# INSTALLATION INSTRUCTIONS

# COMMERCIAL ROOM VENTILATORS WITH EXHAUST

## MODEL
## CRV-5

## For Use with Bard 3-1/2 thru 5 Ton Wall Mount Air Conditioners and Heat Pumps

Bard Manufacturing Company
Bryan, Ohio 43506

*Since 1914...Moving ahead, just as planned.*

Manual : 2100-222E
Supersedes: 2100-222D
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**Manufactured under U.S. patent nuber 5,301,744**
**Other patents pending**

# GENERAL

## 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, 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 CRV-5 ventilator is designed to be used with Bard 3-1/2 thru 5 ton wall mount series air conditioners and heat pumps. They are electromechanical vent systems designed to provide fresh air to meet indoor air quality standards with built in exhaust provisions.

# INSTALLATION

## BASIC INSTALLATION

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

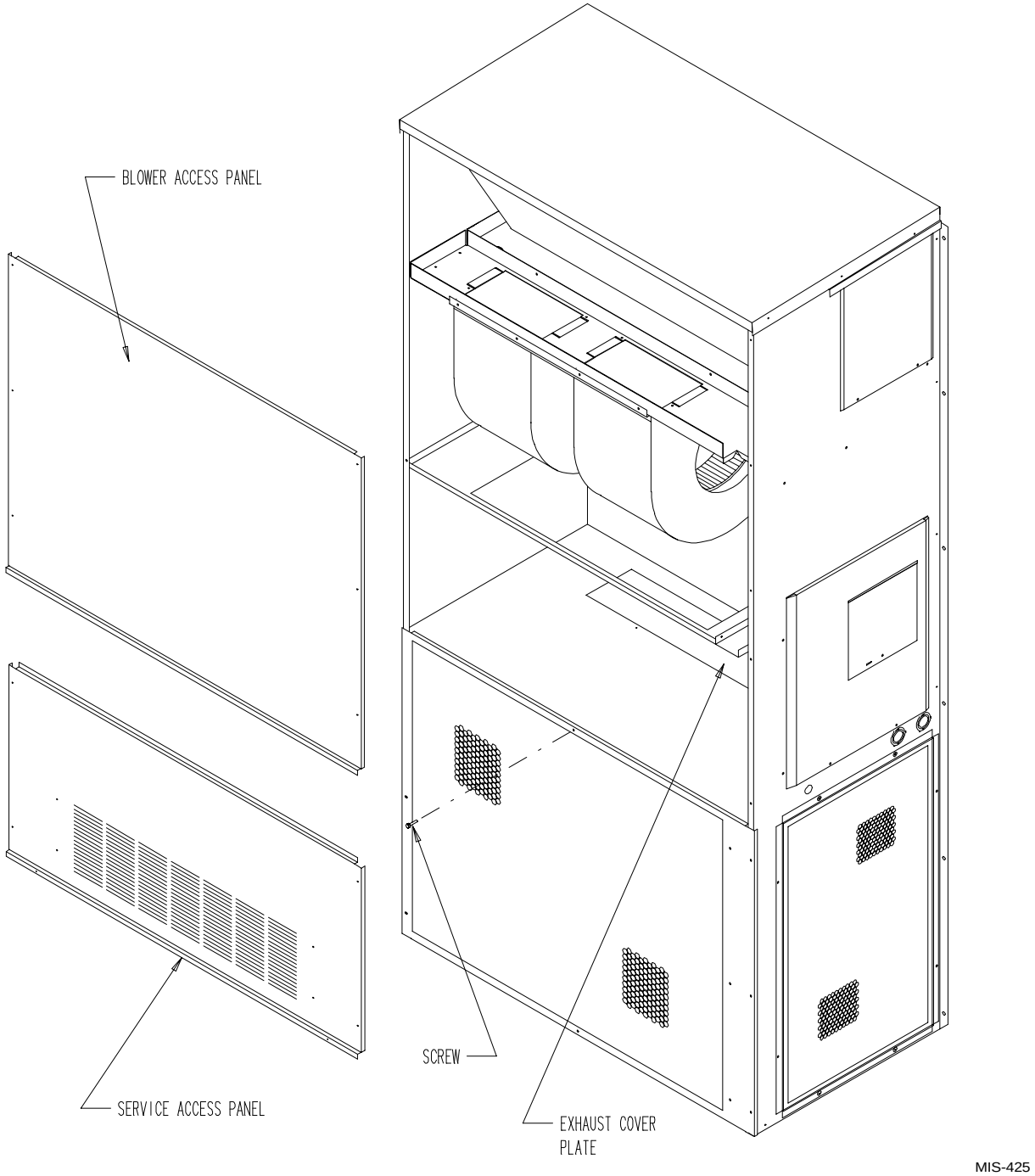
**⚠ WARNING**

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.

| MODEL | FOR USE WITH FOLLOWING UNITS | | |
|---|---|---|---|
| CRV-2 | WA1881<br>WA241 | WH181<br>WH241 | WL181<br>WL241 |
| CRV-3 | WA301<br>WA361 | WH301<br>WH361 | WL301<br>WL361 |
| CRV-5 | WA421<br>WA482<br>WA602 | WH421<br>WH482<br>WH602 | WL421<br>WL482<br>WL602 |

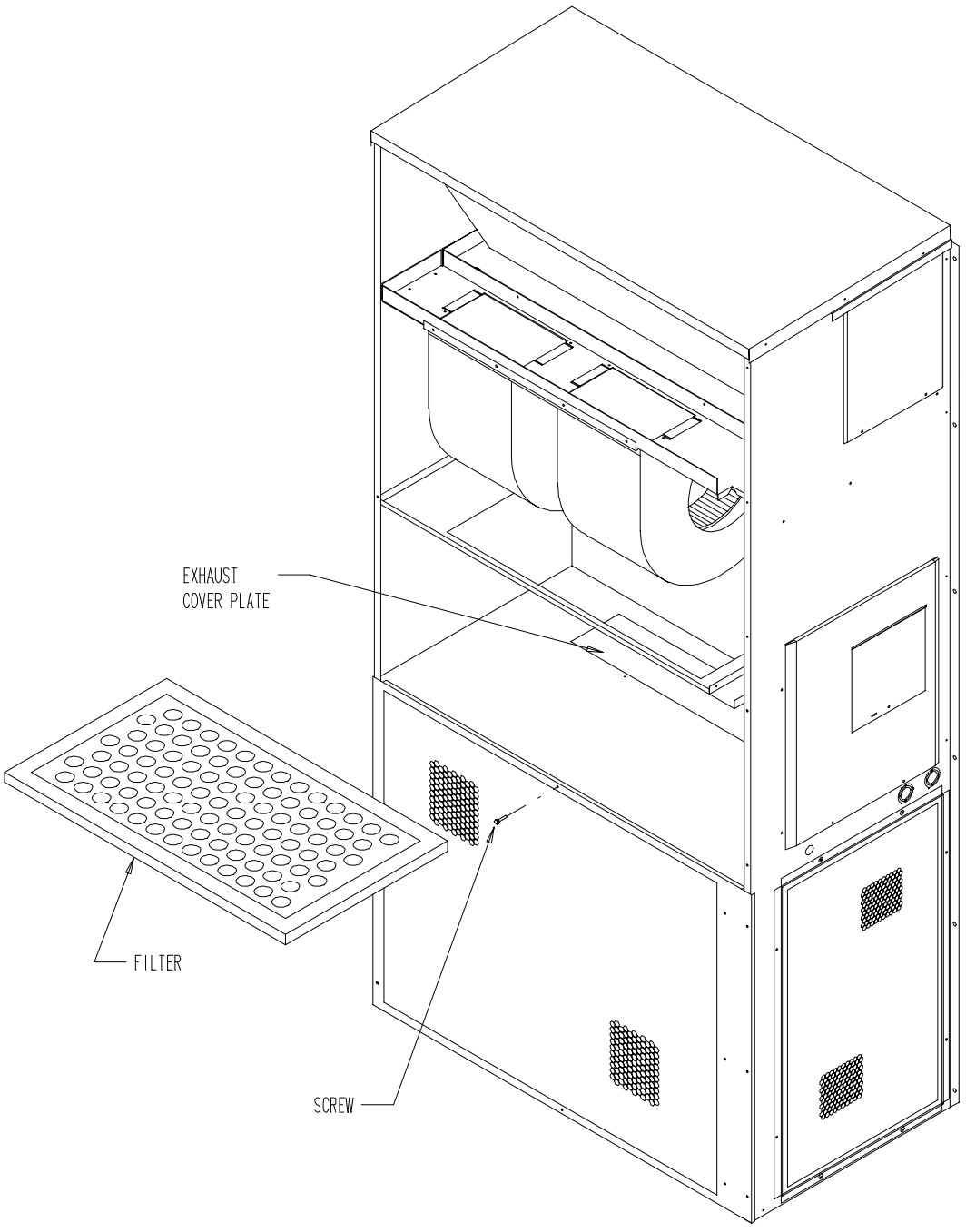
2. Remove and save the existing exterior blower access and service access panels on the Bard wall mount unit. (See Figure 1.)

**FIGURE 1**
**REMOVE ACCESS 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**

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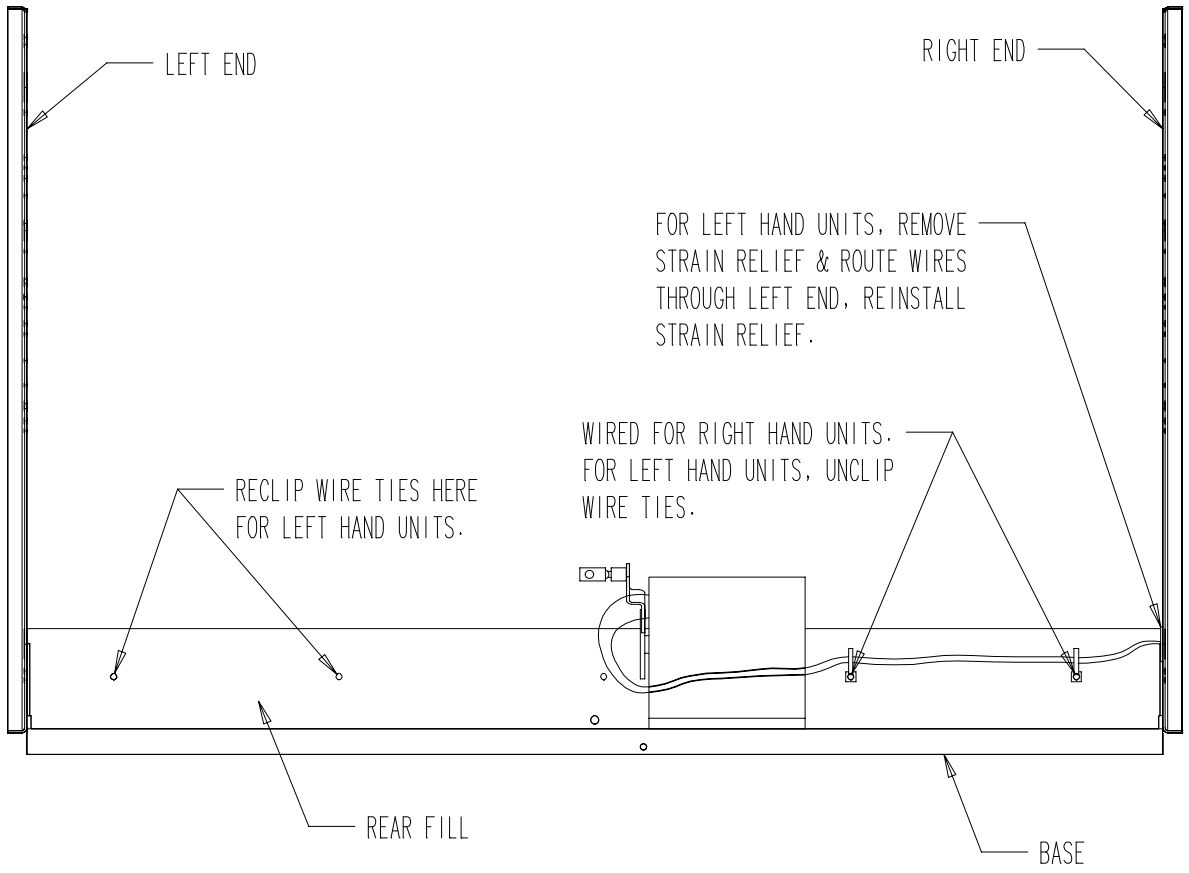
5. For Installation of Left Hand Units Only – Remove strain relief in right side of CRV. Un-clip the (2) wire ties holding the wire harness. Reroute wires to left side of CRV. Reinstall wire ties in left side holes. Route wires through left side and reinstall strain relief. (See Figure 3.)

**FIGURE 3**
**REROUTE WIRES FOR LEFT HAND UNITS ONLY**

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6. Install ventilator 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 4.)

   *IMPORTANT: Position front lip of ventilator on top of front grille and condenser partition. (See Figure 4 inset.) This is important to ensure proper drainage of any water entering damper assembly.*

7. Open control panel to gain access to unit low voltage terminal block.
8. Route electrical harness leads through the 7/8" bushing in control panel (Figure 4) into low voltage box.

**FIGURE 4**
**INSTALL VENTILATOR**

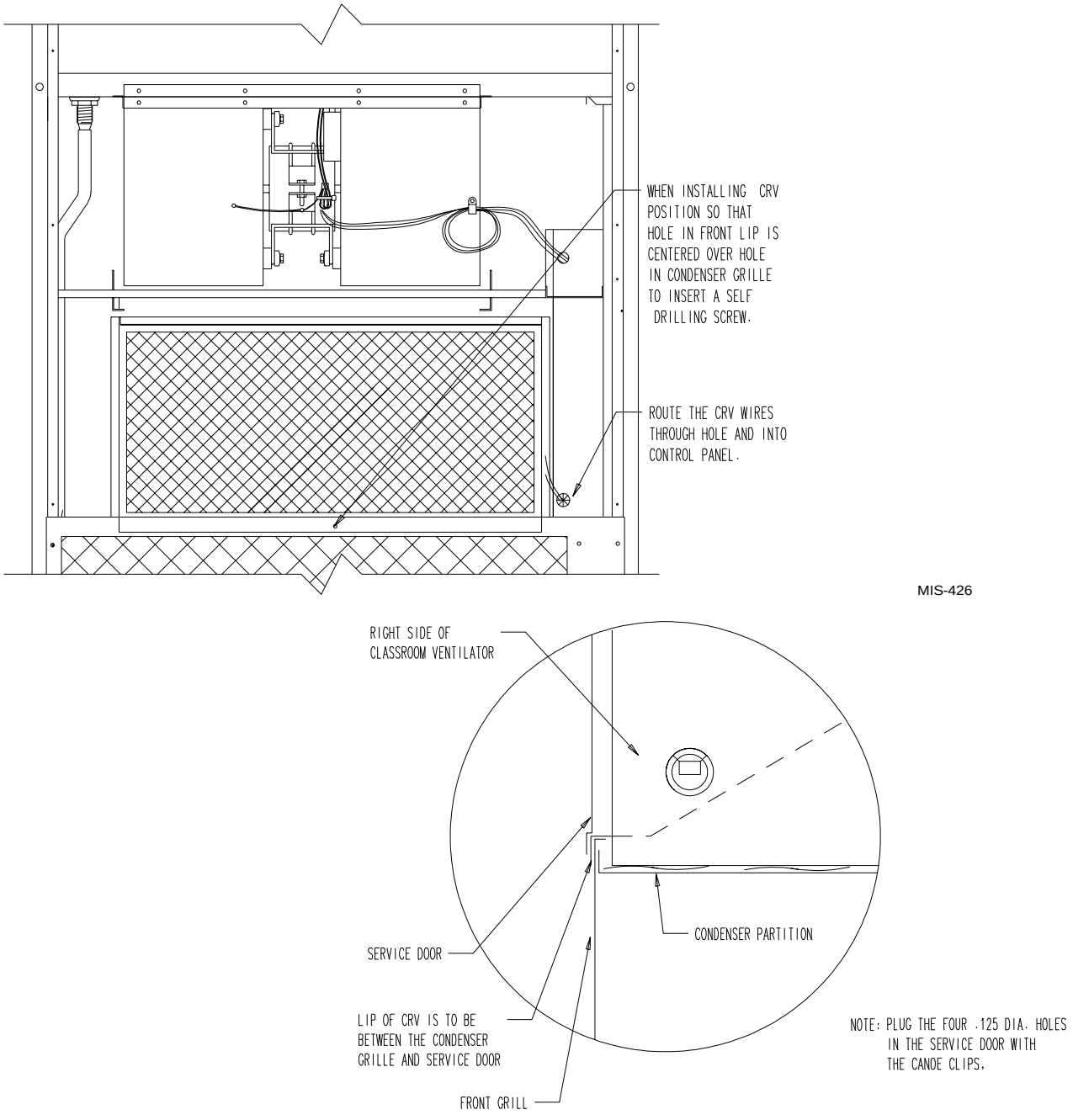
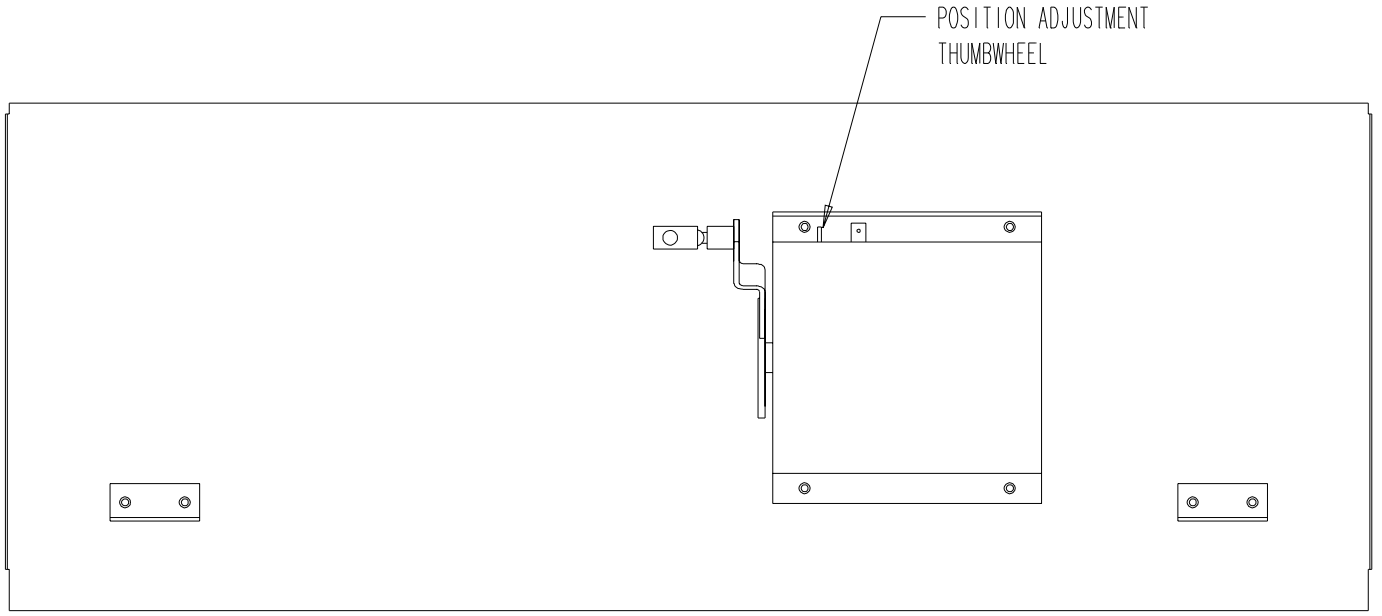


**FIGURE 5**
**TOP VIEW OF CONTROL PANEL**

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*NOTE: Rotate thumbwheel up to open; down to close.*

9. Connect leads with fork terminal to corresponding points on terminal strip to terminals C and G. (See wiring diagram, Figure 6 below or on ventilator.)
10. Close control panel cover
11. Replace left filter support, filter and four (4) screws in condenser grille.
12. Reinstall the blower access panel at top of unit and secure with sheet metal screws.
13. Ventilator Checkout
    A. Remove mist eliminator to allow access to minimum position thumbwheel. (See Figures 4 & 5.)
    B. Resupply power to unit.
    C. Energize the evaporator blower by switching thermostat to the manual fan position with heat/cool in OFF position.
    D. Ventilator should open to the position set by position adjustment thumbwheel. Cycle position adjustment thumbwheel to full open through full close. Observe damper blade operation throughout travel to assure free, unobstructed movement. (See Figure 5.)
    E. Adjust position adjustment thumbwheel until desired blade setting is reached with power applied to unit. See Tables 1 through 3 for required blade setting versus ventilator air.
    F. De-energize evaporator blower. Damper blade should close.
    G. This completes ventilator checkout.
14. Replace mist eliminator. Be sure it is installed with the drain holes to the bottom.
15. 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.
16. Replace service access panel.
17. Ventilator is now ready for operation.

## BLADE ADJUSTMENT FOR DESIRED VENTILATOR AIR

The amount of ventilation air supplied by the commercial room ventilator is dependant on four (4) factors.

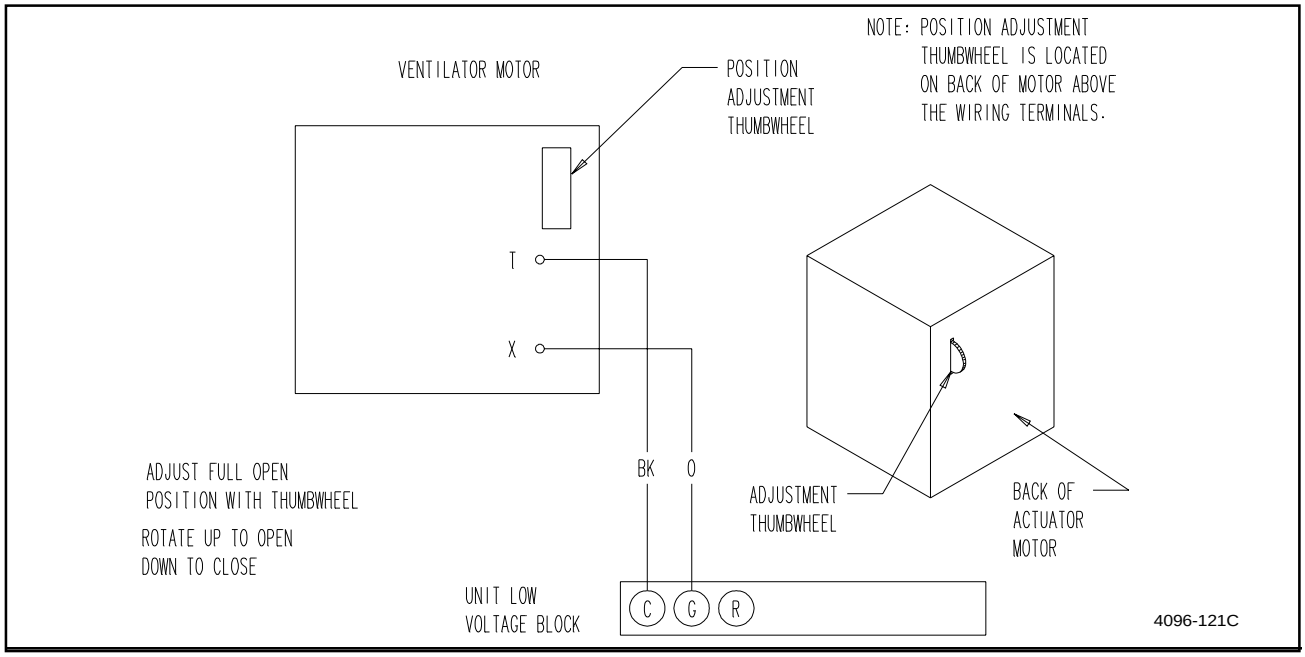
1. Return air duct static pressure drop.
2. Supply air duct static pressure drop.
3. Indoor blower motor speed.
4. Damper blade open position setting.

To determine the amount of fresh air that will be supplied to the structure first determine the pressure drops of the supply and return air ducts. For free blow application with return air filter grille and supply grille assume .05 supply static, .10 return static. See application Table 3.

Determine on what speed the evaporator motor is running.

Refer to the tables on the following pages to determine the blade setting necessary to achieve the ventilation air requited at the supply and return static duct pressures drops that are applicable.

**FIGURE 6**
**LEAD CONNECTIONS**



## COMMERCIAL ROOM VENTILATOR – CRV-5
## VENTILATION AIR WITH DUCTED SYSTEM

**TABLE 1**

0.00 SUPPLY AIR STATIC

| HIGH SPEED | | Ventilation Air (CFM) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Damper Position | A | 185 | 270 | 350 | 390 | 425 | 490 | 550 |
| | B | 345 | 425 | 460 | 500 | 540 | 595 | 650 |
| | C | 500 | 535 | 570 | 615 | 660 | 710 | 755 |
| | D | 660 | 685 | 415 | 740 | 770 | 805 | 840 |
| | E | 820 | 835 | 855 | 870 | 885 | 910 | 930 |
| Return Static Pressure | | .00 | .05 | .10 | .15 | .20 | .25 | .30 |

0.20 SUPPLY AIR STATIC

| HIGH SPEED | | Ventilation Air (CFM) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Damper Position | A | 175 | 260 | 350 | 390 | 430 | 490 | 550 |
| | B | 325 | 385 | 450 | 495 | 540 | 590 | 645 |
| | C | 480 | 515 | 550 | 600 | 650 | 695 | 740 |
| | D | 630 | 660 | 690 | 720 | 750 | 785 | 820 |
| | E | 780 | 805 | 830 | 840 | 850 | 875 | 900 |
| Return Static Pressure | | .00 | .05 | .10 | .15 | .20 | .25 | .30 |

0.30 SUPPLY AIR STATIC

| HIGH SPEED | | Ventilation Air (CFM) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Damper Position | A | 185 | 255 | 330 | 380 | 430 | | |
| | B | 320 | 375 | 435 | 485 | 535 | | |
| | C | 460 | 500 | 540 | 590 | 640 | | |
| | D | 600 | 625 | 655 | 690 | 730 | | |
| | E | 745 | 755 | 770 | 795 | 820 | | |
| Return Static Pressure | | .00 | .05 | .10 | .15 | .20 | .25 | .30 |

0.40 SUPPLY AIR STATIC

| HIGH SPEED | | Ventilation Air (CFM) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Damper Position | A | 195 | 255 | 315 | | | | |
| | B | 320 | 365 | 420 | | | | |
| | C | 440 | 480 | 525 | | | | |
| | D | 575 | 595 | 650 | | | | |
| | E | 710 | 710 | 715 | | | | |
| Return Static Pressure | | .00 | .05 | .10 | .15 | .20 | .25 | .30 |

**TABLE 1 (continued)**

0.00 SUPPLY AIR STATIC

| LOW SPEED | | Ventilation Air (CFM) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Damper Position | A | 200 | 260 | 320 | 380 | 440 | | |
| | B | 295 | 345 | 395 | 460 | 525 | | |
| | C | 390 | 430 | 470 | 540 | 610 | | |
| | D | 520 | 550 | 585 | 630 | 680 | | |
| | E | 650 | 675 | 700 | 725 | 750 | | |
| Return Static Pressure | | .00 | .05 | .10 | .15 | .20 | .25 | .30 |

0.10 SUPPLY AIR STATIC

| LOW SPEED | | Ventilation Air (CFM) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Damper Position | A | 185 | 250 | 310 | 375 | 435 | | |
| | B | 280 | 335 | 385 | 450 | 515 | | |
| | C | 380 | 425 | 465 | 530 | 595 | | |
| | D | 505 | 540 | 570 | 620 | 665 | | |
| | E | 635 | 660 | 680 | 710 | 740 | | |
| Return Static Pressure | | .00 | .05 | .10 | .15 | .20 | .25 | .30 |

0.20 SUPPLY AIR STATIC

| LOW SPEED | | Ventilation Air (CFM) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Damper Position | A | 180 | 240 | 300 | 365 | 430 | | |
| | B | 275 | 325 | 380 | 445 | 510 | | |
| | C | 370 | 415 | 465 | 530 | 595 | | |
| | D | 490 | 525 | 560 | 610 | 655 | | |
| | E | 615 | 635 | 660 | 690 | 720 | | |
| Return Static Pressure | | .00 | .05 | .10 | .15 | .20 | .25 | .30 |

## NON-DUCTED BLOW APPLICATION VENTILATION AIR WITH RETURN AIR FILTER GRILLE AND SUPPLY AIR GRILLE

**TABLE 2**

| | | Ventilation Air (CFM) | |
|---|---|---|---|
| | | High Speed | Low Speed |
| Damper Posiiton | A | 350 | 315 |
| | B | 460 | 390 |
| | C | 575 | 465 |
| | D | 720 | 575 |
| | E | 870 | 690 |

## CRV-5 TOTAL DELIVERED AIR WH602, WA602 and WL602

**TABLE 3**

HIGH SPEED BLOWER

| | | TOTAL DELIVERED AIR (CFM) | | | | | |
|---|---|---|---|---|---|---|---|
| Damper Position | Close | 2040 | 1955 | 1870 | 1775 | 1680 | 1585 |
| | A | 2030 | 1950 | 1870 | 1775 | 1680 | 1585 |
| | B | 1995 | 1910 | 1830 | 1740 | 1645 | 1550 |
| | C | 1960 | 1875 | 1790 | 1700 | 1610 | 1520 |
| | D | 1885 | 1750 | 1615 | 1575 | 1535 | 1490 |
| | E | 1810 | 1725 | 1640 | 1550 | 1460 | 1370 |
| Total Static Pressure | | .00 | .10 | .20 | .30 | .40 | .50 |

LOW SPEED BLOWER

| | | TOTAL DELIVERED AIR (CFM) | | | | | |
|---|---|---|---|---|---|---|---|
| Damper Position | Close | 1510 | 1480 | 1450 | 1420 | 1385 | 1350 |
| | A | 1490 | 1460 | 1430 | 1400 | 1370 | 1340 |
| | B | 1465 | 1435 | 1410 | 1380 | 1350 | 1320 |
| | C | 1440 | 1415 | 1390 | 1360 | 1330 | 1300 |
| | D | 1405 | 1375 | 1350 | 1320 | 1290 | 1260 |
| | E | 1370 | 1340 | 1310 | 1280 | 1255 | 1230 |
| Total Static Pressure | | .00 | .05 | .10 | .15 | .20 | .25 |

## CRV-5 TOTAL DELIVERED AIR
## WH482, WA482 and WL482
## WH421, WA421 and WL421

**TABLE 3 (continued)**

HIGH SPEED BLOWER

| | | TOTAL DELIVERED AIR (CFM) | | | | | |
|---|---|---|---|---|---|---|---|
| Damper Position | Close | 1865 | 1775 | 1685 | 1585 | 1485 | 1485 |
| | A | 1860 | 1770 | 1685 | 1585 | 1485 | 1385 |
| | B | 1850 | 1755 | 1660 | 1560 | 1460 | 1360 |
| | C | 1840 | 1740 | 1655 | 1555 | 1455 | 1355 |
| | D | 1770 | 1680 | 1590 | 1490 | 1390 | 1290 |
| | E | 1700 | 1610 | 1525 | 1425 | 1325 | 1225 |
| Total Static Pressure | | .00 | .10 | .20 | .30 | .40 | .50 |

LOW SPEED BLOWER

| | | TOTAL DELIVERED AIR (CFM) | | | | | |
|---|---|---|---|---|---|---|---|
| Damper Position | Close | 1560 | 1530 | 1500 | 1460 | 1425 | 1390 |
| | A | 1545 | 1515 | 1480 | 1445 | 1415 | 1380 |
| | B | 1530 | 1495 | 1460 | 1430 | 1400 | 1365 |
| | C | 1510 | 1485 | 1455 | 1420 | 1385 | 1350 |
| | D | 1480 | 1450 | 1420 | 1385 | 1345 | 1310 |
| | E | 1445 | 1415 | 1380 | 1345 | 1305 | 1270 |
| Total Static Pressure | | .00 | .05 | .10 | .15 | .20 | .25 |

## COMMERCIAL ROOM VENTILATOR – WA, WH AND WL SERIES

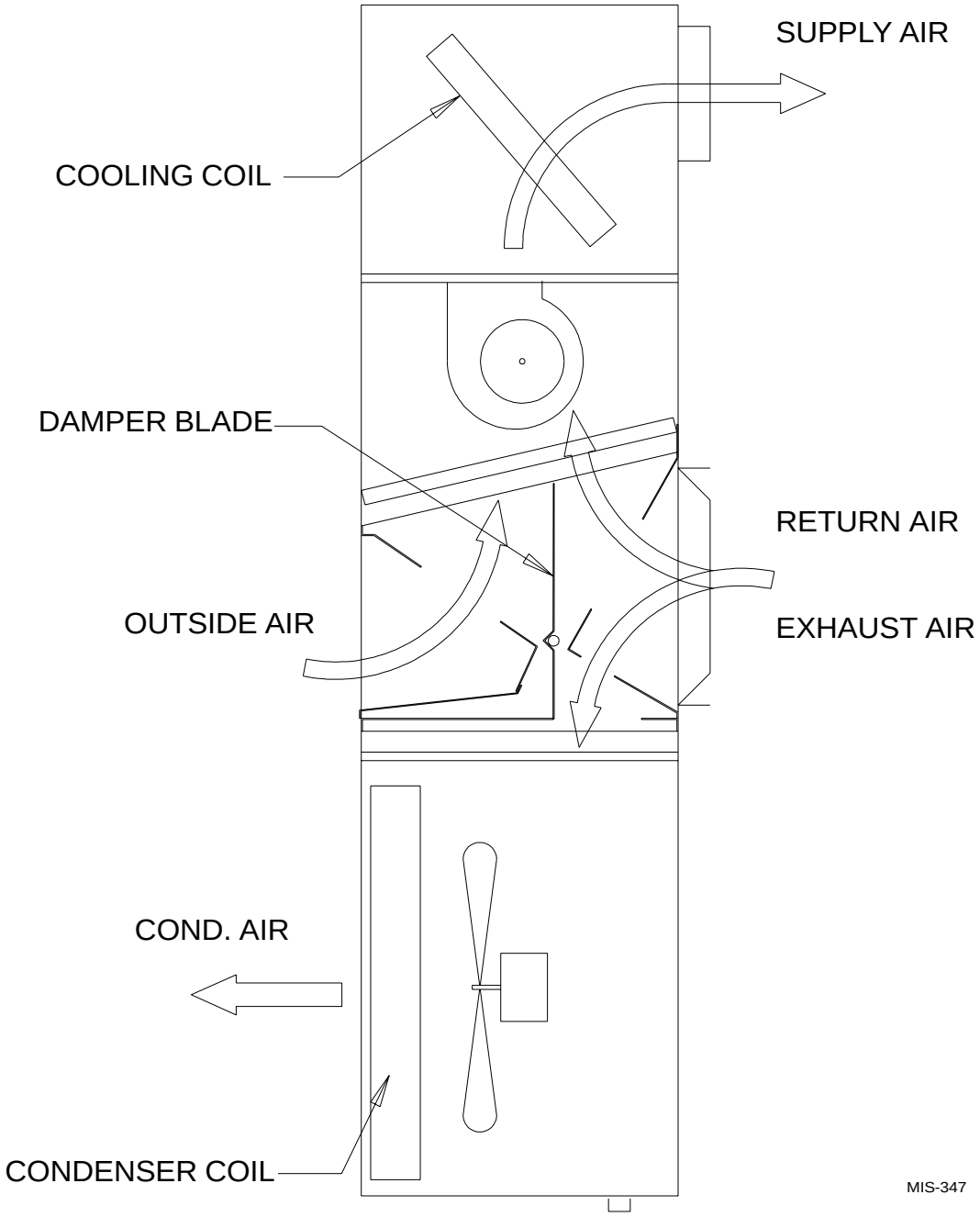
### FEATURES

- 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 minimum position potentiometer. See Figure 7.

**FIGURE 7**
**BLOWER OPERATION**



A call for cooling cycles the compressor, and dampers remain in the ventilation mode. On loss of blower operation, CRV closes fully. See Figure 8.

**FIGURE 8**
**LOSS OF BLOWER OPERATION**