Aprilaire®

Dehumidifier

Safety and Installation Instructions

Model 1700

INSTALLER – PLEASE NOTE!

1. **Installation must conform to all applicable codes.**
2. **A dedicated 15 Amp circuit is required for proper operation of the dehumidifier.** If a dedicated circuit is not available, do not install unit.
3. **For protection of the compressor, unit must be transported and installed in an upright position.** If the unit was shipped or stored on its side, a 24 hour settling period is required before running the unit.

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SAFETY INSTRUCTIONS

WARNING

- This product must be installed by a qualified heating and air conditioning contractor. Failure to do so could result in serious injury from electrical shock or damage to product.
- **120 volts may cause serious injury from electric shock.** Disconnect electrical power before starting installation. Leave power disconnected until installation is completed.
- **Sharp edges may cause serious injury from cuts.** Use care when cutting plenum openings and handling ductwork.
- **Unit weight and dropping may cause personal injury or equipment damage.** Handle with care.

OVERVIEW

The purpose of the Aprilaire Dehumidifier is to keep the humidity in the house at acceptable limits to reduce the unwanted effects of high humidity. The dehumidifier will measure the dewpoint of the house to decide if to run. The dryness set point can be adjusted with the control knob on the side of the unit.

An integrated air cycling feature can be used to turn on the HVAC blower to cycle the air through the house to balance the indoor conditions. This feature is set up during installation based on house size and homeowner preference. An optional ventilation damper can be also installed to bring in outside air during air cycling.

SPECIFICATIONS

Dimensions: 20"W x 24"L x 21.75"H

Weight: 100 lbs

Capacity: 90 pints per day @ 60%RH, 80 F (ANSI/AHAM DH-1-2003 conditions)

Power: 115 VAC, 9 Amps. Unit is equipped with an 8 ft. grounded power cord.

Design Airflow: 275 CFM @ 0.6 in. w.c.

Filter: MERV 8 Filter

Cabinet Insulation: 1" foil faced EPS insulation

Inlet Air Operating Conditions: 40F to 105F

Ambient Air Operating Conditions: 40F to 150F

LOCATION NOTES

The dehumidifier can be installed in a wide variety of locations including unconditioned spaces, provided the ambient conditions are between 40F and 150F. Note the following requirements for each application:

Attic / Garage

- All duct work must be insulated.
- Unit should be placed in a drain pan with overflow protection to prevent water damage in the event of a drain failure.
- The condensate line should be insulated to prevent condensation on the outside of the condensate line.
- Precautions should be taken to assure that the unit does not operate in conditions below 40F.

Basement

- Precautions should be taken to assure that the unit does not operate in conditions below 40F.

Crawl Space

- All duct work must be insulated.
- The condensate line should also be insulated to prevent condensation on the outside of the condensate line.
- Precautions should be taken to assure that the unit does not operate in conditions below 40F.

DUCTING

The Aprilaire Dehumidifier is supplied with two, 8" round collars. These are packaged inside the unit behind the filter access panel. When installing the collar make sure the foam seal uniformly contacts the cabinet and secure with 4 screws (not included). UL approved 8" diameter, insulated flexible duct is recommended for all connections. Rigid metal duct may be used. The duct should be capable of handling at least 2" w.g. of positive and 0.75" of negative pressure. All joints and seams must be sealed.

Design Air flow is 275 CFM @ 0.6" w.c. This is equivalent to 70 ft. of 8" duct on the inlet and outlet side of the dehumidifier. Elbows, turns and the Static pressure of the HVAC equipment will affect the airflow through the dehumidifier. See **Table 1** on page 11 for more detail.

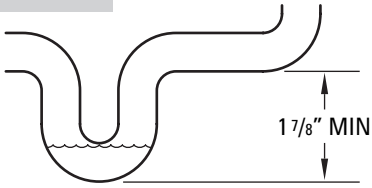
- **For optimal moisture removal, use a manual balancing damper to adjust air flow to 275 CFM @ 0.6" w.c. across the dehumidifier. Do not exceed 300 CFM or drop below 210 CFM.**
- **The total static pressure across the dehumidifier must not exceed 0.8" w.c. Check all pressures with the HVAC equipment blower on.**
- The outlet from the dehumidifier to the HVAC supply duct must be located at least 6" downstream of the cooling coil.
- If connected to HVAC ductwork, the dehumidifier inlet must be located at least 6" upstream of the HVAC system air cleaner. This will prevent any trapped particulates from being drawn into the dehumidifier.
- If UV Germicidal lamps are installed in the HVAC system, use appropriate methods to protect the flexible duct from the UV light.
- If air noise is a problem, install at least 5 feet of acoustical flexible duct on the outlet and inlet of the dehumidifier.

DRAIN LINE

The condensate drain of the humidifier must have a trap installed. Make sure that a secure, leak-proof connection is made between the drain trap and drain elbow on the dehumidifier. The condensate drain should be sloped to a floor drain or condensate pump so water can not back up past trap.

If unit is installed in an attic or in an area where flooding is a potential problem the unit should be installed in a secondary drain pan with a condensate overflow safety switch.

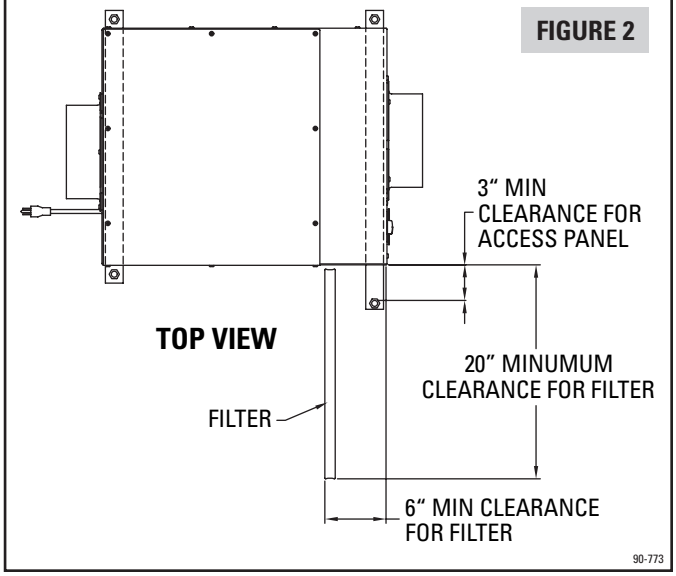
FIGURE 1



HANGING

If handing the unit, use two unistruts to support the base on the outside edges of the feet locations. The strut must come out a minimum of 20" in front of the filter access panel to allow the panel and filter to be removed.

FIGURE 2



WHOLE HOUSE INSTALLATION AND OPERATION

In this configuration the dehumidifier will pull air from the return duct. The air passes through the dehumidifier, where moisture is removed, and then returned to the HVAC system downstream of the cooling coil in the supply plenum. This installation is used when the HVAC unit conditions the area where dehumidification is needed. Connection to the HVAC unit for the primary living space or basement HVAC unit is ideal for this installation.

REQUIRED COMPONENTS

1 – 6508 Normally Closed Power Open Damper

Duct Work

24 VA Transformer (10 VA minimum per damper)

Thermostat Wire

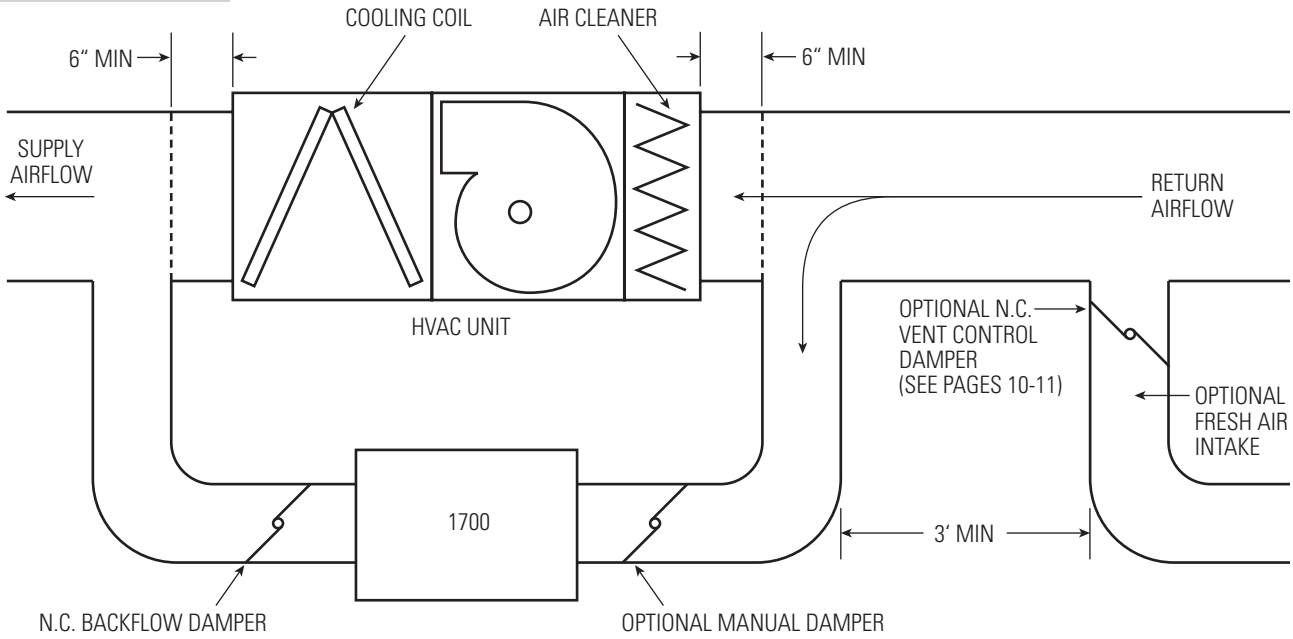
OPTIONAL COMPONENTS

8" Manual Damper to adjust air flow to 275 CFM

6506 Ventilation Damper

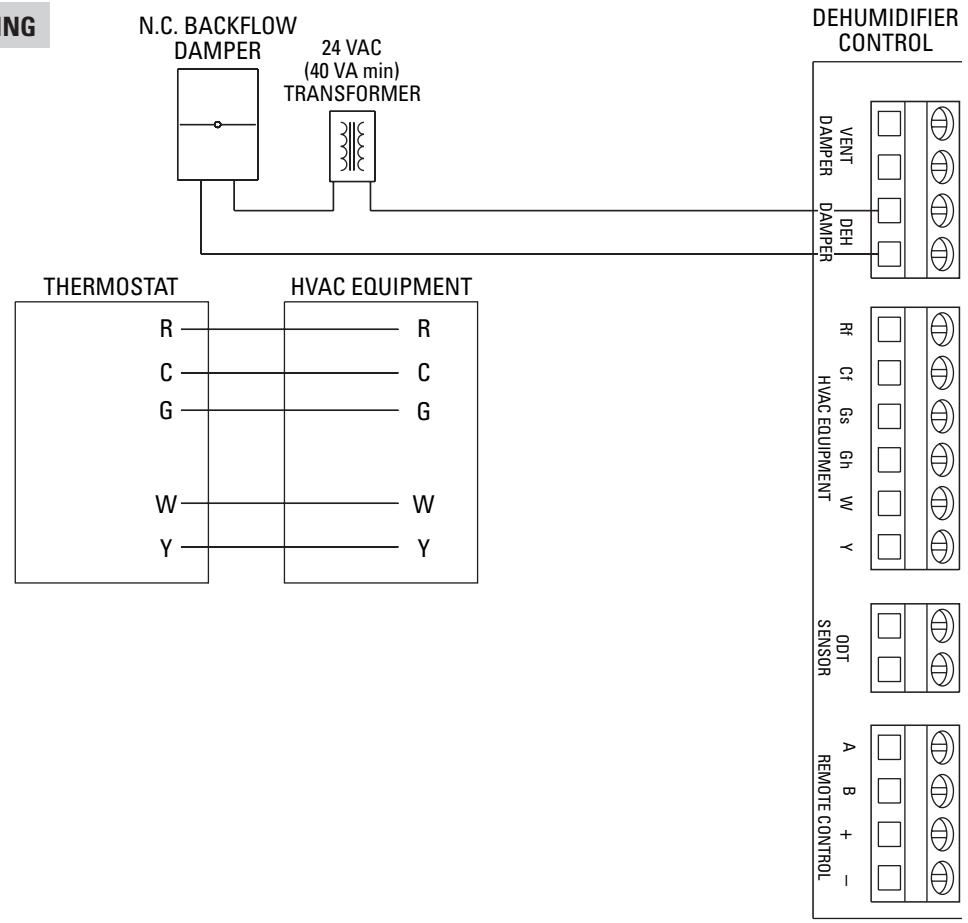
8052 Outdoor Temperature Sensor

FIGURE 3 – DUCTING



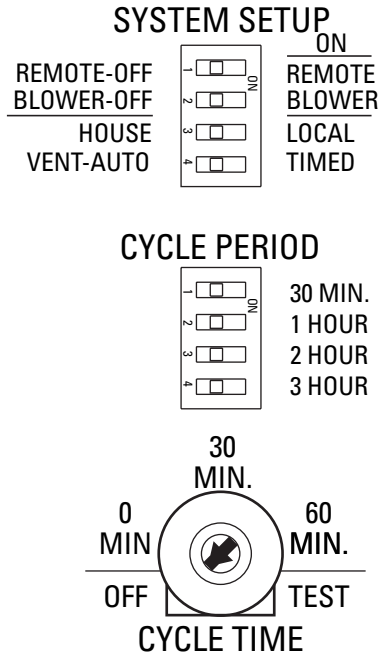
WHOLE HOUSE INSTALLATION AND OPERATION (CONTINUED)

FIGURE 4 – WIRING



90-781 WH

FIGURE 5 – SETTINGS



Standard	Fan Cycling	Ventilation
OFF	OFF	OFF
See pages 10-11	See pages 10-11	See pages 10-11
OFF	OFF	OFF
OFF	ON	OFF

Standard	Fan Cycling	Ventilation
OFF	See pages 10-11	See pages 10-11
ON	See pages 10-11	See pages 10-11
OFF	See pages 10-11	See pages 10-11
OFF	See pages 10-11	See pages 10-11

Standard	Fan Cycling	Ventilation
OFF	See pages 10-11	See pages 10-11

90-783 WH

LOCALIZED INSTALLATION AND OPERATION

In this configuration the dehumidifier will pull air from an area in the home. The air passes through the dehumidifier, where moisture is removed, and then returned to area. This installation is used when the HVAC unit conditions the area other than where dehumidification is needed. A basement or crawl space application is ideal for this installation.

REQUIRED COMPONENTS

None

OPTIONAL COMPONENTS

Duct Work

24 VA Transformer (10 VA Minimum)

Thermostat Wire

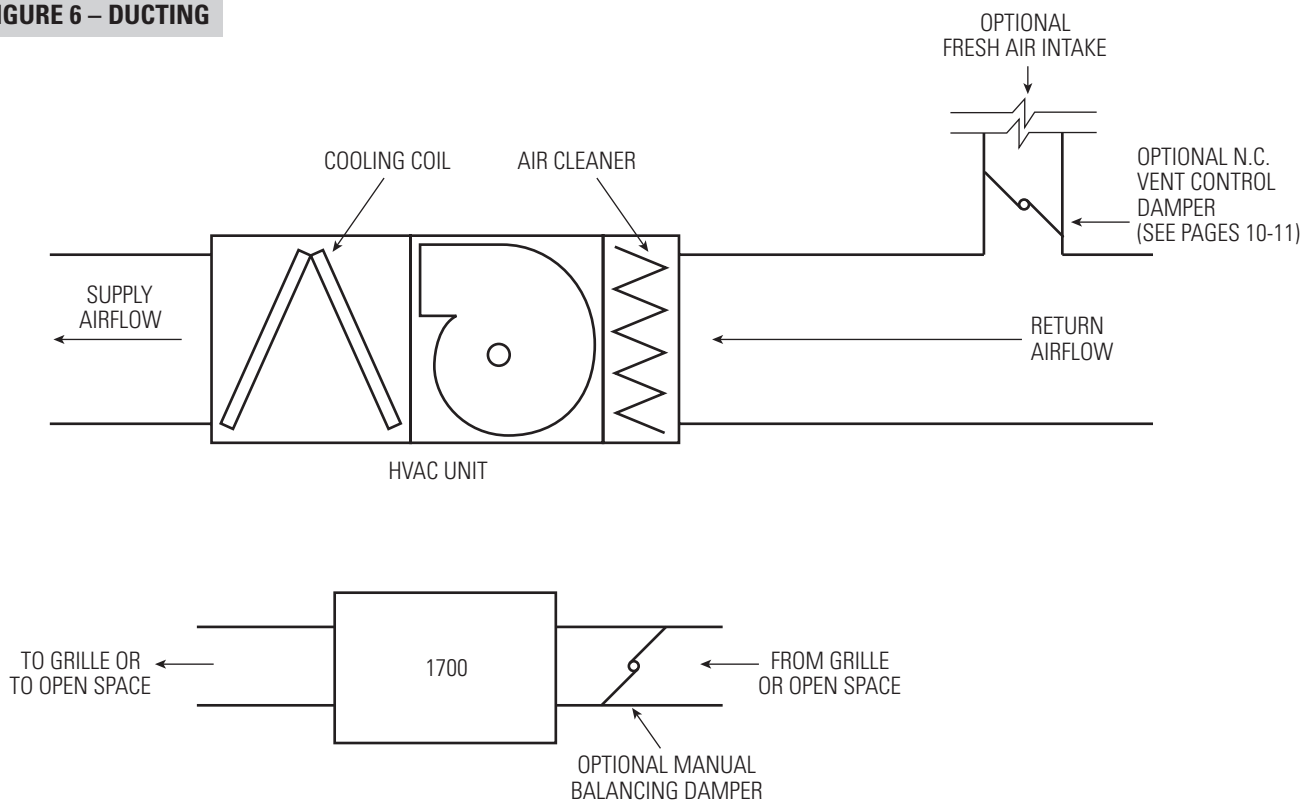
8" Manual Damper to adjust air flow to 275 CFM

6506 Ventilation Damper

8052 Outdoor Temperature Sensor

Grills

FIGURE 6 – DUCTING



LOCALIZED INSTALLATION AND OPERATION (CONTINUED)

FIGURE 7 – WIRING

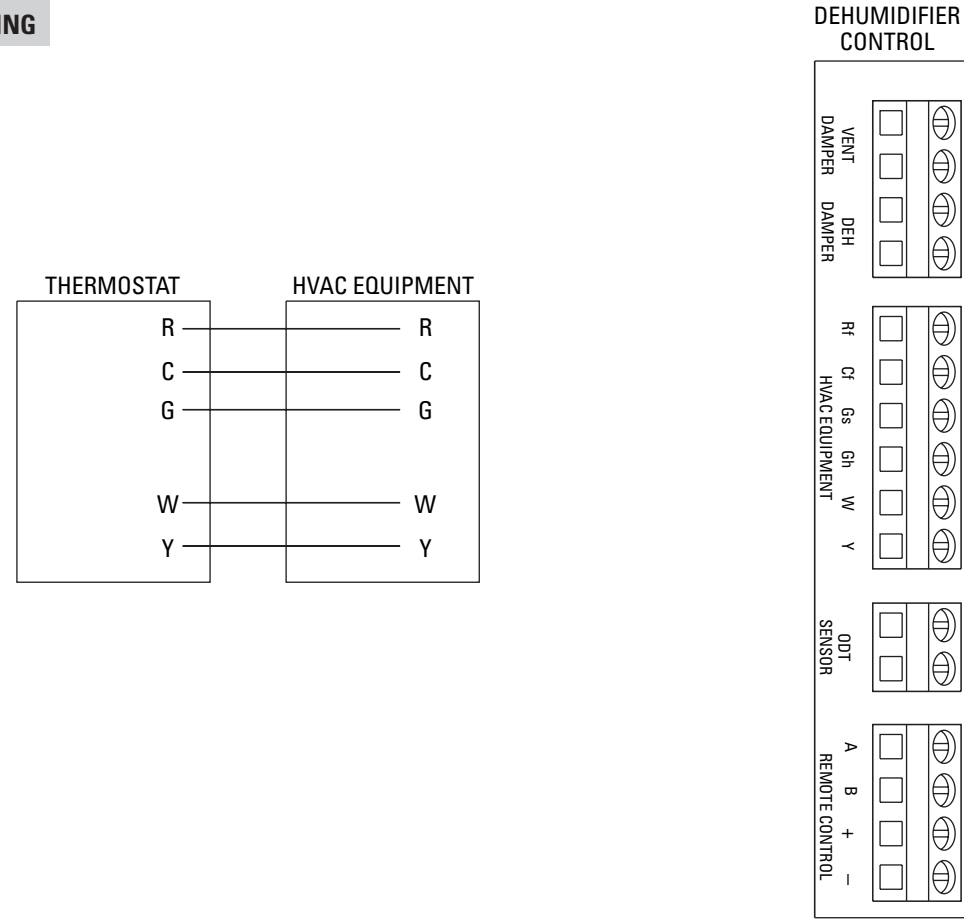


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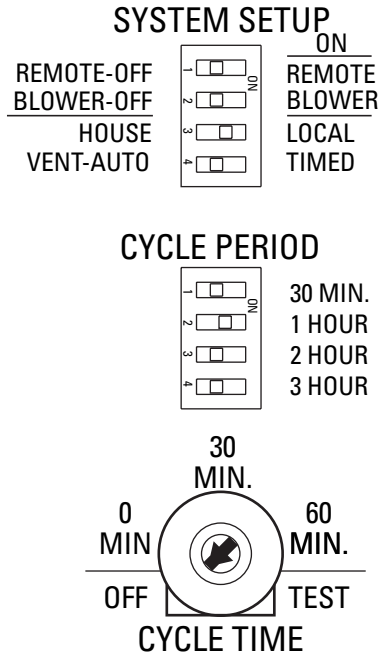
FIGURE 8 – SETTINGS



Standard	Fan Cycling	Ventilation
OFF	OFF	OFF
See pages 10-11	See pages 10-11	See pages 10-11
ON	ON	ON
OFF	ON	OFF

Standard	Fan Cycling	Ventilation
OFF	See pages 10-11	See pages 10-11
OFF	See pages 10-11	See pages 10-11
ON	See pages 10-11	See pages 10-11
OFF	See pages 10-11	See pages 10-11

Standard	Fan Cycling	Ventilation
OFF	See pages 10-11	See pages 10-11

90-783 L

WHOLE HOUSE / LOCAL CONVERTIBLE INSTALLATION AND OPERATION

In this configuration the dehumidifier will automatically switch between whole-house dehumidification when the HVAC equipment is on, and localized dehumidification when the equipment is off. This installation is used to dehumidify a whole house and a separate unconditioned space like an unfinished basement, or an area where circulation from that location throughout the entire house is undesirable.

REQUIRED COMPONENTS

2 – 6508 Normally Closed Power Open Damper

2 – 6608 Normally Open Power Closed Damper

Duct Work

24 VA Transformer (10 VA minimum per damper)

Thermostat Wire

OPTIONAL COMPONENTS

2 – 8" Manual Damper to adjust air flow to 275 CFM

6506 Ventilation Damper

8052 Outdoor Temperature Sensor

FIGURE 9 – DUCTING

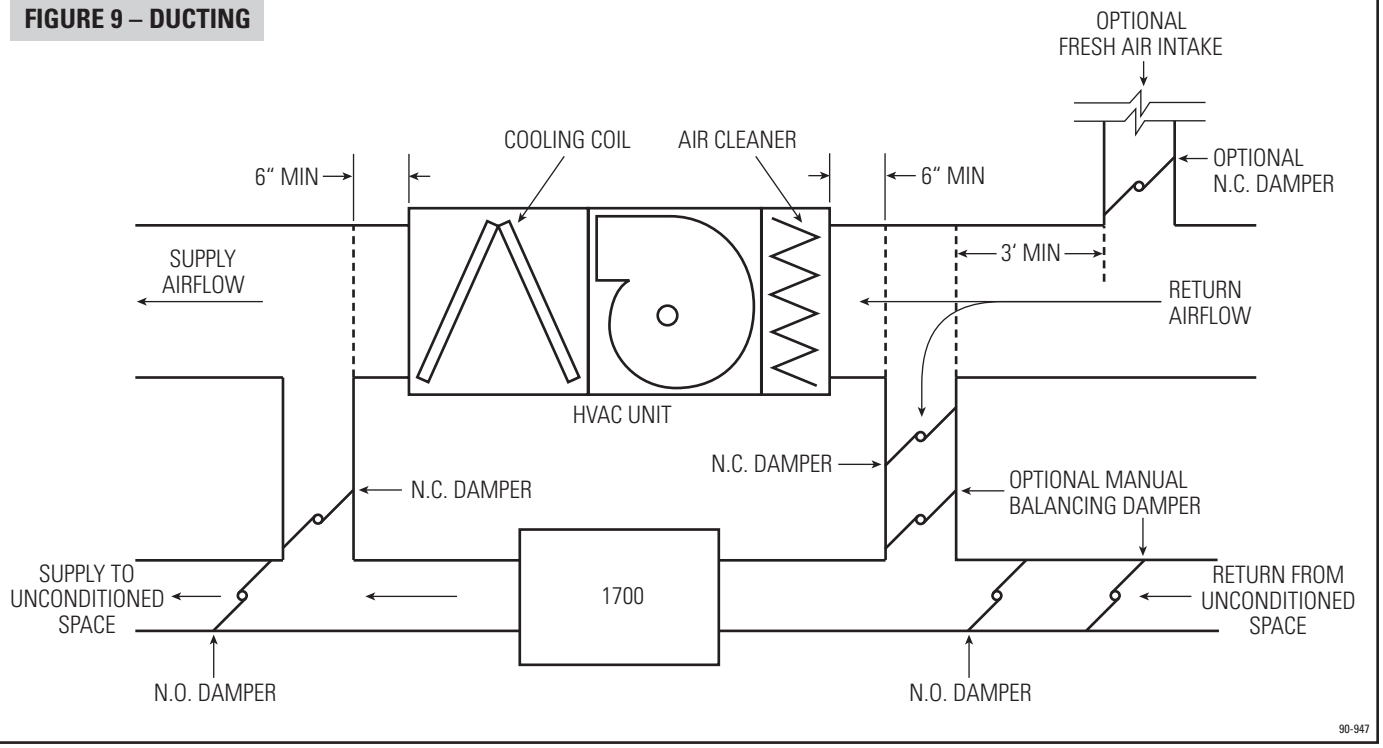


FIGURE 10 – WIRING

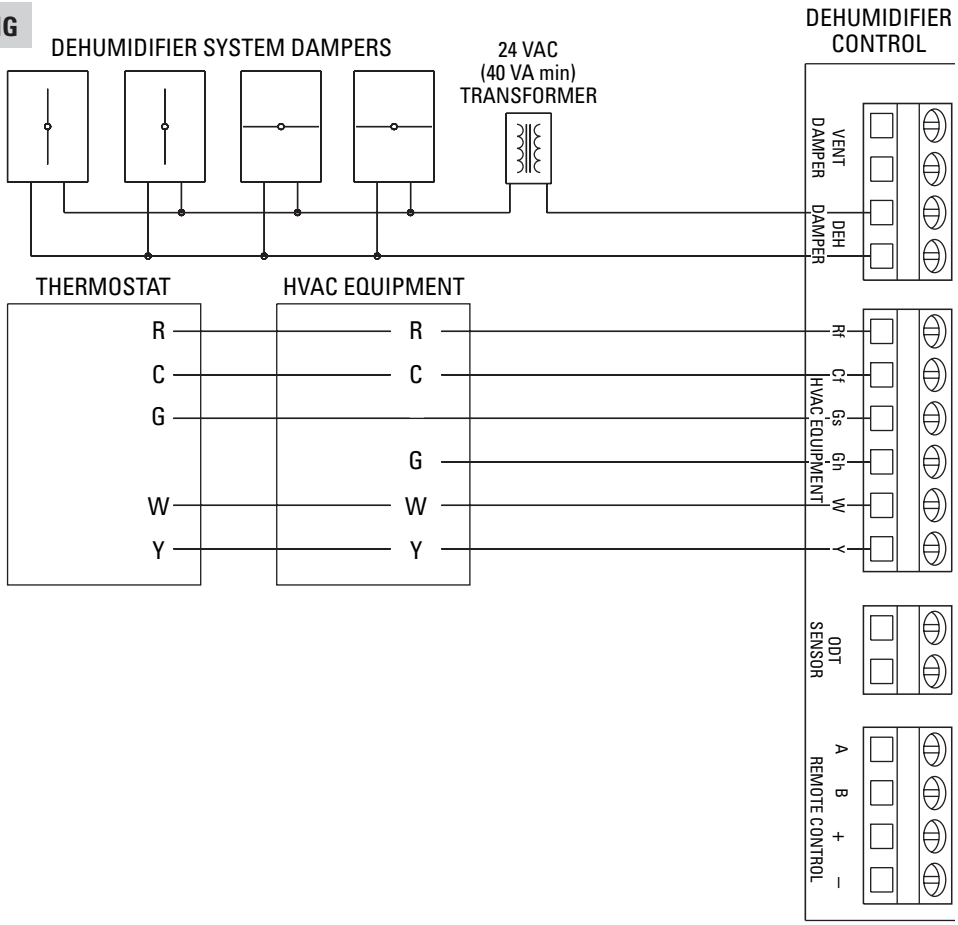


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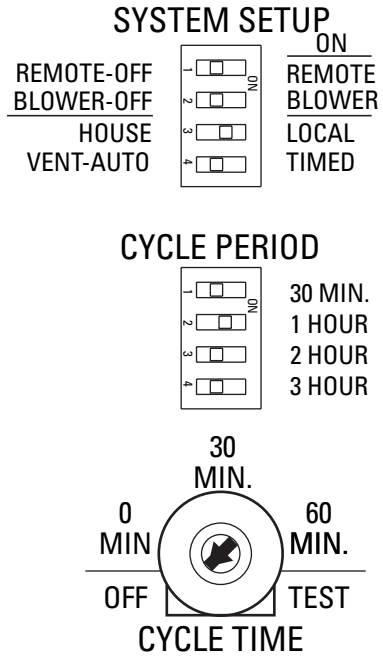
FIGURE 11 – SETTINGS



Standard	Fan Cycling	Ventilation
OFF	OFF	OFF
OFF	OFF	OFF
ON	ON	ON
OFF	ON	OFF

Standard	Fan Cycling	Ventilation
OFF	See pages 10-11	See pages 10-11
ON	See pages 10-11	See pages 10-11
OFF	See pages 10-11	See pages 10-11
OFF	See pages 10-11	See pages 10-11

Standard	Fan Cycling	Ventilation
OFF	See pages 10-11	See pages 10-11

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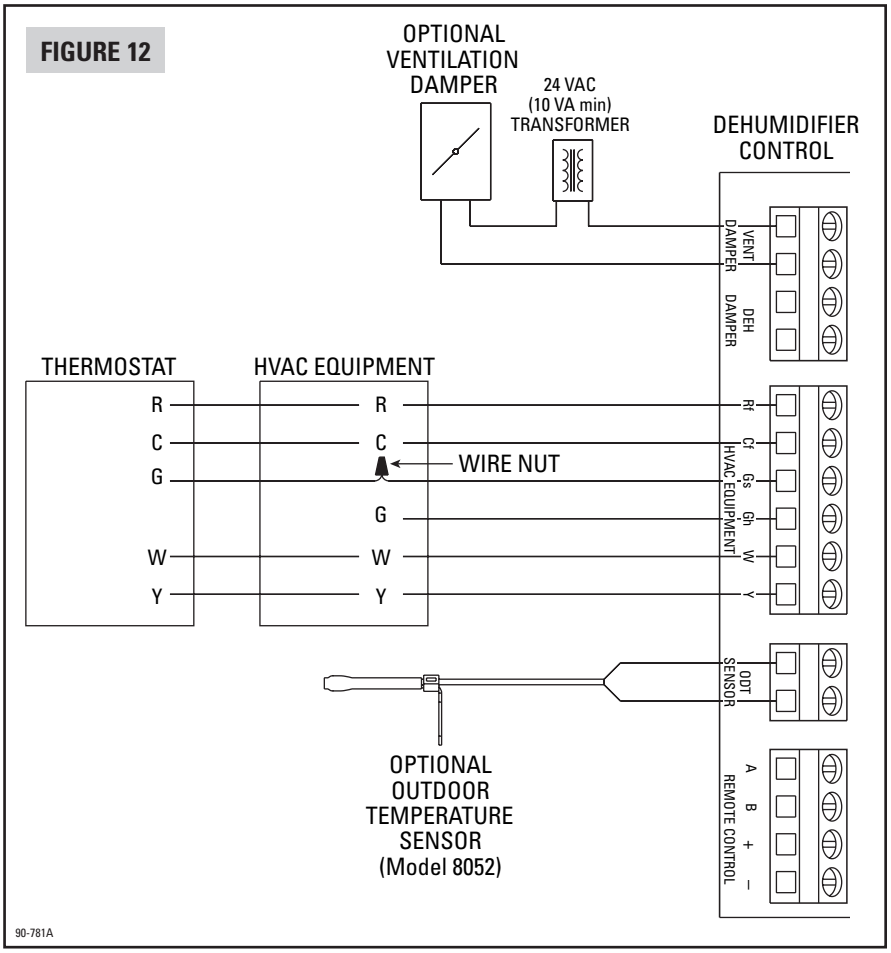
VENTILATION / FAN CYCLING SETTINGS

The Aprilaire Dehumidifier has the option to monitor HVAC heating, cooling and fan calls to assure the HVAC blower has operated a predetermined amount of time each 1/2, 1, 2 or 3 hours. The dehumidifier can also open a normally closed damper in a fresh air intake to ventilate during this predetermined amount of time. This feature will function even if the dehumidifier is turned off at the dehumidifier or living space control. The only way to disable this feature is by turning the Cycle Time setting to OFF or turning power off at the On/Off switch near the power cord.

FIGURE 12



First, set the 1/2, 1, 2 or 3 hour period by setting the CYCLE PERIOD dip switches to determine how often the dehumidifier should look to ventilate or cycle the HVAC fan.

Next, use the CYCLE TIME potentiometer to determine how long during every cycle period the HVAC blower should operate. Adjust the potentiometer from OFF anywhere from 1 to 60 minutes. This will give you HVAC blower operation from 1 to 60 minutes every 1/2, 1, 2 or 3 hours. A call for heat, cooling or fan from the HVAC equipment will satisfy the 1 to 60 minutes. If not, the dehumidifier will turn on the HVAC blower to assure that the cycle time is met. **For example: If the home requires ventilation of 20 minutes every two hours set the CYCLE PERIOD Dip Switch for 2 hours to ON and rotate the CYCLE TIME to 20 minutes. If the HVAC equipment has only run for 10 minutes, the dehumidifier will turn on the HVAC blower for 10 minutes at the end of the 2 hours to assure the ventilation / fan cycling time.**

Finally, if using the Ventilation Damper, determine if the ventilation should be restricted based on outdoor temperature. Set the VENT-AUTO / TIMED dip switch in VENT-AUTO (see **Figure 15**) to prevent opening the ventilation damper if the outdoor air is above 100F, below 0F or except with a heat call between 20F and 0F. In the timed setting the ventilation damper is activated regardless of outdoor conditions. **Note:** The Outdoor Temperature Sensor (Model 8052) must be installed for this to work.

You can also check the wiring of the dehumidifier to the HVAC equipment. If you rotate the CYCLE TIME potentiometer to TEST, the HVAC blower should come on and the Ventilation Damper (if equipped) should open. **DO NOT leave the CYCLE TIME in TEST.**

FIGURE 13 (shown set to 1 hour)

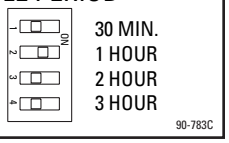


FIGURE 14 (shown set to 30 minutes)

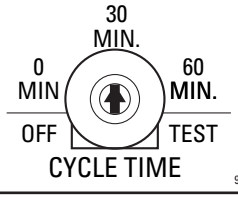
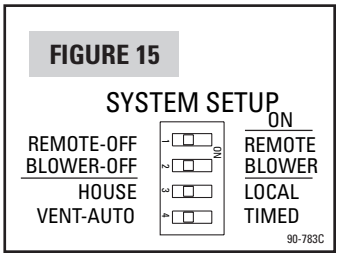


FIGURE 15



VENTILATION / FAN CYCLING SETTINGS (CONTINUED)

This installed option allows outside air to be combined with the fan cycling feature from the dehumidifier, provided the outside air temperature is in the acceptable range (0-100°F). **Note:** The dehumidifier can control the HVAC blower to provide fan cycling, regardless of whether or not an outdoor ventilation duct is installed.

- An Aprilaire® Normally-Closed Damper (Model 6506) should be installed in the outside air intake. It should be wired to the terminals labeled "VENT DAMPER" on the dehumidifier control board. Follow all installation instructions supplied with the damper. Refer to each installation for ducting.
- The Outdoor Temperature Sensor (Model 4278) should be installed outside in a shaded location **(Figure 16)** or in an outside air intake duct, but no more than 3 feet from the outside **(Figure 17)**.
- The Outdoor Temperature Sensor is not affected by wire length. However, do not route the wire alongside wires carrying high voltage (115 VAC or greater), as interference may occur.

FIGURE 16

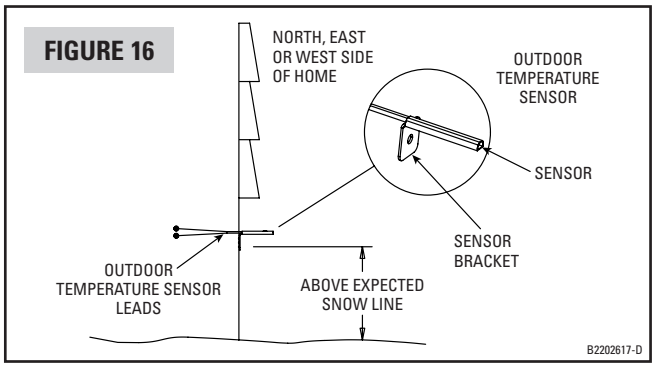
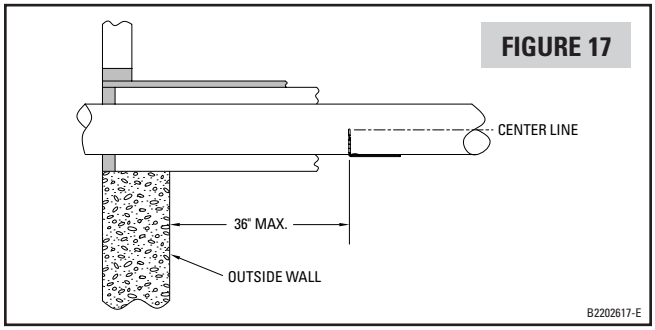


FIGURE 17



- Connect the wires from the sensor to the terminals labeled "ODT SENSOR" on the dehumidifier. See **Figure 12** for terminal locations.

VENTILATION GUIDELINES

TABLE 1 – Air Cycling Time Setting (min./hr.)

House Size (square feet)	Bedrooms			
	2	3	4	5
1000-1500	20	25	30	35
1501-2000	25	30	30	35
2001-2500	25	30	35	40
2501-3000	30	35	40	40
3001-3500	30	35	40	45

1. Based on ASHRAE 62.2 ventilation requirement.
2. Based on outside air duct of 6" dia., 20' long flex duct, 0.15" w.c. static pressure at fresh air duct.
3. Based on 'Cycle Period' being in the default (1 hour) position.
4. A longer outside air duct and/or lower static pressure will require a longer Ventilation Time.

As an example, for a 2,500 square foot home with 3 bedrooms, set the cycle time to 30 minutes of ventilation per one-hour cycle.

A longer fresh air intake duct or lower return static pressure will increase the ventilation time required. Additionally, local codes may affect the setting.

DIP SWITCH DEFINITIONS

REMOTE – OFF / REMOTE – ON (SYSTEM SETUP SWITCH #1):

Determines use of internal RH and temperature sensor or use of the RH and temperature sensor on the Living Space Control (PART NO. 70).

Remote-Off, use inlet RH and temperature sensor.

Remote-On, use Living Space Control (PART NO. 70) RH and Temperature Sensor.

Default is **Remote-Off**.

BLOWER – OFF / BLOWER – ON (SYSTEM SETUP SWITCH #2):

Determines if the HVAC blower activates during a call for dehumidification.

Blower-Off position, the dehumidifier will not activate the HVAC blower during a call for dehumidification; it will however activate the HVAC blower for air cycling and ventilation.

Blower-On position, the dehumidifier will activate the HVAC blower during a call for dehumidification as well as for air cycling and ventilation.

Default is **Blower-Off**.

HOUSE / LOCAL (SYSTEM SETUP SWITCH #3):

Determines when the dampers are powered open or closed.

House position, the damper (DEH) terminals are actuated if HVAC equipment making a call for heat, cool or fan and dehumidifier is making an internal blower call for air sampling or dehumidification.

Local position, the damper (DEH) terminals are actuated any time the dehumidifier is making an internal blower call for air sampling or dehumidification.

The default position is **House**.

VENT-AUTO / TIMED (SYSTEM SETUP SWITCH #4):

Determines if ventilation is restricted based on outdoor temperature

Vent-Auto position, the dehumidifier will measure the outdoor temperature (through sensor, part # 8052) to determine if the ventilation damper will open. If the outside temperature is above 100°F or below 0°F the dehumidifier will not actuate the ventilation damper terminals (VENT DAMPER). If the outside temperature is between 0°F - 20°F, the dehumidifier will only actuate the ventilation damper terminals (VENT DAMPER) when the HVAC system is making a call for Heat. The dehumidifier will energize the HVAC blower whether or not the ventilation damper opens.

In **"Timed position"**, the dehumidifier will actuate the ventilation damper terminals (VENT DAMPER) regardless of the outdoor temperature.

The default position is **Vent-Auto**.

TROUBLESHOOTING GUIDE

SYMPTOM	TROUBLESHOOTING PROCEDURE
Dehumidifier is producing hot air.	• Reheat of outgoing air will cause a temperature increase across the dehumidifier. • Make sure air flow through unit is between 210 CFM and 300 CFM. This will limit the volume of heated air introduced into the home. • Unit will possibly run continuous initially. After unit has "dried" home, dehumidifier will cycle, reducing load.
Dehumidifier Blower is running, but no airflow.	• Manual Damper Completely closed. • Normally Open Damper used instead of Normally Closed Damper in backflow. • Total HVAC system static higher than 0.8" w.c.
Dehumidifier not adequately dehumidifying.	• Unit will need time to "dry" materials in home before effectively changing RH. • Too much or too little airflow through dehumidifier. Use manual damper to adjust airflow to 275 CFM. • Compressor is not turning on. • System undercharged.
Dehumidifier is not draining properly.	• Check condensate trap. • Check drain line for continuous slope.
HVAC blower does not turn on when cycle time potentiometer is in "TEST" mode.	• Make sure there is power to the HVAC equipment. • Check the wiring diagram for the R, C, W, Y, GH, and GS at the HVAC equipment, thermostat, and the dehumidifier. • Make sure the sensor is connected to the Outdoor Temperature Sensor terminals or the System Setup block is set to "TIMED" mode. • Check the voltage across the R and C terminals at the dehumidifier. Voltage should be 22 VAC minimum - 30 VAC maximum. • In "TEST" Mode, the HVAC blower will activate for 1 minute, DO NOT LEAVE IN TEST MODE AS DEHUMIDIFIER WILL NOT OPERATE.
The dehumidifier damper does not open in "TEST" Mode.	• Follow all of the system checkout procedures. • Check the wiring diagram for the damper & 24 VAC transformers.
Air cycling operates continuously after the potentiometer is taken off "TEST" mode.	• If the HVAC equipment is making a Heat or Cool call, or the fan is in Continuous Operation, air cycling will remain on until the requirement set by the cycle period dip switch and knob is met. • If the interval is set at 1 HOUR and the cycle time is set at 60 minutes, air cycling will be on continuously. Change the setting to a lower amount if this is not desired.

TROUBLESHOOTING GUIDE (CONTINUED)

SYMPTOM	TROUBLESHOOTING PROCEDURE
The ventilation damper does not open when the HVAC blower is active.	• The damper will not open if the cycle time within the current period has already been met. For instance if the cycle time is set to 5 minutes and the control has already ventilated for 5 minutes in that interval, the damper will remain closed. • If using the Outdoor Temperature Sensor, check that it is installed in the Fresh Air Intake a maximum of 3 feet from the outside, or on the North, East or West side of the house. (Not in direct sunlight.) • If the outdoor temperature is below 0°F or above 100°F, the damper will remain closed. • Verify that the Outdoor Temperature Sensor is reporting an accurate resistance. Remove the Outdoor Temperature Sensor leads from ODT Sensor terminals and check the resistance. Compare the reading with the resistance shown in **Table 2**.
The fan turns on unexpectedly.	• The control will turn on the fan as needed to meet the air cycling requirements determined by the cycle time and cycle period settings.
The dehumidifier does not run.	• Follow all of the system checkout procedures. • Check that the power switch on the dehumidifier is on. • Check that the circuit breaker is not tripped. The dehumidifier requires a minimum of 9 amps. It is recommended the dehumidifier be placed on its own dedicated 15 amp circuit.

TABLE 2

Outdoor Temperature	Resistance
-30˚F	229,500 OHMS
-20˚F	162,500 OHMS
-10˚F	116,500 OHMS
0˚F	84,500 OHMS
10˚F	62,000 OHMS
20˚F	46,000 OHMS
30˚F	34,500 OHMS
40˚F	26,000 OHMS
50˚F	20,000 OHMS
60˚F	15,500 OHMS
70˚F	12,000 OHMS
80˚F	9,500 OHMS
90˚F	7,500 OHMS
100˚F	6,000 OHMS

DEHUMIDIFIER SEQUENCE OF OPERATION

IF THE DEHUMIDIFIER IS NOT WIRED TO THE HVAC EQUIPMENT, THE DEHUMIDIFIER WILL SAMPLE AT THE END OF THE CYCLE PERIOD.

With 3 minutes left in the Cycle Period, the Dehumidifier will turn on the Dehumidifier blower for 2 minutes, during this time the temperature and relative humidity are measured and the dewpoint is calculated. If the dewpoint is higher than the setting at the Control Knob then the Dehumidifier will turn on the Dehumidifier compressor and the Dehumidifier will run until it reaches set point.

After reaching the set point, the Dehumidifier will not sample again until the end of the next Sample Period.

For example, if the Sample Period is set for 1 hour, the Dehumidifier will sample at the end of the hour. Once the dehumidifier reaches set point and shuts off, the dehumidifier will not sample again until the end of the next hour.

IF THE DEHUMIDIFIER IS WIRED INTO THE HVAC EQUIPMENT, THE DEHUMIDIFIER WILL SAMPLE THE FIRST TIME THE HVAC EQUIPMENT RUNS IN THE CYCLE PERIOD OR AT THE END OF THE CYCLE PERIOD IF THE HVAC EQUIPMENT DOES NOT RUN.

For example, if the Cycle Period is set to 1 hour and the air conditioner starts 15 minutes into that hour, the Dehumidifier will sample when the air conditioner starts. Once the Dehumidifier begins dehumidifying, it will run until set point is reached. If the Dehumidifier samples and determines that dehumidification is not needed, it will not sample again until the next Cycle Period.

DAMPER SEQUENCE OF OPERATION

In the Whole House Convertible to Localized installation 4 motorized dampers are used to control the air flow through the Dehumidifier. The dampers are energized when the HVAC equipment is running. This means that when the HVAC equipment is running, the dampers are in the Whole-House position. When the HVAC equipment is not running, the dampers are in the local position.

VENTILATION OR AIR CYCLING SEQUENCE OF OPERATION

If the Model 1700 is providing fresh air ventilation or air cycling, it is monitoring the HVAC equipment to provide the amount of HVAC blower run time that has been set by the Cycle Time during the Cycle Period.

If a fresh air damper has not been installed then the 1700 is providing air cycling. The Dehumidifier will monitor the HVAC system and if the system has not run for the specified Cycle Time within the Cycle Period, the Dehumidifier will energize the HVAC blower through the G terminal to provide the desired amount of blower run time.

For example, if the Cycle Time is set for 10 minutes and the Cycle Period is set for 1 hour then the Dehumidifier will provide 10 minutes of air cycling or fresh air ventilation. If the HVAC system runs for 5 minutes during this hour then the Dehumidifier will energize the blower for an additional 5 minutes.

If a fresh air damper has been installed, then the Model 1700 is providing fresh air ventilation. The 1700 will open the fresh air damper whenever the HVAC system is running, up to the amount of time specified by the Cycle Time. The Dehumidifier will energize the HVAC blower and open the fresh air damper to provide the desired ventilation time if the HVAC system has not run for the specified Cycle Time.

If an Outdoor Temperature Sensor has been installed, then the Dehumidifier will use the outdoor temperature to determine if the fresh air damper is opened. If the outdoor temperature is above 100°F the damper will not open. If the temperature is between 20°F and 0°F the damper will only open with a Heat call. If the outdoor temperature is below 0°F the damper will not open. If the outdoor temperature is not installed then the temperature is not considered in opening the damper.

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