# Honeywell

# ER200 Perfect Window™ Fresh Air Ventilation System

### **PRODUCT DATA**



## **APPLICATION**

The ER200 Fresh Air Ventilation System provides fresh air while retaining up to 85 percent of the heating or cooling energy in the exhaust air. It is the energy efficient answer to controlling indoor air pollution and maintaining comfortable humidity levels.

## **FEATURES**

- Provides ventilation that helps contractors meet ASHRAE 62-89.
- Reduces air conditioning load by up to 0.4 ton during air conditioning season.
- Remote operation provides total control from a single convenient location.
- Energy transfer wheel for heat and moisture recovery.
- Model available with automatic and economical built-in preheat frost control for operation at design temperatures to -29°F (-34°C).
- Rugged steel cabinet.
- No drain required—condensation free.
- Eliminates or reduces need for humidifier.
- Exhausts 80-250 cfm of stale indoor air while bringing in equal amounts of fresh air.
- Variable fan speed control.
- Latent and sensible energy transfer efficiency up to 85 percent.
- Permanently lubricated fan and wheel bearings.

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## **SPECIFICATIONS**

#### IMPORTANT

The specifications in this publication do not include normal manufacturing tolerances. Therefore, an individual unit may not exactly match the listed specifications. Also, this product is tested and calibrated under closely controlled conditions and some minor differences in performance can be expected if those conditions are changed.

#### Model:

ER200 Perfect Window<sup>™</sup> Fresh Air Ventilation System: Includes energy transfer wheel, filter, fan and blower assembly, energy wheel drive motor and speed control. Select models have frost control preheater, temperature control module and thermistor assembly.

#### Color:

White.

#### **Electrical Ratings:**

Voltage and Frequency: 120 Vac, 60 Hz or 240 Vac, 60 Hz. Maximum Current:

Without Frost Control: 2.2A. With Frost Control: 14.7A at 240 Vac. Neutral required

for motor operation.

#### Air Flow Capacity:

80 to 250 cfm (40 to 120 L/s).

### Efficiency:

75 to 85 percent.

#### Minimum Outdoor Operating Temperature:

Without Frost Control (120 Vac): 5°F (-15°C). With Frost Control (240 Vac): -29°F (-34°C).

#### Dimensions:

See Fig. 1.

#### Mounting:

Mounts in conditioned space such as basements, utility rooms, hallway or closet. Can also be mounted in a conditioned attic space.

#### **Approvals:**

Underwriters Laboratories, Inc. listed. Canadian Standards Association certified. Home Ventilating Institute certified.

#### Weight:

Unit Weight: 74 lb (34 kg). Shipping Weight: 98 lb (44 kg).

#### Accessories:

272672 Seven-inch Round Balancing Grid. 272673 Seven-inch Weather Cap. H8808C Dehumidistat.

## **ORDERING INFORMATION**

When purchasing replacement and modernization products from your authorized distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

- 1. Your local Honeywell Home and Building Control Sales Office (check white pages of your phone directory).
- Home and Building Control Customer Relations Honeywell, 1885 Douglas Drive North Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9. International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.



Fig. 1. ER200 installation dimensions in in. (mm).

# PLANNING THE INSTALLATION

### Application

The Fresh Air Ventilation System is designed to provide stale air exhaust and fresh air supply. The system draws outdoor fresh air through the ventilator for distribution throughout the house. Stale air is exhausted through the ventilator and to the outdoors. Ducting between the ventilator and outdoors and ducting in unconditioned space must be insulated. See Fig. 2.

### **Mounting Position and Location**

The ER200 can be suspended from the exposed floor/ceiling joists, ceiling or floor surface, closet floor or utility room to accommodate ducting between joists. The ER200 may be mounted in any position. Locate the fresh air intake 6 ft (2m) or farther from the stale air exhaust to avoid exhaust air reentry. See Fig. 2.

NOTE: Build an insulated frame around the ventilator when installing in an unconditioned space.

### **Frost Control Guidelines**

ER200 120 Vac models are recommended for use to an outdoor design temperature of  $5^{\circ}F$  (- $15^{\circ}C$ ). In colder climates, use the 240 Vac model that includes a preheat frost control system to avoid frost formation in the ventilator.

NOTE: For pool, spa and other high humidity applications, a frost control model is recommended for operation at outdoor design temperatures below 15°F (-9°C).

### Ducting

Ducting between the Fresh Air Ventilation System and the outdoors must be insulated and have a continuous air vapor barrier. See Fig. 3. Fresh air supply ducts from the Fresh Air Ventilation System to the room must be insulated only when located in an unconditioned space (without heating or cooling).







Fig. 3. Sealing insulated duct terminations.

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All ducting to the outdoors must be installed above anticipated snow lines and fitted with a weather cap that incorporates bird screening.

Design and installation of ductwork must be in accordance with standard HVAC practice to deliver required quantities of fresh air to the temperature controlled space and exhaust equivalent quantities of room air to the outside.

Make intake and exhaust duct runs as short as possible with few bends or elbows.

1. Choose duct sizes that will maintain 0.2 in. wc static pressure.

- 2. Use 7-in. diameter round duct for all connections to and from the ventilator.
- 3. Plan fresh air supply for good ventilation efficiency. Separate outside vents from intake and exhaust by at least 6 ft (2m).

NOTE:

- Fresh air should not blow directly onto occupants or thermostat.
- Do not locate the fresh air intake close to known sources of pollutants such as automobile exhaust, dryer vent or chimney smoke.
- Supply air can be ducted directly to the return side of a forced-air heating or air conditioning system. This can provide excellent distribution of fresh air while saving substantially on installation.
  - NOTE: Continuous operation of the ER200 during periods of occupancy is recommended. When the furnace air handler operates, fresh air will be distributed through the heating/air conditioning supply registers. When the air handler is off, fresh air will be delivered through both supplies and returns.
- 5. Use electrical interlock or automatic powered damper to prevent unwanted entry of outside air in the event that the ER200 is turned off while the furnace air handler continues to operate.

### **Balancing Airflow**

Balancing the airflow is important to verify that the Fresh Air Ventilation System is delivering the intended airflow and energy performance. Use the Balancing Airflow instructions in the Installation section to check and balance the airflow.

### Controls

### Remote Override Switch Functions—On/Off Control

If continuous ventilation is not required, an on/off control can be used to activate the ventilator when it is switched to Standby. Controls that can be used for this function include dehumidistats, timers, wall switches and the ventilate function of the Perfect Climate® Comfort Center<sup>™</sup>. If moisture control in bathrooms is a primary function of the system, a dehumidistat can be used to switch the ventilator from a Low or Standby setting to the High setting. Moisture removal throughout the entire home can be achieved only when the outside air contains less moisture than the inside air (typically during cold weather conditions).

With the Perfect Climate® Comfort Center<sup>™</sup>, the ventilator can be controlled automatically by using the programmed times or manually by pressing the VENTILATE button on the keypad. See the Perfect Climate Comfort Center User's Guide (form 69-0891) for complete instructions.

### **Moisture Control**

For optimum indoor air pollutant reduction and humidity control, continuous operation of the ventilation system is recommended. Increased moisture removal will always occur at maximum ventilation rates. This high setting should be used when first occupying a new building to remove excess moisture from new wood, plaster, cement and other moisture absorbing construction materials. If the system is wired to a dehumidistat, preselected moisture levels will be maintained automatically. For correction of severe moisture problems, the sensible energy transfer wheel can be substituted for the desiccant coated wheel.

### **Frost Control**

Select models have a factory installed automatic preheat frost control system that operates to prevent the inlet air temperature from falling below  $10^{\circ}F$  (- $12^{\circ}C$ ). The frost control system is designed to maintain this level down to outdoor temperatures of  $-29^{\circ}F$  (- $34^{\circ}C$ ) with 40 percent indoor relative humidity. The light located next to the press-to-test button lights when the frost control preheater is active or the TEST button is pressed.

#### IMPORTANT

Release the TEST button as soon as the neon light comes on. Pressing the TEST button longer can cause overheating of the ventilator.

## INSTALLATION

### When Installing this Product

- 1. Read these instructions carefully. Failure to follow them could damage the ER200 or cause a hazardous condition.
- 2. Check the ratings given in the instructions and on the ER200 to make sure the product is suitable for your application.
- 3. Installer must be a trained, experienced service technician.
- 4. After installation is complete, check out product operation as provided in these instructions.

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Disconnect power supply before wiring to prevent electrical shock or equipment damage.

### **Unpack Fresh Air Ventilation System**

The Fresh Air Ventilation System is shipped assembled. Check that all the components are included. The unit consists of:

- Painted finish cabinet with starting collars.
- Variable speed fresh air control.
- Built-in preheater (on selected models).
- Two mounting straps.
- Hardware package.
- Literature package.

The Fresh Air Ventilation System comes ready for installation as received. Wiring and ducting are required to complete the installation. Before proceeding, check to make sure all the components are available.

### **Review the Installation Plan**

Place the unit on the floor; position it as it will be when installed. Cut out the mounting template printed on the outer carton. Use the template to determine the location of the mounting straps. Make sure all the required duct work and additional accessories are available before starting the installation.

### **Suspended Mounting**

- Attach two mounting straps to the bottom of the Fresh Air Ventilation System cabinet. Use four of the no. 10-24 x 1/2 in. round head machine screws and four no. 10 internal tooth washers supplied in the hardware package.
- Attach a pair of hanging brackets to a joist. See Fig. 4. Space the brackets 25-1/4 in. apart on centers. Use two 1-1/2 in. lag screws to secure each bracket.
- Locate and attach the remaining pair of brackets on a joist so each pair is 32 in. apart and perpendicular to each other.
- Install a lock washer and a hex nut onto each of the four 6 in. bolts. Thread each hex nut to 1/2 in. below the bolt head.
- Insert the bolts through the mounting strap bushing and secure each bolt with a pair of hex nuts. See Fig. 4.
- Raise the cabinet to slip the heads of the bolts over the edges of the brackets and allow the bolt shanks to engage the slots in the brackets. Tighten the lockwasher and hex nut upward against the bottom of each bracket. The cabinet is now positioned for attachment of ducting.

### Wall Mounting

- Attach two mounting straps to the bottom of the cabinet. Use four each of the no. 10-24 x 1/2 in. round head machine screws and no. 10 internal tooth washers as supplied in the hardware package.
- Insert a steel sleeve into each of the four mounting strap bushings. See Fig. 5. With the cabinet mounted horizontally, these bushings will be spaced 32 in. on centers for direct attachment to wall studs spaced 16 in. on centers. For other wall configurations, using of a mounting board may be required.
- Support the cabinet at the desired location and secure with four no. 12 x 1-1/2 in. lag screws. The Fresh Air Ventilation System is now mounted and ready for attaching the ducting.

### Wiring

Before wiring 240 Vac models, disconnect power supply to prevent electrical shock or equipment damage. All wiring must comply with local codes and ordinances.

120 Vac models are equipped with a line cord and a standard 3-prong plug that plugs into a wall outlet. See Fig. 6. 240 Vac models, with frost control, require 240 Vac for the heater and must be hardwired per the local electrical code. A neutral must be connected to provide 120 Vac to the motors.

The Fresh Air Control is connected to the ventilator by six low voltage wires. Wiring is one to one, two to two, etc., see Fig. 7. Terminal 2 on the Fresh Air Control is used as a tie point for the optional remote switches; no factory wiring is connected to this terminal.



Fig. 4. Typical mounting when suspending unit from basement ceiling with four suspension bolts (one shown).



Fig. 5. Typical mounting when unit is mounted to a wall with four lag screws (one shown).



Fig. 6. Wiring ER200 without preheater, with line cord and plug.



Fig. 7. Wiring ER200 with preheater.



Fig. 8. Airflow measurement grid.

### **Balancing Airflows**

Balancing system airflow is important to verify the Fresh Air Ventilation System is delivering the intended airflow. Balancing is a good check for duct system blockages, fan operation, and that system exhaust and supply pressure are equal.

Honeywell 272672 Round Balancing Grid can be mounted in the duct work connected to the Fresh Air Ventilation System to balance the airflow. See Fig. 8. Grids can be used temporarily or installed permanently to allow periodic check. The grid is connected to a pressure measurement to translate the pressure reading into an airflow reading (cfm or L/s) using the table mounted on the grid or Table 1.

The grids must be used with a pressure measurement device capable of measuring pressures ranging from 0 to 0.25 in. wc (60 Pa). Use a magnehelic gauge or incline manometer, available from your local wholesaler. A single pressure measurement device can be used to measure airflow in both Fresh Air Ventilation System air streams.

# Measuring and Balancing Fresh Air Ventilation System Airflows

One or two grids can be installed to take the measurements. When using one, move it from the exhaust to the supply air ducts to get the readings. Use the following procedure to get accurate measurements:

- Close all doors, windows and any other openings in the building. Exhaust appliances (exhaust fans, furnace, clothes dryer, water heater, etc.) must be off while measuring airflow and balancing the Fresh Air Ventilation System.
- Insert the grid in the exhaust duct. Install so that the arrow on the grid casing points in the direction of the airflow in the duct work. Mount on the warm side of the duct work where airflow turbulence from a fan blower, duct elbow or damper is minimized. Turbulence can result in incorrect airflow measurements. See Fig. 9.
  - NOTE: The magnehelic gauge or incline manometer must be mounted on a level surface. Incline manometers include a bubble-type level indicator. When the unit is level, zero the pressure measuring device. Magnehelic gauges must be lightly tapped to verify pressure reading before making any adjustments or readings.

- Attach flexible tubing from the low pressure port on the pressure gauge to the downwind tap on the airflow grid.
- Seal the ductwork using duct tape.
- Attach tubing from the high pressure tap on the pressure measuring device to the upwind tap on the airflow grid.
- Turn on airflow and note the pressure registering on the pressure measurement gauge. If the reading on the pressure measuring device is negative, the pressure connections are reversed and need to be changed.
- Use the table on the airflow grid or Table 1 below to translate the pressure measurement into an airflow reading.

# Table 1. Pressure To Airflow Conversion Chart For aSeven-inch Airflow Grid.

Pressure (in. wc)	Airflow		
	cfm	L/s	
0.010	73	(34)	
0.015	89	(42)	
0.020	103	(48)	
0.025	115	(54)	
0.030	126	(59)	
0.035	136	(64)	
0.040	145	(68)	
0.045	154	(73)	
0.050	162	(76)	
0.055	170	(80)	
0.060	178	(84)	
0.065	185	(87)	
0.070	192	(90)	
0.075	199	(94)	
0.080	205	(97)	
0.085	211	(100)	
0.090	218	(103)	
0.095	223	(105)	
0.100	229	(108)	
0.105	235	(111)	
0.110	240	(113)	
0.115	246	(116)	
0.120	251	(118)	
0.125	256	(121)	
0.130	261	(123)	
0.135	266	(126)	
0.140	272	(128)	

NOTE: Check local codes for balancing requirements. Normally the Fresh Air Ventilation System is balanced at its highest speed; however, some local codes require that the Fresh Air Ventilation System be balanced at its normal continuous speed.

- When the supply air from the Fresh Air Ventilation System is connected to the furnace return:
  - Balance with the furnace blower *on* if the furnace fan normally runs continuously.
  - Balance with the furnace blower off if the furnace fan runs only when the heating or cooling is on.
- Turn on the Fresh Air Ventilation System. Wait 60 seconds for airflows to stabilize. Record reading in the exhaust air stream.
  - NOTE: If using a magnehelic gauge, tap lightly before recording the reading.
- Move the grid to the supply air stream and repeat steps 3 through 9.
- To correct imbalance:
  - Airflow is greater in supply air section of Fresh Air Ventilation System—install a damper on the downwind side of the ventilator (warm side) and adjust until the airflow is within ±10 percent of the exhaust airflow. See Fig. 10.
    - When radon control is a concern, balance the supply airflow to provide 10 to15 cfm (5 to 8 L/s) more airflow than the exhaust.
  - Airflow is greater in exhaust section of Fresh Air Ventilation System—install a damper on the downwind side of the exhaust blower (cold side) and adjust until the airflows are within ±10 percent. See Fig. 10.
    - When radon control is a concern, balance so that exhaust is 10 to 15 cfm (5 to 8 L/s) less than supply airflow.

After the damper is adjusted and set, cover the damper with insulated ducting and tape.

- Mark the damper position on the duct for future reference.
- Place a sticker on the unit and record airflows measured while balancing, name of installer and date for future reference.



Fig. 9. Location of airflow grid in in. (mm).





# STARTUP AND CHECKOUT

After the installation and wiring are complete, make a final check that all components are working.

- Open the cabinet door.
- Turn the master switch on the side of the cabinet to the ON position.
- Turn on fresh air control to verify airflow and wheel rotation. Operate the control from MAX to MIN to verify decrease in airflow.
- Activate any line voltage override switch to verify function. Master power switch must be on.
- For the model equipped with preheat frost control, check out operation of the frost control system by momentarily depressing the press-to-test button located on the top blower plate using a pen or small screwdriver. The neon lamp adjacent to the test button lights to indicate preheater operation.

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Press button momentarily to avoid overheating unit. Do not hold down button for more than two seconds. Fresh air filter must be in place. Do not touch heater element.

- The ON/OFF illuminated rocker switch located on the side of the cabinet should be on at all times except when providing routine maintenance or servicing the unit.
- A fresh air control located at a remote location turns the unit on and off and allows continuously variable selection of ventilation rates. Airflow rate is determined by the specific application, the number of occupants and the design of the ductwork system. Gradually adjust the airflow rate until the desired comfort level is attained.

## **Setting Frost Control Temperatures**

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Only an authorized appliance repair or service technician should make adjustments to the frost control preheat temperature.

The preheat temperature is factory set to an inlet air temperature of  $10^{\circ}$ F (- $12^{\circ}$ C). This setting protects the desiccant coated energy transfer wheel from freezing at indoor relative humidities of up to 40 percent. This setpoint can be changed by rotating the slotted potentiometer extension arm. The arm is accessible at the end of the temperature control module attached to the underside of the fresh air blower cover. (See Fig. 11.)

For high indoor humidity conditions such as pool or spa applications and outdoor temperatures at or below  $10^{\circ}F$  (- $12^{\circ}C$ ), the preheat setpoint can be adjusted to maintain up to  $15^{\circ}F$ (- $9^{\circ}C$ ) inlet air temperature (suitable for 50 percent indoor RH). This is accomplished by rotating the potentiometer extension arm clockwise to the stop mark at 50 percent,  $15^{\circ}F$ .

Many buildings require humidifiers to maintain comfortable indoor relative humidities at approximately 30 percent, and many operate throughout the winter season at 20 percent or lower. In these situations, greater energy savings can be attained with lower preheat temperatures. To accomplish this, rotate the field adjustment potentiometer counterclockwise to the stop.

This will establish a  $0^{\circ}$ F (- $18^{\circ}$ C) temperature set point, which is acceptable when maximum indoor relative humidity will be 20 percent or less.



Fig. 11. Temperature control module adjustment.

# OPERATION

The Fresh Air Ventilation System has an energy transfer wheel that rotates between two counter-flowing air streams (supply and exhaust). The wheel picks up heat from one side and gives it to the other (cooler) air stream. This causes a temperature gradient through the wheel from the warm side to the cool side. As the cooler air stream passes through the porous wheel, it picks up heat from an increasingly warmer surface. The rotation takes that same surface into the opposing air stream where the warmer air gradually gives up heat to the increasingly cooler surface of the film. The rotation is constantly regenerating the temperature gradient for maximum efficiency.

The desiccant energy recovery wheel also removes moisture during the rotation. In summer, the wheel strips moisture from the incoming warm humid air stream. The moisture is then transferred into the cooler, dryer exhaust air. In winter, moisture in the exhaust air stream is transferred to the incoming dry fresh air stream. This eliminates the need for a condensation drain or pan.

# SERVICE AND TROUBLESHOOTING

### Service

### **Frost Control System**

Test the frost control system by pressing the test button annually before the heating season starts.

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Press the test button only momentarily—do not hold down more than two seconds. Longer testing can melt the fusible link in the over-temperature safety circuit. If this occurs, it will be necessary to replace the heater assembly.

### **Fresh Air Filter**

Replace the fresh air filter at least twice a year. To remove the filter:

- Unscrew the access panel thumbscrews to remove the filter access panel.
- 2 Slide the fresh air filter out of the Fresh Air Ventilation System.
- 3 Check the filter and replace if clogged.
- Replace the filter access panel on the Fresh Air Ventilation System and tighten the thumbscrews.

### Weather Caps

Check to ensure that the fresh air inlet and exhaust grilles do not become clogged with debris like grass, leaves or snow.

### **Energy Transfer Wheel**

Check the energy transfer wheel for build-up of dirt and debris.

NOTE: Energy transfer is not affected by stained surfaces.

### **Remove and Clean the Energy Transfer Wheel**

- Unscrew the screws holding the ventilator door and open the door.
- 2 Take out the center divider.
- Remove the belt from the rim of the wheel.
- Unscrew the screw in the center of the hub.
- **6** Use the rim of the wheel and lift the wheel straight off the drive shaft.
- Spray the energy transfer wheel thoroughly with household spray cleaner (Fantastik® or equivalent). Rinse with warm water. Use a soft brush to remove stains between the plastic windings. Shake excess water from the wheel.
- Replace the wheel on the drive shaft.
- 8 Replace and tighten the screw in the center of the hub.
- 9 Place the belt back on the wheel.
- Reinstall the center divider.
- Close the ventilator door and tighten the screws.

### **Belt Drive**

If the blower is operating (air coming out of fresh air vent) but energy transfer wheel does not rotate, check the pulley system. Replace broken or stretched belts.

If the blower fails to operate with the master switch in the ON position and the Fresh Air Control on, check circuit breakers in house electrical panel. If power is supplied to the unit but the blower does not operate, contact your local HVAC contractor.

### Troubleshooting

All required maintenance and repair can be accomplished by HVAC service personnel or appliance repair persons. Use Fig. 12 and 13 to identify the problems and causes. Start at Level 1 in Fig. 12 and proceed vertically downward through each level. If a negative response is obtained, proceed through the steps in that level as directed until the fault is found and is corrected. Continue until completed. This systematic diagnosis will provide a thorough inspection and checkout of the Fresh Air Ventilation System, both electrically and mechanically.



Fig. 12. ER200 system check and troubleshooting procedures for Levels 1 through 4.



Fig. 13. ER200 system check and troubleshooting procedures for Levels 5 through 10.

		Part Number		
Item No.	Description	Without Preheater Frost Control	With Preheater Frost Control	
1	Desiccant Energy Transfer Wheel	208677	208677	
1a	Sensible Energy Transfer Wheel	208678	208678	
2	Fresh Air Intake Filter	272737	272737	
3	Wheel Drive Belt	272754	272754	
4	Fresh Air Filter Access Panel	272755	272755	
5	Diameter Divider and Seal	272757	272757	
6	Cabinet Door	272758	272758	
7	AC Wiring Box Access Cover	272694	272694	
8	Blower and Motor (with capacitor)	272761	272761	
9	Blower Motor Capacitor	272762	272762	
10	Frost Control Preheater	N/A	272700	
11	Temperature Control Module	N/A	272706	
12	Master Control Module	272738	272739	
13	Thermistor Assembly	N/A	272768	
14	Wheel Drive Motor (with capacitor)	272767	272767	
15	Control Module Cover Plate	272780	272780	
16	Blower Chamber Cover	272781	272781	
17	Wheel Drive Pulley	272782	272782	
18	Heater Chamber Cover	272783	272783	
19	Wheel Shaft	208669	208669	

## **REPLACEMENT PARTS LIST**

Parts not illustrated are:

208377—Ventilation Switch. 272672—Seven-inch Round Balancing Grid. 272673—Weather Cap. 272682B—12-pack of Fresh Air Intake Filters. 272692—Cover Thumbscrews.

272695—Airflow Speed Control. 272749—Filter Clip.

272763—Line Cord and Plug. 272770—Wheel Drive Motor Capacitor.



Fig. 14. ER200 exploded view. Part numbers are keyed to parts list.

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