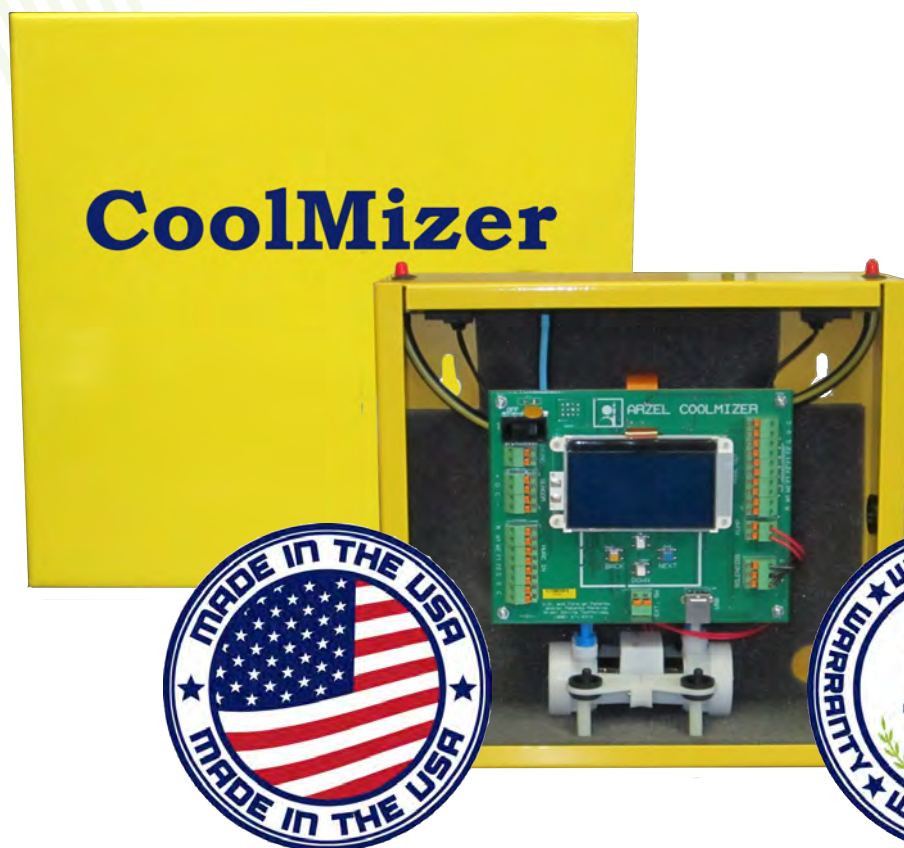


Installation & Operation Instructions

Panel: CoolMizer®



 **Arzel® Zoning**
TECHNOLOGY

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Thank you for choosing Arzel®!

Thank you for choosing the Arzel® CoolMizer® Economizer/Ventilation Control System. Now you can enjoy the healthful benefits of controlled levels of outdoor air and experience the energy savings of free heating and/or cooling when conditions permit. No other system on the market offers these features in such a simple package.

Arzel® is committed to providing homeowners and facilities' managers the tools to make the most of their HVAC systems. CoolMizer® is but one tool in that arsenal. Combined with an Arzel® Zoning System, you can deliver heating and cooling to certain areas that need it, only when it's needed. Everyone deserves the customized comfort offered by Arzel®'s solutions.

Ask your HVAC contractor about additional solutions which allow you to create an environment customized for the way you live and the way you use your home or facility.



Product Overview

The CoolMizer® control system monitors outdoor temperature and humidity conditions along with indoor conditioning demands. A thermostat call prompts CoolMizer® to examine outdoor conditions and determine if they are favorable (as programmed by the HVAC contractor) for free conditioning. If they are, the thermostat call will not start equipment but instead only energize the system's blower while a damper opens to the outdoors allowing fresh air to be drawn into the return.

CoolMizer® takes advantage of Damper2™ technology. The intake damper(s) have two functions. The larger opening is sized to provide enough air through the system to heat or cool the space. A smaller opening provides ventilation air to dilute and remove indoor pollutants as well as meet minimum ventilation standards.

There are separate settings for high temperature, low temperature and high humidity for heating, cooling, economizer and ventilation operations. Your contractor will help you decide what limits work best for where you live, the way you use your home and your comfort goals. The system features a Set-Up Wizard to walk you through the simple configuration process to assure system operating parameters fit your needs.

Please feel free to learn more about the installation and operation of Coolmizer® by reviewing this entire manual. Consult your installing contractor with any questions regarding system operation. If questions are still unresolved, you may call Arzel®'s Technical support for homeowners from 8 AM - 5 PM EST from Monday-Friday. Please have your system serial number available when you call. Your installing contractor can reach Arzel® Technical support seven days a week from 8 AM - 9 PM EST. The Arzel® Technical support phone number is 1-800-611-8312.

INSTALLATION PRECAUTIONS

Read these instructions carefully.
Failure to follow them could damage the Arzel® Zoning System
and/or cause a hazardous condition.

WARNING

1. Disconnect the power supply to the HVAC system and the CoolMizer® control system before making any wiring connections to prevent the danger of electrical shock or equipment damage.
2. Be sure the HVAC manufacturer's operating specifications are compatible with CoolMizer®.
3. All wiring must comply with applicable electrical codes, ordinances, and regulations.
4. Use properly grounded tools, safety glasses, and gloves when drilling or cutting sheet-metal ducts, fiberglass or any hard objects.

INTAKE LOCATION WARNING

Air from outside can become a potential source for Carbon Monoxide or other Outdoor Air contaminants. Care should be taken when selecting the location of the CoolMizer® intake so that it's at least 10 feet away from sources of Carbon Monoxide and other Contaminates. See Energy.gov guidelines for other considerations: <https://basc.pnnl.gov/resource-guides/ventilation-air-inlet-locations>.

CAUTION

1. The CoolMizer® is designed for indoor use only.
2. You must touch a grounded metal object before handling the control panel to avoid potential loss of internal programs due to electrostatic discharge.
3. Install in an area where the ambient temperature is between 40 F and 140 F in a non-condensing area.
4. Check all system operations after installation is complete.
5. The damper blade gently wipes the inside of the ductwork. Insert a sleeve inside any fiberglass, or abradable ductwork, so the blade does not abrade the materials into the air.
6. Leave these instructions with the installed system for future use.
7. There are both AC and DC terminals on the circuit board. Do not intermingle wires.

CoolMizer® Board Layout

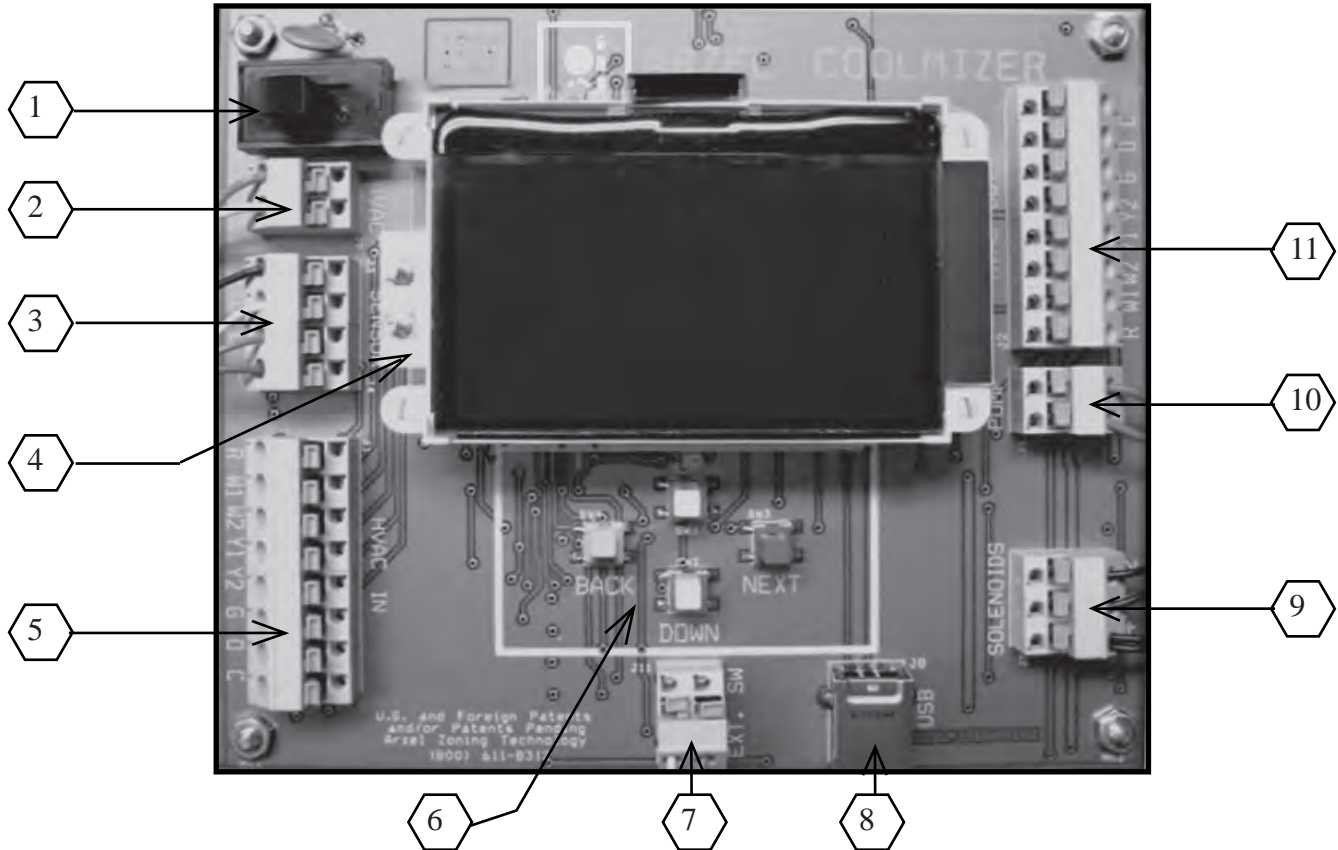


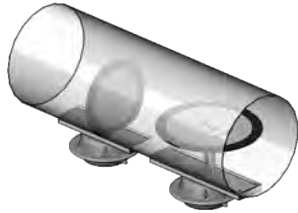
Table 1 - Board Layout

Item	Description	Function	Pg Ref
1	Power Switch	Controls power to panel	
2	24VAC power Input	Connect Arzel® provided 24VAC transformer	
3	Outdoor sensor connections	Temperature and humidity sensor connections	
4	LCD Screen	LCD Screen outputs set-up information and operational data	
5	Thermostat/Zoning System Inputs	Connect 24VAC Thermostat use heat/cool or heat pump thermostat (up to 2 stage) or zoning system outputs.	
6	Navigation Buttons	Provide programming interface for Set-up Wizard White buttons scroll up and down to make program selections Blue button is Enter and/or Next Yellow button is step Back button.	
7	External Switch	External switch allows for additional input from a field supplied control. See Power-On Set-up Parameters p.8 section 6.5	
8	USB Port	Used for firmware revision only	
9	Solenoid Connections	24VDC powers solenoids	
10	Pump Terminals	24VAC pump connections	
11	HVAC Outputs	Outputs to the HVAC equipment.	

Damper²™ Damper



The Damper2™ damper has been designed to control two levels of airflow with one convenient package. The larger portion of the damper brings in larger volumes of air for free heating or cooling. The smaller window brings in a lesser amount of air for controlled ventilation and IAQ. The amount of air brought in is controlled by the size of the total opening and the relative sizes of the damper portions.



(See page 7 for sizing guidelines. Damper2™ can be built in virtually any size you need.)

Multiple round dampers may be used instead of the Damper2™ damper if the application necessitates round installation.

Intake/Exhaust

WARNING

Air from outside can become a potential source for Carbon Monoxide or other Outdoor Air contaminants. Care should be taken when selecting the location of the CoolMizer intake so that it's at least 10 feet away from sources of Carbon Monoxide and other Contaminants. See Energy.gov guidelines for other considerations <https://basc.pnnl.gov/resource-guides/ventilation-air-inletlocations>

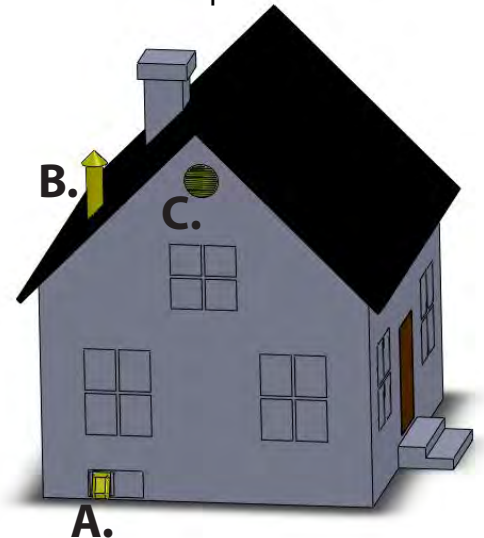
CoolMizer® has been designed to be flexible. Your intake position will depend largely on where your equipment and ductwork is.

House 1 offers 3 different possible intake scenarios:

- A. The downflow unit in the basement with a hood through a basement window or sill plate.
- B. A stack intake for an attic unit.
- C. An intake hidden behind the attic vents.

The CoolMizer® System includes a sophisticated temperature and humidity sensor that should be mounted where it can accurately measure ambient conditions. The sensor should be mounted on the north side of the building, in a shady place, where it will not be influenced by direct sunlight, ground humidity or other environmental factors.

In an Idaho University study, the single largest factor for energy savings was sensor orientation. Sensor positions on the North or West side tended to save energy whereas, on the south and east sides, there were many service hours lost due to the sensor reading conditions as unacceptable because of the direct exposure to sunlight.



Intake Duct and Damper Sizing

The quantity of Outside Air introduced into the duct system is controlled by the size of the opening to the outside and the existing static pressure of the return. Care must be taken to match the cooling or heating potential of the intake air with the maximum load to be serviced by CoolMizer®. Sizing the penetration as well as the proportion for each damper follows a simple 4-step process.

Step 1: Load Calculation

Perform a cooling load calculation on the structure at the highest temperature that CoolMizer® will be employed (the CoolMizer® High Limit Temp setting). The calculation provides the maximum Btu/hour that the economizer must provide.

Step 2: Calculate Required Airflow

Calculate the amount of air required to supply the demand Btu's using the following formula:

$$\text{Required CFM} = \frac{\text{Btu}}{(\text{DT} \times 1.08)}$$

Where: Btu- is the result of the load calculation (Step 1)
 DT- is the difference between Inside desired temperature and Outside temperature
 1.08- is the Btu constant

Required Airflow Example		
Example: 6,000 BTUH @ 55°OAT desiring 73° Indoor Air Temp		
Required CFM =	$\frac{\text{Load Calculation BTUH}}{(\text{Indoor Target} - \text{OAT}) \times 1.08}$	CFM
Required CFM =	$\frac{6000 \text{ BTUH}}{(72-55) \times 1.08}$	CFM
Required CFM =	$\frac{6000 \text{ BTUH}}{17 \times 1.08}$	CFM = 327

Step 3: Calculate CoolMizer® Intake Size

The total opening size must be able to deliver the CFM requirement from Step 2. More air can be drawn in by increasing the velocity (FPM) of the intake by restricting the return air coming from the house. Using a duct slide chart or the following formula will help determine how large a duct is needed. (View chart CoolMizer® Duct Sizing Example)

CoolMizer® Duct Sizing Example			
SQ.IN=	$\frac{\text{CFM} \times 144}{\text{Velocity or FPM}}$	SQ.IN of Duct	Duct Equivalent
SQ.IN=	$\frac{327 \times 144}{600}$	79 SQ. IN	10x8 10" Round
SQ.IN=	$\frac{327 \times 144}{900}$	52 SQ. IN	6x8 8" or 9" Round
SQ.IN=	$\frac{327 \times 144}{1200}$	39 SQ. IN	4x10 7" Round

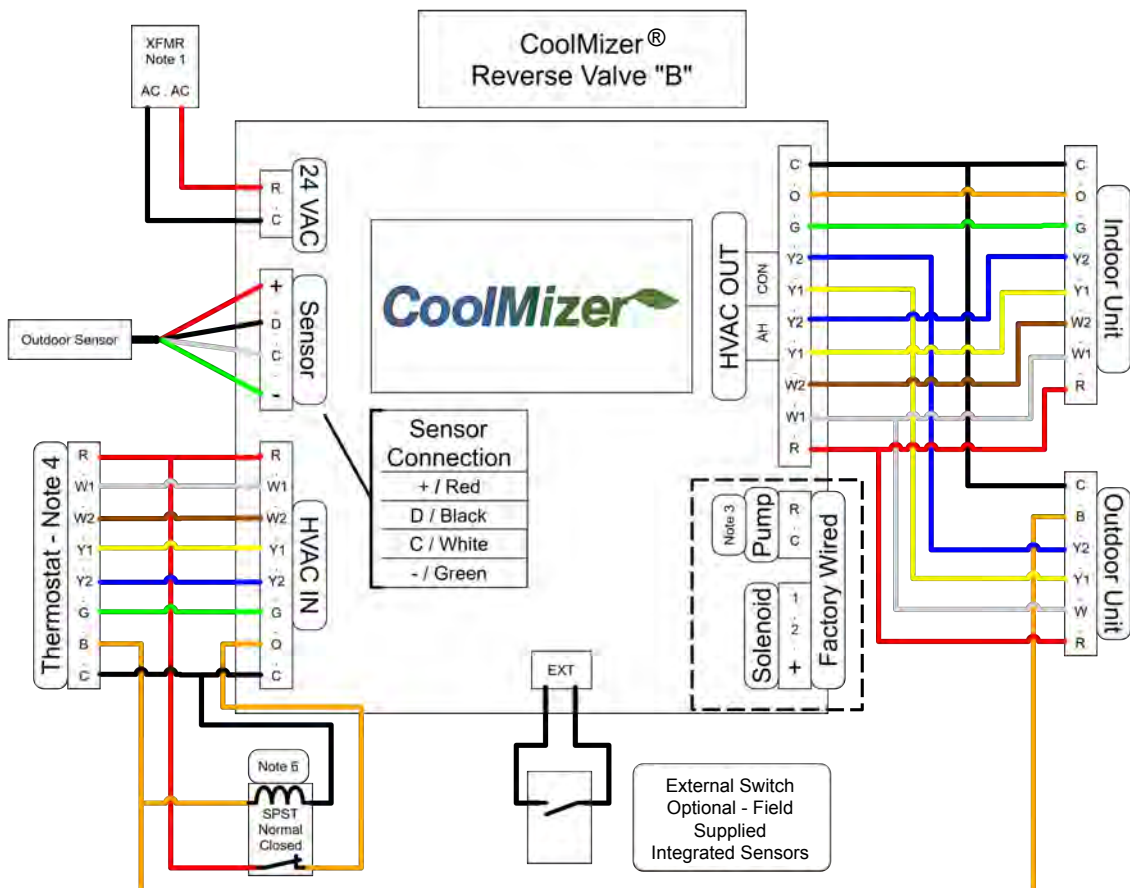
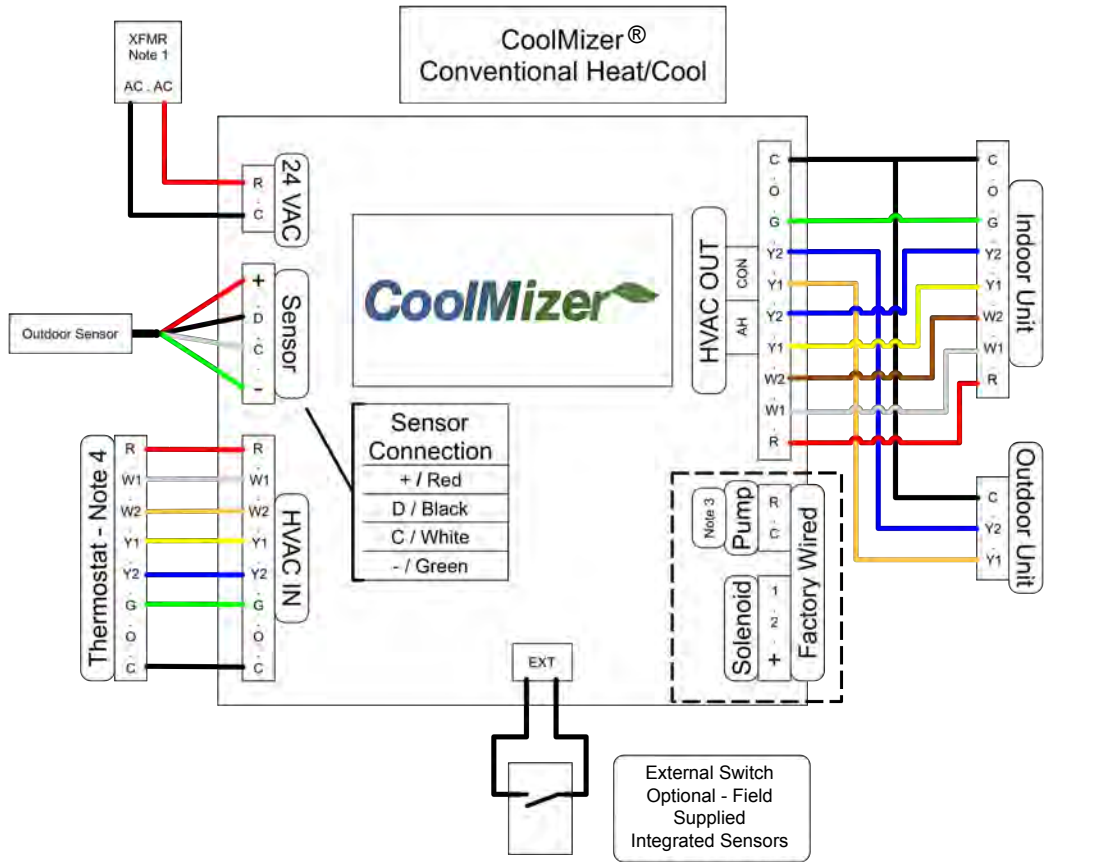
Step 4: Calculate Ventilation Size

ASHRAE Standard 62.2 dictates how much fresh air is needed for residential structures and should be used to ensure an optimal amount of fresh air is drawn into the building for healthy living.

ASHRAE 62.2 -2019
FA CFM = 0.03 (House sq. ft.) + 7.5(Bedrooms + 1)
Example House - 2,500 SQ FT and 4 bedrooms
FA CFM = 0.03(2500) + 7.5(4+1)
FA CFM = 75 + 7.5(5)
FA CFM = 112.5

Home Area Sq. Ft.	ASHRAE 62.2 -2019				
	1	2	3	4	5
501 to 1000	45	53	60	68	75
1001 to 1500	65	68	75	83	90
1501 to 2000	75	83	90	98	105
2001 to 2500	90	98	105	113	120
2501 to 3000	105	113	120	128	135
3001 to 3500	120	128	135	143	150
3501 to 4000	135	143	150	158	165

Wiring Diagrams



Wiring Diagrams

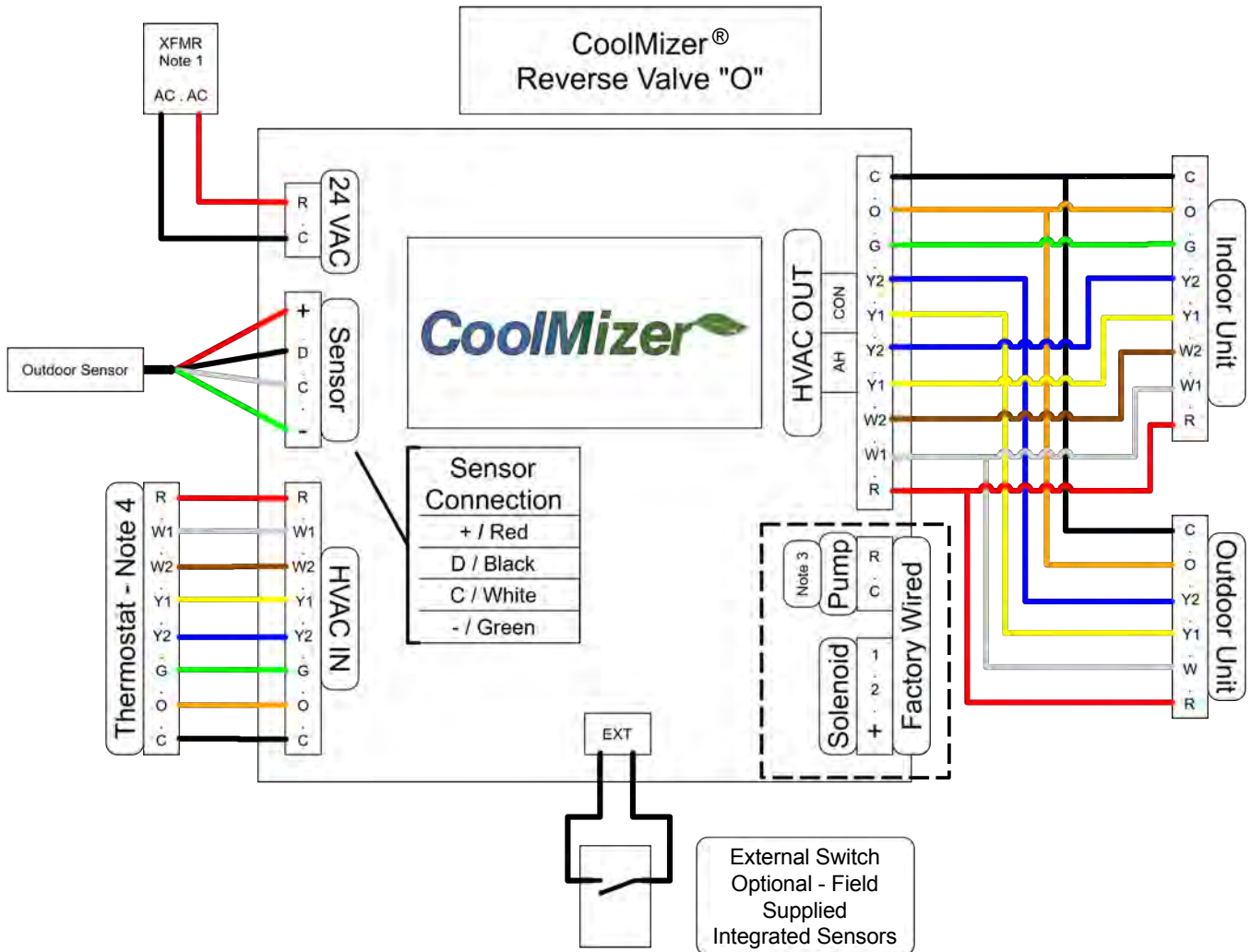


Table 5 Wiring Notes

Note 1	Power Supplies	The Arzel® transformer supplies power to the CoolMizer® Components. All Inputs and Outputs are powered from the HVAC equipment transformer.
Note 2	Power Connections	HVAC OUT (equipment connection) must include R and C inputs.
Note 3	Pump Power	Power for the Pump terminals is fed from the Equipment Transformer.
Note 4	Thermostat choice	For Heat Pump installations use a heat pump thermostat. For Furnace and A/C installations use a heat/cool thermostat.
Note 5	Rev. Valve	CoolMizer® interprets an O call as a cooling call
Note 6	SPST Relay	Reverses B signal to energize O in cooling

Installation Instructions

1. Size appropriate penetration and damper sizes.

Penetration will be sized for the largest airflow requirement based upon the duct and damper sizing section on page 7.

2. Install intake ductwork and outside intake hood.

An insulated duct must be installed from the penetration to the HVAC system return. Arzel® recommends installing a screened hood over the outside of the penetration to keep water and pests out of the ductwork.

3. Mount control panel

The control panel must be mounted vertically on an exterior wall to reduce noise. The wall must also be located in a non-condensing area where temperatures will not normally exceed 140° F. **DO NOT MOUNT PANEL ON DUCTWORK, HVAC EQUIPMENT, STAIRWELL, or BEDROOM WALLS.** The best method is to attach a piece of $\frac{3}{4}$ plywood to an exterior stud wall or foundation. Hold the panel level on the wall and mark the positions of the upper mounting holes. Drive two screws into the wall leaving the heads at least $\frac{1}{2}$ " out. Set the panel over the screws. Drive two screws into the lower mounting holes. Tighten the upper screws.

Note: Prior to making electrical connections, touch a mechanical ground to discharge static electricity.

4. Install dampers/run tubing

The CoolMizer® Damper(s) are installed in the intake ductwork. See page 6 for typical system layouts. You may require a damper in the return as well to generate enough outside draw. See Damper Sizing on Page 7.

Dampers are driven by air pressure (to close) and vacuum (to open) produced by the pump inside the control panel. Run a length of tubing from each damper to the appropriate ports on the top of the control panel. If a return damper is used, it is Tee'd into the economizer tube.

5. Connect thermostats

CoolMizer® monitors the thermostat request to understand what service is required. Use 18 gauge, multi-conductor, solid thermostat wire to connect the thermostat or the outputs from the zone control panel to the HVAC IN terminal block on the lower left side of the CoolMizer® panel. For heat pump applications where the reversing valve is reversed in heating (B terminal), (see page 9).

6. Connect equipment

Use 18 gauge, multi-conductor, solid thermostat wire to connect the HVAC outputs located on the upper left side of the CoolMizer® circuit board to the HVAC equipment.

7. Connect transformer

Use 18 gauge, 2-conductor solid wire to connect the R and C power input terminals to the mounting screws on the 40VAC self-resetting, plug-in transformer supplied with the CoolMizer® control panel. Plug in the transformer to any standard 120VAC receptacle.

Set-Up Wizard

8. Turn on power and run the Set-up Wizard

Turn Power ON, CoolMizer® will appear on the display. Push the blue button to enter the Set-up Wizard. Push the blue button to confirm each choice you make.

8.1 Set the Heating, Cooling and Fresh Air Set-points

The High Temp setting will be the highest acceptable temperature air to bring in. The Low Temp setting is the lowest acceptable temperature air to bring in. The RH % is the highest relative humidity that is acceptable to bring in. (See Table 5 for acceptable ranges).

8.2 Choose an Operational Mode

	Range		
	Heating Setpoints	Cooling Setpoints	Fresh-Air
High Temp	70° to 120° F	0° to 120° F	-10° to 120° F
Low Temp	70° to 120° F	0° to 120° F	-10° to 120° F
RH%	0% to 60%	0% to 60%	0% to 80%

Economizer: Economizer only operations.

Fresh-Air: Fresh-air operations only.

CoolMizer®: System covers both functions. It will have multiple damper components to select between at least two different airflow levels and OFF. This is the default setting.

8.3 Set the External Switch Mode

The External Switch has been provided to customize the way the fresh-air damper works.

OFF: Switch is ignored.

Override: System operates while the switch is open. When the switch closes the fresh-air damper is forced open regardless of outdoor conditions and the blower is started at fan-only speed. This mode was designed for use with CO₂ sensors or kitchen hood interlocks.

Ext. Control: Fresh-air Damper only operates while the switch is closed. This has been designed for use with a timer where fresh-air is only desired for certain amounts of time.

8.4 System type

Choose the appropriate HVAC equipment type: furnace or heat pump.

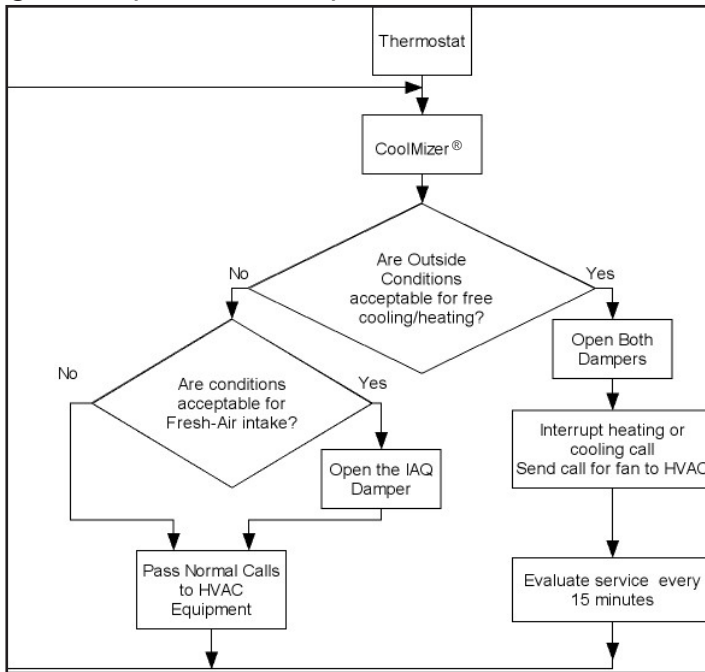
CoolMizer® Sequence of Operation

The CoolMizer® is wired between the thermostat and the HVAC equipment. When the thermostat calls, CoolMizer® compares the outside conditions to the temperature and relative humidity parameters the contractor has set. If conditions are favorable for free heating or cooling, CoolMizer® will then prevent the condenser or furnace from being started. Instead, it will open both dampers to the outside and bring on the fan to circulate air through the space.

If conditions are not acceptable for free heating or cooling, the CoolMizer® passes the thermostat signal to the HVAC equipment. It also checks to determine if conditions are acceptable for a minimum airflow from outside for ventilation and indoor air quality.

See Figure 1 for a graphic representation of this sequence.

Figure 1 Operational Sequence



Service Change-Over: Once CoolMizer® starts the equipment, it continues to serve that call with the equipment until it is satisfied. If the call is initially served with outside air, a 15-minute timer is started. At the end of 15 minutes, CoolMizer® reevaluates outdoor conditions to see if they are still within the prescribed parameters.

External Switch: CoolMizer® has been designed with a built-in integration function. Closing the switch across the Ext. SW terminal blocks will allow for the manipulation of the Fresh-Air Damper with an additional field supplied control.

The External Switch controls only the Fresh-Air Damper.

Mode	Function	Intended Use
OFF	Switch Ignored	No Switch installed
Override	Fact Damper Forced OPEN when switch closed	itchen Hood Interlock - CO ₂ Sensor
Ext. Control	Fact Damper Forced Closed unless switch closed	Timer to only allow operation so many minutes/hour

Sensor Install

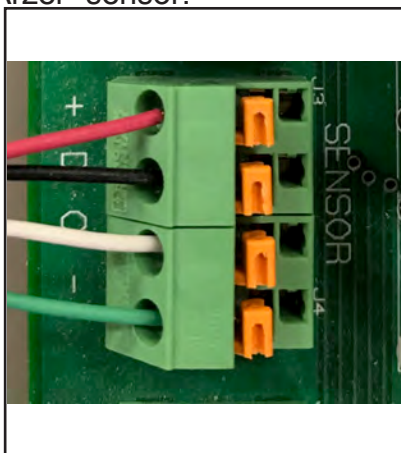
An enclosure is provided to protect the outdoor sensor from physical damage as well as snow, ice and solar heat influence.

1. Choose a location:
 - Out of direct sunlight
 - Above maximum snow level
 - That is accessible should service be required
 - A location on the north side of the house is preferable
2. The enclosure is a two-piece, Zinc-coated, steel box. Remove the top cover by sliding it off the enclosure body to either the right or left.
3. Drill a 5/16" access hole through the exterior wall aligned with one of the pre-drilled holes on the back of the enclosure body. If the sensor wire is to run along the outside of the structure, use opening located at the bottom of the enclosure.
4. Mount the Sensor Enclosure level over the access hole with the sensor opening on the back plate aligned with the 5/16" opening. Fasten with appropriate screws being cautious not to over tighten, flexing the box out of square.
5. Route the sensor lead into the sensor enclosure and fasten with the provided wire tie.
6. Slide the cover back onto the box until it snaps into position.



Sensor Connections

The Temperature/Humidity Sensor is a state of the art electronic package. The package is weather resistant but may not be waterproof. Care should be exercised to place it in a location where it will not be immersed in water or other precipitation. It cannot be replaced with any other Arzel® sensor.



It comes with 15 feet of wire. If more length is required, up to 50 feet of 18 guage thermostat wire may be used. No shielding is required. Connect to terminals on the upper left side of the circuit board labeled Sensor

Table 3 provides Sensor Wire connections

Label	Color
(plus)	Red
D	Black
C	White
- (minus)	Green

Set-up Worksheet

Fill in the right-hand column with the Set-up Wizard settings that you use when programming the panel. Record the setup date. If any settings change, record those changes and the date they were made.

Function	Options	Settings			
		Initial Set-Up Date	Adjusted Setting Date		
Heating Setpoints					
High Temp	70° to 120° F				
Low Temp	70° to 120° F				
RH%	0% to 60%				
Cooling Setpoints					
High Temp	0° to 120° F				
Low Temp	0° to 120° F				
RH%	0% to 60%				
Fresh-Air Settings					
High Temp	-10° to 120° F				
Low Temp	-10° to 120° F				
RH%	0% to 80%				
Operational Mode					
Economizer Only	1 larger damper for FREE Heat/Cool				
Fresh-Air only	1 smaller damper for ventilation/IAQ				
CoolMizer (both)	2 dampers - providing both FREE Heat/Cool and IAQ				
External Switch					
OFF	Contacts ignored				
Override	Force IAQ damper open when made				
External Control	Damper(s) Only open if switch is made				
System Type					
	Furnace or Heat pump				

CoolMizer® work-around Procedure:

If you need to take the CoolMizer® off line for any reason, use the following procedure:

1. Power off the CoolMizer® board
2. Unplug the Arzel® 24VAC/40VA transformer
3. Remove the wires from both the 24vac input and the pump Terminals.
4. Wire nut one leg of the pump to the hot R input from the transformer and the other leg to the common C input.
5. Plug the transformer back in

This will run the pump continually, forcing all dampers to the outdoors to close and any dampers in the return to drive open. The CoolMizer® panel will be out of the loop and thermostat or zone control signals will go right to the HVAC equipment.

Ezy-Slide Damper Install

A visual aid to installing both the round and rectangular Ezy-Slide® dampers:

1. Apply the Template

Apply template with Air Flow Arrow pointed towards register.



2. Cut out the Triangle

Drill a 3/4" hole at each of the three corners and connect the holes with your SNIPS.



3. Insert the Damper

With the damper being held in the "Closed" position, insert with the blade at the wide end of the triangle.



4. Twist into Position

Once the blade is inserted, rotate the damper 90 degrees with the tubing port facing the main duct



Ezy-Slide Damper Install cont.

5. Fasten with Zip Screws

Secure damper at two opposing corners. Add the two other screws. Tighten all four screws to just seal gasket.



6. Attach the Air Line

Cut a 3/4" section out of the "Homerun Tube" for that zone and insert a tee to connect to damper.



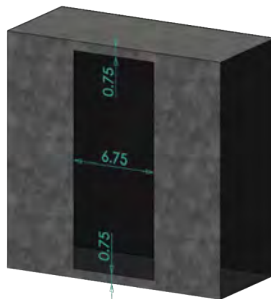
7. Finished!

If the tubing looks neat and well organized, the workmanship appears worthy of the investment.



Rectangular Damper Install

Angle Damper Blade from corner to corner, slide into opening, align it with the duct and screw it in.



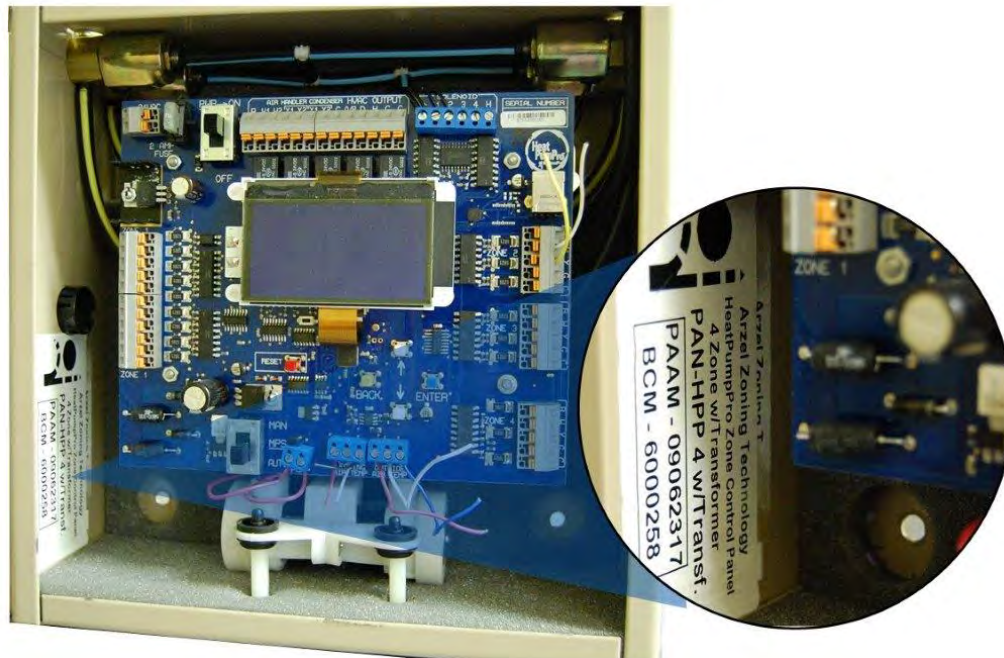
Warranty Information + Procedure

Warranty Information

Limited Lifetime Warranty on Panel & Dampers if warranty information is submitted to Arzel® Zoning Technology, Inc. for Limited Lifetime Warranty Coverage within 90 days of installation.

Limited Lifetime Warranty Information can be found at www.arzelzoning.com/warranty

The Panel serial number is required when entering warranty information, please see image below:



Warranty Procedure

To receive an RMA, technicians must call while on site (no call no warranty).

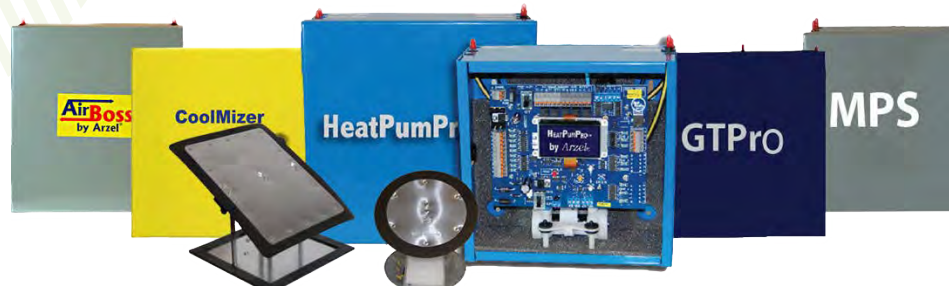
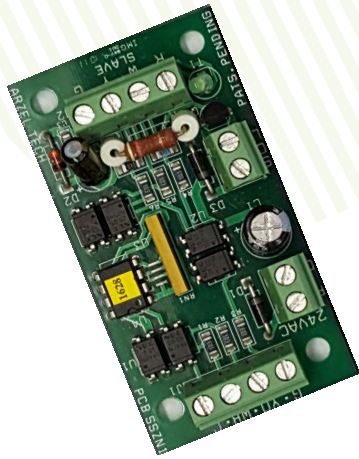
Warranties returned to distributors without prior authorization may be denied or subject to 20% processing fee.

1. Call 800-611-8312 while on the jobsite to diagnose failed parts and continue the warranty process
2. Any diagnosis of failed parts must be verified by Arzel® Technical Support to receive an RMA (Return Material Authorization)
3. All warranty claims must include the serial number of the panel (see image above)
4. Arzel® will ship warranty parts directly to licensed contractors via UPS Ground
*Next day air available at additional cost
5. Arzel® Technical Support is available 7 days a week from 8am - 9pm EST

Did you know?

WE CAN ADD FRESH AIR CONTROL (FACT) TO ANY OF OUR ZONING PANELS!

The Arzel® FACT System brings in fresh air anytime you want and lets you decide how much fresh air to bring in and under what conditions.



Contact us & ask us how! Or go to www.arzelzoning.com/training to schedule your individual Webinar on the Arzel® FACT System!

Online Resources



All Marketing and Technical literature, installation, and troubleshooting videos, Tech guides, charts, and manuals, as well as recordings of our webinars, can be viewed online in our contractor portal.

Sign up on our website today at www.arzelzoning.com

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