
INSTALLATION INSTRUCTIONS

Commercial Room Ventilator with Exhaust and Optional CO₂ Modulation

Model: QCRV-4 (920-0540)

For Use with Bard QC501 Series
Chilled Water Air Conditioners



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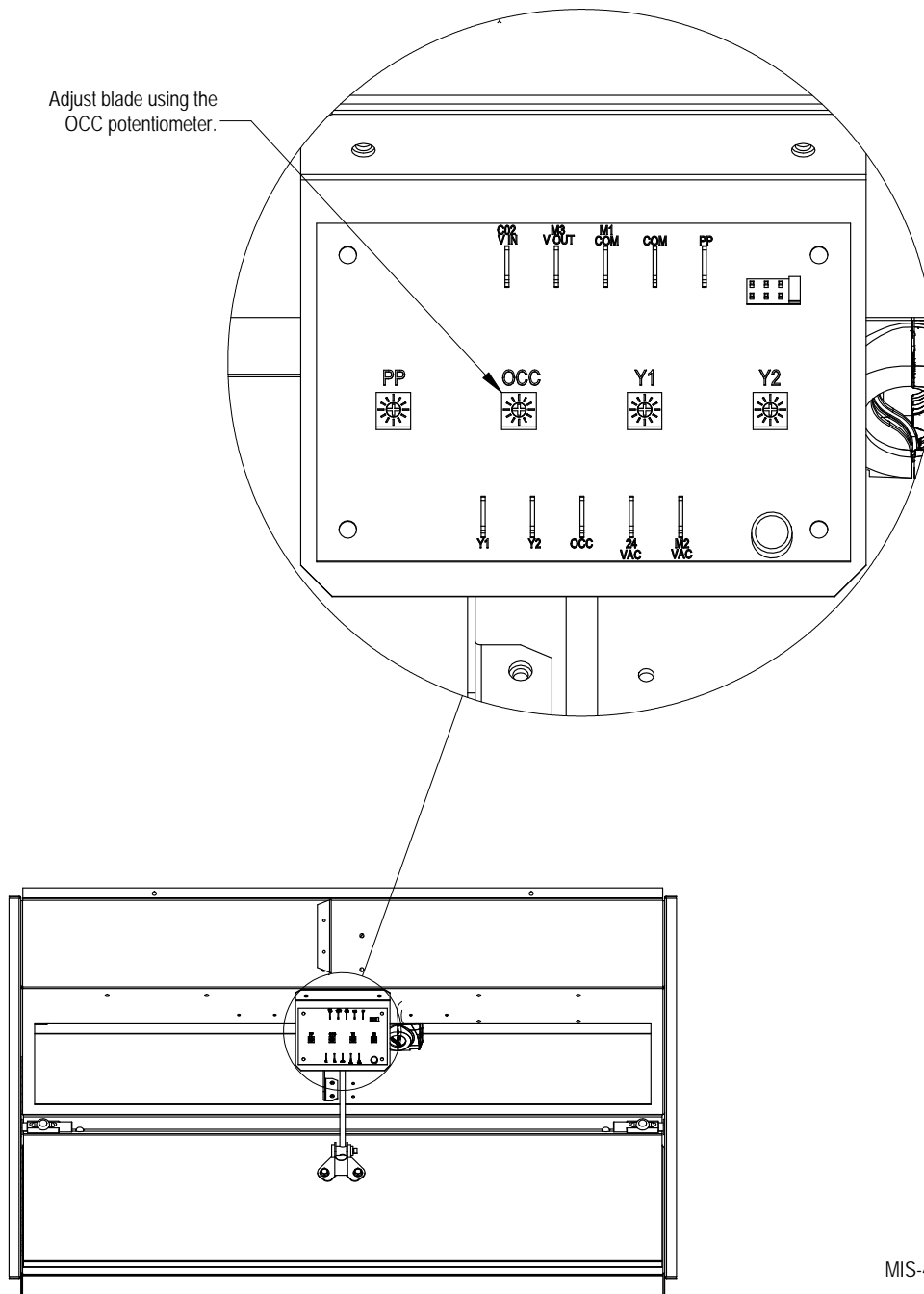
Description

The QCRV commercial room ventilator (CRV) is designed to be used with Bard QC501 series chilled water air conditioners. It is an electromechanical ventilation system designed to provide fresh air to meet indoor air quality standards with built in exhaust provisions.

QCRV-4

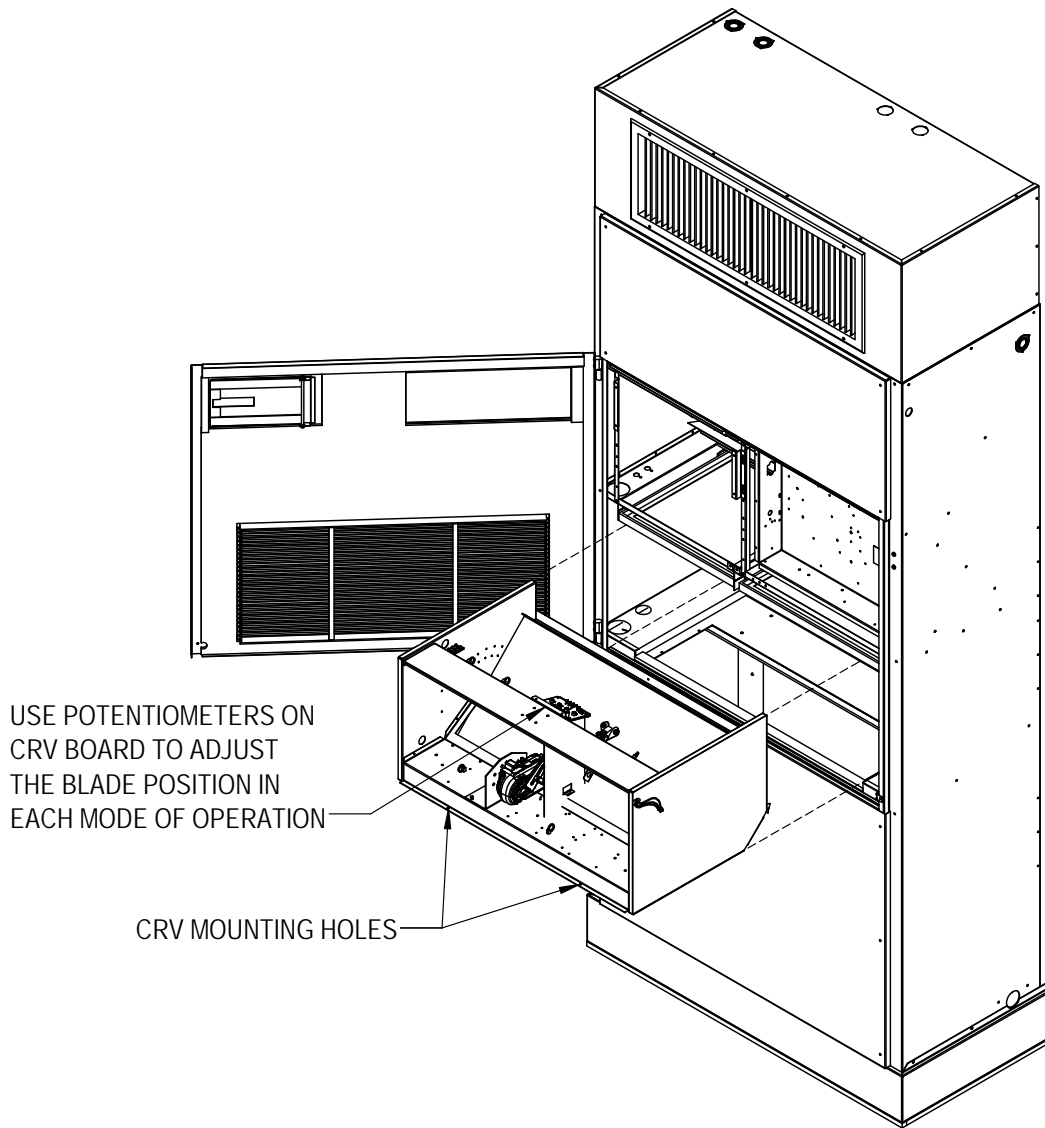
The QCRV-4 has a spring return damper blade. If vent operation is no longer required or in the event of a power loss, the blade will spring return close. Adjusting the OCC potentiometer on the CRV control board will set the maximum blade position (see Figure 1) Using the graphs, set the blade position to deliver the proper CFM.

FIGURE 1
Adjusting OCC Potentiometer on CRV Control Board



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FIGURE 2
CRV Installation and Adjustment



USE POTENTIOMETERS ON
CRV BOARD TO ADJUST
THE BLADE POSITION IN
EACH MODE OF OPERATION

CRV MOUNTING HOLES

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Blade Adjustment for Desired Ventilator Air

NOTE: QCRV-4 is factory adjusted to the "B" blade setting.

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.

To determine the amount of fresh air that will be supplied to the structure:

1. Determine the pressure drop of the supply air duct (see Table 1). For duct-free applications with return air filter grille and supply grille, use the Duct-Free column.
2. Determine the ventilation CFM required.
3. Find the ventilation CFM required in Table 1. Read left to determine required blade position for the desired ventilation CFM.

TABLE 1
QCRV-4 Ventilation Mode

Damper Position	Duct-Free	Static Pressure		
		0.1	0.3	0.5
A	140	135	125	120
B	180	170	160	160
C	220	210	205	195
D	315	315	315	290
E	410	400	385	380

- Energize ventilator and adjust OCC potentiometer to open the blade to the desired position on the QCRV-4 (see Figure 1 on page 3). Label on right side of QCRV indicates the A, B, C, D and E positions. Remove filter for better viewing.
- Program thermostat, CS2000A or DDC control system to turn on ventilator during occupied periods only.

CRV Board Sequence of Operation

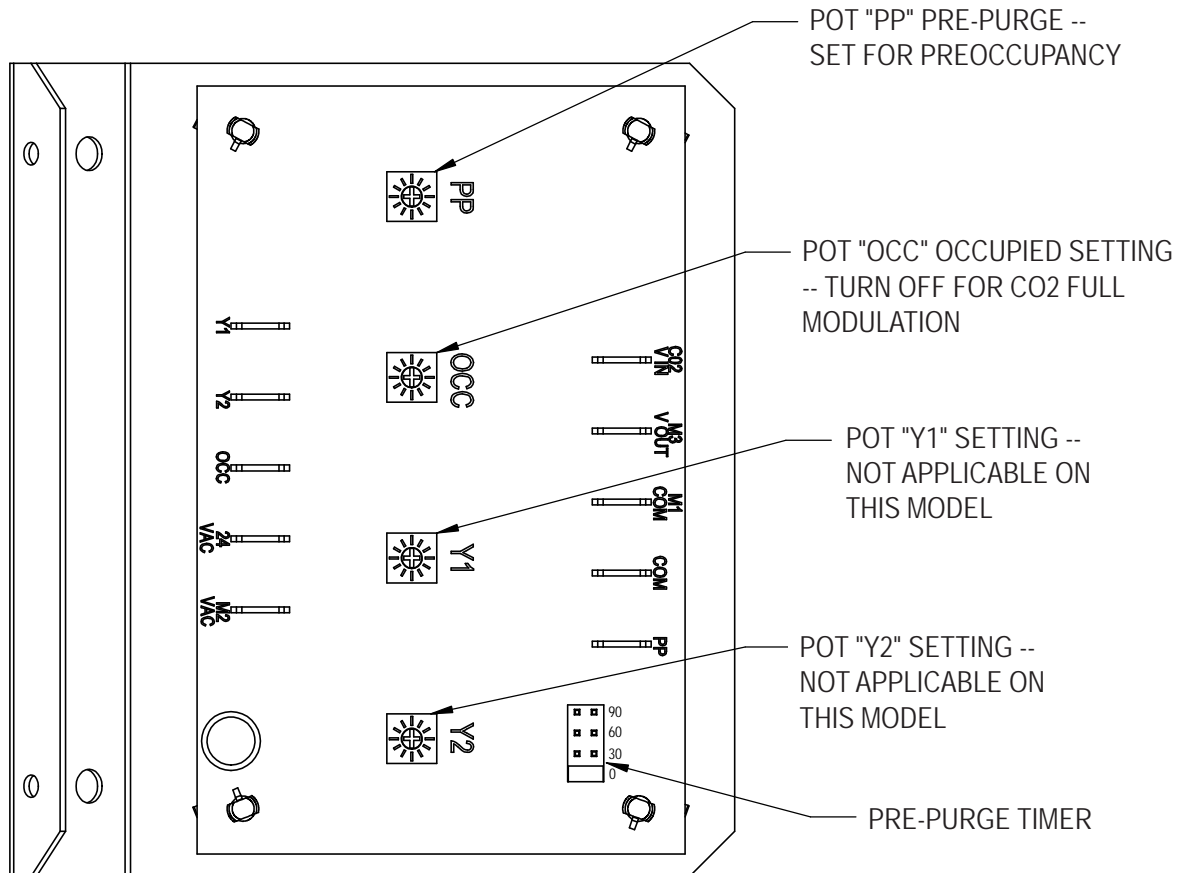
The "V" Ventilation option includes a control board with blade positioning potentiometers along with an input for a 2-10V input signal (see Figure 3).

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. The pre-purge time can be set to 0, 30, 60 or 90 minutes using the PP jumper on the CRV control board. The pre-purge function is triggered when the "3" terminal on the low voltage terminal strip is energized, indicating occupancy. Once the selected time has passed, the blade will move to the position set by the "OCC" potentiometer.

"OCC" Potentiometer setting: This potentiometer can be used to adjust the blade setting for outdoor air intake when the "3" terminal is energized on the low voltage terminal strip indicating occupancy. The control board will energize the occupied setting after the pre-purge cycle or immediately if pre-purge jumper is set to the "0" position.

FIGURE 3
CRV Control Board



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“Y1” Potentiometer setting: *Not applicable on this model.*

“Y2” Potentiometer setting: *Not applicable on this model.*

2-10V Operation

A CO₂ 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 CO₂ sensor part #8403-096 can be used when the 2-10V output is connected to the "CO2 V IN" tab on the CRV control board. The pre-purge "PP" and occupied "OCC" potentiometer settings must be set to the off position and pre-purge jumper must be set to "0" position for total modulation. The OCC potentiometer can be used to maintain a minimum blade position when "3" 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 1/4" tab connector of the white wire coming from the damper motor lead must be disconnected from the CRV control board wiring. The 2-10V signal coming from the CO₂ controller must be connected to this wire.

During 2-10VDC operation with "3" energized and pre-purge timed operation active, DC voltage signaling occupancy from a source such as a CO₂ sensor will increase ventilation amounts as needed.

Adding Optional Co₂ Control Sensor

Adding an optional CO₂ control sensor (Bard Part #8403-096) to this control will maximize the capabilities of this vent by only supplying fresh air intake to maintain CO₂ levels. This has multiple benefits.

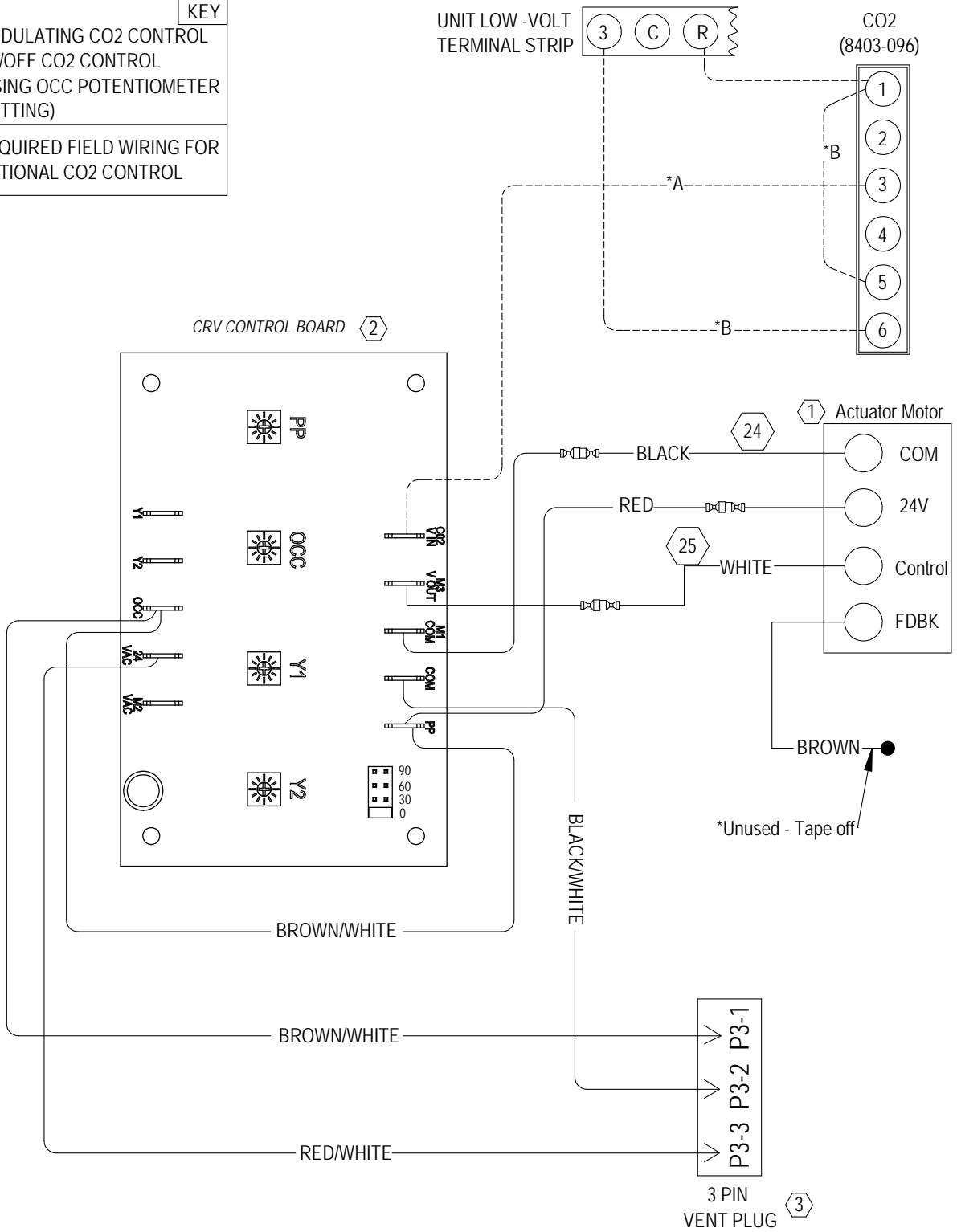
- Minimizes ventilation load on structure as it only brings in what is required to maintain CO₂ levels thus lowering reconditioning requirements (not having to heat/cool as much outside air).
- Will self-adjust for various occupancy levels so that fresh air is not being brought in beyond need. For example, if a room is designed for a maximum occupancy of 40 persons (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. Run four (4) wire thermostat wire from the unit to the desired CO₂ sensor location.
3. Follow Figure 5 on page 8 to configure the CO₂ sensor for proper operation.
4. Connect the thermostat wiring from the CO₂ sensor to step control assembly following the wiring diagram in Figure 4 or the one on the ventilator assembly.
5. To check operation, restore power to the unit.
6. Make sure that thermostatic control is in "occupied" mode of operation calling for ventilation. Terminal "3" on the low voltage terminal strip must be energized to open damper.
7. Have someone stand in front of the CO₂ sensor and breathe on it. The display should show an increase in CO₂ ppm, and the damper blade in the ventilation package should increase. (It may be best to have two people to do this—one to breathe on control and one to observe damper.)

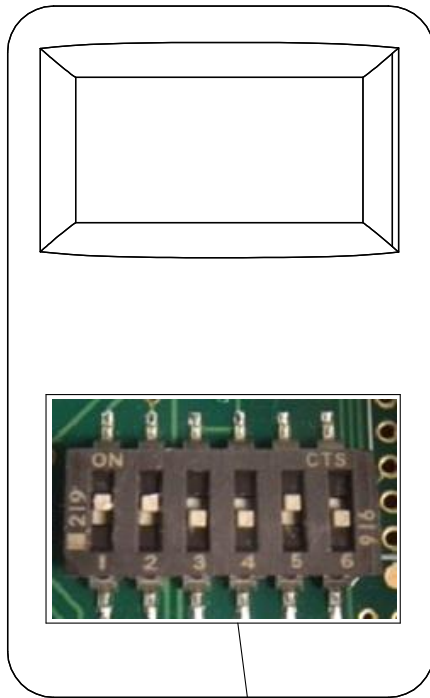
FIGURE 4
CRV Wiring Diagram

KEY	
*A - MODULATING CO2 CONTROL	
*B - ON/OFF CO2 CONTROL (USING OCC POTENTIOMETER SETTING)	
---	REQUIRED FIELD WIRING FOR OPTIONAL CO2 CONTROL



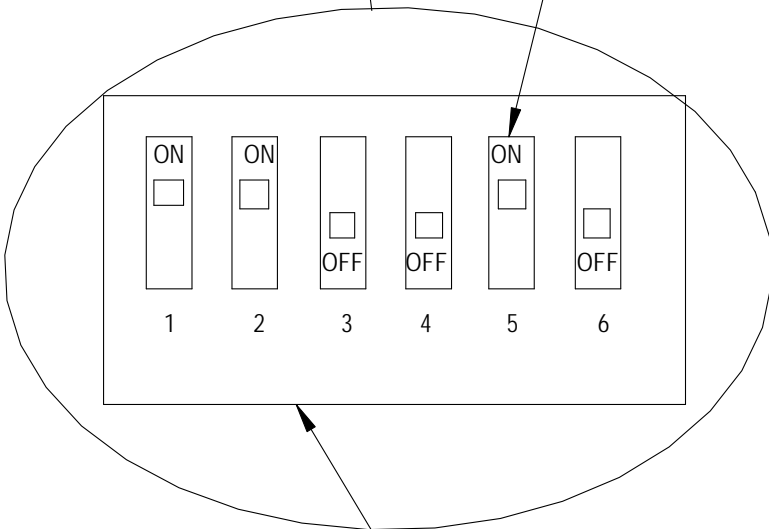
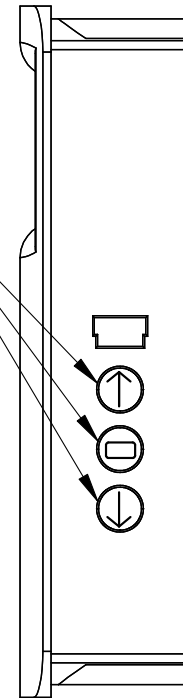
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FIGURE 5
8403-096 CO₂ Sensor Set Up



PRESS UP AND DOWN
 ARROWS TO ENTER
 CONFIGURATION MODE
 USE ARROWS TO SELECT
 SETTING. PUSH MIDDLE
 BUTTON TO CHANGE.
 CONTROLLER WILL
 SHOW SET.

NOTE: MENU
 DIP SWITCH MUST
 BE IN "ON" POSITION #5
 TO CHANGE ANY
 SETTINGS WITH
 THE SIDE BUTTONS.
 TO LOCK THE CO2
 CONTROLLER MOVE
 DIP SWITCH TO "OFF" AFTER
 IT HAS BEEN CONFIGURED.



DIP SWITCHES MUST BE
 POSITIONED AS SHOWN
 FOR PROPER OPERATION

Settings	Recommended	Default
RON (RELAY ON SET POINT)	725	
ROF (RELAY OFF SET POINT)	700	
DSP (DISPLAY CONFIGURATION)	C	CT
UNI (UNITS SELECTION)	US	US
COL (CO2 LOW OUTPUT RANGE)	700	0
COH (CO2 HIGH OUTPUT RANGE)	1500	2000
TOL (TEMP. LOW OUTPUT RANGE)	Not Used	
TOH (TEMP. HIGH OUTPUT RANGE)	Not Used	
BAR (BAROMETRIC PRESSURE)	See Instructions with Controller For High Altitude Installations	
CAL (CALIBRATION)	Used for Field Calibration	

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