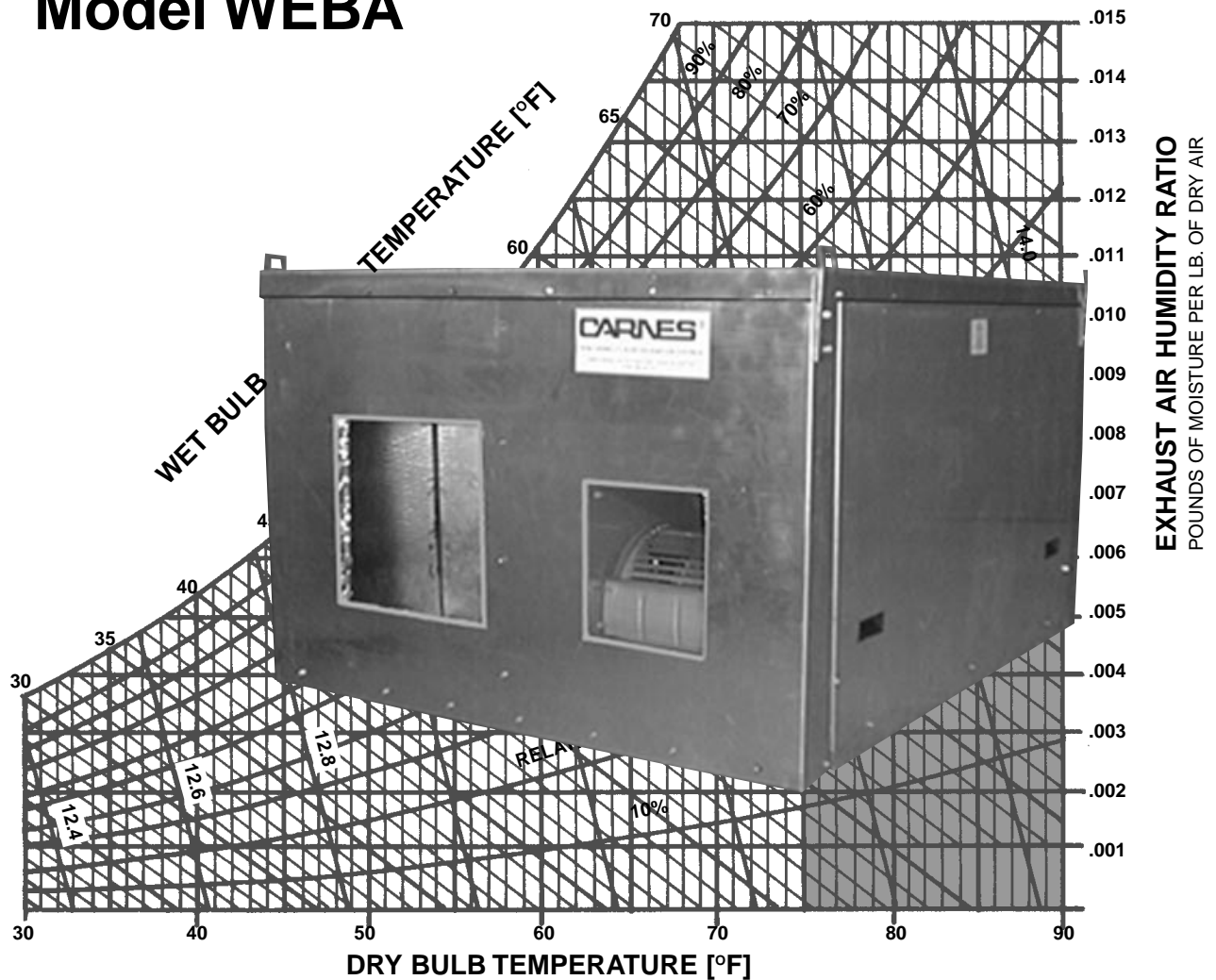




INSTALLATION, OPERATION AND MAINTENANCE MANUAL ENERGY RECOVERY VENTILATOR

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Model WECA Model WEBA



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The Carnes WECA Energy Recovery Ventilator is shipped as a factory assembled factory-wired and run-tested unit. This includes an air-to-air rotary exchanger, supply and exhaust fans, supply and exhaust filters, electrical control panel, and external disconnect. The ventilator is housed in a weathertight aluminum cabinet. Optional dampers, controls and safety devices may be included.

This manual describes basic installation, operation and maintenance requirements for the cataloged features. Non cataloged features may be covered by the Equipment Submittal or separate Carnes Instructions.

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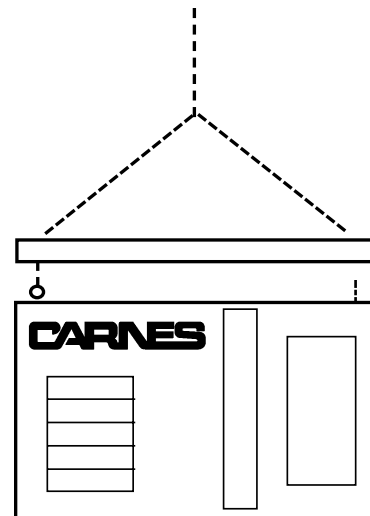
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I. RECEIPT and STORAGE

- 1). The unit must be thoroughly inspected before accepting delivery from the carrier. Inspect for:
 - a) Impact damage or serious scratches to the exterior.
 - b) Damage to the interior components such as energy recovery wheel, fan and motor mountings or wiring.
- 2) Any discrepancies in equipment or condition as received must be reported in writing to the carrier and Carnes Company immediately. In particular note:
The optional roof curb is shipped in advance for installation as part of the building roof.
- 3) The system is weathertight. However, if extended storage without operation is expected:
 - a) Any special unit roof penetration not connected to operating ductwork should be covered with rainproof coverings.
 - b) All access panels should be tightly closed.
 - c) Store the unit indoors, under roof. Moisture and high and low temperature extremes may harm the unit. If stored more than 3 months, rotate the rotor, and fans, at least 3 turns by hand. Repeat every 3 months.



II. PLACEMENT and INSTALLATION

- 1) Hoist the ventilator only with the lifting brackets provided. Attach a suitable chain or strap and a spreader bar. Access panels must be in place during lifting to prevent damage.
- 2) Before lifting for final placement, confirm the duct locations are correctly oriented to the building connections. Install the foam gasket provided with the optional curb on the top flange of the curb to seal against the underside of the system. The lifting brackets ARE NOT to be used for hanging the unit. Support the unit from below if it is installed in a hanging position.
- 3) After all items have been completed, lift the system into position on the curb. Carnes optional curb allows a tolerance of 1" (25mm) to 2" (51mm) on each axis when positioning the system, so care must be taken for accurate placement to match with ductwork and utility connections through the curb.
- 4) After removing shipping covers from airflow openings, fasten and seal the connecting ductwork. No specific provisions are made for fastening the unit base to the curb. If this is required, use caution to maintain the weathertightness of the unit, curb and roof.
- 5) The electrical diagram for the energy recovery system is found inside the exhaust access panel. Verify that the available power matches the unit. Then, incorporating applicable **NEC** and local code requirements, run the power supply to the main disconnect switch.
- 6) Damper motor and safety controls are wired by Carnes. Verify from the project plans and specifications, or Carnes electrical diagram which controls or equipment within the system are to be "field wired" or "provided and wired in the field."
- 7) In specific instances, other building controls (i.e., master time clocks or fire protection systems) may interface with the Carnes energy recovery system. Verify that building controls are compatible with the controls on the Carnes electrical diagram.

III. START-UP and OPERATION

- 1). Verify that all Placement and Installation tasks have been completed, including the removal of all airflow opening/damper shipment covers.
- 2) Verify that the tensions on all fan belts (adjusted by motor location) is proper. "A" belts when properly adjusted on typical fan drives, require 8-1/4 pounds (3.75 Kg) [+10%] to deflect the midpoint on the belt 1/64 of the distance between sheave centers. The belts should be tight enough not to "squeal" audibly on start-up. If they are allowed to squeal on start-up, accelerated belt and sheave wear will result.
- 3) Verify fan rotation is correct. This can be viewed with access panels removed, or looking through the discharge duct openings.
- 4) Forward-curved fans used with this unit will overload severely if operated without all access panels in place. Therefore, any run inspections made with an access panel removed **MUST** be brief (less than 2 minutes) to avoid tripping motor starter thermal overloads and/or damaging the motor and wiring.

CAUTION: *Avoid operating the fans for extended periods unless the wheel is also operating. During rotation the wheel is self-cleaning, but when stopped debris can accumulate on the wheel surface over an extended period of time. This accumulation increases the static pressure drop across the wheel, and can result in damage to the wheel surface whenever wheel rotation is resumed.*

- 5). If unable to start the unit above, check for -
 - a) Proper electrical power supplies, control power and supplemental utility supplies.
 - b) All fuses and circuit breakers within the unit and on power supply to unit are in good condition and properly sized.
 - c) Reset of thermal overload(s) on the fan motors. The reset button is part of the motor starter(s) typically located in the main electrical panel. Verify that an overload condition or ambient temperature above motor nameplate is not causing recurring tripping of the overload device.
 - d) All disconnect switches and circuit breakers within the unit are on the power supplied to the unit when power is switched on.
 - e) All "field wired" and/or "provided and wired in the field" controls are properly installed and compatible with unit equipment and controls. DDC controls may require jumpers between terminals or providing a proper control signal to operate system components. See Carnes electrical diagram.
- 6) After balancing the ductwork and control system served by the unit-including any unit fan speed changes made with the variable pitch sheaves provided--verify acceptable wheel brush adjustment, wheel start following shutdown and fan motor currents.

IV. MAINTENANCE and TROUBLESHOOTING

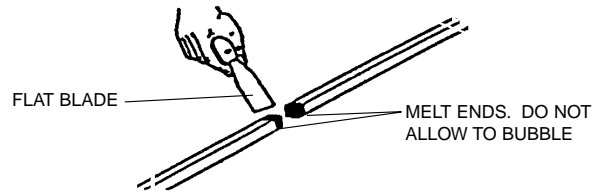
- 1) Inspect filter conditions quarterly and replace with equivalent panel filters.

The wheel reduction drive is a permanently sealed unit and requires no maintenance.

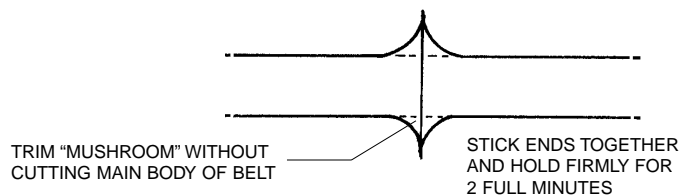
- 2) Inspect and, if necessary, adjust the fan belt tension as discussed under Start-Up and Operation. If the belts are frayed, slip after tension adjustment or require frequent adjustment to maintain tension, replace with equivalent belts. After years of operation (particularly if belt tension has not been properly maintained) the contact surfaces of the drive or driven sheaves may exhibit "cutting" from the belts wear. If this happens, replace the sheave(s) with equivalent unit.
- 3) The very "stretchy" urethane wheel drive belt should **not** require belt tension adjustment. If cracks appear or belt breakage occurs, it may be repaired or replaced by the following fusing procedure:
 - a) *Tools Required* -
 1. Razor blade (or sharp knife).
 2. Propane torch or spade-tipped soldering gun.
 3. Flat blade tool (such as putty knife).
 - b) *Preparation* -
 1. Route the belt so the closed loop will be properly located with no twists.
 2. Arrange the belt so it is not under tension while welding. The finished belt should stretch 6-8 percent [about 7/8" (22mm) per foot] beyond its relaxed length when in operation. Note the relaxed length of a new rotor belt is nearly tight to the outer rim of the rotor itself.
 3. Cut both ends of the belt squarely using the razor blade.
 4. Weld the belt in an open or ventilated area to minimize inhalation of the fumes.

c) Welding -

1. Heat the putty knife or flat tool to approximately 300°F (149°C). **DO NOT OVER HEAT**. Hold both ends of the belt against the tool until belt material starts to flow out of the point. The urethane belt melts at 200°F (93C).



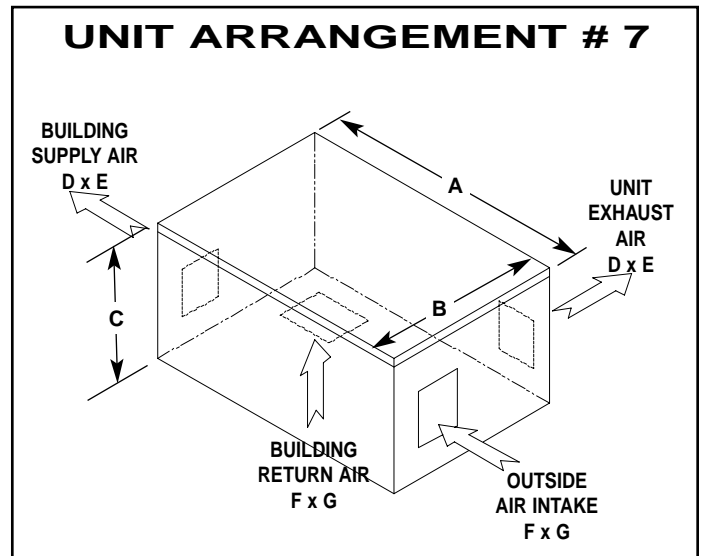
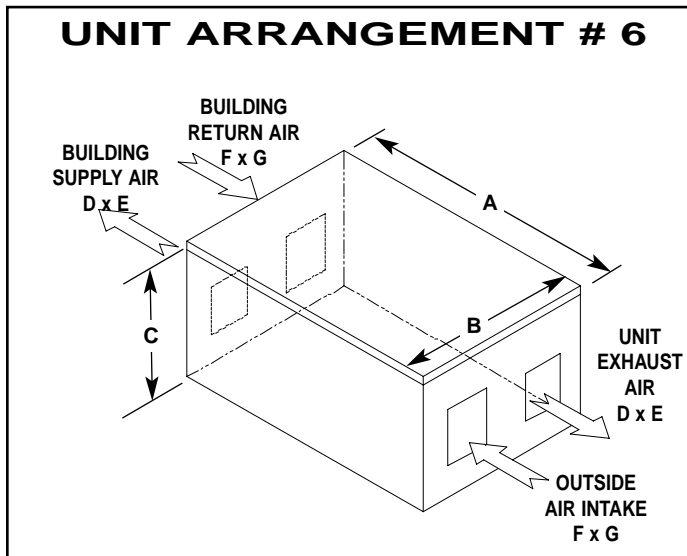
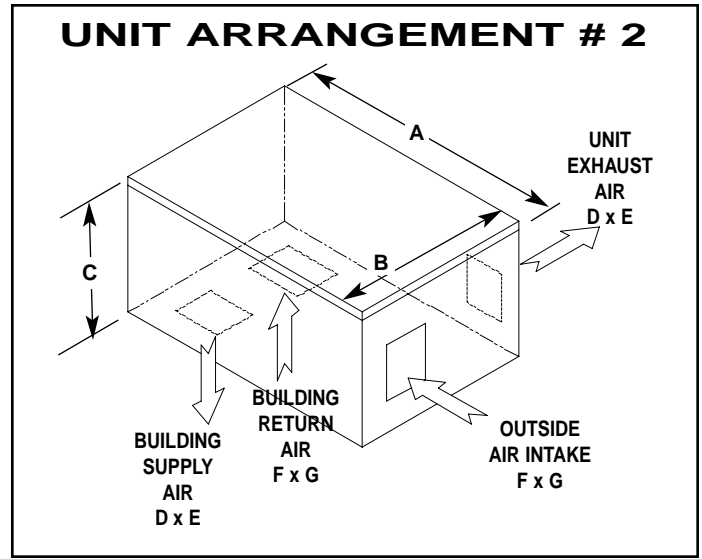
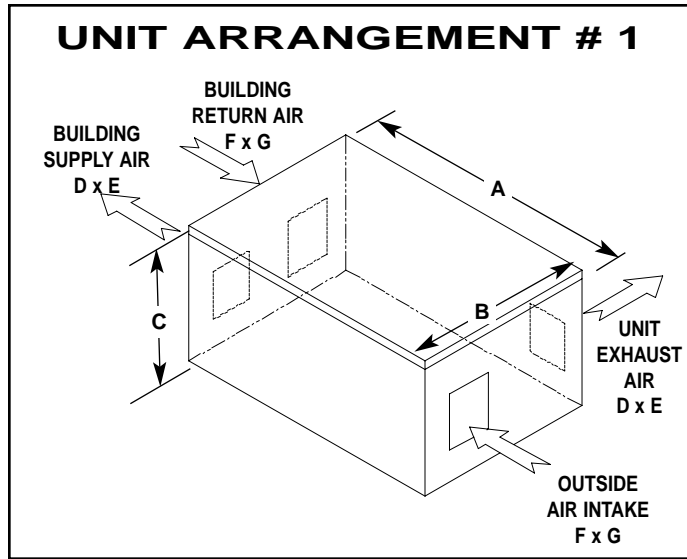
2. Remove the tool and immediately push the belt ends together. The softened material should flow slightly out of the joint, but do not squeeze all of the melted material out. Hold together for 2 minutes. If the material bubbles, it is too hot and will not maintain the bond. Re-trim and re-weld at a lower temperature.
3. After the belt has cooled for at least 10 minutes, trim from the excess material welded joint. If two people can pull the weld apart, repeat the process.



4. Verify that -
 - a) Wheel face is free of dirt and debris.
 - b) Access doors and seals close tightly. All access panels are secured tightly and sealed.
- 4) If trouble occurs and the energy recovery ventilator operation is suspected, check the following items as well -
 - a) Confirm that all interlocks (i e., motor starter, auxiliary contacts or damper motor end switches) are operating.
 - b) Confirm that all field-provided safety devices (i.e., fire stat, freeze stat or smoke detector) are operating.
 - c) Verify that all fuses, circuit breakers, switches and motor starter overloads within and serving the unit, are in running condition.
 - d) Verify that all dampers and linkages operate properly.
 - e) Measure static pressures to and from the unit and verify agreement with original operation and values for which the unit was designed.

V. DIMENSIONS and WEIGHTS

SIZE	DIMENSIONS LISTED IN INCHES (In Millimeters)							HOOD LENGTH		WGT Lbs. (Kg.)
	A	B	C	D	E	F	G	INTAKE	EXHAUST	
01	46 (1168)	32 (813)	24 (610)	7-1/8 (181)	8-1/2 (216)	8 (203)	10 (254)	12-1/2 (318)	14-1/4 (362)	350 (159)
02	54 (1372)	46 (1168)	31-1/2 (800)	9-3/8 (238)	10-1/2 (267)	14 (356)	14 (356)	18-1/4 (464)	18-1/4 (464)	525 (238)
03	66 (1676)	54 (1372)	42 (1067)	12-1/2 (318)	13-3/4 (349)	18 (457)	18 (457)	21 (534)	20-1/4 (515)	775 (352)



SERVICE ACCESS

Allow sufficient clearance on sides of unit for filter maintenance and service access.

SIZE	MINIMUM CLEARANCE
1	32 Inches (813mm)
2	46 Inches (1168mm)
3	54 Inches (1372mm)

CARNES ENERGY RECOVERY WHEEL PRODUCTS

CARNES Energy Recovery Wheel Products help designers and building owners:

- Provide economical solutions to Indoor Air Quality problems.
- Meet ASHRAE 62-1989 ventilation guidelines while controlling energy costs and humidity levels.
- Reduce fresh air HVAC operating costs by up to 80%.
- Reduce HVAC equipment first cost by reducing heating and cooling capacities.
- Increase cooling recovery up to 300% with full latent recovery, unlike plates or heat pipes.



ENERGY RECOVERY WHEELS



SENSIBLE OR TOTAL ENERGY RECOVERY
850 TO 41,500 CFM

CARNES Energy Recovery Wheels feature permanent desiccant media coating which recovers up to 83% of sensible and latent exhaust air energy. Ideal for air conditioned and humidified applications with significant fresh air intake.

Available options include: sensible only media, segmented wheels, replacement rotors, replacement wheel media, corrosion protected media, complete integral or DDC controls, and insulated frames.

Request Catalog HW-01

CARNES Energy Recovery Ventilators Models WECA and WVBB provide affordable outside ventilation by combining a roof exhauster, make-up air handler, and energy recovery wheel into a compact economical package that minimizes first cost and operating costs. Corrugated aluminum media with permanent desiccant recovers up to 85% of sensible and latent exhaust air energy in air conditioned and humidified applications. Ideal for classrooms, offices, and low rise buildings. For outdoor or interior installation, 4 duct locations available. Optional weatherhoods, dampers, defrost controls, and curbs available.

Request Catalogs HV-01 and HV-02

ENERGY RECOVERY VENTILATORS



300 TO 7,000 CFM



CARNES Energy Recovery Mini-Systems combine the economy of Energy Recovery Ventilators with up to 83% total energy recovery, and adds supplemental heating and cooling capabilities. Access panel construction with insulated walls and 5 standard duct orientations offer flexibility for any outdoor or indoor installation. Electric or hot water reheat, DX or chilled water cooling, and complete control and damper capabilities are available. **Dehumidifier Option** reduces dehumidification cooling cost by 75% while eliminating reheat cost.

Request Catalog HM-01



ENERGY RECOVERY MINI-SYSTEMS



850 TO 11,500 CFM



CARNES Energy Recovery Systems incorporate CARNES Energy Recovery Wheel savings of up to 83% recovery with the advantages of a factory assembled walk-in air handler. Features include steel or aluminum insulated double wall cabinets, corrosion protective coatings, and a complete selection of filtration, heating, cooling, humidification, recirculation, operating modes, and integral or DDC controls. **Dehumidifier Option** reduces dehumidification cooling cost by up to 75% and eliminates reheat cost.

Request Catalog HS-01

ENERGY RECOVERY SYSTEMS



1,750 TO 80,000 CFM



Request your FREE ENERGY-C-LECT Performance Software



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