ZMS 2000
Zone Management System

Product Features, Capabilities and System Configuration

Winn Energy Controls, Inc.

ZMS Control Series

Zone Management System

Features

ZMS 2000 Zone Management System

General Description

The ZMS2000 is an intelligent zone control system that provides maximum comfort and energy savings, managed setpoint control, intelligent by-pass damper control and is compatible with practically any gas/electric or heat pump system.

The exclusive energy recovery technology can reduce energy consumption by 20 to 30% whenever the demand for heating or cooling is below the maximum system capacity. Programmable setpoint temperatures allow the user to tailor the zone temperatures to the occupancy needs.

There are three components used in a ZMS2000 zone control system. The **master thermostat** provides a means of programming and displaying data for each zone. The **zone control module** is the heart of the system and controls each of the zone dampers, monitors the zone temperatures, controls the by-pass damper and controls the HVAC system. The **room temperature sensor** allows the zone control module to know the temperature in each zone, override the programmed setpoint temperatures using the Warmer or Cooler key and display the room temperature using the bimetal or digital thermometer.

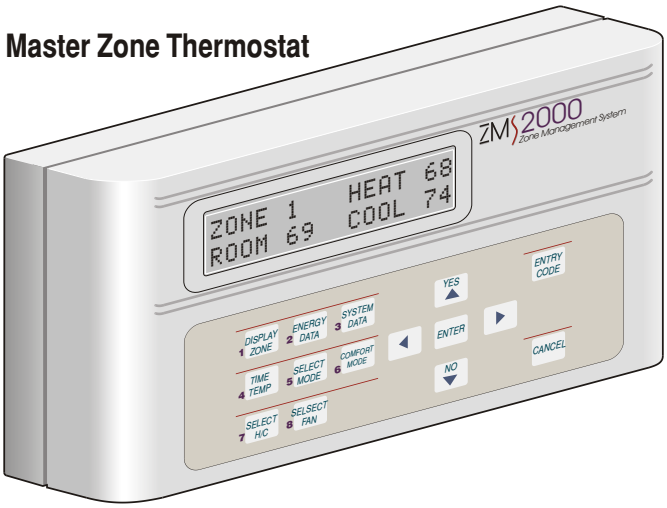
- Control and display the temperatures in 32 zones from a single master thermostat.
- Select manual or programmed setpoint temperature control with program override in each zone.
- For residential applications program up to four temperature changes (two setback periods) for weekdays, four for Saturday and four for Sunday for each zone.
- For commercial applications program two temperature changes (one setback period) for each day and for each zone.
- Select automatic, continuous or timed operation of the indoor fan.
- Inter-active keyboard and LCD display makes programming easier and faster.
- Factory programs reduce amount of programming.
- Programmed times and temperatures and system parameters are stored in non-volatile memory and unaffected by power losses.
- Master thermostat communicates with zone control module over a 4-conductor thermostat cable.
- Electronic keyboard lock with 3-digit code prevents unauthorized changes to setpoint temperatures and eliminates the need for thermostat covers or guards.
- A single zone control module can control up to 8 zone dampers (up to 32 zones with a zone expansion module), a by-pass damper and the HVAC system.
- Programmable outputs allow the same zone control module to be used with single and multistage gas/electric and heat pump systems with either heating (B) or cooling (O) type reversing valves.
- Delayed indoor fan startup in heating with a heat pump eliminates circulation of cool air.
- Economizer control provides added savings during calls for air conditioning.
- Monitors zone temperatures, supply air temperature and outdoor temperature.
- Exclusive energy recovery technology provides 20% to 30% reduction in energy consumption in both heating and cooling during periods when demand for heating and cooling is below maximum capacity.
- Optional Warmer and Cooler keys on room temperature sensors provide limited override of the programmed setpoint temperatures.
- Optional Warmer and Cooler keys on room temperature sensors provide a means of returning the zone to the comfort temperature during a setback period.
- Powered by the 24 VAC transformer used to power the motorized dampers.

ZMS Control Series

Zone Management System

Features

Master Zone Thermostat



The Master Zone Thermostat provides a means of programming the Zone Control Module and displaying data from the module. The Master Zone Thermostat (MZT) has a 2 line by 16 character LCD display, a keyboard for entering, displaying and retrieving data and an RS232 communications interface for communicating with the Zone Control Module.

LCD Display

The LCD displays data in response to keys being pressed. The LCD tutors the user through the programming sequence by displaying messages that can be answered with the YES or No key or by increasing or decreasing a value using the ▲ or ▼ keys. When two or more values must be changed as would be the case with time of day, the ◀ and ▶ cursor keys allow you to select the hour or minute or day and then change the value.

Keyboard

The keys are used to enter or display data for all zones or for a particular zone. For example, after changing a particular time/temperature schedule you will be asked if this applies to all days. If you were to answer No, all of the days would be displayed and you could select days you want and turn Off using the NO key or turn On using the YES key. After selecting the days you would then select the zones in the same manner.

YES ▲ / **NO ▼** — These keys are used to respond to questions or to increase or decrease a number such as time or temperature. They are also used to select and deselect days and zones when programming time/temperature schedules.

◀ / **▶** — These keys are for positioning the cursor under the number you wish to change. Pressing the key moves the cursor to the right or left and moves to the next line when it reaches the end of a line.

ENTER — The ENTER key is pressed after selections and changes have been made. The data will then be sent to or retreived from the Zone Control Module.

CANCEL — The CANCEL key can be pressed at any time to terminate an entry.

ENTRY CODE — The ENTRY CODE key is used to lock or unlock the keyboard to prevent unauthorized changes to the programs. If the keyboard is locked and access is attempted, a message is displayed asking for the combination. The combination, a 3-digit number, is entered using the numbered keys.

DISPLAY ZONE — The DISPLAY ZONE key is used to display the zone temperature, heating setpoint and cooling setpoint for a particular zone or the zone temperatures in all zones. It can also be used to display the time of day and Zone 1 temperature.

ENERGY DATA — The ENERGY DATA key is used to display the accumulated operating times for the HVAC components on a monthly or yearly basis.

SYSTEM DATA — The SYSTEM DATA key is used to program and display a variety of HVAC parameters including the type of HVAC system, number of stages, economizer operation, anticipation, short cycle time, minimum run time, supply air temperature, outdoor temperature, first to second stage differential and a number of other parameters that optimize the operation of the system.

TIME TEMP — The TIME TEMP key is used to set the time of day and date and to program the setback schedules. It is also used to program the default comfort and economy temperatures.

SELECT MODE — The SELECT MODE key selects the manual or program mode for setpoint temperatures. In the manual mode the setpoint temperature for each zone is set and not changed until a new temperature is entered. In the program mode the setpoint temperatures are changed according to the programmed time/temperature schedules.

Features

COMFORT MODE

The COMFORT MODE returns all zones to the default comfort temperature and allows you to select the number of hours (1 to 12) the comfort period is in effect. This is used to facilitate temporary changes in schedules or working late in a commercial application or a party or other event in a residential application.

SELECT H/C

The SELECT H/C key selects heating, cooling, both Off or automatic changeover for the HVAC system. Any zone can initiate a call for heating or cooling provided it is not in conflict with the master zone or another zone that has been calling.

SELECT FAN

The SELECT FAN key selects the automatic, continuous or timed operating mode for the indoor fan.

Electrical

The Master Zone Thermostat operates on +12 VDC supplied by the Zone Control Module and then regulated to +5 VDC within the unit. A 9 V battery can be installed on the sub-base to provide power to the unit during power failures.

Mechanical

The ZMS2000 has a sub-base that connects to the thermostat with a 4-pin connector. The thermostat has four keyed holes that slide over screws in the sub-base. This allows all wiring to be completed before the Master Zone Thermostat is installed.

PC Computer Compatible

The zone control modules have an RS232 input and can be operated form a PC Computer on site or a remote PC Computer with a modem off site using the EnergyPro Windows software..

Controlling Multiple Zone Control Modules

The commercial Zone Control Module can be daisy chained on the roof so that a single modem or PC Computer can address any of 64 systems each with up to 32 zones. Each control module has both an input RS232 and an RS232 port to drive the next control module.

Each zone will still operate independently from the PC computer. The computer is only used to enter new setpoint temperatures and times or to access data. Each zone has its own sensor with the Warmer and Cooler override keys and will operate even if the computer is off line.

EnergyPro Windows 95, 98, ME, 2000 and XP Software

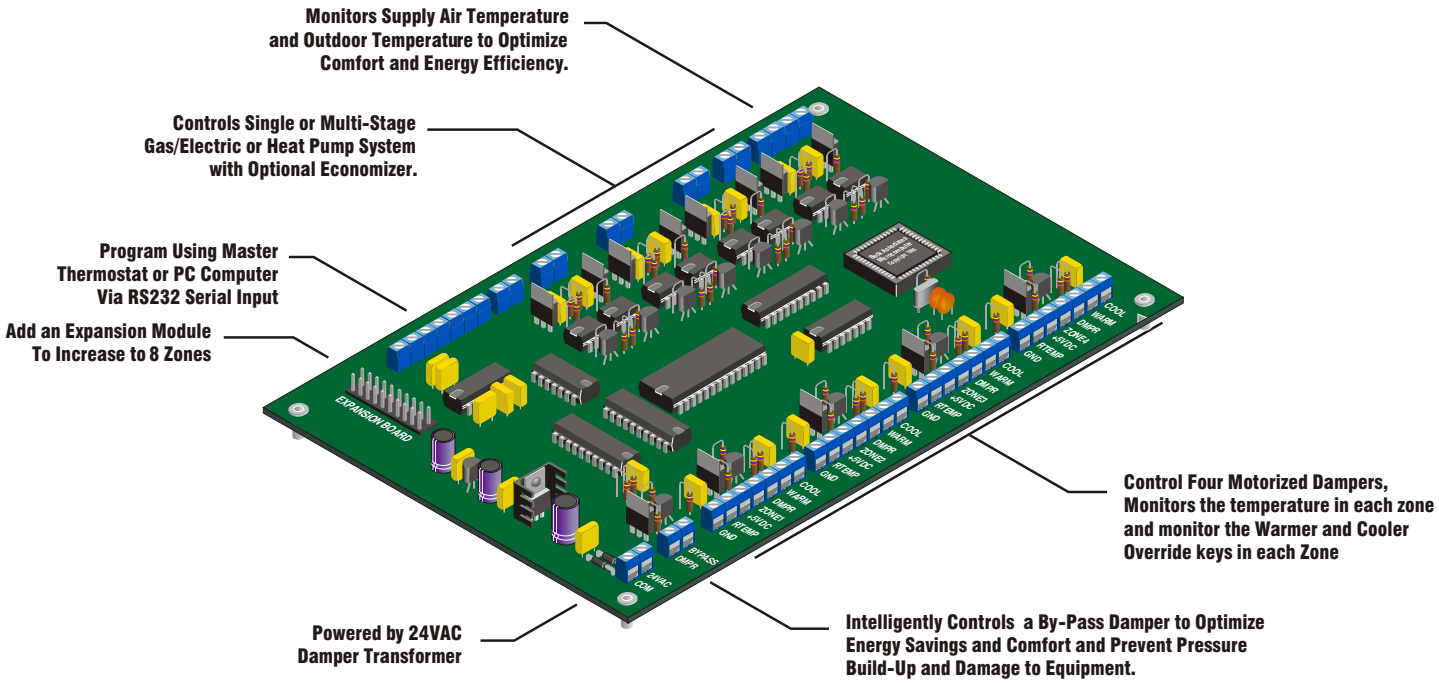
The EnergyPro Windows XX software is used for entering and displaying data via the PC Computer. The ZMS2000 system can be mixed with EMS2000 system hardware in any project.

ZMS Control Series

Zone Management System

Commercial System Features

Zone Control Module, Commercial



Communication

The Zone Control Module receives its data and sends data to the Master Zone Thermostat using a 1200 Baud RS232 serial data line. The low Baud rate allows thermostat wiring to be used rather than expensive shielded wiring. The Zone Control Module echoes each command back to the Master Thermostat to assure it was received and interpreted properly.

Zone Capacity

A Zone Control Module can control four (4) zones, a bypass damper and the HVAC system. A Zone Expansion Module can be used to expand the capacity to eight (8) zones.

Compatible Dampers

The Zone Control Module can control a 24VAC motorized damper with a spring return. Other Zone Control Modules will be available for dampers that use power openning and closing. A typical interconnect for the zone damper is shown in diagram W1.

Zone Temperature Sensors

A variety of room or zone temperature sensors are available and each model has a thermistor sensor connected by two wires to the Zone Control Module as shown in diagram W1.

Optional Warmer and Cooler Keys

Some room temperature sensors include a Warmer and Cooler key as previously discussed. These models require three additional wires (total of 7) to the Zone Control Module as shown in diagram W2.

Supply Air Temperature Sensor

The Zone Control Module uses a sensor to monitor the temperature of the air being supplied by the HVAC system so that it can intelligently control the bypass damper and the energy recovery cycle. Wiring for the sensor is shown in diagram W1 and W2.

Outdoor Air Temperature Sensor

The Zone Control Module uses an outdoor temperature sensor to determine if outside air is cool enough to be used for cooling rather than compressor cooling. The Economizer is activated in this case rather than the compressor. The outdoor setpoint is programmable from the Master Thermostat.

Compatible HVAC Systems

The Zone Control Module can control practically any single or multistage gas/electric and heat pump system with either heating or cooling activated reversing valves and an optional economizer.

Heating Only Operation
If the HVAC mode is set to heating only, any zone can initiate a call for heating. Once that zone is satisfied, the zone damper will close. If no other zones are calling for heating, the HVAC heating controls will be turned Off.

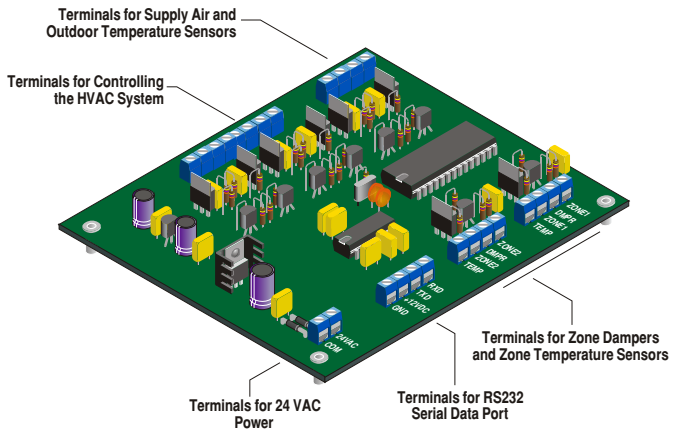
Cooling Only Operation
If the HVAC mode is set to cooling only, any zone can initiate a call for cooling. Once that zone is satisfied, the zone damper will close. If no other zones are calling for cooling, the HVAC cooling controls will be turned Off.

Automatic Changeover Operation
If the HVAC mode is set to auto changeover, a zone can initiate a call for heating or cooling provided another zone is not calling for a conflicting system. In addition the changeover cannot occur until a 15 minute interval has elapsed since the last call terminated. This prevents cycling between heating and cooling due to migration of heating or cooling from other zones after a damper has been closed.

By-Pass Damper Operation
When a number of zone dampers have closed, the by-pass damper is activated to prevent high pressure in the ducts and excessive airflow into the zones that are still open. In order to prevent excessively hot supply air temperatures in heating or excessively cold temperatures in cooling, the Zone Control Module will turn the compressor off or the gas valve off for a period of time to keep the supply air temperatures within operating limits. This not only protects the equipment but also reduces energy consumption with no loss in comfort.

Operating Power
The Zone Control Module operates off the 24 VAC transformer that powers the motorized zone dampers.

Zone Control Module, Residential



The residential Zone Control Module is similar to the commercial except it does not have the all the features. This module can control two zone dampers and a single or two-stage HVAC system. The control provides the same energy savings as the commercial version.

Zone Temperature Sensors
The residential model does not provide for the Warmer or Cooler keys on some sensor modules.

Supply Air Temperature Sensor
The residential model does have provision for the supply air temperature sensor although the outdoor temperature sensor is eliminated.

No By-Pass Damper Control
The by-pass damper control has been eliminated although the cycling of the gas valve or compressor to maintain the supply air temperature within operating limits remains.

No Economizer Control
The economizer damper control has been eliminated because most residential applications do not use economizers.

Lower Cost
The residential control is simpler and lower cost than the commercial version and a cost effective solution for residential applications.

Wiring Diagram
The residential control uses the simplest wiring as shown in diagram W3.

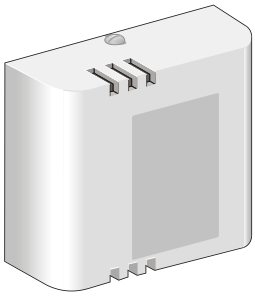
Sensor Features

Room/Zone Temperature Sensors

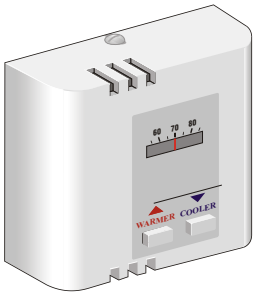
A variety of zone or room temperature sensors are available with different features as shown below.

Model 43021-200
Features a digital thermometer, an internal thermistor temperature sensor for connection to the Zone Control Module and Warmer and Cooler keys for overriding the programmed setpoint temperatures. Not for use with the residential zone control.

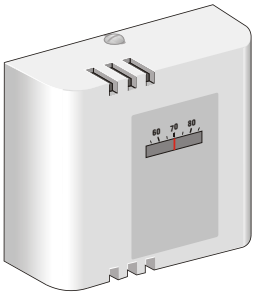
Model 43021-200
Features an internal thermistor temperature sensor for connection to the Zone Control Module and Warmer and Cooler keys for overriding the programmed setpoint temperatures. Not for use with the residential zone control.



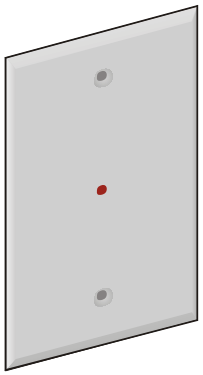
Model 43021-100
Features an internal thermistor temperature sensor for connection to the Zone Control Module.



Model 43021-400
Features a bimetal thermometer, an internal thermistor temperature sensor for connection to the Zone Control Module and Warmer and Cooler keys for overriding the programmed setpoint temperatures. Not for use with the residential zone control.

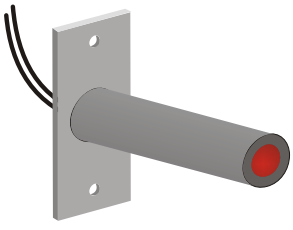


Model 43021-500
Features a bimetal thermometer and an internal thermistor temperature sensor for connection to the Zone Control Module.



Model 43102-100
Features an internal thermistor temperature sensor for connection to the Zone Control Module. Uses a white plastic, single wide switch plate that can be attached to an electrical box or directly to a wall.

Model 43104-100
Features an internal thermistor temperature sensor for connection to the Zone Control Module. Uses a white plastic bushing and locking retainer. Used for outdoor temperature monitoring.

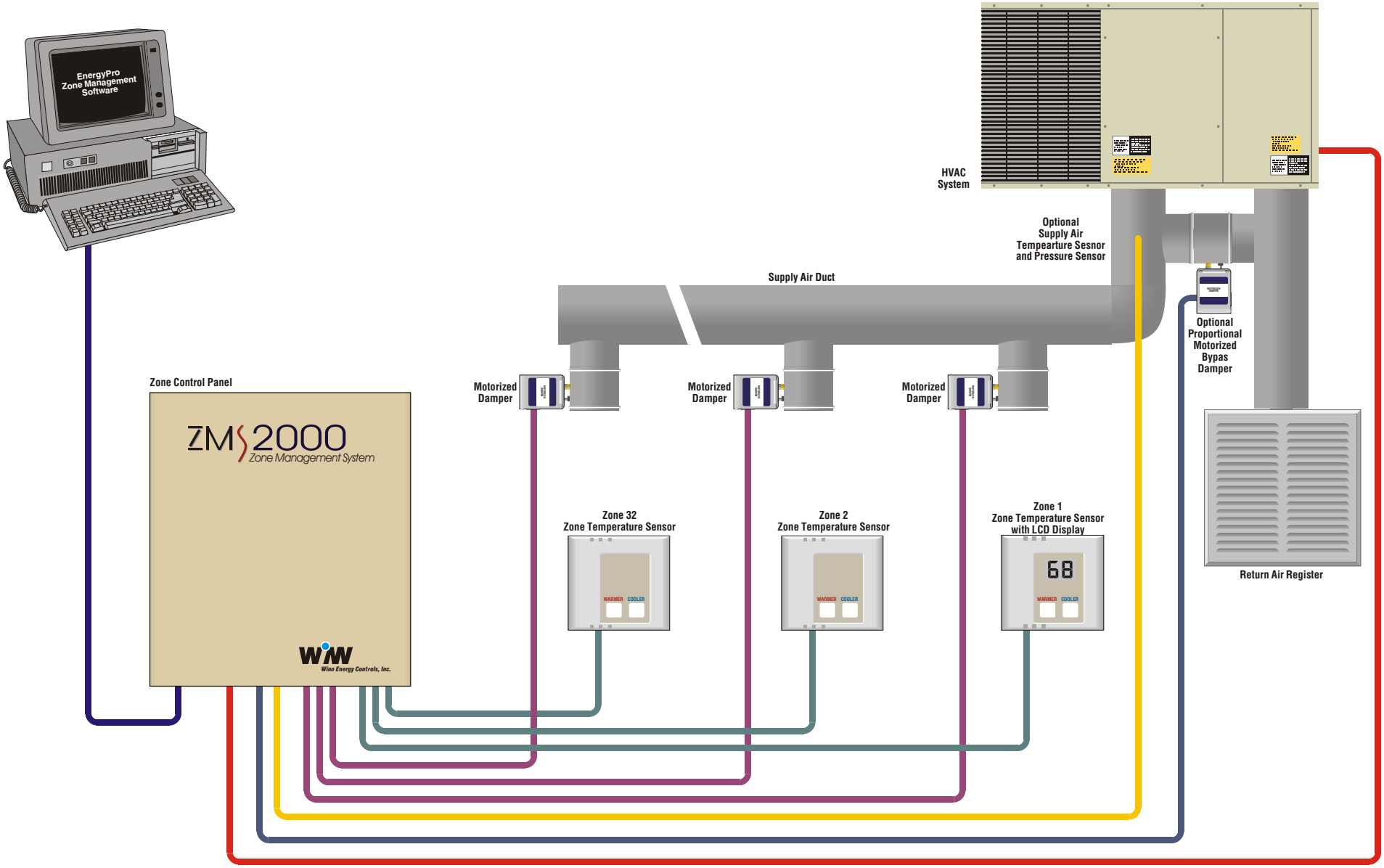


Model 43103-100
Features an internal thermistor temperature sensor for connection to the Zone Control Module. Uses a metal tube with a bracket for easy mounting to a duct. Used for supply air temperature monitoring..

ZMS Control Series

Zone Management System

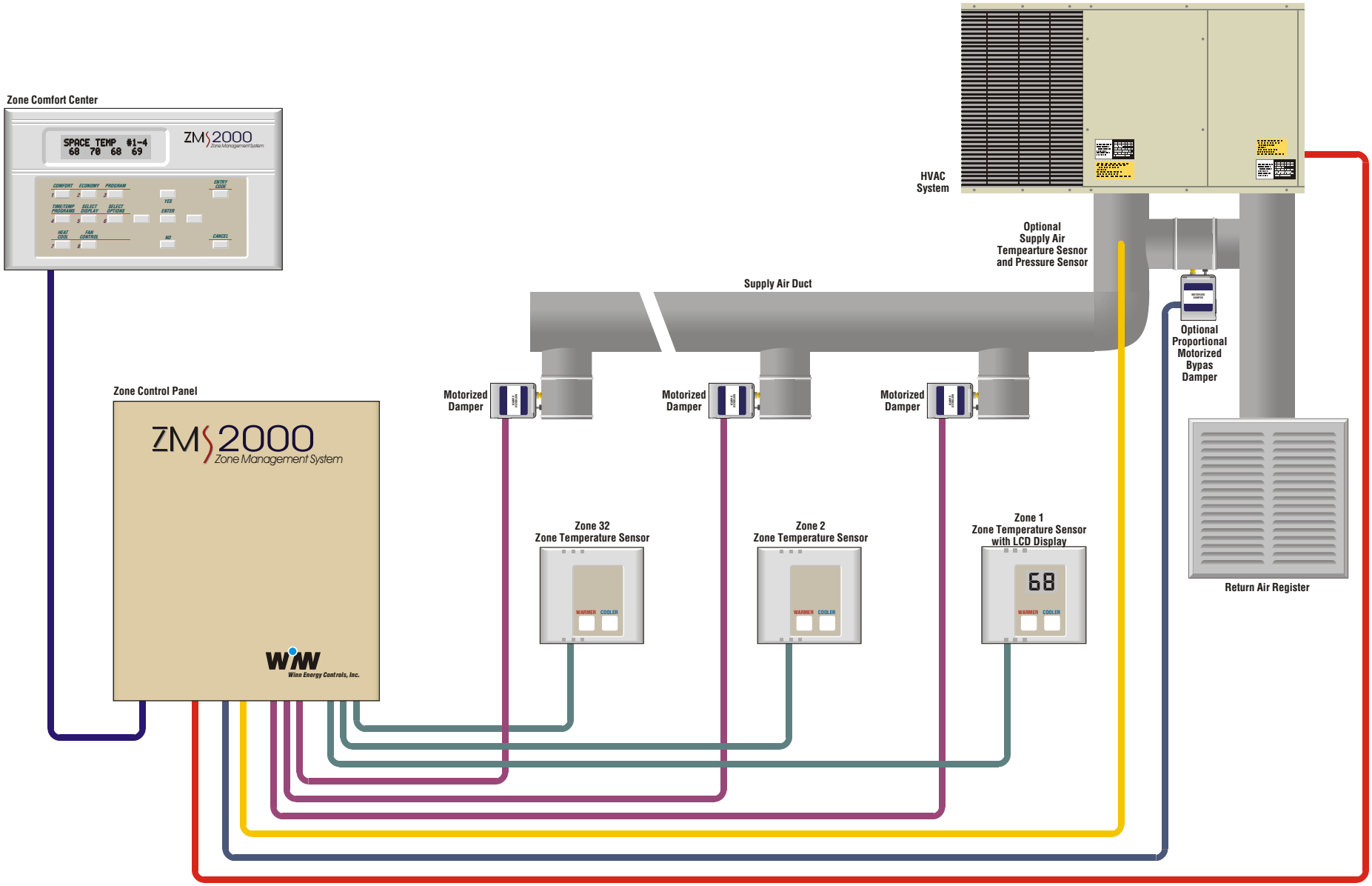
PC Controlled ZMS2000



ZMS Control Series

Zone Management System

MCU Controlled ZMS2000



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