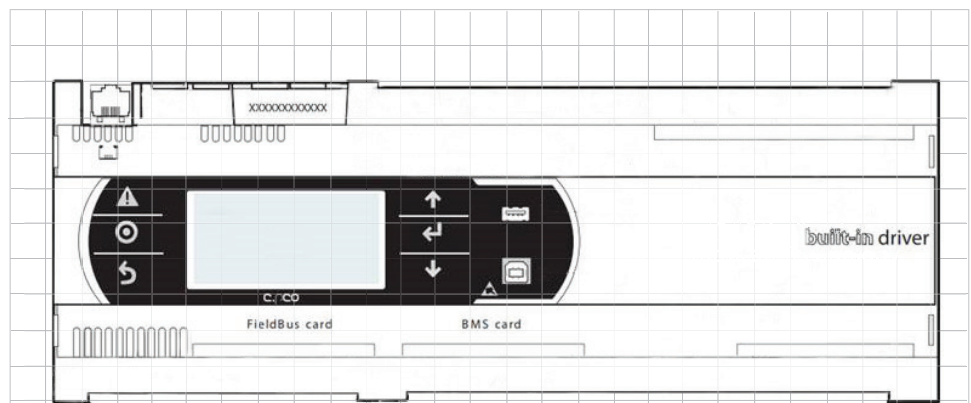




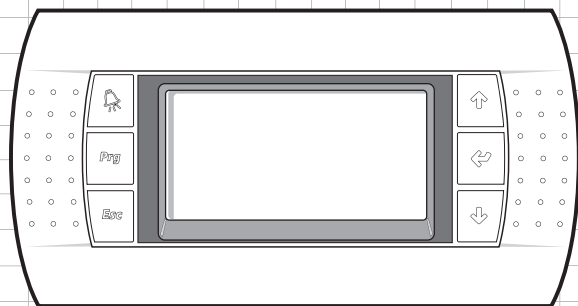
# CM3510 Series Controller

*Installation and Operation Manual for SA Units*

- Backlit LCD User Interface
- Programmed by Desert Aire for dehumidification and temperature control
- Multiple communication interface options:
  - LonWorks®
  - BACNet™ Ethernet
  - BACNet™ MS/TP
  - Modbus®
- Alarm history retention
- Internal time clock for stand alone operation



**CM3510 Controller**



**Optional CM3510 Series Remote Display Terminal (RDT)**



## DANGER

ONLY TRAINED, QUALIFIED PERSONNEL SHOULD INSTALL AND/OR SERVICE DESERT AIRE EQUIPMENT. SERIOUS INJURY, DEATH AND PROPERTY DAMAGE CAN RESULT FROM IMPROPER INSTALLATION/SERVICE OF THIS EQUIPMENT. HIGH VOLTAGE ELECTRICAL COMPONENTS AND REFRIGERANT UNDER PRESSURE ARE PRESENT.

# Desert Aire Dehumidification Equipment Standard Limited Warranty

Desert Aire warrants the dehumidifying unit to be free from defects in materials and workmanship subject to the terms, conditions and limitations stated herein.

## TERMS

Desert Aire warrants all components (except as noted) for a period of two (2) years from the date of shipment. This warranty shall be limited to the supply of new or rebuilt parts for the part which has failed because of defects in workmanship or material, and does not include the cost for labor, transportation or other costs not herein provided for. Replaced parts are warranted only for the remaining portion of the original warranty period.

## CONDITIONS

**The warranty is subject to the following conditions:**

1. The unit must be properly installed and maintained in accordance with the Desert Aire "Installation and Operation Manual" provided with each unit and/or other documentation provided.
2. **The Start-Up Report must be completed and returned to Desert Aire Service for evaluation. If no deficiencies are identified a Warranty Validation Letter will be issued that provides all warranty dates and coverage. If installation or start-up deficiencies are present, these must be corrected and communicated to Desert Aire in order to activate warranty.**
3. This warranty shall not apply to any part that has been tampered with, or has been subject to misuse, negligence or accident. A warranty can be obtained for altered equipment but only with written consent from Desert Aire.
4. The following parts and components are excluded from the warranty: belts, filters, driers, fuses and refrigerant.
5. Refrigerant coils or other components that corrode due to improperly balanced pool chemistry or corrosive air quality will not be warranted.
6. All replacements or repairs will be FOB Germantown, WI.
7. This warranty shall be null and void if defects or damages result from unauthorized opening of the refrigerant circuit, tampering with factory set controls, or operating outside the original design conditions.

8. Desert Aire shall not be liable for labor costs incurred in diagnosing the problem, or the removal or replacement of the part or parts being repaired.
9. Desert Aire must preauthorize all warranty coverage described herein.

**Extended Warranty:**

Your Desert Aire unit may have extended warranties beyond this Standard Limited Warranty document. Extended warranties are only available at the time of the purchase of the original equipment. These extended warranties are covered under a separate document and their terms and conditions are separate from this document. It is mentioned in this document for informational purposes only. Any extended warranties will be identified on the Warranty Validation letter.

Any and all incidental or consequential damages are expressly excluded from this warranty. Some states do not allow the exclusion of incidental or consequential damages for personal injury, so the above limitations may not apply to you for certain damages. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. No person or representative is authorized to make any warranty or assume any liability not strictly in accordance with the aforementioned.

Inquiries regarding warranty matters should be addressed to:

Desert Aire Corp  
c/o Service Manager  
N120 W18485 Freistadt Road  
Germantown, WI 53022  
PH: (262) 946-7400  
TOLL FREE: (800) 443-5276  
FAX: (262) 946-7401  
E-MAIL: [service@desert-aire.com](mailto:service@desert-aire.com)

Additional copies of this manual can be purchased for a nominal fee from Desert Aire. Desert Aire also posts the most current revision of our I/O Manuals on our website. For a digital copy of the I/O Manual for your unit revision, please submit request to the contact information listed above.



**Product Warning for the State of California:**



**WARNING:** Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)



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# **1. Installation**

## **1.1 Introduction**

Your Desert Aire controller is designed for precise monitoring and control of air temperature and relative humidity (RH) within a conditioned environment.

This CM3510 control system is easy to install and operate. The controller features an internal display terminal (IDT). This display allows viewing and adjustment of the unit's sensors and setpoints. It also indicates the operating status of major components inside of the dehumidifier. The CM3510 controller also has the ability to control auxiliary equipment such as a pool water or tower water pumps and auxiliary heating devices for optimum energy efficiency.

Most sensors and devices have been factory-installed and wired inside of the dehumidifier. In most cases, only connection to a remote condenser, electrical power connection, the supply air temperature sensor and an Ethernet connection to the facilities computer network are required. For units requiring a wall mounted zone air temperature and relative humidity sensor, wiring of this sensor to the unit will be required. An outdoor air sensor will be mounted in the air hood of units rated for outdoor duty. For indoor units, this sensor will need to be mounted in an outdoor area and wired as well. Also, units with a pool condenser will require temperature sensors be wired in the pool water piping.

The control system includes a web page which allows a virtual display terminal to be accessed from any device on the computer network. Simply browse to the IP address assigned to the dehumidifier, enter the appropriate credentials, [user – Desert-Aire, password – 18485] and select the DISPLAY tab. Logging is also available from this web page.

The CM3510 controller also features optional building automation access. This includes options for network connect ability including BACnet IP, BACnet MS/TP, ModBus RTU and ModBus IP.

## **1.2 Sensor Installation**

The CM3510 control system is normally provided with a unit mounted combination relative humidity and temperature sensor. This sensor provides accurate control without the problems associated with wall-mounted sensors, such as faulty readings due to hot spots or drafts. The supply air temperature sensor will be required to insure proper operation of the air heating system. If a pool water condenser has been provided in the dehumidifier, pool water temperature sensors will need to be installed in the water piping.

### **1.2.1 Unit Mounted Sensor**

This sensor is factory mounted in the return air duct upstream of any outdoor air intakes.

### **1.2.2 Wall Mount Humidity and Temperature Sensor**

If your dehumidifier was ordered with a wall-mount humidity and temperature sensor, mount the sensor about five feet above the pool deck on an interior wall with natural air circulation. Avoid the following locations:

- Hot spots near concealed heating pipes, warm air ducts, supply register outlets, or solar radiation.
- Cold spots due to a cold wall or drafts from stairwells, doors, windows, or supply register outlets.
- Dead spots such as behind doors or in corners where room air cannot circulate freely.

### **1.2.3 Water Temperature Sensors**

Desert Aire dehumidifiers ordered with the pool water heating option are supplied with two water temperature sensors for each pool water condenser purchased. One of these sensors is for the inlet temperature and the other is for the outlet temperature. Each sensor comes with an immersion well for mounting.

- Screw the wells into adapter fittings of the inlet and outlet pool water piping. The wells are equipped with a 1/2" MPT connection.
- Install the sensors upstream and downstream from the dehumidifier of the auxiliary pool water heater.
- The sensors must be installed in a location where they will accurately sense the pool water inlet and outlet temperature conditions. This means you must have continuous water flow at the sensor locations.

### **1.2.4 Outdoor Air Mounted Humidity and Temperature Sensor**

If your dehumidifier was ordered for indoor use, an outdoor air sensor will need to be mounted outdoors. The sensor will come with a radiant shield to allow ambient conditions unaffected by direct sunlight.

## **1.3. Auxiliary Air Heating Control Wiring**

Note: You must use the Desert Aire CM3510 control system to control or interlock with the room heating system. This prevents wide fluctuations in room air temperature. It also prevents the heater from trying to heat the room while the dehumidifier is running in the cooling mode.

### **1.3.1. Auxiliary Heating - Dry Contact Closure**

The standard Desert Aire CM3510 Controller provides a dry contact closure to operate the auxiliary space heater. The contact closes to energize a heater (may be supplied by others) which has its own power source.

Install two wires from the thermostat terminal blocks on the heater to the terminals H1 and H2 in the control panel of the dehumidifier. (See your wiring schematic for connection details.)

NOTE: Units with an internal electric air heater have an airflow proving switch function in the controls. If an air heater is installed external to the unit, provide an external airflow proving switch for protection of the heater.

### **1.3.2. Auxiliary Heating - Proportional Signal**

Desert Aire will provide a proportional 0-10 VDC direct-acting signal to modulate a heating coil control valve or other auxiliary modulating heater. Most proportional valves have either three (3) or four (4) terminals for field-installed wiring.

- Four-terminal valves have two terminals for 24 VAC power and two terminals for the signal input.
- Three-terminal valves have one terminal for the “hot” 24 VAC input, a second terminal for the “positive” signal input and a third, common terminal for the “neutral” 24 VAC input and the “negative” signal input.

The control signal may also be set for reverse-acting or for 2-10 VDC. Contact Desert Aire’s service department for recommendations or instructions on how these options can be implemented.

You must follow the instructions included with the valve cut sheet. Observe the proper polarity or you may damage both the valve and the controller. (See your wiring schematic for connection details.)

## **1.4. CM3510 Controller Overview**

Desert Aire’s CM3510 microprocessor controller is a powerful, flexible controller with many useful features including:

- Display of room air temperature, relative humidity and refrigerant pressures.
- Display of equipment operating status such as dehumidification and cooling.
- Display of alarms for abnormal conditions such as sensor failures or tripped safety controls.
- An optional seven-day occupancy timer which can control outdoor air dampers (if used) to bring in fresh air when the dehumidifier is in an occupied state.
- A convenient, easy-to-understand display interface which allows the operator to view and change set points and time schedules.

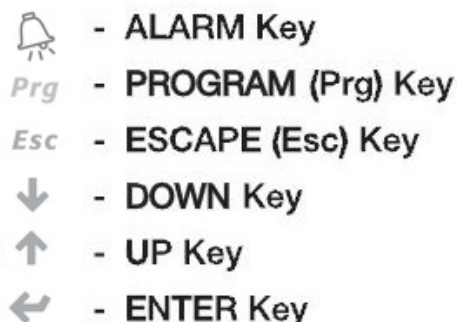
## 2. Controller Details

### 2.1. Menu Overview and General Instructions (Figure 1)

Your Desert Aire controller is pre-programmed and configured at the factory for use in the application you have specified. The internal display terminal (IDT, see Figure 1) allows the operator to monitor and adjust the setpoints of your Desert Aire system. The IDT has an LCD screen and six keys. These keys are labeled as below:



The remote display terminal (RDT) has an LCD screen and six keys. These keys are labeled as below:



The Home Screen (Figure 1) displays the Desert Aire logo and shows the dehumidifier status, zone temperature and relative humidity and the operational state of the fan, compressor and air heating. The unit type is displayed in the upper right of the screen indicating SP and the tonnage. Below this line, “Esc→Menu” indicates that if the **Esc** key is pressed, the Main Menu will be displayed. Pressing **Esc** on any other screen will take you back one screen. The “Prg→Stpt” indicates that if the **Prg** key is pressed, the setpoints can be changed. The “↑ ↓ →Help” indicates that if the **UP** or **DOWN** keys are pressed, the help screens will be shown. The **UP** or **DOWN** keys will now scroll through the help screens.

Menu screens allow the user to select from a series of actions. The action that is capitalized on the screen is selected by pressing the **ENTER** key. To cycle through the selections on a menu screen, use the **UP** and **DOWN** keys.

If setpoints or selections can be altered on a screen, the **ENTER** key will cycle through those items. Once the cursor is over an item, the **UP** and **DOWN** arrow keys will modify the setting. Numeric values require that the **ENTER** key be pressed to accept the value. An “on” or “off”



selection is altered as soon as the **UP** or **DOWN** keys are pressed.

When an alarm is triggered, the red LED behind the **ALARM** key will light and will remain on until the alarm is reset.

To view the alarms from any menu, simply press the **ALARM** key. If no alarm is active, the display will state **NO ALARMS**. If an alarm is present, it will be displayed along with the date and time it was triggered. The bottom two lines will display two data points recorded when the alarm was triggered.

To reset the alarm, use the **DOWN** key until the reset instructions are shown. Pressing the **ALARM** key for three seconds will reset all active alarms. See Section 3 for further alarm and alarm data logging information.

Screens which display a small **UP** arrow in the upper right and a small **DOWN** arrow in the lower right are part of a series of screens which can be accessed by pressing either the **UP** or **DOWN** arrow keys. If the operator has not pressed a key for an hour, the display will return to the Home Screen.

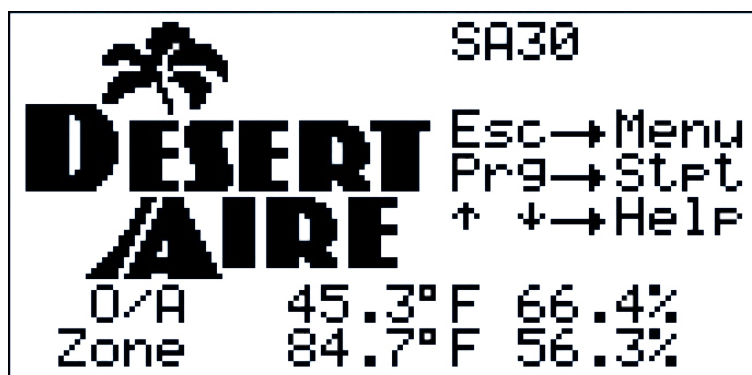


Figure 1

## 2.2. Zone Setpoints (Figure 2)

Pressing the **Prg** key from the Home Screen displays the ZONE SETPOINTS (Figure 2). This menu allows for modifications of the temperature and humidity setpoints specific to the unit. To modify the setpoints, press the **ENTER** key and use the arrow keys until the desired setting is shown. Press the **ENTER** key to accept the setpoint value. To return to the Home Screen, press the **Esc** key.

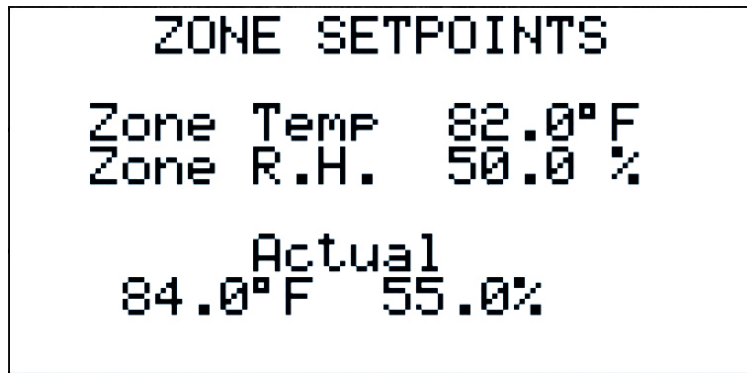


Figure 2

If pool heating is included in the unit, the **UP** and down arrows keys will be shown on the right of the screen. Press the **DOWN** key and the screen shown in Figure 3 will appear. Set the pool water temperature setpoint with the **ENTER** and **UP** and **DOWN** keys and press the **ENTER** key to modify. Pool 2 setpoint will be shown in a similar manner when a second pool condenser is supplied with the dehumidifier.

To return to the MAIN MENU, press the **Esc** key.

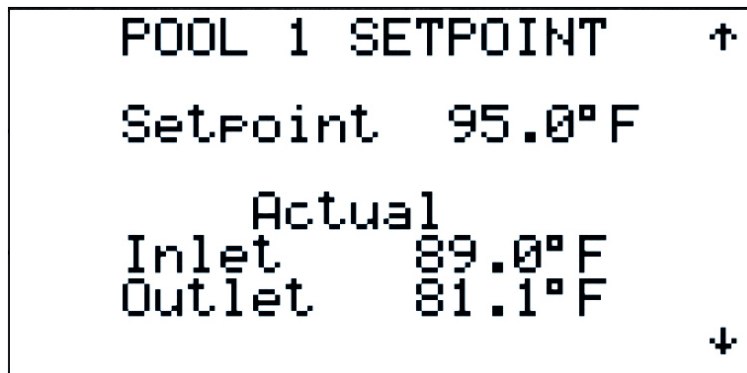


Figure 3

### 2.3 Main Menu (Figure 4)

Pressing the **Esc** key from the Home Screen displays the MAIN MENU (Figure 4). This menu allows the operator to select the STATUS MENU, set an Occupancy Schedule, enter the Service Menu and view the Unit Revision. To return to the Home Screen, press the **Esc** key.

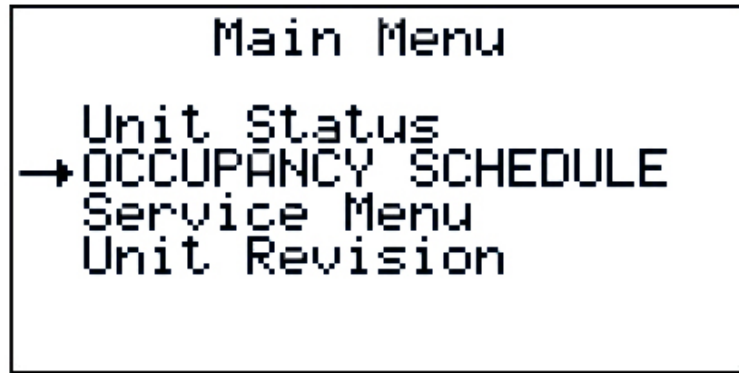


Figure 4

### 2.3.1 Unit Status (Figure 5)

Selecting Unit Status from the MAIN MENU displays a text explanation of the unit. The first line will show one of the following states:

- Off/Satisfied
- Heating Req.
- Cooling Req.
- Dehum Req.
- Dehum & Heat
- Dehum & Cool
- Energy Recovery
- Low Air Flow
- Low Suct. Press
- EXV Initializing

The Airflow condition is shown on the second line. The Occupied state (either Occupied or Un-Occupied) is shown on the third line. The Fourth line will display the air mode either Normal, Event Mode, Max O/A or Purge Mode. The fifth line displays will display "BMS has Disabled Unit" if the BMS has turned the unit off. The date and time will be shown on the bottom line. To return to the STATUS MENU, press the **Esc** key.

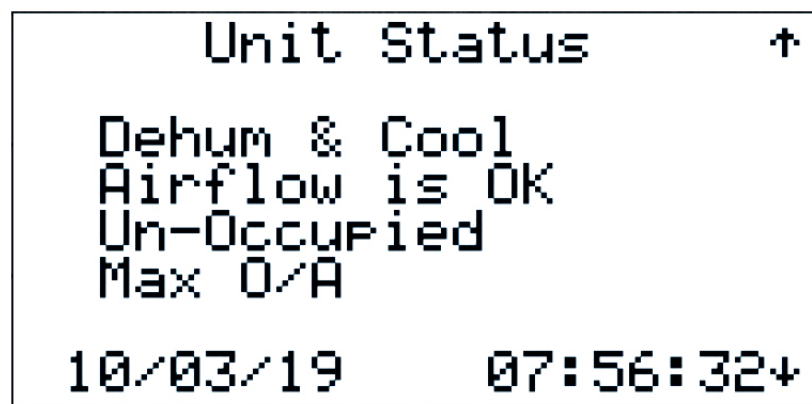


Figure 5

Pressing the **DOWN** key will display the screen shown in Figure 6. This screen will show Circuit A compressor status and if it is waiting on its non-short cycling timer. The off state of circuit A or the condenser used is shown on the third line. The Air or Water priority is shown on the fourth line. To return to the STATUS MENU, press the **Esc** key.

```
Circuit A Status  ↑  
  
Compressor  On  
  
Water Condenser  
Air Priority  
  
↓
```

Figure 6

Pressing the **DOWN** key will display the screen shown in Figure 7. This screen will show Circuit B compressor status and if it is waiting on its non-short cycling timer. The off state of Circuit B or the condenser used is shown on the third line. The Air or Water priority is shown on the fourth line. To return to the STATUS MENU, press the **Esc** key.

```
Circuit B Status  ↑  
  
Compressor  On  
  
Water Condenser  
Air Priority  
  
↓
```

Figure 7

Pressing the **DOWN** key will display the screen shown in Figure 8. This screen will show the EXV of Circuit A along with the superheat, suction temperature, suction pressure suction P2T, steps and percent open of the EXV. This screen is for troubleshooting only. To return to the STATUS MENU, press the **Esc** key.

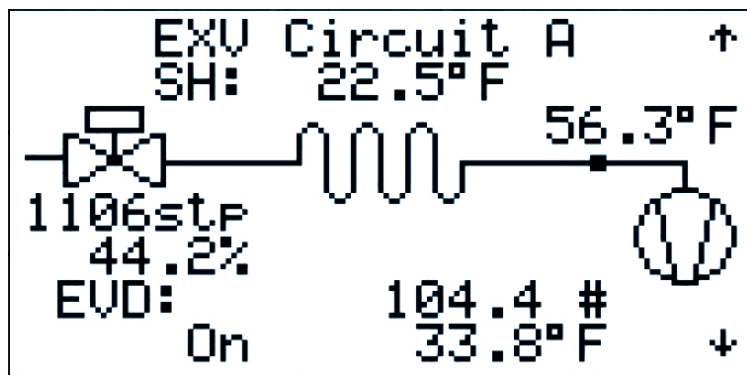


Figure 8

Pressing the **DOWN** key will display the screen shown in Figure 9. This screen will show the EXV of Circuit B along with the superheat, suction temperature, suction pressure suction P2T, steps and percent open of the EXV. This screen is for troubleshooting only. To return to the STATUS MENU, press the **Esc** key.

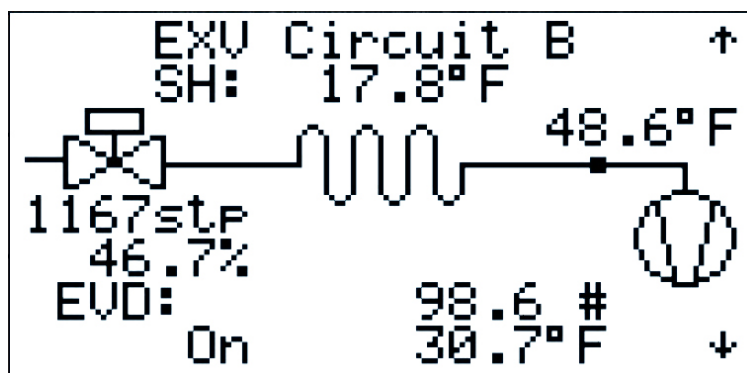


Figure 9

### 2.3.2 Occupancy Schedule (Figure 10)

Select the OCCUPANCY SCHEDULE from the MAIN MENU to enable a schedule to place the dehumidifier in the occupied mode. See Figure 10. To enable a schedule, select 'Yes', and press **ENTER**. The schedule will need to be setup before this will be enabled. Pressing the **Prg** key from this menu allows the date and time to be modified. To return to the MAIN MENU, press the **Esc** key.

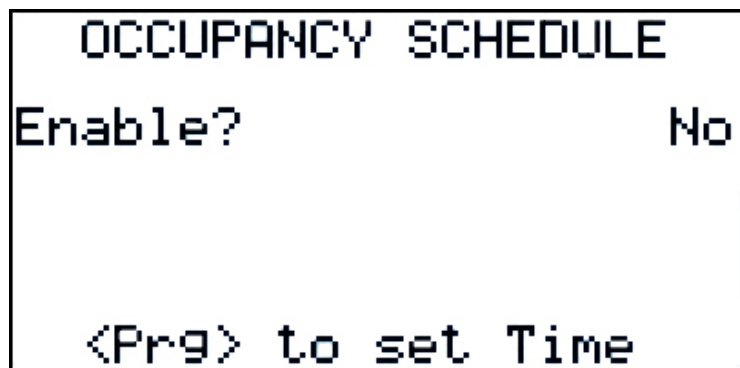
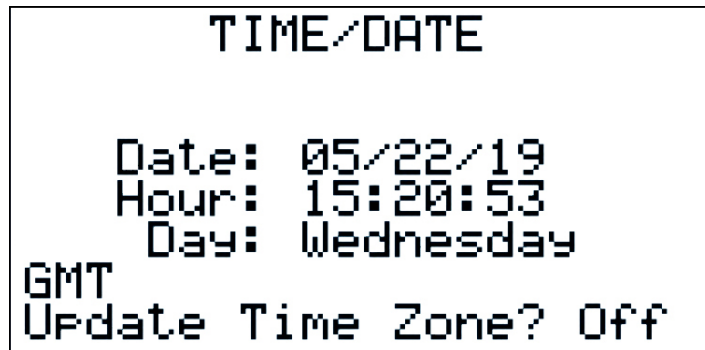


Figure 10

### 2.3.2.1 Time/Date (Figure 11)

This screen sets the time, date and day of week and the time zone. To modify these settings, press the **ENTER** key until the cursor is over the appropriate item and use the arrow keys until the desired setting is shown. All times are set in the 24 hour format. Pressing the **ENTER** key will accept that value and step to the next item. To return to the OCCUPANCY SCHEDULE, press the **Esc** key.



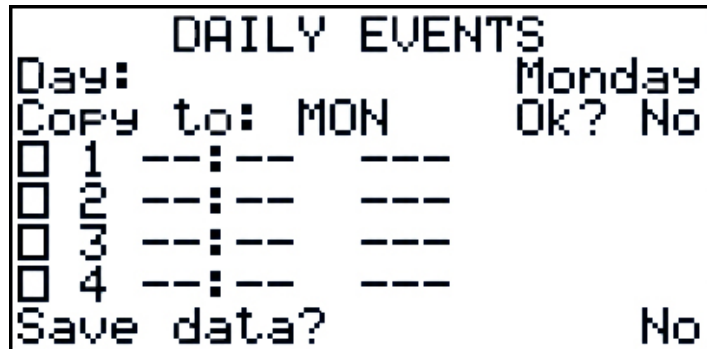
```
TIME/DATE
Date: 05/22/19
Hour: 15:20:53
Day: Wednesday
GMT
Update Time Zone? Off
```

Figure 11

### 2.3.2.2 Daily Events (Figure 12)

This is where each day's events are set. Four settings are possible, which will allow two separate occupancy periods. Check the first box by pressing the **UP** key when the cursor is over the check box. Set the time in 24 hour format and then select 'Occupied' or 'Un-Occupied'. Save this data at the bottom of this screen by selecting 'Yes' and pressing **ENTER**.

Once a day is entered, these settings can be copied to any other day by selecting the day to copy, setting the Copy To: the appropriate day, and then selecting Ok? to 'Yes'. Modify these days as appropriate. To return to the OCCUPANCY SCHEDULE MENU, press the **Esc** key.



```
DAILY EVENTS
Day: Monday
Copy to: MON
Ok? No
[ ] 1 ---:-- ---
[ ] 2 ---:-- ---
[ ] 3 ---:-- ---
[ ] 4 ---:-- ---
Save data? No
```

Figure 12

### 2.3.2.3 Vacation Periods (Figure 13)

The Vacation Period will allow three sets of vacation to keep the dehumidifier 'Occupied' or 'Un-Occupied'. Set the range of days that this will occur, the Start Date and End Date for that holiday. To return to the OCCUPANCY SCHEDULE MENU, press the **Esc** key.

VACATIONS PERIODS			
	Start	End	Status
<input type="checkbox"/>	--/--	--/--	---
<input type="checkbox"/>	--/--	--/--	---
<input type="checkbox"/>	--/--	--/--	---

Figure 13

### 2.3.2.4 Special Days (Figure 14)

Also available are 6 special days where the full day can be set for either 'Occupied' or 'Un-Occupied'.

To return to the OCCUPANCY SCHEDULE MENU, press the **Esc** key.

SPECIAL DAYS		
<input type="checkbox"/>	1	--/--
<input type="checkbox"/>	2	--/--
<input type="checkbox"/>	3	--/--
<input type="checkbox"/>	4	--/--
<input type="checkbox"/>	5	--/--
<input type="checkbox"/>	6	--/--

Figure 14

### 2.3.2.5 Temporary Occupancy (Figure 15)

This screen allows the unit to be manually set to Occupied for a preset amount of time. Press the **ENTER** key and enter the hours you would like the unit to be temporarily in the occupied mode. Press the **ENTER** key again and enter the minutes you would like the unit to be temporarily in the occupied mode. Press the **ENTER** key again and the cursor will begin blinking over the "Set Override" message. Press **UP** and **ENTER** keys to set this override to 'On'. The dehumidifier will now be 'Occupied' for this period of time. When the override expires, the screen will again display Set Override, and the dehumidifier will return to its normal state.

To return to the OCCUPANCY SCHEDULE MENU, press the **Esc** key.

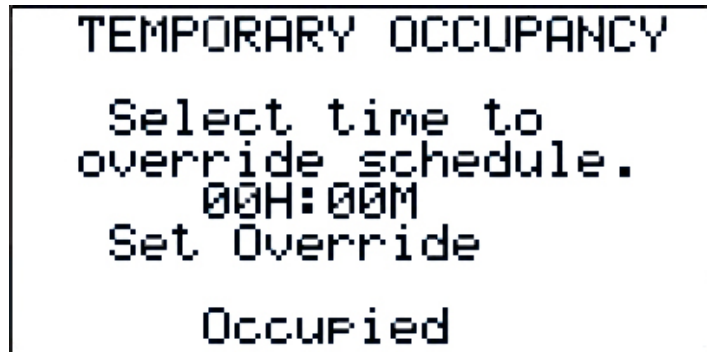


Figure 15

### 2.3.3 Service Menu (Figures 16 and 17)

Selecting the SERVICE MENU will display the Login Screen (Figure 16). Enter the service password, 1234, and press **ENTER**.

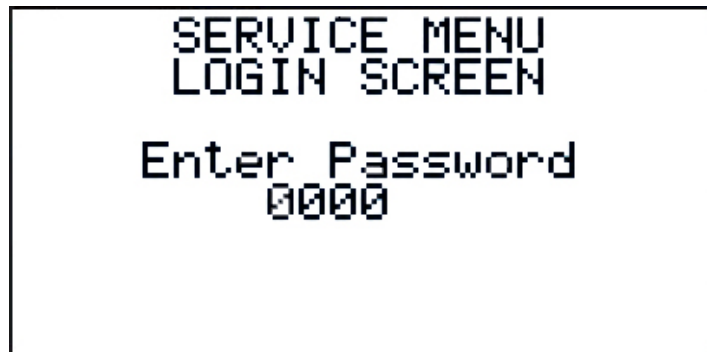


Figure 16

The SERVICE MENU gives access to Commissioning, Tuning, I/O Status, Sensor Offsets and Memory Options. (Figure 17).

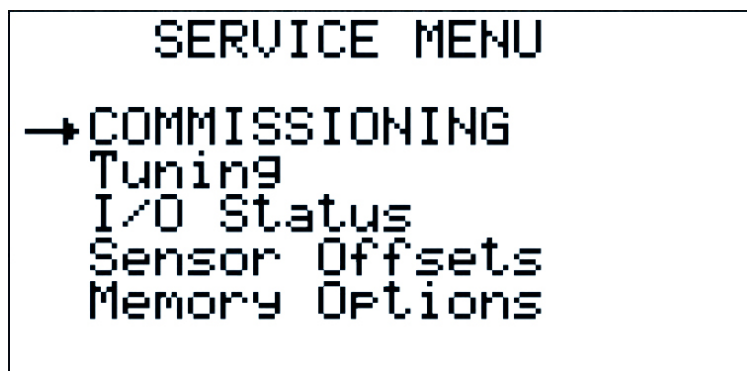


Figure 17



To return to the Unit Revision Screen, press the **Esc** key. The user remains logged in for 30 minutes after the password is entered. During this time, the Login screen reads “Logged In For” and the seconds left before the password expires. To login without entering the password, while this message is shown, press the **Prg** key.

#### 2.3.3.1 Commissioning (Figure 18)

Selecting the COMMISSIONING MENU from the Service Menu displays the COMMISSIONING MENU (Figure 14). This menu allows the operator to select the Configuration, Supply Blower Setup, Exhaust Blower Setup, Airflow Setup and BMS Setup. To return to the Service Menu, press the **Esc** key.

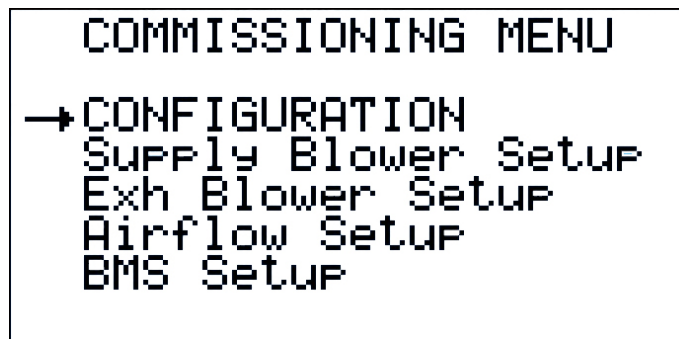


Figure 18

##### 2.3.3.1.1 Configuration (Figure 19)

Selecting the CONFIGURATION from the Commissioning Menu displays the CONDENSER SETTINGS screen (Figure 19). This screen allows the remote condenser to be used for circuits A and B. This screen also allows the settings for the tower and pool flow switches to be modified.

Press the **DOWN** key for the next Configuration screen. To return to the Service Menu, press the **Esc** key.

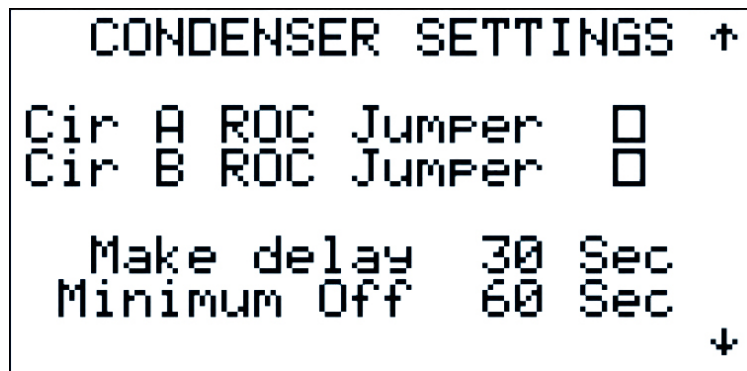


Figure 19

Press the **DOWN** key for the next Configuration screen. To return to the Service Menu, press the **Esc** key.

Pressing the **DOWN** key will display Tower and Pool Pump setup screens (Figure 20 & 21). Note that up to four of these screens are available for Circuit A Tower Pump, Circuit B Tower Pump, Pool 1 Pump and Pool 2 Pump, but only if the appropriate water condensers are provided. If no water condensers have been provided, these screens will NOT be shown. The Pump screens allow modification to the Pump Minimum On and Minimum Off time as well as the allowable delay for making the flow switch. The water flow status is also shown here.

```
CIRCUIT A TOWER  ↑
  WATER PUMP
PUMP A Min On      1 Sec
PUMP A Min Off     1 Sec
Flow Sw Delay    10 Sec
RC Flow Low
                               ↓
```

Figure 20

```
CIRCUIT A POOL  ↑
  WATER PUMP
PUMP A Min On      1 Sec
PUMP A Min Off     1 Sec
Flow Sw Delay    10 Sec
                               ↓
```

Figure 21

Press the **DOWN** key for the next Configuration screen. To return to the Service Menu, press the **Esc** key. The MOVABLE ROOF/WALL screen shown in Figure 22 allow the state of the Roof Switch and BMS point for indication that the Roof or Wall is open. The Force Open State will manually set the Roof Open state from the controller. To determine what the

dehumidifier will do when the Roof is Open, see next screen.

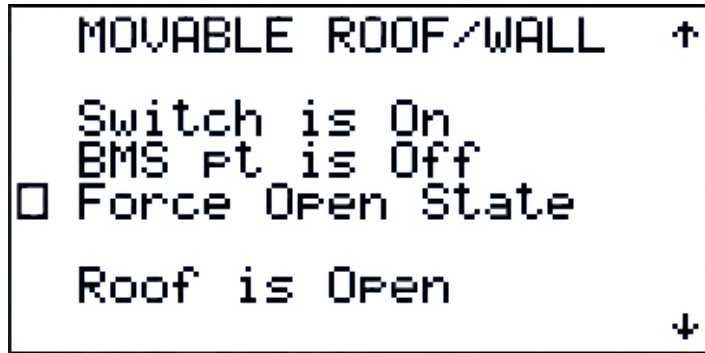


Figure 22

Pressing the **DOWN** key will now display the Action that will be disabled when the roof is open. Check all devices to disable that action when the roof is open.

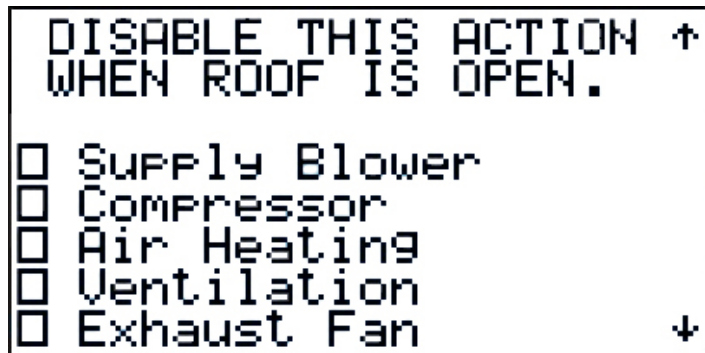


Figure 23

If the Low Exhaust option has been provided, the screen in Figure 24 will be shown. This screen allows the settings for the Low Exhaust VFD speeds in the selected air modes. To return to the Service Menu, press the **Esc** key.

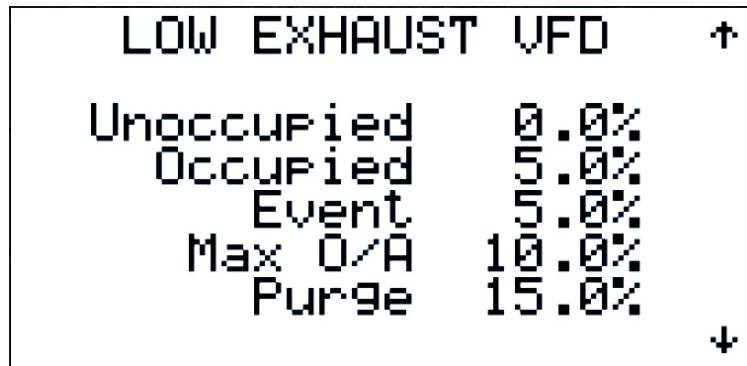


Figure 24

If the Economizer function has been enabled, the screen in Figure 25 will be shown. This screen allows the settings for the Low Limit Band from 0.0 to 20.0. The status of the economizer is shown as well on this screen. Pressing the **Prg** key displays additional information as shown in Figures 26 & 27. This information is used to examine the OA conditions and setpoints used to determine the psychrometric chart segment and PID loop that is in control. Press the **Esc** key to return to Figure 25. Pressing the **DOWN** key will display the screen shown in Figure 28.

```

ECONOMIZER SETTINGS ↑
Low Limit Band  2.2°F
Economizer Active
Press <Prg> for
more data.          ↓
  
```

Figure 25

```

      ECON RH PID      ↑
      OA      LOW LIMIT
DB    45.4°F      25.6°F
RH    62.7%      SETPOINTS
DP    32.0°F      16.4°F
kJ    17.6      57.2
Seg=   4          T      ↓
  
```

Figure 26

```

      ECONOMIZER DATA  ↑
      100.0 % Max OA T
      100.0 % Max OA RH
Economizer Active      ↓
  
```

Figure 27

The screen shown in Figure 28 displays the PID settings for the outside air damper position controlled by the outdoor air temperature. The Kp-Gain, Ki-Int and Kd-Der terms can be modified from this screen. To modify these terms, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the term. The current outdoor air temperature and damper position are shown as well.

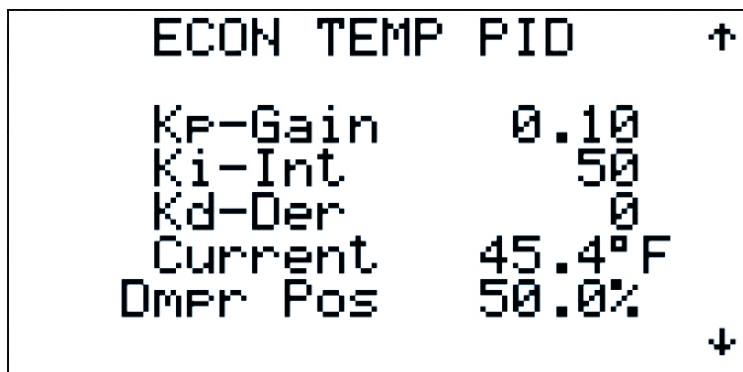


Figure 28

To The screen shown in Figure 29 displays the PID settings for the outside air damper position controlled by the outdoor air relative humidity. The Kp-Gain, Ki-Int and Kd-Der terms can be modified from this screen. To modify these terms, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the term. The current outdoor air relative humidity and damper position are shown as well.

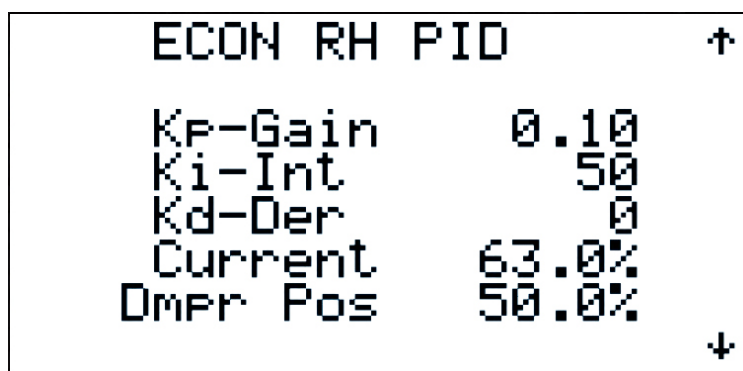


Figure 29

The Press the **DOWN** key for the next Configuration screen. To return to the Service Menu, press the **Esc** key.

#### 2.3.3.1.2 Exhaust Blower Setup (Figure 30)

Selecting the EXHAUST BLOWER SETUP from the Commissioning Menu displays the screen shown in Figure 30. This screen displays the current CFM of the Supply Blowers. The speed of the blower can be placed in manual control from this screen and a manual speed set for troubleshooting.

Press the **DOWN** key for the next Exhaust Blower screen. To return to the Commissioning Menu, press the **Esc** key.

```
SUPPLY BLOWER SETUP↑  
  
Current      7337CFM  
  
Std Airflow  8200CFM  
Std DP Drop  0.390"wc  
  
Altitude    1085ft  ↓
```

Figure 30

#### 2.3.3.1.3 Exhaust Blower Setup (Figure 31)

Selecting the EXHAUST BLOWER SETUP from the Commissioning Menu displays the screen shown in Figure 30. This screen displays the current CFM of the Supply Blowers. The speed of the blower can be placed in manual control from this screen and a manual speed set for troubleshooting.

Press the **DOWN** key for the next Exhaust Blower screen. To return to the Commissioning Menu, press the **Esc** key.

```
EXHAUST BLOWER SETUP↑  
  
Current      0CFM  
Auto Control  
Manual Cmd   0.0%  
Loop Out    100.0%  
  
Altitude    1013ft  ↓
```

Figure 31

Pressing the **DOWN** key will display the screen shown in Figure 32. The maximum exhaust flow rates are set from this screen for each air mode of operation. To modify these settings, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the setting.

Press the **DOWN** key for the next Exhaust Blower screen. To return to the Commissioning Menu, press the **Esc** key.

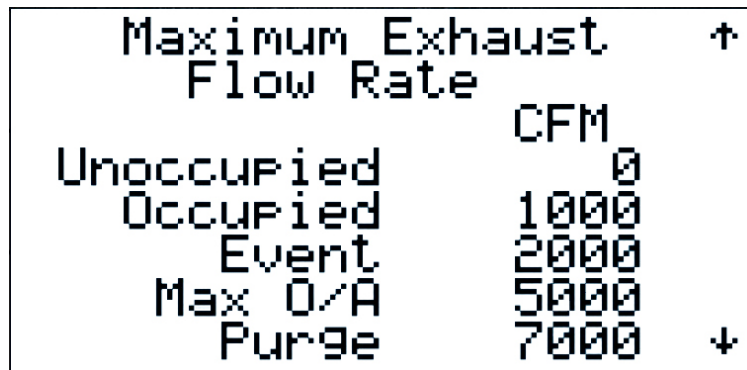


Figure 32

Pressing the **DOWN** key will display the screen shown in Figure 33. The Kp-Gain, Ki-Int and Kd-Der terms for the automatic CFM control can be modified from this screen. To modify these terms, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the term. The Setpoint, current CFM and the speed output are also shown.

Press the **DOWN** key for the next Exhaust Blower screen. To return to the Commissioning Menu, press the **Esc** key.

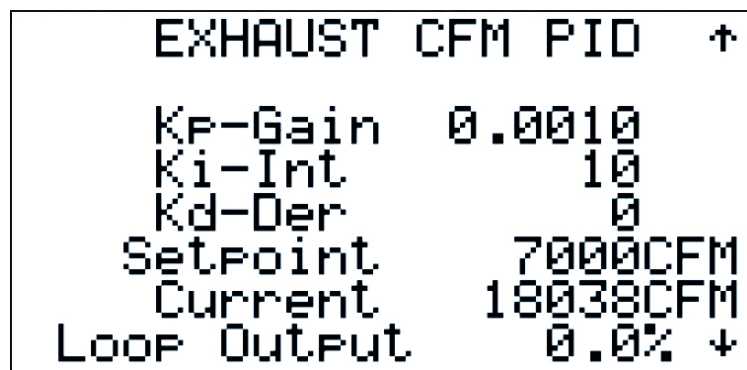


Figure 33

Pressing the **DOWN** key will display the screen shown in Figure 34. The Kp-Gain, Ki-Int and Kd-Der terms for the Zone Pressurization control can be modified from this screen. To modify these terms, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the term. The Setpoint, current pressure and the loop output are also shown.

Press the **DOWN** key for the next Exhaust Blower screen. To return to the Commissioning Menu, press the **Esc** key.

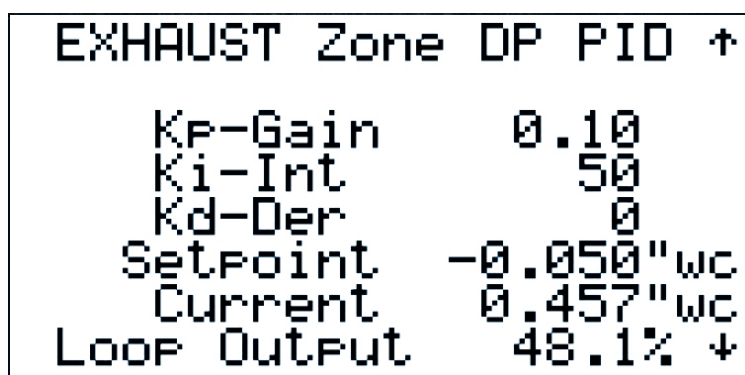


Figure 34

Pressing the **DOWN** key will display the screen shown on Figure 35. This screen is shown for troubleshooting the exhaust blower CFM. The minimum speed setting of the exhaust blower output is set here as well. Set this value in the un-occupied mode to insure no air is leaving the unit.

To return to the Commissioning Menu, press the **Esc** key.

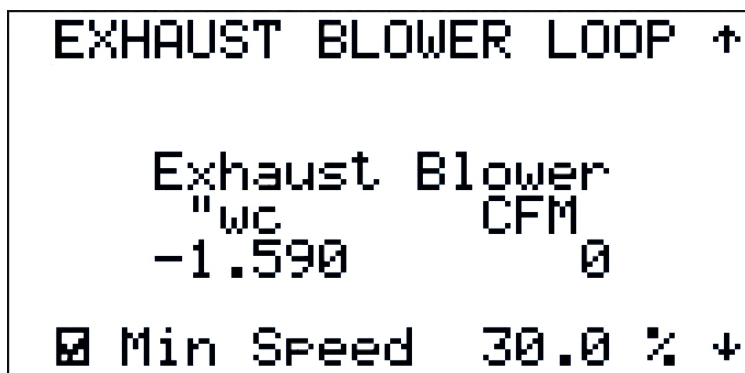


Figure 35



#### 2.3.3.1.4 Airflow Setup (Figure 36)

Selecting the AIRFLOW SETUP from the Commissioning Menu displays the screen shown in Figure 36. This screen allows the entire unit to be turned off. This would typically be used during service on the unit when power is required and the blowers need to be off. Note that this settings is not lost on a power cycle.

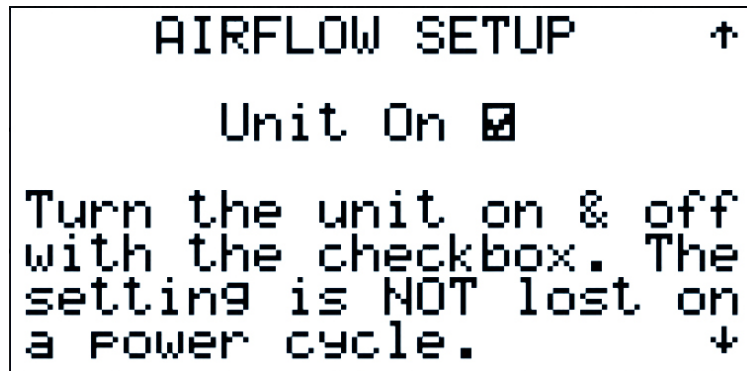


Figure 36

Pressing the **DOWN** key will display the screen shown in Figure 37. The Outdoor Air CFM settings for each air mode are set here. To modify these settings, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the setting.

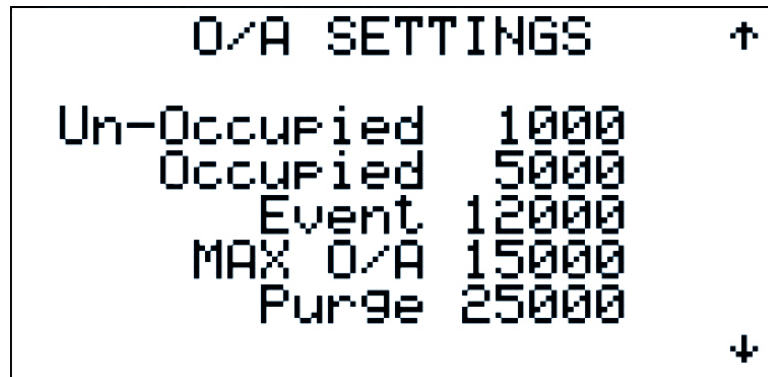


Figure 37

Pressing the **DOWN** key will display the screen shown in Figure 38. The Kp-Gain, Ki-Int and Kd-Der terms for the Outdoor Air Damper control can be modified from this screen. To modify these terms, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the term. The Setpoint, current O/A CFM and the loop output are also shown.

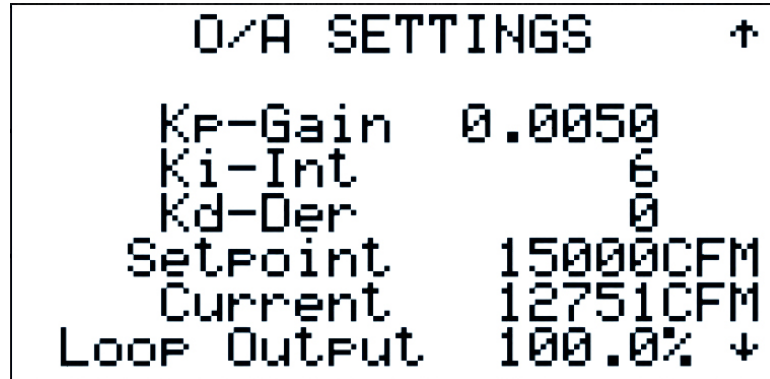


Figure 38

Pressing the **DOWN** key will display the screen shown in Figure 39. The Kp-Gain, Ki-Int and Kd-Der terms for the Warm Exhaust Damper control can be modified from this screen. To modify these terms, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the term. The Setpoint, current pressure drop and the loop output are also shown.

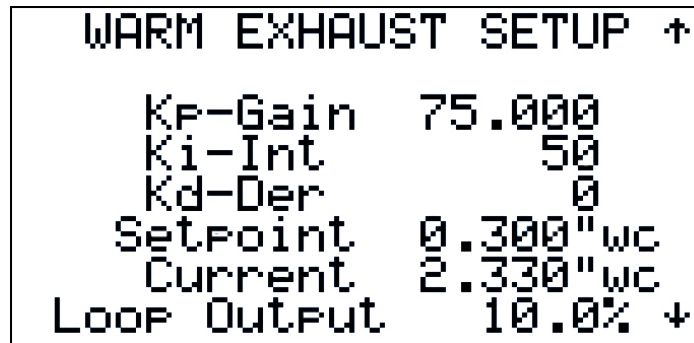


Figure 39

Pressing the **DOWN** key will display the screen shown in Figure 40. The Kp-Gain, Ki-Int and Kd-Der terms for the Cool Exhaust Damper control can be modified from this screen. To modify these terms, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the term. The Setpoint, current pressure drop and the loop output are also shown.

```

COOL EXHAUST SETUP ↑
      KP-Gain  50.000
      Ki-Int   15
      Kd-Der   0
      Setpoint 0.300"wc
      Current  2.321"wc
      Loop Output 0.0% ↓

```

Figure 40

Pressing the **DOWN** key will display the screen shown in Figure 41. This screen allows access to the Air Mode Overrides. Pressing the **Prg** key will display the screen shown in Figure 42 To return to the OCCUPANCY SCHEDULE MENU, press the **Esc** key.

```

AIRFLOW SETUP ↑
For the Overrides and
O/A Perforated Plate
Formulas and settings
press the <Prg> key.
↓

```

Figure 41

To return to the Commissioning Menu, press the **Esc** key.

Selecting the OVERRIDES screen, Figure 48, allows the unit to be placed the Occupied, Event, Max O/A or Purge Modes. This would typically be used during service on the unit or testing of the air modes. Note that these settings are lost on a power cycle, so the unit will return to normal control mode.

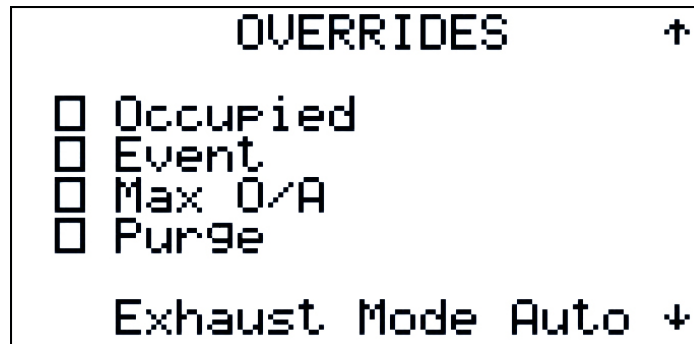


Figure 42

Pressing the **DOWN** key will display the Manual Damper Setup screen shown in Figure 43. To set the damper in Manual mode, change the 'A' to 'M'. Modify the percentage setting to move the actuator. Note that these settings are lost on a power cycle, so the unit will return to normal control mode.

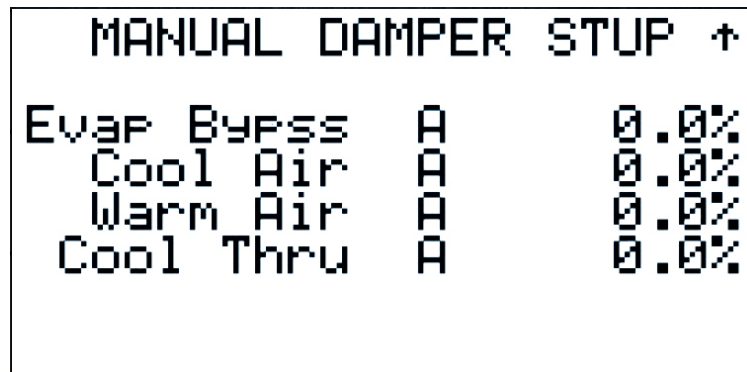


Figure 43

Pressing the **DOWN** key will display the Manual Air Heat Control screen shown in Figure 44. To set the heat in Manual mode, change the 'A' to 'M'. Modify the percentage to set the amount of heat. Note that these settings are lost on a power cycle, so the unit will return to normal control mode.

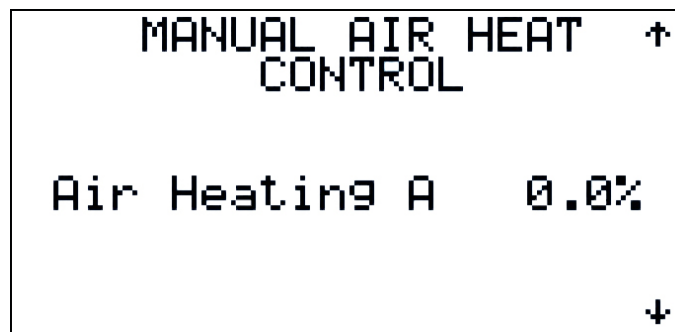
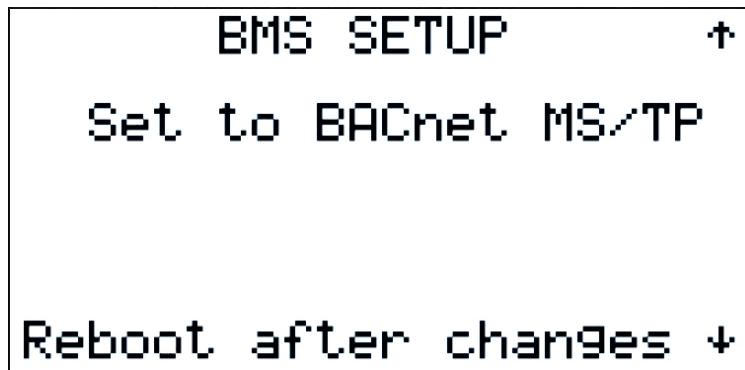


Figure 44

#### 2.3.3.1.5 BMS Setup (Figures 45 thru 52)

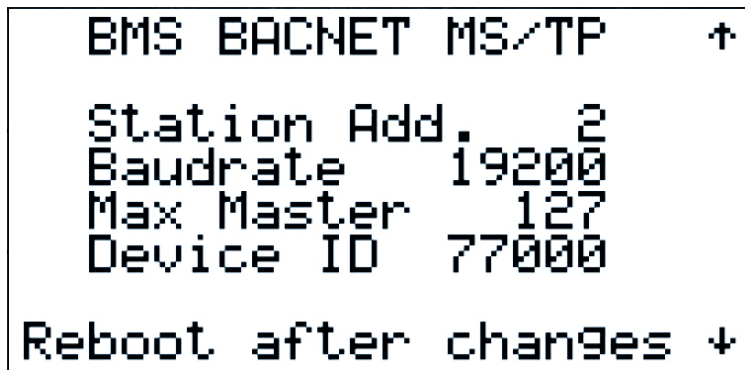
Selecting the BMS SETUP from the Commissioning Menu will display the screen shown in Figure 45. This determines how the J25 serial port can communicate with other equipment. The port can be set to BACnet MS/TP or to Modbus RTU. Making any changes will require a power cycle to have those changes take effect.

A monochrome LCD screen showing the 'BMS SETUP' menu. The text is arranged as follows: 'BMS SETUP' at the top with an up arrow to its right; 'Set to BACnet MS/TP' in the center; and 'Reboot after changes' at the bottom with a down arrow to its right.

```
BMS SETUP ↑  
Set to BACnet MS/TP  
Reboot after changes ↓
```

Figure 45

Pressing the **DOWN** key will display Figure 46. This screen will allow the BACnet data to be set. Making any changes will require a power cycle to have those changes take effect.

A monochrome LCD screen showing the 'BMS BACNET MS/TP' configuration screen. The text is arranged as follows: 'BMS BACNET MS/TP' at the top with an up arrow to its right; four lines of configuration data in the center: 'Station Add. 2', 'Baudrate 19200', 'Max Master 127', and 'Device ID 77000'; and 'Reboot after changes' at the bottom with a down arrow to its right.

```
BMS BACNET MS/TP ↑  
Station Add. 2  
Baudrate 19200  
Max Master 127  
Device ID 77000  
Reboot after changes ↓
```

Figure 46

When the BMS is set for Modbus RTU, pressing the **DOWN** key will display Figure 47. This screen allows the address, baud rate and data parameters for Modbus RTU communication to be set. Making any changes will require a power cycle to have those changes take effect.

```
BMS MODBUS RTU ↑
Address      7
Baudrate    19200
8 Data Bits
Parity NONE
2 Stop Bits
Reboot after changes ↓
```

Figure 47

To set the unit for BACnet IP, serial port J25 must be set to Modbus RTU. This will allow the screen shown in Figure 48 to be displayed. The BACnet License can now be assigned to the Ethernet port, by changing the Modbus TCP/IP to BACnet. Once set, pressing the **DOWN** key will display Figure 49.

```
ETHERNET SETUP ↑
Set to Modbus TCP/IP

Reboot after changes ↓
```

Figure 48

Pressing the **DOWN** key again will display the port setup for BACnet IP. This allows the Device ID and Port to be set.

```
BACnet IP Settings

Device ID    77000
Port        47808
```

Figure 49

Pressing the **DOWN** key again will display the port setup for the ER. This communication to the ER unit is through an RS485 card installed in the BMS port.

```
ER SETUP      ↑
BMS Card Port
Address      4
Baudrate    19200
8 Data Bits
Parity NONE
2 Stop Bits
Reboot after changes ↓
```

Figure 50

Pressing the **DOWN** key will now display the Network Configuration screen, Figure 51. The unit default is DHCP.

```
Network Conf19
DHCP: On
IP: 192.168.1.93
MASK: 255.255.255.0
GW: 192.168.1.14
DNS: 192.168.1.3
Update? No
```

Figure 51

Pressing the **DOWN** key will now display the Network Configuration screen shown in Figure 52. The screen allows for the zone temperature and relative humidity from one unit on the Ethernet subnet to be sent to any other unit on that subnet. The first three octets of the IP address must be the same as well. In order to prevent network faults from shutting down the dehumidifier, DHCP must be turned "Off" and static an IP address must be used. Consult with the facility system administrator for static IP addresses for all dehumidifiers.

The octets in the address are all settable from 000 to 255. Set the octet to the assigned address of the unit with the zone sensor that is to be used. If data is being sent from that unit,

the **\*\* NETWORK FAULT \*\*** display will change to “Data is Being Sent”. Now the bottom line of this screen can be modified from Use “Local Sensor” to Use “Network Sensor”. Adjusting setpoints, dead bands and differentials will now allow the network sensor to control all dehumidifiers on the network.

Note that turning off the Dehumidifier with the network sensor will cause all Dehumidifiers to fault, as the sensor data will not be available. Before turning off the dehumidifier with the network sensor, set all other dehumidifiers to Use “Local Sensor”.

To return to the Commissioning Menu, press the **Esc** key.

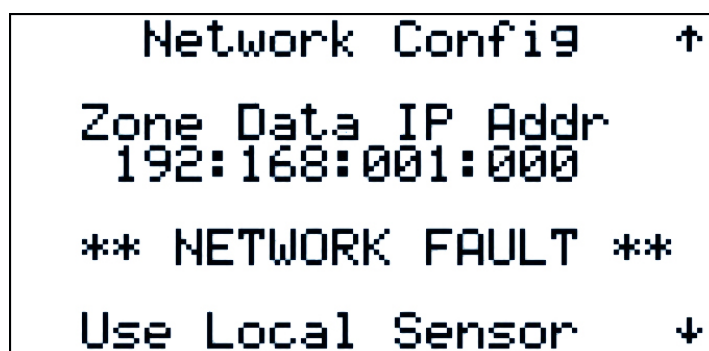


Figure 52

Making any changes to the J25 or Ethernet ports will require a power cycle to have those changes take effect.

While BACnet can be selected for the J25 or Ethernet port, a license file will need to be loaded into the controller in order for BACnet communication to be allowed.

To return to the Commissioning Menu, press the **Esc** key.

#### 2.3.3.2 Tuning – Dead Bands (Figure 53)

Selecting TUNING from the SERVICE MENU displays the DEAD BANDS screen shown in Figure 53. The default settings for the dead bands can be modified on this screen. The Heating Deadband value is subtracted from the Zone Temperature Setpoint from section 2.2. This value is the heating setpoint that enables the aux air heating output. It is also the heating setpoint for the Air Heating PID loop. The Cooling Deadband value is added to the Zone Temperature Setpoint. This value enables the first cooling stage. The Cooling Stage is then added to the first cooling stage value to enable the second



cooling stage. The Dehum Deadband value is added to the Zone RH Setpoint. This value enables the first dehumidification stage. The Dehum Stage is then added to the first dehumidification stage value to enable the second dehumidification stage. The Deadband and stage settings will be useful in multiple unit installations to provide for the more customizable sequence.

Press the **DOWN** key for the next Tuning screen. To return to the Service Menu, press the **Esc** key.

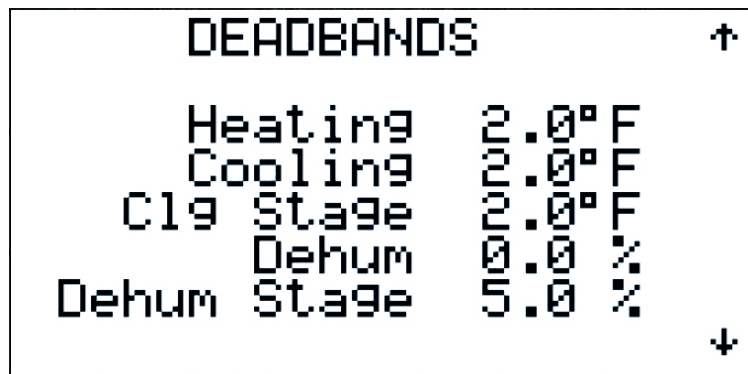


Figure 53

#### 2.3.3.2.1 Tuning - Differentials (Figure 54)

Pressing the **DOWN** key will now display the DIFFERENTIALS screen, shown in Figure 54. This screen shows the Cooling, Heating and Humidity Switch Differentials. This differential is the range between the making and breaking of the switch. The range of the Cooling and Heating Differential is 0.0° F to 9.9° F. The range of the Humidity Differential is 0.0% to 9.9%.

Press the **DOWN** key for the next Tuning screen. To return to the Service Menu, press the **Esc** key.

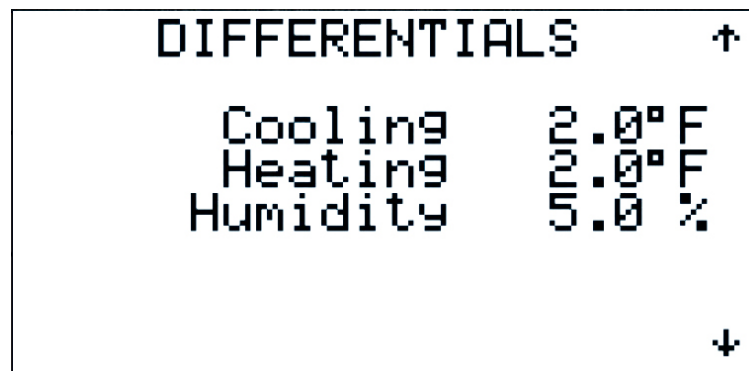


Figure 54

#### 2.3.3.2.2 Tuning – Energy Recovery (Figure 55)

Pressing the **DOWN** key will now display the Energy Recovery Differential and Dead Band. The Low RH Setpoint and Differential are the allowable settings for use of the energy recovery feature. A zone RH below the Low RH Setpoint will disable energy recovery. Press the **DOWN** key for the next Tuning screen. To return to the Service Menu, press the **Esc** key.

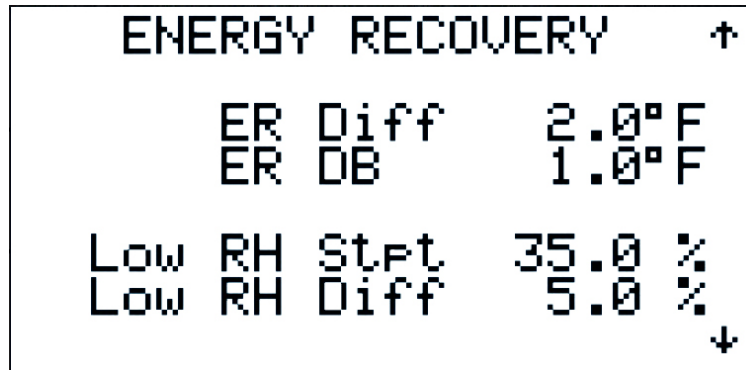


Figure 55

#### 2.3.3.2.3. Tuning – Pool Settings (Figures 56 & 57)

Pressing the **DOWN** key will now display the settings of the optional Pool Heat for Pool 1 or Pool 2, if selected. The differential can be modified here as well as the Stage Deadband for enabling external auxiliary pool heat. The inlet and outlet temperatures are shown here as well.

To return to the Service Menu, press the **Esc** key.

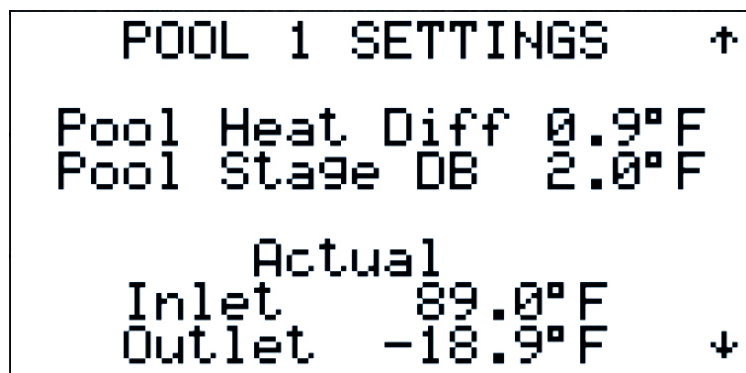


Figure 56

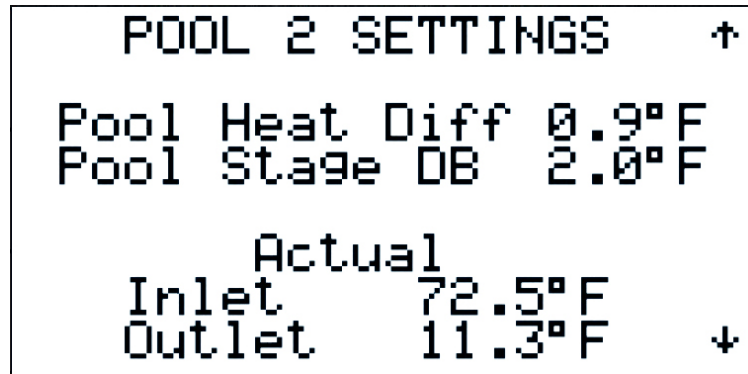


Figure 57

#### 2.3.3.2.4. Tuning – Air Heating (Figures 58 - 61)

Pressing the **DOWN** key will now display the settings shown in Figure 58. This screen will be shown if the modulating heat has been set or not. The status of the heat is shown as well as the heat bypass damper position setting. If Purge has been enabled, the heat setpoint in purge mode is also shown.

To return to the Service Menu, press the **Esc** key.

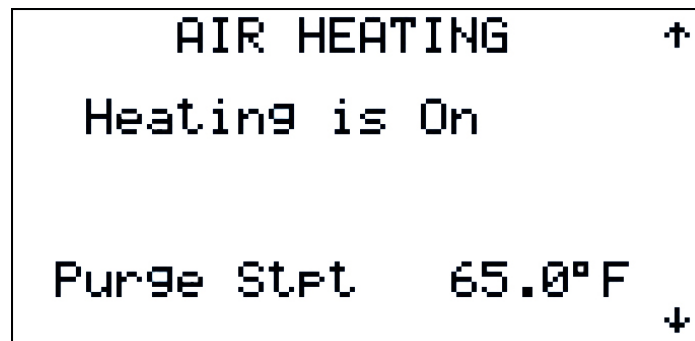


Figure 58

If modulating heat has been enabled, pressing the **DOWN** key will now display the settings shown in Figures 59, 60 and 61.

These settings control the modulating signal. Figure 59 allows inverting the heat signal for water valve operation and varying the heat output from 0-10VDC to 2-10VDC, if desired. Also shown are the settings for the percentage to disable the digital heat contact and the time required for this to occur. Pressing the **DOWN** key will now display the screen shown in Figure 60. This shows the Gain, Integral and Derivative terms, which can be set here, as well as the current zone temperature and command signal output. Pressing the **DOWN** key will now display the screen shown in Figure 60. This shows the zone reset PID and limits settings and the calculated heating setpoint.

To return to the Service Menu, press the **Esc** key.

```

AIR HEATING ↑
□ Invert Heat Command
  Heat Output 0-10VDC

Disable if loop 1.0%
or less for 30 Sec. ↓

```

Figure 59

```

AIR HEAT SETTINGS ↑

  KP-Gain      1.00
  Ki-Int       50
  Kd-Der       1

  Zone Temp    84.0°F
  Heat Cmd     0.0% ↓

```

Figure 60

```

ZONE RESET SETTINGS ↑

  KP-Gain      0.10
  Ki-Int       50
  Kd-Der       1
  Calc Stpt    92.4°F
  High Limit   110.0°F
  Low Limit    75.0°F ↓

```

Figure 61

#### 2.3.3.2.5. Tuning – Outdoor Air Pre-Heating (Figures 62 & 63)

Pressing the **DOWN** key will now display the settings of the Outdoor Air Pre-Heating settings. Figure 61 allows inverting the heat signal for water valve operation and varying the heat output from 0-10VDC to 2-10VDC, if desired. The setpoint and Off Differential are set here as well.

To return to the Service Menu, press the **Esc** key.

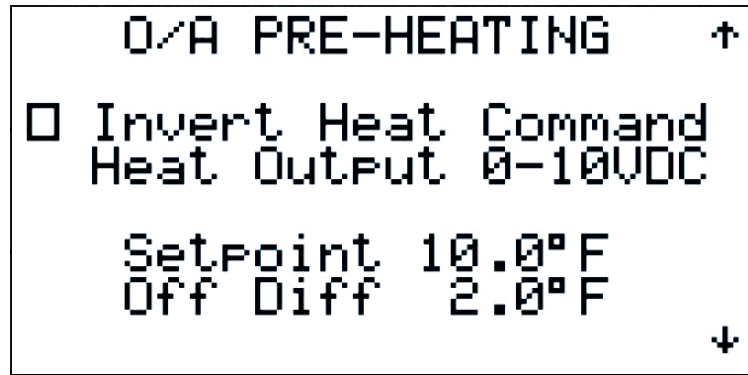


Figure 62

Pressing the **DOWN** key will now display the PID settings of the Outdoor Air Pre-Heating settings. Figure 63 allows modification of the Gain, Integral and Derivative terms. The pre-heat supply temperature and the Loop command output are shown as well.

To return to the Service Menu, press the **Esc** key.

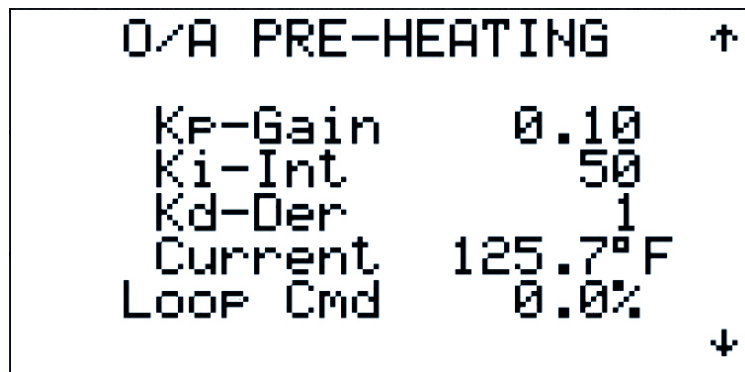


Figure 63

#### 2.3.3.2.6. Tuning – Maximum Outdoor Air (Figure 64)

Pressing the **DOWN** key will now display the settings of the VOC sensor which will activate the Maximum Outdoor Air mode. VOC readings above the Setpoint will enable the Max OA Mode and readings below the setpoint minus the Differential will disable this mode. The current reading of the VOC sensor is shown also.

To return to the Service Menu, press the **Esc** key.

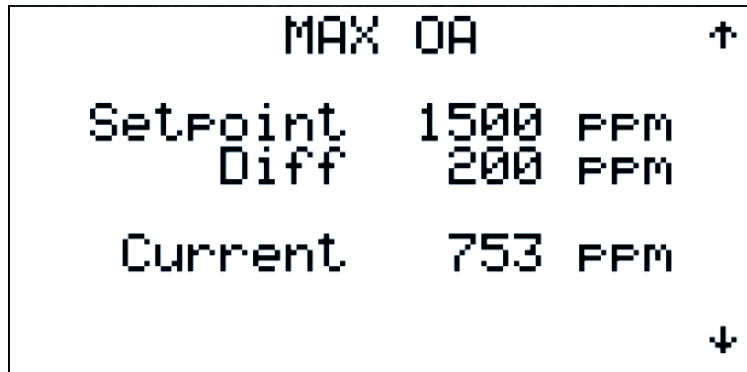


Figure 64

### 2.3.3.3 I/O Status (Figure 65)

Selecting the I/O Status from the SERVICE MENU allow selection of the Digital Inputs, Analog Inputs, Digital Outputs and Analog Outputs. Use the **UP** or **DOWN** key to make a selection and press the **ENTER** key. To return to the SERVICE MENU, press the **Esc** key.

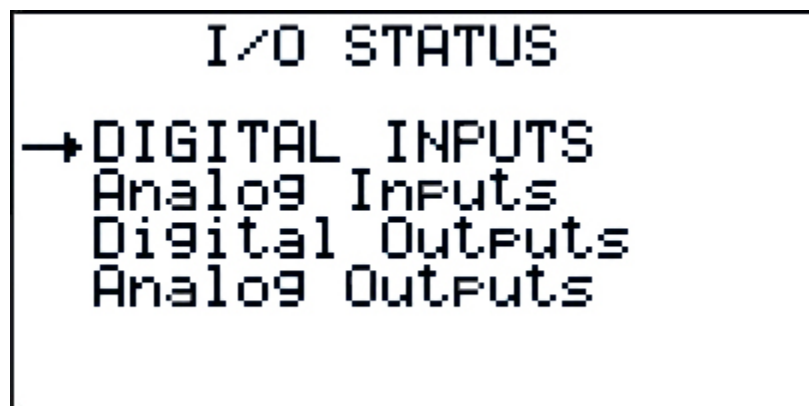


Figure 65

#### 2.3.3.3.1 Digital Inputs (Binary) (Figure 66 - 80)

The Digital Inputs Screen shows the state of the digital contacts used by the control system. The first page shows the state of the contacts wired into ports of the controller. These screens are provided for troubleshooting the control system.

- The first line will show the status of ID2, the roof switch contact - "On" if switch is closed, and "Off" if the switch is open.
- The second line will show the status of ID3, circuit A starter auxiliary contact - "On" if circuit A is on, and "Off" if circuit A is off.
- The third line will show the status of ID4, Circuit B starter auxiliary contact - "On" if Circuit B is on, and "Off" if Circuit B is off.

- The fourth line will show the status ID6 the occupancy contact, “On” for Occupied and “Off” for Un-Occupied.
- The fifth line will show the status of ID7 the Event Mode contact, “On” and “Off”.
- The sixth line will show the status of ID8 the Purge Mode contact, “On” and “Off”.

DIGITAL INPUTS ↑		
Roof Switch	Off	
Circuit A Aux	Off	
Circuit B Aux	Off	
Occupancy	Off	
Event Mode	Off	
Purge Mode	Off	↓

Figure 66

The second page of the Digital Inputs shows the status of the next six contacts wired to the controller.

- The first line will show the status of ID9 the circuit A compressor motor starter over load contacts - “Ok” if no overload is present, and “Flt” if an overload exists.
- The second line will show the status of ID10 the Circuit B compressor motor starter overload contacts - “Ok” if no overload is present, and “Flt” if an overload exists.
- The third line will show the status of ID11 the exhaust blower overload contacts - “Ok” if no overload is present, and “Flt” if an overload exists.
- The fourth line will show the status ID12 the supply blower overload contacts - “Ok” if no overload is present, and “Flt” if an overload exists.
- The fifth line will show the status of ID13 the smoke alarm contact - “Ok” if this contact is made, and “Flt” if this contact is open.
- The sixth line will show the status of ID14 the voltage monitor alarm contact - “Ok” if this contact is made, and “Flt” if this contact is open.

DIGITAL INPUTS ↑			
Compressor A	OL	OK	
Compressor B	OL	OK	
Exhaust Blower	OL	OK	
Supply Blower	OL	OK	
Smoke Alarm		OK	
Voltage Monitor		OK	↓

Figure 67

The third page shows the state of the next six contacts wired into the controller.

- The first line will show the status U9 of address 2 expansion module, the pool 1 flow switch, or jumper, “On” if there is flow, and “Off” if no flow is present.
- The fourth line will show the status of U10 of address 2 expansion module, the pool 2 flow switch, or jumper, “On” if there is flow, and “Off” if no flow is present.
- The third line will show the status of U1 of address 3 expansion module, the Low Exhaust VFD Overload contact - “Ok” if this contact is made, and “Flt” if this contact is open.
- The fourth line will show the status of U9 of address 3 expansion module the tower 1 flow switch, or jumper, “On” if there is flow, and “Off” if no flow is present. voltage monitor alarm contact - “Ok” if this contact is made, and “Flt” if this contact is open.
- The fifth line will show the status of U10 of address 3 expansion module, the tower 2 flow switch, or jumper, “On” if there is flow, and “Off” if no flow is present.
- The sixth line will show the status of DI2 on J29, the optional condensate level switch or switches, - “OK” if the level is low, and “Flt” if the level is high.

DIGITAL INPUTS ↑			
Pool 1	Flow	Off	
Pool 2	Flow	On	
Low Exh	VFD OL	Off	
Tower A	Flow	Off	
Tower B	Flow	Off	
Condensate Sw		OK	↓

Figure 68



### 2.3.3.3.2 Analog Inputs (Figures 69 thru 77)

The Analog Inputs Screens shows the state of the sensors used by the control system. The first page shows the zone sensor and outdoor air sensor RH and Temperature conditions. Note that these sensors are communicating devices wired to serial port J26. Also shown is the supply air temperature sensor.

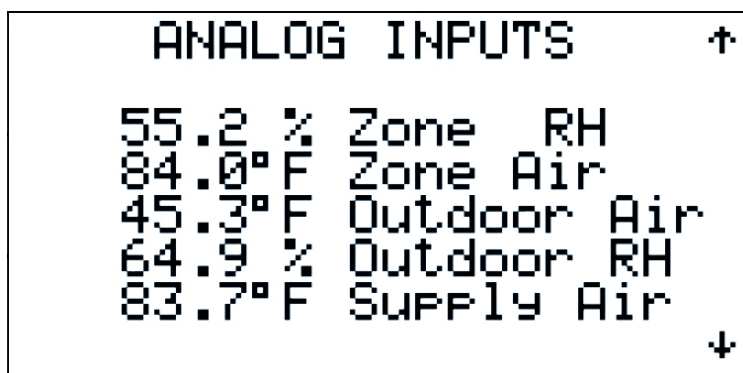


Figure 69

The second page shows the readings of the suction pressure and temperature sensors, the calculated P2T value of the suction pressure sensor, the superheat and the discharge pressure sensor values of circuit A.

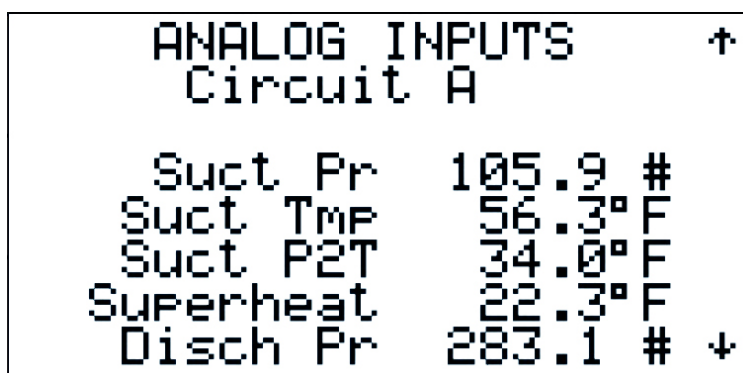


Figure 70

The third page shows the readings of the liquid pressure and temperature sensors, the calculated P2T value of the liquid pressure sensor and the Subcooling values of circuit A.

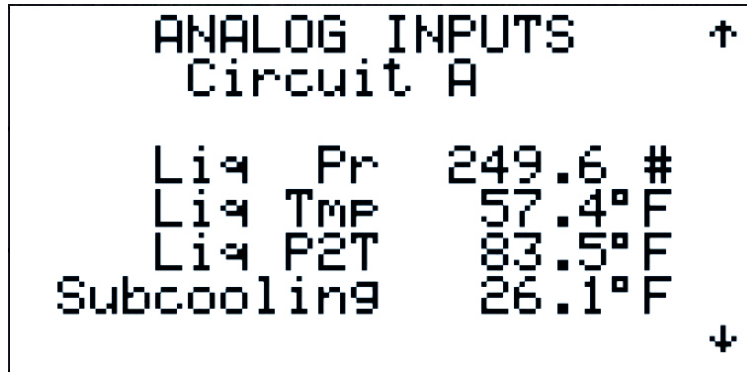


Figure 71

To The fourth page shows the readings of the suction pressure and temperature sensors, the calculated P2T value of the suction pressure sensor, the superheat and the discharge pressure sensor values of Circuit B.

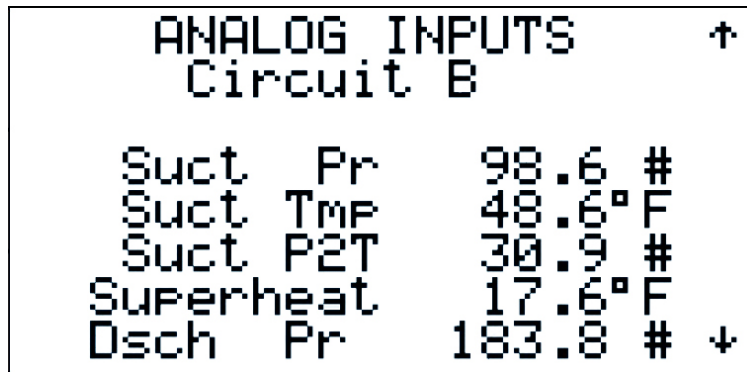


Figure 72

The fifth page shows the readings of the liquid pressure and temperature sensors, the calculated P2T value of the liquid pressure sensor and the Subcooling values of Circuit B.

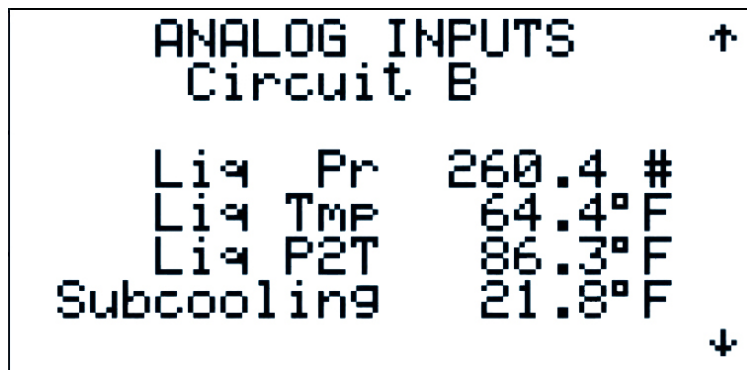


Figure 73

The sixth page shows the readings of the air pressure differential sensors as shown.

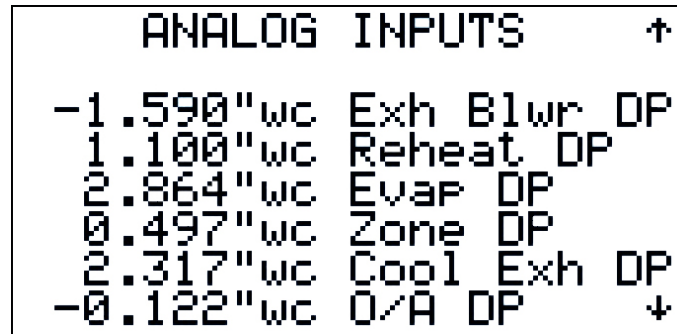


Figure 74

The seventh page shows the readings of the optional sensors, including the pool temperature sensors, VOC sensor and the Outdoor Air Pre-Heat temperature sensor.

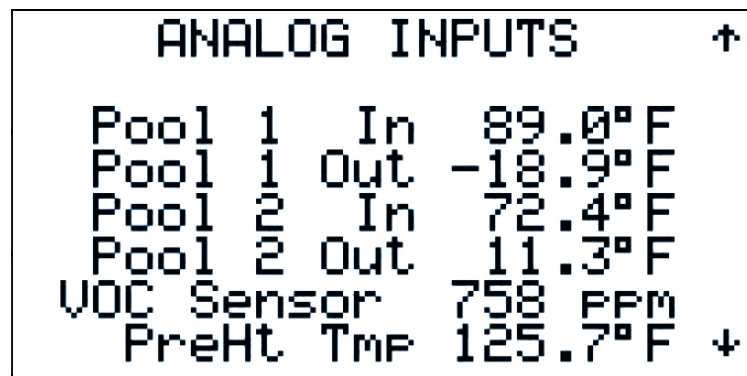


Figure 75

The eighth page shows the readings of the optional freeze protection sensor.

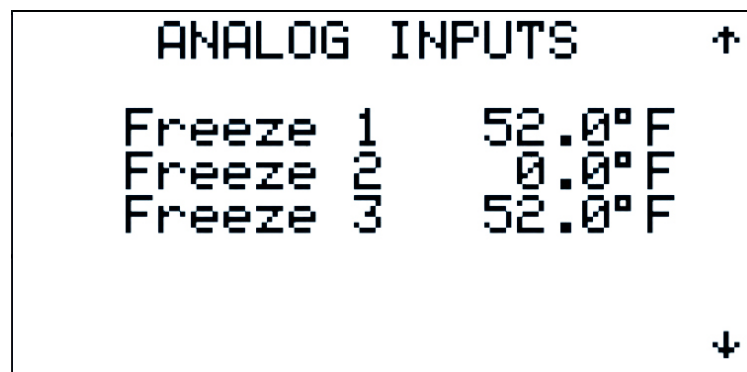


Figure 76

The ninth page shows the readings of optional air pressure differential sensors for Return Air and Outdoor Air filter sensing.

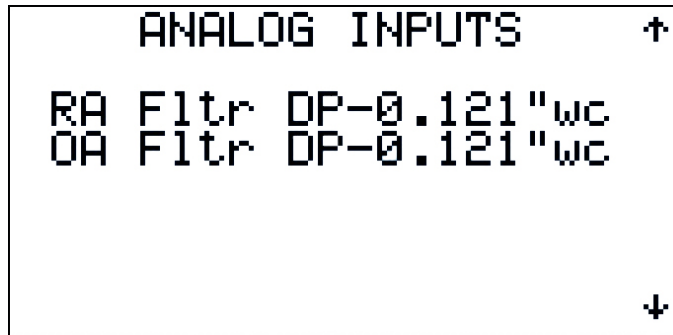


Figure 77

To return to the I/O STATUS screen, press the **Esc** key.

#### 2.3.3.3.3 Digital Outputs (Binary) (Figures 78 - 81)

The Digital Outputs Screens shows the state of the devices turned on and off by the control system. The first page shows the state of the first six outputs.

- The first line will show the status of NO1, Circuit A Lead Compressor contact, "On" and "Off".
- The second line will show the status of NO2, Circuit A Lag Compressor contact, "On" and "Off".
- The third line will show the status of NO3, Circuit A 1Sol contact, "On" and "Off".
- The fourth line will show the status of NO4, Circuit B Lead Compressor contact, "On" and "Off".
- The fifth line will show the status of NO5, Circuit B Lag Compressor contact, "On" and "Off".
- The sixth line will show the status of NO6, Circuit B 1Sol contact, "On" and "Off".

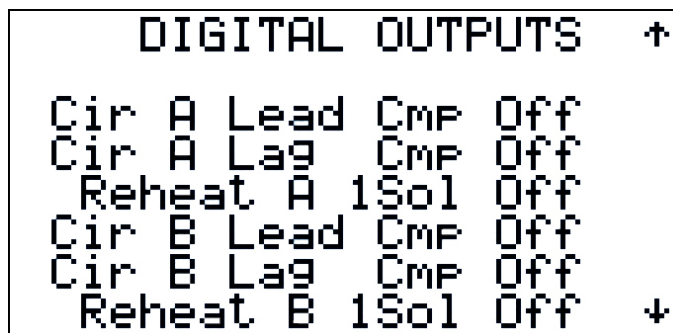


Figure 78

The second page shows the state of the next five output contacts.

- The first line will show the status of NO7, the External Exhaust contact, “On” and “Off”.
- The second line will show the status of NO8, the Alarm contact, “On” and “Off”.
- The third line will show the status of NO9, the Circuit A Water Solenoid, 4SOL, contact, “On” and “Off”.
- The fourth line will show the status of NO10, the Circuit B Water Solenoid, 4SOL, contact, “On” and “Off”.
- The fifth line will show the status of NO12, the Supply Blower Enable contact, “On” and “Off”.
- The sixth line will show the status of NO13, the optional Outdoor Air Perforated Plate Damper, “On” and “Off”.

DIGITAL OUTPUTS				+
External Exh	On			
	Alarm	On		
Water A 4SOL	Off			
Water B 4SOL	Off			
Supply Blower	On			
				+

Figure 79

The third page shows the state of the next five output contacts of expansion module address 2.

- The first line will show the status of NO1, the Auxiliary Pool 1 Heater contact, “On” and “Off”.
- The second line will show the status of NO2, Auxiliary Pool 2 Heater contact, “On” and “Off”.
- The third line will show the status of NO3, the Tower A Pump contact, “On” and “Off”.
- The fourth line will show the status of NO4, the Tower B Pump contact, “On” and “Off”.
- The fifth line will show the status of NO6, the air heater contact, “On” and “Off”.

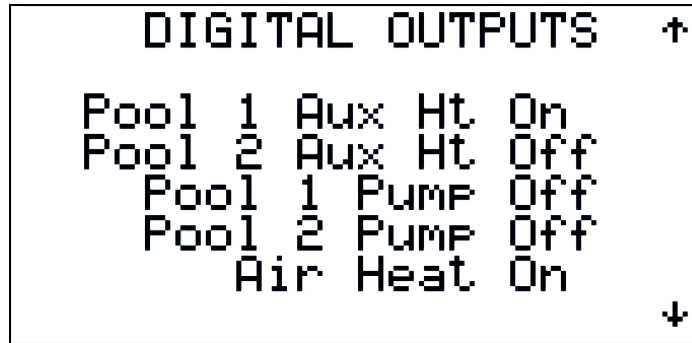


Figure 80

The fourth page shows the state of the next five output contacts of expansion module address 3.

- The first line will show the status of NO1, the Enable Low Exhaust VFD contact, “On” and “Off”.
- The second line will show the status of NO3, the Circuit A Tower Pump contact, “On” and “Off”.
- The third line will show the status of NO4, the Circuit B Tower Pump contact, “On” and “Off”.
- The fourth line will show the status of NO6, the Outdoor Air Pre-Heat contact, “On” and “Off”.

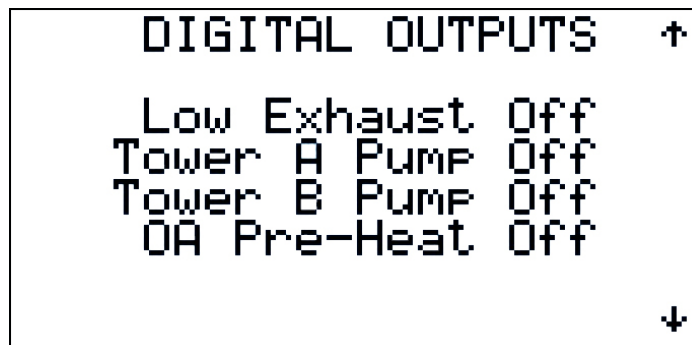


Figure 81

To return to the I/O STATUS screen, press the **Esc** key.

#### 2.3.3.3.4 Analog Outputs (Figures 82 - 83)

The Analog Outputs Screens shows the state of the devices turned on and off by the 0-10VDC Outputs of the control system. The first page shows the state of the first four outputs.

- Evap Bypass Damper Command
- Cool Exhaust Damper Command
- Warm Exhaust Damper Command
- Outdoor Air Damper Command

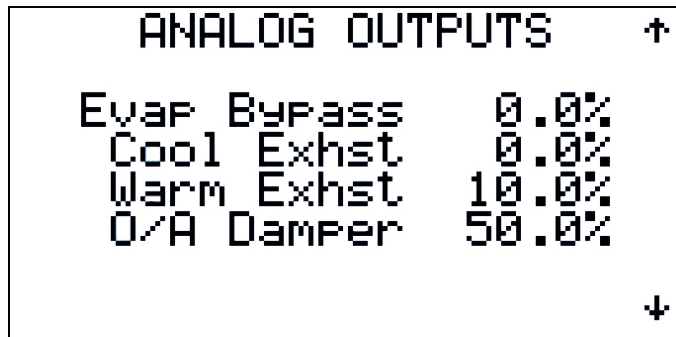


Figure 82

The second page shows the state of the next four outputs.

- Air Heat Modulating Command
- Exhaust Blower Speed Command
- Outdoor Air Bypass Damper Command
- Air Heat Modulating Command

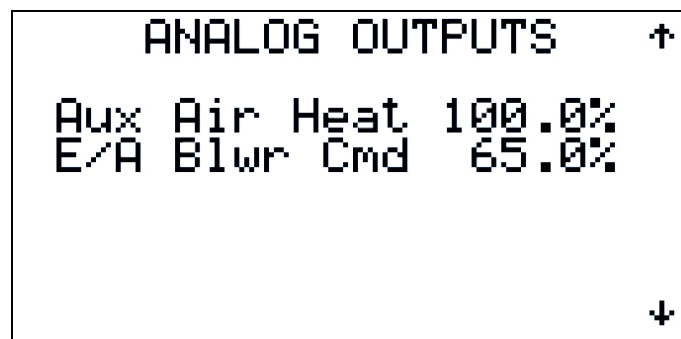


Figure 83

The third page shows the state of the last four outputs.

- Gas Heat Damper Command
- Condenser Fan Speed Command
- Optional Low Exhaust VFD Speed Command
- Optional Outdoor Air Pre-Heat Command

To return to the I/O STATUS screen, press the **Esc** key.

#### 2.3.3.4 Sensor Offsets (Figures 84 - 91)

These screens allow the control values of the analog input points to be adjusted if calibration shows these devices to be inaccurate. The range of these most of these offsets is from -99.99 to 99.99. Care must be used when applying an offset to an analog value as erratic operation can result. To modify the offsets, press the **ENTER** key until the desired offset is selected and use the arrow keys until the desired setting is shown. Press the **ENTER** key to accept the offset value.

SENSOR OFFSETS			↑
Zone	RH	0.00	
Zone	TMF	0.00	
O/A	RH	0.00	
O/A	TMF	0.00	
S/A	TMF	0.00	
			↓

Figure 84

SENSOR OFFSETS			↑
Circuit A			
Suct	Pr	0.00	
Suct	TMF	0.00	
Disch	Pr	0.00	
Liq	Pr	0.00	
Liq	TMF	0.00	
			↓

Figure 85

SENSOR OFFSETS			↑
Circuit B			
Suct	Pr	0.00	
Suct	TMF	0.00	
Disch	Pr	0.00	
Liq	Pr	0.00	
Liq	TMF	0.00	
			↓

Figure 86



SENSOR OFFSETS				↑
Reheat	DP	0.000		
Exh Blwr	DP	0.00		
				↓

Figure 87

SENSOR OFFSETS				↑
	Evap	DP	0.000	
	Zone	DP	0.000	
Cool	Exh	DP	0.000	
	O/A	DP	0.000	
				↓

Figure 88

SENSOR OFFSETS				↑
Pool 1	In	0.00		
Pool 1	Out	0.00		
Pool 2	In	0.00		
Pool 2	Out	0.00		
				↓

Figure 89

SENSOR OFFSETS				↑
Freeze	Tmp1	0.00		
Freeze	Tmp2	0.00		
Freeze	Tmp3	0.00		
				↓

Figure 90

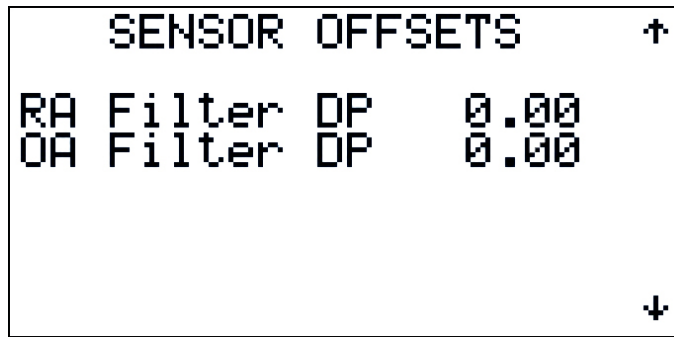


Figure 91

To return to the SERVICE MENU, press the **Esc** key.

### 2.3.3.5 Memory Options (Figures 92 - 94)

These screens allow the logging files to be written to a portion of the internal memory space on the controller or a USB Pen Drive. To use, select the memory to write to, if USB Pen Drive, insert a USB Pen Drive and, with the cursor over the 'Press UP to Write' field, press the **UP** key. Wait for the screen to say "Completed" before removing the drive. This may take a few minutes. The files written are the Alarm Log.csv and the Data Log.csv. Both of this can be opened in Excel. The Alarm Log takes a snapshot of the conditions whenever an Alarm is triggered. The Data Log records values every minute of operation for the past month.

The second and third screens allow for the file Setpoint.txt to either be saved or loaded. After the dehumidifier has been commissioned and is stable, saving the setpoints allows for these to be reloaded if anything happens to the controller. To use, select the memory to write to, if USB Pen Drive, insert a USB Pen Drive and, with the cursor over the 'Press UP to Import' or 'Press UP to Export' field, press the **UP** key. Wait for the screen to say "Completed" before removing the drive.

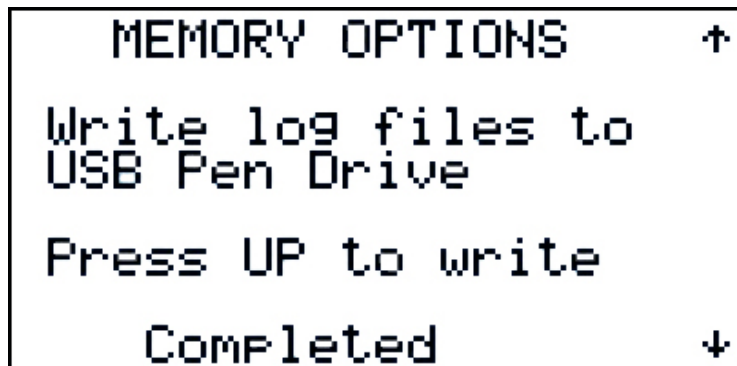


Figure 92

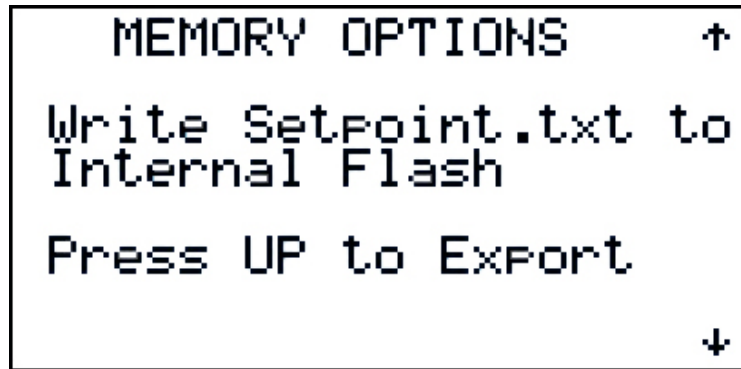


Figure 93

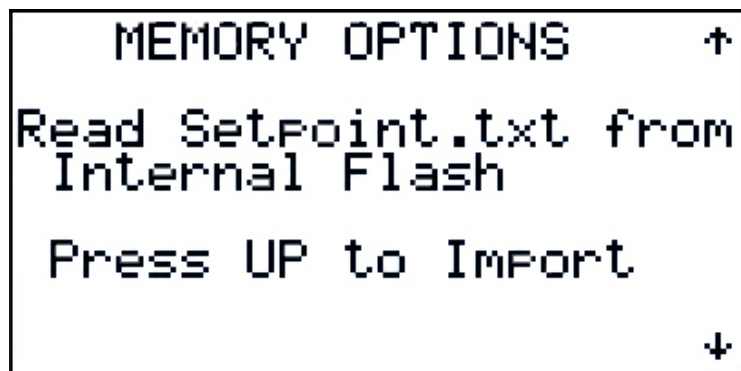


Figure 94

To return to the SERVICE MENU, press the **Esc** key.

#### 2.3.4 Unit Revision (Figure 95)

The Unit Revision Screen shows the version of the application program that is running along with the release date of the software. This information should be passed to Desert Aire in the event a service call is necessary.

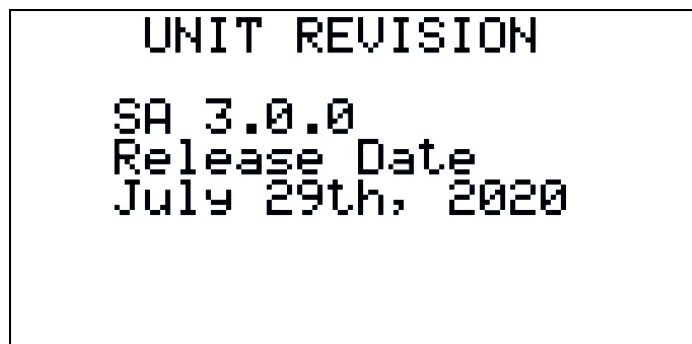
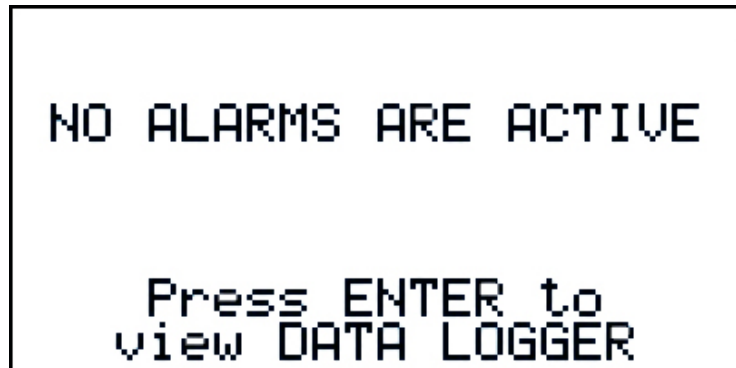


Figure 95

### 3.0 Alarm Menu

To view the alarms from any menu, simply press the **ALARM** key. If no alarms are active, the display will state **NO ALARMS ARE ACTIVE**. See Figure 96.

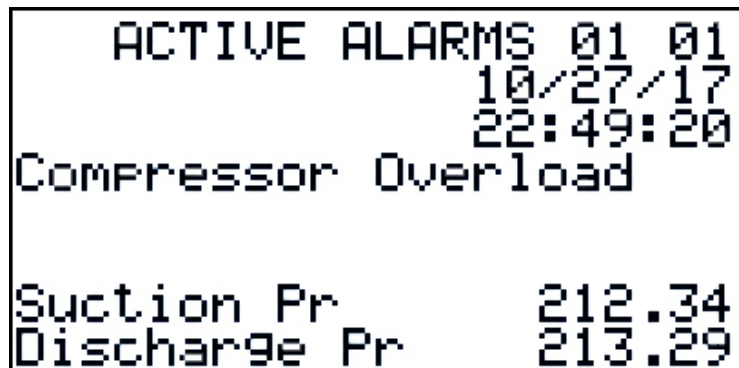


```
NO ALARMS ARE ACTIVE

Press ENTER to
view DATA LOGGER
```

Figure 96

When an alarm is triggered, the red LED behind the **ALARM** key will light and will remain on until the alarm is reset. If an alarm is present, pressing the **ALARM** key will display a screen similar to Figure 106. The triggered alarm will be displayed along with the time and date. The bottom lines will display two pertinent data point values when the alarm occurred.

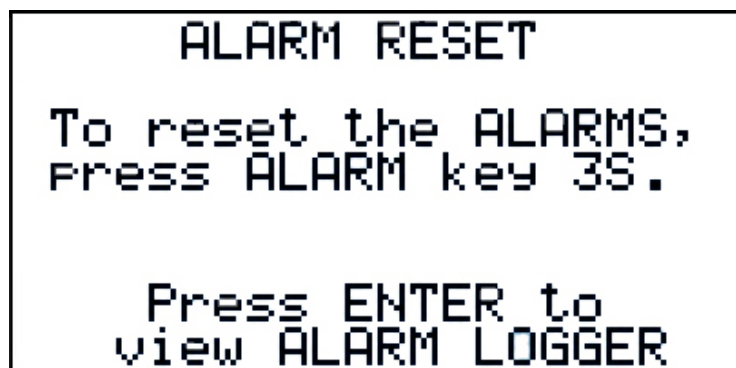


```
ACTIVE ALARMS 01 01
                  10/27/17
                  22:49:20
Compressor Overload

Suction Pr      212.34
Discharge Pr    213.29
```

Figure 97

To reset the alarm, use the **DOWN** key until the reset instructions are shown. See Figure 98. Pressing the **ALARM** key for three seconds will reset all active alarms.



```
ALARM RESET

To reset the ALARMS,
Press ALARM key 3S.

Press ENTER to
view ALARM LOGGER
```

Figure 98

Alarms are either Automatic Reset or Manual Reset. Automatic Reset Alarms are alarms that can occur and be reset without any action by the operator. Manual reset alarms require an operator action to reset the alarm. For system alarms, listed below, the red Alarm LED will remain illuminated until acknowledged to alert the operator the alarm occurred. For EEV alarms, listed below, the alarm is Automatic Reset and provided to display information of the valve driver but do not affect operation of the unit. The red Alarm LED will be turned off when the EEV alarm clears, without action by the operator.

To return to the home screen, press the **Esc** button.

### 3.1 System Alarms

The system alarms include low suction pressure, multiple suction pressure shutdowns, high discharge pressure, zone and o/a sensor fault, motor overloads, VFD faults, smoke alarm, expansion I/O Module communication loss, low voltage, clogged filter, freeze protection and high condensate level. The red ALARM LED on the display will stay lit until the alarm is reset.

### 3.2 EEV Alarms

The EEV alarms are automatically generated from the addition of the EEV control. These alarms do not affect the operation of the unit and are shown for informational troubleshooting only. These include EVD Offline, Low SH A, Low SH B, LOP A, LOP B, MOP A, MOP B, EEV A, EEV B, Low Suction A, Low Suction B, Hi T Cond, S1, S2, S3, S4, Battery, EEPROM, Incomplete Closing, Emergency Closing, FW Compatible Err, Config Err, Retain and Error Retain Write. The red ALARM LED on the display will stay lit until the alarm is cleared internally.

### 3.3 Alarm Log (Figure 99)

The Alarm Data Logger Screen is accessible from the Alarm Reset screen (See Figure 99) by pressing the **ENTER** key. This screen shows records of the alarm log. The bottom two lines will show the pertinent data that was recorded when the alarm occurred. Use the **UP** and **DOWN** keys to view other records.

To return to the home screen, press the **Esc** button.

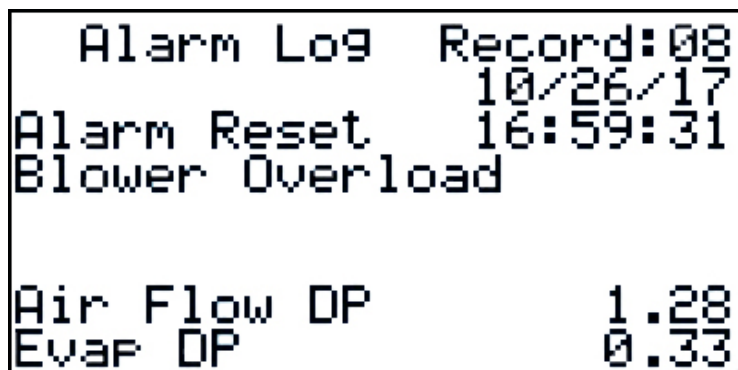


Figure 99

## 4 Hardware Details

### 4.1 Programmable Controller

The programmable controller is preprogrammed by Desert Aire for the control of your unit. The Desert Aire replacement part number for this controller is available by calling our service department.

### 4.2 Suction Pressure Transducers

The Suction Pressure Transducer is a 0.5 - 4.5 VDC to 0 - 250 psig ratio metric device. The body is brass with a ¼ SAE female refrigerant connection. This transducer must be supplied with 4.5 to 5.5 VDC power. A display reading of 0.0 psig for the transducer indicates the device is disconnected or defective. For this device to function, 5.0 VDC must be present from the black to green wires on the transducer. To verify the output of the transducer, measure the DC voltage (should read between 0.5 to 4.5 VDC) from the white to green wires on the transducer and use this voltage in the following formula to determine the pressure (0-250 psig).

$$\text{Pressure (psig)} = (62.5)(V) - 31.25$$

Example, if  $V = 2.50$  VDC, then;

$$\begin{aligned}\text{Pressure (psig)} &= (62.5)(2.50) - 31.25 \\ &= 156.25 - 31.25 \\ &= 125 \text{ psig.}\end{aligned}$$

The Suction Pressure Transducer's replacement part number is available from Desert Aire by calling our service department.

### 4.3 Discharge & Liquid Pressure Transducers

The Discharge & Liquid Pressure Transducers are 0.5 - 4.5 VDC to 0 - 652 psig ratio metric devices. The body is brass with a ¼ SAE female refrigerant connection. This transducer must be supplied with 4.5 to 5.5 VDC power. A display reading of 0.0 psig for the transducer indicates the device is disconnected or defective. For this device to function, 5.0 VDC must be present from the black to green wires on the transducer. To verify the output of the transducer, measure the DC voltage (should read between 0.5 to 4.5 VDC) from the white to green wires on the transducer and use this voltage in the following formula to determine the pressure (0-652psig).

$$\text{Pressure (psig)} = (163)(V) - 81.5$$

Example, if  $V = 2.50$  VDC, then;

$$\begin{aligned}\text{Pressure (psig)} &= (163)(2.50) - 81.5 \\ &= 407.5 - 81.5 \\ &= 326 \text{ psig.}\end{aligned}$$

The Desert Aire replacement part number for the Discharge or Liquid Pressure Transducer is available by calling our service department.

#### **4.4 Suction, Liquid, Pool & Supply Air Temperature Sensors**

These temperature sensors are a resistive NTC Bulb type device with a 10 foot cable. The temperature range is -58.0° to 212.0° F and the environmental rating is IP67. The failure mode of this device will display a reading of -623.3° F if the sensor is open, and display a reading of 687.3° F if the sensor is shorted. The Desert Aire replacement part number for the Supply Air Temperature Sensor is available by calling our service department.

#### **4.5 Zone and Outdoor Air Temperature and Relative Humidity Sensors**

This sensor is a communicating device which sends Modbus data out from address 190 for the Zone sensor and address 191 for the Outdoor Air sensor. If communication is lost from these devices, an alarm is activated. The Desert Aire replacement part number for these sensors is available by calling our service department.

#### **4.6 Differential Air Pressure Sensors**

These sensors have multiple ranges, which vary from -1.00"wc to 1.00"wc, 0.0"wc to 2.0"wc, 0.0"wc to 10.0"wc and 0.0"wc to 25.0"wc, depending on the application. The output of this device is a 0.25 VDC at the low end and 4 VDC at the high end. The Desert Aire replacement part number is available by calling our service department and noting the range of the device.

## **APPENDIX**

### **5.1 Internal Web Page**

The programmable controller is preprogrammed by Desert Aire to include a web page allowing a virtual remote display to be used from any node on the facilities computer network. Simply attach an Ethernet cable from your facilities computer network to the RJ45 port of the controller. Always check with your IT department before connecting this device to your network.

The Ethernet port of the controller has a factory default of DHCP for the TCP/IP address. To obtain the current address, see section **2.3.3.1.5** for the Ethernet port setup, Figure 50. A static TCP/IP address can be set from this screen. Refer to your IT department to obtain a static TCP/IP address. Browse to the IP address assigned to the dehumidifier, enter the appropriate credentials, [user – Desert-Aire, password – 18485] and select the DISPLAY tab. Logging is also available from this web page. Wait a few moments for initialization and use your mouse to click the keys. Key combinations are define on the bottom of this web page.



**OPTIMIZING SOLUTIONS THROUGH SUPERIOR DEHUMIDIFICATION TECHNOLOGY**

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