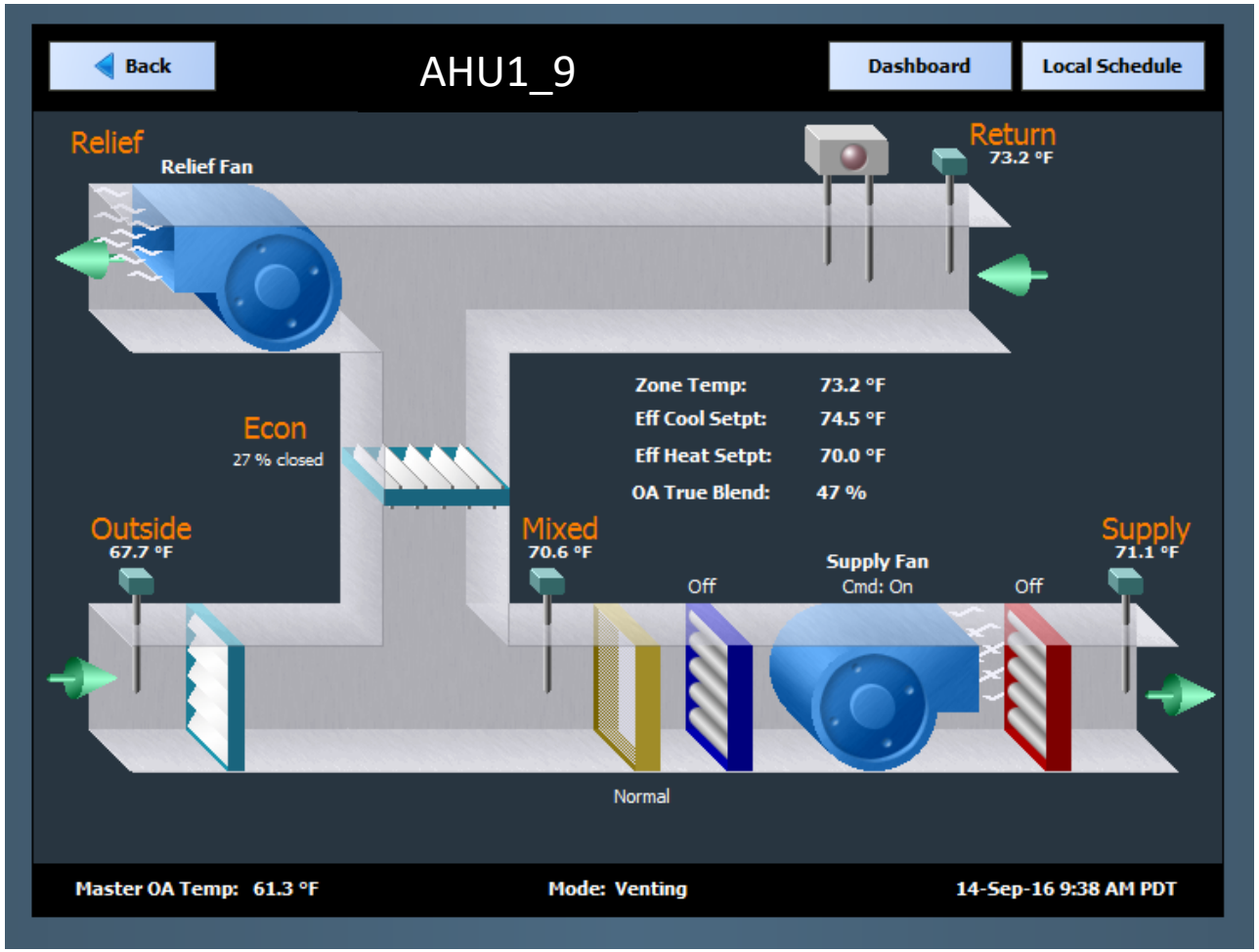
Constant Volume AHU Applications

CvAHU PRE-BUILT APPLICATION SERIES FOR THE BASCONTROL22 SERIES

What is the CvAHU Application Series?



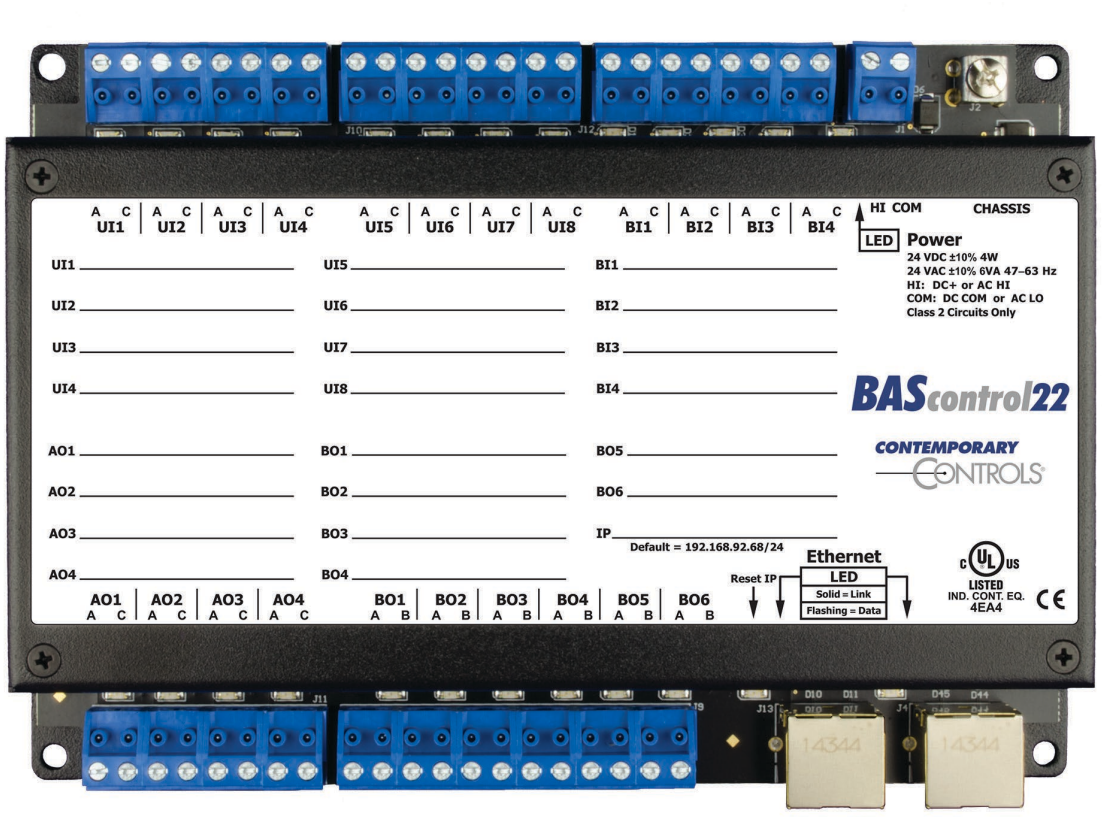
The CvAHU series provides five pre-built control applications for air handlers (AHUs) that will execute on a Contemporary Controls' BAScontrol22 BACnet/IP Sedona controller. Pre-built applications speed up installation time by only requiring configuration during installation.

Equipment Summary	
Fan(s)	Sfan-Cv, PExh-Cv or Variable
Cooling	DX-1 or 2 stage
Heating	Elect/Gas – 1 or 2 stage
Humidification	None
Dehumidification	None
Economizer	Dual Dry Bulb or Enthalpy
Ventilation	Fixed% or DCV – CO2 sensor

BAScontrol Series –Truly Open Controllers

- The **BAScontrol series** is Contemporary Controls' way of providing a truly open controller by having…
  - An open communications network in **IP Ethernet**
  - An open industry supported building automation protocol in **BACnet**
  - An open control language that is license-free in **Sedona**
  - A programming tool that is available to all without restriction in the **Sedona Application Editor**
  - Access to a **Sedona community** where there is a sharing of development, know-how and applications for the common good

BAScontrol22 – BACnet/IP Sedona Controller



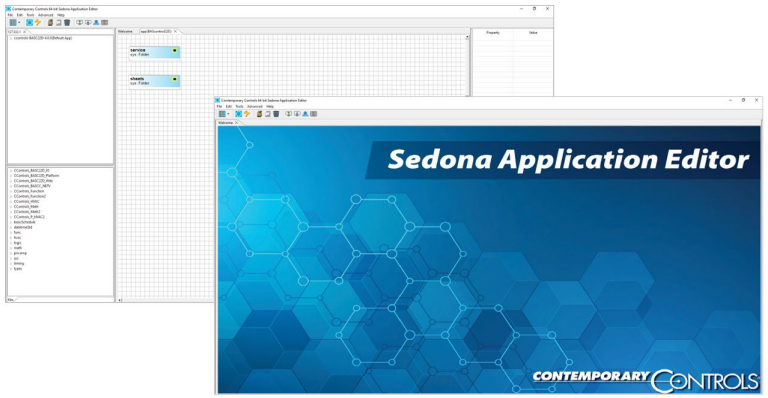
- Eight universal inputs
- Four binary inputs
- Four analog outputs
- Six binary outputs
- 24 virtual points
- 48 web components
- Dual Ethernet switch ports
- BACnet/IP B-ASC compatible
- Outdoor temperature range

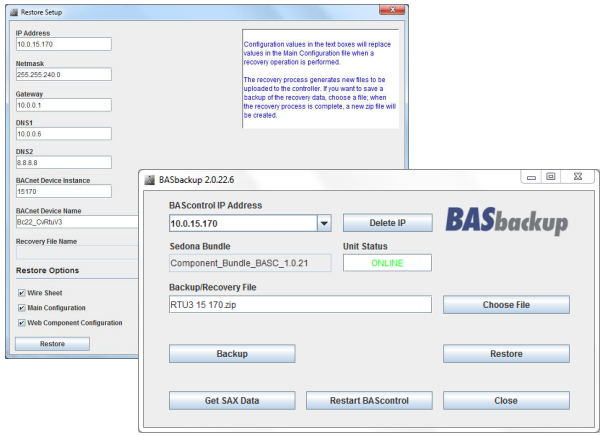
By loading in a CvAHU version, this freely-programmable BAScontrol22 becomes an application-specific controller. Works with any BAScontrol22 model.

BAScontrol Toolset – All You Need is FREE

- BASemulator – *for controller emulation on a PC*
- Sedona Applications Editor – *for function block programming*
- BASbackup – *for BAScontrol project archiving*

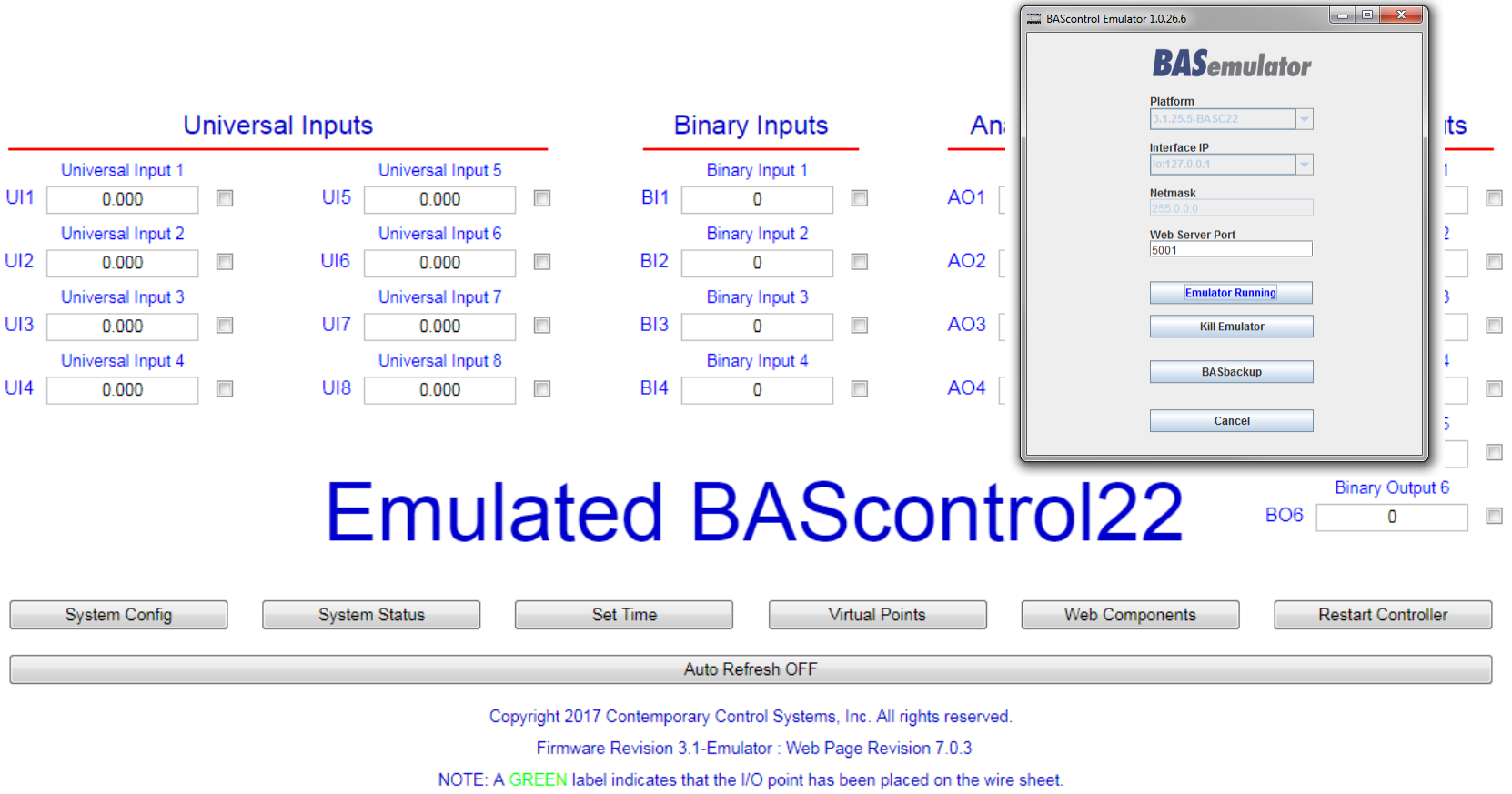
BAScontrol Toolset is available FREE via download from Contemporary Controls' web site. The toolset and a web browser are all you need to do a BAScontrol project even without having a real controller.



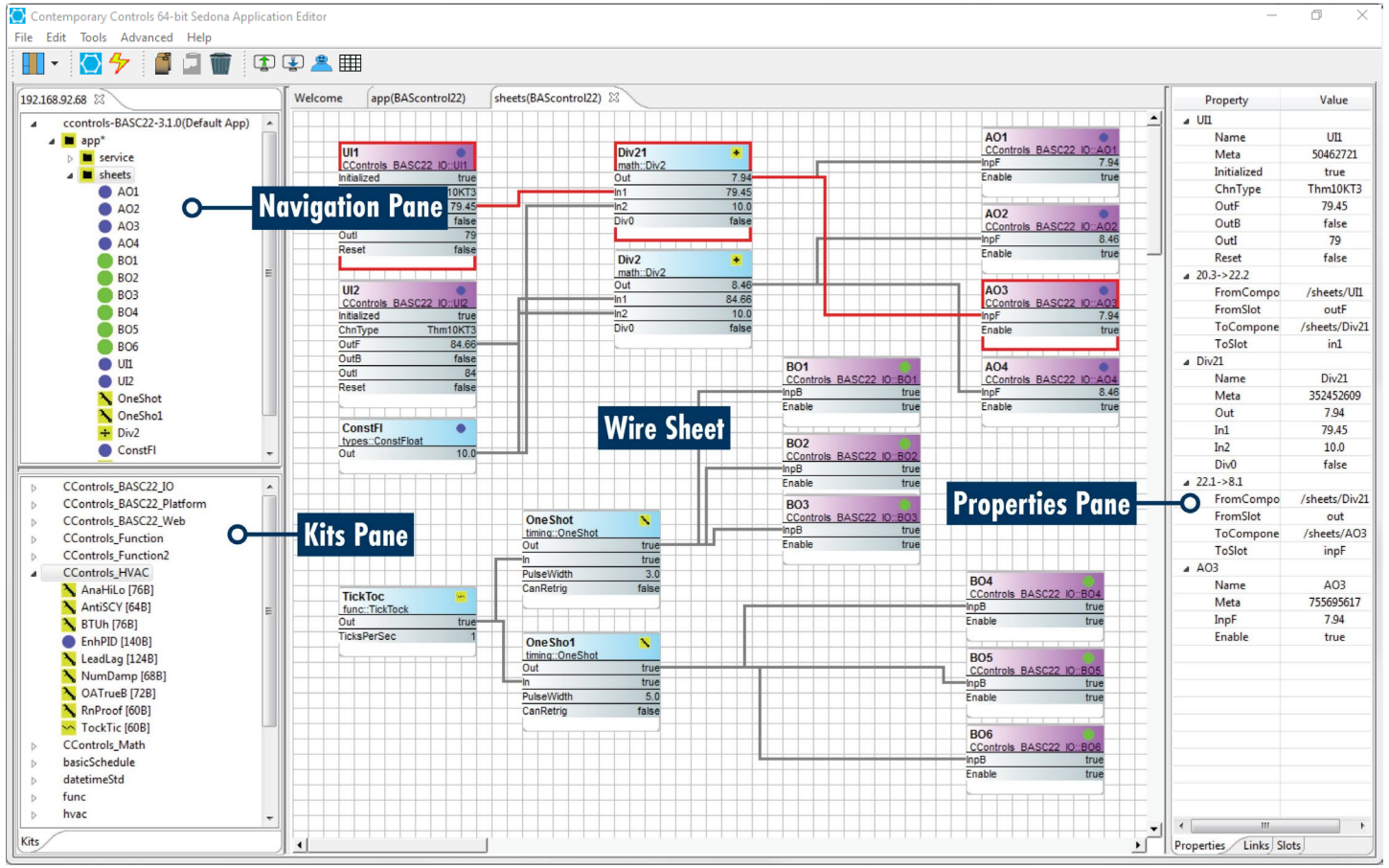


BASemulator – BAScontrol Emulation on a PC

- Very handy in learning Sedona and cloning real controllers
- Works on the same Windows PC as SAE and BASbackup
- Emulates all BAScontrol models

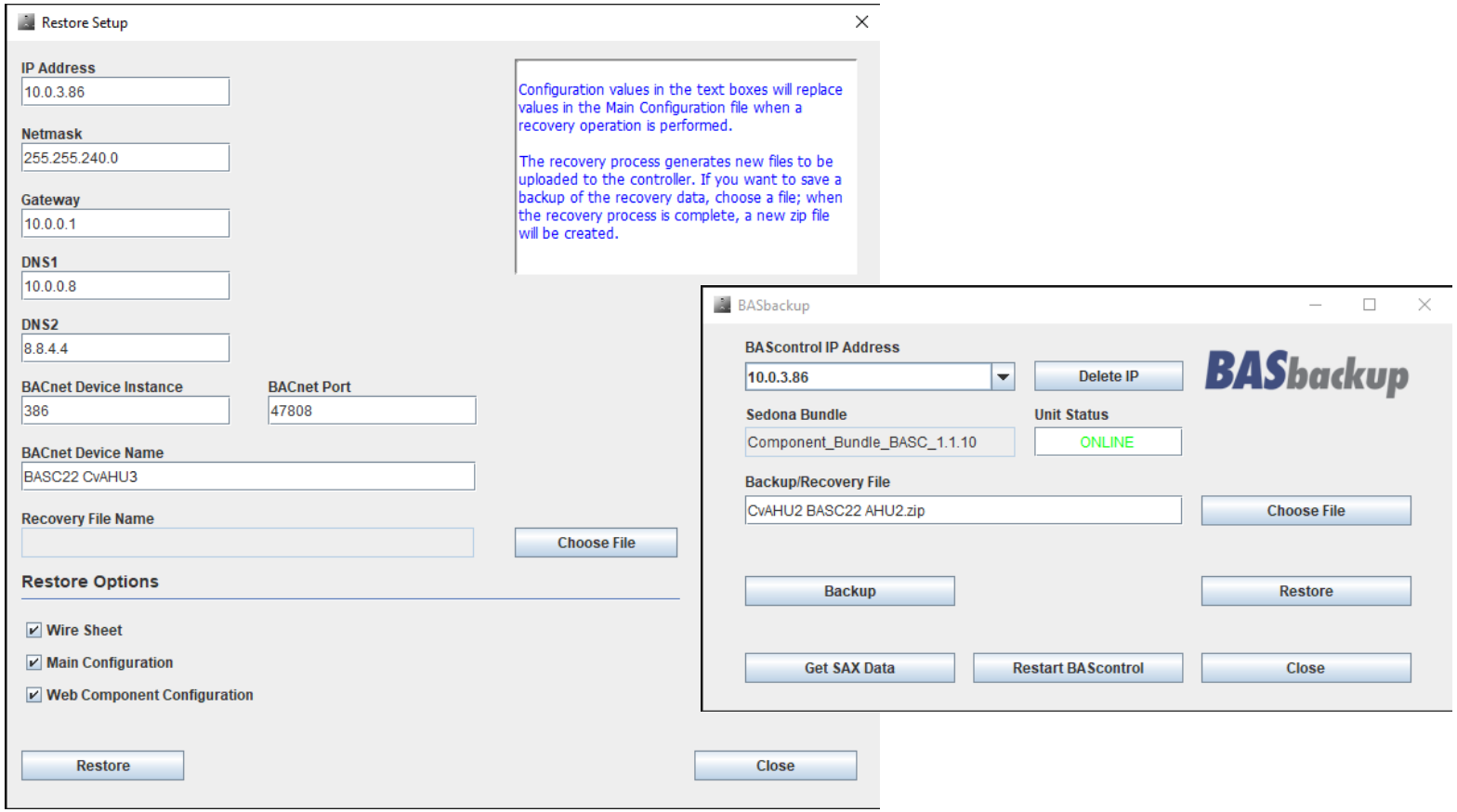


Sedona Application Editor (SAE)



To view or edit the Sedona function block program requires a Sedona tool such as Contemporary Controls SAE which is included in the FREE BAScontrol Toolset

BASbackup – Indispensable Project Tool



Pre-built applications are provided in a BASbackup compatible zip file. Once the application is loaded, possibly modified, and then configured, the resulting version can be completely backed up using BASbackup thereby providing a comprehensive archive of the project. The proven version can then be used in cloning additional controllers only requiring a modification to individual IP addresses and BACnet device instances.

Application Version Contents in one Zip File

- *Application Notes* – A Word document that provides specific comments regarding implementation
- *System Schematic – A* .pdf file that identifies the air-flow and location of the sensors and actuators required to implement the sequence
- *Points List* – An Excel file that identifies all real, virtual and web points along with BACnet names and properties
- *Sequence of Operation* – A Word document that logs the sequence with references to BACnet and Sedona points along with recommended set points and settings
- *Wiring Diagram* – A .pdf file that provides a generic wiring diagram to assist the panel builder in wiring the controller and ancillary equipment
- *Application Program* – A BASbackup .zip file bundles the Sedona Application along with all configuration data to replicate the application version

CvAHU Package Includes Everything for the SI

BASc22 CvAHU2 Applic Notes	Microsoft Word Document
BASc22 CvAHU2 Points List	Microsoft Excel Worksheet
BASc22 CvAHU2 Seq of Ops	Rich Text Format
BASc22R_CvAHU2_Backup	Compressed (zipped) Folder
CvAHU Generic Wiring Diagram	Adobe Acrobat Document
CvAHU2 System Schematic RevA	Adobe Acrobat Document

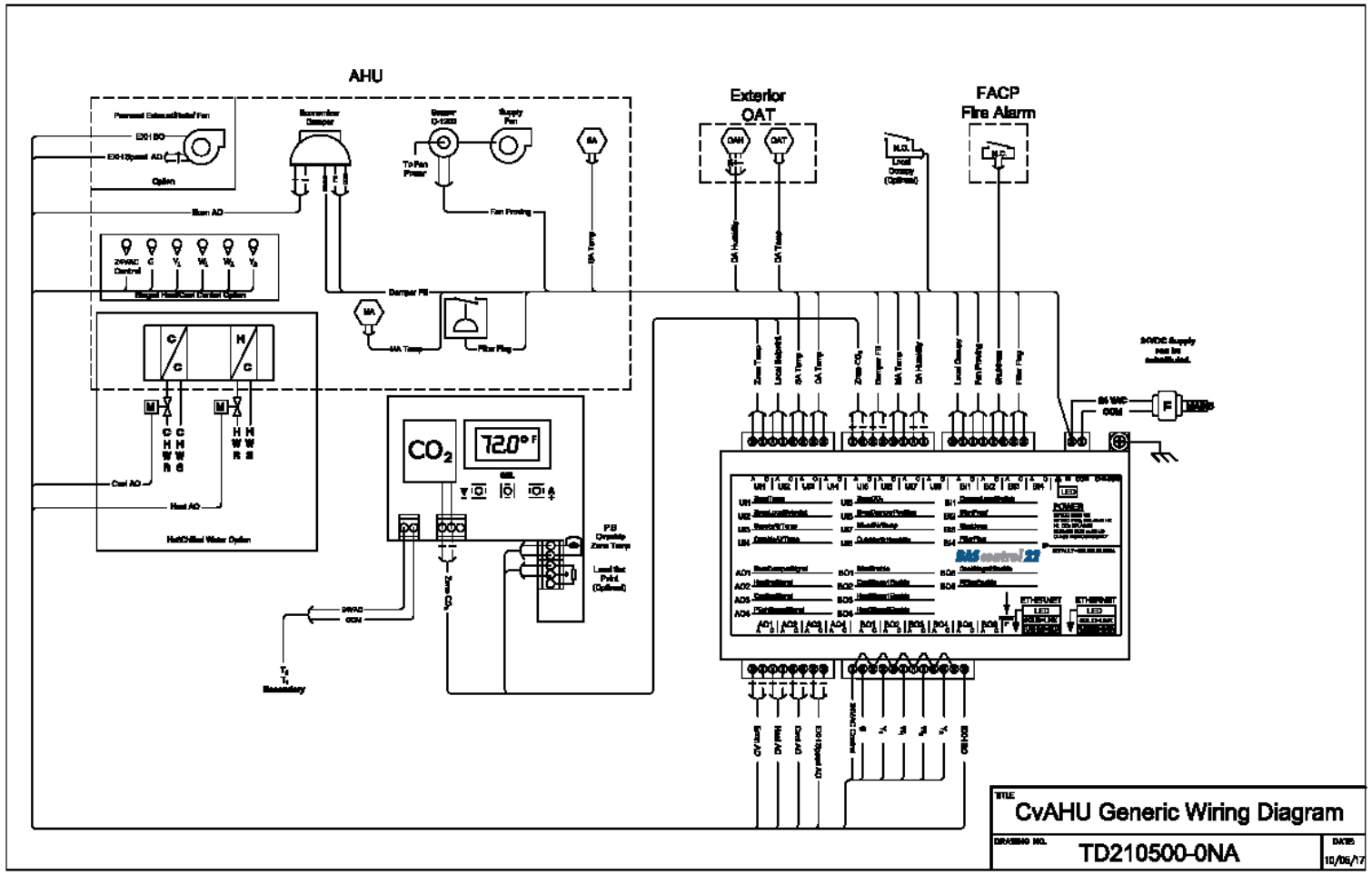
Application packages are free to the system integrator, but registration is required.

Sequence of Operation (SOO) in Word

- Sequence of Operation
  - OPERATING MODES: CvAHU2 shall have the following modes of operation:
    - BAS OCCUPIED – NORMAL USE: The BAS network shall have an hourly schedule for zone /space occupancy (VT01). The following items shall occur when the system is operating in occupied mode:
      - LOCAL SETPOINTS: Zone temperature setpoint slider (UI2) shall have a span of 65°F to 75°F with a 5°F (adj. WC02) deadband. Cooling setpoint shall have a minimum 69°F (adj. WC15) limit. Heating setpoint shall have a maximum 73°F (adj. WC14) limit.
      - NETWORK SETPOINTS: If a local setpoint slider is not installed the Network Occupied heating and cooling setpoints shall automatically be utilized. Network setpoints shall be 75°F Cooling (adj. VT03) and 70°F Heating (adj. VT04).

As a Word document, the SOO can be modified to address the specifics of the project. Real, virtual and web Sedona points are referenced in the document.

Wiring Diagram – Generic that can be Edited



To assist the panel builder in designing a panel, a generic wiring diagram is provided in .pdf format showing the interconnections between the controller and recommended ancillary equipment.

Device List – Selection Recommendations

Device	Part Number	Manufacturer	Notes
BAS Control 22 - w/relay Outputs	BASC-22R	Contemporary Controls	
Wall Setter 10kT3 w/10kohm setpoint slider & override	AQW-AAACBF1	Senva	Alt: Senva TR (non-display) series See Senva catalog for AQW options
Wall Setter same as above but with built-in CO2 sensor	AQW-ABACBF1	Senva	Alt: separate 0-10v CO2 sensor See Senva catalog for AQW options
Status "Go-No Go" CT	C1200	Senva	Alt: Veris H300 See Senva catalog for other CT options
24V SPST Relay	VMB1B-F24	Veris	Use if isolation relays are required
RIB Relay	V100	Veris	For PE / Relief fan option if needed
12" 10K T3 probe	TFEHR00	Veris	duct flange mount included
10K T3 OAT sensor	TOHR00	Veris	½" NPT mount
12' 10K T3 averaging sensor	TAHH0	Veris	use with larger RTUs
Small Actuator 90deg 2-10v sig, 2-10v pos	LMB-24SR	Belimo	"SR" type required for 0-10v
Larger Actuator 2-10v with 2-10v feedback	LF24-SR-S-US	Belimo	Larger with spring return
Dry Diff Psi switch - .2 to 2.0" wc	ADPS-03-2-N	Dwyer	For filter status
Occupancy sensor – wall switch type	MSCD1000	Veris	See Veris catalog for other options

Depending upon the application version selected, some ancillary equipment is required that can be found on this recommended device list. Substitutions are possible.

Intended for Skilled Professionals

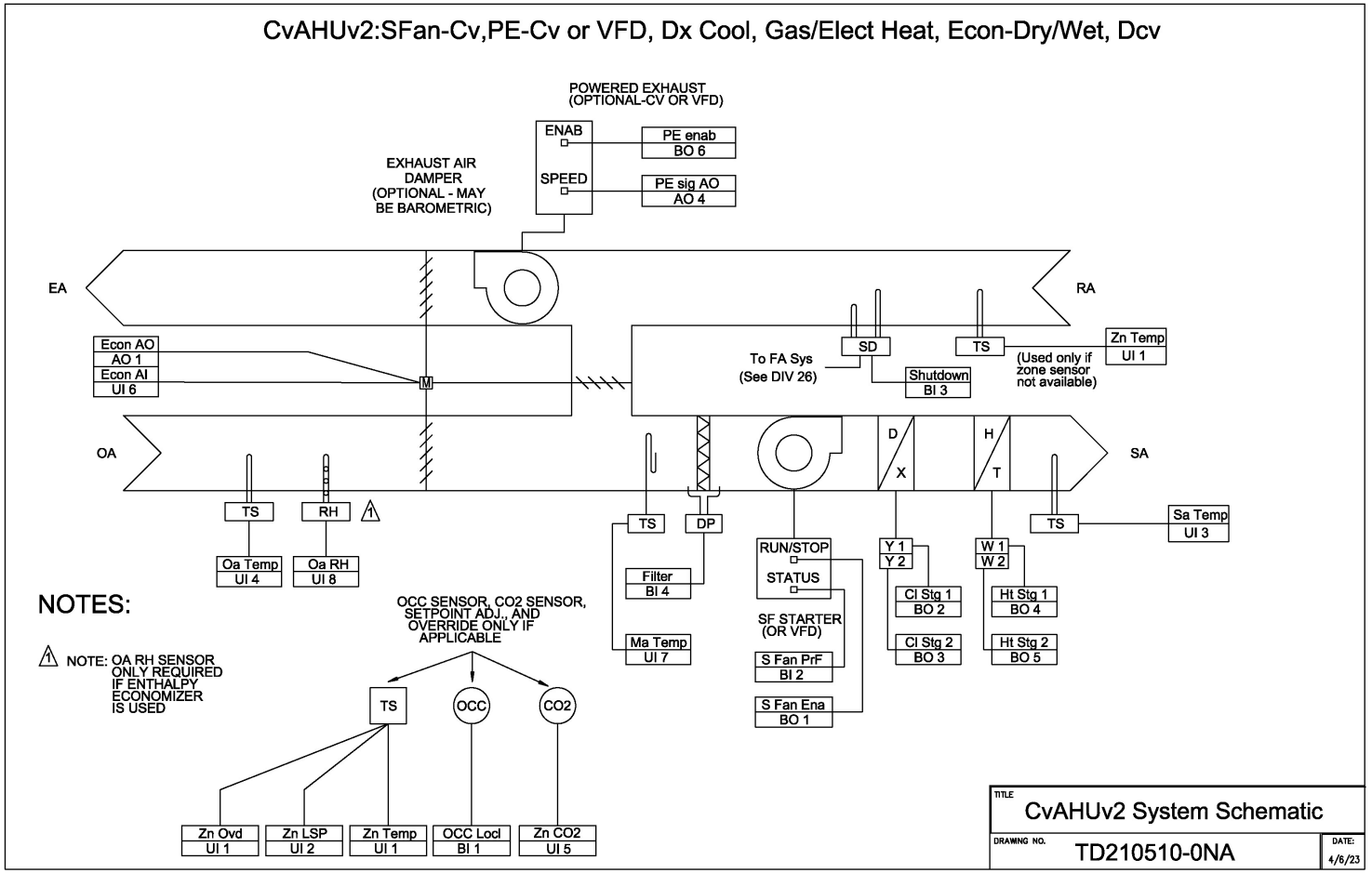
The Generic CvAHU application packages are free to systems integrators and controls contractors who register with Contemporary Controls attesting that they are skilled in implementing HVAC sequences in programmable controllers and understand that the sequences are provided as-is and that Contemporary Controls makes no guarantee that the sequences are suitable for any AHU application. The responsibility for suitability rests with the systems integrator or controls contractor.

CvAHU Selection Guide – Identifying Features

CvAHU Version	Power Exhaust (Rfan)	Cooling	Heating	Economizer	Vent
1	CV or Variable	0-10VDC AO	0-10VDC AO	DBulb or Enthalpy	Fixed% or CO2
2	CV or Variable	2-stage DO	2 stage DO	DBulb or Enthalpy	Fixed% or CO2
3	CV or Variable	2-stage DO	2 stage DO	DBulb or Enthalpy	Fixed%
4	None	2-stage DO	2 stage DO	DBulb or Enthalpy	Fixed%
5	None	2-stage DO or 0-10VDC AO	2-stage DO or 0-10VDC AO	None	None

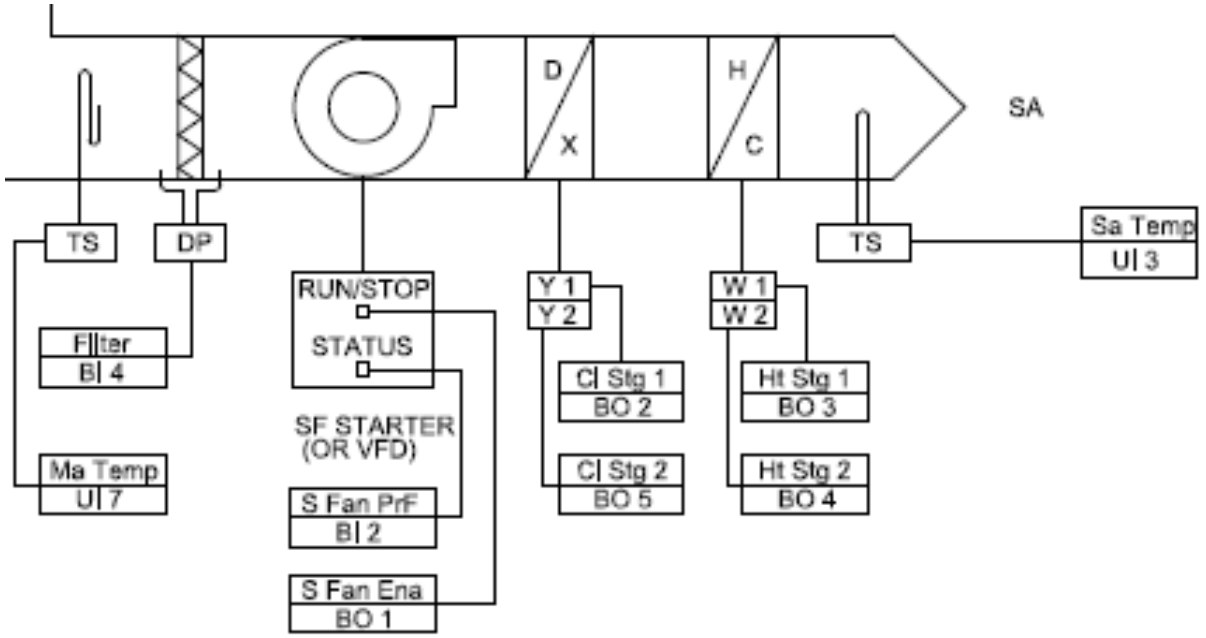
There are five versions in the pre-built Constant Volume AHU series addressing a mix of AHU features, such as staged versus analog heating/cooling, fixed ventilation versus demand control, dry-bulb or enthalpy economizer, powered or unpowered exhaust. The controls contractor selects the version that best addresses the project needs with the understanding that all versions can be modified to suit. Each version is available by download as one zipped file.

CvAHU2 – Dual-Stage Heating/Cooling



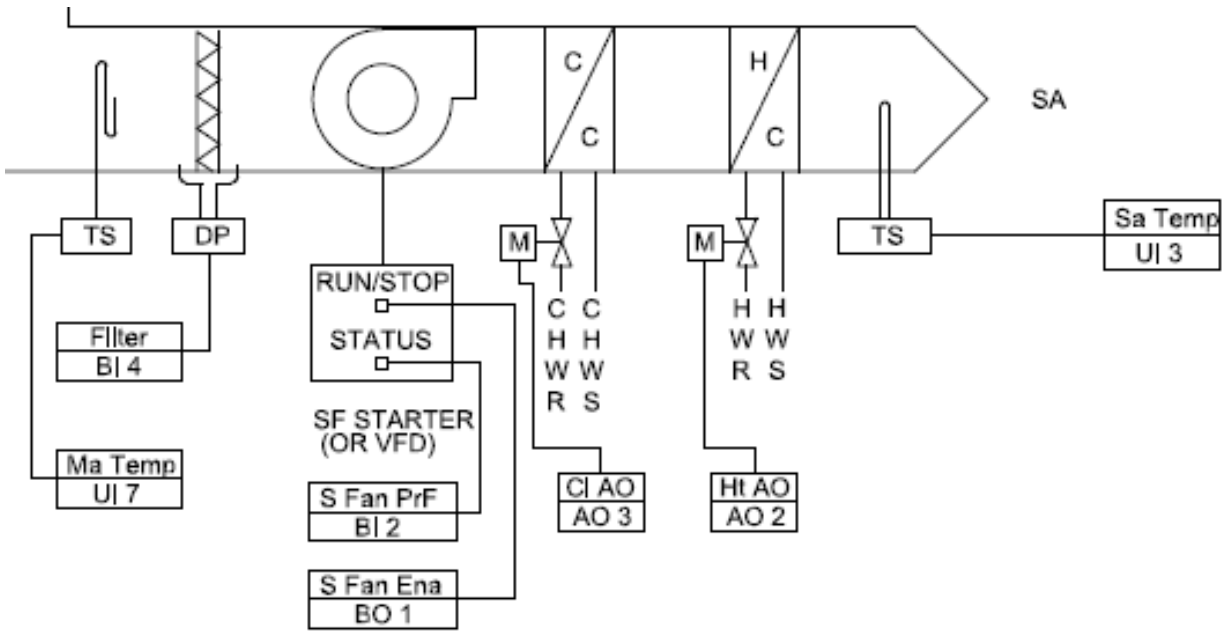
With each version program you get a system schematic that can be modified to meet the specific needs of the project. Each version is identified by a version suffix, such as CvAHU2.

Supply Air – Staged Heating/Cooling



For staged heating and cooling you have the choice of one or two stages of direct expansion (DX) cooling and one or two stages of gas or electric heating. Temperature sensors (TS) exist for supply air and mixed air ducts. A differential pressure (DP) switch checks for a plugged filter. The constant volume supply air fan (S fan) has a run-proving signal from a current transformer in addition to start and stop commands. If a variable frequency drive (VFD) is used for soft starting, it is assumed to be set for a single running speed.

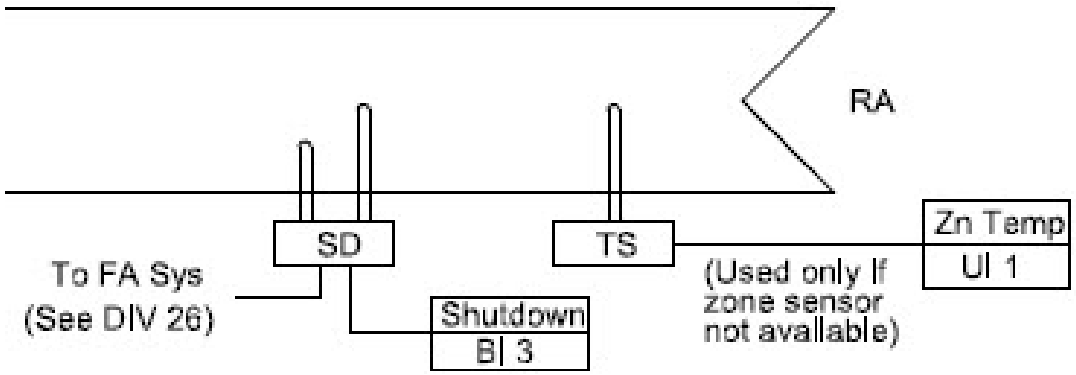
Supply Air – Analog Heating/Cooling



It is also possible to have 0-10 Volt analog control for chilled water (CHW) cooling and hot water (HW) heating. All other sensors remain the same as for staged heating and cooling.

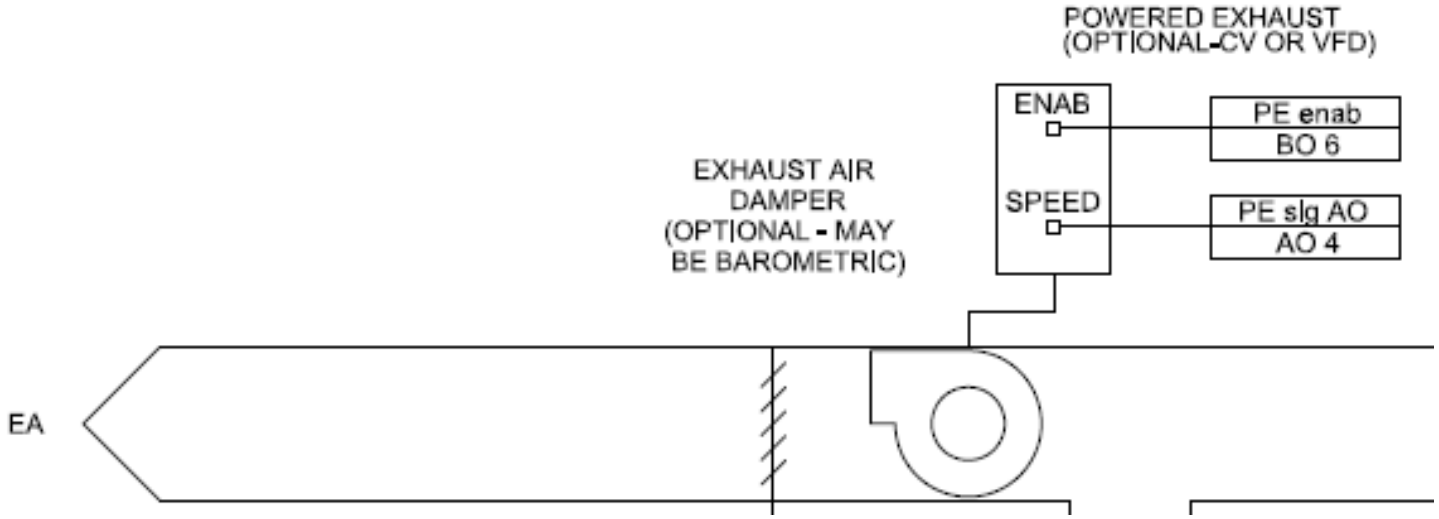
Notice that each point has both the Sedona variable name and the I/O channel reference used on the Sedona wiresheet.

Return Air – With Shutdown Provision



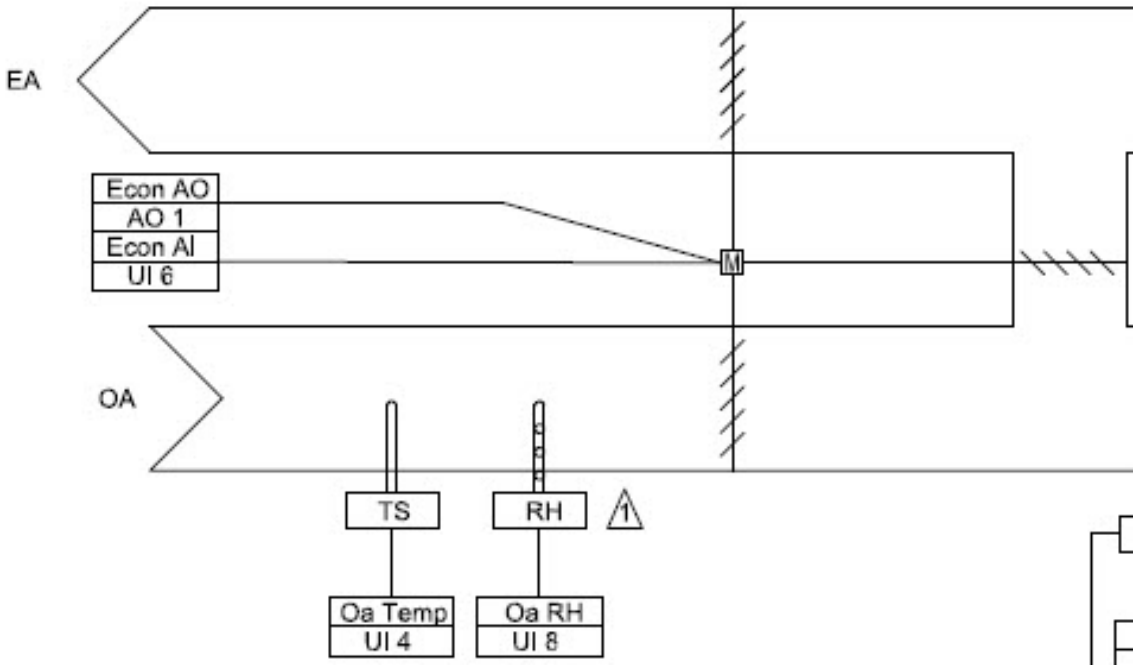
For return air, you have a provision for a return air temperature sensor (TS) that can be in the return air duct, or you can use a space temperature sensor that is mounted in the wall setter. A shutdown provision such as a smoke detector (SD) is provided to meet local fire code requirements.

Exhaust – Powered or Unpowered



For the exhaust duct, you can have a constant volume exhaust fan, a variable speed exhaust fan or no fan at all. The exhaust damper could be a simple barometric damper. Variable speed exhaust fan is based upon outside air damper position rather than building static pressure input.

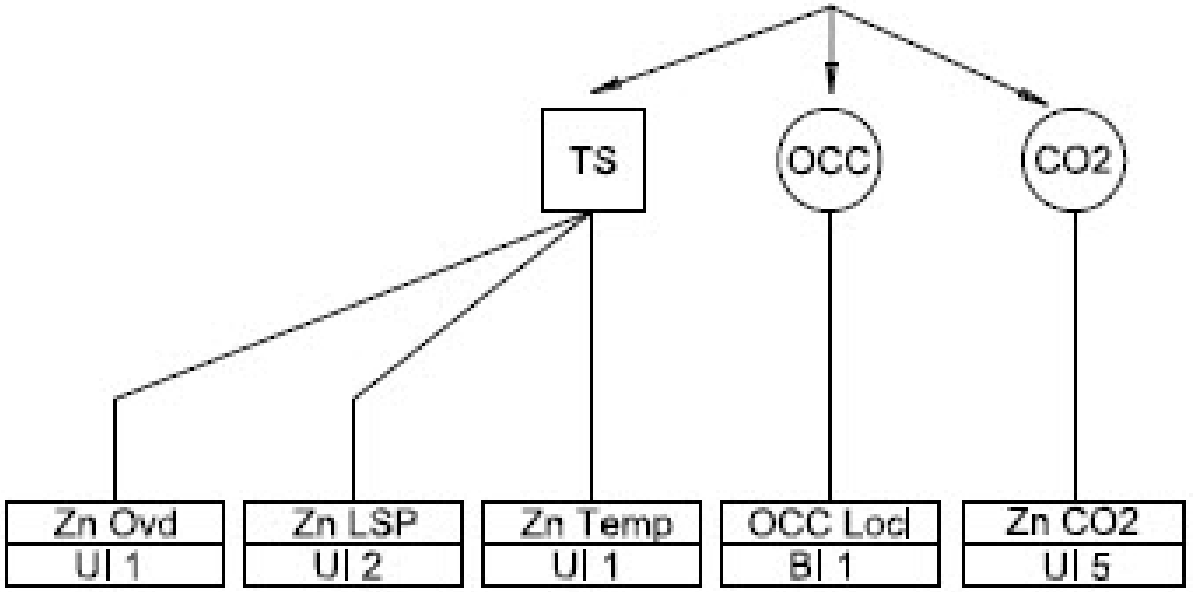
Outside Air – Economizers and Ventilation



You can also have a dry-bulb economizer requiring an outside air temperature sensor (TS), an enthalpy economizer requiring a relative humidity sensor (RH) in addition to the dry-bulb sensor or no economizer at all. A proportional damper actuator must be provided which has analog position feedback.

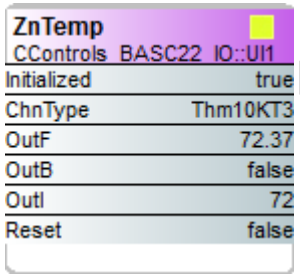
For ventilation, you can have a fixed amount of ventilation or have a variable amount of ventilation based upon CO2 or what is called demand control ventilation (DCV).

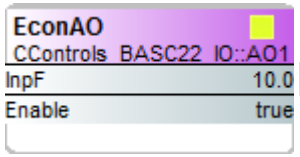
Operational Inputs



A wall setter is optional. If no slider switch (ZnLSP) is discovered for setpoint control, then the program assumes BACnet client control of the setpoint. However, a space temperature sensor (ZnTemp) is needed which could be located in the zone or in the return air duct. By momentarily shorting out the zone temperature sensor, a momentary occupied (ZnOvd) signal is created. Optionally, a continuous local occupy command (OCC) can be obtained by the OCC input (OCCLocl). Finally, if demand control ventilation (DCA) is required then a CO2 sensor needs to be installed (ZnCO2).

Real Points List – BACnet Client Accessible

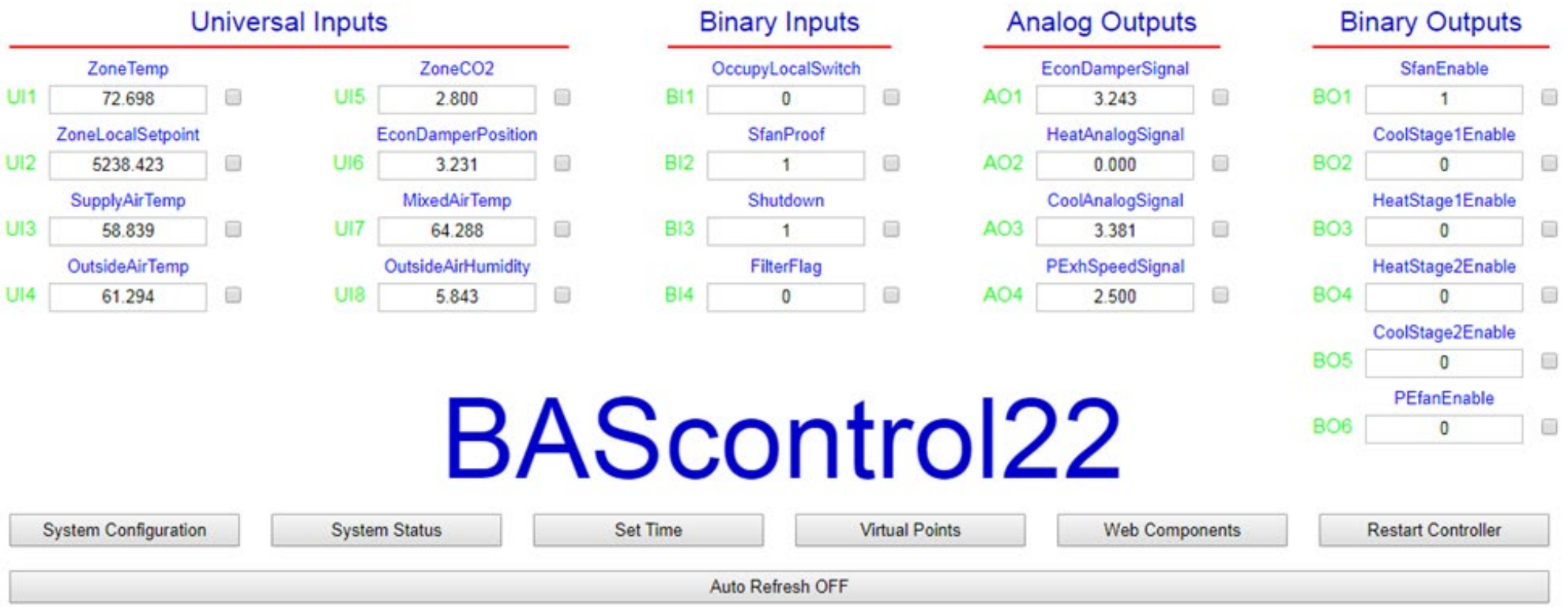




I/O Point	Configured as	Sedona Tag	BACnet Object Instance	Name	Type	Comments
UI1	10k T3	ZnTemp	1	ZoneTemp	AI	Space temperature thermistor
UI2	Resistance	ZnLSP	2	ZoneLocalSetpoint	AI	Two-wire potentiometer
UI3	10k T3	SaTemp	3	SupplyAirTemp	AI	Supply air thermistor
UI4	10k T3	OaTemp	4	OutsideAirTemp	AI	Outside air thermistor
UI5	0-10V	ZnCO2	5	ZoneCO2	AI	0-2000 ppm CO2 transmitter
UI6	0-10V	EconAI	6	EconDamperPosition	AI	OA damper position feedback
UI7	10k T3	MaTemp	7	MixedAirTemp	AI	Mixed air thermistor
UI8	0-10V	OaRH	8	OutsideAirHumidity	AI	Outside air humidity
BI1	contact	OccLocl	9	OccupyLocalSwitch	BI	Temporary occupancy switch
BI2	contact	SfanPrf	10	SfanProof	BI	Supply air fan proving sensor
BI3	contact	Shutdwn	11	Shutdown	BI	Shutdown occurs if open
BI4	contact	Filter	12	FilterFlag	BI	Filter requires changing
AO1	0-10V	EconAO	13	EconDamperSignal	AO	OA damper command signal
AO2	0-10V	HtAO	14	HeatAnalogOutput	AO	Heating analog output
AO3	0-10V	ClAO	15	CoolAnalogOutput	AO	Cooling analog output
AO4	0-10V	PEsigAO	16	PExhSpeedSignal	AO	Powered exhaust speed cmd.
BO1	contact	SfanEna	17	SfanEnable	BO	Engage supply fan
BO2	contact	ClStg1	18	CoolStage1Enable	BO	Engage stage 1 cooling
BO3	contact	HtStg1	19	HeatStage1Enable	BO	Engage stage 1 heating
BO4	contact	HtStg2	20	HeatStage2Enable	BO	Engage stage 2 heating
BO5	contact	ClStg2	21	CoolStage2Enable	BO	Engage stage 2 cooling
BO6	contact	PEenab	22	PEfanEnable	BO	Engage powered exhaust

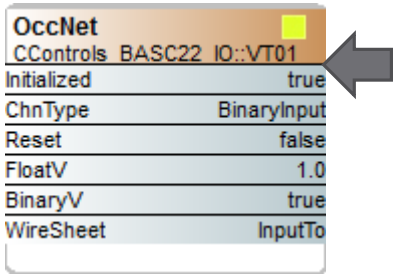
A Real points list is provided for each application version. Universal inputs (UI) are pre-configured and assigned both a Sedona name and a BACnet name. BACnet instances are fixed but BACnet names, types, descriptions and present values can be changed if needed. A comment field is provided to aid in understanding the significance of the point.

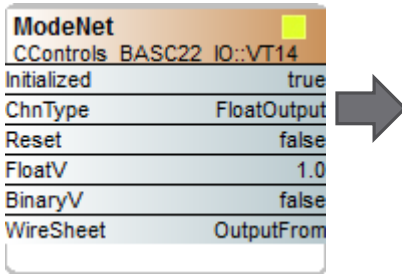
Real Points View – Main Web Page



All 22 real points with their present value and BACnet name are displayed. Buttons launch to other pages.

Virtual Points List – BACnet Client Accessible

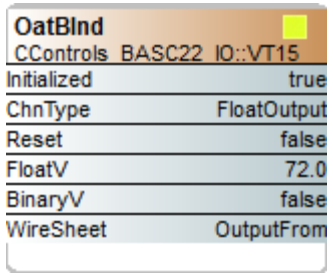


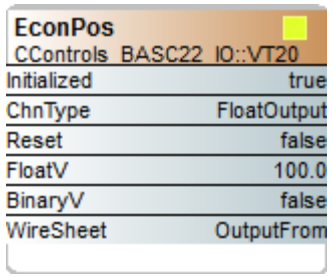


I/O Point	Configured as	Sedona Tag	BACnet Object Instance	Name	Type	Comments
VT01	WS input	OccNet	201	OccupyViaNetwork	BV	Network occupy command
VT02	WS input	OvdTime	202	OccupyOvrdDuration	AV	Net. Occ. override time (min)
VT03	WS input	OccClSP	203	OccCoolingSetpoint	AV	Occupied cooling setpoint
VT04	WS input	OccHtSP	204	OccHeatingSetpoint	AV	Occupied heating setpoint
VT05			205			
VT06			206			
VT07	WS input	EcoMin	207	EconMinPosSetpoint	AV	OA damper minimum position
VT08	WS input	Co2NSP	208	CO2_SP_ViaNetwork	AV	Network supplied CO2 setpoint
VT09			209			
VT10			210			
VT11			211			
VT12			212			
VT13			213			
VT14	WS output	ModeNet	214	ModeEnumStatus	AV	"0" = Standby "1" = Ventilation "2" = Heating "3" = Cooling "4" = Filter "5" = Emergency Off

BACnet commands from a BACnet client appear to the wiresheet (WS) as inputs. The BACnet instance numbers are pre-defined as are the Sedona tags. Wiresheet outputs appear as BACnet client inputs.

Virtual Points List – BACnet Client Accessible

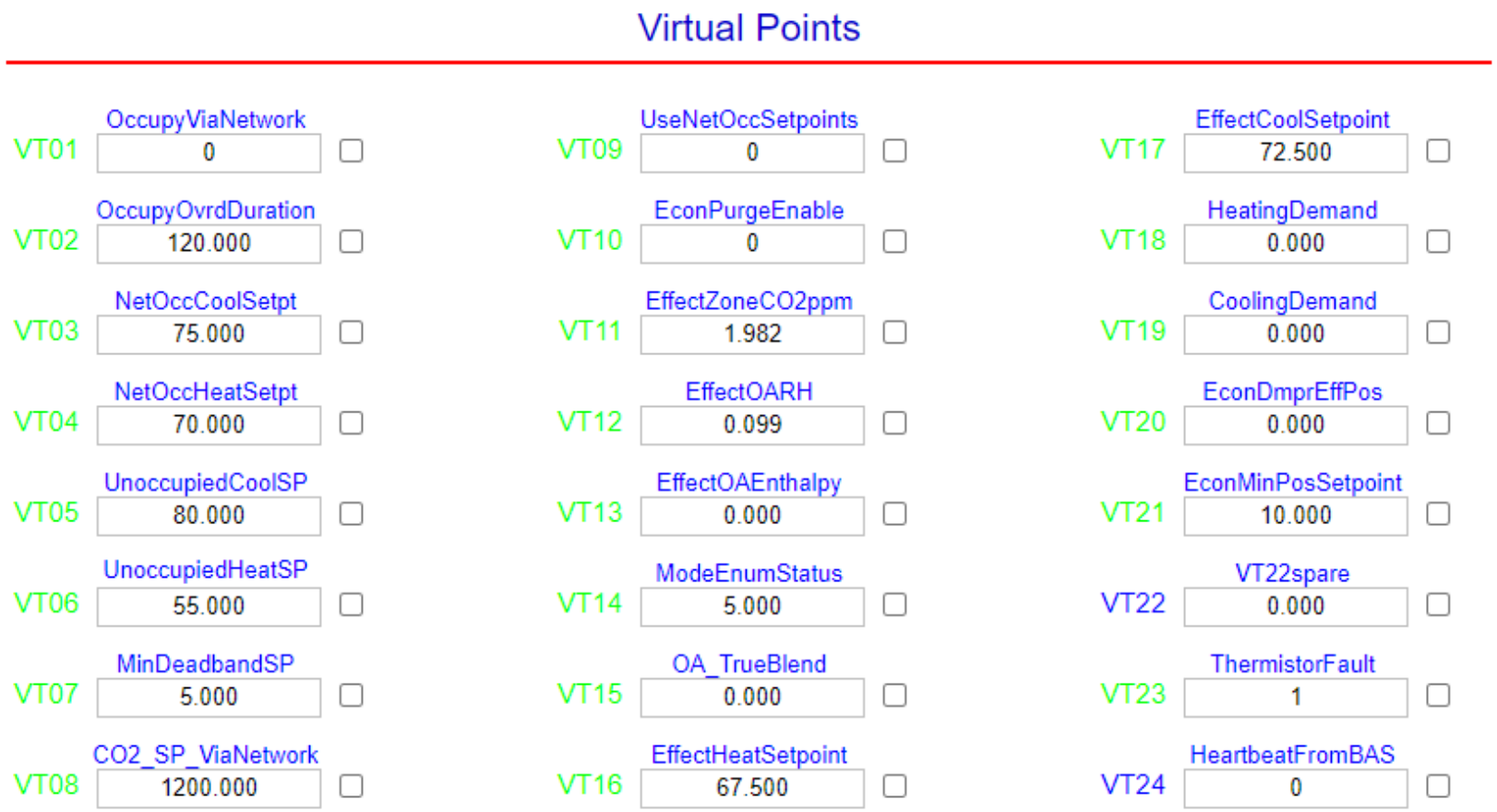




I/O Point	Configured as	Sedona Tag	BACnet Object Instance	Name	Type	Comments
VT15	WS output	OatBlnd	215	OA_TrueBlend	AV	Percentage of outside air based upon SA, MA and OA temperatures
VT16	WS output	EffHtSP	216	EffectHeatingSetpoint	AV	Reflects the current heating setpoint
VT17	WS output	EffClSP	217	EffectCoolingSetpoint	AV	Reflects the current cooling setpoint
VT18	WS output	HtNDem	218	HeatingDemand	AV	Heating demand from 0-100%
VT19	WS output	ClNDem	219	CoolingDemand	AV	Cooling demand from 0-100%
VT20	WS output	EconPos	220	EconDmprEffPos	AV	Outside damper position
VT21			221			
VT22			222			
VT23			223			
VT24	WS input	Hrtbeat	224	HeartbeatFromBAS	BV	Wink from BAS for fallback

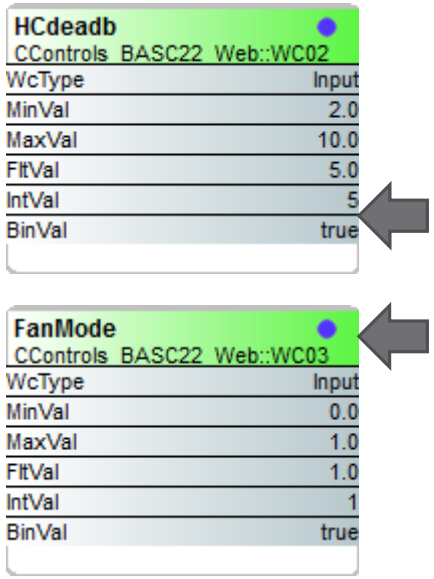
There are 24 available virtual points providing communication between a BACnet client and a Sedona wiresheet.

Virtual Points View – Virtual Points Web Page



The present value of all 24 virtual points are displayed along with their BACnet name.

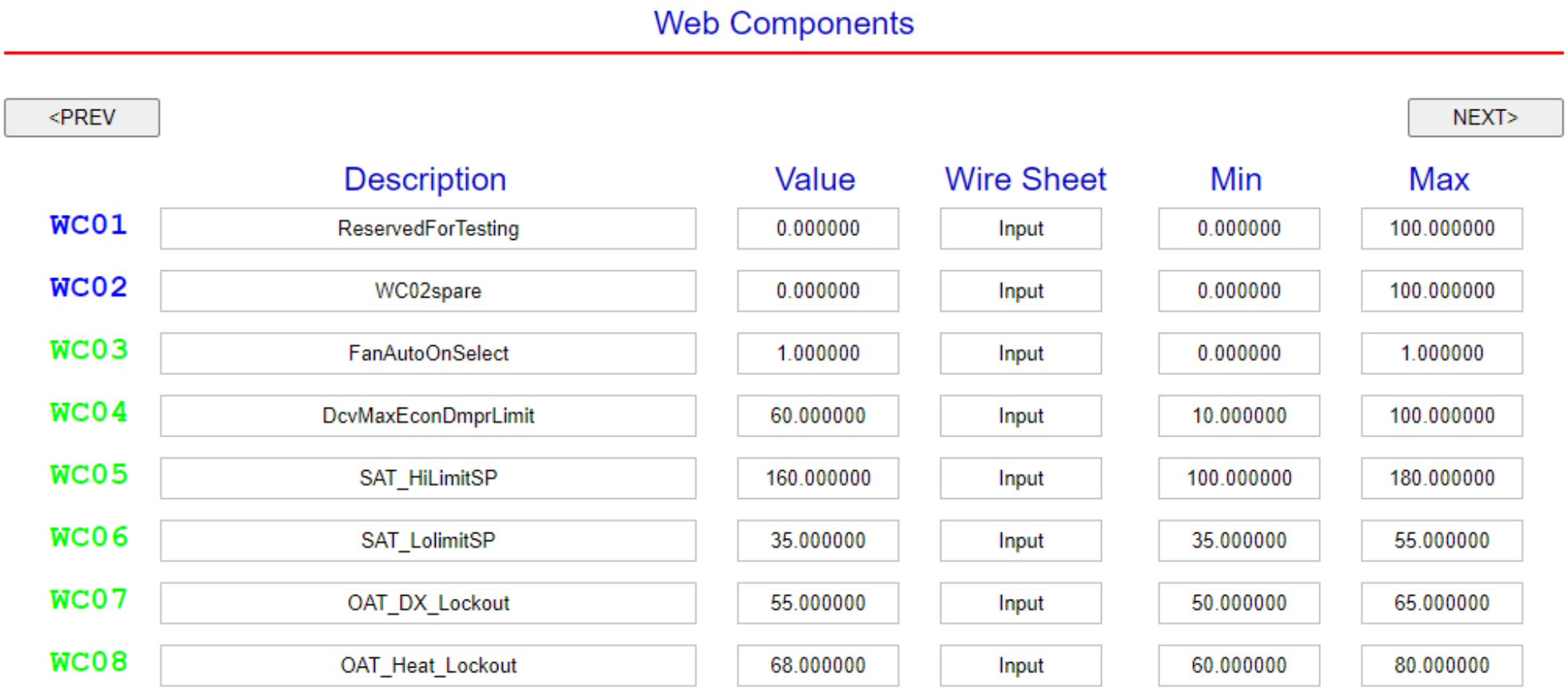
Web Components – Used for Configuration



Web Point	Web Name	Sedona Tag	I/O	Default Value	Comments
WC01	ReservedForTesting	TestVal	I	0	Set to "1" to test the occupy logic. Currently not used as part of the logic.
WC02	HeatCoolDeadbandSP	HCdeadb	I	5	Forced difference between the local and network heating and cooling setpoints.
WC03	FanAutoOnModeSelect	FanMode	I	1	When set to "0" the supply fan is in automatic mode. With a "1" the supply fan runs continuously while in occupied mode.
WC04	DcvMaxEconDmprLimit	Co2Max	I	60	The sets the maximum throttling range of the CO@ PID controller. Maximum setting is 100%.
WC05	SAT_HighLimitSP	SaHiLim	I	160	Supply air temperature high limit. Min=0; Max=200
WC06	SAT_LowLimitSP	SaLoLim	I	25	Supply air temperature low limit. Min=0; Max=100
WC07	OAT_DX_Lockout	ClLoLoc	I	55	If outside air temperature drops below this setting, cooling will be locked out until the outside air temperature rises 2 degrees F above this setting.
WC08	OAT_HeatLockout	HtHiLoc	I	68	If outside air temperature rises above this setting, heating will be locked out until the outside air temperature drops 2 degrees F below this setting.

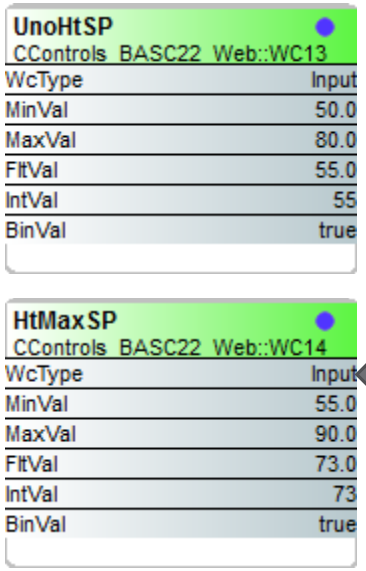
Web components (WC) provide communication between the Sedona wiresheet and a common web browser allowing the browser to set local parameters and monitor points of interest.

Web Points View – Web Components Page 1



48 web components are available with their descriptions and present values.

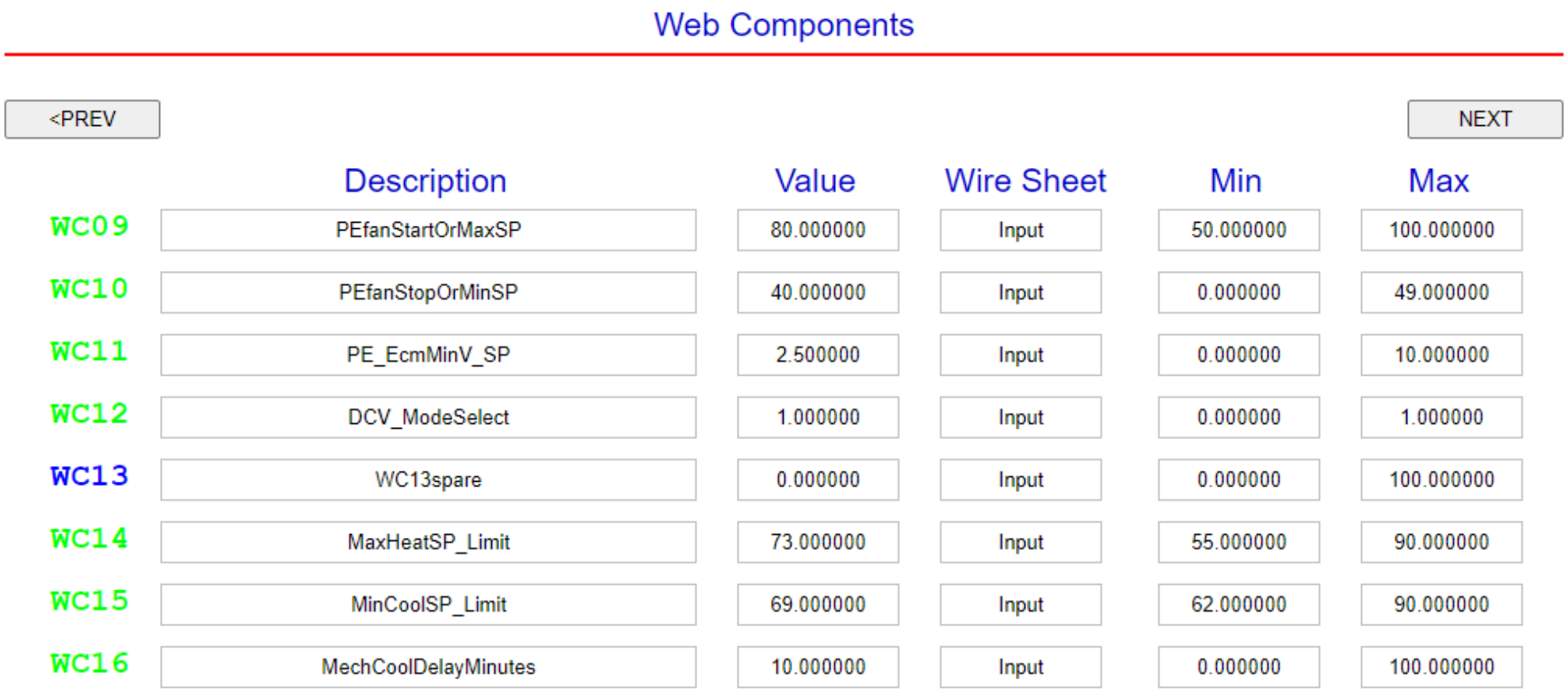
Web Components – Used for Configuration



Web Point	Web Name	Sedona Tag	I/O	Default Value	Comments
WC09	PEfanStartOrMaxSP	PEStart	I	80	If a powered exhaust is being used and the exhaust damper position (percentage open) exceeds this setting, the exhaust fan will turn on. If a variable speed drive is being used, its speed will throttle between the two damper position limits.
WC10	PEfanStopOrMinSP	PEStop	I	40	If a powered exhaust is being used and is running and the exhaust damper position becomes less than this setting, the exhaust fan will turn off.
WC11	PE_EcmMinV_SP	PEminSP	I	2.5	Low-limit of the 0-10V powered exhaust signal
WC12					
WC13	UnocHeatingSetpoint	UnoHtSP	I	55	Unoccupied heating setpoint
WC14	MaxHeatSP_Limit	HtMaxSP	I	73	Maximum heating setpoint allowed.
WC15	MinCoolSP_Limit	ClMinSP	I	69	Minimum cooling setpoint allowed.
WC16	UnocCoolingSetpoint	UnoClSP	I	85	Unoccupied cooling setpoint

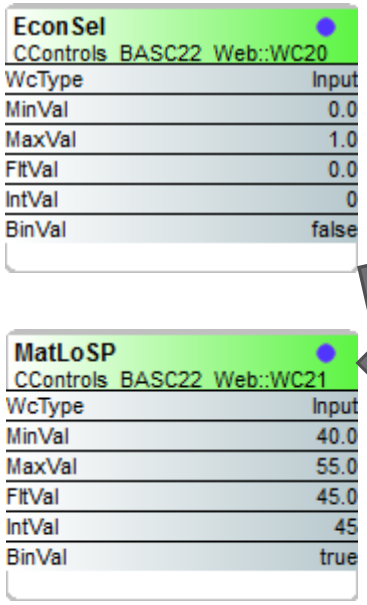
The web name appears on the web components web page. The Sedona tag is pre-defined as well as the characteristic of the point – input or output. A comment field helps in understanding the significance of the point.

Web Points View – Web Components Page 2



Minimum and maximum values can be established to restrict the entries into a defined range.

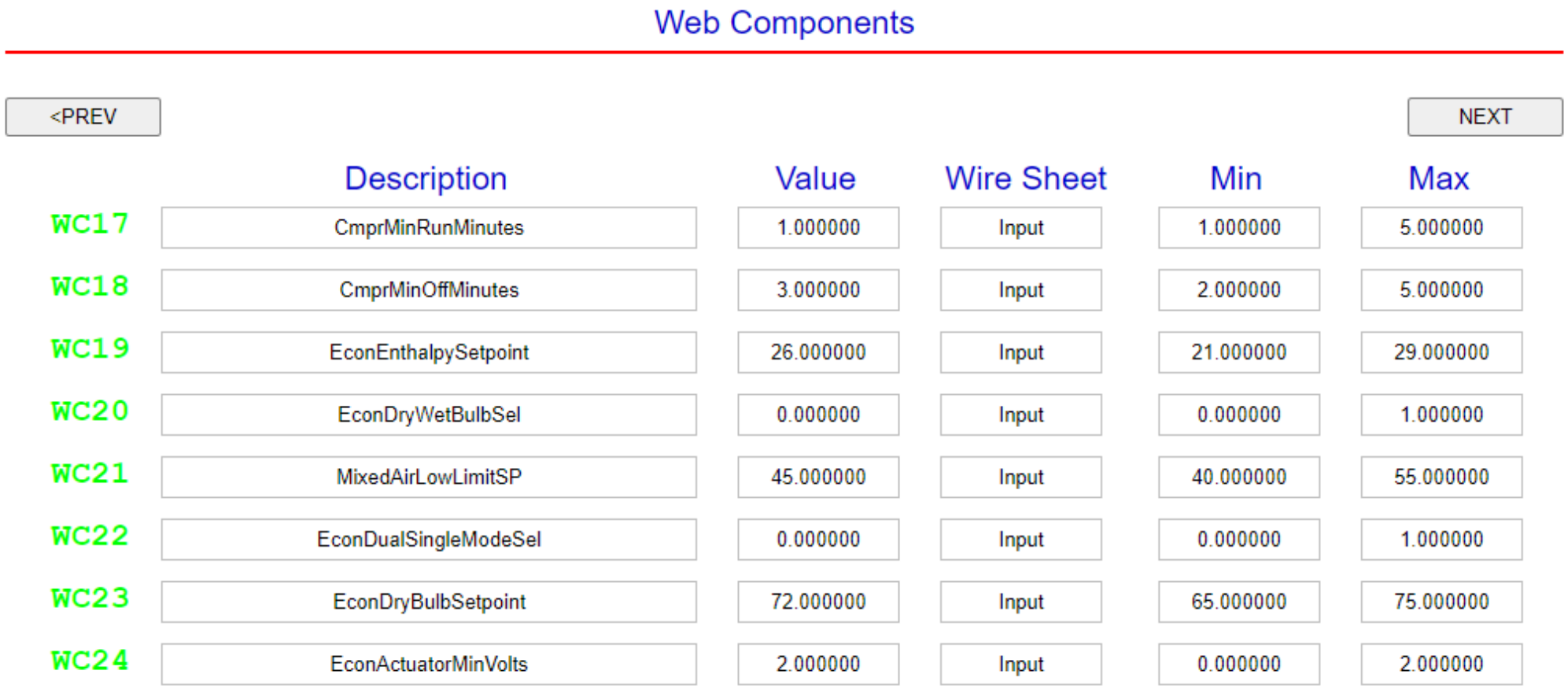
Web Components – Used for Configuration



Web Point	Web Name	Sedona Tag	I/O	Default Value	Comments
WC17	CmprMinRunMinutes	RunTim1	I	1	Minimum running time in minutes when a compressor is engaged.
WC18	CmprMinOffMinutes	OffTim1	I	3	Minimum running time in minutes when a compressor is disengaged.
WC19	EconEnthalpySetpoint	EnthSP	I	30	Above this setpoint economizer operation is disabled.
WC20	EconDryWetBulbSelect	EconSel	I	0	"0"=Dry Bulb, "1"=Enthalpy & Dry Bulb
WC21	MixedAirLowLimitSP	MatLoSP	I	45	MAT low limit setpoint typ. 45°F
WC22-WC48					

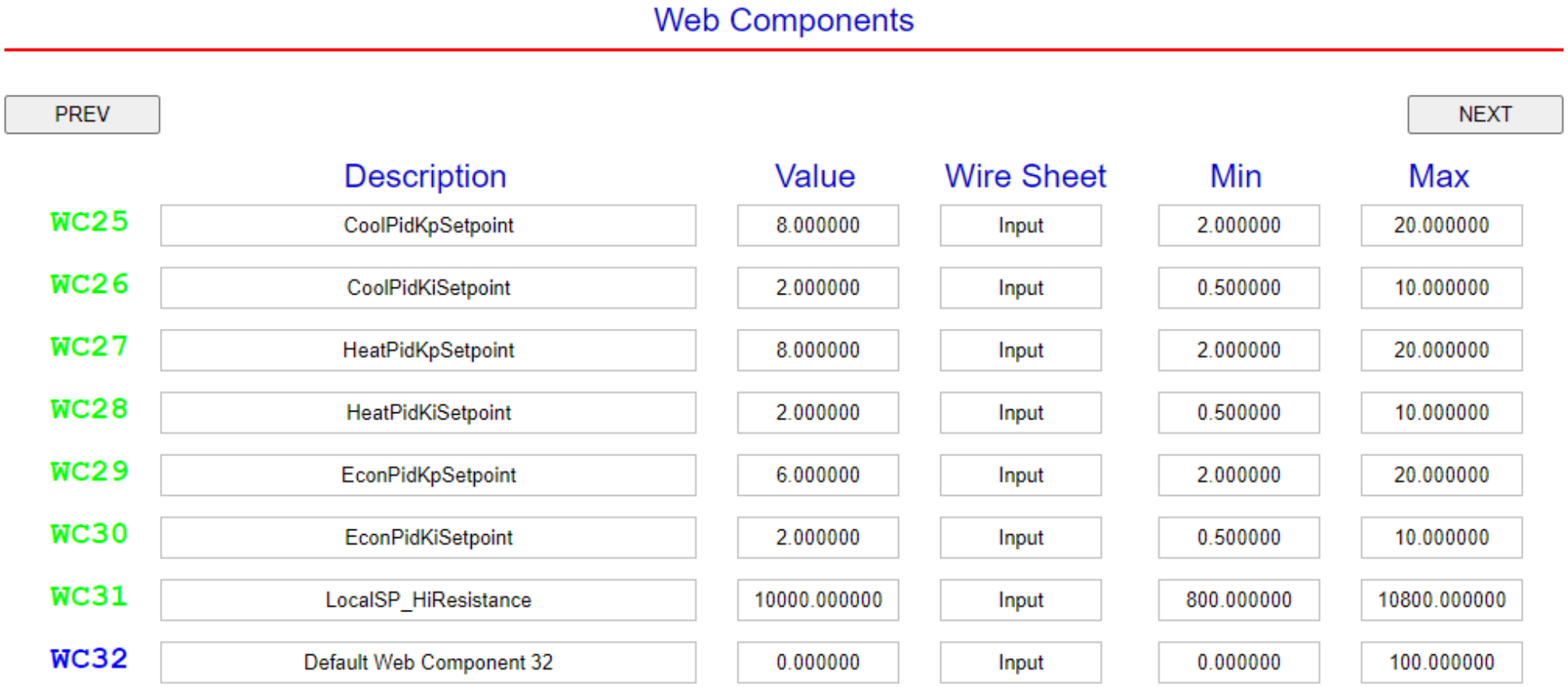
There are a total of 48 web components available. Binary, integer and float variables are supported with the same web component.

Web Points View – Web Components Page 3



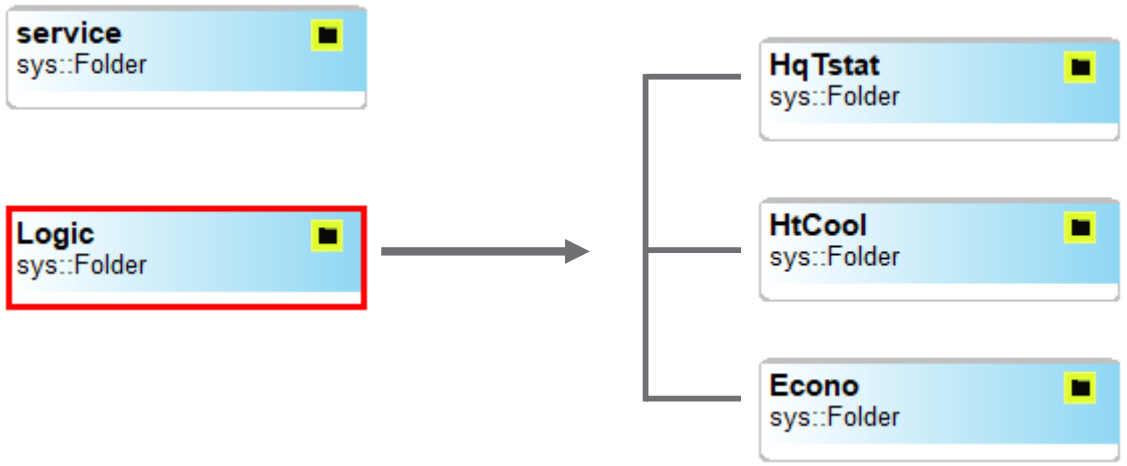
Local configuration of economizer is accomplished via webpage.

Web Points View – Web Components Page 4



Both heating and cooling PID Kp and Ki parameters can be adjusted via webpage.

Sedona Application is in a Hierarchy of Folders



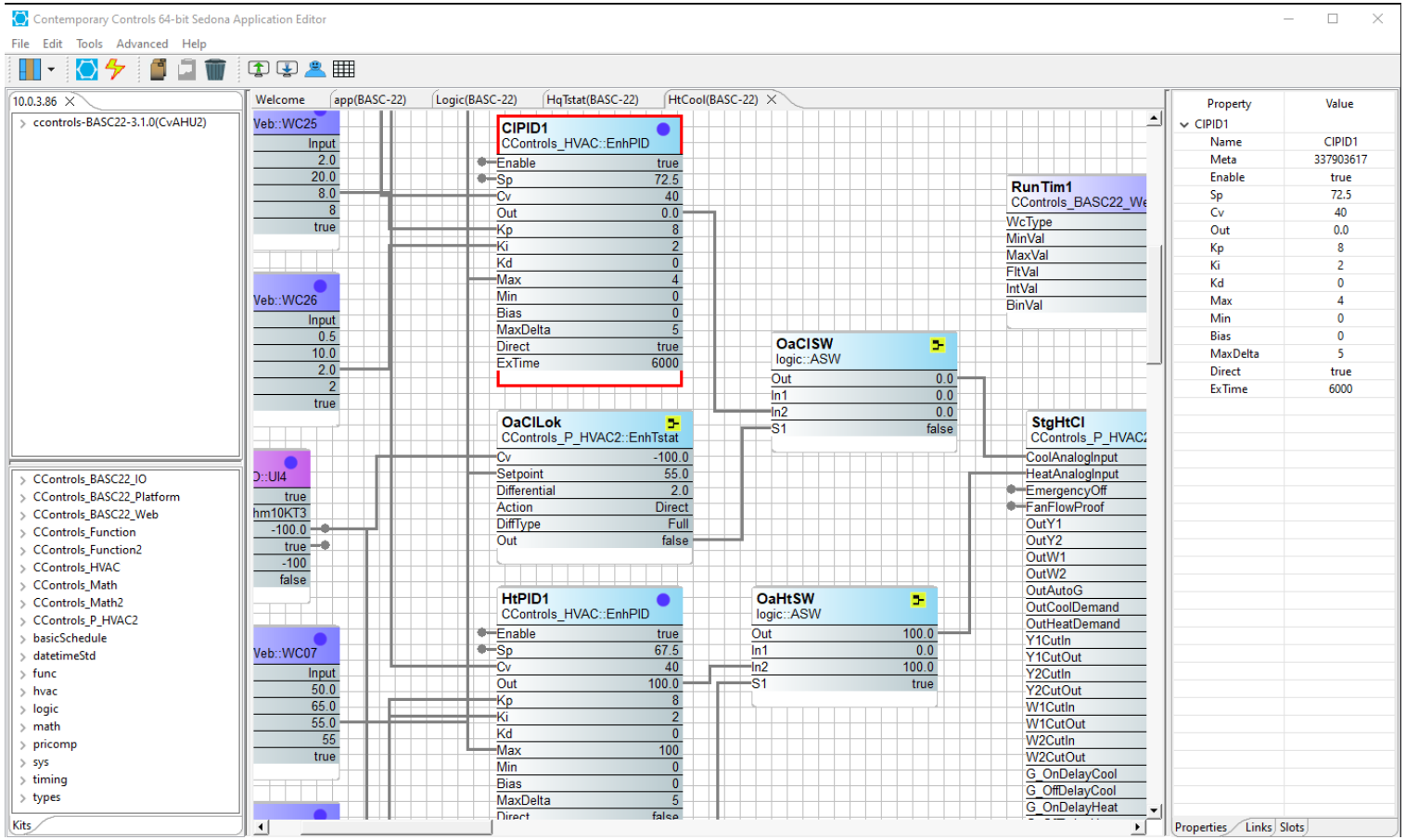
The main wiresheet has only two folders – service and Logic. Drilling down the Logic folder gains you access to the functional folders of the CvAHU version that is loaded.

HqTstat – Headquarters thermostat provides setpoint and setback logic

HtCool – provides staged and analog heating and cooling logic

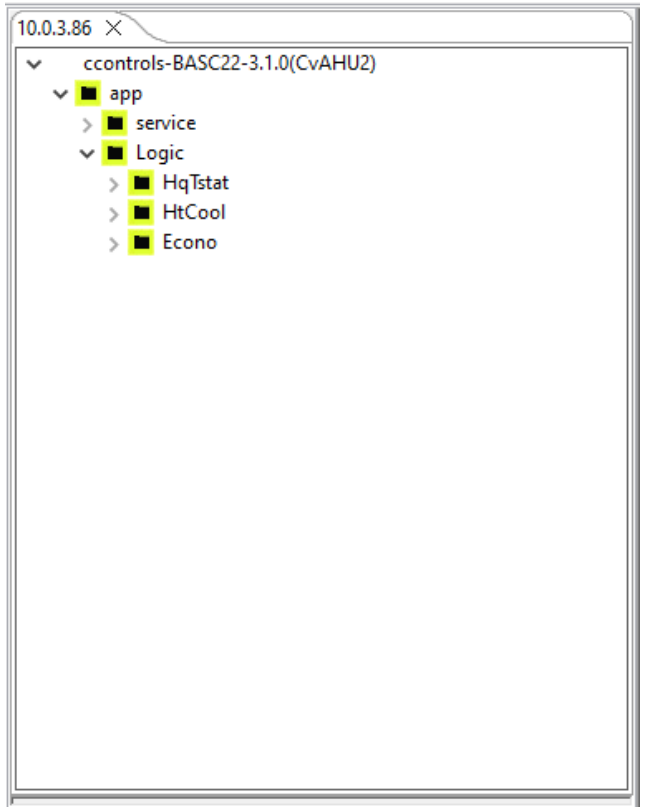
Econo – provides both dry-bulb and enthalpy economizer plus demand control ventilation logic

HtCool Folder – Heating/Cooling Logic

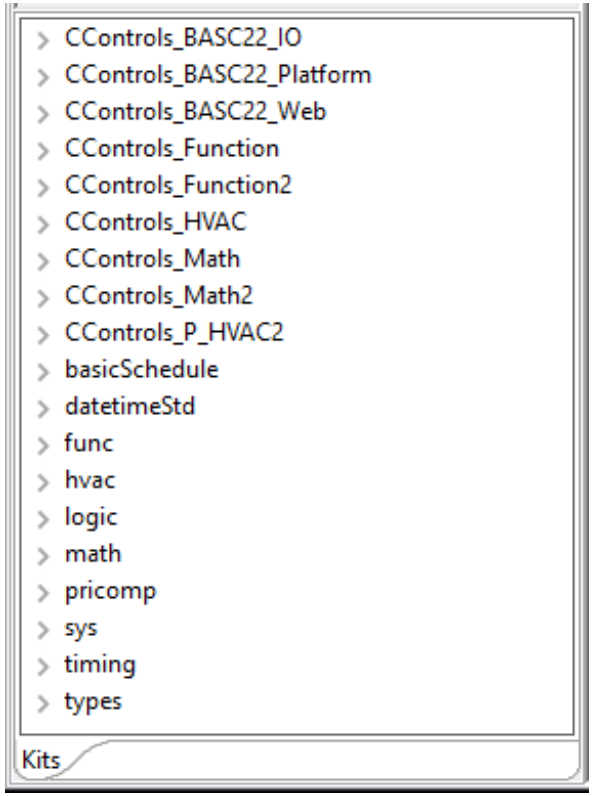


Logic exists in the three folders found in the "Logic" folder. The logic in the folders will change somewhat depending upon what version is being used but the intent is to maintain as much commonality as possible to help in understanding the applications.

SAE Views – Navigation and Kits Panes

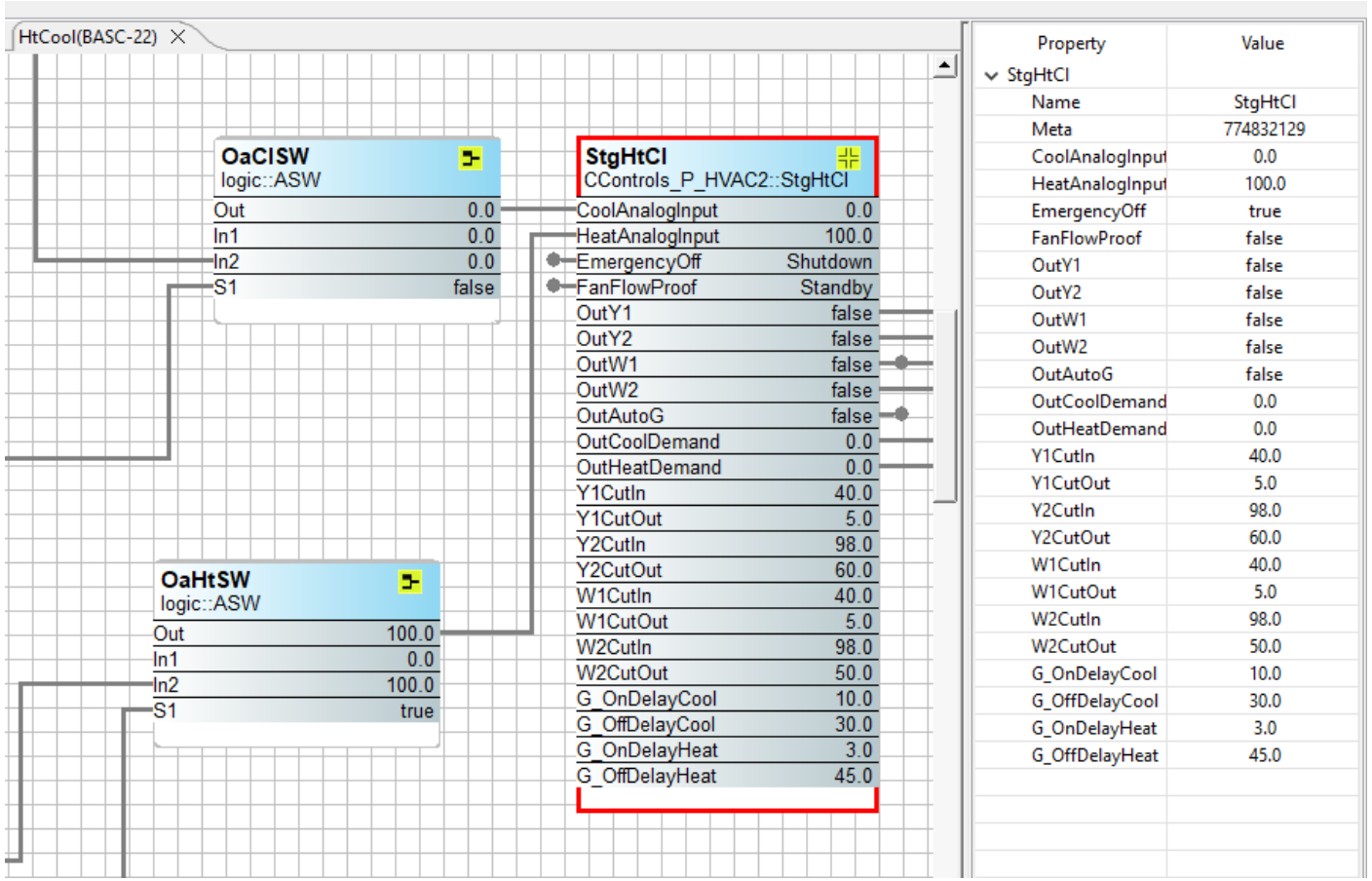


The Navigation pane shows you the hierarchy of the folders. Expanding the folders will show the order of execution of the logic.



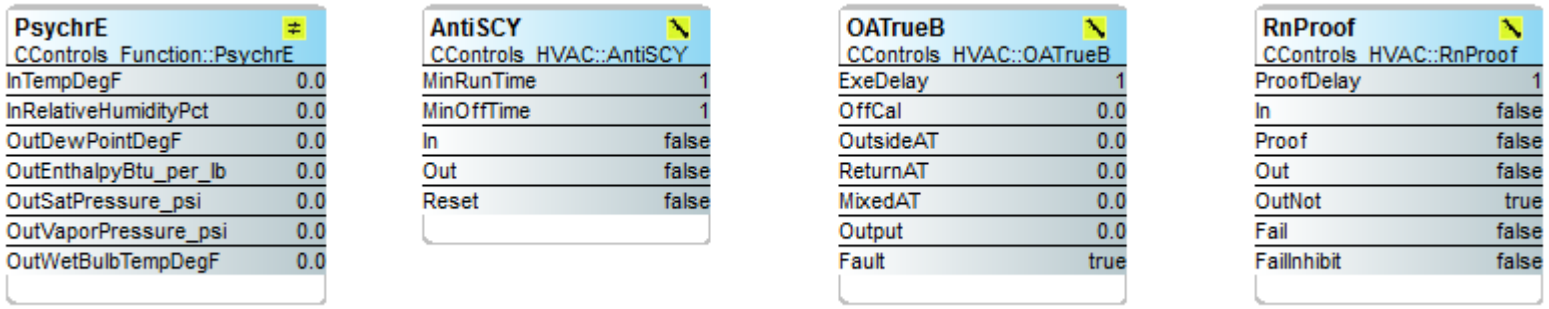
The Kits pane shows you all the kits installed on the controller. Expanding a kit gains you access to the components within the kit.

SAE – Properties Pane



By highlighting a component, its properties can be viewed in the Properties pane. This is where properties can be changed. Any changes are temporary until the application is saved to the controller.

Custom Components Simplify Logic



Psychrometric *component provides enthalpy calculation for economizer operation.*

Anti-cycle *component is used to protect staged compressors against short-cycling during cooling operation.*

Outside-air true-blend *component determines the actual percentage of outside-air injected based upon outside-air, mixed-air and return-air temperatures and not damper position.*

Run-proving *component verifies that commanded motors remain running as commanded.*

Macro Components Reduce Wiresheet Complexity

Staged Heat Cool *combines one or two-stage heating/cooling binary outputs, supply fan stop/start control, fan proof protection, buffered analog outputs, and emergency shutdown.*

Wall Setter *manages inputs from either digital or analog type wall setters which provides space temperature, setpoint, humidity, and CO2 control.*

Economizer-English Units *is a comprehensive "virtual" airside economizer with configuration options that include single or dual dry-bulb, single or dual enthalpy, demand control ventilation (DCV), powered exhaust fan, and a Purge mode.*

StgHtCl
CControls_Macro::StgHtCl

CoolAnalogInput	0.0
HeatAnalogInput	0.0
EmergencyOff	Normal
FanFlowProof	Standby
OutY1	false
OutY2	false
OutW1	false
OutW2	false
OutAutoG	false
OutCoolDemand	0.0
OutHeatDemand	0.0
Y1CutIn	50.0
Y1CutOut	5.0
Y2CutIn	95.0
Y2CutOut	55.0
W1CutIn	50.0
W1CutOut	5.0
W2CutIn	95.0
W2CutOut	55.0
G_OnDelayCool	15.0
G_OffDelayCool	30.0
G_OnDelayHeat	5.0
G_OffDelayHeat	45.0

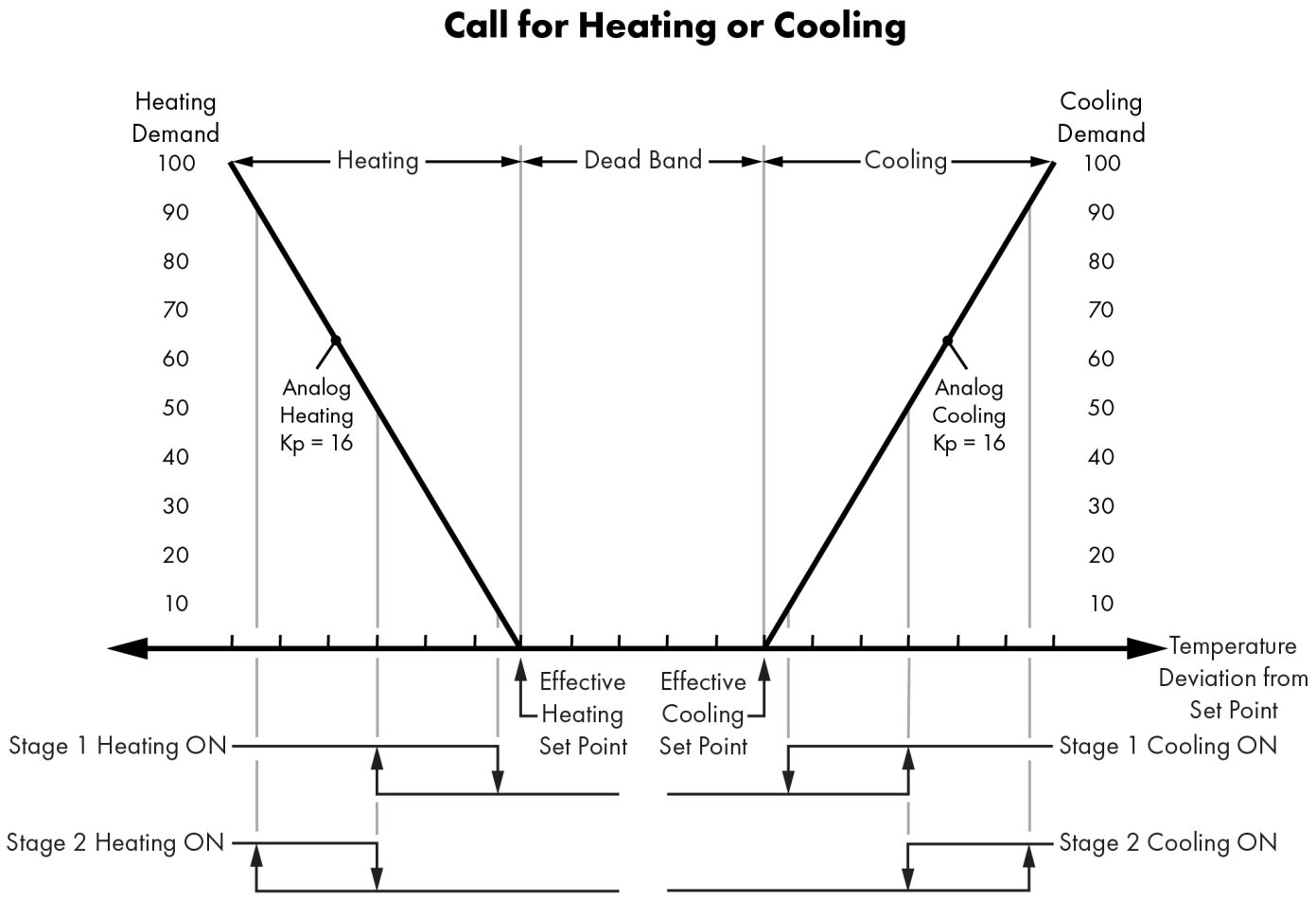
WallSet
CControls_Macro::WallSet

OccupyStatus	Unoccupied
SetpointOhms	0.0
ZoneTempTherm	0.0
ZoneTempVolts	0.0
HumidityVolts	0.0
CO2_Volts	0.0
OutEffCoolingSP	85.0
OutEffHeatingSP	55.0
OutTemperature	0.0
OutHumidity	0.0
OutCO2ppm	0.0
OutOccOvrd	Standby
OutUnocCooling	Off
OutUnocHeating	On
UnocCoolingSP	85.0
OccCoolingSP	75.0
OccHeatingSP	70.0
UnocHeatingSP	55.0
CoolSPminLimit	70.0
HeatSPmaxLimit	72.0
SP_PotInMin	0.0
SP_PotInMax	10000.0
SP_PotOutMin	65.0
SP_PotOutMax	75.0
LocalSP_Deadband	5.0
LocalOvrdDurationMinutes	120.0
CO2_OutMax	2000.0
ZoneTempV_OutMin	50.0
ZoneTempV_OutMax	95.0
ZnTempTorV_Select	UseThermIn
OccupiedSP_Select	UseSP_Pot

EconoE
CControls_P_HVAC2::EconoE

OccupyStatus	Unoccupied
SfanStatus	Standby
ReturnTemp	0.0
ReturnHumidity	0.0
ReturnCO2ppm	0.0
MixedTemp	0.0
OutsideTemp	0.0
OutsideHumidity	0.0
EffectiveCoolingSP	0.0
RetDamperPosVolts	0.0
OutDamperPosVolts	0.0
PurgeCommand	Standby
OutEconoDamperV	2.0
OutRetDmprEffPos	0.0
OutOA_DmprEffPos	0.0
OutOA_TrueBlend	0.0
OutRA_Enthalpy	0.0
OutOA_Enthalpy	0.0
OutOA_Dewpoint	0.0
EconCoolingDemand	0.0
DCV_CO2_Demand	0.0
MechCoolingEnab	Enable
ExhFanEnab	Standby
DryWetModeSelect	Dry bulb
FixedDiffModeSelect	Differential (Dual)
DCV_ModeSelect	Use MinVent only
MinVentPosSP	10.0
MaxDCV_PosSP	50.0
DCV_CO2_Setpoint	1000.0
DryBulbLimitSP	72.0
EnthalpyLimitSP	26.0
MA_LowLimitSP	40.0
ActuatorMinVolts	2.0
MechCoolDelayMinutes	5.0
ExFanCutInSP	80.0
ExFanCutOutSP	40.0
EconPID_Kp	6.0
EconPID_Ki	1.5
CO2_PID_Kp	2.0
CO2_PID_Ki	0.5

Staged or Analog Heating/Cooling Control

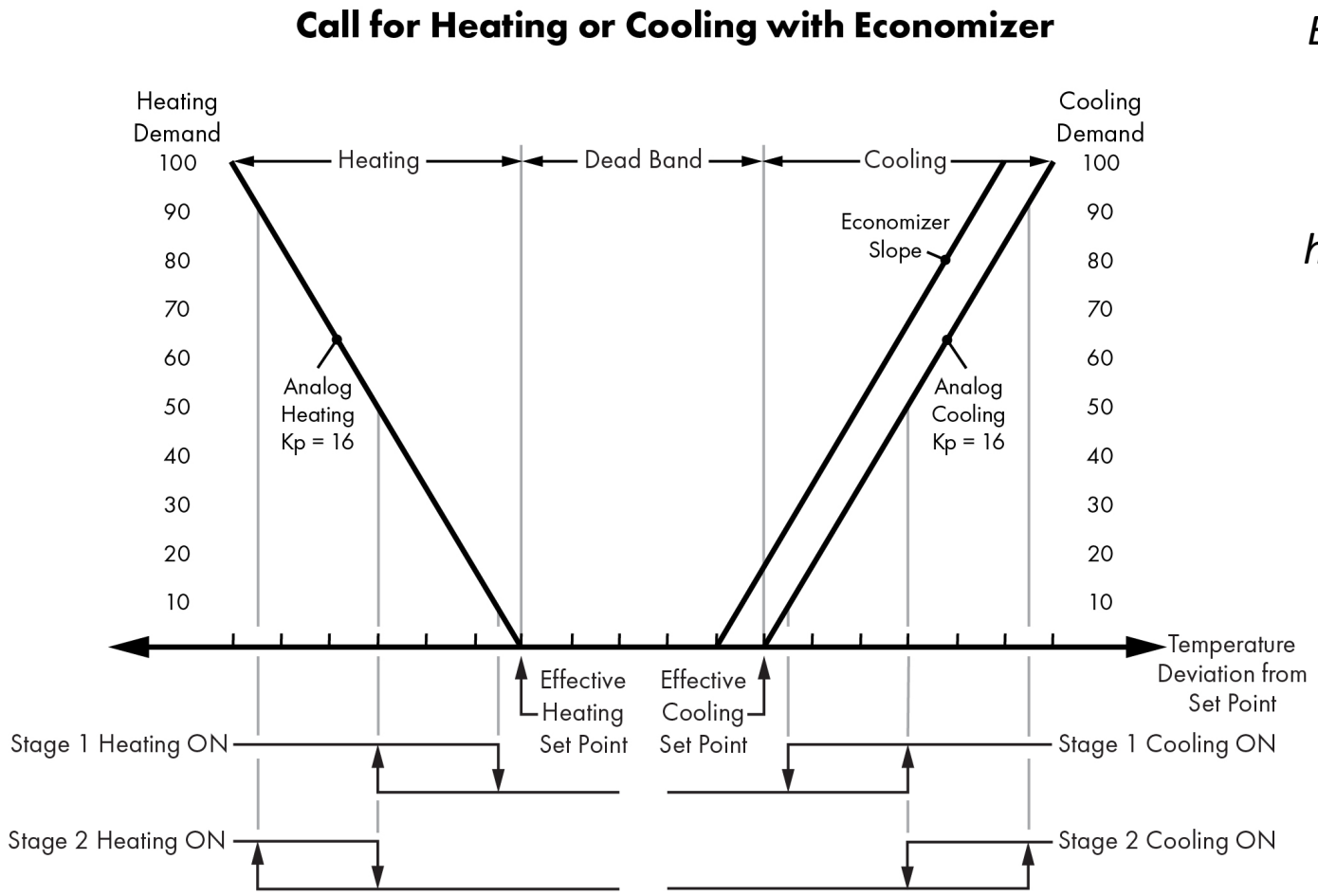


Heating and cooling control utilize two enhanced PID components along with hysteresis and timer components. PID parameters can be changed as well as the hysteresis trip points and timer delays.

HtPID1 CControls_HVAC::EnhPID	
Enable	true
Sp	67.51
Cv	72.5
Out	0.0
Kp	16
Ki	4
Kd	0
Max	100
Min	0
Bias	0
MaxDelta	5
Direct	false
ExTime	6000

CIPID1 CControls_HVAC::EnhPID	
Enable	true
Sp	72.51
Cv	72.5
Out	0.0
Kp	16
Ki	4
Kd	0
Max	100
Min	0
Bias	0
MaxDelta	5
Direct	true
ExTime	6000

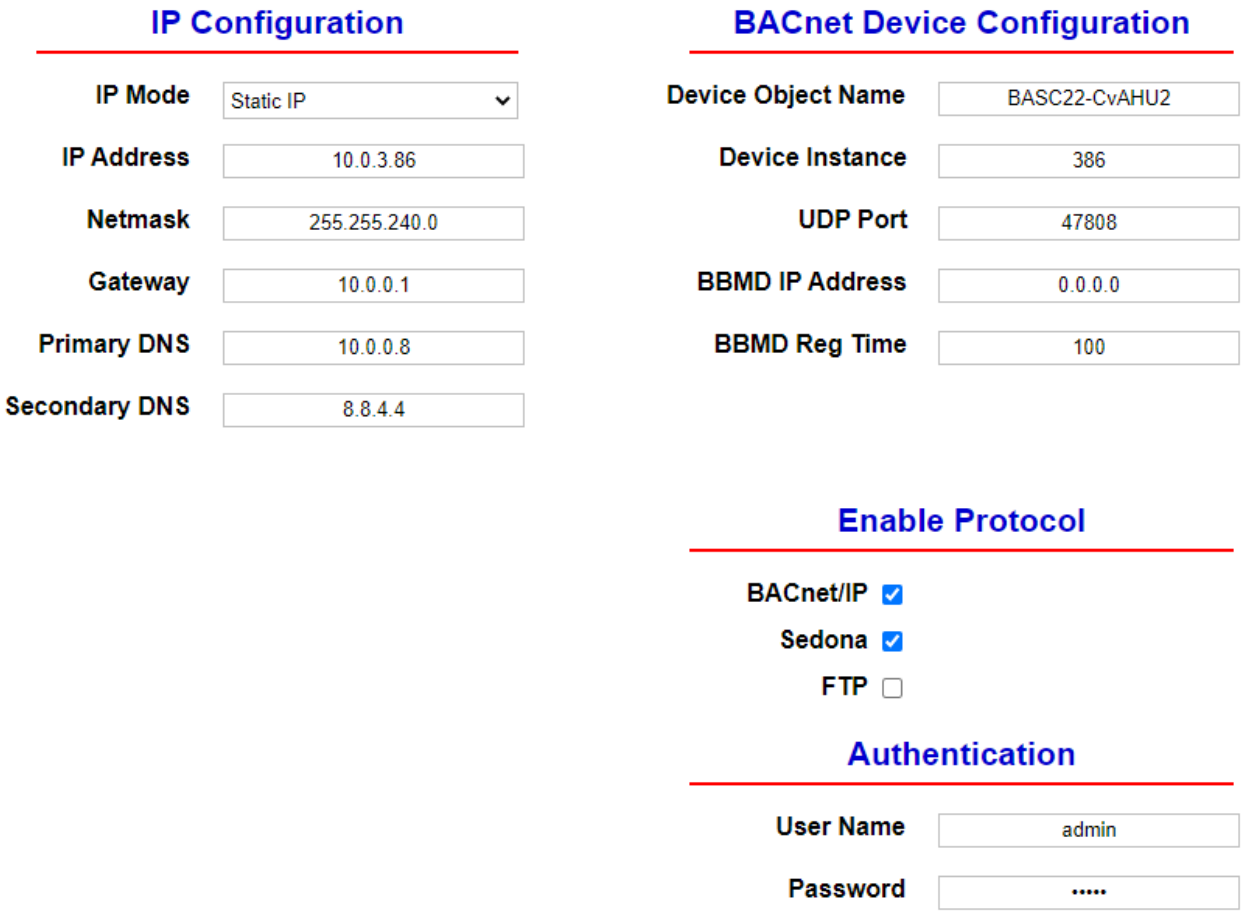
Heating/Cooling with Economizer



Economizers add an early stage of free-cooling assuming the outside temperature (dry-bulb) or outside humidity (dry-bulb and relative humidity) are conducive to free-cooling. An additional PID component and the economizer component are used for economizing.

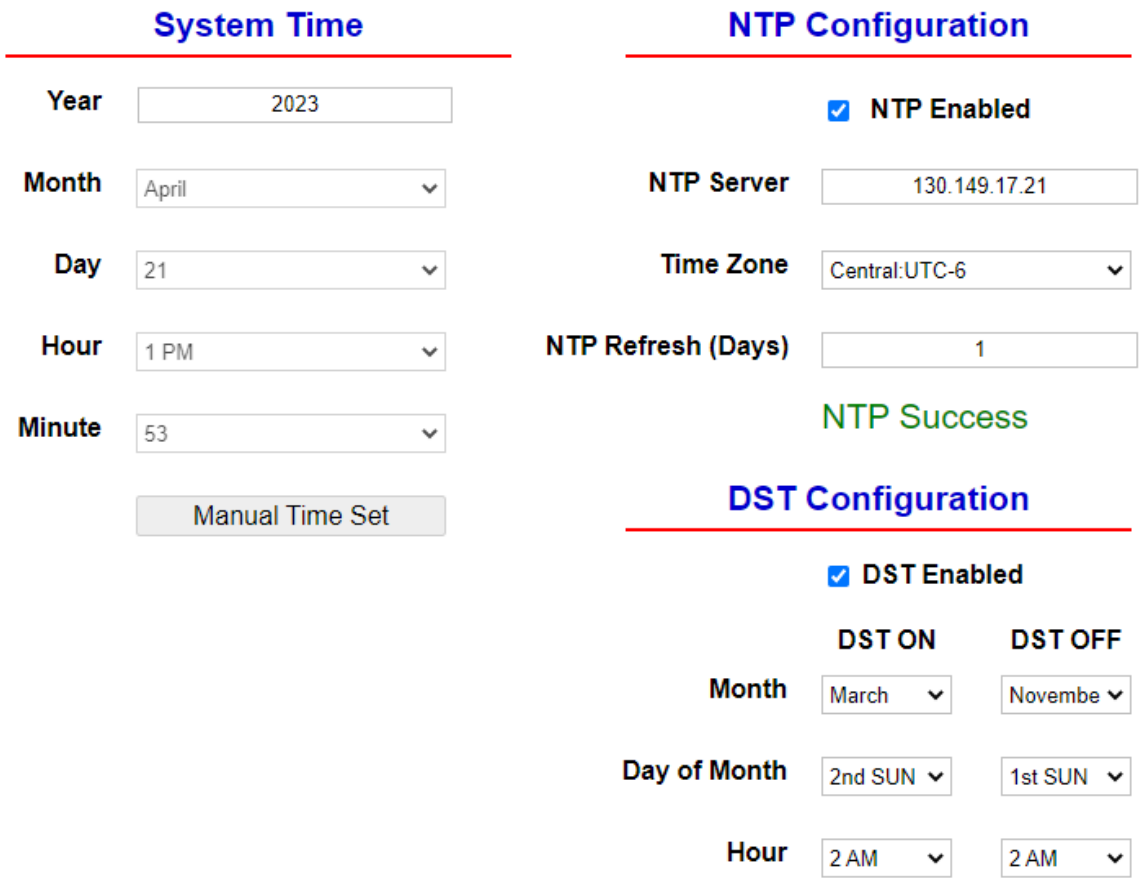
EconPID	
CControls_HVAC::EnhPID	
Enable	true
Sp	71.51
Cv	72.48
Out	100.0
Kp	8
Ki	2
Kd	0
Max	100
Min	3
Bias	0
MaxDelta	5
Direct	true
ExTime	15000

Commissioning – Configuration Web Page



To commission a controller using one of the CvAHU versions, you must use BASbackup to restore the version to the known IP address of the target controller. Both IP configuration and BACnet device configuration is required. DNS settings are necessary if access to a time server is done by name. BACnet device object and device instance must be unique.

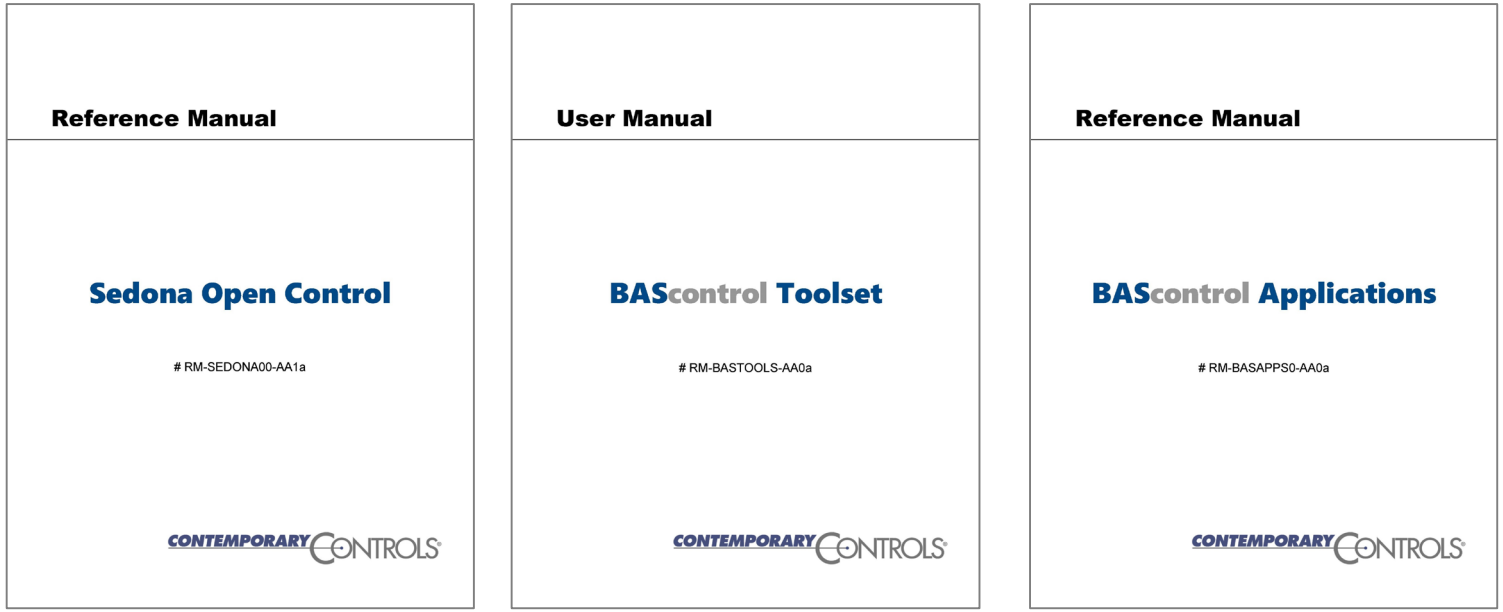
Commissioning – Configuring System Time



System time can be set manually or automatically when there is Internet access to a network time protocol (NTP) server. The time zone must be set, and daylight-saving time (DST) dates must be entered. In the event of a power loss, system time is maintained for up for several days.

Once the application is functioning on the controller, use BASbackup to save the controller settings as a project backup which will save all your configuration settings plus the Sedona application.

BAScontrol Applications Documentation



Detailed information on Sedona component and kit descriptions, basic Sedona programming, using Sedona and BASbackup tools, as well as using the pre-built applications can be found on the Contemporary Controls web site.

CvAHU Applied to CC's Rooftop Laboratory

Contemporary Controls outfitted four dual-stage heating/cooling RTUs with economizers on the roof of the company's Downers Grove, IL facility with CvAHU2 programs. All units are scheduled using a variety of head-ends for testing purposes. Our rooftop is our outside laboratory experiencing the variability of Chicago weather.

Thank You