
RACAN CARRIER AIR HANDLING UNITS

INSTALLATION AND MAINTENANCE MANUAL

INSPECTION

When the equipment is received all items should be carefully checked against the bill of lading to be sure all crates and pieces have been received. All units should be carefully inspected for damage upon arrival. All shipping damage should be reported to the carrier and a claim should be filed.

The unit nameplate should be checked to make sure the voltage conforms to the power supply available.

RIGGING AND HANDLING

Always use lifting brackets to raise the air-handling unit. Use spreader bars to prevent damage to the unit cabinet. Avoid twisting or uneven lifting of unit. If the unit must be stored at the job site for an intermediate period, set the unit in a level position, and protect components from the weather.

Special care should be taken when handling the blower section all fans are statically and dynamically balanced by the fan manufacturer. Rough handling, however, can cause bearing misalignment or shaft damage. Fans and shaft should be carefully inspected before unit installation to make sure this has not happened.

It is the responsibility of the installer to insure the unit is properly supported and square.

INSTALLATION

The installation of this equipment shall be in accordance with the regulations of authorities having jurisdiction and all applicable codes. It is the responsibility of the installer to determine and follow the applicable codes.

Sheet-metal parts, self-tapping screws, clips, and such items inherently have sharp edges, and it is necessary that the installer exercise caution.

This equipment is to be installed only by an experienced installation company employing trained personnel.

GENERAL

The system design and installation should follow accepted industry practice, such as described in ASHRAE Handbook.

UNIT INSTALLATION

When Racan Carrier air handling units are installed on the floor, precautions have to be taken to insure that the supporting structure is

leveled and strong enough to allow proper operation.

If a unit has to be suspended, structural beams must be installed underneath the unit to give proper support. The beams should be dimensioned according to well-proven structural practice. The maximum deflection of the beams (underneath unit) should not exceed 1/360 of the beam span or 1/2" maximum.

A second unit can be installed on top of a Racan Carrier air-handling unit. The bottom unit will incorporate additional optional structure and the top unit must have the same floor area or less.

ACCESS

The concept behind Racan Carrier air-handling units allows that all access and piping connections are on the same side of the unit, which gives the possibility of installing the unit against a wall or other equipment. Adequate clearance should be left around the unit for piping coils and drains, filter replacement, and maintenance such as lubrication and belt replacement. On the access side, it is recommended to have 40" wide of free access for regular maintenance. Clearance at least equal to the length of the coil would be required for coil removal. For ease of removal, consideration should be given to removing the coil from the end opposite the piping connections.

DUCTS

A good layout will minimize friction and generated noise in the system. The ducts should allow for an aerodynamic airflow. Sharp elbows at blower discharge, and particularly those opposed to the wheel rotation, should be avoided. Turning vanes, where used, should be of the long radius type. All abrupt changes in duct dimensions should not be tolerated. For more details, refer to the ASHRAE and AMCA publications.

In cases of noise problems, it is highly recommended to install silencers in the supply and return ducts at the walls of the mechanical room.

ELECTRICAL INSTALLATION

Electrical service to the fan must correspond to the rated voltage on the motor nameplate and be in conformance with the National Electrical Code and local restrictions.

The fan section metal frame must be connected to the building electrical ground. An electrical door interlock is not provided as standard.

Thermal motor protection is not included unless indicated otherwise in the project submittal. Thermal protection and a disconnect switch per electrical codes are provided by others unless indicated otherwise on the approval drawings or in the project submittal.

PIPING AND DRAIN TRAPS

Piping should be in accordance with accepted industry standards. Undue stress should not be applied to the coil connection or to coil headers. Pipe work should be supported independently of the coils. Drain lines and traps should be run full size from the drain pan connection. Drain pans should have traps to permit condensate from the coils to drain freely. On both blow-through and draw-through units, the trap depth and the distance between the trap outlet and the drain pan outlet should be as indicated in the project submittal.

INTERNAL ISOLATION ASSEMBLY ADJUSTMENT

All units have internally isolated fan and motor assemblies that have been secured before shipment.

BEFORE OPERATING THE UNIT:

1. Remove the shipping restraints and discard.
2. If the unit is provided with a thrust restraint on each side of the blower housing, the spring tension has been preset at the factory. With unit operating at normal CFM and static pressure, the stop nut should ride approximately 1/4" from the restraint housing. Adjust as required by loosening the adjusting nut to increase the gap and by tightening the adjusting nut to decrease the gap. *The stop nut should not be adjusted.*
3. The spring isolators under the four corners of the fan and motor assembly have been factory adjusted to the proper heights for when the fan will be in operation. With the unit operating at normal CFM and static pressure, the isolators should all be at the same height with the fan housing centered in the outlet panel opening. If adjustments are required, loosen the cap screw on top of the isolator and turn the adjusting bolt to lower or raise the fan and motor base. Retighten the cap screw when adjustments are completed.

MOUNTING ACTUATORS

The mounting of all field-mounted actuators is the responsibility of the installing contractor. No provisions are made for the location of these actuators due to the number of options and arrangements available and the variety of specific applications.

SECTIONS ASSEMBLY

The necessary hardware for the assembly of the different sections is inside the unit. Installation instructions are included with this manual.

LONG TERM STORAGE (ONE MONTH AND OVER)

All blowers must be re-lubricated after a long storage period. During storage, all bearings should be greased every first of the month. Turn

the wheel by hand while greasing the bearings. A clean 1/16" bead of grease must appear on each side of each bearing. Refer to the specific lubricating instructions on the fan.

Bearings that are to be stored or idle for an extended period of time should be wrapped in a neutral greaseproof paper, foil or plastic film. Compounds can be recommended by the bearing manufacturer to provide protection for several months to several years.

After long-term storage, grease should be purged from the bearings and fresh grease injected prior to start-up.

FIELD ASSEMBLY OF COMPONENTS

All the necessary hardware (caulking, screws, gasketing) for the assembly of the different components is included with the unit.

Locate the exact position of the blower(s). The blower's angle frames are drilled for the installation of the blower on the integral base. Install solidly in place and make sure all components are leveled.

If they are not already installed on the integral base, the motor and drive should then be installed. It is important that the motor and blower pulleys are aligned to allow the belts to turn freely. Misalignment could cause increased wear and noisier operation of the blowers.

BEFORE STARTUP CHECKS

WHEN PERFORMING STARTUP AND SERVICE, THOROUGH SAFETY PRECAUTIONS SHOULD ALWAYS BE TAKEN. ONLY QUALIFIED INDIVIDUALS SHOULD PERFORM THESE FUNCTIONS.

Before entering the fan section make sure that fan electrical power source is disconnected and in the "OFF" position and locked.

1. Check that unit is completely and properly installed with ductwork connected. Check that all construction debris is removed, and filters are clean.
2. Check that all electrical work is complete and properly terminated. Check that all electrical connections are tight and that the proper voltage is connected. Phase imbalance must not exceed 2%.
3. Ball bearings on fan shaft and motor are pre-lubricated and do not need grease before startup.
4. Check alignment of fan and motor sheaves and belt tension. Check tightness of sheave set screws and/or cap screws.
5. Leak test thermal system to ensure that connections are tight.
6. Rotate fan impeller to check for shifting during shipment. If necessary, shift wheel position and retighten.
7. Check tightness of setscrews in blower wheel hub.
8. Check tightness of setscrews in bearing locking collar.

9. Check tightness of setscrews in motor and fan pulleys.
10. Check tightness of all frame bolts and/or base bolts.
11. Check tightness of bearing mounting bolts.

NOTE: Damaged equipment due to loose screws or bolts is considered faulty startup and abuse of equipment and is therefore not covered by the warranty of Racan Carrier.

12. Check that condensate drain(s) is (are) trapped correctly.
13. Adjust belt tension, by sliding the motor on the motor slide base.
14. Fan startup: Fan should start and run. Observe the rotation. If the fan is operating backward, reverse two legs of the 3-phase supply power.

NOTE: The fan drives are usually provided for operation in the mid-speed adjustment range. However, the drives are usually shipped with the adjustment opened up for minimum fan speed. The drives should be adjusted for the proper airflow (see "Drive Adjustment" section).

AFTER FIRST 48 HOURS OF OPERATION

1. Disconnect and lock electrical power source. Check tightness of all bearing, wheel and sheave setscrews or cap screws.
2. Recheck belt tension and adjust if necessary. Belts tensioned sufficiently to slip one or two seconds at startup will perform satisfactorily, extending life and reducing vibration. If re-tensioning is necessary, be certain sheave alignment is retained.

FAN SPEED AND OPERATING TEMPERATURE

Refer to the blower section for the maximum operating speed (RPM).

The maximum operating temperature for Racan air handling units is 140°F. Exposure to temperature beyond the temperature limits may result in motor and/or bearing failure. Optional motors, belts, bearings, and other components can be selected for higher/lower operating temperatures.

VIBRATION LEVELS

Each fan has been trim-balanced and should operate smoothly. Since fans will have endured the rigors of shipping and installation, it is recommended to field test the vibration levels at the bearings. Table 1 below contains accepted industry guidelines for field balancing fans that are sufficient to assure satisfactory operation.

Table 1. Start-up Vibration Levels *

FAN MOTOR HP	VIBRATION
5 HP or less	0.50 in/sec. Max. Velocity
7½ HP or greater	0.35 in/sec. Max. Velocity

* Start-up Condition Vibration Levels based on AMCA 204-96 "Balance Quality and Vibration Levels for Fans." Levels stated are "filter-out" readings taken at the bearing housings on spring-isolated fans.

NOTE: Excessive vibration from any cause contributes to premature fan and motor failure. Overall vibration levels should be monitored every six months of operation. An increase in vibration level is an indication of potential trouble.

VIBRATION CAUSES

1. Wheel imbalance:
 - a. Dirt or debris on wheel blades.
 - b. Loose setscrews in wheel hub or bearing-to-shaft.
 - c. Wheel distorted from over-speed.
2. Bent shaft.
3. Faulty Drive:
 - a. Variable pitch sheaves -- Axial and radial run out of flanges; uneven groove spacing; out of balance. Also: similar faults in driven sheave.
 - b. Drive misalignment.
 - c. Bad V-belts; lumpy or mismatched
 - d. Belt tension too tight or too loose.
4. Bad bearing, loose hold-down bearing bolts.
5. Motor imbalance.
6. Fan section not supported evenly on foundation.

AIR BALANCING

Some units are supplied with a variable pitch motor sheave to aid airflow adjustment. They are typically set at the lower end of the RPM range for field adjustment to the required airflow.

When the final adjustments are complete, the current draw of the motor(s) should be checked and compared with the full load current rating of the motor(s). The amperage must not exceed the service factor times the full amps stamped on the motor nameplate.

Upon completion of the air balance, it is a common industry recommendation that the variable pitched motor sheave be replaced with the properly sized fixed sheave. A matching fixed sheave will provide longer belt and bearing life and vibration free operation. Initially, it is best to have variable pitched sheave for air balancing purposes, but fixed sheaves maintain balancing and alignment more effectively.

If units are supplied with electric heating coils or gas burners, the total airflow must not be less than that required for their operation.

OPERATING GUIDELINES

LUBRICATION

1. Anti-friction bearings: specific lubrication instructions are provided on the fan housing of each fan manufactured. Correlation with the enclosed instruction sheet is necessary, in view of the varied types and styles of anti-friction bearings used.
2. Sleeve-oil Pillow Blocks: Dodge Oil Lubricated Bearings are used on special applications. Where these have been called for and furnished, please refer to the special operating, maintenance, and lubrication sheet enclosed with these instructions.

TROUBLESHOOTING

REDUCED AIRFLOW

1. Blower impellers operating in the wrong direction.
2. Dirt plugged filters.
3. Belt slippage or belts broken.
4. Overload, starter cutout.
5. Dirt plugged coils.
6. Intake and return air dampers closed.
7. Dirt accumulation on blower wheel.

NOISE IN BLOWER

1. **Bad bearings.**
2. **Loose tie rods or blades.**
3. **Blower wheels loose on shaft, wheels rubbing on housing.**
4. **Drive pulley loose on shaft.**
5. **Foreign object located in blower wheel or blower housing.**

FAN FAILS TO START

Verify fuses and power supply. Verify that all electrical connections are tight in starter or at motor.

UNUSUAL NOISE FROM FAN

If noise is of a mechanical nature, verify that setscrews on fan wheel are tight. Verify that the impeller is not striking the fan housing and adjust if necessary. If noise is of a churning air nature, verify whether either the fan intake or discharge ducts are plugged or closed. If automatic louvers are included in the installation, verify that they are operating properly, and are not stuck shut. Be sure connecting ductwork is not touching the fan housing, and that canvas connections are in place.

LOW AIR MOVEMENT

Check connecting ductwork for clogging with foreign material. Check outlet dampers, if used, to see if they are stuck shut. Check fan impeller for accumulation of dirt. Clean if necessary.

NECESSARY ACTION

Correct the situation immediately. Continued operation can shorten the life of component parts and can result in poor airflow and general shutdown of system.

In general, if properly installed and given normal attention and service, these fans will give years of trouble free, satisfactory service.

DRIVE ADJUSTMENTS

BEFORE ENTERING ANY FAN SECTION, MAKE SURE THE ELECTRICAL POWER SOURCE TO THE FAN MOTOR IS DISCONNECTED AND LOCKED.

Do not enter the fan section to determine the fan speed of an internally-mounted-motor-type unit while the unit is operating. With the electrical power locked off, measure the diameter of the V-belt outer surface where it passes around the sheave (pitch diameter) and calculate fan speed from the motor nameplate RPM.

MAINTENANCE

The user is reminded that:

1. Electrical service to the fan motor must correspond to the rated voltage on the motor nameplate and be in accordance with the National electrical Code and the local restrictions.
2. The fan section metal frame must be connected to the building electrical ground.
3. A door electrical interlock is not provided as standard.
4. Thermal protection is external to the unit, unless otherwise indicated in the submittal drawings. Thermal protection and a disconnect switch per electrical code are usually provided by others.
5. Filters must be clean to obtain maximum performance. They should be inspected every three to four months under normal operating conditions and be replaced when they have reached the final air pressure as recommended by the air filter manufacturer. Units should never be operated without filters.
6. In areas where airborne bacteria or contaminants produce slime in the drain pan, it may be necessary to treat the pan with chemicals to minimize the problem, even with a double-sloped stainless steel drain pan. Contact your local Racan representative or one of the many companies dealing with water conditioning. Only qualified personnel should perform this work.

7. The condensate drain can pick up lint and dirt, especially with dirty filters. Inspect twice a year to avoid the possibility of overflow.
8. The coil(s) must be clean to obtain maximum performance. Check once a year under normal operating conditions and, if dirty, brush or vacuum clean. On multiple row coils a chemical coil cleaner is recommended, but caution must be exercised as many contain harsh chemicals. Care must be taken not to damage the fins while cleaning. **CAUTION: Fin edges are sharp.**

PERIODIC SERVICE AND MAINTENANCE

1. Check all moving parts for wear every six months.
2. Check bearing collar, sheave and wheel hub setscrews, sheave cap screws, and bearing hold down bolts for tightness every six months.

WINTERIZING WATER COILS

Due to air stratification, failure of outdoor air dampers and/or preheat controls, coil freeze-up can occur. Routine draining of water cooling coils for winter shutdown can not be depended on as insurance against freeze-up, resulting in severe coil damage. It is recommended that all coils be drained as thoroughly as possible and then treated in the following manner:

Fill each coil independently with an anti-freeze solution using a small circulating pump and again thoroughly drain.

Check freezing point of anti-freeze before proceeding to the next coil. Due to a small amount of water always remaining in each coil, there will be a diluting effect. The small amount of anti-freeze solution remaining in coil must always be potent enough to prevent freeze-up. **WARNING: CAREFULLY READ INSTRUCTIONS FOR MIXING ANTI-FREEZE SOLUTION USED. SOME PRODUCTS WILL HAVE A HIGHER FREEZING POINT IN ITS NATURAL STATE THAN WHEN MIXED WITH WATER. THE FREEZING OF THE COILS IS NOT THE RESPONSIBILITY OF RACAN CARRIER.**

INSTALLATION RECOMMENDATIONS FOR COIL PIPING

GENERAL

Piping design, sizing, and installation information presented in ASHRAE Handbooks should, where applicable, be followed in design and installation of piping.

WATER COOLING COILS

1. Water supply, water return, drain and vent connections extend through the removable panels (unless otherwise indicated on unit drawings). All connections are labeled on the removable panel(s).
2. Standard water supply and water return connections are male N.P.T. carbon-steel pipe.
3. When installing couplings, do not apply undue stress to the connection extending through unit panel(s). Use a backup pipe wrench to avoid breaking the weld between coil connection and header.
4. Follow recommendations of the control manufacturer regarding types, sizing and installation of controls.

DIRECT EXPANSION COILS

1. The coil suction connection(s) extend(s) through the removable panel(s) unless otherwise indicated on unit drawings. All connections are labeled on the coil removable panels.
2. The distributor connection(s) is (are) inside the unit, unless indicated otherwise in the project submittal. Penetration and sealing of the unit casing for the liquid line is the responsibility of the installing contractor.
3. Check nozzle in distributor for proper tonnage.
4. The thermostatic expansion valve(s) is (are) not provided with the unit. These valves must be of the external equalizer tube type. Connect the 1/4" diameter external equalizer tube provided on the coil to the connection on the field-provided expansion valve.
5. Care should be exercised when piping the system to be sure all joints are tight and all lines are dry and free of foreign material.

STEAM COILS

1. For integral face and bypass coil sections, please refer to the proper section of this manual.
2. All steam coils in units are pitched towards return connection.
3. Steam supply and steam return connections extend through the coil removable panels (unless otherwise indicated on unit drawings). All connections are labeled on the removable panel(s).
4. Steam supply and steam return connections are male N.P.T. carbon-steel pipe and are labeled on the end access panel. Connections
5. When installing couplings, do not apply undue stress to the connection extending through unit panel(s). Use a backup pipe wrench to avoid breaking the weld between coil connection and header.
6. Support piping independently of coils and provide adequate piping flexibility. Stresses resulting from expansion of closely coupled piping can cause serious damage.
7. Do not reduce pipe size at the return coil connection. Maintain return connection size

- through the dirt pocket, making the reduction at the branch leading to the trap.
8. It is recommended that vacuum breakers be installed on all applications to prevent retaining condensate in the coil. Generally, the vacuum breaker is to be connected between the coil inlet and the return main. However, for a system with a flooded return main, the vacuum breaker should be open to the atmosphere and the trap design should allow venting of large quantities of air.
 9. Do not drip supply mains through the coil.
 10. Do not attempt to lift condensate when using modulating on/off control.
 11. Size traps in accordance with manufacturer's recommendations. Be certain that the required pressure differential will always be available. **DO NOT UNDERSIZE.**
 12. Bucket traps are recommended for use with on/off control only.
 13. Locate traps at least 12 inches below the coil return connection.
 14. Multiple coil installation:
 - a. Each coil or group of coils that is individually controlled must be individually trapped.
 - b. Coils in series: Separate traps are required for each coil or bank of coils in series.
 - c. Coils in parallel: A single trap may generally be used but an individual trap for each coil is preferred.
 - d. Do not attempt to lift condensate when using modulating or on/off control.
 15. With coil arranged for series airflow, a separate control is required on each bank or coil in the direction of airflow.
 16. Modulating steam valves are not recommended on high-pressure systems.
 17. Modulating valves must be sized properly. **DO NOT UNDERSIZE.**
 18. Freezing conditions (entering air temperatures below 35°F):
 - a. 5 psi must be supplied to coils at all times.
 - b. Modulating valves are not recommended. Control should be by means of face and bypass dampers.
 - c. Consideration should be given to the use of two or three coils in series with two-position steam control valves on that (those) coil(s) which will be handling 35°F (or colder) air. The desired degree of control can be attained with a modulating valve on the downstream coil.
 - d. Provision should always be made to thoroughly mix fresh air and return air before it enters the coil. Also, temperature control elements must be properly located to obtain true air mixture temperatures.
 - e. As additional protection against freeze-up, the trap should be installed sufficiently far below the coil to provide an adequate hydrostatic head to ensure

removal of condensate during an interruption in the steam pressure. Estimate three (3) feet for each one (1) psi of trap differential required.

- f. On start-up, admit steam to coil ten minutes before admitting fresh air.
- g. Provision must be made to close the outside air dampers if steam supply pressure falls below minimum specified.

WATER HEATING COILS

1. For integral face and bypass coil sections, please refer to the proper section of this manual.
2. Water supply and water return connections extend through the coil removable panel(s) (unless otherwise indicated on unit drawings). All connections are labeled on the coil panel(s).
3. The drain and vent connections on one-row and two-row coils must be added to jobsite piping.
4. Water supply and water return connections are male N.P.T. carbon-steel pipe.
5. When installing couplings, do not apply undue stress to the connection extending through unit panel(s). Use a backup pipe wrench to avoid breaking the weld between coil connection and header.
6. Follow recommendations of the control manufacturer regarding types, sizes, and installation of control.
7. Hot water coils are not recommended for use with entering air below 40°F.
8. If fresh air and return air are to be treated by hot water coils, care should be used in the design of the system to assure thorough mixing before air enters the coil.

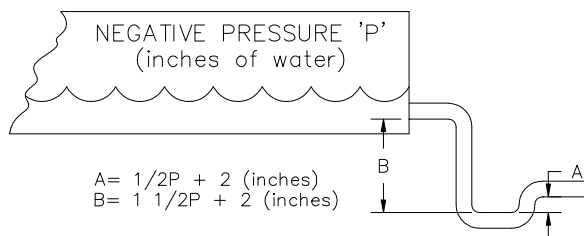
P-TRAP SIZING

Static Pressure At Drain	Negative Pressure		Positive Pressure
	A	B	A
0.50	2.25 in	2.75 in	2.50 in
1.00	2.50 in	3.50 in	3.00 in
1.50	2.75 in	4.25 in	3.50 in
2.00	3.00 in	5.00 in	4.00 in
2.50	3.25 in	5.75 in	4.50 in
3.00	3.50 in	6.50 in	5.00 in
3.50	3.75 in	7.25 in	5.50 in
4.00	4.00 in	8.00 in	6.00 in
4.50	4.25 in	8.75 in	6.50 in
5.00	4.50 in	9.50 in	7.00 in
5.50	4.75 in	10.25 in	7.50 in

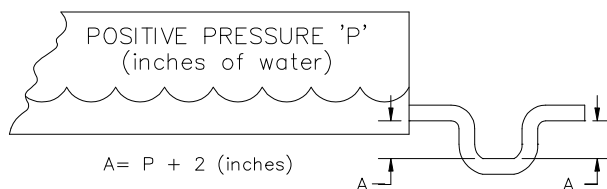
6.00	5.00 in	11.00 in	8.00 in
6.50	5.25 in	11.75 in	8.50 in
7.00	5.50 in	12.50 in	9.00 in
7.50	5.75 in	13.25 in	9.50 in
8.00	6.00 in	14.00 in	10.00 in
8.50	6.25 in	14.75 in	10.50 in
9.00	6.50 in	15.50 in	11.00 in
9.50	6.75 in	16.25 in	11.50 in
10.00	7.00 in	17.00 in	12.00 in
10.50	7.25 in	17.75 in	12.50 in
11.00	7.50 in	18.50 in	13.00 in
11.50	7.75 in	19.25 in	13.50 in
12.00	8.00 in	20.00 in	14.00 in
12.50	8.25 in	20.75 in	14.50 in
13.00	8.50 in	21.50 in	15.00 in
13.50	8.75 in	22.25 in	15.50 in
14.00	9.00 in	23.00 in	16.00 in
14.50	9.25 in	23.75 in	16.50 in
15.00	9.50 in	24.50 in	17.00 in
15.50	9.75 in	25.25 in	17.50 in
16.00	10.00 in	26.00 in	18.00 in

DRAIN PAN TRAPS

DRAW-THRU COIL SECTION



BLOW-THRU COIL SECTION



IN-WARRANTY RETURN MATERIAL PROCEDURE

Defective material may not be returned except by permission of authorized factory service personnel of Racan Carrier. Please contact your local Racan representative. All parts shall be returned to Racan factory, transportation charges prepaid. The return of the parts does not constitute an order for replacement. Therefore, a purchase order must be entered through your local Racan representative. The order should include part number, model number and serial number of the unit involved. Following our inspection of the returned part, if it is determined that the failure is due to faulty material or workmanship, credit will be issued on customer's purchase order.

PRODUCT WARRANTY

Racan Carrier, hereinafter referred to as the "Company", warrants that it will provide, at the Company's option, either free replacement parts or free repair of component parts in the event any product manufactured by the Company and used in the United States and Canada proves defective in material or workmanship within twelve (12) months from initial startup or eighteen (18) months from the date shipped by the Company, whichever comes first.

To obtain assistance under this parts warranty, simply contact the selling agency. To obtain information or to obtain factory help for Racan and Vibracoustair brand names, contact Racan Carrier, 2025 Boulevard Dagenais Ouest, Laval, Québec, Canada, H7L 5V1, telephone (514) 324-5050.

This warranty constitutes the buyer's sole remedy. It is given in lieu of all other warranties. There is no implied warranty of merchantability or fitness for a particular purpose. In no event and under no circumstance shall the company be liable for incidental or consequential damages, whether the theory be breach of this or any other warranty, negligence or intentional act.

This parts warranty and the optional extended warranties extend only to the original user. Abuse, misuse, or alteration of the product in any manner voids the Company's warranty obligation. Neither the parts nor extended warranty obligate the Company to pay any labor or service costs for removing or replacing parts, or any shipping charges. Refrigerants, fluids, oils, and expendable items such as filters are not covered by this warranty.

Attached to this warranty is a requirement to report start-up information. The registration form accompanying the product must be completed and returned to Racan Carrier within ten (10) days of original equipment startup. If that is not done, the date of shipment shall be presumed to be the date of startup and the warranty shall expire twelve (12) months from that date.

No person (including any agent, sales representative, dealer or distributor) has authority to expand the Company's obligation beyond the terms of this express warranty, or to state that the performance of the product is other than that published by Racan Carrier.