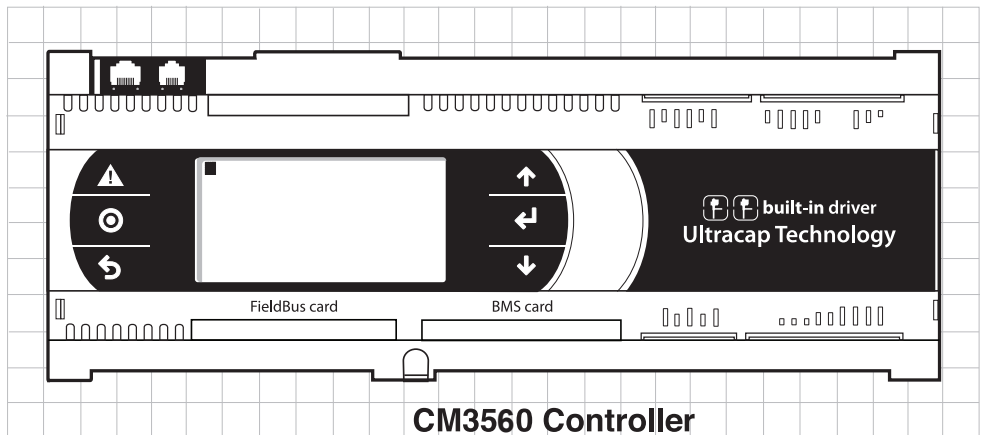




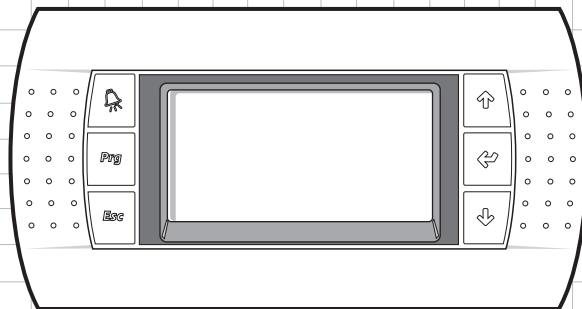
CM3560 Series Controller

Installation and Operation Manual for SP Units

- Monitoring of zone temperature and RH
- Real-time monitoring and control of airflow
- Optional VOC sensor control of ventilation air
- Low exhaust fan control
- Economizer capability
- Cloud-based logging, alarms, and control when used with AireGuard™



CM3560 Controller



**Optional CM3560 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
FAX: (262) 946-7401
E-MAIL: 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

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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 CM3560 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 CM3560 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 CM3560 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 CM3560 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 Sensor Installation

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 CM3560 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 CM3560 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 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 installed between the heater and the control enclosure. 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 CM3560 Controller Overview

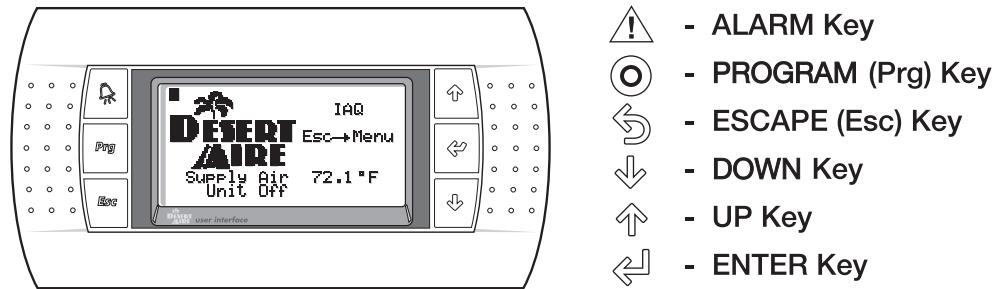
Desert Aire’s CM3560 microprocessor controller is a powerful, flexible controller with many useful features including:

- 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 an occupied state.
- A convenient, easy-to-understand display interface which allows the operator to view and change setpoints and time schedules.

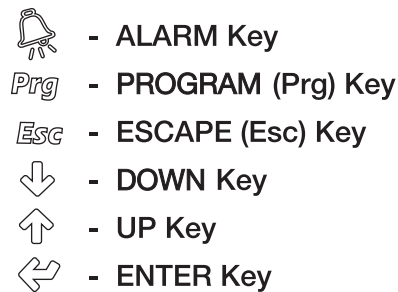
2 Controller Details

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.

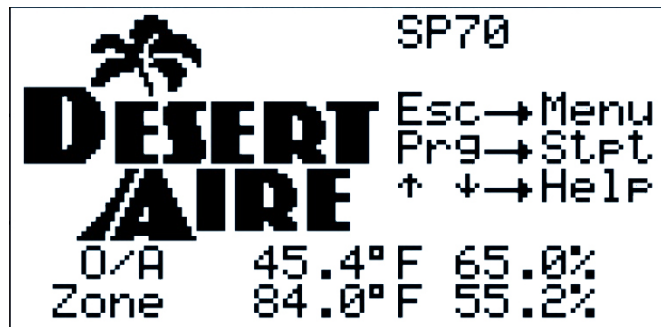


Figure 1

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.

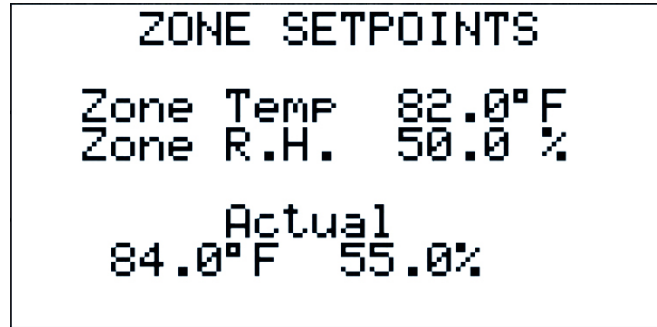


Figure 2

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.

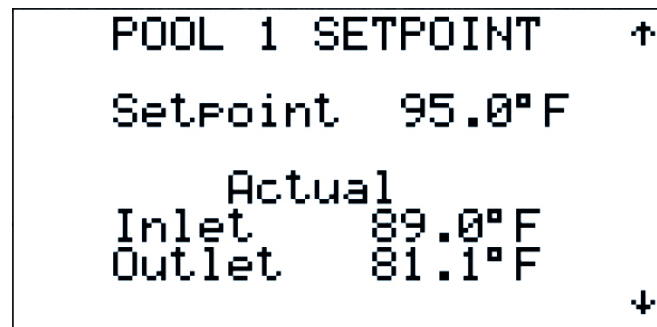


Figure 3

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.

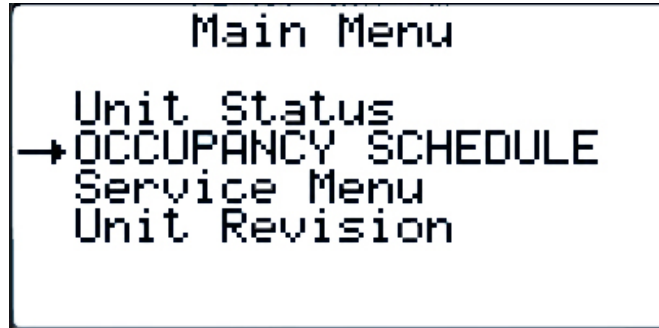


Figure 4

2.3.1 Status Menu (Figure 5)

Selecting the 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
- Low Air Flow
- Low Suct. Pr.
- EXV Init.

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.

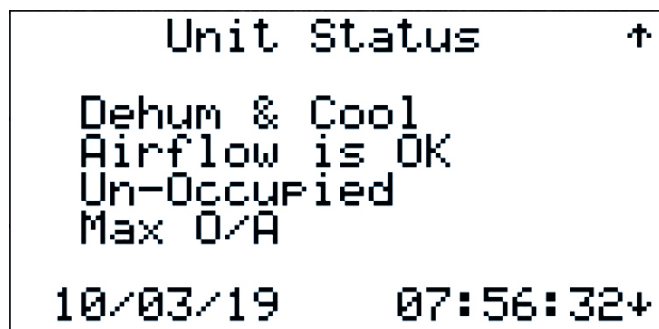


Figure 5

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 show 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 EVX. This screen is for troubleshooting only. To return to the STATUS MENU, press the **Esc** key.

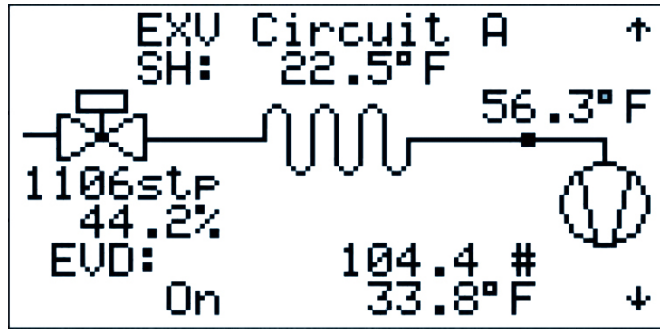


Figure 8

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 EVX. This screen is for troubleshooting only. To return to the STATUS MENU, press the **Esc** key.

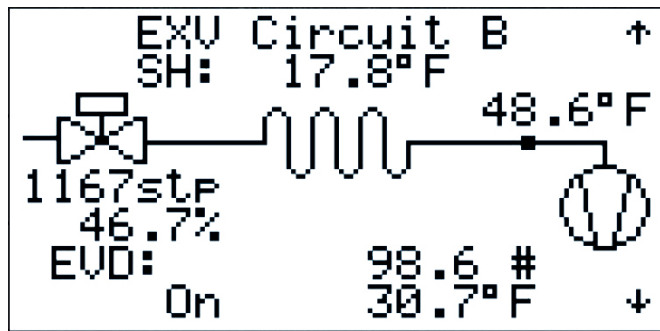


Figure 9

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.

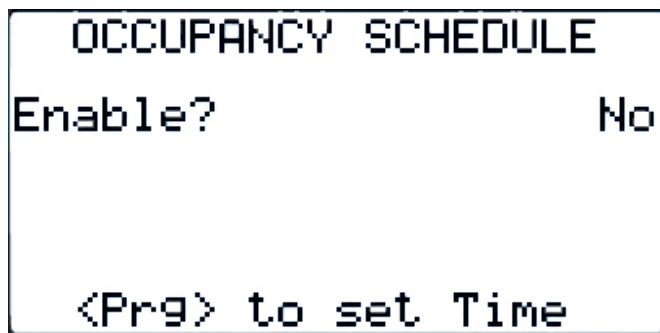


Figure 10

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.

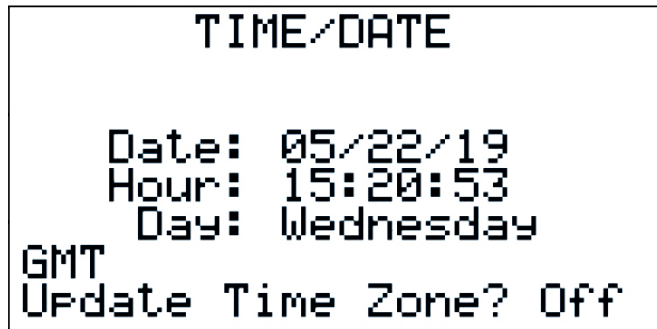


Figure 11

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.

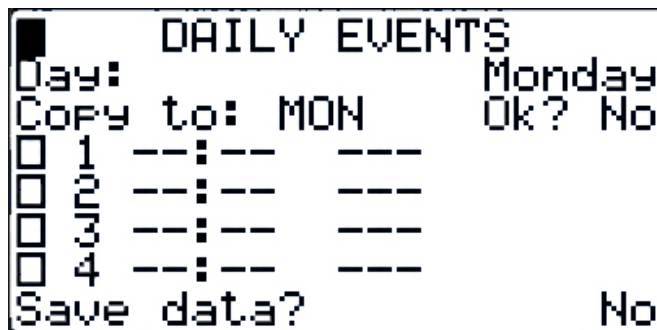
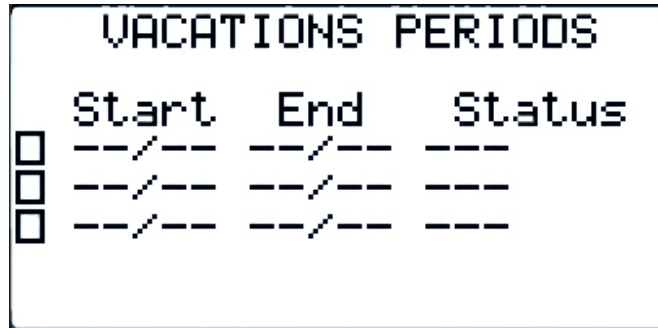


Figure 12

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.

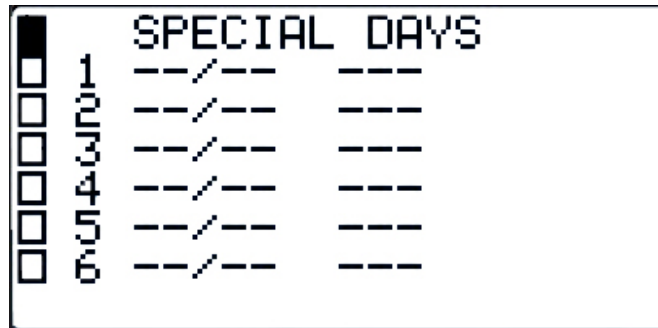


	Start	End	Status
<input type="checkbox"/>	--/---	--/---	---
<input type="checkbox"/>	--/---	--/---	---
<input type="checkbox"/>	--/---	--/---	---

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.



<input checked="" type="checkbox"/>		--/---
<input type="checkbox"/>	OCCUPANCY	--/---
<input type="checkbox"/>		--/---
<input type="checkbox"/>		--/---
<input type="checkbox"/>		--/---
<input type="checkbox"/>		--/---
<input type="checkbox"/>		--/---

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.

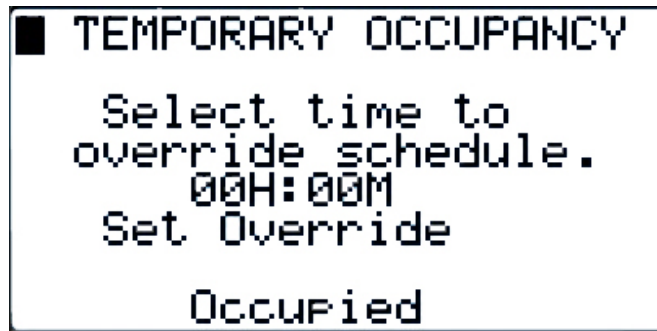


Figure 15

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**.

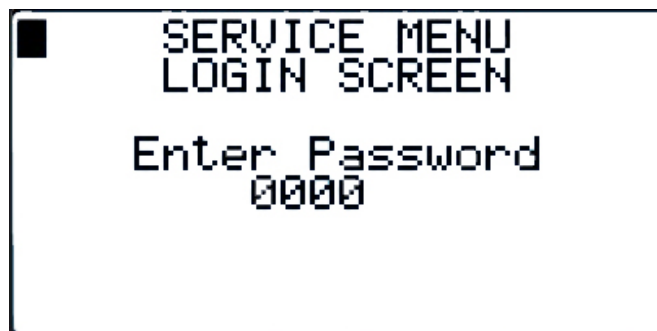


Figure 16

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

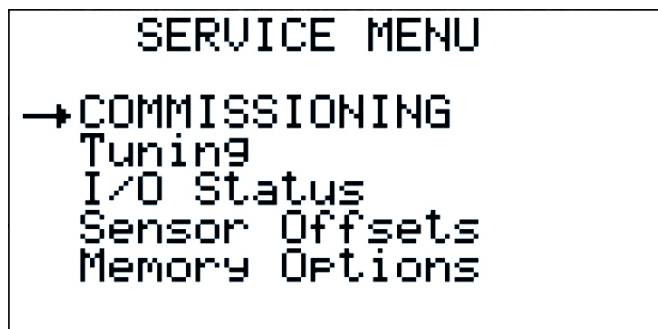


Figure 17

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 17). 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.

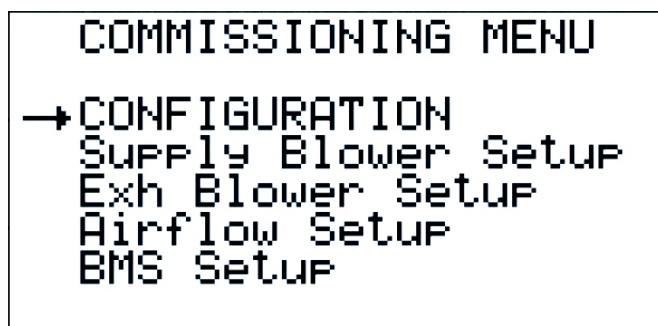


Figure 18

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.

```

CONDENSER SETTINGS ↑
Cir A ROC Jumper  □
Cir B ROC Jumper  □

Make delay  30 Sec
Minimum Off  60 Sec
↓

```

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 (Figures 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 the next screen.

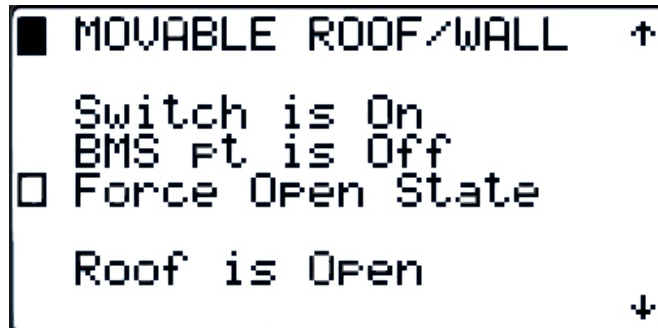


Figure 22

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.

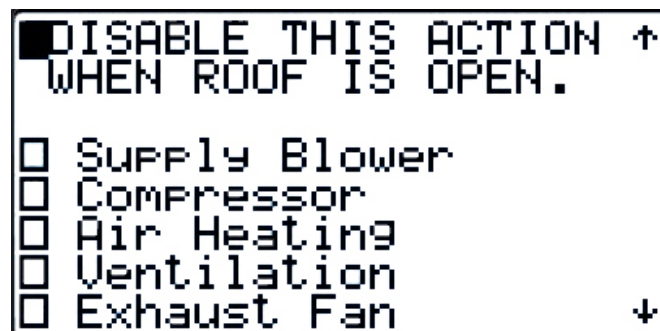


Figure 23

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.

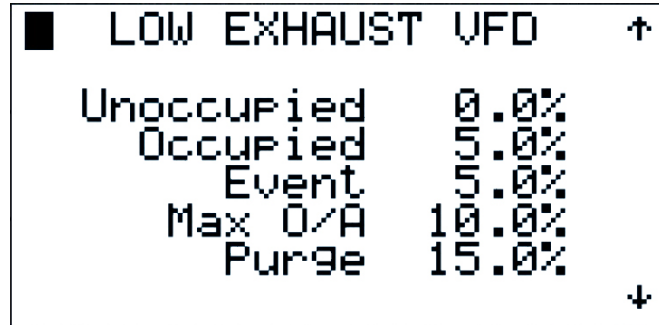


Figure 24

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.

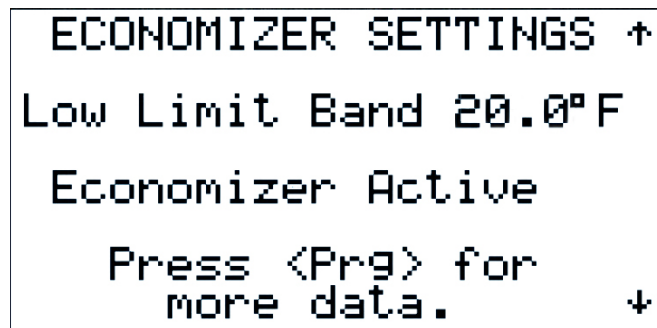


Figure 25

The OA conditions and setpoints will be displayed in Figure 26. This information is used to determine the psychrometric chart segment that the economizer is allowed to operate in, and PID loop controls. The left side of the screen will display Outside Air conditions as follows: Outside Air Temperature (DB), Relative Humidity (RH), Dewpoint(DP), and Enthalpy in kilojoules (kJ). The right side of the screen will display the low limit temperature that is calculated from zone temperature setpoint minus the low limit band. This shows the minimum temperature allowed to keep the unit active in economizer mode. Below the low limit temperature, the setpoints are displayed for both dewpoint and enthalpy respectively. The dewpoint and enthalpy for the outside air are displayed next to the setpoints for comparison of values which determine the mode that will be active. Lastly, the bottom left corner of the screen displays the psychrometric chart

segment and a "T" or "RH" for indicating the mode that the economizer is operating in.

Press the **DOWN** key to display screen shown in Figure 27.

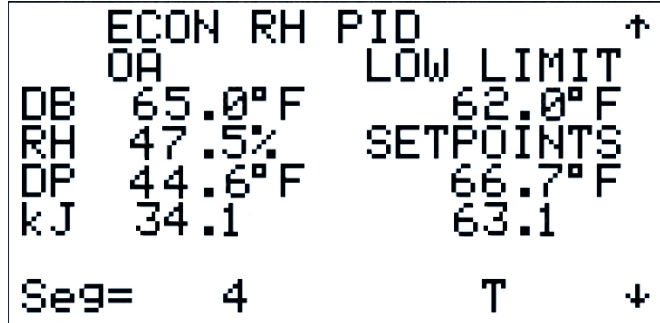


Figure 26

The economizer data will be shown in Figure 27. This screen will display maximum setting for the outside air temperature and relative humidity. The last line indicates whether the economizer is active or in-active.

Press the **ESC** key to return to Figure 25.

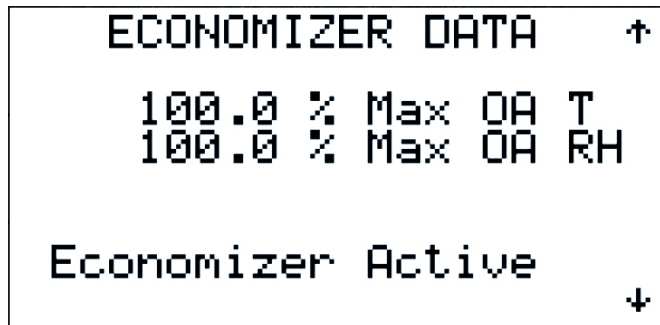


Figure 27

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.

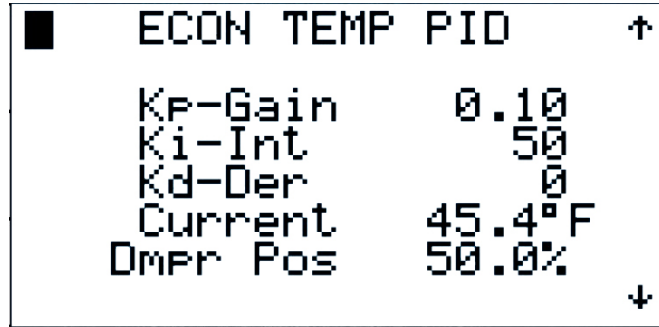


Figure 28

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

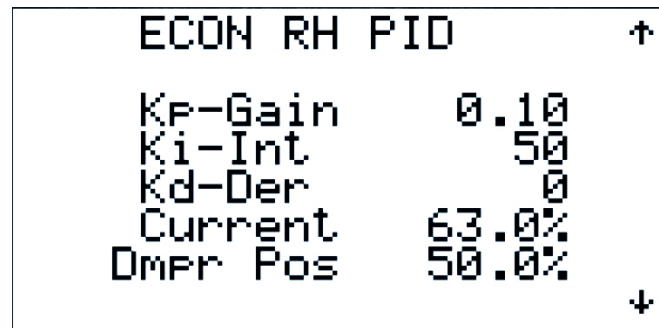


Figure 29

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

If a unit mounted outdoor condenser is provided with the unit, the screen in Figure 30 will be shown. 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 Setpoint, current highest discharge pressure and the condenser fan speed output are also shown.

```

ROC PRESSURE PID  ↑
Kp-Gain      0.10
Ki-Int       50
Kd-Der       0
Setpoint     261.1 #
Current      183.2 #
Output       0.0%  ↑

```

Figure 30

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

2.3.3.1.2 Supply Blower Setup (Figure 31)

Selecting the SUPPLY BLOWER SETUP from the Commissioning Menu displays the screen shown in Figure 31. 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. The altitude that the CFM calculation uses is settable on this screen as well.

Press the **DOWN** key for the next Supply Blower screen.

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

```

■ SUPPLY BLOWER SETUP↑
Current 13444CFM
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 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 Supply Blower screen. To return to the Commissioning Menu, press the **Esc** key.

```

SUPPLY BLOWER LOOP ↑
  KP-Gain  0.0070
  Ki-Int   50
  Kd-Der   1
  Setpoint 15000CFM
  Current  13443CFM
  LOOP Output 100.0% ↓

```

Figure 32

Pressing the **DOWN** key will display either the screen shown on Figure 33 or 34 depending on the presence of back draft dampers. These screens are shown for troubleshooting the supply blower CFM.

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

```

SUPPLY BLOWER LOOP ↑
w/NO BACKDRAFT DMPRS

  Supply Blower
  "wc          CFM
  13.910      53770

```

↓

Figure 33

```

SUPPLY BLOWER LOOP ↑
w/BACKDRAFT DMPRS

  "wc          CFM
Mtr 1  13.913  13444
Mtr 2  -1.571    0
Mtr 3  -1.571    0
Mtr 4  -1.571    0↓

```

Figure 34

2.3.2.1.3 Exhaust Blower Setup (Figure 35)

Selecting the EXHAUST BLOWER SETUP from the Commissioning Menu displays the screen shown in Figure 35. 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.

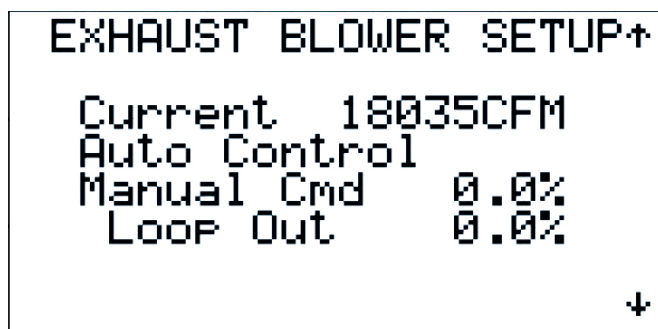


Figure 35

Pressing the **DOWN** key will display the screen shown in Figure 36. 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.

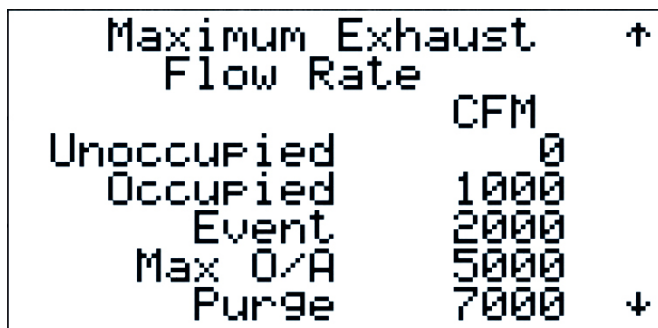


Figure 36

Pressing the **DOWN** key will display the screen shown in Figure 37. 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.

```

EXHAUST CFM PID ↑
Kp-Gain    0.0010
Ki-Int     10
Kd-Der     0
Setpoint   7000CFM
Current    18038CFM
Loop Output 0.0% ↓

```

Figure 37

Pressing the **DOWN** key will display the screen shown in Figure 37. 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.

```

EXHAUST Zone DP PID ↑
Kp-Gain    0.10
Ki-Int     50
Kd-Der     0
Setpoint   -0.050"wc
Current    0.457"wc
Loop Output 48.1% ↓

```

Figure 38

Pressing the **DOWN** key will display either the screen shown on Figure 39 or 40 depending on the presence of back draft dampers. These screens are 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.

```

EXHAUST BLOWER LOOP ↑
w/BACKDRAFT DMPRS

Mtr 7    "wc    CFM
        24.970  14556
Mtr 8    -1.570    0

☑ Min Speed  30.0 % ↑

```

Figure 39

```

EXHAUST BLOWER LOOP ↑
w/BACKDRAFT DMPRS

Mtr 7    "wc    CFM
        24.970  14556
Mtr 8    -1.570    0

☑ Min Speed  30.0 % ↑

```

Figure 40

2.3.3.1.4 Airflow Setup (Figure 41)

Selecting the AIRFLOW SETUP from the Commissioning Menu displays the screen shown in Figure 41. 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 setting is not lost on a power cycle.

```

■ AIRFLOW SETUP ↑

Unit On ☑

Turn the unit on & off
with the checkbox. The
setting is NOT lost on
a power cycle. ↓

```

Figure 41

Pressing the **DOWN** key will display the screen shown in Figure 42. 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.

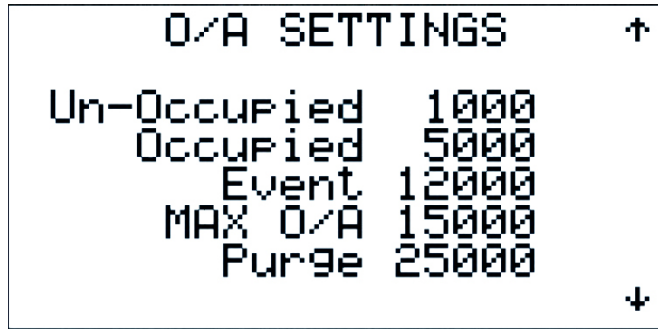


Figure 42

Pressing the **DOWN** key will display the screen shown in Figure 43. 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.

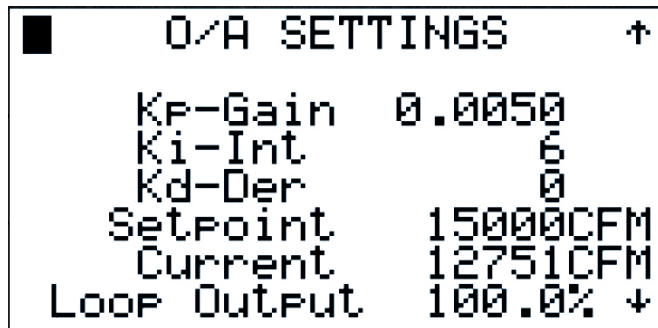


Figure 43

Pressing the **DOWN** key will display the screen shown in Figure 44. The Kp-Gain, Ki-Int and Kd-Der terms for the Evap 'A' Cool Thru 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.

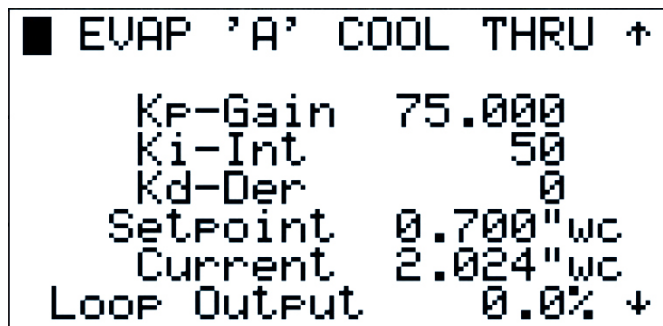


Figure 44

Pressing the **DOWN** key will display the screen shown in Figure 45. The Kp-Gain, Ki-Int and Kd-Der terms for the Exhaust Cool or Warm (CE/WE) 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.

```

EXH (CE/WE) SETTINGS↑
      Kp-Gain  50.000
      Ki-Int   15
      Kd-Der   0
      Setpoint 0.700"wc
      Current  2.024"wc
      Loop Output 100.0% ↓
  
```

Figure 45

Pressing the **DOWN** key will display the screen shown in Figure 46. This screen allows access to the Air Mode Overrides and Perforated Plate formulas. Pressing the **Prg** key will display the screen shown in Figure 47.

```

■ AIRFLOW SETUP ↑
For the Overrides and
O/A Perforated Plate
Formulas and settings
press the <Pr9> key.
↓
  
```

Figure 46

To return to the Commissioning Menu, press the **Esc** key. Selecting the **OVERRIDES** screen, Figure 47, 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.

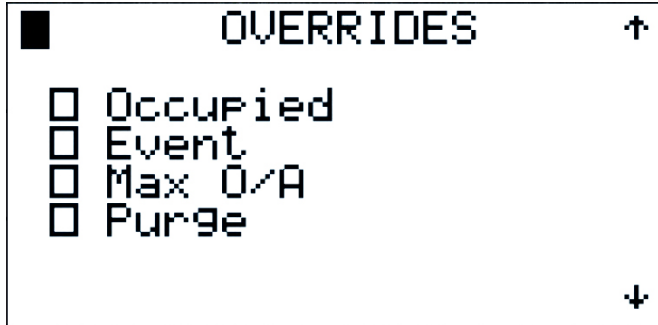


Figure 47

Pressing the **DOWN** key will display the screen shown in Figure 48. The CFM Setpoints for using the Perforated Plate formulas 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.

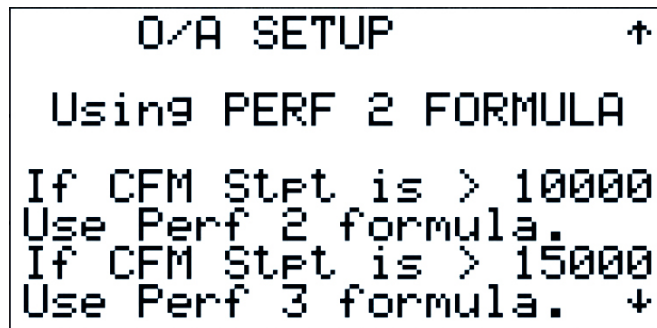


Figure 48

Pressing the **DOWN** key will display the screens shown in Figures 49 through 51. These screen set the coefficients used to model the perforated plate CFM at the here CFM levels selected from Figure 48. 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.

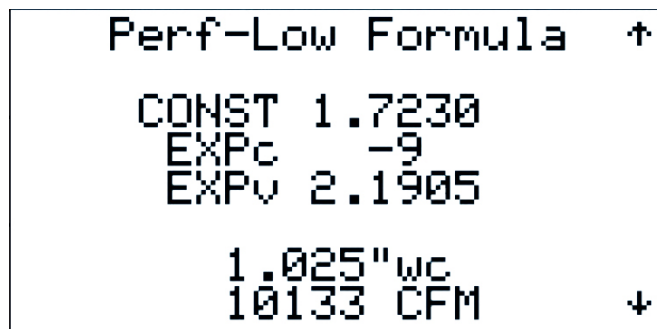


Figure 49

```

Perf-Mid Formula ↑
CONST 3.9150
EXPC -23
EXPU 5.4601

1.026"wc
12760 CFM ↓

```

Figure 50

```

Perf-High Formula ↑
CONST 6.2848
EXPC -6
EXPU 1.2062

1.026"wc
20983 CFM ↓

```

Figure 51

Pressing the **DOWN** key will display the last screen shown in Figure 52. The Mid adjustment is settable on this screen which sets the bypass damper to the adjustable setting when using the mid Perforated Plate formula. To modify this setting, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the setting.

```

OA BYPASS DAMPER ↑
Low 0.0%
Mid 50.0%
High 100.0%

Current 50.0% ↓

```

Figure 52

Pressing the **DOWN** key will display the first Manual Damper Setup screen shown in Figure 53. 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.

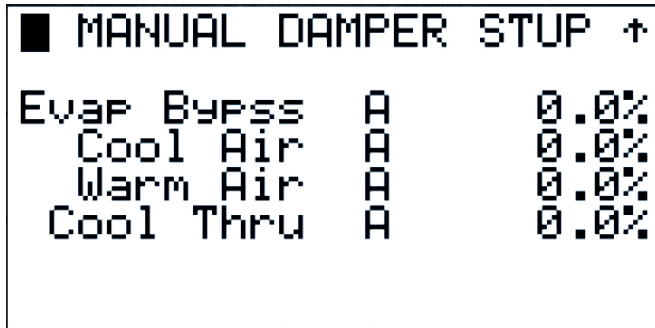


Figure 53

Pressing the **DOWN** key will display the last Manual Damper Setup screen shown in Figure 54. 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.

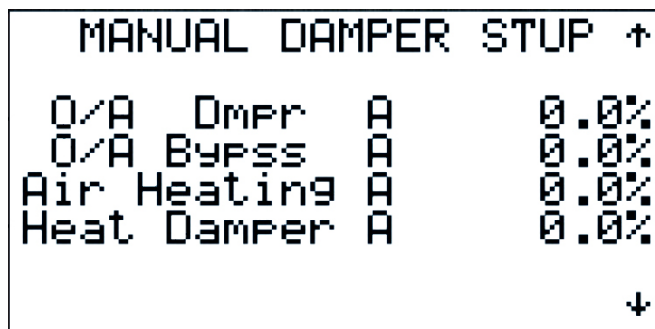


Figure 54

2.3.3.1.5 BMS Setup (Figures 55 through 62)

Selecting the BMS SETUP from the Commissioning Menu will display the screen shown in Figure 55. 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.

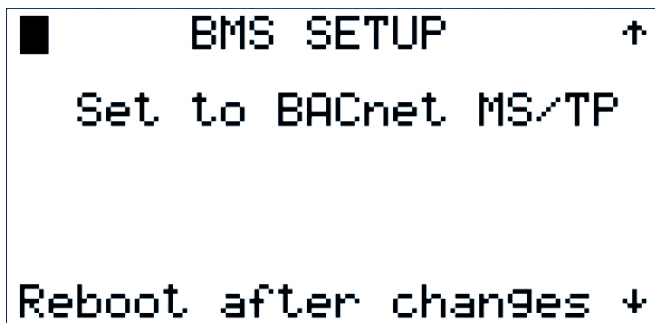


Figure 55

Pressing the **DOWN** key will display Figure 56. This screen will allow the BACnet data to be set. Making any changes will require a power cycle to have those changes take effect.

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

Figure 56

When the BMS is set for Modbus RTU, pressing the **DOWN** key will display Figure 57. 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 57

To set the unit for BACnet IP, serial port J25 must be set to Modbus RTU. This will allow the screen shown in Figure 58 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 58.

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

Reboot after changes ↓
```

Figure 58

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 59

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 60

Pressing the **DOWN** key will now display the Network Configuration screen, Figure 61. 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 61

Pressing the **DOWN** key will now display the Network Configuration screen shown in Figure 62. 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 a static 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.

```
Network Config ↑
Zone Data IP Addr
192:168:001:000
** NETWORK FAULT **
Use Local Sensor ↓
```

Figure 62

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 63)

Selecting TUNING from the SERVICE MENU displays the DEADBANDS screen shown in Figure 63. 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.

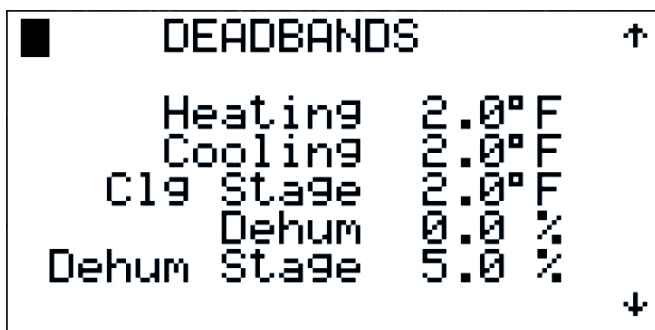


Figure 63

2.3.3.2.1 Tuning - Differentials (Figure 64)

Pressing the **DOWN** key will now display the DIFFERENTIALS screen, shown in Figure 64. 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.

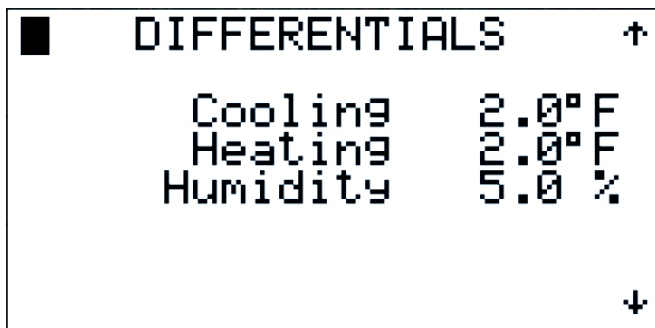


Figure 64

2.3.3.2.2 Tuning – Energy Recovery (Figure 65)

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.

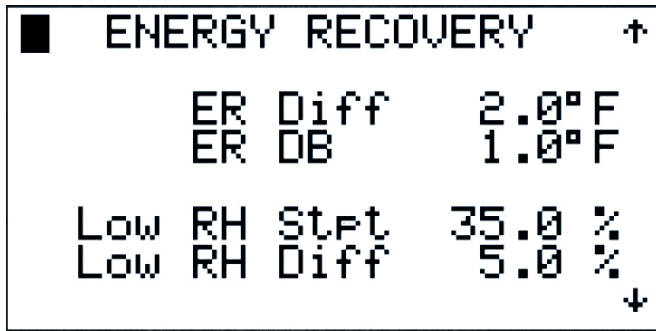


Figure 65

2.3.3.2.3 Tuning – Pool Settings (Figures 66 & 67)

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.

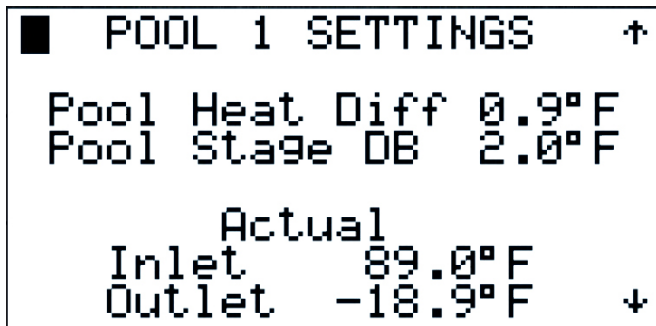


Figure 66

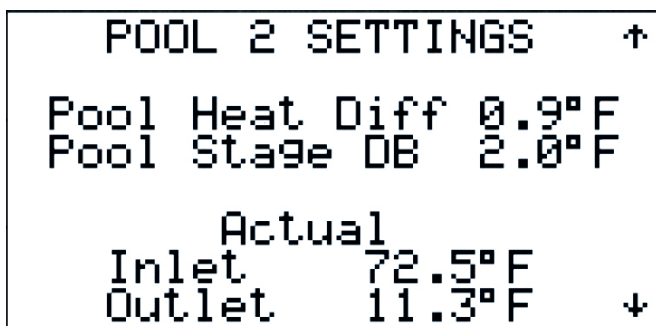


Figure 67

2.3.3.2.4 Tuning – Air Heating (Figures 68 - 71)

Pressing the **DOWN** key will now display the settings shown in Figure 68. 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.

```
■ AIR HEATING ↑
Heating is Off
Damper Stpt 50.0%
Purge Stpt 65.0°F ↓
```

Figure 68

If modulating heat has been enabled, pressing the **DOWN** key will now display the settings shown in Figures 69, 70 and 71. These settings control the modulating signal. Figure 69 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 70. 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 71. 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 69

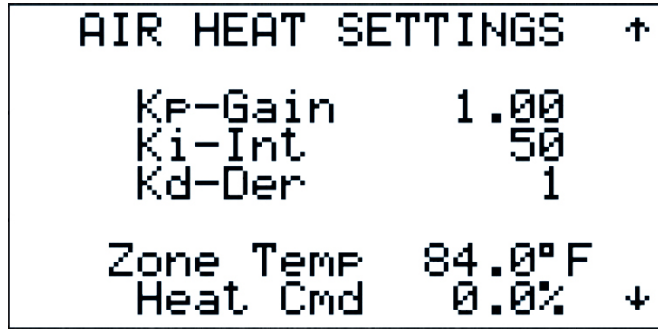


Figure 70

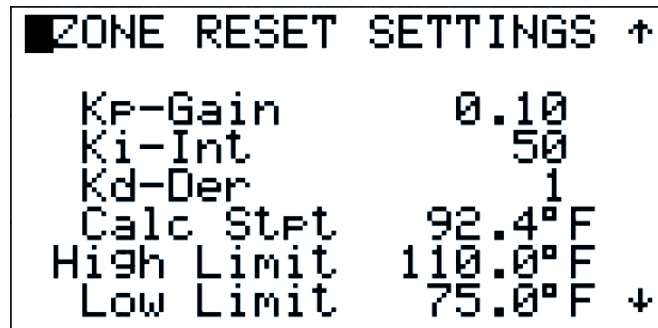


Figure 71

2.3.3.2.5. Tuning – Outdoor Air Pre-Heating (Figure 72 & 73)

Pressing the **DOWN** key will now display the settings of the Outdoor Air Pre-Heating settings. Figure 72 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.

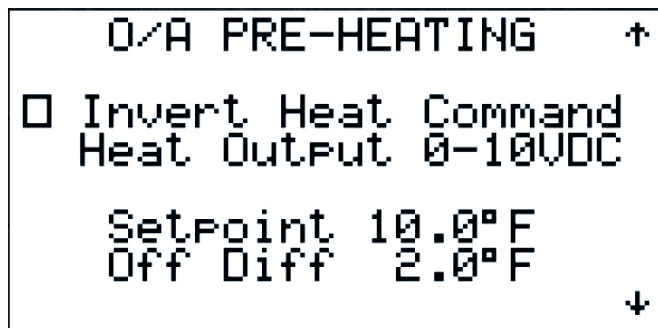


Figure 72

Pressing the **DOWN** key will now display the PID settings of the Outdoor Air Pre-Heating settings. Figure 73 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.

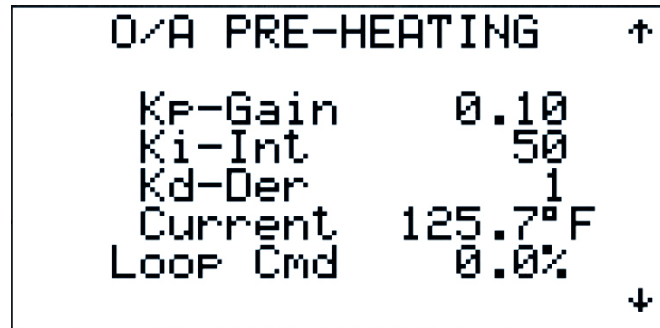


Figure 73

2.3.3.2.6. Tuning – Maximum Outdoor Air (Figure 74)

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.

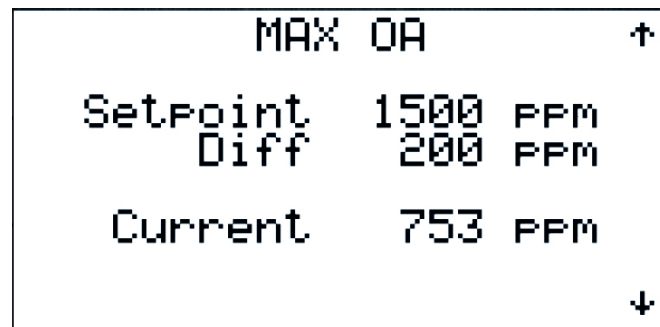


Figure 74

2.3.3.3 I/O Status (Figure 75)

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.

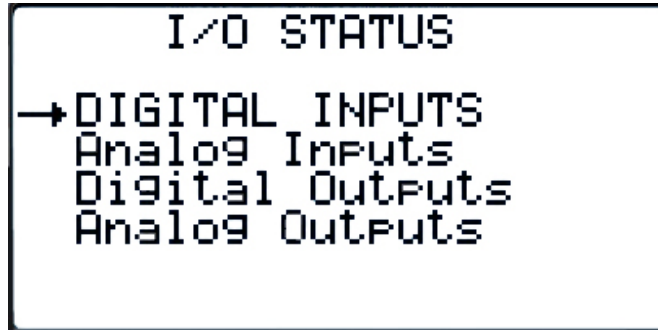


Figure 75

2.3.3.3.1 Digital Inputs (Binary) (Figure 76 - 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 ID1, the supply blower motor starter overload contacts - "OK" if the contact is closed, and "Flt" if an overload exists.
- The second line will show the status of ID2, the exhaust blower motor starter overload contacts - "Ok" if no overload is present, and "Flt" if an overload exists.
- The third line will show the status of ID3, the packaged condenser motor starter overload contacts - "Ok" if no overload is present, and "Flt" if an overload exists.
- The fourth line will show the status of ID4 the circuit A compressor motor starter overload contacts - "Ok" if no overload is present, and "Flt" if an overload exists.
- The fifth line will show the status of ID5 the circuit B compressor motor starter overload contacts - "Ok" if no overload is present, and "Flt" if an overload exists.

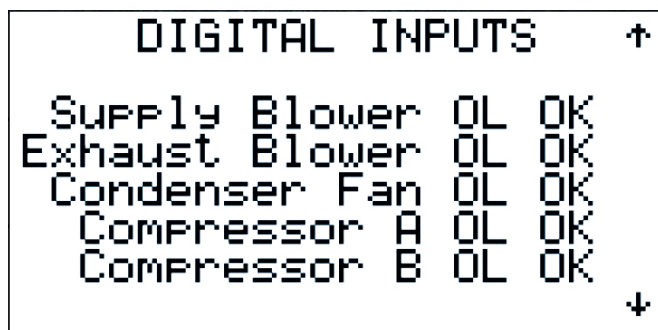


Figure 76

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

- The first line will show the status ID6 the occupancy contact, “On” for Occupied and “Off” for Un-Occupied.
- The second line will show the status of ID7 the Event Mode contact, “On” and “Off”.
- The third line will show the status of ID8 the Purge Mode contact, “On” and “Off”.
- The fourth line will show the status of ID9 the circuit A compressor auxiliary contact, “On” if the compressor is on and “Off” if the compressor is off.
- The fifth line will show the status of ID10 the circuit B compressor auxiliary contact, “On” if the compressor is on and “Off” if the compressor is off.

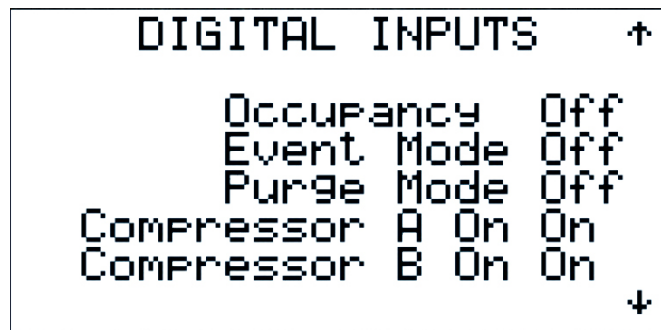


Figure 77

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

- The first line will show the status of ID11 the low exhaust blower motor starter overload contact. “OK” if the contact is closed, and “Flt” if an overload exists.
- The second line will show the status of ID12 the roof switch contact - “On” if switch is closed, and “Off” if the switch is open.
- The third 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 fourth 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 ↑
Low Exh VFD OL OK
Roof Switch On
Smoke Alarm OK
Voltage Monitor OK
Filter Switch OK
Condensate Sw OK ↓

```

Figure 78

The fourth page of the Digital Inputs shows the status of the contacts wired into the expansion modules.

- The first line will show the status U6 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 second line will show the status of U9 of address 2 expansion module, the tower 1 flow switch, or jumper, "On" if there is flow, and "Off" if no flow is present.
- The third line will show the status of U10 of address 2 expansion module, the tower 2 flow switch, or jumper, "On" if there is flow, and "Off" if no flow is present.
- The fourth line will show the status of U4 of address 4 expansion module, the pool 2 flow switch, or jumper, "On" if there is flow, and "Off" if no flow is present.
- The fifth line will show the status of DI1 on port J29, the optional filter switch, "OK" if the filter pressure is low, and "Flt" if the filter pressure is high.
- The sixth line will show the status of DI2 on port J29, the optional condensate switch, "OK" if the level is low, and "Flt" if level is high.

if

```

DIGITAL INPUTS ↑
Pool 1 Flow Off
Tower A Flow Off
Tower B Flow Off
Pool 2 Flow Off ↓

```

Figure 79

The fifth page shows the state of the contacts wired into the expansion module address 5.

- The first line will show the status of U5, EC110 blower fault contact. "OK" if the contact is closed, and "Flt" if the contact is open.
- The second line will show the status of U6, EC114 blower fault contact. "OK" if the contact is closed, and "Flt" if the contact is open.
- The third line will show the status of U7, EC118 blower fault contact. "OK" if the contact is closed, and "Flt" if the contact is open.
- The fourth line will show the status of U8 EC146 blower fault contact. "OK" if the contact is closed, and "Flt" if the contact is open.
- The fifth line will show the status of U9 VFD106 VFD fault contact. "OK" if the contact is closed, and "Flt" if the contact is open.
- The sixth line will show the status of U10 VFD146 VFD fault contact. "OK" if the contact is closed, and "Flt" if the contact is open.

DIGITAL INPUTS				↑
EC	110	OL	OK	
EC	114	OL	OK	
EC	118	OL	OK	
EC	146	OL	OK	
VFD	106	OL	OK	
VFD	146	OL	OK	↓

Figure 80

2.3.3.3.2 Analog Inputs (Figures 81 through 90)

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.

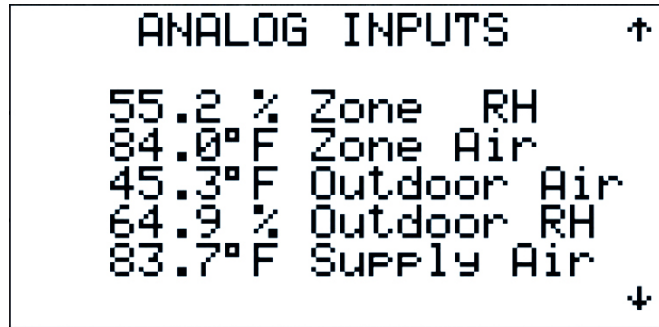


Figure 81

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.

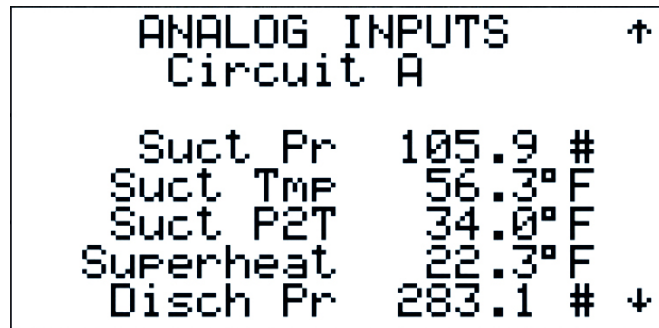


Figure 82

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.

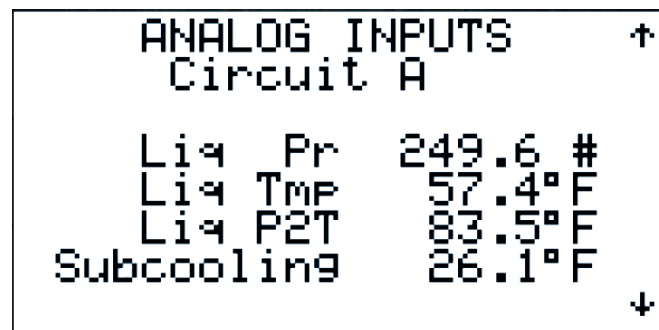


Figure 83

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.

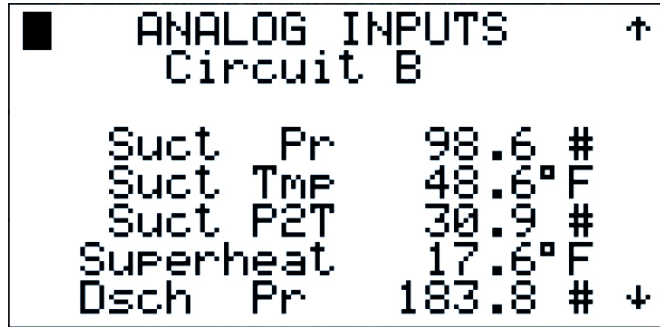


Figure 84

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.

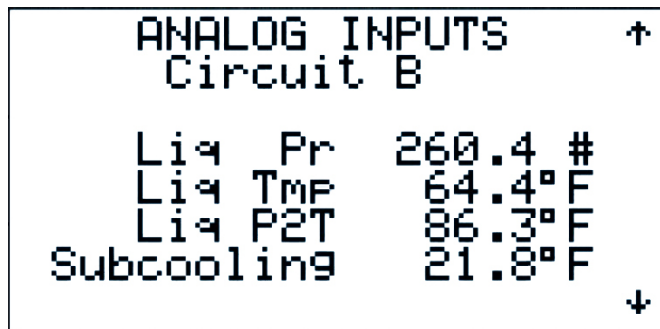


Figure 85

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

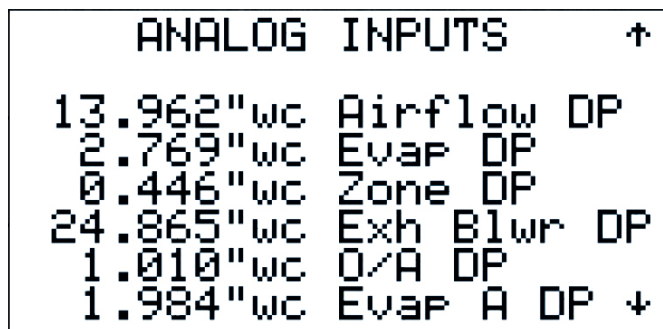


Figure 86

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.

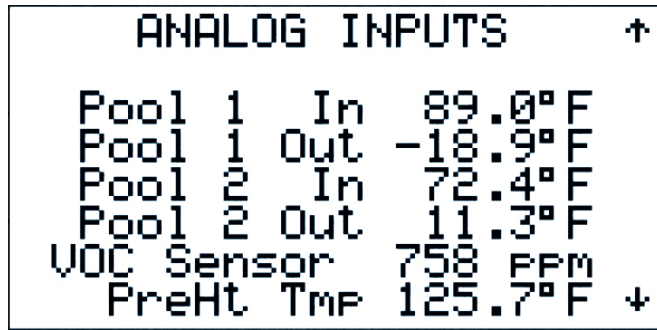


Figure 87

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

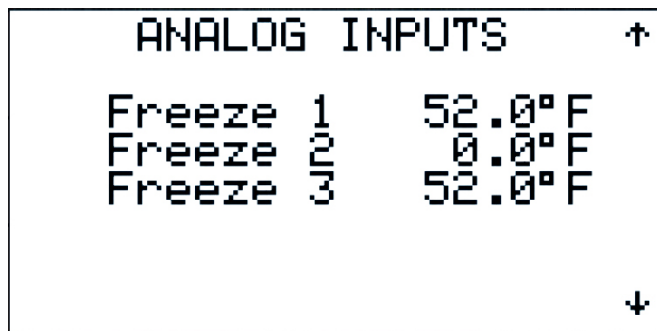


Figure 88

The ninth page shows the readings of optional air pressure differential sensors that are provided if the back draft damper option has been provided.

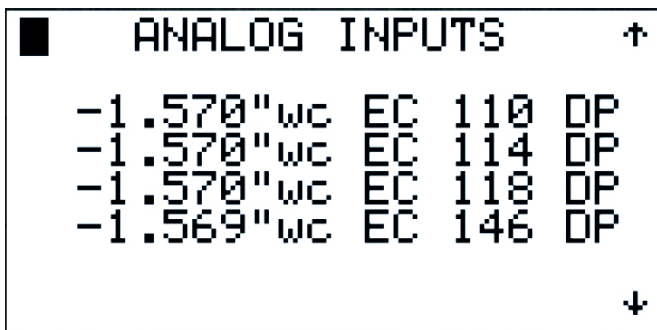


Figure 89

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

2.3.3.3.3 Digital Outputs (Binary) (Figures 87 - 93)

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 C1, the Compressor A contact, “On” and “Off”.
- The second line will show the status of C2, Circuit A 1Sol contact, “On” and “Off”.
- The third line will show the status of C3, Circuit A 4Sol contact, “On” and “Off”.
- The fourth line will show the status of C4, the Compressor B contact, “On” and “Off”.
- The fifth line will show the status of C5, Circuit B 1Sol contact, “On” and “Off”.
- The sixth line will show the status of C6, Circuit B 4Sol contact, “On” and “Off”.

DIGITAL OUTPUTS ↑			
Compressor A	On		
Reheat A 1Sol	Off		
Water A 4Sol	On		
Compressor B	On		
Reheat B 1Sol	On		
Water B 4Sol	On		↓

Figure 90

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

- The first line will show the status of C7, the Air Heat contact, “On” and “Off”.
- The second line will show the status of C8, the Alarm contact, “On” and “Off”.
- The third line will show the status of C9, the Low Exhaust VFD Enable contact, “On” and “Off”.
- The fourth line will show the status of C12, the Supply Blower VFD Enable contact, “On” and “Off”.
- The fifth line will show the status of C13, the Exhaust Blower VFD Enable contact, “On” and “Off”.

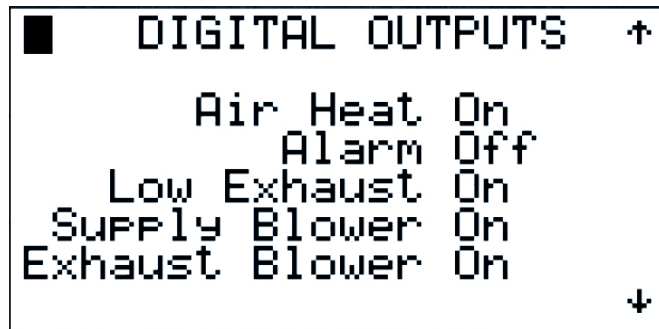


Figure 91

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

- The first line will show the status of C1, the Auxiliary Pool 1 Heater contact, “On” and “Off”.
- The second line will show the status of C3, the Tower A Pump contact, “On” and “Off”.
- The third line will show the status of C4, the Tower B Pump contact, “On” and “Off”.
- The fourth line will show the status of C6, the Pool 1 Pump contact, “On” and “Off”.

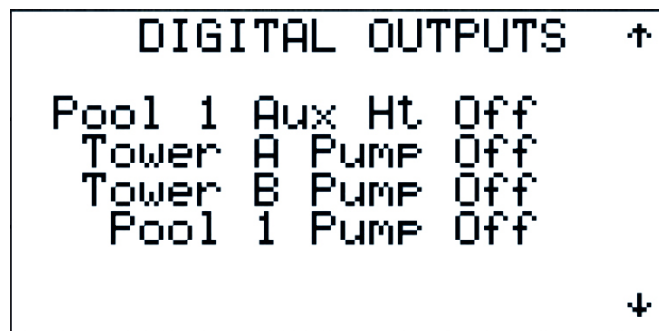


Figure 92

The fourth page shows the state of the next four output contacts of expansion modules addresses 3 & 4.

- The first line will show the status of C1 address 3, the ROC Enable contact, “On” and “Off”.
- The second line will show the status of C1 address 4, the Auxiliary Pool 2 Heater contact, “On” and “Off”.
- The third line will show the status of C3 address 4, the Outdoor Air Pre-Heat Enable contact, “On” and “Off”.
- The fourth line will show the status of C6 address 4, the Pool 2 Pump contact, “On” and “Off”.

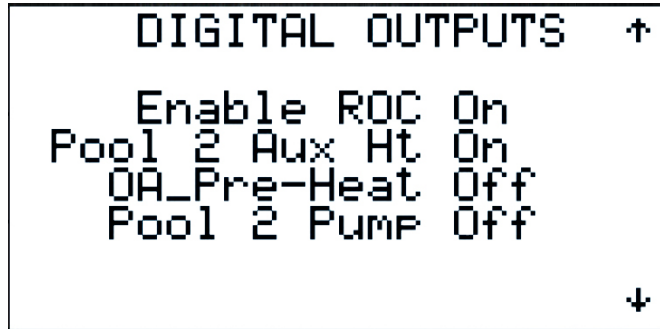


Figure 93

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

2.3.3.3.4 Analog Outputs (Figures 94 - 97)

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 five outputs.

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

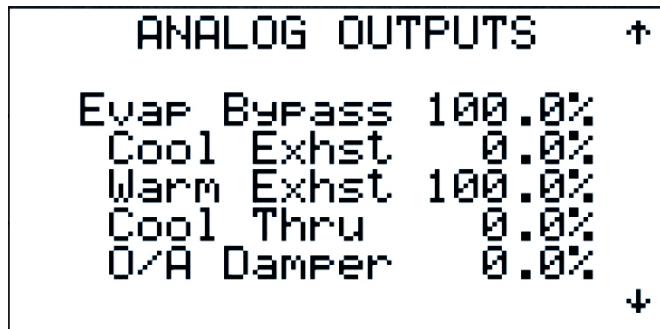


Figure 94

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

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

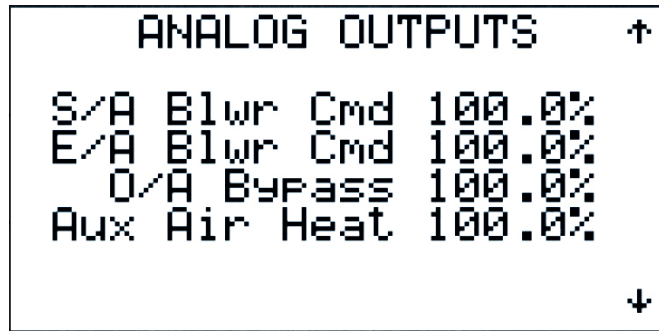


Figure 95

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

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

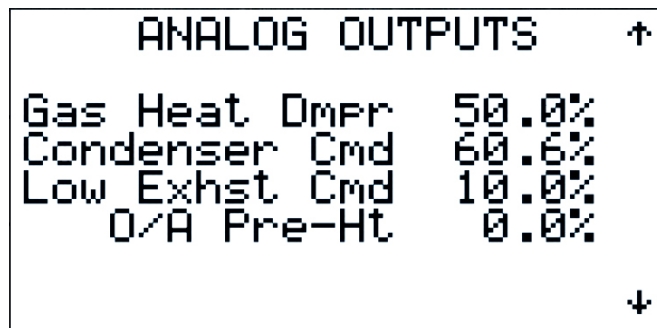


Figure 96

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

2.3.3.4 Sensor Offsets (Figures 97 - 103)

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 offsets is -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 TMP 0.00
O/A RH 0.00
O/A TMP 0.00
S/A TMP 0.00 ↓

```

Figure 97

```

SENSOR OFFSETS ↑
Circuit A
Suct Pr 0.00
Suct TMP 0.00
Disch Pr 0.00
Li9 Pr 0.00
Li9 TMP 0.00 ↓

```

Figure 98

```

SENSOR OFFSETS ↑
Circuit B
Suct Pr 0.00
Suct TMP 0.00
Disch Pr 0.00
Li9 Pr 0.00
Li9 TMP 0.00 ↓

```

Figure 99

```

SENSOR OFFSETS ↑
Airflow DP 0.00
Evap DP 0.00
Zone DP 0.00
O/A DP 0.00
Evap A DP 0.00 ↓

```

Figure 100

SENSOR OFFSETS				↑
Exh Blwr	DP		0.00	
EC110	DP		0.00	
EC114	DP		0.00	
EC118	DP		0.00	
EC146	DP		0.00	

Figure 101

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

Figure 102

SENSOR OFFSETS				↑
Freeze	TMP1		0.00	
Freeze	TMP2		0.00	
Freeze	TMP3		0.00	
PreHeat	TMP		0.00	
VOC	Sensor		0.00	

Figure 103

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

2.3.3.5 Memory Options (Figures 104 - 106)

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.

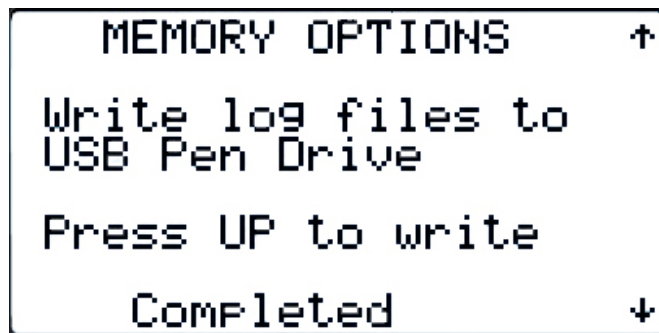


Figure 104

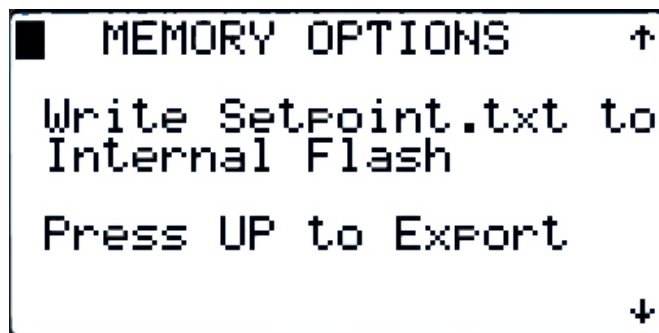


Figure 105

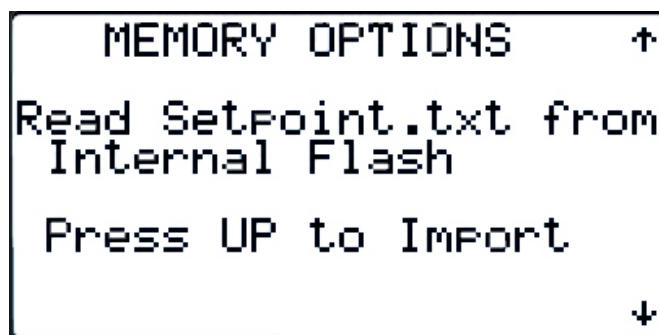


Figure 106

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

2.3.4 Unit Revision (Figure 107)

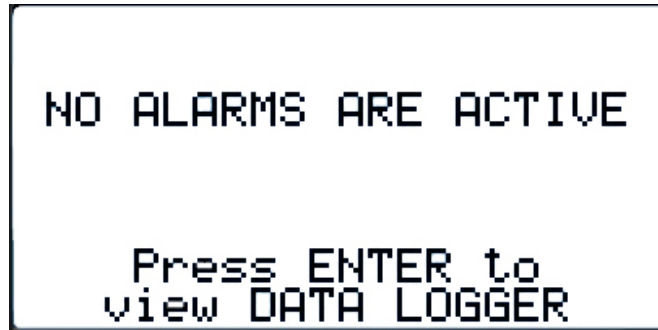
The Unit Revision Screen shows the version of the application program that is running along with the release date of the software. This information should be passed to Desert Aire in the event a service call is necessary.

UNIT REVISION
SP 1.0.0
Release Date
Oct. 3rd, 2019

Figure 107

3 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 108.

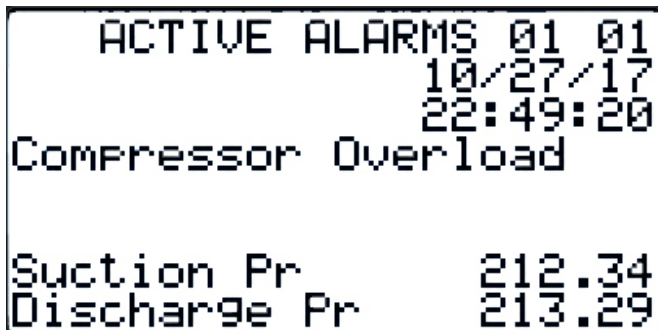


```
NO ALARMS ARE ACTIVE

Press ENTER to
view DATA LOGGER
```

Figure 108

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 109. 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.

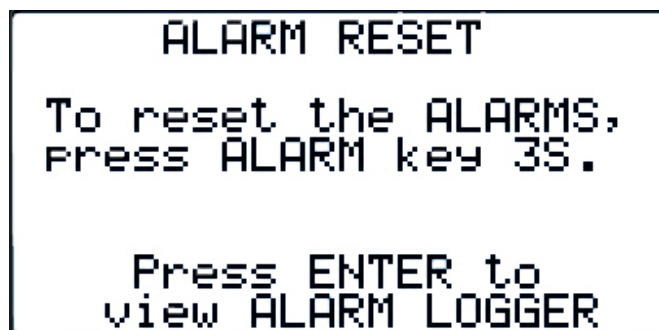


```
ACTIVE ALARMS 01 01
                10/27/17
                22:49:20
Compressor Overload

Suction Pr      212.34
Discharge Pr    213.29
```

Figure 109

To reset the alarm, use the **DOWN** key until the reset instructions are shown. See Figure 110. 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 110

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 111)

The Alarm Data Logger Screen is accessible from the Alarm Reset screen (See Figure 111) 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.

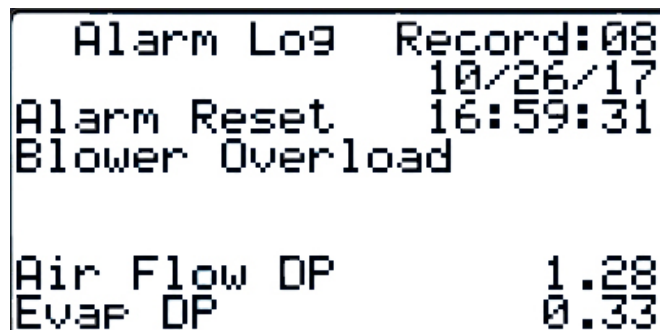


Figure 111

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. If communication is lost from this device, an alarm is activated. The Desert Aire replacement part number for the Zone Air Temperature and Relative Humidity Sensor 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.

5 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 61. 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.



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