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COMMERCIAL TECHNICAL FREQUENTLY ASKED QUESTIONS
Prodigy® Unit Controllers

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Q1. Is there training and tutorials available for the Prodigy® unit controller?

Yes, we have training and tutorials available on the Lennox Commercial website. You can also go to the following links to access Prodigy® training sessions and videos:

- Prodigy® Controller Training: http://www.lennoxcommercial.com/support/training.asp
- Controls Link: http://www.lennoxcommercial.com/prodigy
- Prodigy® How-To Videos: http://www.lennoxcommercial.com/landing/prodigy/how-to-videos.asp

Q2. How do I program the replacement M2 controller?

Reprogram the replacement M2 controller as follows (follow the flowchart in figure1 for assistance):

When a new M2 is installed and powered up, the display will flash PREINSTALL indicating that it needs to be configured for use. Press the **select** button to move to the next screen.

In replacement process, first program the model number of the unit. This will allow the Prodigy® Unit Controller to set the correct operational parameters. The model number should only be programmed once. After programming the model number, the control will reset and it will come back into one of its operating modes (idle, cooling, heating, fan only, etc.). Then proceed to the SETTINGS menu to set the appropriate settings for the control.

Items that must be addressed are in the SETTINGS > INSTALL > NEW M2 menu option (shown in figure 1); be sure to set these options so their install status matches that of the equipment. After setting all the parameters, hold the **left arrow** button down until you see the words "UPDATING SETTINGS" then release the **left arrow** button, the M2 will reset itself shortly.

Go to Technical Documents:

http://www.lennoxcommercial.com/technical-documents/installation-instructions.asp

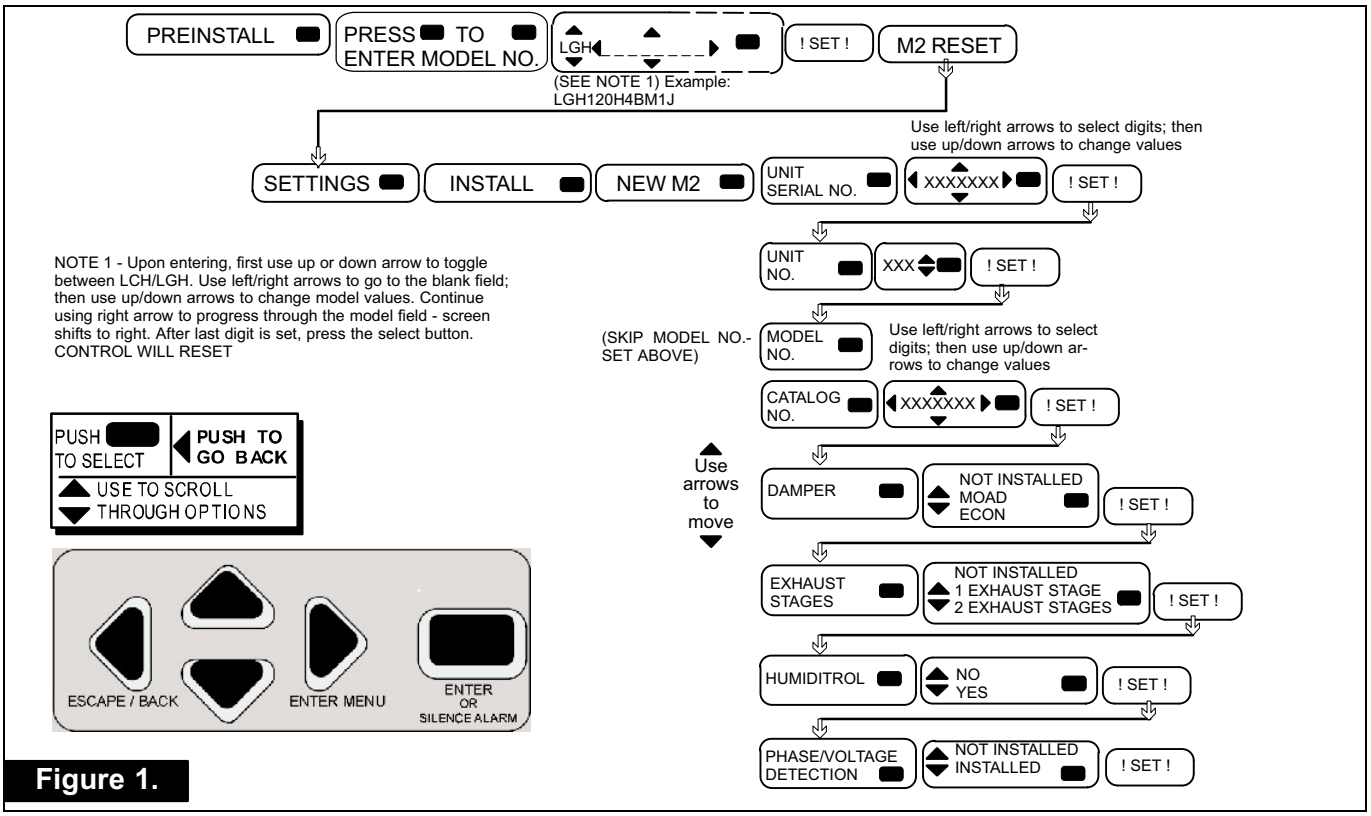


Figure 1.

Q3. How do I operate the unit in test mode?

Prodigy® M2 unit controller

Figures 2 and 3 show the sub-menus in the SERVICE menu of the Prodigy M2. In order to perform any kind of testing, you will need to enter the TEST mode and perform your desired test. The display will show the current status of the unit i.e. Idle, Cooling, Heating etc. To access Test Mode, press the **select** button and follow the steps in figure 2. Once satisfied with the test, press the **select** button to disable the active test. To return to normal unit operation, press the **left arrow** until M2 RESET appears and allow the board to reset and return to its current status.

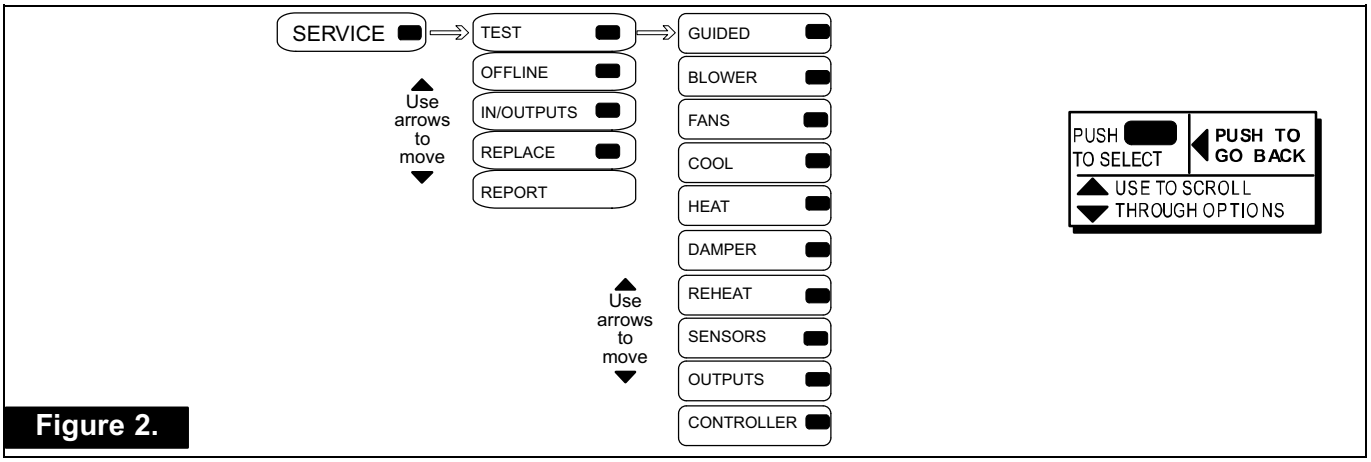


Figure 2.

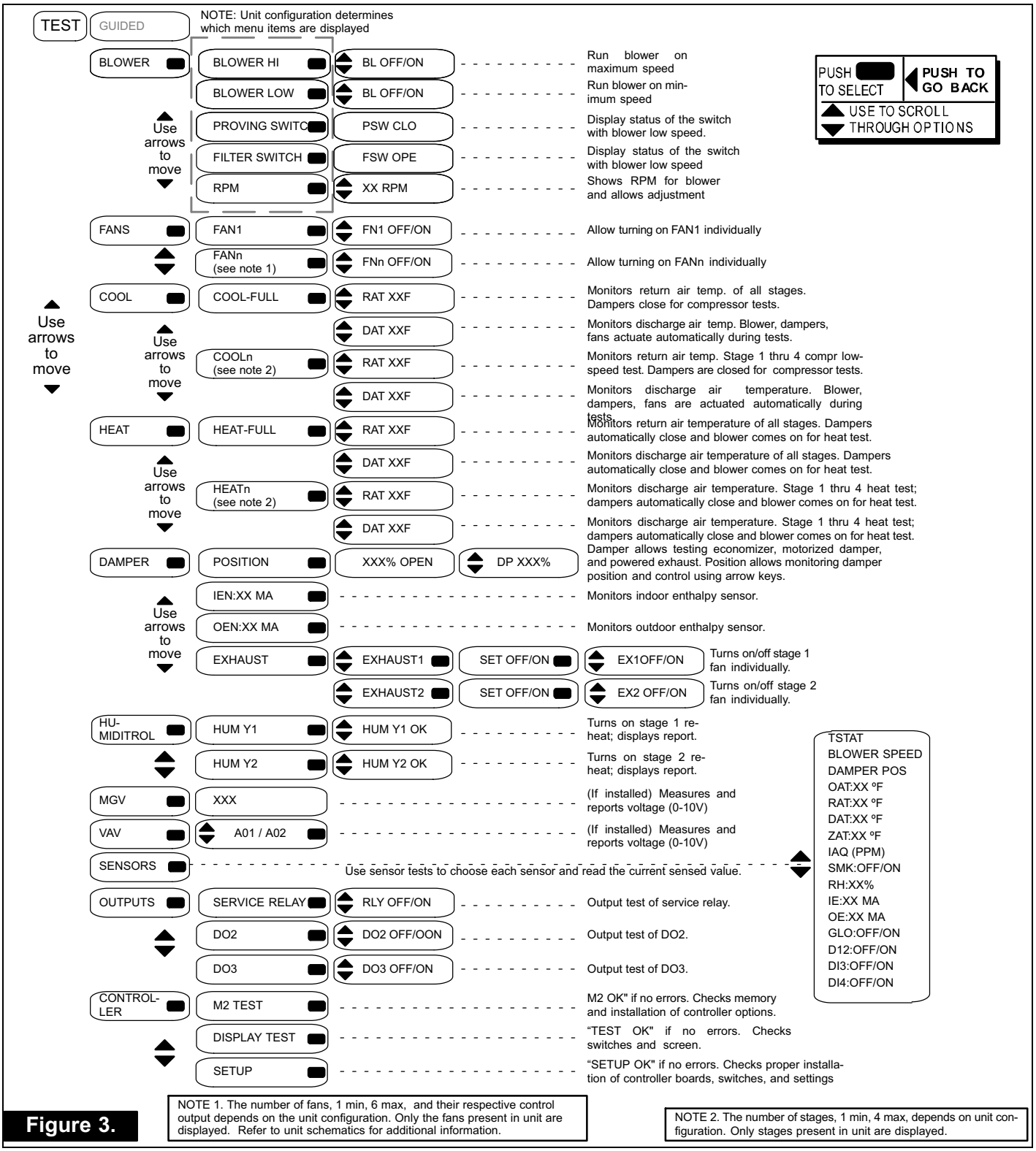


Figure 3.

NOTE 1. The number of fans, 1 min, 6 max, and their respective control output depends on the unit configuration. Only the fans present in unit are displayed. Refer to unit schematics for additional information.

NOTE 2. The number of stages, 1 min, 4 max, depends on unit configuration. Only stages present in unit are displayed.

Q4. How can I setup the unit to operate temporarily using the factory-installed return air sensor, prior to installation of the A2 zone sensor? (How do I set the unit up for temporary heating and cooling?)

- You can also refer to the How-To video at the following link for help:
  http://www.lennoxcommercial.com/landing/prodigy/how-to-videos.asp

Prodigy® M2 unit controller

In order to temporarily operate the unit with the installed return air sensors, the RETURN AIR BACKUP option in the LOCAL setting of the CONTROL needs to be enabled. Follow the steps in figure 4. Once the RETURN AIR BACKUP option is enabled, it is required that you verify (adjust or select the defaults) the following setpoints:

- Occupied Heat Setpoint (OCP HEAT BU STPT)
- Un-Occupied Heat Setpoint (UNOCP HEAT BU STPT)
- Occupied Cool Setpoint (OCP COOL BU STPT)
- Un-Occupied Cool Setpoint (UNOCP COOL BU STPT)

After completing the steps press and hold the **left arrow** until the message UPDATING SETTINGS is flashed on the display.

You can also achieve this by accessing the appropriate ECTO (6.01) and setting it to 3. Do so by going to SETTINGS > CONTROL > ECTO > BLOCKPARAMTERSCOUNTS > B#6/P#1 > CNT and setting it to 3. The display flashes ! SET !. Then hold the **left arrow** down until you see UPDATING SETTINGS on the display.

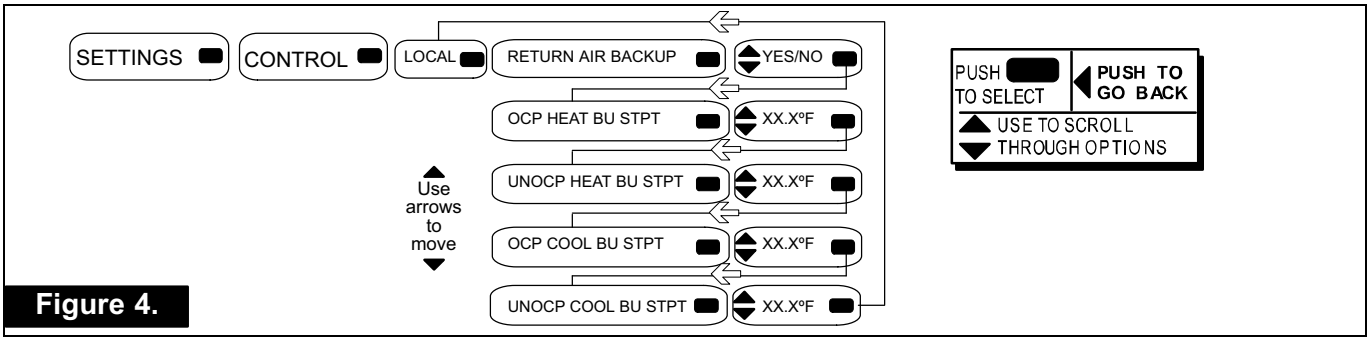


Figure 4.

CAUTION: The use of this unit as a construction heater or air conditioner is not recommended during any phase of construction. Very low return air temperatures, harmful vapors and operation of the unit with clogged or misplaced filters will damage the unit. If this unit has been used for heating or cooling of buildings or structures under construction, the following conditions must be met or the warranty will be void:

- The vent hood must be installed per these installation instructions.
- A room thermostat must control the unit. The use of fixed jumpers that will provide continuous heating or cooling is not allowed.
- A pre-filter must be installed at the entry to the return air duct.
- The return air duct must be provided and sealed to the unit.
- Return air temperature range between 55°F (13°C) and 80°F (27°C) must be maintained.
- Air filters must be replaced and pre-filter must be removed upon construction completion.
- The input rate and temperature rise must be set per the unit rating plate.
- The heat exchanger, components, duct system, air filters and evaporator coil must be thoroughly cleaned following final construction clean-up.
- The unit operating conditions (including airflow, cooling operation, ignition, input rate, temperature rise and venting) must be verified according to these installation instructions.

Q5. How do I setup the unit in backup mode (to operate the unit on return air sensor)?

See question Q4.

Q6. How do I set-up the economizer operation?

Prodigy® M2 unit controller

In order to setup the economizer operation, the appropriate Economizer Mode (TEMP, ENTH, or GLOBAL) will need to be selected. Make sure the appropriate DIP SW1 has also been set. After selecting the right mode, change the appropriate settings for the following parameters:

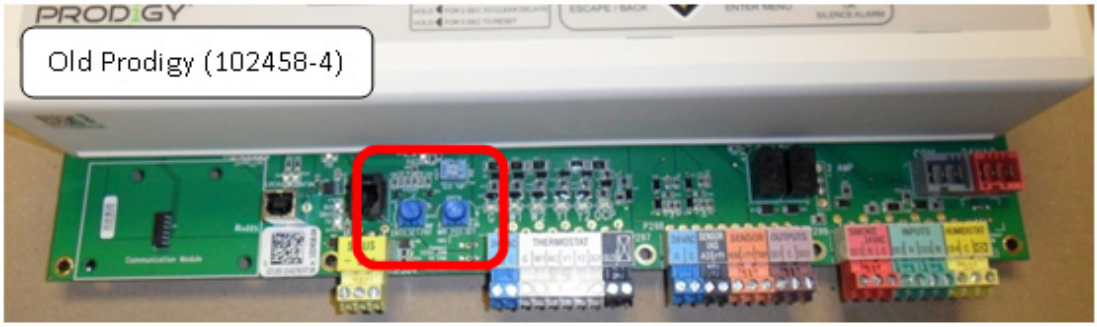
- Supply Air Setpoint (SUPPLY AIR STPT)
- Minimum Occupancy Blower Low (MIN OCP BLOWER LOW)
- Minimum Occupancy Blower High (MIN OCP BLOWER HIGH)
- Fresh Air Tempering Heating (FAH)
- Fresh Air Tempering Cooling (FAC)

Use the flowchart in figure 5 to get to the Economizer Mode and the related settings. After completing the setup do the following:

- Press and hold the **left arrow** until display shows updating then will show M2 reset.
- Need to wire the OCP terminal of T-Stat to OCP terminal of M2 or install a jumper from R to OCP on M2.

Newer M2 Hardware

The newer M2 hardware includes several changes which includes simplified economizer setup. All the economizer setup is now done through the Prodigy controller's user interface. By removing the minimum position potentiometer, the enthalpy setpoint potentiometer, and the economizer mode selection DIP switch from the M2 board, the user will now simply setup the economizer with a few button presses. This ensures the economizer is setup accurately since Prodigy will allow setting the economizer minimum position with 1% resolution.



Use Table 1 for Enthalpy Setpoint conversions, as the input value required is in mA.

Table 1. Enthalpy Control Setpoints

	Control Setting	Enthalpy Control Setpoint At 50% Relative Humidity Approximate Degrees F (C)	ECTO 6.26 cnt (mA)
The recommended enthalpy setpoint is "A". If the economizer is allowing air which is too warm or too humid to enter the system, the enthalpy control may be changed to a lower setting (B, C, or D).	A	73 (23)	150 (11.8)
	B	70 (21)	173 (13.6)
	C	67 (19)	199 (15.5)
	D	63 (17)	224 (17.6)

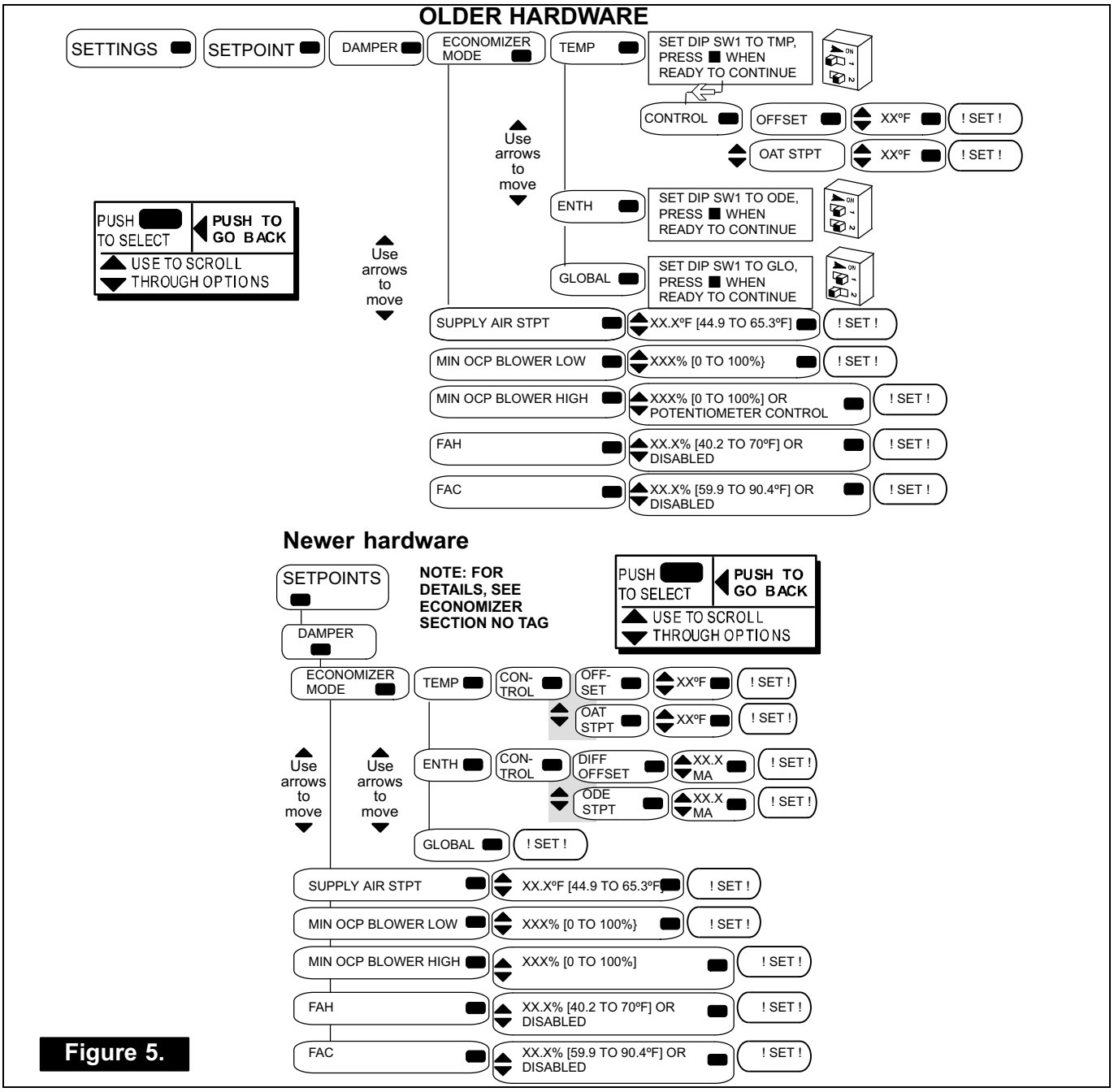

OLDER HARDWARE
SETTINGS
SETPOINT
DAMPER
ECONOMIZER MODE
TEMP
SET DIP SW1 TO TMP, PRESS ■ WHEN READY TO CONTINUE
CONTROL
OFFSET
XXºF
! SET !
OAT STPT
XXºF
! SET !
Use arrows to move
ENTH
SET DIP SW1 TO ODE, PRESS ■ WHEN READY TO CONTINUE
GLOBAL
SET DIP SW1 TO GLO, PRESS ■ WHEN READY TO CONTINUE
PUSH TO SELECT
PUSH TO GO BACK
USE TO SCROLL THROUGH OPTIONS
Use arrows to move
SUPPLY AIR STPT
XX.XºF [44.9 TO 65.3ºF]
! SET !
MIN OCP BLOWER LOW
XXX% [0 TO 100%}
! SET !
MIN OCP BLOWER HIGH
XXX% [0 TO 100%] OR POTENTIOMETER CONTROL
! SET !
FAH
XX.X% [40.2 TO 70ºF] OR DISABLED
! SET !
FAC
XX.X% [59.9 TO 90.4ºF] OR DISABLED
! SET !
Newer hardware
SETPOINTS
NOTE: FOR DETAILS, SEE ECONOMIZER SECTION NO TAG
PUSH TO SELECT
PUSH TO GO BACK
USE TO SCROLL THROUGH OPTIONS
DAMPER
ECONOMIZER MODE
TEMP
CON-TROL
OFF-SET
XXºF
! SET !
OAT STPT
XXºF
! SET !
Use arrows to move
Use arrows to move
ENTH
CON-TROL
DIFF OFFSET
XX.X MA
! SET !
ODE STPT
XX.X MA
! SET !
GLOBAL
! SET !
SUPPLY AIR STPT
XX.XºF [44.9 TO 65.3ºF]
! SET !
MIN OCP BLOWER LOW
XXX% [0 TO 100%}
! SET !
MIN OCP BLOWER HIGH
XXX% [0 TO 100%]
! SET !
FAH
XX.X% [40.2 TO 70ºF] OR DISABLED
! SET !
FAC
XX.X% [59.9 TO 90.4ºF] OR DISABLED
! SET !

Figure 5.

Q7. How do I adjust the Economizer for minimum damper settings?

Older Hardware

There are two methods to set the Minimum Damper setting for the Economizer:

A By setting the appropriate ECTO and potentiometer settings:

- Set 0.09 ECTO for Minimum Blower Low
- Adjust the potentiometer (MIN POS SET) for Minimum Blower High

B By setting the appropriate settings though the Damper menu as described in question Q6.

NOTE - For units with a single speed blower, set only the HIGH speed minimum position.

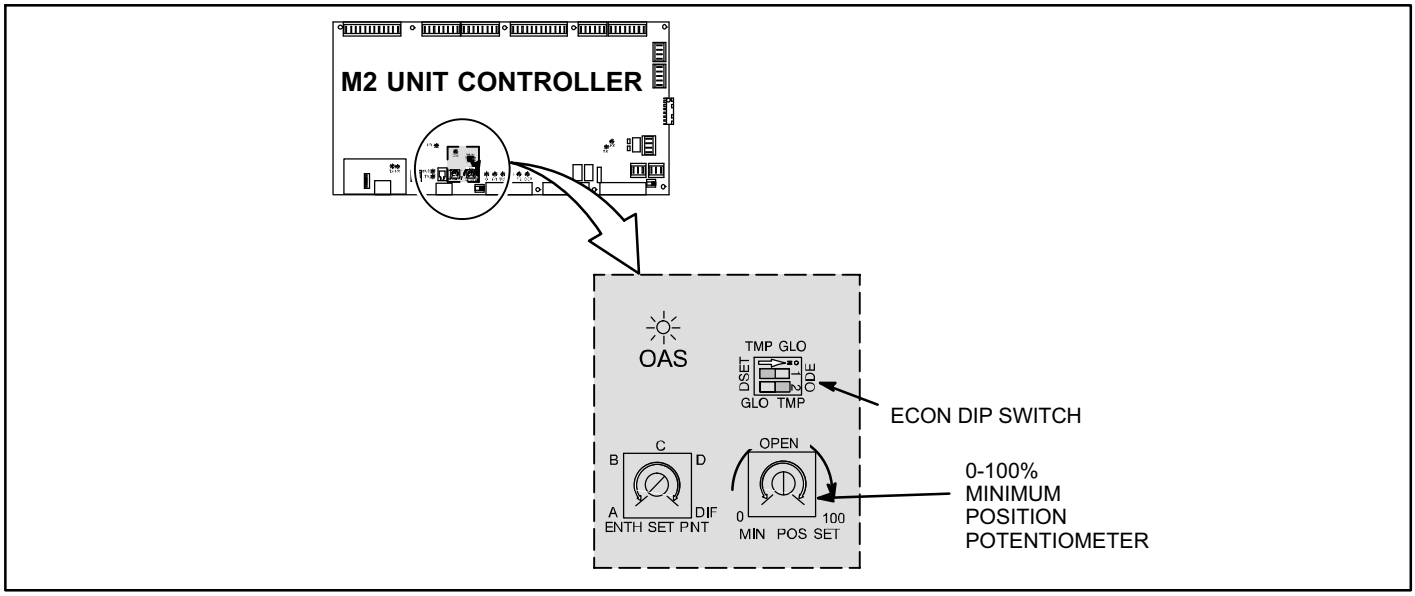


Figure 6. Older Economizer controls

Newer Hardware

The newer M2 hardware minimum damper settings are changed using the Prodigy® controller's user interface. Follow the flowchart in figure 7 to access the minimum damper settings.

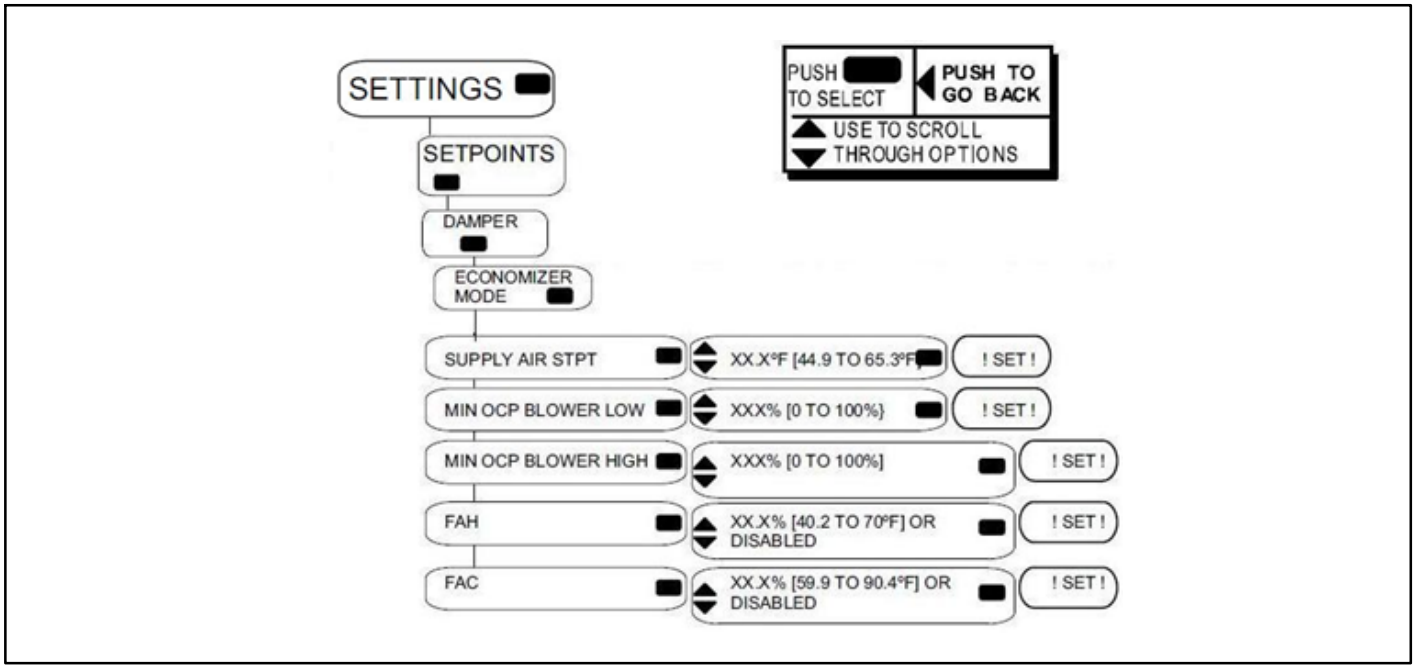


Figure 7. New M2 Hardware Economizer minimum damper settings flowchart

Economizer (Damper)

General

The economizer, when configured, controls

- damper position, which determines how much outdoor air is used to meet free cooling or indoor air quality (IAQ) requirements, and
- the optional power exhaust fans.

On a cooling demand, outdoor air is used for free cooling instead of first-stage compressor(s) when outdoor air is suitable (OAS).

Outdoor Air Suitable (OAS) LED (Early M2 hardware)

A yellow LED which is labeled OAS provides economizer status. A steady yellow LED indicates that outdoor air is suitable for free cooling. A flashing yellow OAS light indicates the IAQ sensor requires outdoor air. (A flashing yellow LED can also mean that the economizer dampers are open to bring in fresh air while a compressor is on.) If the economizer is already operating, a flashing yellow OAS light indicates the IAQ sensor requires more outdoor air than is suitable for free cooling.

DIP Switch Settings (Early M2 hardware)

The DIP switch setting determines the mode used to enable free cooling. The DIP switch also has a mode to set the damper minimum position and test damper operation. DIP switch is factory-set when the economizer is factory-configured.

Free Cooling Discharge Air Setpoint

When outdoor air conditions are suitable and economizer is set to provide free cooling, dampers will modulate to achieve a discharge air temperature of 55°F (13°C) default. This setpoint is adjustable between 45° and 65°F.

The setpoint can also be automatically increased when outdoor or return air temperatures drop. See Outdoor Air Reset and Return Air Reset in the Discharge Air Control section in the *Prodigy Application Guide (Advanced Features)* manual. These settings must be enabled and adjusted using the Prodigy CONTROL/ECTO menu to make changes to ECTO values. Refer to the Prodigy Application Guide. The unit does not have to be operating in discharge air cooling mode to adjust the free cooling discharge air setpoint, or to use setpoint reset.

During free cooling operation, the damper modulates to maintain a discharge air temperature equal to the free cooling discharge air setpoint. If the damper has been continuously at its maximum open position for at least three minutes, then a second stage cooling demand will be allowed to turn on the first stage of mechanical cooling. While the mechanical cooling is on, the damper is held to its maximum position, and does not modulate until the second stage demand is satisfied. On a third stage cooling demand, the second stage of mechanical cooling will be turned on.

Outdoor Air Suitability

There are five modes which can be used to determine if the outdoor conditions will enable free cooling.

- Old hardware: DIP switch is set to ODE (Outdoor Enthalpy), and the Enthalpy Setpoint potentiometer is set A-through-D.
- New hardware: Configuration is set to Single Enthalpy Economizer Control and ECTO 6.26 setpoint value is set to between 12 and 19mA, 150 to 240 counts.

Enthalpy Setpoint

This setting pertains to the ODE free cooling mode only. The M2 will enable free cooling when outdoor air enthalpy (A7) is less than the enthalpy setpoint. Table 2 shows the approximate enthalpy setpoints for each potentiometer setting at 50% relative humidity. The ECTO 6.26 column is the correlating values used in the new hardware.

Example:—At setting “A”, the enthalpy control will modulate dampers open when outdoor air is at 73°F and 50% relative humidity. If space temperatures are too warm, rotate the potentiometer to “B” (old hardware) or enter a count of 173 (ECTO 6.26 if new hardware). The enthalpy control will now modulate dampers open when outdoor air is 70°F and 50% relative humidity.

NOTE - When in outdoor enthalpy mode, a value between 130-240 counts is entered. When in differential enthalpy mode a 2mA (or 26 count) difference between outdoor and indoor enthalpy corresponds to about a 3.5°F difference in temperature at constant relative humidity (or about a 12%RH difference at constant temperature). When in differential enthalpy mode, a value between 0-75 counts is entered.

Table 2. Enthalpy Control Setpoints

	Control Setting	Enthalpy Control Setpoint At 50% Relative Humidity Approximate Degrees F (C)	ECTO 6.26 cnt (mA)
The recommended enthalpy setpoint is “A”. If the economizer is allowing air which is too warm or too humid to enter the system, the enthalpy control may be changed to a lower setting (B, C, or D).	A	73 (23)	150 (11.8)
	B	70 (21)	173 (13.6)
	C	67 (19)	199 (15.5)
	D	63 (17)	224 (17.6)

Economizer (Damper) (Continued)

There are six options available to determine outdoor air suitability (OAS) for free cooling. See table 3. Economizer settings are shown for each mode in figure 6.

The appropriate sensors are provided when the economizer is factory-configured. When the economizer is field-configured, the ODE mode requires additional field-provided sensor(s). See table 3. The TEMP mode uses sensors provided with all units.

Table 3. Free Cooling Options

Free cooling mode	DIP SW positions	MODE Selection	CONTROL Selection	OAS Setpoint Calculation
	Older M2 Hardware	Newer M2 Hardware		
Temperature offset	1,2 to TMP	TEMP	OFFSET	OAT<RAT-OFFSET (0 to 40 F)
Temperature setpoint	1,2 to TMP	TEMP	OAT STPT	OAT<OAT STPT (41 to 70 F)
Remote	1,2 to TMP	TEMP	ANY	OAS sent by network.
Enthalpy differential (Potentiometer set to DIFF) for old hardware, or ECTO 6.26 = 0 to 75 counts for OFFSET in new hardware. Old hardware does not use an OFFSET.	1,2 to ODE	ENTH	N/A	ODE<IDE (old hardware) or ODE < IDE - OFFSET (new hardware)
Enthalpy setpoint (Potentiometer set to A-D) for old hardware, or ECTO 6.26 = 130 to 240 counts for new hardware.	1,2 to ODE	ENTH	N/A	ODE<POT (old hardware) or ODE < ECTO 6.26 (new hardware)
Global input	1,2 to GLO	GLOBAL	N/A	GLO input

Mode	Outdoor air is suitable for free cooling when:
TEMP OFFSET	Outdoor air temperature (RT17) is less than return air temperature (RT16) by at least the OFFSET value.
TEMP OAT STPT	Outdoor air temperature (RT17) is less than the OAT STPT value.
Remote	Either of the TEMP modes can be used when a network OAS signal is provided by an energy management or building control system, via BACnet, LonTalk, or L Connection. The network can command OAS, NOT OAS, or AUTO. AUTO returns to local control of OAS, which is the selected TEMP mode..
ENTH (differential)	Outdoor air enthalpy* (A7) is less than return air enthalpy (A62) by at least the OFFSET value. (There is no OFFSET value in old hardware.)
ENTH (setpoint)	Outdoor air enthalpy (A7) is less than enthalpy setpoint potentiometer position A, B, C, or D (for old hardware), or less than ECTO 6.26 STPT value (new hardware).
GLOBAL	Global input is energized by (P297-9). This setting is also used for outdoor air damper applications. Global input also brings on the blower. (This mode is NOT used when OAS signal is provided via network connection. GLO is only used when a 24VAC signal is used to energize the P297-9 GLO input.)
Enthalpy includes effects of both temperature and humidity.	

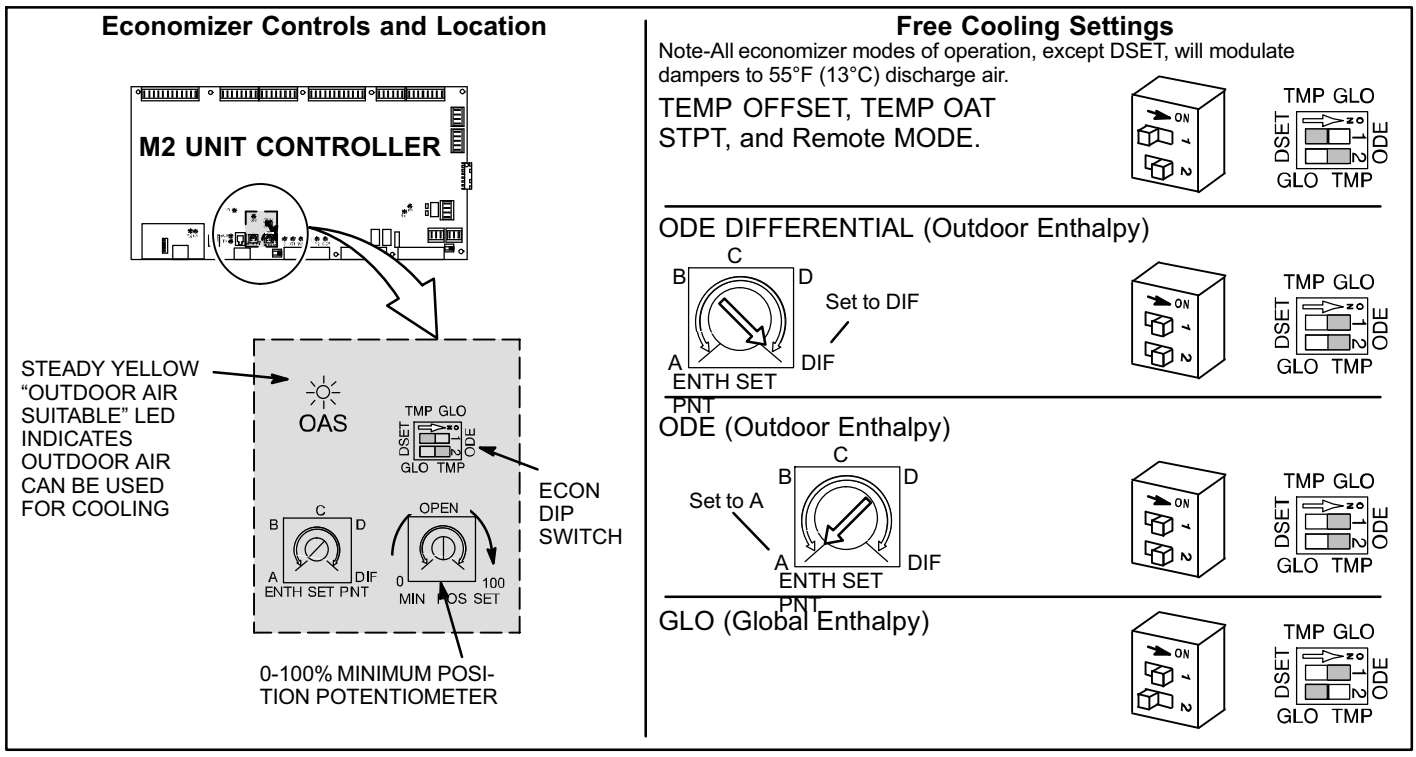


Figure 8. Economizer controls and free cooling settings (Early M2 Hardware)

Q8. What are error codes 74 and 93 and how do I resolve them?

First, determine if this unit should be in zone sensor mode or not, by determining the type of control system being used.
If control is not setup in zone sensor mode:
Simply changing the unit back to thermostat mode will solve both error codes.
If control is setup in zone sensor mode:
There are two basic possibilities.

A No zone sensor input. Go to the data menu and see if there is an A2 sensor reading. If not, the 93 is there as an affect of the code 74 and the answer is to check zone sensor and wiring.

B Loss of communication with network controller. If there is a zone temp reading, troubleshoot the communication issue. Check for proper address, communication wire connections, and polarity, and for proper system mode setting at ECTO 6.01.

Q9. What is the Error Code 114 and why am I seeing it?

Please see Service Flash CU-10-2 for an in depth look into error 114. The other fix is the replacement of the M2 board and display. If the CU-10-2 Service Flash cannot be found, please contact a Lennox Service Representative.

Q10. How do I make my Unit Controller software work with Windows 7 and Windows 8?

A: Additional steps when installing UC Software with Windows 7 or Windows 8.

1. Click **Start**
2. Click **Computer**
3. Double Click Local Disk C:
4. Double Click Program Files (x86)
5. Right Click L-Connection
6. Click Copy
7. Click the BACK arrow at the top of the screen
8. Right Click Program Files and click Paste

This will copy L-Connection from Program Files (x86) to Program Files. Close everything out and click on the L-Connection Icon again and the program should work. If it does not, un-install and reinstall your UC and NCP software again and repeat the procedures outlined above.