
INSTALLATION INSTRUCTIONS

COMMERCIAL ROOM VENTILATORS with EXHAUST and MULTI-STEP CONTROL

MODEL
QWSCRV
(920-0063)

For Use with Bard QW*S1 Series Geothermal
2-Stage Heat Pumps



Bard Manufacturing Company, Inc.
Bryan, Ohio 43506

Since 1914...Moving ahead just as planned.

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CLIMATE CONTROL SOLUTIONS

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**Manufactured under U.S. Patent number 5,301,744
Other patents pending**

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GENERAL

DESCRIPTION

The QWSCRV ventilator is designed to be used with Bard QW*S Q-Tec series 2-stage geothermal heat pumps. 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, part load cooling, and full load cooling, which are all set for different total airflows.

BLADE ADJUSTMENT FOR DESIRED VENTILATION AIR

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

1. Return air 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 1). See Table 1 for Factory Default Settings.

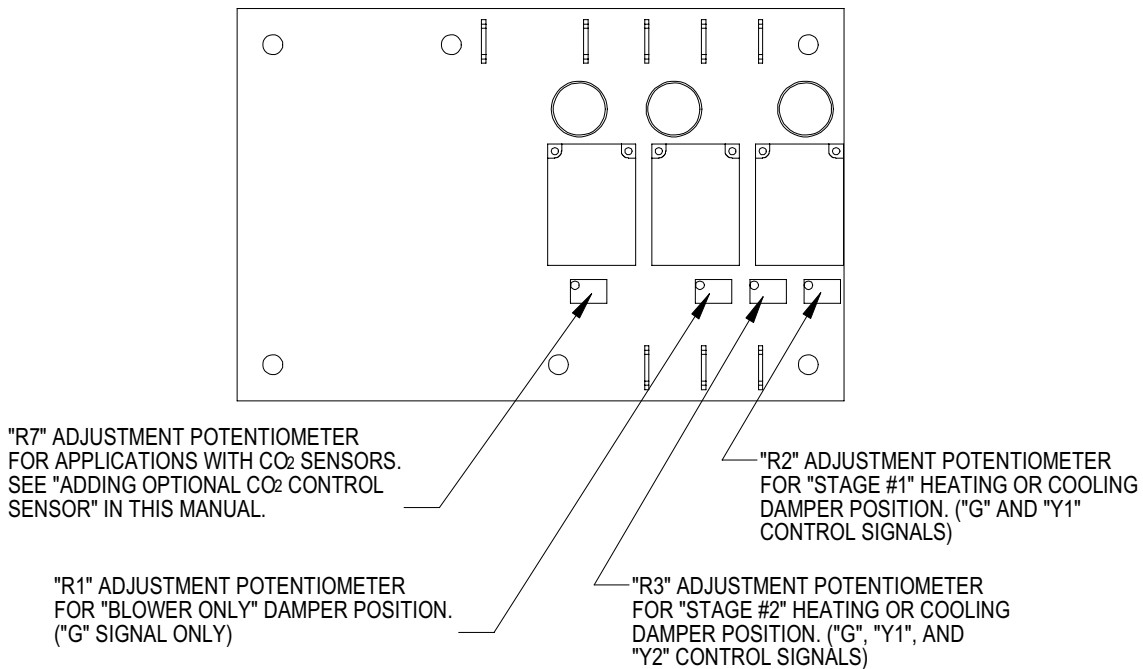
Refer to the graphs on the following pages to determine the necessary blade setting to achieve the ventilation air required based upon blower only, part load, full load, (or optional full load) modes of operation. These graphs are model specific, so you will have to match the chart to the specific model 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 1.)
 - C. Using a small screwdriver, adjust potentiometer "R1" until damper position aligns with numerical location on the label interior of the sheet metal damper assembly per the graph.
2. Set the damper position for Part Load (Stage #1) cooling or heating operation.
 - A. Energize the evaporator blower and compressor by switching thermostat to heat or cool mode, and setting it to a minimum offset to the room temperature to engage the mode of operation desired (*or Jumper "R" to "G" and "R" to "Y1" (+)O" for cooling) with thermostat disconnected at unit*).
 - B. Locate potentiometer "R2" on the Damper Position Step Control Board. (See Figure 1.)
 - C. Using a small screwdriver, adjust potentiometer "R2" until damper position aligns with numerical location on the label interior of the sheet metal damper assembly per the graph.
3. Set the damper position for Full Load (Stage #2) cooling or heating operation.
 - A. Energize the evaporator blower and compressor by switching thermostat to heat or cool mode, and setting it to a minimum offset to the room temperature to engage the mode of operation desired (*or Jumper "R" to "G", "R" to "Y1" & "R" to "Y2" (+)O" for cooling) with thermostat disconnected at unit*).
 - B. Locate potentiometer "R3" on the Damper Position Step Control Board. (See Figure 1.)
 - C. Using a small screwdriver, adjust potentiometer "R3" until damper position aligns with numerical location on the label interior of the sheet metal damper assembly per the graph.

**TABLE 1
FACTORY DEFAULT SETTINGS**

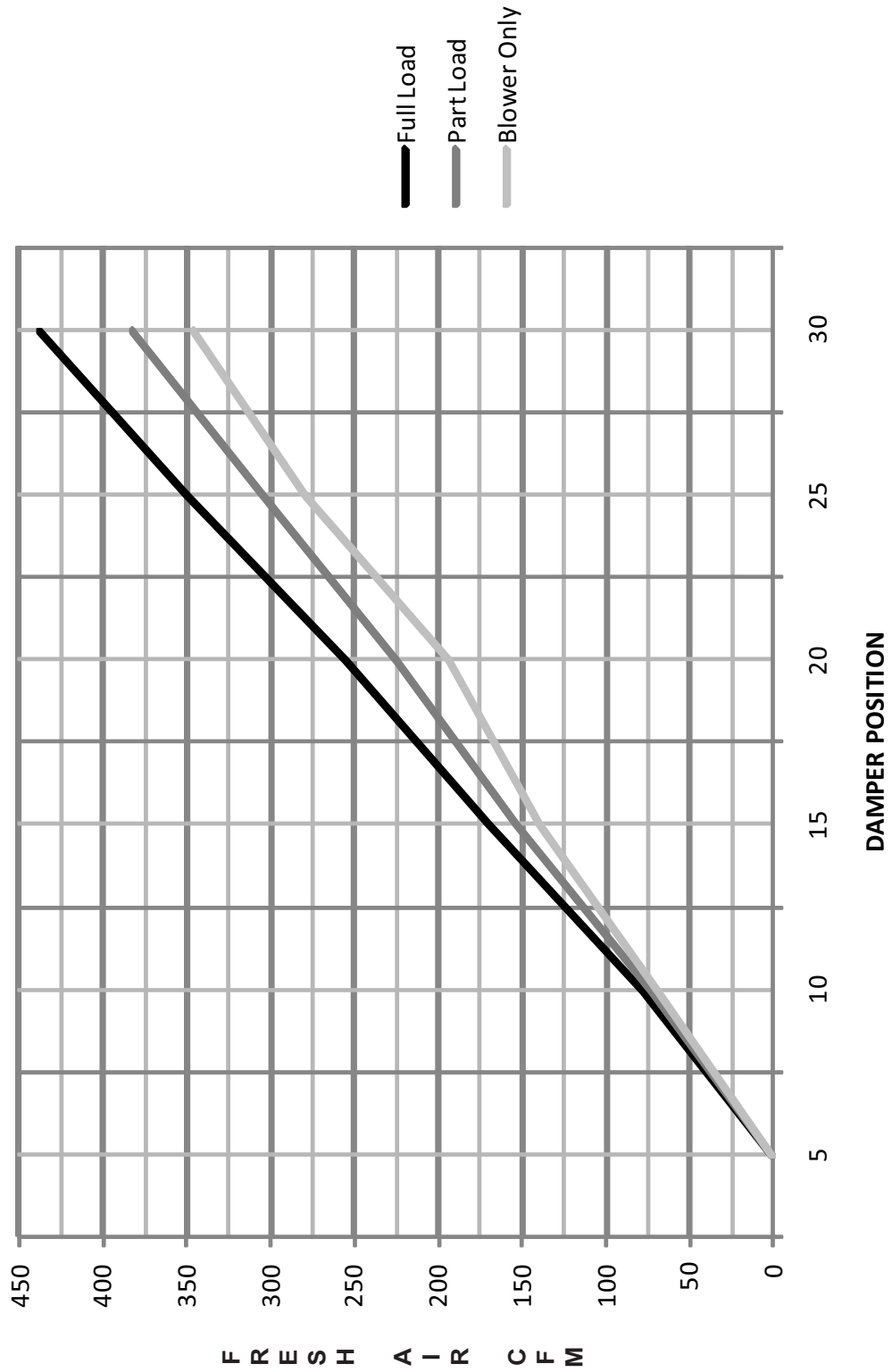
MODE OF OPERATION	POTENTIOMETER	QW2S		QW3S		QW4S		QW5S	
		BLADE SETTING	APPROX. CFM	BLADE SETTING	APPROX. CFM	BLADE SETTING	APPROX. CFM	BLADE SETTING	APPROX. CFM
VENT (Blower Only)	R1	28	350	28	350	27	400	26	400
PART LOAD (Stage 1)	R2	27	350	28	350	24	400	23	450
FULL LOAD (Stage 2)	R3	25	350	23	400	23	450	21	450

**FIGURE 1
SETTING 3-POSITION CRV DAMPER CONTROL BOARD
(USE GRAPHS FOR YOUR SPECIFIC MODEL ON THE FOLLOWING PAGES)**

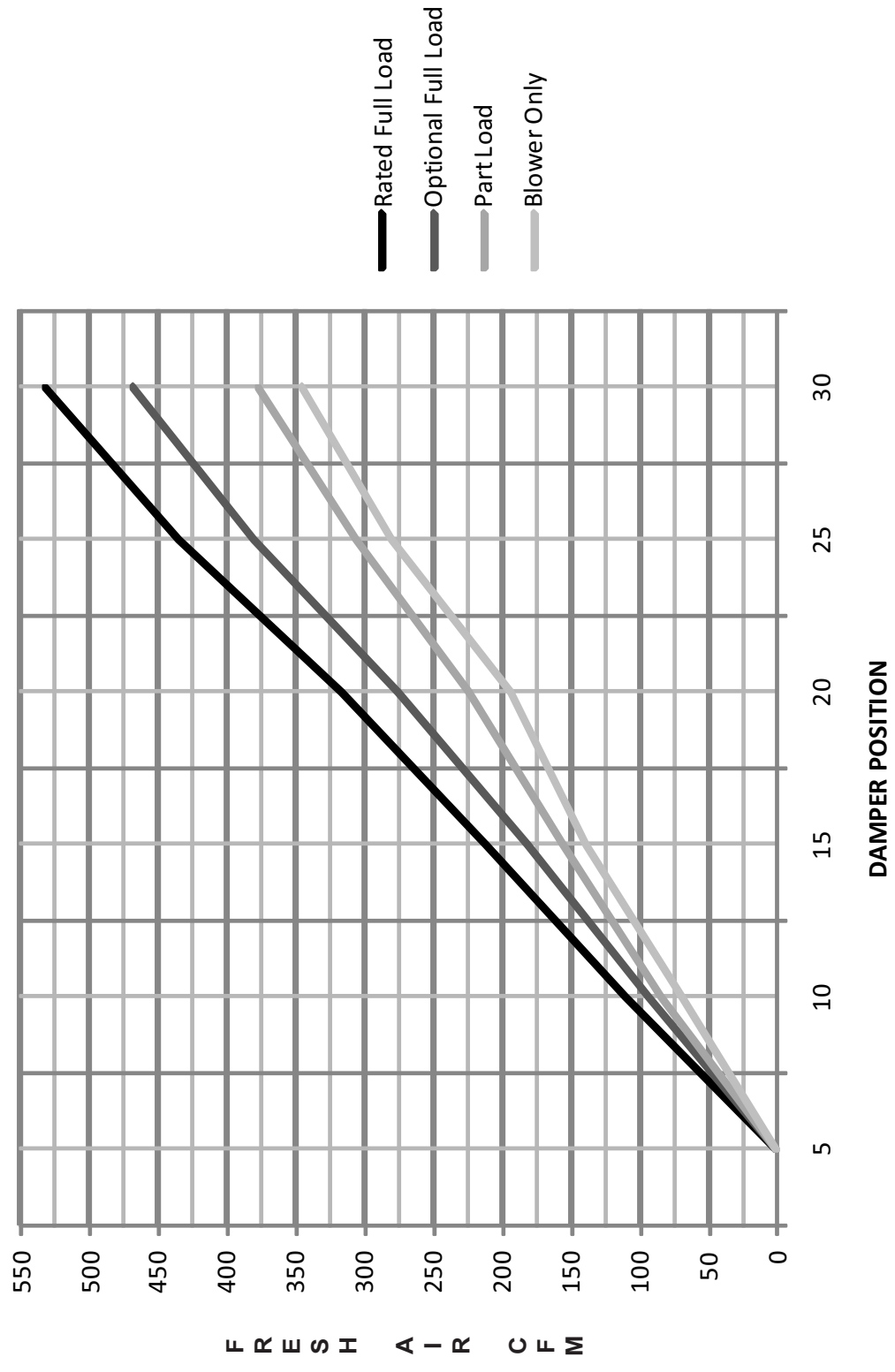


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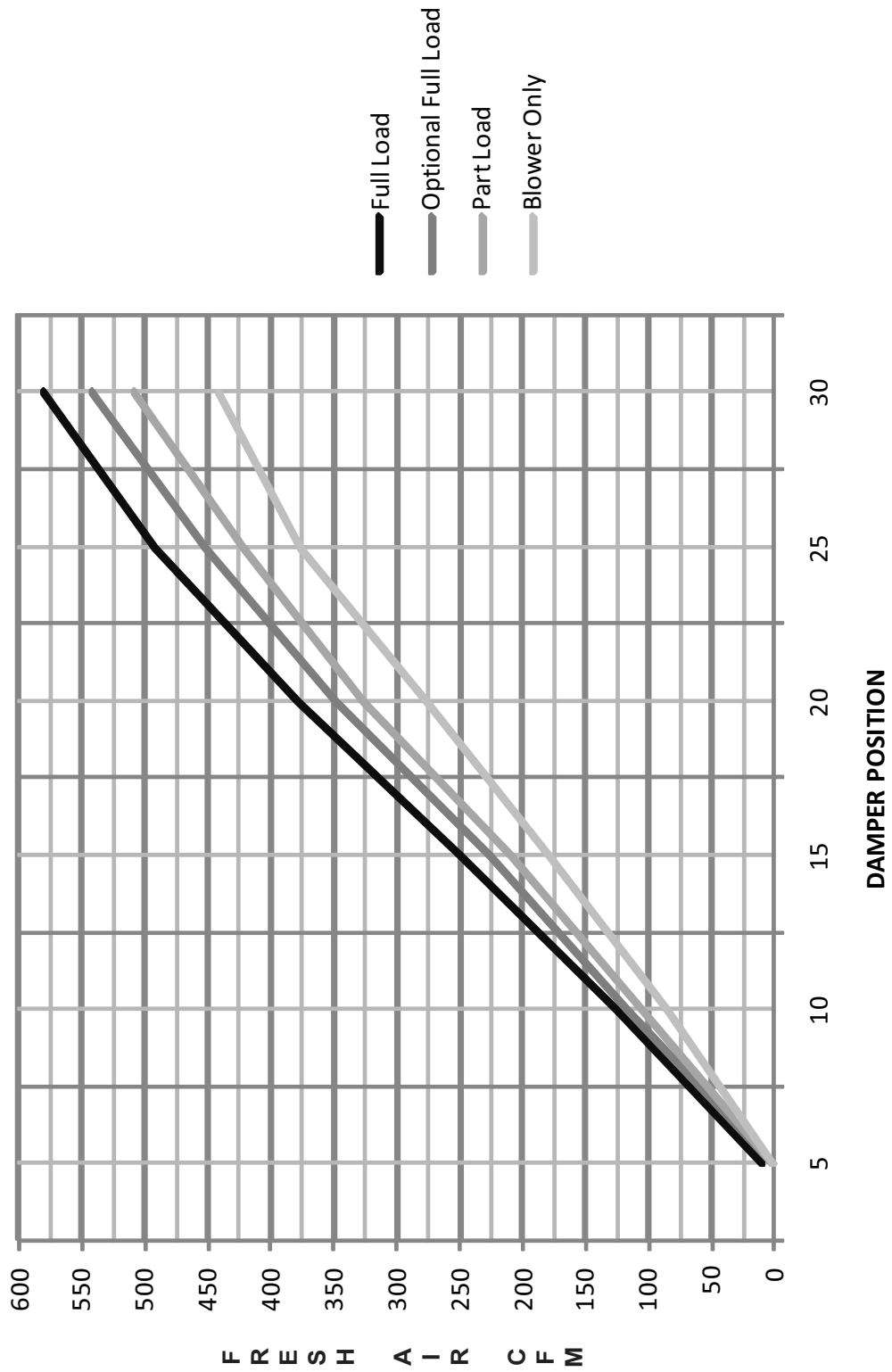
QW2S CRV AIRFLOW VS. DAMPER POSITION



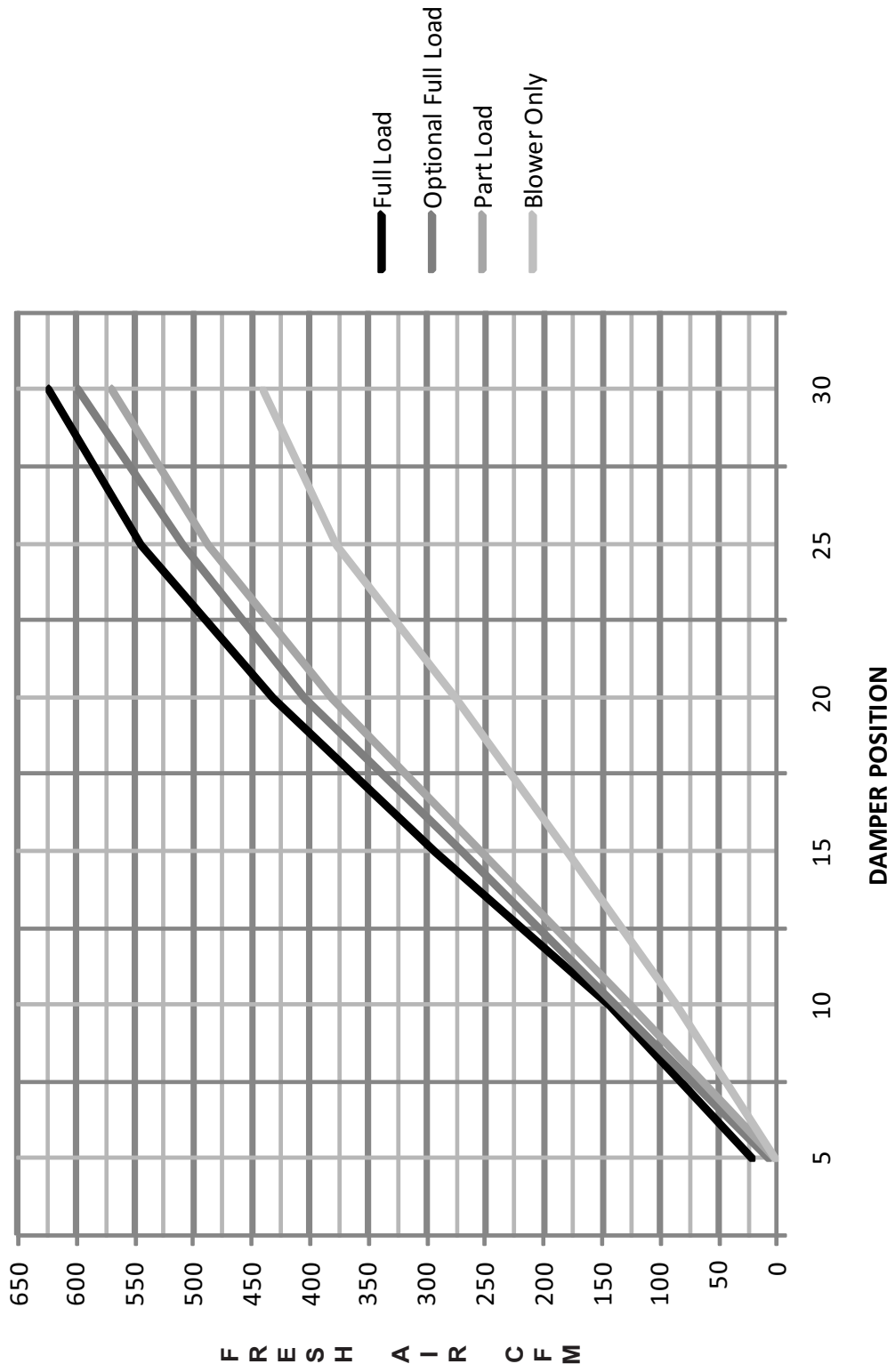
QW3S CRV AIRFLOW VS. DAMPER POSITION



QW4S CRV AIRFLOW VS. DAMPER POSITION



QW5S CRV AIRFLOW VS. DAMPER POSITION



ADDING OPTIONAL CO₂ CONTROL SENSOR

Adding an optional Bard Part #8403-056 CO₂ sensor to this vent package will maximize the capabilities of this vent by only supplying fresh air intake to maintain CO₂ levels. This has multiple benefits.

- Minimizes ventilation load on structure as it only brings in what is required to maintain CO₂ 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 3 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 CO₂ sensor location.
4. Follow Figure 2 to configure the CO₂ sensor for proper operation. This set-up includes:
 - Setting control for 500-1500 ppm CO₂ control band (damper will be in full closed position @ 5000 ppm CO₂, and will be at full position if CO₂ 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 CO₂ sensor to step control assembly or the one on the ventilator assembly.
6. Connect the orange wire from the “A” 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 CO₂ sensor and breath on it. The display should show an increase in CO₂ 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). There may be a delay between movements as the damper indexes open.

**FIGURE 2
8403-056 CO₂ SENSOR SET UP**

QWSCRV Set-Up for Full Demand Control Using 8403-056 CO₂ Controller

Controller Settings--See Fig. 2b	
Range 500-1500 ppm	
SW1 = "Off"	
SW2 = "On"	
"Out" set to "0-100%"	NOTE: Fig. 2a are the default jumper settings. The "OUT" and "AN" must be repositioned as shown in Fig. 2b
Analog Output (AN) set to "Current"	

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.

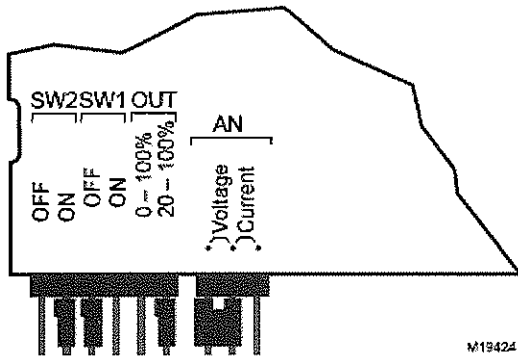


Fig. 2a -- Default Jumper Settings

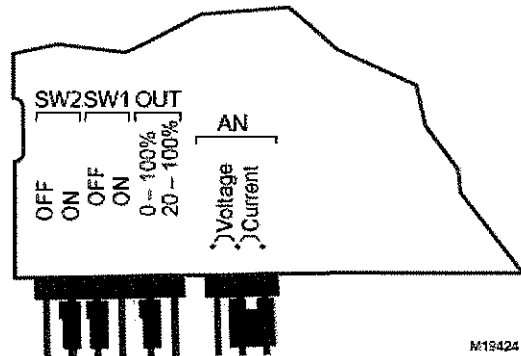


Fig. 2b -- Final Jumper Settings