

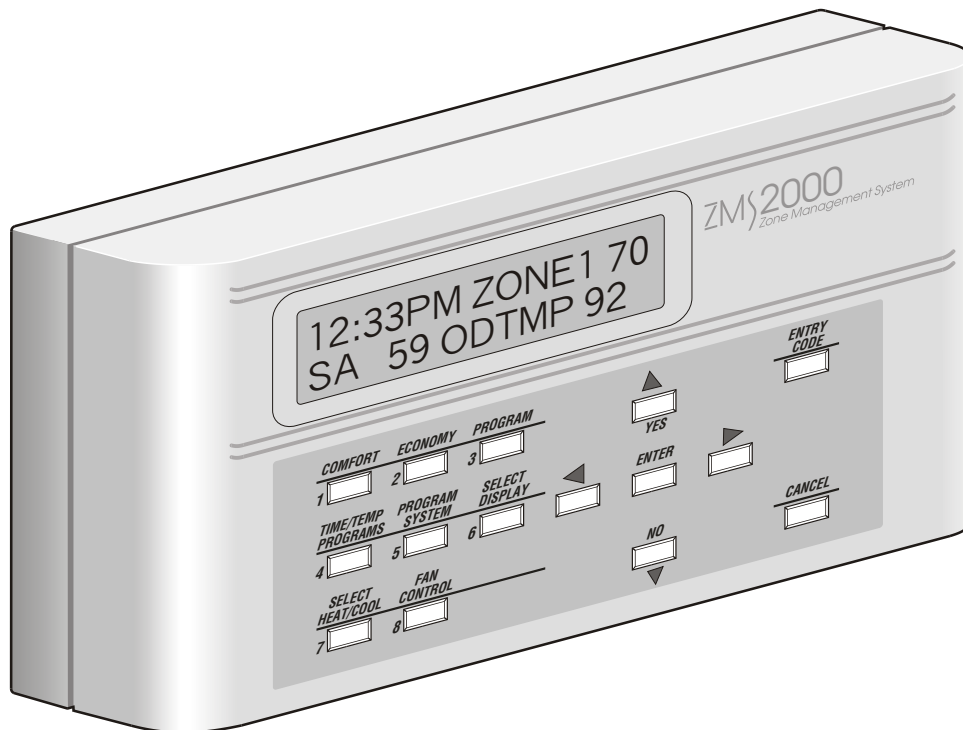
Installation Manual

ZMS 2000

Zone Management System

This manual describes the installation of all Ultra-Zone Zone Management Control Components.

- Master Control Unit
- 3-Zone Control Module
- 4/8-Zone Control Module
- Zone Temperature Sensor
- 4-Zone Expansion Module
- Zone Temperature Sensor with LCD Display



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1 Determine the type of HVAC System.

Determine if the HVAC system is a gas or oil fired furnace, electric air conditioning or a heat pump with an O or B-type reversing valves.

2 Select a location to install the Zone Control Module.

The Zone Control Module can be installed within the HVAC enclosure, within the building or external to the HVAC enclosure provided it is protected from the outside elements. When installing the control within the HVAC enclosure, be sure it is high enough to prevent water damage should the condensate line become blocked.

3 Select a location to install the Master Control Unit.

The zone Master Control Unit (MCU) can be located using the same good practices as when installing a thermostat. The MCU contains the a temperature sensor that can be used for zone 1. An external Zone Temperature Sensor can be used instead of the sensor in the MCU. If the sensor in the MCU is not used, the MCU can be installed on any wall convenient for wiring and access.

4 Select locations to install the Zone Temperature Sensors.

The Zone Temperature Sensors should be located so they accurately sense the temperature in the zone. The location should be selected using the same criteria used when installing a thermostat.

5 Wiring Zone Temperature Sensor to the Zone Control Module.

Standard thermostat wire can be used for all connections. The following should be helpful when wiring the zone control system.

For Zone Temperature Sensors with Warmer and Cooler keys and optional LCD display use 5-conductor stat wire and connect as shown below.

	Zone Temperature Sensor		Zone Control Module	Wire Color
Connect	+5VDC	to	+5VDC	RED
	GND		GND	BLK
	WRM		WRM	WHT
	CLR		CLR	YEL
	SNR		SNR	GRN

For Zone Temperature Sensors with only a temperature sensor, use 2-conductor stat wire and connect as follows.

	Zone Temperature Sensor		Zone Control Module	Wire Color
Connect	+5VDC	to	+5VDC	RED
	SNR		SNR	GRN

6 Wiring Master Control Unit to Zone Control Module.

For Master Control Units with a built-in zone temperature sensor use 6-conductor stat wire and connect as shown below.

	Master Control Unit		Zone Control Module	Wire Color
Connect	+12VDC	to	+12VDC	RED
	GND		GND	BLK
	DATA OUT		DATA IN	WHT
	DATA IN		DATA OUT	YEL
	+5VDC		+5VDC	GRN
	SNR		SNR	BLU

If you are not using the built-in temperature sensor, use 4-conductor stat wire and connect as shown below.

	Master Control Unit		Zone Control Module	Wire Color
Connect	+12VDC	to	+12VDC	RED
	GND		GND	BLK
	DATA OUT		DATA IN	WHT
	DATA IN		DATA OUT	YEL

7 HVAC System to Zone Control Module.

The wiring and conductor requirements will vary depending on the type of HVAC system and the number of stages.

The wiring for a gas/electric system with two stages of heating and cooling is shown below.

	HVAC System		Zone Control Module	Wire Color
Connect	W or W1	to	W1	WHT
	W2		W2	GRY
	Y or Y1		Y1	YEL
	Y2		Y2	ORG
	G		G	GRN
	RH		RH	RED
	RC		RC	BRN
	C or COM		C	BLK

For HVAC systems with only a single transformer, jumper RH to RC at the Zone Control Module.

The wiring for a heat pump with two stages of heating and cooling is shown below.

	HVAC System		Zone Control Module	Wire Color
Connect	O or B	to	W1/O/B	WHT
	W2		W2	GRY
	Y or Y1		Y1	YEL
	Y2		Y2	ORG
	G		G	GRN
	R		RH and RC	RED
	C or COM		C	BLK

8 Motorized Dampers to Zone Control Module.

The motorized dampers are connected to the Zone Control Module using 2-conductor thermostat wire as shown below.

	Motorized Damper		Zone Control Module	Wire Color
Connect	Motor	to	DX	WHT
	Motor		DX	RED

Where DX corresponds to D1 through D8.

9 Zone Transformer to Zone Control Module.

The 24VAC transformer used to power the motorized dampers and Zone Control Module is connected using a 2-conductor stat wire.

	Zone Transformer		Zone Control Module	Wire Color
Connect	R		R	RED
	C or COM		C	BLK

Some 24VAC transformers terminals are not marked and either 24VAC output terminal may be connected to R or C.

10 Programming the HVAC System Parameters.

There are a number of HVAC parameters that control the HVAC system and insure compatibility between the Zone Control Module and the HVAC system and insure maximum occupant comfort.

These parameters are stored in non-volatile ram in the Zone Control Module and are not affected by power losses. They are factory programmed but can be easily changed from the Master Control Unit.

These parameters are summarized below with their factory settings and adjustable range.

Before changing parameters using the SYSTEM DATA key on the Master Control Unit, refer to the Operating Manual for information about using the keys on the Master Control Unit.

Parameter	Factory Setting	Range
Heating On/Off Differential Temperature	On 2°F	1to 9°F
	Off 1°F	1to 9°F

The Heating On differential is the degrees below setpoint temperature at which first stage heating is activated.

The Heating Off differential is the degrees above setpoint temperature at which the first stage heating is turned off.

Parameter	Factory Setting	Range
Cooling On/Off Differential Temperature	On 2°F Off 1°F	1 to 9°F

The Cooling On differential is the degrees above setpoint temperature at which first stage cooling is activated.

The Cooling Off differential is the degrees below setpoint temperature at which the first stage cooling is turned off.

Parameter	Factory Setting	Range
Stage 2 On Differential Temperature	Cool 2°F Heat 2°F	1 to 9°F

The Stage 2 Cooling On differential is the degrees above stage 1 cooling turn-on temperature at which second stage cooling is activated. The Stage 2 Heating On differential is the degrees below stage 1 heating turn-on temperature at which the second stage heating is activated.

Stage 2 heating and cooling are both turned off at the setpoint temperature.

Parameter	Factory Setting	Range
Minimum Run Time (Minutes)	Cool 5 Min. Heat 4 Min.	2 to 15

The Minimum Run Time minutes are the minimum operating time to insure lubricants are circulated and water is evaporated in the heat exchanger.

Parameter	Factory Setting	Range
Minimum Off Time (Minutes)	Cool 3 Min. Heat 3 Min.	2 to 11

The Minimum Off Time minutes are the minimum off time to assure the compressor does not re-start under full head pressure.

Parameter	Factory Setting	Range
Number of Zones	2	2 to 8

The Total Number of Zones being used on the Zone Control Module and Zone Expansion Module.

Parameter	Factory Setting	Range
Type of HVAC System	Gas/Electric	Gas/Electric Heat Pump O-Type Valve Heat Pump B-Type Valve

The type of HVAC system selected controls the function of the W1, Y1, W2, Y2 and G terminals.

The number of stages are automatically determined by the Master Control Unit.

Parameter	Factory Setting	Range
Maximum Temperature Override	3	1 to 10

The Maximum Override Temperature controls the number of degrees the setpoint temperature can be changed using the Warmer or Cooler keys on the Zone Temperature Sensors.

Parameter	Factory Setting	Range
Commercial or Residential Program Schedule	Residential	Commercial or Residential

The Commercial program schedule has 2 time/temperature changes per day with separate programs for each day. The Residential schedule has 4 time/temperature changes for weekdays, 4 for Saturday and 4 for Sunday.

Factory Commercial Schedule

Program 1 6:00AM Heating 68°F
Cooling 72°F

Program 2 10:00PM Heating 58°F
Cooling 80°F

All days have the same program for all zones.

Factory Residential Schedule

Program 1 6:00AM Heating 68°F
Cooling 72°F

Program 2 8:00AM Heating 58°F
Cooling 80°F

Program 3 6:00PM Heating 68°F
Cooling 72°F

Program 4 10:00PM Heating 58°F
Cooling 80°F

Weekdays, Saturday and Sunday have the same program for all zones.

Parameter	Factory Setting	Range
Automatic Change Over Delay (Minutes)	15	5 to 30

The Auto Change Over delay prevents the HVAC system from cycling between heating and cooling due to migrating heating or cooling. At the termination of a heating or cooling call, the time delay begins and the opposing system cannot be called until the delay has timed out.

Parameter	Factory Setting	Range
Default Damper Position	Open	Open or Closed

The zone dampers will return to the default position when a call for heating or cooling has terminated and the indoor fan is off. Each zone damper can be programmed for open or closed position.

11 Testing the Dampers and HVAC System.

A simple way to insure the Ultra-Zone components are properly connected is described below.

Using the Select Heat/Cool key, set all the zones to both heating and cooling off and wait until the heating or cooling goes off.

Using the Fan Control key, set the indoor to Automatic operation and observe that the indoor fan goes off after any call for heating or cooling has terminated.

Using the PROGRAM SYSTEM key, set the default damper position for Zone 1 to closed (CLS) and observe that the appropriate damper closes. Repeat this process for each damper being used. After each damper has been tested, set the Default Position to the desired position.

12 Using the LCD Display to Monitor the HVAC System.

A simple way to assure the Ultra-Zone components are properly connected is to use the various display modes to monitor the zone temperatures, zone status and HVAC status.

The various display modes can be accessed using the SELECT DISPLAY key and are described in detail in the Operation Manual.

13 Using the Error Codes to Find Problems.

The Master Control Unit will display an error message if it has difficulty communicating with the HVAC Control Module. The most common error message is RS232 ERROR 01 which indicates that the MCU is not receiving responses from the Zone Control Module. This is normally caused by the Data In and Data Out wires improperly connected or a loss of power at the Zone Control Module.

14 Optional Battery Backup Power.

The Master Control Unit has provision for a 9V battery to maintain operation of the MCU during a power failure. If a battery is not used, the clock and date will have to be restored when power is restored. The Zone Control Module time and date is automatically set if a power failure occurs.

15 Optional Supply Air and Outdoor Air Temperature Sensors.

Temperature sensors can be installed in the supply air duct and outside to monitor the performance of the HVAC equipment and outdoor conditions. If these sensors are installed, use the PROGRAM SYSTEM key to select these options so the temperatures will be displayed.



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