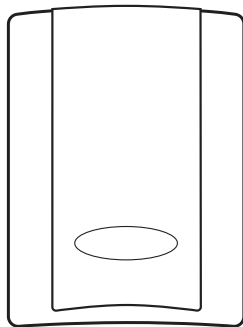
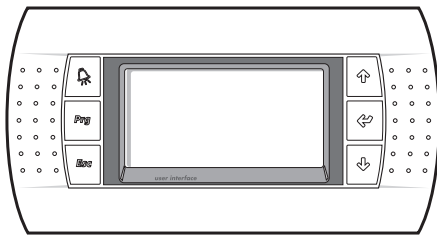
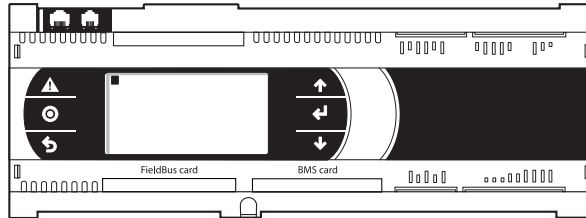


# DOAS CM3500 CONTROLLER



## APPLICATION, OPERATION & MAINTENANCE

97B0065N01  
Rev: February 17, 2016



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## DOAS CM3500 Controller

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## Dehumidification Equipment Standard Limited Warranty

### ⚠ CAUTION! ⚠

**CAUTION!** ONLY TRAINED, QUALIFIED PERSONNEL SHOULD INSTALL AND/OR SERVICE CLIMATEMASTER. 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.

### DEHUMIDIFICATION EQUIPMENT STANDARD LIMITED WARRANTY

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

#### Terms

ClimateMaster 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 ClimateMaster "Installation and Operation Manual" provided with each unit and/or other documentation provided.
2. The Start-Up Report must be completed and returned to ClimateMaster within 30 days of the start-up.
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 ClimateMaster.
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 Oklahoma City, OK.

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. ClimateMaster 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. ClimateMaster must preauthorize all warranty coverage described herein.

### Extended Warranty

Your ClimateMaster 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 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.

## DOAS CM3500 Controller

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## Installation

**Humidity and Temperature Control Package**

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

This CM3500 control system is easy to install and operate. It features either an internal display terminal, as part of the controller, or a wall-mountable remote display terminal (RDT), in cases where the controller mounted display would prove hard to view or use. Both allow you to view and adjust set points and modes of operation. They also indicate the operating status of major components inside of the dehumidifier.

Most sensors and inputs have been factory-installed and wired inside of the dehumidifier. In most cases, you need only mount and wire the supply air temperature sensor and, if provided, the RDT. The RDT, which is simply an interface tool, contains no sensors. You do not need to install it in the room you wish to dehumidify. If purchased with your system, CO<sub>2</sub> and remote room sensors may require mounting as well.

**Sensor Installation**

Your controller is provided with a duct-mountable temperature sensor for the supply air. If the unit was purchased with the zone reset option, it also has one or multiple remote room sensors. Additionally, if the unit was purchased with the CO<sub>2</sub> option, it has an indoor and outdoor CO<sub>2</sub> sensor.

**Duct-Mount Sensor** - A duct-mount sensor is normally used in applications where continuous blower operation is desired. A duct-mount sensor helps ensure consistent conditions throughout the space.

**⚠ CAUTION! ⚠**

**CAUTION!** A potential drawback of this sensor is that it relies on a continuous stream of air moving past it. Using a duct-mount sensor with a non-continuous blower may lead to short-cycling of the refrigeration compressor. Install the duct-mount sensor in the supply air duct.

Install the duct-mount sensor in the supply air duct.

**⚠ CAUTION! ⚠**

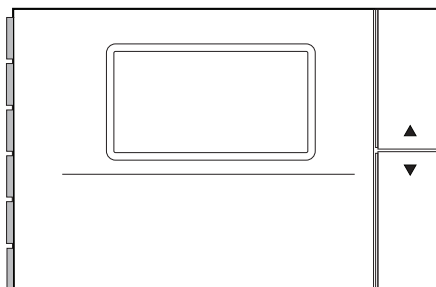
**CAUTION!** Do not mount the sensor in a section of duct where false readings may occur due to dead air regions, solar heat gain or thermal losses in winter. Do not mount the sensor where water is likely to drip on it. Install two, 18 gauge (0-500 feet) OR two, 24 gauge (0-100 feet) wires from the sensor to the labeled terminal strip in the control panel of the dehumidifier. (See your wiring schematic for connection details.)

**⚠ CAUTION! ⚠**

**CAUTION!** Undersized wiring will cause inaccurate sensor readings. Do not run sensor wiring adjacent to, OR in the same conduit as, wires carrying more than 24 VAC.

**Remote Room Sensors** - ClimateMaster dehumidifiers ordered with the zone reset option are supplied with a remote room sensor. Up to four of these sensors may be wired to the system.

**Figure 1: Remote Room Sensor**



This wall-mountable display is an IP30 rated device. Operating conditions must be between 32.0° F and 120.0° F and less than 85% RH. The controller's RS485 serial interface communicates via three-way plug-in terminals. Install a twisted pair plus shielded cable, 20-22 AWG. Total length of the network must not exceed 1,500 feet. The capacitance between the wires must not exceed 90 pF/M. (See your wiring schematic for connection details.)

**⚠ CAUTION! ⚠**

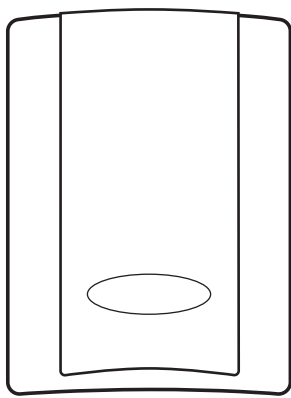
**CAUTION!** Undersized wiring will cause inaccurate sensor readings. Do not run sensor wiring adjacent to, OR in the same conduit as, wires carrying more than 24 VAC.

These remote devices require a separate 24Vac 50/60HZ 1.5VA power connection. Provide a dedicated 250 mA fuse for each sensor. Use a class 2 safety transformer with a minimum rating of 4VA. If the sensor is wired to F1 and F2 of the dehumidifier control panel terminal, G0 must be connected to F2.

## Installation

**CO<sub>2</sub> Sensors** - ClimateMaster dehumidifiers ordered with the CO<sub>2</sub> control package require sensors for the indoor and outdoor CO<sub>2</sub> levels. These measurements are used to determine the CO<sub>2</sub> differential level in the conditioned space. This differential is the variable compared to the CO<sub>2</sub> setpoint and used in the control loop to provide more or less outdoor air into the conditioned space.

**Figure 2: CO<sub>2</sub> Sensor**



The outdoor CO<sub>2</sub> sensor is installed in a protective enclosure and is designed to operate in outdoor conditions ranging from -40° F to 158° F. 24VAC power is required for this device and the output is 4-20mA. (See your wiring schematic for connection details.)

The indoor CO<sub>2</sub> sensor is installed in a high impact ABS enclosure and has an operating temperature range of 32° F to 122° F. 24VAC power is required for this device and the output is 4-20mA. (See your wiring schematic for connection details.)

### ⚠ CAUTION! ⚠

**CAUTION!** Do not run sensor wiring adjacent to, OR in the same conduit as, wires carrying more than 24 VAC.

## Auxiliary Air Heating Control Wiring

**Note: You must use the ClimateMaster CM3500 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.**

**Auxiliary Heating - Dry Contact Closure** - The standard ClimateMaster CM3500 Controller provides a dry contact closure to operate the auxiliary space heater. The contact closes to energize a heater (may be supplied by others) which has its own power source.

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

**Auxiliary Heating - Proportional Signal** - As an option, ClimateMaster 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.

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.)

## DOAS CM3500 Controller

Rev.: February 17, 2016

## Installation

## Mounting the optional RDT

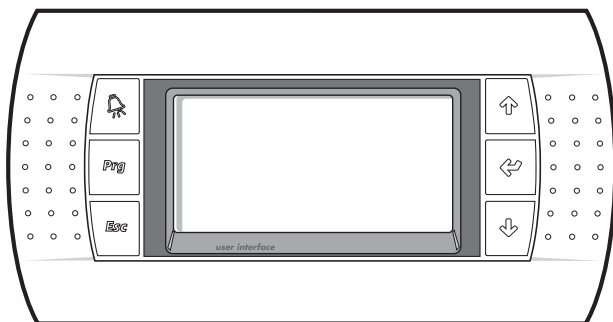
The optional RDT must be mounted in a dry, non-corrosive environment. Operating conditions must be between 0.0° F and 140.0° F and less than 90% RH.

**⚠ CAUTION! ⚠**

**CAUTION!** Moisture can damage the circuitry of the display. The display can either be mounted directly to the dehumidifier or located up to 20 feet away using the cable that came with the display.

**Wiring the optional RDT** - The optional RDT is an IP40 device and is powered through the cable provided. If a longer length is required, there are two options. For locations of the RDT up to 150 feet, use a standard 24 AWG, 6 conductor phone cable. For locations of the sensor up to 1,500 feet, use 22 AWG, 3 twisted pair cable. Pull the connector through the hole in the back of the mounting bracket. Attach the bracket to the wall. After plugging the cord into the back of the RDT, feed any extra wiring back into the hole of the mounting bracket and gently snap the RDT into the bracket.

Figure 3: User Interface

**⚠ CAUTION! ⚠**

**CAUTION!** Do not run the RDT wiring in the same conduit as, OR adjacent to wires carrying over 24 VAC.

## CM3500 Controller Overview

ClimateMaster's CM3500 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 on abnormal conditions such as sensor failures or tripped safety controls.
- An optional seven-day occupancy timer which can control outdoor air dampers
- (if used) to bring in fresh air when the dehumidifier is in an occupied state.
- A convenient, easy-to-understand display interface which allows the operator to view and change set points and time schedules.

## RDT Troubleshooting

The remote terminal allows the operator to monitor the operation of the dehumidifier and view the alarm screens and history to insure proper dehumidifier operation. It is important that the RDT remains functional for safe and efficient unit operation. If you think the RDT is not functioning correctly, refer to the table below.

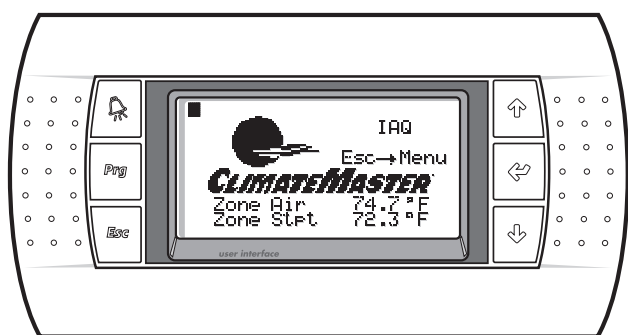
Problem	Solution
No LEDs lit on the remote terminal.	No power is getting to the remote terminal. Check field wiring between remote terminal and controller.
Remote terminal shows: "NO LINK"	The display address has been altered. Press the <b>UP</b> , <b>ENTER</b> and <b>DOWN</b> keys together for 4 seconds and set the display address to 32.
Red alarm LED is lit.	The system has experienced an alarm and is waiting for it to be acknowledged. Press <b>ENTER</b> from the Alarm Screen. If the red LED stays lit, clear the alarm condition and then press <b>ENTER</b> from the Alarm Screen.
If the remote terminal is not functioning after review of the above, consult ClimateMaster's Service Department at (405) 745-6000.	

## IAQ Controller Details

### Menu Overview and General Instructions

The ClimateMaster CM3500 Controller is pre-programmed and configured at the factory for use in the application specified. The optional Remote Display Terminal (RDT) will appear as shown in Figure 4a. The Internal Display Terminal (IDT) will appear as shown in Figure 4b. The display terminal allows the operator to monitor and adjust the setpoints of the ClimateMaster IAQ dehumidifier.




**Figure 4a: Optional Remote Display Terminal**



**Figure 4b: Internal Display Terminal**



The RDT has a display screen and 6 keys. The keys on the left hand side of the remote terminal, top to bottom, are the **ALARM** key shown as an alarm bell, **PROGRAM** key abbreviated "Prg" and the **ESCAPE** key abbreviated "Esc". The keys on the right hand side of the remote terminal, top to bottom, are the **UP** key shown as an up arrow, the **ENTER** key shown as a left arrow and the **DOWN** key shown as a down arrow.

The IDT also has a display screen and 6 keys. The keys on the left hand side of the internal display terminal, top to bottom, are the **ALARM** key, depicted as symbol , the **PROGRAM** key, depicted as symbol , and the **ESCAPE** key, depicted as symbol . The keys on the right hand side of the internal display terminal, top to bottom, are the **UP** key shown as an up arrow, the **ENTER** key shown as a left arrow and the **DOWN** key shown as a down arrow.

The Home Screen, displaying the ClimateMaster logo, shows 2 items below it; the current supply air temperature and the current unit status. The IAQ displayed in the upper right of the screen indicates that the product series of the program installed in the controller is for Indoor Air Quality. Below it, "Esc → Menu" indicates that if the **Esc** key is pressed, the Main Menu will be displayed. On any other screen of this unit, pressing **Esc** will take you back one screen.

Menu screens allow the user to select from a series of actions. The action that is capitalized on the screen will be selected when the **ENTER** key is pressed. 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 will require that the **ENTER** key be pressed to accept the value. An "ON" or "OFF" selection will be altered as soon as the **UP** or **DOWN** keys are pressed.

To view the alarms from any menu, simply press the **ALARM** key. Press the **UP** and **DOWN** keys to display any active alarm. When an alarm is triggered, the red LED behind the **ALARM** key will light. This LED will remain on until the alarm is acknowledged. Alarm acknowledgement and history instructions are shown on the main Alarm Screen. To escape from the alarm screens, press the **Esc** key, and the Home Screen will be displayed.

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 remote terminal will return to the Home Screen.

## DOAS CM3500 Controller

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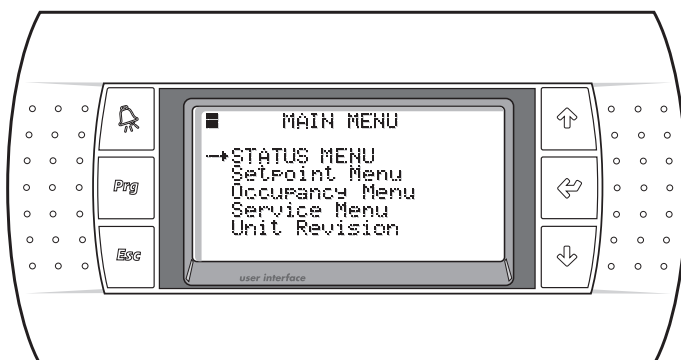
## IAQ Controller Details

## Main Menu

Pressing the **Esc** key from the Home Screen displays the MAIN MENU (Figure 6). This menu allows the operator to select the STATUS MENU, Setpoint Menu, set a Temporary Occupancy, change the Occupancy Schedule and view the Unit Revision.

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

Figure 5: Main Menu

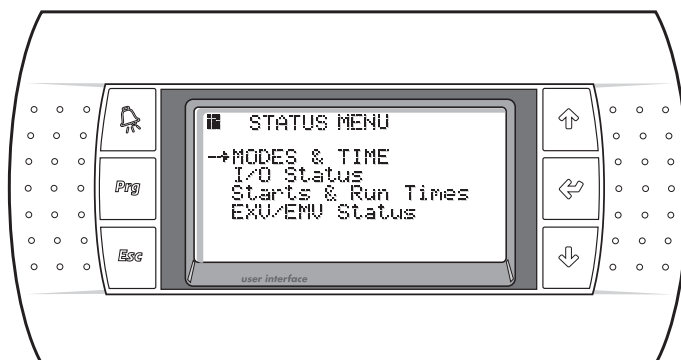


## Status Menu

Selecting the STATUS MENU from the MAIN MENU allows access to the Modes & Time, I/O Status and Starts & Run Times.

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

Figure 6: Status Menu



## Modes &amp; Time

Selecting Modes & Time from the STATUS MENU displays a text explanation of the unit operation. The first line will either be blank. The damper state and the state of the damper end switch. is shown on the next line. The blower state and the state of the system switch is shown on the next line. The compressor state and the occupied state (either Occupied or Un-Occupied) is shown on the next line. The Unit Status is shown on the next line and will show one of

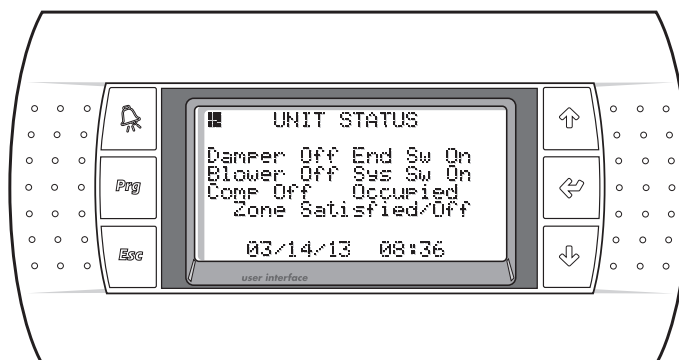
the following states:

- Zone Satisfied/Off
- Heating Required
- Cooling Required
- Dehumidifying
- Dehumid / Heat
- Dehumid / Cool
- Low Suction Pressure
- EXV/EMV Init
- Wait - Damper Opening
- Pumpdown Required
- Comp Switched Off
- VS Speed Limited
- Disch Pr Limiting

If any compressor is waiting for its non short cycling timer to time out, this will be shown on the next line. This line will be blank if no compressor timing is active. The current date and time will be shown at the bottom of the screen.

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

**I/O Status**  
Figure 7: Unit Status



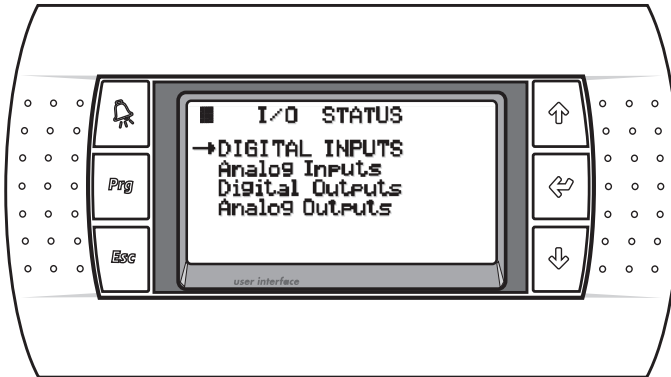
Selecting the I/O Status from the STATUS MENU displays the Digital Inputs, Analog Inputs, Digital Outputs and Analog Outputs. Room Sensor Data and Expansion I/O will also be shown on this screen if these options were purchased with the IAQ system.

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



## IAQ Controller Details

Figure 8: I/O Status

**Digital Inputs**

The Digital Input screens will show the state of the contacts wired into the controller. These screens are provided for troubleshooting of the control system. Figure 9 is shown as an example of what these screens look like. Refer to your schematic diagram for the specific devices provided. Please note that contacts can be wired into ports J5, J7, J8 and J29 of the controller as well as into the EVD evolution valve driver and expansion I/O devices.

Devices shown in the Digital Input screens vary depending upon the type of dehumidifier provided. They can include the Occupancy Input, Air Flow Switch, Motor Overloads, Damper End Switch, Voltage Monitor, Condensate Level Switch, Water Flow Switch, Smoke Alarm, Water Coil Thermostat, Air Filter Switch, System On/Off Switch, Fixed Speed (FS) Phase Monitor and Compressor On/Off Switch.

Pressing the **UP** or **DOWN** keys from the first Digital Input screen will cycle through all applicable screens.

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

Figure 9: Digital Inputs

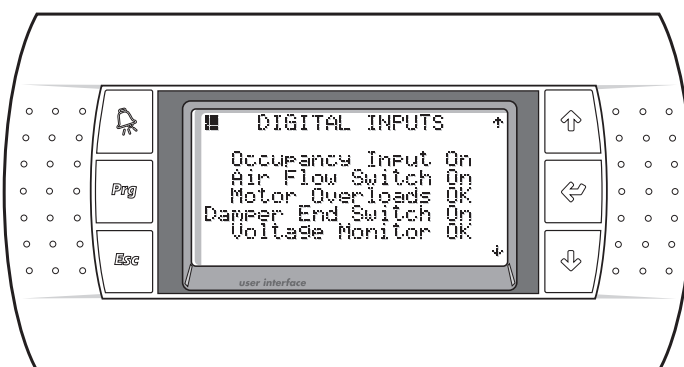


Figure 10 shows the following inputs:

**Condensate Level Switch** – “OK” if the level is acceptable, and “Flt” if a fault from a high condensate level switch is present.

**Water Flow Switch** – “On” if the water flow is acceptable, and “Off” when the water flow is low.

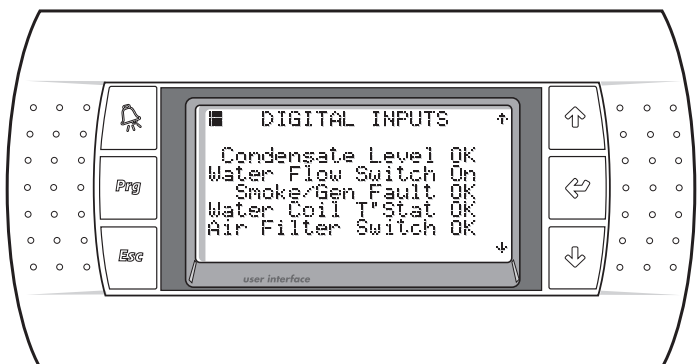
**Smoke Alarm/General Fault Contact** – “OK” when no alarm exists, and “Flt” if a fault occurs.

**Water Coil Thermostat** – “OK” if the water temperature is acceptable and “Low” when the water temperature is too low.

**Air Filter Differential Switch** – “OK” when filter pressure is acceptable and “Flt” if a fault when the differential air pressure is too high.

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

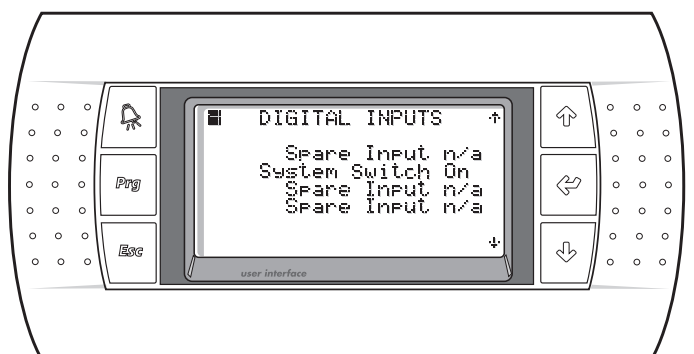
Figure 10: Digital Inputs



**System Switch** – “On” if the switch is closed, and “Off” if the switch is open.

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

Figure 11: Digital Inputs



## DOAS CM3500 Controller

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## IAQ Controller Details

## Analog Inputs

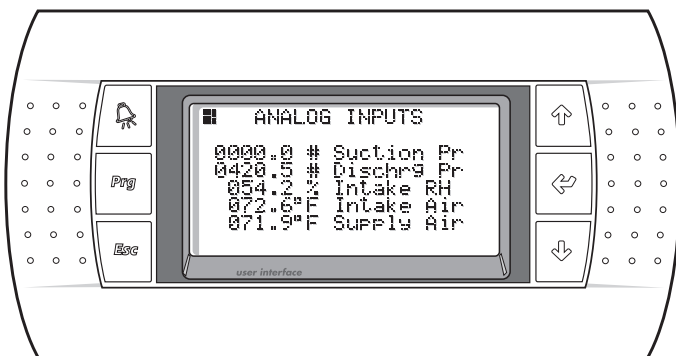
The Analog Input screens will read the values of the sensors wired into the controller. These screens are provided for troubleshooting of the control system. Figure 12 is shown as an example of what these screens looks like. Refer to your schematic diagram for the specific devices provided. Please note that sensors can be wired into ports J2, J3, J6 and J29 of the controller as well as into the EVD evolution valve driver and expansion I/O devices. The calculated values of superheat and sub cooling are also included in this series of screens.

Devices shown in the Analog Input screens vary depending upon the type of dehumidifier provided. They can include sensing of the Suction Pressure and Temperature, Discharge Pressure and Temperature, Intake Air Relative Humidity, Intake Air Temperature, Supply Air Temperature, Off Evaporator Temperature, Liquid Pressure and Temperature Water Inlet Temperature, Water Outlet Temperature, Water Between Temperature and Supply Fan Differential Pressure. Wheeled units can also include sensing of the Outside Air Temperature and Relative Humidity, Return Air Temperature and Relative Humidity, Optional Exhaust Air Relative Humidity, and Optional CO<sub>2</sub> and Air Differential Pressure sensors.

Pressing the **UP** or **DOWN** keys from the first Analog Input Screen will cycle through all applicable screens. Refer to your wiring schematic for the exact sensor wiring details of your dehumidifier.

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

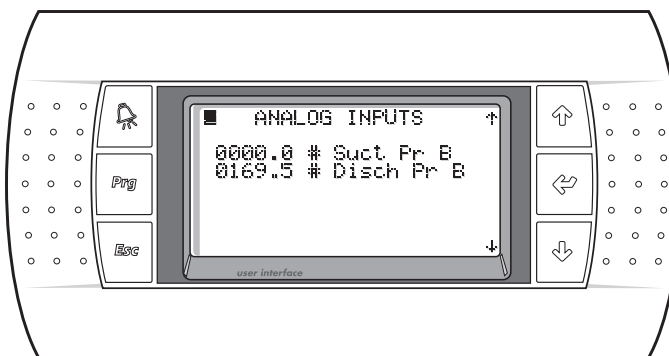
Figure 12: Analog Inputs



Pressing the **UP** or **DOWN** keys will display the second Analog Inputs Screen (Figure 13), if applicable. If your unit comes standard with dual refrigerant circuits, the Suction Pressure and Discharge Pressure of circuit B are displayed here. If your unit has an Enthalpy Wheel with Freeze Protection Exhaust Air Relative Humidity will be shown here. If your unit is set for CO<sub>2</sub> control, the Reheat Condenser Differential Air Pressure will be shown here.

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

Figure 13: Analog Inputs



## Digital Outputs

The Digital Output screens will show the state of the devices wired into the controller. These screens are provided for troubleshooting of the control system. Figure 14 is shown as an example of what these screens looks like. Refer to your schematic diagram for the specific devices provided. Please note that these devices can be wired into ports J12, J13, J14, J15, J16, J17 and J18 of the controller as well as into the expansion I/O devices.

Devices shown in the Digital Output screens vary depending upon the type of dehumidifier provided. They can include Compressor Contactors, Solenoid Valves, Heat Enable Dry Contacts, Water Pump / Alarm Dry Contact, Damper Actuator or Fan Contactors.

Pressing the **UP** or **DOWN** keys from the first Digital Output screen will cycle through all applicable screens.

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

## IAQ Controller Details

Figure 14: Digital Outputs

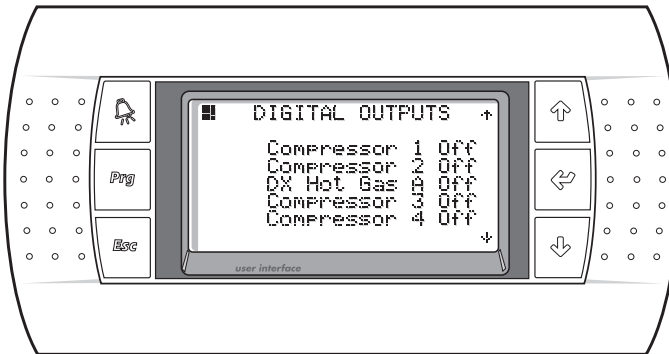


Figure 15 shows the following outputs:

**Chiller Hot Gas A** – “On” or “Off” as required.

**Auxiliary Heater** – “On” or “Off” as required.

**Water Pump or Alarm** – “On” or “Off” as required. DX

**Hot Gas B** – “On” or “Off” as required.

**Chiller Hot Gas B** – “On” or “Off” as required.

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

Figure 15: Digital Outputs

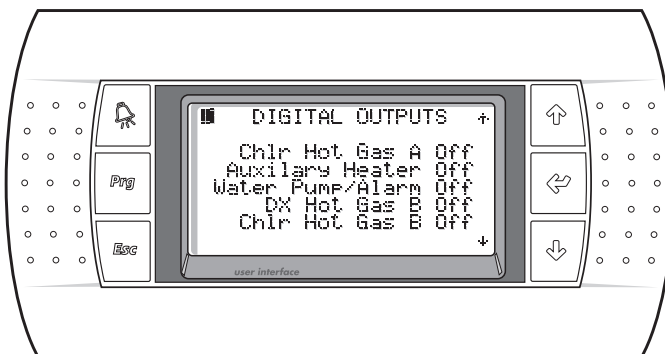


Figure 16 shows the following outputs:

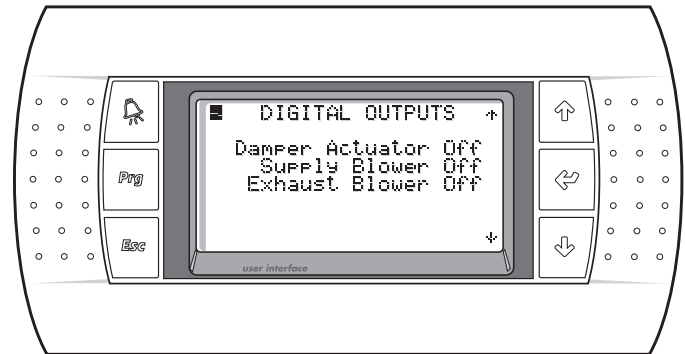
**Damper Actuator** – “On” or “Off” as required. Supply

**Blower** – “On” or “Off” as required.

**Exhaust Blower** – “On” or “Off” as required.

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

Figure 16: Digital Outputs



## Analog Outputs

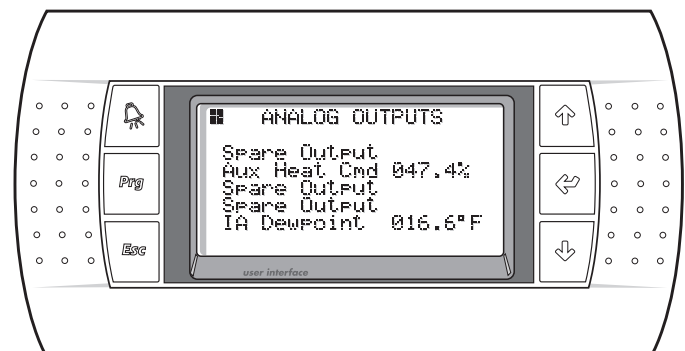
The Analog Output screens will show the state of the devices wired into the controller. These screens are provided for troubleshooting of the control system. Figure 17 is shown as an example of what these screens looks like. Refer to your schematic diagram for the specific devices provided. Please note that these devices can be wired into ports J4 of the controller.

The Analog Output screens will show the current position of the Auxiliary Heating Command. Units without an external wheel module and set for Recirculation will also show the position of the O/A and R/A modulating damper actuators. The Intake Air Dewpoint is also shown on this screen as this is a calculated output function.

Pressing the **UP** or **DOWN** keys from the first Analog Output screen will cycle through all applicable screens.

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

Figure 17: Analog Outputs



## DOAS CM3500 Controller

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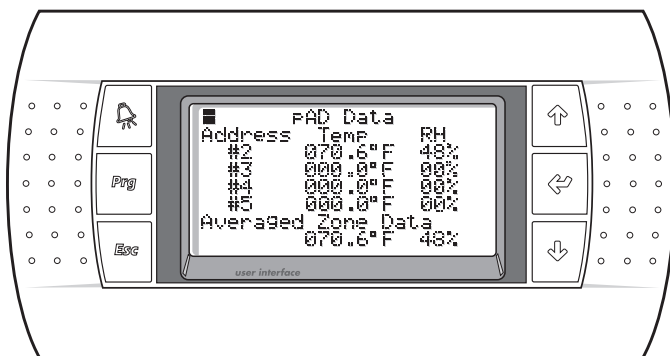
## IAQ Controller Details

**Room Sensor Data**

This screen is provided for troubleshooting of the control system. This screen is only shown if the Zone Reset is selected in the Factory Configuration of the unit. The Remote Room Sensor Temperature and Humidity Readings wired into the system are shown on this screen by the device address. The average of these sensors is shown as well.

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

Figure 18: Room Sensor Data

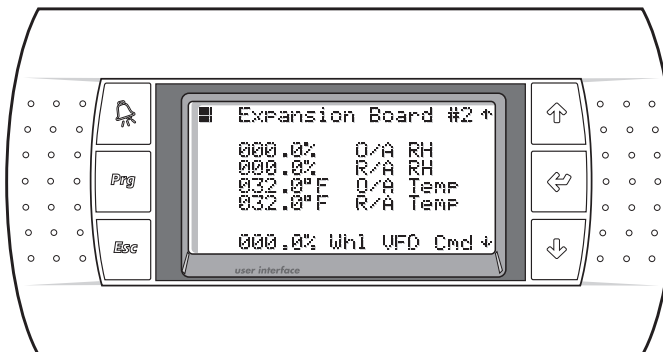
**Expansion I/O**

Expansion I/O boards can be connected to CM3500 control system through either the FieldBus 1 Port using a tLAN communication board or the FieldBus 2 port using ModBus. The I/O expansion boards using FieldBus 1 are used for the optional CO<sub>2</sub> controls of TO units, control of the packaged condenser fans, the optional enthalpy wheel of TO units and the staged heat outputs. These screens are provided for troubleshooting of the control system. Figure 19 is shown as an example of what these screens looks like. Refer to your schematic diagram for the specific devices provided.

Devices shown in the Expansion I/O screens vary depending upon the type of dehumidifier provided. They can include sensing of the CO<sub>2</sub> sensor, enthalpy wheel differential air pressures, outdoor and return air temperature and relative humidity, exhaust air relative humidity, exhaust blower speed command, enthalpy wheel speed command, enthalpy wheel and exhaust blower overload contacts, outside air damper end switch, enthalpy wheel run, outside air and recirculation damper commands.

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

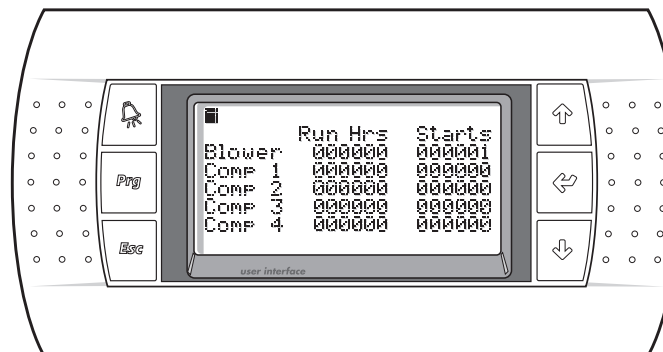
Figure 19: Expansion I/O

**Starts & Run Times**

Selecting the Starts & Run Times allows the display of the number of starts for the Blower and the Compressors on the unit. This is strictly a display screen and is provided for troubleshooting of the unit.

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

Figure 20: Starts &amp; Run Times

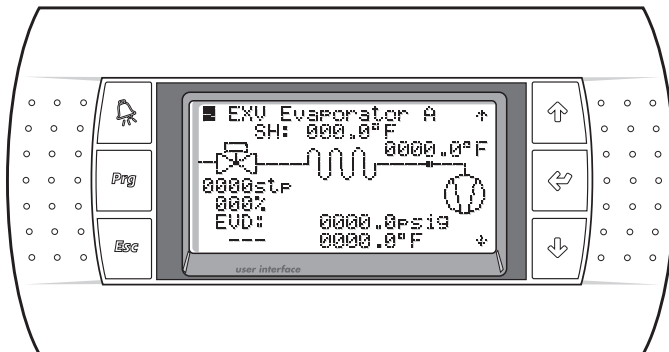


## IAQ Controller Details

**EXV/EMV Status**

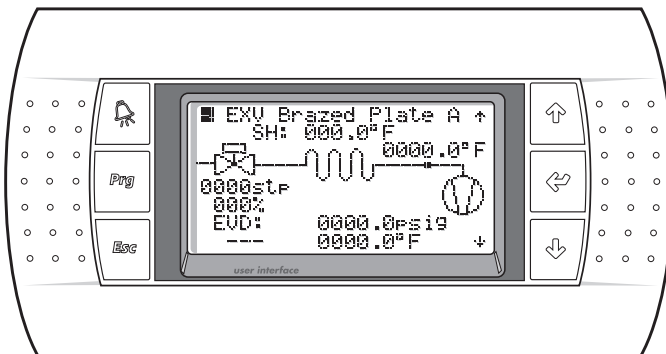
Selecting the EXV/EMV Status will display the status of the Electronic Expansion Valve (EXV) for the evaporator in circuit A. The current superheat and suction temperature are shown. The current suction pressure is shown at the bottom with the saturated suction temperature below the pressure. The valve position is shown in steps and in percentage. The status is also shown on the bottom left. This is strictly a display screen and is provided for troubleshooting of the unit.

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

**Figure 21: EXV/EMV Status**

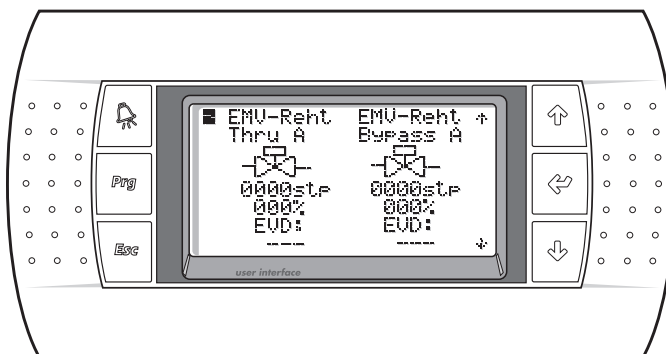
Pressing the **DOWN** key will display the screen shown in Figure 22 only if the unit is a heat pump. The Electronic Expansion Valve (EXV) for the brazed plate heat exchanger in circuit A is shown. The current superheat and suction temperature are shown. The current suction pressure is shown at the bottom with the saturated suction temperature below the pressure. The valve position is shown in steps and in percentage. The status is also shown on the bottom left. This is strictly a display screen and is provided for troubleshooting of the unit.

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

**Figure 22: EXV/EMV Status**

Pressing the **DOWN** key again will display the Electronic Motorized Valve (EMV) status for the two valves controlling the reheat condenser. The valve position and status for each valve is shown. This is strictly a display screen and is provided for troubleshooting of the unit.

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

**Figure 23: EXV/EMV Status**

The next screens shows the valve status screens of circuit B of a dual circuit unit.

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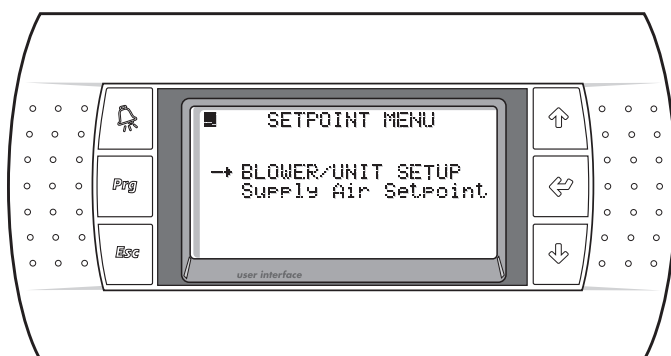
## IAQ Controller Details

## Setpoint Menu

Selecting the Setpoint Menu from the STATUS MENU allows for selection of the Blower/Unit Setup or the temperature setpoints specific to the unit. Select the appropriate item with the **UP** and **DOWN** keys and press the **ENTER** key to select.

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

Figure 24: Setpoint Menu



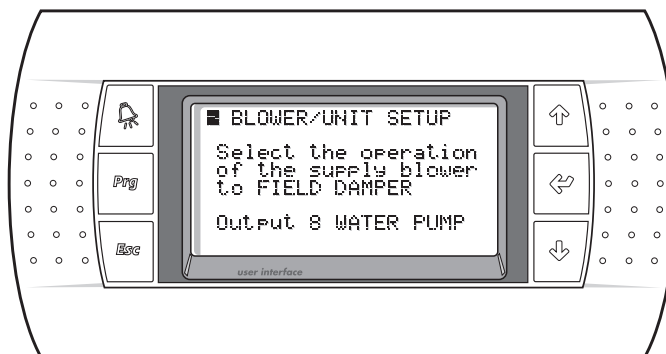
## Blower/Unit Setup

Selecting the Blower/Unit Setup enables adjustments to the operation of the damper and the operation of Output 8. The blower operation can be set for FIELD DAMPER, RECIRCULATION or CONTINUOUS. Set the blower operation for FIELD DAMPER when the intake air is supplied directly from the outside. Set the blower operation to RECIRCULATION when a mixing box is used to supply the intake air. In this mode the blower will cycle automatically. Set the blower to CONTINUOUS when a mixing box is used and the blower is always required to run.

Output 8 can be set to cycle a water pump, if required, or to indicate the alarm condition of the unit. The WATER PUMP selection will start and run the pump for a minute before the compressors will be allowed to start. The pump will also run for two (2) minutes after the compressors shutdown. The REMOTE ALARM OUTPUT, when selected, will turn the output off to indicate an alarm mode. This output will be on when the unit is in a normal running mode. Select the appropriate item with the **UP** and **DOWN** keys and press the **ENTER** key to select.

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

Figure 25: Blower/Unit Setup

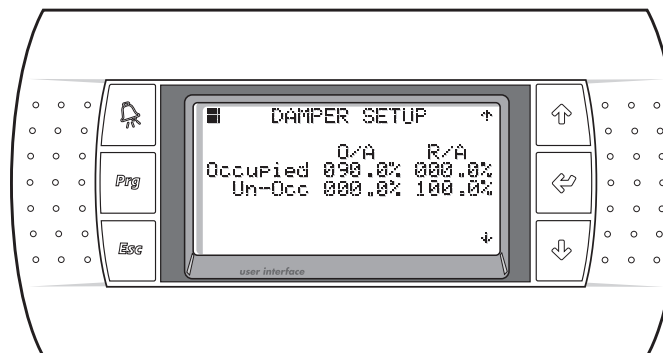


## Damper Setup

Setting the blower operation for continuous or recirculation will allow the damper setup screen to be viewable (Figure 26). This screen allows the positions of the outdoor air and recirculation air to be set in the Occupied and Un-Occupied modes. The range of these settings is from 0.0 to 100.0%. To modify the settings, press the **ENTER** key and use the **UP** and **DOWN** keys until the desired setting is shown. Press the **ENTER** key to accept the setting.

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

Figure 26: Damper Setup



## IAQ Controller Details

**Supply Air Temperature Setpoint**

This screen will only be shown if the zone or outside air reset options are not selected. This screen allows the supply air temperature setpoint to be modified. The value of the setpoint ranges from 45.0° F to 99.9° F with a 72.0° F default. To modify the setpoint, press the **ENTER** key and use the **UP** and **DOWN** arrow keys until the desired setting is shown. Press the **ENTER** key to accept the setpoint value.

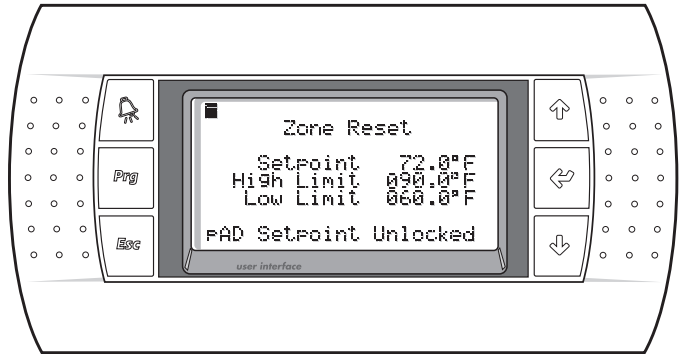
To return to the TEMPERATURE SETTINGS MENU, press the **Esc** key.

**Figure 27: Supply Air Temperature Setpoint**

Low Limit ranges from 35.0° F to 70.0° F, with a 60.0° F default. The pAD Setpoint setting allows the setpoint to be Locked and Unlocked. In the Unlocked mode, the zone sensor addressed as 2 allows modification of the zone air setpoint. In the Locked mode, none of the zone sensors allow this setpoint to be modified.

Also, in the Zone Reset mode, the Home Screen will display the actual zone air temperature instead of the supply air temperature.

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

**Figure 28: Zone Reset Setpoints****Zone Reset Setpoints**

In the Zone Reset mode of operation, the Supply Air Temperature Setpoint is calculated based upon the actual zone air temperature and the zone air temperature setpoint and will fall between the High and Low Limit Setpoints. This mode requires the remote room sensor be installed in the conditioned space. As the zone air temperature increases above the zone air setpoint, the setpoint is continuously modified to achieve a faster return to setpoint. The same logic applies to a decrease in zone air temperature below the setpoint. The High and Low Limit Setpoints create the band within which the calculated zone air temperature setpoint will fall.

This screen will only be shown if the Zone Reset option is selected. The Zone Reset Setpoint as well as the High and Low Limit Setpoints can be modified within this screen. The value of the Zone Reset Setpoint ranges from 55.0° F to 95.0° F, with a default of 72.0° F. To modify the setpoint, press the **ENTER** key and use the arrow keys until the desired setting is shown. Press the **ENTER** key to accept setpoint value. The value of the High Limit ranges from 40.0° F to 140.0° F, with a 90.0° F default and the value of the



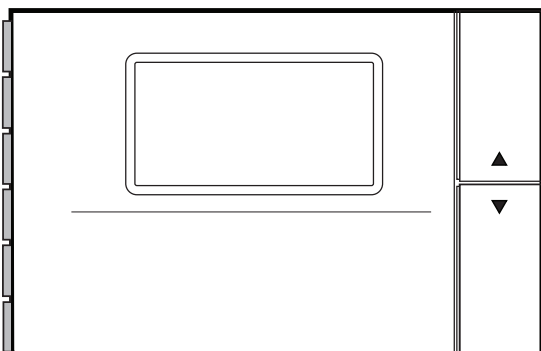
## DOAS CM3500 Controller

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## IAQ Controller Details

**Operation of the Remote Room Sensor**

The remote room sensor supplied with the Zone Reset option will also allow modification of the Zone Air Setpoint. This can only be changed on the remote room sensor assigned as address 2. Pressing the **UP** or **DOWN** buttons will display and flash the current setpoint. Pressing the **UP** or **DOWN** buttons again will change the setpoint in 0.1° increments. Pressing and holding down these buttons will allow for a faster scroll of the setpoint. The last displayed value will become the setpoint after a few moments. The setpoint will assume the value of the last device to modify it, either the remote room sensor or the display terminal.

**Figure 29: Operation of the Remote Room Sensor**

The remote room sensor displays the occupancy status of the unit. A house icon is shown to the left of the temperature. If the house icon is empty, the unit is in the un-occupied mode. If a figure of a person is displayed within the house icon, the unit is in the occupied mode.

The remote room sensor can also be used to override the occupancy of the unit for a few hours. Press the **SLEEP** button, symbolized as a crescent moon on the left side of the sensor, fourth button from the top. This will display “1” and the crescent moon. The unit will now be occupied for one hour. Pressing the button multiple times will allow for up to nine hours of occupancy. To cancel the occupancy set from the remote room sensor, simply press the **SLEEP** button again, or set the hours to zero. When the crescent moon icon disappears, the occupancy override is cancelled.

The bottom left button on the remote room sensor flips the large temperature and small humidity display to the large humidity and small temperature display for a few seconds. This allows the humidity to be displayed in a larger font.

The remaining buttons on the left of the remote room sensor are disabled for this application. Pressing them will display an icon of a lock.

The remote room sensor will flash “ALr” to indicate that an alarm has occurred. The display of the current alarm must be done from the IDT or the RDT. The remote room sensor will flash “oLn” to indicate that the sensor is offline from the controller.

To change the internal settable parameters of the remote room sensor, see Remote Room Sensor Configuration.

**Outside Air Reset**

In the Outside Air Reset mode of operation, the supply air temperature setpoint will be modified based upon the outside air temperature and where it falls within four temperature ranges. When the outside air temperature is below the lower temperature range setting, the highest SAT Setpoint will be used. When the outside air temperature falls between the low setting and the medium setting, the second highest SAT Setpoint will be used. When the outside air temperature falls between the medium setting and the high setting, the second lowest SAT Setpoint will be used. When the outside air temperature rises above the high setting, the lowest SAT Setpoint will be used.

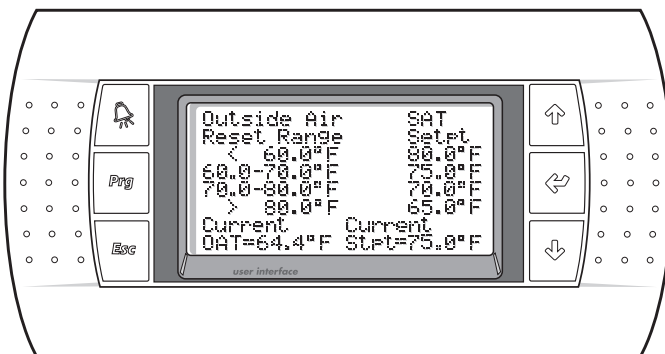
This screen will only be shown if the Outside Air Reset option is selected. This screen allows the Outside Air Low, Medium and High Setpoints as well as the four SAT Setpoints to be modified. The range of all setpoints on this screen is 55° to 95.0° F. However, the Outside Air Low Setting cannot be greater than the Outside Air Medium Setting. The Outside Air Medium Setting cannot be less than the Outside Air Low Setting and it cannot be greater than the Outside Air High Setting. Lastly, the Outside Air High Setting cannot be less than the Outside Air Medium Setting. Also, the highest SAT Setpoint cannot be set lower than the second highest SAT Setpoint. The second highest SAT Setpoint cannot be set higher than the highest SAT Setpoint and lower than the second lowest SAT Setpoint. The second lowest SAT Setpoint cannot be set higher than the second highest SAT Setpoint and lower than the lowest SAT Setpoint. The lowest SAT Setpoint cannot be set higher than the second lowest SAT Setpoint. 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 setpoint value.



## IAQ Controller Details

To return to the TEMPERATURE SETTINGS MENU, press the **Esc** key.

Figure 30: Outside Air Reset

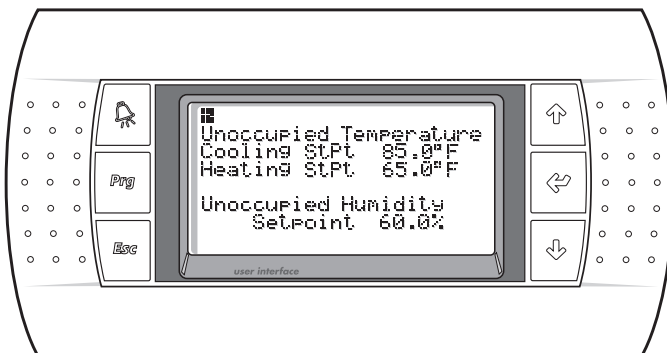


## Unoccupied Settings

This screen will only be shown if the Zone Reset and the Unoccupied Control is selected in for the unit. These setpoints will only be used in the unoccupied mode. The range of the Cooling Setpoint is from the current Heating Setpoint setting to 95.0° F with a default of 65.0° F. The range of the Heating Setpoint is from 40.0° F to the current Cooling Setpoint setting with a default of 85.0° F. To modify the setpoint, press the **ENTER** key and use the arrow keys until the desired setting is shown. The range of the Unoccupied Humidity Setpoint is 20.0% to 99.9%, with a default of 60.0%. To modify the setpoint, press the **ENTER** key and use the arrow keys until the desired setting is shown. Press the **ENTER** key to accept setpoint value.

To return to the TEMPERATURE SETTINGS MENU, press the **Esc** key.

Figure 31: Unoccupied Settings

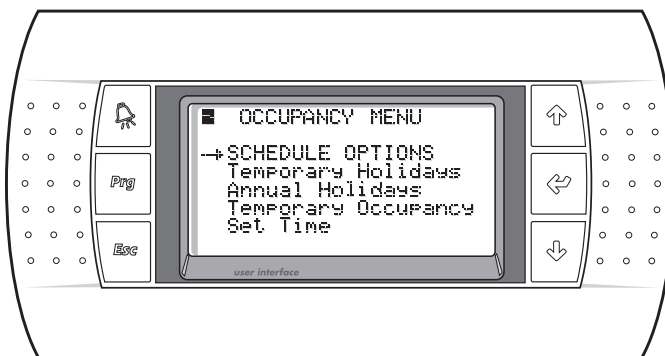


## Occupancy Menu

Select the OCCUPANCY MENU from the MAIN MENU allows access to the 10 occupancy schedules in the controller as well as adjusting the current date and time. From this menu it is possible to access and adjust the Schedule Options, Temporary Holidays, Annual Holidays, Temporary Occupancy and the Time settings.

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

Figure 32: Occupancy Menu

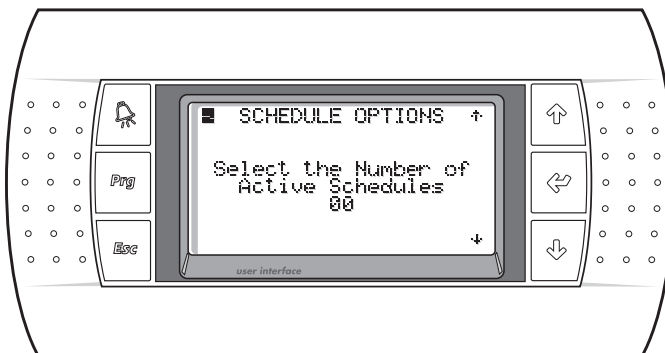


## Schedule Options

This screen sets the number of active occupancy schedules. Setting at least one active schedule allows the occupancy schedule timing to be set from the Current Schedule Screen. If the number of active schedules is left at zero, no occupancy scheduling will be active.

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

Figure 33: Schedule Options



## DOAS CM3500 Controller

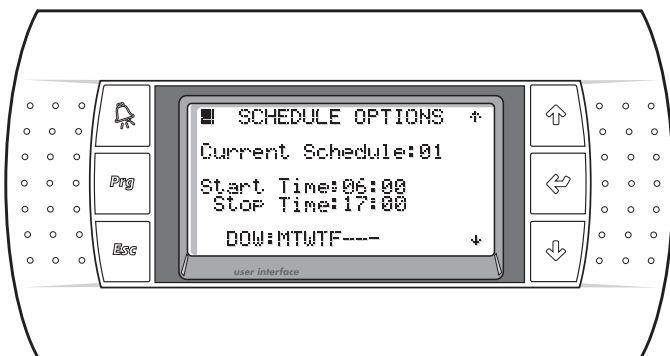
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## IAQ Controller Details

**Current Schedule**

The bottom of this screen allows the occupancy timing to be set for the selected day of the week (DOW). Select the schedule to modify the start time and stop time. This is the time span that the unit will be in the occupied mode. All times are set in the 24 hour format. As the DOW is selected, the **UP** and **DOWN** keys allow for Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday and any holiday to be occupied during that time. Up to 10 schedules can be active at any time. The 10 schedules allow for different start and stop times on various days of the week, weekends or programmed holidays.

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

**Figure 34: Current Schedule****Temporary Holidays**

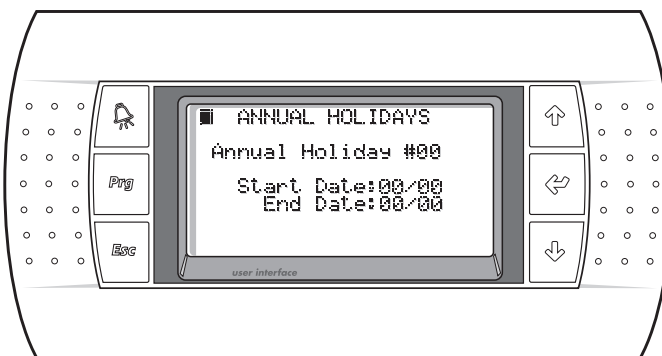
The Temporary Holiday settings are for holidays that change dates from year to year, such as Memorial Day or Thanksgiving. Up to 10 different temporary holidays can be set from this screen. Select the number to assign to the Annual Holiday and then select the Start Date and the End Date for that holiday.

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

**Figure 35: Temporary Holidays****Annual Holidays**

The Annual Holiday settings are for holidays with dates that remain constant year-to-year, such as New Years Day and the 4th of July. Up to 10 different annual holidays can be set from this screen. Select the number to assign to the Annual Holiday and then select the Start Date and the End Date for that holiday.

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

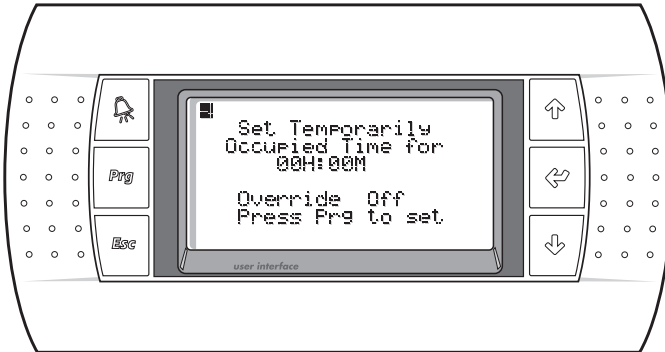
**Figure 36: Annual Holidays****Temporary Occupancy**

This screen allows the unit to be set to occupied mode 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 and enter the minutes you would like the unit to be temporarily in the occupied mode. Press the **ENTER** key and the cursor will be blinking over the "Press **Prg** to set" message. Pressing the **Prg** key will override the schedule and allow the unit to be temporarily occupied. The screen will now show "Override On." To clear this occupied override, set the hours and minutes to zero and press the **Prg** key. The screen will now show "Override Off."

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

## IAQ Controller Details

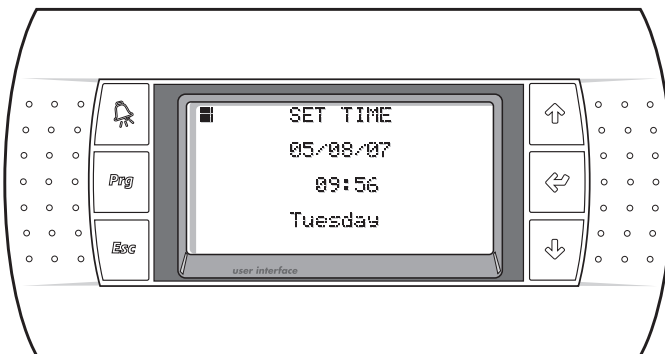
Figure 37: Temporary Occupancy

**Set Time** (Figure 38)

This screen sets the time, date and day of week. 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 step to the next item. If any item was modified, the message “Enter to Set” will be shown. Press the **ENTER** key to accept the time and date values.

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

Figure 38: Set Time

**Service Menu**

Selecting the SERVICE MENU will display the Service Menu Login Screen (Figure 39). Enter the service password, 1234, and press **ENTER**. The SERVICE MENU screen (Figure 40) will now be shown. This menu gives access to the Unit Setup, Parameter Settings, Sensor Offsets and Pressure /SAT Alarms. If the unit is a heat pump, the Glycol Ratio screen will also be available.

The user remains logged in for 10 minutes after the password is entered. During this time, the Login

screen reads “Still Logged In, Press PRG to Enter.” During these 10 minutes, the service menu may be re-entered by simply pressing the Prg key.

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

Figure 39: Service Menu

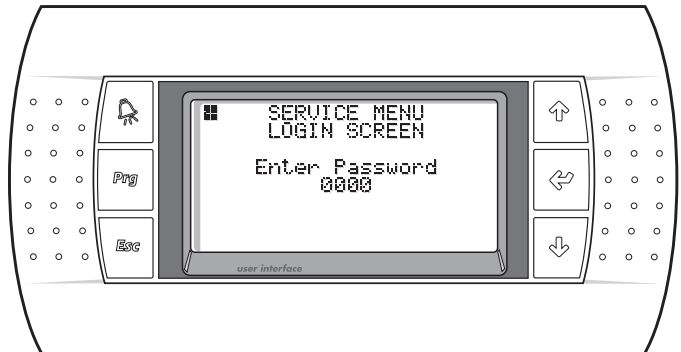


Figure 40: Service Menu



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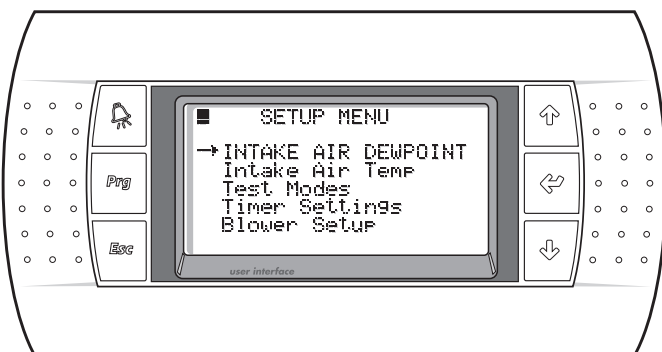
Rev.: February 17, 2016

## IAQ Controller Details

**Setup Menu**

Selecting the Unit Setup from the SERVICE MENU will allow access to the Intake Air Dewpoint, Intake Air Temp, Test Modes, Timer Settings, Blower Setup.

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

**Figure 41: Setup Menu****Intake Air Dewpoint**

The default setting for the Intake Air Dewpoint Setpoint and Deadband can be modified on this screen. This factory setpoint is preset before the controller is shipped and should only be modified by a trained technician. The range of the Intake Air Dewpoint setpoint is 0.0° to 99.9° F with a default of 60.0° F. The range of the Deadband is 0.0° to 9.9° F with a default of 3.0° F. The Actual Intake Air Dewpoint is shown for reference. To modify settings, press the **ENTER** key until the desired setpoint is selected and use the arrow keys until the desired value is shown. Press the **ENTER** key to accept the setpoint value.

To return to the Unit Setup Screen, press the **Esc** key.

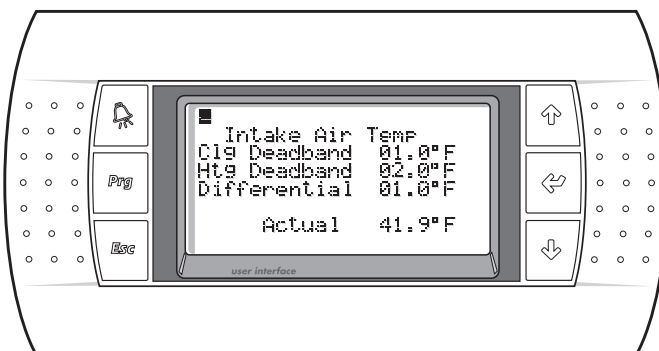
**Figure 42: Intake Air Dewpoint****Intake Air Temperature Setpoints** (Figure 43)

This screen shows the Cooling and Heating Deadbands. These deadbands are applied to the Supply Air Setpoint and determine when the cooling or heating modes are required. The Differential is the switch differential and is used to help prevent nuisance cycling of the heating or cooling modes. The range of Deadbands and Differential is 0.0° to 9.9° F. The Actual Intake Air Temperature is shown for reference.

For instance, if the Supply Air Setpoint is 72.0°F, using the deadbands and switch differential shown, the cooling mode will be required when the intake air temperature is above 72.0°F plus the 2.0 °F deadband, or any temperature above 74.0°F. The cooling mode will cease at 1.0°F below 74.0°F, or any intake air temperature below 73.0°F. The heating mode will be required when the intake air temperature is below 72.0°F minus the 2.0 °F deadband, or any temperature below 70.0°F. The heating mode cease at 1.0°F above this, or any temperature above 71.0°F.

To modify the setpoint, 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 Unit Setup Screen, press the Esc key.

**Figure 43: Intake Air Temperature Setpoints**

## IAQ Controller Details

**Test Modes** (Figure 44)

The test modes allow for pre-determined tests to be accomplished during the initial factory run of the unit. No user serviceability tests are available at this time.

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

**Figure 44: Test Modes****Timer Settings**

Selecting the Timer Settings from the SERVICE MENU will allow access to the time delays in the control system. Time delays shown in the Timer Settings screens vary depending upon the type of dehumidifier provided. They can include the timing for the multi-stage heating controller. Up to 3 stages of heat can be set at the factory. This control will employ a vernier sequence which will allow the first stage to be variable from the auxiliary heat analog output. The second or third stage will be cycled on, sequentially, after the analog output has been at 100% for the stage on delay. The stages will cycle off in the same manner. After the analog output is at 0% for the stage off time, the third and second stages will cycle off sequentially.

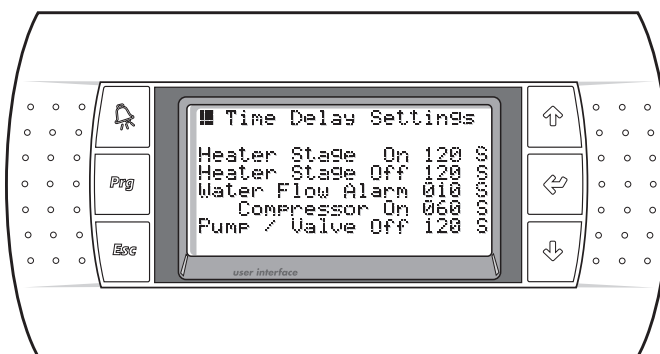
The water flow alarm time enables a delay after starting the water pump. The water flow switch will need to be on before this delay times out or a Low Water Flow alarm will disable the unit. The Compressor On delay will allow the water pump to run for one (1) minute before the compressor will turn on. The Pump / Valve Off delay will run the pump for two (2) minutes after the compressor is cycled off.

The Fan Delay and Air Flow Delay work together to allow the supply fan to ramp up to full speed over an extended period of time. The fan delay time will start once the fan starts and will not set the low air flow alarm during this initial start. After this time, a low air flow condition will need to be present for the Air Flow Delay time to set the alarm.

The Damper On/Fan Delay will delay the start of the fan until the damper has been energized for the delay time. After this time, the fan will start if the damper end switch is closed.

To modify the time delays, press the **ENTER** key and use the arrow keys until the desired setting is shown. Press the **ENTER** key to accept the delay value.

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

**Figure 45: Timer Settings**

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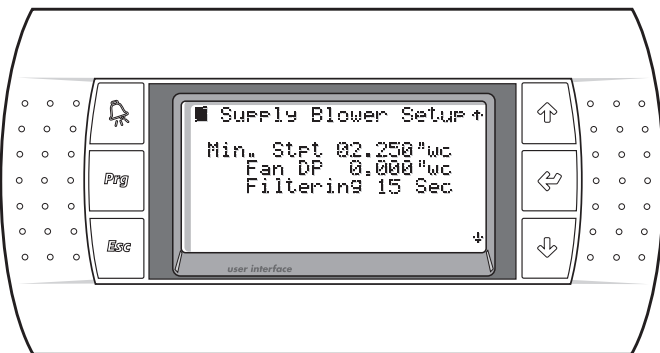
## IAQ Controller Details

**Blower Setup** (Figures 46-49)

The Blower Setup screens allow configuration of the EC supply fans used on Aura units. If an Aura unit is not provided, the manual blower setup screen will be the only screen shown. The Fan type is selected here, as well as the altitude of the site, which are required to calculate the correct CFM. The Fan DP and the calculated CFM are shown at the bottom of this screen for informational purposes only.

**Figure 46: Blower Setup**

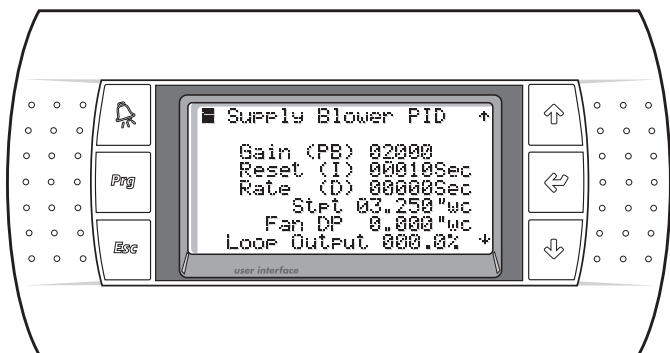
Pressing the **DOWN** key will display the screen on Figure 47. This screen is used to modify the minimum air flow setpoint. The fan DP has to be lower than 80% of the setpoint to set the alarm. The fan DP is shown on this screen for informational purposes only. The filtering time is used to filter any abrupt changes in the reading of the air pressure transducer. This can be set from 1 to 99 seconds, with 1 having the least amount of filtering and 99 the most amount of filtering.

**Figure 47: Blower Setup**

Pressing the **DOWN** key will display the Supply Blower PID screen shown on Figure 48. The Supply Blower PID screen allows the PID loop for the blower speed to be modified. The PID setting of the Gain (or Proportional Band), Reset (or Integral) and the Rate (or Derivative) can be modified here. The range of

the Gain is 0 to 32767. The range of the Reset is 0 to 32767. The range of the Rate is 0 to 32767. The Setpoint of the Fan DP is also set here. The actual fan DP and Loop Output are displayed here to aid in the tuning of the PID loop.

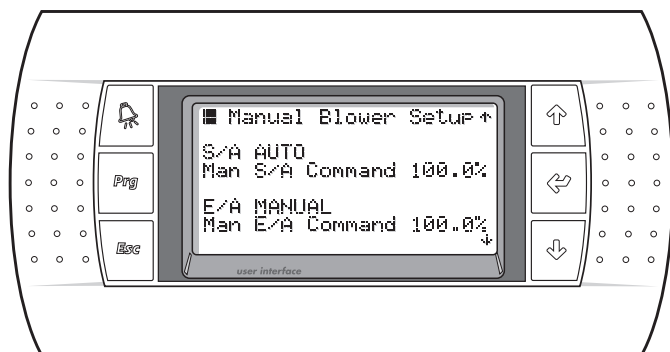
To modify these setpoints, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the setpoint.

**Figure 48: Blower Setup**

Pressing the **DOWN** key will display the Manual Blower Setup screen shown on Figure 49. The supply air blower can be set to manual control here. The Man S/A Command will be used for the speed of the blower. The Man E/A Command will be used for the speed of the exhaust blower. These commands can be set from 0.0% to 100.0%.

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.

To return to the Setup Menu press the **Esc** key.

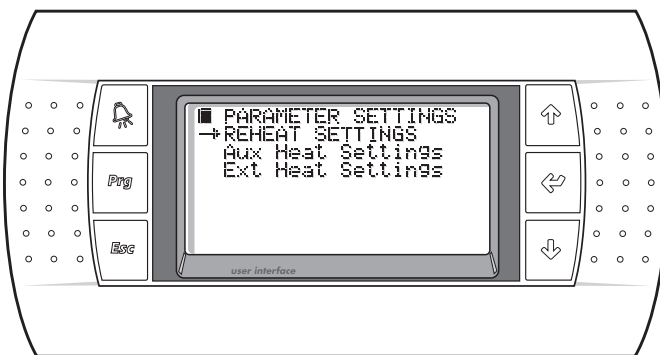
**Figure 49: Blower Setup**

## IAQ Controller Details

**Parameter Settings**

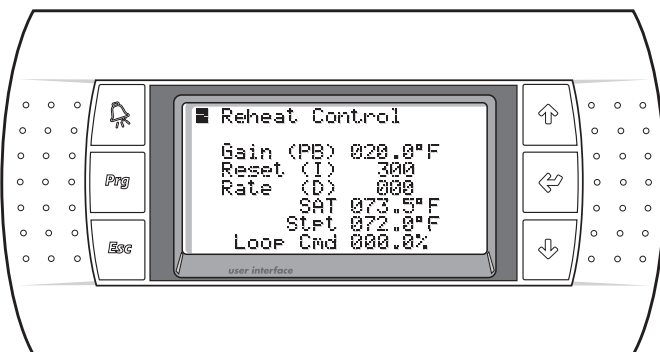
Selecting the Parameter Settings from the SERVICE MENU gives access to the Reheat Settings, Auxiliary Heat Settings and (if applicable) the Extended Heat Settings, Unoccupied Deadbands, Zone Reset Settings, Enthalpy Wheel Settings and Condenser Control Settings.

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

**Figure 50: Parameter Settings****Reheat Control Settings**

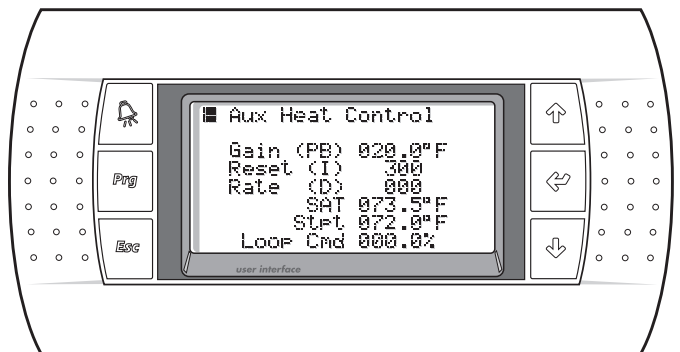
This screen allows the Reheat Control PID Gain (or Proportional Band), Reset (or Integral) and the Rate (or Derivative) to be modified for loop tuning. The range of the Gain is 0.0° F to 999.9° F. The range of the Reset is 0 to 999. The range of the Rate is 0 to 999. The Supply Air Temperature, Setpoint and actual loop output are displayed here to aid in the tuning of the PID loop. To modify these 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 Parameter Settings, press the **Esc** key.

**Figure 51: Reheat Control Settings****Auxiliary Heat Control Settings**

This screen allows the Auxiliary Heat PID Gain (or Proportional Band), Reset (or Integral) and the Rate (or Derivative) to be modified for loop tuning. The range of the Gain is 0.0° F to 999.9° F. The range of the Reset is 0 to 999. The range of the Rate is 0 to 999. The Supply Air Temperature, Setpoint and actual loop output are displayed here to aid in the tuning of the PID loop. To modify these setpoints, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the setpoint.

To return to the Parameter Settings, press the **Esc** key.

**Figure 52: Auxiliary Heat Control Settings****Extended Heat Control Settings**

This screen will only be shown for heat pump units. This screen allows the Extended Heat Control PID Gain (or Proportional Band), Reset (or Integral) and the Rate (or Derivative) to be modified for loop tuning. The range of the Gain is 0.0° F to 999.9° F. The range of the Reset is 0 to 999. The range of the Rate is 0 to 999. The Supply Air Temperature, Setpoint and actual loop output are displayed here to aid in the tuning of the PID loop. To modify these setpoints, press the **ENTER** key and use the arrow keys until the desired setting is shown. Pressing the **ENTER** key will now change the setpoint.

To return to the Parameter Settings, press the **Esc** key.

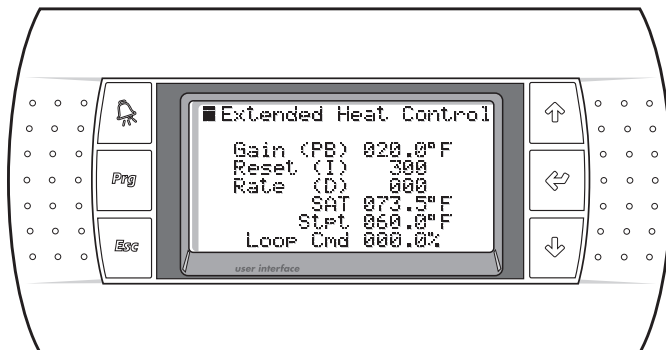


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## IAQ Controller Details

Figure 53: Extended Heat Control Settings

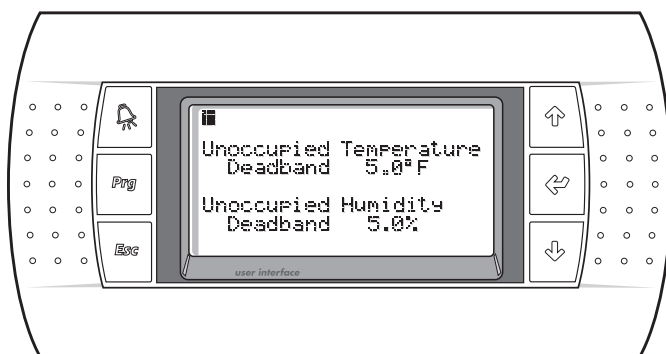


## Unoccupied Deadbands

This screen will only be shown if the Unoccupied Control is selected in the unit setup. These deadbands will only be used in the unoccupied mode. The Cooling and Heating Deadband is used to prevent short cycling and is added to the Cooling Setpoint and subtracted from the Heating Setpoint. The Humidity Deadband is added to the Setpoint. To modify the Deadbands, press the **ENTER** key and use the arrow keys until the desired setting is shown. Press the **ENTER** key to accept the deadband values. The range of both Deadbands is 0.0° F to 9.9° F.

To return to the Parameter Settings, press the Esc key.

Figure 54: Unoccupied Deadbands

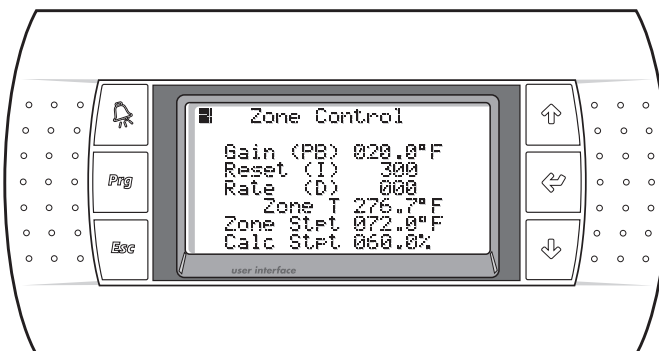


## Zone Control Settings

This screen will only be shown if the Zone Reset option is selected in the unit setup. This screen allows the Zone Reset PID Gain (or Proportional Band), Reset (or Integral) and Rate (or Derivative) to be modified for loop tuning. The range of the Gain is 0.0° F to 99.9° F. The range of the Reset is 0 to 999. The range of the Rate is 0 to 999. The Zone Air Temperature, Zone Setpoint and calculated setpoint are displayed here to aid in the tuning of the PID loop. To modify these 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. The calculated setpoint is also shown on this screen.

To return to the Parameter Settings, press the Esc key.

Figure 55: Zone Control Settings



## Enthalpy Wheel Settings

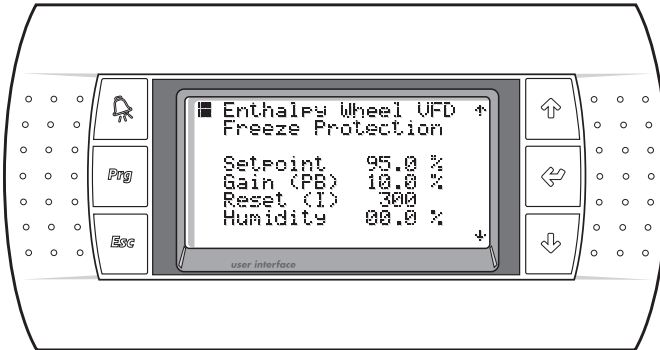
This screen will only be shown if the Enthalpy Wheel option is selected in the unit setup and a VFD is provided. The screen shown in Figure 61 allows modification of the Enthalpy Wheel Relative Humidity Setpoint, PID Gain (or Proportional Band) and Reset (or Integral) for the freeze protection. The Humidity level in the exhaust section of the unit is also shown. The range of the Gain is 0.0% to 99.9%. The range of the Reset is 0 to 999. The range for the Setpoint is 0.0% to 99.9%. To modify these setpoints, press the **ENTER** key until the desired setpoint is selected and use the arrow keys until the desired setting is shown. Press the **ENTER** key to accept the setpoint value.

To return to the Parameter Settings, press the **Esc** key.



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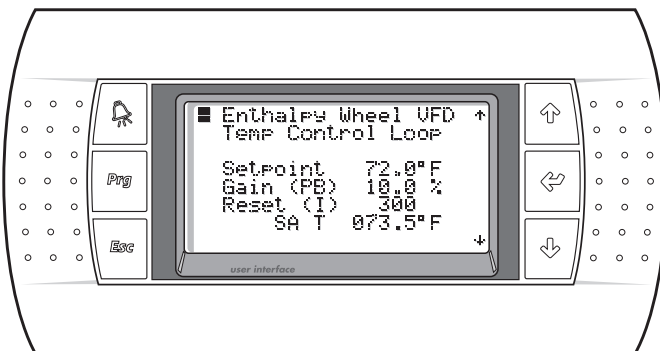
Figure 56: Enthalpy Wheel Settings



The screen shown in Figure 62 is for the Enthalpy Wheel VFD speed control. If the outdoor air temperature is lower than the supply air temperature setpoint minus the heating deadband the enthalpy wheel speed will be modulated to maintain the entering air temperature. The enthalpy wheel speed increases to increase the off-wheel temperature. This screen allows modification of the PID loop Gain (or Proportional Band) and Reset (or Integral). The range of the Gain is 0.0% to 99.9%. The range of the Reset is 0 to 999. The range for the Setpoint is 0.0% to 99.9%. The Supply Air Temperature Setpoint and the Supply Air Temperature are displayed here to aid in the tuning of the PID loop. To modify these setpoints, press the **ENTER** key until the desired setpoint is selected and use the arrow keys until the desired setting is shown. Press the **ENTER** key to accept the setpoint value.

To return to the Parameter Settings, press the **Esc** key.

Figure 57: Enthalpy Wheel Settings



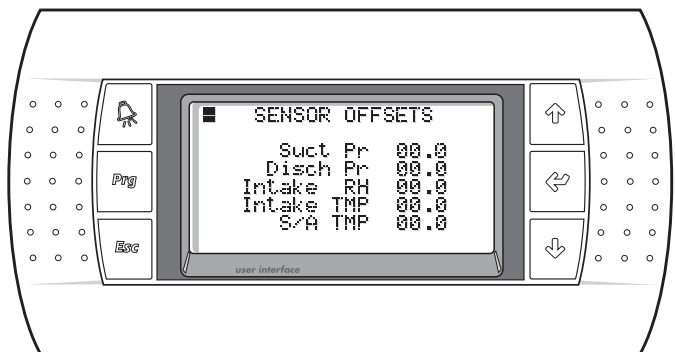
## Sensor Offsets

These screens allow for the control values of the analog input points to be adjusted if calibration shows these devices to be inaccurate. More than one Sensor Offset screen may be provided depending upon the optional equipment included with your dehumidifier. Pressing the **UP** or **DOWN** keys from the first Sensor Offset Screen, Figure 65, will cycle through all applicable screens. The range of these offsets is -99.9 to 99.9 for the refrigerant pressures, temperatures and humidity. The range for the air pressure and CO<sub>2</sub> sensors is -99 to 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.

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

Figure 58: Sensor Offsets



The second offset screen allow for the control values of the analog input points wired into the two possible expansion I/O boards to be adjusted if calibration shows these devices to be inaccurate. This screen will only be shown if an expansion I/O board is wired into the controller. The range for the air pressure and CO<sub>2</sub> sensors is -99 to 99. The range for the temperatures and humidity sensors is -99.9 to 99.9. 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.

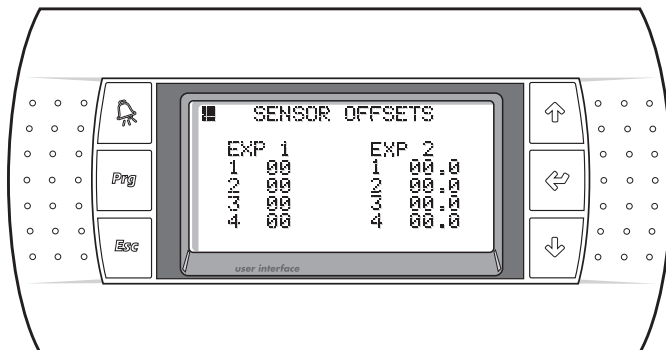
To return to the SERVICE MENU, press the **Esc** key.

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## IAQ Controller Details

Figure 59: Sensor Offsets

**Pressure / SAT Alarms** (Figure 67)

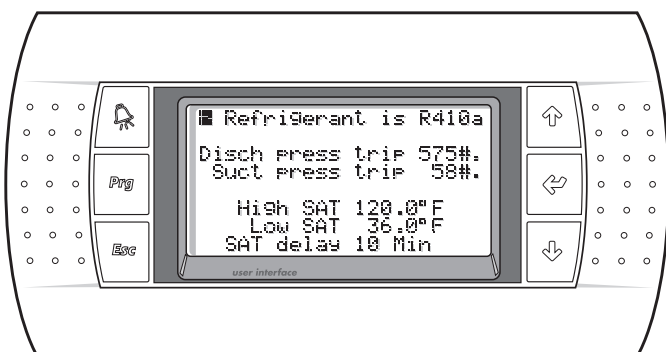
This screen displays the Refrigerant used in the unit, High Discharge Pressure and Low Suction pressure cutout values currently being used for the unit.

**(NOTE: The operator cannot change these settings.)** The suction pressure trip will vary depending on the mode and run time of the unit. At initial start the trip point is 22# for 2 minutes. When run as a heat pump, the low pressure trip is varied based upon the glycol ratio.

The High SAT alarm and the Low SAT alarm are active after a call for a compressor to run or a call for heating, if appropriate, and the SAT delay time has expired. The SAT delay time will be reset when the compressor call or heating requirement end. The range of the High SAT alarm varies from 90.0°F to 150.0°F with a 120.0° F default. The range of the Low SAT alarm varies from -20.0°F to 50.0°F with a 36.0° F default. The range of the SAT delay varies from 0 minutes to 30 minutes with a 10 minutes default. To modify these setpoints, press the **ENTER** key and use the **UP** and **DOWN** arrow keys until the desired setting is shown. Press the **ENTER** key to accept the setpoint value.

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

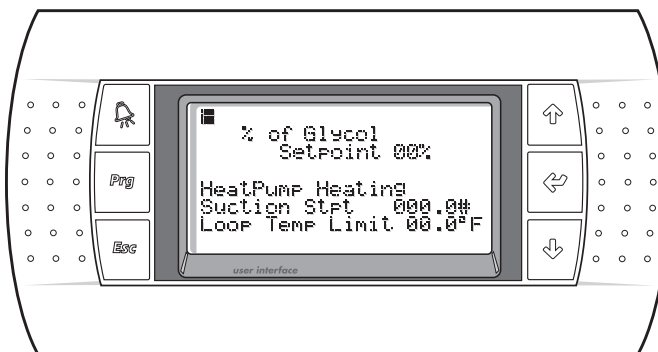
Figure 60: Pressure / SAT Alarms

**Glycol Ratio**

This screen will only be shown if the unit is set as a heat pump. This screen allows modifying the percent of glycol in the water. The range of the setpoint is 0% to 30% of glycol in the water. To modify this setpoint, press the **ENTER** key and use the arrow keys until the desired setting is shown. Press the **ENTER** key to accept the setpoint value. Modifying the % of Glycol Setpoint will change the Suction Pressure Trip Setting (shown as Suction Stpt here) and the water loop temperature limit (shown as Loop Temp Limit here) used by the compressor in the heating mode. **(NOTE: The Suction Stpt and Loop Temp Limit are calculated values and cannot be modified from this screen.)**

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

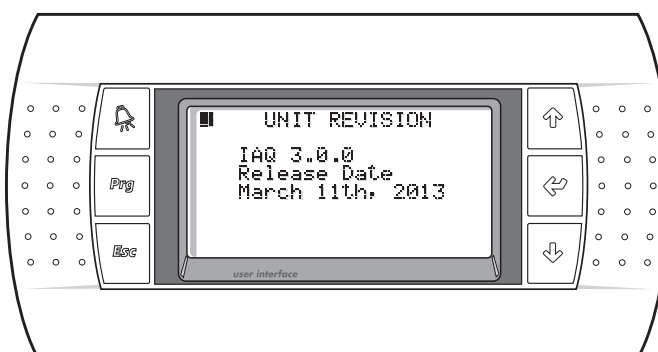
Figure 61: Glycol Ratio

**Unit Revision**

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 ClimateMaster in the event a service call is necessary. When an order number is shown on this screen, the controller program may have been modified from the standards described in this manual. See the order documentation for further details.

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

Figure 62: Unit Revision



## Alarms

### Alarms

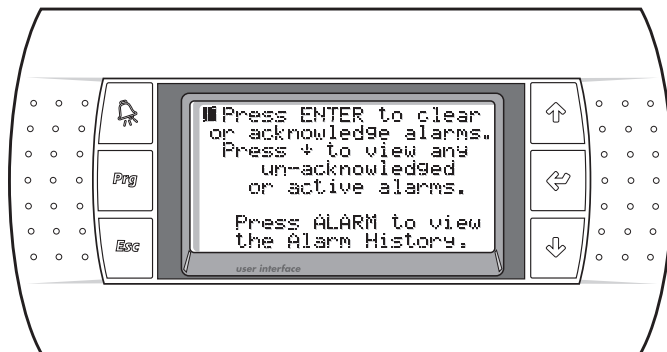
Alarms are either Automatic Reset or Manual Reset. Automatic Reset Alarms are alarms that allow the unit and/or circuit to return to operation once the operating parameter has been returned to acceptable operating conditions. The unit and/or circuit will restart automatically; however, the red Alarm LED will remain illuminated until acknowledged to alert the operator the alarm occurred. Manual Reset Alarms are alarms that stop the unit and/or circuit 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.

#### Alarm Screen

The ALARM MENU can be accessed anytime by pressing the **ALARM** key. The main alarm screen includes the instructions for viewing and resetting the alarms, as well as a means to access the alarm history page. Pressing the **ENTER** key while viewing this alarm screen or the active alarm will reset any alarm that has returned to its safe state. Any active alarm can be viewed by pressing the **DOWN** key from this page. If no active alarms are shown, no alarms are active. To view the Alarm History Screen, press the **ALARM** key.

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

Figure 63: Alarm Screen



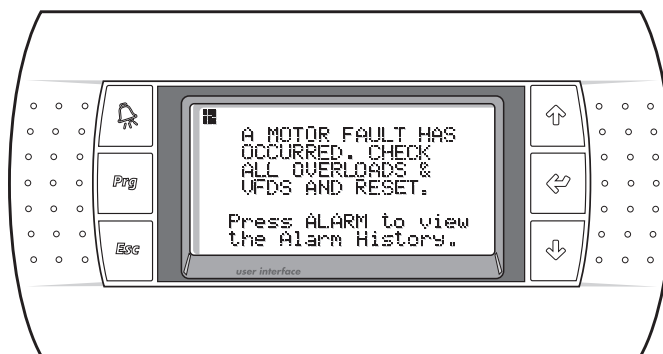
#### Low Suction Pressure

This is a Manual Reset Alarm. The Low Suction Pressure Alarm will only be activated when the Suction Pressure falls below 22 psig. In this state, the unit will stop and not restart until the unit is reset manually. This condition would only occur on a loss of refrigerant in a circuit or an extremely low operating temperature. The red ALARM LED on the display will stay lit until the alarm is reset.

#### Motor Fault

This is a Manual Reset Alarm. The Motor Fault Alarm will only be activated when any of the motor overload devices wired into digital input 3 indicate an overloaded condition. In this state, the unit will stop and not restart until the alarm condition is reset manually. The red ALARM LED on the display will stay lit until the alarm is reset.

Figure 64: Motor Fault



#### High Discharge Pressure Circuit A or Circuit B

This is a Manual Reset Alarm. The High Discharge Pressure Alarm is activated when the Discharge Pressure rises above the High Pressure Trip Setpoint. The unit will stop and not restart until the alarm condition is reset manually. The red ALARM LED on the display will stay lit until the alarm is reset.

#### Multiple Low Suction Pressure Alarms Circuit A or Circuit B

This is an Automatic Reset Alarm that becomes a Manual Reset Alarm after a number of attempts. If the low suction pressure cycle occurs 3 (adjustable) times in a 1 (adjustable) hour time period, then an alarm will be indicated and recorded in the alarm history as a multiple suction pressure alarm. This alarm will be reset, by the controller after a 2 (adjustable) hour time delay. This controller reset will be tried 3 (adjustable) times in a 36 (adjustable) hour period. After the fourth controller reset, if the multiple suction pressure alarm occurs again, an operator initiated reset will be required to restart the unit.

#### Room Reset Network Failure

This is an Automatic Reset Alarm. The Room Reset Network Failure Alarm is activated when the Remote Room Sensor is offline or disconnected from the controller. In this state, the unit will be placed in SAT Control and will run in this mode with the alarm active. When the Remote Room Sensor is back online with

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### Alarms

the controller, the unit will return to Zone Reset Control automatically. The red ALARM LED on the display will stay lit until the alarm is reset.

#### Temperature Sensor Failure

This is an Automatic Reset Alarm. The Temperature Sensor Failure Alarm is activated when the supply or intake air temperature sensors are in a shorted or open condition. In this state, the unit will stop and not restart until the alarm condition is cleared. The red ALARM LED on the display will stay lit until the alarm is reset.

#### Supply Air Temperature Out of Range

This is an Automatic Reset Alarm. The Supply Air Temperature Out of Range Alarm is active when the supply air temperature is above or below the setpoints for the time period specified. See Section 2.6.4 for details. In this state, the unit will stop and not restart until the alarm condition is cleared. The red ALARM LED on the display will stay lit until the alarm is reset.

#### Air Filter Service Required

This is an Automatic Reset Alarm. The optional Air Pressure Switch is required to activate this alarm. The Air Filter Service Required Alarm is activated when the pressure differential across the air filter exceeds the normal pressure. In this state the unit will continue to run but will signal an alarm condition. The red ALARM LED on the display will stay lit until the alarm is reset.

#### Low Voltage Monitor

This is an Automatic Reset Alarm. The optional Low Voltage Monitor is required to activate this alarm. The Low Voltage Monitor Alarm is activated when Low Voltage Monitor senses a below normal voltage in the unit – low enough to damage the equipment. The unit will stop and the Low Voltage Alarm will be activated. The unit will restart when the Low Voltage Monitor does not indicate low voltage. The red ALARM LED on the display will stay lit until the alarm is reset.

#### High Condensate Level

This is an Automatic Reset Alarm. The optional Condensate Level Switch is required to activate this alarm. The High Condensate Level failure is activated when the condensate drain is plugged for any reason. In this state the unit will stop and not restart until the alarm condition is cleared. The red ALARM LED on the display will stay lit until the alarm is reset.

#### Low Water Flow

This is an Automatic Reset Alarm. The optional Water Flow Switch is required to activate this alarm. The Low Water Flow Alarm is activated when the water in the heat pump loop stops flowing. In this state the unit will stop and not restart until the water flow is re-established. The red ALARM LED on the display will stay lit until the alarm is reset.

#### Smoke Alarm

This is an Automatic Reset Alarm. The Smoke Alarm is activated when the smoke alarm contact opens. 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 reset.

#### Low Air Flow

This is a Manual Reset alarm. The Low Air Flow failure is activated when the air flow drops below acceptable levels. In this state the unit will stop and not restart until the alarm condition is reset manually. The red ALARM LED on the display will stay lit until the alarm is reset.

#### Freeze 'Stat Alarm

This is a Manual Reset alarm. The Freeze 'Stat Alarm is activated when the temperature across the water coils drops. In this state the unit will stop and not restart until the alarm condition is reset manually. The red ALARM LED on the display will stay lit until the alarm is reset.

#### High Discharge Temperature Alarm

This is a Manual Reset alarm. The High Discharge Temperature Alarm is activated when the compressor temperature rises to an unacceptable level. In this state the unit will stop and not restart until the alarm condition is reset manually. The red ALARM LED on the display will stay lit until the alarm is reset.

#### High Superheat Alarm

This is a Manual Reset alarm. The High Superheat Alarm is activated the superheat rises to an unacceptable level. In this state the unit will stop and not restart until the alarm condition is reset manually. The red ALARM LED on the display will stay lit until the alarm is reset.

## Alarms

### Low Oil Level Alarm

This is a Manual Reset alarm. The Low Oil Level Alarm is activated when the variable speed compressor oil level drops to an unacceptable level. In this state the unit will stop and not restart until the alarm condition is reset manually. The red ALARM LED on the display will stay lit until the alarm is reset.

### Modbus Fault

This is a Manual Reset alarm. The Modbus Fault is activated when the c. PCOe expansion board is required by the system, but communication had not been established. In this state the unit will stop and not restart until the alarm condition is reset manually. The red ALARM LED on the display will stay lit until the alarm is reset.

### Fixed Speed Compressor Phase Monitor

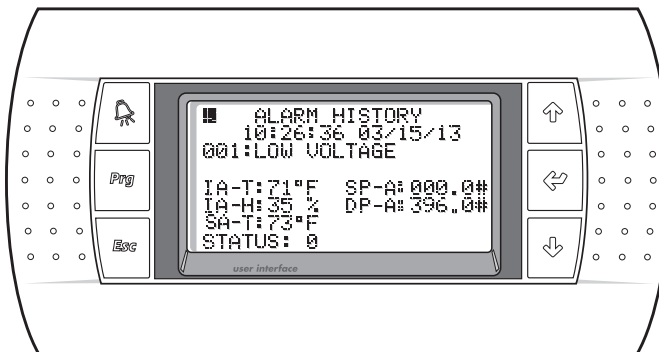
This is an Automatic Reset alarm. The FS Phase Monitor Alarm is activated when an Aura Q-Pump Inverter Plus unit requires a fixed speed compressor and the phase monitor detects that the fixed speed compressor will run backwards. In this state the unit will continue to run, but not allow the fixed speed compressor to run. The red ALARM LED on the display will stay lit until the alarm is reset.

### Alarm History Screen

The Alarm History Screen is accessible from the Alarm Screen by pressing the **ALARM** key. This screen lists a history of alarm conditions by time and date which have existed on the IAQ system. The most recent alarm will be displayed as 001 along with the Intake Air Temperature, Intake Air Relative Humidity, Supply Air Temperature, Suction Pressure, Discharge Pressure and the Status of the unit when the alarm occurred. On units with dual refrigerant circuits, the suction and discharge pressures of circuit B will also be shown when the alarm occurred. The Status number shown corresponds as follows: 0-Zone Satisfied/Off, 1-Heating, 2-Cooling, 3-Dehumidifying, 4-Dehum/Heat, 5-Dehum/Cool and 6-Low Suction Pressure.

To access the history of alarms, press the **DOWN** key. The last 100 alarm conditions are saved in this history with the 101st being overwritten.

Figure 65: Alarm History Screen





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**Programmable Controller**

The programmable controller is preprogrammed by ClimateMaster for the control of your unit. The ClimateMaster replacement part number for both of these controllers is available by calling our service department.

**Remote Display Terminal**

This wall-mountable remote display is an IP40 rated device. Operating conditions must be between 0.0° F and 140° F and less than 90% RH. The remote display is powered through the cable provided. The maximum distance when using a 6 conductor phone cable is 150 feet, and 1,500 feet when using a 22 AWG 3 twisted pair cable. The ClimateMaster replacement part number for the remote terminal is available by calling our service department.

**Remote Room Sensor**

The Remote Room Sensor is an electronic device designed as an interface to send temperature and/or humidity data from remote areas to the control system. The unit operates on an RS485 pLAN network. The ClimateMaster replacement part number for the Remote Room Sensor is available by calling our service department.

The system's network addressing must be correctly set in order for the remote information to be sent to the control system. Generally, the controller itself is at address 1 and the first Remote Room Sensor is at address 2. The second Remote Room Sensor will be address 3, the third will be address 4 and the fourth will be address 5. The addresses are set in the PARAMETER MENU of the Remote Room Sensor. Holding both the **UP** and **DOWN** buttons together for 4 seconds will display the PARAMETER MENU. While continuing to hold the UP button, press the button on the lower left of the Remote Room Sensor to enter the menu. The settable parameters can now be seen using the **UP** or **DOWN** buttons. To modify a parameter, press the lower left button. The parameter value will now flash allowing the **UP** and **DOWN** buttons to modify it. When the values are correct, hold the lower left button to enter the modified values into the remote room sensor memory. Please refer to the Remote Room Sensor instructions for further parameter definitions and product specifications.

**Remote Room Sensor Configuration**

For zone reset controlled dehumidifiers, a sensor in the conditioned space is required. The Remote Room

Sensor is used with the CM3500 to accomplish this. The remote room sensor is available as a temperature sensor to reset the supply air setpoint based on the conditioned space temperature. It is also available as a temperature and relative humidity sensor. In this configuration, un-occupied control in the conditioned space can also be accomplished.

Up to four room sensors can communicate data to the CM3500 controller. These will require addresses of 2, 3, 4 and 5. For installations requiring less than four room sensors, start the addresses from 2 and work up. The room sensor with address 2 may allow zone setpoint modification, if the sensor is unlocked. When unlocked, the zone setpoint can be modified by using the **UP** and **DOWN** buttons. Simply press one of these buttons to display the setpoint. When the appropriate setpoint is displayed, wait a few seconds and the setpoint will be saved.

The remote room sensor with address 2 can also be used to temporarily override occupancy from one to nine hours. To override occupancy, press the **SLEEP** button on the left side of the Remote Room Sensor. The **SLEEP** button, symbolized as a crescent moon on the left side of the sensor, is the fourth button from the top. An icon showing a crescent moon and the number of hours the occupancy will be overridden is displayed. To increase the hours, press the **SLEEP** button repeatedly until the appropriate number of hours is displayed. To disable the temporary override, press the **SLEEP** button until "0" (zero) hours is displayed. The temporary override will now end.

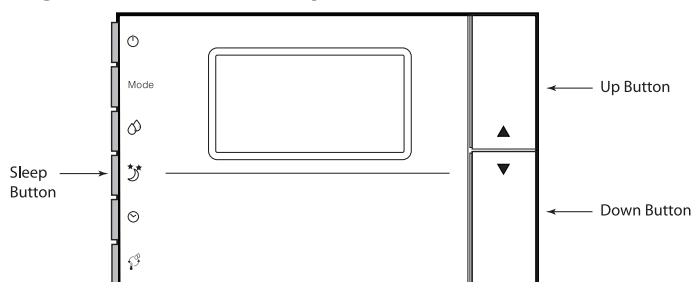
Additionally, any Remote Room Sensor connected to the CM3500 will also display important information such as an alarm condition, the occupied mode and whether the room sensor network connection has failed. An alarm condition is displayed as "ALr" and will flash between the room temperature and "ALr." A bell icon will also blink on the display. The occupancy of the unit will be displayed as a house icon to the left of the room temperature. If the house icon is empty, the dehumidifier is in the un-occupied mode. If a human figure is in the house, the dehumidifier is in the occupied mode. If the network connection has failed, "oLn" is displayed to indicate that the Remote Room Sensor is offline.

Internal setup of the remote room sensor is accomplished by pressing the **DOWN** button and, while

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holding the **DOWN** button, pressing the **UP** button for 4 seconds. When the display blinks "Par", keep pressing the **UP** button, release the **DOWN** button and press the bottom button on the left hand side of the sensor for three seconds. The display will now show the current device address as "Ad01". Select and modify respectively with the bottom button on the left hand side of the sensor, the **UP** and **DOWN** buttons. "Ad01" is the pAD address, settable from 1 - 32. "br01" is the baud rate and needs to be set at 0. "En01" set to 0 disables the buzzer. "Pc01" is the offset of the zone temperature from -9.9 to 9.9.

**Figure 66: Alarm History Screen**



### Suction Pressure Transducer

The Suction Pressure Transducer is a 0.5 - 4.5 VDC to 0 - 250 psig ratiometric 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 the 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 the green wires on this transducer and use this voltage in the following formula to determine the pressure (0-250 psig).

$$\begin{aligned}\text{Pressure (psig)} &= (62.5) \times (V) - 31.25 \\ \text{Example, if } V &= 2.50 \text{ VDC, then;} \\ \text{Pressure (psig)} &= (62.5) \times (2.50) - 31.25 \\ &= 156.25 - 31.25 \\ &= 125 \text{ psig.}\end{aligned}$$

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

### Discharge Pressure Transducer

The Discharge Pressure Transducer is a 0.5 - 4.5

VDC to 0 - 652 psig ratiometric 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 the 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 the green wires on this transducer and use this voltage in the following formula to determine the pressure (0-652psig).

$$\begin{aligned}\text{Pressure (psig)} &= (163) \times (V) - 81.5 \\ \text{Example, if } V &= 2.50 \text{ VDC, then;} \\ \text{Pressure (psig)} &= (163) \times (2.50) - 81.5 \\ &= 407.5 - 81.5 \\ &= 326 \text{ psig.}\end{aligned}$$

The ClimateMaster replacement part number for the Discharge Pressure Transducer is available by calling our service department.

### Differential Air Pressure Transducer

The Differential Air Pressure Transducer is 0.5 - 4.5 VDC to 0 - 2 inches or 0-5 inches of water column. This transducer must be supplied with 5.0 +/- 0.25 VDC power.

### CO<sub>2</sub> Sensor

The CO<sub>2</sub> sensor is a non-dispersive infrared technology (NDIR) repeatable to +/- 20ppm, +/- 1% of measured value. The output is 4-20 mA with a range of 0-2000ppm. This transducer must be supplied with 20-30VDC/24VAC power.

### Supply Air Temperature Sensor

The Supply Air Temperature Sensor is a resistive NTC Bulb type device with a 10 foot cable. The temperature range is -58.0° F 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.

### Intake Air Temperature and Relative Humidity Sensor

The Intake Air and Relative Humidity Sensor is internally mounted in the air stream of the unit, behind the air filter. The Temperature Sensor is a resistive NTC

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### Hardware Details

Bulb type device. 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. A reading of 0.0% humidity indicates a failure of the RH sensor. The Desert Aire replacement part number for the Intake Air Temperature and Relative Humidity Sensor is available by calling our service department.

#### **Air Flow Switch**

The Air Flow Switch is internally mounted in the air stream of your dehumidifier. The Desert Aire replacement part number for the Air Flow Switch is available by calling our service department.



## Specifications

Physical specifications	Dimensions	SMALL	13 DIN modules   110 X 227,5 X 60 mm
		MEDIUM, LARGE, EXTRA LARGE	18 DIN modules   110 X 315 X 60 mm
		BUILT-IN DRIVER	18 DIN modules   110 X 315 X 75 mm
	Plastic case	Mounting	Can be mounted on DIN rail in accordance with DIN 43880 and IEC EN 50022
		Material	Technopolymer
		Flame retardancy	V2 (standard UL94) and 850 °C (standard IEC 60695)
		Ball pressure test	125 °C
		Creeping current resistance	≥ 250 V
		Color	White RAL 9016
	Built-in terminal	PGD1 (132x64 pixel) with backlit keypad	
	Other characteristics	Operating conditions	P+(3,5)*****0** (no built-in terminal): -40T70 °C, 90% RH non-condensing(*)
			P+(3,5)*****E** (with built-in terminal): -20T60 °C, 90% RH non-condensing (*) with Ultracap module installed: -40T60 °C
			P+(3,5)*****0** (no built-in terminal): -40T70 °C, 90% RH non-condensing
		Storage conditions	P+(3,5)*****E** (with built-in terminal): -30T70 °C, 90% RH non-condensing
			Models with USB port and/or Ultracap module: IP20 (front panel only)
		Protection rating	Models without USB port and without Ultracap module: IP40 (front panel only)
		Environmental pollution category	2
		Class of protection against electric shocks	to be integrated into Class I and/or II units (on versions without valve driver), and Class I units (on versions with valve driver)
		PTI of insulating materials	PCB: PTI 250 V; insulating material; PTI 175
		Period of electrical stress across insulating parts	long
		Type of action	1C; 1Y in SSR versions
		Type of disconnection or microswitching	microswitching
		Category of resistance to heat and fire	Category D (UL94-V2)
		Ageing characteristics (operating hours)	80.000
		No. of automatic operating cycles	100.00 (EN 60730-1); 30.000 (UL 873)
		Immunity against voltage surges	Category II

Electrical specifications	Power supply	SMALL, MEDIUM, LARGE, EXTRA LARGE: Use a dedicated, class II, 50 VA safety isolating transformer				
		BUILT IN DRIVER: Use a dedicated, class II, 100 VA safety isolating transformer				
			Vac	P (Vac)	Vdc	P (Vdc)
		SMALL	24 Vac (+10/-15%), 50/60 Hz to be protected by 2.5 A T external fuse	45 VA	28 to 36 Vdc (- 20/+10%) to be protected by 2.5 A T external fuse	30 W
		MEDIUM				
		LARGE				
		EXTRA LARGE				
	BUILT-IN DRIVER (BUILT-IN VALVE DRIVER)		90 VA	Not allowed		
	<b>Attention:</b> The pCO5+ with built-in driver must be powered only by alternating current. Earthing the power transformer's secondary winding is <b>mandatory</b> .					
	Terminal block	With plug-in male/female connectors				
	Cable section	min 0.5 mm² - max 2.5 mm²				
	CPU	32 bit, 100 MHz				
	Non-volatile memory (FLASH)	P+3*****: 5 MB (2 MB BIOS + 3 MB application program)				
		P+5*****: 9 MB (2 MB BIOS + 7 MB application program)				
	Data memory (RAM)	3.2 MB (1.76 MB BIOS + 1.44 MB application program)				
	Buffer memory T (EEPROM)	13 kB				
	Parameter memory P (EEPROM)	32 kB (not visible from pLAN)				
	Working cycle duration (medium complexity applications)	0.2 s (typical)				
	Clock with battery	Supplied, accuracy 100 ppm				
	Buzzer	Can be software-enabled only via built-in terminal				
	Battery	3 Vdc lithium button battery (24x3 mm), code CR2430				
	Software class and structure	Class A				
	Voltage surge immunity category (IEC EN 61000-4-5)	Category III				
	The device is not designed to be hand-held when powered					

## DOAS CM3500 Controller

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## Specifications

Universal inputs/outputs	Analogue inputs, Lmax = 30 m (max no.)		SMALL	MEDIUM/BUILT-IN DRIVER/EXTRA LARGE	LARGE
		- CAREL NTC probes (-50T90 °C; R/T 10 kΩ ± 1% at 25 °C) - NTC HT (0T150 °C) - PTC (600Ω to 2200Ω) - PT500 (-100T400 °C) - PT1000 (-100T400 °C)	5	8	10
		- PT100 probes (-10T200 °C)	2	3 (2 on U1 to U5, 1 on U6 to U8)	4 (2 on U1 to U5, 1 on U6 to U8), 1 on U9 to U10
		- 0 to 1 Vdc/0 to 10 Vdc signals from controller powered probes	Tot. max 5 5	Tot. max 8 6	Tot. max 10 6
		- 0 to 1 Vdc/0 to 10 Vdc signals from externally powered probes	Tot. max 5 5	Tot. max 8 8	Tot. max 10 10
		- 0 to 20 mA/4 to 20 mA inputs from controller powered probes	Tot. max 4 4	Tot. max 7 6: (max 4 on U1 to U5, 3 on U6 to U8)	Tot. max 9 6: (max 4 on U1 to U5, 3 on U6 to U8, 2 on U9 to U10)
		- 0 to 20 mA/4 to 20 mA inputs from externally powered probes	Tot. max 4 4	Tot. max 7 7: (max 4 on U1 to U5, 3 on U6 to U8)	Tot. max 9 9: (max 4 on U1 to U5, 3 on U6 to U8, 2 on U9 to U10)
		- 0 to 5 V signals from controller powered ratiometric probes	5	6	6
		Input accuracy: ±0.3% fs Time constant for each input: 0.5s Classification of measuring circuits (IEC EN 61010-1): Category 1			
	Non-optically-isolated digital inputs, Lmax = 30 m (max no.)		SMALL	MEDIUM/BUILT-IN DRIVER/EXTRA LARGE	LARGE
		- Voltage-free contacts	5	8	10
		- Fast digital inputs Type: voltage-free contact Max current: 10 mA Max frequency 2 kHz and resolution ± 1 Hz	max 2	4 (max 2 on U1 to U5, max 2 on U6 to U8)	6 (max 2 on U1 to U5, max 2 on U6 to U8, 2 on U9 to U10)
		<b>Attention:</b> <ul style="list-style-type: none"> <li>To avoid irreparably damaging the controller, externally powered active probes (0 to 1 V, 0 to 10 V, 0 to 20 mA, 4 to 20 mA) should be provided with adequate current protection and the current should be &lt;100 mA.</li> <li>Ratiometric probes can be powered by the controller only.</li> </ul>			
	Non-optically-isolated analogue outputs (max no.), Lmax = 30 m		SMALL	MEDIUM/BUILT-IN DRIVER/EXTRA LARGE	LARGE
		0 to 10 Vdc (max current 2 mA)	5	8	10
		PWM (0/3.3 Vdc output, max current 2 mA, frequency: 2 kHz asynchronous, 100 Hz asynchronous)	5	8	10

Power supply for probes and terminals	+Vdc	Active probes can be powered by the 24/12 Vdc ± 10% (P+5*/P+3*) available on terminal +VDC (J2). The max available current is 150 mA, protected against short-circuits.
	+5Vref	To power the 0 to 5 V ratiometric probes use the 5 Vdc (± 5%) available on terminal +5REF (J24). The max available current is 60 mA.
	Vterm	P+3*****: 21 Vdc ± 10%; P+5*****: 24 Vdc ± 10% To be used to power an external terminal in alternative to the one connected to J10, Pmax = 1.5W
	<b>Attention:</b> For lengths greater than 10 m use a shielded cable with earthed shield. In any case the max allowable length is 30 m.	

Digital inputs ID... IDH...	Type	Optically-isolated		
	Lmax	30 m		
			no. opto-isolated inp. 24 Vac or 24 Vdc	no. opto-isolated inp. @ 24 Vac/Vdc or 230 Vac - 50/60 Hz
	Maximum number	SMALL	8	None
		MEDIUM/BUILT-IN DRIVER/ EXTRA LARGE	12	2
		LARGE	14	4
	Min pulse detection time on digital inputs	Normally open (open-closed-open)	200 ms	
		Normally closed (closed-open-closed)	400 ms	
	Power supply to inputs	External	IDH...: 230 Vac (+10/-15%) 50/60 Hz) ID...: 24 Vac (+10/-15%) 50/60 Hz or 28...36Vdc (+10/-20%)	
	Classification of measuring circuits (IEC EN 61010-1)	Category I: 24 Vac/Vdc (J5, J7, J20) Category III: 230 Vac (J8, J19)		
Current draw on 24 Vac/Vdc digital inputs			5 mA	
Current draw on 230 Vac digital inputs			5 mA	

## Specifications

### Notes:

- to avoid electromagnetic interference, separate as much as possible the probe and digital input cables from the cables carrying inductive loads and the power cables. Never run power cables and probe signal cables in the same conduits (including the ones in the electrical panels);
- the two 230 Vac or 24 Vac/Vdc inputs on terminals J8 (ID13,ID14) or J19 (ID15,ID16) have the same common pole and must therefore be powered at the same voltage (230 Vac or 24 Vac/Vdc). The two inputs are provided with basic insulation; reinforced insulation is provided between the inputs and the rest of the controller;
- ID1 to ID8, ID9 to ID12, ID17, ID18 are functionally isolated from the rest of the controller;
- for DC digital inputs (24 Vdc), either the + or the - can be connected to the common terminal;
- the rating of the external contact connected to the digital inputs must be at least 5 mA.

Analogue outputs  Y...	Type	0 to 10 V optically-isolated on Y1 to Y6		
	Lmax	30 m		
	Maximum number	SMALL, MEDIUM/BUILT-IN DRIVER/ EXTRA LARGE	4	Y1...Y4 a 0...10V
		LARGE	6	Y1...Y6 a 0...10V
	Power supply	External	24 Vac (+10/-15%) or 28 to 36 Vdc on VG(+), VG0(-)	
	Accuracy	Y1...Y6	±2% full scale	
	Resolution	8 bit		
	Setting time	Y1...Y6	from 1 s (slew rate 10 V/s) to 20 s (slew rate 0.5 V/s) selectable via SW	
	Maximum load	1 kΩ (10 mA)		

### Warnings:

- for lengths greater than 10 m use a shielded cable with earthed shield;
- a 0 to 10 Vdc analogue output can be connected in parallel to other outputs of the same kind, or alternatively to an external source of voltage. The higher voltage will be considered. Correct operation is not guaranteed if actuators with voltage inputs are connected;
- power the VG-VG0 analogue outputs at the same voltage on G-G0: connect G to VG and G0 to VG0. This applies in case of both alternating or direct current power supplies.

### Digital outputs

NO...

NC...

Type	Relay. Min contact current: 50 mA												
Maximum number	8: SMALL; 13: MEDIUM/BUILT-IN DRIVER; 18: LARGE; 29: EXTRA LARGE												
Insulation distance	The relay outputs have different features depending on the controller model. The outputs can be divided into groups. Relays belonging to the same group (individual cell in the table) have basic insulation and must therefore be powered at the same voltage. Between groups (between cells in the table) there is double insulation, so the relays can be powered at different voltages. There is also double insulation between each terminal of the digital outputs and the rest of the controller.												
Relays with same insulation													
Composition of groups		Group											
	Model	1	2	3	4	5	6	7	8	9	10	11	
	SMALL	1...3	4...6	7	8	-	-	-	-	-	-	-	
	Type of relay	Type A	Type A	Type A	Type A	-	-	-	-	-	-	-	
	MEDIUM/BUILT-IN DRIVER	1...3	4...6	7	8	9...11	12	13	-	-	-	-	
	Type of relay	Type A	Type A	Type A	Type A	Type A	Type A	Type A	-	-	-	-	
	LARGE NO	1...3	4...6	7	8	9...11	12	13	14...15	16...18	-	-	
	Type of relay	Type A	Type A	Type A	Type A	Type A	Type A	Type A	Type A	Type A	-	-	
	LARGE NC	1...3	4...6	7	8	9...11	12	13	14...15	16...18	-	-	
Type of relay	Type A	Type A	Type A	Type A	Type A	Type A	Type A	Type A	Type C	-	-		
EXTRA LARGE	1...3	4...6	7	8	9...11	12	13	14...16	17...20	21...24	25...29		
Type of relay	Type A	Type A	Type A	Type A	Type A	Type A	Type A	Type B	Type B	Type B	Type B		
Number of change-over contacts	1: SMALL (relay 8) 3: MEDIUM & EXTRA LARGE (relays 8, 12, 13) 5: LARGE NO/NC (relays 8, 12, 13, 14 & 15)												
Note: The output relays have different features depending on the model of pCO5+													
Switchable power	Type A relay	Nameplate information	SPDT, 2000 VA, 250 Vac, 8A resistive										
		Certification	UL 873		2 A 250 Vac resistive, 2A FLA, 12 LRA, 250 Vac, C300 pilot duty (30,000 cycles)								
	Type B relay	Relay nameplate information	SPST, 1250 VA, 250 Vac, 5A resistive										
		Certification	UL 873		A 250 Vac resistive, 1A FLA, 6 LRA, 250 Vac, C300 pilot duty (30,000 cycles)								
	Type C relay	Relay nameplate information	SPDT, 1250 VA, 250 Vac, 5 A resistive										
		Certification	UL 873		A 250 Vac resistive, 1A FLA, 6 LRA, 250 Vac, C300 pilot duty (30,000 cycles)								
			EN 60730-1		A resistive, 1 A inductive, cosφ = 0.6, 1(1)A (100,000 cycles)								

SSR outputs (on models where provided)	Maximum number	1: SMALL (output 7); 2: MEDIUM and EXTRA LARGE (outputs 7 and 12); 3 or 4: LARGE (outputs 7, 12, 14 or 7, 12, 14, 15)
	Working voltage	24 Vac/Vdc
	Load current (MAX)	1 A
	Pulse load current (MAX)	1,2 A

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## Specifications

## Warnings:

- if the load requires a higher current, use an external SSR;
- to power external loads, use the same power supply as the pCO (connected to terminals G-G0); this must always be dedicated and not in common with the power supply to other devices (e.g. contactors, coils, etc.);
- to simplify wiring, the groups of digital outputs have two common pole terminals;
- make sure that the current running through the common terminals does not exceed the rated current of each terminal, i.e. 8A.

Serial ports for +/- use AWG 20-22 twisted pair shielded cable	Serial	Type/Connectors	Characteristics
	Serial 0	pLAN/J10,J11	<ul style="list-style-type: none"> <li>• Built in main board</li> <li>• HW driver: asynchronous half duplex RS485 pLAN</li> <li>• Not optically isolated</li> <li>• Connectors: 6-pin telephone jack + 3-pin plug-in connector p.5.08</li> <li>• Max length: 500 m</li> <li>• Max data rate: 1*5200 bit/s</li> <li>• Max number of devices connectable: 32</li> </ul>
	Serial ONE	BMS 1 Serial Card	<ul style="list-style-type: none"> <li>• Not built into main board</li> <li>• HW driver: not present</li> <li>• Can be used with all optional BMS cards of the pCO family</li> </ul>
	Serial TWO	FieldBus 1 Serial Card	<ul style="list-style-type: none"> <li>• Not built into main board</li> <li>• HW driver: not present</li> <li>• Can be used with all optional Fieldbus cards of the pCO family</li> </ul>
	Serial THREE	BMS 2/ J25	<ul style="list-style-type: none"> <li>• Built into main board</li> <li>• HW driver: asynchronous half duplex RS485 slave</li> <li>• Optically-isolated/non-optically-isolated serial(*)</li> <li>• 3-pin plug-in connector p.5.08</li> <li>• Max length: 1000 m</li> <li>• Max data rate: 384000 bit/s</li> <li>• Max number of devices connectable: 16</li> </ul>
Serial ports for +/- use AWG 20-22 twisted pair shielded cable	Serial FOUR	Fieldbus 2/J26 (and J23 on Large and Extra Large versions)	<ul style="list-style-type: none"> <li>• Built into main board</li> <li>• HW driver: asynchronous half duplex RS485 master/slave(**)</li> <li>• J23: not optically isolated</li> <li>• J26: optically isolated/not optically isolated</li> <li>• 3-pin plug-in connector p.5.08</li> <li>• J23 and J26 are both managed by the same protocol as serial 4, with the advantage of being electrically independent.</li> </ul>

(\*): both models are available; (\*\*): configurable port J26: see par. 3.2.

**Note:** In industrial/residential applications with distances greater than 10 m, use shielded cable with earthed shield. In domestic applications (EN 55014), regardless of cable length, in versions without valve driver, the connection cable between controller and terminal and the serial cable must be shielded and earthed on both sides.

## Model with driver for electronic expansion valve

	CAREL: E*V**** ALCO: EX4; EX5; EX6; EX7; EX8 330 Hz (recommended by CAREL); EX8 500 Hz (as per ALCO specifications) SPORLAN: SEI 0.5-11; SER 1.5-20; SEI 30; SEI 50; SHE 100; SEH175 Danfoss: ETS 12.5-25B; ETS 50B; ETS 100B; ETS 250; ETS 400 CAREL: Two CAREL EXVs as for EVD EVOLUTION TWIN SPORLAN: SER(I) G, J, K			
Valve compatibility				
Motor connection	Shielded 4-wire cable CAREL code E2VCABS*00, or AWG22 shielded 4-wire cable Lmax = 10 m, or AWG14 shielded 4-wire cable Lmax = 50 m.			
Digital input connection	Digital input to be activated with voltage-free contact or transistor to GND. Making current 5 mA; max. length < 10 m.			
Probes	Max. length 10 m or up to 30 m with shielded cable			
	S1	Ratiometric pressure probe (0 to 5V)	Resolution 0,1 % fs	Measurement error: 2% fs maximum; 1% typical
		Resolution 0.1% fs	Resolution 0,5 % fs	Measurement error: 8% fs maximum; 7% typical
		Measurement error: 2% fs maximum; 1% typical	Resolution 0,1 % fs	Measurement error: 2% fs maximum; 1% typical
		Electronic pressure probe (4 to 20 mA)	Resolution 0,5 % fs	Measurement error: 8% fs maximum; 7% typical
	S2	Low temperature NTC	10 kΩ at 25 °C, -50T90 °C	Measurement error: 1 °C in the range -50T50 °C; 3 °C in the range +50T90 °C
		High temperature NTC	50 kΩ at 25 °C, -40T150 °C	Measurement error: 1.5 °C in the range -20T115 °C; 4 °C in the range outside of -20T115 °C
		Combined NTC	10 kΩ at 25 °C, -40T120 °C	Measurement error: 1 °C in the range -40T50 °C; 3 °C in the range of +50T90 °C
		0 to 10 V input (max 12 V)	Resolution 0,1 % fs	Measurement error: 1 °C in the range -40T50 °C; 3 °C in the range of +50T90 °C
	S3	Ratiometric pressure probe (0 to 5V)	Resolution 0,1 % fs	Measurement error: 2% fs maximum; 1% typical
		Electronic pressure probe (4 to 20 mA)	Resolution 0,5 % fs	Measurement error: 9% fs maximum; 8% typical
		Combined ratiometric pressure probe (0 to 5V)	Resolution 0,1 % fs	Measurement error: 2% fs maximum; 1% typical
		4 to 20 mA input (max 24 mA)	Resolution 0,5 % fs	Measurement error: 2% fs maximum; 1% typical
	S4	Low temperature NTC	10 kΩ at 25 °C, -50T105 °C	Measurement error: 1 °C in the range -50T50 °C; 3 °C in the range 50T90 °C
		High temperature NTC	10 kΩ at 25 °C, -40T150 °C	Measurement error: 1.5 °C in the range -20T115 °C; 4 °C in the range outside -20T115 °C
		Combined NTC	10 kΩ at 25 °C, -40T120 °C	Measurement error: 1 °C in the range -40T50 °C; 3 °C in the range +50T90 °C
Power to active probes (VREF)	Programmable output: +5 Vdc ± 2% or 12 Vdc ± 10%, I <sub>max</sub> = 50 mA			
Emergency power supply	Optional Ultracapacitor module (PCOS00UC20 or EVD0000UC0) If the controller works constantly at temperatures near the upper limit of 60 °C it is recommended to use the external module code EVD0000UC0, if possible placed in the coolest point of the panel. Modules PCOS00UC20 and EVD0000UC0 can be connected to the same controller at the same time, thereby doubling the energy available for closing the valves. Important: The module only powers the valve driver and not the controller.			

## Points List

## BACNET Points List

Unit Type: Program Version 3.2.0 x &amp; Above

#	Description	Type	R/W Status	Comments
1	Network Occupied Input	BV	Read/Write	0 = Unoccupied, 1=Occupied.
2	Occupied	BV	Read Only	Confirmation of Occupied Status.
3	Alarm Active	BV	Read Only	Confirmation of Alarm Status. 0 = Alarm, 1 = Normal.
4	Air Flow	BV	Read Only	Confirmation of Air Flow. 0 = No Flow, 1 = Flow.
5	Supply Fan	BV	Read Only	Confirmation of Supply Fan, 0 = Off, 1 = On.
6	Exhaust Fan	BV	Read Only	Confirmation of Exhaust Fan, 0 = Off, 1 = On.
7	Wheel Motor	BV	Read Only	Confirmation of Wheel Motor, 0 = Off, 1 = On.
8	Compressor #1	BV	Read Only	Confirmation of Compressor #1, 0 = Off, 1 = On.
9	Compressor #2	BV	Read Only	Confirmation of Compressor #2, 0 = Off, 1 = On.
10	Compressor #3	BV	Read Only	Confirmation of Compressor #3, 0 = Off, 1 = On.
11	Compressor #4	BV	Read Only	Confirmation of Compressor #4, 0 = Off, 1 = On.
12	Condenser Fan #1	BV	Read Only	Confirmation of Condenser Fan #1, 0 = Off, 1 = On.
13	Condenser Fan #2	BV	Read Only	Confirmation of Condenser Fan #2, 0 = Off, 1 = On.
14	Condenser Fan #3	BV	Read Only	Confirmation of Condenser Fan #3, 0 = Off, 1 = On.
15	Condenser Fan #4	BV	Read Only	Confirmation of Condenser Fan #4, 0 = Off, 1 = On.
16	Remote Reset	BV	Read/Write	Write 1 to Reset. 0 is set after a program scan.

#	Description	Type	R/W Status	Comments
1	Suction Pressure	AV	Read Only	In Tenths, linear from 0 to 250 psig.
2	Discharge Pressure	AV	Read Only	In Tenths, linear from 0 to 650 psig.
3	Intake Air Relative Humidity	AV	Read Only	In Tenths, linear from 0 to 100 %.
4	Intake Air Temperature	AV	Read Only	In Tenths, linear from -42°F to 137°F.
5	Intake Air Dewpoint	AV	Read Only	In Tenths, calculated value in °F.
6	Supply Air Temperature	AV	Read Only	In Tenths, linear from -58 to 212 °F.
7	Zone Air Temperature	AV	Read Only	In Tenths, linear from -58 to 212 °F.
8	Zone Air Relative Humidity	AV	Read Only	In Tenths, linear from 0 to 100 %.
9	Suction Press Circuit B	AV	Read Only	In Tenths, linear from 0 to 250 psig.
10	Discharge Press Circuit B	AV	Read Only	In Tenths, linear from 0 to 650 psig.
11	Supply Fan Speed Command	AV	Read Only	In Tenths, linear from 0 to 100 %.



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## Points List

## BACNET Points List

Unit Type: Program Version 3.2.0 x &amp; Above

#	Description	Type	R/W Status	Comments
12	Auxiliary Heating Comm.	AV	Read Only	In Tenths, linear from 0 to 100 %.
13	Outside Air Damper Comm.	AV	Read Only	In Tenths, linear from 0 to 100 %.
14	Recirc. Damper Command	AV	Read Only	In Tenths, linear from 0 to 100 %.
15	Exhaust Fan Speed Comm.	AV	Read Only	In Tenths, linear from 0 to 100 %.
16	Wheel Speed Command	AV	Read Only	In Tenths, linear from 0 to 100 %.
17	Outside Air Relative Humidity	AV	Read Only	In Tenths, linear from 0 to 100 %.
18	Outside Air Temperature	AV	Read Only	In Tenths, linear from -42°F to 137°F.
19	Return Air Relative Humidity	AV	Read Only	In Tenths, linear from 0 to 100 %.
20	Return Air Temperature	AV	Read Only	In Tenths, linear from -42°F to 137°F.
21	Supply Air Setpoint	AV	Read/Write	In Tenths, settable from 45.0 to 99.9 °F.
22	Zone Air Setpoint	AV	Read/Write	In Tenths, settable from 55.0 to 95.0 °F.

#	Description	Type	R/W Status	Comments
1001	Unit Status	INT	Read Only	Unit Status. See Table 1 at end of list.
1002	CO2 In Zone	INT	Read Only	0 to 2000 ppm.
1003	CO2 Outside	INT	Read Only	0 to 2000 ppm.
1004	CO2 Differential	INT	Read Only	CO2 In Zone minus CO2 Outside, 0 to 2000 ppm.
1005	Heat Wheel Supply Pressure	INT	Read Only	Inches of water column, in thousandths, ie.1452 = 1.452 "wc
1006	Heat Wheel Exhaust Pressure	INT	Read Only	Inches of water column, in thousandths.
1007	Air Flow Differential Pressure	INT	Read Only	Inches of water column, in thousandths.
1008	Alarm Code	INT	Read Only	Alarm code. See Table 2 at end of list.

**Points List****BACNET Points List****Unit Type: Program Version 3.2.0 x & Above**

CODE	ALARM DESCRIPTION
1	Low Suction Pressure
2	Motor Overloads
3	High Discharge Pressure A
4	High Discharge Pressure B
5	Multiple Low Pressure A
6	Multiple Low Pressure B
7	Temperature Sensor Fault
8	pAD Network Fault
9	SAT Out of Range
10	Air Filter Clogged
11	Low Voltage Fault
12	High Condensate Level
13	Low Water Flow
14	Smoke Alarm
15	Low Air Flow
16	Freeze 'Stat Alarm
17	Condenser Overload Alarm

CODE	STATUS DESCRIPTION
0	Unit Satisfied / Unit Off
1	Heating Required
2	Cooling Required
3	Dehumidification Required
4	Dehum and Heating Required
5	Dehum and Cooling Required
6	Low Suction Pressure Condition
7	EXV Initialization
8	High Discharge Pressure Limiting

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## Points List

## LON Points List

Unit Type: Program Version 3.2.0 x &amp; Above

#	DESCRIPTION	TYPE	SNVT	Dir	UNITS	COMMENTS
1	Suction Pressure	AV	30	Out	K Pa	Linear from 0.0 to 1724.0 K Pa.
2	Discharge Pressure	AV	30	Out	K Pa	Linear from 0.0 to 4482.0 K Pa.
3	Intake Air Relative Humidity	AV	81	Out	%	Linear from 0.0 to 100.0 %.
4	Intake Air Temperature	AV	105	Out	°C	Linear from -42.0 to 58.0 °C.
5	Intake Air Dewpoint	AV	105	Out	°C	Calculated value in °C.
6	Supply Air Temperature	AV	105	Out	°C	Linear from -50.0 to 100.0 °C.
7	Zone Air Temperature	AV	105	Out	°C	Linear from -50.0 to 100.0 °C.
8	Zone Air Relative Humidity	AV	81	Out	%	Linear from 0.0 to 100.0 %.
9	Suction Pressure Circuit B	AV	30	Out	K Pa	Linear from 0.0 to 1724.0 K Pa.
10	Discharge Pressure Circuit B	AV	30	Out	K Pa	Linear from 0.0 to 4481.0 K Pa.
11	Supply Blower Command	AV	81	Out	%	Linear from 0.0 to 100.0 %.
12	Auxiliary Heating Command	AV	81	Out	%	Linear from 0.0 to 100.0 %.
13	Outside Air Damper Command	AV	81	Out	%	Linear from 0.0 to 100.0 %.
14	Recirc. Damper Command	AV	81	Out	%	Linear from 0.0 to 100.0 %.
15	Exhaust Blower Command	AV	81	Out	%	Linear from 0.0 to 100.0 %.
16	Wheel Speed Command	AV	81	Out	%	Linear from 0.0 to 100.0 %.
17	Outside Air Relative Humidity	AV	81	Out	%	Linear from 0.0 to 100.0 %.
18	Outside Air Temperature	AV	105	Out	°C	Linear from -42.0 to 58.0 °C.
19	Return Air Relative Humidity	AV	81	Out	%	Linear from 0.0 to 100.0 %.
20	Return Air Temperature	AV	105	Out	°C	Linear from -42.0 to 58.0 °C.
21	Supply Air Setpoint	AV	105	In	°C	Settable from 7.2 to 37.7 °C.
22	Zone Air Setpoint	AV	105	In	°C	Settable from 12.7 to 25.0 °C.

#	DESCRIPTION	TYPE	SNVT	Dir	UNITS	COMMENTS
1	Unit Status	INT	8	Out		Unit Status. See Table 1 at end of list.
2	CO2 In Zone	INT	29	Out		0 to 2000 ppm.
3	CO2 Outside	INT	29	Out		0 to 2000 ppm.
4	CO2 Differential	INT	29	Out		CO2 In Zone minus CO2 Outside, 0 to 2000 ppm.
5	Heat Wheel Supply Pressure	INT	8	Out		Inches of water column, in thousandths, ie.1452 = 1.452 "wc
6	Heat Wheel Exhaust Pressure	INT	8	Out		Inches of water column, in thousandths.
7	Air Flow Differential Pressure	INT	8	Out		Inches of water column, in thousandths.
8	Alarm Code	INT	8	Out		Alarm code. See Table 2 at end of list.

#	DESCRIPTION	TYPE	SNVT	DIR	UNITS	COMMENTS
1	Network Occupied Input	DGT	95	In		0 = Unoccupied, 1=Occupied.
2	Occupied	DGT	95	Out		Confirmation of Occupied Status.
3	Alarm Active	DGT	95	Out		Confirmation of Alarm Status. 0 = Alarm, 1 = Normal.
4	Air Flow	DGT	95	Out		Confirmation of Air Flow. 0 = No Flow, 1 = Flow.
5	Supply Fan	DGT	95	Out		Confirmation of Supply Fan, 0 = Off, 1 = On.
6	Exhaust Fan	DGT	95	Out		Confirmation of Exhaust Fan, 0 = Off, 1 = On.
7	Wheel Motor	DGT	95	Out		Confirmation of Wheel Motor, 0 = Off, 1 = On.



## Points List

## LON Points List

Unit Type: Program Version 3.2.0 x &amp; Above

#	DESCRIPTION	TYPE	SNVT	DIR	UNITS	COMMENTS
8	Compressor #1	DGT	95	Out		Confirmation of Compressor #1, 0 = Off, 1 = On.
9	Compressor #2	DGT	95	Out		Confirmation of Compressor #2, 0 = Off, 1 = On.
10	Compressor #3	DGT	95	Out		Confirmation of Compressor #3, 0 = Off, 1 = On.
11	Compressor #4	DGT	95	Out		Confirmation of Compressor #4, 0 = Off, 1 = On.
12	Condenser Fan #1	DGT	95	Out		Confirmation of Condenser Fan #1, 0 = Off, 1 = On.
13	Condenser Fan #2	DGT	95	Out		Confirmation of Condenser Fan #2, 0 = Off, 1 = On.
14	Condenser Fan #3	DGT	95	Out		Confirmation of Condenser Fan #3, 0 = Off, 1 = On.
15	Condenser Fan #4	DGT	95	Out		Confirmation of Condenser Fan #4, 0 = Off, 1 = On.
16	Remote Reset	DGT	95	In/Out		Write 1 to Reset. 0 is set after a program scan.

CODE	STATUS DESCRIPTION
0	Unit Satisfied / Unit Off
1	Heating Required
2	Cooling Required
3	Dehumidification Required
4	Dehum and Heating Required
5	Dehum and Cooling Required
6	Low Suction Pressure Condition
7	EXV Initialization
8	High Discharge Pressure Limiting

CODE	ALARM DESCRIPTION
1	Low Suction Pressure
2	Motor Overloads
3	High Discharge Pressure A
4	High Discharge Pressure B
5	Multiple Low Pressure A
6	Multiple Low Pressure B
7	Temperature Sensor Fault
8	pAD Network Fault
9	SAT Out of Range
10	Air Filter Clogged
11	Low Voltage Fault
12	High Condensate Level
13	Low Water Flow
14	Smoke Alarm
15	Low Air Flow
16	Freeze 'Stat Alarm
17	Condenser Overload Alarm

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## Points List

## MODBUS Points List

Unit Type: Program Version 3.2.0 x &amp; Above

* Coil Address	Description	Modbus Function	R/W Status	Comments
00002	Network Occupied Input	1/5	Read/Write	0 = Unoccupied, 1=Occupied.
00003	Occupied	1	Read Only	Confirmation of Occupied Status.
00004	Alarm Active	1	Read Only	Confirmation of Alarm Status. 0 = Alarm, 1 = Normal.
00005	Air Flow	1	Read Only	Confirmation of Air Flow. 0 = No Flow, 1 = Flow.
00006	Supply Fan	1	Read Only	Confirmation of Supply Fan, 0 = Off, 1 = On.
00007	Exhaust Fan	1	Read Only	Confirmation of Exhaust Fan, 0 = Off, 1 = On.
00008	Wheel Motor	1	Read Only	Confirmation of Wheel Motor, 0 = Off, 1 = On.
00009	Compressor #1	1	Read Only	Confirmation of Compressor #1, 0 = Off, 1 = On.
00010	Compressor #2	1	Read Only	Confirmation of Compressor #2, 0 = Off, 1 = On.
00011	Compressor #3	1	Read Only	Confirmation of Compressor #3, 0 = Off, 1 = On.
00012	Compressor #4	1	Read Only	Confirmation of Compressor #4, 0 = Off, 1 = On.
00013	Condenser Fan #1	1	Read Only	Confirmation of Condenser Fan #1, 0 = Off, 1 = On.
00014	Condenser Fan #2	1	Read Only	Confirmation of Condenser Fan #2, 0 = Off, 1 = On.
00015	Condenser Fan #3	1	Read Only	Confirmation of Condenser Fan #3, 0 = Off, 1 = On.
00016	Condenser Fan #4	1	Read Only	Confirmation of Condenser Fan #4, 0 = Off, 1 = On.
00017	Remote Reset	1/5	Read/Write	Write 1 to Reset. 0 is set after a program scan.

* Holding Register Address	Description	Modbus Function	R/W Status	Comments
00002	Suction Pressure	3	Read Only	In Tenths, linear from 0 to 250 psig.
00003	Discharge Pressure	3	Read Only	In Tenths, linear from 0 to 650 psig.
00004	Intake Air Relative Humidity	3	Read Only	In Tenths, linear from 0 to 100 %.
00005	Intake Air Temperature	3	Read Only	In Tenths, linear from -42°F to 137°F.
00006	Intake Air Dewpoint	3	Read Only	In Tenths, calculated value in °F.
00007	Supply Air Temperature	3	Read Only	In Tenths, linear from -58 to 212 °F.
00008	Zone Air Temperature	3	Read Only	In Tenths, linear from -58 to 212 °F.
00009	Zone Air Relative Humidity	3	Read Only	In Tenths, linear from 0 to 100 %.
00010	Suction Press Circuit B	3	Read Only	In Tenths, linear from 0 to 250 psig.
00011	Discharge Press Circuit B	3	Read Only	In Tenths, linear from 0 to 650 psig.
00012	Supply Fan Speed Command	3	Read Only	In Tenths, linear from 0 to 100 %.
00013	Auxiliary Heating Command	3	Read Only	In Tenths, linear from 0 to 100 %.

## Points List

### MODBUS Points List

Unit Type: Program Version 3.2.0 x & Above

* Holding Register Address	Description	Modbus Function	R/W Status	Comments
00014	Exhaust Fan Speed Comm.	3	Read Only	In Tenths, linear from 0 to 100 %.
00015	Wheel Speed Comm.	3	Read Only	In Tenths, linear from 0 to 100 %.
00016	Outside Air Damper Comm.	3	Read Only	In Tenths, linear from 0 to 100 %.
00017	Recirc. Damper Command	3	Read Only	In Tenths, linear from 0 to 100 %.
00018	Outside Air Relative Humidity	3	Read Only	In Tenths, linear from 0 to 100 %.
00019	Outside Air Temperature	3	Read Only	In Tenths, linear from -42°F to 137°F.
00020	Return Air Relative Humidity	3	Read Only	In Tenths, linear from 0 to 100 %.
00021	Return Air Temperature	3	Read Only	In Tenths, linear from -42°F to 137°F.
00022	Supply Air Setpoint	3/6	Read/Write	In Tenths, settable from 45.0 to 99.9 °F.
00023	Zone Air Setpoint	3/6	Read/Write	In Tenths, settable from 55.0 to 95.0 °F.

* Holding Register Address	Description	Modbus Function	R/W Status	Comments
00210	Unit Status	3	Read Only	Unit Status. See Table 1 at end of list.
00211	CO2 In Zone	3	Read Only	0 to 2000 ppm.
00212	CO2 Outside	3	Read Only	0 to 2000 ppm.
00213	CO2 Differential	3	Read Only	CO2 In Zone minus CO2 Outside, 0 to 2000 ppm.
00214	Heat Wheel Supply Pressure	3	Read Only	Inches of water column, in thousandths. 1452 = 1.452 "wc
00215	Heat Wheel Exhaust Pressure	3	Read Only	Inches of water column, in thousandths.
00216	Air Flow Differential Pressure	3	Read Only	Inches of water column, in thousandths.
00217	Alarm Code	3	Read Only	Alarm code. See Table 2 at end of list.

\* All coil and holding register addresses are in PLC style base 1 notation. If base 0 notation is required, subtract 1 from the address number.

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## Points List

## MODBUS Points List

Unit Type: Program Version 3.2.0 x &amp; Above

CODE	ALARM DESCRIPTION
1	Low Suction Pressure
2	Motor Overloads
3	High Discharge Pressure A
4	High Discharge Pressure B
5	Multiple Low Pressure A
6	Multiple Low Pressure B
7	Temperature Sensor Fault
8	pAD Network Fault
9	SAT Out of Range
10	Air Filter Clogged
11	Low Voltage Fault
12	High Condensate Level
13	Low Water Flow
14	Smoke Alarm
15	Low Air Flow
16	Freeze 'Stat Alarm
17	Condenser Overload Alarm

CODE	STATUS DESCRIPTION
0	Unit Satisfied / Unit Off
1	Heating Required
2	Cooling Required
3	Dehumidification Required
4	Dehum and Heating Required
5	Dehum and Cooling Required
6	Low Suction Pressure Condition
7	EXV Initialization
8	High Discharge Pressure Limiting

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### Notes

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## Revision History

Date:	Item:	Action:
2/17/16	All	Updated
3/05/15	Points List Tables	Updated
7/31/13	Points List Tables	Added
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