



**Standard Instructions**

**For**

**MC-2000/3000/4000**

**Controllers**

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Version: 3.10

# 1 QUICK REFERENCE GUIDE

## 1.1 NAVIGATING THE DISPLAY

Interacting with the AboveAir Technologies unit is accomplished through the Carel pGD user interface. This wall- or unit-mounted display terminal allows access to all of the unit features.

The home screen will show the current temperature sensed by the unit identifier (if connected to BMS), date, time, temperature, and unit status. A flashing cursor will be displayed in the upper left corner of the screen.

Press the **PRG** key to access the menu system. Use the up (↑) and down (↓) arrows to scroll through the available menus. The current menu selection will be highlighted: > CURRENT SELECTION <. To access a menu, press the enter (↵) key once.

Pressing ↑ or ↓ while the cursor is in the upper left corner of the screen will scroll through the available submenus within the current selection. To leave a menu, press **ESC**. To return to the screen, press **ESC** once more.

To choose an adjustable parameter, press ↵ once. The cursor will move from the top left corner of the display to the first user adjustable data field. Press ↵ again to select the next user adjustable data field. After using ↵ to cycle through all user adjustable data fields on the current screen, the cursor will move back to the top left corner of the display.

To change an adjustable data field, press ↵ until the flashing cursor is positioned on the desired field. Press ↑ or ↓ to change the selection. Press ↵ again to confirm the selection.

## 1.2 SYSTEM ALARMS

If the system enters into an alarm condition, an alarm will sound from the display terminal and the alarm key will illuminate. To silence the alarm, press the alarm key. The system display will change to show the date, time, and nature of the current alarm.

## 1.3 START-UP REFERENCES

The following sections should be referenced while performing system start-up procedures:

Procedure	Section
To activate system/components	3.3 Enables
To adjust setpoints	3.4 Setpoints
To manually run components	4.5 Manual Control
To set up pLan networks	6 pLan Network Setup
To set up BMS options	7 BMS Setup

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## **2 GENERAL INFORMATION**

### **2.1 INTRODUCTION**

Congratulations on your purchase of an AboveAir Technologies product. Your unit has come equipped with a Carel pCO controller loaded with the latest AboveAir control software. This guide will lead you through the features and programming of the microprocessor control module installed in your unit.

### **2.2 APPLICATIONS**

Your unit shipped from the AboveAir factory in one of the following configurations:

- MC-2000: Comfort and Mission Critical Units
- MC-3000: Make-Up Air Units
- MC-4000: Variable Air Volume Units

Refer to the system documentation for specific configuration and features.

### **2.3 STANDARD FUNCTIONS**

The full-featured AboveAir controller program is designed for versatility and customizability. Notable standard features include:

- Three levels of password protection
- Up to four stages of cooling or one proportional cooling valve (floating point or 0-10 Vdc)
- Economizer Modes (Enthalpy or Temperature Only control)
- Compressor Rotation
- Up to four stages of heating or one proportional heating valve (floating point or 0-10 Vdc)
- Dehumidification by cooling/reheat or relay output.
- Humidity control (On/Off or Proportional control)
- Time scheduling (7 day/24 hour) features for Occupied and Unoccupied modes
- Record of running hours for all subsystems
- System alarming, holding the last 150 alarms in memory

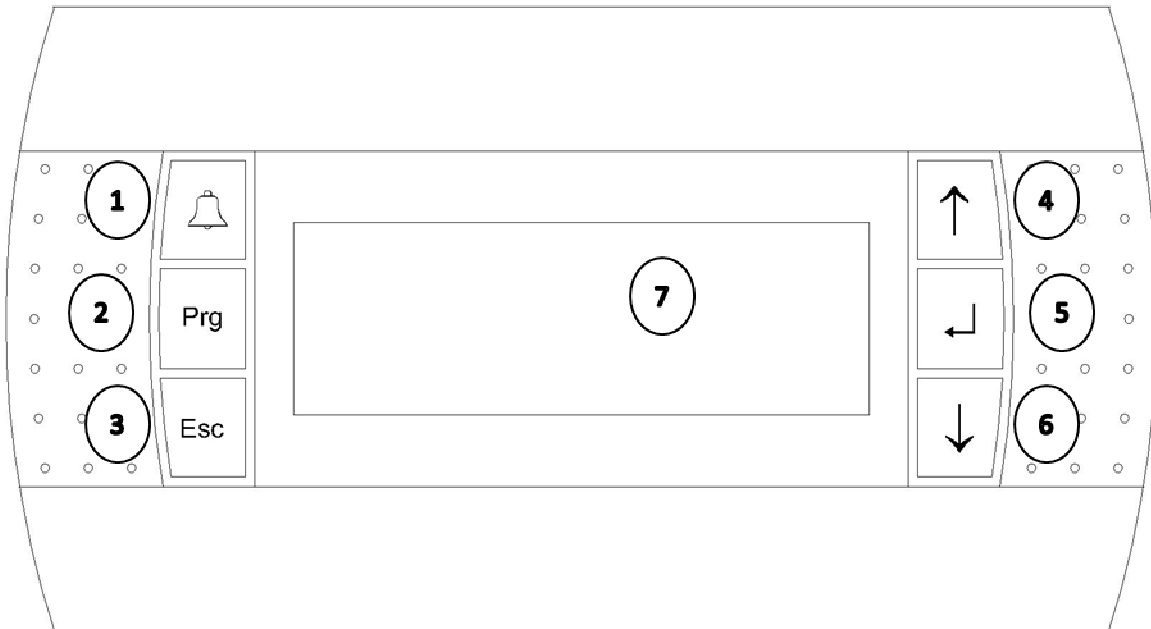
### **2.4 MAIN CONTROL BOARD**

The pCO controller contains a 16-bit microprocessor dedicated to the execution of the control program. It is fitted with quick connect terminals for connection to the various input and output devices which comprise your AboveAir system. The program and all of the parameters are saved permanently onboard in FLASH memory to prevent data loss (without requiring battery backup) in the event of a power failure.

### **2.5 DISPLAY TERMINAL**

A pGD user interface is provided with every MC-2000, MC-3000, or MC-4000 equipped AboveAir Unit, either unit-mounted or shipped loose for wall-mounting. The display terminal allows the user to setup and change unit settings, as well as to display alarms and sensor readings. Refer to the following figure

for the display terminal layout and a brief description of the buttons; refer to the Quick Reference Guide (Section 1) for more information on navigating the display.



1. The Alarm (**ALRM**) key is used to mute a current alarm and view current/recent alarms.
2. The Program (**PRG**) key is used to access the menu system
3. The Escape (**ESC**) key is used to exit selections and menus.
4. The Up Arrow (**↑**) key is used to navigate menus and change adjustable values.
5. The Enter (**↵**) key is used to make selections, confirm selections, and move the cursor within a menu.
6. The Down Arrow (**↓**) key is used to navigate menus and change adjustable values.
7. Display LCD

### 2.5.1 CHANGING THE TERMINAL ADDRESS

AboveAir Technologies ships the display terminals pre-programmed for the specific application. The terminal should not require adjustment at installation. In the event this must be changed in the future: press and hold **↑**, **↵**, and **↓** simultaneously, until the display changes to the network address screen (approximately 3 seconds). The display address must be set to 00 unless the unit is installed in a pPlan network.

```

Display address
setting.....:01

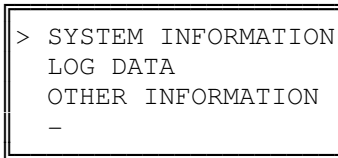
I/O Board address:--
    
```

### 2.5.2 ADJUSTING THE DISPLAY CONTRAST

While holding the **ALRM** and **PRG** keys, press the  $\uparrow$  or  $\downarrow$  keys to adjust the contrast as desired.

### 2.5.3 SYSTEM INFORMATION

The system information screen provides basic information regarding the system. To access the system information screen, hold the **ALRM** and keys simultaneously for approximately 3 seconds. System Information will display the current boot and bios versions, Log Data displays and log information, and Other Information will display the unit ID number, if applicable.



## 2.6 SECURITY LEVELS

The controller software utilizes three levels of security. The features are organized according to protect vital system functions while making frequently accessed options easily accessible for technicians and building personnel. This manual is organized by level and will describe the use of the functions contained within each level.

Level	Description
Level 1 - User	This level contains frequently accessed items and items that can be changed without significant technical expertise. It allows access to set-points, scheduling features, and clock settings. This level is not password protected by default.
Level 2 - Technician	This level allows a service technician to adjust sensor calibration and to modify parameters associated with the control of the unit. This level is password protected by default (0002).
Level 3 - Factory	The factory menu level contains I/O settings and fundamental controls setup. Changing settings on this level can cause improper unit operation and it is password protected by default (contact factory).



### 3 NAVIGATING THE MAIN MENU (LEVEL 1)

#### 3.1 INTRODUCTION

The AboveAir Technologies controller program utilizes a menu structure to organize system functions and allow the user to easily navigate to and adjust system parameters as required. To access the menus, press **PRG**. Use the **↑** and **↓** keys to scroll through the selections; the current selection will be displayed in all capital letters and contained between "> <." Press **↵** to access a menu. The following sample screen shows all of the menus accessible under the first menu layer.

```
*****  
> SYSTEM STATUS <  
  enables  
  set points  
alarm set points  
  run hours  
  day min/max  
  alarm history  
  set time  
  schedule  
unoccupied cntrl  
  bms setup  
change password  
technician menu  
factory menu
```

#### 3.2 SYSTEM STATUS

The system status menu contains the home screen, as shown below:

This screen shows the unit designation (if applicable), date, and time on the top row of the display. Temperature, as measured by the applicable temperature sensor (duct or room mounted, depending on the application) is displayed on the following line of the display. The bottom row of the display shows the current system status and mode. Pressing the **↑** and **↓** keys will scroll through additional system status screens which indicate system demands and additional sensor readings.

##### 3.2.1 UNOCCUPIED MODE OVERRIDE

To override the schedule while the unit is in its unoccupied mode, press the key while on the home screen. With the cursor blinking in the top left corner, press **↵** to select the override mode and press the **↑** key to change it to ON. Press **↵** again to confirm the change and select the override time. Use the **↑** and **↓** keys to set the override time from 001-999 minutes and press the **↵** key again to confirm the selection.

```
01/06/18 03:39  
MODE: SAT UNOCC  
OVERRIDE MODE> ON  
OVERRIDE TIME>075min
```

### 3.2.2 SYSTEM STATUS AND MODE


The following tables list and describe the system and mode indications displayed on the home screen during normal unit operation. Refer to Section 6 for error codes and troubleshooting information.

Status Indication	Description
FAN	The fan is on and operating
FAN*	The fan is on and there is no heating or cooling demand.
DAMPER OPENING	System is starting-up; fan will activate after damper delay.
OFF BY NETWORK	The unit is in a pLAN configuration and is currently standby.
OFF BY TIME CLOCK	The unit is in its unoccupied mode.
OFF BY DIGITAL INPUT	The remote on/off is in the OFF position.
OFF BY KEYPAD	The system is deactivated by the display terminal control or BMS input.
OFF BY ARIA	The unit is deactivated by an Aria network.

Mode Indication	Description
CL=1s	One cooling stage is active.
CL=2s	Two cooling stages are active.
CL=3s	Three cooling stages are active.
CL=4s	Four cooling stages are active.
COOL	Modulating cooling is active.
CL=FC	Water free cooling is active.
CL=EC	Air-side economizer is active.
HT=1s	One heating stage is active.
HT=2s	Two heating stages are active.
HT=3s	Three heating stages are active.
HT=4s	Four heating stages are active.
HEAT	Modulating heating is active.
HT=RHT	Hot gas reheat is active.
DEH	The unit is dehumidifying.
HUM	The unit is humidifying

### 3.3 ENABLES

The system enables menu shows the subsystems installed in the unit and their current status. If a subsystem's enable status is set to ON, then that subsystem is currently under the control of the system's software; if a subsystem's enable status is set to OFF, then that subsystem is disabled and cannot be activated by the controller.

 SYSTEM ENABLES SYSTEM= ON  DEHUMIDIFY=OFF
--

After the unit has been installed, all subsystems should be enabled in order for the unit to operate properly. In order to change the enable status for a subsystem, press the  $\downarrow$  key to move the cursor to the subsystem of choice. Press either the  $\uparrow$  or  $\downarrow$  key to change the enable status between ON and OFF. After making a selection, press the  $\downarrow$  key again to confirm the change.

### 3.3.1 AFTER AN ALARM

Following an alarm condition (e.g. loss of airflow), some subsystems may be disabled in order to protect the system components. After physically checking the system to determine the cause of the alarm and remedying any problems (e.g. replace a broken fan belt), the subsystem must be re-enabled from this menu.

## 3.4 SETPOINTS

The set points submenu allows the system set points to be adjusted. The submenus available will depend on the specific application and sensors installed.

### 3.4.1 STANDARD

AboveAir Technologies units configured for comfort or precision cooling require two setpoints: temperature and humidity, as shown below. To change a value, press  $\downarrow$  to move the cursor to the set point then press  $\uparrow$  and  $\downarrow$  to change the setpoint. Press  $\downarrow$  to return the cursor to the upper left side of the screen and confirm the changes.

■	ROOM SETPOINTS
Temperature	070.0°F
Humidity=	050.0%

### 3.4.2 MAKEUP AIR/HIGH PERCENTAGE OA

The logic required to control a HPOA unit requires several more set points beyond the basic humidity and temperature set points. Refer to the following table for a description of each set point.

■	Makeup Air
Dew point=	050.0°F
Cooling=	075.0°F

■	Supply Air
Humidify=	050.0%
Heat Area 1=	070.0°F
Heat Area 2=	070.0°F

■	Heating
PreHeat=	000.0°F
HG ReHeat=	000.0°F

■	Makeup Room 1+2
C1 Area1=	070.0°F
C2 Area2=	070.0°F

Display	Controls
Dew Point	Dew point set point; used for dehumidification control.
Cooling	Dry bulb temperature set point; used for cooling control.

Humidify	Relative humidity set point for units provided with a humidifier.
Heat Area 1	Heating setpoint for primary space.
Heat Area 2	Heating setpoint if the unit is setup to (if applicable). Not typically used.
PreHeat	Setpoint for preheat coil (if applicable). Not typically used.
HG ReHeat	Setpoint for hot gas reheat (if applicable). Not typically used.
C1 Area1	Setpoint for additional temperature sensor (if applicable). Not typically used.
C2 Area2	Setpoint for additional temperature sensor (if applicable). Not typically used.

### 3.4.3 FREECOOL SET POINT

### 3.5 ALARM SET POINTS

Alarm set points sets the high and low sensor values which will cause, as shown in the example screen below. These values come set from the factory to minimize nuisance alarms. These values can be adjusted as necessary to balance nuisance alarms with alarming for unacceptable local conditions. See the following sample screens.

ROOM
TEMPEARTURE ALARMS
HIGH= 085.0°F
LOW= 065.0°F

### 3.6 RUN HOURS

The run hours menu displays the actual operating hours for the various system components. Scroll through the submenus to see runtimes for all of the components for your particular system. To reset run hours to zero, press  $\downarrow$  to move the cursor to the chosen component and then press  $\uparrow$  or  $\downarrow$  to reset the value to zero.

RUN HOURS
ACTUAL
FAN > 00023

### 3.7 DAY MIN/MAX

The day minimum and maximum screen displays the high and low temperatures and relative humidities as measured by the system sensors during the latest 24 hour period.

24 HOUR HIGH/LOW
LOW HIGH
TMP= 070.3°F 074.6°F
HUM= 040.3% 054.6%

### 3.8 ALARM HISTORY

The alarm history will display the last 150 alarms detected by the system, with time/date stamps, the system set points, and the corresponding sensor measurements at the time of the failure.

```
█ 08:49:29 04/27/11
001:C1 high pressure
SET T: 72.0 T: 81.3
SET H:050.0 H:040.1
```

### 3.9 SET TIME

The set time submenu allows the date and time to be set if your AboveAir Unit has been provided with a time clock card. The first submenu allows the day, time, and date to be set and the second submenu specifies daylight savings time. The clock comes preset from the factory, but may need to be adjusted for the local time zone.

```
█ REAL TIME CLOCK
DAY= THU
TIME= 09:42
DATE= 05/12/2011
```

### 3.10 SCHEDULE

The schedule submenu allows manual input of an occupied/unoccupied operation schedule. Refer to the sample screen below:

```
█ OCCUPIED TIME
START END
Monday= 05:00 19:00
Copy all week=OFF
```

Start and end times for occupied times are input based on the 24-hour time clock. Selecting "Copy all week=ON" will copy the times input for Monday to all other days. Scroll through the remaining submenus to adjust times for Tuesday-Sunday.

### 3.11 UNOCCUPIED CNTRL

The unoccupied control submenu will only be accessible if a schedule has been set. If a schedule has been set, the unit can be set to maintain the space between high & low temperatures and/or high & low relative humidity percentages. See the sample screens below:

```
█ UNOCCUPIED
TEMP CONTROL=ON
HIGH TEMP= 090.0°F
LOW TEMP= 055.0°F
```

```
█ UNOCCUPIED
HUM CONTROL= OFF
HIGH HUM= 065.0%
LOW HUM= 035.0%
```

### 3.12 BMS SETUP

This submenu provides configuration options for connection to a building management system (BMS) or for remote communication, if your AboveAir Technologies unit has been provided with a serial card.

Protocol	Description
LOCAL	Default setting for units - also used for local connection to local PC. Systems with BacNET or LonWorks BMS options also utilize this setting.
REMOTE	Direct connection to a modem for connection to a remote PC or PlantVisor
MODBUS	Standard Modbus protocol for connection to third-party PC or BMS

```
U01 COMMUNICATIONS
PROTOCOL= LOCAL
IDENT= 001
BAUD RATE= 19200
```

Additionally, the unit's identity and baud rate are set here. Each unit connected to a network must have a unique identifier. This value will be displayed in the upper left hand corner of the screen after being set - for example, a unit set with an identity of 001 will display U01 in the upper left corner of the display screen. The baud rate should be set to match the BMS system. Baud rate is given in bits per second (bps) and can be set at 1200, 2400, 4800, 9600, or 19200 bps.

To change the unit's communication method, press to move the cursor to the desired item, then press to scroll through the selections. After all selections have been made, press until the cursor returns to the upper left hand of the screen to confirm the changes.

If your unit has been provided with a serial card for connection to a BMS system, refer to the supplemental insert for the points list.

### 3.13 CHANGE PASSWORD

This submenu allows you to set a four digit password for the Level 1 menus to prevent occupants from changing set points, disabling system operation, and accessing the other system functions under the Level 1 menus. This password does not come set by the factory by default. AboveAir Technologies recommends setting this password unless permitting occupants local control is desired.

```
CHANGE PASSWORDS
LEVEL 1>0000
```

## 4 TECHNICIAN'S MENU (LEVEL 2)

### 4.1 INTRODUCTION

AboveAir Technologies ships all of its microprocessor equipped units with the technician's menu (level 2) functions protected by the password 0002. The technician's menu allows access to submenus critical to the system's proper function and should only be accessed by or under the guidance of a trained service technician. The complete list of submenus under the technician's menu is shown below and described at length within this section.

```

*****
> FAN OPERATION <
  network setup
  temperature units
  manual control
  sensors
  digital inputs
  economizer
  room pressure
  change passwords
  alarm relays
  software version
  
```

### 4.2 FAN OPERATION

The fan setup submenus configure the operation parameters for the fan.

Parameter	Description
Startup Delay	The startup delay parameter is a time delay that allows the fan to get up to speed prior to enabling the airflow alarm. This also serves as a delay for temperature, humidity, and pressure alarms and for startup of other system components (compressors, heaters, etc.)
Fan Operation	Select "ON" for continuous operation, or "AUTO" for demand operation.
Heat Purge	During demand operation, the heat purge parameter allows the fan to continue running after heating demand has been met, to purge heat from the unit.
OA Damper Delay	For systems with OA dampers, this parameter delays the start of the fan by the selected time after unit activation to enable the damper to fully open.
Protect Sys Off	Requires two steps to deactivate unit.
Airflow SW Off	This parameter controls whether an airflow alarm will deactivate the fan. YES will deactivate the fan on an alarm, NO will not deactivate the fan on an alarm. AboveAir Units ship with this parameter set to YES to protect the system in the event of a belt failure.

```

FAN SETUP 1
STARTUP DELAY= 030s
FAN OPERATION= ON
HEAT PURGE=    020s

```

```

FAN SETUP 2
OA DAMPER DELAY=030s
PROTECT SYS OFF=NO
AIRFLOW SW OFF= YES

```

### 4.3 NETWORK SETUP

Up to 8 units can be configured in a pLAN network. Unit typically ship from the AboveAir Factory preset for the network and labeled with the corresponding unit number. Refer to Section 6 for full setup directions.

### 4.4 TEMPERATURE UNITS

AboveAir Technologies can be configured to display temperature units in either Fahrenheit or Centigrade. To change the units, press  $\downarrow$  then press  $\uparrow$  or  $\downarrow$  to change between FAHRENHEIT and CENTIGRADE. Press  $\downarrow$  to return the cursor to the upper left corner of the screen and confirm the change.

```

TEMP UNITS
MODE= FAHRENHEIT

```

### 4.5 MANUAL CONTROL

The manual control submenu allows the technician to force a component to place a system component in hand, or under manual control. To place a component under manual control, scroll through the manual control submenus using until the desired component is found. Press  $\downarrow$  to move the cursor to the mode, then press  $\uparrow$  or  $\downarrow$  to change control mode to HAND. Press  $\downarrow$  again to select the position and use  $\uparrow$  or  $\downarrow$  change the run position to ON or OFF. After all selections have been changed as desired, press  $\downarrow$  until the cursor returns to the upper left corner of the screen to confirm all changes.

```

MANUAL MODE  POS
COMP 1=    HAND  OFF
COMP 2=    AUTO  OFF
HEATER 1=  AUTO  OFF

```

### 4.6 SENSORS

The sensors submenu allows the technician to calibrate the unit's sensors. ACTUAL IN displays the value currently seen by the unit. To change the offset, press  $\downarrow$  to move the cursor to the CAL OFFSET line of the display, then press  $\uparrow$  to increase the value or  $\downarrow$  to decrease the value. After setting the desired offset, press  $\downarrow$ . The ACTUAL IN will change to display the value as sensed by the sensor adjusted by the value entered under CAL OFFSET. Use  $\uparrow$  or  $\downarrow$  to scroll through all of the sensors available for calibration



on the system. Press ↵ to return the cursor to the upper left corner of the screen and confirm the change.

```
SENSOR SETUP
ROOM TEMPERATURE
CAL OFFSET> 000.0°F
ACTUAL IN : 075.0°F
```

#### 4.7 DIGITAL INPUTS

The digital input submenu displays the actual reading of the input and allows the contact to be set up to alarm on an open or closed contact. Use ↑ or ↓ to scroll through all of digital inputs. To change an input to alarm on a different state, press ↵ to move the cursor to the desired input, then press ↑ or ↓ to switch the value between OPEN and CLOSED.

```
DIGITAL INPUTS
ALARMS ON:      ACT
AIRFLOW>OPEN   CLOSE
```

#### 4.8 ECONOMIZER

For systems provided with an airside economizer, the economizer submenu allows its control features to be set. The economizer control logic can be setup for either enthalpy or temperature only operation. Verify economizer type with your unit documentation to ensure the necessary sensors are installed. ECON VALVE TIME is the time it takes the damper to move from fully closed to fully open. DAMPER MINIMUM allows the damper minimum to be set between 0-100% while the unit is active.

```
ECONOMIZER
ECON TYPE=OFF
ECON VALVE TIME=120s
DAMPER MINIMUM= 000%
```

#### 4.9 ROOM PRESSURE

#### 4.10 CHANGE PASSWORDS

The technician's menu allows both the Level 1 and Level 2 passwords to be changed under the change passwords submenu. The factory password for the technician's menu is preset at 0002. The Level 2 password will allow access to both Level 1 and Level 2 menus. AboveAir Technologies does not recommend changing the technician's menu password; if this password is changed and lost, you will need to contact the factory for assistance in resetting the password.

```
CHANGE PASSWORDS
LEVEL 1=0000
LEVEL 2=0002
```

#### 4.11 ALARM RELAYS

If the unit is configured with an alarm out relay, the alarm relay menu will be available. This submenu allows the selection of which alarms will close the alarm relay. Press  $\uparrow$  or  $\downarrow$  to scroll through the available alarms. To select a possible alarm, press  $\downarrow$  to move the cursor to the selection, then press  $\uparrow$  or  $\downarrow$  to change the selection between YES and NO. After all desired selections have been made, press  $\downarrow$  to return the cursor to the upper left corner of the screen and confirm the changes.

```
ALARM RELAY 1
AIRFLOW          YES
FILTER           NO
SMOKE            NO
```

#### 4.12 SOFTWARE VERSION

The software version submenu will display the version of software currently installed on the unit and that version's date.

```
AboveAir Tech
HVAC Controller
V3.0   pCO1 04/05/11
```

##### 4.12.1 RESETTING THE UNIT

The following procedure will completely reset the unit, including all set points, passwords, inputs/outputs, and other system variables. DO NOT PERFORM THE FOLLOWING OPERATION WITHOUT GUIDANCE OF AN ABOVEAIR TECHNOLOGY REPRESENTATIVE.

1. On the software version screen, press  $\downarrow$  followed by the **Alrm** button. The cursor will move to the month field of the date.
2. Press the  $\downarrow$  to change the month.
3. Press  $\downarrow$  to confirm the reset. Once the factory reset has been completed, the power reset screen will display:

```
THE UNIT MUST BE
TURNED OFF FOR 5
SECONDS TO CLEAR
AUXILIARY MEMORY
```

4. The unit must be completely reset to clear the temporary memory. Turn the unit disconnect into the off position for 5 seconds, then back into the on position.

Once power has been restored to the unit, a member of the AboveAir Technologies support team will need to reprogram the system for your particular application.

## 5 FACTORY MENU (LEVEL 3)

### 5.1 WARNING

ADJUSTING SETTINGS UNDER THE FACTORY MENU WITHOUT THE GUIDANCE OF ABOVEAIR TECHNOLOGIES' FACTORY SUPPORT STAFF MAY RESULT IN UNSATISFACTORY UNIT OPERATION AND MAY VOID THE WARRANTY. THE FOLLOWING SECTION IS PROVIDED AS INFORMATIONAL ONLY AND SHOULD ONLY BE CONSULTED WITH THE GUIDANCE OF THE FACTORY SUPPORT TEAM.

### 5.2 INTRODUCTION

AboveAir Technologies ships all of its units with the features contained in the factory menu setup according to the specific unit application. I/O setup and other control features are set under the factory level submenus. Units are tested at the factory to insure that all controls, inputs, and outputs are working properly prior to shipment. This section describes the features programmed into your AboveAir unit and is provided as a reference only. The complete list of submenus available in the factory menu is shown below.

```
*****  
> I/O SETUP <  
t/h control ramps  
cooling setup  
heating setup  
hot gas setup  
humidity setup
```

### 5.3 I/O SETUP

The I/O setup submenu defines all of the digital inputs & outputs and analog inputs & outputs that the controller will use for control points. This is programmed at the factory, based on the specific requirements of the unit order. Your unit will only utilize some of the inputs and outputs listed in this section.

#### 5.3.1 SELECT UNIT TYPE

AboveAir Technologies uses two general unit types for its program: Standard and Make-Up Air. The standard unit logic is applied to most comfort and precision cooling applications, while the make-up air program is used for high percentage outdoor air units. The factory password can also be reset from this screen. Under no circumstances should this password be changed. If this password is lost, the unit will need to be reset and reprogrammed.

```
SELECT UNIT TYPE  
Unit=Standard  
  
New Password=1234
```

### 5.3.2 SELECT DIG IN

The Carel controller utilized in your AboveAir unit can utilize up to 14 digital inputs (labeled ID1-ID14). These inputs have been configured at the factory for your specific application. The following table shows all of the available inputs; refer to your unit's wiring diagram to identify which digital inputs are utilized in your application.

Digital Input Identification (ID-)	Input
1	Airflow, Off
2	Heat Limit, Remote Setpoint, Off
3	Pump, Off
4	Drain Pan, Off
5	Filter, Off
6	C3 H/L Pres, Off
7	C2 H/L Pres, Off
8	C1 H/L Pres, Off
9	Smoke Detect
10	Remote On
11	Freeze State, Ht/Hum Lockout, Off
12	Comp 4 H/L Pres, Humidifier Alarm, Comp Lockout, Off
13	C1 High Pres, Off
14	C2 High Pres, Off

The following is an example of the digital input selection screens:

SELECT DIG IN	
1 AIRFLOW=	YES
2 OFF	
3 PUMP=	NO

### 5.3.3 INSTALL SENSORS

The Carel controller utilized in your AboveAir Technologies unit can accept up to 8 analog inputs. The table below lists the sensors that may be used in AboveAir units; refer to the IOM included with your unit for sensor installation and recommended locations.

Sensor Input (B-)	Sensor
1	Return Humid / Outside Humid
2	Not Used
3	Suct Press 1
4	Suct Press 2
5	Return Temp / Room Temp
6	Outside Temp
7	Freecool Temp / Supply Temp 1
8	Supply Temp / Supply Temp 2

The following is an example of a typical screen used to setup the unit's sensors.

```

INSTALL SENSORS
1 RETURN HUMID= YES
2 NO SENSOR PRESENT
3 SUCT PRESS 1= NO
    
```

### 5.3.4 SELECT OUTPUT

The controller installed in your unit can support up to 13 digital outputs. The table below lists the features that may be installed in your unit and the corresponding relay used for control. Refer to your submittal to determine which features are installed on your unit.

Outputs (NO-)	Control
Relay 1	Fan, Off
Relay 2	Compressor 1, Cool Open, Off
Relay 3	Compressor 2, Cool Open, Off
Relay 4	Heater 1, Heat Open, Off
Relay 5	Heater 2, Heat Open, Off
Relay 6	Heater 3, Alarm Out, Off
Relay 7	Compressor 4, C2 Unloader, Fan Low SP, OSA Damper, Pump, Preheat, Off
Relay 8	Compressor 3, C1 Unloader, OSA Damper, Preheat, Off
Relay 9	Free Cool, Heater 4, Alarm Out, Fan Low SP, HT Area2Stg1, Off
Relay 10	Econ Close, Pres Close, Dehum, Humidifier, HT Area2Stg2, HP Rev Valve, Off
Relay 11	Econ Open, Pres Open, Exhaust Fan, Cond Fan, Off
Relay 12	Hotgas, Humidify, Exhaust, Freecool, HG Reheat, Off
Relay 13	Hotgas, Humidify, Freecool, HG Reheat, Off

The following is an example of the typical screen used to setup the unit's outputs.

```

SELECT OUPUT
RELAY 1=FAN
RELAY 2=COMPRESSOR 1
RELAY 3=COMPRESSOR 2
    
```

### 5.3.5 ANALOG OUTPUTS

The controller installed in your unit can support up to 4 analog outputs - 2 standard and 2 pulse-width modulating. The table below lists features that may be installed in your unit and the corresponding output. Refer to your unit's documentation for information about features installed on your unit.

Outputs (NO-)	Control
---------------	---------

OUT 1	Hot Gas, Ht SCR, CL Valve, Humid, Press, Econo, Freecool, HG Rht, Pre-ht, Off
OUT 2	Hot Gas, Ht SCR, CL Valve, Humid, Press, Econo, Freecool, HG Rht, Pre-ht, SCRHTar2, HP F1 V1, Off
OUT 3	Hot Gas, Ht SCR, CL Valve, Humid, Press, nu, Freecool, HG Rht, Pre-ht, Off
OUT 4	Hot Gas, Ht SCR, CL Valve, Humid, Press, Econo, nu, HG Rht, Pre-ht, Off

ANALOG OUTPUTS	
OUT 1=	HOT GAS =REV
OUT 2=	FREECOOL =DIR

## 5.4 T/H CONTROL RAMPS

### 5.4.1 Ramp Control

AboveAir's controller software is setup to utilize one of two different controls schemes: Proportional (P) control and Proportional Integral (PI) control. In the T/H Control Ramp menu, control type can be selected as well as setting up the ramp control variables.

A brief description each control scheme is given as follows:

Proportional (P) Control: A setpoint and a control band are defined in the system setup. System demand is calculated proportionate to the deviation from the setpoint, based on the control band. The demand modulates from 0% to 100% as the measured variable moves from the setpoint to setpoint + (control band/2). Figure 5-1 illustrates a proportional control scheme for temperature. In the example, the control band is 10°F with a setpoint of 75°F. In the example illustrated here, at 80°F, the demand for cooling would be 100% and at 70°F the demand for heating would be 100%. A rise of temperature of 1 above setpoint would cause a cooling demand of 20%.

Proportional-Integral (PI) Control: Proportional-integral control adds an integral term to the previous control scheme. An additional term for the integration time also must be defined in the system setup. The integration time determines the period of history that will be considered in calculating system demand. For example, with an integral time of 60 seconds, the deviation from setpoint over the previous 60 seconds will be taken into account when determining system demand. Total demand is then a combination of the current measured demand (the proportional term) and historical demand (the integral term).

A long integration time will result in sluggish controller response, while a short integration time can result in oscillatory behavior as short-term fluctuations are magnified. If PI control is selected, integration time will need to be adjusted in the field to dial in the controls.

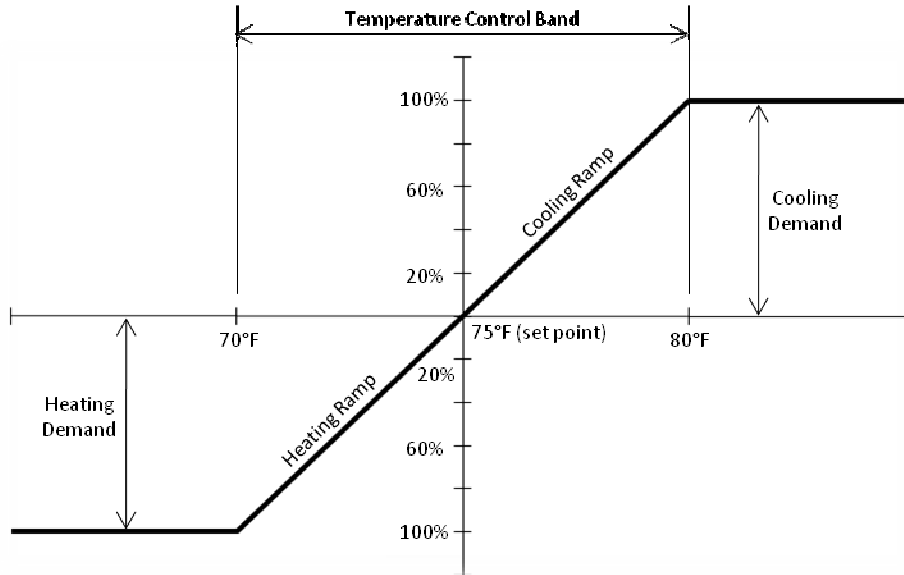


Figure 5-1: Temperature Control Ramps for Proportional Control

The control bands for temperature and humidity are set under the ramp control menu. If proportional integral control is used, the time period for the integral is set here as well. AboveAir Technologies units use 8.0 and 10.0 for the default temperature and humidity bands, respectively, as shown in the screen below.

RAMP CONTROL		
TYPE	Band	INT
TEMP=P	08.0	120s
HUM= P	10.0	120s

#### 5.4.2 CL/HT RAMP CNTRL

Cooling and heating ramp controls are one of the means used to create dead bands around the set point. Referring to the screen below, START defines the point where a call for cooling or heating will begin when the temperature is moving away from set point. END defines the point where a call for cooling or heating will cease as the temperature is moving towards the set point.

CL/HT RAMP CNTRL		
	START	END
COOLING=	000%	100%
HEATING=	000%	100%

In the example shown in Figure 5-1, cooling or heating demand begins upon any deviation from the set point. In order to create a 1°F dead band on the cooling ramp, COOLING START would be set to 20% and COOLING END would be set to 80%.



### 5.4.3 HU/DH RAMP CNTRL

Humidify and dehumidify ramp controls operate in the same manner as the temperature controls discussed under 5.04.2.

```
      HU/DH RAMP CNTRL
      START  END
HUMIDIFY= 000% 100%
DEHUMID=  000% 100%
```

## 5.5 COOLING SETUP

### 5.5.1 COOLING SETUP

AboveAir Technologies produces units that can utilize direct expansion or chilled water coils for cooling. The cooling setup screen is utilized to set the system TYPE to correspond to your unit's cooling method - valve or stage - and will affect the subsequent submenus.

#### 5.5.1.1 COOLING SETUP - CHILLED WATER SYSTEMS

For chilled water systems utilizing a modulating control valve, cooling type will be set to VALVE. With type set to valve, 3P Valve Time must be set. 3P Valve Time is the delay for the control valve to go from fully closed to fully open. None of the subsequent submenus will appear for chilled water systems.

```
      COOLING SETUP
TYPE=VALVE
3P VALVE TIME= 060 s
```

#### 5.5.1.2 COOLING SETUP - DX SYSTEMS

For DX systems, cooling type will be set to STAGE. The number of stages corresponds to the number of compressors installed in the system, which may vary from 1 to 4 in a DX system. Unloaders per stage can be set to 0 or 1; this value will typically be 0 for AboveAir systems.

```
      COOLING SETUP
TYPE=STAGE
NUMBER OF STAGES=0
UNLOADERS/STAGE= 0
```

### 5.5.2 COMPRESS SETUP

AboveAir's program can operate up to 4 compressors. These compressors are staged using step logic based on the cooling demand as determined in 5.04, with ON and OFF points set under this submenu, as shown in the example screen below. In the example screen shown below, Compressor 1 would be activated when the cooling demand reached 40% and Compressor 2 would be activated when the

cooling demand reached 60%. As the cooling demand was met, Compressor 2 (if active) would be deactivated when cooling demand fell to 15% and Compressor 1 would be deactivated when cooling demand fell to 5%.

COMPRESS SETUP		
	ON	OFF
COMPRESS 1=	040	005%
COMPRESS 2=	060	015%

### 5.5.3 COMPRESSORS

The first COMPRESSORS submenu allows low pressure delay and minimum on & off times to be set for the compressors. These delays are used to prevent compressor short cycling. AboveAir Technologies ships its units with a 60 second compressor delay after a low pressure warning and with a 3 minute minimum for the compressor on/off. **NOTE:** Altering these values can result in improper compressor operation and will void the compressor warranty.

Parameter	Description
Low Press Delay	Sets a time delay for restart after a compressor suffers a low pressure alarm.
Minimum On Time	Sets a minimum compressor run time - the compressor will run at least this length of time, even if demand is met. This value is set at 3 minutes to prevent short cycling of the compressors.
Min Off Time	Sets a minimum off time, during which time the compressor will not reactivate even on a call for cooling. This value is set at 3 minutes to prevent short cycling of the compressors.
Time Bet Comps	Sets a minimum time between the activation of compressor stages - for example, the second compressor will not start for at least 60 seconds after the first stage has activated regardless of cooling demand based on the sample menu screen setting.
Comp Rotation	"OFF" deactivates compressor rotation. "ON" enables compressor rotation on a first on, first off basis.

COMPRESSORS
LOW PRESS DELAY=060s
MINIMUM ON TIME=180s
MIN OFF TIME= 180s

COMPRESSORS
TIME BET COMPS= 060s
COMP ROTATION= OFF

### 5.5.4 FREECOOL SETUP

On water or glycol cooled systems with a free cooling coil, the FREECOOL SETUP submenu defines the operation of the coil. They can be setup to operate in one of two ways: ON UNTIL DX or ALWAYS ON.

Parameter	Description
Mode	"ON UNTIL DX" will utilize free cooling until the system's first compressor is activated. "ALWAYS ON" will utilize the free cooling

	coil while there is cooling demand.
On Delay	Sets a delay following unit activation during which time the free cooling feature will not be activated.
Cool Ramp	Defines the range over which the free cooling coil will operate; refer to Sections 5.4.1 and 5.5.2 for further information on the ramp and for coordinating the staging of free cooling with compressor operation.

```

FREECOOL SETUP
Mode=      ON UNTIL DX
On Delay=  600 sec
Cool Ramp=000 - 025%

```

## 5.6 HEATING SETUP

### 5.6.1 HEAT SETUP

Control type is selected on this screen. AboveAir Technologies produces units that may use hot gas reheat, electric heating, steam heating, or hot water heating. The heat setup screen allows the type of heat/reheat to be setup.

Additionally, OA HT DISABLE can be set on this screen. This value will disable any reheat options based on the outdoor air temperature.

#### 5.6.1.1 HEAT SETUP - STEAM/HEATING WATER SYSTEMS

For a system featuring a single stage of steam or heating water heat or reheat, the system TYPE will be set to VALVE. With type set to valve, 3P Valve Time must be set. 3P Valve Time is the delay for the control valve to go from fully closed to fully open. None of the subsequent submenus will appear for systems with TYPE set to VALVE.

```

HEAT SETUP
TYPE=VALVE
3P VALVE TIME= 060 s
OA HT DISABLE= 85°F

```

#### 5.6.1.2 HEAT SETUP - STAGED SYSTEMS

For a system featuring multiple heating or reheat stages, or a system using ON/OFF type heating elements, the system TYPE will be set to STAGE. The number of stages can be set from 0 to 4 and can control a combination of ON/OFF heating stages combined with a modulating stage.

```

HEAT SETUP
TYPE=STAGE
NUMBER OF STAGES=0
OA HT DISABLE= 85°F

```

### 5.6.2 HEATER STAGES

AboveAir's program can operate up to 4 stages of heating, including a modulating stage. The various heating components are staged using step logic based on the cooling demand as determined in 5.04, with ON and OFF points set under this submenu, as shown in the example screen below. In the example screen shown below, Heater 1 would be activated when the heating demand reached 40% and Heater 2 would be activated when the heating demand reached 60%. As the heating demand was met, Heater 2 (if active) would be deactivated when cooling demand fell to 15% and Heater 1 would be deactivated when cooling demand fell to 5%.

HEATER STAGES		
	ON	OFF
HEATER 1=	040	005%
HEATER 2=	050	010%

### 5.6.3 HEAT STAGE/RAMP

For systems with a modulating stage of heat, STAGE RAMP will be set to ON. This enables the heater output to modulate the output between 0 and 100%. The modulating heating stage will typically be set as the last stage of heating.

For systems with 2 ON/OFF stages of heating, where the elements are sized such that one is twice the size of the other, the system can be set up for 3 stages of heating. The smaller element will be connected to the system as Heater 1 and the larger element will be connected to the system as Heater 2. STAGE RAMP will be set to ON and STAGE TYPE will be set to 3S. The system will then control the stages in the following pattern:

Stage 1 - Heater 1 ON, Heater 2 OFF

Stage 2 - Heater 1 OFF, Heater 2 ON

Stage 3 - Heater 1 ON, Heater 2 ON

HEAT STAGE/RAMP	
STAGE RAMP=	OFF
STAGE TYPE=	2S

## 5.7 HUMIDITY SETUP

AboveAir Technologies units can be used for dehumidification and may be provided with an optional humidifier.

### 5.7.1 HUMIDITY CONTROL

For all AboveAir Technologies units, the first humidity control menu will be set up exactly as below. AboveAir units use a separate canister humidifier for humidification and use cooling with reheat for dehumidification.

```
HUMIDITY CONTROL
Integr. Humidify:OFF
DEH=      COOL/REHEAT
```

### 5.7.2 HUMIDITY CONTROL

For systems equipped with a humidifier, the set points for the humidifier relay are set in a similar manner to the compressor and heater setpoints. ON is the percentage of demand as determined by the humidity ramp control which will activate the humidifier relay; OFF is the percentage of demand as determined by the humidity ramp control which will deactivate the humidifier relay.

```
HUMIDITY CONTROL
      ON  OFF
HUM RELAY= 040  005%
```

## 6 pLAN NETWORK SETUP

### 6.1 CONNECTING UNITS

Connection between boards in a pLAN network is carried out using an AWG20/22 shielded cable, twisted pair plus shield. The boards are connected in parallel, with terminal J11 as the reference.

**Pay ATTENTION to the network polarity:** RX/TX+ on one board must be connected to RX/TX+ on the other boards; the same is true for RX/TX-.

### 6.2 SAMPLE SETUP

The following steps demonstrate a setup with three units with one standby. Setup for additional units will be similar.

#### 6.2.1 INITIAL SETUP

1. Disconnect pLAN Cables from terminal J11 between each unit's pCO1 I/O Boards.
2. Start with First Unit (Unit-1 / Master Unit):
  - a. Power-Down Unit-1 (switch main disconnect to OFF position)
  - b. Power-UP Unit-1 (switch main disconnect to ON position)
  - c. Watch the PGD Display, when the display shows **\*\*\* Self-Test\*\*\***, Simultaneously HOLD-DOWN the **ALRM** and **↑** keys. The pLAN set-up screen will appear.
  - d. Using the **↑** or **↓** keys, Set the pLAN Address for the master unit to **1**.
3. Repeat steps 2a-d for Unit-2, setting the pLan address to 2.
4. Repeat steps 2a-d for Unit-3, setting the pLan address to 3.
5. Power-Down all three units (switch main disconnects to OFF position) and reconnect the pLAN wiring terminal J11 between each unit.
6. Energize / Power-UP each unit (switch main disconnects to ON position).
7. Go back to Unit-1 (MASTER UNIT)
  - a. After approximately 10 seconds of Unit-1 being powered-up, press and hold **↑**, **↵**, and **↓** simultaneously until the Display Address Setting screen appears.
  - b. Press **↵** once to move the flashing cursor under the Display Address Number.
  - c. Using the **↑** or **↓** keys, change Unit-1's display address to **17**. Press **↵** to save this change.
    - i. Note: If the display goes blank, , press and hold **↑**, **↵**, and **↓** simultaneously again until the Display Address Setting screen appears.
    - ii. Press **↵** twice to move the flashing cursor under the I/O Board Address. Using the **↑** or **↓** keys, change Unit-1's I/O Board Address to 01 (if it is not already). Press **↵** to save this change. Press **↵** button to advance to Terminal configuration screen. The parameters for Unit-1 should match the following. If not, press **↵** button to move the flashing cursor under respective each parameter, and use the **↑** or **↓** keys to change each value as required. Press **↵** button to save each change:

TRM1 to 17 PR  
TRM2 to none ---  
TRM3 to none --- answer OK YES

Note: Remember to press ↵ to save these changes. Press **ESC** as required to return to the default display screen showing Date/Time, Unit Set Points & Status

8. Go to Unit-2
  - a. Follow steps 7a-c, however, set Unit-2's Display Address to 18 and I/O Board Address to 02.

TRM1 to 18 PR  
TRM2 to none ---  
TRM3 to none --- answer OK YES

Note: Remember to press ↵ to save these changes. Press **ESC** as required to return to the default display screen showing Date/Time, Unit Set Points & Status.

9. Go to Unit-3
  - a. Follow steps 7a-c, however, set Unit-2's Display Address to 19 and I/O Board Address to 03.

TRM1 to 18 PR  
TRM2 to none ---  
TRM3 to none --- answer OK YES

Note: Remember to press ↵ to save these changes. Press **ESC** as required to return to the default display screen showing Date/Time, Unit Set Points & Status.

## 6.2.2 MASTER UNIT SETUP (UNIT-1)

1. Press **PRG**.
2. Using the ↑ key, scroll to the TECHNICIAN MENU. Press ↵ to enter the Technician Menu Password Screen.
3. Press ↵ once to move the cursor to the password. Use the ↑ key to change the password to 002 and press ↵ to enter the TECHNICIAN MENU.
4. Use the ↓ key to scroll to NETWORK SETUP. Press the ENTER button to enter the First Network Setup screen. Using the same type of maneuvering through and value changing / saving, change the values of the following five Network Set-Up screens as follows:
  - a. First Screen (Network Set-up)

NETWORK SET-UP	
TOTAL UNITS	3
STAND-BY UNITS	1

NETWORK CLOCK	ON
---------------	----

b. Second Screen (Unit Rotation)

UNIT ROTATION	
DAY	1
TIME	12:00

c. Third Screen (Network Alarms)

NETWORK ALARMS	
SHUTDOWN	NO
STANDBY	YES

d. Fourth Screen (Network Assist)

*Note: Network Assist allows standby unit to turn on to assist in the Cooling, Heating, Dehumidifying and/or Humidifying of the space if the current two units can not handle the room load. There must be enough power for all three units to operate simultaneously.*

NETWORK ASSIST		
		BAND
DEH	OFF	00.0
HUM	OFF	00.0

e. Fifth Screen (Network Assist)

*Note: Network Assist allows standby unit to turn on to assist in the Cooling, Heating, Dehumidifying and/or Humidifying of the space if the current two units can not handle the room load. There must be enough power for all three units to operate simultaneously.*

NETWORK ASSIST		
		BAND
COOL	OFF	00.0
HEAT	OFF	00.0



## 7 BMS Setup

### 7.1 pCOWeb Serial Card (Ethernet Connection)

The pCOWeb serial card may be provided with your unit in order to allow connection to a BMS network. It offers a variety of functions for administering your unit, including:

- BACnet/IP: Provides access to the controller for supervision software using the BACnet/IP protocol.
- BACnet/Ethernet: Provides access to the controller for supervision software based on the BACnet Ethernet protocol.
- Web Server: Allows access to the controller using an internet browser.
- E-mail: Send e-mail when programmable events occur.
- SNMPv1 & v2: Allows for access to the controller using software based on the SNMP protocol.

The serial card is installed at the factory; refer to the brochure included with the card if purchased separately at a later date.

By default, the card is set-up with the following parameters:

Parameter	Factory Value
IP Address	172.16.0.1
Subnet mask	255.255.0.0
Admin user name	admin
Admin password	fadmin

Refer to the supplemental pCOWeb manual from Carel provided with your unit for a full discussion of all of the available features. Refer to section 7.3 for a list of points (both Carel and BACnet indices) available for integration.

The card may be configured either using the BACset tool available from <http://ksa.carel.com>, or by accessing the card directly using a crossover cable. Note: to access the card via direct connection, the connection must be set up so that the computer's IP address is 172.16.XX.XX (XX.XX can be anything other than 0.1) with subnet mask 255.255.0.0.

### 7.2 pCONet (RS-485 Connection for BACnet)

The pCONet serial card may be provided with your unit in order to allow connection to a BMS network (refer to your submittal documents). It allows connections via:

- BACnet/MSTP: Provides access to the controller for supervision software for using the BACnet/MSTP protocol.
- BACnet/IP: Provides access to the controller for the supervision software using the BACnet/IP protocol.

The serial card is installed at the factory; refer to the brochure included with the card if purchased separately at a later date.

By default, the card is set-up with the following parameters:

<b>Parameter</b>	<b>Min</b>	<b>Max</b>	<b>Factory</b>
Device Instance	0	4194303	77000
Station Address	0	127	0
MaxMaster	0	127	127
Max Info Frames	0	255	20
Baud Rate	9600-19200-38400-76800		38400

To configure these values, an RS-485 interface is required. A USB to RS-485 adapter is available from Carel (CVSTDUMOR0), an integral RS-485 pc card, or a serial to RS-485 adapter can be used. Download the BACset tool from <http://ksa.carel.com>. Follow the directions included with the download to set the appropriate COM port for configuration.

### 7.3 Points Lists

Description	BACnet	Modbus	Carel		R/W	Notes
	BV=Binary Value AV=Analog Value	Register	D=Digital A=Analog I=Integer	Index	R=Read Only W=Writable	
<u>Active Modes</u>						
Cooling Status	AV1015		I	15	R	0=Off, 1-4=Qty Stages 5=Cool
Heating Status	AV1051		I	51	R	0=Off, 1-4=Qty Stages, 5=heat, 6=reheat
<u>Alarms (0=Normal, 1=Alarm)</u>						
Airflow Switch	BV137		D	137	R	
Compressor 1 High Pressure	BV57		D	57	R	
Compressor 2 High Pressure	BV60		D	60	R	
Compressor 1 Low Pressure	BV149		D	149	R	
Compressor 2 Low Pressure	BV148		D	148	R	
Dirty Filter	BV111		D	111	R	
Drain Pan	BV101		D	101	R	
Pump Failure	BV144		D	144	R	
Smoke Detector	BV167		D	167	R	
<u>Enables (0=Not Enabled, 1=Enabled)</u>						
Compressor 1 Enable	BV56		D	56	W	
Compressor 2 Enable	BV59		D	59	W	
Compressor Rotation	BV54		D	54	W	Enables First On/First Off Rotation
Dehumidification Mode Enable	BV81		D	81	W	
System Enable	BV170		D	170	W	System On/Off
Humidifier Enable	BV130		D	130	W	
Heater 1 Enable	BV121		D	121	W	
Heater 2 Enable	BV123		D	123	W	

Description	BACnet	Modbus	Carel		R/W	Notes
	BV=Binary Value AV=Analog Value	Register	D=Digital A=Analog I=Integer	Index	R=Read Only W=Writable	
<u>Sensor Values</u>						
Return/Inlet Temperature	AV2		A	2	R	Refer to Wiring Diagram for installed sensors
Dewpoint Temperature	AV90		A	90	R	Refer to Wiring Diagram for installed sensors
Room Temperature	AV14		A	14	R	Refer to Wiring Diagram for installed sensors
Return/Inlet Humidity	AV19		A	19	R	Refer to Wiring Diagram for installed sensors
<u>Setpoints</u>						
Dew point	AV91		A	91	W	OA Unit
Cooling	AV86		A	86	W	OA Unit
Humidify	AV23		A	23	W	OA Unit
Heat Area 1	AV92		A	92	W	OA Unit
HG ReHeat	AV96		A	96	W	OA Unit
Temperature	AV86		A	86	W	Standard Unit
Humidify	AV23		A	23	W	Standard Unit
<u>Statuses (0=Off, 1=On)</u>						
Compressor 1 Status	BV50		D	54	R	
Compressor 2 Status	BV53		D	53	R	
Fan Status	BV33		D	33	R	
Schedule Override Status	BV158		D	158	R	
Occupied Mode (Schedule)	BV52		D	52	R	0=Unoccupied, 1=Occupied
Heater 1 Status	BV66		D	66	R	
Heater 2 Status	BV88		D	66	R	
Remote On/Off	BV138		D	138	R	0=On, 1=Off by Remote Switch
<u>System Demands</u>						
Cooling Demand	AV3		A	3	R	
Heating Demand	AV4		A	4	R	
Humidify Demand	AV1		A	1	R	
Dehumidification Demand	AV5		A	5	R	

## 8 ALARMS & TROUBLESHOOTING

This guide is provided as a supplement to the unit's IOM manual, other supplemental manuals, and wiring diagram. Prior to troubleshooting any alarms via the controller, verify that there is not a mechanical or electrical cause for an alarm. System alarms and lockouts are designed to protect system components from conditions that may cause serious damage - unacceptable pressure conditions for compressor operation, for example.

Problem	Possible Cause	Checks & Solutions
No Power to Display	Cord not attached	Verify that the 6-pin cord is firmly attached to the control board and the display terminal
	No power to unit	Refer to unit IOM manual and troubleshoot power issues.
	Fuse on control board is blown	Check fuse at board »If blown: replace fuse »If not blown: contact manufacturer
Display is blank	Display address is incorrect	Refer to section 2.5.1 to change terminal address (no pLan) or section 6 (with pLan).
Unit off by keypad	Unit off by alarm	Verify no recent or active alarms. »If active alarm: troubleshoot alarm prior to re-enabling the unit. Refer to section 3.3 to re-enable unit after clearing alarm.
	Unit off by manual control	Refer to section 3.3 to re-enable unit.
No Cooling, Heating, or Humidification	No call for cooling	Verify setpoints and adjust as required.
	System/components off following alarm	Verify all system alarms have been addressed. After addressing any alarms, refer to section 3.3 to re-enable system/components.