

## Reference Guide for the Network Interface Controller

Please read and save these instructions. Read carefully before attempting to operate or maintain the product described. Protect yourself and others by observing all safety practices. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.







**BMS v1.10**
**Version Date: 5/1/2017**


### Introduction

#### Program Features

The network interface controller is a device that acts as a communication link between the BMS (Building Management System) and the unit. The network interface controller will transform the communication into an action within the unit and will provide monitoring status of various functions and temperatures. The controller has the ability to communicate with a BMS through protocols such as LonWorks®, BACnet® MSTP, BACnet® IP or Modbus. See Points List at end of document for a complete list of BMS points.

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## Input/Output Points

Standard Input/Output points are Supply Air Temp, Outside Air Temp and Fan Proving Status. The following are optional I/O points. See Network Interface unit diagram to see job specific I/O.

Input Points (Max 5)	Output Points Digital (Max 5)	Output Points Analog (Max 3)
Cold Coil Temp	Call for Heat Stage 1	Heat Output
Return Air Temp	Call for Cool Stage 1	Cool Output
Exhaust Discharge Temp	Call for Cool Stage 2	Supply VFD
Outdoor Air After Wheel Temp	Occupied Unoccupied	Exhaust VFD
Dirty Filter Status	Remote Exhaust Fan	Energy Wheel VFD
Rotation Status	Call for HGRH	Return Air Damper
CO <sub>2</sub> Sensor	Alarm	User Defined
Supply VFD Monitor Signal	User Defined	
Exhaust VFD Monitor Signal		
User Defined		
Room Temp		
Frost Status		
Econ Status		

### Alarms

The network interface controller will monitor the unit conditions for alarm conditions. Upon detecting an alarm, the controller will record the alarm description, time, date and available temperatures for user review. An optional digital output is available for remote alarm indication. Alarms are also communicated via BMS.

- **Temperature Sensor Alarm:** Network interface controller will send an alarm in the case of a failed air temperature sensor.
- **Supply Air Low Limit:** If the supply air temperature drops below the supply air low limit (35°F), the network interface controller can do one of the following based on user setup.
  - Alarm Only: Sends alarm via BMS.
  - Alarm and Open NO3: Sends an alarm and turns the unit run command off, even if BMS run command is active.
  - Disable: Disables the supply air low limit function.

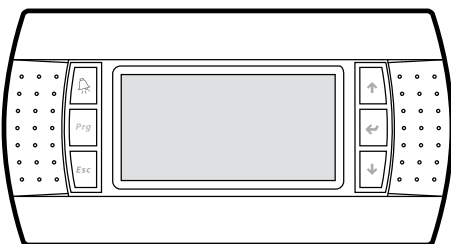
### Display Use

The network interface controller is located in the unit control panel. The face of the controller has six keys, allowing the user to view unit conditions and alter parameters. The network interface controller is pre-programmed with easy-to-use menus.



### Remote Display Panel (Optional)

A display panel allows for remote monitoring and adjustment of parameters, allowing ease of control access without going outdoors.



A remote mounted display is also available, which connects via the J4 port. A six-wire patch cable is needed.



Keypad Description		
	Alarm	Button will blink red, indicating an alarm condition. Press to review current alarms. To review previous alarms, access the DATA LOGGER through the main menu.
	Down Arrow	The arrow keys allow the user to scroll through different screens and adjust parameters.
	Up Arrow	
	Enter	A. In screens with adjustable parameters, pressing the Enter key moves the cursor from the upper left corner of the screen to the parameter. The arrow keys can then be used to adjust the parameter. B. To move to the next parameter on the same screen, press the Enter button. C. To save the change, press the Enter button until the cursor moves back to the upper left corner of the screen.
	Escape	Allows the user to exit the current menu, jumping to the Main Menu.
	Program	Pressing the Prg (Program) button allows the user to enter the Main Program Menu. See below for Main Program Menu description.

### Example of Parameter Adjustment

**Supply air low limit**

Alarm when supply is below: 35.0° F

Alarm delay: 300s

The cursor always begins in the upper left corner of the display and will be blinking. Press the key to move the cursor down for parameter adjustment.

**Supply air low limit**

Alarm when supply is below: 32.0° F

Alarm delay: 300s

Once the cursor has reached the desired parameter, press the keys to adjust the value.

**Supply air low limit**

Alarm when supply is below: 32.0° F

Alarm delay: 300s

When satisfied with the adjustment, press the key to save the parameter. When finished, make certain the cursor is in the upper left corner. If the cursor is not in the upper left corner, the changes will not be saved. The cursor must be in the upper left corner to enable screen advancement.

### Examples of Alarms

If an alarm occurs, the status line will state !PRESS ALARM BUTTON! and the or button will glow red on the controller and the remote display (if installed).

**Alarms**

Press DOWN to review current alarm(s).

Press ESC to exit.

Press ALARM to reset.

To view alarm, press the or button once. This will display the most recent alarm. Press the or button again to reset the alarm. If the alarm cannot be cleared, the cause of the alarm has not been fixed. Press the buttons to view any additional occurring alarms.

B3-Outdoor Temp  
Sensor B03 Failure

This is an example of an outdoor air sensor failure.

**Alarms**

No active alarm

Press ENTER to DATA LOGGER



This screen appears if there are no active alarms. To view all saved alarms, press the button to enter the DATA LOGGER. For more information, see the Data Logger menu.



## List of Possible Alarms

<b>Temperature Sensor Failure</b>	Failure of temperature sensor.	Alarm only
<b>System has exceeded the set number of run hours</b>	The unit has been operating for a period longer than the maintenance set point.	Alarm only
<b>Supply temperature low limit alarm</b>	Indicates a supply air temperature lower than the supply low limit set point.	Alarm & Open NO3 or Alarm Only
<b>pCOe Offline</b>	Indicates communication with pCOe auxiliary I/O has failed.	Alarm only
<b>pCOe - Analog input probe on channel # disconnected or broken</b>	Indicates an analog probe failure on the pCOe. Check integrity of auxiliary I/O analog probes.	Alarm only

## Main Menu Overview

The remote interface controller will revert to a default main menu loop. This loop includes several screens to view the operating conditions of the unit. Scroll through the menu screens by using the   keys. Screens with a dashed line border are dependent upon an optional accessory and may not always appear.

TIME	DATE	UNIT##
 ENGINEERED RESTAURANT SYSTEMS		
v1.10 AXXXXX00XX100b		
STATUS LINE		

**THE INITIAL MENU SCREEN DISPLAYS THE PROGRAM VERSION, UNIT CODE AND STATUS LINE. THE STATUS LINE WILL DISPLAY “!MANUAL OVERRIDE!” IF THE OVERRIDE SCREEN IS ACTIVE OR “!PRESS ALARM BUTTON!” IF THERE IS AN ALARM CONDITION.**

TIME	DATE	UNIT##
Inputs		
B1-		
B2-		
B3-OutsideAir: 80.0°F		
B4-SupplyAir: 65.0°F		
B5-		
B6-		

### INPUTS

*This screen displays real-time conditions from the input sensors located in the unit.*

TIME	DATE	UNIT##
Digital Inputs		
ID1-Fan Proving: Open		
ID2-DirtyFilter: Open		

### DIGITAL INPUTS

*This screen displays real-time digital input open/closed status from the selected components.*

TIME	DATE	UNIT##
Analog Ouput		
Y2-VFD Supply: 100%		
Y3-		
Y4-		

### ANALOG OUTPUTS

*This screen displays real-time analog output signals to the selected components.*

TIME	DATE	UNIT##
Digital Output		
NO1-		
NO2-		
NO3- Unit OnOff: Open		
NO4-		
NO5-		
NO6-		

### DIGITAL OUPUTS


*This screen displays real-time digital output open/closed status.*



Press  or  to enter menus.

**Main Menu**


- Main Status
- Inputs
- Digital Inputs
- Analog Output
- Digital Output Status

 **Setpoint**


- Supply Air Low Limit
- CO2 Sensor Setup

 **Clock**


- Clock
- Daylight Savings Time

 **Input/Output**


- Analog Input
- Digital Input
- Relay Output
- Analog Output

 **Data Logger**

- Alarm Description

 **Service**


- Information**
  - Information
- Overrides**
  - Service Password
  - Testing Overrides
- BMS Config**
  - Service Password
  - BMS Configuration
  - Modbus Setup
  - MSTP Setup
  - TCP/IP Setup
  - BACnet ReadWrite
- Service Setting**
  - Service Password
  - Working hour set
  - Maintenance Hours
  - Probe Adjustment
    - Analog Inputs
    - Probe Adjust
  - Password/Defaults
    - User Default
    - User Default settings

 **Manufacturer**

- Configuration**
  - Unit Code
  - Expansion I/O
  - Controller pLAN Setup
- I/O Configuration**
  - Analog Input
  - Digital Input
  - Relay Output
  - Analog Output Config
- Factory Setting**
  - Factory Setup
  - Temperature Scale
  - Display Buzzer
- Initialization**
  - Factory Settings
  - New Password
  - Initialization



## Menus

The controller is equipped with several menus to help guide users with altering program parameters. The following menus can be accessed by pressing the  or  key. To enter the desired menu, press the  key.

### A. Setpoint

The **Setpoint** menu allows the user to view and adjust temperature related parameters.

#### Supply air low limit

Alarm when supply is below	35.0°F
Alarm delay:	300s
Alarm Function:	Alarm Only

#### **THIS SCREEN DISPLAYS THE LOW SUPPLY AIR TEMPERATURE LIMIT.**

If the unit supply air temperature falls below Supply Air Low Limit for a period of Alarm Delay, the unit will do one of the following based on the Alarm Function.

- **Alarm Only:** Sends alarm via BMS.
- **Alarm and Open NO3:** Sends an alarm and opens NO3 (Unit Start/Stop command) even if the BMS start/stop command is active.
- **Disable:** Disables the supply air low limit function.

The purpose of the supply low limit is to protect the building and contents from cold supply air. It is NOT designed to protect the air handling unit.

If the unit does not have cold or hot water coils, it should not need additional protection from freezing. If the unit does have cold or hot water coils, field provided coil freeze protection may be necessary.

#### CO2 Sensor Setup

CO2 Output	2-10VDC
Scaling:	
2vdc	500 ppm
10vdc	1500 ppm

#### **THIS SCREEN DISPLAYS CO<sub>2</sub> SENSOR SETUP.**

This screen only appears if the unit is equipped with a CO<sub>2</sub> sensor.

This screen is used to match the settings of the CO<sub>2</sub> sensor to the network interface controller.

### B. Clock

The **Clock** menu allows the user to view and alter the time and date.

#### Set Date & Time

Day:	Monday
Date:	01/31/10
Hour:	15:30

The Clock screen allows the user to adjust the time and date.

#### Clock

Daylight Savings Time	
DST:	ENABLE
Transition Time:	60min
Start:	SECOND SUNDAY in MARCH at 2:00
End:	FIRST SUNDAY in NOVEMBER at 2:00

#### **THIS SCREEN ALLOWS THE USER TO MODIFY THE DAYLIGHT SAVINGS TIME FUNCTION.**

This internal clock is set by default to adjust for daylight savings time. On this screen the user can enable, disable, or change when the unit compensates for daylight savings time.

### C. Input/Output

The **Input/Output** menu allows the user to quickly view the status of the controller inputs and outputs.

#### Analog Input

B4-Supply Air Temp	
Input B04:	70.0°F

To manually control I/O values, go to the **Service** menu > **Overrides**.

Similar screens appear for all controller inputs and outputs.



## D. Data Logger

The **Data Logger** menu allows the user to view past alarms.

13:21:04	10/05/10
OA Sensor	
Outside Air T:	-623.3
Supply Air T:	70.0

**THIS SCREEN IS AN EXAMPLE OF A RECORDED ALARM.**

The unit conditions are displayed for past alarm events. The date, time, temperatures and unit status are recorded.

To clear recorded alarms, press  or  and  or  simultaneously.

## E. Service

The **Service** menu allows the user to access several sub-menus regarding controller information, controller overrides, operating hours, BMS configuration, I/O manual management and Probe Adjustment. The user can also change the default Service Password (Default=1000) by accessing the **Service Settings** sub-menu. By accessing the **BMS Config** sub-menu, the user can adjust BMS protocol settings (BACnet, LonWorks, Modbus).

### E. Service

#### a. Information

**ENTERING THE INFORMATION SUB-MENU WILL DISPLAY INFORMATION ABOUT THE CONTROLLER AND THE PROGRAM LOADED ON THE CONTROLLER.**

#### Information

ACCUREX  
Code:AXXXXX00XX100b  
Ver.: 1.10 05/1/17  
Manual: 476811  
Bios: 5.18 11/17/10  
Boot: 4.07 12/18/11

**Code:** Controller setup code determines functionality of program. When contacting the factory, please reference this code.

**Manual:** Reference this Installation and Operation Manual, available at [www.greenheck.com](http://www.greenheck.com)

### E. Service

#### b. Overrides

The **Overrides** menu is for start-up, commissioning and troubleshooting. This menu allows the user to override the control loops. If further control is required, the user can also manually control the controller inputs and outputs. To access the **Overrides** sub-menu, enter the service password (Default=1000).

#### Testing Overrides

To resume normal operation, cycle unit power.

To manually override an output, in each respective screen, change the override from No to Yes, then change the Position to open or closed or adjust the vdc output setting.

To resume normal operation after overriding the controller, simply cycle power to the unit.

This menu allows the user to manually control the outputs of the controller. The user can manually control the analog outputs and digital outputs. **EXTREME CAUTION** should be used when manually controlling the outputs and should only be used as a troubleshooting feature. If the controller is powered down, overrides are reset to off. Therefore, if using this troubleshooting feature, the best way to clear manually input values is to power down the controller.

#### Testing Overrides

Override: No Position  
NO1-  
NO2-  
NO3- Unit On/Off: Open  
NO4-  
NO5-  
NO6-

**THIS SCREEN ALLOWS THE USER TO OVERRIDE THE DIGITAL OUTPUTS.**

*This screen only appears if the unit is equipped with a digital output option.*

#### Testing Overrides

Override: No  
Y2- VFD Supply: 10.0vdc  
Y3-  
Y4-

**THIS SCREEN ALLOWS THE USER TO OVERRIDE THE ANALOG OUTPUTS.**

*This screen only appears if the unit is equipped with an analog output option.*





## E. Service

### c. BMS Config



The **BMS Config** menu allows the user to view and alter BMS protocol settings. If the BMS protocol is BACnet or Modbus, additional screens allow further configuration. See below for details. To access the BMS Config sub-menu, enter the service password (Default=1000).

#### BMS Configuration

Protocol: BACnet MSTP  
BACnet Plugin? YES

**THIS SCREEN ALLOWS THE USER TO SELECT THE BMS PROTOCOL. ALL BMS PROTOCOLS REQUIRE A COMMUNICATIONS CARD INSTALLED IN THE SERIAL CARD PORT, LOCATED ON THE FACE OF THE CONTROLLER.**

If the protocol is BACnet MSTP or BACnet IP/Eth, the user can change common BACnet parameters via the controller. The BACnet Plugin must be set to YES.

#### MODBUS SETUP

Address: 1  
Baudrate 9600

**THIS SCREEN ALLOWS THE USER TO ADJUST MODBUS PARAMETERS.**

*This screen only appears if the selected BMS protocol is set to Modbus.*

The address is the Modbus address of the card installed in the SERIAL CARD port located on the face of the controller. (Factory Default Address = 1). The Baud Rate should be set to the BMS baud rate. (Factory Default Baud Rate is 9600).

#### MSTP SETUP

Instance: 77000  
Baudrate 38400  
MAC Addr: 0  
MaxMasters: 127  
MaxInfoFrames: 20

**THIS SCREEN ALLOWS THE USER TO ADJUST BACNET MSTP PARAMETERS.**

*This screen only appears if the selected BMS protocol is set to BACnet MSTP and BACnet Plugin = YES.*

If a BACnet MSTP card has been installed, the default parameters can be changed via the controller display. Factory settings are shown in the screen to the left.

#### BACnet Read/Write

Function: Read  
Update? Yes  
\*Cycle unit power to confirm write command.

To view current parameters:

1. Power on controller and allow several minutes to initialize.
2. Go to **BMS Config** menu and view BACnet Read/Write screen.
3. Change *Function* to *Read* and *Update?* to *YES*.

Current BACnet MSTP parameters should now be displayed in the BACnet MSTP SETUP screen. If all values appear to be zeros, consult the factory. (Make sure you have allowed several minutes for the controller to initialize).  
*\*Values may appear to be zero prior to setting the Function to READ.*

To change BACnet MSTP parameters:

1. Power on controller and allow several minutes to initialize.
2. Go to **BMS Config** menu and view MSTP SETUP screen.
3. Move cursor to desired parameter by pressing the buttons. Press to select the parameter to change. Press the buttons to adjust the parameter. Press to save adjusted value.
4. Once desired parameters have been entered, go to BACnet Read/Write screen. Change *Function* to *Write* and *Update?* to *YES*.
5. Reboot the controller by cycling power to the unit. Allow several minutes for the controller to initialize.
6. View MSTP parameters. If changed values did not save, contact the factory.







TCP/IP SETUP	
Instance:	77000
IP set by:	DHCP
IP:	128.2.104.134
Subnet:	255.255.000.000
Gateway:	128.2.0.12


TCP/IP SETUP	
DNS 1:	193.168.001.001
DNS 2:	193.168.001.001
Type:	IP

BACnet Read/Write	
Function:	Read
Update?	Yes
*Cycle unit power to confirm write command.	

E.  Service	
d. Service Settings	
a. Working hour set	
b. Probe adjustment	
c. Password/Defaults	

MAINTENANCE HOURS	
SYSTEM	
Run hours:	0000h
Set Point:	0000h
Reset to Zero?	No

Analog Input	
Outside Temperature Input B3	
Offset:	0.0°F
Value:	70.5°F

User Default	
	
Insert new service password (PW1):	1000

**THIS SCREEN ALLOWS THE USER TO ADJUST BACNET IP PARAMETERS.**

This screen only appears if the selected BMS protocol is set to BACnet IP/Eth and BACnet Plugin = YES.

If a BACnet IP card has been installed, the default parameters can be changed via the controller display. **The card is in DHCP mode from the factory.** Once communication is established, the user can enter static IP parameters.







To view current parameters:

1. Power on controller and allow several minutes to initialize.
2. Go to **BMS Config** menu and view BACnet Read/Write screen.
3. Change *Function* to *Read* and *Update?* to *YES*.

Current BACnet IP parameters should now be displayed in the BACnet TCP/IP SETUP screen. If all values appear to be zeros, consult the factory. (Make sure you have allowed several minutes for the controller to initialize).

\*Values may appear to be zero prior to setting the *Function* to *READ*.

To change BACnet TCP/IP parameters:

1. Power on the controller and allow several minutes to initialize.
2. Go to **BMS Config** menu and view TCP/IP SETUP screen.
3. Move cursor to desired parameter by pressing the   buttons. Press  to select the parameter to change. Press the   buttons to adjust the parameter. Press  to save adjusted value.
4. Once desired parameters have been entered, go to BACnet Read/Write screen. Change *Function* to *Write* and *Update?* to *YES*.
5. Reboot the controller by cycling power to the unit. Allow several minutes for the controller to initialize.
6. View TCP/IP parameters. If changed values did not save, contact the factory.

The **Service Settings** menu allows the user to change the default Service Password (1000), save and restore default parameters, and adjust probe values.

**THIS SCREEN ALLOWS THE USER TO VIEW UNIT RUN HOURS, AND ALTER SET POINTS FOR MAINTENANCE.**

Run hours: The amount of time in hours that the unit has been powered.

Set Point: The amount of running time in hours before a maintenance alarm should occur.


Reset to Zero: Reset the measured amount of run time.

**THE PROBE ADJUSTMENT MENU ALLOWS THE USER TO CALIBRATE SENSOR PROBES WITH AN OFFSET VALUE.**

Similar screens are available for remaining sensor probes.

**THIS SCREEN ALLOWS THE USER TO CHANGE THE SERVICE LEVEL PASSWORD (PW1)**



User Default Settings	
	
Save?	No
Restore?	No

**THIS SCREEN ALLOWS THE USER TO SAVE AND RESTORE THE DEFAULT PARAMETERS STORED IN MEMORY.**

If the user would like to save their settings, move the cursor to the SAVE position and change to YES. This will save all of the current parameters into memory as Service Settings. If the user would like to restore to these values at some point in the future, moving the cursor to the RESTORE position, and selecting YES will restore the controller to the user saved defaults.

## F. Manufacturer

### a. Configuration

Configuration menu allows the user to change the setup code for the unit, enable Scheduling, Holidays, expansion I/O and change Field Card settings. Users are welcomed to enable Scheduling and Holidays. However, code changes and expansion I/O enabling are to be done under factory advice only!

Unit Code	
Select DDC configuration code here.	
Code:	AXXXXX000XX101b

**THIS SCREEN DISPLAYS AND ALLOWS ADJUSTMENT OF THE UNIT CODE.**

This code is set from the factory to operate the components selected with the unit. When troubleshooting, refer to the wiring diagram sent with the unit (located on the control center door) to verify the Unit Code is correct. The code will be listed on the wiring diagram.

Configuration	
Modbus settings	
Baudrate:	19200
Stop bit:	2
Parity mode:	None
Timeout:	300ms

**THIS SCREEN ALLOWS THE USER TO ALTER THE FIELD CARD MODBUS SETTINGS.**

The FIELD CARD is used for peripheral device control (pCOe Expansion Module).

The Modbus settings should only be changed with factory guidance.

Unit Expansion I/O	
Enable Expansion:	No

**THIS SCREEN ALLOWS THE USER TO ENABLE ADDITIONAL I/O POINTS.**

*Unit I/O expansion requires the installation of a pCOe and Field Card. Please contact the factory for more information.*

Enabling the I/O expansion allows the user to add the following points for monitoring:

- Four analog inputs (0/1vdc, 0/5vdc, 0/20mA, 4/20mA, NTC Temp)
- One analog output (0/10vdc)
- Four digital inputs
- Four digital outputs

The additional I/O points available on the pCOe expansion module allow the user to monitor and control the additional points over the BMS and user display.

Controller pLAN Setup	
Current pLAN Addr:	1
New pLAN Addr:	1

**THIS SCREEN ALLOWS THE USER TO VIEW AND CHANGE THE CONTROLLER pLAN ADDRESS.**

A pLAN (pCO Local Area Network) is a Carel proprietary local area network, allowing the user to connect multiple controllers to one remote display panel. Each controller on a pLAN must have a unique address.

This address is only applicable for units connected on a pLAN. For BACnet, LonWorks or Modbus parameters, go to **Service > BMS Config**.



## F. Manufacturer

### b. I/O Configuration

Analog Input	
Outside Temperature Channel: B3	Normal
Type:	NTC
Offset:	0.0°F
Value:	70.5°F

Alarm Time Delay	
Outside Temperature Input B03:	72.0°F
Out of Range Alarm	
Power Delay:	30s
Run Delay:	30s

Digital Input	
ID1- Fan Proving	
Channel:	ID1
Action:	CLOSED
Delay	0s
	CLOSED

Relay Output	
NO3- Unit ON	
Channel:	3
Status:	OFF

Analog Output Config	
Y2-Heat Output	
Channel:	Y2
Action:	DIRECT
Minimum:	0.0vdc
Maximum:	10.0vdc

The **I/O Configuration** menu allows adjustment of all controller inputs and outputs. This menu is similar to the **Probe Adjustment** menu, except that it additionally allows adjustment of the factory default 'normal' states of the digital inputs and the direction of the analog outputs. Additionally, it allows adjustment of the physical location of each I/O. **ADJUSTMENT OF I/O PHYSICAL LOCATION MUST ONLY BE DONE UNDER FACTORY GUIDANCE! IMPROPER ADJUSTMENT MAY RESULT IN SYSTEM DAMAGE!**

This is an example of an analog input configuration screen.

In the I/O configuration screens, the user can alter the physical location and type of each point.

Similar configuration screens appear for the remaining I/O.

## F. Manufacturer

### c. Factory Settings

Temperature Scale	
Select:	Fahrenheit

Display Buzzer	
Select:	Disable

The **Factory Settings** menu allows adjustment of parameters that are critical for proper unit operation. Adjustment of these parameters is only recommended with factory guidance. To access the **Factory Settings** menu, enter the manufacturer password (Default=1000).

***THIS SCREEN ALLOWS THE USER TO ADJUST WHAT TEMPERATURE UNITS THE CONTROLLER SHOULD DISPLAY AND WHETHER THE DISPLAY BUZZER SHOULD BE ENABLED OR DISABLED.***


The temperature unit of measurement can either be Fahrenheit or Celsius. If using Celsius, the user will need to manually convert the factory default parameters in the **Factory Settings** menu.

The display buzzer is only applicable when a remote interface panel is attached to the controller. If an alarm were to occur, the remote display panel would begin buzzing loudly (if the buzzer was enabled) and would show the alarm status.

The **Initialization Menu** allows the user to save and restore the controllers default parameters. The controller can be restored with either the Manufacturer's default parameters from shipment, or an unconfigured factory default.

## F. Manufacturer

### d. Initialization

Factory Settings	
	
Save?	No
Restore?	No

***THIS SCREEN ALLOWS THE USER TO SAVE AND RESTORE THE FACTORY DEFAULT PARAMETERS STORED IN MEMORY.***

The **Factory Settings** include the Factory default parameters and the unit setup code. If the user would like to restore to these parameters, move the cursor to the Restore position and change to YES.

New Password	
	
Insert new manufacturer password (PW2):	0000

***THIS SCREEN ALLOWS THE USER TO CHANGE THE MANUFACTURER PASSWORD (PW2)***

Initialization	
DEFAULT INSTALLATION	
Erase user settings and install global default values:	No

***THIS SCREEN ALLOWS THE USER TO RESTORE BACK TO THE ORIGINAL FACTORY DEFAULT PARAMETERS.***

Restoring to the original default parameters will result in a non-customized controller. The user should not restore to these settings unless instructed by the factory.



## Points List • LonWorks®

Type	NV_Index	Name NV	Type NV	Read (Unit to BMS) Write (BMS to Unit)	Description
Analog	23	nvoOutsideTemp	105	Read	Outdoor Air Temp (###.##°F)
Analog	24	nvoSupplyAirTemp	105	Read	Supply Air Temp (###.##°F)
Analog	25	nvoColdCoilDisch	105	Read	Cold Coil Temp (###.##°F)
Analog	26	nvoReturnTemp	105	Read	Return AirTemp (###.##°F)
Analog	27	nvoExhDishTemp	105	Read	Exhaust Discharge Temp (###.##°F)
Analog	28	nvoAAWTemp	105	Read	Outdoor Air After Wheel Temp (###.##°F)
Analog	29	nvoRoomTemp	105	Read	Room Temp (###.##°F)
Analog	3	nviHeatOutput	81	Write	Heater output (0-100%)
Analog	4	nviCoolOutput	81	Write	Cooling output (0-100%)
Analog	5	nviVFDSupply	81	Write	VFD Supply Fan Output (0-100%)
Analog	6	nviVFDExhaust	81	Write	VFD Exhaust Fan Output (0-100%)
Analog	7	nviVFDWheel	81	Write	VFD Wheel Output (0-100%)
Analog	8	nviRADamperOut	81	Write	RA Damper Output (0-100%)
Analog	30	nvoOutdoorRH	81	Read	Outdoor RH
Analog	31	nvoVFDSupSignal	44	Read	Supply VFD Monitor Signal (Vdc)
Analog	32	nvoVFDExhSignal	44	Read	Exhaust VFD Monitor Signal (Vdc)
Analog	33	nvoB1User	9	Read	User Define B1 Analog Input
Analog	34	nvoB2User	9	Read	User Define B2 Analog Input
Analog	35	nvoB5UserAI	9	Read	User Define B5 Analog Input
Analog	36	nvoB6UserAI	9	Read	User Define B6 Analog Input
Analog	10	nviY4UserOut	81	Write	User Define Y4 Analog Output
Integer	41	nvoCO2Output	29	Read	CO2 Levels (ppm)
<b>pCOe Analog Variables</b>					
Analog	37	nvoAux_AI1	9	Read	pCOe Analog Input Probe Value 1
Analog	38	nvoAux_AI2	9	Read	pCOe Analog Input Probe Value 2
Analog	39	nvoAux_AI3	9	Read	pCOe Analog Input Probe Value 3
Analog	40	nvoAux_AI4	9	Read	pCOe Analog Input Probe Value 4
Analog	9	nviAux_AO1	81	Write	pCOe Auxillary Analog Out (0-10V)
<b>Digital Variables</b>					
Digital	11	nviUnitOnOff	95	Write	Unit start/stop command
Digital	12	nviResetAlarms	95	Write	Reset alarms command
Digital	13	nviStg1Cooling	95	Write	Cooling Stage 1 Command
Digital	14	nviStg2Cooling	95	Write	Cooling Stage 2 Command
Digital	15	nviStg1Heat	95	Write	Heating Stage 1 Command
Digital	16	nviOccUnocc	95	Write	Occupied/unoccupied Command
Digital	17	nviRemoteExhFan	95	Write	Remote Exhaust Fan Command
Digital	18	nviHGRH	95	Write	Hot Gas Reheat Command
Digital	42	nvoGlobalAlarm	95	Read	Global alarm indication (active when there is at least one alarm)
Digital	43	nvoFrostStatus	95	Read	Frost Status
Digital	44	nvoEconStatus	95	Read	Econ Status
Digital	45	nvoFanStatus	95	Read	Fan Proving status
Digital	46	nvoFilterStatus	95	Read	Dirty filter status
Digital	47	nvoWheelStatus	95	Read	Wheel status-Not Ok=Wheel not running when commanded on
Digital	48	nvoAlarm	83		
Digital	bit0	nvoSupplyTempAlm		Read	Supply air temperature low limit alarm
Digital	bit1	nvoB1Alarm		Read	Sensor B1 out of range
Digital	bit2	nvoB2Alarm		Read	Sensor B2 out of range
Digital	bit3	nvoB3Alarm		Read	Sensor B3 out of range
Digital	bit4	nvoB4Alarm		Read	Sensor B4 out of range
Digital	bit5	nvoB5Alarm		Read	Sensor B5 out of range
Digital	bit6	nvoB6Alarm		Read	Sensor B6 out of range
Digital	bit7	nvoB5UserAlarm		Read	B5 User Input Alarm
Digital	bit8	nvoB6UserAlarm		Read	B6 User Input Alarm
Digital	49	nvoB5UserDI	95	Read	User Define B5 Digital Input
Digital	50	nvoB6UserDI	95	Read	User Define B6 Digital Input
Digital	19	nviN01UserDO	95	Write	User Define N01 Digital Output
Digital	20	nviN02UserDO	95	Write	User Define N02 Digital Output
Digital	51	nvoID2UserDI	95	Read	User Define ID2 Digital Input
<b>pCOe Digital Variables</b>					
Digital	52	nvoAux_DI1	95	Read	pCOe Auxillary Digital Input1
Digital	53	nvoAux_DI2	95	Read	pCOe Auxillary Digital Input2
Digital	54	nvoAux_DI3	95	Read	pCOe Auxillary Digital Input3
Digital	55	nvoAux_DI4	95	Read	pCOe Auxillary Digital Input4
Digital	21	nviAux_DO1	95	Read/Write	pCOe Auxillary Digital Output1
Digital	22	nviAux_DO2	95	Read/Write	pCOe Auxillary Digital Output2



## Points List • Modbus/BACnet®

Type	Modbus-RTU/TCP/IP Network Address: 1		BACnet IP/Ethernet BACnet MSTP Device Instance: 77000(default)			Read Write	Description
	Address	Address	Name	Units			
Analog	40002	1	Outside_Air_Temp	°F	R	Outdoor Air Temp (###.##°F)	
Analog	40003	2	Supply_Air_Temp	°F	R	Supply Air Temp (###.##°F)	
Analog	40004	3	Cold_Coil_Leaving_Temp	°F	R	Cold Coil Temp (###.##°F)	
Analog	40005	4	Return_Air_Temp	°F	R	Return AirTemp (###.##°F)	
Analog	40006	5	Exhaust_Discharge_Temp	°F	R	Exhaust Discharge Temp (###.##°F)	
Analog	40007	6	OA_After_Wheel_Temp	°F	R	Outdoor Air After Wheel Temp (###.##°F)	
Analog	40008	7	Room_Temp	°F	R	Room Temp (###.##°F)	
Analog	40011	10	Heat_Output	percent	R/W	Heater output (0-100%)	
Analog	40012	11	Cool_Output	percent	R/W	Cooling output (0-100%)	
Analog	40013	12	VFD_Supply_Output	percent	R/W	VFD Supply Fan Output (0-100%)	
Analog	40014	13	VFD_Exhaust_Output	percent	R/W	VFD Exhaust Fan Output (0-100%)	
Analog	40015	14	VFD_Wheel_Output	percent	R/W	VFD Wheel Output (0-100%)	
Analog	40016	15	RA_Damper_Output	percent	R/W	Return Air Damper Output (0-100%)	
Analog	40017	16	Outdoor RH	percent relative humidity	R	Outdoor RH	
Analog	40018	17	Supply_VFD_Mointor	volts	R	Supply VFD Monitor Signal (Vdc)	
Analog	40019	18	Exhaust_VFD_Monitor	volts	R	Exhaust VFD Monitor Signal (Vdc)	
Analog	40027	26	User_Define_B1_Analog_Input	no-units	R	User Define B1 Analog Input	
Analog	40028	27	User_Define_B2_Analog_Input	no-units	R	User Define B2 Analog Input	
Analog	40029	28	User_Define_B5_Analog_Input	no-units	R	User Define B5 Analog Input	
Analog	40030	29	User_Define_B6_Analog_Input	no-units	R	User Define B6 Analog Input	
Analog	40031	30	User_Define_Y4_Analog_Output	no-units	R/W	User Define Y4 Analog Output	
Integer	40216	1007	CO2_Level	ppm	R	CO2 Levels (ppm)	
<b>pCOe Analog Variables</b>							
Analog	40022	21	pCOe_Analog_Input_Probe_Value_1	°F or Percent	R	pCOe Analog Input Probe Value 1	
Analog	40023	22	pCOe_Analog_Input_Probe_Value_2	°F or Percent	R	pCOe Analog Input Probe Value 2	
Analog	40024	23	pCOe_Analog_Input_Probe_Value_3	°F or Percent	R	pCOe Analog Input Probe Value 3	
Analog	40025	24	pCOe_Analog_Input_Probe_Value_4	°F or Percent	R	pCOe Analog Input Probe Value 4	
Analog	40026	25	pCOe_Analog_Out	percent	R/W	pCOe Auxillary Analog Out (0-10V)	
Type	Address	Address	Name	Inactive_Text	Active_Text	Read Write	Description
Digital	10011	10	Unit_Start_Stop	Stop	Start	R/W	Unit start/stop command
Digital	10012	11	Reset_Alarms	Don't Reset	Reset Alarms	R/W	Reset alarms command
Digital	10015	14	Cooling_Stg1_Command	Off	On	R/W	Cooling Stage 1 Command
Digital	10016	15	Cooling_Stg2_Command	Off	On	R/W	Cooling Stage 2 Command
Digital	10017	16	Heat_Stg1_Command	Off	On	R/W	Heating Stage 1 Command
Digital	10018	17	Occ_Unocc_Command	Off	On	R/W	Occupied/unoccupied Command
Digital	10019	18	Exh_Fan_Command	Off	On	R/W	Exhaust Fan Command
Digital	10020	19	HGRH_Command	Off	On	R/W	Hot Gas Reheat Command
Digital	10021	20	Global_Alarm	Off	Alarm	R	Global alarm indication (active when there is at least one alarm)
Digital	10022	21	Frost_Status	Off	On	R	Frost Status
Digital	10023	22	Econ_Status	Off	On	R	Econ Status
Digital	10024	23	Fan_Proving_Status	Off	On	R	Fan Proving status
Digital	10026	25	Dirty_filter_Status	Clean	Dirty	R	Dirty filter status
Digital	10027	26	Wheel_Status	Ok	Not Ok	R	Wheel status-Not Ok=Wheel not running when commanded on
Digital	10028	27	Supply_air_low_limit	Off	Alarm	R	Supply air temperature low limit alarm
Digital	10029	28	Sensor_B1_out_of_range	Off	Alarm	R	Sensor B1 out of range
Digital	10030	29	Sensor_B2_out_of_range	Off	Alarm	R	Sensor B2 out of range
Digital	10031	30	Sensor_B3_out_of_range	Off	Alarm	R	Sensor B3 out of range
Digital	10032	31	Sensor_B4_out_of_range	Off	Alarm	R	Sensor B4 out of range
Digital	10033	32	Sensor_B5_out_of_range	Off	Alarm	R	Sensor B5 out of range
Digital	10034	33	Sensor_B6_out_of_range	Off	Alarm	R	Sensor B6 out of range
Digital	10035	34	B5_User_Alarm	No Alarm	Alarm	R	B5 User Input Alarm
Digital	10036	35	B6_User_Alarm	No Alarm	Alarm	R	B6 User Input Alarm
Digital	10039	38	User_Define_B5_DI	Open	Closed	R	User Define B5 Digital Input
Digital	10040	39	User_Define_B6_DI	Open	Closed	R	User Define B6 Digital Input
Digital	10041	40	User_Define_N01_DO	Off	On	R/W	User Define N01 Digital Output
Digital	10042	41	User_Define_N02_DO	Off	On	R/W	User Define N02 Digital Output
Digital	10043	42	User_Define_ID2_DI	Open	Closed	R	User Define ID2 Digital Input
<b>pCOe Analog Variables</b>							
Digital	10052	51	pCOe_Auxiliary_Digital_Input_1	Off	On	R	pCOe Auxillary Digital Input1
Digital	10053	52	pCOe_Auxiliary_Digital_Input_2	Off	On	R	pCOe Auxillary Digital Input2
Digital	10054	53	pCOe_Auxiliary_Digital_Input_3	Off	On	R	pCOe Auxillary Digital Input3
Digital	10055	54	pCOe_Auxiliary_Digital_Input_4	Off	On	R	pCOe Auxillary Digital Input4
Digital	10056	55	pCOe_Auxiliary_Digital_Output1	Off	On	R/W	pCOe Auxillary Digital Output1
Digital	10057	56	pCOe_Auxiliary_Digital_Output2	Off	On	R/W	pCOe Auxillary Digital Output2
Digital	10058	57	pCOe_Auxiliary_Digital_Output3	Off	On	R/W	pCOe Auxillary Digital Output3
Digital	10059	58	pCOe_Auxiliary_Digital_Output4	Off	On	R/W	pCOe Auxillary Digital Output4



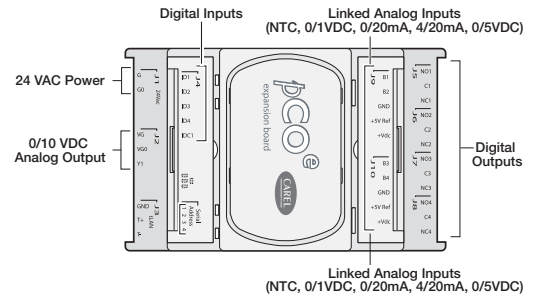
## I/O Expansion Board (pCOe)



The pCOe expansion board is an I/O module that can be used to monitor additional statuses within the unit or provide commands. The pCOe allows the user to view and control:

- 4 Digital Inputs
- 4 Digital Outputs
- 4 Analog Inputs
- 1 Analog Output

The inputs and outputs can be monitored and manually controlled either via the controller display or Building Management System. See Points List for detailed point information.



### Setup

In order for the controller to communicate with the pCOe, several parameters must be adjusted. If you have a pCOe installed from the factory, the controller is already set up for communication with the main controller.

Unit Expansion I/O	
Enable Expansion	Yes

**Enabling the pCOe in the Main Controller:** To enable the pCOe expansion I/O module, go to **Manufacturer > Configuration**. You will have to enter the Manufacturer password (Default = 1000). Enabling the pCOe expansion module allows additional screens to appear in other menus (see below).

Analog Inputs pCOe1	
Aux AI Pair 1	
Channels: B1 & B2	
Type:	Carel NTC

**Configuring the pCOe Analog Inputs:** The analog inputs are grouped in pairs (Channels B1-B2 and Channels B3-B4). Each pair must be configured as the same analog input type (Carel NTC, 0/1 VDC, 0/20 mA, 4/20 mA or 0/5 VDC).

To setup the analog inputs:

1. Go to **Manufacturer > I/O Configuration > Analog Inputs**.
2. Find the pCOe Analog input screens.
3. Select desired channels and input type. If only one channel is to be used, select the desired channel to prevent nuisance sensor alarms.

If using a non-Carel NTC type, scale the input to match the probe range.

Analog Input pCOe1	
Aux AI Pair 2	
Channels: B3 & B4	
Type:	4 . . 20 mA
B3 Min:	0.0
B3 Max:	10.0
B4 Min:	0.0
B4 Max:	10.0

Digital Inputs pCOe1	
Channel ID1:	Closed
Channel ID2:	Closed
Channel ID3:	Closed
Channel ID4:	Closed

**Viewing pCOe I/O Values:** To view input values, go to the Input/Output menu.

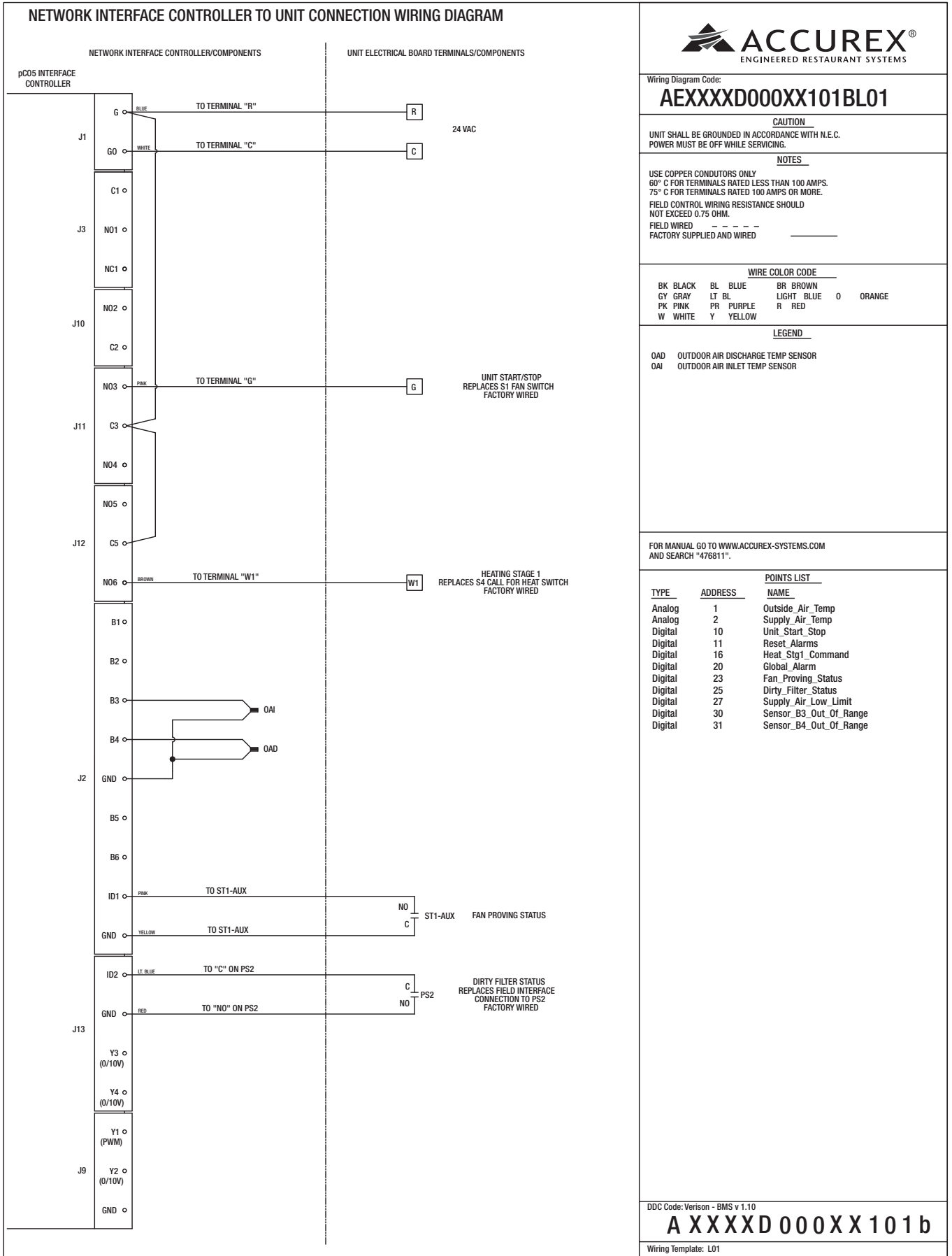
The pCOe I/O values can be viewed on the BMS. The digital and analog outputs can be changed through the BMS. See Points List for more details.

Analog Inputs	pCOe1	Digital Outputs	pCOe1	Analog Outputs	pCOe1
Input B1:	32.0°F	Output NO1:	OFF	Output Y1:	0.0vdc
Input B2:	32.0°F	Output NO2:	OFF		
Input B3:	0.0°F	Output NO3:	OFF		
Input B4:	0.0°F	Output NO4:	OFF		





# Typical Wiring Diagram



DDC Code: Verison - BMS v 1.10



















**A X X X X D 0 0 0 X X 1 0 1 b**

Wiring Template: L01

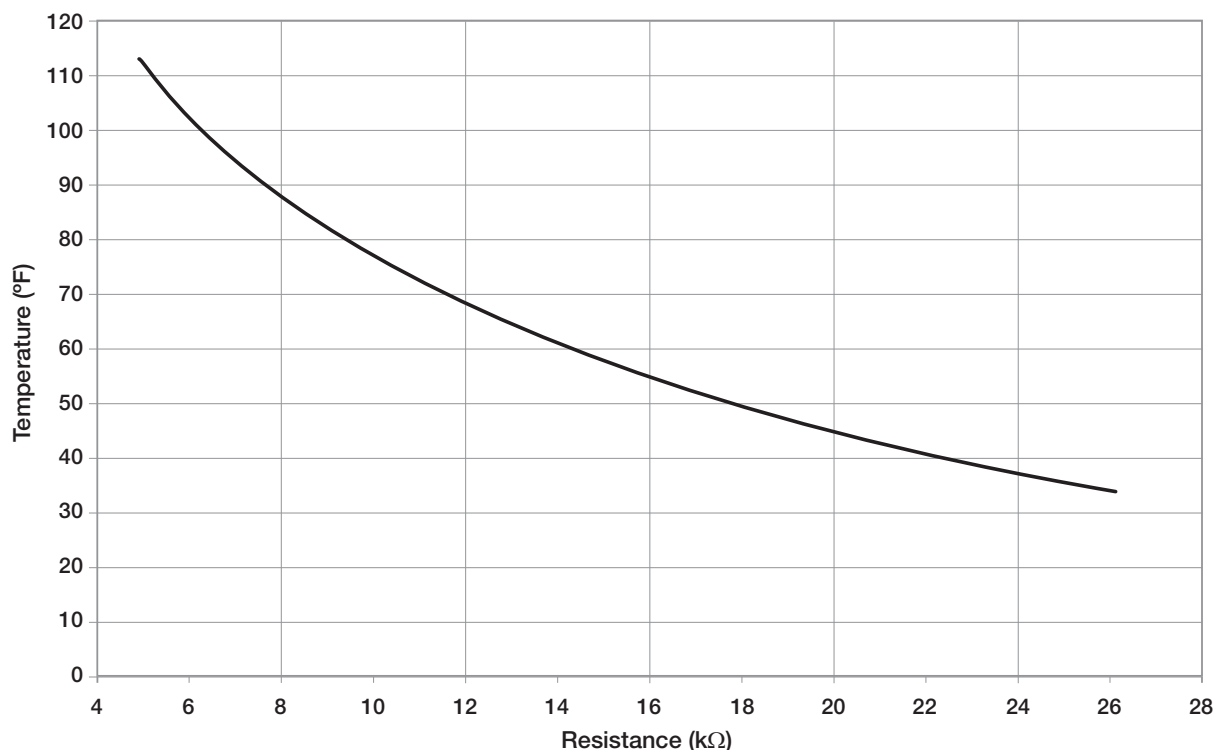




## Troubleshooting

Display is hard to read.	<p>Unit Controller Display: Hold  or  and  at the same time, while pressing  DOWN or  UP to adjust display contrast.</p> <p>Remote Display: Hold  or ,  or , and  or  at the same time, while pressing  DOWN or  UP to adjust display contrast.</p>
Remote display panel displays “NO LINK” or is blank.	Hold  DOWN,  UP and  ENTER for 4 seconds. Set the display address to 32. The display requires a standard 24 AWG six conductor phone cable connected to the unit controller.
Red alarm button is flashing.	Press the  or  ALARM button to review and clear unit alarms. Enter the DATA LOGGER menu to view previous alarms.
Controller resets itself or is not on.	Check the supply voltage to the controller at terminals G-G0. The board requires 24VAC. Check the 24VAC transformer in the unit control center.
Menus are locked with a password.	The factory default Manufacturer Password = 1000. The factory default Service Password = 1000.
Temperature sensor failure.	Check the analog input terminal block (labeled terminals B1, B2, B3, etc) for loose wires. Disconnect temperature sensors to check sensor resistance.

## NTC Temperature Sensor Chart



The card is loaded with the following default BACnet MSTP parameters.

Parameter	Factory	Minimum	Maximum
Device Instance	77000	0	4194303
Station Address	0	0	127
Max Master	127	0	127
Max Info Frames	20	0	255
Baudrate	38400	9600-19200-38400-76800	

## G. Service

### c. BMS Config

#### BMS Configuration

Protocol: BACnet MSTP  
BACnet Plugin? YES

#### MSTP SETUP

Instance: 77000  
Baudrate 38400  
MAC Addr: 0  
MaxMasters: 127  
MaxInfoFrames: 20

#### BACnet Read/Write

Function: Read  
Update? Yes  
\*Cycle unit power to confirm write command.

To view the current parameters, go the **BMS Config** menu within the controller by pressing the **Prog** or **Enter** key.

To access the **BMS Config** sub-menu, enter the service-password (Default=1000).

**Protocol must be BACnet MSTP and BACnet Plugin must be YES.**

Press the **Down** button arrow to view next screen.

Current BACnet MSTP parameters should be displayed. If values appear to be zero, follow the procedure below.

To read current settings:

1. Power on controller and allow several minutes to initialize.

2. Go to **BMS Config** menu and view BACnet Read/Write screen.

3. Change *Function* to *Read* and *Update?* to *YES*.

Current BACnet MSTP parameters should now be displayed in the BACnet MSTP SETUP screen. If all values appear to be zeros, consult the factory. (Make sure you have allowed several minutes for the controller to initialize). *\*Values may appear to be zero prior to setting the Function to READ.*

To change BACnet MSTP parameters:

1. Power on the controller and allow several minutes to initialize.

2. Go to **BMS Config** menu and view MSTP SETUP screen.

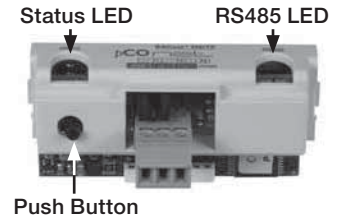
3. Move cursor to desired parameter by pressing the **Down** **Up** buttons. Press **Left** to select the parameter to change. Press the **Down** **Up** buttons to adjust the parameter. Press **Right** to save adjusted value.

4. Once desired parameters have been entered, go to BACnet Read/Write screen. Change *Function* to *Write* and *Update?* to *YES*.

5. Reboot the controller by cycling power to the unit. Allow several minutes for the controller to initialize.

6. View MSTP parameters. If changed values did not save, contact the factory.

The communication card is located in the **Serial Card** port on the face of the controller. The card includes two sets of LED lights for communication troubleshooting.



**Status LED:** Indicates the status of communication between the card and controller.

- Quick green-off-green if communication with controller is ok.
- Slow red-off-red if communication is not established.

**RS485 LED:** Indicates the status of communication with the BACnet MSTP network. Wait for 40 seconds to determine status of communication.

- Green with occasional red, communication is OK.
- Green and red both on, communications is not established.

### Communication Troubleshooting

See Carel Data sheet for more info.

If attempting to communicate with the controller over BACnet MSTP, refer to the card LEDs for system information.

Status LED slow red blink

- Confirm card is firmly plugged in.
- Confirm BMS Protocol is set to BACnet MSTP.

RS485 LED green and red both on



- Confirm system and card baudrate are the same.
- Confirm card Max Master is equal to or greater than the Station (MAC) Address of the Master with the highest address.

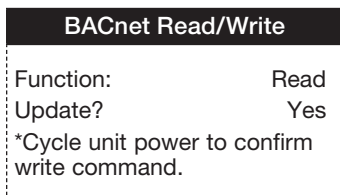
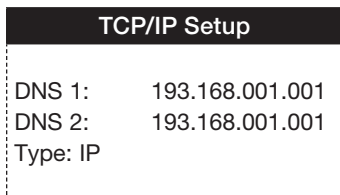
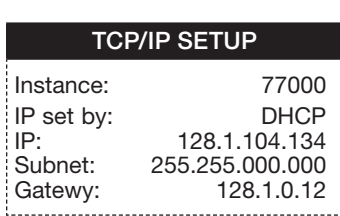
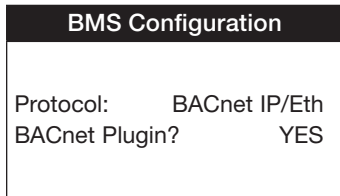
### Recalling Factory Parameters

Follow this procedure to revert to factory parameters for one power cycle. When restarted, the card will resume using the previous user parameters.

1. With controller off, hold the push button located on the BACnet MSTP card, while powering the controller back on.
2. Continue to hold the button, while watching the **Status LEDs**. Wait for the Status LEDs to blink red slowly, and release before the third slow flash.
3. Wait for about one minute for the factory parameters to be loaded.







\*The BACnet IP/Eth card is configured for DHCP from the factory.

To view the current parameters, go the **BMS Config** menu within the controller by pressing the  or .



Current BACnet IP parameters should now be displayed in the BACnet TCP/IP SETUP screen. If all values appear to be zeros, consult the factory. (Make sure you have allowed several minutes for the controller to initialize). \*Values may appear to be zero prior to setting the Function to READ.

To change BACnet TCP/IP parameters:

1. Power on the controller and allow several minutes to initialize.
2. Go to **BMS Config** menu and view TCP/IP SETUP screen.
3. Move cursor to desired parameter by pressing the   buttons. Press  to select the parameter to change. Press the   buttons to adjust the parameter. Press  to save adjusted value.
4. Once desired parameters have been entered, go to BACnet Read/Write screen. Change *Function* to *Write* and *Update?* to *YES*.
5. Reboot the controller by cycling power to the unit. Allow several minutes for the controller to initialize.

key.  
To access the **BMS Config** sub-menu, enter the service password (Default=1000).

**Protocol must be BACnet IP/Eth and BACnet Plugin must be YES.**

Press  arrow button to view next screen.

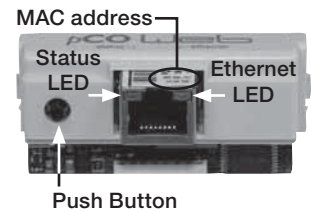
Current BACnet IP parameters should be displayed. If values appear to be zero, follow the procedure below.

To read current parameters:

1. Power on controller and allow several minutes to initialize.
2. Go to **BMS Config** menu and view BACnet Read/Write screen.
3. Change *Function* to *Read* and *Update?* to *YES*.

6. View TCP/IP parameters. If changed values did not save, contact the factory.

The communication card is located in the **Serial Card** port on the face of the controller. The card includes two sets of LED lights for communication troubleshooting.



**Status LED:** Indicates the status of communication between the card and controller.

- Quick green-off-green if communication with controller is ok.
- Slow red-off-red if communication is not established.

**Ethernet LED:** Indicates the status of communication with the network. Wait for 40 seconds to determine status of communication.

- Flashing green, communication is OK.
- Steady red, communications is not established.

**Communication Troubleshooting**

See Carel Data sheet for more info.

If attempting to communicate with the controller over BACnet IP/Eth, refer to the card LEDs for system information.

Status LED slow red blink

- Confirm card is firmly plugged in.
- Confirm BMS Protocol is set to BACnet IP/Eth.

Ethernet LED red on

- Confirm card is connected to the network.

**Recalling Factory Parameters**

Follow this procedure to revert to factory parameters for one power cycle. When restarted, the card will resume using the previous user parameters.

Factory Default IP address: 172.016.000.001

1. With controller off, hold the push button located on the BACnet IP/Eth card, while powering the controller back on.
2. Continue to hold the button, while watching the **Status LED**. Wait for the Status LED to blink red slowly, and release before the third slow flash.
3. Wait for about one minute for the factory parameters to be loaded.
4. Follow the procedure to read the current parameters to confirm factory defaults have been loaded.



## Maintenance Log

Date \_\_\_\_\_ Time \_\_\_\_\_ AM/PM

Notes: \_\_\_\_\_

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Date \_\_\_\_\_ Time \_\_\_\_\_ AM/PM

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## Our Commitment

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*As a result of our commitment to continuous improvement, Accurex reserves the right to change specifications without notice.*

Specific Accurex product warranties are located on [accurex-systems.com](http://accurex-systems.com) within the product area tabs and in the Library under Warranties.



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