



AIR CONDITIONING TECHNOLOGIES

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

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AIR CONDITIONING TECHNOLOGIES

SOURCES

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Safety Precautions

Service and Installation

DANGER

- All industry standard safety instructions—as well as all local, state, and federal safety codes regarding refrigerant, electricity, and equipment—must be followed to prevent death or injury to the servicer or others.

WARNING

- All industry standard safety instructions—as well as all local, state, and federal safety codes regarding refrigerant, electricity, and equipment—must be followed to prevent personal injury and/or property damage. If the protection devices have been bypassed or are forced to operate improperly, or parts other than those specified by LG are used, there is risk of fire, electric shock, and explosion resulting in physical injury or death.

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, joint connections, isolation valves, introduced debris inside the piping system, or other problems caused by the interconnecting piping system.
- For a complete list of safety precautions, refer to the Multi V IV, Multi V 5, or Multi V S, and the appropriate Indoor Unit(s) Installation and Service Manuals on www.lghvac.com.

Safety Precautions

Service and Installation

- Always check for system refrigerant leaks after the unit has been serviced.
 - Low refrigerant levels may cause product failure.
-  **DO NOT** make refrigerant substitutions. Use R410A only.
 - If a different refrigerant is used, or air mixes with original refrigerant, the unit will malfunction and damage will occur.

DANGER

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

WARNING

- All industry standard safety instructions—as well as all local, state, and federal safety codes regarding refrigerant, electricity, and equipment—must be followed to prevent personal injury and/or property damage. If the protection devices have been bypassed or are forced to operate improperly, or parts other than those specified by LG are used, there is risk of fire, electric shock, and explosion resulting in physical injury or death.
- Replace all control box and panel covers.
 - If cover panels are not installed securely, dust, water and animals may enter the outdoor unit, causing fire, electric shock, and physical injury or death.

LG Split Compact Dedicated Outdoor Air System (DOAS)



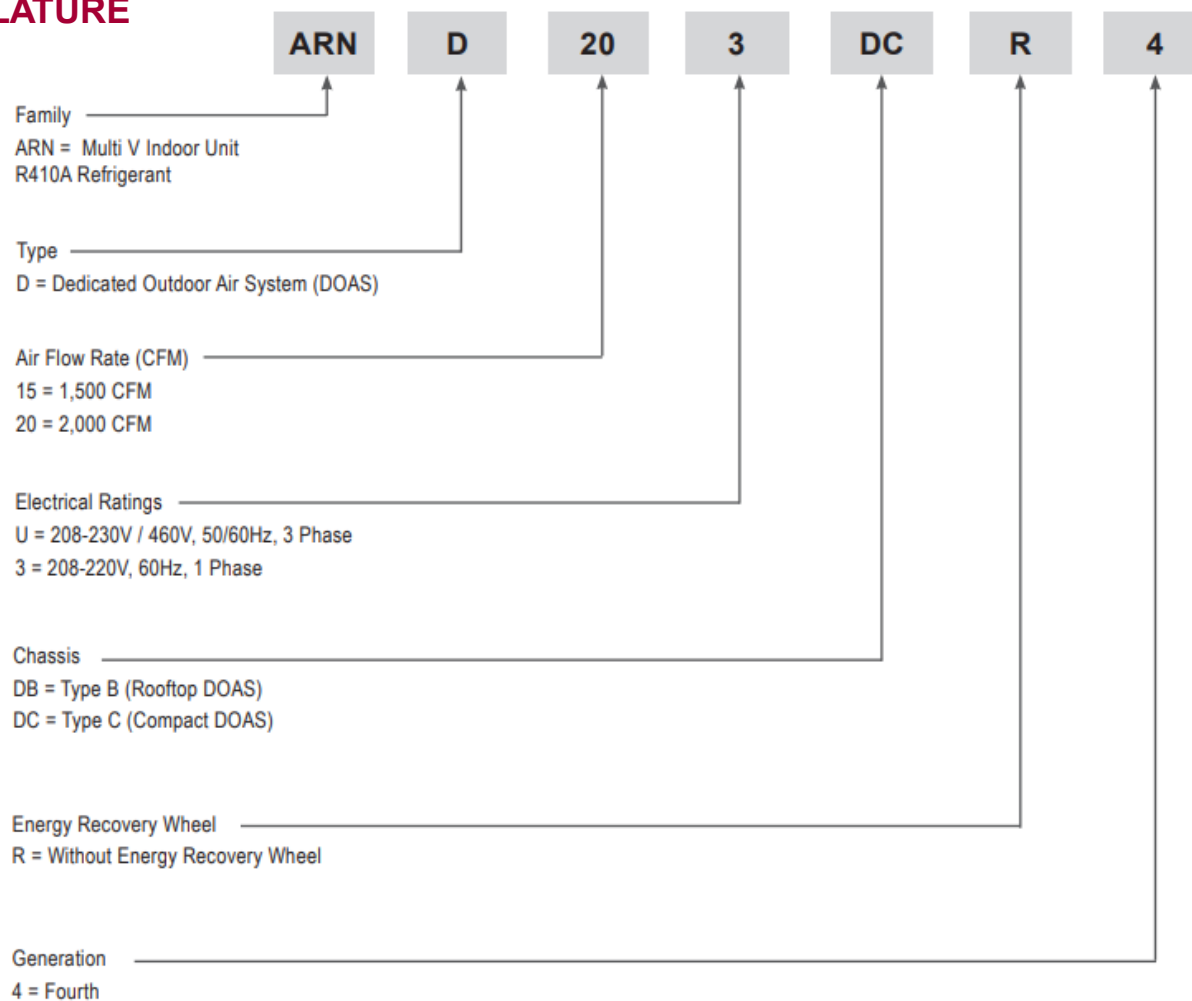
LG SPLIT COMPACT DEDICATED OUTDOOR AIR SYSTEM (DOAS) INSTALLATION MANUAL



Variable Refrigerant Flow Split Compact DOAS
ARND***DCR4 Series
(1,500 and 2,000 CFM)

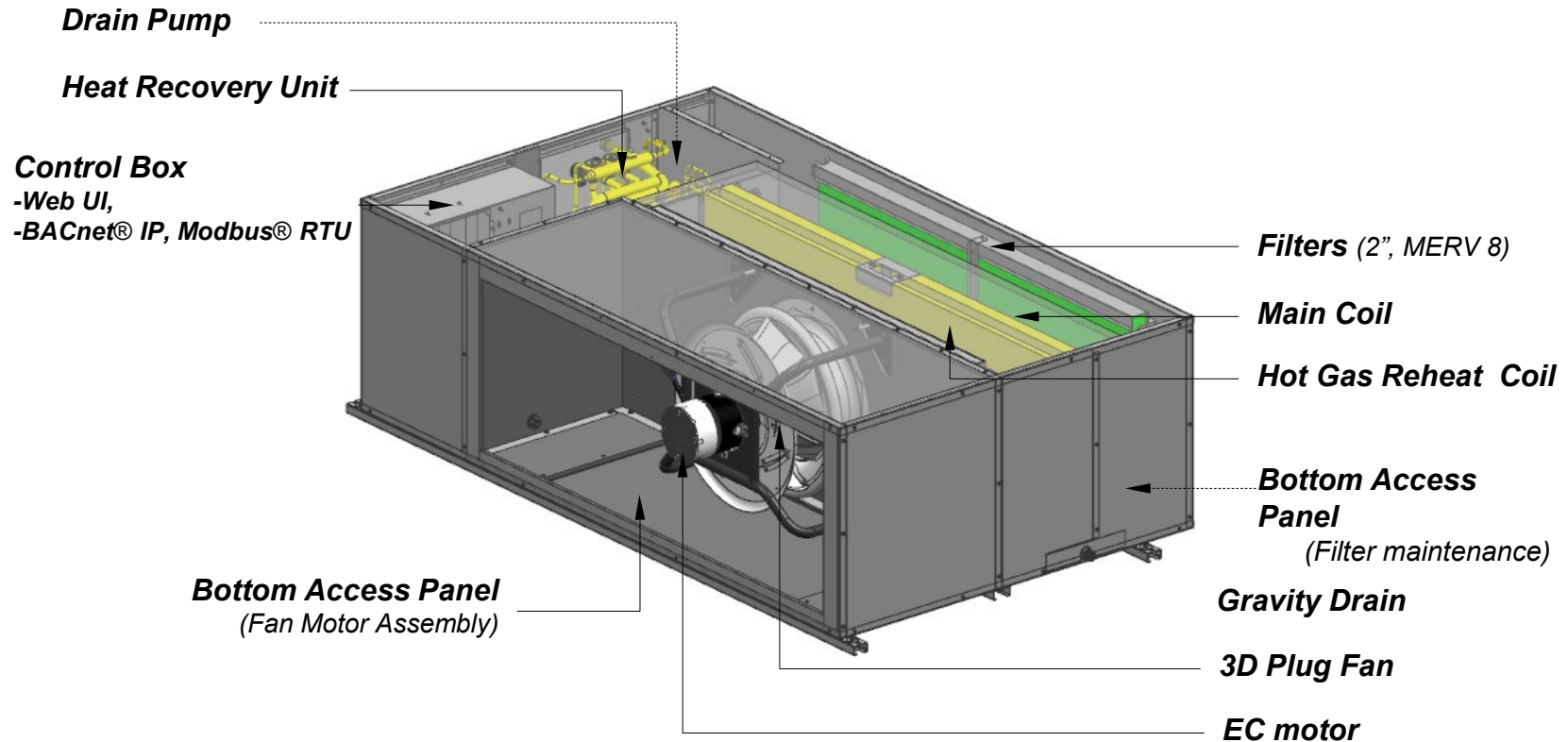
LG Split Compact Dedicated Outdoor Air System (DOAS)

UNIT NOMENCLATURE



LG Split Compact Dedicated Outdoor Air System (DOAS)

INTERIOR COMPONENTS



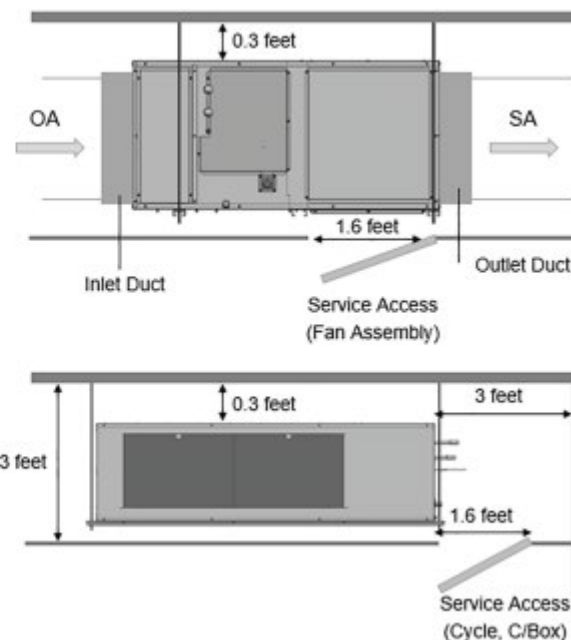
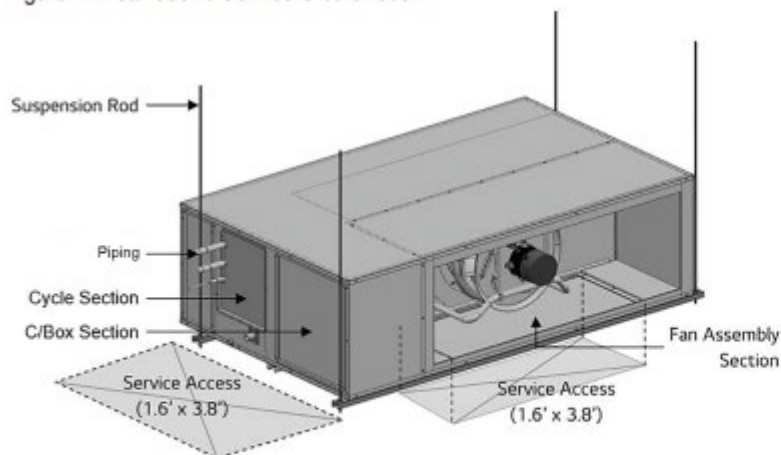
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LG Split Compact Dedicated Outdoor Air System (DOAS)

SERVICE CLEARANCES

- Allow service clearances as indicated in the figures below. Refer to NEC and local guidelines for minimum clearances around the unit and control panel.

Figure 1: Installation / Service Clearances.



LIFTING

- Before lifting, check that all shipping materials have been removed from unit.
- To assist in determining rigging requirements, see weights in the table at right, or in the general specifications table.
- Always test-lift the unit to check for proper balance and rigging before hoisting to desired location.

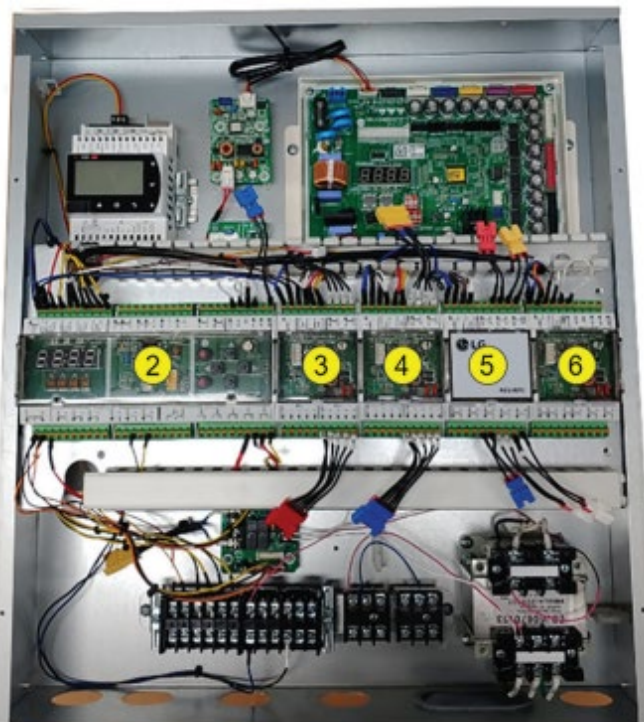
Table 3: Weights.

Model No.	ARND153DCR4	ARND203DCR4
Net Weight (lbs.)	364	364

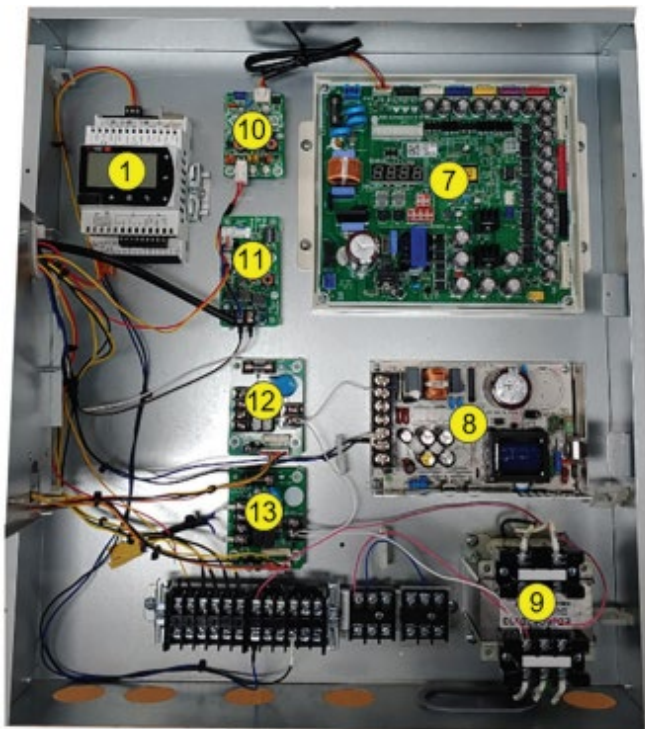
LG Split Compact Dedicated Outdoor Air System (DOAS)

ELECTRICAL COMPONENTS

Top Layer



Bottom Layer



Electrical Components Legend

No.	Description
1	CAREL® Controller
2	Main Module
3	Main Coil EEV Module
4	Reheat Coil EEV Module
5	NTC Module
6	UI Module
7	Heat Recovery Unit PCB
8	SMPS
9	Transformer
10	RS-485 1
11	RS-485 2
12	Relay 1
13	Relay 2

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LG Split Compact Dedicated Outdoor Air System (DOAS)

PRE-COMMISSIONING - DOAS Controller Setup

DOAS Controller Overview

All DOAS units are equipped with a fully programmed, microprocessor-based controller that monitors inputs and regulate outputs to maintain unit operation. The controller includes:

- Unit-specific controls sequence.
- Component safeties and alarms.
- Ethernet RJ-45 network port.
- MODBUS protocol to connect to AC Smart and ACP.
- Points and system settings can be manipulated through a computer operating Web UI software.

The controller also provides user feedback through an optional handheld keypad / display (hardwired), or can be connected to a building management system interface.

Electrical Specifications

The DOAS controller receives 24 VAC (CAREL) and 12 VDC (LG) power from a transformer on the main control panel, and is energized when the main disconnect is on.

Connecting to the Web UI

To use the Web UI and access the controller from a computer, tablet, or smart phone connected to the local area network, enter the controller's IP address into the device's web browser.

1. Using a standard CAT5 Ethernet cable, connect the computer to the controller at the Ethernet port connection as shown in the figure.
2. Open a web browser (Internet Explorer® or Chrome® browsers are supported).
3. Type in IP address 192.168.1.101 (factory-configured).

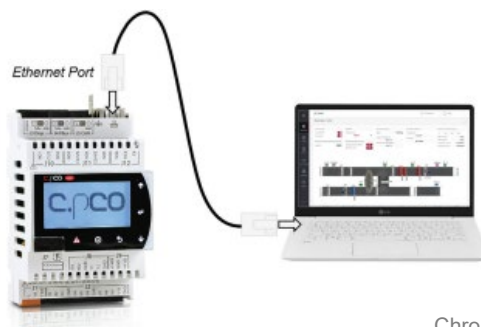


Figure 29: Connecting to the Web UI.

Figure 26: Split DOAS Component Diagram.

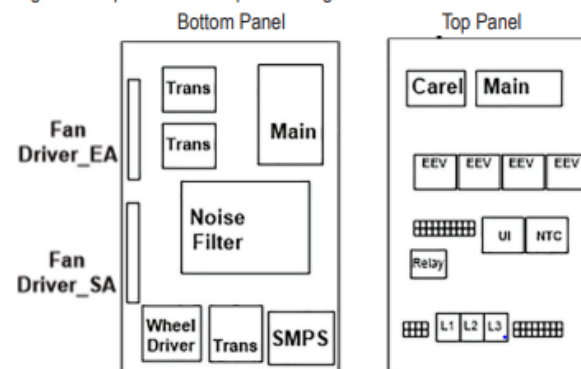
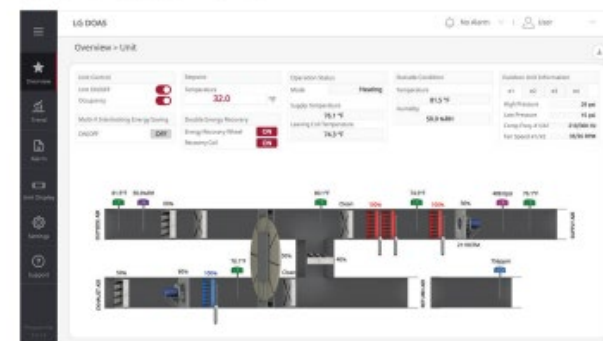


Figure 27: LG DOAS Controller (CAREL + LG Controller).



Figure 28: Web User Interface.



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REFRIGERANT PIPING DIAGRAM (Cooling)

ARND153DCR4, ARND203DCR4

- ← High Temperature High Pressure Vapor
- ← High Temperature High Pressure Liquid
- ← Low Temperature Low Pressure Vapor

- TH1 ~TH5 : Air Thermistor
- TH6 ~TH12 : Pipe Thermistor
- Humid1 : Air Humidity Sensor

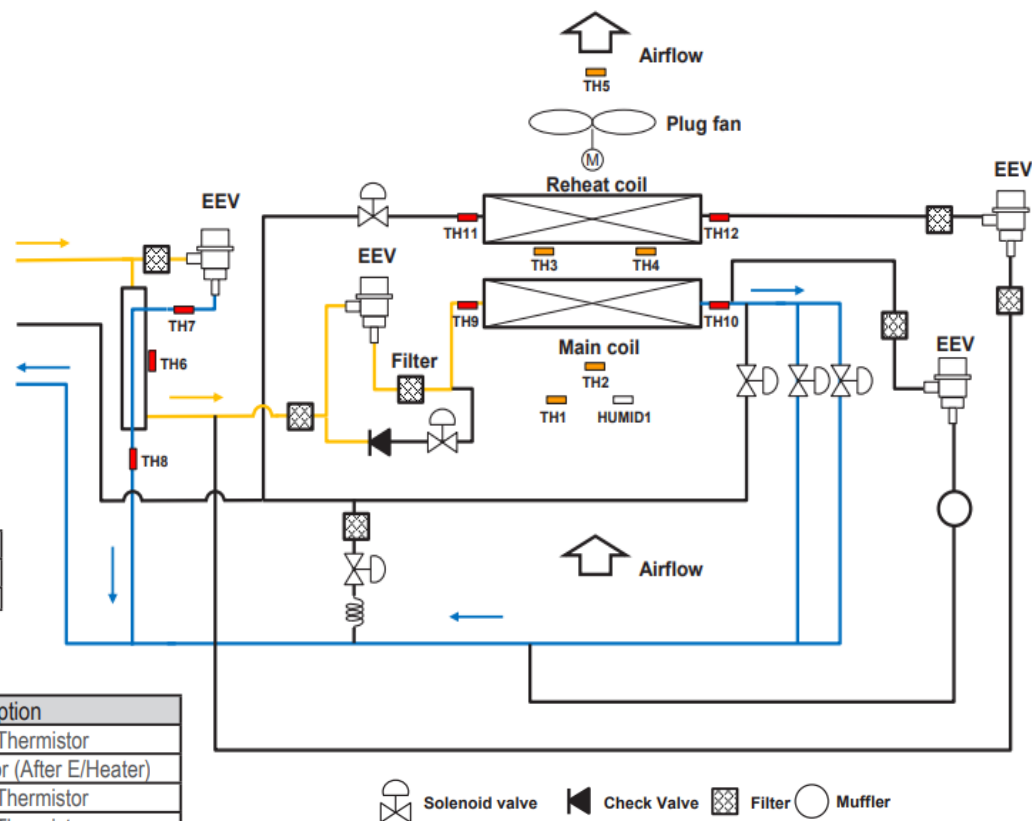


Table 6: ARND153DCR4 and ARND203DCR4 Refrigerant Pipe Connection Port Diameters.

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

Table 7: 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

LG Split Compact Dedicated Outdoor Air System (DOAS)

REFRIGERANT PIPING DIAGRAM (Dehumidification)

ARND153DCR4, ARND203DCR4

- ← High Temperature High Pressure Vapor
- ← High Temperature High Pressure Liquid
- ← Low Temperature Low Pressure Vapor

- TH1 ~TH5 : Air Thermistor
- TH6 ~TH12 : Pipe Thermistor
- Humid1 : Air Humidity Sensor

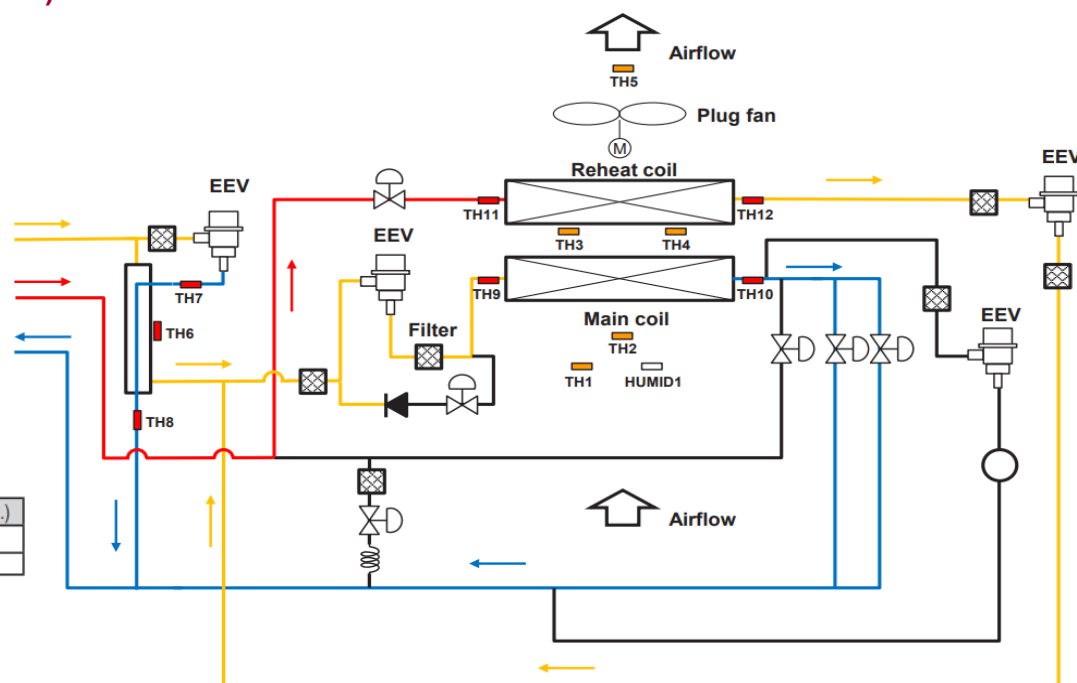


Table 8: ARND153DCR4 and ARND203DCR4 Refrigerant Pipe Connection Port Diameters.

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

Table 9: 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



LG Split Compact Dedicated Outdoor Air System (DOAS)

REFRIGERANT PIPING DIAGRAM (Heating)

ARND153DCR4, ARND203DCR4

- ← High Temperature High Pressure Vapor
- ← High Temperature High Pressure Liquid
- ← Low Temperature Low Pressure Vapor

- TH1 ~TH5 : Air Thermistor
- TH6 ~TH12 : Pipe Thermistor
- Humid1 : Air Humidity Sensor

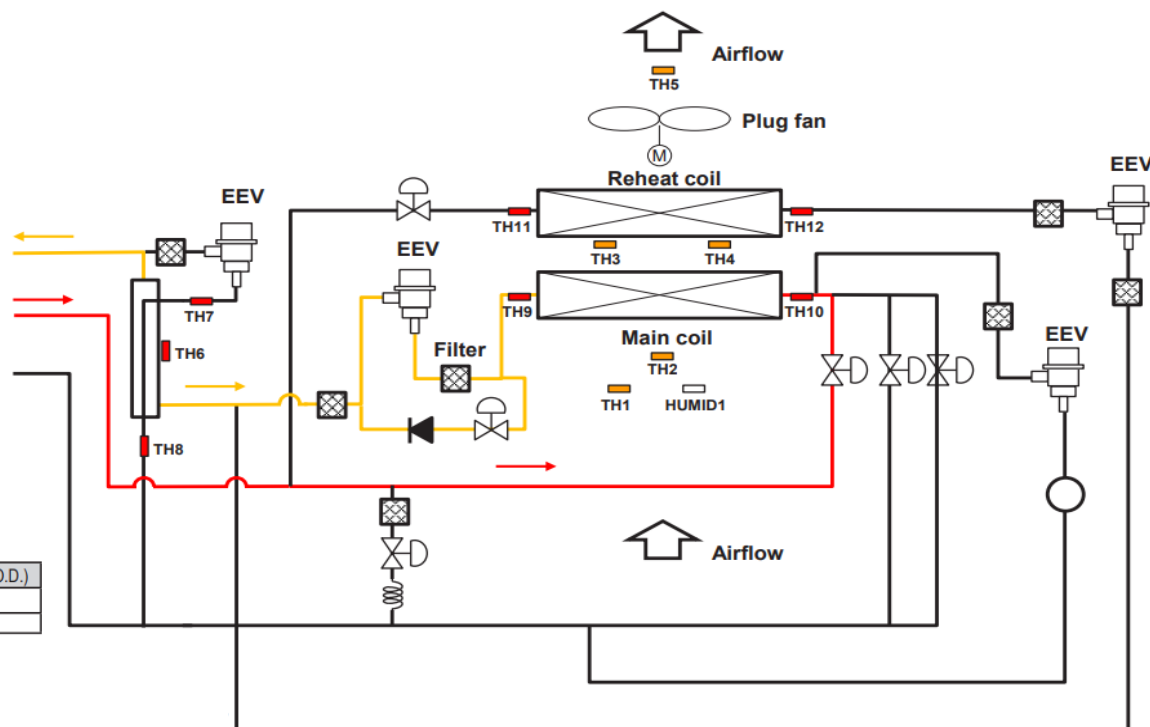


Table 10: ARND153DCR4 and ARND203DCR4 Refrigerant Pipe Connection Port Diameters.

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

Table 11: 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



LG Split Compact Dedicated Outdoor Air System (DOAS)

Power Wiring / Communications Cable Guidelines

- Follow manufacturer's circuit diagrams displayed on the inside of the control box cover.
- Have a separate power supply for the DOAS units.
- Provide a circuit breaker switch between the power source and the DOAS unit.
- Confirm power source specifications.
- Confirm that the electrical capacity is sufficient.
- Starting current must be maintained ± 10 percent of the rated current marked on the name plate.
- Confirm wiring / cable thickness specifications: Power wiring is field supplied. Wire size is selected based on the larger MCA value, and must comply with the applicable local and national codes.
- Communication cable must be a minimum of 18 AWG, two-conductor, twisted, stranded, shielded, and must comply with the applicable local and national codes. Ensure the communication cable is properly grounded at the main outdoor unit only. **DO NOT** ground the ODU-DOAS communications cable at any other point.
- It is recommended that a circuit breaker is installed, especially if conditions could become wet or moist.
- Include a disconnect in the power wiring system. Add an air gap contact separation of at least 1/8 inch in each active (phase) conductor.
- Any openings where the field wiring enters the cabinet must be completely sealed.

WARNING

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

NOTE:

- Terminal screws may loosen during transport. Properly tighten the terminal connections during installation or risk equipment malfunction or property damage.
- Loose wiring may cause unit malfunction, the wires to burnout or the terminal to overheat and catch fire. There is a risk of equipment malfunction or property damage.

A voltage drop may cause the following problems:

- Magnetic switch vibration, fuse breaks, or disturbance to the normal function of an overload protection device.
- Compressor will not receive the proper starting current.

LG Split Compact Dedicated Outdoor Air System (DOAS)

Power Wiring and Communications Cable Connections

1. Insert the power wiring / communications cable from the outdoor unit using the designated path in the DOAS unit.
2. Connect each wire to its appropriate terminal on the DOAS unit control board. Verify that the color and terminal numbers from the outdoor unit wiring match the color and terminal numbers on the DOAS unit.
3. Secure the power wiring / communications cable.

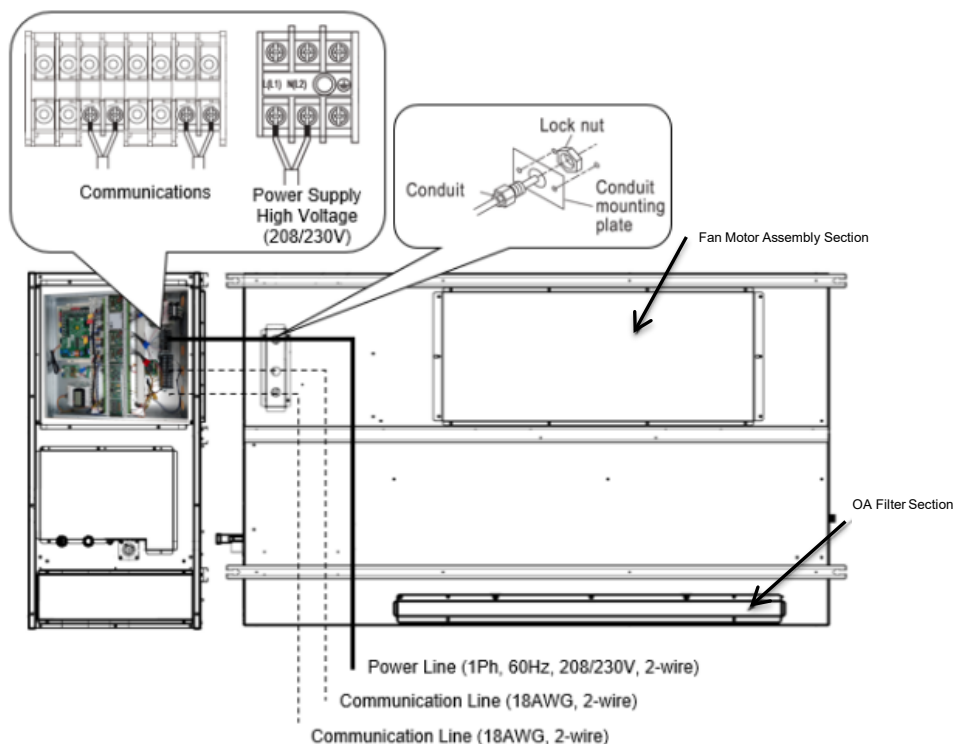
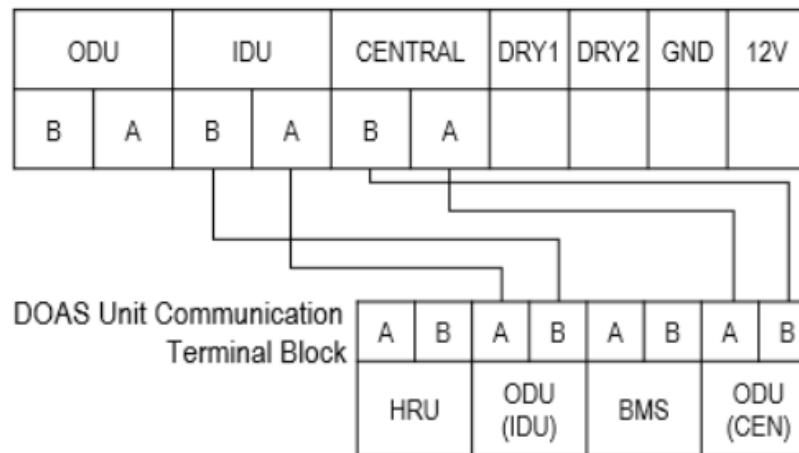


Figure 16: Outdoor Unit to DOAS Terminal Block Connections.

Outdoor Unit Communication Terminal Block



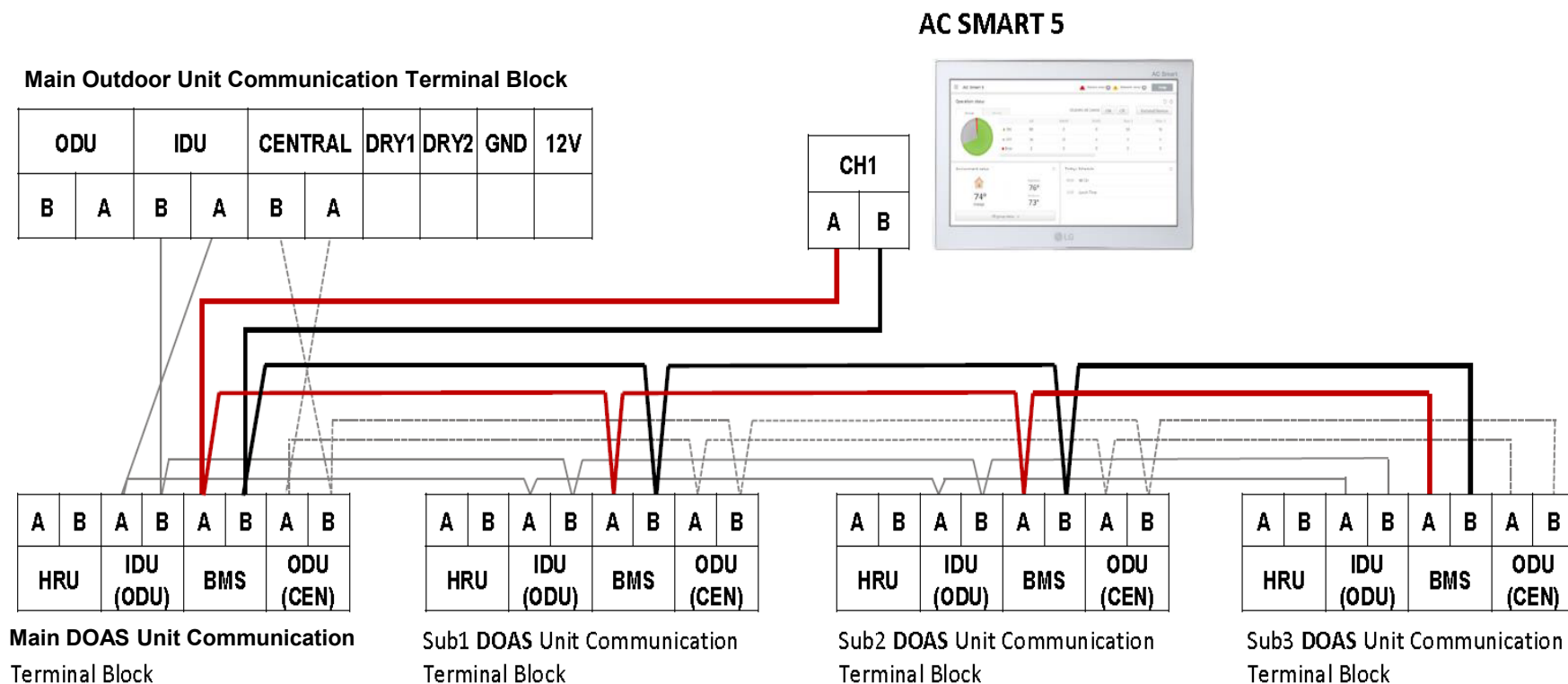
NOTE:

BMS terminals A / B are for connecting to CH1 of AC Smart.

LG Split Compact Dedicated Outdoor Air System (DOAS)

Network Setting (Central Controller)

Setting Procedure (AC SMART 5)





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