

Add contractor logo here

Add distributor logo here



#### Support:

Contractor Phone # **Insert Info**  
Distributor Phone # **Insert Info**  
Verasys Tech Support (866) 663-6105  
be-verasyssupport@jci.com

#### Warranty: 3-Year Limited Warranty


<https://www.johnsoncontrols.com/-/media/jci/be/united-states/legal/warranty/files/jci-3y-warranty-final-11202018.pdf?la=en&hash=DD21C45A73770C636ED6088662E78EB0ACD02FC9>

#### Drawings:

- 1 Cover
- 2 Bill of Material
- 3 Riser Diagram
- 4 SSE Board Detail
- 5 SSE Board Wiring
- 6 SBH Detail
- 7 SBH Quick Start
- 8 SBH Internet
- 9 SBH Alerts & Alarms
- 10 Sensor Detail
- 11 Standard Installation
- 12 Appendix


#### Disclosure:

The following drawings & parts quote is our best interpretation of the parts needed based on the information given for this specific project. It is your (the contractor's) responsibility to verify that the parts quoted meet the requirements (ex. quantities needed, parts required) and specifications of the project being quoted. If additional or different parts are needed in order to complete the project or meet the specification; please reach out to the distributor listed on your quote to address the issues before using this quote to bid to your customer. **ADDITIONAL OR DIFFERENT PARTS MAY RESULT IN A PRICE DIFFERENCE.**

Drawing Title															
Cover															
	REFERENCE DRAWING			NO.		REVISION-LOCATION			ECN		DATE		BY		
	Sales Engineer		Project Manager		Application Engineer		DRAWN BY Steve Nichols			APPROVED					
							DATE 8-12-2022			BY		DATE			
Project Title						Branch Information					CONTRACT NUMBER				
SMART RTU											DRAWING NUMBER				
											1				

Verasys Bill of Materials				
System	Function	JCI Part No	Description	Qty
Network	Smart Building Hub	LC-SBH200-0S	Verasys Smart Building Hub	1
Network	Communication Wire	CBL-22/3-FC-PLN	System/Zone Bus Cable 22-3C Shielded Plenum Wire	1
Network	Communication Wire	CBL-22/2P-SAPLN	Sensor Bus Cable 22-2P Shielded Plenum Wire	1
SZ - Smart Equipment	NS Sensor	NSB8BTN240-0	TEMP, DISPLAY, SETPOINT, WHITE, LOGO	14
SZ - Smart Equipment	COMM CARD	SE-COM1001-0	Smart Equipment BACnet Communications Card. Required!	14

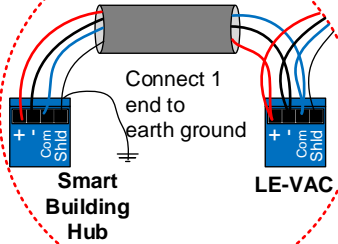
\*Complete estimating tool for parts needed on this project & then  
copy Bill of Material to this page

Drawing Title									
Bill Of Materials									
REFERENCE DRAWING		NO.		REVISION-LOCATION		ECN		DATE	
Sales Engineer		Project Manager		Application Engineer		BY		APPROVED	
				Steve Nichols		DATE		8-12-2022	
Project Title				Branch Information		CONTRACT NUMBER			
SMART RTU								DRAWING NUMBER	
								2	

System Riser

FC System Bus

BACnet Bus  
3 Wire



Non-Plenum Applications:  
CBL-22/3-FC-PVC

Plenum Applications:  
CBL-22/3-FC-PLN



Every device needs to have a unique address. Duplicate addresses on the bus will cause controllers to disappear

Internet Connection

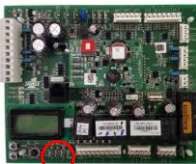


Smart Building Hub

FC Bus  
BACnet Bus  
3 Wire

SA Bus  
Sensor Bus  
4 Wire

Sensor Bus



Sensor Bus  
4/22 GA Shielded Cable

Thermostat sensor  
connection - Typical

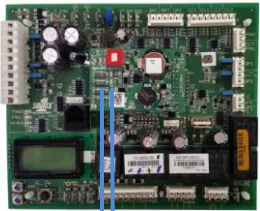
Non-Plenum Applications:  
Anixter: CBL-22/2P-SA-PVC  
Belden: B5541FE  
or equivalent

Plenum Applications:  
Anixter: CBL-22/2P-SA-PLN  
Belden: B6541FE  
or equivalent

RTU1  
Address 4



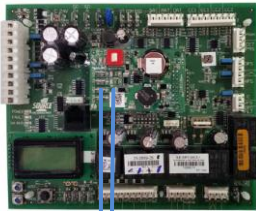
RTU2  
Address 5



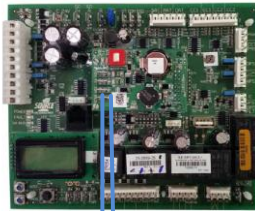
RTU3  
Address 6



RTU4  
Address 7



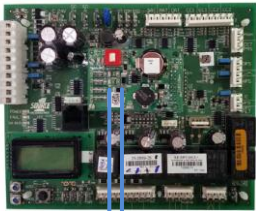
RTU5  
Address 8



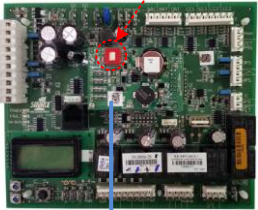
RTU6  
Address 9



RTU7  
Address 10



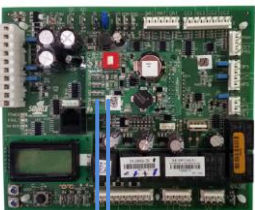
RTU14  
Address 17



RTU13  
Address 16



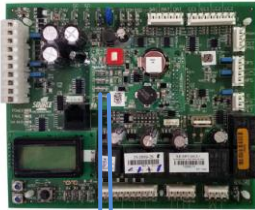
RTU12  
Address 15



RTU11  
Address 14



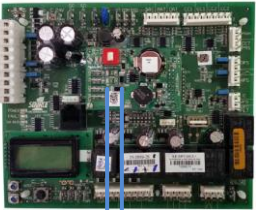
RTU10  
Address 13



RTU9  
Address 12



RTU8  
Address 11



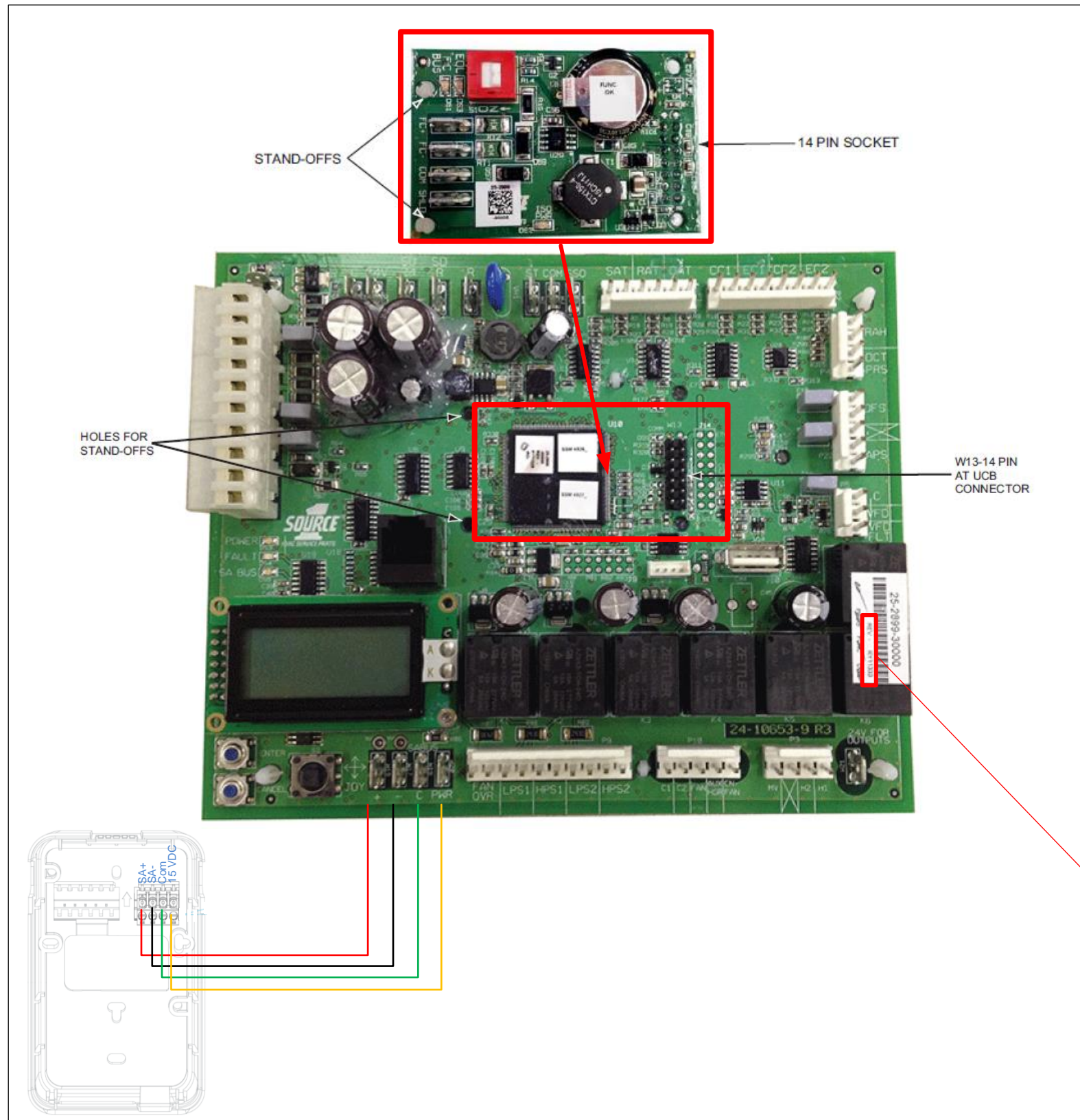
Drawing Title

Project Title

SMART RTU

VERASYS






## Installation:

1. Power down the Unit Control Board (UCB).
2. Ensure that no power source is connected to the unit.
3. Align the SE-COM1001 (14 Slot) socket with the 14 pins at W13 on the UCB.
4. Carefully insert the socket into the pins on the UCB as shown.
5. Align the support pins on the SE-COM1001 with the holes on the UCB.
6. Carefully seat the pins on the board.
7. After the SE-COM1001 board is attached to the UCB, connect the BACnet (FC) bus to FC+, FC-, COM, & SHLD on the SE-COM1001.
8. After connecting the BACnet (FC) bus to the SE-COM1001, power the unit up & wait for the controller to become operational.

## Setting up the UCB to talk to Verasys:

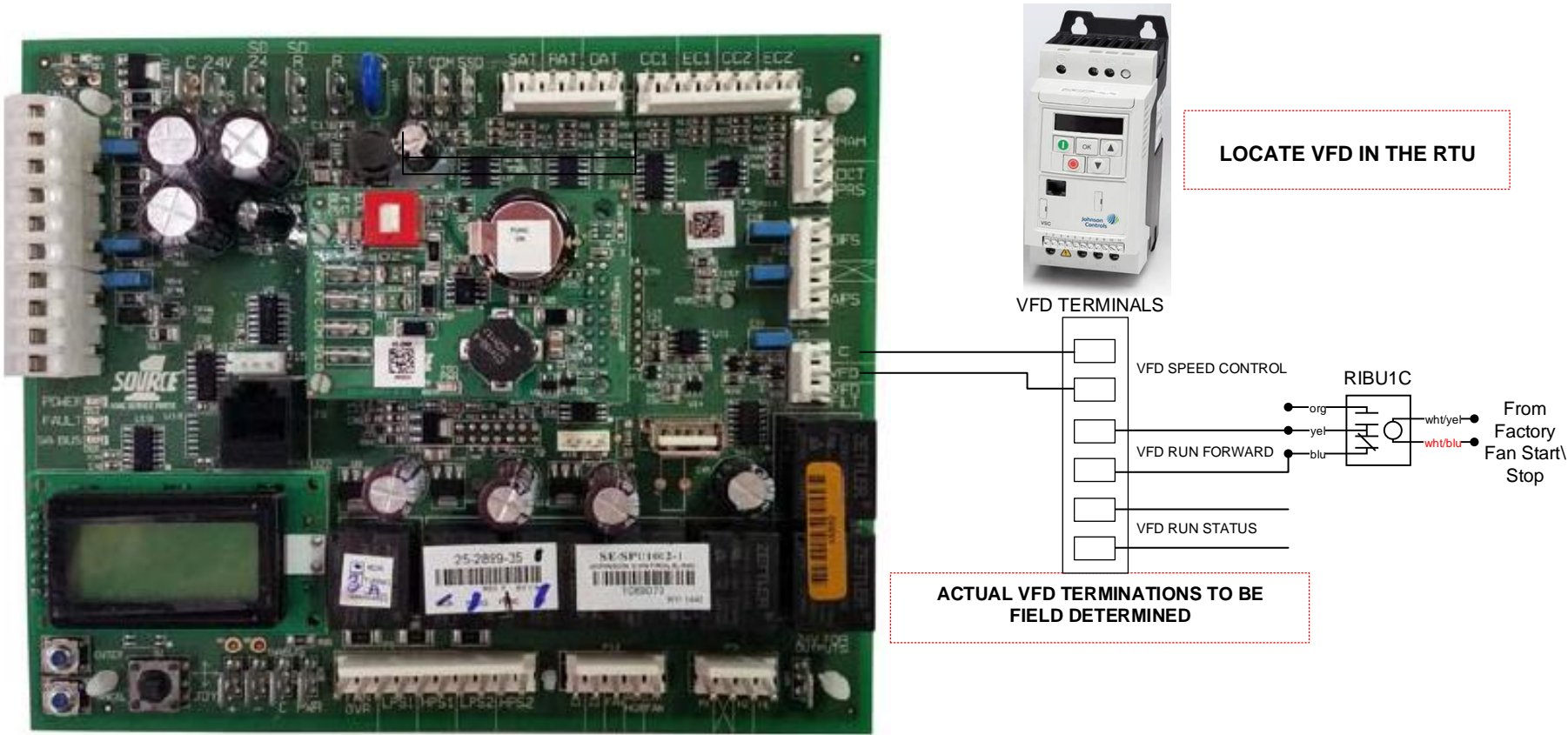
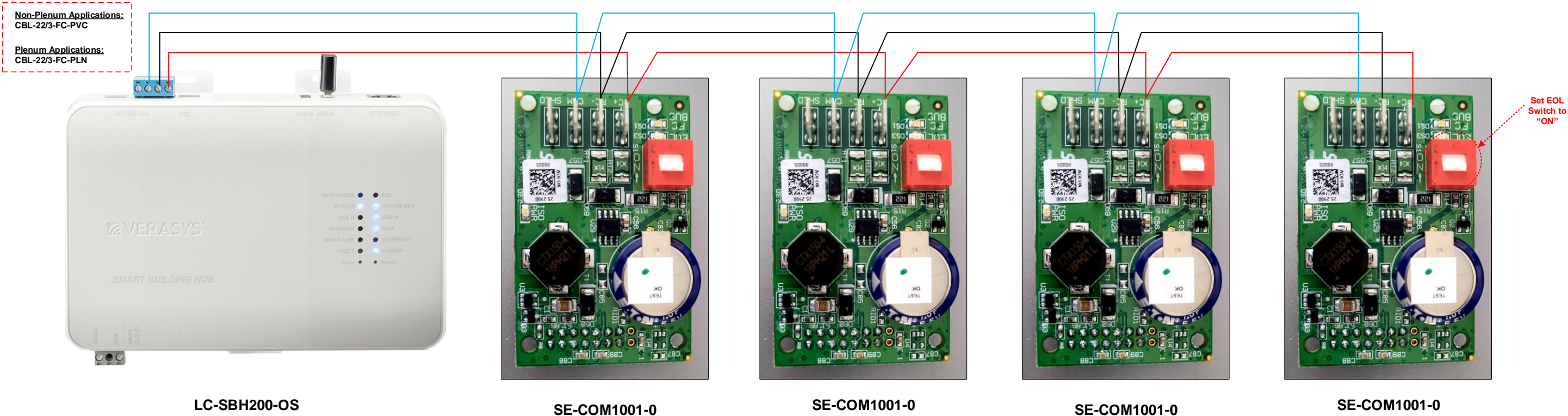
1. Set the communication protocol to be used (**LCD MENU -> CONTROLLER -> NETWORK -> FCBUSMODE**) Choices are as follows:
  - A. **Wired Field Bus**=BACNET MS/TP (Default)
  - B. Wireless=Not Used
  - C. Modbus Fiedl Bus=Modbus RTU
  - D. N2 Slave Fiedl Bus=JCI N2
  - E. Ethernet Field Bus
2. Set the board address (**LCD MENU -> CONTROLLER -> NETWORK -> ADDRESS**)
  - A. Default=4 (Set to matching address from page 3 Riser Diagram). The board address must be unique on the FC bus or communication errors will occur.
3. Verify that current firmware is on both the UCB & the SBH. If pages aren't loading or missing data it's usually a firmware mismatch. The number below the barcode will help determine if the UCB has 4mb or 8mb of memory. Units 2017 or older typically have 4mb & cannot be upgraded to the current firmware & loading it will brick the UCB. You can choose to add a new UCB or just control the unit with a VAC. **REV. O-G=4mb board \ Rev. H=8mb board**


For best performance on MS/TP bus applications, use 22 AWG stranded, 3-Wire, twisted in a shielded cable with proper shield grounding. Other wire gauges & non-shielded cable may provide acceptable bus performance in many applications, especially applications that have short cable runs & low ambient inductive noise levels. It is also good practice to switch on EOL on the last device on a BACnet bus.

Drawing Title										
COVER	REFERENCE DRAWING			NO.		REVISION-LOCATION		ECN	DATE	BY
	Sales Engineer		Project Manager		Application Engineer		DRAWN		APPROVED	
							BY	JB	DATE	01/31/20
							BY		DATE	
Project Title						Branch Information			CONTRACT NUMBER	
								DRAWING NUMBER		
		4								



## SSE Wiring

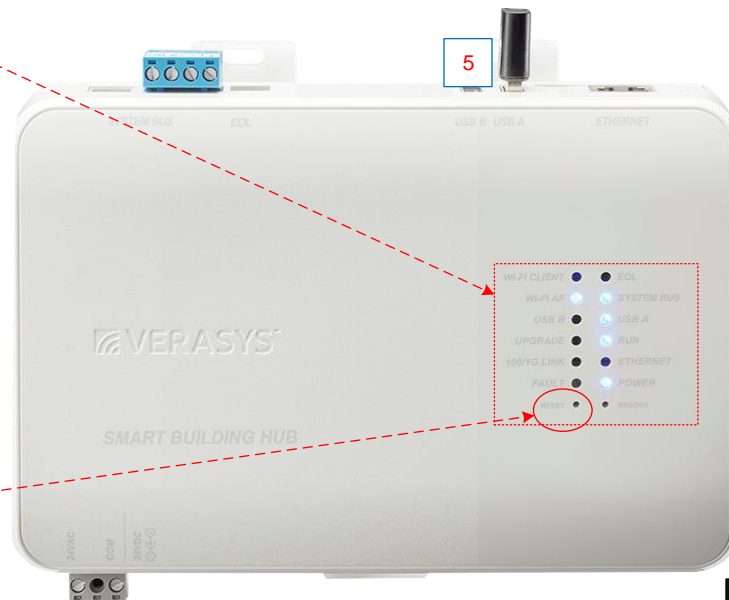
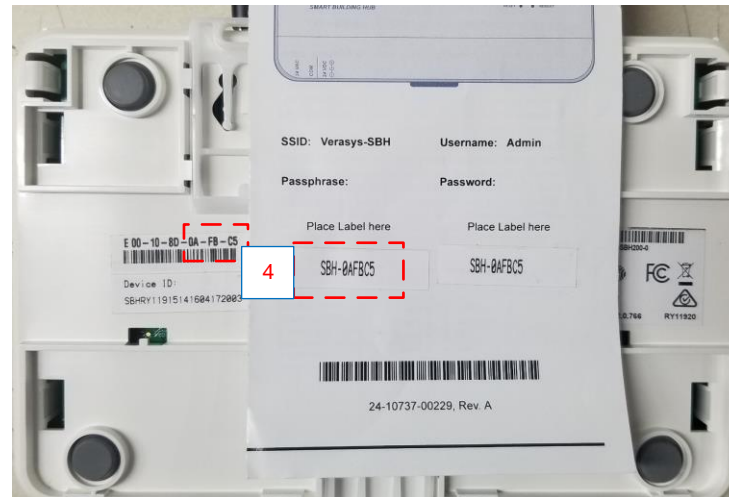



Drawing Title									
VFD Detail	REFERENCE DRAWING			NO.	REVISION-LOCATION		ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED			
				BY	JB	DATE	01/31/20	BY	DATE
Project Title				Branch Information		CONTRACT NUMBER			
						DRAWING NUMBER			
				5					

### SBH Detail

LED Name	Color	Normal	Descriptions/Other Conditions
Power	Blue or Purple	On steady	<b>Off</b> = No power <b>On Purple</b> = Power is supplied by primary voltage <b>On Blue</b> = OS booted and power is supplied by primary voltage
Fault	Red	Off	<b>Off</b> = No faults/normal operation <b>On steady</b> = Missing hardware, missing software, operating system has not yet been initialized, or reset is in progress <b>Slow flicker then fast flicker</b> = Reset button is being pressed <b>Medium flicker</b> (2 blinks per second) = Startup sequence <b>Fast flicker</b> (5 blinks per second) = Fault
Ethernet	Blue	Flicker with activity	<b>Off</b> = Receiving data <b>On steady</b> = Transmitting data <b>Flicker</b> = Data transmission
100/1G Link	Blue	On steady	<b>Off</b> = no network connection <b>On steady</b> = network is connected
Run	Blue	On steady	<b>Off</b> = No power or waiting for processes to start <b>On steady</b> = OS and all monitored processes have started and the device is ready to use
Upgrade	Blue	On steady	<b>Off</b> = No upgrade in progress <b>On steady</b> = upgrade in progress
USB A	Blue	On when a device is connected	<b>Off</b> = No device is connected <b>On steady</b> = a device is connected
USB B	Blue	On when a device is connected	<b>Off</b> = No device is connected <b>On steady</b> = A device is connected
System Bus	Blue	Flicker with activity	<b>Off</b> = Not receiving data <b>On steady</b> = Transmitting data <b>Flicker</b> = Data transmission
Wi-Fi AP	Yellow	Flicker with activity	<b>Off</b> = No Wi-Fi adapter connected <b>On steady</b> = A device is connected to the Wi-Fi Network of the SBH <b>Flicker</b> = Wifi adapter is connected but no devices are connected
EOL	Yellow	On if the device is the end of the line Off if it is in the middle of the bus	<b>Off</b> = EOL not switched on <b>On steady</b> = EOL is switched on
Wi-Fi Client	Yellow	Not Used	Not Used - This will be used at a future date

Reset Function	Reset Operation <sup>1</sup>
Reset the Wi-Fi and Ethernet Settings	<ol style="list-style-type: none"> <li>1. Press and hold the <b>RESET</b> button for two seconds. The <b>FAULT</b> LED displays slow flicker behavior.</li> <li>2. Release the <b>RESET</b> button within three seconds. The <b>FAULT</b> LED continues slow flicker behavior.</li> <li>3. Within five seconds, press the <b>RESET</b> button again, and then immediately release it to confirm that you want to reset Wi-Fi and Ethernet settings. If you do not press the reset button to confirm within five seconds, the reset operation is canceled.</li> </ol> <p><b>Result:</b> You have reset the Wi-Fi SSID and passphrase and Ethernet settings to factory defaults. The LEDs stop flickering for two seconds, then the LEDs return to normal operation, based on the current state of the device.</p>
Reset to Factory Defaults <sup>2</sup>	<ol style="list-style-type: none"> <li>1. Press and hold the <b>RESET</b> button for six seconds. After two seconds, the <b>FAULT</b> LED displays slow flicker behavior. This changes to fast flicker behavior after an additional four seconds of holding the <b>RESET</b> button.</li> <li>2. Release the <b>RESET</b> button within three seconds of seeing fast flicker behavior. The <b>FAULT</b> LED continues fast flicker behavior.</li> <li>3. Within five seconds, press the <b>RESET</b> button again, and then immediately release it to confirm that you want to reset to factory defaults. If you do not press the <b>RESET</b> button to confirm within five seconds, the reset operation is canceled.</li> </ol> <p><b>Result:</b> You have reset all unit settings to factory defaults. The LEDs stop flashing for two seconds, then the LEDs return to normal operation, based on the current state of the device.</p>





2

Welcome to the Smart Building Hub. For security purposes, you will need to change the default passwords for this device.

### Update Admin User

New Admin Password

Verify New Admin Password

### Wi-Fi Access Point

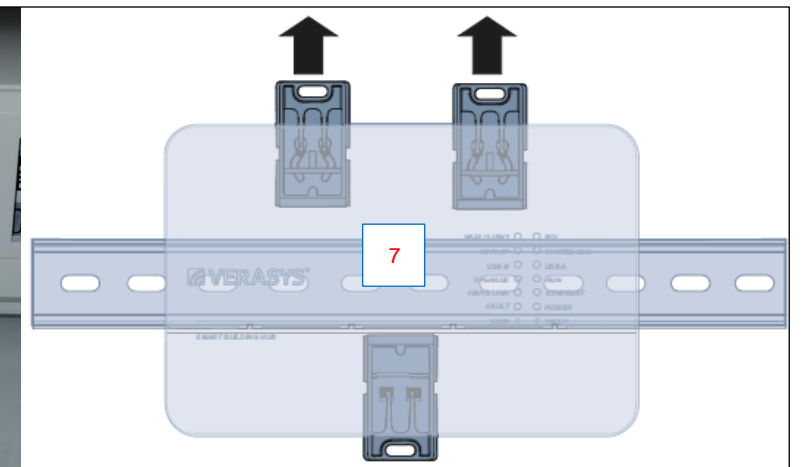
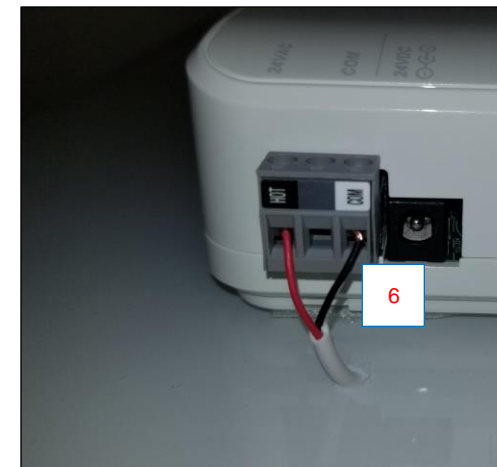
New Wi-Fi SSID

Verasys-SBH


New Wi-Fi Passphrase

SBH-0A75B8

Save



- |   |  |
|---|--|
| 1 | Every SBH comes with a Quick Start Guide that gives you the login information  |
| 2 | When you first login into the SBH it will prompt you to change the default login (SAVE THIS NEW LOGIN INFO)  |
| 3 | If you forget or lose the login information follow the info above  |
| 4 | If you don't have the Quick Start Guide & need the default login use the following... <div>Verasys-SBH<br/>SBH-XXXXXX(last 6 digits of your mac address on the back of the SBH)<br/>Admin<br/>SBH-XXXXXX(last 6 digits of your mac address on the back of the SBH)</div> |
| 5 | The Wi-Fi dongle can be used in either USB port  |
| 6 | The SBH can be powered by a 24vdc, 50w, Class II power supply or you can use a 24vac , 75va Class II transformer   |
| 7 | The SBH can be mounted on denrail or screwed down using the standoffs  |

Drawing Title								
	REFERENCE DRAWING		NO.	REVISION-LOCATION		ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED		
				BY	SJN	DATE	8-12-2022	BY
								DATE
Project Title  <b>SMART RTU</b>				Branch Information		CONTRACT NUMBER		
						DRAWING NUMBER		
						6		



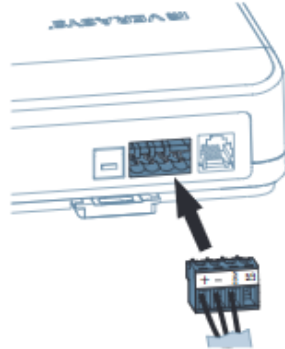
## 1. Connect the Smart Building Hub to Equipment

The Smart Building Hub (SBH) permanently connects to the Verasys™ system using the 4-terminal System bus port. Wire the system bus communications to the blue, 4-terminal connector and plug it into the port.

Note: If this device is at the end of a line, set the end of the line switch to on.

Note: The RJ-12 jack next to the 4-terminal block can be used as a temporary connection to the System bus using the RJ-12 cable supplied with the SBH.

Figure 1: Connecting the SBH



- Wire your cable to the supplied four-pin adapter as illustrated.
- Plug the Wi-Fi adapter that comes with the SBH into either of the USB ports.
- Connect the RJ45 Ethernet port to the building Ethernet network as instructed by the building IT department. The Ethernet must be plugged into the device if you choose the (optional) Ethernet setup in step 6.
- Connect power to the Smart Building Hub.  
Once power is supplied to the SBH, the **WiFi AP** LED flashes to indicate that the device is initializing. When the **Fault** LED turns off, the **WiFi AP** LED flashes, and the **RUN** LED is on, you can connect the SBH using the built-in Wifi access point.

Figure 2: SBH LED Map

WI-FI CLIENT	●	●	EOL
WI-FI AP	●	●	SYSTEM BUS
USB B	●	●	USB A
UPGRADE	●	●	RUN
100/1G LINK	●	●	ETHERNET
FAULT	●	●	POWER
RESET	●	●	REBOOT

## 2. Connect to the Smart Building Hub Wi-Fi access point

The SBH can be configured over Wi-Fi using a mobile device or laptop.

- In your Wi-Fi enabled device, access the Wi-Fi settings and select the Verasys-SBH access point name.
- Connect to the SBH Wi-Fi network using the supplied credentials from the beginning of this guide.

### 3. Open a Web Browser

- Navigate to the following URL: [www.smartbuildinghub.com](http://www.smartbuildinghub.com), to open the SBH browser interface.

**Note:** The SBH ships with a private smartbuildinghub.com SSL certificate installed to ensure secure communication with the SBH. However, this certificate does not indicate that it is trusted in a browser. If you wish to install your own certificate, refer to the *Smart Building Hub Network and IT Guidance Technical Bulletin (LIT-12012324)* for more information.

#### 4. Log in to the Smart Building Hub

- Use the default Admin login credentials from the beginning of this guide.
- Read and accept the SBH license agreement.

## 5. Change Passwords and SSID

The first time you log into the SBH, the **Change Password and Passphrase** web page appears. You must change the Admin password, Wi-Fi passphrase, and the SSID.

**IMPORTANT:** After you change the Wi-Fi passphrase or SSID, the web server restarts and you must rejoin the SBH Wi-Fi network using the new passphrase. On some mobile devices, you must select and forget the original SBH Wi-Fi network before rejoining the network with the new passphrase. A laptop running Microsoft Windows is a device that behaves this way.

- In the **New Admin Password** field, enter a new password.
- In the **Verify New Admin Password** field, enter the same new password.
- In the **New Wi-Fi SSID** field, enter the new Wi-Fi SSID.
- In the **New Wi-Fi Passphrase** field, enter the new Wi-Fi Passphrase.
- Click the **Save** button.

Navigate to the following URL: [www.smartbuildinghub.com](http://www.smartbuildinghub.com), to open the SBH browser interface.

**Note:** The SBH ships with a private [smartbuildinghub.com](https://smartbuildinghub.com) SSL

certificate installed to ensure secure communication with the SBH. However, this certificate does not indicate that it is trusted in a browser. If you wish to install your own certificate, refer to the *Smart Building Hub Network and IT Guidance Technical Bulletin (LIT-12012324)* for more information.

Navigate to the following URL: [www.smartbuildinghub.com](http://www.smartbuildinghub.com), to open the SBH browser interface.

**Note:** The SBH ships with a private smartbuildinghub.com SSL certificate installed to ensure secure communication with the SBH. However, this certificate does not indicate that it is trusted in a browser. If you wish to install your own certificate, refer to the *Smart Building Hub Network and IT Guidance Technical Bulletin (LIT-12012324)* for more information.

## 6. Ethernet Setup (Optional)

This step describes how to access the SBH over an Ethernet network.

- In the SBH UI, navigate to **Settings > Ethernet**.
- On the **Ethernet** drop-down list, select **On** to enable the SBH Ethernet port.
- Click the **Save** button.
- Take note of the address in the IP Address field. By default, the SBH is configured to dynamically receive an IP address from your network using DHCP.  
**Note:** If the IP Address does not appear, refresh the screen.
- Enter the IP address from the previous step. You now have access to the SBH over an Ethernet network.  
Refer to the *Smart Building Hub Network and IT Guidance Technical Bulletin (LIT-12012324)* for more options.

## 7. Use the Smart Building Hub


Select a device from the equipment list and use the web pages from the SBH to view, commission, and configure devices as needed.

**IMPORTANT:** Save this guide. It contains your default user name and password information. This information may be needed to reset your Smart Building Hub to factory defaults.

### Technical Specifications

## Smart Building Hub

<b>Power Consumption</b>	38W maximum
<b>Ambient Temperature Conditions</b>	<b>Operating:</b> 0 to 50°C (32 to 122°F) <b>Operating Survival:</b> -30 to 60°C (-22 to 140°F) <b>Non-Operating:</b> -40 to 70°C (-40 to 158°F)
<b>Ambient Humidity Conditions</b>	<b>Storage:</b> 5 to 95% RH 30°C (86°F) maximum dew point conditions <b>Operating:</b> 10-90% RH, 30°C (86°F) maximum dew point conditions

Drawing Title									
	REFERENCE DRAWING		NO.	REVISION-LOCATION		ECN	DATE	BY	
	Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED			
				BY	SJN	DATE	8-12-2022	BY	DATE
Project Title  SMART RTU				Branch Information		CONTRACT NUMBER			
						DRAWING NUMBER  7			

Choose a device...

Menu

Settings

Wi-Fi Access Point

Backup

Restore

Profiles

Clone

Ethernet

Load Shedding

Global Shutdown

System Settings

Verasys Enterprise

BACnet Settings

BBMD

SSL

Alarm Notifications

Software Updates

Administration

Custom Logo

SETTINGSETHERNET

Ethernet

3On

Hostname

SBH00108D0A7F56

Domain Name Suffix

Ethernet Mac Address

00:10:8d:0a:7f:56

Auto DHCP

4Off

IP Address

5Get From I.T. Group

Subnet Mask

6Get From I.T. Group

Default Gateway

7Get From I.T. Group

Auto DNS

Off

Primary DNS Server

88.8.8.8

Secondary DNS Server

98.8.4.4

Enable Proxy

No

Note: Smart Building Hub must be connected to an external power source for Ethernet to function.

Cancel10Save

Setting up Internet Access:

- Reach out to the customers I.T. group & get the following... a "Static IP Address", "Subnet Mask", "Default Gateway", & "Primary & a Secondary DNS Server"
- Log into the SBH, click on "Settings" then "Ethernet" & change "Auto DHCP" to "Off"
- Add the info you got from the IT group into the SBH & make sure there's a network cable plugged into the SBH & the customers internet.
- Turn off your wifi. Open Chrome or Safari & type in the ip address. This should bring you to the Verasys login page...if not you may need to log into the customers VPN. (Call customer I.T. people up for VPN access) & repeat Step 4.

Get This Info From Customer I.T. Group or I.S.P.  
Then Write Info Here:

Static IP Address:\_\_\_\_\_

Subnet Mask:\_\_\_\_\_

Default Gateway:\_\_\_\_\_

Primary DNS Server:\_\_\_\_\_

Secondary DNS Server:\_\_\_\_\_

Email Host:\_\_\_\_\_

Email Port:\_\_\_\_\_

Mail Server User Name:\_\_\_\_\_

Mail Server Password:\_\_\_\_\_

VPN Address:\_\_\_\_\_

VPN User:\_\_\_\_\_

VPN Password:\_\_\_\_\_

After you set up the SBH  
write down login info here

SSID:\_\_\_\_\_

Wi-Fi Password:\_\_\_\_\_

User Name:\_\_\_\_\_

User Password:\_\_\_\_\_

Drawing Title						
SBH Internet Info						
REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY	
Sales Engineer	Project Manager	Application Engineer	Steve Nichols	DATE 8-12-2022	BY	DATE
Project Title	VERASYS		Branch Information	CONTRACT NUMBER		
3rd Party RTU				DRAWING NUMBER		
				8		



Global Shutdown

System Settings

Verasys Enterprise

BACnet Settings

BBMD

SSL

1 Alarm Notifications


Software Updates


13 Administration

Custom Logo

Audit Log

Diagnostics





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Patents: <https://jciapat.com>  
SW Version: 4.1.0.37  
OS Version: 20181004182348  
Dictionary Version: 8.0.0.3797

ORE Up

SOCKET Up

SETTINGS

ALARM NOTIFICATIONS

Enabled

2 On

Use SSL/TLS

3 Yes

Host

Ex: mail.server.com

4 mail.server.com

Port

5 80

Locale

Notification emails will be sent using this locale

6 English

From Email Address

Notification emails will come from this address

7 This can be any email address

Site Name

8 Best to make this the name of the building

Username

9

☐ Set Password

Cancel

10 Save

Test Email Address

Address to send test email to

11 Enter the name of your email to verify it works

12 Send Test Email

Note: To get text & email alerts you need to be connected to the internet & set up a user for each person who needs to get alerts. Follow Steps 1-23

**Setting Up Text & Email Alerts:**  
-Reach out to the customers I.T. group & get the following... a mail server "Host", "Port #"

**Setting Up Text & Email Alerts:**  
-Reach out to the customers I.T. group & get the following... Mail Server "User Name" & "Password"

**Adding Text Alerts:**  
AT&T [phone#nodashes@txt.att.net](#)  
Verizon [phone#nodashes@vtext.com](#)  
T-Mobile [phone#nodashes@tmomail.net](#)  
Sprint [phone#nodashes@messaging.sprintpcs.com](#)  
Cricket [phone#nodashes@mms.cricketwireless.net](#)  
Virgin [phone#nodashes@vmobl.com](#)  
Tracfone [phone#nodashes@mmst5.tracfone.com](#)  
Metro PCS [phone#nodashes@mymetropcs.com](#)  
Boost [phone#nodashes@myboostmobile.com](#)  
If your cell carrier is not displayed go to Google & search for their text address

14 Add New User

ADMINISTRATION

ADD USER

Name

15 Brad Pitt

Username

No spaces

16 Brad

Password

Must contain 8 or more characters, 1 lowercase letter, 1 uppercase letter, 1 number

17

Verify Password

18

Role

19 Admin

Alarm Notification Level

20 Service Priority

Email Address 1


21 bradley.pitt@hollywood.com

Email Address 2

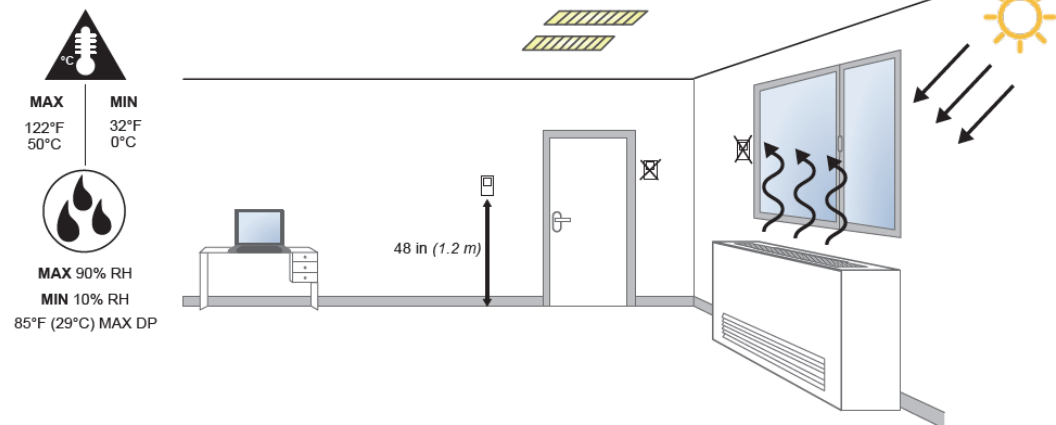
22 8038675309@txt.att.net

Cancel

23 Save

Drawing Title									
Project Title		REFERENCE DRAWING		NO.		REVISION-LOCATION		ECN	
		Sales Engineer		Project Manager		Application Engineer		DRAWN	
SMART RTU		BY		DATE		BY		DATE	
		SUN		8-12-2022					
		Branch Information		CONTRACT NUMBER					
								DRAWING NUMBER	
								9	

## NS8000 Sensor Detail



**Note:** • Locate the network sensor away from steam or water pipes, warm air stacks, unconditioned areas (not heated or cooled), or sources of electrical interference.

- Height requirements may vary depending on the site.
- Network sensors without CO<sub>2</sub> sensing are shock and vibration resistant, but not shock and vibration proof. Be careful not to drop the unit or mount it where it could be exposed to excessive vibration. Dropping a CO<sub>2</sub> network sensor may result in readings outside of the specified accuracy tolerance.

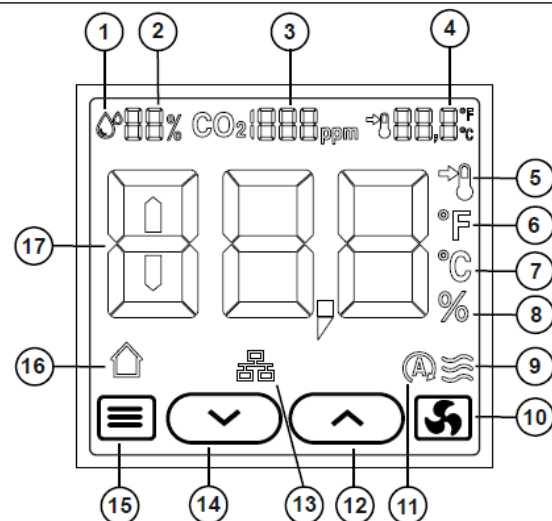


Table 1: Display icons

Icon	Description
1	Humidity indicator icon
2	Humidity measurement
3	CO <sub>2</sub> measurement
4	Configurable setpoint or current temperature
5	Setpoint indicator icon
6	Fahrenheit icon
7	Celsius icon
8	Percent relative humidity icon
9	Fan speed bars
10	Fan icon
11	Automatic fan speed icon
12	Up adjustment or navigation icon
13	SA bus online indicator
14	Down adjustment or navigation icon
15	Menu or enter icon
16	Occupancy indicator
17	Default display value (setpoint, zone temperature, relative humidity)

-To change the display from °C to °F hold down

- Once you connect the NS to a controller that is connected to a SBH it will hold it's parameters when there's a power cycle

- The NS8000 uses a dipswitch to address it

- If the sensor is the only one on the bus there is no need to change the default address of 199

-You can have a max of 5 NS sensors on the sensor bus that can be daisy chained for averaging. You can use addresses (199-206)  
You do not need to do additional steps it will average automatically.

-Each averaging sensor will display it's local temp not the average. While looking at the SBH for that SA bus it will display the average. If you want to see the individual averaging sensor temp click on the **controller>details>netsensor plug and play.**

-This is a 4 wire bus & will not work on 3 wires. Use 18awg to 22awg

- In a retrofit application existing stat wire maybe used as long as you have 4 conductors

- If you are using a sensor with CO2 it's lifespan is 10 years under standard operating conditions

- If you are using a sensor with PIR it can work up to 26ft with clear line of site

- You can add a MAP tool on the bottom of the sensor to access the devices on the bus

- You have the option to terminate to the sensor with a modular jack or screw terminals



**In order for an NS8000 C02 sensor to work properly your SSE card needs to be running 4.0.1 firmware or higher. SSE cards with 4mb or 3.0 firmware will not work with 4.0.1 firmware. An SSE card needs at least 8mb to run the 4.0.1 firmware & pretty much any SSE card made before 2017 only has 4mb of memory.**




## Dipswitch Settings

OFF  $\rightarrow$  ON   OFF  $\rightarrow$  ON   OFF  $\rightarrow$  ON   OFF  $\rightarrow$  ON   OFF  $\rightarrow$  ON   OFF  $\rightarrow$  ON   OFF  $\rightarrow$  ON   OFF  $\rightarrow$  ON





























4 2 1   4 2 1   4 2 1   4 2 1   4 2 1   4 2 1   4 2 1   4 2 1

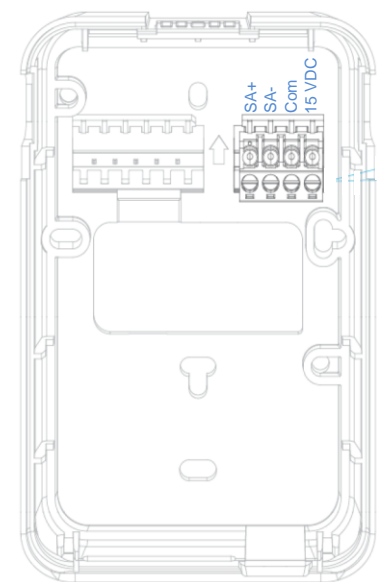
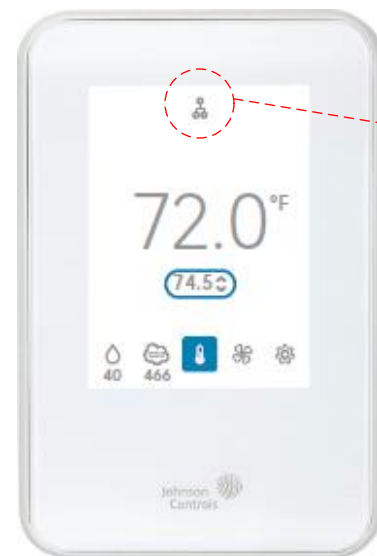
199   200   201   202   203   204   205   206

Drawing Title								
	REFERENCE DRAWING	NO.	REVISION-LOCATION			ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED		
				BY	SJN	DATE	8-12-2022	BY
								DATE
Project Title				Branch Information			CONTRACT NUMBER	
SMART RTU							DRAWING NUMBER	
							10	



### NS8000 Color Sensor Detail

	Up Arrow-Cannot Hide Icon
	Down Arrow-Cannot Hide Icon
	Background Light-Cannot Hide Icon
	Background Dark-Cannot Hide Icon
	Brightness Bar-Cannot Hide Icon
	Brightness-Cannot Hide Icon
	Cancel-Cannot Hide Icon
	Checkmark-Cannot Hide Icon
	Fan Speed-Can Hide Icon
	Fan Auto-Can Hide Icon
	Fan Speed Bars-Can Hide Icon
	Relative Humidity-Can Hide Icon
	CO2-Can Hide Icon
	Occupancy-Can Hide Icon
	Setpoint-Can Hide Icon
	Occupancy-Cannot Hide Icon
	Setpoint-Cannot Hide Icon
	Settings-Can Hide Icon
	Settings Lock-Can Hide Icon
	Temperature-Cannot Hide Icon
	Settings Enabled-Cannot Hide Icon
	Settings Disabled-Cannot Hide Icon
	Error-Cannot Hide Icon
	Page Indicator-Cannot Hide Icon
	Scroll Arrows-Cannot Hide Icon
	Timeout-Cannot Hide Icon
	Screen Dim-Cannot Hide Icon
	Screen Off-Cannot Hide Icon



- Once you connect the NS to a controller that is connected to a SBH it will hold it's parameters when there's a power cycle

-To change the address hold the network icon for 3 seconds, then hold the "SA Bus" for 3 seconds then use the arrow & save

- If the sensor is the only one on the bus there is no need to change the default address

-You can have a max of 8 NS sensors on the sensor bus that can be daisy chained for averaging. You can use addresses (199-206)  
You do not need to do additional steps it will average automatically.

-Each averaging sensor will display it's local temp not the average. While looking at the SBH for that SA bus it will display the average. If you want to see the individual averaging sensor temp click on the **controller>details>netsensor plug and play.**

-This is a 4 wire bus & will not work on 3 wires. Use 18awg to 22awg

- In a retrofit application existing stat wire maybe used as long as you have 4 conductors

- If you are using a sensor with CO2 it's lifespan is 10 years under standard operating conditions

- If you are using a sensor with PIR it can work up to 26ft with clear line of site

- You can add a MAP tool on the bottom of the sensor to access the devices on the bus

- You have the option to terminate to the sensor with a modular jack or screw terminals

-To change the set point range log into the **Smart Building Hub, Devices**, click on the controller your stat is attached to & go to **Setpoints**,

-To lock out the color screen see the installation guide in the link below

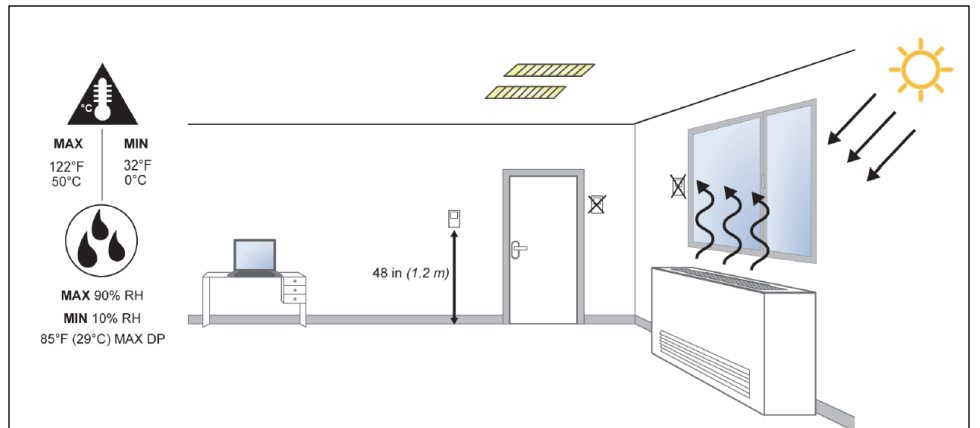
-To hide icons on the color display refer to the installation guide in the link below

<https://docs.johnsoncontrols.com/bas/r/Johnson-Controls/en-US/Vertical-Wallbox-Mounted-or-Surface-Mounted-NS8000-Series-Network-Sensors-Graphical-Display-Models-Installation-Guide/D>



### Tech Tip:

**In order for an NS8000 C02 sensor to work properly your SSE card needs to be running 4.0.1 firmware or higher. SSE cards with 4mb or 3.0 firmware will not work with 4.0.1 firmware. An SSE card needs at least 8mb to run the 4.0.1 firmware & pretty much any SSE card made before 2017 only has 4mb of memory.**




Locate sensor away from steam, water pipes, warm air stacks, unconditioned areas (not heated or cooled), sources of electrical interference, or on walls that radiate the temperature from the outside (you can use a thermal barrier)

Make sure to plug conduit coming from an unconditioned space to keep cold or warm air from being pushed down conduit to the back of the sensor

Height requirements may vary depending on the site & ADA requirements


Network sensors without CO<sub>2</sub> sensing are shock & vibration resistant, but not shock & vibration proof. Be careful not to drop the unit or mount it where it could be exposed to excessive vibration. Dropping CO<sub>2</sub> network sensor may result in reading outside of the specified accuracy tolerance

Display Text	Economizer Fault Condition	Possible Problem
E0	Air Temp Sensor Failure or Fault	Problem with one of the air temperature sensors. Check outdoor air, return air, or supply air sensors
E1	Not economizing when it should	The economizer is not using outdoor air when it should
E2	Economizing when it should not	The economizer is allowing outdoor air inside when the conditions are not suitable for economizer operation
E3	Damper not modulating	The economizer damper is not able to modulate properly. Check damper, linkage to actuator, or the actuator
E4	Excess outdoor air	The economizer is allowing excess air inside

Drawing Title								
	REFERENCE DRAWING		NO.	REVISION-LOCATION		ECN	DATE	BY
Sales Engineer		Project Manager		Application Engineer	DRAWN		APPROVED	
					BY SJN	DATE 8-12-2022	BY	DATE
Project Title  SMART RTU					Branch Information		CONTRACT NUMBER	
							DRAWING NUMBER  10	

## Standard Installation Procedures

- Step 1: Install SBH (Smart Building Hub) at the jobsite, configure it, & connect to the internet. See pages 6, 7, 8, 9.
- Step 2: Verify the firmware on each SSE is at 4.2.1.6. When you do a power cycle on the SSE it will display it's current firmware. See page 4
- Step 3: Install SE-COM1001-0 Comm Card on each SSE card. See page 4.
- Step 4: Make sure each SSE board communication protocol is set to BACnet. See Page 4
- Step 5: Make sure each SSE board has it's own unique BACnet address. See pages 3 & 4
- Step 6: Pull 22\3 comm wire from the SBH to each SSE board. Before you terminate wires check for ground faults. See page 5.
- Step 9: Pull 22\4 sensor wire from each SSE board to it's wall module. Check for ground faults & terminate wires. See pages 4 & 10
- Step 10: Make sure comm wire to SSE boards is terminated on SBH & log into SBH.
- Step 11: Verify the RTUs\SSE boards show up in the device list of the SBH.
- Step 12: On the "Device" list page select "Edit Device Details" & give each RTU a proper descriptor.
- Step 13: Create a schedule for each RTU.
- Step 14: Verify functionality of each RTU & that text & email alerts are actually being sent.
- Step 15: Add login info (IP Address, User, & Password) to these drawings on page 8.
- Step 16: Redline these drawings & then print a new set to leave at the SBH & a copy to end user.

Drawing Title								
	REFERENCE DRAWING		NO.	REVISION-LOCATION		ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED		
Project Title  <b>SBH Config</b>				Branch Information		CONTRACT NUMBER		
				BY JB	DATE 3-23-21	BY	DATE	
				DRAWING NUMBER		12		



Definitions:

**Actuator**-A controlled piece of hardware that rotates to open & close valves or dampers  
**AHU**-Air Handling Unit. Typically heat supplied by a boiler & cool water supplied by a chiller  
**BACnet IP**-BACnet communication over the internet  
**BACnet MS\TP**-Master-Slave/Token Passing. 3 wire communication bus  
**BACnet**-A data communication protocol for building automation & control networks  
**BAS**-Building Automation System.  
**BBMD**-BACnet/IP Broadcast Management Device. Not used unless your using BACnet/IP  
**BYP200**-Bypass Damper Controller used for COBP.  
**CO2**-Carbon Dioxide. Our bodies breathe in Oxygen & breath out CO2.  
**COBP**-Change Over Bypass may also be called VVT. A type of zoning for your building using a bypass damper & zone dampers. Each zone gets a vote & the VZC determines the order of attention for each zone.  
**DHCP**-When a router or gateway assigns an address to each device plugged into it (Can change with power cycle)  
**Differential Pressure**-The difference in pressure between 2 given points. (like a VAV box or a filter)  
**DNS**-Domain Name System. Similar to a phone book for the internet.  
**DVC or DCV**-Demand Ventilation Control. A method to add fresh air in a room using CO2 sensors.  
**ECM**-Electronically Commutated Controller. A DC powered motor that can vary the speed & torque.  
**Ethernet**-A system for connecting a number of computers or controllers to form a local area network.  
**FC**-BACnet ms\tp bus. Verasys can have up to 100 devices on this bus or 10 VZCs.  
**Gateway**-The network hardware that routes information in your building.  
**ISP**-Internet Service Provider. (Comcast, Century Link, Cox,...)  
**LAN**-Local Area Network. A collection of devices connected together in one physical location, such as a building, office, or home.  
**MA**-Mixed Air. Where outside air & return air from the building mix.  
**OA**-Outside Air. Fresh air from outside the building.  
**RA**-Return Air. Air from the building coming back into the duct work to be reused or cycled outside.  
**RTU**-Rooftop Unit. A packaged unit that contains heating & cooling.  
**SA**-Sensor Bus. Verasys can have 8 devices on this bus. It has to have 4 wires. 2 for power & 2 for data.  
**SA**-Supply Air. May also be referred to as Discharge Air. This is the conditioned air from the RTU or AHU going into the space  
**SBH**-Smart Building Hub. The internet hub for Verasys.  
**SMART**-A software layer on many JCI products that allows them to be a plug & play device with Verasys.  
**SSE**-Simplicity Smart Equipment. Many York RTU\AHU\Chillers, Coleman, Lux Air, Tempmaster, Quantech Chillers have the SSE card installed. This makes them a SMART plug & play device with Verasys.  
**SSL**-Secure Sockets Layer. A computing protocol that ensures the security of data sent via the internet by using encryption.  
**Static I.P. Address**- Similar to a phone number but on the internet. (Fixed) Used to access the SBH.  
**Subnet**-A method used to separate a network in a building. BAS should be on it's own Subnet.  
**TEC**-BACnet Stat for 3rd Party RTU, Heat Pumps, Unit Heaters, & Splits. Has a built in economizer. Can't control VFDs.  
**TLS**-Transport Layer Security. A security protocol designed to facilitate privacy and data security for communications over the Internet.  
**VAC**-RTU Controller for 3rd Party Units. Can also be used for IOM, Lighting, Boiler, Chiller, & Sideloop applications.  
**VAV**-Variable Air Volume. A type of zoning for your building using VAV boxes & a VFD. RTU is usually cooling only.  
**VEC**-RTU Controller for Zoning. There are multiple apps you can install on the VEC. (Heat Pump, Mod Heat Mod Cool, Mod Heat Stage Cool, Stage Heat Mod Cool, Stage Heat Stage Cool)  
**VFD**-Variable Frequency Drive. Hardware that allows you to vary the speed of a fan or pump. Great for saving energy!  
**VPN**-Virtual Private Network. A layer of internet security end user typically use requiring you to have a login to access their network.  
**VZC**-Verasys Zone Coordinator. Verasys can have up to 10 VZCs on the FC System bus.  
**ZA**-Zone Bus. Verasys can have up 33 controllers on this bus. 32 zones & 1 controller for RTU.  
**ZEC310**-Damper Controller used for COBP.  
**ZEC510**-VAV Box Controller. Can be used as stand alone zone control.


The Gotchas:

- #1-Identify what kind of system this is? SMART, 3<sup>rd</sup> Party, CV, VAV, VVT, Boiler, Chiller, Lighting, Power Monitoring? This will determine what parts & apps you need.
- #2-Is the RTU or AHU motor an ECM? (variable speed motor...no need for a VFD)
- #3-Is the fan motor single phase? (VFDs typically don't work on single phase)
- #4-Does the OA Damper have an existing actuator & if so can you re-use it?
- #5-Does the existing actuator even work?
- #6-How does the actuator mount & will we need mounting hardware to mount a new actuator?
- #7-How are you going to run the BACnet wire & how much do you need?
- #8-Where will everything mount in RTU or AHU?
- #9-Do the RTUs already have DCV & VFD's?
- #10-Where am I going to mount the SBH & can I get internet access?
- #11-Have you read the spec & have you reviewed the notes in the drawings?
- #12-Can the RTU or AHU be used for VAV? Does it have a VFD or differential pressure?
- #13-Is there already a BACnet Com card on the SSE board?
- #14-Does the SSE board have 8mb of memory? If not it will lock up the board if you load the Verasys firmware on it.
- #15-Current firmware is loaded at the factory. However we don't know how long a part will sit before installation. On every job **update all hardware to current firmware versions**.

**Suggestion:** When bidding a job get pictures of the RTU TAG, nameplate on the fan motor, the inside of the RTU where equipment will mount, OA damper & how it mounts. If the RTU has an SSE card then take a detailed picture of the board & barcode on it to determine if it will work with Verasys. This is also a good time to meet with the I.T. group to see if you can be on their network. If they say “yes” then ask for: Static IP Address, Subnet Mask, Default Gateway, & Primary & a Secondary DNS Server. If they say “no” talk to the end user about getting internet from a local ISP. There’s even a cellular option we could recommend for Vearsys.

Helpful Links:

- <http://www.verasyscontrols.com/resources/training-and-education>
- <http://www.verasyscontrols.com/resources/technical-literature-and-documentation#installation>

Drawing Title <b>Appendix</b>						
	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	By Steve Nichols	DATE 8-12-2022	BY DATE
Project Title <b>SMART RTU</b>			Branch Information		CONTRACT NUMBER	
					DRAWING NUMBER <b>12</b>	