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# INSTALLATION INSTRUCTIONS

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## COMMERCIAL ROOM VENTILATORS WITH EXHAUST

### MODEL CRVMP-5

**For Use with Bard 3 through 5 Ton  
WA\*S Series Wall Mount Air Conditioners**



**CLIMATE CONTROL SOLUTIONS**

Bard Manufacturing Company, Inc.  
Bryan, Ohio 43506  
*Since 1914...Moving ahead just as planned.*

|             |                   |
|-------------|-------------------|
| Manual :    | 2100-457A         |
| Supersedes: | 2100-457          |
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**Manufactured under U.S. Patent number 5,301,744**  
**Other patents pending**

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## GENERAL INFORMATION

The ventilator should only be installed by a trained heating and air conditioning technician. These instructions serve as a guide to the technician installing the ventilator package. They are not intended as a step by step procedure with which the mechanically inclined owner can install the package.

The ventilator housing is shipped in one carton which contains the electrical harness, step control assembly, miscellaneous hardware and installation instructions.

## UNPACKING

Upon receipt of the equipment be sure to compare the model number found on the shipping label with the accessory identification information on the ordering and shipping document to verify that the correct accessory has been shipped.

Inspect the carton housing of each ventilator as it is received, and before signing the freight bill, verify that all items have been received and that there is no visible damage. Note any shortages or damage on all copies of the freight bill. The receiving party must contact the last carrier immediately, preferably in writing, requesting inspection by the carrier's agent. Concealed damage not discovered until after loading must be reported to the carrier within 15 days of its receipt.

## DESCRIPTION

The CRVMP-5 ventilator is designed to be used with Bard 3 through 5 ton wall mount series step capacity air conditioners. It is an electromechanical vent system designed to provide fresh air to meet indoor air quality standards. It automatically adjusts to the mode of operation to maintain consistent fresh air intake levels. Examples are blower only, stage 1 cooling and stage 2 cooling, which are all set for different total airflows.

## MODELS

When installed in the above-listed models, the CRVMP-5 provides built in exhaust provisions. When the damper blade opens to bring fresh air in, the damper also opens an exhaust relief. The exhaust air will flow into the condenser section of the unit. The condenser fan will help draw exhaust air out.

# INSTALLATION

## BASIC INSTALLATION

1. Unpack the ventilator assembly which includes the integral ventilator with attached electrical harness, step control assembly and miscellaneous hardware.

### WARNING

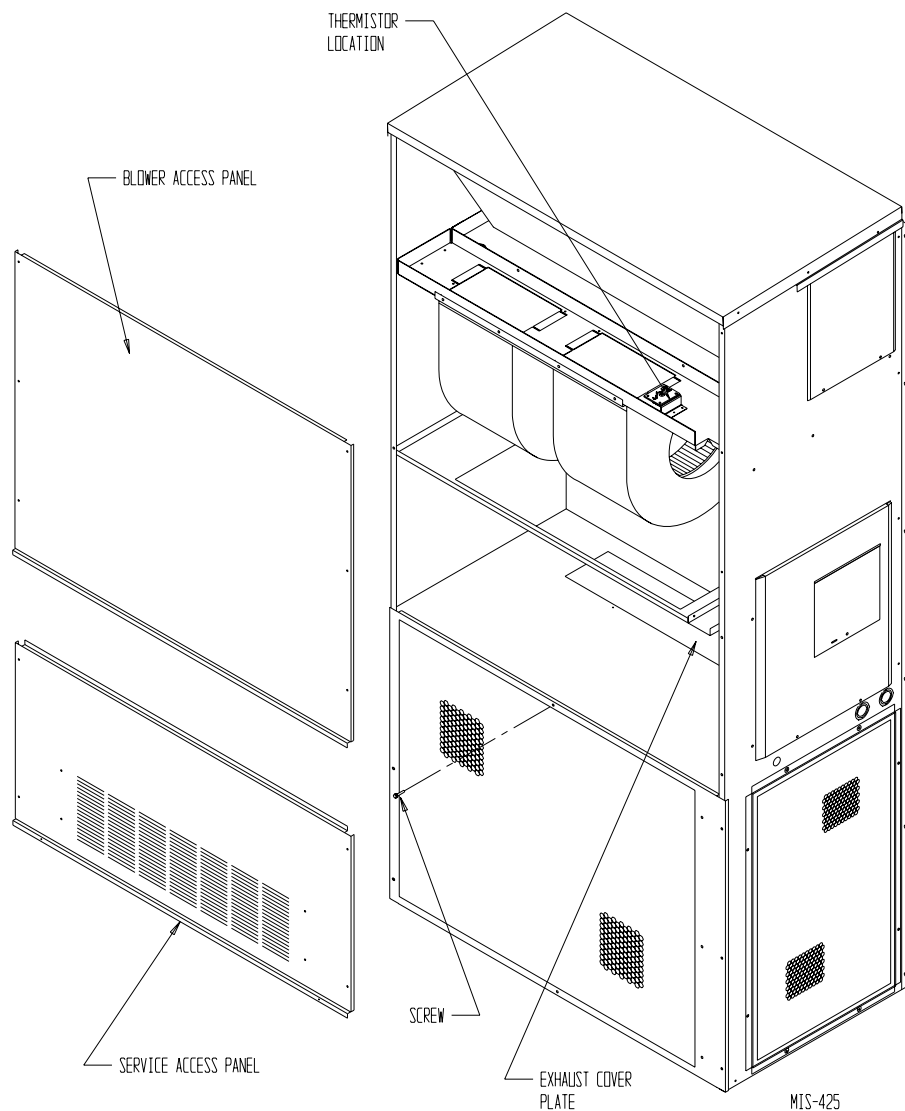
Open and lock unit disconnect switch before installing this accessory to prevent injury or death due to electrical shock or contact with moving parts. Turn thermostat to off.

TABLE 1

| MODEL   | FOR USE WITH FOLLOWING UNITS |
|---------|------------------------------|
| CRVMP-5 | WA3S<br>WA4S<br>WA5S         |

2. Remove and save the existing exterior blower access and service access panels on the Bard wall mount unit. (See Figure 1.)

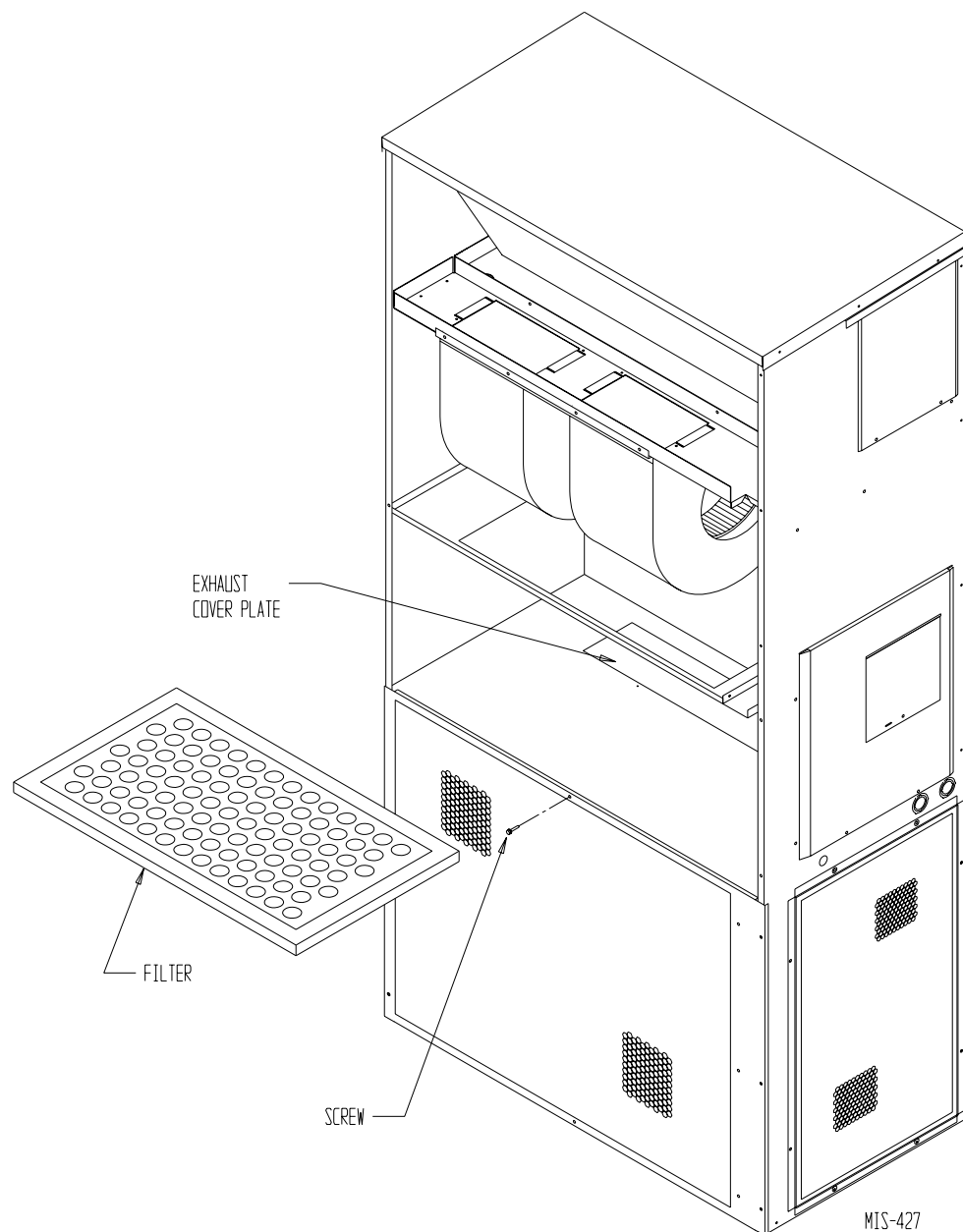
FIGURE 1  
REMOVAL OF EXTERIOR PANELS



3. Remove and save existing unit air filter and screws from front center grille. (See Figure 2.)

4. Remove and discard the exhaust cover plate.

**FIGURE 2**  
**REMOVE AIR FILTER AND EXHAUST COVER PLATE**



5. Install ventilator sheet metal assembly by inserting the ventilator into the unit to the far left side clearing the right filter bracket. Once the ventilator is fully inserted, slide the ventilator to the right until it is tight against the back of the control panel. (See Figure 3.)
6. Open control panel to gain access to unit low voltage terminal block.
7. Route electrical harness leads through the 7/8" bushing in control panel (Figure 3) into low voltage box.

**IMPORTANT:** Position front lip of ventilator on top of front grille and condenser partition. (See Figure 3 inset.) This is important to ensure proper drainage of any water entering damper assembly.

**FIGURE 3  
INSTALL VENTILATOR**

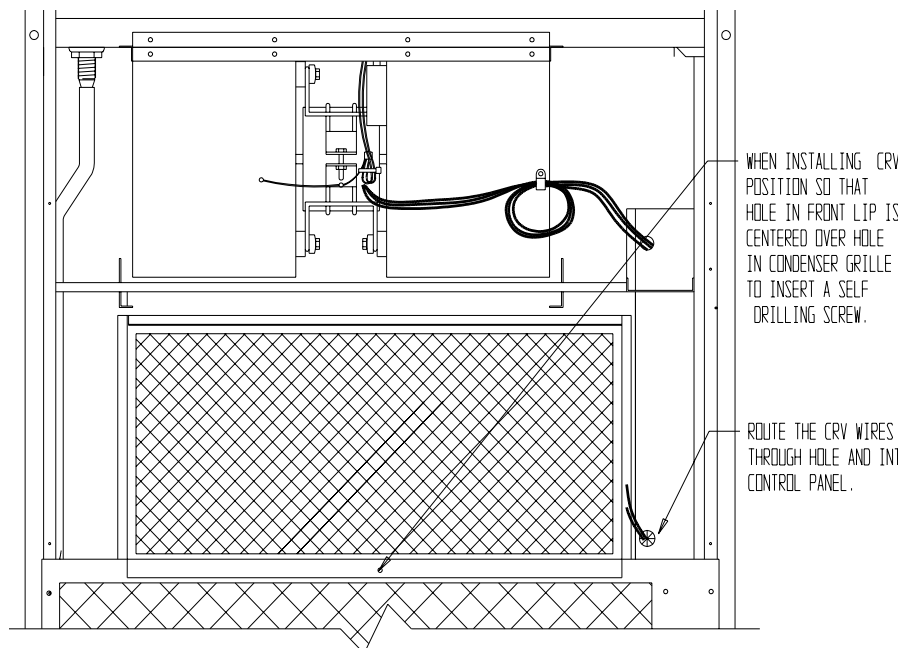
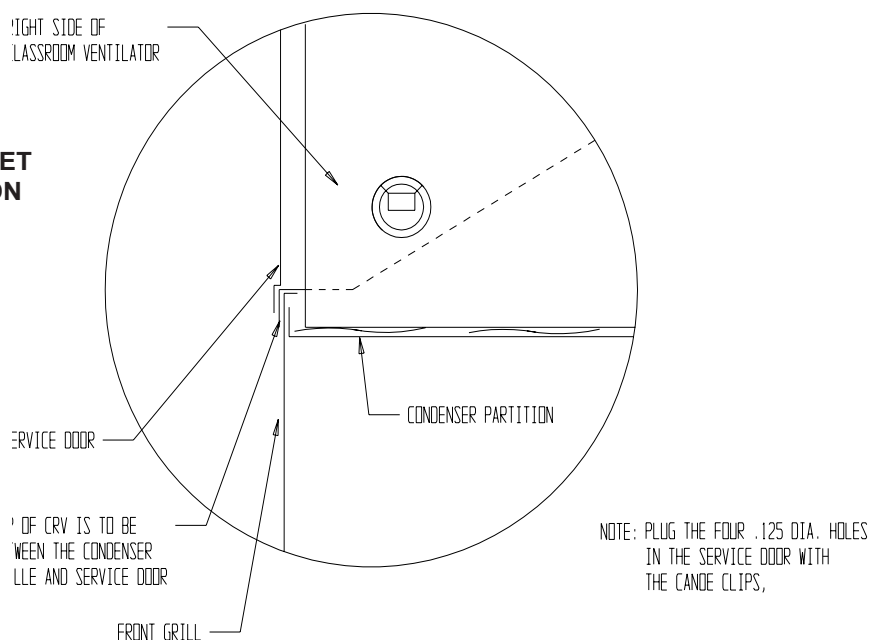
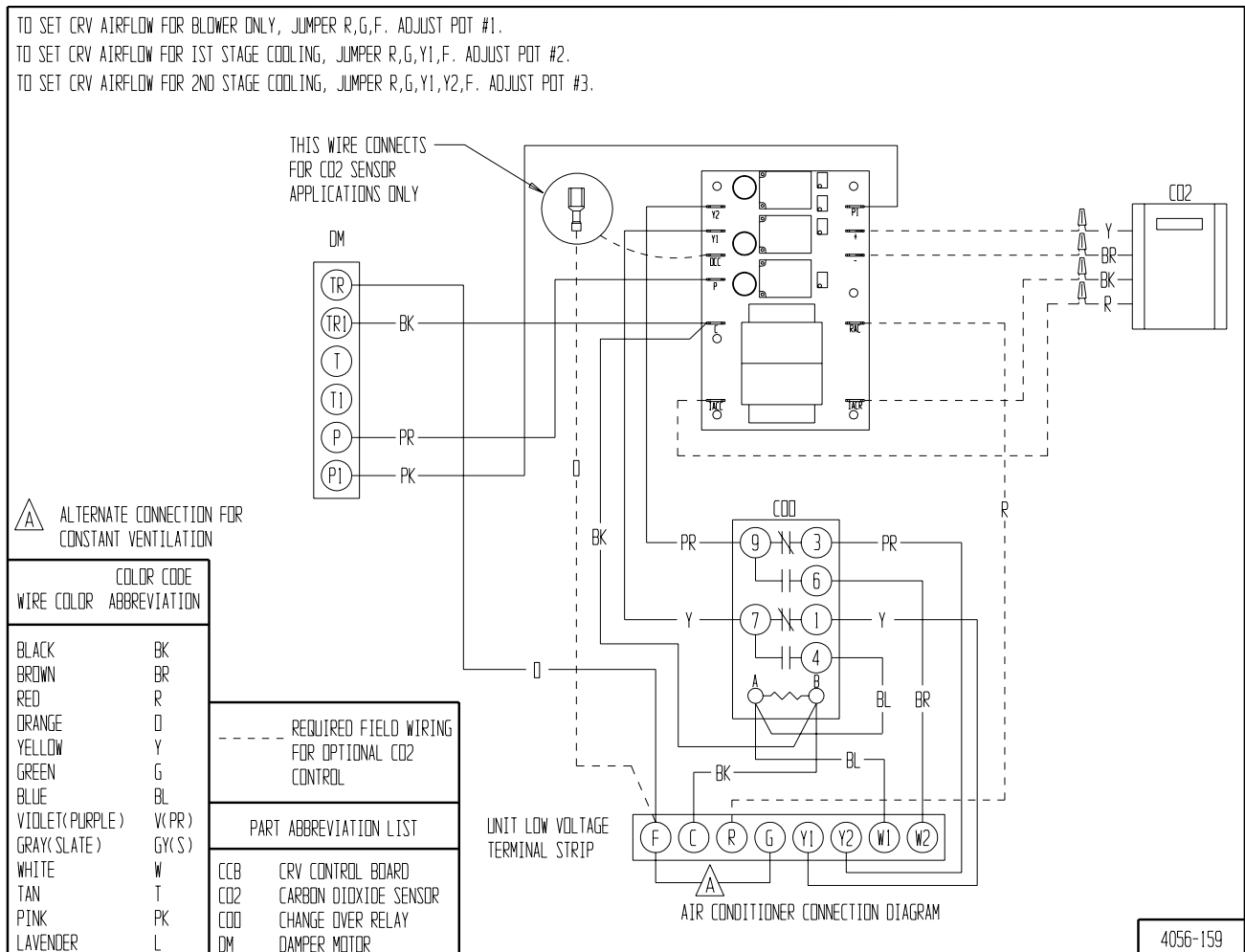


**FIGURE 3 INSET  
SIDE SECTION**



MTS-426

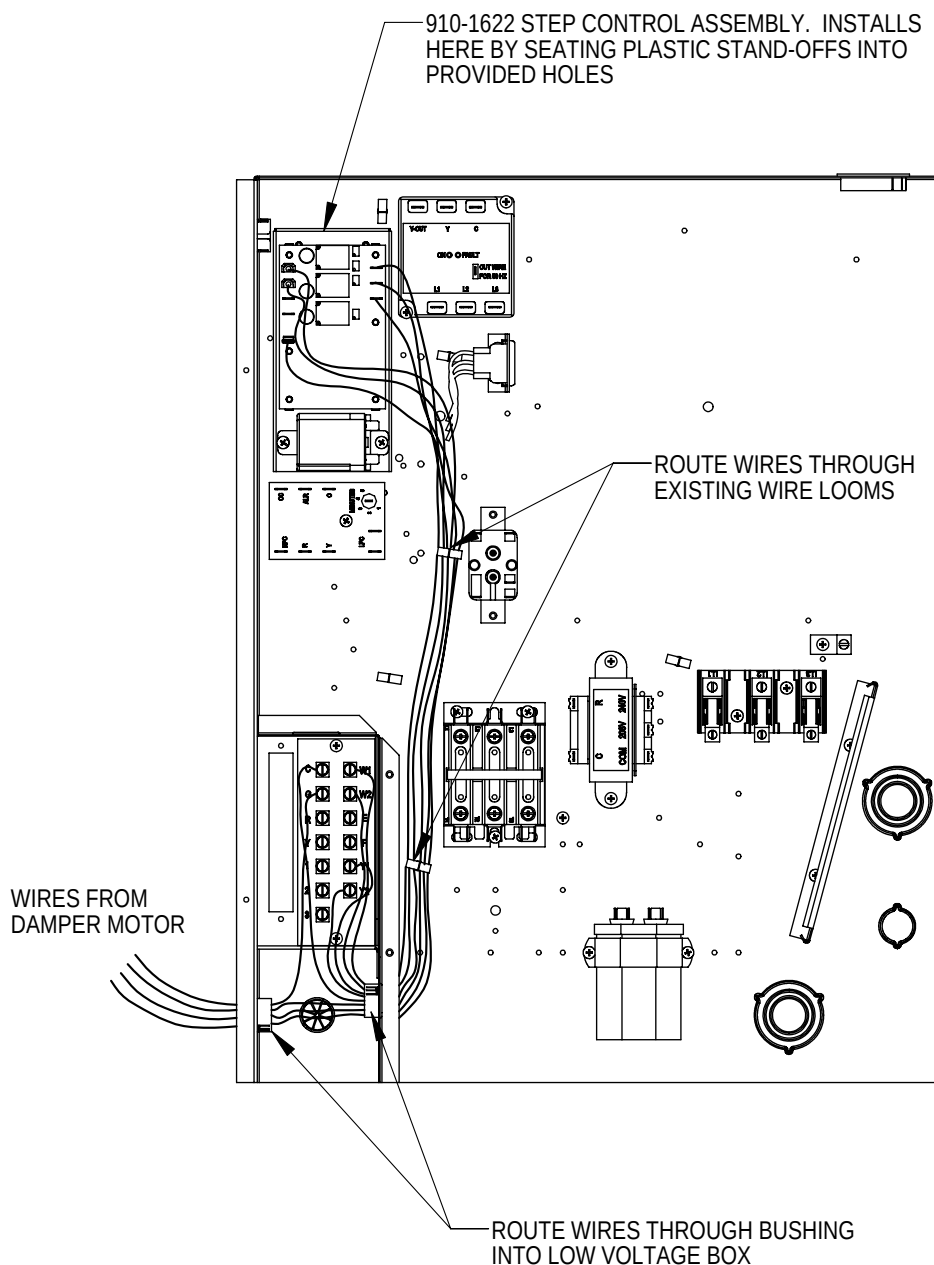
**FIGURE 4  
CRVMP-5 LEAD CONNECTIONS**



8. Connect "orange lead" with the fork terminal to either the "G" terminal of the low voltage strip (will ventilate anytime there is a call for the blower), or the "F" terminal (can be used as a junction point for on-demand ventilation with a capable thermostat or occupancy sensor).
9. The pink, purple and black wires will pass through bushing on opposite side of low voltage box where they entered, and will run up the wire loom to the step-control assembly for connection installed in Step #10, Figure 5 following the wiring diagram in Figure 4, or on ventilator.
10. Locate the step control assembly packaged with the assembly. This assembly will install in the upper left-hand corner of the control panel by aligning the plastic standoffs with pre-punched holes in the control panel. See Figure 5.
11. Route the wires from the step control assembly down the control panel through the wire looms, and route them into the low voltage box through the bushing. See Figure 5. Make connections following the wiring diagram in Figure 4, or on ventilator.
12. Replace left filter support, filter and four (4) screws in condenser grille.
13. Reinstall the blower access panel at top of unit and secure with sheet metal screws.
14. Ventilator checkout – *(Note: It may be more efficient to disconnect the thermostat from the low voltage terminal strip and use a set of jumper wires to perform these steps.)*
  - A. Resupply power to the unit.
  - B. Energize the evaporator blower by switching thermostat to the manual fan position with heat/cool in OFF position. **(Jumper "R" to "G")**
  - C. Ventilator should open to the position set by "R1" potentiometer on step control board. (See Figure 6.)
  - D. Now energize Stage #1 cooling/heating by switching the thermostat to the corresponding mode and setting the temperature offset slightly beyond the actual room temperature. **(Jumper "R" to "G" and "Y1")**
  - E. Ventilator should now open to the position set by "R2" potentiometer on step control board. (See Figure 6.)

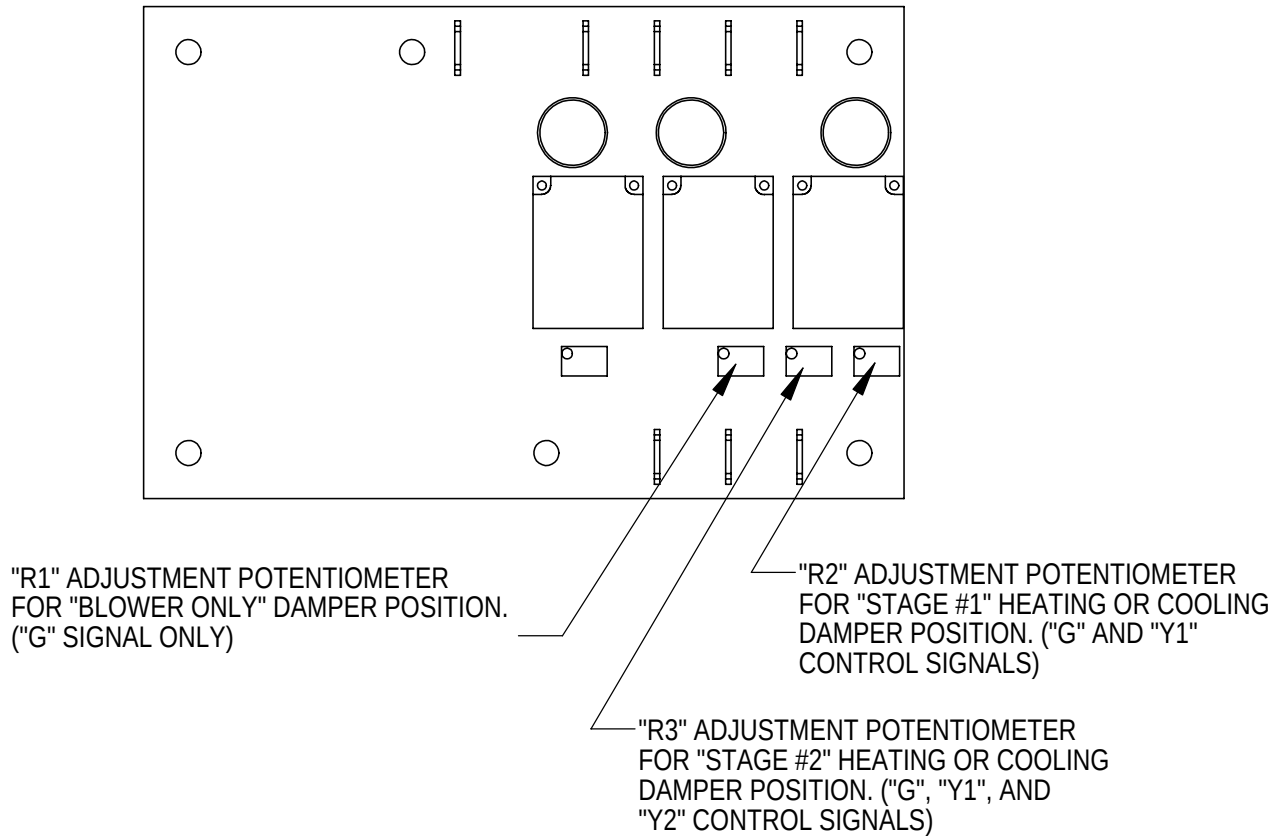
- F. Now energize the Stage #2 cooling/heating by increasing the thermostat setting to a greater offset than the actual room temperature.  
**(Jumper “R” to “G”, “Y1” and “Y2”)**
- G. Ventilator should now open to the position set by “R3” potentiometer on step control board.  
(See Figure 6.)
- H. Now turn the heat/cool selector to OFF, and set the fan switch back to AUTO. The damper blade should close. **(Remove all jumper connections.)**
- I. This completes the ventilator checkout.
15. Adjust damper blade for required ventilation.  
(See next section.)
16. Replace mist eliminator filter. Be sure that it is installed with the drain holes to the bottom.
17. Remove blank off plate or barometric fresh air damper installed on service access door. Plug four (4) mounting holes with the plastic plugs provided with the ventilator.
18. Replace service access panel.
19. Close control panel cover.
20. Ventilator is now ready for operation.

**FIGURE 5  
STEP CONTROL INSTALLATION**



MIS-2116

**FIGURE 6**  
**SETTING 3-POSITION CRV DAMPER CONTROL BOARD**  
*(Utilize the charts for your specific model on the following pages)*



MIS-2117

## BLADE ADJUSTMENT FOR DESIRED VENTILATOR AIR

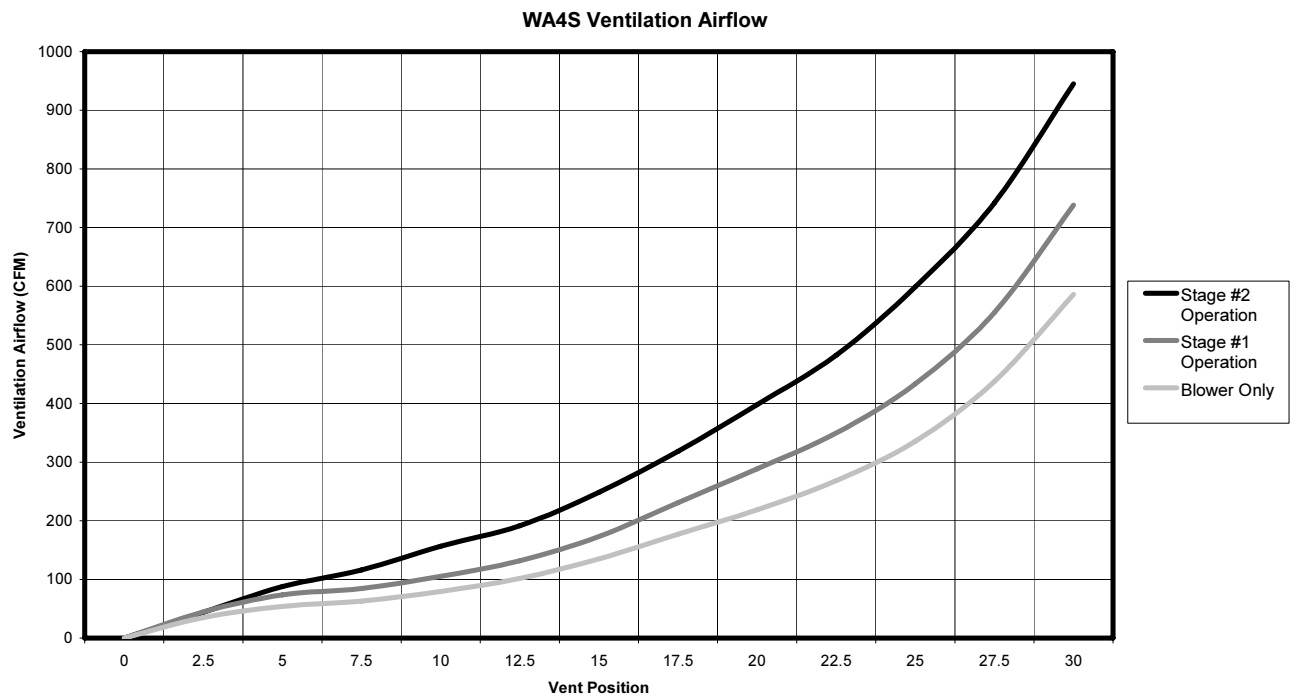
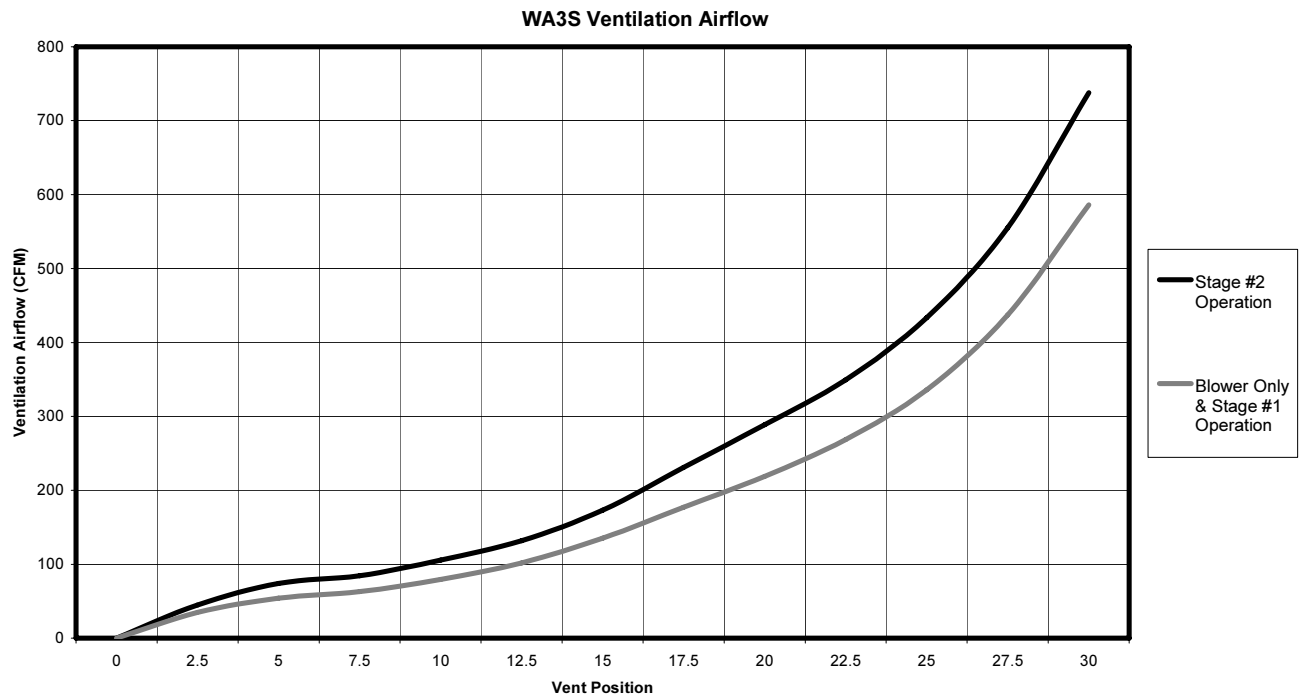
The amount of ventilation air supplied by the commercial room ventilator is dependent on five (5) factors.

1. Return air duct static pressure drop.
2. Supply air duct static pressure drop.
3. Indoor blower motor speed.
4. Damper blade open position setting for each mode of operation.
5. Tightness or looseness of building envelope.

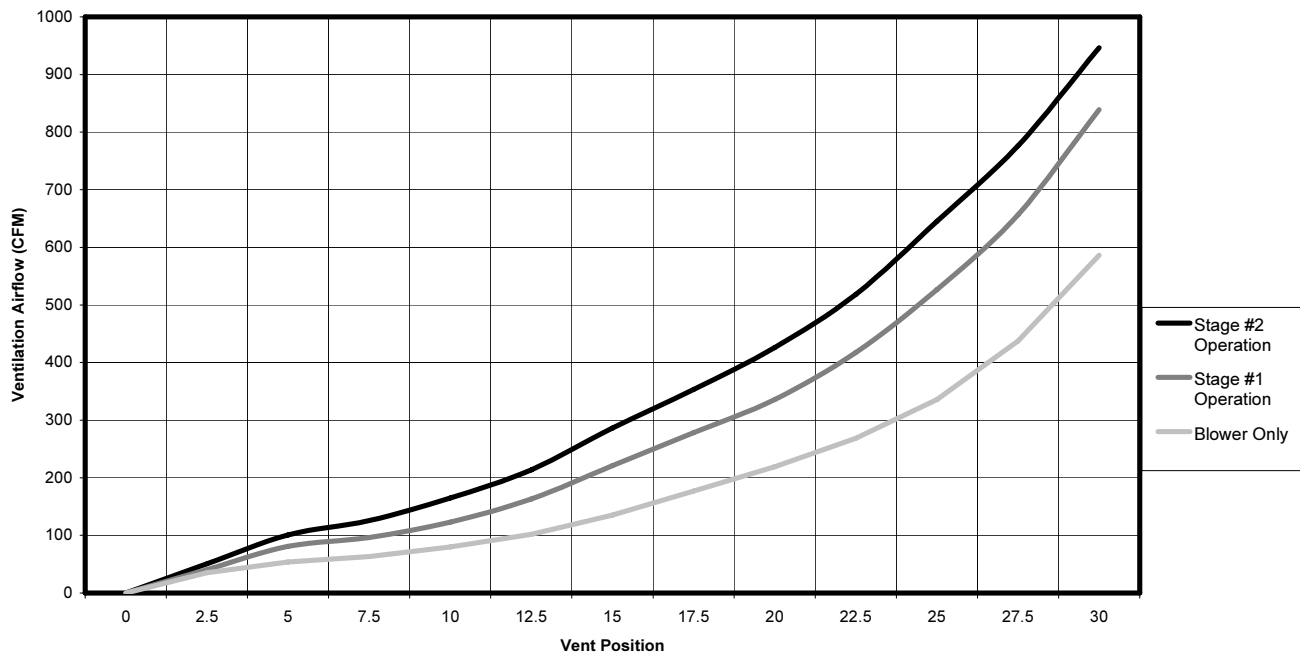
You will have to set the damper position for each mode of operation using the set-point potentiometers on the Damper Position Step Control Board. See Figure 6.

Refer to the graphs on the following pages to determine the necessary blade setting to achieve the ventilation air required based upon blower only, Stage #1 and Stage #2 modes of operation. These charts are model specific, so you will have to match the chart to the specific model you are working with.

1. Set the damper position for blower only operation.
  - A. Energize the evaporator blower by switching thermostat to the manual fan position with heat/cool in OFF position (**or Jumper “R” to “G” with thermostat disconnected at unit**).
  - B. Locate potentiometer “R1” on the Damper Position Step Control Board. See Figure 6.
  - C. Using a small screwdriver, adjust potentiometer until damper position aligns with numerical location on the label interior of the sheet metal damper assembly.
2. Set the damper position for Stage #1 cooling/heating operation.
  - A. Energize the evaporator blower and compressor by switching thermostat to the heat or cool mode, and setting it to a minimal offset to the room temperature to engage the mode of operation desired (**or Jumper “R” to “G” and “Y1” with thermostat disconnected at unit**).
  - B. Locate potentiometer “R2” on the Damper Position Step Control Board. See Figure 6.
  - C. Using a small screwdriver, adjust potentiometer until damper position aligns with numerical location on the label interior of the sheet metal damper assembly. (Make sure there is not a call on “Y2” or “W2”.)
3. Set the damper position for Stage #2 cooling/heating operation.
  - A. Energize the evaporator blower and compressor by switching thermostat to the heat or cool mode and set a large temperature offset to the room temperature to engage the mode of operation desired (**or Jumper “R” to “G”, “Y1” and “Y2” with thermostat disconnected at unit**).
  - B. Locate potentiometer “R3” on the Damper Position Step Control Board. See Figure 6.
  - C. Using a small screwdriver, adjust potentiometer until damper position aligns with numerical location on the label interior of the sheet metal damper assembly per the chart.



### WA5S Ventilation Airflow



## ADDING OPTIONAL CO<sub>2</sub> CONTROL SENSOR

Adding an optional Bard Part #8403-056 to this control will maximize the capabilities of this vent by only supplying fresh air intake to maintain CO<sub>2</sub> levels. This has multiple benefits.

- Minimizes ventilation load on structure as it only brings in what is required to maintain CO<sub>2</sub> levels lowering reconditioning requirements (not having to heat/cool as much outside air).
- Will self-adjust for various occupancy levels so that you are not bringing in fresh air beyond need. For example, if a room is designed for a maximum occupancy of 40 persons (the standard ventilation control would have to be set for that occupancy), but the room typically only contains 25 persons. This control will self-adjust the amount of fresh air intake from 600 to 375 CFM automatically (based upon 15 CFM per person standard rate to ASHRAE standards).

### Basic Installation

1. Make sure power is turned off to the unit
2. Follow steps beginning on page 2 for installation for standard control and vent assembly, then proceed with the following steps.
3. Run (4) wire thermostat wire from the unit to the desired CO<sub>2</sub> sensor location.
4. Follow Figure 7 to configure the CO<sub>2</sub> sensor for proper operation. This set-up includes:
  - Setting control for 500-1500 ppm CO<sub>2</sub> control band (damper will be in full closed position @ 5000 ppm CO<sub>2</sub>, and will be at full position if CO<sub>2</sub> levels reach 1500 ppm). This is accomplished by setting “SW1” to the “OFF” position and “SW2” to the “ON” position.
  - Setting control for 4-20 MA control by installing the jumper for the 20-100% range.
  - Setting control for current (rather than voltage) output.
5. Connect the thermostat wiring from the CO<sub>2</sub> sensor to step control assembly following the wiring diagram in Figure 4, or the one on the ventilator assembly.
6. Connect the orange wire from the “F” terminal of the units low voltage connection strip to the “OCC” terminal on the step control board.
7. To check operation, restore power to the unit.
8. Make sure that thermostatic control is in “occupied” mode of operation calling for ventilation.
9. Have someone stand in front of the CO<sub>2</sub> sensor and breath on it. The display should show an increase in CO<sub>2</sub> ppm, and the damper blade in the ventilation package should increase (may be good to have a helper - one to breath on control and one to observe damper).

## FIGURE 7 8403-056 CO<sub>2</sub> SENSOR SET UP

### WGCRVMP-5 Set-Up for Full Demand Control Using 8403-056 CO<sub>2</sub> Controller

| Controller Settings--See Fig. 7b    |                                                                                                                   |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Range 500-1500 ppm                  |                                                                                                                   |
| SW1 = "Off"                         |                                                                                                                   |
| SW2 = "On"                          |                                                                                                                   |
| "Out" set to "0-100%"               |                                                                                                                   |
| Analog Output (AN) set to "Current" | <b>NOTE:</b> Fig. 7a are the default jumper settings. The "OUT" and "AN" must be repositioned as shown in Fig. 7b |

| 4-20mA | AN (ppm) | Damper (1)   | Approx. Blade Position (2) |
|--------|----------|--------------|----------------------------|
| ---    | 500      | Fully Closed | 0                          |
| ---    | 550      | Fully Closed | 0                          |
| ---    | 600      | Fully Closed | 0                          |
| ---    | 650      | Fully Closed | 0                          |
| 4      | 700      | Fully Closed | 0                          |
| 5      | 750      |              | 2                          |
| 6      | 800      |              | 4                          |
| 7      | 850      |              | 5.5                        |
| 8      | 900      |              | 7.5                        |
| 9      | 950      |              | 9.5                        |
| 10     | 1000     |              | 11                         |
| 11     | 1050     |              | 13                         |
| 12     | 1100     |              | 15                         |
| 13     | 1150     |              | 17                         |
| 14     | 1200     |              | 19                         |
| 15     | 1250     |              | 20.5                       |
| 16     | 1300     |              | 22.5                       |
| 17     | 1350     |              | 24.5                       |
| 18     | 1400     |              | 26                         |
| 19     | 1450     |              | 28                         |
| 20     | 1500     | Fully Open   | 30                         |

- (1) Damper should be fully closed at 700 ppm, if not Potentiometer R7 can be adjusted clockwise (CW) to close it. If it is fully closed at 700 ppm or lower, no adjustments required.
- (2) Blade as referenced to the Blade Position Label.

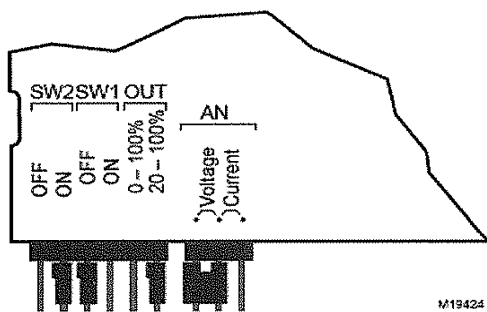


Fig. 7a -- Default Jumper Settings

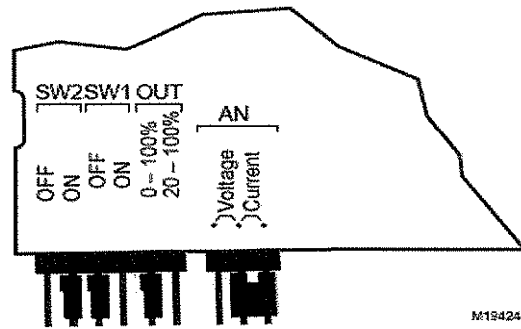


Fig. 7b -- Final Jumper Settings

## COMMERCIAL ROOM VENTILATOR – WA\*S SERIES

### FEATURES

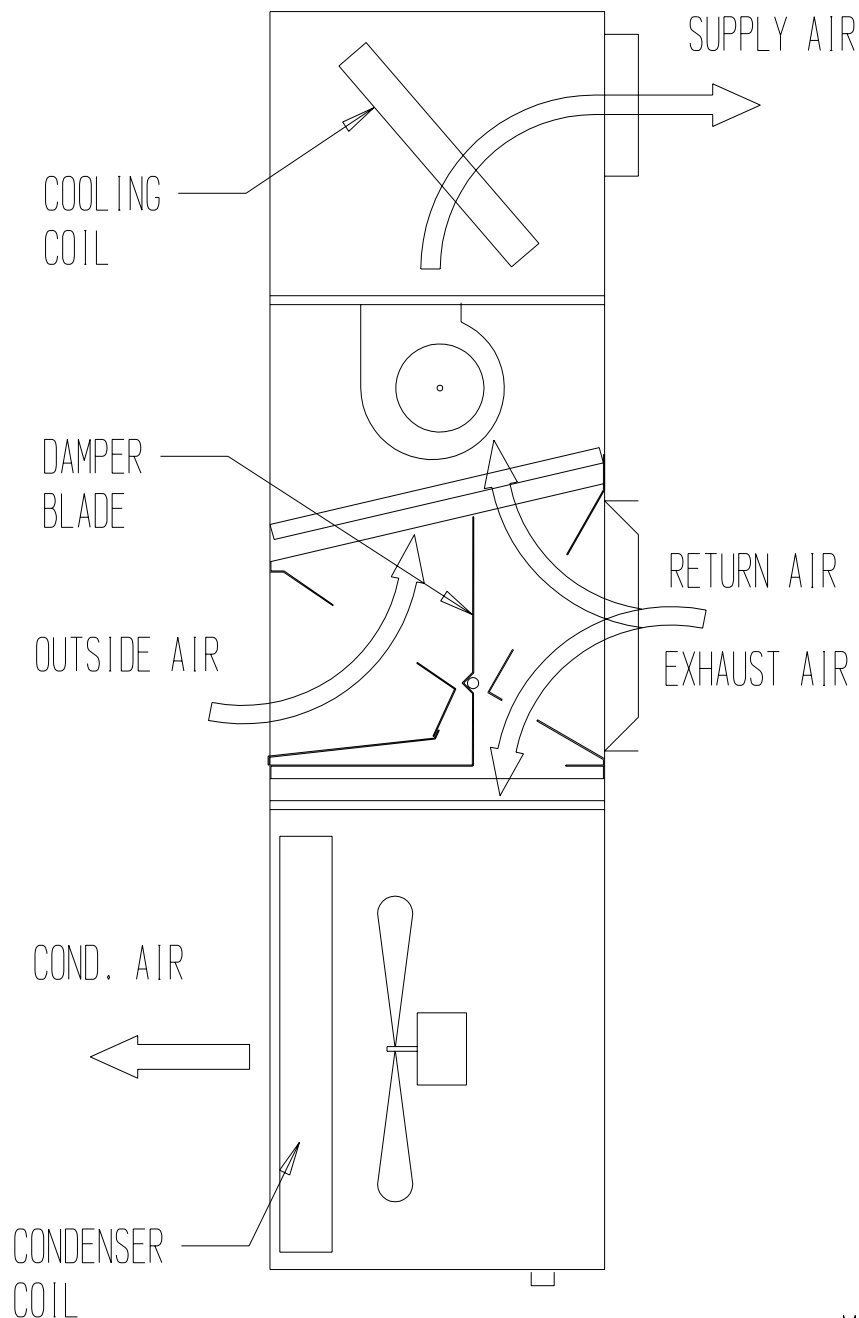
- One piece construction – easy to install with no mechanical linkage adjustment required.
- Exhaust air damper – built in with positive closed position. Provides exhaust air capability to prevent pressurization of tight buildings.

- Actuator motor – 24 volt, power open, spring return with built in torque limiting switch.
- Provides up to 75 percent of outside air.

### COMMERCIAL ROOM VENTILATOR SEQUENCE OF OPERATION

On a call for blower operation, CRV opens to a position as set by Step Control Position Assembly. See Figure 8

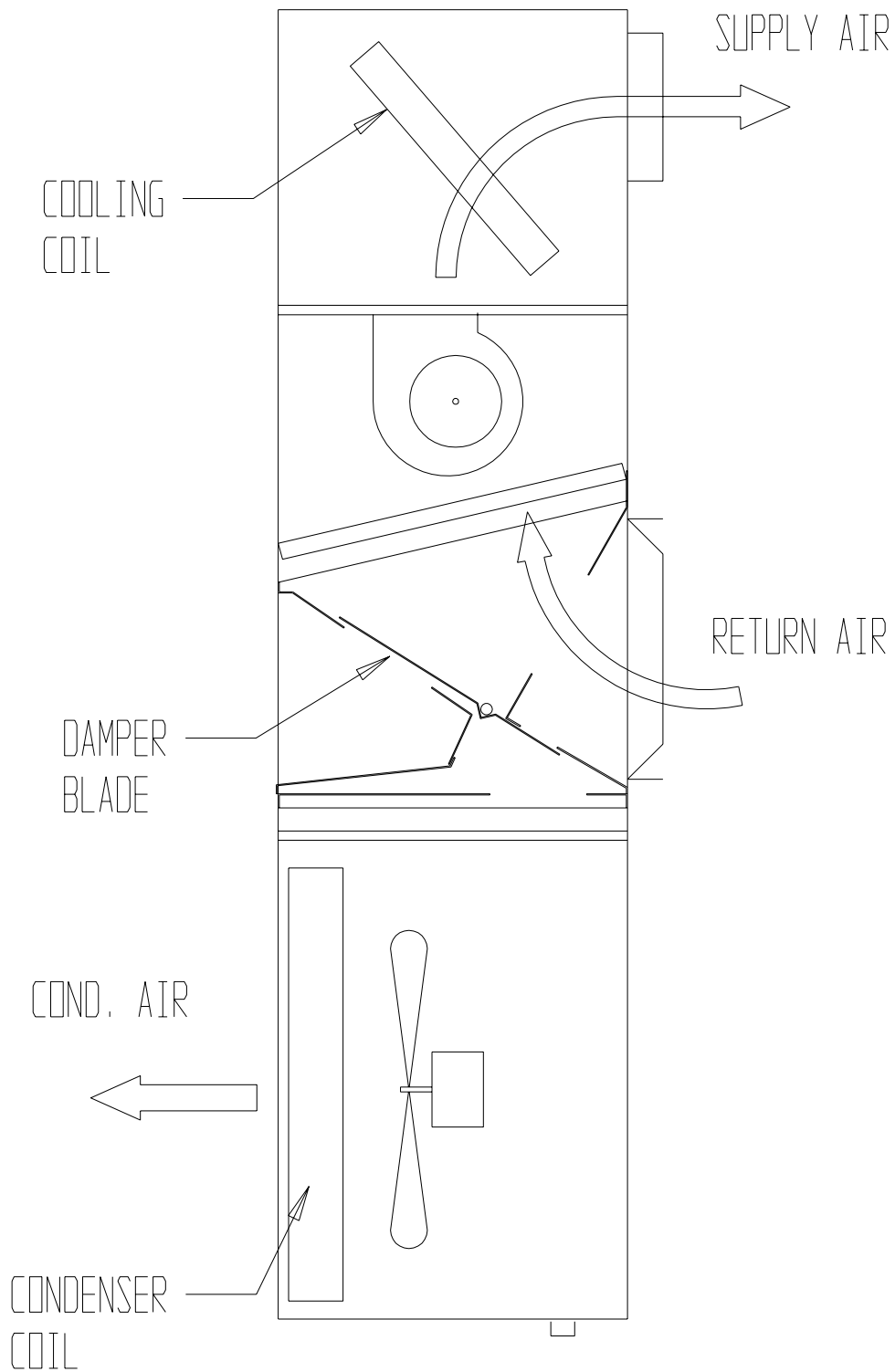
**FIGURE 8  
CALL FOR BLOWER OPERATION**



MIS-347

A call for cooling cycles the compressor, and dampers remain in the ventilation mode. On loss of blower operation, CRV closes fully. See Figure 9.

**FIGURE 9**  
**CALL FOR COOLING OPERATION**



MIS-348