

MiniVentilator

INSTALLATION INSTRUCTIONS

MV75-1ERV
JUNE 4, 2012
SUPERCEDES 10-04-11

ENERGY RECOVERY WHEEL

INSTALLATION INSTRUCTIONS FOR MINI VENTILATOR (MV) USED AS A STAND ALONE OR WITH SPLIT SYSTEMS UNITS



Energy recovery COMPONENT certified to the AHRI Air-to-Air Energy Recovery Ventilation Equipment Certification Program in accordance with AHRI Standard 1060-2000. Actual performance in packaged equipment may vary.



ETL Certified per UL 1995 and CSA 22.2

I - Shipping And Packing List

Package 1 of 1 contains:

- 1 - Mini Ventilator Assembly (See Figure 1)

II - Shipping Damage

Check unit for shipping damage. Receiving party should contact last carrier immediately if shipping damage is found.

III - General

These instructions are intended as a general guide and do not supersede local codes in any way. Authorities having jurisdiction should be consulted before installation.

IV - Requirements

When installed, the unit must be electrically wired and grounded in accordance with local codes or, in the absence of local codes, with the current National Electric Code, ANSI/NFPA No. 70.

V - Application

Mini Ventilators (MV) are used as stand alone. These ventilators conserve energy by mixing warmer air with cooler air in the following manner:

Recovery Wheel Mode

The Recovery Wheel mode is accomplished by two blowers providing continuous exhaust of stale indoor air and replacement by equal amount of outdoor air. Energy recovery is achieved by slowly rotating the energy recovery wheel within the cassette frame work. In winter, the MV adsorbs heat and moisture from the exhaust air stream during one half of a complete rotation and gives them back to the cold, drier intake air supply during the other half rotation. In summer, the process is automatically reversed. Heat and moisture are absorbed from incoming intake air supply and transferred to the exhaust air stream. This process allows outdoor air ventilation rates to be increased by factors of three or more without additional energy penalty or increase in size of heating or air conditioning systems.

VI - Rigging Unit For Lifting

1. Maximum weight of unit is

| Model# | C25 / MV250 | C45 / MV450 | C75 / MV750 |
|-------------|-------------|-------------|-------------|
| Net Weight | 190 | 190 | 220 |
| Ship Weight | 210 | 210 | 256 |

2. Remove carton.
3. All panels must be in place for rigging.

CAUTION

Danger of sharp metallic edges. Can cause injury. Take care when servicing unit to avoid accidental contact with sharp edges.

WARNING



Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

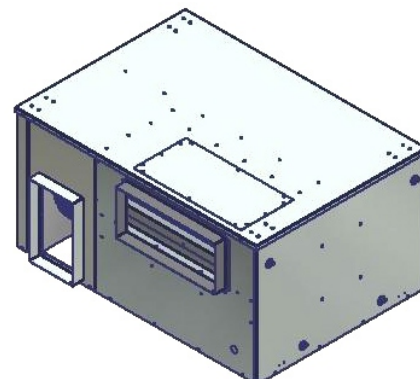


Figure 1

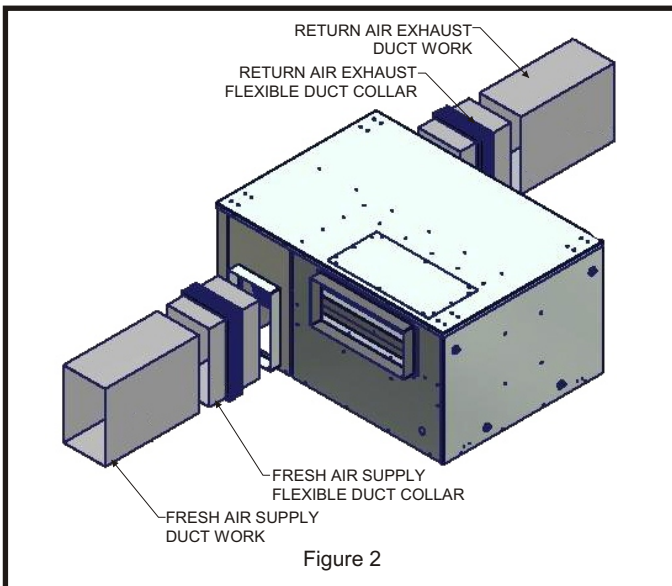
VII - Installation

The unit can be installed using two different intakes general configurations. The unit is shipped in horizontal intake configuration. Please refer to the following diagrams for installation instructions:

Note: All duct work and flex connectors are field supplied.

A - Horizontal Configuration Duct Work Installation

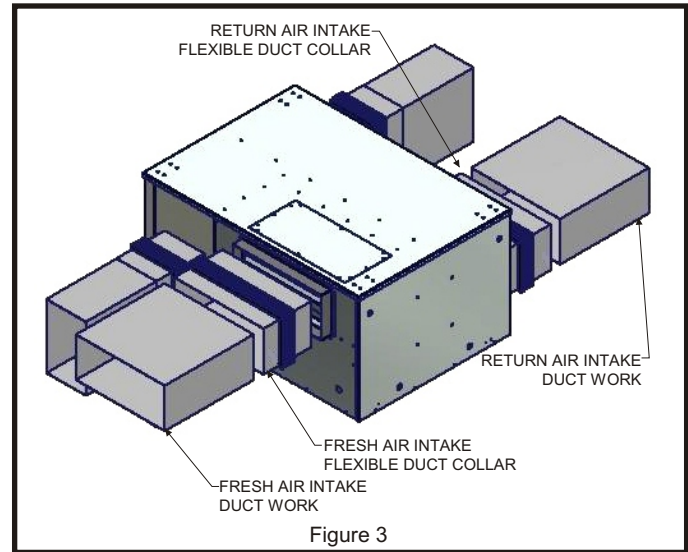
1. Attach Flexible Duct Collar to the MV fresh air intake and secure with screws. **See Figure 2.**
2. Attach fresh air supply duct work to fresh air supply Flexible Duct Collar and secure with screws. **See Figure 2.**
3. Attach Flexible Duct Collar return air exhaust and secure with screws. **See Figure 2.**
4. Attach return air exhaust duct work to return air exhaust Flexible Duct Collar and secure with screws. **See Figure 2.**



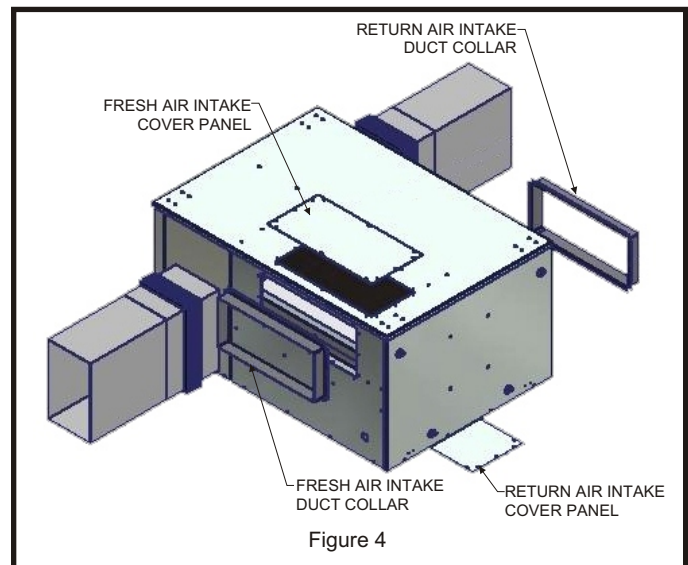
5. Attach Flexible Duct Collar to MV fresh air intake and secure with screws. **See Figure 3.**
6. Attach fresh air intake duct work to fresh air intake Flexible Duct Collar and secure with screws. **See Figure 3.**
7. Attach Flexible Duct Collar to return air intake and secure with screws. **See Figure 3.**
8. Attach return air intake duct work to return air intake Flexible Duct Collar and secure with screws. **See Figure 3.**

B - Top/Bottom Configuration Duct Work Installation

1. Attach Flexible Duct Collar to the MV fresh air intake and secure with screws. **See Figure 2.**
2. Attach fresh air supply duct work to fresh air exhaust Flexible Duct Collar and secure with screws. **See Figure 2.**
3. Attach Flexible Duct Collar return air exhaust and secure with screws. **See Figure 2.**



4. Attach return air exhaust duct work to return air exhaust Flexible Duct Collar and secure with screws. **See Figure 2.**
5. Remove fresh air intake duct collar from lateral intake. **See Figure 4.**
6. Remove return air intake duct collar from lateral intake. **See Figure 4.**
7. Remove cover panel from top fresh air intake. **See Figure 4.**
8. Remove cover panel from bottom return air intake. **See Figure 4.**



9. Attach fresh air duct collar to top fresh air intake and secure with provided screws. **See Figure 5.**
10. Attach return air duct collar to bottom return air intake and secure with provided screws. **See Figure 5.**
11. Attach fresh air cover panel to lateral fresh air intake and secure with provided screws. **See Figure 5.**
12. Attach return air cover panel to lateral return air intake and secure with provided screws. **See Figure 5.**

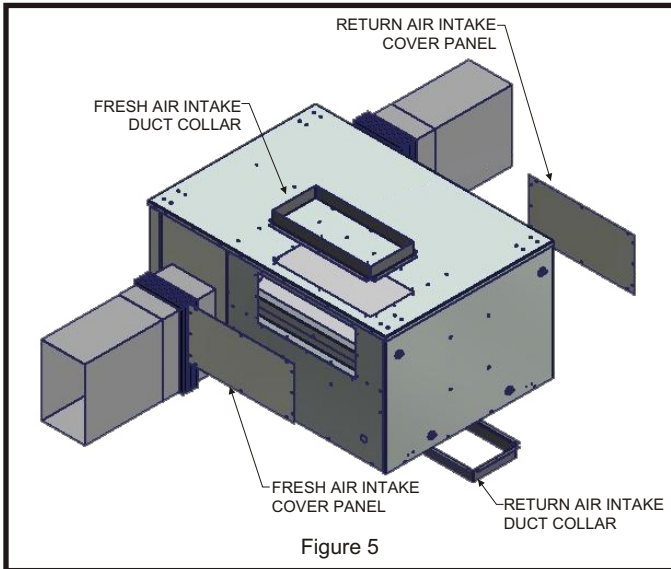


Figure 5

13. Attach Flexible Duct Collar to the MV fresh air intake and secure with screws. **See Figure 6.**
14. Attach fresh air intake duct work to fresh air intake Flexible Duct Collar and secure with screws. **See Figure 6.**
15. Attach Flexible Duct Collar to return air intake and secure with screws. **See Figure 6.**
16. Attach return air intake duct work to return air intake Flexible Duct Collar and secure with screws. **See Figure 6.**

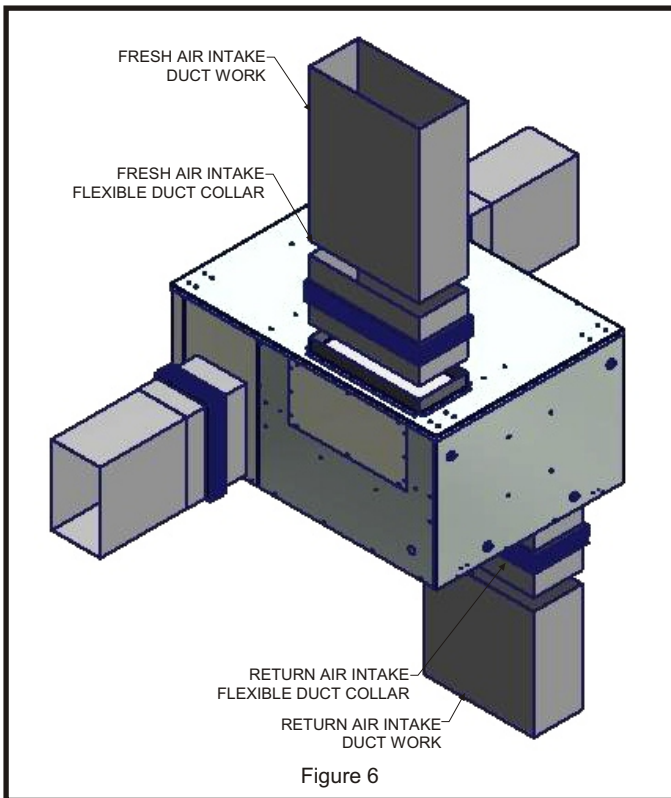


Figure 6

VIII - Operation

How It Works

The unit contains an Mini Ventilator that is a new concept in a rotary air-to-air heat exchanger. Designed as a packaged unit for ease of installation and maintenance, only connection of electrical power is required to make the system operational. The concept consists of a unique rotary energy recovery wheel that rotates in and out of fresh air streams within a heavy duty, permanently installed blower cabinet that provides ready access to all internal components. The Energy Recovery Wheel contains spirally wound polymeric material that is coated and permanently bonded with a silica gel desiccant for transfer of sensible and latent heat. The wheel is belt driven by one motor and stretch urethane perimeter drive belt.

When slowly rotating through counter flowing exhaust and intake air streams the MV adsorbs sensible heat and latent heat from the warmer air stream and transfers this total energy to the cooler air stream during the second half of its rotating cycle. Rotating the wheel provides constant flow of energy from warmer to cooler air stream. The large energy transfer surface and laminar flow through the wheel causes this constant flow of recovered energy to represent up to 85% of the difference in total energy contained within the two air streams.

Sensible and latent heat are the two components of total heat. Sensible heat is energy contained in dry air and latent heat is the energy contained within the moisture of the air. The latent heat load from the outdoor fresh air on an air conditioning system can often be two to three times that of the sensible heat load and in the winter it is a significant part of a humidification heat load.

During both the summer and winter, the MV transfers moisture entirely in the vapor phase. This eliminates wet surfaces that retain dust and promote fungal growth as well as the need for a condensate pan and drain to carry water.

Because it is constantly rotating when in the air stream, the MV is always being cleared by air, first in one direction then the other. Because it is always dry, dust or other particles impinging on the surface during one half cycle, are readily removed during the next half cycle.

In the heating season, when outdoor air temperatures are below 10 degrees Fahrenheit, it is recommended to use the (optional) low ambient kit (factory installed 02 models only). At these conditions you will need to determine the frost threshold parameters.

The frost threshold is the outdoor temperature at which frost will begin to form on the MV wheel. For energy recovery ventilators, the frost threshold is typically below 10°F. Frost threshold is dependent on indoor temperature and humidity. The table shows how the frost threshold temperatures vary depending on indoor conditions.

| FROST THRESHOLD TEMPERATURE | |
|-----------------------------|-----------------------------|
| INDOOR RH AT 70°F | FROST THRESHOLD TEMPERATURE |
| 20% | 0°F |
| 30% | 5°F |
| 40% | 10°F |

Because Mini Ventilators have a low frost threshold, frost control options are not necessary in many climates. Where outdoor temperatures may drop below the frost threshold during the MV operational hours, exhaust only frost control option is available.

Recovery Wheel Mode

On a call for operation the MV media will rotate between intake air and exhaust air streams. Both the intake air blower and exhaust air blowers will also be operating to overcome the air resistance of the MV media.

IX - System Check

1. Disconnect MV main power.
2. Remove control access panel and apply jumper to low voltage terminal strip at "1" and "3".
3. Restore power to unit. Observe MV drive motor for wheel and both blowers are running.
4. Verify that the MV blower motors are set to "high" speed for correct speed and operation.

A - Blower Speed Adjustment

Blower speed selection is accomplished by changing the speed selection switch on terminal strip in control box. Both fresh air and exhaust air blowers are direct drive multi-tap motors. Both blowers are factory set at "high" speed for maximum airflow. To determine air flow setting, external static pressure readings will need to be read across the MV.

B - Air Balancing Adjustment

1. Remove plastic plugs in door panels(4 total).
2. With a manometer measure pressure drop [inches of water column] across left half of MV(top and bottom

holes in door panel). Unit CFM is determined then by referring to **Table #1**.

3. Repeat the same process for the right half of MV.
4. Place plastic plugs back in to door panels.

X - Maintenance

1. All motors use prelubricated sealed bearings; no further lubrication is necessary.
2. Make visual inspection of filters, motor assemblies and MV rotating bearings during routine maintenance.
3. Filters should be checked periodically and cleaned when necessary. Filter is located in front of MV unit and before blower cabinet.
4. MV segment is positioned on a shaft extended from middle support bar. Annual inspection of the self cleaning wheel is recommended. With power disconnected, remove MV access panels and unplug [J150 & P150] (**Refer to wiring diagram in this instruction manual**). Then remove wheel cassette from cabinet by sliding assembly out of support tracks in center of unit. Discoloration and staining of wheel segment does not affect its performance. Only excessive buildup of foreign material need be removed. If the segment appears excessively dirty, it should be cleaned to ensure maximum operating efficiency. Thoroughly spray plastic surface with household cleaner such as Fantastic® or equivalent or middle detergent and gently rinse with warm water using a soft brush to remove heavier accumulation. Shake excess water from segment and replace in reverse of removal instructions.

| C25 / MV250 Cabinet | | | | | | | | | | | | |
|--------------------------|--------|------|------|------|------|------|------|------|------|------|-----|-----|
| External Static Pressure | | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| CFM | Low | 498 | 479 | 459 | 435 | 411 | 384 | 347 | 307 | 263 | 218 | 175 |
| | High | 592 | 565 | 530 | 496 | 463 | 431 | 398 | 356 | 311 | 262 | 218 |
| C45 / MV450 Cabinet | | | | | | | | | | | | |
| External Static Pressure | | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 |
| CFM | Low | 656 | 640 | 625 | 609 | 590 | 570 | 552 | 538 | 511 | 477 | 440 |
| | Medium | 729 | 708 | 690 | 671 | 649 | 627 | 605 | 582 | 560 | 530 | 495 |
| | High | 783 | 765 | 740 | 721 | 700 | 678 | 650 | 622 | 598 | 580 | 560 |
| C75 / MV750 Cabinet | | | | | | | | | | | | |
| External Static Pressure | | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 |
| CFM | Low | 823 | 822 | 821 | 819 | 808 | 790 | 778 | 762 | 755 | 738 | 718 |
| | Medium | 997 | 992 | 985 | 975 | 960 | 940 | 928 | 905 | 884 | 872 | 850 |
| | High | 1162 | 1145 | 1130 | 1104 | 1095 | 1090 | 1068 | 1047 | 1020 | 998 | 967 |

Table #1

A - Wheel Removal (See Figure 7)

1. Remove Filter Access panel to expose wheel.
2. Disconnect wheel electrical harness.
3. Carefully slide the wheel outwards.

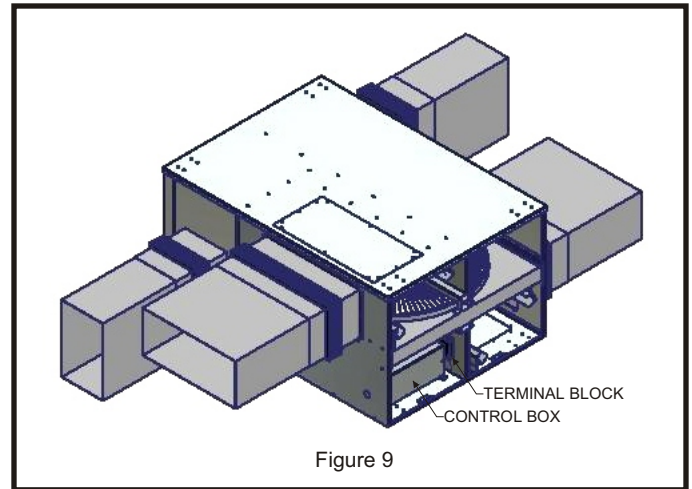
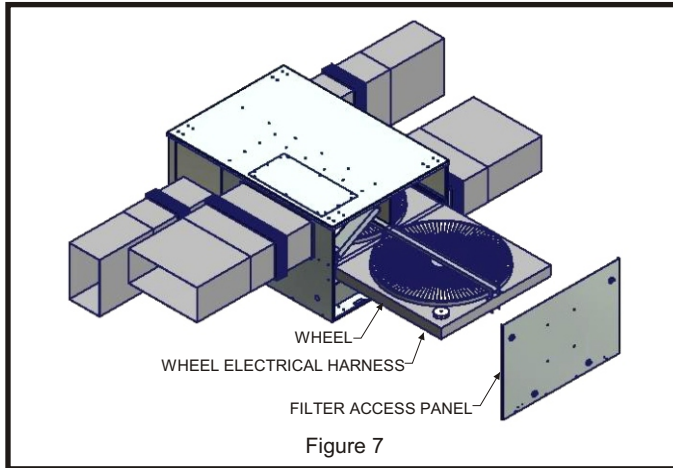


Figure 9

B - Filter Removal (See Figure 8)

1. Remove the Filter Access panel to expose filters.
2. Remove the filter pushers.
3. Slide filters outwards.

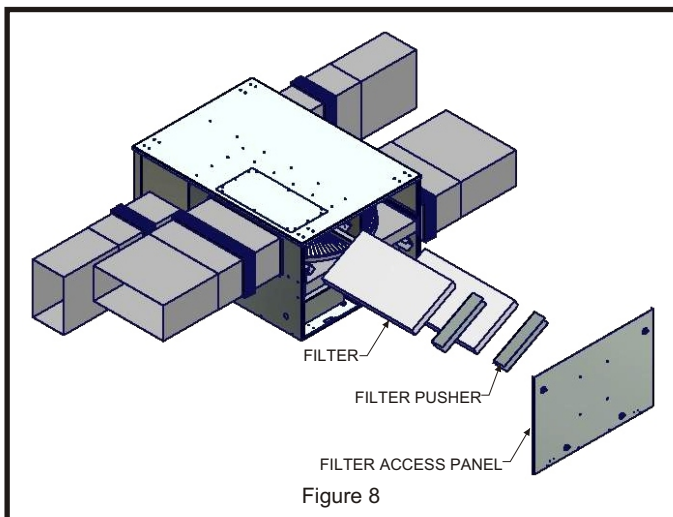


Figure 8

C - Control Box Location (See Figure 9)

The control box is located on the bottom left hand corners of the MV when the Filter Access Panel is removed.

XI - Warranty

RRS Manufactured Parts

In the event that defects in workmanship or materials originate in any part manufactured by RRS, FOB point of manufactured, we guarantee to repair or replace that part, within three (3) months of the shipment date.

Other Supplied Parts

Additionally, RRS guarantees to replace standard components purchased new from a RRS vendor, (motors, controls, etc.) that may be found defective, within twelve (12) months of the installation date. The components warranty, however, excludes service call charges and labor cost for replacing or adjusting the defective part.

Limitation Of Warranties

Misapplication, destruction, negligence or alteration constitute the warranty and/or the components warranty of RRS products and/or parts, null and void. This warranty is provided in lieu of all other written, stated or implied warranties.

C25/MV250 UNIT SCHEMATIC DIAGRAM

COMPONENT CODE

B26 Motor, Exhaust Air
 B27 Motor, Fresh Air
 B28 Motor, Desiccant Wheel
 C23 Capacitor, Wheel Motor
 C25 Capacitor, Motor Exhaust Air
 C26 Capacitor, Motor Fresh Air
 CB20 Circuit Breaker, Transformer
 F29 Fuse
 J48 Jack, Control Box (Fresh Air)

J50 Jack, Control Box (Wheel)
 J51 Jack, Control Box (Exhaust Air)
 J148 Jack, Fresh Air Motor Harness
 J150 Jack, Wheel Motor Harness
 J151 Jack, Exhaust Air Motor Harness
 K163 Relay, Motors
 P48 Plug, Control Box (Fresh Air)
 P50 Plug, Control Box (Wheel)
 P51 Plug, Control Box (Exhaust Air)

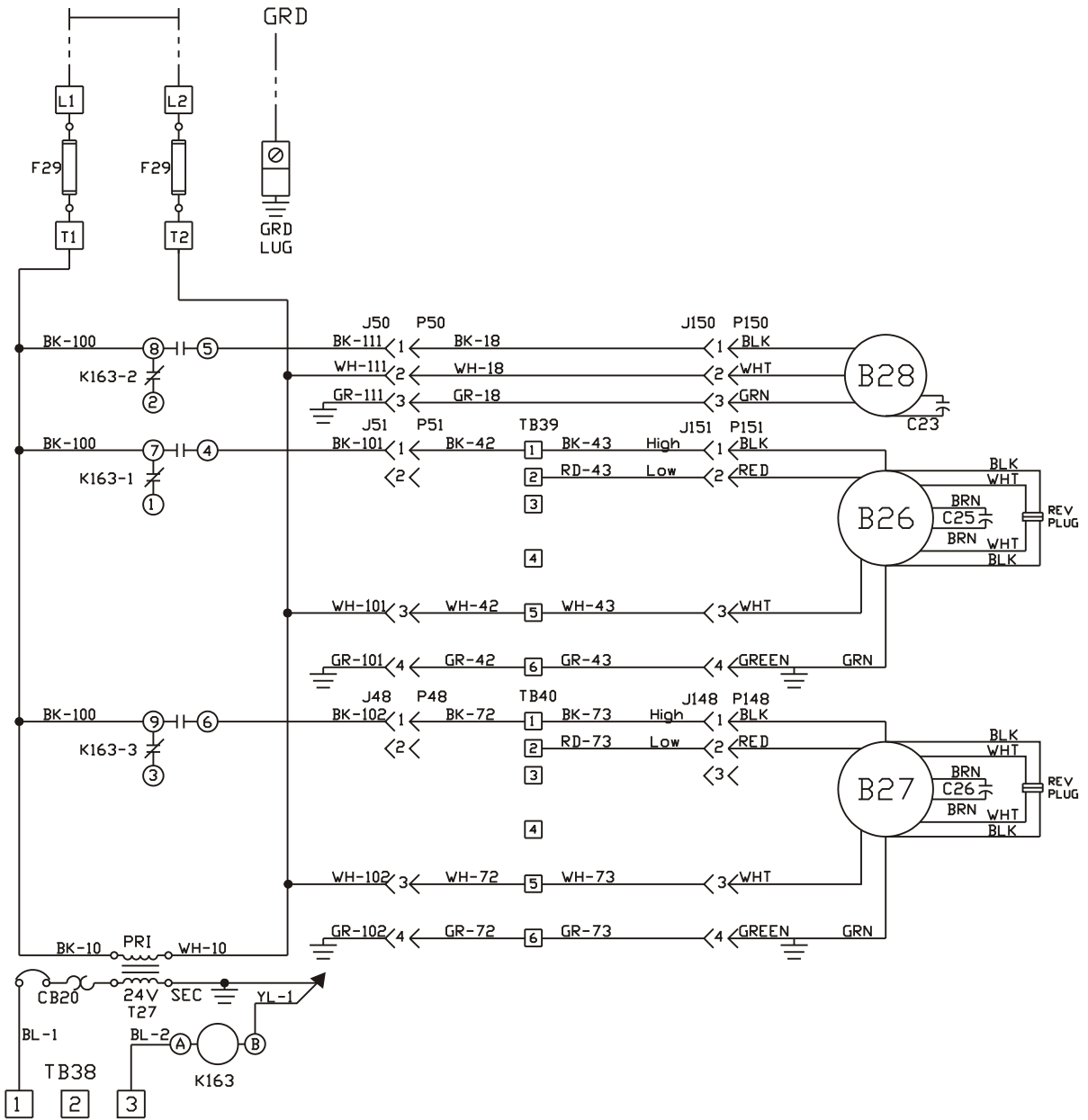
P148 Plug, Fresh Air Motor
 P150 Plug, Wheel Motor
 P151 Plug, Exhaust Air Motor
 S26 Switch, Low Ambient (Optional)
 T27 Transformer, Step-down
 TB38 Terminal Block (Low Voltage)
 TB39 Terminal Block (High Voltage, Exhaust)
 TB40 Terminal Block (High Voltage, Fresh)

WIRE COLOR

BK Black
 BL Blue
 GR Green
 OR Orange
 RD Red
 WH White
 YL Yellow

POWER SUPPLY 115-1-60

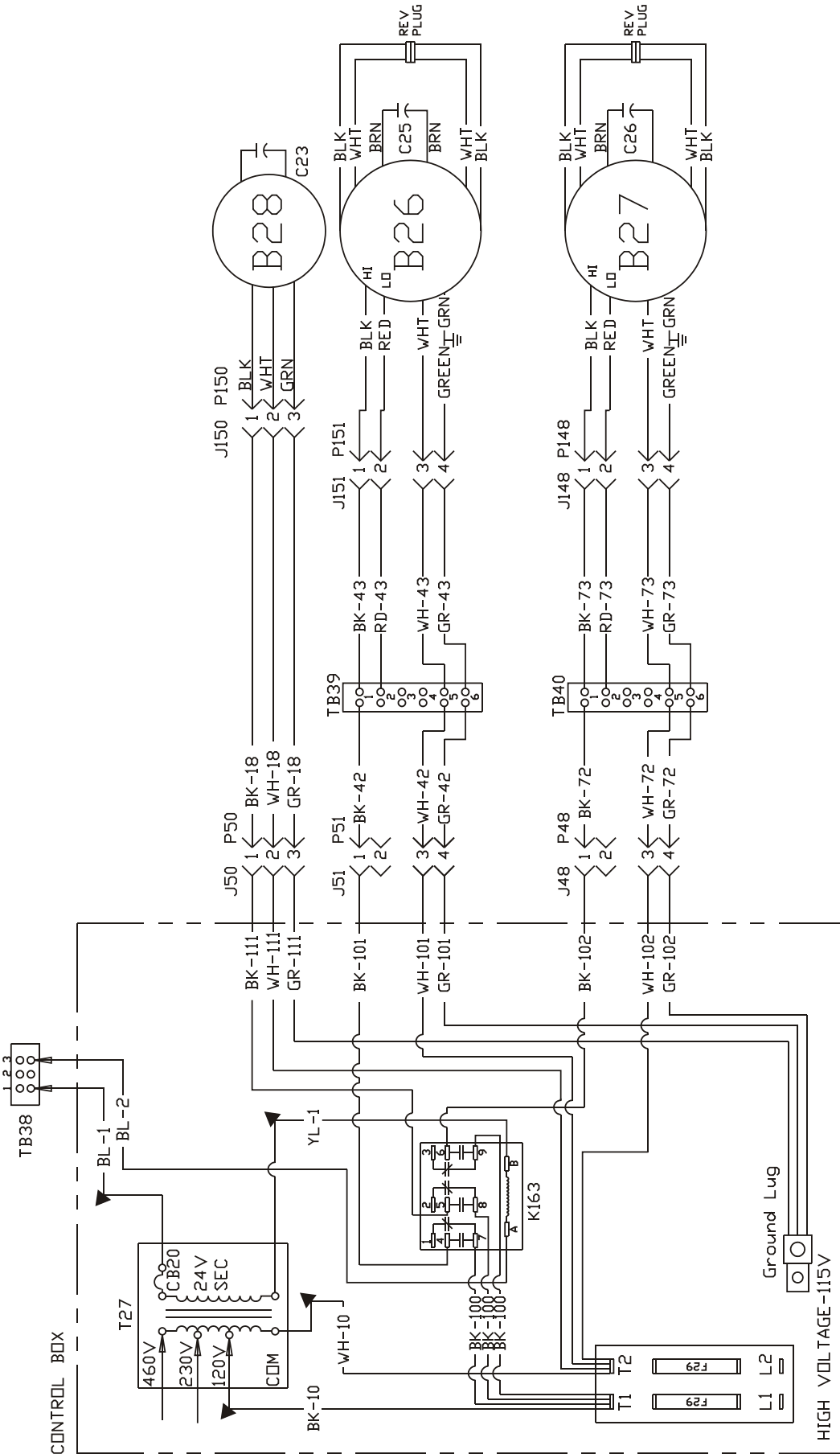
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(Field Installed)
 NORMALLY OPEN
 CONTACT SWITCH

C25/MV250 UNIT WIRING DIAGRAM

FIELD SWITCH CONNECTION



Mini Ventilator
115V (1 PH)
Unit#: 01-C2501xH-01

C45/MV450 / C75/MV750 UNIT SCHEMATIC DIAGRAM

COMPONENT CODE

B26 Motor, Exhaust Air
 B27 Motor, Fresh Air
 B28 Motor, Desiccant Wheel
 C23 Capacitor, Wheel Motor
 C25 Capacitor, Motor Exhaust Air
 C26 Capacitor, Motor Fresh Air
 CB20 Circuit Breaker, Transformer
 F29 Fuse
 J48 Jack, Control Box (Fresh Air)

J50 Jack, Control Box (Wheel)
 J51 Jack, Control Box (Exhaust Air)
 J148 Jack, Fresh Air Motor Harness
 J150 Jack, Wheel Motor Harness
 J151 Jack, Exhaust Air Motor Harness
 K163 Relay, Motors
 P48 Plug, Control Box (Fresh Air)
 P50 Plug, Control Box (Wheel)
 P51 Plug, Control Box (Exhaust Air)

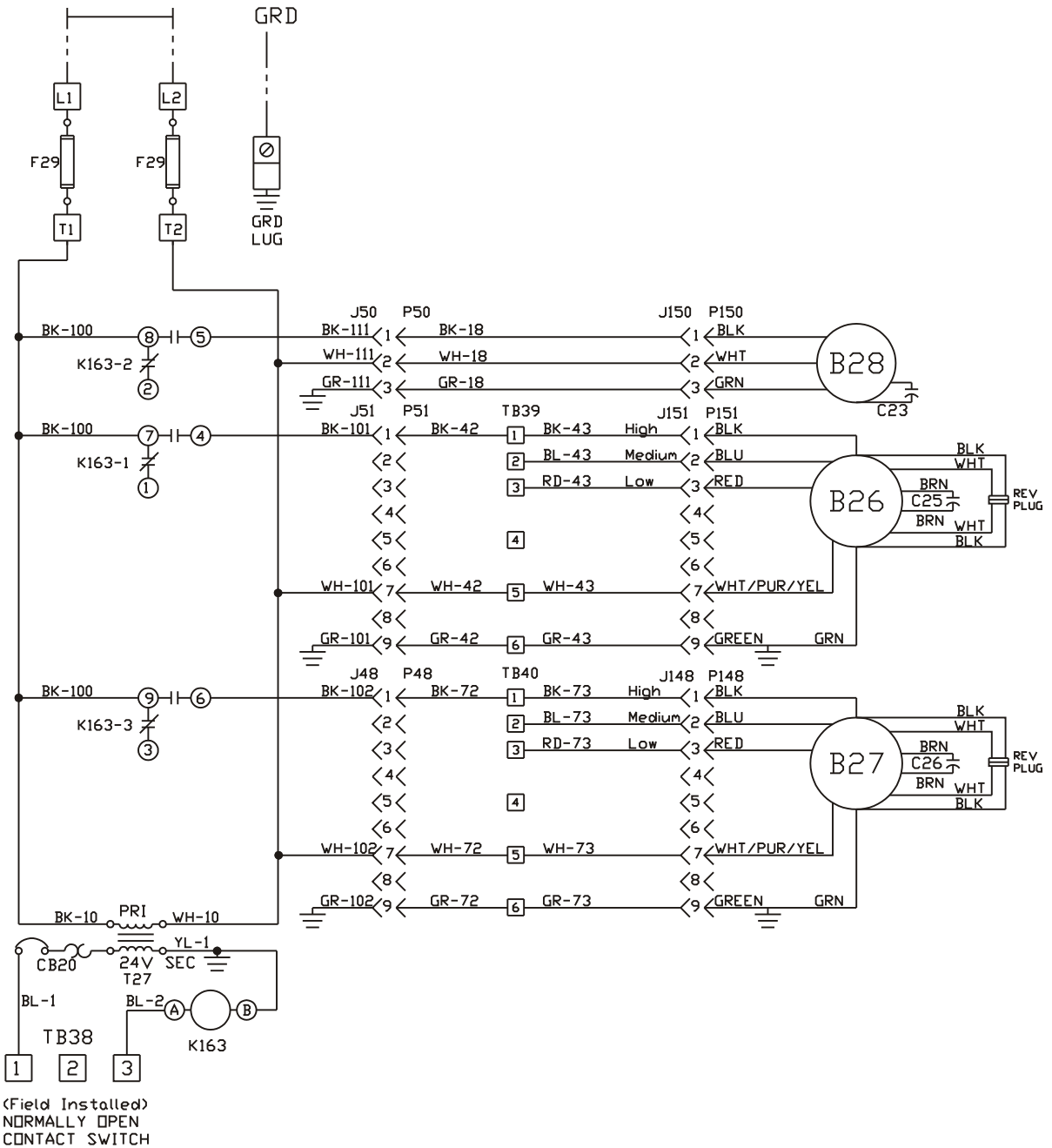
P148 Plug, Fresh Air Motor
 P150 Plug, Wheel Motor
 P151 Plug, Exhaust Air Motor
 S26 Switch, Low Ambient (Optional)
 T27 Transformer, Step-down
 TB38 Terminal Block (Low Voltage)
 TB39 Terminal Block (High Voltage, Exhaust)
 TB40 Terminal Block (High Voltage, Fresh)

WIRE COLOR

BK Black
 BL Blue
 GR Green
 OR Orange
 RD Red
 WH White
 YL Yellow

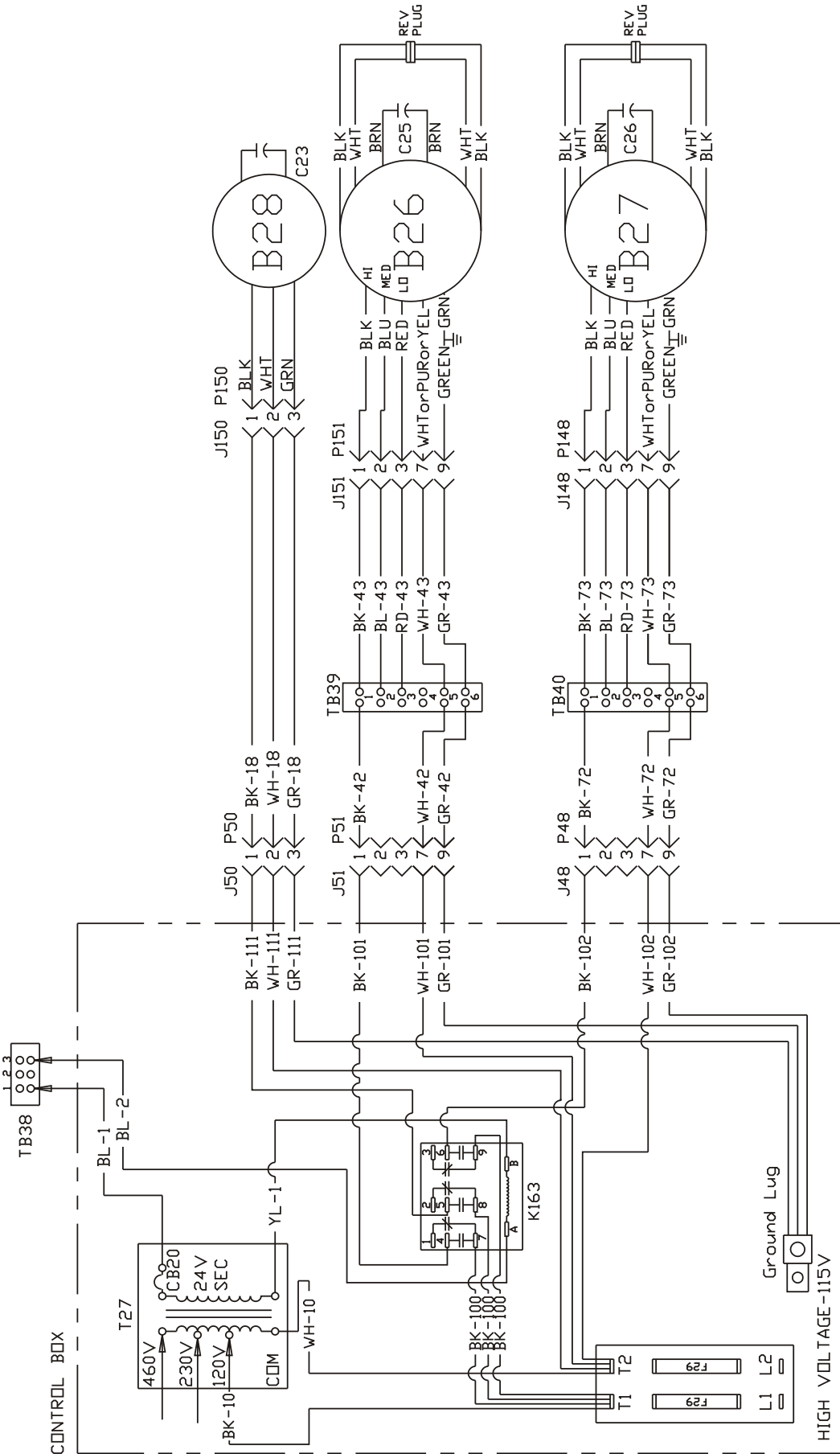
POWER SUPPLY 115-1-60

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C45/IMV450 / C75/IMV750 UNIT WIRING DIAGRAM

FIELD SWITCH CONNECTION



Mini Ventilator
115V (1 PH)

Unit#: 01-C45/C7501xH-01

START UP INFORMATION SHEET

VOLTAGE - MV UNIT

Incoming Voltage L1-L2_____

Running Voltage L1-L2_____

Secondary Voltage_____

AMPERAGE - MV MOTORS

Intake Motor: Nominal HP_____ Rated Amps_____ Running Amps_____

Exhaust Motor: Nominal HP_____ Rated Amps_____ Running Amps_____

Wheel Motor: Nominal HP_____ Rated Amps_____ Running Amps_____

AIRFLOW

Intake Design CFM_____ Pressure Drop_____ Calculated CFM_____

Exhaust Design CFM_____ Pressure Drop_____ Calculated CFM_____

Amb. db Temp_____ Return Air db Temp*_____ Tempered Air db Temp*_____

Amb. wb Temp_____ Return Air wb Temp*_____ Tempered Air wbTemp*_____

* Measure after 15 minutes of run time

INSTALLATION CHECK LIST

MV Model #_____

Serial # _____

Owner_____

Owner Phone # _____

Owner Address_____

Installing Contractor_____

Start Up Mechanic_____

- Inspect the unit for transit damage and report any damage on the carrier's freight bill.
- Check model number to insure it matches the job requirements.
- Install field accessories and unit adapter panels as required. Follow accessory and unit installation manuals.
- Verify field wiring, including the wiring to any accessories.
- Check all multi-tap transformers, to insure they are set to the proper incoming voltage.
- Verify blower wheels are centered. Realign if needed.
- Prior to energizing the unit, inspect all the electrical connections.
- Power the unit. Bump the motor relay to check rotation. If blower motor fans are running backwards, de-energize power to the unit, then swap reversing plug on motors to change direction. Re-check.
- Perform all start up procedures outlined in the installation manual shipped with the unit.
- Fill in the Start Up Information as outlined on the opposite side of this sheet.
- Provide owner with information packet. Explain the thermostat and unit operation.