

CAPSULE PAK™

REMOTE

REFRIGERATION

SYSTEMS

INSTALLATION

MANUAL



Condensing Unit Section
Remotely Located

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TOOLS REQUIRED FOR UNCRATING AND INSTALLATION OF THE REFRIGERATION SYSTEM



- SAFETY GLASSES
- PRY BAR
- HAMMER
- ADJUSTABLE OPEN END WRENCH (2)
- DRILL DRIVER
- PENCIL

CEILING MOUNTED REFRIGERATION SYSTEM

GENERAL INFORMATION

This Refrigeration System was produced utilizing the latest in manufacturing technology, the highest quality materials available, along with innovations that make it a distinctive product in its field. Despite rigid controls in the production of the product, there is no substitute for thoroughly reading and UNDERSTANDING the instructions that follow. The result will be an orderly and efficient installation. Please take the time to follow the steps explicitly!

UNPACKING & INSPECTION FOR REMOTE REFRIGERATION SYSTEMS

Check the delivery receipt for the number of pieces that made up the shipment and make sure that the number of pallets, boxes or crates agrees with that number. Each piece should be clearly marked with the same five-digit order number that appears on the delivery receipt as the shipper's number.

Examine the general condition of the shipment and, as soon as unpacking is completed, carefully inspect all parts for possible shipping damage. If damaged parts are discovered, contact the supplier immediately.

For outdoor remote Capsule Pak™ systems it is recommended the condensing unit be elevated from the deck a minimum of 12"-18" to ensure the condenser fan is not drawing or pulling heat reflected off the building roof or pavement in a grade level installation in which the summer heat may exceed +120°F.

For indoor systems the ambient temperature around the system should be less than +90°F and 50% RH.

GENERAL INSTALLATION INSTRUCTIONS

This section has the general instructions for installing the ceiling mounted Refrigeration System.

Note: Proper "temporary" support of the ceiling panel with the cut out must be added during the installation of the refrigeration.

Position the insulated evaporator section of the Refrigeration System over the hole in the walk-in ceiling section. Special care should be used when positioning the evaporator section over the ceiling cut-out. Be sure not to damage the gasket underneath the evaporator section. The side with the temperature control should face the walk-in door side.

Fasten latches and seal perimeter as described in the Latch and Diffuser Installation Instructions found on pages 6 and 7. When reinstalling the diffuser panel, make sure the ceiling section divider on the panel seals against the black gasket. Some adjustment may be required by simply bending the ceiling section divider slightly forward or backward. This will prevent any short cycling of discharge and return air.

Note: On smaller refrigeration systems, you may elect to install the system on the ceiling section while the section is still on the floor. **CAUTION!** Make sure to fasten down the system to the ceiling panel. The ceiling section and the refrigeration system may then be erected together in the normal sequence of assembly as shown in the Kold Locker™ Walk-in Installation Instructions. This method is not practical and should not be used with larger systems of 100 series or above.

CAPSULE PAK™ LATCH AND DIFFUSER INSTALLATION INSTRUCTIONS

1. Remove diffuser from ceiling panel before installing ceiling panel (Figures 1 and 2)



Figure 1



Figure 2

2. Lift Capsule Pak into position on top of walk-in. Note: Do not slide Capsule Pak into position as cowl gasket damage will occur. If the Capsule Pak must be slid into position, place it on a piece of cardboard prior to moving to prevent gasket damage.
3. Inspect cowl gasket to ensure proper placement (Figure 3)



Figure 3

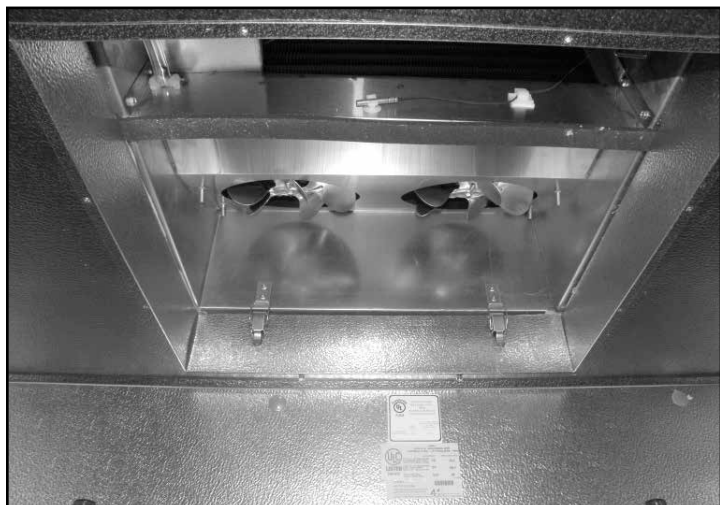


Figure 4

4. Secure interior latches (Figure 4)
5. Seal cowl to ceiling at gasket seam above diffuser panel using provided silicone (Figure 5)



Figure 5

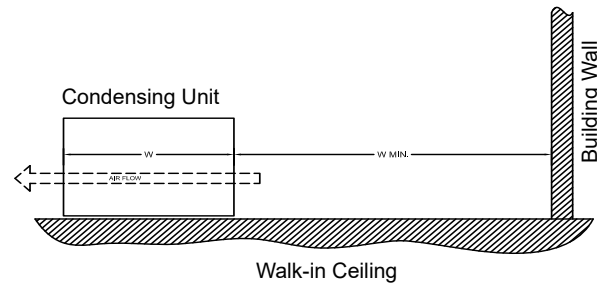
6. Replace diffuser panel removed in step 1.

LOCATING AND MOUNTING CONDENSING UNITS

Condensing units (CUs) must be located where there is an unrestricted supply of clean, fresh air. Do not locate units where air discharge from one will enter into the air intake of others nor where the air flow is toward a wall or obstruction. Avoid locating units in restricted spaces where heat will build up and can enter the condenser. There must be room around the unit for regular inspection and service. We recommend 200CFM in any area where condensing units may be located. Air flow should be sufficient to maintain an ambient temperature of no more than 85°. Minimum clearance is 24".

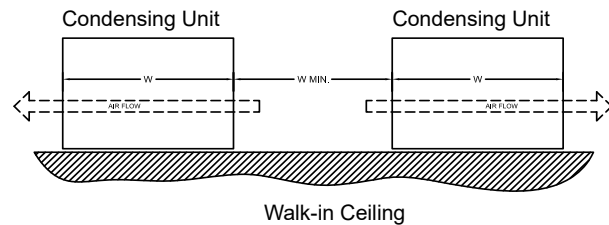
Walls or Obstructions

The units should be located so that air may circulate freely. For proper air flow, all sides of the unit should be a minimum of the width of the condensing unit away from any wall or obstruction. It is preferred that this distance be increased whenever possible.



Multiple units

For units placed side by side, the minimum distance between units should be the width of the largest unit. If units are placed end to end, the minimum distance between units should be 4 feet.



Roof mounted condensing units must have adequate support for their operating weight. Corrosive atmospheres require custom design condensers.

It is recommended the condensing unit be elevated from the deck a minimum of 12"-18" to ensure the condenser fan is not drawing or pulling heat reflected off the building roof or pavement in a grade level installation in which the summer heat may exceed +120°F.

INSTRUCTIONS FOR PRE-CHARGED LINES

By employing self-sealing refrigeration couplings, the condensing unit section, evaporator section, and the connecting tubing are separately pre-charged with refrigerant and leak tested at the factory before shipment. Follow steps 1-8 below to install the connecting tubing at both the condensing unit and the evaporator section.



1. Carefully uncoil the suction line. This is the line covered with a continuous length of sponge rubber insulation.

2. Carefully uncoil the liquid line. The liquid line is the smaller diameter, bare copper tube.

3. Before making any connections, determine the routing of both lines and carefully hand bend them to suit the situation. Keep any bend radius rather large to prevent kinking the tubing. It is a general practice to route the suction and liquid line parallel and close together in the installation.

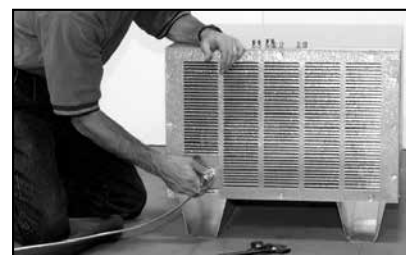
4. Remove the dust caps and plugs from the couplings and inspect them to see if the synthetic seals are intact.

5. Using a clean cloth, wipe the coupling seals and threaded surfaces to prevent the inclusion of any dirt or foreign material in the system.

6. LUBRICATE the synthetic seal in the male half of the couplings with refrigeration oil and thread the two coupling halves together BY HAND to ensure proper mating of the threads. **Note:** Make certain that the insulated suction line is connected to the coupling half marked "Suction Line" and that the bare tube liquid line is connected to the coupling half marked "Liquid Line".

Note: Always use two wrenches on the coupling body hex nut and on the union to prevent twisting of the tube while tightening the connections as described in the next step.

7. Using the proper size wrench on the union nut, tighten until the coupling bodies bottom, or until a definite resistance is felt. Tighten an additional 1/6 to 1/4 turn. This final turn is needed to compress the spring loaded fitting allowing the free flow of refrigerant and to seal the coupling. We advise leak checking the couplings to ensure there are no leaks.



Note: legs shown in photos are not standard but an optional item.

Connecting to the Condensing Unit Side

8. Once the suction line is connected, the sponge insulation must be pulled up to cover the quick connects. Tie or tape off the insulation to prevent air infiltration and reduce water/ice formation on the suction line.

All valves are open and the system is ready for operation. Remember, the refrigeration couplings on this system are self sealing and, if the need ever arises, the couplings may be disconnected without any loss of refrigerant.

IMPORTANT: Since this system is equipped with pre-charged refrigerant lines, it is the installing contractor's responsibility to ensure that the quick connect refrigerant couplings are properly mated and are leak free. It is also their responsibility upon start-up to check the system for proper operation and make any necessary temperature control or thermal expansion valve adjustments.

Note: A drain line is required to be run by the contractor for this type of installation.

CAUTION: Line set must not exceed 3 feet longer than required length to complete connection or improper oil return may result in compressor failure. Contact the Service Department with model and serial number for further assistance. This information is also included on a tag attached to the line set.

Some systems require a permanent connection to an electrical service and a connection at the junction box located on the condensing unit housing. Refer to the serial tag for all pertinent electrical data. These systems must be connected to a power supply disconnect switch and wired according to local and national electric codes. Do not attach power disconnect to the condensing unit housing.

INSTRUCTIONS FOR WIRING HARNESS

These systems require a permanent connection to an electrical service and a connection at the junction box located on the condensing unit housing. Refer to the serial tag for all pertinent electrical data. These systems must be connected to a power supply disconnect switch and wired according to local and national electric codes.

Wiring Instruction for The Remote Refrigeration System

After the evaporator section is properly located on the walk-in and the condensing unit is in its final location, the supplied 4-wire wiring harness can be used to electrically connect two sections.

Be sure to connect the two sections together with the supplied wire harness prior to connecting power to the condensing unit section.

The evaporator section has a junction box located on the control box. Inside the junction box are three wire leads with colors corresponding to the wire colors in the wire harness. Use wire nuts to connect the like-colored wires and secure the green ground lead to the ground lug in the junction box.

There is a junction box on the condensing unit. Inside the junction box are two wire groups. One has black, red and green wire for connection to the field power supply and one has blue, brown, and yellow leads for connection to the wire harness. Connect the like colored wires to the supplied wire harness from the evaporator section and secure the green ground wire to the ground lug in the junction box.

These systems require a permanent connection to an electrical service at the condensing unit junction box. Refer to the serial tag on the condensing unit for all pertinent electrical data. These systems must be connected to a power supply disconnect switch and wired according to local and national electrical codes.

Note: Do not mount the power disconnect to the condensing unit housing.

If you do not have the wiring diagram for the system, contact the factory for the correct wiring diagram. Have your model and serial number available when you call.

OUTDOOR SYSTEMS UTILIZING A MEMBRANE ROOFING MATERIAL

1. After the walk-in is completely assembled, place the curb face down on top of the ceiling sections (curb is fastened to crate base during shipping and must be removed and installed prior to membrane roof installation). To ensure proper opening alignment, mark the outside portion of the curb on the ceiling sections with a marking pencil.
2. Remove the paper from the gasket and position the curb, gasket side down, on the pencil line. Press down firmly. Note: Movement of the curb is very difficult after the gasket adheres to the ceiling section. Refer to Figure 1.

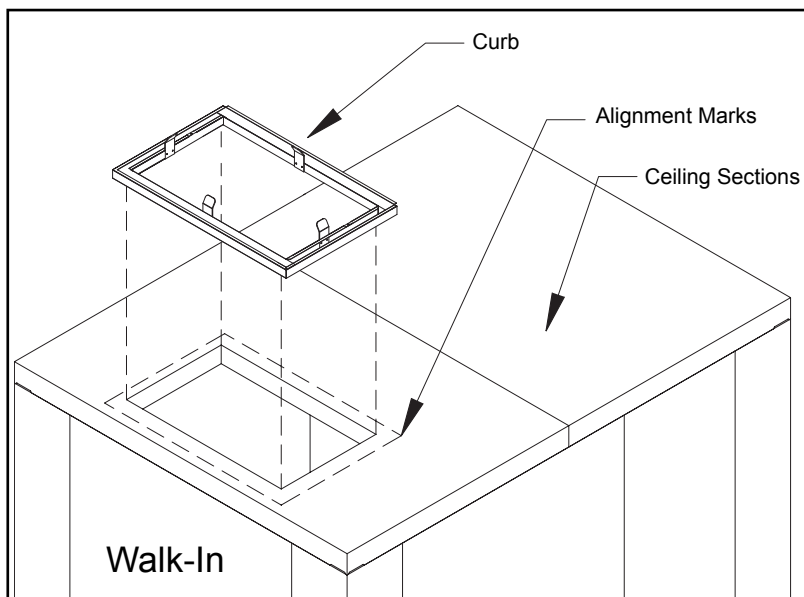


Figure 1

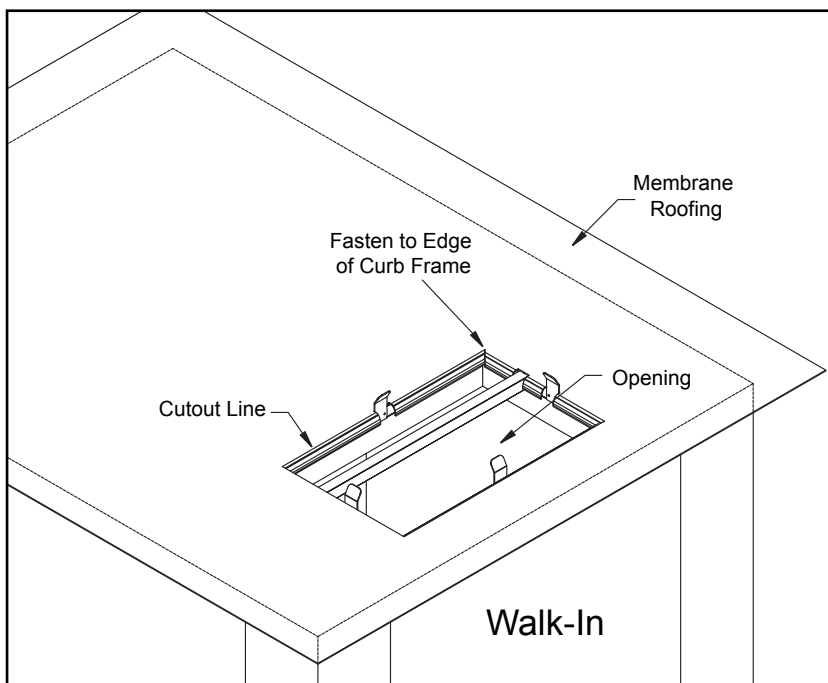


Figure 2

3. Lay the membrane roofing material over the walk-in ceiling sections and curb leaving a six inch overhang on all four sides of the walk-in. Using an utility knife, cut a hole in the membrane roof approximately 1-1/2" in from the edge of the opening. (The resulting hole in the membrane will be smaller than the ceiling opening). Fold the 1-1/2" membrane flaps into the opening, notching the membrane around the locators and divider. Use either sheet metal screws, caulk, glue, etc. to fasten the membrane roofing material to the inside edge of the curb frame. Refer to Figure 2. Do not make any penetrations in the top of the membrane roof. Any needed penetrations should be through the side wall to maintain the integrity of the roof.

4. Set the Refrigeration System over the opening in the curb. Remove Diffuser Panel from the ceiling inside the walk-in to gain access to four latches located along the inner perimeter of the cowl. Refer to the Latch and Diffuser Installation Instructions found on pages 8-9. Use the Lock Extensions supplied with the curb to bridge the distance between the latches and strikes. Seal the latched seam as described in the instructions. When reinstalling the Diffuser Panel, make sure that the ceiling section divider located on the panel seals against the black gasket. Some adjustment may be required by simply bending the ceiling section divider slightly forward or backward. This will prevent any short cycling of discharge and return air.

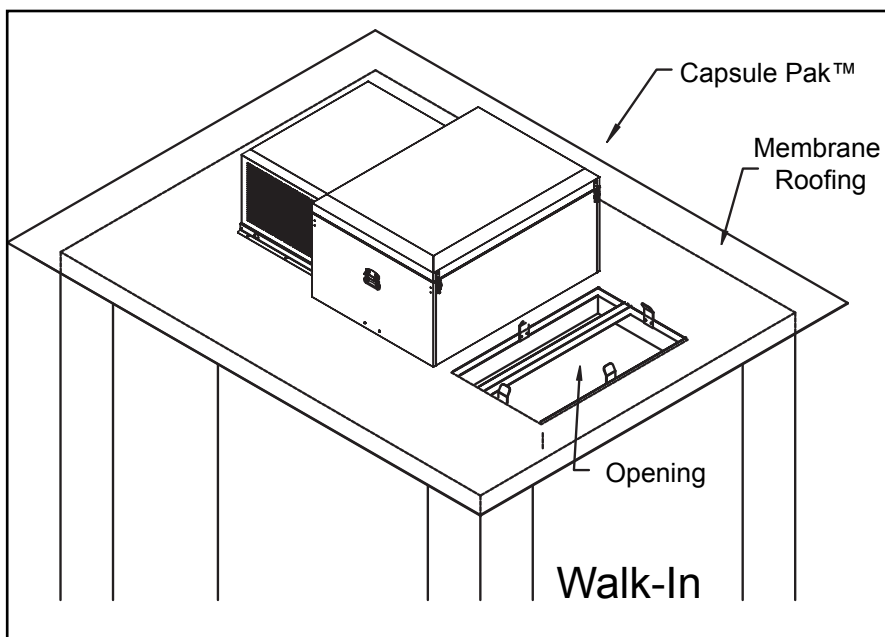


Figure 3

Before proceeding to step 5, pull membrane straight and smooth.

Note: Seal gasket at top of curb with silicone.

5. Fold all four corners of the membrane roofing material over the walk-in corners as shown in Figure 4.
6. Attach the trim and door hood (if your walk-in is equipped with them) by using the provided pan head sheet metal screws. Ensure the trim and membrane roof material cover the joint between the ceiling and wall panels. Refer to figure 5. Note: The trim may have to be cut to fit.

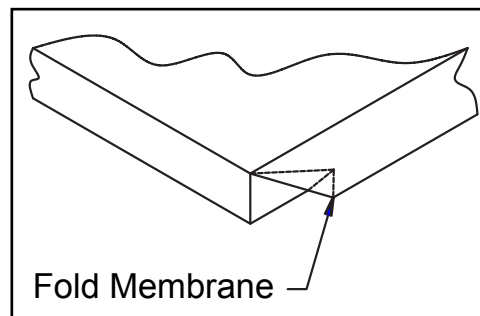


Figure 4

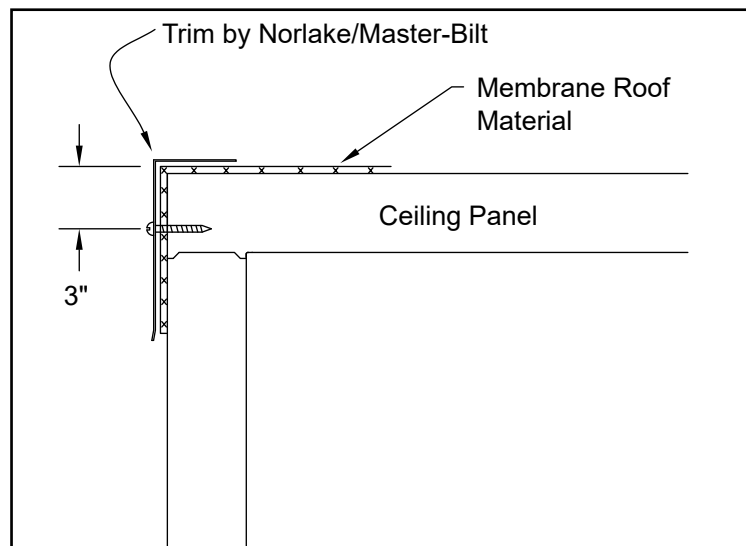


Figure 5

7. Trim off all excess membrane roofing material from under the trim with a utility knife. Do not allow the knife to cut the metal panel, as this will damage the coating and cause rust.

NOTE: In outdoor installations, the condensate line should be plumbed to the nearest drain and a P-trap installed near the end. Check local building codes. Outside drain lines must also be wrapped with a suitable heater wire and insulated if they are ever subjected to below freezing temperatures.

OPERATION

STANDARD TEMPERATURE (COOLER) SYSTEMS

A highly efficient electronic controller regulates an electronic expansion valve in response to evaporator superheat and return air temperature, featuring demand defrost fan control technology.

This system will operate differently from previous system you may have worked with in the past. Refer to the controller instructions located in the condensing unit for additional information.

Important: It is the installing contractor's responsibility to check the operation upon start-up and make necessary temperature adjustments as required for proper operation.

Note: Capsule Pak™ Refrigeration Systems that are designed for outdoor installation will be fitted with electric crankcase heaters, and automatic head pressure control valve.

Refrigeration Controller

Capsule Pak™ refrigeration systems are equipped with the electronic controller system. See separate instructions on the operation of this electronic temperature control.

Defrost Cycle (Cooler System)

The electronic controller uses an automatic on-demand defrost algorithm that eliminates unnecessary defrosts typically associated with time-based alternatives which reduces energy consumption.

LOW TEMPERATURE (FREEZER) SYSTEMS

The low temperature, automatic electric defrost Capsule Pak™ refrigeration system utilizes the Electronic controller with a programmable set point and a preset algorithm to cycle the fans and compressor in order to maintain a tighter room temperature.

Important: It is the installing contractor's responsibility to check the operation upon start-up and make necessary temperature control adjustments as required for proper operation.

Note: Capsule Pak™ Refrigeration Systems that are designed for outdoor installation will be fitted with electric crankcase heaters, electrically heated condensate drain tubes, automatic head pressure control valve, and the "pump-down cycle".

Defrost Cycle

The electronic controller which uses an automatic or demand defrost algorithm that eliminates unnecessary defrosts typically associated with time based alternatives which reduces energy consumption. For additional information see the controller instructions located in the condensing unit section of the refrigeration system.

Defrost Cycle Termination

The electronic controller will run the coil heater until the coil is above 32°F. At this point it will work very different than a traditional defrost cycle. The heaters will pulse on and off allowing the heat to radiate through the coil until both coil sensing probes reach 50°F or 30 minutes whichever happens first. The fan(s) in the evaporator housing will not start, however, until the fan delay cycle has expired. See the "Fan Delay" below.

Fan Delay

When a defrost cycle is terminated the evaporator fan(s) will not start until the evaporator coil temperature is reduced to about +30°F. Once this temperature is reached, the fan delay cycle will turn the fans back on continuing the refrigeration cycle.

The fan delay feature is an important part of defrosting. If the fan(s) was permitted to start immediately following a defrost period, the heat that accumulated in the evaporator housing would be circulated throughout the walk-in, raising the temperature considerably. In addition, any droplets of moisture that remained clinging to the fins of the evaporator coil would be blown into the storage space. The fan delay feature provides for a short refrigeration cycle WITHOUT the evaporator fan(s) to prevent these conditions.

Note: During the initial startup of a Capsule Pak™ Refrigeration System on warm walk-in, the evaporator fan(s) will not start until the evaporator coil reaches +40°F. Further, the evaporator fans may cycle "on" and "off" several times until the evaporator coil reaches and maintains +40°F.

Drain Tube Heater

Low temperature ceiling mounted Capsule Pak refrigeration systems employ a low wattage, electric heater wire. This heater is spirally wound around the condensate drain tube that extends from the drain pan below the evaporator through the Capsule Pak evaporator section housing wall. This heater is energized continually to allow the free flow of the condensate water to the outside of the evaporator section.

Medium temperatures mounted Capsule Pak employ the same condensate drain tube that extends from the drain pan below the evaporator through the Capsule Pak evaporator section housing wall but has no heater wire.

Drainage Of Condensate Water

Remote Capsule Pak

The discharge water should be removed per local code.

1. On indoor units: RSG offers an electric condensate vaporizer kit, P/N-132962(115V) or P/N-133141(230V). This kit can be installed on the walk-in to automatically evaporate the condensate water from the evaporator section. If the optional electric condensate vaporizer is not used the condensate line should be plumbed to the nearest drain and a P-trap installed near the end. Check local building codes.
2. On outdoor units: drain lines must have a P-trap installed at the termination point and be wrapped continuously with a suitable heater wire and insulation if they are subjected to below freezing temperatures.

MAINTENANCE

WARNING: When servicing any Capsule Pak™ Refrigeration System or performing any maintenance procedure, always disconnect the main power supply.

The condensing unit is accessible by removing the condensing unit housing. The evaporator coil section is accessible by unlatching and removing the evaporator section housing cover.

Cleaning the Condenser and Evaporator Coils

The efficiency of the refrigeration system, to a great extent, depends upon the unrestricted flow of air through the condenser and evaporator coils. For this reason, both coils should be as clean as possible at all times and should have an unrestricted supply of air.

Cleaning the condenser should be done at a minimum of every 3 months.

A vacuum cleaner with a bristle attachment can be used to clean the coil. If debris on the coil cannot be removed easily, a bristle brush can be used to loosen it by gently brushing in the same direction as the fins so as not to damage them and restrict air flow. An air compressor can be used to clean the condenser coil also. The air flow should be directed through the coil from the fan motor side. A damp hand towel can be blocked against the opposite side so that the majority of the dust will be captured in the towel minimizing the mess in the room.

NOTE: Do not use corrosive cleaners as they may damage the copper tubing or welds.

RECOMMENDED PREVENTATIVE MAINTENANCE FOR WALK-INS & REFRIGERATION SYSTEMS

This preventative maintenance is recommended to be executed on a quarterly schedule by a certified technician from an Authorized Service Provider.

Walk-In Coolers & Freezers:

- Check door alignment, door closer and hinges.
- Check door gasket for any tears or damage.
- Check and adjust door sweep.
- Inspect heated vent ports for proper operations.
- Check lighting is in working order.
- Inspect door control, alarm and/or thermometer.

Refrigeration Systems:

- Cycle unit and check operations of refrigeration and defrost modes.
- Clean and inspect evaporator and condenser coils.
- Inspect and secure all electrical connections.
- Check relays and contactors for wear or pitting.
- Check start components.
- Inspect and clean motors, especially around rear air vents.
- Inspect fan blades, shafts, and bearings.
- Check and tighten any flair, quick connect, and roto lock fittings.
- Ensure sight glass is clear.
- Blow out and flush condensate drains/lines.
- Ensure drain pans are free of debris.
- Inspect drier for restrictions by ensuring there is no temperature drop across it.
- Ensure all covers and panels are securely fastened when completed.

MALFUNCTION	POSSIBLE CAUSE	SOLUTION
Compressor will not start - no hum	<ol style="list-style-type: none"> 1. Unplugged or power off 2. Fuse blown or removed 3. Overload tripped 4. Control stuck open 5. Wiring incorrect 	<ol style="list-style-type: none"> 1. Plug in service cord or turn power on 2. Replace fuse 3. Determine reasons and correct 4. Repair or replace 5. Check wiring against the diagram
Compressor will not start - hums but trips on overload protector	<ol style="list-style-type: none"> 1. Improperly wired 2. Low voltage to unit 3. Starting capacitor defective 4. Relay failing to close 	<ol style="list-style-type: none"> 1. Check wiring against the diagram 2. Determine reason and correct 3. Determine reason and replace 4. Determine reason, correct or replace
Compressor starts and runs, but short cycles on overload protector	<ol style="list-style-type: none"> 1. Low voltage to unit 2. Overload defective 3. Excessive head pressure 4. Compressor hot — warm ambient conditions 	<ol style="list-style-type: none"> 1. Determine reason and correct 2. Check current, replace overload protector 3. Check ventilation or restriction in refrigeration system 4. Check refrigerant charge, fix leak if necessary
Compressor operates long or continuously	<ol style="list-style-type: none"> 1. Short of refrigerant 2. Control contact stuck 3. Evaporator coil iced 4. Restriction in refrigeration system 5. Dirty condenser — warm ambient conditions 6. Warm ambient 	<ol style="list-style-type: none"> 1. Fix leak, add charge 2. Repair or replace 3. Determine cause, defrost manually 4. Determine location and remove restriction 5. Clean condenser 6. Address ambient conditions
Compressor runs fine, but short cycles	<ol style="list-style-type: none"> 1. Overload protector 2. Cold control 3. Overcharge 4. Air in system 5. Undercharge 	<ol style="list-style-type: none"> 1. Check wiring diagram 2. Differential too close - widen 3. Reduce charge 4. Purge and recharge 5. Fix leak, add refrigerant
Starting capacitor open, shorted or blown	<ol style="list-style-type: none"> 1. Relay contacts stuck 2. Low voltage to unit 3. Improper relay 	<ol style="list-style-type: none"> 1. Clean contacts or replace relay 2. Determine reason and correct 3. Replace
Relay defective or burned out	<ol style="list-style-type: none"> 1. Incorrect relay 2. Voltage too high or too low 	<ol style="list-style-type: none"> 1. Check and replace 2. Determine reason and correct
Refrigerated space too warm	<ol style="list-style-type: none"> 1. Control setting too high 2. Refrigerant overcharge 3. Dirty condenser 4. Evaporator coil iced 5. Not operating 6. Air flow to condenser or evaporator blocked 7. Warm ambient conditions 	<ol style="list-style-type: none"> 1. Reset control 2. Purge refrigerant 3. Clean condenser 4. Determine reason and defrost 5. Determine reason, replace if necessary 6. Remove obstruction for free air flow — no storage on top of walk-in 7. Ambient conditions should be 90° or less
Standard temperature system freezes the product	<ol style="list-style-type: none"> 1. Control setting is too low 	<ol style="list-style-type: none"> 1. Reset the control
Objectionable noise	<ol style="list-style-type: none"> 1. Fan blade hitting fan shroud 2. Tubing rattle 3. Vibrating fan blade 4. Condenser fan motor rattles 5. General vibration 6. Worn fan motor bearings 	<ol style="list-style-type: none"> 1. Reform or cut away small section of shroud 2. Locate and reform 3. Replace fan blade 4. Check motor bracket mounting, tighten 5. Compressor suspension bolts not loosened on applicable models - loosen them 6. Replace fan motor
Water overflowing from evaporator drain pan or condensate vaporizer pan	<ol style="list-style-type: none"> 1. Air leak between refrigeration system and walk-in panel. 2. Drain line from evaporator drain pan to condensate vaporizer is blocked with foreign material. 3. Drain line from evaporator drain pan to condensate vaporizer is blocked with ice. 4. Walk-in operating in high humidity environment (heavy door usage). 	<ol style="list-style-type: none"> 1. Check that refrigeration system is properly set in panel opening. 2. Clean blockage from inside of drain line. 3. Check that drain line heater (on freezers) is working and repair or replace as required. 4. Plumb drain line from evaporator to floor drain or replace high gas vaporizer with electric vaporizer. Consult factory for further information.

Thank you for purchasing Refrigerated Solutions Group equipment!
Please visit the links below to complete your
WARRANTY REGISTRATION.



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Equipment

master-bilt.com/register



For Norlake
Equipment

norlake.com/register

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Hudson, WI 54016

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800-477-5253 Norlake Scientific Sales
800-388-5253 Norlake Parts/Service
877-503-5253 Norlake Walk-In Installation

800-647-1284 Master-Bilt Sales
800-684-8988 Master-Bilt Parts/Service