Airzone Troubleshooting Manual

REV. 02/03

Use this troubleshooting manual in conjunction with the inside cover diagrams for you specific Airzone system. The inside cover diagram will identify different wires and parts of your Airzone System.

The "* " symbol denotes an associated technical reference diagram.

DETERMINING AN AIRZONE PROBLEM FROM AN HVAC PROBLEM

NOTE: Also used to temporarily override zoning system if service is not immediately available).

CAUTION: Always check wiring before handling to insure only low voltage is present.

Distinguishing between an Airzone problem and an HVAC problem is simple. Disconnect the four wires (more for heat pumps) that run between the Airzone electronic control board and the HVAC system. These wires are usually color coded as follows:

RED: 24vac control power from transformer located in HVAC unit (not the Airzone's transformer). This 24 vac power is switched at the Airzone electronic control board to the other three wires as follows:

GREEN: brings the HVAC system fan on.
WHITE: Brings the furnace or heat on.
YELLOW: Brings cooling compressor on. Be careful to not short-cycle compressor when working with this wire.

Carefully jump the red 24vac wire to Green and Yellow wire to start the fan and compressor;(caution: do not rapid-cycle compressor, wait 5 minutes to restart) White wire (gas heat) to start furnace.

If HVAC system fails to respond to these commands, problem is with HVAC system.

TEMPORARY AIRZONE OVERRIDE OPERATION

Disconnect zone one thermostat from Airzone Control board and connect to HVAC wires. Make sure all Flexdampers are open. HVAC System will operate as a one thermostat, single zone system until repairs are made.

DIAGNOSING AN AIRZONE PROBLEM

1.0 PROBLEM: HVAC unit appears “dead”, no response to thermostats.

Step 1: Check Airzone 24vac transformer for power. If transformer has not output, determine why transformer has failed before replacing. Check transformer VA rating. Typical cause of failure is:
A. Overloading transformer beyond capacity.
B. Solenoid switch shorted, or other short in system. Solenoids should require less than 1/2 amp (.33 is normal) of 24 vac power; if more than that is measured, replace solenoid. (pronounce “click” should be heard when solenoid is energized.

It’s a good idea to check the total draw on the transformer by having one zone at a time call for conditioned air, which will cause the maximum number of solenoids to be energized. Make sure the transformer you use has some reserve capacity. Consult catalog install manual for more information.

2.0 PROBLEM: HVAC unit operates, but dampers will NOT inflate and close off air flow.

Possible Causes:

2.1 No common from Airzone Transformer to Solenoid Panel
2.2 ECL switch activating, malfunctioning, or improperly installed (if equipped).
2.3 Airzone pump not running
2.4 Airzone pump not producing pressure or vacuum
2.5 Problem in pressure or vacuum relief circuits
2.6 Solenoid Air Switch not operating correctly
2.7 Air leak in Flexdamper or tubing network
2.8 Water or ice in tubing, obstructing airflow
2.9 Flexdamper not correctly mounted or loose in duct

2.1 No electrical Common: For Airzone Systems using SEPARATE control board and pumping unit, this problem maybe caused by no common from the Airzone transformer to the solenoid panel-pumping unit. No common may result from: failure by installer to run a common from the control board to the solenoid panel-pumping unit.

2.2 ECL Switch: (optional on some systems) If this problem is on an existing system (that has operated correctly in the past), the ECL switch may be triggering, defeating the common to the solenoids, and causing all dampers to open. The ECL switch is a protective device designed to do this, restoring all airflow to the system if refrigerant drops too low. If the ECL switch is activating, immediately check HVAC system for proper airflow in different zoning modes, check for dirty coils, overcharging, or any combination of conditions that may be causing low refrigerant temperatures. the ECL switch should trigger at approx. 38 F, and reset at 51F. CAUTION: IF EVAPORATOR COIL IS FREEZING, DO NOT OPERATE SYSTEM.

The ECL switch is a “normally closed” device, and when not activated should provide a closed circuit to provide common to the solenoid panel. Check for continuity , but DO NOT test by shorting Airzone transformer.

NOTE: An ECL switch that is occasionally activating may be hard to catch “in the act”. Complaints that “sometimes” the dampers don’t close may be ECL related. Also, extremely cold attic temperatures in the winter can sometimes activate the ECL, defeating all the Flexdampers even though the HVAC unit is in the heating mode.

***2.3 Airzone pump not running:** The Airzone pump contains an internal, 24vac operated relay with a three wire, low voltage only input. When 24vac is applied to this relay, the relay completes the 110vac circuit to operate the pump. This relay is designed to run the pump only when the HVAC system is running. WHEN OPERATING, A SLIGHT VIBRATION CAN BE FELT FROM THE PUMP.

If Airzone Pumps fails to run:

A. Verify with voltage meter that 110vac is present at outlet;
B. NOTE: The most common reason an Airzone Pump fails to run when first installed is failure to connect the black “common” wire of the pump to the HVAC unit’s 24vac transformer “common” (not the Airzone transformer common).

2.4 Airzone pump not producing pressure or vacuum: Insure that the pump is running. Carefully disconnect the two tubes from the pump where the tubes enter the solenoid panel cabinet. The large vacuum tube should be pulling a noticeable amount of vacuum. Momentarily plug the vacuum tube with your finger; a noticeable amount of vacuum should be felt, and the pump noise should change as the pump “pulls down”. Weak vacuum and/or the hiss of air around the black rubber base of the pump would indicate a vacuum leak. Note: vacuum leaks can be caused by overtightening the support screw in the black rubber base.

***Explanation of Pump Operation:**

Electrical: The three low voltage-only wires that extend from the pump are typically color coded red, green, and black. The red and green wire connect to the same terminal of the internal relay, however, inline diodes provide voltage isolation of the two wires. The green wires to the green fan wire of the HVAC unit, and the red wire to the White furnace wire of the HVAC system. The black wire must be connected to the HVAC unit’s 24vac control transformer for the Airzone pump relay to pull in when the fan or furnace is in operation.

HEAT PUMPS may require only the green and black wire to be connected, as long as the green wire is connected to an HVAC wire that is energized whenever the HVAC fan runs (test in heat, coil, emergency heat, and fan only modes).

Mechanical: The Airzone pump, when running, produces both pressure to inflate the Flexdampers, and vacuum to deflate the Flexdampers. It is possible for a malfunctioning pump to produce pressure but no vacuum. A pump with bad diaphragms will produce no pressure or vacuum. A pump with a bad seal will produce pressure, but no vacuum.

2.5 Problem in pressure or vacuum relief circuits: if pump is running and producing both vacuum and pressure, make sure that this pressure and vacuum is present at the zone outlet tubes located just outside the Airzone enclosure, and connected to the solenoid air switches).

To check pressure and vacuum circuit and relief valves, plug or clamp off all zone outlet tubes with pump running . Air should be heard venting from the pressure relief valve * (2.5a) and the pump should not be straining, or changing tempo. Make sure relief valves are in the correct tubes, and pointed in the correct direction. Refer to inside cover panel diagrams.

If a problem is suspected, unplug the relief valves one at a time at the 1/4 to 3/8 inch adapter -connector. Blow through the pressure relief. Resistance should be felt up to a point, then the spring should release allowing air to pass. If not, check for foreign matter in the valve. Then unplug the vacuum relief valve (with filter) at the connector. Suck through the vacuum relief. Resistance should be felt to a point, and then the valve should open and allow air to pass. If not, remover filter and check for foreign matter. Replace valves.

CHECKOUT: With pump running and valves in place unplug or clamp each zone outlet tube one at a time. Check for strong vacuum or pressure. Energize the air solenoid by jumping 24vac to the screw terminal that wires to the valve.

Check for strong vacuum or pressure.

NOTE: Most air solenoids are plumbed to pull vacuum when not energized, although the air solenoids can be plumbed opposite of this. NOTE2: The voltage to a solenoid diode network is 24vac; the solenoid itself is 12vdc.

IF PUMP AND PRESSURE RELIEF VALVES AND PUMP ARE OK...but a strong vacuum or pressure is not present at the zone outlet tube, note the following possibility:

Although rare, an air solenoid can get a large piece of foreign debris on it's valve seat, and fail to fully open or close. When this happens, pressure can flow from the pressure circuit through the valve, and into the vacuum circuit. The pressure and relief valves

never vent, and no air is forced to the zone outlet tube, since the pump is now operating in a “closed loop” configuration.

***2.5a Pressure and Vacuum Relief Circuit Explained:** The pressure circuits (see inside cover panel diagrams for identification) main component is a spring loaded pressure relief valves that allows all Flexdampers in the system to develop about 1/3 PSI, or about 7 inches on a water column,
SEQUENCE OF OPERATION, PRESSURE RELIEF VALVE: When any Flexdamper in the system is inflating, the pressure relief valve will not vent air, forcing all air into the Flexdampers. When all Flexdampers have inflated, pressure increases in the pressure circuit up to 1/3 PSI , at which point the pressure relief valve begins to “dump” the excess air to avoid over inflating the Flexdampers.
HINT: The pressure relief valve can be a helpful aid when checking out the system, by alerting you when the Flexdampers on a zone are fully inflated. Listen for the slight noise of the air being vented from the pressure relief.

NOTE: Makes sure unused tubes are plugged when not in use, or when testing. A zone outlet tube that is unplugged is open to atmosphere and will prevent the Airzone System from developing either vacuum or pressure, depending on the position of the valve.

2.6 Solenoid air switch not operating properly: TO TEST FOR AN AIR SOLENOID THAT MAY NOT BE FULLY OPENING OR CLOSING:
With pump running, plug or clamp all zone outlet tubes where no air can pass. Little or no air should be entering the vacuum relief, and little or no air should be exiting the pressure relief, since a sticking air solenoid will be bypassing air
from the pressure circuit back to the vacuum circuit. One at a time, clamp either the pressure or vacuum tube just at the point the tube attaches to the air solenoid with needle nose players (but not so close as to pull the tube off the air solenoid).

This action will block air from bypassing through a sticking air solenoid. Do this for each solenoid, carefully noting whether the pressure relief solenoid suddenly begin to relieve air. If the pressure relief does begin to vent air on an air solenoid you have identified the offending part. Lubricate with silicone spray or replace part.

AMPERAGE DRAW OF SOLENOID: 33 AMPS

2.7 Air leak in Flexdamper or Tubing Network: Disconnect each zone tube and orally inflate. At some point dampers should fill and then hold pressure; if not , a leak is present somewhere in that zone circuit.

If a zone tube hold pressure, plug the tube while still under pressure, turn the HVAC system fan to the on position (CAUTION: Make sure at least one set of zone dampers is open so that HVAC fan air does not over pressurize duct system), then go check that air flow from that zone's ducts are substantially shut off. If a duct is still passing a large quantity of air, chances are the Flexdamper in that duct has become dislocated or improperly mounted in the duct.

Visually inspect the Flexdamper(s), and remount using alternative mounting methods that more securely affix Flexdamper to the ducts. See diagram 2.7

2.8 Water, ice or other obstruction in Airline. Some condensation in the Airlines or Flexdampers is normal, and all internal system parts are impervious to water. However, this water freezing in the air lines can prevent proper operation. Attempt to run air tubing in ducts or in some manner where freezing temperatures will not be encountered. Other obstructions or kinks in the airline should be corrected.

2.9 Flexdamper incorrectly positioned or loose in duct: Flexdampers mounted in vertical runs, corners, or subjected to high velocities may suddenly or gradually move to an incorrect position in the duct. When this happens, the Flexdamper may partially block the duct, even when defaulted, or fail to close the duct when inflated.

For this reason, RetroZone recommends all Flexdampers be mounted with a silicone adhesive on the top tape joint, according to the "alternative mounting methods" instructions supplied with each Flexdamper.

3.0 FLEX DAMPERS WILL NOT DEFLATE AND ALLOW AIR THROUGH THE DUCT WHEN THE THERMOSTAT CALLS.

3.1 Pump not supplying sufficient vacuum, see 2.4 above
3.2 Flexdamper out of position and blocking duct, see 2.9
3.3 Air leak somewhere in tubing or Flexdamper, see 2.7
3.4 Other vacuum system problem, check entire vacuum circuit

4.0 PRESSURE RELIEF, PUMP, OR FLEX DAMPER MAKE EXCESSIVE NOISE.

4.1 Pressure relief valve in panel makes too much noise-if Airzone panel in mounted in a noise sensitive area, request a pressure relief valve silencer from RetroZone, which will substantially reduce the noise level. Insure the pump is hooked up correctly run only when the HVAC unit is on.

4.2 Pump making excessive noise: Make sure pump hangs loosely from it's mounting support, and that vibration from pump is not causing the noise. If pump noise seems to be internal to pump, internal diaphragms may be bad. Test pump for vacuum and pressure (see 2.4)

4.3 Flexdamper makes excessive noise when inflating or deflating: Noise problems with Flexdampers almost always have to do with installations in steel duct work where the Round Flexdamper is located close to the register. If this noise is a problem, attempt to locate the Flexdamper closest to the plenum or truck line. Even when Flexdampers are located at the register, noise may only be a problem if the Flexdampers cycle at night. Placing the Sleeping areas on just one zone, then setting back the unused living areas at night will usually eliminate any problems for the sensitive sleeper.

5.0 HVAC UNIT RUNS BUT FLEXDAMPERS OCCASIONALLY FAIL TO CLOSE DUCT OFF, THEN WILL BEGIN TO FUNCTION PROPERLY.

5.1 See 2.2 ECL Switch Activating

6.0 ELECTRONIC CONTROL BOARD FAILS TO RESPOND TO THERMOSTAT COMMANDS, OR OTHER CONTROL BOARD PROBLEMS:

Because of the many types of control boards offered by refrozen, the following is designed as a general overview of troubleshooting the control boards. The specific wiring diagrams of each electronic control board should be consulted as part of the troubleshooting.

6.1 MAKE SURE CORRECT THERMOSTATS ARE BEING USED FOR YOUR APPLICATION, AND THAT THERMOSTATS ARE WIRED CORRECTLY. MOST CONTROL BOARD PROBLEMS ARISE FROM INCORRECT THERMOSTATS OR WIRING.

6.2 Individual control board checkout: To identify a malfunctioning thermostat or incorrect wiring, disconnect thermostat inputs from board, the “jumper” the inputs to simulate a call from the thermostat. Then check the outputs to the HVAC unit between F (which should have 24vac present) and G (green fan) , W (white, furnace), Y (yellow, AC). The specifics for different types of boards are given below:

6.3 AZ-2, AZ-3 Control Boards:

Before continuing, make sure side switches on boards are set in correct positions.
a. Check for 24vac at position 1 and 2.
b. Check for 24vac at pos 1 and the body of a solenoid,insuring solenoids are common to transformer.
c. Jump a wire between pos 1 and cool 01, this simulates putting the system in the cooling mode.
d. Jump between R and Y1 on each row of thermostat inputs; this will simulate a thermostat calling for cooling.
e. The contacts should then close between RCA/RAH an Y1 or G1 (or the fan and compressor should start if hooked up).
f. In this same manner, heat, fan, and other functions may be checked out.
g. Carefully rotate relay to check for a malfunctioning relay.