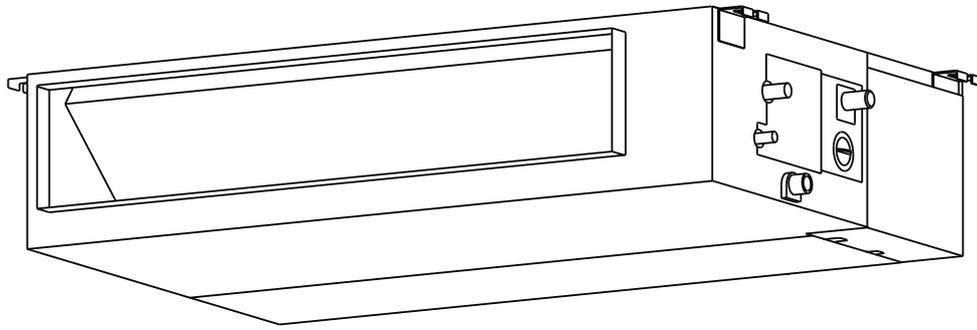


INSTALLATION MANUAL

**SLIM DUCTED INDOOR UNIT  
SPLIT-STYLE AIR CONDITIONER**

DRAD09F1A, DRAD12F1A, DRAD18F1A, DRAD24F1A



Model Number:

Serial Number:

Purchase Date:

Installing Contractor Company Name:



**TIP**

Capture relevant information about your Durastar mini-split equipment before it is installed and write it above for future reference.

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## INTRODUCTION

To better serve you, please do the following before contacting customer service:

- If you received a damaged product, immediately contact the retailer or dealer that sold you the product.
- Read and follow this owner's manual carefully to help you use and maintain your air conditioner.
- Read the troubleshooting section of this manual as it will help you diagnose and solve common issues.
- Visit us on the web at [www.durastar.com](http://www.durastar.com) to download product guides and up-to-date information.
- If you need warranty service, our friendly customer service representatives are available via email at [questions@durastar.com](mailto:questions@durastar.com) or by telephone at 1-888-320-0706.

## WARNINGS

### Symbols Used in This Manual



The warning symbol indicates cautionary information for the user. Extra care and precautions should be taken to ensure the user's safety.



The pencil indicates any manufacturer notes relating to surrounding content. These may include further clarifications or call-outs.



A light bulb symbol indicates suggested manufacturer tips for the user to get the most out of the Durastar equipment and to accommodate the best user experience.

## IMPORTANT SAFETY PRECAUTIONS

Improper handling can cause serious damage or injury. Please read the following safety information in its entirety.



### **Operation, Cleaning, and Maintenance Safety Precautions**

- Children and people with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, should only use this air conditioner if they are given supervision or instructions concerning use of the air conditioner in a safe way and understand the hazards involved.
- Children should not play with the air conditioner.
- Never stick fingers or any other body parts into the air conditioner openings. The internal fan may be rotating at high speeds, and may result in injury.
- After removing the filter, do not touch the fins in order to avoid injury.
- Maintenance must be performed by qualified professionals. Otherwise, you may experience personal injury or damage to the air conditioner and surrounding property.
- Do not repair the air conditioner by yourself. It may cause electric shock or damage. Please contact a qualified service representative when you need to repair the air conditioner.
- Do not block the air outlet or air inlet. This could cause a malfunction.
- Do not spill water on the remote control as this can permanently damage the remote.
- If the below problems occur, please turn off the air conditioner and disconnect power at the circuit breaker immediately. Then contact your dealer or a qualified professional for service.
- The power cord is overheating or damaged.
- There is an abnormal sound during operation.
- The circuit breaker trips frequently.
- The air conditioner gives off a burning smell.
- The indoor unit is leaking.
- If the air conditioner operates under abnormal conditions, it may cause malfunctions, electric shock, or fire hazard.
- When turning the unit on or off via the emergency operation switch, press the switch with an insulated object other than metal.
- Do not step on the top panel of the unit, or put heavy objects on the top panel. This could cause damage or personal injury.
- Cleaning and user maintenance should not be performed by children without supervision.
- Do not spray water on the indoor unit. This could cause electric shock or a unit malfunction.
- Do not use flammable materials such as hair spray, lacquer, or paint near the air conditioner as they may catch fire.
- Do not operate the air conditioner in places near combustible gases. Emitted gases may collect around the air conditioner and cause an explosion.
- Do not use fire or a hair dryer to dry the filter. This could cause a deformation or fire hazard.
- Do not wash the air conditioner with water as this could cause an electric shock.
- Disconnect the power supply by turning it off at the circuit breaker when cleaning the air conditioner. Otherwise, you could risk electric shock.



## **Electrical Safety**

- Only use the specified power cord. If the power cord is damaged, it must be replaced by the manufacturer, its service agent, or similarly qualified persons in order to avoid a hazard.
- Keep the power plug clean. Remove any dust or grime that accumulates on or around the plug. Dirty plugs can cause fire or electric shock.
- Do not pull the power cord to unplug unit. Hold the plug firmly and pull it from the outlet. Pulling directly on the cord can damage it, which can lead to fire or electric shock.
- Do not connect the air conditioner to a multi-purpose socket. Doing so could cause a fire hazard.
- Do not modify the length of the power supply cord or use an extension cord to power the unit.
- If the supply cord is damaged, it must be replaced by the manufacturer, a service agent, or a similarly qualified person in order to avoid a safety hazard.
- Do not share the electrical outlet with other appliances. Improper or insufficient power supply can cause fire or electrical shock.
- The product must be properly grounded at the time of installation, or electrical shock may occur.
- For all electrical work, follow all local and national wiring standards and regulations. Connect cables tightly, and clamp them securely to prevent external forces from damaging the terminal. Improper electrical connections can overheat and cause fire, and may also cause shock. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
- All wiring must be properly arranged to ensure that the control board cover can close properly. If the control board cover is not closed properly, it can lead to corrosion and cause the connection points on the terminal to heat up, catch fire, or cause electrical shock.
- The air conditioner's circuit board (PCB) is designed with a fuse to provide overcurrent protection. The specifications of the fuse are printed on the circuit board.

## Installation Safety

- Installation must be performed by an authorized dealer or specialist. Improper installation can cause water leakage, electrical shock, or fire. (In North America, installation must be performed in accordance with NEC and CEC requirements by authorized personnel only.)
- Installation must be performed according to the installation instructions. Improper installation can cause water leakage, electrical shock, or fire.
- This air conditioner shall be installed in accordance with national and local wiring regulations.
- Contact an authorized service technician for repair or maintenance of this unit.
- Only use the included accessories, parts, and specified parts for installation. Using non-standard parts can cause water leakage, electrical shock, fire, and can cause the unit to fail.
- Install the unit in a firm location that can support the unit's weight. If the chosen location cannot support the unit's weight, or the installation is not done properly, the unit may fall and cause serious injury and damage.
- Install drainage piping according to the instructions in the installation manual. Improper drainage may cause water damage to your home and property.
- For units that have an auxiliary electric heater, do not install the unit within 3 feet (1 meter) of any combustible materials.
- Do not install the unit in a location that may be exposed to combustible gas leaks. If combustible gas accumulates around the unit, it may cause a fire.
- Do not turn on the power until all work has been completed.
- When moving or relocating the air conditioner, consult experienced service technicians for disconnection and re-installation of the unit.

## Additional Precautions

- Turn off the air conditioner and disconnect the power if you are not going to use it for a long time.
- Turn off and unplug the unit during storms.
- Make sure that water condensation can drain unhindered from the unit.
- Do not operate the air conditioner with wet hands. This may cause electric shock.
- Do not use this device for any other purpose than its intended use.
- Do not climb onto or place objects on top of the outdoor unit.
- Do not allow the air conditioner to operate for long periods of time with doors or windows open, or if the humidity is very high.

## OPERATING TEMPERATURES

Your air conditioner is designed to operate in the following indoor and outdoor temperatures. When your air conditioner is used outside of the following temperature ranges, certain safety features may activate and turn off the unit to protect it from damage.

### TEMPERATURE RANGES

	<b>COOL mode</b>	<b>HEAT mode</b>	<b>DRY mode</b>
<b>Indoor Air Temperature</b>	62°F - 90°F (17°C - 32°C)	32°F - 86°F (0°C - 30°C)	50°F - 90°F (10°C - 32°C)
<b>Outdoor Air Temperature</b>	-13°F - 122°F (-25°C - 50°C)	-13°F - 86°F (-25°C - 30°C)	32°F - 122°F (0°C - 50°C)

To further optimize the performance of your unit, do the following:

- Keep doors and windows closed.
- Limit energy usage by using TIMER ON and TIMER OFF features.
- Do not block air inlets or outlets.
- Regularly inspect and clean air filters.

#### NOTE

 Your Durastar air conditioner's outdoor unit is equipped with a base pan heater, allowing it to continue to operate at freezing temperatures as low as -13°F (-25°C). When outdoor air temperatures are at or below 32°F (0°C), we strongly recommend keeping the unit plugged in at all times to ensure smooth ongoing performance.

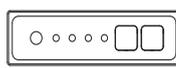
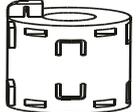
#### NOTE

 Keep the room's relative humidity below 80%. If the air conditioner operates in excess of this, the surface of the air conditioner may attract condensation. To help prevent condensation from forming and dripping, set the vertical airflow louver to its maximum angle (vertically to the floor) and set the fan to HIGH.

# ACCESSORIES

## INCLUDED INSTALLATION ACCESSORIES

The air conditioning system comes with the following accessories.

Accessory	Quantity	Image	Accessory	Quantity	Image
Manual	1-2		Display Panel	1	
Soundproof Insulation Sheath	1		Wired Thermostat	1	
Cord Protector	1		Magnetic Ring (Some Models)	1-2	
Copper Nut	2		Drain Pipe Worm Clamp	2	
Drain Pipe Insulation Sheath	1				

## FIELD SUPPLIED INSTALLATION ACCESSORIES

The following installation accessories are required and must be purchased separately.

- Refrigerant piping (line set)
- Indoor and outdoor connection wire
- Outdoor power supply cord
- Drain pipe
- Pipe and cable wrapping tape
- Wall hole sleeve and cover
- Putty
- Suspension bolts and necessary hardware to hang indoor unit
- Wiring u-lugs

## TOOLS NEEDED

The following tools are required for installation.

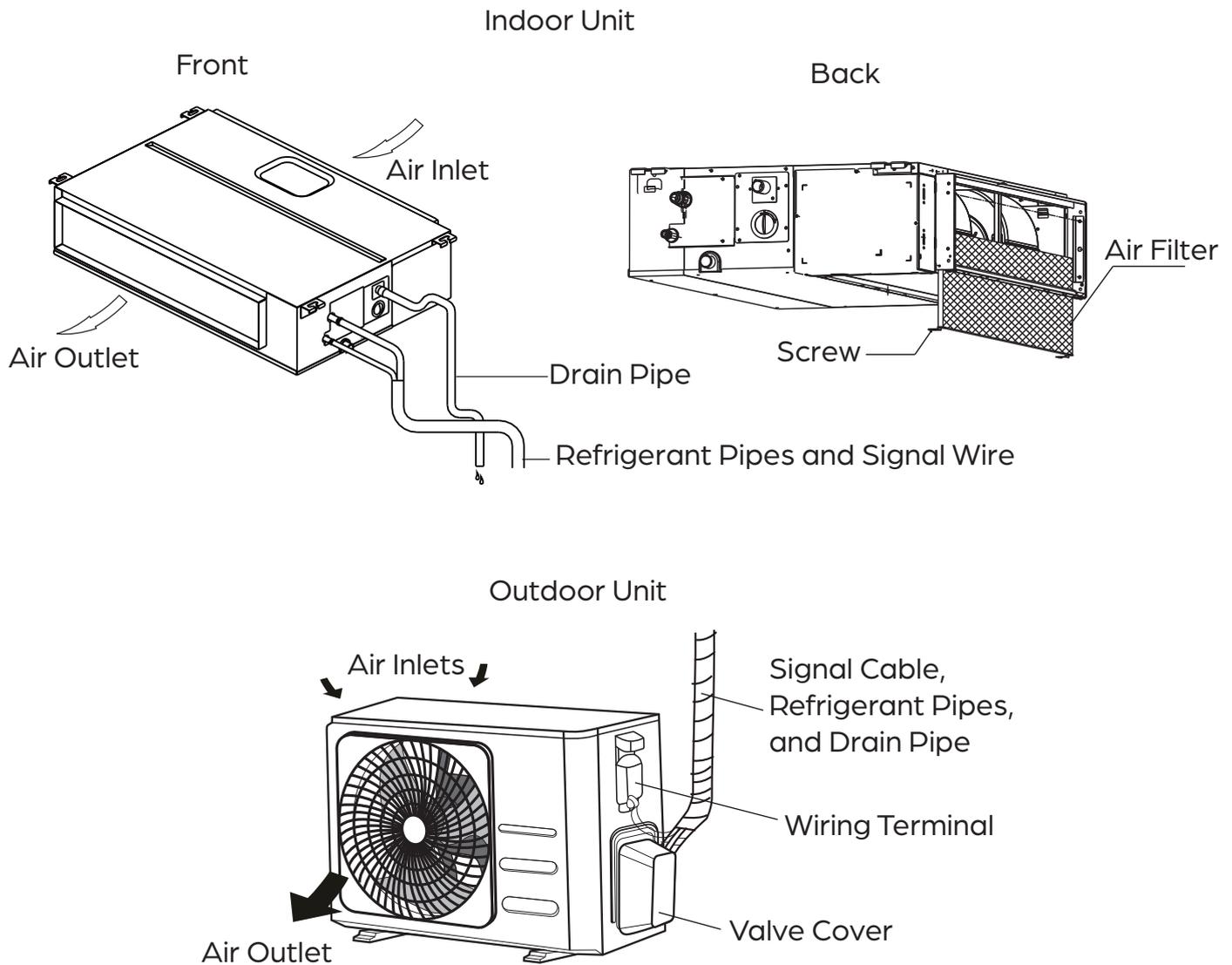
- Phillips screwdriver
- Drill with 2 1/2" or 3 1/2" (indoor unit model depending) core bit
- Vacuum pump
- HVAC manifold gauge set
- Refrigerant leak detector
- Copper pipe cutter
- Flaring tool
- Burr reamer
- Crescent or spanner wrench
- Hexagonal wrench set
- Torque wrench
- Multimeter
- Electroprobe
- Level
- Hammer
- Wire strippers
- Wire crimper

## PARTS IDENTIFICATION



### NOTE

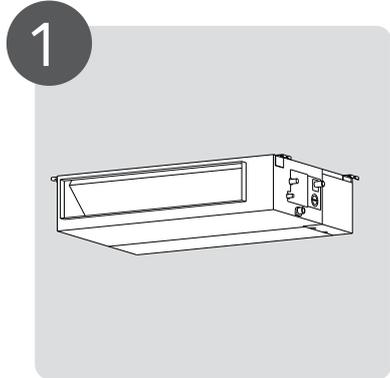
The installation must be performed in accordance with the required local and national standards. The installation may be slightly different in different markets.



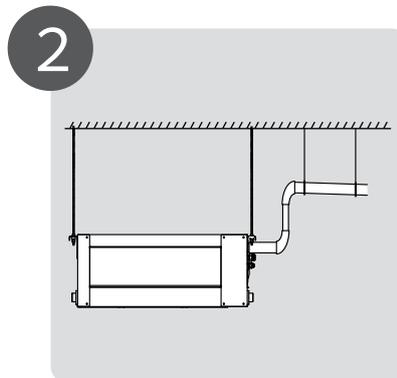
### NOTE

Illustrations in this manual are for explanatory purposes. The actual shape of your mini-split equipment may vary slightly.

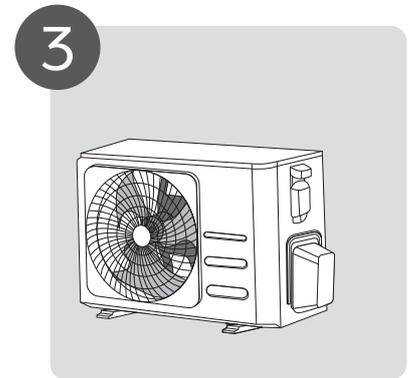
## INSTALLATION OVERVIEW – INDOOR UNIT



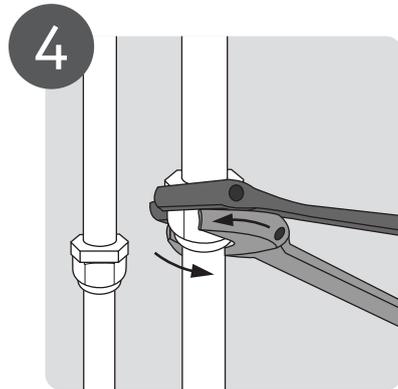
Install the indoor unit



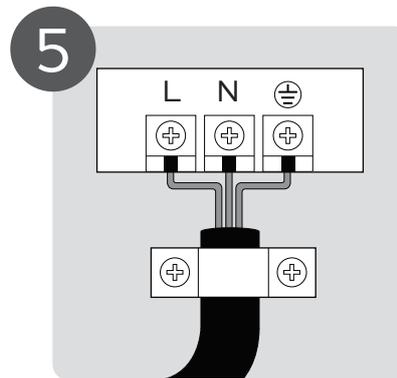
Install the drain pipe



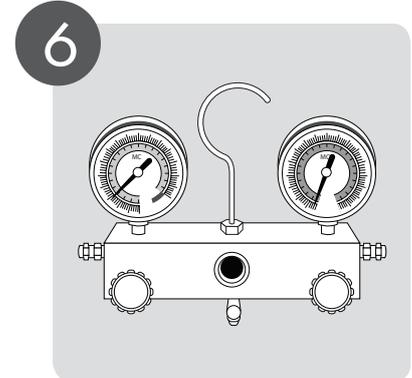
Install the outdoor unit



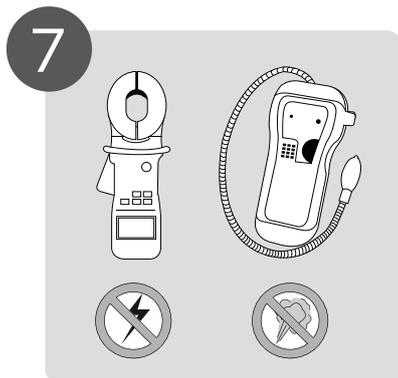
Connect the refrigerant pipes



Connect the wires



Evacuate and charge the refrigeration system



Perform a test run

## INDOOR UNIT INSTALLATION

### STEP 1: SELECT INSTALLATION LOCATION

Before installing the indoor unit, you must choose an appropriate location. The following standards should be met for an appropriate location for the unit:

- Good air circulation
- Convenient drainage
- Noise from the unit will not disturb other people
- Firm and solid – the location will not vibrate
- Strong enough to support the weight of the unit
- A location at least three feet (one meter) from all other electrical devices (e.g., TV, radio, computer)

DO NOT install unit in the following locations:

- Near any source of heat, steam, or combustible gas
- Near flammable items such as curtains or clothing
- Near any obstacle that might block air circulation
- Near a doorway
- In a location subject to direct sunlight

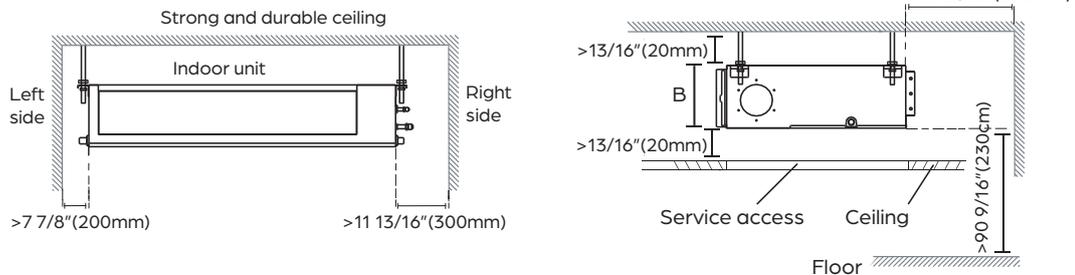


#### NOTE

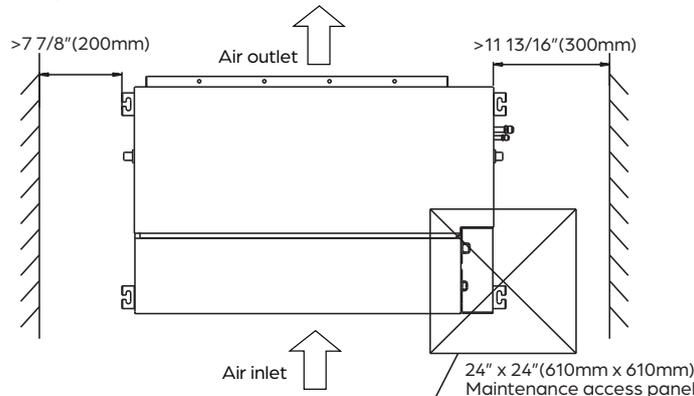
This model is designed for horizontal installation only.

Refer to the following diagrams to ensure proper distance from walls and ceiling:

#### Installation clearances



#### Maintenance access panel



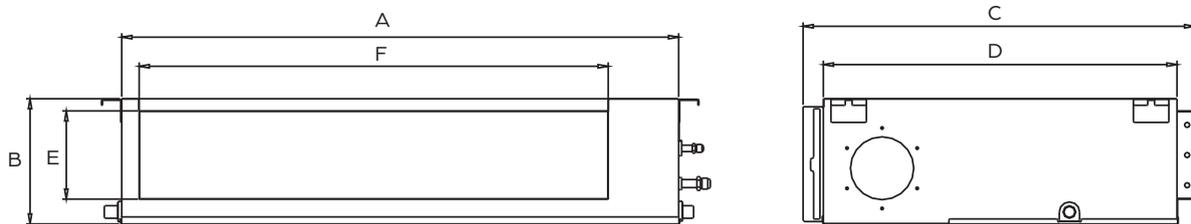
#### NOTE

If there is no pre-existing refrigerant piping, when choosing a location, leave ample room for a wall hole (see *Step 3: Drill Wall Hole for Connective Piping*) for the signal cable and refrigerant piping that connect the indoor and outdoor units.

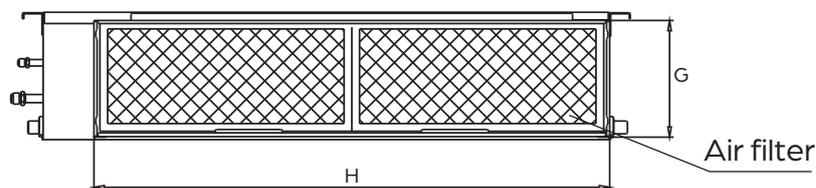
## STEP 2: HANG INDOOR UNIT

1. Refer to the following diagrams for unit dimensions and locations for the four suspension bolt holes required to hang the indoor unit.

Unit and air outlet dimensions

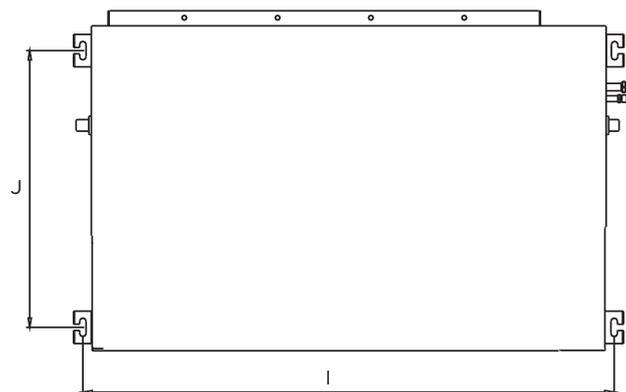


Air inlet dimensions



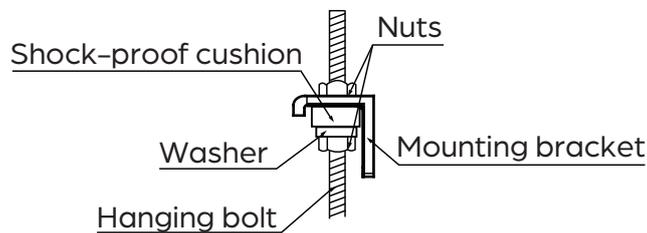
Model	A	B	C	D	E	F	G	H
DRAD09F1A DRAD12F1A	27 9/16" (700mm)	7 7/8" (200mm)	19 15/16" (506mm)	17 3/4" (450mm)	6" (152mm)	21 1/8" (537mm)	7 5/16" (186mm)	23 9/16" (599mm)
DRAD18F1A	34 5/8" (880mm)	8 1/4" (210mm)	26 9/16" (674mm)	23 5/8" (600mm)	5 3/8" (136mm)	27 13/16" (706mm)	7 1/2" (190mm)	30 13/16" (782mm)
DRAD24F1A	43 5/16" (1100mm)	9 13/16" (249mm)	30 1/2" (774mm)	27 9/16" (700mm)	6 7/8" (175mm)	36 7/16" (926mm)	9" (228mm)	39 7/16" (1001mm)

Mounting dimensions for ceiling bolts



Model	I	J
DRAD09F1A DRAD12F1A	29 3/16" (741mm)	14 3/16" (360mm)
DRAD18F1A	36 1/4" (920mm)	20" (508mm)
DRAD24F1A	44 7/8" (1140mm)	23 9/16" (598mm)

2. Before drilling the holes in the ceiling and mounting the unit, align the refrigerant pipes, drain pipe, and electric cable connection points with the direction they will be drawn out and connected to the outdoor unit through the wall hole (see *Step 3: Drill Wall Hole For Connective Piping*).
3. Drill four holes 4" deep in the internal ceiling for each of the required suspension bolt anchors (field supplied). Make sure to hold the drill at a 90° angle to the ceiling.
4. Using a hammer, insert the suspension bolt anchors into the pre-drilled holes.
5. Install the four suspension bolts.
6. Mount the indoor unit. Using two people to lift and secure it, insert the suspension bolts into the unit's hanging bracket holes and secure in place with washers and nuts (see diagram below). Make sure the unit is level.

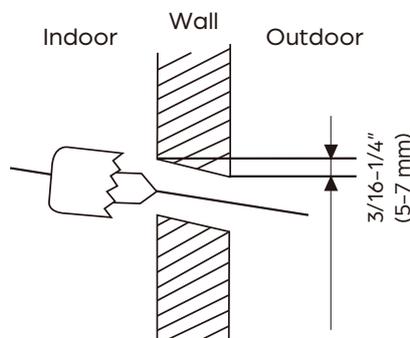


### WARNING

Ensure that the indoor unit is completely level. Improper installation can cause the drain pipe to back up into the unit and water leaks.

### STEP 3: DRILL WALL HOLE FOR CONNECTIVE PIPING

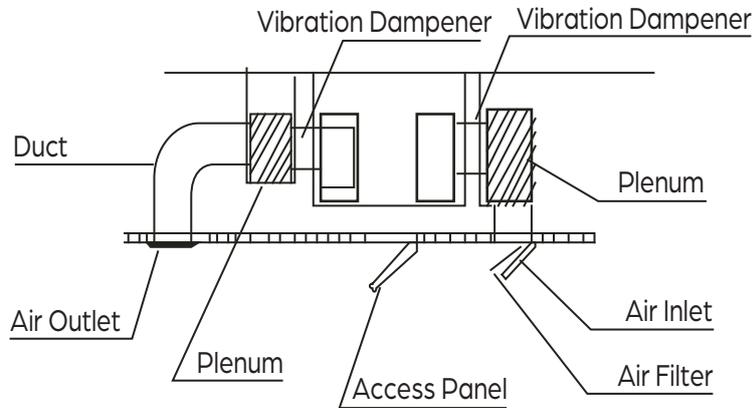
1. Determine the location of the wall hole based on the location of the outdoor unit.
2. Using a 2 1/2" (65mm) core drill for units with a gas side connective pipe less than 5/8" (16mm), or 3 1/2" (90mm) for units with a gas side pipe greater than or equal to 5/8" (16mm), drill a hole in the wall. Make sure that the hole is drilled at a slight downward angle, so that the outdoor end of the hole is lower than the indoor end by about 3/16 - 1/4" (5mm to 7mm). This will ensure proper water drainage.



3. Place the protective wall hole sleeve (field supplied) into the hole. This protects pipes and cables from sharp edges and will help seal the opening when you finish the installation process. After the sleeve is inserted through the wall, connect the wall hole sleeve cover to the wall sleeve on the outside end. Make sure the cover is flush with the outside wall.

### STEP 4: DUCT AND ACCESSORIES INSTALLATION

Once the unit is hung, you may install any additional ducting required. The diagram below illustrates one example of installing the unit with hidden ducting. The unit may also be installed exposed, depending on your needs.



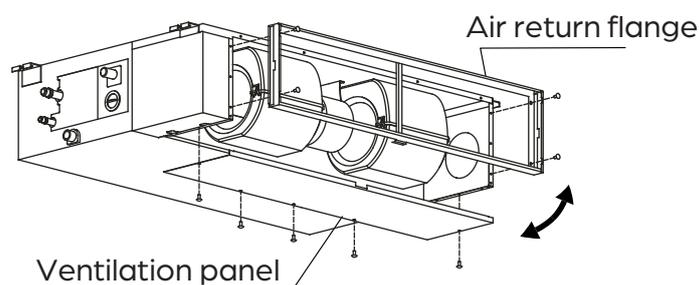
### INSTALLATION TIPS

- Air filters help remove dust and particles from the circulating air. They should be installed on the air inlet side according to the size of the inlet on the unit.
- Vibration dampeners are recommended to be installed between the unit and the ductwork. They will decrease vibrations and noise coming from the unit. They also provide some flexibility when installing and positioning the ductwork.
- The air inlet and air outlet should be far enough apart to avoid short-circuiting the air flow and provide proper circulation in the room.
- Do not place the connecting duct weight on the unit. Provide proper support for the ductwork independent of the unit supports.
- All ductwork should be properly insulated to prevent condensation.
- Refer to the following static pressure guidelines when installing the indoor unit:

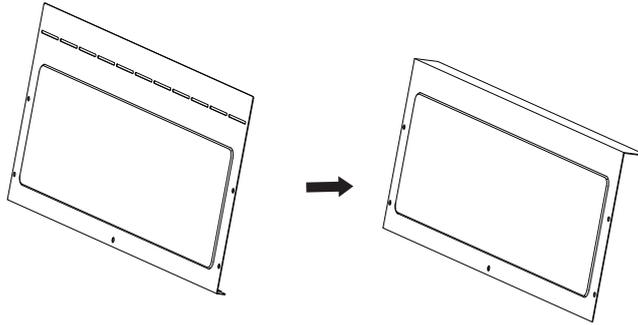
Model	Static Pressure (Pa / in. wc)
DRAD09F1A	0~50 / 0~0.2
DRAD12F1A	0~50 / 0~0.2
DRAD18F1A	0~100 / 0~0.4
DRAD24F1A	0~160 / 0~0.64

### CHANGING THE AIR INLET DIRECTION (REAR TO UNDERSIDE)

1. Remove the ventilation panel and air return flange.

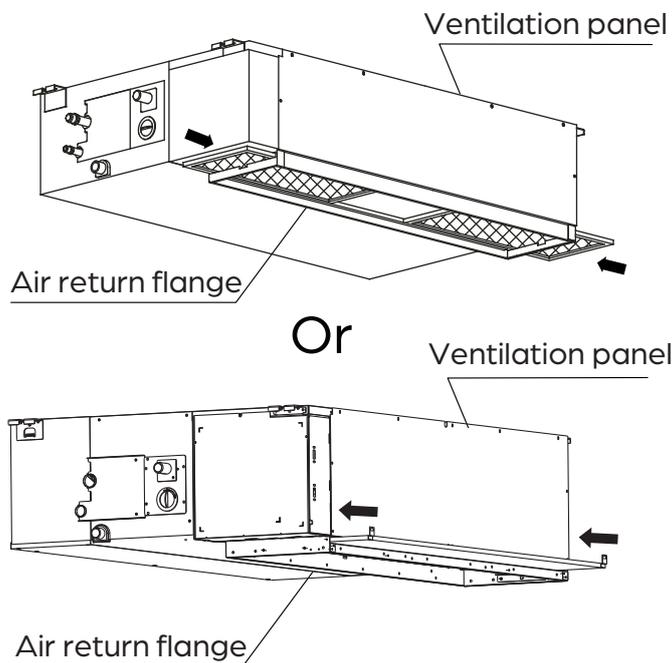


2. Bend the rear ventilation panel 90° along the dotted line (some models).



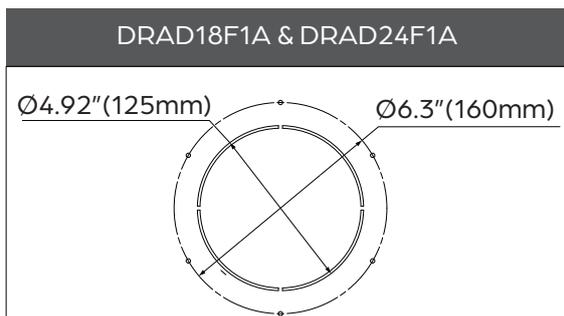
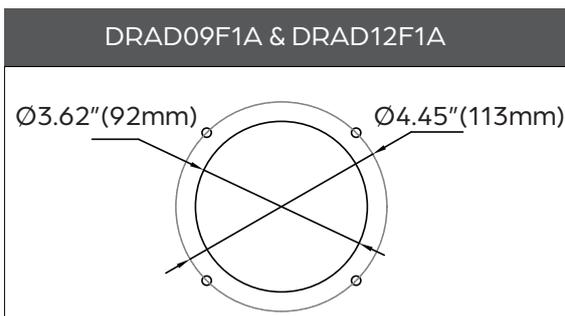
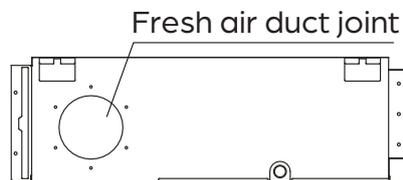
3. Swap the mounting positions of the ventilation panel and air return flange.

4. Install the filter mesh. Insert into flange as illustrated below.



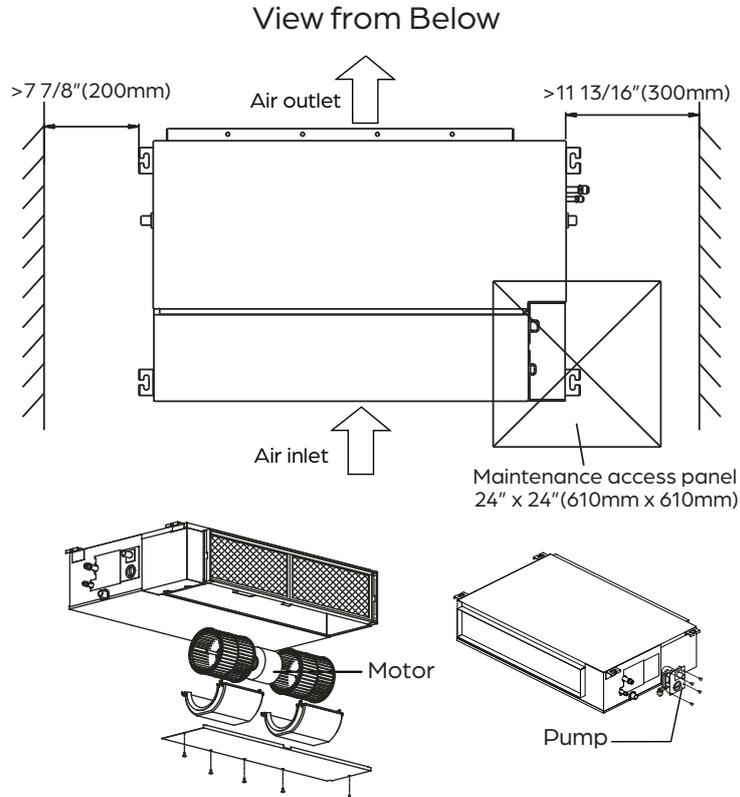
## FRESH AIR DUCT INSTALLATION

This unit allows for a fresh air duct to be installed. Duct location and dimensions are shown below.



### MAINTENANCE ACCESS PANEL

If this unit is located in a sub-ceiling, an access panel should be installed in order to gain access to the unit for routine maintenance. Common maintenance items are shown below for consideration when designing panel size and location. A minimum panel size of 2' x 2' is recommended.

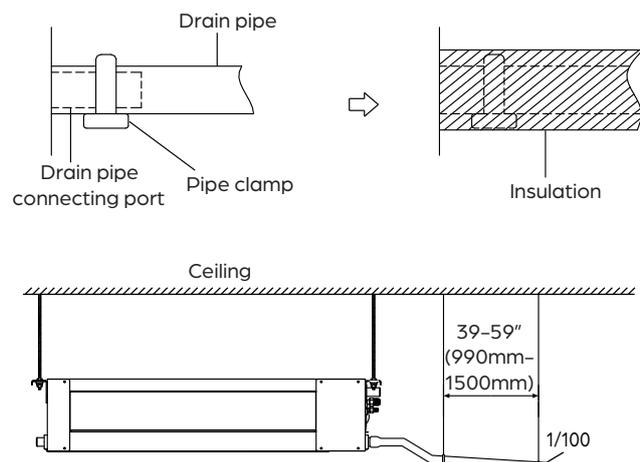


### STEP 5: CONNECT DRAIN PIPE

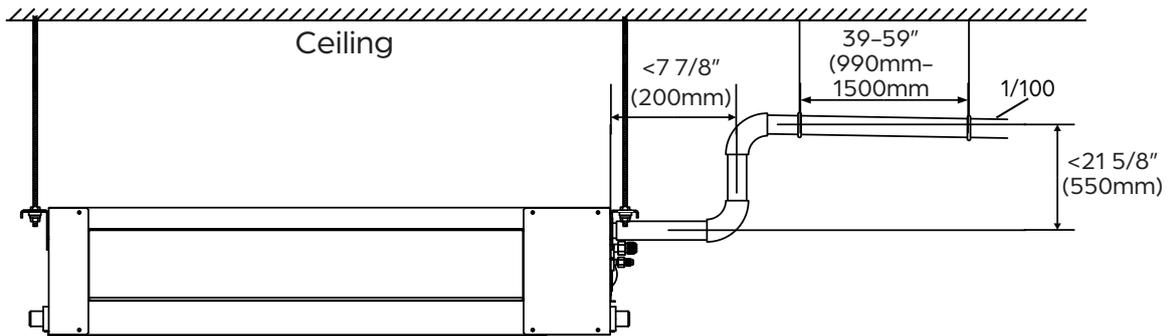
The drain pipe is used to drain condensate water away from the unit. Improper installation may cause leaks and unit or property damage.

1. Connect the drain pipe (field supplied) to the appropriate unit's connecting port using a metal worm clamp. Make sure it is secured tightly and cannot be easily pulled loose.
2. Insulate the connecting port and pipe with the accessory sheath provided.
3. For gravity draining, install the drain pipe to the lower drain connecting port with a downward slope of at least a 1/100 gradient to prevent water from flowing back into the unit. To keep the drain pipe from sagging, install hanging wires every 39 - 59". Wrap the remaining indoor portion of the drain pipe with foam pipe insulation to prevent condensation.

Model	Drain Pipe Inner Diameter
DRAD09F1A	1" (25mm)
DRAD12F1A	1" (25mm)
DRAD18F1A	1" (25mm)
DRAD24F1A	1" (25mm)

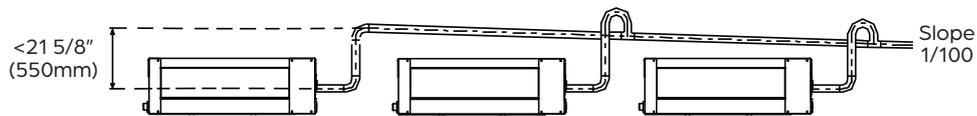


4. This unit is equipped with a drain pump that allows the outlet of the drain pipe to be higher than the pipe's connecting port. For pump assisted draining, install the drain pipe to the upper connecting port. The vertical lift pipe must be installed no higher than 21 5/8" (550mm) from the drain connection port with a maximum distance of 7 7/8" (200mm) between the unit and the lift pipe. To prevent air bubbles, make sure the pipe between the unit and the lift pipe is level or slightly tilted up (0 - 1"). Install hanging wires every 39 - 59" to keep the drain pipe from sagging, and wrap the indoor portion of the pipe with foam pipe insulation to prevent condensation. Incorrect installation can cause water to flow back into the unit and leaks.

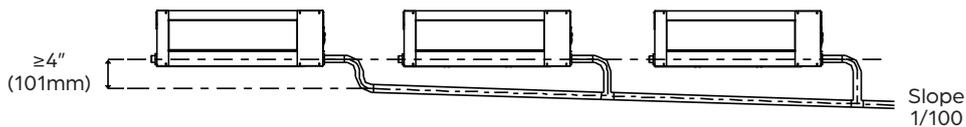


5. If connecting multiple drain pipes, install the pipes as illustrated below.

### Using pump



### Not using pump



6. Pass the drain pipe through the wall hole to the outside. The end of the pipe should be at least 2" (50mm) above the ground. If it touches the ground, the pipe may become blocked. Make sure the water drains to a safe location where it will not cause water damage or a slipping hazard.

## STEP 6: CONNECT SIGNAL CABLE

### BEFORE PERFORMING ANY ELECTRICAL WORK, READ THESE REGULATIONS

1. All wiring must comply with local and national electrical codes and regulations, and must be installed by a licensed electrician.
2. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
3. If there is a serious safety issue with the power supply, stop work immediately and contact a licensed electrician. Do not continue with the installation until the safety issue is properly resolved.
4. Power voltage should be within 90–110% of rated voltage. Insufficient power supply can cause malfunction, electrical shock, or fire.
5. If connecting power to fixed wiring, install a surge protector and main power switch with a capacity of 1.5 times the maximum current of the unit.
6. If connecting power to fixed wiring, a switch or circuit breaker that disconnects all poles and has a contact separation of at least 1/8" (3mm) must be incorporated in the fixed wiring. A qualified technician must use an approved circuit breaker or switch.
7. Only connect the unit to an individual branch circuit outlet. Do not connect another appliance to that outlet.
8. Make sure to properly ground the air conditioner.
9. Every wire must be firmly connected. Loose wiring can cause the terminal to overheat, resulting in product malfunction and possible fire.
10. Do not let wires touch or rest against refrigerant tubing, the compressor, or any moving parts within the unit.
11. If the unit has an auxiliary electric heater, it must be installed at least 40" away from any combustible materials.
12. To avoid getting an electric shock, never touch the electrical components soon after the power supply has been turned off. After turning off the power, always wait 10 minutes or more before you touch the electrical components.



#### **WARNING**

Before performing any electrical or wiring work, turn off the main power to the system.

The signal cable enables communication between the indoor and outdoor units. You must first choose the right cable size before preparing it for connection.

### USE THE RIGHT CABLE

- Indoor Power Cable (if applicable): H05VV-F or H05V2V2-F
- Outdoor Power Cable: H07RN-F
- Signal Cable: H07RN-F

### CABLE SIZING

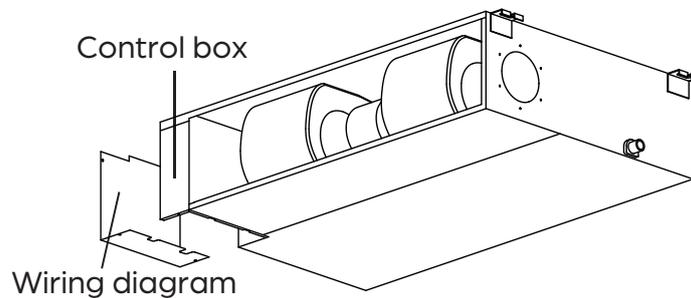
Use a minimum of 16 AWG for power and signal cables connected to and between the indoor and outdoor units.

### Choose the correct size of cable

The size of the power supply cable, signal cable, fuse, and switch needed is determined by the maximum current of the unit. The maximum current is indicated on the nameplate located on the side panel of the unit. Refer to this nameplate to choose the right cable, fuse, or switch.

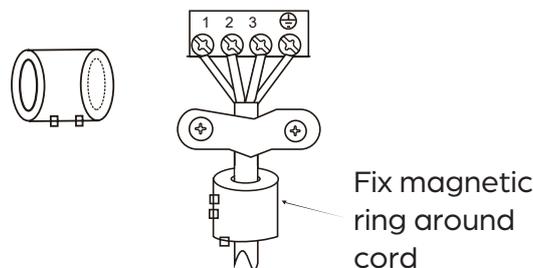
### Wiring the Indoor Unit

1. Prepare the cable for connection:
  - Using wire strippers, strip the jacket from both ends of the cable to reveal about 6" of the wires.
  - Strip the insulation from the ends of the wires.
  - Using a wire crimper, crimp u-lugs to the ends of the wires.
2. Open the control box lid of the indoor unit and locate the wiring diagram on the inside.



3. Unscrew the cable clamp below the terminal block and place it to the side.
4. Feed the cable through the magnetic ring (some models) and secure the ring in place.

Magnetic ring (if supplied with accessories)



5. Refer to the wiring diagram and connect the u-lugs to the terminal block. Firmly screw the u-lug of each wire to its corresponding terminal.
6. After checking to make sure every connection is secure, use the cable clamp to fasten the signal cable to the unit. Screw the cable clamp down tightly.
7. Replace the control box lid.



#### **WARNING**

All wiring must be performed strictly in accordance with the wiring diagram located on the inside of the control box lid.

### STEP 7: PREPARE REFRIGERANT PIPING

1. If pre-existing refrigerant piping is already embedded in the wall, begin the outdoor unit installation. Refer to the *Refrigerant Piping Connections* section of the outdoor unit's installation manual for detailed instructions.
2. If there is no pre-existing piping, connect the indoor unit's refrigerant piping to the connective piping that will join the indoor and outdoor units. Refer to the *Refrigerant Piping Connections* section of the outdoor unit's installation manual for detailed instructions.



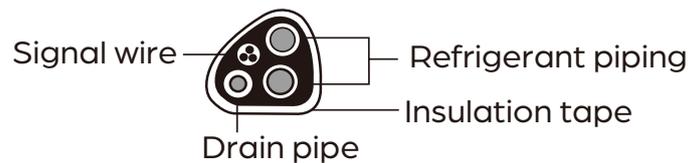
**WARNING**

Be extremely careful not to dent or damage the piping while bending them away from the unit. Any dents in the piping will affect the unit's performance.

### STEP 8: WRAP PIPES AND CABLE

Before passing the refrigerant piping, drain pipe, and the signal cable through the wall hole, you must bundle them together to save space, protect them, and insulate them.

1. Bundle the drain hose, refrigerant pipes, and signal cable as shown below:



**NOTE**

The drain hose **MUST** be at the bottom of the bundle. Putting the drain hose at the top of the bundle can cause the drain pan to overflow, which can lead to fire or water damage.



**NOTE**

**DO NOT** intertwine the signal cable with any of the other wires while bundling these items together.

2. Using adhesive vinyl tape, attach the drain hose to the underside of the refrigerant pipes.
3. Using insulation tape, wrap the signal wire, refrigerant pipes, and drain hose tightly together. Double-check that all items are bundled.



**NOTE**

When wrapping the bundle, keep the ends of the piping unwrapped. You need to access them to test for leaks at the end of the installation process (refer to *Electrical and Gas Leak Checks* section of the outdoor unit's installation manual).

# TROUBLESHOOTING

## SAFETY PRECAUTIONS

If ANY of the following conditions occurs, turn off your unit immediately!

- The power cord is damaged or abnormally warm
- You smell a burning odor
- The unit emits loud or abnormal sounds
- A power fuse blows or the circuit breaker frequently trips
- Water or other objects fall into or out of the unit

**DO NOT ATTEMPT TO FIX THESE YOURSELF! CONTACT AN AUTHORIZED SERVICE PROVIDER IMMEDIATELY!**

## COMMON ISSUES

The following problems are not a malfunction and in most situations will not require repairs.

ISSUE	POSSIBLE CAUSES
<b>Unit does not turn on when pressing ON/OFF button</b>	The Unit has a 3-minute protection feature that prevents the unit from overloading. The unit cannot be restarted within three minutes of being turned off.
<b>The unit changes from COOL/HEAT mode to FAN mode</b>	The unit may change its setting to prevent frost from forming on the unit. Once the temperature increases, the unit will start operating in the previously selected mode again.
	The set temperature has been reached, at which point the unit turns off the compressor. The unit will continue operating when the temperature fluctuates again.
<b>The indoor unit emits white mist</b>	In humid regions, a large temperature difference between the room's air and the conditioned air can cause white mist.
<b>Both the indoor and outdoor units emit white mist</b>	When the unit restarts in HEAT mode after defrosting, white mist may be emitted due to moisture generated during the defrosting process.
<b>The indoor unit makes noises</b>	A rushing air sound may occur when the louver resets its position.
	A squeaking sound may occur after running the unit in HEAT mode due to expansion and contraction of the unit's plastic parts.

ISSUE	POSSIBLE CAUSES
<b>Both the indoor unit and outdoor unit make noises</b>	Low hissing sound during operation: This is normal and is caused by refrigerant gas flowing through both indoor and outdoor units.
	Low hissing sound when the system starts, has just stopped running, or is defrosting: This noise is normal and is caused by the refrigerant gas stopping or changing direction.
	Squeaking sound: Normal expansion and contraction of plastic and metal parts caused by temperature changes during operation can cause squeaking noises.
<b>The outdoor unit makes noises</b>	The unit will make different sounds based on its current operating mode.
<b>Dust is emitted from either the indoor or outdoor unit</b>	The unit may accumulate dust during extended periods of non-use, which will be emitted when the unit is turned on. This can be mitigated by covering the unit during long periods of inactivity.
<b>The unit emits a bad odor</b>	The unit may absorb odors from the environment (such as furniture, cooking, cigarettes, etc.) which will be emitted during operations.
	The unit's filters have become moldy and should be cleaned.
<b>The fan of the outdoor unit does not operate</b>	During operation, the fan speed is controlled to optimize product operation.
<b>Operation is erratic, unpredictable, or unit is unresponsive</b>	Interference from cell phone towers and remote boosters may cause the unit to malfunction. In this case, try the following: <ul style="list-style-type: none"> <li>• Disconnect the power, then reconnect.</li> <li>• Press ON/OFF button on remote control to restart operation.</li> </ul>

**NOTE**



If problem persists, contact a local dealer or your nearest customer service center. Provide them with a detailed description of the unit malfunction as well as your model number.

## TROUBLESHOOTING

When troubles occur, please check the following points before contacting a repair company.

PROBLEM	POSSIBLE CAUSES	SOLUTION
<b>Poor Cooling Performance</b>	Temperature setting may be higher than ambient room temperature	Lower the temperature setting
	The heat exchanger on the indoor or outdoor unit is dirty	Clean the affected heat exchanger
	The air filter is dirty	Remove the filter and clean it according to instructions
	The air inlet or outlet of either unit is blocked	Turn the unit off, remove the obstruction and turn it back on
	Doors and windows are open	Make sure that all doors and windows are closed while operating the unit
	Excessive heat is generated by sunlight	Close windows and curtains during periods of high heat or bright sunshine
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary and top off refrigerant
	Excessive heat is generated by sunlight	Excessive heat is generated by sunlight
	Too many sources of heat in the room (people, computers, electronics, etc.)	Reduce amount of heat sources
<b>Poor Heating Performance</b>	The outdoor temperature is extremely low	This model is designed to work down to -13°F, however, heating performance is impacted at temperatures below freezing.
	Cold air is entering through doors and windows	Make sure that all doors and windows are closed during use
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary, and top off refrigerant
<b>The unit starts and stops frequently</b>	There's too much or too little refrigerant in the system	Check for leaks and recharge the system with refrigerant
	Incompressible gas or moisture has entered the system	Evacuate and recharge the system with refrigerant
	The compressor is broken	Replace the compressor
	The voltage is too high or too low	Install a manostat to regulate the voltage

PROBLEM	POSSIBLE CAUSES	SOLUTION
<b>The unit is not working</b>	Power failure	Wait for the power to be restored
	The power is turned off	Turn on the power
	The fuse is burned out	Replace the fuse
	Remote control batteries are dead	Replace batteries
	The Unit's 3-minute protection has been activated	Wait three minutes after restarting the unit
	Timer is activated	Turn timer off
<b>Indicator lamps continue flashing or error code appears</b>	<p>The unit may stop operation or continue to run safely. If the indicator lamps continue to flash or error codes appear, wait for about 10 minutes. The problem may resolve itself.</p> <p>If not, disconnect the power, then connect it again. Turn the unit on.</p> <p>If the problem persists, disconnect the power and contact your nearest customer service center.</p>	



**NOTE**

If your problem persists after performing the checks and diagnostics above, turn off your unit immediately and contact an authorized service center.

## WIRING DIAGRAM

### DRAD09F1A, DRAD12F1A, DRAD18F1A and DRAD24F1A

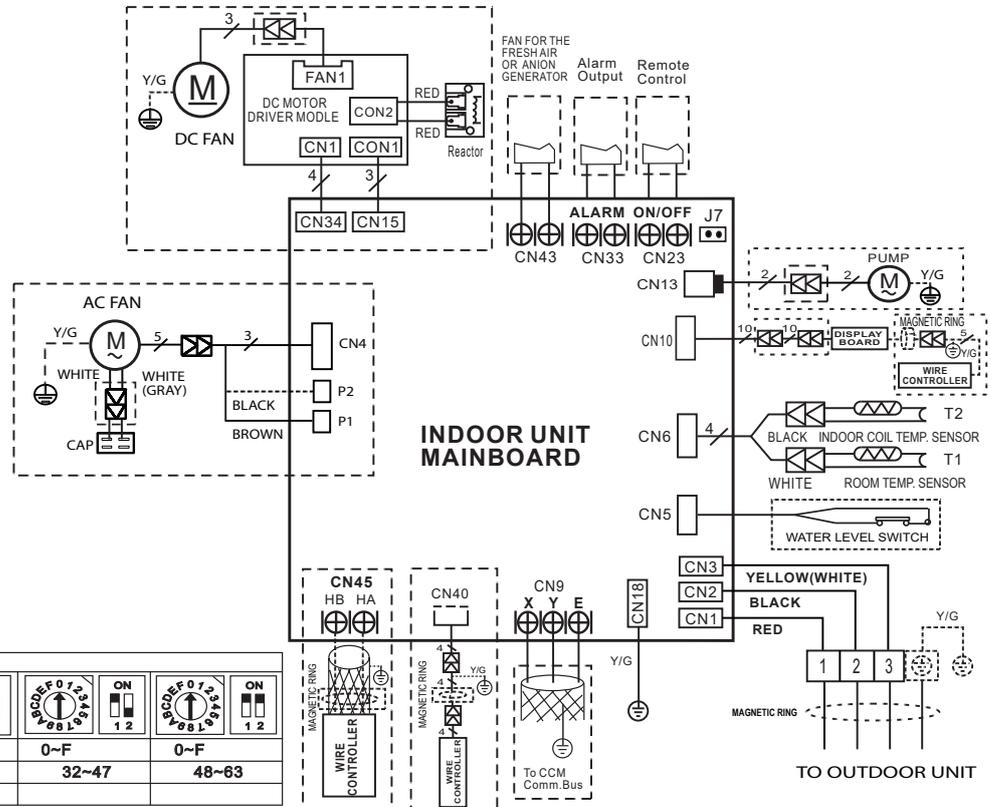
- NOTE:
- The parts with dotted lines indicate optional features.
  - Remove the short connector of J7 when you use the "on-off" function.
  - When the wire controller uses the shielded wire, the shielded wire should be properly grounded.

FOR TEMP. COMPENSATION(HEATING)				
SW6	<input type="checkbox"/> ON <input type="checkbox"/> 1 2			
CODE	6 <sub>0</sub>	2 <sub>0</sub>	4 <sub>0</sub>	EEPROM DEFAULT
FACTORY SETTING			<input checked="" type="checkbox"/>	

FOR ANTI-COLD WIND				
SW1	<input type="checkbox"/> ON <input type="checkbox"/> 1 2			
TELO	24 <sub>0</sub>	15 <sub>0</sub>	8 <sub>0</sub>	EEPROM DEFAULT
FACTORY SETTING	<input checked="" type="checkbox"/>			

FOR SETTING AUTO-RESTART		
SW3	<input type="checkbox"/> ON <input type="checkbox"/> 1	<input type="checkbox"/> ON <input type="checkbox"/> 1
MODE	AUTO-RESTART	NOT AUTO-RESTART
FACTORY SETTING	<input checked="" type="checkbox"/>	

FOR SETTING NET ADDRESS				
S1+S2	<input type="checkbox"/> ON <input type="checkbox"/> 1 2			
CODE	0~F	0~F	0~F	0~F
NETADDRESS	0~15	16~31	32~47	48~63
FACTORY SETTING	<input checked="" type="checkbox"/>			



## ERROR CODES – INDOOR UNIT

Running lamp	Timer lamp	Display	Malfunction or Protection
★1 time	X	E0	Indoor EEPROM malfunction
★2 times	X	E1	Indoor and outdoor unit communication malfunction
★4 times	X	E3	Indoor fan speed malfunction
★5 times	X	E4	Indoor room temperature sensor error
★6 times	X	E5	Evaporator coil temperature sensor error
★7 times	X	EC	Refrigerant leak detection system malfunction
★8 times	X	EE	Water level alarm malfunction
★11times	X	Ed	Wrong outdoor unit
★1 time	●	F0	Overload protection
★2 times	●	F1	Outdoor temperature sensor error
★3 times	●	F2	Outdoor condenser pipe sensor error
★4 times	●	F3	Discharge air temperature sensor error
★5 times	●	F4	Outdoor EEPROM error
★6 times	●	F5	Outdoor fan speed (DC fan motor only) malfunction
★7 times	●	F6	T2b sensor error
★8 times	●	F7	Auto-lifting panel communication error
★9 times	●	F8	Auto-lifting panel malfunction
★10times	●	F9	Auto-lifting panel is open
★1 time	★	P0	Inverter module IPM protection
★2 times	★	P1	High/Low voltage protection
★3 times	★	P2	Compressor top overheating protection
★4 times	★	P3	Outdoor low temperature protection
★5 times	★	P4	Compressor drive error
★6 times	★	--	Mode conflict
★7 times	★	P6	Compressor low-pressure protection
★8 times	★	P7	Outdoor IGBT sensor error

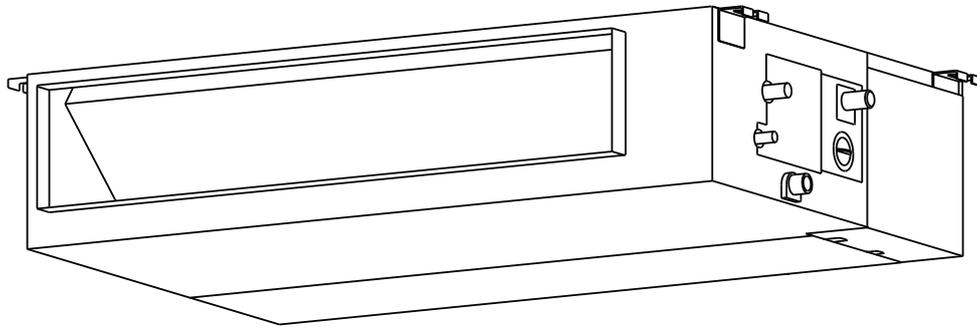
NOTE: ★ flashing ● light on X light off



INSTALLATION MANUAL

**SLIM DUCTED INDOOR UNIT  
SPLIT-STYLE AIR CONDITIONER**

DRAD09F1A, DRAD12F1A, DRAD18F1A, DRAD24F1A



Model Number:

Serial Number:

Purchase Date:

Installing Contractor Company Name:



**TIP**

Capture relevant information about your Durastar mini-split equipment before it is installed and write it above for future reference.

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## INTRODUCTION

To better serve you, please do the following before contacting customer service:

- If you received a damaged product, immediately contact the retailer or dealer that sold you the product.
- Read and follow this owner's manual carefully to help you use and maintain your air conditioner.
- Read the troubleshooting section of this manual as it will help you diagnose and solve common issues.
- Visit us on the web at [www.durastar.com](http://www.durastar.com) to download product guides and up-to-date information.
- If you need warranty service, our friendly customer service representatives are available via email at [questions@durastar.com](mailto:questions@durastar.com) or by telephone at 1-888-320-0706.

## WARNINGS

### Symbols Used in This Manual



The warning symbol indicates cautionary information for the user. Extra care and precautions should be taken to ensure the user's safety.



The pencil indicates any manufacturer notes relating to surrounding content. These may include further clarifications or call-outs.



A light bulb symbol indicates suggested manufacturer tips for the user to get the most out of the Durastar equipment and to accommodate the best user experience.

## IMPORTANT SAFETY PRECAUTIONS

Improper handling can cause serious damage or injury. Please read the following safety information in its entirety.



### **Operation, Cleaning, and Maintenance Safety Precautions**

- Children and people with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, should only use this air conditioner if they are given supervision or instructions concerning use of the air conditioner in a safe way and understand the hazards involved.
- Children should not play with the air conditioner.
- Never stick fingers or any other body parts into the air conditioner openings. The internal fan may be rotating at high speeds, and may result in injury.
- After removing the filter, do not touch the fins in order to avoid injury.
- Maintenance must be performed by qualified professionals. Otherwise, you may experience personal injury or damage to the air conditioner and surrounding property.
- Do not repair the air conditioner by yourself. It may cause electric shock or damage. Please contact a qualified service representative when you need to repair the air conditioner.
- Do not block the air outlet or air inlet. This could cause a malfunction.
- Do not spill water on the remote control as this can permanently damage the remote.
- If the below problems occur, please turn off the air conditioner and disconnect power at the circuit breaker immediately. Then contact your dealer or a qualified professional for service.
- The power cord is overheating or damaged.
- There is an abnormal sound during operation.
- The circuit breaker trips frequently.
- The air conditioner gives off a burning smell.
- The indoor unit is leaking.
- If the air conditioner operates under abnormal conditions, it may cause malfunctions, electric shock, or fire hazard.
- When turning the unit on or off via the emergency operation switch, press the switch with an insulated object other than metal.
- Do not step on the top panel of the unit, or put heavy objects on the top panel. This could cause damage or personal injury.
- Cleaning and user maintenance should not be performed by children without supervision.
- Do not spray water on the indoor unit. This could cause electric shock or a unit malfunction.
- Do not use flammable materials such as hair spray, lacquer, or paint near the air conditioner as they may catch fire.
- Do not operate the air conditioner in places near combustible gases. Emitted gases may collect around the air conditioner and cause an explosion.
- Do not use fire or a hair dryer to dry the filter. This could cause a deformation or fire hazard.
- Do not wash the air conditioner with water as this could cause an electric shock.
- Disconnect the power supply by turning it off at the circuit breaker when cleaning the air conditioner. Otherwise, you could risk electric shock.



## **Electrical Safety**

- Only use the specified power cord. If the power cord is damaged, it must be replaced by the manufacturer, its service agent, or similarly qualified persons in order to avoid a hazard.
- Keep the power plug clean. Remove any dust or grime that accumulates on or around the plug. Dirty plugs can cause fire or electric shock.
- Do not pull the power cord to unplug unit. Hold the plug firmly and pull it from the outlet. Pulling directly on the cord can damage it, which can lead to fire or electric shock.
- Do not connect the air conditioner to a multi-purpose socket. Doing so could cause a fire hazard.
- Do not modify the length of the power supply cord or use an extension cord to power the unit.
- If the supply cord is damaged, it must be replaced by the manufacturer, a service agent, or a similarly qualified person in order to avoid a safety hazard.
- Do not share the electrical outlet with other appliances. Improper or insufficient power supply can cause fire or electrical shock.
- The product must be properly grounded at the time of installation, or electrical shock may occur.
- For all electrical work, follow all local and national wiring standards and regulations. Connect cables tightly, and clamp them securely to prevent external forces from damaging the terminal. Improper electrical connections can overheat and cause fire, and may also cause shock. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
- All wiring must be properly arranged to ensure that the control board cover can close properly. If the control board cover is not closed properly, it can lead to corrosion and cause the connection points on the terminal to heat up, catch fire, or cause electrical shock.
- The air conditioner's circuit board (PCB) is designed with a fuse to provide overcurrent protection. The specifications of the fuse are printed on the circuit board.

## Installation Safety

- Installation must be performed by an authorized dealer or specialist. Improper installation can cause water leakage, electrical shock, or fire. (In North America, installation must be performed in accordance with NEC and CEC requirements by authorized personnel only.)
- Installation must be performed according to the installation instructions. Improper installation can cause water leakage, electrical shock, or fire.
- This air conditioner shall be installed in accordance with national and local wiring regulations.
- Contact an authorized service technician for repair or maintenance of this unit.
- Only use the included accessories, parts, and specified parts for installation. Using non-standard parts can cause water leakage, electrical shock, fire, and can cause the unit to fail.
- Install the unit in a firm location that can support the unit's weight. If the chosen location cannot support the unit's weight, or the installation is not done properly, the unit may fall and cause serious injury and damage.
- Install drainage piping according to the instructions in the installation manual. Improper drainage may cause water damage to your home and property.
- For units that have an auxiliary electric heater, do not install the unit within 3 feet (1 meter) of any combustible materials.
- Do not install the unit in a location that may be exposed to combustible gas leaks. If combustible gas accumulates around the unit, it may cause a fire.
- Do not turn on the power until all work has been completed.
- When moving or relocating the air conditioner, consult experienced service technicians for disconnection and re-installation of the unit.

## Additional Precautions

- Turn off the air conditioner and disconnect the power if you are not going to use it for a long time.
- Turn off and unplug the unit during storms.
- Make sure that water condensation can drain unhindered from the unit.
- Do not operate the air conditioner with wet hands. This may cause electric shock.
- Do not use this device for any other purpose than its intended use.
- Do not climb onto or place objects on top of the outdoor unit.
- Do not allow the air conditioner to operate for long periods of time with doors or windows open, or if the humidity is very high.

## OPERATING TEMPERATURES

Your air conditioner is designed to operate in the following indoor and outdoor temperatures. When your air conditioner is used outside of the following temperature ranges, certain safety features may activate and turn off the unit to protect it from damage.

### TEMPERATURE RANGES

	<b>COOL mode</b>	<b>HEAT mode</b>	<b>DRY mode</b>
<b>Indoor Air Temperature</b>	62°F - 90°F (17°C - 32°C)	32°F - 86°F (0°C - 30°C)	50°F - 90°F (10°C - 32°C)
<b>Outdoor Air Temperature</b>	-13°F - 122°F (-25°C - 50°C)	-13°F - 86°F (-25°C - 30°C)	32°F - 122°F (0°C - 50°C)

To further optimize the performance of your unit, do the following:

- Keep doors and windows closed.
- Limit energy usage by using TIMER ON and TIMER OFF features.
- Do not block air inlets or outlets.
- Regularly inspect and clean air filters.

#### NOTE

 Your Durastar air conditioner's outdoor unit is equipped with a base pan heater, allowing it to continue to operate at freezing temperatures as low as -13°F (-25°C). When outdoor air temperatures are at or below 32°F (0°C), we strongly recommend keeping the unit plugged in at all times to ensure smooth ongoing performance.

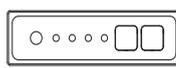
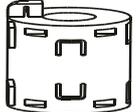
#### NOTE

 Keep the room's relative humidity below 80%. If the air conditioner operates in excess of this, the surface of the air conditioner may attract condensation. To help prevent condensation from forming and dripping, set the vertical airflow louver to its maximum angle (vertically to the floor) and set the fan to HIGH.

# ACCESSORIES

## INCLUDED INSTALLATION ACCESSORIES

The air conditioning system comes with the following accessories.

Accessory	Quantity	Image	Accessory	Quantity	Image
Manual	1-2		Display Panel	1	
Soundproof Insulation Sheath	1		Wired Thermostat	1	
Cord Protector	1		Magnetic Ring (Some Models)	1-2	
Copper Nut	2		Drain Pipe Worm Clamp	2	
Drain Pipe Insulation Sheath	1				

## FIELD SUPPLIED INSTALLATION ACCESSORIES

The following installation accessories are required and must be purchased separately.

- Refrigerant piping (line set)
- Indoor and outdoor connection wire
- Outdoor power supply cord
- Drain pipe
- Pipe and cable wrapping tape
- Wall hole sleeve and cover
- Putty
- Suspension bolts and necessary hardware to hang indoor unit
- Wiring u-lugs

## **TOOLS NEEDED**

The following tools are required for installation.

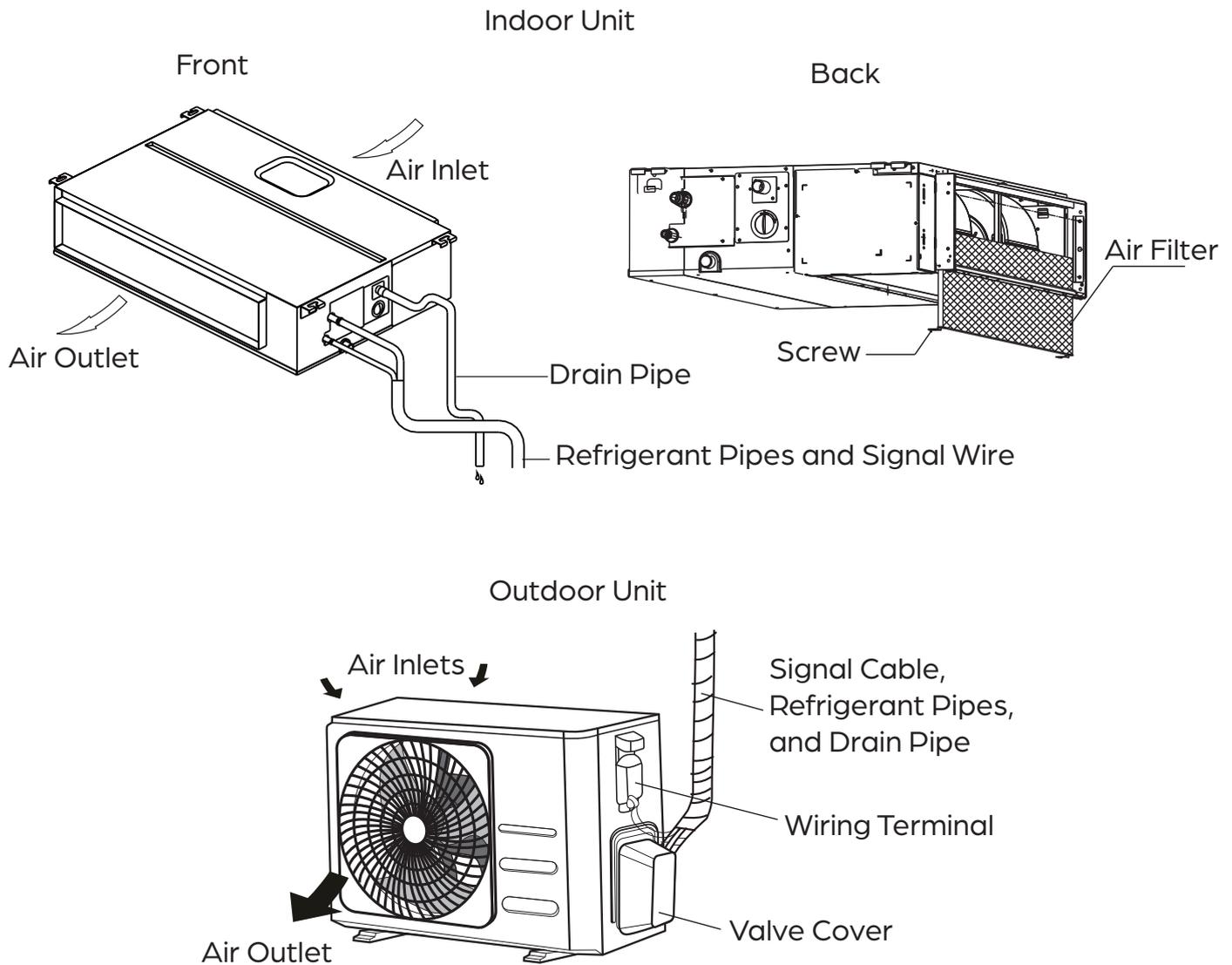
- Phillips screwdriver
- Drill with 2 1/2" or 3 1/2" (indoor unit model depending) core bit
- Vacuum pump
- HVAC manifold gauge set
- Refrigerant leak detector
- Copper pipe cutter
- Flaring tool
- Burr reamer
- Crescent or spanner wrench
- Hexagonal wrench set
- Torque wrench
- Multimeter
- Electroprobe
- Level
- Hammer
- Wire strippers
- Wire crimper

## PARTS IDENTIFICATION



### NOTE

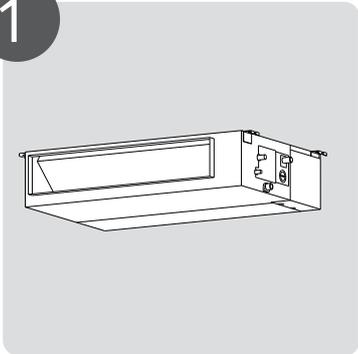
The installation must be performed in accordance with the required local and national standards. The installation may be slightly different in different markets.



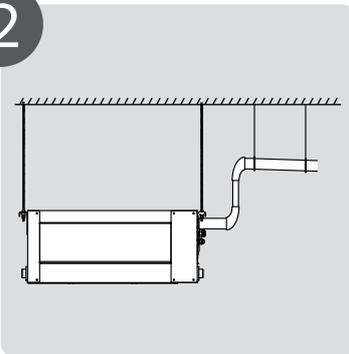
### NOTE

Illustrations in this manual are for explanatory purposes. The actual shape of your mini-split equipment may vary slightly.

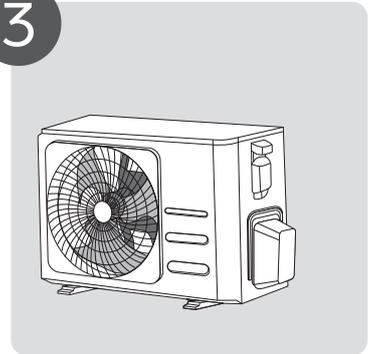
## INSTALLATION OVERVIEW – INDOOR UNIT

**1**

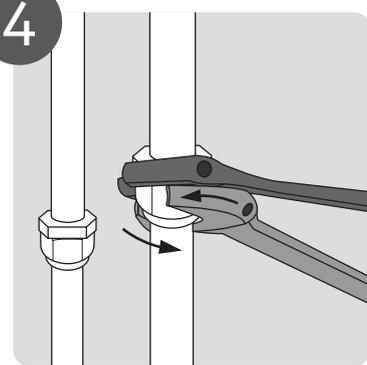
Install the indoor unit

**2**

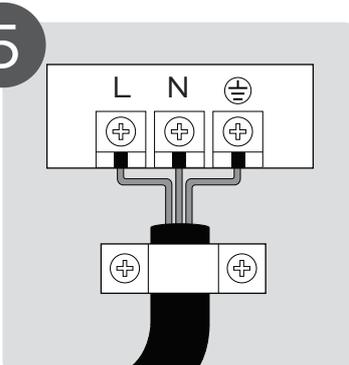
Install the drain pipe

**3**

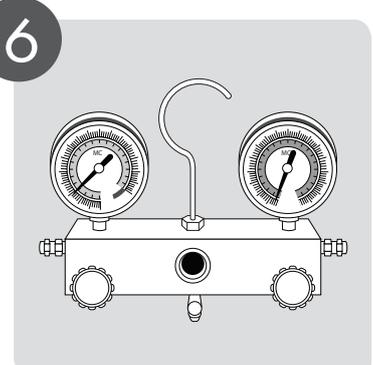
Install the outdoor unit

**4**

Connect the refrigerant pipes

**5**

Connect the wires

**6**

Evacuate and charge the refrigeration system

**7**

Perform a test run

## INDOOR UNIT INSTALLATION

### STEP 1: SELECT INSTALLATION LOCATION

Before installing the indoor unit, you must choose an appropriate location. The following standards should be met for an appropriate location for the unit:

- Good air circulation
- Convenient drainage
- Noise from the unit will not disturb other people
- Firm and solid – the location will not vibrate
- Strong enough to support the weight of the unit
- A location at least three feet (one meter) from all other electrical devices (e.g., TV, radio, computer)

DO NOT install unit in the following locations:

- Near any source of heat, steam, or combustible gas
- Near flammable items such as curtains or clothing
- Near any obstacle that might block air circulation
- Near a doorway
- In a location subject to direct sunlight

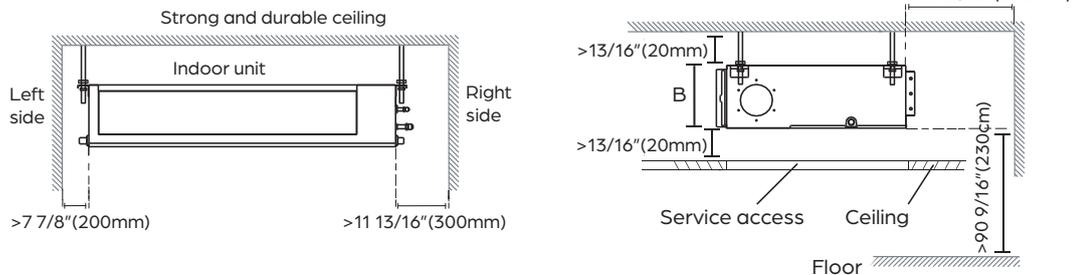


#### NOTE

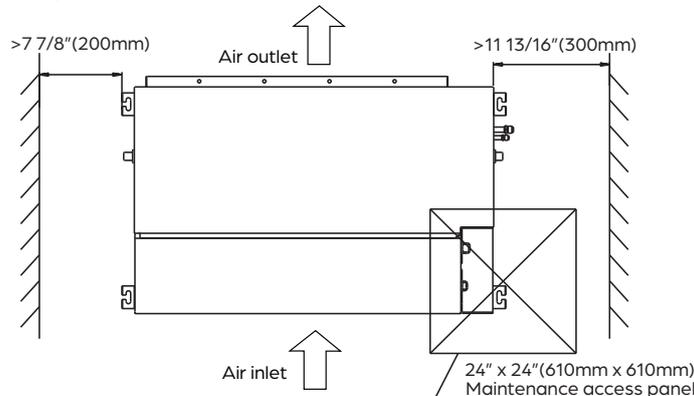
This model is designed for horizontal installation only.

Refer to the following diagrams to ensure proper distance from walls and ceiling:

#### Installation clearances



#### Maintenance access panel



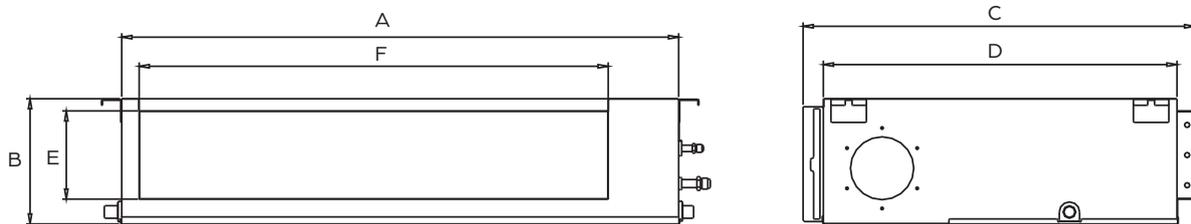
#### NOTE

If there is no pre-existing refrigerant piping, when choosing a location, leave ample room for a wall hole (see *Step 3: Drill Wall Hole for Connective Piping*) for the signal cable and refrigerant piping that connect the indoor and outdoor units.

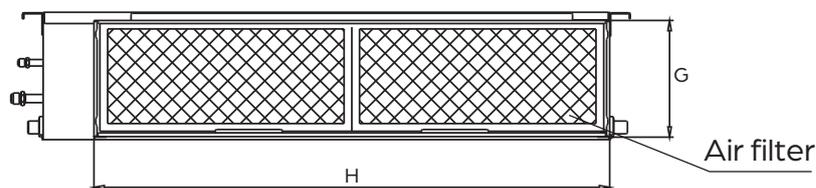
## STEP 2: HANG INDOOR UNIT

1. Refer to the following diagrams for unit dimensions and locations for the four suspension bolt holes required to hang the indoor unit.

Unit and air outlet dimensions

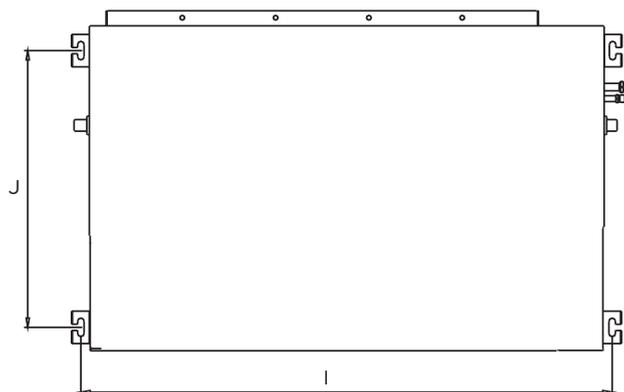


Air inlet dimensions



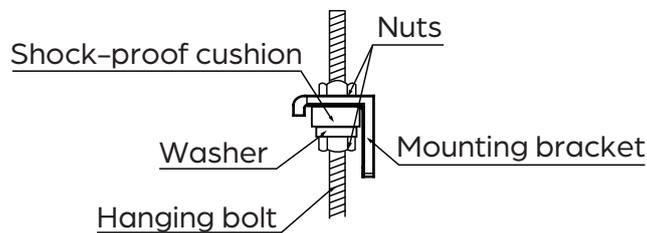
Model	A	B	C	D	E	F	G	H
DRAD09F1A DRAD12F1A	27 9/16" (700mm)	7 7/8" (200mm)	19 15/16" (506mm)	17 3/4" (450mm)	6" (152mm)	21 1/8" (537mm)	7 5/16" (186mm)	23 9/16" (599mm)
DRAD18F1A	34 5/8" (880mm)	8 1/4" (210mm)	26 9/16" (674mm)	23 5/8" (600mm)	5 3/8" (136mm)	27 13/16" (706mm)	7 1/2" (190mm)	30 13/16" (782mm)
DRAD24F1A	43 5/16" (1100mm)	9 13/16" (249mm)	30 1/2" (774mm)	27 9/16" (700mm)	6 7/8" (175mm)	36 7/16" (926mm)	9" (228mm)	39 7/16" (1001mm)

Mounting dimensions for ceiling bolts



Model	I	J
DRAD09F1A DRAD12F1A	29 3/16" (741mm)	14 3/16" (360mm)
DRAD18F1A	36 1/4" (920mm)	20" (508mm)
DRAD24F1A	44 7/8" (1140mm)	23 9/16" (598mm)

2. Before drilling the holes in the ceiling and mounting the unit, align the refrigerant pipes, drain pipe, and electric cable connection points with the direction they will be drawn out and connected to the outdoor unit through the wall hole (see *Step 3: Drill Wall Hole For Connective Piping*).
3. Drill four holes 4" deep in the internal ceiling for each of the required suspension bolt anchors (field supplied). Make sure to hold the drill at a 90° angle to the ceiling.
4. Using a hammer, insert the suspension bolt anchors into the pre-drilled holes.
5. Install the four suspension bolts.
6. Mount the indoor unit. Using two people to lift and secure it, insert the suspension bolts into the unit's hanging bracket holes and secure in place with washers and nuts (see diagram below). Make sure the unit is level.

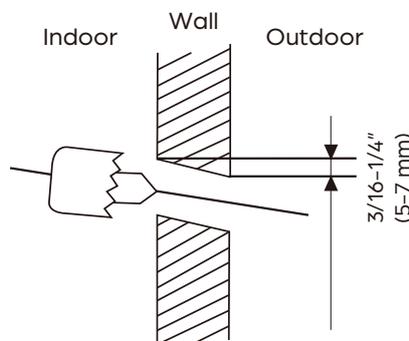


**WARNING**

Ensure that the indoor unit is completely level. Improper installation can cause the drain pipe to back up into the unit and water leaks.

**STEP 3: DRILL WALL HOLE FOR CONNECTIVE PIPING**

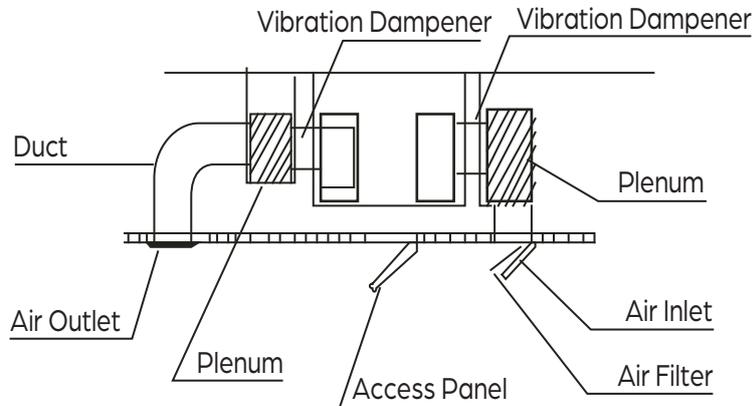
1. Determine the location of the wall hole based on the location of the outdoor unit.
2. Using a 2 1/2" (65mm) core drill for units with a gas side connective pipe less than 5/8" (16mm), or 3 1/2" (90mm) for units with a gas side pipe greater than or equal to 5/8" (16mm), drill a hole in the wall. Make sure that the hole is drilled at a slight downward angle, so that the outdoor end of the hole is lower than the indoor end by about 3/16 - 1/4" (5mm to 7mm). This will ensure proper water drainage.



3. Place the protective wall hole sleeve (field supplied) into the hole. This protects pipes and cables from sharp edges and will help seal the opening when you finish the installation process. After the sleeve is inserted through the wall, connect the wall hole sleeve cover to the wall sleeve on the outside end. Make sure the cover is flush with the outside wall.

### STEP 4: DUCT AND ACCESSORIES INSTALLATION

Once the unit is hung, you may install any additional ducting required. The diagram below illustrates one example of installing the unit with hidden ducting. The unit may also be installed exposed, depending on your needs.



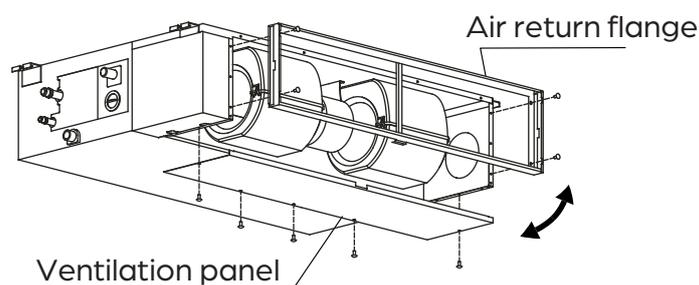
### INSTALLATION TIPS

- Air filters help remove dust and particles from the circulating air. They should be installed on the air inlet side according to the size of the inlet on the unit.
- Vibration dampeners are recommended to be installed between the unit and the ductwork. They will decrease vibrations and noise coming from the unit. They also provide some flexibility when installing and positioning the ductwork.
- The air inlet and air outlet should be far enough apart to avoid short-circuiting the air flow and provide proper circulation in the room.
- Do not place the connecting duct weight on the unit. Provide proper support for the ductwork independent of the unit supports.
- All ductwork should be properly insulated to prevent condensation.
- Refer to the following static pressure guidelines when installing the indoor unit:

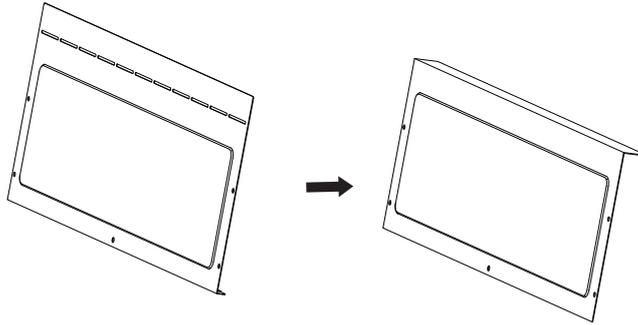
Model	Static Pressure (Pa / in. wc)
DRAD09F1A	0~50 / 0~0.2
DRAD12F1A	0~50 / 0~0.2
DRAD18F1A	0~100 / 0~0.4
DRAD24F1A	0~160 / 0~0.64

### CHANGING THE AIR INLET DIRECTION (REAR TO UNDERSIDE)

1. Remove the ventilation panel and air return flange.

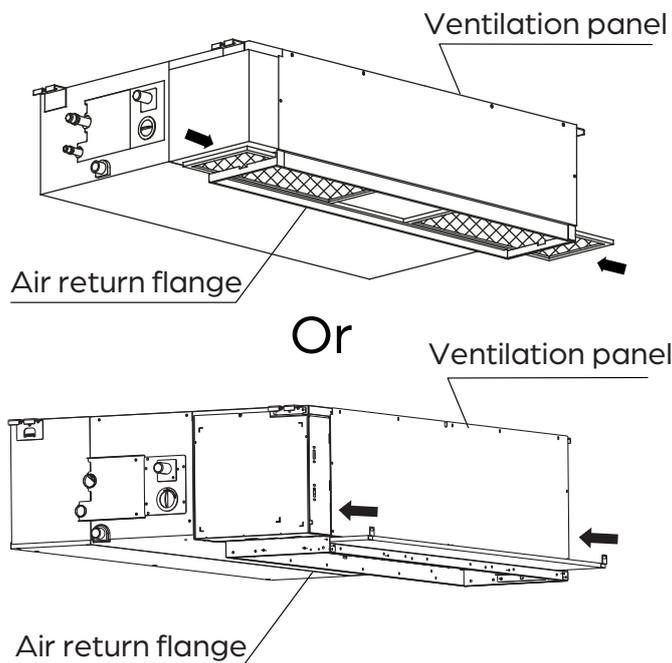


2. Bend the rear ventilation panel 90° along the dotted line (some models).



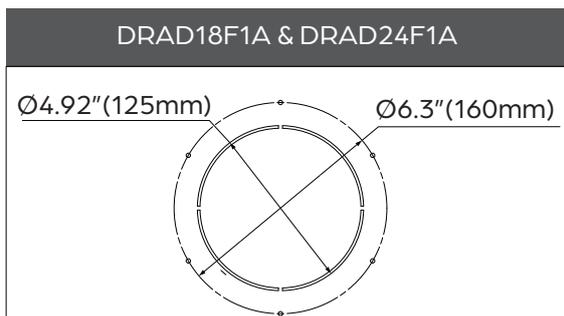
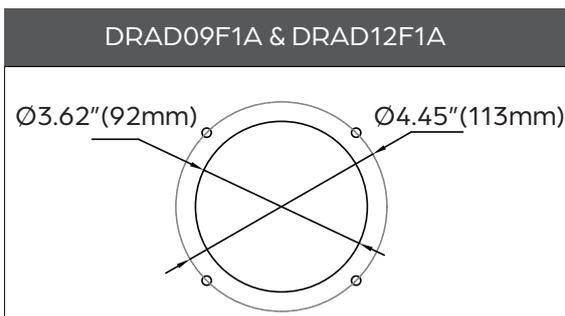
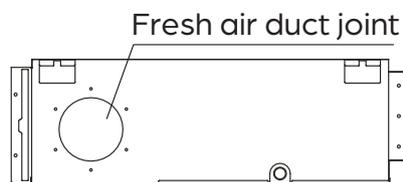
3. Swap the mounting positions of the ventilation panel and air return flange.

4. Install the filter mesh. Insert into flange as illustrated below.



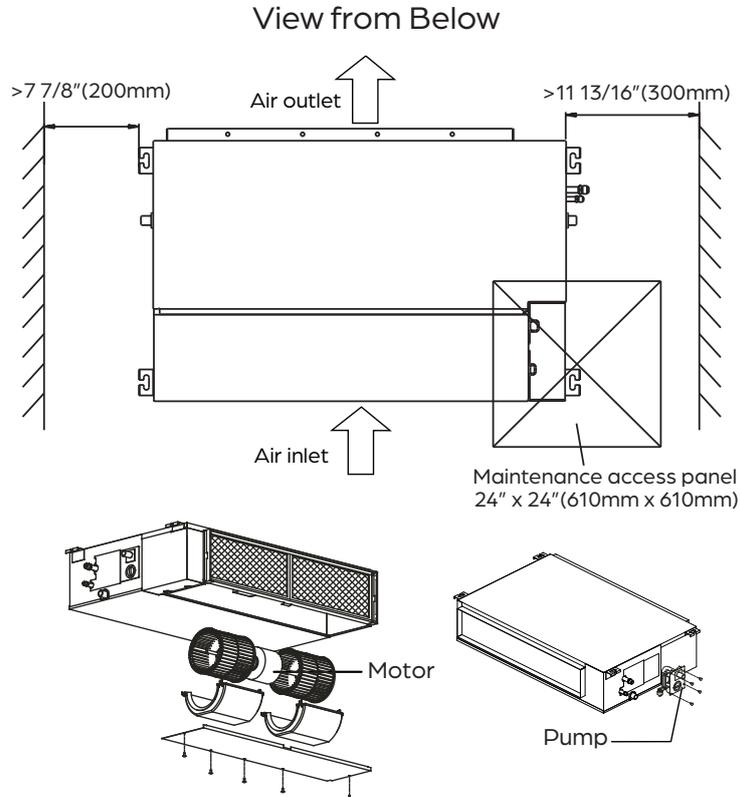
## FRESH AIR DUCT INSTALLATION

This unit allows for a fresh air duct to be installed. Duct location and dimensions are shown below.



### MAINTENANCE ACCESS PANEL

If this unit is located in a sub-ceiling, an access panel should be installed in order to gain access to the unit for routine maintenance. Common maintenance items are shown below for consideration when designing panel size and location. A minimum panel size of 2' x 2' is recommended.

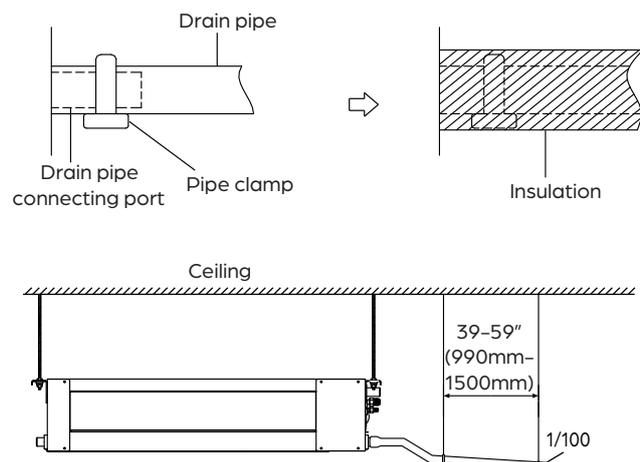


### STEP 5: CONNECT DRAIN PIPE

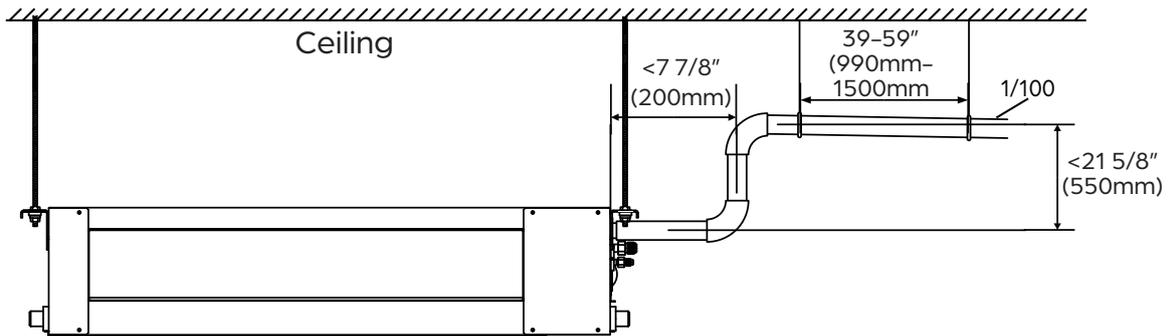
The drain pipe is used to drain condensate water away from the unit. Improper installation may cause leaks and unit or property damage.

1. Connect the drain pipe (field supplied) to the appropriate unit's connecting port using a metal worm clamp. Make sure it is secured tightly and cannot be easily pulled loose.
2. Insulate the connecting port and pipe with the accessory sheath provided.
3. For gravity draining, install the drain pipe to the lower drain connecting port with a downward slope of at least a 1/100 gradient to prevent water from flowing back into the unit. To keep the drain pipe from sagging, install hanging wires every 39 - 59". Wrap the remaining indoor portion of the drain pipe with foam pipe insulation to prevent condensation.

Model	Drain Pipe Inner Diameter
DRAD09F1A	1" (25mm)
DRAD12F1A	1" (25mm)
DRAD18F1A	1" (25mm)
DRAD24F1A	1" (25mm)

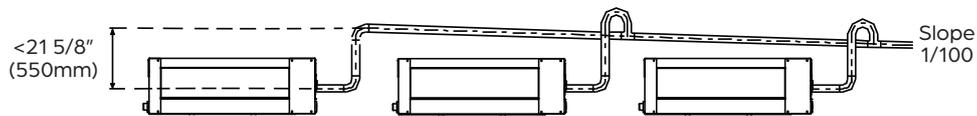


4. This unit is equipped with a drain pump that allows the outlet of the drain pipe to be higher than the pipe's connecting port. For pump assisted draining, install the drain pipe to the upper connecting port. The vertical lift pipe must be installed no higher than 21 5/8" (550mm) from the drain connection port with a maximum distance of 7 7/8" (200mm) between the unit and the lift pipe. To prevent air bubbles, make sure the pipe between the unit and the lift pipe is level or slightly tilted up (0 - 1"). Install hanging wires every 39 - 59" to keep the drain pipe from sagging, and wrap the indoor portion of the pipe with foam pipe insulation to prevent condensation. Incorrect installation can cause water to flow back into the unit and leaks.

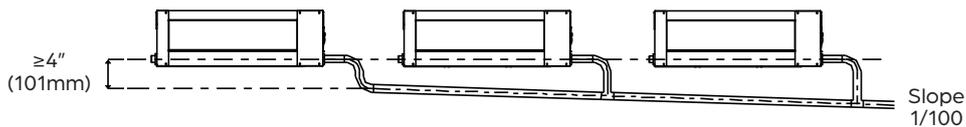


5. If connecting multiple drain pipes, install the pipes as illustrated below.

### Using pump



### Not using pump



6. Pass the drain pipe through the wall hole to the outside. The end of the pipe should be at least 2" (50mm) above the ground. If it touches the ground, the pipe may become blocked. Make sure the water drains to a safe location where it will not cause water damage or a slipping hazard.

## STEP 6: CONNECT SIGNAL CABLE

### BEFORE PERFORMING ANY ELECTRICAL WORK, READ THESE REGULATIONS

1. All wiring must comply with local and national electrical codes and regulations, and must be installed by a licensed electrician.
2. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
3. If there is a serious safety issue with the power supply, stop work immediately and contact a licensed electrician. Do not continue with the installation until the safety issue is properly resolved.
4. Power voltage should be within 90–110% of rated voltage. Insufficient power supply can cause malfunction, electrical shock, or fire.
5. If connecting power to fixed wiring, install a surge protector and main power switch with a capacity of 1.5 times the maximum current of the unit.
6. If connecting power to fixed wiring, a switch or circuit breaker that disconnects all poles and has a contact separation of at least 1/8" (3mm) must be incorporated in the fixed wiring. A qualified technician must use an approved circuit breaker or switch.
7. Only connect the unit to an individual branch circuit outlet. Do not connect another appliance to that outlet.
8. Make sure to properly ground the air conditioner.
9. Every wire must be firmly connected. Loose wiring can cause the terminal to overheat, resulting in product malfunction and possible fire.
10. Do not let wires touch or rest against refrigerant tubing, the compressor, or any moving parts within the unit.
11. If the unit has an auxiliary electric heater, it must be installed at least 40" away from any combustible materials.
12. To avoid getting an electric shock, never touch the electrical components soon after the power supply has been turned off. After turning off the power, always wait 10 minutes or more before you touch the electrical components.



#### **WARNING**

Before performing any electrical or wiring work, turn off the main power to the system.

The signal cable enables communication between the indoor and outdoor units. You must first choose the right cable size before preparing it for connection.

### USE THE RIGHT CABLE

- Indoor Power Cable (if applicable): H05VV-F or H05V2V2-F
- Outdoor Power Cable: H07RN-F
- Signal Cable: H07RN-F

### CABLE SIZING

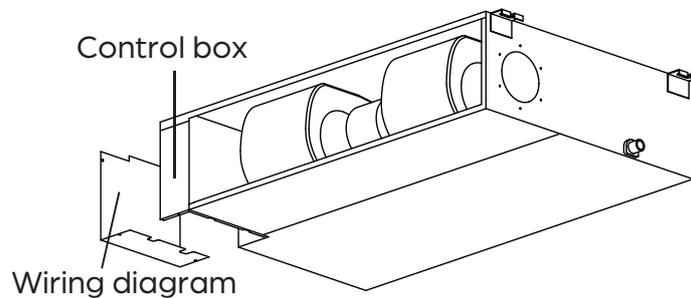
Use a minimum of 16 AWG for power and signal cables connected to and between the indoor and outdoor units.

### Choose the correct size of cable

The size of the power supply cable, signal cable, fuse, and switch needed is determined by the maximum current of the unit. The maximum current is indicated on the nameplate located on the side panel of the unit. Refer to this nameplate to choose the right cable, fuse, or switch.

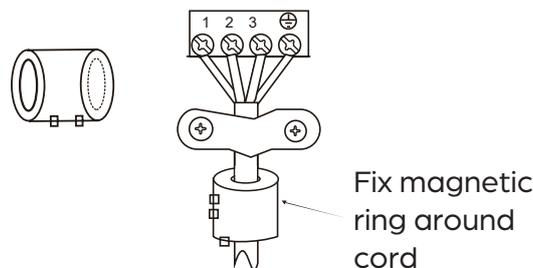
### Wiring the Indoor Unit

1. Prepare the cable for connection:
  - Using wire strippers, strip the jacket from both ends of the cable to reveal about 6" of the wires.
  - Strip the insulation from the ends of the wires.
  - Using a wire crimper, crimp u-lugs to the ends of the wires.
2. Open the control box lid of the indoor unit and locate the wiring diagram on the inside.



3. Unscrew the cable clamp below the terminal block and place it to the side.
4. Feed the cable through the magnetic ring (some models) and secure the ring in place.

Magnetic ring (if supplied with accessories)



5. Refer to the wiring diagram and connect the u-lugs to the terminal block. Firmly screw the u-lug of each wire to its corresponding terminal.
6. After checking to make sure every connection is secure, use the cable clamp to fasten the signal cable to the unit. Screw the cable clamp down tightly.
7. Replace the control box lid.



#### **WARNING**

All wiring must be performed strictly in accordance with the wiring diagram located on the inside of the control box lid.

### STEP 7: PREPARE REFRIGERANT PIPING

1. If pre-existing refrigerant piping is already embedded in the wall, begin the outdoor unit installation. Refer to the *Refrigerant Piping Connections* section of the outdoor unit's installation manual for detailed instructions.
2. If there is no pre-existing piping, connect the indoor unit's refrigerant piping to the connective piping that will join the indoor and outdoor units. Refer to the *Refrigerant Piping Connections* section of the outdoor unit's installation manual for detailed instructions.



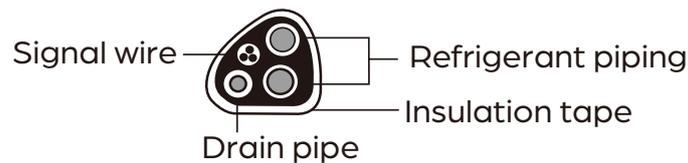
**WARNING**

Be extremely careful not to dent or damage the piping while bending them away from the unit. Any dents in the piping will affect the unit's performance.

### STEP 8: WRAP PIPES AND CABLE

Before passing the refrigerant piping, drain pipe, and the signal cable through the wall hole, you must bundle them together to save space, protect them, and insulate them.

1. Bundle the drain hose, refrigerant pipes, and signal cable as shown below:



**NOTE**

The drain hose **MUST** be at the bottom of the bundle. Putting the drain hose at the top of the bundle can cause the drain pan to overflow, which can lead to fire or water damage.



**NOTE**

**DO NOT** intertwine the signal cable with any of the other wires while bundling these items together.

2. Using adhesive vinyl tape, attach the drain hose to the underside of the refrigerant pipes.
3. Using insulation tape, wrap the signal wire, refrigerant pipes, and drain hose tightly together. Double-check that all items are bundled.



**NOTE**

When wrapping the bundle, keep the ends of the piping unwrapped. You need to access them to test for leaks at the end of the installation process (refer to *Electrical and Gas Leak Checks* section of the outdoor unit's installation manual).

# TROUBLESHOOTING

## SAFETY PRECAUTIONS

If ANY of the following conditions occurs, turn off your unit immediately!

- The power cord is damaged or abnormally warm
- You smell a burning odor
- The unit emits loud or abnormal sounds
- A power fuse blows or the circuit breaker frequently trips
- Water or other objects fall into or out of the unit

**DO NOT ATTEMPT TO FIX THESE YOURSELF! CONTACT AN AUTHORIZED SERVICE PROVIDER IMMEDIATELY!**

## COMMON ISSUES

The following problems are not a malfunction and in most situations will not require repairs.

ISSUE	POSSIBLE CAUSES
<b>Unit does not turn on when pressing ON/OFF button</b>	The Unit has a 3-minute protection feature that prevents the unit from overloading. The unit cannot be restarted within three minutes of being turned off.
<b>The unit changes from COOL/HEAT mode to FAN mode</b>	The unit may change its setting to prevent frost from forming on the unit. Once the temperature increases, the unit will start operating in the previously selected mode again.
	The set temperature has been reached, at which point the unit turns off the compressor. The unit will continue operating when the temperature fluctuates again.
<b>The indoor unit emits white mist</b>	In humid regions, a large temperature difference between the room's air and the conditioned air can cause white mist.
<b>Both the indoor and outdoor units emit white mist</b>	When the unit restarts in HEAT mode after defrosting, white mist may be emitted due to moisture generated during the defrosting process.
<b>The indoor unit makes noises</b>	A rushing air sound may occur when the louver resets its position.
	A squeaking sound may occur after running the unit in HEAT mode due to expansion and contraction of the unit's plastic parts.

ISSUE	POSSIBLE CAUSES
<b>Both the indoor unit and outdoor unit make noises</b>	Low hissing sound during operation: This is normal and is caused by refrigerant gas flowing through both indoor and outdoor units.
	Low hissing sound when the system starts, has just stopped running, or is defrosting: This noise is normal and is caused by the refrigerant gas stopping or changing direction.
	Squeaking sound: Normal expansion and contraction of plastic and metal parts caused by temperature changes during operation can cause squeaking noises.
<b>The outdoor unit makes noises</b>	The unit will make different sounds based on its current operating mode.
<b>Dust is emitted from either the indoor or outdoor unit</b>	The unit may accumulate dust during extended periods of non-use, which will be emitted when the unit is turned on. This can be mitigated by covering the unit during long periods of inactivity.
<b>The unit emits a bad odor</b>	The unit may absorb odors from the environment (such as furniture, cooking, cigarettes, etc.) which will be emitted during operations.
	The unit's filters have become moldy and should be cleaned.
<b>The fan of the outdoor unit does not operate</b>	During operation, the fan speed is controlled to optimize product operation.
<b>Operation is erratic, unpredictable, or unit is unresponsive</b>	Interference from cell phone towers and remote boosters may cause the unit to malfunction. In this case, try the following: <ul style="list-style-type: none"> <li>• Disconnect the power, then reconnect.</li> <li>• Press ON/OFF button on remote control to restart operation.</li> </ul>

**NOTE**



If problem persists, contact a local dealer or your nearest customer service center. Provide them with a detailed description of the unit malfunction as well as your model number.

## TROUBLESHOOTING

When troubles occur, please check the following points before contacting a repair company.

PROBLEM	POSSIBLE CAUSES	SOLUTION
<b>Poor Cooling Performance</b>	Temperature setting may be higher than ambient room temperature	Lower the temperature setting
	The heat exchanger on the indoor or outdoor unit is dirty	Clean the affected heat exchanger
	The air filter is dirty	Remove the filter and clean it according to instructions
	The air inlet or outlet of either unit is blocked	Turn the unit off, remove the obstruction and turn it back on
	Doors and windows are open	Make sure that all doors and windows are closed while operating the unit
	Excessive heat is generated by sunlight	Close windows and curtains during periods of high heat or bright sunshine
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary and top off refrigerant
	Excessive heat is generated by sunlight	Excessive heat is generated by sunlight
	Too many sources of heat in the room (people, computers, electronics, etc.)	Reduce amount of heat sources
<b>Poor Heating Performance</b>	The outdoor temperature is extremely low	This model is designed to work down to -13°F, however, heating performance is impacted at temperatures below freezing.
	Cold air is entering through doors and windows	Make sure that all doors and windows are closed during use
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary, and top off refrigerant
<b>The unit starts and stops frequently</b>	There's too much or too little refrigerant in the system	Check for leaks and recharge the system with refrigerant
	Incompressible gas or moisture has entered the system	Evacuate and recharge the system with refrigerant
	The compressor is broken	Replace the compressor
	The voltage is too high or too low	Install a manostat to regulate the voltage

PROBLEM	POSSIBLE CAUSES	SOLUTION
<b>The unit is not working</b>	Power failure	Wait for the power to be restored
	The power is turned off	Turn on the power
	The fuse is burned out	Replace the fuse
	Remote control batteries are dead	Replace batteries
	The Unit's 3-minute protection has been activated	Wait three minutes after restarting the unit
	Timer is activated	Turn timer off
<b>Indicator lamps continue flashing or error code appears</b>	<p>The unit may stop operation or continue to run safely. If the indicator lamps continue to flash or error codes appear, wait for about 10 minutes. The problem may resolve itself.</p> <p>If not, disconnect the power, then connect it again. Turn the unit on.</p> <p>If the problem persists, disconnect the power and contact your nearest customer service center.</p>	



**NOTE**

If your problem persists after performing the checks and diagnostics above, turn off your unit immediately and contact an authorized service center.

## WIRING DIAGRAM

### DRAD09F1A, DRAD12F1A, DRAD18F1A and DRAD24F1A

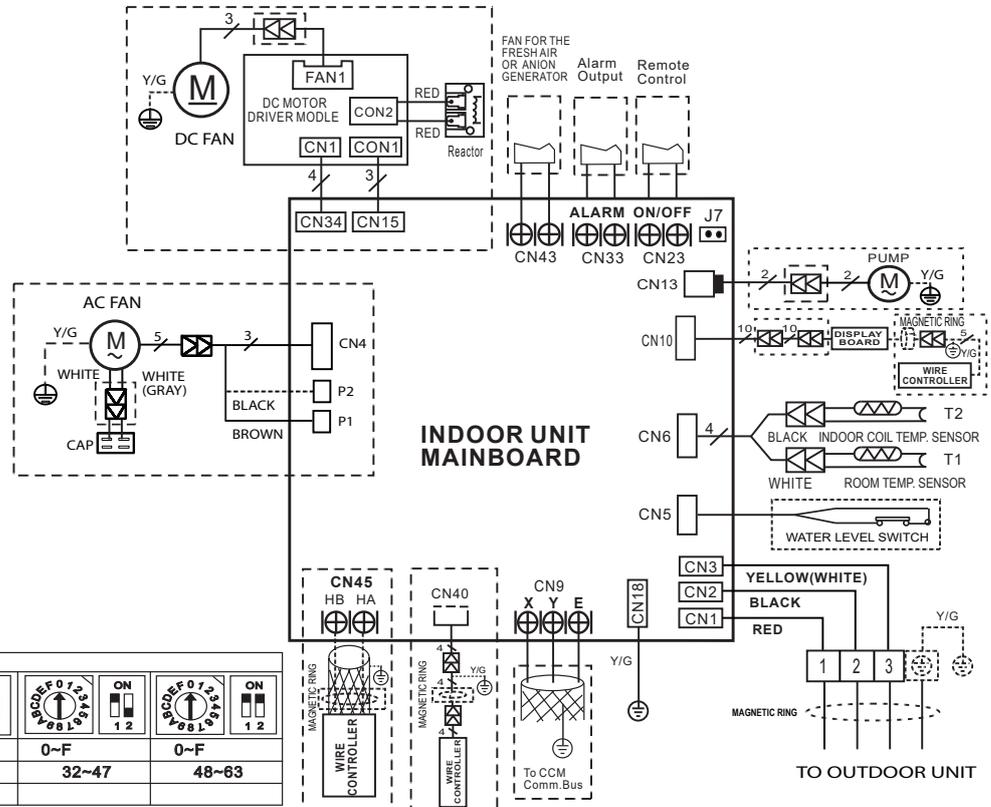
- NOTE:
1. The parts with dotted lines indicate optional features.
  2. Remove the short connector of J7 when you use the "on-off" function.
  3. When the wire controller uses the shielded wire, the shielded wire should be properly grounded.

FOR TEMP. COMPENSATION(HEATING)				
SW6	<input type="checkbox"/> ON <input type="checkbox"/> 1 2			
CODE	6 <sub>0</sub>	2 <sub>0</sub>	4 <sub>0</sub>	EEPROM DEFAULT
FACTORY SETTING			<input checked="" type="checkbox"/>	

FOR ANTI-COLD WIND				
SW1	<input type="checkbox"/> ON <input type="checkbox"/> 1 2			
TELO	24 <sub>0</sub>	15 <sub>0</sub>	8 <sub>0</sub>	EEPROM DEFAULT
FACTORY SETTING	<input checked="" type="checkbox"/>			

FOR SETTING AUTO-RESTART		
SW3	<input type="checkbox"/> ON <input type="checkbox"/> 1	<input type="checkbox"/> ON <input type="checkbox"/> 1
MODE	AUTO-RESTART	NOT AUTO-RESTART
FACTORY SETTING	<input checked="" type="checkbox"/>	

FOR SETTING NET ADDRESS				
S1+S2	<input type="checkbox"/> ON <input type="checkbox"/> 1 2			
CODE	0~F	0~F	0~F	0~F
NETADDRESS	0~15	16~31	32~47	48~63
FACTORY SETTING	<input checked="" type="checkbox"/>			



## ERROR CODES – INDOOR UNIT

Running lamp	Timer lamp	Display	Malfunction or Protection
★1 time	X	E0	Indoor EEPROM malfunction
★2 times	X	E1	Indoor and outdoor unit communication malfunction
★4 times	X	E3	Indoor fan speed malfunction
★5 times	X	E4	Indoor room temperature sensor error
★6 times	X	E5	Evaporator coil temperature sensor error
★7 times	X	EC	Refrigerant leak detection system malfunction
★8 times	X	EE	Water level alarm malfunction
★11times	X	Ed	Wrong outdoor unit
★1 time	●	F0	Overload protection
★2 times	●	F1	Outdoor temperature sensor error
★3 times	●	F2	Outdoor condenser pipe sensor error
★4 times	●	F3	Discharge air temperature sensor error
★5 times	●	F4	Outdoor EEPROM error
★6 times	●	F5	Outdoor fan speed (DC fan motor only) malfunction
★7 times	●	F6	T2b sensor error
★8 times	●	F7	Auto-lifting panel communication error
★9 times	●	F8	Auto-lifting panel malfunction
★10times	●	F9	Auto-lifting panel is open
★1 time	★	P0	Inverter module IPM protection
★2 times	★	P1	High/Low voltage protection
★3 times	★	P2	Compressor top overheating protection
★4 times	★	P3	Outdoor low temperature protection
★5 times	★	P4	Compressor drive error
★6 times	★	--	Mode conflict
★7 times	★	P6	Compressor low-pressure protection
★8 times	★	P7	Outdoor IGBT sensor error

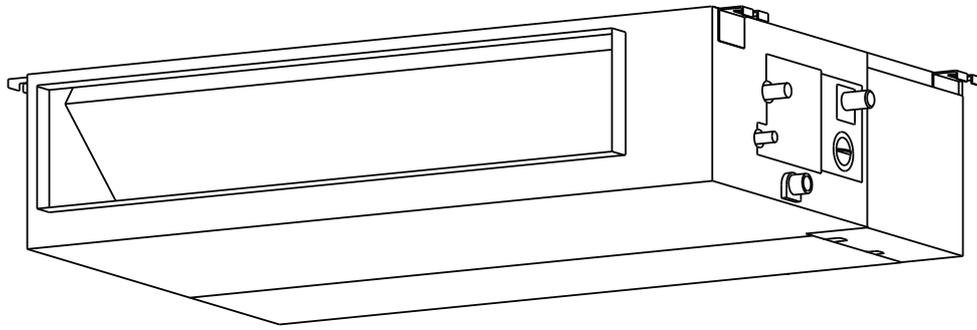
NOTE: ★ flashing ● light on X light off



INSTALLATION MANUAL

**SLIM DUCTED INDOOR UNIT  
SPLIT-STYLE AIR CONDITIONER**

DRAD09F1A, DRAD12F1A, DRAD18F1A, DRAD24F1A



Model Number:

Serial Number:

Purchase Date:

Installing Contractor Company Name:



**TIP**

Capture relevant information about your Durastar mini-split equipment before it is installed and write it above for future reference.

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## INTRODUCTION

To better serve you, please do the following before contacting customer service:

- If you received a damaged product, immediately contact the retailer or dealer that sold you the product.
- Read and follow this owner's manual carefully to help you use and maintain your air conditioner.
- Read the troubleshooting section of this manual as it will help you diagnose and solve common issues.
- Visit us on the web at [www.durastar.com](http://www.durastar.com) to download product guides and up-to-date information.
- If you need warranty service, our friendly customer service representatives are available via email at [questions@durastar.com](mailto:questions@durastar.com) or by telephone at 1-888-320-0706.

## WARNINGS

### Symbols Used in This Manual



The warning symbol indicates cautionary information for the user. Extra care and precautions should be taken to ensure the user's safety.



The pencil indicates any manufacturer notes relating to surrounding content. These may include further clarifications or call-outs.



A light bulb symbol indicates suggested manufacturer tips for the user to get the most out of the Durastar equipment and to accommodate the best user experience.

## IMPORTANT SAFETY PRECAUTIONS

Improper handling can cause serious damage or injury. Please read the following safety information in its entirety.



### **Operation, Cleaning, and Maintenance Safety Precautions**

- Children and people with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, should only use this air conditioner if they are given supervision or instructions concerning use of the air conditioner in a safe way and understand the hazards involved.
- Children should not play with the air conditioner.
- Never stick fingers or any other body parts into the air conditioner openings. The internal fan may be rotating at high speeds, and may result in injury.
- After removing the filter, do not touch the fins in order to avoid injury.
- Maintenance must be performed by qualified professionals. Otherwise, you may experience personal injury or damage to the air conditioner and surrounding property.
- Do not repair the air conditioner by yourself. It may cause electric shock or damage. Please contact a qualified service representative when you need to repair the air conditioner.
- Do not block the air outlet or air inlet. This could cause a malfunction.
- Do not spill water on the remote control as this can permanently damage the remote.
- If the below problems occur, please turn off the air conditioner and disconnect power at the circuit breaker immediately. Then contact your dealer or a qualified professional for service.
- The power cord is overheating or damaged.
- There is an abnormal sound during operation.
- The circuit breaker trips frequently.
- The air conditioner gives off a burning smell.
- The indoor unit is leaking.
- If the air conditioner operates under abnormal conditions, it may cause malfunctions, electric shock, or fire hazard.
- When turning the unit on or off via the emergency operation switch, press the switch with an insulated object other than metal.
- Do not step on the top panel of the unit, or put heavy objects on the top panel. This could cause damage or personal injury.
- Cleaning and user maintenance should not be performed by children without supervision.
- Do not spray water on the indoor unit. This could cause electric shock or a unit malfunction.
- Do not use flammable materials such as hair spray, lacquer, or paint near the air conditioner as they may catch fire.
- Do not operate the air conditioner in places near combustible gases. Emitted gases may collect around the air conditioner and cause an explosion.
- Do not use fire or a hair dryer to dry the filter. This could cause a deformation or fire hazard.
- Do not wash the air conditioner with water as this could cause an electric shock.
- Disconnect the power supply by turning it off at the circuit breaker when cleaning the air conditioner. Otherwise, you could risk electric shock.



## **Electrical Safety**

- Only use the specified power cord. If the power cord is damaged, it must be replaced by the manufacturer, its service agent, or similarly qualified persons in order to avoid a hazard.
- Keep the power plug clean. Remove any dust or grime that accumulates on or around the plug. Dirty plugs can cause fire or electric shock.
- Do not pull the power cord to unplug unit. Hold the plug firmly and pull it from the outlet. Pulling directly on the cord can damage it, which can lead to fire or electric shock.
- Do not connect the air conditioner to a multi-purpose socket. Doing so could cause a fire hazard.
- Do not modify the length of the power supply cord or use an extension cord to power the unit.
- If the supply cord is damaged, it must be replaced by the manufacturer, a service agent, or a similarly qualified person in order to avoid a safety hazard.
- Do not share the electrical outlet with other appliances. Improper or insufficient power supply can cause fire or electrical shock.
- The product must be properly grounded at the time of installation, or electrical shock may occur.
- For all electrical work, follow all local and national wiring standards and regulations. Connect cables tightly, and clamp them securely to prevent external forces from damaging the terminal. Improper electrical connections can overheat and cause fire, and may also cause shock. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
- All wiring must be properly arranged to ensure that the control board cover can close properly. If the control board cover is not closed properly, it can lead to corrosion and cause the connection points on the terminal to heat up, catch fire, or cause electrical shock.
- The air conditioner's circuit board (PCB) is designed with a fuse to provide overcurrent protection. The specifications of the fuse are printed on the circuit board.

## Installation Safety

- Installation must be performed by an authorized dealer or specialist. Improper installation can cause water leakage, electrical shock, or fire. (In North America, installation must be performed in accordance with NEC and CEC requirements by authorized personnel only.)
- Installation must be performed according to the installation instructions. Improper installation can cause water leakage, electrical shock, or fire.
- This air conditioner shall be installed in accordance with national and local wiring regulations.
- Contact an authorized service technician for repair or maintenance of this unit.
- Only use the included accessories, parts, and specified parts for installation. Using non-standard parts can cause water leakage, electrical shock, fire, and can cause the unit to fail.
- Install the unit in a firm location that can support the unit's weight. If the chosen location cannot support the unit's weight, or the installation is not done properly, the unit may fall and cause serious injury and damage.
- Install drainage piping according to the instructions in the installation manual. Improper drainage may cause water damage to your home and property.
- For units that have an auxiliary electric heater, do not install the unit within 3 feet (1 meter) of any combustible materials.
- Do not install the unit in a location that may be exposed to combustible gas leaks. If combustible gas accumulates around the unit, it may cause a fire.
- Do not turn on the power until all work has been completed.
- When moving or relocating the air conditioner, consult experienced service technicians for disconnection and re-installation of the unit.

## Additional Precautions

- Turn off the air conditioner and disconnect the power if you are not going to use it for a long time.
- Turn off and unplug the unit during storms.
- Make sure that water condensation can drain unhindered from the unit.
- Do not operate the air conditioner with wet hands. This may cause electric shock.
- Do not use this device for any other purpose than its intended use.
- Do not climb onto or place objects on top of the outdoor unit.
- Do not allow the air conditioner to operate for long periods of time with doors or windows open, or if the humidity is very high.

## OPERATING TEMPERATURES

Your air conditioner is designed to operate in the following indoor and outdoor temperatures. When your air conditioner is used outside of the following temperature ranges, certain safety features may activate and turn off the unit to protect it from damage.

### TEMPERATURE RANGES

	<b>COOL mode</b>	<b>HEAT mode</b>	<b>DRY mode</b>
<b>Indoor Air Temperature</b>	62°F - 90°F (17°C - 32°C)	32°F - 86°F (0°C - 30°C)	50°F - 90°F (10°C - 32°C)
<b>Outdoor Air Temperature</b>	-13°F - 122°F (-25°C - 50°C)	-13°F - 86°F (-25°C - 30°C)	32°F - 122°F (0°C - 50°C)

To further optimize the performance of your unit, do the following:

- Keep doors and windows closed.
- Limit energy usage by using TIMER ON and TIMER OFF features.
- Do not block air inlets or outlets.
- Regularly inspect and clean air filters.

#### **NOTE**

 Your Durastar air conditioner's outdoor unit is equipped with a base pan heater, allowing it to continue to operate at freezing temperatures as low as -13°F (-25°C). When outdoor air temperatures are at or below 32°F (0°C), we strongly recommend keeping the unit plugged in at all times to ensure smooth ongoing performance.

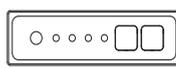
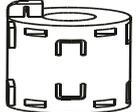
#### **NOTE**

 Keep the room's relative humidity below 80%. If the air conditioner operates in excess of this, the surface of the air conditioner may attract condensation. To help prevent condensation from forming and dripping, set the vertical airflow louver to its maximum angle (vertically to the floor) and set the fan to HIGH.

# ACCESSORIES

## INCLUDED INSTALLATION ACCESSORIES

The air conditioning system comes with the following accessories.

Accessory	Quantity	Image	Accessory	Quantity	Image
Manual	1-2		Display Panel	1	
Soundproof Insulation Sheath	1		Wired Thermostat	1	
Cord Protector	1		Magnetic Ring (Some Models)	1-2	
Copper Nut	2		Drain Pipe Worm Clamp	2	
Drain Pipe Insulation Sheath	1				

## FIELD SUPPLIED INSTALLATION ACCESSORIES

The following installation accessories are required and must be purchased separately.

- Refrigerant piping (line set)
- Indoor and outdoor connection wire
- Outdoor power supply cord
- Drain pipe
- Pipe and cable wrapping tape
- Wall hole sleeve and cover
- Putty
- Suspension bolts and necessary hardware to hang indoor unit
- Wiring u-lugs

## **TOOLS NEEDED**

The following tools are required for installation.

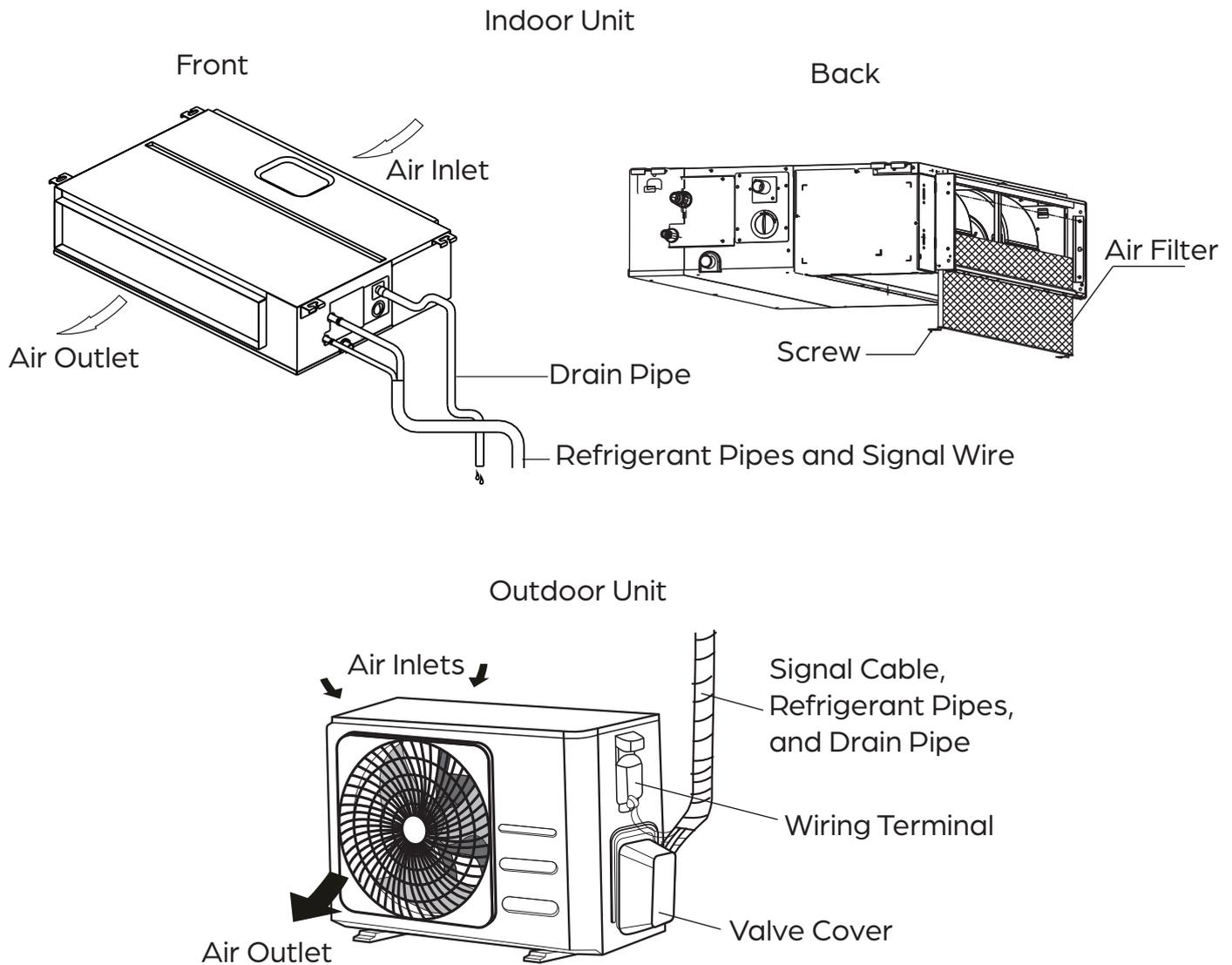
- Phillips screwdriver
- Drill with 2 1/2" or 3 1/2" (indoor unit model depending) core bit
- Vacuum pump
- HVAC manifold gauge set
- Refrigerant leak detector
- Copper pipe cutter
- Flaring tool
- Burr reamer
- Crescent or spanner wrench
- Hexagonal wrench set
- Torque wrench
- Multimeter
- Electroprobe
- Level
- Hammer
- Wire strippers
- Wire crimper

## PARTS IDENTIFICATION



### NOTE

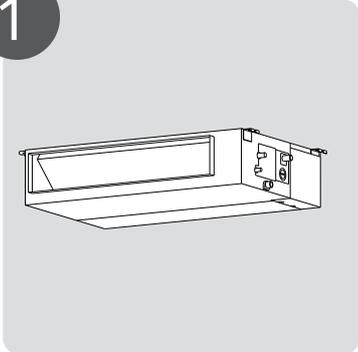
The installation must be performed in accordance with the required local and national standards. The installation may be slightly different in different markets.



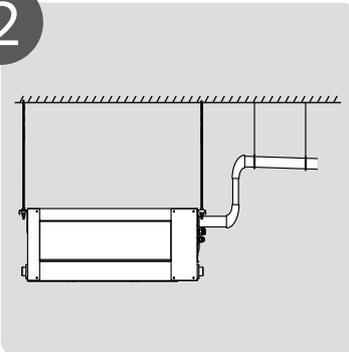
### NOTE

Illustrations in this manual are for explanatory purposes. The actual shape of your mini-split equipment may vary slightly.

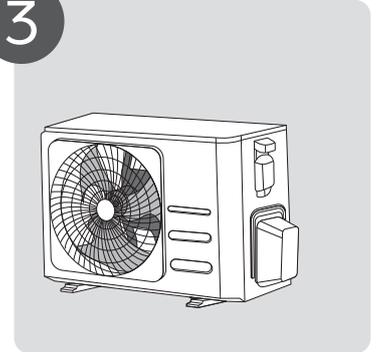
## INSTALLATION OVERVIEW – INDOOR UNIT

**1**

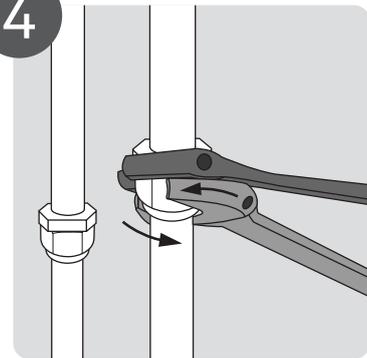
Install the indoor unit

**2**

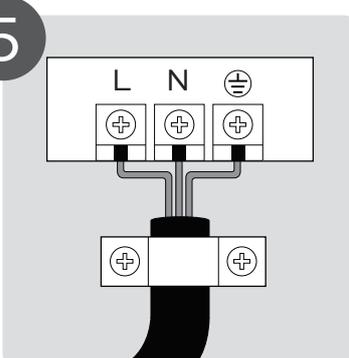
Install the drain pipe

**3**

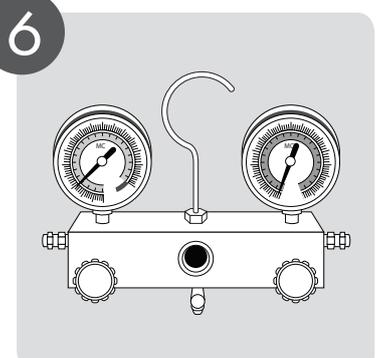
Install the outdoor unit

**4**

Connect the refrigerant pipes

**5**

Connect the wires

**6**

Evacuate and charge the refrigeration system

**7**

Perform a test run

## INDOOR UNIT INSTALLATION

### STEP 1: SELECT INSTALLATION LOCATION

Before installing the indoor unit, you must choose an appropriate location. The following standards should be met for an appropriate location for the unit:

- Good air circulation
- Convenient drainage
- Noise from the unit will not disturb other people
- Firm and solid – the location will not vibrate
- Strong enough to support the weight of the unit
- A location at least three feet (one meter) from all other electrical devices (e.g., TV, radio, computer)

DO NOT install unit in the following locations:

- Near any source of heat, steam, or combustible gas
- Near flammable items such as curtains or clothing
- Near any obstacle that might block air circulation
- Near a doorway
- In a location subject to direct sunlight

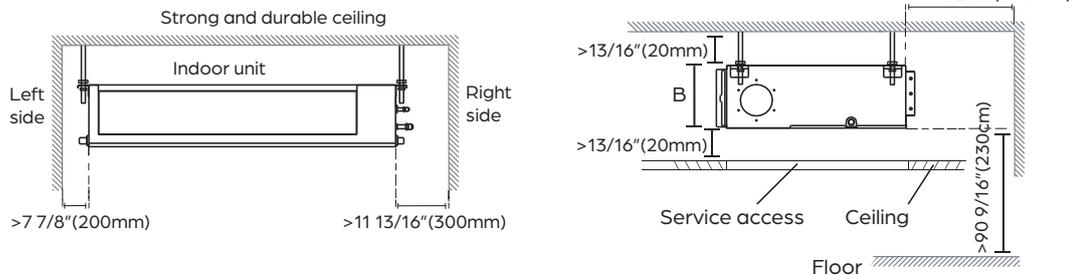


#### NOTE

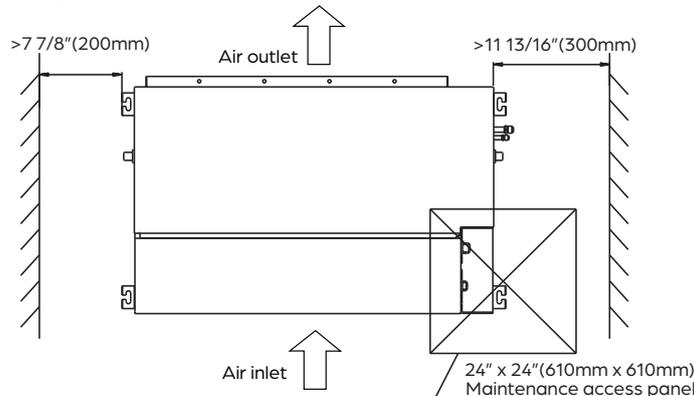
This model is designed for horizontal installation only.

Refer to the following diagrams to ensure proper distance from walls and ceiling:

#### Installation clearances



#### Maintenance access panel



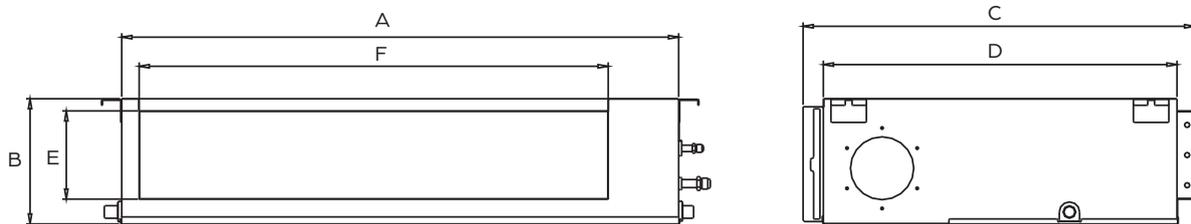
#### NOTE

If there is no pre-existing refrigerant piping, when choosing a location, leave ample room for a wall hole (see *Step 3: Drill Wall Hole for Connective Piping*) for the signal cable and refrigerant piping that connect the indoor and outdoor units.

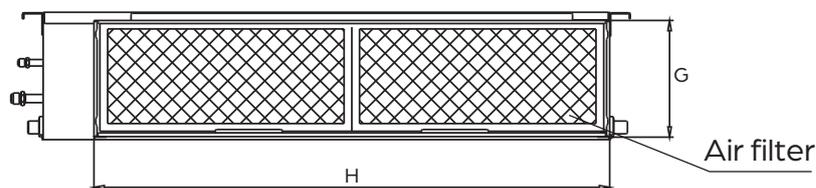
## STEP 2: HANG INDOOR UNIT

1. Refer to the following diagrams for unit dimensions and locations for the four suspension bolt holes required to hang the indoor unit.

Unit and air outlet dimensions

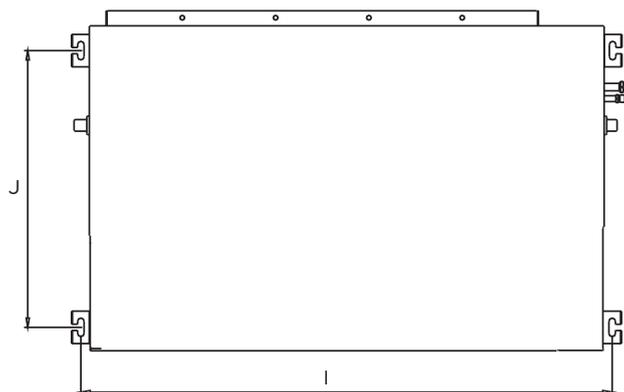


Air inlet dimensions



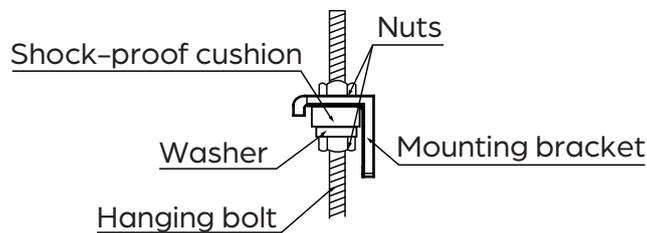
Model	A	B	C	D	E	F	G	H
DRAD09F1A DRAD12F1A	27 9/16" (700mm)	7 7/8" (200mm)	19 15/16" (506mm)	17 3/4" (450mm)	6" (152mm)	21 1/8" (537mm)	7 5/16" (186mm)	23 9/16" (599mm)
DRAD18F1A	34 5/8" (880mm)	8 1/4" (210mm)	26 9/16" (674mm)	23 5/8" (600mm)	5 3/8" (136mm)	27 13/16" (706mm)	7 1/2" (190mm)	30 13/16" (782mm)
DRAD24F1A	43 5/16" (1100mm)	9 13/16" (249mm)	30 1/2" (774mm)	27 9/16" (700mm)	6 7/8" (175mm)	36 7/16" (926mm)	9" (228mm)	39 7/16" (1001mm)

Mounting dimensions for ceiling bolts



Model	I	J
DRAD09F1A DRAD12F1A	29 3/16" (741mm)	14 3/16" (360mm)
DRAD18F1A	36 1/4" (920mm)	20" (508mm)
DRAD24F1A	44 7/8" (1140mm)	23 9/16" (598mm)

2. Before drilling the holes in the ceiling and mounting the unit, align the refrigerant pipes, drain pipe, and electric cable connection points with the direction they will be drawn out and connected to the outdoor unit through the wall hole (see *Step 3: Drill Wall Hole For Connective Piping*).
3. Drill four holes 4" deep in the internal ceiling for each of the required suspension bolt anchors (field supplied). Make sure to hold the drill at a 90° angle to the ceiling.
4. Using a hammer, insert the suspension bolt anchors into the pre-drilled holes.
5. Install the four suspension bolts.
6. Mount the indoor unit. Using two people to lift and secure it, insert the suspension bolts into the unit's hanging bracket holes and secure in place with washers and nuts (see diagram below). Make sure the unit is level.

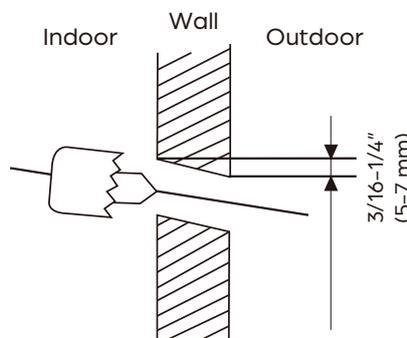


**WARNING**

Ensure that the indoor unit is completely level. Improper installation can cause the drain pipe to back up into the unit and water leaks.

**STEP 3: DRILL WALL HOLE FOR CONNECTIVE PIPING**

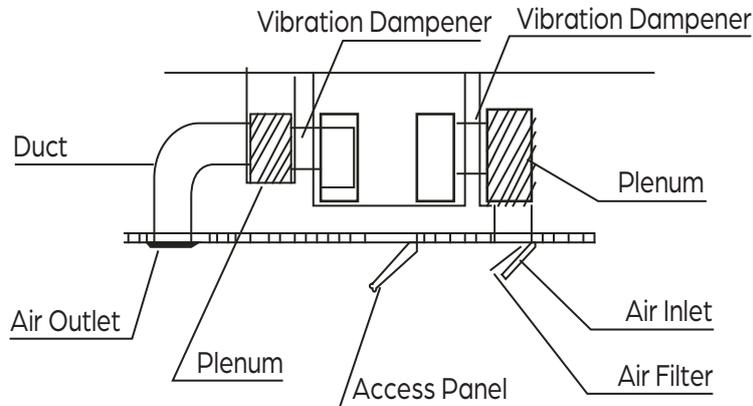
1. Determine the location of the wall hole based on the location of the outdoor unit.
2. Using a 2 1/2" (65mm) core drill for units with a gas side connective pipe less than 5/8" (16mm), or 3 1/2" (90mm) for units with a gas side pipe greater than or equal to 5/8" (16mm), drill a hole in the wall. Make sure that the hole is drilled at a slight downward angle, so that the outdoor end of the hole is lower than the indoor end by about 3/16 - 1/4" (5mm to 7mm). This will ensure proper water drainage.



3. Place the protective wall hole sleeve (field supplied) into the hole. This protects pipes and cables from sharp edges and will help seal the opening when you finish the installation process. After the sleeve is inserted through the wall, connect the wall hole sleeve cover to the wall sleeve on the outside end. Make sure the cover is flush with the outside wall.

## STEP 4: DUCT AND ACCESSORIES INSTALLATION

Once the unit is hung, you may install any additional ducting required. The diagram below illustrates one example of installing the unit with hidden ducting. The unit may also be installed exposed, depending on your needs.



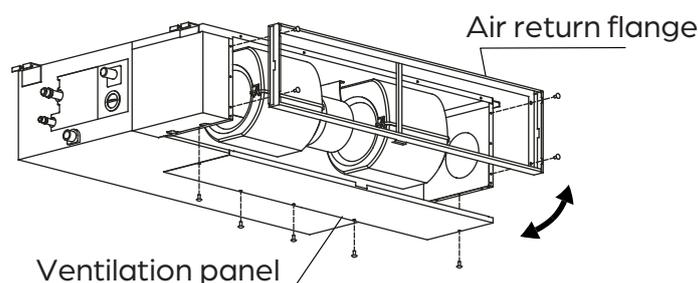
## INSTALLATION TIPS

- Air filters help remove dust and particles from the circulating air. They should be installed on the air inlet side according to the size of the inlet on the unit.
- Vibration dampeners are recommended to be installed between the unit and the ductwork. They will decrease vibrations and noise coming from the unit. They also provide some flexibility when installing and positioning the ductwork.
- The air inlet and air outlet should be far enough apart to avoid short-circuiting the air flow and provide proper circulation in the room.
- Do not place the connecting duct weight on the unit. Provide proper support for the ductwork independent of the unit supports.
- All ductwork should be properly insulated to prevent condensation.
- Refer to the following static pressure guidelines when installing the indoor unit:

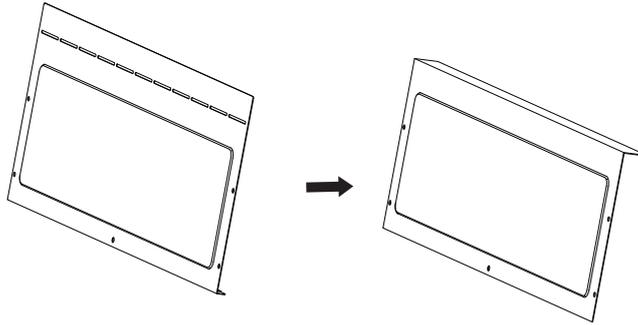
Model	Static Pressure (Pa / in. wc)
DRAD09F1A	0~50 / 0~0.2
DRAD12F1A	0~50 / 0~0.2
DRAD18F1A	0~100 / 0~0.4
DRAD24F1A	0~160 / 0~0.64

## CHANGING THE AIR INLET DIRECTION (REAR TO UNDERSIDE)

1. Remove the ventilation panel and air return flange.

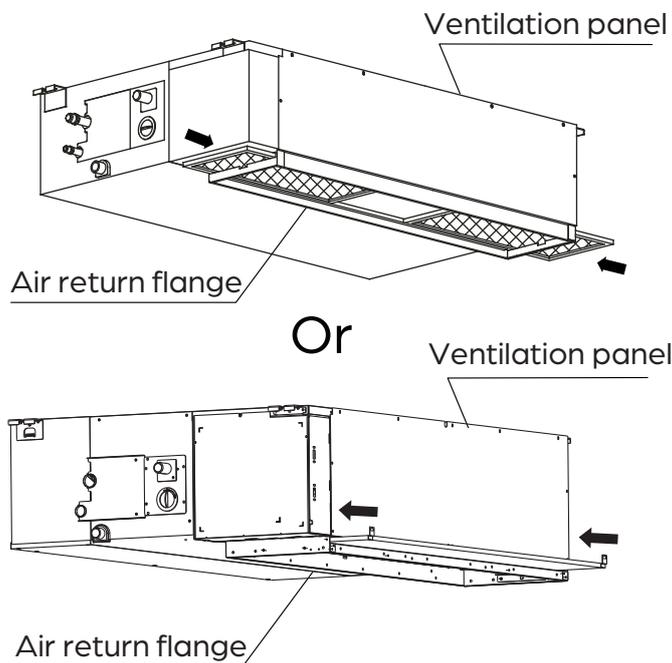


2. Bend the rear ventilation panel 90° along the dotted line (some models).



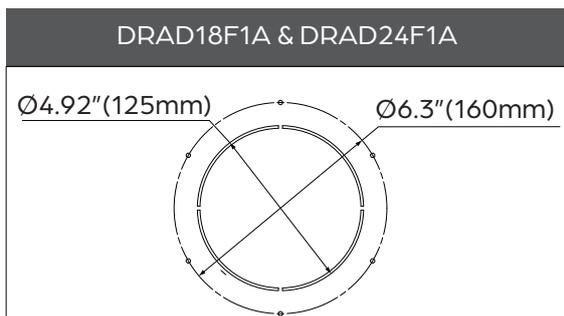
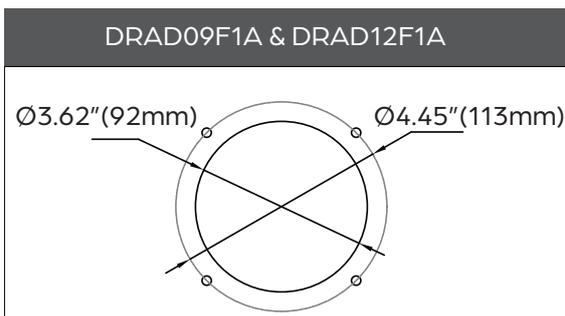
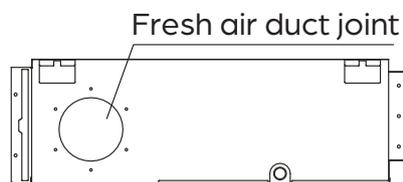
3. Swap the mounting positions of the ventilation panel and air return flange.

4. Install the filter mesh. Insert into flange as illustrated below.



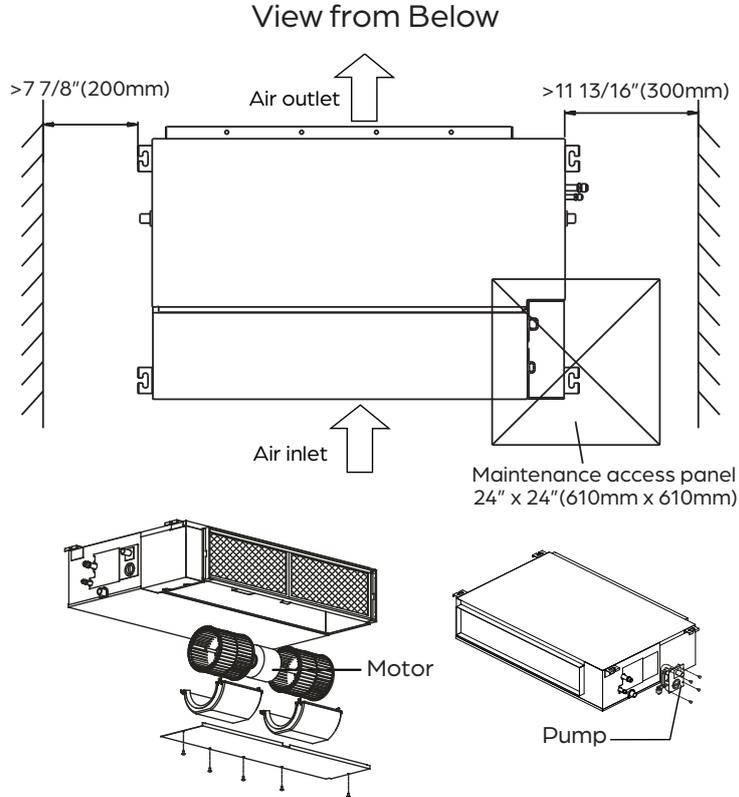
## FRESH AIR DUCT INSTALLATION

This unit allows for a fresh air duct to be installed. Duct location and dimensions are shown below.



### MAINTENANCE ACCESS PANEL

If this unit is located in a sub-ceiling, an access panel should be installed in order to gain access to the unit for routine maintenance. Common maintenance items are shown below for consideration when designing panel size and location. A minimum panel size of 2' x 2' is recommended.

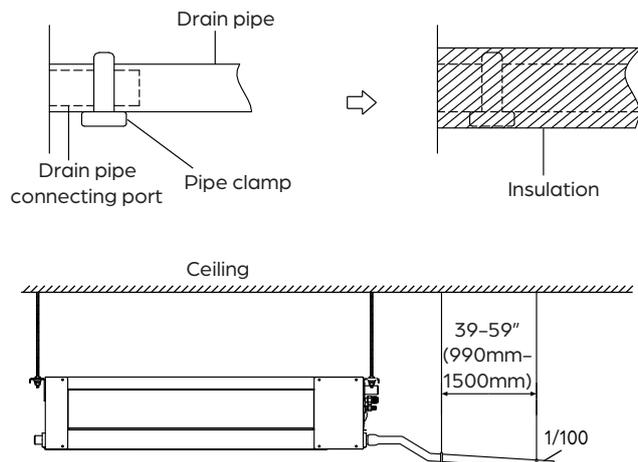


### STEP 5: CONNECT DRAIN PIPE

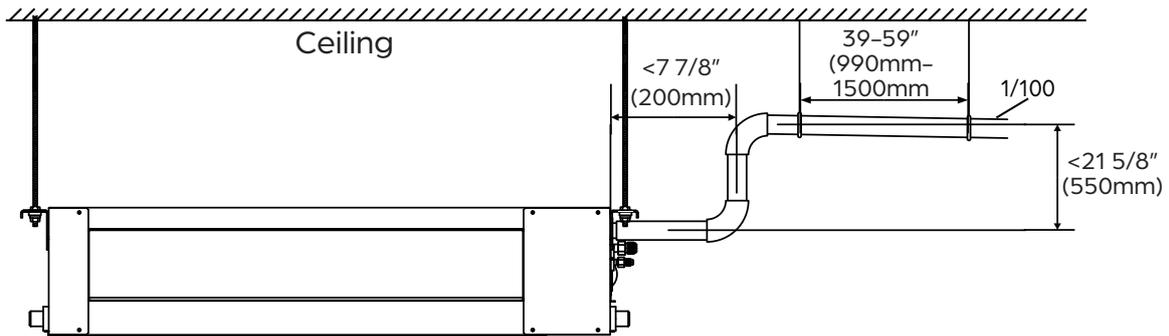
The drain pipe is used to drain condensate water away from the unit. Improper installation may cause leaks and unit or property damage.

1. Connect the drain pipe (field supplied) to the appropriate unit's connecting port using a metal worm clamp. Make sure it is secured tightly and cannot be easily pulled loose.
2. Insulate the connecting port and pipe with the accessory sheath provided.
3. For gravity draining, install the drain pipe to the lower drain connecting port with a downward slope of at least a 1/100 gradient to prevent water from flowing back into the unit. To keep the drain pipe from sagging, install hanging wires every 39 - 59". Wrap the remaining indoor portion of the drain pipe with foam pipe insulation to prevent condensation.

Model	Drain Pipe Inner Diameter
DRAD09F1A	1" (25mm)
DRAD12F1A	1" (25mm)
DRAD18F1A	1" (25mm)
DRAD24F1A	1" (25mm)

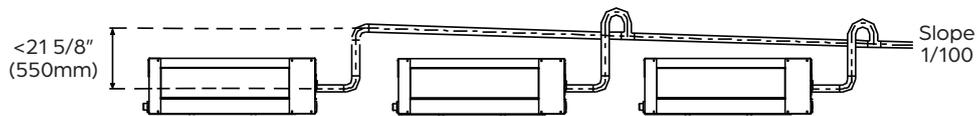


4. This unit is equipped with a drain pump that allows the outlet of the drain pipe to be higher than the pipe's connecting port. For pump assisted draining, install the drain pipe to the upper connecting port. The vertical lift pipe must be installed no higher than 21 5/8" (550mm) from the drain connection port with a maximum distance of 7 7/8" (200mm) between the unit and the lift pipe. To prevent air bubbles, make sure the pipe between the unit and the lift pipe is level or slightly tilted up (0 - 1"). Install hanging wires every 39 - 59" to keep the drain pipe from sagging, and wrap the indoor portion of the pipe with foam pipe insulation to prevent condensation. Incorrect installation can cause water to flow back into the unit and leaks.

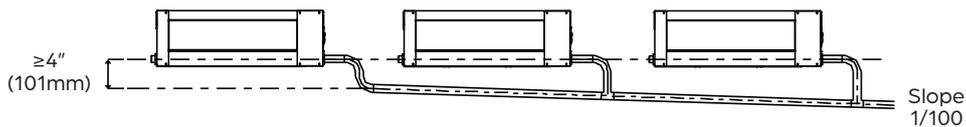


5. If connecting multiple drain pipes, install the pipes as illustrated below.

### Using pump



### Not using pump



6. Pass the drain pipe through the wall hole to the outside. The end of the pipe should be at least 2" (50mm) above the ground. If it touches the ground, the pipe may become blocked. Make sure the water drains to a safe location where it will not cause water damage or a slipping hazard.

## STEP 6: CONNECT SIGNAL CABLE

### BEFORE PERFORMING ANY ELECTRICAL WORK, READ THESE REGULATIONS

1. All wiring must comply with local and national electrical codes and regulations, and must be installed by a licensed electrician.
2. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
3. If there is a serious safety issue with the power supply, stop work immediately and contact a licensed electrician. Do not continue with the installation until the safety issue is properly resolved.
4. Power voltage should be within 90–110% of rated voltage. Insufficient power supply can cause malfunction, electrical shock, or fire.
5. If connecting power to fixed wiring, install a surge protector and main power switch with a capacity of 1.5 times the maximum current of the unit.
6. If connecting power to fixed wiring, a switch or circuit breaker that disconnects all poles and has a contact separation of at least 1/8" (3mm) must be incorporated in the fixed wiring. A qualified technician must use an approved circuit breaker or switch.
7. Only connect the unit to an individual branch circuit outlet. Do not connect another appliance to that outlet.
8. Make sure to properly ground the air conditioner.
9. Every wire must be firmly connected. Loose wiring can cause the terminal to overheat, resulting in product malfunction and possible fire.
10. Do not let wires touch or rest against refrigerant tubing, the compressor, or any moving parts within the unit.
11. If the unit has an auxiliary electric heater, it must be installed at least 40" away from any combustible materials.
12. To avoid getting an electric shock, never touch the electrical components soon after the power supply has been turned off. After turning off the power, always wait 10 minutes or more before you touch the electrical components.



#### **WARNING**

Before performing any electrical or wiring work, turn off the main power to the system.

The signal cable enables communication between the indoor and outdoor units. You must first choose the right cable size before preparing it for connection.

### USE THE RIGHT CABLE

- Indoor Power Cable (if applicable): H05VV-F or H05V2V2-F
- Outdoor Power Cable: H07RN-F
- Signal Cable: H07RN-F

### CABLE SIZING

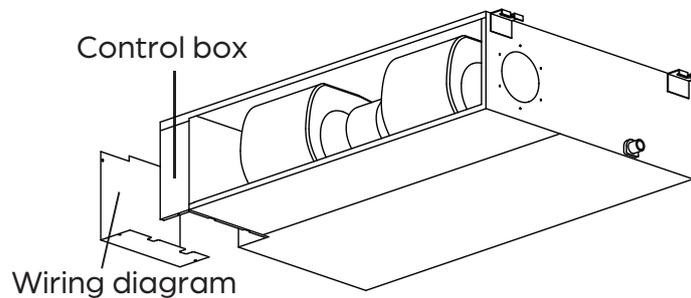
Use a minimum of 16 AWG for power and signal cables connected to and between the indoor and outdoor units.

### Choose the correct size of cable

The size of the power supply cable, signal cable, fuse, and switch needed is determined by the maximum current of the unit. The maximum current is indicated on the nameplate located on the side panel of the unit. Refer to this nameplate to choose the right cable, fuse, or switch.

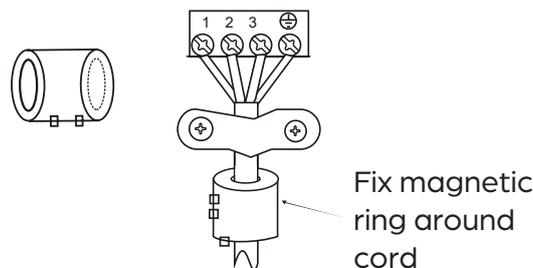
### Wiring the Indoor Unit

1. Prepare the cable for connection:
  - Using wire strippers, strip the jacket from both ends of the cable to reveal about 6" of the wires.
  - Strip the insulation from the ends of the wires.
  - Using a wire crimper, crimp u-lugs to the ends of the wires.
2. Open the control box lid of the indoor unit and locate the wiring diagram on the inside.



3. Unscrew the cable clamp below the terminal block and place it to the side.
4. Feed the cable through the magnetic ring (some models) and secure the ring in place.

Magnetic ring (if supplied with accessories)



5. Refer to the wiring diagram and connect the u-lugs to the terminal block. Firmly screw the u-lug of each wire to its corresponding terminal.
6. After checking to make sure every connection is secure, use the cable clamp to fasten the signal cable to the unit. Screw the cable clamp down tightly.
7. Replace the control box lid.



#### **WARNING**

All wiring must be performed strictly in accordance with the wiring diagram located on the inside of the control box lid.

### STEP 7: PREPARE REFRIGERANT PIPING

1. If pre-existing refrigerant piping is already embedded in the wall, begin the outdoor unit installation. Refer to the *Refrigerant Piping Connections* section of the outdoor unit's installation manual for detailed instructions.
2. If there is no pre-existing piping, connect the indoor unit's refrigerant piping to the connective piping that will join the indoor and outdoor units. Refer to the *Refrigerant Piping Connections* section of the outdoor unit's installation manual for detailed instructions.



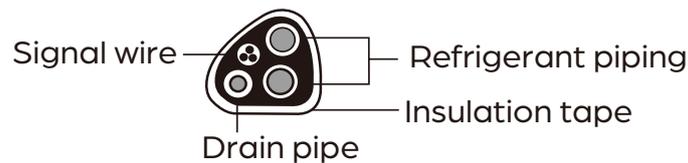
**WARNING**

Be extremely careful not to dent or damage the piping while bending them away from the unit. Any dents in the piping will affect the unit's performance.

### STEP 8: WRAP PIPES AND CABLE

Before passing the refrigerant piping, drain pipe, and the signal cable through the wall hole, you must bundle them together to save space, protect them, and insulate them.

1. Bundle the drain hose, refrigerant pipes, and signal cable as shown below:



**NOTE**

The drain hose **MUST** be at the bottom of the bundle. Putting the drain hose at the top of the bundle can cause the drain pan to overflow, which can lead to fire or water damage.



**NOTE**

**DO NOT** intertwine the signal cable with any of the other wires while bundling these items together.

2. Using adhesive vinyl tape, attach the drain hose to the underside of the refrigerant pipes.
3. Using insulation tape, wrap the signal wire, refrigerant pipes, and drain hose tightly together. Double-check that all items are bundled.



**NOTE**

When wrapping the bundle, keep the ends of the piping unwrapped. You need to access them to test for leaks at the end of the installation process (refer to *Electrical and Gas Leak Checks* section of the outdoor unit's installation manual).

# TROUBLESHOOTING

## SAFETY PRECAUTIONS

If ANY of the following conditions occurs, turn off your unit immediately!

- The power cord is damaged or abnormally warm
- You smell a burning odor
- The unit emits loud or abnormal sounds
- A power fuse blows or the circuit breaker frequently trips
- Water or other objects fall into or out of the unit

**DO NOT ATTEMPT TO FIX THESE YOURSELF! CONTACT AN AUTHORIZED SERVICE PROVIDER IMMEDIATELY!**

## COMMON ISSUES

The following problems are not a malfunction and in most situations will not require repairs.

ISSUE	POSSIBLE CAUSES
<b>Unit does not turn on when pressing ON/OFF button</b>	The Unit has a 3-minute protection feature that prevents the unit from overloading. The unit cannot be restarted within three minutes of being turned off.
<b>The unit changes from COOL/HEAT mode to FAN mode</b>	The unit may change its setting to prevent frost from forming on the unit. Once the temperature increases, the unit will start operating in the previously selected mode again.
	The set temperature has been reached, at which point the unit turns off the compressor. The unit will continue operating when the temperature fluctuates again.
<b>The indoor unit emits white mist</b>	In humid regions, a large temperature difference between the room's air and the conditioned air can cause white mist.
<b>Both the indoor and outdoor units emit white mist</b>	When the unit restarts in HEAT mode after defrosting, white mist may be emitted due to moisture generated during the defrosting process.
<b>The indoor unit makes noises</b>	A rushing air sound may occur when the louver resets its position.
	A squeaking sound may occur after running the unit in HEAT mode due to expansion and contraction of the unit's plastic parts.

ISSUE	POSSIBLE CAUSES
<b>Both the indoor unit and outdoor unit make noises</b>	Low hissing sound during operation: This is normal and is caused by refrigerant gas flowing through both indoor and outdoor units.
	Low hissing sound when the system starts, has just stopped running, or is defrosting: This noise is normal and is caused by the refrigerant gas stopping or changing direction.
	Squeaking sound: Normal expansion and contraction of plastic and metal parts caused by temperature changes during operation can cause squeaking noises.
<b>The outdoor unit makes noises</b>	The unit will make different sounds based on its current operating mode.
<b>Dust is emitted from either the indoor or outdoor unit</b>	The unit may accumulate dust during extended periods of non-use, which will be emitted when the unit is turned on. This can be mitigated by covering the unit during long periods of inactivity.
<b>The unit emits a bad odor</b>	The unit may absorb odors from the environment (such as furniture, cooking, cigarettes, etc.) which will be emitted during operations.
	The unit's filters have become moldy and should be cleaned.
<b>The fan of the outdoor unit does not operate</b>	During operation, the fan speed is controlled to optimize product operation.
<b>Operation is erratic, unpredictable, or unit is unresponsive</b>	Interference from cell phone towers and remote boosters may cause the unit to malfunction. In this case, try the following: <ul style="list-style-type: none"> <li>• Disconnect the power, then reconnect.</li> <li>• Press ON/OFF button on remote control to restart operation.</li> </ul>

**NOTE**



If problem persists, contact a local dealer or your nearest customer service center. Provide them with a detailed description of the unit malfunction as well as your model number.

## TROUBLESHOOTING

When troubles occur, please check the following points before contacting a repair company.

PROBLEM	POSSIBLE CAUSES	SOLUTION
<b>Poor Cooling Performance</b>	Temperature setting may be higher than ambient room temperature	Lower the temperature setting
	The heat exchanger on the indoor or outdoor unit is dirty	Clean the affected heat exchanger
	The air filter is dirty	Remove the filter and clean it according to instructions
	The air inlet or outlet of either unit is blocked	Turn the unit off, remove the obstruction and turn it back on
	Doors and windows are open	Make sure that all doors and windows are closed while operating the unit
	Excessive heat is generated by sunlight	Close windows and curtains during periods of high heat or bright sunshine
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary and top off refrigerant
	Excessive heat is generated by sunlight	Excessive heat is generated by sunlight
	Too many sources of heat in the room (people, computers, electronics, etc.)	Reduce amount of heat sources
<b>Poor Heating Performance</b>	The outdoor temperature is extremely low	This model is designed to work down to -13°F, however, heating performance is impacted at temperatures below freezing.
	Cold air is entering through doors and windows	Make sure that all doors and windows are closed during use
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary, and top off refrigerant
<b>The unit starts and stops frequently</b>	There's too much or too little refrigerant in the system	Check for leaks and recharge the system with refrigerant
	Incompressible gas or moisture has entered the system	Evacuate and recharge the system with refrigerant
	The compressor is broken	Replace the compressor
	The voltage is too high or too low	Install a manostat to regulate the voltage

PROBLEM	POSSIBLE CAUSES	SOLUTION
<b>The unit is not working</b>	Power failure	Wait for the power to be restored
	The power is turned off	Turn on the power
	The fuse is burned out	Replace the fuse
	Remote control batteries are dead	Replace batteries
	The Unit's 3-minute protection has been activated	Wait three minutes after restarting the unit
	Timer is activated	Turn timer off
<b>Indicator lamps continue flashing or error code appears</b>	<p>The unit may stop operation or continue to run safely. If the indicator lamps continue to flash or error codes appear, wait for about 10 minutes. The problem may resolve itself.</p> <p>If not, disconnect the power, then connect it again. Turn the unit on.</p> <p>If the problem persists, disconnect the power and contact your nearest customer service center.</p>	



**NOTE**

If your problem persists after performing the checks and diagnostics above, turn off your unit immediately and contact an authorized service center.

## WIRING DIAGRAM

### DRAD09F1A, DRAD12F1A, DRAD18F1A and DRAD24F1A

**NOTE:**

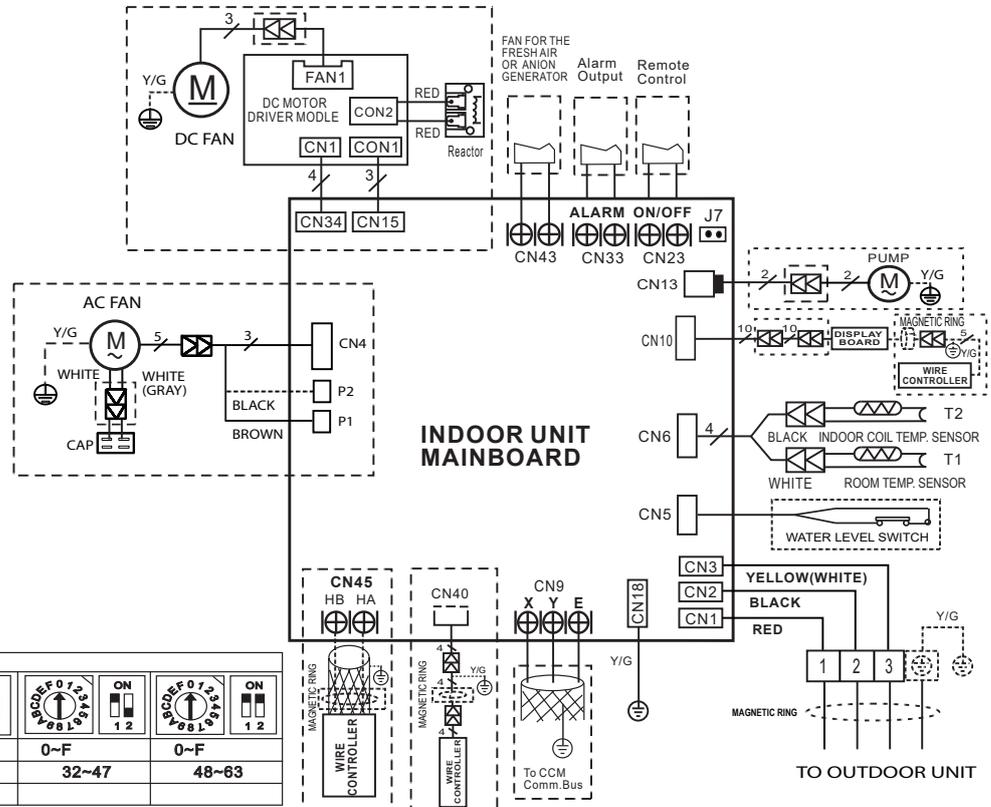
1. The parts with dotted lines indicate optional features.
2. Remove the short connector of J7 when you use the "on-off" function.
3. When the wire controller uses the shielded wire, the shielded wire should be properly grounded.

FOR TEMP. COMPENSATION(HEATING)				
SW6	<input type="checkbox"/> ON <input type="checkbox"/> 1 2			
CODE	6 <sub>0</sub>	2 <sub>0</sub>	4 <sub>0</sub>	EEPROM DEFAULT
FACTORY SETTING			<input checked="" type="checkbox"/>	

FOR ANTI-COLD WIND				
SW1	<input type="checkbox"/> ON <input type="checkbox"/> 1 2			
TELO	24 <sub>0</sub>	15 <sub>0</sub>	8 <sub>0</sub>	EEPROM DEFAULT
FACTORY SETTING	<input checked="" type="checkbox"/>			

FOR SETTING AUTO-RESTART		
SW3	<input type="checkbox"/> ON <input type="checkbox"/> 1	<input type="checkbox"/> ON <input type="checkbox"/> 1
MODE	AUTO-RESTART	NOT AUTO-RESTART
FACTORY SETTING	<input checked="" type="checkbox"/>	

FOR SETTING NET ADDRESS				
S1+S2	<input type="checkbox"/> ON <input type="checkbox"/> 1 2			
CODE	0~F	0~F	0~F	0~F
NETADDRESS	0~15	16~31	32~47	48~63
FACTORY SETTING	<input checked="" type="checkbox"/>			



## ERROR CODES – INDOOR UNIT

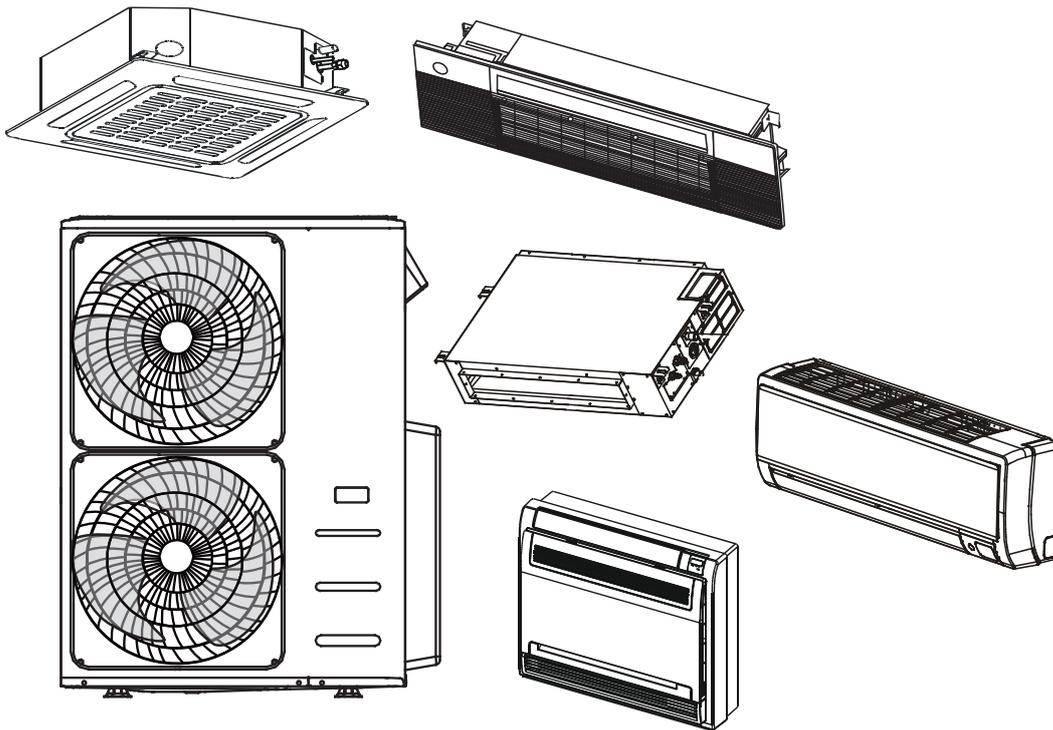
Running lamp	Timer lamp	Display	Malfunction or Protection
★1 time	X	E0	Indoor EEPROM malfunction
★2 times	X	E1	Indoor and outdoor unit communication malfunction
★4 times	X	E3	Indoor fan speed malfunction
★5 times	X	E4	Indoor room temperature sensor error
★6 times	X	E5	Evaporator coil temperature sensor error
★7 times	X	EC	Refrigerant leak detection system malfunction
★8 times	X	EE	Water level alarm malfunction
★11times	X	Ed	Wrong outdoor unit
★1 time	●	F0	Overload protection
★2 times	●	F1	Outdoor temperature sensor error
★3 times	●	F2	Outdoor condenser pipe sensor error
★4 times	●	F3	Discharge air temperature sensor error
★5 times	●	F4	Outdoor EEPROM error
★6 times	●	F5	Outdoor fan speed (DC fan motor only) malfunction
★7 times	●	F6	T2b sensor error
★8 times	●	F7	Auto-lifting panel communication error
★9 times	●	F8	Auto-lifting panel malfunction
★10times	●	F9	Auto-lifting panel is open
★1 time	★	P0	Inverter module IPM protection
★2 times	★	P1	High/Low voltage protection
★3 times	★	P2	Compressor top overheating protection
★4 times	★	P3	Outdoor low temperature protection
★5 times	★	P4	Compressor drive error
★6 times	★	--	Mode conflict
★7 times	★	P6	Compressor low-pressure protection
★8 times	★	P7	Outdoor IGBT sensor error

NOTE: ★ flashing ● light on X light off



**INSTALLATION MANUAL**  
**MULTI-ZONE OUTDOOR UNIT**  
**SPLIT-STYLE AIR CONDITIONER**

DRA2U18M1B, DRA3U28M1B, DRA4U36M1B,  
DRA5U48M1B, DRA5U55M1B



Model Number:

Serial Number:

Purchase Date:

Installing Contractor Company Name:



**TIP**

Capture relevant information about your Durastar mini-split equipment before it is installed and write it above for future reference.

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## INTRODUCTION

To better serve you, please do the following before contacting customer service:

- If you received a damaged product, immediately contact the retailer or dealer that sold you the product.
- Read and follow this owner's manual carefully to help you use and maintain your air conditioner.
- Read the troubleshooting section of this manual as it will help you diagnose and solve common issues.
- Visit us on the web at **WWW.DURASTAR.COM** to download product guides and up-to-date information.
- If you need warranty service, our friendly customer service representatives are available via email at **QUESTIONS@DURASTAR.COM** or by telephone at **1-888-320-0706**.

## WARNINGS

### Symbols Used in This Manual



The warning symbol indicates cautionary information for the user. Extra care and precautions should be taken to ensure the user's safety.



The pencil indicates any manufacturer notes relating to surrounding content. These may include further clarifications or call-outs.



A light bulb symbol indicates suggested manufacturer tips for the user to get the most out of the Durastar equipment and to accommodate the best user experience.

## IMPORTANT SAFETY PRECAUTIONS

Improper handling can cause serious damage or injury. Please read the following safety information in its entirety.



### **Operation, Cleaning, and Maintenance Safety Precautions**

- Children and people with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, should only use this air conditioner if they are given supervision or instructions concerning use of the air conditioner in a safe way and understand the hazards involved.
- Children should not play with the air conditioner.
- Never stick fingers or any other body parts into the air conditioner openings. The internal fan may be rotating at high speeds, and may result in injury.
- After removing the filter, do not touch the fins in order to avoid injury.
- Maintenance must be performed by qualified professionals. Otherwise, you may experience personal injury or damage to the air conditioner and surrounding property.
- Do not repair the air conditioner by yourself. It may cause electric shock or damage. Please contact a qualified service representative when you need to repair the air conditioner.
- Do not block the air outlet or air inlet. This could cause a malfunction.
- Do not spill water on the remote control as this can permanently damage the remote.
- If the below problems occur, please turn off the air conditioner and disconnect power at the circuit breaker immediately. Then contact your dealer or a qualified professional for service.
  - The power cord is overheating or damaged.
  - There is an abnormal sound during operation.
  - The circuit breaker trips frequently.
  - The air conditioner gives off a burning smell.
  - The indoor unit is leaking.
- If the air conditioner operates under abnormal conditions, it may cause malfunctions, electric shock, or fire hazard.
- When turning the unit on or off via the emergency operation switch, press the switch with an insulated object other than metal.
- Do not step on the top panel of the unit, or put heavy objects on the top panel. This could cause damage or personal injury.
- Cleaning and user maintenance should not be performed by children without supervision.
- Do not spray water on the indoor unit. This could cause electric shock or a unit malfunction.
- Do not use flammable materials such as hair spray, lacquer, or paint near the air conditioner as they may catch fire.
- Do not operate the air conditioner in places near combustible gases. Emitted gases may collect around the air conditioner and cause an explosion.
- Do not use fire or a hair dryer to dry the filter. This could cause a deformation or fire hazard.
- Do not wash the air conditioner with water as this could cause an electric shock.
- Disconnect the power supply by turning it off at the circuit breaker when cleaning the air conditioner. Otherwise, you could risk electric shock.

**Electrical Safety**

- Do not modify the length of the power supply cord or use an extension cord to power the unit.
- If the supply cord is damaged, it must be replaced by the manufacturer, a service agent, or a similarly qualified person in order to avoid a safety hazard.
- Do not share the electrical outlet with other appliances. Improper or insufficient power supply can cause fire or electrical shock.
- The product must be properly grounded at the time of installation, or electrical shock may occur.
- For all electrical work, follow all local and national wiring standards and regulations. Connect cables tightly, and clamp them securely to prevent external forces from damaging the terminal. Improper electrical connections can overheat and cause fire, and may also cause shock. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
- All wiring must be properly arranged to ensure that the control board cover can close properly. If the control board cover is not closed properly, it can lead to corrosion and cause the connection points on the terminal to heat up, catch fire, or cause electrical shock.
- The air conditioner's circuit board (PCB) is designed with a fuse to provide over-current protection. The specifications of the fuse are printed on the circuit board.

## Installation Safety

- Installation must be performed by an authorized dealer or specialist. Improper installation can cause water leakage, electrical shock, or fire. (In North America, installation must be performed in accordance with NEC and CEC requirements by authorized personnel only.)
- Installation must be performed according to the installation instructions. Improper installation can cause water leakage, electrical shock, or fire.
- This air conditioner shall be installed in accordance with national and local wiring regulations.
- Contact an authorized service technician for repair or maintenance of this unit.
- Only use the included accessories, parts, and specified parts for installation. Using non-standard parts can cause water leakage, electrical shock, fire, and can cause the unit to fail.
- Install the unit in a firm location that can support the unit's weight. If the chosen location cannot support the unit's weight, or the installation is not done properly, the unit may fall and cause serious injury and damage.
- Install drainage piping according to the instructions in the installation manual. Improper drainage may cause water damage to your home and property.
- For units that have an auxiliary electric heater, do not install the unit within 3 feet (1 meter) of any combustible materials.
- Do not install the unit in a location that may be exposed to combustible gas leaks. If combustible gas accumulates around the unit, it may cause a fire.
- Do not turn on the power until all work has been completed.
- When moving or relocating the air conditioner, consult experienced service technicians for disconnection and re-installation of the unit.

## Additional Precautions

- Turn off the air conditioner and disconnect the power if you are not going to use it for a long time.
- Turn off the unit during electrical storms to avoid damaging the unit.
- Make sure that water condensation can drain unhindered from the unit.
- Do not operate the air conditioner with wet hands. This may cause electric shock.
- Do not use this device for any other purpose than its intended use.
- Do not climb onto or place objects on top of the outdoor unit.
- Do not allow the air conditioner to operate for long periods of time with doors or windows open, or if the humidity is very high.

# OPERATING TEMPERATURES

Your air conditioner is designed to operate in the following indoor and outdoor temperatures. When your air conditioner is used outside of the following temperature ranges, certain safety features may activate and turn off the unit to protect it from damage.

## TEMPERATURE RANGES

	<b>COOL mode</b>	<b>HEAT mode</b>	<b>DRY mode</b>
<b>Indoor Air Temperature</b>	62°F - 90°F (17°C - 32°C)	32°F - 86°F (0°C - 30°C)	50°F - 90°F (10°C - 32°C)
<b>Outdoor Air Temperature</b>	5°F - 122°F (-15°C - 50°C)	-13°F - 75°F (-25°C - 24°C)	32°F - 122°F (0°C - 50°C)

To further optimize the performance of your unit, do the following:

- Keep doors and windows closed.
- Limit energy usage by using TIMER ON and TIMER OFF features.
- Do not block air inlets or outlets.
- Regularly inspect and clean air filters.

### NOTE

 Your Durastar air conditioner's outdoor unit is equipped with a base pan heater, allowing it to continue to operate at freezing temperatures as low as -13°F (-25°C). When outdoor air temperatures are at or below 32°F (0°C), we strongly recommend keeping the unit plugged in at all times to ensure smooth ongoing performance.

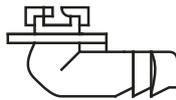
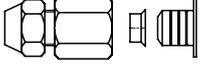
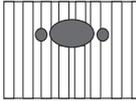
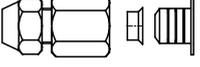
### NOTE

 Keep the room's relative humidity below 80%. If the air conditioner operates in excess of this, the surface of the air conditioner may attract condensation. To help prevent condensation from forming and dripping, set the vertical airflow louver to its maximum angle (vertically to the floor) and set the fan to HIGH.

# ACCESSORIES

## INCLUDED INSTALLATION ACCESSORIES

The air conditioning system comes with the following accessories. They may vary by model.

Accessory	Quantity	Image	Accessory	Quantity	Image
Installation Manual	1		Refrigerant Pipe Adapter (3/8"-1/2")	2-3	
Drain Joint	1		Refrigerant Pipe Adapter (1/2"-3/8")	0-2	
Drain Joint Seal	1		Refrigerant Pipe Adapter (1/2"-5/8")	0-2	
Rubber Foot	4		Refrigerant Pipe Adapter (1/4"-3/8")	0-2	

## FIELD SUPPLIED INSTALLATION ACCESSORIES

The following installation accessories may be required and must be purchased separately.

- Refrigerant lines
- Indoor and outdoor connection wire
- Outdoor power supply cord
- Drain hose
- Pipe and cable wrapping tape
- Wall hole sleeve and cover
- Putty
- Suspension bolts and necessary hardware to hang indoor unit (if necessary)
- Wiring u-lugs

## TOOLS NEEDED

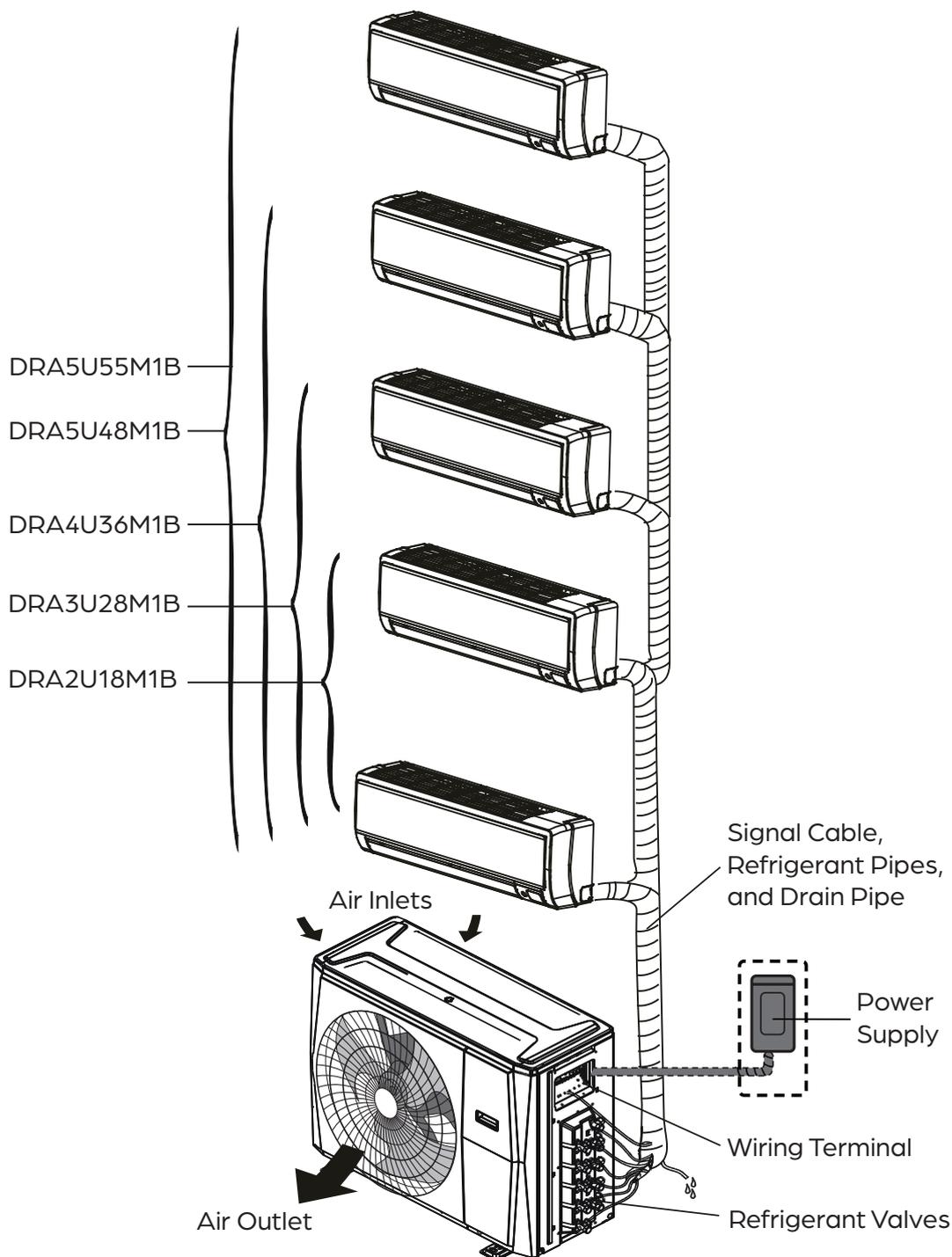
The following tools may be required for installation.

- Phillips screwdriver
- Drill with 2 1/2" or 3 1/2" (indoor unit model depending) core bit
- Vacuum pump
- HVAC manifold gauge set
- Micron Gauge
- Refrigerant leak detector
- Copper pipe cutter
- Flaring tool
- Burr reamer
- Crescent or spanner wrench
- Hexagonal wrench set
- Torque wrench
- Hammer
- Wire strippers
- Wire crimper
- Multimeter
- Electroprobe
- Level

## PARTS IDENTIFICATION

**WARNING**

When installing a Multi-zone outdoor unit, a minimum of 2 associated indoor units must be installed and operational for the system to operate properly.

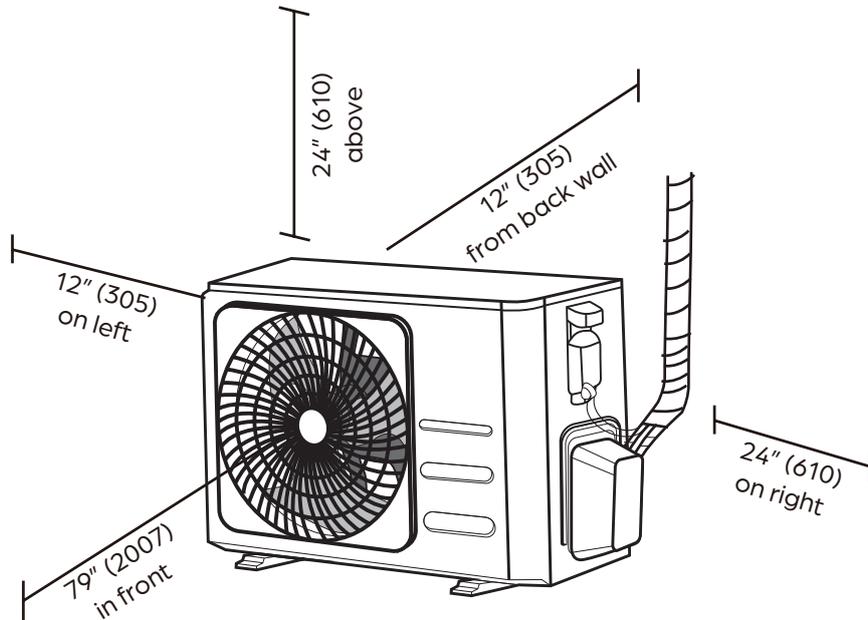
**NOTE**

Illustrations in this manual are for explanatory purposes. The actual shape of your mini-split equipment may vary slightly. Indoor units may also vary in configuration.

## OUTDOOR UNIT INSTALLATION

**NOTE**

The installation must be performed in accordance with the required local and national standard. The installation may be slightly different in certain areas.



### STEP 1: SELECT INSTALLATION LOCATION

Before installing the outdoor unit, you must choose an appropriate location. The following are standards that will help you choose an appropriate location for the unit.

**Proper installation locations meet the following standards:**

- Meets all spatial requirements shown in installation space requirements above.
- Good air circulation and ventilation.
- Firm and solid location—the location can support the unit's weight and will not vibrate.
- Noise from the unit will not disturb others.
- Protected from prolonged periods of direct sunlight or rain.

**NOTE**

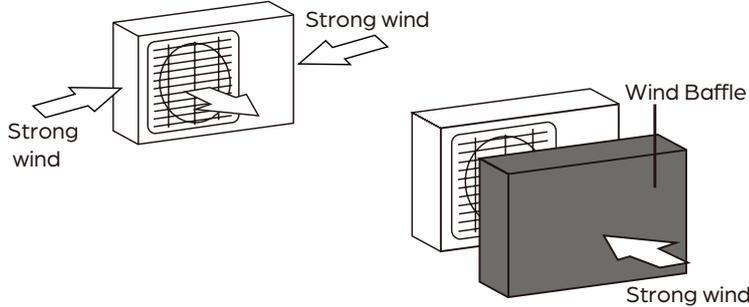
Where snowfall is anticipated, raise the unit above the base pad to prevent ice buildup and coil damage. Mount the unit high enough to be above the average accumulated area snowfall. The minimum height must be 18 inches.

**DO NOT install unit in the following locations:**

- Near an obstacle that will block air inlets and outlets.
- Near a public street, crowded areas, or where noise from the unit will disturb others.
- Near animals or plants that will be harmed by hot air discharge.
- Near any source of combustible gas.
- In a location that is exposed to large amounts of dust.
- In a location exposed to an excessive amount of salty air.

**Special considerations for extreme weather**

If the unit is exposed to heavy wind, install unit so that air outlet fan is at a 90° angle to the direction of the wind. If needed, build a barrier in front of the unit to protect it from extremely heavy winds. See figures below.

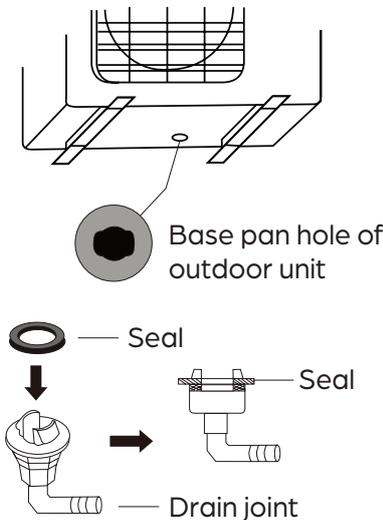


**If the unit is frequently exposed to heavy rain or snow**

Build a shelter above the unit to protect it from rain or snow. Be careful not to obstruct airflow around the unit.

**STEP 2: INSTALL THE DRAIN JOINT**

1. Fit the rubber seal on the end of the drain joint that will connect to the outdoor unit.
2. Insert the drain joint into the hole in the base pan of the unit.
3. Rotate the drain joint 90° until it clicks in place facing the front of the unit.
4. Connect a drain hose extension (not included) to the drain joint to redirect water from the unit during heating mode.



**NOTE**  
 In cold climates, make sure that the drain hose is as vertical as possible to ensure swift water drainage. If water drains too slowly, it can freeze in the hose and flood the unit.

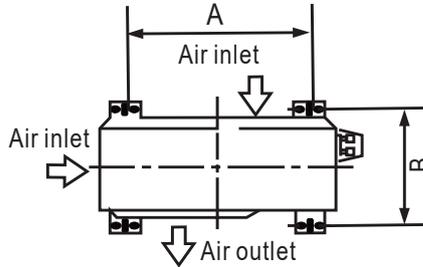
**STEP 3: MOUNT THE OUTDOOR UNIT**

**Anchoring the Unit**

The outdoor unit can be anchored to the ground or to a wall-mounted bracket (sold separately) with bolts (M10). Mount the unit on a cement slab, condenser mounting pad, or other level surface able to support the unit's weight. **Do not place the unit directly on the ground.** If using a wall-mounting bracket, make sure the attached structure can support at least four times the unit's weight.

## Unit Mounting Dimensions

The distance between their mounting feet varies by outdoor unit. Prepare the installation base of the unit according to the dimensions below. In most cases, it may be easier to place the outdoor unit in its correct location and mark the exact placement for the anchor holes.



Outdoor Unit - Dimensions W x H x D inches (mm)	Mounting Dimensions	
	Dist. A inches (mm)	Dist. B inches (mm)
DRA2U18M1B - 35 1/16" x 26 1/2" x 13 7/16" (890 x 673 x 342)	26-1/8" (663)	13-15/16" (354)
DRA3U28M1B - 37 1/4" x 31 7/8" x 16 1/8" (946 x 810 x 410)	26-1/2" (673)	15-7/8" (403)
DRA4U36M1B - 37 1/4" x 31 7/8" x 16 1/8" (946 x 810 x 410)	26-1/2" (673)	15-7/8" (403)
DRA5U48M1B - 37 1/2" x 52 1/2" x 16 5/16" (952 x 1333 x 415)	24-15/16" (634)	15-15/16" (404)
DRA5U55M1B - 37 1/2" x 52 1/2" x 16 5/16" (952 x 1333 x 415)	24-15/16" (634)	15-15/16" (404)

## Installing multiple outdoor units

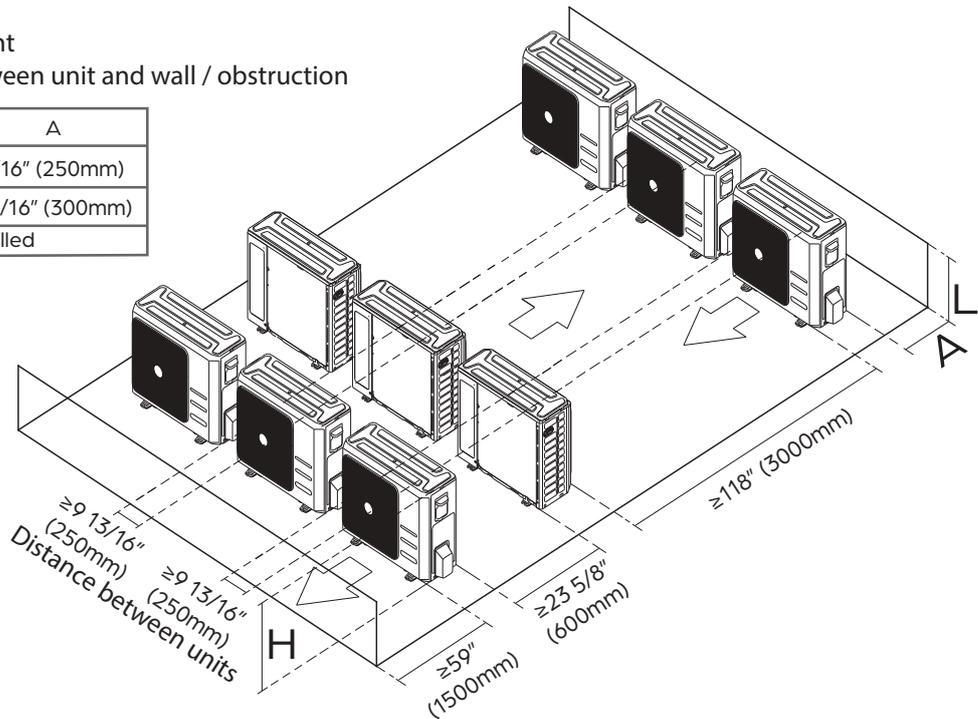
If installing multiple outdoor units, refer to the diagram below for proper clearances.

H = Outdoor unit height

L = Wall / Obstruction height

A = Required distance between unit and wall / obstruction

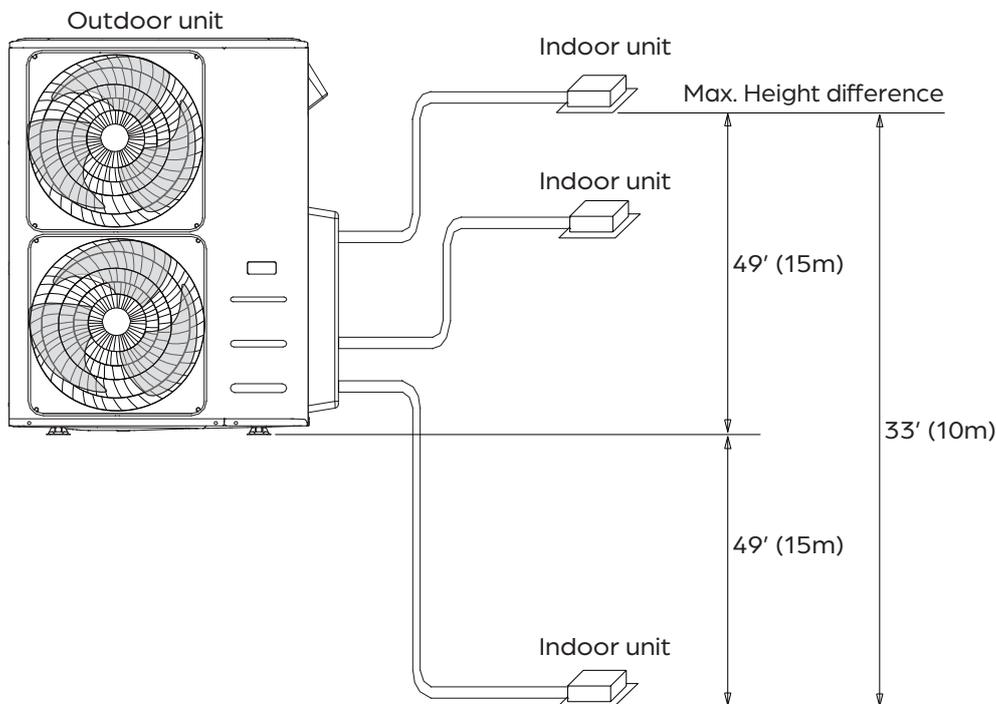
	L	A
L ≤ H	L ≤ 1/2H	≥ 9 13/16" (250mm)
	1/2H < L ≤ H	≥ 11 13/16" (300mm)
L > H	Can not be installed	



### Pipe length and unit height difference maximums

When installing multiple indoor units with a single outdoor unit, ensure that the length of the refrigerant pipe and the drop height between the outdoor and indoor units, and between indoor units, meets the requirements below.

	DRA2U18M1B	DRA3U28M1B	DRA4U36M1B	DRA5U48M1B	DRA5H55M1B
Max. length for all rooms	131' (40m)	197' (60m)	262' (80m)	262' (80m)	262' (80m)
Max. length for one indoor unit	82' (25m)	98' (30m)	115' (35m)	115' (35m)	115' (35m)
Max. height difference between outdoor and indoor unit	49' (15m)				
Max. height difference between indoor units	33' (10m)				



### STEP 4: CONNECT THE SIGNAL AND POWER CABLES

The outside unit's terminal block is protected by an electrical wiring cover on the side of the unit. A comprehensive wiring diagram is printed on the inside of the wiring cover.



#### WARNING

Before performing any electrical or wiring work, turn off the main power to the system.

### USE THE RIGHT CABLE

- Indoor Power/ Signal Cable: 14/4 stranded, unshielded
- Outdoor Power Cable: Determined by amperage of system and the local codes in your area.

## Choose the Correct Size of Cable

The size of the power supply cable, signal cable, fuse, and switch needed is determined by the maximum current of the unit. The maximum current is indicated on the nameplate located on the side panel of the unit. Refer to this nameplate to choose the right cable (stranded wire preferred), fuse, or switch.

## Prepare the cable and wires for connection:

- Using wire strippers, strip the rubber jacket from both ends of cable to reveal about 1.5" (38-40mm) of the wires inside.
- Strip the insulation from the ends of the wires.
- Using a wire crimper, crimp u-lugs on the ends of the wires.



### WARNING

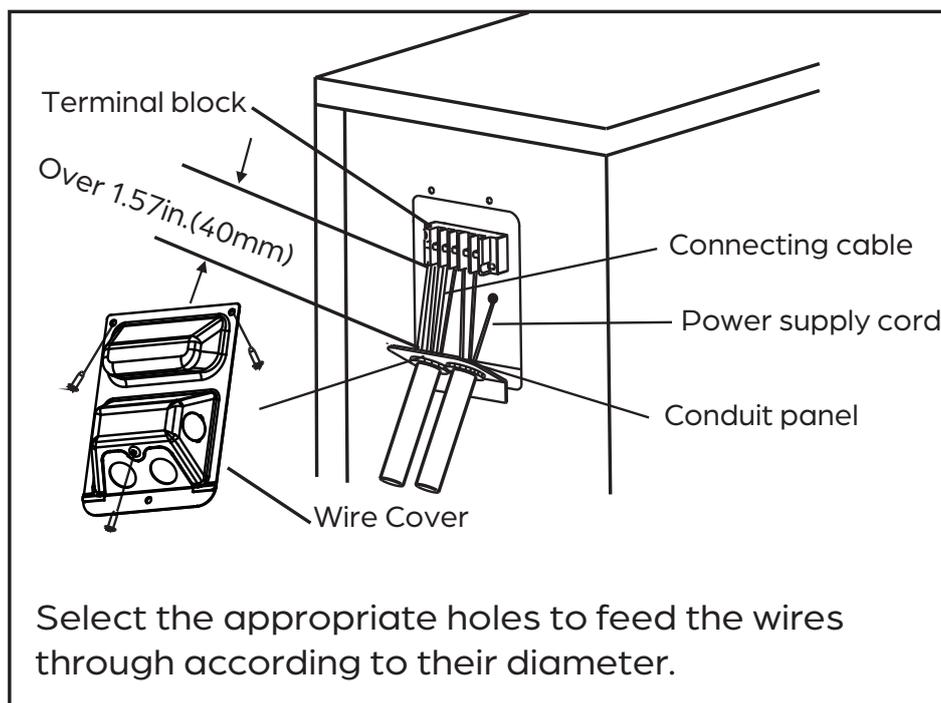
Pay attention to the live wire. While crimping wires, make sure you clearly distinguish the Live ("L") Wire from other wires.



### WARNING

All wiring work must be performed strictly in accordance with the wiring diagram located inside the terminal cover of the outdoor unit.

1. Remove the electrical wiring cover.
2. Remove the caps on the conduit panel.
3. Temporarily mount the conduit tubes (sold separately) onto the conduit panel.
4. Properly connect both the power supply and low voltage lines to the corresponding terminals on the terminal block.
5. Ground the unit in accordance with local codes.
6. Be sure to cut the wire several inches longer than the required length for future maintenance.
7. Permanently secure the conduit tubes to the conduit panel.
8. Replace the wire cover on the side of the unit, and screw it in place.



# REFRIGERANT PIPING CONNECTIONS



**WARNING**

When connecting refrigerant piping, do not let substances or moisture other than specified refrigerant enter the unit or pipes. Run nitrogen through the refrigerant tubing when brazing to avoid carbon build up. The presence of foreign materials will lower the unit's capacity and can cause abnormally high pressure in the refrigeration system. This can result in explosion and personal injury.

**REFRIGERANT PIPE LENGTH**

The length of refrigerant piping will affect the performance and efficiency of the unit. Nominal efficiency is tested with a pipe length of 25 feet (7.6 meters). A minimum pipe run of 10 feet (3 meters) is required to minimize vibration and excessive noise.

Refer to the table on page 13 for specifications on the maximum length and drop height of refrigerant piping.

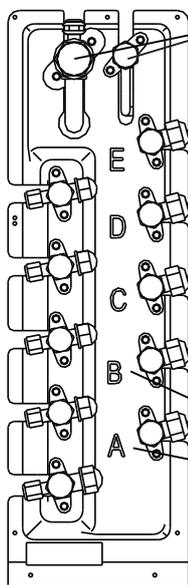
**Note on refrigerant valve selection for indoor units**

For DRA3U28M1B and DRA4U36M1B:

If installing a 24,000 BTU indoor unit, only connect the unit to the valve ports labeled "A" on the outdoor unit.

For DRA5U48M1B and DRA5U55M1B:

If installing one 24,000 BTU indoor unit, only connect the unit to the valve ports labeled "A" on the outdoor unit. If installing two 24,000 BTU indoor units, only connect the units to the valve ports labeled "A" and "B" on the outdoor unit.



Master Valves

Refrigerant connecting pipe sizes for indoor units

Indoor Unit capacity (Btu/h)	Liquid	Gas
6K/9K/12K	1/4"	3/8"
12K & 18K	1/4"	1/2"
24K	3/8"	5/8"

"A" and "B" valve ports.

**Note on master valves**

For DRA3U28M1B, DRA4U36M1B, DRA5U48M1B, and DRA5U55M1B

Initial startup

Once installation is complete, open all zone valves connected to an indoor unit. Connect the high side hose of the manifold gauge to the gas side master valve to gain access to all connected zones. Perform leak check procedures. Afterwards, remove the high side hose and attach the low side hose from the manifold to evacuate all connected zones.

Once a vacuum is maintained, open both master valves to release the refrigerant charge into the entire system. After all the refrigerant is released, both master valves and all zone valves connected to an IDU must remain open for proper operation.



**WARNING**

After startup, the master valves and all zone valves connected to an IDU must remain open for proper operation.

Post start-up and servicing

Once the system is operational, the master valves can be used to access the entire system for servicing and troubleshooting. If a repair requires the entire refrigerant charge to be removed, the master valves will allow the recovery of all system refrigerant. Simply connect the low side hose of the manifold gauge directly to the gas side master valve to recover refrigerant. Once repair is complete, use the high side hose of the manifold to leak check. Then, connect the low side hose again to pull a vacuum and charge the system. After service is complete, both master valves and all zone valves connected to an IDU must remain open for proper operation.

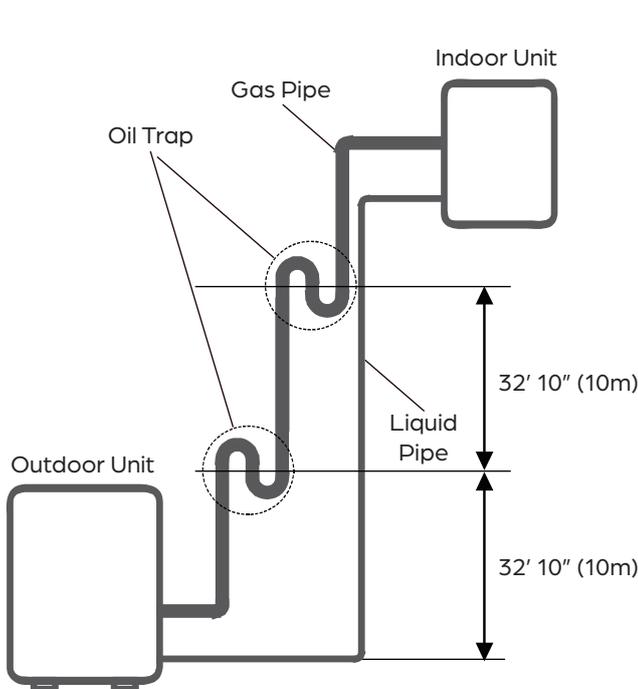


**WARNING**

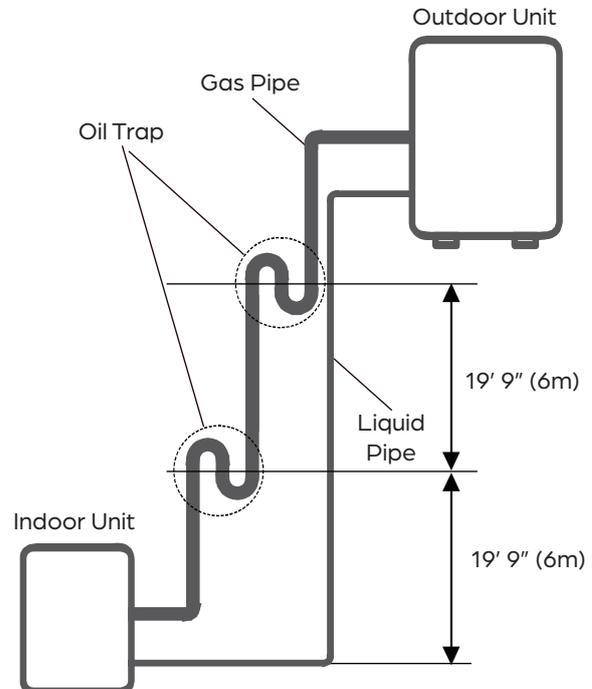
After servicing, the master valves and all zone valves connected to an IDU must remain open for proper operation.

**OIL TRAPS**

Oil traps are necessary for the continued performance of the system if the indoor and outdoor units are installed at significantly different heights.



Required distance between oil traps when the indoor unit is installed higher than the outdoor unit.



Required distance between oil traps when the outdoor unit is installed higher than the indoor unit.

**If the indoor unit is installed higher than the outdoor unit:**

Oil may flow back into the outdoor unit's compressor and cause liquid compression. This will lead to deterioration of performance and shorten the life of the compressor. Oil traps in the rising gas piping can prevent this and should be installed every 32'10" (10m) of vertical rise.

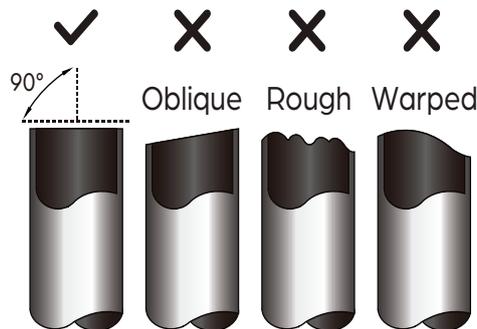
**If the outdoor unit is installed higher than the indoor unit:**

Proper oil return to the compressor must be maintained with the suction gas velocity. If velocities drop below 1500fpm, oil return will be decreased and lead to deterioration of performance and shorten the life of the compressor. Oil traps in the rising gas piping can prevent this and should be installed every 19'9" (6m) of vertical rise.

**REFRIGERANT PIPE CONNECTION INSTRUCTIONS****STEP 1: CUT PIPES**

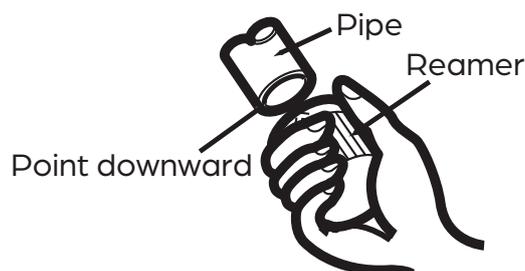
When preparing refrigerant pipes, take extra care to cut and flare them properly. This will ensure efficient operation and minimize leaks and the need for future maintenance.

1. Measure the distance between the indoor and outdoor units.
2. Using a pipe cutter, cut the pipe length a little longer than the measured distance.
3. Make sure that the pipe is cut at a perfect 90° angle.
4. Do not damage, deform, or dent the pipe while cutting.

**STEP 2: REMOVE BURRS**

Burrs can affect the airtight seal of the refrigerant piping connection and must be completely removed.

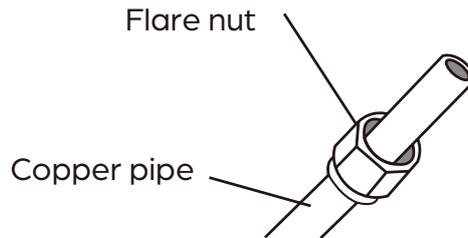
1. Hold the pipe at a downward angle to prevent burrs from falling into the pipe.
2. Using a reamer or deburring tool, remove all burrs from the cut section of the pipe.



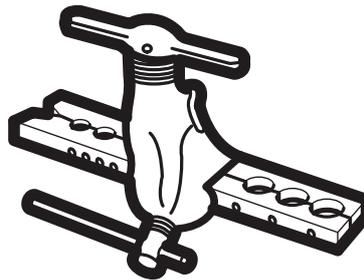
## STEP 3: FLARE PIPE ENDS

Proper flaring is essential to achieve an airtight seal.

1. After removing burrs from cut pipe, seal the ends with PVC tape to prevent foreign materials from entering the pipe.
2. Sheath pipe with insulating material.
3. Place flare nuts on both ends of the pipe. Make sure they are facing in the right direction as you cannot change their orientation after flaring.

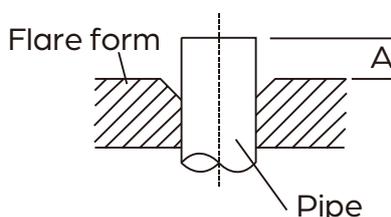


4. Remove PVC tape from ends of pipe when ready to perform flaring.
5. Clamp flare form on the end of pipe. The end of the pipe must extend beyond the edge of the flare form in accordance with the pipe extension table.



## PIPE EXTENSION BEYOND FLARE FORM

Outer Diameter of Pipe Inches (mm)	"A" Minimum Extension Inches (mm)	"A" Maximum Extension Inches (mm)
∅ 1/4" (6.4mm)	0.0275" (0.7mm)	0.05" (1.3mm)
∅ 3/8" (9.5mm)	0.04" (1.0mm)	0.063" (1.6mm)
∅ 1/2" (12.7mm)	0.04" (1.0mm)	0.07" (1.8mm)
∅ 5/8" (15.9mm)	0.078" (2.0mm)	0.086" (2.2mm)
∅ 3/4" (19.1mm)	0.078" (2.0mm)	0.094" (2.4mm)



### TIP: THICKNESS COMPARISON

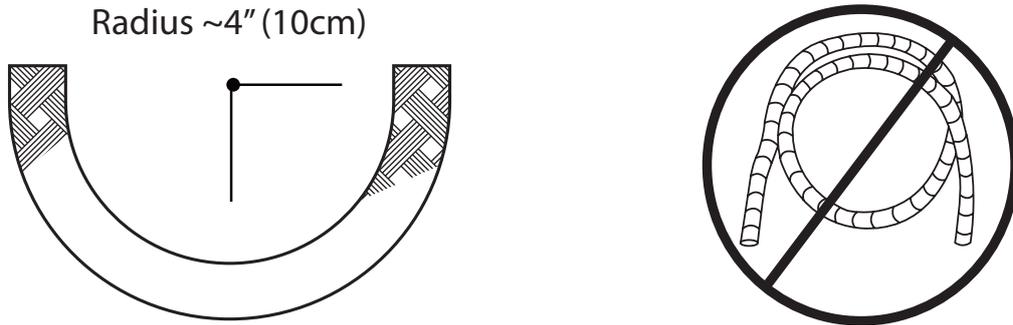
- 0.0275" = A Thumbnail
- 0.04" = A Dime
- 0.078" = A Nickle

6. Place flaring tool onto the form.
7. Turn the handle of the flaring tool clockwise until the pipe is fully flared.
8. Remove the flaring tool and flare form, then inspect the pipe for cracks and even flaring.

**STEP 4: CONNECT PIPES**

When connecting refrigerant pipes, be careful not to use excessive torque or to deform the piping in any way. You should first connect the low-pressure pipe, then the high-pressure pipe.

When bending connective refrigerant piping, the minimum bending radius is 4 inches (10cm). Do not leave coils in the refrigerant line sets. Remove excess line length to ensure proper system operation.

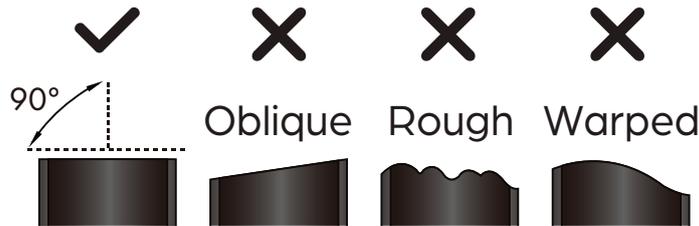




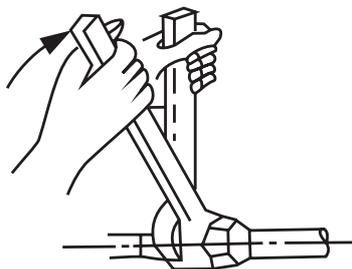
**WARNING**  
Do not leave coils in the refrigerant line sets. All excess line length must be removed to ensure proper system operation.

**CONNECTING PIPING TO INDOOR UNIT**

1. Align the center of the two pipes that you will connect.



2. Tighten the flare nut as tightly as possible by hand.
3. Using a spanner, grip the nut on the unit tubing.
4. While firmly gripping the nut on the unit tubing, use a torque wrench to tighten the flare nut according to the torque values in the table on the next page. Loosen the flaring nut slightly, then tighten again.



Outer Diameter of Pipe Inches (mm)	Tightening Torque lb-ft (Nm)	Flare Dimension "B" Inches (mm)	Flare Shape
Ø 1/4" (6.4mm)	13.3~14.8 (18~20)	0.33~0.34 (8.4~8.7)	
Ø 3/8" (9.5mm)	23.6~28.8 (32~39)	0.52~0.53 (13.2~13.5)	
Ø 1/2" (12.7mm)	36.1~43.5 (49~59)	0.64~0.65 (16.2~16.5)	
Ø 5/8" (15.9mm)	42~52.4 (57~71)	0.76~0.78 (19.2~19.7)	
Ø 3/4" (19.1mm)	49.4~74.5 (67~101)	0.91~0.93 (23.2~23.7)	

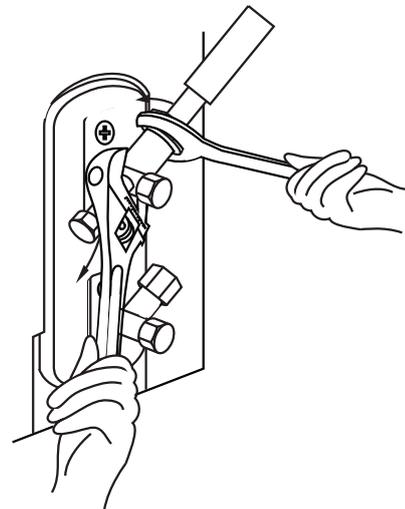
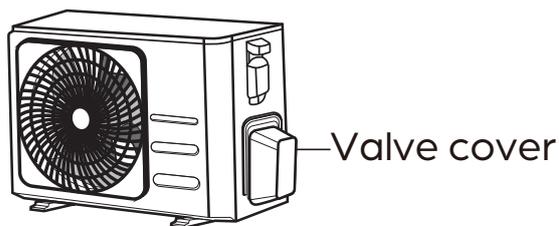


**WARNING**

Do not use excessive torque. Excessive force can break the nut or damage the refrigerant piping. You must not exceed the torque requirements shown in the table above.

**CONNECTING PIPING TO OUTDOOR UNIT**

1. Remove the valve cover on the side of the outdoor unit.
2. Remove the protective caps from the ends of the valves.
3. Align flared pipe end with each valve and tighten the flare nut as tightly as possible by hand.
4. Using a spanner, grip the body of the valve. Do not grip the nut that seals the service valve.
5. While firmly gripping the body of the valve, use a torque wrench to tighten the flare nut according to the correct torque values in the table above.
6. Loosen the flare nut slightly, then tighten again.
7. Repeat steps 3-6 for the remaining pipe.



## SYSTEM EVACUATION

**PREPARATIONS AND PRECAUTIONS**

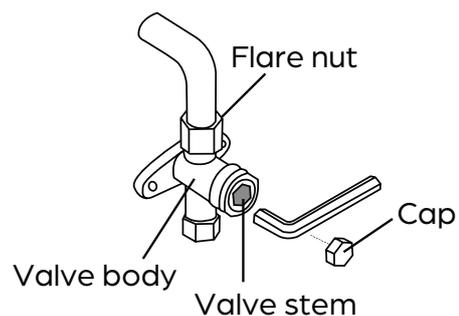
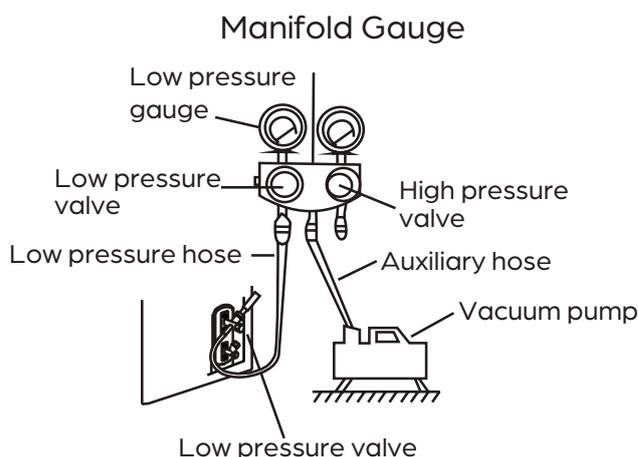
Air and foreign matter in the refrigerant system can cause abnormal rises in pressure, which can damage the air conditioner, reduce energy efficiency, and cause injury. Use a vacuum pump and manifold gauge to evacuate the refrigerant system, removing any non-condensable gas and moisture from the system. Evacuation should be performed upon initial installation and if unit is relocated.

## BEFORE PERFORMING EVACUATION

1. Check to make sure the refrigerant pipes connecting the indoor and outdoor units are connected properly and leak free.
2. Check to make sure all wiring is connected properly.

## EVACUATION INSTRUCTIONS

1. Connect the high pressure side hose of the manifold gauge to the service port on the outdoor unit's service valve.
2. Connect the hose from the auxiliary port of the manifold gauge to the nitrogen tank.
3. Open the high pressure side of the manifold gauge. Keep the low pressure side closed.
4. Open the nitrogen tank valve and pressurize the system to 600PSIG.
5. Close nitrogen tank valve and high pressure side of the manifold gauge.
6. Wait 15 minutes, then check that there has been no change in pressure.
7. If pressure loss is greater than 5PSIG, a leak may be present. Using the Soap and Bubble Method, locate and fix all leaks. Start back at step 1 once all leaks have been fixed.
8. If there is no change in pressure, remove the auxiliary port of the manifold gauge from the nitrogen tank.
9. Release the pressure in the system by opening up the high side of the manifold gauge.
10. Once pressure has been released, remove the high pressure side hose of the manifold gauge from the service port and replace it with the low pressure side hose.
11. Connect the hose of the auxiliary port of the manifold gauge to the vacuum pump and a MICRON GAUGE.
12. Turn on the vacuum pump to evacuate the system.
13. Run the vacuum until the micron gauge reads 250 microns.
14. Once the micron gauge reads 250 microns, close the low pressure side of the manifold gauge and turn off the vacuum pump. System must hold below 500 microns for 15 minutes with the vacuum pump off.
15. If there is a change in pressure, a leak may be present. Using the Soap and Bubble Method, locate and fix all leaks. Start back at step 1 once all leaks have been fixed.
16. If there is no change in pressure, remove the manifold gauge auxiliary hose from the vacuum pump.
17. Remove the caps from the unit's valve bodies, and open the system's valves gently with a hex wrench by turning it counterclockwise until they reach their stopping point. Do not try to force the valves to open further.



## NOTE ON ADDING ADDITIONAL REFRIGERANT

Each outdoor unit is factory charged with enough refrigerant to support up to 25' (7.5m) per zone. This is based on a one way liquid line measurement from the outdoor unit to the indoor unit. For example,  $(N \times 25' = T)$  where "T" is the total length of line set that can be supported by the units factory charge and "N" is the number of zones available for use (eg. The DRA3 outdoor system has zone A, B, and C available or 3 zones [ $3 \times 25' = 75'$ ]) So the total length of line set that the DRA3 can support in one direction is 75' distributed between the 3 (or less) zones available.) Systems with line sets that exceed this length will require additional refrigerant (see the following chart). The refrigerant should be charged from the service port on the outdoor unit's low pressure valve. Additional refrigerant information can be found in the **SUBMITTALS DOCUMENTS** at **WWW.SERVICE.DURASTAR.COM**. Additional refrigerant can be calculated using the following formula:

Liquid Side $\varnothing$ 1/4" (6.35mm)	Liquid Side $\varnothing$ 3/8" (9.52mm)
(Actual pipe length – Standard pipe length) x 0.16oz/ft or (Actual pipe length – Standard pipe length) x 15g/m	(Actual pipe length – Standard pipe length) x 0.32oz/ft or (Actual pipe length – Standard pipe length) x 30g/m



### WARNING

DO NOT mix refrigerant types.

## FINAL CHECKS

### BEFORE THE TEST RUN

Only perform the test run after you have completed the following steps:

- Electrical Safety Checks – Confirm that the unit's electrical system is connected and operating correctly.
- Gas Leak Check – Check all flare nut connections and confirm the system is not leaking.
- Confirm that the low and high pressure valves are fully open.
- Check grounding work by measuring the grounding resistance by visual detection and with a multimeter. The grounding resistance must be less than 0.1  $\Omega$ .

### ELECTRICAL SAFETY CHECKS

After installation, confirm that all electrical wiring is installed in accordance with local and national regulations, and according to this installation manual.

### DURING TEST RUN

Using your multimeter, verify the voltage of the main power entering the system. If the main power voltage is greater than  $\pm 10\%$  of the name plate voltage, turn off the unit and immediately call a licensed electrician to find and resolve the cause.



### WARNING

RISK OF ELECTRICAL SHOCK – All wiring must comply with local and national electrical codes, and must be installed by a licensed electrician.

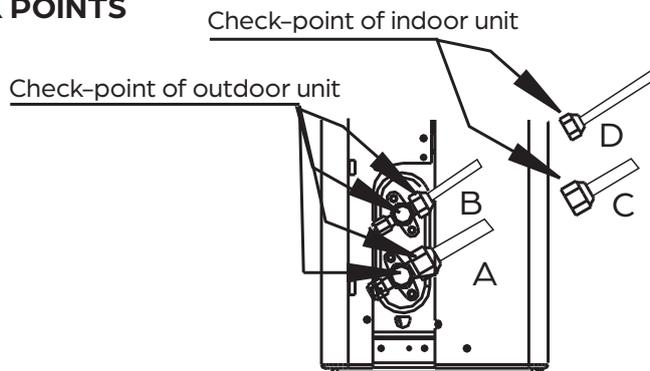
### GAS LEAK CHECK

There are two methods to check for gas leaks:

1. Soap and Water Method – Using a soft brush, apply a soapy water or liquid detergent to all pipe connection points on the indoor and outdoor unit. The presence of bubbles indicates a leak.

2. Leak Detector Method – If using a leak detector, refer to the device's operation manual for proper usage instructions.

**GAS LEAK CHECK POINTS**



A: Low pressure stop valve  
 B: High pressure stop valve  
 C & D: Indoor unit flare nuts



**TIP**

Use the Durastar Job Site Information Sheet at the end of this manual as a commissioning report to record your start up readings.

**TEST RUN**

**TEST RUN INSTRUCTIONS**

You should perform the test run for at least 30 minutes.

1. Connect power to the unit.
2. Press the ON/OFF button on the remote controller or wired thermostat to turn the unit on.
3. Press the MODE button to scroll through the following functions, one at a time:
  - COOL – Select lowest possible temperature.
  - HEAT – Select highest possible temperature.
4. Let each function run for 5 minutes and perform the following checks:

LIST OF CHECKS TO PERFORM	[ X ]
Unit is Properly Grounded	[ ]
All Electrical Terminals are Properly Covered	[ ]
Indoor and Outdoor Units are Solidly Installed	[ ]
All Pipe Connection Points Do Not Leak	[ ]
Water Drains Properly from Drain Hose	[ ]
All Piping is Properly Insulated	[ ]
Unit Performs COOL Function Properly	[ ]
Unit Performs HEAT Function Properly	[ ]
Indoor Unit Louvers Move Properly	[ ]
Indoor Unit Responds to Remote Controller or Thermostat	[ ]

5. Double check all pipe connections. During operation, the pressure of the refrigerant system will increase. This may reveal leaks that were not present during the initial leak check. Take time during the test run to recheck all pipe connection points. Refer to *Gas Leak Check* section for instructions.

# TROUBLESHOOTING

## SAFETY PRECAUTIONS

If ANY of the following conditions occurs, turn off your unit immediately!

- The power cord is damaged or abnormally warm
- You smell a burning odor
- The unit emits loud or abnormal sounds
- A power fuse blows or the circuit breaker frequently trips
- Water or other objects fall into or out of the unit

DO NOT ATTEMPT TO FIX THESE YOURSELF! CONTACT AN AUTHORIZED SERVICE PROVIDER IMMEDIATELY!

## COMMON ISSUES

The following problems are not a malfunction and in most situations will not require repairs.

ISSUE	POSSIBLE CAUSES
<b>Unit does not turn on when pressing ON/OFF button</b>	The Unit has a 3-minute protection feature that prevents the unit from overloading. The unit cannot be restarted within three minutes of being turned off.
<b>The unit changes from COOL/HEAT mode to FAN mode</b>	The unit may change its setting to prevent frost from forming on the unit. Once the temperature increases, the unit will start operating in the previously selected mode again.
	The set temperature has been reached, at which point the unit turns off the compressor. The unit will continue operating when the temperature fluctuates again.
<b>The indoor unit emits white mist</b>	In humid regions, a large temperature difference between the room's air and the conditioned air can cause white mist.
<b>Both the indoor and outdoor units emit white mist</b>	When the unit restarts in HEAT mode after defrosting, white mist may be emitted due to moisture generated during the defrosting process.
<b>The indoor unit makes noises</b>	A rushing air sound may occur when the louver resets its position.
	A squeaking sound may occur after running the unit in HEAT mode due to expansion and contraction of the unit's plastic parts.

ISSUE	POSSIBLE CAUSES
<b>Both the indoor unit and outdoor unit make noises</b>	Low hissing sound during operation: This is normal and is caused by refrigerant gas flowing through both indoor and outdoor units.
	Low hissing sound when the system starts, has just stopped running, or is defrosting: This noise is normal and is caused by the refrigerant gas stopping or changing direction.
	Squeaking sound: Normal expansion and contraction of plastic and metal parts caused by temperature changes during operation can cause squeaking noises.
<b>The outdoor unit makes noises</b>	The unit will make different sounds based on its current operating mode.
<b>Dust is emitted from either the indoor or outdoor unit</b>	The unit may accumulate dust during extended periods of non-use, which will be emitted when the unit is turned on. This can be mitigated by covering the unit during long periods of inactivity.
<b>The unit emits a bad odor</b>	The unit may absorb odors from the environment (such as furniture, cooking, cigarettes, etc.) which will be emitted during operations.
	The unit's filters have become moldy and should be cleaned.
<b>The fan of the outdoor unit does not operate</b>	During operation, the fan speed is controlled to optimize product operation.
<b>Operation is erratic, unpredictable, or unit is unresponsive</b>	Interference from cell phone towers and remote boosters may cause the unit to malfunction. In this case, try the following: <ul style="list-style-type: none"> <li>• Disconnect the power, then reconnect.</li> <li>• Press ON/OFF button on remote control to restart operation.</li> </ul>

**NOTE**



If problem persists, contact a local dealer or your nearest customer service center. Provide them with a detailed description of the unit malfunction as well as your model number.

## TROUBLESHOOTING

When troubles occur, please check the following points before contacting a repair company.

PROBLEM	POSSIBLE CAUSES	SOLUTION
<b>Poor Cooling Performance</b>	Temperature setting may be higher than ambient room temperature	Lower the temperature setting
	The heat exchanger on the indoor or outdoor unit is dirty	Clean the affected heat exchanger
	The air filter is dirty	Remove the filter and clean it according to instructions
	The air inlet or outlet of either unit is blocked	Turn the unit off, remove the obstruction and turn it back on
	Doors and windows are open	Make sure that all doors and windows are closed while operating the unit
	Excessive heat is generated by sunlight	Close windows and curtains during periods of high heat or bright sunshine
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary and top off refrigerant
	Excessive heat is generated by sunlight	Block sunlight in installation area
	Too many sources of heat in the room (people, computers, electronics, etc.)	Reduce amount of heat sources
<b>Poor Heating Performance</b>	The outdoor temperature is extremely low	This model is designed to work down to -13°F, however, heating performance is impacted at temperatures below freezing
	Cold air is entering through doors and windows	Make sure that all doors and windows are closed during use
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary, and top off refrigerant
<b>The unit starts and stops frequently</b>	There's too much or too little refrigerant in the system	Check for leaks and recharge the system with refrigerant
	Incompressible gas or moisture has entered the system	Evacuate and recharge the system with refrigerant
	The compressor is broken	Replace the compressor
	The voltage is too high or too low	Install a manostat to regulate the voltage

PROBLEM	POSSIBLE CAUSES	SOLUTION
<b>The unit is not working</b>	Power failure	Wait for the power to be restored
	The power is turned off	Turn on the power
	The fuse is burned out	Replace the fuse
	Remote control batteries are dead	Replace batteries
	The Unit's 3-minute protection has been activated	Wait three minutes after restarting the unit
	Timer is activated	Turn timer off
<b>Indicator lamps continue flashing or error code appears</b>	<p>The unit may stop operation or continue to run safely. If the indicator lamps continue to flash or error codes appear, wait for about 10 minutes. The problem may resolve itself.</p> <p>If not, disconnect the power, then connect it again. Turn the unit on.</p> <p>If the problem persists, disconnect the power and contact your nearest customer service center.</p>	

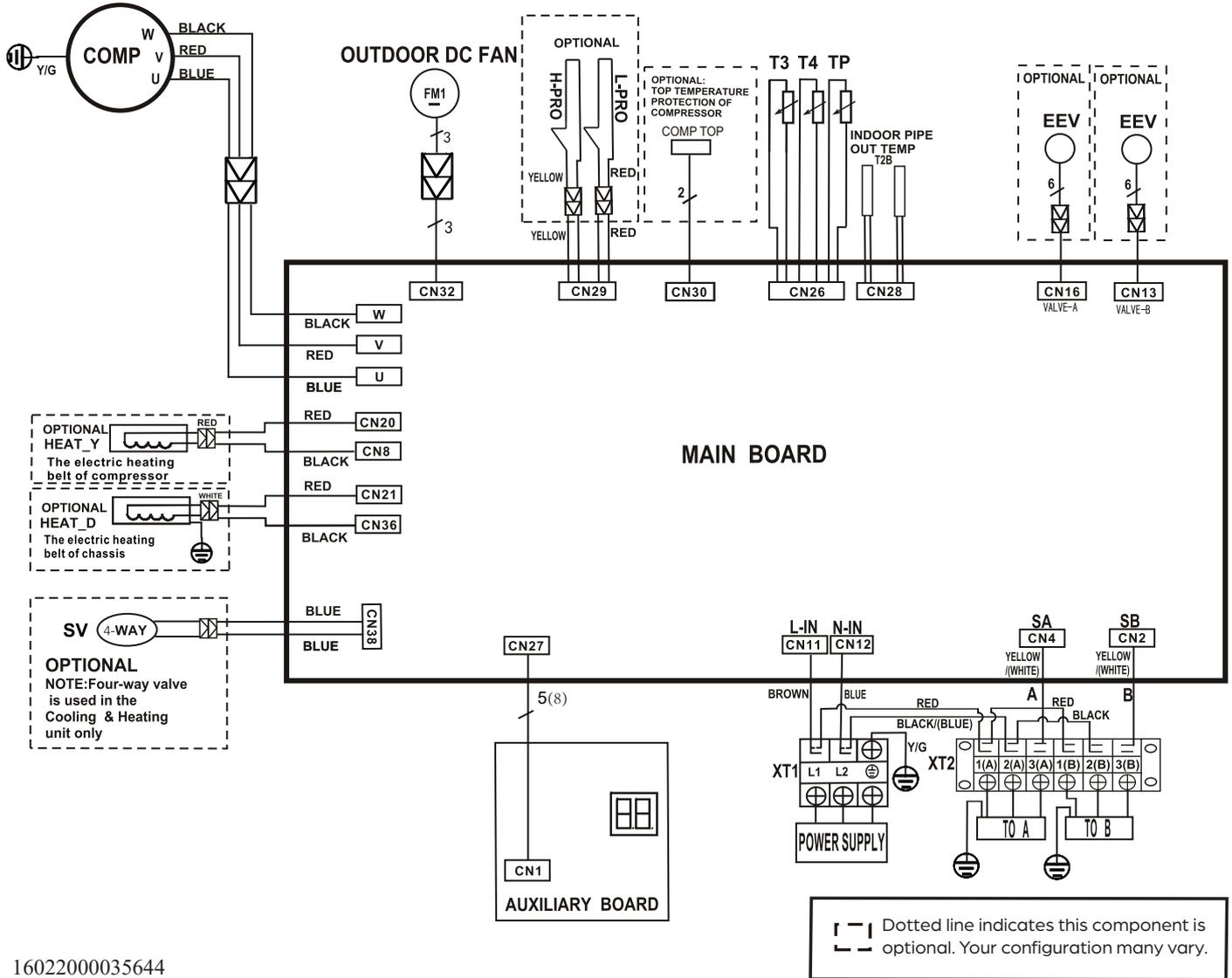


**NOTE**

If your problem persists after performing the checks and diagnostics above, turn off your unit immediately and contact an authorized service center.

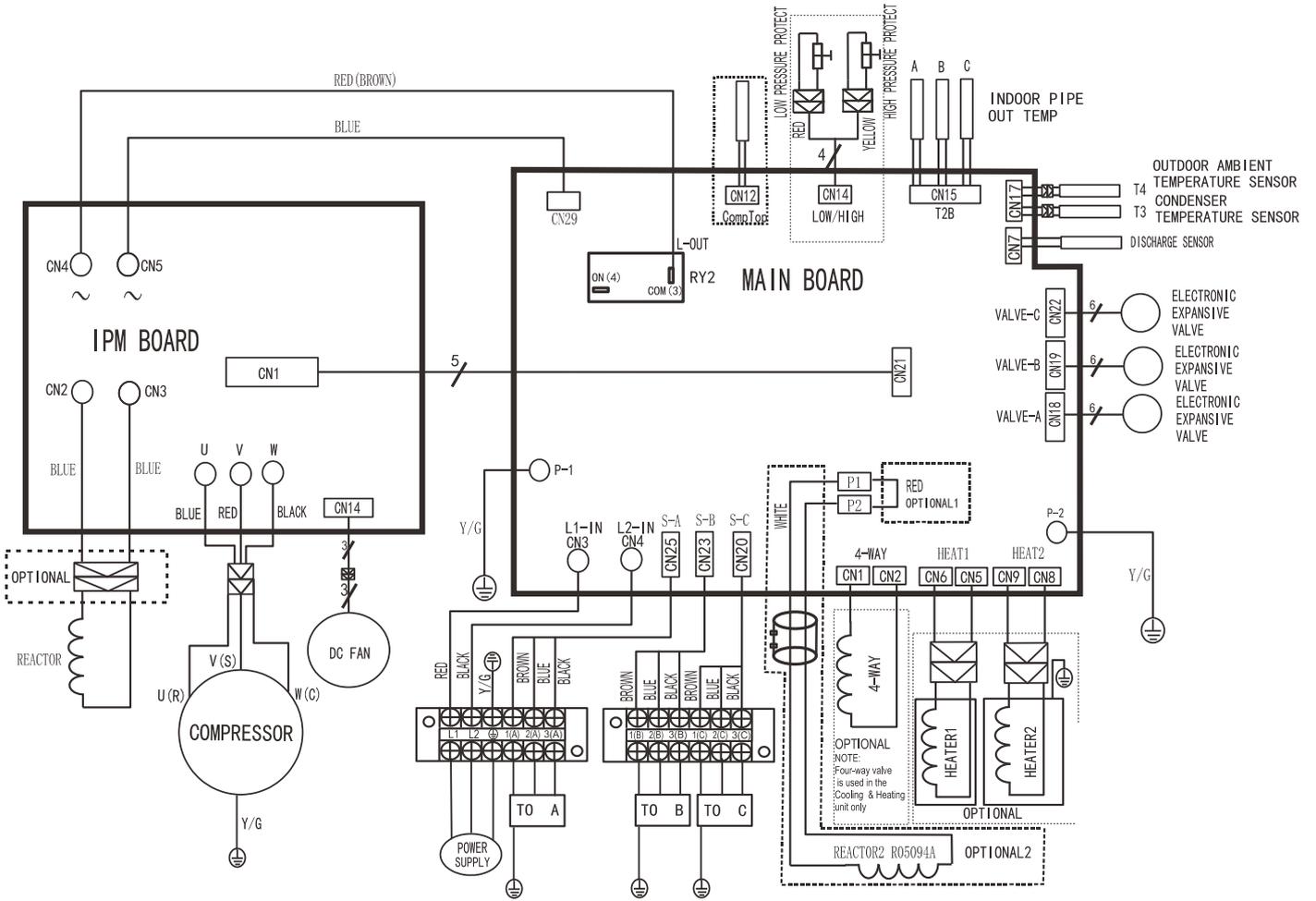
## WIRING DIAGRAMS

### DRA2U18M1B



16022000035644

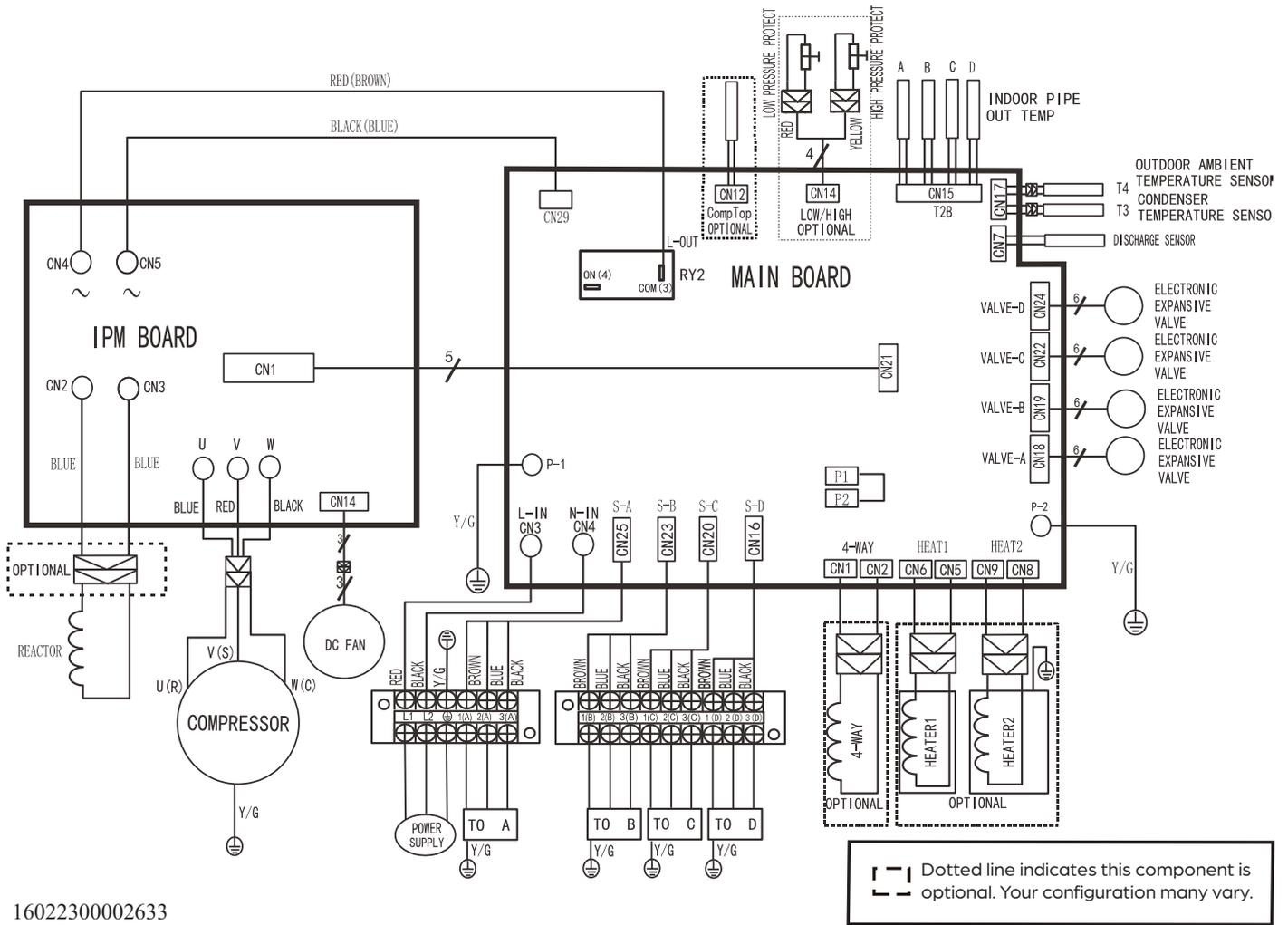
**DRA3U28M1B**



⋯ Dotted line indicates this component is optional. Your configuration may vary.

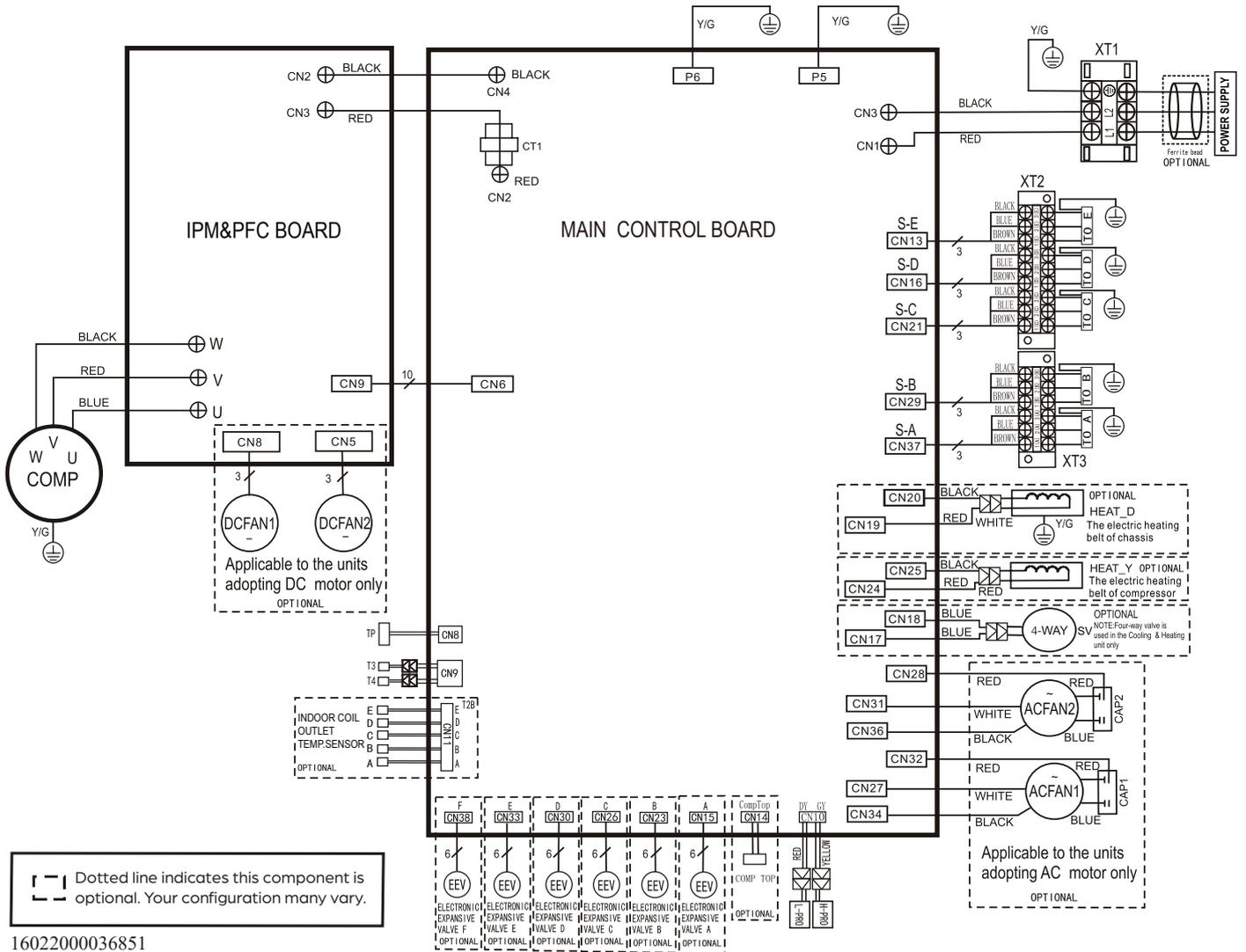
16022300002514

## DRA4U36M1B



1602230002633

## DRA5U48M1B and DRA5U55M1B



## ERROR AND OPERATING CODES

Display	Malfunction & protection indication
EL01	Communication malfunction between indoor and outdoor units
FL14 ※	Capability mismatch between indoor unit and outdoor unit
EC50	Outdoor temp. sensor error
EC51	Outdoor EEPROM error
EC52	Condenser coil temperature sensor (T3) malfunction
EC53	Outdoor ambient temperature sensor (T4 ) malfunction
EC54	Compressor discharge temperature sensor TP is in open circuit or has short circuited
EC55 ※	Outdoor IPM module temperature sensor malfunction
EC56 ※	Outdoor T2B sensor error
EC57 ※	Refrigerant pipe temperature sensor error
EC07	Outdoor DC fan motor malfunction/fan speed out of control
EC71	Over current failure of outdoor DC fan motor
EC72	Lack phase failure of outdoor DC fan motor
PC00	Inverter module (IPM) protection
PC02 ※	Top temperature protection of compressor
PC06	Discharge temperature protection of compressor
PC08	Outdoor overcurrent protection
PC0A	High temperature protection of condenser
PC0F	PFC module protection
PC0L ※	Low temperature protection of outdoor unit
PC10	Outdoor unit low AC voltage protection
PC11	Outdoor unit main control board DC bus high voltage protection
PC12	Outdoor unit main control board DC bus high voltage protection /341 MCE error
PC30	System high pressure protection
PC31	System low pressure protection
PC40 ※	Communication error between outdoor main chip and compressor driven chip
PC42	Compressor start failure of outdoor unit
PC43	Outdoor compressor lack phase protection
PC44	Outdoor unit zero speed protection
PC45	Outdoor unit IR chip drive failure
PC46	Compressor speed has been out of control
PC49	Compressor overcurrent failure
PCA1 ※	Condensation protection of refrigerant pipe
PH90 ※	High temperature protection of Evaporator
PH91 ※	Low temperature protection of Evaporator
LC06 ※	High temperature protection of Inverter module (IPM)

Note: DF (defrost) and FC (forced cooling) are normal operating codes, not malfunctions.

[※] Applicable to some units only.

# JOB SITE INFORMATION SHEET

## Site Information

Job Name: \_\_\_\_\_ Installation Date: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Email: \_\_\_\_\_

## Contractor Information

Contractor Name: \_\_\_\_\_ Technician Name: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Email: \_\_\_\_\_

## Outdoor Unit Information

Model #: \_\_\_\_\_ Serial #: \_\_\_\_\_

Unit Location: \_\_\_\_\_

## Outdoor Electrical Readings

Line Power Wire Color: L1 \_\_\_\_\_ L2 \_\_\_\_\_ G \_\_\_\_\_

Line Voltage (Power Off): L1 to L2 \_\_\_\_\_ L1 to G \_\_\_\_\_ L2 to G \_\_\_\_\_

Line Voltage (Power On): L1 to L2 \_\_\_\_\_ L1 to G \_\_\_\_\_ L2 to G \_\_\_\_\_

## Outdoor Thermal Readings

Discharge: \_\_\_\_\_ °F Ambient: \_\_\_\_\_ °F

**Indoor System Information****A****Unit Information**

Model #: \_\_\_\_\_ Serial #: \_\_\_\_\_

Type: \_\_\_\_\_ Location: \_\_\_\_\_

Refrigerant Line Size 1/4" 3/8" 1/2" 5/8" Line Set Length: \_\_\_\_\_  
(Circle Liquid and Gas Line):**Electrical Readings**

Power/Control Wire Color: 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_

Voltage Readings: 1-2 \_\_\_\_\_ AC 2-3 \_\_\_\_\_ DC

**Thermal Readings**

Return Air: \_\_\_\_\_ °F Supply Air: \_\_\_\_\_ °F Room Air: \_\_\_\_\_ °F

Gas Line Saturation: \_\_\_\_\_ °F Liquid Line Saturation: \_\_\_\_\_ °F

**B****DRA2****Unit Information**

Model #: \_\_\_\_\_ Serial #: \_\_\_\_\_

Type: \_\_\_\_\_ Location: \_\_\_\_\_

Refrigerant Line Size 1/4" 3/8" 1/2" 5/8" Line Set Length: \_\_\_\_\_  
(Circle Liquid and Gas Line):**Electrical Readings**

Power/Control Wire Color: 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_

Voltage Readings: 1-2 \_\_\_\_\_ AC 2-3 \_\_\_\_\_ DC

**Thermal Readings**

Return Air: \_\_\_\_\_ °F Supply Air: \_\_\_\_\_ °F Room Air: \_\_\_\_\_ °F

Gas Line Saturation: \_\_\_\_\_ °F Liquid Line Saturation: \_\_\_\_\_ °F

**C Unit Information****C  
DRA3**

Model #: \_\_\_\_\_ Serial #: \_\_\_\_\_

Type: \_\_\_\_\_ Location: \_\_\_\_\_

Refrigerant Line Size 1/4" 3/8" 1/2" 5/8" Line Set Length: \_\_\_\_\_  
(Circle Liquid and Gas Line):**Electrical Readings**

Power/Control Wire Color: 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_

Voltage Readings: 1-2 \_\_\_\_\_ AC 2-3 \_\_\_\_\_ DC

**Thermal Readings**

Return Air: \_\_\_\_\_ °F Supply Air: \_\_\_\_\_ °F Room Air: \_\_\_\_\_ °F

Gas Line Saturation: \_\_\_\_\_ °F Liquid Line Saturation: \_\_\_\_\_ °F

**D Unit Information****D  
DRA4**

Model #: \_\_\_\_\_ Serial #: \_\_\_\_\_

Type: \_\_\_\_\_ Location: \_\_\_\_\_

Refrigerant Line Size 1/4" 3/8" 1/2" 5/8" Line Set Length: \_\_\_\_\_  
(Circle Liquid and Gas Line):**Electrical Readings**

Power/Control Wire Color: 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_

Voltage Readings: 1-2 \_\_\_\_\_ AC 2-3 \_\_\_\_\_ DC

**Thermal Readings**

Return Air: \_\_\_\_\_ °F Supply Air: \_\_\_\_\_ °F Room Air: \_\_\_\_\_ °F

Gas Line Saturation: \_\_\_\_\_ °F Liquid Line Saturation: \_\_\_\_\_ °F

**E** **Unit Information**

**DRA5** Model #: \_\_\_\_\_ Serial #: \_\_\_\_\_

Type: \_\_\_\_\_ Location: \_\_\_\_\_

Refrigerant Line Size 1/4" 3/8" 1/2" 5/8" Line Set Length: \_\_\_\_\_  
(Circle Liquid and Gas Line):

**Electrical Readings**

Power/Control Wire Color: 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_

Voltage Readings: 1-2 \_\_\_\_\_ AC 2-3 \_\_\_\_\_ DC

**Thermal Readings**

Return Air: \_\_\_\_\_ °F Supply Air: \_\_\_\_\_ °F Room Air: \_\_\_\_\_ °F

Gas Line Saturation: \_\_\_\_\_ °F Liquid Line Saturation: \_\_\_\_\_ °F

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