VERASYS™

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Support:

Distributor Phone # Insert Info
Contractor 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:

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		APPROVED	
				BY Steve Nichol DATE 12-30-2021	BY	DATE	
Project Title			Branch Installation		CONTRACT NUMBER		
3rd Party COBP		VERASYS™				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-PVC	System/Zone Bus Cable 22-3C Shielded NonPlenum Wire	1
Network	Communication Wire	CBL-22/2P-SAPVC	Sensor Bus Cable 22-2P Shielded NonPlenum Wire	1
MZ- Zone Coordinator	Zone Coordinator	LC-VZC100-0	Verasys Zoning Coordinator for VAV and COBP applications	1
MZ- Zone Coordinator	Zone Power	PSH300A	480/277/240/120V to 24V XFR, 3 Circuits 100VA each (Power for 18 Boxes)	1
MZ- 3rd Party Units	3rd Party Controller	LC-VEC100-0	3rd Party RTU (VAV, COPB)	1
MZ- 3rd Party Units	Duct Sensors	TE-6311M-1	8" Duct Sensor Metal Enclosure, Nickel	2
MZ- 3rd Party Units	Outside Temp	TE-6313P-1	Outside Air Sensor, Nickel	1
MZ - COBP Zones	NS Sensor	NSB8BTN240-0	TEMP, DISPLAY, SETPOINT, WHITE, LOGO	14
MZ - COBP Zones	Controller	LC-ZEC310-0	Field Installed, Zone Damper Controller No Damper	14
MZ- Bypass Damper	Controller	LC-BYP200-0	Field Installed, Bypass Damper Controller No Damper	1
MZ- Bypass Damper	Static Pressure Sensor	DPT2640-005D	Low Differential Pressure Transducer 0-5 in WC, 0-5VDC	1
MZ- Bypass Damper	Static Pressure Probe	FTG18A-600R	Duct Static Pressure Probe (Need 1 Per Sensor)	1

Feature	System Features the VEC100 can cover
Up to 2 Stage Cooling	Yes
Up to 4 Stage Cooling	Yes
Modulating Cooling	Yes
Up to 2 Stage Heating	Yes
Up to 3 Stage Heating	No
Modulated Heating	Yes
Heat Pump	Yes
Economizer	Yes
Title 24 Economizer	No
Demand Ventilation Control	Yes
Dehumidification	No
Humidification	No
Variable Air Volume	Yes
Changeover Bypass (COBP)	Yes
VFD for COBP	Yes

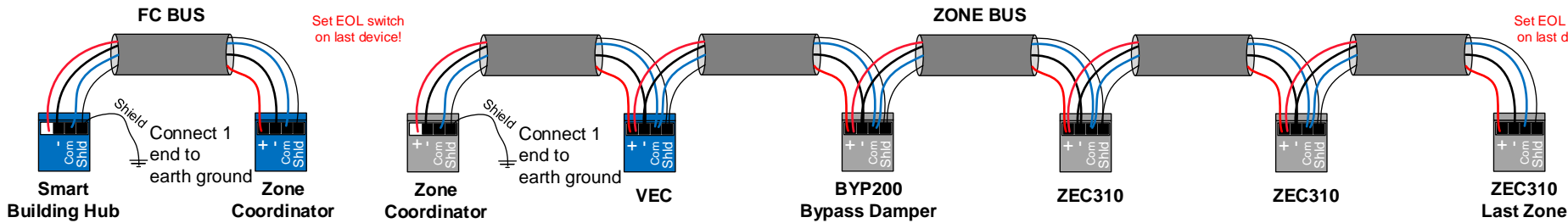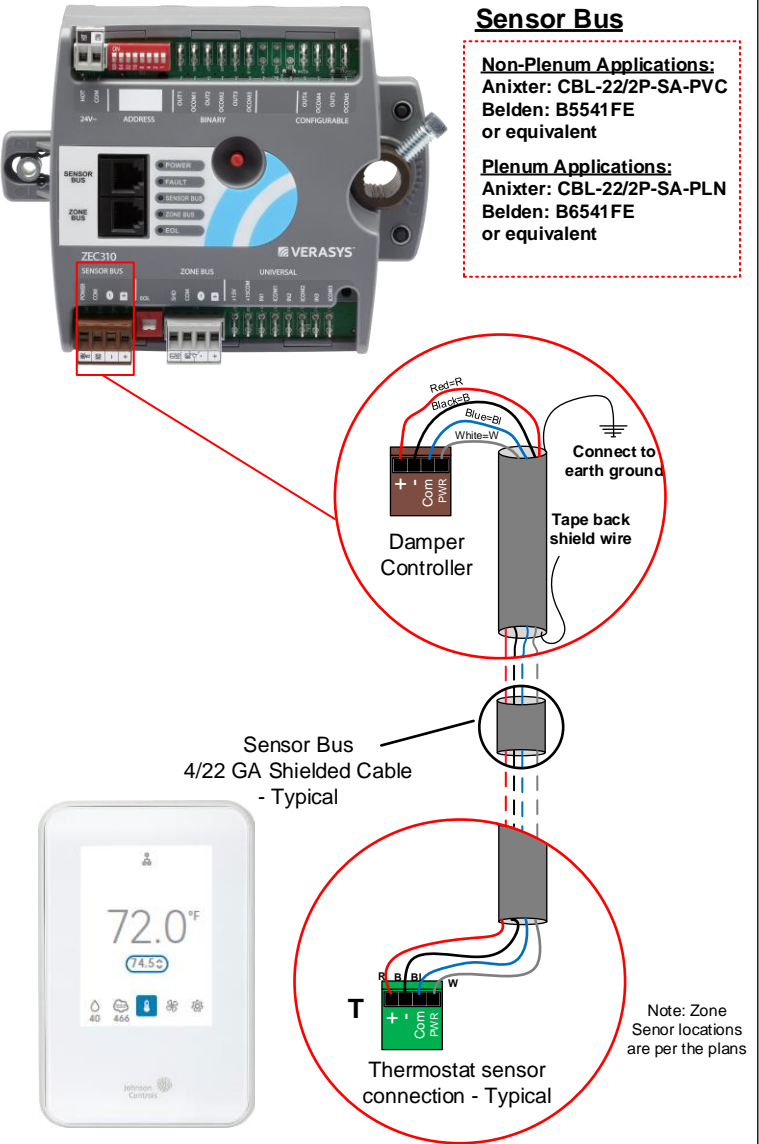*** add a 16awg 2 conductor stranded wire 1k foot roll of wire to your estimate for power to the controllers**

Drawing Title							
Bill Of Material							
	REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY
Sales Engineer	Project Manager	Application Engineer	DRAWN			APPROVED	
			BY Steve Nichols	DATE 12-30-2021	BY	DATE	
Project Title		Branch Installation			CONTRACT NUMBER		
3rd Party COBP							
					DRAWING NUMBER		
					2		

System Riser
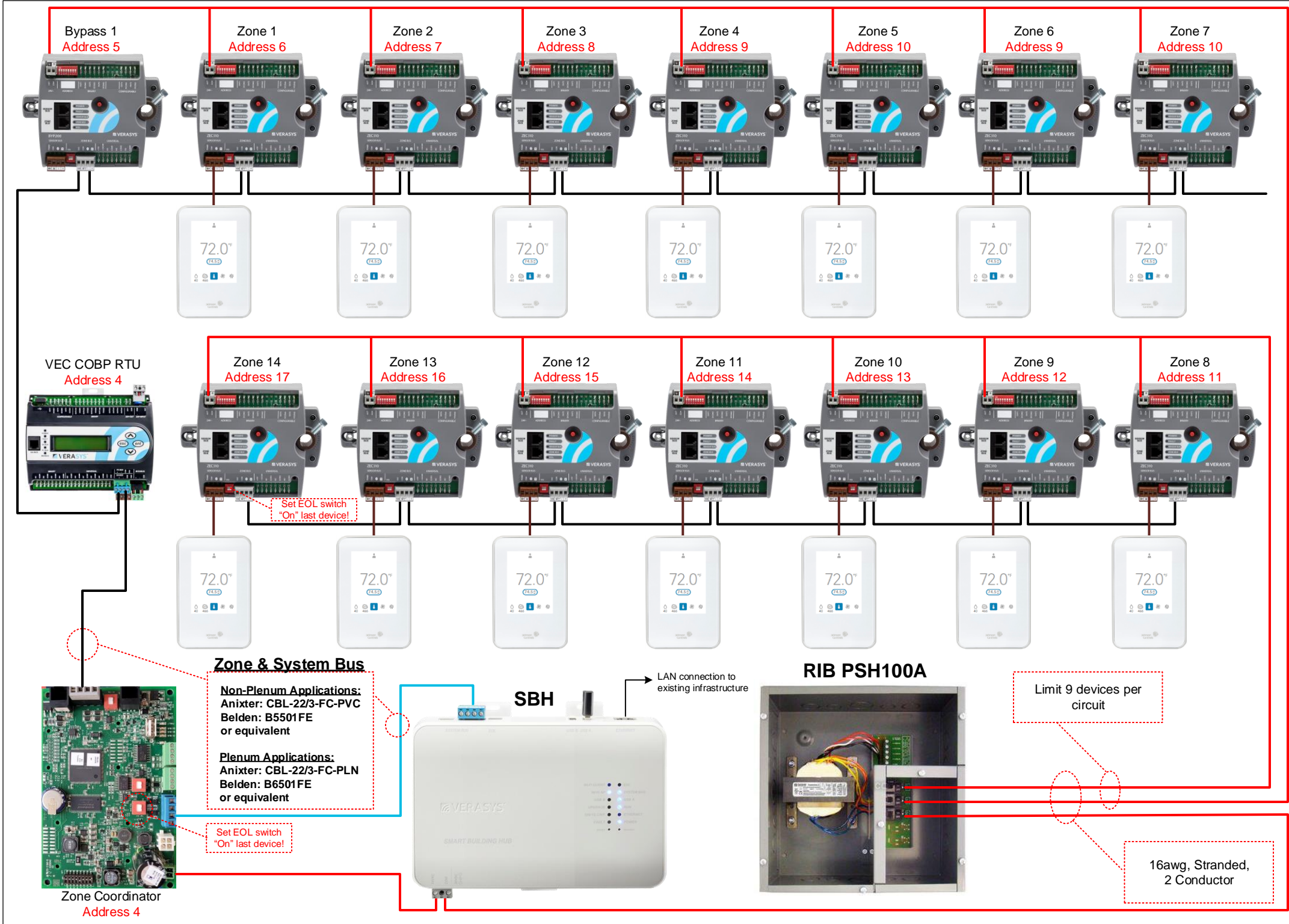
Additional Notes

The system bus and zone bus trunk wiring is shown as a guide.
- The controllers on the system bus can be in a different order but you still must follow the rules for end of line (EOL).
- The controllers for the zone bus must go to the appropriate zone coordinator but can in a different order but you still must follow the rules for end of line (EOL).
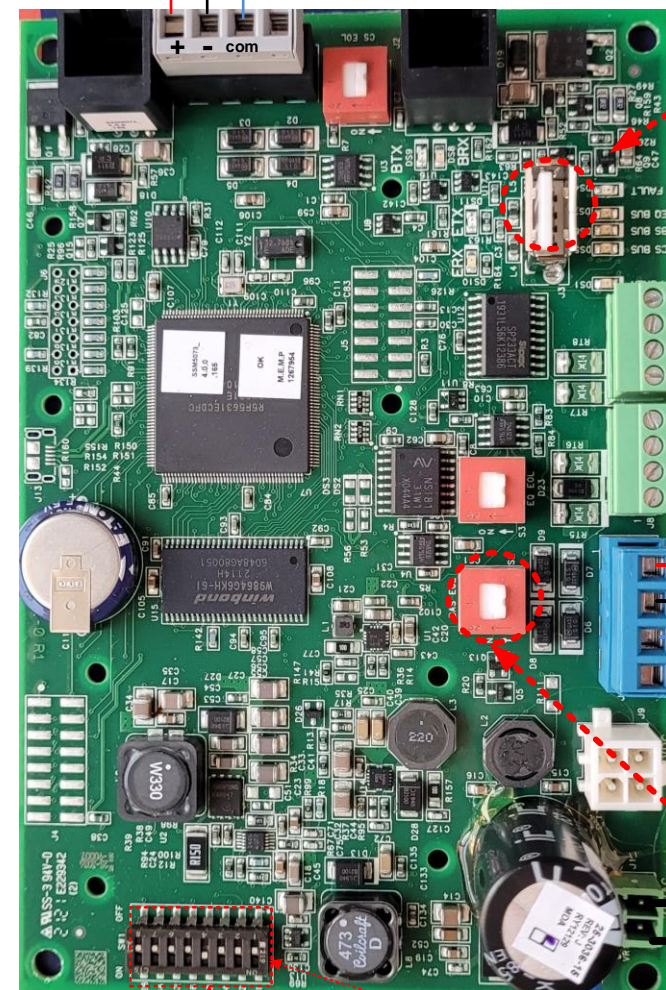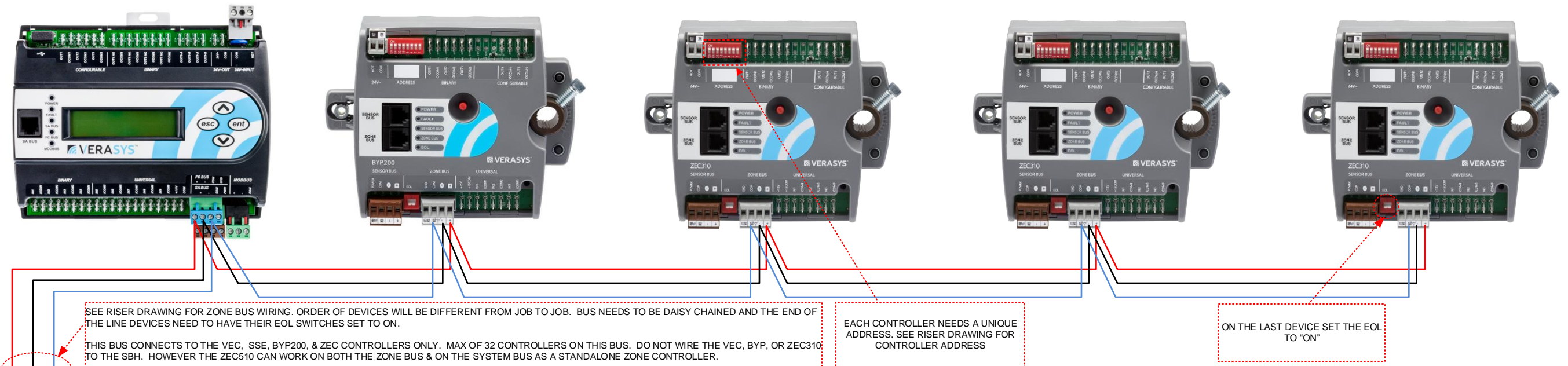
Bypass 1 Address 5
Zone 1 Address 6
Zone 2 Address 7
Zone 3 Address 8
Zone 4 Address 9
Zone 5 Address 10
Zone 6 Address 9
Zone 7 Address 10

72.0° 72.0° 72.0° 72.0° 72.0° 72.0° 72.0°

VEC COBP RTU
Address 4

Zone 14 Address 17
Zone 13 Address 16
Zone 12 Address 15
Zone 11 Address 14
Zone 10 Address 13
Zone 9 Address 12
Zone 8 Address 11

Set EOL switch "On" last device!

72.0° 72.0° 72.0° 72.0° 72.0° 72.0° 72.0°

Sensor Bus

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

Connect to earth ground

Tape back shield wire

Red=R
Black=B
Blue=Bl
White=W

Damper Controller

Sensor Bus 4/22 GA Shielded Cable - Typical

72.0°F
74.5°

T

Thermostat sensor connection - Typical

Note: Zone Senor locations are per the plans

Zone & System Bus

Non-Plenum Applications:
Anixter: CBL-22/3-FC-PVC
Belden: B5501FE
or equivalent

Plenum Applications:
Anixter: CBL-22/3-FC-PLN
Belden: B6501FE
or equivalent

LAN connection to existing infrastructure

SBH

RIB PSH100A

Limit 9 devices per circuit

16awg, Stranded, 2 Conductor

Zone Coordinator
Address 4

Set EOL switch "On" last device!

FC BUS

Set EOL switch on last device!

Shield

Connect 1 end to earth ground

Smart Building Hub

Zone Coordinator

ZONE BUS

Set EOL switch on last device!

Shield

Connect 1 end to earth ground

Zone Coordinator

VEC

BYP200 Bypass Damper

ZEC310

ZEC310

ZEC310 Last Zone

Verasys Zone Coordinator

SEE RISER DRAWING FOR ZONE BUS WIRING. ORDER OF DEVICES WILL BE DIFFERENT FROM JOB TO JOB. BUS NEEDS TO BE DAISY CHAINED AND THE END OF THE LINE DEVICES NEED TO HAVE THEIR EOL SWITCHES SET TO ON.

THIS BUS CONNECTS TO THE VEC, SSE, BYP200, & ZEC CONTROLLERS ONLY. MAX OF 32 CONTROLLERS ON THIS BUS. DO NOT WIRE THE VEC, BYP, OR ZEC310 TO THE SBH. HOWEVER THE ZEC510 CAN WORK ON BOTH THE ZONE BUS & ON THE SYSTEM BUS AS A STANDALONE ZONE CONTROLLER.

EACH CONTROLLER NEEDS A UNIQUE ADDRESS. SEE RISER DRAWING FOR CONTROLLER ADDRESS

ON THE LAST DEVICE SET THE EOL TO "ON"

USB PORT IS USED FOR UPDATING FIRMWARE

Tech Tip: To upgrade firmware on the VZC download it from the verasyscontrols.com website. This firmware will also load new firmware on all the controllers connected to the Zone Bus. This update will take awhile depending on how many controllers are connected.

Tech Tip: If you change a dipswitch while the device is powered you will need to do a power cycle for the new address to show up.

Tech Tip: Get the VZC communicating with the SBH first. Then add a controller at a time. It can take a long time for devices to show up under the VZC. You may even need to do a power cycle on the VZC to force it to look for new controllers.

SEE RISER DRAWING FOR SYSTEM BUS WIRING

24VAC
24VAC

#4

OFF
ON
128 64 32 16 8 4 2 1

EACH CONTROLLER NEEDS A UNIQUE ADDRESS. SEE RISER FOR VZC ADDRESS

SEE RISER SCHEDULE SET EOL TO ON IF VZC100 IS THE END OF THE LINE ON THE SYSTEM BUS

See page 14 for more dipswitch addresses

SCHEDULING: THE ZONE COORDINATOR WILL HOLD A SCHEDULE FOR THE UNIT AND ASSOCIATED ZONES. WHEN THE SCHEDULE IS OCCUPIED THE UNIT AND ZONES ASSOCIATED TO THE COORDINATOR WILL BE INDEXED TO OCCUPIED. WHEN THIS SCHEDULE IS SET TO UNOCCUPIED THE UNIT AND THE ZONES WILL BE SET TO UNOCCUPIED.

SYSTEM TYPE: THRU THE INTERFACE IN ZONE COORDINATOR THE COORDINATOR CAN BE SET TO CONTROL A VAV SYSTEM OR A CHANGE OVER BYPASS SYSTEM DEPENDING UPON SELECTION THE UNIT AND ZONE WILL OPERATE AS FOLLOWS.
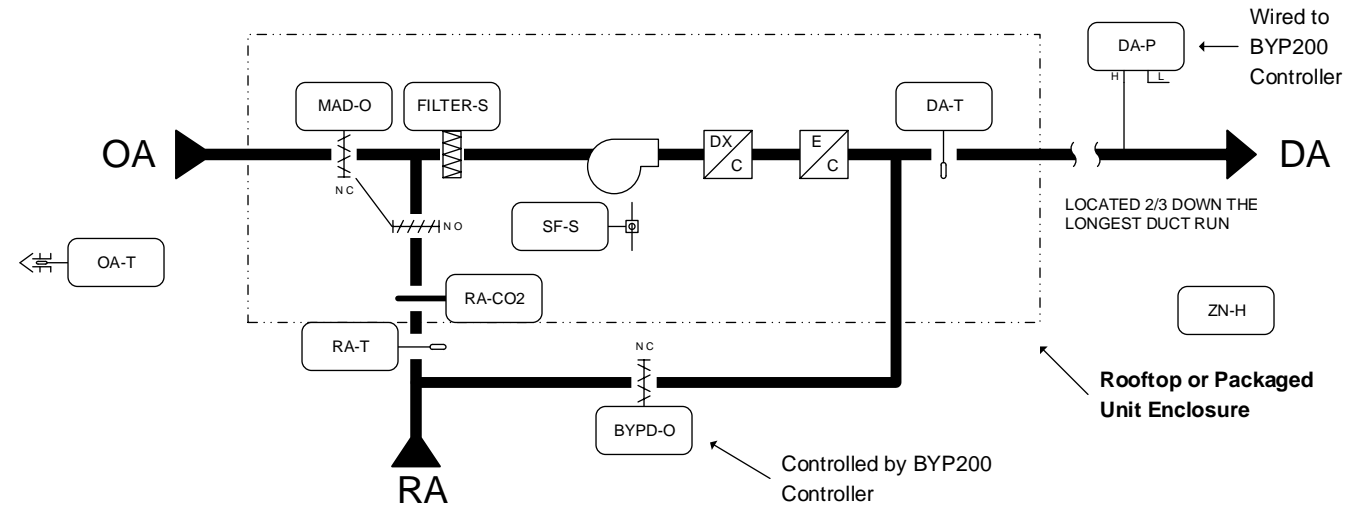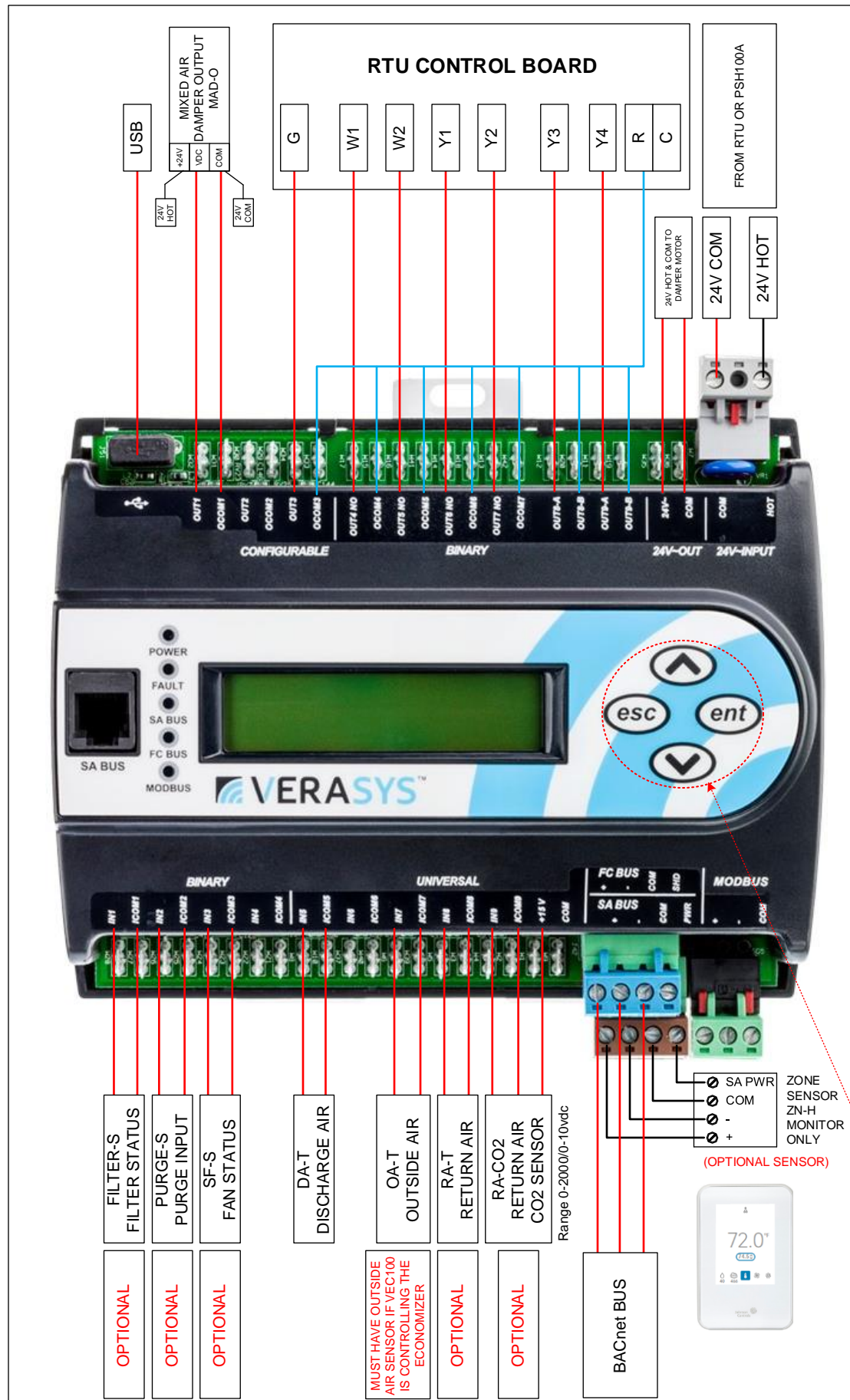
VAV SYSTEM: WHEN SET TO VAV, THE UNIT WILL CONTROL TO THE DISCHARGE AIR TEMPERATURE SETPOINT WHICH IS RESET BASED ON A REPRESENTATIVE ZONE. IF THIS FEATURE IS DISABLED THE UNIT WILL CONTROL TO A FIXED DISCHARGE AIR TEMPERATURE. IN ADDITION TO TEMPERATURE THE UNIT WILL CONTROL THE PRESSURE WHICH MAYBE RESET BASED ON THE DAMPER OF THE ZONE CALLING FOR THE MOST COOLING. IT TOO MAYBE DISABLED AND A FIXED SETPOINT CAN BE SET. THE VAV BOXES WILL CONTROL EACH ZONE TO THE ZONE SETPOINT USING THE UNITS COOLING FOR COOLING AND THE BOX HEAT FOR REHEAT (IF AVAILIBLE).

CHANGE OVER BYPASS SYSTEM: WHEN SET TO CHANGE OVER BYPASS, THE UNIT WILL CONTROL THE DISCHARGE AIR TO PROVIDE EITHER HEATING OR COOLING DEPENDING UPON THE VOTE OF THE ZONES. THE USER WILL HAVE THE ABILITY TO DECLARE WHICH ZONE CAN VOTE AND HOW MUCH VOTING POWER THEY WILL HAVE. THE PRESSURE IN THE DUCT WILL BE CONTROLED BY THE BYPASS DAMPER CONTROLLER. EACH ZONE DAMPER WILL INDEPENDANTLY CONTROL TO HEATING OR COOLING DEPENDING UPON THE DISCHARGE OF THE UNIT. IF THE ZONE IS CONTROLLED BY A VAV BOX THE ZONE MAYBE ABLE TO PROVIDE HEATING WHEN THE DISCHARGE IS COOLING. WHEN THE UNIT IS OFF THE BYPASS DAMPER WILL INDEX TO 50%.

THIS IS A SIMPLIFIED SEQUENCE FOR HOW THE VAV AND CHANGE OVER BYPASS SYSTEM WILL WORK. FOR MORE DETAILED INFORMATION SEE THE VERASYS USER MANUAL.

Drawing Title						
VZC Detail						
		REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED
				BY Steve Nichol	DATE 12-30-2021	BY	DATE
Project Title		Branch Information				CONTRACT NUMBER
3rd Party COBP						

VERASYS™

DRAWING NUMBER

4

RTU CONTROL BOARD

Labels (top terminals): USB, MIXED AIR DAMPER OUTPUT MAD-O (24V, VDC, COM), 24V HOT, 24V COM, G, W1, W2, Y1, Y2, Y3, Y4, R, C, FROM RTU OR PSH100A, 24V HOT & COM TO DAMPER MOTOR, 24V COM, 24V HOT

CONFIGURABLE | BINARY | 24V-OUT | 24V-INPUT

VERASYS

POWER, FAULT, SA BUS, FC BUS, MODBUS

esc / ent / up / down

SA BUS

BINARY | UNIVERSAL | FC BUS (COM, SHD), SA BUS (COM, PWR), MODBUS (COM)

Bottom labels:
- FILTER-S FILTER STATUS — OPTIONAL
- PURGE-S PURGE INPUT — OPTIONAL
- SF-S FAN STATUS — OPTIONAL
- DA-T DISCHARGE AIR
- OA-T OUTSIDE AIR — MUST HAVE OUTSIDE AIR SENSOR IF VEC100 IS CONTROLLING THE ECONOMIZER
- RA-T RETURN AIR — OPTIONAL
- RA-CO2 RETURN AIR CO2 SENSOR — OPTIONAL (Range 0-2000/0-10vdc)
- BACnet BUS

SA PWR, COM, -, + — ZONE SENSOR ZN-H MONITOR ONLY (OPTIONAL SENSOR)

72.0°

Diagram (right top)

OA → MAD-O, FILTER-S, DX C, E C, DA-T → DA
Wired to BYP200 Controller (DA-P)
LOCATED 2/3 DOWN THE LONGEST DUCT RUN
ZN-H
OA-T
SF-S
RA-CO2
RA-T
BYPD-O — Controlled by BYP200 Controller
RA
Rooftop or Packaged Unit Enclosure

SUPPLY FAN START/STOP: THE SUPPLY FAN WILL BE STARTED ACCORDING TO THE SCHEDULE AND THE CONTROL SEQUENCE WILL BE ENABLED. IF THE SUPPLY FAN STATUS DOES NOT MATCH THE COMMANDED VALUE AFTER AN ADJUSTABLE PERIOD OF TIME, AN ALARM WILL BE GENERATED THIS FEATURE CAN BE DISABLED. A TOTALIZATION ALARM CAN ALSO BE SETUP TO GENERATE AN ALARM AFTER THE FAN HAS REACHED THE RUN HOURS. THIS LIMIT CAN BE USED TO SET SERVICE ACTIVITIES LIKE FILTER REPLACEMENT. SETTING THE LIMIT TO 0 WILL DISABLE THIS ALARM.

STATIC PRESSURE CONTROL: THE BYPASS DAMPER WILL MODULATE TO MAINTAIN THE DISCHARGE STATIC PRESSURE AT SETPOINT. THE CONTROLLER FOR THIS IS A SEPARATE CONTROLLER.

DISCHARGE AIR TEMPERATURE CONTROL: THE MIXED AIR DAMPERS, ELECTRIC HEATING STAGES, AND THE DX COOLING STAGES WILL MODULATE/CYCLE TO MAINTAIN THE DISCHARGE AIR SETPOINT THAT IS ADJUSTED TO PROVIDE HOT OR COLD AIR DEPENDING UPON WHAT THE MAJORITY OF THE ZONES ARE CALLING FOR. IF THE CONTROLLER IS CALLING FOR COOLING AND THE DISCHARGE AIR DOES NOT DROP OVER AN ADJUSTABLE PERIOD OF TIME A COOLING ALARM WILL BE GENERATED. LIKEWISE IF A CALL FOR HEATING AND THE TEMPERATURE DOES NOT RISE OVER A PERIOD OF TIME A HEATING ALARM WILL BE GENERATED. AGAIN THESE ALARMS MAYBE TURNED OFF BY SETTING THE TIME PERIOD TO 0.

ECONOMIZER DRY BULB SWITCHOVER: WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW THE SWITCHOVER SETPOINT, THE ECONOMIZER WILL BE ENABLED. WHEN THE OUTSIDE AIR TEMPERATURE RISES ABOVE THE SWITCHOVER SETPOINT PLUS A DIFFERENTIAL, THE ECONOMIZER WILL BE DISABLED. IF ENABLED, THE ECONOMIZER LOW LIMIT WILL MODULATE THE DAMPER CLOSED WHEN THE DISCHARGE AIR REACHES A LOW LIMIT SETPOINT. IF AT ANYTIME THE PURGE CONTACT IS INITIATED THE DAMPERS WILL BE POSITIONED WIDE OPEN.

DEMAND VENTILATION CONTROL: IF THE WHEN RETURN AIR CO2 SENSOR IS CONNECTED, THE MINIMUM OUTSIDE AIR DAMPER POSITION WILL BE PROPORTIONALLY INCREASED IF THE RETURN AIR CO2 RISES ABOVE SETPOINT UNTIL IT HITS THE MAXIMUM POSITION SETPOINT.

NIGHT SETBACK/NIGHT SETUP: WHEN IN "UNOCCUPIED" MODE, THE UNIT WILL CYCLE AS NECESSARY TO MAINTAIN THE SHARED NIGHT SETBACK ZONE TEMPERATURE AT SETPOINT. A DIFFERENTIAL PREVENTS THE UNIT FROM CYCLING EXCESSIVELY.

SHUTDOWN:
WHEN THE UNIT IS SHUTDOWN BY EITHER A STOP COMMAND OR SYSTEM SAFETY THE UNIT WILL BE SET AS FOLLOWS:
- SUPPLY FAN WILL BE OFF
- BYPASS DAMPER WILL BE COMMANDED TO 50%
- OUTSIDE AIR DAMPER WILL CLOSE
- RETURN AIR DAMPER WILL OPEN
- DX COOLING WILL BE OFF
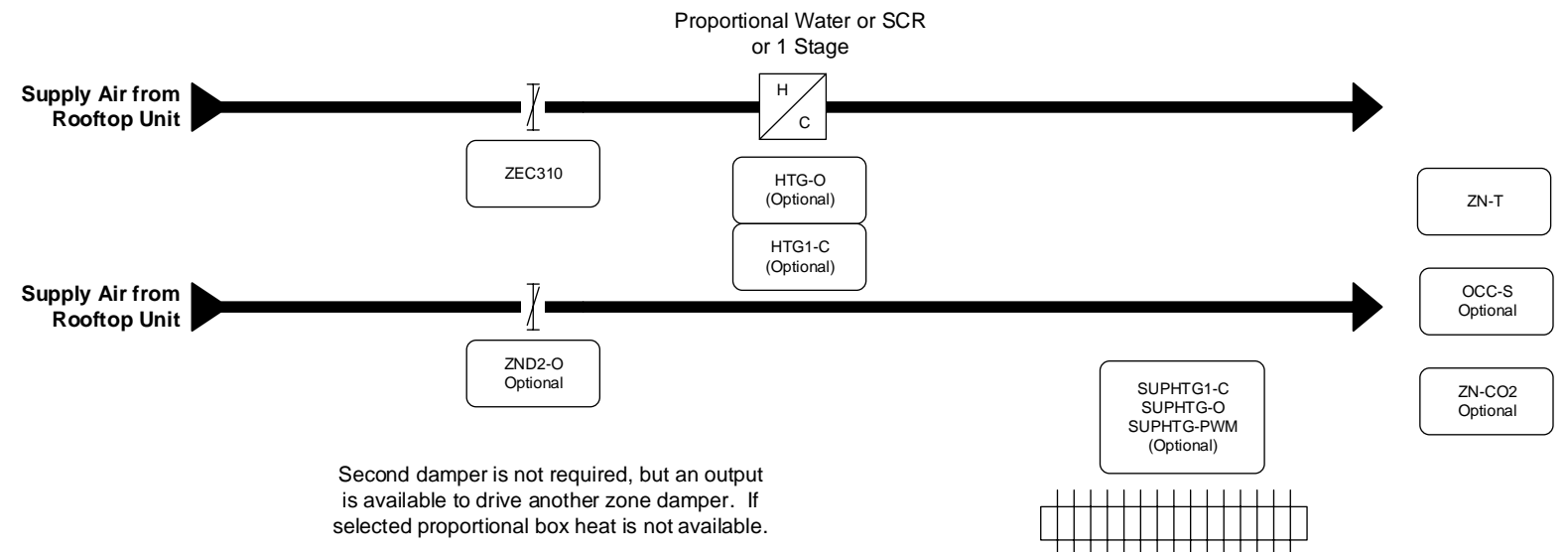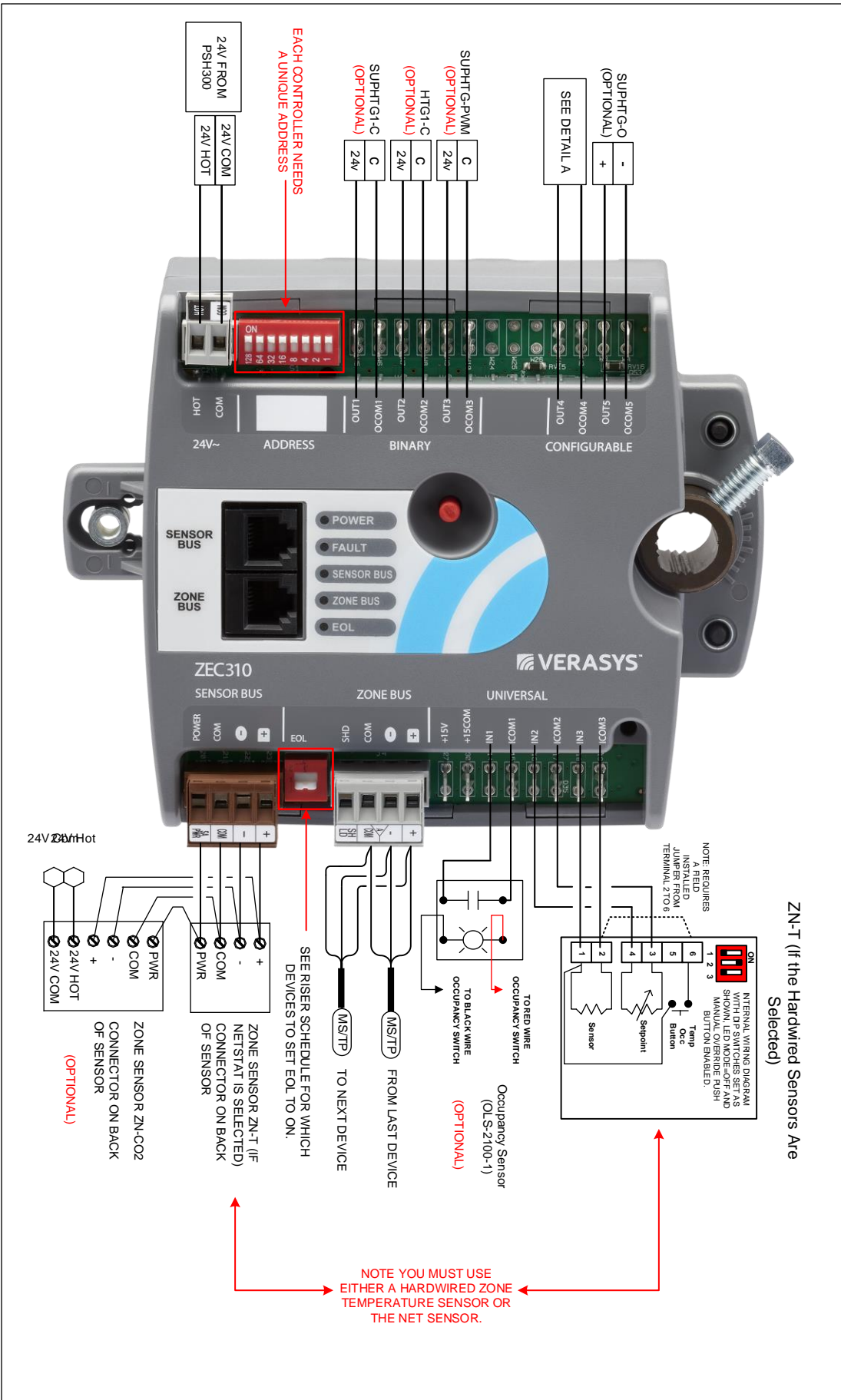- ELECTRIC REHEAT WILL BE OFF

You have 2 options when addressing a VEC zone controller:

1-From the display on the front of the VEC press "**ent**", arrow down to "**Controller**" & press "**ent**", arrow down to "**Network**" & press "**ent**", arrow down to "**Address**" & press "**ent**", press "**ent**" a 2nd time & the screen will blink, use the up or down arrow to change the address & press "**ent**". Note: You may need to do this 2 times for the address to stick

2-Connect the VEC to the smart building hub & power up the VEC. Once the SBH recognizes the VEC click on "Controller", "Network", & change "Address".

Drawing Title					
VEC Detail					
		REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN / DATE / BY
		Sales Engineer / Project Manager / Application Engineer	DRAWN	APPROVED	
Project Title		Branch Information	BY Steve Nichol DATE 12-30-2021	BY DATE	
3rd Party COBP			CONTRACT NUMBER		
			DRAWING NUMBER		5

VERASYS

Proportional Water or SCR or 1 Stage

Supply Air from Rooftop Unit

ZEC310

HTG-O (Optional)

HTG1-C (Optional)

ZN-T

Supply Air from Rooftop Unit

ZND2-O Optional

OCC-S Optional

ZN-CO2 Optional

SUPHTG1-C
SUPHTG-O
SUPHTG-PWM
(Optional)

Second damper is not required, but an output is available to drive another zone damper. If selected proportional box heat is not available.

Controller panel labels:
- 24V FROM PSH300 — 24V HOT, 24V COM
- EACH CONTROLLER NEEDS A UNIQUE ADDRESS
- SUPHTG1-C (OPTIONAL) — 24V, C
- SUPHTG-PWM (OPTIONAL) — C
- HTG1-C (OPTIONAL) — 24V, C
- SUPHTG-PWM (OPTIONAL) — 24V, C
- SEE DETAIL A
- SUPHTG-O (OPTIONAL) — +, -
- 24V~ ADDRESS BINARY CONFIGURABLE
- HOT COM
- OUT1 OCOM1 OUT2 OCOM2 OUT3 OCOM3 OUT4 OCOM4 OUT5 OCOM5
- POWER, FAULT, SENSOR BUS, ZONE BUS, EOL
- ZEC310 VERASYS
- SENSOR BUS, ZONE BUS, UNIVERSAL
- POWER, COM, EOL
- GND, COM, +15V, +15COM, IN1, ICOM1, IN2, ICOM2, IN3, ICOM3

Lower wiring labels:
- 24V Com / 24V Hot
- 24V HOT / 24V COM
- CONNECTOR ON BACK OF SENSOR
- ZONE SENSOR ZN-CO2 (OPTIONAL)
- CONNECTOR ON BACK OF SENSOR
- ZONE SENSOR ZN-T (IF NETSTAT IS SELECTED)
- SEE RISER SCHEDULE FOR WHICH DEVICES TO SET EOL TO ON.
- MS/TP TO NEXT DEVICE
- MS/TP FROM LAST DEVICE
- TO BLACK WIRE OCCUPANCY SWITCH
- TO RED WIRE OCCUPANCY SWITCH
- Occupancy Sensor (OLS-2100-1) (OPTIONAL)
- NOTE REQUIRES A FIELD INSTALLED JUMPER FROM TERMINAL 2 TO 6
- INTERNAL WIRING DIAGRAM WITH DIP SWITCHES SET AS SHOWN. LED MODE=OFF AND MANUAL OVERRIDE PUSH BUTTON ENABLED.
- Sensor, Setpoint, Temp Occ Button
- ZN-T (If the Hardwired Sensors Are Selected)
- NOTE YOU MUST USE EITHER A HARDWIRED ZONE TEMPERATURE SENSOR OR THE NET SENSOR.

OCCUPIED MODE: THE ZONE DAMPER CONTROLLER WILL MONITOR WHETHER WARM OR COOL AIR IS BEING SUPPLIED. ON A RISE IN ZONE TEMPERATURE ABOVE THE OCCUPIED COOLING SETPOINT AND SUPPLY AIR IS COOL, THE PRIMARY AIR DAMPER WILL MODULATE OPEN. ON A DROP IN ZONE TEMPERATURE BELOW THE OCCUPIED HEATING SETPOINT AND SUPPLY AIR IS WARM, THE PRIMARY AIR DAMPER WILL MODULATE OPEN. IF THE SUPPLY AIR IS NOT THE TYPE, WARM OR COOL, TO SATISFY THE COOLING OR HEATING REQUIREMENTS, THE PRIMARY AIR DAMPER WILL REMAIN AT MINIMUM.

UNOCCUPIED MODE: ALL ZONE DAMPER CONTROLLERS WILL BE INDEXED TO UNOCCUPIED HEATING AND COOLING SETPOINTS AND THE PRIMARY AIR DAMPERS FULLY OPEN. ON A RISE IN ZONE TEMPERATURE ABOVE THE UNOCCUPIED COOLING SETPOINT AND SUPPLY AIR IS COOL, THE PRIMARY AIR DAMPER WILL MODULATE OPEN. ON A DROP IN ZONE TEMPERATURE BELOW THE UNOCCUPIED HEATING SETPOINT AND SUPPLY AIR IS WARM, THE PRIMARY AIR DAMPER WILL MODULATE OPEN. IF THE SUPPLY AIR IS NOT THE TYPE, WARM OR COOL, TO SATISFY THE COOLING OR HEATING REQUIREMENTS, THE PRIMARY AIR DAMPER WILL REMAIN AT MINIMUM POSITION.

SUPPLEMENTAL HEATING (OPTIONAL): OUTPUTS FOR SUPPLEMENT HEATING WILL ALLOW THE USE TO ADD SUPPLEMENTAL HEATING TO THE CONTROLLER. IF ADDED AND SUPPLEMENTAL HEAT IS SET TO TRUE THE CONTROLLER WILL TRY TO USE SUPPLEMENTAL HEATING BEFORE VOTING FOR UNIT HEATING. IF THE SPACE DOES NOT SATISFY WITH ALL OF THE LOCAL HEAT THE CONTROLLER WILL VOTE FOR HEAT AND IF AVAILIBLE WILL ALSO USE IT TO SATISFY THE SPACE.

BOX HEATING (OPTIONAL): OUTPUTS FOR BOX HEATING WILL ALLOW THE USE TO ADD BOX HEATING TO THE CONTROLLER. IF ADDED THE CONTROLLER WILL TRY TO USE BOX HEATING BEFORE VOTING FOR UNIT HEATING. IF SUPPLEMENTAL HEAT IS ALSO ADDED THE USER CAN DECIDE WHICH IS USED FIRST. IF THE SPACE DOES NOT SATISFY WITH ALL OF THE LOCAL HEAT THE CONTROLLER WILL VOTE FOR HEAT AND IF AVAILIBLE WILL ALSO USE IT TO SATISFY THE SPACE.
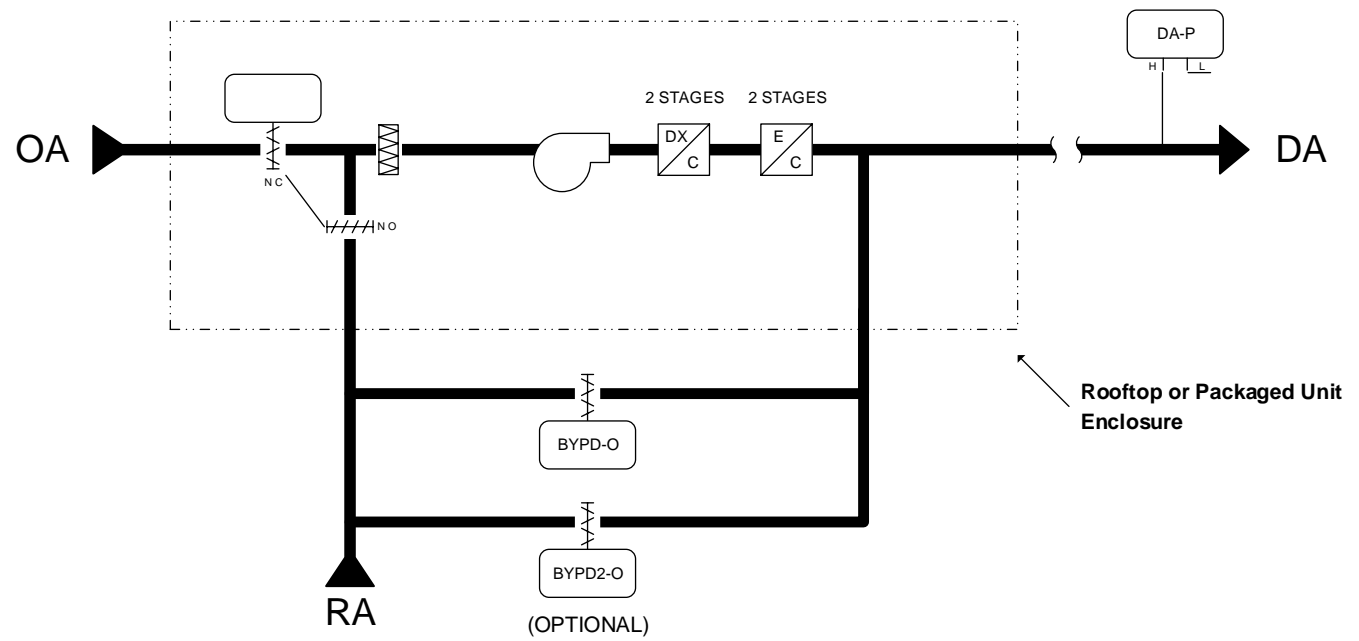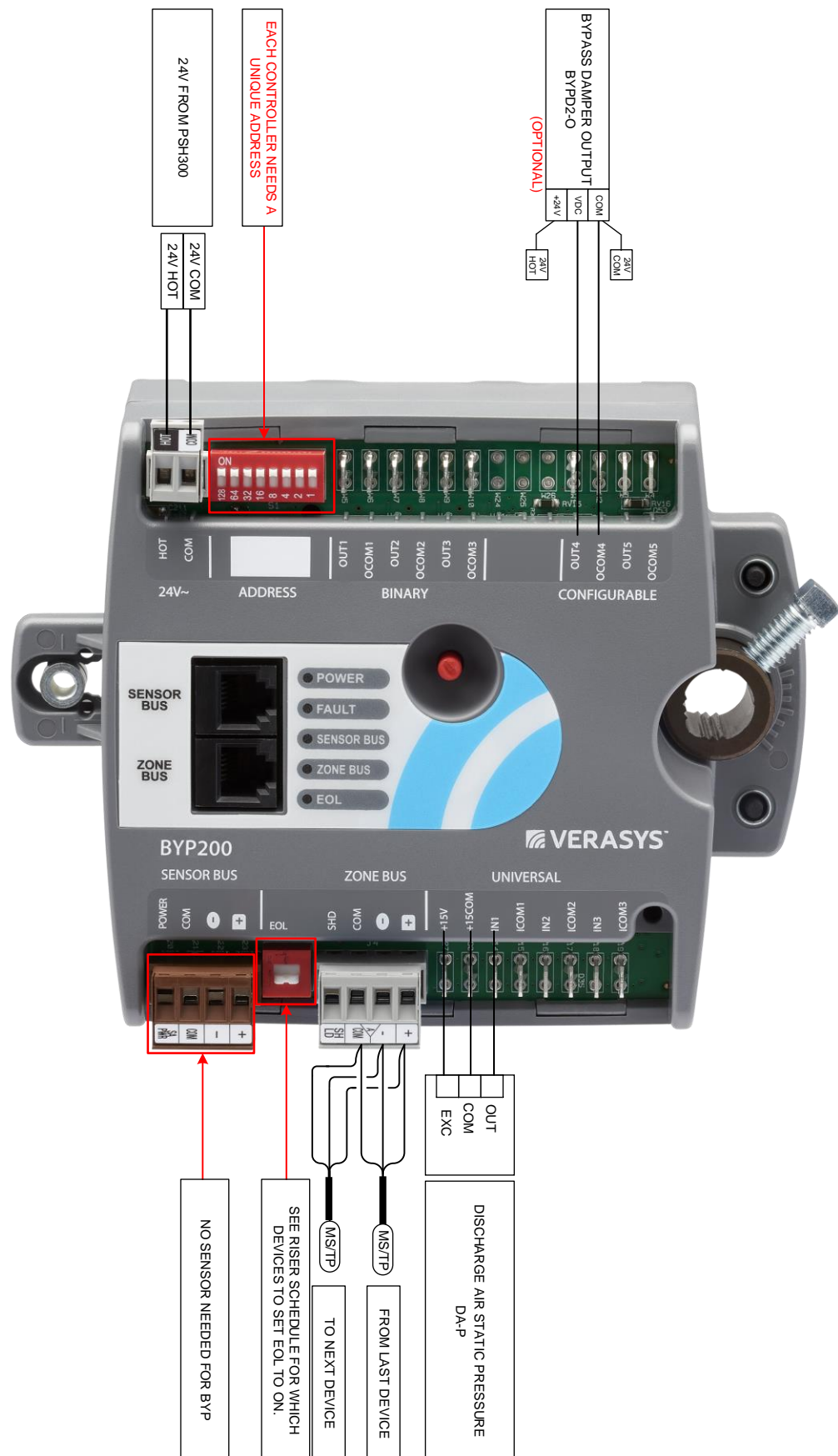
OCCUPANCY LIGHTING SWITCH (OPTIONAL): A OCCUPANCY LIGHTING SWITCH CAN BE ADDED TO THE CONTROLLER AND WILL TEMPORARILY SET THE CONTROLLER TO STANDBY MODE WHEN THE OCCUPANCY IS NOT BEING SENSED. WHEN THE CONTROLLER SENSES OCCUPANCY, THE ZONE WILL SWITCH BACK TO OCCUPIED. STANDBY MODE USES STANDBY TEMPERATURE SETPOINTS THAT ARE SLIGHTLY HIGHER OR LOWER THAN THE OCCUPIED COOLING OR HEATING SETPOINTS RESPECTIVELY.

DEMAND CONTROL VENTILATION (OPTIONAL): WHEN THE ZONE CO_2 SENSOR IS WIRED TO THE CONTROLLER, TO SENSE THE AIR QUALITY IN THE ZONE, THE MINIMUM DAMPER POSITIONS ARE PROPORTIONALLY RESET BASED ON AN AIR QUALITY (CO_2) SETPOINT. THE RESET OF THE DAMPER MINIMUM POSITIONS DO NOT EXCEED THE MAXIMUM VALUE THAT THE USER SETS. IF THE CO_2 SENSOR IS NOT CONNECTED THE CONTROLLER WILL USE THE COOLING MINIMUM POSITION AND THE HEATING MINIMUM POSITION.

DETAIL A

ZONE DAMPER OUTPUT 2
ZND2-O
(OPTIONAL)

24V Com
COM — OCOM4
VDC — OUT4
+24V
24V Hot

BOX HEATING OUTPUT
HTG-O
(OPTIONAL)

- — OCOM4
+ — OUT4

If box heat is selected the second damper is not available.
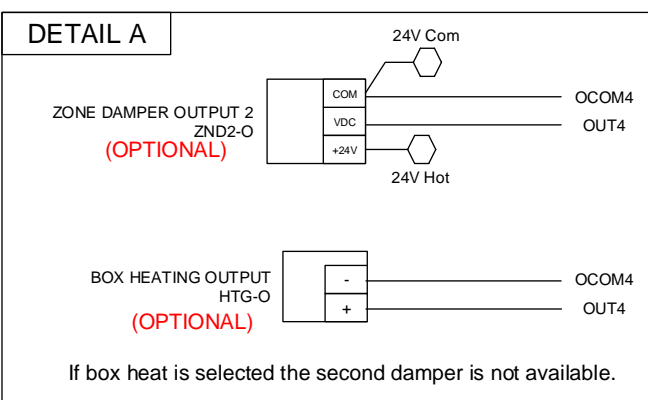
Drawing Title						
ZEC310 Detail						
	REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY
Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED	
			BY Steve Nichols DATE 12-30-2021	BY	DATE	
Project Title			Branch Installation	CONTRACT NUMBER		
3rd Party COBP						

VERASYS

DRAWING NUMBER

6

BYP200 Bypass Damper Controller for COBP

Left diagram labels:

24V FROM PSH300

24V HOT | 24V COM

EACH CONTROLLER NEEDS A UNIQUE ADDRESS

BYPASS DAMPER OUTPUT BYPD2-O

(OPTIONAL)

+24V | VDC | COM

24V HOT | 24V COM

ON

128 64 32 16 8 4 2 1

HOT COM — 24V~

ADDRESS

OUT1 OCOM1 OUT2 OCOM2 OUT3 OCOM3 — BINARY

OUT4 OCOM4 OUT5 OCOM5 — CONFIGURABLE

SENSOR BUS

ZONE BUS

POWER
FAULT
SENSOR BUS
ZONE BUS
EOL

BYP200

VERASYS™

SENSOR BUS | ZONE BUS | UNIVERSAL

POWER | COM | EOL | SHD | COM | IN1 | ICOM1 | IN2 | ICOM2 | IN3 | ICOM3

SHD | COM | − | +

OUT | COM | EXC

NO SENSOR NEEDED FOR BYP

SEE RISER SCHEDULE FOR WHICH DEVICES TO SET EOL TO ON.

MS/TP — TO NEXT DEVICE

MS/TP — FROM LAST DEVICE

DISCHARGE AIR STATIC PRESSURE DA-P

Right diagram:

DA-P H L

OA → ... → DA

NC / NO

2 STAGES | 2 STAGES

DX/C | E/C

RA

BYPD-O

BYPD2-O

(OPTIONAL)

Rooftop or Packaged Unit Enclosure

OCCUPIED MODE: THE BYPASS DAMPER CONTROLLER WILL MONITOR THE DUCT STATIC PRESSURE. ON A RISE IN STATIC PRESSURE ABOVE SETPOINT, THE BYPASS DAMPER WILL OPEN TO DECREASE PRESSURE. ON A DROP IN STATIC PRESSURE BELOW SETPOINT, THE BYPASS DAMPER WILL MODULATE CLOSED TO INCREASE PRESSURE.

UNOCCUPIED MODE: WHEN THE SINGLE PACKAGED UNIT IS INDEXED OFF, THE BYPASS DAMPER WILL BE INDEXED TO 50%. IF THE SINGLE PACKAGED UNIT IS INDEXED ON, THE BYPASS DAMPER WILL CONTROL AS PER THE OCCUPIED MODE SEQUENCE.

Drawing Title							
BYP200 Detail							
	REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED	
				BY Steve Nichols DATE 12-30-2021		BY DATE	
				Branch Installation		CONTRACT NUMBER	
Project Title							
3rd Party COBP						DRAWING NUMBER	
			VERASYS™			**7**	

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

Reset Function	Reset Operation[1]
Reset the Wi-Fi and Ethernet Settings	1. Press and hold the **RESET** button for two seconds. The **FAULT** LED displays slow flicker behavior. 2. Release the **RESET** button within three seconds. The **FAULT** LED continues slow flicker behavior. 3. Within five seconds, press the **RESET** 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. **Result**: 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.
Reset to Factory Defaults[2]	1. Press and hold the **RESET** button for six seconds. After two seconds, the **FAULT** LED displays slow flicker behavior. This changes to fast flicker behavior after an additional four seconds of holding the **RESET** button. 2. Release the **RESET** button within three seconds of seeing fast flicker behavior. The **FAULT** LED continues fast flicker behavior. 3. Within five seconds, press the **RESET** button again, and then immediately release it to confirm that you want to reset to factory defaults. If you do not press the **RESET** button to confirm within five seconds, the reset operation is canceled. **Result**: 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.
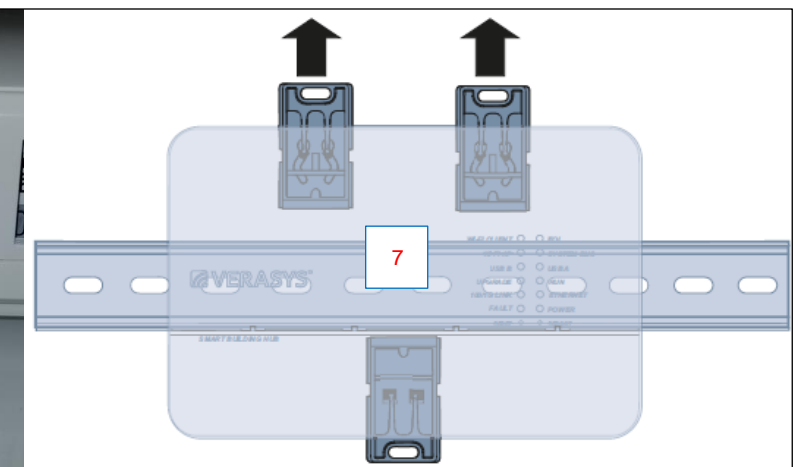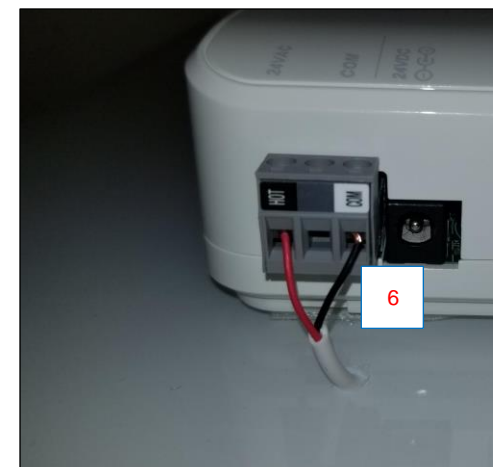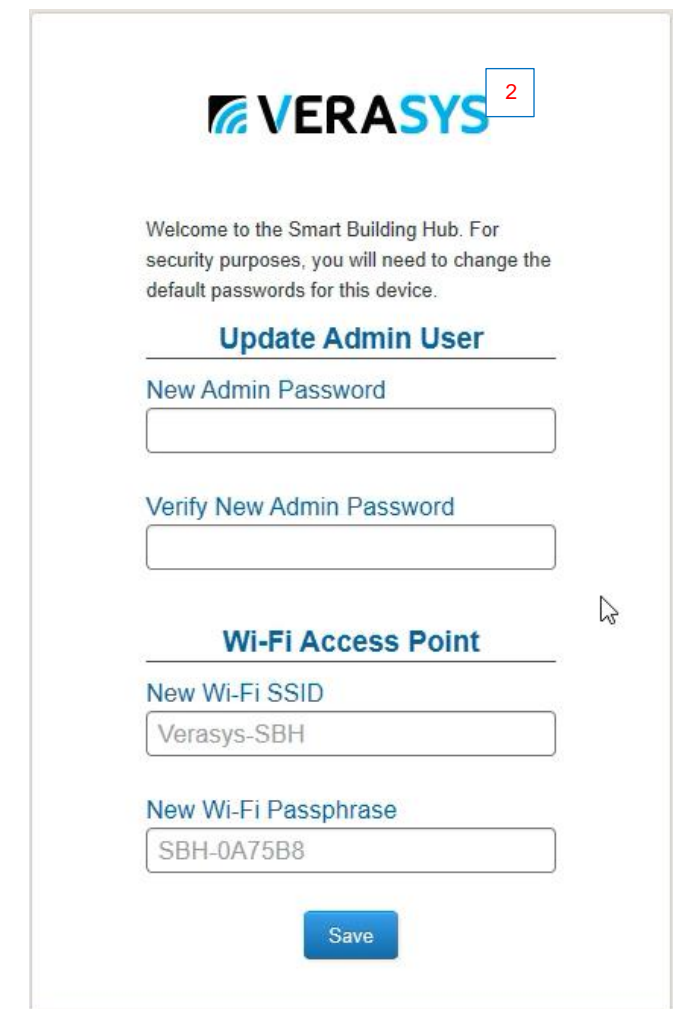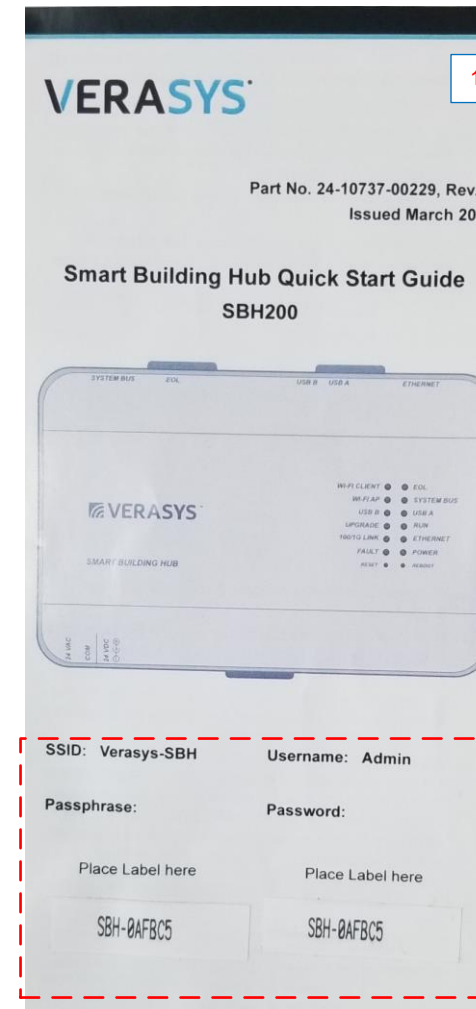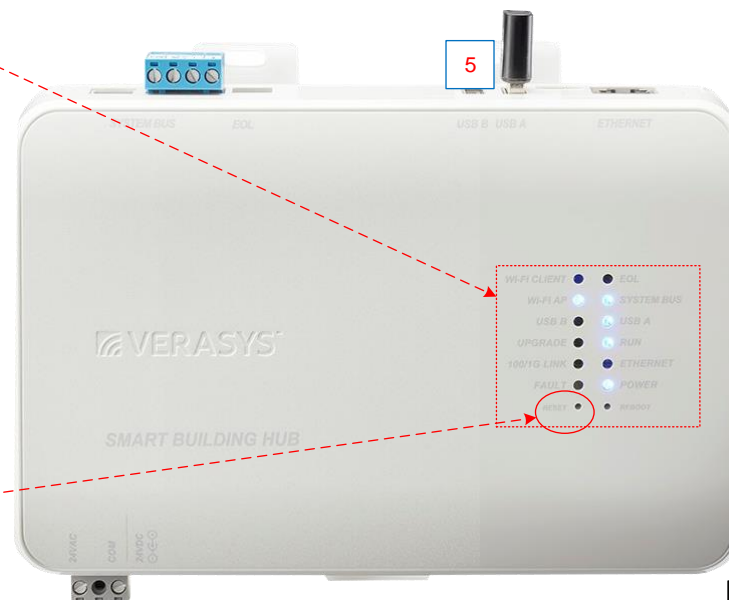
1. Every SBH comes with a Quick Start Guide that gives you the login information

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…
   Verasys-SBH
   SBH-XXXXXX (last 6 digits of your mac address on the back of the SBH)
   Admin
   SBH-XXXXXX (last 6 digits of your mac address on the back of the SBH)

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						
SBH Detail						
	REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED
				BY Steve Nichol DATE 12-30-2021		BY	DATE
Project Title			Branch Installation			
3rd Party COBP				CONTRACT NUMBER		
					DRAWING NUMBER	
						8

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.

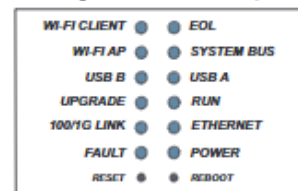Note: If this device is at the end of a line, set the end of the line switch to on.

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
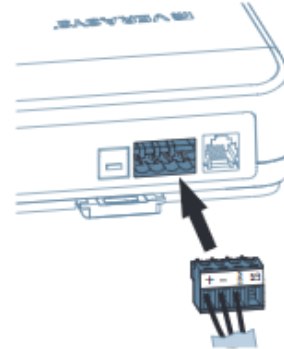
a. Wire your cable to the supplied four-pin adapter as illustrated.
b. Plug the Wi-Fi adapter that comes with the SBH into either of the USB ports.
c. Connect the RJ45 Ethernet port to the building Ethernet network as instructed by the building IT department. The Ethernet must be plugged into the device if you choose the (optional) Ethernet setup in step 6.
d. 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.

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

3. Open a Web Browser

a. Navigate to the following URL: 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

a. Use the default Admin login credentials from the beginning of this guide.
b. 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.

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

Navigate to the following URL: 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.
Navigate to the following URL: 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.

a. In the SBH UI, navigate to **Settings** > **Ethernet**.
b. On the **Ethernet** drop-down list, select **On** to enable the SBH Ethernet port.
c. Click the **Save** button.
d. 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.
e. 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

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

Drawing Title							
SBH Setup							
	REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED	
				BY Steve Nichols DATE 12-30-2021		BY	DATE
Project Title			Branch Information		CONTRACT NUMBER		
3rd Party COBP					DRAWING NUMBER		
					9		

VERASYS™

SETTINGS ETHERNET

Choose a device... ▼

‹ Menu

1 Settings

Wi-Fi Access Point

Backup

Restore

Profiles

Clone

2 Ethernet

Load Shedding

Global Shutdown

System Settings

Verasys Enterprise

BACnet Settings

BBMD

SSL

Alarm Notifications

Software Updates

Administration

Custom Logo

Ethernet
3 On

Hostname
SBH00108D0A7F56

Domain Name Suffix

Ethernet Mac Address
00:10:8d:0a:7f:56

Auto DHCP
4 Off

IP Address
5 Get From I.T. Group

Subnet Mask
6 Get From I.T. Group

Default Gateway
7 Get From I.T. Group

Auto DNS
Off

Primary DNS Server
8 8.8.8.8

Secondary DNS Server
9 8.8.4.4

Enable Proxy
No

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

Cancel   **10** Save

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	DRAWN		APPROVED	
				BY Steve Nichols	DATE 7-6-2022	BY	DATE
Project Title **3rd Party COBP**	Branch Information				CONTRACT NUMBER	

VERASYS™

DRAWING NUMBER

10

Global Shutdown

System Settings

Verasys Enterprise

BACnet Settings

BBMD

SSL

1 **Alarm Notifications**

Software Updates

13 **Administration**

Custom Logo

Audit Log

Diagnostics

TRADIUM
MECHANICAL INC.

VERASYS™

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Patents: https://jcipat.com
SW Version: 4.1.0.37
OS Version: 201810041823448
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

14 Add New User

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

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							
Alert & Email Setup							
		REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY
		Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED
Project Title					BY Steve Nichol	DATE 12-30-2021	BY	DATE
3rd Party COBP					Branch Installation	CONTRACT NUMBER		
						DRAWING NUMBER		
						11		

VERASYS™

Installation environment diagram

MAX 122°F / 50°C
MIN 32°F / 0°C

MAX 90% RH
MIN 10% RH
85°F (29°C) MAX DP

48 in (1.2 m)

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_2 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_2 network sensor may result in readings outside of the specified accuracy tolerance.

Display layout

Table 1: Display icons

Icon	Description
1	Humiditiy indicator icon
2	Humidity measurement
3	CO_2 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)

Sensor information

- 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 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

60% CO₂ 675ppm 68.0°
72.0 °F

Dipswitch Settings

OFF → ON	OFF → ON	OFF → ON	OFF → ON	OFF → ON	OFF → ON	OFF → ON	OFF → ON
199	**200**	**201**	**202**	**203**	**204**	**205**	**206**

Tech Tip: **In order for an NS8000 sensor to work properly you need to be running 4.1 firmware or newer.**

60.5.%
72.0°F
72.0°

Drawing Title		
Sensor Detail		
	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
				BY Steve Nichol DATE 12-30-2021	BY DATE
Project Title	Branch Information	CONTRACT NUMBER
3rd Party COBP		
	VERASYS™	DRAWING NUMBER **12**

Icon Legend

Icon	Description
^	Up Arrow-Cannot Hide Icon
v	Down Arrow-Cannot Hide Icon
(A)	Background Light-Cannot Hide Icon
(A)	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	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
E 1	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
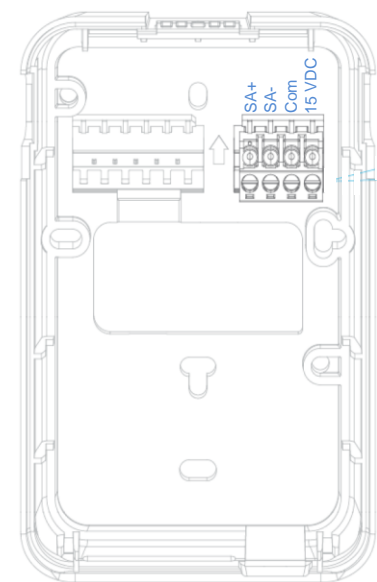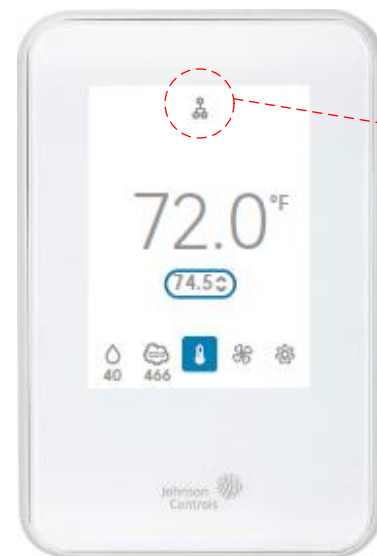
-Once you connect the NS to a controller that is connected to a SBH it will hold it's parameters when there's a power cycle

-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

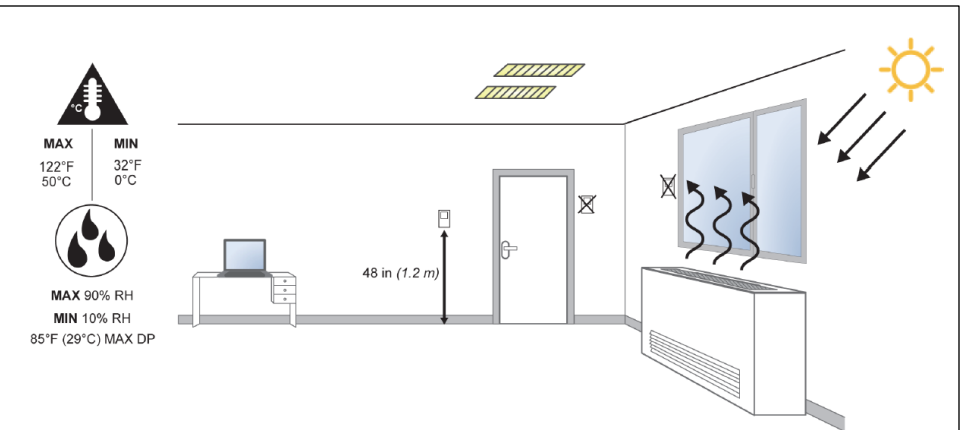-You can add a MAP tool on the bottom of the sensor to access the devices on the bus

-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

MAX 122°F 50°C / MIN 32°F 0°C

48 in (1.2 m)

MAX 90% RH
MIN 10% RH
85°F (29°C) MAX DP

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 very depending on the site & ADA requirements

Network sensors without CO2 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 CO2 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

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.**
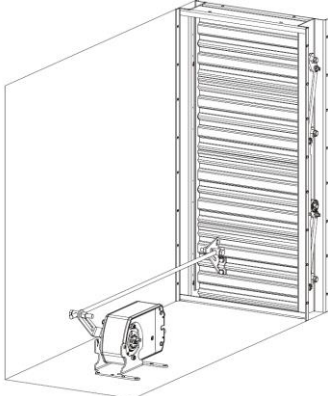
Drawing Title						
	REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	DRAWN			
				BY SJN DATE 6-20-2022	APPROVED BY DATE		
Project Title **SMART RTU**						

Branch Information

CONTRACT NUMBER

VERASYS

DRAWING NUMBER

12

Damper Wiring Detail

OUTSIDE AIR DAMPER

M9208-GGC-3
8 Nm (70 IN-LB)

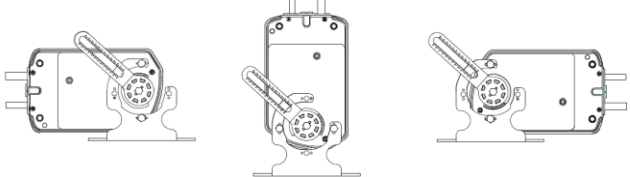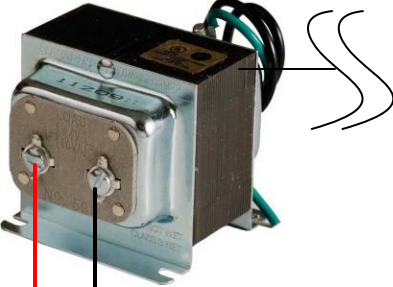**Tech Tip:**

An **M9208-250 Mounting Bracket Kit** may be needed for this application. Verify existing damper needs & order as needed.

120vac

MIXED AIR DAMPER

M9208-GGC-3
8 Nm (70 IN-LB)

Tech Tips:

Make sure the 2nd actuator is set to reverse 0-10

It's also mandatory that the 2nd actuator connects to the damper position of the previous actuator.

VERASYS

Drawing Title							
Actuator Detail							
	REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY
Sales Engineer	Project Manager	Application Engineer	DRAWN			APPROVED	
			BY Steve Nichols	DATE 12-30-2021	BY		DATE
Project Title			Branch Information		CONTRACT NUMBER		
3rd Party COBP							
					DRAWING NUMBER		
					13		

VERASYS™

Dip Switch Addresses

ZEC

Tech Tip: If you change a dipswitch while the ZEC is powered you will need to do a power cycle for it to change.

VZC

Switch #

Address #

Left column (red, ZEC):
#4, #5, #6, #7, #8, #9, #10, #11, #12, #13, #14 — each with labels 128 64 32 16 8 4 2 1

Middle column (red):
#15, #16, #17, #18, #19, #20, #21, #22, #23, #24, #25 — each with labels 128 64 32 16 8 4 2 1

Third column (red):
#26, #27, #28, #29, #30, #31, #32, #33, #34, #35, #36 — each with labels 128 64 32 16 8 4 2 1

Right columns (green, VZC):
#4, #5, #6, #7, #8 and #9, #10, #11, #12, #13 — each with labels 128 64 32 16 8 4 2 1 and OFF/ON

Drawing Title							
Addressing Detail							
REFERENCE DRAWING		NO.	REVISION-LOCATION		ECN	DATE	BY
Sales Engineer	Project Manager	Application Engineer	DRAWN			APPROVED	
			BY Steven Nichols	DATE 7-7-2022	BY		DATE
Project Title			Branch Profession		CONTRACT NUMBER		
3rd Party COBP							

VERASYS ™

DRAWING NUMBER

14

480
277
240
120
COMM

Power Installed by certified electrician

ON OFF 1
ON OFF 2
ON OFF 3

24v for ZEC310s (8-14)

24v for BYC200 & ZEC310s (1-7)

24v for SBH & VZC

Switch
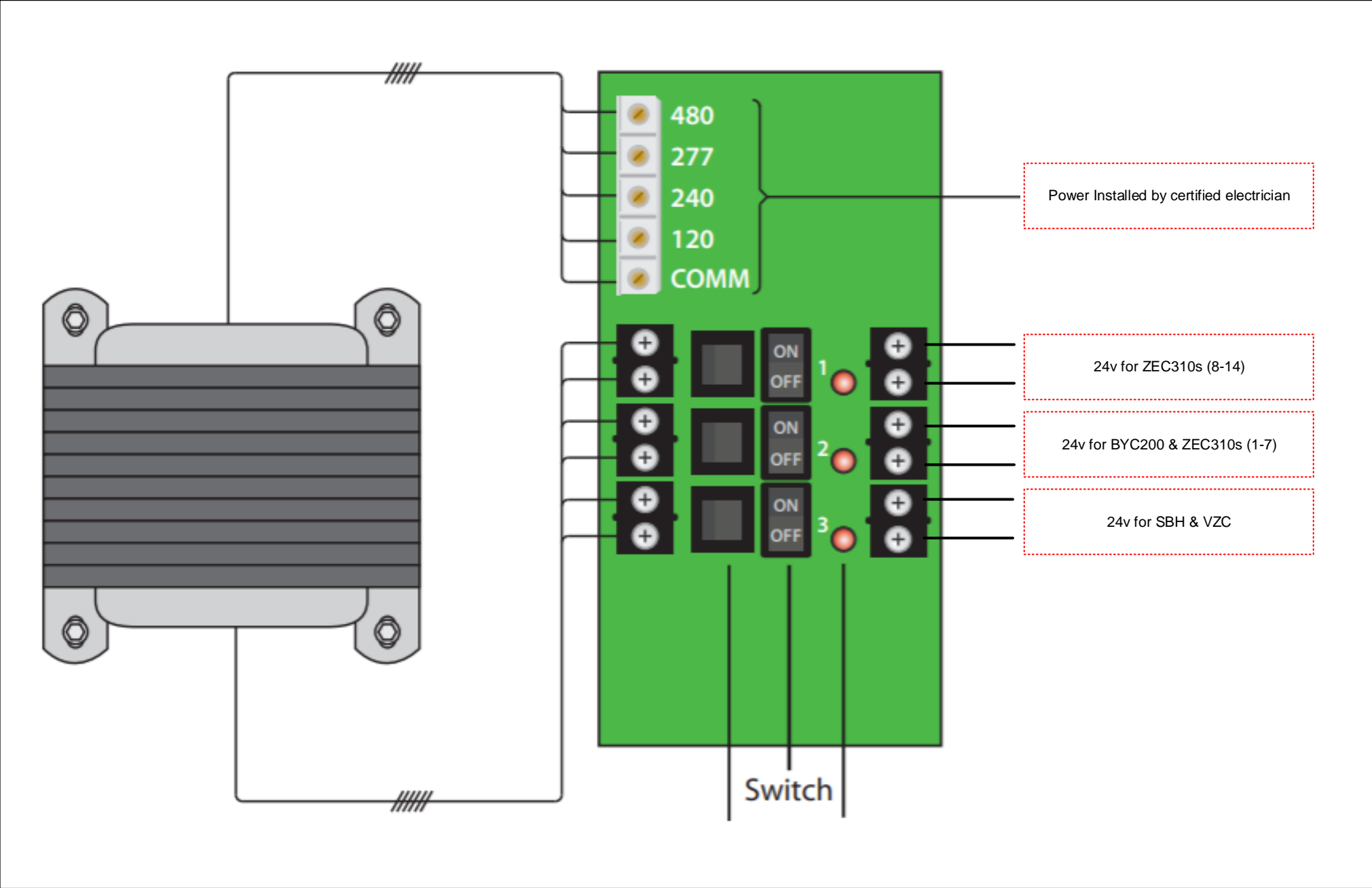
Tech Tip: High voltage wire & comm wire should never be in the same conduit or zipped tied together

Drawing Title							
Power Supply Detail							
REFERENCE DRAWING		NO.	REVISION-LOCATION			ECN	DATE	BY
Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED		
			BY Steve Nichols	DATE 7-11-2022	BY	DATE	
Project Title			Branch Information		CONTRACT NUMBER		
3rd Party COBP							
			VERASYS™		DRAWING NUMBER		
					15		

Verasys Enclosure

120vac
Installed by electrician

Installed By HVAC Contractor

24v

Zone Bus

HVAC Contractor works with I.T. Group

1) Network cable

RIB PSH300 #1

HVAC Contractor provides panel enclosure

SBH

VZC

Drawing Title					REVISION-LOCATION		ECN	DATE	BY
Enclosure									
				REFERENCE DRAWING	NO.				
	Sales Engineer	Project Manager	Application Engineer	DRAWN			APPROVED		
				BY Steve Nicholl DATE 7-7-2022		BY		DATE	
Project Title			Branch Information			CONTRACT NUMBER			
3rd Part COBP									
		VERASYS™				DRAWING NUMBER			
						16			

Verasys Enclosure

Tech Tip: **High voltage wire & comm wire should never be in the same conduit or zipped tied together**

HVAC Contractor works with I.T. Group

Installed By HVAC Contractor

1) Network cable

120vac Installed by electrician

24v   Zone Bus

RIB PSH300 #1

HVAC Contractor provides panel enclosure

SBH

Tech Tip: **Install SBH & connect to internet before job starts. See page 13-16**

Tech Tip: **A PSH300A can power 18 devices.**

VZC RTU 1   VZC RTU 2

RIB PSH300 #2

Drawing Title								
Enclosure								
	REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY	
	Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED		
				BY Steve Nichols DATE 7-7-2022		BY	DATE	
Project Title	Branch Information					CONTRACT NUMBER		
3rd Part COBP								
						DRAWING NUMBER		

VERASYS™

16

Verasys Enclosure

120vac Installed by electrician

120vac

Installed By HVAC Contractor

24v to AC1
24v to AC3
24v to AC7
24v to AC8
24v to AC9
24v to AC12
24v to AC13
24v to AC14
24v to AC15
24v to AC18

HVAC Contractor works with I.T. Group

Internet

Installed By HVAC Contractor

Zone Bus AC1
Zone Bus AC3
Zone Bus AC7
Zone Bus AC8
Zone Bus AC9
Zone Bus AC12
Zone Bus AC13
Zone Bus AC14
Zone Bus AC15
Zone Bus AC18

Power Supply #1

Power Supply #2

Power Supply #3

Power Supply #4

SBH200

AC1 VZC
Address 4

AC3 VZC
Address 5

AC7 VZC
Address 6

AC8 VZC
Address 7

AC9 VZC
Address 8

AC12 VZC
Address 9

AC13 VZC
Address 10

AC14 VZC
Address 11

AC15 VZC
Address 12

AC18 VZC
Address 13

Set EOL to "On"

Tech Tip: Install SBH & connect to internet before job starts. See pages 12 & 13

Tech Tip: High voltage wire & comm wire should never be in the same conduit or zipped tied together

Tech Tip: An SBH can talk to 100 controllers or 10 VZCs. Each VZC counts as 10 controllers. If you have 7 VZCs you are using 70 controllers & have 30 controller spaces left.

Tech Tip: Each VZC can talk to 32 zone controllers.

Tech Tip: A PSH300A can power 18 devices.

Drawing Title								
Enclosure								
	REFERENCE DRAWING		NO.		REVISION-LOCATION		ECN	DATE	BY
Sales Engineer	Project Manager	Application Engineer		DRAWN			APPROVED	
			BY Steve Nichols	DATE 8-30-2022		BY		DATE
Project Title			Branch Technician			CONTRACT NUMBER		
3rd Party COBP						DRAWING NUMBER		
						16		

VERASYS™

Verasys Enclosure

Tech Tip: **High voltage wire & comm wire should never be in the same conduit or zipped tied together**
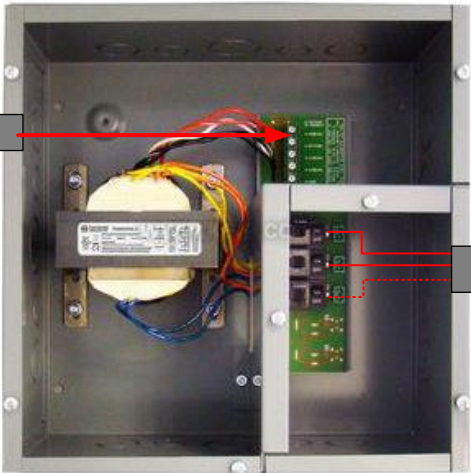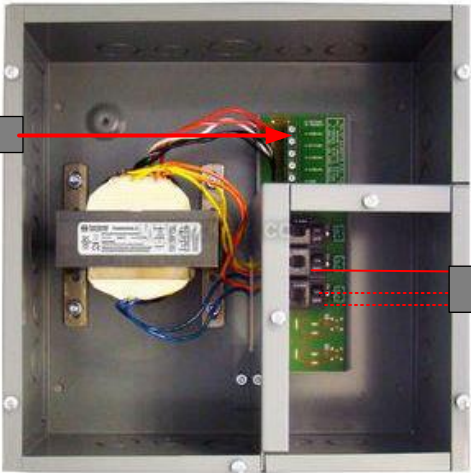
Installed By HVAC Contractor
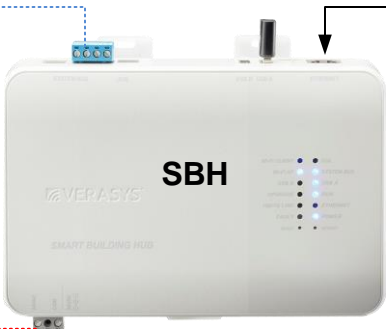
24v   Zone Bus

HVAC Contractor works with I.T. Group

1) Network cable

120vac Installed by electrician

HVAC Contractor provides panel enclosure

SBH

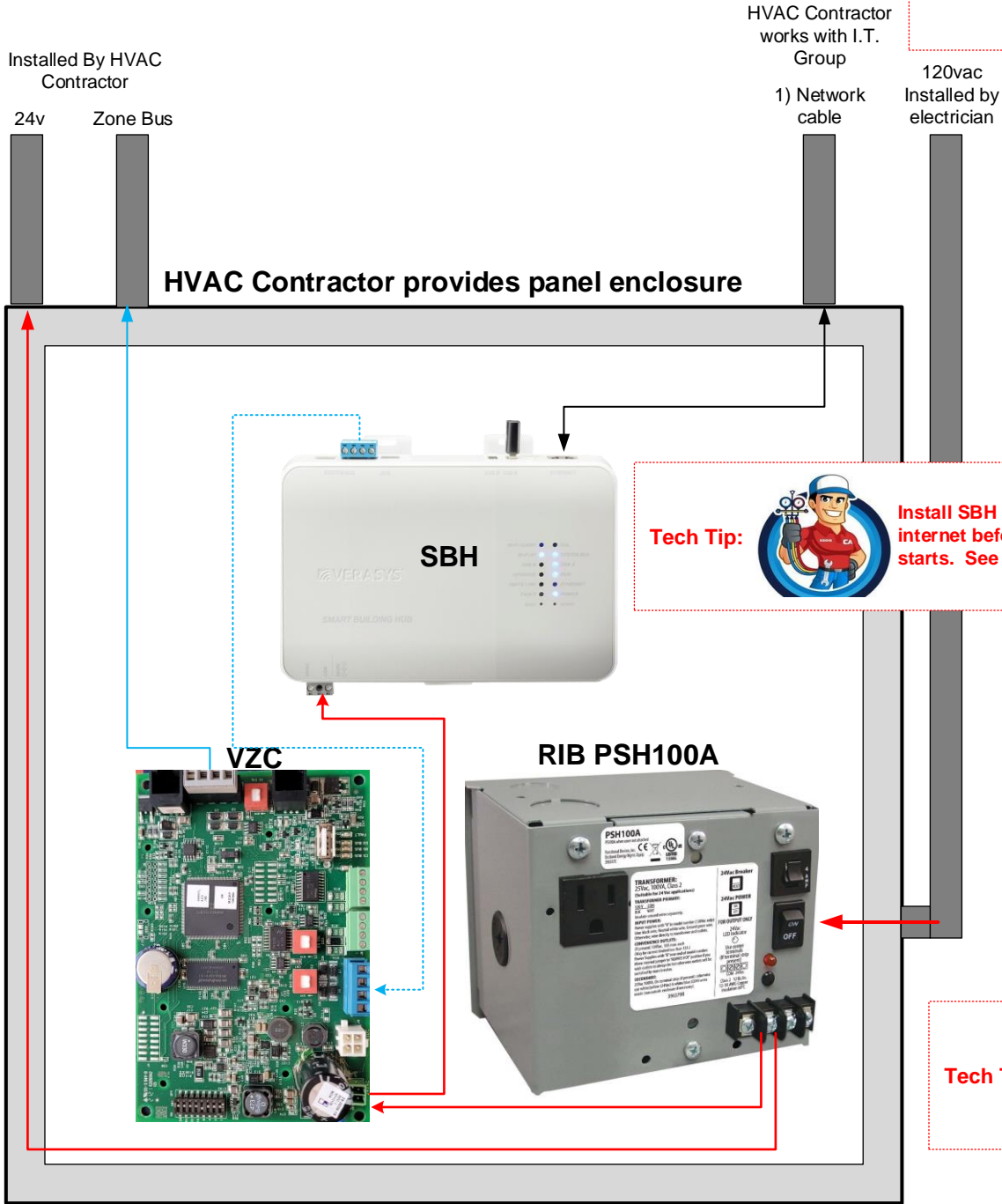**Tech Tip:** **Install SBH & connect to internet before job starts. See page 8-11**

VZC

RIB PSH100A

PSH100A

Tech Tip: **A PSH100A can power 6 devices.**

Drawing Title								
Enclosure								
		REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED		
				BY Steven Nichols DATE 7-7-2022		BY	DATE	
Project Title				Branch Information		CONTRACT NUMBER		
3rd Part COBP								
						DRAWING NUMBER		

VERASYS™

16

Step 1: At your office pull out all the controllers & wire them up to the SBH referring to pages 3 & 4. (do not apply power yet)

Step 2: Address the VZC, BYPs, ZECs according to Page 3 Riser Diagram & label each.

Step 3: Power up & log into your SBH & verify firmware & update if needed. (watch YouTube video)

Step 4: Power up VZC & verify it shows up in the SBH device list with the proper address.(watch YouTube video)

Step 5: Power up the VEC, change the address if needed.

Step 6: Log into the VEC & configure it for COBP. "Details" \ "Service" \ "Factory" \ "Rooftop Controller Type"=Changeover Bypass

Step 7: Power up BYP200 & verify it shows up under the VZC on the SBH. (watch YouTube video)

Step 8: Power up each ZEC310 & Verify they show up under the VZC.

Step 9: Back on the SBH give each controller a descriptor. (Write a descriptor as if you showed up on job after the install & don't know where anything is)

Step 10: Log into each ZEC 310 & configure as needed giving each a vote (0-4)(watch YouTube video)

Step 11: Create a schedule for your VZC. (Each VZC is capable of having 4 schedules)

Step 12: Attach 1 of the 4 schedules to each ZEC310.

| On the VZC select \ | Set Schedule | Edit Zone Group 1,2,3,& 4 Schedules however you want |
| On the ZEC510 select \ | Control Setup | select a group ZONE GROUP NUMBER [1] |

Step 13: Verify the firmware is current on the VZC & update if needed. (When you update the VZC it will also update all the controllers on the Zone Bus)

Step 14: If you have a 2nd VZC repeat steps 2-13.

Step 15: At the jobsite Install PSH100 power supply. See page 3. Have licensed Electrician terminate high voltage to power supply.

Step 16: Install SBH & apply power to it from PSH100. Get SBH connected to internet. See pages 8-11.

Step 17: Install VZC next to SBH, terminate BACnet bus from VZC to SBH, power up VZC, & verify it shows up on SBH. See page 4.

Step 18: Pull BACNet wire from VZC to all the controllers (strip but don't terminate wires yet). See pages 3 & 4.

Step 19: While pulling the BACnet wire pull a 2 conductor 16awg power bus to all controllers. See page 3 Riser Diagram.

Step 20: Check all wires you just pulled for ground faults before you apply power or terminate BACnet bus.

Step 21: Install VEC controller inside RTU (leave powered down)

Step 22: Install DA, RA, & OA sensors & terminate to VEC checking all wires for ground faults. See page 5.

Step 23: Terminate all outputs on the VEC checking all wires for ground faults. See page 5.

Step 24: Power up VEC & verify it shows up on the SBH under the VZC.

Step 25: Install the BYP200 on the bypass damper & terminate BACnet wire checking for ground faults first.

Step 26: Install Discharge Air Static Pressure Sensor & terminate to BYP200. See page 7.

Step 27: If you have a 2nd Bypass Damper install actuator following wiring on page 7.

Step 28: Apply power to the BYP & verify it shows up on the SBH under the VZC.

Step 29: Install ZEC310s on each of the zone dampers & terminate BACnet wires. See page 6.

Step 30: Unless there's existing stat wire from controller to wall\zone sensor pull a 4 conductor wire. See pages 3 & 6.

Step 31: On SA bus wires check for ground faults. Terminate the SA bus to controller & wall module. See page 3 & 6.

Step 32: Power up first ZEC310 controller & verify it shows up on the SBH. Repeat step 32 until all ZECs are showing up on SBH.

Step 33: Test your VEC. On the SBH click on "Devices", select your VZC then VEC \ "Commissioning" \ "Commission Output" \ "Start Commissioning" \ set to "Trigger" \ now test each option verifying functionality.

Step 34: Go Back to "Start Commissioning" & set to "Normal".

Step 35: Test each ZEC310. On the SBH click on "Devices", select your VZC then VEC "Commissioning" & test functionality.

Step 36: Cause a trouble condition & verify email & text alerts are sent.

Step 37: Add login info (IP Address, User, & Password) to these drawings on Page 10.

Step 38: Redline these drawings & then print a new set to leave at the SBH & email a copy to end user.

PDF YouTube Links

SBH

ZEC310

VEC

BYP

VZC

Drawing Title							
Standard Installation Details							
REFERENCE DRAWING		NO.	REVISION-LOCATION		ECN	DATE	BY
Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED		
			BY Steve Nichol	DATE 7-11-2022	BY	DATE	
Project Title			Branch Installation	CONTRACT NUMBER			
3rd Party COBP							
					DRAWING NUMBER		
					17		

Single Package Unit

Bypass Damper

Static Pressure Sensor

Zone Sensor
Room Thermostat
Zone 3

Zone Sensor
Room Thermostat
Zone 2

Zone Damper

Zone Sensor
Room Thermostat
Zone 1

Drawing Title							
COBP Layout							
	REFERENCE DRAWING		NO.	REVISION-LOCATION		ECN	DATE	BY
	Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED	
				BY Steve Nichols	DATE 12-30-2021	BY	DATE
Project Title				Branch Installation		CONTRACT NUMBER	
3rd Party COBP							
						DRAWING NUMBER	
						18	

VERASYS™

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-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.

#2-Identify what kind of system this is? SMART, 3rd 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.

#16-Make sure your power supply can handle the number of controllers you have on this job.

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:

Drawing Title								
Appendix								
			REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
			Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED
						BY Steve DATE 1-3-2022 Nichol		BY DATE
Project Title						Branch Installation		CONTRACT NUMBER
3rd Party COBP								
					VERASYS™			DRAWING NUMBER
								19