NŌRDEN®

INSTALLATION MANUAL
R-410A CONDENSER

MODELS:

CDV-036-100
CDV-060-100

Refrigerant R-410A

Rev 1.0

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All phases of this installation must comply with NATIONAL, STATE, AND LOCAL CODES.

1. Key to symbols and safety instructions

1.1 Key to symbols

Warnings in this document are identified by a warning triangle. Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken.

This symbol indicates important information where there is no risk to people or property.

The following keywords are defined and can be used in this document:

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a hazardous situation which, if not avoided, could result in minor to moderate injury.

NOTICE is used to address practices not related to personal injury.

1.2 Safety

CAUTION:

- This document is customer property and is to remain with this unit. Please return to service information pack upon completion of work.
- These instructions do not cover all variations in systems or provide for every possible contingency to be met in connection with the installation.
- Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to your installing dealer or local distributor.

This document contains a wiring diagram and service information.

CAUTION:

This information is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience. Any attempt to repair a central air conditioning product may result in personal injury and/or property damage.

WARNING: HAZARDOUS VOLTAGE

- Failure to follow this warning could result in property damage, severe personal injury or death.
- Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.

WARNING: REFRIGERANT OIL

These units use R-410A refrigerant which operates at 50% to 70% higher pressures than R-22. Use only R-410A approved service equipments. Refrigerant cylinders are painted a "Rose" color to indicate the type of refrigerant and may contain a "dip" tube to allow for charging of liquid refrigerant into the system. All R-410A systems use a POE oil that readily absorbs moisture from the atmosphere. To limit this "hygroscopic" action, the system should remain sealed whenever possible. If a system has been opening to the atmosphere for more than 4 hours, the compressor oil must be replaced. Never break a vacuum with air and always change the driers when opening the system for component replacement.

CAUTION: HOT SURFACE

May cause minor to severe burning. Failure to follow this Caution could result in property damage or personal injury. Do not touch the top of compressor.

CAUTION: CONTAINS REFRIGERANT

Failure to follow proper procedures can result in personal illness or injury or severe equipment damage. System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening system.

CAUTION: GROUNDING REQUIRED

Failure to inspect or use proper service tools may result in equipment damage or personal injury. Reconnect all grounding devices. All parts of this product that are capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

WARNING: SERVICE VALVES

Failure to follow this warning will result in abrupt release of system charge and may result in personal injury and/or property damage. Extreme caution should be exercised when opening the Liquid Line Service Valve. Turn valve stem counterclockwise only until the stem contacts the rolled edge. No torque is required.

WARNING: BRAZING REQUIRED

Failure to inspect lines or use proper service tools may result in equipment damage or personal injury.
All outdoor unit and evaporator coil connections are copper-to-copper and should be brazed with a phosphorous-copper alloy material such as Silfos-5 or equivalent. Do not use soft solder.

WARNING: HIGH CURRENT LEAKAGE

Failure to follow this warning could result in property damage, severe personal injury or death. Grounding is essential before connecting electrical supply.

2. Unit location considerations

2.1 Unit dimensions

Model	H(Inches)	W(Inches)	L(Inches)
36	24-15/16	23-5/8	23-5/8
60	29-7/8	28	28

Table 1

The unit's weight value is on the cardboard box.

When mounting the outdoor unit on a roof, be sure the roof will support the unit's weight. Properly selected isolation is recommended to prevent sound or vibration transmission to the building structure.

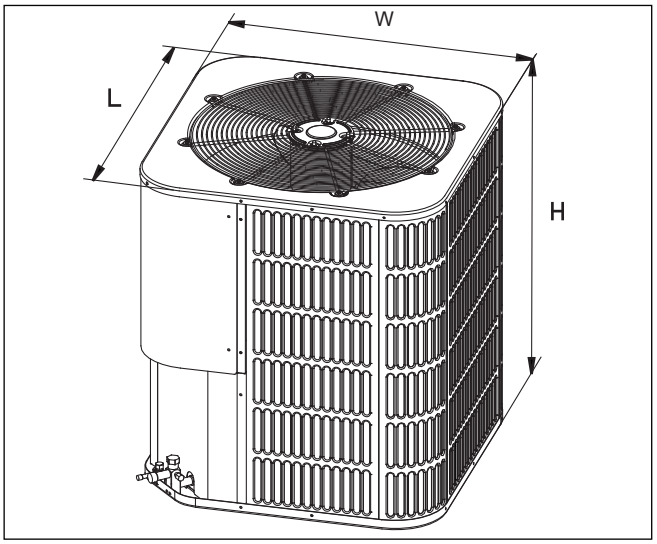


Figure 1

2.2 Location restrictions

Ensure the top discharge area is unrestricted for at least 60 inches above the unit.

Do not locate outdoor unit near bedrooms since normal operational sounds may be objectionable.

Position unit to allow adequate space for unobstructed airflow, wiring, refrigerant lines, and serviceability.

Maintain a distance of 24 inches between units.

24 inches clearance must be provided in front of the control box (access panels) and any other side requiring service.

Position unit where water, snow or ice from roof or overhang cannot fall directly on unit.

Position the outdoor unit a minimum of 12'' from any wall or surrounding shrubbery to ensure adequate airflow.

See Figure 2 and Figure 3.

Cold climate considerations (heat pump only)

Precautions must be taken for units being installed in areas where snow accumulation and prolonged below-freezing temperatures occur.

- Units should be elevated 3-12 inches above the pad or rooftop, depending on local weather. This additional height will allow drainage of snow and ice melted during defrost cycle prior to its refreezing. Ensure that drain holes in unit base pan are not obstructed, preventing drainage of defrost water (Figure 4).
- If possible, avoid locations that are likely to accumulate snow drifts. If not possible, a snow drift barrier should be installed around the unit to prevent a build-up of snow on the sides of the unit.

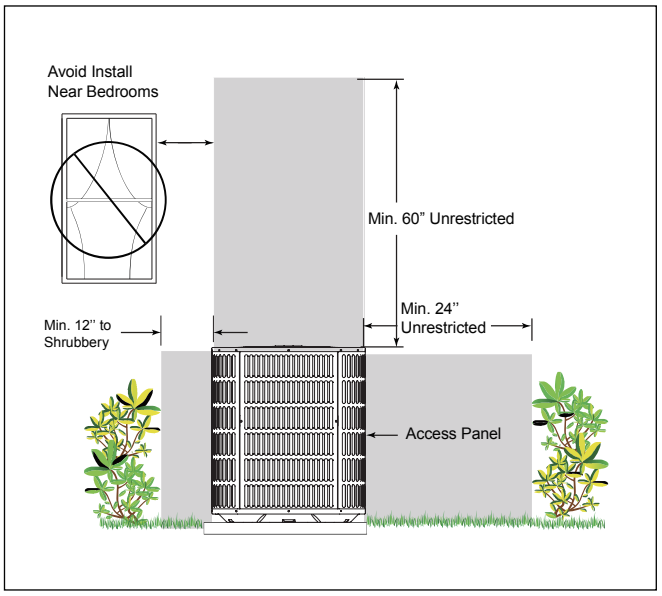


Figure 2

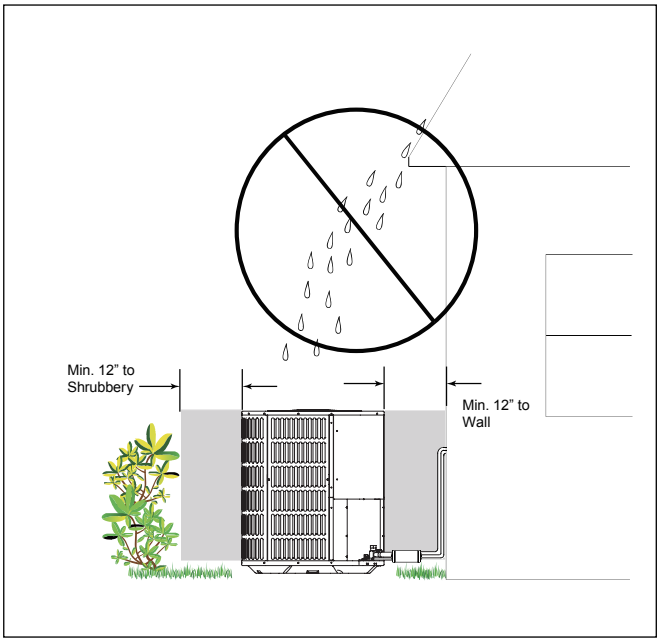


Figure 3

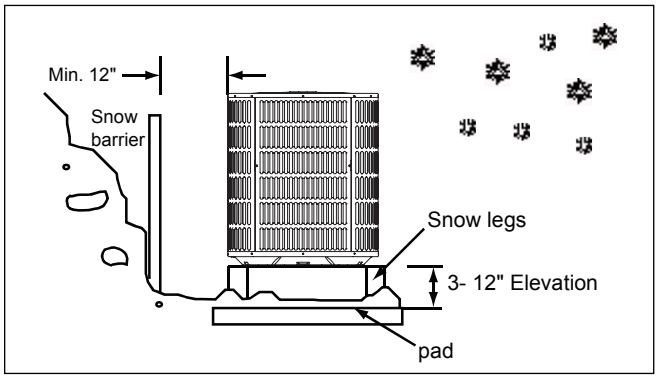


Figure 4

3. Unit preparation

3.1 Pre-installation

STEP 1 - Check for damage and report promptly to the carrier any damage found to the unit (Figure 5).

STEP 2 - Instruments must be designed to install/serve R410A equipmens.

- Gauge sets, hoses, refrigerant containers and recovery system must be designed to handle the POE type oils.
- Manifold sets should be 800 PSIG high side and 250 PSIG low side.
- All hoses must have a 700 PSIG service pressure rating.
- Leak detectors should be disigned to detect R410A.
- Recovery equipments (including refrigerant recovery containers) must be specifically designed to handle R410A.
- Do not use an R22 TXV.

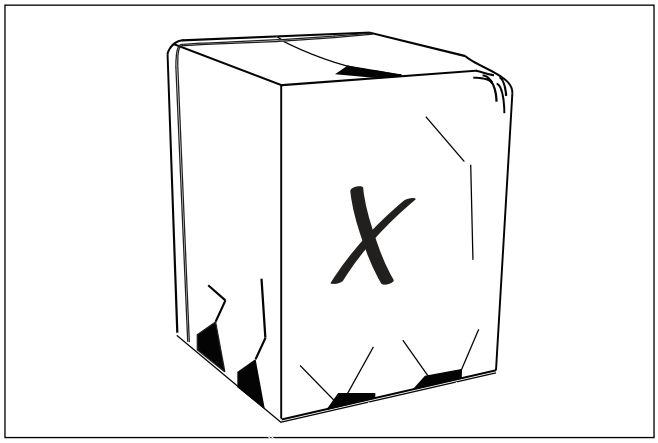


Figure 5

4. Setting up the unit

4.1 Pad installation

When installing the unit on a support pad, such as a concrete slab, consider the following:

- The pad must be at least 1-2” larger than the unit on all sides.
- The pad must be separate from any structure.
- The pad must be level.
- The pad must be high enough above grade to allow for drainage.
- The pad location must comply with National, State and Local codes.

These instructions are intended to provide a method to tie-down system to concrete slab as a securing procedure for high wind areas. Check Local Codes for tie-down methods and protocols.

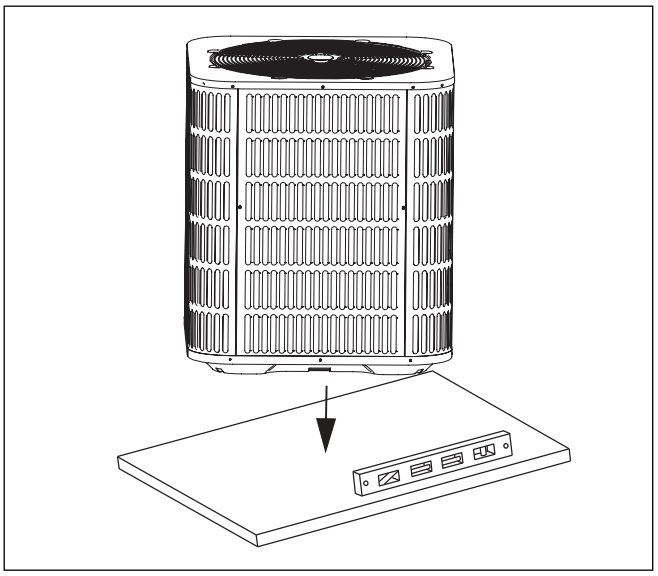


Figure 6

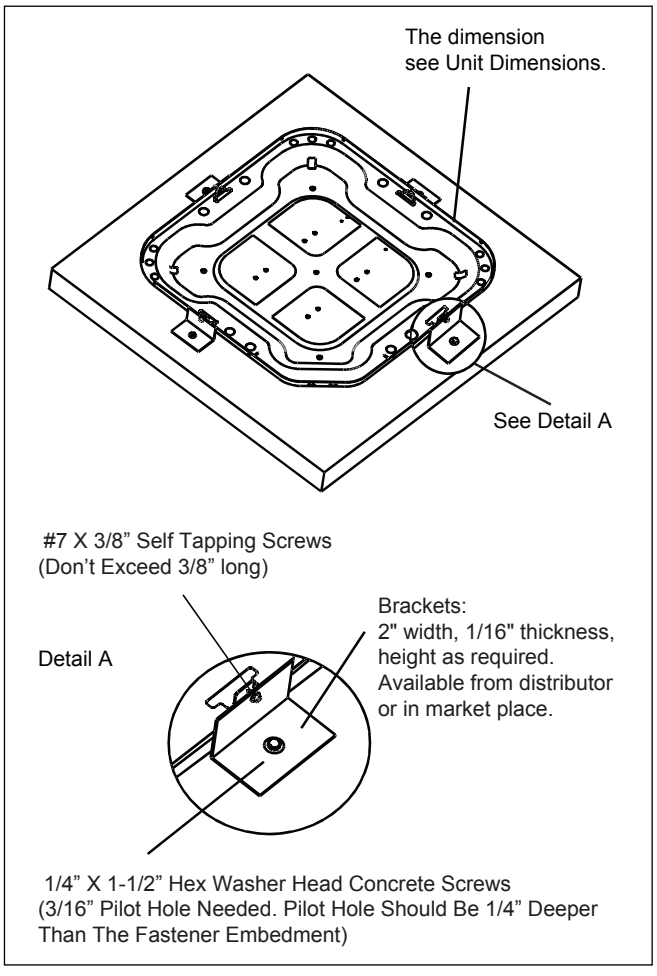


Figure 7

5. Refrigerant line considerations

5.1 Service valve connection sizes

Model	Suction line connection	Liquid line connection
36	3/4	3/8
60	7/8	3/8

Table 2

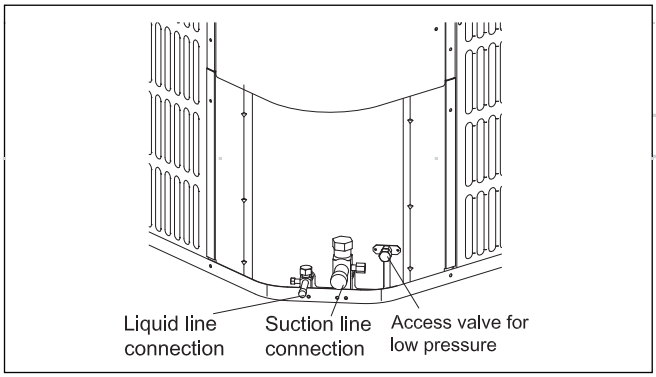


Figure 8

5.2 Refrigerant line sizes

Model				
36	5/8	3/4	5/16	3/8
60	7/8	1-1/8	1/2	3/8

Table 3

5.3 Refrigerant piping limits and required refrigerant line length

Model	Liquid line (Inches)						
36	5/16	25	50	37	22	7	N/A
	3/8	25	50	60	60	40	30
60	1/2	25	50	60	60	40	30
	3/8	25	50	56	44	32	20

Table 4

Model	Suction line (Inches)				
36	5/8	1.00	0.97	0.94	0.90
	3/4	1.00	0.99	0.97	0.96
60	7/8	0.99	0.98	0.94	0.90

Table 5 Suction line length/size VS capcaity multiplier

Using suction line larger than shown in chart will result in poor oil return and is not recommended.
For example: the system capacity published in AHRI is 17800 Btu/h. This data is based on the AHRI test condition and 25 feet line set with standard suction tube size (3/4" tube). If you need to add the line set more than 25 feet or use the optional suction tube size, you need to recalculate the capacity with the coefficient in the table. For 50 feet line and 5/8" suction tube, the capacity will be 17800*0.97=17266 Btu/h.

Determine required line length and lift. You will need this later in Section 14.

Total Line Length = _____ Feet.

Total vertical Change(Lift) = _____ Feet.

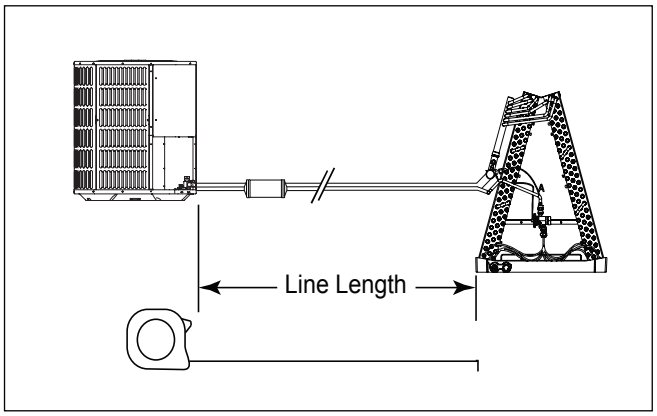


Figure 9

5.4 Refrigerant line insulation

The suction line must always be insulated. DO NOT allow the Liquid Line and Suction Line to come in direct (metal to metal) contact.

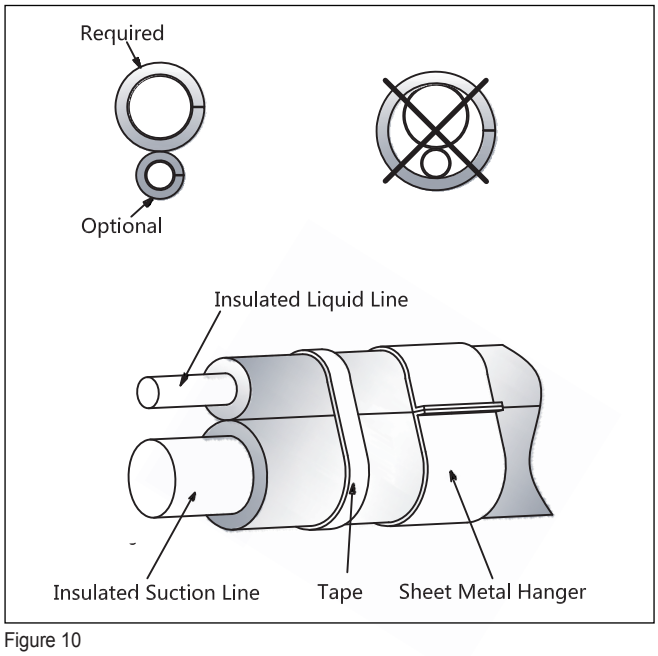


Figure 10

5.5 Reuse existing refrigerant lines

CAUTION:

If using existing refrigerant lines make certain that all joints are brazed, not soldered.

For retrofit applications, where the existing refrigerant lines will be used, the following precautions should be taken:

- Ensure that the refrigerant lines are the correct size. Refer to Section 5.1 listed and Table 3.
- Ensure that the refrigerant lines are free of leaks, acid, and oil.

The manufacturer recommends installing only approved matched indoor and outdoor systems. All of the manufacturer's split systems are AHRI certified. Some of the benefits of installing approved matched indoor and outdoor split systems are maximum efficiency, optimum performance and the best overall system reliability.

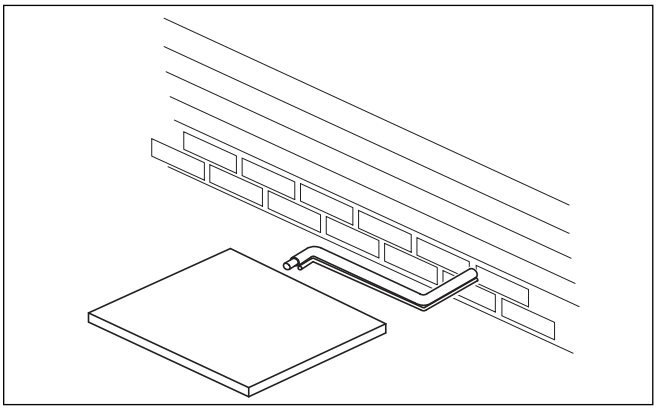


Figure 11

6. Refrigerant line routing

6.1 Precautions

Take precautions to prevent noise within the building structure due to vibration transmission from the refrigerant lines. For example:

- When the refrigerant lines have to be fastened to floor joists or other framing in a structure, use isolation type hangers.
- Isolation hangers should also be used when refrigerant lines are run in stud spaces or enclosed ceilings.
- Where the refrigerant lines run through a wall or sill, they should be insulated and isolated.
- Isolate the lines from all ductwork.
- Minimize the number of 90º turns.
- Use PVC piping as a conduit for all underground installations as shown in Figure 15. Buried lines should be keep as short as possible.
- The lines should not obstruct service access to the coil, air handling system or filter.
- Care must also be taken to isolate the refrigerant lines to minimize noise transmission from the equipment to the structure.

Comply with National, State, and Local Codes when isolating line sets from joists, rafters, walls or other structural elements.

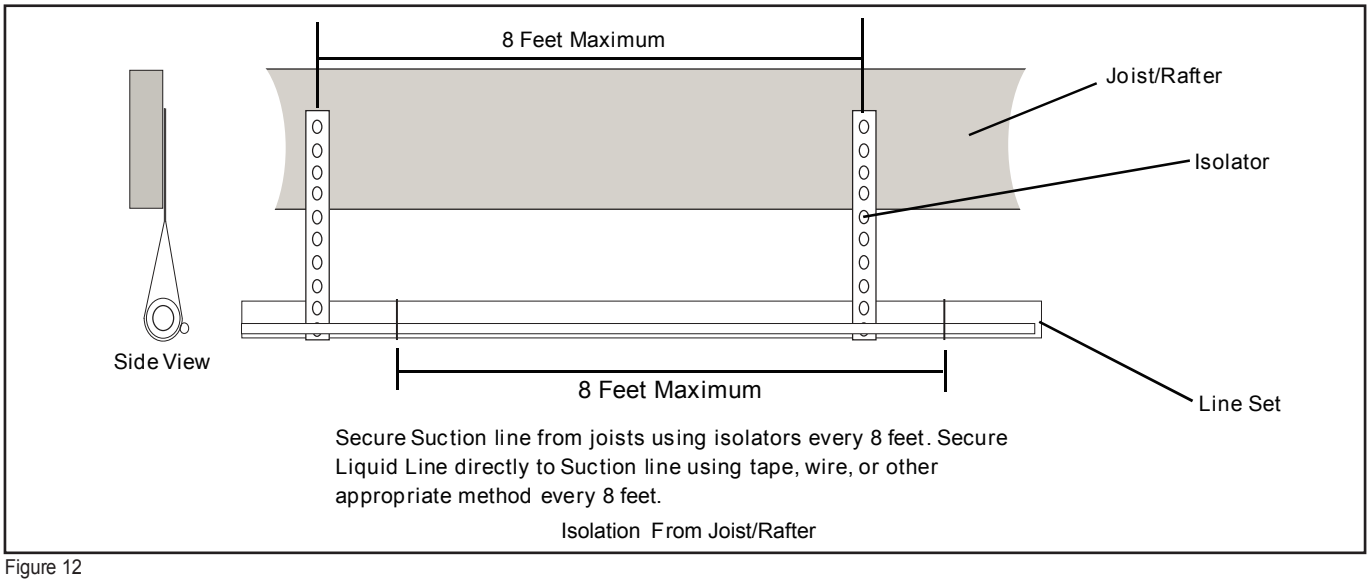


Figure 12

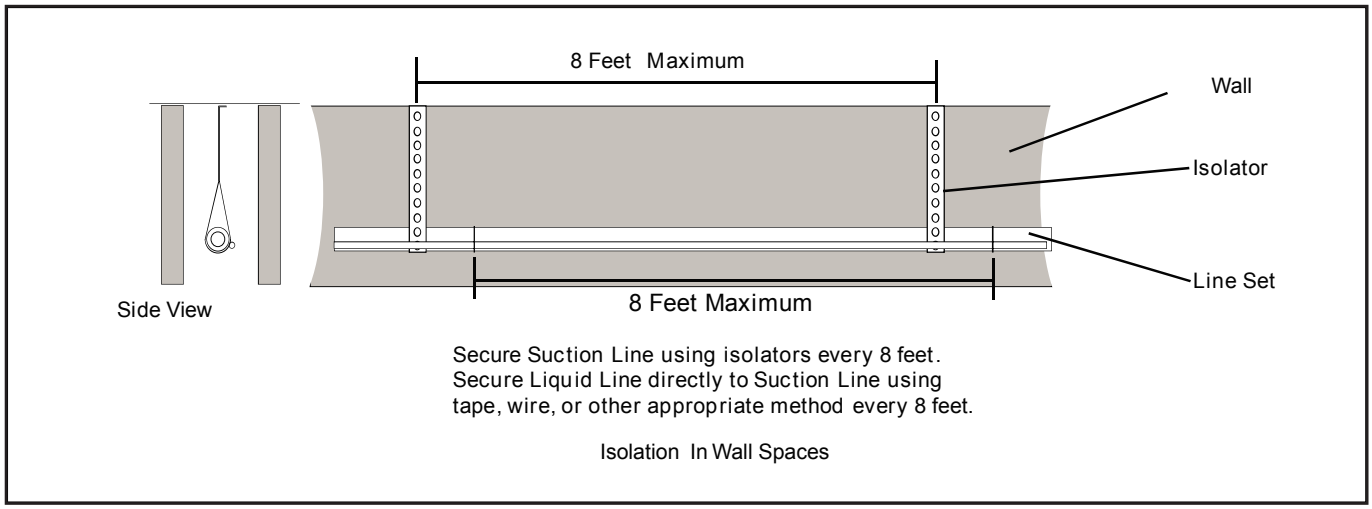


Figure 13

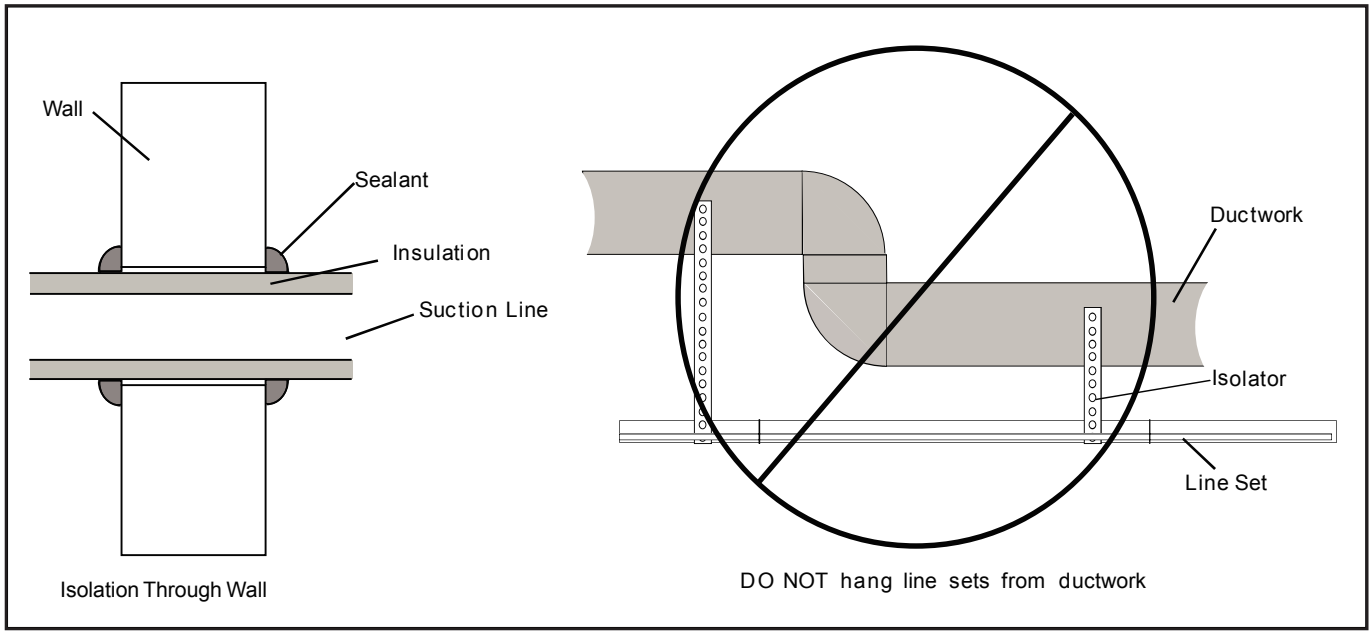


Figure 14

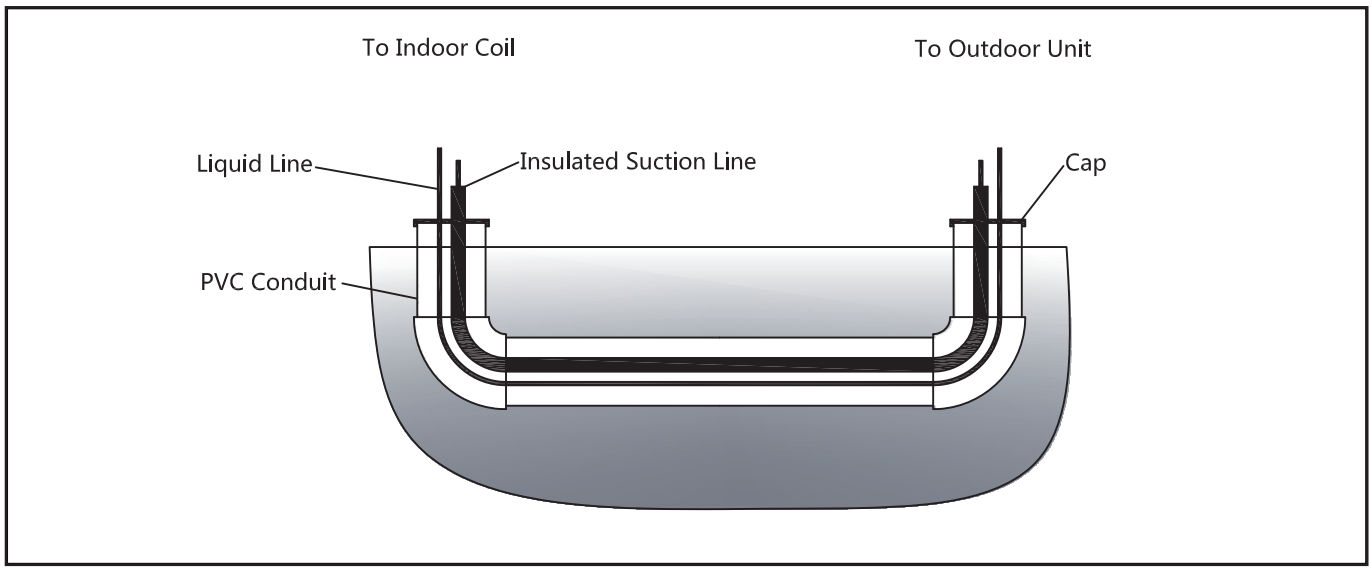


Figure 15

7. Refrigerant line brazing

7.1 Braze the refrigerant lines

1. Remove caps or plugs. Use a deburing tool to debur the pipe ends. Clean both internal and external surfaces of the tubing using an emery cloth.

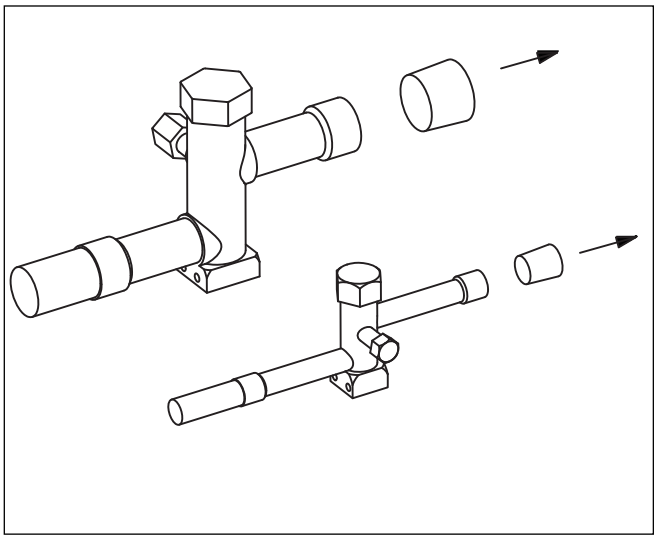


Figure 16

2. Remove the pressure tap cap from both service valves.

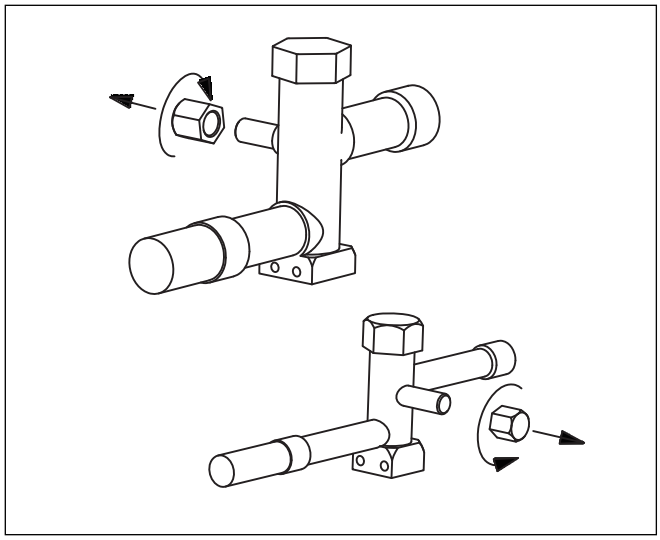


Figure 17

3. Purge the refrigerant lines and indoor coil with dry nitrogen.

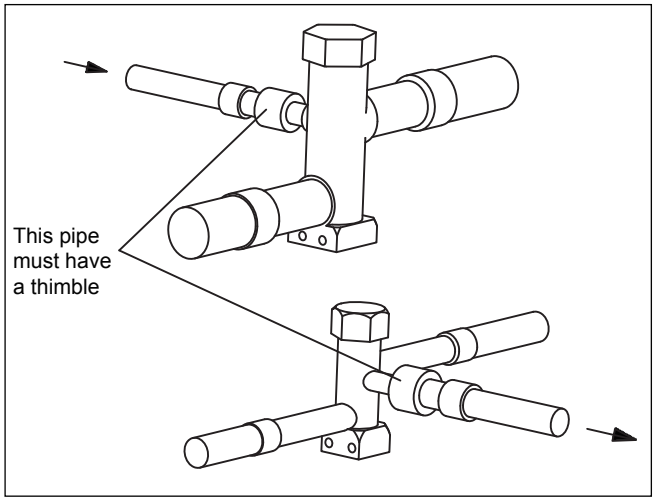


Figure 18

4. Wrap a wet rag around the valve body to avoid heat damage and continue the dry nitrogen purge (Figure 19).

   Braze the refrigerant lines to the service valves.

   Check liquid line filter drier's directional flow arrow to confirm correct direction of refrigeration flow (away from outdoor unit and toward evaporator coil) as illustrated. Brazing the filter drier to the Liquid Line.

   Continue the dry nitrogen purge. Do not remove the wet rag until all brazing is completed.

Remove the wet rag before stopping the dry nitrogen purge.

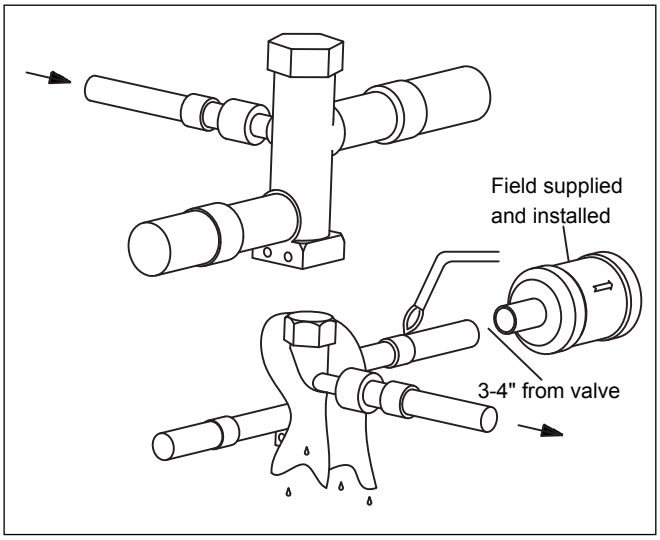


Figure 19

5. Replace the pressure tap caps after the service valves have cooled.

   Note: Do not over tighen (between 40 and 60 inch-lbs. maximum).

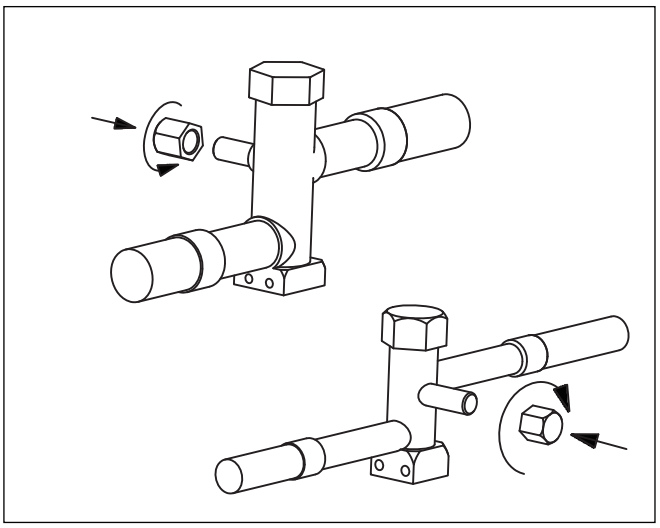


Figure 20

8. Refrigerant line leak check

8.1 Check for leaks

1. Pressurize the refrigerant lines and evaporator coil to 150 PSIG using dry nitrogen.

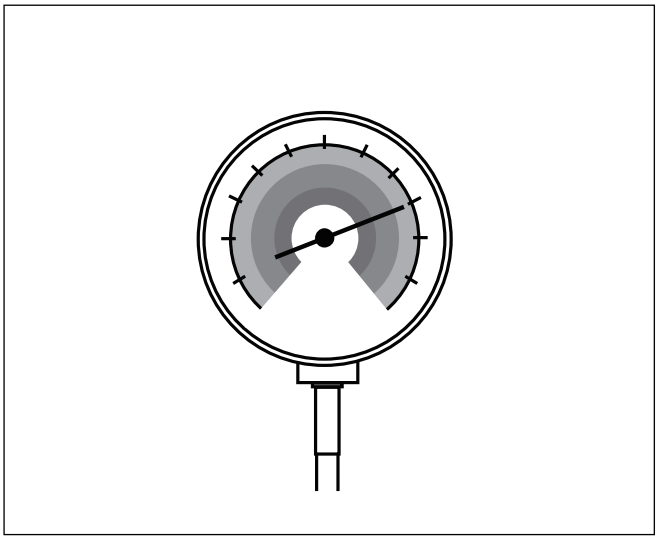


Figure 21

2. Check for leaks by using a soapy solution or bubbles at each brazed location.

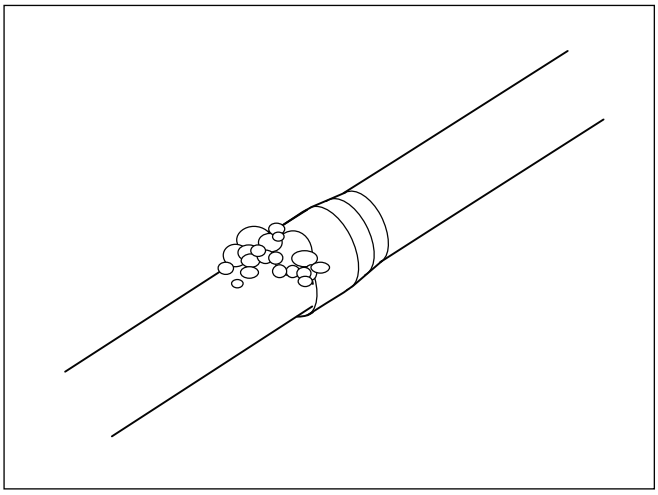


Figure 22

Remove nitrogren pressure and repair any leaks before continuing.

9. Evacuation

9.1 Evacuate the refrigerant lines and indoor coil

Do not open the service valves until the refrigerant lines and indoor coil leak check and evacuation are complete.

1. Evacuate until the micron gauge reads no higher than 350 microns, then close off the valve to the vacuum pump.

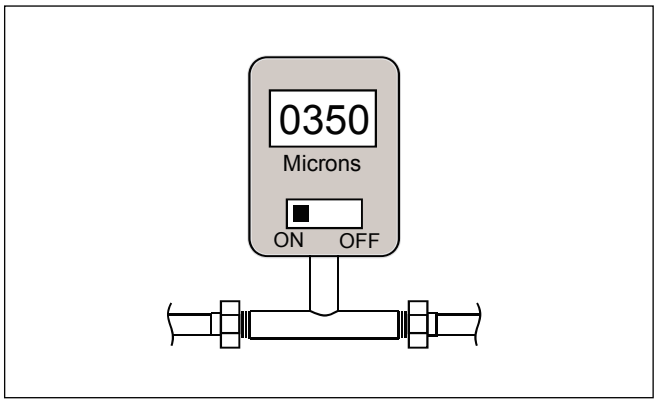


Figure 23

2. Observe the micron gauge. Evacuation is complete if the micron gauge does not rise above 500 microns in one (1) minute.

   Once evacuation is complete blank off the vacuum pump and micron gauge, and close the valves on the manifold gauge set.

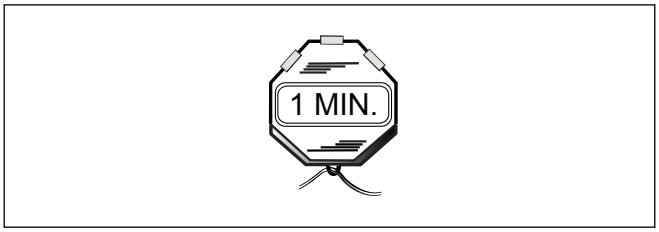


Figure 24

10. Service valves

10.1 Open the service valves

WARNING:

Extreme caution should be exercised when opening the Liquid Line Service Valve. Turn counterclock wise until the valve stem just touches the rolled edge. No torque is required. Failure to follow this warning will result in abrupt release of system charge and may result in personal injury and /or property damage.

Leak check and evacuation must be completed before opening the service valves.

1. Remove service valve cap (Figure 25).
2. Fully insert hex wrench into the stem and back out counterclockwise until valve stem just touches the rolled edge.
3. Replace the valve stem cap to prevent leaks. Tighten finger tight plus an additional 1/6 turn.

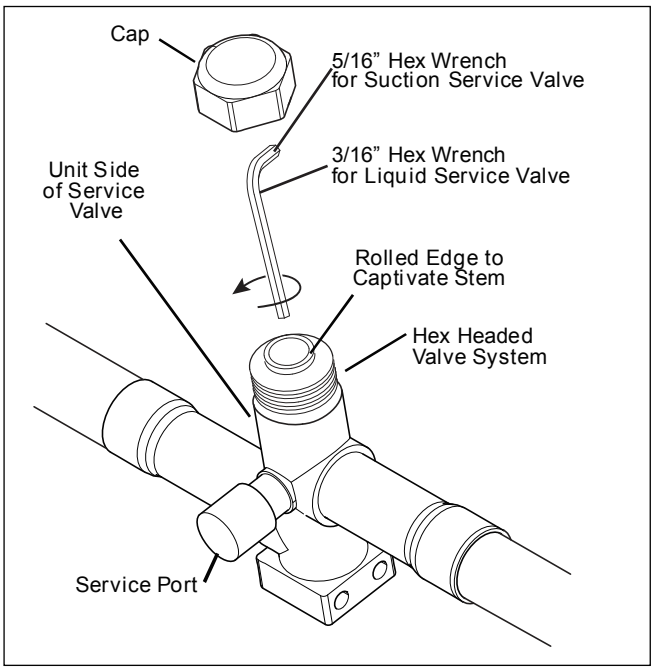


Figure 25

11. Electrical - low voltage

11.1 Low Voltage Maximum Wire Length

Table 6 defines the maximum total length of low voltage wiring from the outdoor unit to the indoor unit and to the thermostat.

24 Volts - Wire size	Max. wire length
18 AWG	150 Ft.
16 AWG	225 Ft.
14 AWG	300 Ft.

Table 6

11.2 Low voltage hook-up diagrams

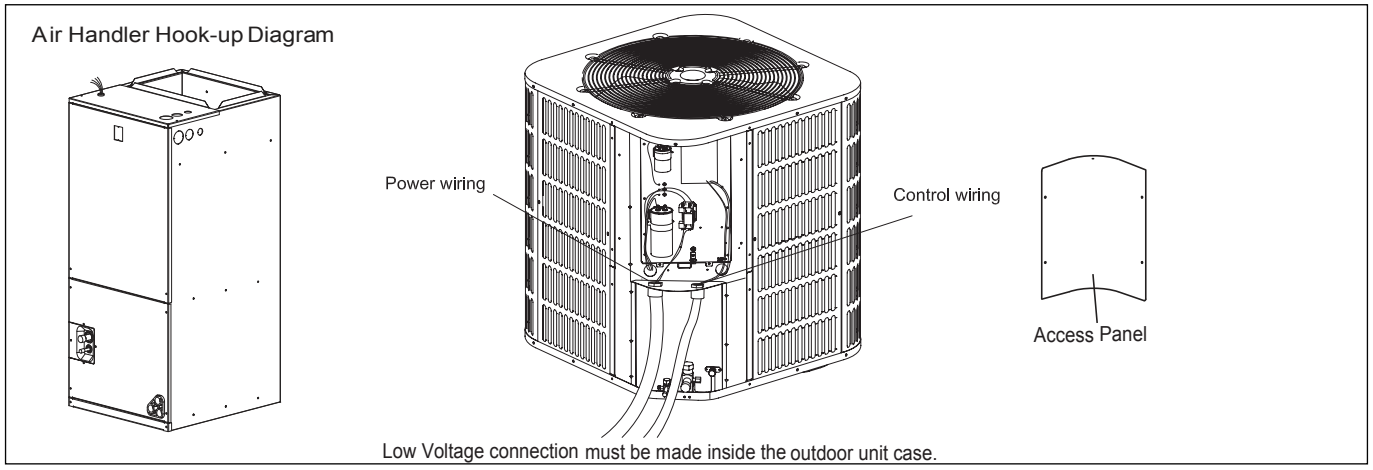


Figure 26

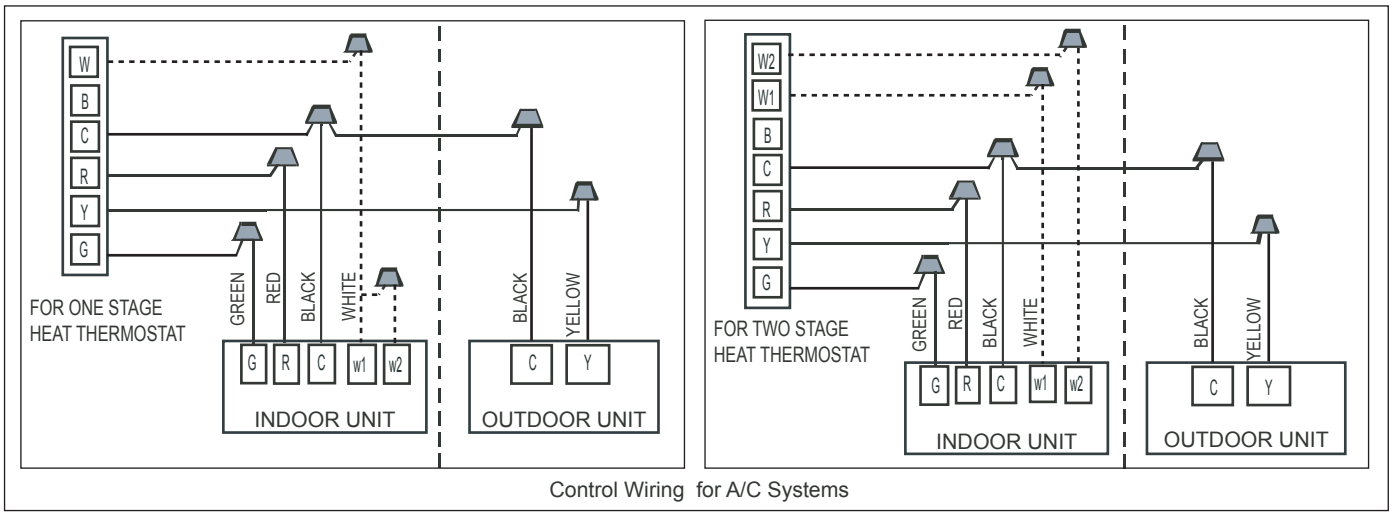


Figure 27

Notes: "-----"The electric auxiliary heat connection(optional).
W:Electric auxiliary heat signal.
W1 :The first Electric auxiliary heat signal.
W2 :The second Electric auxiliary heat signal.

12. Electrical - high voltage

12.1 High voltage power supply

⚠ WARNING: LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing, and trouble shooting of this product, it may be necessary to work with live electrical components. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

The high voltage power supply must agree with the equipment nameplate.

Power wiring must comply with National, State and Local Codes.

Follow instructions on unit wiring diagram located on the inside of the access panel.

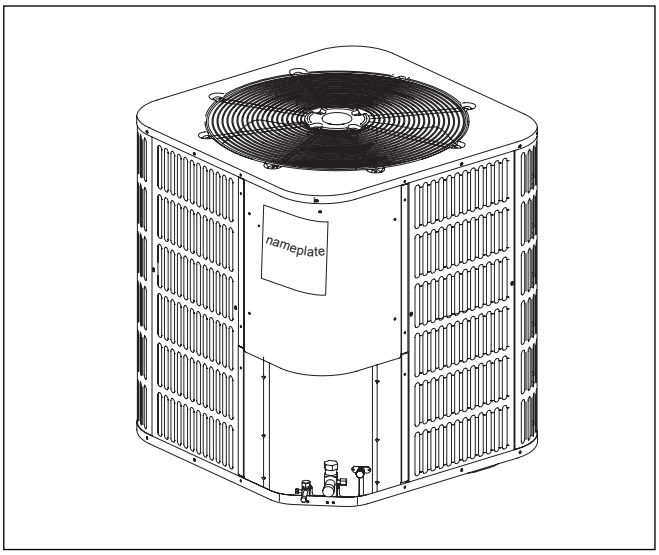


Figure 28

12.2 High voltage disconnect switch

Install a separate disconnect switch at the outdoor unit.

Field provided flexible electrical conduit must be used for high voltage wiring.

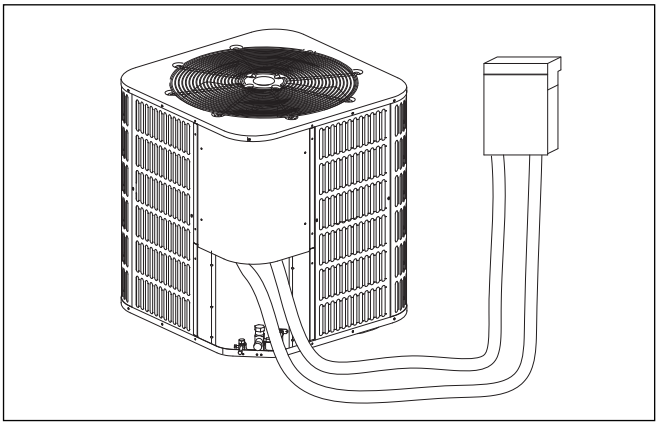


Figure 29

12.3 High voltage ground

Ground the outdoor unit per National, State and Local Code requirements.

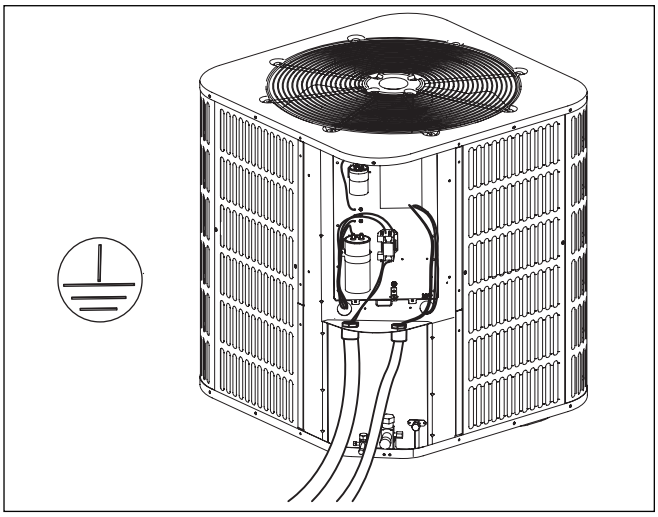


Figure 30

13. Start up

13.1 System start up

1. Ensure Sections 7, 8, 9, 10, 11 and 12 have been completed.

2. Set System Thermostat to OFF.

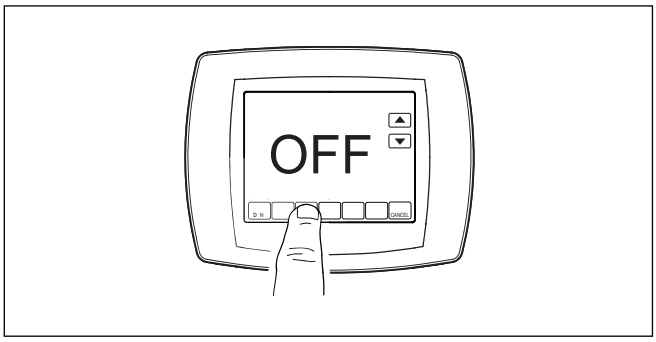


Figure 31

3. Turn on disconnect to apply power to the indoor and outdoor units.

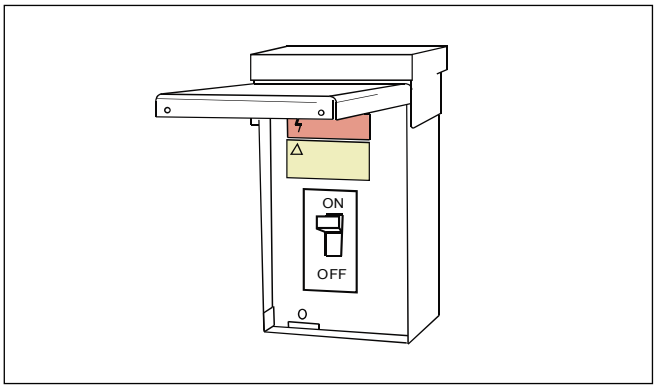


Figure 32

4. Wait one (1) hour before starting the unit if compressor crankcase heater is used and the outdoor ambient temperature is below 70 ºF.

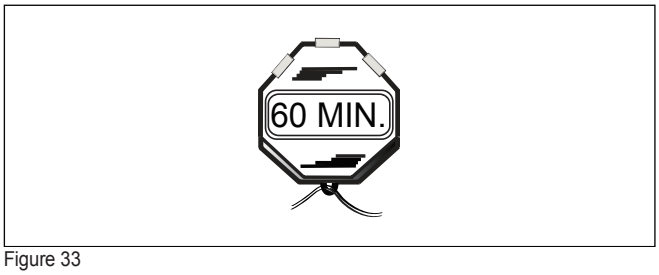


Figure 33

5. Set system thermostat to ON.

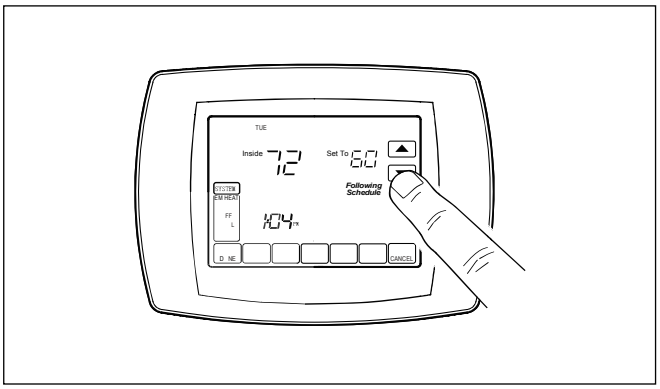


Figure 34

14. System charge adjustment

14.1 Charging: Weigh-In Method

Weigh-In method can be used for the initial installation, or anytime a system charge is being replaced. Weigh-In Method can also be used when power is not available to the equipment site or operating conditions (indoor/outdoor temperatures) are not in range to verify with the liquid line pressure charging method.

Model	Factory Charge	Charge multiplier for liquid line length		
All models	The data on	5/16"	3/8"	1/2"

Table 7

The factory charge in the outdoor unit is sufficient for 15 feet of standard size interconnecting liquid line.

New Installations — Calculating additional charge for lineset greater than 15 feet.

1. Total Line Length (ft) =_____ (a)
2. Standard Line set (ft) =___15___ (b)
3. (a) minus (b) =_____ (c)
4. Refrigerant Multiplier =_____ (d)
5. Refrigerant Adder (c*d) =_____ (e*)

*If lineset is less than 15 feet, (e) = 0

Sealed-System Repairs — Calculating total system charge.

1. Total Line Length (ft) =_____ (a)
2. Standard Line set (ft) =___15___ (b)
3. (a) minus (b) =_____ (c)
4. Refrigerant Multiplier =_____ (d)
5. Refrigerant Adder (c*d) =_____ (e*)
6. Factory Charge (nameplate) =_____ (f)
7. Total System Charge (e+f) =_____ _

*If line set is less than 15 feet, (e) = 0

The only mode approved for validating system charge is while in Cooling Mode. Outdoor Temperature must be between 55°F and 115°F with Indoor Temperature kept between 70°F and 80°F.

15. Warranty

Assist owner with processing Warranty cards and/or online registration.

15.1 Maintenance

Dirt should not be allowed to accumulate on the indoor or outdoor coils or other parts in the air circuit. Clean as often as necessary to keep the unit clean. Use a brush, vacuum cleaner attachment or other suitable means.

The outdoor fan motor is permanently lubricated and does not require periodic oiling.

Refer to the furnace or air handler instructions for filter and blower motor maintenance.

The indoor coil and drain pan should be inspected and cleaned regularly to assure proper drainage.

It is unlawful to knowingly vent, release or discharge refrigerant into the open air during repair, service, maintenance or the final disposal of this unit. When the system is functioning properly and the owner has been fully instructed, secure the owner's approval.

15.2 Changing motor

When motor requires changing, follow the steps below:

STEP 1 - Go into electrical panel, disconnect motor power lines.

Note: Disconnect main power to unit. Severe burns and electrical shock will occur if you do not disconnect main power.

STEP 2 - Remove cover (be careful of motor wires).

STEP 3 - Be sure to place fan cover unit on the ground (Figure 43).

Note: Do not place or lean fan blades on ground or against surface.

STEP 4 - Remove fan motor by removing 5/16” nuts from cover.

STEP 5 - Remove fan blade from motor by removing 1/2” nut and place fan on the ground.

STEP 6 - Reverse removal process to reinstall the fan and motor.

Note: When connecting motor wires be sure to check motor direction.

Damage will occur to condenser unit if you remove 5/16’’ nuts prior to cover removal.

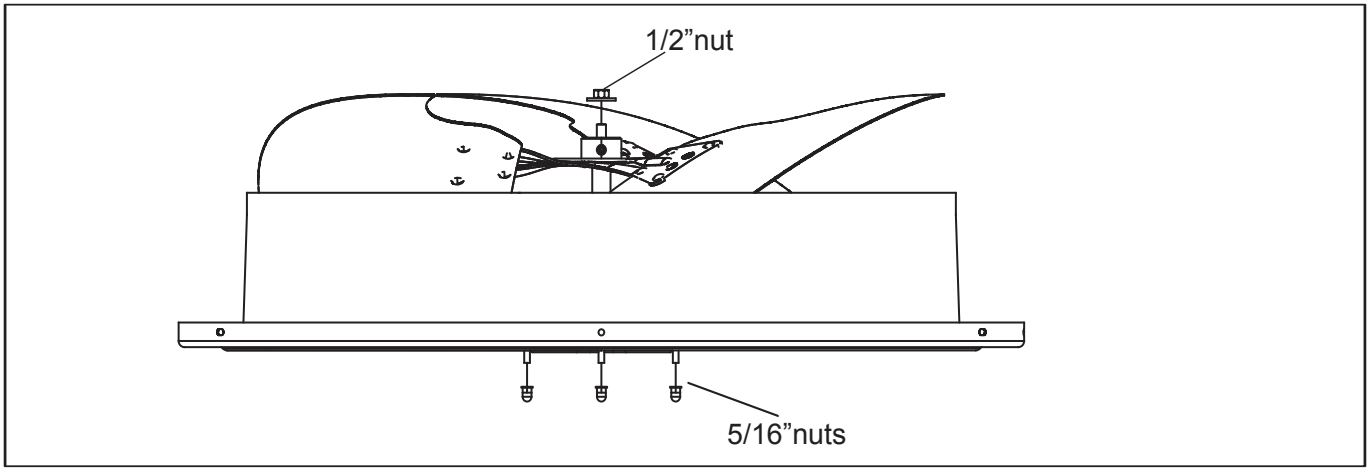


Figure 43

16. Checkout Procedures

16.1 Operational and Checkout Procedures

Final phases of this installation are the unit Operational and Checkout Procedures. To obtain proper performance, all units must be operated and charge adjustments made in accordance with procedures found in the Service Facts of the Outdoor Unit.

After installation has been completed, it is recommended that the entire system be checked against the following list:

1. Be sure unit suspension(if used) is secure and that there are no tools or loose debris in or around or on top of the unit..... [ ]
2. Properly insulate suction lines and fittings..... [ ]
3. Properly secure and isolate all refrigerant lines... [ ]
4. Verify that all electrical connections are tight. ..... [ ]
5. Check all duct outlets; they must be open and unrestricted. [ ]
6. Check drain lines and be sure all joints are tight..... [ ]
7. Be sure that a return air filter is installed..... [ ]
8. Operate complete system in each mode to verify proper performance. Verify operation of supplementary electric heater. ..... [ ]

NOTE - Due to Nōrden's ongoing commitment to quality, specifications, ratings, and dimensions are subject to change without notice and without incurring liability.