LG
Life's Good

MULTI V™ IV

ENGINEERING MANUAL

Variable Refrigerant Flow Outdoor Units
6.0 to 42.0 Tons

PROPRIETARY DATA NOTICE

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A summary list of safety precautions is on page 3.

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

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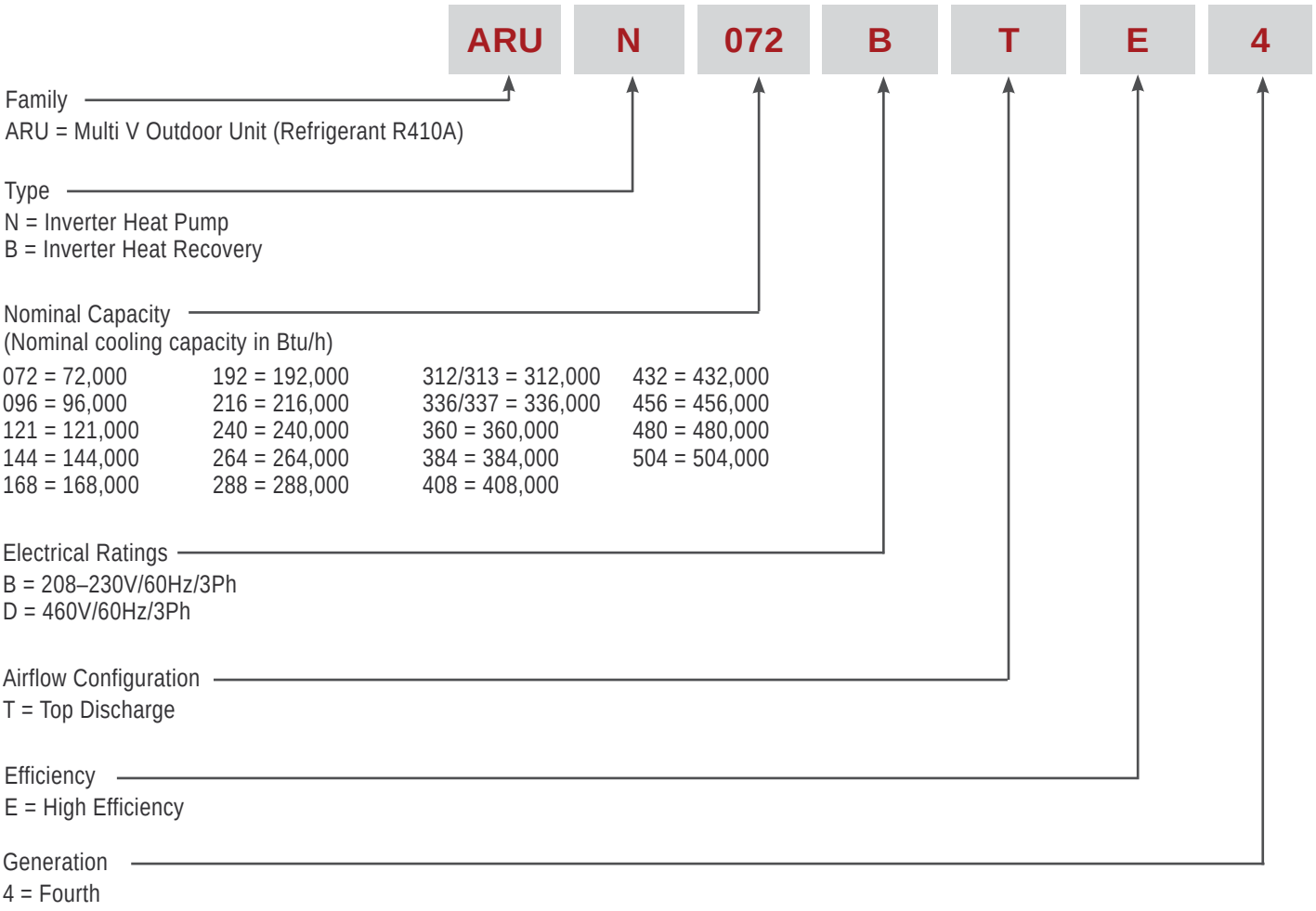
TABLE OF SYMBOLS

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

UNIT NOMENCLATURE

Outdoor and Heat Recovery Units

Outdoor Units (ODU)



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)

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

UNIT NOMENCLATURE

Indoor Units

Indoor Units (IDU)

ARN	U	07	3	TN	C	4

Family
ARN = Multi V Indoor Unit
(Refrigerant R410A)

Type
U = DC Inverter Heat Pump

Indoor Unit Nominal Capacity

05 = 5,000 Btu/h	18 = 18,000 Btu/h	42 = 42,000 Btu/h
07 = 7,000 Btu/h	24 = 24,000 Btu/h	48 = 48,000 Btu/h
09 = 9,000 Btu/h	28 = 28,000 Btu/h	54 = 54,000 Btu/h
12 = 12,000 Btu/h	30 = 30,000 Btu/h	76 = 76,000 Btu/h
15 = 15,000 Btu/h	36 = 36,000 Btu/h	96 = 96,000 Btu/h

Electrical Ratings
3 = 208–230V/60Hz/1Ph

Model

B3 = Ducted (low static - bottom return)
B4 = Ducted (low static - bottom return)
B8 = Ducted (high static)
BG = Ducted (high static)
BH = Ducted (high static)
BR = Ducted (high static)
CE = Floor Standing (small frame)
CF = Floor Standing (large frame)
L1 = Ducted (low static)
L2 = Ducted (low static)
L3 = Ducted (low static)
NJ = Vertical/Horizontal Air Handling Unit
NK = Vertical/Horizontal Air Handling Unit
SB = Wall Mounted / Art Cool™ Mirror
SC = Wall Mounted / Art Cool Mirror
SF = Art Cool Gallery
SV = Wall Mounted
TT = 1-Way Ceiling Cassette
TU = 1-Way Ceiling Cassette
TL = 2-Way Ceiling Cassette
TM = 4-Way Ceiling Cassette
TN = 4-Way Ceiling Cassette
TP = 4-Way Ceiling Cassette
TQ = 4-Way Ceiling Cassette
TR = 4-Way Ceiling Cassette
VE = Convertible Surface Mounted
VJ = Ceiling Suspended

Feature
A, C, L, R = Standard*
G = Low Static
U = Uncased

**Filter accessories are available separately. Always follow all local, state, and national building codes with the use of this or any product.*

Generation
2 = Second
4 = Fourth
A = Second, Revision A

ACRONYMS

%OA	Percentage Outdoor Air	IDU	Indoor Unit
%RA	Percentage Return Air	IEQ	Indoor Environmental Quality (LEED Related)
ABS	Acrylonitrile Butadiene Styrene	ISO	International Organization for Standardization
AC	Air Conditioner	IUCF	Indoor Unit Correction Factor
ACP	Advanced Control Platform	KTL	Korea Testing Laboratories
AHRI	Air-Conditioning, Heating, and Refrigeration Institute	LEED	Leadership in Energy and Environmental Design
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning	LGAP	LG Air Conditioner Protocol
AHU	Air Handling Unit	MAT	Mixed Air Temperature
AWG	American Wire Gauge	MBh	Thousands BTUs per hour
BLDC	Brushless Digitally Controlled/Direct	MCA	Maximum Circuit Ampacity
Btu/h	British Thermal Units per hour	MFS	Maximum Fuel Size
CCR	Corrected Capacity Ratio	MOCP	Maximum Overcurrent Protection
CDOA	Coupled Dedicated Outdoor Air	MR	Materials and Resources (LEED Related)
CFM	Cubic Feet per Minute	NC	New Construction (LEED Related)
CI	Commercial Interiors (LEED® Related)		Normally Closed
COP	Coefficient Of Performance	NEC	National Electrical Code
CR	Combination Ratio	NO	Normally Open
CR	Credit (LEED Related)	OAT	Outdoor Air Temperature
CS	Core and Shell (LEED Related)	O&M	Existing Building Operations and Maintenance (LEED Related)
DB	Dry Bulb	ODU	Outdoor Unit
dB(A)	Decibels with “A” frequency weighting	OUCF	Outdoor Unit Correction Factor
DDOAS	Decoupled Dedicated Outdoor Air	PDI	Power Distribution Integrator
DI	Digital Input	PI	Power Input
DO	Digital Output	PR	Prerequisite (LEED Related)
EA	Energy and Atmosphere (LEED Related)	PTAC	Packaged Terminal Air Conditioner
EEV	Electronic Expansion Valve	PVE	Polyvinyl Ether
ELF	Equivalent Length in Feet	RAT	Return Air Temperature
EPDM	Ethylene Propylene Diene M-Class Rubber	RCL	Refrigerant Concentration Limit
ESP	External Static Pressure	RP	Regional Priority (LEED Related)
ETL	Electronic Testing Laboratories	RUR	Running Unit Ratio
FLA	Full Load Amps	K12	K-12 Schools (LEED Related)
GND	Ground	USGBC	U.S. Green Building Council (LEED Related)
HACR	Heating, Air Conditioning, and Refrigeration	VAH	Vertical Air Handler
HiPOR™	High Pressure Oil Return	VAV	Variable Air Volume
H/M/L	High/Medium/Low	VRF	Variable Refrigerant Flow
HVAC	Heating, , Ventilation and Air Conditioning	VRP	Ventilation Rate Procedure
IAQ	Indoor Air Quality	WB	Wet Bulb
ID	Innovations in Design (LEED Related)	WE	Water Efficiency (LEED Related)

PRODUCT DATA

MECHANICAL SPECIFICATIONS

VRF Multi V IV Outdoor Units

Multi V IV Outdoor Units

General

LG Multi V IV Variable Refrigerant Flow (VRF) comprises of a Heat Pump system or a Heat Recovery System with a single, dual or triple frame outdoor unit connected to indoor units or heat recovery units (for heat recovery systems only) with a single refrigerant piping system connectable using factory designed and supplied Y-branches and Headers, and having integrated controls.

An LG Multi V IV Heat pump system is a VRF system that can operate in either cooling or heating mode, whereas an LG Multi V IV Heat Recovery system is a VRF system that can operate with its indoor units in different modes (heating or cooling) simultaneously. The Heat Recovery unit is capable of being designed for minimum piping and maximum design flexibility. Individual indoor units or zones can change modes (cooling to heating or heating to cooling).

LG components are manufactured in a facility registered to ISO 9001 and ISO 14001, which is a set of standards applying to environmental protection set by the International Organization for Standardization (ISO). The units are listed by Intertek Electrical Testing Laboratories (ETL) and bear the ETL label. Wiring in these units are in accordance with the National Electrical Code (NEC).

Temperature Ranges

Heat Pump Systems

Air-cooled heat pump systems can operate continuously in outdoor ambient conditions while in heating mode from -13.0°F to 61°F and in cooling mode from 14°F to 122°F. Beyond these continuous operating ranges, heating or cooling can be delivered but cycling may occur. (When the optional low ambient cooling baffle [sold separately] has been installed, system minimum cooling operation range is extended [-9.9°F to 122°F]).

Heat Recovery Systems

Air-cooled heat recovery systems can operate with continuous compressor operation in outdoor ambient conditions while all indoor units are in heating mode from -13.0°F to 61°F; with some indoor units in cooling and some in heating from 14°F to 61°F; and when all indoor units are in cooling mode from 14°F1 to 122°F. Beyond these continuous operating ranges, heating or cooling can be delivered but cycling may occur. (When the optional low ambient cooling baffle [sold separately] has been installed, system minimum cooling operation range is extended [9.9°F to 122°F]) when all indoor units are in cooling mode.

Casing / Frame

Heat Pump and Heat Recovery outdoor units are constructed with galvanized steel, bonderized and finished with a baked enamel paint. Each frame has a removable inspection panel to allow access to service tool connection, DIP switches, auto addressing, and error code display without removing the entire front panel. The entire front panel of the outdoor unit is removable for maintenance.

Outdoor unit frames are completely factory assembled, piped and wired. Dual and triple frame outdoor units need to be field piped with factory designed and supplied Y-branch kits to manifold them together into a single refrigerant circuit.

Refrigerant System

The refrigeration system consists of a single refrigeration circuit and uses R410A refrigerant. The outdoor unit is provided with factory installed components, including a refrigerant strainer, check valves, oil separator, accumulator, four-way reversing valve, electronic controlled expansion valve (EEV), high and low side charging ports, high pressure safety switch, service valves, and interconnecting piping. Also included is an integral subcooler assembly consisting of a double spiral tube-type subcooling heat exchanger and EEV providing refrigerant subcooling modulation up to 23ºF.

Refrigeration Oil Control

Oil return system utilizes the following technologies:

HiPOR™ (High Pressure Oil Return)

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

Smart Oil Control

Monitors the oil level inside the compressor and only initiates oil return cycle to flush oil in pipe system back to the compressor, when the oil level is too low. Timed oil return cycles are not necessary and compressor is protected from running at oil levels that are too low.

Compressors

All 3-phase outdoor unit frames ≤130MBh are equipped with one hermetic digitally controlled inverter driven scroll compressor to modulated capacity (variable from 15 to 150Hz, modulate in 0.5Hz increments). All 3 phase outdoor unit frames ≥130MBh nominal capacity are equipped with two digitally controlled inverter-driven hermetic scroll compressors to modulated capacity (variable from 15 to 150Hz. An internal thermal overload and a factory-mounted 60 watt crankcase heater is included on all compressors.

Outdoor Unit Coil

Heat Pump and Heat Recovery outdoor unit coils are of a nonferrous construction with louvered aluminum fins on copper tubing, and are protected with an integral metal guard. Coil fins have a factory applied corrosion resistant GoldFin™ material with hydrophilic coating.

MECHANICAL SPECIFICATIONS

Multi V IV Outdoor Units / Multi V Heat Recovery Units

Fans and Motors

All outdoor unit frames <80MBh include one direct drive, variable speed propeller type fan. All outdoor unit frames >80MBh include two direct drives, variable speed propeller type fans.

All fan motors have inherent protection, permanently lubricated bearings, and are variable speed with a maximum speed up to 1,100 rpm. Raised guards are provided to limit contact with moving parts.

All Heat Pump and Heat Recovery outdoor units have vertical discharge airflow. Optional factory-provided air guides can be field installed to change discharge airflow from vertical to horizontal.

Outdoor units have a static pressure capability up to 0.32" WG with a DIP switch setting to accommodate additional external static pressure.

Controls

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

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

Microprocessor-based algorithms provide component protection, soft-start capability, refrigeration system pressure, temperature, defrost, and ambient control.

Electrical

Both Heat Pump and Heat Recovery outdoor units are available in choice of 208-230V 60 Hz, 3-phase or 460V, 60 Hz, 3-phase power supply. The units include over/undervoltage protection.

Multi V Heat Recovery Units

General

Multi V heat recovery units are for use with Multi V heat recovery outdoor units to permit simultaneous heating and cooling operation.

Heat recovery units have two (2), three (3), or four (4) ports for connections to indoor units. Each port is capable of connecting from one (1) indoor unit up to eight (8) indoor units up to a maximum nominal capacity of ≤54 MBh. Individual indoor units ≥54 MBh nominal capacity must use two (2) neighboring heat recovery unit ports twinned together with a Y-branch kit.

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

Casing and Construction

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

Refrigerant Valves

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

Refrigerant Piping

Units can be piped in series and / or parallel to optimize cost between material and labor. Up to 16 heat recovery units can be piped in series, parallel, or a combination of series and parallel to optimize cost between material and labor. Any series string of heat recovery ports/units can connect up to 192MBh of indoor unit nominal capacity.

Four-port Heat Recovery Unit.

- Indoor units up to 131 equivalent feet of piping length from the Heat Recovery unit to which it is connected.
- Indoor units up to 295 equivalent feet of piping length from the first branch.
- Difference between highest and lowest elevation indoor units piped to separate parallel heat recovery units (HRUs) up to 131 feet in elevation.
- Difference between highest and lowest heat recovery units piped in parallel up to 49 feet in elevation.
- Difference between highest and lowest elevation heat recovery units piped in series up to 16 feet in elevation.
- Elevation difference of series connected heat recovery units cannot exceed 16 feet.

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

Electrical

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

Controls

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

GENERAL DATA

ARUN Series Heat Pump Outdoor Unit Specifications

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 31 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.

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 31 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.

GENERAL DATA

ARUN Series Heat Pump Outdoor Unit Specifications

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 31 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.

ARUN Series Heat Pump Outdoor Unit Specifications

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, ARUN-144BTE4/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 31 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.

GENERAL DATA

ARUN Series Heat Pump Outdoor Unit Specifications

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.		0.60 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 ARUN121BTE4/ARUN121DTE4, ARUN-144BTE4/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 31 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 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 32 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.

GENERAL DATA

ARUN Series Heat Pump Outdoor Unit Specifications

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 32 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.

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 32 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.

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ARUN Series Heat Pump Outdoor Unit Specifications

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 + 628 + 628	540 + 628 + 628
Shipping Weight (lbs.)		452 + 573 + 661	573 + 573 + 661	573 + 573 + 661	573 + 661 + 661	573 + 661 + 661
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, ARUN-168BTE4/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 32 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

ARUN Series Heat Pump Outdoor Unit Specifications

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
Max. Nominal Cooling Cap.[4]		561,600	592,800	624,000	655,200
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, ARUN-168BTE4/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 32 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.

GENERAL DATA

ARUB Series Heat Recovery Outdoor Unit Specifications

Table 11: 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 33 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.

ARUB Series Heat Recovery Outdoor Unit Specifications

Table 12: 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 33 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.

GENERAL DATA

ARUB Series Heat Recovery Outdoor Unit Specifications

Table 13: 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 33 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.

Table 14: 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
	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 33 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.

GENERAL DATA

ARUB Series Heat Recovery Outdoor Unit Specifications

Table 15: 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.

[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 33 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.

ARUB Series Heat Recovery Outdoor Unit Specifications

Table 16: 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 34 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.

GENERAL DATA

ARUB Series Heat Recovery Outdoor Unit Specifications

Table 17: 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 34 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.

ARUB Series Heat Recovery Outdoor Unit Specifications

Table 18: 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 34 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.

GENERAL DATA

ARUB Series Heat Recovery Outdoor Unit Specifications

Table 19: 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 34 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.

ARUB Series Heat Recovery Outdoor Unit Specifications

Table 20: 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 34 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.

GENERAL DATA

Heat Recovery Unit Specifications and Electrical Data

Figure 1: Two-Port Heat Recovery Unit.

Figure 2: Three-Port Heat Recovery Unit.

Figure 3: Four-Port Heat Recovery Unit.

Note:

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

Table 21: 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)		inches	17-7/8 x 8-5/8 x 18-15/16		
Casing			Galvanized steel plate		
Connecting Pipes	To Indoor Units	Liquid Pipe (inches)	3/8		
		Vapor Pipe (inches)	5/8		
	To Outdoor Units	Liquid (inches)	3/8	1/2	5/8
		Low-pressure Vapor (inches)	7/8	1-1/8	1-1/8
		High-pressure Vapor (inches)	3/4	7/8	7/8
Insulation Material			Polyethylene		
Current	Minimum Circuit Amps (MCA)		0.1	0.15	0.2
	Maximum Fuse Amps (MFA)		15		
Power Supply			1Ø, 208-230V, 60Hz		

Table 22: Heat Recovery Unit Electrical Data.

Unit Model No.	V / Hz / Ph	Input (kW)	
		Cooling	Heating
PRHR022A	208-230 / 60 / 1	0.026	0.026
PRHR032A	208-230 / 60 / 1	0.033	0.033
PRHR042A	208-230 / 60 / 1	0.040	0.040

Table 23: 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.)			1	2	3	1	2	3	1	2	3
			Frame								Frame											
			1		2		3															
			Comp. A	Comp. B	Comp. A	Comp. B	Comp. A	Comp. B		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	-	60	70	-	60	70	-
28.0	ARUN337BTE4	4	20.7	20.7	20.7	20.7	-	-	4	6.0	6.0	-	52.5	52.5	-	70	70	-	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. 10-14.

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.

ELECTRICAL DATA

MULTI V IV

ARUN Series Heat Pump Outdoor Units

Table 24: 460V, 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								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	-	40	45	-	50	50	-
28.0	ARUN337DTE4	4	13.9	13.9	13.9	13.9	-	-	4	2.6	2.6	-	33.9	33.9	-	45	45	-	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. 15-19.

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.

LG

Table 25: 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			1	2	3		1	2	3	1	2	3	1	2	3
			Comp. A	Comp. B	Comp. A	Comp. B	Comp. A	Comp. B														
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. 20-24.

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.

ELECTRICAL DATA

ARUB Series Heat Recovery Outdoor Units

Table 26: 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. 25-29.

Voltage tolerance is 414-528V.

Maximum allowable voltage unbalance is 2%.

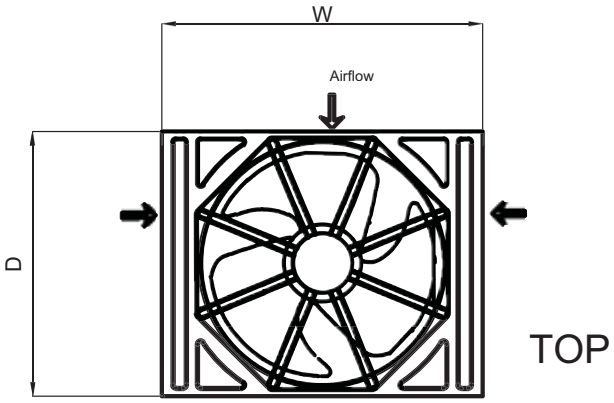
MCA = Minimum Circuit Ampacity.

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.

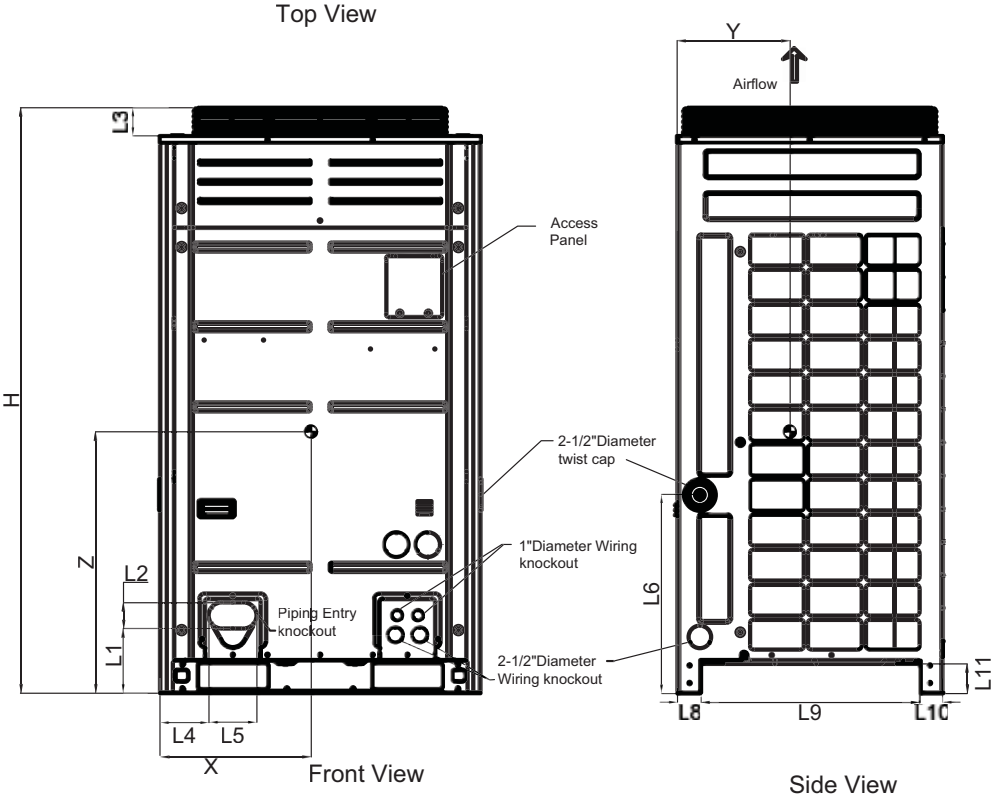
RFA = Recommended Fuse Amps.

OUTDOOR UNIT DIMENSIONS

ARUN072BTE4/ ARUN072DTE4, ARUB072BTE4 / ARUB072DTE4

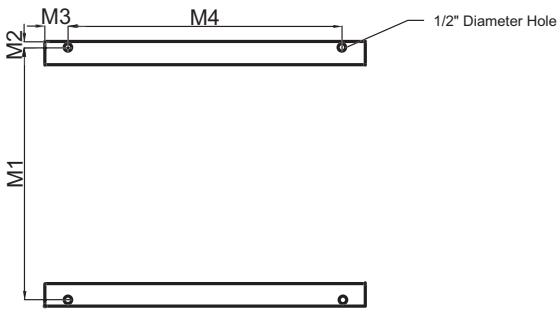


Top View



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

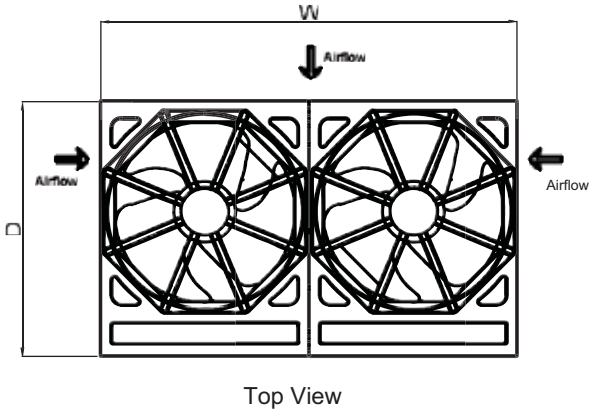
X	17-5/8"
Y	13-1/2"
Z	29-5/8"

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

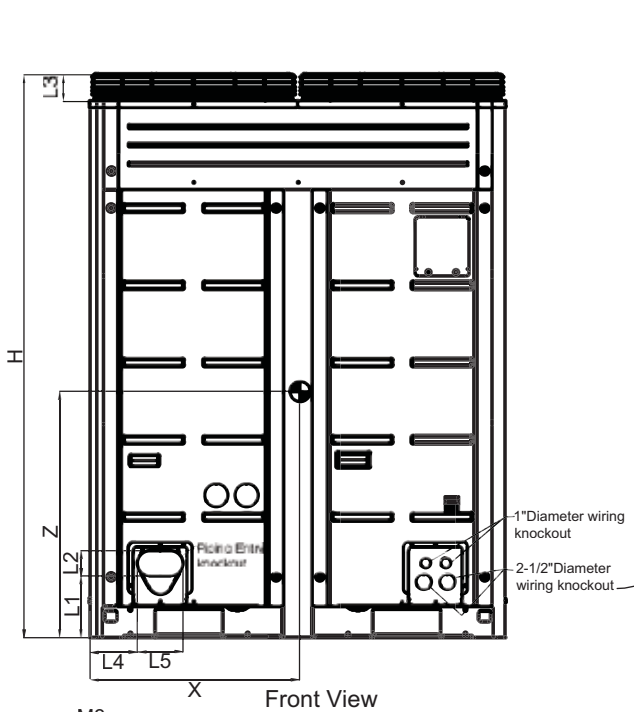
= Center of Gravity

OUTDOOR UNIT DIMENSIONS

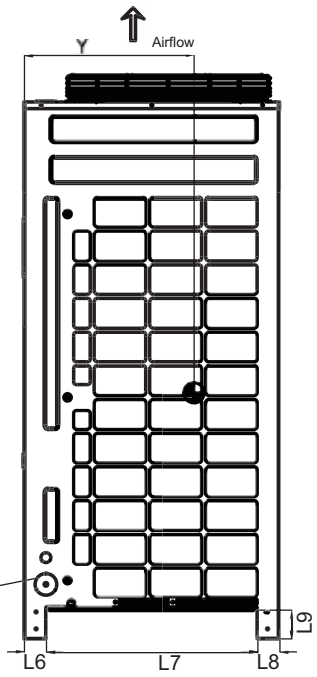
ARUN/ARUB096BTE4/DTE4, ARUN/ARUB121BTE4/DTE4, ARUN/ARUB144BTE4/DTE4,
ARUN/ARUB145BTE4/DTE4, ARUN/ARUB168BTE4/DTE4, ARUN/ARUB169BTE4/DTE4



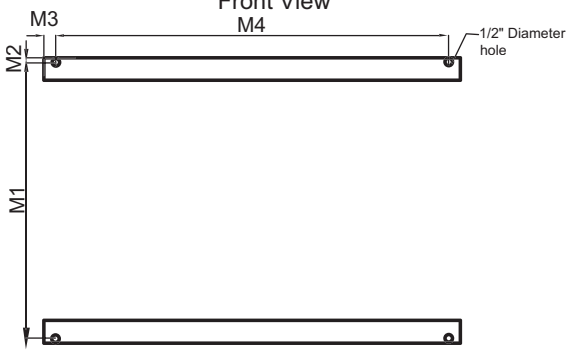
Top View



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.

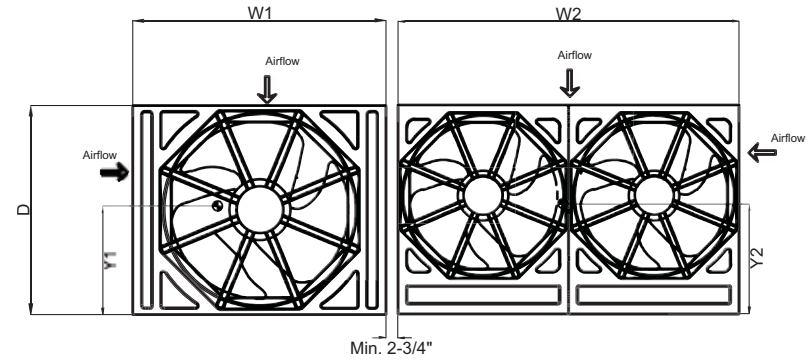
= Center of Gravity

Note:

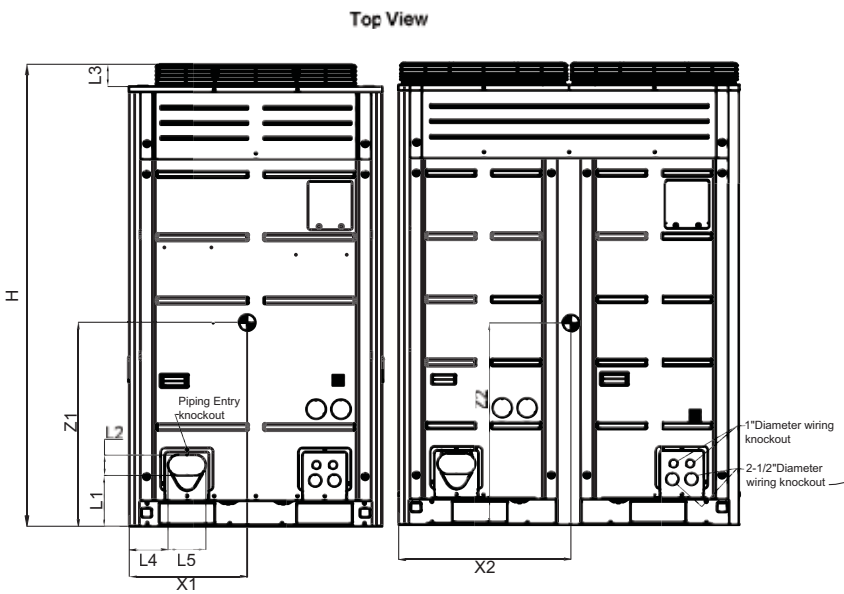
ARUN145BTE4/ARUN145DTE4, ARUB145BTE4/ARUB145DTE4, ARUN169BTE4/ARUN169DTE4, ARUB169BTE4/ARUB169DTE4, frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/ARUN144DTE4, ARUB144BTE4/ARUB144DTE4, ARUN169BTE4/ARUN169DTE4, ARUB169BTE4/ARUB169DTE4 single frame models.

OUTDOOR UNIT DIMENSIONS

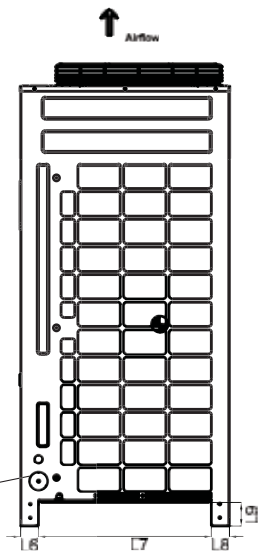
ARUN192BTE4 / 192DTE4, ARUN216BTE4 / 216DTE4, ARUB192BTE4 / 192DTE4, ARUB216BTE4 / 216DTE4



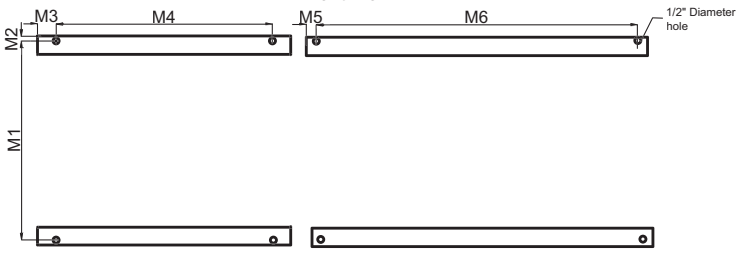
Top View



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

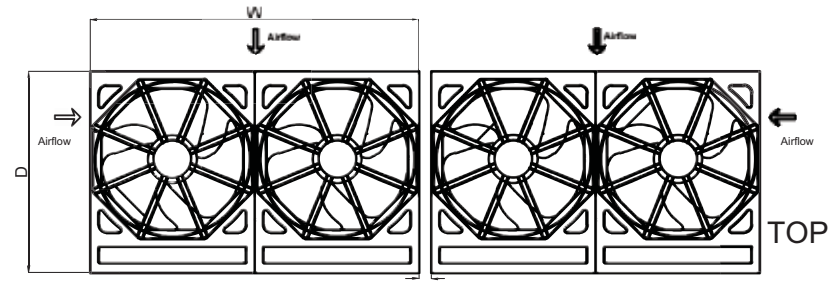
X1	17-5/8"
X2	24-3/4"
Y1	13-1/2"
Y2	21-9/16"
Z1	29-5/8"
Z2	29-7/8"

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

= Center of Gravity

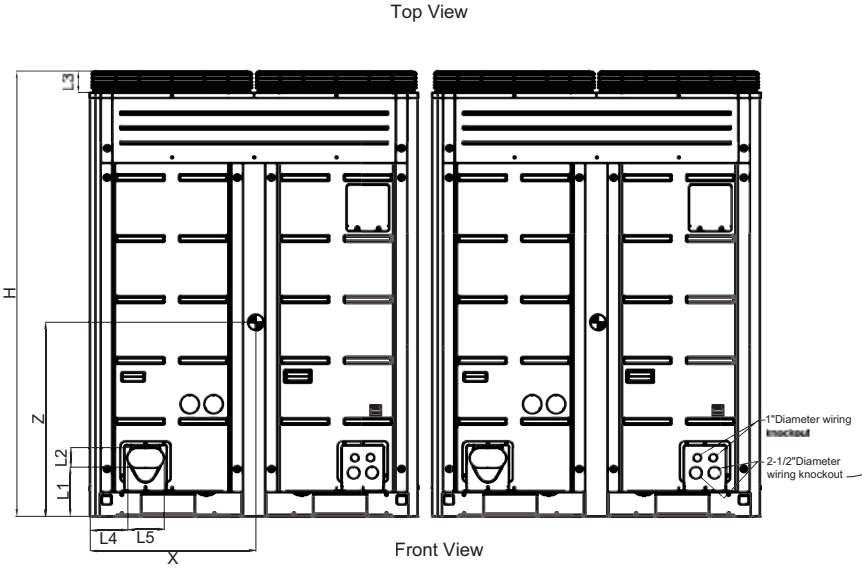
OUTDOOR UNIT DIMENSIONS

ARUN/ARUB240-264-288-313-337BTE4/DTE4

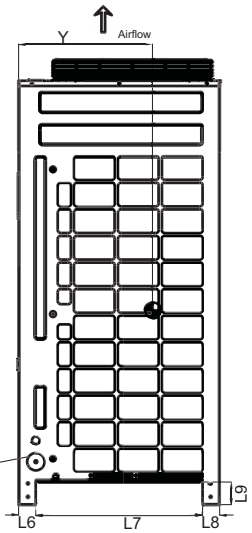


Min. 2-3/4"

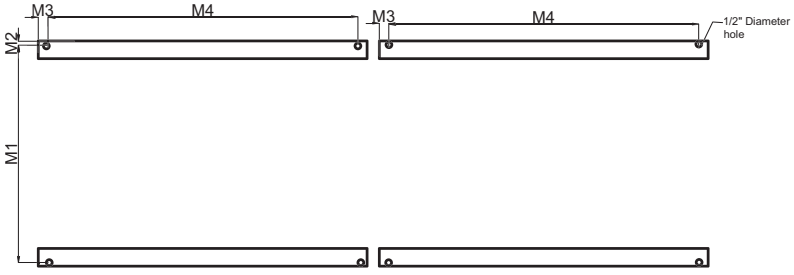
Top View



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

OUTDOOR UNIT DIMENSIONS

ARUN312BTE4 / 312DTE4, ARUB312BTE4 / 312DTE4

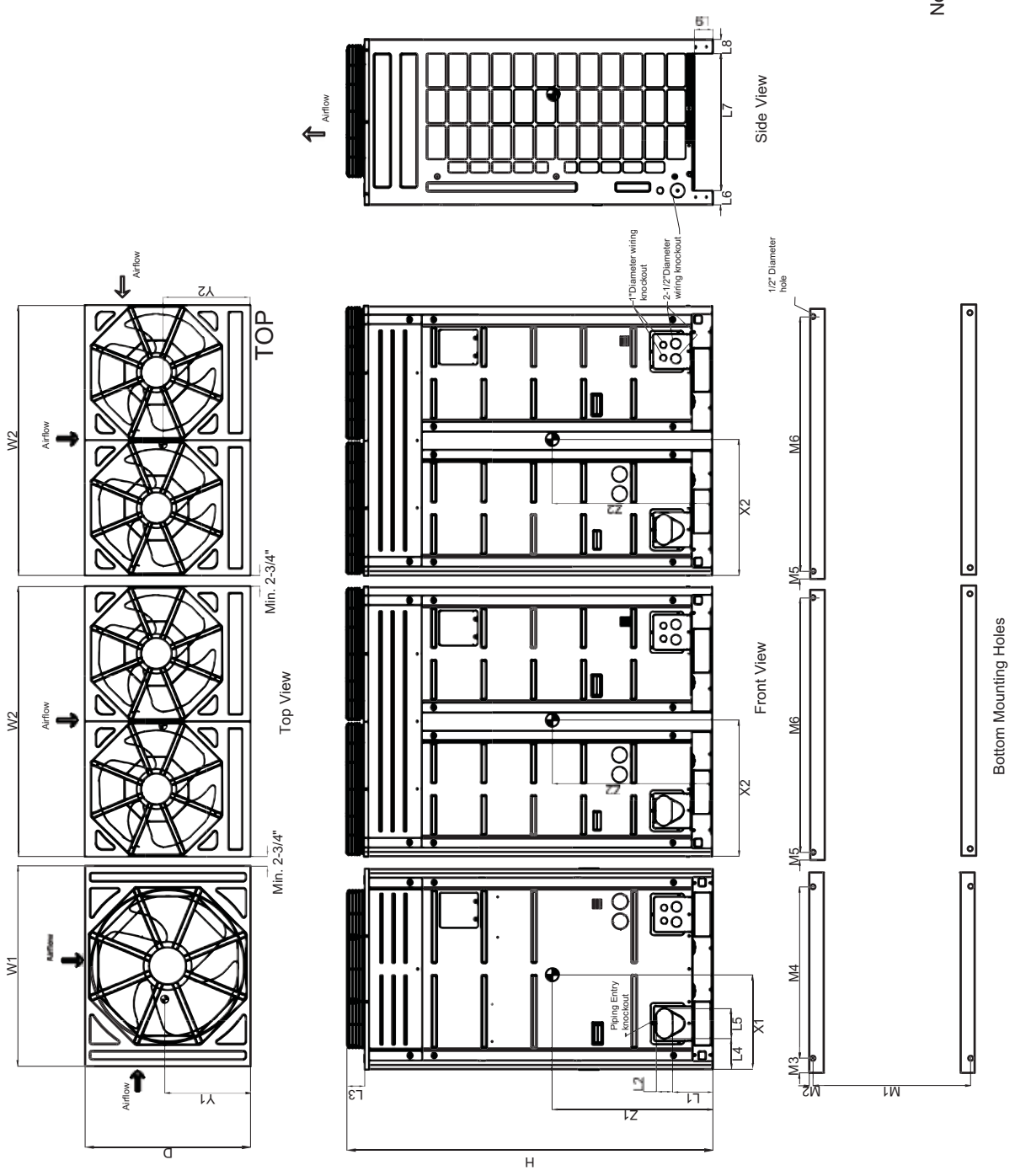
W1	36-1/4"
W2	48-13/16"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	2-9/16
L7	24-3/16"
L8	2-9/16"
L9	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	31-3/16"
M5	2-5/8"
M6	43-3/8"

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



Product Data

OUTDOOR UNIT DIMENSIONS

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

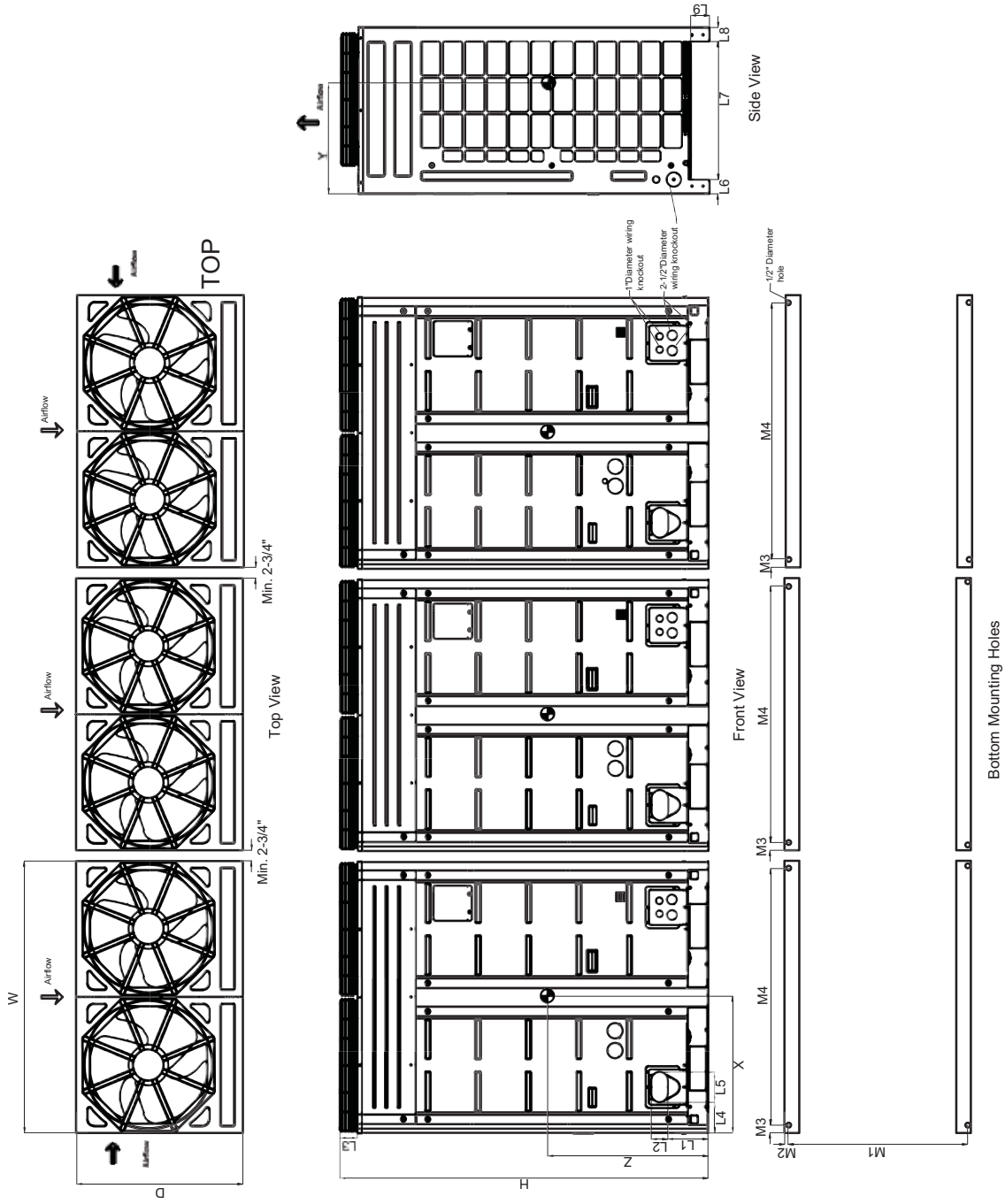
W	48-13/16"
D	29-15/16"
H	66-1/8"
L1	7-1/4"
L2	2-15/16"
L3	3-1/8"
L4	5-1/2"
L5	5-3/8"
L6	2-9/16
L7	24-3/16"
L8	2-9/16"
L9	3-5/16"
M1	29-1/16"
M2	7/16"
M3	2-5/8"
M4	43-3/8"

Center of Gravity

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

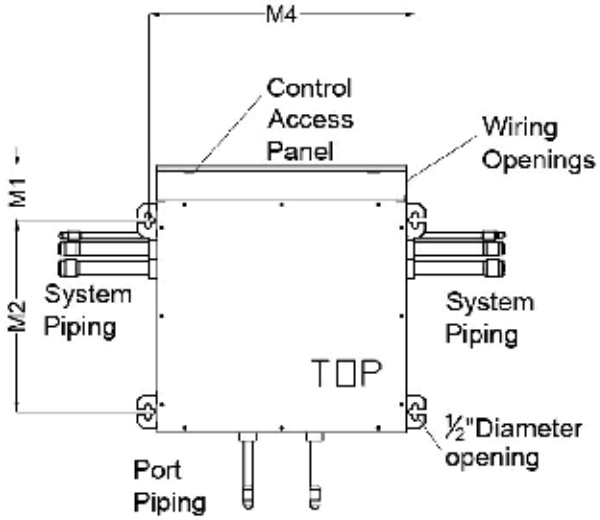
Note - All dimensions have a tolerance of ± 0.25 in.

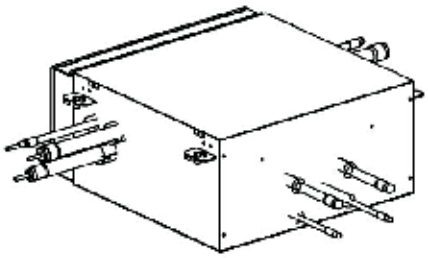
= Center of Gravity

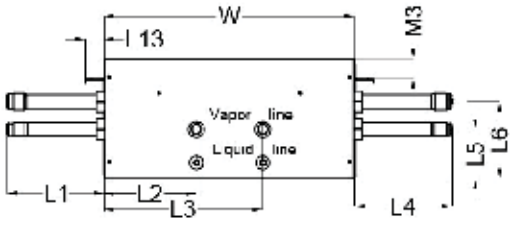


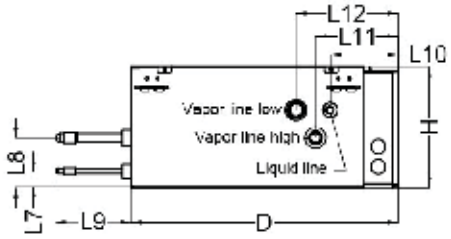
HEAT RECOVERY UNIT DIMENSIONS

PRHR022A

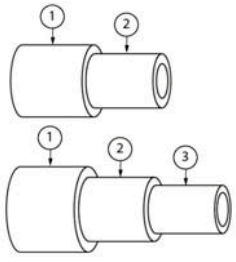








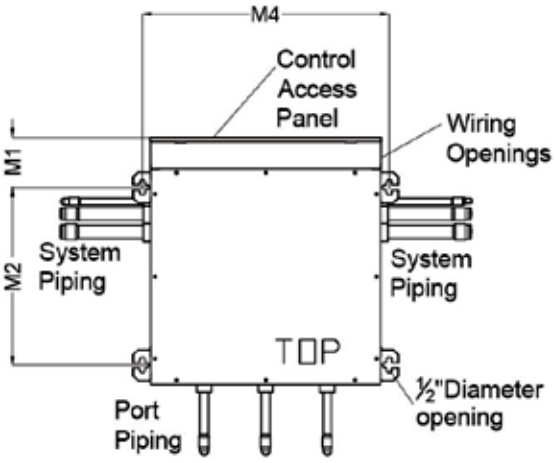
W	17-7/8"
H	8-5/8"
D	18-15/16"
L1	6-7/8"
L2	6-5/8"
L3	11-3/8"
L4	6-7/8"
L5	3-1/2"
L6	5-1/2"
L7	1-3/16"
L8	3-9/16"
L9	5-7/16"
L10	4-3/4"
L11	5-3/4"
L12	7-1/4"
L13	1-1/4"
M1	3-3/4"
M2	13-5/8"
M3	1-1/2"
M4	18-15/16"

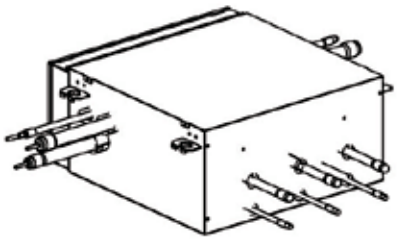


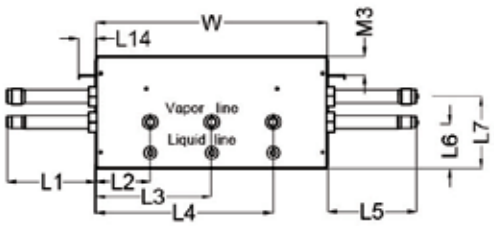
Reducer Dimensions (in)					
		1	2	3	Quantity
Indoor Unit	Liquid Line	3/8 OD	1/4 OD	-	2
	Vapor Line	5/8 OD	1/2 OD	-	2
HR Unit	Liquid Line	3/8 OD	1/4 OD	-	2
	Vapor Line Low	5/8 OD	1/2 OD	-	2
		7/8 OD	3/4 OD	5/8 OD	2
	Vapor Line High	1/2 OD	3/8 OD	-	2
		3/4 OD	5/8 OD	1/2 OD	2

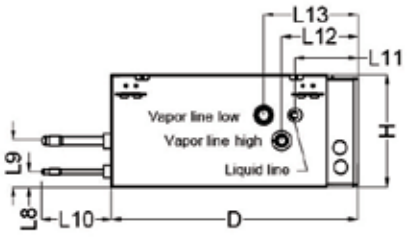
HEAT RECOVERY UNIT DIMENSIONS

PRHR032A

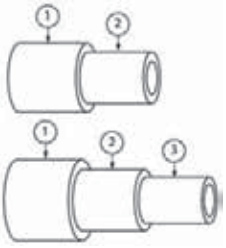








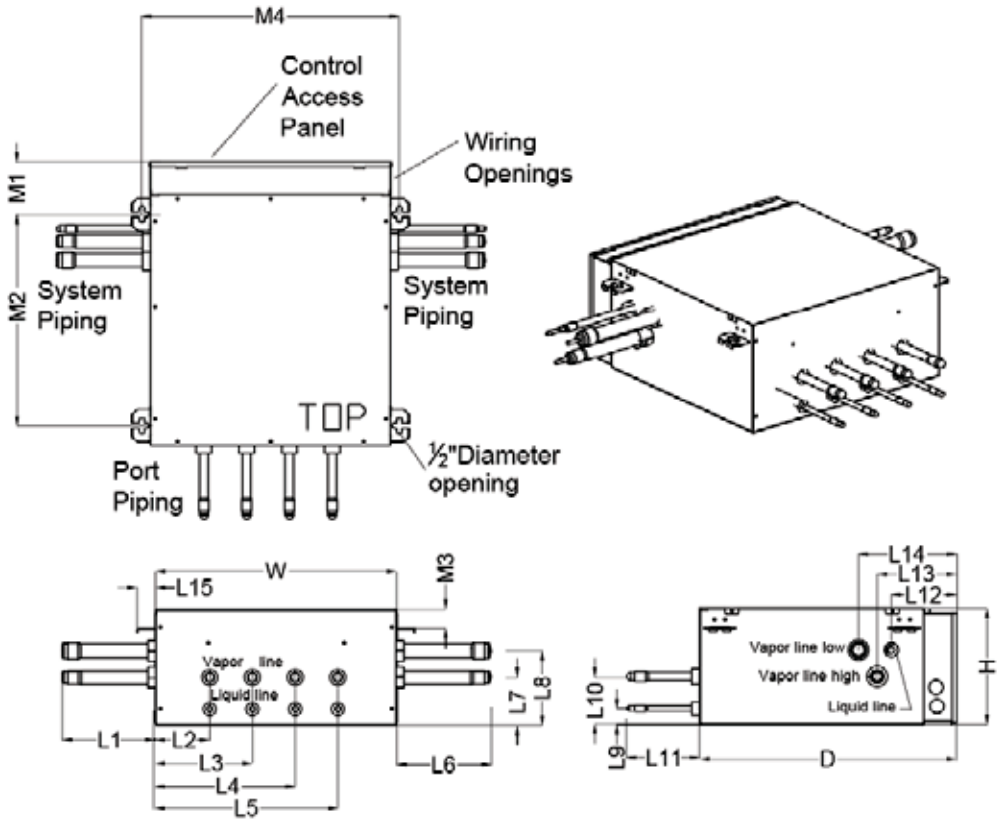
W	17-7/8"
H	8-5/8"
D	18-15/16"
L1	6-7/8"
L2	4-1/4"
L3	9"
L4	13-3/4"
L5	6-7/8"
L6	3-1/2"
L7	5-1/2"
L8	1-3/16"
L9	3-9/16"
L10	5-7/16"
L11	4-3/4"
L12	5-3/4"
L13	7-1/4"
L14	1-1/4"
M1	3-3/4"
M2	13-5/8"
M3	1-1/2"
M4	18-15/16"



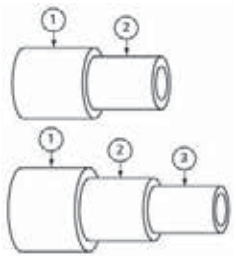
Reducer Dimensions (in)					
		1	2	3	Quantity
Indoor Unit	Liquid Line	3/8 OD	1/4 OD	-	3
	Vapor Line	5/8 OD	1/2 OD	-	3
HR Unit	Liquid Line	1/2 OD	3/8 OD	-	2
	Vapor Line Low	3/4 OD	5/8 OD	-	2
		1-1/8 OD	7/8 OD	3/4 OD	2
	Vapor Line High	5/8 OD	1/2 OD	-	2
		7/8 OD	3/4 OD	5/8 OD	2

HEAT RECOVERY UNIT DIMENSIONS

PRHR042A



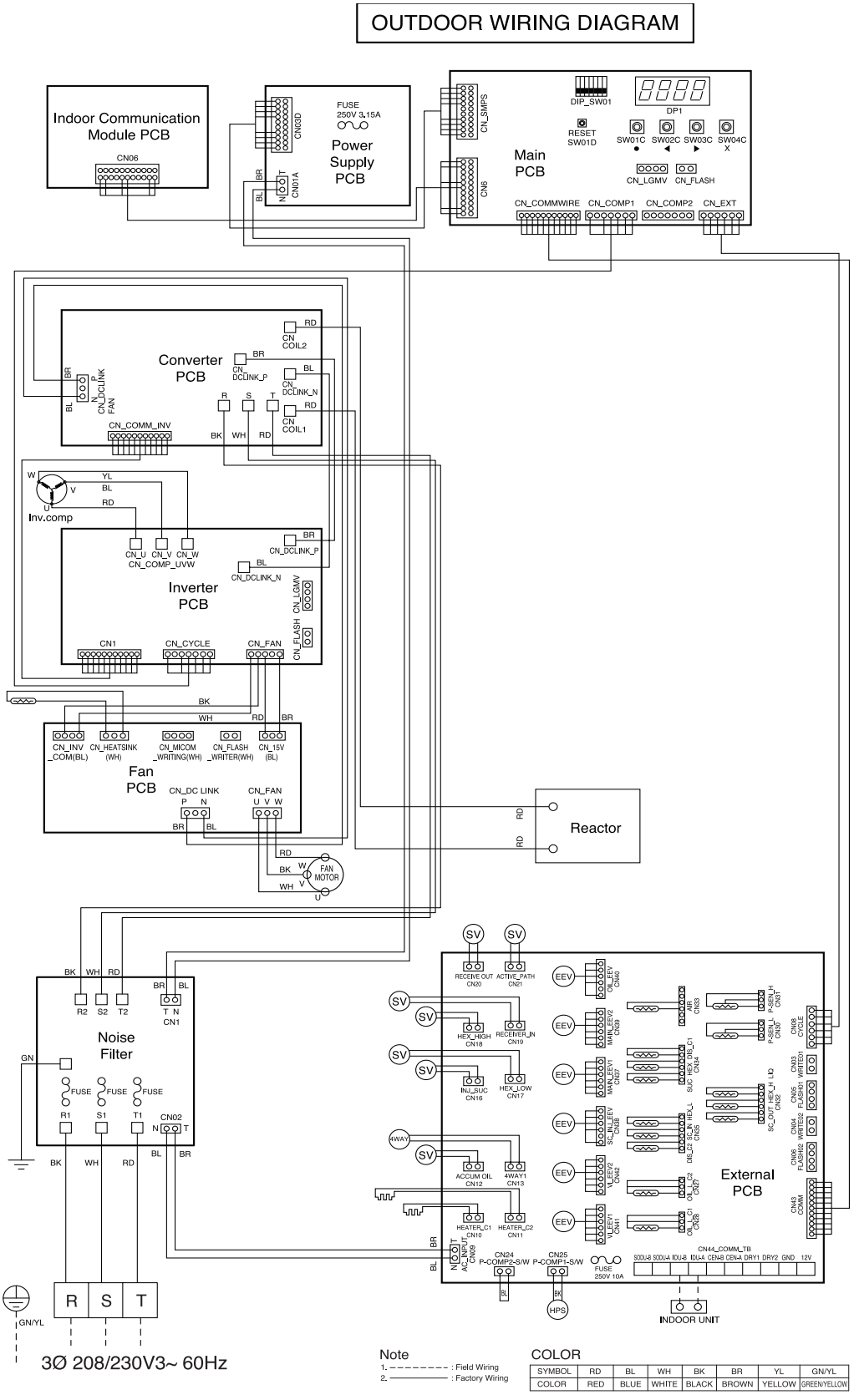
W	17-7/8"
H	8-5/8"
D	18-15/16"
L1	6-7/8"
L2	4-1/4"
L3	7-1/2"
L4	10-1/2"
L5	13-3/4"
L6	6-7/8"
L7	3-1/2"
L8	5-1/2"
L9	1-3/16"
L10	3-9/16"
L11	5-7/16"
L12	4-3/4"
L13	5-3/4"
L14	7-1/4"
L15	1-1/4"
M1	3-3/4"
M2	13-5/8"
M3	1-1/2"
M4	18-15/16"



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

WIRING DIAGRAMS

ARUN072BTE4 208-230V Heat Pump



◆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

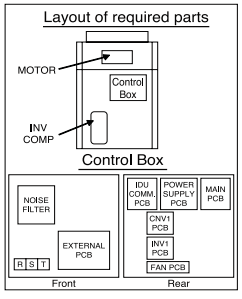
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U.V.W PHASE

◆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

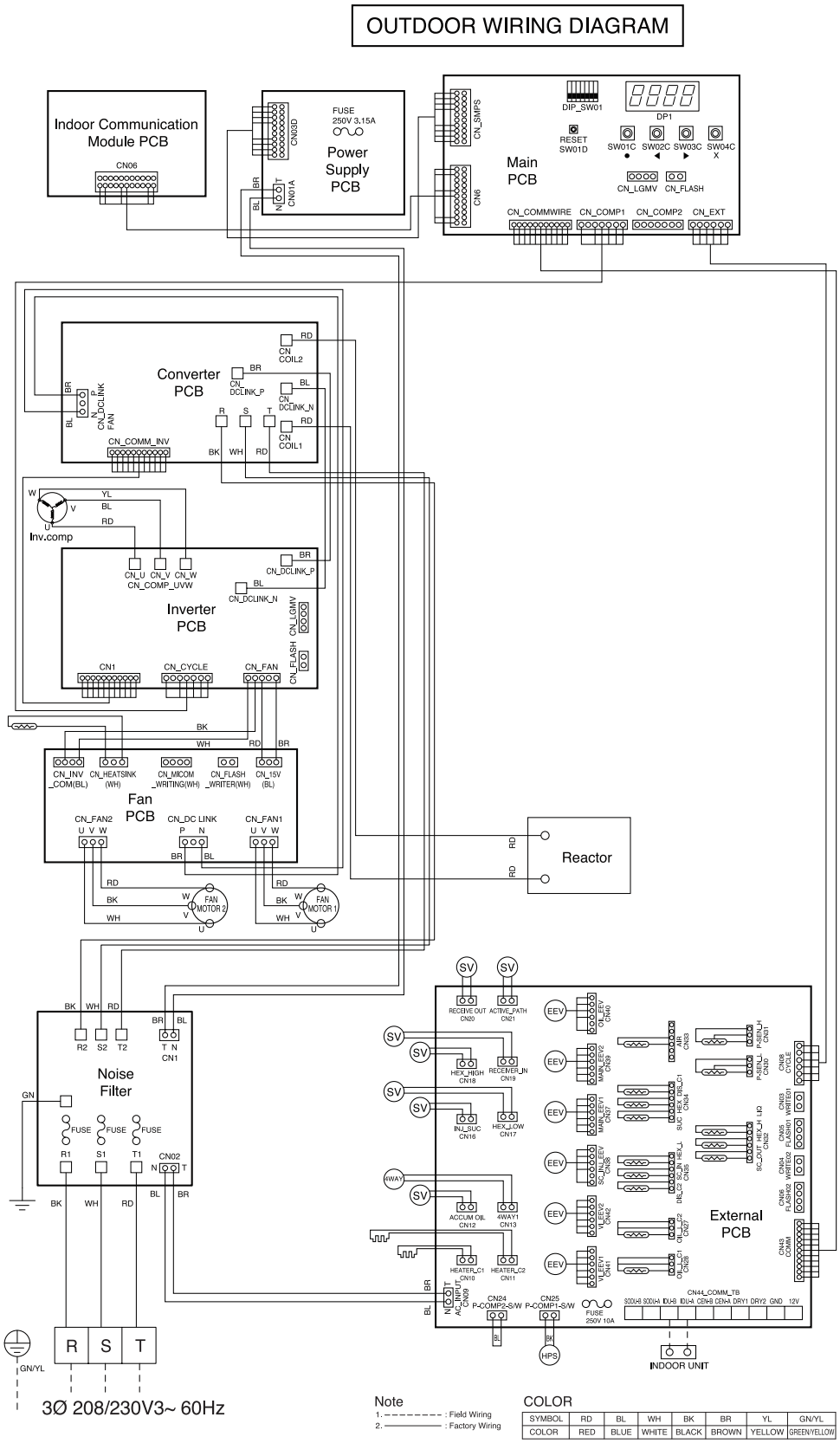
◆Noise PCB Note

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



ARUN096BTE4, ARUN121BTE4, ARUN144BTE4, ARUN168BTE4 208-230V

Heat Pump



◆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_JN)	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

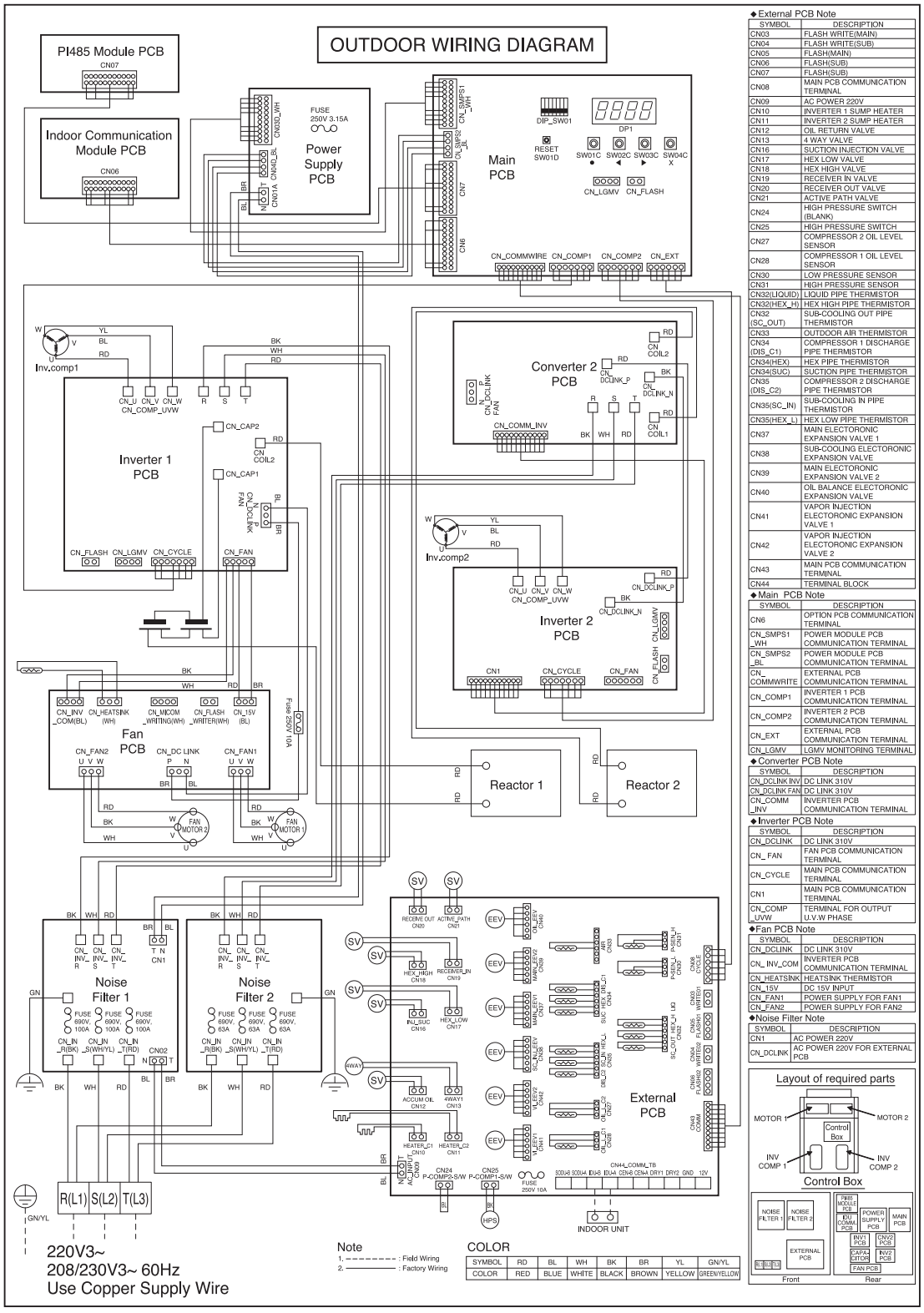
Note
1. ---------- : Field Wiring
2. ———— : Factory Wiring

COLOR

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

WIRING DIAGRAMS

ARUN145BTE4, ARUN169BTE4 208-230V Heat Pump



◆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

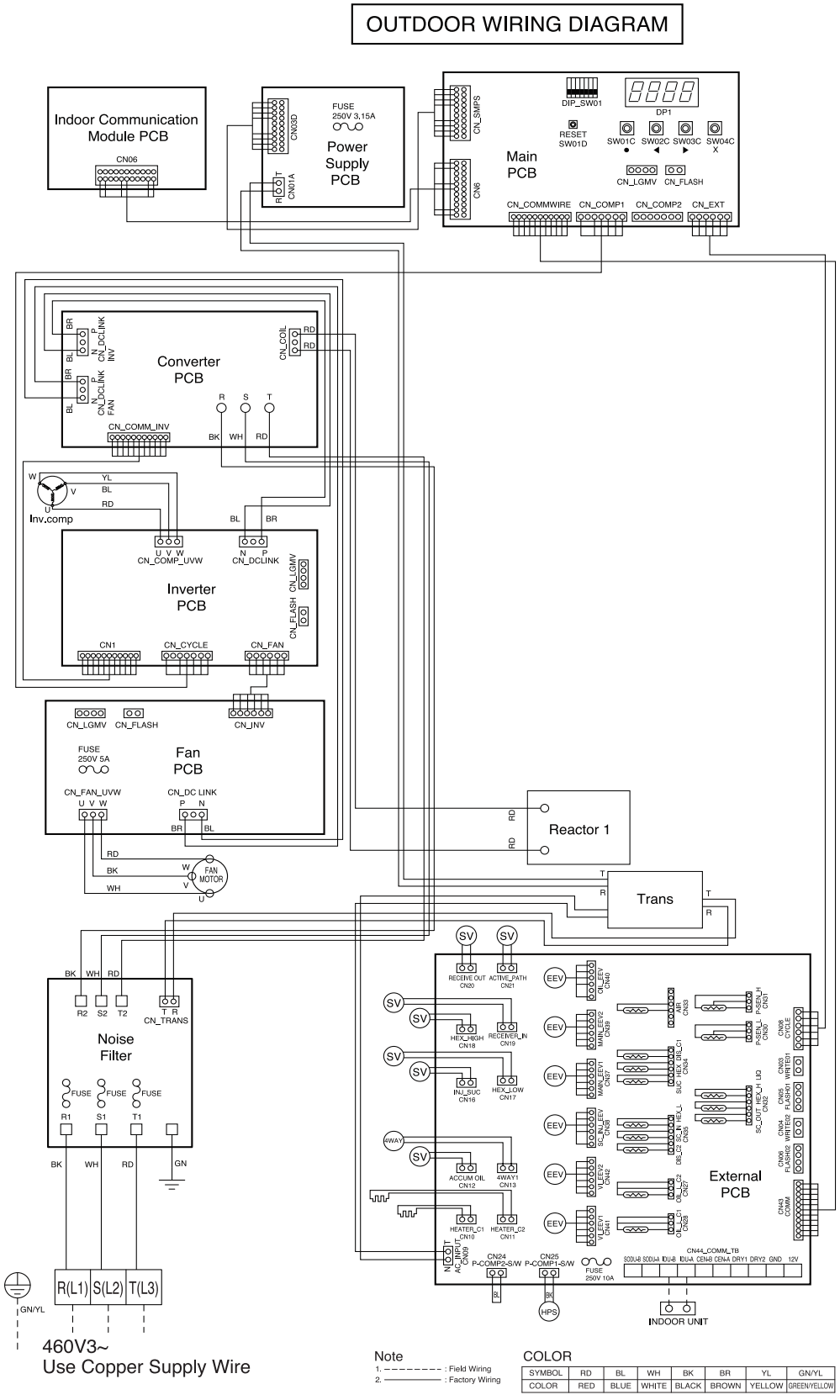
◆Noise Filter Note

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

Note:

ARUN145BTE4/ARUN145DTE4, 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.

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

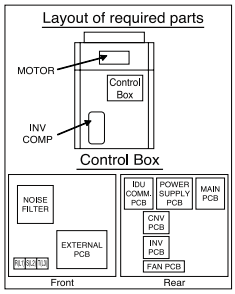
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 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

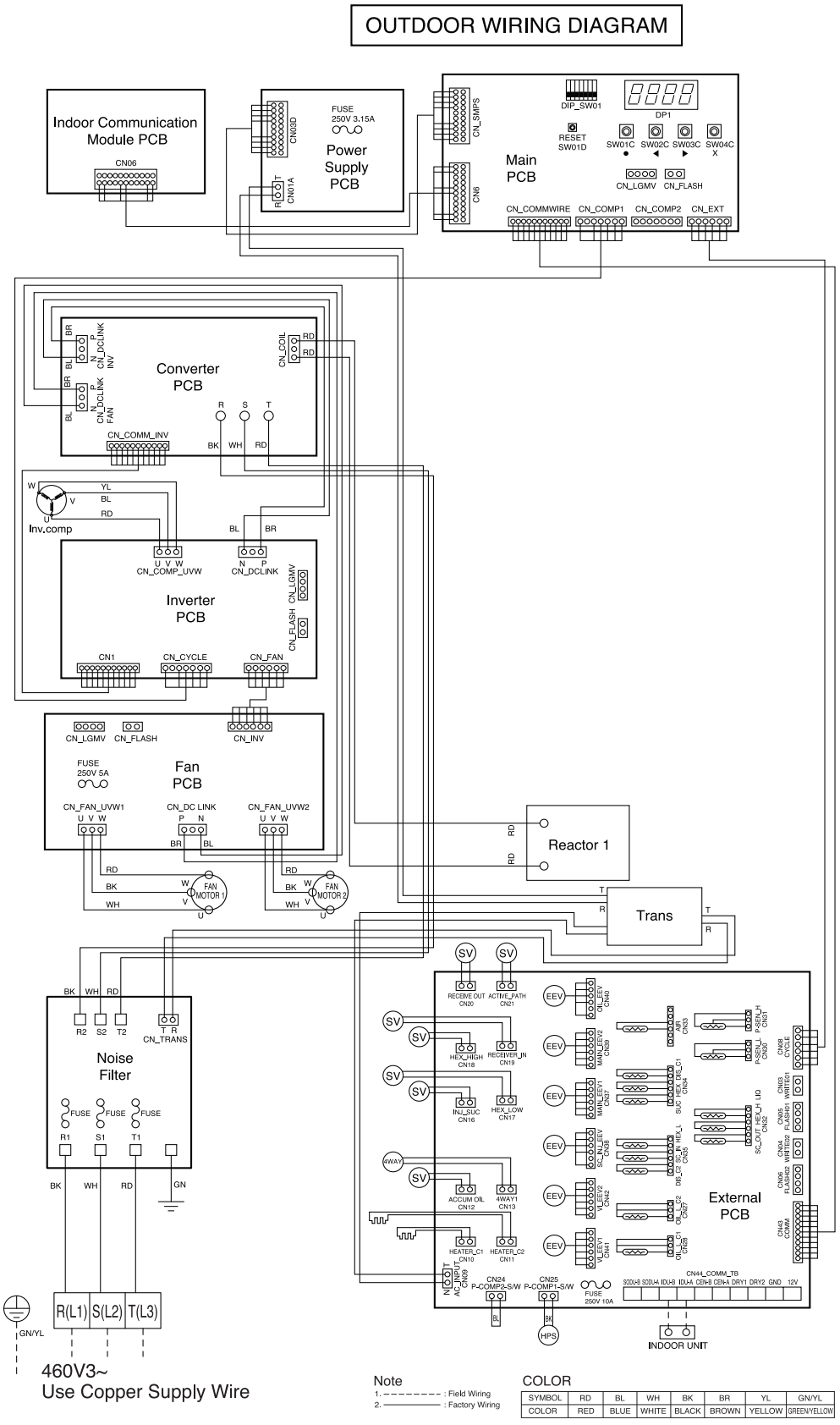
SYMBOL	DESCRIPTION
CN_TRANS	AC POWER 460V



Product Data

WIRING DIAGRAMS

ARUN096DTE4, ARUN121DTE4 460V Heat Pump



◆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

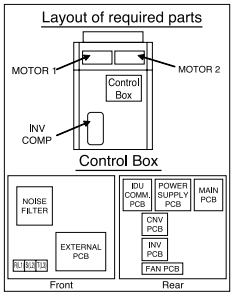
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

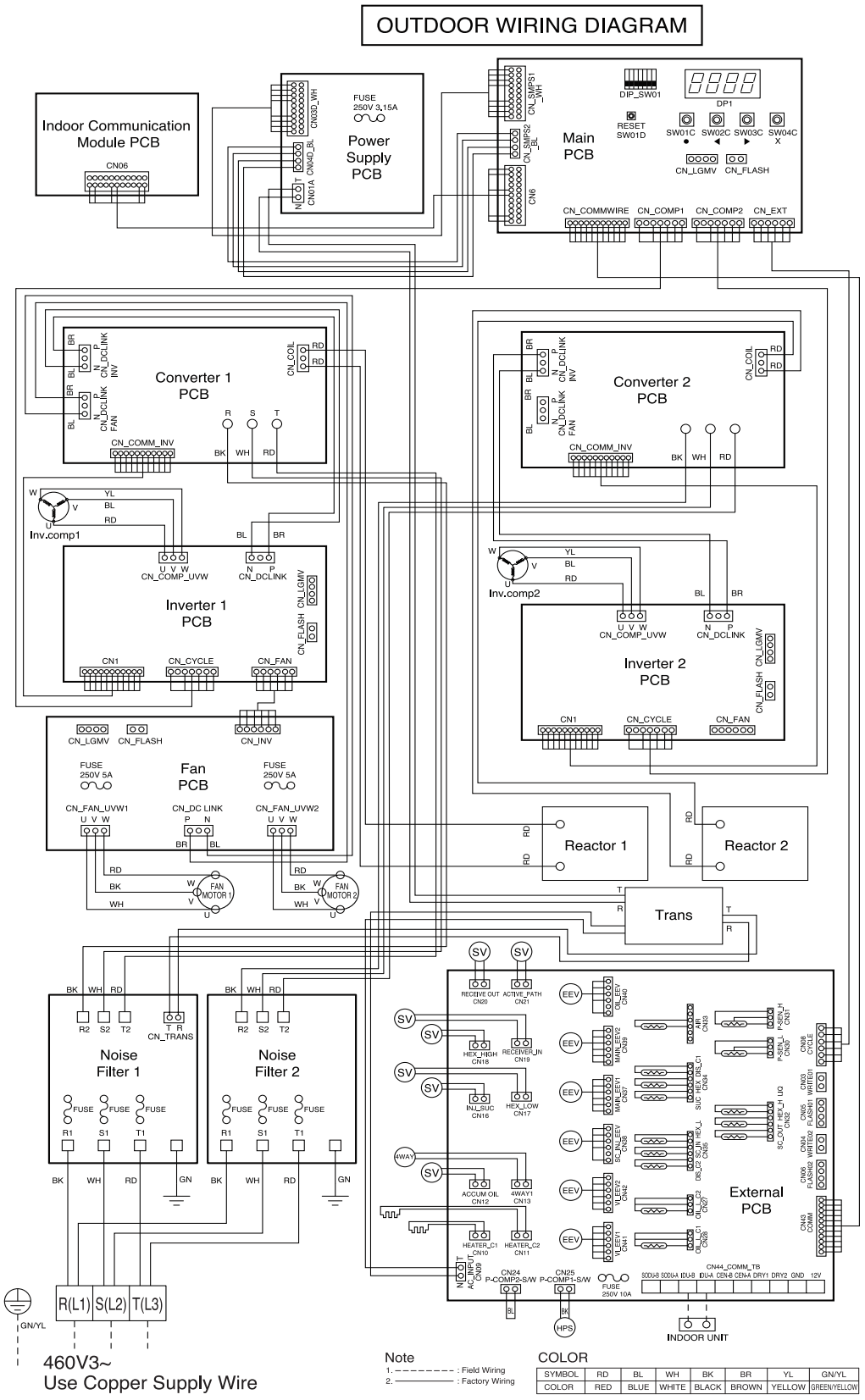
◆Fan PCB Note

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

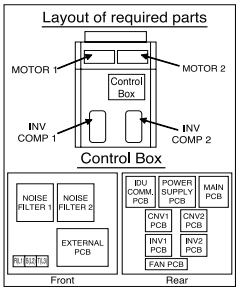
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

◆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

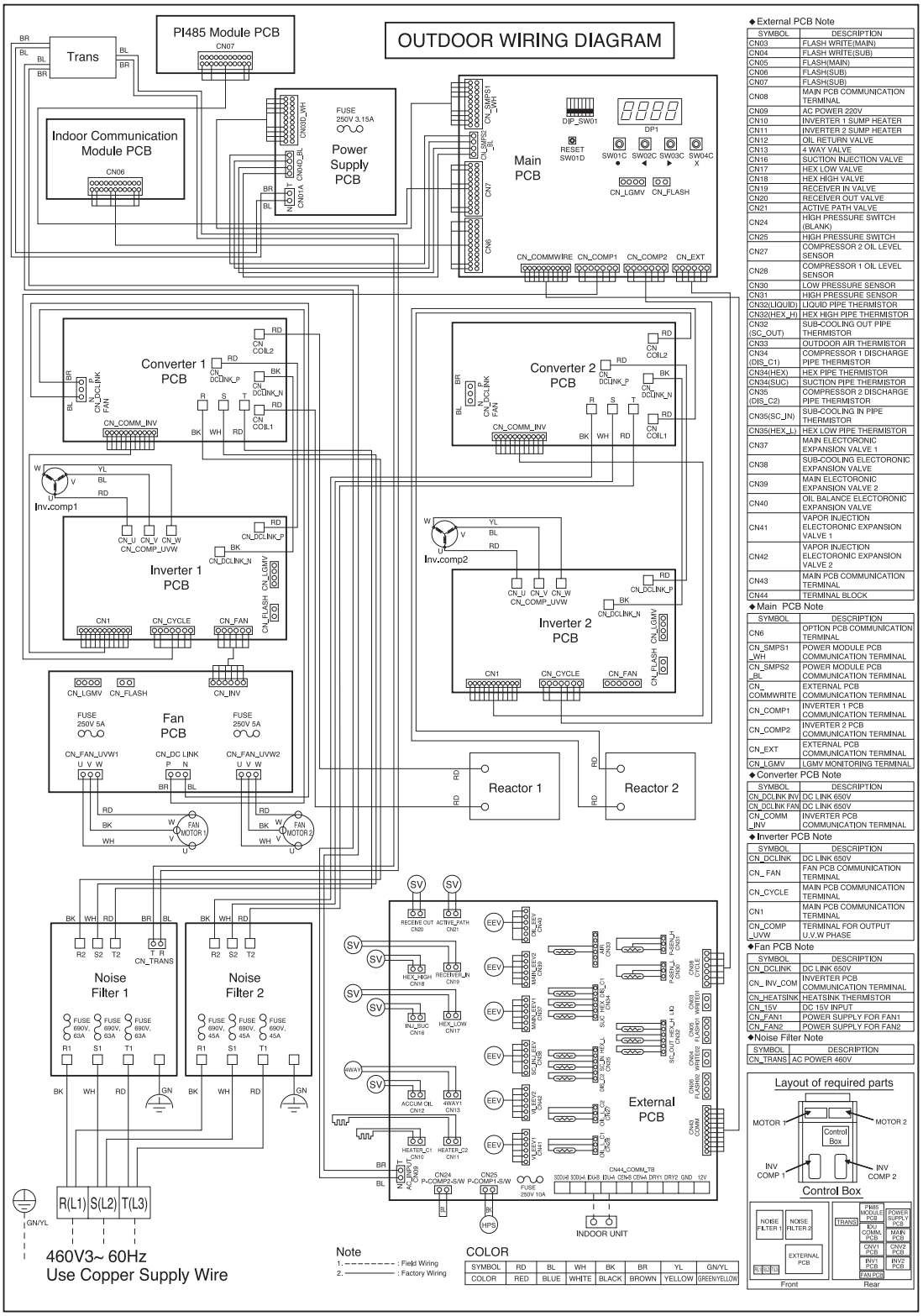
SYMBOL	DESCRIPTION
CN_TRANS	AC POWER 460V



Product Data

WIRING DIAGRAMS

ARUN145DTE4, ARUN169DTE4 460V Heat Pump



◆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)	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

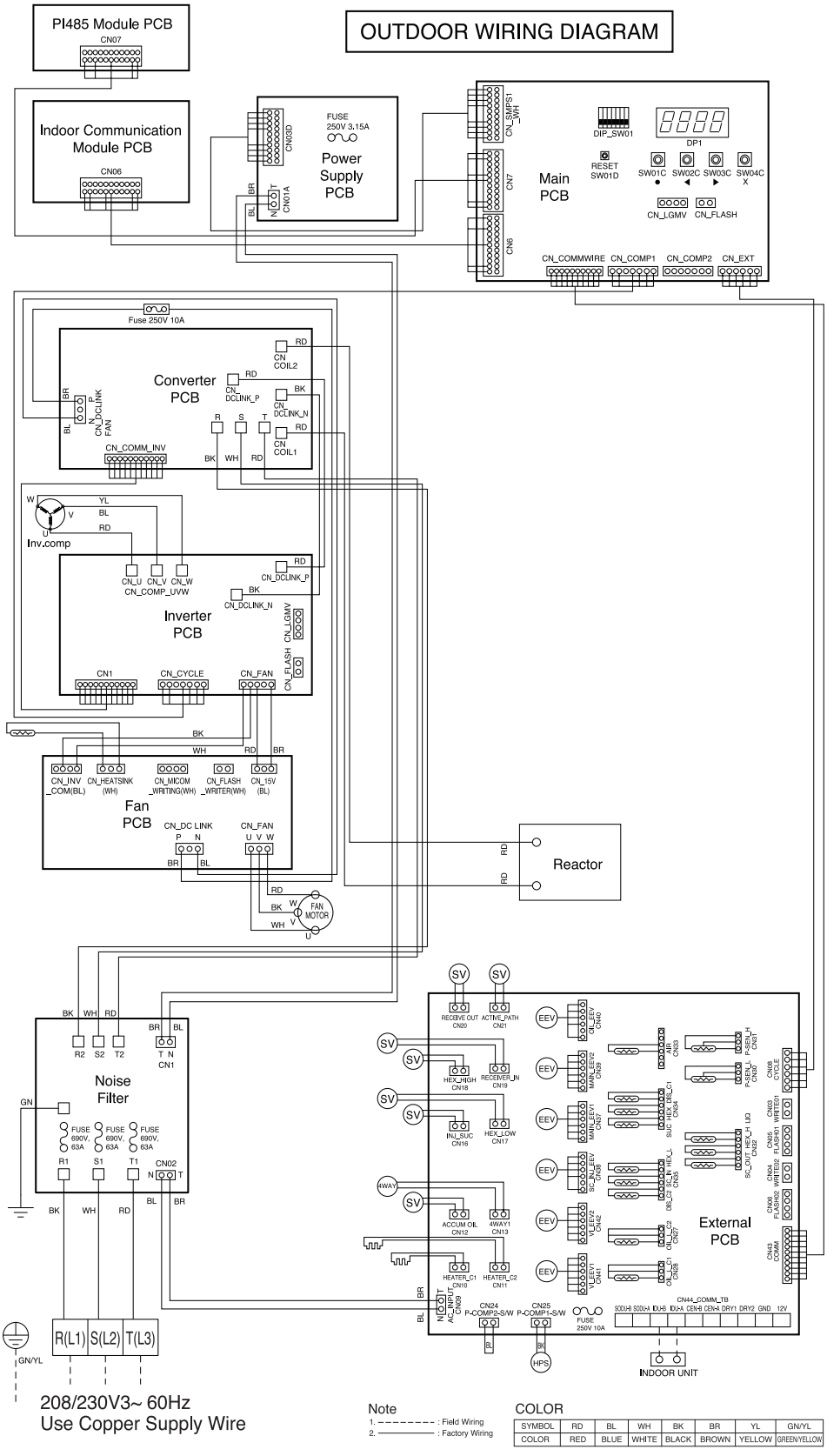
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 650V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise Filter Note

SYMBOL	DESCRIPTION
CN_TRANS	AC POWER 460V

Note:

ARUN145BTE4/ARUN145DTE4, 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.



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)
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

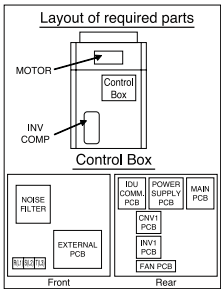
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U,V,W PHASE

◆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

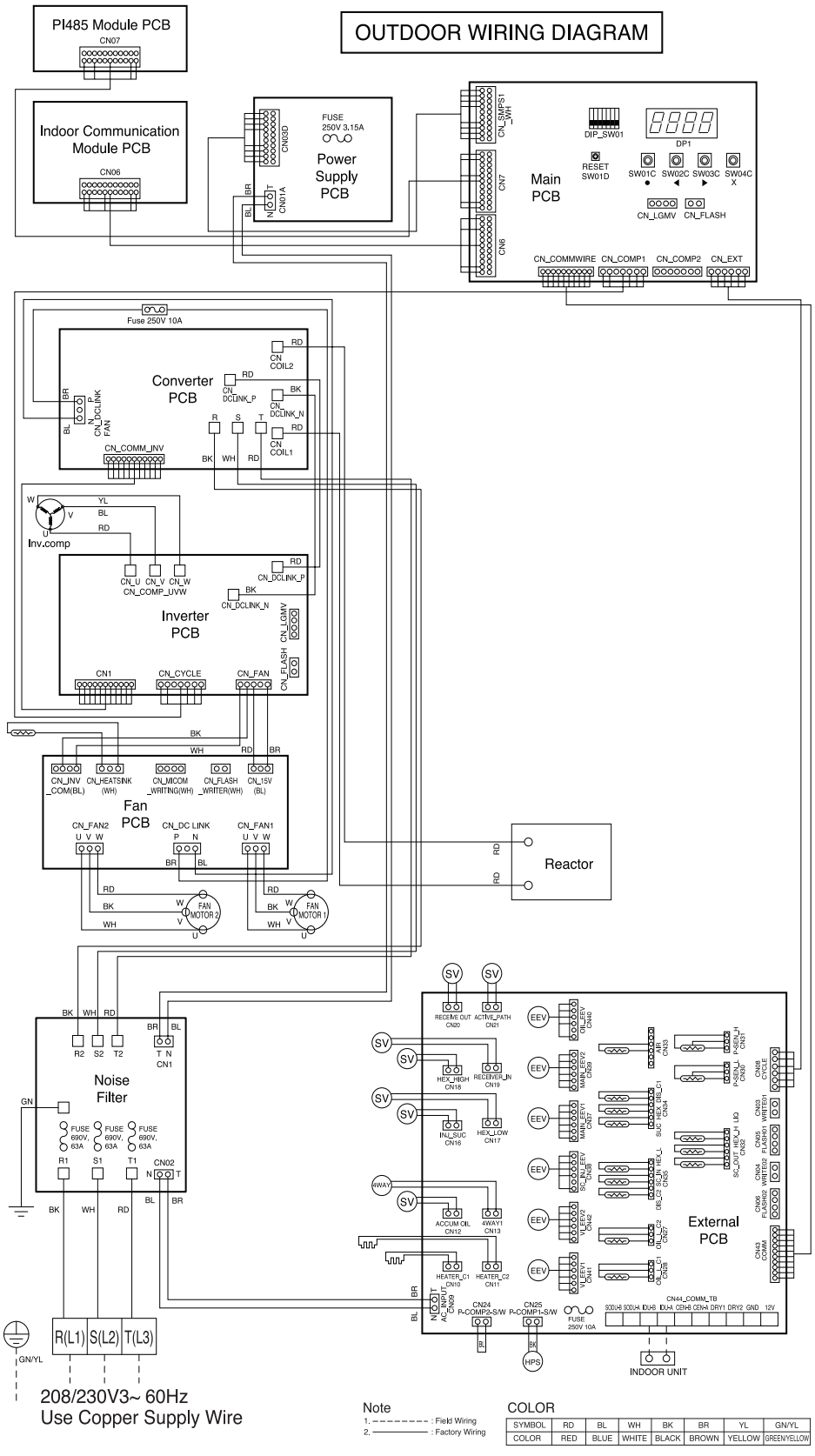
SYMBOL	DESCRIPTION
CN1	AC POWER 220V
CN_DCLINK	AC POWER 220V FOR EXTERNAL PCB



Product Data

WIRING DIAGRAMS

ARUB096BTE4, ARUB121BTE4 208-230V Heat Recovery



◆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

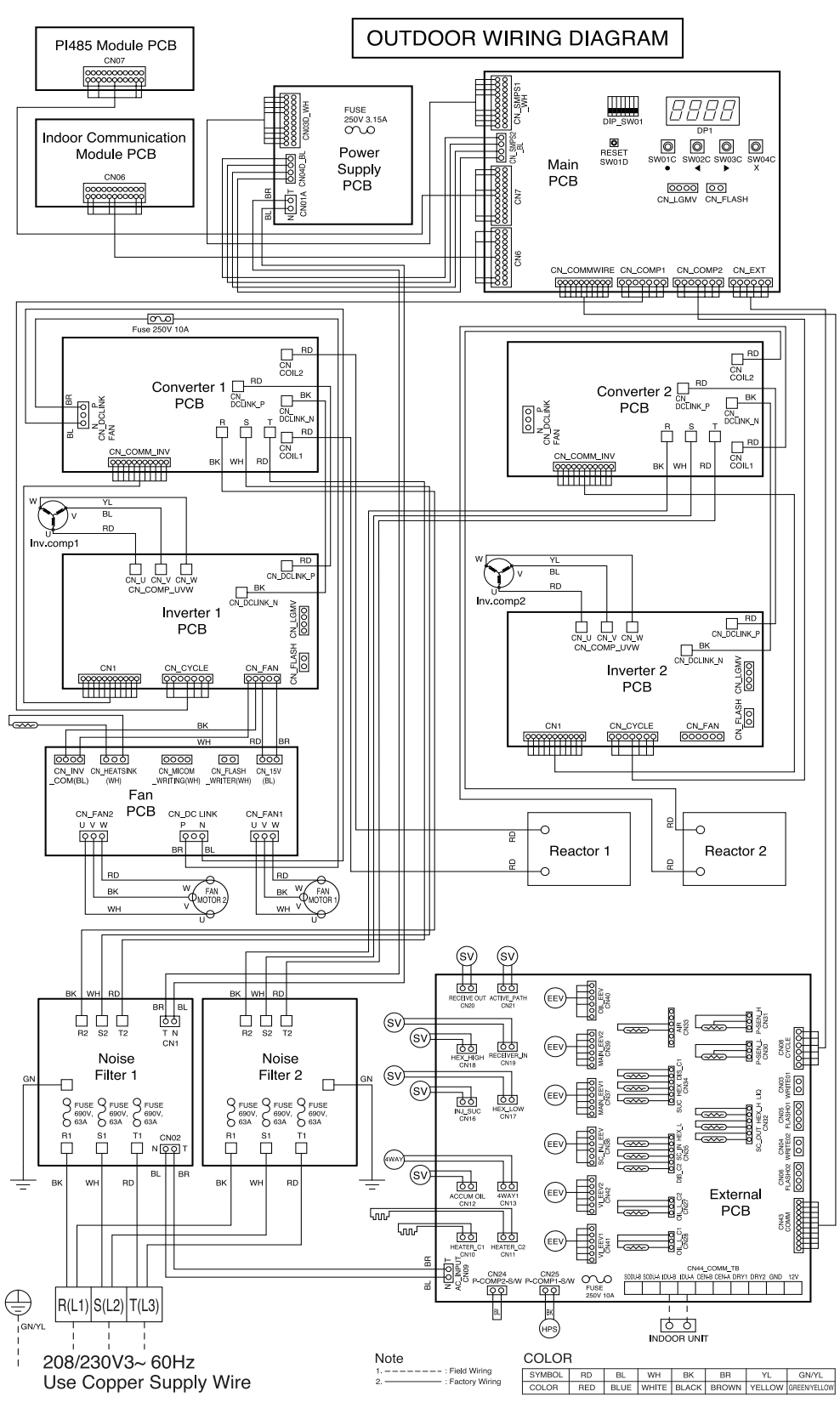
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

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

WIRING DIAGRAMS

ARUB144BTE4, ARUB168BTE4 208-230V Heat Recovery



◆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 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

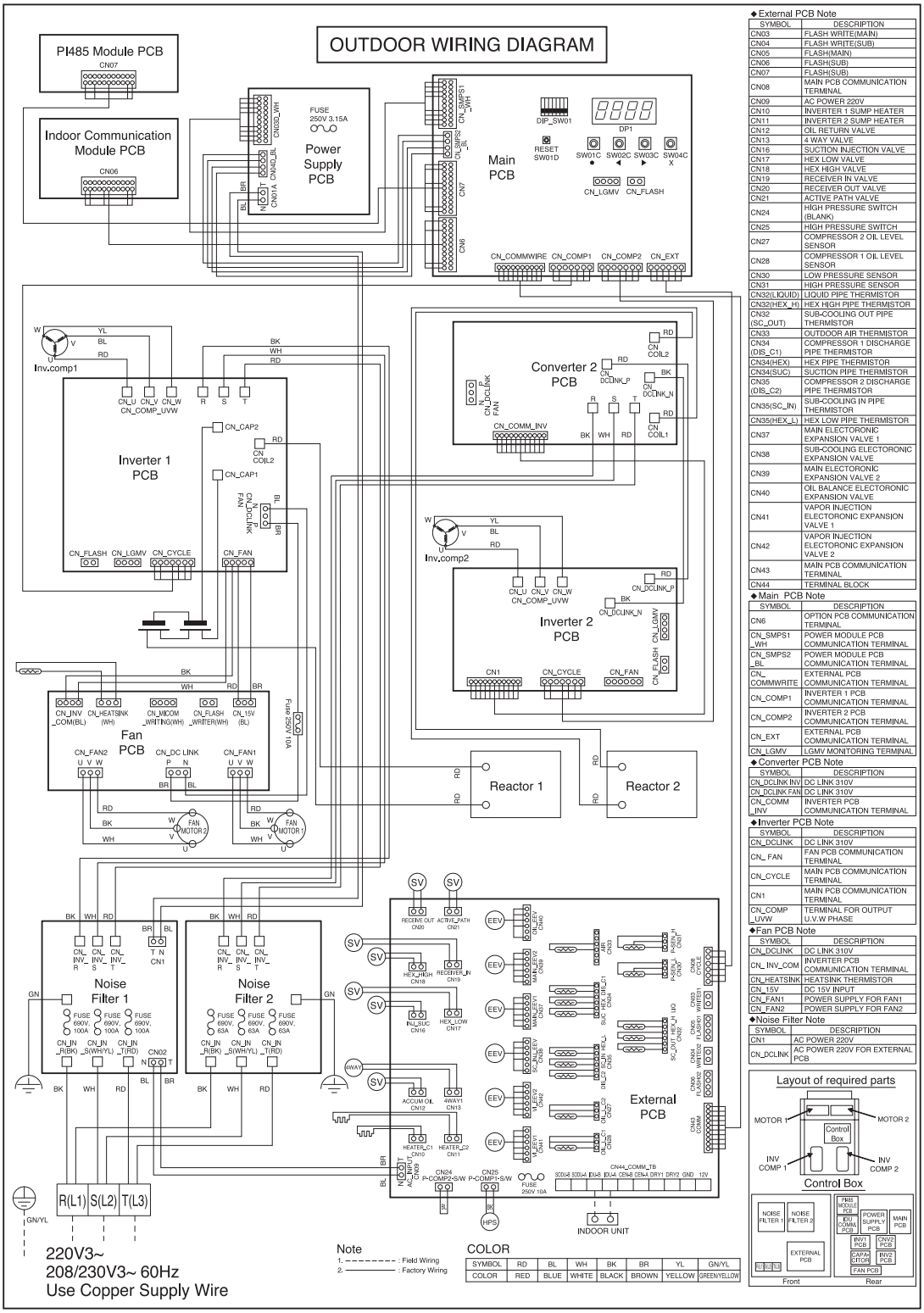
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

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

WIRING DIAGRAMS

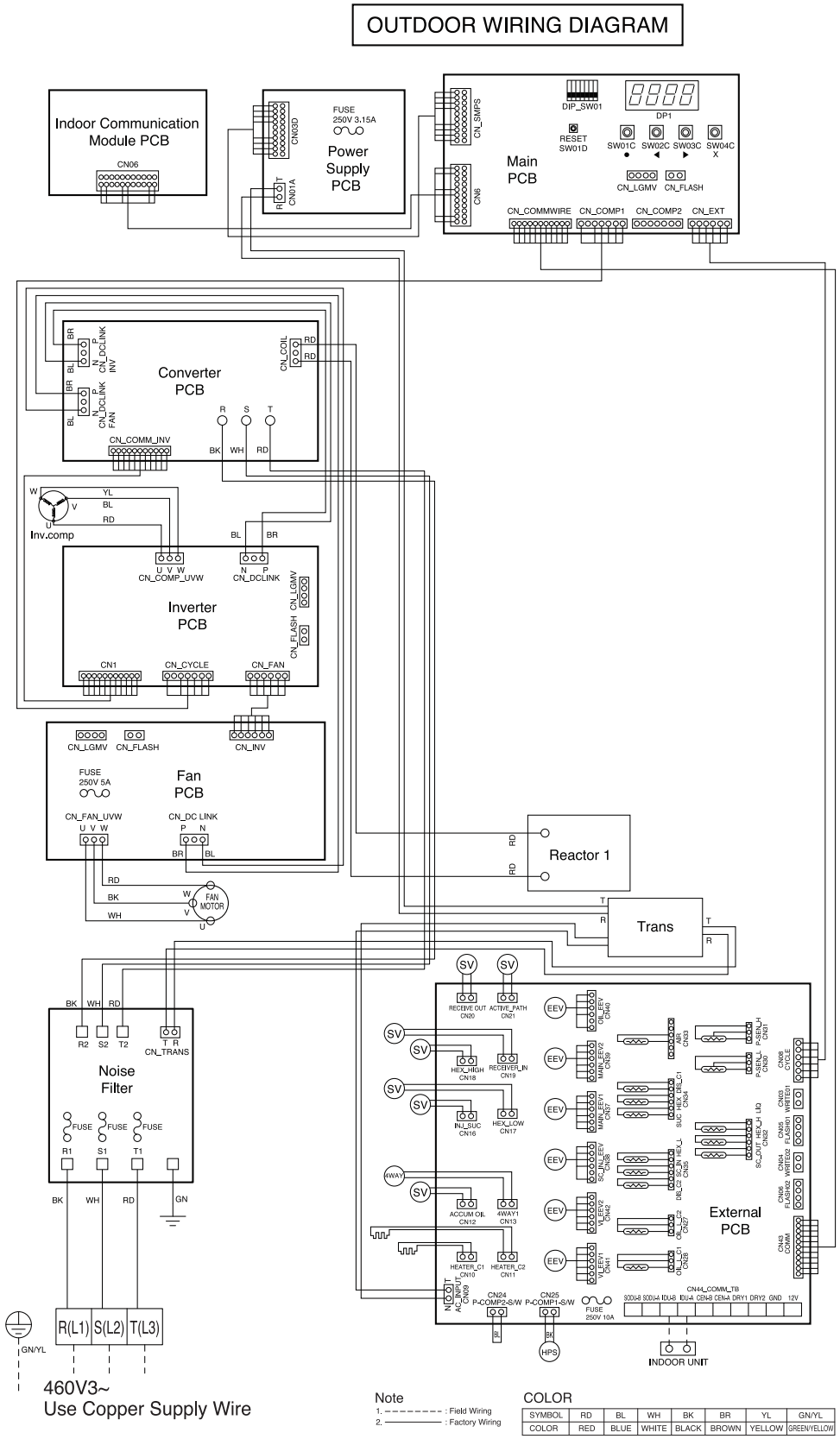
ARUB145BTE4, ARUB169BTE4 208-230V Heat Recovery



Note:

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/ARUB-144DTE4, ARUB168BTE4/ARUB168DTE4 single frame models.

OUTDOOR WIRING DIAGRAM



◆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

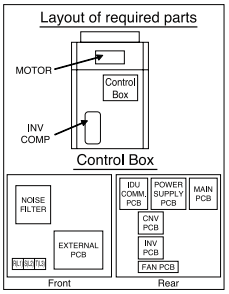
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 310V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U.V.W PHASE

◆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



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

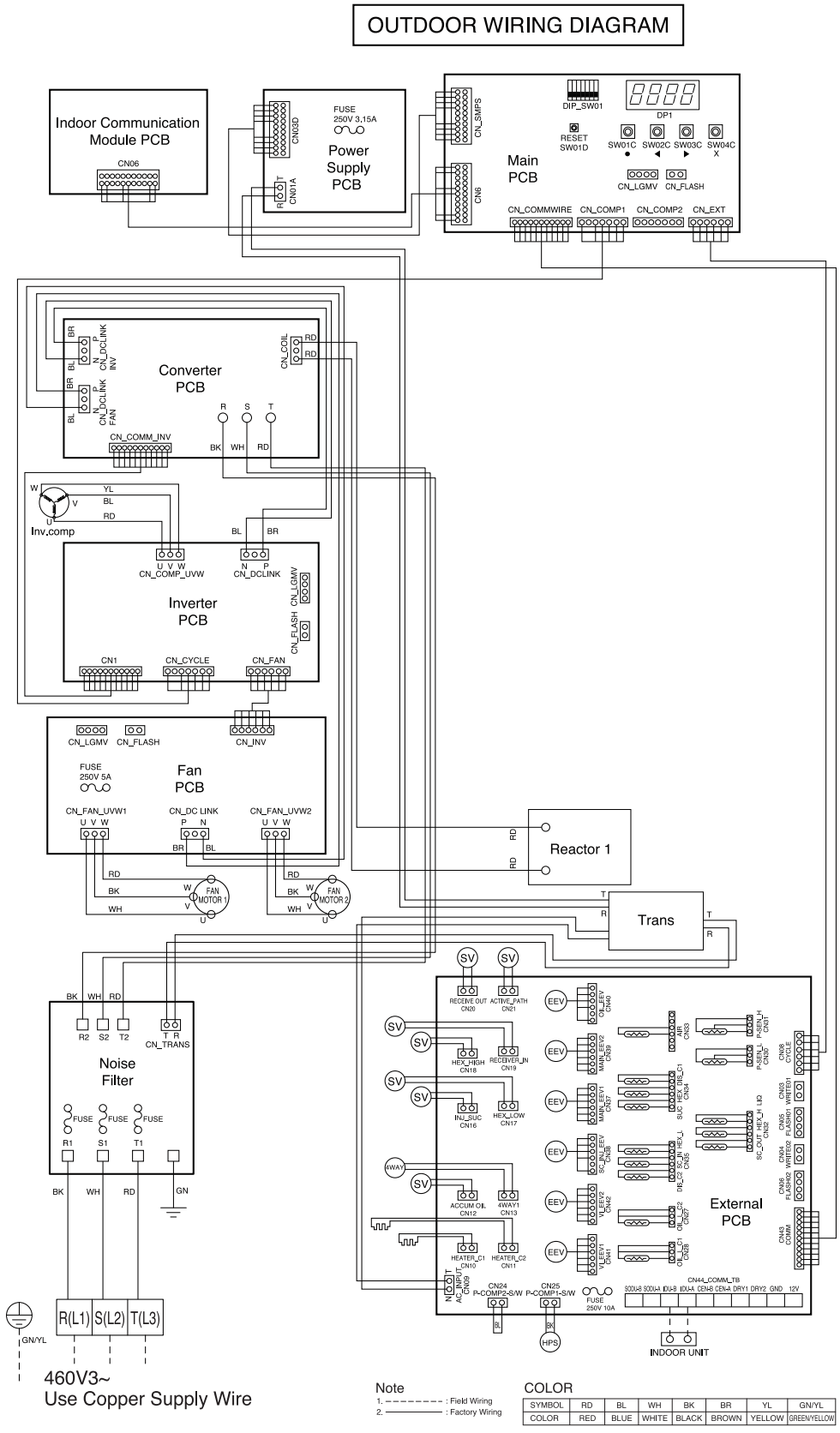
COLOR

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

Product Data

WIRING DIAGRAMS

ARUB096DTE4, ARUB121DTE4 460V Heat Recovery



◆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

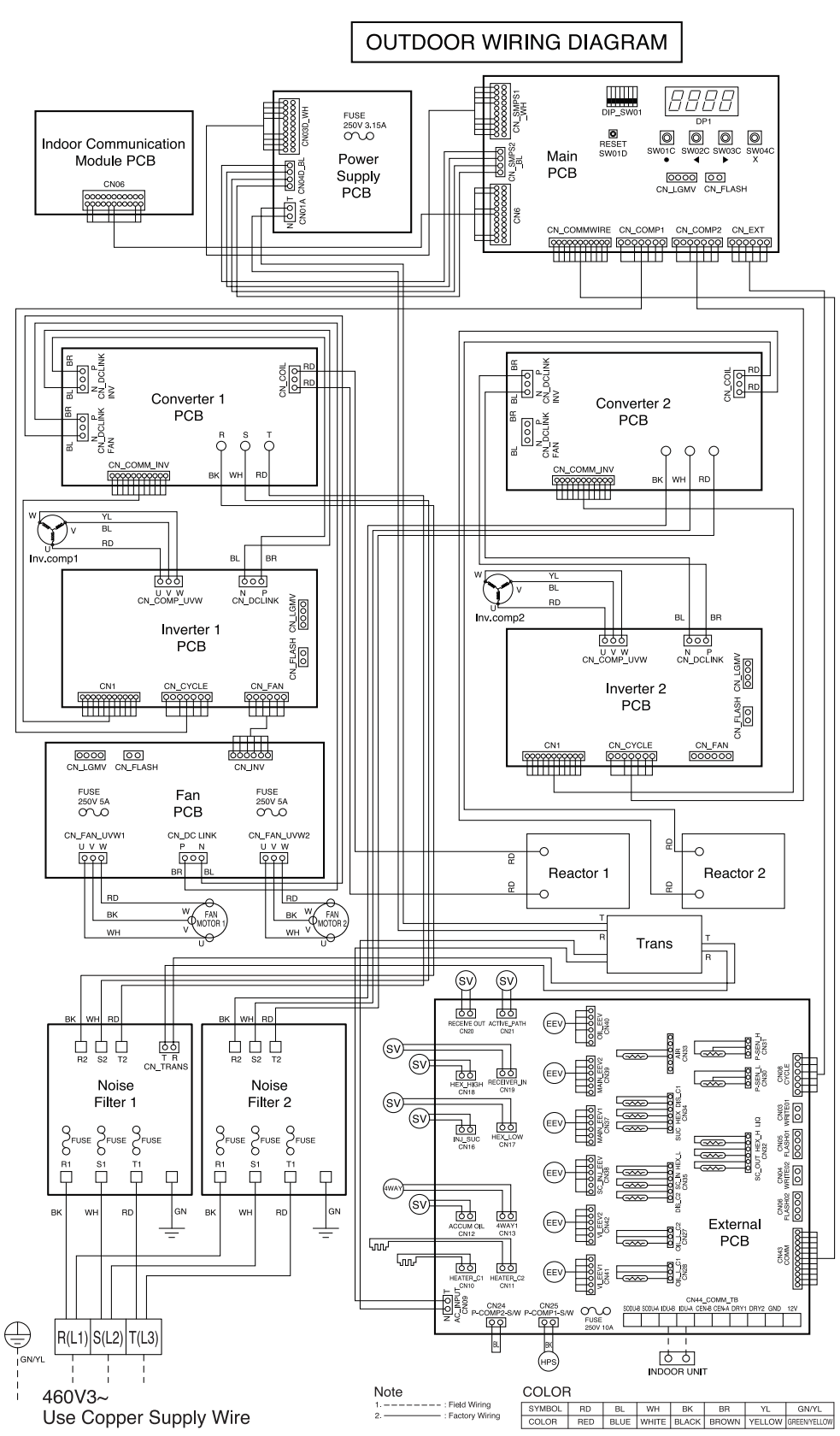
SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 650V
CN_INV_COM	INVERTER PCB COMMUNICATION TERMINAL
CN_HEATSINK	HEATSINK THERMISTOR
CN_15V	DC 15V INPUT
CN_FAN1	POWER SUPPLY FOR FAN1
CN_FAN2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

SYMBOL	DESCRIPTION
CN_TRANS	AC POWER 460V

WIRING DIAGRAMS

ARUB144DTE4, ARUB168DTE4 460V Heat Recovery



◆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

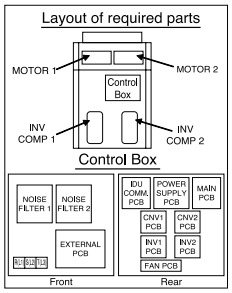
◆Fan PCB Note

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

Layout of required parts



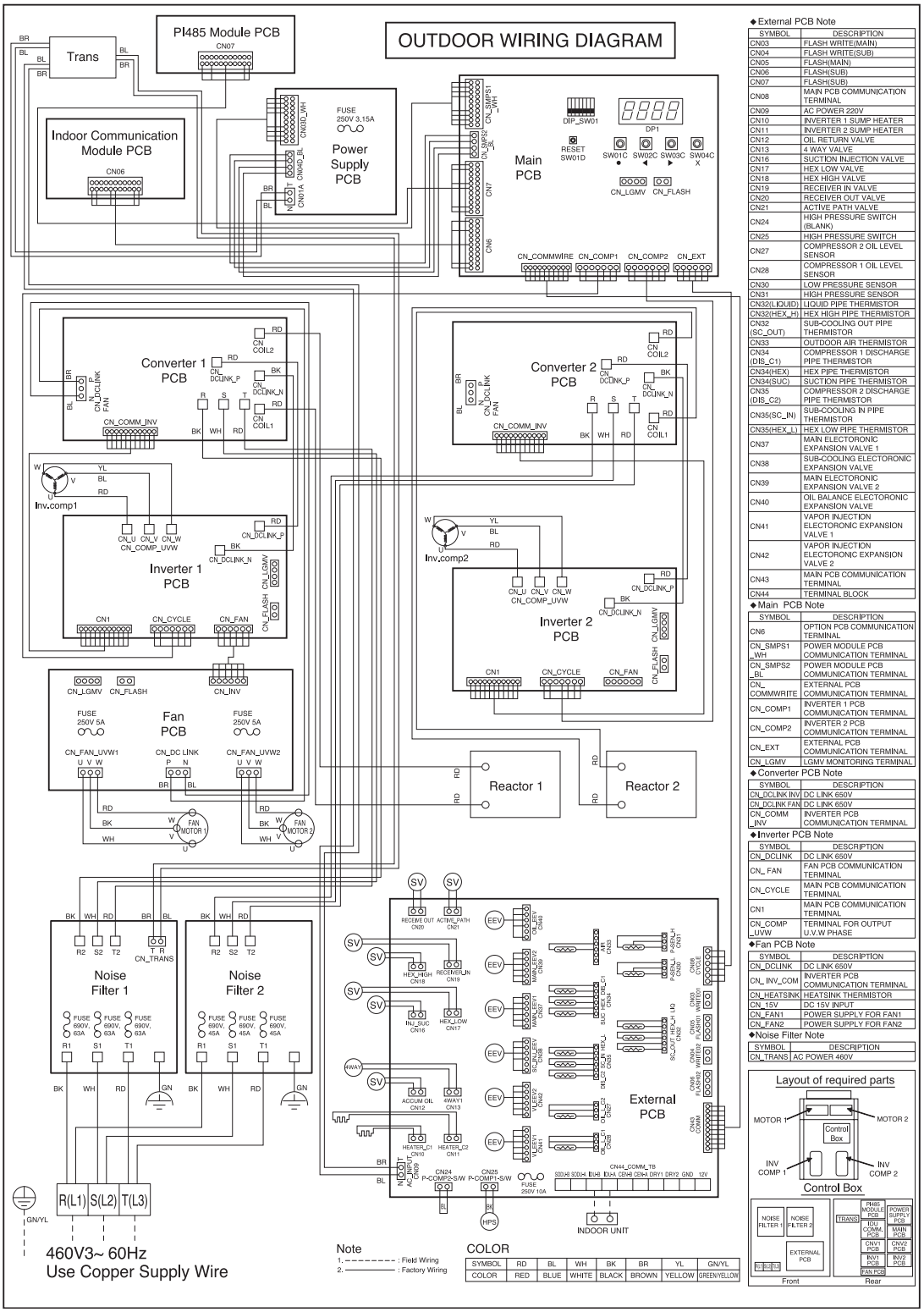
Note
1. ---------- : Field Wiring
2. ——— : Factory Wiring

COLOR

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

WIRING DIAGRAMS

ARUB145DTE4, ARUB169DTE4 460V Heat Recovery



◆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)	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

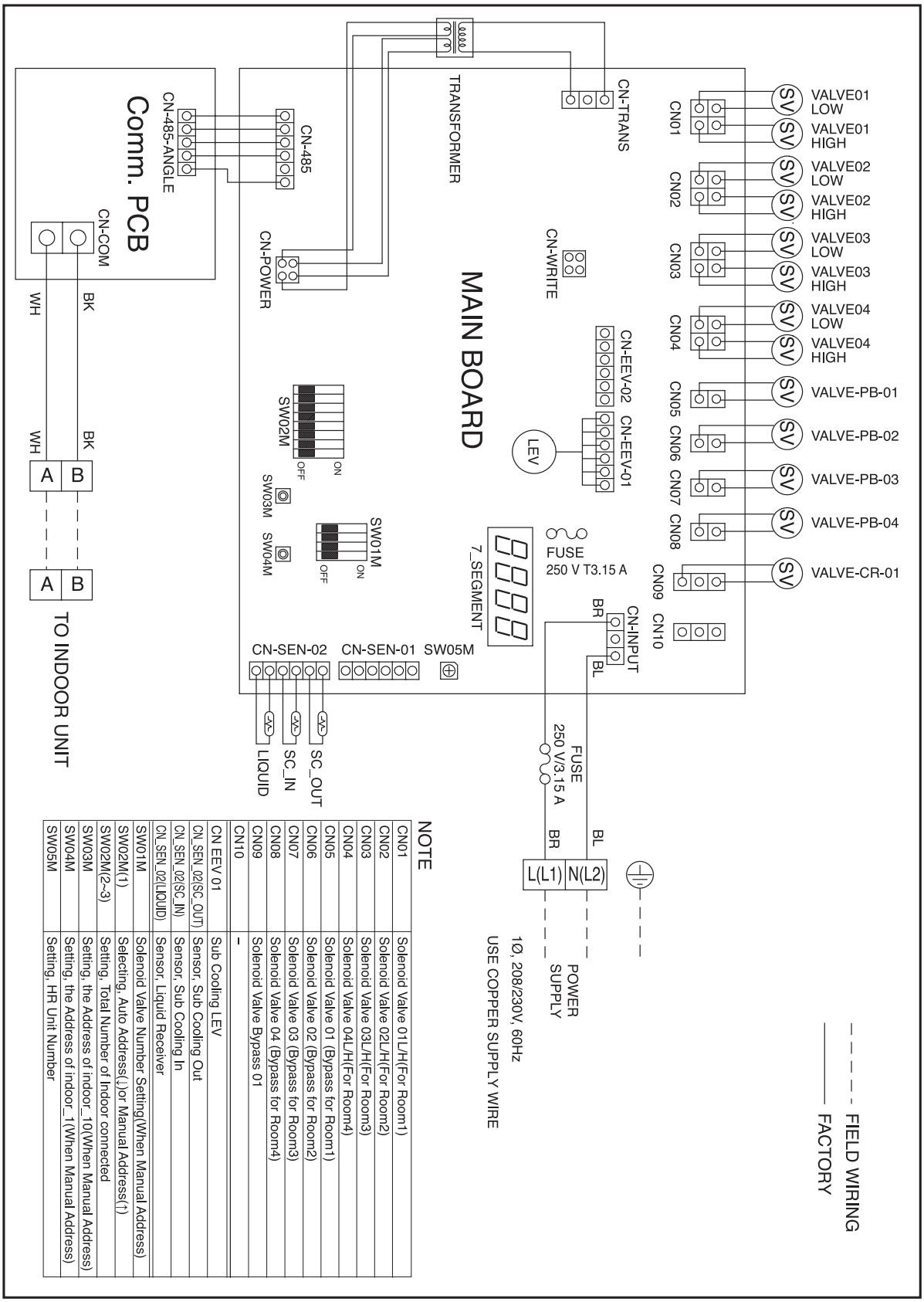
COLOR	SYMBOL	RD	BL	WH	BK	BR	YL	GN/YL
	COLOR	RED	BLUE	WHITE	BLACK	BROWN	YELLOW	GREEN/YELLOW

Note:

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/ARUB-144DTE4, ARUB168BTE4/ARUB168DTE4 single frame models.

WIRING DIAGRAMS

PRHR022A, PRHR032A, PRHR042A Heat Recovery Units



NOTE

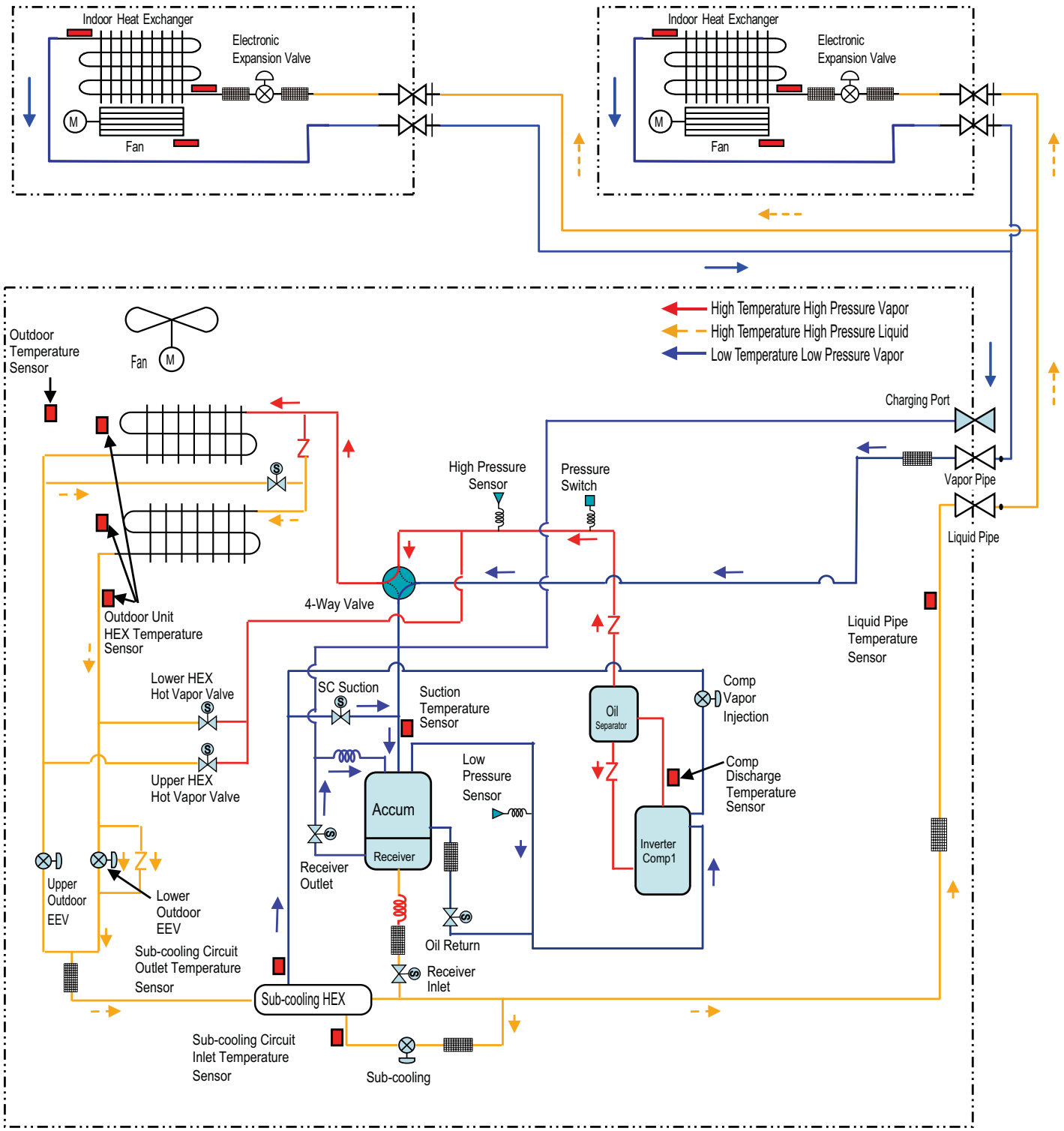
CN01	Solenoid Valve 01L/H(For Room1)
CN02	Solenoid Valve 02L/H(For Room2)
CN03	Solenoid Valve 03L/H(For Room3)
CN04	Solenoid Valve 04L/H(For Room4)
CN05	Solenoid Valve 01 (Bypass for Room1)
CN06	Solenoid Valve 02 (Bypass for Room2)
CN07	Solenoid Valve 03 (Bypass for Room3)
CN08	Solenoid Valve 04 (Bypass 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

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

Cooling Mode



*8 ton and 10 ton units have 2 fans.

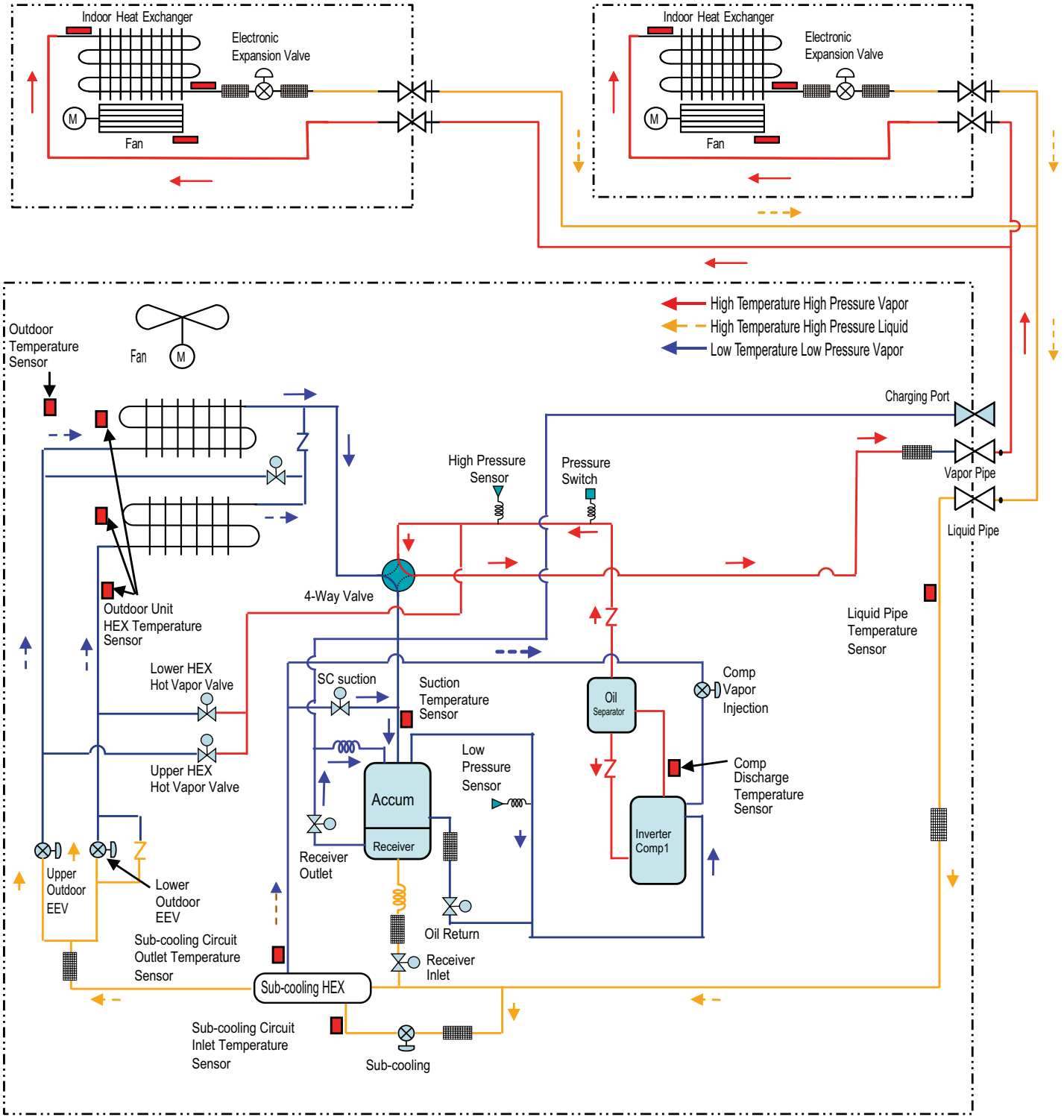
Remarks				
Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
Pressure Switch	SVC Valve	EEV	Strainer

LG

REFRIGERANT FLOW DIAGRAMS

Heating Mode

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



*8 ton and 10 ton units have 2 fans.

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

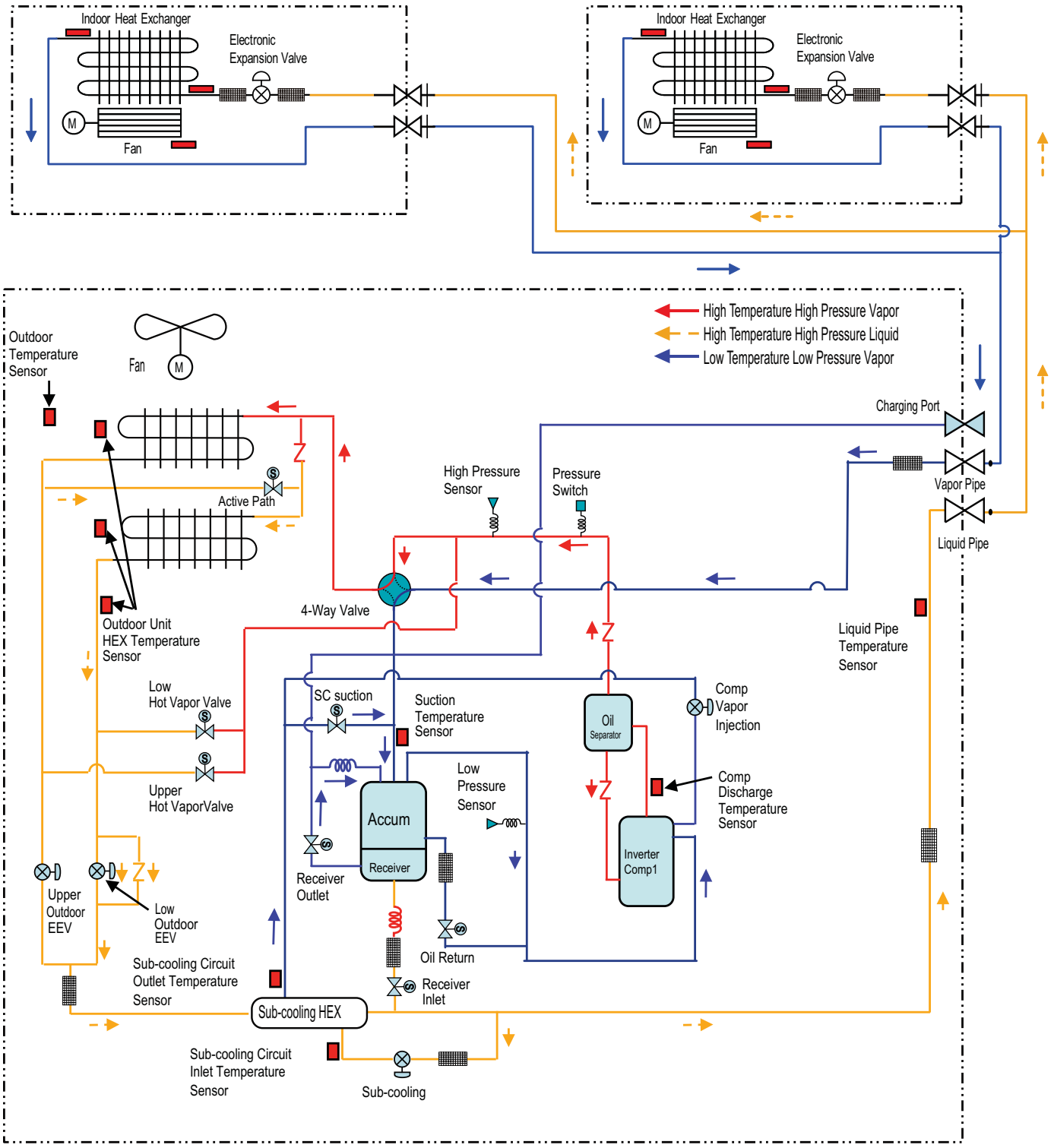
Product Data

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

Oil Return and Defrost Operation



*8 ton and 10 ton units have 2 fans.

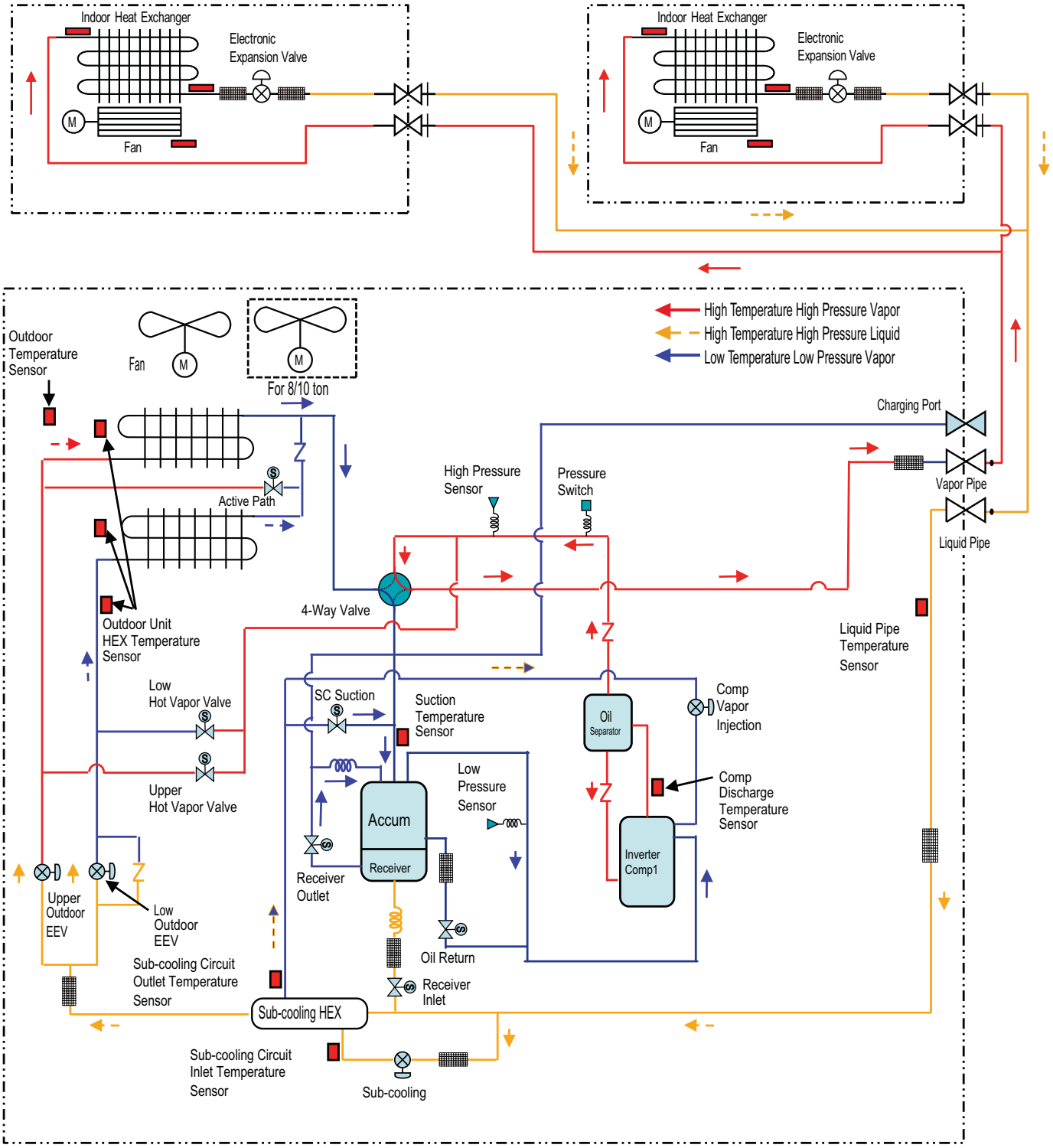
Remarks				
Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
Pressure Switch	SVC Valve	EEV	Strainer

LG

REFRIGERANT FLOW DIAGRAMS

Upper HEX Defrost Operation

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



*8 ton and 10 ton units have 2 fans.

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

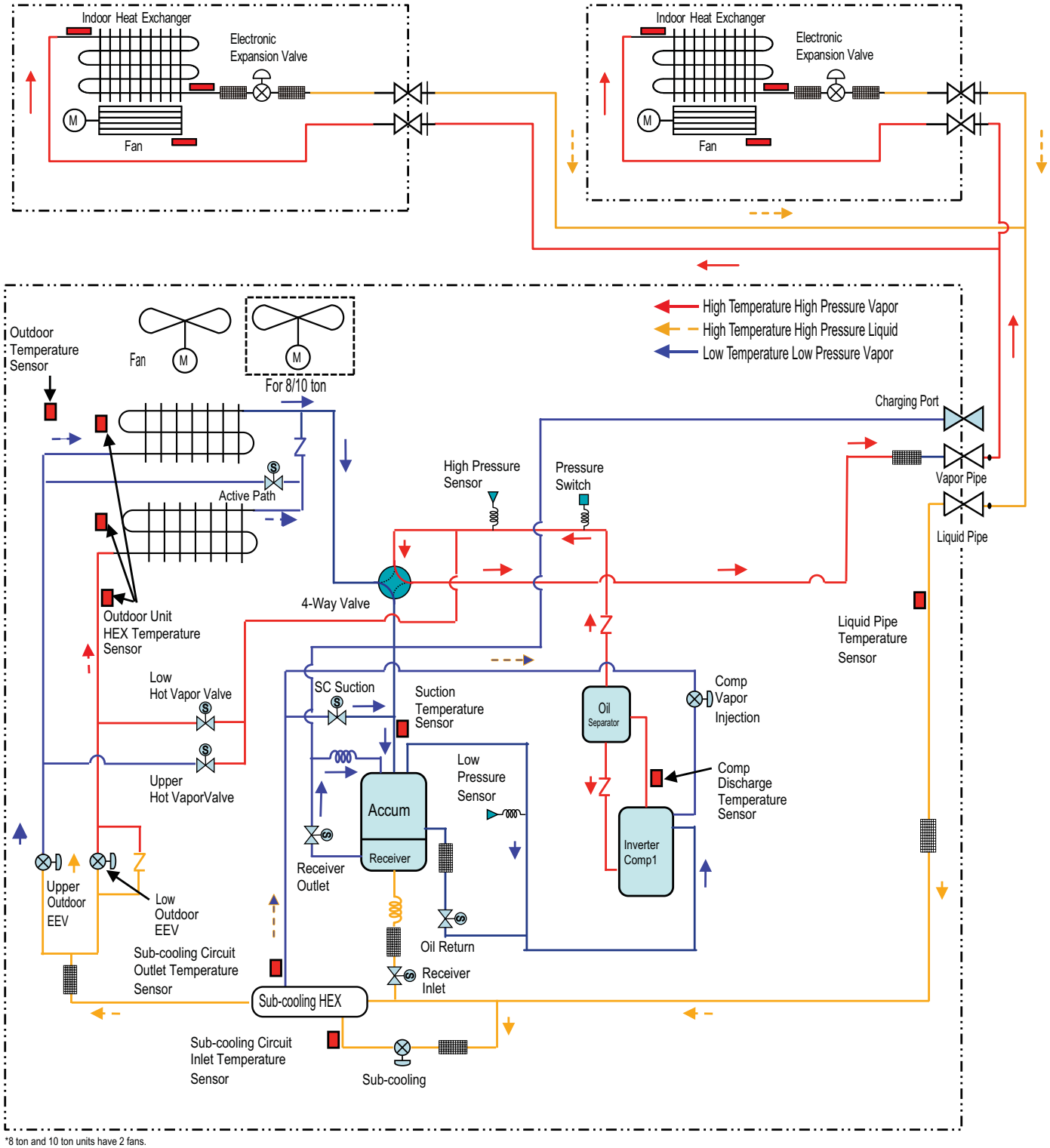
Product Data

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

Low HEX Defrost Operation



*8 ton and 10 ton units have 2 fans.

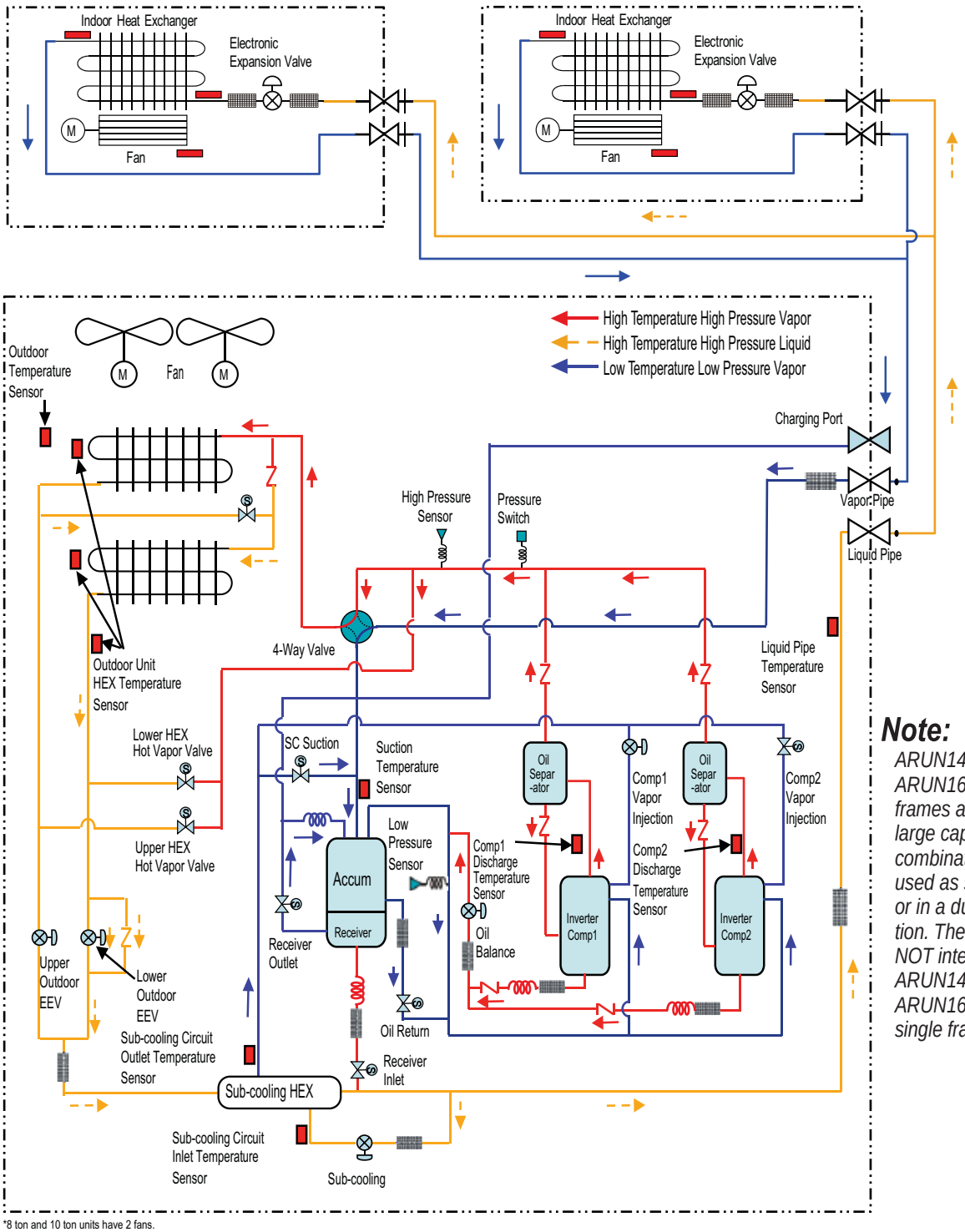
Remarks							
	Pressure Sensor	Temperature Sensor	Check valve	Solenoid valve
	Pressure Switch	SVC Valve	EEV	Strainer

LG

REFRIGERANT FLOW DIAGRAMS

Cooling Mode

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



*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:

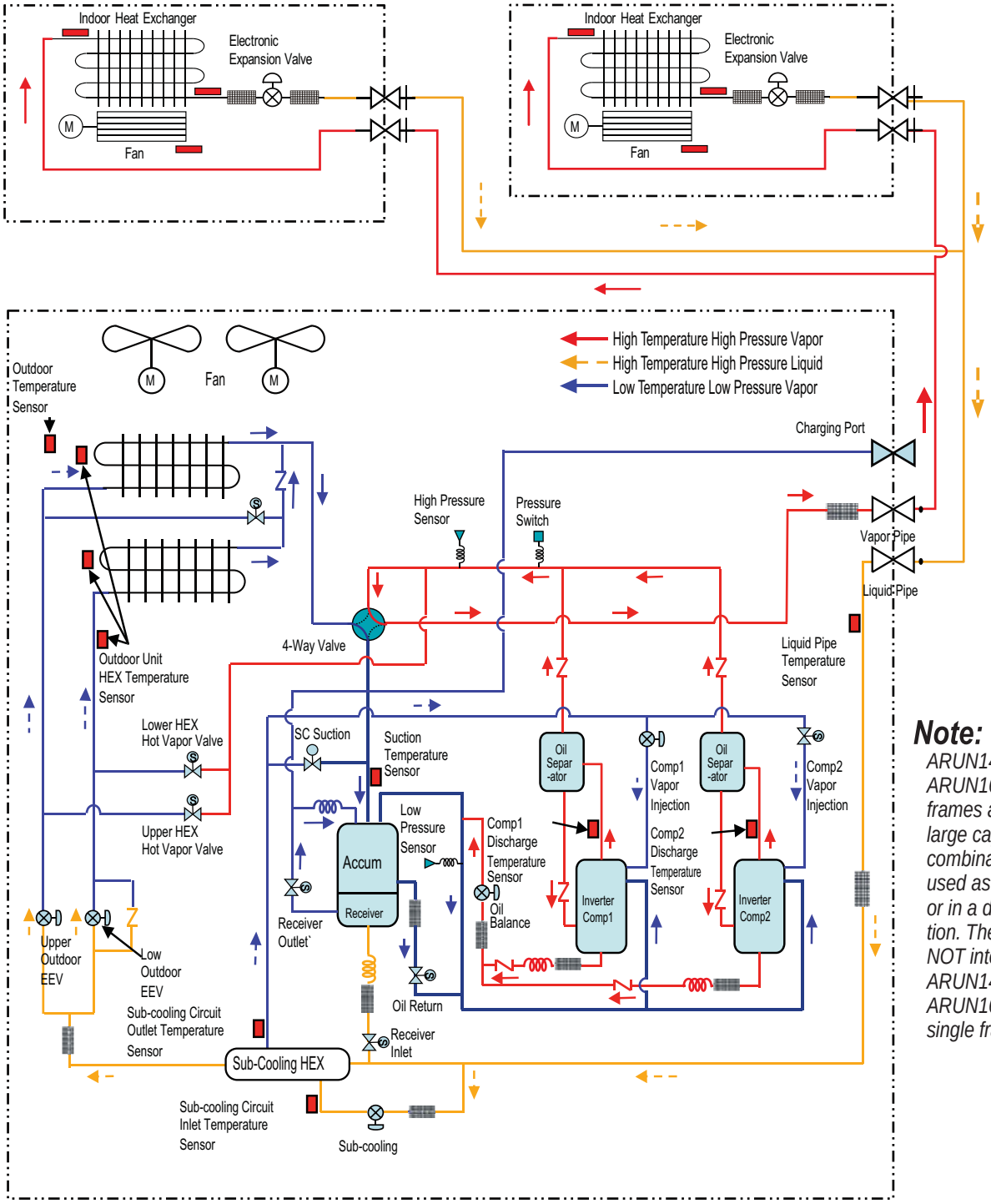
ARUN145BTE4/145DTE4, ARUN169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/144DTE4, ARUN168BTE4/168DTE4 single frame models.

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

Heating Mode



*8 ton and 10 ton units have 2 fans.

Note:

ARUN145BTE4/145DTE4, 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, ARUN168BTE4/168DTE4 single frame models.

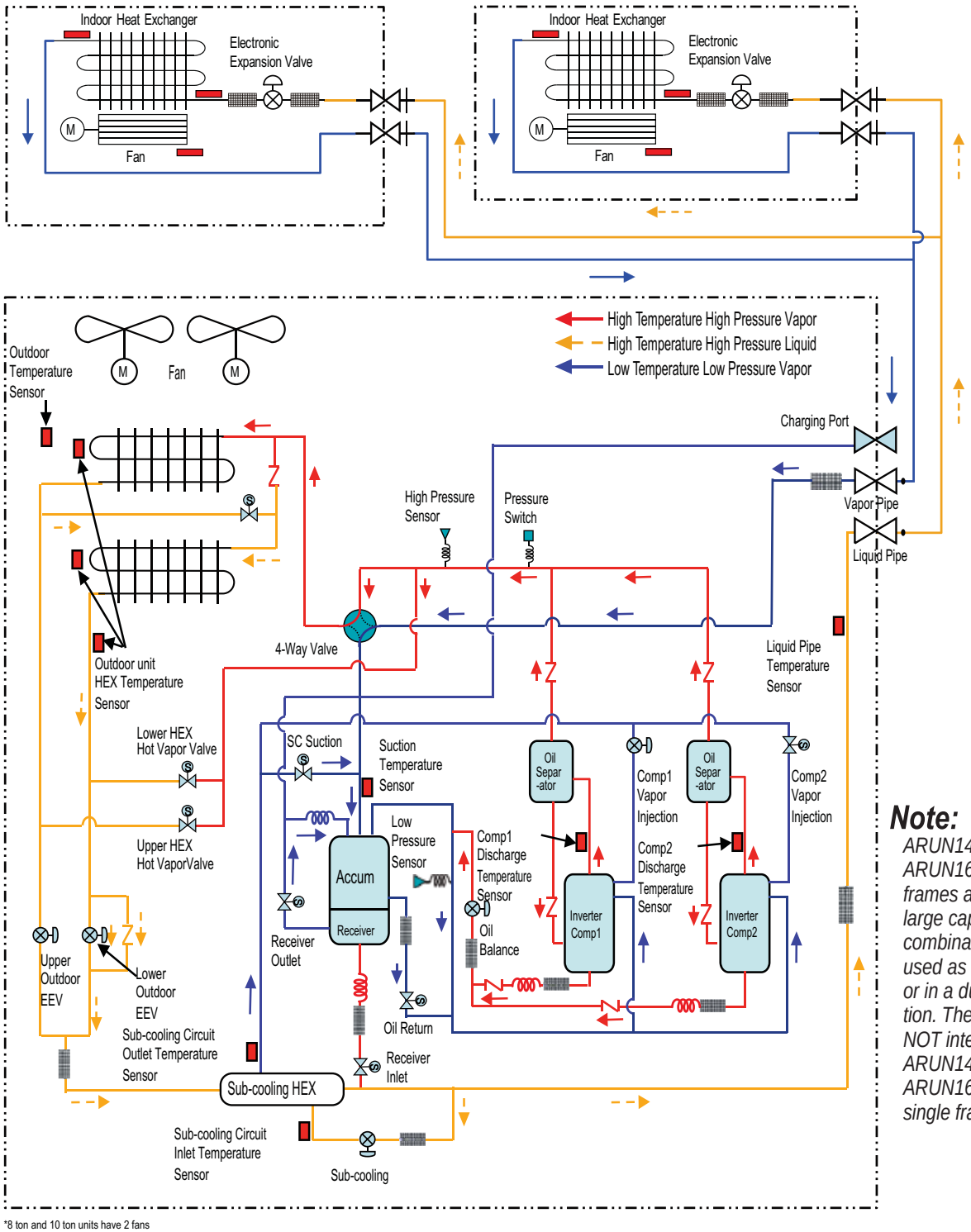
Remarks				
	Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
	Pressure Switch	SVC Valve	EEV	Strainer

LG

REFRIGERANT FLOW DIAGRAMS

Oil Return and Defrost Operation

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



*8 ton and 10 ton units have 2 fans

Note:

ARUN145BTE4/145DTE4, 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, ARUN168BTE4/168DTE4 single frame models.

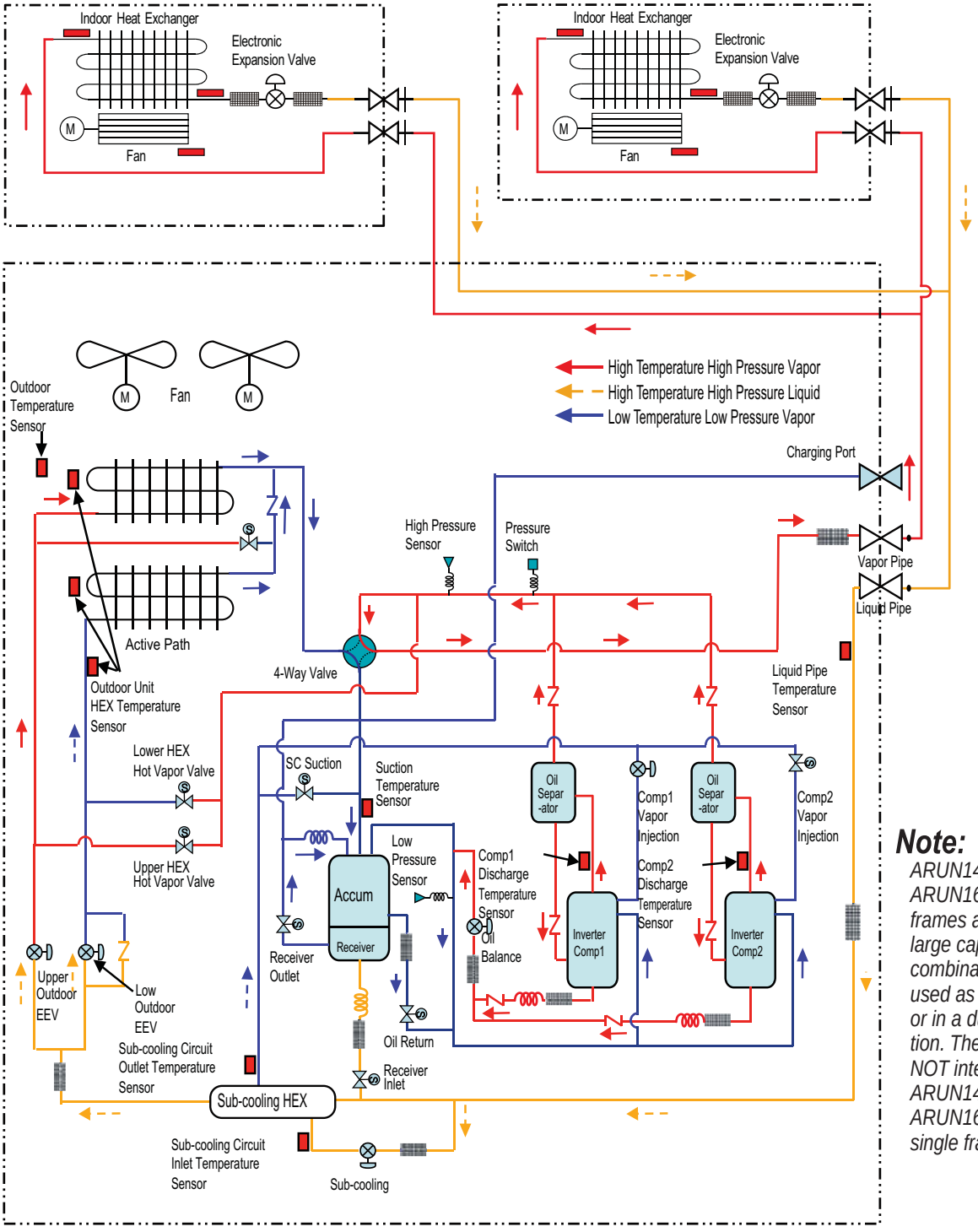
Remarks				
	Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
	Pressure Switch	SVC Valve	EEV	Strainer

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

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.

Note:

ARUN145BTE4/145DTE4, 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, ARUN168BTE4/168DTE4 single frame models.

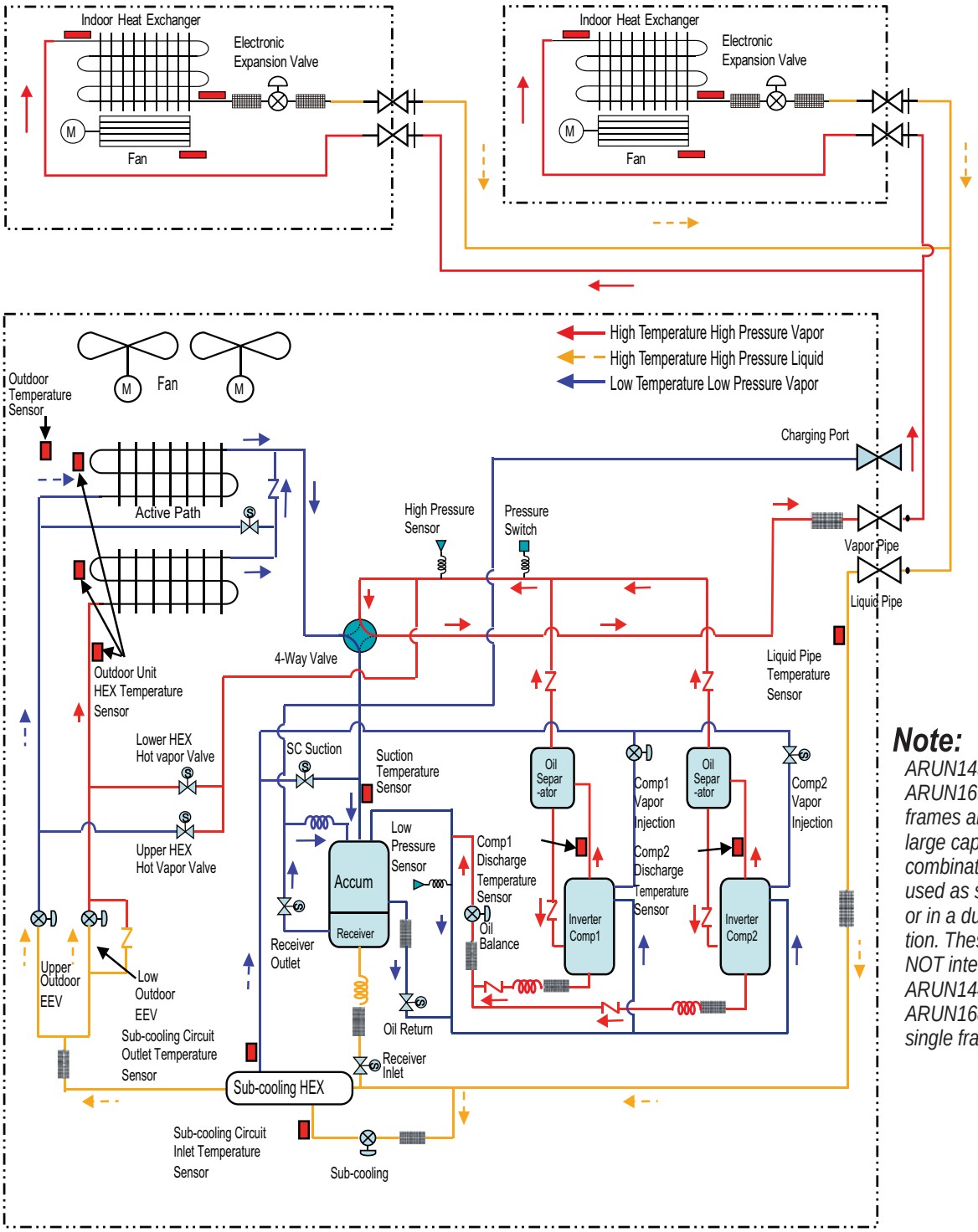
Remarks							
	Pressure Sensor		Temperature Sensor		Check Valve		Solenoid Valve
	Pressure Switch		SVC Valve		EEV		Strainer

LG

REFRIGERANT FLOW DIAGRAMS

Low HEX Defrost Operation

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



*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:

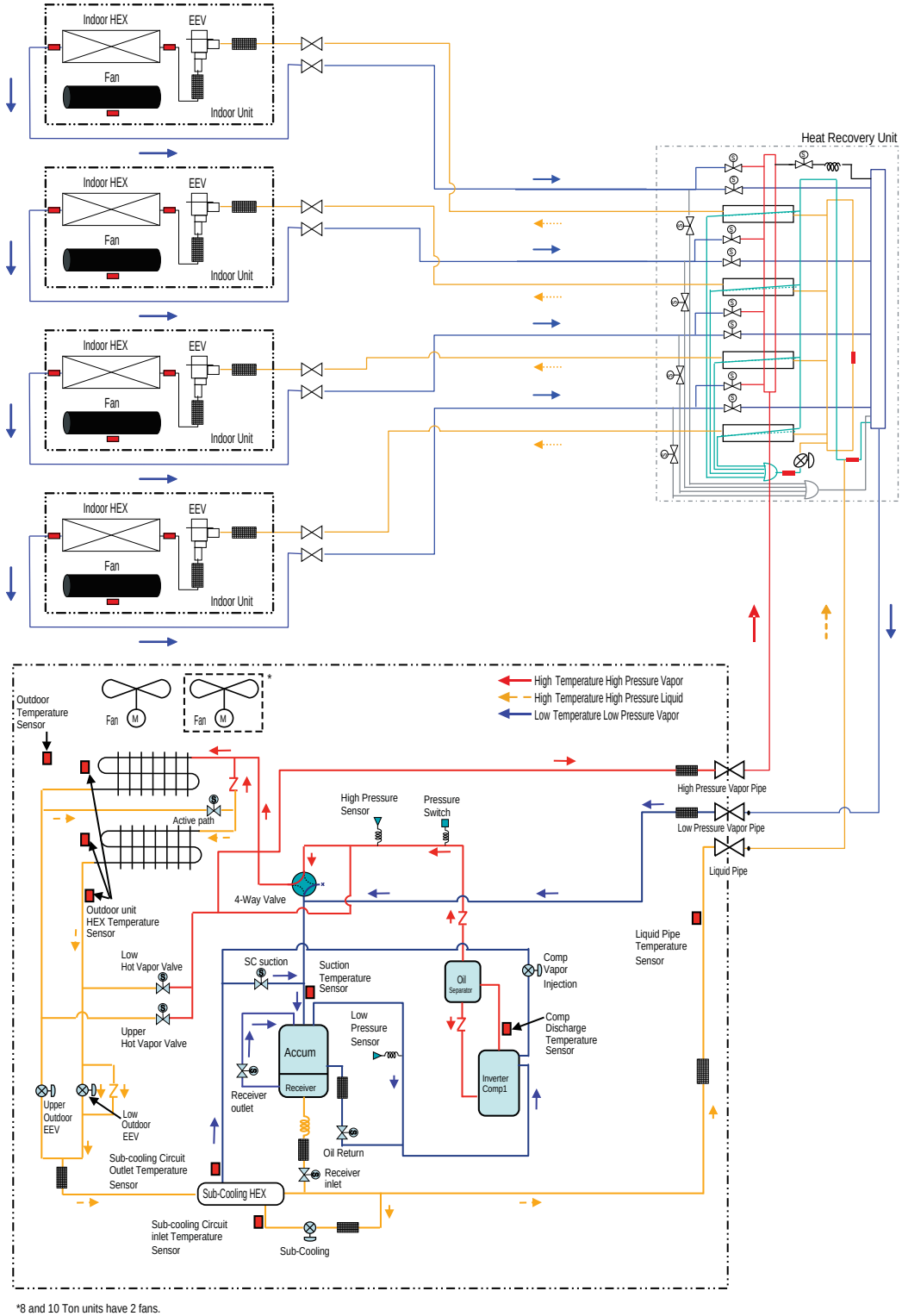
ARUN145BTE4/145DTE4, ARUN169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/144DTE4, ARUN168BTE4/168DTE4 single frame models.

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

Cooling Mode



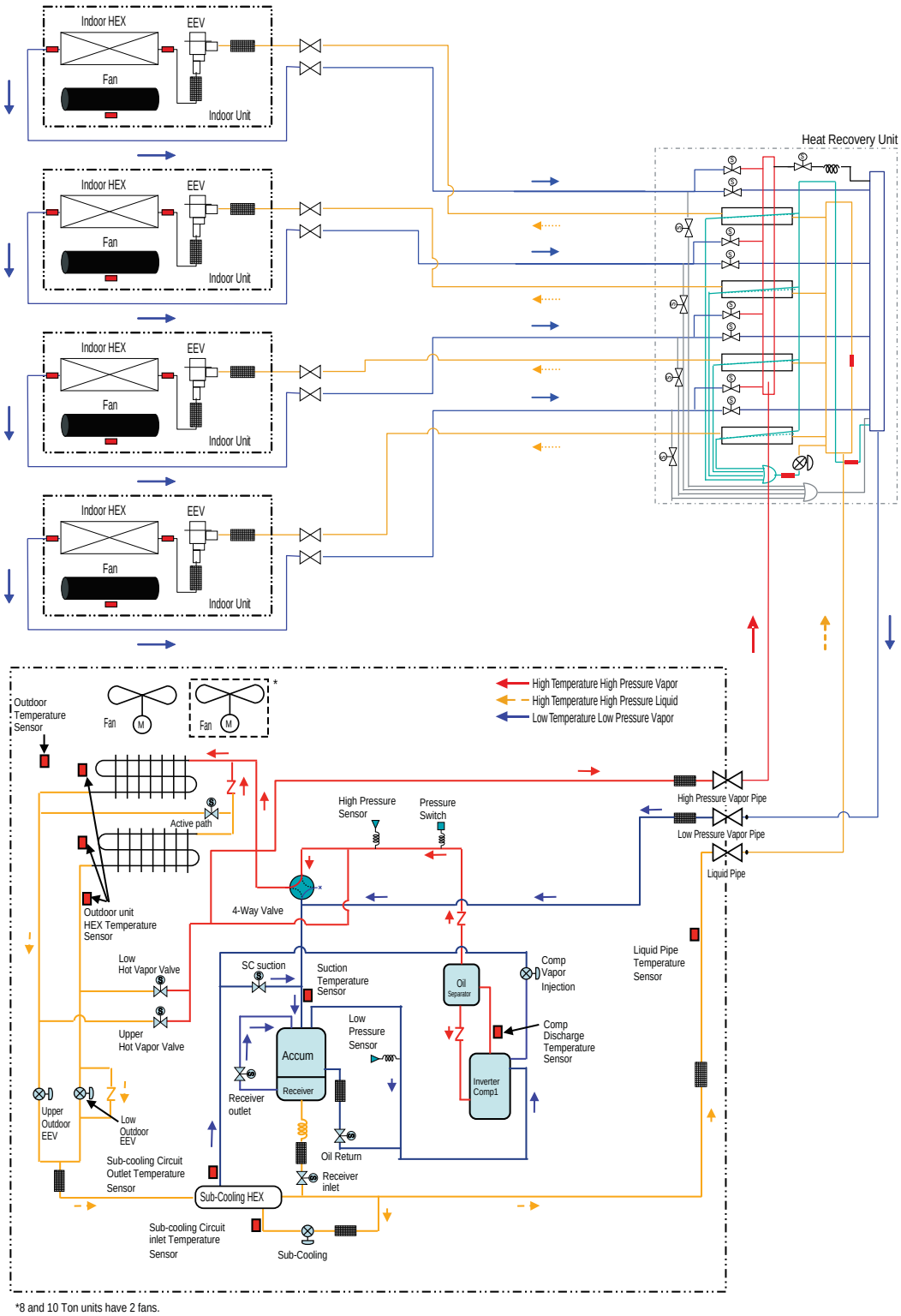
*8 and 10 Ton units have 2 fans.

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

LG

REFRIGERANT FLOW DIAGRAMS

Cooling at Low Ambient Temperatures ARUB072BTE4 / 072DTE4, ARUB096BTE4 / 096DTE4, ARUB121BTE4 / 121DTE4 Heat Recovery



*8 and 10 Ton units have 2 fans.

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

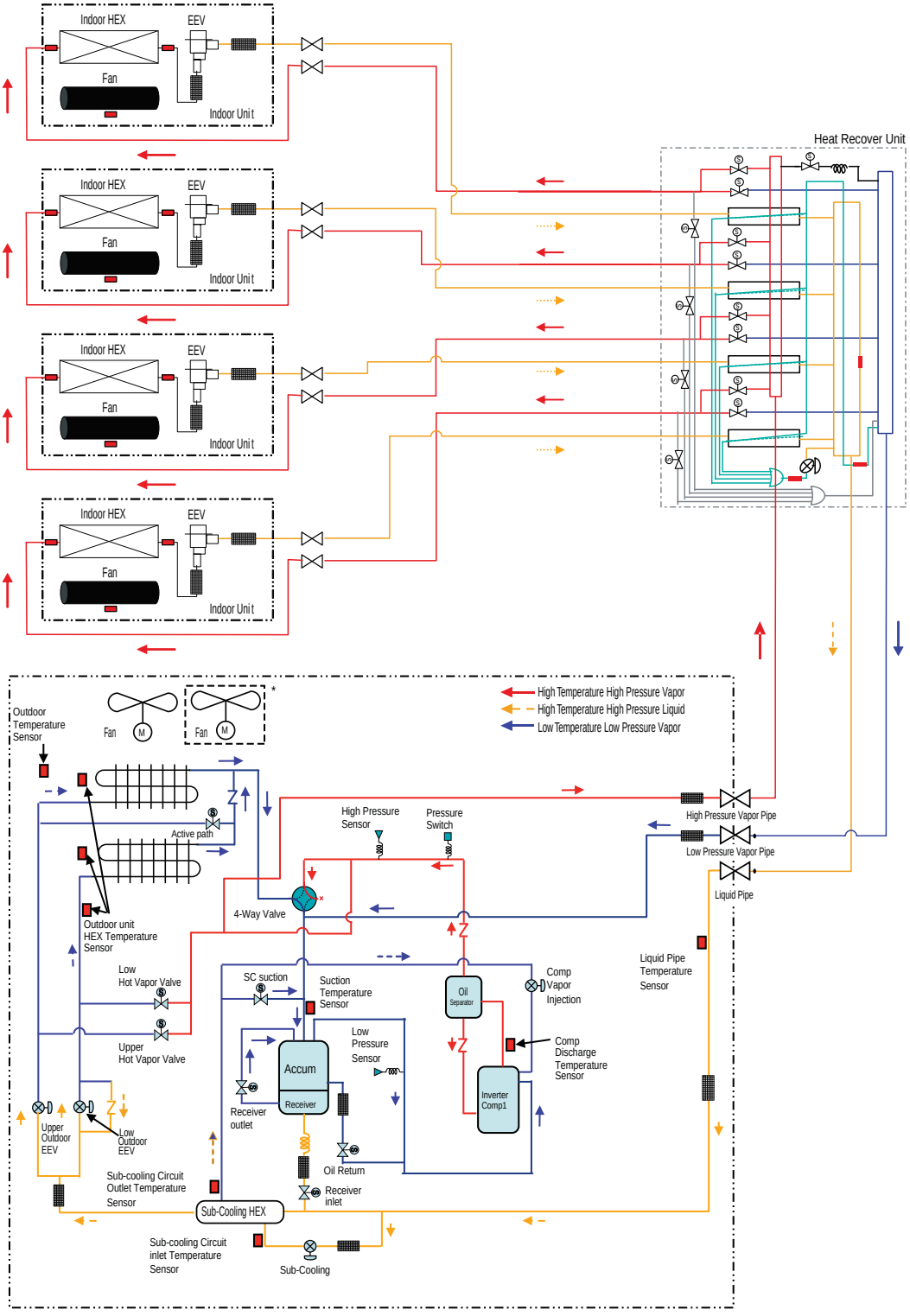
Product Data

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

Heating Mode



*8 and 10 Ton units have 2 fans.

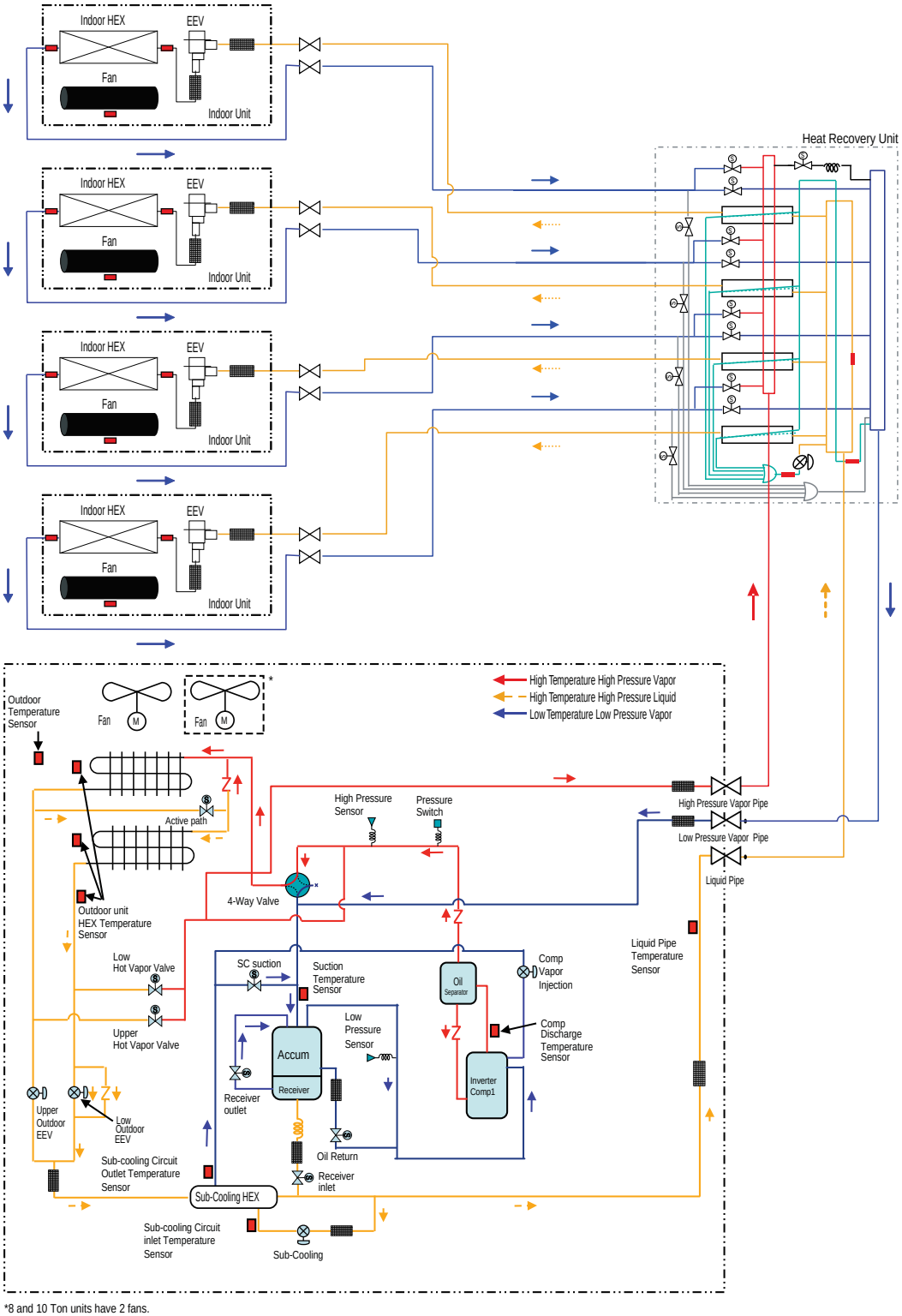
Remarks				
	Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
	Pressure Switch	SVC Valve	EEV	Strainer

LG

REFRIGERANT FLOW DIAGRAMS

Oil Return and Defrost Operation

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



*8 and 10 Ton units have 2 fans.

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

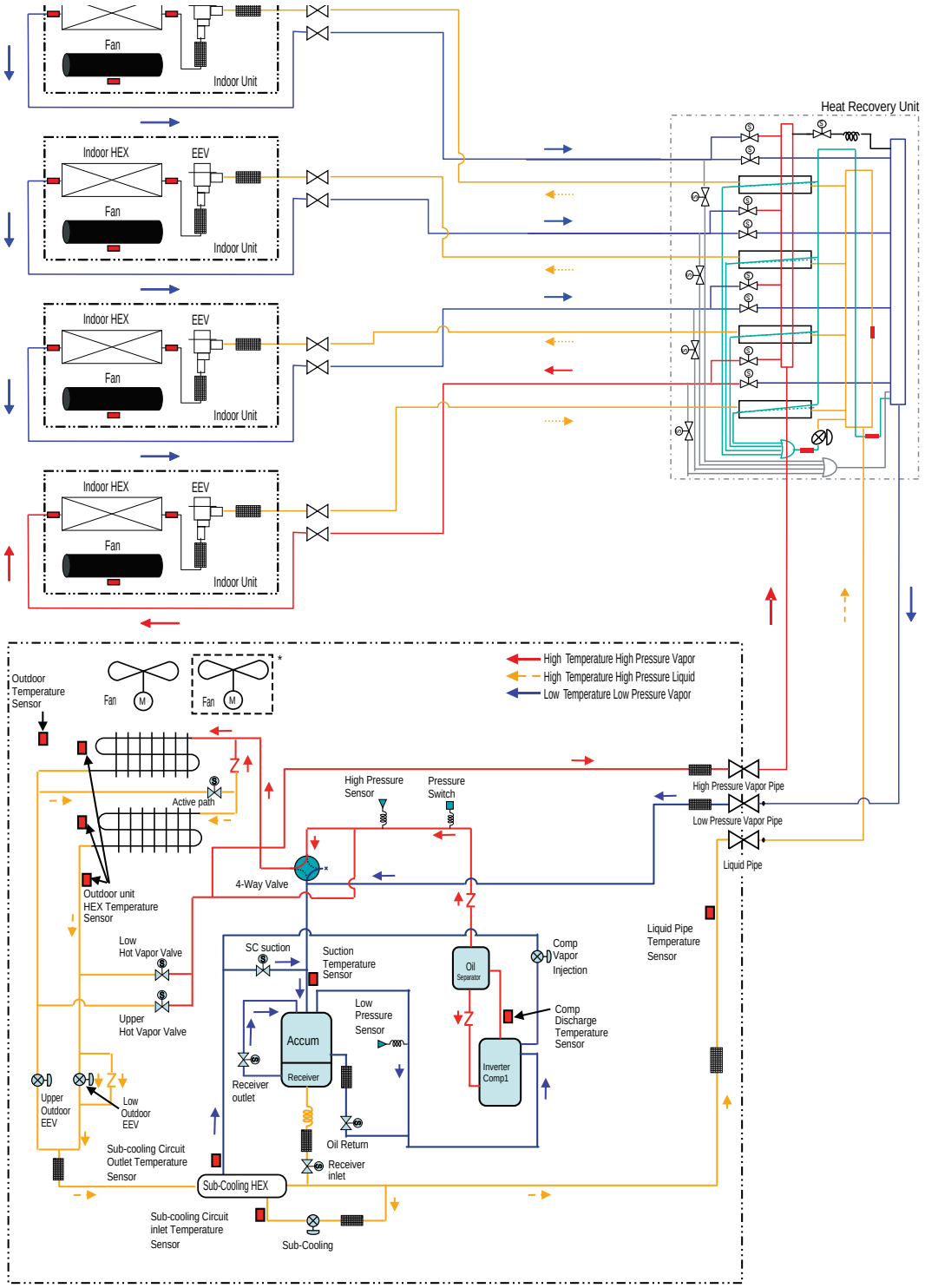
Product Data

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

Cooling-based Simultaneous Operation



Remarks

*8 and 10 Ton units have 2 fans.

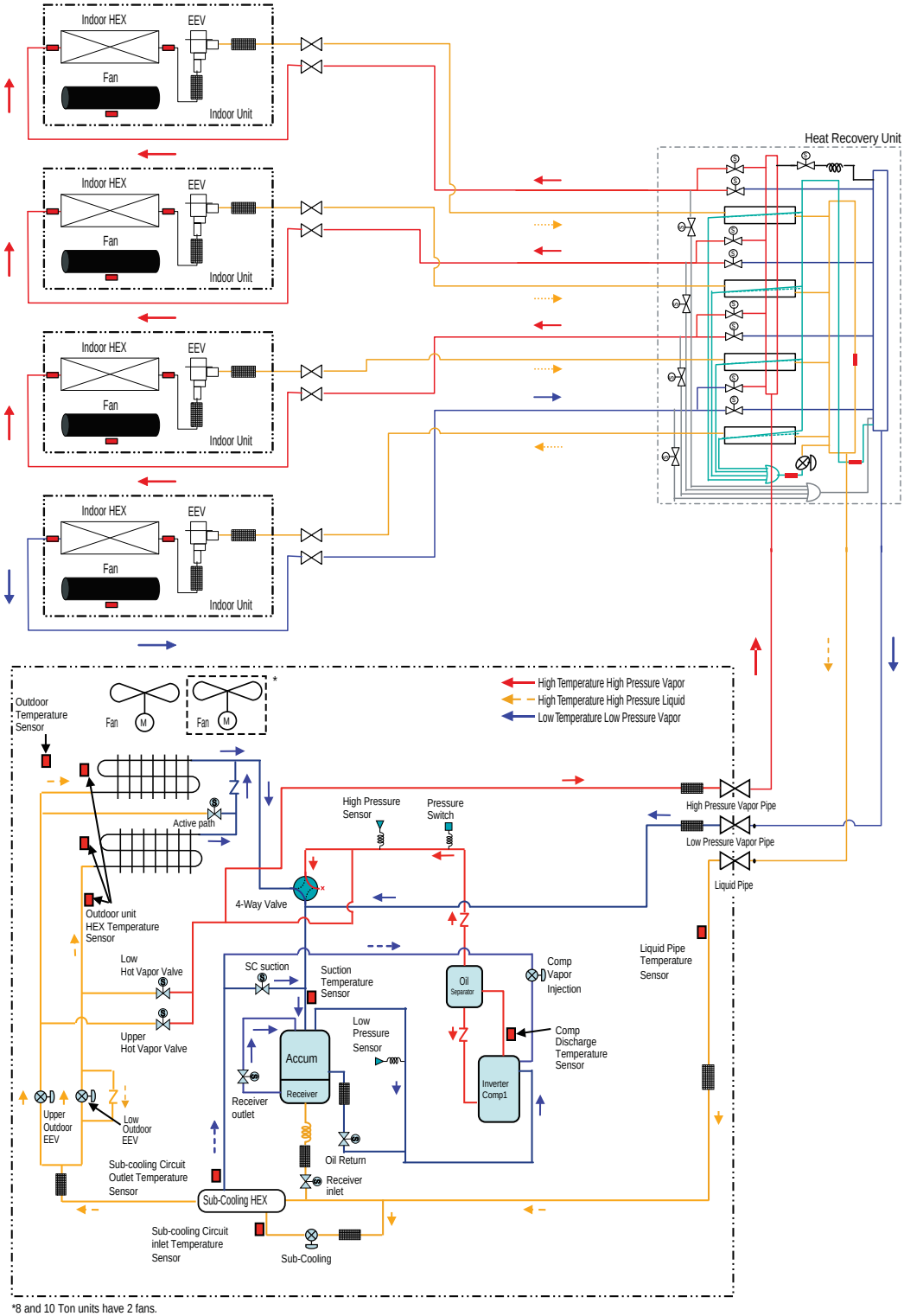
Pressure Sensor | Temperature Sensor | Check Valve | Solenoid

Pressure Switch | SVC Valve | EEV | Strainer Valve

LG

REFRIGERANT FLOW DIAGRAMS

Heating-based Simultaneous Operation ARUB072BTE4 / 072DTE4, ARUB096BTE4 / 096DTE4, ARUB121BTE4 / 121DTE4 Heat Recovery



*8 and 10 Ton units have 2 fans.

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

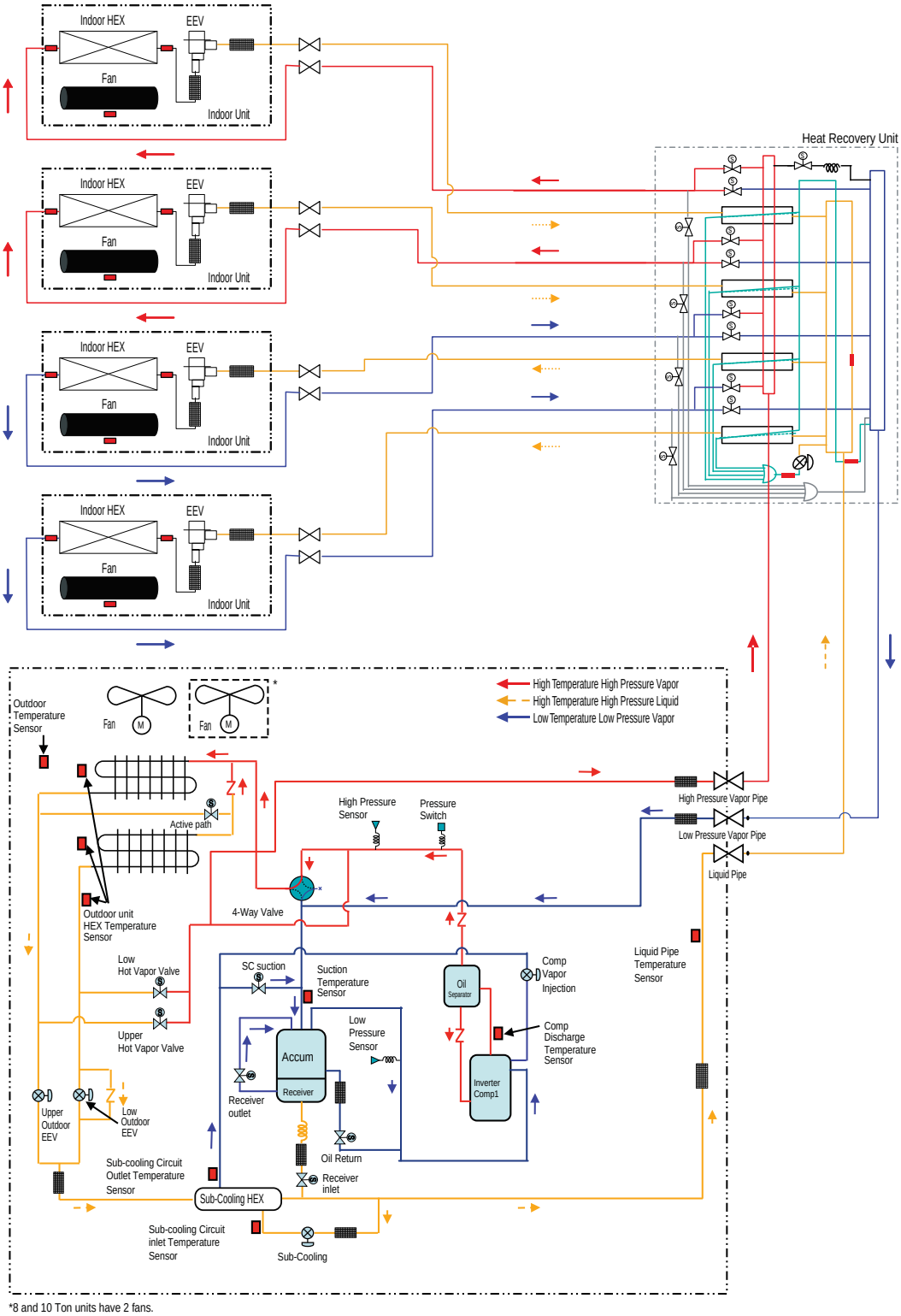
Product Data

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

Balanced Simultaneous Operation



*8 and 10 Ton units have 2 fans.

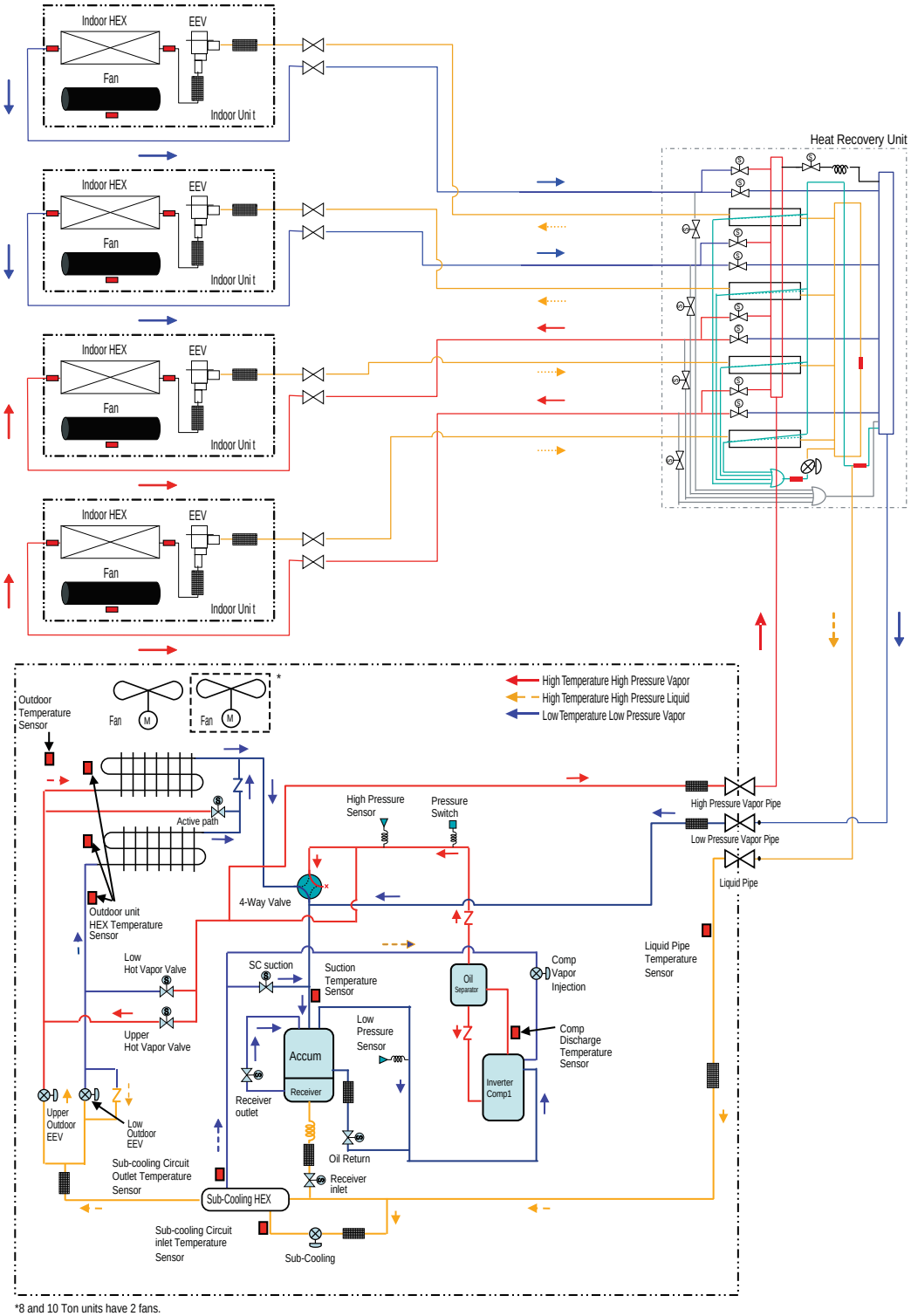
Remarks				
	Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
	Pressure Switch	SVC Valve	EEV	Strainer

LG

REFRIGERANT FLOW DIAGRAMS

Upper HEX Defrost Operation

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



*8 and 10 Ton units have 2 fans.

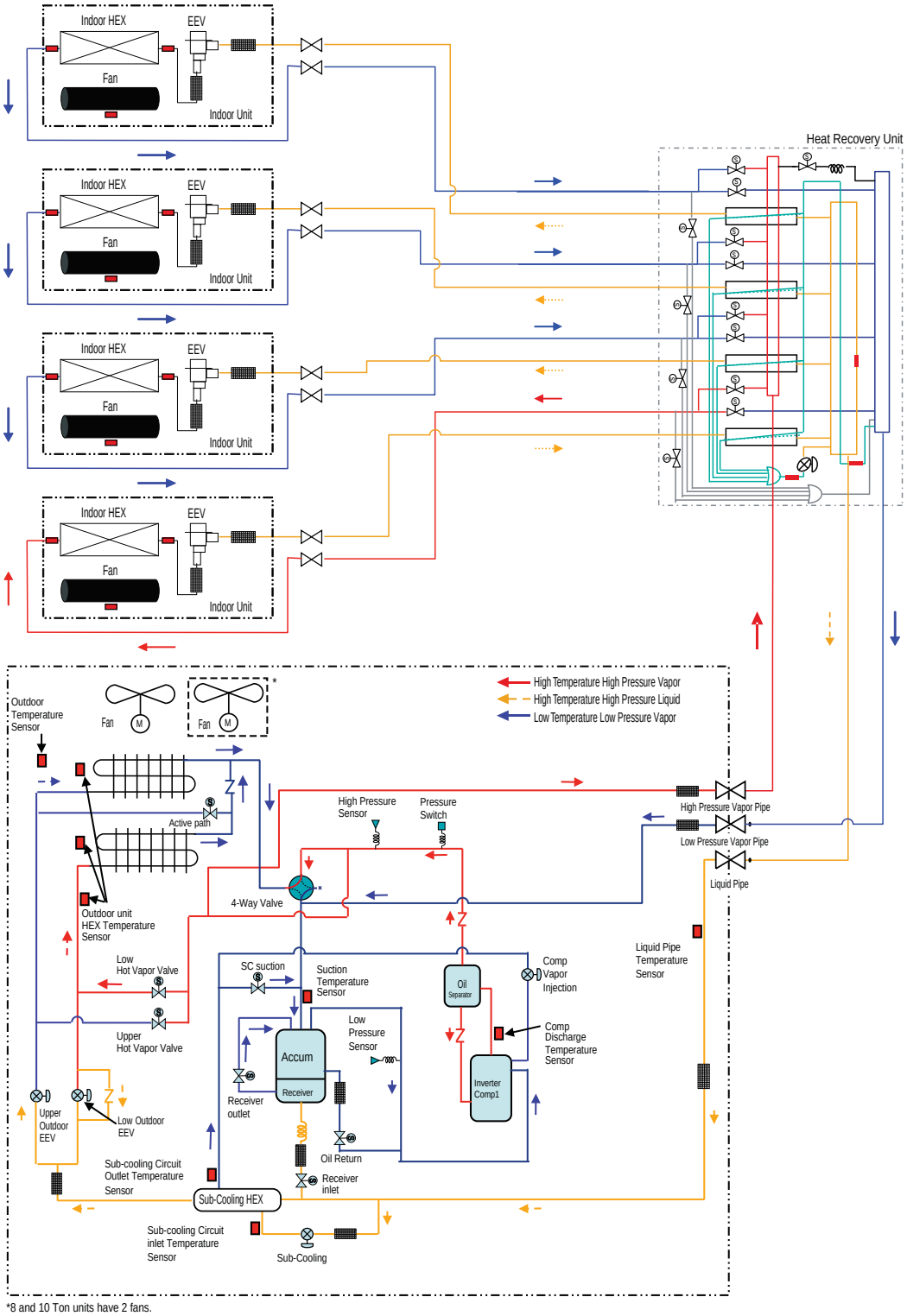
Remarks				
Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
Pressure Switch	SVC Valve	EEV	Strainer

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

Low HEX Defrost Operation



*8 and 10 Ton units have 2 fans.

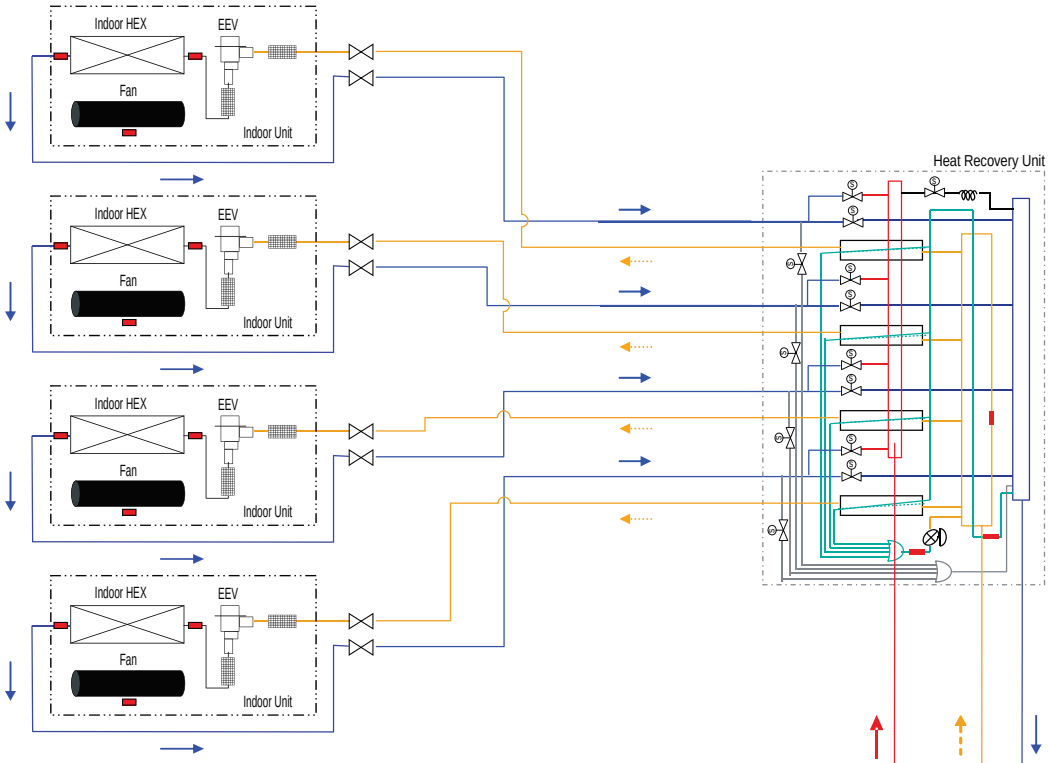
Remarks				
	Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
	Pressure Switch	SVC Valve	EEV	Strainer

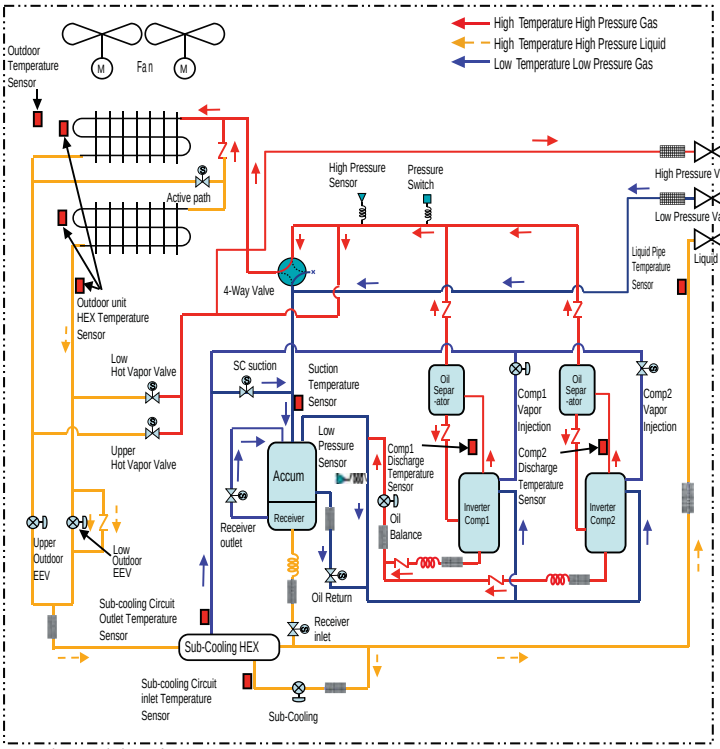
LG

REFRIGERANT FLOW DIAGRAMS

Cooling Mode

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





*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, 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, ARUB168BTE4/168DTE4 single frame models.

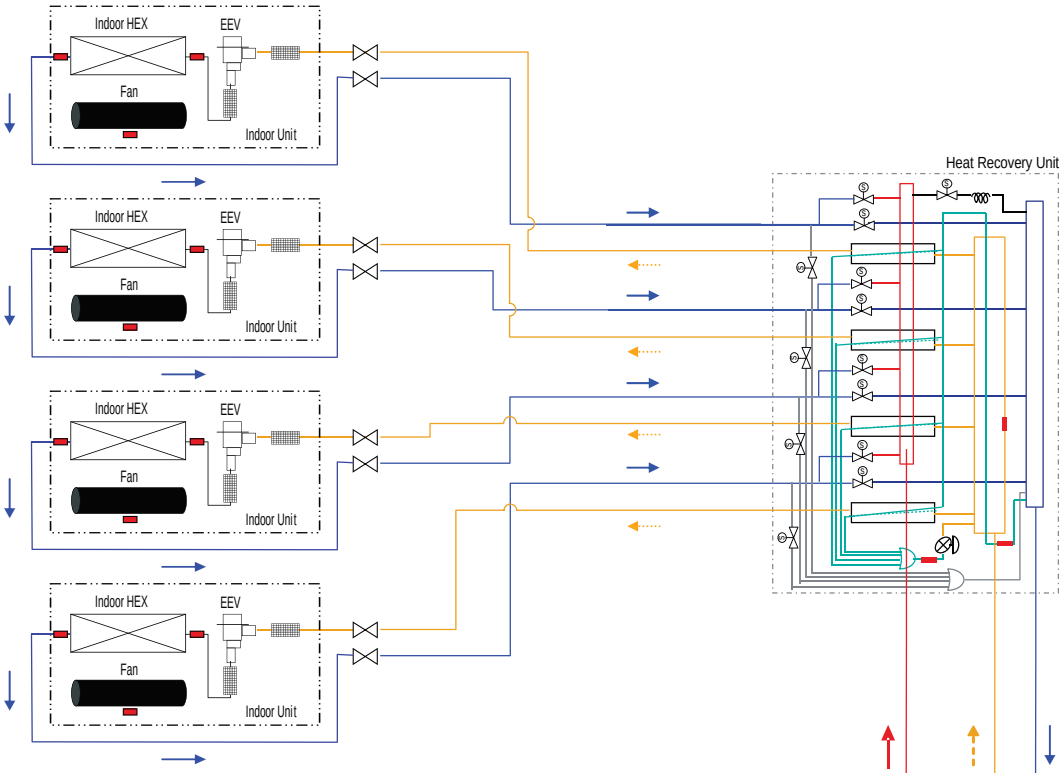
Remarks				
Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
Pressure Switch	SVC Valve	EEV	Strainer

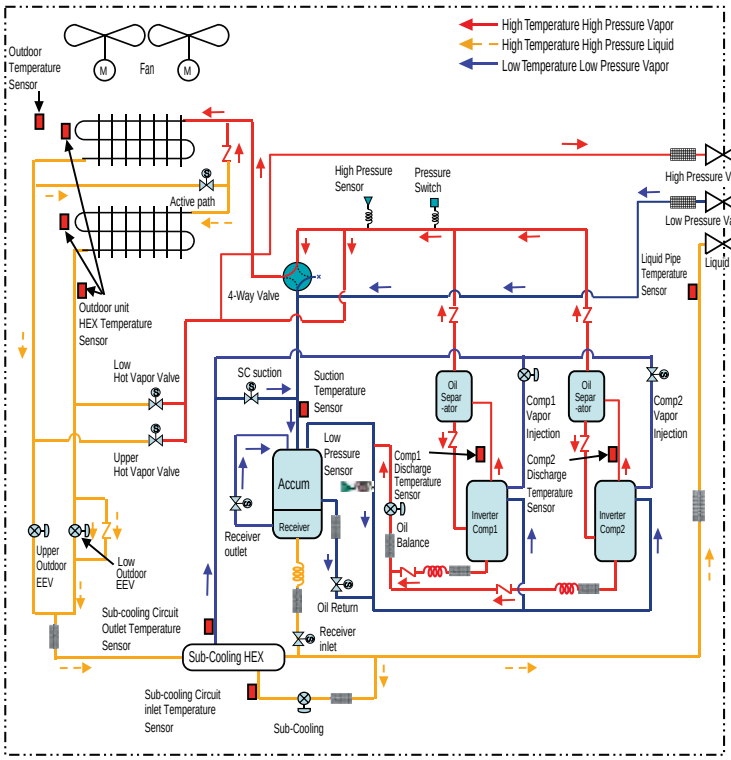
REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

Cooling at Low Ambient Temp.





*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, 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, ARUB168BTE4/168DTE4 single frame models.

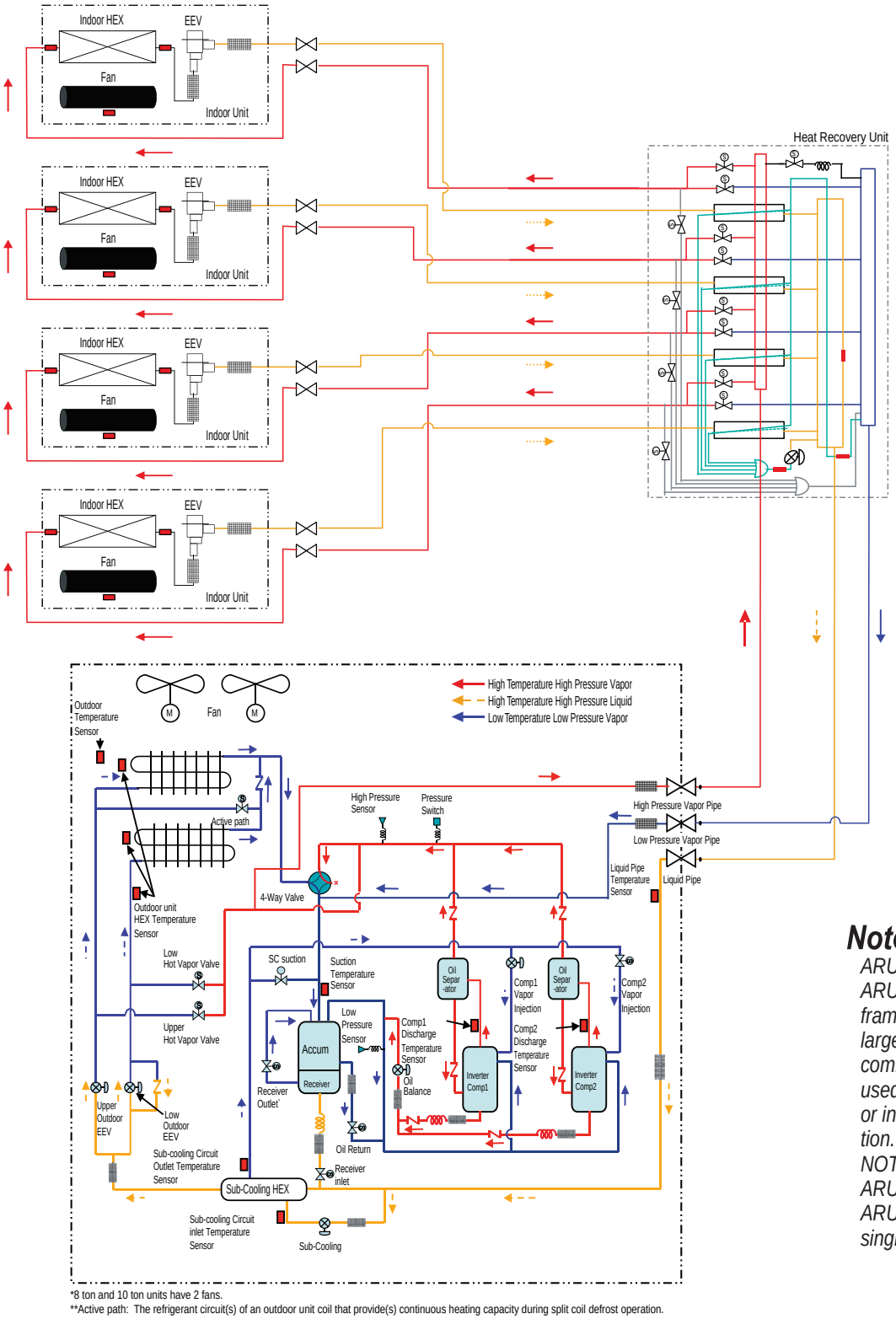
Remarks				
Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
Pressure Switch	SVC Valve	EEV	Strainer

LG

REFRIGERANT FLOW DIAGRAMS

Heating Mode

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



*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, 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, ARUB168BTE4/168DTE4 single frame models.

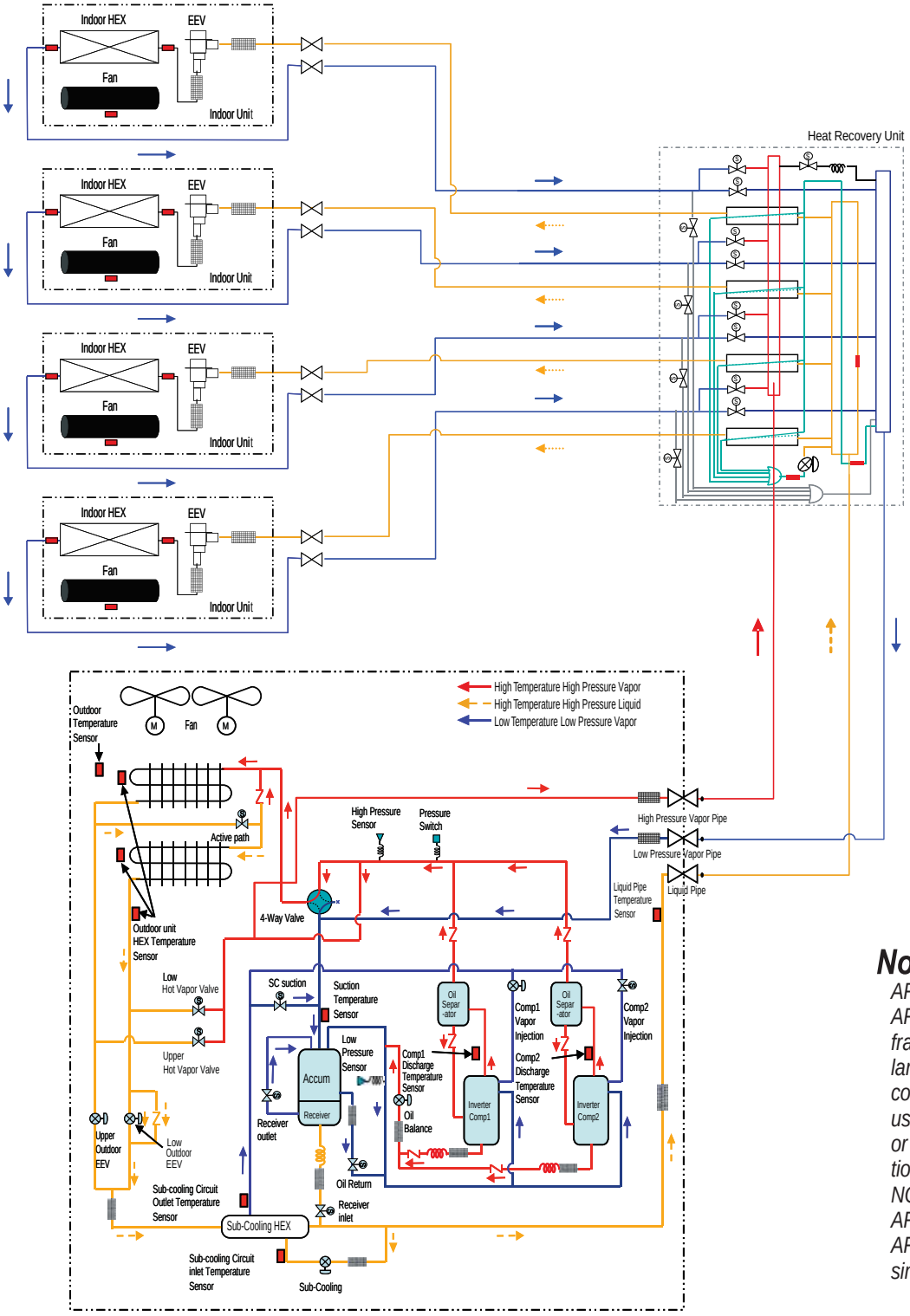
Remarks				
Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
Pressure Switch	SVC Valve	EEV	Strainer

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

Oil Return and 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, 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, ARUB168BTE4/168DTE4 single frame models.

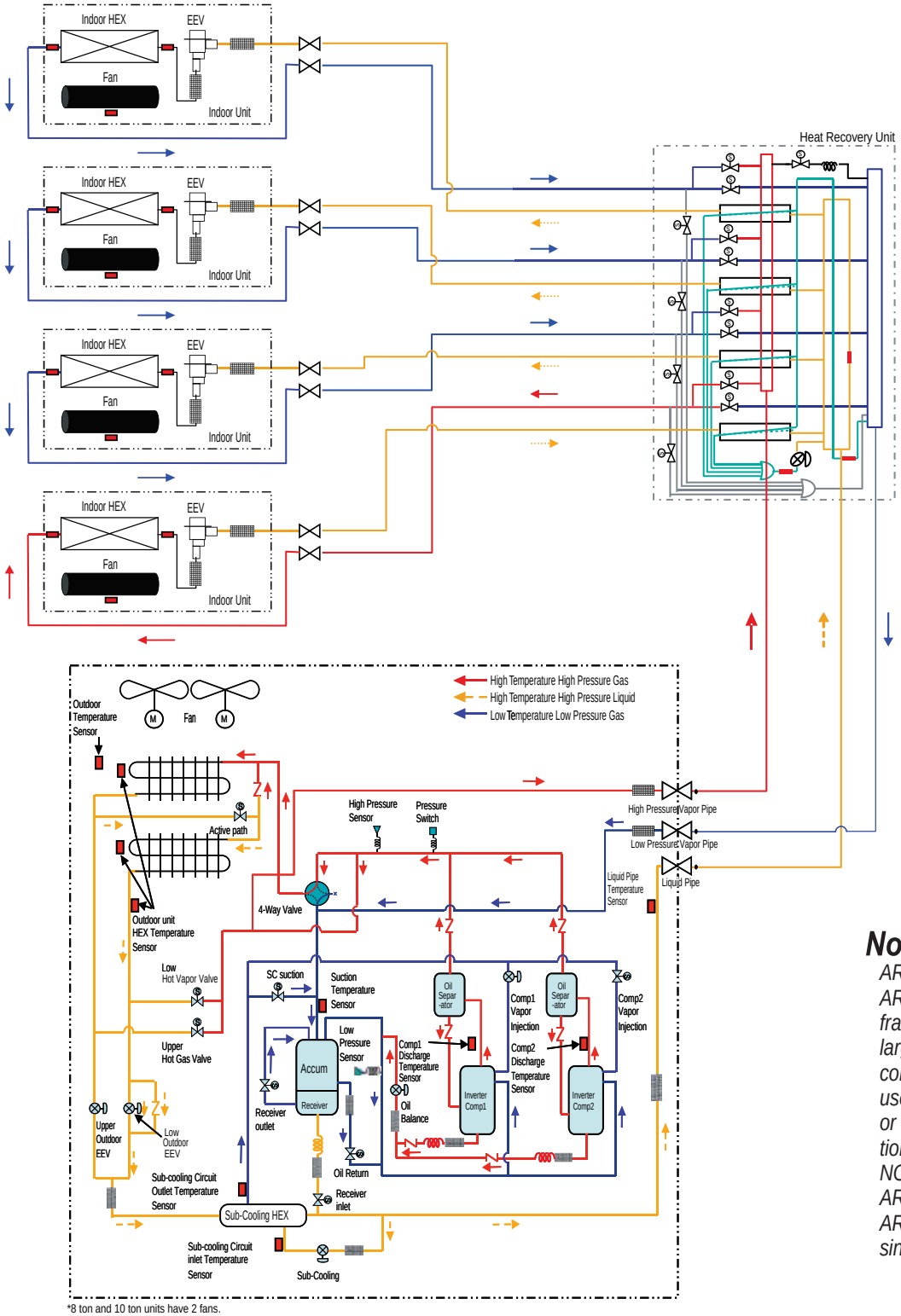
Remarks				
Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
Pressure Switch	SVC Valve	EEV	Strainer

LG

REFRIGERANT FLOW DIAGRAMS

Cooling-based Simul. Operation

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



*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:

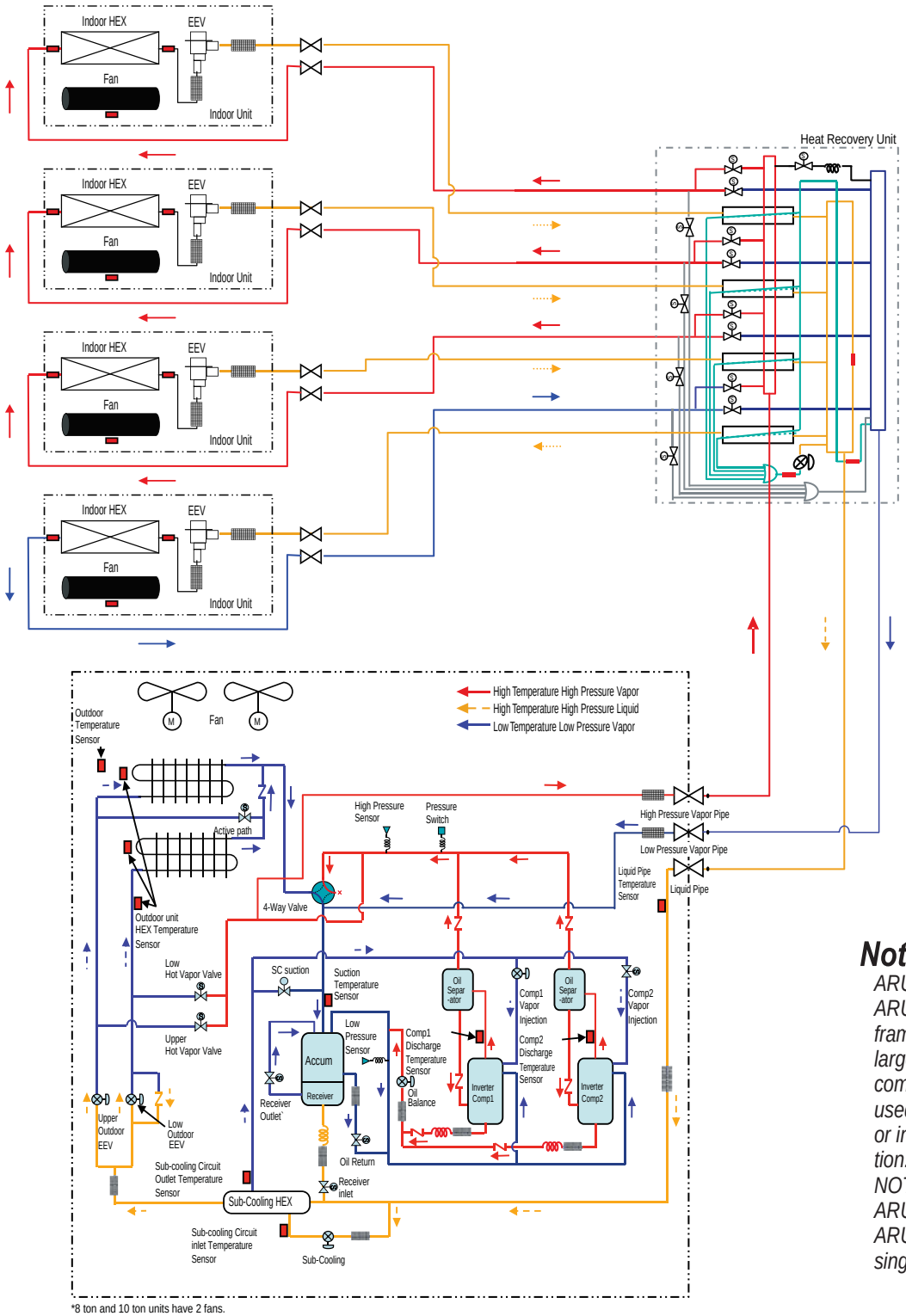
ARUB145BTE4/145DTE4, ARUB169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/144DTE4, ARUB168BTE4/168DTE4 single frame models.

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

Heating-based Simul. 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, 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, ARUB168BTE4/168DTE4 single frame models.

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

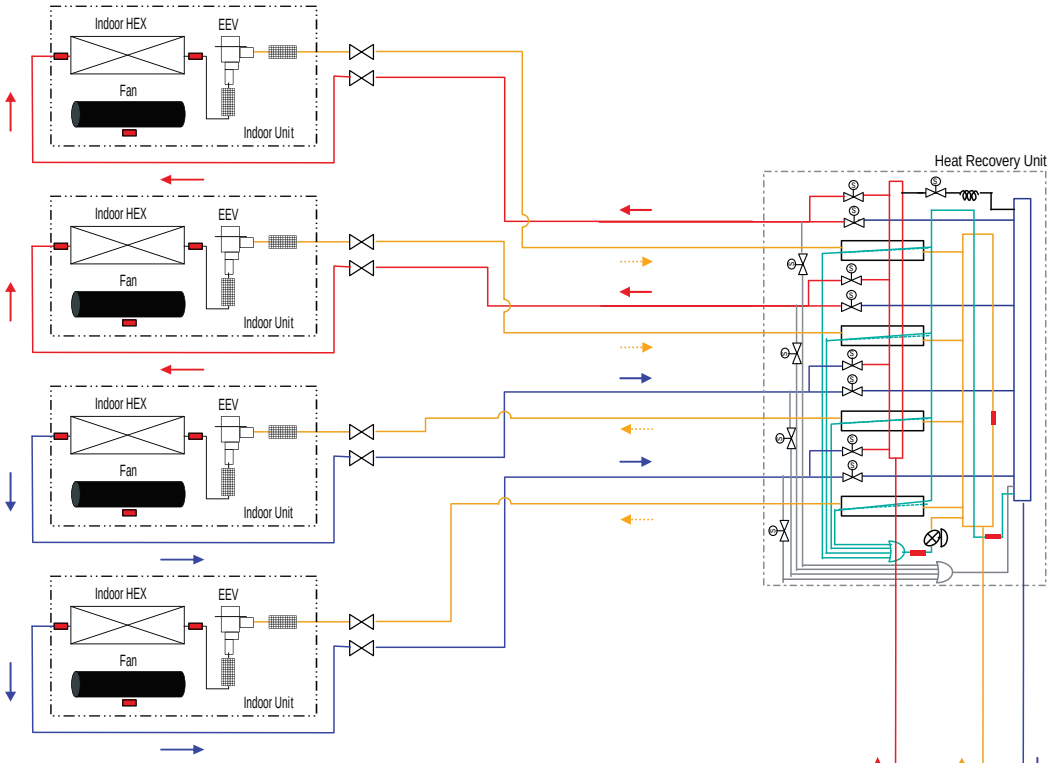
LG

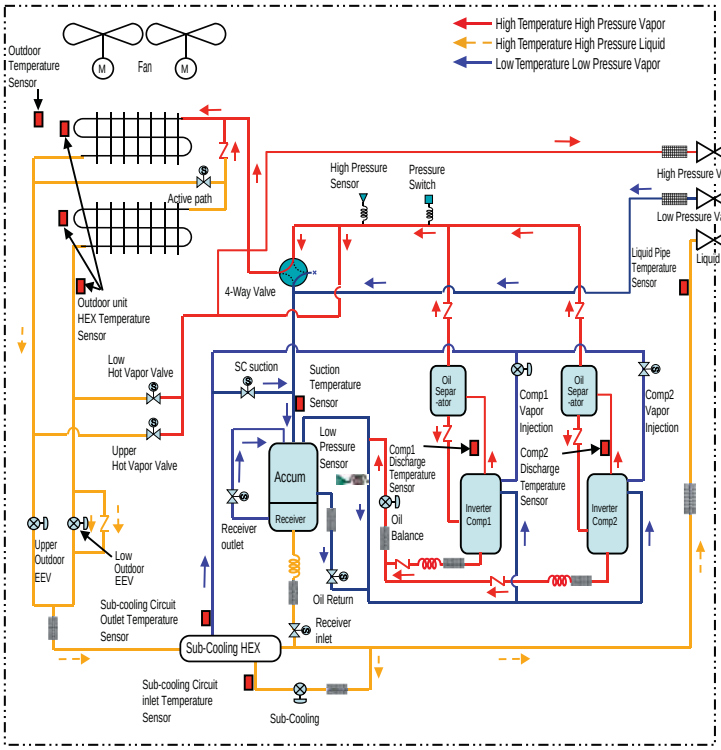
REFRIGERANT FLOW DIAGRAMS

Balanced

Simul. Operation

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





*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, 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, ARUB168BTE4/168DTE4 single frame models.

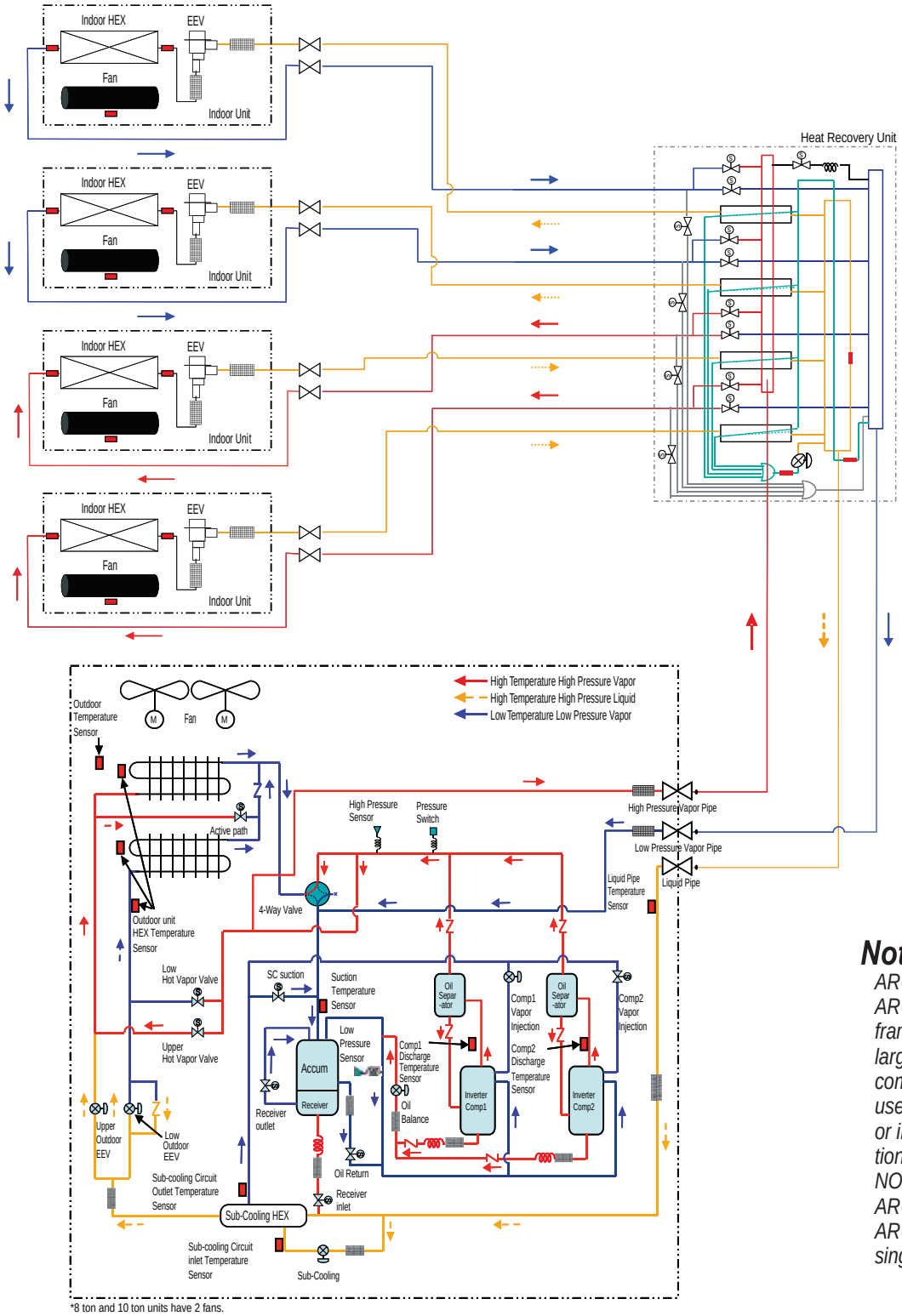
Remarks				
	Pressure Sensor	Temperature Sensor	Check Valve	Solenoid Valve
	Pressure Switch	SVC Valve	EEV	Strainer

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

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

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:

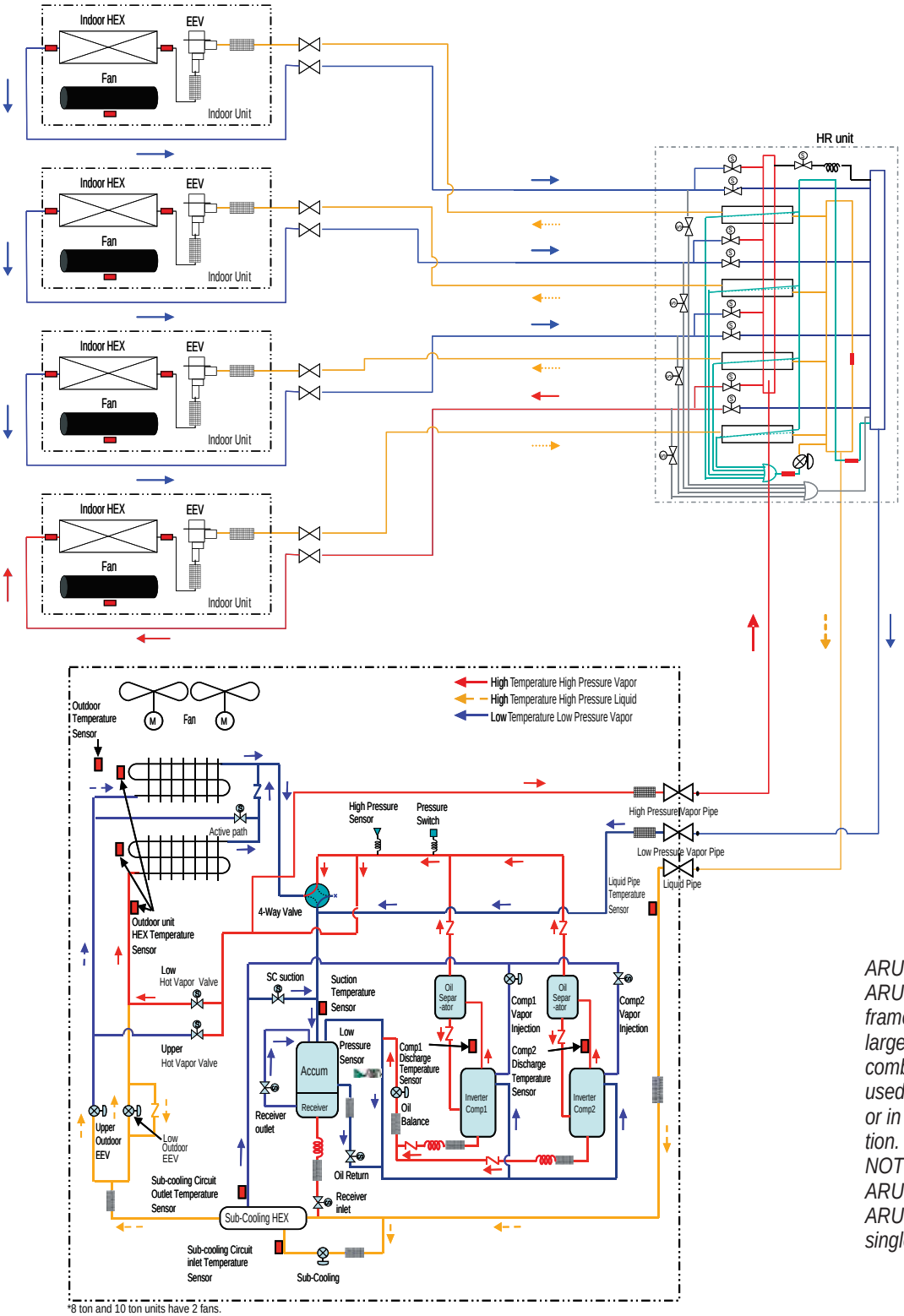
ARUB145BTE4/145DTE4, ARUB169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/144DTE4, ARUB168BTE4/168DTE4 single frame models.

LG

REFRIGERANT FLOW DIAGRAMS

Low HEX Defrost Operation

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



*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.

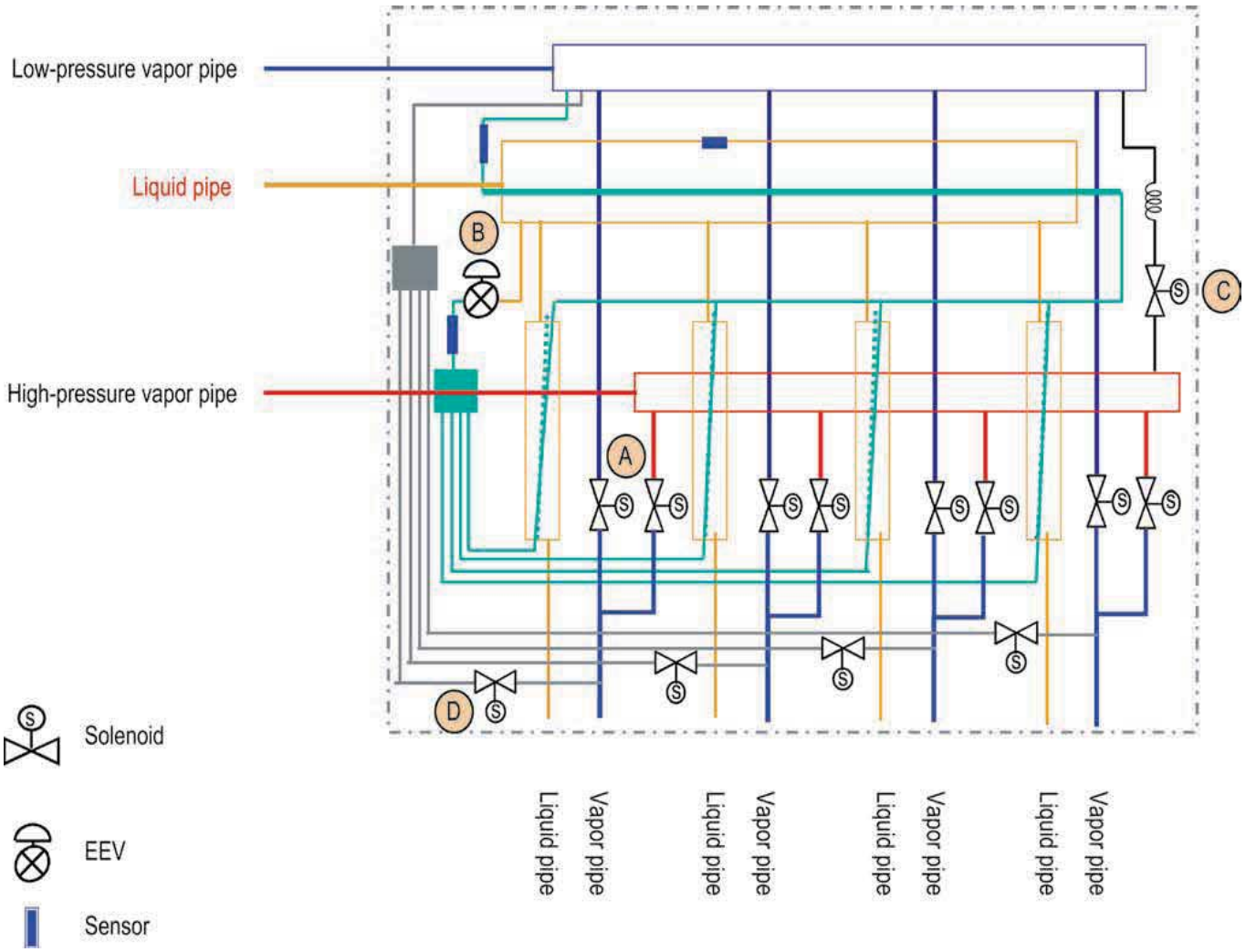
ARUB145BTE4/145DTE4, ARUB169BTE4/169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUB144BTE4/144DTE4, ARUB168BTE4/168DTE4 single frame models.

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

REFRIGERANT FLOW DIAGRAMS

MULTI V IV

PRHR022A, PRHR032A, PRHR042A Heat Recovery Units



A : Switch operation between cooling and heating.

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

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

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

LG

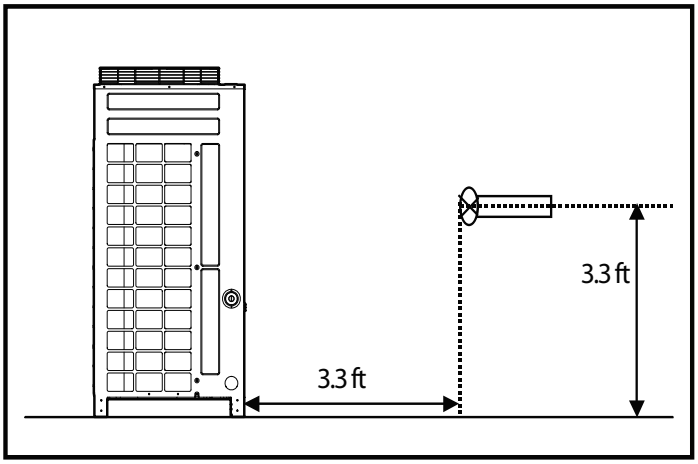
Table 27: Heat Pump Sound Pressure Levels.

Heat Pump Models		dB(A)
208-230V	460V	
ARUN072BTE4	ARUN072DTE4	58.5
ARUN096BTE4	ARUN096DTE4	59.0
ARUN121BTE4	ARUN121DTE4	59.0
ARUN144BTE4	ARUN144DTE4	59.5
ARUN145BTE4	ARUN145DTE4	59.5
ARUN168BTE4	ARUN168DTE4	59.5
ARUN169BTE4	ARUN169DTE4	59.5
ARUN192BTE4	ARUN192DTE4	61.8
ARUN216BTE4	ARUN216DTE4	62.0
ARUN240BTE4	ARUN240DTE4	62.3
ARUN264BTE4	ARUN264DTE4	62.3
ARUN288BTE4	ARUN288DTE4	62.5
ARUN313BTE4	ARUN313DTE4	62.5
ARUN337BTE4	ARUN337DTE4	62.5
ARUN312BTE4	ARUN312DTE4	63.8
ARUN336BTE4	ARUN336DTE4	63.9
ARUN360BTE4	ARUN360DTE4	63.9
ARUN384BTE4	ARUN384DTE4	64.1
ARUN408BTE4	ARUN408DTE4	64.1
ARUN432BTE4	ARUN432DTE4	64.3
ARUN456BTE4	ARUN456DTE4	64.3
ARUN480BTE4	ARUN480DTE4	64.3
ARUN504BTE4	ARUN504DTE4	64.3

Table 28: Heat Recovery Sound Pressure Levels.

Heat Recovery Models		dB(A)
208-230V	460V	
ARUB072BTE4	ARUB072DTE4	58.5
ARUB096BTE4	ARUB096DTE4	59.0
ARUB121BTE4	ARUB121DTE4	59.0
ARUB144BTE4	ARUB144DTE4	59.5
ARUB145BTE4	ARUB145DTE4	59.5
ARUB168BTE4	ARUB168DTE4	59.5
ARUB169BTE4	ARUB169DTE4	59.5
ARUB192BTE4	ARUB192DTE4	61.8
ARUB216BTE4	ARUB216DTE4	62.0
ARUB240BTE4	ARUB240DTE4	62.3
ARUB264BTE4	ARUB264DTE4	62.3
ARUB288BTE4	ARUB288DTE4	62.5
ARUB313BTE4	ARUB313DTE4	62.5
ARUB337BTE4	ARUB337DTE4	62.5
ARUB312BTE4	ARUB312DTE4	63.8
ARUB336BTE4	ARUB336DTE4	63.9
ARUB360BTE4	ARUB360DTE4	63.9
ARUB384BTE4	ARUB384DTE4	64.1
ARUB408BTE4	ARUB408DTE4	64.1
ARUB432BTE4	ARUB432DTE4	64.3
ARUB456BTE4	ARUB465DTE4	64.3
ARUB480BTE4	ARUB480DTE4	64.3
ARUB504BTE4	ARUB504DTE4	64.3

Figure 4: Sound Pressure Measurement Location.



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

Note:

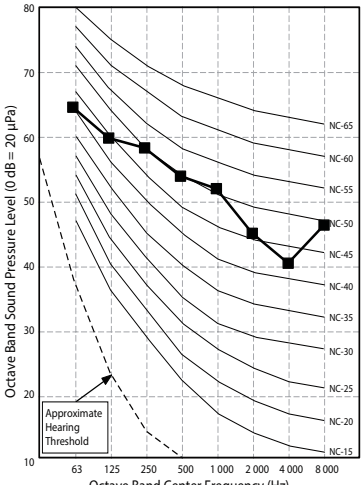
ARUN145BTE4/ARUN145DTE4, ARUB145BTE4/ARUB145DTE4, ARUN169BTE4/ARUN169DTE4, ARUB169BTE4/ARUB169DTE4 frames are ONLY for use in large capacity triple frame combinations. They cannot be used as stand alone models or in a dual frame combination. These frames ARE NOT interchangeable with ARUN144BTE4/ARUN144DTE4, ARUB144BTE4/ARUB144DTE4, ARUN168BTE4/ARUN168DTE4, ARUB168BTE4/ARUB168DTE4 single frame models.

ACOUSTIC DATA

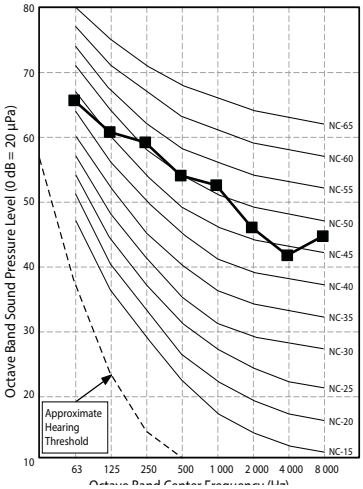
Sound Pressure Levels - Heat Pump

Heat Pump Sound Pressure Levels

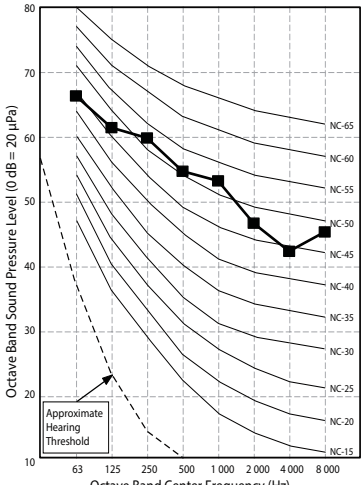
ARUN072BTE4, ARUN072DTE4



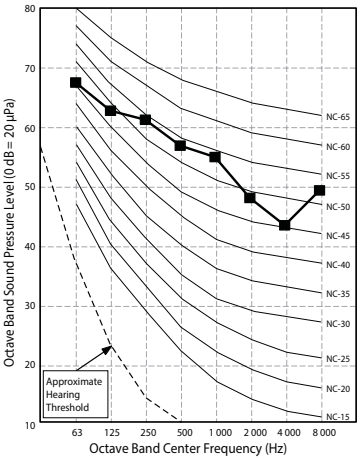
ARUN096BTE4, ARUN121BTE4, ARUN096DTE4, ARUN121DTE4



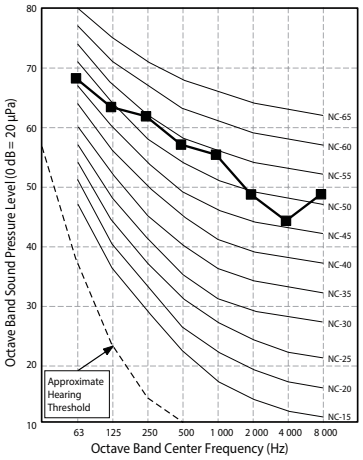
ARUN144BTE4, ARUN145BTE, ARUN168BTE4, ARUN144DTE4, ARUN145DTE, ARUN168DTE4



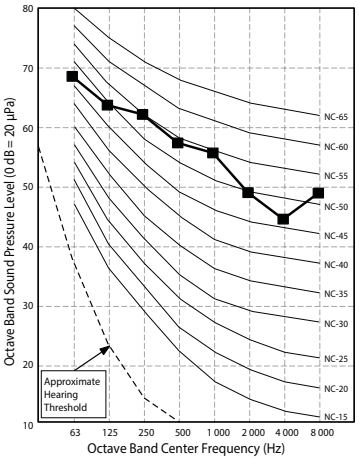
ARUN192BTE4, ARUN192DTE4



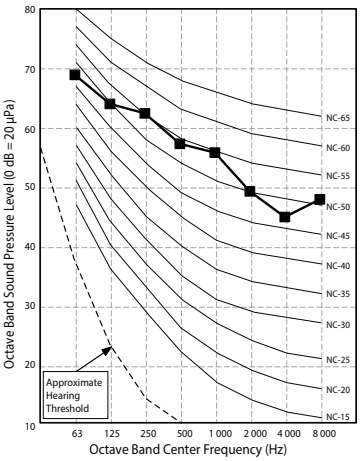
ARUN216BTE4, ARUN240BTE4, ARUN216DTE4, ARUN240DTE4



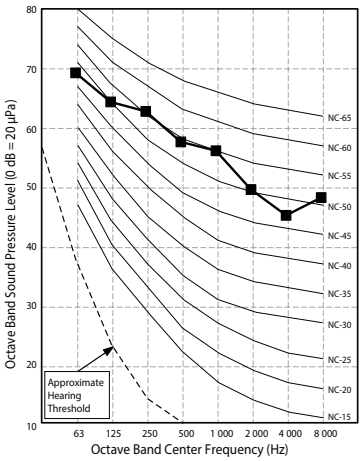
ARUN264BTE4, ARUN288BTE4, ARUN264DTE4, ARUN288DTE4



ARUN312BTE4, ARUN336BTE4, ARUN312DTE4, ARUN336DTE4

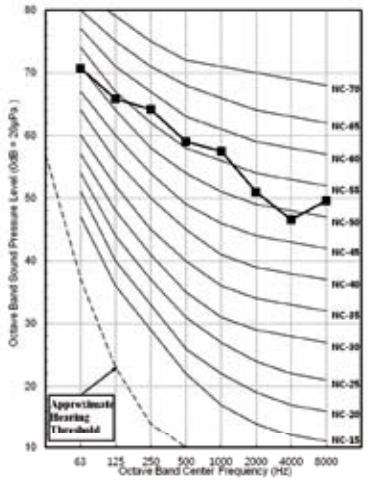


ARUN360BTE4, ARUN360DTE4

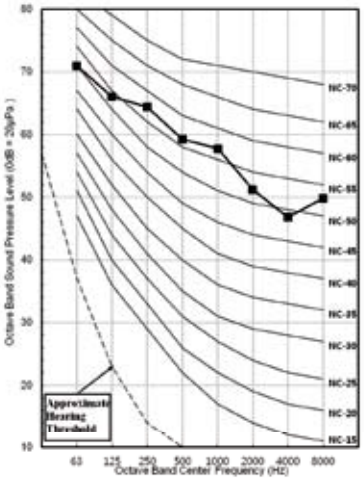


Heat Pump Sound Pressure Levels, continued

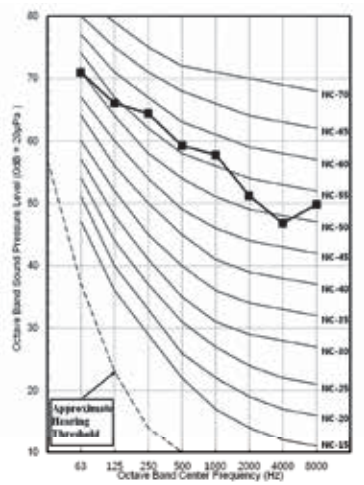
ARUN384BTE4, ARUN384DTE4
ARUN408BTE4, ARUN408DTE4



ARUN432BTE4, ARUN432DTE4

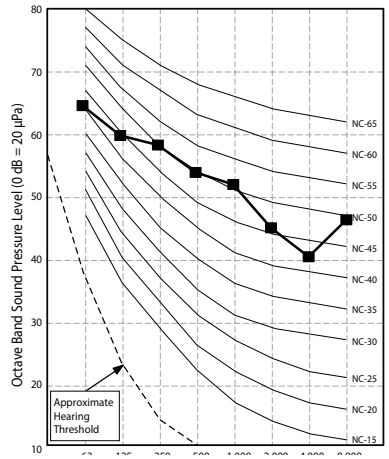


ARUN456BTE4, ARUN480DTE4, ARUN504BTE4
ARUN408BTE4, ARUN408DTE4, ARUN504DTE4

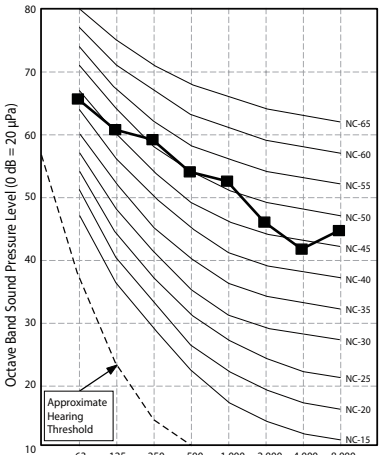


Heat Recovery Sound Pressure Levels

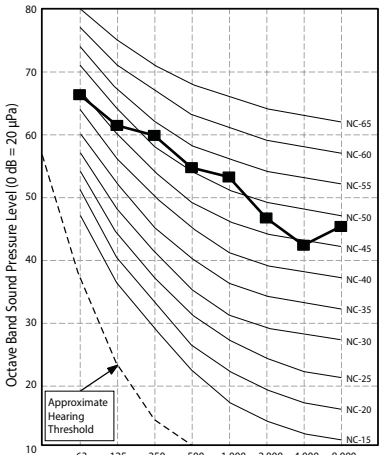
ARUB072BTE4, ARUB072DTE4



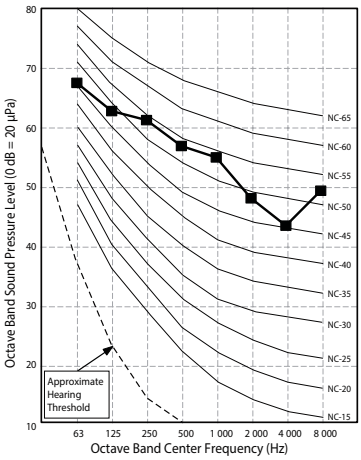
ARUB096BTE4, ARUB121BTE4,
ARUB096DTE4, ARUB121DTE4



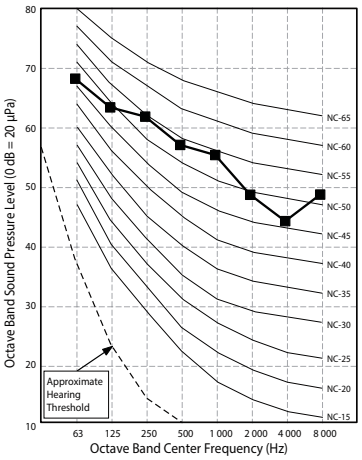
ARUB144BTE4, ARUB168BTE4,
ARUB144DTE4, ARUB168DTE4



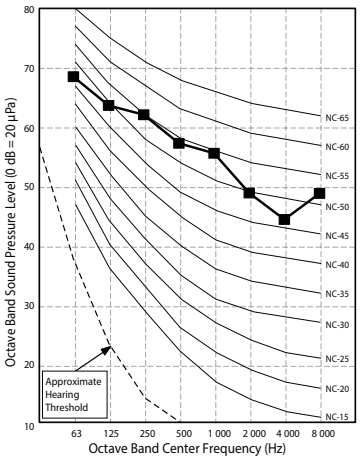
ARUB192BTE4, ARUB192DTE4



ARUB216BTE4, ARUB240BTE4,
ARUB216DTE4 , ARUB240DTE4



ARUB264BTE4, ARUB288BTE4,
ARUB264DTE4, ARUB288DTE4

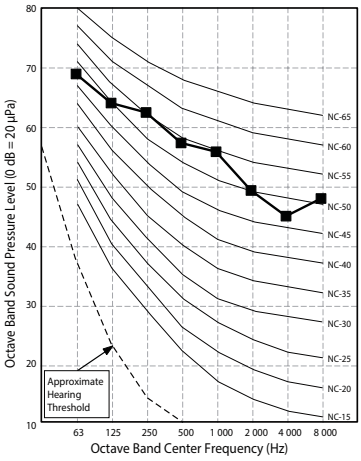


ACOUSTIC DATA

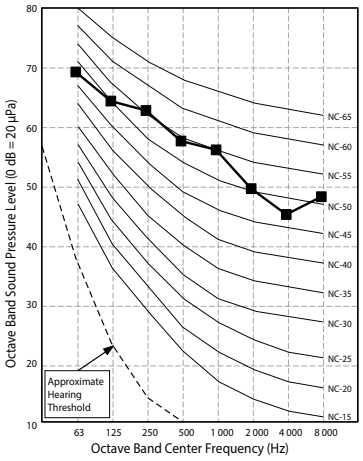
Sound Pressure Levels - Heat Recovery

Heat Recovery Sound Pressure Levels, continued

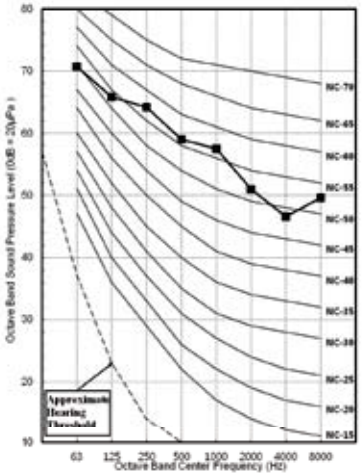
ARUB312BTE4, ARUB336BTE4,
ARUB312DTE4, ARUB336DTE4



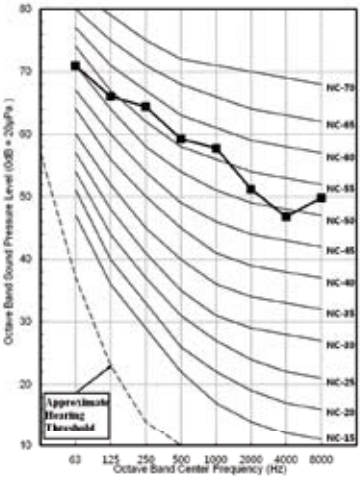
ARUB360BTE4, ARUB360DTE4



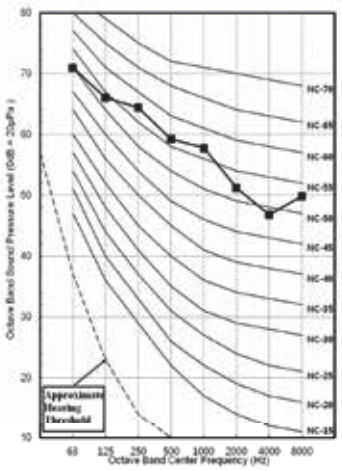
ARUB384BTE4, ARUB384DTE4
ARUB408BTE4, ARUB408DTE4



ARUB432BTE4, ARUB432DTE4



ARUB456BTE4, ARUB480DTE4, ARUB504BTE4
ARUB408BTE4, ARUB408DTE4, ARUB504DTE4



- Data is valid under diffuse field conditions.
- Data is valid under nominal operating conditions.
- Sound level may be increased in static pressure mode or if air guide is used.
- Sound power level is measured using rated conditions, and tested in a reverberation room per ISO 3741 standards.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Reference acoustic intensity: 0dB = 10E-6μW/m^2

Note:

ARUN145BTE4/ARUN145DTE4, ARUB145BTE4/ARUB145DTE4, ARUN169BTE4/ARUN169DTE4, 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 ARUN144BTE4/ARUN144DTE4, ARUB144BTE4/ARUB144DTE4, ARUN168BTE4/ARUN168DTE4, ARUB168BTE4/ARUB168DTE4 single frame models.

Table 29: Heat Pump Sound Power Levels.

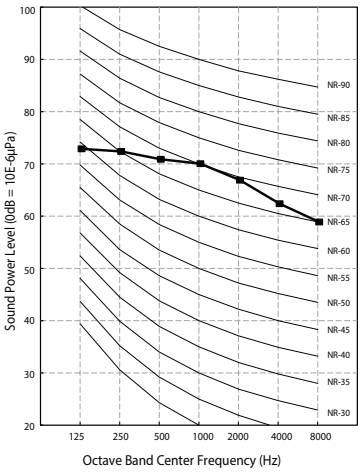
Heat Pump Models		dB(A)
208-230V	460V	
ARUN072BTE4	ARUN072DTE4	78.0
ARUN096BTE4	ARUN096DTE4	79.0
ARUN121BTE4	ARUN121DTE4	79.0
ARUN144BTE4	ARUN144DTE4	79.5
ARUN145BTE4	ARUN145DTE4	79.5
ARUN168BTE4	ARUN168DTE4	79.5
ARUN169BTE4	ARUN169DTE4	79.5
ARUN192BTE4	ARUN192DTE4	81.5
ARUN216BTE4	ARUN216DTE4	81.8
ARUN240BTE4	ARUN240DTE4	82.3
ARUN264BTE4	ARUN264DTE4	82.3
ARUN288BTE4	ARUN288DTE4	82.5
ARUN313BTE4	ARUN313DTE4	82.5
ARUN337BTE4	ARUN337DTE4	82.5
ARUN312BTE4	ARUN312DTE4	83.6
ARUN336BTE4	ARUN336DTE4	83.9
ARUN360BTE4	ARUN360DTE4	83.9
ARUN384BTE4	ARUN384DTE4	84.1
ARUN408BTE4	ARUN408DTE4	84.1
ARUN432BTE4	ARUN423DTE4	84.3
ARUN384BTE4	ARUN384DTE4	84.3
ARUN408BTE4	ARUN408DTE4	84.3
ARUN432BTE4	ARUN432DTE4	84.3
ARUN456BTE4	ARUN456DTE4	84.3
ARUN480BTE4	ARUN480DTE4	84.3
ARUN504BTE4	ARUN504DTE4	84.3

Table 30: Heat Recovery Sound Power Levels.

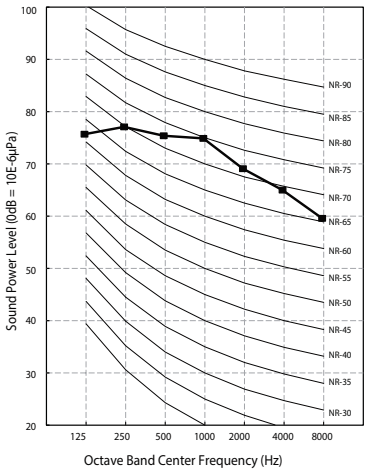
Heat Recovery Models		dB(A)
208-230V	460V	
ARUB072BTE4	ARUB072DTE4	78.0
ARUB096BTE4	ARUB096DTE4	79.0
ARUB121BTE4	ARUB121DTE4	79.0
ARUB144BTE4	ARUB144DTE4	79.5
ARUB145BTE4	ARUB145DTE4	79.5
ARUB168BTE4	ARUB168DTE4	79.5
ARUB169BTE4	ARUB169DTE4	79.5
ARUB192BTE4	ARUB192DTE4	81.5
ARUB216BTE4	ARUB216DTE4	81.8
ARUB240BTE4	ARUB240DTE4	82.3
ARUB264BTE4	ARUB264DTE4	82.3
ARUB288BTE4	ARUB288DTE4	82.5
ARUB313BTE4	ARUB313DTE4	82.5
ARUB337BTE4	ARUB337DTE4	82.5
ARUB312BTE4	ARUB312DTE4	83.6
ARUB336BTE4	ARUB336DTE4	83.9
ARUB360BTE4	ARUB360DTE4	83.9
ARUB384BTE4	ARUB384DTE4	84.1
ARUB408BTE4	ARUB408DTE4	84.1
ARUB432BTE4	ARUB432DTE4	84.3
ARUB384BTE4	ARUB384DTE4	84.3
ARUB408BTE4	ARUB408DTE4	84.3
ARUB432BTE4	ARUB432DTE4	84.3
ARUB456BTE4	ARUB465DTE4	84.3
ARUB480BTE4	ARUB480DTE4	84.3
ARUB504BTE4	ARUB504DTE4	84.3

Heat Pump Sound Power Levels

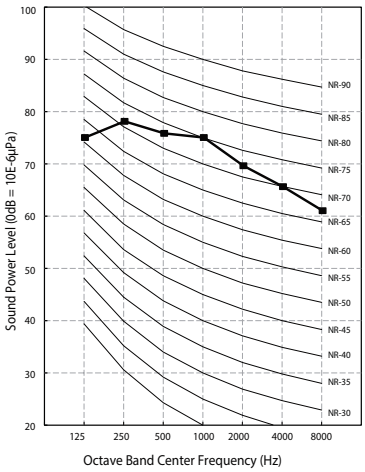
ARUN072BTE4, ARUN072DTE4



ARUN096BTE4 , ARUN121BTE4, ARUN096DTE4, ARUN121DTE4



ARUN144BTE4, ARUN145BTE4, ARUN168BTE4, ARUN144DTE4, ARUN145DTE4, ARUN168DTE4

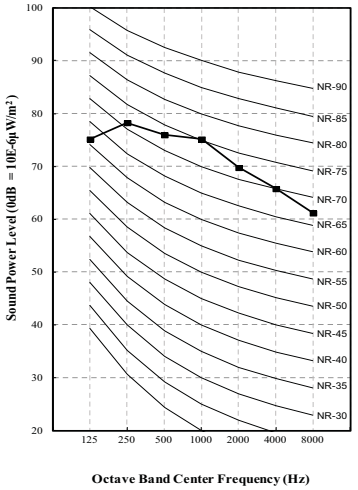


ACOUSTIC DATA

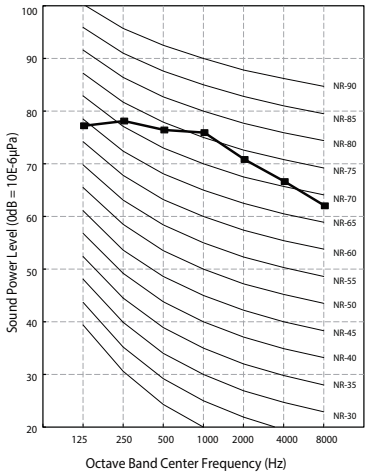
Sound Power Levels - Heat Pump

Heat Pump Sound Power Levels, continued

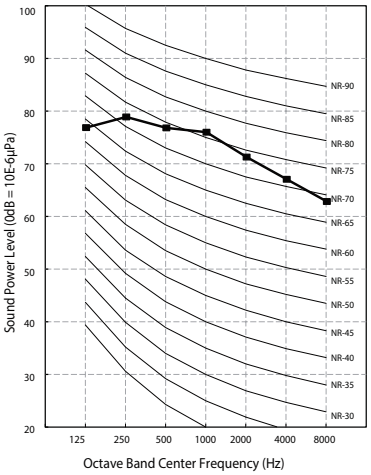
ARUN169BTE4, ARUN169DTE4



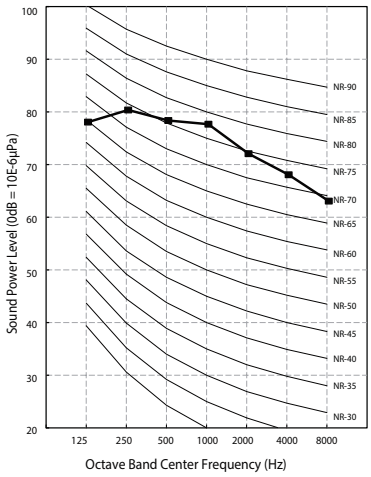
ARUN192BTE4, ARUN192DTE4



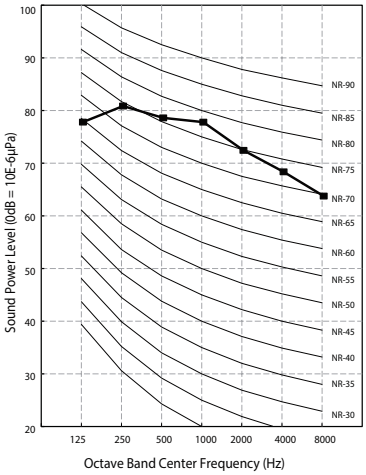
ARUN216BTE4, ARUN216DTE4



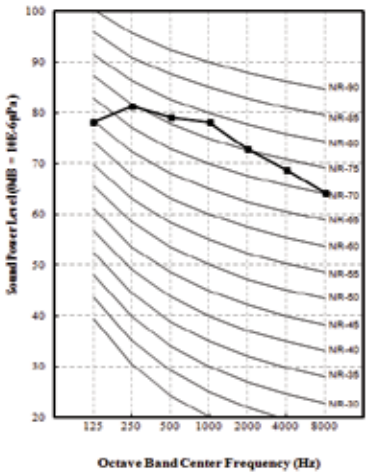
ARUN240BTE4, ARUN264BTE4,
ARUN240DTE4, ARUN264DTE4



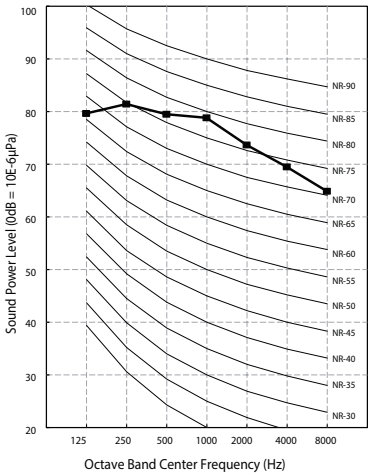
ARUN288BTE4 , ARUN288DTE4



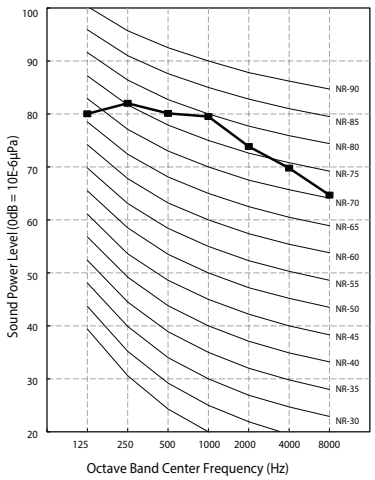
ARUN313BTE4, ARUN337BTE4,
ARUN313DTE4, ARUN337DTE4



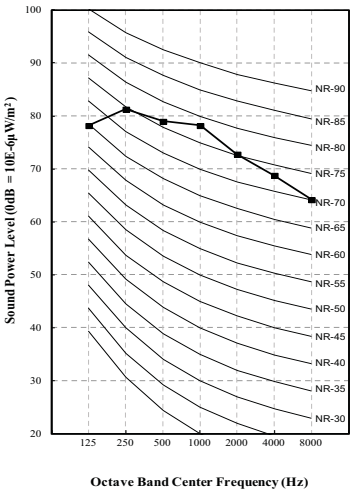
ARUN312BTE4, ARUN312DTE4



ARUN336BTE4, ARUN360BTE4,
ARUN336DTE4, ARUN360DTE4

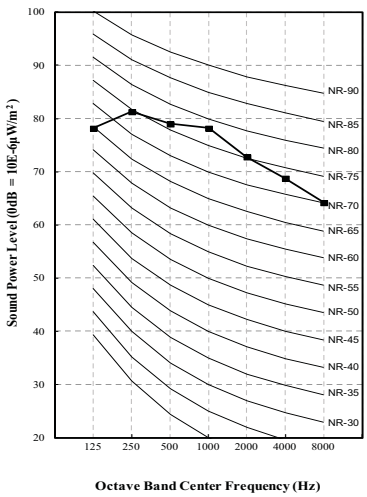


ARUN384BTE4, ARUN384DTE4
ARUN408BTE4, ARUN408DTE4

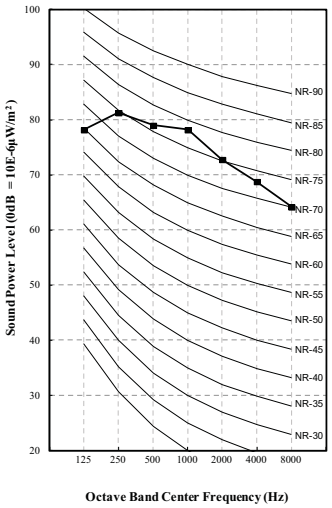


Heat Pump Sound Power Levels, continued

ARUN432BTE4, ARUN432DTE4

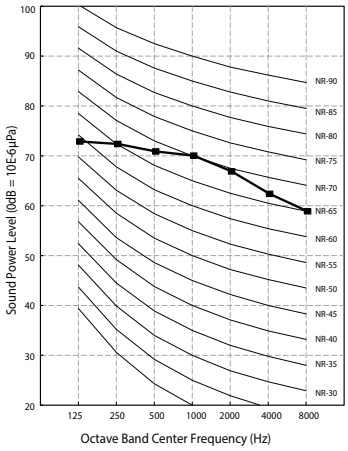


ARUN456BTE4, ARUN480BTE4, ARUN504BTE4
ARUN456DTE4, ARUN480DTE4, ARUN504DTE4

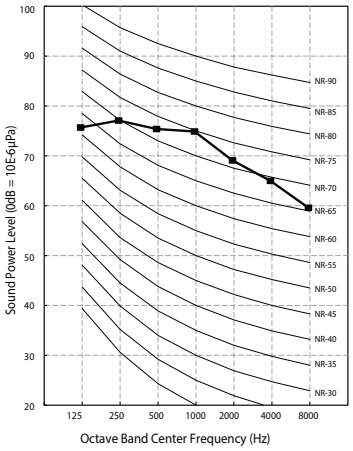


Heat Recovery Sound Power Levels

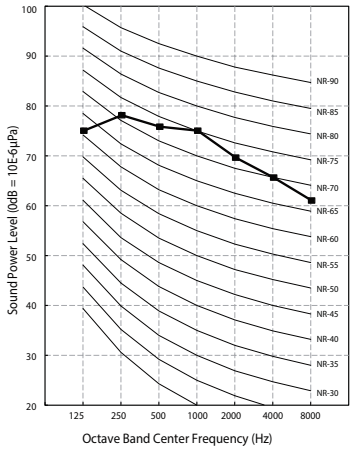
ARUB072BTE4, ARUB072DTE4



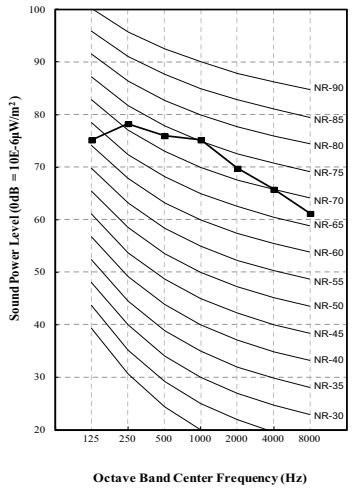
ARUB096BTE4, ARUB121BTE4,
ARUB096DTE4, ARUB121DTE4



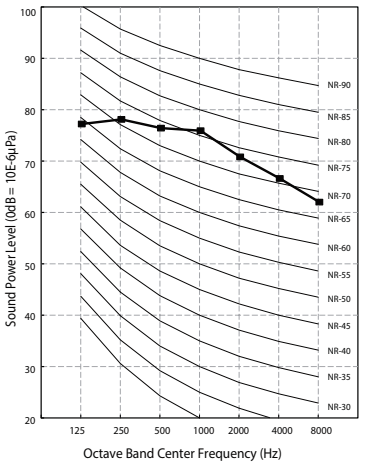
ARUB144BTE4, ARUB145BTE4, ARUB168BTE4,
ARUB144DTE4, ARUB145DTE4, ARUB168DTE4



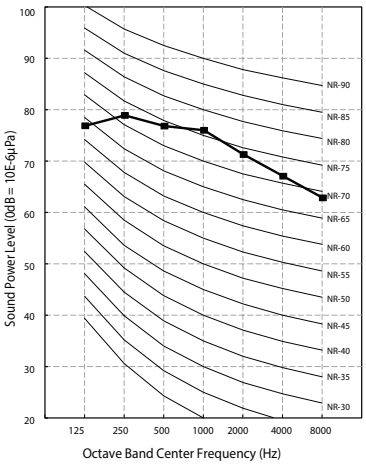
ARUB169BTE4, ARUB169DTE4



ARUB192BTE4, ARUB192DTE4



ARUB216BTE4, ARUB216DTE4

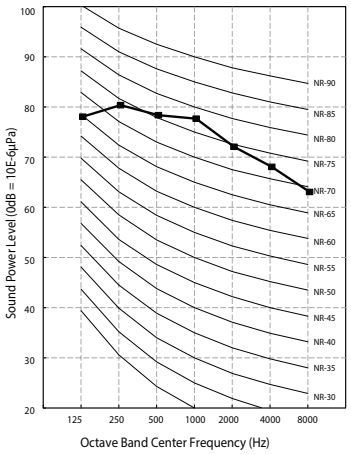


ACOUSTIC DATA

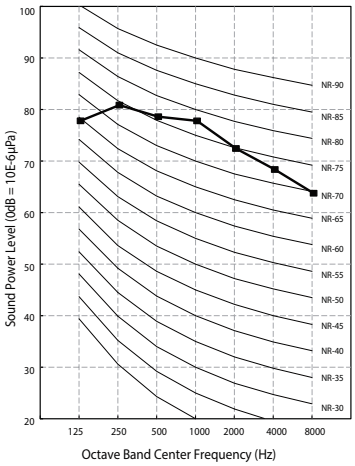
Sound Power Levels - Heat Recovery

Heat Recovery Sound Power Levels, continued

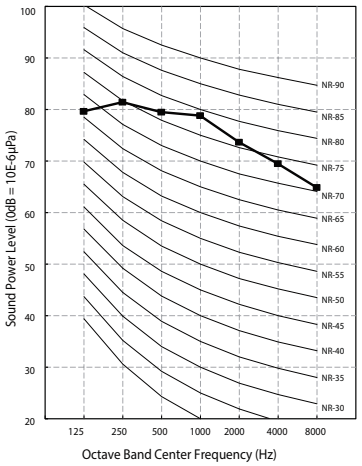
ARUB240BTE4, ARUB264BTE4,
ARUB240DTE4, ARUB264DTE4



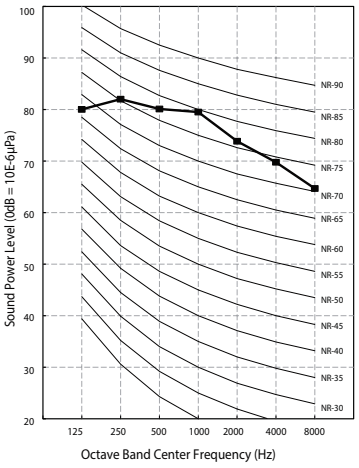
ARUB288BTE4, ARUB288DTE4



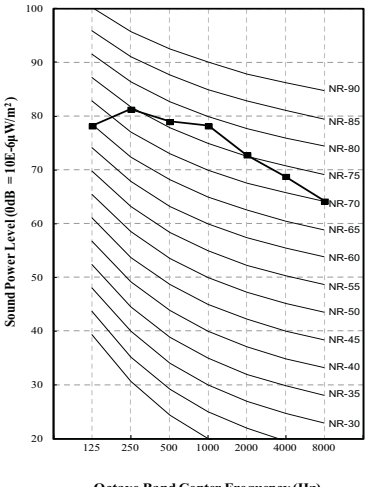
ARUB312BTE4, ARUB312DTE4

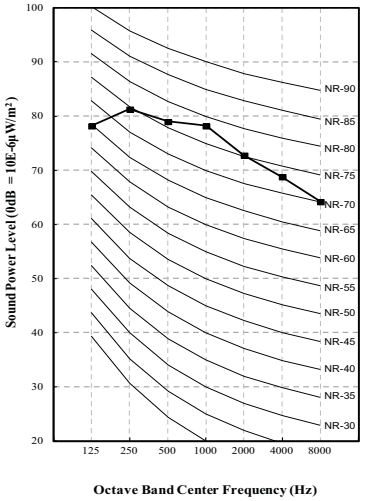


ARUB336BTE4, ARUB360BTE4,
ARUB336DTE4, ARUB360DTE4

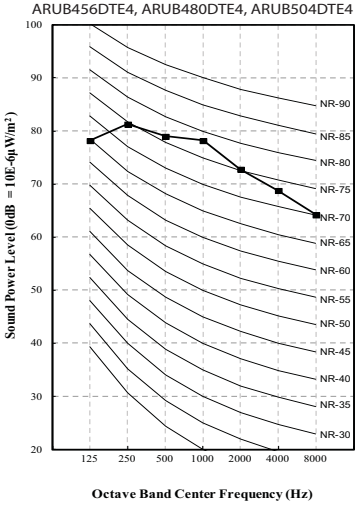


ARUB408BTE4, ARUB408DTE4





ARUB456BTE4, ARUB480BTE4, ARUB504BTE4
ARUB456DTE4, ARUB480DTE4, ARUB504DTE4



Air Guides

(PRAGX2S0 and PRAGX3S0)

Optional air guides are available for Multi V IV outdoor units to change the discharge direction from vertical to horizontal.

Use PRAGX2SO air guides with the following models:
ARUN072BTE4, ARUN072DTE4, ARUB072BTE4, ARUB072DTE4.

Use PRAGX3SO air guides with the following models:
ARUN096BTE4, ARUN121BTE4, ARUN144BTE4, ARUN145BTE4, ARUN168BTE4, ARUN169BTE4,
ARUN096DTE4, ARUN121DTE4, ARUN144DTE4, ARUN145DTE4, ARUN168DTE4, ARUN169DTE4
ARUB096BTE4, ARUB121BTE4, ARUB144BTE4, ARUB145BTE4, ARUB168BTE4, ARUB169BTE4,
ARUB096DTE4, ARUB121DTE4, ARUB144DTE4, ARUB145DTE4, ARUB168DTE4, ARUB169DTE4

Figure 5: Air Guide.

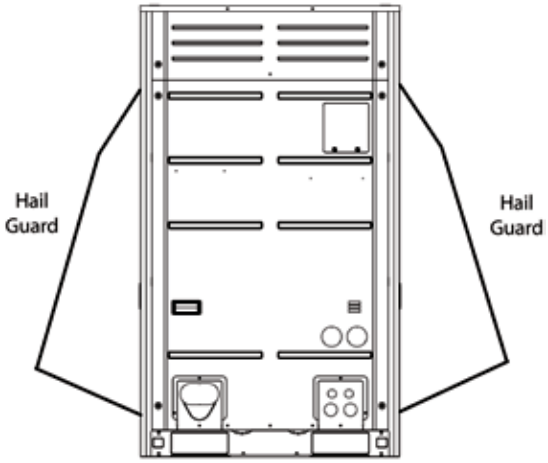
Multi V Hail Guard Kits

(ZHGDKA01A and ZHGDKA04A)

Optional hail guard kits help protect the heat exchangers in Multi V IV outdoor units.
Each kit includes:

- Right wind baffle
- Left wind baffle
- Rear wind baffle
- (50) #10 x 1/2 self-drilling hex head screws

Figure 6: Hail Guard Kit.



Use ZHGDKA01A with the following Multi V IV models:
6-ton Outdoor Units ARUN072BT4, ARUN072DT4, ARUB072BT4, ARUB072DT4

Use ZHGDKA04A with the following Multi V IV models:
8-ton to 14-ton Outdoor Units ARUN096BTE4, ARUN096DTE4, ARUN121BTE4,
ARUN121DTE4, ARUN144BTE4, ARUN144DTE4, ARUN145BTE4, ARUN145DTE4, ARUN168BTE4, ARUN168DTE4, ARUN169BTE4,
ARUN169DTE4
ARUB096BTE4, ARUB096DTE4, ARUB121BTE4, ARUB121DTE4, ARUB144BTE4, ARUB144DTE4, ARUB145BTE4, ARUB145DTE4,
ARUB168BTE4, ARUB168DTE4, ARUB169BTE4, ARUB169DTE4

See submittals at www.lg-vrf.com to verify how many kits are needed for each combination frame.

Note:

ARUN145BTE4-DTE4 / ARUB145BTE4-DTE4, ARUN169BTE4-DTE4 / ARUB169BTE4-DTE4 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-DTE4 / ARUB144BTE4-144DTE4, ARUN168BTE4-DTE4 / ARUB168BTE4-144DTE4 single frame models.

Low Ambient Baffle Kits

(ZLABKA01A and ZLABKA03A)

Optional low ambient baffle kits allow for Multi V IV outdoor unit operation down to -9.9°F in cooling mode. Can be applied to heat pump and heat recovery systems. When used with heat recovery systems, low ambient cooling to -9.9°F is possible only when all indoor units are operating in cooling mode. Does not impact synchronous operating range.

Each kit includes:

- Right wind baffle
- Left wind baffle
- Rear wind baffle
- Top discharge elbow with motorized damper and 24V damper actuator
- (50) #10 x 1/2 self-drilling hex head screws
- Sealtite connector (for routing of actuator control and power wiring down to outdoor unit electrical box)
- PRVC2 Control kit is a required accessory (sold separately)

Use ZLABKA01A with the following Multi V IV models:
6-ton Outdoor Units ARUN072BT4, ARUN072DT4, ARUB072BT4, ARUB072DT4

Use ZLABKA03A with the following Multi V IV models:
8-ton to 14-ton Outdoor Units ARUN096BTE4, ARUN096DTE4, ARUN121BTE4, ARUN121DTE4, ARUN144BTE4, ARUN144DTE4, ARUN145BTE4, ARUN145DTE4, ARUN168BTE4, ARUN168DTE4, ARUN169BTE4, ARUN169DTE4,
ARUB096BTE4, ARUB096DTE4, ARUB121BTE4, ARUB121DTE4, ARUB144BTE4, ARUB144DTE4, ARUB145BTE4, ARUB145DTE4, ARUB168BTE4, ARUB168DTE4, ARUB169BTE4, ARUB169DTE4

See submittals at www.lg-vrf.com to verify how many kits are needed for each combination frame.

Note:

ARUN145BTE4-DTE4 / ARUB145BTE4-DTE4, ARUN169BTE4-DTE4 / ARUB169BTE4-DTE4 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-DTE4 / ARUB144BTE4-144DTE4, ARUN168BTE4-DTE4 / ARUB168BTE4-144DTE4 single frame models.

Figure 7: ZLABKA01A Low Ambient Kit for 6-ton Outdoor Units

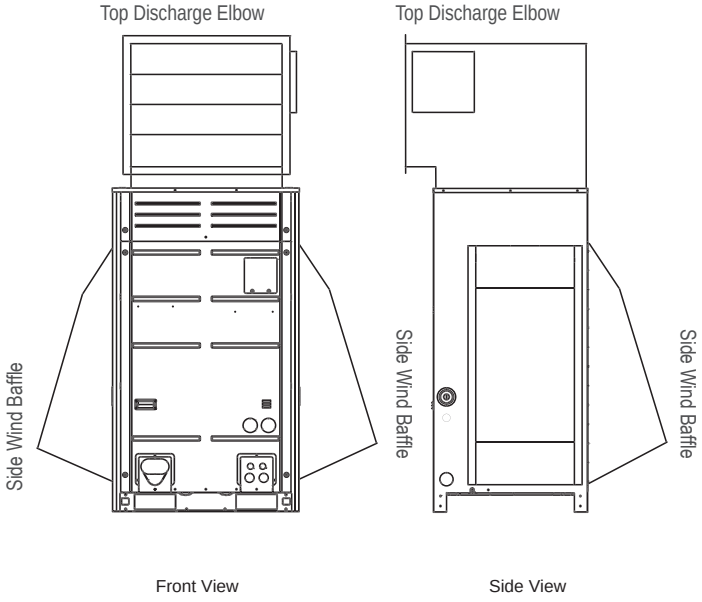
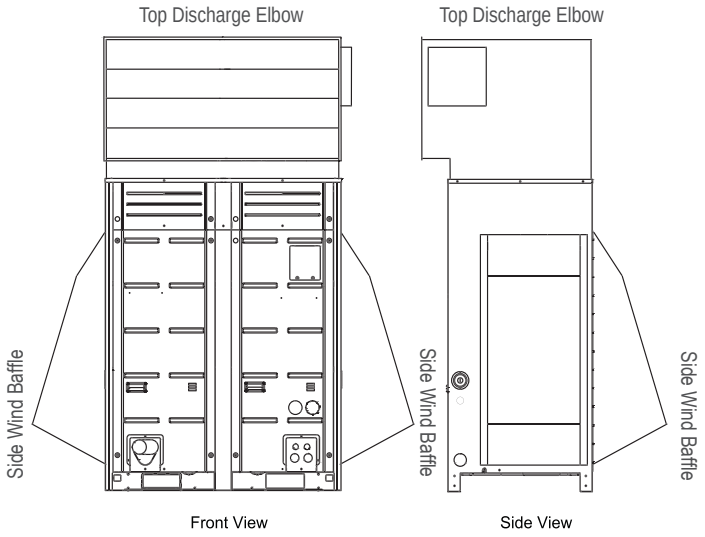


Figure 8: ZLABKA03A Low Ambient Kit for 8-ton to 14-ton Outdoor Units



LG Monitoring View (LGMV) Diagnostic Software and Cable

(PRCTSL1 and PRCTFE1)

LGMV software allows the service technician or commissioning agent to connect a computer USB port to the outdoor unit main printed circuit board (PCB) using an accessory cable without the need for a separate interface device. The main screen for LGMV shall allow user to view the following real time data on one screen:

- Actual inverter compressor speed
- Target inverter compressor speed
- Actual outdoor fan speed
- Target outdoor unit fan speed
- Actual superheat
- Target superheat
- Actual subcooler circuit superheat
- Target subcooler circuit superheat
- Main EEV position
- Subcooling EEV position
- Inverter compressor current transducer value
- Outdoor air temperature
- Actual high pressure/saturation temperature
- Actual low pressure/saturation temperature
- Suction temperature
- Inverter compressor discharge temperature
- Constant speed compressor discharge temperature
- Front outdoor coil pipe temperature
- Back outdoor coil pipe temperature
- Liquid line pipe temperature
- Subcooler inlet temperature
- Subcooler outlet temperature
- Average indoor unit (IDU) pipe temperature
- Inverter compressor operation indicator light
- Four-way reversing valve operation indicator light
- Pressure graph showing actual low pressure and actual high pressure levels
- Error code display
- Operating mode indicator
- Target high pressure
- Target low pressure
- PCB (printed circuit board) version
- Software version
- Installer name
- Model number of outdoor units
- Site name
- Total number of connected indoor units
- Communication indicator lights
- Indoor unit capacity
- Indoor unit operating mode
- Indoor unit fan speed
- Indoor unit EEV position
- Indoor unit room temperature
- Indoor unit inlet pipe temperature
- Indoor unit outlet pipe temperature
- Indoor unit error code

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

1. Cycleview: Graphic of internal components including:
   - Compressors showing actual speeds
   - EEVs
   - IDUs
   - Liquid injection valves
   - Temperature and pressure sensors
   - Four-way reversing valve
   - Outdoor fans showing status and speeds

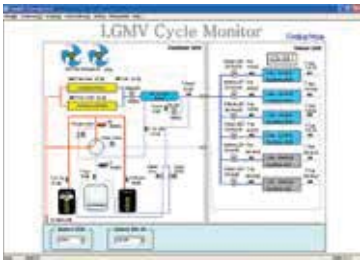


Figure 9: MV Cycleview.

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

The software is available in a high version with all of the features listed above. The low version has all features as the high version without Target High Pressure and Target Low Pressure values shown on main screen.

In lieu of connecting to the ODU, user has the option to connect to IDU with the use of a USB to RS-485 connector kit. When connected through IDU, user will not be able to record data.

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.

Recommended Minimum PC Configuration:

- CPU: Pentium® IV 1.6 GHz
- Operating System: Windows® NT/2000/XP/Vista
- Main Memory: 256 MB
- Hard Disk: 600 MB when operating
- Web Browser: Internet Explorer® 5.0

APPLICATION GUIDELINES

LATS Multi V Piping Design Software

The proper design and installation of the refrigerant piping system is a critical element of a Multi V system. Multi V Heat Pump systems require two pipes between components – a liquid line and a vapor line. Multi V Heat Recovery systems require three pipes between the outdoor unit and the heat recovery unit – a liquid line, a low-pressure vapor line, and a high-pressure vapor line. A properly designed refrigerant piping system ensures that refrigerant is delivered to the indoor unit coils for optimal system performance and capacity.

LG Air Conditioner Technical Solution (LATS) software is a total design solution for LG Multi V air conditioning systems. This Windows®-based application assists the design engineer with specifying and sizing outdoor and indoor units (by calculating component capacity based on design conditions), laying out the refrigeration distribution pipe system, checking piping limitations, calculating refrigerant charge, and generating equipment schedules and piping diagrams in (.dxf) format for use on CAD building design drawings.*

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

To ensure that the refrigerant piping design meets LG's quality standards, a LATS refrigerant piping design must be provided with every Multi V order. Following the installation, if any changes or variations to the design are necessary, a new LATS file must be created and provided to LG prior to system commissioning to ensure the proper pipe size has not changed.

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 correction factors when calculating actual indoor unit capacities at that altitude.

Design Choices

LATS Multi V software is flexible, offering the HVAC system engineer an easy to use Tree mode.

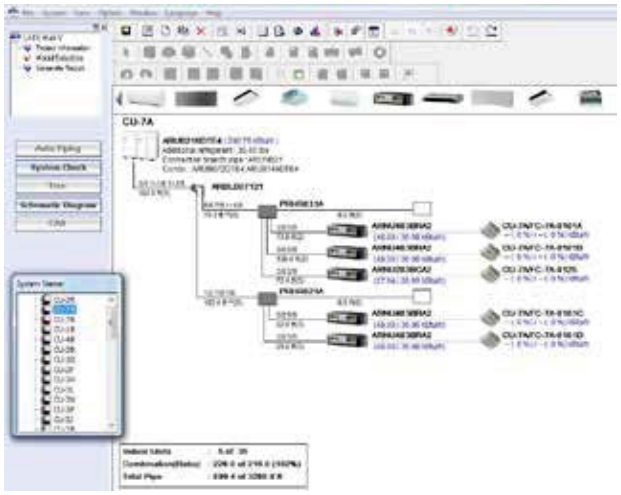
Tree Mode

Using the Tree mode, the engineer can quickly create a one-line schematic drawing of a Multi V system. Integration of the engineered pipe system into the building drawings is done at a later date by the draftsperson using standard drafting software tools.

Import building loads from an external file (.xls format).

- System components selected using an easy drag and drop process.
- Automatically analyzes and checks the design complies with most piping design limitations.
- Sizes refrigerant piping.
- Generates a system engineering report (.xls format).
- Generates an equipment schedule (.xls or .dxf format).
- Generates a system piping diagram (.dxf format).

Figure 10: Screenshot of LATS Pipe System Design Tool in Tree Mode.



LATS Report

LATS Multi V software generates a report file (.xls format) containing project design parameters, cooling and heating design day system component performance, and capacity data. The report calculates the system combination ratio, calculates the system refrigerant charge, and provides detailed bill of material information including a list of Multi V outdoor units, air handlers, control devices, accessories, refrigerant pipe sizes segregated by building, by system, by pipe size, and by pipe segments.

LG

EQUIPMENT SELECTION PROCEDURE

Note:

The following procedure is a representation on how LATS Multi V Piping Design software works when designing a Multi V HVAC system. It should not replace the use of LG's LATS Multi V complimentary selection software, but should instead be used in conjunction with it. Contact your LG representative to obtain a copy of the software and the user's manual.

Always use LATS Multi V Software

To properly select, size, and verify that the Multi V system components are optimized, follow the recommendations and instructions provided in this section:

- Zone the building.
- Determine the ventilation method.
- Select the indoor unit(s).
- Select the outdoor unit(s).
- Perform system sizing checks.
  - Calculate the Corrected Capacity Ratio (CCR).
  - Determine the system Combination Ratio (CR).
  - Determine the Running (indoor) Unit Ratio (RUR).

When using the LATS Multi V software, the default indoor design day conditions of 80.6°F DB / 67°F WB in cooling mode and 68°F DB / 56.7°F WB in heating mode may need to be adjusted to reflect the designer's preferred return air design temperature.

Note:

Data provided in the LATS tree mode diagram or report file is not valid until the "Auto-Piping" and "System Check" routines are run without errors. Errors will be reported immediately in pop-up dialog boxes or red lines surrounding indoor unit(s) and / or along pipe segments. If errors are indicated, modify the pipe system design and / or system components and re-run LATS.

Zone the Building–Multi V IV Heat Pump Systems

Multi V IV Heat Pump is a two-pipe heat pump system that can cool or heat, but not both simultaneously. When designing a heat pump system, the designer typically combines spaces with similar load profiles located near or adjacent to each other into "thermal zones." After combining like spaces into thermal zones that will be served by a single (or grouped) indoor unit(s), calculate the peak cooling and heating loads for each thermal zone.

Zone the Building–Multi V IV Heat Recovery Systems

Multi V IV Heat Recovery is a three-pipe heat pump system that can cool and heat simultaneously. To maximize the amount of heat recovered and optimize the system operating efficiency, it is best to combine spaces that require heating and cooling concurrently on each Multi V pipe system. LG multi-port heat recovery units are designed to serve spaces that need cooling and others that need heating at the same time. The heating/cooling operating mode selection is made at the heat recovery units' outbound pipe port, independent of the adjacent ports' operating mode.

In many buildings, to optimize system design, spaces on opposite sides of the building are combined on a single pipe system served by a common Multi V IV Heat Recovery outdoor unit. If the building has multiple floors, connected load diversity is often maximized by combining spaces located on different floors (maximum 131 feet vertical height difference between indoor system components). Each building will be unique. To discover the best combination of spaces, use a building energy modeling software.

Calculate the Ventilation Method

Decide how ventilation air will be introduced to each space. Some models of Multi V indoor units have field-installed accessories available to accommodate the direct connection of ventilation ductwork to the unit. It is recommended, however, that additional considerations be assessed and understood when using direct connection accessories. For more information, contact your LG applied equipment representative or visit www.lg-vrf.com for technical product information.

Note:

In all cases, LG recommends ducting pre-treated room neutral, ventilation air directly to the space. If the ventilation air is not tempered to room neutral conditions before introduction to the conditioned space, remember to add the ventilation air load(s) to the space load before sizing the indoor unit(s). Local codes or other professional design guidelines, such as ASHRAE 62.1, will dictate the volume of ventilation air required.

It may be prudent to oversize the dedicated outdoor air system considering there will be a few days of the year when weather conditions exceed the design day conditions. This will minimize the possibility of ventilation air conditions causing the space temperature to drift outside design day parameters in the case where a decoupled outside air system is used, or the indoor unit's entering air temperature falls outside the approved design temperature range if a coupled outside air system is used.

Designing for Extreme Climatic Conditions

The Multi V IV air-cooled outdoor unit(s) may have to operate in weather conditions more extreme than a typical design day. Design days are the days of the year that either cooling or heating capacity is needed the most. In light of this, it may be prudent to size the outdoor unit considering the anticipated worst weather day conditions to ensure adequate capacity year round.

When design outdoor ambient conditions are outside the cataloged air-cooled outdoor unit operating range, the net refrigeration effect (capacity) delivered to the indoor units cannot be guaranteed. As a result, the outdoor unit's net refrigeration capacity available for use by the indoor units will be slightly reduced under certain extreme ambient air conditions. (For cooling and heating capacity performance

data, see the separate Multi V IV Performance Data Manual on www.lg-vrf.com.)

In lieu of designing for extreme weather conditions beyond the cataloged temperature range, consider limiting the maximum and / or minimum temperature of the air around the Multi V outdoor air-cooled unit, or consider a Multi V water-cooled unit.

When installing a Multi V outdoor unit indoors, provide a condensate drain pan with drain in locations where frozen run-off water may present a slipping danger. Also, the air guide accessory (sold separately) should be installed when mounting outdoor units indoors, to prevent short cycling of discharge air.

Heating Season

Provide a ventilated equipment enclosure equipped with an auxiliary heat source, or place the outdoor unit(s) within the confines of the building envelope. On retrofit projects, it is best practice to position the outdoor unit(s) in former chiller, boiler, or air handler rooms. These strategies are commonly used on air-cooled projects to eliminate "extreme" over-sizing of the outdoor unit(s).

The enclosure will eliminate other potential operational problems from occurring, including the build-up of snow and ice on the unit case, fan shroud and fan blade, limit the capacity reduction effect of operating the outdoor unit at extremely low temperatures, and may reduce the size and initial cost of the Multi V IV outdoor unit.

Cooling Season

An enclosure housing the outdoor unit or roof structure designed to shade the outdoor unit will protect the unit(s) from the negative impact of direct sun exposure, hail, and on sunny days, increase the cooling capacity by reducing the refrigerant condensing temperature.

Note:

When the designer provides the LATS software with ambient air design conditions that are above or below the cataloged operational temperature range, the software will override the designer's specified conditions and will size the refrigerant pipe system using the maximum or minimum cataloged ambient air operating temperature. The report generated by LATS will reflect the outdoor ambient air conditions the designer provides, but the indoor and outdoor unit(s) cooling and heating corrected capacities calculated and shown in the report will be based on the cataloged ambient air operating temperature limits. On these projects, the designer must manually estimate the corrected cooling and heating capacity of the outdoor unit when specified ambient conditions are outside the cataloged range.

Select the Indoor Unit(s)

The building sensible cooling load is typically the critical load to satisfy. In coastal areas or humid applications, such as high occupancy spaces, both the latent and sensible cooling loads should be considered. In areas where the cooling and heating loads are similar or the heating load may exceed the total cooling load, the designer should verify the indoor unit selection satisfies both the heating and cooling requirements.

Determine how many indoor units will be required. Refer to the specification tables to obtain the maximum number of indoor units allowed on Multi V IV Heat Pump and Heat Recovery units. If the quantity of indoor units exceeds the maximum allowed for the outdoor model selected, consider increasing the size of the outdoor unit or split the indoor units into two groups served by separate outdoor units.

Calculate the entering mixed air conditions. Verify the entering air temperature is below 76˚F WB in cooling mode and above 59˚F in heating mode.

To calculate the indoor unit entering mixed air temperature:

$$MAT = \frac{(RAT \times \%RA) + (OAT \times \%OA)}{100}$$

Where:

MAT = Mixed air temperature

RAT = Return air temperature

OAT = Outside air temperature

%RA = Percentage of return air

%OA = Percentage of outdoor air

Note:

When the indoor unit entering air temperature is outside the cataloged operational limits, operational abnormalities may occur. These include frost accumulating on the coil, low or high suction temperature, low or high head pressure, low or high discharge temperature, or complete system shutdown.

Indoor unit *nominal* cooling capacity ratings, among other parameters, are based on an entering air condition of 80°F DB / 67°F WB and a 95°F DB outdoor ambient temperature. *Nominal* heating capacity ratings are based on an indoor unit entering air condition of 70°F DB and an outdoor ambient air temperature of 47°F DB / 43°F WB.

Capacity Correction

The *corrected* cooling/heating capacity is different from the nominal cooling / heating capacity. The corrected capacity reported by LATS includes changes in unit performance after considering refrigerant line pressure drop, the system's Combination Ratio (CR), and the effect design ambient operating conditions has on the system's cooling capability.

Depending on the location of the building, additional capacity correction factors may need to be applied to the corrected capacity values provided by LATS . (For correction factors, see the separate Multi V IV Performance Data Manual on www.lg-vrf.com.)

Altitude Correction

On air-cooled systems, the impact of air density must be considered on systems installed at a significant altitude above sea level. To calculate the effect on the indoor unit's cooling capacity, manually apply locally accepted altitude correction factors. LATS does not de-rate indoor unit capacity for altitude.

Minimum Air Change Requirements

Avoid over-sizing indoor units in an attempt to increase the air exchange rate in the space. VRF systems are designed for minimum airflow over the coil to maximize latent capacity while cooling, maintain a comfortable, consistent discharge air temperature while heating, and minimize fan motor power consumption. In extreme cases, over-sizing indoor units may compromise the outdoor unit's ability to effectively match the space load(s).

Check the Indoor Unit Selection(s)

Verify the sensible (and total) corrected cooling capacity. For each indoor unit the corrected capacity must be at least equal to the sum of the appropriate cooling design day space load(s) (plus ventilation load, if applicable) for the space(s) served by the indoor unit.

Verify the corrected heating capacity. For each indoor unit, the corrected capacity must be at least equal to the sum of the heating design day space load (plus ventilation load, if applicable) for all spaces served by the indoor unit.

Select the Outdoor Unit

After all indoor units are properly sized to offset the applicable loads in each space, begin the selection of the outdoor unit by choosing a size that meets both the block load cooling requirement and offsets the sum of the peak heating load.

After making an outdoor unit selection, look up the outdoor unit's corrected cooling and heating capacity at the specified ambient design conditions. Use values reported by LATS or find it in the tables provided in the separate Multi V IV Performance Data Manual on www.lg-vrf.com.

Note:

In LATS always run the Auto-Pipe and System Check features following any change in the outdoor unit selection to verify the system design is acceptable.

Capacity Correction

For air-cooled systems operating in cooling mode, a capacity correction factor may apply to account for the length of the system's liquid pipe and elevation difference between the outdoor unit and the indoor unit(s). If the outdoor units corrected cooling capacity was derived from the LATS report, the elevation difference correction factor has already been applied. If the corrected cooling capacity was found using corrected capacity tables found in the separate Multi V IV Performance Data Manual on www.lg-vrf.com, apply the appropriate elevation difference factor also found in the Performance Data Manual (choice of table depends on the architecture of the system design). Multiply the outdoor unit corrected cooling capacity by the elevation difference correction factor. For high altitude locations, locally accepted altitude correction factors must be manually applied to outdoor unit capacity. LATS will not de-rate outdoor unit capacity for altitude.

Frost Accumulation

The outdoor unit heating capacity may need to be adjusted for frost accumulation on air-cooled systems. If design day conditions are below the dew-point of the surrounding air, frost may not be a problem and no correction factor is needed. In certain weather conditions, however, frost may form and accumulate on the air-cooled outdoor unit coil and impact the coils ability to transfer heat.

If significant frost accumulates on the outdoor unit coil, a defrost algorithm will start automatically. The timing between defrost periods is determined by the system's ability to achieve a target head pressure value.

LATS will automatically apply a frost accumulation factor if the check box labeled "Defrost Factor" in the outdoor unit selection dialog box is marked. The dialog box can be accessed by double-clicking on the outdoor unit image. If checked, the corrected outdoor unit capacity provided by the LATS report and displayed on the tree mode piping diagram will already be adjusted for outdoor unit coil frost accumulation.

If the corrected heating capacity was found using the Performance Data tables, the frost accumulation factor must be applied. (For correction factors, see the separate Multi V IV Performance Data Manual on www.lg-vrf.com.).

Check the Indoor Unit Selection(s)

After applying the appropriate correction factors to the outdoor unit, verify the corrected cooling capacity is at least equal to the total building load (considering building diversity, if applicable), and the corrected heating capacity is at least equal to the sum of the peak heating loads for all spaces and/or thermal zones served by the system.

System Sizing Checks

Calculate the Corrected Capacity Ratio (CCR)

The system's CCR is defined as the sum of the space loads divided by the outdoor unit corrected capacity after all applicable correction factors are applied. Calculate this ratio for both the cooling and heating design days.

$$CCR\%_{(Clg)} = \left(\frac{\text{Total Cooling Block Load}}{\text{Actual Corrected Outdoor Unit Cooling Capacity}} \right) \times 100 \leq 100\%$$

$$CCR\%_{(Htg)} = \left(\frac{\text{Heating Peak Load}}{\text{Actual Corrected Outdoor Unit Heating Capacity}} \right) \times 100 \leq 100\%$$

The outdoor unit selected should be large enough to offset the total block cooling load for all spaces served by the VRF system during the peak cooling load hour on the cooling design day (account for ventilation air cooling load if the ventilation air has not been pretreated to room neutral conditions).

The corrected cooling capacity ratio (CCR% [clg]) should never exceed 100% plus building diversity. If it does, increase the size of the outdoor unit or change the system design by moving some of the building load and associated indoor unit(s) to another Multi V system.

The outdoor unit should also be large enough to offset the sum of the building's space heating loads without considering building diversity. In the heating season, it is typical that all spaces served by the system will peak simultaneously in the early morning, thus building diversity should never be considered. If the corrected heating capacity ratio (CCR% [htg]) exceeds 100%, increase the size of the outdoor unit or change the system design by moving some of the building load to another Multi V system.

Determine the System Combination Ratio (CR)

The system's CR compares the nominal capacity of all connected indoor units with the nominal capacity of the outdoor unit serving them. Locate nominal capacity information for indoor and outdoor units in the General Data Tables of their respective Engineering Manuals.

For example,

If a VRF system has an outdoor unit with a nominal capacity of C and four indoor units having nominal capacity ratings of W, X, Y, and Z respectively, the CR would be determined as follows:

$$CR\% = \left(\frac{W + X + Y + Z}{C} \right) \times 100$$

Note:

The Multi V system will not commission, start or operate unless the CR is between 50% and 130%.

If the CR is over 100%, the designer is under-sizing the outdoor unit relative to the combined nominal capacity of the connected indoor units. In some applications, under-sizing of the outdoor unit is prudent as it reduces the initial equipment investment and will properly perform as long as the designer:

1. Knows the indoor unit(s) are oversized relative to the actual load(s) in the spaces served.
2. Knows the space loads will peak at different times of the day (i.e., building has "load diversity").

In some designs, over-sized indoor units may be unavoidable in the case where the smallest size indoor unit available from LG is larger than what is necessary to satisfy the space load. This scenario may occur when an indoor unit selection one size down from the selected unit is slightly short of fulfilling the design load requirements, and the designer must choose the next largest size unit.

Note:

If the outdoor unit is properly sized to offset the building's total cooling block load and the system's combination ratio is above 130%, indoor units are likely oversized. In applications where all indoor units are "right-sized" and there is no building diversity, the system's CR will likely be ≤100%.

If the CR is above 130%, review the indoor unit choices and downsize, or select a larger outdoor unit. Consider moving indoor units to another Multi V, Multi F, or single-split system if the outdoor unit size cannot be increased.

If the CR falls below 50%, select a smaller outdoor unit or consider adding more or larger indoor unit(s) to the system. This situation is common on multi-phase projects where the design calls for the majority of indoor units be added to the system at a later date. To raise the CR above the minimum 50% requirement:

3. Consider including additional indoor units on the first phase
4. Design two smaller systems in lieu of a single larger system. Connect all "first phase" indoor units to the outdoor unit being installed on the first phase, and delay the installation of the additional outdoor unit until a later date.

Conclusions and Recommendations

- Always use LATS Multi V system design software to check a design.
- Validate that each indoor unit is appropriately sized. Before validating, if the indoor units have been properly sized, the outdoor unit's size must be temporarily adjusted to make the system's CR ≤100%.
- Using the indoor unit's corrected capacity for cooling and heating provided by LATS and apply a correction factor for altitude if appropriate.
- Verify that the outdoor unit selection for each system is properly sized. Verify that the corrected capacity for cooling and heating provided by LATS is sufficient to offset the block building space load after applying additional correction factors for capacity and frost accumulation, if appropriate.
- For each Multi V system, calculate the cooling and heating design days
  1. Corrected Capacity Ratio (CCR).
  2. Combination Ratio (CR).

After these system checks are complete and design limitations are adhered, the system's indoor and outdoor components should be properly sized and the system's performance should now be optimized. The VRF system component size selections should be acceptable.

At any time, if further system design assistance is needed or you have a unique application you would like to discuss, contact your LG applied equipment representative for assistance.

Building Ventilation Design Guide

ASHRAE 62.1 and local codes specify the minimum volume of outdoor air that must be provided to an occupied space. Outdoor air is required to minimize adverse health effects, and it provides acceptable indoor air quality for building occupants. The five methods of accomplishing this with LG Multi V IV systems are summarized here.

Note:

Disclaimer

Although we believe that these building ventilation methods have been portrayed accurately, none of the methods have been tested, verified, or evaluated by LG Electronics, U.S.A., Inc., In all cases, the designer, installer, and contractor should understand if the suggested method is used, it is used at their own risk. LG Electronics U.S.A., Inc., takes no responsibility and offers no warranty, expressed or implied, in law or in fact, including but not limited to any implied warranty of merchantability or fitness for a particular purpose.

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

Method 1: Decoupled Dedicated Outdoor Air System (DDOAS)

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

Note:

LG recommends using the DDOAS method in all installations.

Advantages

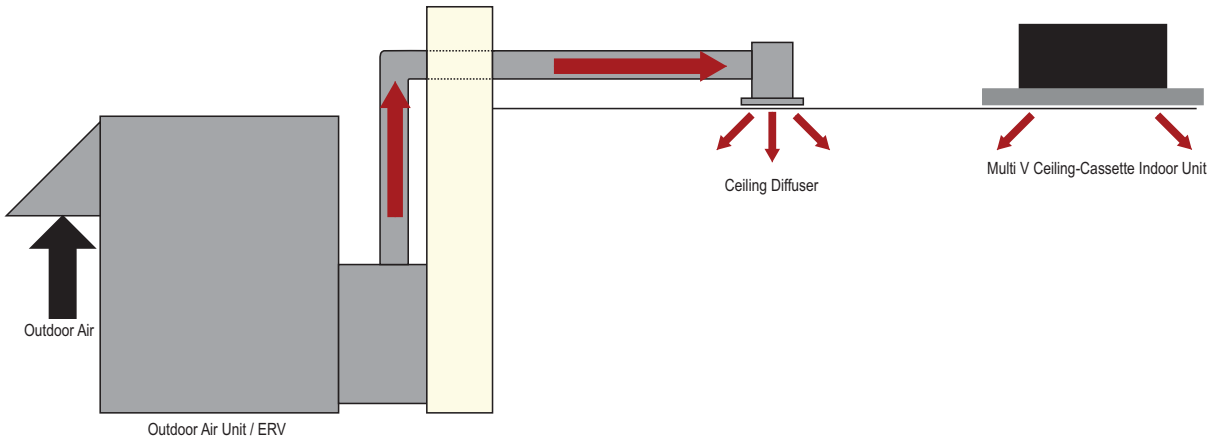
- Does not add additional heating or cooling loads to indoor units.
- May be used with a full lineup of the indoor units.
- The outdoor air unit may supply “neutral” air to the occupant space even when the Multi V indoor unit fan changes speed or cycles on and off. DDOAS controls do not have to be interlocked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

Disadvantages

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

Note:

Methodology illustrations are for examples only and do not depict actual indoor units for the specific outdoor unit pairing. These are generic illustrations to show ventilation design only.



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

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

Advantages

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

Disadvantages

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

Method 3: Unconditioned Outdoor Air Ducted to Indoor Units

Untreated outdoor air is channeled through a duct system that is piped to the return air duct on Multi V concealed indoor units or to the frame of Multi V 1-way and 4-way cassettes.

Note:

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

Advantages

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

Disadvantages

- Fan(s) will be required to push outdoor air to the indoor unit. Indoor units are engineered for low sound levels and are not designed to overcome the added static pressure caused by the outdoor air source ductwork.
- Ventilation air must be pre-filtered before mixing with the return air stream. LG indoor cassette models are configured to introduce the ventilation air downstream of the return air filter media.
- Ducted, 1-way, and 4-way cassette models are the only indoor units that accept the connection of an outdoor air duct to the unit case.
- Mixed air conditions must be between a minimum of 59°F DB while operating in heating and a maximum of 76°F WB while operating in cooling. Depending on the ventilation air volume requirement, the location choices are limited where untreated outside air may be introduced to the building using this method.
- Larger indoor units may be required to satisfy for additional outdoor air.
- Motorized dampers may be required to prevent outdoor air flow through the indoor unit when the indoor unit is not operating.
- An LG Dry Contact adapter may be necessary to interlock the motorized damper with the indoor unit.
- While operating in heating, the untreated outdoor air may delay the start of the indoor unit fan impacting building comfort.
- In most cases, in lieu of using the factory mounted return-air thermistor on indoor units, a remote wall temperature sensor or zone controller will be needed for each indoor unit to provide an accurate reading of the conditioned area temperature.

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

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

Note:

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

Advantages

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

Disadvantages

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

Method 5: Coupled Dedicated Outdoor Air (CDOA)

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

Note:

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

Advantages

- Separate ceiling registers or grilles for introduction of the outside air to the conditioned space may be avoided.

Disadvantages

- Ducted, 1-way, and 4-way cassette indoor units are the only models designed for direct connection of an outside air duct.
- The building occupant may not notice the outdoor air pretreatment system has malfunctioned until the unconditioned outdoor air exceeds the indoor unit mixed air limits of 59°F DB for heating and 76°F WB for cooling.
- If the coil entering air condition limitation is exceeded, the indoor unit may malfunction and ceases to operate.
- If the outdoor air unit cooling or heating system fails, the malfunction may be masked by the indoor unit ramping up operating parameters to compensate for the failure.
- Motorized dampers may be required to prevent outdoor air from entering the indoor unit while the indoor unit has cycled off.
- An LG Dry Contact adapter is necessary to interlock the motorized damper with the indoor unit fan operation.
- In lieu of using the factory mounted return-air thermistor, a remote wall temperature sensor or zone controller may be required to provide an accurate conditioned space temperature reading.

Selecting the Best Location—Outdoor Units

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

- Where the unit will not be subjected to direct thermal radiation from other heat sources.
- Where operating sound from the unit will not disturb inhabitants of surrounding buildings.
- Where the unit will not be exposed to direct, strong winds.
- Where there is enough strength to bear the weight of the unit.
- Include space for drainage to ensure condensate flows properly out of the unit when it is in heating mode.
- Include enough space for air flow and for service access.
- To avoid the possibility of fire, do not install the unit in an area where combustible gas may generate, flow, stagnate, or leak.
- Do not install the unit in a location where acidic solution and spray (sulfur) are often used.
- Do not use the unit in environments where oil, steam, or sulfuric gas are present.
- Install a fence to prevent vermin from crawling into the unit or unauthorized individuals from accessing it.

To ensure the outdoor unit operates properly, certain measures are required in locations where there is a possibility of heavy snowfall or severe windchill or cold:

1. Prepare for severe winter wind chills and heavy snowfall, even in areas of the country where these are unusual phenomena.
2. Position the outdoor unit so that its airflow fans are not buried by direct, heavy snowfall. If snow piles up and blocks the airflow, the system may malfunction.
3. Remove any snow that has accumulated 3-15/16 inches or more on the top of the outdoor unit.
4. Place the outdoor unit on a raised platform at least 19-11/16 inches higher than the average annual snowfall for the area. In environments where there is a possibility of heavy snow, the H frame height must be more than two (2) times the amount of average annual snowfall, and should not exceed the width of the outdoor unit. If the frame width is wider than the outdoor unit, snow may accumulate.
5. Install a snow protection hood or an air guide.
6. To prevent snow and heavy rain from entering the outdoor unit, install the air guide and/or hail guard kits.

Additionally, the following conditions should be taken into considerations when the unit operates in defrost mode:

- If the outdoor unit is installed in a highly humid environment (near an ocean, lake, etc.), ensure that the site is well-ventilated and has a lot of natural light. (Example: Install on a rooftop.)
- Sidewalks or parking lots near the outdoor unit may accumulate moisture after unit operates in defrost mode that can turn to ice.

The indoor unit may take longer to provide heat, or heating performance will be reduced in winter if the unit is installed:

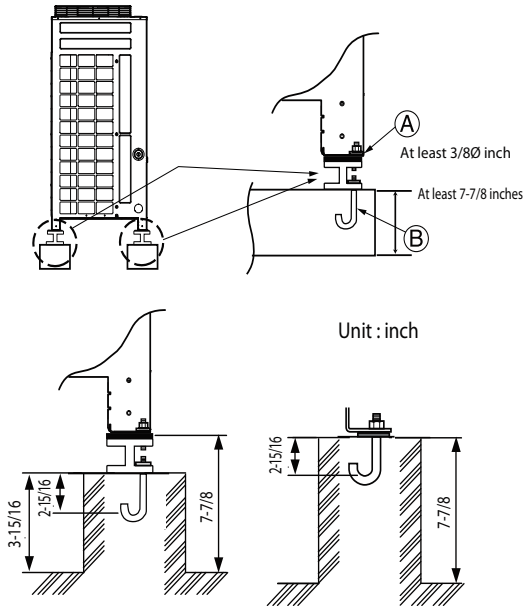
1. In a narrow, shady location.
2. Near a location that has a lot of ground moisture.
3. In a highly humid environment.
4. In an area in which condensate does not drain properly.

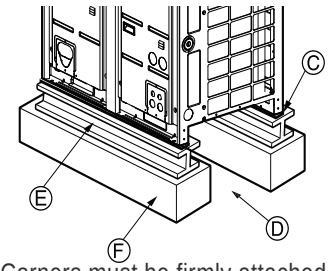
General Mounting

Securely attach the outdoor unit to a condenser pad, base rails, or other mounting platform that is securely anchored to the ground or building structure. Refer to dimensional drawings in the "Product Data" section on pages 35 to 40, and follow the applicable local code for clearance, mounting, anchor, and vibration attenuation requirements.

[1]All referenced materials are to be field-supplied. Images are not to scale. All dimensions ±0.25 inches.

Figure 11: Outdoor Unit—Mounting Methods[1].





A: Corners must be firmly attached, otherwise, the support will bend.

B: Use a 3/8 inch or 5/16 inch hexagon nut with a spring washer.

C: Anti-vibration material.

D: Include enough space for refrigerant piping and electrical wiring when installing through the bottom of the unit.

E: H-beam support.

F: Concrete support.

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 the Multi V IV frame 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 codes when designing a wind restraint system.

Dealing with Snow and Ice

In climates that experience snow buildup, place the unit on a raised platform to ensure proper condenser airflow. The raised support platform must be high enough to allow the unit to remain above possible snow drifts. Mount the unit on a field-provided snow stand at a minimum height that is equal to the average annual snowfall, plus 20 inches. Design the mounting base to prevent snow accumulation on the platform in front or back of the unit case. If necessary, provide a field fabricated hood to keep snow and ice and/or drifting snow from accumulating on the coil surfaces. Install the optional hail guard kit and air guide accessories (sold separately) to prevent snow or rain from accumulating on the fan inlet and outlet guards. When the system is commissioned, set the controller for "snow throw" operation. In all cases, connected duct work and accessories must provide 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.*

Ambient Air Conditions

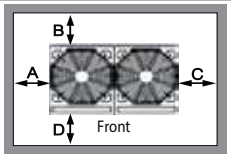
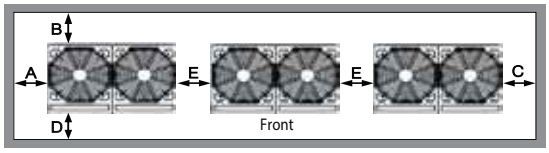
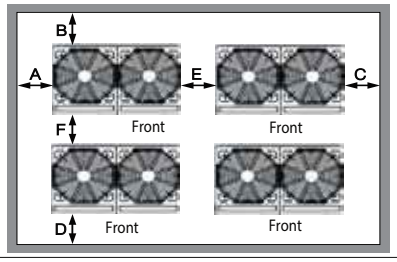
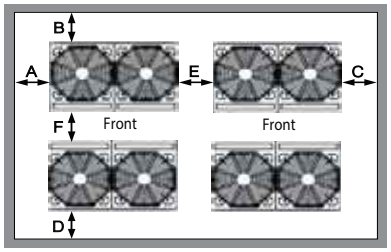
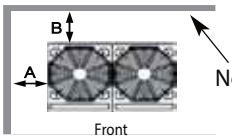
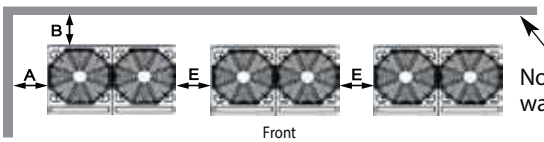
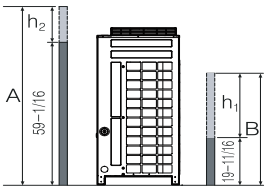
Avoid exposing the outdoor unit to steam, combustible gases, or other corrosive elements. Avoid exposing the unit to discharge from boiler stacks, chimneys, steam relief ports, other air conditioning units, kitchen vents, plumbing vents, and other sources of extreme temperature, gases, or substances that may degrade performance or cause damage to the unit.

When installing multiple outdoor units, avoid placing the units where discharge of one outdoor unit will blow into the inlet side of an adjacent unit.

Installation Space

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

Figure 12: 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	 No limitations on wall height	A≥ 7/16" B≥ 11-13/16"	
	 No limitations on wall height	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	

Installing Outdoor Units Indoors

LG Multi V outdoor units are engineered to be mounted outdoors and include technology designed to minimize the negative effects of winter weather's freezing rain, sleet, and snow. Some building projects, however, necessitate placing the HVAC outdoor units indoors:

- Lack of ground space.
- Lack of an appropriate outdoor location that meets system design requirements.
- When mounting on the roof is not an option due to a lack of roof space.
- Roof warranty will be voided if mechanical equipment is placed on the membrane.
- On retrofit projects, a former chiller/boiler/air handler equipment room, mechanical area, or penthouse already exists.
- Where a project has vertical, self-contained VAV air handlers on each floor (in lieu of a centralized mechanical room).
- To curtail the potential need for redundant zone heating devices such as wall-fin radiators or duct heaters.
- In extremely cold environments where there is a significant amount of run-time at temperatures well below freezing outside the outdoor unit ambient air temperature range published in this engineering manual.

Benefits of Installing Outdoor Units Indoors

- Shelters the outdoor unit from direct exposure to prevailing winds that decrease the heating capability of the outdoor unit.
- Protects equipment from freezing precipitation and/or potential ice build-up that could hinder unit operation.
- Maintains coil heat transfer efficiency by reducing the number of and shortening the cycle time for defrost operation.
- Easier maintenance and servicing during inclement weather.
- When mounted in a fully enclosed space, limiting the ambient air temperature may allow the Multi V system designer to eliminate oversizing the outdoor unit to compensate for loss of capacity at low ambient temperatures.
- May also curtail the need to provide inefficient redundant zone heating devices such as wall-fin radiators and second-stage ancillary heating devices.

Design Considerations Include:

- Enclosure types and elements such as louvers, rain hoods, dampers and controls, heating methods and sizing of heating devices
- Heating strategies
- Duct design
- Condensate handling

General Guidelines

- Follow ASHRAE 62.1 design guidelines.
- Depending on the project / application, a roof over the outdoor units in combination with a wind break may be all that is necessary.
- Consider the potential for snow accumulation near louvers/roof openings. Outside air intakes and discharge ducts/louvers should be engineered to clear anticipated snow accumulation levels by at least one (1) foot.
- In situations where operation is anticipated at temperatures of -13°F and lower, ancillary heat should be provided to heat the outdoor unit coils to assure continuous compressor operation and heating.

It may be necessary to use an air guide accessory to prevent discharge air from short-cycling back to the coil inlet.

- Another option is to field manufacture ductwork and mount on top of the unit to encompass the outdoor unit fan discharge and connect to the exterior discharge grille on the building.
- Avoid using a single duct on multi-fan units to prevent short cycling. Provide a dedicated duct for each outdoor unit fan discharge.
- Consider the direction of prevailing winds and opening placement. If possible, locate inlet openings upwind of discharge openings and other exhaust outlets.
- When inlet and outlet openings are placed on the same wall, minimum distance between the two openings should be approximately three (3) feet (minimum distance varies significantly with variations in outlet opening face velocity).
- If roof-mounted ventilation openings are used, strategically locate the inlet ventilation opening(s) upwind of the outlet opening(s).
- Discharge and supply ductwork should be designed to avoid weather related long periods of water entrainment and the potential for microbial growth.

PLACEMENT CONSIDERATIONS

MULTI V IV

Outdoor Units / Indoor Units

Provide a means to drain the condensate generated during heating mode and defrost cycle in addition to rainwater that infiltrates the inlet louver enclosed area.

- Install a field-provided drain pan under the outdoor units and provide a path to a nearby floor drain.
- If the ambient air temperature is expected to drop below 32°F in the enclosure, heat the bottom surface of the pan, drain line, and floor drain so that the condensate does not freeze before reaching the drain.

Allow for ventilation intake and exhaust air based on maximum outdoor unit fan capacity.

- Select the size, type and orientation of architectural louvers with adequate "net free area" face velocity to ensure the total external static pressure from the outdoor unit fan does not exceed design limitations (see specification data tables).
- No obstructions should be placed in front of the louver that could hamper the free flow (throw) of air.
- Roof top openings and / or discharge and supply louvers should be equipped with screens to prevent bird and insect infiltration.

As always, the best solution for each project balances acceptable heating performance (considering local weather conditions), capital costs, life cycle energy consumption, and limitations set forth by local building codes. For more detailed information on how to design indoor spaces for LG Multi V outdoor units, see the white paper "Air-Source VRF Mechanical Room Design Considerations for Outdoor Unit Placement in Enclosures" on www.lg-vrf.com.

Selecting the Best Location—Indoor Units

General Do's

- Place the unit where air circulation will not be blocked.
- Place the unit where drainage can be obtained easily and to minimize the length of the condensate drain piping.
- Place the unit where noise prevention is taken into consideration.
- Ensure there is sufficient supply air and maintenance space.
- Locate the indoor unit in a location where it can be easily connected to the outdoor unit / heat recovery unit.
- Follow the clearance and installation area weight requirements designated for each indoor unit type

General Don'ts

- *Avoid installing the unit near high-frequency generators.*
- *Do not install the unit near a doorway.*
- *The unit should not be installed near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used. (These materials may generate condensate, cause a reduction in heat exchanger efficiency, or the drain to malfunction. If this is a potential problem, install a ventilation fan large enough to vent out these materials.)*

Note:

For more detailed installation requirements for each specific indoor unit type, refer to the Indoor Unit Engineering and / or Installation Manuals.

Installing in an Area Exposed to Unconditioned Air

In some installation applications, areas (floors, walls) in some rooms may be exposed to unconditioned air (room may be above or next to an unheated garage or storeroom). To countermeasure:

- Verify that carpet is or will be installed (carpet may increase the temperature by three [3] degrees).
- Add insulation between the floor joists.
- Install radiant heat or another type of heating system to the floor.

⚠ WARNING

The unit should not be installed where sulfuric acid and flammable or corrosive gases are generated, vented into, or stored. There is risk of fire, explosion, and physical injury or death.

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

Note:

If the unit is installed near a body of water, the installation parts are at risk of being corroded. Appropriate anti-corrosion methods should be taken for the unit and all installation parts.

LG

Note:

Heat recovery units are for use with ARUB Series heat recovery systems only.

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

- Install the heat recovery unit indoors in a level and upright position.
- Ensure there is enough space in the installation area for service access.
- 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.
- Condensate drain piping is not required.

Figure 13: Dimensions for Heat Recovery Units.

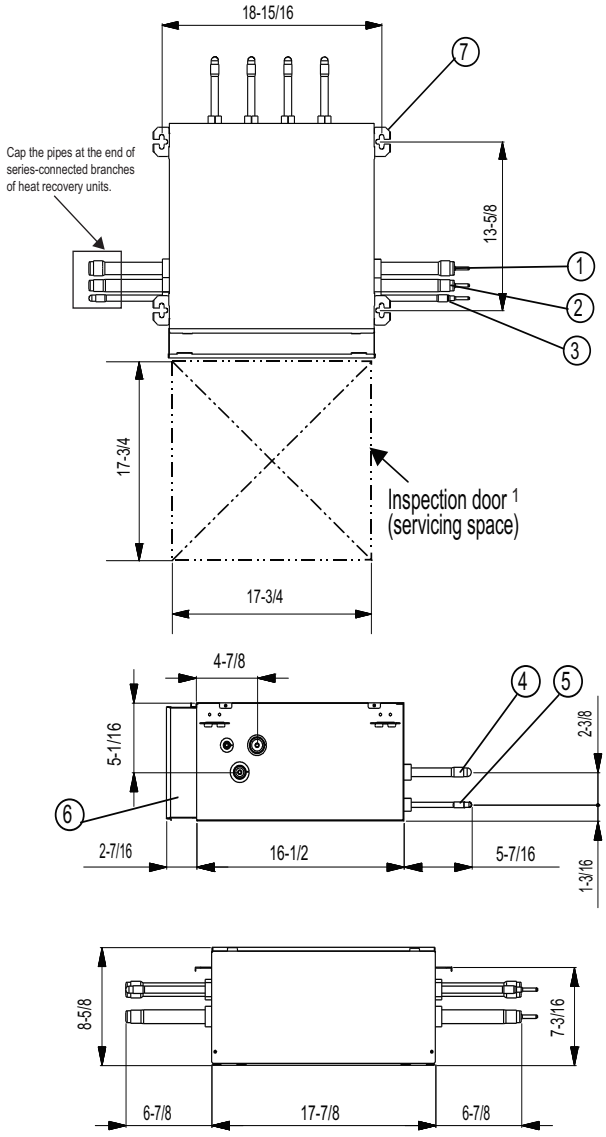


Figure 14: Minimum Service Clearances for Heat Recovery Units.

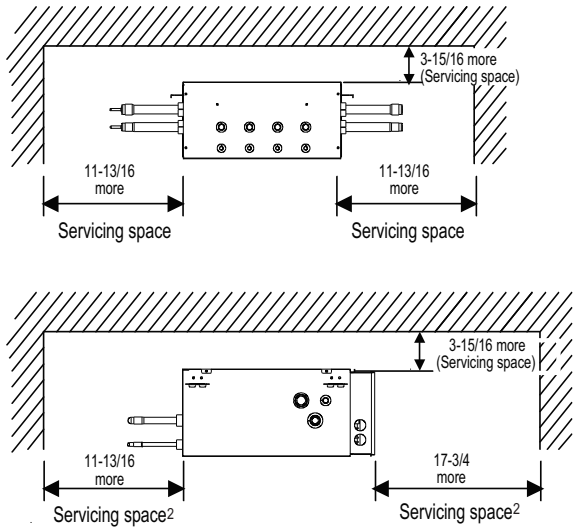


Table 31: Heat Recovery Unit Parts.

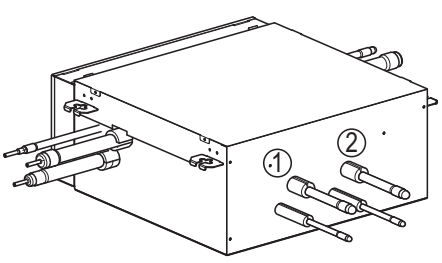
Tag No.	Part Name	Connection Size(in.)/Type		
		PRHR022A	PRHR032A	PRHR042A
1	Low pressure vapor pipe connection port	7/8 Braze	1-1/8 Braze	1-1/8 Braze
2	High pressure vapor pipe connection port	3/4 Braze	7/8 Braze	7/8 Braze
3	Liquid pipe connection port	3/8 Braze	1/2 Braze	5/8 Braze
4	Indoor unit vapor pipe connection port	5/8 Braze	5/8 Braze	5/8 Braze
5	Indoor unit liquid pipe connection port	3/8 Braze	3/8 Braze	3/8 Braze
6	Control box	–	–	–
7	Hanger bracket	3/8 or 5/16	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.

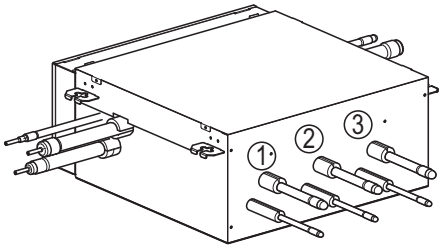
PLACEMENT CONSIDERATIONS

Heat Recovery Units

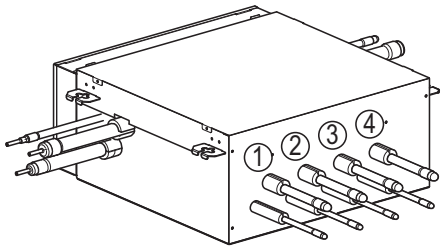
Figure 15: Heat Recovery Unit Types.



PRHR022A (Two [2] ports)



PRHR032A (Three [3] ports)



PRHR042A (Four [4] ports)

1. Each heat recovery unit has a capacity up to 192,000 Btu/h.
2. Heat recovery units connected in series have a total capacity up to 192,000 Btu/h per series string. Series string is defined as heat recovery units piped in series.
3. Elevation difference between heat recovery units connected in series is permitted, but should not exceed 16 feet.
4. Each port on the heat recovery unit has a capacity up to 54,000 Btu/h.
5. Each port can be connected to a maximum of eight (8) indoor units. When multiple indoor units are connected to one port, all indoor units on that port must operate in the same mode (cooling or heating).
6. If an indoor unit larger than 54,000 Btu/h is to be used, two (2) ports must be twinned using a reverse Y-branch.
7. Connect largest indoor unit to first port of the heat recovery unit.
8. Elevation difference between the heat recovery unit and the indoor unit(s) should not exceed 49 feet.

REFRIGERANT PIPING DESIGN & LAYOUT BEST PRACTICES

REFRIGERANT PIPING DESIGN

Piping Design Guideline Summary

The proper design and installation of the refrigerant piping system is a critical element of a Multi V system. As detailed on page 102, LG provides engineers LG Air Conditioner Technical Solution (LATS) software to help design LG Multi V air conditioning systems. The following pages are examples of manual pipe size calculations for Multi V refrigerant piping systems.

The information represents how LATS Multi V Piping Design software works when designing the piping system for Multi V heat pump and heat recovery units. It should not replace the use of LG's LATS Multi V complimentary selection software, but should instead be used in conjunction with it. Contact your LG representative to obtain a copy of the software and the user's manual.

Refrigerant Piping System Quality Assurance

To ensure that the refrigerant piping design meets LG's quality standards, a LATS refrigerant piping design software report must be provided with every Multi V IV order. Following the installation, if any changes or variations to the design were necessary, an "as-built" LATS piping design software report must be 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. User should always check the LATS report actual pipe layout versus pipe limits. The user may want to increase pipe lengths when conditions close to the standard application limits are present, forcing increased pipe diameters seen in conditional applications to be used and avoiding 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, re-sizing, 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 ensures profitable installation, eliminates rework, and ensures easier system commissioning.

Creating a Balanced Piping System

Unlike designing duct-work 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 systems have to be designed to 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 long radius elbows, bends present, fitting installation orientation, and end use device elevation differences.

Note:

It is imperative the designer avoids 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.

Figure 16: Typical VRF Heat Pump System Building Layout Listing the Piping Limitations.

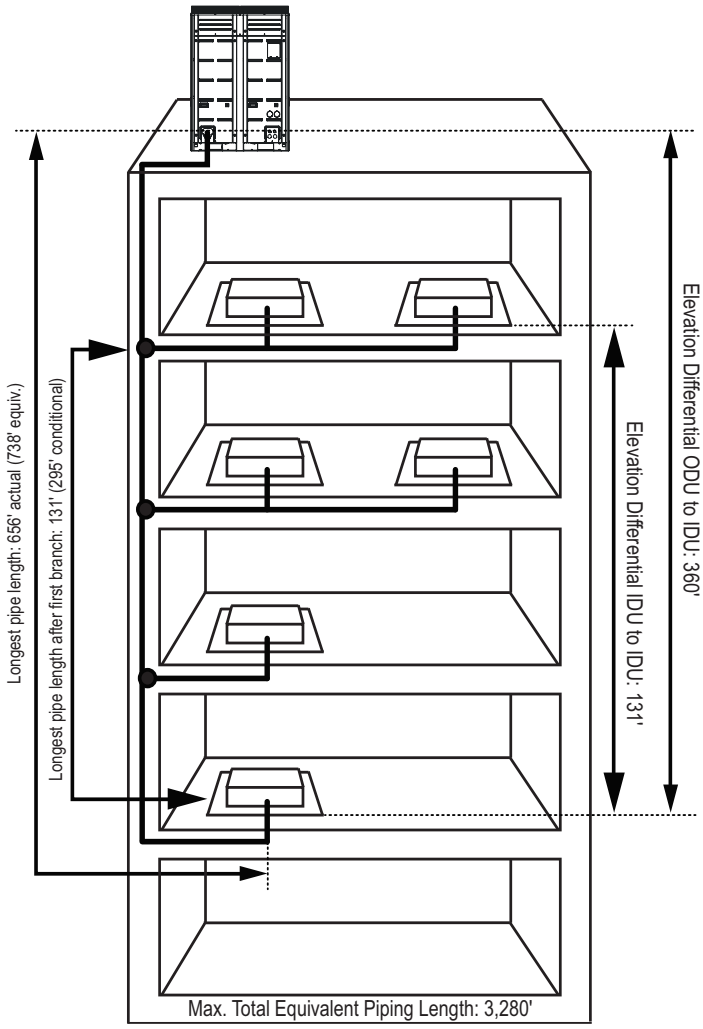


Figure 17: Typical VRF Heat Recovery System Building Layout Listing the Piping Limitations..

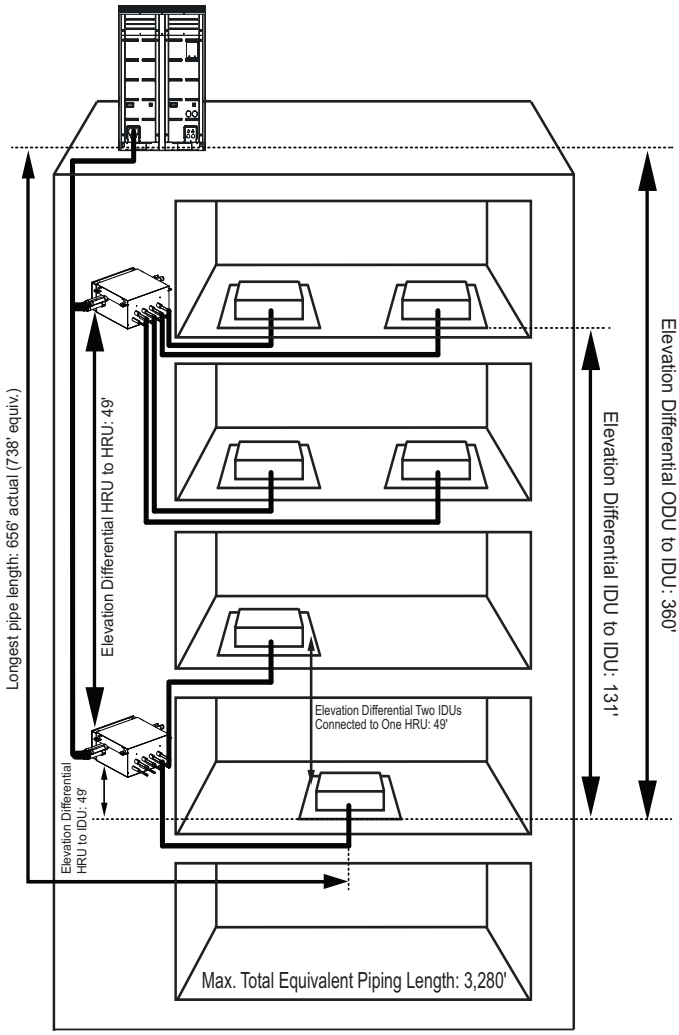


Table 32: Equivalent Piping Length for Y-branches, Headers, and Other Piping Components.

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 for ARUN Heat Pump systems contains two Y-branches: one for liquid and one for vapor; Kit for ARUB Heat Recovery systems contains three Y-branches: one for liquid, one for low-pressure vapor, one for high-pressure vapor.

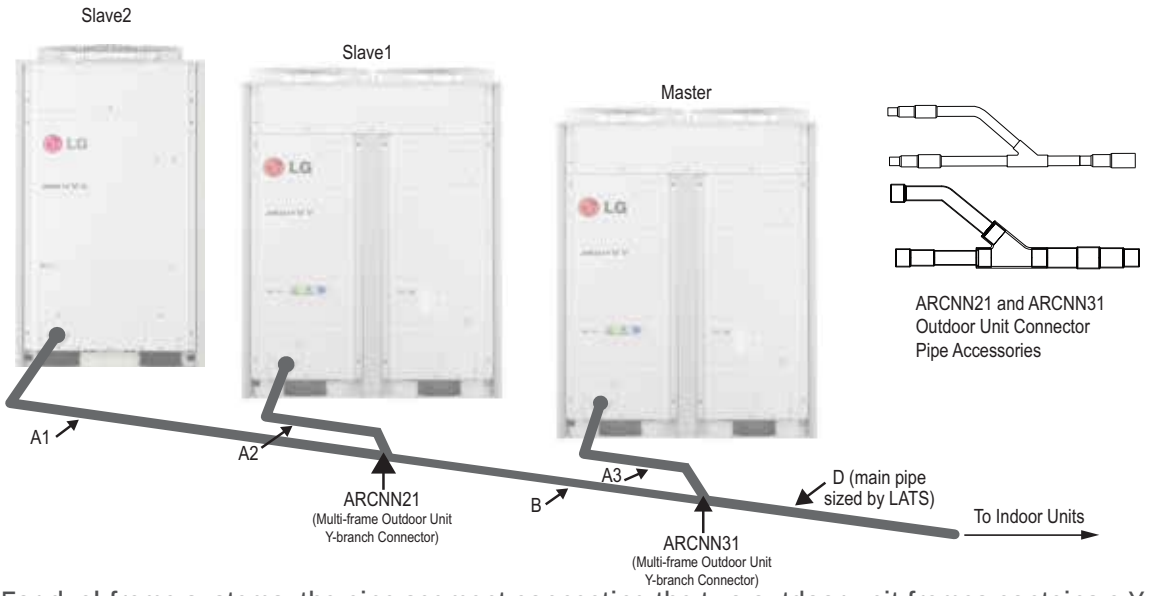
REFRIGERANT PIPING DESIGN

MULTI V IV

Piping Design Guideline Summary

Pipe Sizing for ARUN Series Heat Pump Systems

Figure 18: Heat Pump Triple-Frame Connections.



For dual-frame systems, the pipe segment connecting the two outdoor unit frames contains a Y-branch connector. The two pipe segments ("A") that connect the multi-frame Y-branch fitting to each outdoor unit frame must be the same diameter of the outdoor unit pipe connection.

Similar for triple-frame systems, the pipe segments ("A1, A2, A3") that connect the multi-frame outdoor unit Y-branch fittings to the outdoor unit frames must also match the outdoor unit frame pipe diameter. Main pipe segment D diameters are sized by LATS. See the table below to properly size the diameter of pipe segment B.

Table 33: 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 146.*

LG

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

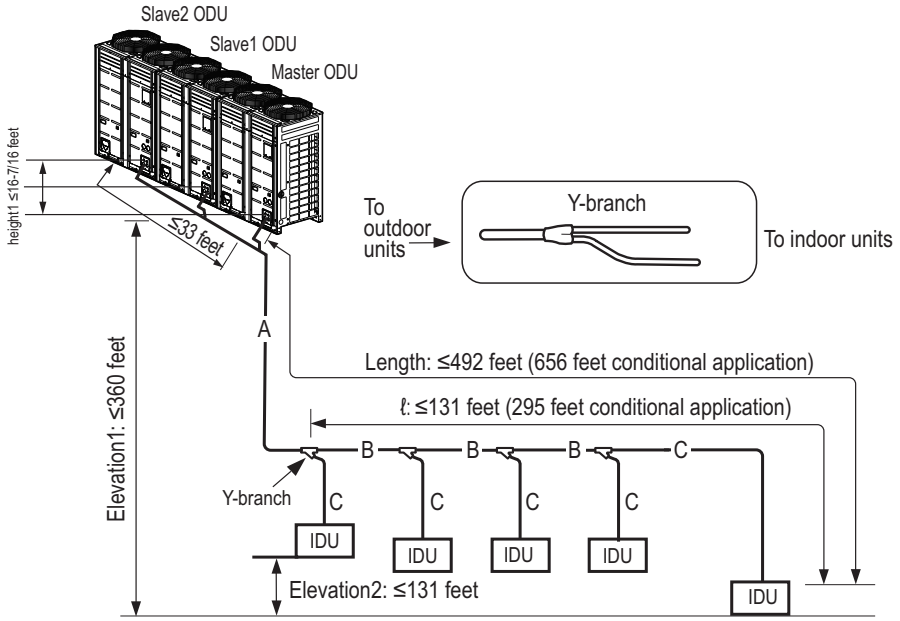
ODU: Outdoor Units.

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

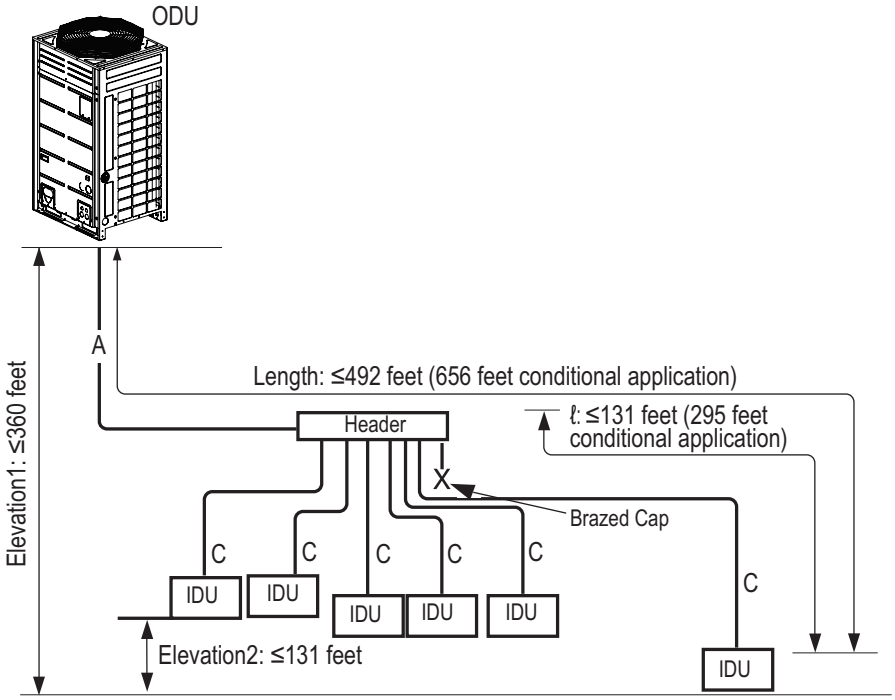
Example: Six (6) indoor units connected

ODU: Outdoor Unit.

IDU: Indoor Units.

A: Main Pipe from Outdoor Unit to Header.

C: Header to Indoor Unit.



Note:

See pages 122-123 for refrigerant pipe diameter and pipe length tables.

REFRIGERANT PIPING DESIGN

MULTI V IV

Piping Design Guideline Summary

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

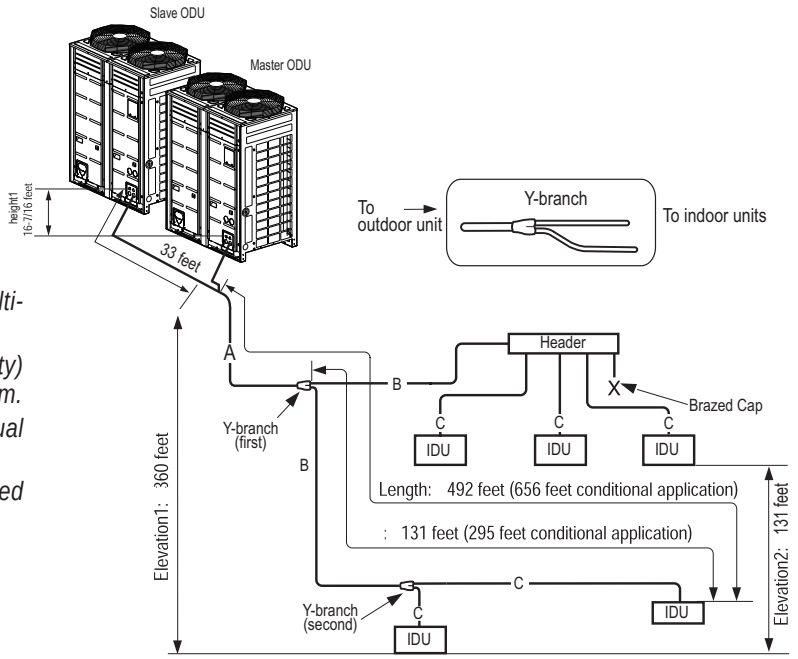
ODU: Outdoor Units.

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 units 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 122-123 for refrigerant pipe diameter and pipe length tables.

Table 34: 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
30-42	3/4Ø	1-5/8Ø	7/8Ø	No Increase	7/8Ø	No Increase

*ARUN145BTE4 / ARUN145DTE4 and ARUN169BTE4 / ARUN169DTE4 only.

Table 35: 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.

Table 36: 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).

LG

REFRIGERANT PIPING DESIGN

Piping Design Guideline Summary

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

Table 37: 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+(ΣBx2)+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.

REFRIGERANT PIPING DESIGN

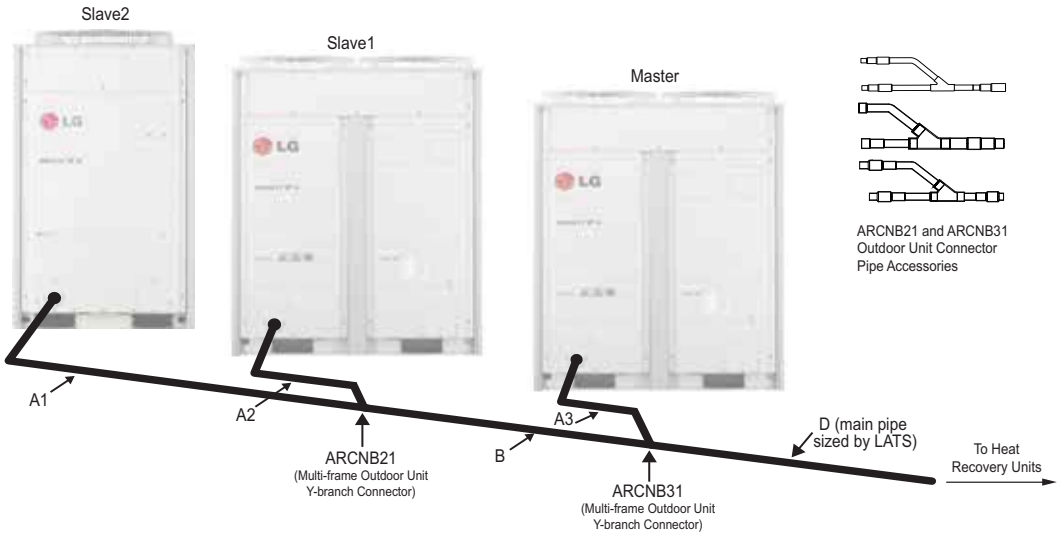
MULTI V IV

Piping Design Guideline Summary

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

Pipe Sizing for ARUB Series Heat Recovery Systems

Figure 19: Heat Recovery Triple-Frame Connections.



For dual-frame systems, the pipe segment connecting the two outdoor unit frames contains a Y-branch connector. The two pipe segments ("A") that connect the multi-frame Y-branch fitting to each outdoor unit frame must be the same diameter of the outdoor unit pipe connection.
Similar for triple-frame systems, the pipe segments ("A1, A2, A3") that connect the multi-frame outdoor unit Y-branch fittings to the outdoor unit frames must also match the outdoor unit frame pipe diameter. Main pipe segment D diameters are sized by LATS. See the table below to properly size the diameter of pipe segment B.

Table 38: 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 146.*

LG

REFRIGERANT PIPING DESIGN

Piping Design Guideline Summary

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

Pipe Sizing for ARUB Series Heat Recovery Systems

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.

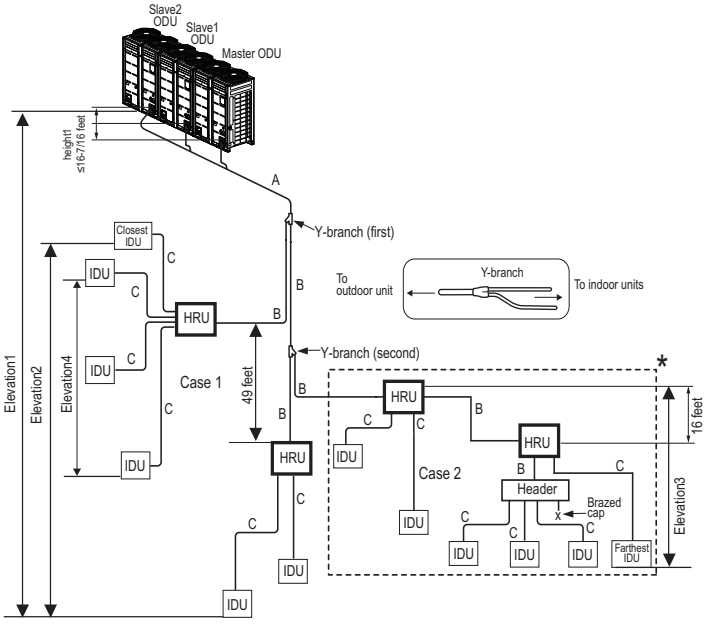
C: Heat Recovery Unit / Header to Indoor Unit.

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 125-126 for refrigerant pipe diameter and pipe length tables.



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:

- *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 39: 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
30-42	3/4Ø	1-5/8Ø	1-1/8Ø	7/8Ø	No Increase	No Increase

*ARUB145BTE4 / ARUB145DTE4 and ARUB169BTE4 / ARUB169DTE4 only.

REFRIGERANT PIPING DESIGN

MULTI V IV

Piping Design Guideline Summary

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

Table 40: 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 41: 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 42: 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		
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.

LG

Note:

No Substitutions

Only LG supplied Y-branch 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.

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.

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.

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.

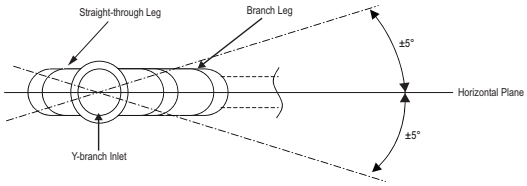
There is no limitation on the number of indoor unit Y-branches that can be installed, but there is a limitation on the number of indoor units connected to a single outdoor unit. It is recommended that when a Y-branch is located in a pipe chase or other concealed space, access doors should be provided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

Figure 20: Y-branch Vertical Installation Alignment Specifications.

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

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

Figure 21: Horizontal Configuration.



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

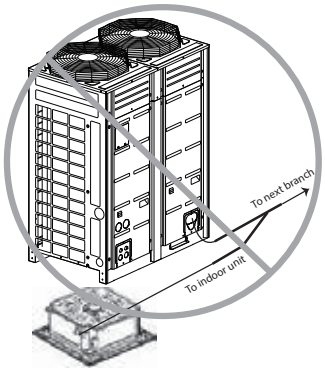
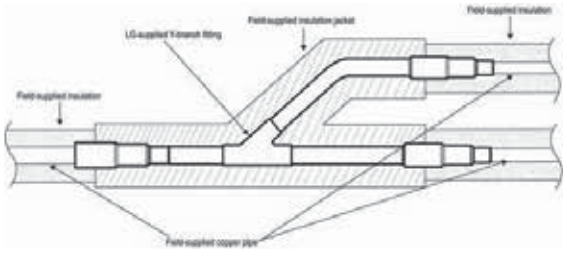


Figure 23: Y-branch Insulation and Pipe Detail.

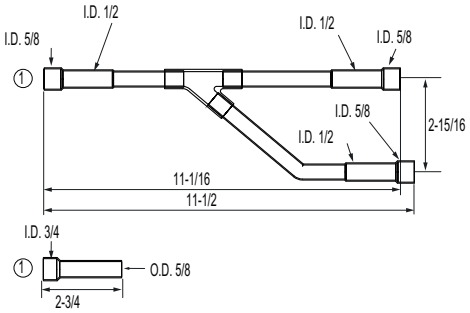
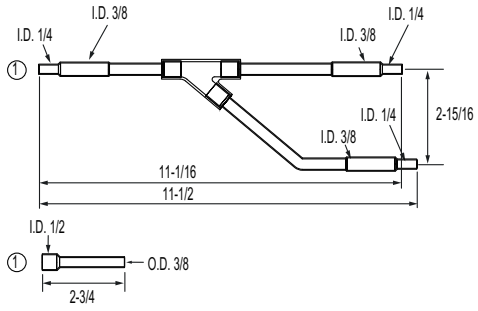
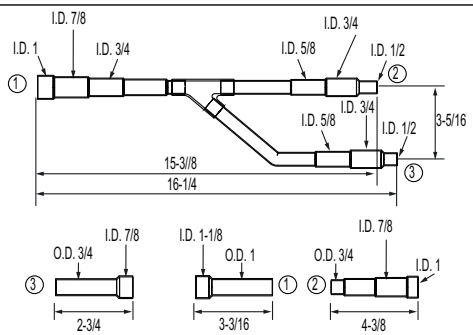
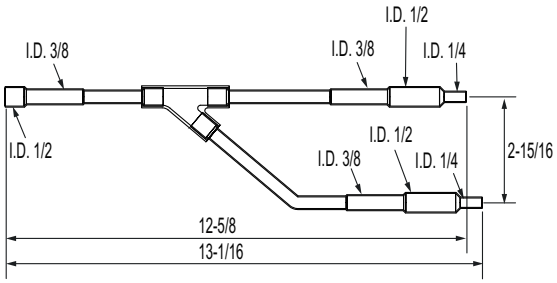
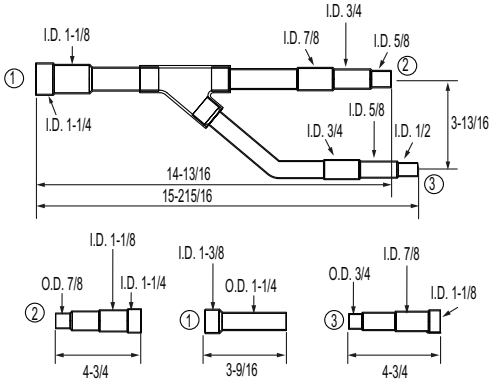
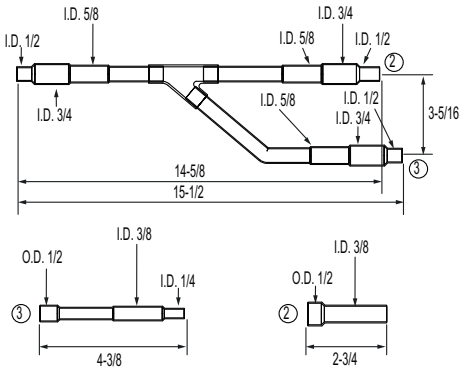
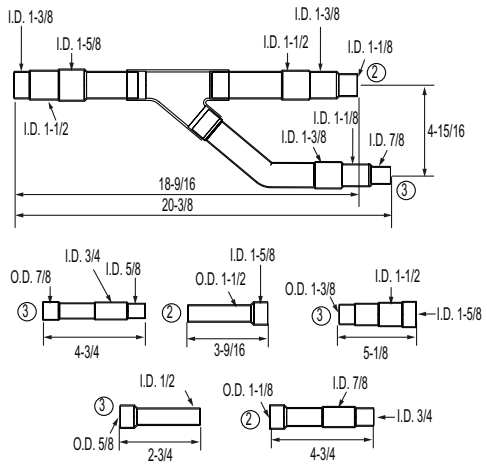
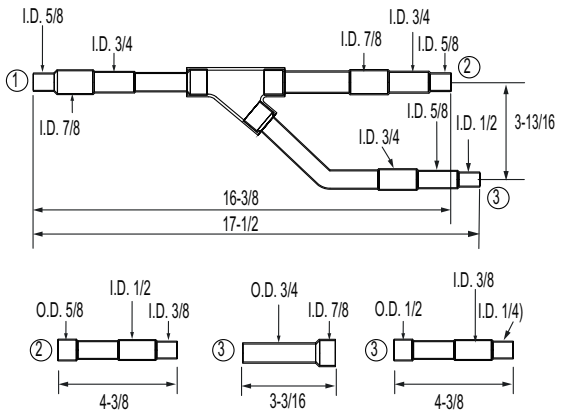


REFRIGERANT PIPING DESIGN

LG Engineered Y-branch Kits

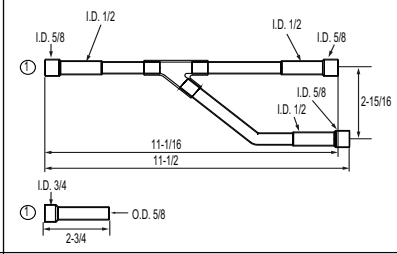
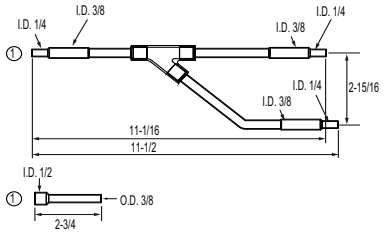
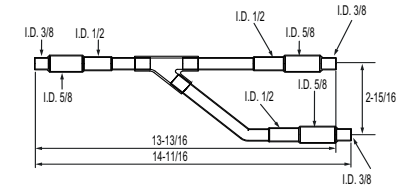
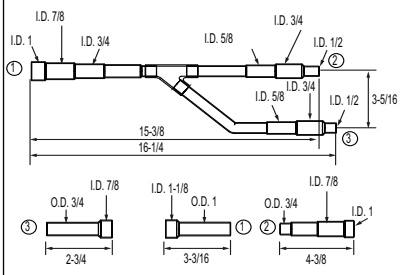
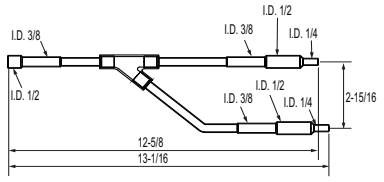
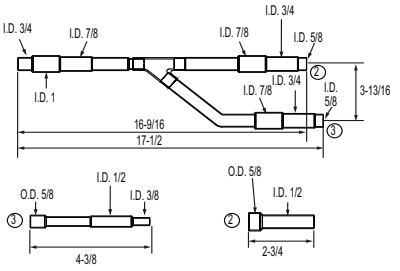
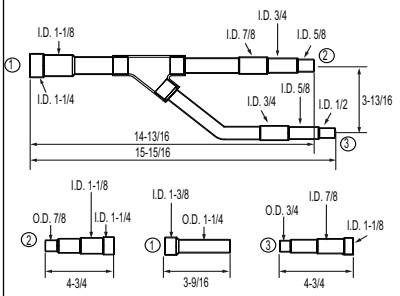
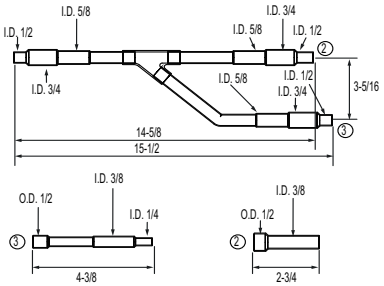
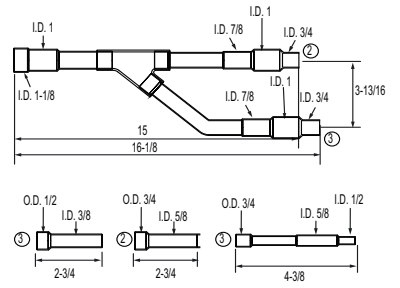
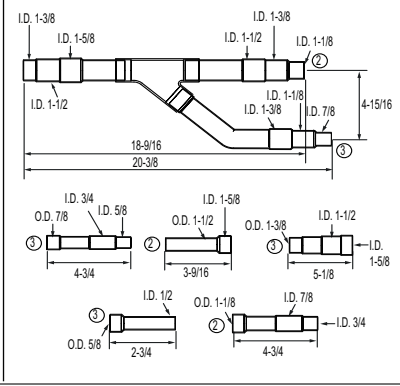
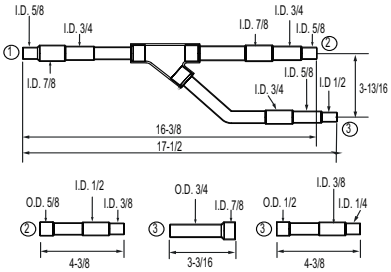
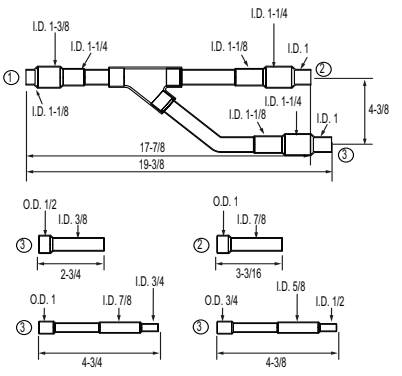
Indoor Unit Y-branches for ARUN Series Heat Pump Systems

Unit: Inch

Models	Vapor pipe	Liquid pipe
ARBLN01621		
ARBLN03321		
ARBLN07121		
ARBLN14521		

Indoor Unit Y-branches for ARUB Series Heat Recovery Units

Unit: Inch

Models	Low-Pressure Vapor Pipe	Liquid pipe	High-Pressure Vapor Pipe
ARBLB01621			
ARBLB03321			
ARBLB07121			
ARBLB14521			

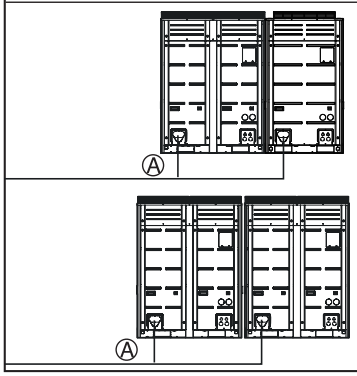
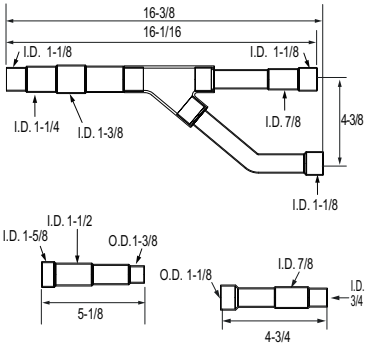
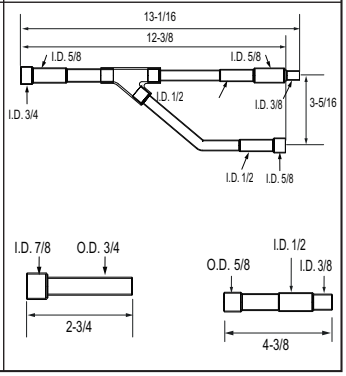
REFRIGERANT PIPING DESIGN

LG Engineered Y-branch Kits

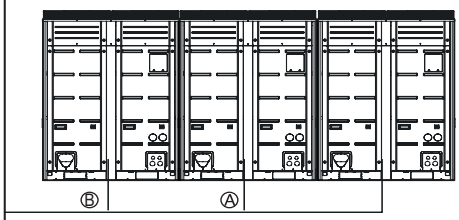
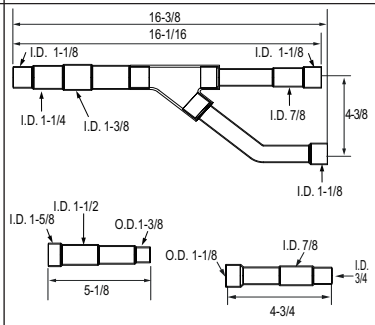
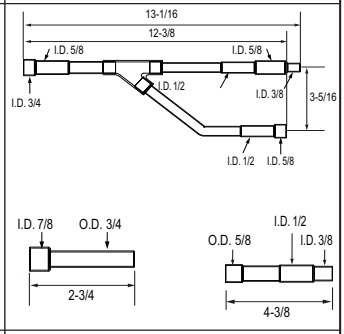
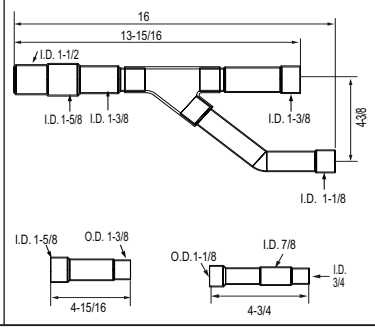
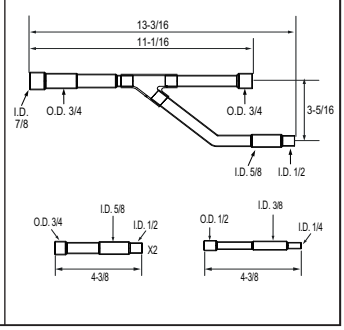
Outdoor Unit Y-branches for ARUN Series Heat Pump Systems

For Dual-Frame Heat Pump Systems

Unit: inch

Combination	Multi-Frame Connector	Vapor pipe	Liquid pipe
	Ⓐ ARCNN21		

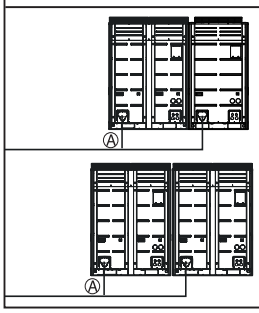
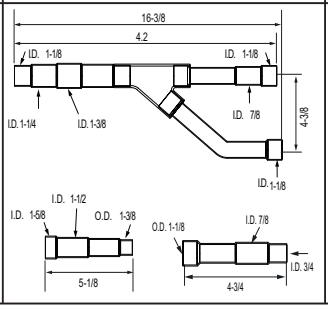
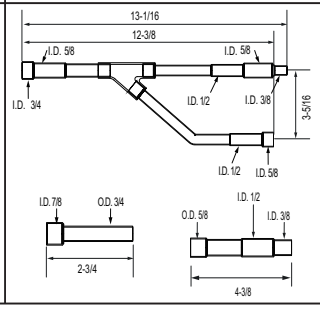
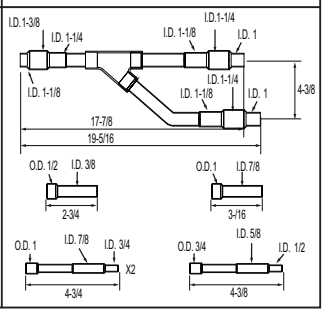
For Triple-Frame Heat Pump Systems

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

Outdoor Unit Y-branches for ARUB Series Heat Recovery Units

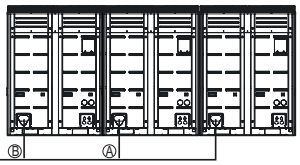
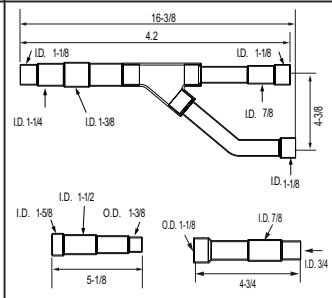
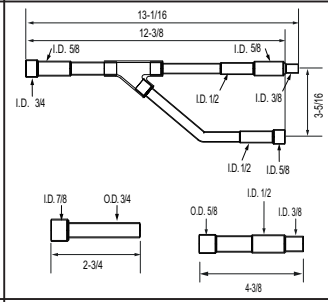
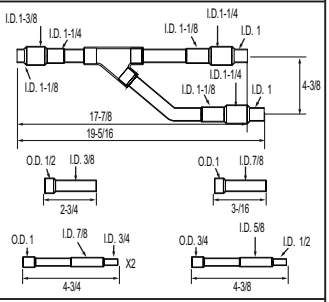
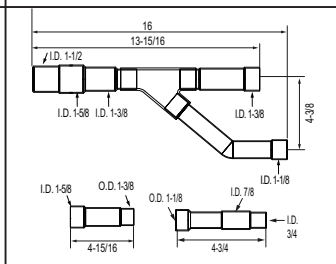
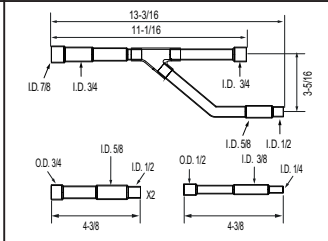
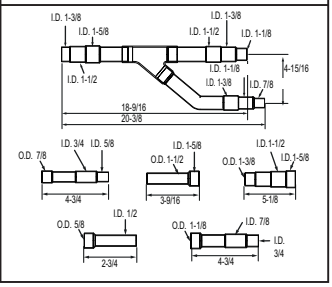
For Dual-Frame Heat Recovery Systems

Unit: inch

Combination specification	Multi-Frame Connector	Low-Pressure Vapor Pipe	Liquid Pipe	High-Pressure Vapor Pipe
	Ⓐ ARCNB21			

For Triple-Frame Heat Recovery Systems

Unit: inch

Combination specification	Multi-Frame Connector	Low-Pressure Vapor Pipe	Liquid Pipe	High-Pressure Vapor Pipe
	Ⓐ ARCNB21			
	Ⓑ ARCNB31			

REFRIGERANT PIPING DESIGN

MULTI V IV

LG Engineered Header Kits

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° long radius 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.

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.

Figure 24: Header Kit—Horizontal Rotation Limit (Must be Installed Level with No Rotation).

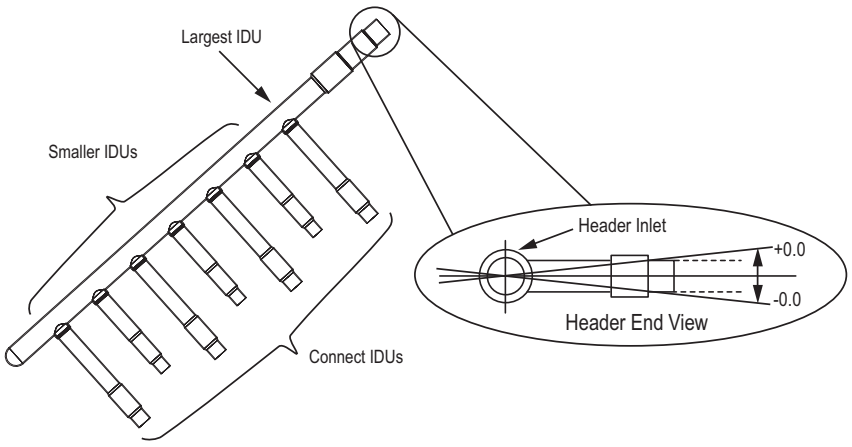
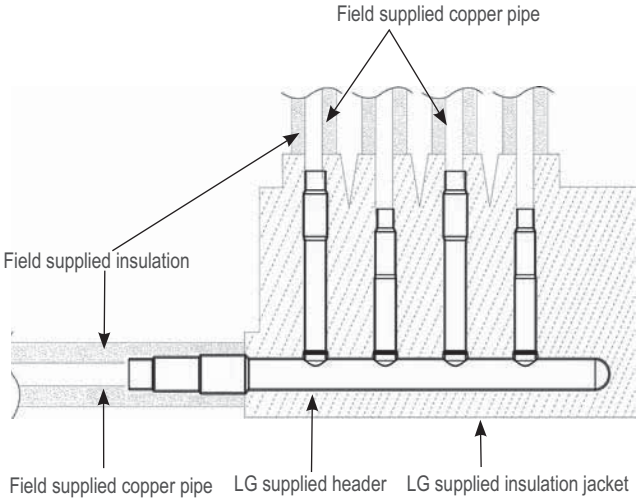


Figure 25: Header Insulation and Pipe Detail.



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.

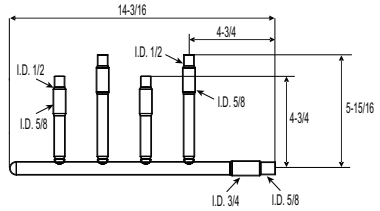
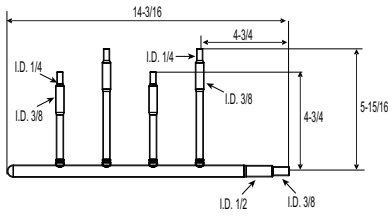
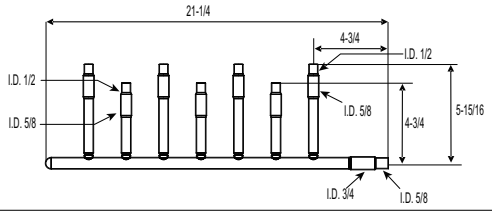
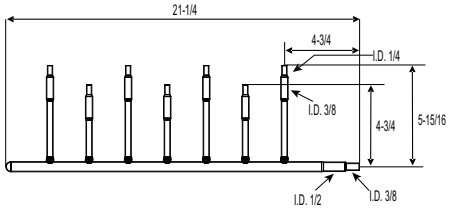
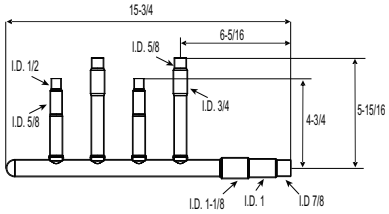
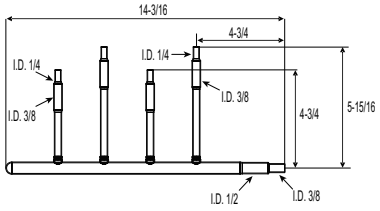
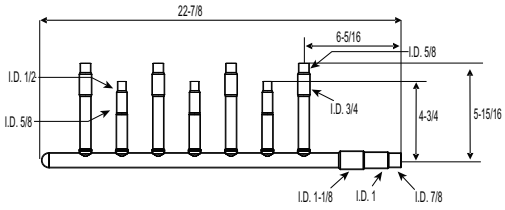
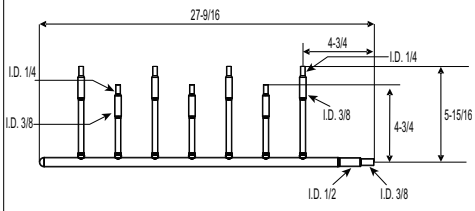
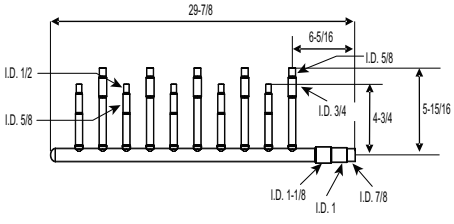
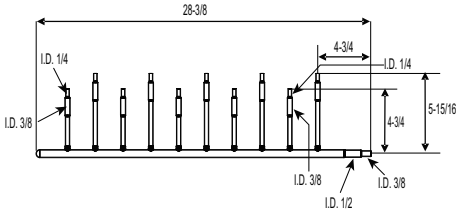
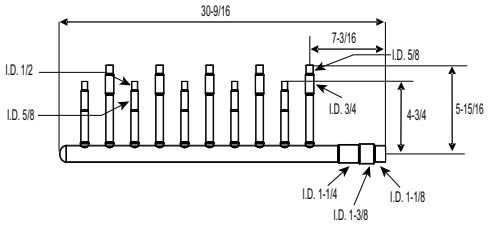
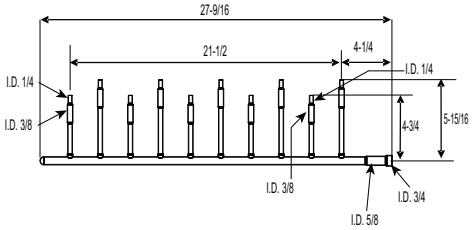
All indoor units connected to a single Header fitting should be located with an elevation difference between indoor units that does not exceed 49 feet.

LG

REFRIGERANT PIPING DESIGN

LG Engineered Header Kits

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		

REFRIGERANT PIPING DESIGN

LATS Calculated Refrigerant Charge Example

Note:

Consider refrigerant safety in all designs.

LG Multi V IV outdoor units ship from the factory with a charge of R410A refrigerant. This charge serves as the base charge and will not be sufficient for the system to operate. A trim charge will need to be added after the system is installed that is based on system design. LATS Multi V piping design software will calculate the size of the refrigerant piping and calculate the refrigerant charge; this added trim refrigerant charge is shown on the LATS Multi V output.

The example LATS Multi V design software report below shows both the base charge and the calculated trim charge (Tables 43-48). The information used in the tables below are obtained from a LATS-generated report.

Project Name: Multi V IV Heat Recovery System Test Update System No: 1/1

Table 43: Design Conditions.

Summer					Winter				
Indoor			Outdoor		Indoor			Outdoor	
DB (°F)	WB (°F)	RH (%)	DB (°F)	WB (°F)	DB (°F)	WB (°F)	RH (%)	DB (°F)	WB (°F)
80.6	67.1	50	93.9	73.9	68.0	56.8	50	17.1	16.2

Table 44: Outdoor Unit Specifications.

Model Name	Max. Indoor Unit Connectivity	Max. Total Over Load (kBtu/h/%)	Indoor Unit to Outdoor Unit Ratio	Product Charge[1] (lbs.)	Additional Ref. Amount[2] (lbs.)	Rated / Corrected Capacity (kBtu/h)		Rated / Corrected Power Input (kW)	
						Cooling	Heating	Cooling	Heating
ARUB121DTE4	20	156.0 (130%)	1.26:1	23.6	18.26	120.0 / 126.0	135.0 / 127.8	8.5 / 9.2	8.7 / 10.6

[1] Product Charge = Factory charge of outdoor unit.

[2] Additional Ref Amount = Trim charge.

Table 45: Piping Specifications.

Index (from LATS selection)	Piping Dia. (Inches) Liquid : Vapor	Length (Feet)[1]
P28	1/2 : 3/4 : 1+1/8	20.0
P22	3/8 : 3/4 : 7/8	15.0
P0	1/4 : 1/2	130.0
P1	3/8 : 5/8	50.0
P27	3/8 : 5/8 : 3/4	35.0
P21	3/8 : 1/2 : 5/8	16.0

[1]It is imperative to know the "as-built" physical length of each segment of liquid line, to calculate the total refrigerant charge required. An accurate "as built" field-verified piping diagram is required to verify within LATS that piping is within limits, proper pipe sizing, and refrigerant charge.

Table 46: Branches / Headers / Common Pipes / Heat Recovery Units.

Model Name	Quantity
ARBLB03321	1
PRHR042A	1
PRHR032A	1
PRHR022A	1

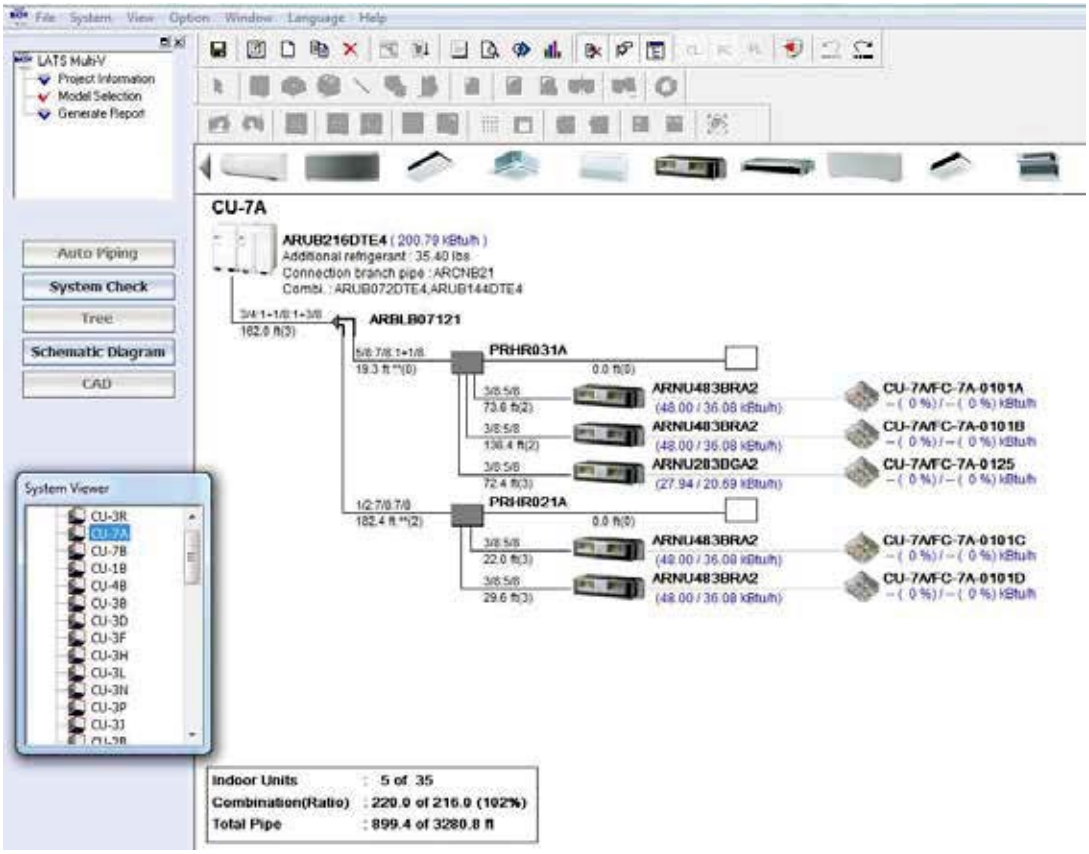
Table 47: Accessories.

Index	Model Name	Quantity	Description
IDU	PT-UMC	1	Std. Grille - Four-way Cassette (TN, TM, TP)

Table 48: Indoor Units.

Model Name	Quantity	Description
ARNU183SCL4	1	Wall Mounted (18 MBh)
ARNU183TQC4	1	Ceiling Cassette - Four-Way (18 MBh)
ARNU243BGA4	1	Ceiling-Concealed Ducted - High Static (24 MBh)
ARNU123SBL4	2	Wall Mounted (12 MBh)
ARNU123SER2	1	Art Cool Mirror (12 MBh)
ARNU183NJA4	1	Vertical / Horizontal Air Handling Unit (18 MBh)
ARNU123VEA2	1	Convertible Surface (12 MBh)
ARNU183CFU4	1	Floor Standing - Without Case (18 MBh)
Total	9	-

Figure 26: LATS Tree Diagram for Multi V IV Heat Recovery System Test Update System No: 1/1 Example.



Determining the Total System Charge (Refer to Table 49)

1. Using the LATS Tree diagram, document the linear feet of straight liquid piping and the quantity and type of each fitting by pipe diameter into System Refrigerant Charge Calculator.

2. Calculate the total linear feet of liquid line piping in the system. It is imperative to know the “as-built” physical length of each segment of liquid line to calculate the total refrigerant charge required. An accurate “as built” field-verified piping diagram is required to verify within LATS that piping is within limits, proper pipe sizing, and refrigerant charge. Record the values on lines 1–7.

3. Count the number of indoor units. Group them by model type and nominal capacity as indicated in the description field on lines 8–38. Record the quantity of units in each group, multiply each by their specific correction factor, and add the sum in the Total (lbs.) column.

4. Count the number of heat recovery units, record the quantity, multiply by the specific correction factor, and record the sum in the Total (lbs.) column on line 39.

5. Sum the total values on lines 1-39 and place in the field labeled "Additional Refrigerant Charge Required" on line 40.

6. Record the quantity of each outdoor unit frame, multiple total of each by their specific correction factor on lines 41a-g, and enter the total on line 42 (Total Factory Refrigerant Charge).

7. Add the Additional Refrigerant Charge Required to the Total Factory Refrigerant Charge. This is the Total System Charge. Record on line 43.

REFRIGERANT PIPING DESIGN

LATS Calculated Refrigerant Charge Example

Table 49: 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.*

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, 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 50: ACR Rated Copper Tubing Material.

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

Table 51: ACR Rated Piping Tube Thicknesses.

OD (in)	1/4	3/8	1/2	5/8	3/4	7/8	1-1/8	1-3/8	1-5/8
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	4.5
Min. Wall Thickness (in)	.03	.03	.03	.03	.03	.03	.03	.04	.05

Copper Expansion and Contraction

Under normal operating conditions, the vapor pipe temperature of a Multi V 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. 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:

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

LE	=	Anticipated linear tubing expansion (in.)
C	=	Constant (For copper = 9.2 x 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.)

1. From Table 52, find the row corresponding with the actual length of the straight pipe segment.
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.

Example:

A Multi V IV heat pump system is installed and the design shows that there is a 260 feet straight segment of tubing 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 tube is a suction line returning refrigerant vapor to the outdoor unit at 40°F. Look up the copper tubing expansion at each temperature and calculate the difference.

Vapor Line

Transporting Hot Vapor: 260 ft. pipe at 120°F = 3.64 in.
Transporting Suction Vapor: 260 ft. pipe at 40°F = 1.04 in.
Anticipated Change in Length: 3.64 in. – 1.04 in. = 2.60 in.

Liquid Line

The liquid temperature remains 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 53. 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.

LAYOUT BEST PRACTICES

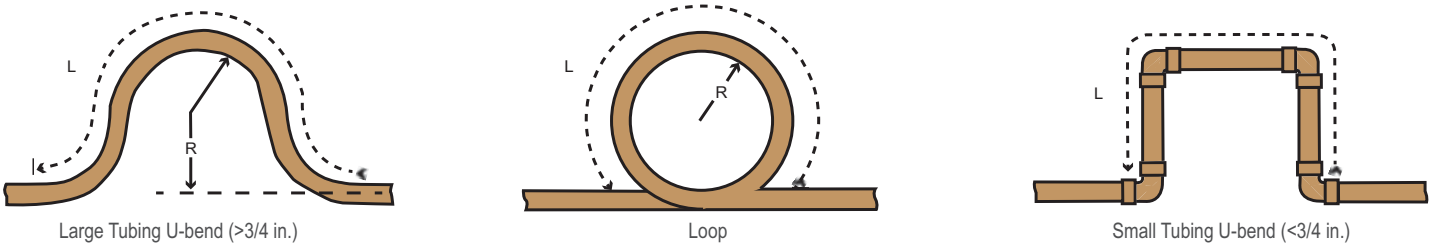
Selecting Field-Supplied Copper Tubing

Table 52: 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 27: Coiled Expansion Loops and Offsets (Plan View).



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

Table 53: Radii of Coiled Expansion Loops and Developed Lengths of Expansion Offsets.

Anticipated Linear Expansion (LE) (inches)		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.

LAYOUT BEST PRACTICES

General Information / Guidelines

Note:

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

Definitions

Main: The piping segment between the outdoor unit and the first Y-branch.

Branch: A segment of pipe between two Y-branches.

Run-out: The segment of pipe connecting an indoor unit to a Y-branch.

Physical Pipe Length: Actual length of straight segment(s) of pipe.

Equivalent Pipe Length: Actual length of pipe plus equivalent lengths of elbows, Y-branches, and valves.

Layout Procedure

1. Draft a one-line diagram of the proposed piping system connecting outdoor unit to heat recovery and indoor units. Follow the pipe limitations listed on pages 122 - 123 and 125 - 126.
2. Calculate the physical length of each pipe segment and note it on the drawing.
3. Calculate the equivalent pipe length of each pipe segment.
4. Input the pipe lengths into the LATS software and perform “Auto Pipe Sizing” check and “System Check”. LATS will automatically calculate pipe sizes.

Using Elbows

Field-supplied elbows are allowed as long as they are long radius and designed for use with R410A refrigerant. The designer, 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.

Field-Provided Isolation Ball Valves

LG maintains a neutral position on using isolation valves in VRF refrigerant piping systems. LG does not endorse any manufacturer of isolation valves. It is recognized that installing isolation valves may simplify future maintenance requirements, and, if used, considerations should be taken including, but not limited to, the following:

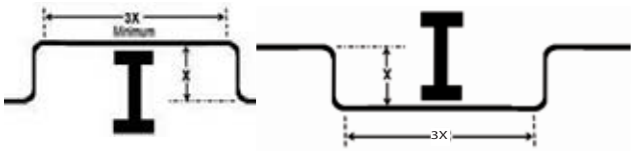
- Pressure drops for any component used, including isolation valves, must be known in equivalent pipe length and calculated into the total and segment equivalent piping lengths and compared to product design limitations.
- In all cases, materials must be suitable for the application and any applicable codes, including, but not limited to, diameter and wall thickness continuity per ACR standards.

Failure to do so may cause significant performance degradation. Proper leak checks must be performed. Using isolation valves does not automatically void any LG product warranty, however, a limited warranty may be voided in whole or part should any field supplied accessory fail in any way that causes product 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 horizontal section of pipe above or below the obstacle be a minimum of three (3) times greater than the longest vertical rise (or fall) distance.

Figure 28: Installing Piping Above and Below an Obstacle.



Above an obstacle. Below an obstacle.

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 / heat recovery units. Multi V IV air-source 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.

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 to work at all.

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

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

Figure 32: Pipe Support at Y-branch Fitting.

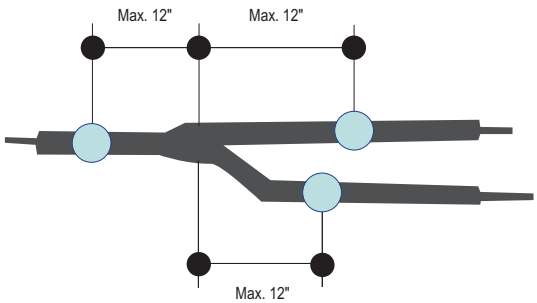
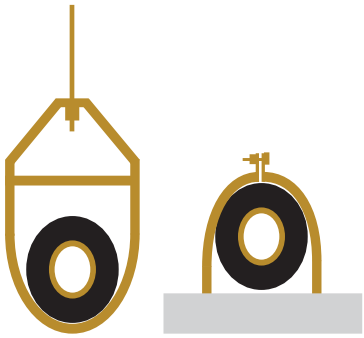


Figure 29: Pipe Hanger Details.



Note:

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

Figure 30: Typical Pipe Support Location—Change in Pipe Direction.

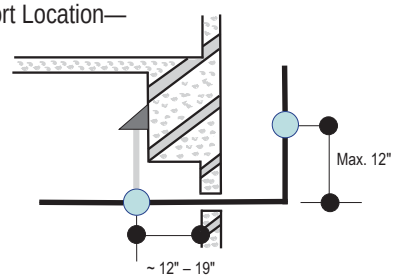


Figure 31: Pipe Support at Indoor Unit.

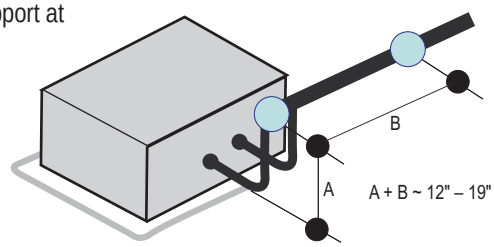
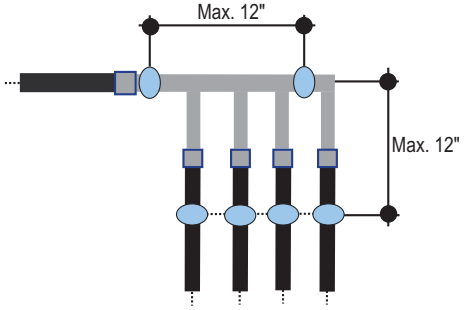


Figure 33: Pipe Support at Header Fitting.



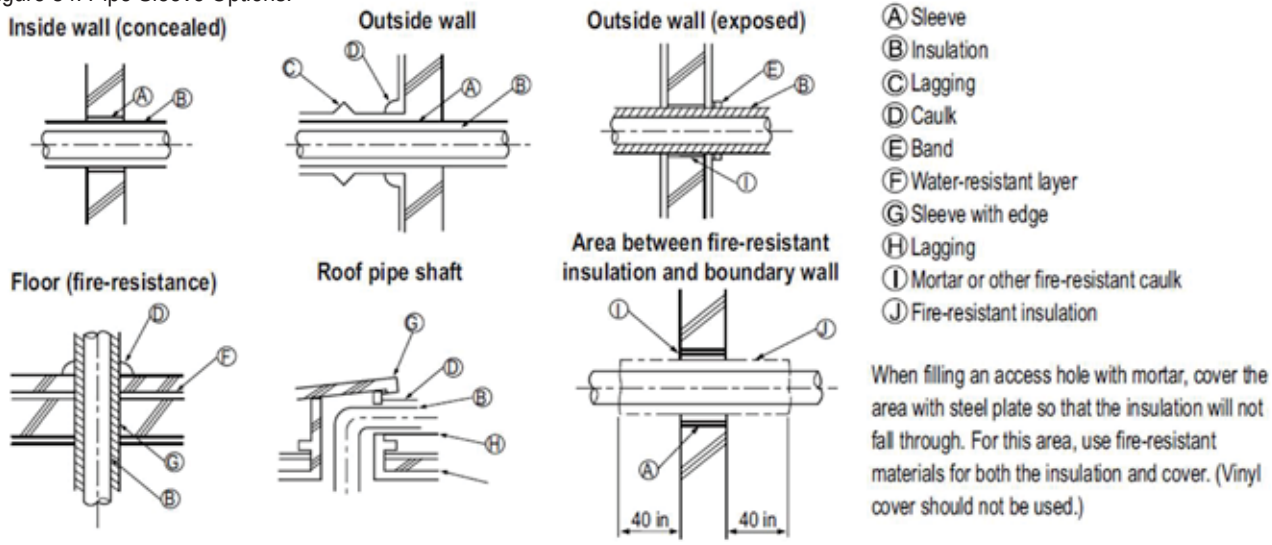
LAYOUT BEST PRACTICES

General Information / Guidelines

Pipe Sleeves at 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 promote free movement of the pipe within the sleeve. Use 4"+ curved sheet metal saddles between the bottom surface of the pipe and the bottom surface of the penetration. Underground refrigerant pipe shall be routed inside a protective sleeve to prevent insulation deterioration.

Figure 34: Pipe Sleeve Options.



Note:

Diameter of penetrations shall be determined by pipe diameter plus the thickness of the insulation.

Underground Refrigerant Piping

Refrigerant pipe installed underground should be routed inside a vapor tight protective sleeve to prevent insulation deterioration and water infiltration. Refrigerant pipe installed inside underground casing must be continuous without any joints. Underground refrigerant pipe must be located at a level below the frost line.

Note:

Provide expansion joints in long pipe segments and place in an accessible conduit box for inspection. Use galvanized curved sheet metal saddles at all mounting points. Pipe should be allowed to move freely linearly.

Figure 35: Typical Arrangement of Refrigerant Pipe and Cable(s) in a Utility Conduit.

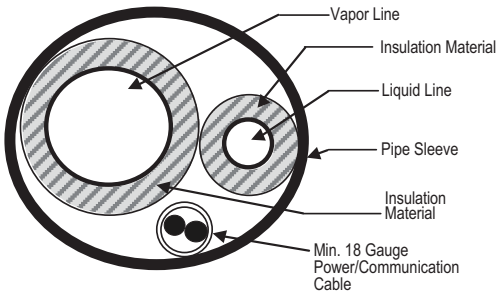


Table 54: Utility Conduit Sizes.

Liquid Pipe[1]	Vapor Pipe[1]		
	1/2 (2.0[2,5])	5/8 (2-1/8[2,5])	3/4 (2-1/4[2,5])
1/4 (1.0)[3]	4	4	4
3/8 (1-1/8)[3]	4	4	5
1/2 (1-1/2)[4]	5	5	5
5/8 (1-5/8)[4]	5	5	5
3/4 (1-3/4)[4]	5	5	5

[1]OD pipe diameter in inches; Values in parenthesis () indicate OD of pipe with insulation jacket.

[2]Diameter of pipe with insulation. Thickness of pipe insulation is typical. Actual required thickness may vary based on surrounding ambient conditions and should be calculated and specified by the design engineer.

[3]Insulation thickness (value in parenthesis) = 3/8 inch.

[4]Insulation thickness (value in parenthesis) = 1 inch.

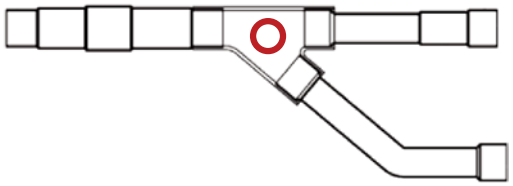
[5]Insulation thickness (value in parenthesis) = 3/4 inch.

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:

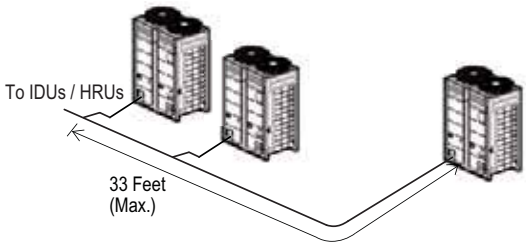
1. Measurements.
All measurements should be made from the union center of the outdoor unit Y-branch.

Figure 36: Y-branch Measurement Location.



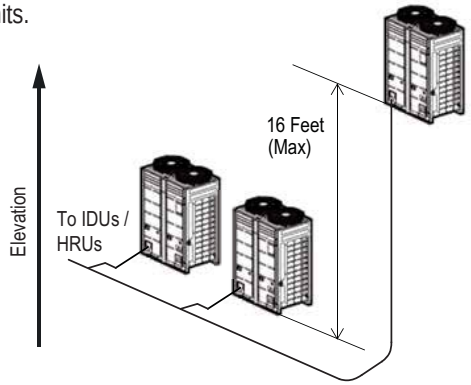
2. Maximum pipe length from first outdoor unit Y-branch to farthest outdoor unit.
Total pipe length from the first outdoor unit Y-branch to the piping connection at the farthest outdoor unit must not exceed thirty-three (33) feet.

Figure 37: 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 38: 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 39: Traps for Heat Pump and Heat Recovery Units.

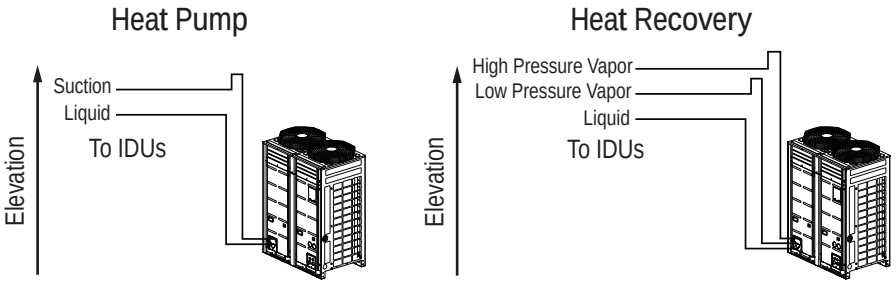


Figure 40: Close Up of An Inverted Oil Trap.

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 41: Examples of Inverted Traps.

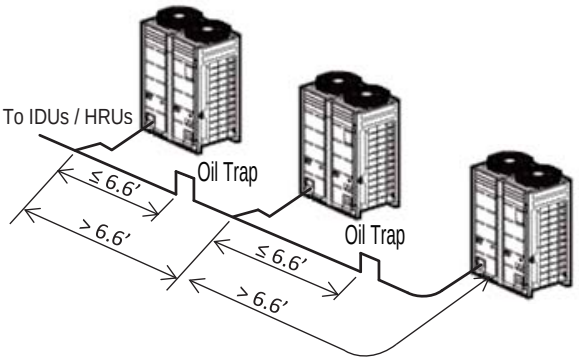
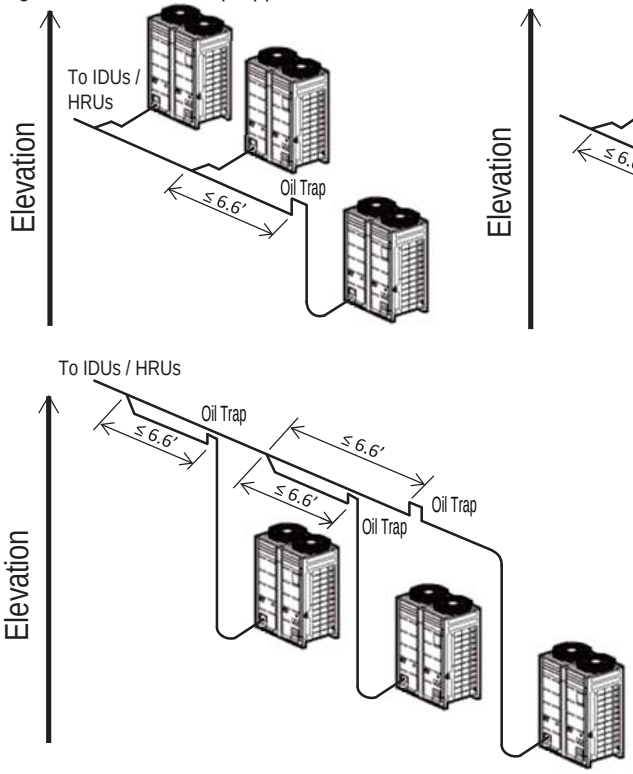


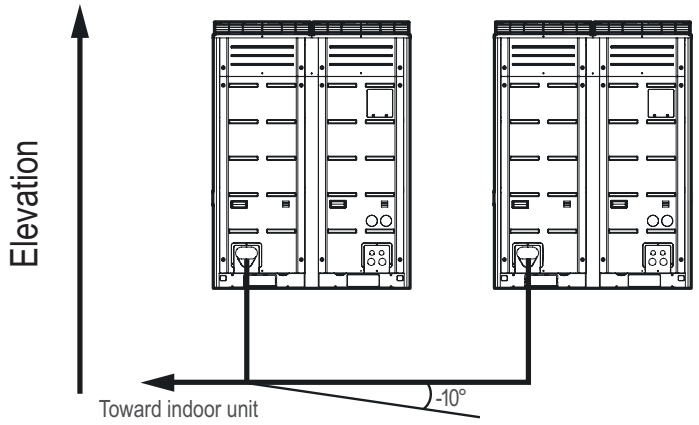
Figure 42: Inverted Trap Applications.



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 43: Allowable Pipe Slope.



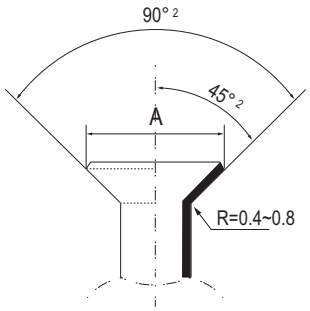
Refrigerant Piping Installation

Proper system operation depends on the installer using best practices and utmost care while assembling the piping system as one of the main causes of refrigerant leaks is defective connections. For VRF systems, the installer needs to know how perform both flared and brazed connections successfully.

Flaring Practices

Flared fittings are used to connect the indoor units and heat recovery units to the refrigerant piping system. Always use the proper size tool to finish the flare, creating a 45° flare (see table and diagram). When connecting the flare nuts, coat the inside and outside with PVE refrigeration oil only. Hand tighten the nuts at first, then, use a torque wrench and a backup wrench to finish. Avoid overtightening the flare nuts.

Figure 44: Dimensions of the Flare.



Brazing Practices

Refrigerant piping system 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.

- Use adapters to assemble different sizes of pipe.
- Do not use flux, soft solder, or anti-oxidant agents; use a 15% silver phosphorous copper brazing alloy.
- Protect isolation valves, electronic expansion valves, and other heat-sensitive control components from excessive heat with a wet rag or a heat barrier spray product

Table 55: 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

Note:

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

Refrigerant Safety Standards

ASHRAE Standards 15-2010 and 34-2010 address refrigerant safety and the maximum allowable concentration of refrigerant in an occupied space. Refrigerant will dissipate into the atmosphere, but a certain volume of air is required to safely dissipate the refrigerant. For R410A refrigerant, the maximum allowable concentration of refrigerant is 26 lbs./1,000 cubic feet (Addendum L modified the RCL to 26) of occupied spaces. Buildings with 24-hour occupancy allow half of that concentration.

If a VRF system develops a refrigerant leak, the entire refrigerant charge of the system will dump into the area where the leak occurs. To meet ASHRAE Standards 15 and 34, the smallest room volume on the system must be calculated and compared to the maximum allowable concentration. If the concentration level is higher than allowed, the following are some design suggestions to eliminate the problem:

- Split dual-frame and triple-frame systems into single-frame systems that have lower refrigerant charges.
- Add transfer grilles in the ceiling or walls of the smaller rooms to increase the volume of the room.
- Remove the smallest space from the system and serve it with a smaller mini-split system.

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 below 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.

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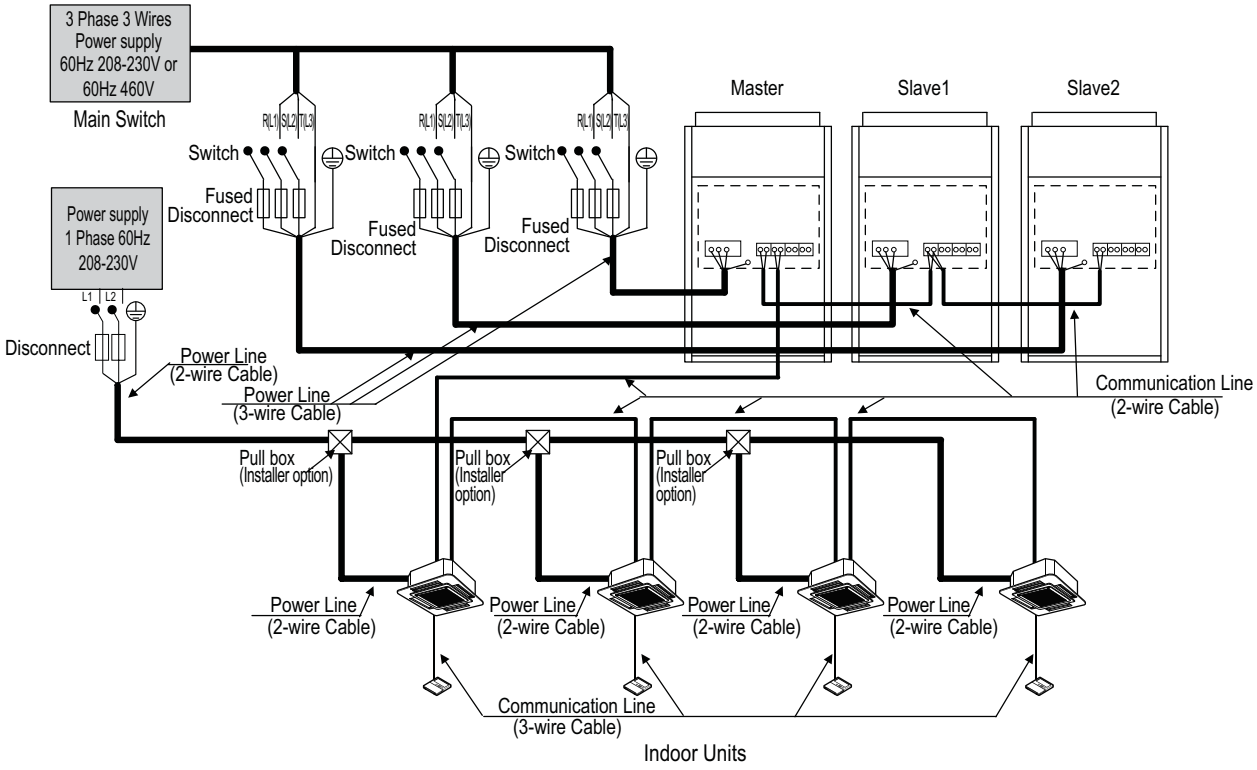
ELECTRICAL CONNECTIONS

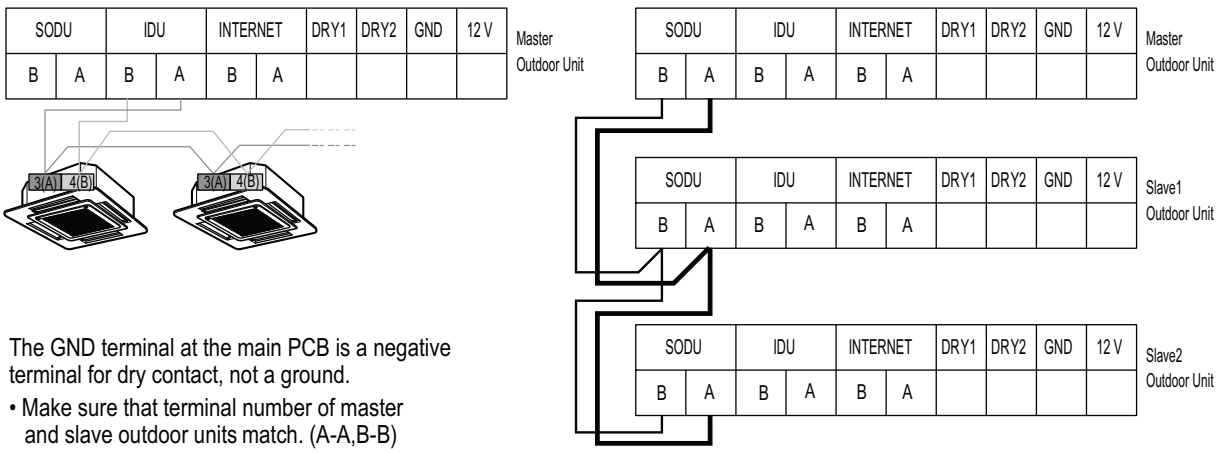
Figure 45: Typical Multi V IV Heat Pump VRF System Power and Communications Wiring Schematic.



⚠ WARNING

- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. Do not connect the ground line to the pipes.*
- *Install a main shutoff switch that interrupts all power sources simultaneously.*
- *If the system operates in reversed phase, it may break the compressors and other components.*
- *If there is a possibility of reversed phase, phase loss, momentary blackout, or the power goes on and off while the system is operating, install a field-supplied phase loss protection circuit. Operating the system in reverse phase may break the compressor and other unit components.*

Heat Pump
Between Indoor and Master Outdoor unit



The GND terminal at the main PCB is a negative terminal for dry contact, not a ground.

- Make sure that terminal number of master and slave outdoor units match. (A-A,B-B)

Note:

Communications cables are shielded, grounded at the outdoor unit(s) only. Maintain polarity throughout the communication network.

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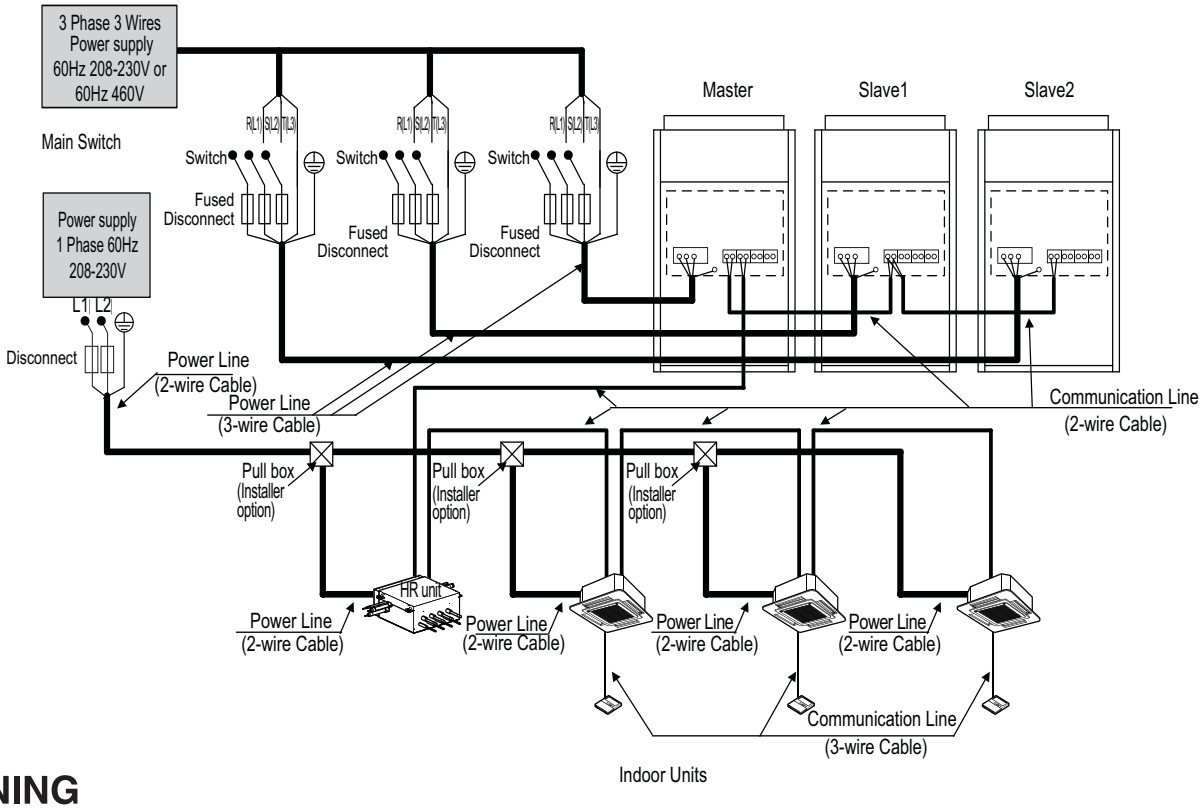
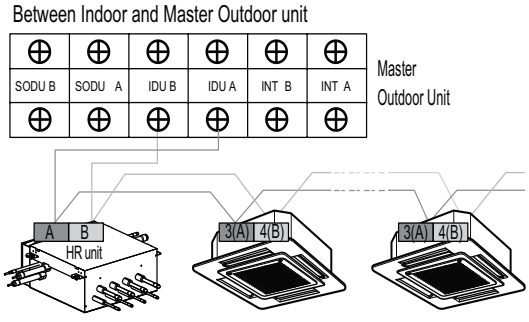
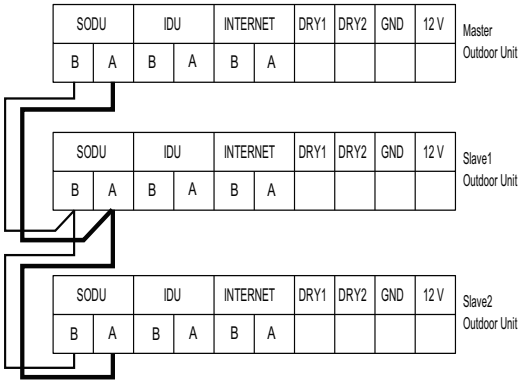
Figure 46: Typical Multi V IV Heat Recovery VRF System Power and Communications Wiring Schematic.



⚠ WARNING

- *Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage . Do not connect the ground line to the pipes.*
- *Install a main shutoff switch that interrupts all power sources simultaneously.*
- *If the system operates in reversed phase, it may break the compressors and other components.*
- *If there is a possibility of reversed phase, phase loss, momentary blackout, or the power goes on and off while the system is operating, install a field-supplied phase loss protection circuit. Operating the system in reverse phase may break the compressor and other unit components.*





The GND terminal at the main PCB is a negative terminal for dry contact, not a ground line.

- Make sure that terminal number of master and slave outdoor units match. (A-A,B-B)

Note:

Communications cables are shielded, grounded at the outdoor unit(s) only. Maintain polarity throughout the communication network.

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 figure 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 47: Location and Setting of ODU DIP Switch 3.

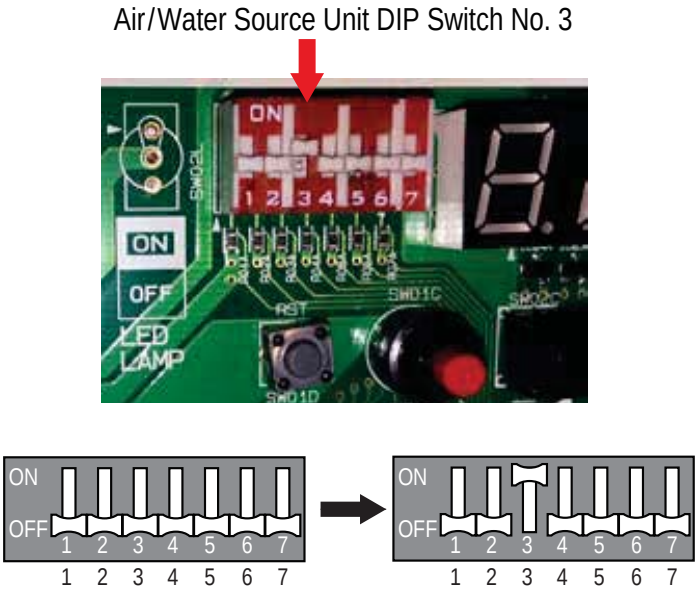


Table 56: System Component Combinations and Operation Status.

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 57: 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	

LG Electronics, U.S.A., Inc.
Commercial Air Conditioning Division
4300 North Point Parkway
Alpharetta, Georgia 30022
www.lg-vrf.com

EM_MultiVIV_OutdoorUnits_04_16
Supersedes: EM_MultiVIV_OutdoorUnits_09_15
EM_MultiVIV_OutdoorUnits_06_15
EM-MultiVIV-OutdoorUnits-05-15

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