



# Model 76 Dehumidifier Control Installation Instructions

## READ AND SAVE THESE INSTRUCTIONS

The Model 76 is for use with any dehumidifier as an **EXTERNAL CONTROL**, including Aprilaire Models 1710A, 1730A, 1750A, 1770A.

The Model 76 can also be used as a communicating **REMOTE CONTROL** with Aprilaire Models 1710A, 1750A, 1770A.

(See **OVERVIEW** on page 3 for details.)

## SAFETY INSTRUCTIONS

### **WARNING**

1. Improper installation may cause property damage or injury. Installation, service, and maintenance must be performed by a qualified service technician.
2. 120 Volts may cause serious injury from electric shock. Disconnect electrical power before starting installation or servicing. Leave power disconnected until installation/service is completed. This control is not a 120 Volt (line voltage) device.

### **CAUTION**

1. Read all instructions before beginning installation.
2. Do not use in pool applications. Pool chemicals can damage the control.
3. Do not use solvents or cleaners on or near the display and circuit board. Chemicals can damage components.

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## OVERVIEW

The Aprilaire® Model 76 Dehumidifier Control provides control of the dehumidifier from the living space.

The control can be installed as an EXTERNAL CONTROL, allowing the homeowner to set and adjust the humidity setting and turn dehumidification on or off from a convenient location. In this application, the Model 76 uses an onboard sensor to monitor the relative humidity (%RH) in the space in which it is located and displays the measured relative humidity on the digital display.

The control can also be installed to function as a REMOTE CONTROL if the dehumidifier is located where it is not easy or convenient to access. The control can be installed in any location within the living space, with the dehumidifier installed in the area to be dehumidified, such as a crawl space, attic, or basement. The dryness level is set on the control and communicated to the dehumidifier. The dehumidifier communicates the measured relative humidity in the space being dehumidified back to the Model 76 Control where it is displayed on the digital display.

## SPECIFICATIONS

ELECTRICAL	External	Remote
Input Voltage and Current	Voltage: 24VAC +/-20% Current: 25mA (nominal), 50mA (max.) at 24VAC	Voltage: 9VDC (supplied by dehumidifier control board)
Output	Dry Contact, Normally Open	Communication (RS485)

CONTROL	External	Remote
Control Range	40% – 80% RH	1 (less dry) – 7 (more dry) 65°F – 40°F Dew Point
Accuracy	+/-5% RH	See Dehumidifier Specifications
Differential	3%	
Low Limit	40°F Dew Point	50°F Dry Bulb
High Limit	99°F Dry Bulb	105°F Dry Bulb

## LOCATION RECOMMENDATIONS

As a REMOTE CONTROL, the Model 76 can be mounted wherever is convenient for the homeowner.

Follow the recommendations below when installing the Model 76 as an EXTERNAL CONTROL.

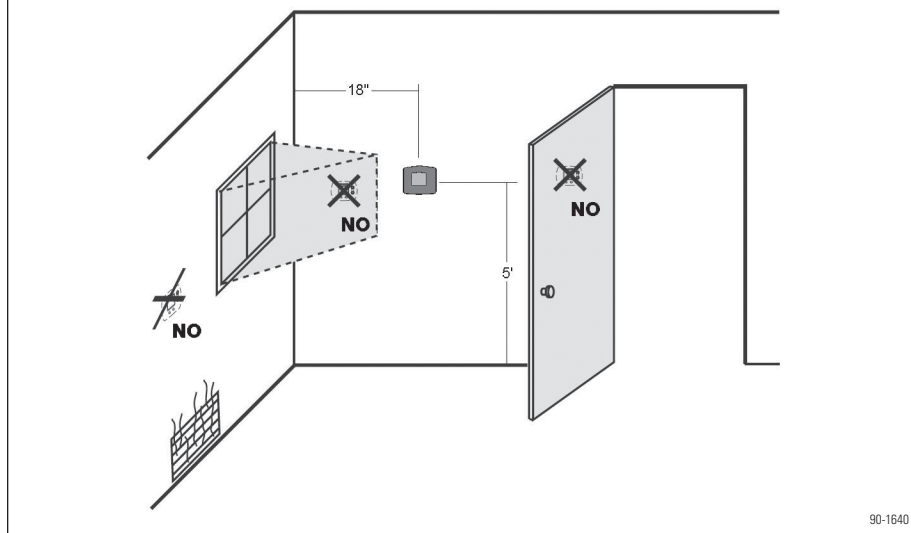
### MOUNT CONTROL

- In an area the homeowner wants to monitor and control moisture levels.
- On an interior wall.
- Approximately 5' off the floor.
- At least 18" from an outside wall.

### DO NOT MOUNT CONTROL

- **In the flow of a supply register.**
  - Behind doors, in corners or other dead air spaces.
  - In direct sunlight, near lighting fixtures, or other appliances that give off heat.
- On an outside or unconditioned area wall.
- In stairwells or near outside doors.
- On a wall with concealed pipes or ductwork.

FIGURE 1 – Mounting Control



## INSTALLATION

### MOUNT CONTROL

If replacing a control mounted in the living space, see **Control Mounted in Living Space** on page 6.

FIGURE 2 – Disassemble Control

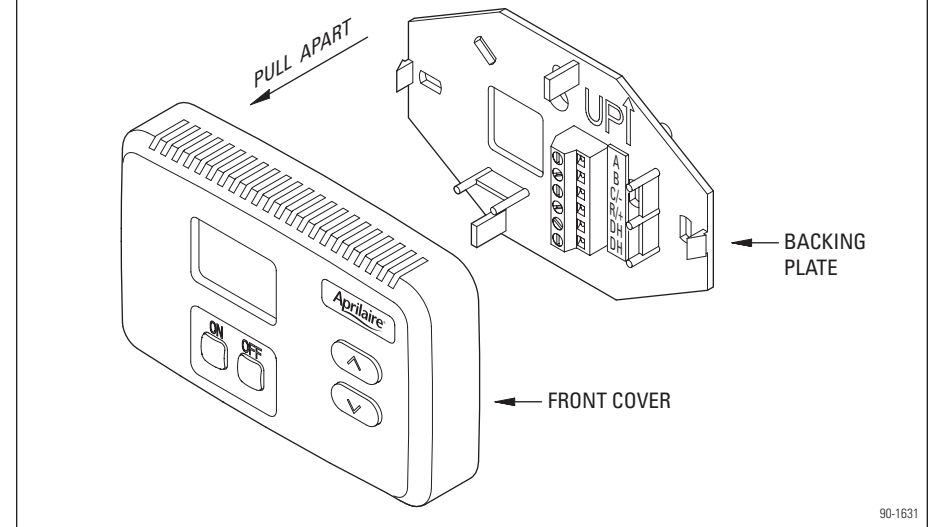
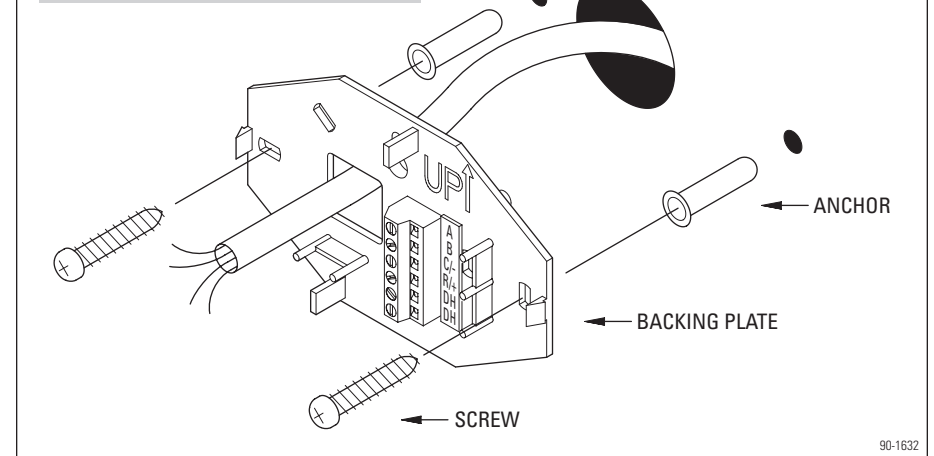


FIGURE 3 – Mount Backing Plate



## REQUIRED COMPONENTS

- 18 – 24 gauge wire (field supplied) – 4 wires required, run new cable as needed.
- (2) #8 x 1-1/2" mounting screws (supplied)
- (2) Anchors (supplied)

1. Level the backing plate on the wall and mark the mounting holes and wire access location on the wall.
2. Drill two 3/16" mounting holes and a 3/4" wire access hole. See **Figure 3**.
3. Install the drywall anchors flush with the wall surface. **Note:** Mounting holes on the backing plate are designed to fit on a horizontal J-box.
4. Run a 4-wire cable from the dehumidifier to the wall mount location and through the square hole in the backing plate.
5. Secure the backing plate to the wall using the two #8 x 1-1/2" screws.

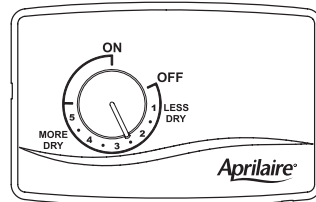
## REPLACING A 1730A MANUAL DEHUMIDISTAT

### STEP 1 – REMOVE THE CURRENT MANUAL CONTROL

#### IF THE CONTROL IS MOUNTED IN THE LIVING SPACE:

1. **Disconnect power to the dehumidifier and HVAC system.**
2. Pull knob from the dehumidistat cover and remove cover from the control base.
3. Remove the four screws from the base plate.
4. Pull the dehumidistat off the wall until wire nuts are exposed.
5. Remove dehumidistat leads.
6. The existing 2-wire cable can remain. The Model 76 wiring requires 4 wires. Install more wires as needed.
7. Mount the Model 76 control following steps 1-5 in the **MOUNT CONTROL** section above. Reuse the existing wire access hole and wiring as needed.
8. Connect the existing wires (from 1730A **REMOTE** terminals) to the **DH** terminals and connect the remaining two wires to the **C/-** and **R/+** terminals on the Model 76 backing plate.
9. Push excess cable into the wire access hole and fill the hole with insulation. **Note:** Failure to seal the hole can cause drafts to enter the control and affect sensing accuracy.
10. Proceed to **WIRING** section on page 8.

FIGURE 4 – Manual Dehumidistat



#### IF THE CONTROL IS MOUNTED ON A 1730A DEHUMIDIFIER:

**NOTE:** The Model 76 is installed in the living space and not on the dehumidifier. See **LOCATION RECOMMENDATIONS** on page 4.

1. **Disconnect power to the dehumidifier and HVAC system.**
2. Pull knob from the dehumidistat cover and remove cover from the control base.
3. Remove the four screws from the base plate and pull the dehumidistat off the unit until 4"–6" of wire is outside of the unit.
4. Cut the wires and use metal tape to secure the leads to the inside of the unit, preventing contact with the blower.
5. Remove the gasket from the base plate.
6. Install the insulated cover plate (Service Part 4927) and gasket over the opening, using the screws removed in step 3. See **Figure 5**.
7. Remove the wiring access panel on the outlet panel. See **Figure 6**.
8. Unplug the **REMOTE** terminals from the circuit board, remove the two wires and cut off the bare leads. Once cut, the wires may remain in the unit.
9. Replace **REMOTE** terminals on circuit board and leave wiring access panel off for Model 76 wiring.
10. Proceed to **WIRING** section on page 8.

FIGURE 5 – Inlet with Cover Plate

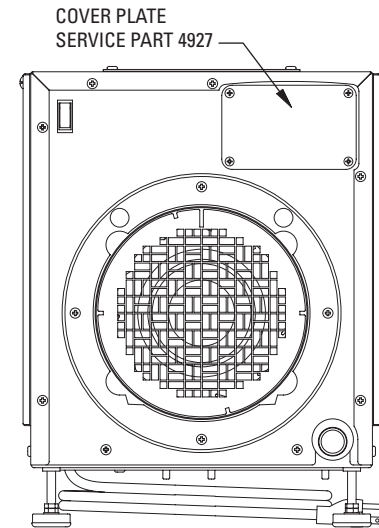
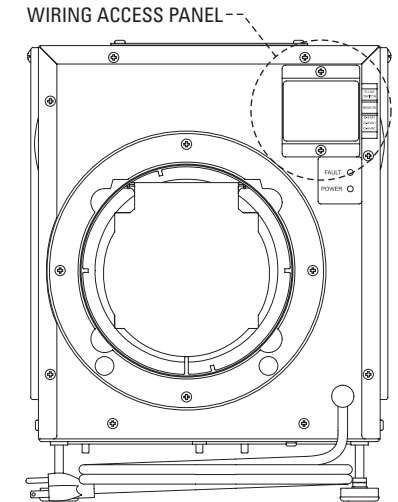


FIGURE 6 – Wiring Access Panel on Outlet



## WIRING

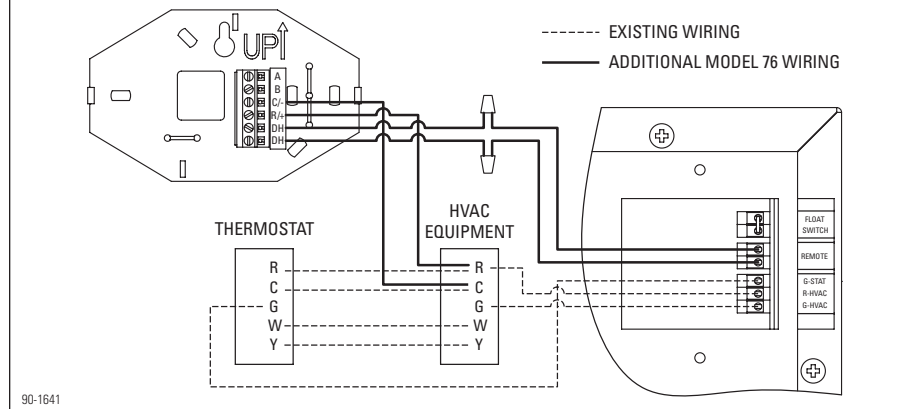
### STEP 2 – SUPPLY 24VAC TO THE MODEL 76 CONTROL

The Model 76 control requires 24VAC when installed as an EXTERNAL CONTROL for the 1730A. Pulling power from the HVAC system is the recommended method.

#### MODEL 76 TO 1730A

1. **Disconnect power to the dehumidifier and HVAC system.**
2. If replacing a dehumidistat that was in the living space, follow steps 3-6. If replacing a dehumidistat that was on the dehumidifier, follow steps 7-13.
3. Connect the wires from the **C/-** and **R/+** terminals on the Model 76 to the HVAC or thermostat **C** and **R** terminals.
4. Connect the existing wires connected to the **REMOTE** terminals to the **DH** terminals on the Model 76.
5. Snap the Model 76 front cover on the back plate. The 6-pin terminal aligns with the terminal block receptacle on the back plate.
6. Proceed to **SYSTEM CHECKOUT** on page 11.
7. Remove the wiring access panel (if not already removed) on the dehumidifier outlet panel.
8. Unplug the **REMOTE** terminals from the circuit board.
9. Connect the wires from the **DH** terminals on the Model 76 to the **REMOTE** terminals and plug the terminals back into the unit circuit board.
10. Connect the wires from the **C/-** and **R/+** terminals on the Model 76 to the HVAC or thermostat **C** and **R** terminals.
11. Replace the wiring access panel on the dehumidifier.
12. Snap the Model 76 front cover on the backing plate. The 6-pin terminal aligns with the terminal block receptacle on the backing plate.
13. Proceed to **SYSTEM CHECKOUT** on page 11.

**FIGURE 7 – Model 76 to 1730A Wired to HVAC System**

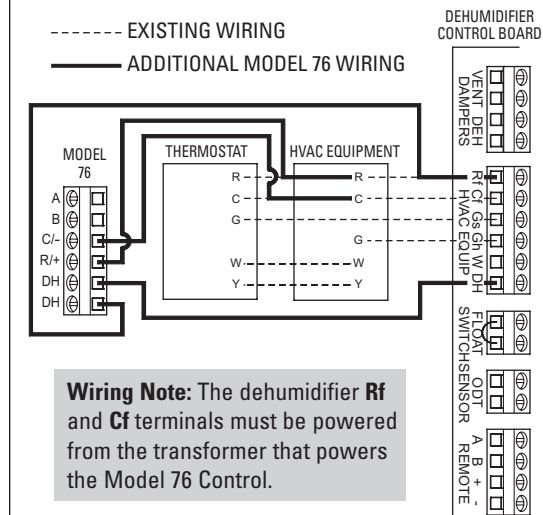


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### MODEL 76 EXTERNAL CONTROL TO 1710A/1750A/1770A

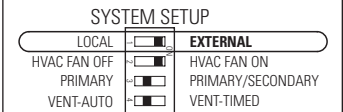
1. **Disconnect power to the dehumidifier and HVAC system.**
2. Remove the control door on the dehumidifier inlet panel.
3. Connect one wire from the **DH** terminal on the Model 76 to the **DH** terminal on the control board.
4. Connect the other wire from the **DH** terminal on the Model 76 to the **Rf** terminal on the control board.
5. Connect the wires from the **C/-** and **R/+** terminals on the Model 76 to the HVAC or thermostat **C** and **R** terminals.
6. Set **SYSTEM SETUP** switch to **EXTERNAL**. See **Figure 9**.
7. Replace the control door on the dehumidifier.
8. Snap the Model 76 front cover on the backing plate. The 6-pin terminal aligns with the terminal block receptacle on the backing plate.

**FIGURE 8 – Model 76 External Control to 1710A/1750A/1770A Wiring**



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**FIGURE 9 – Model 76 External Control Dip Switch Configuration**

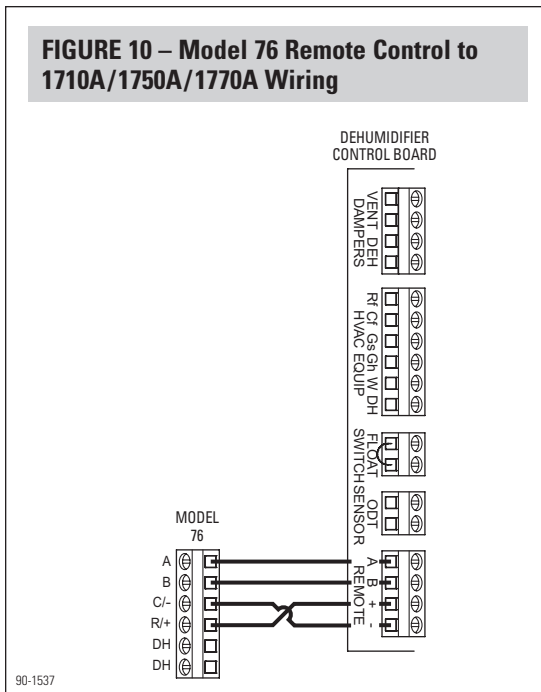


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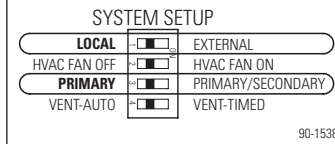
## MODEL 76 REMOTE CONTROL TO 1710A/1750A/1770A

1. **Disconnect power to the dehumidifier and HVAC system.**
2. Remove the control door on the dehumidifier inlet panel.
3. Connect one wire from the **A** terminal on the Model 76 to the **A** terminal on the control board.
4. Connect one wire from the **B** terminal on the Model 76 to the **B** terminal on the control board.
5. Connect one wire from the **R/+** terminal on the Model 76 to the **+** terminal on the control board.
6. Connect one wire from the **C/-** terminal on the Model 76 to the **-** terminal on the control board.
7. Set **SYSTEM SETUP** switches to **LOCAL** and **PRIMARY**, See **Figure 11**.
8. Replace the control door on the dehumidifier.
9. Snap the Model 76 front cover on the backing plate. The 6-pin terminal aligns with the terminal block receptacle on the backing plate.

**FIGURE 10 – Model 76 Remote Control to 1710A/1750A/1770A Wiring**



**FIGURE 11 – Model 76 Remote Control Dip Switch Configuration**

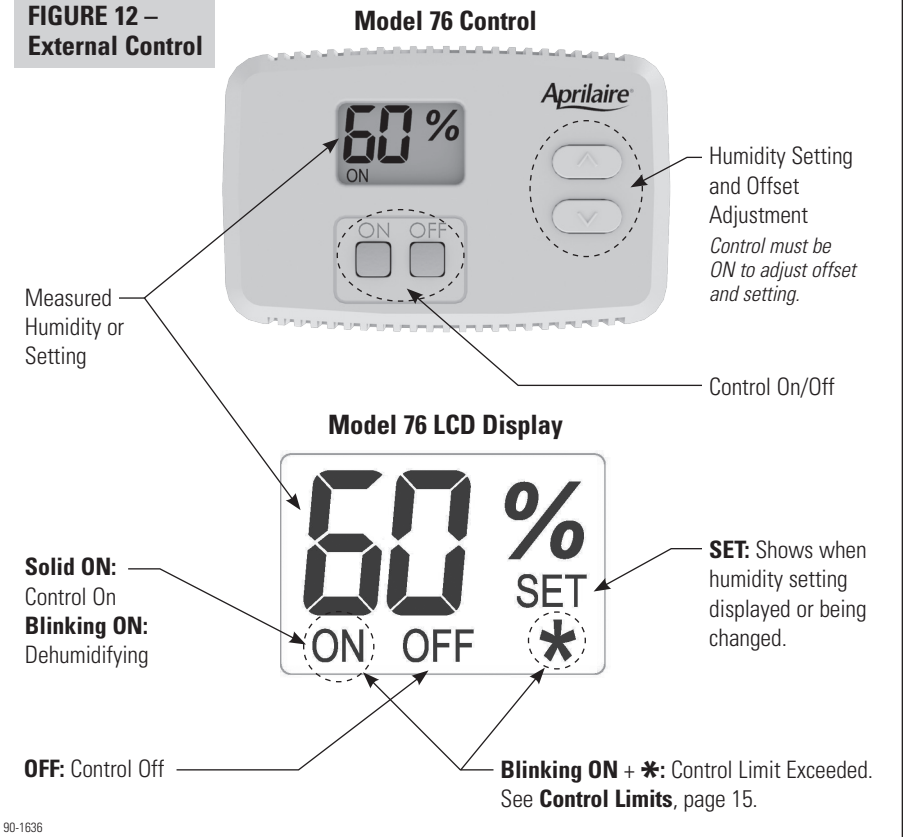


## SYSTEM CHECKOUT

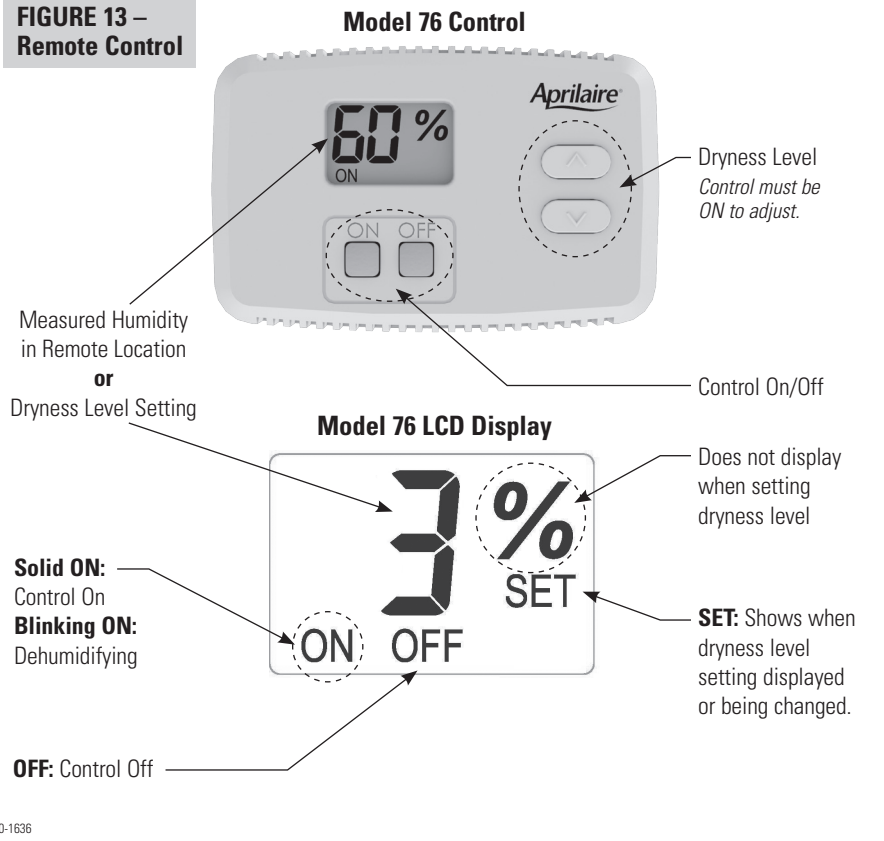
### POWER UP

1. Check all wiring.
2. Plug in dehumidifier and restore power to the HVAC system.
3. Turn on/off switch on dehumidifier ON. After a 4 second start up sequence all buttons on the Model 76 will be functional.
  - The control will be OFF.
  - The humidity setting will be 60% if wired for EXTERNAL CONTROL. The dryness level will be set to 3 if REMOTE CONTROL.
  - The control will display the measured humidity.
    - EXTERNAL CONTROL displays humidity measured by the control in it's installed space.
    - REMOTE CONTROL displays humidity measured by the dehumidifier in it's installed space.

**FIGURE 12 – External Control**



**FIGURE 13 – Remote Control**



## TEST MODE

1. Press and hold the ON button for 5 seconds to enter Test Mode.
  - a. Verify the measured humidity is displayed on the Model 76 screen.
  - b. Verify dehumidifier turns on, and **ON** blinks on the Model 76 screen.
  - c. Verify the \* is displayed on the Model 76 screen when wired as a REMOTE CONTROL.
2. After 5 minutes or after pressing the OFF button, the control will enter Off mode.
  - a. Verify the dehumidifier turns off.

## HUMIDITY/DRYNESS LEVEL SETTING

- The control must be ON to adjust the humidity or dryness level setting.
- The ▲ (up) and ▼ (down) buttons are used to increase or decrease the setting.
- The first press of either button will display the current setting and **SET** on the LCD display.
- Each subsequent push of the up or down buttons will change the setting by 1% or 1 dryness level.
- If a button is held down, the setting will continually change by 1% or 1 dryness level every 1/2 second for as long as the button is pressed.
- The control will return to Normal Mode, displaying the measured humidity, 5 seconds after the last button press/release.

## OFFSET

When the Model 76 is installed as an EXTERNAL CONTROL, an offset can be applied to the humidity reading to avoid discrepancies with other humidity measuring devices in the home. Allow 48 hours for the control to acclimate before applying an offset. The control must be ON to enter the Offset screen.

**NOTE:** This feature is not available when the control is installed as a REMOTE CONTROL.

- Press and hold the OFF button for 5 seconds to enter the Offset screen.
- The ▲▼ buttons can be used to set an offset value between -5% RH and +5% RH.
- The control will return to Normal Mode, displaying the measured humidity, 5 seconds after the last button press/release.

**FIGURE 14 – Offset Screen**



## TURNING ON AND SETTING THE CONTROL

### EXTERNAL CONTROL

1. Press the ON button.
2. Use the ▲▼ buttons to set the control at 59%.
  - ▲ Increasing the humidity setting will decrease dehumidifier run time, allowing for higher humidity levels.
  - ▼ Decreasing the humidity setting will increase dehumidifier run time, allowing for lower humidity levels.

### REMOTE CONTROL

1. Press the ON button.
2. Use the ▲▼ buttons to set the control to a 3 dryness level.
  - ▲ Increasing the dryness level will increase dehumidifier run time, allowing for lower humidity levels.
  - ▼ Decreasing the dryness level will decrease dehumidifier run time, allowing for higher humidity levels.

The dryness level settings can be approximated to relative humidity (%RH) using **Table 1**.

Dryness Level Setting	Indoor Temperature (°F)			
	65	70	75	80
1		84%	71%	60%
2	86%	73%	61%	52%
3	74%	63%	53%	45%
4	64%	54%	45%	39%
5	55%	46%	39%	33%
6	47%	39%	33%	28%
7	40%	34%	28%	24%

**Note:** This table is for reference only.

## SEQUENCE OF OPERATION

### EXTERNAL CONTROL

#### Normal Mode

- When the measured humidity is greater than the setting, the control will activate the dehumidifier output, the dehumidifier will begin dehumidifying and ON will blink on the LCD display.
- When the measured humidity falls 3% below the setting, the control will deactivate the dehumidifier output, the dehumidifier will stop dehumidifying and the LCD will display a solid ON.

#### Control Limits

- If the control measures a dew point below 40°F OR a temperature above 99°F, the control will deactivate the dehumidifier output if actively dehumidifying, the dehumidifier will stop dehumidifying, and **ON** and **\*** will blink on the LCD screen.
- The control will resume normal operation when the measured dew point is greater than 45°F or the measured temperature is below 94°F, whichever control limit was exceeded.

### REMOTE CONTROL

#### Normal Mode

- Once during every Cycle Period (set by the dip switches in the dehumidifier) the dehumidifier blower and dehumidifier damper output will turn on and sample the air in the area served by the dehumidifier. Sampling will also occur whenever the dryness level setting is increased on the Model 76 Control.
- After three minutes, the dew point of the incoming air is measured and compared to the dryness level set on the Model 76 Control. If the dew point of the incoming air is above the setting, the compressor turns on and ON will flash on the Model 76 screen.
- The dew point of the incoming air is continuously monitored during compressor operation. When the dew point of the incoming air falls below the dryness level setting, the dehumidifier compressor and blower will turn off and ON will stop flashing on the Model 76 screen.

#### Control Limits

The control limits are determined by the dehumidifier.

- If the dehumidifier senses incoming air below 50°F or above 105°F, the dehumidifier will stop compressor operation if actively dehumidifying and ON will stop flashing on the Model 76 screen.
- The dehumidifier will resume normal operation when the measured incoming air to the dehumidifier is between 55°F and 100°F.



## TROUBLESHOOTING

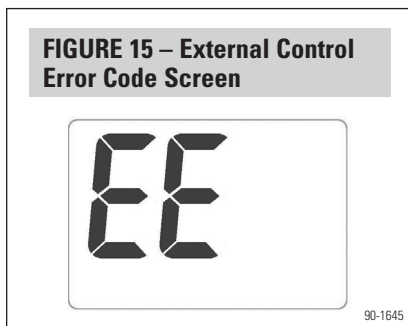
Technical Support is available Monday through Friday, 7:00 a.m. to 5:00 p.m. CST, at (800) 334-6011. Use the guide on the following page to help find and correct system faults. Contact Technical Support before replacing the control or for additional troubleshooting.

### ERROR CODES

#### EXTERNAL CONTROL

When the control detects an internal error, it will stop controlling, deactivate the dehumidifier output, and the LCD will display the Error Code. See **Figure 15**. The control will attempt to recover from the error every 10 minutes. The Error Code will continue to be displayed as long as the error condition exists. Button presses are not registered when in Error Mode. Cycling power to the control will not clear the code and the control will need to be replaced.

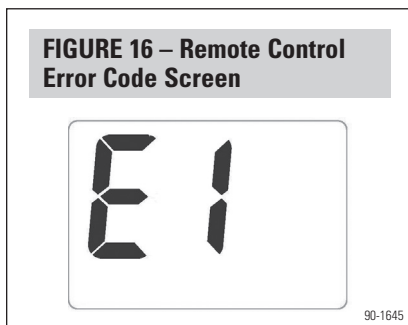
**FIGURE 15 – External Control Error Code Screen**



#### REMOTE CONTROL

When there is a dehumidifier or control communication fault, all dehumidifier outputs will turn off and the Model 76 LCD will display an Error Code. See **Figure 16** for an example. The faults can either be critical or non-critical. When a critical fault is detected, all dehumidifier outputs will immediately turn off. A critical fault is cleared by repairing the fault and cycling power using the on/off switch on the dehumidifier. When a non-critical fault is detected, the dehumidifier will revert to limited operation. A non-critical fault is cleared by repairing the fault and cycling power to the dehumidifier is not required. See **Table 2** for the error codes and required action.

**FIGURE 16 – Remote Control Error Code Screen**



**TABLE 2 – Error Codes**

Model 76 Error Code	Failure Mode	Fault Type	Failure Condition	Action
E1	Internal dehumidifier RH sensor fault.	Critical	RH sensor non-existent, erratic or reads out of 0% - 100% range.	<ol style="list-style-type: none"> <li>1. Check connection between dehumidifier sensor board and control board.</li> <li>2. If connection okay, replace sensor board, Part No. 4752.</li> </ol>
E2	Internal dehumidifier temperature sensor fault.	Critical	Temperature sensor non-existent, erratic or reads out of -20°F – 150°F range.	<ol style="list-style-type: none"> <li>1. Check connection between dehumidifier sensor board and control board.</li> <li>2. If connection okay, replace sensor board, Part No. 4752.</li> </ol>
E3	Model 76 Remote Control fault.	Critical	Model 76 Remote Control not communicating with dehumidifier.	<ol style="list-style-type: none"> <li>1. Check connections between Model 76 and dehumidifier control board.</li> <li>2. If connections are correct and secure, turn off the dehumidifier and remove the Model 76. Use a short section of 4-wire cable to reconnect the Model 76 to the control board. Turn the dehumidifier back on and increase the dryness level setting on the Model 76. If the dehumidifier turns on, the problem is with the wiring between the dehumidifier and control.</li> <li>3. If the dehumidifier does not turn on, call Technical Support.</li> </ol>
E4	Dehumidifier insufficient capacity	Critical	After 20 minutes of compressor operation, the frost sensor temperature is not at least 5°F below the inlet air temperature.	<ol style="list-style-type: none"> <li>1. Check the frost sensor connection at the dehumidifier control board.</li> <li>2. Remove the side panel of the dehumidifier and verify the temperature sensor is not damaged, is fully inserted in the sensor well, and the well is filled with thermal paste.</li> </ol>
E6	Dehumidifier frost sensor failure.	Critical	Frost temperature sensor non-existent, erratic or reads out of -20°F – 150°F range.	<ol style="list-style-type: none"> <li>3. If the sensor is not damaged and positioned correctly, contact Technical Support.</li> </ol>
E7	Dehumidifier float switch open.	Non-Critical	Open circuit between float switch inputs.	<ol style="list-style-type: none"> <li>1. Empty the condensate pan (if applicable).</li> <li>2. Check the float switch connection at the control board.</li> <li>3. If not using a float switch, verify the jumper is between the float switch terminals on the dehumidifier control board.</li> <li>4. If the problem persists, replace the float switch.</li> </ol>

TABLE 3 – Troubleshooting Guide		
Symptom	Possible Reason	Troubleshooting Procedure
No power to the control.	Incorrect wiring.	Verify wiring connections between control, dehumidifier and HVAC system (where applicable).
	No power to dehumidifier.	<ul style="list-style-type: none"> <li>• Verify that the dehumidifier power switch is ON.</li> <li>• Verify the circuit breaker has not tripped.</li> </ul>
	No power to HVAC equipment.	<ul style="list-style-type: none"> <li>• Verify HVAC system switch is on.</li> <li>• Verify the circuit breaker has not tripped.</li> </ul>
Control does not turn on dehumidifier output.	Incorrect wiring.	Verify wiring connections between control and dehumidifier.
Blank display or missing segments during Test mode.	LCD error.	Replace control.
Display shows EE.	Control detected an internal error.	The control will need to be replaced.
Display shows E1-E7.	Dehumidifier or communication error.	Use <b>Table 2</b> to troubleshoot fault.
Inaccurate humidity reading when using <b>External Control</b> .	Control recently installed after being stored in an uncontrolled temperature and humidity environment.	Allow 48 hours for control to acclimate.
	Offset has been applied to the humidity reading.	Change the offset.
	Control is mounted in direct sunlight, above a heat or humidity source, or in the path of a supply register.	Relocate the control.



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