



LG SPLIT COMPACT DEDICATED OUTDOOR AIR SYSTEM (DOAS) ENGINEERING MANUAL



Variable Refrigerant Flow Split Compact DOAS

ARND***DCR4 Series

ARND063DER4 Series

(600, 900, 1,500, and 2,000 CFM)

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A summary list of safety precautions is on page 3.

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

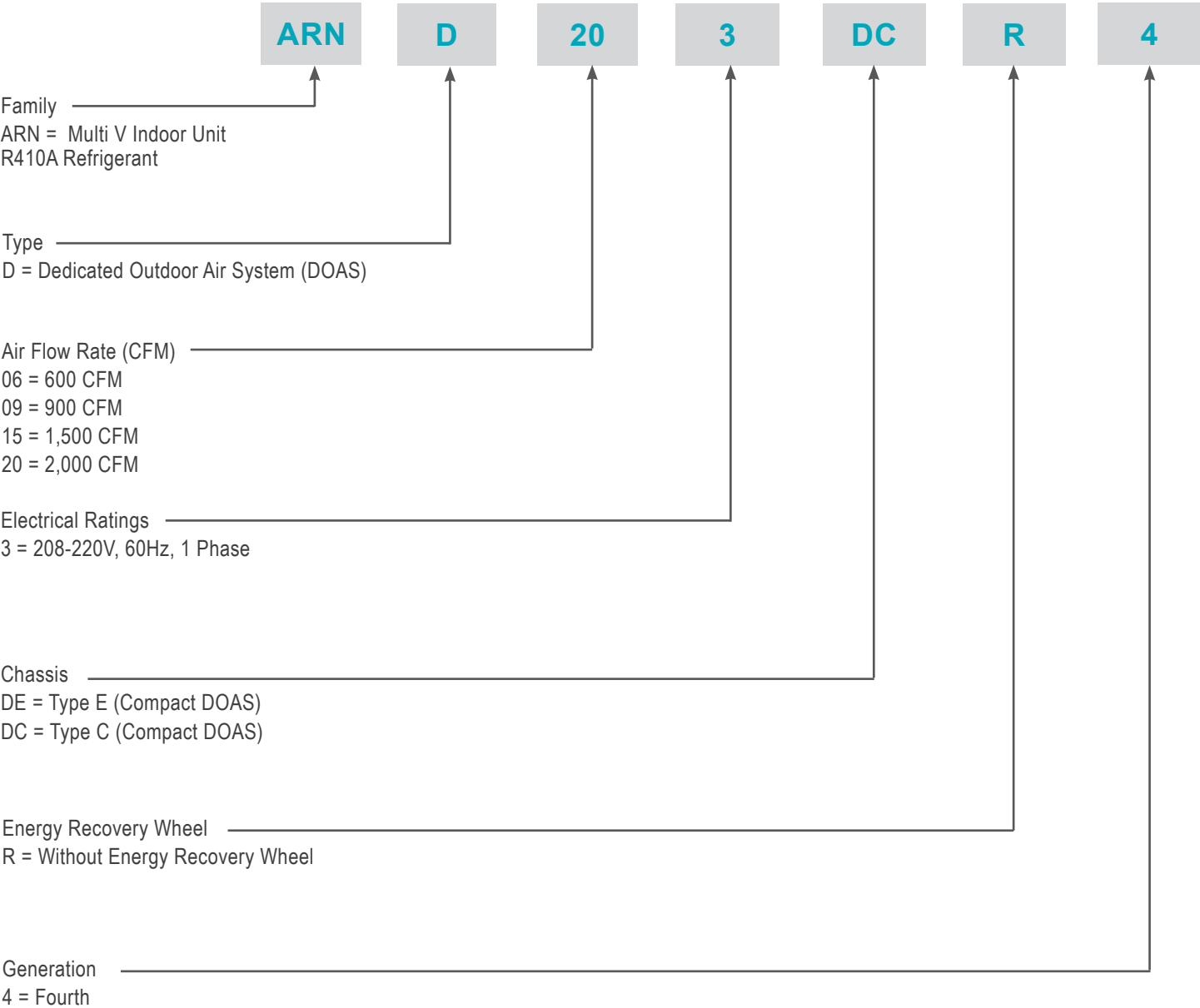
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TABLE OF SYMBOLS

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

UNIT NOMENCLATURE



LG AIR CONDITIONER TECHNICAL SOLUTION (LATS)

LG Air Conditioner Technical Solution (LATS) Software

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

Note:

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

Formats

LATS is available to LG customers in two user interfaces: LATS HVAC and LATS Revit. Both LATS formats are available through www.myLGHVAC.com, or contact an LG Sales Representative.

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

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

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

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

Features

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

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

The program can also:

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

Note:

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

LG AIR CONDITIONER TECHNICAL SOLUTION (LATS)

LATS Generates a Complete Project Report

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

Proper Design to Install Procedure

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

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

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

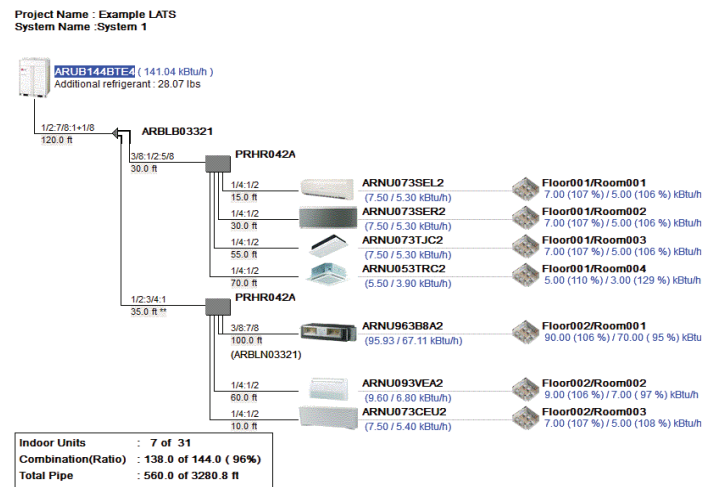
- Differences in pipe diameter(s). If incorrect diameters have been installed, the piping must be changed out. If pipe diameters have changed, check to see if Y-Branches will also need to be changed.
- Changes to outdoor unit and indoor unit capacities. Capacities changes could impact line length changes.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

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

Note:

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

Figure 1: Example of a LATS Tree Diagram.




REFRIGERANT CHARGE WORKSHEET

DANGER

- Refrigerant gas is heavier than air and replaces oxygen. A massive leak will result in oxygen depletion, especially in basements, and an asphyxiation hazard will result in serious injury or death.
- If refrigerant gas leaks during installation, ventilate the area immediately. Refrigerant gas will result in producing toxic gas if it comes into contact with fire. Exposure to this gas will result in severe injury or death.

WARNING

- Refrigerant cannot be charged until field wiring has been completed. Improper installation could result in physical injury and / or death.
- Refrigerant must only be charged after performing the leak test and the vacuum drying. Improper installation could result in physical injury and / or death.
- When charging a system, take care that its maximum permissible charge is never exceeded. Improper installation could result in physical injury and / or death.
- Charging with an unsuitable substance can cause explosions and accidents, so always ensure that the appropriate R410A refrigerant is used. Improper installation could result in physical injury and / or death.
- Refrigerant cylinders must be opened slowly. Improper installation could result in physical injury and / or death.
- Always use protective gloves and eyewear when charging refrigerant. It could result in physical injury and / or death.
- When the refrigerant system is to be opened, refrigerant must be treated according to the applicable local, state, and federal codes. Improper installation could result in physical injury and / or death.
- To avoid compressor breakdown,  do not charge the refrigerant more than the specified amount. Improper installation could result in physical injury and / or death.

Refrigerant Charge Worksheet

The calculation of the additional charge should take into account the length of pipe and Correction Factor (CF) value of DOAS unit.

System Tag or ID _____		Job Name: _____					
		Project Manager: _____				Date: _____	
Line No.	Description	Chassis I.D.	Size	Quantity	CF (Ref.) ¹	Total (lbs.)	
1	Linear feet of 1/4" liquid line ²				0.015		
2	Linear feet of 3/8" liquid line ²				0.041		
3	Linear feet of 1/2" liquid line ²				0.079		
4	Linear feet of 5/8" liquid line ²				0.116		
5	Linear feet of 3/4" liquid line ²				0.179		
6	Linear feet of 7/8" liquid line ²				0.238		
7	Linear feet of 1" liquid line ²				0.323		
8	Split Rooftop DOAS (with Energy Recovery Wheel)	DB	127k (200k)		11.35		
9	Split Compact DOAS	DC	70k		6.23		
10	Split Compact DOAS	DC	120k		6.23		
11	Split Compact DOAS	DC	143k		6.23		
12	ADDITIONAL Refrigerant Charge Required (Sum of lines 1-11)						
13	Outdoor Unit Factory Refrigerant Charge	13A	ARUM072*TE5	72k		14.3	
		13B	ARUM096*TE5	96k		23.2	
		13C	ARUM121*TE5	121k		23.2	
		13D	ARUM144*TE5	144k		26.5	
		13E	ARUM168*TE5	168k		26.5	
		13F	ARUM192*TE5	192k		30.9	
		13G	ARUM216*TE5	216k		37.5	
13H	ARUM241*TE5	241k		37.5			
14	Total ODU FACTORY Refrigerant Charge (Sum of factory refrigerant charges for all ODUs in the system, lines 13A – 13H)						
15	TOTAL SYSTEM CHARGE Sum of Additional Refrigerant Charge Required (line 12) and Total ODU Factory Refrigerant Charge (line 14)						

¹CF (Ref.) = Correction Factor for Refrigerant Charge.

²For refrigerant charge purposes, consider only the liquid line; ignore the vapor line(s).

PRODUCT DATA

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STANDARD FEATURES AND BENEFITS / FIELD OPTIONS

Standard Features and Benefits

LG Split Compact Dedicated Outdoor Air System (DOAS) units provide 100% outdoor air in heating, cooling, and dehumidification modes. Working with LG VRF systems, the LG Split Compact DOAS unit optimizes energy savings and performance.

The DOAS provides many benefits, including:

- Solution for high rise buildings with ceiling mounted applications.
- Airflow range from 300~600 CFM (ARND063DER4), 500~900 CFM (ARND093DCR4), 1,000~1,500 CFM (ARND153DCR4), and 1,000 to 2,000 CFM (ARND203DCR4).
- Air handler controller senses high outdoor air humidity and provides dehumidification mode.
- Reheat coil allows heating of dehumidified air to room neutral temperatures.
- Varying outdoor air temperatures can be conditioned using energy efficient LG VRF technology.
- Factory-installed heat recovery unit for hot gas reheat.
- Modulating hot gas reheat coil for dehumidification mode.
- Direct drive supply fan with an Electronically Commutated Motor (ECM).
- Microprocessor controller connectible to AC Smart or ACP central controllers.
- BACnet® IP, Modbus® Control Protocol. (BACnet is a registered trademark of ASHRAE. Modbus is a registered trademark of Schneider Electric USA, Inc.)
- Web access to controller.
- 2" MERV 8 supply for models ARND093DCR4, ARND153DCR4 and ARND203DCR4; cleanable for ARND063DER4, outside air filter.
- Heat pump operation down to 14°F without heater.
- Discharge air control sequence with factory-mounted sensor or (optional) field-mounted duct temperature sensor.
- Flexible design allows matching the outdoor unit to meet local outdoor air design conditions.
- Dehumidification mode is initiated based on adjustable outdoor air dew point temperature set-points.
- Bottom access for easy service and maintenance.
- Double water drainage structure (gravity drainage, drain pump).

Field Options

- Supply Duct Air Temperature Sensor (field supplied).
- Supply Duct Air Humidity Sensor (field supplied).
- Space Temperature Sensor (field supplied).
- Space Humidity Sensor (field supplied).
- Space CO₂ Sensor (field supplied).
- Differential Pressure Sensor (for filter replacement signal, field supplied).
- 2" MERV 8, (factory supplied for models ARND093DCR4, ARND153DCR4 and ARND203DCR4) or 2" MERV 13 filters (Field supplied)

Note:

Compact DOAS can only use filters with ≤2" thickness.

Note:

- Wiring diagrams can be found on the inside of the control cabinet access panel.
- Performance data for each unit will vary depending on entering air temperatures, design leaving air temperatures, and airflow rates. LG LATS HVAC Software must be used for each application to generate accurate performance data.
- See the LG Split Compact DOAS Installation manual for details on mounting, etc.

MECHANICAL SPECIFICATIONS

Split Compact Dedicated Outdoor Air Systems (DOAS)

Split Compact Dedicated Outdoor Air Systems (DOAS)

Casing

- Materials: SGCC Z22 Galvanized steel (18 gauge).
- Internal Assemblies: 18 gauge SGCC Z22 Galvanized steel, except for motor support (14 Gauge).
- Cabinet Insulation: FORM PE (Thermal resistance R1.40, thickness 0.39 inch).
- Split Direct Exchange (DX) System: Unit is combined only with air-source Multi V 5 heat recovery outdoor unit(s).
- Control and Diagnostics: System is controlled by a Microprocessor controller that indicates both owner-supplied settings and fault conditions that may occur.

The Microprocessor controller is programmed to indicate the following faults:

- Supply Fan Motor Alarm
- Outdoor Unit Alarm
- Supply Air Temperature Sensor out of range
- Outdoor air temperature/humidity sensor out of range
- Space Temperature/Humidity sensor out of range
- Cold coil leaving air temperature sensor out of range

Sensors are considered to be part of various optional operational modes or device controllers, and are to be field supplied and installed as specified by the design engineer.

- Factory-Installed Sensors
 1. Supply Air Temperature Sensor
 2. Outdoor Air Temperature Sensor
 3. Outdoor Air Humidity Sensor
- Field-Supplied Sensors (optional)
 1. Supply Duct Air Temperature Sensor
 2. Supply Duct Air Humidity Sensor
 3. Space Temperature Sensor
 4. Space Humidity Sensor
 5. Space CO₂ Sensor

Blower and Motor

- Supply Air Blower Assemblies: Blower assembly consists of an electric motor and direct-drive fan(s). Assembly is mounted on heavy gauge galvanized steel rails. Blower motor(s) is / are capable of continuous speed modulation, and is / are and controlled by an Inverter fan motor PCB.
- Blower Section Construction Supply Air: Direct drive motor and blower is assembled on a 13 gauge galvanized steel platform.
- Blower Assemblies: Assemblies are statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.
- Fan: Direct Drive, LG 3D Plug fan with painted steel wheels, statically and dynamically balanced, and Air Movement and Control

Figure 2: Split Compact DOAS.



Association International, Inc. (AMCA) certified for air and sound performance.

- Blower Section Motor Source Quality Control: Blower performance is factory tested for flow rate, pressure, power, air density, rotation speed and efficiency. Ratings are to be established in accordance with AMCA 210, "Laboratory Methods of Testing Fans for Rating."
- Blower Motor is an Electronically Commutated (EC) Motor. Supply Fan Motor enables Auto CFM modulation or RPM control (40-100% for ARND093DCR4 and ARND063DER4, or 50-100% for ARND-153DCR4 and ARND203DCR4). Microprocessor controller could set Direct CFM value and supply fan motor will modulating to follow the target CFM value.

Filter

The outdoor air filter is a 2-inch thick pleated filter panel with MERV 8 rating (factory supplied for models ARND093DCR4, ARND-153DCR4 and ARND203DCR4). A 2-inch MERV 13 filter is a field provided option.

Microprocessor Controls

The unit is constructed so that it can function as a stand-alone heating and cooling system controlled by factory-supplied controllers and sensors, or it can be operated as a heating and cooling system controlled by a Building Management System (BMS). The unit is controlled by a factory-installed microprocessor programmable controller that is connected to various field optional sensors.

- Supply fan is configured for Constant Volume by advanced control sequence.
 - Capacity Control: Unit enable to control air volume by Percentage (which is exchanged with RPM value).
 - CFM Modulation: The fan speed is controlled using a microprocessor, and can be field adjusted from the factory setting to compensate for a limited amount of additional resistance to airflow caused by field connected ductwork or other airflow restricting devices.
- Optional: Network Control, CO₂ Control (Sensor to be supplied at

MECHANICAL SPECIFICATIONS

Split Compact Dedicated Outdoor Air Systems (DOAS)

field).

- Operating Protocol: The microprocessor controller is factory-programmed for Modbus, BACnet IP.
- Embedded web page with complete web user interface to allow full remote control and monitoring of unit.
- Alarm Recording: Controller stores all alarm events for download.

Main Coil

The main coil uses R410A refrigerant and is (silver) soldered or brazed into the compressed refrigerant system. It is constructed of copper tubing, permanently bonded to aluminum fins, and enclosed in a SGCC galvanized steel frame. Fin design is sine wave rippled. An electronic expansion valve (EEV) regulates the flow of refrigerant.

Reheat Coil

The reheat coil uses R410A refrigerant. It is (silver) soldered or brazed into the compressed refrigerant system. Coil is constructed of copper tubing, permanently bonded to aluminum fins and enclosed in a SGCC steel frame. Coil has a factory-installed modulating hot gas reheat valve.

Condensate Pan

The unit includes a sloped drain pan that is an integral part of the unit. Pan is formed of welded 18 gauge SGCC steel with proprietary pre-painted material. Drain pan is sloped in one direction to provide positive draining and the drain connector is sealed at the penetration through the cabinet wall.

GENERAL DATA

Table 1: Split Compact DOAS General Data.

Unit Model No.		ARND063DER4	ARND093DCR4	ARND153DCR4	ARND203DCR4
Cooling Mode Performance					
Total Cooling Capacity (Btu/h)		42,000	70,000	120,000	143,100
Hot Gas Reheat Capacity (Btu/h)		10,000	13,000	24,000	30,000
Moisture Removal Capacity (lb. / h)		21.0	33.0	55.0	67
Heating Mode Performance					
Capacity (Btu/h) (Main Coil)		30,000	40,000	51,000	59,900
Entering Air					
Cooling Maximum (°F, D.B. / W.B.)		122 / 80	122 / 80	122 / 80	122 / 80
Heating Minimum (°F, D.B.)		14	14	(10 ⁴) 14	14
Unit Data					
Refrigerant Type ¹		R410A	R410A	R410A	R410A
Refrigerant Control		EEV	EEV	EEV	EEV
Sound Power dB(A) ²		55	60	74	72
Net Unit Weight (lbs.)		110	342	390	390
Shipping Weight (lbs.)		126	393	448	448
Communication Cable ³ (No. x AWG)		2 (2 conductor) x 18	2 (2 conductor) x 18	2 (2 conductor) x 18	2 (2 conductor) x 18
Fan					
Type		Sirocco	Sirocco	3D Plug	3D Plug
Motor (HP / W)		0.66 / 500	0.33 / 250	1 / 750	1 / 750
Motor / Drive		BLDC / Direct	ECM / Direct	ECM / Direct	ECM / Direct
Airflow Rate (CFM)		600	900	1,500	2,000
External Static Pressure (in. w.g.)		1.0	1.0	2.0	1.5
Airflow Range (CFM)		300-600	500-900	1,000 ⁵ – 1,500	1,000 ⁵ – 2,000
Piping					
Liquid Connection Size (in., O.D.)		3/8 Brazed	3/8 Brazed	1/2 Brazed	1/2 Brazed
High Pressure Vapor Connection Size (in., O.D.)		5/8 Brazed	5/8 Brazed	3/4 Brazed	7/8 Brazed
Low Pressure Vapor Connection Size (in., O.D.)		5/8 Brazed	3/4 Brazed	1-1/8 Brazed	1-1/8 Brazed
Condensate Drain (in.)	Drain Pump (in., I.D.)	1	1	1	1
	Gravity (in., O.D.)	1	1	1	1
Filter					
Outdoor		Cleanable (13-1/4" x 23-15/16" x 3/16")	2" Merv 8 (25" x 20")	2" Merv 8 (25" x 20")	2" Merv 8 (25" x 20")

EEV - Electronic Expansion Valve

ECM - Electronically Commutated Motor

Power Supply (V/Hz/Ø): 208-230/60/1

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

This data is rated 0 ft. above sea level, with 25 ft. of refrigerant piping per coil.

Main Coil Cooling Capacity Rating obtained with entering air of 95°F D.B. / 75°F W.B. and leaving air of 52.9°F D.B. / 52.5°F W.B.

Main Coil Heating Capacity Rating obtained with entering air of 44°F D.B. and leaving air of 70°F D.B.

Reheat Coil Heating Capacity Rating obtained with entering air of 54°F D.B. and leaving air of 75°F

D.B.

¹Take appropriate actions at the end of HVAC equipment life to recover, recycle, reclaim or destroy R410A refrigerant according to applicable regulations (40 CFR Part 82, Subpart F) under section 608 of CAA.

²Sound power levels are tested under AHRI 260 Standard.

³All communication cable from the outdoor unit to the DOAS unit is to be minimum 18 AWG, 2 (2 conductor) wires, twisted, stranded, shielded and must comply with applicable local and national codes. Ensure the communication cable is properly grounded at the outdoor unit only. Ⓢ Do not ground the outdoor unit -DOAS unit communication cable at any other point.

Note:

Actual discharge air temperatures may vary from discharge air temperature set-point due to changes in outdoor air processing loads.

ELECTRICAL AND ACOUSTIC DATA

Electrical Data

Table 2: Split Compact DOAS Electrical Data.

Model	Power Supply				FLA	MCA	MOP
	Hz	Volts	Voltage Range	Phase			
ARND063DER4	60	208-230	187-253	1	2.5	3.1	15
ARND093DCR4					2.0	2.5	15
ARND153DCR4					5.8	7.3	15
ARND203DCR4					6.0	7.5	15

MCA : Minimum Circuit Ampacity.

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

Acoustic Data

Table 3: ARND093DCR4 500 CFM Sound Power Data (@0.2 ESP).

Model	Rating	E.S.P	CFM	Sound Power Level, Lw (dB one reference picowatt)							
				63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
ARND093DCR4	Ducted Inlet	0.2	500	39.8	47.5	51.7	57.6	56.8	51.9	45.2	32.5
	Casing Radiated			33.5	35.8	40.9	50.0	47.2	43.8	36.3	25.8
	Ducted Outlet			55.5	51.6	54.2	59.0	57.6	54.0	48.5	37.1

Table 4: ARND093DCR4 900 CFM Sound Power Data (@0.64 ESP).

Model	Rating	E.S.P	CFM	Sound Power Level, Lw (dB one reference picowatt)							
				63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
ARND093DCR4	Ducted Inlet	0.64	900	43.6	48.2	54.7	58.9	60.0	55.4	48.5	36.3
	Casing Radiated			36.2	40.6	43.8	50.0	51.6	48.1	39.7	28.7
	Ducted Outlet			70.9	66.8	58.8	62.1	62.7	59.6	56.1	48.0

Table 5: ARND153DCR4 and ARND203DCR4 1,200 CFM Sound Data (@0.96 ESP).

Model	Rating	E.S.P	CFM	Sound Power Level, Lw (dB one reference picowatt)							
				63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
ARND153DCR4, ARND203DCR4	Ducted Inlet	0.96	1,211	70.9	68.2	62.4	58.8	53.9	50.9	42.5	39.5
	Casing Radiated			65.3	68.2	62.0	62.4	63.0	60.5	55.4	52.3
	Ducted Outlet			71.3	68.2	67.0	64.1	66.3	61.0	48.8	43.5

Table 6: ARND153DCR4 1,500 CFM Sound Data (@1.96 ESP).

Model	Rating	E.S.P	CFM	Sound Power Level, Lw (dB one reference picowatt)							
				63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
ARND153DCR4	Ducted Inlet	1.96	1,516	76.9	72.1	71.7	68.7	61.7	58.7	52.7	49.8
	Casing Radiated			76.9	79.6	71.1	69.3	69.7	67.8	65.0	63.2
	Ducted Outlet			80.3	72.6	79.5	72.6	72.9	67.5	61.2	54.5

Table 7: ARND203DCR4 2,000 CFM Sound Data (@1.5 ESP).

Model	Rating	E.S.P	CFM	Sound Power Level, Lw (dB one reference picowatt)							
				63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
ARND203DCR4	Ducted Inlet	1.5	2,023	71.9	70.3	74.8	68.1	60.2	58.6	53.6	49.7
	Casing Radiated			73.5	73.2	70.0	67.5	67.1	65.1	63.0	59.5
	Ducted Outlet			72.5	77.3	82.9	72.7	72.3	67.4	60.5	54.7

ELECTRICAL AND ACOUSTIC DATA

Acoustic Data

Table 8: ARND063DER4 600 CFM Sound Power Data (@0.85ESP).

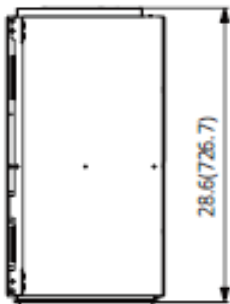
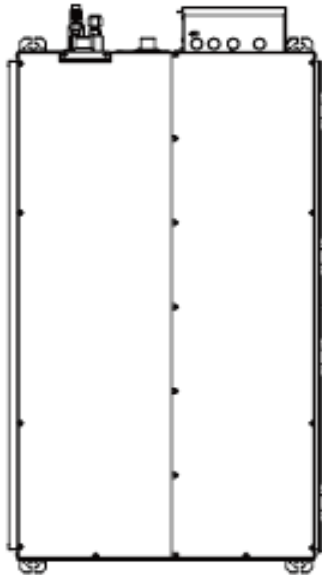
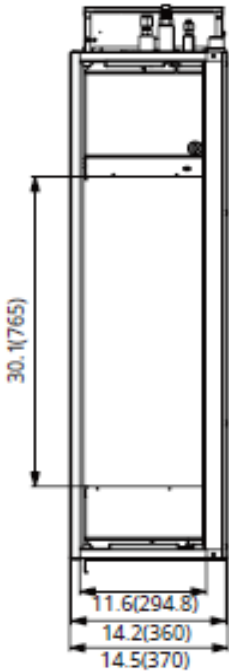
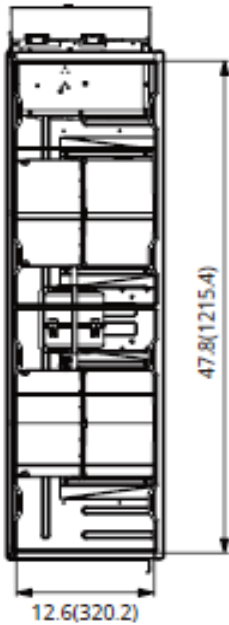
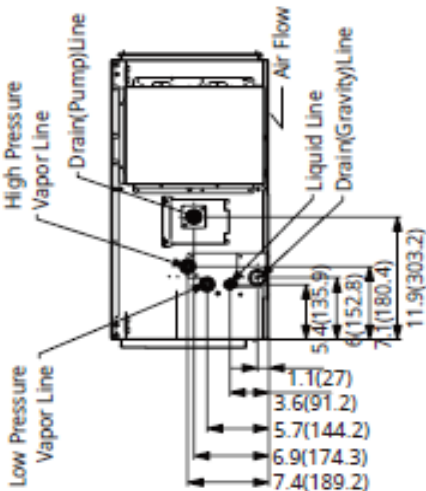
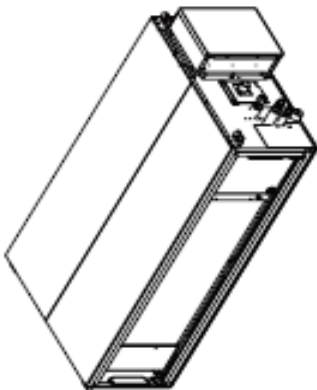
Model	Rating	E.S.P	CFM	Sound Power Level, Lw (dB one reference picowatt)							
				63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
ARND063DER4	Ducted Inlet	0.85	600	41.2	50.2	53.5	54.1	51.1	53.5	49.1	41.2
	Casing Radiated			43.9	49.1	55.9	60.2	65.9	57.7	50.1	42.8
	Ducted Outlet			42.3	53.5	55.6	62.6	65.7	66.1	51.5	47.1



DIMENSIONS

ARND063DER4

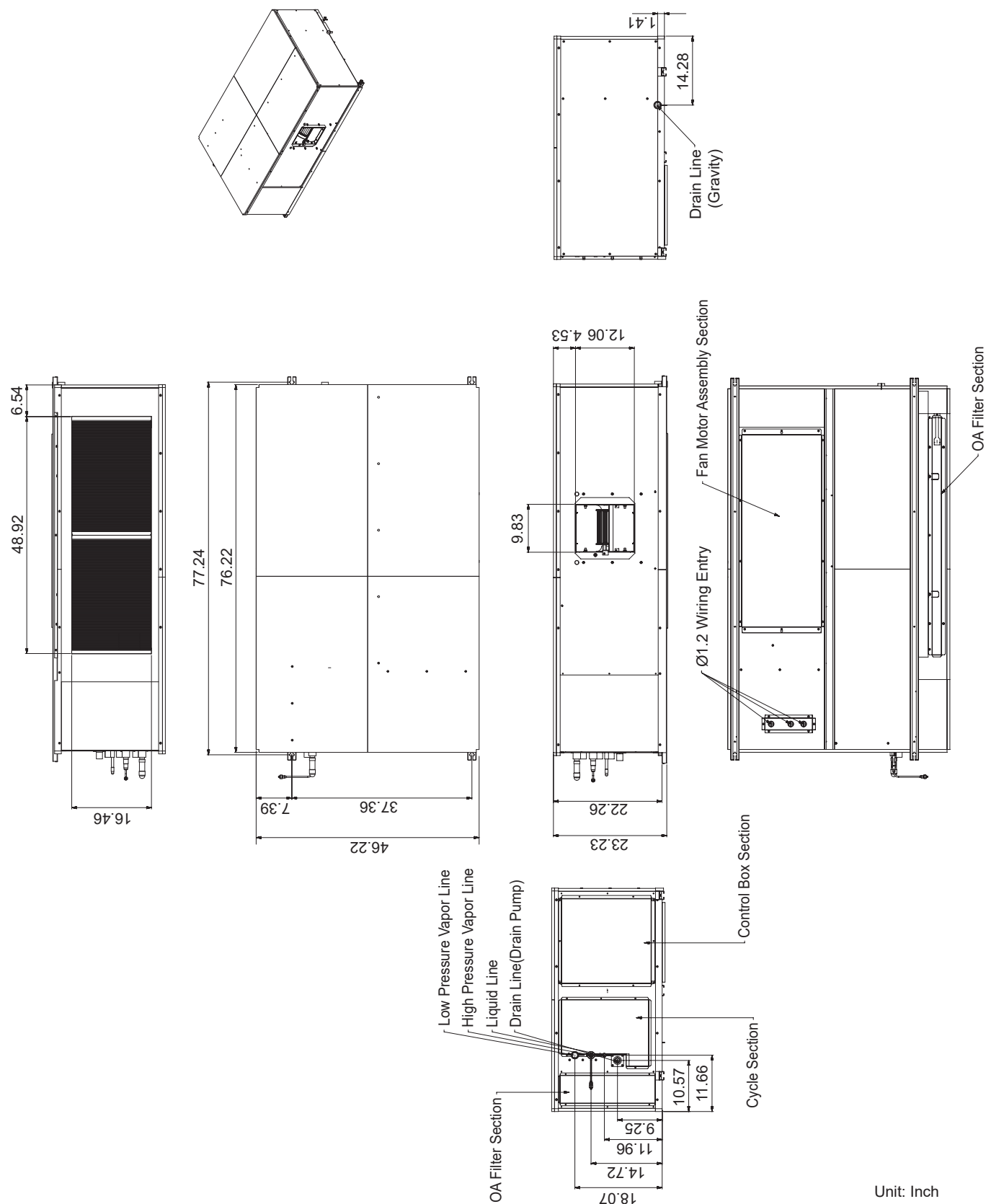
[Unit : Inch(m)]



Product Data

DIMENSIONS

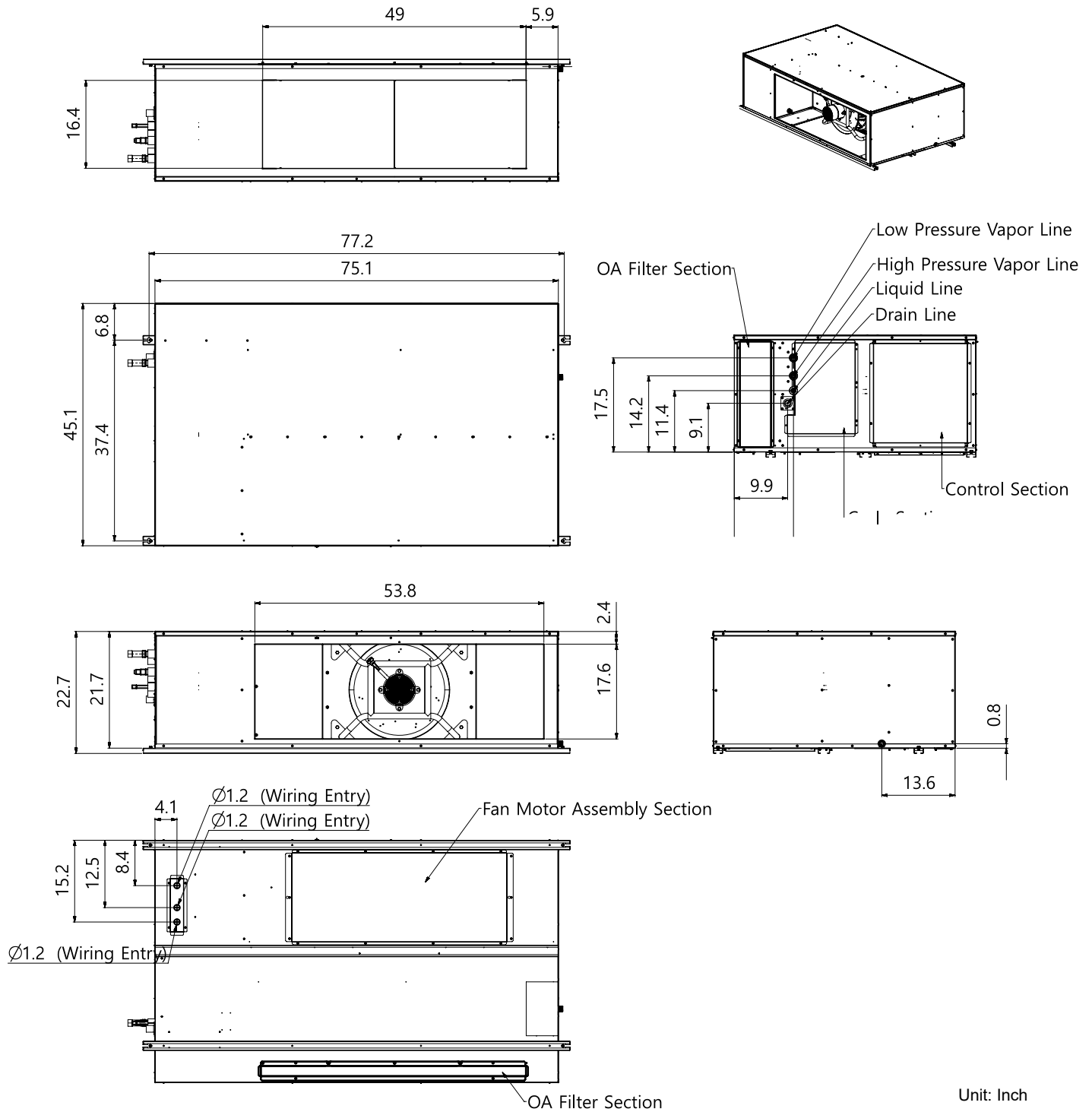
ARND093DCR4



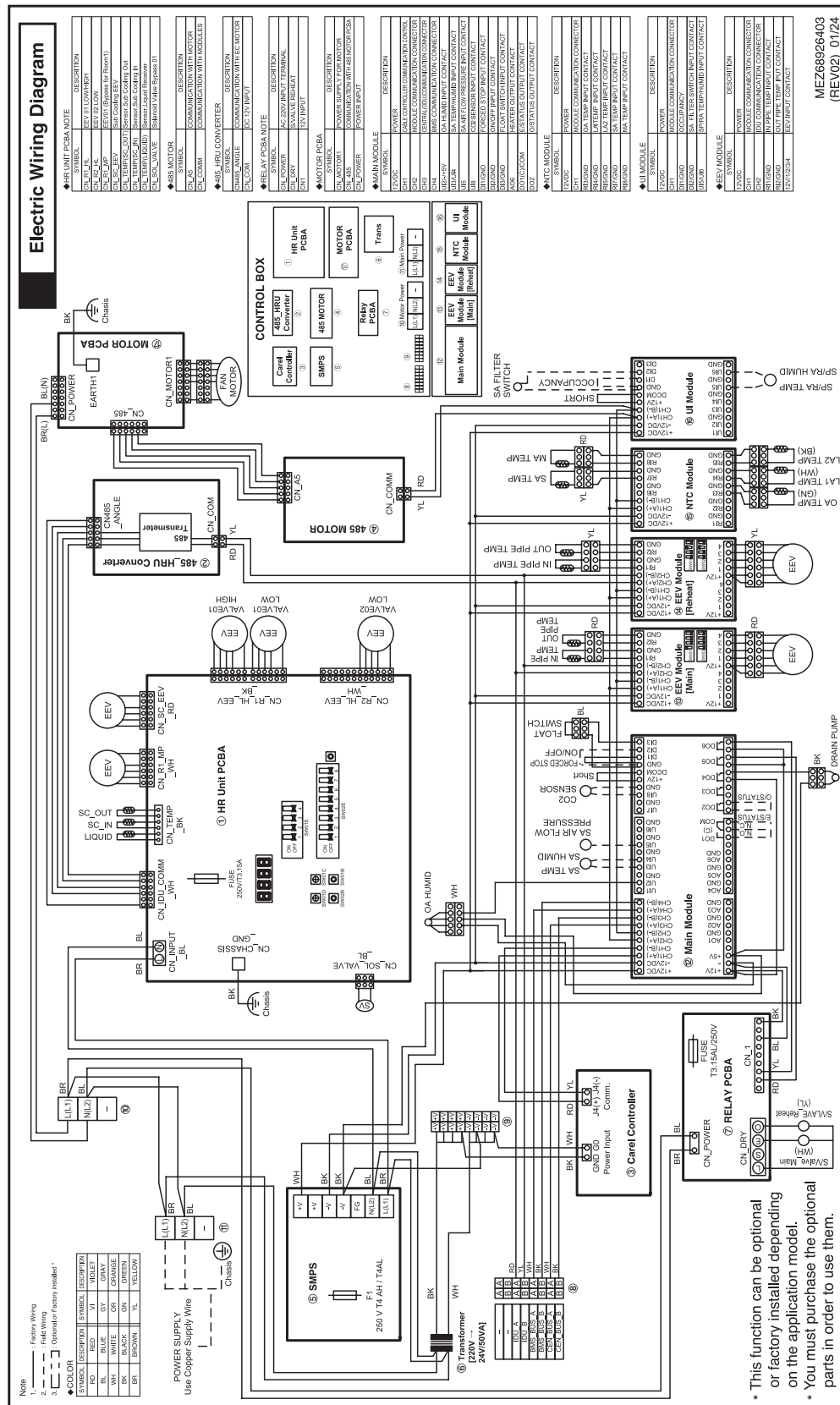
Unit: Inch

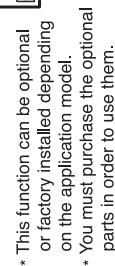
DIMENSIONS

ARND153DCR4, ARND203DCR4



ARND093DCR4





REFRIGERANT PIPING DIAGRAM (COOLING)

ARND093DCR4, ARND153DCR4, ARND203DCR4

Refrigerant Piping Diagram (Cooling)

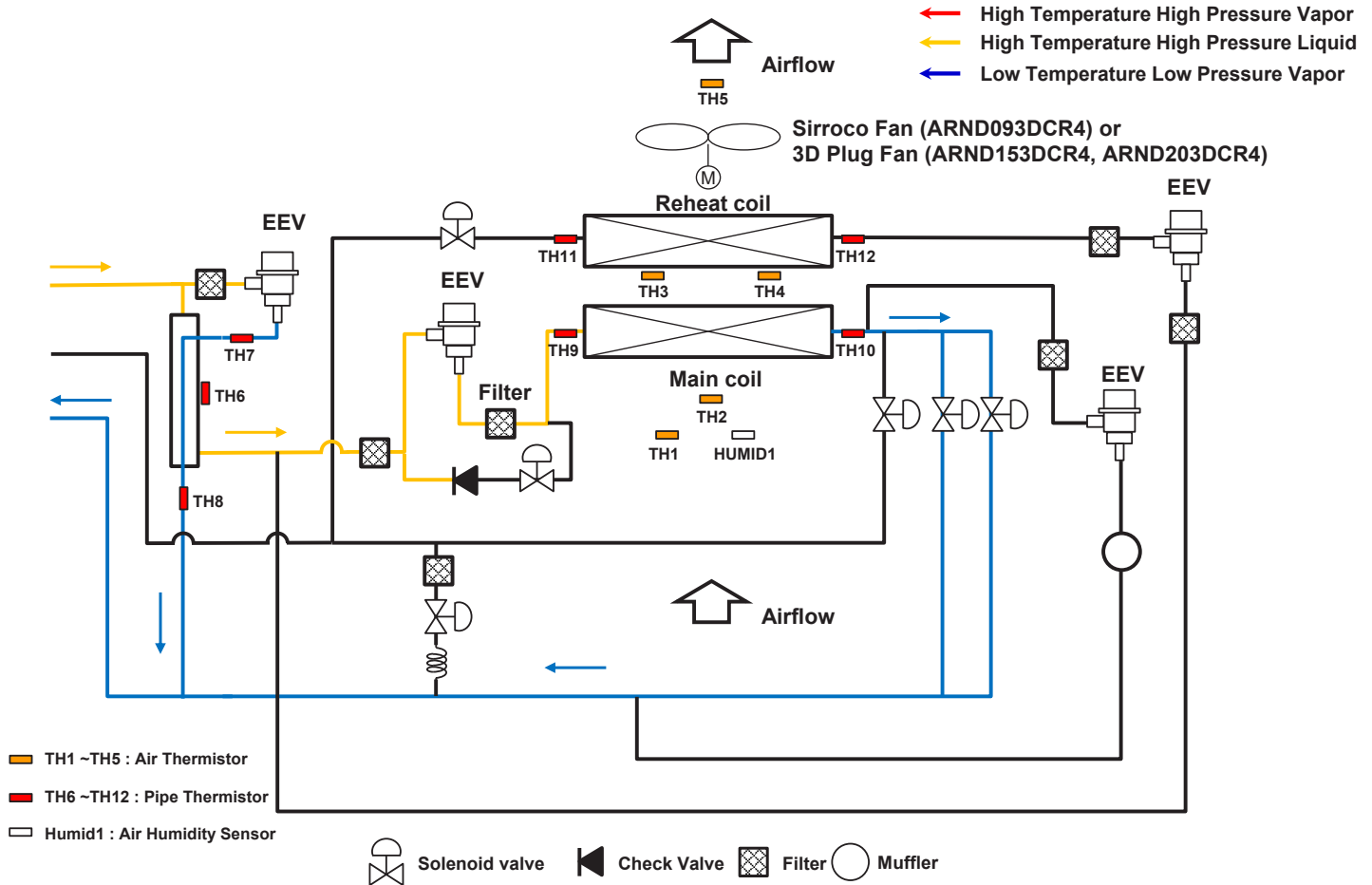


Table 9: ARND093DCR4, ARND153DCR4, and ARND203DCR4 Refrigerant Pipe Connection Port Diameters.

Model	Liquid (in., O.D.)	High Pressure Vapor (in., O.D.)	Low Pressure Vapor Size (in., O.D.)
ARND093DCR4	3/8 Brazed	5/8 Brazed	3/4 Brazed
ARND153DCR4	1/2 Brazed	3/4 Brazed	1-1/8 Brazed
ARND203DCR4	1/2 Brazed	7/8 Brazed	1-1/8 Brazed

Table 10: ARND093DCR4, ARND153DCR4, and ARND203DCR4 Thermistors.

Thermistor	Type	Description
TH1	Air	Outdoor Air Thermistor
TH2	Air	Mixed Air Thermistor (After E/Heater)
TH3	Air	Main Coil 1 Thermistor
TH4	Air	Main Coil 2 Thermistor
TH5	Air	Supply Air Thermistor
TH6	Pipe	Liquid Pipe Thermistor
TH7	Pipe	SC In Thermistor
TH8	Pipe	SC Out Thermistor
TH9	Pipe	Main Coil In Thermistor
TH10	Pipe	Main Coil Out Thermistor
TH11	Pipe	Reheat Coil In Thermistor
TH12	Pipe	Reheat Coil Out Thermistor
Humid1	-	Outdoor Air Humidity Sensor

REFRIGERANT PIPING DIAGRAM (DEHUMID.)

ARND093DCR4, ARND153DCR4, ARND203DCR4

Refrigerant Piping Diagram (Dehumidification)

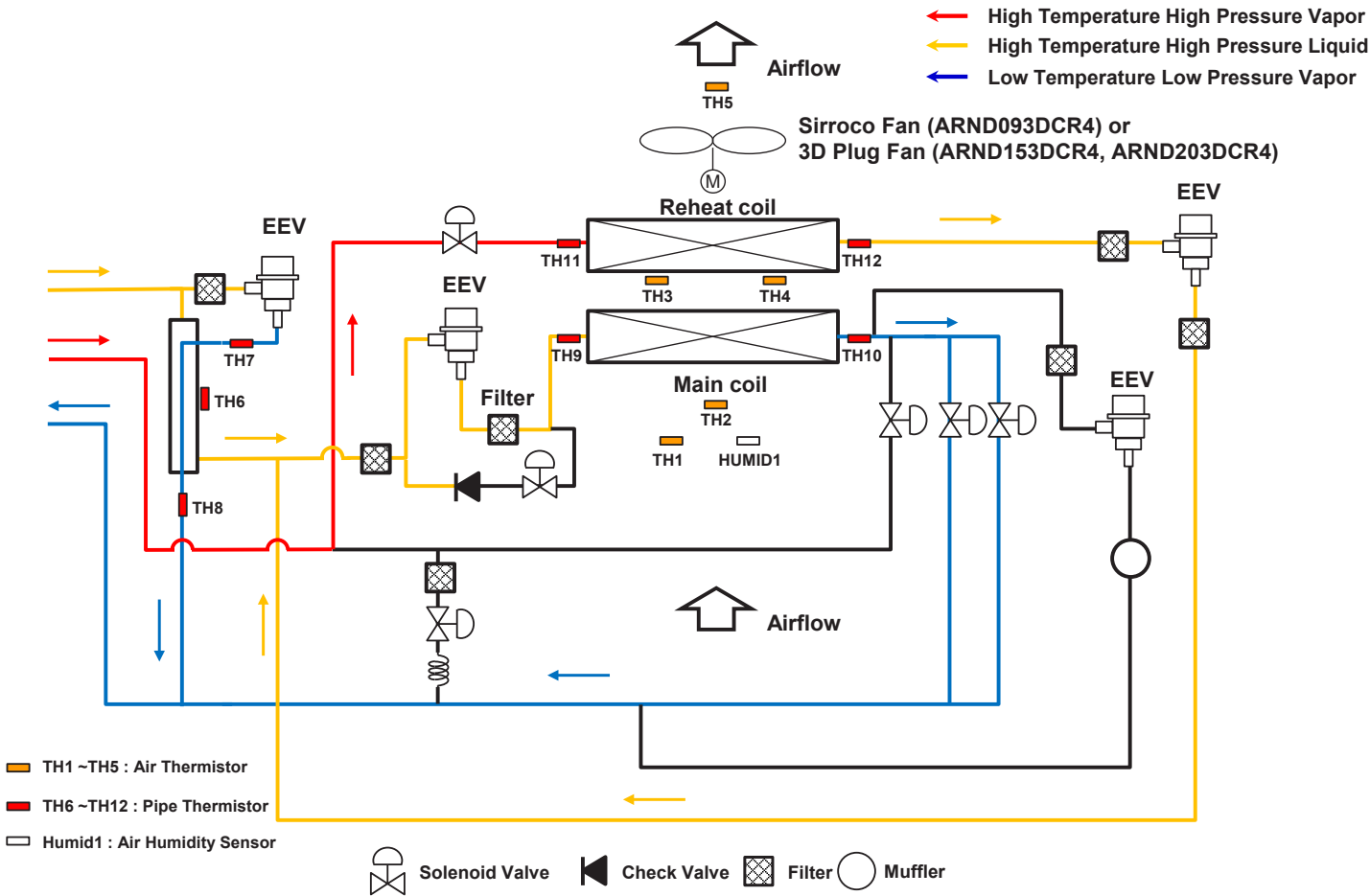


Table 11: ARND093DCR4, ARND153DCR4, and ARND203DCR4 Refrigerant Pipe Connection Port Diameters.

Model	Liquid (in., O.D.)	High Pressure Vapor (in., O.D.)	Low Pressure Vapor Size (in., O.D.)
ARND093DCR4	3/8 Brazed	5/8 Brazed	3/4 Brazed
ARND153DCR4	1/2 Brazed	3/4 Brazed	1-1/8 Brazed
ARND203DCR4	1/2 Brazed	7/8 Brazed	1-1/8 Brazed

Table 12: ARND093DCR4, ARND153DCR4, and ARND203DCR4 Thermistors.

Thermistor	Type	Description
TH1	Air	Outdoor Air Thermistor
TH2	Air	Mixed Air Thermistor (After E/Heater)
TH3	Air	Main Coil 1 Thermistor
TH4	Air	Main Coil 2 Thermistor
TH5	Air	Supply Air Thermistor
TH6	Pipe	Liquid Pipe Thermistor
TH7	Pipe	SC In Thermistor
TH8	Pipe	SC Out Thermistor
TH9	Pipe	Main Coil In Thermistor
TH10	Pipe	Main Coil Out Thermistor
TH11	Pipe	Reheat Coil In Thermistor
TH12	Pipe	Reheat Coil Out Thermistor
Humid1	-	Outdoor Air Humidity Sensor

REFRIGERANT PIPING DIAGRAM (HEATING)

ARND093DCR4, ARND153DCR4, ARND203DCR4

Refrigerant Piping Diagram (Heating)

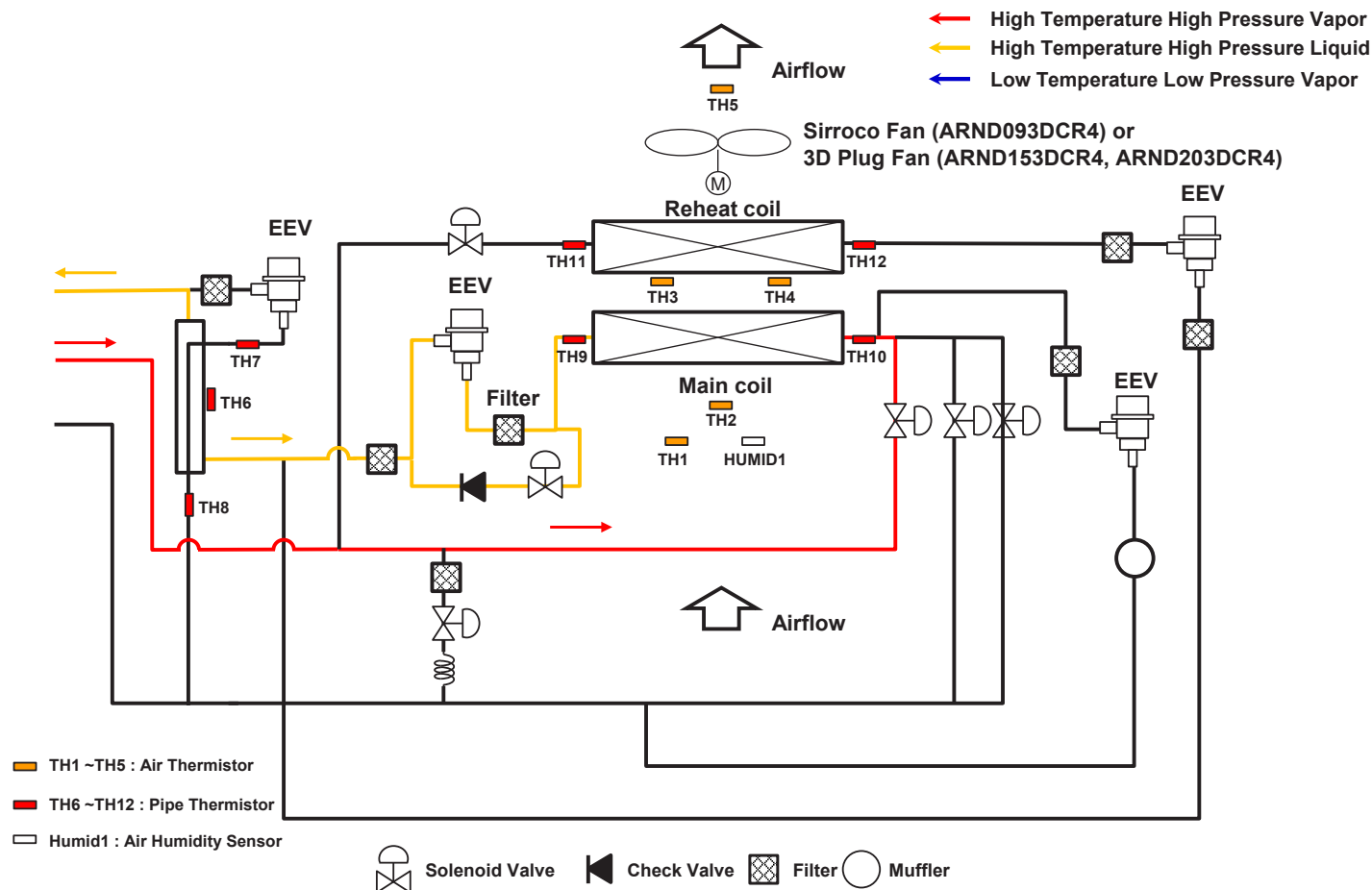


Table 13: ARND093DCR4, ARND153DCR4, and ARND203DCR4 Refrigerant Pipe Connection Port Diameters.

Model	Liquid (in., O.D.)	High Pressure Vapor (in., O.D.)	Low Pressure Vapor Size (in., O.D.)
ARND093DCR4	3/8 Brazed	5/8 Brazed	3/4 Brazed
ARND153DCR4	1/2 Brazed	3/4 Brazed	1-1/8 Brazed
ARND203DCR4	1/2 Brazed	7/8 Brazed	1-1/8 Brazed

Table 14: ARND093DCR4, ARND153DCR4, and ARND203DCR4 Thermistors.

Thermistor	Type	Description
TH1	Air	Outdoor Air Thermistor
TH2	Air	Mixed Air Thermistor (After E/Heater)
TH3	Air	Main Coil 1 Thermistor
TH4	Air	Main Coil 2 Thermistor
TH5	Air	Supply Air Thermistor
TH6	Pipe	Liquid Pipe Thermistor
TH7	Pipe	SC In Thermistor
TH8	Pipe	SC Out Thermistor
TH9	Pipe	Main Coil In Thermistor
TH10	Pipe	Main Coil Out Thermistor
TH11	Pipe	Reheat Coil In Thermistor
TH12	Pipe	Reheat Coil Out Thermistor
Humid1	-	Outdoor Air Humidity Sensor

PERFORMANCE DATA

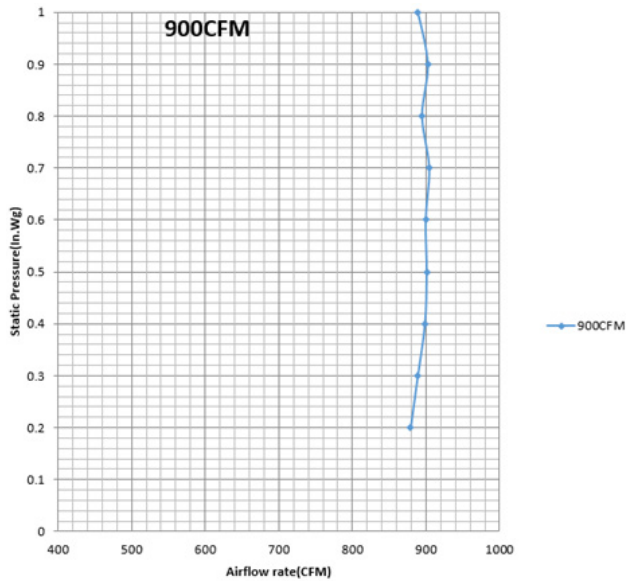
[Fan Curves on page 24](#)

[Cooling / Heating / Dehumidification Data on page 29](#)

FAN CURVES

ARND093DCR4 Constant Airflow Rate Control

Figure 3: ARND093DCR4 DOAS Airflow Rate Change by External Static Pressure.



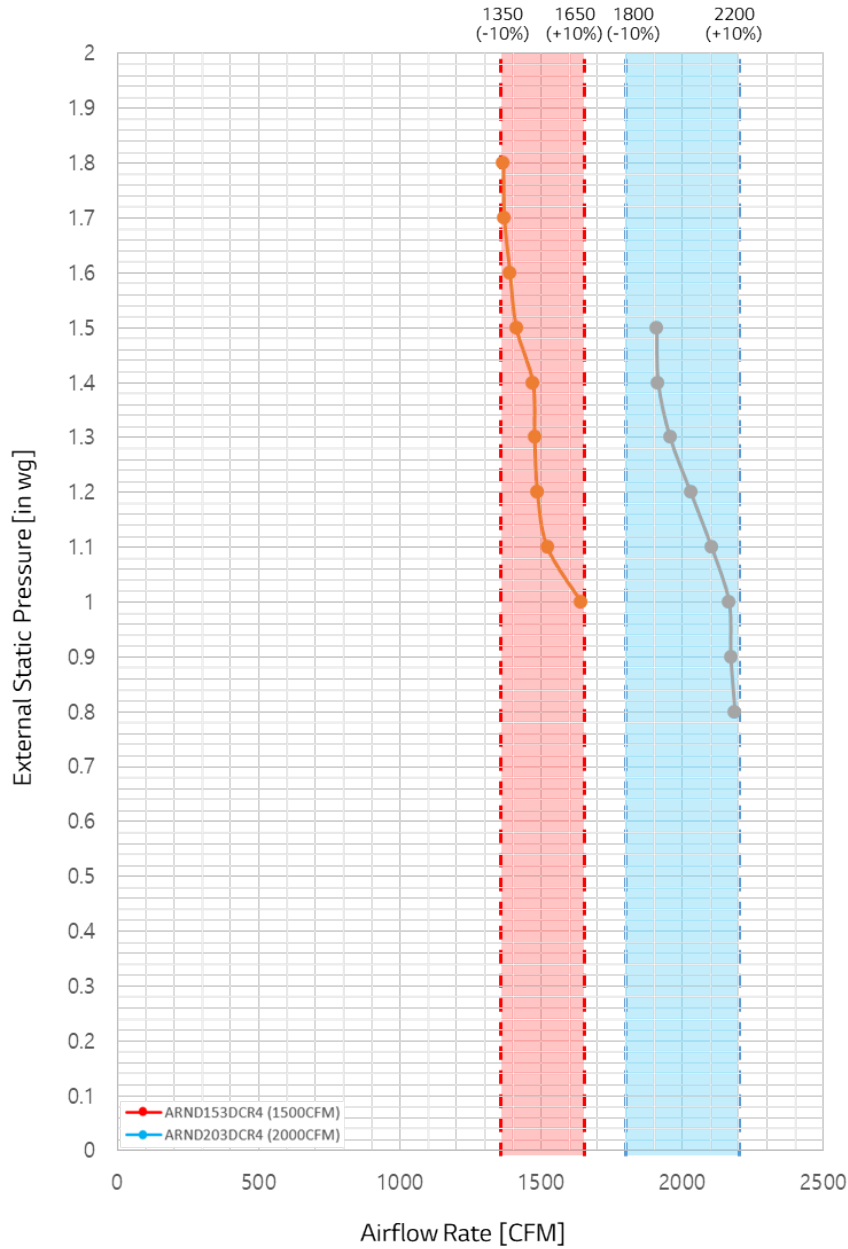
Note:

Split Compact DOAS units include electronically commutated motor (ECM) fan motors, which automatically adjust the fan speed to maintain the same airflow rate, regardless of external static pressure.

FAN CURVES

ARND153DCR4, ARND203DCR4 Constant Airflow Rate Control

Figure 4: ARND153DCR4 and ARND203DCR4 DOAS Airflow Rate Change by External Static Pressure.



Note:

Split Compact DOAS units include electronically commutated motor (ECM) fan motors, which automatically adjust the fan speed to maintain the same airflow rate, regardless of external static pressure.

FAN CURVES

ARND063DER4, ARND093DCR4, ARND153DCR4, ARND203DCR4

Constant RPM Control

Figure 6: ARND093DCR4 DOAS P-Q Curves.

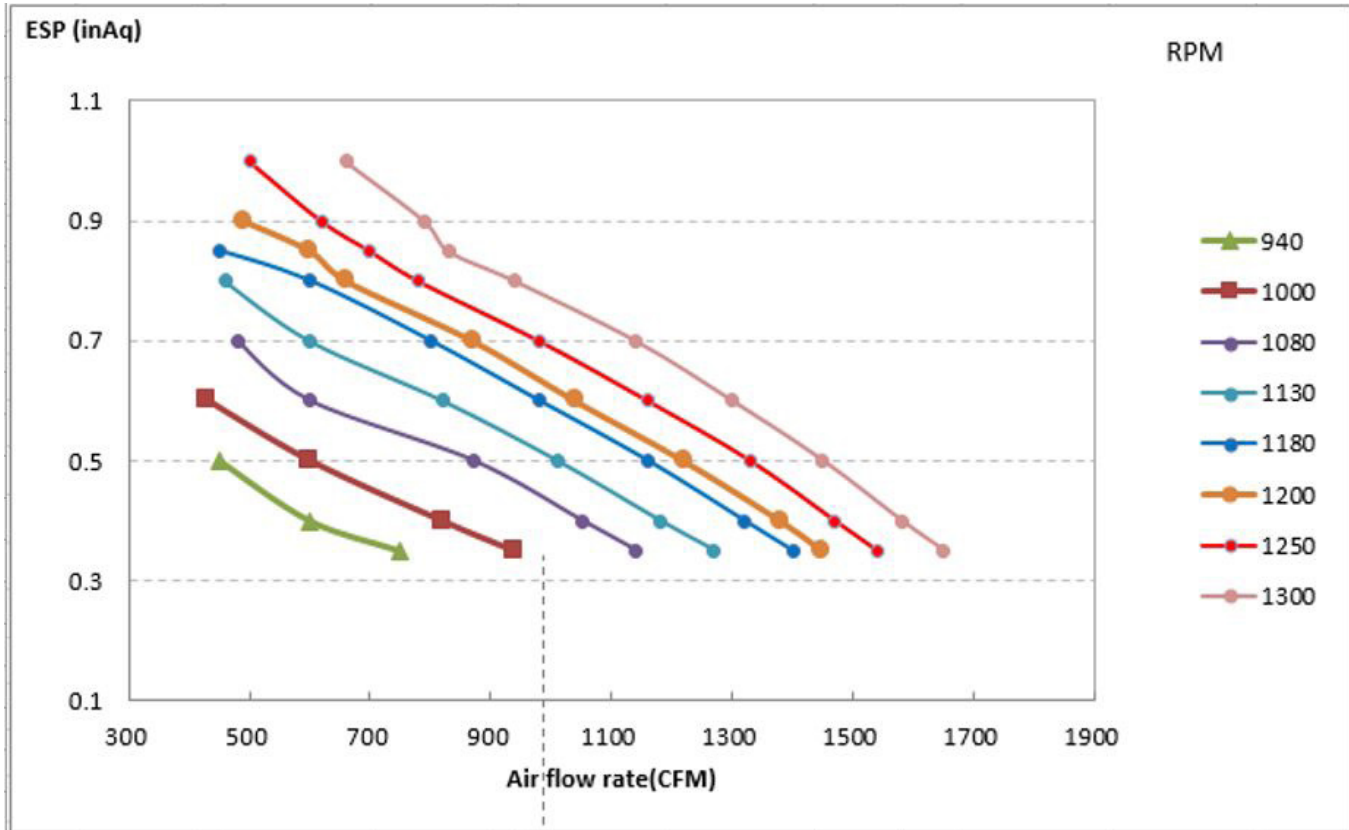
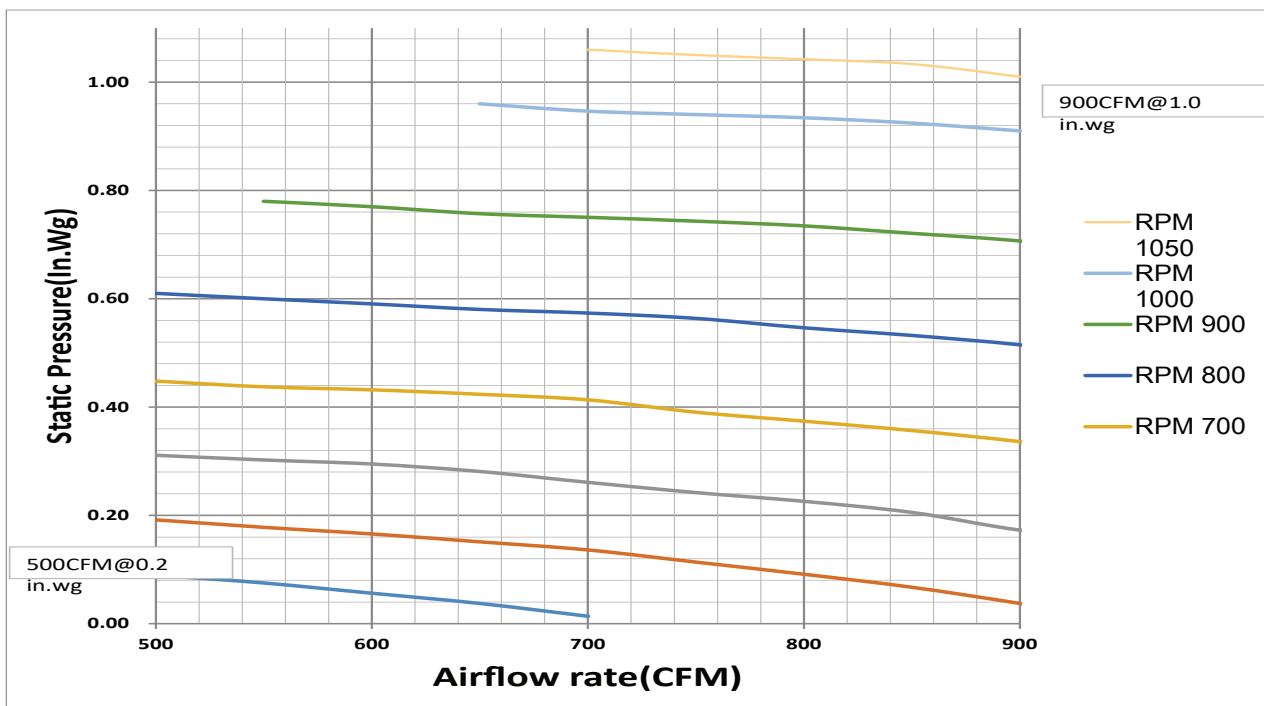
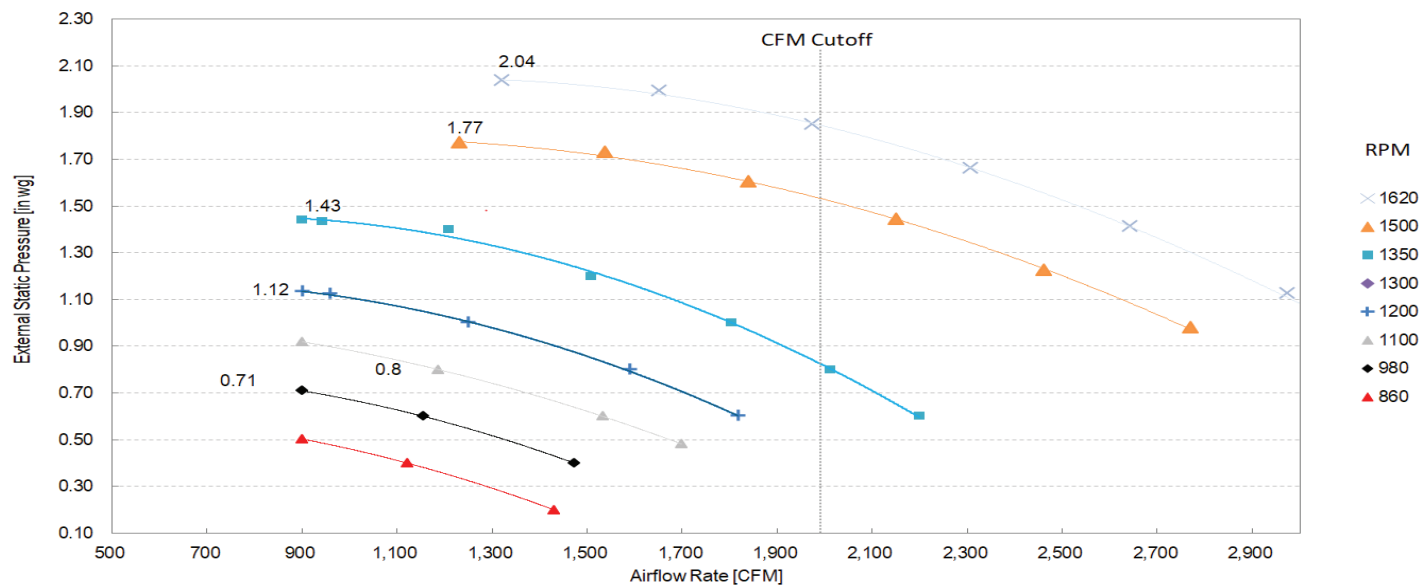


Figure 5: ARND093DCR4 DOAS P-Q Curves



Performance Data

Figure 7: ARND153DCR4 and ARND203DCR4 DOAS P-Q Curves..



COOLING / HEATING / DEHUMIDIFICATION DATA

ARND063DER4

Table 15: ARND063DER4 (600 CFM) Cooling Capacity.

Outdoor Air Temperature (DB, °F)	Outdoor Air Temperature (WB, °F)															
	57		61		64		66		70		73		75		79	
	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
	kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h	
64	1.8	1.7	1.8	1.7	5.4	1.7	-	-	-	-	-	-	-	-	-	-
70	5.5	5.5	5.5	5.5	6.3	5.5	9.8	5.5	-	-	-	-	-	-	-	-
75	9.1	9.2	9.1	9.2	9.1	9.2	10.5	9.2	17.9	9.2	26.0	9.2	-	-	-	-
81	12.6	12.6	12.7	12.6	12.7	12.6	12.7	12.6	18.6	13.0	26.6	12.6	30.9	12.6	40.1	12.6
90	18.6	18.8	18.7	18.8	18.8	18.8	18.8	18.8	19.9	19.1	27.9	18.8	32.2	18.8	41.4	18.8
95	22.1	22.2	22.2	22.2	22.3	22.2	22.4	22.5	22.5	22.5	28.6	22.5	32.9	22.5	42.0	22.5
100	25.6	25.6	25.7	25.6	25.8	25.9	25.9	25.9	26.0	25.9	29.2	26.3	33.5	26.3	42.6	26.3
104	-	-	28.2	28.3	28.3	28.3	28.3	28.3	28.5	28.3	29.9	28.7	34.2	28.7	43.9	28.7
109	-	-	31.7	31.7	31.8	31.7	31.9	31.7	32.0	32.1	32.2	32.1	34.8	32.1	43.9	32.1
115	-	-	-	-	35.3	35.1	35.4	35.5	35.5	35.5	35.7	35.8	35.8	35.8	44.5	35.8
120	-	-	-	-	-	-	38.9	38.9	39.1	38.9	39.3	39.2	39.4	39.2	45.1	39.6
122	-	-	-	-	-	-	40.1	39.9	40.3	40.3	40.5	40.6	40.6	40.6	45.4	40.6

Table 16: ARND063DER4 (600 CFM) Heating Capacity.

Outdoor Temperature	DOAS	
DB, °F	TC (kBtu)	Supply Air Temperature (°F)
5	56.8	93
14	51.0	93
18	48.7	93
21	46.3	93
23	45.2	93
27	42.8	93
30	40.5	93
32	39.3	93
34	38.1	93
36	37.1	93
39	34.7	93
41	33.5	93
43	32.4	93
47	30.0	93
50	27.8	93
54	25.4	93
57	23.0	93
61	20.7	93

Table 17: ARND063DER4 (600 CFM) Dehumidification - Supply Air Dew Point.

Outdoor Air Temperature (DB, °F)	Outdoor Air temperature (WB, °F)							
	57	61	64	66	70	73	75	79
64	52.2	58.6	61.7	-	-	-	-	-
70	47.8	55.2	61.0	61.2	-	-	-	-
75	43.0	51.3	58.3	60.4	61.0	61.5	-	-
81	36.9	46.9	54.9	58.5	60.4	61.0	61.3	62.1
90	22.6	37.8	48.0	52.3	59.2	59.7	60.1	60.8
95	7.7	30.4	43.2	48.2	56.7	59.0	59.4	60.1
100	-38.6	20.1	37.2	43.3	53.1	58.5	58.8	59.5
104	-	10.0	32.4	39.4	50.4	57.7	58.1	58.8
109	-	-24.9	23.2	32.5	45.7	55.4	57.4	58.1
115	-	-	8.6	23.4	40.3	51.6	56.3	57.4
120	-	-	-	9.0	33.8	47.3	52.5	56.7
122	-	-	-	1.6	31.1	45.7	51.3	56.5

COOLING / HEATING / DEHUMIDIFICATION DATA

ARND093DCR4

Table 18: ARND093DCR4 (900 CFM) Cooling Capacity.

Outdoor Air Temperature (DB, °F)	Outdoor Air Temperature (WB, °F)															
	58		61		64		67		70		73		75		78	
	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
	kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h	
65	16.7	16.7	29.3	16.4	43.0	16.4	-	-	-	-	-	-	-	-	-	-
70	25.2	25.2	28.0	24.9	42.7	24.9	57.3	24.9	-	-	-	-	-	-	-	-
75	33.4	33.4	33.4	33.4	42.3	33.4	57.7	33.4	73.7	32.8	90.8	32.1	-	-	-	-
80	42.0	42.0	42.0	42.0	42.7	41.6	57.3	41.6	73.4	41.3	90.4	40.6	103.0	40.6	90.1	29.0
90	59.4	59.4	58.3	58.3	58.3	58.3	58.7	58.7	73.0	57.7	90.1	57.3	102.4	57.0	111.9	52.5
95	68.2	68.2	66.9	66.9	66.9	66.9	66.9	66.9	72.7	66.2	89.7	65.9	102.0	65.5	122.8	65.5
100	76.4	76.4	76.4	76.4	75.4	75.4	75.4	75.4	75.4	75.4	89.4	74.0	101.7	73.7	116.7	71.7
104	-	-	83.3	83.3	82.2	82.2	81.9	81.9	81.9	81.9	89.1	80.9	101.3	80.5	113.3	76.8
110	-	-	92.5	92.5	93.2	93.2	91.8	91.8	91.8	91.8	91.8	91.8	101.0	90.4	107.8	84.6
115	-	-	-	-	101.7	101.7	101.0	101.0	100.3	100.0	100.3	100.0	100.7	98.6	103.0	91.4
120	-	-	-	-	-	-	100.0	100.0	98.6	98.3	98.6	98.3	99.0	98.6	99.0	98.6
122	-	-	-	-	-	-	98.3	98.3	96.6	96.2	96.9	96.2	96.6	96.6	96.9	96.6

Table 19: ARND093DCR4 (900 CFM) Heating Capacity.

Outdoor Temperature DB, °F	DOAS	
	TC (kBtu)	Supply Air Temperature (°F)
14	73.7	90
18	70.2	90
21	66.6	90
23	65.0	90
27	61.3	90
30	58.0	90
32	56.2	90
34	54.4	90
36	52.7	90
39	49.2	90
41	47.4	90
43	45.7	90
47	41.5	90
50	38.6	90
54	35.2	90
57	31.7	90
61	28.1	90

Table 20: ARND093DCR4 (900 CFM) Dehumidification - Supply Air Dew Point.

Outdoor Air Temperature (DB, °F)	Outdoor Air temperature (WB, °F)							
	60	63	66	69	72	75	77	80
65	53.2	53.8	54.5	-	-	-	-	-
70	49.3	54.3	54.5	54.7	-	-	-	-
75	45.0	51.8	54.5	54.5	54.5	55.0	-	-
80	39.7	47.8	54.3	54.5	54.7	55.0	55.0	62.4
90	25.5	37.9	46.9	53.8	54.7	55.0	55.0	57.6
95	14.0	31.1	42.1	50.0	54.7	55.0	55.0	55.0
100	-8.7	22.1	36.3	45.7	53.6	55.0	55.0	56.3
104	-	11.7	30.7	41.9	50.7	55.0	55.0	57.0
110	-	-25.6	19.6	34.9	45.9	54.1	55.0	58.1
115	-	-	3.7	27.3	40.8	50.5	55.0	59.0
120	-	-	-	16.5	34.9	46.4	52.2	59.9
122	-	-	-	10.6	32.0	44.4	50.7	58.6

Note:

The 10°F Entering Air Temperature only permitted for 900 CFM airflow rate or less.

COOLING / HEATING / DEHUMIDIFICATION DATA

ARND153DCR4

Table 21: ARND153DCR4 (1,500 CFM) Cooling Capacity.

Outdoor Air Temperature (DB, °F)	Outdoor Air Temperature (WB, °F)															
	58		61		64		67		70		73		75		78	
	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
	kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h	
65	16.7	16.7	29.3	16.4	43.0	16.4	-	-	-	-	-	-	-	-	-	-
70	25.2	25.2	28.0	24.9	42.7	24.9	57.3	24.9	-	-	-	-	-	-	-	-
75	33.4	33.4	33.4	33.4	42.3	33.4	57.7	33.4	73.7	32.8	90.8	32.1	-	-	-	-
80	42.0	42.0	42.0	42.0	42.7	41.6	57.3	41.6	73.4	41.3	90.4	40.6	103.0	40.6	90.1	29.0
90	59.4	59.4	58.3	58.3	58.3	58.3	58.7	58.7	73.0	57.7	90.1	57.3	102.4	57.0	111.9	52.5
95	68.2	68.2	66.9	66.9	66.9	66.9	66.9	66.9	72.7	66.2	89.7	65.9	102.0	65.5	122.8	65.5
100	76.4	76.4	76.4	76.4	75.4	75.4	75.4	75.4	75.4	75.4	89.4	74.0	101.7	73.7	116.7	71.7
104	-	-	83.3	83.3	82.2	82.2	81.9	81.9	81.9	81.9	89.1	80.9	101.3	80.5	113.3	76.8
110	-	-	92.5	92.5	93.2	93.2	91.8	91.8	91.8	91.8	91.8	91.8	101.0	90.4	107.8	84.6
115	-	-	-	-	101.7	101.7	101.0	101.0	100.3	100.0	100.3	100.0	100.7	98.6	103.0	91.4
120	-	-	-	-	-	-	100.0	100.0	98.6	98.3	98.6	98.3	99.0	98.6	99.0	98.6
122	-	-	-	-	-	-	98.3	98.3	96.6	96.2	96.9	96.2	96.6	96.6	96.9	96.6

Table 22: ARND153DCR4 (1,500 CFM) Heating Capacity.

Outdoor Temperature	DOAS	
DB, °F	TC (kBtu)	Supply Air Temperature (°F)
14	110.3	82
18	106.7	83
21	103.0	85
23	101.2	85
27	97.5	87
30	93.9	88
32	92.0	89
34	90.2	89
36	87.7	90
39	81.9	90
41	78.9	90
43	76.0	90
47	69.2	90
50	64.5	90
54	58.6	90
57	52.8	90
61	47.0	90

Table 23: ARND153DCR4 (1,500 CFM) Dehumidification - Supply Air Dew Point.

Outdoor Air Temperature (DB, °F)	Outdoor Air temperature (WB, °F)							
	60	63	66	69	72	75	77	80
65	53.2	53.8	54.5	-	-	-	-	-
70	49.3	54.3	54.5	54.7	-	-	-	-
75	45.0	51.8	54.5	54.5	54.5	55.0	-	-
80	39.7	47.8	54.3	54.5	54.7	55.0	55.0	62.4
90	25.5	37.9	46.9	53.8	54.7	55.0	55.0	57.6
95	14.0	31.1	42.1	50.0	54.7	55.0	55.0	55.0
100	-8.7	22.1	36.3	45.7	53.6	55.0	55.0	56.3
104	-	11.7	30.7	41.9	50.7	55.0	55.0	57.0
110	-	-25.6	19.6	34.9	45.9	54.1	55.0	58.1
115	-	-	3.7	27.3	40.8	50.5	55.0	59.0
120	-	-	-	16.5	34.9	46.4	52.2	59.9
122	-	-	-	10.6	32.0	44.4	50.7	58.6

Note:

The 10°F Entering Air Temperature only permitted for 1,500 CFM airflow rate or less with the following restrictions:

- Minimum 12 ton outdoor unit required for one (1) DOAS unit connected to one (1) outdoor unit.
- Minimum 30 ton outdoor unit required for two (2) DOAS units connected to one (1) outdoor unit.
- Maximum of two (2) DOAS units connected to one (1) outdoor unit permitted.



COOLING / HEATING / DEHUMIDIFICATION DATA

ARND203DCR4

Table 24: ARND203DCR4 (2,000 CFM) Cooling Capacity.

Outdoor Air Temperature (DB, °F)	Outdoor Air temperature (WB, °F)															
	58		61		64		67		70		73		75		78	
	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
	kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h		kBtu/h	
65	22.2	22.2	39.2	22.2	57.0	22.2	-	-	-	-	-	-	-	-	-	-
70	33.8	33.1	37.2	33.1	56.6	33.4	76.4	33.1	-	-	-	-	-	-	-	-
75	44.7	44.4	45.0	44.4	56.3	44.4	76.8	44.4	100.0	44.4	121.1	42.7	-	-	-	-
80	56.0	55.6	56.0	55.6	56.3	55.6	76.4	55.6	99.3	55.6	120.4	53.9	136.1	53.2	131.7	40.3
90	79.2	77.8	77.8	77.8	77.8	77.8	78.1	77.8	98.6	77.8	117.4	74.0	134.4	74.0	145.7	67.6
95	91.1	88.7	89.4	88.7	89.1	89.1	89.4	89.1	98.3	89.1	122.5	88.7	136.1	85.6	159.7	83.3
100	102.0	100.0	101.7	100.0	100.3	100.0	100.7	100.3	100.7	100.3	118.7	96.6	135.8	96.6	152.2	92.1
104	-	-	111.2	108.8	109.5	108.8	109.2	108.8	109.5	108.8	116.4	103.4	133.1	103.4	148.8	99.0
110	-	-	123.5	122.2	124.2	122.2	122.5	122.2	122.5	122.2	114.0	113.3	130.7	113.3	140.2	105.8
115	-	-	-	-	135.5	133.1	134.4	133.4	133.8	133.4	122.2	121.8	129.3	121.8	126.6	114.3
120	-	-	-	-	-	-	120.8	118.7	119.1	118.7	119.1	119.1	119.4	119.1	119.1	118.7
122	-	-	-	-	-	-	110.2	108.2	108.5	108.2	108.8	108.2	108.5	108.2	108.2	107.5

Table 25: ARND203DCR4 (2,000 CFM) Heating Capacity.

Outdoor Temperature DB, °F	DOAS	
	TC (kBtu)	Supply Air Temperature (°F)
14	129.6	74
18	125.3	76
21	121.0	77
23	118.8	78
27	114.5	80
30	110.3	81
32	108.1	82
34	106.0	83
36	103.8	84
39	99.5	85
41	97.4	86
43	95.2	87
47	90.2	89
50	85.8	90
54	78.1	90
57	70.3	90
61	62.4	90

Table 26: ARND203DCR4 (2,000 CFM) Dehumidification - Supply Air Dew Point.

Outdoor Air Temperature (DB, °F)	Outdoor Air temperature (WB, °F)							
	60	63	66	69	72	75	77	80
65	53.2	53.8	54.5					
70	49.3	54.3	54.5	54.7				
75	45.0	51.8	54.5	54.5	54.5	55.0		
80	39.7	47.8	54.5	54.5	54.5	55.0	55.2	60.1
90	25.5	37.9	46.9	53.8	54.5	55.0	55.0	57.7
95	14.0	31.1	42.1	50.0	54.5	54.5	54.5	55.0
100	-8.7	22.1	36.3	45.7	53.6	54.5	54.5	56.3
104		11.7	30.7	41.9	50.7	54.5	54.5	56.7
110		-25.6	19.6	34.9	45.9	54.1	54.1	57.0
115			3.7	27.3	40.8	50.5	53.6	59.7
120				16.5	34.9	46.4	52.2	59.9
122				10.6	32.0	44.4	50.7	58.6

Note:

The 10°F Entering Air Temperature only permitted for 1,500 CFM airflow rate or less with the following restrictions:

- Minimum 12 ton outdoor unit required for one (1) DOAS unit connected to one (1) outdoor unit.
- Minimum 30 ton outdoor unit required for two (2) DOAS units connected to one (1) outdoor unit.
- Maximum of two (2) DOAS units connected to one (1) outdoor unit permitted.

APPLICATION GUIDELINES

Location Selection / Roughing In on page 34

Mounting Dimensions / Ductwork Configuration on page 35

Service Clearances / Piping Connections on page 36

Unit Piping on page 37

LOCATION SELECTION / ROUGHING IN

Location Selection

⚠ DANGER

To avoid the possibility of fire, ⚡ do not install the unit in an area where combustible gas may generate, flow, stagnate, or leak. Failure to do so will cause serious bodily injury or death. Before beginning installation, read the safety summary at the beginning of this manual.

Note:

Do not locate the Split Compaq DOAS product in an un-conditioned space where the relative humidity level of the surrounding air could exceed 60% RH. Temperature range in the mounted location must be maintained between 55 F and 90 F DB.

Select a location for installing the unit that meets the following conditions:

Do's

1. Where there is enough structural strength to bear the weight of the unit.
2. Operating sound from the unit will not disturb occupants.
3. Include enough space for service access.
4. Include space for drainage to ensure condensate flows properly out of the unit when it is in cooling mode.
5. Use a level indicator to ensure the unit is installed on a level plane.

⚠ WARNING

- Securely install threaded rod hangars (bolts) and hardware to prevent the chassis falling from its installation location. There is risk of personal injury from falling equipment.
- Installation work must be performed by trained personnel and in accordance with all local or other applicable codes. There is risk of injury to personnel from incorrect installation.

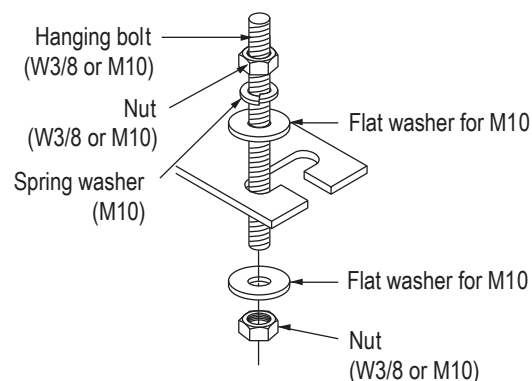
Note:

- Ensure the unit is properly installed. Incorrectly installed units can malfunction resulting in degraded performance or an inoperative unit/system.
- Securely install threaded rod hangars (bolts) and hardware to prevent the chassis falling from its installation location. There is risk of equipment or property damage from falling equipment.

Roughing In the DOAS Unit

1. Determine the installation location. Ensure the location has enough space to allow necessary duct connections and maintenance access.
2. Securely install the four field-provided threaded rod hangars to the overhead support locations.
3. Hang the chassis from the four field-supplied threaded rod hangars. Refer to the threaded rod hanger details in the figure.
4. Use a level to ensure the chassis is level and securely tighten the mounting nuts.
5. If local code requires an auxiliary drain pan under the unit, install a field-provided auxiliary drain pan.
6. Connect ductwork to the unit as necessary.

Figure 8: Hanging Bolt Assembly.



The following parts are field-supplied:
 Hanging Bolt - W-3/8" or 1/2"
 Nut - W-3/8" or M10
 Spring Washer - M10

Included with the Unit:
 Flat Washer - M10

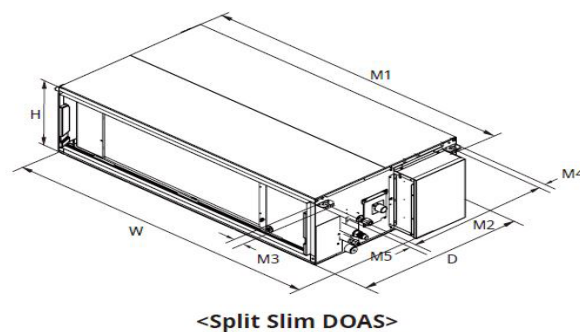
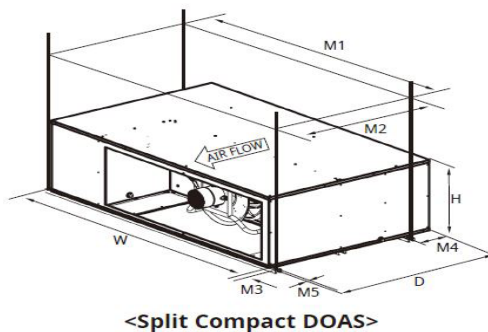
MOUNTING DIMENSIONS / DUCTWORK CONFIGURATION

Mounting Dimensions

Table 27: Dimensions and Weights.

Frame Code	Weight (lbs.)	Overall Dimensions (in.)			Mounting Dimensions (in.)				
		W	H	D	M1	M2	M3	M4	M5
DC	364	75.1	21.7	45.1	77.2	37.3	1.1	6.8	0.9
DE	126	53.8	14.6	27.6	50.5	24.4	0.7	1.4	1.2

Figure 9: Split Compact DOAS Unit Mounting Dimensions.



Ductwork Configuration

When connecting ducts, insert a canvas duct between the main body and the duct.

- Use non-combustible duct components.
- Install sufficient insulation to prevent condensation forming on outlet duct flanges and outlet ducts.

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

Note:

When an air duct which carries supply air or warm air passes through a combustible roof, a clearance of one (1) inch must be maintained between the outside perimeter of ductwork and any combustible materials, per NFPA Standard 90A.

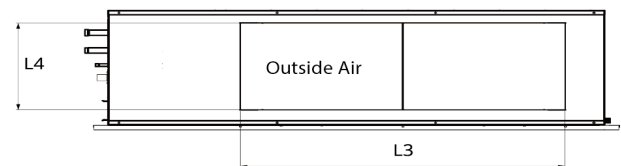
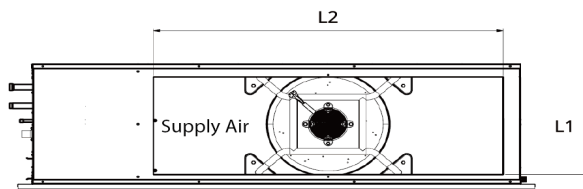
MOUNTING DIMENSIONS / DUCTWORK CONFIGURATION

Table 28: Duct Connection Dimensions.

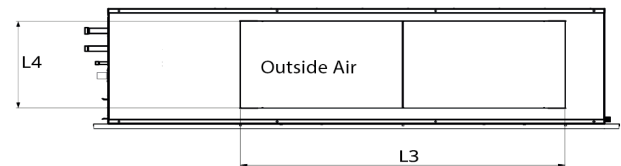
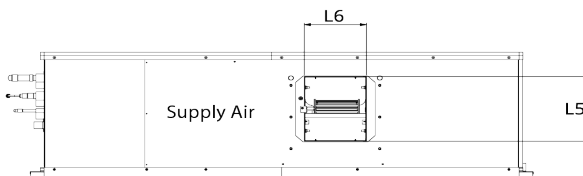
Chassis Code	SA Outlet		OA Inlet	
DC	L1	L2	L3	L4
	17.6	53.8	48.9	16.5
DC	L5	L6	L3	L4
			48.9	16.5
DE	L7	L8	L9	L10
	10.9	30.1	12.7	47.6

Figure 10: Duct Connection Dimensions.

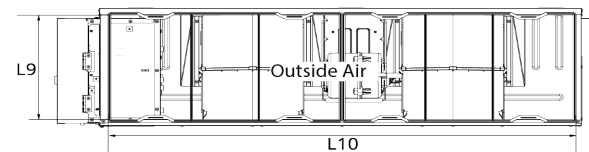
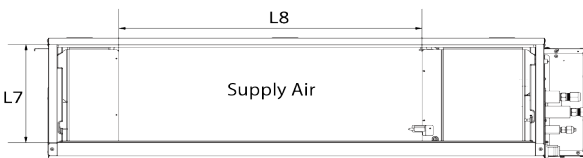
ARND203DCR4, ARND153DCR4



ARND093DCR4



ARND063DER4



SERVICE CLEARANCES / PIPING CONNECTIONS

Service Clearances

Models ARND093DCR4, ARND153DCR4 and ARND203DCR4

Allow service clearances as approximately indicated in the figures below. Refer to NEC and local for minimum clearances around the unit and control panel. Follow local building codes for additional service clearance requirements.

Figure 11: Service Clearance Requirements - Isometric View.

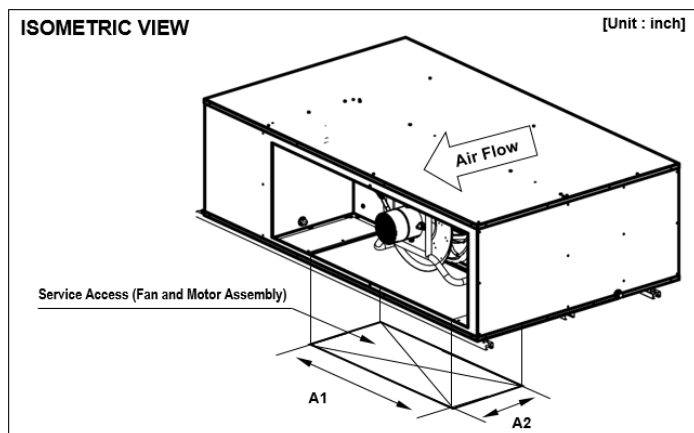


Figure 12: Service Clearance Requirements - Top View.

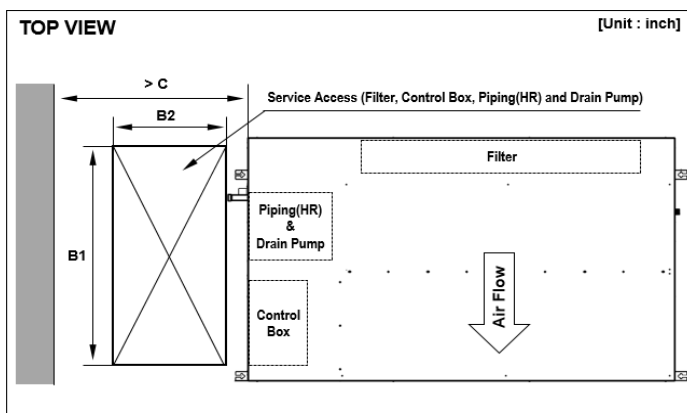
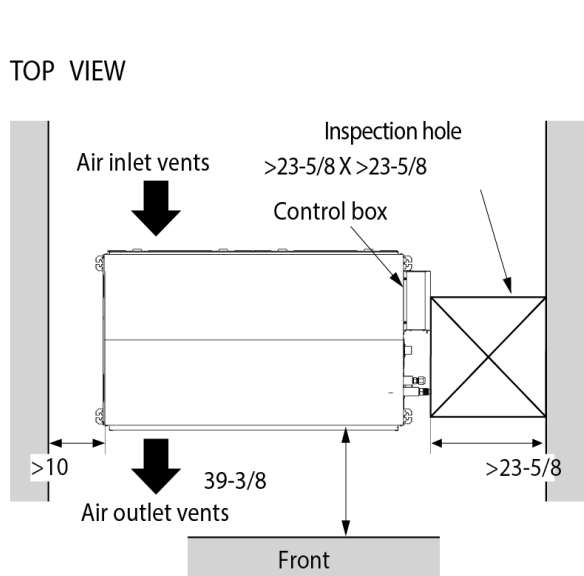


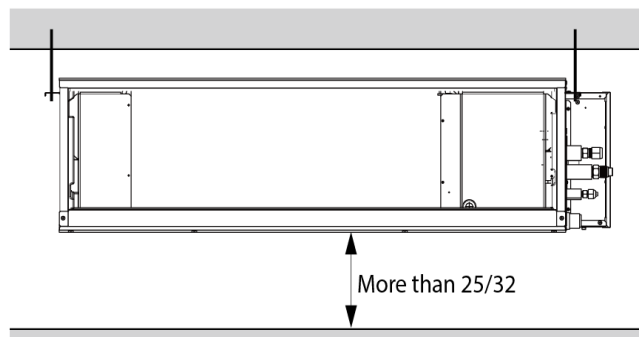
Table 29: Service Clearance Dimensions.

Chassis Code	Fan and Motor Assembly		Controller, Cycle (HR), Filter		Minimum Distance
	A1	A2	B1	B2	C
DC	45.6	19.2	45.6	19.2	36

Figure 13: Service Clearance Dimensions



Front view



SERVICE CLEARANCES / PIPING CONNECTIONS

Piping Connections

Figure 14: Refrigerant Pipe Connection Dimensions.

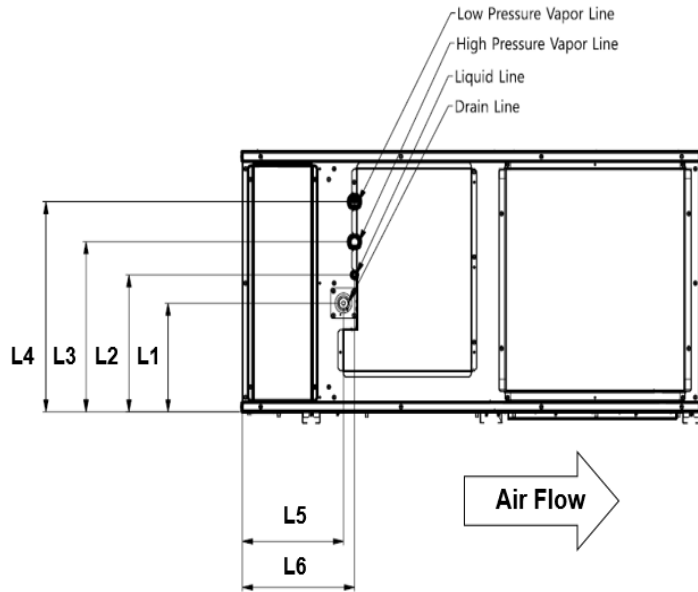


Figure 15: Condensate Pipe Connection Dimensions.

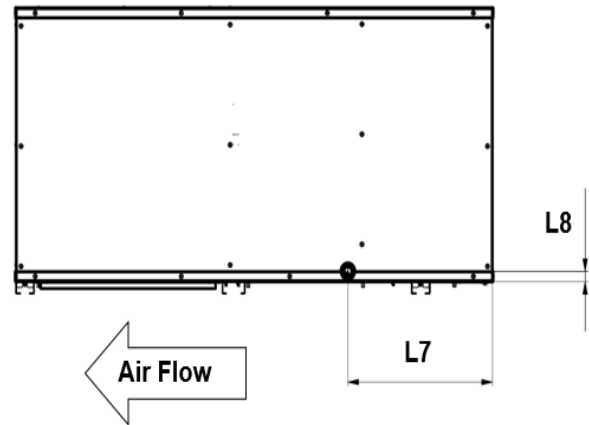


Table 30: Refrigerant and Condensate Pipe Connection Dimensions.

Chassis Code	Refrigerant Pipe (Brazed)								
	Liquid			High-Pressure Vapor			Low-Pressure Vapor		
DC	Dia.	L2	L6	Dia.	L2	L6	Dia.	L2	L6
ARND093DCR4	3/8	11.4	11	5/8	14.2	11	3/4	17.5	11
ARND153DCR4	1/2	11.4	11	7/8	14.2	11	1-1/8	17.5	11
ARND203DCR4	1/2	11.4	11	7/8	14.2	11	1-1/8	17.5	11
Condensate Pipe									
Pump Drain				Gravity Drain					
Dia.1	Conn.	L1	L5	Dia.3	Conn.	L7	L8		
1 / ID	Plain	9.1	9.9	1 / OD	NPT	13.6	0.8		

Chassis Code	Refrigerant Pipe (Brazed)								
	Liquid			High-Pressure Vapor			Low-Pressure Vapor		
DE	Dia.	L10	L14	Dia.	L11	L14	Dia.	L13	L16
ARND063DER4	3/8	3.6	5.6	5/8	5.7	5.6	3/4	7.5	7.1
Condensate Pipe									
Pump Drain				Gravity Drain					
Dia.1	Conn.	L12	L17	Dia.3	Conn.	L9	L15		
1 / ID	Plain	6.9	11.9	1 / OD	NPT	1.1	5		

Refrigerant Safety

⚠ WARNING

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

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

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

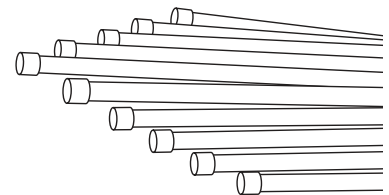
¹Information about ASHRAE Standard 15 / 34 and addenda current as of the date of this publication.

Piping Handling

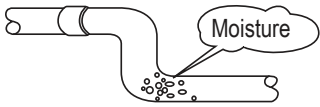
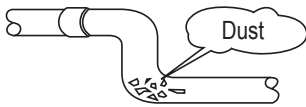
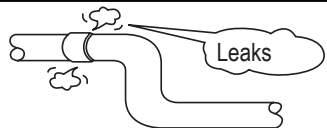
Pipes used for the refrigerant piping system must include the specified thickness, and the interior must be clean.

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

Keep Pipes Capped While Storing.



Keep refrigerant pipe dry, clean, and airtight.

	Dry	Clean	Airtight
	No moisture should be inside the piping.	No dust should be inside the piping.	No leaks should occur.
			
Possible Problems	<ul style="list-style-type: none"> - Significant hydrolysis of refrigerant oil. - Refrigerant oil degradation. - Poor insulation of the compressor. - System does not operate properly. - EEVs, capillary tubes are clogged. 	<ul style="list-style-type: none"> - Refrigerant oil degradation. - Poor insulation of the compressor. - System does not operate properly. - EEVs and capillary tubes become clogged. 	<ul style="list-style-type: none"> - Refrigerant gas leaks / shortages. - Refrigerant oil degradation. - Poor insulation of the compressor. - System does not operate properly.
Solutions	<ul style="list-style-type: none"> - Remove moisture from the piping. - Piping ends should remain capped until connections are complete. - ⚠ Do not install piping on a rainy day. - Connect piping properly at the unit's side. - Remove caps only after the piping is cut, the burrs are removed, and after passing the piping through the walls. - Evacuate system to a maximum of 500 microns and insure the vacuum holds at that level for 1 hour. 	<ul style="list-style-type: none"> - Remove dust from the piping. - Piping ends should remain capped until connections are complete. - Connect piping properly at the side of the unit. - Remove caps only after the piping is cut and burrs are removed. - Retain the cap on the piping when passing it through walls, etc. 	<ul style="list-style-type: none"> - Test system for air tightness. - Perform brazing procedures that comply with all applicable standards. - Perform flaring procedures that comply with all applicable standards. - Perform flanging procedures that comply with all applicable standards. - Ensure that refrigerant lines are pressure tested to 550 psig and hold for 24 hours.

UNIT PIPING

Brazing Procedure / Pipe Support Location / Insulate

Brazing Procedure

Refrigerant Pipe Connections

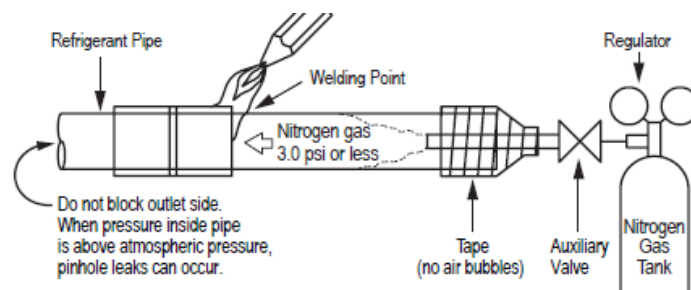
Units include brazed connections only.

Note:

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

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

Figure 16: Using Nitrogen Gas During Brazing



Pipe Support Location

A properly installed pipe system must have sufficient support so that pipes will not sag during the life of the system. As necessary, place supports closer for segments where potential sagging could occur. Maximum spacing of pipe supports must meet local codes.

Figure 17: Pipe Support at Split Compact DOAS Unit.

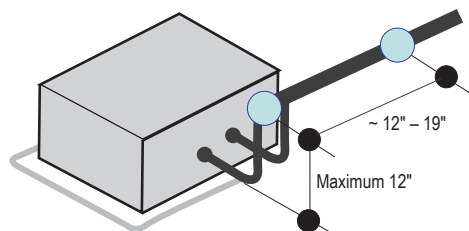


Figure 18: Typical Pipe Support Location—Change in Pipe Direction.

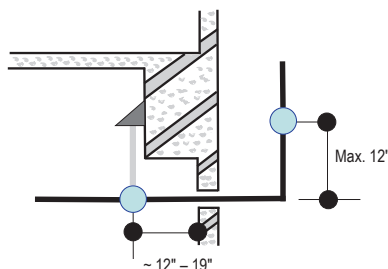
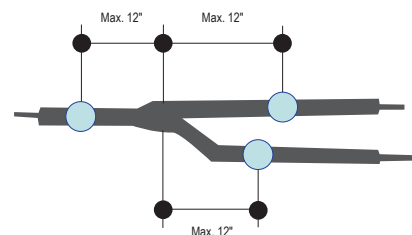


Figure 19: Pipe Support at Y-branch Fitting.



Insulate Refrigerant Pipes

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

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

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

Condensate Drain Connections


⚠ NOTE

All condensate drain connections must be properly trapped and primed before operating the unit. Failure to properly trap a drain will result in flooding the drain pan and potential water damage to the unit or building.

Unit has a factory mounted condensate pump that runs continuously while the unit is in cooling mode. The pump has an internal high level float switch that stops the unit if the water level in the pan rises too high.

Unit includes a factory-provided flexible drain hose kit with one or two clamps to connect the unit to the drain piping system. The hose can be used to connect the condensate pipe to the condensate pump connection. There is the option to direct connect a 1 NPT fitting to the drain pan's gravity drain connection.

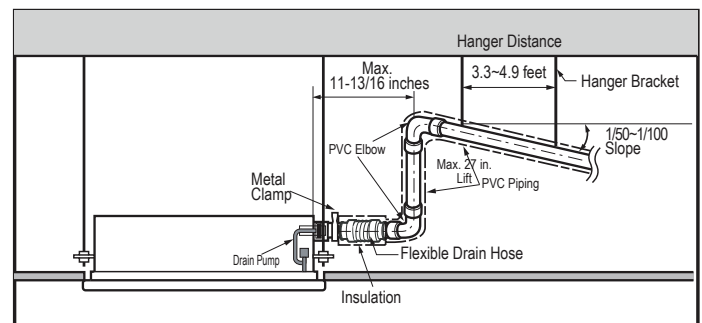
Note:

When making condensate pipe connections, be careful  not to exert lateral force on the drain nipple. Internal damage may occur. Refer to Table 26 on page 31 for condensate pipe connection size.

Condensate Pump Connection

- Unit has a condensate pump. Note the following when connecting the condensate pipe to the unit (see figure at right).
- Units DO NOT come with check valves or a backflow prevention device. If check valves are needed, they must be field supplied.
- The maximum lift of all condensate pumps is 27 in.wg.
- Measure lift distance from the bottom surface of the unit, NOT from the condensate pipe connection.
- Slope all horizontal condensate pipe segments a minimum of 1/4 inch per foot away from the indoor unit.

Figure 20: Built in Drain Duct to Drain Piping System.



Unit Drain Information

When the bottom surface of the unit is at an elevation below the receiving building drain line connection, install an inverted trap at the top of the condensate pump discharge riser before connection to the building drain pipe.

When the receiving drain line is mounted horizontal, connect the inverted trap to the top half of the pipe. The connection point of the inverted trap to the building drain pipe must always be to the top half of the pipe and must never be over 45° either side of the upper most point of the horizontal building drain line.

If connecting to a vertical drain line or plumbing system vent line, connect the DOAS unit condensate pump discharge line using a Y-45 fitting with the double end of the Y-45 fitting facing up. When connecting to a vertical drain line include an inverted trap at the top of the IDU condensate pump discharge riser before connection to the Y-45 fitting.

UNIT PIPING

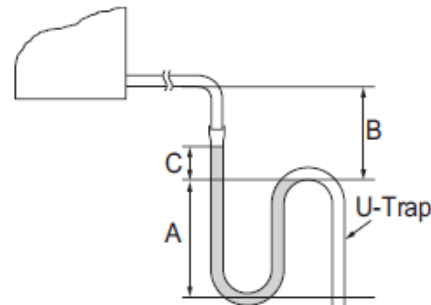
Gravity Condensate Pipe Connection / Installing the Condensate Drain Pipe

Gravity Condensate Pipe Connection

Unit has an auxiliary gravity condensate drain connection opposite side of condensate pump pipe connection the unit. This connection may be used instead of using the condensate pump. If the gravity drain is used, disconnect the DOAS condensate pump connector on the controller.

- Verify the unit is installed with a slight cant toward the gravity drain connection.
- Remove the rubber plug before connecting the condensate line to the indoor unit.
- The gravity condensate line must be equipped with a condensate trap for proper condensate flow. Refer to the figure at right for trap details.
- All horizontal segments of condensate pipe should be sloped a minimum of 1/4 inch per foot away from the DOAS unit.

Figure 21: Gravity Condensate Trap.



Where:

$$A = 2\text{--}1/2"$$

$$B \geq 2 \times C$$

$$C \leq 2 \times \text{External Static Pressure (in.-wg)}$$

Installing the Condensation Drain Pipe

- Drain piping must slope down or flow may reverse back to unit.
- During drain piping connection, be careful not to exert extra force on the drain port on the indoor unit.
- Refer to the Specifications table for drain pipe sizing.
- Use polyvinyl chloride pipe.

1. Refer to the figure at top right and plan the drain pipe routing so that the pipe will slope downward from the unit to its end drain location.
2. Connect the provided flexible drain pipe to the main drain pipe.
3. Pour water into the flexible pipe as shown in the figure below to test for leaks. Repair leaks if necessary.
4. Route the flexible drain pipe to the unit and connect the flexible drain pipe to the drain port of the indoor unit.
5. Install field supplied polyethylene foam insulation 5/16 inch thick or greater on the flexible drain pipe and position snugly against indoor unit.

Figure 22: Drain Piping Slope.

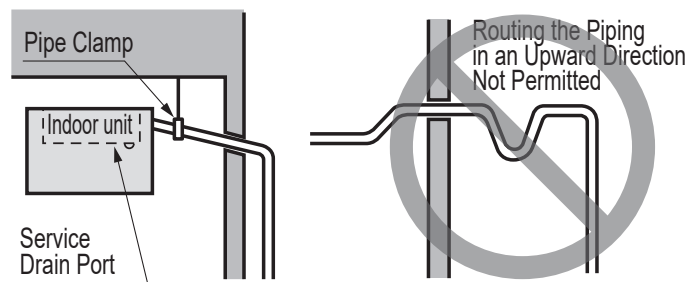


Figure 23: Do Not Sharply Bend the Drain Pipe.

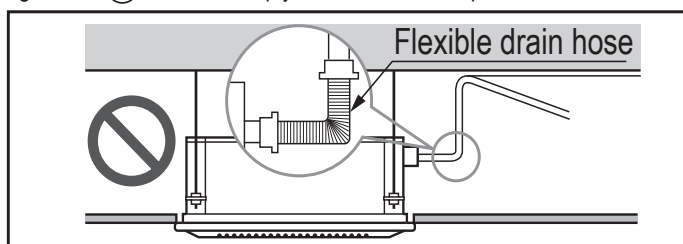
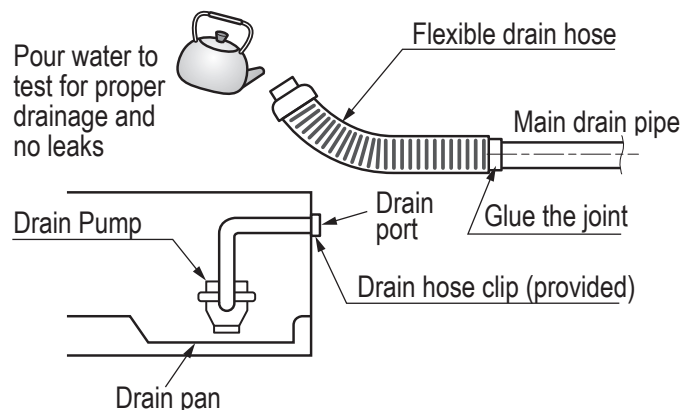


Figure 24: Testing the Drain Pipe.



ELECTRICAL INFORMATION

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ELECTRICAL INFORMATION

General Information / Separating Power Wiring and Communication Cables

General Information

WARNING

- All power wiring and communication cable installation must be performed by authorized service providers working in accordance with local, state, and National Electrical Code (NEC) regulations related to electrical equipment and wiring, and following the instructions in this manual. Failure to do so will lead to electric shock, resulting in bodily injury or death.
- Be sure that main power to the unit is completely off before proceeding. Follow all safety and warning information outlined at the beginning of this manual. Failure to do so will cause electric shock, resulting in bodily injury.
- Familiarize yourself with the location of the circuit breaker. Be sure that a circuit breaker or some other emergency power cutoff device is in place before any power wiring is done to the system. Failure to do so will cause bodily injury or death.
- ⚡ Never touch any power lines or live cables before all power is cutoff to the system. To do so will cause bodily injury or death.
- Undersized wiring will lead to unacceptable voltage at the unit and will cause a fire, which will cause bodily injury or death.
- Properly ground all outdoor units and DOAS units. Ground wiring must always be installed by a qualified technician. Ground wiring is required to prevent accidental electrical shock during current leakage, which will cause bodily injury or death.
- Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent could include some amount of direct current. Using an oversized breaker or fuse will result in electric shock, causing physical injury or death.
- ⚡ Do not connect ground wire to refrigerant, gas, or water piping; to lightning rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide a NEC-approved earth ground will result in electric shock, resulting in physical injury or death.

Note:

- Consider ambient conditions (temperature, direct sunlight, inclement weather, etc.) when selecting, installing, and connecting the power wiring.
- Properly ground all DOAS units. Ground wiring must always be installed by a qualified technician. Improperly ground wire can cause communication problems from electrical noise, and motor current leakage.
- If there is a possibility of reversed phase, phase loss, momentary blackout, or the power goes on and off while the system is operating, install a field-supplied phase loss protection circuit. If the system operates in reversed phase, etc., it will damage the compressors and other components.
- Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent will include some amount of direct current. Using an oversized breaker or fuse will result in equipment malfunction and property damage.
- ⚡ Do not connect ground wire to refrigerant, gas, or water piping; to lightning rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide a NEC-approved earth ground can result in property damage and equipment malfunction.
- Verify the power imbalance is no greater than 2% between phases at each outdoor unit frame. Power imbalances will damage the compressors and other components.

Separating Power Wiring and Communication Cables

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

Table 31: Power Wire and Communication Cable Minimum Required Separation Allowable Distance.

Capacity of Power Supply Wiring (Current)		Minimum Distance ^{1,2}
100V or more	10A	12 inches
	50A	20 inches
	100A	40 inches
	Exceeding 100A	60 inches

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

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

Note:

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

ELECTRICAL INFORMATION

Power Wiring / Communication Cable Connections, Terminal Connections

Power Wiring / Communication Cable Connections

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

- Firmly attach the wire; secure in a way to prevent external forces from being imparted to the terminal block.
- Use an appropriately sized screwdriver for tightening the terminals.
- ⓧ Do not overtighten the connections; overtightening will damage the terminals.
- If ring terminals or fork terminals are not available, then:
- ⓧ Do not terminate different gauge wires to the power terminal block. (Slack in the wiring will generate heat.)
- When terminating wires of the same thickness, follow the instructions demonstrated in the figures below.

Figure 25: Typical Ring Terminal.

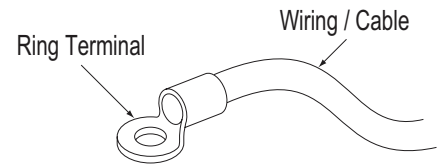
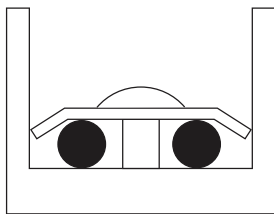
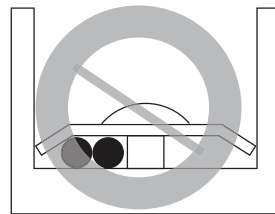


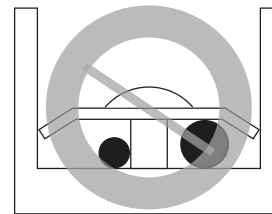
Figure 26: Proper and Improper Power Wiring Connections.



Terminate multiple power wires of the same gauge to both sides.



ⓧ Do not terminate two wires of one side.



ⓧ Do not terminate different gauge wires to a terminal block.

● :Copper Wire

⚠ WARNING

If power wires are not properly terminated and firmly attached, there is risk of fire, electric shock, and physical injury or death.

Note:

- ⓧ Never apply line voltage power to the communications cable terminal block. If contact is made, the PCBs will be damaged.
- Always include some allowance in the wiring length when terminating. Firmly attach the wiring or cable, but provide some slack to facilitate removing the electrical panels while servicing, and to prevent external forces from damaging the terminal block.

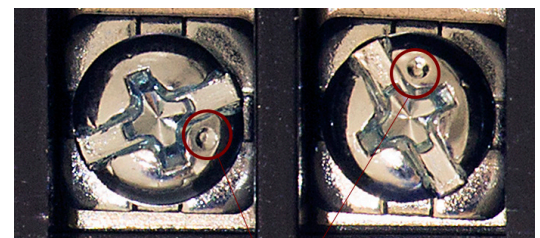
Terminal Connections

LG uses a "JIS" type of screw for all terminals; use a JIS screwdriver to tighten and loosen these screws and ⓧ avoid damaging the terminal. ⓧ Do not overtighten the connections — overtightening will damage the terminals — but firmly and securely attach the wiring in a way to prevent external forces from being imparted to the terminal block.

Note:

- All wiring to the unit must be drawn through one of the pre-punched holes in the bottom of the floor pan immediately underneath the control center or through a field-cut hole in the side of the unit casing.
- The terminals labeled "GND" are NOT ground terminals. The terminals labeled ⚡ ARE ground terminals.
- Polarity matters. Always connect "A" to "A" and "B" to "B."
- Always create a wiring diagram that contains the exact sequence in which all the DOAS units are wired in relation to the outdoor unit.
- ⓧ Do not include splices or wire nuts in the communication cable.

Figure 27: JIS Screws.



JIS DIMPLES

ELECTRICAL INFORMATION

Power Supply / Power Wiring Specifications

Power Supply / Power Wiring Specifications

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


Compact DOAS Units

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

WARNING

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

Note:

- Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent could include some amount of direct current. Using an oversized breaker or fuse will result in equipment malfunction and property damage.
-  Do not connect ground wire to refrigerant, gas, or water piping to lightning rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide a National Electrical Code-approved earth ground can result in property damage and equipment malfunction.

ELECTRICAL INFORMATION

Communication Cable Specifications From Outdoor Unit to DOAS Units

Communication Cable Specifications From Outdoor Unit to DOAS Units

- Communication cable from Main Outdoor Unit to DOAS Units is to be LG supplied or field supplied 18 AWG, 2 (2 conductor), twisted, stranded, shielded. ⓧ Never splice communications cable. Ensure the communication cable shield is properly grounded to the Main Outdoor Unit chassis only. ⓧ Do not ground the Outdoor Unit to DOAS Units communication cable at any other point. Wiring must comply with all applicable local and national codes.
- Cable shields between the connected devices must be tied together and continuous from the main outdoor unit to the last component connected and insulated to prevent grounding against the DOAS Unit electrical enclosures.
- Start the communication cable at the main outdoor unit and route to the DOAS units in a daisy chain configuration. ⓧ Do not install in a starburst configuration.
- Insulation as required by NEC and local codes.
- Rated for continuous exposure of temperatures up to 140°F.
- Maximum allowable communication cable length is 3,281 feet.

WARNING

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

Note:

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

ELECTRICAL INFORMATION

Connection Procedure

Connection Procedure

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

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

Note:

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

6. Connect the power wiring to the terminal block connections. Ensure the screws securely connect the wire to the terminals and are not loose.
7. Polarity matters on the outdoor unit to DOAS unit communications bus, and must be maintained throughout the entire system. Be sure to connect:
 - IDU-A terminals (outdoor unit) to ODU(IDU)-A (DOAS unit) terminals and connect IDU-B terminals (outdoor unit) terminals to ODU(IDU)-B (DOAS unit) terminals.
 - Central-A terminals (outdoor unit) to ODU(CEN)-A (DOAS unit) terminals and connect Central-B terminals (outdoor unit) to ODU(CEN)-B (DOAS unit) terminals.

Refer to the preceding pages for DOAS unit wiring connections.

Note:

- Cross connecting the A and B terminals will cause communications errors and system malfunction.
- Field-provided communication cable between Main ODU to DOAS units to be 18 AWG, 2 (2 conductor), twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the Main ODU chassis only. Shield must be tied together so it is continuous and insulated to prevent grounding against DOAS unit electrical cabinet. ⚠ Do not ground the ODU to DOAS unit communication cable at any other point. Wiring must comply with all applicable local and national codes.

Figure 28: Internal Routing in DOAS Units.

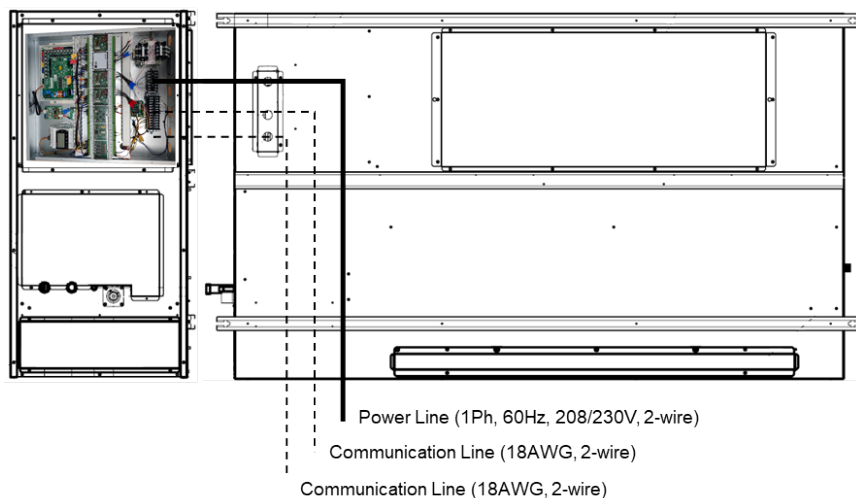


Figure 29: Example of an ODU to DOAS Power Wiring and Communications Cable Schematic.

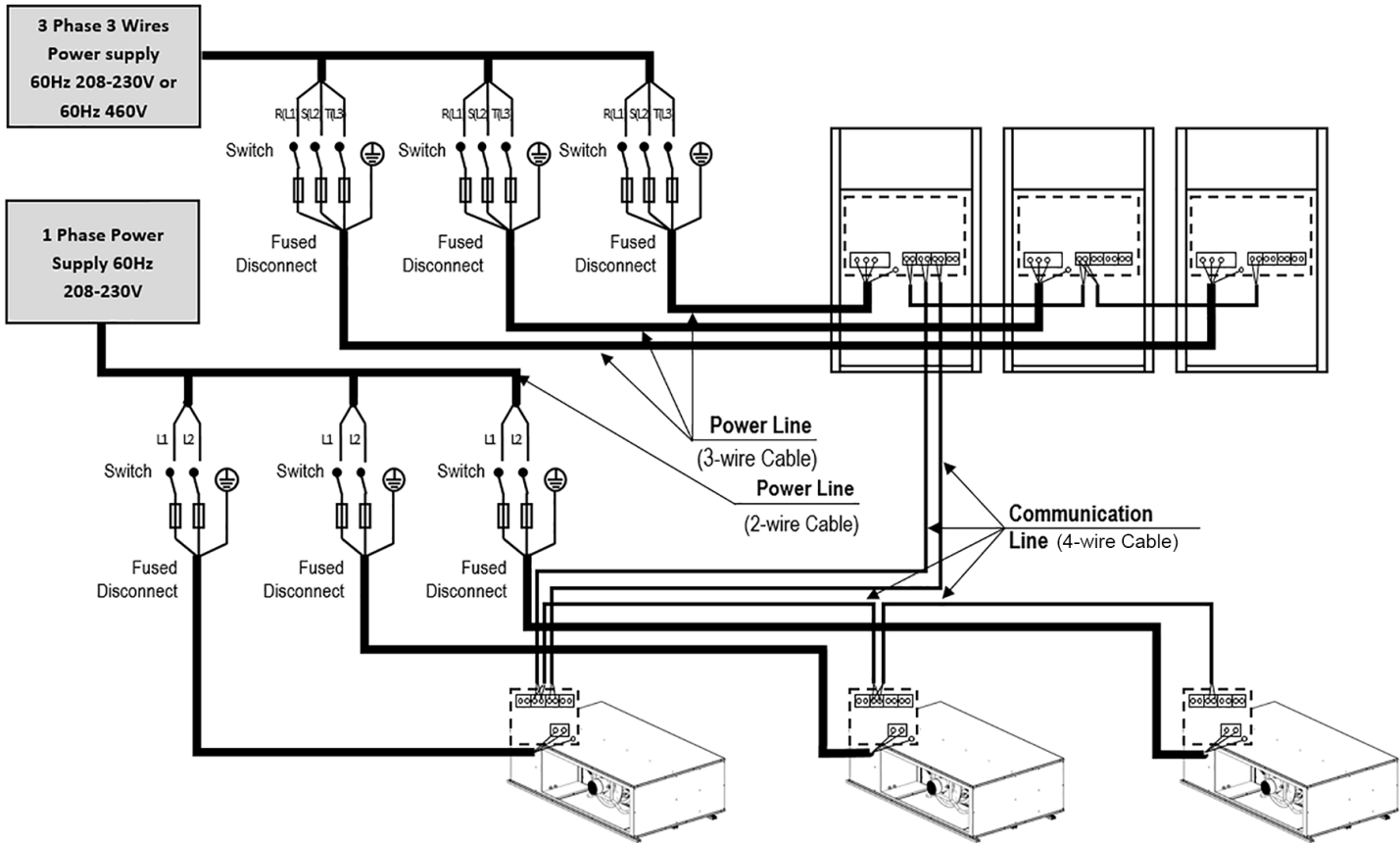


Figure 30: Communications Cable Between Outdoor Unit and DOAS Unit.

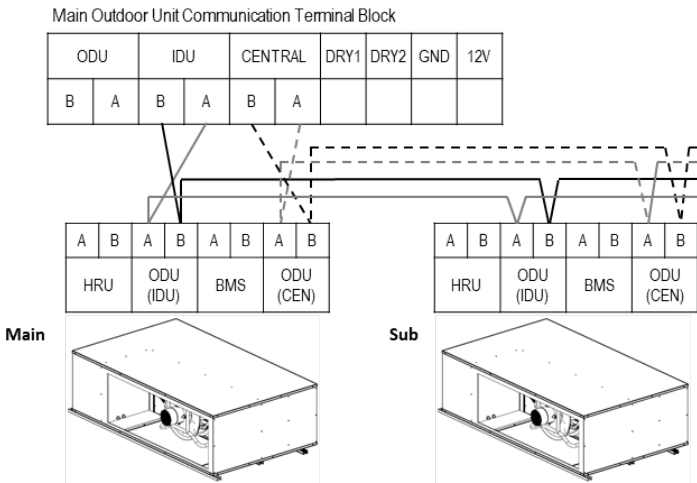
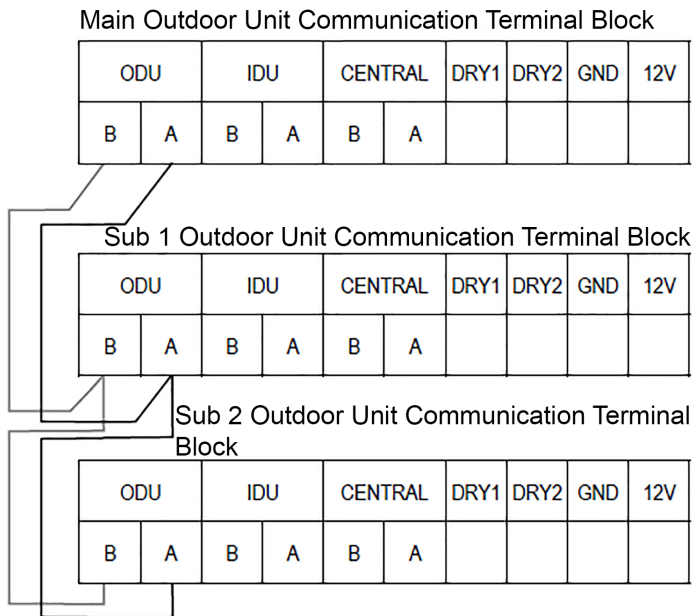


Figure 31: Communications Cable Between Main Outdoor Unit and Sub Outdoor Units.



ACRONYMS

Table 32: Table of Acronyms.

ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning	HVAC	Heating, Ventilation and Air Conditioning
AHU	Air Handling Unit	IDU	Indoor Unit
AWG	American Wire Gauge	MBh	Thousands BTUs per Hour
Btu/h	British Thermal Units per Hour	MCA	Maximum Circuit Ampacity
CFM	Cubic Feet per Minute	MPT	Male Pipe Thread
D.B.	Dry Bulb	ODU	Outdoor Unit
dB(A)	Decibels with "A" Frequency Weighting	PTAC	Packaged Terminal Air Conditioner
DOAS	Dedicated Outdoor Air System	SCR	Silicon Controlled Rectifier
ECM	Electronically Commutated Motor	VRF	Variable Refrigerant Flow
EEV	Electronic Expansion Valve	W.B.	Wet Bulb



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EM_LG_Split_Compact_DOAS_02_24
EM_LG_Split_Compact_DOAS_12_23
EM_LG_Split_Compact_DOAS_07_23
EM_LG_Split_Compact_DOAS_06_23A
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