



## BAScontrol20 — 20-point BACnet/IP Sedona Unitary Controller

The BAScontrol20 is a 20-point unitary controller which supports BACnet/IP and Sedona Framework using an Ethernet connection. The controller complies with the B-ASC device profile having a convenient mix of 8 universal inputs, 4 binary inputs, 4 analog outputs and 4 relay (20R) or triac (20T) outputs. Unique to the unit are 48 web components which link Sedona wire sheet readable/writeable data to web pages, and 24 virtual points which link Sedona wire sheet readable/writeable data to a BACnet client. The device is fully web page-configurable, and freely programmable using Sedona's drag-and-drop

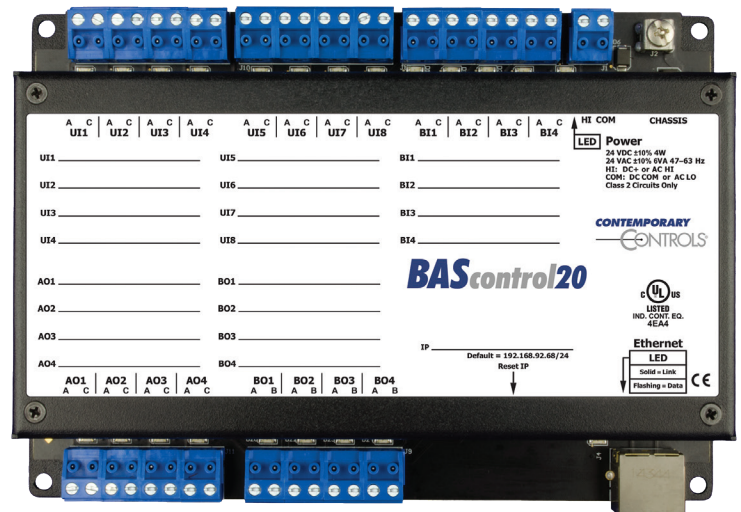
programming methodology of assembling components onto a wire sheet to create applications. The unit can be programmed using Niagara Workbench AX or a third-party Sedona programming tool such as Sedona Application Editor (SAE). Rugged design, low profile, and wide temperature operation make it suitable for indoor or outdoor use. To download the free Sedona Application Editor, visit: [www.ccontrols.com/sae](http://www.ccontrols.com/sae). For more information about Sedona, SAE, kits, components, and programming download the Sedona Reference Manual at: [www.ccontrols.com/sedona](http://www.ccontrols.com/sedona).

### Versatile Control Device — Unitary controller or remote Ethernet I/O

- BACnet/IP compliant with a B-ASC device profile
- Resident Sedona Virtual Machine (SVM)
- Programmable via Workbench AX or Sedona Editor
- Configurable with a common web browser
- Direct connection to Ethernet network
- NTP or manually-settable real-time clock
- COV subscriptions – 14 binary and 2 analog
- Outdoor temperature operation -40°C to +75°C

### Flexible Input/Output — 20-points of physical I/O

- Eight configurable universal inputs:  
Thermistor, resistance, analog voltage, binary input, pulse inputs (4 max)
- Four contact closure inputs
- Four analog voltage outputs
- Four relay or triac outputs (model specific)



BAScontrol20-R has four relay outputs

## BAScontrol20 — Overview

The BAScontrol20 utilizes a powerful 32-bit ARM7 processor with 512 kB of flash memory plus a 16 Mbit serial flash file system for storing configuration data and an application program.

By operating at the BACnet/IP level, the BAScontrol20 can share the same Ethernet network with supervisory controllers and operator workstations. The unit can be configured for a fixed IP address or can operate as a DHCP client receiving its IP address from a DHCP server. A real-time clock with a super-cap backup allows for creating local schedules.

A 10/100 Mbps Ethernet port supports protocols such as BACnet/IP, Sedona SOX, HTTP and FTP. Configuration of universal inputs and virtual points can be accomplished using web pages. Type II and type III 10 kΩ thermistor curves and a 20 kΩ thermistor curve are resident in the unit. Current inputs can be measured using external resistors. Contact closures require a voltage-free source. Binary inputs and outputs as well as analog outputs require no configuration. The unit is powered from either a 24VAC/VDC source.

### Universal Inputs

Eight input points can be configured — all discoverable as BACnet objects.

- Analog inputs: 0–10 VDC, 12-bit resolution, 0–20 mA (with external resistor)
- Temperature inputs: Type II or Type III 10 kΩ thermistors; 20 kΩ thermistor
- Resistance inputs: 1 kΩ to 100 kΩ
- Contact closure, voltage-free
- Pulse input accumulators (UI1–UI4): accommodates active or passive sources (40 Hz max)

### Binary Inputs

Four points of voltage-free contact closure

### Power Input

24 VAC/VDC 6 VA half-wave rectified allows power sharing with other half-wave devices.

### Earth

Optional Earth Connection

### Power LED

Indicates power applied

### IP Address

Fixed or DHCP client

### Ethernet LED

Lights on link and flashes with data



### Analog Outputs

0–10 V, 10-bit resolution

### Binary Outputs

Four form “A” relays  
30 VAC/VDC 2 A loads or  
four triacs 0.5A loads.  
Class 2 circuits only.

### Point LEDs

for all 20 Points

### Reset

to factory  
IP defaults

### Ethernet

10/100 Mbps Ethernet with auto-negotiation and Auto-MDIX. Protocols supported include HTTP, IP, UDP, TCP, BACnet/IP, NTP, DNS, DHCP, FTP and Sedona SOX.

## Web Page Configuration — Main Page and System

Access to the web pages is intended for the installer or skilled technicians. In order to access any of the web pages authentication is required. The default IP address is 192.68.92.68 and the default User Name and Password is admin/admin. Once on the main page, the System Configuration button can be clicked.

The main web page provides an overview of all real points plus access to other web pages. To configure a

point, click on the point and a configuration page will appear. To observe the updated data for each point, click Auto Refresh button to ON. Point values can be temporarily forced by checking the box adjacent to the point and entering a value into the point's text box (make sure Auto Refresh button is OFF). The value will remain forced until the box is unchecked or the unit power cycled. Care must be exercised when forcing values into points.

The screenshot displays the main web page of the BAScontrol20 system. It features four columns of points: Universal Inputs (UI1-UI8), Binary Inputs (BI1-BI4), Analog Outputs (AO1-AO4), and Binary Outputs (BO1-BO4). Each point has a text box for its value and a checkbox for forcing the value. The page also includes a navigation bar with buttons for System Config, System Status, Set Time, Virtual Points, Web Components, and Restart Controller. An Auto Refresh button is set to OFF. The page footer contains copyright information and a note about the GREEN label indicating points on the wire sheet.

**Universal Inputs**

|     |                   |          |                          |
|-----|-------------------|----------|--------------------------|
| UI1 | Space Temperature | 82.793°F | <input type="checkbox"/> |
| UI2 | Universal Input 2 | 0.009    | <input type="checkbox"/> |
| UI3 | Universal Input 3 | 0.001    | <input type="checkbox"/> |
| UI4 | Universal Input 4 | 0.000    | <input type="checkbox"/> |
| UI5 | Universal Input 5 | 0.000    | <input type="checkbox"/> |
| UI6 | Universal Input 6 | 0.003    | <input type="checkbox"/> |
| UI7 | Universal Input 7 | 0.000    | <input type="checkbox"/> |
| UI8 | Universal Input 8 | 0.001    | <input type="checkbox"/> |

**Binary Inputs**

|     |                |   |                          |
|-----|----------------|---|--------------------------|
| BI1 | Binary Input 1 | 0 | <input type="checkbox"/> |
| BI2 | Binary Input 2 | 0 | <input type="checkbox"/> |
| BI3 | Binary Input 3 | 0 | <input type="checkbox"/> |
| BI4 | Binary Input 4 | 0 | <input type="checkbox"/> |

**Analog Outputs**

|     |                 |       |                                     |
|-----|-----------------|-------|-------------------------------------|
| AO1 | Damper Control  | 8.534 | <input type="checkbox"/>            |
| AO2 | Analog Output 2 | 0     | <input checked="" type="checkbox"/> |
| AO3 | Analog Output 3 | 5.25  | <input checked="" type="checkbox"/> |
| AO4 | Analog Output 4 | 7.25  | <input checked="" type="checkbox"/> |

**Binary Outputs**

|     |                 |   |                                     |
|-----|-----------------|---|-------------------------------------|
| BO1 | Binary Output 1 | 0 | <input type="checkbox"/>            |
| BO2 | Fan             | 0 | <input checked="" type="checkbox"/> |
| BO3 | Binary Output 3 | 1 | <input type="checkbox"/>            |
| BO4 | Binary Output 4 | 1 | <input type="checkbox"/>            |

**BAScontrol20**

System Config System Status Set Time Virtual Points Web Components Restart Controller

Auto Refresh OFF

Copyright 2017 Contemporary Control Systems, Inc. All rights reserved.  
Firmware Revision 3.1 : Web Page Revision 6.1.4  
NOTE: A GREEN label indicates that the I/O point has been placed on the wire sheet.

The IP settings can be changed to the desired values. Either DHCP or a static IP address can be selected. If a static address is desired, enter the value along with the network mask and gateway address. If domain addresses are required, for using NTP enter in the Primary and Secondary DNS addresses.

BACnet device data must be entered when using BACnet. Make sure the Device Instance and Device Object Name are both unique over the complete BACnet Internetwork.

Either BACnet or Sedona protocols or both can be selected.

Authentication credentials can be changed from the default values.

The screenshot displays the IP Configuration and BACnet Device Configuration pages. The IP Configuration page includes fields for IP Mode (Static IP), IP Address (10.0.13.9), Netmask (255.255.240.0), Gateway (10.0.0.1), Primary DNS (8.8.8.8), and Secondary DNS (8.8.4.4). The BACnet Device Configuration page includes fields for Device Object Name (BAScontrol20), Device Instance (21309), UDP Port (47808), BBMD IP Address (0.0.0.0), and BBMD Reg Time (100). Below these fields is the Enable Protocol section with checkboxes for BACnet/IP, Sedona, and FTP. The Authentication section includes fields for User Name (admin) and Password (\*\*\*\*). A Close button and a Submit button are at the bottom. A note states: 'NOTE: You must click the Submit button to store any changes. Changes will not take effect until the controller has been restarted. You can restart the controller from the main page.'

**IP Configuration**

|               |               |
|---------------|---------------|
| IP Mode       | Static IP     |
| IP Address    | 10.0.13.9     |
| Netmask       | 255.255.240.0 |
| Gateway       | 10.0.0.1      |
| Primary DNS   | 8.8.8.8       |
| Secondary DNS | 8.8.4.4       |

**BACnet Device Configuration**

|                    |              |
|--------------------|--------------|
| Device Object Name | BAScontrol20 |
| Device Instance    | 21309        |
| UDP Port           | 47808        |
| BBMD IP Address    | 0.0.0.0      |
| BBMD Reg Time      | 100          |

**Enable Protocol**

BACnet/IP ☒  
Sedona ☒  
FTP ☐

**Authentication**

|           |       |
|-----------|-------|
| User Name | admin |
| Password  | ****  |

Close Submit

NOTE: You must click the Submit button to store any changes.  
Changes will not take effect until the controller has been restarted. You can restart the controller from the main page.



## Web Page Configuration — Channel, Time and Web Components

### BAS Channel Configuration

Channel Type Therm 10kT3

Temperature Offset -1.3

Temperature Units Fahrenheit

Out of Bounds Value 77

U11

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### BACnet Object Configuration

Object Instance 1

Object Name Space Temperature

Object Type Analog Input

Object Description Space Temperature

Units DEGREES\_FAHRENHEIT

COV Increment 0

Close
Submit

### System Time

Year 2017

Month May

Day 31

Hour 5 PM

Minute 16

Manual Time Set

Close

### NTP Configuration

☒ NTP Enabled

NTP Server pool.ntp.org

Time Zone Central-UTC-6

NTP Refresh (Days) 1

NTP Success

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### DST Configuration

☐ DST Enabled

DST ON

Month March

Day of Month 2nd SUN

Hour 2 AM

DST OFF

Month November

Day of Month 1st SUN

Hour 2 AM

Submit

The BAS Channel should be configured first. Universal inputs must first be defined which may lead to more requests for information. Once the BAS Channel is configured, the BACnet Object Configuration can be accomplished. Although the BACnet Object Instance is predefined, the Object Name can be entered and Units can be selected with the drop-down. The COV Increment can be specified for those channels intended for COV reporting by the BACnet client device.

Time and date can be set manually or with the help of a NTP server if access to the Internet is possible. Daylight Savings Time can also be supported. Manually-set time is backed up for seven days through the use of a super-cap in the event of power loss. If accessing an NTP server using domain names, make sure the DNS servers are specified in the System Configuration screen.

Separate web pages allow for the configuration of up to 48 web components. Web components provide a means to write and read data to and from Sedona wire sheets without the need of a Sedona or BACnet tool. A web component configured as a wire sheet input can have its input range restricted to minimum and maximum values eliminating the need to add limit detection within the wire sheet logic. Web components are ideal for simplified control logic configuration.

### Web Components

<PREV
NEXT>

|      | Description                | Value     | Wire Sheet | Min      | Max        |
|------|----------------------------|-----------|------------|----------|------------|
| WC01 | Space Temperature (SpcTmp) | 83.382370 | Output     |          |            |
| WC02 | Occupied Damper (OccDmp)   | 1.000000  | Output     |          |            |
| WC03 | Default Web Component 3    | 0.000000  | Input      | 0.000000 | 100.000000 |
| WC04 | Default Web Component 4    | 0.000000  | Input      | 0.000000 | 100.000000 |
| WC05 | Default Web Component 5    | 0.000000  | Input      | 0.000000 | 100.000000 |
| WC06 | Default Web Component 6    | 0.000000  | Input      | 0.000000 | 100.000000 |
| WC07 | Default Web Component 7    | 0.000000  | Input      | 0.000000 | 100.000000 |
| WC08 | Default Web Component 8    | 0.000000  | Input      | 0.000000 | 100.000000 |

Auto Refresh ON

NOTE: A GREEN label indicates that the component has been placed on the wire sheet.

Close
Submit

## Virtual Points

|  |   |   |
|--|---|---|
| Space Temperature Zone 1<br>VT01 83.187 <input type="checkbox"/> | Occupied State<br>VT09 0.000 <input type="checkbox"/>   | Virtual Point 17<br>VT17 0.000 <input type="checkbox"/> |
| Cooling Runtime in Hrs<br>VT02 0.000 <input type="checkbox"/>    | Virtual Point 10<br>VT10 0.000 <input type="checkbox"/> | Virtual Point 18<br>VT18 0.000 <input type="checkbox"/> |
| Virtual Point 3<br>VT03 0.000 <input type="checkbox"/>           | Virtual Point 11<br>VT11 0.000 <input type="checkbox"/> | Virtual Point 19<br>VT19 0.000 <input type="checkbox"/> |
| Virtual Point 4<br>VT04 0.000 <input type="checkbox"/>           | Virtual Point 12<br>VT12 0.000 <input type="checkbox"/> | Virtual Point 20<br>VT20 0.000 <input type="checkbox"/> |
| Virtual Point 5<br>VT05 0.000 <input type="checkbox"/>           | Virtual Point 13<br>VT13 0.000 <input type="checkbox"/> | Virtual Point 21<br>VT21 0.000 <input type="checkbox"/> |
| Virtual Point 6<br>VT06 0.000 <input type="checkbox"/>           | Virtual Point 14<br>VT14 0.000 <input type="checkbox"/> | Virtual Point 22<br>VT22 0.000 <input type="checkbox"/> |
| Virtual Point 7<br>VT07 0.000 <input type="checkbox"/>           | Virtual Point 15<br>VT15 0.000 <input type="checkbox"/> | Virtual Point 23<br>VT23 0.000 <input type="checkbox"/> |
| Virtual Point 8<br>VT08 0.000 <input type="checkbox"/>           | Virtual Point 16<br>VT16 0.000 <input type="checkbox"/> | Virtual Point 24<br>VT24 0.000 <input type="checkbox"/> |

Auto Refresh OFF

NOTES:

1. A **GREEN** label means that the virtual point has been placed on the wire sheet. The label hover text indicates if the point is configured as "Read from Wire Sheet" or "Write to Wire Sheet"
2. Values for virtual points VT01-VT08 are kept in persistent memory and will remain unchanged through resets and power cycles.

The 24 virtual points are viewable from a separate web page.

## System Status

|                             |                                  |                           |
|-----------------------------|----------------------------------|---------------------------|
| Firmware Revision<br>3.1.23 | MAC Address<br>00:50:DB:01:74:66 | Available Memory<br>27200 |
|-----------------------------|----------------------------------|---------------------------|

### System Message Log

```

BAScontrol20 : 3.1.23 : May 23 2017 : 09:00:51
Free memory: 98520
Watchdog timer enabled
Refreshing chn_data.xml...done
Low memory limit= 8192
Creating object name and instance mappings...done
Reading binary object data file...done
IP Addr: 10.0.13.9
IP Mask: 255.255.240.0
IP Gate: 10.0.0.1
Start Responder...OK

bacnet-ip : 3.1.23 : May 23 2017 : 09:00:34
SVM starting: 46304 bytes free
Running SVM in platform mode
Sedona VM 1.2.28
buildDate: May 23 2017 09:00:48
endian: little
blockSize: 4
refSize: 4
Network initialized
RTC Time: Wed May 31 15:51:11 2017
    
```

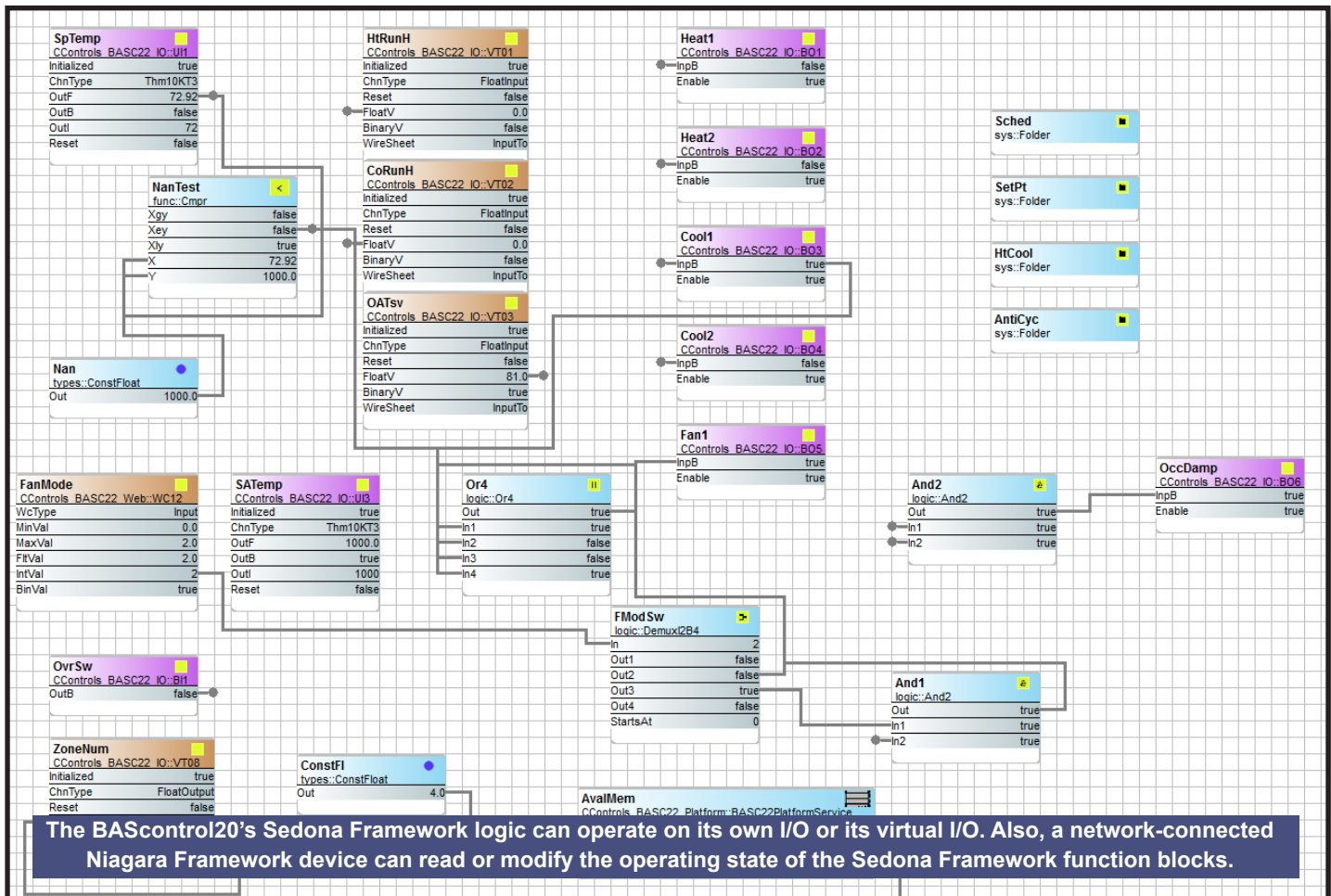
The System Status page provides information on the controller.

## Powered by a Sedona Virtual Machine — for Implementing Control

The BAScontrol20 incorporates Sedona Virtual Machine (SVM) technology developed by Tridium. Using Niagara Workbench AX or Contemporary Controls' Sedona Application Editor, a system integrator can develop a control application using Sedona's powerful drag-and-drop visual programming methodology. Once developed, the program remains stored in the BAScontrol20 and executes by way of the SVM. The application can run standalone in the BAScontrol20 or it can interact with a program in a Tridium JACE supervisory controller over Ethernet. The number of potential applications is only limited by the imagination of the systems integrator.

The BAScontrol20 includes Tridium's Sedona 1.2 kits of components — and Contemporary Controls' product-specific and non-product-specific kits. The BAScontrol20 IO Kit components provide 20 physical points, 24 virtual points and four retentive counters. The BAScontrol20 Web Kit has 48 components that share data with webpages. Input components receive data from hosted webpages. Output components send data to hosted webpages. The Contemporary Controls' Function kit provides additional components for increased flexibility.

**The free Sedona Application Editor, Workbench AX, or a third-party Sedona tool can be used to program Sedona applications running on the BAScontrol 20.**



## Contemporary Controls' Developed Sedona Components

### BAScontrol20 I/O Kit – BAScontrol20 platform specific components

|             |   |
|-------------|---|
| AO1 – AO4   | Analog output – analog voltage output point                                       |
| BI1 – BI4   | Binary input – binary input point   |
| BO1 – BO4   | Binary output – binary output point   |
| ScanTim     | Scan time monitor – records the min, max and average scan times                   |
| UI1 – UI4   | Universal input – binary, analog voltage, thermistor, resistance or accumulator   |
| UI5 – UI8   | Universal input – binary, analog voltage, thermistor or resistance                |
| UC1 – UC4   | Retentive universal counters – up/down retentive counters                         |
| VT01 – VT08 | Retentive virtual Points – share retentive wire sheet data with BACnet/IP clients |
| VT09 – VT24 | Virtual Points – share wire sheet data with BACnet/IP clients                     |

### BAScontrol20 Web Kit – BAScontrol20 platform specific components

|             |  |
|-------------|--|
| WC01 – WC48 | Web components – share wire sheet data with the BAScontrol20 web pages |
|-------------|--|

### Contemporary Controls Function Kit – Common to Sedona 1.2 compliant controllers

|         |  |
|---------|--|
| Cand2   | Two-input Boolean product – two-input AND/NAND gate with complementary outputs     |
| Cand4   | Four-input Boolean product – four-input AND/NAND gate with complementary outputs   |
| Cand6   | Six-input Boolean product – six-input AND/NAND gate with complementary outputs     |
| Cand8   | Eight-input Boolean product – eight-input AND/NAND gate with complementary outputs |
| Cmt     | Comment – comment field up to 64 characters  |
| Cor2    | Two-input Boolean sum – two-input OR/NOR gate with complementary outputs           |
| Cor4    | Four-input Boolean sum – four-input OR/NOR gate with complementary outputs         |
| Cor6    | Six-input Boolean sum – six-input OR/NOR gate with complementary outputs           |
| Cor8    | Eight-input Boolean sum – eight-input OR/NOR gate with complementary outputs       |
| CtoF    | °C to °F – Celsius to Fahrenheit Temperature Conversion                            |
| Dff     | “D” Flip-Flop – D-style Edge-triggered Single-bit Storage                          |
| FtoC    | °F to °C – Fahrenheit to Celsius Temperature Conversion                            |
| HLpre   | High – Low Preset – defined logical true and false states                          |
| PsychrE | Psychrometric Calculator – English Units   |
| PsychrS | Psychrometric Calculator – SI Units  |
| SCLatch | Set/Clear Latch – single-bit level-triggered single-bit data storage               |

## Tridium's Sedona 1.2 Components

|   |                         |  |
|---|-------------------------|--|
| The HVAC Group<br>operations that<br>facilitate control                               | <b>LSeq</b>             | Linear Sequencer — bar graph representation of input value   |
|   | <b>ReheatSeq</b>        | Reheat sequence — linear sequence up to four outputs   |
|   | <b>Reset</b>            | Reset — output scales an input range between two limits  |
|   | <b>Tstat</b>            | Thermostat — on/off temperature controller   |
| The Scheduling Group<br>scheduling operations<br>based upon time of day               | <b>DailySc</b>          | Daily Schedule Boolean — two-period Boolean scheduler  |
|   | <b>DailyS1</b>          | Daily Schedule Float — two-period float scheduler  |
|   | <b>DateTime</b>         | Time of Day — time, day, month, year   |
|   | <b>Cmpr</b>             | Comparison math — comparison ( $\leq$ , $\geq$ ) of two floats                                     |
|   | <b>Count</b>            | Integer counter — up/down counter with integer output  |
|   | <b>Freq</b>             | Pulse frequency — calculates the input pulse frequency   |
|   | <b>Hysteresis</b>       | Hysteresis — setting on/off trip points to an input variable                                       |
|   | <b>IRamp</b>            | IRamp — generates a repeating triangular wave with an integer output                               |
|   | <b>Limiter</b>          | Limiter — Restricts output within upper and lower bounds   |
|   | <b>Linearize</b>        | Linearize — piecewise linearization of a float   |
|   | <b>LP</b>               | LP — proportional, integral, derivative (PID) loop controller                                      |
|   | <b>Ramp</b>             | Ramp — generates a repeating triangular or sawtooth wave with a float output                       |
|   | <b>SRLatch</b>          | Set/Reset Latch — single-bit data storage  |
|   | <b>TickTock</b>         | Ticking clock — an astable oscillator used as a time base  |
|   | <b>UpDn</b>             | Float counter — up/down counter with float output  |
| The Priority Group<br>prioritizing actions of Boolean,<br>Float and Integer variables | <b>PrioritizedBool</b>  | Prioritized boolean output — highest of sixteen inputs   |
|   | <b>PrioritizedFloat</b> | Prioritized float output — highest of sixteen inputs   |
|   | <b>PrioritizedInt</b>   | Prioritized integer output — highest of sixteen inputs   |
|   | <b>B2F</b>              | Binary to float encoder — 16-bit binary to float conversion  |
|   | <b>ConstBool</b>        | Boolean constant — a predefined Boolean value  |
|   | <b>ConstFloat</b>       | Float constant — a predefined float variable   |
|   | <b>ConstInt</b>         | Integer constant — a predefined integer variable   |
|   | <b>F2B</b>              | Float to binary decoder — float to 16-bit binary conversion  |
|   | <b>F2I</b>              | Float to integer — float to integer conversion   |
|   | <b>I2F</b>              | Integer to float — integer to float conversion   |
|   | <b>L2F</b>              | Long to float — long integer to float conversion   |
|   | <b>WriteBool</b>        | Write Boolean — setting a writable Boolean value   |
|   | <b>WriteFloat</b>       | Write Float — setting a writable float value   |
|   | <b>WriteInt</b>         | Write integer — setting an integer value   |
|   | <b>ADemux2</b>          | Analog Demux — Single-input, two-output analog de-multiplexer                                      |
|   | <b>And2</b>             | Two-input Boolean product — two-input AND gate   |
|   | <b>And4</b>             | Four-input Boolean product — four-input AND gate   |
|   | <b>ASW</b>              | Analog switch — selection between two float variables  |
|   | <b>ASW4</b>             | Analog switch — selection between four floats  |
|   | <b>B2P</b>              | Binary to pulse — simple mono-stable oscillator (single-shot)                                      |
|   | <b>BSW</b>              | Boolean switch — selection between two Boolean variables   |
|   | <b>DemuxI2B4</b>        | Four-output Demux — integer to Boolean de-multiplexer  |
|   | <b>ISW</b>              | Integer switch — selection between two integer variables   |
|   | <b>Not</b>              | Not — inverts the state of a Boolean   |
|   | <b>Or2</b>              | Two-input Boolean sum — two-input OR gate  |
|   | <b>Or4</b>              | Four-input Boolean sum — four-input OR gate  |
|   | <b>Xor</b>              | Two-input exclusive Boolean sum — two-input XOR gate   |
|   | <b>DlyOff</b>           | Off delay timer — time delay from a “true” to “false” transition of the input                      |
|   | <b>DlyOn</b>            | On delay timer — time delay from an “false” to “true” transition of the input                      |
|   | <b>OneShot</b>          | Single Shot — provides an adjustable pulse width to an input transition                            |
|   | <b>Timer</b>            | Timer — countdown timer  |
|   | <b>Add2</b>             | Two-input addition — results in the addition of two floats   |
|   | <b>Add4</b>             | Four-input addition — results in the addition of four floats                                       |
|   | <b>Avg10</b>            | Average of 10 — sums the last ten floats while dividing by ten thereby providing a running average |
|   | <b>AvgN</b>             | Average of N — sums the last N floats while dividing by N thereby providing a running average      |
|   | <b>Div2</b>             | Divide two — results in the division of two float variables  |
|   | <b>FloatOffset</b>      | Float offset — float shifted by a fixed amount   |
|   | <b>Max</b>              | Maximum selector — selects the greater of two inputs   |
|   | <b>Min</b>              | Minimum selector — selects the lesser of two inputs  |
|   | <b>MinMax</b>           | Min/Max detector — records both the maximum and minimum values of a float                          |
|   | <b>Mul2</b>             | Multiply two — results in the multiplication of two floats   |
|   | <b>Mul4</b>             | Multiply four — results in the multiplication of four floats                                       |
|   | <b>Neg</b>              | Negate — changes the sign of a float   |
|   | <b>Round</b>            | Round — rounds a float to the nearest N places   |
|   | <b>Sub2</b>             | Subtract two — results in the subtraction of two floats  |
|   | <b>Sub4</b>             | Subtract four — results in the subtraction of four floats  |
|   | <b>TimeAvg</b>          | Time average — average value of float over time  |



## BACnet Protocol Implementation Conformance (PIC) Statement

**BAScontrol20**

BACnet/IP Sedona Field Controller

**BACnet Protocol Implementation Conformance Statement (Annex A)**

**Date:** August 29, 2016  
**Vendor Name:** Contemporary Controls  
**Product Name:** BAScontrol20  
**Product Model Number:** BASC-20R and BASC-20T  
**Applications Software Version:** 1.2.28      **Firmware Revision:** 3.1.2      **BACnet Protocol Revision:** 3  
**Product Description:** BACnet/IP compliant 20-point field controller or remote I/O that allows a direct connection to Ethernet without the need of a BACnet router.

**BACnet Standardized Device Profile (Annex L):**

- ☐ BACnet Operator Workstation (B-OWS)      ☒ BACnet Application Specific Controller (B-ASC)  
☐ BACnet Building Controller (B-BC)      ☐ BACnet Smart Sensor (B-SS)  
☐ BACnet Advanced Application Controller (B-AAC)      ☐ BACnet Smart Actuator (B-SA)

**List all BACnet Interoperability Building Block Supported (Annex K):**

DS-RP-B Data Sharing — ReadProperty — B      DM-DDB-B Device Management — Dynamic Device Binding — B  
 DS-WP-B Data Sharing — WriteProperty — B      DM-DOB-B Device Management — Dynamic Object Binding — B  
 DS-RPM-B Data Sharing — ReadPropertyMultiple — B      DM-DCC-B Device Management — Device Communication Control — B  
 DS-COV-B Data Sharing — ChangeOfValue — B      DM-TS-B Device Management — Time Synchronization — B

**Segmentation Capability:**

- ☐ Able to transmit segmented messages      Window Size:  
☐ Able to receive segmented messages      Window Size:

**Standard Object Types Supported:**

| Object Type Supported | Can Be Created Dynamically | Can Be Deleted Dynamically |
|-----------------------|----------------------------|----------------------------|
| Analog Input          | No                         | No                         |
| Analog Output         | No                         | No                         |
| Analog Value          | No                         | No                         |
| Binary Input          | No                         | No                         |
| Binary Output         | No                         | No                         |
| Binary Value          | No                         | No                         |
| Device                | No                         | No                         |

No optional properties are supported.

**Data Link Layer Options:**

- ☒ BACnet IP, (Annex J)      ☐ MS/TP slave (Clause 9), baud rate(s):  
☒ BACnet IP, (Annex J), Foreign Device      ☐ Point-To-Point, EIA 232 (Clause 10), baud rate(s):  
☐ ISO 8802-3, Ethernet (Clause 7)      ☐ Point-To-Point, modem, (Clause 10), baud rate(s):  
☐ ANSI/ATA 878.1, EIA-485 ARCNET (Clause 8), baud rate(s):      ☐ LonTalk, (Clause 11), medium:  
☐ MS/TP master (Clause 9), baud rate(s):      ☐ Other:

**Device Address Binding:**

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.) ☐ Yes      ☒ No

**Networking Options:**

- ☐ Router, Clause 6 — List all routing configurations, e.g., ARCNET-Ethernet-MS/TP, etc.  
☐ Annex H, BACnet Tunnelling Router over IP  
☐ BACnet/IP Broadcast Management Device (BBMD)  
 Does the BBMD support registrations by Foreign Devices? ☐ Yes      ☐ No

**Character Sets Supported:**

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

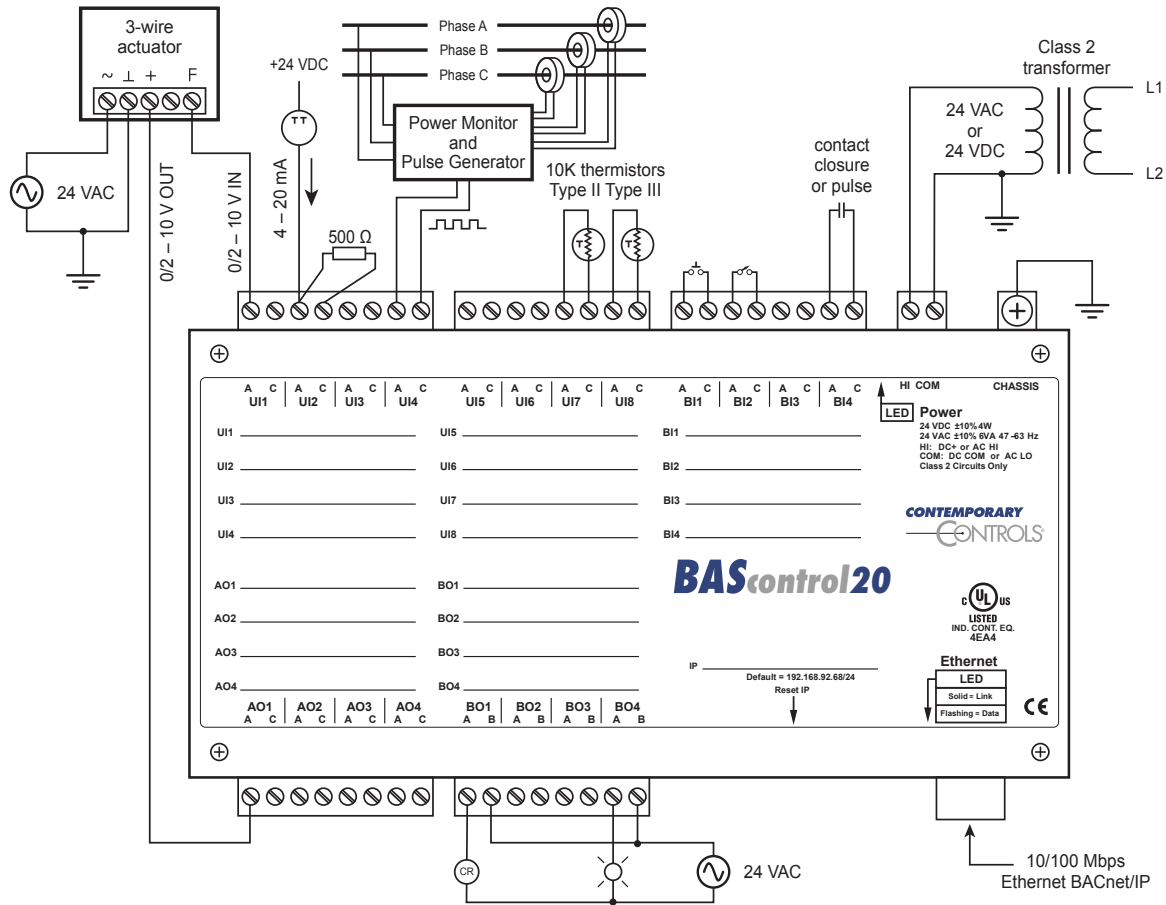
- ☒ ANSI X3.4      ☐ IBM™/Microsoft™ DBCS      ☐ ISO 8859-1  
☐ ISO 10646 (UCS-2)      ☐ ISO 10646 (UCS-4)      ☐ JIS C 6226

**If this product is a communication gateway, describe the types of non-BACnet equipment/network(s) that the gateway supports:**  
 No gateway support.

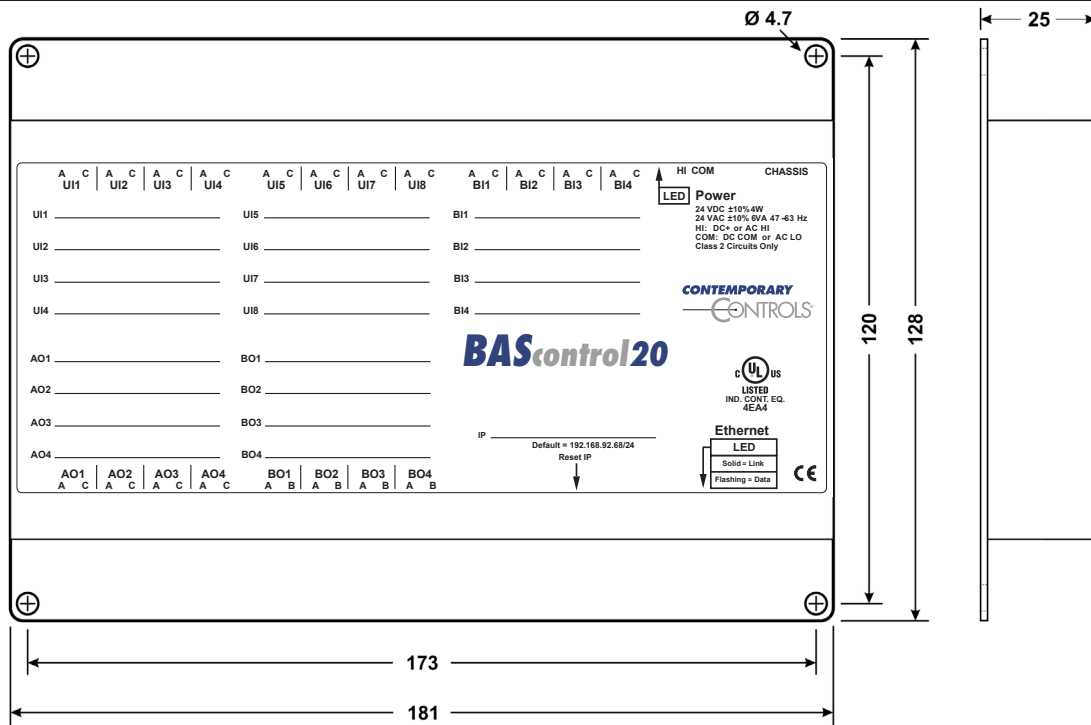
August 29, 2016

PI-BASC2000-AA1

## Wiring Diagram



## Dimensions (all dimensions are in mm)



## Specifications

### Universal Inputs (Points UI1 through UI8 )

| <b>Configured As</b>         | <b>Characteristics</b>   |
|------------------------------|--|
| Analog input                 | 0–10 VDC or 0–20 mA (with external resistor).<br>Input impedance 1 MΩ on voltage.  |
| Temperature input            | Type II 10 kΩ thermistors: –10° to +190 °F (–23.3° to +87.8°C)<br>Type III 10 kΩ thermistors: –15° to +200 °F (–26.1° to +93.3°C)<br>20 kΩ thermistors: 15° to 215° F (–9° to +101° C)                     |
| Contact closure input        | Excitation current 0.5 mA. Open circuit voltage 12 VDC.<br>Sensing threshold 3 VDC (low) and 7 VDC (high). Response time 20 ms.  |
| Pulse input (Points UI1–UI4) | 0–10 VDC for active output devices<br>0–12 VDC for passive devices (configured for internal pull-up resistor)<br>40 Hz maximum input frequency with 50% duty cycle.<br>Adjustable high and low thresholds. |
| Resistance                   | 1 kΩ -100 kΩ range   |

### Binary Inputs (Points BI1 through BI4)

|                 |   |
|-----------------|---|
| Contact closure | Excitation current 1.2 mA. Open circuit voltage 12 VDC<br>Sensing threshold 3 VDC (low) and 7 VDC (high). Response time 20 ms |
|-----------------|---|

### Analog Outputs (Points AO1 through AO4)

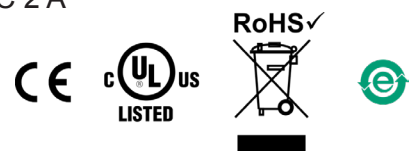
|               |   |
|---------------|---|
| Analog output | 0–10 VDC. 10-bit resolution. 4 mA maximum |
|---------------|---|

### Binary Outputs (Points BO1 through BO4) (Class 2 circuits only — requires external power source)

|                |  |
|----------------|--|
| Model BASC-20R | Normally open relay contacts. 30 VAC/VDC 2 A |
| Model BASC-20T | Isolated triacs. 30 VAC 0.5 A                |

### Regulatory Compliance

CE Mark; CFR 47, Part 15 Class A; RoHS  
UL 508, C22.2 No. 142-M1987



### Functional

|                     |   |
|---------------------|---|
| Compliance          | IEEE 802.3  |
| Protocols supported | BACnet/IP, Sedona SOX, HTTP and FTP               |
| Data rate           | 10 Mbps, 100 Mbps                                 |
| Physical layer      | 10BASE-T, 100BASE-TX                              |
| Cable length        | 100 m (max)                                       |
| Port connector      | Shielded RJ-45                                    |
| LED                 | Green = Link established<br>Flash = Link activity |

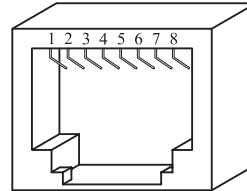
### Electrical

| <i>Input (DC or AC)</i> | <i>DC</i> | <i>AC</i> |
|-------------------------|-----------|-----------|
| Voltage (V, ± 10%)      | 24        | 24        |
| Power                   | 4 W       | 6 VA      |
| Frequency               | N/A       | 47–63 Hz  |

## Specifications (continued)

### Environmental/Mechanical

|                       |                       |
|-----------------------|-----------------------|
| Operating temperature | -40°C to +75°C        |
| Storage temperature   | -40°C to +85°C        |
| Relative humidity     | 10–95%, noncondensing |
| Protection            | IP30                  |
| Weight                | 0.6 lbs. (.27 kg)     |



### RJ-45 Pin Assignments

10BASE-T/100BASE-TX

| Terminal   | Usage    |
|------------|----------|
| 1          | TD +     |
| 2          | TD –     |
| 3          | RD +     |
| 6          | RD –     |
| Other pins | Not Used |

### Electromagnetic Compatibility

| Standard        | Test Method   | Description                  | Test Levels                       |
|-----------------|---------------|------------------------------|-----------------------------------|
| EN 55024        | EN 61000-4-2  | Electrostatic Discharge      | 6 kV contact & 8 kV air           |
| EN 55024        | EN 61000-4-3  | Radiated Immunity            | 10 V/m, 80 MHz to 1 GHz           |
| EN 55024        | EN 61000-4-4  | Fast Transient Burst         | 1 kV clamp & 2 kV direct          |
| EN 55024        | EN 61000-4-5  | Voltage Surge                | 2 kV L-L & 2 kV L-Earth           |
| EN 55024        | EN 61000-4-6  | Conducted Immunity           | 10 Volts (rms)                    |
| EN 55024        | EN 61000-4-11 | Voltage Dips & Interruptions | 1 Line Cycle, 1 to 5 s @ 100% dip |
| EN 55022        | CISPR 22      | Radiated Emissions           | Class A                           |
| EN 55022        | CISPR 22      | Conducted Emissions          | Class B                           |
| CFR 47, Part 15 | ANSI C63-4    | Radiated Emissions           | Class A                           |

## Ordering Information

| Model    | Description   |
|----------|---|
| BASC-20R | BAScontrol with 20 I/O points, includes 4 relay outputs |
| BASC-20T | BAScontrol with 20 I/O points, includes 4 triac outputs |

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