CM3570 Series Controller

Est. 1978

Desert Aire

Installation and Operation Manual for GR Units

- Controls specific to Controlled Environment Agriculture

- Monitoring of temperature, RH, dew point and VPD

- Photocell input allows for feedback of light cycle

- Optional CO_2 monitoring and automated control

- Capability to link units for coordinated control in a single space

- Cloud-based logging, alarms and control when used with AireGuard™
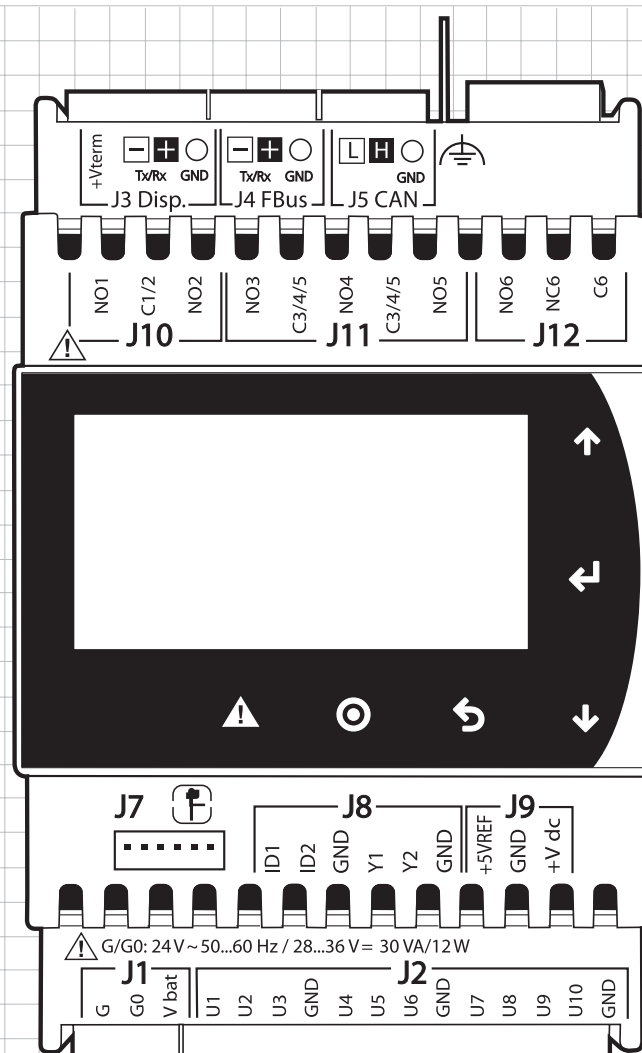
CM3570 Controller

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: filters and fuses.
5. Coils or other components that corrode due to 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 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 warrantees beyond this Standard Limited Warranty document. Extended warrantees are only available at the time of the purchase of the original equipment. These extended warrantees 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
> EMAIL: 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

TABLE OF CONTENTS

1.   Installation

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

This CM3570 control system is easy to install and operate. The controller itself is installed in the electrical cabinet of the dehumidifier and features an internal display terminal (IDT) and an optional remote display terminal (RDT). This display allows viewing and adjustment of the unit's sensors and set points. It also indicates the operating status of major components inside the dehumidifier.

Most sensors and devices have been factory-installed and wired inside the dehumidifier. In most cases, only connection to cold and hot water inlet/outlet pipes, electrical power connection, and zone air sensors are required. Connection to the facilities computer network or building management system may also be required.

The CM3570 controller features optional building automation access. This includes options for network communication ability including BACnet IP, BACnet MS/TP, ModBus RTU and ModBus IP.

1.2   Sensor Installation
The CM3570 control system requires a zone mounted combination relative humidity and temperature sensor. Mount this sensor in the conditioned space away from any hot spots but in an area that is representative of the zone. Constant air flow across this sensor will help insure proper readings.

1.3   CM3570 Controller Overview
Desert Aire's CM3570 microprocessor controller is a powerful, flexible controller with many useful features including
  •   Display of zone air conditions and refrigerant pressures.
  •   Display of equipment operating status such as dehumidification, cooling and heating.
  •   Display of alarms for abnormal conditions such as sensor failures or tripped safety controls.
  •   Remote setpoint option as well as lights on and lights off setpoints.
  •   A convenient, easy-to-understand display interface which allows the operator to view and change setpoints and time schedules.

2. CM3570 Controller Details

2.1. Menu Overview and General Instructions

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:

⚠ - ALARM Key

◎ - PROGRAM (Prg) Key

↩ - ESCAPE (Esc) Key

⇩ - DOWN Key

⇧ - UP Key

↵ - ENTER Key

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

🔔 - ALARM Key

Prg - PROGRAM (Prg) Key

Esc - ESCAPE (Esc) Key

↓ - DOWN Key

↑ - UP Key

↵ - ENTER Key
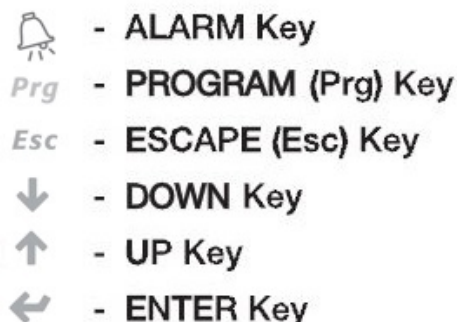
The Home Screen (Figure 1) displays the Desert Aire logo and shows the dehumidifier programmed size, the actively used zone temperature and humidity sensor, and the unit status. The right side of the display shows "Esc → Menu" which indicates that if the **Esc** key is pressed, the Main Menu will be 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** and **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

Pressing the **Prg** key from the Home Screen displays one of the following options for setpoint screens; the standard setpoints adjustable in the unit, the setpoints from a lead unit, or the setpoints from a Business Management System (BMS) network. If the unit has a GrowCycle schedule active, the setpoints may also come from the GrowCycle Scheduler. With standard setpoints active, pressing the **Prg** key will display the screens of Figures 2 and 3 for Lights On and Lights Off setpoints respectively.
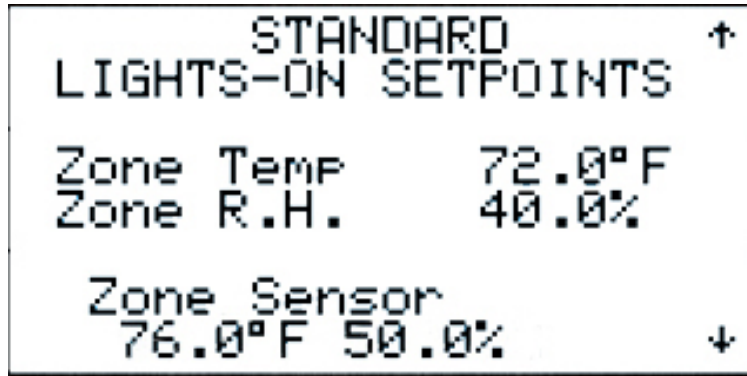
Figure 2
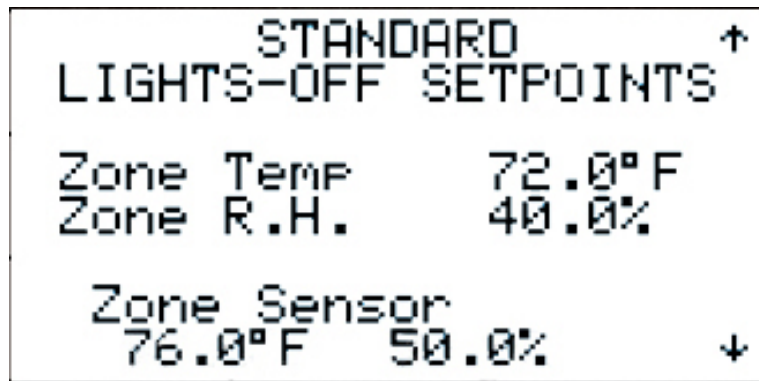
Figure 3

If the unit is set up as a lag unit in a lead-lag system, then pressing the **Prg** key will display the screen in Figure 4. Here the lead unit's setpoints are displayed, and can only be adjusted from the lead unit.

Figure 4

If the unit is set up to use setpoints sent by a BMS system, pressing the **Prg** key will display the screens of Figure 5 and 6. Here the network zone temperature and humidity setpoints are adjustable for both the lights on and lights off mode of operation. These setpoints will also be adjustable through Modbus or BACnet protocol depending on the BMS option selected.

```
          NETWORK              ↑
    LIGHTS-ON SETPOINTS

  Zone Temp          72.0°F
  Zone R.H.          40.0%

    Zone Sensor
     76.0°F  50.0%          ↓
```

Figure 5

```
          NETWORK              ↑
    LIGHTS-OFF SETPOINTS

  Zone Temp          72.0°F
  Zone R.H.          40.0%

    Zone Sensor
     76.0°F  50.0%          ↓
```
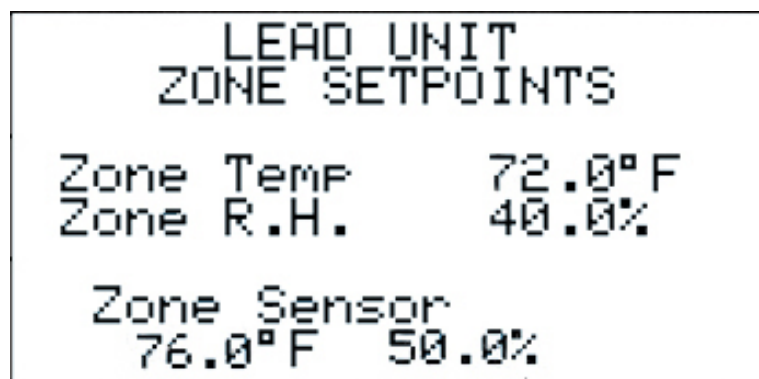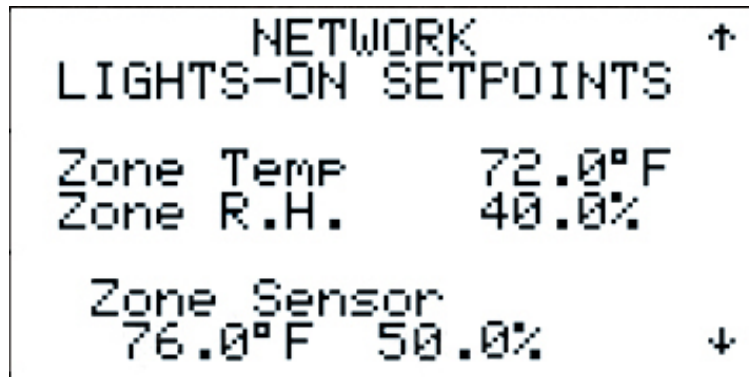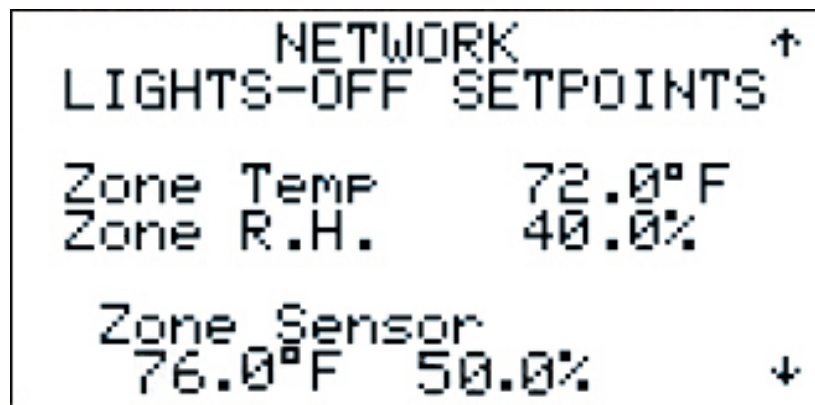
Figure 6

If the unit has a GrowCycle schedule set up, then pressing the **Prg** key will display the screen in Figure 7. The zone temperature and humidity setpoints will be adjustable in the GrowCycle Setpoints menus, and displayed on this screen. The screen will either say "Schedule Active", "Schedule Ended", or display which period the schedule is on. Press the **Esc** key to return to the Home Screen.

```
         SCHEDULED
       ZONE SETPOINTS
  Schedule   Active
  Zone Temp          72.0°F
  Zone R.H.          40.0%

    Zone Sensor
     76.0°F  50.0%
```

Figure 7

Pressing the **Dwn** key from any of the above zone setpoints screens will display the screen of Figure 8. From the ZONE ALERT SETPOINTS screen, the minimum and maximum zone temperature alert setpoints, and minimum and maximum zone RH alert setpoints are adjustable.
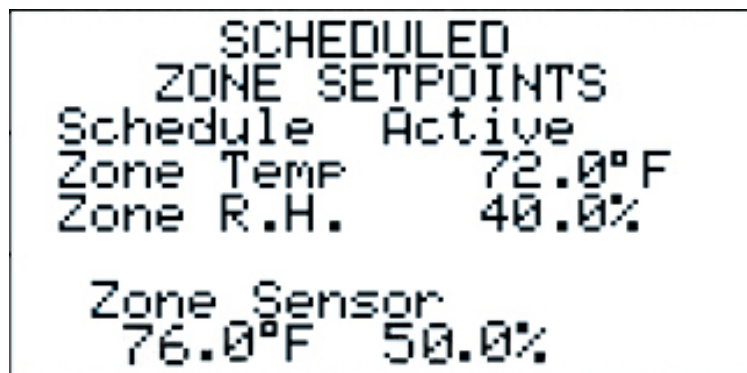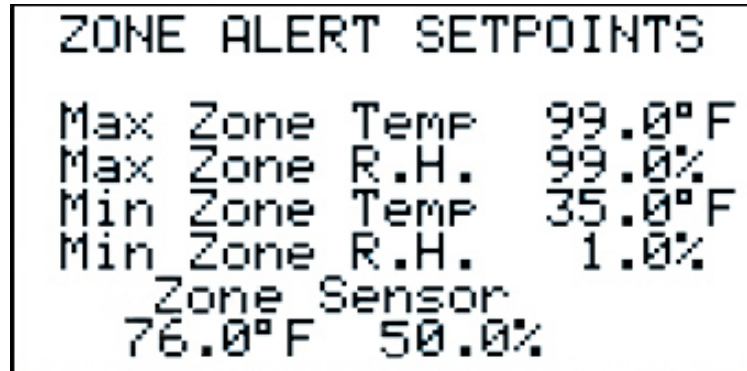
```
ZONE ALERT SETPOINTS

Max Zone Temp    99.0°F
Max Zone R.H.    99.0%
Min Zone Temp    35.0°F
Min Zone R.H.     1.0%
       Zone Sensor
     76.0°F  50.0%
```

Figure 8

Press the **Esc** key to return to the Home Screen.

2.3.   Main Menu

Pressing the **Esc** key from the Home Screen displays the MAIN MENU shown in Figure 9. This menu allows the operator to select the UNIT STATUS, SET DATE & TIME, enter the SERVICE MENU and view the UNIT REVISION. If the GrowCycle Scheduler is enabled, then SCHEDULE MENU will also be available from this screen.

```
MAIN MENU

→UNIT STATUS
 Set Date & Time
 Service Menu
 Unit Revision
```

Figure 9

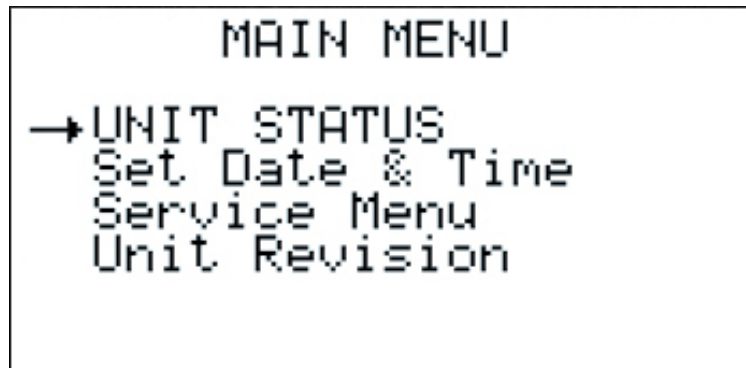To return to the Home Screen, press the **Esc** key.

2.3.1   Unit Status

Selecting UNIT STATUS will display the screen shown in Figure 9. The first screen of Unit Status displays the lights on/off status, the zone Vapor Pressure Deficit VPD), the zone CO_2 level, and CO_2 valve status if enabled, and finally the zone temperature and humidity. At the very bottom the time and date are displayed.

Figure 10

Pressing the **Dwn** Key displays the UNIT DEMANDS screen shown in Figure 11. At the top of the screens the calculated unit demands for cooling, dewpoint, RH, dehumidification, and humidification are displayed as percentages. The bottom value is the calculated supply air temperature (SAT) setpoint.

Figure 11

Pressing the **Dwn** Key will display the PUMP STATUS screen shown in Figure 12. This screen displays whether the pump is on, or off. If the pump is off due to the off time pump delay, the delay will be displayed on the screen counting down to when the pump is allowed to start again. At the bottom of the screen the time and date are displayed.

Figure 12

Pressing the **Dwn** key will display the FAN STATUS screen shown in Figure 13. At the top of this screen the "Unit Airflow" in cubic feet per minute (CFM) is displayed. Right beneath this unit airflow are the speed commands of the supply fans. Depending on the size of the GreenAire unit there can be up to 3 supply fans.

```
        FAN STATUS        ↑
Unit Airflow          0CFM
Fan 1 Cmd:            0.0%




                          ↓
```
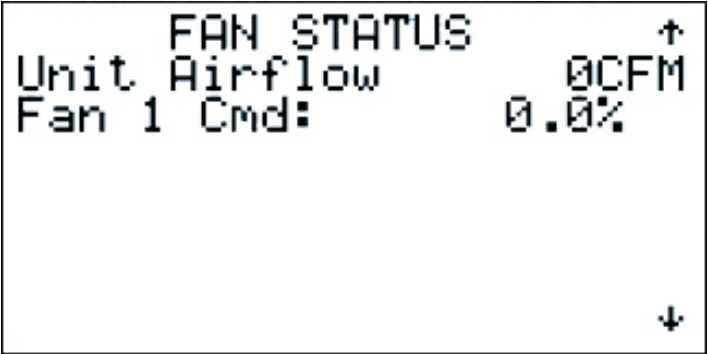
Figure 13

Pressing the **Dwn** key will display the VALVE STATUS screen shown in Figure 14. Displayed on this screen are the positions of the Chilled Water Coil (CWC) temperature and flow valves, and the Hot Water Coil (HWC) flow valve.

```
      VALVE STATUS        ↑

CWC Tmp Vlv:      100.0%
CWC Flw Vlv:      100.0%
HWC Flw Vlv:      100.0%



                          ↓
```

Figure 14

Pressing the **Dwn** key will display the CWC Flow Valve status screen shown in Figure 15. The chilled water coil flow valve is driven by either the stage 1 cooling command, or the stage 2 dehumidification command. These commands will be expressed as a position (%), and the valve will use the maximum value of either of these two commands displayed at the bottom.

```
    CWC FLOW VALVE       ↑

Stg1 Cool  Pos. 100.0%
Stg2 Dehum Pos.  89.2%



 Valve Pos: 100.0%    ↓
```

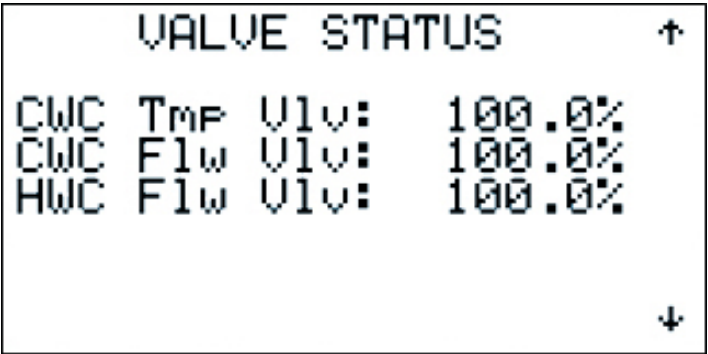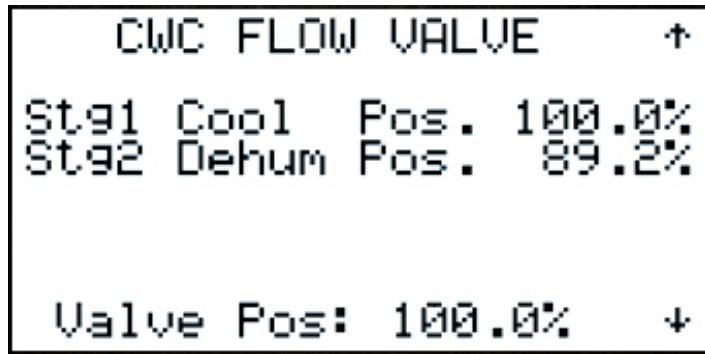Figure 15

Pressing the **Dwn** key will display the CWC Temp Valve status screen shown in Figure 16. The chilled water coil temperature valve will modulate to control the coil inlet temperature to the coil inlet temperature setpoint. The setpoint is driven by stage 2 of cooling and stage 1 of dehumidification. The stage 2 cooling and stage 1 dehumidification setpoints are displayed on the screen, and the valve will select the lowest temperature setpoint to control to displayed as "Wtr Stpt:". The current chilled water coil inlet temperature is displayed right below the active setpoint, and at the very bottom the valve position is displayed.

```
    CWC TEMP VALVE       ↑

Stg2 Cool  SP.   42.0°F
Stg1 Dehum SP.   42.0°F

  Wtr Stpt:     42.0°F
  Wtr Temp:     45.1°F
 Valve Pos:    100.0%  ↓
```
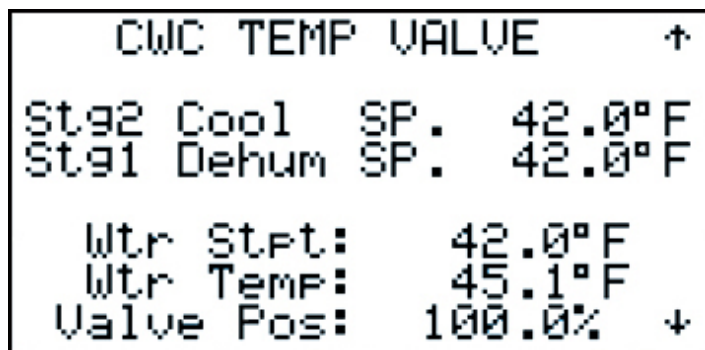
Figure 16

Pressing the **Dwn** key will display the unit CFM status screen shown in Figure 17. The Electronically Commutated (EC) fans will modulate to control the unit CFM to the CFM setpoint. The CFM setpoint is driven by stage 3 of cooling, and stage 3 of dehumidification. The CFM setpoints from the various stages are displayed in the middle of the screen. The unit CFM setpoint will select the maximum of these values, which is displayed towards the bottom of the screen. At the very bottom of the screen the calculated unit CFM is displayed.

Figure 17

Press the **ESC** key to return to the MAIN MENU.

2.3.2   Set Time & Date

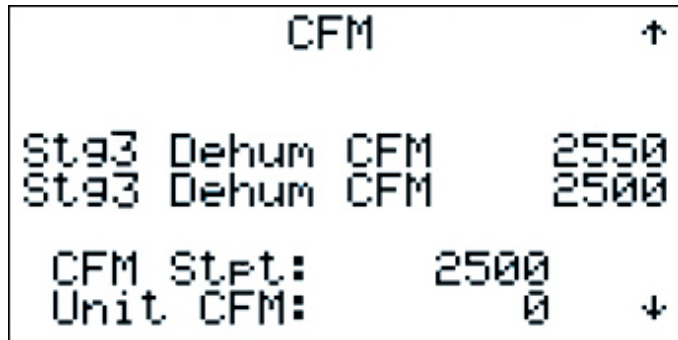To set the date and time of the Real Time Clock inside the controller select "SET DATE & TIME" from the Main Menu. The screen of Figure 19 will be displayed. Here the "Date":, and "In-Hour": can be edited to the correct values. The time zone is also settable from this screen. Selecting the text "CHICAGO" in the screen below will allow you to change to various standard time zones. Once a time zone is changed the "Update Time Zone?" should be changed from "Off" to "On". This will write the new time zone to the controller.
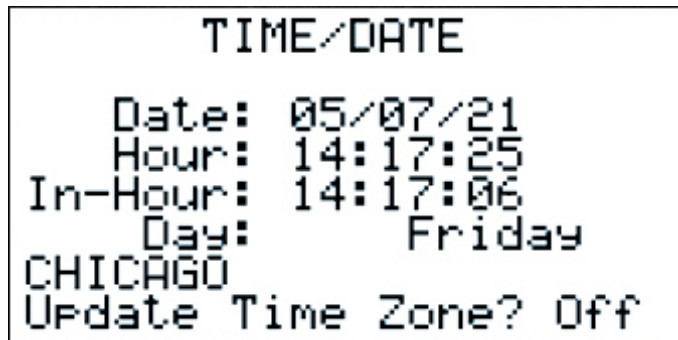

Figure 18

Press the **ESC** key to return to the MAIN MENU.

2.3.3   Service Menu

Selecting the SERVICE MENU will display the Login Screen shown in Figure 19. Enter the service password, 1234, and press **Ent**.
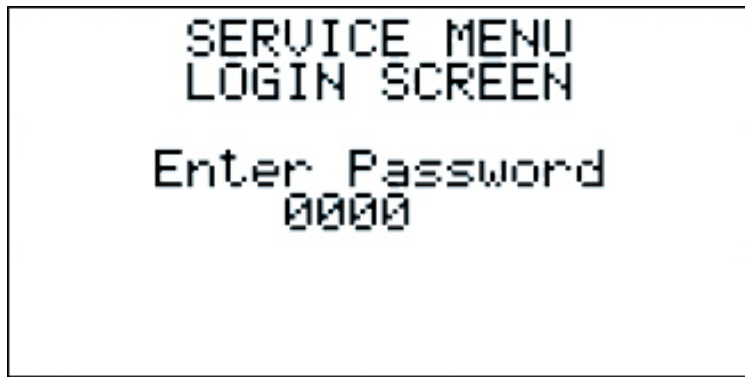
Figure 19

The SERVICE MENU allows access to COMMISSIONING, TUNING, I/O STATUS, SENSOR OFFSETS, DIAGNOSTICS, MEMORY OPTIONS, and CLEAR OVERRIDES.
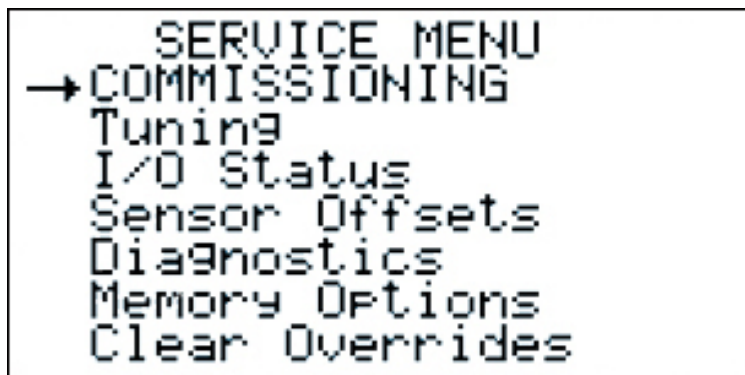
Figure 20

To return to the MAIN MENU, press the **Esc** key. The user remains logged in for 30 minutes after the password is entered. During this time, the Login Screen reads "Still Logged In – Press **Prg** to Enter". To login without entering the password, while this message is shown, press the **Prg** key.

2.3.3.1 Commissioning

Selecting COMMISSIONING from the Service Menu displays the COMMISSIONING MENU. From the Commissioning Menu the user can access the CONFIGURATION, NETWORK CONFIG, SYSTEM SETUP, COMMISSIONING TESTS, and BMS SETUP SCREENS. If the CO_2 or dirty filter option has been enabled, the CO2 SETUP and FILTER SETUP means will also be selectable.
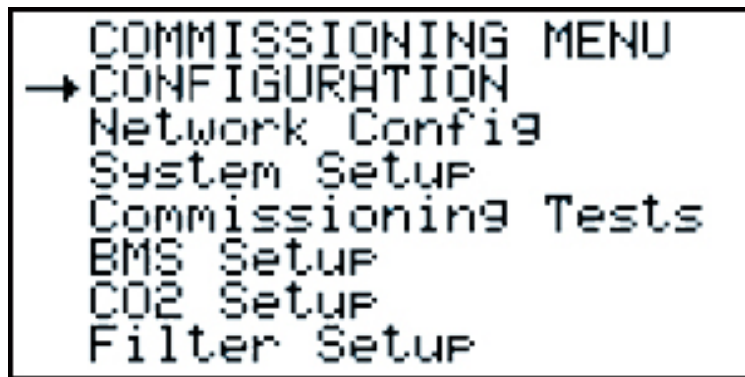
Figure 21

Press the **ESC** key to return to the MAIN MENU.

2.3.3.1.1 Configuration

Selecting CONFIGURATION from the Commissioning Menu will display the screen shown in Figure 22. This screen allows the user to enable/disable the unit pump, and adjust the chiller water setpoint. Pressing the **Dwn** key will display the screen of Figure 23.
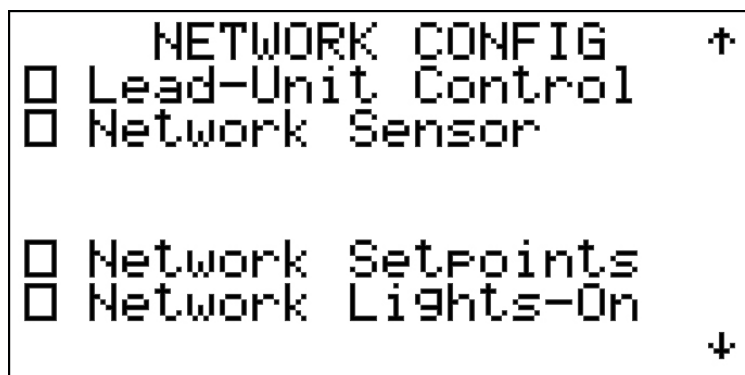
Figure 22

The NETWORK CONFIG screen allows the user to make zone sensor and setpoint selections. The first option is "Lead-Unit Control". If this option is selected the unit will use the lead unit zone sensor, zone setpoints, lights on/off status, and calculated setpoints. If this option is selected the controller must be connected to the network and will need to be adjusted for proper lead unit communication.

The next option is "Network Sensor". If this is selected the unit will use a zone sensor connected via some BMS network. When network sensor is selected, an option for "Net Heartbeat Enable" will appear. If enabled, the heartbeat delay can be set (in seconds). The heartbeat and heartbeat delay needs to be coordinated with BMS administrator. The next option is "Network Setpoints". If this is selected the unit will

receive lights on/off zone temperature and R.H. setpoints from a BMS network.

The last option is "Network Lights On". If this option is selected the unit will receive lights on/off status from a BMS network. Pressing the **Dwn** key will display the screen of Figure 24.

```
NETWORK CONFIG      ↑
□ Lead-Unit Control
□ BMS Sensor


□ BMS Setpoints
□ BMS Lights-On
                    ↓
```
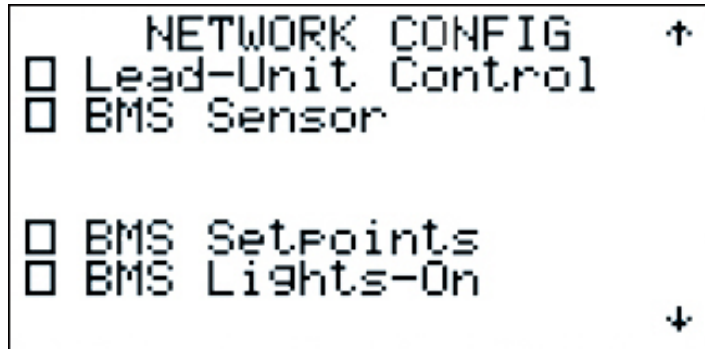
Figure 23

The CONFIGURATION SCHEDULE SELECT screen allows the user to enable the GrowCycle Scheduler. Turning on the GrowCycle Scheduler will open access to the GrowCycle Scheduler screens where multiple setpoints can be adjusted for set durations across a period of time.

Below the GrowCycle Scheduler is the CO_2 SENSOR SELECT. If the CO_2 option is enabled, this checkbox allows for reading of the zone CO_2 senor from the Lead Unit. If the unit has a CO_2 sensor connected, this checkbox should be left unchecked

```
CONFIGURATION
SCHEDULE SELECT
GrowCycle Schedule

CO2 SENSOR SELECT

□ Use Lead Unit CO2
```

Figure 24

Press the **Esc** key to return to the Commissioning Menu.

2.3.3.1.2 Network Config

Selecting NETWORK CONFIG from the Commissioning Menu will display the screen shown in Figure 25. This screen allows the user to set DHCP On or Off. When DHCP is set to Off, a Static IP address, Mask, Gateway, and DNS server can be manually entered. When DHCP is set to On, the router will automatically set the IP address, Mask, Gateway, and DNS server.

Pressing the **Dwn** key will display the screen of Figure 26.

```
  Network Config

DHCP: On
IP:     192.168.  1.105
MASK:   255.255.255.  0
GW:     192.168.  1. 14
DNS:    192.168.  1.  3
Update?
```
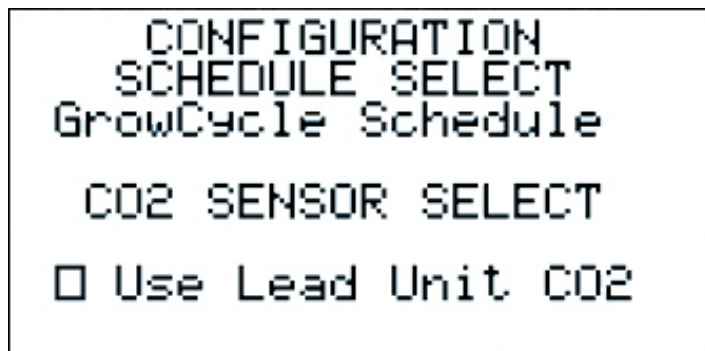
Figure 25

The ENTER UNIT TAG screen allows the user to enter a hostname for the unit. This hostname is a label that will show up on the site network to identify this particular unit. This is defaulted to "dhu1" but it is recommended that the hostname matches the unit tag on the equipment. Hostnames should be coordinated with the building IT administrator. Once the unit tag (hostname) is changed to the desired value, the checkbox "Set Unit Tag" must be checked. This will write the new hostname to the controller. The checkbox "Get Unit Tag" can be checked to confirm that the correct hostname was written to the controller. After changing the unit tag the unit should be power cycled. Pressing the **Dwn** key will display the screen of Figure 27.

```
  ENTER UNIT TAG

      dhu1

  ☐ Set Unit Tag
  ☐ Get Unit Tag
```

Figure 26

The ENTER LEAD UNIT TAG screen allows the user to enter the unit tag (hostname) of the lead unit if applicable. The lead unit will share zone sensor, setpoints, and lights on/off data with lag units that have a matching unit tag entered here. If no data is sent from the Lead Unit, the message "Hostname MB FLT" will be displayed. This will not cause an alarm, but inform the user that the unit tags (hostnames) must be coordinated. Towards the bottom of the screen the zone temperature and R.H. are displayed. Above the displayed values will be text that will either say "Zone Sensor", "Lead Unit Sensor", "BMS Sensor", or "Intake Sensor" depending on what option has been selected and which sensor is connected and sharing data.

Figure 27

Press the **Esc** key to return to the Commissioning Menu.

2.3.3.1.3 System Setup

Selecting SYSTEM SETUP from the Commissioning Menu will display the screens shown in Figures 28 and 29. From these screens the unit sizes and unit tags of a lead-lag system for the equipment can be set. If the equipment is a Lead Unit, then the unit sizes and unit tags for all of the lag units can be entered on these screens. If the equipment is a lag unit, then the unit sizes and unit tags will be displayed on these screens but not editable.

Figure 28

```
        SYSTEM SETUP
          Size    Unit Tag
Lag6 Not Set---------
Lag7 Not Set---------
Lag8 Not Set---------
Lag9 Not Set---------
```

Figure 29

2.3.3.1.4 Commissioning Tests

Selecting COMMISSIONING TESTS from the Commissioning Menu will display the screen shown in Figure 30. The COMMISSIONING TESTS CHILLED WATER COIL will override the chilled water coil leaving air temperature setpoint by changing the setting from "Auto" to "Manual". Directly below the leaving air temperature setpoint can be adjusted to the desired value. Below these settings "Start Recording" can changed to "Recording" so that the unit will collect data. A test timer at the bottom of the screen will start as a reference for the duration of the test. Pressing the **Prg** key will display the screens of Figures 31 and 32. Pressing the **Dwn** key will display the screen of Figure 33.

```
    COMMISSIONING TEST
    CHILLED WATER COIL
CWC LAT Stpt: Auto
 Manual Stpt: 65.0°F
    Start Recording

Press (Prg) for Data
 Test Time:   0:00
```

Figure 30

The COMM TEST DATA screens show both the start value of the recordings alongside the current recorded value. This allows the user to determine if the unit is operating properly during the associated test. At the bottom of the screen in Figure 32 an "Erase Record" can be edited to clear the recorded data. This will also reset the reference timer on the test. Pressing the **Esc** key from either of these screens will return to the screen of Figure 30.

```
COMM TEST DATA
         Start    Rec.
Z  RH     25.7    25.8
Z  Tmp    72.7    72.7
Z  Dwpt   35.7    35.7
IA RH     25.7    25.8
IA Tmp    72.7    72.7
IA Dwpt   35.7    35.7
```

Figure 31

```
COMM TEST DATA
          Start    Rec.
CWC LAT   57.4    57.9
SAT       52.7    53.0
CWC In    47.7    47.8
HWC In    27.5    27.6

    Erase Record
```

Figure 32

The COMMISSIONING TEST HOT WATER COIL screen will override the supply air temperature setpoint by changing the setting from "Auto" to "Manual." Directly below the supply air temperature setpoint can be adjusted to the desired value. Below these settings "Start Recording" can changed to "Recording" so that the unit will collect data. A test timer at the bottom of the screen will start as a reference for the duration of the test. Pressing the **Prg** key will display the screens of Figures 31 and 32. Pressing the **Dwn** key will display the screen of Figure 34.

```
COMMISSIONING TEST
   HOT WATER COIL
  SAT Stpt: Auto
Manual Stpt: 65.0°F
   Start Recording

Press (Prg) for Data
 Test Time:   0:00
```

Figure 33

The COMMISSIONING TEST AIRFLOW screen shown in Figure 34 will allow an override on the unit to target the maximum cfm setpoint for airflow balancing. With the override on, the unit supply fans will run and target the CFM setpoint. Displayed under the CFM setpoint is the "Raw CFM" reading. Below the raw CFM reading is the "Measured CFM" reading which can be adjusted. If the measured and raw CFM values differ where an adjustment is required, then the "Adjust Airflow" at the bottom of the screen can be selected. The unit will use the measured and raw CFM to determine a multiplier to use in the CFM calculation. This will be displayed as "Adjusted CFM" on the screen.

```
COMMISSIONING TEST
        AIRFLOW
Overide: Off
Setpoint   CFM:    2500
Raw        CFM:    7861
Measured   CFM:    2500
Adjusted   CFM:       0
     Adjust Airflow
```

Figure 34

Press the **Esc** key to return to the Commissioning Menu.

2.3.3.1.5 BMS Setup

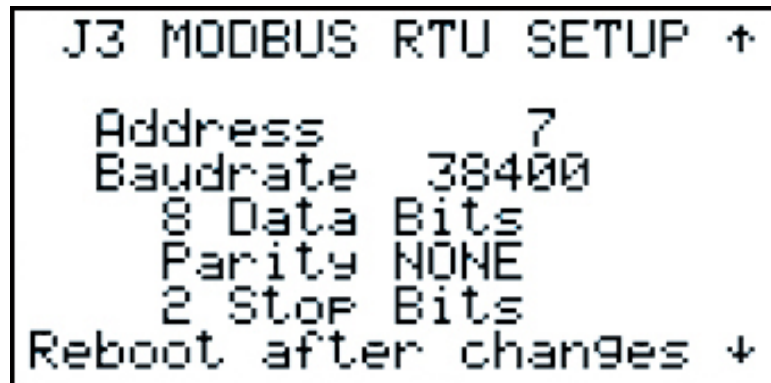Selecting BMS SETUP from the Commissioning Menu will display the screen in Figure 35. From the PORT J3 SETUP screen the controllers J3 port can be set to either PGD Display, BACnet MS/TP, or Modbus RTU. After a change is made the controller should be power cycled. Pressing the **Dwn** key will display the screen of Figure 36.

```
PORT J3 SETUP       ↑

Set to PGD Display




Reboot after changes ↓
```

Figure 35

If the J3 Port is set for Modbus RTU then the J3 MODBUS RTU SETUP screen can be used to make adjustments to the communication protocol. If the J3 Port is NOT set for Modbus RTU this screen can be ignored. On the screen the Address, Baudrate, Number of Data Bits, Parity, and Stop Bits can all be set. After making any adjustments the controller should be power cycled. Pressing the **Dwn** key displays the screen of Figure 37
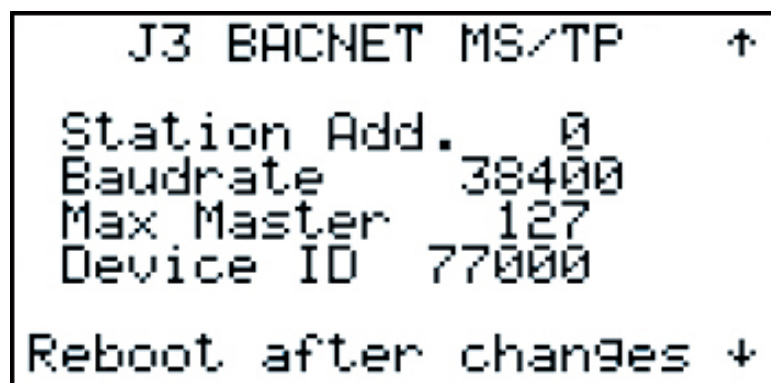

Figure 36

If the J3 Port is set for BACnet MS/TP then the J3 BACNET MS/TP screen can be used to make adjustments to the communication protocol. If the J3 Port is NOT set for BACnet MS/TP this screen can be ignored. On the screen the Station Address, Baudrate, Max Master, and Device ID can all be adjusted. After making any adjustments the controller should be power cycled. Pressing the **Dwn** key displays the screen of Figure 38.

Figure 37

From the ETHERNET SETUP screen the controllers Ethernet Port can be configured for Modbus TCP/IP, or BACnet communications protocols. After a change is made the controller should be power cycled. Pressing the **Dwn** key displays the screen of Figure 39.
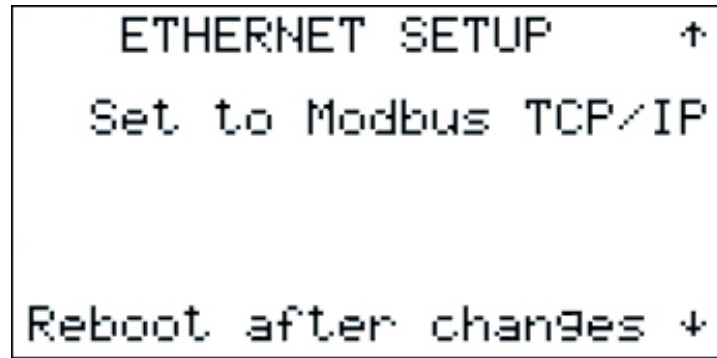
Figure 38

If the Ethernet Port is set for BACnet IP then the BACnet IP Settings screen can be used to make adjustments to the communications protocol. If the Ethernet Port is NOT set for BACnet IP this screen can be ignored. On the screen the Device ID, and Port can be adjusted. After making any adjustments the controller should be power cycled.
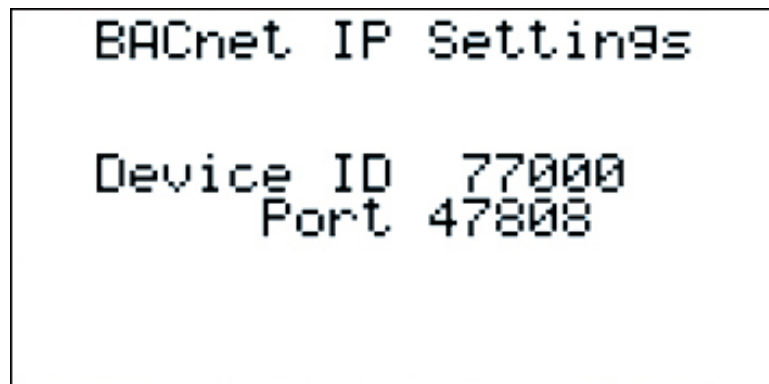
Figure 39

Press the **Esc** key to return to the COMMISSIONING MENU.

2.3.3.1.6 CO_2 Setup

Selecting CO2 SETUP from the Commissioning Menu will display the CO2 VALVE SETUP screen shown in Figure 40. From this screen the valve "On Setpoint" is adjustable as well as the differential. The valve "Off Setpoint" will be calculated as the "On Setpoint" plus the differential displayed below these settings. Towards the bottom of the screen the zone CO_2 is displayed as well as the CO_2 Valve On/Off status. Pressing the **Dwn** key will display the screen of Figure 41.

Figure 40

From the CO2 HIGH ALARM SETUP screen the high alarm setpoint and differential are adjustable towards the top of the screen. Towards the bottom of the screen the zone CO_2 is displayed as well as the CO_2 high alarm "OK/FLT" status. Pressing the **Dwn** key will display the screen of Figure 42.

Figure 41

From the CO2 LOW ALARM SETUP screen the low alarm setpoint and differential are adjustable towards the top of the screen. Towards the bottom of the screen the zone CO_2 is displayed as well as the CO_2 low alarm "OK/FLT" status. Press the **Esc** key to return to the COMMISSIONING MENU.

Figure 42

2.3.3.1.7 Filter Setup

Selecting FILTER SETUP from the Commissioning Menu will display the screen of Figure 43. From the FILTER SETUP screen the filter differential pressure alarm setpoint is adjustable as well as the alarm differential. At the top of the screen the current filter differential pressure is displayed, and towards the bottom the filter alarm status is displayed.


```
FILTER SETUP

Fltr DP      1.488"wc
Alrm Stpt    1.000"wc
Alrm Diff    0.050"wc


   Filter Alarm!!
```

Figure 43

Press the **Esc** key to return to the COMMISSIONING MENU. From the Commissioning Menu press the **Esc** key again to return to the SERVICE MENU.

2.3.3.2. Tuning

Selecting TUNING from the Service Menu will display the TUNING MENU screen shown in Figure 44. From the Tuning Menu the user can access the ZONE CONTROL PID, COIL DEMANDS PID, TEMP-BAND SETUP, STAGES SETUP, VALVES PID, SUPPLY FANS, and VPD SETUP menus .
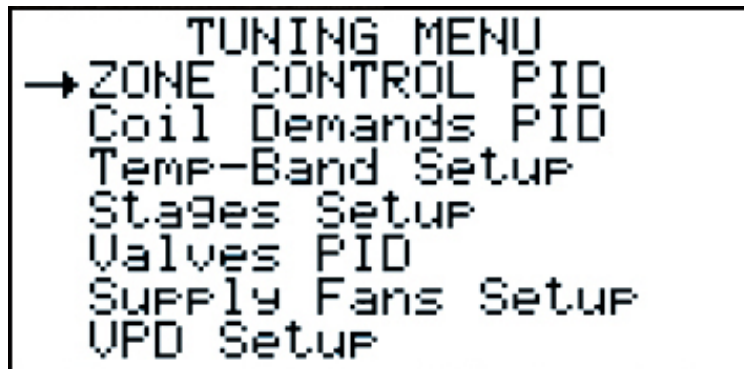


```
    TUNING MENU
→ZONE CONTROL PID
  Coil Demands PID
  Temp-Band Setup
  Stages Setup
  Valves PID
  Supply Fans Setup
  VPD Setup
```

Figure 44

Press the **Esc** key to return to the Service Menu.

2.3.3.2.1 Zone Control PID

Selecting ZONE CONTROL PID from the Tuning Menu will either display the COOL DEMAND TUNING screen shown in Figure 45 for Lead Units, or the LEAD-UNIT ZONE DEMANDS screen shown in Figure 51 for lag units. From the Cool Demand Tuning screen the Proportional Integral Derivative (PID) terms for cooling demand are all adjustable. Towards the bottom half of the screen the zone temperature, zone temperature setpoint, and calculated cooling demand are all displayed. Pressing the **Dwn** key will display the screen of Figure 46.

```
 COOL DEMAND TUNING ↑

  Kp-Gain:      40.0
   Ti-Int:   100.0Sec
   Td-Der:     0.0Sec
 Zone Temp:    69.6°F
      Stpt:    49.9°F
 Cool Dmd:   100.0%   ↓
```

Figure 45

The HEAT/REHEAT SAT RESET TUNING screen allows for adjustments of the PID terms on the top half of the screen. Towards the bottom half of the screen the zone temperature, zone temperature setpoint, and calculated supply air temperature setpoint are all displayed. Pressing the **Dwn** key will display the screen of Figure 47.

```
 HEAT/REHEAT SAT    ↑
 RESET TUNING
  Kp-Gain:      55.0
   Ti-Int:   150.0Sec
   Td-Der:     5.0Sec
 Zone Temp:    32.0°F
      Stpt:    49.9°F
 SAT Stpt:     54.9°F  ↓
```

Figure 46

The DEWPOINT DEMAND TUNING screen allows for adjustments of the PID terms on the top half of the screen. Towards the bottom half of the screen the zone dewpoint, zone dewpoint setpoint, and calculated dewpoint demand are all displayed. Pressing the **Dwn** key will display the screen of Figure 48.

Figure 47

The HUMIDIFY DEMAND TUNING screen allows for adjustments of the PID terms on the top half of the screen. Towards the bottom half of the screen the zone dewpoint, zone dewpoint setpoint, and calculated humidify demand are all displayed. Pressing the **Dwn** key will display the screen of Figure 49.
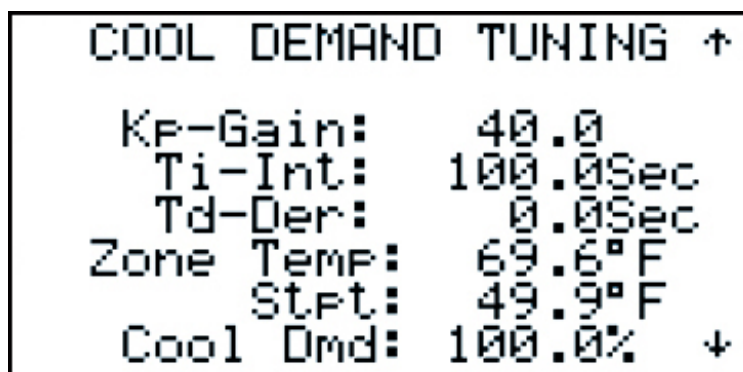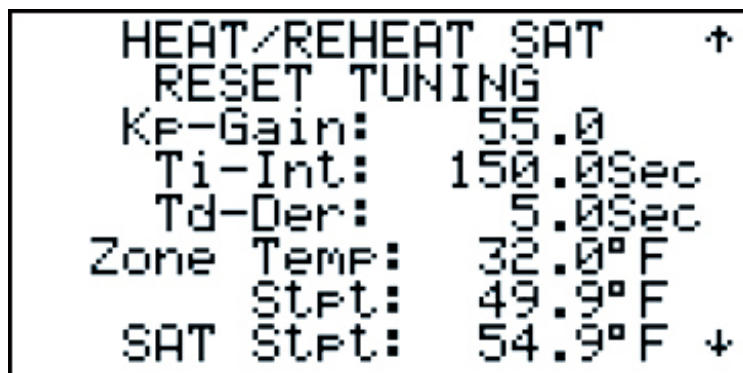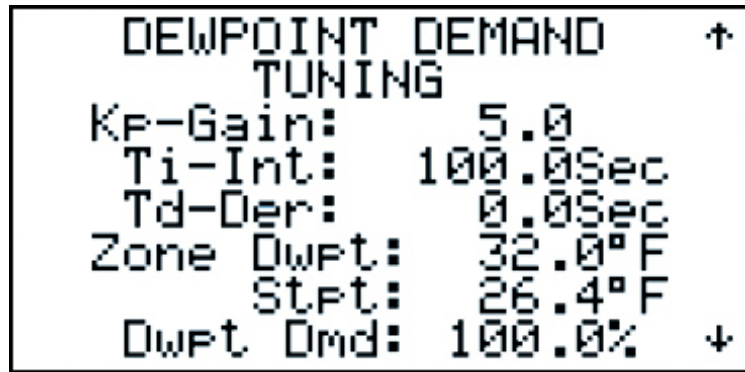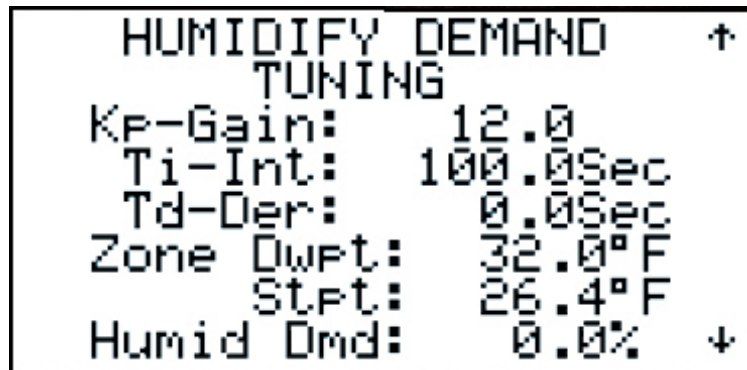

Figure 48

The RH LIMIT DEMAND TUNING screen allows for adjustments of the PID terms on the top half of the screen. Towards the bottom half of the screen the zone RH, zone RH setpoint, and RH limit demand are all displayed. Pressing the **Dwn** key will display the screen of Figure 50.
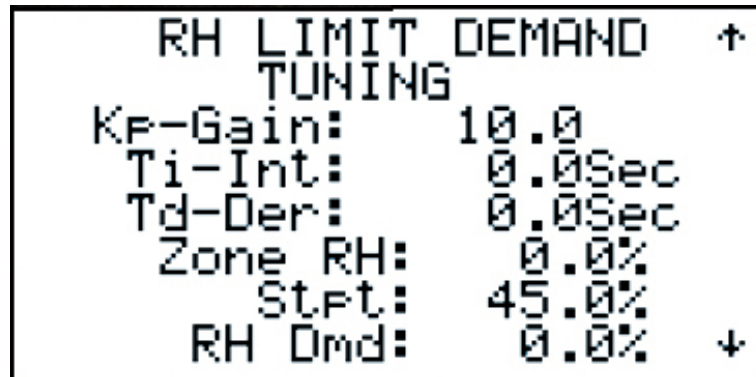
Figure 49

The DEHUM DEMAND screen shows the status of the RH limit demand, and dewpoint demand towards the top of the screen. Towards the bottom of the screen the dehum demand is displayed. This is the maximum value of the RH Limit and dewpoint demands. Press the **Esc** key to return to the Tuning Menu.
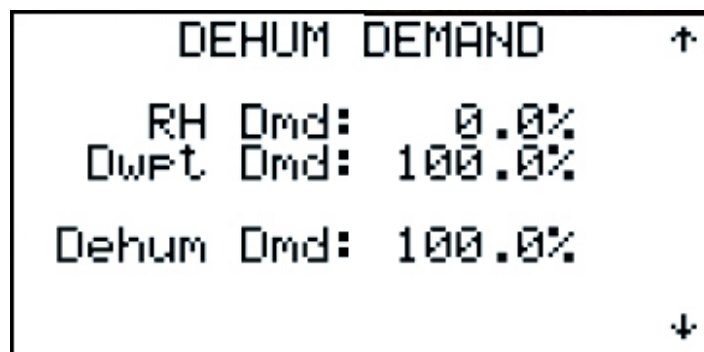
Figure 50

If the equipment is set up as a lag unit then selecting the ZONE RESET PID will display the screen of Figure 51. The unit will receive the calculated demands and setpoints from the Lead Unit, and no PID adjustments are required in the lag unit. The values are displayed on the LEAD-UNIT ZONE DEMANDS screen shown in Figure 51. At the top the cooling demand is displayed followed by the RH limit demand, dewpoint demand, and dehum demand. Pressing the **Dwn** key will display the screen of Figure 52.
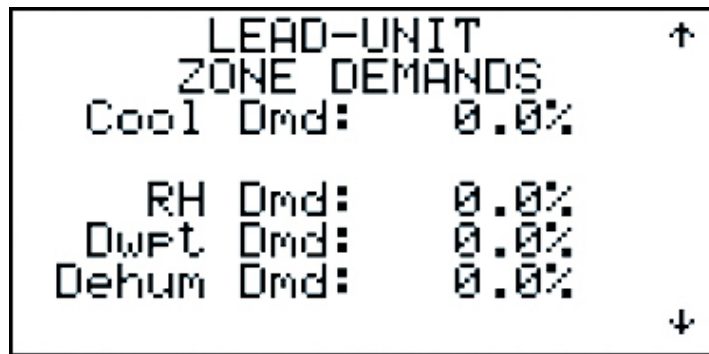
Figure 51

The ZONE DEMANDS screen of Figure 52 also displays calculated demands and setpoints from the Lead Unit. At the top of the screen the humidify demand is displayed. Towards the bottom of the screen the supply air temperature setpoint is displayed.

Figure 52

Press the **Esc** key to return to the Tuning Menu.

2.3.3.2.2 Coil Demands PID

Selecting the COIL DEMANDS PID from the Tuning Menu will display the screen shown in Figure 53. From the COOLING CWC LAT RESET TUNING screen the PID terms for the cooling chilled water coil leaving air temperature reset demand control loop are adjustable. On the bottom half of the screen the chilled water coil leaving air temperature, cooling chilled water coil leaving air temperature setpoint, and calculated cooling chilled water coil demand are all displayed. Pressing the **Dwn** key will display the screen of Figure 54.

Figure 53

From the COOLING COIL DEMAND MANUAL SETTINGS screen the cooling chilled water coil demand and setpoint can be manually overwritten. At the top of the screen the cooling chilled water coil leaving air temperature setpoint can be set from "Auto" to "Manual". Directly below the manual cooling chilled water coil leaving air temperature setpoint can be adjusted. Towards the bottom of the screen the cooling chilled water coil demand can be set from "Auto" to "Manual", and directly below the manual cooling chilled water coil demand can be adjusted. Pressing the **Dwn** key will display the screen of Figure 55.

Figure 54

From the DEHUM CWC LAT RESET TUNING screen the PID terms for the dehum chilled water coil leaving air temperature reset demand control loop are adjustable. On the bottom half of the screen the chilled water coil leaving air temperature, dehum chilled water coil leaving air temperature setpoint, and calculated dehum chilled water coil demand are all displayed. Pressing the **Dwn** key will display the screen of Figure 56.

Figure 55

From the DEHUM COIL DEMAND MANUAL SETTINGS screen the dehum chilled water coil demand and setpoint can be manually overwritten. At the top of the screen the dehum chilled water coil leaving air temperature setpoint can be set from "Auto" to "Manual". Directly below the manual dehum chilled water coil leaving air temperature setpoint can be adjusted. Towards the bottom of the screen the dehum chilled water coil demand can be set from "Auto" to "Manual", and directly below the manual dehum chilled water coil demand can be adjusted.
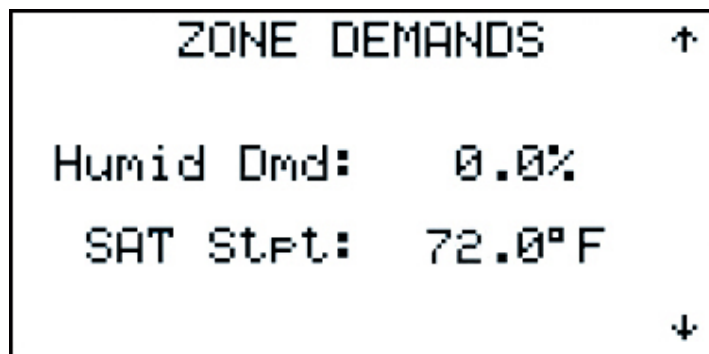

Figure 56

Press the **Esc** key to return to the Tuning Menu.

2.3.3.2.3   Temp-Band Setup

Selecting TEMP-BAND SETUP from the Tuning Menu will display either the screen of Figure 56 for Lead Units, or the screen of Figure 57 lor lag units. The LIGHTS OFF SAT BAND screen allows the user to adjust the lights off calculated supply air temperature setpoint band. The lowband and highband are calculated by adding the low offset and high offset to the zone temperature setpoint

respectively. The zone temperature setpoint is displayed on the top of the screen. The low offset, and high offset are adjustable directly below the zone temperature setpoint. The lowband, and highband are displayed towards the bottom of the screen. Pressing the **Dwn** key will display the screen of Figure 58.
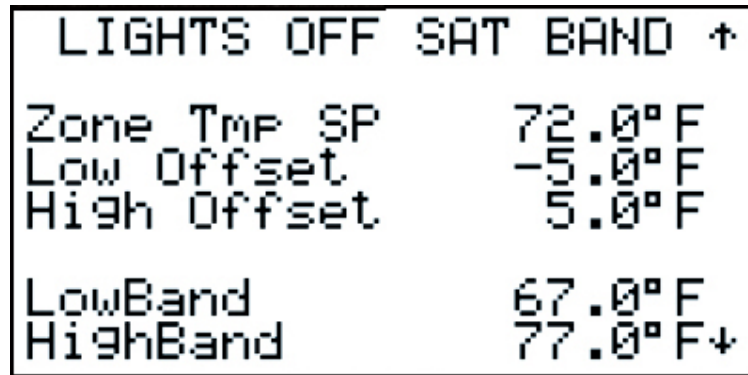
Figure 57

From the LIGHTS ON SAT BAND screen the user can adjust the lights on calculated supply air temperature setpoint bands. The lowband and highband are calculated by adding the low offset and high offset to the zone temperature setpoint respectively. The zone temperature setpoint is displayed on the top of the screen. The low offset, and high offset are adjustable directly below the zone temperature setpoint. The lowband, and highband are displayed towards the bottom of the screen. Pressing the **Dwn** key will display the screen of Figure 60.
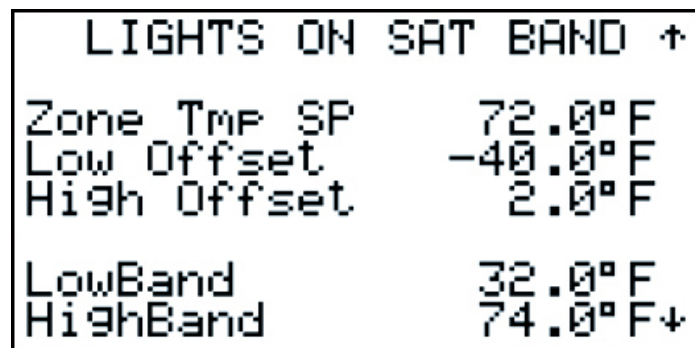
Figure 58

If the equipment is a lag unit, then the screen of Figure 59 will be displayed when selecting the TEMP-BAND SETUP screens. On the LEAD-UNIT SAT BAND screen the lowBand and highband are displayed on the screen. These values are sent by the lead unit and are display only on the lag unit. Pressing the **Dwn** key will display the screen of Figure 60.
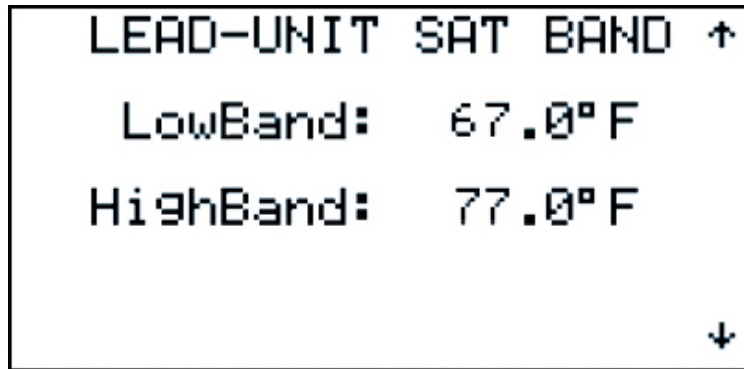
Figure 59

From the COOLING CWC LAT RESET SETPOINT screen the start cooling demand and setpoint are viewable towards the top of the screen. Directly below the max cooling demand and setpoint are displayed. At the bottom the current calculated cooling demand and corresponding cooling chilled water coil leaving air temperature setpoint are displayed. Pressing the **Dwn** key will display the screen of Figure 61.
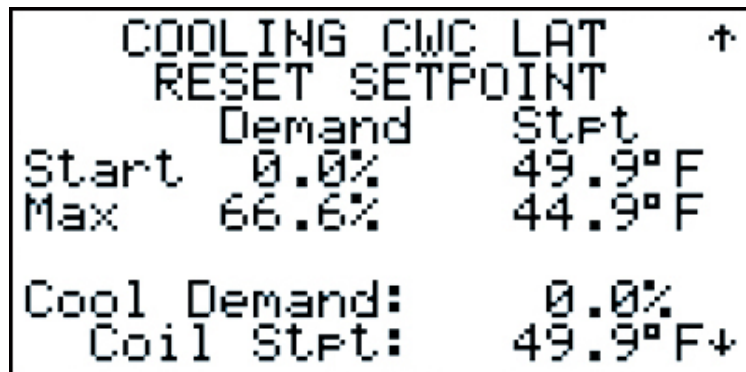
Figure 60

From the DEHUM CWC LAT RESET SETPOINT screen the start dehum demand and setpoint are viewable towards the top of the screen. Directly below the max dehum demand and setpoint are displayed. At the bottom the current calculated dehum demand and corresponding dehum chilled water coil leaving air temperature setpoint are displayed.
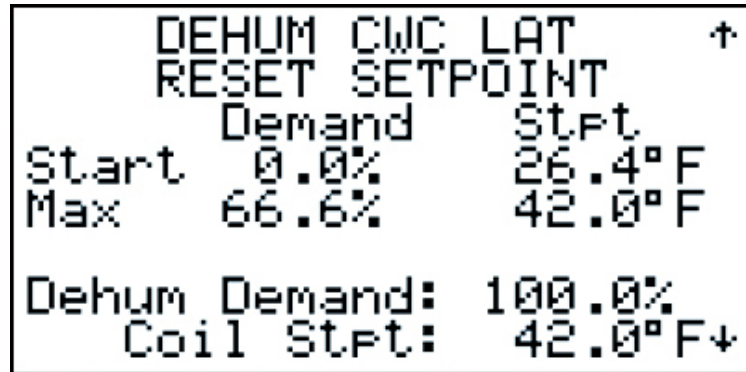
Figure 61

Press the **Esc** key to return to the Tuning Menu.

2.3.3.2.4　Stages Setup

Selecting STAGES SETUP from the Tuning Menu will display the screen of Figure 62. The stages setup starts with cooling stage 1 which has direct control over the chilled water coil flow valve. The cooling stage 1 start demand and start position are adjustable towards the top of the screen. Directly below, the cooling stage 1 maximum demand and valve position are adjustable. Towards the bottom of the screen the current cooling coil demand, and cooling stage 1 flow valve command are displayed. Pressing the **Dwn** key will display the screen of Figure 63.
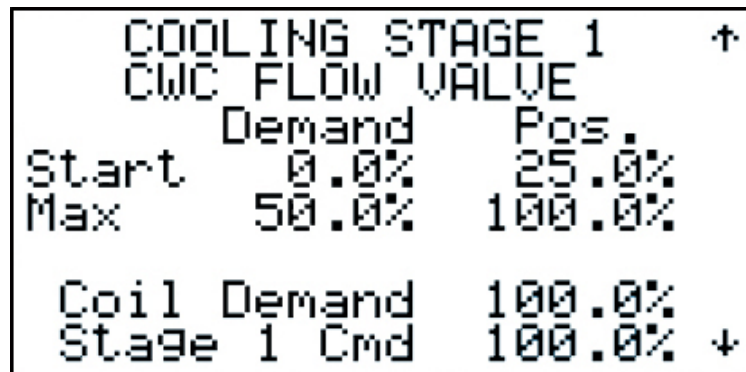
Figure 62

Stage 2 of cooling has indirect control of the chilled water coil temperature valve. As the cooling demand changes, the setpoint for the chilled water coil temperature valve control loop is changed. The cooling stage 2 start demand (adjustable) and cold water inlet temperature setpoint are shown towards the top of the screen. Directly below, the cooling stage 2 maximum demand (adjustable) and cold water inlet temperature setpoint are shown. Towards the bottom of the screen the current cooling coil demand, and cooling stage 2 cold

water inlet temperature setpoint are displayed.

```
  COOLING STAGE 2      ↑
  CWC TEMP VALVE
        Demand CWC-In SP
Start   50.0%     47.9°F
Max    100.0%     42.0°F

 Coil Demand      100.0%
Stage 2 Stpt       42.0°F↓
```

Figure 63

Stage 3 of cooling has indirect control of the unit CFM. As the cooling demand changes, the setpoint for the unit CFM control loop is changed. The cooling stage 3 start demand (adjustable) and CFM setpoint are shown towards the top of the screen. Directly below, the cooling stage 3 maximum demand (adjustable) and CFM setpoint are shown. Towards the bottom of the screen the current cooling demand and cooling stage 3 airflow setpoint are displayed. Pressing the **Dwn** key will display the screen of Figure 65.

```
  COOLING STAGE 3      ↑
      FAN CFM
        Demand  Airflow
Start   66.6%    1250.0
Max    100.0%    2500.0

 Cool Demand        0.0%
Stage 3 Stpt     1250.0 ↓
```
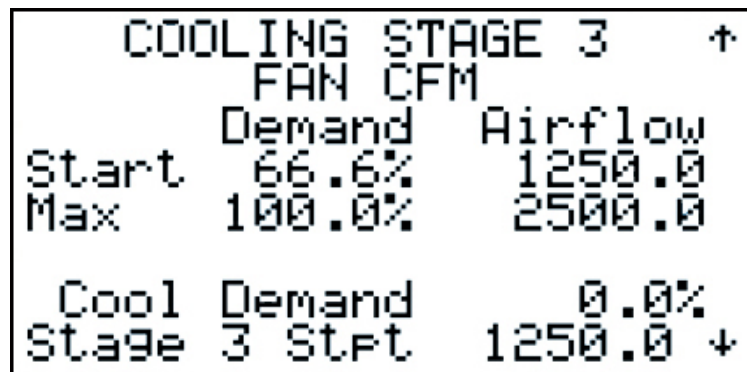
Figure 64

Stage 1 of dehum has indirect control of the chilled water coil temperature valve. As the dehum demand changes, the setpoint for the chilled water coil temperature valve control loop is changed. The dehum stage 1 start demand (adjustable) and cold water inlet temperature setpoint are shown towards the top of the screen. Directly below, the dehum stage 2 maximum demand (adjustable) and cold water inlet temperature setpoint are shown. Towards the bottom of the screen the current dehum coil demand, and dehum stage 1 cold water inlet temperature setpoint are displayed. Pressing the **Dwn** key will display the screen of Figure 66.

```
 ┌─────────────────────────────────┐
 │   DEHUM STAGE 1        ✝         │
 │   CWC TEMP VALVE                 │
 │        Demand CWC-In SP          │
 │ Start     0.0      47.9°F        │
 │ Max      50.0      42.0°F        │
 │                                  │
 │  Coil Demand    100.0            │
 │ Stage 1 Stpt     42.0°F↓         │
 └─────────────────────────────────┘
```
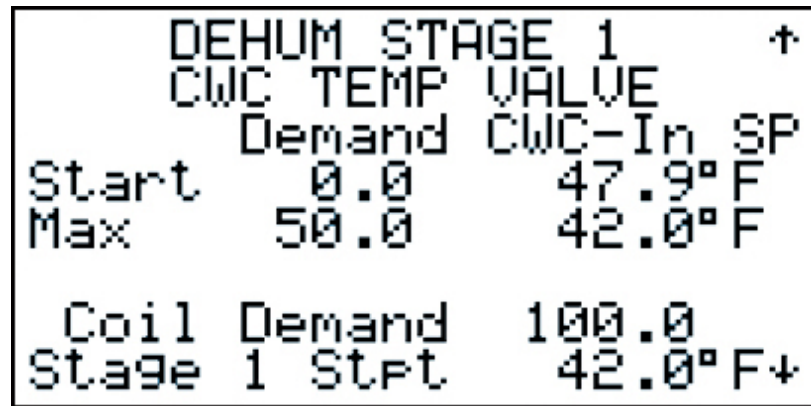
Figure 65

Stage 2 of dehum has direct control over the chilled water coil flow valve. The dehum stage 2 start demand and valve position are adjustable towards the top of the screen. Directly below, the dehum stage 2 maximum demand and valve position are adjustable. Towards the bottom of the screen the current dehum coil demand, and dehum stage 2 flow valve command are displayed. Pressing the **Dwn** key will display the screen of Figure 67.

```
 ┌─────────────────────────────────┐
 │   DEHUM STAGE 2        ✝         │
 │   CWC FLOW VALVE                 │
 │        Demand      Pos.          │
 │ Start   50.0%     25.0%          │
 │ Max    100.0%    100.0%          │
 │                                  │
 │  Coil Demand    100.0%           │
 │ Stage 2 Cmd     100.0%  ↓        │
 └─────────────────────────────────┘
```

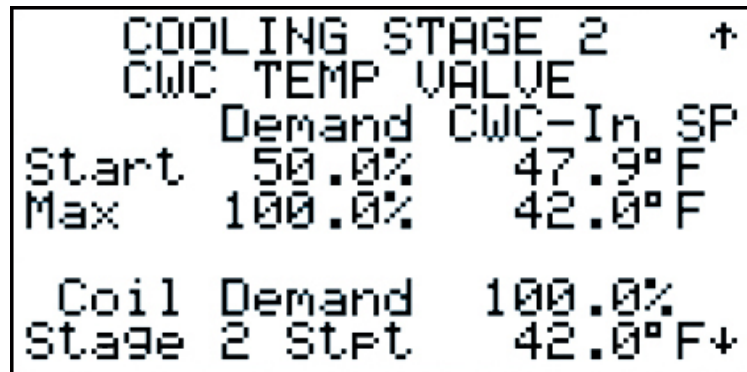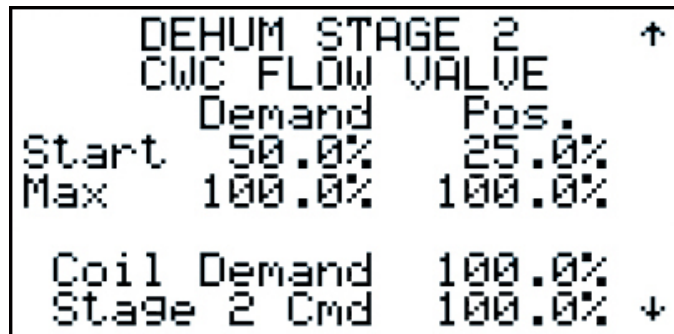Figure 66

Stage 3 of dehum has indirect control of the unit CFM. As the dehum demand changes, the setpoint for the unit CFM control loop is changed. The dehum stage 3 start demand (adjustable) and CFM setpoint are shown towards the top of the screen. Directly below, the dehum stage 3 maximum demand (adjustable) and CFM setpoint are shown. Towards the bottom of the screen the current dehum demand and dehum stage 3 airflow setpoint are displayed.
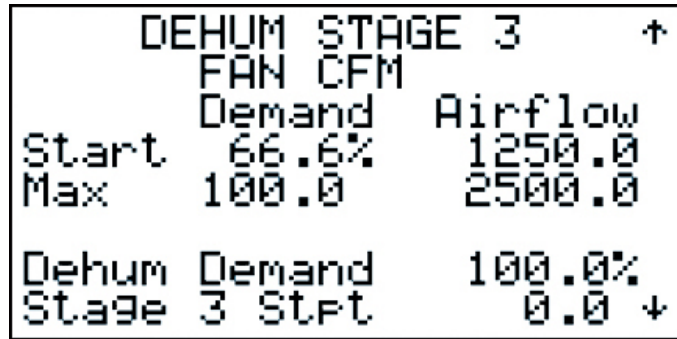
Figure 67

Press the **Esc** key to return to the Tuning menu.

2.3.3.2.5   Valves PID

Selecting VALVES PID from the Tuning Menu will display the screen of Figure 68. From the CHILLED WATER COIL TEMP VALVE PID screen the PID terms for the cold water coil temperature valve control loop are adjustable towards the top of the screen. The chilled water coil inlet temperature and chilled water coil inlet temperature setpoint are displayed below the PID terms. At the bottom of the screen the valve position is displayed. Pressing the **Dwn** key will display the screen of Figure 69.
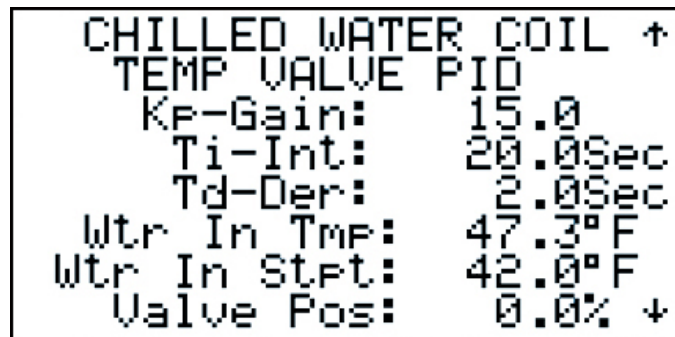
Figure 68

From the CWC TEMP VALVE MANUAL SETTINGS screen, the chilled water coil inlet temperature setpoint can be switched from "Auto" to "Manual". Directly below the chilled water coil inlet temperature setpoint can be manually adjusted. On the bottom half of the screen the chilled water coil temperature valve position can be switched from "Auto" to "Manual". Directly below the manual valve position can be adjusted. Pressing the **Dwn** key will display the screen of Figure 70.

Figure 69

From the HOT WATER COIL VALVE PID screen, the PID terms for the hot water coil valve control loop are all adjustable towards the top of the screen. The supply air temperature, calculated supply air temperature setpoint, and the hot water coil valve command are displayed towards the bottom half of the screen. Pressing the **Dwn** key will display the screen of Figure 71.

Figure 70

From the HWC VALVE MANUAL SETTINGS screen, the calculated supply air temperature setpoint can be switched from "Auto" to "Manual". Directly below the manual supply air temperature setpoint can be adjusted. On the bottom half of the screen the hot water coil valve position can be switched from "Auto" to "Manual". Directly below the manual hot water coil valve position can be adjusted.

Figure 71

Press the **Esc** key to return to the Tuning Menu.

2.3.3.2.6 Supply Fans Setup

Selecting SUPPLY FANS SETUP from the Tuning Menu will display the screen of Figure 72. From the SUPPLY FAN PID screen the PID terms for the unit airflow control loop are all adjustable towards the top of the screen. The airflow setpoint, current airflow, and loop output are displayed on the bottom half of the screen. Pressing the **Dwn** key will display the screen of Figure 73.

Figure 72

From the MAX/MIN CFM SETTINGS screen the maximum and minimum unit CFM setpoints are adjustable. These values are selected based on unit size. The supply fan PID loop will use either the maximum or minimum setpoint based on what stage the unit is in, and what demands are required. Pressing the **Dwn** key will display the screen of Figure 74.

```
┌─────────────────────────────────┐
│    MAX/MIN CFM          ↑        │
│      SETTINGS                    │
│                                  │
│  Nominal Min. Airflow            │
│        1250 CFM                  │
│  Nominal Max. Airflow            │
│        2500 CFM                  │
│                         ↓        │
└─────────────────────────────────┘
```
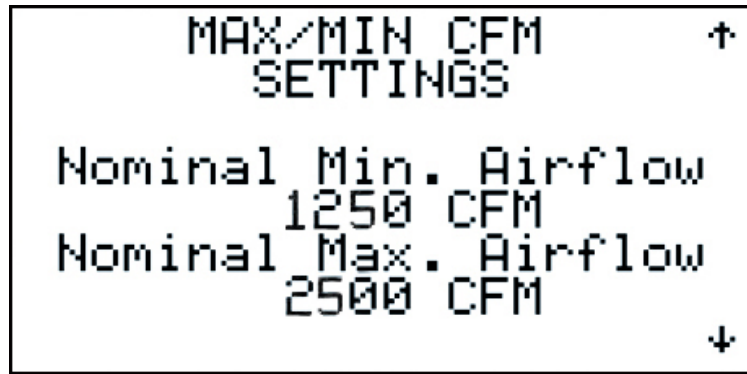
Figure 73

From the MANUAL SETTINGS screen, the CFM setpoint can be changed from "Auto" to "Manual" towards the top of the screen. When in manual mode the CFM setpoint can be adjusted and will ignore inputs from the various stages of cooling or dehum. On the bottom half of the screen the supply fan(s) speed command can be changed from "Auto" to "Manual". When in manual mode the supply fan(s) speed command can be manually adjusted and will ignore the speed command from the CFM control loop.

```
┌─────────────────────────────────┐
│  MANUAL SETTINGS        ↑        │
│                                  │
│    CFM Stpt: Auto                │
│  Manual Stpt:      0             │
│                                  │
│    Speed Cmd: Auto               │
│  Manual Cmd:   20.0%             │
│                         ↓        │
└─────────────────────────────────┘
```
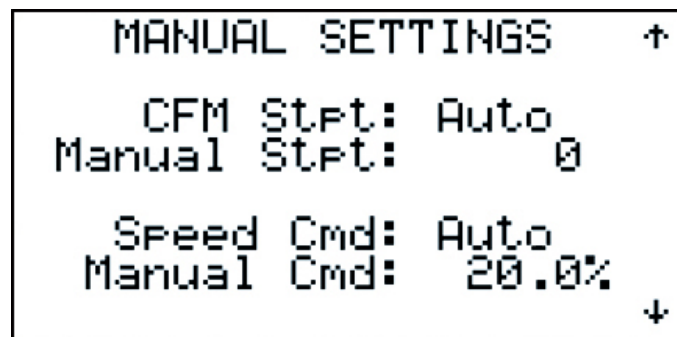
Figure 74

Press the **Esc** key to return to the TUNING MENU.

2.3.3.2.7   VPD Setup

Selecting VPD SETUP from the Tuning Menu displays the screen of Figure 75. On the LEAF TEMP SETUP screen the zone temperature is displayed at the top. Directly below the leaf temperature offset is adjustable. This is added to the zone temperature as an approximation of the leaf temperature. The controller can also receive its leaf temperature from a BMS system. Below the leaf offset, a check box can be checked if the unit will receive its leaf temperature from a BMS sensor. At the bottom of the screen the leaf temperature is displayed. Pressing the **Dwn** key will display the screen of Figure 76.

```
  LEAF TEMP SETUP    ↑
Zone Tmp        72.0°F
Leaf Offset      6.0°F

☐ Use Net Leaf Tmp


Leaf Tmp        70.0°F  ↓
```
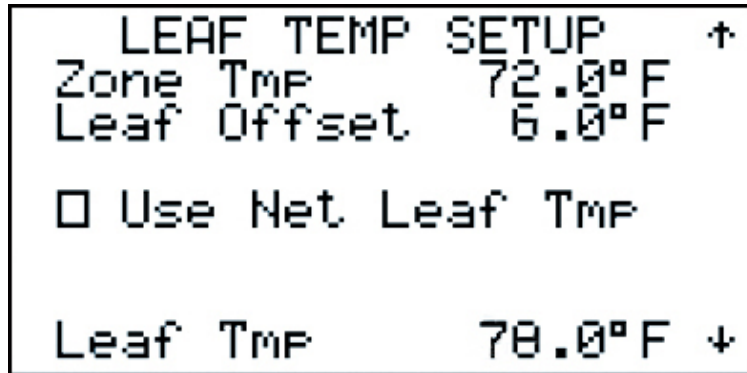
Figure 75

From the VAP PRESS. DEFICIT screen the leaf temperature, zone temperature, and zone relative humidity are all displayed. At the bottom of the screen the calculated vapor pressure deficit is displayed

```
 VAP PRESS. DEFECIT  ↑

Leaf Tmp        70.0°F
Zone Tmp        72.0°F
Zone RH         50.0°F


VPD          0.611kPa   ↓
```
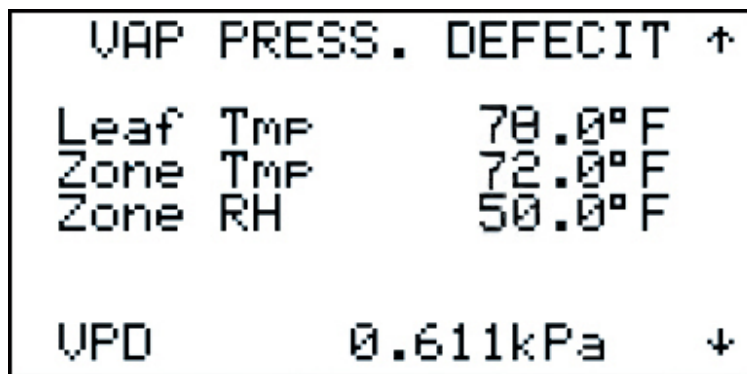
Figure 76

Press the **Esc** key to return to the Tuning Menu. Press the **Esc** key on the Tuning Menu to return to the Service Menu.

2.3.3.3   I/O Status

Selecting I/O STATUS from the Service Menu will display the screen of Figure 77. From this menu the DIGITAL INPUTS, ANALOG INPUTS, DIGITAL OUTPUTS, and ANALOG OUTPUTS screens are all available.

```
         I/O STATUS

→DIGITAL INPUTS
 Analog Inputs
 Digital Outputs
 Analog Outputs
```
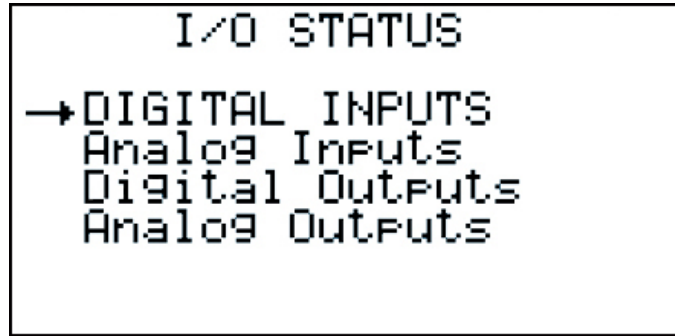
Figure 77

2.3.3.3.1   Digital Inputs (Binary)

Selecting the DIGITAL INPUTS screen shows the state of the digital contacts used by the control system. This screen is provided for troubleshooting the control system. Shown in Figure 78

- The first line shows the status of U3, the digital photocell input. This is an optional input, and will not be shown if the photocell option is not selected. The input will read "On" when the photocell contact is closed, indicating lights on. The input will read "Off" when the photocell contact is open indicating lights off.

- The second line shows the status of U8, the low voltage alarm input. This is an optional input, and will not be shown if the low voltage option is not selected. The input will read "OK" when the contact is closed, and no fault found. The input will read "FLT" when the contact is opened, and a fault has been detected.

- The third line shows the status of U9, the pump overload input. This will always be displayed. The input will read "OK" when the Motor Starter Protector (MSP) contact is closed and no overload has occurred. The input will read "FLT" when the MSP contact is open, and an overload has occurred.

- The fourth line shows the status of U10, the system On/Off input. The input will read "On" when the switch contact is closed, and "Off" when the switch contact is open.

- The fifth line shows the status of ID1, the smoke alarm contact. The input will read "OK" when the contact is closed, and "FLT" when the contact is open.

- The sixth line shows the status of ID2, the condensate overflow switch. This is an optional input, and will not be shown if the condensate float switch option has not been selected. The input will read "OK" when the contact is open, and "FLT" when the contact is closed.

```
   DIGITAL  INPUTS

U3    Photocell       On
U8    Low Volt Alrm   OK
U9    Pump OL         FLT
U10   System On/Off   On
ID1   Smoke Alarm     OK
ID2   Cond. Flt Sw    FLT
```

Figure 78

Press the **Esc** key to return to the I/O STATUS MENU.

2.3.3.3.2   Analog Inputs

Selecting ANALOG INPUTS displays the screens shown in Figure 79. This first Analog Inputs screen shows the status of the zone temperature and humidity Modbus sensor (address 190). It will display the zone temperature, relative humidity, and dewpoint read by the zone sensor

```
   ANALOG  INPUTS      ↑
     ZONE SENSOR


MB190  Temp      72.0° F
MB190  RH        50.0 %
MB190  Dewpt.    52.0° F


                       ↓
```

Figure 79

Pressing the **Dwn** key will display the screen of Figure 80. This screen shows the status of the intake temperature and humidity Modbus sensor (address 191). It will display the intake temperature, relative humidity, and dewpoint read by the intake sensor.

```
    ANALOG INPUTS      ↑
     INTAKE SENSOR

MB191 Temp        72.0°F
MB191 RH          50.0 %
MB191 Dewpt       52.0°F

                     ↓
```

Figure 80

Pressing the **Dwn** key will display the screen of Figure 81. This screen displays the inputs associated with the chilled water coil. Towards the top the status of U1 the chilled water coil water inlet temperature is displayed. Directly below the status of U4 the chilled water coil leaving air temperature is displayed.

```
    ANALOG INPUTS      ↑
       COLD WATER

U1 CWC Wtr In    45.0°F
U4 CWC LAT       49.0°F

                     ↓
```

Figure 81

Pressing the **Dwn** key will display the screen of Figure 82. This screen displays the inputs associated with the hot water coil. In the center of the screen the status of U2 the hot water coil water inlet temperature is displayed.

```
    ANALOG INPUTS      ↑
       HOT WATER

U2 HWC Wtr In  78.0°F



                     ↓
```
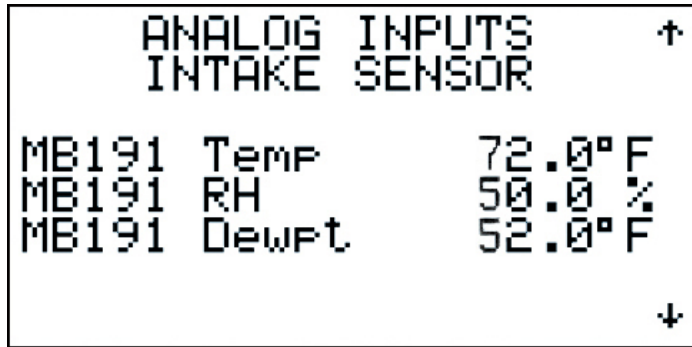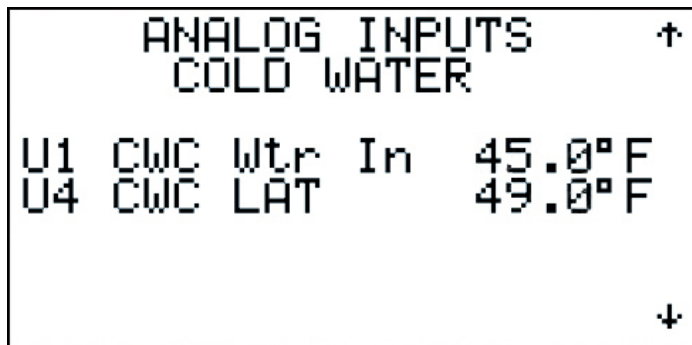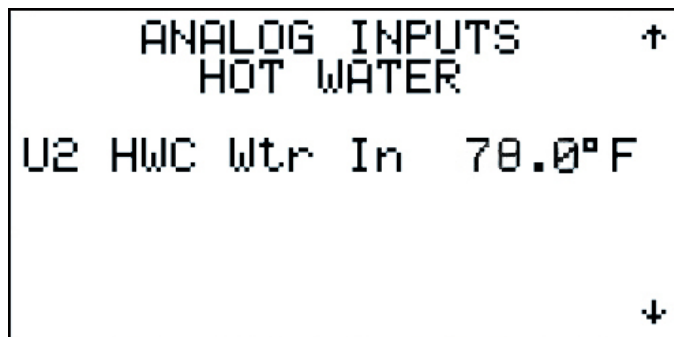
Figure 82

Pressing the **Dwn** key will display the screen of Figure 83. This screen displays the inputs associated with air conditions in the unit. Towards the top the status of U5 the supply air temperature is displayed. Directly below the status of U6 the unit airflow differential pressure is displayed. Press the **Esc** key to return to the I/O STATUS MENU.

```
ANALOG INPUTS      ↑
   AIR SENSORS

U5 SAT              67.0°F
U6 Airflw DP 14.450"wc


                    ↓
```
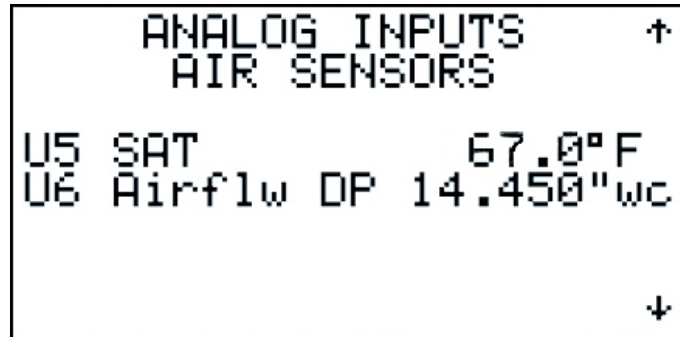
Figure 83

If the CO_2 option has been enabled, pressing the **Dwn** key will display the screen of Figure 84. This screen displays the status of the zone CO_2 Sensor displayed in the center of the screen. Press the **Esc** key to return to the I/O STATUS MENU.

```
ANALOG INPUTS      ↑
   CO2 SENSOR

CO2 Zone     1126.0 PPM



                    ↓
```

Figure 84

Press the **Esc** key to return to the I/O STATUS MENU..

2.3.3.3.3   Digital Inputs

Selecting DIGITAL OUTPUTS will display the screen of Figure 85. This screen is provided for troubleshooting the control system.
- The first line shows the status of NO1, the digital alarm output. The output will read "On" if there is an active alarm, and "Off" if no alarm present.
- The second line shows the status of NO3, the digital pump output. The output will read "On" when the pump is running, and "Off" when

the pump is not running.

- The third line shows the status of NO6, the digital CO_2 alarm output. The output will read "OK" when no CO_2 alarm is present, and "FLT" when a CO_2 alarm is active.
- The fourth line shows the status of NO4, the digital CO_2 valve output. The output will read "On" when the CO_2 valve is open, and "Off" when the CO_2 valve is closed.

Press the **Esc** key to return to the I/O STATUS MENU.


```
 DIGITAL OUTPUTS   ↑

NO1 Alarm Output  On
NO3 Pump          On
NO6 CO2 Alarm     OK
NO4 CO2 Valve     Off

                  ↓
```
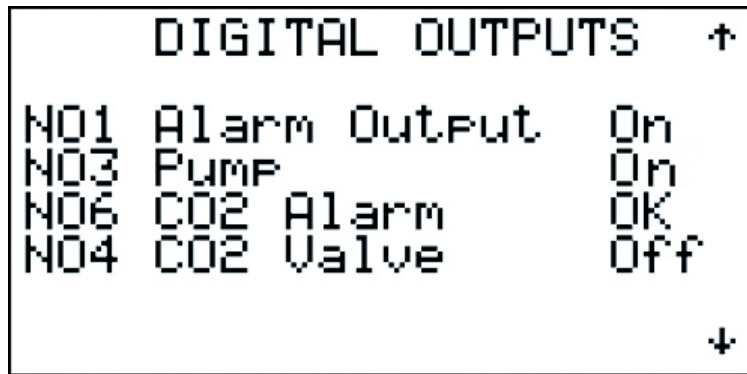
Figure 85

Press the **Esc** key to return to the I/O STATUS MENU.

2.3.3.3.4   Analog Inputs

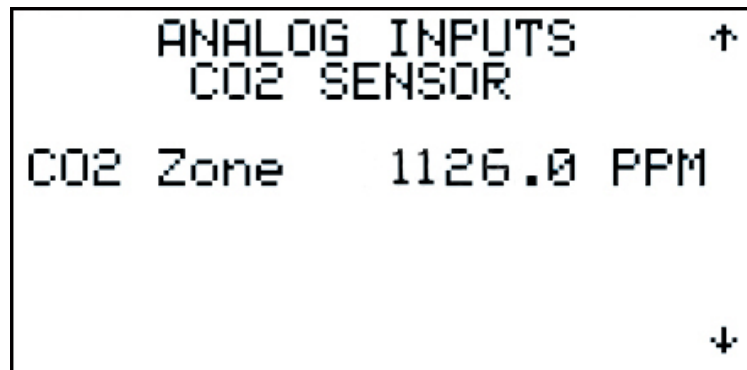Selecting ANALOG OUTPUTS will display the screen of Figure 86. This screen displays the status of the valve output commands. At the top of the screen the chilled water coil temperature valve position is displayed. Directly below that the chilled water coil flow valve position is displayed. At the bottom of the screen the hot water coil flow valve position is displayed.


```
 ANALOG OUTPUTS   ↑
 VALVE COMMAND

CWC Tmp Vlv       0.0%
CWC Flw Vlv      25.0%
HWC Flw Vlv     100.0%

                  ↓
```
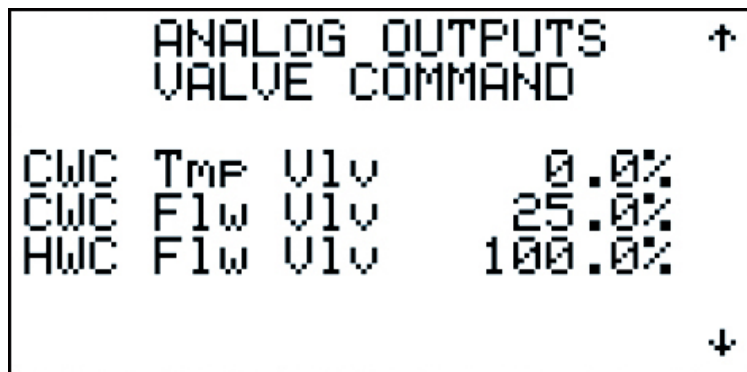
Figure 86

The FAN COMMANDS screen displays the supply fan output commands. At the top of the screen the supply fan 1 speed command is displayed. If the unit has more than one fan, then directly below the supply fan 2 and supply fan 3 speed commands are displayed.

```
 ANALOG OUTPUTS      ✝
   FAN COMMANDS

Fan 1 Cmd:       0.0%
Fan 2 Cmd:       0.0%
Fan 3 Cmd:       0.0%

                    ✦
```
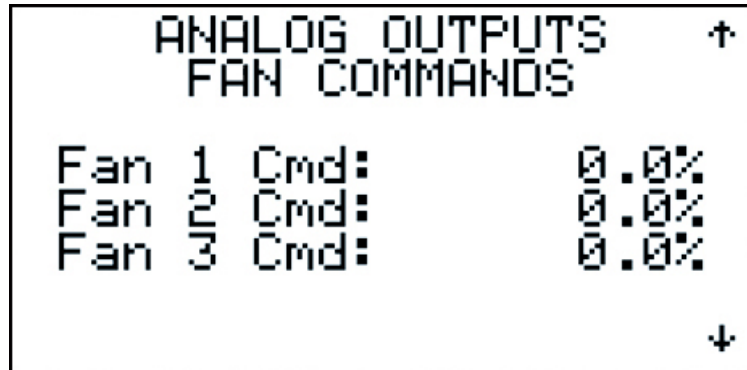
Figure 87

Press the **Esc** key to return to the I/O STATUS MENU.
Press the **Esc** key again to return to the SERVICE MENU.

2.3.3.4   **Sensor Offsets**

Selecting SENSOR OFFSETS from the Service Menu will display the screen of Figure 88. From this screen the offsets for the zone temperature, relative humidity, and dewpoint are all adjustable.

```
 SENSOR OFFSETS      ✝

Zone   RH     0.0
Zone   Tmp    0.0
Zone   Dwpt.  0.0

                    ✦
```
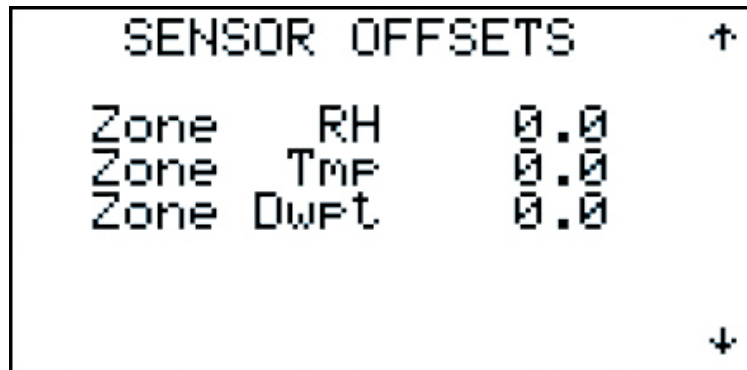
Figure 88

Pressing the **Dwn** key will display the screen of Figure 89. From this screen the offsets for the intake temperature, relative humidity, and dewpoint are all adjustable.

```
        SENSOR OFFSETS        ↑

  Intake    RH       0.0
  Intake    Tmp      0.0
  Intake   Dwpt      0.0



                              ↓
```

Figure 89

Pressing the **Dwn** key will display the screen of Figure 90. From this screen the unit sensor offsets are all adjustable. At the top of the screen the chilled water coil inlet temperature sensor is adjustable. Directly below the hot water coil inlet temperature sensor is adjustable. Directly below the chilled water coil leaving air temperature sensor is adjustable. Directly below the supply air temperature sensor is adjustable. Directly below the airflow differential pressure sensor is adjustable. If enabled, then directly below the filter differential pressure sensor is adjustable. Also if enabled, then at the bottom the zone CO_2 sensor is adjustable".

```
     SENSOR OFFSETS     ↑
  CWC Wtr In Tmp     0.0
  HWC Wtr In Tmp     0.0
  CWC LAT            0.0
  SAT               0.0
  Airflw  DP      0.000
  Fltr DP         0.000
  CO2 Zone          0.0↓
```
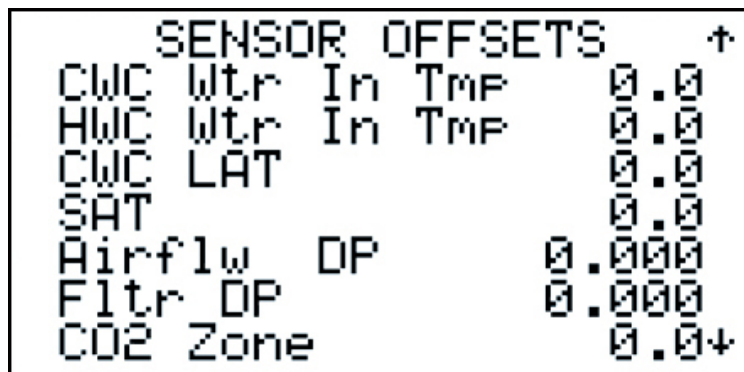
Figure 90

Press the **Esc** key to return to the Service Menu.

2.3.3.5   Diagnostics

Selecting DIAGNOSTICS from the Service Menu will display the screen of Figure 91. The diagnostics screens give a quick overview of the entire system, and are useful for troubleshooting. The CHILLED WATER COIL screen gives an overall status of the chilled water coil. On the top left of the screen the position of the chilled water coil flow valve is displayed. To the Right on the top, the status of the pump is displayed. In the middle of the screen on the right, the intake air temperature is displayed and directly below the chilled

water coil Inlet temperature is displayed. On the bottom left of the screen the chilled water coil leaving air temperature is displayed. On the bottom of the screen the chilled wa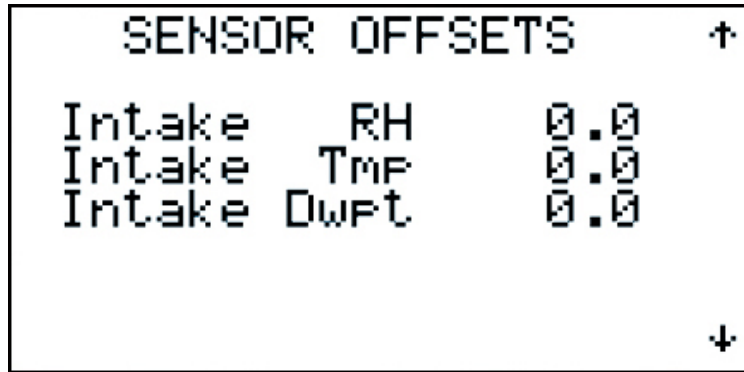ter coil temperature valve status is displayed. In the center of the screen and a little towards the left, a rough schematic of the chilled water coil, and piping is shown. Pressing the **Dwn** key will display the screen of Figure 92.

Figure 91

The HOT WATER COIL screen gives an overall status of the hot water coil. Towards the top center of the screen the hot water coil flow valve status is displayed. In the center of the screen towards the right the chilled water coil leaving air temperature is displayed, and directly below the hot water coil inlet temperature is displayed. Towards the bottom left side of the screen the supply air temperature is displayed. In the center of the screen a rough schematic of the hot water coil and piping is shown.

Figure 92

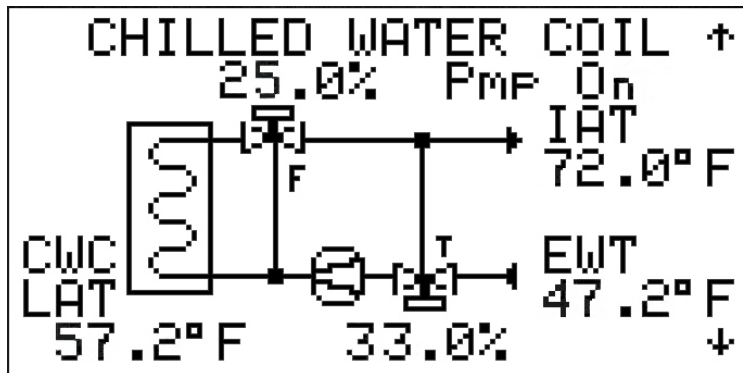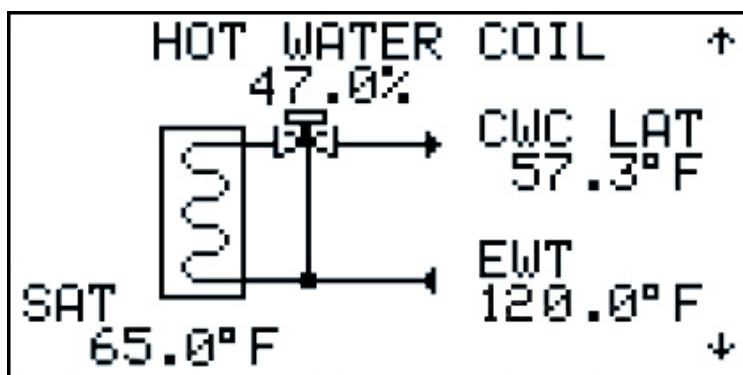Pressing the **Dwn** key will display the screen of Figure 93. This screen gives an overview of the chilled water coil temperature valve. At the top of the screen the relative position of the valve is displayed. Directly below that the absolute position of the valve is displayed. In the center of the screen a

manual enable can be turned "On" or "Off", and directly below a manual position can be set. Towards the bottom the valve can be reset. Resetting the valve will essentially clear any alarms stored in the valve. At the very bottom of the screen a valve status is displayed. This can either be "Valve On", "Valve Test", "Gear Diseng.", "Comm Err.", "Range Err.", "Blkd Err.".

```
CWC TMP VALVE DIAG. ↑
Rel. Pos.      0.0%
Abs. Pos.      0.0°
Man En: Off
Man Pos:       0.0%
Reset Valve
Valve On
                       ↓
```

Figure 93

Pressing the **Dwn** key will display the screen of Figure 94. This screen gives an overview of the chilled water coil flow valve. At the top of the screen the relative position of the valve is displayed. Directly below that the absolute position of the valve is displayed. In the center of the screen a manual enable can be turned "On" or "Off", and directly below a manual position can be set. Towards the bottom the valve can be reset. Resetting the valve will essentially clear any alarms stored in the valve. At the very bottom of the screen a valve status is displayed. This can either be "Valve On", "Valve Test", "Gear Diseng.", "Comm Err.", "Range Err.", "Blkd Err.".

```
CWC FLW VALVE DIAG. ↑
Rel. Pos.      0.0%
Abs. Pos.      0.0°
Man En: Off
Man Pos:       0.0%
Reset Valve
Valve On
                       ↓
```

Figure 94

Pressing the **Dwn** key will display the screen of Figure 94.

The HWC FLW VALVE DIAG. screen of Figure 95 gives an overview of the hot water coil flow valve. At the top of the screen the relative position of the

valve is displayed. Directly below that the absolute position of the valve is displayed. In the center of the screen a manual enable can be turned "On" or "Off", and directly below a manual position can be set. Towards the bottom the valve can be reset. Resetting the valve will essentially clear any alarms stored in the valve. At the very bottom of the screen a valve status is displayed. This can either be "Valve On", "Valve Test", "Gear Diseng.", "Comm Err.", "Range Err.", "Blkd Err.".

```
HWC FLW VALVE DIAG. ↑
Rel. Pos.      0.0%
Abs. Pos.      0.0°
Man En: Off
Man Pos:      0.0%
Reset Valve
Valve On
                     ↓
```
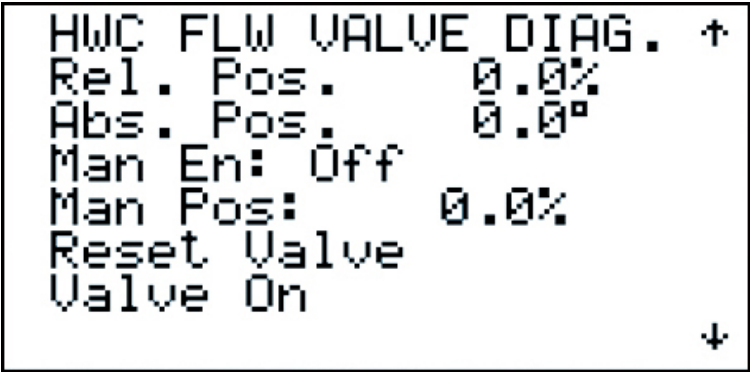
Figure 95

Pressing the **Dwn** key will display the screen of Figure 96. This screen gives an overview of EC Fan 1. At the top of the screen the fan speed is displayed. Directly below that the fan power is displayed. A manual enable is editable on the bottom half of the screen and can be turned "On" or "Off", and directly below a manual speed command can be set. At the very bottom of the screen a fan status is displayed. This can either be "Fan OK", "IGBT FLT", "GND FLT", "Hi. DC ERR", "Lw. DC ERR", "Hi. Vlt ERR", "Lw. Vlt ERR", "Line FLT", "Hall Snsr ERR", "Blkd ERR", "Pk. Curr. ERR", "Safety OFF", "Tmp FLT", "Mtr Strt ERR", or "Comm ERR". If Modbus communication drops out a message at the bottom of the screen will say "EC Bus Error".

```
       EC FAN 1         ↑
Speed                0RPM
Power             0.0WATT

Manual Enable:    Off
Manual Cmd:       0.0%
Fan OK
                        ↓
```

Figure 96

If the unit has more than one fan, then pressing the **Dwn** key will display the screen of Figure 97. This screen gives an overview of EC Fan 2. At the top of the screen the fan speed is displayed. Directly below that the fan power is displayed. A manual enable is editable on the bottom half of the screen and can be turned "On" or "Off", and directly below a manual speed command can be set. At the very bottom of the screen a fan status is displayed. This can either be "Fan OK", "IGBT FLT", "GND FLT", "Hi. DC ERR", "Lw. DC ERR", "Hi. Vlt ERR", "Lw. Vlt ERR", "Line FLT", "Hall Snsr ERR", "Blkd ERR", "Pk. Curr. ERR", "Safety OFF", "Tmp FLT", "Mtr Strt ERR", or "Comm ERR". If Modbus communication drops out a message at the bottom of the screen will say "EC Bus Error".
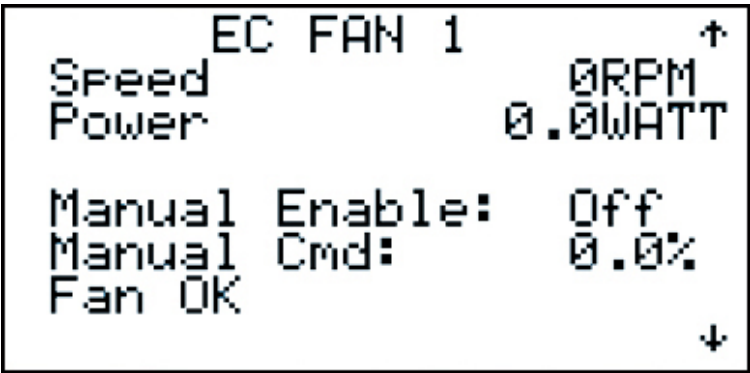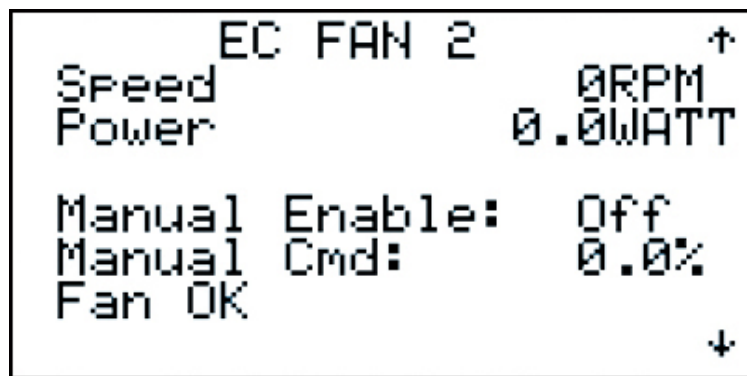

Figure 97

If the unit has more than two fans, then pressing the **Dwn** key will display the screen of Figure 98. This screen gives an overview of EC Fan 3. At the top of the screen the fan speed is displayed. Directly below that the fan power is displayed. A manual enable is editable on the bottom half of the screen and can be turned "On" or "Off", and directly below a manual speed command can be set. At the very bottom of the screen a fan status is displayed. This can either be "Fan OK", "IGBT FLT", "GND FLT", "Hi. DC ERR", "Lw. DC ERR", "Hi. Vlt ERR", "Lw. Vlt ERR", "Line FLT", "Hall Snsr ERR", "Blkd ERR", "Pk. Curr. ERR", "Safety OFF", "Tmp FLT", "Mtr Strt ERR", or "Comm ERR". If Modbus communication drops out a message at the bottom of the screen will say "EC Bus Error".
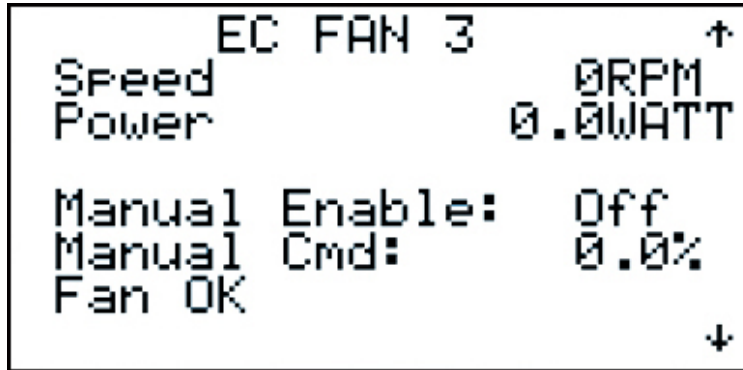
Figure 98

Press the **Esc** key to return to the Service Menu.

2.3.3.6   Memory Options

Selecting MEMORY OPTIONS from the Service Menu will display the screen of Figure 99. This screen allows for the writing of log files to a specific storage location. In the center of the screen it asks "Write log files to" and gives the choice of either "Internal Flash" or "USB Pen Drive". Once the correct selection is made select the "Press UP to write" text and select the **Up** key. This will write the log files to the selected location. If the log files are written correctly a message will appear at the bottom of the screen stating "Completed". If there is an issue a message will be displayed stating "FAILED, try again".

Figure 99

Pressing the **Dwn** key will display the screen of Figure 100. This screen allows for the writing of setpoints.txt to a specific location. The setpoints.txt file will capture all of the retained settings of the unit and can be used to capture specific adjusted values at a specific time. In the center the screen asks "Write Setpoint.txt to" and gives the choice of either "Internal Flash", or "USB Pen

Drive". Once the correct selection is made select the "Press UP to write" text and select the **Up** key. This will write the setpoint.txt file to the selected location. If the file is written correctly a message will appear at the bottom of the screen stating "Completed". If there is an issue a message will be displayed stating "FAILED, try again".
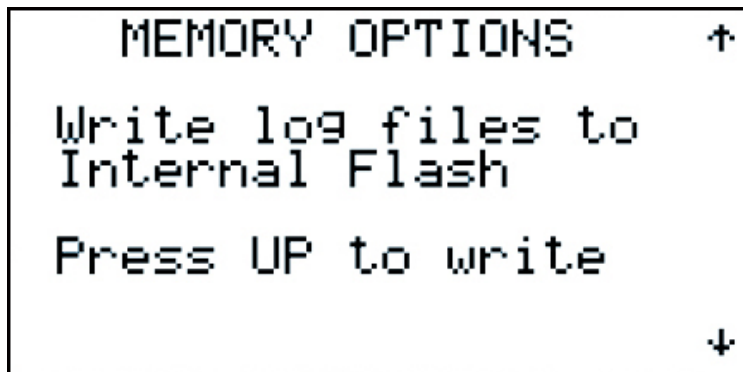
```
 MEMORY OPTIONS        ↑

Write Setpoint.txt to
Internal Flash

Press UP to Export

                       ↓
```
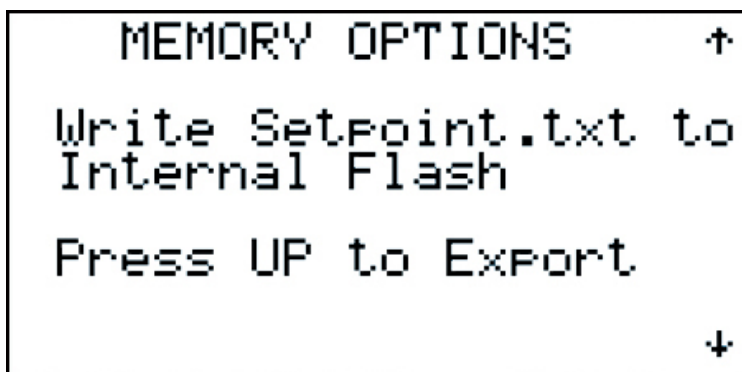
Figure 100

Pressing the **Dwn** key will display the screen of Figure 101. This screen allows for the reading of the setpoints.txt file from a specific location. Reading the setpoints.txt file will adjust all the retained settings to match what is in the setpoints.txt file. This can be useful if factory settings, or start up settings have been saved in the setpoints.txt file. In the center the screen asks "Read Setpoint.txt from" and gives the choice of either "Internal Flash", or "USB Pen Drive". Once the correct selection is made select the "Press UP to Import" text and select the **Up** key. This will read the setpoint.txt file from the selected location. If the file is read correctly a message will appear at the bottom of the screen stating "Completed". If there is an issue a message will be displayed stating "FAILED, try again".
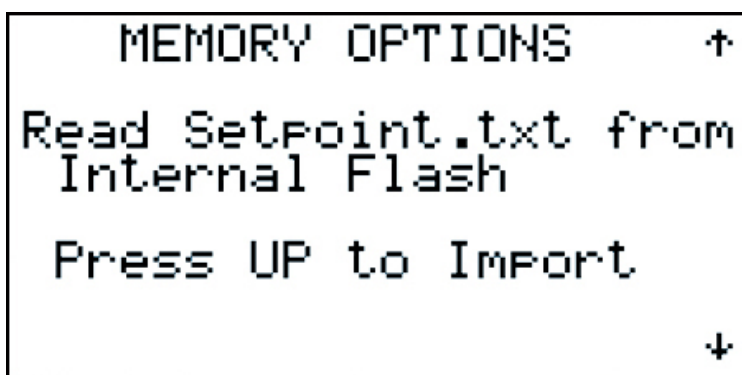
Press the **Esc** key to return to the Service Menu.

```
 MEMORY OPTIONS        ↑

Read Setpoint.txt from
 Internal Flash

Press UP to Import

                       ↓
```

Figure 101

2.3.3.7   Clear Overrides

Selecting CLEAR OVERRIDES from the Service Menu will display the screen of Figure 102. This screen will turn off any overrides, or running tests on the unit. Towards the bottom of the screen you can select "Clear Overrides" and change it to "Clearing…". After it clears no overrides or tests should be on.

Press the **Esc** key to return to the Service Menu. Press the **Esc** key again to return to the Main Menu.
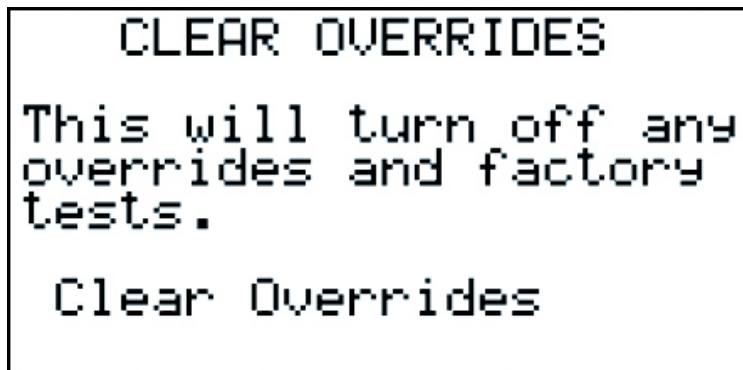

Figure 102

2.3.4   Unit Revision

Selecting UNIT REVISION from the Main Menu will display the screen of Figure 103. 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.
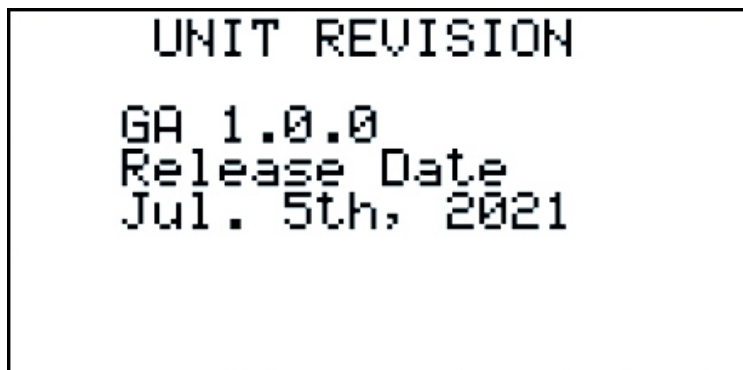

Figure 103

3.0   Alarm Menu

Alarms are either automatic reset or manual reset. Automatic reset alarms are alarms that allow the unit to return to operation once the operating parameter has been returned to acceptable operating conditions. The unit will restart automatically; however, the red alarm LED will remain illuminated until acknowledged, to alert the operator the alarm occurred. Manual reset alarms are alarms that stop the unit and do not restart until the alarm is acknowledged and the alarm condition is reset manually on the alarm screen. The red alarm LED will stay illuminated until the alarm acknowledged AND the alarm condition is reset.

The ALARM MENU can be accessed anytime by pressing the **ALARM** key. If an alarm is active pressing the **ALARM** key will display the active alarms. Press the **Dwn** key until the ALARM RESET screen is displayed shown in Figure 104. From the alarm reset screen pressing the **ALARM** key for 3 seconds will reset all alarms. Pressing the **Ent** key will display the alarm log records.
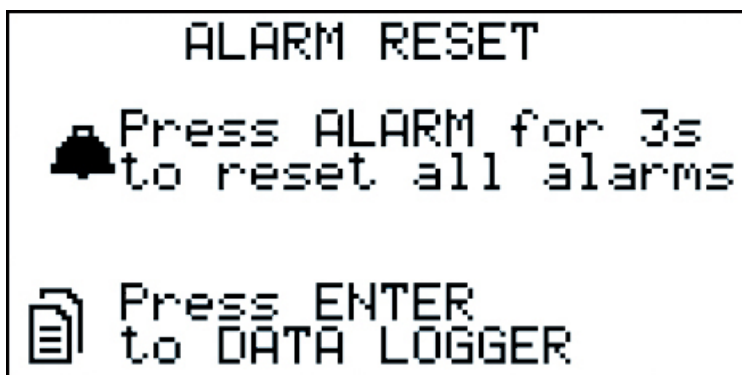

Figure 104

To return to the Home Screen press the **Esc** key.

3.1   Retain Memory Writings or Retain Memory Write Error

These are automatic reset alarms. These alarms occur when there is an issue with the controller memory itself. If this fault cannot be reset, new controller hardware may be required. The red alarm LED on the display will stay lit until the alarm is reset.

3.2   c.pCOe Comm Fault

This is an automatic reset alarm. The c.pCOe is the expansion module. Check the expansion module power and communication link. The red alarm LED on the display will stay lit until the alarm is reset.

3.3   c.pCOe Cnfg Fault

This is an automatic reset alarm. The c.pCOe is the expansion module. Check the expansion module power and communication link. The red alarm LED on the display will stay lit until the alarm is reset.

**3.4	Zone Sensor Fault or Intake Sensor Fault**

This is an automatic reset alarm. Check the communication wiring to the sensor when this fault occurs. The red alarm LED on the display will stay lit until the alarm is reset.

**3.5	Pump Overload**

This is a manual reset alarm. The pump overload is activated when the pump motor overload device indicates an overload condition. In this state the unit will stop and not restart until the alarm condition is reset manually. Typically, the motor starting hardware will need to be reset along with a control system reset.

**3.6	Supply Fan(s) Overload**

This is a manual reset alarm. This alarm is activated when all of the supply fans on the equipment are in alarm. The unit will shut down and not restart until the alarm is cleared.

**3.7	Low Voltage Monitor Tripped**

This is an automatic reset alarm. The optional low voltage monitor is required to activate this alarm. The low voltage monitor tripped is activated when the monitor senses a below normal voltage – low enough to damage the equipment. The unit will stop and not restart until this condition is reset. The red alarm LED on the display will stay lit until the alarm is reset.

**3.8	Smoke Alarm**

This is an automatic reset Alarm. The smoke alarm is activated if the alarm contact wired to ID1 is opened. In this state, the unit will stop and not restart until the smoke alarm contact closes. The red alarm LED on the display will stay lit until the alarm is acknowledged, even after the alarm condition is cleared, to alert the operator an alarm occurred.

**3.9	Dirty Filter Alarm**

This is an automatic reset alarm. The optional filter differential air pressure sensor is required to activate this alarm. The Dirty Filter Condition is activated when the pres-

sure

differential across the air filter exceeds the normal pressure. In this state, the unit will continue to run. The red Alarm LED on the display will stay lit until the alarm is reset.

**3.10	Condensate Switch Alarm**

This is an automatic reset alarm. The optional condensate level switch is required to activate this alarm. The high condensate level alarm is activated when the condensate drain is plugged for any reason. The unit will continue to run the fans, but the cooling coil will stop receiving cold water from the chiller until this condition is reset. The red alarm LED on the display will stay lit until the alarm is reset.

3.11 CWC Temp, CWC Flow, or HWC Flow Valve Alarms

These are manual reset alarms. The valve alarm is activated when the valve sees a fault condition. This can be a variety of different faults, and the valve diagnostics should be viewed to determine the exact fault. If a valve alarm occurs the unit will continue to run with significantly reduced performance. The valve will be locked to whatever position it faulted in. Once the fault has been diagnosed, the diagnostics screen can be used to reset the valve. After the valve is reset, reset the alarm. The red alarm LED on the display will stay lit until the alarm is reset.

3.12 Supply Fan 1, 2 or 3 Alarm

These are manual reset alarms. The supply fan alarms are activated when the supply fan sees a fault condition. This can be a variety of different faults, and the supply fan diagnostics screen should be viewed to determine the exact fault. If all fans on the unit are in alarm, the Supply Fan(s) Overload alarm will activate and the equipment will stop running. If only one of multiple fans is in alarm, the unit will continue to operate at reduced performance. After the supply fan fault is diagnosed and fixed, reset the alarm. The red alarm LED on the display will stay lit until the alarm is reset.

3.13 High CO_2 Alarm

This is an automatic reset alarm. The optional CO_2 sensor is required to activate this alarm. The high CO_2 alarm will occur when the sensor reads CO_2 values above the high CO_2 setpoint. In this state, the CO_2 valve will close. The red alarm LED on the display will stay lit until the alarm is reset.

3.14 Low CO_2 Alarm

This is an automatic reset alarm. The optional CO_2 sensor is required to activate this alarm. The low CO_2 alarm will occur when the sensor reads CO_2 values below the low CO_2 setpoint. In this state, the CO_2 valve will open. The red alarm LED on the display will stay lit until the alarm is reset

3.15 CO_2 Sensor Fault

This is an automatic reset alarm. The optional CO_2 sensor is required to activate this alarm. If there is a communication fault with the CO_2 sensor this alarm will occur. In this state, the CO_2 valve will close. The red alarm LED on the display will stay lit until the alarm is reset.

3.16 Zone Alert Alarms

These are automatic reset alarms. When the zone temperature or R.H rises above, or falls below the maximum or minim alert setpoints, then these alarms are activated. These are informative alarms only, and the unit will operate when these alarms are active. The red alarm LED on the display will stay lit until the alarm is reset.

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 the controller is available by calling our service department.

4.2   Cold Water, Hot Water, Off Coil Air, Supply Air Temperature Sensor
These temperature sensors are a resistive NTC bulb type device with a 10-foot cable. The temperature range is -58.0°F to 212.0°F and the environment 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 numbers are available by calling our Service Department.

4.3   Zone, Intake Temperature, Relative Humidity and Dewpoint Sensor
These sensors are communication devices which send Modbus data out from addresses 190, and 191. If communication is lost from this device, an alarm is activated. The Desert Aire replacement part numbers are available by calling our Service Department.

4.4   Supply Blower Differential Air Pressure Sensor
This sensor can has a range of 0.0"wc to 25.0"wc. The output of this device is 0.25 VDC at 0.0"wc and 4 VDC at 25.0"wc. The Desert Aire replacement part number is available by calling our Service Department.

5   Hardware Details

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 2.3.3.1.2 for the Ethernet port setup, Figure 25. A static TCP/IP address can be set from this screen. Refer to your IT department to obtain a static TCP/IP address. Browse 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 defined on the bottom of this web page.

DESERT AIRE