INSTALLATION INSTRUCTIONS

Full Flow Modulating Commercial Room Ventilator with Pre-Purge and Exhaust

Model: CRV-V5

For Use with Bard Single Stage Wall Mount Air Conditioner and Heat Pump Models:

W42AC, W48AC, W60AC, W72AC
W42HB, W48HB, W60HB, W72HB

Bard® SINCE 1914
Climate Control Solutions

Bard Manufacturing Company, Inc.
Bryan, Ohio 43506
www.bardhvac.com

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Supersedes: ***NEW***
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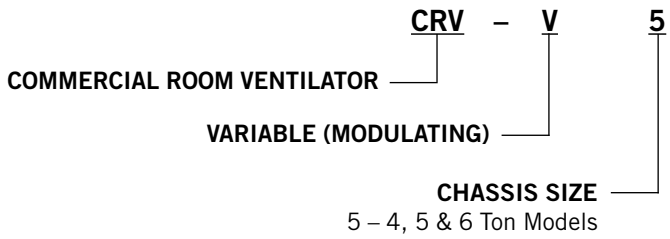
CONTENTS

Commercial Room Ventilator Model Nomenclature



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 (check parts list below). 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.

General

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, miscellaneous hardware and installation instructions.

Ventilator kit includes:

(1) CRV-V5 ventilator
(2) 7003-084 mist filters
(1) 7003-083 exhaust bug screen
(2) 1913-002-0808 8-1/2" foam strips
(4) 1913-002-0708 7-1/2" foam strips
(2) 539-405 intake sealing frames
(1) 910-2065 control board assembly
(2) 543-223 lower block off plates
(24) #10-16x1/2 screws
(4) #8-18x3/8 pan head screws
(1) 2100-698 installation instructions

Commercial Room Ventilator 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.

Description

The CRV-V ventilator is designed to be used with the specific models with "letter" revision codes as designated on the front page of this installation instructions manual.

The ventilator is an electromechanical vent system designed to provide fresh air to meet indoor air quality standards.

Models

When installed in the models listed on the front page, the CRV-V 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 when it is operating with compressor in cooling or heat pump mode.

Basic Installation

⚠ WARNING

Electrical shock hazard.

Disconnect remote electrical power supply or supplies before servicing.

Failure to do so could result in electric shock or death.

⚠ WARNING

Exposed moving parts.

Disconnect electrical power before servicing.

Failure to do so could result in severe injury or amputation.

⚠ CAUTION

Cut hazard.

Wear gloves to avoid contact with sharp edges.

Failure to do so could result in personal injury.

Disconnect all power to unit (see Figure 1).

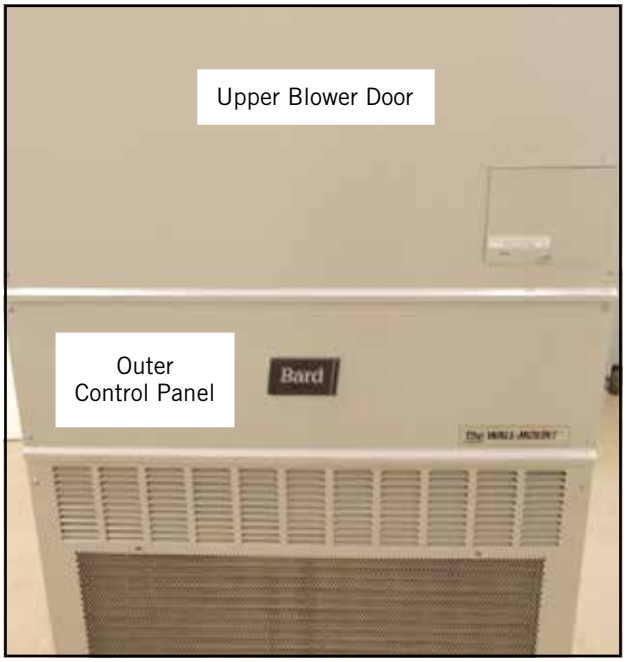
FIGURE 1
Disconnect Power

Remove both side grilles (see FIgure 2).

FIGURE 2
Remove Side Grilles

Remove upper blower door and outer control panel (see Figure 3).

FIGURE 3
Remove Blower Door and Control Panel

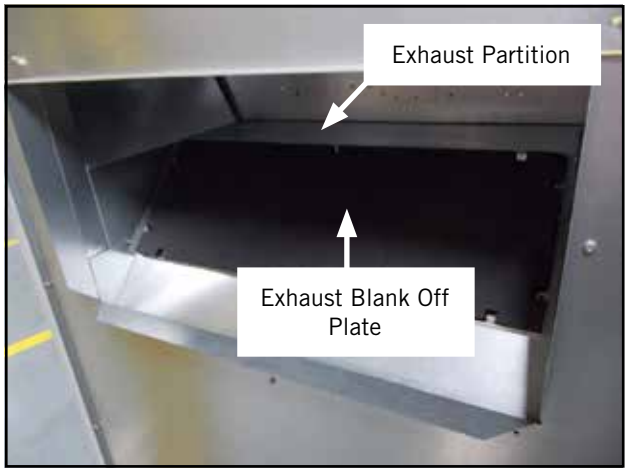


Remove blank off plates (both sides) and discard (see Figure 4).

FIGURE 4
Remove Blank Off Plates (Both Sides)

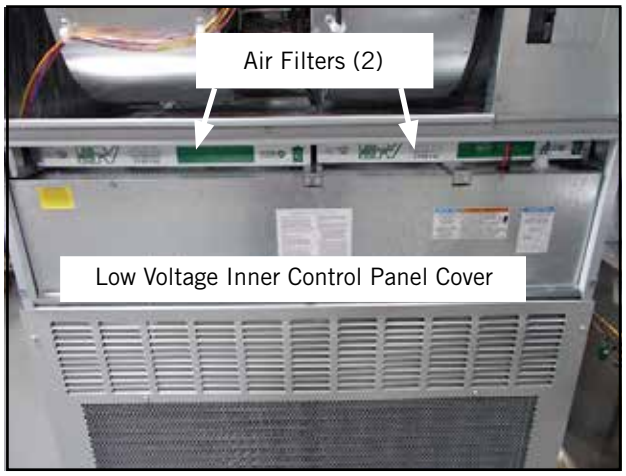
Remove exhaust blank off plate through return or through side intake openings and discard (see Figure 5).

FIGURE 5
Remove Exhaust Blank Off Plate



Remove both air filters and the low voltage inner control panel cover (see Figure 6). Remove left filter first then slide right filter to the left to remove.

FIGURE 6
Remove AIr Filters and Low Voltage Control Panel Cover

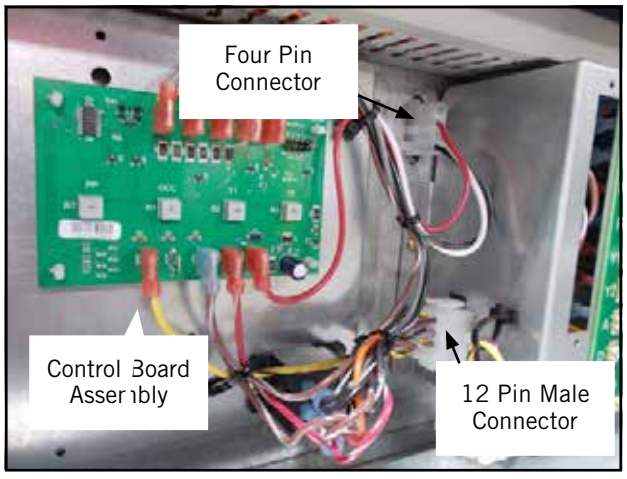


Install the 910-2065 control board assembly on the left side of the control panel using four (4) #10 x 1/2 screws (provided) as shown in Figure 7.

Snap the four pin connector into the opening next to the low voltage box.

Plug the 12 pin male connector into the female plug in the low voltage box.

FIGURE 7
Install 910-2065 Control Board Assembly



Before installing vent, remove CRV from packaging and verify there is no damage. Install the CRV as shown in Figure 8. CRV can be installed from either side.

Set CRV on the exhaust partition (see Figure 5 on page 5) and slide in until flush with the side of the wall mount.

FIGURE 8
Install Vent

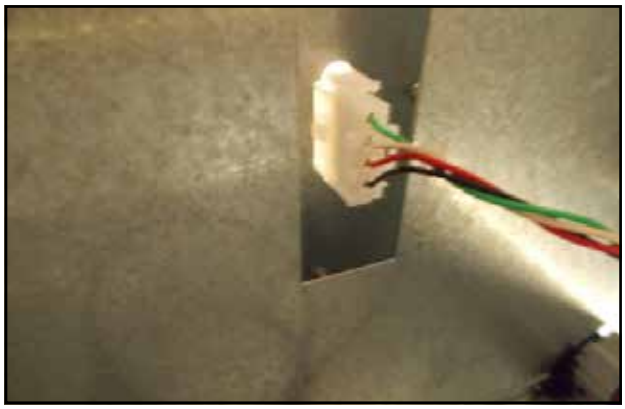
When the CRV is fully installed, the control plug should be centered in the plug access opening on the front panel of the CRV as shown in Figure 9.

FIGURE 9
Control Plug Centered in Plug Access Opening

From the front, through the filter opening, plug the CRV power plug into the control panel plug (see Figure 10).

IMPORTANT: *Sharp edges--PPE required.*

FIGURE 10
Connect CRV Power Plug to Control Panel Plug



The CRV exhaust blade is fixed in the shipping position by the latch located on the bottom of the blade (see Figure 11). Access can be made through the return air opening or through the opening under the CRV. Turning the latch 1/4 turn will release the blade.

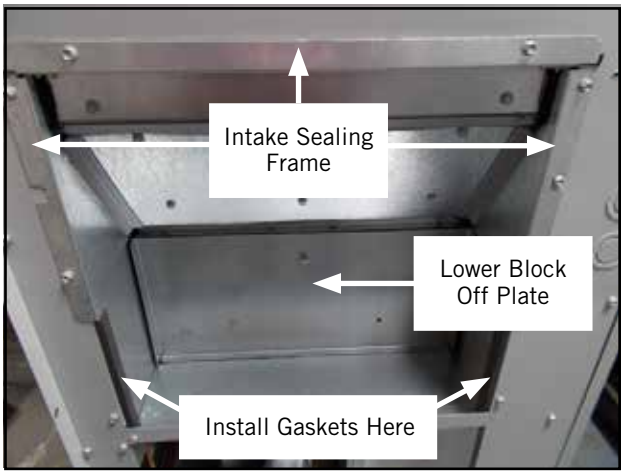
FIGURE 11
Release the Exhaust Blade

Make sure the blade seats correctly over the exhaust opening and that the latch is as shown in Figure 12.

FIGURE 12
Exhaust Blade and Latch

Install the 539-405 intake sealing frame and the 543-223 lower block off plates (both sides) as shown in Figure 13. Install two (2) 1913-002-0708 7-1/2" foam gaskets below the intake sealing frame (both sides).

FIGURE 13
Install Intake Sealing Frame and Lower Block Off Plates

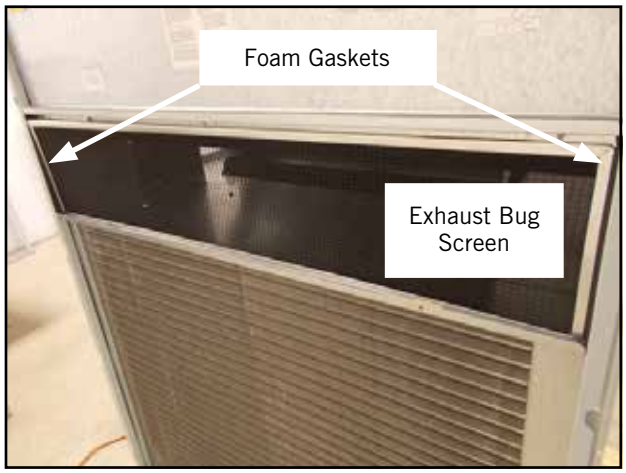


Install 7003-084 mist filters on both sides (see Figure 14). Then re-install the side grilles removed earlier.

FIGURE 14
Install Mist Filters

Remove the front lower (condenser) grille and install the 7003-083 exhaust bug screen (see Figure 15). Install two (2) 1913-002-0808 8-1/2" foam gaskets to ends of cabinet. Re-install grille.

FIGURE 15
Install Bug Screen and Gaskets



Restore power to unit.

Set the preferred amount of ventilation air by using the numbered label on the CRV (see Figure 16) and referring to **Blade Ajustment for Desired Ventilator Air** on page 8 and the airflow charts on pages 14 and 15.

FIGURE 16
Ventilation Air Label

When blade settings are complete, disconnect power.

Install both filters, then re-install the inner control panel, outer control panel and upper blower door.

Restore power to unit.

CO_2 Control

For CO_2-based control, add CO_2 sensor/controller (Bard part #8403-067) to the wall and run additional optional wires as shown in the wiring diagrams on pages 11 and 12.

The CO_2 controller must also be reconfigured from the standard default settings as shipped from the factory. See page 13 for complete details.

Control System Notes

This ventilation package is capable of being set to meet the current ASHRAE specifications for minimum occupied airflow rates, with extended capability to meet demand ventilation requirements.

Two Switch Application

Energizing the A terminal in the low voltage connection box during occupied conditions will allow the prepurge and minimum occupied airflow rates to be set to meet ASHRAE requirements. This can be accomplished by adjusting the PP and OCC potentiometers on the CRV control board (see Figure 17) by aligning the damper position per the charts included on pages 14 and 15.

Blade Adjustment for Desired Ventilator Air

The amount of ventilation air supplied by the commercial room ventilator is dependant on four 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.

Refer to the appropriate graph on pages 14 and 15 to determine the blade setting necessary to achieve the ventilation air required for each operating mode.

All potentiometers are set in the closed position from the factory.

Turning potentiometers counter clockwise will close the blade; clockwise will open the blade.

Adjusting Blade Settings

Blade settings can be made without the thermostat connected.

1. With the unit powered up, jumper R to A. The OCC potientiometer on the CRV board can be set. Remove jumper.
2. Move the pre-purge jumper on the board to the 30 second setting, then jumper R to A and set the PP potentiometer.
3. Remove jumper from R to A, then move pre-purge jumper back to 0.
4. Remove the factory jumper on unit low voltage terminal strip from Y1 and Y2.
5. Jumper R to A and Y1 and set the Y1 potentiometer; this will be used for Balanced Climate mode. Set blade to to achieve 28% more airflow than indicated on graph when using Balanced Climate mode.
6. With factory jumper still removed from Y1 and Y2, jumper R to A, Y1 and Y2. The Y2 potentiometer can now be set. This setting will be activated when the factory jumper is installed and there is a call for cooling or anytime Y2 is energized.

FIGURE 17
CRV Control Board Settings

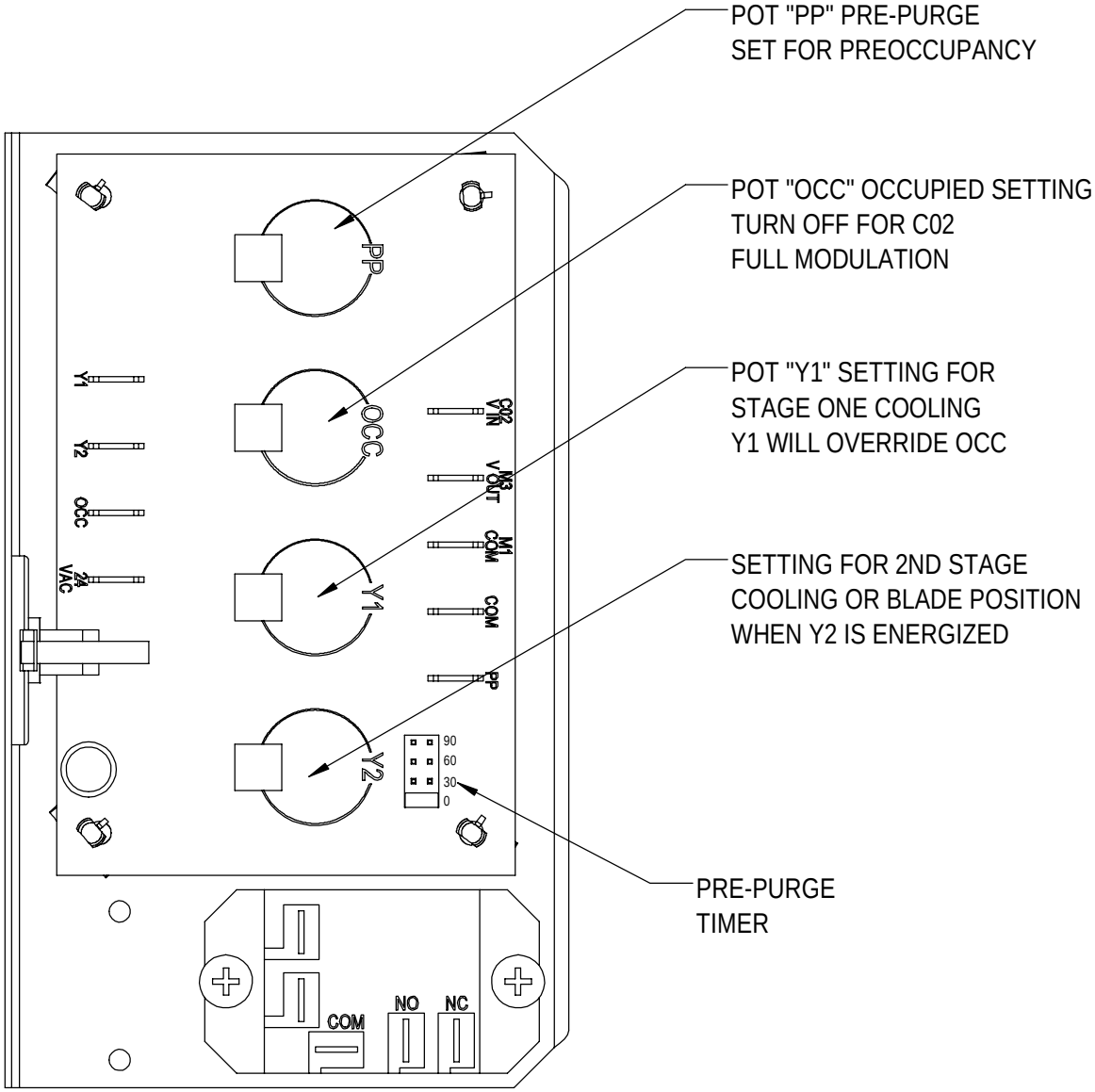


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FIGURE 18
CRV Control Board Wiring

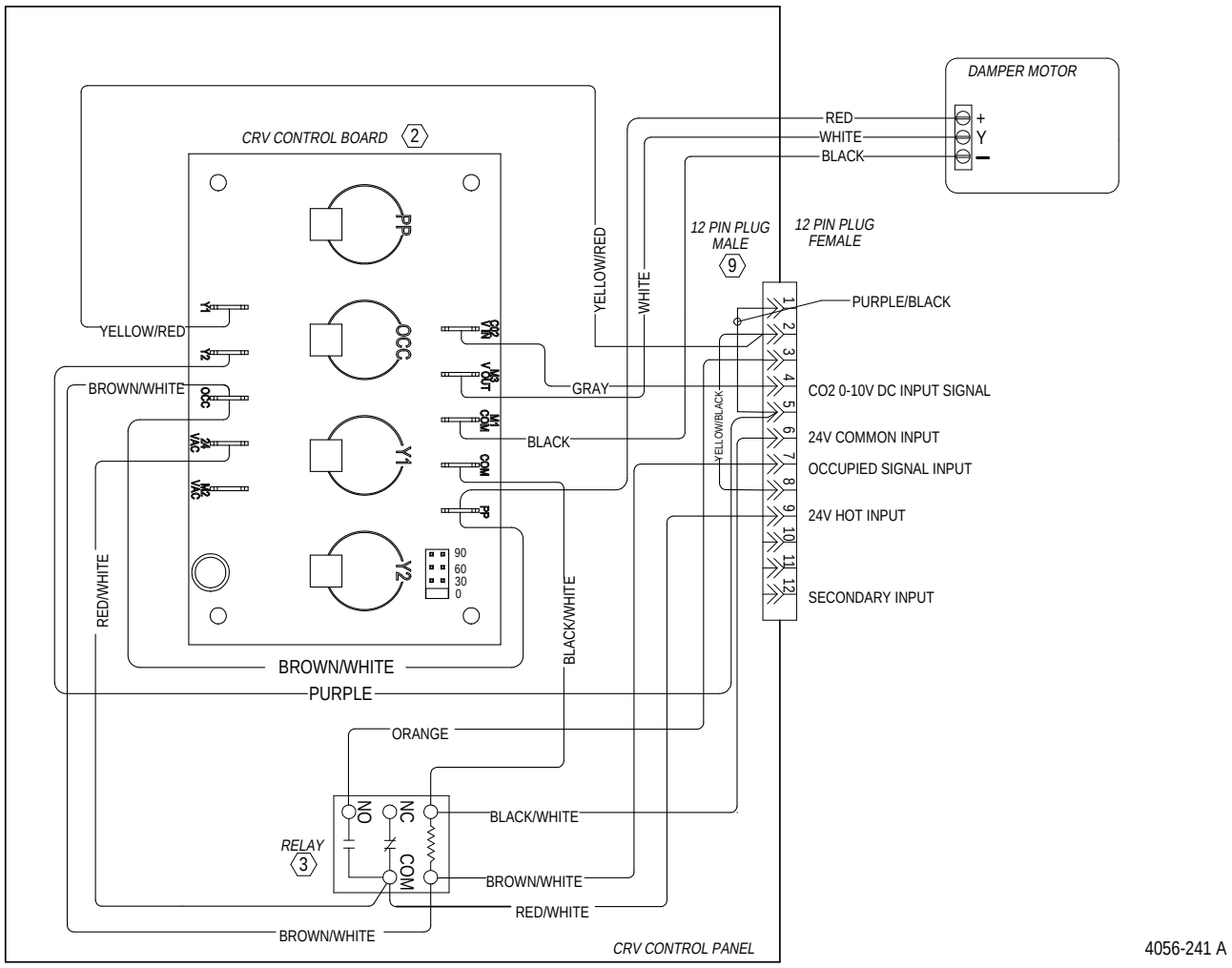

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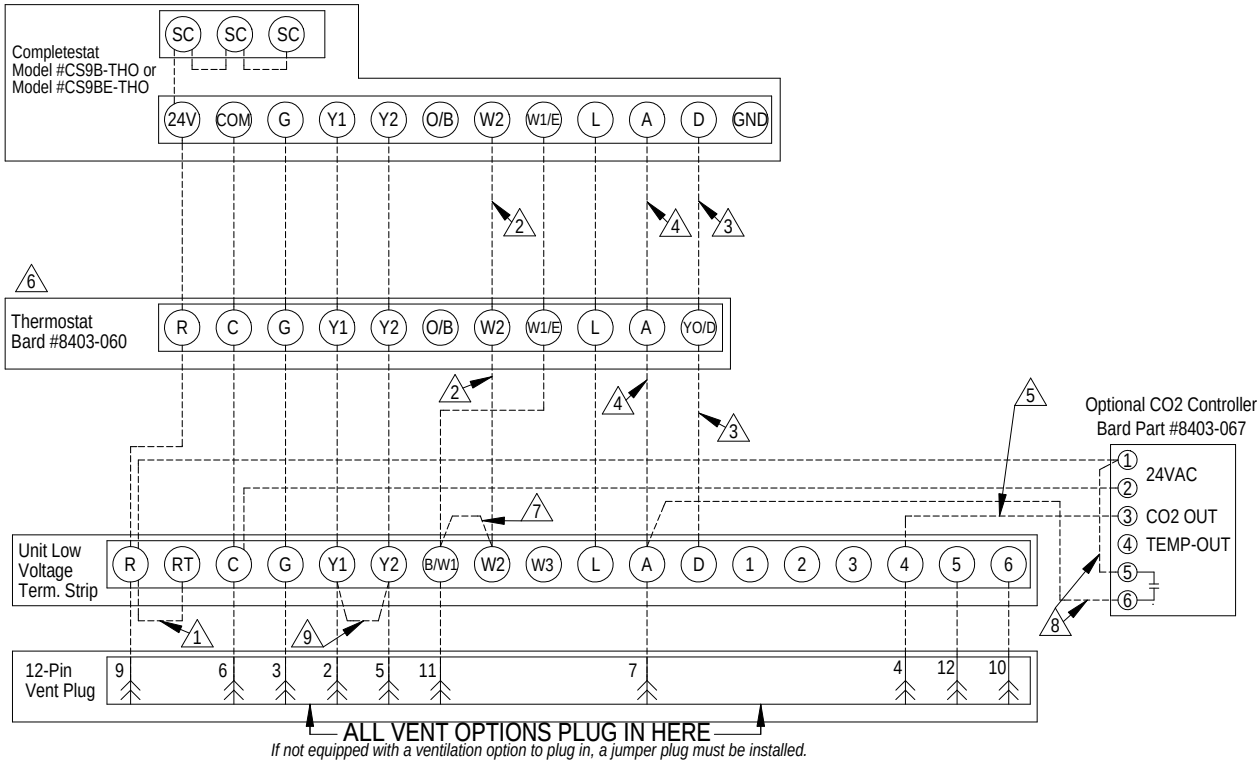
FIGURE 19
Required Control Connections for CRV with Air Conditioners



If not equipped with a ventilation option to plug in, a jumper plug must be installed.

1. Factory installed jumper. Remove jumper and connect to N.C fire alarm circuit if emergency shutdown required.
2. Wire not needed below 15KW.
3. Wire required for dehumidification models only.
4. Do not connect "A" from thermostat if optional CO2 controller is used
5. 0-10 VDC modulating C02 control signal for modulating ventilation control (optional for ECON only - see vent instruction manuals)
6. Change model configuration from heat pump to heat/cool. Must be configured to programmable and fan set to be programmed fan for the "A" output to function during scheduled occupied periods. Must be configured for multi-stage for Y1 output to be active 1st stage cooling. For dehumidification, must be configured for "No Economizer" for YO/D to be active for humidity control.
7. Install jumper for 1 stage electric heat on units with less than 15KW
8. Do not add these wires if setting up for modulating control. See note 7.
9. Factory installed jumper. Remove jumper to activate Balanced Climate™ mode. A 2-stage thermostat is recommended for Balanced Climate mode.

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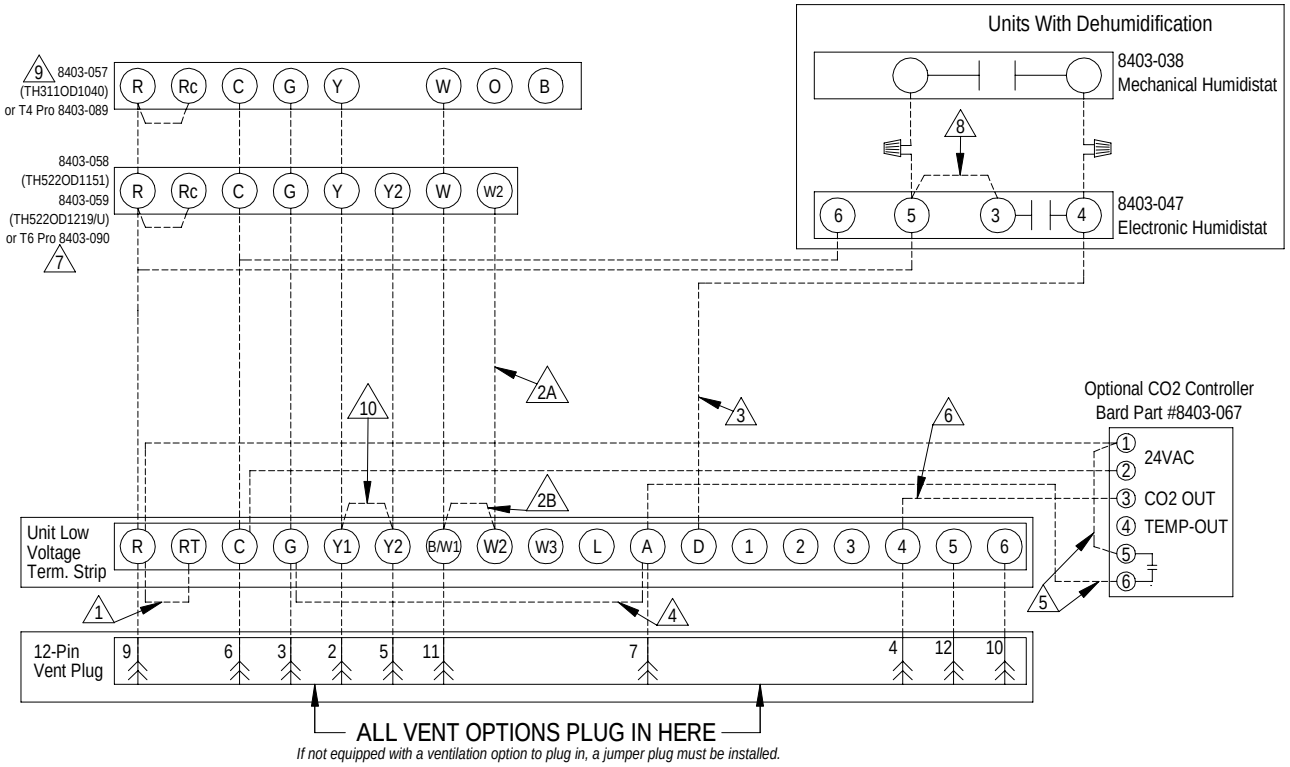
FIGURE 20
Required Control Connections for CRV with Heat Pumps



1. Factory installed jumper. Remove jumper and connect to N.C fire alarm circuit if emergency shutdown required.
2A. Wire not needed below 15KW.
2B. Install Jumper for 1 stage electric heat on units with more than 10KW.
3. Wire required for dehumidification models only.
4. For vent operation, add jumper if optional CO2 controller is not used. Vent will run while blower is energized.
5. Do not add these wires if setting up for modulating control. See note 7.
6. 0-10 VDC Modulating CO2 control signal for modulating ventilation control (Optional for ECON Only) - See vent installation manual.
7. For 8403-058, change "system type", set up Function 1, From 5 (2 Heat/ 1 Cool heat Pump) to 6 (2 Heat / 2 Cool Conventional). For 8403-059, No change required.
8. Jumper needs added.
9. Thermostat will not work with units equipped with economizers.
10. Factory installed jumper. Remove jumper to activate Balanced Climate™ Mode. A 2-stage thermostat is recommended for Balanced Climate mode.

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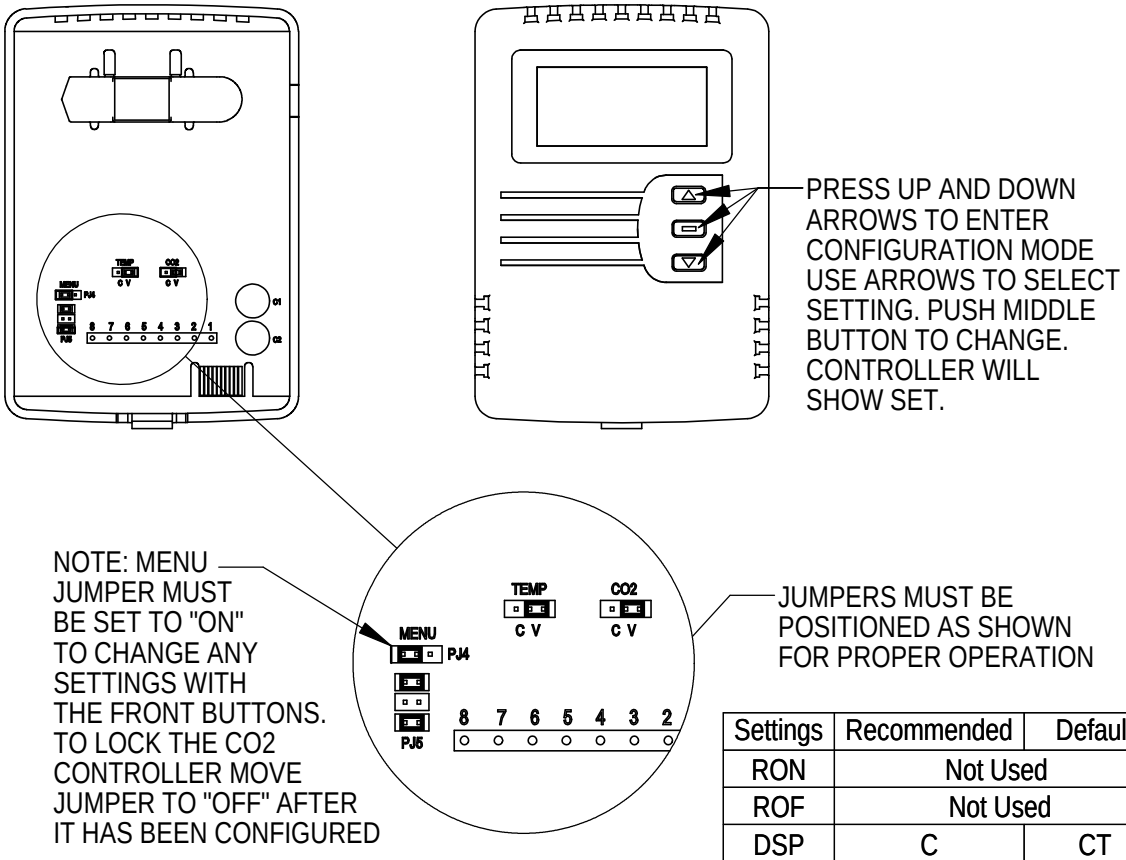
FIGURE 21
CO_2 Sensor Default and Final Settings
Bard Part #8403-067 CO_2 Controller



Settings	Recommended	Default
RON	Not Used	
ROF	Not Used	
DSP	C	CT
UNI	US	US
COL	700	0
COH	1500	2000
TOL	Not Used	
TOH	Not Used	
BAR	See Instrution with Controller For High Altitude Installations	
CAL	Used for Field Calibration	

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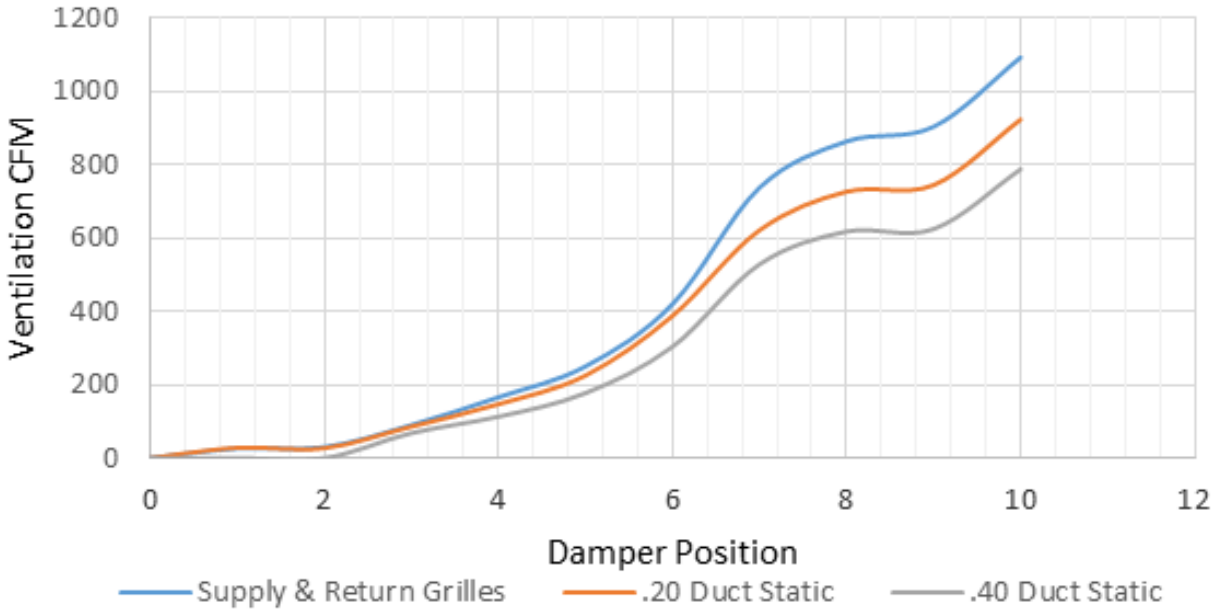
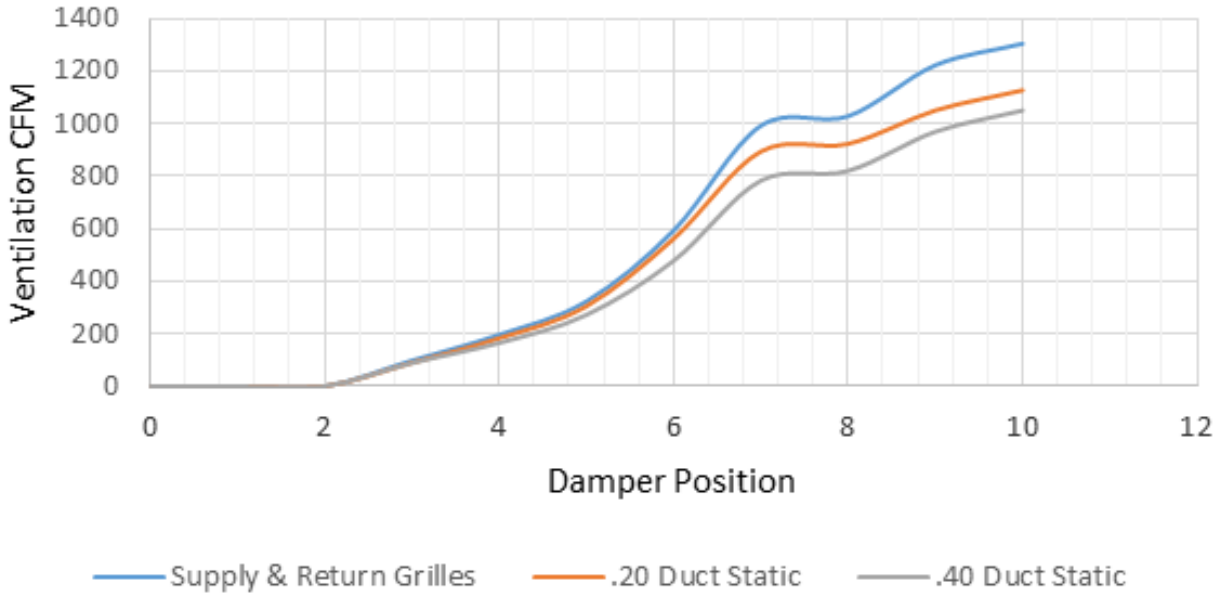
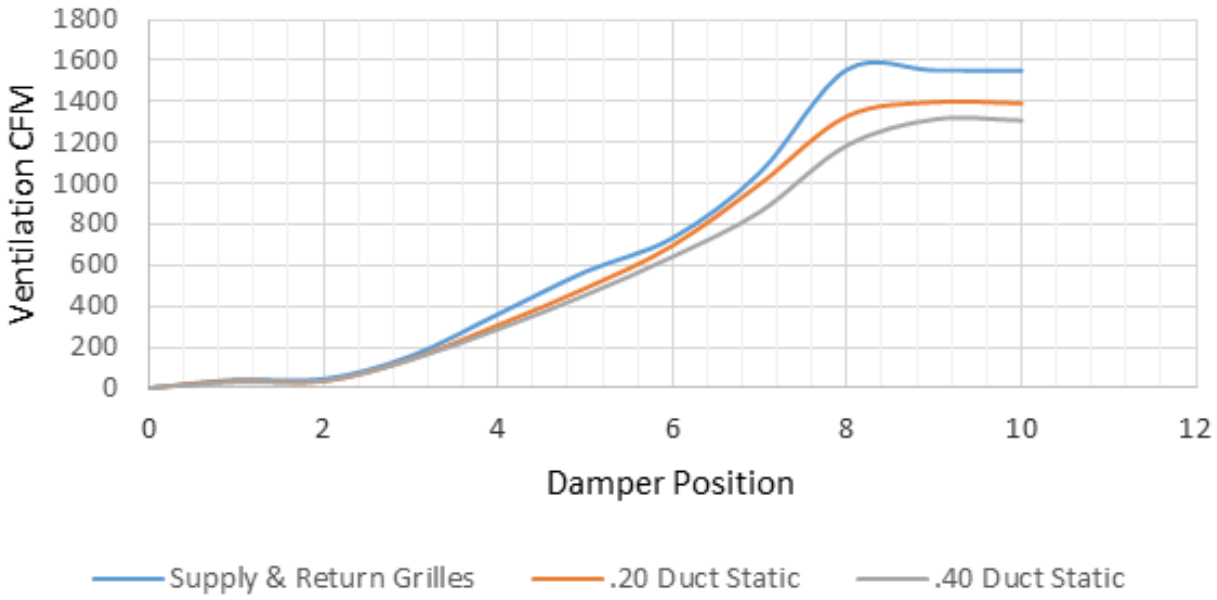
GRAPH 1
W42AC CRV-V5 Ventilation Delivery



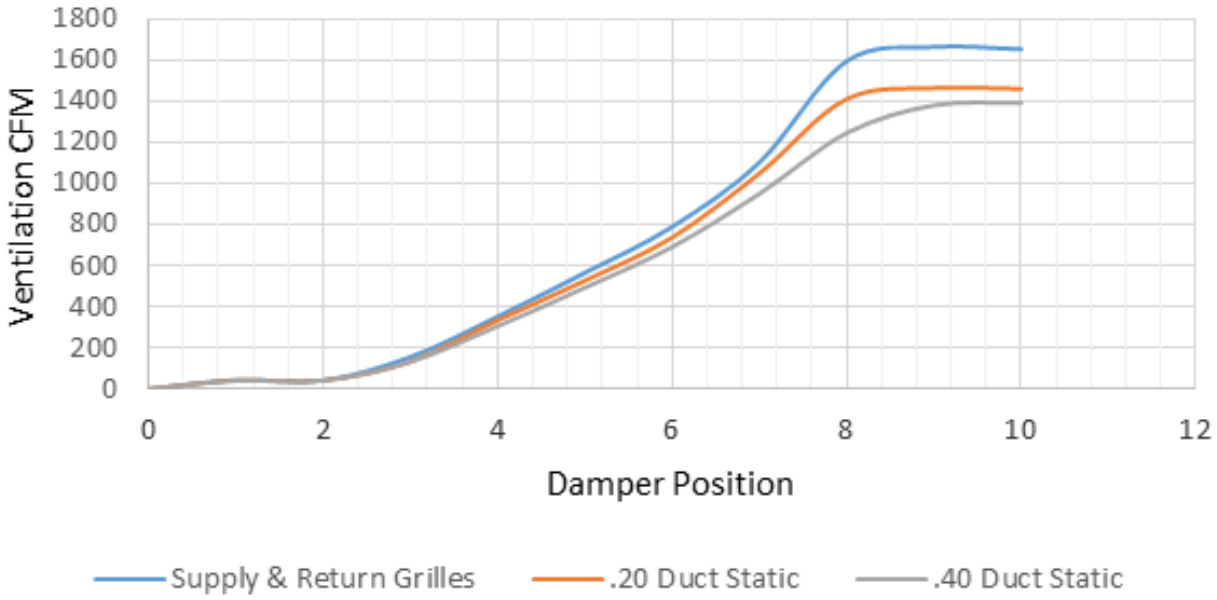
GRAPH 2
W48AC CRV-V5 Ventilation Delivery



GRAPH 3
W60AC CRV-V5 Ventilation Delivery



GRAPH 4
W72AC CRV-V5 Ventilation Delivery



"V" Option CRV Sequence of Operation

The "V" Ventilation option includes a control board with blade positioning potentiometers along with an input for a 2-10V input signal (see Figure 22).

Adjustable potentiometers:

"PP" Potentiometer setting: This potentiometer can be used to adjust the blade setting for outdoor air intake during a pre-purge cycle. The pre-purge cycle time is based on the setting of the pre-purge timer.

"OCC" Potentiometer setting: This potentiometer can be used to adjust the blade setting for outdoor air intake when the "A" terminal is energized on the low voltage terminal strip indicating occupancy.

"Y1" Potentiometer setting: This potentiometer can be used to adjust the blade setting for outdoor air intake when the "Y1" terminal is energized on the low voltage terminal strip indicating 1st stage cooling or Balanced Climate operation. When energized, it overrides the "OCC" potentiometer setting.

"Y2" Potentiometer setting: This potentiometer can be used to adjust the blade setting for outdoor air intake when the "Y2" terminal is energized on the low voltage terminal strip indicating 2nd stage cooling operation. When energized, it overrides the "OCC" and "Y1" potentiometer settings.

Pre-Purge Feature

Pre-purge is used to ventilate a specified CFM amount before occupants enter the room or structure. The control board has a built-in pre-purge timer that can be set to 30, 60 and 90 minute intervals by moving the jumper noted in Figure 17 on page 9. This timer will start when the jumper is installed and the A terminal is energized on the low voltage terminal strip. Blade adjustment can be made on the PP potentiometer. Once the timer has timed out, the board will default to the occupied setting and this blade position can be adjusted on the OCC potentiometer. If the timer is set to 0 (off—shipped position), the occupied setting is instantaneous and the pre-purge setting (PP) is no longer in the sequence.

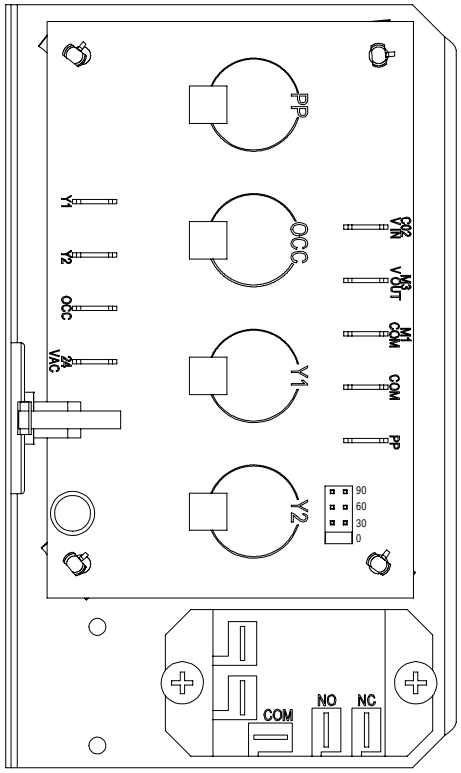
Occupied Setting

Occupied is used to ventilate a specified CFM amount when occupants enter the room or structure. The control board will energize the occupied setting after the pre-purge cycle, or if pre-purge is disabled immediately when the A terminal is energized on the low voltage strip. Blade adjustment can be made on the OCC potentiometer.

Y1 Setting

Y1 is used to ventilate a specified CFM amount when Y1 cooling is energized. If Balanced Climate operation is used, the Y1 setting should be set to a blade setting that will allow additional outdoor intake air. The control board will energize the Y1 setting when Y1 is energized on the low voltage strip. Blade adjustment can be made on the Y1 potentiometer. This potentiometer setting overrides the OCC occupied setting.

FIGURE 22
CRV Control Board



Y2 Setting

Y2 is used to ventilate a specified CFM amount when Y2 cooling is energized. The blade setting for the Y2 potentiometer must be set to match the occupied setting (OCC potentiometer) in order to bring in the same amount of outdoor air when non-Balanced Climate cooling occurs. The control board will energize the Y2 setting when Y2 is energized on the low voltage strip. Blade adjustment can be made on the Y2 potentiometer. This potentiometer setting overrides the OCC occupied and the Y1 setting.

2-10V Operation

A CO_2 sensor or other device sending a 2-10V signal can be used to control the damper motor. Two control methods are available to control the damper motor:

- Method 1: The control board will accept a 2-10VDC signal with a resistive load greater than 5000 ohms. Bard CO_2 sensor part #8403-056 can be used when the 2-10V output is connected to terminal 4 on the unit low voltage terminal strip. The occupied OCC potentiometer setting must be

set to the off position for total modulation. The OCC potentiometer can be used to maintain a minimum blade position when A is energized.

- Method 2: The damper motor will accept a 2-10VDC signal with a resistive load less than 5000 ohms. This method involves bypassing the control board and powering the motor directly from the device providing the 2-10VDC modulating signal. The gray wire from pin 4 on the 12 pin connector (2-10V IN on control board) must be spliced with the white wire ran to the damper motor (2-10V OUT on control board).

During 2-10VDC operation with A energized and pre-purge timed operation active, DC voltage signaling occupancy from a source such as a CO_2 sensor will increase ventilation amounts as needed.

TABLE 1
Unit Operation with V (Variable CRV) Ventilation Option

Unit Operation	Occ. Signal	Low Voltage 24VAC							Speed Taps			Fan Speed	Comp. Oper.	Damper Pot.
		G	Y1	Y2	W1	W2	A	D	1	2	3-4-5[1]			
Fan Only	Yes	X					X		X			Vent	Off	PP/OCC
Fan Only	No	X							X			Vent	Off	Closed
BC Cooling[2]	Yes		X				X		X	X		B Climate	On	Y1
BC Cooling[2]	No		X						X	X		B Climate	On	Closed
Full Load Cool	Yes		X	X			X		X	X	X	Lo/Med/Hi	On	Y2
Full Load Cool	No		X	X					X	X	X	Lo/Med/Hi	On	Closed
1st Stage Heat	Yes				X		X				X	Lo/Med/Hi	Off	Y2
1st Stage Heat	No				X						X	Lo/Med/Hi	Off	Closed
2nd Stage Heat	Yes				X	X	X				X	Lo/Med/Hi	Off	Y2
2nd Stage Heat	No				X	X					X	Lo/Med/Hi	Off	Closed
Dehumidify[3]	Yes						X	X	X	X		B Climate	On	Y1
Dehumidify[3]	No							X	X	X		B Climate	On	Closed

BC and B Climate – Balanced Climate

1 Fan speed is selectable through the blower speed control terminal block. LO (default), MED or HI speeds can be used.

2 Y1 and Y2 jumper must be removed on low voltage terminal block connections and 2 stage thermostat must be utilized.

3 Dehumidification operation is disabled when a call for heating or cooling occurs. Unit runs at Balanced Climate speed during dehumidification operation.

FIGURE 23
Call for Ventilation With or Without Compressor Operation

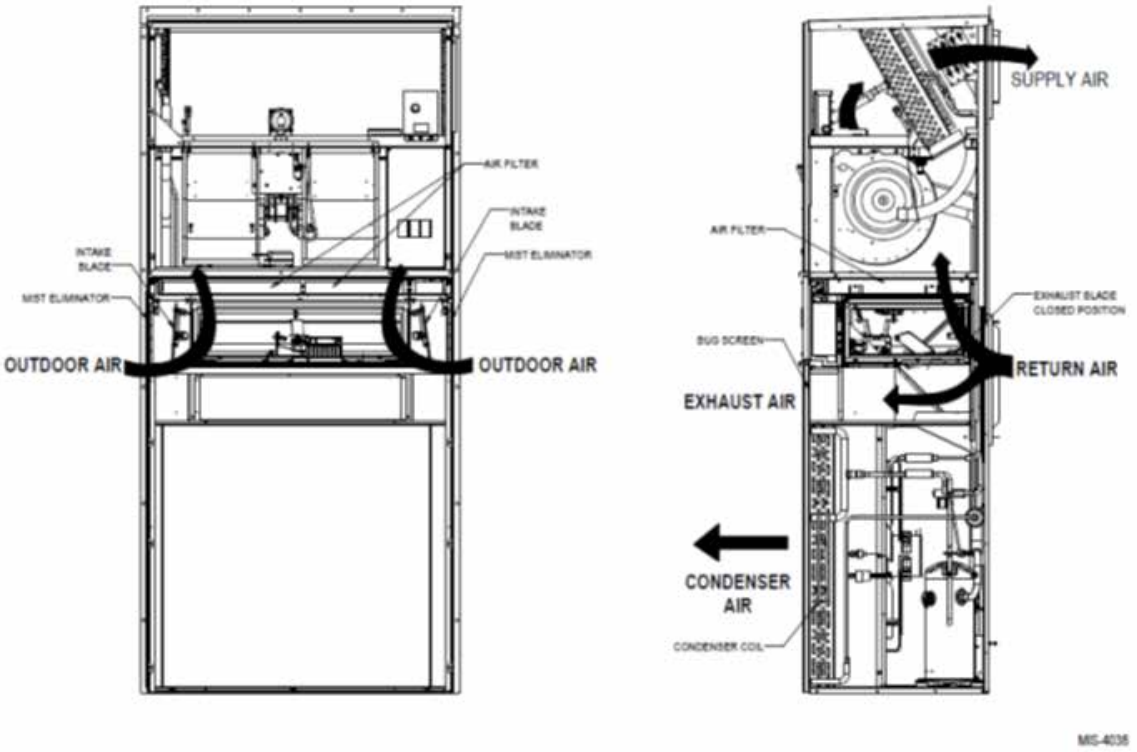


FIGURE 24
Call for Compressor or Fan Only with Ventilation Off