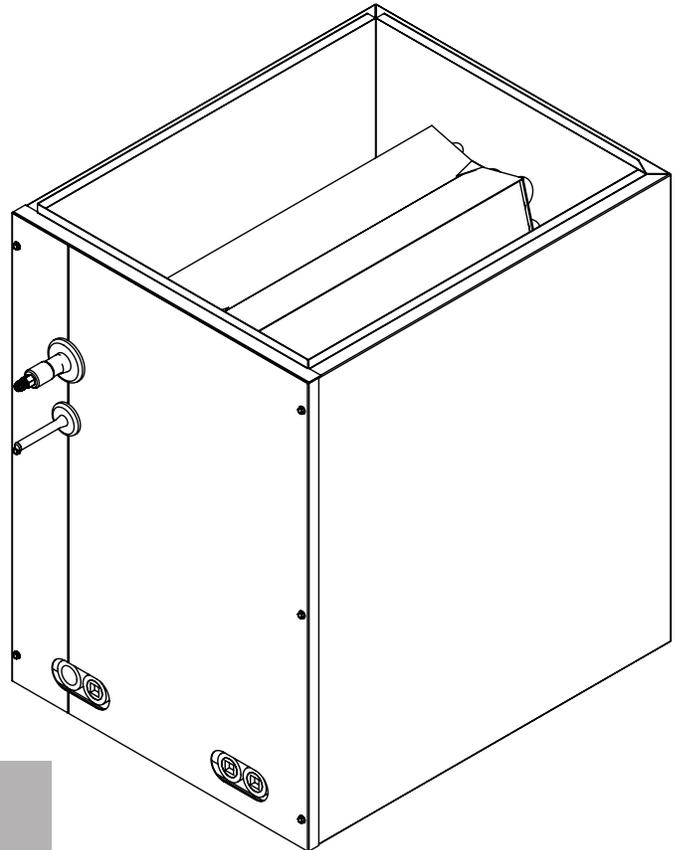


Thru-the-Wall Comfort

Heating & Cooling

Installation Guide

NCC Series
Cased Coil



Read Installation Manual
Prior To Starting The Installation.

Important: This Document is customer property and is to remain with this unit.



National Comfort Products
A Division of National Refrigeration and Air Conditioning Products, Inc.
539 Dunksferry Road · Bensalem, PA 19020-5908
(800) 523-7138
www.nationalcomfortproducts.com

Go Thru-the-Wall

Table of Contents

Safety Warnings.....	3
Inspection.....	3
Codes & Regulations.....	3
Installation Preparation.....	3
Condensate Drain Preparation.....	4
Coil Installation.....	5
Suction Line Connection.....	6
Metering Device/TXV.....	7
LeakCheck.....	8
System Charging.....	8
Coil Cleaning Instructions.....	9
A2L Coils and Refrigerant Detections Systems.....	9-13
Additional A2L Installation Requirements.....	13
Wiring Diagrams.....	14

**DO NOT DESTROY OR THROW AWAY THIS MANUAL.
IT SHOULD BE KEPT IN A SAFE PLACE FOR FUTURE REFERENCE.**

Safety Warnings!

WARNING

POTENTIAL SAFETY HAZARDS ARE ALERTED USING THE FOLLOWING SYMBOLS. THE SYMBOL IS USED IN CONJUNCTION WITH TERMS THAT INDICATE THE INTENSITY OF THE HAZARD.

WARNING

THIS SYMBOL INDICATES A POTENTIALLY HAZARDOUS SITUATION, WHICH IF NOT AVOIDED, COULD RESULT IN SERIOUS INJURY, PROPERTY DAMAGE, PRODUCT DAMAGE OR DEATH.

CAUTION

THIS SYMBOL INDICATES A POTENTIALLY HAZARDOUS SITUATION, WHICH IF NOT AVOIDED, MAY RESULT IN MODERATE INJURY OR PROPERTY DAMAGE.

WARNING

PRODUCT DESIGNED AND MANUFACTURED TO PERMIT INSTALLATION IN ACCORDANCE WITH LOCAL AND NATIONAL BUILDING CODES. IT IS THE INSTALLER'S RESPONSIBILITY TO ENSURE THAT PRODUCT IS INSTALLED IN STRICT COMPLIANCE WITH THE AFOREMENTIONED CODES. MANUFACTURER ASSUMES NO RESPONSIBILITY FOR DAMAGE (PERSONAL, PRODUCT OR PROPERTY) CAUSED DUE TO INSTALLATIONS VIOLATING REGULATIONS.

WARNING

CERTIFIED TECHNICIANS OR THOSE INDIVIDUALS MEETING THE REQUIREMENTS SPECIFIED BY NATE MAY USE THIS INFORMATION. PROPERTY AND PRODUCT DAMAGE OR PERSONAL INJURY HAZARD MAY OCCUR WITHOUT SUCH BACKGROUND.

WARNING

ALL POWER SOURCES SHOULD BE DISCONNECTED PRIOR TO SERVICING. FAILURE TO DO SO MAY CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.

This appliance is not intended for use at altitudes exceeding 2,000 meters.

Inspection

On receiving the product, visually inspect it for any major shipping related damages. Shipping damages are the carrier's responsibility. Inspect the product labels to verify the model number and options are in accordance with your order. Manufacturer will not accept damage claims for incorrectly shipped product.



Refrigerant
Safety Group
A2L



This product is design for use with A2L refrigerant and MUST be equipped with an A2L refrigerant detection system (RDS), which includes A2L Sensor, Mitigation Control Board, and Wiring Harnesses. Refer to pages #12-14 of this manual for wiring and operation instructions. The A2L RDS kit part number is NCCA2L-KIT.

Codes & Regulations

This product is designed and manufactured to comply with national codes. The product shall be installed in accordance with national wiring regulations. It is the responsibility of the installer to follow such codes and / or prevailing local codes / regulations. Compliance with national gas regulations shall be observed. The manufacturer assumes no responsibility for equipment installed in violation of any codes or regulations.

Installation Preparation

Read all the instructions in this guideline carefully while paying special attention to the WARNING and CAUTION alerts. If any of the instructions are unclear, clarify with a certified technician before proceeding. Gather all tools needed for successful installation of the unit prior to beginning the installation.

NOTICE

ABSENCE OF PRESSURE/CHARGE DOES NOT VERIFY A LEAK. CHECK COILS FOR LEAKS PRIOR TO INSTALLATION.

Assure that the maximum operating pressure is considered when connecting any evaporator unit or condenser unit. Refer to page #8 of this manual for refrigerant charging instructions.

WARNING

PARTIAL UNITS SHALL ONLY BE CONNECTED TO AN APPLIANCE SUITABLE FOR THE SAME REFRIGERANT.

NCC cased coils, are PARTIAL UNIT AIR CONDITIONERS, complying with PARTIAL UNIT requirements of the UL 60335-2-40 Standard and must only be connected to other units that have been confirmed as complying to corresponding PARTIAL UNIT requirements of this Standard (UL 60335-2-40).

The appliance shall be installed in accordance with national regulations. This product was tested at an external static pressure of 0.66" W.C. None of the components in this product family are designed or approved to be suitable for outdoor use. Refrigerant lines must be routed to allow the minimum required clearance of 24" for service. Consult all appropriate regulatory codes prior to determining final clearances.

Condensate Drain Preparation

National Comfort Products recommends an auxiliary drain pan be provided and installed by the installing contractor, which should be properly sloped, installed according to code, and terminated in an area visible to the home owner. The auxiliary pans provide extra protection to the area under the unit should the primary and secondary drain plug up and overflow.

⚠ WARNING

AS EXPRESSED IN OUR PRODUCT WARRANTY; NATIONAL COMFORT PRODUCTS WILL NOT BE BILLED FOR ANY STRUCTURAL DAMAGES CAUSE BY FAILURE TO FOLLOW THIS INSTALLATION REQUIREMENT.

⚠ CAUTION

DRAIN LINES FROM THE AUXILIARY DRAIN PAN SHOULD NOT BE CONNECTED TO THE PRIMARY DRAIN LINE OF THE COIL.

⚠ WARNING

DO NOT INSTALL COILS WITH PLASTIC DRAIN PANS ON ANY OIL OR DRUM TYPE FURNACES OR APPLICATIONS WHERE TEMPERATURE OF THE DRAIN PAN MIGHT EXCEED 260±5 °F. A METAL PAN SHOULD BE INSTALLED IN THESE APPLICATIONS.

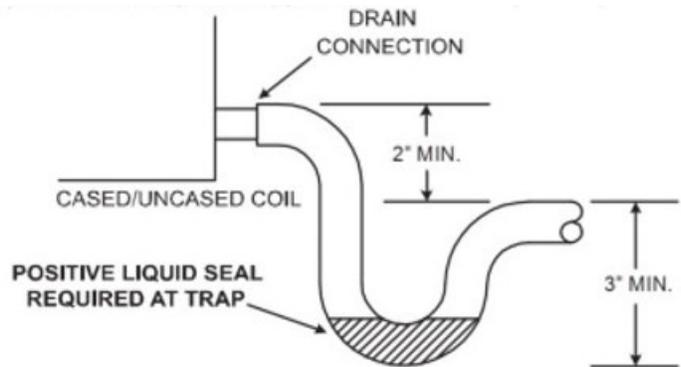
Install coils with the drain pan and/or casing on a flat, level surface. Slope the coil 1/4" towards the drain. Condensate lines must be installed in accordance with building codes. It is the contractor's responsibility to ensure proper condensate drainage at the time of the installation; National Comfort Products bears no responsibility for damages caused by improper condensate management.

⚠ CAUTION

SOME COILS HAVE PRIMARY AND SECONDARY DRAIN PORTS ON BOTH SIDES OF THE PAN TO OFFER INSTALLATION FLEXIBILITY, SO ENSURE ALL THREADED PLUGS ARE IN PRESENT AND TIGHTENED IN ANY UNUSED DRAIN PORTS. THESE MAY BE HIDDEN BEHIND THE COIL CASING ACCESS DOOR. FAILURE TO DO SO MAY RESULT IN PROPERTY WATER DAMAGE; IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THESE PLUGS ARE PRESENT AND TIGHT.

The drain lines must be installed with 1/4" per foot pitch to provide free drainage. A condensate trap MUST be installed on the primary drain line to ensure proper drainage of the condensate. The trap must be installed in the drain line below the bottom of the drain pan. Fig. 1 illustrates the typical drain trap installation. Prior to installation, ensure drain pan hole is not obstructed. Additionally, National Comfort Products recommends the drain lines be insulated to prevent sweating and dripping.

Fig. 1



⚠ CAUTION

USE TEFLON TAPE TO CONNECT THE DRAIN LINES TO THE THREADS IN THE DRAIN PAN. DO NOT USE SOLVENT BASED PIPE DOPE. THIS WILL REDUCE THE LIFE OF THE PAN.

The drain pan has primary (white) and secondary (red) drain connections. If a secondary drain line is required, it should be run separately from the primary and should terminate in a highly visible location. Condensate disposal through the secondary drain line indicates that the primary drain line is plugged and needs cleaning. If a secondary drain line will not be provided, plug the secondary drain. Drain plugs are NOT to be reused without plumbers tape or putty. Drain line connection should be finger tightened, then turned no more than one complete turn as needed to ensure a firm connection. DO NOT overtighten connection or damage may occur.

Coil Installation

⚠ WARNING

THE COIL IS MANUFACTURED WITH DRY NITROGEN PRE-CHARGE. RELEASE THE PRESSURE THROUGH THE SCHRADER VALVE TEST PORT PRIOR TO INSTALLATION. IF HOLDING PRESSURE IS NOT PRESENT, RETURN COIL TO DISTRIBUTOR FOR EXCHANGE.

⚠ NOTICE

REFRIGERANT TUBING MUST BE ROUTED TO ALLOW ACCESSIBILITY FOR SERVICE AND MAINTENANCE OF THE UNIT.

Pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

⚠ WARNING

FOR COILS USING A2L FLAMMABLE REFRIGERANTS, WHEN INSTALLED IN A ROOM WITH AN AREA LESS THAN THAT OUTLINED IN TABLE 2 ON PAGE #13, THAT ROOM SHALL BE WITHOUT CONTINUOUSLY OPERATING OPEN FLAMES (FOR EXAMPLE AN OPERATING GAS APPLIANCE) OR OTHER POTENTIAL IGNITION SOURCES (FOR EXAMPLE AN OPERATING ELECTRIC HEATER, HOT SURFACES). A FLAME PROVIDING DEVICE MAY BE INSTALLED IN THE SAME SPACE IF THE DEVICE IS PROVIDED WITH AN EFFECTIVE FLAME ARREST.

After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements:

The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.

Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected. REFER TO PAGE #8-11 FOR SYSTEM CHARGING INSTRUCTIONS.

Clean coil fins with degreasing agent or mild detergent and rinse fins clean prior to installation. Refer to page 9 for coil cleaning/maintenance guidance.

The refrigerant line sizes should be selected according to the recommendations of the outdoor unit manufacturer.

Care must be taken to ensure all connection joints are burr-free and clean. Failure to do so may increase chances of a leak. It is recommended to use a pipe cutter to remove the spun closed end of the suction line.

To reduce air leakage, rubber grommets may be present where the lines pass through the coil case. To avoid damage, remove grommets prior to brazing by sliding over the lines. Use a quenching cloth or allow the lines to cool before reinstalling the grommets.

Use of wet rags/quenching cloth is highly recommended to prevent weld-related damages to the casing and Schrader valve (if present).

Can be installed in either an upflow or a downflow application.

⚠ CAUTION

COIL SHOULD BE INSTALLED ON THE DISCHARGE SIDE OF THE FURNACE

⚠ CAUTION

NATIONAL COMFORT PRODUCTS COILS MAY INCLUDE A SCHRADER VALVE ON THE SUCTION MANIFOLD. ENSURE THAT THE SCHRADER VALVE AND VALVE CORE (WHERE PRESENT) ARE PROTECTED FROM HEAT TO PREVENT LEAKAGE.

⚠ WARNING

AS MENTIONED ELSEWHERE IN THIS DOCUMENT, IN AN APPLICATION INVOLVING OIL FURNACE A METAL DRAIN PAN MUST BE USED. COILS INSTALLED ON AN OIL FURNACE MUST HAVE A MINIMUM OF SIX INCHES CLEARANCE BETWEEN THE TOP OF THE FURNACE AND BOTTOM OF THE DRAIN PAN.

Vertical Upflow/Downflow Installation (NCC)

⚠ CAUTION

WHEN INSTALLING IN CONJUNCTION WITH A GAS FURNACE IN A VERTICAL ORIENTATION, ENSURE THAT THERE IS 2" GAP BETWEEN THE BOTTOM OF THE DRAIN PAN AND THE OUTLET OF THE FURNACE.!

To set up coils for downflow application, install the two 3" wide by 16" long galvanized metal plates on the outside of the coil, against the fins on each side of the coil as shown in Fig. 2A and 2C. These plates are supplied with the coil.

Do NOT exceed 350 cfm/ton of airflow for downflow applications.

Fig. 2A
Metal Plate location for a Downflow/Counterflow Application

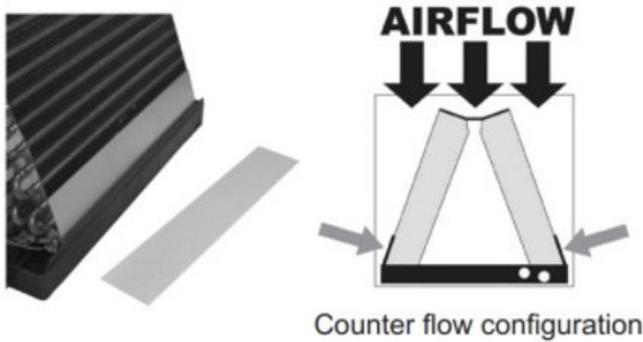


Fig. 2B
Upflow Application

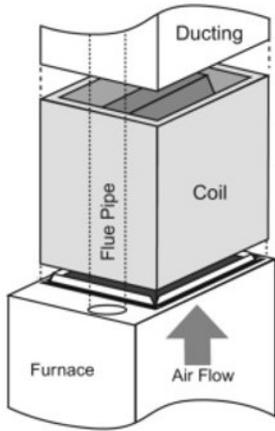
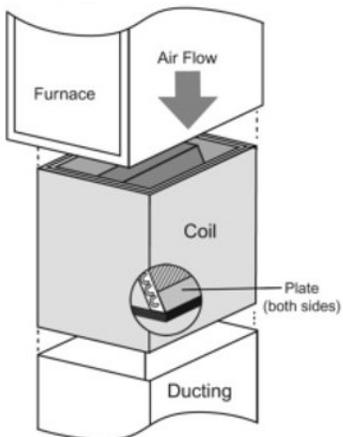


Fig. 2C
Downflow Application



To position the coil on furnace:

1. Locate the air outlet of the furnace.
2. Adjust flanges accordingly and position the coil over or under the furnace outlet.
3. Place ductwork over the casing.

Refer to Furnace/Air Handler manufacturer literature for specific coil installation guidelines and recommendations

⚠ CAUTION

DUE TO HIGHER DESIGNED RADIANT HEAT, A SIX INCH SPACER (PLACED BETWEEN THE FURNACE EXIT AND THE INLET OF THE EVAPORATOR) SHOULD BE INSTALLED WHEN MATCHING UP A NATIONAL COMFORT PRODUCTS COIL WITH AN ULTRALOW NOX (ULN) FURNACE.

Suction Line Connection

⚠ NOTICE

COILS DESIGNED FOR USE WITH A2L REFRIGERANT ARE MARKED WITH A RED TAG ON THE SUCTION AND LIQUID STUBS. THIS MARKING MUST BE REMOVED PRIOR TO BRAZING AND SHALL BE REPLACED AFTER BRAZING.

1. Ensure suction line connection joints are burr-free and clean. Failure to do so may increase chances of a leak and introduce contaminants to the system. It is recommended to use a pipe cutter to remove the spun closed end of the suction line.
2. Swedge (or use a field supplied coupler) and braze the field supplied refrigerant suction line tubing to the coil stub using approved industry practices.

⚠ WARNING

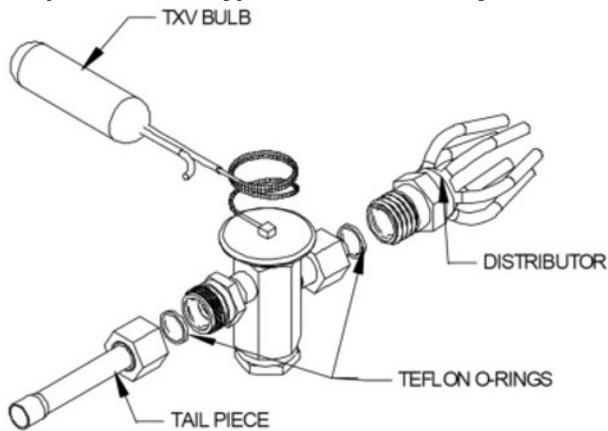
DO NOT ATTEMPT TO TOUCH BRAZED JOINTS WHILE HOT. SEVERE BURNS MAY RESULT.

Metering Device/TXV

National Comfort Products coils are made with an adjustable TXV.

Fig. 3A

Components of a typical TXV assembly



⚠ WARNING

THE SENSING BULB AND TXV BODY MUST BE PROTECTED FROM OVERHEATING DURING BRAZING. THE SENSING BULB AND TXV BODY MUST BE COVERED USING A QUENCH CLOTH OR WET CLOTH WHEN BRAZING. POINTING THE BRAZING FLAME AWAY FROM THE VALVE AND SENSING BULB PROVIDE PARTIAL PROTECTION ONLY.

TXV Bulb Horizontal Mounting

The orientation and location of the TXV bulb has a major influence on the system performance.

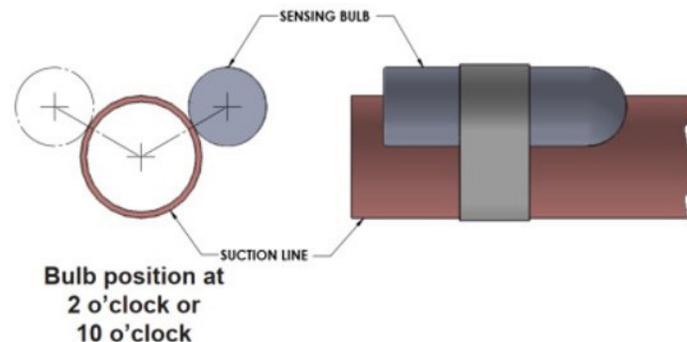
⚠ CAUTION

ENSURE THAT THE TXV BULB IS IN DIRECT CONTACT WITH THE SUCTION/VAPOR LINE. GAP BETWEEN THE BULB AND TUBE SHOULD BE AVOIDED. FAILURE TO DO SO WILL IMPAIR THE PROPER FUNCTIONING OF THE TXV VALVE.

It is recommended that the TXV bulb be installed parallel to the ground (on a horizontal plane). The bulb position should be at 2 o'clock or 10 o'clock. Fig. 3B-1 shows the recommended position for the TXV bulb installation in the horizontal plane.

Fig. 3B-1

Recommended location for horizontal TXV bulb mount



The TXV sensing bulb SHOULD be mounted on the suction line approximately 6" from the TXV or coil housing using the metal clamp provided. In order to obtain a good temperature reading and correct superheat control, the TXV sensing bulb must conform to ALL of the following criteria:

1. The sensing bulb MUST be in direct and continuous contact with the suction line.
2. The sensing bulb should be mounted horizontally on the suction line.
3. The sensing bulb MUST be mounted at the 2 o'clock or 10 o'clock position on the circumference of the suction line.
4. The sensing bulb MUST be insulated from outside air.

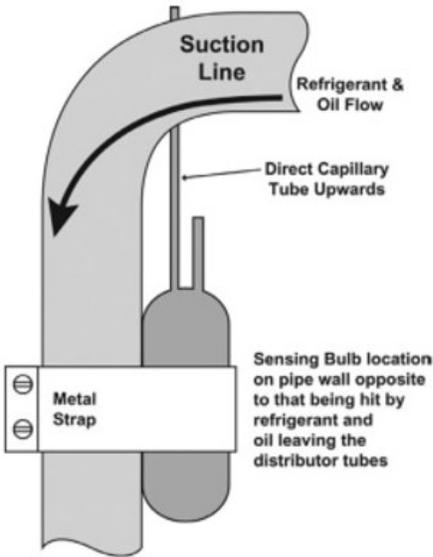
A properly mounted sensing bulb will prevent false readings caused by liquid refrigerant that may have formed inside the suction/vapor line. Insulation will protect the sensing bulb from false readings due to contact with warm air.

Please refer to the installation guide of the outside unit for specific bulb mounting requirements.

TXV Bulb Vertical Mounting

As recommended in Section 3B-1, the TXV sensing bulb should be mounted in a horizontal plane in relation to the suction/vapor line. However, some installation configurations may require that the sensing bulb be mounted vertically. In this instance, place the bulb opposite the piping wall being hit by refrigerant and oil leaving the distributor tubes, and with capillary tubes directed upwards as shown in Fig. 3B-2.

Fig. 3B-2
Recommended location for vertical TXV bulb mount

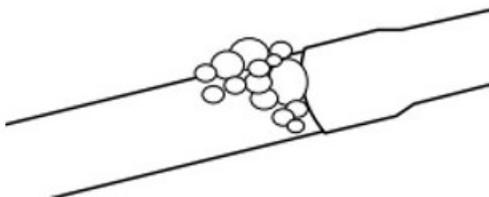


CAUTION

IF THE TXV SENSING BULB IS MOUNTED VERTICALLY; THE CAPILLARY MUST BE DIRECTED UPWARDS. THE BULB MUST BE MOUNTED ON THE WALL OPPOSITE TO THAT BEING DIRECTLY HIT BY THE REFRIGERANT AND OIL LEAVING THE DISTRIBUTOR TUBES.

Leak Check

1. Following outdoor unit manufacturer instructions and recommendations, charge the system with dry nitrogen to a maximum pressure of 150 PSIG.
2. Check all brazed and screw on line connections by applying a soap solution to the joint. A leak will produce bubbles in the soap solution.



3. If any leaks or are discovered, relieve system pressure and repair leaks. Repeat steps 1-3.
4. With no leaks or weak connections present, evacuate the system and charge as per the outdoor unit manufacturer instructions and specifications.

NOTICE

TEST PRESSURES FOR A2L REFRIGERANTS, FIELD MADE REFRIGERANT JOINTS SHALL HAVE A SENSITIVITY OF 5 GRAMS PER YEAR OF REFRIGERANT OR AT LEAST 25 TIMES THE MAXIMUM ALLOWABLE PRESSURE. NO LEAKS SHALL BE DETECTED IN THE SYSTEMS.

System Charging

WARNING

UNITS DESIGNED FOR USE WITH R454B REFRIGERANT MUST BE CHARGED WITH R454B REFRIGERANT. ENSURE THAT THE R454B SENSOR IS INSTALLED CORRECTLY AND IS OPERATIONAL.

CAUTION

AN IMPROPERLY CHARGED SYSTEM WILL LIKELY CAUSE LOSS IN SYSTEM PERFORMANCE AND MAY DAMAGE THE COMPRESSOR.

CAUTION

REFER TO OUTDOOR UNIT MANUFACTURER CHARGING GUIDELINES AND RECOMMENDATIONS. THE RECOMMENDATIONS GIVEN BELOW ARE GENERAL IN NATURE AND ARE NOT TO SUPERSEDE OUTDOOR UNIT MANUFACTURER SPECIFICATIONS.

Where addition of charge is required to complete installation, follow the instructions on how to determine the additional REFRIGERANT CHARGE from the instructions provided with the outdoor unit and how to complete the REFRIGERANT CHARGE on the label provided by the outdoor unit manufacturer adjacent to the nameplate of the compressor bearing unit. Interconnecting refrigerant piping length and diameter MUST be taken into consideration.

Add refrigerant until the subcooling measured at the indoor unit liquid line matches the subcooling recommendation of the outdoor manufacturer.

TXV Adjustments:

National Comfort Products cased coils are equipped with an adjustable TXV. The Installer MUST adjust the TXV to match the recommended superheat of the outdoor manufacturer.

⚠ NOTICE

WHEN ADJUSTING THE TXV, THE VALVE STEM OR ADJUSTING SCREW SHOULD NOT BE ADJUSTED MORE THAN A 1/4 TURN AT A TIME. TO ADJUST SUPERHEAT, TURN THE VALVE STEM CLOCKWISE TO INCREASE AND COUNTERCLOCKWISE TO DECREASE.

The TXV should NOT be adjusted at light load / ambient conditions of 60°F or below.

Coil Cleaning Instructions

⚠ WARNING

DO NOT USE MEANS TO ACCELERATE THE DEFROSTING PROCESS OR TO CLEAN, OTHER THAN THOSE RECOMMENDED BY THE MANUFACTURER.

National Comfort Products cased coils are equipped with a two-piece panel door to allow for cleaning and maintenance access. Remove one or both doors to access the coil for cleaning.

For copper tube coils, it is recommended to flush with the coil with water. There are coil cleaners that are available that contain corrosive chemicals, such as, but not limited to, chlorine and hydroxide, that are not approved for use on National Comfort Products coils.

A2L Coils and Refrigerant Detections Systems



READ THE PRECAUTIONS IN THIS MANUAL CAREFULLY BEFORE OPERATING THE UNIT.



READ THE INSTRUCTIONS IN THIS MANUAL CAREFULLY BEFORE OPERATING THE UNIT.



READ THE PRECAUTIONS IN THIS MANUAL CAREFULLY BEFORE SERVICING THE UNIT.

Installation, Service, Maintenance, & Repair Instructions

National Comfort Products coils are designed for use with (R454B) A2L Refrigerant and they MUST be equipped with a refrigerant leak detection system (which includes an A2L Sensor, a Mitigation Control Board, and Harnesses). The refrigerant detection system must be wired to the furnace as specified in the Wiring Diagram.

The A2L Sensor must be installed and powered for service. On cased coils ensure that the strain relief is installed through the knockout hole in the access panel.

⚠ WARNING

DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH.

⚠ WARNING

WHEN USING FLAMMABLE REFRIGERANTS, LEAK DETECTION SYSTEM INSTALLED. UNIT MUST BE POWERED EXCEPT FOR SERVICE.

For mechanical ventilation, the lower edge of the air extraction opening where air is exhausted from the room shall not be more than 100 mm above the floor. The location where the mechanical ventilation air extracted from the space is discharged shall be separated by a sufficient distance, but not less than 3 m, from the mechanical ventilation air intake openings, to prevent recirculation to the space.

⚠ WARNING

REFRIGERATING PIPE OR COMPONENTS ARE INSTALLED IN A POSITION WHERE THEY ARE UNLIKELY TO BE EXPOSED TO ANY SUBSTANCE WHICH MAY CORRODE REFRIGERANT CONTAINING COMPONENTS, UNLESS THE COMPONENTS ARE CONSTRUCTED OF MATERIALS WHICH ARE INHERENTLY RESISTANT TO BEING CORRODED OR ARE SUITABLY PROTECTED AGAINST BEING SO CORRODED.

False ceilings or drop ceilings may be used as a return air plenum only if a refrigerant detection system is provided in the appliance and any external connections are also provided with a sensor immediately below the return air plenum duct joint.

⚠ WARNING

AUXILIARY DEVICES WHICH MAY BE A POTENTIAL IGNITION SOURCE SHALL NOT BE INSTALLED IN THE DUCT WORK. EXAMPLES OF SUCH POTENTIAL IGNITION SOURCES ARE HOT SURFACES WITH A TEMPERATURE EXCEEDING 700 C AND ELECTRIC SWITCHING DEVICES.

⚠ WARNING

ONLY AUXILIARY DEVICES APPROVED BY THE APPLIANCE MANUFACTURER OR DECLARED SUITABLE WITH THE REFRIGERANT SHALL BE INSTALLED IN CONNECTING DUCTWORK.

Qualification of Workers

Only technicians with training carried out by national training organizations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation may work on this equipment. The achieved competence must be documented by a certificate.

Checks To The Work Area & Work Procedure

Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks.

Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

Checking For Presence of Refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres.

Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

Presence of Fire Extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

No Ignition Sources

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "NO SMOKING" signs shall be displayed.

Ventilated Area

Ensure that the area is open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

Checks to the Refrigerating Equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- The actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed;
- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

Checks to Electrical Devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so all parties are advised.

Initial Safety Checks shall include:

- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- That no live electrical components and wiring are exposed while charging, recovering or purging the system;
- That there is continuity of earth bonding.

Repairs To Sealed Electrical Components

During repairs to sealed electrical components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanent operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that the apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications

Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Detection of Flammable Refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (15 % maximum) is confirmed.

Leak detection fluids such as the bubble method is also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipework. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

Removal and Evacuation

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for FLAMMABLE REFRIGERANTS it is important that best practice is followed since flammability is a consideration. The following procedure shall be adhered to:

- safely remove refrigerant following local and national regulations;
- evacuate;
- purge the circuit with inert gas (optional for A2L);
- evacuate (optional for A2L);
- continuously flush or purge with inert gas when using flame to open circuit; and
- open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing until the working pressure is achieved, then venting to the atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

Charging Procedures

In addition to conventional charging procedures, the following requirements shall be followed:

- Ensure that contamination of different refrigerants does not occur when using charging equipment.
- Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task commences.

- a. Become familiar with the equipment and its operation.
- b. Isolate the system electrically.
- c. Before attempting the procedure, ensure that:
 - mechanical handling equipment is available, if required, for handling refrigerant cylinders
 - all personal protective equipment is available and being used correctly;
 - the recovery process is supervised at all times by a competent person;
 - recovery equipment and cylinders conform to the appropriate standards
- d. Pump down refrigerant system, if possible.
- e. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system
- f. Make sure that cylinder is situated on the scales before recovery takes place.

- g. Start the recovery machine and operate in accordance with instructions.
- h. Do not overfill cylinders (no more than 80 % volume liquid charge).
- i. Do not exceed the maximum working pressure of the cylinder, even temporarily.
- j. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- k. Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

Labeling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating that the equipment contains FLAMMABLE REFRIGERANT.

Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Refrigerant Detection System Installation

For the field installation of the included RDS, please see additional installation manual included with the kit. Refer to Table 2 for R454B minimum conditioned room requirements.

Wiring instructions are detailed in the wiring diagrams in Section 13 of this manual. All wiring installed in the field used with the RDS must meet the following specifications:

- 18 AWG
- 1.58mm insulation thickness or protected from damage

The installation of the RDS and sensor location will vary depending on the product configuration and direction of airflow. Follow instructions in this manual carefully. Units with factory installed RDS are configured for upflow/downflow installation as shown in Figure 4.

It is the installer's responsibility to ensure that mitigation mode is operational. The functionality can be tested after the installation.

The A2L sensor is not intended for service or repair. If the sensor is not functioning properly, mitigation mode will engage and the sensor must be replaced by removing the sensor and sensor clip assembly from the drain pan and replacing it with a new sensor and sensor clip assembly.

⚠ WARNING

REFRIGERANT SENSORS FOR REFRIGERANT DETECTION SYSTEMS SHALL ONLY BE REPLACED WITH SENSORS SPECIFIED BY THE APPLIANCE MANUFACTURER.

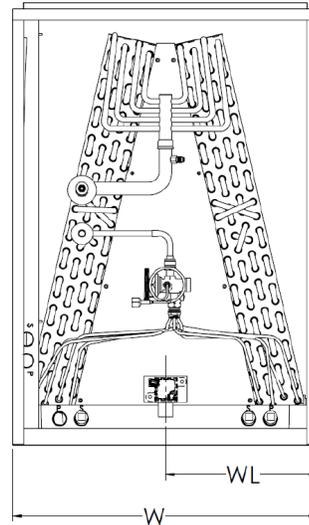


Figure 4 - Upflow/Downflow

VERTICAL	
CABINET WIDTH (W) INCHES	SENSOR LOCATION (WL) INCHES
17.5	8.75
21.0	10.50

Table 1

Minimum Mitigation Airflow for R454B Systems						
Total System Charge (lb)	Total System Charge (oz)	Total System Charge (kg)	Minimum Room Area (m ²)	Minimum Room Area (ft ²)	Minimum Mitigation Airflow (m ³ /hr)	Minimum Mitigation Airflow (CFM)
4	64	1.81	5.57	59.98	183.89	108
5	80	2.27	6.97	74.98	229.86	135
6	96	2.72	8.36	89.97	275.83	162
7	112	3.18	9.75	104.97	321.81	189
8	128	3.63	11.14	119.96	367.78	216
9	144	4.08	12.54	134.96	413.75	244
10	160	4.54	13.93	149.95	459.72	271
11	176	4.99	15.32	164.95	505.69	298
12	192	5.44	16.72	179.94	551.67	325
13	208	5.90	18.11	194.94	597.64	352
14	224	6.35	19.50	209.93	643.61	379
15	240	6.80	20.90	224.93	689.58	406
16	256	7.26	22.29	239.92	735.55	433
17	272	7.71	23.68	254.92	781.53	460
18	288	8.16	25.08	269.92	827.50	487
19	304	8.62	26.47	284.91	873.47	514
20	320	9.07	27.86	299.91	919.44	541

Table 2

NOTE: The Total System Charge in the above table, 3 is the total system charge which is marked on the system as specified in the outdoor unit manufacturer's instructions.

Additional A2L Installation Requirements

THE FOLLOWING INSTRUCTIONS ARE MANDATORY FOR A2L SYSTEMS AND SUPERSEDE OTHER INSTRUCTIONS

⚠ WARNING

ONLY BRAZING TECHNIQUES AND APPROVED MECHANICAL JOINTS SHOULD BE USED TO CONNECT REFRIGERANT TUBING CONNECTIONS. NON-APPROVED MECHANICAL CONNECTIONS AND OTHER METHODS ARE NOT PERMITTED IN THIS SYSTEM CONTAINING A2L REFRIGERANT. APPROVED MECHANICAL JOINTS WILL BE DETAILED IN THE PRODUCT SPECIFICATION.

STANDING PRESSURE TEST / LEAK DETECTION METHOD

Using dry nitrogen or dry helium, pressurize the system to 450 PSIG. Allow the pressure to stabilize and hold for 15 minutes (minimum). The system is considered leak-free if the pressure does not drop below 450 PSIG. If, after 15 minutes the pressure drops below 450 PSIG, it implies a leak in the system. Proceed with identifying and sealing the leak and repeat the Standing Pressure Test. Leak test the system using dry nitrogen or dry helium and soapy water to identify leaks. No refrigerant shall be used for pressure testing to detect leaks. Proceed to system evacuation using the Deep Vacuum Method.

DEEP VACUUM METHOD

The Deep Vacuum Method requires a vacuum pump rated for 500 microns or less. This method effectively and efficiently ensures the system is free of non-condensable air and moisture. The Triple Evacuation Method is detailed in this manual for this product model as an alternative. To expedite the evacuation procedure, it is recommended that the Schrader cores be removed from the service valves using a core-removal tool.

1. Connect the vacuum pump, micron gauge, and vacuum rated hoses to both service valves. Evacuation must use both service valves to eliminate system mechanical seals.
2. Evacuate the system to less than 500 microns.
3. Isolate the pump from the system and hold the vacuum for 10 minutes (minimum). Typically, pressure will rise slowly during this period. If the pressure rises to less than 1000 microns and remains steady, the system is considered leak-free; proceed to system charge and startup.
4. If pressure rises above 1000 microns but holds steady below 2000 microns, non-condensable air or moisture may remain, or a small leak may be present. Return to step 2; If the same result is achieved, check for leaks and repair. Repeat the evacuation procedure.
5. If pressure rises above 2000 microns, a leak is present. Check for leaks and repair them. Then, repeat evacuation procedure.

TRIPLE EVACUATION METHOD

The Triple Evacuation Method is a process used to clean out moisture, grit, and other residue from a system, such as an air conditioner's line set. It's often used when installing a new air conditioner, even if the line set is being reused. This method involves repeatedly evacuating the system and breaking the vacuum with dry nitrogen to absorb moisture:

1. Connect the vacuum pump, micron gauge, and vacuum rated hoses to both service valves. Evacuation must use both service valves to eliminate system mechanical seals.
2. Evacuate the system to less than 500 microns.
3. Turn off pump and break vacuum with dry nitrogen.
4. Start pump again and the system to less than 500 microns.
5. Turn off pump and break vacuum with dry nitrogen
6. Repeat steps 1-5, ending with a final pull down to 400 microns

ACCESSORY INSTALLATION

⚠ WARNING

ALL ACCESSORIES THAT MAY BE A POTENTIAL IGNITION SOURCE IF INSTALLED, SUCH AS ELECTRONIC AIR CLEANERS, MUST ONLY BE POWERED THROUGH THE ACCESSORY CONTROL KIT. IF AN ELECTRONIC AIR CLEANER IS ALREADY INSTALLED IN THE DUCTWORK AND NOT CONNECTED TO THE ACCESSORY CONTROL BOARD, IT WILL HAVE TO BE DISABLED OR REMOVED. ENSURE THAT ANY ADDITIONAL WIRING FROM THE INDOOR UNIT TO THE ACCESSORY CONTROL KIT IS ROUTED AND PROTECTED FROM DAMAGE AND WEAR, AVOIDING THE FLUE PIPE AND ANY JOINTS THAT MAY NEED BRAZED OR DISCONNECTED FOR SERVICE. REFER TO THE PRODUCT SPECIFICATION SHEET FOR THE ACCESSORY CONTROL KIT.

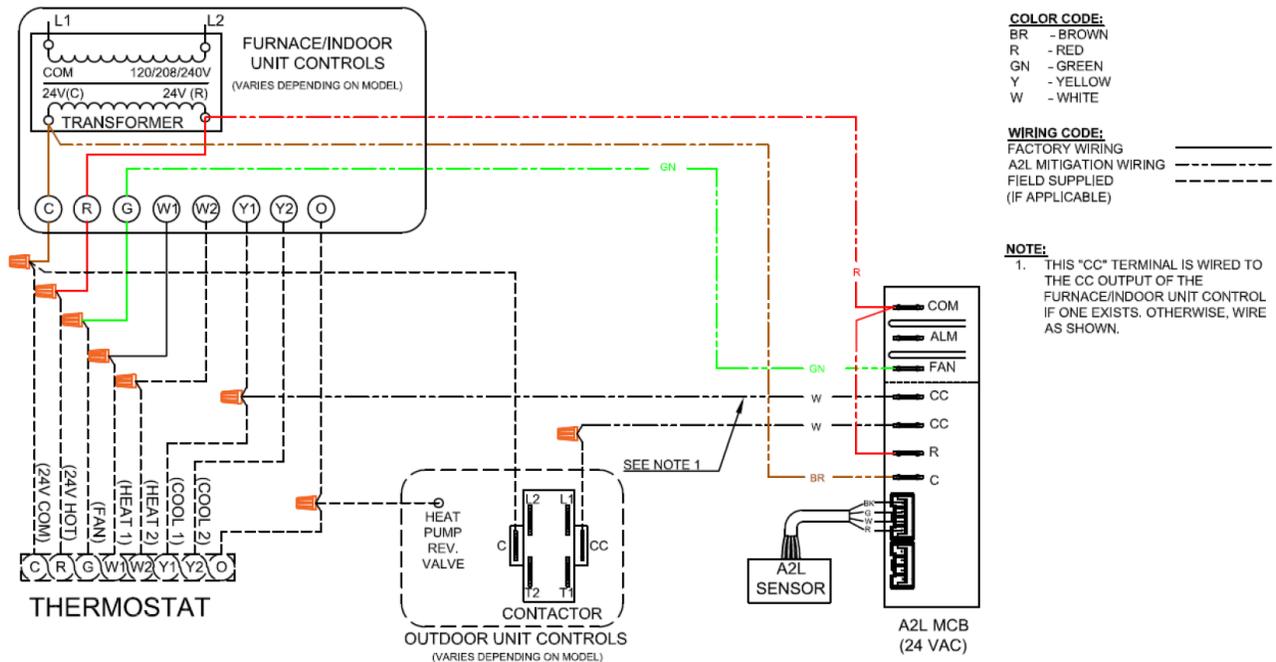
ALTITUDE ADJUSTMENT FACTOR TO CALCULATE MINIMUM ROOM AREA

The indoor equipment mitigation requirements are calculated at sea level. For higher altitudes adjust the minimum room area specified on the Serial Plate by the corresponding altitude adjustment factor shown below. This table is produced as a reference. Adjust the room area ($A_{min\ alt}$) is the product of the minimum room area specified in the serial plate and the adjustment factor AF, as shown in below formula.

$$A_{min\ alt} = A_{min\ (serial\ plate)} * AF$$

Height/Altitude (m)	Height/Altitude (ft)	Altitude Adjustment Factor (AF)
0 (Sea Level)-200	0 (Sea Level)-656	1.00
200-400	656-1312	1.00
400-600	1312-1969	1.00
600-800	1969-2625	1.00
800-1000	2625-3281	1.02
1000-1200	3281-3937	1.05
1200-1400	3937-4593	1.07
1400-1600	4593-5249	1.10
1600-1800	5249-5906	1.12
1800-2000	5906-6562	1.15
2000-2200	6562-7218	1.18
2200-2400	7218-7874	1.21
2400-2600	7874-8530	1.25
2600-2800	8530-9186	1.28
2800-3000	9186-9843	1.32
3000-3200	9843-10499	1.36
3200-3400	10499-11155	1.40

Wiring Diagrams



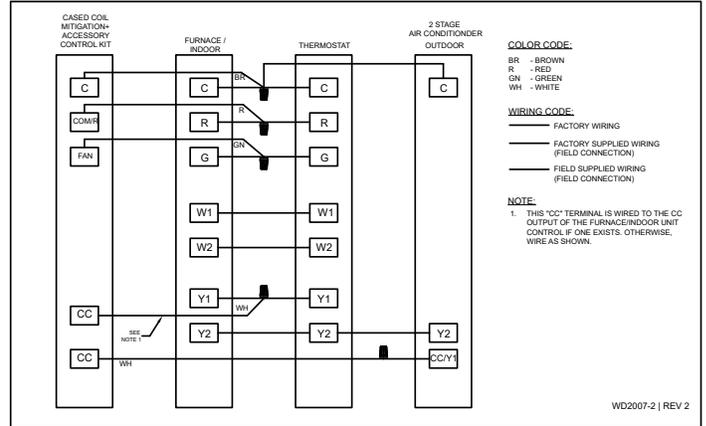
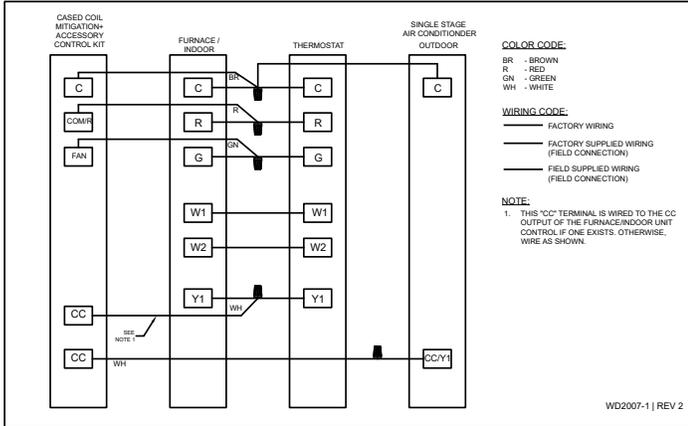
A2L Mitigation System Wiring Diagram

NOTE: Wiring Diagram is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

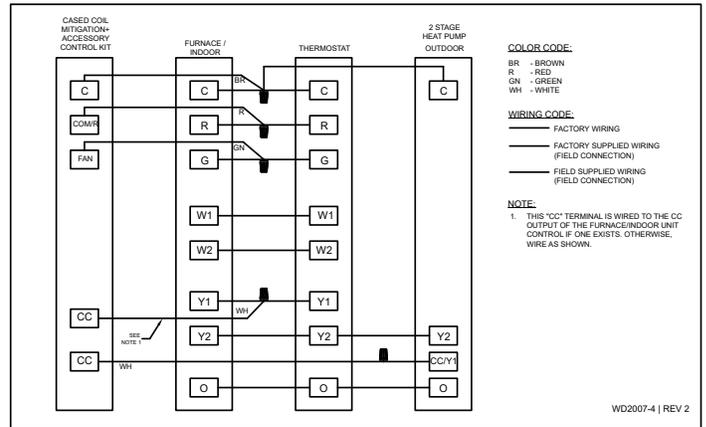
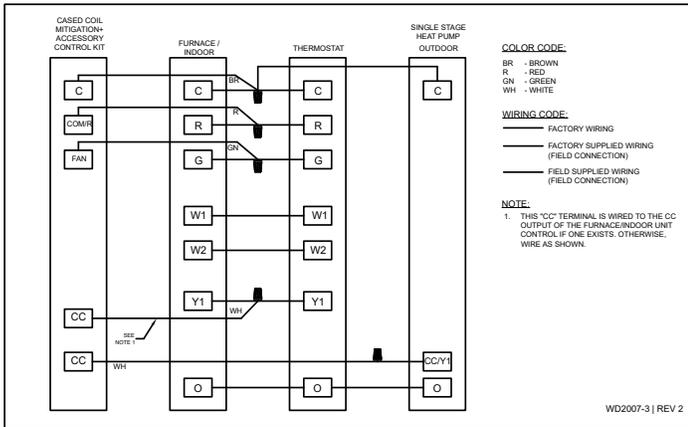
Figure 5

Installation Guide | NCC Series Cased Coil

AIR CONDITIONER ONLY



HEAT PUMP ONLY





National Comfort Products

A Division of National Refrigeration and Air Conditioning Products, Inc.

539 Dunksferry Road | Bensalem, PA 19020-5908

(800) 523-7138

www.nationalcomfortproducts.com

2 YEAR
WARRANTY
ON PARTS

