100	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)	30,600	30,600	30,600	30,600
Unit Data				
Refrigerant Type	R410A	R410A	R410A	R410A
Refrigerant Control/Location	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/System[5]	1 - 64	1 - 64	1 - 64	1 - 64
Sound Pressure dB(A)[6]	64.3	64.3	64.3	64.3
Net Unit Weight (lbs.)	672 + 672 + 672	672 + 672 + 672	672 + 672 + 672	672 + 672 + 672
Shipping Weight (lbs.)	705 + 705 + 705	705 + 705 + 705	705 + 705 + 705	705 + 705 + 705
Communication Cables[7,8]	2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger				
Material and Fin Coating	Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic			
Rows/Fins per inch	3/14	3/14	3/14	3/14
Piping[9]				
Liquid Line Connection (in., OD)	1/2 + 5/8 + 5/8 Braze	5/8 + 5/8 + 5/8 Braze	5/8 + 5/8 + 5/8 Braze	5/8 + 5/8 + 5/8 Braze
Low Pressure Vapor Line Conn (in., OD)	1-1/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze
High Pressure Vapor Line Conn (in, OD)	3/4 + 7/8 + 7/8 Braze	7/8 + 7/8 + 7/8 Braze	7/8 + 7/8 + 7/8 Braze	7/8 + 7/8 + 7/8 Braze
Factory Charge lbs. of R410A	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6

[1]ARUB145BTE4/ARUB145DTE4, ARUB169BTE4/ARUB169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/ARUB144DTE4, ARUB168BTE4/ARUB168DTE4 single frame models.

[2]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[3]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[4]Cooling range with the Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F and is achieved only when all indoor units are operating in cooling mode. Does not impact synchronous operating range.

[5]The System Combination Ratio must be between 50–130%.

[6]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[8]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 58 for detailed electrical data.

[9]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

LG

HEAT RECOVERY SPECIFICATIONS

Single-Frame 460V

Table 19: Single-Frame 460V Heat Recovery Units.

Combination Unit Model Number		6.0 Ton ARUB072DTE4	8.0 Ton ARUB096DTE4	10.0 Ton ARUB121DTE4	12.0 ARUB144DTE4	14.0 ARUB168DTE4
Individual Component Model Numbers		-	-	-	-	-
Cooling Performance						
Nominal Cooling Capacity (Btu/h)[1]		72,000	96,000	120,000	144,000	168,000
Rated Cooling Capacity (Btu/h)[2]		69,000	92,000	114,000	138,000	160,000
Heating Performance						
Nominal Heating Capacity (Btu/h)[1]		81,000	108,000	135,000	162,000	189,000
Rated Heating Capacity (Btu/h)[2]		77,000	103,000	129,000	154,000	180,000
Operating Range						
Cooling (°F DB)[3]		14 to 122	14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61	-13 to +61
Synchronous — Cooling Based (°F DB)		14 to 81	14 to 81	14 to 81	14 to 81	14 to 81
Synchronous — Heating Based (°F DB)		14 to 61	14 to 61	14 to 61	14 to 61	14 to 61
Compressor						
Inverter Quantity		HSS DC Scroll x 1	HSS DC Scroll x 1	HSS DC Scroll x 1	HSS DC Scroll x 2	HSS DC Scroll x 2
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)						
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.75 x 1	0.60 x 2	0.60 x 2	0.60 x 2	0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct				
Operating Range (RPM)	Cooling	0 - 850	0 - 1,050	0 - 1,050	0 - 1,100	0 - 1,100
	Heating	80 - 850	80 - 1,050	80 - 1,050	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		7,400	9,850	9,850	10,200	10,200
Unit Data						
Refrigerant Type		R410A	R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. Number Indoor Units/ System[4]		1 - 13	1 - 16	1 - 20	1 - 24	1 - 29
Sound Pressure dB(A)[5]		58.5	59.0	59.0	59.5	59.5
Net Unit Weight (lbs.)		430	540	540	628	628
Shipping Weight (lbs.)		452	573	573	661	661
Communication Cables[6,7]		2 x 18	2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger						
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic				
Rows/Fins per inch		3/14	3/14	3/14	3/14	3/14
Piping[8]						
Liquid Line Connection (in., OD)		3/8 Braze	3/8 Braze	1/2 Braze	1/2 Braze	5/8 Braze
Low Pressure Vapor Line Conn (in., OD)		3/4 Braze	7/8 Braze	1-1/8 Braze	1-1/8 Braze	1-1/8 Braze
High Pressure Vapor Line Conn (in, OD)		5/8 Braze	3/4 Braze	3/4 Braze	7/8 Braze	7/8 Braze
Factory Charge lbs. of R410A		16.9	23.6	23.6	23.6	23.6

[1]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[2]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[3]Cooling range with the Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F and is achieved only when all indoor units are operating in cooling mode. Does not impact synchronous operating range.

[4]The System Combination Ratio must be between 50–130%.

[5]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[7]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 49 for detailed electrical data.

[8]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

HEAT RECOVERY SPECIFICATIONS

MULTI V IV

Dual-Frame 460V

Table 20: Dual-Frame 460V Heat Recovery Units.

Combination Unit Model Number		16.0 Ton ARUB192DTE4	18.0 Ton ARUB216DTE4	20.0 Ton ARUB240DTE4	22.0 Ton ARUB264DTE4
Individual Component Model Numbers		ARUB072DTE4 + ARUB121DTE4	ARUB072DTE4 + ARUB144DTE4	ARUB096DTE4 + ARUB144DTE4	ARUB121DTE4+ ARUB144DTE4
Cooling Performance					
Nominal Cooling Cap. (Btu/h)[1]		192,000	216,000	240,000	264,000
Rated Cooling Cap. (Btu/h)[2]		184,000	206,000	228,000	250,000
Heating Performance					
Nominal Heating Cap. (Btu/h)[1]		216,000	243,000	270,000	297,000
Rated Heating Cap. (Btu/h)[2]		206,000	230,000	256,000	282,000
Operating Range					
Cooling (°F DB)[3]		14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61
Synchronous—Cooling Based (°F DB)		14 to 81	14 to 81	14 to 81	14 to 81
Synchronous—Heating Based (°F DB)		14 to 61	14 to 61	14 to 61	14 to 61
Compressor					
Inverter Quantity		HSS DC Scroll x 2	HSS DC Scroll x 3	HSS DC Scroll x 3	HSS DC Scroll x 3
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)					
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.75 + 0.60 x 2	0.75 + 0.60 x 2	0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct			
Operation. Range (RPM)	Cooling	0 - 1,050	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,050	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		17,250	17,600	20,050	20,050
Unit Data					
Refrigerant Type		R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/System[4]		1 - 32	1 - 35	1 - 39	1 - 42
Sound Pressure dB(A)[5]		61.8	62.0	62.3	62.3
Net Unit Weight (lbs.)		430 + 540	430 + 628	540 + 628	540 + 628
Shipping Weight (lbs.)		452 + 573	452 + 661	573 + 661	573 + 661
Communication Cables[6,7]		2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger					
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic			
Rows/Fins per inch		3/14	3/14	3/14	3/14
Piping[8]					
Liquid Line Conn. (in., OD)		3/8 + 1/2 Braze	3/8 + 1/2 Braze	3/8 + 1/2 Braze	1/2 + 1/2 Braze
Low Pressure Vapor Line Conn. (in., OD)		3/4 + 1-1/8 Braze	3/4 + 1-1/8 Braze	7/8 + 1-1/8 Braze	1-1/8 + 1-1/8 Braze
High Pressure Vapor Line Conn (in, OD)		5/8 + 3/4 Braze	5/8 + 7/8 Braze	3/4 + 7/8 Braze	3/4 + 7/8 Braze
Factory Charge lbs. of R410A		16.9 + 23.6	16.9 + 23.6	23.6 + 23.6	23.6 + 23.6

[1]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[2]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[3]Cooling range with the Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F and is achieved only when all indoor units are operating in cooling mode. Does not impact synchronous operating range.

[4]The System Combination Ratio must be between 50–130%.

[5]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[7]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 59 for detailed electrical data.

[8]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

LG

HEAT RECOVERY SPECIFICATIONS

Dual-Frame 460V

Table 21: Dual-Frame 460V Heat Recovery Units, continued.

Combination Unit Model Number		24.0 Ton ARUB288DTE4	26.0 Ton ARUB313DTE4	28.0 Ton ARUB337DTE4
Individual Component Model Numbers		ARUB144DTE4 + ARUB144DTE4	ARUB144DTE4 + ARUB168DTE4	ARUB168DTE4 + ARUB168DTE4
Cooling Performance				
Nominal Cooling Cap. (Btu/h)[1]		288,000	312,000	336,000
Rated Cooling Cap. (Btu/h)[2]		274,000	296,000	320,000
Heating Performance				
Nominal Heating Cap. (Btu/h)[1]		324,000	351,000	378,000
Rated Heating Cap. (Btu/h)[2]		308,000	334,000	361,000
Operating Range				
Cooling (°F DB)[3]		14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61
Synchronous—Cooling Based (°F DB)		14 to 81	14 to 81	14 to 81
Synchronous—Heating Based (°F DB)		14 to 61	14 to 61	14 to 61
Compressor				
Inverter Quantity		HSS DC Scroll x 4	HSS DC Scroll x 4	HSS DC Scroll x 4
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)				
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct		
Operation. Range (RPM)	Cooling	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		20,400	20,400	20,400
Unit Data				
Refrigerant Type		R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/System[4]		1 - 45	1 - 52	1 - 55
Sound Pressure dB(A)[5]		62.5	62.5	62.5
Net Unit Weight (lbs.)		628 + 628	628 + 628	628 + 628
Shipping Weight (lbs.)		661 + 661	661 + 661	661 + 661
Communication Cables[6,7]		2 x 18	2 x 18	2 x 18
Heat Exchanger				
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic		
Rows/Fins per inch		3/14	3/14	3/14
Piping[8]				
Liquid Line Conn. (in., OD)		1/2 + 1/2 Braze	1/2 + 5/8 Braze	5/8 + 5/8 Braze
Low Pressure Vapor Line Conn. (in., OD)		1-1/8 + 1-1/8 Braze	1-1/8 + 1-1/8 Braze	1-1/8 + 1-1/8 Braze
High Pressure Vapor Line Conn (in, OD)		7/8 + 7/8 Braze	7/8 + 7/8 Braze	7/8 + 7/8 Braze
Factory Charge lbs. of R410A		23.6 + 23.6	23.6 + 23.6	23.6 + 23.6

[1]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[2]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[3]Cooling range with the Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F and is achieved only when all indoor units are operating in cooling mode. Does not impact synchronous operating range.

[4]The System Combination Ratio must be between 50–130%.

[5]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[7]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 59 for detailed electrical data.

[8]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

HEAT RECOVERY SPECIFICATIONS

MULTI V IV

Triple-Frame 460V

Table 22: Triple-Frame 460V Heat Recovery Units.

Combination Unit Model Number		26.0 Ton ARUB312DTE4	28.0 Ton ARUB336DTE4	30.0 Ton ARUB360DTE4	32.0 Ton ARUB384DTE4	34.0 Ton ARUB408DTE4
Individual Component Model Numbers[1]		ARUB072DTE4 + ARUB096DTE4 + ARUB144DTE4	ARUB096DTE4 + ARUB096DTE4 + ARUB144DTE4	ARUB096DTE4 + ARUB121DTE4 + ARUB144DTE4	ARUB096DTE4 + ARUB145DTE4 + ARUB145DTE4	ARUB121DTE4 + ARUB145DTE4 + ARUB145DTE4
Cooling Performance						
Nominal Cooling Cap. (Btu/h)[2]		312,000	336,000	360,000	384,000	408,000
Rated Cooling Cap. (Btu/h)[3]		296,000	320,000	342,000	366,000	390,000
Heating Performance						
Nominal Heating Cap. (Btu/h)[2]		351,000	378,000	405,000	432,000	459,000
Rated Heating Cap. (Btu/h)[3]		334,000	361,000	387,000	412,000	437,000
Operating Range						
Cooling (°F DB)[4]		14 to 122	14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61	-13 to +61
Synchronous — Cooling Based (°F DB)		14 to 81	14 to 81	14 to 81	14 to 81	14 to 81
Synchronous — Heating Based (°F DB)		14 to 61	14 to 61	14 to 61	14 to 61	14 to 61
Compressor						
Inverter Quantity		HSS DC Scroll x 4	HSS DC Scroll x 4	HSS DC Scroll x 4	HSS DC Scroll x 5	HSS DC Scroll x 5
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)						
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.75 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2	0.60 x 2 + 0.60 x 2 + 0.60 x 2
Motor/Drive		Brushless Digitally Controlled/Direct				
Operating Range (RPM)	Cooling	0 - 1,100	0 - 1,100	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,100	80 - 1,100	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		27,450	29,900	29,900	30,250	30,250
Unit Data						
Refrigerant Type		R410A	R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/System[5]		1 - 52	1 - 55	1 - 58	1 - 61	1 - 64
Sound Pressure dB(A)[6]		63.8	63.9	63.9	64.1	64.1
Net Unit Weight (lbs.)		430 + 540 + 628	540 + 540 + 628	540 + 540 + 628	540 + 672 + 672	540 + 672 + 672
Shipping Weight (lbs.)		452 + 573 + 661	573 + 573 + 661	573 + 573 + 661	573 + 705 + 705	573 + 705 + 705
Communication Cables[7,8]		2 x 18	2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger						
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic				
Rows/Fins per inch		3/14	3/14	3/14	3/14	3/14
Piping[9]						
Liquid Line Conn. (in., OD)		3/8+3/8+1/2 Braze	3/8+3/8+1/2 Braze	3/8+1/2+1/2 Braze	3/8+5/8+5/8 Braze	1/2+5/8+5/8 Braze
Low Pressure Vapor Line Conn. (in., OD)		3/4+7/8+1-1/8 Braze	7/8+7/8+1-1/8 Braze	7/8+1-1/8+1-1/8 Braze	7/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze
High Pressure Vapor Line Conn (in, OD)		5/8+3/4+7/8 Braze	3/4+3/4+7/8 Braze	3/4+3/4+7/8 Braze	3/4+7/8+7/8 Braze	3/4+7/8+7/8 Braze
Factory Charge lbs. of R410A		16.9 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6

[1]ARUB145BTE4/ARUB145DTE4, ARUB169BTE4/ARUB169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/ARUB144DTE4, ARUB168BTE4/ARUB168DTE4 single frame models.
[2]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[3]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[4]Cooling range with the Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F and is achieved only when all indoor units are operating in cooling mode. Does not impact synchronous operating range.

[5]The System Combination Ratio must be between 50–130%.

[6]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[8]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 59 for detailed electrical data.

[9]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

LG

Table 23: Triple-Frame 460V Heat Recovery Units, continued.

Combination Unit Model Number		36.0 Ton ARUB432DTE4	38.0 Ton ARUB456DTE4	40.0 Ton ARUB480DTE4	42.0 Ton ARUB504DTE4
Individual Component Model Numbers[1]		ARUB145DTE4 + ARUB145DTE4 + ARUB145DTE4	ARUB145DTE4 + ARUB145DTE4 + ARUB169DTE4	ARUB145DTE4 + ARUB169DTE4 + ARUB169DTE4	ARUB169DTE4 + ARUB169DTE4 + ARUB169DTE4
Cooling Performance					
Nominal Cooling Cap. (Btu/h)[2]		432,000	456,000	480,000	504,000
Rated Cooling Cap. (Btu/h)[3]		414,000	436,000	458,000	479,000
Heating Performance					
Nominal Heating Cap. (Btu/h)[2]		486,000	513,000	540,000	567,000
Rated Heating Cap. (Btu/h)[3]		462,000	488,000	514,000	539,000
Operating Range					
Cooling (°F DB)[4]		14 to 122	14 to 122	14 to 122	14 to 122
Heating (°F WB)		-13 to +61	-13 to +61	-13 to +61	-13 to +61
Synchronous—Cooling Based (°F DB)		14 to 81	14 to 81	14 to 81	14 to 81
Synchronous—Heating Based (°F DB)		14 to 61	14 to 61	14 to 61	14 to 61
Compressor					
Inverter Quantity		HSS DC Scroll x 6	HSS DC Scroll x 6	HSS DC Scroll x 6	HSS DC Scroll x 6
Oil/Type		PVE/FVC68D	PVE/FVC68D	PVE/FVC68D	PVE/FVC68D
Fan (Top Discharge)					
Type		Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)	Propeller (BLDC)
Motor Output (kW) x Qty.		0.60x2 + 0.60x2 + 0.60x2	0.60x2 + 0.60x2 + 0.60x2	0.60x2 + 0.60x2 + 0.60x2	0.60x2 + 0.60x2 + 0.60x2
Motor/Drive		Brushless Digitally Controlled/Direct			
Operating Range (RPM)	Cooling	0 - 1,100	0 - 1,100	0 - 1,100	0 - 1,100
	Heating	80 - 1,100	80 - 1,100	80 - 1,100	80 - 1,100
Maximum Air Volume (CFM)		30,600	30,600	30,600	30,600
Unit Data					
Refrigerant Type		R410A	R410A	R410A	R410A
Refrigerant Control/Location		EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit	EEV/Indoor Unit
Min. to Max. No. Indoor Units/System[5]		1 - 64	1 - 64	1 - 64	1 - 64
Sound Pressure dB(A)[6]		64.3	64.3	64.3	64.3
Net Unit Weight (lbs.)		672 + 672 + 672	672 + 672 + 672	672 + 672 + 672	672 + 672 + 672
Shipping Weight (lbs.)		705 + 705 + 705	705 + 705 + 705	705 + 705 + 705	705 + 705 + 705
Communication Cables[7,8]		2 x 18	2 x 18	2 x 18	2 x 18
Heat Exchanger					
Material and Fin Coating		Copper Tube/Aluminum Fin and GoldFin™/Hydrophilic			
Rows/Fins per inch		3/14	3/14	3/14	3/14
Piping[9]					
Liquid Line Conn. (in., OD)		5/8 + 5/8 + 5/8 Braze	5/8 + 5/8 + 5/8 Braze	5/8 + 5/8 + 5/8 Braze	5/8 + 5/8 + 5/8 Braze
Low Pressure Vapor Line Conn. (in., OD)		1-1/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze	1-1/8+1-1/8+1-1/8 Braze
High Pressure Vapor Line Conn (in, OD)		7/8 + 7/8 + 7/8 Braze	7/8 + 7/8 + 7/8 Braze	7/8 + 7/8 + 7/8 Braze	7/8 + 7/8 + 7/8 Braze
Factory Charge lbs. of R410A		23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6	23.6 + 23.6 + 23.6

[1]ARUB145BTE4/ARUB145DTE4, ARUB169BTE4/ARUB169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/ARUB144DTE4, ARUB168BTE4/ARUB168DTE4 single frame models.

[2]Nominal capacity applied with non-ducted indoor units, and is rated 0 ft. above sea level with 25 ft. of refrigerant line per indoor unit and a 0 ft. level difference between outdoor and indoor units. All capacities are net with a Combination Ratio between 95–105%.

Nominal cooling capacity rating obtained with air entering the indoor unit at 80ºF dry bulb (DB) and 67ºF wet bulb (WB) and outdoor ambient conditions of 95ºF dry bulb (DB) and 75ºF wet bulb (WB).
Nominal heating capacity rating obtained with air entering the indoor unit at 70ºF dry bulb (DB) and 59ºF wet bulb (WB) and outdoor ambient conditions of 47ºF dry bulb (DB) and 43ºF wet bulb (WB).

[3]Rated capacity is certified under AHRI Standard 1230. See www.ahrinet.org for information.

[4]Cooling range with the Low Ambient Baffle Kit (sold separately) is -9.9°F to +122°F and is achieved only when all indoor units are operating in cooling mode. Does not impact synchronous operating range.

[5]The System Combination Ratio must be between 50–130%.

[6]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

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

[8]Power wiring cable is field provided and must comply with the applicable local and national codes. See page 59 for detailed electrical data.

[9]Refer to the Refrigerant Piping section of this manual for correct line sizing. Contractor must use LG manufactured Y-Branch and Header Kits only. Designer must verify refrigerant piping design configuration using LG's computerized refrigerant piping (LATS Multi V) software to validate the pipe design.

Table 24: 208-230V, 60Hz, 3-Phase Heat Recovery Units.

Nom. Tons	Unit Model Nos.	Compressor (Comp.)								Condenser Fan Motor(s)				MCA			MOCP			RFA		
		Comp. Qty.	Motor Amps						Fan Qty.	Amps				Frame			Frame			Frame		
			Motor RLA (Ea.)							FLA (Ea.)												
			Frame							Frame												
			1		2		3															
			Comp. A	Comp. B	Comp. A	Comp. B	Comp. A	Comp. B		1	2	3		1	2	3	1	2	3	1	2	3
6.0	ARUB072BTE4	1	17.0	-	-	-	-	-	1	4.0	-	-		25.3	-	-	40	-	-	35	-	-
8.0	ARUB096BTE4	1	27.3	-	-	-	-	-	2	6.0	-	-		40.1	-	-	60	-	-	50	-	-
10.0	ARUB121BTE4	1	27.4	-	-	-	-	-	2	6.0	-	-		40.3	-	-	60	-	-	50	-	-
12.0	ARUB144BTE4	2	19.0	19.0	-	-	-	-	2	6.0	-	-		48.8	-	-	60	-	-	60	-	-
14.0	ARUB168BTE4	2	20.7	20.7	-	-	-	-	2	6.0	-	-		52.5	-	-	70	-	-	70	-	-
16.0	ARUB192BTE4	2	17.0	-	27.4	-	-	-	3	4.0	6.0	-		25.3	40.3	-	40	60	-	35	50	-
18.0	ARUB216BTE4	3	17.0	-	19.0	19.0	-	-	3	4.0	6.0	-		25.3	48.8	-	40	60	-	35	60	-
20.0	ARUB240BTE4	3	27.3	-	19.0	19.0	-	-	4	6.0	6.0	-		40.1	48.8	-	60	60	-	50	60	-
22.0	ARUB264BTE4	3	27.4	-	19.0	19.0	-	-	4	6.0	6.0	-		40.3	48.8	-	60	60	-	50	60	-
24.0	ARUB288BTE4	4	19.0	19.0	19.0	19.0	-	-	4	6.0	6.0	-		48.8	48.8	-	60	60	-	60	60	-
26.0	ARUB313BTE4	4	20.7	20.7	19.0	19.0	-	-	4	6.0	-	-		48.8	52.5	-	60	70	-	60	70	-
28.0	ARUB337BTE4	4	20.7	20.7	20.7	20.7	-	-	4	6.0	6.0	-		52.5	52.5	-	70	70	-	70	70	-
26.0	ARUB312BTE4	4	17.0	-	27.3	-	19.0	19.0	5	4.0	6.0	6.0		25.3	40.1	48.8	40	60	60	35	50	60
28.0	ARUB336BTE4	4	27.3	-	27.3	-	19.0	19.0	6	6.0	6.0	6.0		40.1	40.1	48.8	60	60	60	50	50	60
30.0	ARUB360BTE4	4	27.3	-	27.4	-	19.0	19.0	6	6.0	6.0	6.0		40.1	40.3	48.8	60	60	60	50	50	60
32.0	ARUB384BTE4	5	27.3	-	27.2	17.0	27.2	17.0	6	6.0	6.0	6.0		40.1	57.0	57.0	60	80*	80*	50	80	80
34.0	ARUB408BTE4	5	27.4	-	27.2	17.0	27.2	17.0	6	6.0	6.0	6.0		40.3	57.0	57.0	60	80*	80*	50	80	80
36.0	ARUB432BTE4	6	27.2	17.0	27.2	17.0	27.2	17.0	6	6.0	6.0	6.0		57.0	57.0	57.0	80*	80*	80*	80	80	80
38.0	ARUB456BTE4	6	27.2	17.0	27.2	17.0	27.2	17.0	6	6.0	6.0	6.0		57.0	57.0	57.0	80*	80*	80*	80	80	80
40.0	ARUB480BTE4	6	27.2	17.0	27.2	17.0	27.2	17.0	6	6.0	6.0	6.0		57.0	57.0	57.0	80*	80*	80*	80	80	80
42.0	ARUB504BTE4	6	27.2	17.0	27.2	17.0	27.2	17.0	6	6.0	6.0	6.0		57.0	57.0	57.0	80*	80*	80*	80	80	80

For component model nos. see the specification tables on p. 48-52.

Voltage tolerance is ±10%.

Maximum allowable voltage unbalance is 2%.

MCA = Minimum Circuit Ampacity.

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

RFA: Recommended Fuse Amps.

*SCCR rating: 5kA RMS Symmetrical.

LG

Table 25: 460V, 60Hz, 3-Phase Heat Recovery Units.

Nom. Tons	Unit Model Nos.	Compressor (Comp.)								Condenser Fan Motor(s)				MCA			MOCP			RFA		
		Comp. Qty.	Motor Amps							Fan Qty.	Amps			Frame			Frame			Frame		
			Motor RLA (Ea.)								FLA (Ea.)											
			Frame								Frame											
			1		2		3							1	2	3	1	2	3	1	2	3
			Comp. A	Comp. B	Comp. A	Comp. B	Comp. A	Comp. B		1	2	3										
6.0	ARUB072DTE4	1	11.7	-	-	-	-	-	1	2.1	-	-		16.7	-	-	25	-	-	25	-	-
8.0	ARUB096DTE4	1	16.5	-	-	-	-	-	2	2.6	-	-		23.2	-	-	35	-	-	30	-	-
10.0	ARUB121DTE4	1	17.1	-	-	-	-	-	2	2.6	-	-		24.0	-	-	40	-	-	30	-	-
12.0	ARUB144DTE4	2	12.9	12.9	-	-	-	-	2	2.6	-	-		31.6	-	-	40	-	-	40	-	-
14.0	ARUB168DTE4	2	13.9	13.9	-	-	-	-	2	2.6	-	-		33.9	-	-	45	-	-	45	-	-
16.0	ARUB192DTE4	2	11.7	-	17.1	-	-	-	3	2.1	2.6	-		16.7	24.0	-	25	40	-	25	30	-
18.0	ARUB216DTE4	3	11.7	-	12.9	12.9	-	-	3	2.1	2.6	-		16.7	31.6	-	25	40	-	25	40	-
20.0	ARUB240DTE4	3	16.5	-	12.9	12.9	-	-	4	2.6	2.6	-		23.2	31.6	-	35	40	-	30	40	-
22.0	ARUB264DTE4	3	17.1	-	12.9	12.9	-	-	4	2.6	2.6	-		24.0	31.6	-	40	40	-	30	40	-
24.0	ARUB288DTE4	4	12.9	12.9	12.9	12.9	-	-	4	2.6	2.6	-		31.6	31.6	-	40	40	-	40	40	-
26.0	ARUB313DTE4	4	13.9	13.9	12.9	12.9	-	-	4	2.6	2.6	-		31.6	33.9	-	40	45	-	50	50	-
28.0	ARUB337DTE4	4	13.9	13.9	13.9	13.9	-	-	4	2.6	2.6	-		33.9	33.9	-	45	45	-	50	50	-
26.0	ARUB312DTE4	4	11.7	-	16.5	-	12.9	12.9	5	2.1	2.6	2.6		16.7	23.2	31.6	25	35	40	25	30	40
28.0	ARUB336DTE4	4	16.5	-	16.5	-	12.9	12.9	6	2.6	2.6	2.6		23.2	23.2	31.6	35	35	40	30	30	40
30.0	ARUB360DTE4	4	16.5	-	17.1	-	12.9	12.9	6	2.6	2.6	2.6		23.2	24.0	31.6	35	40	40	30	30	40
32.0	ARUB384DTE4	5	16.5	-	16.2	12.9	16.2	12.9	6	2.6	2.6	2.6		23.2	35.8	35.8	35	50	50	30	50	50
34.0	ARUB408DTE4	5	17.1	-	16.2	12.9	16.2	12.9	6	2.6	2.6	2.6		24.0	35.8	35.8	40	50	50	30	50	50
36.0	ARUB432DTE4	6	16.2	12.9	16.2	12.9	16.2	12.9	6	2.6	2.6	2.6		35.8	35.8	35.8	50	50	50	50	50	50
38.0	ARUB456DTE4	6	16.2	12.9	16.2	12.9	16.2	12.9	6	2.6	2.6	2.6		35.8	35.8	35.8	50	50	50	50	50	50
40.0	ARUB480DTE4	6	16.2	12.9	16.2	12.9	16.2	12.9	6	2.6	2.6	2.6		35.8	35.8	35.8	50	50	50	50	50	50
42.0	ARUB504DTE4	6	16.2	12.9	16.2	12.9	16.2	12.9	6	2.6	2.6	2.6		35.8	35.8	35.8	50	50	50	50	50	50

For component model nos. see the specification tables on p. 53-57.

Voltage tolerance is 414-528V.

Maximum allowable voltage unbalance is 2%.

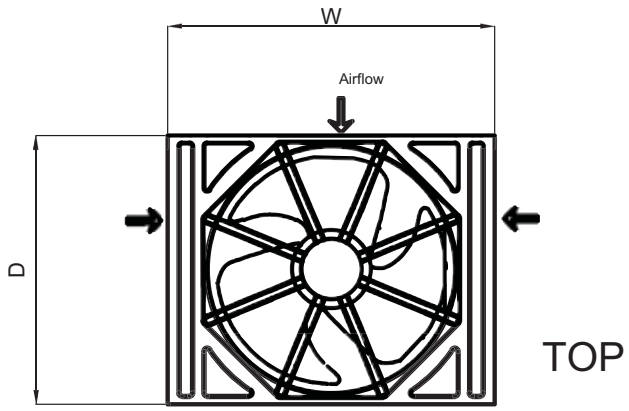
MCA = Minimum Circuit Ampacity.

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

RFA: Recommended Fuse Amps.

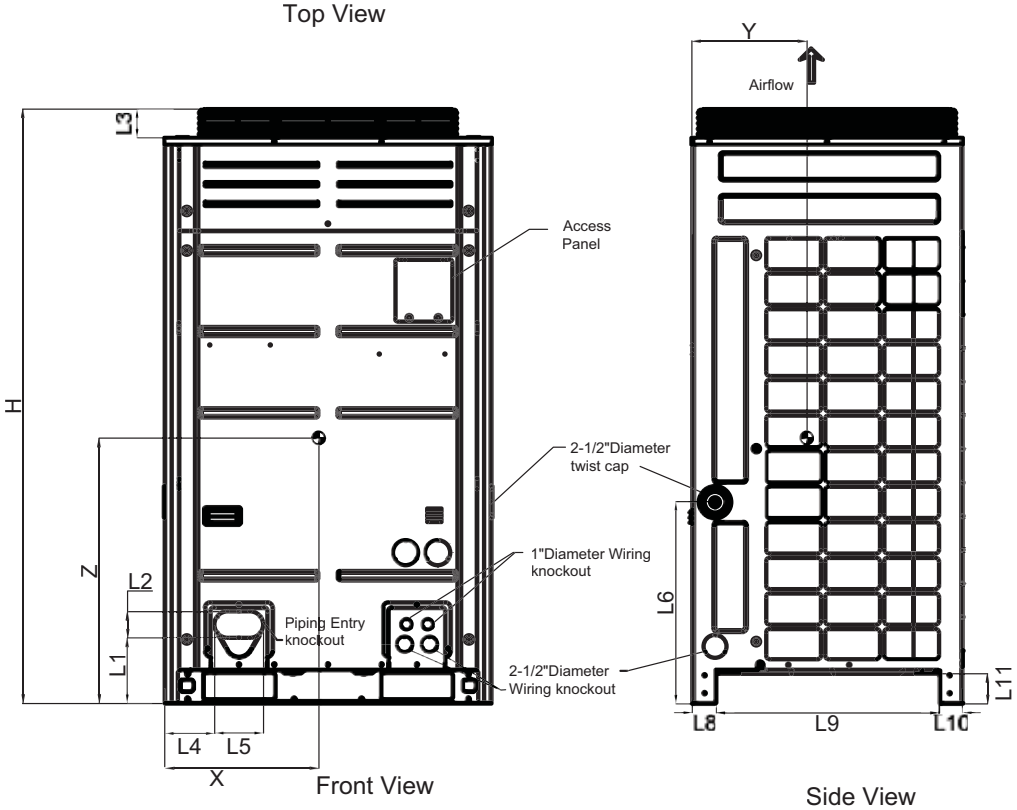
HEAT RECOVERY DIMENSIONS

ARUB072BTE4 / ARUB072DTE4



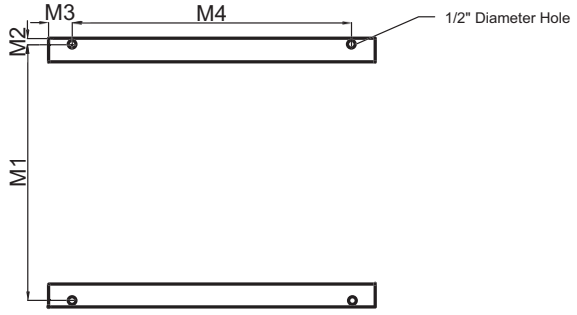
TOP

Top View



Front View

Side View



Bottom Mounting Holes

W	36-1/4"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	22-7/16"
L7	2-9/16"
L8	2-9/16"
L9	24-3/16"
L10	2-9/16"
L11	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	31-3/16"

Center of Gravity

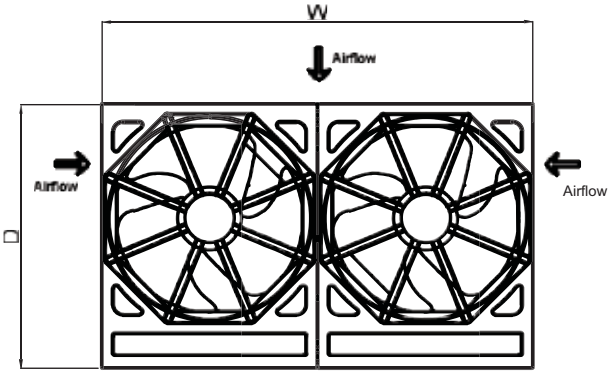
X	17-5/8"
Y	13-1/2"
Z	29-5/8"

Note - All dimensions have a tolerance of ± 0.25 in.

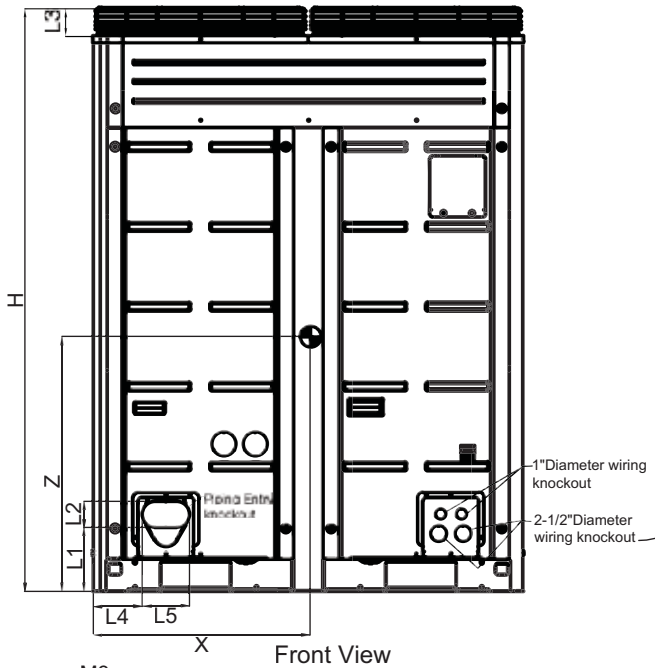
= Center of Gravity

HEAT RECOVERY DIMENSIONS

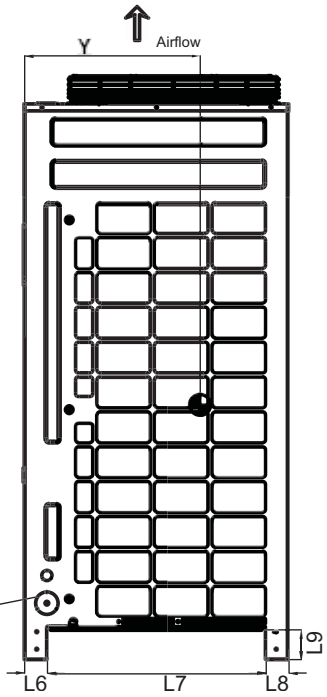
ARUB096BTE4 / 096DTE4, ARUB121BTE4 / 121DTE4, ARUB144BTE4 / 144DTE4,
ARUB145BTE4 / 145DTE4, ARUB168BTE4 / 168DTE4, ARUB169BTE4 / 169DTE4



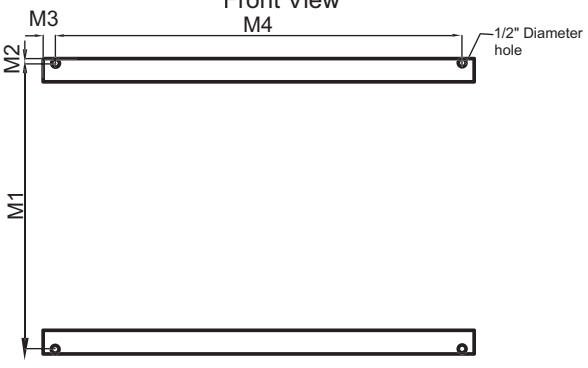
Top View



Front View



Side View



Bottom Mounting Holes

W	48-13/16"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	2-9/16
L7	24-3/16"
L8	2-9/16"
L9	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	43-3/8"

Center of Gravity

X	17-5/8"
Y	13-1/2"
Z	29-5/8"

Note - All dimensions have a tolerance of ± 0.25 in.

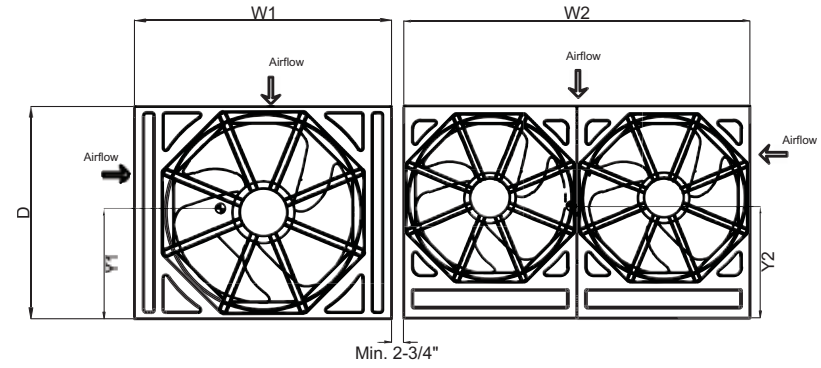
= Center of Gravity

Note:

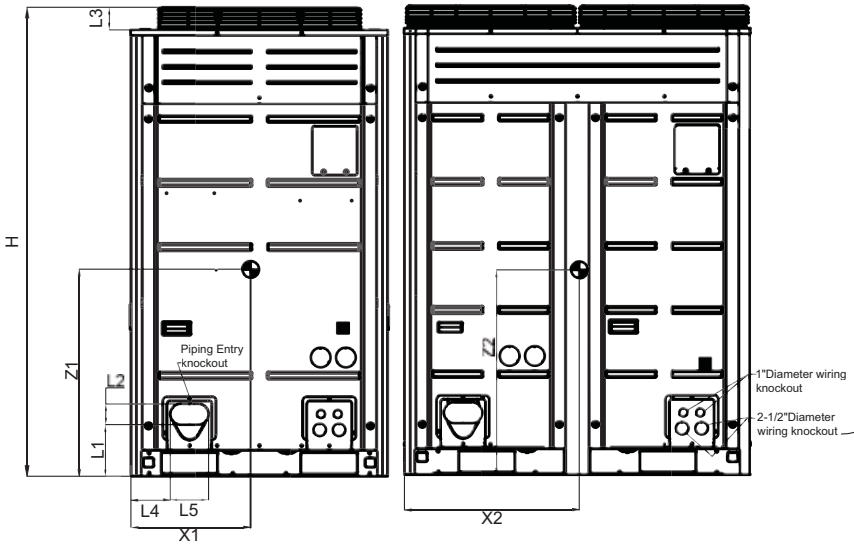
ARUB145BTE4/ARUB145DTE4 and ARUB169BTE4/ARUB169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/ ARUB144DTE4 and ARUB168BTE4/ARUB168DTE4 single frame models.

HEAT RECOVERY DIMENSIONS

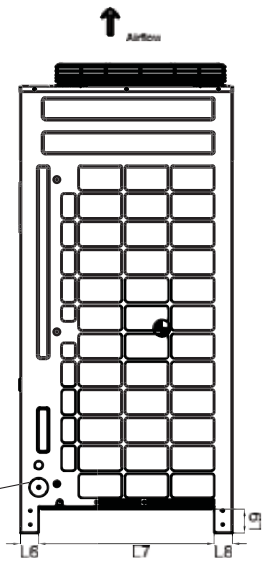
ARUB192BTE4 / 192DTE4, ARUB216BTE4 / 216DTE4



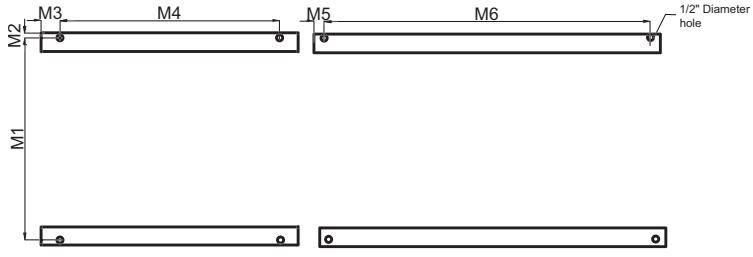
Top View



Front View



Side View



Bottom Mounting Holes

W1	36-1/4"
W2	48-13/16"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	2-9/16
L7	24-3/16"
L8	2-9/16"
L9	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	31-3/16"
M5	2-5/8"
M6	43-3/8"

Center of Gravity

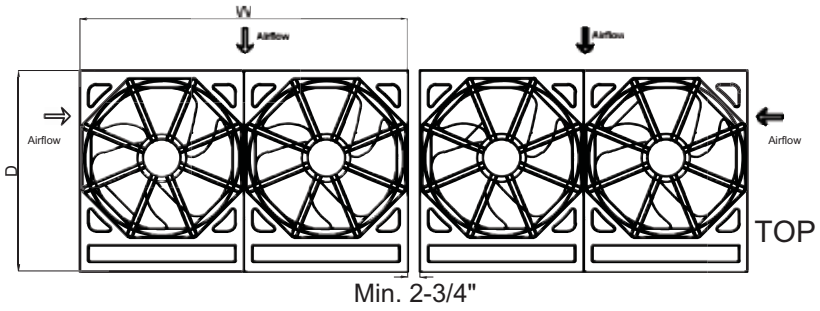
X1	17-5/8"
X2	24-3/4"
Y1	13-1/2"
Y2	21-9/16"
Z1	29-5/8"
Z2	29-7/8"

Note - All dimensions have a tolerance of ± 0.25 in.

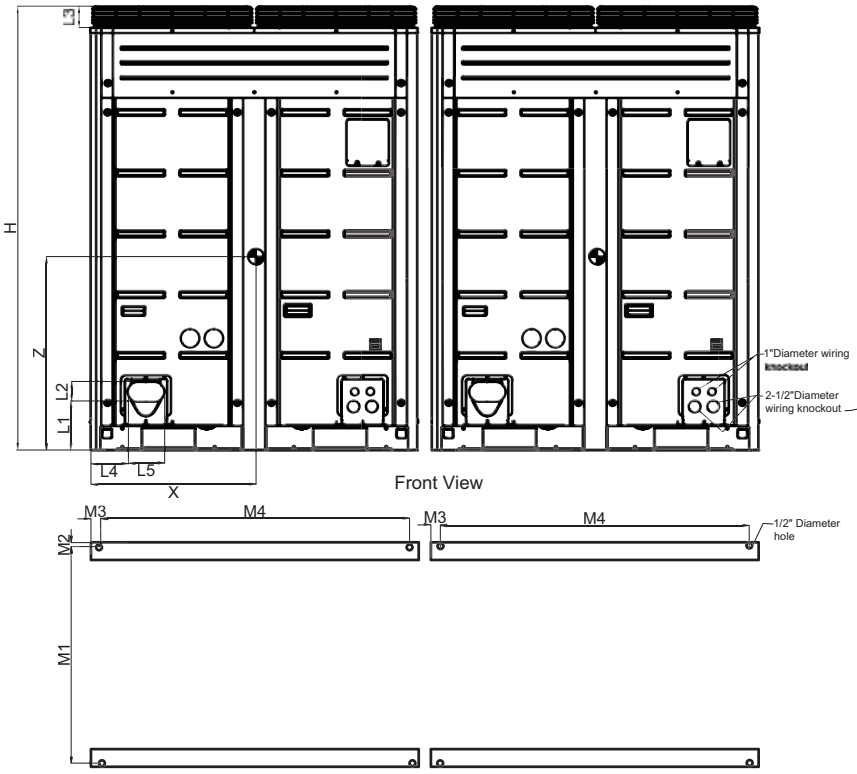
= Center of Gravity

HEAT RECOVERY DIMENSIONS

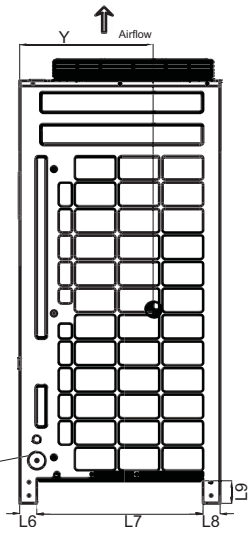
ARUB240BTE4 / 240DTE4, ARUB264BTE4 / 264DTE4, ARUB288BTE4 / 288DTE4, ARUB313BTE4 / 313DTE4, ARUB337BTE4 / 337DTE4



Top View



Front View



Side View

Bottom Mounting Holes

W	48-13/16"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	2-9/16
L7	24-3/16"
L8	2-9/16"
L9	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	43-3/8"

Center of Gravity

X	24-3/4"
Y	21-9/16"
Z	29-7/8"

Note - All dimensions have a tolerance of ± 0.25 in.

= Center of Gravity

HEAT RECOVERY DIMENSIONS

MULTI V IV

ARUB312BTE4 / 312DTE4

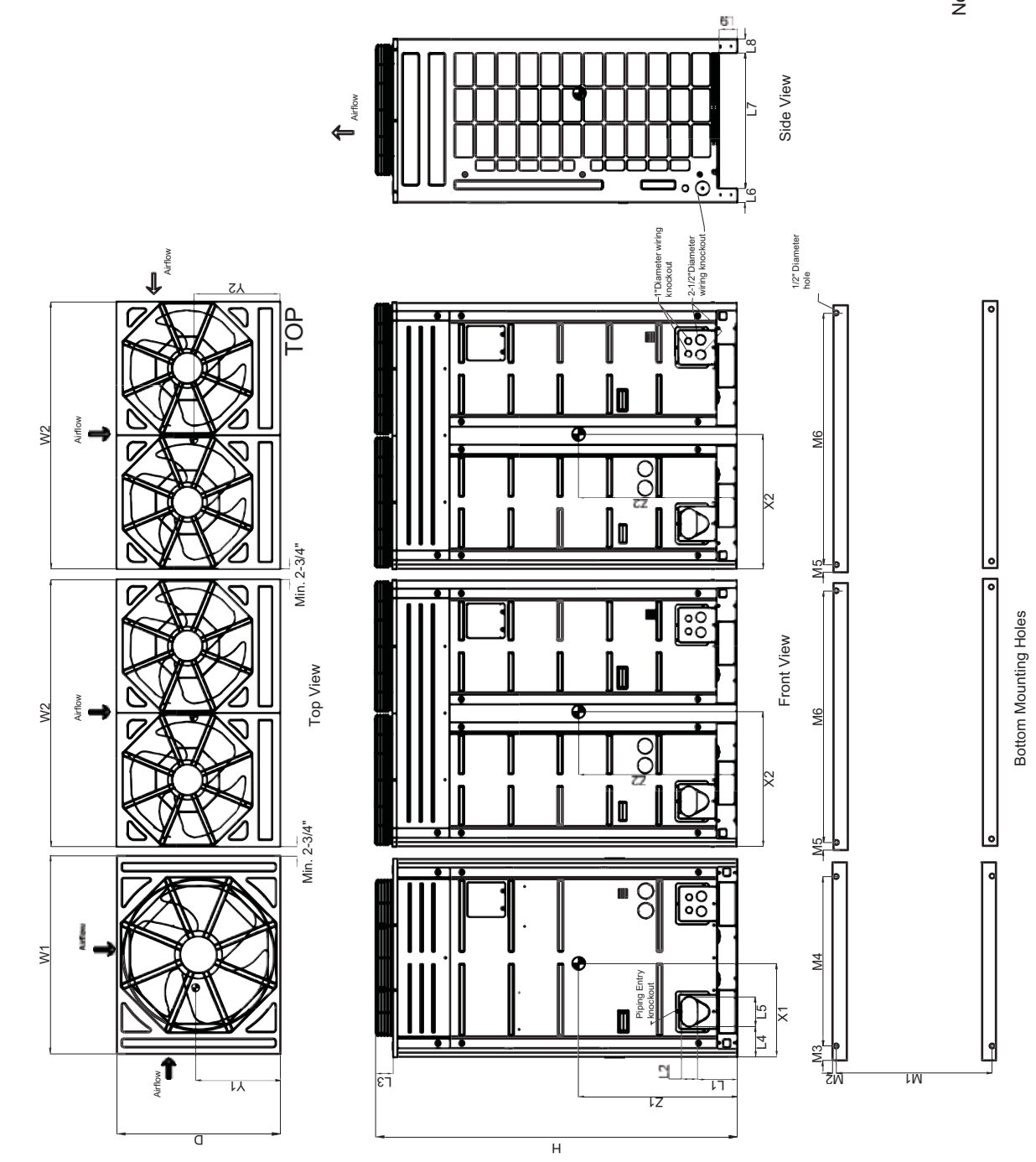
W1	36-1/4"
W2	48-13/16"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	2-9/16
L7	24-3/16"
L8	2-9/16"
L9	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	31-3/16"
M5	2-5/8"
M6	43-3/8"

Center of Gravity

X1	17-5/8"
X2	24-3/4"
Y1	13-1/2"
Y2	21-9/16"
Z1	29-5/8"
Z2	29-7/8"

Note - All dimensions have a tolerance of ± 0.25 in.

= Center of Gravity



LG

HEAT RECOVERY DIMENSIONS

ARUB336-360-384-408-432-456-480-504BTE4 / DTE4

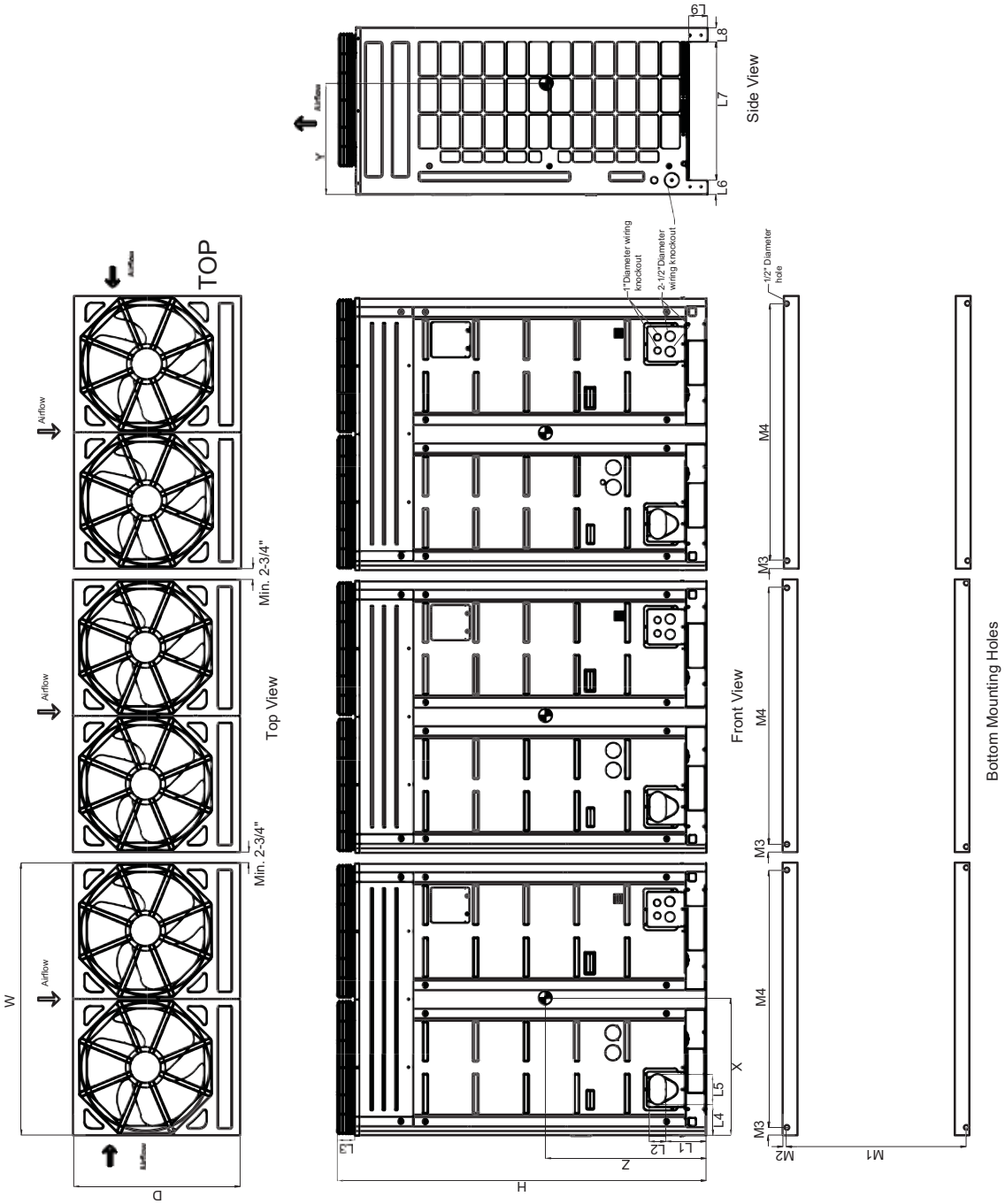
W	48-13/16"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	2-9/16
L7	24-3/16"
L8	2-9/16"
L9	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	43-3/8"

Center of Gravity

X	24-3/4"
Y	21-9/16"
Z	29-7/8"

Note - All dimensions have a tolerance of ± 0.25 in.

= Center of Gravity

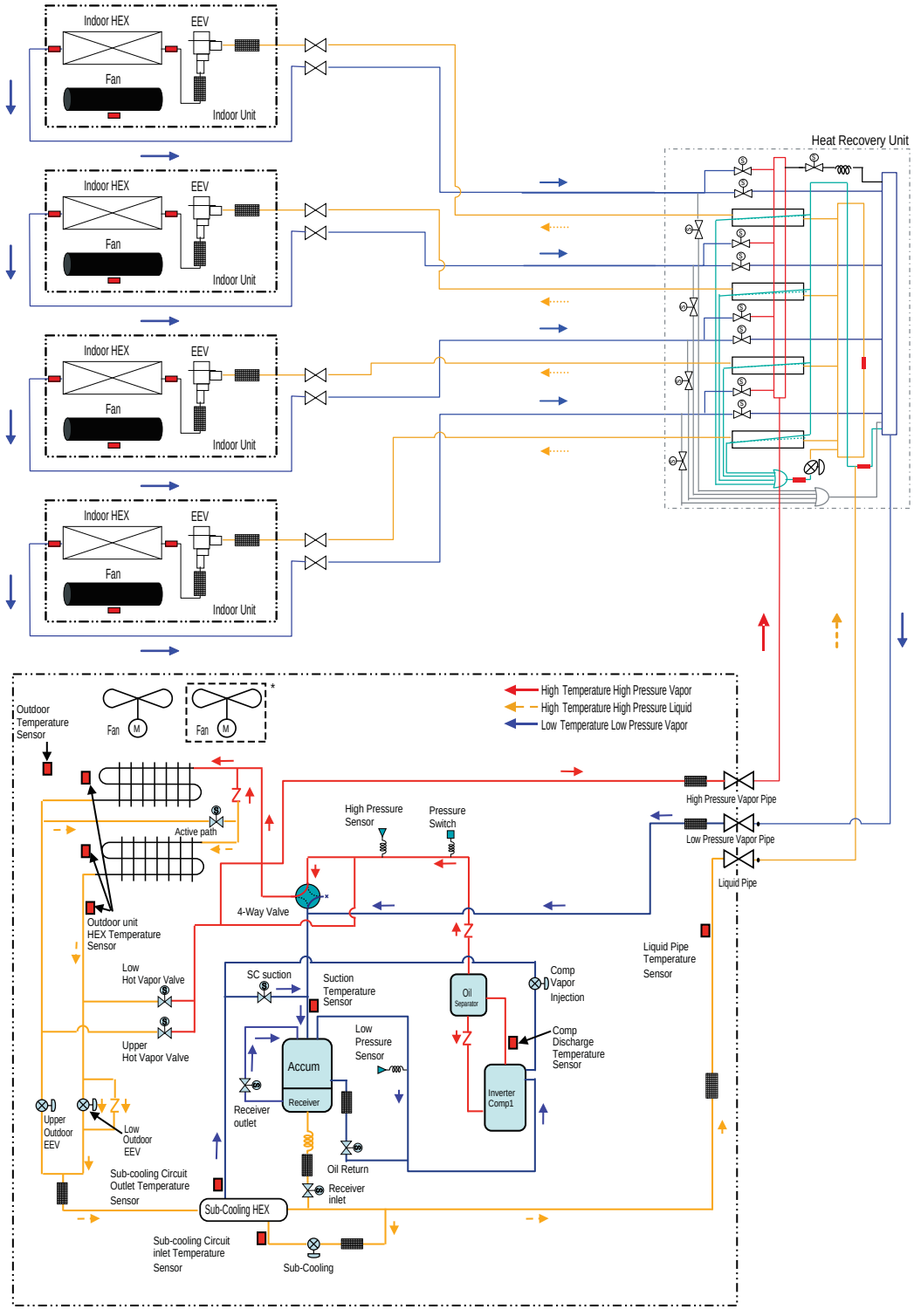


HEAT RECOVERY REFRIG. CIRCUIT

MULTI V IV

Cooling Mode

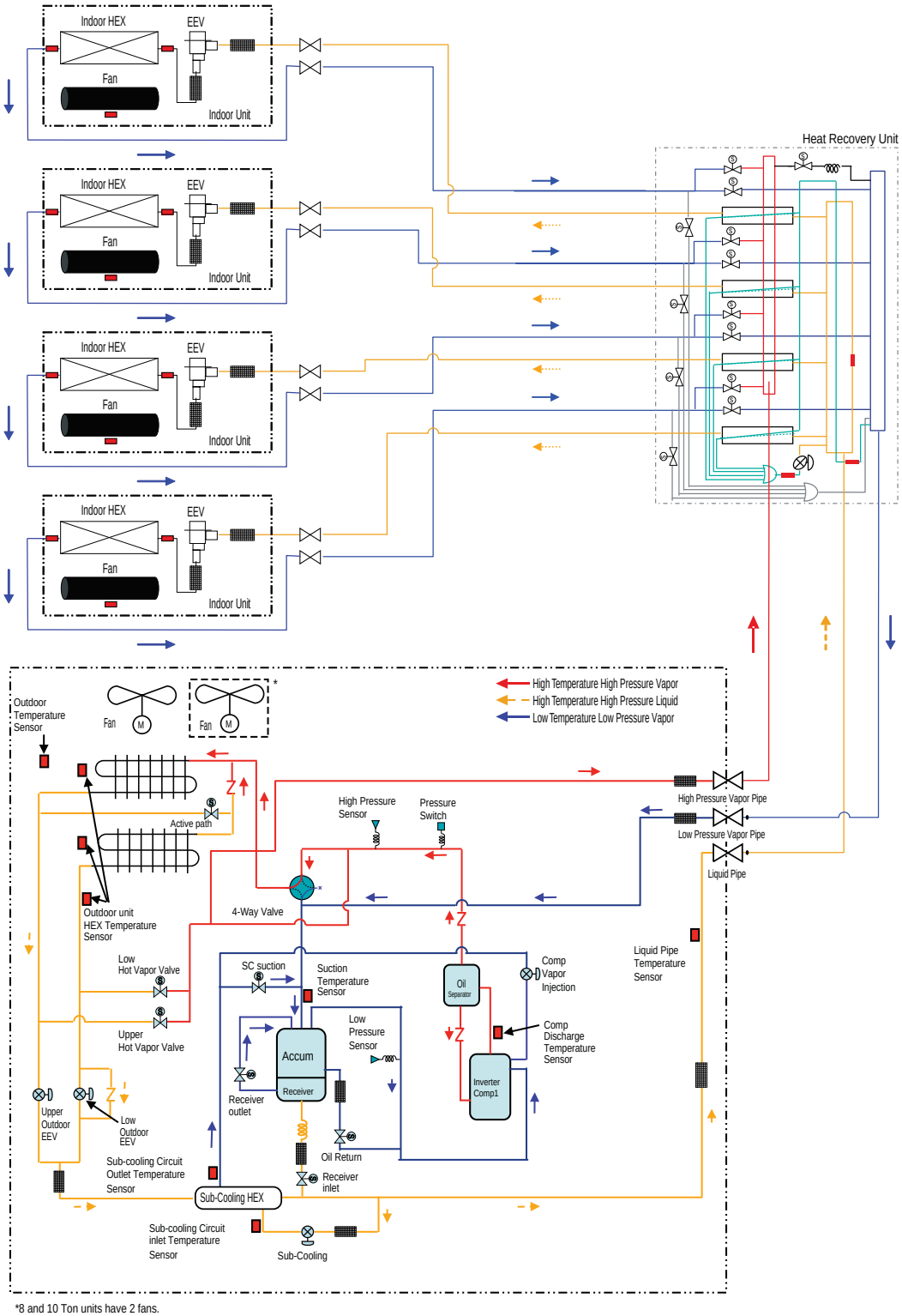
ARUB072BTE4 / 072DTE4, ARUB096BTE4 / 096DTE4, ARUB121BTE4 / 121DTE4



*8 and 10 Ton units have 2 fans.

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

LG



*8 and 10 Ton units have 2 fans.

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

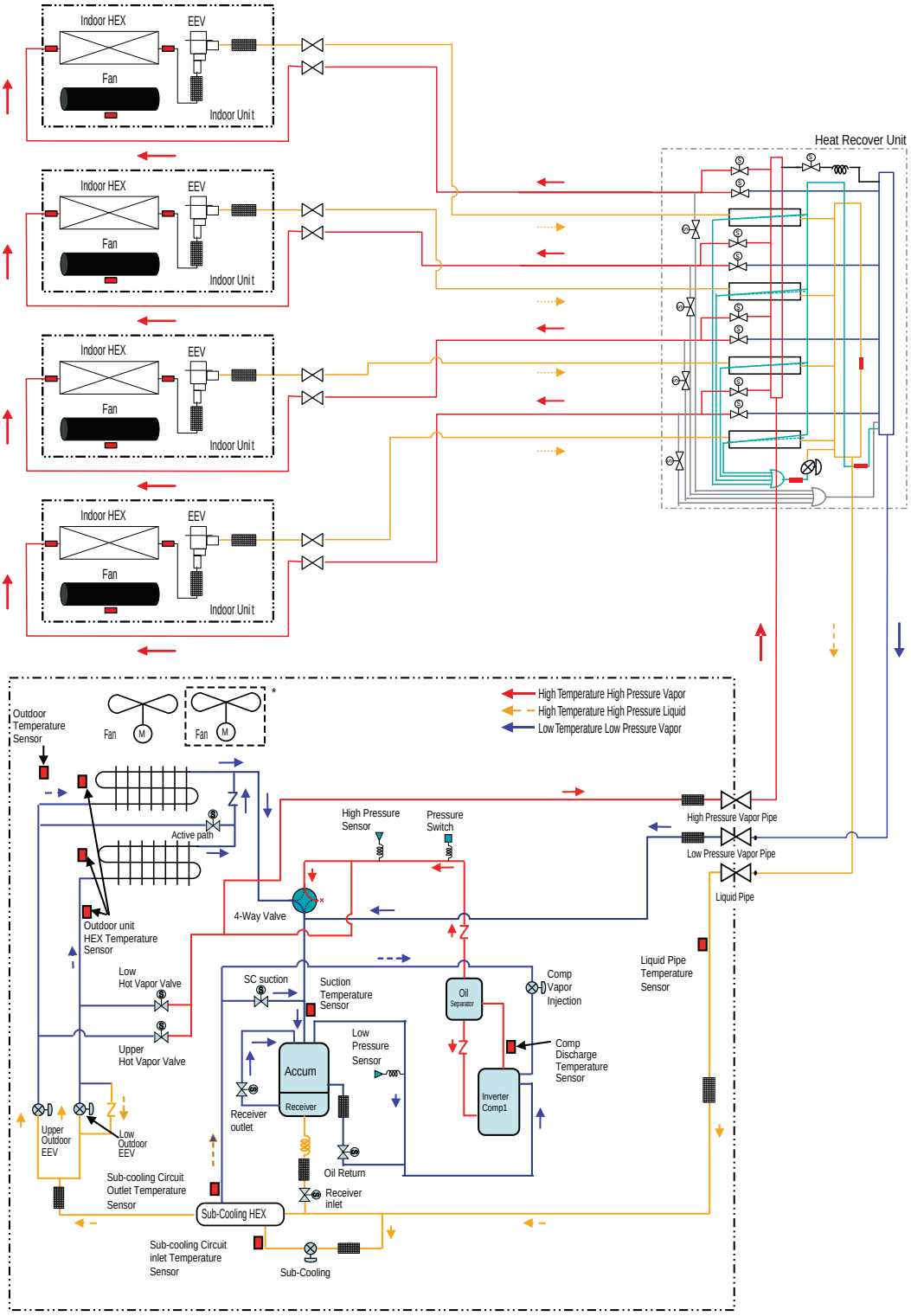
Product Data

HEAT RECOVERY REFRIG. CIRCUIT

MULTI V IV

Heating

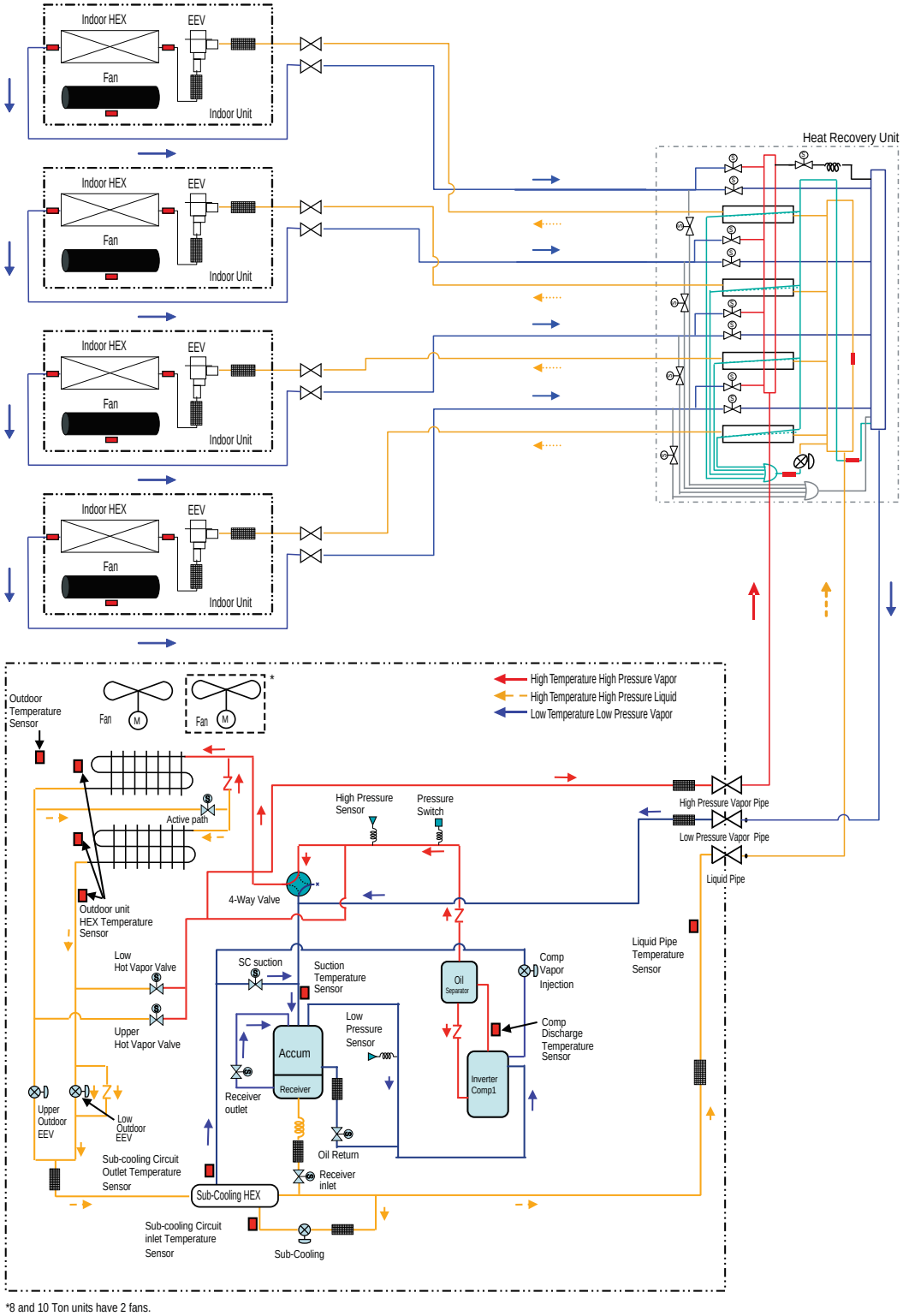
ARUB072BTE4 / 072DTE4, ARUB096BTE4 / 096DTE4, ARUB121BTE4 / 121DTE4



*8 and 10 Ton units have 2 fans.

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

LG



*8 and 10 Ton units have 2 fans.

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

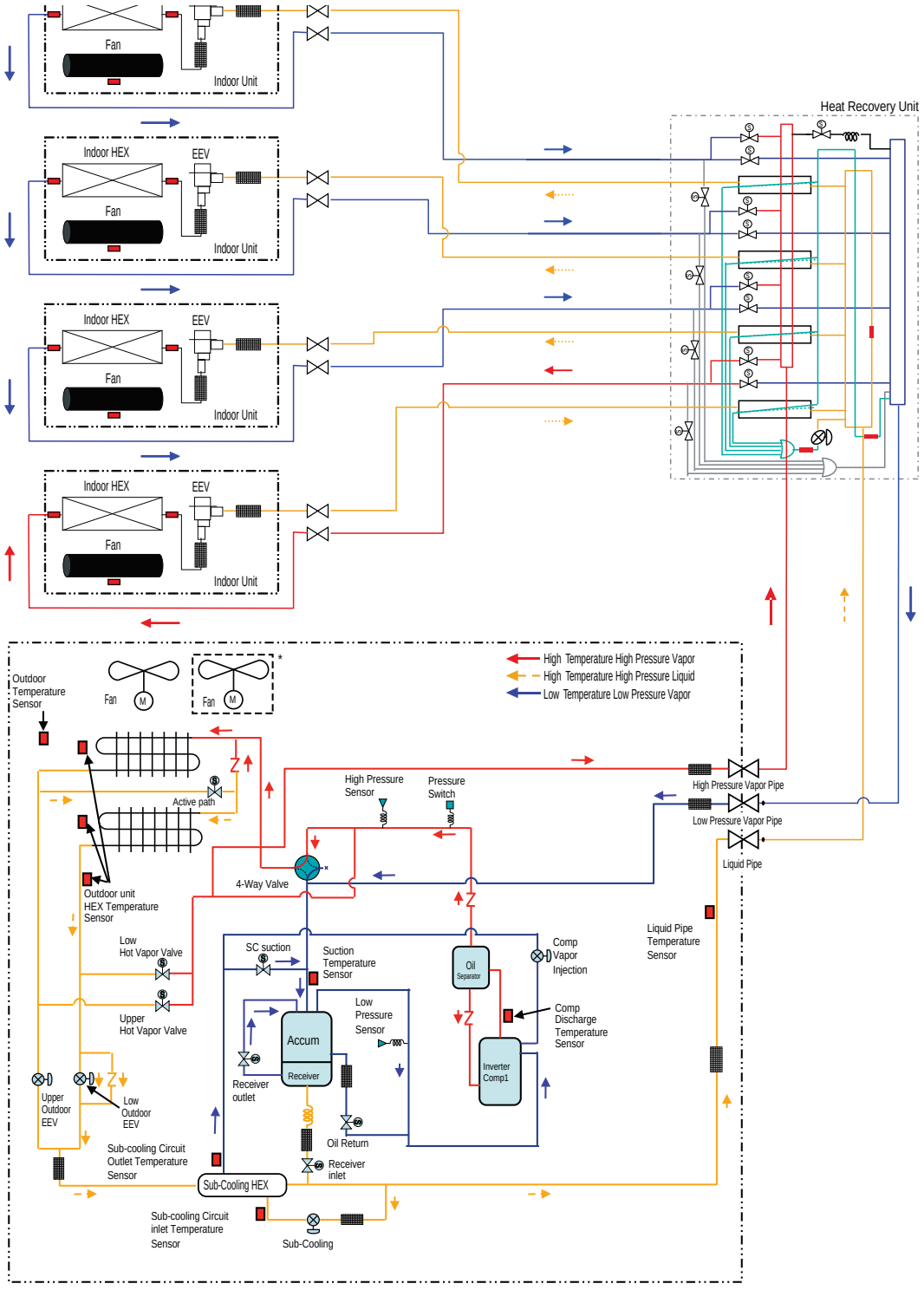
Product Data

HEAT RECOVERY REFRIG. CIRCUIT

MULTI V IV

Cooling-based Simultaneous Operation

ARUB072BTE4 / 072DTE4, ARUB096BTE4 / 096DTE4, ARUB121BTE4 / 121DTE4



Remarks

*8 and 10 Ton units have 2 fans.

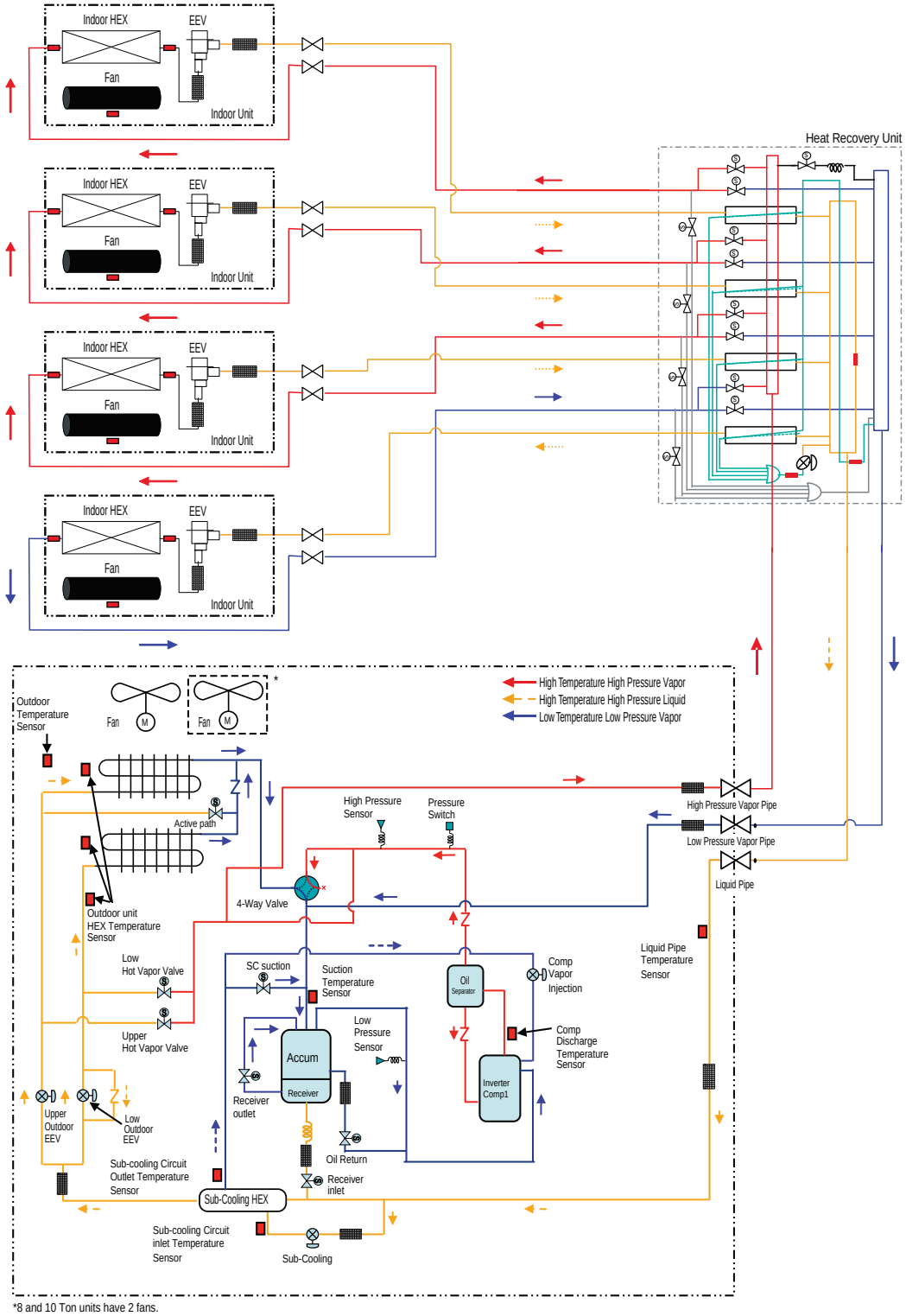
Pressure Sensor | Temperature Sensor | Check Valve | Solenoid

Pressure Switch | SVC Valve | EEV | Strainer Valve

LG

ARUB072BTE4 / 072DTE4, ARUB096BTE4 / 096DTE4,
ARUB121BTE4 / 121DTE4

Heating-based
Simultaneous Operation



*8 and 10 Ton units have 2 fans.

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

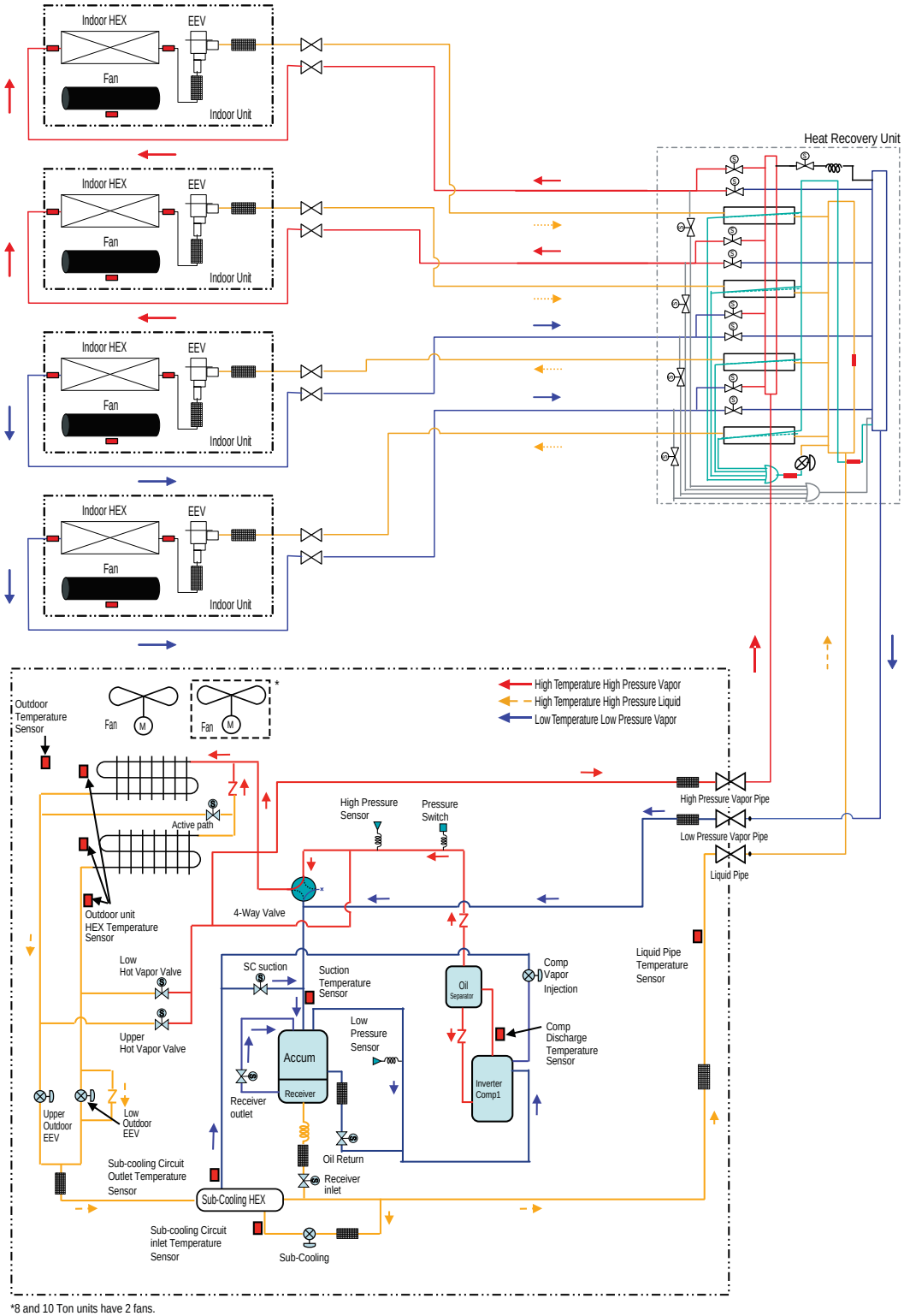
Product Data

HEAT RECOVERY REFRIG. CIRCUIT

MULTI V IV

Balanced Simultaneous Operation

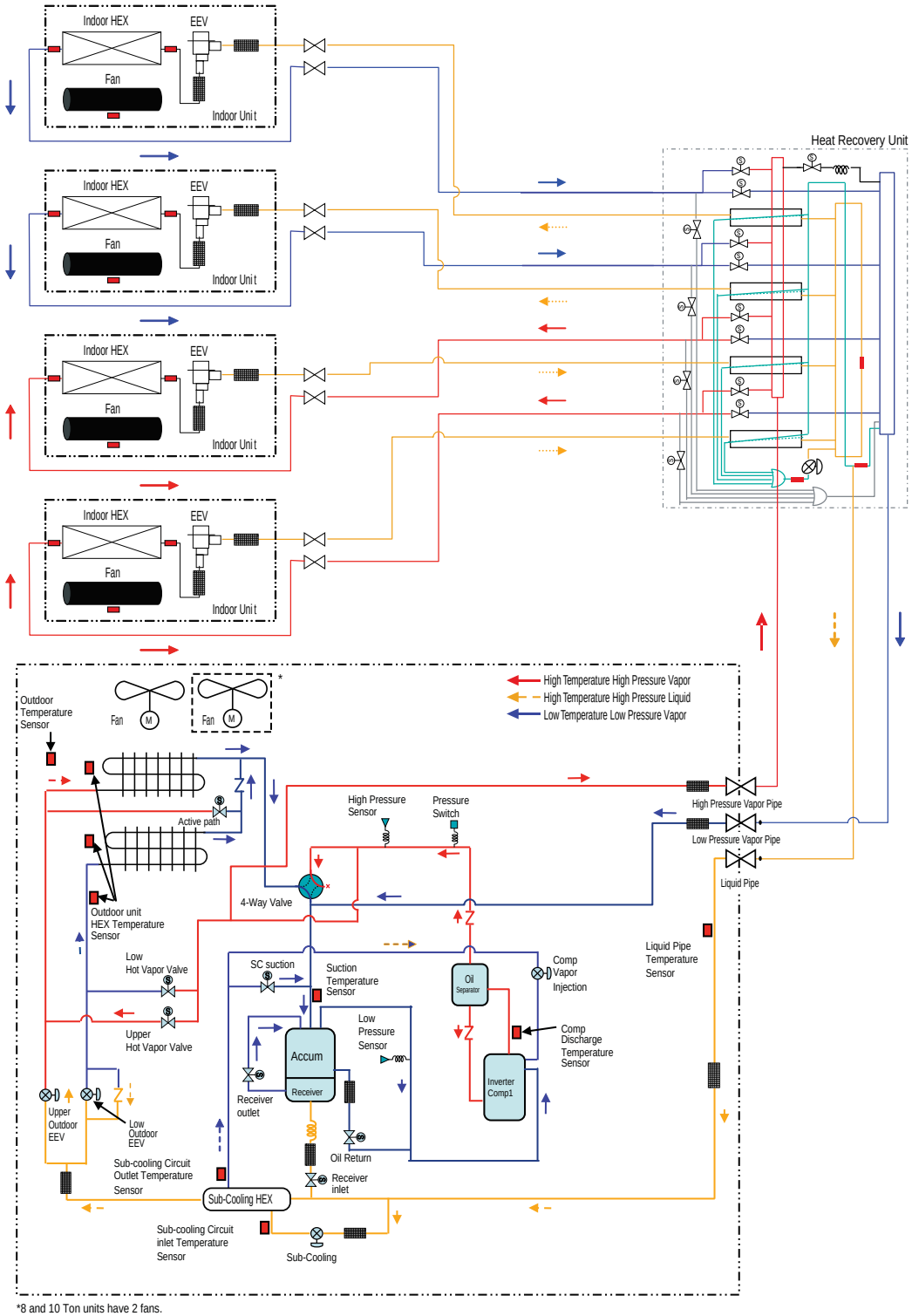
ARUB072BTE4 / 072DTE4, ARUB096BTE4 / 096DTE4, ARUB121BTE4 / 121DTE4



*8 and 10 Ton units have 2 fans.

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

LG



*8 and 10 Ton units have 2 fans.

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

Product Data

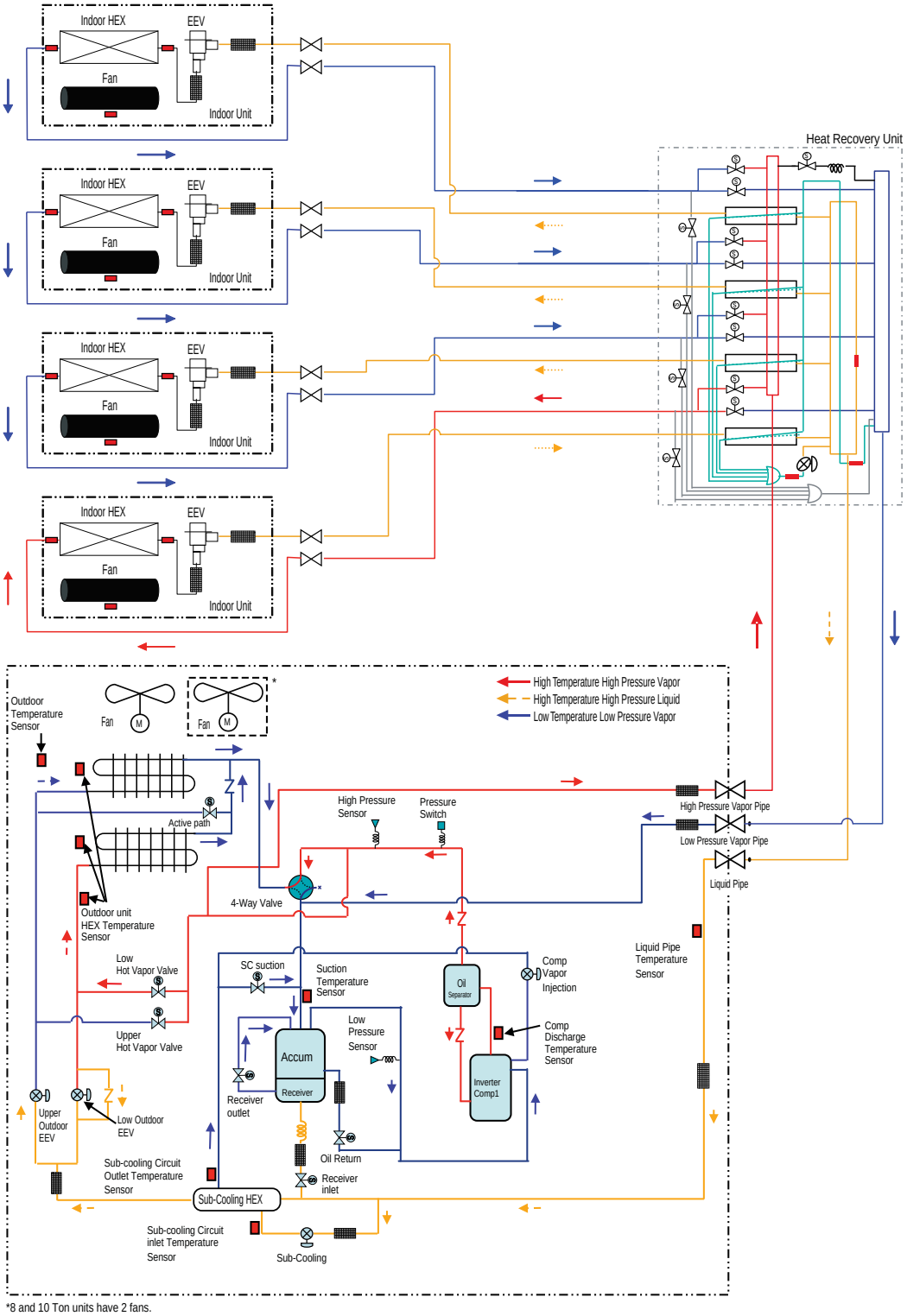
HEAT RECOVERY REFRIG. CIRCUIT

MULTI V IV

Lower HEX

Defrost Operation

ARUB072BTE4 / 072DTE4, ARUB096BTE4 / 096DTE4,
ARUB121BTE4 / 121DTE4



*8 and 10 Ton units have 2 fans.

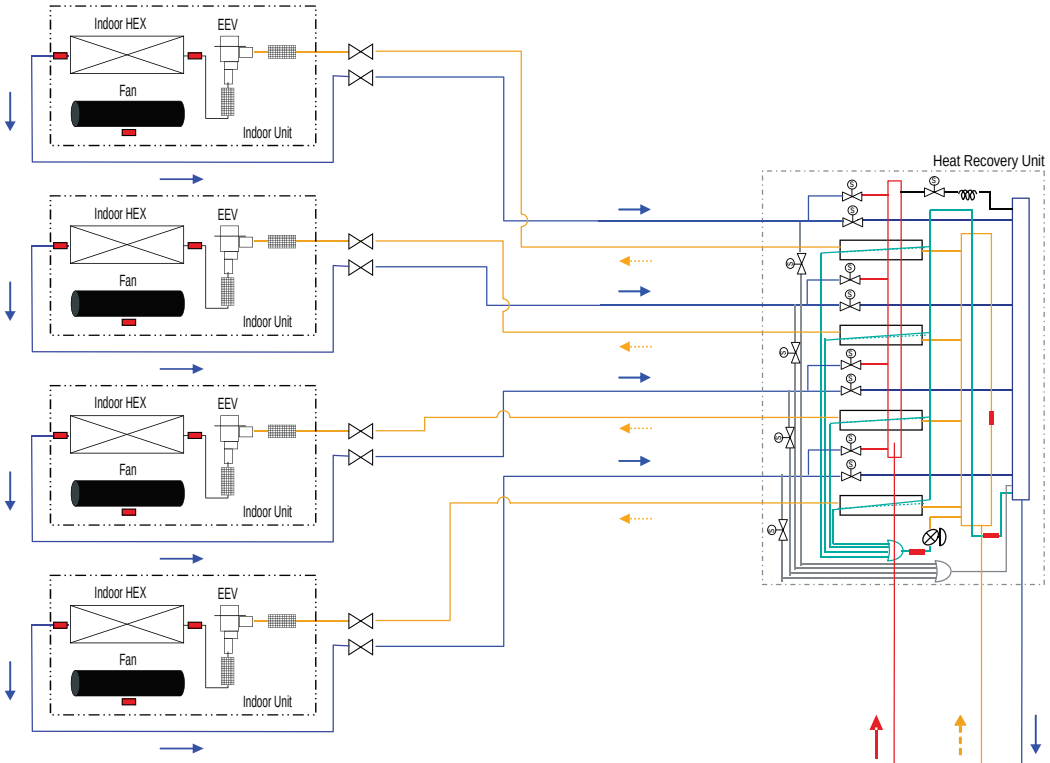
Remarks				
	Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
	Pressure Switch	SVC Valve	EEV	Strainer

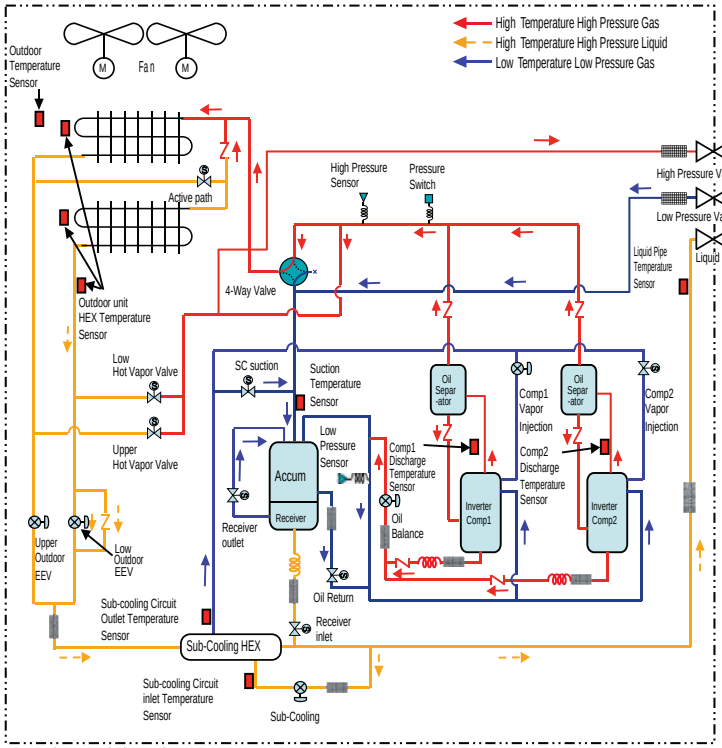
LG

HEAT RECOVERY REFRIG. CIRCUIT

ARUB144BTE4 / 144DTE4, ARUB145BTE4 / 145DTE4,
ARUB168BTE4 / 168DTE4, ARUB169BTE4 / 169DTE4

Cooling Mode





*8 ton and 10 ton units have 2 fans.
**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

Note:

ARUB145BTE4/145DTE4 and ARUB169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/144DTE4 and ARUB168BTE4/168DTE4 single frame models.

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

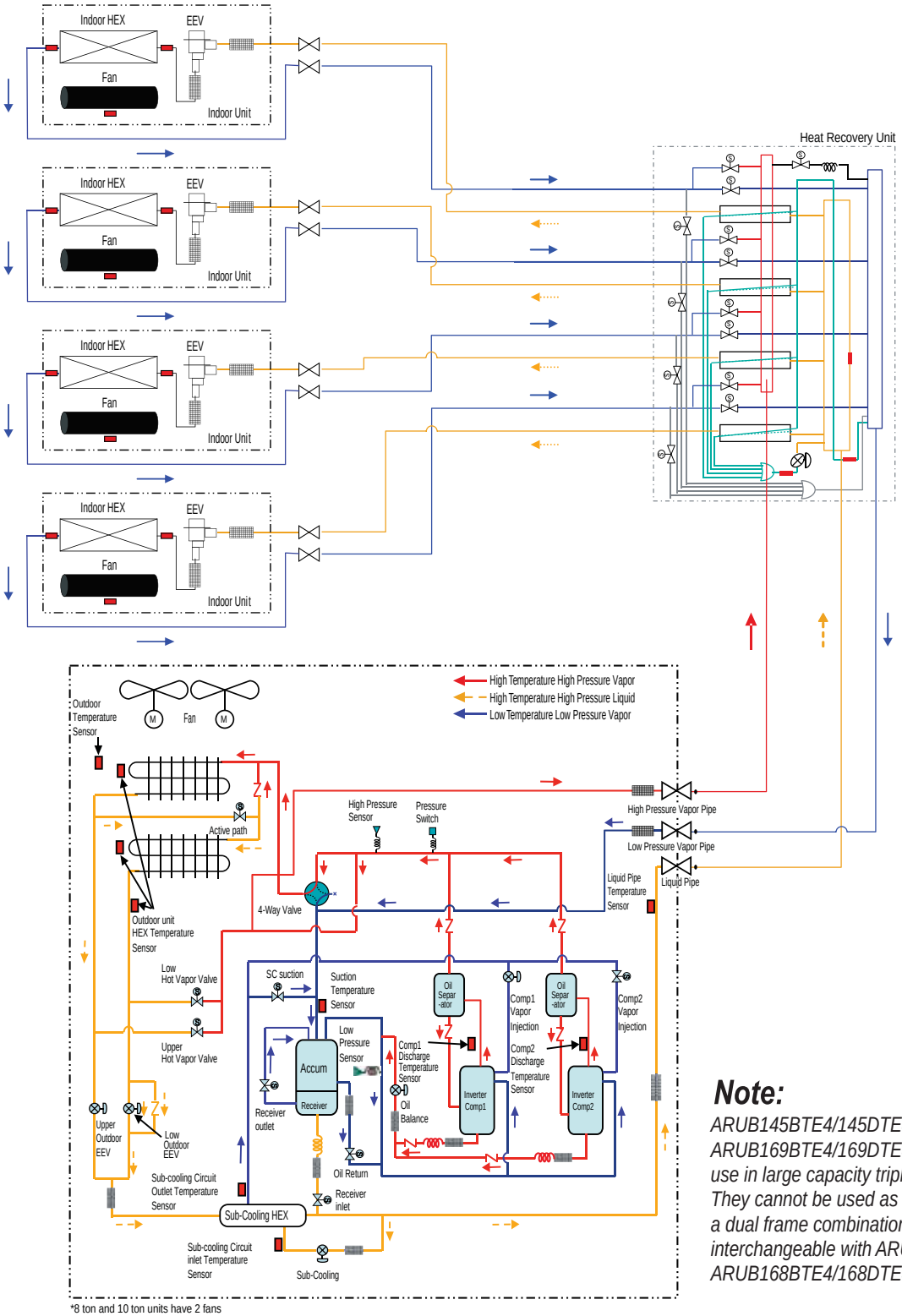
Product Data

HEAT RECOVERY REFRIG. CIRCUIT

MULTI V IV

Cooling at Low Ambient Temp.

ARUB144BTE4 / 144DTE4, ARUB145BTE4 / 145DTE4, ARUB168BTE4 / 168DTE4, ARUB169BTE4 / 169DTE4



*8 ton and 10 ton units have 2 fans

**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

Note:

ARUB145BTE4/145DTE4 and ARUB169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/144DTE4 and ARUB168BTE4/168DTE4 single frame models.

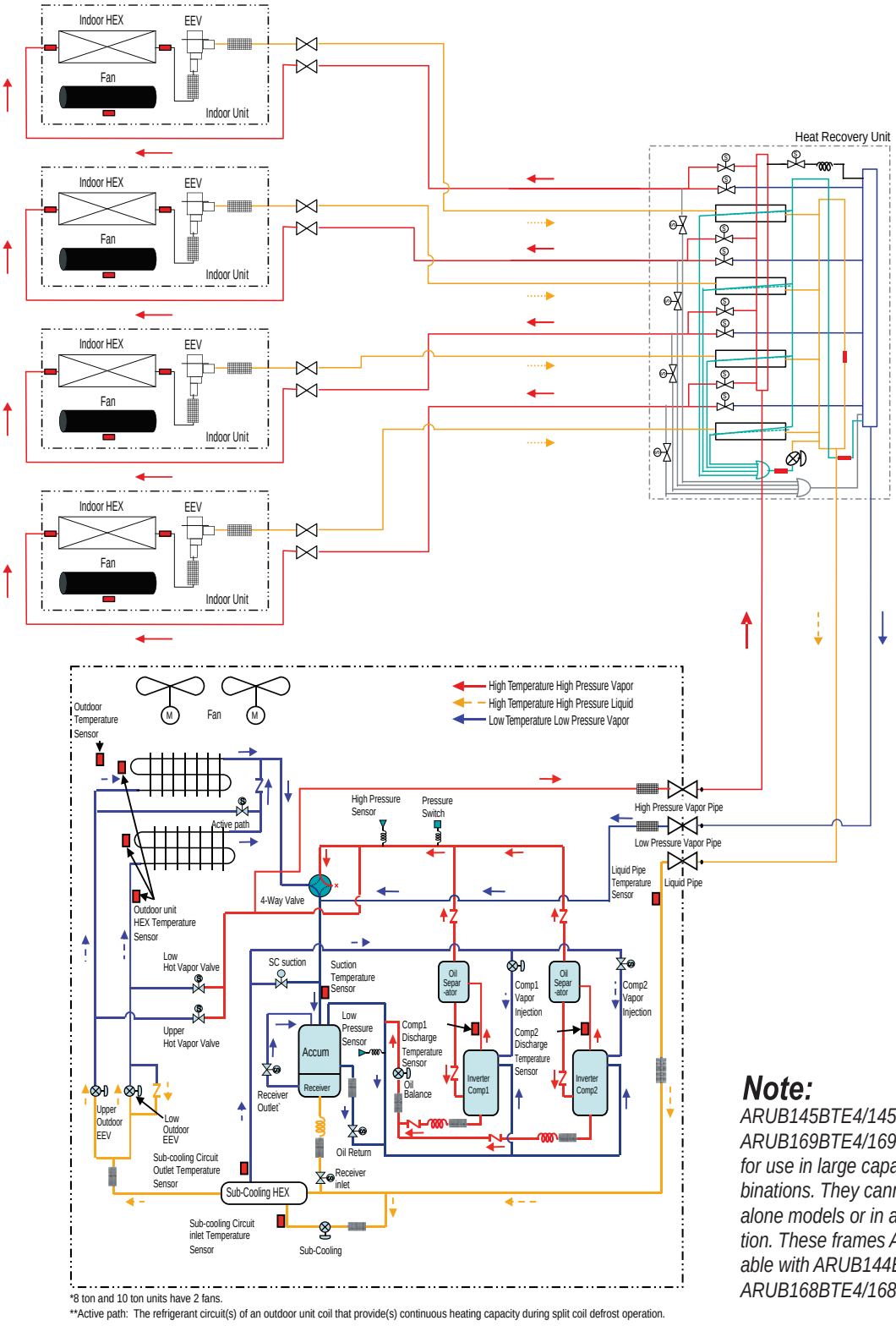
Remarks				
Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
Pressure Switch	SVC Valve	EEV	Strainer

LG

HEAT RECOVERY REFRIG. CIRCUIT

ARUB144BTE4 / 144DTE4, ARUB145BTE4 / 145DTE4,
ARUB168BTE4 / 168DTE4, ARUB169BTE4 / 169DTE4

Heating Mode



*8 ton and 10 ton units have 2 fans.

**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

Note:

ARUB145BTE4/145DTE4 and ARUB169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/144DTE4 and ARUB168BTE4/168DTE4 single frame models.

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

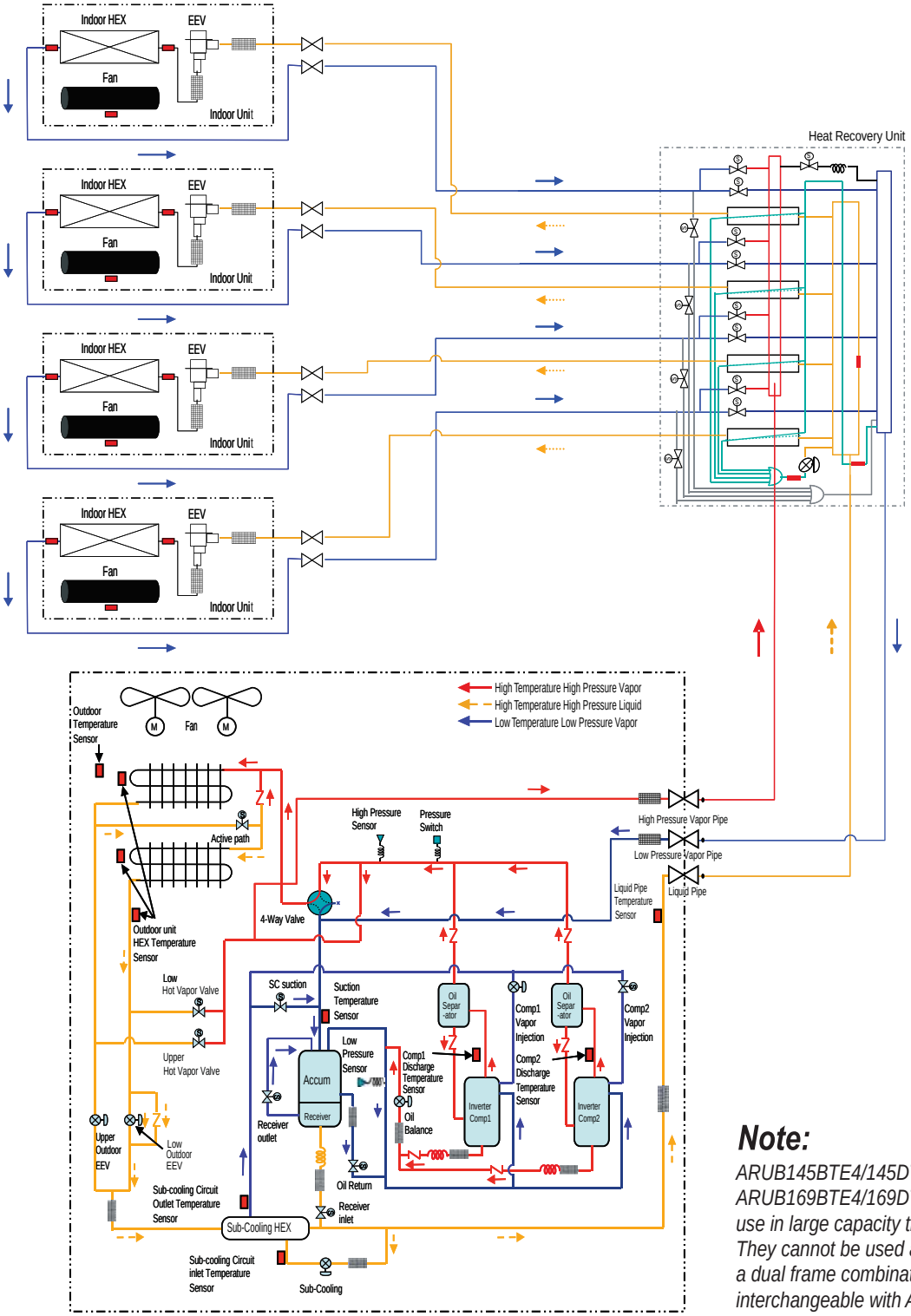
Product Data

HEAT RECOVERY REFRIG. CIRCUIT

MULTI V IV

Oil Return and Defrost Operation

ARUB144BTE4 / 144DTE4, ARUB145BTE4 / 145DTE4,
ARUB168BTE4 / 168DTE4, ARUB169BTE4 / 169DTE4



*8 ton and 10 ton units have 2 fans.
**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

Note:

ARUB145BTE4/145DTE4 and ARUB169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/144DTE4 and ARUB168BTE4/168DTE4 single frame models.

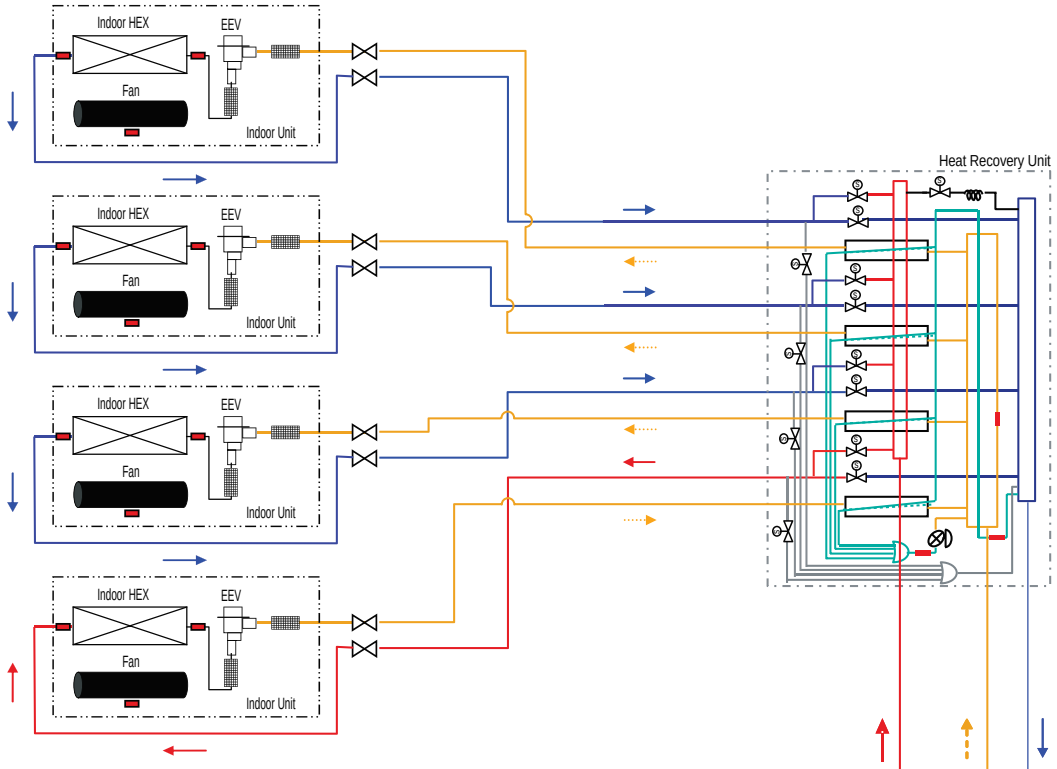
Remarks				
Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
Pressure Switch	SVC Valve	EEV	Strainer

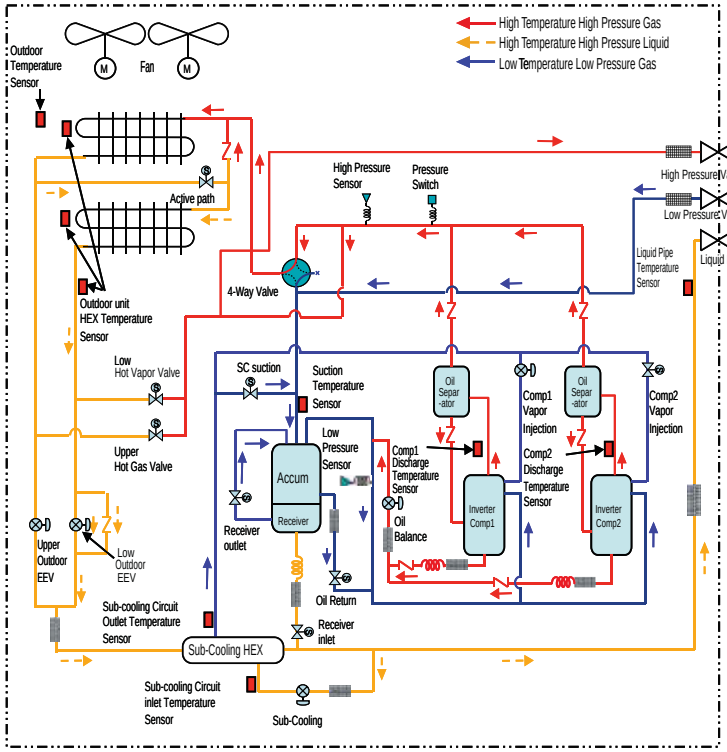
LG

HEAT RECOVERY REFRIG. CIRCUIT

ARUB144BTE4 / 144DTE4, ARUB145BTE4 / 145DTE4,
ARUB168BTE4 / 168DTE4, ARUB169BTE4 / 169DTE4

Cooling-based
Simultaneous Operation





*8 ton and 10 ton units have 2 fans.
**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

Note:

ARUB145BTE4/145DTE4 and ARUB169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/144DTE4 and ARUB168BTE4/168DTE4 single frame models.

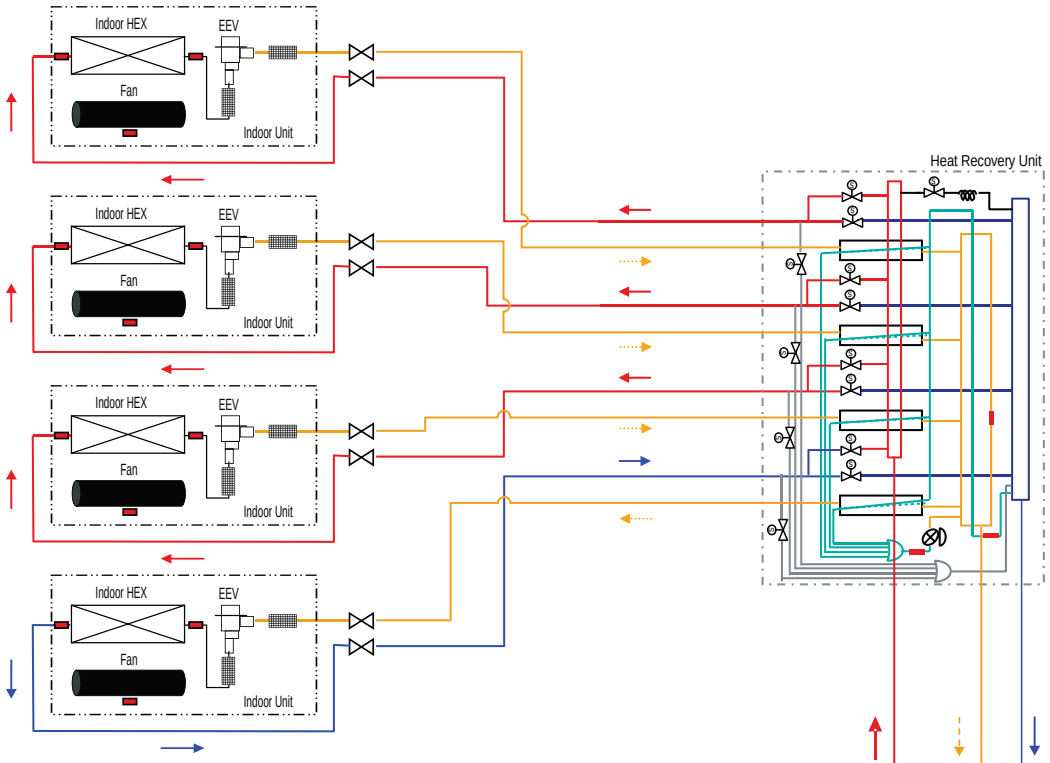
Remarks				
Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
Pressure Switch	SVC Valve	EEV	Strainer

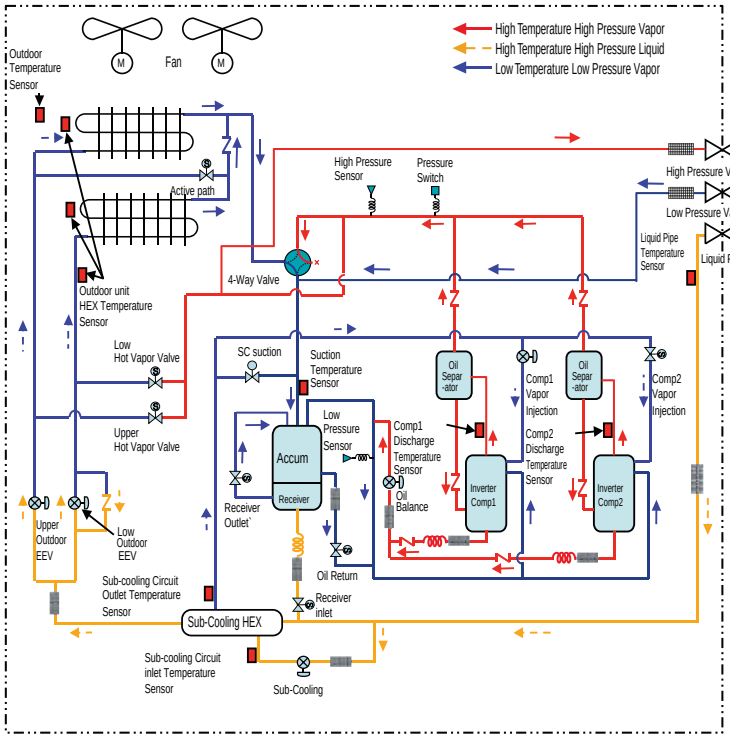
HEAT RECOVERY REFRIG. CIRCUIT

MULTI V IV

Heating-based Simultaneous Operation

ARUB144BTE4 / 144DTE4, ARUB145BTE4 / 145DTE4, ARUB168BTE4 / 168DTE4, ARUB169BTE4 / 169DTE4





*8 ton and 10 ton units have 2 fans.
**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

Note:

ARUB145BTE4/145DTE4 and ARUB169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/144DTE4 and ARUB168BTE4/168DTE4 single frame models.

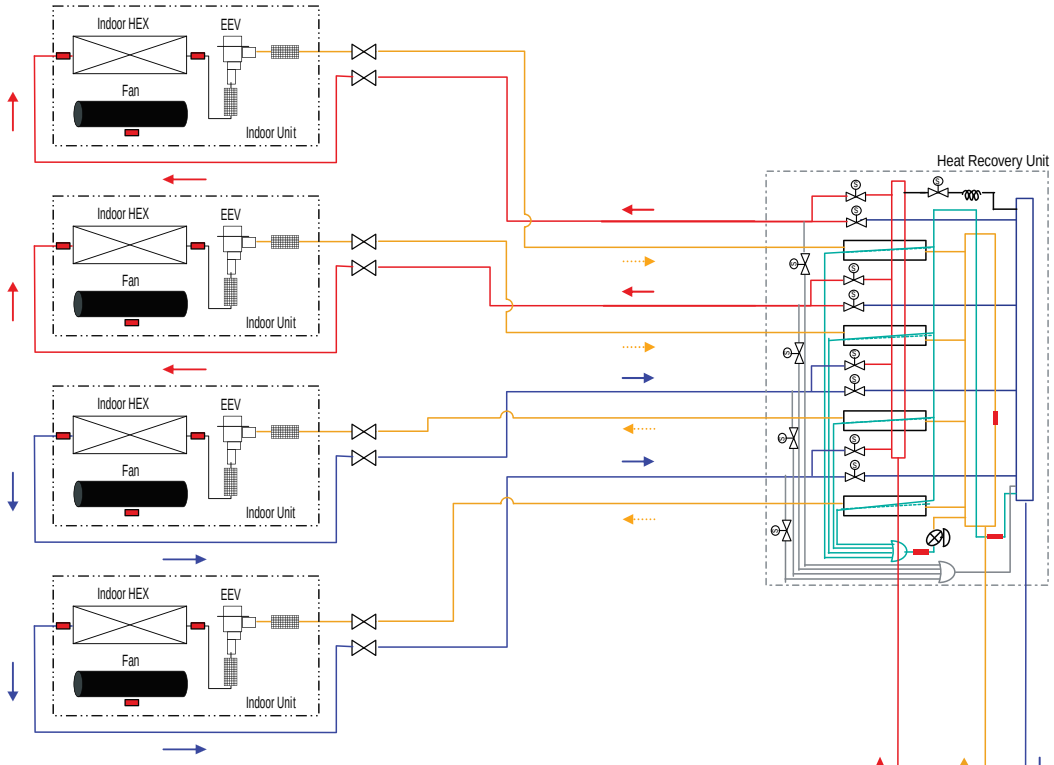
Remarks				
Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
Pressure Switch	SVC Valve	EEV	Strainer

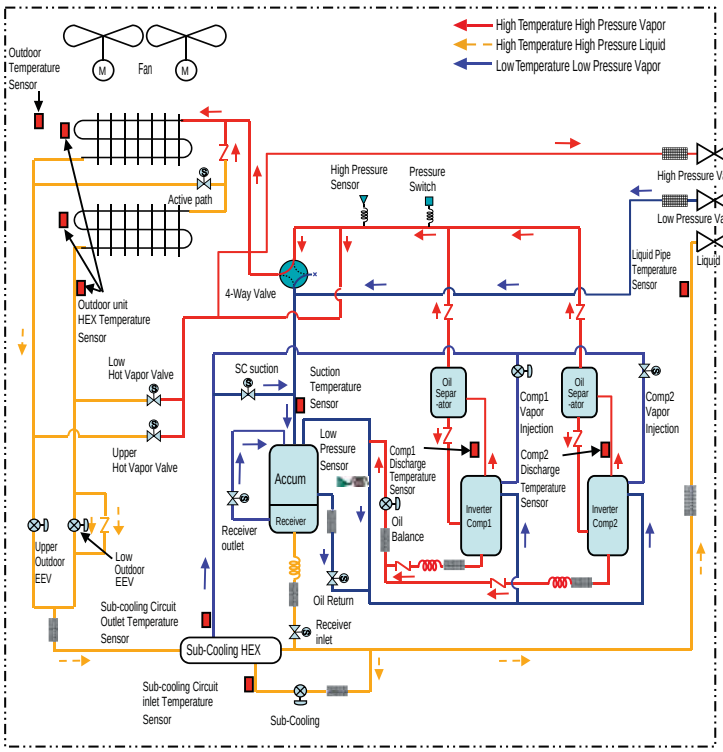
LG

HEAT RECOVERY REFRIG. CIRCUIT

ARUB144BTE4 / 144DTE4, ARUB145BTE4 / 145DTE4,
ARUB168BTE4 / 168DTE4, ARUB169BTE4 / 169DTE4

Balanced
Simultaneous Operation





*8 ton and 10 ton units have 2 fans.
**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

Note:

ARUB145BTE4/145DTE4 and ARUB169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/144DTE4 and ARUB168BTE4/168DTE4 single frame models.

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

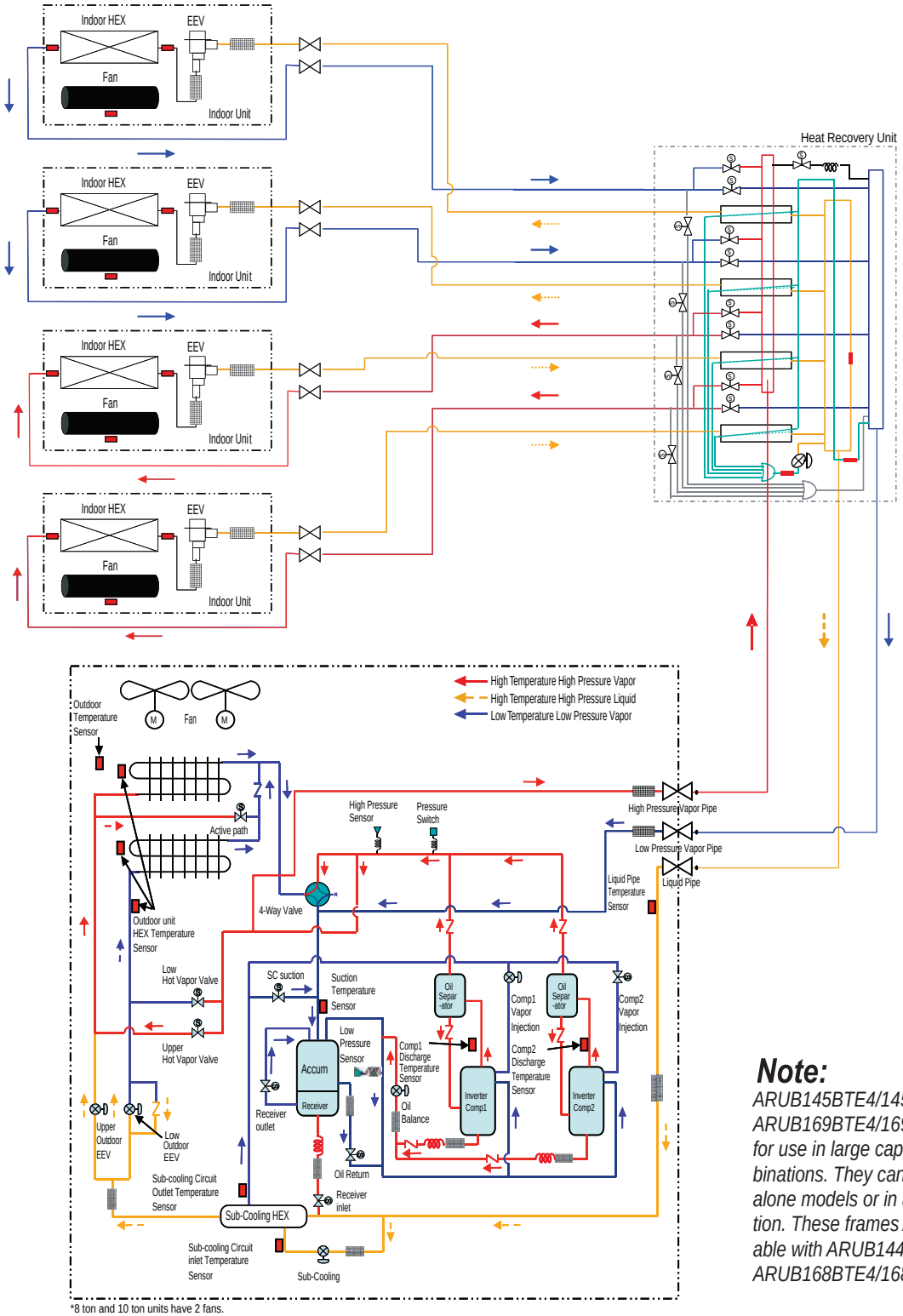
HEAT RECOVERY REFRIG. CIRCUIT

MULTI V IV

Upper HEX

Defrost Operation

ARUB144BTE4 / 144DTE4, ARUB145BTE4 / 145DTE4,
ARUB168BTE4 / 168DTE4, ARUB169BTE4 / 169DTE4



*8 ton and 10 ton units have 2 fans.

**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

Note:

ARUB145BTE4/145DTE4 and ARUB169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/144DTE4 and ARUB168BTE4/168DTE4 single frame models.

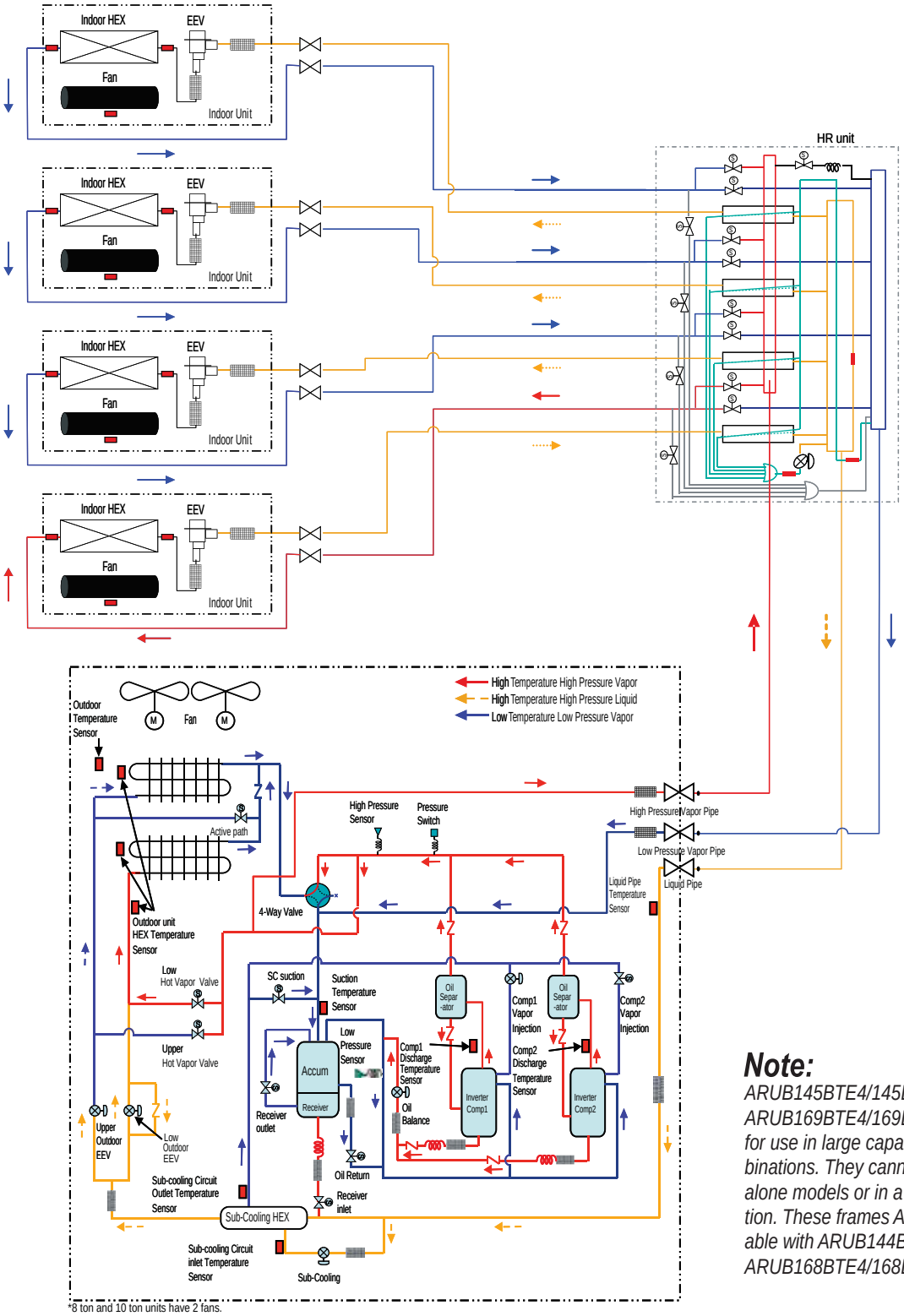
Remarks				
Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
Pressure Switch	SVC Valve	EEV	Strainer

LG

HEAT RECOVERY REFRIG. CIRCUIT

ARUB144BTE4 / 144DTE4, ARUB145BTE4 / 145DTE4,
ARUB168BTE4 / 168DTE4, ARUB169BTE4 / 169DTE4

Lower HEX
Defrost Operation



*8 ton and 10 ton units have 2 fans.
**Active path: The refrigerant circuit(s) of an outdoor unit coil that provide(s) continuous heating capacity during split coil defrost operation.

Note:

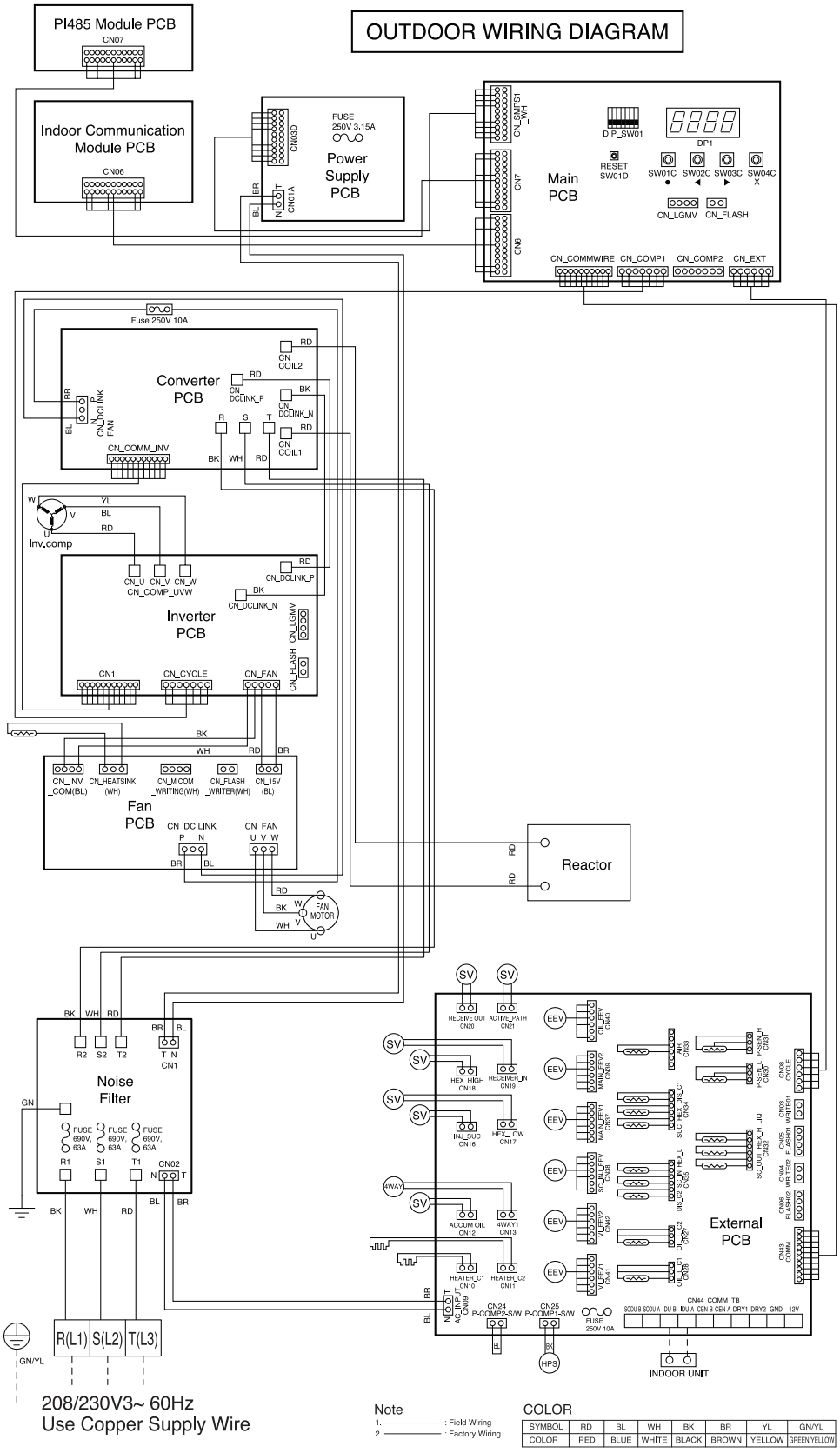
ARUB145BTE4/145DTE4 and ARUB169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/144DTE4 and ARUB168BTE4/168DTE4 single frame models.

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

HEAT RECOVERY WIRING DIAGRAMS

MULTI V IV

ARUB072BTE4 208-230V



COLOR

SYMBOL	RD	BL	WH	BK	BR	YL	GN/YL
COLOR	RED	BLUE	WHITE	BLACK	BROWN	YELLOW	GREEN/YELLOW

◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN07	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THEMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTRONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTRONIC EXPANSION VALVE 1
CN39	SUB-COOLING ELECTRONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTRONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

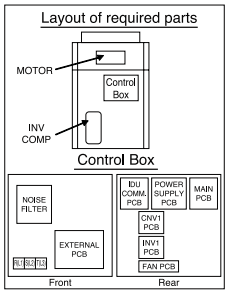
◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

SYMBOL	DESCRIPTION
CN1	AC POWER 220V
CN_DCLINK	AC POWER 220V FOR EXTERNAL PCB

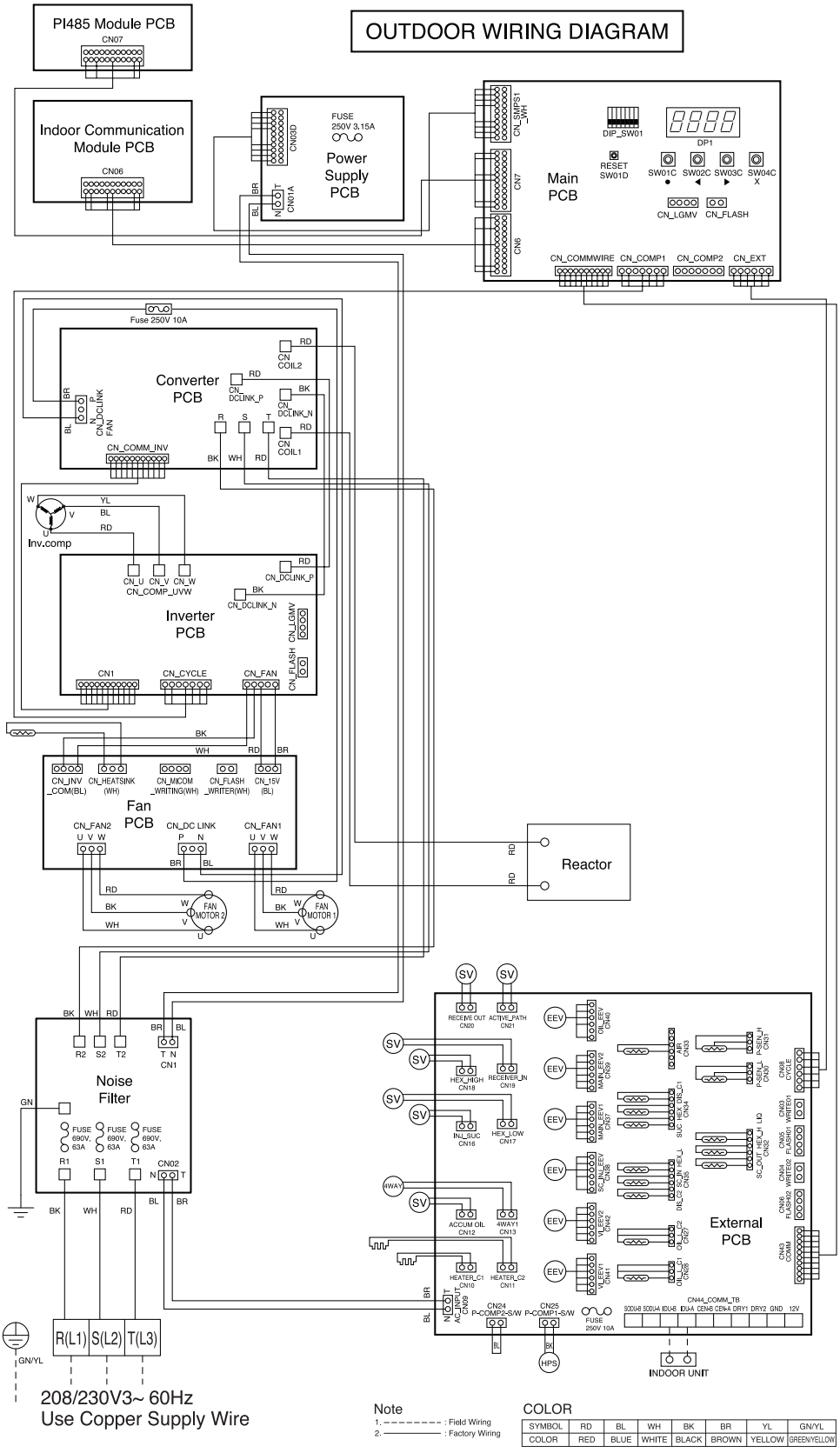
Layout of required parts



LG

HEAT RECOVERY WIRING DIAGRAMS

ARUB096BTE4, ARUB121BTE4 208-230V



◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN07	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THEMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTRONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTRONIC EXPANSION VALVE
CN39	MAIN ELECTRONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTRONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

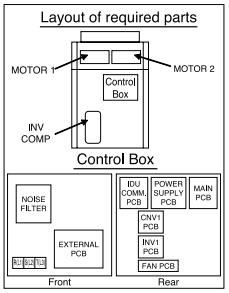
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

SYMBOL	DESCRIPTION
CN1	AC POWER 220V
CN_DCLINK	AC POWER 220V FOR EXTERNAL PCB



Note
1. ---------- : Field Wiring
2. ———— : Factory Wiring

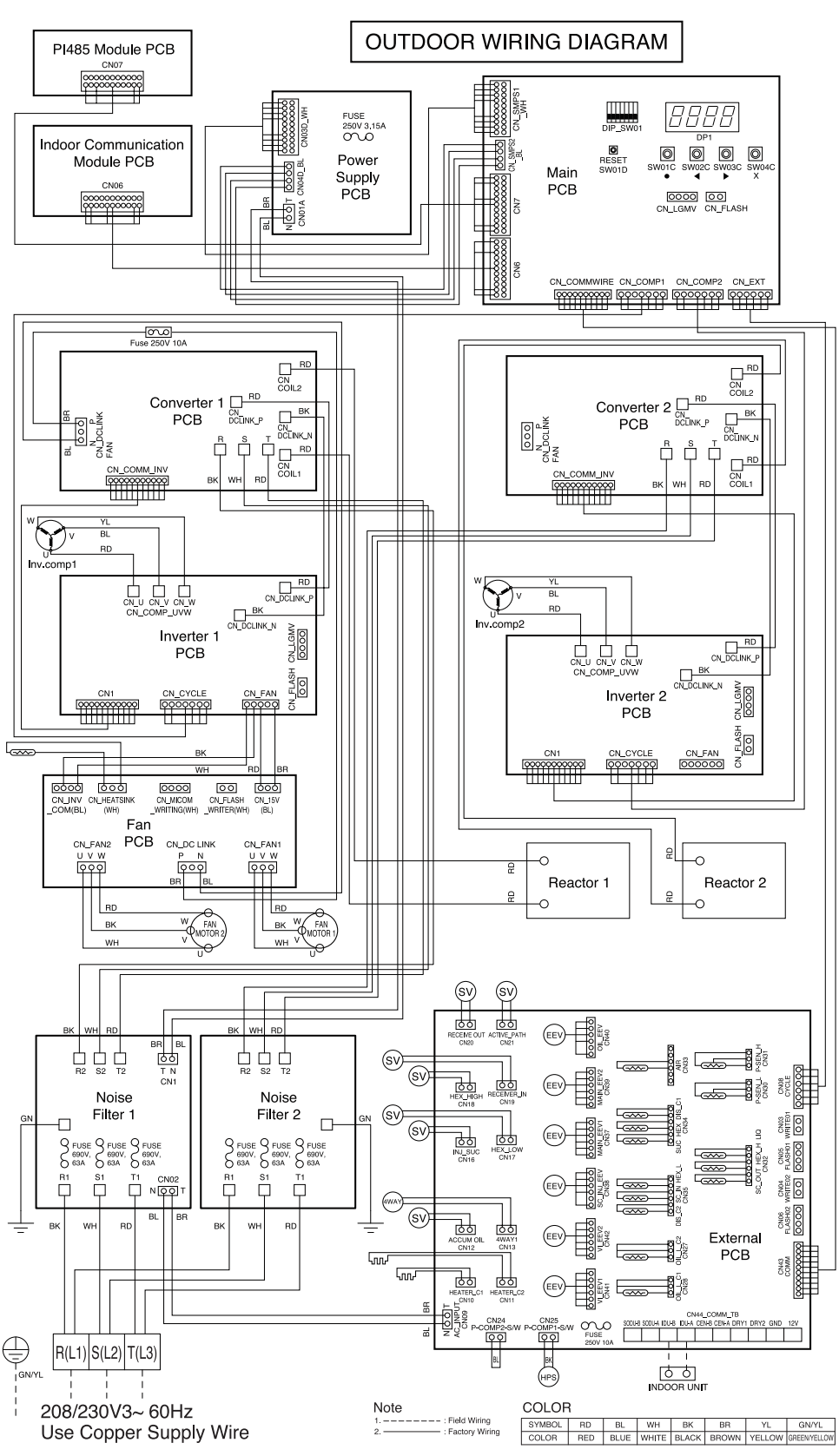
COLOR

SYMBOL	RD	BL	WH	BK	BR	YL	GN/YL
COLOR	RED	BLUE	WHITE	BLACK	BROWN	YELLOW	GREEN/YELLOW

HEAT RECOVERY WIRING DIAGRAMS

MULTI V IV

ARUB144BTE4, ARUB168BTE4 208-230V



◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN07	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THEMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTRONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTRONIC EXPANSION VALVE
CN39	MAIN ELECTRONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTRONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS1 _WH	POWER MODULE PCB COMMUNICATION TERMINAL
CN_SMPS2 _BL	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

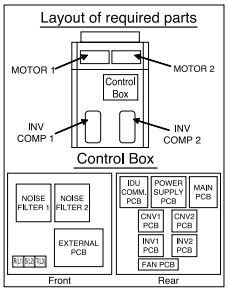
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U.V.W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

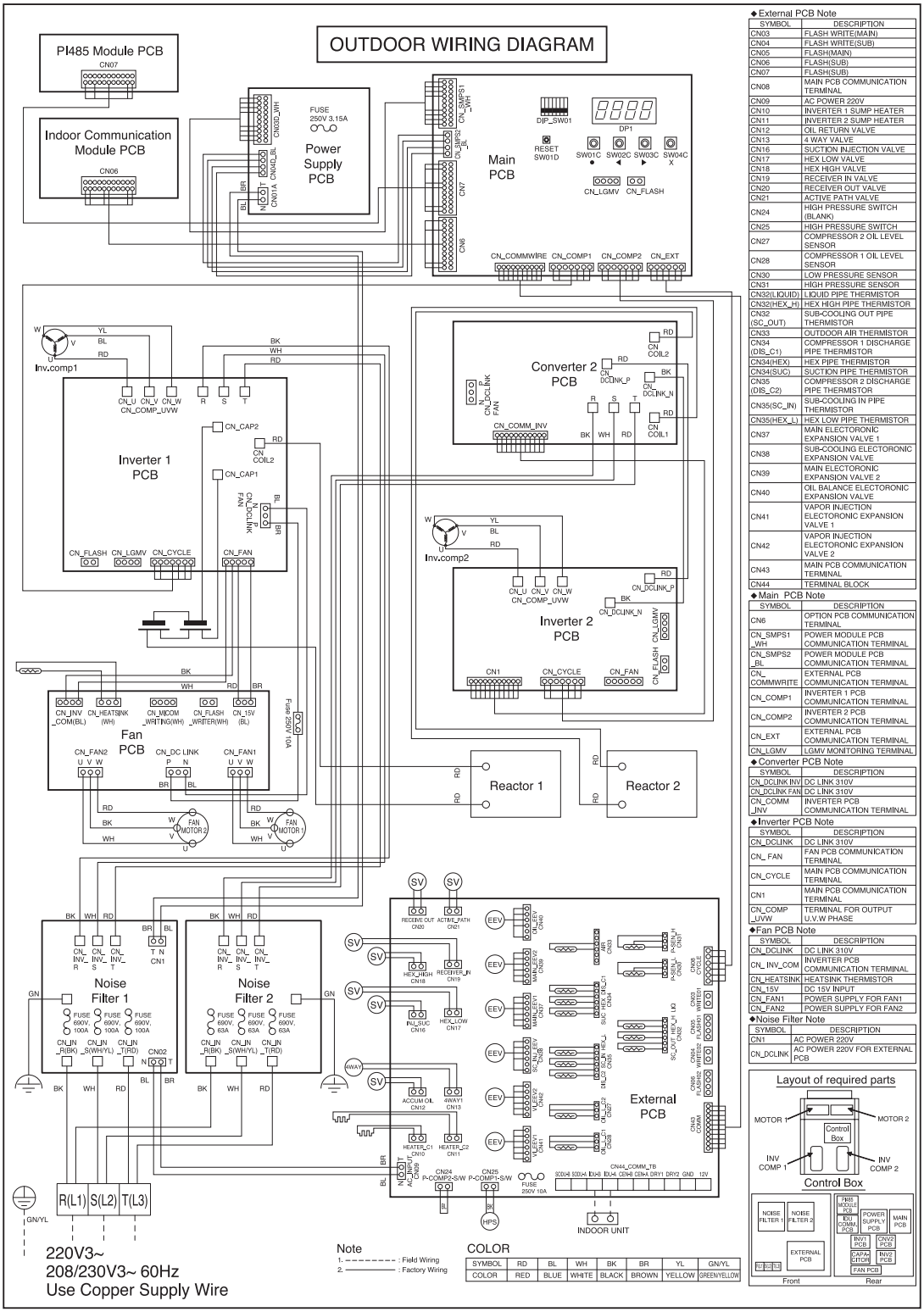
SYMBOL	DESCRIPTION
CN1	AC POWER 220V
CN_DCLINK	AC POWER 220V FOR EXTERNAL PCB



LG

HEAT RECOVERY WIRING DIAGRAMS

ARUB145BTE4, ARUB169BTE4, 208-230V



◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN07	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_HI)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THERMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUBCOOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTORONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTORONIC EXPANSION VALVE
CN39	MAIN ELECTORONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTORONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTORONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTORONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS1 _WH	POWER MODULE PCB COMMUNICATION TERMINAL
CN_SMPS2 _BL	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U.V.W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise Filter Note

SYMBOL	DESCRIPTION
CN1	AC POWER 220V
CN_DCLINK	AC POWER 220V FOR EXTERNAL PCB

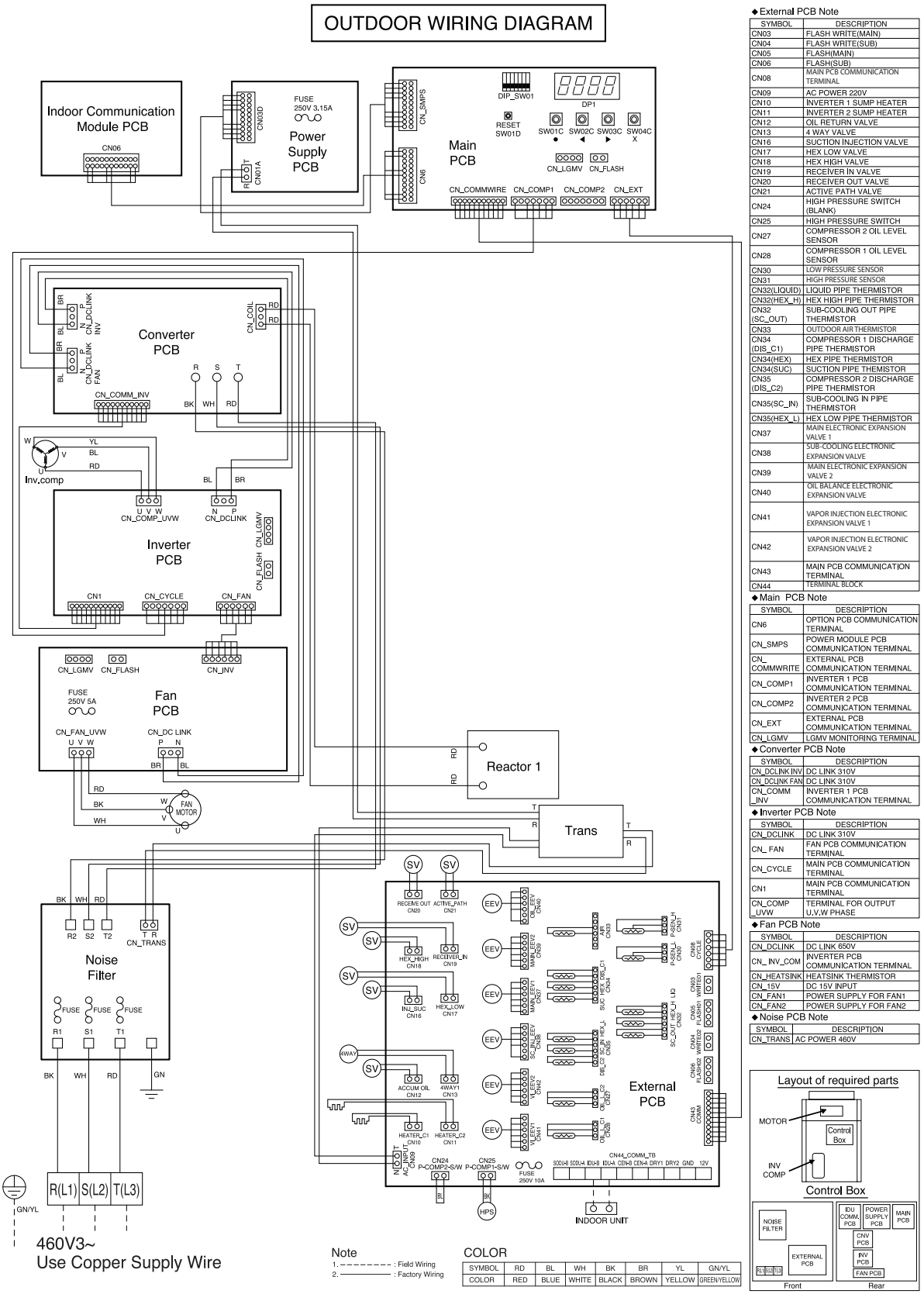
Note:

ARUB145BTE4/ARUB145DTE4 and ARUB169BTE4/ARUB169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/ ARUB144DTE4 and ARUB168BTE4/ARUB168DTE4 single frame models.

HEAT RECOVERY WIRING DIAGRAMS

MULTI V IV

ARUB072DTE4 460V



◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THEMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTRONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTRONIC EXPANSION VALVE
CN39	MAIN ELECTRONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTRONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 650V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

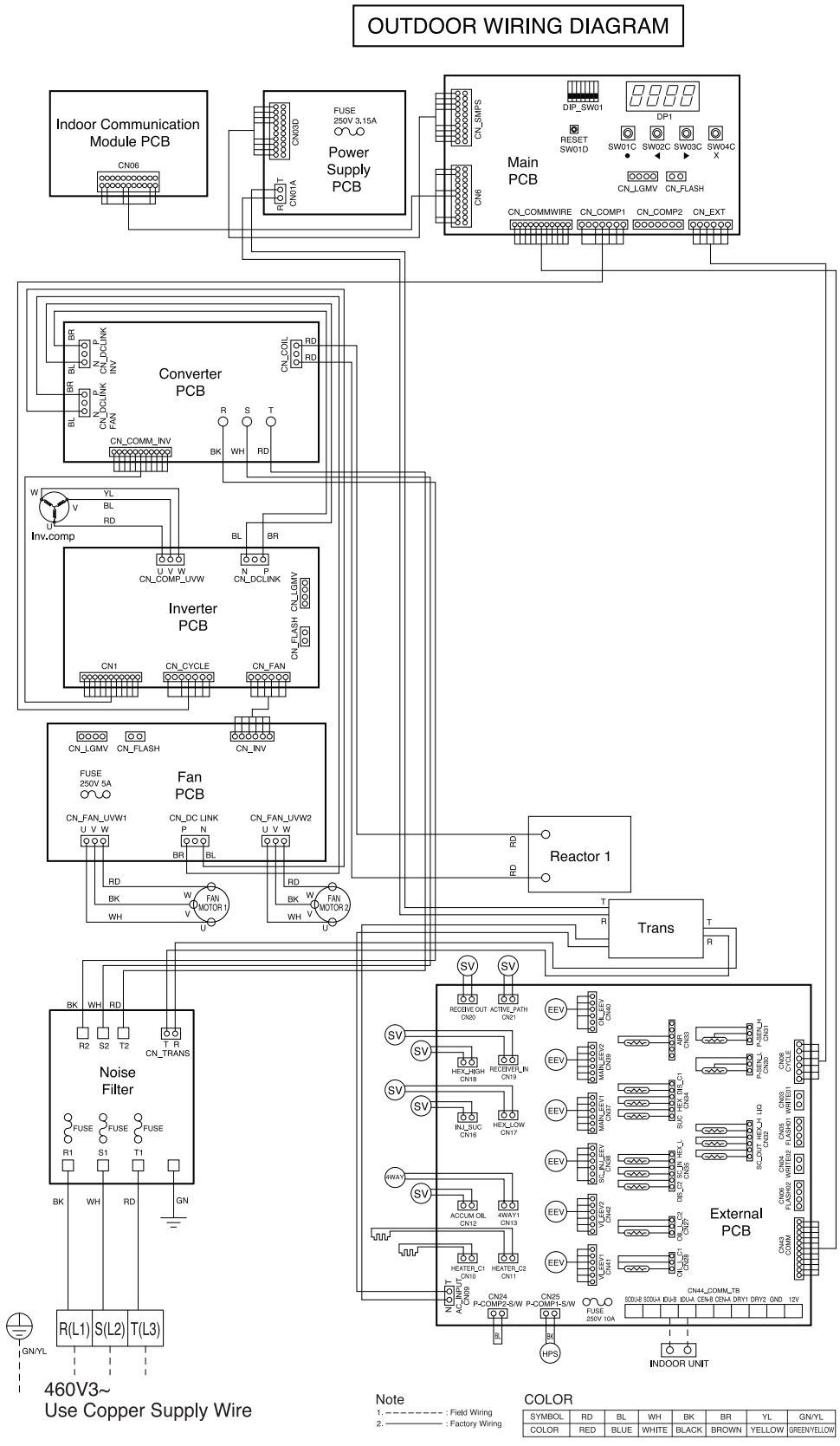
◆Noise PCB Note

SYMBOL	DESCRIPTION
CN_TRANS	AC POWER 460V

LG

HEAT RECOVERY WIRING DIAGRAMS

ARUB096DTE4, ARUB121DTE4 460V



Note
1. ---------- : Field Wiring
2. ———— : Factory Wiring

COLOR

SYMBOL	RD	BL	WH	BK	BR	YL	GN/YL
COLOR	RED	BLUE	WHITE	BLACK	BROWN	YELLOW	GREEN/YELLOW

◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THEMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTRONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTRONIC EXPANSION VALVE
CN39	MAIN ELECTRONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTRONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK 310V
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

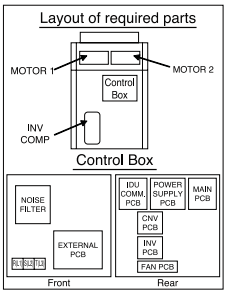
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 650V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

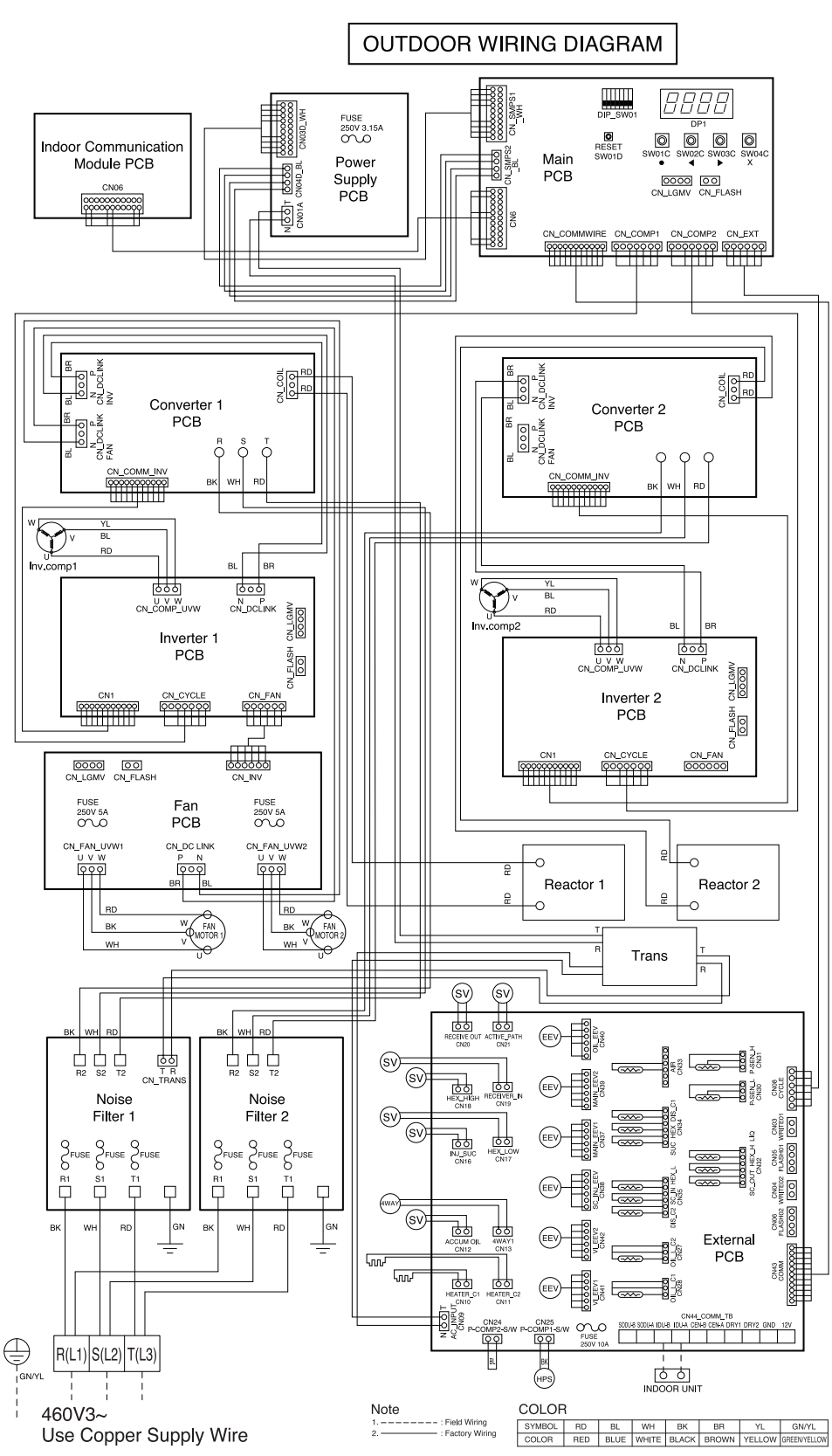
SYMBOL	DESCRIPTION
CN_TRANS	AC POWER 460V



HEAT RECOVERY WIRING DIAGRAMS

MULTI V IV

ARUB144DTE4, ARUB168DTE4 460V



Note
1. ---------- : Field Wiring
2. ———— : Factory Wiring

COLOR

SYMBOL	RD	BL	WH	BK	BR	YL	GN/YL
COLOR	RED	BLUE	WHITE	BLACK	BROWN	YELLOW	GREEN/YELLOW

◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN08	MAIN PCB COMMUNICATION TERMINAL
CN09	AC POWER 220V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THERMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THEMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTRONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTRONIC EXPANSION VALVE
CN39	MAIN ELECTRONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTRONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTRONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS1 _WH	POWER MODULE PCB COMMUNICATION TERMINAL
CN_SMPS2 _BL	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 310V
CN_DCLINK FAN	DC LINK
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

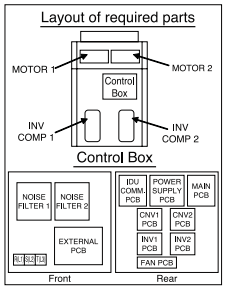
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 650V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

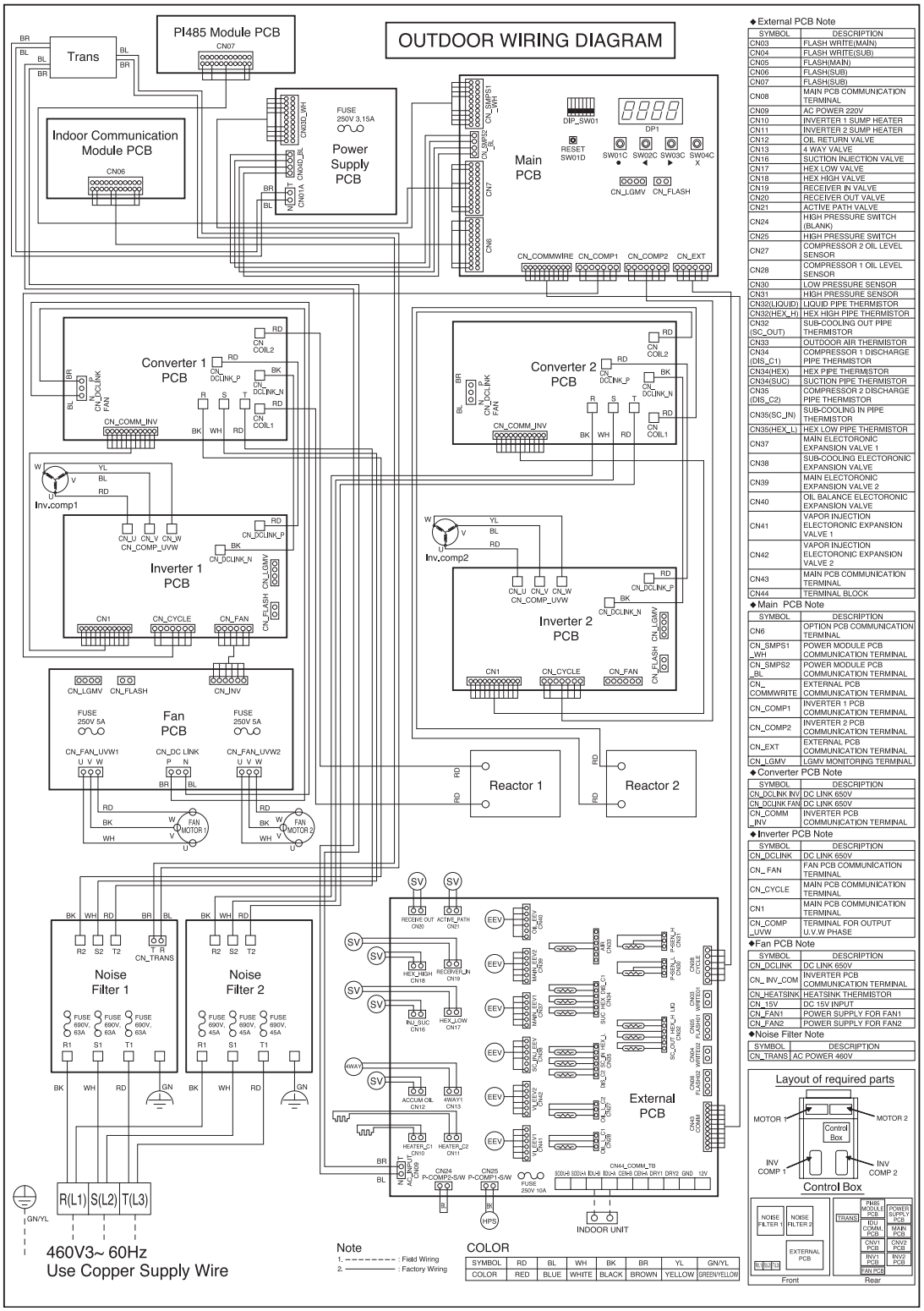
◆Noise PCB Note

SYMBOL	DESCRIPTION
CN_TRANS	AC POWER 460V



HEAT RECOVERY WIRING DIAGRAMS

ARUB145DTE4, ARUB169DTE4 460V



Note:

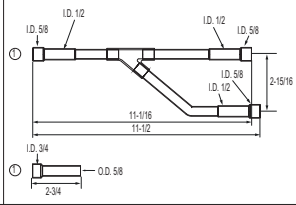
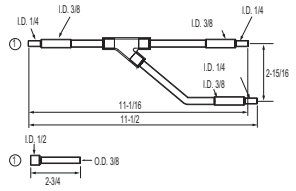
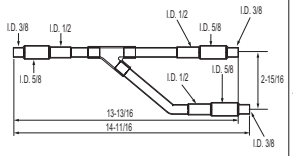
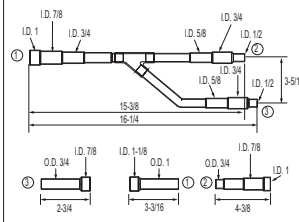
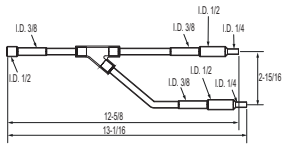
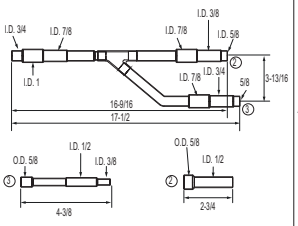
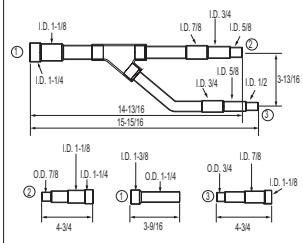
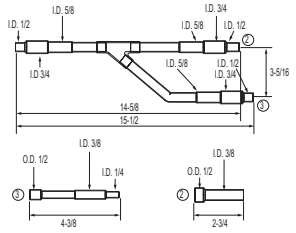
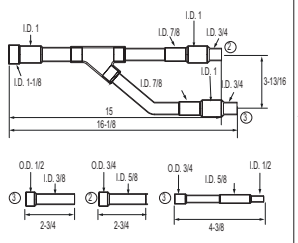
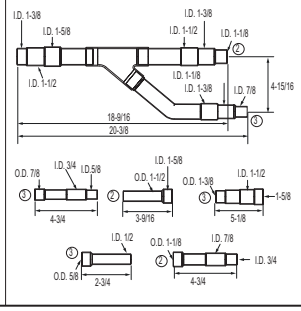
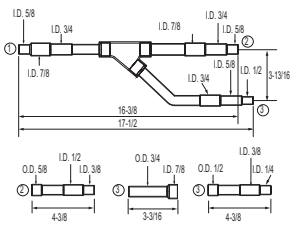
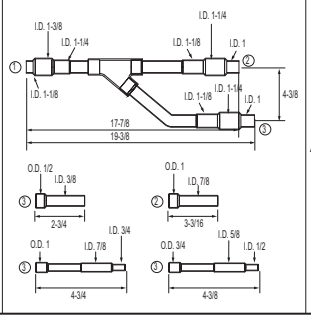
ARUB145BTE4/ARUB145DTE4 and ARUB169BTE4/ARUB169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/ ARUB144DTE4 and ARUB168BTE4/ARUB168DTE4 single frame models.

Table 26: Heat Recovery Accessories.

Required Accessories	Model No.		
Y-branches (for indoor unit connection)	ARBLB01621		ARBLB07121
	ARBLB03321		ARBLB14521
Headers (for indoor unit connection)	Four (4) branch	Seven (7) branch	Ten (10) branch
	ARBL054	ARBL057	ARBL1010
	ARBL104	ARBL107	ARBL2010
Heat Recovery Units	For two (2) indoor units	For three (3) indoor units	For four (4) indoor units
	PRHR021A	PRHR031A	PRHR041A
Multi-frame Connectors (for outdoor unit connection)	Use to Combine Two Frames		Use to Combine Three Frames
	ARCNB21		ARCNB21
			ARCNB31

Y-branches (for indoor unit connection)

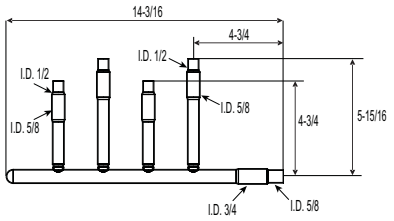
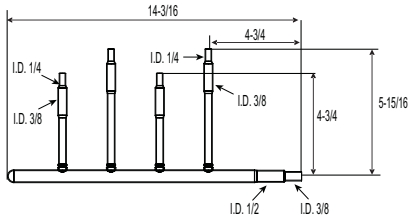
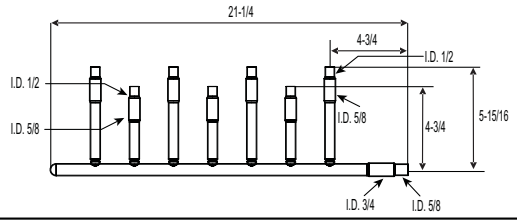
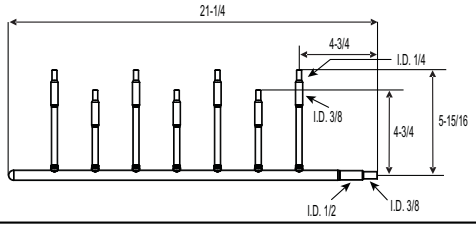
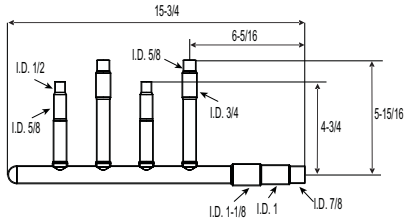
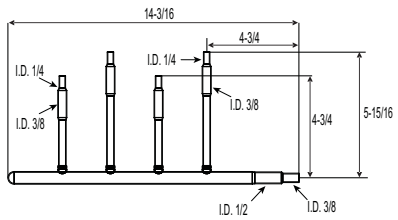
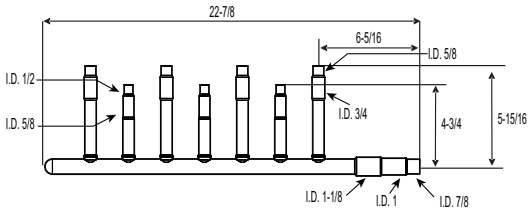
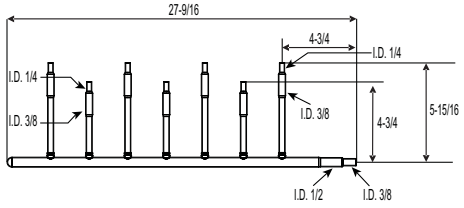
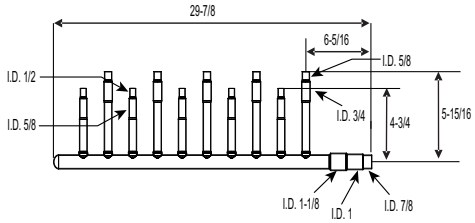
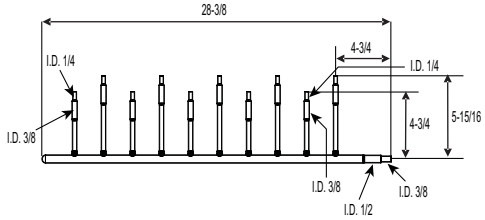
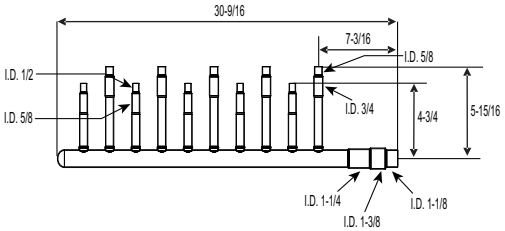
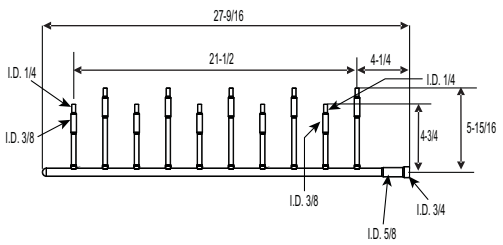
Unit: inch

Kit Model No.	Low-pressure Vapor Pipe Dimensions	Low-pressure Vapor Pipe Model No.	Liquid Pipe Dimensions	Liquid Pipe Model No.	High-pressure Vapor Pipe Dimensions	High-pressure Vapor Pipe Model No.
ARBLB01621		AJR54072905		AJR54072901		AJR72963601
ARBLB03321		AJR54072906		AJR54072902		AJR72963602
ARBLB07121		AJR54072907		AJR54072903		AJR72963603
ARBLB14521		AJR54072908		AJR54072904		AJR72963604

LG

Headers (for indoor unit connection)

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		

Product Data

Heat Recovery Units

Note:

Heat recovery units can only be used with heat recovery systems.

Table 28: Heat Recovery Unit Specifications.

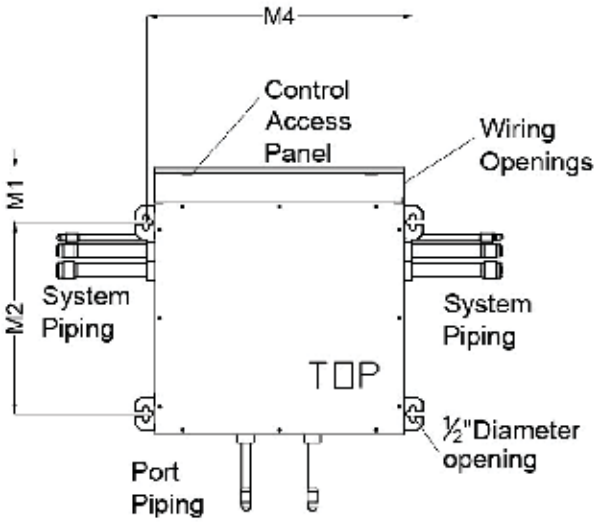
Model			PRHR022A	PRHR032A	PRHR042A
Number of Ports			2	3	4
Max. Connectable No. of Indoor Units			16	24	32
Max. Connectable No. of Indoor Units on each port			8	8	8
Max. Port Capacity (each port)		Btu/h	54,000	54,000	54,000
Max. Unit Capacity (sum of ports)		Btu/h	192,000	192,000	192,000
Net Weight		lbs	40	45	49
Dimensions (W x H x D)		inch	17-7/8 x 8-5/8 x 18-15/16		
Casing			Galvanized steel plate		
Connecting Pipes	To Indoor Units	Liquid Pipe (inch)	3/8		
		Vapor Pipe (inch)	5/8		
	To Outdoor Units	Liquid (inch)	3/8	1/2	5/8
		Low-pressure Vapor (inch)	7/8	1-1/8	1-1/8
		High-pressure Vapor (inch)	3/4	7/8	7/8
Insulation Material			Polyethylene		
Current	Minimum Circuit Amps (MCA)		0.1	0.15	0.2
	Maximum Fuse Amps (MFA)		15		
Power Supply			1Ø, 208-230V, 60Hz		

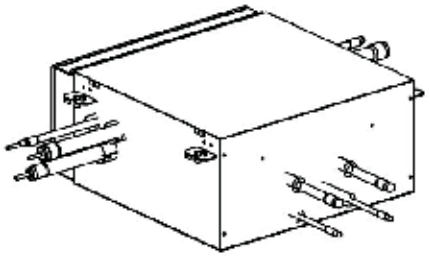
Table 27: Heat Recovery Unit Electrical Data.

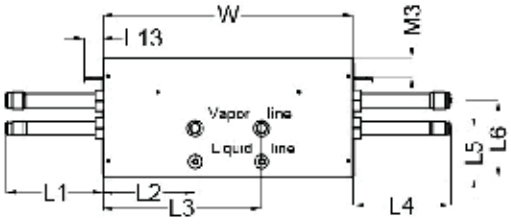
Unit Model No.	V / Hz / Ph	Input (kW)	
		Cooling	Heating
PRHR021A	208-230 / 60 / 1	0.026	0.026
PRHR031A	208-230 / 60 / 1	0.033	0.033
PRHR041A	208-230 / 60 / 1	0.040	0.040

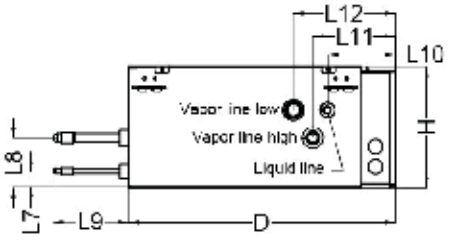
LG

PRHR022A Heat Recovery Unit

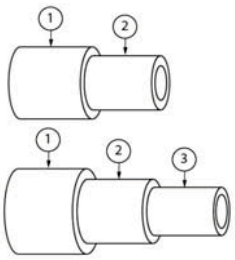






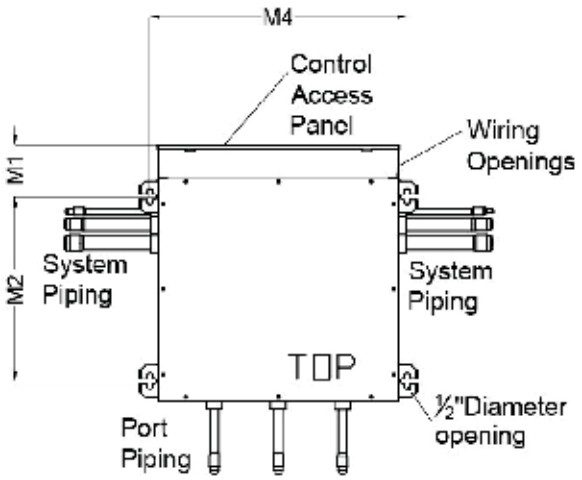


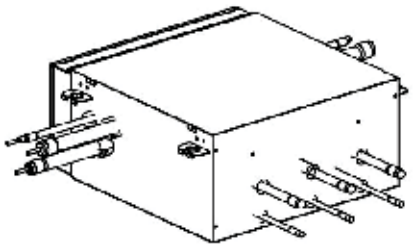
W	17-7/8"
H	8-5/8"
D	18-15/16"
L1	6-7/8"
L2	6-5/8"
L3	11-3/8"
L4	6-7/8"
L5	3-1/2"
L6	5-1/2"
L7	1-3/16"
L8	3-9/16"
L9	5-7/16"
L10	4-3/4"
L11	5-3/4"
L12	7-1/4"
L13	1-1/4"
M1	3-3/4"
M2	13-5/8"
M3	1-1/2"
M4	18-15/16"

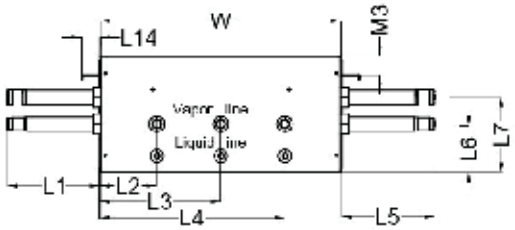


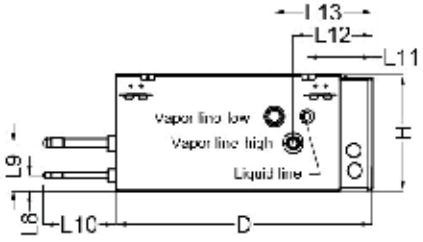
Reducer Dimensions (in)					
		1	2	3	Quantity
Indoor Unit	Liquid Line	3/8 OD	1/4 OD	-	2
	Vapor Line	5/8 OD	1/2 OD	-	2
HR Unit	Liquid Line	3/8 OD	1/4 OD	-	2
	Vapor Line Low	5/8 OD	1/2 OD	-	2
		7/8 OD	3/4 OD	5/8 OD	2
	Vapor Line High	1/2 OD	3/8 OD	-	2
		3/4 OD	5/8 OD	1/2 OD	2

PRHR032A Heat Recovery Unit

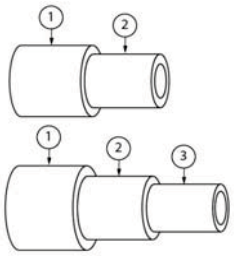








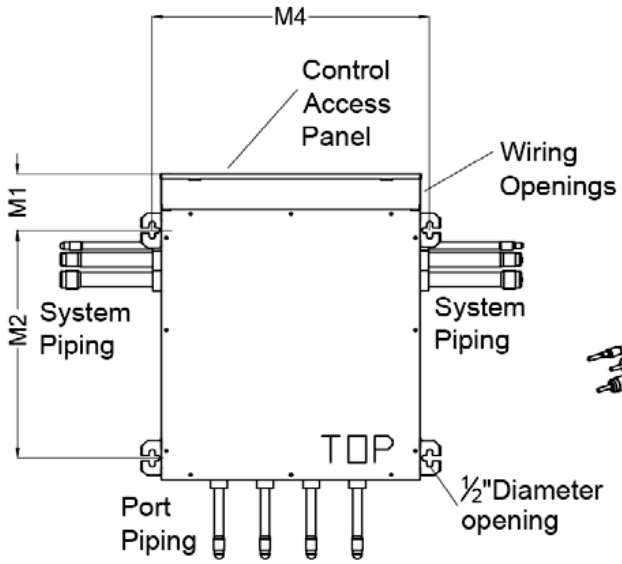
W	17-7/8"
H	8-5/8"
D	18-15/16"
L1	6-7/8"
L2	4-1/4"
L3	9"
L4	13-3/4"
L5	6-7/8"
L6	3-1/2"
L7	5-1/2"
L8	1-3/16"
L9	3-9/16"
L10	5-7/16"
L11	4-3/4"
L12	5-3/4"
L13	7-1/4"
L14	1-1/4"
M1	3-3/4"
M2	13-5/8"
M3	1-1/2"
M4	18-15/16"

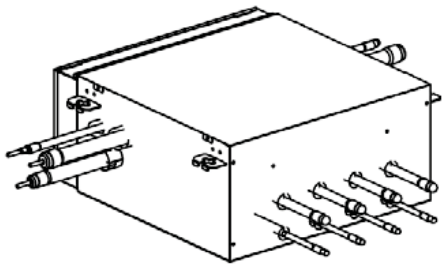


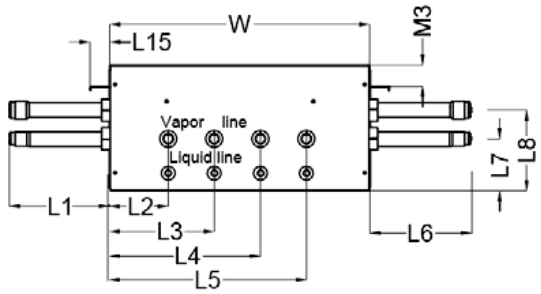
Reducer Dimensions (in)					
		1	2	3	Quantity
Indoor Unit	Liquid Line	3/8 OD	1/4 OD	-	3
	Vapor Line	5/8 OD	1/2 OD	-	3
HR Unit	Liquid Line	1/2 OD	3/8 OD	-	2
	Vapor Line Low	3/4 OD	5/8 OD	-	2
		1-1/8 OD	7/8 OD	3/4 OD	2
	Vapor Line High	5/8 OD	1/2 OD	-	2
		7/8 OD	3/4 OD	5/8 OD	2

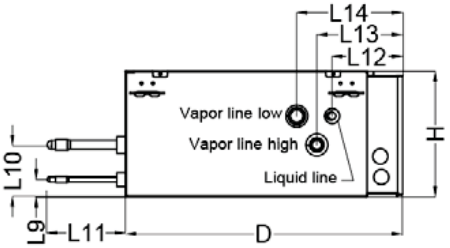
LG

PRHR042A Heat Recovery Unit

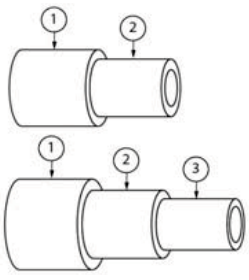






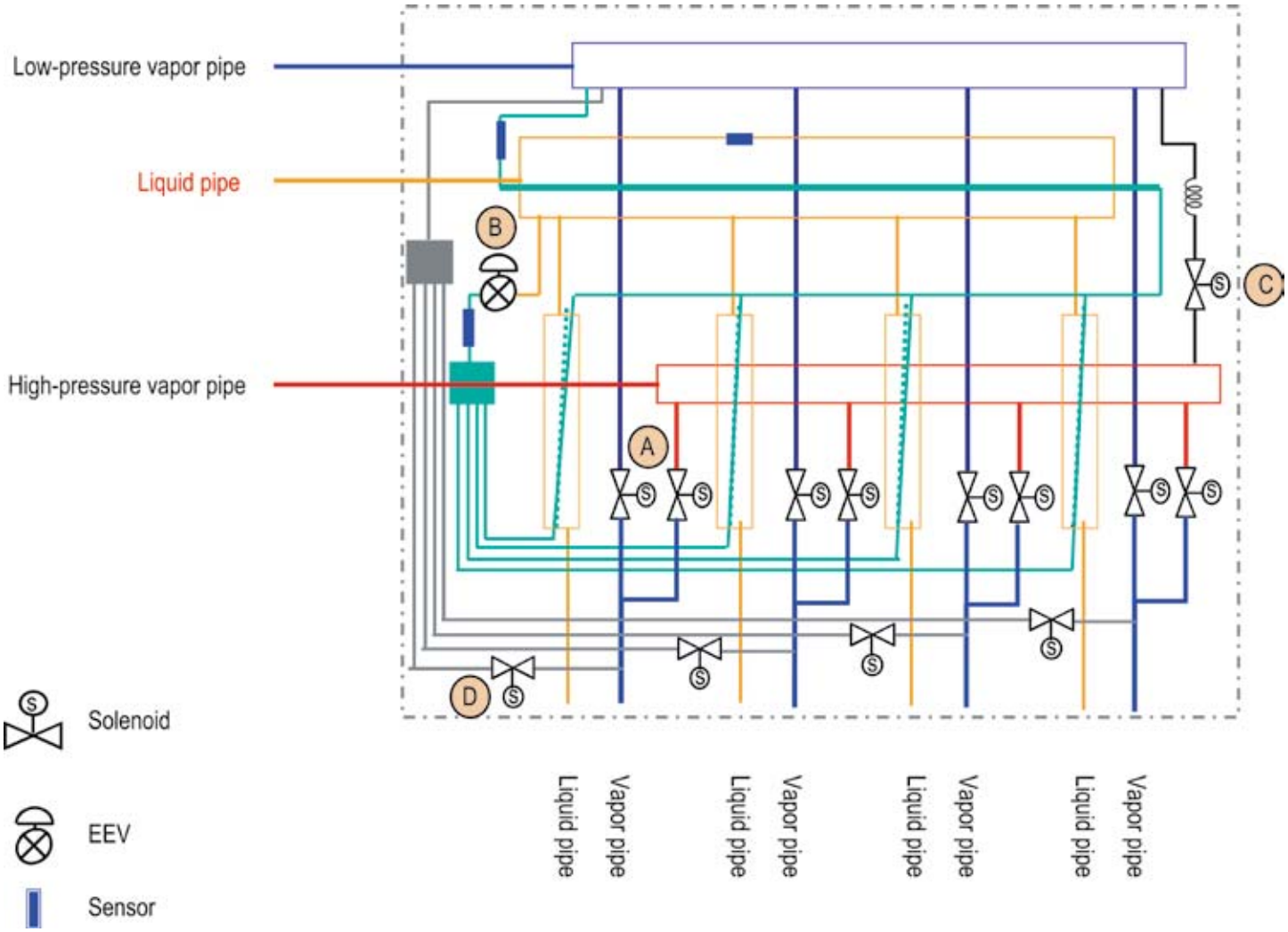


W	17-7/8"
H	8-5/8"
D	18-15/16"
L1	6-7/8"
L2	4-1/4"
L3	7-1/2"
L4	10-1/2"
L5	13-3/4"
L6	6-7/8"
L7	3-1/2"
L8	5-1/2"
L9	1-3/16"
L10	3-9/16"
L11	5-7/16"
L12	4-3/4"
L13	5-3/4"
L14	7-1/4"
L15	1-1/4"
M1	3-3/4"
M2	13-5/8"
M3	1-1/2"
M4	18-15/16"



Reducer Dimensions (in)					
		1	2	3	Quantity
Indoor Unit	Liquid Line	3/8 OD	1/4 OD	-	4
	Vapor Line	5/8 OD	1/2 OD	-	4
HR Unit	Liquid Line	1/2 OD	3/8 OD	-	2
	Vapor Line Low	3/4 OD	5/8 OD	-	2
		1-1/8 OD	7/8 OD	3/4 OD	2
	Vapor Line High	5/8 OD	1/2 OD	-	2
		7/8 OD	3/4 OD	5/8 OD	2

PRHR022A, 032A, 042A Heat Recovery Unit Refrigerant Circuit Diagram



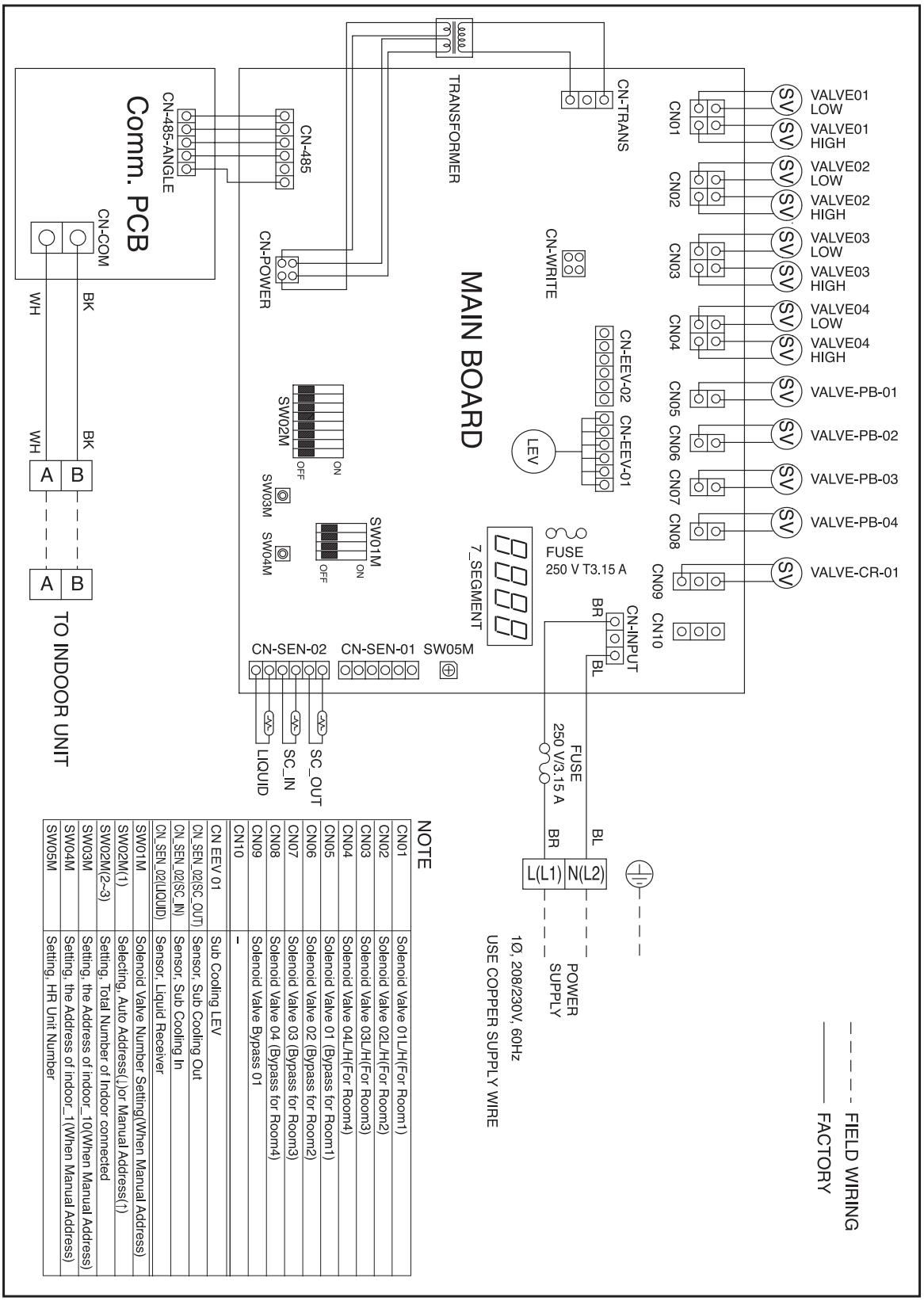
Ⓐ: Switch operation between cooling and heating.

Ⓑ: Decreases noise following subcooling operation between 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 control unit during cooling mode.

Ⓓ: Controls pressure between the high and low pressure vapor pipes during simultaneous operation.

PRHR022A, 032A, 042A Heat Recovery Unit Wiring Diagram



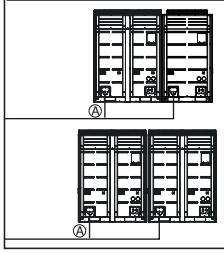
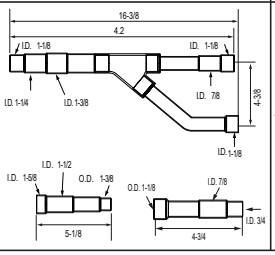
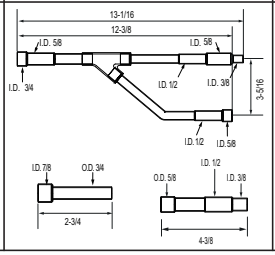
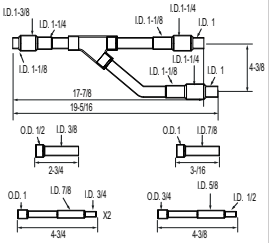
NOTE

CN01	Solenoid Valve 01L/H(For Room1)
CN02	Solenoid Valve 02L/H(For Room2)
CN03	Solenoid Valve 03L/H(For Room3)
CN04	Solenoid Valve 04L/H(For Room4)
CN05	Solenoid Valve 01 (Bypass for Room1)
CN06	Solenoid Valve 02 (Bypass for Room2)
CN07	Solenoid Valve 03 (Bypass for Room3)
CN08	Solenoid Valve 04 (Bypass for Room4)
CN09	Solenoid Valve Bypass 01
CN10	-
CN EEV 01	Sub Cooling LEV
CN_SEN_02(SC_OUT)	Sensor, Sub Cooling Out
CN_SEN_02(SC_IN)	Sensor, Sub Cooling In
CN_SEN_02(LIQUID)	Sensor, Liquid Receiver
SW01M	Solenoid Valve Number Setting(When Manual Address)
SW02M(1)	Selecting, Auto Address(↓)or Manual Address(↑)
SW02M(2~3)	Setting, Total Number of Indoor connected
SW03M	Setting, the Address of indoor_10(When Manual Address)
SW04M	Setting, the Address of indoor_1(When Manual Address)
SW05M	Setting, HR Unit Number

Multi-frame Connectors (for heat recovery outdoor unit connection)

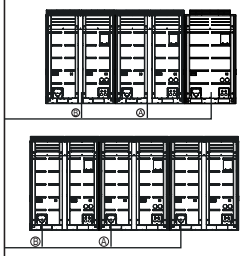
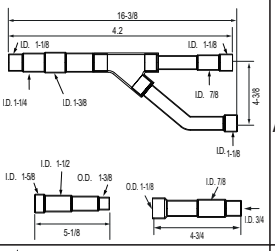
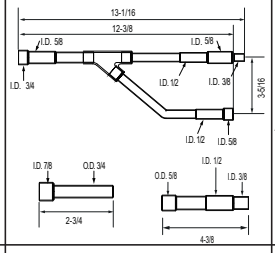
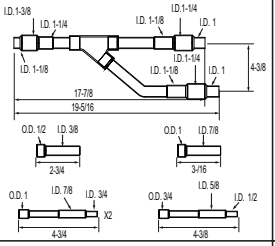
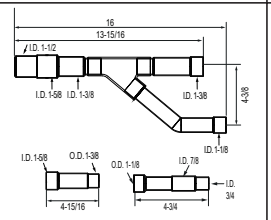
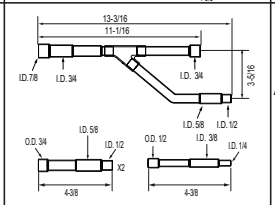
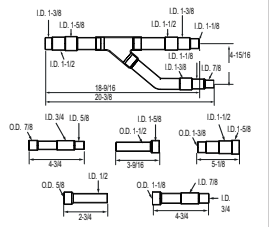
Two outdoor units

Unit: inch

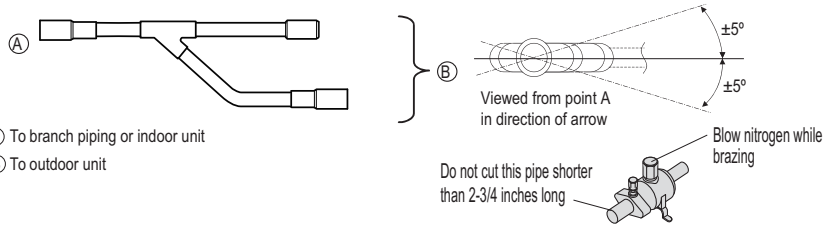
Combination specification	Multi-Frame Connector Kit No.	Low-Pressure Vapor Pipe Dimensions	Low-Pressure Vapor Pipe Model No.	Liquid Pipe Dimensions	Liquid Pipe Model No.	High-Pressure Vapor Pipe Dimensions	High-Pressure Vapor Pipe Model No.
	Ⓐ ARCNB21		AJR67613701		AJR67613702		AJR72963604

Three outdoor units

Unit: inch

Combination specification	Multi-Frame Connector Kit No.	Low-Pressure Vapor Pipe Dimensions	Low-Pressure Vapor Pipe Model No.	Liquid Pipe Dimensions	Liquid Pipe Model No.	High-Pressure Vapor Pipe Dimensions	High-Pressure Vapor Pipe Model No.
	Ⓐ ARCNB21		AJR67613701		AJR67613702		AJR72963604
	Ⓑ ARCNB31		AJR67613703		AJR67613704		AJR54072908

Install the branch pipe between the outdoor units so that the outlet pipe is parallel with the surface.



Ⓐ To branch piping or indoor unit

Ⓑ To outdoor unit

Facing up

Multi V IV outdoor units are designed to operate properly in a wide range of environmental conditions, but correct placement of the outdoor unit is essential for maximizing unit performance. Consider the following factors:

Mounting Platform

The underlying structure or foundation must be designed to support the weight of the unit. Avoid placing the unit in a low lying area where water may accumulate.

Tie-Downs and Wind Restraints

The strength of Multi V IV frames is adequate to be used with field-provided wind restraint tie-downs. The overall tie-down configuration must be approved by a local professional engineer. Always refer to local code when designing a wind restraint system.

Ambient Air Conditions

Do not place the unit in a corrosive environment. Avoid exposing the outdoor unit to steam, combustible gases, chimneys, steam relief ports, other air conditioning units, kitchen vents, plumbing vents, discharge from boiler stacks, and other sources of extreme temperature, gases, or substances that may degrade performance or cause damage to the unit. When installing multiple outdoor units, avoid placing the units where discharge air from the front of one outdoor unit is blown into the back side of an adjacent unit.

Dealing with Snow and Ice

In climates that experience snow buildup, place the unit on a raised platform to ensure proper outdoor unit coil airflow. The raised support platform must be high enough to allow the unit to remain above the anticipated snow accumulation level (consider snow drifts). Design the mounting base to prevent snow accumulation on the platform in front or back of the unit case. If necessary, use an inlet and discharge duct or a snow hood to prevent snow or ice from accumulating on the coil, fan blades, and fan guards. Best practice prevents snow from accumulating on top of the unit as well. When the system is commissioned, adjust the DIP switch for “snow throw” operation if a snow hood is not used. In all cases, the outdoor unit supply and/or discharge duct work or hood must be designed to have a combined air pressure drop rating that does not exceed 0.32" WG.

Note:

- *When deciding on a location to place the outdoor unit, be sure to choose an area where run-off from defrost mode will not accumulate and freeze on sidewalks or driveways.*
- *Snow throw mode does not prevent ice from forming on the fan blade or discharge grille.*

Handling Outdoor Unit Condensate

While operating in heating mode, the surface temperature of the outdoor coil may drop below the dew point of the surrounding air. Moisture may condense on the coil fins and subsequently drain onto the surface of the surrounding area from the bottom of the unit case. If the designer chooses to control the flow of condensate from the outdoor unit, install a field-provided drain pan under the unit and pipe the condensate to a nearby drain. Mount the unit in the pan on rails or isolation pads. If the unit will be operating near or below freezing with a condensate drain pan installed, consider installing heat tape in the bottom of the outdoor unit drain pan and along the condensate drain line.

Oceanside Installation Precautions

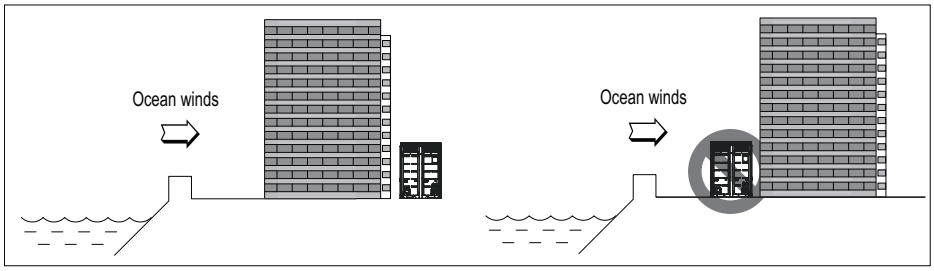
- Avoid installing the outdoor unit where it would be directly exposed to ocean winds.
- Install the outdoor unit on the side of the building opposite from direct ocean winds.
- Select a location with good drainage.
- Periodically clean dust or salt particles off of the heat exchanger with water.

Note:

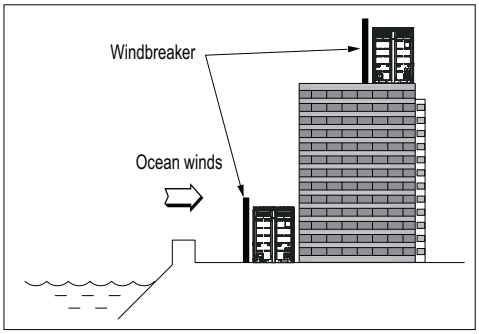
Additional anti-corrosion treatment may need to be applied to the outdoor unit at oceanside locations.

Note:

Ocean winds may cause corrosion, particularly on the condenser and evaporator fins, which, in turn could cause product malfunction or inefficient performance.



If the outdoor unit must be placed in a location where it would be subjected to direct ocean winds, install a concrete windbreaker strong enough to block any winds. Windbreaker height and width should be more than 150% of the outdoor unit, and be installed at least 27-1/2 inches away from the outdoor unit to allow for airflow.



INSTALLATION

MULTI V IV

Transporting / Lifting the Outdoor Unit

Transporting / Lifting

- When lifting the unit, use lifting straps and place around the unit as shown below.
- 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 at “A”.

Figure 1: Transporting the Outdoor Unit.

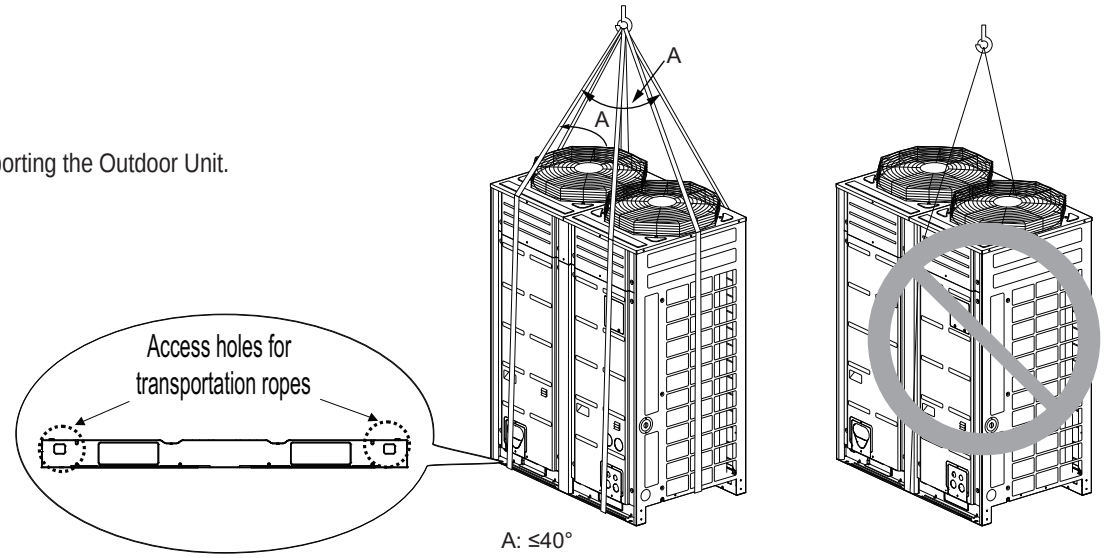
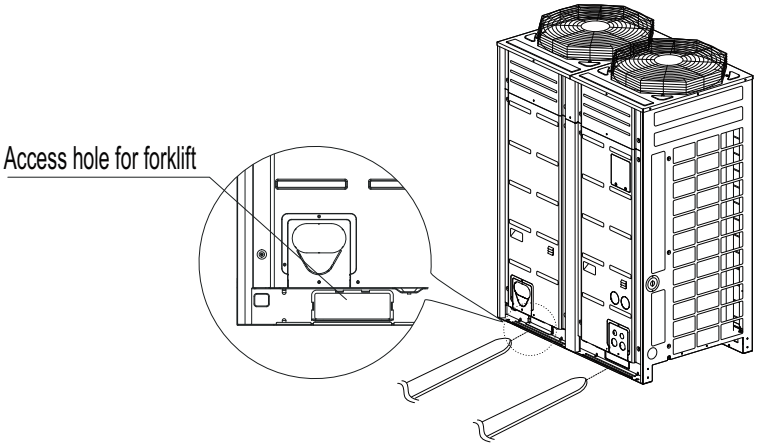


Table 29: Multi V IV Shipping and Net Weights.

Capacity (ton)	Shipping Weight (lbs.)	Net Weight (lbs.)
6	452	430
8	573	540
10	573	540
12	661-705	628-672
14	661-705	628-672



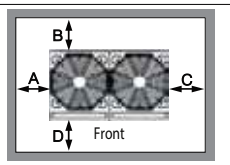
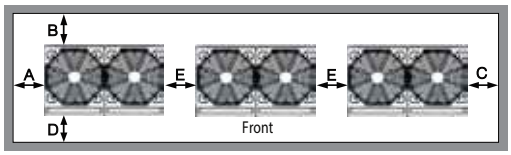
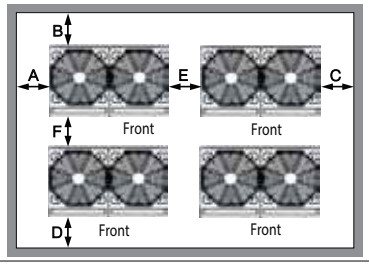
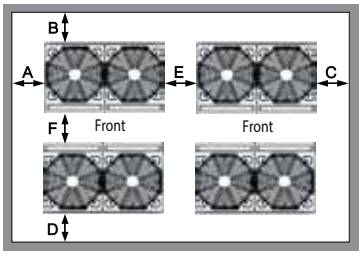
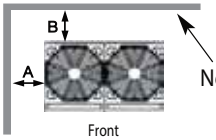
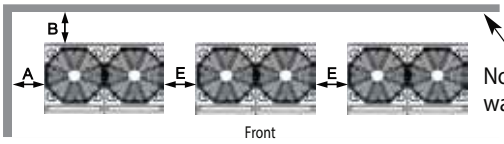
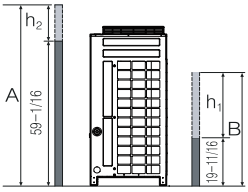
⚠ WARNING

- *Use appropriate moving equipment to transport each frame; ensure the equipment is capable of supporting the weights listed above.*
- *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.*
- *Tear apart and throw away plastic packaging bags so that children may not play with them and risk suffocation and death.*
- *Lift the outdoor unit from the base at specified locations. Support the outdoor unit at a minimum of six (6) points to avoid slippage from the rigging apparatus.*
- *Do not drop the unit when carrying it with a forklift.*
- *Use a minimum of three (3) lifting straps.*
- *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.*
- *Always know where the unit’s center of gravity is before lifting. Hoist the unit with the center of gravity centered among the lifting straps.*
- *Use caution when using forklift to transport an unpackaged unit. Consider the unit’s center of gravity when lifting. Protect the painted surfaces as necessary to prevent damage to the unit finish.*

LG

Proper airflow through the outdoor unit coil is critical for correct unit operation. When installing the outdoor unit, consider service, inlet, and outlet, and minimum allowable space requirements as illustrated in the diagrams below.

Table 30: Minimum Space Requirements.

Description	Installation Area	Example No.1 7/16" ≤ Space A, C ≤ 1-7/8"	Example No. 2 Space A, C ≥ 1-7/8"
Unit(s) is (are) enclosed by (4) walls		A≥ 7/16" B≥ 11-13/16" C≥ 7/16" D≥ 20"	A ≥ 2" B ≥ 3-15/16" C ≥ 2" D ≥ 20"
		A≥ 7/16" B≥ 11-13/16" C≥ 7/16" D≥ 36" E≥ 2-3/4"	A ≥ 2" B ≥ 3-15/16" C ≥ 2" D ≥ 36" E ≥ 3-15/16"
		A≥ 7/16" B≥ 11-13/16" C≥ 7/16" D≥ 36" E≥ 2-3/4" F≥ 24"	A ≥ 2" B ≥ 3-15/16" C ≥ 2" D ≥ 36" E ≥ 3-15/16" F ≥ 20"
		A≥ 7/16" B≥ 11-13/16" C≥ 7/16" D≥ 36" E≥ 2-3/4" F≥ 36" G≥ 20"	A ≥ 2" B ≥ 3-15/16" C ≥ 2" D ≥ 36" E ≥ 3-15/16" F ≥ 36" G ≥ 20"
Two (2) sides are walls		A≥ 7/16" B≥ 11-13/16"	
		A≥ 200(7-7/8") B≥ 300(11-13/16") E≥ 400(15-3/4")	
Wall height limitations (when the unit[s] is [are] surrounded by four [4] walls)		• Wall height at the front of the unit must be ≤ 59-1/16 inches. • Wall height at the inlet side of the unit must be ≤ 19-11/16 inches. • There are no height limitations for the walls at the sides of the unit. • If the wall height at the front and inlet sides of the unit are higher than allowable limits, additional space muct be included. - Additional Space on the inlet side by 1/2 of h1. - Additional Space on the front side by 1/2 of h2 - h2 = A(Actual height) - 59-1/16 inches - h1 = B(Actual height) - 19-11/16 inches	

Note:

Follow the applicable local and state codes for clearances, mounting, anchor, and vibration attenuation requirements.

INSTALLATION

Mounting / Anchoring the Outdoor Unit

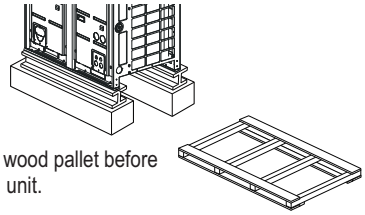
⚠ WARNING

Remove the wood pallet from the bottom of the outdoor unit base pan before brazing. A fire may occur if the pallet is not removed.

Note:

Remove the wood pallet from the bottom of the outdoor unit base pan before attaching the anchor bolt. If the pallet is not removed, the outdoor unit may become unstable and heat exchanger may freeze, resulting in improper operation.

Figure 2: Removing the Pallet.



Remove wood pallet before installing unit.

General Mounting

⚠ WARNING

- *When building a base support for the outdoor unit, ensure that the floor surface / location has enough strength to support the weight of the unit so it does not fall and cause physical injury or death.*
- *Install the outdoor unit to protect against extremely high winds and earthquakes. Any deficiency in installation may cause unit to fall, resulting in physical injury or death.*

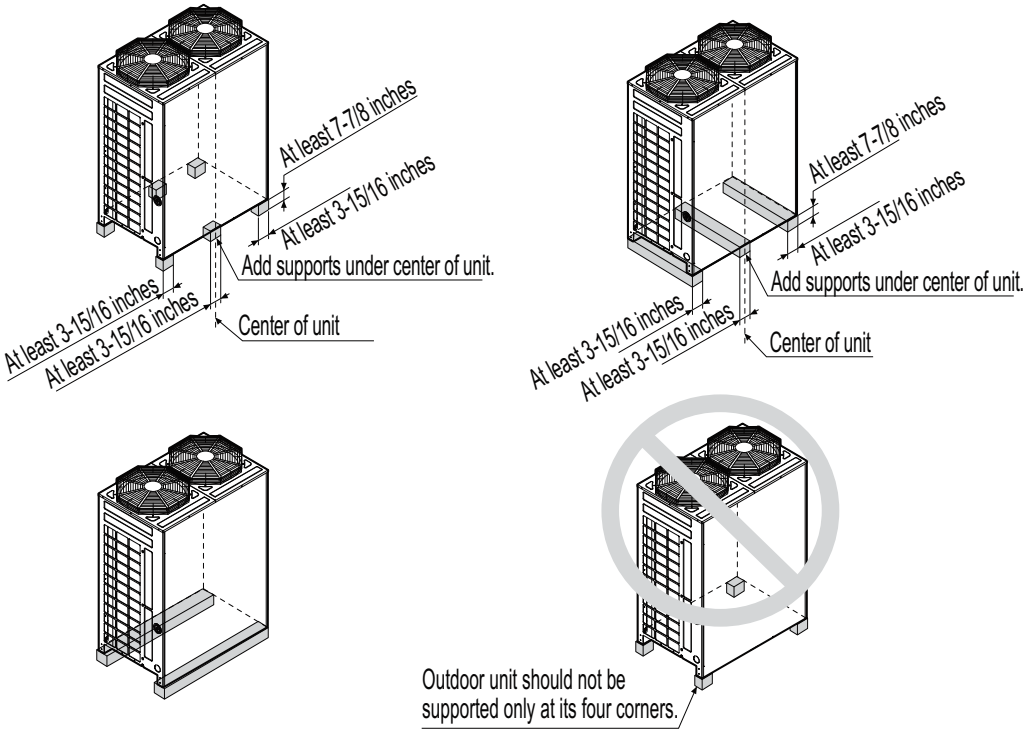
Note:

- *When building a base support for the outdoor unit, ensure that the floor surface / location has enough strength to support the weight of the unit, enough space for the pipes and wiring, and sufficient slope for proper drainage between the units, the condensate drain connection, and the floor drain.*

Securely attach the outdoor unit to a concrete pad, base rails, or other mounting platform that is anchored to the building structure. Avoid placing the unit in a low lying area where water may accumulate. Refer to dimensional drawings in the “Product Data” section on pages 21 to 26 and pages 60 to 65, and follow the applicable local and state codes for clearances, mounting, anchor, and vibration attenuation requirements.

- Outdoor unit supports must be ≥3-15/16 inches wide and ≥7-7/8 inches high.
- 3/8-inch or 5/16-inch anchor bolts must be inserted at least 2-15/16 inches deep into the supports.

Figure 3: Support Options.



Note:

Job site conditions may require routing utilities—including the refrigerant piping, condensate pipe, and electrical wiring—under the unit base. If job site conditions warrant, consider adding mounting rails under the unit. The unit may need to be elevated above the floor to provide the necessary slope for proper condensate draining on long pipe installations.

Table 31: Anchor Bolt Location Specifications.

Capacity (ton)	A (inches)	B (inches)
6	36-1/4	31-3/16
8	48-13/16	43-3/8
10		
12		
14		

Figure 5: Location of the Anchor Bolts.

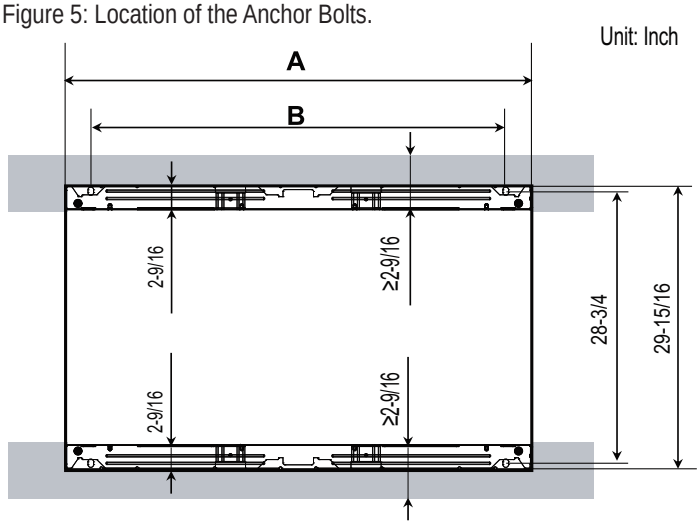
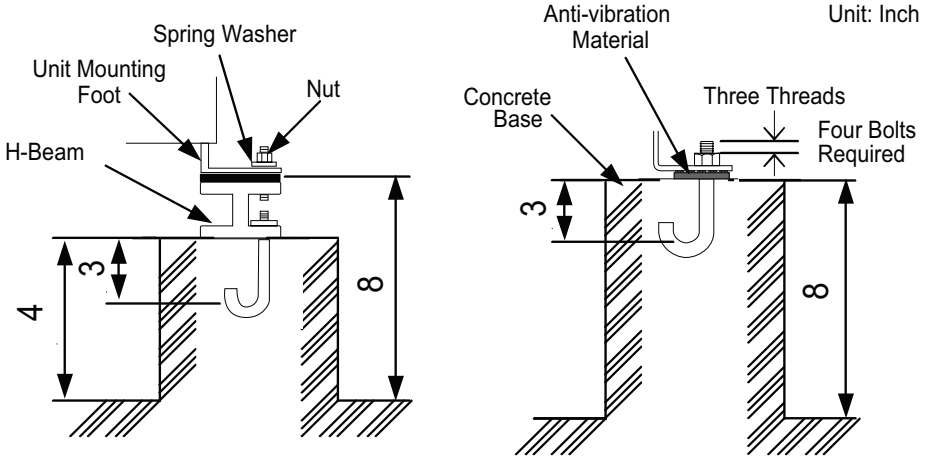


Figure 4: Close up of Anchor Bolts.

- Securely fasten all four (4) corners to the supporting base.
- If not otherwise directed by the structural engineer or local codes, Use a 7/8 inch or 1/2 inch diameter J-bolt. Use a hexagon nut with a spring washer.
- Include anti-vibration material chosen by the acoustics engineer.
- Include enough space for refrigerant piping and electrical wiring when installing through the bottom of the unit.
- Use an H-beam, concrete support, or other acceptable support structure designed by a structural engineer.



Note:

All referenced materials are to be field-supplied as specified by the designer. Images are not to scale. Images are for reference only and are not intended to be used for design purposes.

INSTALLATION

MULTI V IV

Mounting / Anchoring the Heat Recovery Unit

Note:

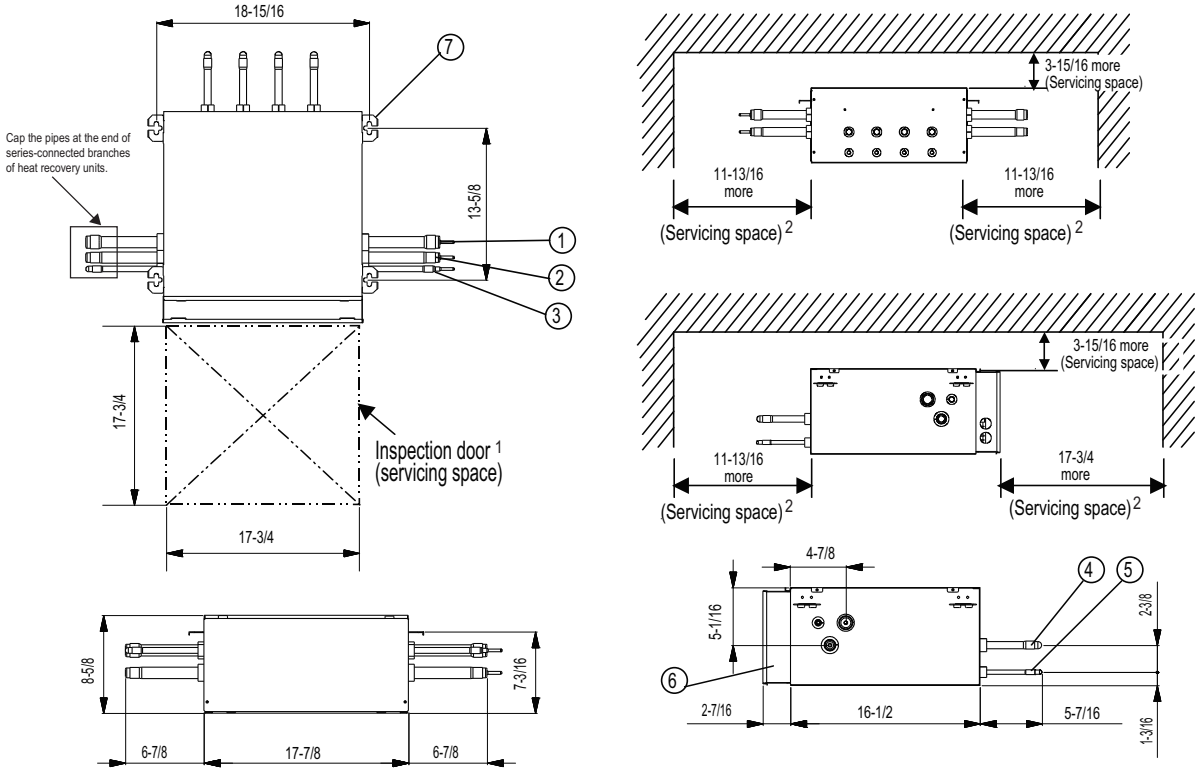
Heat recovery units are for use Heat Recovery systems only.

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

- Install the heat recovery unit indoors.
- Ensure there is enough space in the installation area for service access.
- Refrigerant pipes must not exceed lengths specified by LG Electronics.
- Do not install the heat recovery unit in a location where it would be subjected to strong radiation heat from heat sources.
- Avoid an installation environment where oil splattering, vapor spray, or high-frequency electric noise could occur.
- Install the heat recovery unit in a location where any sound it may generate will not disturb occupants in the surrounding rooms.
- Install the refrigerant piping and electrical wiring system in an easily accessible location.

Figure 6: Heat Recovery Control Unit Minimum Space Requirements.

Unit: inch



Unit: inch

No.	Part Name	Description	
		PRHR021A	PRHR031A / PRHR041A
①	Low pressure vapor pipe connection port	7/8Ø Brazed connection	1-1/8Ø Brazed connection
②	High pressure vapor pipe connection port	3/4Ø Brazed connection	7/8Ø Brazed connection
③	Liquid pipe connection port	3/8Ø Brazed connection	1/2Ø Brazed connection (PRHR031A) 5/8Ø Brazed connection (PRHR041A)
④	Indoor unit vapor pipe connection port	5/8Ø Brazed connection	5/8Ø Brazed connection
⑤	Indoor unit liquid pipe connection port	3/8Ø Brazed connection	3/8Ø Brazed connection
⑥	Control box	-	-
⑦	Metal hanger tab	3/8 or 5/16	3/8 or 5/16

[1]Locate the inspection door at the control box side of the heat recovery unit.
[2]If reducers are used, space for service access must be increased to match the dimensions of the reducer. See dimensions on pages 91-93 for more information.

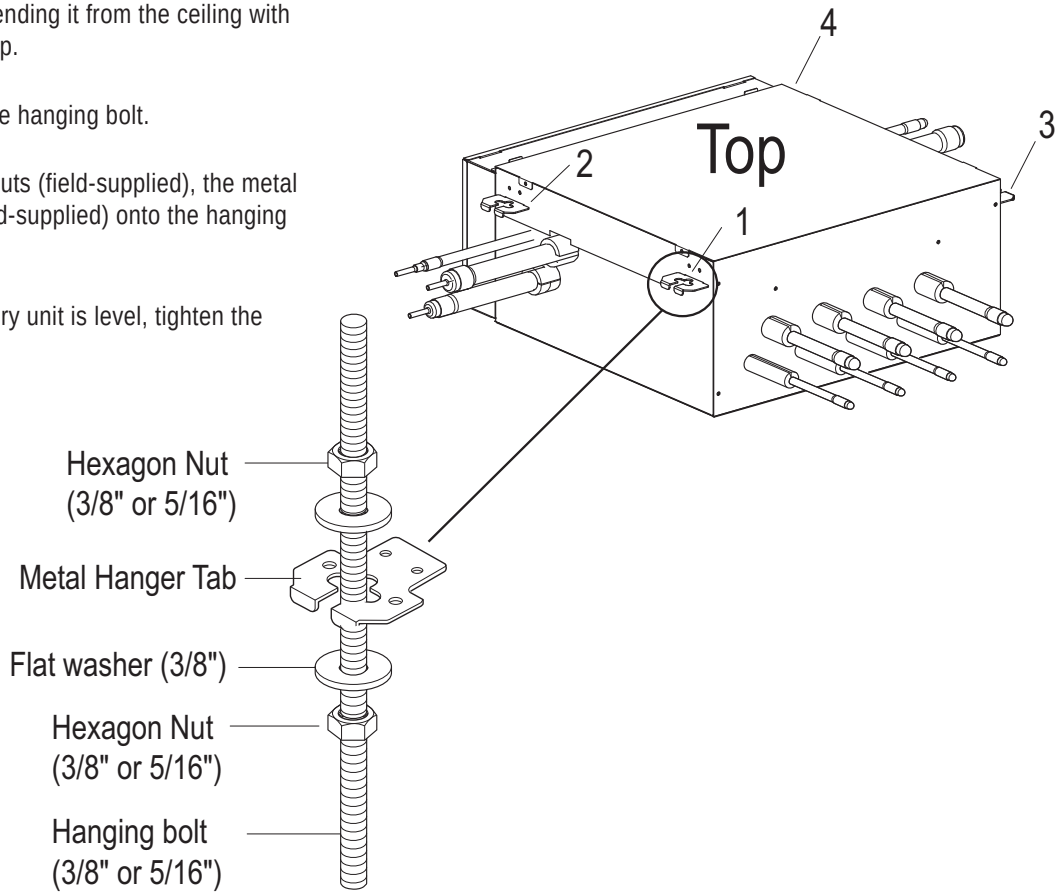
LG

Install the heat recovery unit by suspending it from the ceiling with the top (see diagram) always facing up.

1. Insert-hole-in-anchor and install the hanging bolt.
2. Thread 3/8 or 5/16 inch hexagon nuts (field-supplied), the metal hanger tabs, and flat washers (field-supplied) onto the hanging bolts as shown in the diagram.
3. After verifying that the heat recovery unit is level, tighten the hexagon nuts.

Note:

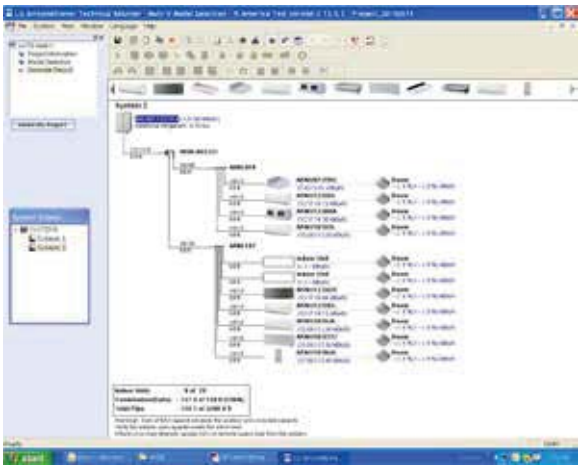
The heat recovery unit should be positioned no more than ±5° from level front to back and left to right.



LATS MULTI V Piping Design Software

Proper design and installation of the refrigerant piping system is a critical element of the Multi V system. Multi IV Heat Pump unit requires two pipes (liquid line and vapor line) between system components. Multi IV Heat Recovery unit requires three pipes (liquid, low-pressure vapor, and high pressure vapor) between the outdoor unit and the heat recovery unit. A properly designed refrigerant piping system ensures that refrigerant is delivered to the evaporator coil's electronic expansion valve (EEV) in a pure liquid state free of gas bubbles. A proper design also ensures a sufficient refrigerant gas flow rate in the vapor line(s) that eliminates the possibility of refrigeration oil from collecting in the vapor line(s).

Figure 7: Screenshot of LATS Pipe System Design Tool in Tree Mode.



Refrigerant Piping Quality Assurance

LG Air Conditioning Technical Solution (LATS) Multi V software makes designing the refrigerant system easy. LATS Multi V is a Microsoft Windows®-based application that assists the engineer in refrigeration distribution pipe system design, verifies the design complies with pipe design limitations, applies capacity correction factors, and calculates the system refrigerant charge. The piping system design can be entered manually into LATS from a one-line pipe diagram. To ensure that the refrigerant piping design meets LG's quality standards, a LATS refrigerant piping design must be provided with every Multi V IV order. Following the installation, if any changes or variations to the design were necessary, a new "as-built" LATS piping design software report must be created and provided to LG prior to system commissioning.

Systems that are close to the standard application limits may be converted into a conditional application by field changes to pipe equivalent lengths. Always check the LATS report actual pipe layout versus pipe limits. The user may want to increase pipe lengths when design conditions are approaching the Standard Application Piping Rule limits to force the LATS program to engineer the system using the "Conditional Application Pipe Rules," which will increase the diameter of the main and a few branch segments to minimize the possibility of required pipe changes due to field installation variations.

Note:

Any field changes, such as re-routing, shortening or lengthening a pipe segment, adding or eliminating elbows and/or fittings, resizing, adding, or eliminating indoor units, changing the mounting height, or moving the location of a device or fitting during installation should be done with caution and ALWAYS VERIFIED in LATS MULTI V SOFTWARE BEFORE supplies are purchased or installed. Doing so may 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 commissioning.

Adjusting LATS Multi V Output for Altitude

When a system is installed at elevations significantly above sea level, consider the impact air density has on the capacity of the indoor and air source units. LATS does not de-rate indoor unit capacity for high altitude applications. Be sure to apply locally accepted altitude correction factors to calculate actual indoor unit capacities at that altitude.

Creating a Balanced Piping System

Unlike designing ductwork or chilled and hot water pipe systems where balancing dampers, ball valves, orifices, circuit setters, or other flow control devices can be installed to modify or balance the flow of cooling medium, these cannot be used in a VRF system. Therefore, variable refrigerant flow system designs must be "self balanced." Balanced liquid refrigerant distribution is solely dependent on the designer choosing the correct pipe size for each segment. Pipe sizing considerations include pipe length, pipe segment pressure drop relative to other pipe segments in the system, type and quantity of elbows, bends, fitting installation orientation, and end use device elevation differences.

Note:

It is imperative to avoid creating excessive pressure drop. When liquid refrigerant is subjected to excessive pressure drop, liquid refrigerant will change state and "flash" to vapor. Vapor present in a stream of liquid refrigerant before reaching the electronic expansion valve (EEV) results in a loss of system control and causes damage to the valve. The pipe system must be designed in a manner that avoids the creation of unwanted vapor.

Device Connection Limitations

- The minimum number of connected and operating indoor units to Multi IV systems is one, taking into consideration of the minimum combination ratio.
- The maximum number of indoor units on Multi IV outdoor heat pump and heat recovery systems is:

ARUN072BTE4-DTE4 / ARUB072BTE4-DTE4 = 13
ARUN096BTE4-DTE4 / ARUB096BTE4-DTE4 = 16
ARUN121BTE4-DTE4 / ARUB121BTE4-DTE4 = 20
ARUN144BTE4-DTE4 / ARUB144BTE4-DTE4 = 24
ARUN168BTE4-DTE4 / ARUB168BTE4-DTE4 = 29
ARUN192BTE4-DTE4 / ARUB192BTE4-DTE4 = 32
ARUN216BTE4-DTE4 / ARUB216BTE4-DTE4 = 35
ARUN240BTE4-DTE4 / ARUB240BTE4-DTE4 = 39
ARUN264BTE4-DTE4 / ARUB264BTE4-DTE4 = 42
ARUN288BTE4-DTE4 / ARUB288BTE4-DTE4 = 45
ARUN312/313BTE4-DTE4 / ARUB312/313BTE4-DTE4 = 52
ARUN336/337BTE4-DTE4 / ARUB336/337BTE4-DTE4 = 55
ARUN360BTE4-DTE4 / ARUB360BTE4-DTE4 = 58
ARUN384BTE4-DTE4 / ARUB384BTE4-DTE4 = 61
ARUN408BTE4-DTE4 / ARUB408BTE4-DTE4 = 64
ARUN432BTE4-DTE4 / ARUB432BTE4-DTE4 = 64
ARUN456BTE4-DTE4 / ARUB456BTE4-DTE4 = 64
ARUN480BTE4-DTE4 / ARUB480BTE4-DTE4 = 64
ARUN504BTE4-DTE4 / ARUB504BTE4-DTE4 = 64

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

Table 32: Multi IV Refrigerant Piping System Limitations.

Pipe Length (ELF = Equivalent Length of pipe in Feet)	Longest total equivalent piping length	3,280 feet
	Longest distance from outdoor unit to indoor unit	656 feet (Actual) 738 feet (Equivalent)
	Distance between fittings and indoor units	≥20 inches
	Distance between fittings and Y-branches	≥20 inches
	Distance between two Y-branches	≥20 inches
	Distance between two series-piped heat recovery units (ARUB Series only)	≥20 inches
	Minimum distance between indoor unit to any Y-branch	3 feet from indoor unit to Y-branch
	Maximum distance between first Y-branch to farthest indoor unit	131 feet (295 feet for conditional applications)
Elevation (All Elevation Limitations are Measured in Actual Feet)	If outdoor unit is above or below indoor unit	360 feet
	Between indoor units on heat pump systems (ARUN Series), or indoor units connected to separate parallel heat recovery units (ARUB Series)	131 feet
	Between indoor units connected to single heat recovery unit or series heat recovery units (ARUB series only)	49 feet

Table 33: Equivalent Piping Length for Y-branches, Headers, and Other Piping Components.

Component	Size (Inches)													
	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
Long Radius Elbow (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]	1.6													
Header (ft.)	3.3													
Heat Recovery Unit (ft.) (For ARUB Heat Recovery Units only)	8.2													

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

LG

Selecting Field-Supplied Copper Tubing

Type ACR copper is the only approved refrigerant pipe material for use with LG Multi V commercial air conditioning products. ACR rated tubing is the only type that ships with yellow caps. Approved tubing for use with Multi V products will be marked “R410 RATED” along the length of the tube.

- Drawn temper (rigid) ACR copper tubing is available in sizes 3/8 through 2-1/8 inches (ASTM B 280, clean, dry and capped).
- Annealed temper (soft) ACR copper tubing is available in sizes 1/4 through 2-1/8 inches (ASTM B 280, clean, dry, and capped).

Tube wall thickness should meet local code requirements and be approved for a maximum operating pressure of 551 psi. When bending tubing, try to keep the number of bends to a minimum, and use the largest radii possible to reduce the equivalent length of installed pipe; also, bending radii greater than ten (10) pipe diameters can minimize pressure drop. Be sure no traps or sags are present when rolling out soft copper tubing coils.

Note:

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

Table 34: ACR Rated Copper Tubing Material.

Type	Seamless Phosphorous Deoxidized
Class	UNS C12200 DHP
Straight Lengths	H58 Temper
Coils	O60 Temper

Table 35: ACR Rated Piping Wall Thicknesses.

OD (in)	1/4	3/8	1/2	5/8	3/4	7/8	1-1/8	1-3/8
Material	Rigid or Soft ACR Rated for R410A			Rigid or Solid ACR Rated for R410A				
Min. Bend Radius (in)	.563	.9375	1.5	2.25	3.0	3.0	3.5	4.0
Min. Wall Thickness (in)	.03	.03	.035	.040	.042	.045	.050	.050

Table 36: ACR Copper Tubing Dimensions and Physical Characteristics[1-4]

Nominal Pipe Outside Diameter (in)	Actual Outside Diameter (in)	Drawn Temper			Annealed Temper		
		Nominal Wall Thickness (in)	Weight (lb/ft)	Cubic ft per Linear ft	Nominal Wall Thickness (in)	Weight (lb/ft)	Cubic ft per Linear ft
1/4	0.250	--	--	--	0.030	0.081	.00020
3/8	0.375	0.030	0.126	.00054	0.032	0.134	.00053
1/2	0.500	0.035	0.198	.00101	0.032	0.182	.00103
5/8	0.625	0.040	0.285	.00162	0.035	0.251	.00168
3/4	0.750	0.042	0.362	.00242	0.042	0.362	.00242
7/8	0.875	0.045	0.455	.00336	0.045	0.455	.00336
1-1/8	1.125	0.050	0.655	.00573	0.050	0.655	.00573

[1]All dimensions provided are in accordance with ASTM B280 – Standard.
[2]Design pressure = 551 psig.
[3]ACR Tubing is available as hard drawn or annealed (soft) and are suitable for use with R410A refrigerant.
[4]The Copper Tube Handbook, 2010, Copper Development Association Inc., 260 Madison Avenue, New York, NY 10016.

Note:

- *Commercially available piping often contains dust and other materials. Always blow it clean with a dry inert gas.*
- *Prevent dust, water or other contaminants from entering the piping during installation.*

LG Engineered Y-branch Kits and Header Kits

LG Y-branch and Header kits are highly engineered devices designed to evenly divide the flow of refrigerant, and are used to join one pipe segment to two or more segments.

No Substitutions

Only LG supplied Y-branch and Header fittings (as referenced below; sold separately) can be used to join one pipe segment to two or more segments. Third-party or field-fabricated Tee's, Y-fittings, Headers, or other branch fittings are not qualified for use with LG Multi V IV systems. The only field-provided fittings allowed in a Multi V IV piping system are 45° and 90° elbows.

Table 37: Y-Branches and Headers.

Y-branch Kit Model No				Headers		
				4 branch	7 branch	10 branch
ARBLN01621	ARBLN07121	ARBLB01621	ARBLB07121	ARBL054	ARBL057	ARBL1010
ARBLN03321	ARBLN14521	ARBLB03321	ARBLB14521	ARBL104	ARBL107	ARBL2010

- *If the diameter of the branch pipe segments differ from that of the designated refrigerant piping, trim the to the desired section using a pipe cutter, and then use an adapter to connect.*
- *Always follow manufacturer's guidelines on refrigerant piping restrictions such as maximum length, elevation difference, and diameters. Failure to do so can result in reduced heating / cooling performance or equipment malfunction.*

Y-Branch Kits

LG Y-branch and kits are highly engineered devices designed to evenly divide the flow of refrigerant, and are used to join one pipe segment to two or more segments. There are two types of Y-branches used in LG VRF systems: Y-branches that combine two or three outdoor units to make up one large-capacity outdoor unit (also known as multi-frame connectors), or Y-branches used with the indoor units in the refrigerant piping system at each transition. Field-supplied "T" fittings or "Y" branches will not be accepted. Do not install Y-branches backwards; refrigerant flow cannot make U-turns through Y-branches. The equivalent pipe length of each Y-branch (1.6') must be added to each pipe segment entered into LATS piping design software. See page 45 and 47 or 92 and 100 for Y-branch kit specifications and capacities.

LG Y-Branch Kits Consist of:

- Y-branches:
  - For heat pump systems - one liquid line and one vapor line (two [2] total)
  - For heat recovery systems - one liquid line, one low-pressure vapor line, and one high-pressure vapor line (three [3] total)
- Reducer fittings as applicable.
- Molded clam-shell type peel and stick insulation covers.

Figure 8: Y-branch Vertical Installation Alignment Specification.

Vertical UP Configuration - For Indoor and Outdoor Unit Y-Branches.

Vertical DOWN Configuration - For Indoor Unit Y-Branches ONLY.

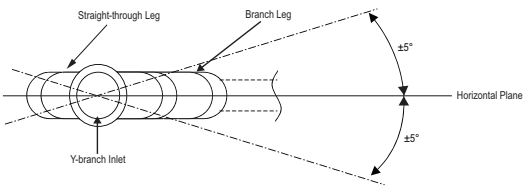
Indoor Unit Y-Branches

Indoor unit Y-branches may be installed in horizontal or vertical configurations. When installed vertically, position the Y-branch so the straight-through leg is within ±3° of plumb. When installed horizontally, position the Y-branch so the take-off leg is level and shares the same horizontal plane as the straight-through leg within ±5° rotation.

Indoor unit Y-branches must always be installed with the single port end towards the outdoor unit, the two-port end towards the indoor units (or heat recovery units for heat recovery systems only). If indoor unit Y-branches are used to combine heat recovery ports to accommodate an indoor unit with a capacity of six (6) tons or larger, then the single port end must be installed with the single port end towards the indoor unit and the two-port end towards the heat recovery unit. The first indoor unit Y-branch kit must be located at least three (3) feet from the outdoor unit. Provide a minimum of twenty (20) inches between a Y-branch and any other fittings or indoor unit piped in series.

There is no limitation on the number of indoor unit Y-branches that can be installed, but there is a limitation on the number of indoor units connected to a single outdoor unit. It is recommended that when a Y-branch is located in a pipe chase or other concealed space, access doors should be provided for inspection access.

Figure 9: Horizontal Configuration.



LG

Outdoor Unit Y-Branches

Outdoor unit Y-branches can only be installed in a horizontal or vertical UP configuration. The vertical DOWN configuration is not permitted. When installed vertically, position the Y-branch at a level lower than the outdoor units it serves, so the straight-through leg is within ±3° of plumb. When installed horizontally, position the Y-branch so the take-off leg is level and shares the same horizontal plane as the straight-through leg within ±5° rotation.

Outdoor unit Y-branches must always be installed with the two-port ends connected to the piping coming from the outdoor units, and the single port end towards the indoor unit refrigerant piping system supporting the indoor units. Outdoor unit Y-branches are usually installed close to the outdoor unit, leaving enough space for servicing and maintenance.

Figure 11: Y-branch Insulation and Pipe Detail.

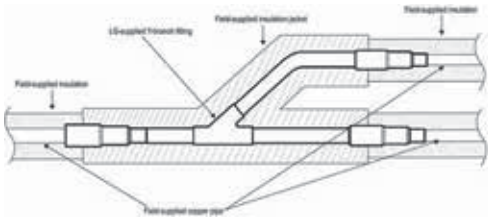
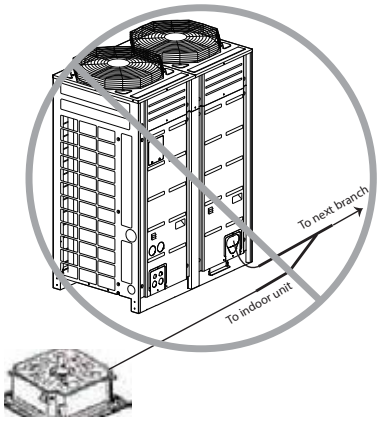


Figure 10: Diagram of an Incorrect Outdoor Unit Y-branch Installation.



Note:

No Substitutions

Only LG supplied Y-branch and Header fittings can be used to join one pipe segment to two or more segments. Third-party or field-fabricated Tee's, Y-fittings, Headers, or other branch fittings are not qualified for use with LG Multi V IV systems. The only field-provided fittings allowed in a Multi V IV piping system are 45° and 90° elbows.

Install Correctly

- *Y-branches can be installed upstream between the Header and the outdoor unit, but a Y-branch cannot be installed between a header and an indoor unit.*
- *To avoid the potential of uneven refrigerant distribution through a header fitting, minimize the difference in equivalent pipe length between the header fitting and each connected indoor unit.*

Header Kits

LG Header kits are highly engineered devices designed to evenly divide the flow of refrigerant, and are used to join one pipe segment to two or more segments. Header kits are intended for use where multiple indoor units are in the same vicinity and it would be better to "home-run" the run-out pipes back to a centralized location. If connecting multiple indoor units that are far apart, Y-branches may be more economical. See page 46 or 93 for Header kit specifications and capacities.

LG Header Kits Consist of:

- Two headers (one liquid line, one vapor line).
- Reducer fittings as applicable.
- Molded clam-shell type peel and stick insulation covers—one for the liquid line and one for the vapor line.

Y-branches can be installed upstream between the Header and the outdoor unit, but a Y-branch cannot be installed between a Header and an indoor unit. Headers must be installed in a horizontal and level position with the distribution ports of the fitting in the same horizontal plane as the straight-through branch.

When connecting indoor units to a Header, always connect the unit with the largest nominal capacity to the port closest to the outdoor unit. Then install the next largest indoor unit to the next port, working down to the smallest indoor unit. Do not skip ports.

All indoor units connected to a single Header fitting should be located with an elevation difference between indoor units that does not exceed 49 feet.

Figure 12: Header Kit—Horizontal Rotation Limit (Must be Installed Level with No Rotation).

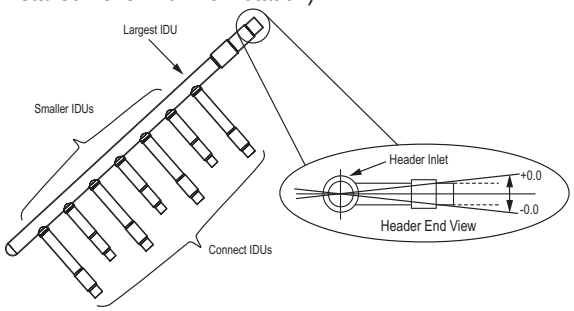
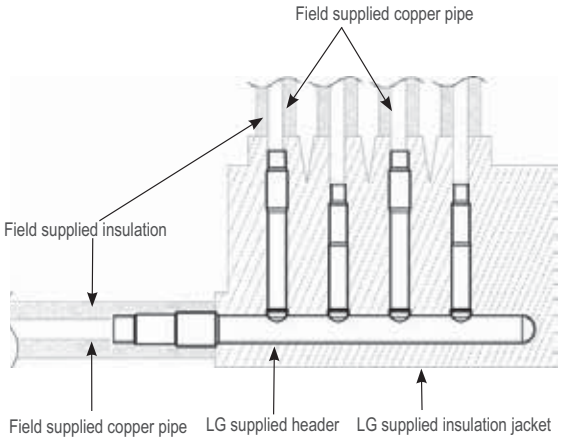


Figure 13: Header Insulation and Pipe Detail.



No Pipe Size Substitutions

Use only the pipe size selected by the LATS Multi V pipe system design software. Using a different size is prohibited and may result in a system malfunction or failure.

Obstacles

When an obstacle, such as an I-beam or concrete T, is in the path of the planned refrigerant pipe run, it is best practice to route the pipe over the obstacle. If adequate space is not available to route the insulated pipe over the obstacle, then route the pipe under the obstacle. In either case, it is imperative the length of the horizontal section of pipe above or below the obstacle be a minimum of three (3) times the longest vertical rise (or fall) at either end of the segment.

Figure 14: Installing Piping Above and Below an Obstacle.

Above an obstacle. Below an obstacle.

Copper Expansion and Contraction

Under normal operating conditions, the vapor pipe temperature of a Multi IV system can vary as much as 180°F. With this large variance in pipe temperature, the designer must consider pipe expansion and contraction to avoid pipe and fitting fatigue failures.

Refrigerant pipe along with the insulation jacket form a cohesive unit that expands and contracts together. During system operation, thermal heat transfer occurs between the pipe and the surrounding insulation.

If the pipe is mounted in free air space, no natural restriction to movement is present if mounting clamps are properly spaced and installed. When the refrigerant pipe is mounted underground in a utility duct stacked among other pipes, natural restriction to linear movement is present. In extreme cases, the restrictive force of surface friction between insulating jackets could become so great that natural expansion ceases and the pipe is “fixed” in place. In this situation, opposing force caused by change in refrigerant fluid/vapor temperature can lead to pipe/fitting stress failure.

The refrigerant pipe support system must be engineered to allow free expansion to occur. When a segment of pipe is mounted between two fixed points, provisions must be provided to allow pipe expansion to naturally occur. The most common method is the inclusion of expansion Loop or U-bends mounted in the horizontal plane. When expansion loops are placed in a vertical riser, the loop is to be formed in a horizontal fashion resulting in a torsional movement during expansion and contraction.. See Figure 16 on page 116. Each segment of pipe has a natural fixed point where no movement occurs. This fixed point is located at the center point of the segment assuming the entire pipe is insulated in a similar fashion. The natural fixed point of the pipe segment is typically where the expansion Loop or U-bend should be. Linear pipe expansion can be calculated using the following formula:

1. From Table 38, find the row corresponding with the actual length of the straight pipe segment.

$LE = C \times L \times (T_r - T_a) \times 12$

LE	=	Anticipated linear tubing expansion (in.)
C	=	Constant (For copper = 9.2×10^{-6} in./in.°F)
L	=	Length of pipe (ft.)
T_R	=	Refrigerant pipe temperature (°F)
T_a	=	Ambient air temperature (°F)
12	=	Inches to feet conversion (12 in./ft.)

2. Estimate the minimum and maximum temperature of the pipe. Typical pipe temperature change range: High Pressure Vapor: ambient temperature to 215°F; Low Pressure Vapor: ambient to 35°F; Liquid pipe: ambient, 80°F, 110°F. Choose the two most extreme. In the column showing the minimum pipe temperature, look up the anticipated expansion distance. Do the same for the maximum pipe temperature.
3. Calculate the difference in the two expansion distance values. The result will be the anticipated change in pipe length .

General Example:

A Multi V system is installed and the design shows that there is a 130 feet straight segment of piping between a Y-branch and an indoor unit. The system operates 24 hours per day. In heating, this pipe transports hot gas vapor to the indoor units at 120°F. In cooling, the same pipe is a suction line returning refrigerant vapor to the outdoor unit at 40°F. Look up the copper piping expansion at each temperature using Table 38, and calculate the difference.

Vapor Line

Transporting Hot Vapor: 130 ft. pipe at 120°F = 1.54 in.
Transporting Suction Vapor: 130 ft. pipe at 40°F = 0.52 in.
Anticipated Change in Length: 1.54 in. – 0.52 in. = 1.02 in.

Liquid Line

The liquid temperature remains relatively the same temperature; only the direction of flow will reverse. Therefore, no significant change in length of the liquid line is anticipated.

When creating an expansion joint, the joint depth should be a minimum of two times the joint width. Although different types of expansion arrangements are available, the data for correctly sizing an expansion loop is provided in Table 39. Use soft copper with long radius bends on longer runs or long radius elbows for shorter pipe segments. Using the anticipated linear expansion (LE) distance calculated, look up the Expansion Loop or U-bend minimum design dimensions. If other types of expansion joints are chosen, design per ASTM B-88 Standards.

See table below for precalculated anticipated expansion for various pipe sizes and lengths of refrigerant tubing.

To find the anticipated expansion value:

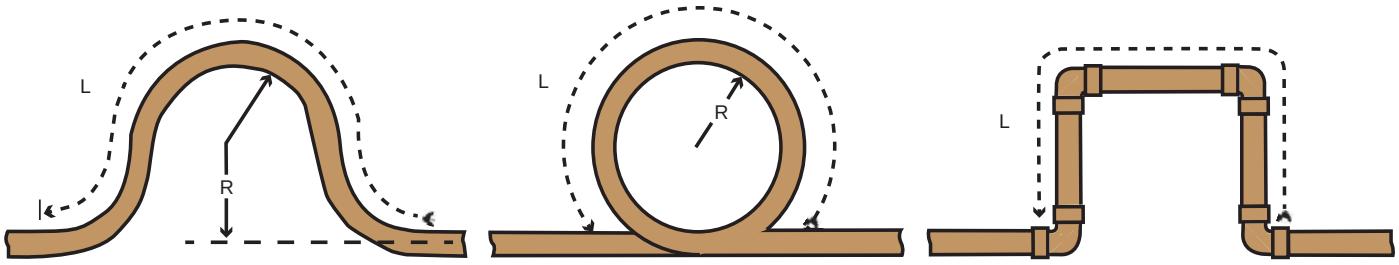
1. From the table below, find the row corresponding with the actual feet of the straight pipe segment.
2. Estimate the minimum and maximum temperature of the pipe.
3. In the column showing the minimum pipe temperature, look up the anticipated expansion distance corresponding to the segment length. Do the same for the maximum pipe temperature.
4. Calculate the difference in the two expansion distance values. The result will be the change in pipe length.

Table 38: Linear Thermal Expansion of Copper Tubing in Inches.

Pipe Length[1]	Fluid Temperature °F																			
	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°	95°	100°	105°	110°	115°	120°	125°	130°
10	0.04	0.04	0.05	0.06	0.06	0.07	0.08	0.08	0.09	0.09	0.10	0.10	0.11	0.11	0.11	0.12	0.13	0.14	0.15	0.15
20	0.08	0.08	0.10	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.22	0.23	0.26	0.28	0.29	0.30
30	0.12	0.12	0.15	0.18	0.20	0.21	0.23	0.24	0.26	0.27	0.29	0.30	0.32	0.33	0.32	0.35	0.39	0.42	0.44	0.45
40	0.16	0.16	0.20	0.24	0.26	0.28	0.30	0.32	0.34	0.36	0.38	0.40	0.42	0.44	0.43	0.46	0.52	0.56	0.58	0.60
50	0.20	0.20	0.25	0.30	0.33	0.35	0.38	0.40	0.43	0.45	0.48	0.50	0.53	0.55	0.54	0.58	0.65	0.70	0.73	0.75
60	0.24	0.24	0.30	0.36	0.39	0.42	0.45	0.48	0.51	0.54	0.57	0.60	0.63	0.66	0.65	0.69	0.78	0.84	0.87	0.90
70	0.28	0.28	0.35	0.42	0.46	0.49	0.53	0.56	0.60	0.63	0.67	0.70	0.74	0.77	0.76	0.81	0.91	0.98	1.02	1.05
80	0.32	0.32	0.40	0.48	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.86	0.92	1.04	1.12	1.16	1.20
90	0.36	0.36	0.45	0.54	0.59	0.63	0.68	0.72	0.77	0.81	0.86	0.90	0.95	0.99	0.97	1.04	1.17	1.26	1.31	1.35
100	0.40	0.40	0.50	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.08	1.15	1.30	1.40	1.45	1.50
120	0.48	0.48	0.60	0.72	0.78	0.84	0.90	0.96	1.02	1.08	1.14	1.20	1.26	1.32	1.30	1.38	1.56	1.68	1.74	1.80
140	0.56	0.56	0.70	0.84	0.91	0.98	1.05	1.12	1.19	1.26	1.33	1.40	1.47	1.54	1.51	1.61	1.82	1.96	2.03	2.10
160	0.64	0.64	0.80	0.96	1.04	1.12	1.20	1.28	1.36	1.44	1.52	1.60	1.68	1.76	1.73	1.84	2.08	2.24	2.32	2.40
180	0.72	0.72	0.90	1.08	1.17	1.26	1.35	1.44	1.53	1.62	1.71	1.80	1.89	1.98	1.94	2.07	2.34	2.52	2.61	2.70
200	0.80	0.80	1.00	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.16	2.30	2.60	2.80	2.90	3.00
220	0.88	0.88	1.10	1.32	1.43	1.54	1.65	1.76	1.87	1.98	2.09	2.20	2.31	2.42	2.38	2.53	2.86	3.08	3.19	3.30
240	0.96	0.96	1.20	1.44	1.56	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64	2.59	2.76	3.12	3.36	3.48	3.60
260	1.04	1.04	1.30	1.56	1.69	1.82	1.95	2.08	2.21	2.34	2.47	2.60	2.73	2.86	2.81	2.99	3.38	3.64	3.77	3.90
280	1.12	1.12	1.40	1.68	1.82	1.96	2.10	2.24	2.38	2.52	2.66	2.80	2.94	3.08	3.02	3.22	3.64	3.92	4.06	4.20
300	1.20	1.20	1.50	1.80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	3.00	3.15	3.30	3.24	3.45	3.90	4.20	4.35	4.50
320	1.28	1.28	1.60	1.92	2.08	2.24	2.40	2.56	2.72	2.88	3.04	3.20	3.36	3.52	3.46	3.68	4.16	4.48	4.64	4.80
340	1.36	1.36	1.70	2.04	2.21	2.38	2.55	2.72	2.89	3.06	3.23	3.40	3.57	3.74	3.67	3.91	4.42	4.76	4.93	5.10
360	1.44	1.44	1.80	2.16	2.34	2.52	2.70	2.88	3.06	3.24	3.42	3.60	3.78	3.96	3.89	4.14	4.68	5.04	5.22	5.40
380	1.52	1.52	1.90	2.28	2.47	2.66	2.85	3.04	3.23	3.42	3.61	3.80	3.99	4.18	4.10	4.37	4.94	5.32	5.51	5.70
400	1.60	1.60	2.00	2.40	2.60	2.80	3.00	3.20	3.40	3.60	3.80	4.00	4.20	4.40	4.32	4.60	5.20	5.60	5.80	6.00
420	1.68	1.68	2.10	2.52	2.73	2.94	3.15	3.36	3.57	3.78	3.99	4.20	4.41	4.62	4.54	4.83	5.46	5.88	6.09	6.30
440	1.76	1.76	2.20	2.64	2.86	3.08	3.30	3.52	3.74	3.96	4.18	4.40	4.62	4.84	4.75	5.06	5.72	6.16	6.38	6.60
460	1.84	1.84	2.30	2.76	2.99	3.22	3.45	3.68	3.91	4.14	4.37	4.60	4.83	5.06	4.97	5.29	5.98	6.44	6.67	6.90
480	1.92	1.92	2.40	2.88	3.12	3.36	3.60	3.84	4.08	4.32	4.56	4.80	5.04	5.28	5.18	5.52	6.24	6.72	6.96	7.20
500	2.00	2.00	2.50	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.40	5.75	6.50	7.00	7.25	7.50

[1]Pipe length baseline temperature = 0°F. "Expansion of Carbon, Copper and Stainless Steel Pipe," The Engineers' Toolbox, www.engineeringtoolbox.com.

Figure 15: Coiled Expansion Loops and Offsets (Plan View Shown).



Large Tubing U-bend (>3/4 in.) | Loop | Small Tubing U-bend (<3/4 in.)

Note:

All expansions joints need to be on the horizontal plane. No vertical loops permitted.

Table 39: Radii of Coiled Expansion Loops and Developed Lengths of Expansion Offsets.

Anticipated Linear Expansion (LE) (in.)		Nominal Tube Size (OD) inches						
		1/4	3/8	1/2	3/4	1	1-1/4	1-1/2
1/2	R[1]	6	7	8	9	11	12	13
	L[2]	38	44	50	59	67	74	80
1	R[1]	9	10	11	13	15	17	18
	L[2]	54	63	70	83	94	104	113
1-1/2	R[1]	11	12	14	16	18	20	22
	L[2]	66	77	86	101	115	127	138
2	R[1]	12	14	16	19	21	23	25
	L[2]	77	89	99	117	133	147	160
2-1/2	R[1]	14	16	18	21	24	26	29
	L[2]	86	99	111	131	149	165	179
3	R[1]	15	17	19	23	26	29	31
	L[2]	94	109	122	143	163	180	196
3-1/2	R[1]	16	19	21	25	28	31	34
	L[2]	102	117	131	155	176	195	212
4	R[1]	17	20	22	26	30	33	36
	L[2]	109	126	140	166	188	208	226

[1]R = Centerline Length of Pipe.
[2]L = Centerline Minimum Radius (inches).

Note:

All expansion loops and offsets should be installed in the horizontal plane to prevent the possibility of trapping oil. Loops and offsets in vertical risers should also be installed in a horizontal plane.

Pipe Bends

When bending soft copper, use long radius bends. Refer to the "Radii of Coiled Expansion Loops and Developed Lengths of Expansion Offsets" table for minimum radius specifications, page 116.

In-line Refrigeration Components

Components such as oil traps, solenoid valves, filter-dryers, sight glasses, tee fittings, and other after-market accessories are not permitted on the refrigerant piping system between the outdoor units and the indoor units. Multi V IV systems are provided with redundant systems that assure oil is properly returned to the compressor. Sight-glasses and solenoid valves may cause vapor to form in the liquid stream. Over time, dryers may deteriorate and introduce debris into the system. The designer and installer should verify the refrigerant piping system is free of traps, sagging pipes, sight glasses, filter dryers, etc.

Field-provided Isolation Ball Valves

LG allows the installation of field-supplied ball valves with Schrader ports at each indoor unit. Full-port isolation ball valves with Schrader ports (positioned between valve and indoor unit) rated for use with R410A refrigerant should be used on both the liquid and vapor lines.

If valves are not installed and a single indoor unit needs to be removed or repaired, the entire system must be shut down and evacuated. If isolation ball valves are installed, and an indoor unit needs to be repaired, the unaffected indoor units can remain operational. Reclamation of refrigerant, then, can be restricted to a single indoor unit.

Position valves with a minimum distance of three (3) to six (6) inches of pipe on either side of the valve, and placed between six (6) and twelve (12) inches from the Y-branch or header connecting the run-out pipe to the upstream main or branch pipe. If ball valves are installed closer to the indoor unit, a section of pipe becomes a dead zone when the valves are closed where oil may accumulate.

Valves shall be accessible for service. If necessary, install drywall access doors or removable ceiling panels, and position the valves to face the access door or ceiling panel opening. Mount valves with adequate space between them to allow for placement of adequate pipe insulation around the valves. Recommended best practice is to clearly label and document locations of all service valves, Y-branches, and headers.

Using Elbows

Field supplied elbows are allowed if they are long radius and designed for use with R410A refrigerant. The designer and installer, however, should be cautious with the quantity and size of fittings used, and must account for the additional pressure losses in equivalent pipe length calculation for each branch. The equivalent pipe length of each elbow must be added to each pipe segment in the LATS program. See page 110 for equivalent lengths.

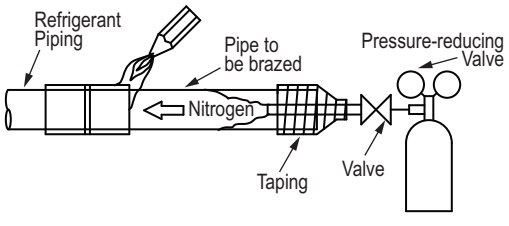
Installation of Refrigerant Piping / Brazing Practices

Note:

It is imperative to keep the piping system free of contaminants and debris such as copper burrs, slag, or carbon dust during installation.

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

Figure 16: Refrigerant Pipe Brazing.



Pipe Supports

A properly installed pipe system should be adequately supported to avoid pipe sagging. Sagging pipes become oil traps that lead to equipment malfunction.

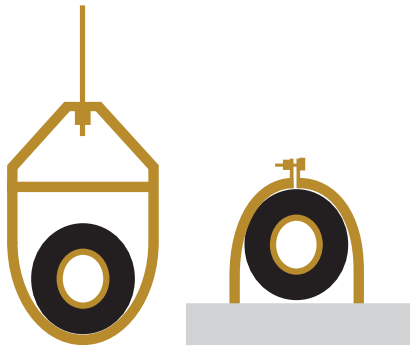
Pipe supports should never touch the pipe wall; supports shall be installed outside (around) the primary pipe insulation jacket. Insulate the pipe first because pipe supports shall be installed outside (around) the primary pipe insulation jacket. Clevis hangers should be used with shields between the hangers and insulation. Field provided pipe supports should be designed to meet local codes. If allowed by code, use fiber straps or split-ring hangers suspended from the ceiling on all-thread rods (fiber straps or split ring hangers can be used as long as they do not compress the pipe insulation). Place a second layer of insulation over the pipe insulation jacket to prevent chafing and compression of the primary insulation in the confines of the support clamp.

A properly installed pipe system will have sufficient supports to avoid pipes from sagging during the life of the system. As necessary, place supports closer for segments where potential sagging could occur. Maximum spacing of pipe supports shall meet local codes. If local codes do not specify pipe support spacing, pipe shall be supported:

- Maximum of five (5) feet on center for straight segments of pipe up to 3/4 inches outside diameter size.
- Maximum of six (6) feet on center for pipe up to one (1) inch outside diameter size.
- Maximum of eight (8) feet on center for pipe up to two (2) inches outside diameter size.

Wherever the pipe changes direction, place a hanger within twelve (12) inches on one side and within twelve (12) to nineteen (19) inches of the bend on the other side. Support piping at indoor units, Y-branch and Header fittings.

Figure 17: Pipe Hanger Details.



Note:

Use a 4" + long sheet curved sheet metal saddles between hanger bracket and insulation to promote linear expansion/contraction.

Figure 18: Typical Pipe Support Location—Change in Pipe Direction.

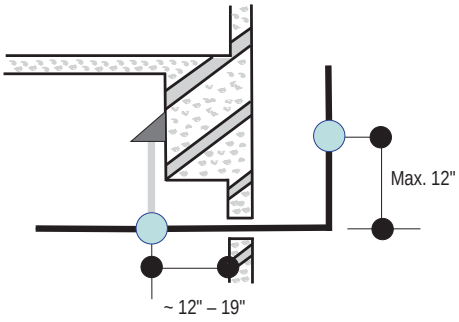


Figure 19: Pipe Support at Indoor Unit.

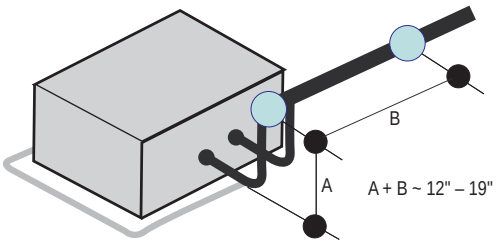


Figure 20: Pipe Support at Y-branch Fitting.

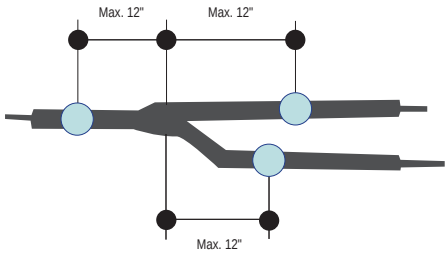
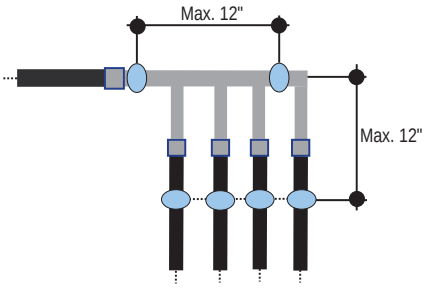


Figure 21: Pipe Support at Y-branch Fitting.



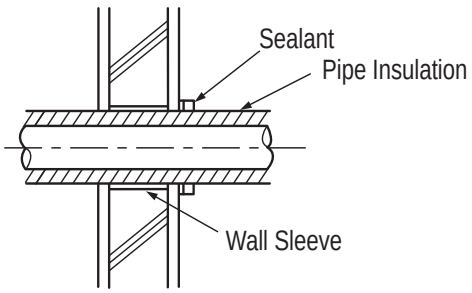
Pipe Slope

The horizontal pipe slope cannot exceed 10° up or down.

Pipe Sleeves and Wall Penetrations

LG requires that all pipe penetrations through walls, floors, and pipes buried underground be properly insulated and routed through an appropriate wall sleeve of sufficient size to prevent compression of refrigerant pipe insulation and free movement of the pipe within the sleeve. Underground refrigerant pipe shall be routed inside a protective sleeve to prevent insulation deterioration.

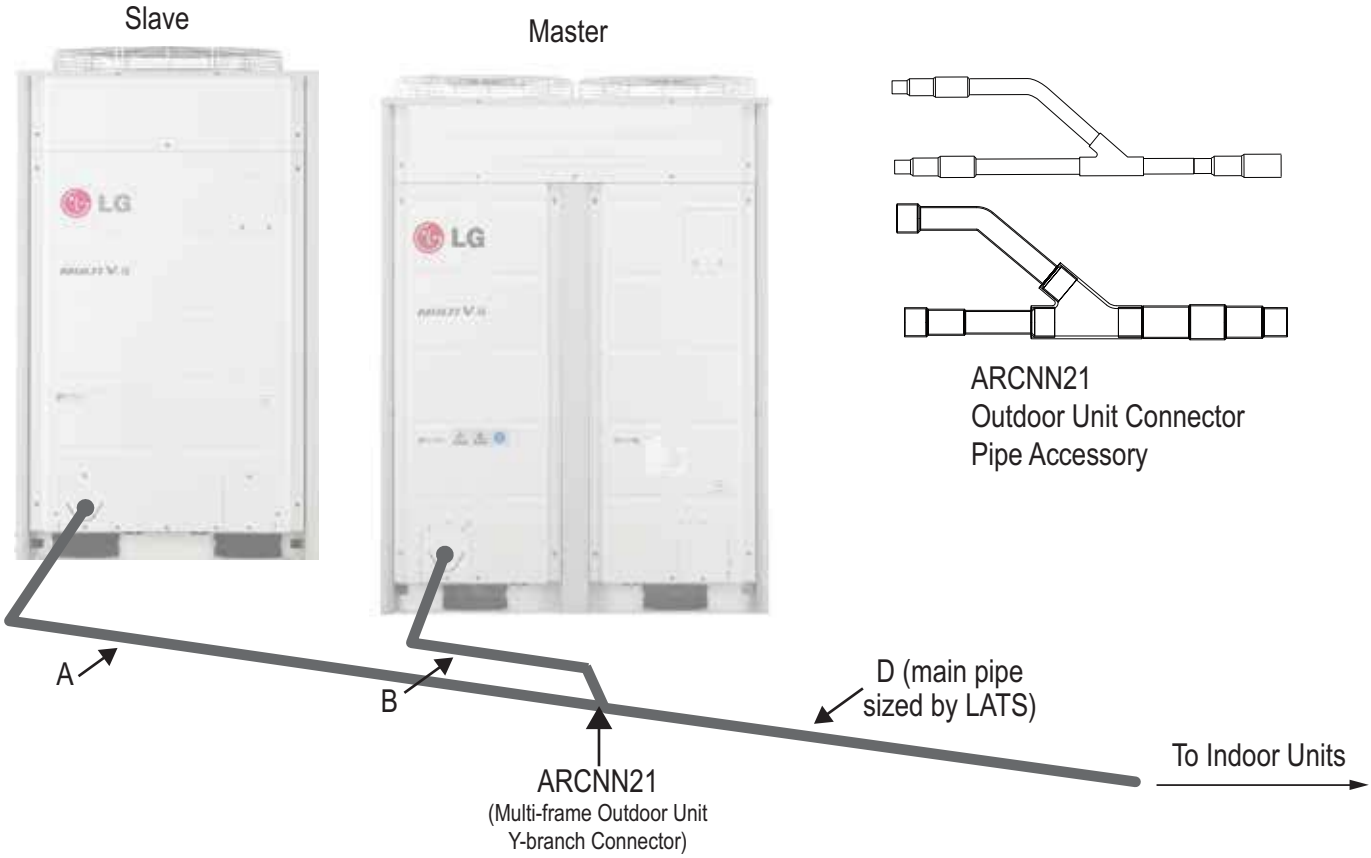
Figure 22: Typical Pipe Penetration.



LG

Dual-Frame Heat Pump Outdoor Unit Connections

Figure 23: Heat Pump Dual Frame Connections.



A and B diameters match outdoor unit connection diameters. Main pipe D diameters are sized by LATS.

Table 40: Heat Pump Dual-Frame Connection Pipe Sizes.

Size (tons)	Model	Master	Slave
16	ARUN192BTE4	ARUN121BTE4	ARUN072BTE4
	ARUN192DTE4	ARUN121DTE4	ARUN072DTE4
18	ARUN216BTE4	ARUN144BTE4	ARUN072BTE4
	ARUN216DTE4	ARUN144DTE4	ARUN072DTE4
20	ARUN240BTE4	ARUN144BTE4	ARUN096BTE4
	ARUN240DTE4	ARUN144DTE4	ARUN096DTE4
22	ARUN264BTE4	ARUN144BTE4	ARUN121BTE4
	ARUN264DTE4	ARUN144DTE4	ARUN121DTE4
24	ARUN288BTE4	ARUN144BTE4	ARUN144BTE4
	ARUN288DTE4	ARUN144DTE4	ARUN144DTE4

Note:

- *Largest-capacity outdoor units must be the master in a multi-frame system and placed in the position closest to pipe segment "D" in the figure above.*
- *Single-compressor outdoor units (72,000 Btu/h capacity) cannot be the master outdoor units in a multi-frame system.*
- *Master outdoor unit capacity must be greater than or equal to the slave1 outdoor unit capacity, and, where applicable, slave1 outdoor unit capacity must be greater than or equal to the slave2 outdoor unit capacity.*
- *Insulate all refrigerant system piping and piping connections separately as detailed on page 145-146.*

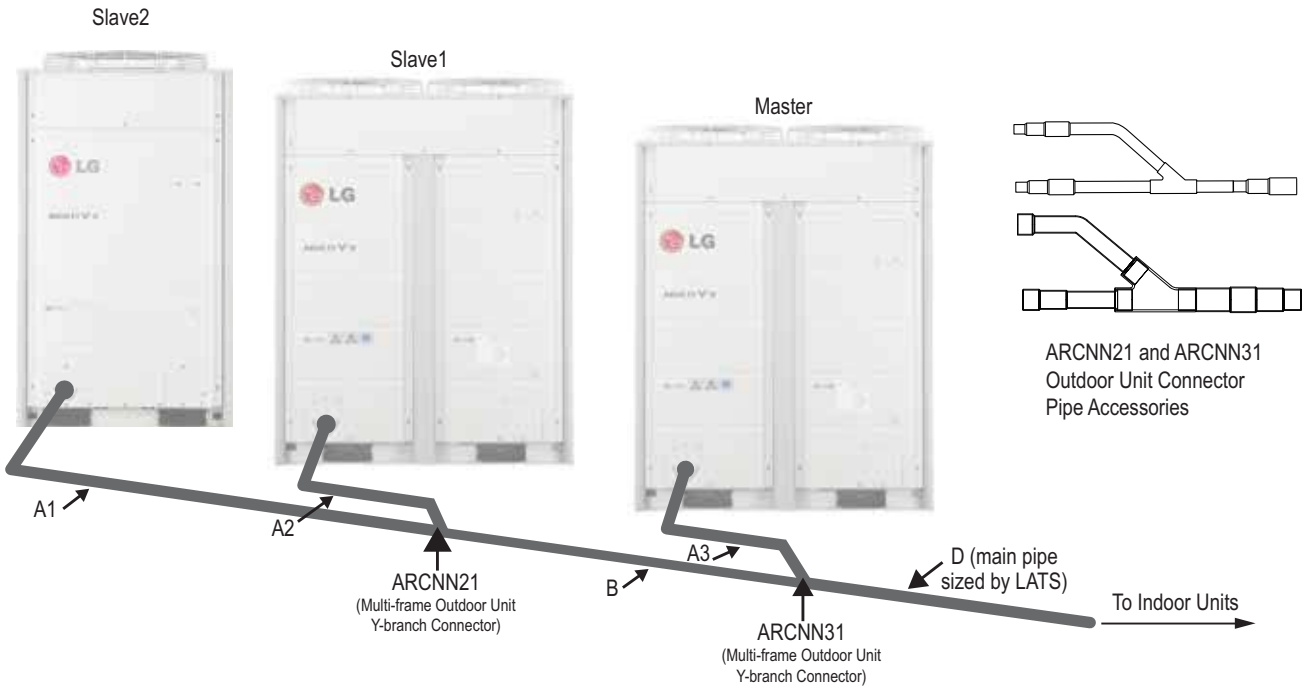
REFRIGERANT PIPING INSTALLATION

MULTI V IV

Pipe Sizing for Heat Pump Units

Triple-Frame Heat Pump Outdoor Unit Connections

Figure 24: Heat Pump Triple-Frame Connections.



A1, A2, and A3 diameters match the outdoor unit connection diameters. Main pipe D diameters are sized by LATS. See the table below for B diameters.

Table 41: Heat Pump Triple-Frame Connection Pipe Sizes.

Size (tons)	Model	Master	Slave1	Slave2	B	
					Liquid	Vapor
26	ARUN312BTE4	ARUN144BTE4	ARUN096BTE4	ARUN072BTE4	5/8"	1-1/8"
	ARUN312DTE4	ARUN144DTE4	ARUN096DTE4	ARUN072DTE4		
28	ARUN336BTE4	ARUN144BTE4	ARUN096DTE4	ARUN096BTE4		
	ARUN336DTE4	ARUN144DTE4	ARUN096DTE4	ARUN096DTE4		
30	ARUN360BTE4	ARUN144BTE4	ARUN121BTE4	ARUN096BTE4		
	ARUN360DTE4	ARUN144DTE4	ARUN121DTE4	ARUN096DTE4		
32	ARUN384BTE4	ARUN145BTE4	ARUN145BTE4	ARUN096BTE4		1-3/8"
	ARUN384DTE4	ARUN145DTE4	ARUN145DTE4	ARUN096DTE4		
34	ARUN408BTE4	ARUN145BTE4	ARUN145BTE4	ARUN121BTE4	3/4"	
	ARUN408DTE4	ARUN145DTE4	ARUN145DTE4	ARUN121DTE4		
36	ARUN432BTE4	ARUN145BTE4	ARUN145BTE4	ARUN145BTE4		
	ARUN432DTE4	ARUN145DTE4	ARUN145DTE4	ARUN145DTE4		
38	ARUN456BTE4	ARUN169BTE4	ARUN145BTE4	ARUN145BTE4		
	ARUN456DTE4	ARUN169DTE4	ARUN145DTE4	ARUN145DTE4		
40	ARUN480BTE4	ARUN169BTE4	ARUN169BTE4	ARUN145BTE4		
	ARUN480DTE4	ARUN169DTE4	ARUN169DTE4	ARUN145DTE4		
42	ARUN504BTE4	ARUN169BTE4	ARUN169BTE4	ARUN169BTE4		
	ARUN504DTE4	ARUN169DTE4	ARUN169DTE4	ARUN169DTE4		

Note:

- *Largest-capacity outdoor units must be the master in a multi-frame system and placed in the position closest to pipe segment "D" in the figure above.*
- *Single-compressor outdoor units (72,000 Btu/h capacity) cannot be the master outdoor units in a multi-frame system.*
- *Master outdoor unit capacity must be greater than or equal to the slave1 outdoor unit capacity, and, where applicable, slave1 outdoor unit capacity must be greater than or equal to the slave2 outdoor unit capacity.*
- *Insulate all refrigerant system piping and piping connections separately as detailed on page 145-146.*

LG

REFRIGERANT PIPING INSTALLATION

Pipe Sizing for Heat Pump Systems

The following is an example of manual pipe size calculations. Designers are highly encouraged to use LATS instead of manual calculations.

Y-branch Pipe Sizing for a Single Outdoor Unit System

Example: Five (5) indoor units connected

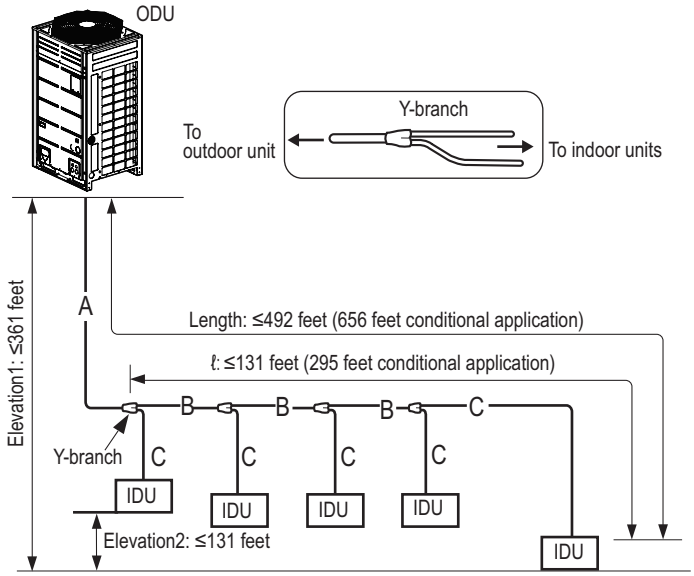
ODU: Outdoor Units.

IDU: Indoor Units.

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

B: Y-branch to Y-branch.

C: Y-branch to Indoor Unit.



Y-branch Pipe Sizing When Installing a Dual-Frame System

Example: Five (5) indoor units connected

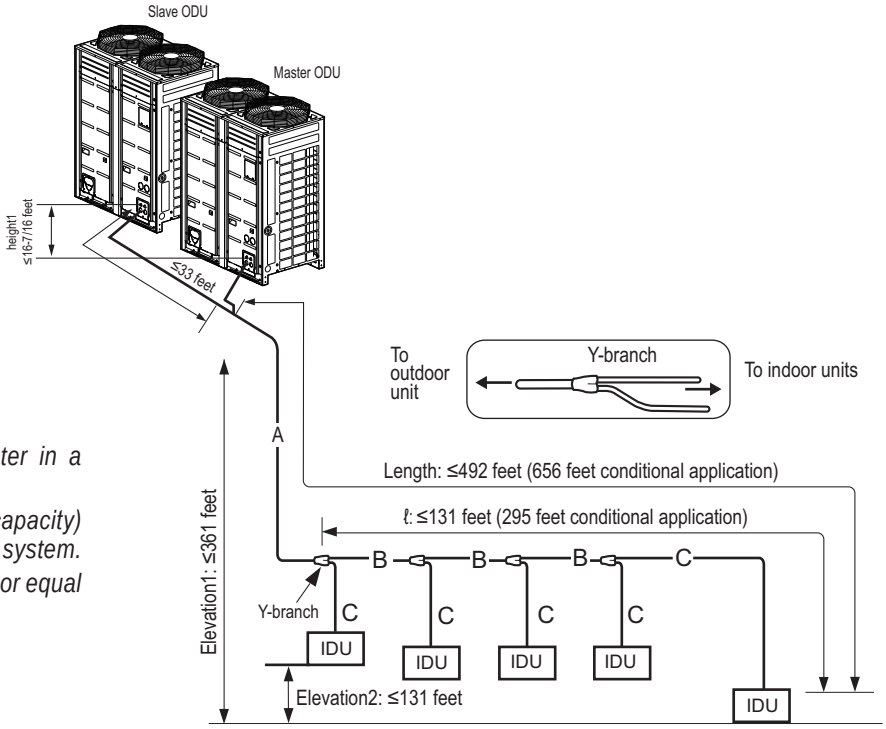
ODU: Outdoor Units.

IDU: Indoor Units.

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

B: Y-branch to Y-branch.

C: Y-branch to Indoor Unit.



Note:

- *Larger-capacity outdoor units must be the master in a multi-frame system.*
- *Single-compressor outdoor units (72,000 Btu/h capacity) cannot be the master outdoor unit in a multi-frame system.*
- *Master outdoor unit capacity must be greater than or equal to the slave outdoor unit capacity.*

Note:

See pages 123-124 for refrigerant pipe diameter and pipe length tables.

REFRIGERANT PIPING INSTALLATION

MULTI V IV

Pipe Sizing for Heat Pump Systems

The following is an example of manual pipe size calculations. Designers are highly encouraged to use LATS instead of manual calculations.

Y-branch Pipe Sizing When Installing a Triple-Frame System

Example: Five (5) indoor units connected

ODU: Outdoor Units.

IDU: Indoor Units.

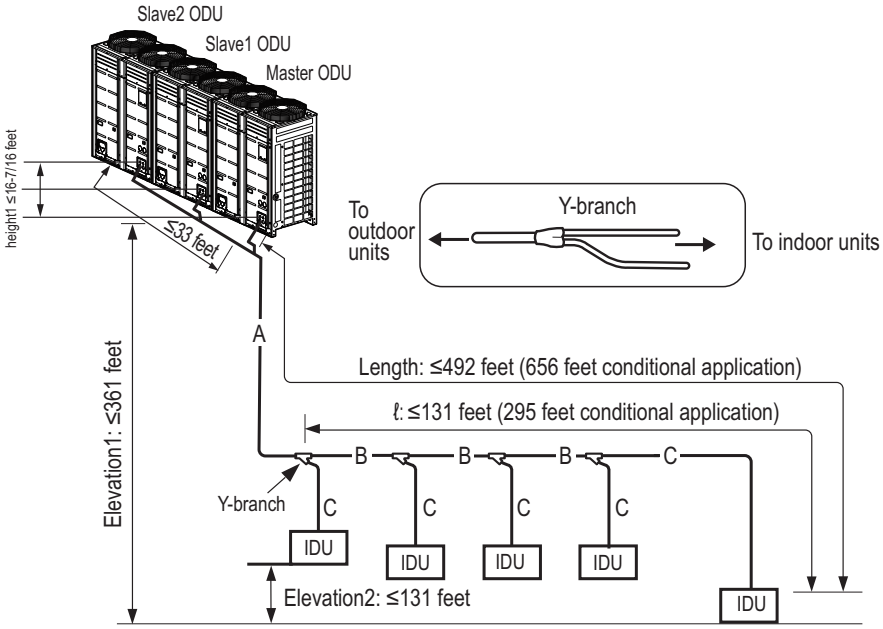
A: Main Pipe from Outdoor Unit to Y-branch.

B: Y-branch to Y-branch.

C: Y-branch to Indoor Unit.

Note:

- *Larger-capacity outdoor units must be the master in a multi-frame system.*
- *Single-compressor outdoor units (72,000 Btu/h capacity) cannot be the master outdoor unit in a multi-frame system.*
- *Master outdoor unit capacity must be greater than or equal to the slave1 outdoor unit capacity, and, where applicable, slave1 outdoor unit capacity must be greater than or equal to the slave2 outdoor unit capacity.*



Header Pipe Sizing When Installing a Single Outdoor Unit System

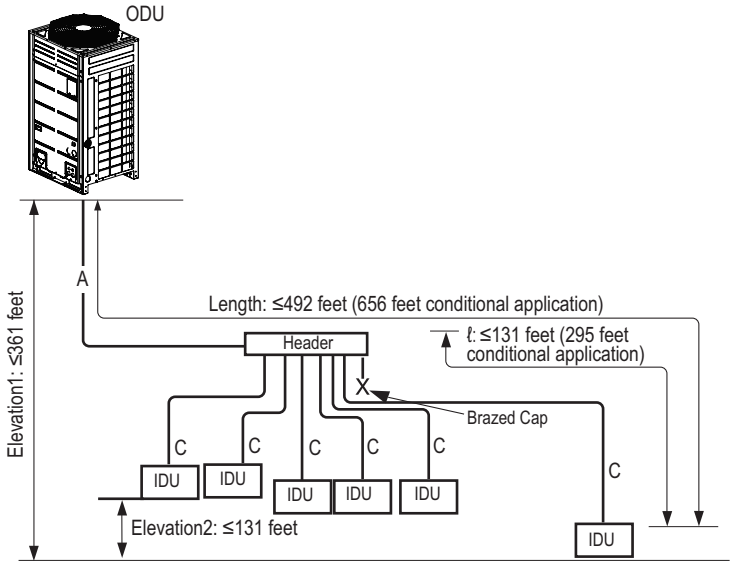
Example: Six (6) indoor units connected

ODU: Outdoor Units

IDU: Indoor Units

A: Main Pipe from Outdoor Unit to Header

C: Header to Indoor Unit



Note:

See pages 123-124 for refrigerant pipe diameter and pipe length tables.

LG

REFRIGERANT PIPING INSTALLATION

Pipe Sizing for Heat Pump Systems

The following is an example of manual pipe size calculations. Designers are highly encouraged to use LATS instead of manual calculations.

Combination Y-branch Pipe and Header Pipe Sizing When Installing a Dual-Frame System

Example: Five (5) indoor units connected

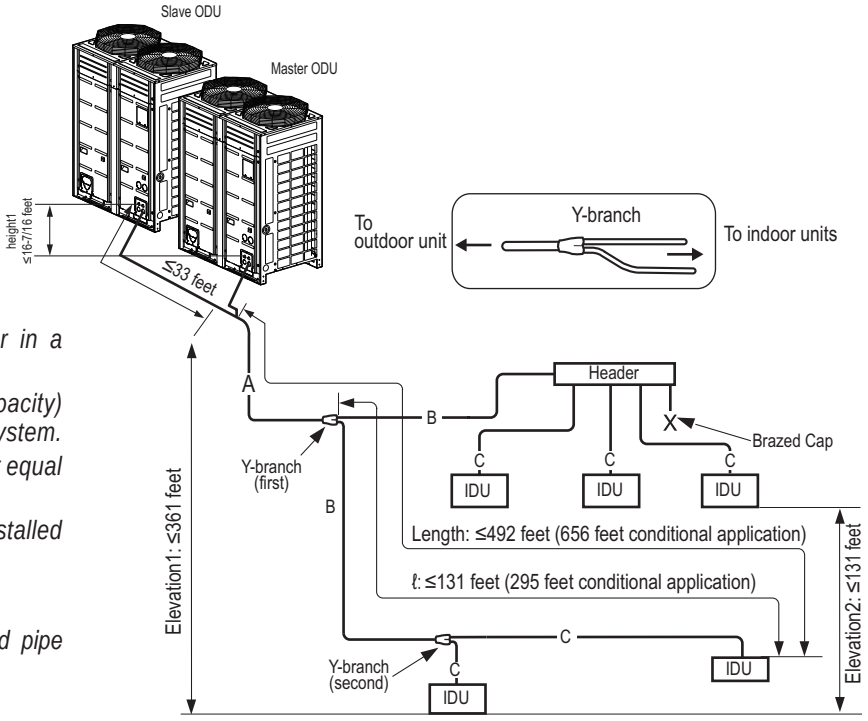
ODU: Outdoor Units.

IDU: Indoor Units.

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

B: Y-branch to Y-branch / Header.

C: Y-branch / Header to Indoor Unit.



Note:

- *Larger-capacity outdoor units must be the master in a multi-frame system.*
- *Single-compressor outdoor units (72,000 Btu/h capacity) cannot be the master outdoor unit in a multi-frame system.*
- *Master outdoor unit capacity must be greater than or equal to the slave outdoor unit capacity.*
- *Y-branches and other header branches cannot be installed downstream of the initial header branch.*

Note:

See pages 123-124 for refrigerant pipe diameter and pipe length tables.

Table 42: Main Pipe (A) Diameter from Outdoor Unit to First Y-branch / Header Branch.

ODU Capacity (ton)	Pipe diameter when pipe length is <295 feet (Standard)		Pipe diameter when pipe **length is ≥295 feet (ODU ↔ IDU)**		Pipe diameter when height differential (ODU ↔ IDU) **is >164 feet**	
	Liquid pipe (inches OD)	Vapor pipe (inches OD)	Liquid pipe (inches OD)	Vapor pipe (inches OD)	Liquid pipe (inches OD	Vapor pipe (inches OD)
6	3/8Ø	3/4Ø	1/2Ø	7/8Ø	1/2Ø	No Increase
8	3/8Ø	7/8Ø	1/2Ø	1-1/8Ø	1/2Ø	No Increase
10-12	1/2Ø	1-1/8Ø	5/8Ø	No Increase	5/8Ø	No Increase
12-14*	5/8Ø	1-1/8Ø	3/4Ø	1-1/4Ø	3/4Ø	No Increase
14-18	5/8Ø	1-1/8Ø	3/4Ø	1-1/4Ø	3/4Ø	No Increase
20	5/8Ø	1-3/8Ø	3/4Ø	No Increase	3/4Ø	No Increase
22-28	3/4Ø	1-3/8Ø	7/8Ø	1-1/2Ø	7/8Ø	No Increase
30-36	3/4Ø	1-5/8Ø	7/8Ø	No Increase	7/8Ø	No Increase

*ARUN145BTE4 / ARUN145DTE4 and ARUN169BTE4 / ARUN169DTE4 only.

Table 43: Refrigerant Pipe Diameter (B) from Y-branch to Y-branch / Header.

Downstream Total Capacity of IDUs (Btu/h)[1]	Liquid pipe (inches OD)	Vapor pipe (inches OD)
≤19,100	1/4Ø	1/2Ø
≤54,600	3/8Ø	5/8Ø
≤76,400	3/8Ø	3/4Ø
≤114,700	3/8Ø	7/8Ø
≤172,000	1/2Ø	1-1/8Ø
≤229,400	5/8Ø	1-1/8Ø
≤248,500	5/8Ø	1-3/8Ø
≤344,000	3/4Ø	1-3/8Ø
≤592,500	3/4Ø	1-5/8Ø

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

Note:

If the next higher pipe diameter size is not available, then sizing up is not possible.

Table 44: Indoor Unit Connecting Pipe from Branch (C).

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

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

REFRIGERANT PIPING INSTALLATION

MULTI V IV

Pipe Sizing for Heat Pump Systems

The following is an example of manual pipe size calculations. Designers are highly encouraged to use LATS instead of manual calculations.

Table 45: Pipe Capabilities.

Length	Total pipe length	Longest actual pipe length	Equivalent pipe length[1]
	A + ΣB + ΣC ≤ 3,280 feet	≤492 feet (656 feet conditional application)	≤574 feet (738 feet conditional application)
ℓ	Longest pipe length after first branch		
	≤131 feet (295 feet conditional application)		
Elevation1	Elevation differential (Outdoor Unit ↔ Indoor Unit)		
	Height ≤360 feet		
Elevation2	Elevation differential (Indoor Unit ↔ Indoor Unit)		
	height ≤131 feet		
height1	Elevation differential (Outdoor Unit ↔ Outdoor Unit)		
	16.4 feet		
Distance between ODU to ODU		≤33 feet (Max. 43 feet for ODU ≥12 tons)	
Distance between fittings and IDU		≥20 inches	
Distance between fittings and Y-branches / Headers		≥20 inches	
Distance between two Y-branches / Headers		≥20 inches	

[1]For calculation purposes, assume equivalent pipe length of Y branches to be 1.6 feet, and the equivalent pipe length of headers to be 3.3 feet.

Note:

- *Always reference the LATS Multi V software report.*
- *Connection piping from branch to branch cannot exceed the main pipe diameter (A) used by the outdoor unit.*
- *Y-branches and other header branches cannot be installed downstream of the initial header branch.*
- *Install the header branch 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.*

Conditional Applications

Conditional application is 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 should be sized up by one. This applies to both liquid and 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+(ΣB x 2)+ΣC ≤3,281 feet.
- Length of pipe (C) from each indoor unit to the closest Y-branch or header ≤131 ft.
- [Length of pipe from outdoor unit to farthest indoor unit (A+B+C)] - [Length of pipe from outdoor unit to closest indoor unit (A+B+C)] ≤131 feet.

If the pipe (B) diameters after the first branch are bigger than the main pipe (A) diameters, pipe (B) should changed to match main pipe (A) sizes.
Example: When an indoor unit combination ratio of 120% is connected to a 22-ton outdoor unit:
Outdoor unit main pipe (A) diameters: 1-3/8Ø inches (vapor) and 5/8Ø inches (liquid).

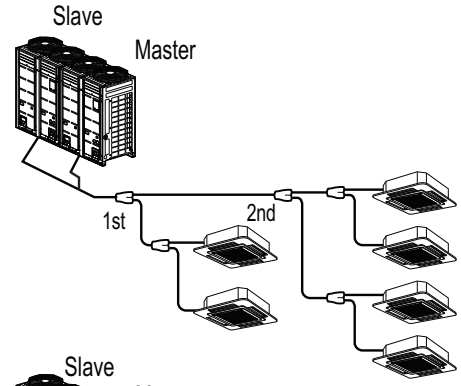
1. Pipe (B) diameters: 1-3/8Ø (vapor) and 3/4Ø (liquid) (after the first branch, when indoor unit combination ratio is 120% [26 tons]).
2. After the first branch, pipe (B) diameters must be changed to 1-3/8Ø inches (vapor) and 5/8Ø inches (liquid) to match main pipe (A) sizes.

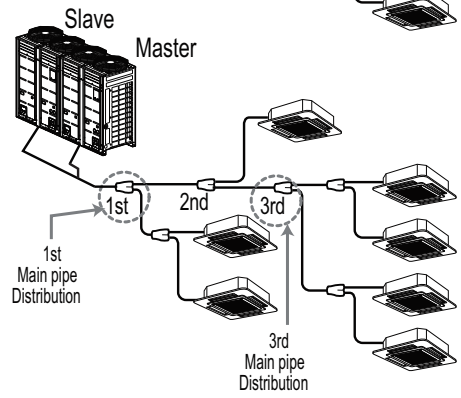
Instead of using the total indoor unit capacity to choose main pipe (A) diameters, use outdoor unit capacity to choose downstream main pipe (A) diameters. Do not permit connection pipes (B) from branch to branch to exceed main pipe (A) diameters as indicated by outdoor unit capacity. Example: When an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

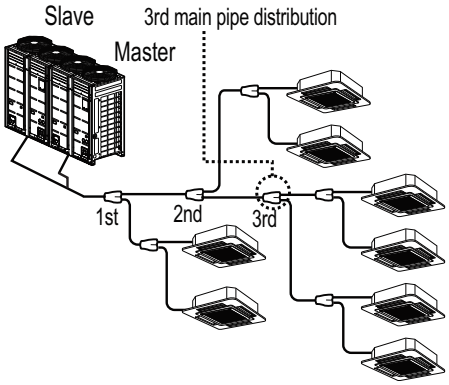
1. Main pipe (A) diameters on a 20-ton outdoor unit: 1-1/8Ø inches (vapor) and 5/8Ø inches (liquid).
2. Pipe diameters between first and second branches, however, are: 1-3/8Ø (vapor) and 3/4Ø (liquid) (connected downstream indoor unit capacity is 20 tons).
3. If main pipe (A) diameters of a 20-ton outdoor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

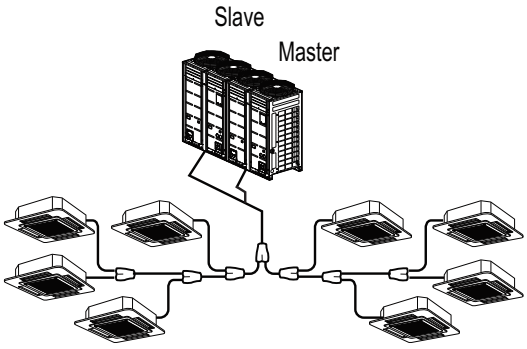
LG

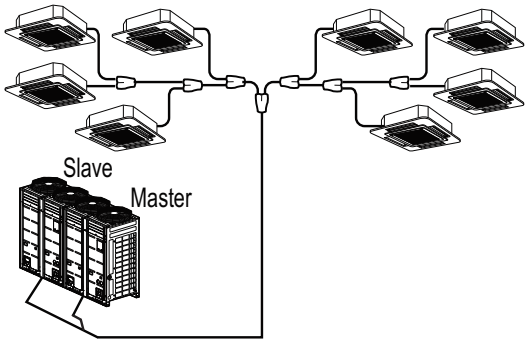
Various Acceptable Sample Layouts

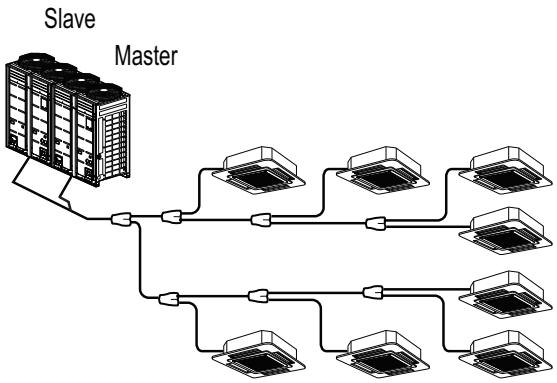


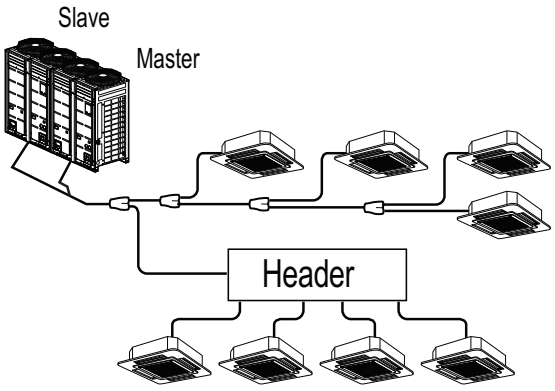












Installation

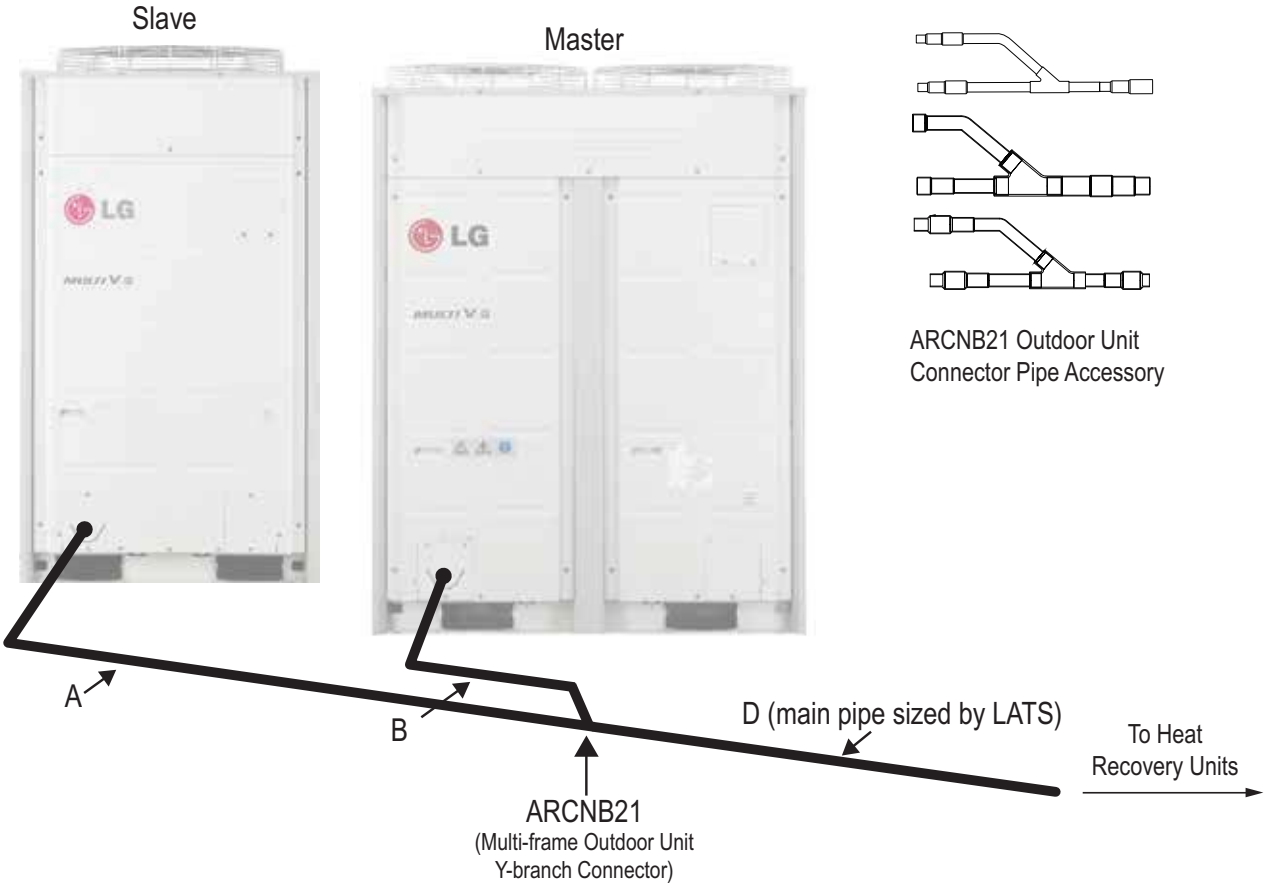
REFRIGERANT PIPING INSTALLATION

MULTI V IV

Pipe Sizing for Heat Recovery Systems

Dual-Frame Heat Recovery Outdoor Unit Connections

Figure 25: Heat Recovery Dual-Frame Connections.



Diameters for A and B match the outdoor unit connection diameters. Main pipe D diameters are sized by LATS.

Table 46: Heat Recovery Triple-Frame Connection Pipe Sizes.

Size (tons)	Model	Master	Slave
16	ARUB192BTE4	ARUB121BTE4	ARUB072BTE4
	ARUB192DTE4	ARUB121DTE4	ARUB072DTE4
18	ARUB216BTE4	ARUB144BTE4	ARUB072BTE4
	ARUB216DTE4	ARUB144DTE4	ARUB072DTE4
20	ARUB240BTE4	ARUB144BTE4	ARUB096BTE4
	ARUB240DTE4	ARUB144DTE4	ARUB096DTE4
22	ARUB264BTE4	ARUB144BTE4	ARUB121BTE4
	ARUB264DTE4	ARUB144DTE4	ARUB121DTE4
24	ARUB288BTE4	ARUB144BTE4	ARUB144BTE4
	ARUB288DTE4	ARUB144DTE4	ARUB144DTE4

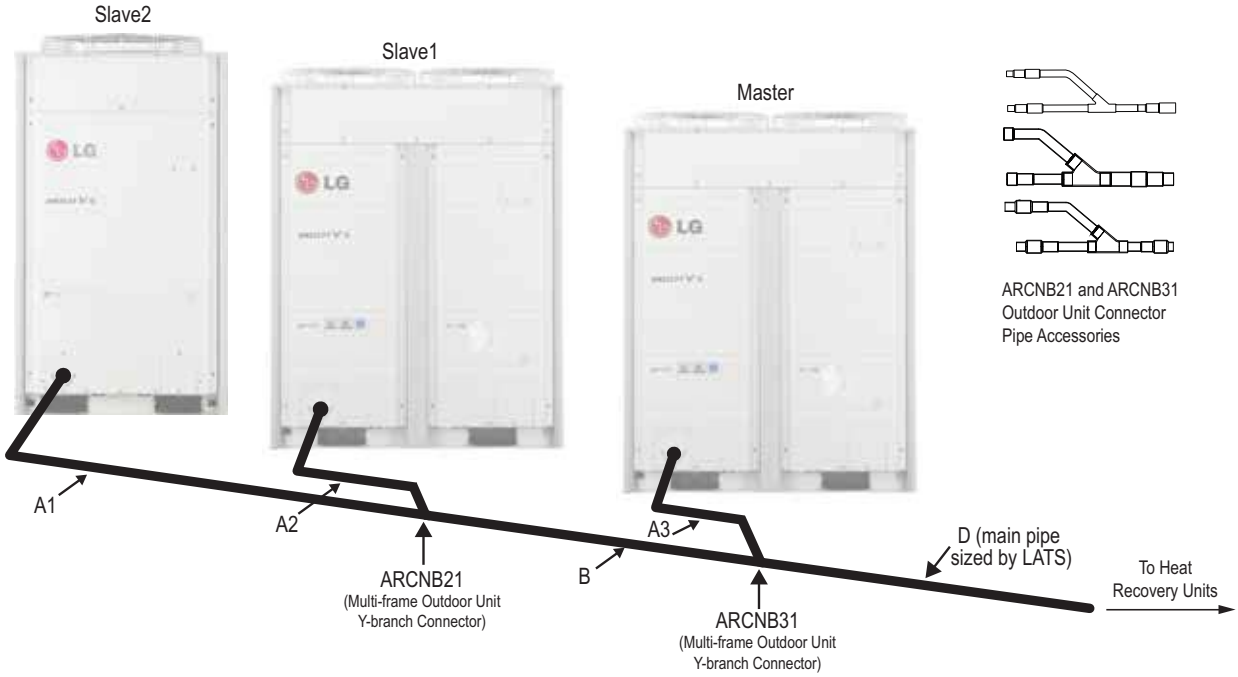
Note:

- *Largest-capacity outdoor units must be the master in a multi-frame system and placed in the position closest to pipe segment "D" in the figure above.*
- *Single-compressor outdoor units (72,000 Btu/h capacity) cannot be the master outdoor units in a multi-frame system.*
- *Master outdoor unit capacity must be greater than or equal to the slave1 outdoor unit capacity, and, where applicable, slave1 outdoor unit capacity must be greater than or equal to the slave2 outdoor unit capacity.*
- *Insulate all refrigerant system piping and piping connections separately as detailed on page 145-146.*

LG

Triple-Frame Heat Recovery Outdoor Unit Connections

Figure 26: Heat Recovery Triple-Frame Connections.



Diameters for A1, A2, and A3 match the outdoor unit connection diameters. Main pipe D diameters are sized by LATS. See the table below for B diameters.

Table 47: Heat Recovery Triple-Frame Connection Pipe Sizes.

Size (tons)	Model	Master	Slave1	Slave2	B		
					Liquid	Low Pressure Vapor	High Pressure Vapor
26	ARUB312BTE4	ARUB144BTE4	ARUB096BTE4	ARUB072BTE4	5/8"	1-1/8"	7/8"
	ARUB312DTE4	ARUB144DTE4	ARUB096DTE4	ARUB072DTE4			
28	ARUB336BTE4	ARUB144BTE4	ARUB096DTE4	ARUB096BTE4			
	ARUB336DTE4	ARUB144DTE4	ARUB096DTE4	ARUB096DTE4			
30	ARUB360BTE4	ARUB144BTE4	ARUB121BTE4	ARUB096BTE4			1-1/8"
	ARUB360DTE4	ARUB144DTE4	ARUB121DTE4	ARUB096DTE4			
32	ARUB384BTE4	ARUB145BTE4	ARUB145BTE4	ARUB096BTE4		1-3/8"	
	ARUB384DTE4	ARUB145DTE4	ARUB145DTE4	ARUB096DTE4			
34	ARUB408BTE4	ARUB145BTE4	ARUB145BTE4	ARUB121BTE4	3/4"		
	ARUB408DTE4	ARUB145DTE4	ARUB145DTE4	ARUB121DTE4			
36	ARUB432BTE4	ARUB145BTE4	ARUB145BTE4	ARUB145BTE4			
	ARUB432DTE4	ARUB145DTE4	ARUB145DTE4	ARUB145DTE4			
38	ARUB456BTE4	ARUB169BTE4	ARUB145BTE4	ARUB145BTE4			
	ARUB456DTE4	ARUB169DTE4	ARUB145DTE4	ARUB145DTE4			
40	ARUB480BTE4	ARUB169BTE4	ARUB169BTE4	ARUB145BTE4			
	ARUB480DTE4	ARUB169DTE4	ARUB169DTE4	ARUB145DTE4			
42	ARUB504BTE4	ARUB169BTE4	ARUB169BTE4	ARUB169BTE4			
	ARUB504DTE4	ARUB169DTE4	ARUB169DTE4	ARUB169DTE4			

Note:

- *Largest-capacity outdoor units must be the master in a multi-frame system and placed in the position closest to pipe segment "D" in the figure above.*
- *Single-compressor outdoor units (72,000 Btu/h capacity) cannot be the master outdoor units in a multi-frame system.*
- *Master outdoor unit capacity must be greater than or equal to the slave1 outdoor unit capacity, and, where applicable, slave1 outdoor unit capacity must be greater than or equal to the slave2 outdoor unit capacity.*
- *Insulate all refrigerant system piping and piping connections separately as detailed on page 145-146.*

REFRIGERANT PIPING INSTALLATION

Pipe Sizing for Heat Recovery Systems

The following is an example of manual pipe size calculations. Designers are highly encouraged to use LATS instead of manual calculations.

Pipe Sizing When Installing Heat Recovery Units

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

ODU: Outdoor Units.

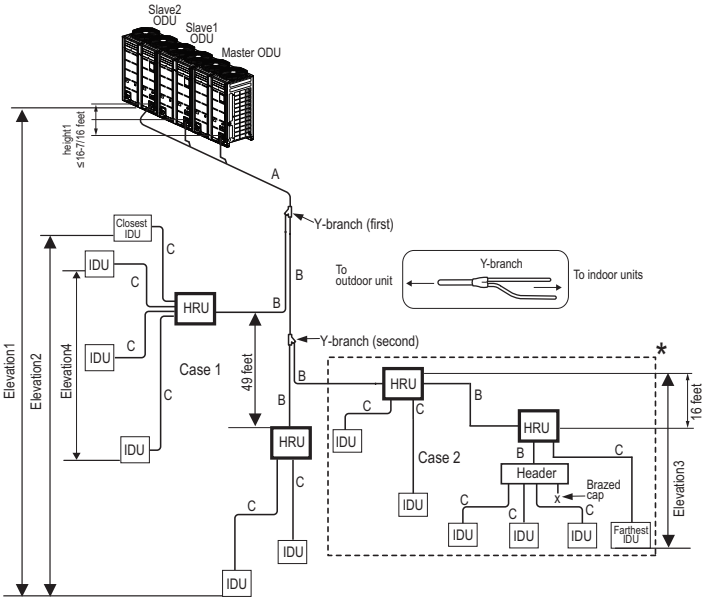
HRU: Heat Recovery Units.

IDU: Indoor units.

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

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

C: Heat Recovery Unit / Header to Indoor Unit.



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

Note:

- *Connection piping from branch to branch cannot exceed the main pipe diameter (A) used by the outdoor unit.*
- *Install the header branches or heat recovery units so that the pipe distances between the connected indoor units are minimized. Large differences in pipe distances can cause indoor unit performances to fluctuate.*
- *Y-branches and other headers 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 should be used. (Refer to the PCB of the heat recovery unit for the valve group control setting.)*
- *Always reference the LATS Multi V software report.*

Note:

See pages 128-129 for refrigerant pipe diameter and pipe length tables.

Note:

- *Larger-capacity outdoor units must be the master in a multi-frame system.*
- *Single-compressor outdoor units (72,000 Btu/h capacity) cannot be the master outdoor unit in a multi-frame system.*
- *Master outdoor unit capacity must be greater than or equal to the slave1 outdoor unit capacity, and, where applicable, slave1 outdoor unit capacity must be greater than or equal to the slave2 outdoor unit capacity.*

Table 48: Main Pipe (A) Diameter from Outdoor Unit to First Y-branch.

ODU Capacity (ton)	Standard Pipe Diameter			**Pipe diameter when pipe length is ≥295 feet or when height differential (ODU ↔IDU) is >164 feet**		
	Liquid Pipe (inches OD)	Low Pressure Vapor Pipe (inches OD)	High Pressure Vapor Pipe (inches OD)	Liquid Pipe (inches OD)	Low Pressure Vapor Pipe (inches OD)	High Pressure Vapor Pipe (inches OD)
6	3/8Ø	3/4Ø	5/8Ø	1/2Ø	No Increase	No Increase
8	3/8Ø	7/8Ø	3/4Ø	1/2Ø	No Increase	No Increase
10	1/2Ø	1-1/8Ø	3/4Ø	5/8Ø	No Increase	No Increase
12	1/2Ø	1-1/8Ø	7/8Ø	5/8Ø	No Increase	No Increase
12-14*	5/8Ø	1-1/8Ø	7/8Ø	3/4Ø	No Increase	No Increase
14-16	5/8Ø	1-1/8Ø	7/8Ø	3/4Ø	No Increase	No Increase
18-20	5/8Ø	1-3/8Ø	1-1/8Ø	3/4Ø	No Increase	No Increase
22-28	3/4Ø	1-3/8Ø	1-1/8Ø	7/8Ø	No Increase	No Increase
30-36	3/4Ø	1-5/8Ø	1-1/8Ø	7/8Ø	No Increase	No Increase

*ARUB145BTE4 / ARUB145DTE4 and ARUB169BTE4 / ARUB169DTE4 only.

Pipe Sizing for Heat Recovery Systems

The following is an example of manual pipe size calculations. Designers are highly encouraged to use LATS instead of manual calculations.

Table 49: Refrigerant Pipe (B) Diameter between Y-branches and Y-branches / Heat Recovery Unit / Headers.

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

Table 50: Indoor Unit Connecting Pipe from Branch (C).

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

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

Table 51: Pipe Capabilities.

Length	Total pipe length	Longest actual pipe length	Equivalent pipe length[1]
	A + ΣB + ΣC ≤ 3,280 feet	≤492 feet (656 feet conditional application)	≤574 feet (738 feet conditional application)
ℓ	Longest pipe length after first branch		
	≤131 feet (295 feet conditional application)		
Elevation1	Elevation differential (Outdoor Unit ↔ Indoor Unit)		
	Height ≤361 feet		
Elevation2	Elevation differential (Indoor Unit ↔ Indoor Unit connected to parallel heat recovery units)		
	height ≤131 feet		
Elevation3	Elevation differential (Indoor Unit ↔ Heat Recovery Unit [single Heat Recovery Unit or series Heat Recovery Units])		
	≤49 feet		
Elevation4	Elevation differential (Indoor Unit ↔ Indoor Unit [connected to same Heat Recovery Unit])		
	≤49 feet		
height1	Elevation differential (Outdoor Unit ↔ Outdoor Unit)		
	≤16.4 feet		
Distance between Outdoor Unit to Outdoor Unit			≤33 feet (Max. 43 feet for Outdoor Unit ≥12 tons)
Distance between fittings and Indoor Unit			≥20 inches
Distance between fittings and Y-branches / Headers			≥20 inches
Distance between two Y-branches / Headers			≥20 inches
Height differential between two Heat Recovery Units if installed with a Y-branch			≤49 feet
Height differential between two series-piped Heat Recovery Units			≤16 feet

[1]For calculation purposes, assume equivalent pipe length of Y-branches to be 1.6 feet, and the equivalent pipe length of headers to be 3.3 feet.

Conditional Applications

Conditional application is 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):

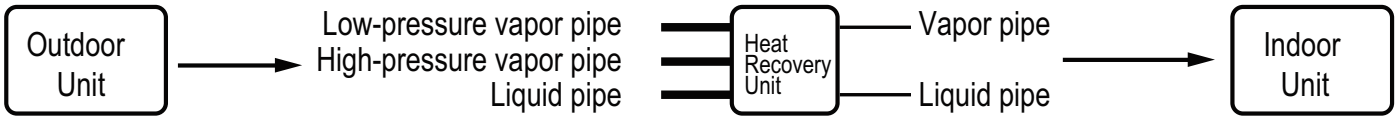
- Pipe segment diameters between the first branch and the last branch should be sized up by one. This applies to both liquid and low / high vapor pipes. If the next size up is not available, or if the pipe segment diameters are the same as main pipe (A) diameters, sizing up is not possible.
- While calculating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

REFRIGERANT PIPING INSTALLATION

MULTI V IV

Pipe Sizing for Heat Recovery Systems

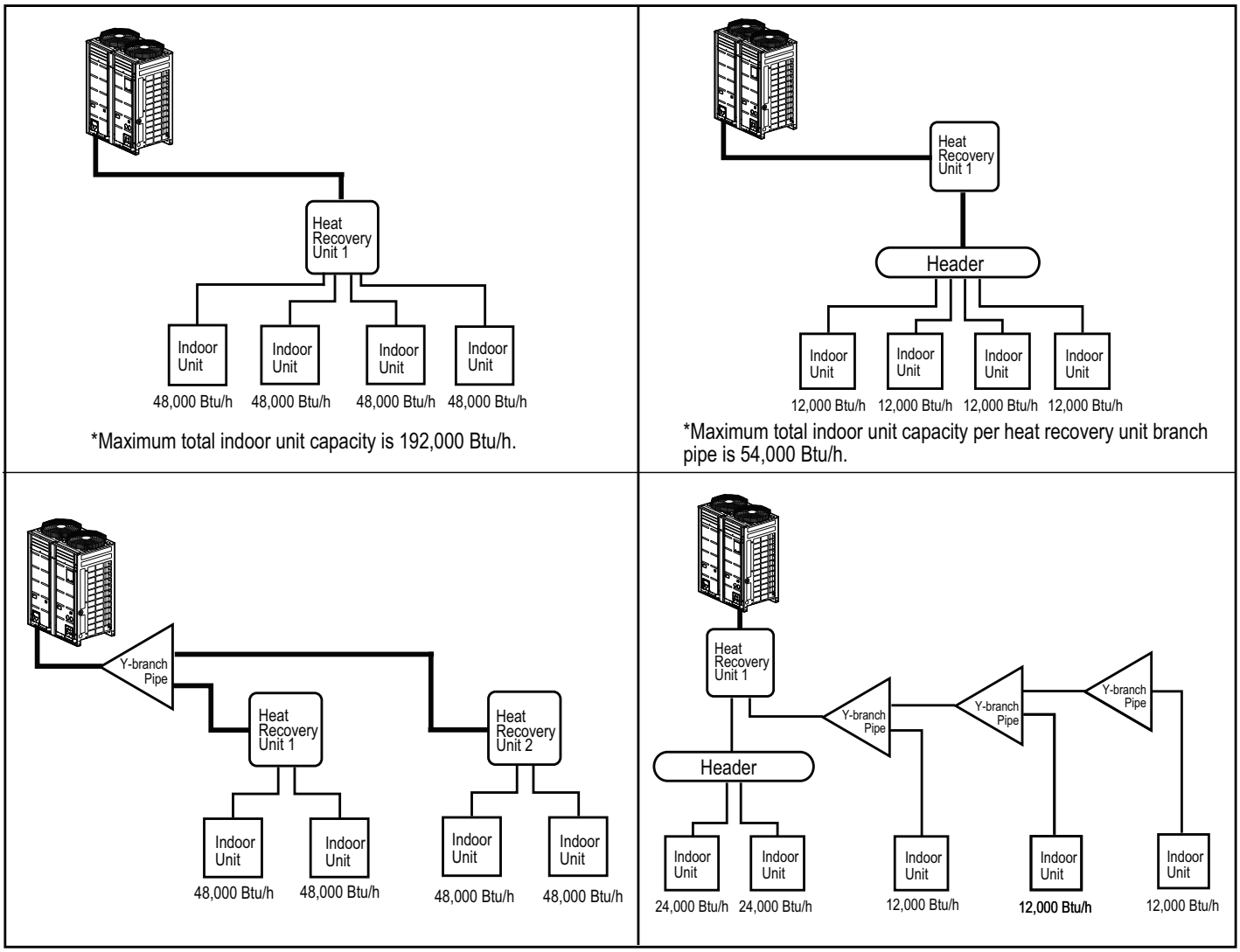
Other Examples of Y-branch, Header and Heat Recovery Unit Connections



Pipe installation from outdoor units to heat recovery units

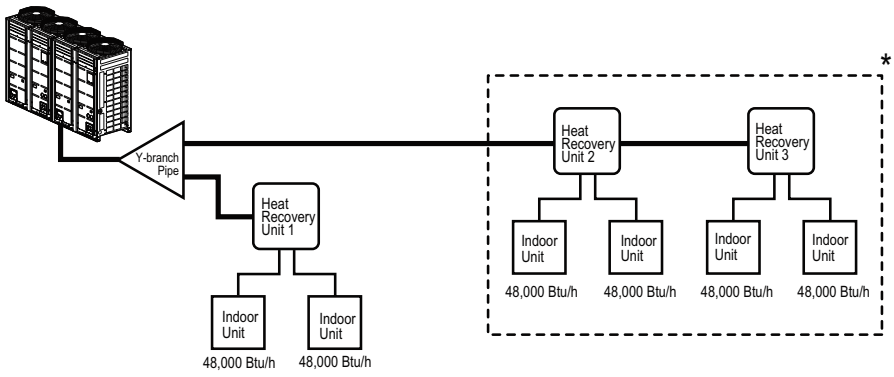
——— : Three (3) pipes (Low-pressure vapor pipe, High-pressure vapor pipe, Liquid pipe)

Pipe installation from heat recovery units to indoor units

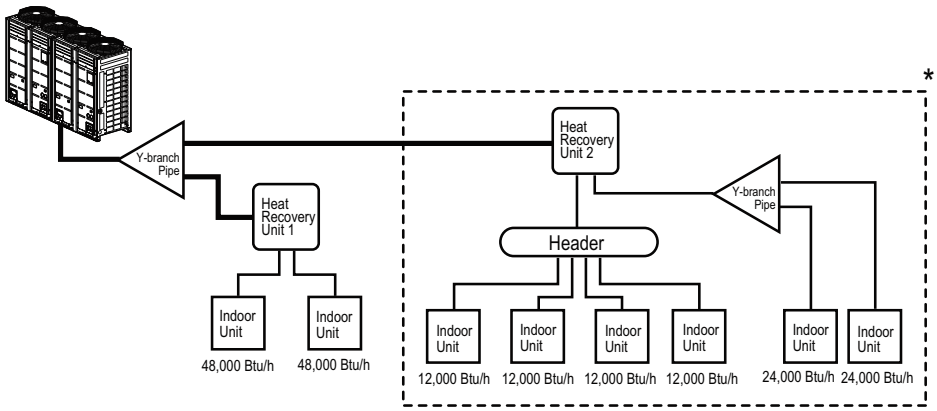


LG

Other Examples of Y-branch, Header and Heat Recovery Unit Connections

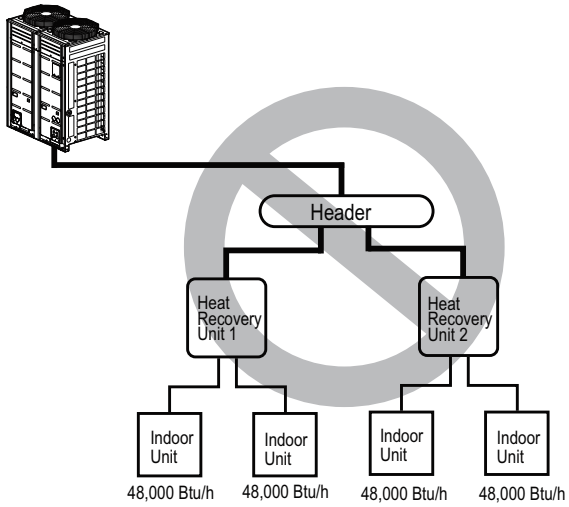


*Serial connection of Heat Recovery Units: Total capacity of indoor units ≤192,000 Btu/h.

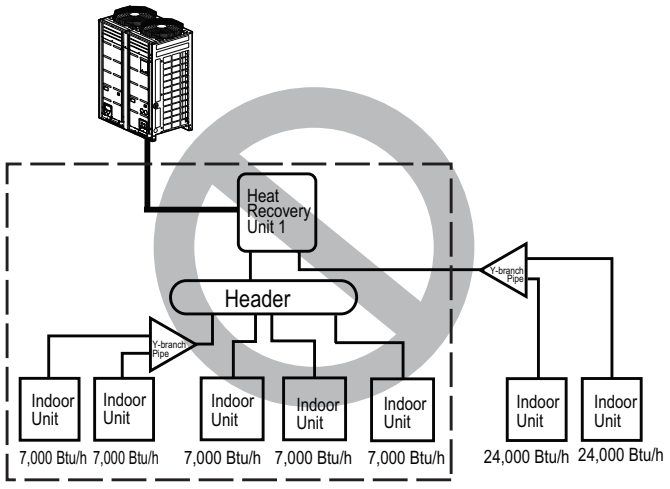


*Maximum indoor units per Header branch is eight (8).

Examples of Improper Connections



*Improper installation: Header branch pipe → heat recovery unit.



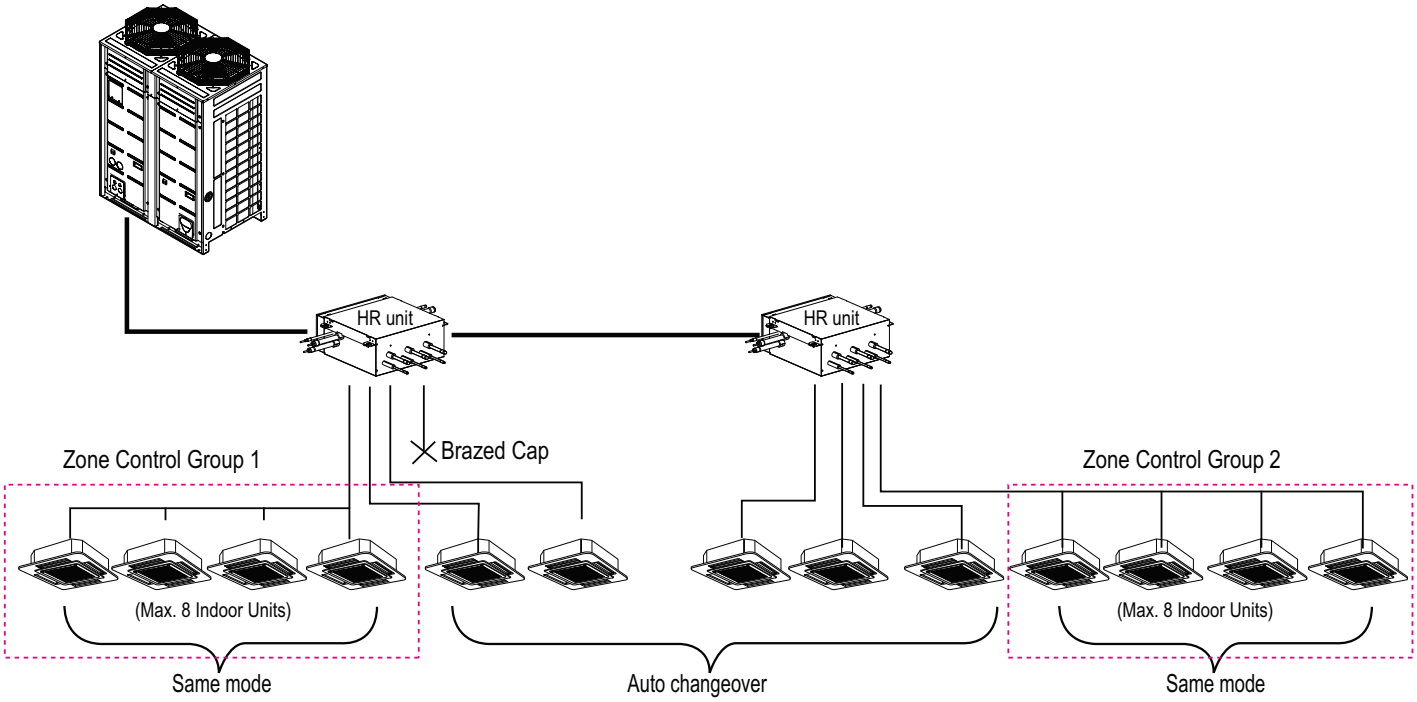
*Improper installation: Heat recovery unit → Header branch pipe → Y-branch and Header branch pipe.

REFRIGERANT PIPING INSTALLATION

Pipe Sizing for Heat Recovery Systems

Zone Control with Heat Recovery Systems

Some indoor units can be connected to one port of heat recovery unit.



- One heat recovery unit branch pipe can support a maximum of 54,000 Btu/h total indoor unit cooling capacity.
- PRHR041A heat recovery unit can support a maximum of 192,000 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 changeover to / operate in the opposite mode.

Heat Recovery Units

Note:

1. *Series connection of heat recovery units: Total capacity of indoor units ≤192,000 Btu/h.*
2. *Refer to the heat recovery unit PCB for valve group control setting.*
3. *Maximum capacity of each port is 54,000 Btu/h and eight (8) indoor units.*
4. *Do not skip ports when connecting indoor units. Start at port 1, then 2, then 3, then 4.*

Figure 27: Close Up of the Heat Recovery Unit Connections.

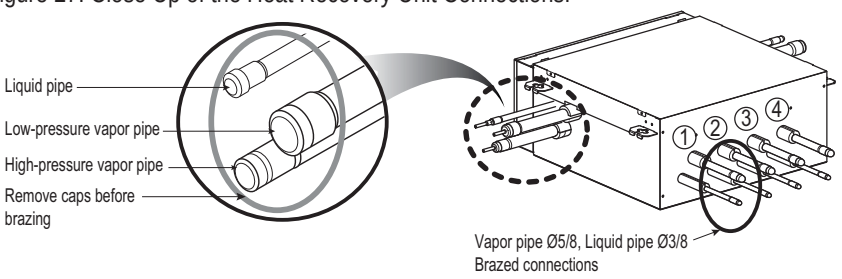


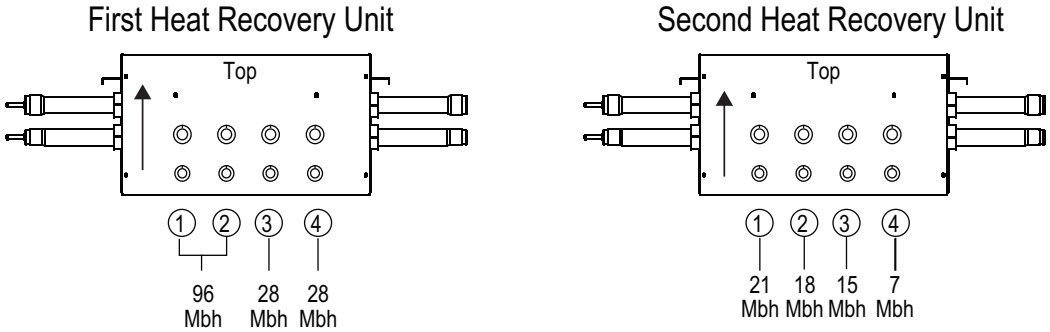
Table 52: Heat Recovery Unit Piping Connection Sizes.

Heat Recovery Unit	PRHR022A (Two Ports)	PRHR032A (Three Ports)	PRHR042A (Four Ports)
Low-pressure vapor pipe (inches)	7/8Ø	1-1/8Ø	1-1/8Ø
High-pressure vapor pipe (inches)	3/4Ø	7/8Ø	7/8Ø
Liquid pipe (inches)	3/8Ø	1/2Ø	5/8Ø

Combining Heat Recovery Ports for Large Indoor Units (currently includes High Static Ducted models ARNU76GB8-, ARNU96GB8-)

It is necessary to combine two ports on a heat recovery unit 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.

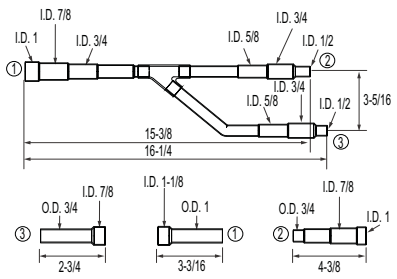
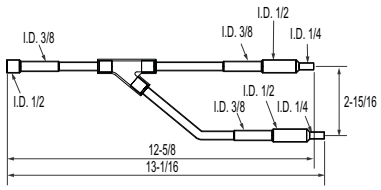
Figure 28: Heat Recovery Unit Ports Connections for Large Indoor Units.



Note:

If large capacity indoor units (larger than 54,000 Btu/h) are installed, the Y-branch pipe shown in the table below should be used to twin the ports.

Unit: Inch

Kit Model No.	Vapor Pipe Dimensions	Vapor Pipe Model No.	Liquid Pipe Dimensions	Liquid Pipe Model No.
ARBLN03321		AJR54072906		AJR54072902

REFRIGERANT PIPING INSTALLATION

MULTI V IV

Pipe Connections and Factory-supplied Shut-off Valve Operation

- Connect the end of the pipe to the branch pipes.
- Outdoor unit refrigerant pipes are divided at the end to connect to each indoor unit.
- Use flare connections for the indoor units, and braze connections for the outdoor pipes and branch pipes.
- Use a hexagon wrench to open and close the valve.

Figure 29: Heat Pump Outdoor Unit Valves (Front Side View).

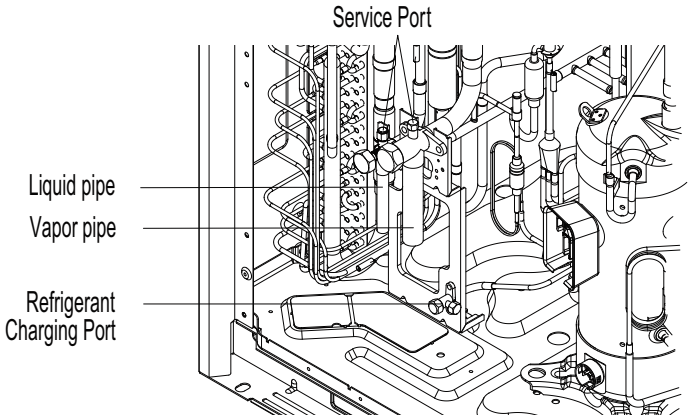
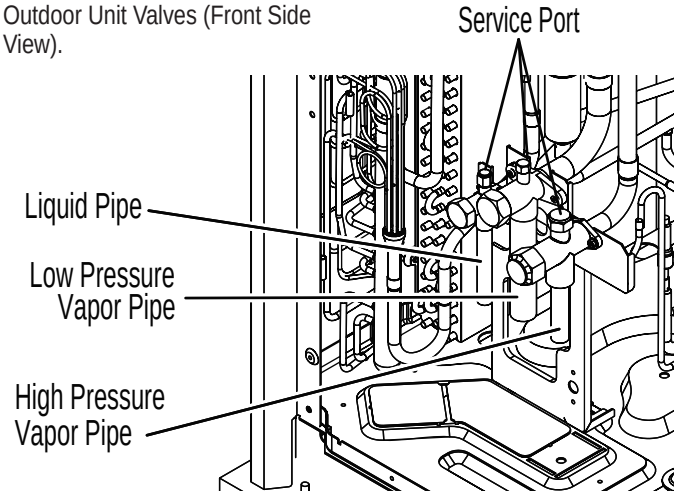
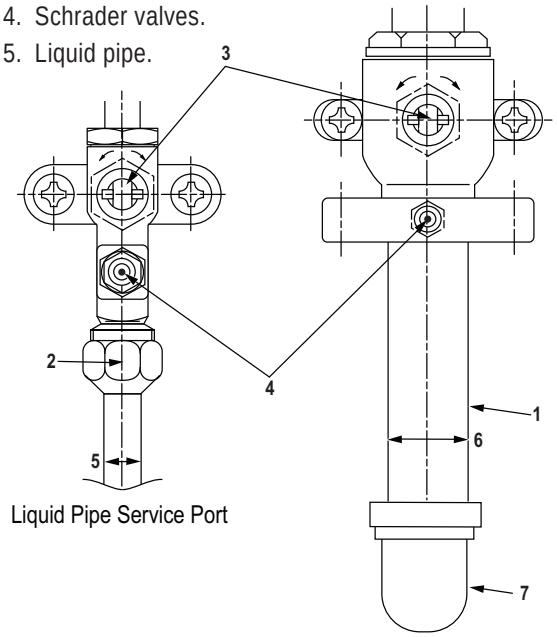


Figure 30: Heat Recovery Outdoor Unit Valves (Front Side View).



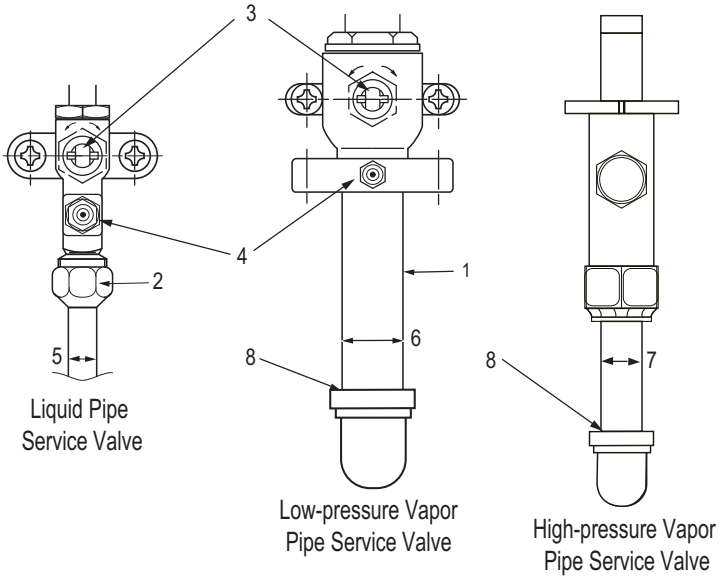
Heat Pump Unit Service Valve Detail

1. Field piping.
2. Flare nut.
3. Ball type service valves.
4. Schrader valves.
5. Liquid pipe.
6. Vapor pipe.
7. Field-supplied 90° elbow.



Heat Recovery Unit Service Valve Detail

1. Field piping.
2. Flare nut.
3. Ball type service valves.
4. Schrader valves.
5. Liquid pipe.
6. Low-pressure Vapor pipe.
7. High-pressure Vapor pipe
8. Field-supplied 90° elbow.



Note:

Do not expose the service valves of the outdoor unit to heat. Protect the service valve with a wet towel during brazing.

LG

REFRIGERANT PIPING INSTALLATION

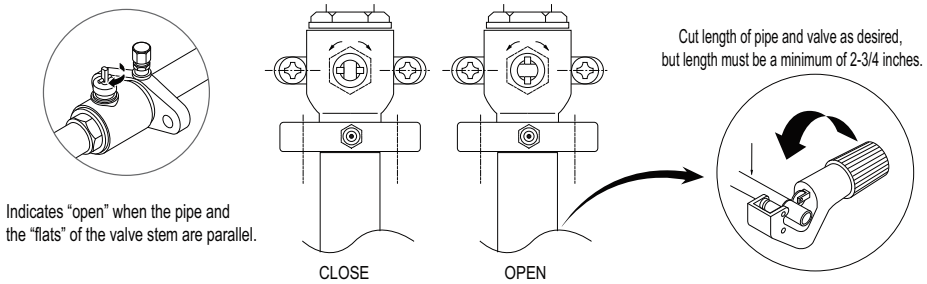
Pipe Connections Between Outdoor Units and Indoor Units

Operating the Service Valves

1. Loosen or tighten the flare nut by using a torque wrench and backup wrench. Coat the flare connection with polyvinyl ether (PVE) refrigeration oil.
2. Remove service valve cap. To operate the shutoff valve, turn ball valve stem 90° using an open-end wrench. Always backseat the valve. After operation, always replace the caps (Tightening torque of service valve cap: =18.0 lb-ft).
3. Evacuate the system, and then charge the refrigerant using the Schrader valve. Reattach the Schrader valve cap after servicing is complete. (Tightening torque of service cap: =10.0 lb-ft).

- The unit ships with a factory charge of refrigerant. When connecting and brazing the vapor line, protect the service and Schrader valves from excessive heat using a wet rag or cooling gel product.
- After connections are complete, verify that the service ports and caps are securely tightened to prevent leaking refrigerant gas.

Figure 31: Service Valves - Open and Closed Positions.



Note:

- *When connecting the refrigerant piping, make sure the service valves of the outdoor unit are completely closed (factory setting). Do not open the service valves or attempt to operate the system until the refrigerant pipe system installation has been completed. Never open the valves before a pressure test is performed, the system is evacuated, a leak test performed, and the Commissioning Agent provides authorization to do so.*
- *Do not use polyolester (POE) or any other type of mineral oil as a thread lubricant. If introduced to the refrigerant circuit, will create oil sludge leading to system malfunction. Use PVE (polyvinyl ether) type refrigeration oil only.*
- *Fill gaps between the unit case and the refrigerant and electrical connections to prevent rodent and animal entry.*

⚠ WARNING

- *Always take extreme caution to prevent refrigerant gas (R410A) from leaking during use, around fire or flame, and during brazing. If the refrigerant gas comes in contact with a flame from any source, it may break down and generate a poisonous gas. Never braze in a room that is not ventilated. After refrigerant piping work is complete, securely tighten both service and Schrader valves to help prevent refrigerant gas from leaking. Verify the system is free of leaks after refrigerant piping installation is complete.*
- *Do not attempt to remove the service valve stem and packing or Shrader valve core. Physical injury or death may occur from the uncontrolled rapid release of refrigerant.*

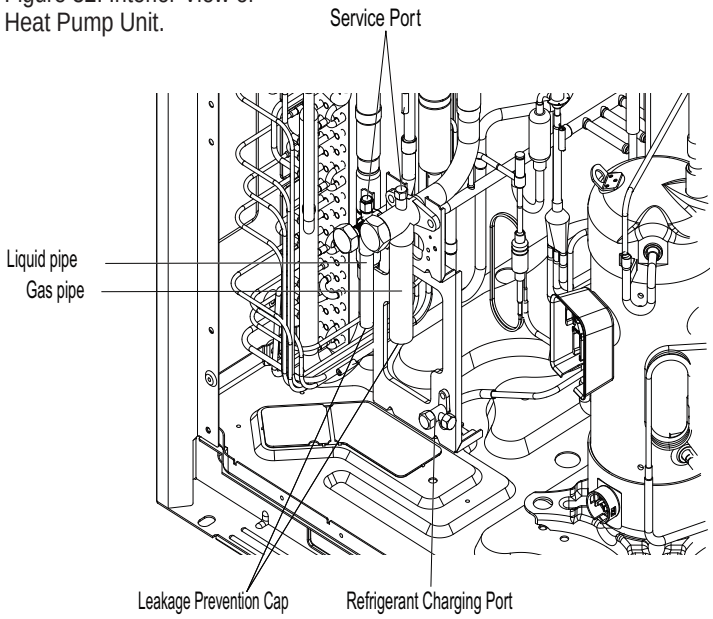
Heat Pump Unit Connections

1. Remove the leak-prevention cap.
2. Check if the liquid and vapor pipes are fully locked.
3. Vacuum out any remaining refrigerant or air through the service port.

Note:

The leak-prevention cap attached to the outdoor unit service valves must be removed before pipe installation.

Figure 32: Interior View of Heat Pump Unit.



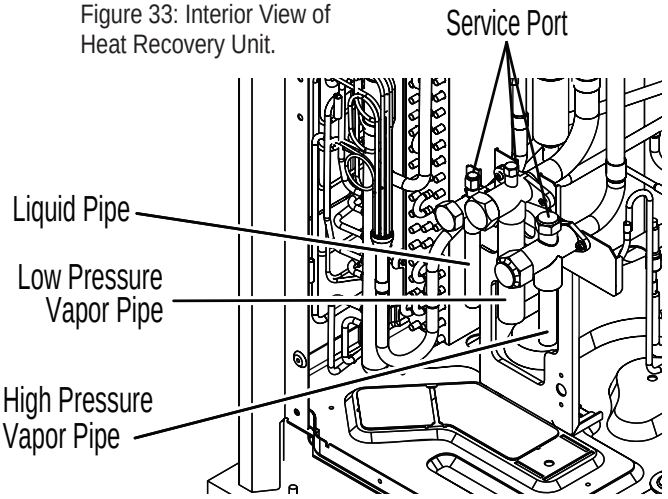
REFRIGERANT PIPING INSTALLATION

Pipe Connections Between Outdoor Units and Indoor Units

Heat Recovery Unit Connections

1. Remove the leak-prevention cap.
2. Check if the liquid, low pressure vapor, and high pressure vapor pipes are locked.
3. Vacuum out any remaining refrigerant or air through the service port.

Figure 33: Interior View of Heat Recovery Unit.



- Refrigerant piping can be positioned through front or bottom access holes on the outdoor unit, depending on installation needs.
- Access holes at the bottom of the unit can be used for left / right or bottom pipe routings.
- Use nitrogen at 2.8 psi of flow during welding.

Note:

If nitrogen was not used while brazing, oxidized materials may form inside the pipe which may affect the operation of the valves and condensers.

Note:

Avoid Pipe Damage

- *When routing field-provided piping inside the outdoor unit frame, avoid causing vibration that will damage the components.*
- *Correctly route the piping so it does not make contact with the compressor casing, terminal cover, or mounting bolts. Allow room for field installation.*
- *Properly insulate all refrigerant pipes separately up to the service valve body inside the confines of the unit frame.*

Figure 34: Piping Route Options.

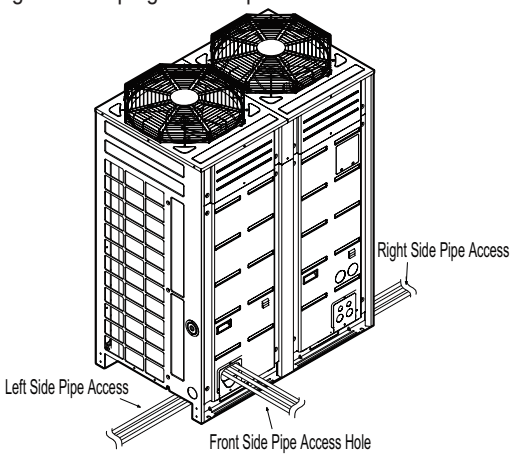


Figure 35: Access Hole at Bottom of Outdoor Unit.

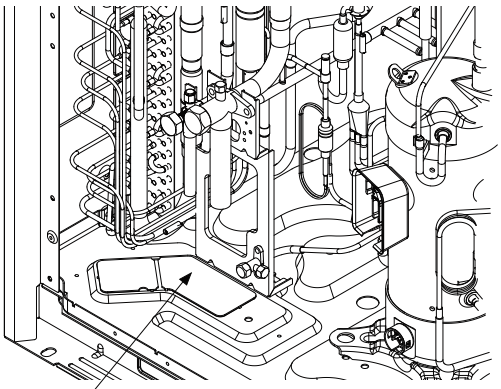


Figure 36: View of Heat Pump Refrigerant Piping Connections Using the Front Access Hole.

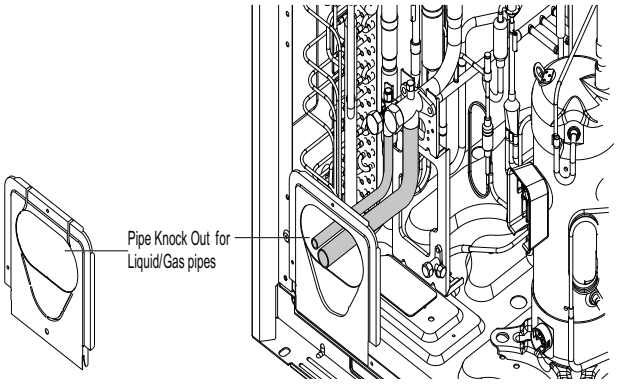
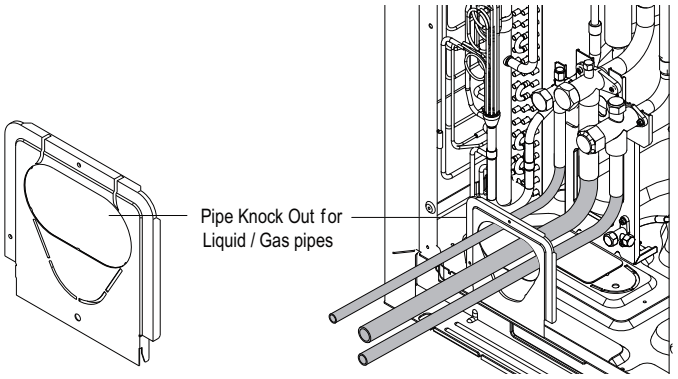


Figure 37: View of Heat Recovery Refrigerant Piping Connections Using the Front Access Hole.



Note:

- *Do not damage the piping or the outdoor unit frame base when opening the access holes.*
- *Remove any burrs that were created when opening the access holes.*
- *Add a protective sleeve around the access hole to prevent the wires from being damaged during installation.*

Figure 38: View of Heat Pump Refrigerant Piping Connections Using the Front Access Hole.

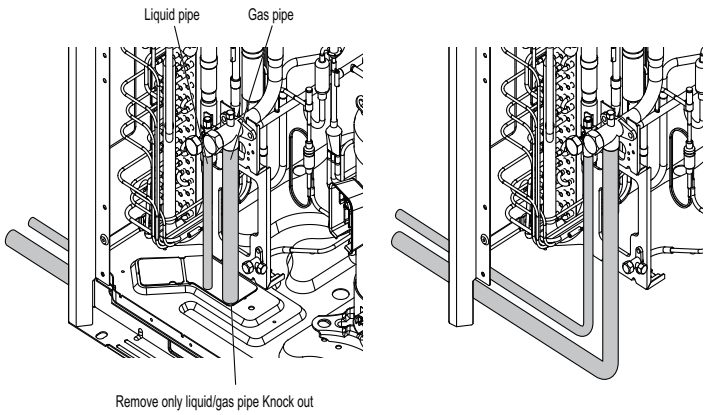
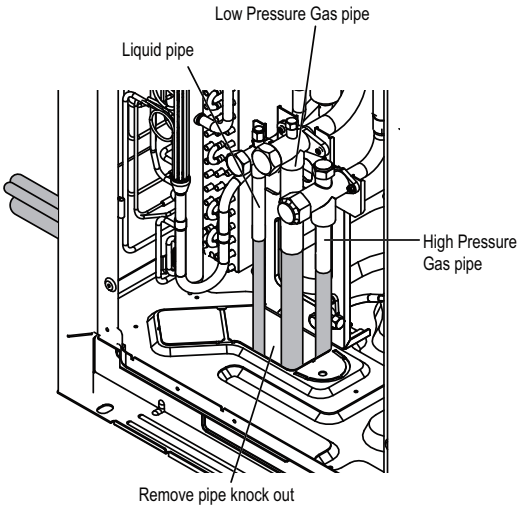


Figure 39: View of Heat Recovery Refrigerant Piping Connections Using the Front Access Hole.



Attaching the Compressor

Brackets are installed on the inverter compressor base to protect the unit during transportation.

Note:

The brackets must be removed or noise or vibration will occur during unit operation.

To remove compressor brackets:

1. Open the front panel.
2. Remove the brackets.
3. Attach the compressor to the outdoor unit frame with a nut and washer.

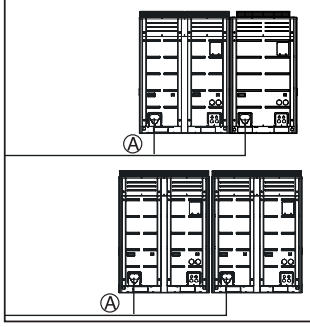
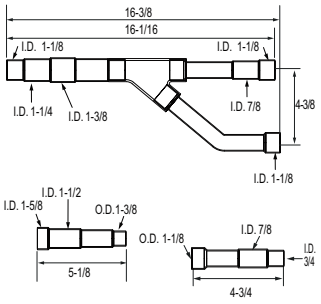
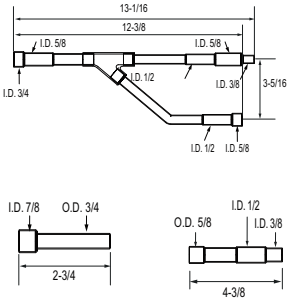
REFRIGERANT PIPING INSTALLATION

MULTI V IV

Pipe Connections—Connecting Branch Pipes (Heat Pump)

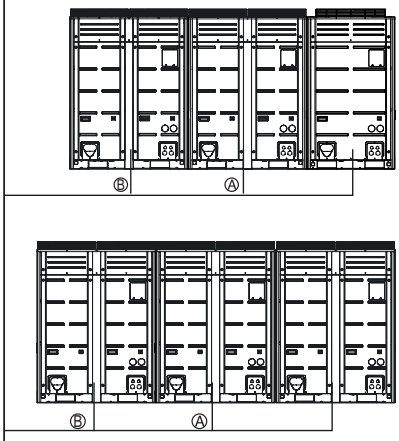
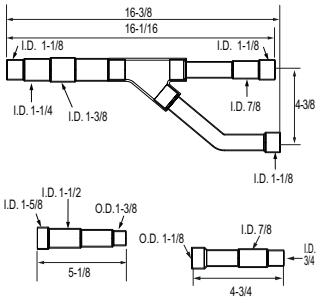
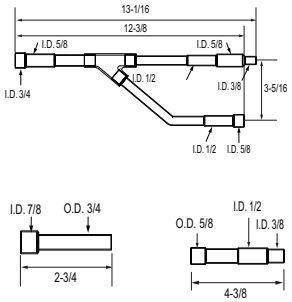
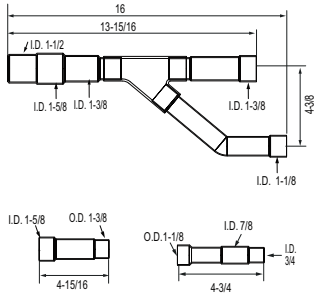
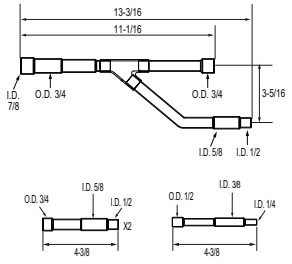
For Dual-Frame Heat Pump Systems

Unit: inch

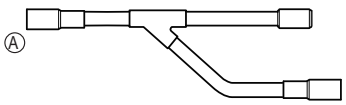
Combination	Multi-Frame Connector Kit Model No.	Vapor Pipe Dimensions	Vapor Pipe Model No.	Liquid Pipe Dimensions	Liquid Pipe Model No.
	Ⓐ ARCNN21		AJR67613701		AJR67613702

For Triple-Frame Heat Pump Systems

Unit: inch

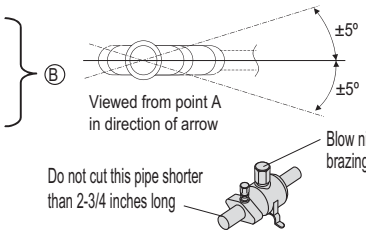
Combination specification	Multi-Frame Connector	Vapor Pipe Dimensions	Vapor Pipe Model No.	Liquid Pipe Dimensions	Liquid Pipe Model No.
	Ⓐ ARCNN21		AJR67613701		AJR67613702
	Ⓑ ARCNN31		AJR67613703		AJR67613704

Install the branch pipe between the outdoor units so that the outlet pipe is parallel with the surface.



Ⓐ To branch piping or indoor unit

Ⓑ To outdoor unit



Facing up

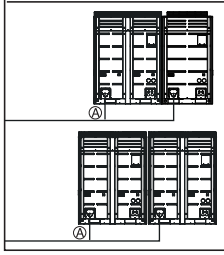
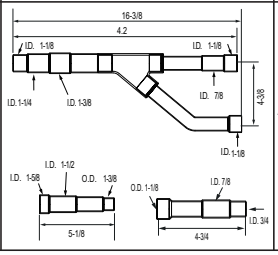
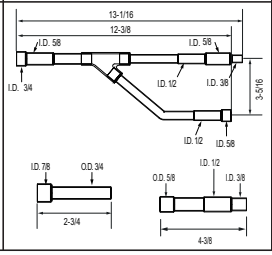
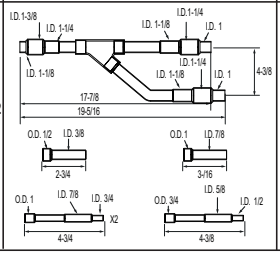
Note:

Use caution when installing the branch pipe vertically between the outdoor units. Improper installation can cause uneven refrigerant distribution between the outdoor units, and may lead to compressor burn and reduced system capacity.

LG

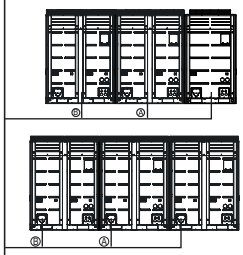
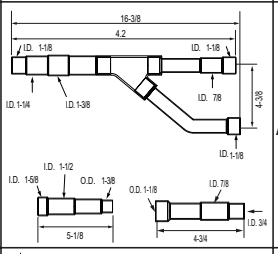
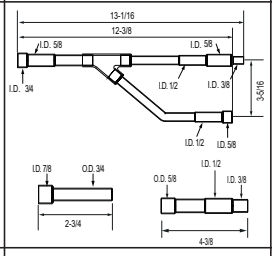
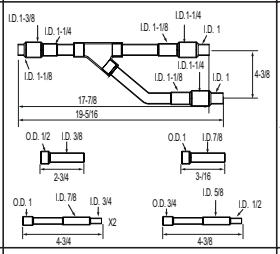
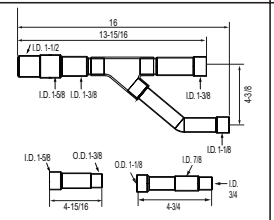
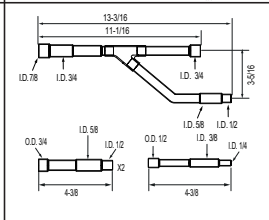
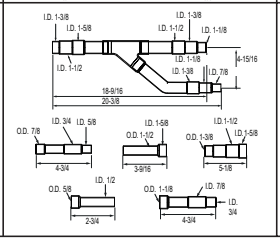
For Dual-Frame Heat Recovery Systems

Unit: inch

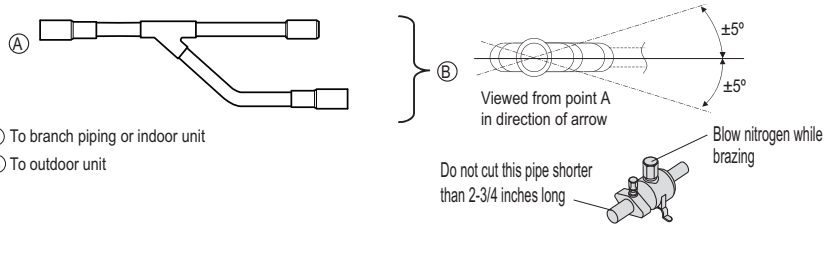
Combination specification	Multi-Frame Connector Kit No.	Low-Pressure Vapor Pipe Dimensions	Low-Pressure Vapor Pipe Model No.	Liquid Pipe Dimensions	Liquid Pipe Model No.	High-Pressure Vapor Pipe Dimensions	High-Pressure Vapor Pipe Model No.
	Ⓐ ARCNB21		AJR67613701		AJR67613702		AJR72963604

For Triple-Frame Heat Recovery Systems

Unit: inch

Combination specification	Multi-Frame Connector Kit No.	Low-Pressure Vapor Pipe Dimensions	Low-Pressure Vapor Pipe Model No.	Liquid Pipe Dimensions	Liquid Pipe Model No.	High-Pressure Vapor Pipe Dimensions	High-Pressure Vapor Pipe Model No.
	Ⓐ ARCNB21		AJR67613701		AJR67613702		AJR72963604
	Ⓑ ARCNB31		AJR67613703		AJR67613704		AJR54072908

Install the branch pipe between the outdoor units so that the outlet pipe is parallel with the surface.



Ⓐ To branch piping or indoor unit

Ⓑ To outdoor unit

Facing up

Note:

Use caution when installing the branch pipe vertically between the outdoor units. Improper installation can cause uneven refrigerant distribution between the outdoor units, and may lead to compressor burn and reduced system capacity.

REFRIGERANT PIPING INSTALLATION

MULTI V IV

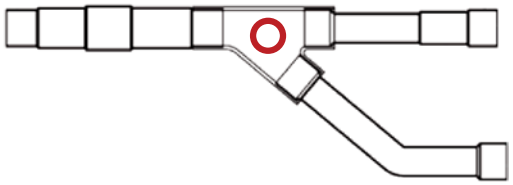
Pipe Connections—Refrigerant Piping for Separated Outdoor Units

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

1. Measurements.

All measurements should be made from the union center of the outdoor unit Y-branch.

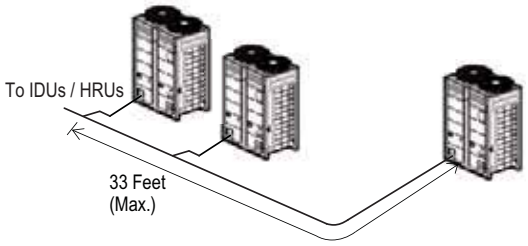
Figure 40: Y-branch Measurement Location.



2. Maximum pipe length from first outdoor unit Y-branch to farthest outdoor 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.

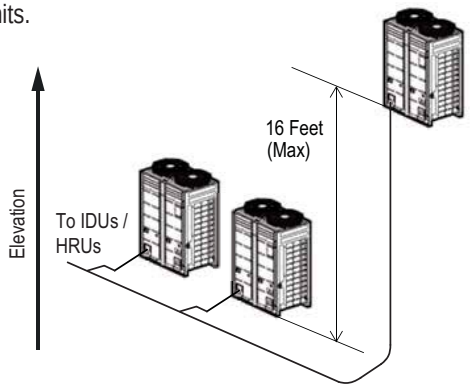
Figure 41: Maximum PIpe Length from First ODU Y-branch to Farthest ODU.



3. Elevation difference between outdoor units.

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

Figure 42: Elevation Difference Between Outdoor Units.



Trapping

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

   a. Heat pump outdoor units would be trapped in the suction vapor line, and heat recovery outdoor 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 43: Traps for Heat Pump and Heat Recovery Units.

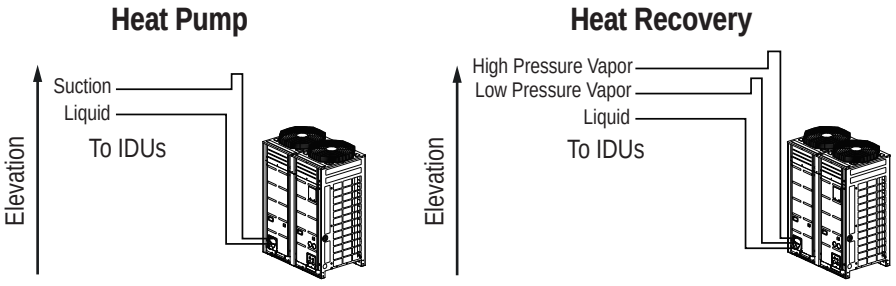
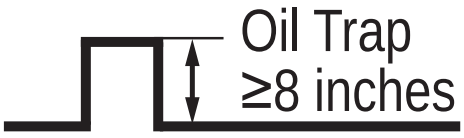


Figure 44: Close Up of An Inverted Oil Trap.



LG

2. 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 should be installed close to the outdoor unit Y-branch (no more than 6.6' away).

   b. Anytime piping turns downward leaving an outdoor unit Y-branch toward an outdoor unit or another outdoor unit Y-branch.

   The inverted trap should be installed close to the outdoor unit Y-branch (no more than 6.6' away), and before the pipe toward the outdoor unit turns downward.

Figure 45: Examples of Inverted Traps.

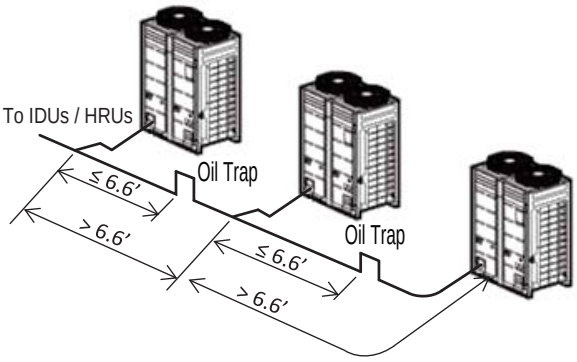
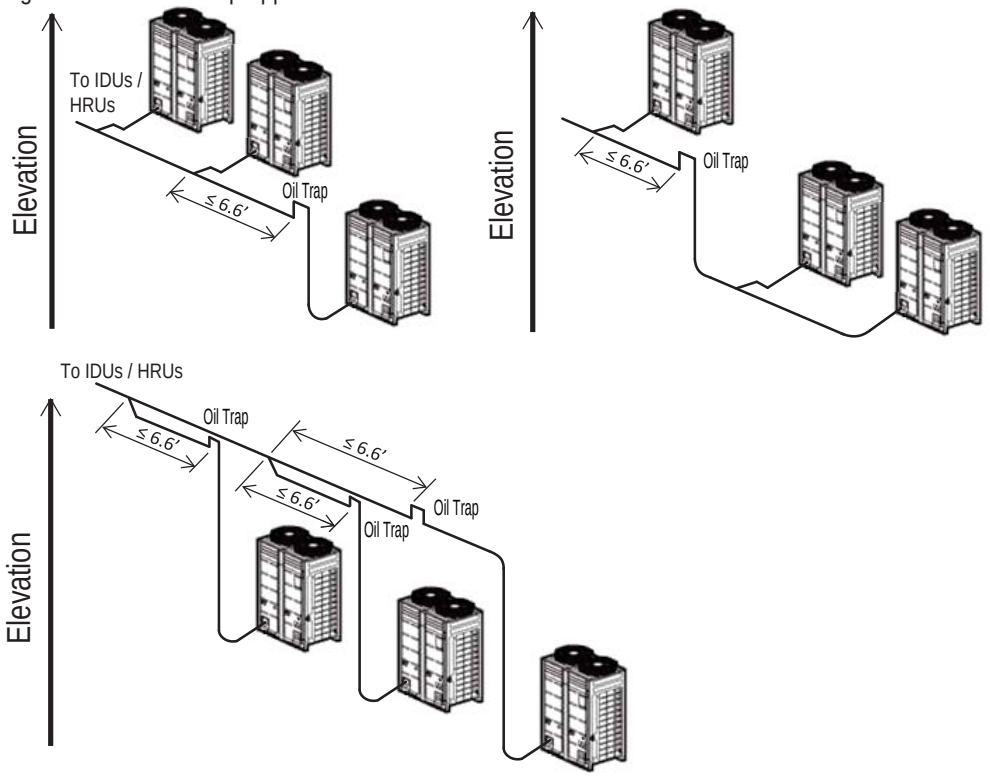


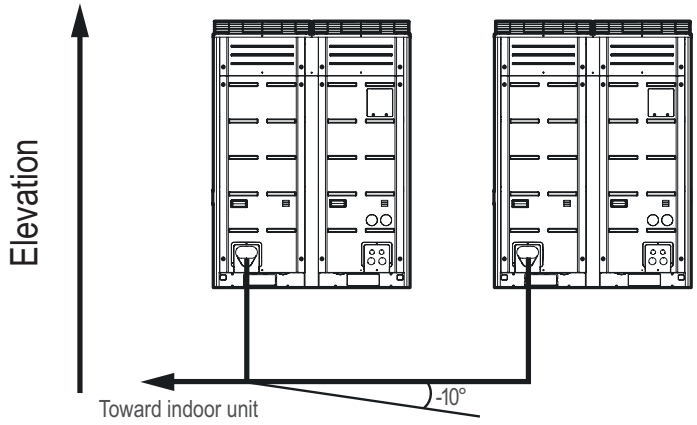
Figure 46: Inverted Trap Applications.



Pipe Slope

Horizontal pipe slope should be level or slightly away from the outdoor units, otherwise refrigerant and oil will migrate toward the outdoor units and accumulate in the pipe segment serving the frame that is not running or at the lowest elevation. Piping should never slope more than -10° (see figure) without installing an inverted trap within 6.6' of the outdoor unit Y-branch and before the pipe slopes downward toward the outdoor unit.

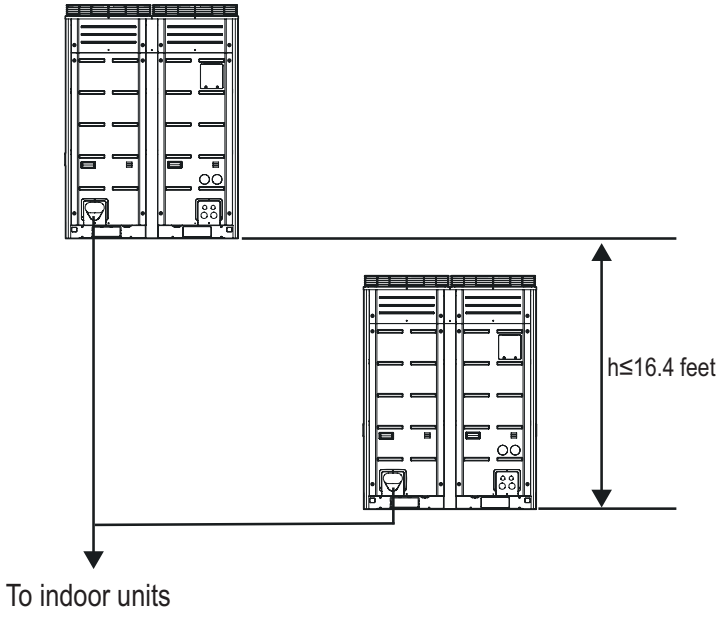
Figure 47: Allowable Pipe Slope.

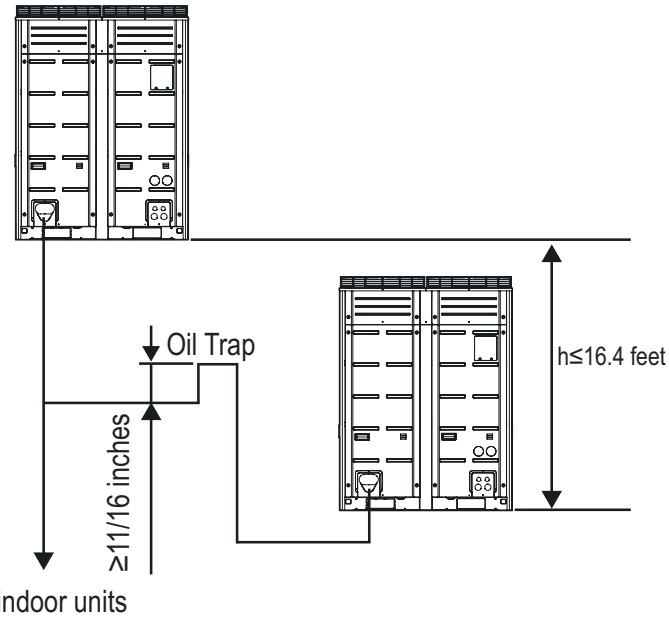


REFRIGERANT PIPING INSTALLATION

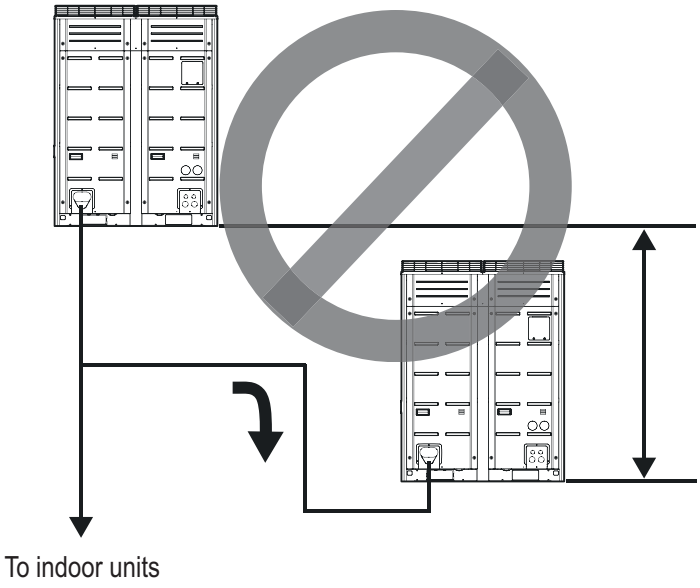
Pipe Connections—Height Differential for Separated Outdoor Units

Maximum allowable height differential (h) between two outdoor units is 16.4 feet.





Example of improper height differential.



⚠ WARNING

- *Do not allow the refrigerant to leak during brazing; if the refrigerant combusts, it generates a toxic gas.*
- *Do not braze in an enclosed location, and always test for gas leaks before / after brazing.*

Outdoor Unit Pipe Connections

1. Do not use kinked pipe caused by excessive bending in one specific area on its length.
2. Braze the pipes to the service valve pipe stub of the outdoor unit.
3. After brazing, check for refrigerant gas leaks.
4. When selecting flare fittings, always use a 45° fitting rated for use with high pressure refrigerant R410A. Selected fittings must also comply with local, state, or federal standards.

Creating a Flare Fitting

One of the main causes of refrigerant leaks is defective flared connections. Create flared connections using the procedure below.

1. Cut the pipe to length.
- Measure the distance between the indoor unit and the outdoor unit.
- Cut the pipes a little longer than measured distance.

2A. Remove the burrs
- Completely remove all burrs from pipe ends.
- When removing burrs, point the end of the copper pipe down to avoid introducing foreign materials in the pipe.

2B. Slide the flare nut onto the copper tube.

3. Flaring the pipe end.
- Use the proper size flaring tool to finish flared connections as shown.
- ALWAYS create a 45° flare when working with R410A.

4. Carefully inspect the flared pipe end.
- Compare the geometry with the figure to the right and dimensions as detailed in Figure 42.
- If the flare is defective, cut it off and re-do procedure.
- If flare looks good, blow clean the pipe with dry nitrogen.

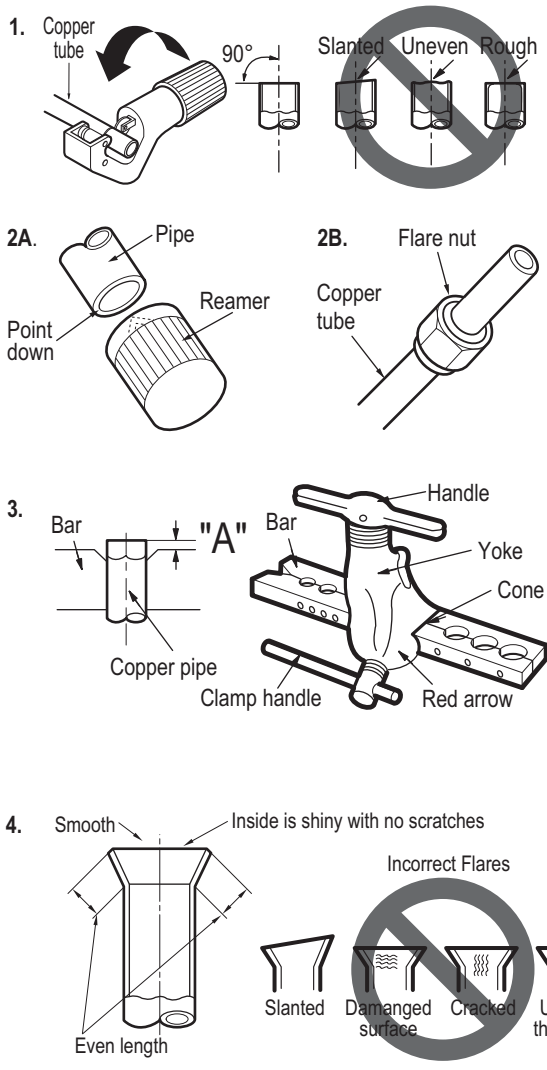


Figure 48: Dimensions of the Flare.

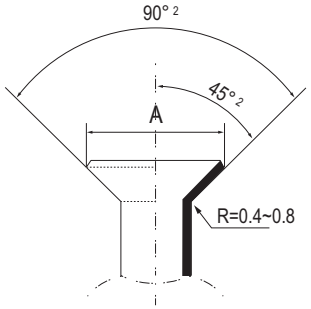


Table 53: Flared Connection Dimensions.

Indoor unit (Btu/h)	Pipe		"A"	
	Vapor (in. O.D.)	Liquid (in. O.D.)	Vapor (in.)	Liquid (in.)
≤19,100	1/2	1/4	5/8 ~ 11/16	7/16 ~ 1/2
<54,600	5/8	3/8	5/8 ~ 11/16	5/8 ~ 11/16
≤76,400	3/4	3/8	3/4 ~ 13/16	5/8 ~ 11/16

Tightening the Flare Nuts

1. When connecting the flare nuts, coat the flare (inside and outside) with polyvinyl ether (PVE) refrigeration oil only.
2. Initially hand tighten the flare nuts using three (3) or four (4) turns.

Note:

Do not use polyolyester (POE) or any other type of mineral oil as a thread lubricant. These lubricants are not compatible with PVE oil used in this system and create oil sludge leading to equipment damage and system malfunction.

Table 54: Tightening Torque for Flare Nuts.

Pipe size (Inches O.D.)	Tightening torque (ft-lbs)
1/4Ø	13.02 ~ 18.08
3/8Ø	24.59 ~ 30.38
1/2Ø	39.78 ~ 47.74
5/8Ø	45.57 ~ 59.31
3/4Ø	71.61 ~ 87.52

3. To finish tightening the flare nuts, use both a torque wrench and a backup wrench.
4. After all the piping has been connected and the caps have been tightened, check for refrigerant gas leaks.

Loosening the Flare Nuts

Always use two (2) wrenches to loosen the flare nuts.

Refrigerant Piping System Insulation

All refrigerant piping from the outdoor unit to the indoor units must be insulated correctly for safety and usage. Y-branch connections, header branch connections, refrigerant piping, field-provided isolation ball valves (if present), service valves, and elbows must be properly and completely insulated using closed cell pipe insulation (up to the indoor unit piping connections). To prevent heat loss / heat gain through the refrigerant piping, all refrigerant piping including liquid lines and vapor lines shall be insulated separately. Insulation shall be a minimum 1/2" thick, and thickness may need to be increased based on ambient conditions and local codes. Table on next page lists minimum wall thickness requirements for Ethylene Propylene Diene Methylene (EPDM) insulation.

Inside the outdoor unit, maximum pipe temperature is 248°F and minimum pipe temperature is -40°F. For field insulation of refrigerant piping between outdoor units and indoor units, consider the following pipe temperature ranges for an operating heat pump system:

- Heating mode refrigerant temperature ranges: Liquid 75-118°F; High Pressure Vapor 95-220°F
- Cooling mode refrigerant temperature ranges: Liquid 75-118°F; Low Pressure Vapor 40-90°F

All insulation joints shall be glued with no air gaps. Insulation material shall fit snugly against the refrigeration pipe with no air space between it and the pipe. Insulation passing through pipe hangers, inside conduit, and/or sleeves must not be compressed. Protect insulation inside hangers and supports with a second layer. All pipe insulation exposed to the sun and outdoor elements shall be properly protected with PVC, aluminum vapor barrier, or alternatively placed in a weather-resistant enclosure such as a pipe rack with a top cover; and meet local codes. LG-provided Y-branches are shipped from the factory with pre-formed peel-and-stick foam insulation jackets, with a 1.84 lb./ft.3 density, 1/2" thickness, and meet UL94 MF-1 flammability.

The design engineer should perform calculations to determine if the factory-supplied insulation jackets are sufficient to meet local codes and avoid sweating. Add additional insulation if necessary. Check the fit of the insulation jacket after the header fitting and all run-out pipes are installed. Mark all pipes at the point where the insulation jacket ends. Remove the jacket. Install field provided insulation on the run-out and main trunk pipes first. Install the LG-provided insulation plugs on the ends of all unused header ports. Peel the adhesive glue protector slip from the insulation jacket and install the clam-shell jacket over the fitting.

Figure 49: Typical Pipe Insulation, Power Wire and Communications Cable Arrangement.

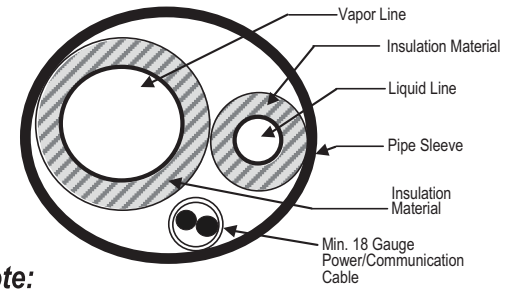


Figure 50: Typical Insulation Butt-Joint at Indoor Unit Casing.

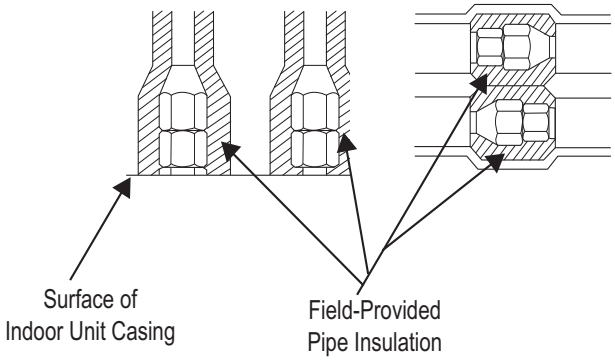


Figure 51: Typical Refrigerant Flare Fitting Insulation Detail.

Note:

• Do not insulate gas and liquid pipes together as this can result in pipe leakage and malfunction due to extreme temperature fluctuations.

• Be sure to fully insulate the piping connections.

LG

Note:

Always properly insulate the piping. Insufficient insulation will result in condensation, reduced heating/cooling performance, etc. Also, if the pipes aren't insulated properly, condensation could potentially cause damage to building finishes. Pay special attention to insulating the pipes installed in the ceiling plenum.

Note:

Follow locals codes and the designer's instructions when selecting EPDM insulation wall thickness.

Table 55: Minimum Refrigerant Pipe EPDM Insulation Wall Thickness Requirements.[1]

Classification / Piping O.D.		Air-conditioned location		Non-air conditioned location	
		1. Typical Conditioned Location	2. Special Conditioned Location	3. Typical Unconditioned Location	4. Special Unconditioned Location
Liquid pipe	ø1/4 inches	>1/2 inches	>1/2 inches	>1/2 inches	>1/2 inches
	ø3/8 inches				
	≥ø1/2 inches	>1/2 inches	>1/2 inches	>1/2 inches	>1/2 inches
Vapor pipe	ø3/8 inches	>1/2 inches	>3/4 inches	>3/4 inches	>1 inch
	ø1/2 inches				
	ø5/8 inches				
	ø3/4 inches				
	ø7/8 inches				
	ø1 inch				
	ø1-1/8 inches	>3/4 inches	>1 inch	>1 inch	
	ø1-1/4 inches				
	ø1-3/8 inches				
	ø1-1/2 inches				
	ø1-3/4 inches				

[1]The thickness of the above insulation material is based on heat conductivity of 0.61 Btu/in/h/ft²/°F.

1. Typical Conditioned Location

A building plenum or space that contains conditioned air that does not exceed 80°F DB.

2. Special Conditioned Location

1. When the location is air conditioned, but there is severe temperature/humidity difference due to high ceilings.

• Church, auditorium, theater, lobby, etc.

2. When the location is air conditioned, but internal temperature/humidity are high.

• Bathroom, swimming pool, locker room, etc.

3. Typical Unconditioned Location

An unconditioned space inside a building.

4. Special Unconditioned Location: If conditions 1 and 2 below are present.

1. An unconditioned space or plenum of a building.
2. An area where there is an elevated humidity level.

5. Additional Insulation for Indoor Units May be Required in Humid Environments.

The air conditioner factory insulation has been tested according to "ISO Conditions with Mist," and it satisfies the requirements. If the system has been operating for a long time in a high humidity environment (dew point temperature: more than 73°F), condensate is likely to form. If this happens, install 3/8 inch thick ethylene propylene diene methylene (EPDM) insulation that is plenum-rated with a heat-resistance factor of more than 248°F.

Applying Insulation to Y-Branch and Header Fittings

Check the fit of the insulation jacket provided with the LG Y-branch and Header kits after all pipes are brazed to fittings. Mark all pipes at the point where the insulation jacket ends. Remove the jacket. Install field-supplied insulation on the pipe segments first, and then install the LG provided insulation plugs on the ends of all unused Header ports. Apply the clam-shell insulation on jackets to Y-branch and Header fittings last. Peel the adhesive glue protector slip from the insulation jacket and install the clam-shell jacket over the fitting.

Figure 52: Y-branch Insulation.

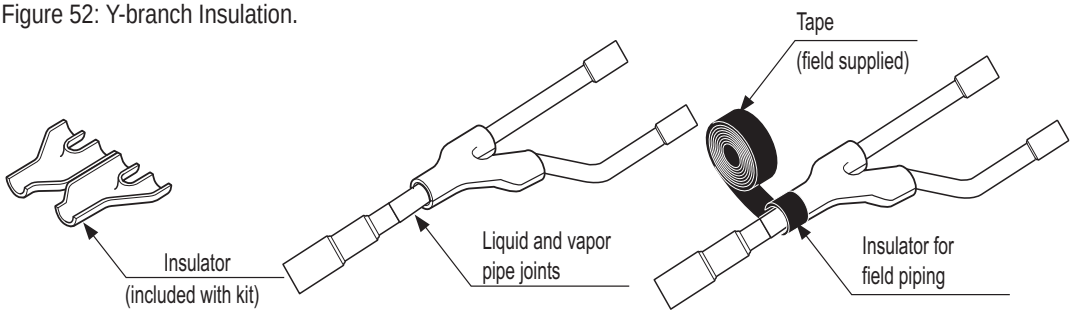


Figure 53: Header Insulation.

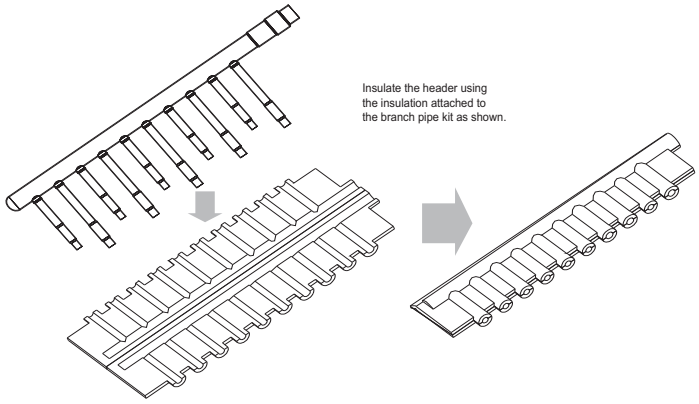


Figure 54: Joints between branch and pipe should be sealed with tape included in each kit.

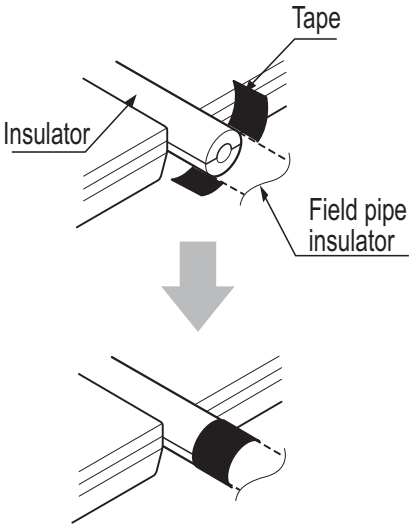
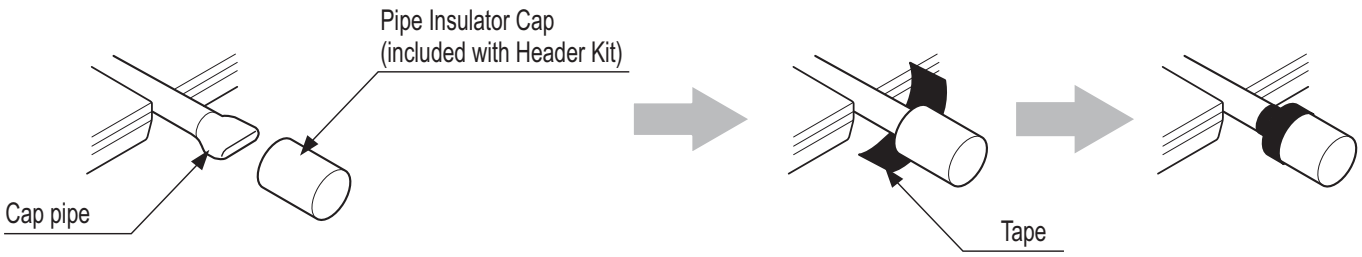


Figure 55: Capped pipes should be insulated using the cap included in each kit, and then taped as shown.



Note:

Additional Insulation for Y-Branches and Headers May be Required in Humid Environments.

If the system has been operating for a long time in a high humidity environment (dew point temperature: more than 73°F), condensate is likely to form. If this happens, install 3/8 inch thick ethylene propylene diene methylene (EPDM) insulation that is plenum-rated with a heat-resistance factor of more than 248°F.

LG

Perform a Pressure (Leak) Test

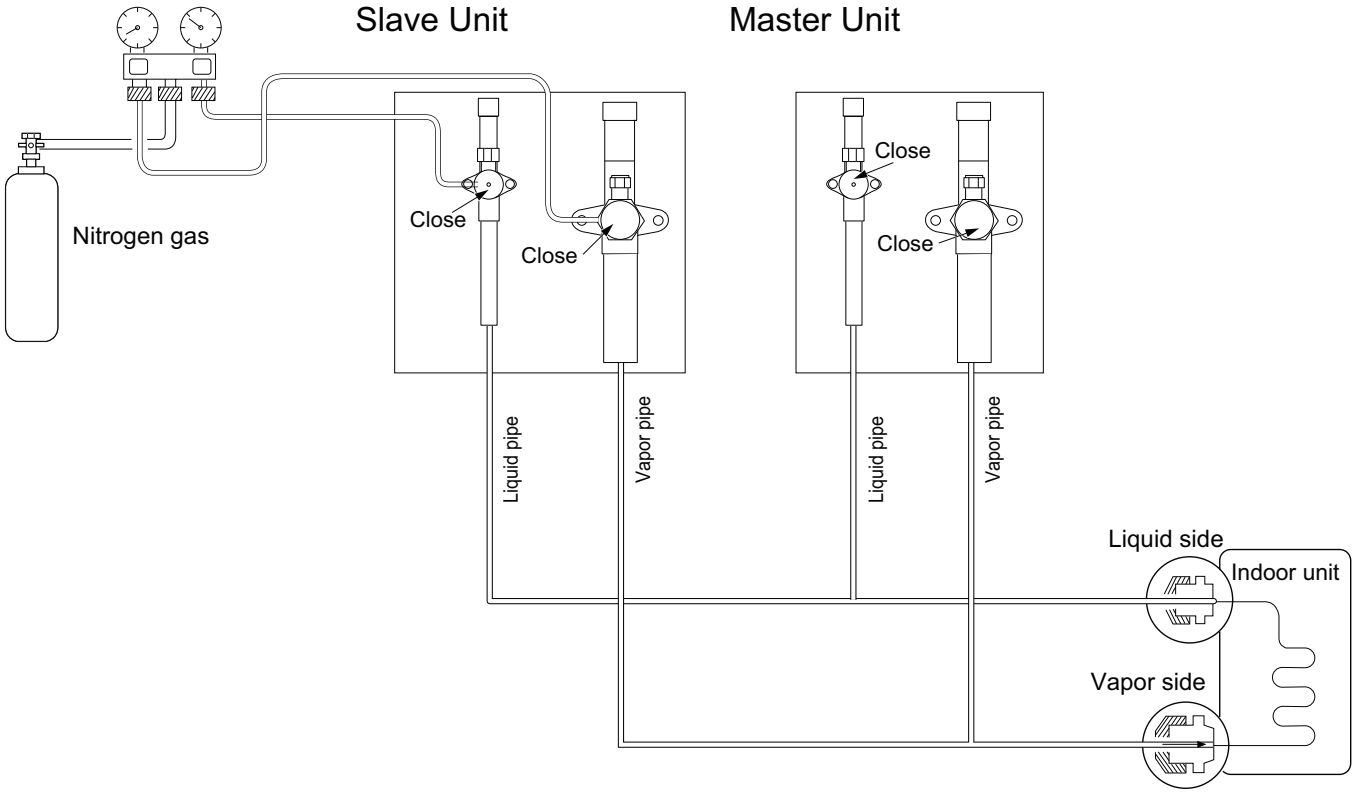
1. Upon completion of refrigerant piping system installation, open all isolation ball valves throughout the piping system.
2. DO NOT apply power to the Outdoor, Indoor, and Heat Recovery Units (Heat recovery systems only). If power is applied, expansion valves close and the pressure test will not be conclusive.

Note:

If power has been applied to any device before the pressure test, contact your LG Applied Rep champion or service technician for the procedure to reopen the EEV valves.

3. DO NOT open the outdoor unit service valves; the factory refrigerant charge will be released.
4. Use medical grade dry nitrogen and pressure test the refrigerant piping system to a minimum of 550 psi for a period of 24 hours. Pressurize the liquid, low pressure vapor, and medium pressure vapor (heat recovery systems only) concurrently.

Pressure (Leak) Testing for Heat Pump Systems



Note:

If the ambient temperature changed between the time when pressure was applied and when the pressure drop was checked, adjust results by factoring in approximately 1.45 psi for each 2°F of temperature difference.
Correction formula = (Temperature when pressure was applied - Temperature when pressure drop was checked) x 0.01.
Example: When pressure (550 psig) was applied, temperature was 80.6°F; 24 hours later when pressure drop (540 psi) was checked, temperature was 68°F. Thus, 80.6 - 68 x 0.01 = 0.126. In this case, the pressure drop of 0.126 was due to temperature difference, therefore, there is no leak in the refrigerant piping system.

⚠ WARNING

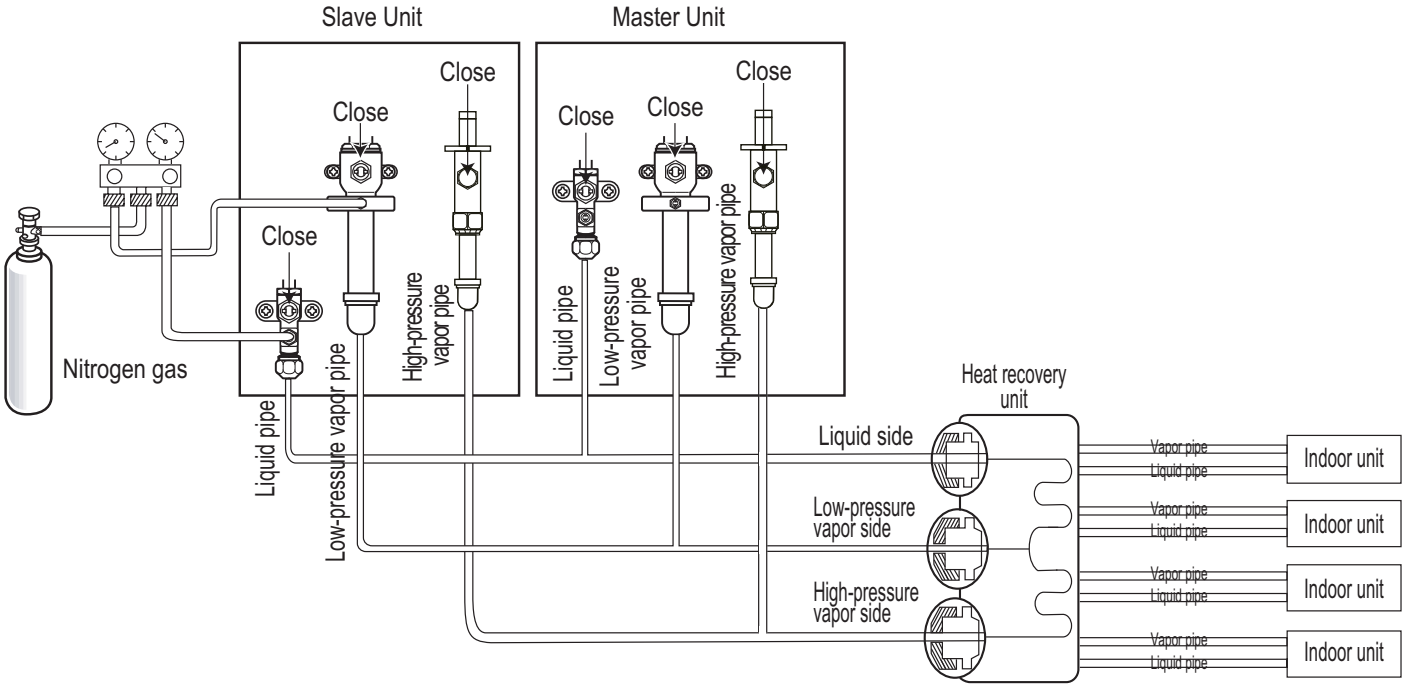
During pressurization, the nitrogen gas cylinder must be positioned vertically to prevent the nitrogen from entering the refrigeration system in its liquid state. Do not lay the nitrogen cylinder on its side.

REFRIGERANT PIPING INSTALLATION

MULTI V IV

Pressure (Leak) Testing

Pressure (Leak) Testing for Heat Recovery Systems



Note:

If the ambient temperature changed between the time when pressure was applied and when the pressure drop was checked, adjust results by factoring in approximately 1.45 psi for each 2°F of temperature difference.
Correction formula = (Temperature when pressure was applied - Temperature when pressure drop was checked) x 0.01.
Example: When pressure (550 psig) was applied, temperature was 80.6°F; 24 hours later when pressure drop (540 psi) was checked, temperature was 68°F. Thus, 80.6 - 68 x 0.01 = 0.126. In this case, the pressure drop of 0.126 was due to temperature difference, therefore, there is no leak in the refrigerant piping system.

⚠ WARNING

During pressurization, the nitrogen gas cylinder must be positioned vertically to prevent the nitrogen from entering the refrigeration system in its liquid state. Do not lay the nitrogen cylinder on its side.

LG

⚠ WARNING

- *All power wiring and communication cable installation must be performed by authorized service providers working in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual.*
- *Undersized wiring may lead to unacceptable voltage at the unit and may cause unit malfunction and be a fire hazard.*
- *Properly ground all outdoor units and indoor units. Ground wiring must always be installed by a qualified technician. Do not connect ground wire to refrigerant, gas, or water piping; to lightening rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide an NEC approved earth ground can result in electric shock, physical injury or death.*
- *Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent may include some amount of direct current. Using an oversized breaker or fuse may result in electric shock, physical injury or death.*
- *The outdoor units are inverter driven. Do not install a phase-leading capacitor; if installed, it will deteriorate the power factor improvement effect, cause the capacitor to generate an abnormal amount of heat, which may result in physical injury.*

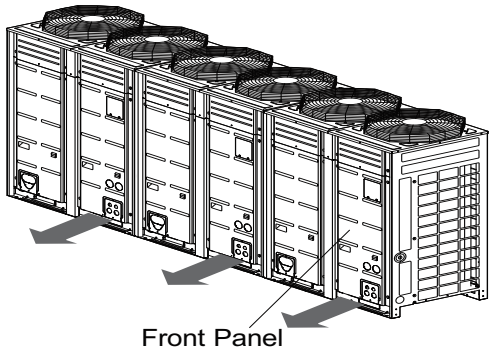
Note:

- *Properly ground all outdoor units and indoor units. Ground wiring must always be installed by a qualified technician. Do not connect ground wire to refrigerant, gas, or water piping; to lightening rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide an NEC approved earth ground can result in equipment malfunction or property damage.*
- *Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent may include some amount of direct current. Using an oversized breaker or fuse may result in equipment malfunction or property damage.*
- *Verify the power imbalance is no greater than 2% between phases at each outdoor unit frame.*
- *Consider ambient conditions (temperature, direct sunlight, inclement weather, etc.) when selecting, installing, and connecting the power wiring.*

Outdoor Unit Wiring / Cable Access Holes and Connections

- Unscrew all of the screws and remove the front panel by pulling it forward.
- Connect the communication cable between the master and slave outdoor units through the terminal block.
- Connect the communication cable between the outdoor unit(s) and indoor units (and heat recovery control units; Heat Recovery Systems only) through the terminal block.

Figure 52: Accessing the Power Wiring and Communication Cable Connections.



Separating Power Wires and Communication Cables

- Position the power wiring a minimum of two (2) inches away from the communication cables to avoid operation problems caused by electrical interference. Do not run both in the same conduit.
- If it is necessary to run the power wiring and communication cable alongside each other and cannot be avoided, table below for minimum recommended distances.

Table 56: Power Wire and Communications Cable Minimum Required Separation Minimum Allowable Distances.

Capacity of Power Supply Wiring (current)		Recommended Minimum Distance[1,2]
100V or more	10A	11-13/16 inches
	50A	19-11/16 inches
	100A	39-3/8 inches
	Exceed 100A	59-1/16 inches

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

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

Note:

- *Do not bunch the power wiring and communication cables together.*
- *Do not run the power wiring and the communication cable in the same conduit.*

Location of Outdoor Unit PCBs and Other Components

Figure 53: Single Frame Outdoor Units.

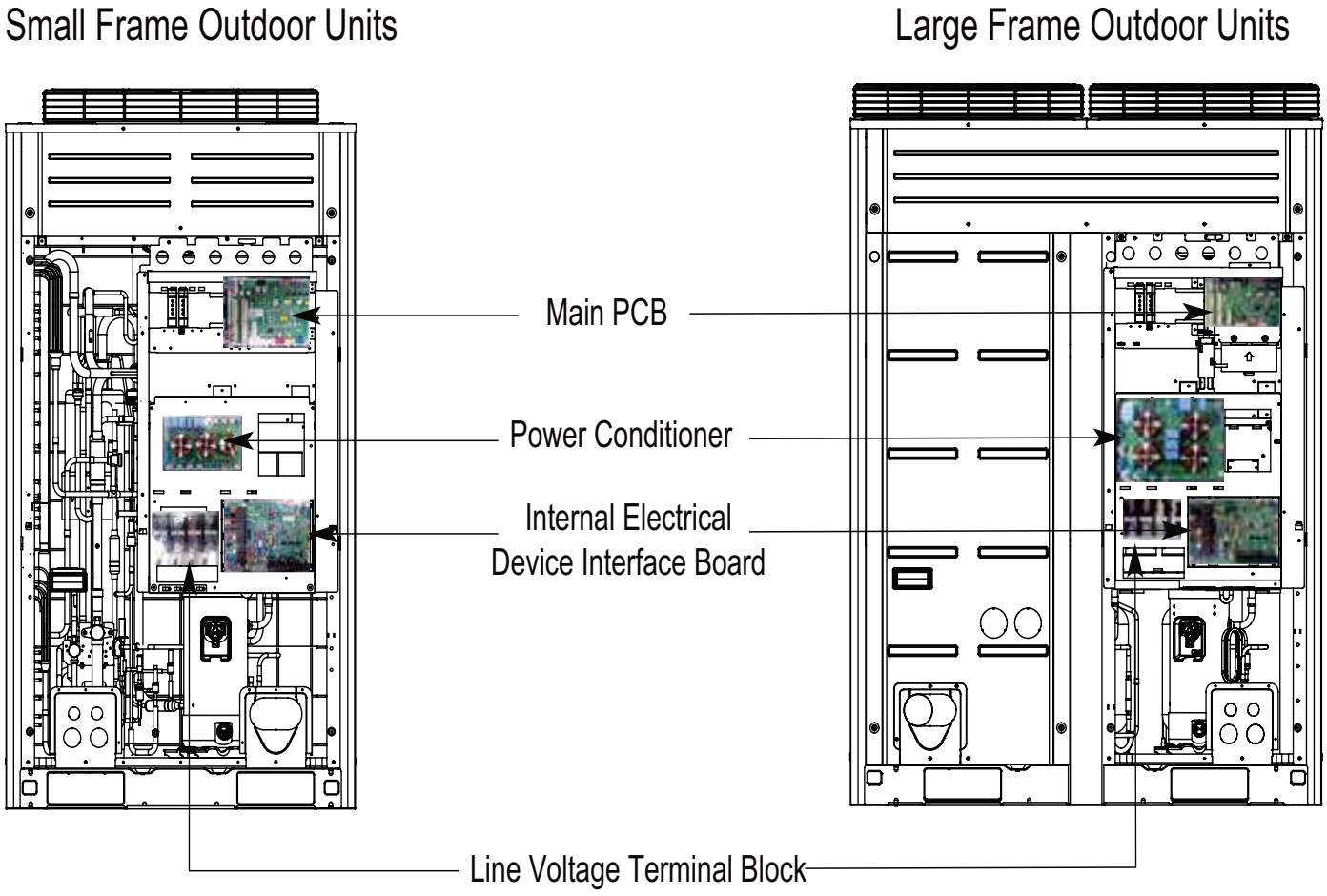
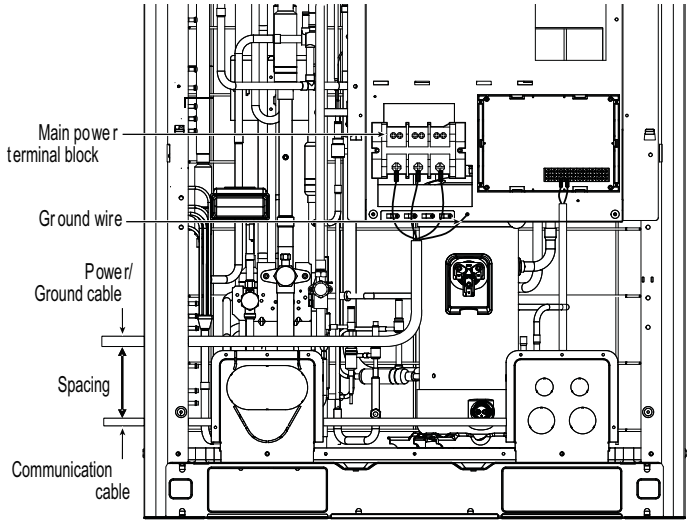
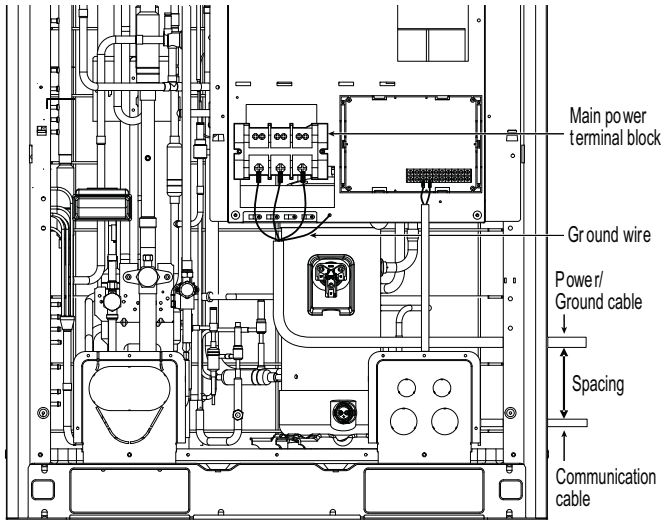


Figure 54: Heat Pump and Heat Recovery Single Frame 72,000 Btu/h Power Wiring and Communication Cable Internal Routing and Terminations.

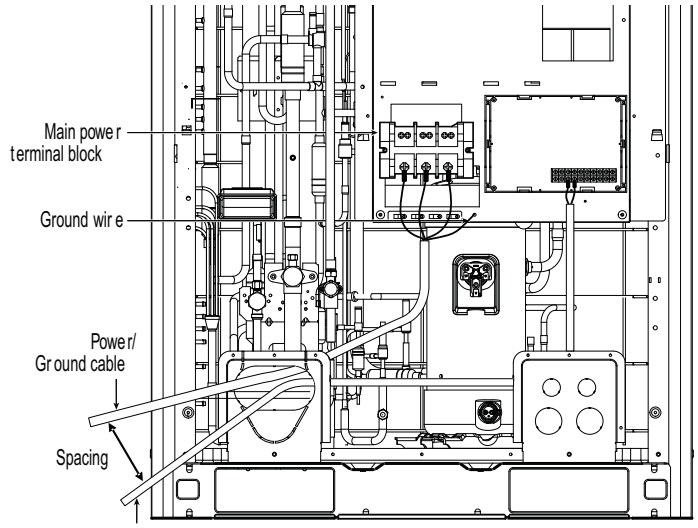
Left Side Routing



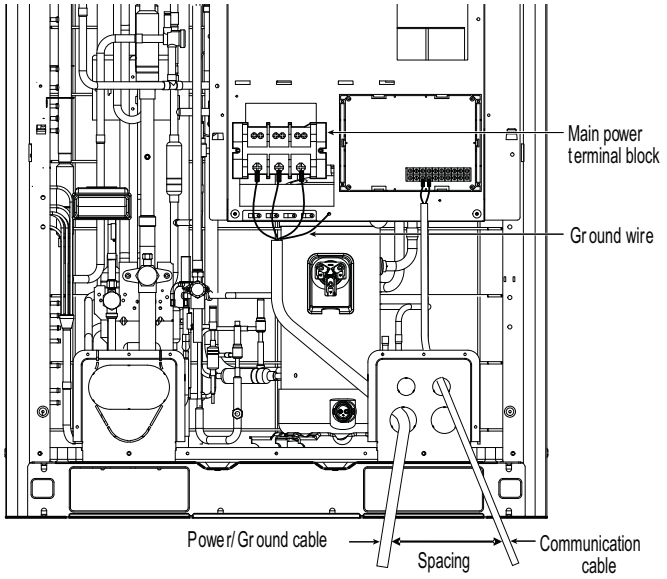
Right Side Routing



Front Panel Access



Front Panel Access

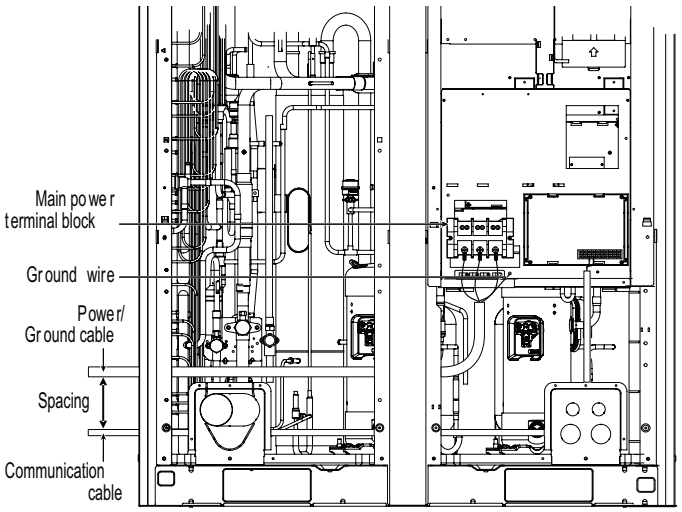


Note:

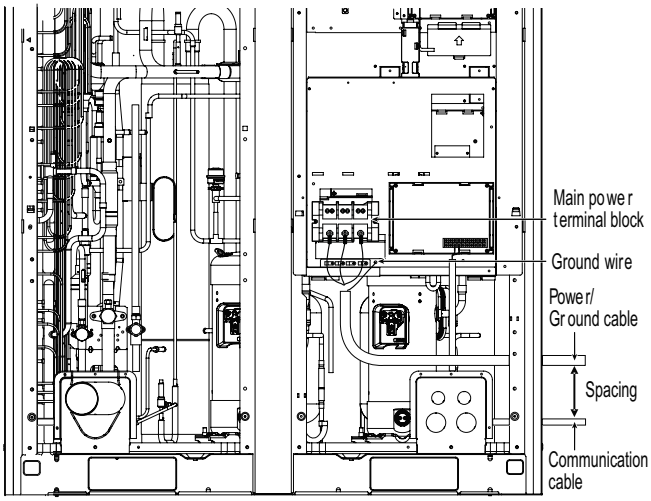
When connecting the power wiring and communication cables, avoid placing these near the oil level sensor. If placed near the sensor, electromagnetic energy may cause the sensor to malfunction.

Figure 55: Heat Pump and Heat Recovery Single Frame (96,000 to 168,000 Btu/h) Power Wiring and Communication Cable Internal Routing and Terminations.

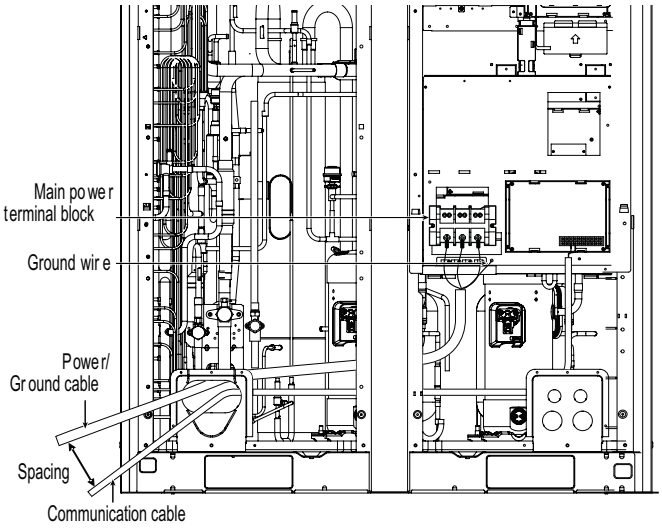
Left Side Routing



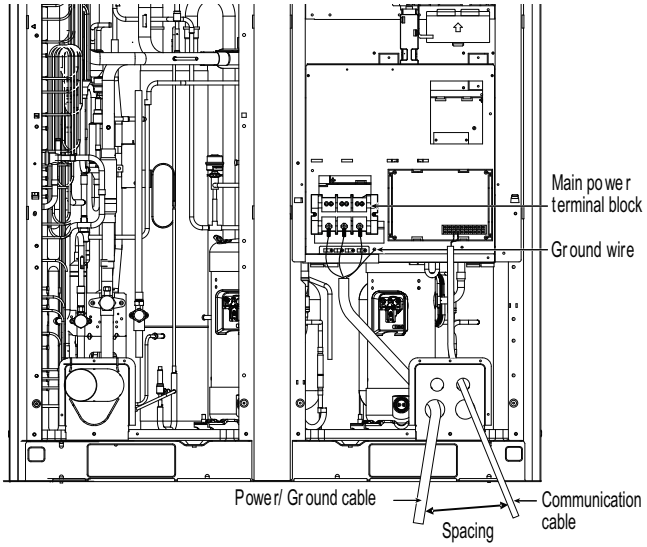
Right Side Routing



Front Panel Access



Front Panel Access



Note:

When connecting the power wiring and communication cables, avoid placing these near the oil level sensor. If placed near the sensor, electromagnetic energy may cause the sensor to malfunction.

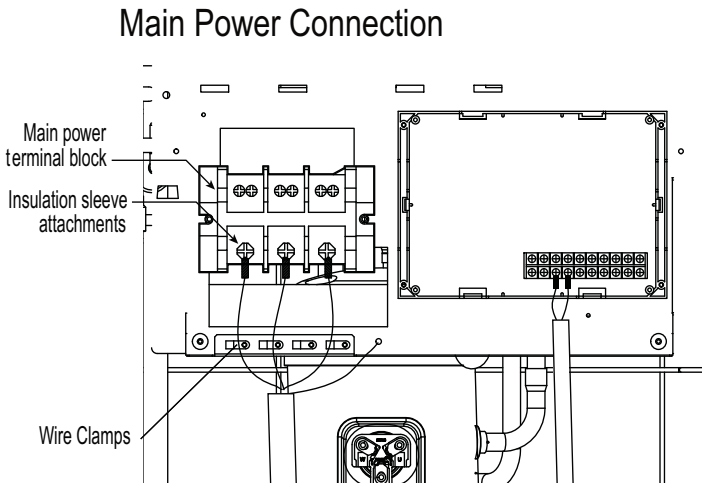
LG

Power Supply / Power Wiring Specifications

1. Outdoor unit(s) and indoor units must be provided power from separate breakers. Each outdoor unit frame in a multi-frame configuration must be provided a dedicated fused disconnect or breaker:
   - Heat Pump and Heat Recovery Outdoor Units are available in both 3Ø, 208-230V, 60Hz, and 3Ø, 460V, 60Hz. Check the nameplate of each frame, and verify that the voltage of the frame matches the power source provided.
   - Indoor Units and Heat Recovery Units (Heat Recovery Systems Only) require 1Ø, 208-230V, 60Hz power. All Indoor Units and Heat Recovery Units (Heat Recovery System Only) draw minimal power. Where permitted by NEC and local code, multiple Indoor Units may be powered from a single 15A breaker.

2. Select power wire gauge and insulation type per NEC and local code requirements. Maximum allowable voltage fluctuation ±10% (on 208-230V outdoor units), 414-528V range (on 460V outdoor units), or nameplate rated value.

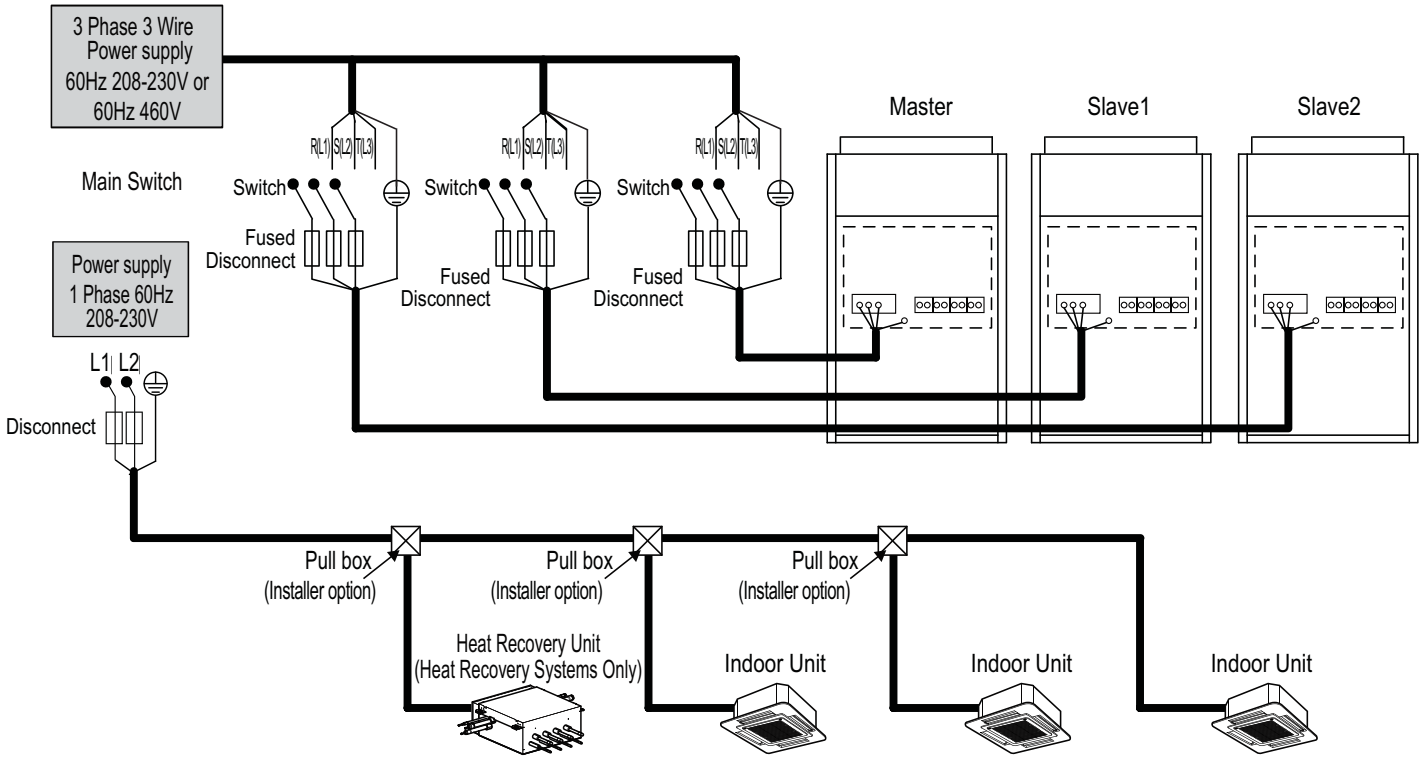
Figure 56: Power Wiring Termination Detail. Connect Power Wiring to Terminal Block Using Clamps.



3. Properly ground each Outdoor Unit per NEC and local codes. On multi-frame installations, ground each frame separately.

4. Ground each Indoor Unit and Heat Recovery Unit (if applicable) separately to a solid earth ground source per NEC and local code requirements.

Figure 57: Schematic of Suggested Power Wiring.



Connecting the Power Wiring

Best practice dictates using ring or spade terminals to terminate power wiring at the power terminal block. If ring terminals or spade clips are not available, then:

- Do not terminate different gauge wires to the power terminal block. (Slack in the wiring may generate heat.)
- When terminating wires of the same thickness, follow the instructions demonstrated in the figures below.
- Firmly attach the wire; secure in a way to prevent external forces from being imparted on the terminal block.
- Use an appropriately sized screwdriver for tightening the terminals.
- Do not overtighten the connections; overtightening may damage the terminals.

Figure 58: Close up of a Typical Ring Terminal.

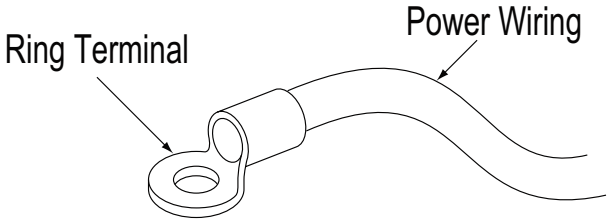
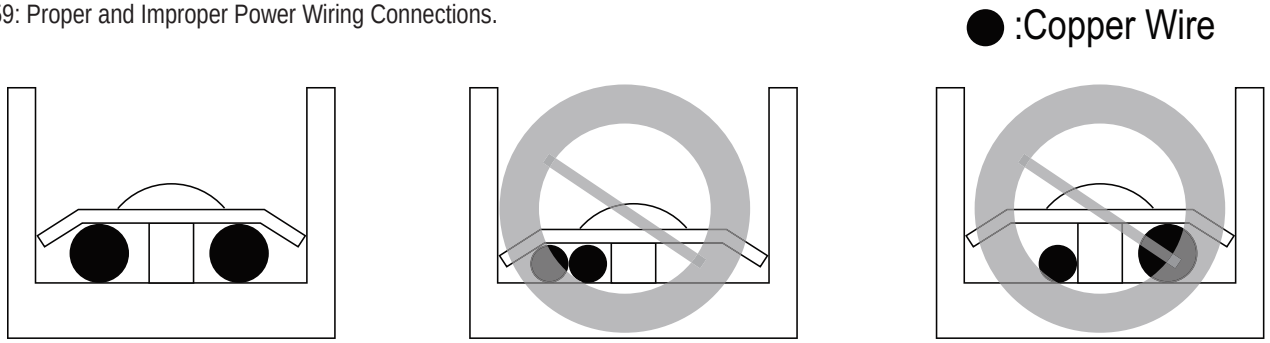


Figure 59: Proper and Improper Power Wiring Connections.



Terminate multiple power wires of the same gauge to both sides.

Do not terminate two wires on one side.

Do not terminate different gauge wires to a terminal block.

⚠ WARNING

If power wires are not properly terminated and firmly attached, there is risk of fire, electric shock, and physical injury or death.

Note:

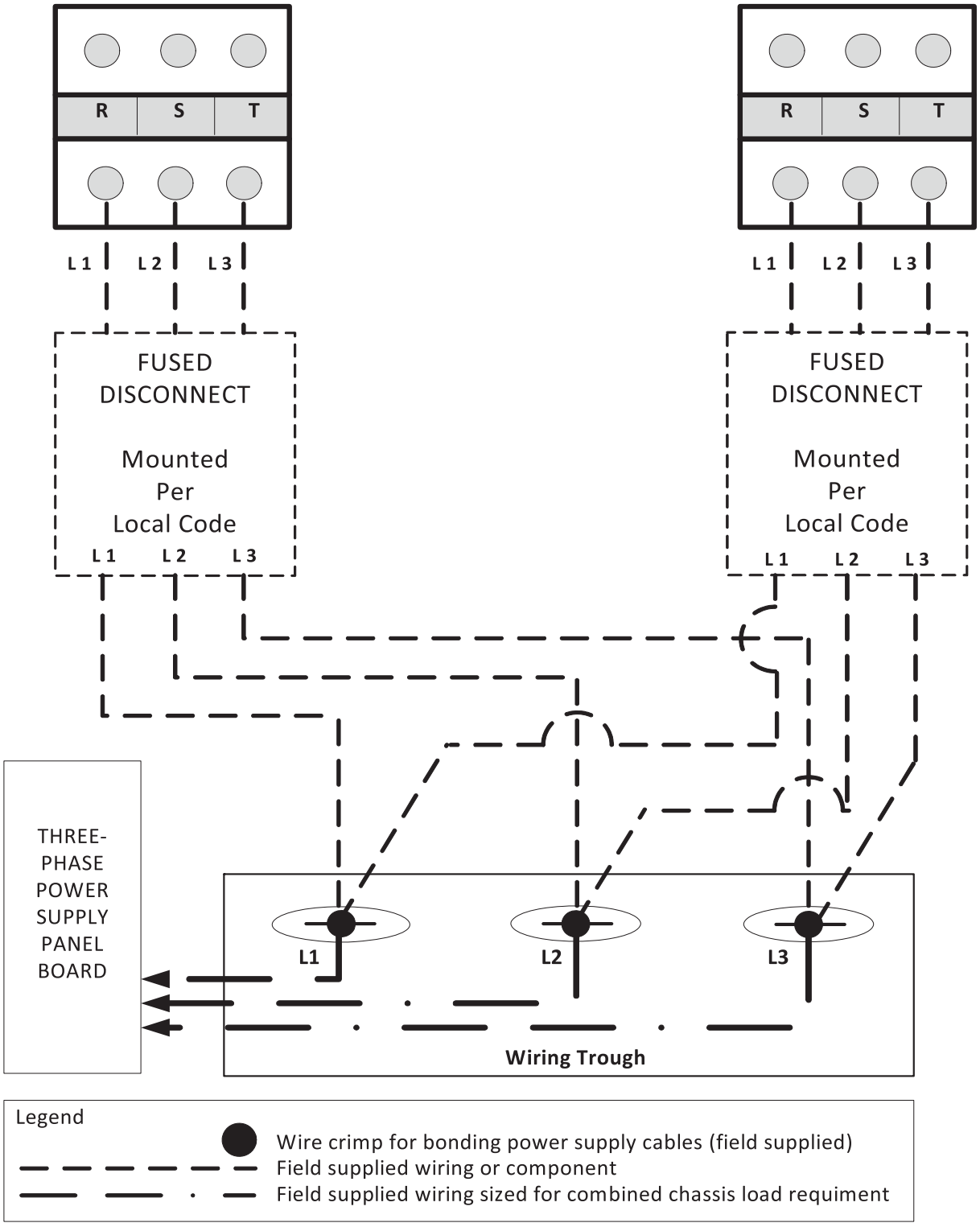
- *Never apply line voltage power to the communications cable terminal block. If contact is made, the PCBs may be damaged.*
- *Always include some allowance in the wiring length when terminating. Provide some slack to facilitate removing the electrical panels while servicing.*

LG

Dual Frame Outdoor Unit Wiring Configuration

Note:

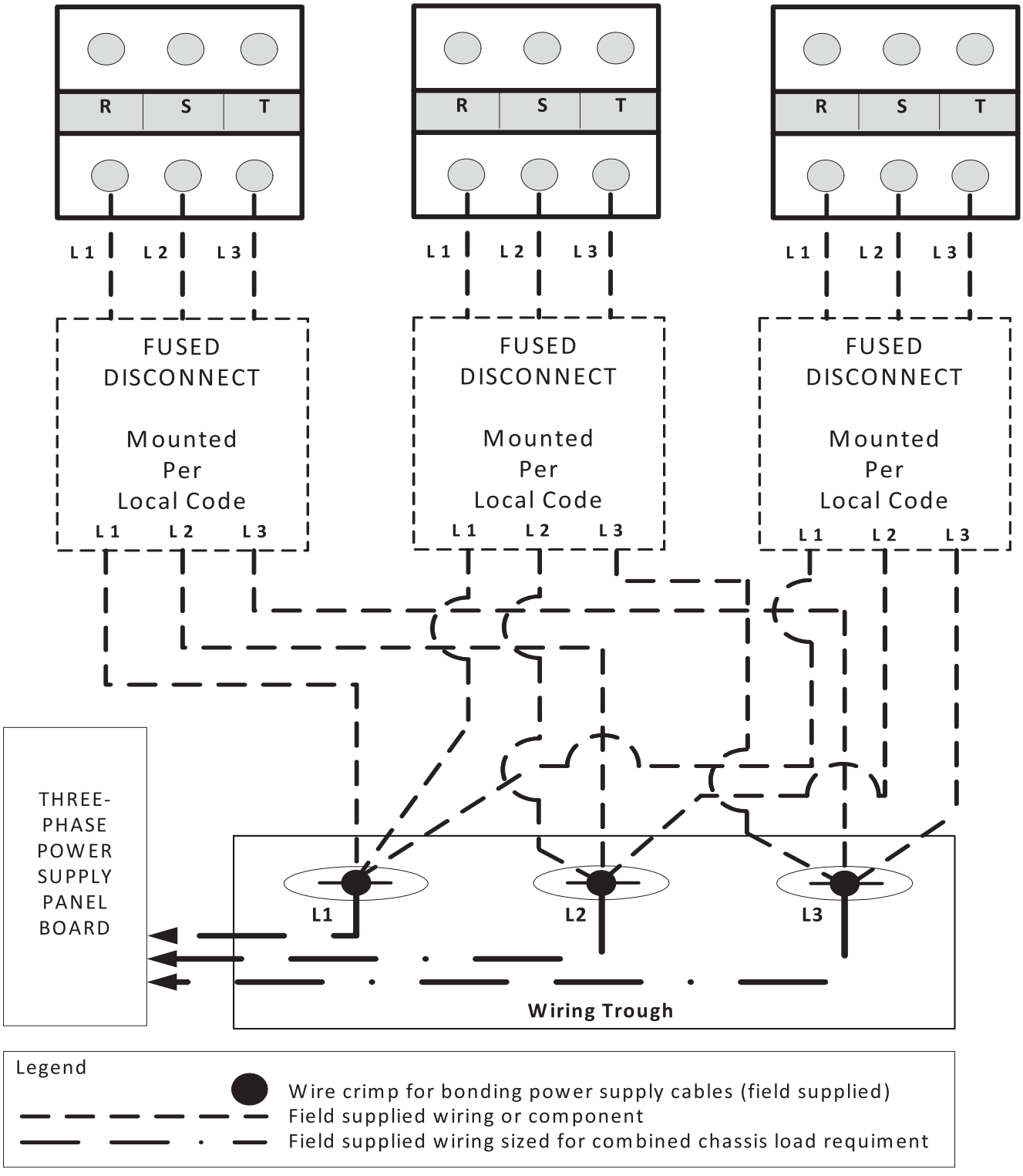
All field power supply wiring must be engineered per local code.



Triple Frame Outdoor Unit Wiring Configuration

Note:

All field power supply wiring must be engineered per local code.

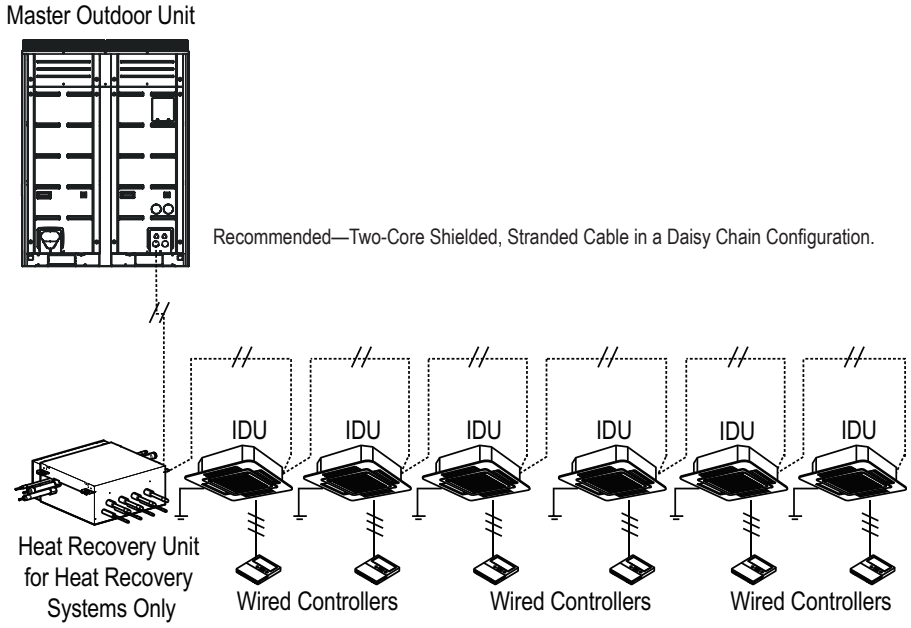


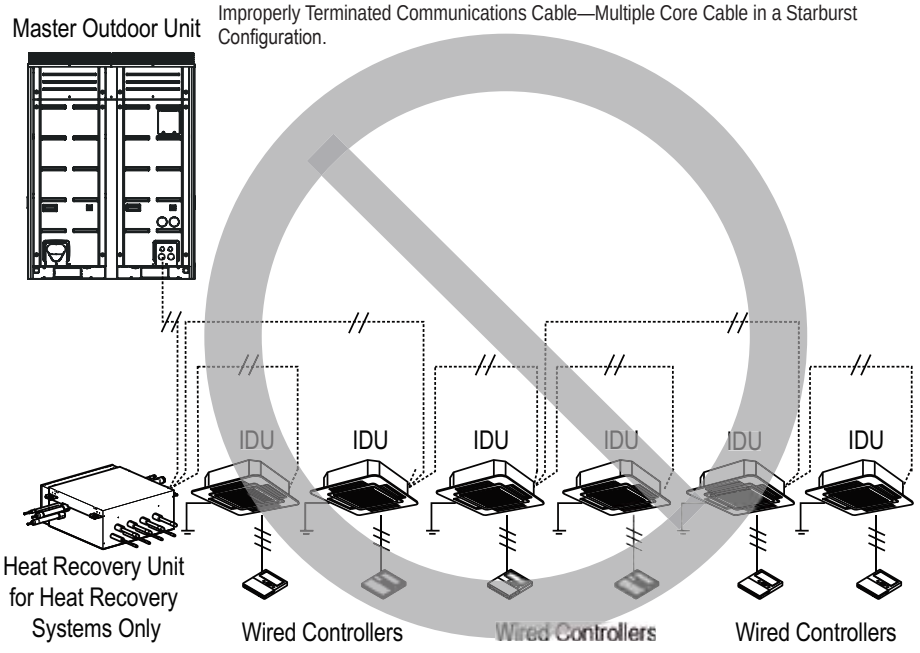
LG

Communications Cable between the Master Outdoor Unit and Indoor Units / Heat Recovery Units (Heat Recovery Systems Only)

- Use a two-core, shielded, stranded cable between the outdoor unit(s) and the indoor units / heat recovery units (Heat Recovery Systems Only).
  - Minimum 18 gauge shielded CVVS or CPEVS cable.
  - Insulation material as required by local code.
  - Rated for continuous exposure of temperatures up to 140°F.
  - Maximum allowable cable length: 3,281 feet.
- Use copper-bearing ring or spade terminals to terminate communication cables.
- Firmly attach the cable; provide slack but secure in a way to prevent external forces from being imparted on the terminal block.
- Communications cable connecting the outdoor unit an indoor unit(s) should be installed and terminated in a daisy chain (BUS) configuration starting at the outdoor unit.
- Terminate the cable shield to a grounded surface at the outdoor unit(s) only. Cable shields between connected devices shall be tied together and continuous from the outdoor unit(s) to the last device connected.

Figure 60: Outdoor Unit Communications Labeling Schematic.





Note:

- *Ring and spade terminals used to connect communications cables MUST be copper bearing. Do NOT use terminals that are galvanized or nickle plate over steel.*
- *Always verify the communication cable is connected to a communications terminal on the outdoor unit(s). Never apply line voltage power to the communication cable connection. If contact is made, the PCBs may be damaged.*
- *The shield of the communications cable connecting the outdoor unit(s) to the indoor units should be grounded only to the outdoor unit(s) frame(s). Tie the shield of each cable segment together using a wire nut at each indoor unit.*
- *Never ground the shield of the communications cable to the indoor unit frame or other grounded entities of the building.*
- *Position the outdoor unit(s) communications cables away from the power wiring. Refer to minimum spacing requirements provided in Table 56.*
- *Never use a common multiple-core communications cable. Each communications bus shall be provided a separate cable (i.e., between outdoor unit(s) and indoor units, outdoor units and central controller(s). If communications cables of separate systems are wired using a common multiple-core cable, it will result in a poor communications signal and unacceptable system operation.*

ELECTRICAL SYSTEM INSTALLATION

Communications Cables

Communication Cables Between the Master Outdoor Unit and Indoor Units / Heat Recovery Units, continued.

- Communications Cable from the Outdoor Units and Indoor Units / Heat Recovery Units (Heat Recovery System Only) Begins at the Master Outdoor Unit.
- Field Provided 18 Gauge Stranded Two-core Cable (Shielded)
- Insulation material as recommended by local code.

Note:

The terminal tagged "GND" on the outdoor unit main PCB is not an earth ground terminal. It is a neutral (-) terminal provided to connect the outdoor unit to central control devices.

Figure 61: Connecting Communication Cables to Outdoor Unit Communication Terminals.

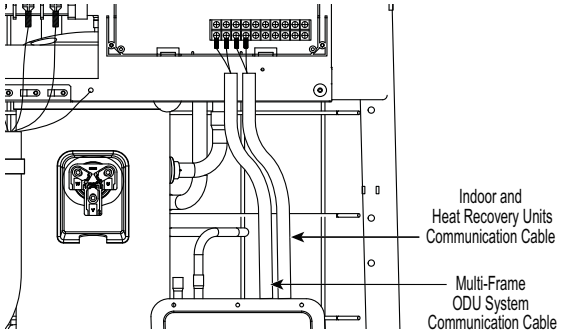
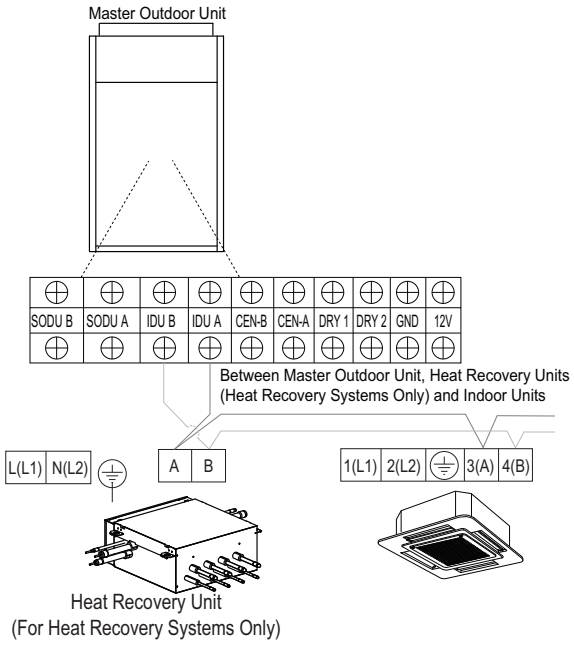


Figure 62: Outdoor Unit to Indoor Unit Communications Cable Termination Detail.



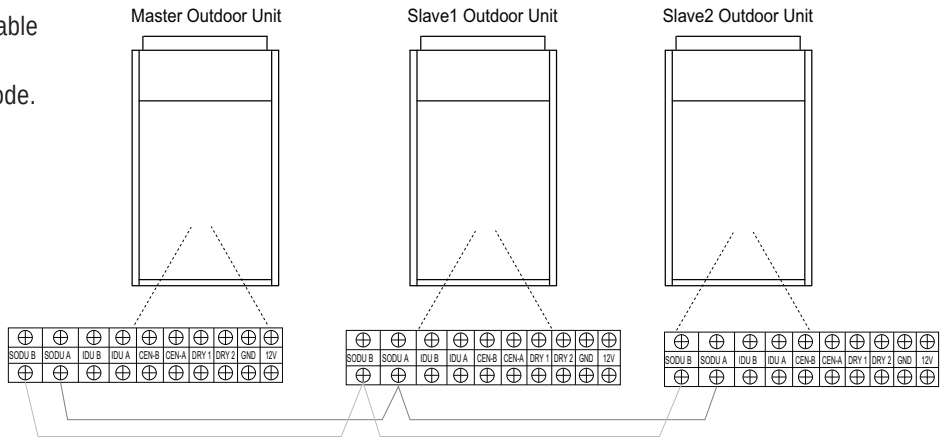
Communication Cables Between Master and Slave Outdoor Units Multi-Frame Systems Only)

- Field Provided 18 Gauge Stranded Two-core Cable (Shielded)
- Insulation material as recommended by local code.

Note:

The terminal tagged "GND" on the outdoor unit main PCB is not an earth ground terminal. It is a neutral (-) terminal provided to connect the outdoor unit to central control devices.

Figure 63: Power Wiring Termination Detail.



Communication Cables Between the Outdoor Unit(s) and the Central Control Device

- Field Provided 18 Gauge Stranded Two-core Cable (Shielded)
- Insulation material as recommended by local code.

Connect all central control devices such as AC products, ACPs, BACnet and LonWorks gateways, and energy recovery ventilators all on the same cable. Order does not matter. Polarity does. Keep “A” terminals with “A” terminals, and “B” terminals with “B” terminals. Starting at the outdoor unit, terminate the cable on terminals Internet A and Internet B. Route the cable as needed between each device.

Note:

Connect the shield to ground ONLY at the outdoor unit. Tie shields together at each termination point.

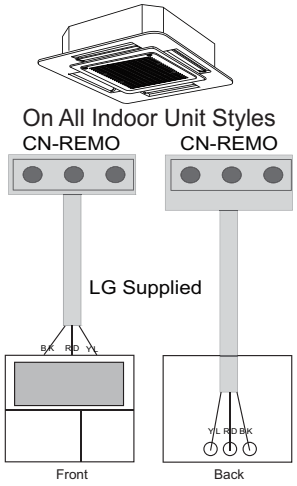
Communication Cables Between the Indoor Units and the Wall-Mounted Zone Controller

- Only use LG provided three-core communications cable between the indoor unit and the wall-mounted zone controller.
- NEVER splice, cut, or extend cable length with field provided cable. If the length needs to be extended, the LG Extension Kit (sold separately) must be used. A maximum of four (4) kits (up to 165 feet) can be used.
- Set the indoor unit operating parameters using DIP switches or by setting up the zone controller. Refer to the indoor unit installation manuals for more details.

Note:

Cable connected to Zone Controller is the factory default connection.

Figure 64: Indoor Unit to Zone Controller Connection.



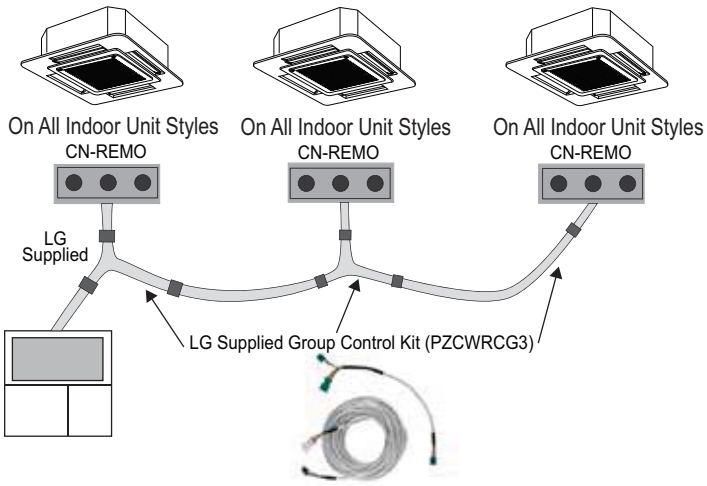
Communication Cables Between Multiple Indoor Units Operating as a Group (Group Control)

- If any indoor units were specified to operate in unison, use one (or multiple) three-core Group Control Kit (sold separately) containing extension and Y-splitter cables. One (1) group control cable kit for each indoor unit in the group except for the last indoor unit.
- Always use an LG provided group control communications cable (Group Control Kit; sold separately) between the indoor unit and the wall-mounted zone controller.
- NEVER splice, cut, or extend cable length with field provided cable.
- Before running cable, decide which indoor unit will be the “Master.” The zone controller will be connected to the “Master.”
- Identify each indoor unit operating as a group as “Master” or “Slave”. Adjust the pertinent DIP switch at each indoor unit. On wall mounted indoor unit models, set the assignment using the handheld remote controller.
- Use a daisy chain configuration and connect all of the group’s indoor units together starting at the “Master” unit.

Note:

Cable connected to Zone Controller is the factory default connection.

Figure 65: Indoor Unit Group to Zone Controller Connections.



DIP SWITCH SETTINGS FOR GEN4 EQUIPMENT

Generation 4 Equipment

The latest versions of LG's indoor units and outdoor (air / water source) units are designated Generation 4 (Gen 4). For Gen 4 units to operate with Gen 4 features, the air conditioning system must meet the following requirements:

- All indoor units, heat recovery units, and air / water source units must be Gen 4.
- All air / water source units must have Gen 4 software installed.
- Air / water source units DIP switch 3 must be set to ON (factory default setting is OFF).
- All controllers must support Gen 4 features.

The firgure at right shows the ODU DIP switch. The "System Component Combinations and Operation Status" table lists how combining different components will affect system operation. The "Serial Numbers or Air / Water Source Units with Gen 4 Software" table lists the serial numbers of air and water source units that have Gen 4 software. All air and water source units, indoor units, heat recovery units, and controllers in a system must be Gen 4 compatible or the system will not operate with Gen 4 features.

Figure 66: Location and Setting of ODU DIP Switch 3.

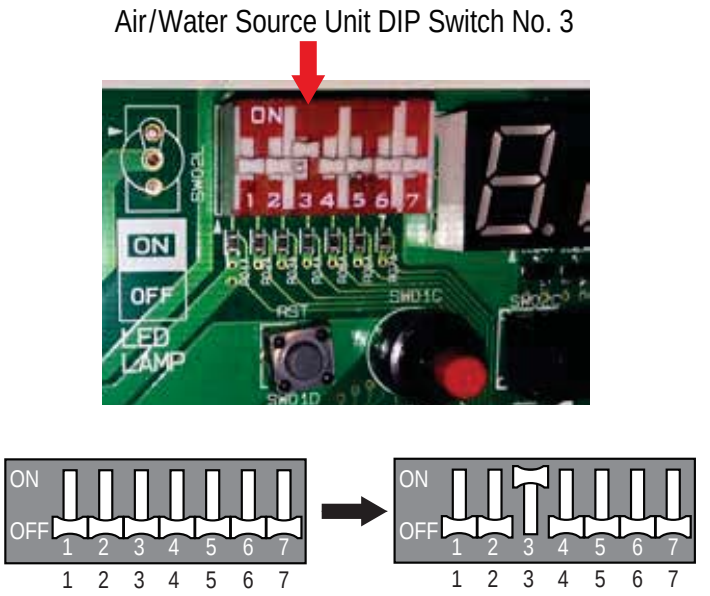


Table 57: System Component Combinations and Operation Status.

Air / Water Source Units*	Indoor Unit(s)**	Heat Recovery Unit(s)	Outdoor Unit DIP Switch No. 3	Operation Status
Gen 4	Gen 4 ONLY	Model 2A ONLY	Must be ON	System will operate WITH Gen. 4 features.
Gen 4	Gen 4 ONLY	Model 2A ONLY	OFF	System will operate but WITHOUT Gen. 4 features.
Gen 4	Gen 4 ONLY	Any combination of Models 1A, 2A	Must be OFF (factory default)	Does NOT include Gen. 4 features. System will not operate if DIP Switch No. 3 is ON, and an error code will be generated.
Gen 4	Any combination of Gen 2 and Gen 4	Model 2A ONLY	Must be OFF (factory default)	
Gen 4	Any combination of Gen 2 and Gen 4	Any combination of Models 1A, 2A	Must be OFF (factory default)	
Gen 2	Any combination of Gen 2 and Gen 4	Any combination of Models 0A****, 1A, 2A	N/A***	Does not include Gen. 4 features.

*Gen 4 Air / Water Source Units = Multi V IV or Multi V Water IV with Gen 4 software (see table below for Gen 4 serial numbers) or Multi V S. Gen 2 Air / Water Source Units = Multi V II, Multi V III, Multi V IV without Gen. 4 software, Multi V Water II, Multi V Water IV without Gen. 4 software, Multi V Mini, Multi V Water Mini, or Multi V Space II.

**Gen 4 Indoor Units model numbers end in "4"; Gen 2 Indoor Units model numbers end in "2" or an "A", including Hydro Kit.

***DIP Switch No. 3 on Gen 2 air/water source units is not related to Gen 4 features as it is with Gen 4 air/water source units.

****0A Model Heat Recovery units are not for use with Multi V IV, Multi V Water IV, or Multi V III heat recovery systems.

Table 58: Serial Numbers of Air / Water Source Units with Gen 4 Software.

Air / Water Source Unit Model Type	Multi V IV Air Source Heat Pump	Multi V Air Source Heat Recovery	Multi V IV Water Source Heat Pump	Multi V IV Water Source Heat Recovery
Serial Number of Air / Water Source Units with Gen 4 Software	502********* and Higher	503********* and Higher	504********* and Higher	

Prepare the Electrical System

1. Verify correct, clean, specified power is at the line side of each system component's disconnect.

2. Note if the green LED light on the component PCB board is illuminated.

3. If a Dynamic V-8 VL air cleaner is installed on a high static ducted model indoor unit, verify power has been provided to the air cleaner controller. Verify by observing the LED in the center of the disconnect plate is illuminated.

4. If a zone controller (Remote Unit controller on the Hydro Kit) is connected to the component, verify the LCD screen displays current operational characteristics.

Pre-commissioning Process

The pre-commissioning process will prepare the system for commissioning in several steps:

1. Power up the system.

2. Verify power is correct.

3. Run self diagnostics check.

4. Assign a system address to indoor units.

5. Assign addresses to heat recovery units (heat recovery systems only).

6. Assign each central control device an address.

Power Up the System / Verify the Power is Correct

Multi V IV outdoor units require either 208-230V / 60Hz / 3Ø or 460V / 60Hz / 3Ø power. Verify that the power and phase requirements are correct and all three legs are present. Make sure that the power imbalance ratio between phases is no greater than 2%. If the electrical power is dirty, the unit may shutdown on a compressor safety and/or the lifespan will be reduced.

Multi V IV outdoor units are inverter driven. Do not install a phase-leading capacitor. If one is included, it will deteriorate the power factor improvement effect, and may cause the capacitor to generate an abnormal amount of heat.

Run Self Diagnostics Check

Note:

If the indoor units have already been successfully assigned a system address, skip this step and go to "Assign Addresses to the Heat Recovery Units."

1. Power all indoor units.

2. Power all heat recovery units in conjunction with powering indoor units (heat recovery systems only).

3. Verify the outdoor units to indoor units / heat recovery units communications cable is installed and terminated correctly.

4. Verify the communications cable between outdoor unit frames is installed and terminated correctly. Inspect terminals (SODU [B] and SODU [A]) at each outdoor unit.

5. Verify that DIP Switches 6 and / or 7 on the slave outdoor unit(s) were properly adjusted for the jobsite configuration.

6. Power all outdoor units. Order does not matter on multi-frame installation.

7. As the power is provided to the main printed circuit board (PCB) on the Master outdoor unit, observe the LED.
   - Wait. The perimeter segments will flash in sequence for 45 seconds.
   - Verify the microprocessor's outdoor unit configuration agrees with the submittal information approved the design engineer (see Tables 57 to 59).
   - Confirm that this step has been completed by checking the box provided on the Record following the information as it is provided. The date is provided in sequence, and segment of the sequence will remain lit for two (2) seconds.

Table 57: Display Code Definitions—Outdoor Unit Nominal Capacity.

Display Code	8	10	12	14	18	20	22	24	26	28	32	34	36	38	40	42
Nominal Mb/h	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36

Table 58: Display Code Definitions—Voltage.

Outdoor Unit Code	22	46
Electrical Requirements	208-230V / 60Hz / 3Ø	460V / 60Hz / 3Ø

Table 59: Segment Display Sequence (Two [2] seconds per segment following a forty-five [45] second wait).

Sequence	Description		Code(s)
1	Master Outdoor Unit Nominal Capacity		8 - 14*
2	Slave1 Outdoor Unit Nominal Capacity		8 - 24*
3	Slave2 Outdoor Unit Nominal Capacity		8 - ~*
4	Total Nominal Capacity of System		8 - ~ *
5	Unit Type	Heat Pump	2
		Heat Recovery	3
6	Unit Voltage	208-230V / 60Hz / 3Ø	22
		460V / 60Hz / 3Ø	46
7	Efficiency Level		1 or 2

**See Table 53 above for code definitions.*

Indoor Unit Auto Addressing

⚠ WARNING

Disconnects should only be operated by a properly licensed electrician at this time. Never look at a disconnect switch when closing. Turn away from the switch when closing. Incorrect wiring could cause the disconnect to explode, physical injury, and / or death.

Note:

During the pre-commissioning process for Gen. 4 systems, do not change any DIP switch settings except for SW01B switch number 3, which should be ON to enable Gen. 4 features. All other combinations of switches should be left in the OFF position on ODU DIP switch SW01B. Refer to System Combinations and Outdoor Unit Operation Settings for proper setting of DIP switch 3.

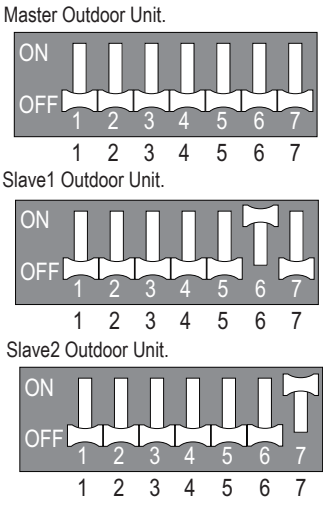
Initiate the Auto Addressing Procedure

Note:

- *If the Auto Address Procedure has never been successfully completed for the system, the compressor(s) will not start when power is applied to the unit.*
- *Auto addressing is only possible on the main PCB of the outdoor unit (master unit if dual / triple frame system).*

1. Verify all that all indoor units connected to the system have power to the PCB board AND all zone controller system start buttons are OFF.
2. Remove the maintenance access panel and unit control box cover from the outdoor unit. Place panels and screws in a secure area.
3. Verify that the communications cable between the indoor units and the outdoor unit is terminated at the outdoor unit terminals IDU(A) and IDU (B).
4. Verify the shield on the communications cable is grounded at the outdoor unit.
5. If installing a dual- or triple-frame system, verify which outdoor unit will be the “Master” unit, the Slave1 unit, and the Slave2 unit; check if the DIP switches on DIP-SW01 are set as shown on right. The outdoor unit with the largest capacity must be set as the Master unit.
6. Cycle power on the outdoor unit. Leave disconnect in the "ON" position.
7. Check the outdoor unit(s) current configuration code(s). Observe the unit setup codes using the LED display found on the outdoor units PCB. Each code will display for two (2) seconds.

Figure 66: Master, Slave1, and Slave2 DIP Switch Settings.



Note:

While this routine runs, the unit runs a self-diagnostics check. At completion, the LED should be clear and nothing displayed. Diagnostic process should take from three (3) to seven (7) minutes.

Initiate the Auto Addressing Procedure, continued

8. Know how many indoor units are connected to the system.

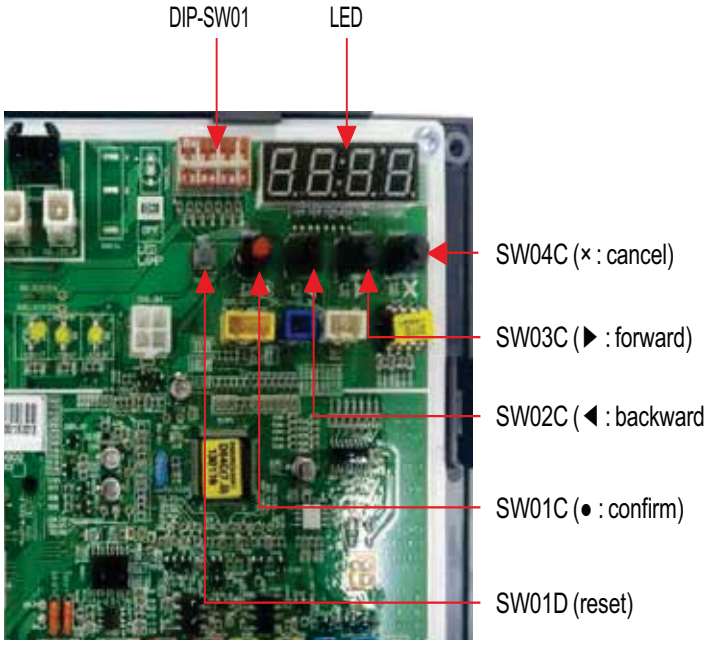
9. Press and hold the red SW01C button for about five (5) seconds. Release when “88” appears on the LED. After three (3) to seven (7) minutes, the display will flash a number for about ten (10) seconds indicating how many indoor units the system successfully communicated with.

10. This number should match the known installed number of indoor units if the auto addressing procedure was successful. Using LGMV, read the address of each indoor unit.

11. Upon completion of the auto addressing routine, the display will be blank and the system will be in standby waiting for another command.

12. Upon successful completion of the auto address procedure, record the system address assigned to each indoor unit by the auto address procedure in the column provided on the Pre-commissioning Device Configuration Worksheet.

Figure 67: Auto Address Button Location.



13. After recording the system addresses assigned to each device, open the outdoor unit disconnect. Remove the outdoor unit to indoor unit communications cable from terminals IDU(A) and IDU(B). Protect conductors by placing electrical tape over the bare ends.

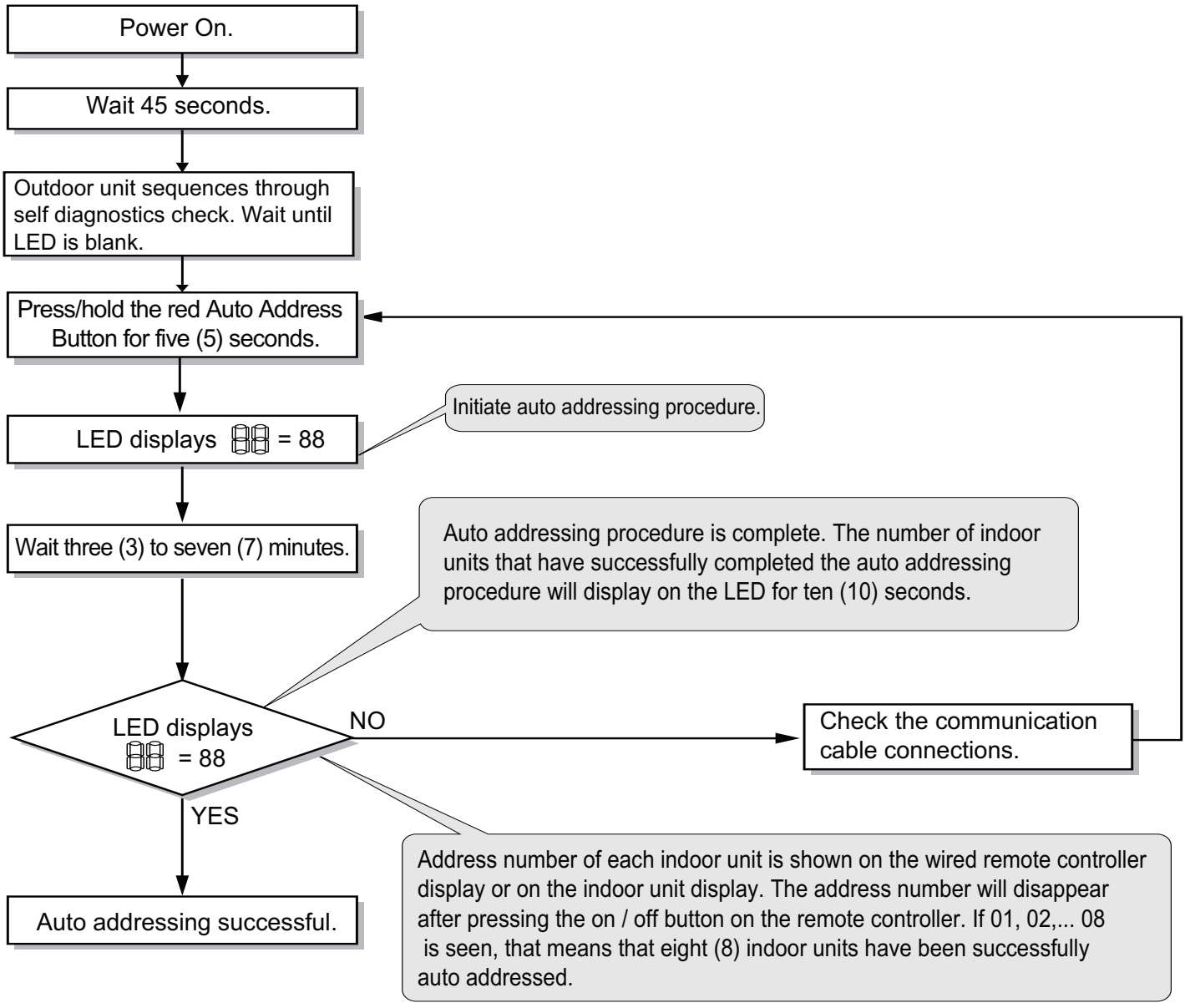
14. Close the disconnect to reapply power to the outdoor unit and energize the compressor crankcase heater. Once again, verify that the outdoor unit to indoor unit(s) communications cable is not connected to terminals IDU(A) and IDU(B) of the outdoor unit.

15. Replace the control panel door.

⚠ WARNING

Upon successful completion of the auto addressing function, an unintentional compressor start can occur unless the communications cable to the indoor units is removed from the outdoor unit terminals IDU(A) and IDU(B). Do NOT open the service valves or attempt to start outdoor unit compressors or until directed by the Commissioning Agent. Major damage to the unit piping and compressors will occur, and there is a risk of explosion, suffocation, physical injury, and / or death.

Figure 68: Indoor Unit Auto Addressing Procedure Flowchart.



Troubleshooting a Failed Indoor Unit Auto Addressing Procedure

If the quantity of indoor units the auto addressing procedure found is incorrect, or the “88” never disappears from the display for the seven (7) minutes, the auto address routine has failed and a communications problem exists. If the Auto Address Procedure failed:

1. Verify ALL indoor unit ON/OFF buttons are in the OFF position (i.e., ON / OFF button NOT illuminated).

2. Check the terminations, polarity, and continuity of each conductor on the communications cable between the outdoor unit and the indoor units. Verify the indoor unit to outdoor unit communications cable is wired correctly.
   - Verify the conductor connected to the “3” (or “5” in the case of cassette frame codes TP, TN, TM) terminals on all indoor units and is terminated on the outdoor unit terminal tagged IDU(A).
   - In a similar fashion, verify the conductor connected to all indoor units on the “4” (or “6” in the case of cassette chassis codes TP, TN, TM) terminals and is terminated on the outdoor unit terminal tagged IDU(B).

3. Verify the shield of the communications cable is grounded at the outdoor unit only. All segment shields should be spliced together at each indoor unit and NOT grounded.

4. After repairing the communications cable, go to Step 9 of the Initiate the Auto Addressing Procedure and repeat the process until successful: Press and hold the red SW01C button for about five (5) seconds. Release when “88” appears on the LED. After three (3) to seven (7) minutes, the display will flash a number for about ten (10) seconds indicating how many indoor units the system successfully communicated with.

5. This number should match the known installed number of indoor units if the auto addressing procedure was successful.

6. Upon completion of the auto addressing routine, the display will be blank and the system will be in standby waiting for another command.

7. Record the system address the outdoor unit assigned to each indoor unit by the auto address procedure in the column provided on the Pre-commissioning Device Configuration Worksheet.

8. After recording the system addresses assigned to each device, open the outdoor unit disconnect. Remove the outdoor unit to indoor unit communications cable from terminals IDU(A) and IDU(B). Protect conductors by placing electrical tape over the bare ends to prevent an accidental compressor start from occurring before the Commissioning Agent arrives.

9. Close the disconnect to reapply power to the outdoor unit and energize the compressor crankcase heater. Once again, verify the outdoor unit to indoor unit(s) communications cable is not connected to terminals IDU(A) and IDU(B) of the outdoor unit.

10. Replace the control panel cover.

LG

Terminating Group Controlled Indoor Units

If any of the indoor units were specified to operate in unison, create a group control communications circuit between the indoor units using a group control cable kit consisting of three (3) cables:

- One pigtail cable.
- One Y-cable.
- One extension cable segment.

1. Before proceeding with group control cable terminations, verify power is off at all indoor units effected.
2. Identify which indoor unit will be the “Master” unit of the group. If not already recorded, record the "Master" and the "Slave" identity assignment to each indoor unit in the group on the Pre-commissioning Device Configuration Worksheet.
3. Termination Procedure:
   - Starting with the Master unit, plug in the male end of the pigtail cable into the CN-REMO socket. At the last Slave indoor unit in the group, a pigtail cable is not required. Plug the male end of the extension cable coming from the previous indoor unit into the CN-REMO socket.
   - Plug the Y-cable into the pigtail at each indoor unit except for the last Slave indoor unit in the group where no Y-cable cable will be needed.
   - Connect two extension cable segments to each “Y” cable except for the “Y” cable connected to the Master indoor unit. At the Master indoor unit, connect one extension cable and the communications cable from the zone controller to the Y-cable.

Plan the Central Control Addresses Assignments

Check with the building’s Chief Engineer and gather any preferences the project may have. If there are no preferences:

- Hex assignments do not have to be assigned in any particular order, or an order defined by the routing of the communications cable between the indoor units. In most cases, Hex addresses can be skipped.[1]
- All members of a Hex Group are not required to be on the same Multi V system.
- Addresses can be assigned at random, not in any particular order, and can be skipped.[1]

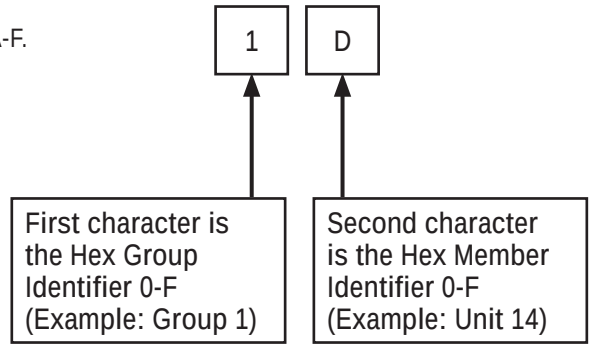
[1]On AC EZ, do not skip addresses. Start with Hex address 0. Buttons have pre-assigned Hex addresses. If an address is skipped, the associated button will do nothing.

Indoor Unit Central Control Address Assignments

A central control address is made up of two hexadecimal characters.

- The first character in the central control address is the Hex Group Identifier. Possible Hex Group Identifiers (in order of lowest to highest) are 0-9 followed by A-F.
- The second character in the address is the Hex Member Identifier in a Hex Group. Hex Member Identifiers (in order from lowest to highest) are 0-9 followed by A-F.

Figure 69: Central Control Address Nomenclature.



Hex Address Assignment Limitations

- There is a limit of 16 Members per Hex Group
- There is a limit of 16 Hex Groups per VRF system.
- There is a limit of 256 possible Member Identifiers per Central Control (See Central Controller Communications Limitations on the next page).

Central Controller Communications Limitations

Each type of Central Controller device is designed to communicate with a limited quantity of indoor units. The quantity of indoor units that can be connected to a single central control communications cable, therefore, will be defined by the central control device on that cable with the smallest Maximum Indoor Unit Quantity as shown at right.

Table 60: Central Controller Indoor Unit Connection Limitations.

Central Control Device	Maximum Indoor Unit Quantity
AC EZ	32
AC SMART / SMART Premium	128
LonWorks Gateway	64
BACnet Gateway	256

Group Number

If the building operator wants to know which indoor units are on each outdoor unit, and multiple systems serve a building:

- Assign a Group Number to each system. If there are more than 16 indoor units on a system, multiple Group Numbers may be necessary.

If the building owner wants to know which indoor units are on each floor:

- Assign a different group number for each floor. If there are more than 16 indoor units on a floor, multiple Group Numbers may be necessary.

Member Number

Can be assigned at will or for example, can follow the room layout on each floor.

For each LG Central Controller product provided on the project, devise a central control address schedule and assign a central control address to each indoor unit(s) Hydro Kit(s), and ERV(s) units. Record this central control address for each component in the column provided on the Pre-commissioning Device Configuration Worksheet.

Upload Central Control Address to the Indoor Units

For all ducted, vertical and floor standing indoor units, the central control address must be assigned using a wired zone controller. Wall-mount, ceiling cassette, ceiling suspended, and the wall / ceiling convertible indoor units, the central control address can be assigned using a wireless handheld controller or a wired zone controller.

Power Up All Indoor Unit PCBs

Turn the disconnect for each indoor unit to the “ON” position. DO NOT turn the unit ON (on/off button remains off).

Note:

During the following procedure, NEVER PUSH the ON / OFF (Enable operation) Button on the zone controller.

For Indoor Units That ARE NOT Being Controlled as a Group

1. Verify the zone controller cable is plugged into CN_REMO socket on the indoor unit PCB.
2. Using the controller, go to the setup function 02 (icons are different for each controller. Refer to the controller user's manual for more information.)
3. Type in the Hex Central Control address that has been designated to the unit.
4. Repeat Steps 1 through 3 for each indoor unit in the building.

For Indoor Units That ARE Being Controlled as a Group

1. Before attempting to assign a central control address to an indoor unit controlled as a group, identify which unit in the group will be the Master indoor unit and which indoor units are going to be identified as Slave units.
2. Go to the Master indoor unit and access the PCB.
3. Verify a group control pigtail cable is plugged into the CN-REMO socket on the indoor unit PCB. If it is not, do so now by plugging the communications cable pigtail into the CN-REMO socket.
4. If the group control extension cable between the indoor units is plugged into the Y-cable, unplug the extension cable from the Y-cable.
5. If not already present, plug the zone controller communications cable into the pigtail cable.
6. Using the controller, go to the setup function 02 (icons are different for each controller. Refer to the controller user's manual for more information.) Type in the Central Control address designated for the Master indoor unit.
7. Disable power to the Master indoor unit. Do not restore power to the Master indoor unit at this time. It shall be restored in step 18.
8. If the zone controller and associated communications cable has already been permanently mounted in place, plug the Y-cable back into the pigtail and obtain a loose zone controller with a communications cable to continue programming the Slave indoor units.
9. Go to the first Slave indoor unit and disconnect the Y-cable from the pigtail.
10. Plug the zone controller communications cable into the socket on the pigtail cable. Do not push the ON / OFF button or enable indoor unit operation.
11. Using the controller, go to the setup function 02 (icons are different for each controller. Refer to the controller user's manual for more information.) Type in the Hex address assigned to the unit.
12. Change DIP Switch No. 3 on the indoor unit PCB to the "ON" position.
13. Disable power to the indoor unit using the disconnect switch. Wait one (1) minute.
14. While power is off, unplug the zone controller cable from the pigtail socket.
15. Plug the group control Y-cable back into the pigtail.
16. Restore power to that Slave indoor unit, and go to the next Slave indoor unit.
17. Repeat Steps 9 to 16 for each Slave indoor unit except the last one in the group. At the last Slave indoor unit, the process is the same except unplug the group control cable from socket CN-REMO on the indoor unit PCB board and plug the zone controller cable into the same socket.
18. After all Slave indoor unit have addresses assigned, go back to the Master indoor unit and restore power.

Indoor Unit Temperature Sensing Location Selection

For each indoor unit connected to a wired zone controller, select a zone temperature sensing option. Assign one of three methods for the indoor unit to sense the zone temperature. Skip this step for indoor units controlled from a handheld (wireless) controller. Record the sensing for each indoor unit on the Pre-commissioning Device Configuration Worksheet. There are three possible strategies:

1. Use the unit-mounted return air sensor (or the optional remote wall-mounted sensor).

2. Use the sensor mounted in the zone controller.

3. Sense the temperature at the unit-mounted return air sensor (or the optional remote wall-mounted sensor) and sensor mounted in the zone controller, then control based on the temperature reading using the sensor that is farthest from setpoint.

Conduct an Air Balance for Ducted Indoor Units

For each ducted model indoor unit, confirm that the Test and Balance contractor adjusted the fan speed setting values. Record the actual fan setting value used to deliver cataloged CFMs at the jobsite static pressure conditions in the appropriate column on the Pre-Commissioning Device Configuration Worksheet. If the fan setting value was left at the factory default insert “00” in the blank.

Note:

It is always best if the air balance is completed prior to a request for a commissioning agent. If the air balancing contractor has not completed the work before commissioning, the Commissioning Agent is not responsible for setting the indoor unit air flow rates, fan speed, or insure the air volume delivered at each indoor unit is per project specifications, only to spot check. Excessive or restricted airflow may impact the ability of the Commissioning Agent to successfully complete system commissioning. If problem exists, request verification from the Test and Balance contractor. If necessary, provide instruction to the air balance technician on how to adjust the indoor unit fan setting value.

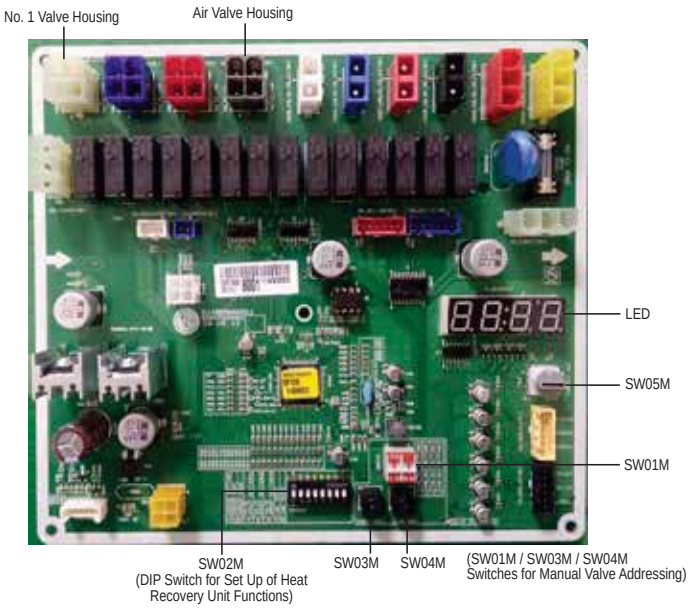
Setting up the Heat Recovery Unit (Only For Heat Recovery Systems)

General

Each heat recovery unit will have a unique address assign so the outdoor unit will be able distinguish it from other heat recovery units. The unique address is assigned by adjusting the rotary dials on the heat recovery unit printed circuit board (PCB).

Upon completion of the heat recovery unit address, the heat recovery unit operating parameters will be set by adjusting the positions DIP Switches on SW01M, SW02M.

Figure 70: Heat Recovery Unit Main PCB.



Procedure

Before beginning the physical process of assigning heat recovery addresses, map out the address assignments using a copy of the LATS tree mode diagram.

Guidelines

1. Addresses must be sequential and cannot be skipped.
2. Assign the lowest address to the heat recovery unit that has the largest capacity indoor unit connected to port number 1. If the capacity of all indoor units connected to port number 1 of each heat recovery unit is the same, assign address “0” to the heat recovery unit farthest away from the outdoor unit. Assign the next address to the next farthest away and so on until all heat recovery units have an address. The heat recovery unit with the highest address should be the one closest to the outdoor unit. Up to 16 heat recovery units can be on a single system.

Note:

Addressing must be performed following the detailed steps above because port number 1 on the heat recovery unit addressed “0” will remain open during the auto pipe detect procedure. If the indoor unit capacity connected to the port is relatively small compared with other units on the system, the outdoor unit high head pressure safety will trip and shut down the unit during the procedure.

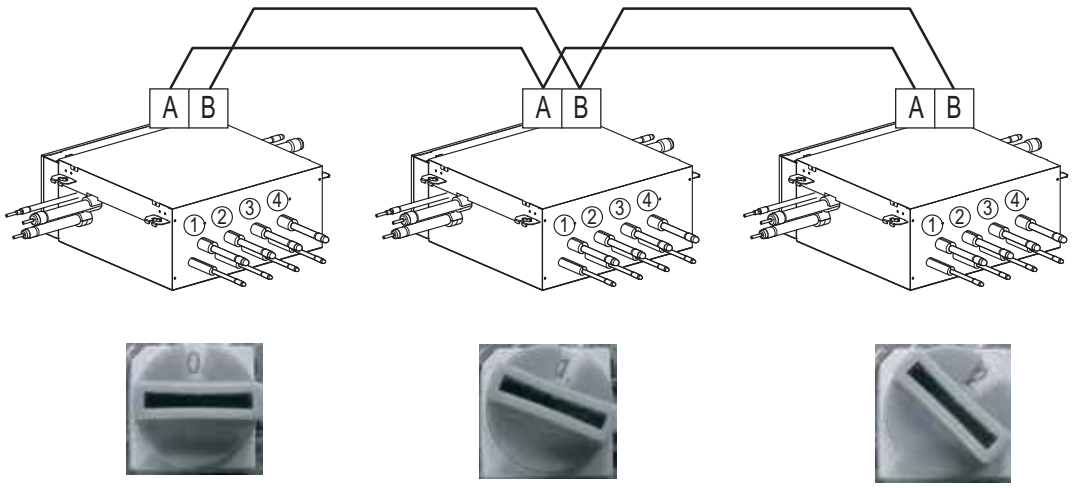
Possible settings in order of lowest to highest are: 0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F.

3. Record the address assigned to each heat recovery unit in the pertinent column on the Pre-Commissioning Device Configuration Worksheet.

SW05M Function (Rotary Switch for Addressing Heat Recovery Units)

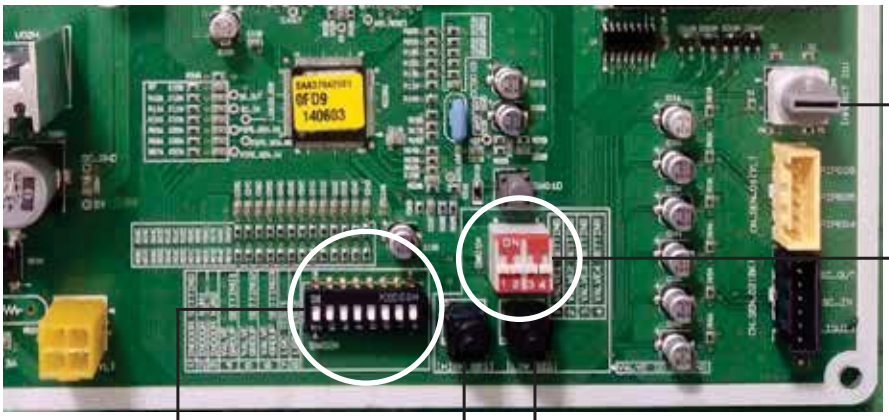
- SW05M must be set to "0"' when installing only one heat recovery unit.
- When installing multiple heat recovery units, address each unit with sequentially increasing numbers starting from "0".

Figure 71: Adjusting the Heat Recovery Unit Addresses.



Setting Up the Heat Recovery Unit (Only For Heat Recovery Systems)

Figure 72: Location of SW02M and SW01M on the Heat Recovery Unit Main PCB.



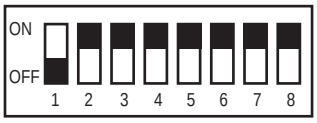
1. Main Function of SW02M (Black denotes the switch position).

SW02M

ON S/W	Selection	
No. 1	Method for addressing the heat-recovery control unit valves (Auto / Manual)	
No. 2	Model of heat recovery unit	
No. 3	Model of heat recovery unit	
No. 4	Valve group setting	
No. 5	Valve group setting	
No. 6	Valve group setting	
No. 7	Used only in factory production (preset to “OFF”)	Zone setting (“ON”)
No. 8	Used only in factory production (preset to “OFF”)	

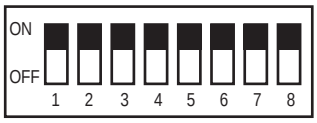
2. Selecting the Heat Recovery Unit Valve Addressing Method (Pipe Detection) (Auto / Manual).

Switch No. 1 OFF



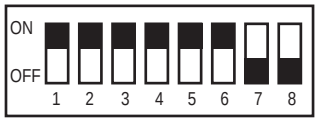
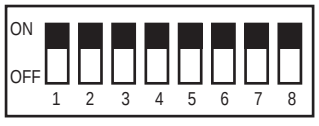
Auto

Switch No. 1 ON



Manual

3. Zone Control Setting.

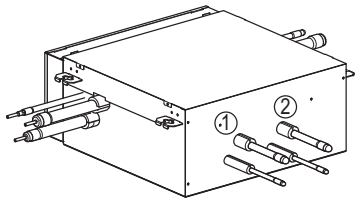
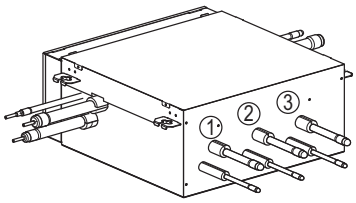
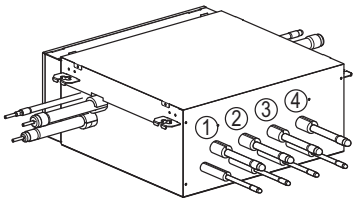
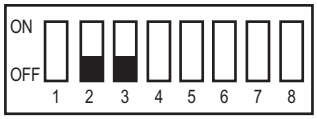
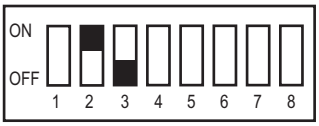
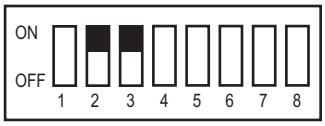
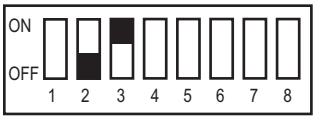
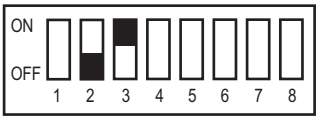
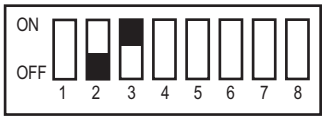
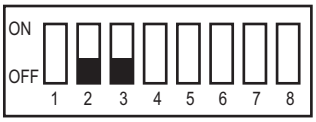
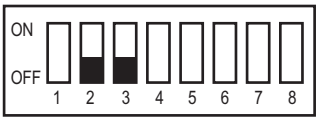
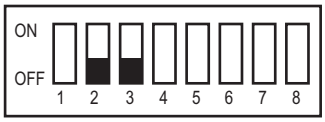
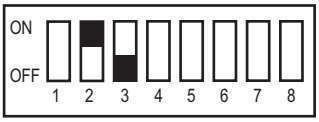
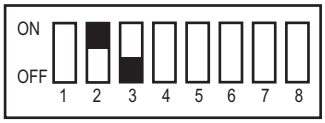
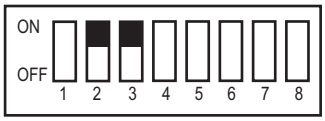
	DIP Switch Settings	
Normal Control		 SW01M
Zone Control		 SW01M Turn the DIP switch of the zoned branch to ON. Example: Branches one (1) and two (2) are set to zone control.

LG

Configure the Heat Recovery Unit Settings

1. Identify how many ports are connected (see Table 61).
2. Group ports if necessary. If any connected indoor units are “large” capacity models (indoor units with >54,000 Btu/h capacity) two heat recovery ports must be “grouped” to serve a large capacity indoor using an inverted ‘Y’ branch.
3. Set switches on SW02M as outlined in Tables 61 and 62.

Table 61: Selecting the Heat Recovery Unit Model.

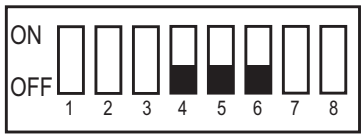
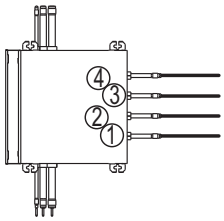
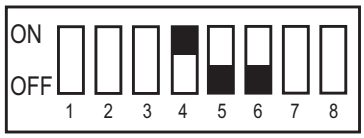
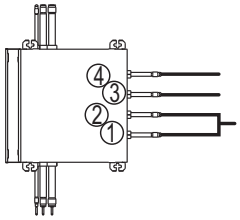
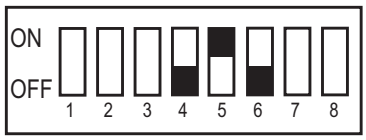
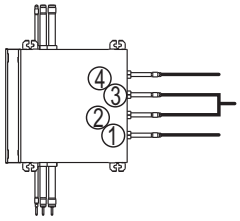
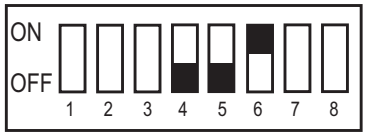
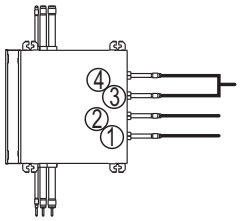
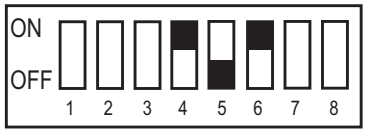
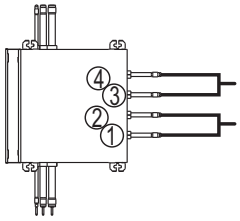
	 PRHR022A (Two [2] ports)	 PRHR032A (Three [3] ports)	 PRHR042A (Four [4] ports)
Factory Setting			
One port connected			
Two ports connected			
Three ports connected			
Four ports connected			

Note:

Each heat recovery unit has switches No. 2 and No. 3 (on SW02M) factory set as shown above in initial setting.

- *To use a PRHR022A for one port, cap off the second pipe, and set the DIP switches on the heat recovery unit for "one port connected" as shown in the table above.*
- *To use a PRHR032A for two ports, cap off the third port, and set the DIP switches on the heat recovery unit for "two ports connected" as shown in the table above.*
- *To use a PRHR042A for three ports, cap off the fourth port, and set the DIP switches on the heat recovery unit for "three ports connected" as shown in the table above.*
- *To use a PRHR042A for two ports, cap off the third and fourth ports, and set the DIP switches on the heat recovery unit for "two ports connected" as shown in the table above.*
- *Any unused port must be sealed with a brazed copper cap, not with a plastic cap.*

Table 62: SW02M Valve Group Settings.

	Dip Switch Setting	Example
No Valve Group Control		 Indoor unit Indoor unit Indoor unit Indoor unit
No. 1, 2 Valve Control		 Indoor unit Indoor unit Large capacity indoor unit
No. 2, 3 Valve Control		 Indoor unit Large capacity indoor unit Indoor unit
No. 3, 4 Valve Control		 Large capacity indoor unit Indoor unit Indoor unit
No. 1, 2 Valve Control No. 3, 4 Valve Control		 Large capacity indoor unit Large capacity indoor unit

LG

Verify a Pressure (Leak) Test Has Been Performed

If not, perform one now. Use medical grade dry nitrogen and pressure test the refrigerant piping system to a minimum of 550 psi for a period of 24 hours.

Evacuate the Refrigerant Piping System

Note:

- *The outdoor unit may be put in "vacuum mode". Generally, using the vacuum mode feature does assist with the vacuum process and is not necessary if a vacuum pump is connected to all charging ports at the outdoor unit(s) simultaneously as suggested. See the Technical Service Manual for this product for more information.*
- *For refrigerant charging in a multi-frame system, only use the charging ports on one outdoor unit (does not matter which one).*
- *For evacuation purposes in a multi-frame system, connect to the hot gas service port and liquid service port on only one outdoor unit.*

Note:

DO NOT apply power to any Multi V system device prior to performing a system evacuation. There is a possibility that EEV valves may close and isolate sections of the pipe system, Contact your LG Applied Rep champion or service technician for the procedure to reopen the EEV valves before evacuation.

1. Release the Pressure Test dry nitrogen charge from all refrigerant pipes.
2. Verify ALL field installed isolation ball valves are OPEN (including those that are capped for future use).
3. Remove and discard the Schrader valve cores at the outdoor unit(s) charging ports. (This is a preventive step that ensures that valves used after charging the system have not been subjected to the high pressure value used during the Pressure Test.)
4. Attach a 5/16" core removal tool equipped with ball valve and a new core to each charging port on the outdoor unit.
5. Check the vacuum pump(s) you intend to use and verify the oil in the sump is fresh and not contaminated.
6. Attach the vacuum pump(s) to each charging port simultaneously using high quality refrigerant vacuum hoses.
7. Perform a triple evacuation.
8. Achieve a micron gauge reading of less than 500 microns.
9. At 500 microns, valve off the charging port by closing the core removal tool ball valves.
10. Remove the vacuum hoses and pumps.

Note:

Do not open the outdoor unit service valves and release the factory refrigerant charge until the Commissioning Agent authorizes to do so.

11. Leave the refrigerant piping system in a vacuum until the Commissioning Agent arrives and is satisfied with the micron gauge reading.

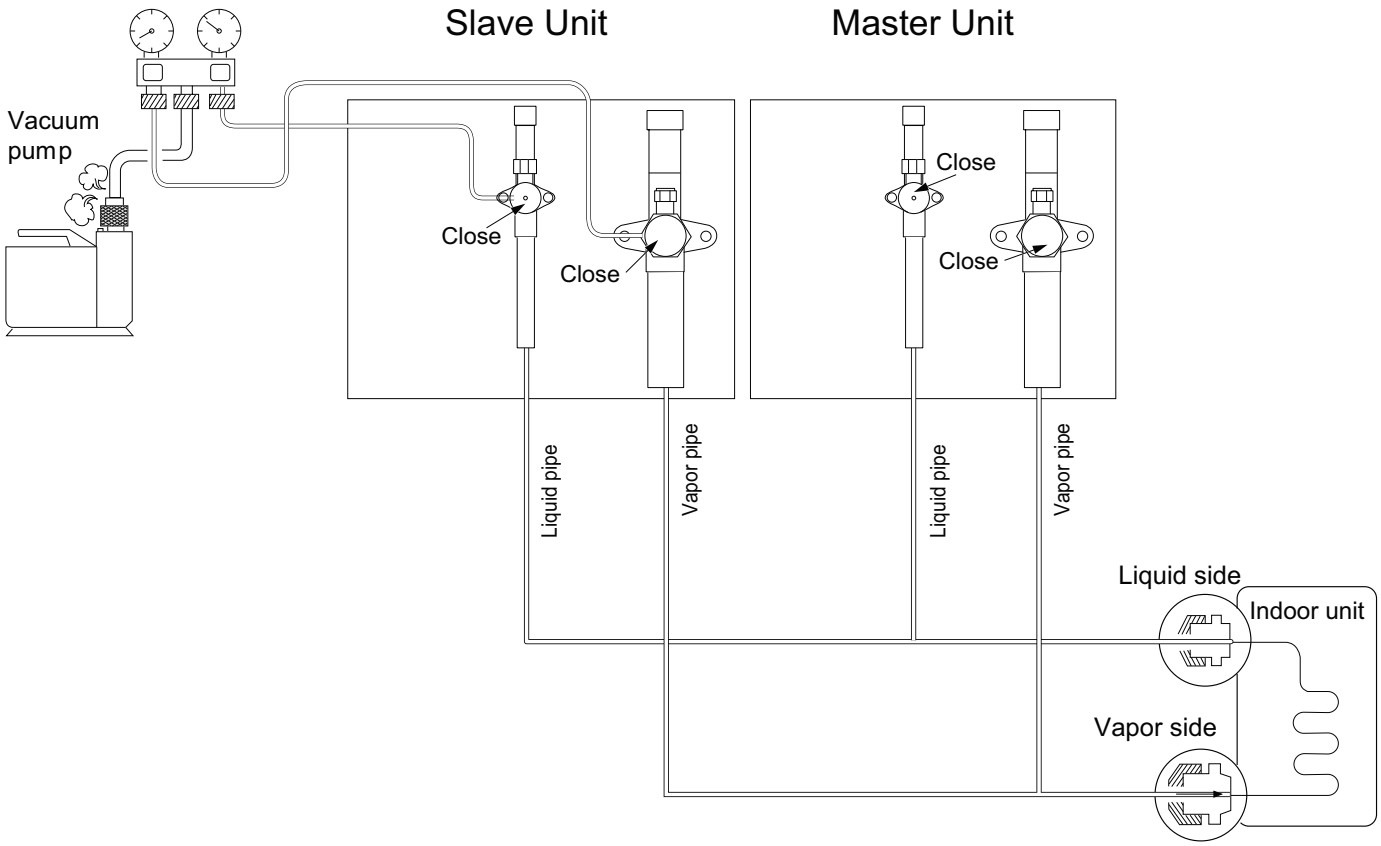
Note:

The system must be left in a vacuum until the Commissioning Agent arrives and verifies the quality of the evacuation process. If the evacuation procedure was not conducted properly, the system will likely malfunction and operate erratically. Significant costs may be incurred including but not limited to refrigerant reclaim, recycle, and replacement.

Vacuum for Heat Pump Systems

Vacuum the refrigerant piping system by connecting the vacuum pump to the service ports for the liquid pipes and the vapor pipes on the outdoor unit. Use a vacuum pump with a gauge that can evacuate to 500 microns, and vacuum with the service port valve closed. Never air purge with refrigerant.

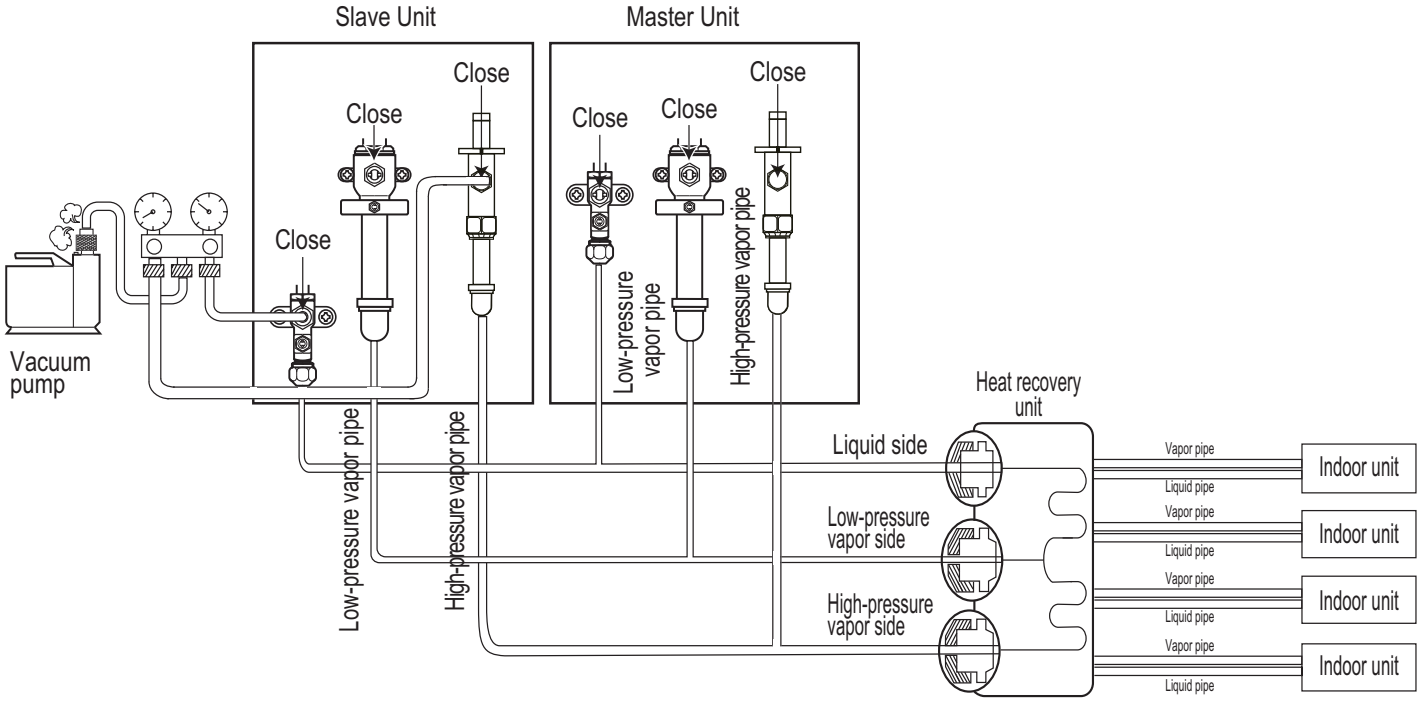
1. Evacuate the system for two (2) hours, bringing the system up to 500 microns. After maintaining the system to 500 microns for more than one (1) hour, confirm that pressure has risen. If not, there may be moisture or a leak somewhere in the refrigerant piping system.
2. If the system has been evacuated for more than two (2) hours and it is suspected that moisture may be present (rainwater may have entered the piping if installation look a long time to complete, or if work occurred during a rainy season), pressurize to 14 psi (vacuum break) with nitrogen gas, and then vacuum again for one (1) hour to 500 microns. If the system cannot be evacuated to 500 microns within two (2) hours, repeat vacuum break. After maintaining the system in vacuum for one (1) hour, check to the vacuum gauge to see if pressure has risen.



Vacuum for Heat Recovery Systems

Vacuum the refrigerant piping system by connecting the vacuum pump to the service ports for the liquid pipes and the high-pressure vapor pipes on the outdoor unit (the low-pressure vapor pipe is included in the vacuum procedure through the heat recovery unit). Use a vacuum pump with a gauge that can evacuate to 500 microns, and vacuum with the service port valve closed. Never air purge with refrigerant.

1. Evacuate the system for two (2) hours, bringing the system up to 500 microns. After maintaining the system to 500 microns for more than one (1) hour, confirm that pressure has risen. If not, there may be moisture or a leak somewhere in the refrigerant piping system.
2. If the system has been evacuated for more than two (2) hours and it is suspected that moisture may be present (rainwater may have entered the piping if installation look a long time to complete, or if work occurred during a rainy season), pressurize to 14 psi (vacuum break) with nitrogen gas, and then vacuum again for one (1) hour to 500 microns. If the system cannot be evacuated to 500 microns within two (2) hours, repeat vacuum break. After maintaining the system in vacuum for one (1) hour, check to the vacuum gauge to see if pressure has risen.



PRE-COMMISSIONING

Prepare Pre-commissioning Package Documents / Initiate a Request

Prepare Pre-commissioning Package Documents

1. A copy of the refrigerant piping system(s) shop drawing(s) generated by LATS Multi V pipe design software.
2. A copy of the pipe fitter's pipe changes and field notes.
3. A verified copy of the "As-Built" LATS Multi V Project file (*.mtv) that includes all changes noted by the pipe fitter(s) in 2. Notes should include changes to the line lengths and number of elbows used for each liquid line segment
4. A copy of a completed and verified Installation Checklist for the outdoor unit(s), indoor units, heat recovery units, ERVs, Air Cleaners, and Control Devices. Correct any needing attention before continuing.
5. A completed Pre-commissioning Device Configuration Worksheet.
6. A completed copy of the Pre-commissioning Checklist.
7. If an AC Smart Central Controller is provided and it is to be connected to the building network, record the IP Address on the Pre-commissioning Device Configuration Worksheet.

Optional, but Highly Recommended

It is always best if the air balance is completed prior to a request for a commissioning agent to insure the air volume delivered at each indoor unit is per project specifications. The commissioning agent is not responsible for setting the indoor unit fan speed or ensure the air volume delivered at each indoor unit is per project specifications. Excessive or restricted airflow may impact the ability of the commissioning agent to successfully complete system commissioning. Upon completion of the air balance, the report should include the adjusted indoor unit's fan speed (i.e., fan setting value) set by the Test and Balance technician to deliver cataloged air volume (CFM) at jobsite static pressure conditions.

Initiate a Request for a System Commissioning

Contact your LG Applied Representative's Project Manager or your account representative and request a System Commissioning. Provide all the documents listed in "Prepare Pre-commssioning Package" section above.

System Commissioning

The Multi V System commissioning process and procedures are provided in a separate manual and/or in training materials provided by the LG Academy Training Team. To obtain a copy, you must be a certified LG commissioning agent.

After Commissioning Has Been Requested

The commissioning agent may contact you to discuss specific job points, scheduled day(s) and expected duration. It is the contractor's responsibility to provide all of the necessary start-up labor, refrigerant, tools and test equipment needed to complete the process in the expected time frame. Please note that the commissioning agent's allotted time at your project DOES NOT include owner training.

It is understood that the contractor is to request for a commissioning agent when all required project readiness points are complete; not based on an "expected" completion date. The contractor also acknowledges that they will assume all responsibility for costs incurred by the commissioning agent including but not limited airfare, travel costs, transportation, shipping, labor, and tool costs due to lack of readiness.

The commissioning agent's schedule is usually very rigid, and may have no flexibility regarding duration. It also involves advance travel arrangements that may be impractical or impossible to change.

Freight Damage and Unit Replacements ..... Your LG Manufacturer Representative
Missing Parts ..... Your LG Manufacturer Representative
Received Wrong Outdoor Unit Model(s) ..... Your LG Manufacturer Representative
Installation, Startup, and Commissioning Technical Assistance 1-888-865-3026

LG MONITORING VIEW (LGMV) DIAGNOSTIC SOFTWARE

LG Monitoring View (LGMV) software allows real-time monitoring of Multi V IV system operating parameters. An industry-standard personal computer (PC) running LGMV connects to the main printed circuit board (PCB) of the air source unit through an LG interface cable. Two versions of LGMV are available: the Low version, which displays real-time parameters, and the High version, which displays the real-time parameters and the parameter targets. This software can be used to both commission 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. For detailed LGMV software information, contact your LG representative.

Note:

Images on these pages are examples of LGMV screenshots. Actual images may differ depending on the version of the software and the units installed.

Figure 73: MV Real-time Data Screen.

Recommended Minimum PC Configuration:

- CPU: Pentium® IV 1.6 GHz
- Main Memory: 1G
- Operating System: Windows® XP/Vista/7 32 bit (recommended), 64 bit
- Hard Disk: 600 MB when operating
- MS Office 2003, 2007 (recommended) for select reporting functions

LGMV Display

LGMV displays the following real-time data:

- Actual inverter compressor speed
- Target inverter compressor 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
- Upper outdoor coil pipe temperature
- Lower outdoor coil pipe temperature
- Liquid line pipe temperature
- Subcooler inlet temperature
- Subcooler outlet temperature
- 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 number
- Site name
- Total number of connected IDUs
- Communication indicator
- IDU capacity
- IDU operating mode
- IDU fan speed
- IDU EEV position
- IDU room temperature
- IDU inlet pipe temperature
- IDU outlet pipe temperature
- IDU error code

LG MONITORING VIEW (LGMV) DIAGNOSTIC SOFTWARE

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

1. Cycleview: Graphic of internal components including:
   - Compressors showing actual speeds
   - EEVs
   - IDUs
   - Temperature and pressure sensors
   - Four-way reversing valve

2. Graph: Full screen graph of actual high and low pressures and high and low pressure limits. A sliding bar allows viewing of previously recorded data.

3. Control FTN: Enables user to turn on IDUs in 1.8°F increments.

4. Useful Tab
   - Unit Conversion: Converts metric values to imperial values.

5. Data
   - Data Saving Start: Recording of real time data to a separate file created to be stored on the user's computer.
   - Data Loading Start: Recorded data from a saved ".CSV" file can be loaded to create an LGMV session.

6. Monitoring
   - Electrical: The lower half of main screen is changed to show Inverter Compressor Amps, Volts, Power Hz, Inverter control board fan Hz.

Figure 74: MV Cycleview.

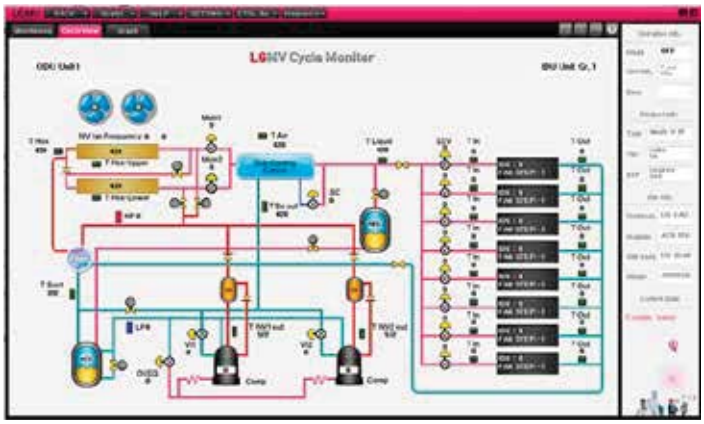


Figure 75: MV Control Indoor Units Screen.

Error Codes

LGMV software helps the service technician or commissioning agent to troubleshoot system operation issues by displaying error codes. These error codes are displayed on the upper right area of the LGMV main screen. For an overview of Multi V IV error codes, see page 181. For more detailed troubleshooting information, refer to the Multi V IV Service Manual.

Figure 76: Error Code Screen.

Note:

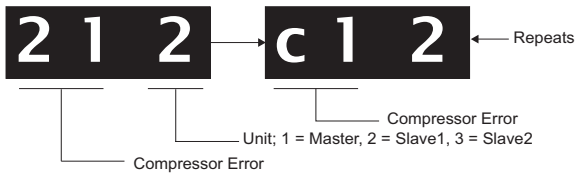
Images on these pages are examples of LGMV screenshots. Actual images may differ depending on the version of the software and the units installed.

ERROR CODE TABLES

⚠WARNING *Please refer to the Safety Precautions on pages 4-7 for more detail to prevent injury or death regarding the operation and service troubleshooting of the Multi V IV product.*

Error Codes

- Indicate different types of unit failures, assist in self-diagnosis and to track the frequency of occurrence.
- Error codes are shown on the LED of indoor units, wired remote controller, the outdoor unit control board, and on the main screen of the LG Monitoring View (LGMV) Diagnostic Software.
- If two or more errors occur simultaneously, the lower error code number is displayed first.
- After error is resolved, the error code does not display.



Error Display

The first, second, and third number on the LED indicates error number; the fourth number on LED indicates outdoor unit number.

Examples: 211 = Error No. 21 on master unit, 213 = Error No. 21 on slave2 unit, 21051 = Error No. 105 on master unit.

Error Code Nomenclature Definitions

- MICOM: Non-volatile memory chip where unit setup information is stored.
- EPROM: Non-volatile memory chip where device identification, size, and factory defined default component operating parameters are stored.

Table 63: Error Codes.

	Error Code			Description	Details
Indoor Unit	0	1	-	Indoor unit return air or optional remote wall temperature sensor communications error.	Indoor unit air temperature sensor has disconnected or short circuited. (Check the wiring, connection at the CN Room socket on the indoor unit PCB, then check the thermistor.)
	0	2	-	Indoor unit inlet pipe temperature sensor communication error.	Indoor unit inlet pipe temperature sensor has disconnected or short circuited. (Check the connection at the CN-PIPE/IN socket on the indoor unit PCB, then check the thermistor.)
	0	3	-	Communication error between zone controller and indoor unit.	Indoor unit PCB has not received communications signal from zone controller.
	0	4	-	Indoor unit drain pump error.	Drain pump and/or flow switch is/are malfunctioning. Also check drain line for obstructions.
	0	5	-	Communication error between outdoor unit and indoor unit.	• Indoor unit has not received communications signal from outdoor unit. • Check indoor unit to outdoor unit communication cable connections for issues.
	0	6	-	Indoor unit outlet pipe temperature sensor error.	Indoor unit outlet pipe temperature sensor has disconnected or short circuited. (Check the connection at the CN-PIPE/OUT socket on the indoor unit PCB, then check the thermistor.)
	0	7	-	Indoor units are not operating in the same mode.	Different operation mode between indoor units.
	0	9	-	Indoor unit EPROM error.	• Communication error between the indoor unit PCB board and its option card. (The option card is about 1' x 1' and is plugged into the indoor unit PCB board. Check connection between the two.) • Communication error between EPROM chips on indoor unit main PCB. • Indoor unit EPROM data is not available.
	1	0	-	Indoor unit BLDC fan motor communications error.	• Fan motor has been removed or is defective. Use the OHM and voltage check charts in the product service manual. • The system has detected the fan motor is not spinning. • On new installs, verify installation manual and paperwork were removed from fan discharge shroud before unit was installed. • Check the wiring plug and connection at sockets CN-MOTOR1 and CN-MOTOR2 (if used).
Outdoor Unit	2	1	1	Master outdoor unit inverter compressor PCB error.	• Outdoor unit inverter compressor PCB error. • Under voltage • Refrigerant flow restriction from defective LEV. • Refrigerant charge is too high (overcharge).
	2	1	2	Slave1 outdoor unit inverter compressor PCB error.	
	2	1	3	Slave2 outdoor unit inverter compressor PCB error.	

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manual on www.lg-vrf.com.

ERROR CODE TABLES

⚠ WARNING *Please refer to the Safety Precautions on pages 4-7 for more detail to prevent injury or death regarding the operation and service troubleshooting of the Multi V IV product.*

Table 64: Error Codes, continued.

	Error Code			Description	Details
Outdoor Unit	2	2	1	Master outdoor unit inverter board input overcurrent (RMS) error.	• Overcurrent of outdoor unit inverter board PCB. • Under voltage • Refrigerant flow restriction from defective LEV. • Refrigerant charge is too high (overcharged).
	2	2	2	Slave1 outdoor unit inverter board input overcurrent (RMS) error.	
	2	2	3	Slave2 outdoor unit inverter board input overcurrent (RMS) error.	
	2	3	1	Low DC voltage sensed at the master outdoor unit inverter compressor DC link.	DC voltage failed to charge on power up. (Start diagnosis at the CN inverter socket on the outdoor unit noise filter PCB.)
	2	3	2	Low voltage to the slave1 outdoor unit inverter compressor DC link.	
	2	3	3	Low voltage to the slave2 outdoor unit inverter compressor DC link.	
	2	4	1	Master outdoor unit high pressure switch error.	System has been turned off by the master outdoor unit high pressure switch.
	2	4	2	Slave1 outdoor unit high pressure switch error.	System has been turned off by the slave1 outdoor unit high pressure switch.
	2	4	3	Slave2 outdoor unit high pressure switch error.	System has been turned off by the slave2 outdoor unit high pressure switch.
	2	5	1	Input voltage to the master outdoor unit is too high or too low.	Master outdoor unit has an input voltage of ≤140V or ≥300V (for 208-230V units), or an input voltage of ≤414V or ≥528V (for 460V units).
	2	5	2	Input voltage to the slave1 outdoor unit is too high or too low.	Slave1 outdoor unit has an input voltage of ≤140V or ≥300V (for 208-230V units), or an input voltage of ≤414V or ≥528V (for 460V units).
	2	5	3	Input voltage to the slave2 outdoor unit is too high or too low.	Slave2 outdoor unit has an input voltage of ≤140V or ≥300V (for 208-230V units), or an input voltage of ≤414V or ≥528V (for 460V units).
	2	6	1	Master outdoor unit inverter compressor operation error.	Initial operation failure due to outdoor unit inverter compressor problem.
	2	6	2	Slave1 outdoor unit inverter compressor operation error.	
	2	6	3	Slave2 outdoor unit inverter compressor operation error.	
	2	8	1	Master outdoor unit inverter DC link high voltage error.	Compressor shut off because outdoor unit inverter PCB DC link voltage is too high.
	2	8	2	Slave1 outdoor unit inverter DC link high voltage error.	
	2	8	3	Slave2 outdoor unit inverter DC link high voltage error.	
	2	9	1	Master outdoor unit inverter compressor overcurrent error.	Outdoor unit inverter compressor current draw is too high.
	2	9	2	Slave1 outdoor unit inverter compressor overcurrent error.	
	2	9	3	Slave2 outdoor unit inverter compressor overcurrent error.	
	3	2	1	Excessive increase in master outdoor unit inverter compressor1 gas discharge temperature.	• Shutdown due to excessive discharge gas temperature. • Check the fan and coils.
	3	2	2	Excessive increase in slave1 outdoor unit inverter compressor1 gas discharge temperature.	
	3	2	3	Excessive increase in slave2 outdoor unit inverter compressor1 gas discharge temperature.	
	3	3	1	Excessive increase in master outdoor unit inverter compressor2 gas discharge temperature.	• Shutdown due to excessive discharge gas temperature. • Check the fan and coils.
	3	3	2	Excessive increase in slave1 outdoor unit inverter compressor2 gas discharge temperature.	
	3	3	3	Excessive increase in slave2 outdoor unit inverter compressor2 gas discharge temperature.	
	3	4	1	Master outdoor unit compressor high pressure safety tripped.	• Shutdown due to excessive discharge gas temperature. • Check the fan and coils.
	3	4	2	Slave1 outdoor unit compressor high pressure safety tripped.	
	3	4	3	Slave2 outdoor unit compressor high pressure safety tripped.	

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manual on www.lg-vrf.com.

⚠WARNING *Please refer to the Safety Precautions on pages 4-7 for more detail to prevent injury or death regarding the operation and service troubleshooting of the Multi V IV product.*

Table 65: Error Codes, continued.

	Error Code			Description	Details
Outdoor Unit	3	5	1	Master outdoor unit low side pressure transducer senses pressure below allowable limits.	• Shutdown due to low suction pressure.
	3	5	2	Slave1 outdoor unit low side pressure transducer senses pressure below allowable limits.	
	3	5	3	Slave1 outdoor unit low side pressure transducer senses pressure below allowable limits.	
	3	6	1	Master outdoor unit fell below low condenser (compression) ratio limit.	Master outdoor unit remained below the low condenser ratio limit for three (3) minutes.
	3	6	2	Slave1 outdoor unit fell below low condenser (compression) ratio limit.	Slave1 outdoor unit remained below the low condenser ratio limit for three (3) minutes.
	3	6	3	Slave2 outdoor unit fell below low condenser ratio limit.	Slave2 outdoor unit remained below the low condenser ratio limit for three (3) minutes.
	4	0	1	Master outdoor unit inverter compressor current transducer (CT) sensor error.	Outdoor unit inverter compressor current transducer (CT) detection sensor has disconnected or short circuited.
	4	0	2	Slave1 outdoor unit inverter compressor current transducer (CT) sensor error.	
	4	0	3	Slave2 outdoor unit inverter compressor current transducer (CT) sensor error.	
	4	1	1	Master outdoor unit inverter compressor1 discharge pipe temperature sensor error.	• Check the connection at the CN-34 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	4	1	2	Slave1 outdoor unit inverter compressor1 discharge pipe temperature sensor error.	
	4	1	3	Slave2 outdoor unit inverter compressor1 discharge pipe temperature sensor error.	
	4	2	1	Master outdoor unit low pressure transducer error.	• Check the connection at the CN-30 socket on the outdoor unit PCB. • Transducer has disconnected or short circuited.
	4	2	2	Slave1 outdoor unit low pressure transducer error.	
	4	2	3	Slave2 outdoor unit low pressure transducer error.	
	4	3	1	Master outdoor unit high pressure transducer error.	• Check the connection at the CN-31 socket on the outdoor unit PCB. • Transducer has disconnected or short circuited.
	4	3	2	Slave1 outdoor unit high pressure transducer error.	
	4	3	3	Slave2 outdoor unit high pressure transducer error.	
	4	4	1	Master outdoor unit ambient temperature sensor error.	• Check the connection at the CN-33 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	4	4	2	Slave1 outdoor unit ambient temperature sensor error.	
	4	4	3	Slave2 outdoor unit ambient temperature sensor error.	
	4	5	1	Master outdoor unit heat exchanger pipe temperature sensor (front side, TH_HEX2) error.	• Check suction sensor in cooling mode; check hot gas sensor located near the heat exchanger in heating mode. • Check the connection at the CN-34 socket, connector tag TH_HEX2, on the outdoor unit PCB, then check if thermistor is open or shorted. • Thermistor has disconnected or short circuited.
	4	5	2	Slave1 outdoor unit heat exchanger pipe temperature sensor (front side, TH_HEX2) error.	
	4	5	3	Slave2 outdoor unit heat exchanger pipe temperature sensor (front side, TH_HEX2) error.	
	4	6	1	Master outdoor unit suction pipe temperature sensor error.	• Check the connection at the CN-34 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	4	6	2	Slave1 outdoor unit suction pipe temperature sensor error.	
	4	6	3	Slave2 outdoor unit suction pipe temperature sensor error.	
	4	7	1	Master outdoor unit inverter compressor2 discharge temperature sensor error.	Disconnection or short circuit of master outdoor unit inverter compressor2 discharge temperature sensor.
	4	7	2	Slave1 outdoor unit inverter compressor2 discharge temperature sensor error.	Disconnection or short circuit of slave1 outdoor unit inverter compressor2 discharge temperature sensor.
	4	7	3	Slave2 outdoor unit inverter compressor2 discharge temperature sensor error.	Disconnection or short circuit of slave2 outdoor unit inverter compressor2 discharge temperature sensor.

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manual on www.lg-vrf.com.

⚠ WARNING *Please refer to the Safety Precautions on pages 4-7 for more detail to prevent injury or death regarding the operation and service troubleshooting of the Multi V IV product.*

Table 66: Error Codes, continued.

	Error Code			Description	Details
Outdoor Unit	4	9	1	Master outdoor unit IPM temperature sensor error.	Disconnection or short circuit of master outdoor unit IPM temperature sensor.
	4	9	2	Slave1 outdoor unit IPM temperature sensor error.	Disconnection or short circuit of slave1 outdoor unit IPM temperature sensor.
	4	9	3	Slave2 outdoor unit IPM temperature sensor error.	Disconnection or short circuit of slave2 outdoor unit IPM temperature sensor.
	5	0	1	Master outdoor unit three-phase power is not connected properly.	One or more of R(L1), S(L2), T(L3) input power line connections is / are missing for the master outdoor unit.
	5	0	2	Slave1 outdoor unit three-phase power is not connected properly.	One or more of R(L1), S(L2), T(L3) input power line connections is / are missing for the slave1 outdoor unit.
	5	0	3	Slave2 outdoor unit three-phase power is not connected properly.	One or more of R(L1), S(L2), T(L3) input power line connections is / are missing for the slave2 outdoor unit.
	5	1	1	Combination ratio is out of range.	The total of the nominal indoor unit capacity is less than 50% or more than 130% of the nominal outdoor unit capacity.
	5	1	2	Total indoor unit capacity exceeds allowable heat recovery unit branch capacity. (Heat Recovery Systems only.)	Value of total indoor unit capacity exceeds allowable heat recovery unit branch capacity specifications. (Heat Recovery Systems only.)
	5	2	1	Communication error between master outdoor unit main PCB and inverter PCB.	• Communication error between main PCB (CN-29) and inverter PCB CN-MAIN (COM/RD). • Check connections at both sockets. • Inspect interconnecting cable for wear.
	5	2	2	Communication error between slave1 outdoor unit main PCB and inverter PCB.	
	5	2	3	Communication error between slave2 outdoor unit main PCB and inverter PCB.	
	5	3	1	Communication error between outdoor unit main PCB and indoor unit(s) PCB.	• Check if outdoor unit to indoor unit(s) communications cable has disconnected or short circuited. • Check A terminals are connected to indoor unit A and 3 (5 on 3 x 3 cassette) terminals; B connect to B or 4 (6 on 3 x 3 cassette) terminals.
	5	4	1	Master outdoor unit power error.	Master outdoor unit three-phase power R(L1), S(L2), T(L3) is not connected properly (reverse phase / phase is missing).
	5	4	2	Slave1 outdoor unit power error.	Slave1 outdoor unit three-phase power R(L1), S(L2), T(L3) is not connected properly (reverse phase / phase is missing).
	5	4	3	Slave2 outdoor unit power error.	Slave2 outdoor unit three-phase power R(L1), S(L2), T(L3) is not connected properly (reverse phase / phase is missing).
	5	7	1	Master outdoor unit main PCB and inverter PCB communication error.	Master outdoor unit inverter PCB is not receiving signal from main PCB.
	5	7	2	Slave1 outdoor unit main PCB and inverter PCB communication error.	Slave1 outdoor unit inverter PCB is not receiving signal from main PCB.
	5	7	3	Slave2 outdoor unit main PCB and inverter PCB communication error.	Slave2 outdoor unit inverter PCB is not receiving signal from main PCB.
	5	9	1	Outdoor unit series installation error.	A smaller outdoor unit is set as the master outdoor unit.
	6	0	1	Master outdoor unit inverter PCB EPROM error.	• Verify the EPROM is present and in the socket correctly. • Check if all pins are in and are not bent. • Check if notch in the chip lines up with the arrow on the socket.
	6	0	2	Slave1 outdoor unit inverter PCB EPROM error.	
	6	0	3	Slave2 outdoor unit inverter PCB EPROM error.	
	6	2	1	High temperature at the master outdoor unit inverter heatsink.	System shut off because of high temperatures at the master outdoor unit inverter heatsink.
	6	2	2	High temperature at the slave1 outdoor unit inverter heatsink.	System shut off because of high temperatures at the slave1 outdoor unit inverter heatsink.
	6	2	3	High temperature at the slave2 outdoor unit inverter heatsink.	System shut off because of high temperatures at the slave2 outdoor unit inverter heatsink.

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manual on www.lg-vrf.com.

LG

⚠WARNING *Please refer to the Safety Precautions on pages 4-7 for more detail to prevent injury or death regarding the operation and service troubleshooting of the Multi V IV product.*

Table 67: Error Codes, continued.

Error Code				Description	Details
Outdoor Unit	6	5	1	Master outdoor unit inverter heatsink temperature sensor error.	Disconnection or short circuit of master outdoor unit inverter heatsink temperature sensor.
	6	5	2	Slave1 outdoor unit inverter heatsink temperature sensor error.	Disconnection or short circuit of slave1 outdoor unit inverter heatsink temperature sensor.
	6	5	3	Slave2 outdoor unit inverter heatsink temperature sensor error.	Disconnection or short circuit of slave2 outdoor unit inverter heatsink temperature sensor.
	6	7	1	Master outdoor unit fan has locked up.	Master outdoor unit air flow is restricted.
	6	7	2	Slave1 outdoor unit fan has locked up.	Slave1 outdoor unit air flow is restricted.
	6	7	3	Slave2 outdoor unit fan has locked up	Slave2 outdoor unit air flow is restricted.
	7	1	1	Master outdoor unit converter CT sensor error.	Master outdoor unit is restricted.
	7	1	2	Slave1 outdoor unit converter CT sensor error.	Slave1 outdoor unit is restricted.
	7	1	3	Slave2 outdoor unit converter CT sensor error.	Slave2 outdoor unit is restricted.
	7	5	1	Master outdoor unit fan CT sensor error.	Disconnection or short circuit of master outdoor unit fan current detection (CT) sensor.
	7	5	2	Slave1 outdoor unit fan CT sensor error.	Disconnection or short circuit of slave1 outdoor unit fan current detection (CT) sensor.
	7	5	3	Slave2 outdoor unit fan CT sensor error.	Disconnection or short circuit of slave2 outdoor unit fan current detection (CT) sensor.
	7	6	1	Master outdoor unit fan DC link high voltage error.	Master outdoor unit fan DC link high voltage error.
	7	6	2	Slave1 outdoor unit fan DC link high voltage error.	Slave1 outdoor unit fan DC link high voltage error.
	7	6	3	Slave2 outdoor unit fan DC link high voltage error.	Slave2 outdoor unit fan DC link high voltage error.
	7	7	1	Master outdoor unit fan overcurrent error.	Master outdoor unit fan current is >10A (for 208-230V units) or 5A (for 460V units).
	7	7	2	Slave1 outdoor unit fan overcurrent error.	Slave1 outdoor unit fan current is >10A (for 208-230V units) or 5A (for 460V units).
	7	7	3	Slave2 outdoor unit fan overcurrent error.	Slave2 outdoor unit fan current is >10A (for 208-230V units) or 5A (for 460V units).
	7	9	1	Master outdoor unit fan operation failure error.	Master outdoor unit fan is experiencing first position sensor failure.
	7	9	2	Slave1 outdoor unit fan operation failure error.	Slave1 outdoor unit fan is experiencing first position sensor failure.
	7	9	3	Slave2 outdoor unit fan operation failure error.	Slave2 outdoor unit fan is experiencing first position sensor failure.
	8	6	1	Master outdoor unit main PCB onboard EPROM error.	• Verify the EPROM is present and in the socket correctly. • Check if all pins are in and are not bent. • Check if notch in the chip lines up with the arrow on the socket.
	8	6	2	Slave1 outdoor unit main PCB onboard EPROM error.	
	8	6	3	Slave2 outdoor unit main PCB onboard EPROM error.	
	8	7	1	Master outdoor unit fan PCB EPROM error.	• Communication error between master outdoor unit fan MICOM and EPROM. • EPROM is missing.
	8	7	2	Slave1 outdoor unit fan PCB EPROM error.	• Communication error between slave1 outdoor unit fan MICOM and EPROM. • EPROM is missing.
	8	7	3	Slave2 outdoor unit fan PCB EPROM error.	• Communication error between slave2 outdoor unit fan MICOM and EPROM. • EPROM is missing.
	1	0	4	1	Communication error between master outdoor unit and slave outdoor units.	Master outdoor unit main PCB is not receiving signals from slave outdoor units.
	1	0	4	2	Communication error between slave1 outdoor unit and master and slave2 outdoor units.	Slave1 outdoor unit main PCB is not receiving signals from master and slave2 outdoor units.
	1	0	4	3	Communication error between slave2 outdoor unit and master and slave1 outdoor units.	Slave2 outdoor unit main PCB is not receiving signals from master and slave1 outdoor units.

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manual on www.lg-vrf.com.

ERROR CODE TABLES

⚠ WARNING *Please refer to the Safety Precautions on pages 4-7 for more detail to prevent injury or death regarding the operation and service troubleshooting of the Multi V IV product.*

Table 68: Error Codes, continued.

Error Code					Description	Details
Outdoor Unit	1	0	5	1	Master outdoor unit fan PCB communication error.	Master outdoor unit main PCB is not receiving a signal from the fan.
	1	0	5	2	Slave1 outdoor unit fan PCB communication error.	Slave1 outdoor unit main PCB is not receiving a signal from the fan.
	1	0	5	3	Slave2 outdoor unit fan PCB communication error.	Slave2 outdoor unit main PCB is not receiving a signal from the fan.
	1	0	6	1	Master outdoor unit fan IPM error.	Instant overcurrent (peak) of master outdoor unit fan IPM.
	1	0	6	2	Slave1 outdoor unit fan IPM error.	Instant overcurrent (peak) of slave1 outdoor unit fan IPM.
	1	0	6	3	Slave2 outdoor unit fan IPM error.	Instant overcurrent (peak) of slave2 outdoor unit fan IPM.
	1	0	7	1	Master outdoor unit fan DC link low voltage error.	Master outdoor unit fan DC link voltage is <140V (for 208-230V units) or <380V (for 460V units).
	1	0	7	2	Slave1 outdoor unit fan DC link low voltage error.	Slave1 outdoor unit fan DC link voltage is <140V (for 208-230V units) or <380V (for 460V units).
	1	0	7	3	Slave2 outdoor unit fan DC link low voltage error.	Slave2 outdoor unit fan DC link voltage is <140V (for 208-230V units) or <380V (for 460V units).
	1	1	3	1	Master outdoor unit liquid pipe temperature sensor error.	• Check the connection at the CN-32 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	1	1	3	2	Slave1 outdoor unit liquid pipe temperature sensor error.	
	1	1	3	3	Slave2 outdoor unit liquid pipe temperature sensor error.	
	1	1	4	1	Master outdoor unit subcooling inlet temperature sensor error.	• Check the connection at the CN-35 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	1	1	4	2	Slave1 outdoor unit subcooling inlet temperature sensor error.	
	1	1	4	3	Slave2 outdoor unit subcooling inlet temperature sensor error.	
	1	1	5	1	Master outdoor unit subcooling outlet temperature sensor error.	• Check the connection at the CN-32 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	1	1	5	2	Slave1 outdoor unit subcooling outlet temperature sensor error.	
	1	1	5	3	Slave2 outdoor unit subcooling outlet temperature sensor error.	
	1	1	6	1	Master outdoor unit oil level sensor error.	Disconnection or short circuit of master outdoor unit oil level sensor.
	1	1	6	2	Slave1 outdoor unit oil level sensor error.	Disconnection or short circuit of slave1 outdoor unit oil level sensor.
	1	1	6	3	Slave2 outdoor unit oil level sensor error.	Disconnection or short circuit of slave2 outdoor unit oil level sensor.
	1	4	5	1	Communication error between master outdoor unit main board and external board.	Master outdoor unit main board to external board communication failure.
	1	4	5	2	Communication error between slave1 outdoor unit main board and external board.	Slave1 outdoor unit main board to external board communication failure.
	1	4	5	3	Communication error between slave2 outdoor unit main board and external board.	Slave2 outdoor unit main board to external board communication failure.
	1	5	1	1	Master outdoor unit operation mode conversion error.	Pressure imbalance between outdoor units.
	1	5	1	2	Slave1 outdoor unit operation mode conversion error.	
	1	5	1	3	Slave2 outdoor unit operation mode conversion error.	
	1	5	3	1	Master outdoor unit upper heat exchanger temperature sensor error.	• Check the connection at the CN-32 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	1	5	3	2	Slave1 outdoor unit upper heat exchanger temperature sensor error.	
	1	5	3	3	Slave2 outdoor unit upper heat exchanger temperature sensor error.	

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manual on www.lg-vrf.com.

⚠WARNING *Please refer to the Safety Precautions on pages 4-7 for more detail to prevent injury or death regarding the operation and service troubleshooting of the Multi V IV product.*

Table 69: Error Codes, continued.

	Error Code				Description	Details
Outdoor Unit	1	5	4	1	Master outdoor unit lower heat exchanger temperature sensor error.	• Check the connection at the CN-35 socket on the outdoor unit PCB. • Thermistor has disconnected or short circuited.
	1	5	4	2	Slave1 outdoor unit lower heat exchanger temperature sensor error.	Disconnection or short circuit of slave1 outdoor unit lower heat exchanger temperature sensor.
	1	5	4	3	Slave2 outdoor unit lower heat exchanger temperature sensor error.	Disconnection or short circuit of slave2 outdoor unit lower heat exchanger temperature sensor.
	1	8	2	1	Communication error between master outdoor unit external board main and sub MICOMs.	Master outdoor unit external board main to sub MICOMs communication failure.
	1	8	2	2	Communication error between slave1 outdoor unit external board main and sub MICOMs.	Slave1 outdoor unit external board main to sub MICOMs communication failure.
	1	8	2	3	Communication error between slave2 outdoor unit external board main and sub MICOMs.	Slave2 outdoor unit external board main to sub MICOMs communication failure.
	1	9	3	1	Excessive increase in master outdoor unit fan heatsink temperature.	System has shut off because master outdoor unit fan heatsink temperature is >203°F.
	1	9	3	2	Excessive increase in slave1 outdoor unit fan heatsink temperature.	System has shut off because slave1 outdoor unit fan heatsink temperature is >203°F.
	1	9	3	3	Excessive increase in slave2 outdoor unit fan heatsink temperature.	System has shut off because slave1 outdoor unit fan heatsink temperature is >203°F.
	1	9	4	1	Master outdoor unit fan heatsink temperature sensor error.	Disconnection or short circuit of master outdoor unit fan heatsink temperature sensor.
	1	9	4	2	Slave1 outdoor unit fan heatsink temperature sensor error.	Disconnection or short circuit of slave1 outdoor unit fan heatsink temperature sensor.
	1	9	4	3	Slave2 outdoor unit fan heatsink temperature sensor error.	Disconnection or short circuit of slave2 outdoor unit fan heatsink temperature sensor.
Heat Recovery Unit	-	5	1	C + No. of HR Unit	Capacity of indoor units connected to the heat recovery unit exceeds allowable limits.	Total capacity of indoor unit(s) connected to each heat recovery unit port exceeds allowable limits.
	2	0	0	1	Valve search error.	Automatic valve addressing failed.
	2	0	1	C + No. of HR Unit	Heat recovery unit liquid sensor error. (C = Heat recovery unit + Heat recovery unit number).	Disconnection or short circuit of heat recovery unit liquid pipe sensor.
	2	0	2		Heat recovery unit subcooling pipe inlet sensor error. (C = Heat recovery unit + Heat recovery unit number).	Disconnection or short circuit of heat recovery unit subcooling pipe inlet sensor.
	2	0	3		Heat recovery unit subcooling pipe outlet sensor error. (C = Heat recovery unit + Heat recovery unit number).	Disconnection or short circuit of heat recovery unit subcooling pipe outlet sensor.
	2	0	4		Communication error between outdoor unit and heat recovery unit. (C = Heat recovery unit + Heat recovery unit number)	Outdoor unit does not receive signal from heat recovery unit.
	2	0	5		Communication error between heat recovery unit and the 485 modem. (2A Series Heat Recovery Units)	Communication error occurred between the heat recovery unit and the heat recovery unit 485 modem. (2A Series Heat Recovery Units)
	2	0	6		Duplicate address error of the heat recovery unit.	The heat recovery unit address is duplicated for 485 communication. (2A Series Heat Recovery Units)

Note:

To use open line 485 communication (9,600 bps communication), you need to use a product that is compatible with all of the "Generation 4" versions of the indoor units, heat recovery units, outdoor units, and accessories.

For detailed information on how to troubleshoot each error, see the Multi V IV Service Manual on www.lg-vrf.com.

LG Multi V Pre-Commissioning Device Configuration Worksheet

Project Name:	**Building ID**
Date: AC Smart Static IP address:	**System ID** **Page #**
Mech Contractor Company Name	MEP Project Mngr Name
Pre-Com Tech Name/Ph#/email	Ph# / Email

IDU's

Unit Tag	Building Floor	Room ID	Type	Model	Serial #	Adjusted Fan Setting Value . Low | Medium | High			System Address	Central Control Address	Group member ID or N/A if not in a group	Group Function M=Master S=Slave	Sensor Strategy (RA/ZC/Both)

INSTALLATION CHECKLIST

Major Component Rough-In

Description	Check
All Multi V outdoor units are connected properly per local code and the product installation procedures.	
All literature and bagged accessories have been removed from the fan discharge (ducted and cassette model indoor units).	
All Indoor units and heat recovery units (for Heat Recovery systems only) are installed, properly supported, and located indoors in a non-corrosive environment.	
Duct work installation completed (ducted indoor units only).	
Outdoor unit's gravity condensate drain line is connected and routed where it properly drained away or, if installed in a mechanical room, is connected and properly routed to a drain terminal.	

Piping and Insulation

Description	Check
Copper	
Over 5/8 inches—Rigid ACR only.	
5/8 inches and under—Can use soft ACR.	
15% silver brazing material only.	
All refrigerant pipes and valves were insulated separately. Insulation is positioned up against the walls of the indoor units and heat recovery units (for Heat Recovery systems only). No gaps shown. Insulation was not compressed at clamps and hangers.	
LG Y-branch fittings or headers were used as per LATS Multi V report.	
(Optional) Full port ball valves for all indoor units. (Schrader between the valve body and the indoor units.)	

Brazing Practices

Description	Check
Use medical grade (there are 4 available) dry nitrogen for purging during brazing (constant 3 psi while brazing).	
Minimum 3/4", maximum 1" condensate piping installed on indoor units–material used is acceptable under local code. Insulated as necessary to prevent condensation.	

Installation

(For more information on any procedure, refer to the detail provided in the Multi V Outdoor and Indoor Unit Installation Manuals.)

Refrigerant Piping

Description	Check
You must have in your possession a copy of the "As-Designed" LATS Multi V piping tree diagram. BEFORE ANY FIELD PIPE SIZE OR LENGTH CHANGES ARE MADE, PROPOSED CHANGES MUST BE FORWARDED TO THE DESIGN ENGINEER SO THAT THEY CAN INPUT THE CHANGES INTO LATS and RE-ISSUE A NEW LATS MULTI V PIPING TREE DIAGRAM. Installer must receive change authorization from the design engineer, because any change made requires the review of the entire tree diagram and verification that the change did not impact the size of piping segments in other parts of the system.	
All pipe materials were properly stored, capped, and clean. All burrs were removed after cutting and pipe ends were reamed before brazing.	
During refrigerant pipe installation, for each segment of pipe, a record was made of the pipe length (including expansion loops, offsets, double-back sections), and sizes, as well as the quantity and type of elbows used.	
All long runs of straight pipe were provided with expansion loops.	
Insure Y-branch fittings are installed with no more than ±10° of horizontal.	
Insure Y-branch fittings are installed with no more than ±3° of vertical.	
A torque wrench and backup wrench were used to tighten all flare connections.	
The back side of all flares were lubricated with a small drop of PVE refrigeration oil before tightening flare fittings.	
Insure all field made flares are 45°. Use factory-supplied flare nuts only.	
All pipe segments were properly supported and all wall penetrations were sleeved.	
All pipe insulation is not compressed at any point.	
Y-branch and headers fittings were properly supported per details provided in the Multi V IV Outdoor Unit Installation Manual.	
Insure Y-branch fittings are installed in the correct direction. Flow is always from the single end to the double end.	
No oil traps, solenoid valves, sight glasses, filter driers, or any other unauthorized refrigerant specialities are present.	
(Optional) High quality R410A rated full port ball valves with a Schrader port were used at all indoor units and at will in the refrigerant piping network. (Recommended for serviceability.)	
Best practice includes a minimum of 20" of straight pipe was installed between each elbow, and Y-branch or header fitting, and between two Y-branch fittings.	

MULTI V™

INSTALLATION CHECKLIST

PAGE 2

LG

Heat Recovery Unit

Description	Check
Heat Recovery Unit is installed properly cannot be installed upside down or any angle, top up and level.	
Piping is insulated properly per the design engineer's specifications. Insulation is snug against the housing of the Heat Recovery Unit.	
DIP switches and rotary dial settings are correct.	
If large capacity indoor unit, a Y-branch is installed properly.	

Condensate Pump / Drain Installation

Description	Check
Indoor unit condensate drain pipes were installed correctly.	
All condensate vertical risers are equal to or less than 27-1/2" from the bottom of the indoor unit.	
Indoor units with condensate pumps were level. Units with gravity drains were level or slightly canted toward the drain connection and are supported properly.	
Pumped condensate drain lines were properly connected (do not have traps, and connect to the top surface of the main drain line).	

Power Wire and Communications Cables

Description	Check
Record power three phase 208-230V source or three phase 460V (verify system electrical requirements). R (L1) to Ground _____ R - S _____ S (L2) to Ground _____ R - T _____ T (L3) to Ground _____ S - T _____ Sum of the Above _____ Divided by 3 _____ = Average Voltage % Imbalance = Maximum Deviation from Average / Average x 100 Example: Measured Values: 242, 241, 246 Sum of Measured Values: 729 Average of Measured Values: 729 / 3 = 243 Maximum Deviation from Average: 246 - 243 = 3 % Imbalance: 3 / 243 x 100 = 1.23%	
Ground wire was installed and properly terminated at the outdoor unit(s).	
The power supplied was clean with voltage fluctuations within specifications. (±10% of nameplate for 208-230V units, 414-528V for 460V units).	
Power wiring to the outdoor unit(s) was installed per all local electrical code requirements.	
Power wiring to each indoor unit was installed per all local electrical code requirements.	
Communications cable between the outdoor unit(s) and indoor units was connected in a daisy chain configuration (i.e., single parallel chain). No "Star" or multiple parallel circuits. No cable splices or wire caps were used to connect communications cables.	
Record Communication Voltage Range High _____ VDC Low _____ VDC	
LG-supplied cable was used between each indoor unit and its zone controller. No cables were spliced and no wire caps are present.	
Communication type RS-485–BUS type.	
All communications cables are a minimum of 18-gauge, two conductor, stranded, with insulation material per local code. Cable segment shields were tied together. Cable shield is grounded at the Master outdoor unit only.	
Use appropriate crimping tool to attach ring or spade terminals at all power wiring and control cable terminations.	
Verify all ring and spade terminals are copper bearing in all communications daisy chains. Galvanized or nickel plated steel connectors were not used.	
All power and control wires were properly separated using the recommended distance provided in the product installation manual.	
Only LG-supplied Y-cables and extension cables were used between indoor units.	

INSTALLATION CHECKLIST

Major Component Rough-In

Piping and Insulation

Brazing Practices

INSTALLATION CHECKLIST

Installation—Refrigerant Piping

Installation—Heat Recovery Unit

Installation—Condensate Pump / Drain Installation

Installation—Power Wire and Communications Cables

PRE-COMMISSIONING CHECKLIST

Job Name / Location _____ Tag # _____

Date: _____

Address: _____

_____

Refrigerant Circuit Preparation

Description	Check
Using a copy of the LATS Multi V pipe design diagram, verify the sum of the indoor unit nominal capacity connected to the piping system is between 50% and 130% of the outdoor unit's(s') nominal capacity. If this rule is violated, the system will not start.	
Check all indoor units for power at the unit disconnect and power is present at the indoor unit PCB board. (LED is lit.) DO NOT TURN ON THE UNIT using the ON/OFF button.	
Successful auto address routine is complete. All device addresses have been recorded on the Indoor Unit Device Configuration Worksheet.	
Insure all field-installed full-port ball valves are open.	
The piping system must hold a constant 550 psig pressure for a minimum of 24 hours with all isolation valves open. **Pressure Measurement Data** Initial Pressure _____ End Pressure _____ Start Date _____ End Date _____ Start Time _____ End Time _____ Initial Ambient Temperature _____ End Ambient Temperature _____	
A triple system evacuation has been performed. Micron gauge reading held at a minimum of 500 for 1 hour with all isolation valves open and without the vacuum pump connected. **Evacuation** Initial Micron Level _____ End Micron Level _____ Start Date _____ End Date _____ Start Time _____ End Time _____ Rise _____	
Power was energized to the outdoor unit(s) at _____(time) on _____day to power the compressor crankcase heater(s). (Must be at least 6 hours before commissioning.)	
The communications cable to the indoor units has been disconnected from the IDU (B) and IDU (A) terminals at the outdoor unit(s).	
None of the outdoor unit(s) service valves have been opened during the installation and preparation of the system for commissioning. (If the valves were opened, the factory refrigerant charge has been released.)	

PRE-COMMISSIONING CHECKLIST

Prepare Pre-commissioning Package Documents

Include	Check
1. A copy of the refrigerant piping system(s) shop drawing(s) generated by LATS Multi V pipe design software.	
2. A copy of the pipe fitter's pipe changes and field notes.	
3. A verified copy of the "As-Built" LATS Multi V Project file (*.mtv) that includes all changes noted by the pipe fitter(s) in Number 2. The tree diagram notes should include changes to the line lengths used for each liquid line segment	
4. A copy of a completed and verified Installation Checklist for the outdoor unit(s), indoor units, ERVs, heat recovery unit (for Heat Recovery systems only) Air Cleaners, and Control Devices. Correct any procedures needing attention before initiating a request for commissioning..	
5. A copy of the air balance report showing proper airflow at all indoor units.	
6. A completed Pre-commissioning Device Configuration Worksheet.	
7. A completed copy of the Pre-commissioning Checklist.	
8. If available, a list of IP addresses obtained from the building owners IT department for each ACP, BacNet, LonWorks, AC Smart devices.	

Initiate a Commissioning Request

Description	Check
Verify this checklist and requirements herein have been met. Complete this checklist in its entirety BEFORE initiating a request for Commissioning.	
Send all Pre-commissioning Package Documents to your LG Applied Representative.	

Contractor Name: _____ _____

(Authorized Signature)

Address: _____

_____

Phone: _____ Date: _____

**This form must be completed and submitted to LG a minimum of three (3) weeks prior to final scheduling of any startup.*
Note: If any of the above items are not complete at time of start-up, back charges will be assessed for additional costs.

Notes for the Commissioning Agent

Notes for the Commissioning Agent

COMMISSIONING NOTES

Job Name / Location _____ Tag # _____

Date: _____

Address: _____

_____

Refrigerant Circuit Preparation

Prepare Pre-commissioning Package Documents

Initiate a Commissioning Request

COMMISSIONING CHECKLIST EXCEPTION REPORT

Job Name / Location _____ Tag # _____

Date: _____

Address: _____

_____

Refrigerant Circuit Preparation

Prepare Pre-commissioning Package Documents

Initiate a Commissioning Request

Date of Commissioning Report: _____

Commissioning Agent Name: _____

Comissioning Agent Signature: _____

MULTI V™ REFRIGERANT CHARGE WORKSHEET LG

Note:

The system will stop operation due to excessive or insufficient refrigerant, therefore, always charge the unit properly. When servicing, always refer to any notes about system piping length and additional refrigerant amounts.

System Refrigerant Charge Calculator (lbs.).

System Tag or ID_____ —	Job Name_____ Project Manager_____ Date_____

Line #	Description	Chassis I.D.		Size	Quantity	CF (Ref.)[1]	Total (lbs.)
1	Linear feet of 1/4" liquid line tubing[2]	—		—		0.015	
2	Linear feet of 3/8" liquid line tubing[2]	—		—		0.041	
3	Linear feet of 1/2" liquid line tubing[2]	—		—		0.079	
4	Linear feet of 5/8" liquid line tubing[2]	—		—		0.116	
5	Linear feet of 3/4" liquid line tubing[2]	—		—		0.179	
6	Linear feet of 7/8" liquid line tubing[2]	—		—		0.238	
7	Linear feet of 1" liquid line tubing[2]	—		—		0.323	
8	Art Cool Gallery	SF		9k to 12k		0.22	
9	Wall Mounted + Art Cool Mirror	SB, SE		5k to 15k		0.53	
10	Wall Mounted + Art Cool Mirror	SC		18k to 24k		0.62	
11	Wall Mounted	SV		30k to 36k		1.01	
12	1-Way Cassette	TU		7k to 12k		0.44	
13	1-Way Cassette	TT		18k to 24k		0.64	
14	2-Way Cassette	TL		18k to 24k		0.35	
15	4-Way 2' x 2' Cassette	TR		5k to 7k		0.40	
16	4-Way 2' x 2' Cassette	TR		9k to 12k		0.55	
17	4-Way 2' x 2' Cassette	TQ		15k to 18k		0.71	
18	4-Way 3' x 3' Cassette	TNA		7k to 24k		0.89	
19	4-Way 3' x 3' Cassette	TPC		24k to 28k		1.06	
20	4-Way 3' x 3' Cassette	TMA		24k to 36k		1.08	
21	4-Way 3' x 3' Cassette	TNC		36k		1.41	
22	4-Way 3' x 3' Cassette	TMC		42k to 48k		1.41	
23	High Static Ducted	BH		7k to 24k		0.57	
24	High Static Ducted	BG		7k to 42k		0.97	
25	High Static Ducted	BR		28k to 54k		1.37	
26	High Static Ducted	B8		36k to 96k		2.2	
27	Low Static Ducted	L1		7k to 9k		0.31	
28	Low Static Ducted	L2		12k to 18k		0.42	
29	Low Static Ducted	L3		24k		0.55	
30	Low Static Ducted Bottom Return	B3		7k to 15k		0.37	
31	Low Static Ducted Bottom Return	B4		18k to 24k		0.82	
32	Vertical / Horizontal Air Handling Unit	NJ		12k to 30k		1.04	
33	Vertical / Horizontal Air Handling Unit	NJ		36k		1.57	
34	Vertical / Horizontal Air Handling Unit	NK		42k to 54k		2.00	
35	Ceiling Suspended	VJ		18k to 24k		0.77	
36	Convertible Surface Mount—Ceiling / Wall	VE		9k to 12k		0.22	
37	Floor Standing	CE (U)		7k to 15k		0.37	
38	Floor Standing	CF (U)		18k to 24k		0.82	
39	PRHR022A, PRHR032A, PRHR042A	—		—		1.1	
40	Additional Refrigerant Charge Required						
41	Outdoor Unit Factory Refrigerant Charge	41a	ARU*072***4	72k		16.9	
		41b	ARU*096***4	96k		23.6	
		41c	ARU*121***4	121k		23.6	
		41d	ARU*144***4	144k		23.6	
		41e	ARU*145***4	144k		23.6	
		41f	ARU*168***4	168K		23.6	
		41g	ARU*169***4	168K		23.6	
42	Total Factory Refrigerant Charge (sum of refrig. charge for all Outdoor Units in the system)						
43	Total System Charge: Sum of Additional Refrigerant Charge Required and Total Factory Refrigerant Charge						

[1]CF (Ref.) = Correction Factor for Refrigerant Charge.

[2]For refrigerant charge purposes, consider only the liquid line; ignore the vapor line(s).

*[3]ARU*145BTE4/145DTE4 & ARU*169BTE4/169DTE4 frames are ONLY for large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These ARE NOT interchangeable with ARU*144BTE4/144DTE4 & ARU*168BTE4/168DTE4 single frame models.*

MAINTENANCE RECOMMENDATIONS

Table 70: Maintenance Recommendations.

Component	Maintenance	Occurrence (Minimum)
Indoor Units	Wash filters	On a regular basis / as needed
	Clean coils	Once a year
	Clean / check condensate pan	Once a year
Outdoor Unit(s)	Clean coils	Once or twice a year
	Clean / check condensate pan	Once or twice a year
Communications Cable and Power Wiring	Verify that all cables and wiring are properly connected	Once or twice a year

Note:

It is also recommended to monitor system operation using LGMV Software at least once a year.

For further technical materials such as submittals, engineering manuals, service manuals, and catalogs, visit www.lg-vrf.com.

LG Electronics, U.S.A., Inc.
Commercial Air Conditioning Division
4300 North Point Parkway
Alpharetta, Georgia 30022
www.lg-vrf.com

LG Customer Information Center, Commercial Products
1-888-865-3026 USA
Follow the prompts for commercial A/C products.

IM_MultiVIV_04_16
Supersedes: IM_MultiVIV_09_15
IM_MultiVIV_06_15
IM-MultiVIV-05-15