

2.10 EnviroMATE Controller (Dual Zone)

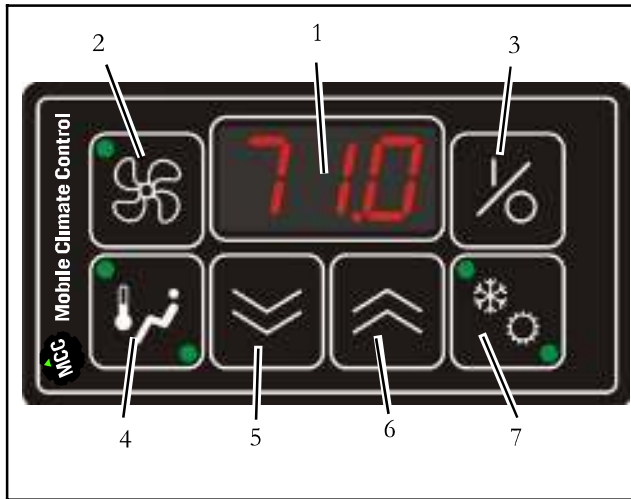


Figure 2-10 EnviroMATE Control Panel

- 1 Display
- 2 Vent Key
- 3 On/Off Key
- 4 Temperature Zone Key
- 5 Decrease Selection Key
- 6 Increase Selection Key
- 7 Cool/Heat Key

The Control Panel consist of the main CPU and keypad to control the air conditioning system operation. It is equipped with a numerical display to view operation status, fan speed and temperatures.

The Controller is designed to automatically operate system components to maintain desired temperature set point.

NOTE




Controller parameters are factory set, and cannot be modified without factory authorization. If necessary, contact MCC's Technical Service Hot Line for assistance (800-450-2211) .

2.10.1 Controller Operation

Once the EnviroMATE controller is powered with 12 VDC, supplied by the Bus OEM, the system can be turn On or Off using the On/Off key (Item 3 in Figure 2-8). When the display is powered On, the controller will go through self test mode, and then the current set point will be displayed. To adjust the temperature set point up or down, use the Increase/Decrease selection keys (Items 5 and 6 in Figure 2-8). Temperature set point can be set from 64°F to 82°F (17.8°C to 27.8°C).

The controller is equipped with two return air temperature sensors, one in each zone to monitor the evaporator return air temperature. To view the return air temperature for Zone 1, press the Temperature Zone Key once (Item 4 in Figure 2-10). The green LED light in upper left corner of Key will light, indicating Zone 1 return air temperature. Return air temperature will be shown on display.

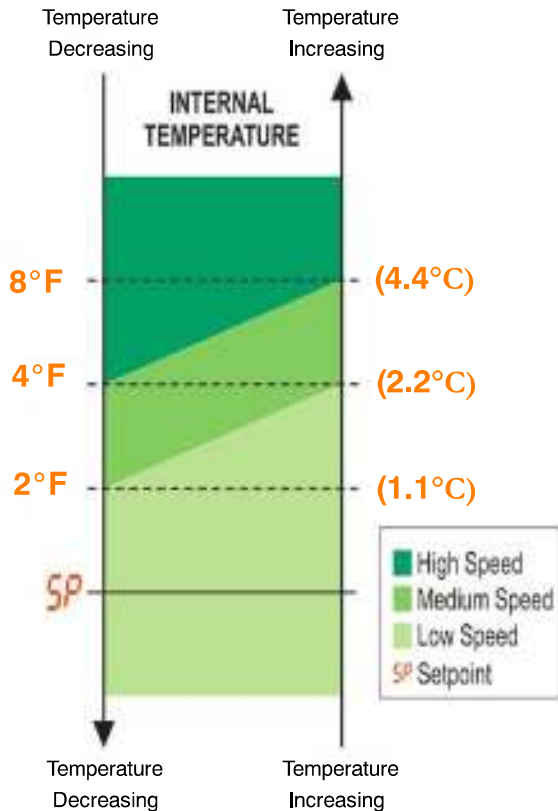
To view the return air temperature for Zone 2, press the Temperature Zone Key again (Item 4 in Figure 2-10). The green LED light in bottom right corner of Key will light, indicating Zone 2 return air temperature. Return air temperature will be shown on display.

Led 	Temperature shown
	Zone 1
	Zone 2

After a few seconds, the display will return to the set point temperature.

2.10.2 Evaporator Fan Operation (Automatic)

Evaporator fan speeds are controlled automatically according to the chart shown below. There are 3 fan speeds controlled by relays mounted to an auxiliary electrical panel. Each zone will control the evaporator fan speeds in that zone, according to the return air temperature sensor controlling that particular zone.



2.10.3 Evaporator Fan Operation (Manual)

Fan speeds can be controlled manually by pressing the Vent Key (Item 2 in Figure 2-10), an LED light will activate in the corner of the Vent Key. After pressing the Vent Key, use the Increase/Decrease Keys (Item 5 and 6 in Figure 2-10) to set the desired fan speed. The display will show the following symbols, indicating selected speed:

u1 = Low speed

(Controller Output **Pin 4** for Zone 1, **Pin 12** for Zone 2)

u2 = Medium speed

(Controller Output **Pin 18** for Zone 1, **Pin 24** for Zone 2)

u3 = High speed

(Controller Output **Pin 19** for Zone 1, **Pin 23** for Zone 2)

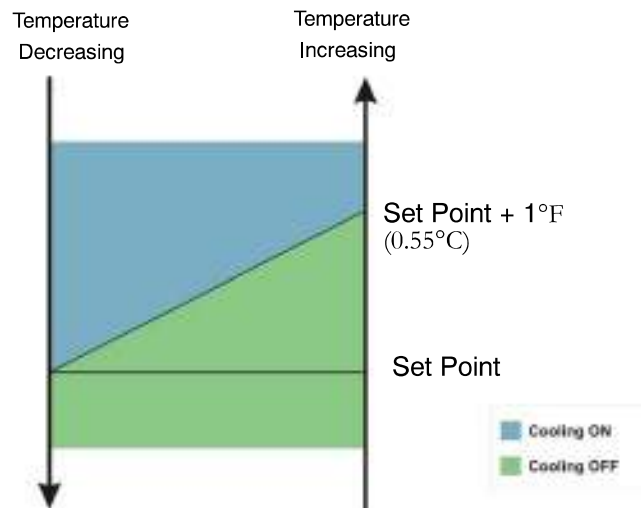
2.10.4 Cooling Mode

When Cooling Mode is selected (Item 7 in Figure 2-10), The green LED light will display in upper left corner of Key by the “Snowflake” symbol. The controller will then compare the return air temperature value for each Zone, with the selected set point temperature. If the value of the return air temperature for Zone 1 is more than 1°F (0.55°C) above system set point, the controller will output a signal on **Pin 6** of controller to energize the condenser and compressor for cooling.

If the value of the return air temperature for Zone 2 is more than 1°F (0.55°C) above system set point, the controller will output a signal on **Pin 10** of controller to energize the condenser and compressor for cooling.

Each zone will control the system components for cooling independently according to need.

The chart below shows the temperature control of the compressor operation.



The controller will constantly monitor the low pressure switch and freeze up thermostat to protect system components by monitoring voltage on **Pin 14** (Zone 1), and **Pin 16** (Zone 2) of controller. If the freeze up thermostat, or low pressure switch circuit opens, the controller will de-energize the compressor clutch relay, and the condenser fan relay for a minimum time of 1 minute, or until the open circuit closes.

The controller will constantly monitor the high pressure switch to protect system components by monitoring voltage on **Pin 13** (Zone 1), and **Pin 5** (Zone 2) of controller. If the high pressure switch circuit opens, the controller will de-energize the

compressor clutch relay, and the condenser fan relay will remain energized to lower system pressure. The compressor relay will remain open for a minimum time of 1 minute, or until high pressure switch circuit closes.

If a low or high pressure condition occurs, an alarm will be generated and shown on the display. The alarms related to low and high pressure are listed below:

L1- Low pressure failure (Zone 1)

L2- Low pressure failure (Zone 2)

H1- High pressure failure (Zone 1)

H2- High pressure failure (Zone 2)

If any condition occurs 3 times within 30 minutes, the cooling circuit will be disabled for the associated Zone until controller power is cycled. An alarm will be generated to indicate this occurrence and shown on the display. Evaporator fans will remain energized to provide ventilation. Lock out of cooling system alarms will show as:

t1- Lock out of Zone 1 cooling system

t2- Lock out of Zone 2 cooling system

2.10.5 Heating Mode (If equipped)

The EnviroMATE Controller has the ability to control output to a heat control valve and boost pump (OEM supplied) to supply heat provided by the engine coolant system. If heat is selected by pressing the Cool/Heat Key (Item 7 in Figure 2-8), and the interior temperature is more than 1°F below set point, the controller will open the coolant heat valve and allow engine coolant to be provided to the heater coil (if equipped), until temperature rises back to set point temperature.

2.10.6 Sensors

The EnviroMATE Controller constantly monitors the Return Air sensors (Controller **Pins 11 & 15 for Zone 1**) and (Controller **Pins 3 & 7 for Zone 2**). In the event the sensor or related wiring causes an Open or Shorted condition, the controller will generate an alarm and either **F1 (Zone 1)** or **F2 (Zone 2)** will be shown on the display screen. The controller response will assume a default value of 72°F (22.2°C) for the affected sensor.

2.10.7 Voltage

The EnviroMATE Controller monitors the voltages being supplied by the OEM by fused circuits on **Pins 1 & 9** at the controller. In the event of a low voltage (below 10 VDC), or an alternator failure, the system will be disabled, and an alarm **bL** or **AL** will be shown on the display.

2.10.8 Schematics

Typical system schematics for an EnviroMATE dual loop system can be found in Section 5, Figure 5-11 and Figure 5-12.

2.10.9 Alarm Description (Dual Zone)

Failure	Description	Action
F1	Temperature zone 1 sensor fail	Assume the temperature of 72°C
F2	Temperature zone 2 sensor fail	Assume the temperature of 72°C
AL	Alternator failure	Only ventilation enabled
bL	Voltage lower than 10V _{DC} -----	-----
L1	Low pressure failure (Group 1)	Turn OFF compressor 1
H1	High pressure failure (Group 1)	Turn OFF compressor 1
L2	Low pressure failure (Group 2)	Turn OFF compressor 2
H2	High pressure failure 1 (Group 2)	Turn OFF compressor 2
t1	3 Failures of L1 or H1 in 30min	Lock the compressor activation 1 and return activating only after reset
t2	3 Failures of L2 or H2 in 30min	Lock the compressor activation 2 and return activating only after reset

Figure 2-11 EnviroMATE Alarms (Dual Zone)

SECTION 3 TROUBLESHOOTING

3.1 INSUFFICIENT OR NO COOLING

3.1.1 Preliminary Checks

Make certain that the evaporator filters are not clogged with dirt. Check to make certain that all vehicle body openings are air tight. Check the adjustment and condition of the compressor drive belt (s); adjust or replace as necessary. Refer to Section 4, paragraph 4.12 for complete drive belt installation and maintenance procedures.

3.1.2 Checking System Air Output

If the evaporator air flow appears less than normal, check the evaporator filter and coil for dirt and obstructions. Clean where necessary. Check the blower assembly for proper operation. Current draw will vary as to evaporator, speed setting and voltage. See Table 3-1, Table 3-2 or Table 3-3 for approximate evaporator current draw. If the current drawn by the motor is not to specifications, replace the motor.

3.1.3 Check The Sight Glass For Bubbles

If the preceding steps do not remedy the problem, check the sight glass for bubbles. Run the vehicle engine at high idle (approximately 1200 RPM) while maintaining a minimum discharge pressure of 150 psig. The thermostatic switch should be positioned for maximum cooling.

Bubbles in the sight glass may indicate an undercharge of refrigerant and/or a restriction in the liquid line. If the charge is low, check the system for leaks; repair if necessary and charge the system with the proper amount of refrigerant.

NOTE

Under certain ambient conditions a few bubbles may appear in the sight glass. Refer to Section 4, Table 4-5 to determine if system has correct charge.

No bubbles in the sight glass will indicate either a full charge or a complete loss of refrigerant. To determine if there is refrigerant in the system, run the vehicle engine at high idle (approximately 1200 RPM) with the thermostatic switch positioned for maximum cooling. Allow system to stabilize, then shut system down while observing the sight glass. If bubbles begin to appear, the system has a refrigerant charge. If no bubbles appear, system is without refrigerant.

A restriction in the liquid line can be found by feeling the liquid line. Any portion that is cold to the touch or that frosts up is restricting the refrigerant flow.

3.1.4 Compressor Amp Draw

Split System Compressor clutch coils typically draw 2 to 3 Amps.