Installation, Operation, & Maintenance

IOM75G03
Rev. A 1/25

WCX Series
R454B Condensing Unit

ATTENTION:

Read all instructions thoroughly and retain all manuals for future reference.

COPYRIGHT

WARNING

Altering the product or replacing parts with non-authorized factory parts voids all warranty or implied warranty and may result in adverse operational performance and/or a possible hazardous condition to service personnel and occupants. Company employees and/or contractors are not authorized to waive this warning.

WARNING

Only personnel trained and qualified in the installation, adjustment, servicing, maintenance, or repair of the equipment described in this manual should perform service. The manufacturer is not responsible for any injury or property damage arising from improper service or procedures. In jurisdictions where licensing is required to service this equipment, only licensed personnel should perform the service.

Improper installation, adjustment, servicing, maintenance, or repair—or attempting to perform these tasks without proper training—may result in product damage, property damage, personal injury, or death. Service personnel assume responsibility for any injury or property damage resulting from improper procedures.

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SAFETY CONSIDERATIONS

1. READ THE ENTIRE MANUAL BEFORE STARTING THE INSTALLATION.
2. Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause personal injury or damage.
3. Consult a qualified licensed installer, service agency, or your distributor for information assistance. The qualified licensed installer or service agency must use factory-authorized kits or accessories when servicing this product.
4. Refer to the individual instructions packaged with kits or accessories when installing.
5. Follow all safety codes.
6. Read these instructions thoroughly and follow all warnings or cautions attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements.

This appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
Children should be supervised to ensure that they do not play with the appliance
Use adequate personal protection equipment when installing and performing maintenance. After switching off and locking-out an electrical disconnect, verify a safe condition with an electrical tester. Discharge a capacitor before handling any PSC motor and wiring. Use eye protection, cut resistant gloves and sleeves to protect against metal edges and screws.

RECOGNIZE THE FOLLOWING SAFETY NOTATIONS THROUGHOUT THIS MANUAL AND POSTED ON THE EQUIPMENT:

WARNING

Indicates a potentially hazardous situation or unsafe practices that could result in severe personal injury or death and/or damage to property.

WARNING

ELECTRIC SHOCK HAZARD

Signifies potential electrical shock hazards that could result in personal injury or death.

CAUTION

Indicates a potentially hazardous situation that may result in minor or moderate personal injury.

IMPORTANT

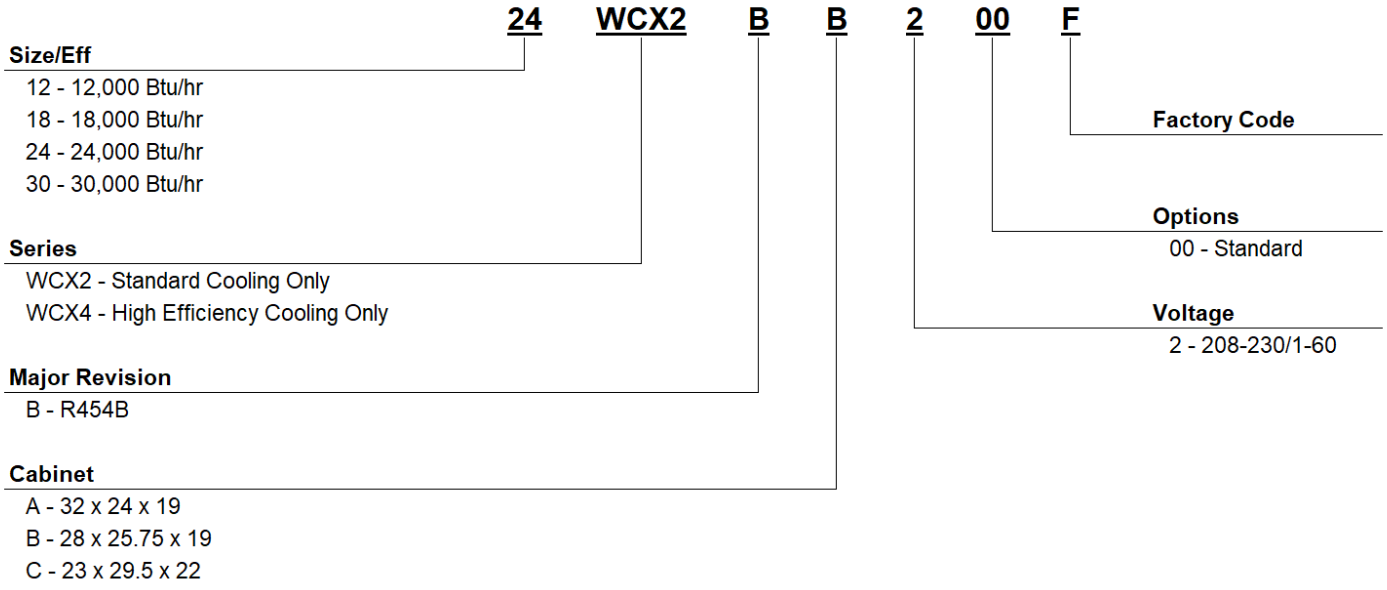
Suggests important procedure steps to ensure proper installation, reliability, or operation.

NOTE

Used to highlight suggestions, which may result in enhanced installation, reliability or operation.

	Service indicator; read technical manual
	Operator's manual; operating instructions
	Read the instructions
	Warning; flammable materials
	UN GHS flame symbol

NOMENCLATURE



INSTALLATION PRECAUTIONS

Installation of this equipment should only be performed by properly trained personnel to ensure proper installation and the safety of the installer.

IMPORTANT

This unit is a partial unit air conditioner, complying with partial unit requirements of international standard, UL60335-2-40 and must be only connected to a unit that has been confirmed as complying to corresponding partial unit requirements of this international standard.

CAUTION

Contact with metal edges and corners can result in injury. Wear protective gloves when handling. Exercise caution when installing and servicing unit.

CAUTION

Always wear appropriate Personal Protective Equipment (PPE) when installing and servicing these units.

NOTE

Verify the supply voltage requirements on the unit nameplate installing the equipment.

WARNING

Do not alter this product by using non-authorized parts. Such action voids warranties or implied warranties and may result in adverse operation and performance and may be hazardous to service personnel and occupants. Company employees and/or contractors are not authorized to waive this warning.

Compressor start assist devices (capacitor and start potential relay) may be required for installations with long line length, unusually high or low ambient operating conditions. Thermostatic expansion valves or any other situation which can lead to slow off cycle pressure equalization and excessive compressor starting problems.

Work with extreme caution to minimize the risk of refrigerant ignition while installing and servicing a system containing a flammable refrigerant. Control the work environment as much as possible while potentially flammable vapors are present. Inform all persons on site about the risks of the nature of the work underway and the necessary safety precautions. Do not work in confined spaces. Test the work area for refrigerant in the air using an intrinsically safe A2L refrigerant leak detector before beginning work. Have a dry powder or CO2 fire extinguisher available. Use proper tools designed for A2L class refrigerants. While working near A2L refrigerants, use only non-sparking tools. Open flames and other ignition sources must not be present except during brazing. Brazing must only take place on evacuated and nitrogen purged refrigerant lines and components that are open to the atmosphere.

Consult local building codes and current editions of the National Electrical Code (NEC) NFPA 70. In Canada, refer to current editions of the Canadian electrical code *CSA* CEC22.1.

WARNING

Take extreme caution that no internal damage will result if screws or holes are drilled into the cabinet.

WARNING

Use multiple people when moving and installing these units. Failure to do so could result in injury or death.

GENERAL

WARNING

These instructions are intended to aid qualified, licensed, service personnel in proper installation, adjustment and operation of this unit. Read these instructions thoroughly before attempting installation or operation. Failure to follow these instructions may result in improper installation, adjustment, service or maintenance possibly resulting in fire, electrical shock, property damage, personal injury or death.

This unit may be installed at altitudes up to 10,000 ft. (3,048 m) above sea level.

CAUTION

Only use components designed for use with R545-B refrigerant

The manufacturer assumes no responsibility for equipment installed in violation of any code requirement. The information represented here has been prepared to assist in the proper installation of the air conditioning system. Improper installation can result in unsatisfactory operation and/or dangerous conditions, and can cause the related warranty to be voided.

Read these instructions and any instructions packaged with separate equipment required to make up the system prior to installation. Material in this shipment has been inspected at the factory and released to the transportation agency in good condition. When received, a visual inspection of all cartons should be made immediately. Any evidence of rough handling or apparent damage should be noted on the delivery receipt and the material inspected in the presence of the carrier's representative. If damage is found, a claim should be filed against the carrier immediately.

WARNING

Before installing or servicing unit, always turn off all power to unit. There may be more than one disconnect switch. Electrical shock can cause personal injury or death.

STORING UNITS

WARNING

DO NOT stack more than THREE units when storing. Failure to follow these instructions may result in property damage, personal injury or death.

WARNING

REFRIGERANT UNDER PRESSURE!
Units are factory charged with refrigerant. Store units in a location that will minimize the potential for damage. Do not store the unit where sources of ignition are continuously present.

UNIT LOCATION

CAUTION

A masonry wall opening must be properly constructed with a lintel for wall support. Wall openings must be flashed and sealed. The unit must be level, front to back, side to side. Refer to CLEARANCE REQUIREMENTS section in this manual for more information.

This unit is intended to be used in a thru-the-wall application with the coil surface side of the unit exposed to the outside of the structure. A wall opening of sufficient size to allow sliding the unit through must be provided with framework sufficient to support the unit to the wall. The unit cabinet must not be relied on to provide wall support. Mounting angles are provided for use in attaching the unit cabinet to the framework on the inside surface of the opening. In attaching the angles to the unit cabinet take care that no screws are driven into the refrigerant tubing inside the cabinet. The opening around the unit must be caulked and sealed to prevent rain leakage. Use silicone sealant or other high grade non hardening sealing compound approved for exterior use (See *Figure 1*). Care must be taken not to block the drain holes provided at the bottom of the unit. These holes allow for drainage of any rain that may be blown into the unit.

UNIT LOCATION CONT.

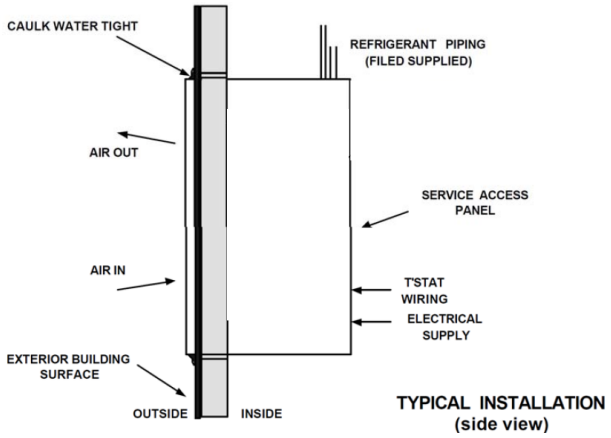


Figure 1

The WCX unit is designed to be installed into a wall with the outside surface of the unit plumb with the wall. Ensure that the top of the cabinet is level. The bottom pan is pitched so it cannot be used to judge the level. If the unit is not level the drain will not function properly.

CAUTION

Seal exposed joints to prevent water and outside air infiltration into the closet, which can cause improper unit operation and may cause damage to the unit and other property.

CAUTION

If a reduction of airflow or a recirculation of airflow occurs the unit performance will decrease. This condition will cause premature equipment failure and void all warranties.

For the unit to function properly, there must be no restriction to free circulation of the condenser air. If architectural design considerations make it necessary to locate the unit behind a decorative louver the unit performance will be reduced if a reduction of airflow or a recirculation of airflow occurs. It may be necessary to provide a baffle between the face of the unit and the decorative louver to prevent recirculation of the hot discharge air back into the coil face. The added louver must be as open as possible to achieve the best performance.

If more than one WCX unit is to be installed in the same area a minimum of 36" (1 m) spacing on the vertical and 18" (.5 m) on the horizontal is recommended between units to minimize recirculation of condenser exhausted air.

For units that are to be installed in the interior of a building or in return air spaces care should be taken to seal any openings in the cabinet that would allow hot condensing unit air into the conditioned space. Failure to seal these openings may result in erratic system operation and in driving rain situations may allow water infiltration into the structure.

All openings around the top, sides and bottom must be caulked and sealed. Care must be taken not to plug the openings in the front of the base pan of the unit. If the optional wall sleeve is used, caulk the spaces between the sleeve and the wall. Completely fill the clearance between the unit and the wall sleeve with polyurethane foam sealant.

A barrier must be provided to prevent recirculation of air to the unit (mixing of inlet and outlet air) when the front of the unit is mounted back from the inside of the architectural louver.

The unit must not be mounted in dead-end hallways or areas where there is no fresh outside air circulation. Thru-the-wall units may not be located where hot exhausts from clothes dryer vents, kitchen vents, steam vents or corrosive fumes could come in contact with coil side of unit.

In cold climate areas, units installed in interior and return air spaces may require that insulation be added to the exterior of the unit cabinet to reduce heat loss thru the cabinet and possible condensation on the cabinet surfaces which could result in water damage.

The unit is equipped with a drain pan located beneath the coil to catch any condensate produced during the heating mode. This pan must be connected to a drain to remove the condensate from the cabinet. A ¾" female pvc fitting is provided for field drain connection and a hole is located at the rear of the unit for routing the drain line. Retain the plastic snap plug for later use.

CAUTION

The drain line will be exposed to freezing conditions. To prevent line freezing, heat tape and insulation is recommended on the drain line both inside and outside of the cabinet. Failure to prevent line freeze up will result in ice formation within the cabinet and on the exterior of the building which will lead to hazardous conditions.

R454B INFORMATION

Tools required for installing and servicing R454B units.
Manifolds sets

Up to 650 psig High Side (45 bar)
Up to 250 psig Low Side (17 bar)

REFRIGERANT LINE

IMPORTANT

This unit is charged with 3.5lbs (1.6kg) of refrigerant to be stored safely. The system will require additional R454B charge during installation. Refer to charging instructions in the Instructions manual for proper charge adjustments.

WARNING

When soldering and brazing, have a fire extinguisher readily available. When soldering and brazing close to valves or sensitive components, heat shields or wet rags are required to prevent damage to the valves or components.

WARNING

Do not exceed the maximum operating pressure listed on the unit rating plate.

Do not open the service valve until the entire evaporator section and connecting tubing has been installed, leak tested, and evacuated. Only when the unit is ready for operation should the service valves be opened.

WARNING

Failure to follow this warning could result in personal injury or death. Recover all refrigerant before attempting a sealed air conditioning system repair. Recover all refrigerant before final unit disposal. Use all service ports and position all refrigerant flow–control devices open, including expansion valves and solenoid valves.

WARNING

FIRE, EXPLOSION HAZARD

Failure to following this warning could result in personal injury, death and/or property damage.

Do not attempt any sealed system repair without first recovering the entire refrigerant charge. R-454B refrigerant and oil mixture could ignite in the presence of a brazing torch flame. Completely recover the refrigerant charge using both the high and low sides of the system and purge the sealed system with nitrogen before brazing any component or tubing.

All pipe work 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.

When routing the lines from the evaporator coil to the condensing unit keep the length as short as possible. Maximum allowable line length is 50 ft (15 m). Knockouts are provided on the unit cabinet at both upper corners and on each side for line entry into the cabinet. Knockout only the openings to be used. Any unused openings in the cabinet must be sealed to prevent air from entering or leaving the cabinet since this will reduce the amount of air being drawn over the condenser coil. The service valves provide for sweat connections of the lines. Take care not to overheat the service valve. Use a wet cloth on the valve to protect it while sweating the line connection. In routing the lines, take care not to block removal of the motor or fan (pulls out through access panel) or to block removal of the access panel.

The suction line must be insulated to prevent condensation. A minimum insulation wall thickness of 3/8” (9.5 mm) with adequate vapor barrier must cover the suction line from the evaporator coil to the condensing unit cabinet. The insulation should penetrate the unit cabinet by a few inches (50-100 mm) to be certain any condensation formation will be contained inside the unit cabinet where it can do no damage.

PURGING AND LEAK TESTING

WARNING

FIRE, EXPLOSION HAZARD

Failure to following this warning could result in personal injury, death and/or property damage.

Do not use flames or any potential ignition sources to leak check refrigerant tubing or components.

Connect the suction and liquid hoses from a gauge manifold to the service ports on the service valves. A hole covered by a plastic snap plug is provided to allow entry of the gauge hoses. By using this hole the unit access panel can be put back on the unit without disturbing the gauge hoses. This will be necessary once the unit is ready for operation when the gauge hoses have been removed, be sure to return the plastic plug to cover the service hole.

Connect a cylinder of dry nitrogen to the gauge manifold and open both liquid and suction manifold valves. Once the system has balanced pressure, leak test all sweat fittings. If a leak is found repair the leak and repeat the procedure.

WARNING

It is illegal to discharge refrigerant into the atmosphere. Use proper reclaiming methods and equipment when installing or servicing this unit. A QUALIFIED service agency should perform this service. A sealed refrigerant system normally requires no maintenance since it is closed and self-contained.

WARNING

FIRE OR EXPLOSION HAZARD

Failure to follow the safety warnings exactly could result in serious injury, death or property damage. Never test for leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections. A fire or explosion may result causing property damage, personal injury or loss of life.

EVACUATION

Since the condensing unit will not have to be evacuated unless it has lost its charge, leave the service valves closed and recover the refrigerant in the evaporator coil and connecting tubing only. Next connect the vacuum pump to the charging port on the gauge manifold, start the vacuum pump and open the suction hand valve on the gauge manifold. Allow the pump to operate until a vacuum of 300 microns is achieved. Shut off the pump and observe the pressure. If the system pressure rises above 500 microns continue the pumping until the 500 micron pressure can be maintained. Close the hand valves at the gauge manifold, remove the vacuum pump and open the service valves on the condensing units. The refrigeration system should now be ready to operate.

CHARGING

WARNING

IMPROPER HANDLING OF REFRIGERANTS CAN CAUSE INJURY, EXPLOSION AND DEATH

- It is illegal to release refrigerant into the atmosphere. Refrigerant released into an enclosed space will displace oxygen causing unconsciousness and death.
- If an indoor refrigerant leak is suspected, thoroughly ventilate the area before beginning any work
- DO NOT purge or allow refrigerant to be released into an interior space
- Contact with liquid refrigerant can cause frostbite and blindness. Avoid skin contact with liquid refrigerant, wear goggles and gloves when working with refrigerants. Seek medical help immediately if any refrigerant contact with skin or eyes occurs
- Never burn refrigerant as highly toxic gas will be produced
- Only EPA certified technicians should handle refrigerants.
- In Canada technicians must be ODP / ODS certified to handle refrigerants
- Follow all EPA regulations

WARNING

- Explosion risk, recover refrigerant only in a cylinder designed and intended for this purpose
- Do not use a damaged cylinder
- Do not apply flame or excessive heat to a refrigerant cylinder
- Do not fill a refrigerant cylinder to more than 80% of its capacity
- Do not use a refrigerant cylinder for anything other than its designed and intended purpose
- Do not use an expired refrigerant cylinder
- Use recovery equipment designed to handle the refrigerant being recovered
- Earth-ground refrigerant cylinders before using

WCX condensing units should be connected to evaporators which are fitted with a thermostatic expansion valve designed and calibrated for use with R454B. As a result all charging or charge adjustments must be made by measuring sub-cooling. Even though the outdoor unit is factory pre-charged, the charge must be checked and adjusted.

WCX units are charged with 3.5lbs (1.6kg) of R454B. The installer must add charge to meet the required subcooling value. For partial system charging, the subcooling and superheat method can be used to make small refrigerant charge adjustments.

IMPORTANT

The unit comes with minimum allowable charge as per safety regulation for shipping and storage purposes. When installing the unit with a matched air-handler, system charge and TXV setting MUST be adjusted to meet the required subcool and superheat values instructed below.

Allow sufficient running time, 20 to 30 minutes, for the system to balance. Then check the sub-cooling of the liquid refrigerant at the outdoor unit to ensure proper liquid seal is present at the expansion valve. This measurement should be made 2 to 4 inches (50-100mm) above the WCX cabinet by measuring the temperature of the liquid line and the high side pressure. At outdoor conditions between 80°F - 95°F (27°C – 35°C)the system should be charged to sub cooling level of 11°F to 13°F (-10°C to -12°C) at the outdoor unit. Superheat should be measured at the same distance from the suction service valve and should be stable in the range of 15°F to 20°F (-6°C to -9°C). In the event that superheat is unstable increase the system charge by one ounce. Re-measure superheat and continue adding charge until superheat is stable.

After final charge adjustments to get stable subcool and superheat values, permanently stamp the field charging label (found next to nameplate) with the amount of refrigerant added and the total amount of refrigerant in the system.

NOTE

Subcooling and superheat readings are reliable when the conditioned space is at comfortable conditions.

Should the condensing unit lose its charge, the whole system will have to be evacuated as described and any leaks repaired before recharging. When recharging, start by weighing in a charge amount equal to that shown on the unit nameplate then check the sub-cooling and adjust the charge as required.

The actual Refrigerant charge must be in accordance with the room size within which the refrigerant containing parts are installed. Refer to Indoor unit instruction guide for airflow and minimum floor area requirements.

ELECTRICAL POWER SUPPLY

IMPORTANT

Electrical work associated with the installation of this appliance must comply with the National Electrical Code (NEC). Other local or regional electrical and building code requirements may apply. In Canada electrical work associated with the installation of this appliance must comply with CE CSA C22.

WARNING

The unit cabinet must have an uninterrupted, unbroken ground to minimize personal injury if an electrical fault should occur. Failure to do so can cause electrical shock resulting in severe personal injury or death.

WARNING

Use copper conductors only. Install all parts and panels before operation of unit. Failure to follow these warnings can result in injury or death.

The electric installation must be in accordance with the National Electric Code and any local codes or ordinances. Use a separate branch circuit for this unit and locate a disconnecting means within sight of the unit and readily accessible for service personnel.

Ensure field wiring complies with local and national fire, safety, and electrical codes. Ensure voltage supply is within limits shown on unit rating plate. Contact the local power company for correction of improper voltage. Refer to the unit rating plate for recommended circuit protection device.

WARNING

Do not supply power to unit with the compressor terminal box cover removed.

Minimum circuit ampacity and maximum circuit breaker size information is shown on the unit nameplate. Use copper conductors only.

WARNING

Do not bypass or eliminate safety devices

NOTE

A Compressor Time Delay Relay may be required and will need to be field installed if rapid cycling of the compressor occurs.

CAUTION

Operation of unit on improper line voltage constitutes abuse and could affect unit reliability and operation. See unit rating plate. Do not install a system where voltage or phase imbalance may fluctuate above or below permissible limits. If low voltage conditions exist, use of Start Assist Device may be required.

WARNING

Transformers are multi-voltage; it is crucial to refer to unit wiring diagram as well as unit voltage to ensure proper connections and operation safety.

THERMOSTAT WIRING

Use 18 AWG wire with color–coded insulation (35°C minimum) up to 100 ft. in length (31 m). Use 16 AWG wire if more than 100 ft. of wire is required

Run a thermostat cable of at least 2 – wires between the condensing unit and the indoor unit. Pigtail leads are provided at the condensing unit. Make connections using wire nuts and tape for security.

OPERATION & MAINTENANCE

CAUTION

All appropriate personal protection equipment should be worn when servicing or maintaining this unit. Personal injury can result from sharp metal edges, moving parts, and hot or cold surfaces.

WARNING

ELECTRIC SHOCK HAZARD

Check motor connections to ensure they are secure and in accordance with the unit wiring diagram. ECM motors have line voltage power applied at all times. MAKE SURE POWER IS DISCONNECTED BEFORE SERVICING.

CAUTION

Compressors and sealed system tubing components may be extremely hot!

CAUTION

Do not use compressors to evacuate the air conditioning system. A vacuum may cause internal electrical arcing resulting in a damaged or failed compressor.

WARNING

- Always wear eye protection.
- When fan coil is operating, some components are operating at high speeds. Do not touch rotating items with any object
- Return and secure all electrical and service access panels in their proper place.
- Clear surrounding area of all tools, equipment and debris.
- Check the entire unit to ensure its cleanliness.

WARNING

Disconnect all power to unit before servicing field wires or removing control package. Make sure that disconnecting means is within sight from, and is readily accessible from, the unit. Disconnect all power to the unit before performing any maintenance or service on it. Lock out and tag switches with a suitable warning label. Failure to follow this WARNING can cause electrical shock, fire, personal injury or death.

Keep the inside of the unit clean and be certain the drain holes in the base of the pan are open to assure rain drainage from the unit.

Keep the condenser coil clean. Any restriction of the condenser air flow can seriously affect the system performance.

WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

WARNING

It is illegal to discharge refrigerant into the atmosphere. Use proper reclaiming methods and equipment when installing or servicing this unit. A QUALIFIED service agency should perform this service. A sealed refrigerant system normally requires no maintenance since it is closed and self-contained.

LABORATORY TESTING

When the unit has less than 100 operational hours and the coils have not had sufficient time to be “seasoned”, it is necessary to clean the coils with mild surfactant such as calgon to remove the oils left by manufacturing processes.

OPERATION & MAINTENANCE (continued)

CAUTION

Failure to keep condensing coil clean and free of blockage will result in system damage and may cause hazardous conditions.

PREVENTATIVE MAINTENANCE

To achieve maximum performance and service life of each piece of equipment a formal schedule of regular maintenance should be established and maintained. This maintenance should be performed on an annual basis by a certified technician.

QUALIFICATION OF WORKERS

Service shall only be performed by qualified technicians, certified by national training organizations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation. Competence to properly service the appliance should be documented by a certificate.

CHECKS TO THE WORK AREA

Prior to beginning work on the appliance, safety checks are necessary to ensure that the risk of ignition of released gasses is minimized. 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.
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 person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any such a pipe work shall use any sources of ignition in 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 in the 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 REFREIGERATING 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 FLAMMANLE 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.

OPERATION & MAINTENANCE (continued)

CHECKS TO ELECTRICAL DEVICES AND SEALED ELECTRICAL COMPONENTS

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.

Sealed electrical components shall be replaced in the event of damage or malfunction.

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 (25 % maximum) is confirmed.

Leak detection fluids (such as the bubble method or fluorescent method agents) are 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 pipe-work.

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.

The outdoor unit communicates with indoor unit through Y-Signal. In case of a leakage detected through indoor RDS, within 15s of leak detection Y-Signal gets disrupted to de-energize the compressor

REMOVAL AND EVACUATION OF FLAMMABLE REFRIGERANTS

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:

- Remove refrigerant charge following local and national regulations
- Purge the circuit with inert gas (optional for A2L);
- Evacuate (optional for A2L)
- If using flame to open circuit, continuously flush system with an inert gas
- Open the circuit by cutting or brazing.

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.

OPERATION & MAINTENANCE (continued)

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.

DECOMISSIONING

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. 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 is commenced.

A. Become familiar with the equipment and its operation.
B. Isolate system electrically.
C. Before attempting the procedure, ensure that:
    a. mechanical handling equipment is available, if required, for handling refrigerant cylinders;
    b. all personal protective equipment is available and being used correctly;
    c. the recovery process is supervised at all times by a competent person;
    d. 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 order commissioning, 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.

OPERATION & MAINTENANCE (continued)

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

PRE-START-UP CHECK LIST

Before Start-up, all components should be checked thoroughly. The system should be completely cleaned of all construction dirt and debris. Coils should be cleaned using an industry acceptable cleaning method.

Prior to starting the unit:
1. Ensure that the supply voltage matches the nameplate data.
2. Ensure that the unit is properly grounded.
3. With the POWER OFF, check that the fan wheel rotates freely.
4. Ensure that the unit is properly and securely installed.
5. Ensure that the unit has proper slope for water drainage.
6. Ensure accessibility of the unit for future servicing.
7. Ensure that all cabinet openings and wiring connections are tight and sealed.
8. Ensure that all access panels and cover plates are properly installed and secured.

START-UP AND OPERATION DATA

Customer: _____ Condensing Unit Model: _____

Address: _____ City: _____ Serial Number: _____
(1 letter) – (2 numbers) – (1 letter) – (6 numbers)

Date: _____ Dealership: _____ Technician: _____

Air Handler Information:

Brand: _____ Model Number: _____ Serial Number: _____

Metering Device: Piston ☐ TXV Hard Shut-Off ☐ TXV Rapid Bleed ☐

Motor Voltage: _____ Amps: _____ Cooling Speed: _____ Heating Speed: _____

Evaporator Coil Temperatures:

Evaporator Coil EAT Dry Bulb: _____ Evaporator Coil LAT Dry Bulb: _____ Delta: _____

Evaporator Coil EAT Wet Bulb: _____ Evaporator Coil LAT Wet Bulb: _____ Delta: _____

Condensing Unit:

Unit Voltage: _____ Compressor Voltage: _____ Amps: _____ Discharge Line Temp: _____

Min Circuit Amps (MCA): _____ Max Overcurrent Amps (MCO): _____ Breaker/Fuse Size: _____ Wire Size: _____

Start Kit: Yes ☐ No ☐ Recommended: Kickstart or similar kit with a potential relay only—do not use solid state kits.

Refrigerant Pressures / Temperatures: Outdoor Ambient Temp: _____

Low Side PSIG: _____ {Vapor Line Temp: _____ **minus** Saturated Temp: _____ = _____ degrees of **Superheat**}

High Side PSIG: ____ {Saturated Temp: _____ **minus** Liquid Line Temp: _____ = _____ degrees of **Sub-cooling**}

Proper start-up and operational checks must be performed on each installation and should include gathering all of the information listed above. When installing a WCX condensing unit with a new air handler it is recommended to choose the next larger size air handler than the condensing unit.
Example: When installing a 24 WCX, chose a 2.5-ton air handler (regardless of the brand) for best performance.

ALTITUDE ADJUSTMENT FACTOR TO CALCULATE MIN. ROOM AREA

The Indoor equipment requirements are calculated at sea level. For altitudes 800 meters and above adjust the minimum room area specified on or near the Serial Plate by the corresponding altitude adjustment factor shown below.

Altitude Correction Factor													
Altitude (m)	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200
Altitude (ft)	2625	3281	39.7	4693	5349	5906	6562	7218	7874	8530	9186	9843	10499
Adj Factor (AF)	1.02	1.05	1.07	1.1	1.12	1.15	1.18	1.21	1.25	1.28	1.32	1.36	1.4

NOTES

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