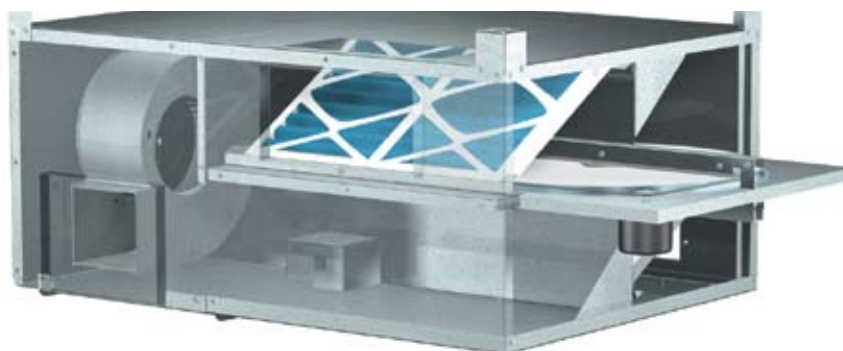




ENERGY RECOVERY VENTILATORS

Model: MiniVent-450 & 750

INSTALLATION, OPERATION AND MAINTENANCE MANUAL



Energy recovery wheels certified by the ARI Air-to-Air Energy Recovery Ventilation Equipment Certification Program in accordance with ARI Standard 1060. Actual performance in packaged equipment may vary. Certified Ratings are available in the Certified Product Directory at <http://www.aridirectory.org>

SAFETY WARNING

DISCONNECT ALL ELECTRICAL POWER TO THE MINIVENT PRIOR TO INSPECTION OR SERVICING. FAILURE TO COMPLY WITH THIS SAFETY PRECAUTION COULD RESULT IN SERIOUS INJURY OR DEATH.

SAFETY WARNING

IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE CAN CAUSE PROPERTY DAMAGE, INJURY OR DEATH. READ THE INSTALLATION, OPERATING, AND MAINTENANCE INSTRUCTIONS THOROUGHLY BEFORE INSTALLING OR SERVICING THIS EQUIPMENT.

This manual is the property of the owner and is required for future maintenance. Please leave it with the owner when you complete the job.

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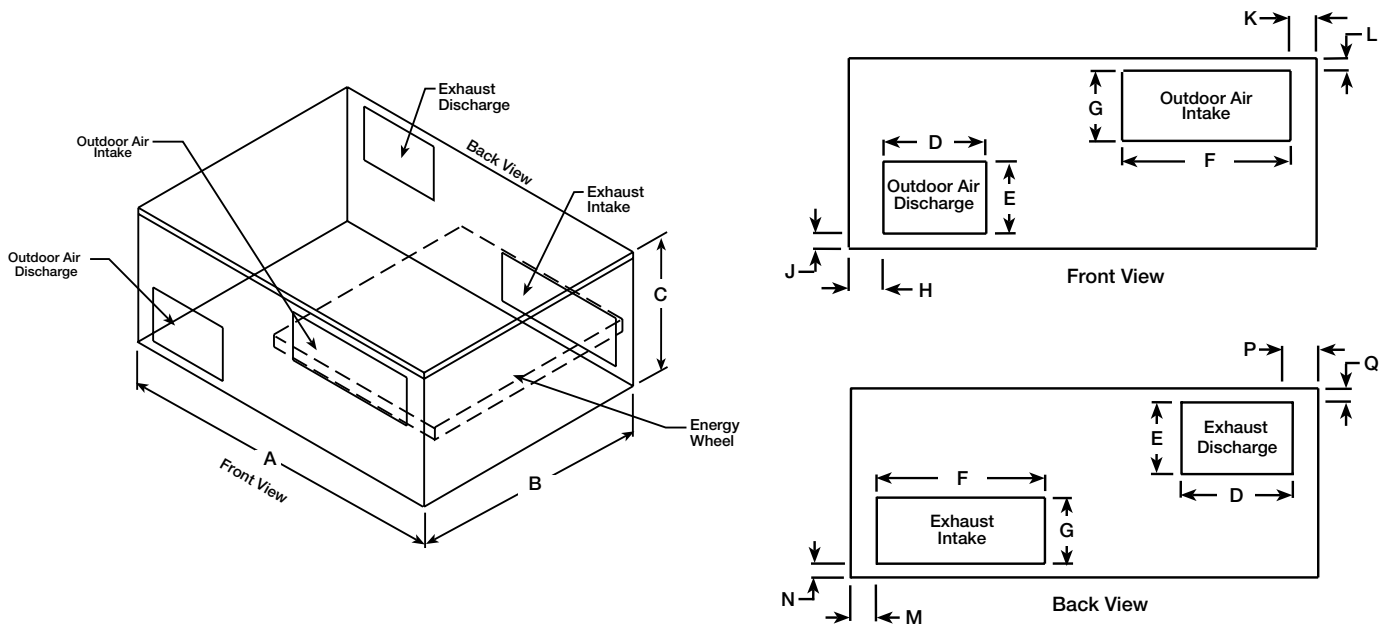
General

Greenheck Energy Recovery Ventilators, Model MiniVent-450 and 750, are thoroughly inspected and test run at the factory. However, damage may occur during handling and shipping. Consequently, it is important to inspect the unit for visible and concealed damage. Report and damage to the shipper immediately. In addition, assure all accessory items are present. Some accessory items are stored inside the unit during shipping. Care must be taken during installation to prevent damage to units.

Dimensional Data

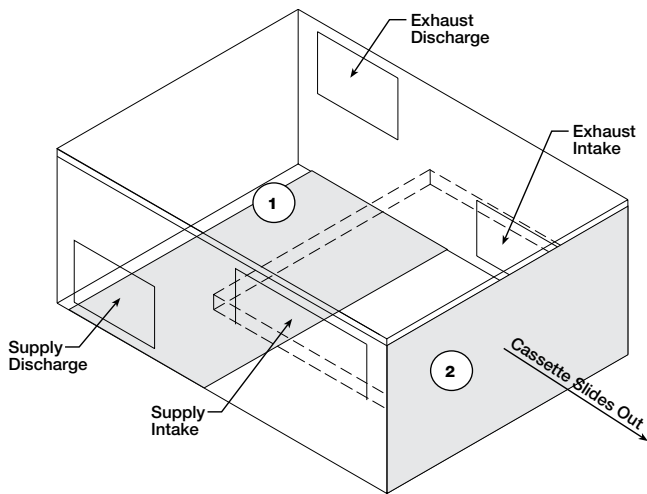
MiniVent	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	Weight (lbs.)
450	40	29	18	10	8	12	6	4 3/8	1 7/8	6	1	6	1	3 1/8	1/8	150
750	46	36	22	9	10	18	7	3 3/4	1 3/4	5 1/8	1	5 1/8	1	3 3/4	1 3/8	210

All dimensions shown are in inches.



Access / Clearance / Openings

Access Panel Locations



- ① Access panel for:
 - Outdoor and exhaust fans and motor
 - Electrical connection (115v)
- ② Access panel for:
 - Energy wheel cassette
 - Internal filters

Service Clearances

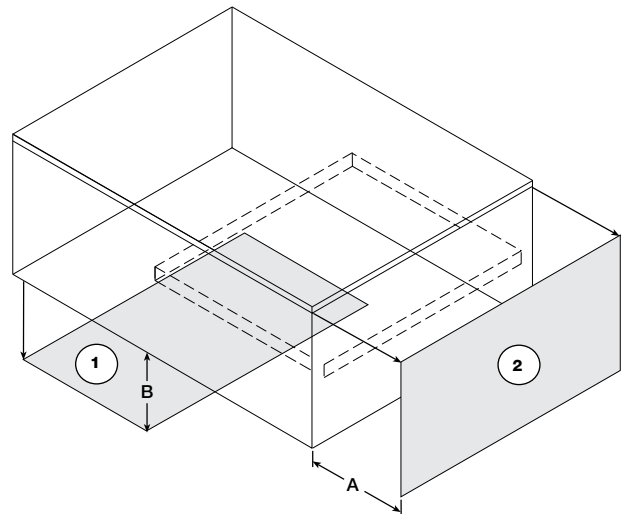
The MiniVent requires minimum clearances to perform routine maintenance, such as filter replacement, energy wheel cassette and fan inspection. Fan and motor assemblies, energy recovery wheel cassette and filter sections are provided with a service door or panel for proper component access.

Clearances for component removal are shown below.

Recommended Service Clearances

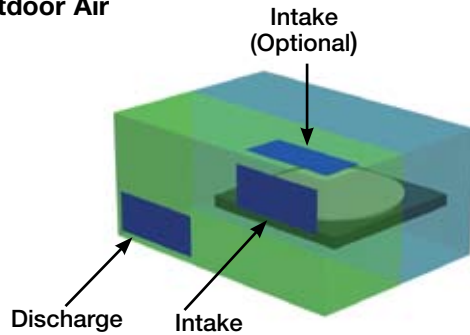
MiniVent	A	B
450	25	15
750	31	21

All dimensions shown are in inches.

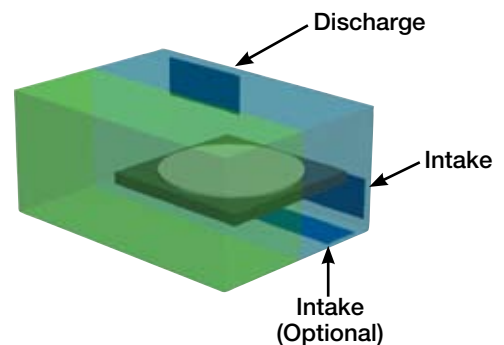


Intake and Discharge Locations

Outdoor Air



Exhaust Air



Intake and discharge locations are shown. Both intake locations are capable of being field relocated to suit installation needs (see optional locations).

Changing the Intake/Discharge Location

Step 1

Remove the metal cover for optional intake by unfastening the (4) sheet metal screws holding it in place.

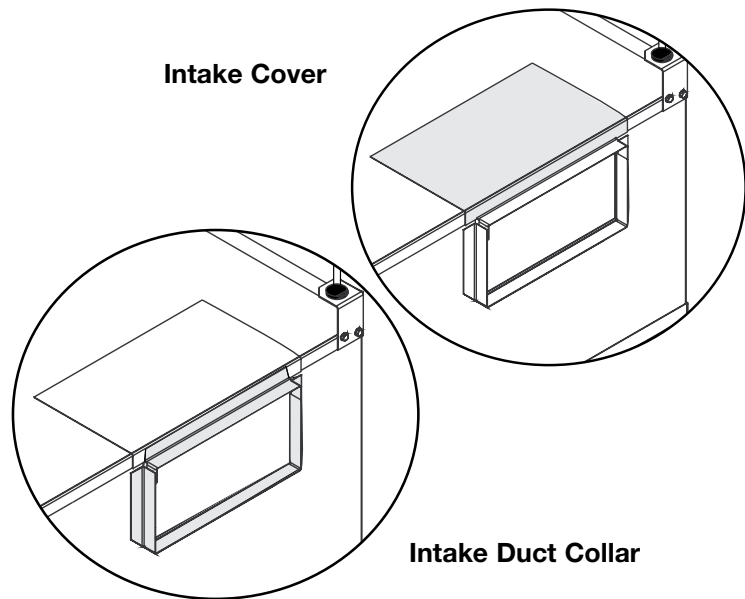
Remove the intake duct collar by unfastening the sheet metal screws holding it in place.

Step 2

Place the duct collar over the newly uncovered intake opening.

Fasten the intake duct collar in place.

Place the metal cover over the original intake and fasten into place. Be sure that the corner angle fits correctly around the unit corner.



Installation

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

Minimum service clearance should be provided on the side of the unit for routine service and component removal should it become necessary.

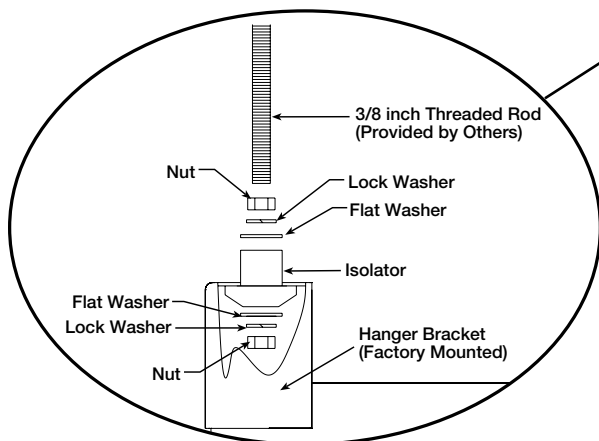
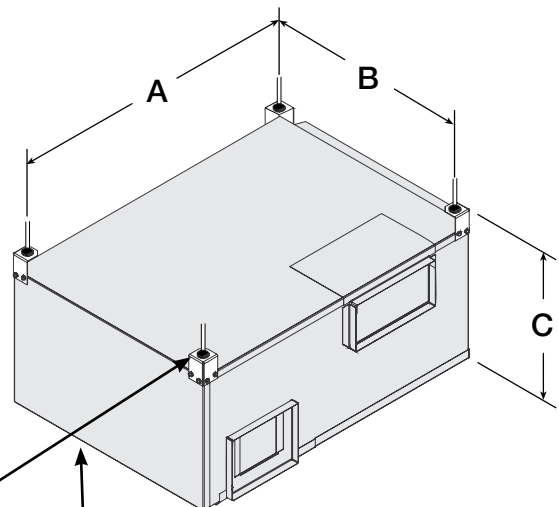
Before beginning installation see page 3 for detail on appropriate service clearances.

Hang Mounting with Hanging Vibration Isolators

- The hanging isolator kit includes four (4) isolators and required hardware.
- The hanger mounting brackets are factory mounted.
- Locate the support rods as shown in drawing to the right.
- Assemble each isolator as shown below.

MiniVent	A	B	C
450	37 ⁷ / ₈	26 ⁷ / ₈	20
750	43 ³ / ₈	32 ⁷ / ₈	24

All dimensions shown are in inches.

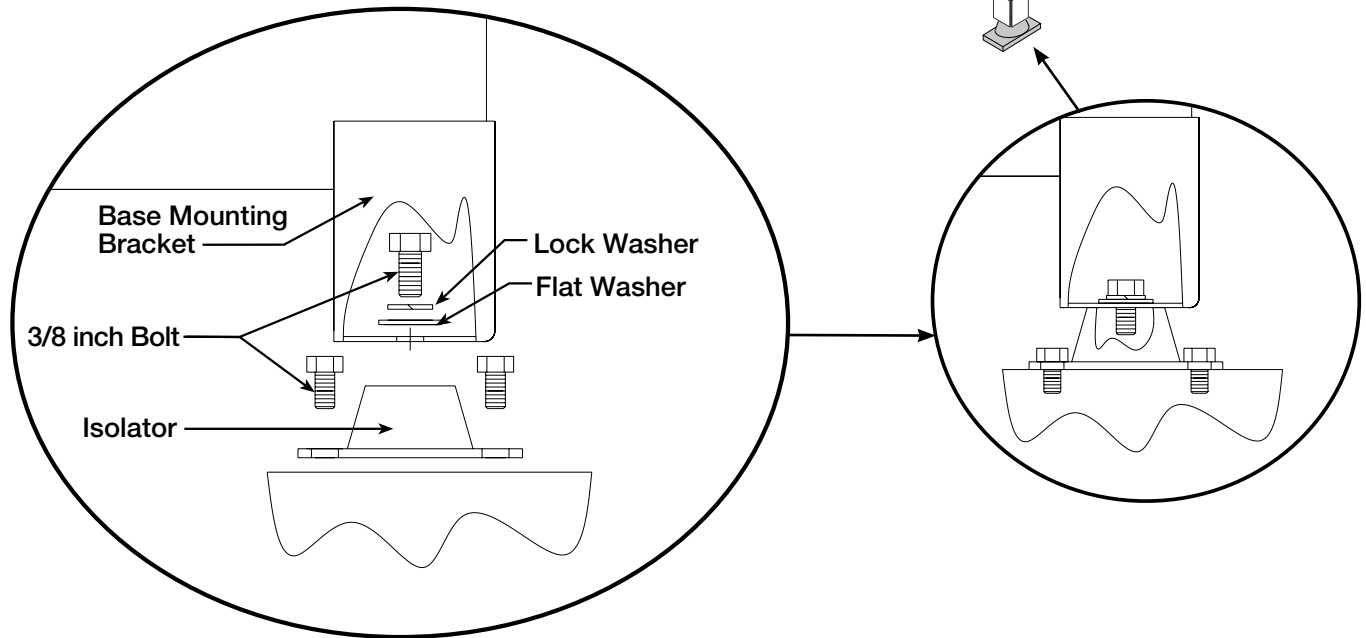
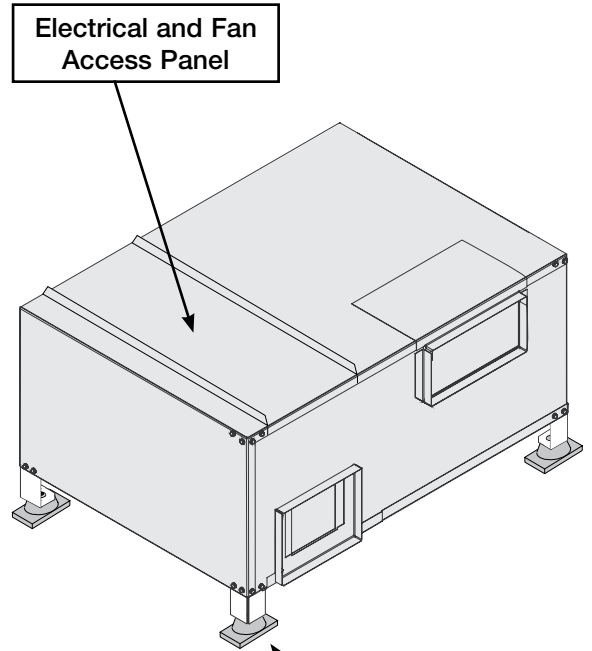


Installation

Base Mounting with Base Vibration Isolation

- The base isolators kit includes four (4) isolators, four (4) brackets and required hardware.
- Remove the hanging brackets from each corner of the MiniVent. These brackets are shipped mounted from the factory. Replace with the base brackets provided.
- Rotate the MiniVent 180 degrees, so the electrical and fan component panel is accessible from the top. The corners, where the brackets are fastened, are now closest to the mounting surface.
- Assemble and mount the isolators as shown in the figures below.

Note: The hanging and base mounting brackets are fastened to the same unit corners.

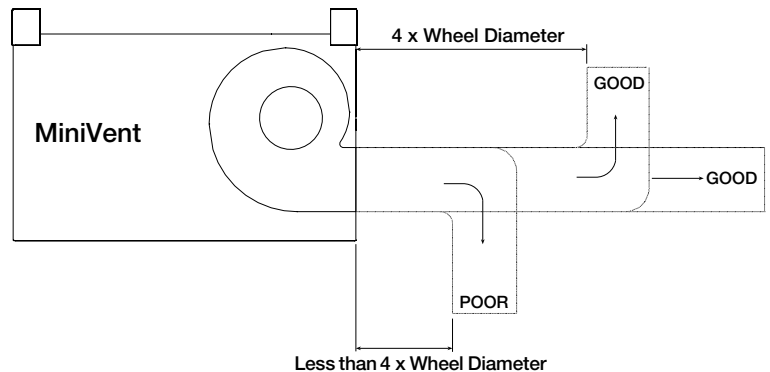


Duct Connections

Examples of good and poor fan-to-duct connections are shown below. Airflow out of the fan should be directed straight or curve the same direction as the fan wheel rotates. Poor duct installation will result in low airflow, loud noise and excessive vibrations.

Recommended Discharge Duct Size and Length			
MiniVent	ERV Blower Size	Duct Size	Straight Duct Length
450	8	10 x 8	32
750	10	10 x 10	40

All dimensions shown are in inches.



Installation

Electrical Connections

Before connecting power to the unit, read and understand the following instructions and wiring diagrams. Complete wiring diagrams are attached inside the blower door of the unit.

All wiring should be done in accordance with the National Electrical Code ANSI/NFPA 70- latest edition and any local codes that may apply. In Canada, wiring should be done in accordance with the Canadian Electrical Code. The equipment must be properly grounded.

CAUTION!

If any of the original wire must be replaced, the replacement wire must have a temperature rating of at least 105°C.

DANGER!

High voltage electrical input is required for this equipment. This work should be performed by a qualified electrician.

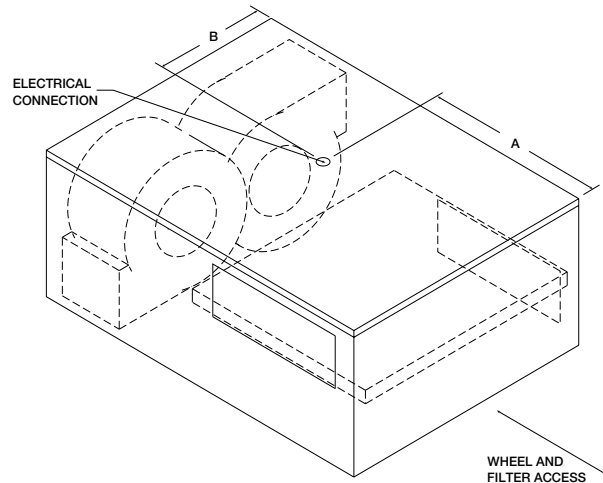
Sequence for wiring MiniVent Unit:

1. The unit's nameplate contains the voltage and total amperage required. The wire supplying power to the unit should be sized accordingly.
2. The main power line should be connected to the appropriate leads in the unit.
Power may be routed to the MiniVent through the opening on the underside of the unit. The locations for the opening are provided in the figure to the right.
3. Refer to the wiring diagrams in this manual or in the unit for controlling the MiniVent.

Electrical Connection Location

MiniVent	A	B
450	12.5	22.0
750	15.5	30.0

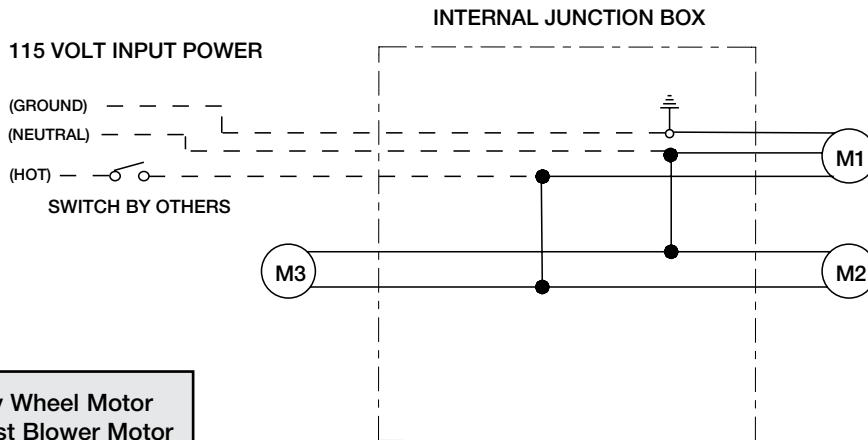
All dimensions shown are in inches.



Wiring Schematic

CAUTION!
 UNIT SHALL BE GROUNDED IN ACCORDANCE WITH NEC.
 POWER MUST BE SHUT OFF WHILE SERVICING.

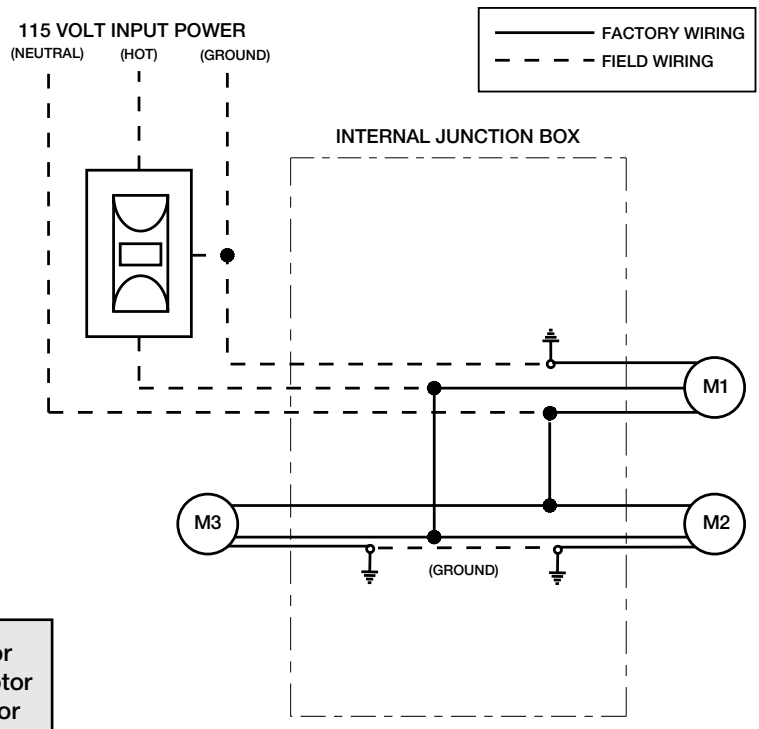
MiniVent Standard Wiring Schematic



- M1 Energy Wheel Motor
- M2 Exhaust Blower Motor
- M3 Supply Blower Motor

MiniVent-450 Motion Sensor Wiring

Model MBW is a wall mounted passive infrared motion detector that automatically turns on the MiniVent when a change in temperature is sensed. The MiniVent will automatically turn off after the room had been vacant past the adjustable time delay setting of 1 minute to 20 minutes. The detector must be installed in the line-of-sight of the subject personnel and requires a 2x4 handy box to be supplied by others.

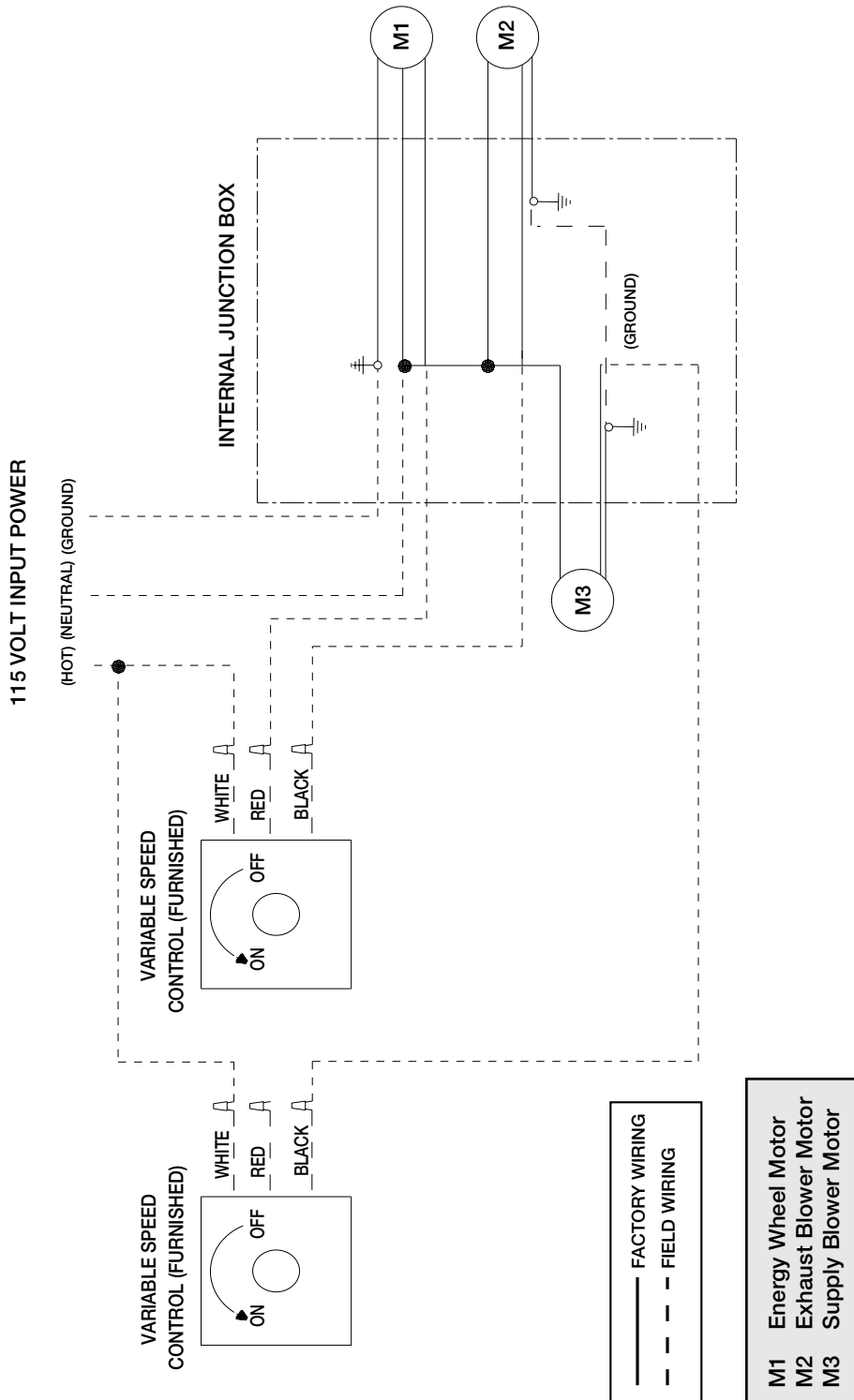


- M1 Energy Wheel Motor
- M2 Exhaust Blower Motor
- M3 Supply Blower Motor

Wiring Schematic

CAUTION!
 UNIT SHALL BE GROUNDED IN ACCORDANCE WITH NEC.
 POWER MUST BE SHUT OFF WHILE SERVICING.

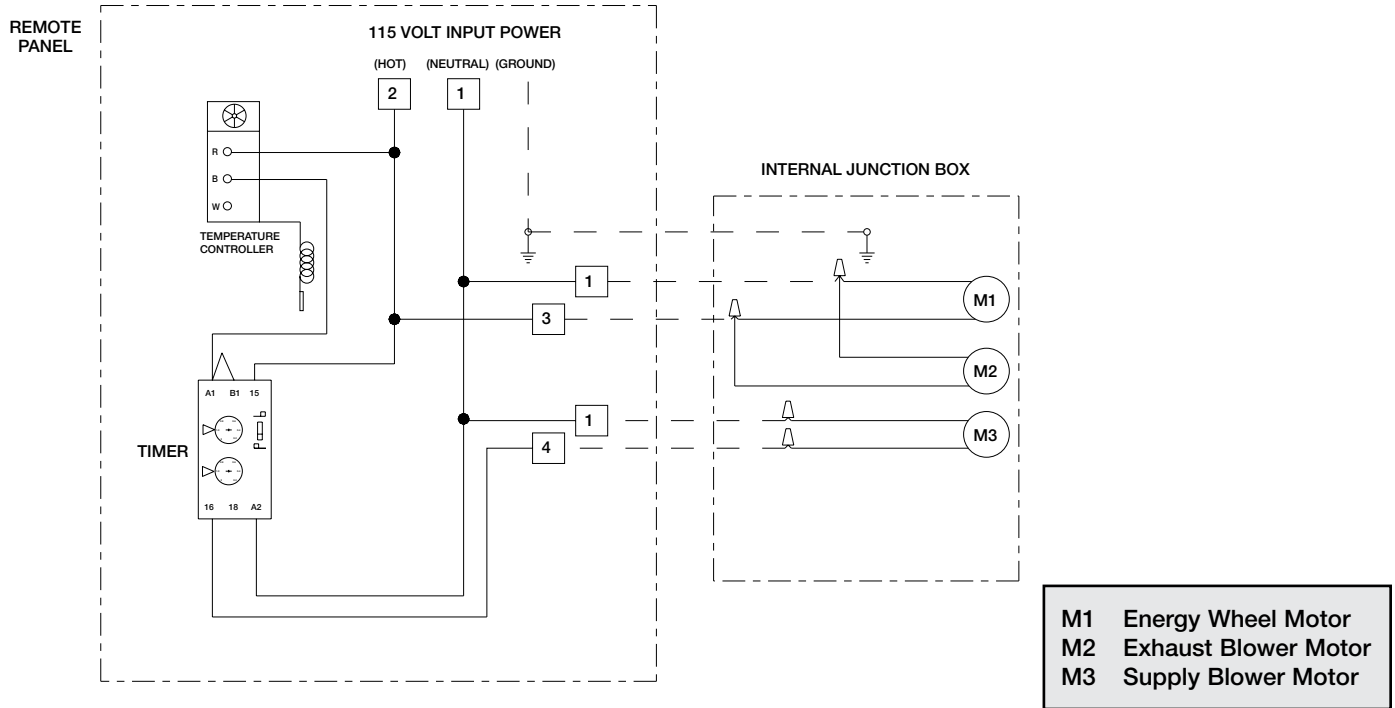
MiniVent Wiring Schematic for Independent Fan Control (2 Speed Controllers)



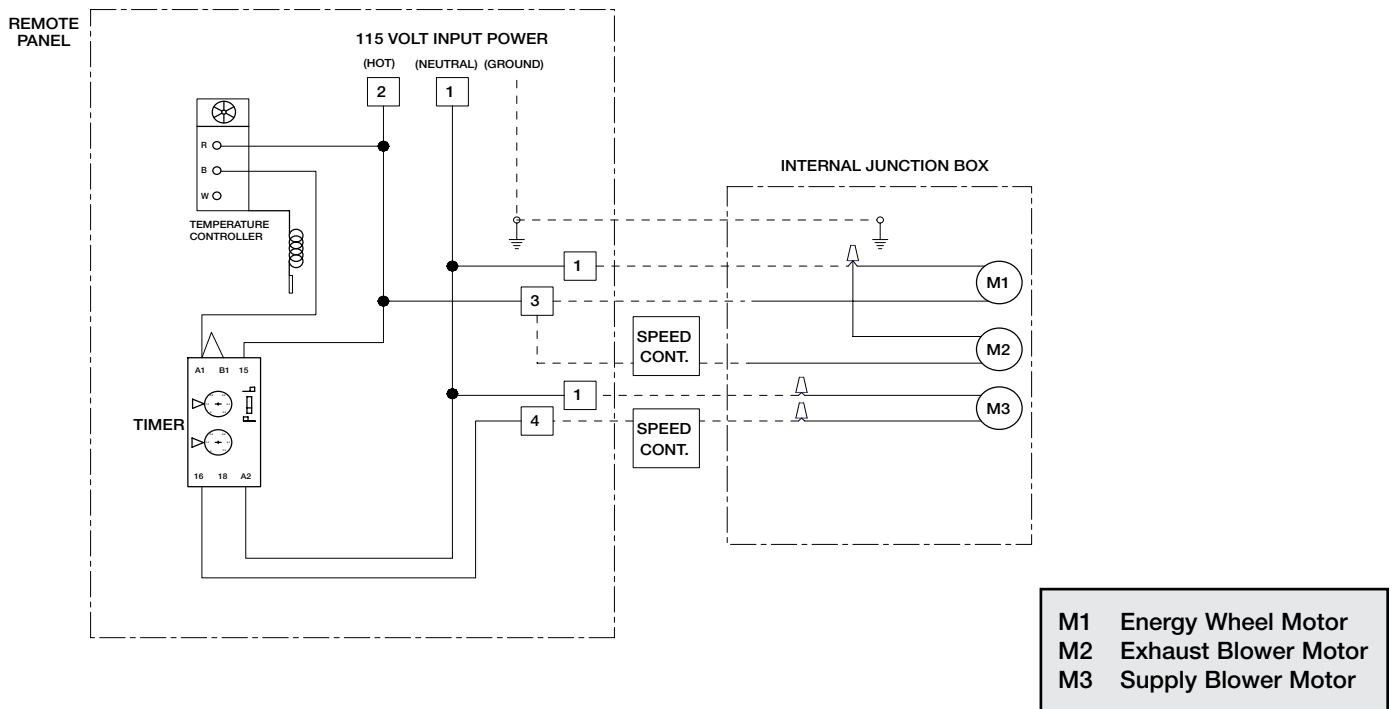
Wiring Schematic

CAUTION!
 UNIT SHALL BE GROUNDED IN ACCORDANCE WITH NEC.
 POWER MUST BE SHUT OFF WHILE SERVICING.

Wiring Schematic for Timed Exhaust Frost Control



Wiring Schematic for Timed Exhaust Frost Control with Speed Controllers



System Startup

SAFETY WARNING!

Do not operate energy recovery ventilator without the filters and birdscreens installed. They prevent the entry of foreign objects such as leaves, birds, etc.

Do not remove access panels or other components while standing on a ladder or other unsteady base. Access panels and components are heavy and serious injury may occur.

For proper unit function and safety, follow everything in this startup procedure in the order presented. Startup is to be done after electrical connections are complete.

Special Tools Required:

- Volt meter
- Incline manometer or equivalent
- Tachometer
- Amperage meter

General

Check all fasteners and set screws for tightness. This is especially important for bearings and fan wheels. Also, if dampers are not motorized, check that they open and close without binding.

Check Voltage

Before starting the unit compare the supplied voltage with the unit's nameplate voltage and the motor voltage.

Energy Recovery Wheel

First, follow the instructions on page 13 for pulling the energy recovery cassette halfway out of the unit.

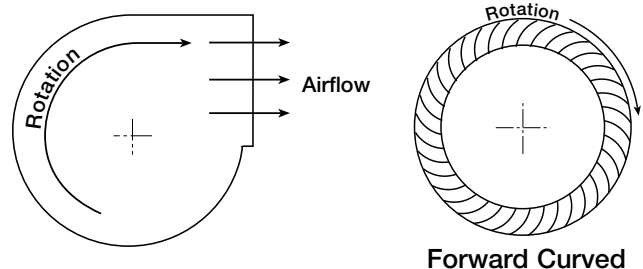
AIR SEALS — turn the energy recovery wheel by hand to verify free operation. Check that the air seals, located around the outside of the wheel and across the center (both sides of wheel), are secure and in good condition. Air seals which are too tight will prevent proper rotation of the energy recovery wheel. Recheck the air seals for tightness. Air seal clearance may be checked by placing a sheet of paper, like a feeler gauge, against the wheel face. To adjust the air seals, loosen all eight seal retaining screws. These screws are located on the bearing support that spans the length of the cassette through the wheel center. Tighten the screws so the air seals tug slightly on the sheet of paper as the wheel is turned.

Replace cassette into unit, plug in wheel drive, replace access door and apply power. Observe that the wheel rotates freely. If wheel does not rotate or is binding, remove the cassette (instruction on page 13).

Check Blower Rotation

First, hand rotate the blower to ensure that the wheel is not rubbing against the scroll. If the blower is rotating in the wrong direction, the unit will move some air but not perform properly.

To check the rotation, open the blower access panel, which is labeled either supply or exhaust, and run the blower momentarily to determine the rotation.



Air Volume Check and Measurement

Along with the building balance, the units air flow (cfm) should be measured and compared with its rated air volume. The MiniVent is direct drive, therefore balancing dampers or speed controls are required for airflow balancing. Air volume measurement must be conducted with access doors on the unit.

The most accurate way to measure the air volume is by using the pitot traverse method in the ductwork away from the blower. Other methods can be used but should be proven and accurate.

To adjust the air volume, change the fan rpm or the system static pressure. See Troubleshooting section in this guide.

With all access panels on the unit, compare measured amps to the motor nameplate full load amps and correct if overamping.

System Startup

Measure Motor Voltage, Amperage and Fan RPM

All access doors must be installed, run the measurement leads through the provided electrical access hole in the bottom access panel of the MiniVent. Measure and record the input voltage and motor amperage(s).

To measure the fan rpm, the blower door will need to be removed. Minimize measurement time because the motor may overamp with the door removed. *Do not operate units with access doors/panels open as the motors will overload.*

With all access panels on the unit, compare measured amps to the motor nameplate full load amps and correct if overamping.

Routine Maintenance

SAFETY WARNING

Disconnect all electrical power to the MiniVent prior to inspection or servicing. Failure to comply with this safety precaution could result in serious injury or death.

SAFETY WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment.

After the MiniVent has been put into operation, an annual inspection and maintenance program should be set-up to preserve reliability and performance. Include the following items in this program:

- GENERAL
- FASTENERS & SET SCREWS
- REMOVAL OF DUST & DIRT
- FILTER MAINTENANCE
- ENERGY WHEEL CASSETTE

General

The MiniVent energy recovery ventilator requires very little maintenance. However, small problems left unchecked, over time, could lead to loss of performance or early motor failure. We recommend that the unit be inspected once or twice a year.

The motor should be checked for lubrication at this time. Lubricate only those motors which have an oil hole provided. A few drops of all-purpose oil (SAE 20) will be sufficient.

Fasteners & Set Screws

Any fan vibration has a tendency to loosen mechanical fasteners. A periodic inspection should include checking all fasteners and set screws for tightness. Particular attention should be paid to set screws attaching the fan wheel to the shaft and the shaft to the bearings. Loose bearing set screws will lead to premature failure of the fan shaft.

Removal of Dust & Dirt

The fan motor and wheel(s) should be checked for dust and dirt accumulation. Dirt buildup clogs cooling openings on the motor housing and causes motor overheating. Dirt buildup can contaminate bearing lubricant and collect on fan wheel blades causing loss of performance or premature failure. Cleaning can be accomplished by brushing off any dust that may have accumulated. Under no circumstances should motors or bearings be sprayed with steam or water. Even filtered units can accumulate build up and should be checked when cleaning filters.

Maintenance to these components is achieved through the provided access panels.

Internal Filter Maintenance

Opening the access panels labeled "Filter Access" provides access to the 1 inch deep, pleated 30% efficient filters. These filters should be checked regularly and cleaned or replaced as needed.

MiniVent	Internal Filter Size	Quantity
450	14 x 20	2
750	16 x 20	2

Energy Wheel Maintenance

SAFETY WARNING

Disconnect all electrical power to the MiniVent prior to inspection or servicing. Failure to comply with this safety precaution could result in serious injury or death.

SAFETY WARNING

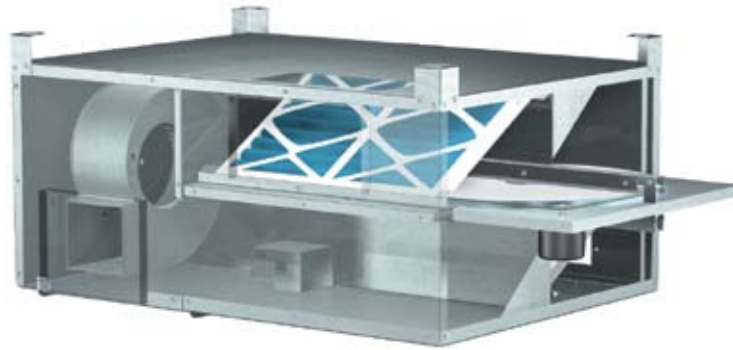
Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating, and maintenance instructions thoroughly before installing or servicing this equipment.

Annual inspection of the energy recovery wheel is recommended. MiniVents ventilating smoking lounges and other non-clean air spaces should have energy recovery wheel inspections more often based upon need.

Accessing the Energy Recovery Wheel in the MiniVent

Disconnect power to the MiniVent. Remove access panel labeled "Energy Wheel Cassette Access".

UNPLUG the wheel drive motor. Pull the cassette halfway out as shown.



Removing the Energy Recovery Wheel

First, remove the drive belt and the collars on both bearings. On the pulley side of the cassette remove the four (4) fasteners that hold the bearing support channel in place. Once the bearing support is removed the wheel can be pulled from the cassette. To replace the wheel reverse this procedure.

Recommended Cleaning Procedure for Energy Recovery Wheels

First, remove the energy recovery wheel by following the instructions on this page.

Wash the segments or small wheels with a non-acid based (evaporator) coil cleaner or alkaline detergent solution, such as 409™ or Fantastik™. Non-acid based coil cleaner such as KMP Acti-Clean AK-1 concentrate in a 5% solution has been demonstrated to provide excellent results. **Do not use acid based cleaners, aromatic solvents, temperatures in excess of 140°F or steam; damage to the wheel may result.** Soak in the cleaning solution until dirt, grease, and/or tar deposits are loosened. Internal heat exchange surfaces may be examined by separating the polymer strips by hand.

(Note: Some staining of the desiccant may remain and is not harmful to performance.)

After soaking, rinse the dirty solution from the wheel until the water runs clear. Allow excess water to drain from the media prior to reinstalling the wheel in the cassette. A small amount of water remaining in the wheel will be dried out by the airflow.

Routine Wheel Maintenance

Frequency of Energy Wheel Cleaning

A regular cleaning cycle must be established for the energy recovery wheel in order to maintain optimum sensible and latent energy transfer. In reasonably clean environments such as schools, offices or retail stores, the energy recovery wheel should be inspected annually and cleaned as needed.

For applications experiencing unusually high levels of tobacco smoke, such as lounges, nightclubs, bars and restaurants, washing of the energy recovery wheel every three months may be necessary to maintain latent energy (water vapor) transfer efficiency.

Failure to follow a regular cleaning cycle for the energy recovery wheel can result in significant energy transfer performance losses.

Energy Recovery Wheel Belt Drive

Drive belt(s) should be inspected annually. Normal operation eventually causes stretching or wear on the belt(s). Once this occurs the belt(s) should be replaced.

Replacement or spare energy wheel drive belt kits are available and ship with their own instructions. The serial number and date code of the energy wheel cassette are required to obtain the proper replacement belt kit from the factory. See below for serial number and date code location.

Energy Wheel Maintenance Documentation

Name Plate Information

Model: _____

Volts: _____ Hertz: _____ Phase: ____

Wheel Serial Number: _____

Manufacture Date Code: _____

Note: Energy wheel serial number and date code are located on a label above the drive pulley on the energy wheel cassette.

Field Start-Up Documentation

Energy Wheel

- Rotates Freely Yes
- No, check items below.
- Air Seal Tightness Acceptable
- Adjusted as on page 10
- Belts runs smoothly Yes
- Adjusted

Date	Time	Notes

Unit Maintenance Documentation

Job Information

Job Name: _____
Address: _____
City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____
Contact Person: _____

Service Organization: _____
Address: _____
City: _____ State: _____ Zip: _____
Phone: _____ Fax: _____
Work Done By: _____

Field Start-Up Documentation

Actual Voltage: _____ Hertz: _____ Phase: _____
Actual Amperage: _____

Supply Motor Voltage: _____
Supply Motor Amperage: _____
Supply Fan rpm: _____

Supply Blower

Rotation Correct
Air Volume Design _____ cfm
 Actual _____ cfm

Exhaust Motor Voltage: _____
Exhaust Motor Amperage: _____
Exhaust Fan rpm: _____

Exhaust Blower

Rotation Correct
Air Volume Design _____ cfm
 Actual _____ cfm

Name Plate Information

Model: _____
Volts: _____ Hertz: _____ Phase: _____
Min. Circuit Amps: _____ Mark: _____
Supply Hp: _____ Exhaust Hp: _____
Unit Serial Number: _____

Date	Time	Notes

Troubleshooting

Problem	Possible Cause	Corrective Action
Unit is NOT Operating	Electrical	Check fuses/circuit breakers, replace if needed. Check for On/Off switches. Check for correct supply voltage.
	Motor	Check motor horsepower is correct and not tripping overloads.
Excessive Noise	Fan wheel rubbing on inlet	Adjust wheel and/or inlet cone. Tighten wheel hub or bearing collars on shaft.
	Bearings	Replace defective bearing(s). Lubricate bearings. Tighten collars and fasteners.
	Wheel out of balance	Clean, replace or rebalance.
Low Airflow (cfm)	Fan speed too low	Check for correct rpms with catalog data.
	Fan wheels are operating backwards	Refer to Fan Wheel Rotation on page 10.
	Dirty filters or energy wheel	Replace filters and/or follow the cleaning procedure on pages 13 and 14.
	High static pressure	Incorrect fan-to-duct connections. Make sure dampers open appropriately. Increase fan speed
High Airflow (cfm)	Fan speed too high	Check for correct fan rpm.
	Low static pressure	Make sure grilles, filters and access doors are installed. Decrease fan speed.
Energy Wheel Does NOT Turn	Air seals too tight	Refer to Energy Recovery Wheel, Air Seals on page 10.
	No power to wheel motor	Make sure wheel drive is plugged in/connected. Verify power is available.
	Wheel drive belt	Check for loose or broken belts. Replace belts (consult factory).
Energy Wheel Runs Intermittently	Wheel motor overloads are tripping due to rubbing between wheel and air seals.	Recheck air seals, make sure they are not too tight. See Energy Recovery Wheel, Air Seals on page 10.

Always provide the unit model and serial number when requesting parts or service information. Always check motor amps and compare to nameplate rating.

Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the purchase date. The energy recovery wheel is warranted to be free from defects in material and workmanship for a period of five years from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid.

Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

*As a result of our commitment to continuous improvement,
Greenheck reserves the right to change specifications without notice.*

